7 Technical Appendices

Appendix A: Wildlife Species and Associated Habitat types in the Methow subbasin Washington (IBIS 2003)

Table 58 Wildlife Species and Associated Habitat types in the Methow subbasin Washington

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
American Badger	American Avocet	American Badger	Great Blue Heron
American Beaver	American Badger	American Beaver	Tundra Swan
American Crow	American Crow	American Crow	American Wigeon
American Goldfinch	American Goldfinch	American Dipper	Blue-winged Teal
American Kestrel	American Kestrel	American Goldfinch	Cinnamon Teal
American Marten	American Robin	American Kestrel	Swainson's Hawk
American Robin	Bank Swallow	American Marten	Red-tailed Hawk
Bald Eagel		Bald Eagle	
Bank Swallow	Barn Owl	American Redstart	Gray Partridge
Barn Swallow	Barn Swallow	American Robin	Ring-necked Pheasant
Barred Owl	Barrow's Goldeneye	American Tree Sparrow	Killdeer
Big Brown Bat	Big Brown Bat	American Wigeon	Solitary Sandpiper
Black Bear	Black Bear	Bank Swallow	Long-billed Curlew
Black Swift	Black-billed Magpie	Barn Owl	Long-billed Dowitcher
Black-backed Woodpecker	Black-chinned Hummingbird	Barn Swallow	Wilson's Snipe
Black-billed Magpie	Black-tailed Jackrabbit	Barred Owl	Rock Dove
Black-capped Chickadee	Black-throated Sparrow	Belted Kingfisher	Mourning Dove
Black-chinned Hummingbird	Blue Grouse	Big Brown Bat	Barn Owl
Black-headed Grosbeak	Bobcat	Black Bear	Short-eared Owl
Black-throated Gray Warbler	Brewer's Blackbird	Black Swift	Loggerhead Shrike
Blue Grouse	Brewer's Sparrow	Black-backed Woodpecker	Northern Shrike
Bobcat	Brown-headed Cowbird	Black-billed Magpie	Black-billed Magpie
Brewer's Blackbird	Bullfrog	Black-capped Chickadee	American Crow
Brewer's Sparrow	Burrowing Owl	Black-chinned Hummingbird	Barn Swallow
Brown Creeper	Bushy-tailed Woodrat	Black-crowned Night-heron	European Starling

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
Brown-headed Cowbird	California Myotis	Black-headed Grosbeak	American Pipit
Bullfrog	California Quail	Black-throated Gray Warbler	Vesper Sparrow
Bushy-tailed Woodrat	Canada Goose	Blue Grouse	Savannah Sparrow
California Myotis	Canyon Wren	Bobcat	Grasshopper Sparrow
California Quail	Chipping Sparrow	Bobolink	Lazuli Bunting
Calliope Hummingbird	Chukar	Bohemian Waxwing	Bobolink
Canyon Wren	Cliff Swallow	Brewer's Blackbird	Western Meadowlark
Cascade Golden-mantled Ground Squirrel	Columbia Spotted Frog	Brown Creeper	Brewer's Blackbird
Cassin's Finch	Columbian Ground Squirrel	Brown-headed Cowbird	Brown-headed Cowbird
Cassin's Vireo	Common Garter Snake	Bullfrog	House Finch
Cedar Waxwing	Common Nighthawk	Bullock's Oriole	House Sparrow
Chipping Sparrow	Common Poorwill	Bushy-tailed Woodrat	Virginia Opossum
Clark's Nutcracker	Common Porcupine	California Myotis	Big Brown Bat
Cliff Swallow	Common Raven	California Quail	Eastern Fox Squirrel
Coast Mole	Cooper's Hawk	Calliope Hummingbird	Northern Pocket Gopher
Columbia Spotted Frog	Coyote	Canada Goose	Deer Mouse
Columbian Ground Squirrel	Deer Mouse	Canyon Wren	Bushy-tailed Woodrat
Common Garter Snake	Eastern Kingbird	Cascades Frog	Montane Vole
Common Nighthawk	European Starling	Cassin's Finch	House Mouse
Common Poorwill	Fringed Myotis	Cassin's Vireo	Raccoon
Common Porcupine	Golden Eagle	Cedar Waxwing	
Common Raven	Golden-mantled Ground Squirrel	Chipping Sparrow	
Cooper's Hawk	Gopher Snake	Chukar	
Coyote	Grasshopper Sparrow	Cliff Swallow	
Dark-eyed Junco	Gray Flycatcher	Coast Mole	
Deer Mouse	Gray Partridge	Columbia Spotted Frog	
Douglas' Squirrel	Great Basin Pocket Mouse	Columbian Ground Squirrel	
Downy Woodpecker	Great Basin Spadefoot	Columbian Mouse	
Dusky Flycatcher	Great Horned Owl	Common Garter Snake	

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
Eastern Kingbird	Greater Yellowlegs	Common Merganser	
Ermine	Hoary Bat	Common Nighthawk	
European Starling	Horned Lark	Common Porcupine	
Evening Grosbeak	Killdeer	Common Raven	
Fisher	Lark Sparrow	Common Redpoll	
Flammulated Owl	Least Chipmunk	Common Yellowthroat	
Fox Sparrow	Lesser Yellowlegs	Cooper's Hawk	
Fringed Myotis	Little Brown Myotis	Cordilleran Flycatcher	
Golden Eagle	Loggerhead Shrike	Coyote	
Golden-crowned Kinglet	Long-billed Curlew	Creeping Vole	
Golden-mantled Ground Squirrel	Long-eared Myotis	Dark-eyed Junco	
Gopher Snake	Long-eared Owl	Deer Mouse	
Gray Flycatcher	Long-legged Myotis	Downy Woodpecker	
Gray Jay	Long-tailed Vole	Dusky Flycatcher	
Gray Wolf	Long-tailed Weasel	Eastern Fox Squirrel	
Great Basin Spadefoot	Long-toed Salamander	Eastern Kingbird	
Great Gray Owl	Mallard	Ermine	
Great Horned Owl	Merriam's Shrew	European Starling	
Grizzly Bear	Mink	Evening Grosbeak	
Hairy Woodpecker	Montane Vole	Fisher	
Hammond's Flycatcher	Mountain Bluebird	Flammulated Owl	
Hermit Thrush	Mourning Dove	Fox Sparrow	
Hoary Bat	Mule Deer	Fringed Myotis	
House Finch	Nashville Warbler	Golden Eagle	
House Wren	Night Snake	Golden-crowned Kinglet	
Killdeer	Northern Flicker	Golden-mantled Ground Squirrel	
Lark Sparrow	Northern Goshawk	Gopher Snake	
Lazuli Bunting	Northern Grasshopper Mouse	Gray Catbird	
Least Chipmunk	Northern Harrier	Gray Jay	
Lewis's Woodpecker	Northern Pocket Gopher	Great Basin Spadefoot	

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
Little Brown Myotis	Northern Rough-winged Swallow	Great Blue Heron	
Long-eared Myotis	Northern Shrike	Great Horned Owl	
Long-eared Owl	Nuttall's (Mountain) Cottontail	Greater Yellowlegs	
Long-legged Myotis	Orange-crowned Warbler	Green-winged Teal	
Long-tailed Vole	Osprey	Grizzly Bear	
Long-tailed Weasel	Pacific Chorus (Tree) Frog	Hairy Woodpecker	
Long-toed Salamander	Painted Turtle	Harlequin Duck	
Macgillivray's Warbler	Pallid Bat	Heather Vole	
Masked Shrew	Prairie Falcon	Hermit Thrush	
Mink	Racer	Hoary Bat	
Montane Vole	Red-tailed Hawk	Hooded Merganser	
Mountain Bluebird	Ring-necked Pheasant	House Finch	
Mountain Chickadee	Rock Dove	House Wren	
Mountain Lion	Rock Wren	Killdeer	
Mourning Dove	Rocky Mountain Elk	Lazuli Bunting	
Mule Deer	Rough-legged Hawk	Least Chipmunk	
Nashville Warbler	Rough-skinned Newt	Lesser Yellowlegs	
Night Snake	Rubber Boa	Lewis's Woodpecker	
Northern Alligator Lizard	Sage Sparrow	Lincoln's Sparrow	
Northern Flicker	Sage Thrasher	Little Brown Myotis	
Northern Flying Squirrel	Sagebrush Lizard	Long-eared Myotis	
Northern Goshawk	Sagebrush Vole	Long-eared Owl	
Northern Pocket Gopher	Savannah Sparrow	Long-legged Myotis	
Northern Pygmy-owl	Say's Phoebe	Long-tailed Vole	
Northern Rough-winged Swallow	Sharp-shinned Hawk	Long-tailed Weasel	
Northern Saw-whet Owl	Sharp-tailed Grouse	Long-toed Salamander	
Northern Spotted Owl		Northern Spotted Owl	
Olive-sided Flycatcher	Short-eared Owl	Macgillivray's Warbler	
Orange-crowned Warbler	Short-horned Lizard	Mallard	
Osprey	Side-blotched Lizard	Masked Shrew	
Pacific Chorus (Tree) Frog	Snow Bunting	Meadow Vole	

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
Pacific Jumping Mouse	Solitary Sandpiper	Mink	
Painted Turtle	Spotted Bat	Montane Shrew	
Pallid Bat	Spotted Sandpiper	Montane Vole	
Pileated Woodpecker	Striped Whipsnake	Moose	
Pine Siskin	Swainson's Hawk	Mountain Bluebird	
Prairie Falcon	Tiger Salamander	Mountain Chickadee	
Pygmy Nuthatch	Townsend's Big-eared Bat	Mountain Lion	
Racer	Townsend's Solitaire	Mourning Dove	
Red Crossbill	Turkey Vulture	Mule Deer	
Red Fox	Vagrant Shrew	Muskrat	
Red Squirrel	Vesper Sparrow	Nashville Warbler	
Red-breasted Nuthatch	Washington Ground Squirrel	Northern Alligator Lizard	
Red-breasted Sapsucker	Western Fence Lizard	Northern Flicker	
Red-naped Sapsucker	Western Harvest Mouse	Northern Flying Squirrel	
Red-tailed Hawk	Western Kingbird	Northern Goshawk	
Ring-necked Pheasant	Western Meadowlark	Northern Harrier	
Rock Wren	Western Pipistrelle	Northern Pocket Gopher	
Rocky Mountain Elk	Western Rattlesnake	Northern Pygmy-owl	
Rough-legged Hawk	Western Skink	Northern River Otter	
Rough-skinned Newt	Western Small-footed Myotis	Northern Rough-winged Swallow	
Rubber Boa	Western Terrestrial Garter Snake	Northern Saw-whet Owl	
Ruby-crowned Kinglet	Western Toad	Northern Waterthrush	
Ruffed Grouse	White-crowned Sparrow	Olive-sided Flycatcher	
Rufous Hummingbird	White-tailed Jackrabbit	Orange-crowned Warbler	
Sagebrush Lizard	White-throated Swift	Osprey	
Say's Phoebe	Yellow-bellied Marmot	Pacific Chorus (Tree) Frog	
Sharp-shinned Hawk	Yuma Myotis	Pacific Jumping Mouse	
Sharp-tail Snake		Pacific Water Shrew	
Short-horned Lizard		Painted Turtle	
Silver-haired Bat		Pallid Bat	
Snowshoe Hare		Pied-billed Grebe	

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
Song Sparrow		Pileated Woodpecker	
Spotted Bat		Pine Siskin	
		Prairie Falcon	
Spotted Towhee		Pygmy Nuthatch	
Steller's Jay		Raccoon	
Striped Skunk		Racer	
Striped Whipsnake		Red Crossbill	
Tailed Frog		Red Fox	
Three-toed Woodpecker		Red-breasted Nuthatch	
Tiger Salamander		Red-breasted Sapsucker	
Townsend's Big-eared Bat		Red-eyed Vireo	
Townsend's Solitaire		Red-naped Sapsucker	
Townsend's Warbler		Red-tailed Hawk	
Tree Swallow		Red-winged Blackbird	
Trowbridge's Shrew		Ring-necked Duck	
Turkey Vulture		Ring-necked Pheasant	
Vagrant Shrew		Rocky Mountain Elk	
Varied Thrush		Rough-legged Hawk	
Vaux's Swift		Rough-skinned Newt	
Violet-green Swallow		Rubber Boa	
Warbling Vireo		Ruby-crowned Kinglet	
Western Bluebird		Ruffed Grouse	
Western Fence Lizard		Rufous Hummingbird	
Western Gray Squirrel		Savannah Sparrow	
Western Jumping Mouse		Say's Phoebe	
Western Kingbird		Sharp-tail Snake	
Western Pipistrelle		Sharp-tailed Grouse	
Western Rattlesnake		Shrew-mole	
Western Screech-owl		Silver-haired Bat	
Western Skink		Snowshoe Hare	
Western Small-footed Myotis		Solitary Sandpiper	
Western Tanager		Song Sparrow	

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
Western Terrestrial Garter Snake		Southern Red-backed Vole	
Western Toad		Spotted Bat	
Western Wood-pewee		Spotted Sandpiper	
White-breasted Nuthatch		Spotted Towhee	
White-crowned Sparrow		Steller's Jay	
White-headed Woodpecker		Striped Skunk	
White-throated Swift		Swainson's Hawk	
Wild Turkey		Swainson's Thrush	
Williamson's Sapsucker		Tailed Frog	
Willow Flycatcher		Three-toed Woodpecker	
Wilson's Warbler		Tiger Salamander	
Yellow-bellied Marmot		Townsend's Big-eared Bat	
Yellow-pine Chipmunk		Townsend's Solitaire	
Yellow-rumped Warbler		Townsend's Warbler	
Yuma Myotis		Tree Swallow	
		Trowbridge's Shrew	
		Turkey Vulture	
		Vagrant Shrew	
		Vaux's Swift	
		Veery	
		Violet-green Swallow	
		Virginia Opossum	
		Warbling Vireo	
		Water Shrew	
		Water Vole	
		Western Bluebird	
		Western Harvest Mouse	
		Western Jumping Mouse	
		Western Pipistrelle	
		Western Rattlesnake	
		Western Screech-owl	

Ponderosa Pine	Shrubsteppe	Riparian Wetlands	Agriculture
		Western Small-footed Myotis	
		Western Tanager	
		Western Terrestrial Garter Snake	
		Western Toad	
		Western Wood-pewee	
		White-breasted Nuthatch	
		White-crowned Sparrow	
		White-headed Woodpecker	
		White-tailed Jackrabbit	
		White-throated Swift	
		Wild Turkey	
		Williamson's Sapsucker	
		Willow Flycatcher	
		Wilson's Warbler	
		Winter Wren	
		Wood Duck	
		Yellow Warbler	
		Yellow-bellied Marmot	
		Yellow-breasted Chat	
		Yellow-pine Chipmunk	
		Yellow-rumped Warbler	
		Yuma Myotis	

(IBIS 2003)

Appendix B: Wildlife Species, Aquatic Habitat and Salmonid Associations in the Methow subbasin

Table 59 Wildlife Species, Aquatic Habitat and Salmonid Associations in the Methow subbasin

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
Amphibians					
	Tiger Salamander	*Ambystoma tigrinum*		1	
	Long-toed Salamander	*Ambystoma macrodactylum*		1	
	Pacific Giant Salamander	*Dicamptodon tenebrosus*	1		
	Rough-skinned Newt	*Taricha granulosa*			1
	Tailed Frog	*Ascaphus truei*		1	
	Great Basin Spadefoot	*Scaphiopus intermontanus*		1	
	Western Toad	*Bufo boreas*		1	
	Pacific Chorus (Tree) Frog	*Pseudacris regilla*		1	
	Cascades Frog	*Rana cascadae*			
	Columbia Spotted Frog	*Rana luteiventris*		1	
	Bullfrog	*Rana catesbeiana*		1	
	Total Amphibians:	11 Total:	1	8	1
Birds					
	Common Loon	*Gavia immer*	1		1
	Pied-billed Grebe	*Podilymbus podiceps*	1		1
	Red-necked Grebe	*Podiceps grisegena*	1		1
	Eared Grebe	*Podiceps nigricollis*			1
	American Bittern	*Botaurus lentiginosus*			1
	Great Blue Heron	*Ardea herodias*	1	1	

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Black-crowned Night-heron	*Nycticorax nycticorax*	1	1	
	Turkey Vulture	*Cathartes aura*	1		
	Canada Goose	*Branta canadensis*			1
	Tundra Swan	*Cygnus columbianus*			
	Wood Duck	*Aix sponsa*		1	
	Gadwall	*Anas strepera*			1
	American Wigeon	*Anas americana*			1
	Mallard	*Anas platyrhynchos*	1	1	
	Blue-winged Teal	*Anas discors*			1
	Cinnamon Teal	*Anas cyanoptera*			1
	Northern Shoveler	*Anas clypeata*			1
	Northern Pintail	*Anas acuta*			1
	Green-winged Teal	*Anas crecca*	1		1
	Canvasback	*Aythya valisineria*	1		1
	Redhead	*Aythya americana*			1
	Ring-necked Duck	*Aythya collaris*			
	Greater Scaup	*Aythya marila*	1		
	Harlequin Duck	*Histrionicus histrionicus*	1	1	
	Barrow's Goldeneye	*Bucephala islandica*	1		
	Hooded Merganser	*Lophodytes cucullatus*	1	1	
	Common Merganser	*Mergus merganser*	1	1	
	Ruddy Duck	*Oxyura jamaicensis*			1
	Osprey	*Pandion haliaetus*	1		

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Northern Harrier	*Circus cyaneus*			
	Sharp-shinned Hawk	*Accipiter striatus*			
	Cooper's Hawk	*Accipiter cooperii*			
	Northern Goshawk	*Accipiter gentilis*			
	Swainson's Hawk	*Buteo swainsoni*			
	Red-tailed Hawk	*Buteo jamaicensis*	1		
	Rough-legged Hawk	*Buteo lagopus*			
	Golden Eagle	*Aquila chrysaetos*	1		
	American Kestrel	*Falco sparverius*			
	Gyrfalcon	*Falco rusticolus*	1		
	Prairie Falcon	*Falco mexicanus*			
	Chukar	*Alectoris chukar*			
	Gray Partridge	*Perdix perdix*			
	Ring-necked Pheasant	*Phasianus colchicus*		1	
	Ruffed Grouse	*Bonasa umbellus*		1	
	Spruce Grouse	*Falcipennis canadensis*			
	White-tailed Ptarmigan	*Lagopus leucurus*			
	Blue Grouse	*Dendragapus obscurus*		1	
	Sharp-tailed Grouse	*Tympanuchus phasianellus*		1	
	Wild Turkey	*Meleagris gallopavo*			
	California Quail	*Callipepla californica*			
	Virginia Rail	*Rallus limicola*			1
	Sora	*Porzana carolina*			1
	American Coot	*Fulica americana*			1

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Killdeer	*Charadrius vociferus*	1		
	American Avocet	*Recurvirostra americana*			1
	Greater Yellowlegs	*Tringa melanoleuca*	1		
	Lesser Yellowlegs	*Tringa flavipes*			
	Solitary Sandpiper	*Tringa solitaria*		1	
	Spotted Sandpiper	*Actitis macularia*	1		
	Long-billed Curlew	*Numenius americanus*			
	Semipalmated Sandpiper	*Calidris pusilla*			
	Western Sandpiper	*Calidris mauri*			
	Least Sandpiper	*Calidris minutilla*			
	Baird's Sandpiper	*Calidris bairdii*			
	Pectoral Sandpiper	*Calidris melanotos*			
	Stilt Sandpiper	*Calidris himantopus*			
	Long-billed Dowitcher	*Limnodromus scolopaceus*			
	Common Snipe	*Gallinago gallinago*			1
	Wilson's Phalarope	*Phalaropus tricolor*			1
	Red-necked Phalarope	*Phalaropus lobatus*			
	Ring-billed Gull	*Larus delawarensis*	1		
	California Gull	*Larus californicus*	1		
	Herring Gull	*Larus argentatus*	1		
	Thayer's Gull	*Larus thayeri*	1		

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Glaucous Gull	*Larus hyperboreus*	1		
	Black Tern	*Chlidonias niger*			1
	Rock Dove	*Columba livia*			
	Mourning Dove	*Zenaida macroura*		1	
	Barn Owl	*Tyto alba*			
	Flammulated Owl	*Otus flammeolus*			
	Western Screech-owl	*Otus kennicottii*		1	
	Great Horned Owl	*Bubo virginianus*			
	Snowy Owl	*Nyctea scandiaca*	1		
	Northern Pygmy-owl	*Glaucidium gnoma*			
	Burrowing Owl	*Athene cunicularia*			
	Barred Owl	*Strix varia*			
	Great Gray Owl	*Strix nebulosa*			
	Long-eared Owl	*Asio otus*		1	
	Short-eared Owl	*Asio flammeus*			1
	Boreal Owl	*Aegolius funereus*			
	Northern Saw-whet Owl	*Aegolius acadicus*			
	Common Nighthawk	*Chordeiles minor*			
	Common Poorwill	*Phalaenoptilus nuttallii*			
	Black Swift	*Cypseloides niger*			
	Vaux's Swift	*Chaetura vauxi*			
	White-throated Swift	*Aeronautes saxatalis*			
	Black-chinned Hummingbird	*Archilochus alexandri*			
	Calliope Hummingbird	*Stellula calliope*			

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Rufous Hummingbird	*Selasphorus rufus*			
	Belted Kingfisher	*Ceryle alcyon*	1	1	
	Lewis's Woodpecker	*Melanerpes lewis*			
	Williamson's Sapsucker	*Sphyrapicus thyroideus*			
	Red-naped Sapsucker	*Sphyrapicus nuchalis*		1	
	Red-breasted Sapsucker	*Sphyrapicus ruber*			
	Downy Woodpecker	*Picoides pubescens*			
	Hairy Woodpecker	*Picoides villosus*			
	White-headed Woodpecker	*Picoides albolarvatus*			
	Three-toed Woodpecker	*Picoides tridactylus*			
	Black-backed Woodpecker	*Picoides arcticus*			
	Northern Flicker	*Colaptes auratus*			
	Pileated Woodpecker	*Dryocopus pileatus*			
	Olive-sided Flycatcher	*Contopus cooperi*			
	Western Wood-pewee	*Contopus sordidulus*			
	Willow Flycatcher	*Empidonax traillii*	1	1	
	Hammond's Flycatcher	*Empidonax hammondii*			
	Gray Flycatcher	*Empidonax wrightii*			
	Dusky Flycatcher	*Empidonax oberholseri*			
	Pacific-slope Flycatcher	*Empidonax difficilis*			

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Cordilleran Flycatcher	*Empidonax occidentalis*		1	
	Say's Phoebe	*Sayornis saya*			
	Western Kingbird	*Tyrannus verticalis*			
	Eastern Kingbird	*Tyrannus tyrannus*			
	Loggerhead Shrike	*Lanius ludovicianus*			
	Northern Shrike	*Lanius excubitor*			
	Cassin's Vireo	*Vireo cassinii*			
	Warbling Vireo	*Vireo gilvus*		1	
	Red-eyed Vireo	*Vireo olivaceus*		1	
	Gray Jay	*Perisoreus canadensis*	1		
	Steller's Jay	*Cyanocitta stelleri*	1		
	Clark's Nutcracker	*Nucifraga columbiana*			
	Black-billed Magpie	*Pica pica*	1	1	
	American Crow	*Corvus brachyrhynchos*	1		
	Northwestern Crow	*Corvus caurinus*	1		
	Common Raven	*Corvus corax*	1		
	Horned Lark	*Eremophila alpestris*			
	Tree Swallow	*Tachycineta bicolor*	1	1	
	Violet-green Swallow	*Tachycineta thalassina*	1		
	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	1	1	
	Bank Swallow	*Riparia riparia*	1	1	
	Cliff Swallow	*Petrochelidon pyrrhonota*	1	1	
	Barn Swallow	*Hirundo rustica*	1	1	

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Black-capped Chickadee	*Poecile atricapillus*			
	Mountain Chickadee	*Poecile gambeli*			
	Chestnut-backed Chickadee	*Poecile rufescens*			
	Boreal Chickadee	*Poecile hudsonicus*			
	Red-breasted Nuthatch	*Sitta canadensis*			
	White-breasted Nuthatch	*Sitta carolinensis*			
	Pygmy Nuthatch	*Sitta pygmaea*		1	
	Brown Creeper	*Certhia americana*			
	Rock Wren	*Salpinctes obsoletus*			
	Canyon Wren	*Catherpes mexicanus*			
	House Wren	*Troglodytes aedon*			
	Winter Wren	*Troglodytes troglodytes*	1		
	Marsh Wren	*Cistothorus palustris*			1
	American Dipper	*Cinclus mexicanus*	1	1	
	Golden-crowned Kinglet	*Regulus satrapa*			
	Ruby-crowned Kinglet	*Regulus calendula*			
	Western Bluebird	*Sialia mexicana*			
	Mountain Bluebird	*Sialia currucoides*			
	Townsend's Solitaire	*Myadestes townsendi*			
	Veery	*Catharus fuscescens*		1	

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Swainson's Thrush	*Catharus ustulatus*			
	Hermit Thrush	*Catharus guttatus*			
	American Robin	*Turdus migratorius*	1		
	Varied Thrush	*Ixoreus naevius*	1		
	Gray Catbird	*Dumetella carolinensis*		1	
	Sage Thrasher	*Oreoscoptes montanus*			
	European Starling	*Sturnus vulgaris*		1	
	American Pipit	*Anthus rubescens*			
	Bohemian Waxwing	*Bombycilla garrulus*			
	Cedar Waxwing	*Bombycilla cedrorum*		1	
	Orange-crowned Warbler	*Vermivora celata*			
	Nashville Warbler	*Vermivora ruficapilla*			
	Yellow Warbler	*Dendroica petechia*		1	
	Yellow-rumped Warbler	*Dendroica coronata*			
	Black-throated Gray Warbler	*Dendroica nigrescens*			
	Townsend's Warbler	*Dendroica townsendi*			
	American Redstart	*Setophaga ruticilla*		1	
	Northern Waterthrush	*Seiurus noveboracensis*		1	
	Macgillivray's Warbler	*Oporornis tolmiei*			
	Common Yellowthroat	*Geothlypis trichas*		1	
	Wilson's Warbler	*Wilsonia pusilla*			

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Yellow-breasted Chat	*Icteria virens*		1	
	Western Tanager	*Piranga ludoviciana*			
	Spotted Towhee	*Pipilo maculatus*	1		
	American Tree Sparrow	*Spizella arborea*			
	Chipping Sparrow	*Spizella passerina*			
	Brewer's Sparrow	*Spizella breweri*			
	Vesper Sparrow	*Pooecetes gramineus*			
	Lark Sparrow	*Chondestes grammacus*			
	Black-throated Sparrow	*Amphispiza bilineata*			
	Sage Sparrow	*Amphispiza belli*			
	Savannah Sparrow	*Passerculus sandwichensis*			
	Grasshopper Sparrow	*Ammodramus savannarum*			
	Fox Sparrow	*Passerella iliaca*		1	
	Song Sparrow	*Melospiza melodia*	1		
	Lincoln's Sparrow	*Melospiza lincolnii*		1	
	White-crowned Sparrow	*Zonotrichia leucophrys*			
	Dark-eyed Junco	*Junco hyemalis*			
	Lapland Longspur	*Calcarius lapponicus*			
	Snow Bunting	*Plectrophenax nivalis*			
	Black-headed Grosbeak	*Pheucticus melanocephalus*			
	Lazuli Bunting	*Passerina amoena*		1	

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Bobolink	*Dolichonyx oryzivorus*			
	Red-winged Blackbird	*Agelaius phoeniceus*			1
	Western Meadowlark	*Sturnella neglecta*			
	Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*			1
	Brewer's Blackbird	*Euphagus cyanocephalus*			
	Brown-headed Cowbird	*Molothrus ater*			
	Bullock's Oriole	*Icterus bullockii*		1	
	Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*			
	Pine Grosbeak	*Pinicola enucleator*			
	Cassin's Finch	*Carpodacus cassinii*			
	House Finch	*Carpodacus mexicanus*			
	Red Crossbill	*Loxia curvirostra*			
	White-winged Crossbill	*Loxia leucoptera*			
	Common Redpoll	*Carduelis flammea*			
	Pine Siskin	*Carduelis pinus*			
	American Goldfinch	*Carduelis tristis*			
	Evening Grosbeak	*Coccothraustes vespertinus*			
	House Sparrow	*Passer domesticus*			1
	Total Birds:	221 Total:	47	42	28
Mammals					
	Virginia Opossum	*Didelphis virginiana*	1		
	Masked Shrew	*Sorex cinereus*	1		

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Vagrant Shrew	*Sorex vagrans*	1		
	Montane Shrew	*Sorex monticolus*	1		
	Water Shrew	*Sorex palustris*	1	1	
	Pacific Water Shrew	*Sorex bendirii*	1		
	Trowbridge's Shrew	*Sorex trowbridgii*	1		
	Merriam's Shrew	*Sorex merriami*			
	Shrew-mole	*Neurotrichus gibbsii*			
	Coast Mole	*Scapanus orarius*			
	California Myotis	*Myotis californicus*			
	Western Small-footed Myotis	*Myotis ciliolabrum*		1	
	Yuma Myotis	*Myotis yumanensis*		1	
	Little Brown Myotis	*Myotis lucifugus*			
	Long-legged Myotis	*Myotis volans*		1	
	Fringed Myotis	*Myotis thysanodes*			
	Long-eared Myotis	*Myotis evotis*			
	Silver-haired Bat	*Lasionycteris noctivagans*			
	Western Pipistrelle	*Pipistrellus hesperus*		1	
	Big Brown Bat	*Eptesicus fuscus*		1	
	Hoary Bat	*Lasiurus cinereus*			
	Spotted Bat	*Euderma maculatum*			
	Townsend's Big-eared Bat	*Corynorhinus townsendii*			
	Pallid Bat	*Antrozous pallidus*		1	
	American Pika	*Ochotona princeps*			

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Nuttall's (Mountain) Cottontail	*Sylvilagus nuttallii*			
	Snowshoe Hare	*Lepus americanus*		1	
	White-tailed Jackrabbit	*Lepus townsendii*			
	Black-tailed Jackrabbit	*Lepus californicus*			
	Mountain Beaver	*Aplodontia rufa*			
	Least Chipmunk	*Tamias minimus*			
	Yellow-pine Chipmunk	*Tamias amoenus*			
	Townsend's Chipmunk	*Tamias townsendii*			
	Yellow-bellied Marmot	*Marmota flaviventris*			
	Hoary Marmot	*Marmota caligata*			
	Washington Ground Squirrel	*Spermophilus washingtoni*			
	Columbian Ground Squirrel	*Spermophilus columbianus*			
	Golden-mantled Ground Squirrel	*Spermophilus lateralis*			
	Cascade Golden-mantled Ground Squirrel	*Spermophilus saturatus*			
	Eastern Fox Squirrel	*Sciurus niger*			
	Western Gray Squirrel	*Sciurus griseus*			
	Red Squirrel	*Tamiasciurus hudsonicus*			
	Douglas' Squirrel	*Tamiasciurus douglasii*	1		
	Northern Flying Squirrel	*Glaucomys sabrinus*	1		
	Northern Pocket Gopher	*Thomomys talpoides*			

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Great Basin Pocket Mouse	*Perognathus parvus*			
	American Beaver	*Castor canadensis*		1	
	Western Harvest Mouse	*Reithrodontomys megalotis*		1	
	Deer Mouse	*Peromyscus maniculatus*	1	1	
	Columbian Mouse	*Peromyscus keeni*			
	Northern Grasshopper Mouse	*Onychomys leucogaster*			
	Bushy-tailed Woodrat	*Neotoma cinerea*		1	
	Southern Red-backed Vole	*Clethrionomys gapperi*		1	
	Heather Vole	*Phenacomys intermedius*			
	Meadow Vole	*Microtus pennsylvanicus*		1	
	Montane Vole	*Microtus montanus*			1
	Long-tailed Vole	*Microtus longicaudus*		1	
	Creeping Vole	*Microtus oregoni*			
	Water Vole	*Microtus richardsoni*		1	
	Sagebrush Vole	*Lemmiscus curtatus*			
	Muskrat	*Ondatra zibethicus*		1	
	Northern Bog Lemming	*Synaptomys borealis*			1
	Black Rat	*Rattus rattus*			
	Norway Rat	*Rattus norvegicus*			
	House Mouse	*Mus musculus*			
	Western Jumping Mouse	*Zapus princeps*		1	

	Common Name	Scientific Name	Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Pacific Jumping Mouse	*Zapus trinotatus*		1	
	Common Porcupine	*Erethizon dorsatum*			
	Nutria	*Myocastor coypus*			1
	Coyote	*Canis latrans*	1		
	Gray Wolf	*Canis lupus*	1		
	Red Fox	*Vulpes vulpes*	1		
	Black Bear	*Ursus americanus*	1		
	Grizzly Bear	*Ursus arctos*	1		
	Raccoon	*Procyon lotor*	1	1	
	American Marten	*Martes americana*	1		
	Fisher	*Martes pennanti*	1		
	Ermine	*Mustela erminea*			
	Long-tailed Weasel	*Mustela frenata*	1		
	Mink	*Mustela vison*	1	1	
	Wolverine	*Gulo gulo*	1		
	American Badger	*Taxidea taxus*			
	Striped Skunk	*Mephitis mephitis*	1		
	Northern River Otter	*Lutra canadensis*	1	1	
	Mountain Lion	*Puma concolor*	1		
	Canadian Lynx	*Lynx canadensis*			
	Bobcat	*Lynx rufus*	1		
	Elk	*Cervus elaphus*			
	Mule Deer	*Odocoileus hemionus*			
	White-tailed Deer	*Odocoileus virginianus*			
	Moose	*Alces alces*			
	Mountain Goat	*Oreamnos americanus*			

	Common Name	Scientific Name		Salmonid Relationship	Closely Associated with Riparian Wetland	Closely Associated with Other Wetlands
	Bighorn Sheep	*Ovis canadensis*				
	Total Mammals:	93	Total:	25	22	3
Reptiles						
	Painted Turtle	*Chrysemys picta*				
	Northern Alligator Lizard	*Elgaria coerulea*				
	Short-horned Lizard	*Phrynosoma douglassii*				
	Sagebrush Lizard	*Sceloporus graciosus*				
	Western Fence Lizard	*Sceloporus occidentalis*				
	Side-blotched Lizard	*Uta stansburiana*				
	Western Skink	*Eumeces skiltonianus*				
	Rubber Boa	*Charina bottae*				
	Racer	*Coluber constrictor*				
	Sharp-tail Snake	*Contia tenuis*				
	Night Snake	*Hypsiglena torquata*				
	Striped Whipsnake	*Masticophis taeniatus*				
	Gopher Snake	*Pituophis catenifer*				
	Western Terrestrial Garter Snake	*Thamnophis elegans*		1		
	Common Garter Snake	*Thamnophis sirtalis*		1	1	
	Western Rattlesnake	*Crotalus viridis*				
	Total Reptiles:	16	Total:	2	1	0
	Total Species:	341	Total:	75	73	32

Appendix C: Relevant Species Ranking, Status and Management Lists

Table 60 Rare plants in the Methow subbasin, Washington

Scientific Name	Common Name
Abies Amabilis / Achlys Triphylla Forest	Pacific Silver Fir / Vanillaleaf
Abies Amabilis Cover Type	Pacific Silver Fir Forest
Abies Lasiocarpa / Calamagrostis Rubescens Forest	Subalpine Fir / Pinegrass
Abies Lasiocarpa / Ledum Glandulosum Forest	Subalpine Fir / Glandular Labrador-Tea
Abies Lasiocarpa / Rhododendron Albiflorum Woodland	Subalpine Fir / Cascade Azalea
Abies Lasiocarpa / Vaccinium Scoparium Forest	Subalpine Fir / Grouseberry
Abies Lasiocarpa Cover Type	Subalpine Fir Forest
Alnus Viridis Ssp. *Sinuata Shrubland (Provisional)*	Sitka Alder
Artemisia Tridentata Ssp. *Wyomingensis / Pseudoroegneria Spicata Shrub Herbaceous Vegetation*	Wyoming Big Sagebrush / Bluebunch Wheatgrass
Artemisia Tridentata Ssp. *Wyomingensis / Stipa Comata Shrubland*	Wyoming Big Sagebrush / Needle-And-Thread
Artemisia Tripartita / Festuca Idahoensis Shrub Herbaceous Vegetation	Threetip Sagebrush / Idaho Fescue
Artemisia Tripartita / Pseudoroegneria Spicata Shrub Herbaceous Vegetation	Threetip Sagebrush / Bluebunch Wheatgrass
Artemisia Tripartita / Stipa Comata Shrub Herbaceous Vegetation	Threetip Sagebrush / Needle-And-Thread
Carex Cover Type	Sedge Spp. Grassland
Carex Scopulorum Herbaceous Vegetation	Holm's Rocky Mountain Sedge
Carex Utriculata Herbaceous Vegetation	Northwest Territory Sedge
Danthonia Intermedia Herbaceous Vegetation	Timber Oatgrass
Dryas Octopetala Dwarf-Shrub Herbaceous Vegetation	Eight Petal Mountain-Avens
Festuca Idahoensis - Eriogonum Heracleoides Herbaceous Vegetation	Idaho Fescue - Parsnip-Flower Buckwheat
Inland Saline Wetland Cb	Inland Saline Wetland Cb
Larix Lyallii Association	Subalpine Larch Community
Larix Occidentalis Cover Type	Western Larch Forest
Picea Engelmannii - Abies Lasiocarpa Cover Type	Engelmann Spruce - Subalpine Fir Forest
Picea Engelmannii / Equisetum Arvense Forest	Engelmann Spruce / Field Horsetail
Pinus Albicaulis - Abies Lasiocarpa Cover Type	White-Bark Pine - Subalpine Fir Forest
Pinus Albicaulis Cover Type	White-Bark Pine Forest
Pinus Contorta Cover Type	Lodgepole Pine Forest
Pinus Ponderosa - Pseudotsuga Menziesii / Pseudoroegneria Spicata Ssp. *Inermis Woodland*	Ponderosa Pine - Douglas-Fir / Bluebunch Wheatgrass

Scientific Name	Common Name
Pinus Ponderosa - Pseudotsuga Menziesii / Purshia Tridentata Woodland	Ponderosa Pine - Douglas-Fir / Bitterbrush
Pinus Ponderosa - Pseudotsuga Menziesii Cover Type	Ponderosa Pine - Douglas-Fir Forest
Pinus Ponderosa / Calamagrostis Rubescens Forest	Ponderosa Pine / Pinegrass
Pinus Ponderosa / Purshia Tridentata Woodland	Ponderosa Pine / Bitterbrush
Pinus Ponderosa Cover Type	Ponderosa Pine Forest
Populus Tremuloides / Symphoricarpos Albus Forest	Quaking Aspen / Common Snowberry
Populus Tremuloides Cover Type	Quaking Aspen Forest
Pseudoroegneria Spicata Cover Type	Bluebunch Wheatgrass Grassland
Pseudotsuga Menziesii / Arctostaphylos Uva-Ursi - Purshia Tridentata Forest	Douglas-Fir / Kinikinnick - Bitterbrush
Pseudotsuga Menziesii / Arctostaphylos Uva-Ursi Cascadian Forest	Douglas-Fir / Kinikinnick Cascadian Forest
Pseudotsuga Menziesii / Calamagrostis Rubescens Forest	Douglas-Fir / Pinegrass
Pseudotsuga Menziesii / Symphoricarpos Albus Forest	Douglas-Fir / Common Snowberry
Purshia Tridentata / Festuca Idahoensis Shrub Herbaceous Vegetation	Bitterbrush / Idaho Fescue
Purshia Tridentata / Pseudoroegneria Spicata Shrub Herbaceous Vegetation	Bitterbrush / Bluebunch Wheatgrass
Purshia Tridentata / Stipa Comata Shrub Herbaceous Vegetation	Bitterbrush / Needle-And-Thread
Rhus Glabra / Pseudoroegneria Spicata Shrub Herbaceous Vegetation	Smooth Sumac / Bluebunch Wheatgrass
Salix Drummondiana / Carex Scopulorum Var. Prionophylla Shrubland	Drummond's Willow / Holm's Rocky Mountain Sedge
Salix Planifolia / Carex Scopulorum Shrubland	Tea-Leaf Willow / Holm's Rocky Mountain Sedge
Scirpus Maritimus Herbaceous Vegetation	Seacoast Bulrush
Stipa Comata Cover Type	Needle-And-Thread Grassland
Subalpine Freshwater Wetland Ec	Subalpine Freshwater Wetland Ec
Subalpine Riparian Wetland Ec	Subalpine Riparian Wetland Ec

(WNHP 2003)

Table 61 Threatened and Endangered wildlife species of the Methow subbasin, Washington

	Common Name	Scientific Name	State Status		Federal Status
Amphibians					
	Dunn's Salamander	*Plethodon dunni*	WA	Candidate Species	
	Western Toad	*Bufo boreas*	WA	Candidate Species	
	Columbia Spotted Frog	*Rana luteiventris*	WA	Candidate Species	
	Northern Leopard Frog	*Rana pipiens*	WA	Endangered	
Total Listed Amphibians:		4			
Birds					
	Common Loon	*Gavia immer*	WA	Sensitive	
	Western Grebe	*Aechmophorus occidentalis*	WA	Candidate Species	
	Northern Goshawk	*Accipiter gentiles*	WA	Candidate Species	
	Ferruginous Hawk	*Buteo regalis*	WA	Threatened	
	Golden Eagle	*Aquila chrysaetos*	WA	Candidate Species	
	Bald Eagle	*Haliaeetus leucocephalusi*		Threatened	
	Sage Grouse	*Centrocercus urophasianus*	WA	Threatened	Anticipated Candidate
	Sharp-tailed Grouse	*Tympanuchus phasianellus*	WA	Threatened	
	Marbled Murrelet	*Brachyramphus marmoratus*	WA	Threatened	Threatened
	Flammulated Owl	*Otus flammeolus*	WA	Candidate Species	
	Burrowing Owl	*Athene cunicularia*	WA	Candidate Species	
	Northern Spotted Owl	*Strix occidentalis*	WA	Endangered	Threatened
	Vaux's Swift	*Chaetura vauxi*	WA	Candidate Species	
	Lewis's Woodpecker	*Melanerpes lewis*	WA	Candidate Species	
	White-headed Woodpecker	*Picoides albolarvatus*	WA	Candidate Species	

	Common Name	Scientific Name	State Status		Federal Status
	Black-backed Woodpecker	*Picoides arcticus*	WA	Candidate Species	
	Pileated Woodpecker	*Dryocopus pileatus*	WA	Candidate Species	
	Loggerhead Shrike	*Lanius ludovicianus*	WA	Candidate Species	
	Horned Lark	*Eremophila alpestris*	WA	Candidate Species	Candidate
	White-breasted Nuthatch	*Sitta carolinensis*	WA	Candidate Species	
	Sage Thrasher	*Oreoscoptes montanus*	WA	Candidate Species	
	Vesper Sparrow	*Pooecetes gramineus*	WA	Candidate Species	
	Sage Sparrow	*Amphispiza belli*	WA	Candidate Species	
Total Listed Birds:		22			
Mammals					
	Merriam's Shrew	*Sorex merriami*	WA	Candidate Species	
	Townsend's Big-eared Bat	*Corynorhinus townsendii*	WA	Candidate Species	
	Pygmy Rabbit	*Brachylagus idahoensis*	WA	Endangered	Endangered
	White-tailed Jackrabbit	*Lepus townsendii*	WA	Candidate Species	
	Black-tailed Jackrabbit	*Lepus californicus*	WA	Candidate Species	
	Washington Ground Squirrel	*Spermophilus washingtoni*	WA	Candidate Species	Anticipated Candidate
	Western Gray Squirrel	*Sciurus griseus*	WA	Threatened	
	Northern Pocket Gopher	*Thomomys talpoides*	WA	Candidate Species	
	Gray Wolf	*Canis lupus*	WA	Endangered	Endangered
	Grizzly Bear	*Ursus arctos*	WA	Endangered	Threatened
	Fisher	*Martes pennanti*	WA	Endangered	
	Wolverine	*Gulo gulo*	WA	Candidate Species	
	Canadian Lynx	*Lynx canadensis*	WA	Threatened	Threatened
	White-tailed Deer	*Odocoileus virginianus*	WA	Endangered	Endangered

	Common Name	Scientific Name		State Status		Federal Status
Total Listed Mammals:		14				
Reptiles						
	Sharp-tail Snake	*Contia tenuis*		WA	Candidate Species	
	Striped Whipsnake	*Masticophis taeniatus*		WA	Candidate Species	
Total Listed Reptiles:		2				
Total Listed Species:		42				

(IBIS 2003)

Table 62 Fish species status under the Endangered Species Act and the Salmon and Steelhead Stock Inventory in the Methow River subbasin

Species	ESA Status	SASSI Status
Spring Chinook	Endangered (1999)	-
Summer Chinook	-	Depressed (1993)
Summer steelhead	Endangered (1997)	Depressed (1993)
Bull trout	Threatened (1998)	Depressed (1993)
Redband trout	Species of concern	-
Pacific lamprey	Species of concern	-
Westslope cutthroat	Species of concern	-

Table 63 Partners in Flight species of the Methow subbasin, Washington

Common Name	Scientific Name	PIF 1998-1999 Continental	PIF Ranking by Super Region Draft 2002	WA PIF Priority & Focal Species
Northern Harrier	*Circus cyaneus*			Yes
Swainson's Hawk	*Buteo swainsoni*		MO (Intermountain West, Prairies)	Yes
Ferruginous Hawk	*Buteo regalis*			Yes
Rough-legged Hawk	*Buteo lagopus*		PR (Arctic)	
American Kestrel	*Falco sparverius*			Yes
Gyrfalcon	*Falco rusticolus*		PR (Arctic)	
Sage Grouse	*Centrocercus urophasianus*		MA (Intermountain West, Prairies)	
Spruce Grouse	*Falcipennis canadensis*		PR (Northern Forests)	
White-tailed Ptarmigan	*Lagopus leucurus*		MO (Arctic)	
Blue Grouse	*Dendragapus obscurus*		MA (Pacific, Intermountain West)	
Sharp-tailed Grouse	*Tympanuchus phasianellus*		MO (Prairies)	Yes
Long-billed Curlew	*Numenius americanus*	Yes		
Stilt Sandpiper	*Calidris himantopus*	Yes		
Flammulated Owl	*Otus flammeolus*		MO (Pacific, Intermountain West, Southwest)	Yes

Common Name	Scientific Name	PIF 1998-1999 Continental	PIF Ranking by Super Region Draft 2002	WA PIF Priority & Focal Species
Snowy Owl	*Nyctea scandiaca*		PR (Arctic)	
Northern Pygmy-owl	*Glaucidium gnoma*		PR (Pacific)	
Burrowing Owl	*Athene cunicularia*			Yes
Spotted Owl	*Strix occidentalis*		IM (Pacific, Intermountain West, Southwest)	
Great Gray Owl	*Strix nebulosa*			Yes
Short-eared Owl	*Asio flammeus*	Yes	MA (Arctic, Northern Forests, Intermountain West, Prairies)	Yes
Common Poorwill	*Phalaenoptilus nuttallii*			Yes
Black Swift	*Cypseloides niger*	Yes	IM (Pacific, Intermountain West)	Yes
Vaux's Swift	*Chaetura vauxi*			Yes
White-throated Swift	*Aeronautes saxatalis*		MA (Intermountain West, Southwest)	Yes
Calliope Hummingbird	*Stellula calliope*		MO (Intermountain West)	Yes
Rufous Hummingbird	*Selasphorus rufus*	Yes	MA (Pacific, Intermountain West)	Yes
Lewis's Woodpecker	*Melanerpes lewis*	Yes	MO (Intermountain West, Prairies)	Yes
Williamson's Sapsucker	*Sphyrapicus thyroideus*		MO (Intermountain West)	Yes
Red-naped Sapsucker	*Sphyrapicus nuchalis*		MO (Intermountain West)	Yes
Red-breasted Sapsucker	*Sphyrapicus ruber*		MO (Pacific)	Yes
Downy Woodpecker	*Picoides pubescens*			Yes
White-headed Woodpecker	*Picoides albolarvatus*	Yes	PR (Pacific, Intermountain West)	Yes
Three-toed Woodpecker	*Picoides tridactylus*		PR (Northern Forests)	
Black-backed Woodpecker	*Picoides arcticus*		PR (Northern Forests)	Yes
Pileated Woodpecker	*Dryocopus pileatus*			Yes

Common Name	Scientific Name	PIF 1998-1999 Continental	PIF Ranking by Super Region Draft 2002	WA PIF Priority & Focal Species
Olive-sided Flycatcher	*Contopus cooperi*		MA (Pacific, Northern Forests, Intermountain West)	Yes
Western Wood-pewee	*Contopus sordidulus*			Yes
Willow Flycatcher	*Empidonax traillii*		MA (Prairies, East)	Yes
Hammond's Flycatcher	*Empidonax hammondii*			Yes
Gray Flycatcher	*Empidonax wrightii*		PR (Intermountain West)	Yes
Dusky Flycatcher	*Empidonax oberholseri*		MA (Intermountain West)	Yes
Pacific-slope Flycatcher	*Empidonax difficilis*		PR (Pacific)	Yes
Loggerhead Shrike	*Lanius ludovicianus*			Yes
Northern Shrike	*Lanius excubitor*		PR (Northern Forests)	
Warbling Vireo	*Vireo gilvus*			Yes
Red-eyed Vireo	*Vireo olivaceus*			Yes
Gray Jay	*Perisoreus canadensis*		PR (Northern Forests)	
Clark's Nutcracker	*Nucifraga columbiana*		PR (Intermountain West)	Yes
Horned Lark	*Eremophila alpestris*			Yes
Bank Swallow	*Riparia riparia*			Yes
Chestnut-backed Chickadee	*Poecile rufescens*		PR (Pacific)	
Boreal Chickadee	*Poecile hudsonicus*		MA (Northern Forests)	
White-breasted Nuthatch	*Sitta carolinensis*			Yes
Brown Creeper	*Certhia americana*			Yes
House Wren	*Troglodytes aedon*			Yes
Winter Wren	*Troglodytes troglodytes*			Yes
American Dipper	*Cinclus mexicanus*			Yes
Western Bluebird	*Sialia mexicana*			Yes
Mountain Bluebird	*Sialia currucoides*		PR (Intermountain West)	

Common Name	Scientific Name	PIF 1998-1999 Continental	PIF Ranking by Super Region Draft 2002	WA PIF Priority & Focal Species
Townsend's Solitaire	*Myadestes townsendi*			Yes
Veery	*Catharus fuscescens*			Yes
Swainson's Thrush	*Catharus ustulatus*			Yes
Hermit Thrush	*Catharus guttatus*			Yes
Varied Thrush	*Ixoreus naevius*			Yes
Sage Thrasher	*Oreoscoptes montanus*		PR (Intermountain West)	Yes
American Pipit	*Anthus rubescens*		PR (Arctic)	Yes
Bohemian Waxwing	*Bombycilla garrulus*		MA (Northern Forests)	
Orange-crowned Warbler	*Vermivora celata*			Yes
Nashville Warbler	*Vermivora ruficapilla*		PR (Northern Forests)	Yes
Yellow Warbler	*Dendroica petechia*			Yes
Yellow-rumped Warbler	*Dendroica coronata*			Yes
Black-throated Gray Warbler	*Dendroica nigrescens*		MO (Pacific)	Yes
Townsend's Warbler	*Dendroica townsendi*			Yes
Hermit Warbler	*Dendroica occidentalis*	Yes	MO (Pacific)	Yes
Macgillivray's Warbler	*Oporornis tolmiei*			Yes
Wilson's Warbler	*Wilsonia pusilla*			Yes
Yellow-breasted Chat	*Icteria virens*			Yes
Western Tanager	*Piranga ludoviciana*			Yes
Chipping Sparrow	*Spizella passerina*			Yes
Brewer's Sparrow	*Spizella breweri*	Yes	MA (Intermountain West)	Yes
Vesper Sparrow	*Pooecetes gramineus*			Yes
Lark Sparrow	*Chondestes grammacus*			Yes

Common Name	Scientific Name	PIF 1998-1999 Continental	PIF Ranking by Super Region Draft 2002	WA PIF Priority & Focal Species
Black-throated Sparrow	*Amphispiza bilineata*			Yes
Sage Sparrow	*Amphispiza belli*	Yes	PR (Intermountain West)	Yes
Grasshopper Sparrow	*Ammodramus savannarum*		MA (Prairies)	Yes
Fox Sparrow	*Passerella iliaca*			Yes
Lincoln's Sparrow	*Melospiza lincolnii*		PR (Northern Forests)	Yes
Lapland Longspur	*Calcarius lapponicus*		PR (Arctic)	
Snow Bunting	*Plectrophenax nivalis*		PR (Arctic)	
Black-headed Grosbeak	*Pheucticus melanocephalus*			Yes
Bobolink	*Dolichonyx oryzivorus*	Yes		
Western Meadowlark	*Sturnella neglecta*			Yes
Bullock's Oriole	*Icterus bullockii*			Yes
Pine Grosbeak	*Pinicola enucleator*		MO (Northern Forests)	
Purple Finch	*Carpodacus purpureus*			Yes
Cassin's Finch	*Carpodacus cassinii*		MA (Intermountain West)	
Red Crossbill	*Loxia curvirostra*			Yes
White-winged Crossbill	*Loxia leucoptera*		PR (Northern Forests)	
Total Species:	98			

(IBIS 2003)

Appendix D: Projects in the Methow subbasin

Table 64 Projects in the Methow subbasin

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Methow subbasin				
Yakama Nation	Alaska	2003 to present	Monitor summer chinook status	
Yakama Nation	PCSRF		Spring chinook pedigree study	
Yakama Nation	BPA Project #9208200		Eastern Washington Landowners Adopt-Stream Training	Groups were targeted for training in stream and watershed management to enhance habitat for anadromous fish. Six watershed-training meetings were held for target groups of Native Americans, ranchers, and foresters in eastern Washington. Conducted 6 watershed-training meetings for various groups in eastern Washington.
Yakama Nation	Funding WDOE and BPA	1999 - 2000	Methow Valley Irrigation District, Reorganization to wells,	Lower ditch was shut off and individuals served by the lower ditch were converted to wells.
Yakama Nation and Methow River Valley Irrigation District	BPA Project # 199603401	ongoing project		Examine the feasibility of alternatives and recommend a project to address water conservation, benefit fish and continue to provide water for irrigation.
Yakama Nation	BPA Project #199802500	2000-2001	Early Winters Creek Habitat Restoration	Restored historic fish, riparian and floodplain habitat, identified methods to augment instream flow to increase spawner success and juvenile survival. Project was completed the summer of 2000 with some follow-up monitoring in 2001.
Yakama Nation	BPA Project #9604000	1996 ongoing	Mid-Columbia Coho Feasibility Reintroduction Study	This project was initiated in 1996. The project is designed to gather data and develop and implement plans for coho restoration in the Methow, Entiat, and Wenatchee river basins in concert with various state and federal agencies. The project is centered on the development of a localized broodstock while minimizing potential negative interactions among coho and listed and sensitive species.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Yakama Nation	BPA Project #23024 200106500	2003	Hancock Springs Passage and Habitat Restoration Improvements, Yakama Nation	The project is designed to increase juvenile salmonid access to, and enhance the habitat of Hancock Springs, a spring fed off-channel to the upper Methow River. Project objectives are to 1) increase the number of juvenile spring Chinook and steelhead utilizing Hancock Springs, and 2) increase the overwinter survival of juvenile spring Chinook and steelhead in the Methow River.
Yakama Nation FWS	BPA Project #199802900	1998-2001	Goat Creek Instream Habitat Restoration	Instream habitat restoration work and instream rehabilitation.
Yakama Nation	BPA Project #200103700		Arrowleaf/Methow River Conservation Easement	Purchase prime riparian habitat in the form of a conservation easement.
Yakama Nation WDFW	BPA Project #200106300	2002	Methow Basin Screening	Provide fish screen facilities and new fish screen construction at Methow subbasin irrigation diversions including Foghoorn, Rockview, McKinney Mountain, Kum Holloway. Some equipment upgrades are also included under the project.
Yakama Nation	Douglas County PUD	Ongoing since 1987	Methow Basin spring Chinook spawner surveys	Basin wide spawner surveys have been conducted. This information is summarized each year in an annual report submitted to Douglas County PUD. The data set consists of redd counts by stream reach for each major tributary in which spring Chinook spawn, estimated spawner escapement, plus bio-sample data (i.e. scale samples, recovery of CWTs, notation of external marks, sex, body length and extent of gamete retention).
Yakama Nation	Douglas County PUD	1993 ongoing	Methow Basin Spring Chinook Salmon Supplementation Program (MBSCSP)	The Yakama Nation contracted with Douglas County PUD in 1993 to conduct monitoring and evaluation activities as part of the MBSCSP. The Methow Basin Spring Chinook Supplementation Plan dictates specific monitoring and evaluation tasks associated with the Program. Since 1993 the spawner surveys have been incorporated into the MBSCSP.
Yakama Nation and Methow Valley Irrigation District				Negotiations to resolve the issue of inadequate instream flows in the lower Twisp River.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Implemented by WDFW	BPA		Methow Watershed Project II	An ongoing $12 million effort to identify and secure more than 5,000 acres of critical riparian/floodplain habitat and linkages to protected upland through fee title acquisition and conservation easements. BPA contributed over $2 million to purchase conservation easements on portions of over 1000 acres of habitat.
USFS	BPA Project #9026,	1993 - ongoing	Respect the River	Respect the River is an ongoing interpretive and public contact program that started out with informational/educational signs along the Methow River and its tributaries. The program has been repeatedly expanded to include both media and one-on-one contacts with river users and to include numerous additional drainages within the Methow subbasin.
University of Washington	BPA Project #199803500	1998-2003	Measure Mine Drainage Effects of Alder Creek	The project involved analyzing the leachable metals in the Methow River and Alder Creek drainages resulting from the abandoned Alder Mine. The Alder Creek Mine is on the western slope of McClure Mountain at 3600 feet on private land surrounded by National Forest. While it is clear that Alder Creek has been impaired, the extent of impact has not been determined.
	BPA Project #199603450		Methow River Valley NEPA Study	NEPA archaeological and historical studies of the Methow Irrigation District. This contract provided for public involvement, communication and coordination support for the NEPA process.
	American Bird Conservancy	1997	Conservations Strategy for Landbirds	Program identified important habitats and desired habitat conditions, and provided interim management targets and recommended management actions for land birds and their habitats.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Methow Conservancy	Funded by State of Washington Interagency Committee for Outdoor Recreation 97-1310	1997-2001	Methow Conservancy Riparian Habitat Project	For the facilitation or purchase of conservation easements that would protect riparian habitat in the Methow Watershed for perpetuity. By the summer of 2001, nine property owners, representing 526 acres and over $930,000 of donated easement value had completed these voluntary conservation restrictions on their properties. The areas include riparian/agricultural lands on the mainstem Methow River and the Little Cub Creek (Rendezvous) complex, an important, upland watershed of the Chewuch River, a tributary of the Methow. Landowners have created protective buffer zones along the critical riparian areas near the river and creeks, have agreed to forest management and land use plans to promote values of watershed and wildlife enhancement, and have agreed that this is to be done for perpetuity.
FWS	BPA Funded	2001	Goat Creek Menader Reconstruction	Restore function floodplain and natural stream morphology within the confines of the lower 1.5 miles of Goat Creek to improve the migrational corridor for bull trout and steelhead,
			Twisp Acclamation ponds	
Methow Conservancy	Funded by State of Washington Salmon Recovery Funding Board 00-1677	2001-ongoing	Methow Watershed Riparian Habitat Acquisition	To help protect spring Chinook salmon, bull trout and steelhead trout habitat in the Methow subbasin. The award to the Conservancy provides financial assistance to landowners who want to assure that their lands along the Twisp, Chewuch and Methow Rivers remain as relatively pristine habitat for fish and wildlife. As of September of 2001, seventeen property owners, representing 870 plus acres and over four miles of riverfront in the areas identified by the Upper Columbia Regional Technical team and Washington State Conservation Commission's Limiting Factors Analysis as of the utmost importance to salmon recovery have signed Letters of Understanding to begin the easement process with the Methow Conservancy.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Methow Conservancy		November 2000 to October 2001	Partners in Flight Habitat Prioritization	This Songbird Conservation Project brought a land trust (the Methow Conservancy) and several conservation biologists (from the U.S. Forest Service, American Bird Conservatory, and the Washington Department of Fish and Wildlife) together to survey and recommend ways to protect the best privately owned riparian areas in the Methow Valley. The Project allowed for detailed landscape-level mapping and analysis of Methow Valley songbird habitat, along with extensive one-to-one habitat conservation education and many hours of on-the-ground surveys, which formed an important foundation for future conservation easements, research and planning.
Methow Valley Irrigation District	Funding WDOE and BPA, project is also listed under BPA funded projects	1999 to 2000.	Reorganization to wells	Lower ditch was shut off and individuals served by the lower ditch were converted to wells.
Methow Valley Irrigation District	Funding WDFW	2001	Remeshing of MVID screens	Screens along both the Methow and Twisp rivers were remeshed to NMFS standard in the spring of 2001.
Okanogan County/ FWS	Salmon Recovery Act RCW 77.85/HB2496 00-1643	2000	Wolf Creek Channel Restoration	Enhanced fish passage and created additional instream habitat during summer low flow for steelhead and Chinook and bull trout in Wolf Creek.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 00-1629	NA	Skyline Ditch Pipe Installation	Assisted in piping part of the 6.2 mile Skyline Ditch in high water loss areas. This irrigation diversion is located on the Methow River.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1612	NA	Airey/Risley Ditch Removal	Removed an irrigation diversion structure and reduced the length of conveyance on an irrigation canal on the Twisp River.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1613	NA	Buttermilk Creek Ditch Fish Screen	Installed a fish screen on the Buttermilk Creek irrigation ditch on the Twisp River.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1691	NA	Skyline Ditch repair	Repaired the headgate at the Skyline Ditch diversion on the Chewuch River and replaced the delivery ditch with pipe in a high water loss area.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1347	NA	Aspen Meadows Ditch Piping	Replaced a portion of the Aspen Meadows irrigation ditch with pipe to prevent water loss on Little Bridge Creek, a tributary to the Twisp River.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1345	NA	Fulton Ditch Lining Project	Lined a portion of the Fulton irrigation canal to prevent seepage/water loss. The Fulton diversion is located on the Chewuch River.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1340	NA	Eagle Creek Ditch Fish Screen	Removed an irrigation ditch and installed a well on Eagle Creek, a tributary to the Twisp River.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1339	NA	Tourangeau Ditch retirement	Abandoned the Tourangeau irrigation canal and installed a well on Little Bridge Creek, a tributary to the Twisp River.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1344	NA	Early Winters Ditch Diversion Structure	Constructed a fish friendly diversion structure that ensures flow to the Early Winters irrigation canal.
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496 99-1692	NA	Little Bridge Creek Culvert passage	Provided engineering & design work to determine alternatives and costs associated with solving a culvert blockage problem on Little Bridge Creek.
Okanogan Conservation District	Department of Natural Resources	1997	Pete's Creek planting and fencing	Seeded 65 acres with grass and planted 880 cottonwood and dogwood whips. Also installed 7,745 feet of cross fence to control grazing and protect riparian areas in the upper watershed.
Okanogan Conservation District	Department of Natural Resources	1997	French Creek fencing	Installed 6,792 feet of fence to protect riparian zone.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Okanogan Conservation District	Department of Natural Resources	1998	Pete's Creek planting and road deactivation	Project to control access road erosion control. Planted 2,000 cottonwoods, 100 pines, and 100 aspen. Developed spring for stock water outside the riparian zone.
Okanogan Conservation District	Department of Natural Resources	1998	French Creek fencing & livestock watering	Installed 6,864 feet fence to protect riparian zone. Installed two miles of pipeline and two troughs for livestock water outside the riparian zone. Planted 6,000 cottonwoods and dogwood whips.
Okanogan Conservation District/NRCS	Department of Natural Resources	1998	Cow Creek planting and erosion control	Instituted measures to control road erosion on an access road. Planted 2,000 cottonwoods, 6,000 dogwoods, 200 pine and stabilized headcut.
Okanogan Conservation District/ NRCS	Department of Natural Resources	1998	Texas Creek planting and livestock control	Planted 6000 dogwoods and 2,000 cottonwoods. Created livestock barriers in creek channel by felling trees.
Okanogan Conservation District,NRCS, DNR, USFS, MVSTA	Department of Natural Resources	1998-1999	Wolf Creek fencing and livestock watering	Built 1.7 miles of fence to exclude livestock from the river. Drilled wells and installed 2,000 feet of pipe and two troughs for stock water outside of riparian zone.
Okanogan Conservation District and the Pacific Watershed Institute	USFW	2000	Methow River, Lehman Site fencing, planting and livestock watering	Drilled a well and installed 500 feet of pipe and one trough for fall stock water outside the riparian zone. Installed 2,640 feet exclusion fence creating a 175-foot riparian buffer. Installed 2,000 feet of pipeline and two troughs for winter stock water outside the riparian zone. Removed corrals from riverbank and rebuild 350 feet away from the river. Replanted the old corral site with native trees and shrubs.
Okanogan Conservation District and the Pacific Watershed Institute	USFW	2000	Methow River, Konrad site planting and livestock watering	Fenced .75 miles of river bank and planted .25 miles of streambank and irrigate riparian plantings. Developed solar stock water system for trough and storage.
Okanogan Conservation District and the Pacific Watershed Institute	Salmon Recovery Funding Board 00-1681	2000 - ongoing	Beaver Creek Fish Passage Barrier Amelioration	This project will provide fish passage that is compatible with irrigation needs on Beaver Creek in addition to eliminating one diversion dam and replacing it with a well.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Okanogan Conservation District and the Pacific Watershed Institute	Salmon Recovery Funding Board	ongoing	Okanogan County Fish Passage Barrier Survey	This project will inventory and access all potential fish passage barriers including unscreened diversions in Okanogan County. Identified barriers will be prioritized for correction based on quality and quantity of habitat.
Pacific Watershed Institute	Jobs for the Environment Program & USFS, FWS, WDFW and PWI	1996 - 1998	Restored riparian vegetation in a mile long dispersed recreation area near the Chewuch River	Activities included road obliteration, fencing, seeding in meadow areas, stream bank re-grading and re-vegetation with associated LWD (LWD) placement in key locations. Construction of a bar apex jam to retain and encourage development of off-channel habitat areas. Placement of non-anchored log complexes within the off-channel area for cover.
Pacific Watershed Institute	Jobs for the Environment Program & USFS, FWS, WDFW and PWI	1996 - 1998	Enhanced and added road slope protection in a large side channel of Chewuch	Activities included: 1) development of a smaller pilot-channel across and island to deflect flow away from the road slope and provide future side channel development opportunities; 2) construction of lateral bar jams to deflect flow into the new side channel; and 3) construction of a large chaotic crib structure to protect the road slope while providing instream habitat and cover.
Pacific Watershed Institute	Jobs for the Environment Program & USFS, FWS, WDFW and PWI	1996 - 1998	Opened .5 mile side channel to increase year-round flow for juvenile rearing and flood refugia habitat	Enhanced the stream channel with 6 LWD complexes to provide summer and winter cover. Investigated ground water relationships to alluvial fan geomorphology as it relates to side channel development and winter habitat availability.
Pacific Watershed Institute	Jobs for the Environment Program & USFS, FWS, WDFW and PWI	1996 - 1998	Restored access to flood channels on a channelized alluvial fan	Activities included the excavation of portions of constructed boulder berms to bankfill level and reshaping connections to the main flow to prevent sub-surface flow during summer.
Pacific Watershed Institute	Jobs for the Environment Program & USFS, FWS, WDFW and PWI	1996 - 1998	Chewuch off channel restoration	Addition of 6 LWD structures to a depositional area of the Chewuch in order to maintain an off–channel area, provide hiding cover and shading. Also, restoration of riparian area in a dispersed campsite.
Pacific Watershed Institute	Jobs for the Environment Program & USFS, FWS, WDFW and PWI	1996 - 1998	Metho0w River native plant collection and propagation program for re-vegetation projects	Propagation methods include transplants, shrub, tree and forb rooted cuttings, and seed collection and propagation to container stock. Project includes work with local and regional nurseries to propagate plants.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Pacific Watershed Institute	Jobs for the Environment Program & USFS, FWS, WDFW and PWI	1998	Monitoring of 6 restoration projects completed in 1996 & 1997	Monitoring includes re-vegetation success, LWD structures, channel geometry, sediment, habitat condition, hydrology and fish presence.
Upper Columbia Regional Fisheries Enhancement Group (UCRFEG) NCRS, OCD		2000	Fraser Creek Riparian Fence	Installed 1.25 miles of fencing to prevent livestock access to the stream and riparian zone.
UCRFEG		2002	Black Pine Basin Riparian Fence	Installed 1.1 miles of fencing to prevent livestock access to the stream and riparian zone.
UCRFEG		2002	South Fork Beaver Creek Riparian Fence	Installed .1 miles of fencing to prevent livestock access to the stream and riparian zone.
UCRFEG			Okanogan Fish Passage Inventory	Assisted Okanogan Conservation District with their assessment of barriers to fish migration.
WDFW	WWRP		Methow Corridors Project, Methow Corridors II Project, Methow Corridors Project III, Methow Watershed Project	Over $20 million of Washington Wildlife Recreation Program (WWRP) funding used to secure several thousand acres of critical lower elevation fish and wildlife habitats.
WDFW	Douglas County Public Utility District as part of the Wells Dam Settlement Agreement	ongoing	Spring Chinook artificial supplementation and captive broodstock program	Artificial supplementation and captive broodstock for spring Chinook
WDFW		ongoing	Operation and Management of the Methow Fish Hatchery for the production of ESA-listed upper Columbia River spring Chinook salmon	The program is responsible for broodstock collection spawning, rearing and releasing up to 550,000 spring Chinook smolts into the Methow River Basin annually.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
WDFW		ongoing	Summer Chinook artificial supplementation program	Operation and management of the Carlton Acclimation Pond and Eastbank Hatchery Facility for production of summer Chinook (400,000 smolts) as a component of the summer Chinook supplementation program associated with mitigation for the construction and operation of Rock Island Dam. The program collects broodstock and spawns, incubates, and releases 400,000 yearling summer Chinook into the Methow subbasin annually.
WDFW			Summer Chinook supplementation program evaluation	The program is funded by Chelan County Public Utility District as part of the Rock Island Project Settlement Agreement. Implementation of the summer Chinook supplementation hatchery evaluation program. The program monitors and evaluates the efficacy of supplementation efforts in the enhancement of summer the Chinook population in the Methow subbasin.
WDFW	Douglas County Public Utility District	ongoing	Summer steelhead hatchery supplementation program.	Operation and management of the Wells Dam Hatchery for the production of ESA-listed upper Columbia River steelhead in the Methow subbasin. The program collects broodstock and spawns, incubates and releases approximately 350,000 steelhead smolts in to the Methow Basin annually. It also provides the egg source for the 100,000- steelhead smolts stocked annually in to Methow subbasin from the Winthrop NFH.
WDFW	Chelan, Douglas and Grant County PUDs		Adult steelhead migration and spawning disposition	WDFW participated in a steelhead radio telemetry study in the mid-Columbia Region to assess the upstream migration and eventual spawning disposition of Upper Columbia River ESA-listed summer steelhead. The radio tags are applied at Priest Rapids Dam and monitored throughout migration and spawning, and includes the monitoring in Methow subbasin.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
WDFW	WDFW	ongoing	Upper Columbia River steelhead stock assessment	The stock assessment project occurs at Priest Rapids Dam and collects biological data related to enumeration, origin (hatchery/wild), age (fork-length and scale), and record of marked/tagged steelhead migrating above Priest Rapids Dam, including those destined for the Methow basin.
WDFW	WDFW	ongoing	Species abundance and distribution	WDFW fisheries personnel conduct annual and periodic species distribution abundance surveys in the Methow Basin.
WDFW	WDFW	ongoing	Creel Census Survey Information	Creel census information is gathered annually during the Methow River trout fishery season to assess angler success, angler effort, species assemblage, and population characteristics.
WDFW	WDFW	ongoing	Methow Wildlife Area Management Plan	Plan developed for WDFW lands in the Methow subbasin to conserve fish and wildlife resources and maximize wildlife-based recreation. Includes removing fish passage barriers and installing fish friendly irrigation components.
WDFW	WDFW		Wildlife species management or recovery plans	Developed Sharp-tailed Grouse Recovery Plan, Lynx Recovery Plan, Elk Management Plan, Black Bear Management Plan, Bald Eagle Recovery Plan.
WDFW	WDFW		Lynx research	Completed ongoing research projects in the 1980s documenting lynx ecology and potential management conflicts.
WDFW	WDFW & Northwest Ecosystem Alliance	ongoing	North Cascades Rare Carnivore Camera Survey	An ongoing volunteer partnership with Northwest Ecosystem Alliance to survey North Cascades backcountry areas with self-activated cameras for rare carnivores. Multiple occurrences of lynx and wolverine documented to date.
WDFW & USFS	Trust for Public Lands		Townsend’s Big-eared Bat Project	Project involved construction of a “bat house” to replace a currently occupied structure (Rattlesnake House) slated for demolition or relocation and site preparation in anticipation of new funds to move an existing structure.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
WDFW & USFS			Mule Deer Research	Research projects in the 1970s and 1980s collected data on mule deer ecology and habitat needs for the West Okanogan herd.
WDFW & USFS & National Park Service (NPS)	WDFW & USFS & National Park Service (NPS)		Grizzly Bear/Gray Wolf Investigations Project	Project evaluated the status of grizzly bears and gray wolves in the North Cascades, and the ability of the North Cascades Ecosystem to support a viable grizzly population
WDFW & USFS & National Fish and Wildlife Foundation	WDFW & USFS & National Fish and Wildlife Foundation		Forest Carnivore Survey	Challenge cost-share project with National Fish and Wildlife Foundation to survey Okanogan National Forest lands for lynx, wolverine, fisher, and marten.
WDFW & USFS	WDFW & USFS, FWS & Skagit Environmental Endowment Commission		Wolverine Investigations	Document wolverine distribution and reproductive status.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	1998	Barkley (Methow River)	Fish screen completed summer 1998. On line 1999 irrigation season, tuneup complete spring 2001.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	1998	Chewuch (Chewuch River)	Completed fall 1998. Tuneup completed. Contributed 10 cfs to river.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	1999	Larson Ditch (Libby Creek)	Completed spring 99, Cap funded, owner cost-share.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	1999	WCRD (Wolf Creek)	Completed sprint 1999, did not divert until spring 2000, tuneup complete 5/31/00. Low flow season 10 cfs contributed to river because of Patterson Lake storage. Owner cost share SRFB. EI 75k, NMFS 25k.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	1999	Buttermilk (Buttermilk Creek)	Completed summer 1999, tuneup complete 5/31/00, (*) GSRO 17.5K, NMFS 11.5K, owner cost-share, (IAC not used)
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	1999	Eightmile (USFS, Eightmile Creek)	Completed spring 1999, USFS funded 18K. Point of diversion change contributed 8cfs to Chewuch.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2000	Twisp Power (Twisp River)	Completed spring 00, tuneup complete by 5/31/00, SRFB EI 80 K, NMFS 40K. WDFW negotiations returned 3 cfs to river.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2000?	Beaver Creek Basin (Beaver, Frazer, Storer)	IAC contract extension to 10/31/00, SRFB EI 100K, Proviso 50K. Will be completed Spring of 1991.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2000	Fulton (Chewuch River)	Completed spring 00, tuneup complete fall 2000, SRFB EI 100K, NMFS 50K, SRFB early 2000 33.5K, NMFS 16.5K. Saved 6 cfs with WDFW negotiations.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2000	Twisp Airey (Twisp River)	Conversion to pump completed spring 2000,GSRO 30K, [Cap Sup 25K, tuneup not yet completed, County has lead] 4 cfs returned to river, change of point of diversion.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2000	Skyline (Chewuch River)	Completed summer 00, SRFB early 2000 100K, NMFS 40K, Proviso 25K. Lined ditch. Saved 8 cfs.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2001	Early Winters (Early Winters Creek)	Pre-design, scheduled construction spring 01, funded SRFB early 2000 100K, NMFS 36.5K, Proviso 14.5K. Creek rebuilt by USFW. Point of diversion changes negotiated and completed. Low flow trigger returned to creek. 6cfs.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2001	McKinney Mtn. (Methow River)	Re-screened with 3/32 perforated plate 1999. Meets current criteria, scoping stage, flows an issue, scheduled spring 2001. Cap funded 25K.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2001	Fog Horn (Methow River)	FWS responsibility, scoping stage, construction scheduled fall 2001. Cap support 65K, FWS 100K.
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2001?	Rockview (Methow River)	Agency screen, re-screened with 3/32 mesh 2000 meeting criteria, pre-design 2001, Proviso 120K
WDFW, Irrigation Districts, USFS, FWS, others	WDFW, Irrigation Districts, USFS, FWS, others	2001	Kumn Holloway (Methow River)	Re-screened with 3/32 perforated plate 99. meets current criteria, scoping stage, construction scheduled spring 2001, Proviso 20K.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2000	Patterson Lake	Modified spillway to allow additional 450 acre-feet of water storage.
Wolf Creek Reclamation District, USFS	SRF Board and National Wildlife Foundation Funds	1999 - 2000	Lower Wolf Creek	Modified creek channel to improve passage opportunities for migrating fish.
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2000 - 2001	WCRD Distribution System	Installed 1,100 feet of new 21" PVC piping. Estimated saving of 500 to 800 acre-feet per year.
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2001	WCRD Distribution System	Installed 5,500 feet of new 18" PVC pipe in WCRD distribution system.
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2001	WCRD Distribution System	Reconstructed existing WCRD structure.
U.S. Forest Service	U.S. Forest Service	1994	Doe Creek	Completed road cut and fill stabilization. Project shifted road further into the hill, seeded, matted, planted, created a drainage ditch and kept sediment laden water from reaching the stream.
U.S. Forest Service	U.S. Forest Service	1994	Chewuch Road	21 miles of non-system roads retired.
U.S. Forest Service	U.S. Forest Service	1994	Chewuch	Survey done to identify the dispersed sites along the Chewuch. Modifying sites to reduce their impact on riparian and aquatic resources prioritized.
U.S. Forest Service	U.S. Forest Service	1994	Chewuch	Installed two miles of electric fence, two miles of barbed wire fencing (E. Chewuch). Cattle guard installed to protect main Chewuch River from migrating cattle.
U.S. Forest Service	U.S. Forest Service	1994	Poorman Creek	Completed variety of road obliteration, planting seeding, riparian rehabilitation projects.
U.S. Forest Service	U.S. Forest Service	1994	Eightmile Ranch	Pulled the fence line back from the river and planted Ponderosa pine.
U.S. Forest Service	U.S. Forest Service	1994	Lake Creek Trail	Rerouted short segments of trail and rehabilitated part that could deliver sediment into the river.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
U.S. Forest Service	U.S. Forest Service	1995	Chewuch Trail	Rerouted short segments of trail and rehabilitated part that could deliver sediment into the river.
U.S. Forest Service	U.S. Forest Service	1994	East Chewuch	Completed riparian surveys.
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Pre-work for LWD material for Chewuch, includes low elevation flights, channel cross-sections and design.
U.S. Forest Service	U.S. Forest Service	1995	Chewuch Campsites	Dispersed sites. Rehab work in 15-20 sites. Minor maintenance on work done previous year.
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Contracted with Watershed Restoration Program at Wenatchee Valley College for road/culvert inventory in uplands.
U.S. Forest Service	U.S. Forest Service	1995	Bromas	Completed road stabilization project.
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Replaced culverts off East Chewuch.
U.S. Forest Service	U.S. Forest Service	1995	Poorman Creek	Replanted riparian units and obliterated some road.
U.S. Forest Service	U.S. Forest Service	1995	Falls Creek	Completed seeding and cut/fill of slopes. Tested various approaches to see what worked best. Results were variable depending on slope orientation.
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Installed 2 miles fencing.
U.S. Forest Service	U.S. Forest Service	1995	Chewuch?	Began Proper Functioning Condition survey for riparian areas and instituted appropriate responses.
U.S. Forest Service	U.S. Forest Service	1996	Chewuch	Implemented large woody material project, two sites included large wood jams in streams and re-vegetation of area.
U.S. Forest Service	U.S. Forest Service	1996	Chewuch	Rehabilitation work on developed sites includes defining river access and moving use further away from shore.
U.S. Forest Service	U.S. Forest Service	1996	Chewuch and others	Many small road fixes, some obliteration of roads, closure, culvert work. Includes Chewuch, Eightmile, Falls, Ortell, Island Mountain, Sherwood, Sweetgrass, War Creek, Little Bridge and Buttermilk.

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
U.S. Forest Service	U.S. Forest Service	1996	Long Creek	Moved water troughs in Long Creek and Cub Pass.
U.S. Forest Service	U.S. Forest Service	1996	Reynolds Landing	Rehabilitation work completed.
U.S. Forest Service	U.S. Forest Service	1996	Rogers Lake	Research Natural Areas designation in process, results in compilation of biological and physical information about Rogers's lake and Chewuch above Andrews Creek.
U.S. Forest Service	U.S. Forest Service	1997	Chewuch River	Site 9 on Chewuch River, added large wood.
U.S. Forest Service	U.S. Forest Service	1997	Vanderpool Crossing	Removed culvert, made passage fish friendly and re-vegitated area.
U.S. Forest Service	U.S. Forest Service	1997	Eightmile	Dispersed and developed site rehabilitation.
U.S. Forest Service	U.S. Forest Service	1997	Blackpine Lake	Beaver Creek fence.
U.S. Forest Service	U.S. Forest Service	1997	Chewuch	Rehabilitation and maintenance of Chewuch sites.
U.S. Forest Service	U.S. Forest Service	1998	Cub Creek	Road package prepared to determine which roads could be closed in preparation for implementation in 2000.
U.S. Forest Service	U.S. Forest Service	1998	Twentymile Creek	Road rehabilitation.
U.S. Forest Service	U.S. Forest Service	1999	Throughout	Modifications in campsites and campgrounds are revisited and maintained.
U.S. Forest Service	U.S. Forest Service	1999	Chewuch	Closed or obliterated USFS roads in Chewuch area.
U.S. Forest Service	U.S. Forest Service	1999	Barney creek (Falls Creek)	Road obliteration halfway completed.
U.S. Forest Service	U.S. Forest Service	2000	Throughout	Dispersed campsite maintenance
BOR	NA	2001 – ongoing	Methow Habitat Mitigation	All listed species – Greg Knott 509.997.0028 gknott@pn.usbr.gov
CBC	02-1524R	2003-2003	Chewuch Basin Irrigators Conveyance	All listed species – Chris Johnson 509.422.0300 $ 349,360
Chewuch Canal/Fulton Ditch Co	00-1679N	2000	Chewuch & Fulton Canal Joint Study	All listed species – Dave Sabold 509.996.2368 $ 61,592

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Methow Conservancy	01-1434	2003 – ongoing	Methow R/H Acquisition Supplement 2001	Katharine Bill $ 499,800
Methow Conservancy	02-1650	2003 – ongoing	Methow Critical Riparian Habitat Acq	Katharine Bill 2,303,542
Methow Valley Flyfishers, Methow	NA	2001 - 2001	Belsby Spring Ck Restoration Project	Ben and Leslea Dennis 509.996.2784 $ 12,000+
MSRF	00-1676	2000 - ongoing	Lower Twisp R side Channel Acquistion	Steelhead, Spring Chinook Terry O'Reilly 509.996.3689 $ 365,626
MSRF	01-1419	2001 - ongoing	Sloan Witchert Slough Habitat/Irrigation	Steelhead, Spring Chinook Terry O'Reilly 509.996.3689 $ 281,397
MSRF	01-1427	2001 - ongoing	Early Winters CK Dike Removal	Steelhead, Spring Chinook Terry O'Reilly 509.996.3689 $ 255,041
MSRF	NA	2001 - ongoing	Lower Twisp Habitat Restoration	Steelhead, Spring Chinook Terry O'Reilly 509.996.3689 $ 300,000
MSRF	NA	2002 - ongoing	Eightmile ditch conversion to wells	Steelhead, Spring Chinook Terry O'Reilly 509.996.3689 $ 140,000
NRCS	NA	1998	French Ck revegetation and water development	Randy Kelley 509.422.2750 ext 3 randy.kelley@wa.usda.gov
NRCS, Okanogan County	NA	2000	Hancock Ck cattle exclusion and revegetation	Randy Kelley
OCD	01-1395	2002 – ongoing	Beaver Ck Coordinated Resource Mgt Plan	Craig Nelson $ 81,464
OCD	NA	1992 - 1994	Lower Methow tributary restoration	Craig Nelson
Okanogan County	99-1346	?	Skyline Ditch Pipe Installation	All listed species Julie Dagnon $ 18,415
Okanogan County	NA	2000 – ongoing	Methow Stream Gaging	All listed species Julie Dagnon

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
Okanogan County	NA	2002 – ongoing	Methow Ditch Diversion Measuring Devices	All listed species Julie Dagnon
Okanogan County	NA	2002 – ongoing	Methow Habitat Area Assessment	All listed species Julie Dagnon
Okanogan County	NA	2001 - 2003	Methow Groundwater Assessement	All listed species Julie Dagnon
PWI	00-1678	2001 - 2002	Assessment Twisp R Watershed	All Species Sandra Strieby 509.996.3452 $ 185,626
PWI, USFS	NA	1995 - 1996	Chewuch Wateshed Strategy	All Species Sandra Strieby
PWI, USFS, MVRD, JFE, YIN	NA	1996 – 1999	Chewuch Watershed Restoration	All Species Sandra Strieby
PWI	NA	1998 – 2001	Early Winters Ck Restoration	All Species Sandra Strieby $ 159,000
PWI	NA	1998 - 2002	Cub, Little Cub, Bearfight creeks Restoraiton	All Species Sandra Strieby $ 523,003
PWI, OCD, MSRF, JITW, Landowners	NA	2000 – 2004	Methow Basin Restoration	All Species Sandra Strieby $ 490,830
FWS	NA	2002 - 2002	Goat Ck instream habitat restoration	Bull Trout, rainbow, spring Chinook Kate Terrelll
USFS	NA	1993 - ongoing	Basinwide Fencing Projects	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us $ 47,777
USFS	NA	1999 - ongoing	Basinwide campground improvement	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us $

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
USFS	NA	1996 - ongoing	Basinwide Dispersed Campsite Maintenance and Rehabilitaiton	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us $ 14,100
USFS	NA	1993 - ongoing	Chewuch dispersed recreation site restoration	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us $ 30,000
USFS	NA	2000 - 2000	Basinwide Culvert Inventory	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us
USFS	NA	1995 - 1996	Chewuch Basin Road and Culvert Inventory	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us $ 4040 +
USFS	NA	1993 - ongoing	Basinwide Road Obliteration, Restoration, Closure	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us $ 57,000
USFS	NA	1995 - 2002	Basinwide Culvert Replacement	All Species Jennifer Molesworth 509.996.4010 jmolesworth@fs.fed.us
USFS	NA	1995 - 1996	Basinwide Proper Function Condition surveys	All Species Jennifer Molesworth 509.996.4010
USFS	NA	1994 - 1994	Texas Ck water development	Jennifer Molesworth 509.996.4010
USFS	NA	1996	Poorman Ck revegatation	Jennifer Molesworth 509.996.4010
USFS	NA	1996 - 1996	Chewuch trail rehab	Jennifer Molesworth 509.996.4010

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results
USFS	NA	1996 - 1998	Pete Ck reveg and weed control	Jennifer Molesworth 509.996.4010
UCRFEG	00-1217	2001 - 2003	Hancock Creek Restoration Project	Juvenile Chinook, Steelhead Larry Bailey 509.486.2400 larry@ncidata.com $ 17,654
WDFW	00-1158	C	Skyline Canal Fish Screen	All Species Pat Schille $ 165,000
WDFW	00-1165	NA	Fulton Canal Fish Screen	All Species Pat Schille $ 50,000
WDFW	99-1324	C	Beaver Ck Watershed Fish Passage	All Species John Easterbrooks $ 142,727
WDFW	99-1325	C	Twisp-Power Ditch Fish Screen	All Species John Easterbrooks $ 130,000
WDFW	99-1328	C	Fulton Canal Fish Screen	All Species Pat Schille $ 150,000
WDFW	00-1156	C	Early Winters Canal Fish Screen	All Species Pat Schille $ 151,000
WDFW, TPL	23012	NA	Arrowleaf/Methow River Conservation Easement	Craig Lee
WCRD	00-1682	2001 - ongoing	Wolf Ck Diversion /Patterson Mtn	Spring Chinook, Bull trout Nim Titcomb 509.996.3302 ntitcomb@methow.com $ 275,373
WCRD	NA	2004	Wolf Creek Rock Pool Structures	Spring Chinook, Bull trout Nim Titcomb 509.996.3302 ntitcomb@methow.com $ 90,000

Appendix E: Methow Subbasin Hatcheries and Production Summaries

Winthrop National Fish Hatchery

The Winthrop NFH was established by the GCFMP in 1937 to help mitigate for anticipated anadromous fish losses above Grand Coulee Dam (Grand Coulee Dam was completed in 1942). The hatchery is funded by the Bureau of Reclamation and operated by the U.S. Fish and Wildlife Service and is a sub-station of the Leavenworth NFH Complex. The Columbia River Fisheries Management Plan under the U.S. v Oregon decision of 1969 set production goals. Winthrop NFH is located near Winthrop, Washington on the Methow River.

Prior to the mid-1970s, cutthroat, rainbow, and brook trout, sockeye, summer steelhead, coho, and spring and summer Chinook salmon were propagated at Winthrop NFH. Current production consists of an Endangered stock of spring Chinook, with a total release goal of 600,000 smolts annually.

Table 65 Yearling spring Chinook salmon released from Winthrop NFH, 1990 to 1999

Year	Number Released	Year	Number Released
1990	1,121,395	1995	770,847
1991	1,055,056	1996	112,395
1992	624,771	1997	14,620
1993	950,624	1998	324,851
1994	556,313	1999	545,062

The hatchery also propagates listed summer steelhead and unlisted coho salmon. From 1990 to 1999, an average of 197 spring Chinook adults have returned to the facility (Carie and Hamstreet 2000). Return% by brood year has varied considerably, ranging from a high of .165% in 1980 to a low of .001% in 1990 ().

Non-indigenous Carson origin stock are being phased out and replaced with Methow Basin Composite Stock (Carie and Hamstreet 1999). At present no sport or tribal harvest occurs in the Methow subbasin. Winthrop National Fish Hatchery developed an HGMP which was submitted to NOAA-fisheries November 2002.

Table 66 Yearling spring Chinook releases, total returns and% returns to Winthrop NFH 1979-1993

Brood Year	Releases	Total Returns	% Return
1979	966,300	402	0.042
1980	712700	1175	0.165
1981	953508	1028	0.108
1982	985081	877	0.089
1983	1167625	1031	0.088
1984	1062794	736	0.069

Brood Year	Releases	Total Returns	% Return
1985	1069293	163	0.015
1986	1090200	90	0.008
1987	865734	117	0.014
1988	1121395	703	0.063
1989	1055056	263	0.025
1990	624771	3	0.001
1991	950624	21	0.002
1992	556,313	202	0.036
1993	770,847	370	0.048

Source: Carie and Hamstreet 1999

Coho salmon are cultured at the Winthrop NFH as part of the of coho reintroduction feasibility study. The Yakama Nation acclimated and released between 69,000 and 341,000 yearling coho smolts in the Methow subbasin between 1995 and 1998 from the Winthrop NFH and acclimation sites on the Chewuch River and Wolf Creek. Subsequent releases from the Winthrop NFH occurred in 2000 and 2001 and totaled 199,763 and 260,319 smolts respectively (K. Murdoch, YIN, pers.comm.).

Estimates of hatchery coho smolt-to-adult survival in the Methow for releases made in 1995-1997 averaged 0.001% (). This survival rate was based on the number of coho adults and jacks passing Wells Dam as enumerated via video monitoring (Dunnigan 2000).

Table 67 Release years, numbers, locations, and smolt-to-adult survival estimates for all coho smolt releases in the Methow sub-basins 1995-2001

Year	Release Location	Release Number	Adult Returns	Smolt-to Adult Survival (%)	Counting Location
1995	Winthrop NFH	70,000	1	0.001%	Wells Dam
1996	Winthrop NFH	235,300			
	Chewuch R.	100,000			
		335,300	3	0.001%	Wells Dam
1997	Winthrop NFH	69,200			
	Chewuch R.	5,000			
		74,200	1	0.001%	Wells Dam
1998*	Winthrop NFH	169,200			
	Chewuch R.	95,099			
	Wolf Creek	76,847			
		341,146	246	0.072%	Wells Dam Trapping and Video
1999	Wenatchee River releases only				
2000	Winthrop NFH	199,763	N/A	N/A	N/A
2001	Winthrop NFH	260,319	N/A	N/A	N/A

*Note: In 1998 program emphasis shifted to local broodstock development.

In 1998 the reintroduction program shifted emphasis to the development of a localized broodstock. As the program transitions from the exclusive use of lower Columbia River hatchery coho towards the exclusive use of in-basin returning broodstock, it is expected that positive trends in smolt-to-adult survival will be observed.

Returns in 1999 calculated from the total number of coho collected for broodstock at Wells Dam and the Wells Dam passage counts, were an order of magnitude higher than previous smolt-to-adult estimates. Based on trapping and video counts, 246 adult coho returned to the Methow Basin resulting in a smolt-to-adult survival rate of 0.07%.

Methow Fish Hatchery

The Methow Fish Hatchery was constructed in 1992 to compensate for passage mortality of spring Chinook salmon at Wells and Rock Island dams. Douglas County PUD funded the construction and is responsible for funding operations and maintenance (Wells Dam Settlement Agreement 1990), while WDFW operates the facility. The Methow Fish Hatchery is located on the Methow River.

The central facility consists of 24 start tanks, 15 raceways and an acclimation pond. In addition 3 of the existing raceways function as adult holding ponds. The facility also has two satellite facilities located on the Chewuch and Twisp rivers. The satellite facilities provide adult trapping and juvenile acclimation capabilities. Details of the hatchery facility and acclimation ponds are included in a 1995 Washington Department of Fish and Wildlife summary report on the Methow subbasin spring Chinook salmon hatchery program (Bartlett 1997).

The Methow Fish Hatchery operates as an adult-based supplementation program using multiple adult broodstock collection locations including the Chewuch, Twisp, and upper Methow rivers. Additional supplementation includes volunteer returns to Methow Fish Hatchery, Winthrop NFH and Wells Hatchery on the Columbia Mainstem.

The hatchery also operates as a captive broodstock program in the Twisp River. The long-term production objective for the Methow Fish Hatchery was set at 738,000 yearling spring Chinook smolts in the Wells Dam Settlement Agreement (1990). However, that production objective was modified during the development of the Mid-Columbia Habitat Conservation Plan (MCHCP) to 550,000 yearlings at 15 fish/lb. (BAMP 1998).

In years with adequate adult returns, production is limited by an insufficient number of start tanks and raceways. In low water years, production is limited by insufficient water volume because the Methow Fish Hatchery's water supply depends on a combination of ground water and surface water from the Methow River.

The long-term production objective and the interim production objective are both consistent with the Draft Biological Opinion for Section 10 Permit 1196 (ESA-Section 7 Biological Opinion for Section 10 Permit 1196, NMFS, 1999).

The location and extent of the trapping for the adult based supplementation program is determined by the expected adult return to Wells Dam (based on lower river dam counts). Broodstock collection in 1994 and 1995 maximized escapement for natural production and created a "bottleneck" in the supplementation program by limiting effective population size.

Effective population size for all artificial production in the subbasin consisted of 63 fish (32% extraction rate) in 1994 and 20 fish (20% extraction rate) in 1995. A summary of the number and location of spring Chinook broodstock collected and retained as part of the Methow River Basin spring Chinook adult based supplementation program, 1992-1999 is contained in **Table 68**.

Table 68 Number and location of spring Chinook broodstock collected and retained as part of the Methow River Basin spring Chinook adult based supplementation program, 1992-1999

Brood Cycle								
Trapping Location	1992	1993	1994	1995	1996	1997	1998	1999
Wells Dam	0	0	0	6	461	192	409	309
Tributaries	54	152	17	0	0	0	0	0
Winthrop NFH	332	646	29	7	0	231	0	12
Methow FH	0	99	17	7	0	131	0	56
Total Escapement to Wells Dam	1573	2626	258	113	461	1163	439	649

Source: Brown 2000. Unpublished data, WDFW.

Poor returns and related limited broodstock collection compounded with by historically poor spring Chinook replacement rate of .669 recruits per spawner (1985-1990; LaVoy unpublished) prompted the development of a 3-tiered broodstock collection protocol for the spring Chinook supplementation program in the Methow subbasin (**Table 69**).

Under a revised approach adopted in 1996, the location and extent of broodstock collections is based on projected escapement at Wells Dam. Broodstock collection protocols are now developed annually and are determined by adult escapement above Wells Dam, expected escapement to tributary and hatchery locations, estimated wild/hatchery proportion, and production objectives and stock origin (endemic/non-endemic).

Table 69 Broodstock collection guidelines of the Methow Basin spring Chinook supplementation plan (ESA Section 7 Draft Biological Opinion, Section 10 Permit 1196)

Wells Escapement Projection	Broodstock Collection Objective
< 668	100% collection of Wells Dam escapement; place all fish into the adult-based supplementation program.
>668 <964	Pass a minimum of 296 adults upstream of Wells Dam for natural spawning.
> 964	Collection at levels to meet interim production level of 550,000 and 600,000 smolts at Methow Fish Hatchery and Winthrop NFH, respectively.

The Captive Broodstock Program promotes the unique population-specific attributes of the Twisp River population and constitutes an alternative to the spread the risk hatchery production strategy. Beginning with brood year 1997, approximately 1,000 to 1,500 eyed-eggs of pre-emergent fry were hydraulically removed from redds on the Twisp River (Bartlett, WDFW pers.comm.).

The eggs/pre-emergent fry were then transferred to the Methow Fish Hatchery where they reared to a yearling stage, and later transferred to AquaSeed Inc. in Rochester, Washington, to mature to adult stage. However, because of funding allocation difficulties, the Twisp River captive broodstock program has not obtained brood year components since 2000.

The hatchery and acclimation ponds are operated in a manner that is consistent with accepted aquaculture standards and those identified in the Wells Dam Settlement Agreement. Broodstock handling, spawning, fertilization, incubation, rearing, fish transport, and release activities are detailed in annual summary reports of specific brood years for the Methow Basin Spring Chinook Salmon Hatchery Program (Bartlett et al. 1994; Bartlett 1996; Bartlett 1997; Bartlett 1998; Bartlett 1999; and Jateff 2001).

Production at the Methow Fish Hatchery has varied considerably since the program began with brood year 1992 (). The variability in production is entirely a function of poor adult returns and different broodstock collection strategies stemming from adaptive management strategies for this tenuous population. Smolt production from the Methow Fish Hatchery has averaged 288,442 smolts annually, representing 52.4% of the interim production level identified in the BAMP (1998).

Table 70 Methow Fish Hatchery complex spring Chinook production, 1994-2001 (PSMFC Coded-Wire Tag Data Base)

Brood Year	Migration Year	Stock	Rearing site	Release site	Number released	ESA Status
1992	1994	Twisp	Methow FH	Twisp R.	35,881	No
1992	1994	Chewuch	Methow FH	Chewuch R.	40,882	No
1993	1995	Twisp	Methow FH	Twisp R.	116,749	No
1993	1995	Chewuch	Methow FH	Chewuch R.	284,165	No
1993	1995	Methow	Methow FH	Methow R.	210,849	No
1994	1996	Twisp	Methow FH	Twisp R.	19,835	No
1994	1996	Chewuch	Methow FH	Chewuch R.	11,854	No
1994	1996	Methow	Methow FH	Methow R.	4,477	No
1995	1997	Methow	Methow FH	Methow R.	14,258	No
1996	1998	Methow	Methow FH	Methow R.	202,947	No
1996	1998	Twisp	Methow FH	Twisp R.	76,689	No
1996	1998	Chewuch	Methow FH	Chewuch R.	91,672	No
1997	1999	Methow	Methow FH	Methow R.	332,484	Yes*
1997	1999	Twisp	Methow FH	Twisp R.	26,714	Yes*
1997	1999	Chewuch	Methow FH	Chewuch R.	132,759	Yes*
1998	2000	Methow	Methow FH	Chewuch R.	217,171	Yes*
1998	2000	Methow	Methow FH	Methow R.	218,499	Yes*
1998	2000	Twisp	Methow FH	Twisp R.	15,470	Yes*
1999	2001	Methow Comp.	Methow FH	Methow R.	186,775	Yes*
1999	2001	Twisp	Methow FH	Twisp R.	67,408	Yes*
Total					2,307,538	
Average					288,442	

* Formal ESA Endangered-listing March 24, 1999

Smolt to adult return rates are currently available for brood years 1992-1995. The brood year 1995 Methow origin production component resulted in the greatest smolt-to-adult return rate at .7% through age 4. It is likely that the brood year 1995 smolt-to-adult survival rate will be greater once the entire brood year has returned (age 4-6). The remaining brood years smolt-adult survival rates ranged between .10% and .01% ().

Production of Methow, Chewuch and Twisp origin fish were segregated into low and high ELISA designations and differentially marked to assess BKD impacts on smolt-adult survival rates. Survival rates between high and low ELISA groups within a specific production group generally favored the low ELISA groups.

Table 71 Smolt to adult survival rates for spring Chinook propagated at the Methow Fish Hatchery, Brood Year 1992-1995

	Brood year			
Stock	1992	1993	1994	1995
Methow	NA	Low ELISA -.09%	.02%	.7% *
		High ELISA -.08%		
Chewuch	0.10%	Low ELISA - .05%	.02%	NA
		High ELISA - .02%		
Twisp	0.06%	Low ELISA - 0.04%	.03%	NA
		High ELISA - .01%		

*Survival rate through age 4

Source: BY 1992-1993, Bartlett 1997; BY 1994-1995, B. Jateff, WDFW, pers.comm.

Wells Dam Hatchery

Wells Dam Hatchery currently provides the majority of the steelhead production for the Methow subbasin as part of the Wells Dam Settlement Agreement in 1990. The hatchery's production objective is 350,000 steelhead smolts destined for the Methow subbasin (NMFS 1998).

The Winthrop NFH also contributes 100,000 steelhead smolts to artificial production in the Methow Basin as part of the GCFMP. The entire Methow subbasin steelhead production is derived from broodstock collections on the west ladder at Wells Dam.

The current broodstock objective is to collect a maximum of 420 adult steelhead from the run-at-large. Adults are held at Wells Hatchery until maturity. Spawning, incubation and rearing all take place at Wells Hatchery. Stocking is conducted primarily as scatter plantings throughout the upper Methow Basin, including upper Methow River, Gold Creek, Eight Mile Creek, Early Winters Creek, Chewuch River, Lost River and Twisp River ().

Throughout the 1980s, smolt production was very high, peaking with brood years 1981 and 1987. Since 1994 production has generally been consistent with the 350,000 smolt objective. Hatchery return rates were variable for brood years 1986/87 through 1993/94 with a return rate average of 1.0% (Bartlett 1999).

Naturally produced steelhead in the Methow subbasin persist at threshold population levels making it difficult to provide a substantial infusion of naturally produced steelhead to complement the hatchery broodstock. Nevertheless, at this time the hatchery program plays an important role in sustaining the steelhead population in the Methow subbasin.

Table 72 Summer steelhead production from the Wells Hatchery stocked into the Methow subbasin, Brood Year 1981-1999

Brood year	Number released	Stock	Release location
1981	38,728	Wells Dam/Chief Joseph dam	Chewuch R.
	784,531	Wells Dam/Chief Joseph dam	Methow R.
	35,745	Wells Dam/Chief Joseph dam	Twisp R.
1982	35,842	Wells Dam/Chief Joseph dam	Chewuch R.
	1,554	Wells Dam/Chief Joseph dam	Gold Cr.
	2,817	Wells Dam/Chief Joseph dam	Lost R.
	143,046	Wells Dam/Chief Joseph dam	Methow R.
	46,143	Wells Dam/Chief Joseph dam	Twisp R.
1983	35,842	Wells Dam/Chief Joseph dam	Chewuch R.
	373,798	Wells Dam/Chief Joseph dam	Methow R.
	24,218	Wells Dam/Chief Joseph dam	Twisp R.
1984	12,600	Wells Dam/Chief Joseph dam	Chewuch R.
	353,862	Wells Dam/Chief Joseph dam	Methow R.
	14,033	Wells Dam/Chief Joseph dam	Twisp R.
1985	32,212	Wells Dam/Chief Joseph dam	Chewuch R.
	1,400	Wells Dam/Chief Joseph dam	Eight Mile Cr.
	3,275	Wells Dam/Chief Joseph dam	Lost R.
	351,537	Wells Dam/Chief Joseph dam	Methow R.
	34,485	Wells Dam/Chief Joseph dam	Twisp R.
1986	37,584	Wells Dam/Chief Joseph dam	Chewuch R.
	1,470	Wells Dam/Chief Joseph dam	Eight Mile Cr.
	60,160	Wells Dam/Chief Joseph dam	Gold Cr.
	339,859	Wells Dam/Chief Joseph dam	Methow R.
	43,980	Wells Dam/Chief Joseph dam	Twisp R.
1987	50,275	Wells Dam/Chief Joseph dam	Chewuch R.
	1,700	Wells Dam/Chief Joseph dam	Eight Mile Cr.
	3,870	Wells Dam/Chief Joseph dam	Lost R.
	593,060	Wells Dam/Chief Joseph dam	Methow R.
	50,835	Wells Dam/Chief Joseph dam	Twisp R.
1988	38,600	Wells Dam/Chief Joseph dam	Chewuch R.
	2,650	Wells Dam/Chief Joseph dam	Eight Mile Cr.

Brood year	Number released	Stock	Release location
	2,650	Wells Dam/Chief Joseph dam	Lost R.
	389,079	Wells Dam/Chief Joseph dam	Methow R.
	48,390	Wells Dam/Chief Joseph dam	Twisp R.
1989	33,300	Wells Dam/Chief Joseph dam	Chewuch R.
	1,500	Wells Dam/Chief Joseph dam	Eight Mile Cr.
	3,075	Wells Dam/Chief Joseph dam	Lost R.
	487,239	Wells Dam/Chief Joseph dam	Methow R.
	35,500	Wells Dam/Chief Joseph dam	Twisp R.
1990	8,000	Wells Dam/Chief Joseph dam	Chewuch R.
	1,680	Wells Dam/Chief Joseph dam	Eight Mile Cr.
	487,567	Wells Dam/Chief Joseph dam	Methow R.
	5,200	Wells Dam/Chief Joseph dam	Twisp R.
1991	4,300	Wells Dam/Chief Joseph dam	Chewuch R.
	1,290	Wells Dam/Chief Joseph dam	Eight Mile Cr.
	1,935	Wells Dam/Chief Joseph dam	Lost R.
	395,350	Wells Dam/Chief Joseph dam	Methow R.
	5,805	Wells Dam/Chief Joseph dam	Twisp R.
1992	5,400	Wells Dam/Chief Joseph dam	Chewuch R.
	2,250	Wells Dam/Chief Joseph dam	Lost R.
	392,815	Wells Dam/Chief Joseph dam	Methow R.
	7,752	Wells Dam/Chief Joseph dam	Twisp R.
1993	4,070	Wells Dam/Chief Joseph dam	Chewuch R.
	324,200	Wells Dam/Chief Joseph dam	Methow R.
	5,920	Wells Dam/Chief Joseph dam	Twisp R.
1994	359,170	Wells Hatchery	Methow R.
1995	255,000	Wells Hatchery	Methow R.
1996	310,480	Wells Hatchery	Methow R.
1997	125,300	Wells Hatchery	Chewuch R.
	127,020	Wells Hatchery	Methow R.
	126,000	Wells Hatchery	Twisp R.
1998	96,225	Wells Hatchery	Chewuch R.
	350,431	Wells Hatchery	Methow R.

Brood year	Number released	Stock	Release location
	127,515	Wells Hatchery	Twisp R.
1999	138,300	Wells Hatchery	Chewuch R.
	39,172	Wells Hatchery	Early Winters Cr.
	126,728	Wells Hatchery	Methow R.
	136,680	Wells Hatchery	Twisp R.
TOTAL	8,521,999		
AVERAGE	448,526		

Carlton Acclimation Pond/Eastbank Hatchery

Artificial production of summer Chinook in the Methow subbasin takes place at the Carlton Acclimation Pond as part of the Rock Island Project Settlement Agreement. The production objective for the Methow subbasin is 400,000 yearling spring Chinook. Since its inception in 1992, the program's average annual smolt production total is 347,508 fish ().

Brood year smolt-adult survival rates for hatchery origin Methow River yearling summer Chinook is outlined in __, and Brood year smolt-adult survival rates for hatchery origin Methow River yearling summer Chinook in __. Stock originated from the Wells Hatchery between 1992 to1995 and from the Methow/Okanogan between 1996 to 1998.

Table 73 Summer Chinook production from the Carlton Acclimation Ponds located on the Methow River

Brood year	Release year	Number released	Stock
1989	1991	420,000	Wells
1990	1992	391,650	Wells
1991	1993	540,900	Wells
1992	1994	402,641	Wells
1993	1995	431,149	Wells
1994	1996	394,042	Methow/Okanogan
1995	1997	346,806	Methow/Okanogan
1996	1998	275,573	Methow/Okanogan
1997	1999	377,211	Methow/Okanogan
1998	2000	205,133	Methow/Okanogan
Total		3,785,105	
Average		378,511	

Table 74 Brood year smolt-adult survival rates for hatchery origin Methow River yearling summer Chinook

Brood year	Release year	Adults produced	Smolt-adult survival%1
1989	1991	2,743	0.653%
1990	1992	415	0.106%
1991	1993	174	0.032%
1992	1994	138	0.034%
1993	1995	126	0.029%
1994	1996	195	0.048%

(Murdoch and Petersen 2000)

[1] The Methow River summer Chinook population adult returns are typically dominated by 4 and 5 year old age classes. The modal age for return years 1993-1998 was five years, with the exception of 1993 and 1998 (Murdoch and Petersen 2000).

Table 75 Methow River adult escapement contribution of Methow/Okanogan summer Chinook released from the Carlton Acclimation Pond

Return year	Hatchery contribution	Tributary escapement	% contribution
1991	0	530a	0
1992	0	364a	0
1993	126	524a	24
1994	474	1054a	45
1995	447	1213a	36.9
1996	97	615a	15.8
1997	64	697a	9.2
1998	150	675b	22.2

(Murdoch and Petersen 2000)

[a] Based on total redd count multiplied by 3.4 fish/redd (Meekin 1967; LaVoy, WDFW, pers.comm.)

[b] Based on total redd count multiplied by 3.0 fish/redd (calculated from broodstock male to female ratio of 2.0:1.0).

Winthrop NFH

Winthrop National Fish Hatchery developed an HGMP which was submitted to NOAA-fisheries November 2002.

Appendix F: EDT Supporting Material

Table 76 Ecological Attribute, Level of Proof, Data Sources and Comments

Ecological Attribute	Level of Proof	Data Sources and Comments
Alkalinity	1) 5% 2) 43% 3) 51%	7 WDOE/USGS watershed monitoring sites (www.ecy.wa.gov/apps/watersheds)
Bed Scour	3) 100%	No empirical data existed for bed scour in the Methow basin. EDT values for bed scour were derived using a multiple regression equation developed in the Yakima basin. Variables included gradient, hydroconfinement, LWD, % pools, fine sediment, high flow, and flow flashy with an r^2 of 0.77. Bed scour estimates were then adjusted to an index value of 2 in known core spawning areas of steelhead and spring Chinook and this correction factor was applied to all other bed scour estimates. Finally, bed scour was given an index score of 4 in all areas over 8% gradient.
Benthic Community Richness	1) 3% 2) 6% 3) 2% 4) 0% 5) 79%	4 WDOE watershed monitoring sites: Values were extrapolated to 8 reaches that were adjacent to the monitoring sites and derived for 3 reaches in the Twisp River that were in between two monitoring sites. The remaining 133 reaches were given the average B-IBI score from the four stations and the level of proof was categorized as "hypothetical". This extrapolation was not based on the opinion or first hand knowledge of an aquatic entomologist so we did not classify it as "expert opinion". Benthic community richness was considered a critical data gap that needs more monitoring and research. (www.ecy.wa.gov/apps/watersheds)
Channel Length	1) 100%	Channel length was measured in Terrain Navigator Pro and was considered empirical data for all reaches.
Channel Width Maximum	1) 66% 2) 1% 3) 19% 4) 14%	USFS habitat surveys PWI (private lands in the lower Twisp River) OCD barrier surveys (private land in Beaver, Gold, and Libby Creeks), unpublished WDFW data (Methow River mainstem from river mile 0-52) USFWS (Goat Creek).
Channel Width Minimum	1) 69% 2) 1% 3) 17% 4) 14%	USFS habitat surveys PWI (private lands in the lower Twisp River) OCD barrier surveys (private land in Beaver, Gold, and Libby Creeks), unpublished WDFW data (Methow River mainstem from river mile 0-52) USFWS (Goat Creek). Notes: Minimum widths of 10 feet were used for all losing reaches that were known to go dry in some or most years (Upper Twisp and Upper Middle Methow). It was important to maintain some minimum width for these reaches or else the model would kill off all fish trajectories every year. Very little detailed information was available to allow us to refine our modeling efforts to accurately capture the spatial and temporal characteristics of these complex hydrological areas. The reaches we defined include areas with some flow and other stretches that go dry in most years. It was known that there was consistent populations of steelhead and spring Chinook above these dry reaches so it was critical to model a usable minimum width throughout the reach.
Confinement	3) 100%	Terrain Navigator Pro (Roads in the floodplain), LFA (described and

Ecological Attribute	Level of Proof	Data Sources and Comments
Man-Caused		sometimes quantified dikes and rip rap), USFS Biological Assessments. This was considered a major data gap. Quantification of dikes, rip rapped areas, and road encroachment is critical to understand loss of riparian function and changes in key habitat types.
Confinement Natural	3) 100%	Terrain Navigator Pro
Dissolved Oxygen	1) 5% 2) 95%	WDOE watershed monitoring stations. Because DO was always adequate for salmonids it was expanded to all other sites with confidence.
Embedded-ness	3) 100%	Used regression equation (provided by Mobrand) to predict from % fines (USFS habitat surveys), except where USFS measurements did not match up, then we considered both to derive the score.
% Fines	1) 45% 2) 8% 3) 7% 4) 32% 5) 7%	USFS habitat surveys PWI (private lands in the lower Twisp and Chewuch Rivers) USFWS (Goat Creek) This is a critical data gap in the lower and middle mainstem Methow River. Many of the small order tributaries that the USFS has not surveyed are low priority, but they contribute to the 32% “expert opinion” category.
Fish Community Richness	3) 100%	Distribution taken from the subbasin summary (2002). Not considered empirical because the descriptions did not reference studies for each stream. Future efforts should refine this attribute rating using USFS, USFWS, and WDFW fisheries survey data.
Pathogens	3) 100%	No studies exist for ambient pathogen levels. Derived via proximity to hatcheries, acclimation ponds, and release sites. Assumed historic stocking occurred in all drainages.
Fish Species Exotic	3) 100%	Fish distribution taken from the subbasin summary (2002). Not considered empirical because the descriptions did not reference studies for each stream. Future efforts should refine this attribute rating using fisheries survey data.
Flow High	3) 100%	Gauging station data showed no trends, no high flow measurements are available for pre-development so we used road density (USFS data base) as an indicator to scale the EDT score between a 2 and 3. Confirmed with USFS hydrologists that this was the appropriate scale that road density would change runoff patterns.
Flow Low	3) 100%	Mullan et al. 1992, Golder Assoc. 2003, Subbasin summary. Calculated as a percentage of base flow by the equation (CFS diverted * (0.63)/ CFS base flow), where 0.63 is a correction factor for groundwater return of diverted flow.
Flow Diel Variation	1) 100%	Wells Pool effect in inundated reach. No other hydroelectric projects so this attribute is not applicable to the rest of the basin.
Flow Flashy	3) 100%	We used road density (USFS data base) as an indicator to scale the EDT score between a 2.25 and 3.25. Confirmed with USFS hydrologists that this was the appropriate scale that road density would increase flashy runoff patterns.
Gradient	1) 99% 2) 1%	Measured in Terrain Navigator Pro. One short reach had a negative slope so we applied the average gradient from the reach above and below it.

Ecological Attribute	Level of Proof	Data Sources and Comments
Habitat: Backwater-Pools; Large Cobble Riffles; Pool- Tailouts; Small Cobble-Riffles; Glides; Beaver Ponds; Primary-Pools;	1) 0% 2) 0% 3) 78% 4) 10% 5) 11%	USFS Stream surveys, USFWS surveys (Goat Creek, Wolf Creek), WDFW Survey 2003 (Methow River mainstem RM 0-52), PWI (Lower Twisp and Chewuch Rivers), OCD barrier inventory (private lands in Beaver Creek, Gold Creek, Libby Creek). Methow mainstem: measurements were estimated or taken with laser rangefinder (while floating the river); did not follow a standard protocol so its still considered derived. Tributaries: Survey data for pools and riffles were split into the 8 habitat categories based on Rosgen channel type and local expert knowledge (Dave Hopkins, USFS). Protocol for OCD surveys was not known, probably not consistent with USFS habitat surveys.
Offchannel Habitat	1) 60% 2) 0% 3) 18% 4) 10% 5) 11%	USFS Stream surveys, USFWS surveys (Goat Creek, Wolf Creek), PWI (Lower Twisp and Chewuch Rivers), OCD barrier inventory (private lands in Beaver Creek, Gold Creek, Libby Creek). Methow mainstem: Length measurements were taken in Terrain Navigator Pro from 1:12000 aerial photos for side channels in the lower and middle mainstem; used an average width of 20 feet. Need a formal survey of current and potential offchannel habitat. Tributaries: Survey data for pools and riffles were split into the 8 habitat categories based on Rosgen channel type and local expert knowledge (Dave Hopkins, USFS). Protocol for OCD surveys was not known, probably not consistent with USFS habitat surveys.
Harassment	3) 100%	Used Terrain Navigator Pro to evaluate proximity to towns and roads (C. Baldwin).
Hatchery Fish Outplants	1) 100%	Stocking records and locations provided by WDFW, Yakama Nation, and USFWS; A value of 2 was used for reaches in tributaries of watersheds with stocking. A 0 was used for lower subbasin watersheds with no stocking.
Hydrologic Regime Natural	1) 7% 2) 43% 3) 49%	USGS gauging stations. Flow patterns were extrapolated up- and downstream of gauges within a watershed and derived for sub watersheds with no gauge by applying the regime from a similar sub watershed.
Hydrologic Regime Regulated	1) 98% 2) 0% 3) 0% 4) 2%	This attribute was only applicable in reach Met1 (Wells Pool effect) and in the lower 2 reaches of Wolf Creek (below Patterson Lake).
Icing	5) 100%	No data exists. Winter temperatures, flows, and icing are such an important data gap that we wanted to stress our uncertainty by categorizing the level of proof as “hypothetical” instead of “expert opinion”.
Metals in Water Column	1) 1% 2) 6% 3) 0% 4) 93%	Metal concentrations at 2 USGS gauging stations (Methow RM 5,39) were below toxicity standards (USEPA 1986). If it was not elevated near Twisp (Alder Mine) then it is not likely to be elevated anywhere in the basin (D. Peplow, personal communication).

Ecological Attribute	Level of Proof	Data Sources and Comments
Metals in Soils/ Sediment	1) 3% 2) 1% 3) 1% 4) 0% 5) 95%	Peplow and Edmonds 2003. Reaches below Alder Ck. should get an elevated score due to transport and deposition, but we have no measurements and this attribute is hard to predict; hypothetical default index score = 1. If we had no data then it was assumed to be at background levels (Peplow and Edmonds 2003).
Miscellaneous Toxins	3) 100%	We used the 303d list, however, because it was binomial and not inclusive we categorized it as "derived".
Nutrients	1) 0% 2) 0% 3) 16% 4) 84%	No data available on Chl-a so Nitrogen and Phosphorus (USGS gauging stations) were used to derive scores for the mainstem reaches. Tributaries were evaluated qualitatively based on development and agriculture use.
Obstructions	NA	Obstructions were assessed individually and level of proof was not evaluated as it was for other attributes in standard reaches. Most of the obstructions had been surveyed but uncertainties still existed for some species/lifestages.
Predation Risk	3) 100%	Fish distribution taken from the subbasin summary (2002). Predation risk was assessed based on increased number of piscivorous exotic species, or reduced native predators (bull trout).
Riparian Function	1) 3% 2) 0% 3) 36% 4) 56% 5) 5%	LFA 2000; USFS stream surveys and biological assessments; USFWS (Goat Creek, Wolf Creek); PWI (Lower Twisp and Chewuch).
Salmon Carcasses	3) 100%	Used WDFW redd counts, adjusted for fish per redd, and adjusted to the 10 yr average run size over Wells Dam. Used Mullen et al. (1992) for historic run re-creation and distributed coho salmon carcasses in areas where steelhead currently spawn.
Temperature Maximum	1) 22% 2) 35% 3) 18% 4) 21% 5) 4%	USGS gauging stations (n=7); USFS temperature loggers (n=44); Mullen et al. 1992; PWI 2003 (FLIR in Twisp and Chewuch).
Temperature Minimum	1) 2% 2) 18% 3) 0% 4) 0% 5) 80%	USGS gauging stations (n=3). These data were extrapolated to other reaches in the mainstem, but no other data was available for the tributaries. We did use FLIR results (Twisp and Chewuch Rivers) to identify areas of potential winter thermal refuge and reduced the severity of the of the minimum temperature effects in the gaining reaches.
Temperature Spatial Variation	1) 0% 2) 0% 3) 29% 4) 5%	PWI 2001 FLIR analysis for the Twisp and Chewuch. LFA 2000 and Mullen et al. 1992 also identified reaches that go dry in the upper middle mainstem of the Methow. No data for the rest of the basin.

Ecological Attribute	Level of Proof	Data Sources and Comments
	5) 66%	
Turbidity	1) 2% 2) 25% 3) 0% 4) 73% 5) 0%	USGS gauging stations (n=6). We had good turbidity estimates across many years but it was not continuous data sets so we could not empirically evaluate the duration of the events.
Withdrawals	1) 100%	WDOE GWIS data. 2003
Woody Debris	1) 0% 2) 0% 3) 95% 4) 1% 5) 4%	USFS habitat surveys; PWI (private lands in the lower Twisp River) unpublished WDFW data (Methow River mainstem from river mile 0-52) USFWS (Goat Creek). We had very good empirical data on # of pieces per mile throughout much of the watershed but the EDT index score formula (which divided by channel width) gave erroneous results. Therefore, we derived it qualitatively using pieces per mile and properly functioning conditions.

Out of subbasin survival factors in Ecosystem Diagnosis and Treatment

Mobrand Biometrics, Inc.

October 9, 2003

Many subbasin planners have elected to use Ecosystem Diagnosis and Treatment (EDT) as a primary assessment tool for aquatic habitats. The EDT assessment of aquatic habitat is based on construction of life history trajectories that begin and end with spawning at particular points within a subbasin at specific times of the year. EDT estimates survival and capacity of a focal species (e.g. spring Chinook salmon) within a defined study area (e.g. a subbasin) based on habitat characteristics and combines this with predefined survival rates outside the study area. These predefined survival rates have been termed the “Out of Subbasin Effects” or OOSE.

As a contribution to the need to supply subbasin planners with a set of assumptions regarding the out of subbasin effects, we are providing here the assumptions that are currently incorporated in the Ecosystem Diagnosis and Treatment model that is being used by subbasin planners. These out of subbasin assumptions in EDT were developed as part of the Council’s Multi-species Framework Project. Calculations behind the results provided here were documented in the final project report to the Council from Mobrand Biometrics and in Marcot and others (2002). The Framework assumptions were intended to capture conditions prevailing in the region around the year 2000. The current out of subbasin assumptions in EDT are based on passage and hydrologic modeling done by the Council, National Marine Fisheries Service and other participants in the Council’s Framework Project.

The OOSE are defined for this memo as the total survival rate of juvenile fish from the mouth of the subbasin to their return to the subbasin as adults. OOSE accounts for survival conditions through the hydroelectric system, the Columbia River below Bonneville Dam, the estuary, the ocean and any harvest occurring outside the subbasin. To be specific, OOSE = Survival through the hydro system X survival in the lower Columbia River X survival through the estuary X survival in the ocean X overall harvest rate. For sub basins below Bonneville Dam the first term is omitted. This definition of the OOSE makes it equivalent to the smolt to adult survival rate or SAR that has been used in other modeling efforts. The SAR is specific for a species and is related to the position of the subbasin within the Columbia Basin and especially relative to its position within the hydroelectric system. In other words, because the SAR (OOSE) is affected by survival through the hydroelectric system (see equation above), the SAR is affected by the number of dams that fish must traverse to get to and from the subbasin. As a result, we see SARs generally decline going upstream in the Columbia River.

Because the out of subbasin assumptions reduce to the SARs that result from the model, we have represented the combined effect of all current OOSE assumptions in EDT as the SARs for spring and fall Chinook salmon projected from various points in the Columbia Basin. These SARs include all considerations for dam passage, survival below Bonneville Dam, survival through the Columbia estuary and the ocean and assumed harvest outside the subbasin. The hope is that by focusing on the SARs (which can be related to empirical survival estimates), the region can avoid becoming embroiled in debates over details of individual survival components as part of the subbasin planning process. This is consistent with direction provided by the Council in previous reports on the Out of Subbasin Effects issue.

	Spring Chinook		***Fall Chinook migrants***	
	SAR	**Expl. Rate**	**SAR**	**Expl. Rate**
Lower Granite Pool	0.9%	6.8%	0.4%	45%
Little Goose Pool	1.0%		0.4%	
Lower Monumental Pool	1.1%		0.5%	
Ice Harbor Pool	1.3%		0.6%	
Lower Snake	1.4%		0.8%	
McNary Pool	1.4%	6.8%	0.7%	45%
John Day Pool	1.5%		0.8%	
The Dalles Pool	2.0%		0.9%	
Bonneville Pool	2.2%		1.0%	
Lower Columbia	3.1%		1.4%	
Wells Pool	0.7%	6.8%	0.3%	45%
Rock Island Pool	0.9%		0.4%	
Wanapum Pool	1.1%		0.4%	
Priest Rapids Pool	1.2%		0.6%	
Hanford Reach	1.4%		0.8%	

Figure 70 Smolt to adult survival rates (SAR) for spring and fall Chinook currently used in the Ecosystem Diagnosis and Treatment model

The results in (Figure 70) are provided to clarify the assumptions that are available to subbasin planners regarding the SARs in EDT. SAR has been estimated from empirical data in a few sub basins in the PATH process and elsewhere. We have compared the estimated SARs in EDT to available empirical estimates of SARs and find them generally in agreement. However, if managers and planners feel that other SAR assumptions are more appropriate for subbasin planning, the assumptions in EDT can be modified.

The results in (Figure 70) approximate the survival rates that would be applied to spring and fall Chinook entering the Columbia River or Snake River at the points in the table. For example, spring Chinook entering the Snake River at the head of Lower Granite Pool would be subject to a SAR of 0.9 percent in EDT. This SAR incorporates an assumed harvest on spring Chinook of 6.8 percent. The SAR for the Lower Columbia represents survival of fish entering just below Bonneville Dam. The total SAR that is actually applied to each population may vary slightly from these rates. For example, if the subbasin enters at the midpoint of a reservoir, the population will not receive the mortality associated with the entire pool but will receive a mortality rate adjusted for the travel speed through the shorter distance. The SARs for fall Chinook represent survival of actively migrating juveniles. Because fall Chinook also include a component of fish that rear for some period within the mainstem Columbia and Snake rivers, total survival of fall Chinook from each point may differ from the results in Table 1.

The SARs in represent survival under “typical” conditions in the Columbia River and the ocean. Empirical estimates of SAR that have been reported in the PATH process and elsewhere vary widely between years reflecting environmental variation including regime shifts in ocean survival conditions. However, the EDT assessment is intended to characterize the potential of current habitat in a subbasin with respect to a focal species and does not include environmental variability.

Attachment 1: Dam survival assumed as part of the SAR in EDT.

The tables below from Marcot and others (2002) provide the schedule of survival rates at each dam for each month of the year for spring and fall Chinook salmon. In EDT, fish leave the subbasin and enter the mainstem across a range of months. They move down at travel speeds related to flow, encountering daily survival rates in the reservoirs. Fish are then passed through a dam where they encounter the survival rates in the tables below. A portion of the fish may be transported downstream. The dam survival rates below were calculated using the National Marine Fisheries Service's SimPass model with conditions specified in the Biological Opinion prevailing in 2000. Other mainstem passage survival assumptions are described in Marcot and others (2002).

Table 77 Yearlings Chinook dam survival rates currently used in EDT

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lower Granite	0.9	0.9	0.93	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.9	0.9
Little Goose	0.9	0.9	0.93	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.9	0.9
Lower Monumental	0.9	0.9	0.93	0.96	0.96	0.96	0.94	0.94	0.94	0.94	0.9	0.9
Ice Harbor	0.9	0.9	0.94	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.9	0.9
McNary	0.9	0.9	0.94	0.98	0.98	0.98	0.98	0.98	0.97	0.97	0.97	0.97
John Day	0.9	0.9	0.93	0.96	0.96	0.96	0.96	0.96	0.94	0.94	0.9	0.9
The Dalles	0.9	0.9	0.94	0.98	0.98	0.98	0.98	0.98	0.9	0.9	0.9	0.9
Bonneville	0.9	0.9	0.92	0.95	0.95	0.95	0.95	0.95	0.93	0.93	0.9	0.9
Rocky Reach	0.89	0.89	0.89	0.95	0.95	0.95	0.95	0.95	0.89	0.89	0.89	0.89
Rock Island	0.89	0.89	0.89	0.95	0.95	0.95	0.95	0.95	0.89	0.89	0.89	0.89
Wanapum	0.89	0.89	0.89	0.95	0.95	0.95	0.95	0.95	0.89	0.89	0.89	0.89
Priest Rapids	0.89	0.89	0.89	0.95	0.95	0.95	0.95	0.95	0.89	0.89	0.89	0.89
Wells	0.9	0.9	0.9	0.97	0.97	0.97	0.97	0.97	0.89	0.89	0.89	0.89

Table 78 Subyearlings Chinook dam survival assumptions used in EDT

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Lower Granite	0.9	0.9	0.95	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.9	0.9
Little Goose	0.9	0.9	0.94	0.96	0.96	0.96	0.94	0.94	0.94	0.94	0.9	0.9
Lower Monumental	0.9	0.9	0.94	0.95	0.95	0.95	0.95	0.94	0.94	0.93	0.9	0.9
Ice Harbor	0.9	0.9	0.93	0.96	0.96	0.96	0.96	0.96	0.94	0.94	0.9	0.9
McNary	0.9	0.9	0.96	0.98	0.98	0.98	0.98	0.98	0.95	0.95	0.95	0.95
John Day	0.9	0.9	0.95	0.97	0.97	0.97	0.97	0.97	0.95	0.95	0.9	0.9
The Dalles	0.9	0.9	0.93	0.98	0.98	0.98	0.98	0.98	0.9	0.9	0.9	0.9
Bonneville	0.9	0.9	0.91	0.93	0.93	0.93	0.93	0.93	0.91	0.91	0.9	0.9
Rocky Reach	0.89	0.89	0.91	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.89
Rock Island	0.89	0.89	0.9	0.93	0.93	0.93	0.93	0.93	0.89	0.89	0.89	0.89
Wanapum	0.89	0.89	0.91	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.89
Priest Rapids	0.89	0.89	0.9	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.89
Wells	0.89	0.89	0.94	0.97	0.97	0.97	0.97	0.97	0.89	0.89	0.89	0.89

Appendix G: EDT Reach Analysis Results

Table 79 Definitions for key headings in the Reach Analysis Reports

Species/ Component	Identifies the species to which the reach analysis applies.
Restoration Potential	Identifies the comparison being used to determine the restoration potential of the reach.
Restoration Emphasis	Identifies whether the results of the analysis depict historic or current fish distribution.
Geographic Area (Assessment Unit)	Identifies the geographic area in which the specific focus reach is located. Reaches were aggregated into geographic areas (called Assessment Units in the Methow and Okanogan/Okanagan) for the sake of analyzing restoration and preservation (protection) benefits and for combining areas with similar Limiting Factors. For example, a single major tributary might be identified as a single geographic area, although many stream reaches might be contained within the reach analysis.
Reach	Provides a brief description of the reach location.
Stream	Identifies the stream name on which the reach is located.
Reach Length	Identifies reach length in miles.
Reach Code	Identifies the reach code used in the database for the focus reach.
Restoration Benefit Category	Identifies the benefit category in which the geographic area is classified with regard to potential restoration benefits to the fish population. Each geographic area is classified into one of four categories based on the potential for affecting overall population performance if all of the reaches within the geographic area were restored to historic conditions. It identifies the strategic importance of restoration in this geographic area relative to the other areas.
Overall Restoration Potential Rank	Overall rank of the geographic area used in plotting to derive the benefit category grade.
Productivity, Average Abundance (NEQ), and Life History Diversity Ranks	Identify the rankings of the geographic area relative to other areas for the three performance measures.
Potential% Change in Productivity, Abundance (Neq), and Diversity	The basic metrics for comparing the benefit category and ranking of the reaches. They show the potential for improvement in overall population performance if the geographic area was fully restored to historic conditions. The metrics are expressed as the% change in overall population performance, e.g., the% increase in average abundance of adults.
Preservation Benefit Category	Identifies the benefit category in which the geographic area is classified with regard to potential preservation (or protection) benefits to the fish population. Potential benefits of protection are assessed by considering the potential for loss in fish performance if the geographic area's reaches are altered through extensive development. Each geographic area is classified into one of four categories based on the potential loss to overall population performance if all of the reaches within the geographic area were impacted by environmental development, changing it to a representative fully developed area.

	The category identifies the strategic importance of preserving the geographic area in its current state relative to the other areas. The categories are designated A (highest benefits of protection) through D (lowest benefits of protection). No consideration is given to these assignments as to feasibility, cost, or desirability of implementing protection actions in the reaches—simply, what would be the benefits to the fish population if the geographic area was to be preserved in its current state. Areas that designated grade A for protection benefits are those that currently have a major role in supporting existing fish performance. Hence environmental degradation of those areas, i.e., degrading to a state worse than its current condition, would result in the greatest loss in population performance. Areas designated grade D are those that are either already largely developed, i.e., those that already have experienced the most dramatic change from pristine condition and little is left to degrade, or are peripheral areas that contribute little to overall population performance. The other items listed with Preservation Benefit Category are derived in the same manner as described above for restoration benefits. Estuarine reaches were not assigned to a preservation benefit category because no representative developed reach characteristics were formulated. The abbreviation "NA" is indicated for these reaches for this item.
Life Stage	Indicates the life-stages examined in the analysis.
Relevant Months	The relevant months or target month when the life-stage occurs. Months vary by species.
% of Life History Trajectories Affected By Life Stage	Shows how the entire fish population uses the reach. Trajectories are computer-generated pathways that define the exact route followed through the aquatic landscape for analytical purposes. Trajectories originate with spawning and end with prespawning holding (i.e., closed life history). e aware of: The percentage of the total life history trajectories affected is reach-specific. The percentage of total life history trajectories affected is life stage specific. For example, the percentage of life history trajectories affected during the 0-age active rearing life stage may differ from those during the spawning life stage. Information on life history trajectories usage in a reach is the means of determining the extent that the population might use a given reach. This measure of usage is analogous to the number of hits that a web site experiences relative to other websites. Productivity change (%) - This item indicates the change in life stage specific productivity resulting from the changes in the attributes to the right on the chart (where change in attribute condition is shown by the size of black dots).
Life Stage Rank	Indicates the extent that distinct environmental attributes have affected species performance by each life stage in the reach. Hence the life stage ranked as "1" has experienced the greatest impact with respect to overall effect on the population performance. The rank is determined through the combination of productivity loss and relative utilization (% life history

	trajectories affected) of the reach by that life stage. A reach that is heavily used for a particular life stage and that has experienced a large loss will rank high (low ranking numbers). A reach may have experienced a large change in productivity for a life stage but if the reach is not used heavily by that life stage it will rank lower (high ranking numbers). Change in attribute impact on survival - A Consumer Report style format is used to show the change in each attribute in comparison to the historic condition. Attributes shown here are actually attribute classes (or umbrella attributes) that encompass the full suite of detailed attributes described through the EDT process. Larger black circles indicate greater effect on survival as a result of a decrease in habitat quality (represented by all attributes shown except Key Habitat Quantity. Circles are scaled in comparison to all other circles presented for the reach. The reader should note that a lot of small black circles spread across multiple attributes could equal or exceed the effect of a single large circle. Thus, it is important to look at both the life stage rank and the size of the circles to draw conclusions from the chart. Clear or open circles indicate that attributes conditions have actually improved for life stage survival compared to historic condition. Circle size for Key Habitat indicates the extent that the amount of key habitat (preferred habitat types by life stage) has been altered in the reach compared to historic levels (change could be because of the percentage of key habitat available or the size of the reach or both). The chart only identifies the extent that an attribute has been altered compared to historic condition, and further, how this change is perceived by the species with respect to survival. Therefore, if a stream naturally carried a high sediment load (glacial melt) and it still does, then the chart would register no change from the historic condition and no increased impact on species survival. The chart also only identifies where the effect occurs to the species in the watershed—it does not show the source of the problem. Hence an increased effect of sediment in a reach does not mean that the sediment is actually generated within the reach—it may be produced from a distant subbasin in the watershed. It is therefore essential when applying the results of the analysis to consider the source of the environmental change and what has caused the change. Corrective actions need to be targeted at the source and the cause.

Appendix H: Public Comments

Comments Received on the Draft Okanogan and Methow Sub basin Plans

Note: Every effort has been made to fully consider and implement applicable comments that were received during the formal public comment periods for the subbasin plan. However, given this, it is recognized that it may be possible that this was not completely accomplished due to the time constraint of meeting the May 28, 2004 NPCC deadline. During the NPCC's Response Period (after the 90 public and ISRP comment period), comments received on the initial plan will then be reconsidered.

PUBLIC COMMENTS ON THE METHOW AND OKANOGAN SUB BASIN PLANS

FEBRUARY 11, 2004 – APRIL 16, 2004

Sub-Basin - Comments on Draft Sub-basin Plan

Thanks for the opportunity to comment. Please note my attached comments. Thank you,

Dick Ewing

From: "Dick Ewing" <fawn@mymethow.com>

To: "Sub-Basin" <sbp@co.okanogan.wa.us>

Date: 3/10/2004 8:08 AM

Subject: Comments on Draft Sub-basin Plan

COMMENTS ON SUB-BASIN SUMMARY FOR METHOW BASIN:

1. P. 22. the USGS Water Resources Investigations Report # 03-4246 needs to be included in this section. So model runs with and without groundwater seepage from canals have already been made. What has been found needs to be cited here.

Response: The comment has been forwarded to the Habitat Working Group (HWG).

2. P. 22: regarding a test site for examining the affects of seepage from canals ….

This has already been done with the Twisp Power and Irrigation Canal study

initiated by the USGS. This work needs to be cited with its present conclusions.

Response: The comment has been forwarded to the Habitat Working Group (HWG).

3. Unfortunately the present draft is not complete. The information presented contains most of the background materials and ESA technobabble that we are all familiar with concerning the region and listed species. What is missing is the core of the draft that actually explains the sub-basin planning perspective, its analysis of the problem and its proposed goals and solutions. Most

importantly the present draft does not show any linkage with present watershed planning efforts and how they will be incorporated into sub-basin planning.

Response: Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

Last sentence of the paragraph: Sub basin planning outreach staff met with the Methow Basin Planning Unit to address the issue on March 31st,2004.

4. References to the Methow Sub Basin Summary by the Conservation Commission do not cite the deficiencies in this summary noted by Ken Williams' review of this summary which was part of the materials submitted for this process. It would be helpful to have as part of the sub basin plan a process cited on how these deficiencies are going to be addressed so a more accurate approach may be initiated in the Methow.

Response: The comment has been forwarded to the Habitat Working Group (HWG).

# # # # # # # # # # # # # # #

Sub-Basin - Okanogan County Subbasin Planning

Comments on Subbasin Plans attached. Thanks. Darlene

From: "hajny" <hajny@pctelecom.us>

To: "Julie Dagnon" <jdagnon@co.okanogan.wa.us>

Date: 3/11/2004 11:56 PM

Subject: Okanogan County Subbasin Planning

CC: "Mike Wilson" <mjwilson@televar.com>, <Commissioners@okanogan.wa.us>,

"Kurt Danison" <kdanison@ncidata.com>

Julie Dagnon, Water Resource Division Manager

Okanogan County Water Resources

123 N 5th Avenue – Room 110

Okanogan, WA 98840

Re: Comment Letter on Draft Subbasin Plans: Okanogan/Similkameen and Methow

Dear Ms. Dagnon:

There is growing concern that the Northwest Power and Conservation Council (NPCC) Subbasin Plans will ultimately be used to direct land management decisions on public and private lands.

We adamantly oppose the use of sub basin Plans for land management purposes and strongly encourage our Legislators and Commissioners to support our position.

Response: Sub basin plans are not land management plans, as such. Local land use management continues to be the responsibility of local government. State government has existing land-use regulatory responsibilities in certain cases. The Sub basin plans are permissive, not prescriptive; they provide a framework for proposed projects. That framework recognizes existing legal mandates and may inform ongoing updates to existing regulations. Local and state government agencies and willing landowners may use the framework to inform land management actions. Effective species recovery will need to include land use management considerations.

The brief comment period of 13 days makes complete review of the draft Subbasin Plans impossible; however following is a list of several major concerns and specific comments on material that has been reviewed to date. It should be noted that the draft plans are very sketchy and core information about how or why species management assumptions were made is not included in the draft plans.

Response: The comment period has been extended; comments on the first draft will be taken until April 16th. (The final draft will be available for review and comment on April 23 – May 10, 2004.) EDT does explicitly document the assumptions made in habitat assessment and working hypotheses. Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

Subbasin Planning Limitations: The reported purpose of sub basin planning is to direct Bonneville Power Administration mitigation funding through the Northwest Power and Conservation Council. It is important that subbasin plans not be extended to land management planning and management due to fundamental limitations of the plans, which include:

•Subbasin plans are being developed solely for the benefit of fish and wildlife, with no consideration of costs, economic losses or conflicting human interests, which results in faulty findings.

Response: The purpose of Sub basin Planning is to develop management strategies to recover fish and wildlife. The April 23 draft plan will include economic goals, and the feasibility of the projects that are proposed to be implemented. Sub basin planning strategies may be constrained by human costs and interests. Sub basin planning does not impose mandatory actions, but provides a framework within which projects may be proposed. Projects may benefit the human community as well as target species.

•The "ecosystem approach" used does not make any distinction between public land and privately owned land in its determination of fish and wildlife management plans.

Response: Because ecosystems cross land boundaries, assessments included all land within each sub basin. Management strategies and actions may distinguish between public and private lands.

•Private property rights and land rights including water rights are not recognized.

Response: The April 23 draft sub basin plan will explicitly state that sub basin planning recognizes and will not impeded those legal rights.

•Management plan goals are based on comparisons to “historic” or perfect, untouched conditions that are thought to exist prior to European settlement, which are not attainable, sensible or necessary.

Response: A baseline of some sort is needed to provide a benchmark against which change can be measured. Where the baseline is set does not affect the focus of the assessment, which reflects the condition of the resource today. The baseline simply allows changes to be compared across reaches and streams. If the baseline were raised or lowered, relative change (compared to today’s conditions) would remain the same. The issue remains the condition of the resource today and what to do about that. The sub basin plans do not advocate returning to a pristine baseline. Management strategies seek to return to properly functioning conditions when necessary for species recovery.

•Goals are widely based on data with significant information gaps and unmeasurable outcomes with minimal public involvement.

Response: Data gaps are explicitly documented in the process. Sub basin planning is not funded (nor intended) to remediate data gaps by new field work, but its recommendations provide the framework for proposals to conduct additional work to fill data gaps. Measurable objectives are included. The sub basin Coordinators have conducted a very substantial public outreach and involvement effort. This effort is more explained in the April 23 draft sub basin plan. Public outreach has included inviting the public to participate in defining goals and management strategies.

•The cumulative effects of restrictions and regulations on private property ownership and land use are not measured.

Response: The sub basin plan does not address cumulative socioeconomic effects. The plan provides a framework for potential projects and recovery planning, and proposed actions may require cumulative effects analysis.

•The economic losses to the private landowner, agriculture, natural resource-based industries and county economic viability are not considered.

Response: The sub basin plan does not address cumulative socioeconomic effects. The plan provides a framework for potential projects and recovery planning, and proposed actions may require cumulative effects analysis.

•The subbasin planning process bypasses land management planning safeguards and requirements such as economic review, public notice and public involvement.

Response: Sub basin plans provide a framework within which projects may be proposed. Land management planning requirements will be met prior to implementation of any proposed project.

•There is no legislative oversight of back-door ecosystem approaches to manage lands.

Response: Sub basin planning is a federal process, and has been the subject of considerable federal oversight. It is not subject to state legislative oversight; however, state and local (as well as federal) requirements will be met prior to implementation of any proposed project.

Examples of Faulty Model Outcomes: Ecosystem Diagnosis and Treatment (EDT) was elected as the model to establish watershed management plans in Okanogan County. The EDT dispenses priority ratings for management actions based on the input or assumptions it receives. The EDT does not consider costs or other competing human interests, which has resulted in flawed and shortsighted outcomes such as:

Response: EDT is a tool used for biological and ecological assessments. It is not intended to incorporate competing human interests. Human factors are addressed in the sub basin plan's goals, and may be addressed in project development and implementation.

The controversial Salmon Creek Project rising to the top of the priority list even though funding has been consistently denied in the past because of the unreasonable high costs per benefit and potential ongoing and escalating costs for maintenance of a pumping stations. Competing human interests and rights again are not considered in the EDT prioritization.

Response: Project prioritization is not complete, and won't be until recovery planning is complete. To the extent that Salmon Creek has been discussed in the sub basin planning process, it has been in an open public process with a multi-stakeholder sub basin core team.

Land acquisition and conservation easements identified as a recurring management priority in a county already burdened with excessive government ownership. This would place more land and land rights under state and federal control and ownership and further expand federal and state regulatory control over land use.

Response: Land and easements can be acquired by state, federal, or local agencies, by private nonprofit organizations. Easements neither take land out of production nor convert it from private ownership. They help keep land in production and in private ownership. Land acquired by agencies is sold to those agencies by willing landowners, often because its productive capacity has been depleted and the owner no longer finds it profitable to manage. Both acquisition and easements can prevent subdivision; landowners sell land or easements as a means of keeping their holdings intact. We have also received the comment that the sub basin plan should not impair private property rights. By limiting land acquisitions and conservation easements, this action would do such impairment feared.

Acquisitions and easements are particularly noticeable as a management strategy in the Methow Watershed. The draft plan recognizes that the government has accumulated 85% of the entire watershed, with only 15% remaining in private ownership; still the management plans call for continuous acquisitions and easements under the guise of increased protection of fish and wildlife.

Response: The comment has been forwarded to the SCT. As stated above as well, we have also received the comment that the sub basin plan should not impair private property rights. By limiting land acquisitions and conservation easements, this action would do such impairment feared.

Increasing flows irregardless of competing water rights and human demands is a dominant management outcome, as well as returning to “natural” pre-European conditions in post-European settlement areas.

Response: Flow rates are frequently a limiting factor, and management strategies address this concern. Flow recommendations seek improvements to flow regimes, but do not necessarily advocate restoring pristine flow regimes. There are numerous strategies to increase flows, many are listed in the Methow Basin watershed plan; may of these recommendations could be potential projects.

Sub basin planning process: Public outreach did not begin until approximately six months after the technical team began work on the plans and public involvement occurred at seven months. The technical team, called the Habitat Work Group, apparently consists of agency staff and consulting firms. Members of the group remain unidentified although we have asked for a list of who is involved in the group.

Response: Technical staff (the HWG) did begin to organize and assess data prior to public involvement, with the intention of efficiently completing the very technical work prior to inviting public participation. Stakeholders were offered opportunities to comment and to participate in development of the su bbasin assessment, including opportunities to review the data being used and comment on decisions made about the use of that data. HWG members were identified in a list sent to the entire sub basin planning outreach email list; HWG members were introduced at early su bbasin core team meetings and lists of HWG members were posted at those meetings.

The draft plans acknowledge some of the scheduling difficulties people have experienced throughout the sub basin planning process, which was attributed to NPCC’s lack of adequate time for public outreach. Although there were scheduling conflicts and problems, the biggest problem has been the lack of core information.

Response: The su bbasin planning process occurred on a very fast-track schedule to meet a deadline set by NPCC. The schedule was difficult for all participants. Evening meetings would have required 2-3 times as many meetings to accomplish what could be done in one full-day meeting, and the schedule would not have allowed for that, nor would a heavy evening meeting schedule have been well received. Evening summary meetings were scheduled in an attempt to provide a window for the public who could not attend day meetings. The number of participants and meetings and the status of work often required changes in meeting schedules and locations, and this was a problem.

Public outreach and involvement consists of 1) e-mails that advise only meeting dates and times and what “stage” the process is in, 2) evening meetings with a slide show and verbal presentations with no handouts and at times no technical person to answer questions and 3) day-long meetings consisting of technical people and “stakeholders.” The day-long meetings are difficult for working people not on the payroll to attend, particularly on a regular basis.

Response: Handouts were not always available at public or sub basin core team (SCT) meetings because work was underway immediately before, and often during, the meetings. The SCT, including technical members, have been using their available time to keep the process on track in order to meet a deadline imposed by the NPCC, and had little time to create polished *handouts. As noted in Response 4, members of the public have been invited to join as participants in the process, rather than receive materials about it after the fact. Technical team members could not attend all public meetings, but did attend most of them. The subbasin planning process occurred on a very fast-track schedule to meet a deadline set by NPCC. The schedule was difficult for all participants. Evening meetings would have required 2-3 times as many meetings to accomplish what could be done in one full-day meeting, and the schedule would not have allowed for that, nor would a heavy evening meeting schedule have been well received. Evening summary meetings were scheduled in an attempt to provide a window for the public who could not attend day meetings. The number of participants and meetings and the status of work often required changes in meeting schedules and locations, and this was a problem.*

As noted, in spite of the complex information, that was shown on slides and presented verbally, no handouts were made available at the evening summary sessions. The complicated information that was presented in this way made it difficult to get a clear picture of the process itself let alone the content information and findings. Requests for handouts and more information have also gone answered. Members who asked questions about the complexity and reliability of the EDT model were referred to the Mobrand website.

Response: Handouts were not always available at public or sub basin core team (SCT) meetings because work was underway immediately before, and often during, the meetings. The SCT, including technical members, have been using their available time to keep the process on track in order to meet a deadline imposed by the NPCC, and had little time to create polished handouts. Members of the public have been invited to join as participants in the process, rather than receive materials about it after the fact. Technical team members could not attend all public meetings, but did attend most of them. Outreach staff gave some information about EDT during presentations, and did refer stakeholders to Mobrand's website for more detailed information in order to use meeting time efficiently.

Agencies and consultants in the Habitat Work Group have generated huge volumes of fast-paced information that has not been made available to the public. There is tremendous frustration throughout the county that this is just another process where an unidentified team of government entities and consultants has come together to write the plans and pass them off as "local" without meaningful local review or input.

Sincerely,

Mike Wilson, President

Okanogan County Farm Bureau

Attachment: Comments on the contents of the plans.

Cc: Okanogan County Commissioners

7th and 12th District Legislators

Kurt Danison, Highlands Associates

Specific Comments

Methow:

1. The USGS Water Resources Investigations Report # 03-4246 needs to be included in this section. So model runs with and without groundwater seepage from canals have already been made. What has been found needs to be cited here on Pg. 22.

Response: The comment has been forwarded to the Habitat Working Group (HWG).

2. Regarding a test site for examining the affects of seepage from canals: This has already been done with the Twisp Power and Irrigation Canal study initiated by the USGS. This work needs to be cited with its present conclusions. (Pg. 22)

Response: The comment has been forwarded to the Habitat Working Group (HWG).

3. The information presented contains most of the background materials and ESA information that we are all familiar with concerning the region and listed species. What is missing is the core of the draft that actually explains the sub basin planning perspective, its analysis of the problem and its proposed goals and solutions.

Response: Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

4. Most importantly the present draft does not show any linkage with present watershed planning efforts and how they will be incorporated into sub basin planning.

Response: Sub basin planning outreach staff met with the Methow Basin Planning Unit to address the issue on March 31st. An organized planning unit for the Okanogan sub basin has not been developed.

5. References to the Methow Sub basin Summary by the Conservation Commission do not cite the deficiencies in the summary noted by Ken Williams' review, which was part of the materials submitted for this process. It would be helpful to have as part of the sub basin plan a process cited on how these noted deficiencies are going to be addressed so a more accurate approach may be initiated in the Methow.

Response: The comment has been forwarded to the Habitat Working Group (HWG).

Okanogan:

Comments Regarding Farm Bureau Outreach: Please correct your statements to reflect that an article was submitted to Okanogan County Farm Bureau for consideration of printing in the B Newsletter." Sandra contacted us and asked us if she could write an article for our newsletter; we did not request it. I told her to feel free to submit an article if she would like.

Response: Flow rates are frequently a limiting factor, and management strategies address this concern. Flow recommendations seek improvements to flow regimes, but do not necessarily advocate restoring pristine flow regimes. There are numerous strategies to increase flows, many are listed in the Methow Basin watershed plan; may of these recommendations could be potential projects.

General: Numerous statements are made and conclusion rendered without benefit of resources cited. It is difficult to determine what is author's opinion and what is cited references, particularly as related to perceived environmental threats. (Third Paragraph, Page 21, 5th Paragraph, Page 21, Paragraph 2, Page 24)

Response: The comment has been forwarded to the technical writer. This is a very early rough draft. Some references are missing and need to be supplied, and the references section needs to be edited. The assessment of environmental conditions was done by the Habitat Work Group.

The Projects Inventories should show costs of projects as an accountability feature to the public.

Response: The comment has been forwarded to the technical writer.

In an apparent effort to combine BC and US portions of the watershed yet keep them distinct, it is difficult to distinguish between the two in portions of the material.

Response: The comment has been forwarded to the technical writer.

Paragraph 3, Page 23 (statement repeated in Paragraph 5)

The Forest section appears to have numerous unreferenced claims.

Response: The comment has been forwarded to the technical writer. "North of Oroville" has been corrected to read "south of Oroville."

Sub basin in Relation to Region, 2nd Paragraph, Page 18

The following statements appear to be more philosophically poetic than factual which does not seem appropriate, and the first sentence in particular is unclear in its meaning.

Response: The comment has been forwarded to the technical writer.

No references are cited.

The Okanogan Subbasin exemplifies the popularity of the modern rural lifestyle and the controlling-protection paradox practiced by the growing number of valley residents. Constraints to the sustainability of anadromous and resident fish, wildlife, and their habitats result from the footprints of this growth within the basin; many of these impacts and their resolution have cross-border implications. Such impacts include matured agriculture, forest and hydroelectric industries, and their extended affects which reach from the alpine mountain tops to the confluence with the Columbia River and beyond.

5th Paragraph, Page 18

The following statement is unclear. Also, is this author's opinion?

Dealing with these constraints will require both institutional and technical approaches, and links between communities of science, interest and place.

Paragraph 1, Page 26

No reference quoted for final portion of the sentence. Is this author's opinion?

Dominant riparian species include black cottonwood, water birch, and white and thinleaf alder (Arno, 1977), but riparian forests and shrubsteppe have been virtually eliminated in the basin.

Paragraph 3, Page 27

Who/what is OWSAC? Is this listed in references?

Conversion of privately owned timber areas into other uses, such as residential subdivisions, is a trend, but not on the large scale that it is further south, in Wenatchee and Entiat (NMFS, 1998). During a recent four year period (1994 1997), approximately 11,000 acres of forestland were subdivided (OWSAC, 2000).

<u>Land Use and Demographics</u>, Paragraph 1, Page 28

In order to present a more accurate and complete picture, more specifics on protected land would be in order, i.e. how much land is in wildlife areas, etc. What does "dominated" mean? Perhaps forestry and range should be broken down rather than grouped together. Is this author's opinion?

Forestry and range are by the far the major uses of land in the Okanogan Basin, followed by croplands (Figure 8). Most of the landscape, from the riparian areas to the upper elevation forests, have been used extensively for agriculture and resource extraction. The valley bottom is dominated by agriculture, primarily orchards and livestock feed. The benches are dominated by livestock grazing, and the lower to mid-upper elevation forests have been harvested for timber and used for livestock grazing. The Okanogan Basin contains six state wildlife areas, a natural preserve in the DNR's Loomis Forest, and a portion of the USFS.s Pasayten Wilderness.

Response: The comment has been forwarded to the technical writer. Forest and range are represented in different parts of Figure 8. "Dominated" has been changed to "predominantly".

<u>Urbanization and population growth, Table, Page 29</u>

Is the 2000 census that last census available?

Response: Yes

Socio-Economic Conditions – Colville Reservation

Is the following statement actual wording of the court's findings? Reference to court ruling?

The Court also ruled that the Colville Tribes possess federally reserved water rights to stream flows sufficient to preserve or restore tribal fisheries.

Response: Federally reserved water rights are established for all tribes under the Winters Doctrine. The statement cited is an accurate reflection of that doctrine.

Starting Paragraph 3, Page 30

Treaties and mitigation for dams are complex issues. Is this the correct forum to discuss the “unfairness” of the mitigation programs to the Colville Tribe? Are some of the following statements fact or opinion?

In 2000, the Bureau of Reclamation agreed with the Colville Confederated Tribes that the Federal government had not completed its authorized anadromous fish mitigation for construction of Grand Coulee Dam over 60 years ago. Planned artificial production programs were not implemented for the Okanogan River Basin when the outbreak of World War II halted non-war related construction projects.

Tribes of the Colville Reservation have been seriously harmed by the lack of Grand Coulee mitigation, with ceremonial and subsistence fisheries declining to minimal levels, even in years of substantial runs entering the Columbia River. Fishing opportunity is now severely limited to summer/fall Chinook immediately below Chief Joseph Dam and an occasional sockeye fishery in the Okanogan River. This situation has been adversely compounded by later formulas for mitigation of mid-Columbia Public Utility District dams where the Federal Energy Regulatory Commission does not require mitigation for now, non-existing. Additional hatchery production under the proposed mitigation agreement with the PUDs is based on the run sizes of salmon and steelhead in a 10-year period during the 1970.s and 1980.s (Bugert 1998). Most of these post-dam runs were supported in large part by the initial hatchery mitigation programs funded by the PUDs and the Federal government. Since the CCT did not receive the initial mitigation from the construction of Federal and PUD dams, the basis for the new agreements discounts obligations to the CCT. Without the initial Federal salmon mitigation that other watersheds in the province obtained, the Okanogan Basin and Colville Tribes again were provided without mitigation. Additionally, the Federal government has never provided Okanogan anadromous fish mitigation for the Colville Tribes for the loss of adult and juvenile fish passing through the four Corps of Engineers hydroelectric projects on the Lower Columbia River. Fish mortality at these projects have been generally estimated at about 10% per project, but were historically higher. Finally, Chinook mitigation by Douglas PUD for losses due to inundation and passage has been sited downriver, at Wells Hatchery and in the Methow River, away from the Colville Tribes reservation fisheries. The Colville Tribes total anadromous salmonid harvest is normally below 1,000 total salmon and steelhead combined and similar estimates are reflected in the Okanagan Nation fisheries upstream in Canada. Yet, in the 1800.s prior to over harvest in lower river commercial fisheries and subsequent habitat destruction, the Colville Tribes were estimated to have harvested in excess of 2 million pounds of salmon and steelhead annually (Koch 1976).

Response: The Tribes’ representative advises that the points made in the text have been upheld. The mitigation cited is directly germane to sub basin planning.

<u>Agriculture</u>, Paragraph 5, Page 31

Says who?

Livestock grazing practices have led to trampled stream banks, increased bank erosion and sedimentation, and changes in vegetation, including loss of native grasses, impacts to woody vegetation, and establishment of noxious weeds.

Response: Livestock impacts are based on the habitat assessment conducted by the HWG and reviewed by the SCT. The assessment process documented the level of certainty associated with each habitat attribute. The sub basin plan should recognize the benefits of limited grazing under proper management and monitoring.

Paragraph 6, Page 31

Who is PNRBC? Is a 1970s report relevant?

A 1970s rangeland evaluation indicated that 25 percent of rangeland in the basin was in good condition, 34 percent in fair condition, and 41 percent was in poor condition (PNRBC, 1977).

Response: PNRBC is the Pacific Northwest River Basin Commission. The technical writer has been asked to search for more current information.

Appendix A, Page 147

Federal ESA species are listed “that are present or may be present in Okanogan” but there is no way to know which listings are actually present and affect Okanogan County. Two separate lists would correct that.

Response: The comment has been forwarded to the technical writer.

# # # # # # # # # # # # # # #

Sub-Basin - Comments on Draft Methow Subbasin plan

Comments on Draft Methow Subbasin plan:

To All on distribution:

My comments prior to 11 March initial comment period deadline attached as MS Word2002 .doc. Please let me know if you have any problem reading that document.

Cordially,

Ken Sletten

360-620-5008 (cell)

From: <wasbra@wavecable.com>

To: <sbp@co.okanogan.wa.us>

Date: 3/8/2004 12:20 AM

Subject: Comments on Draft Methow Subbasin plan

CC: <tkarier@ewu.edu>, <fcassidy@nwcouncil.org>, <lpalensky@nwcouncil.org>, <parlette_li@leg.wa.gov>, <armstron_mi@leg.wa.gov>, <condotta_ca@leg.wa.gov>, <commissioners@co.okanogan.wa.us>, <jdagnon@co.okanogan.wa.us>,

<beichdvb@dfw.wa.gov>, <kdanison@ncidata.com>, <JPratt@entrix.com>, <fawn@mymethow.com>, <ramshead@methow.com>, wasbra@wavecable.com Sub-Basin - Methow Subbasin issues; + missing document.

FROM:

Ken Sletten

Box 902

688 Wolf Creek Road

Winthrop, WA 98862-0902

wasbra@charter.net cell: 360-620-5008

TO:

Lynn Palensky, NWPCC Subbasin Planning Coordinator lpalensky@nwcouncil.org 503-222-5161

COPIES:

Senator Linda Evans Parlette parlette_li@leg.wa.gov, Senator Bob Morton morton_bo@leg.wa.gov, Rep. Mike Armstrong armstron_mi@leg.wa.gov, Rep. Cary Condotta condotta_ca@leg.wa.gov, Okanogan County Commissioners commissioners@co.okanogan.wa.us, Okanogan County - Julie Dagnon sbp@co.okanogan.wa.us, MBWPU: Dick Ewing fawn@mymethow.com, Ron Perrow ramshead@methow.com

SUBJECT:

Methow Subbasin planning issues; and important missing document.

REFERENCE:

(a) http://www.nwcouncil.org/fw/subbasinplanning/Methow/default.asp

(b) http://www.nwcouncil.org/fw/subbasinplanning/admin/recommendations.htm

(c) http://www.cbfwa.org/cfsite/ReviewCycle.cfm?ReviewCycleURL=FY%202003%20Columbia%20Cascade#reports (CBFWA draft Methow

Subbasin Summary dated 2002-05-17)

Lynn,

I am aware from the 11 February 2004 Okanogan Chronicle that the Methow Basin Watershed Planning Unit (MBWPU) has filed a formal complaint with the NWPCC about effectively being left out of the regional subbasin planning process. I'm not necessarily saying the reasons for this complaint are completely the fault of the NWPCC: There are some issues internal to Okanogan County with respect to officially finishing 'final final' revisions to the Methow Basin Watershed

Management Plan (MBWMP). However, given looming NWPCC subbasin planning deadlines I'm afraid that an opportunity to integrate the MBWMP in the NWPCC subbasin process will be lost if steps are not taken to immediately correct this situation. Three key points:

(1) Under headings of full disclosure and presenting an honest picture of the situation in each subbasin, a formal complaint by key players in local watershed planning like members of the MBWPU clearly deserves and needs to be prominently accessible through your Methow Subbasin web page (reference (a)). Now it's possible that it COULD be hidden somewhere on the very extensive NWPCC web site (which is generally pretty well put together and organized); all I can say is I can't find it. I guess nothing is stopping me or members of the MBWPU from posting their complaint to the currently-empty Methow Subbasin public file exchange page, but in my opinion citizens should not have to informally take action to get a document this important and pertinent to Methow Subbasin planning included on the reference (a) web page. This should be done officially by the NWPCC: Please add a link to the MBWPU complaint at least at the reference (a) level ASAP.

Response: The comment letter was addressed to the NPCC; we are not sure what comment is appropriate from us.

(2) I am fully in accord with opinions expressed by the MBWPU in their complaint. I note a few key snippets from your 'Notice of request for recommendations' document on the NWPCC web site at reference (b):

'.... The Council intends to incorporate these specific objectives and measures into the program in locally developed subbasin plans for the 62 subbasins of the Columbia River'

and especially:

'Integration with local efforts - The Council recognizes that there are other watershed and recovery planning efforts taking place across the Columbia basin. Where groups are already working at a local level, the Council will work in partnership with those efforts. The desired approach is to make those existing planning groups aware of the opportunity to have their subbasin plans adopted as part of the fish and wildlife Program, and where there is interest, to make additional resources and guidance available to those planners so that they can assimilate the Council's subbasin planning components into their existing efforts.'

After many years of intensive, dedicated work by members of the MBWPU, no one can deny that they are (and have been) actively working at the local level; and they are without doubt 'interested'. The next phrase in your above sez: ' the Council will work in partnership with those efforts.' It does not say 'might' or 'may': It sez WILL work. I respectfully suggest that the apparent complete failure to date by the NWPCC subbasin planning process to work with the MBWPU or to in any substantive way recognize and incorporate the large amount of excellent technical work already done by that group is unacceptable. In fact, that omission appears to be such a glaring violation of above quoted NWPCC principles that from my admittedly amateur perspective it appears that if the situation is not promptly corrected it might be a valid legal 'cause for action'. At the very least it will be cause for serious complaint to the Washington State Legislature.

Response: The Methow Basin Planning Unit was one of the key groups identified early in the sub basin planning outreach process. The group's participation was expressly solicited; Planning Unit members elected not to participate because completion of the Watershed Plan was demanding a great deal of time and energy during the period when sub-basin planning was initiated. Planning Unit members have been included in outreach efforts throughout the process.

(3) If you click on reference (a) 'Read full subbasin summary', you get redirected to the reference (c) CBFWA web site. The 'Draft Methow Subbasin Summary' info listed on that page is dated 17 May 2002. Given that public meetings have already been held this month to discuss the latest updates, shouldn't the CBFWA web site be better than nearly two years out of date ?... wherever they are publicly posted, latest draft versions of the various subbasin plans should be as up to date as possible.

Response: Since the comment letter was addressed to the NPCC we are unsure as to what comment is appropriate from us.

Respectfully submitted,

Ken Sletten

# # # # # # # # # # # # # # #

Sub-Basin - Comments on Okanogan/Methow subbasin planning

From: "Patrick Plumb" <pplumb@nvhospital.org>

To: <lpalensky@nwcouncil.org>, <jdagnon@co.okanogan.wa.us>, "Mary Lou Peterson"

<PETE6976@co.okanogan.wa.us>, <jsto461@ecy.wa.gov>, <barbaram@iac.wa.gov>

Date: 3/18/2004 3:37 PM

Subject: Comments on Okanogan/Methow subbasin planning

CC: <oc3@northcascades.net>, "hajny" <hajny@pctelecom.us>, <plr@bossig.com>

As a Tonasket City Councilman and also as the Chairman Elect of Okanogan County Citizens Coalition, I would like to concur with the Okanogan County Farm Bureau on the statement below, and also air my cautionary position that local involvement in this subbasin planning process has not been satisfactory to having my input. Whether that be my fault or a fault of bureaucracy I am not sure yet, but I would like to be a part of this process. Promises made in the plan that I have read so far says that local officials will be made aware of what is going on, and I would like to see someone give an update to the Tonasket City Council on where this process is and how we should be able to give input to the watershed planning. I am not sure if a WIRA has been formed for the Okanogan River Watershed, and also I have attended a WIRA meeting for the Kettle River watershed, and I would like to be involved with the watershed that I have a direct connection to (Okanogan River). The comments that I concur with the Okanogan County Farm Bureau are listed below.

Response: Sub basin plans are not land management plans, as such. Local land use management continues to be the responsibility of local government. State government has existing land-use regulatory responsibilities in certain cases. The Sub basin plans are permissive, not prescriptive; they provide a framework for proposed projects. That framework recognizes existing legal mandates and may inform ongoing updates to existing regulations. Local and state government agencies and willing landowners may use the framework to inform land management actions. Effective species recovery will need to include land use management considerations.

There is growing concern that the Northwest Power and Conservation Council (NPPC) Subbasin Plans will ultimately be used to direct land management decisions on public and private lands. I adamantly oppose the use of Subbasin Plans for land management purposes and strongly encourage our Legislators and Commissioners to support our position.

The brief comment period of 13 days makes complete review of the draft Subbasin Plans impossible; however following is a list of several major concerns and specific comments on material that has been reviewed to date. It should be noted that the draft plans are very sketchy and core information about how or why species management assumptions were made is not included in the draft plans.

Response: The comment period has been extended; comments on the first draft will be taken until April 16th. (The final draft will be available for review and comment on April 23rd.) Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact. EDT does explicitly document the assumptions made in habitat assessment and working hypotheses.

Subbasin Planning Limitations: The reported purpose of subbasin planning is to direct Bonneville Power Administration mitigation funding through the Northwest Power and Conservation Council. It is important that subbasin plans not be extended to land management planning and management due to fundamental limitations of the plans, which include:

Subbasin plans are being developed solely for the benefit of fish and wildlife, with no consideration of costs, economic losses or conflicting human interests, which results in faulty findings.

Response: The purpose of Sub basin Planning is to develop management strategies to recover fish and wildlife. The April 23 draft plan will include economic goals, and the feasibility of the projects that are proposed to be implemented. Sub basin planning strategies may be constrained by human costs and interests. Sub basin planning does not impose mandatory actions, but provides a framework within which projects may be proposed. Projects may benefit the human community as well as target species.

The "ecosystem approach" used does not make any distinction between public land and privately owned land in its determination of fish and wildlife management plans. Private property rights and land rights including water rights are not recognized.

Response: Because ecosystems cross land boundaries, assessments included all land within each sub basin. Management strategies and actions may distinguish between public and private lands. The April 23 draft sub basin plan will explicitly state that sub basin planning recognizes and will not impeded those legal rights.

Management plan goals are based on comparisons to "historic" or perfect, untouched conditions that are thought to exist prior to European settlement, which are not attainable, sensible or necessary.

Response: A baseline of some sort is needed to provide a benchmark against which change can be measured. Where the baseline is set does not affect the focus of the assessment, which reflects the condition of the resource today. The baseline simply allows changes to be compared across reaches and streams. If the baseline were raised or lowered, relative change (compared to today's conditions) would remain the same. The issue remains the condition of the resource today and what to do about that. The sub basin plans do not advocate returning to a pristine baseline. Management strategies seek to return to properly functioning conditions when necessary for species recovery.

Goals are widely based on data with significant information gaps and unmeasurable outcomes with minimal public involvement.

Response: Data gaps are explicitly documented in the process. Sub basin planning is not funded (nor intended) to remediate data gaps by new field work, but its recommendations provide the framework for proposals to conduct additional work to fill data gaps. Measurable objectives are included. The sub basin Coordinators have conducted a very substantial public outreach and involvement effort. This effort is more explained in the April 23 draft sub basin plan. Public outreach has included inviting the public to participate in defining goals and management strategies.

The cumulative effects of restrictions and regulations on private property ownership and land use are not measured.

Response: The sub basin plan does not address cumulative socioeconomic effects. The plan provides a framework for potential projects and recovery planning, and proposed actions may require cumulative effects analysis.

The economic losses to the private landowner, agriculture, natural resource-based industries and county economic viability are not considered.

Response: The sub basin plan does not address cumulative socioeconomic effects. The plan provides a framework for potential projects and recovery planning, and proposed actions may require cumulative effects analysis.

The subbasin planning process bypasses land management planning safeguards and requirements such as economic review, public notice and public involvement.

Response: Sub basin plans provide a framework within which projects may be proposed. Land management planning requirements will be met prior to implementation of any proposed project.

There is no legislative oversight of back-door ecosystem approaches to manage lands.

Response: Sub basin planning is a federal process, and has been the subject of considerable federal oversight. It is not subject to state legislative oversight; however, state and local (as well as federal) requirements will be met prior to implementation of any proposed project.

Examples of Faulty Model Outcomes: Ecosystem Diagnosis and Treatment (EDT) was selected as the model to establish watershed management plans in Okanogan County. The EDT dispenses priority ratings for management actions based on the input or assumptions it receives. The EDT does not consider costs or other competing human interests, which has resulted in flawed and shortsighted outcomes such as:

Response: EDT is a tool used for biological and ecological assessments. It is not intended to incorporate competing human interests. Human factors are addressed in the sub basin plan's goals, and may be addressed in project development and implementation.

The controversial Salmon Creek Project rising to the top of the priority list even though funding has been consistently denied in the past because of the unreasonably high costs per benefit and potential ongoing and escalating costs for maintenance of a pumping station. Competing human interests and rights again are not considered in the EDT prioritization.

Response: Project prioritization is not complete, and won't be until recovery planning is complete. To the extent that Salmon Creek has been discussed in the sub basin planning process, it has been in an open public process with a multi-stakeholder sub basin core team.

Land acquisitions and conservation easements identified as a recurring management priority in a county already burdened with excessive government ownership. This would place more land and land rights under state and federal control and ownership and further expand federal and state regulatory control over land use.

Response: Land and easements can be acquired by state, federal, or local agencies, by private nonprofit organizations. Easements neither take land out of production nor convert it from private ownership. They help keep land in production and in private ownership. Land acquired by agencies is sold to those agencies by willing landowners, often because its productive capacity has been depleted and the owner no longer finds it profitable to manage. Both acquisition and easements can prevent subdivision; landowners sell land or easements as a means of keeping their holdings intact. We have also received the comment that the sub basin plan should not impair private property rights. By limiting land acquisitions and conservation easements, this action would do such impairment feared.

Acquisitions and easements are particularly noticeable as a management strategy in the Methow Watershed. The draft plan recognizes that the government has accumulated 85% of the entire watershed, with only 15% remaining in private ownership; still the management plans call for continuous acquisitions and easements under the guise of increased protection of fish and wildlife.

Response: The comment has been forwarded to the SCT. As stated above as well, we have also received the comment that the sub basin plan should not impair private property rights. By limiting land acquisitions and conservation easements, this action would do such impairment feared.

Increasing flows irregardless of competing water rights and human demands is a dominant management outcome, as well as returning to "natural" pre-European conditions in post-European settlement areas.

Response: Flow rates are frequently a limiting factor, and management strategies address this concern. Flow recommendations seek improvements to flow regimes, but do not necessarily advocate restoring pristine flow regimes. There are numerous strategies to increase flows, many are listed in the Methow Basin watershed plan; may of these recommendations could be potential projects.

Subbasin Planning Process: Public outreach did not begin until approximately six months after the technical team began work on the plans and public involvement occurred at seven months. The technical team, called the Habitat Work Group, apparently consists of agency staff and consulting firms. Members of the group remain unidentified although we have asked for a list of who is involved in the group.

Response: Technical staff (the HWG) did begin to organize and assess data prior to public involvement, with the intention of efficiently completing the very technical work prior to inviting public participation. Stakeholders were offered opportunities to comment and to participate in development of the su bbasin assessment, including opportunities to review the data being used and comment on decisions made about the use of that data. HWG members were identified in a list sent to the entire sub basin planning outreach email list; HWG members were introduced at early subbasin core team meetings and lists of HWG members were posted at those meetings.

The draft plans acknowledge some of the scheduling difficulties people have experienced throughout the subbasin planning process, which was attributed to NPCC's lack of adequate time for public outreach. Although there were scheduling conflicts and problems, the biggest problem has been the lack of core information.

Response: The subbasin planning process occurred on a very fast-track schedule to meet a deadline set by NPCC. The schedule was difficult for all participants. Evening meetings would have required 2-3 times as many meetings to accomplish what could be done in one full-day meeting, and the schedule would not have allowed for that, nor would a heavy evening meeting schedule have been well received. Evening summary meetings were scheduled in an attempt to provide a window for the public who could not attend day meetings. The number of participants and meetings and the status of work often required changes in meeting schedules and locations, and this was a problem.

Public outreach and involvement consists of 1) e-mails that advise only meeting dates and times and what "stage" the process is in, 2) evening meetings with a slide show and verbal presentations with no handouts and at times no technical person to answer questions and 3) day-long meetings consisting of technical people and "stakeholders." The day-long meetings are difficult for working people not on the payroll to attend, particularly on a regular basis.

Response: Handouts were not always available at public or sub basin core team (SCT) meetings because work was underway immediately before, and often during, the meetings. The SCT, including technical members, have been using their available time to keep the process on track in order to meet a deadline imposed by the NPCC, and had little time to create polished *handouts. As noted in Response 4, members of the public have been invited to join as participants in the process, rather than receive materials about it after the fact. Technical team members could not attend all public meetings, but did attend most of them. The subbasin planning process occurred on a very fast-track schedule to meet a deadline set by NPCC. The schedule was difficult for all participants. Evening meetings would have required 2-3 times as many meetings to accomplish what could be done in one full-day meeting, and the schedule would not have allowed for that, nor would a heavy evening meeting schedule have been well received. Evening summary meetings were scheduled in an attempt to provide a window for the public who could not attend day meetings. The number of participants and meetings and the status of work often required changes in meeting schedules and locations, and this was a problem.*

As noted, in spite of the complex information that was shown on slides and presented verbally, no handouts were made available at the evening summary sessions. The complicated information that was presented in this way made it difficult to get a clear picture of the process itself let alone the content information and findings. Requests for handouts and more information have also gone unanswered. Members who asked questions about the complexity and reliability of the EDT model were referred to the Mobrand website.

Response: Handouts were not always available at public or sub basin core team (SCT) meetings because work was underway immediately before, and often during, the meetings. The SCT, including technical members, have been using their available time to keep the process on track in order to meet a deadline imposed by the NPCC, and had little time to create polished handouts. As noted in Response 4, members of the public have been invited to join as participants in the process, rather than receive materials about it after the fact. Technical team members could not attend all public meetings, but did attend most of them.

Agencies and consultants in the Habitat Work Group have generated huge volumes of fast-paced information that has not been made available to the public. There is tremendous frustration throughout the county that this is just another process where an unidentified team of government entities and consultants has come together to write the plans and pass them off as “local” without meaningful local review or input.

Specific Comments

Methow:

1. The USGS Water Resources Investigations Report # 03-4246 needs to be included in this section. So model runs with and without groundwater seepage from canals have already been made. What has been found needs to be cited here on Pg. 22.

Response: The comment has been forwarded to the Habitat Working Group (HWG).

2. Regarding a test site for examining the affects of seepage from canals: This has already been done with the Twisp Power and Irrigation Canal study initiated by the USGS. This work needs to be cited with its present conclusions. (Pg. 22)

Response: The comment has been forwarded to the Habitat Working Group (HWG).

3. The information presented contains most of the background materials and ESA information that we are all familiar with concerning the region and listed species. What is missing is the core of the draft that actually explains the subbasin planning perspective, its analysis of the problem and its proposed goals and solutions.

Response: Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

4. Most importantly the present draft does not show any linkage with present watershed planning efforts and how they will be incorporated into subbasin planning.

Response: Sub basin planning outreach staff met with the Methow Basin Planning Unit to address the issue on March 31st.

5. References to the Methow Subbasin Summary by the Conservation Commission do not cite the deficiencies in the summary noted by Ken Williams' review, which was part of the materials submitted for this process. It would be helpful to have as part of the subbasin plan a process cited on how these noted deficiencies are going to be addressed so a more accurate approach may be initiated in the Methow.

Response: The comment has been forwarded to the Habitat Working Group (HWG).

Okanogan:

General: Numerous statements are made and conclusion rendered without benefit of resources cited. It is difficult to determine what is author's opinion and what is cited references, particularly as related to perceived environmental threats. (Third Paragraph, Page 21, 5th Paragraph, Page 21, Paragraph 2, Page 24)

Response: The comment has been forwarded to the technical writer. This is a very early rough draft. Some references are missing and need to be supplied, and the references section needs to be edited. The assessment of environmental conditions was done by the Habitat Work Group.

The Projects Inventories should show costs of projects as an accountability feature to the public.

Response: The comment has been forwarded to the technical writer.

In an apparent effort to combine BC and US portions of the watershed yet keep them distinct, it is difficult to distinguish between the two in portions of the material.

Response: The comment has been forwarded to the technical writer.

Paragraph 3, Page 23 (statement repeated in Paragraph 5)

Response: The comment has been forwarded to the technical writer. "North of Oroville" has been corrected to read "south of Oroville."

The Forest section appears to have numerous unreferenced claims.

<u>Subbasin in Relation to Region</u>, 2nd Paragraph, Page 18

The following statements appear to be more philosophically poetic than factual which does not seem appropriate, and the first sentence in particular is unclear in its meaning. No references are cited.

The Okanogan Subbasin exemplifies the popularity of the modern rural lifestyle and the controlling-protection paradox practiced by the growing number of valley residents.

Constraints to the sustainability of anadromous and resident fish, wildlife, and their habitats result from the footprints of this growth within the basin; many of these impacts and their resolution have cross-border implications. Such impacts include matured agriculture, forest and hydroelectric industries, and their extended affects which reach from the alpine mountain tops to the confluence with the Columbia River and beyond.

Response: The comment has been forwarded to the technical writer.

5th Paragraph, Page 18

The following statement is unclear. Also, is this author's opinion?

Dealing with these constraints will require both institutional and technical approaches, and links

between communities of science, interest and place.

Paragraph 1, Page 26

No reference quoted for final portion of the sentence. Is this author's opinion?

Dominant riparian species include black cottonwood, water birch, and white and thinleaf alder (Arno, 1977), but riparian forests and shrubsteppe have been virtually eliminated in the basin.

Paragraph 3, Page 27

Who/what is OWSAC? Is this listed in references?

Conversion of privately owned timber areas into other uses, such as residential subdivisions, is a trend, but not on the large scale that it is further south, in Wenatchee and Entiat (NMFS, 1998). During a recent four year period (1994 1997), approximately 11,000 acres of forestland were subdivided (OWSAC, 2000).

Land Use and Demographics, Paragraph 1, Page 28

In order to present a more accurate and complete picture, more specifics on protected land would be in order, i.e. how much land is in wildlife areas, etc. What does "dominated" mean? Perhaps forestry and range should be broken down rather than grouped together. Is this author's opinion?

Forestry and range are by the far the major uses of land in the Okanogan Basin, followed by croplands (Figure 8). Most of the landscape, from the riparian areas to the upper elevation forests, have been used extensively for agriculture and resource extraction. The valley bottom is dominated by agriculture, primarily orchards and livestock feed. The benches are dominated by livestock grazing, and the lower to mid-upper elevation forests have been harvested for timber and used for livestock grazing. The Okanogan Basin contains six state wildlife areas, a natural preserve in the DNR.s Loomis Forest, and a portion of the USFS.s Pasayten Wilderness.

Response: The comment has been forwarded to the technical writer. Forest and range are represented in different parts of Figure 8. "Dominated" has been changed to "predominantly".

Socio-Economic Conditions – Colville Reservation

Is the following statement actual wording of the court's findings? Reference to court ruling? The Court also ruled that the Colville Tribes possess federally reserved water rights to stream flows sufficient to preserve or restore tribal fisheries.

Response: Federally reserved water rights are established for all tribes under the Winters Doctrine. The statement cited is an accurate reflection of that doctrine.

Starting Paragraph 3, Page 30

Treaties and mitigation for dams are complex issues. Is this the correct forum to discuss the "unfairness" of the mitigation programs to the Colville Tribe? Are some of the following statements fact or opinion?

In 2000, the Bureau of Reclamation agreed with the Colville Confederated Tribes that the Federal government had not completed its authorized anadromous fish mitigation for construction of Grand Coulee Dam over 60 years ago. Planned artificial production programs were not implemented for the Okanogan River Basin when the outbreak of World War II halted non-war related construction projects. Tribes of the Colville Reservation have been seriously harmed by the lack of Grand Coulee mitigation, with ceremonial and subsistence fisheries declining to minimal levels, even in years of substantial runs entering the Columbia River. Fishing opportunity is now severely limited to summer/fall Chinook immediately below Chief Joseph Dam and an occasional sockeye fishery in the Okanogan River. This situation has been adversely compounded by later formulas for mitigation of mid- Columbia Public Utility District dams where the Federal Energy Regulatory Commission does not require mitigation for now, non-existing. Additional hatchery production under the proposed mitigation agreement with the PUDs is based on the run sizes of salmon and steelhead in a 10-year period during the 1970.s and 1980.s (Bugert 1998). Most of these post-dam runs were supported in large part by the initial hatchery mitigation programs funded by the PUDs and the Federal government. Since the CCT did not receive the initial mitigation from the construction of Federal and PUD dams, the basis for the new agreements discounts obligations to the CCT. Without the initial Federal salmon mitigation that other watersheds in the province obtained, the Okanogan Basin and Colville Tribes again were provided without mitigation. Additionally, the Federal government has never provided Okanogan anadromous fish mitigation for the Colville Tribes for the loss of adult and juvenile fish passing through the four Corps of Engineers. hydroelectric projects on the Lower Columbia River. Fish mortality at these projects have been generally estimated at about 10% per project, but were historically higher. Finally, Chinook mitigation by Douglas PUD for losses due to inundation and passage has been sited downriver, at Wells Hatchery and in the Methow River, away from the Colville Tribes. reservation fisheries. The Colville Tribes. total anadromous salmonid harvest is normally below 1,000 total salmon and steelhead combined and similar estimates are reflected in the Okanagan Nation fisheries upstream in Canada. Yet, in the 1800.s prior to over harvest in lower river commercial fisheries and subsequent habitat destruction, the Colville Tribes were estimated to have harvested in excess of 2 million pounds of salmon and steelhead annually (Koch 1976).

Response: The Tribes' representative advises that the points made in the text have been upheld. The mitigation cited is directly germane to sub basin planning.

Agriculture, Paragraph 5, Page 31

Says who? I cannot agree with a statement that does not list the positive benefits of Livestock Grazing and this needs to be corrected.

Livestock grazing practices have led to trampled stream banks, increased bank erosion and sedimentation, and changes in vegetation, including loss of native grasses, impacts to woody vegetation, and establishment of noxious weeds.

Response: Livestock impacts are based on the habitat assessment conducted by the HWG and reviewed by the SCT. The assessment process documented the level of certainty associated with each habitat attribute. The sub basin plan should recognize the benefits of limited grazing under proper management and monitoring.

Paragraph 6, Page 31

Who is PNRBC? Is a 1970s report relevant?

A 1970s rangeland evaluation indicated that 25 percent of rangeland in the basin was in good condition, 34 percent in fair condition, and 41 percent was in poor condition (PNRBC, 1977).

Response: PNRBC is the Pacific Northwest River Basin Commission. The technical writer has been asked to search for more current information.

Appendix A, Page 147

Federal ESA species are listed "that are present or may be present in Okanogan" but there is no way to know which listings are actually present and affect Okanogan County. Two separate lists would correct that.

Response: The comment has been forwarded to the technical writer.

Thank you for reading my comments and pass them on to any organization or entity that you deem necessary.

Patrick Plumb

Tonasket City Councilman

Okanogan County Citizens Coalition chairman-elect

pplumb@ncidata.com

work: 509-486-3105

home: 509-486-0688

# # # # # # # # # # # # # # #

From: "Ron Perrow" <ramshead@methow.com>

To: <sbp@co.okanogan.wa.us>

Date: 3/8/2004 12:50 PM

Subject: extension for comment

Please see attached letter

Thank you

Ron Perrow, chairman

Methow Basin Watershed Planning Unit

March 8, 2004

Okanogan County Water Resources

Northwest Power and Conservation Council

Re: DRAFT Methow and Okanogan Subbasin Planning

Dear Sirs:

This letter is in response to the February 23rd Memo soliciting comments by March 11th from "Interested Stakeholders" for the Draft Methow and Okanogan Sub-Basin Plans. Many of the individuals involved in watershed planning have been monitoring this process. It is the determination of the planning unit that there should be an extension of the comment deadline for the following reasons:

• Incomplete and inadequate information available for substantive comments.

Response: Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

• Public meetings provided only verbal/visual presentations without informational handouts or technical personnel to answer questions.

Response: Handouts were not always available at public or sub basin core team (SCT) meetings because work was underway immediately before, and often during, the meetings. The SCT, including technical members, have been using their available time to keep the process on track in order to meet a deadline imposed by the NPCC, and had little time to create polished handouts. As noted in Response 4, members of the public have been invited to join as participants in the process, rather than receive materials about it after the fact. Technical team members could not attend all public meetings, but did attend most of them.

• Failure to provide comment document in a timely fashion. (Several reported they had to make repeated requests for the draft and in fact received it between several days to one week after Feb 23rd Memo.)

Response: Delays in data processing (EDT model runs) resulted in delays in releasing the draft. The sub basin planning Coordinators sent the draft to all those who requested it, as soon as it was available.

• Unknown agency bureaucrats selected information and programmed computer models for subbasins before any public involvement.

Response: Technical staff (the HWG) did begin to organize and assess data prior to public involvement, with the intention of efficiently completing the very technical work prior to inviting public participation. Stakeholders were offered opportunities to comment and to participate in development of the subbasin assessment, including opportunities to review the data being used and comment on decisions made about the use of that data. HWG members were identified in a list sent to the entire sub basin planning outreach email list; HWG members were introduced at early subbasin core team meetings and lists of HWG members were posted at those meetings.

• Public meetings were generally held during the day when much of the public is working and not able to attend.

Response: The subbasin planning process occurred on a very fast-track schedule to meet a deadline set by NPCC. The schedule was difficult for all participants. Evening meetings would have required 2-3 times as many meetings to accomplish what could be done in one full-day meeting, and the schedule would not have allowed for that, nor would a heavy evening meeting schedule have been well received. Evening summary meetings were scheduled in an attempt to provide a window for the public who could not attend day meetings. The number of participants and meetings and the status of work often required changes in meeting schedules and locations, and this was a problem.

Since the full extent of how these plans will be used for water management are not known, we are concerned about the fast-track development at the expense of any meaningful public participation.

Sincerely,

Ronald E. Perrow

Chairman

# # # # # # # # # # # # # # #

March 10, 2004

TO: Okanogan County Water Resources

RE: Methow Subbasin Plan

Time for public comment was to brief.

Response: The comment period has been extended; comments on the first draft will be taken until April 16th. (The final draft will be available for review and comment on April 23rd.)

The document is not complete.

Response: Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

No public comment before EDT model runs were conducted.

Response: The sub basin planning process was designed to solicit and respond to stakeholder comment after the EDT run for each assessment unit. Comments regarding the data used and the outcomes will be incorporated in the findings for each assessment unit and will be considered in establishing priorities and management strategies for each sub basin.

No input from the Methow Basin Planning Unit was included before model runs were conducted.

Response: The Methow Basin Planning Unit was one of the key groups identified early in the sub basin planning outreach process. The group's participation was expressly solicited; Planning Unit members elected not to participate because completion of the Watershed Plan was demanding a great deal of time and energy during the period when sub-basin planning was initiated. Planning Unit members have been included in outreach efforts throughout the process.

The Methow Basin Planning Unit Rejected the EDT model, it's a black box we don't know anything about, it should not have been used. Because it was this plan looses credibility with the citizens of the valley.

Response: The NPCC required sub-basin planners to use either EDT or QHA. Planners in the Upper Columbia province elected to use EDT because it incorporates empirical data rather than relying solely on expert opinion.

Politics and state policy do show through bright and clear on page 22 – 6th paragraph. For the benefit of the Methow Basin please stop talking about lining our open canals. Look what was done to Skyline and Wolf Cr. It cost one million to destroy Wolf Cr. Now it's costing another million almost to fix it. Two million, it was working fine the way it was.

Response: The comment has been forwarded to the SCT.

Hannelor Vandenhengel

Box 533

Twisp, WA. 98856

# # # # # # # # # # # # # # #

Okanogan County Water Resources

Comments on Methow Subbasin Plan

March 10, 2004

The time allowed for responses was to short. Please extend it.

Response:The comment period has been extended; comments on the first draft will be taken until April 16th. (The final draft will be available for review and comment on April 23rd.)

The plan is not complete. The plan should have been complete. Putting out incomplete plans is a strategy that's used when you have something to hide, or something you don't want the public to see just yet. This reduces the publics response time overall on specific information that may be controversial.

Response: Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

It's my understanding that the Methow Planning Unit (PU) was not a part of this plan. The integration of all information in the planning process is key to successful planning. Your desire for citizen input in this plan seems a shame without input from the PU.

Response: The Methow Basin Planning Unit was one of the key groups identified early in the sub basin planning outreach process. The group's participation was expressly solicited; Planning Unit members elected not to participate because completion of the Watershed Plan was demanding a great deal of time and energy during the period when sub-basin planning was initiated. Planning Unit members have been included in outreach efforts throughout the process.

EDT model runs were made prior to input from the public. This process is backwards, unless your plan has a predetermined outcome, then public comments are just a nuisance and will probably end up in the trash can.

Response: The sub basin planning process was designed to solicit and respond to stakeholder comment after the EDT run for each assessment unit. Comments regarding the data used and the outcomes will be incorporated in the findings for each assessment unit and will be considered in establishing priorities and management strategies for each sub basin.

State agencies have ignored the possibility that recharge from unlined canals is a benefit. When I read page 22 I can see the plan was not based on science, just politics and state policy. The county and state have been represented on the PU. Why hasn't Okanogan County given direction as to the multiple benefits of recharge water form open canals as identified by the PU? Why hasn't the state seen to it that this information was incorporated in the Subbasin Plan?

Response: The comment has been forwarded to the SCT.

The determinations made by the PU do not jive with Washington state policy. So it seems the state has decided to go out on their own with backing from the NWPCC, using rate payer monies, ignoring the PU findings, and push state policy down our throats.

Response: Please note that the sub basin plan is permissive, not prescriptive. It includes a range of strategies that may be used depending on the limiting factors being addressed in a particular situation, and the characteristics of the project site.

Ken Bruce

488 Twisp-Carlton Rd.

Carlton, WA 98856

# # # # # # # # # # # # # # #

March 12, 2004

To: Julie Dagnon, Okanogan County Water Resources

From: Mike Gage

Re: Methow Subbasin Plan Comments

Julie,

The comment time on the Subbasin Plan was not along enough. There's a lot to read. Then you need time to digest it and respond.

Response: The comment period has been extended; comments on the first draft will be taken until April 16th. (The final draft will be available for review and comment on April 23rd.)

The subbasin Plan is not a complete plan, there's a lot missing. This means that in future drafts the public will have even less time to correct problems in the plan.

Response: Okanogan County's public involvement strategy has been to offer opportunities for involvement while the process was ongoing and work was in progress. The public has been invited to join as a participant in the process, rather than receive materials about it after the fact.

There has been no attempt to coordinate planning efforts with the citizens driven MBPU. This is not what was indicated by the county over one year ago. There is a feeling by some members of the MBPU that the county and state are trying to do an end run around the MBPU. I hope that's not true.

Response: The Methow Basin Planning Unit was one of the key groups identified early in the sub basin planning outreach process. The group's participation was expressly solicited; Planning Unit members elected not to participate because completion of the Watershed Plan was demanding a great deal of time and energy during the period when sub-basin planning was initiated. Planning Unit members have been included in outreach efforts throughout the process.

I have a problem with the EDT model that was used in the Subbasin Plan. The MBPU was not comfortable with EDT. We has our TAG member, Ken Williams review information regarding

EDT, Ken recommended the MBPU not use the EDT model. Models can be manipulated and they are only as good as the data that's put into them. If you control the input of data going into the model you control the results the model will spit out. The MBPU was not allowed a part in the control of data that went into the Subbasin Plan. I now have no confidence in the model results. The citizens of the Methow Basin have been hammered, by state and Federal agencies to the point where we would be total fools to trust anything they tell us. The county sits on both planning groups, why didn't the county step in and ask that EDT not be used, you knew it was very controversial.

Response: The NPCC required sub-basin planners to use either EDT or QHA. Planners in the Upper Columbia province elected to use EDT because it incorporates empirical data rather than relying solely on expert opinion. Material addressing the deficiencies of EDT and the MBPU's rationale for rejecting it will be appended to the Methow sub basin plan.

Through the parts of the Subbasin Plan that I had time to read the plan talks about bringing things back to natural. Yes there Probably is less "natural" riparian habitat today than there was 110 years ago. But there is more riparian habitat over all in the Methow Basin today then there ever was naturally. RCW 90.82 is about not just protecting existing habitat but enhancing what we have. Today we have more trees in the basin than it ever had before the white man came. We have more habitat for wildlife than was here naturally. Because of our farming practices etc. we have more nutrients going into the streams, these enhance the food web providing more food for fish, thus increasing the fish populations by as much as 30% in some streams. Pollution is not a problem in the Methow Basin, nor is sediment. Mullan & Willimas found that sediment was only 10% above natural levels. The gradients in the basin are steep and sediments are washed away causing no problems. Natural is not always better.

Response: A baseline of some sort is needed to provide a benchmark against which change can be measured. Where the baseline is set does not affect the focus of the assessment, which reflects the condition of the resource today. The baseline simply allows changes to be compared across reaches and streams. If the baseline were raised or lowered, relative change (compared to today's conditions) would remain the same. The issue remains the condition of the resource today and what to do about that. The sub basin plans do not advocate returning to a pristine baseline. Management strategies seek to return to properly functioning conditions when necessary for species recovery.

Page 22 is scary, the authors of this plan are still looking at unlined canals as being detrimental. These ideas come from state policy. State policy lags way behind good current science. This is another area where the county should have stepped in and contributed recharge information from the MBPU plan, the county didn't, now we have two plans that will be conflicting with one another in the direction they take. The county is creating a big mess, will the residents ever get out of it, and how much will it cost them in the end.

Response: The comment has been forwarded to the SCT. In addition, sub basin planning outreach staff met with the Methow Basin Planning Unit to address the issue on March 31st. Please note that the sub basin plan is permissive, not prescriptive. It includes a range of strategies that may be used depending on the limiting factors being addressed in a particular situation, and the characteristics of the project site.

Reading this plan has been irritating. After 20 years of trying to see the truth come out I now wonder if it ever will. I feel like a thief is going from door to door and window to window at my house, every time he finds a door locked and bared he tries another then he tries the windows, if one is locked he goes to another. Doors and windows keep appearing and I keep running around locking them and baring them but it never ends. You call for help and they send out more thieves to help the ones already there. The state wants our water, they will take it anyway they can. Next it will be our property.

MBPU members sent a letter of concern to the county and NWPCC. I am sending a copy of the letter and would like it to be part of my comments on the Subbasin plan.

Michael D Gage

Carlton

MBPU Letter enclosed with Michael D Gage's letter:

Northwest Power and Conservation Council

Bonneville Power Administration

Upper Columbia Salmon Recovery Board

Okanogan County Commissioners

RE: Sub-basin Planning

Attention: Sub-basin Planners

It appears that the Northwest Power and Conservation Council (NPCC) sub-basin planning process (SBP) initiated by Okanogan County, Colville Tribes and Washington Department of Fish and Wildlife for determining the restoration measures in the Methow Basin is flawed. The Methow Basin Watershed Planning Unit (planning unit) has not been included in this process. In fact the planning unit has not been contacted nor allowed input into this process. The planning unit ws told the process was being initiated well over a year ago. We were told we would be receiving a letter from the SBP group asking that a representative from the planning unit sit on a board with the three SBP agencies named above to set the course in determining the restoration measures that would be taken in the Methow Basin, this never happened. Later we were told the SBP group would be attending a planning unit meeting to gather input in determining restoration measures, this has not happened.

Response: The comment letter was addressed to the NPCC; we are not sure what comment is appropriate from us.

We can not overlook the fact that the key to successful sub-basin planning is the integration of any efforts into the watershed plan developed by the planning unit. Further more the planning unit has been involved in watershed issues for the last five years with some members also having involvement in the Pilot Plan and Ground water advisory Board, which goes back to the 1980s.

Due to the planning unit not being included in the SBP, the ingredients for good planning is not there. This is primarily because the studies and information developed by the planning unit are not being considered or included in the SBP. Thus your desire for local expertise is not even represented.

Response: The subbasin planning process occurred on a very fast-track schedule to meet a deadline set by NPCC. The schedule was difficult for all participants. Evening meetings would have required 2-3 times as many meetings to accomplish what could be done in one full-day meeting, and the schedule would not have allowed for that, nor would a heavy evening meeting schedule have been well received. Evening summary meetings were scheduled in an attempt to provide a window for the public who could not attend day meetings. The number of participants and meetings and the status of work often required changes in meeting schedules and locations, and this was a problem. Because most of the SCT meetings were held during the day, a summary meeting was held to accommodate those stakeholders who were not able to attend day-time meetings. The MBPU's schedule was a factor in choosing the meeting date; the sub basin coordinators chose an evening on which the MBPU had decided not to meet. After the SCT meeting had been scheduled and advertised, the MBPU decided to hold a meeting on the same evening. While the conflict was regrettable, the coordinators did not think it would be fair to other members of the public to cancel a meeting that had already been advertised. Sub basin Planning outreach staff met with the MBPU on March 31st to discuss the sub basin plan and receive comments. The Methow Basin Planning Unit was one of the key groups identified early in the sub basin planning outreach process. The group's participation was expressly solicited; Planning Unit members elected not to participate because completion of the Watershed Plan was demanding a great deal of time and energy during the period when sub-basin planning was initiated. Planning Unit members have been included in outreach efforts throughout the process. The NPCC required sub-basin planners to use either EDT or QHA. Planners in the Upper Columbia province elected to use EDT because it incorporates empirical data rather than relying solely on expert opinion. Material addressing the deficiencies of EDT and the MBPU's rationale for rejecting it will be appended to the Methow sub basin plan.

While some efforts have been made to make this process know to the planning unit this ignores the fact that the planning unit is on a fast track to complete its plan, and that the planning unit was told that this process would be integrated with watershed planning. It now appears that an end run is being made around the planning unit because there has been no contact nor integration attempted and because the SBP effort is creating a demanding schedule in parallel with the planning units heavy schedule.

In observing these things there is a real fear that efforts such as this will create conflicting or duplicate planning. This is reinforced by the fact that recent key meetings have been held during the day or in conflict with the planning unit meetings. This has eliminated in effect comments that could be provided by experienced planning unit members. Also sub-basin planning is being done without integration of the planning unit priorities. One such priority is that the planning unit on advise from its TAG rejected the EDT modeling technique as a valid tool for assessing habitat conditions and functions in the Methow Basin. This has not been considered by the SBP. The planning unit TAG recommended that an actual habitat assessment be completed focused on what the fish are doing in relation to existing habitat conditions. The planning unit was not able to do this because of funding and time constraints.

Furthermore how can there be valid input if the model runs are already one without citizen or planning unit input? The invitational letter shows that the Upper Columbia Salmon Recovery Board is doing the integrating. They are forming an overall strategy not a Methow Basin specific strategy. The planning unit has specifically made provisions for future planning by setting up a Methow Watershed Council (MWC). The SBP should be seeking to make provisions to integrate its efforts with the planning unit and in the future with the MWC. Without such considerations it is our belief that the SBP group is doing an end run around the state legislature which specifically intended that watershed planning be done by the local citizens. Salmon recovery was a key component of the watershed planning act.

There are too many mandates and differing agendas not based on real science, which in the long run look to be more damaging to the environment than helpful. Such pitfalls should be avoided and agencies responsible for funding restoration and recovery efforts are obligated to see that the process was not done incorrectly, and that funds were spent wisely.

Would it be appropriate for you to come directly to the planning unit for recommendations on recovery and funding projects?

Please send your responses to:

Methow Basin Watershed Planning Unit

PO Box 247

Twisp, WA 98856

Signed by:

Marty Williams – Planning Unit Member

Ron Perrow - Planning Unit Member

Mike Fort - Planning Unit Member

Mark Love - Planning Unit Member

Karla Christianson - Planning Unit Member

John Umberger - Planning Unit Member

Michael D Gage - Planning Unit Member

Dick Ewing - Planning Unit Member

Fred Colley - Planning Unit Member

Ray Campbell - Planning Unit Member

Gary W Erickson - Planning Unit Member

Cc: Sen. Linda Evans Parlette

Sen. Bob Morton

Rep. Cary Condotta

Rep. Michael Armstrong

Rep. Bob Sump

Rep. Cathy McMorris

# # # # # # # # # # # # # # #

April 13, 2004

TO: Okanogan County Water Resources

Northwest Power and Conservation Subbasin Planning

123 North 5th Avenue Rm. 110

Okanogan, WA. 98840

RE: Methow Subbasin Plan

In 1999, Okanogan County, the Town of Twisp, the Methow Valley Irrigation District (MVID), and the Colville Tribe established themselves as "initiating governments" for the watershed planning process, and began developing a stakeholder group, now called the Methow Basin Planning Unit, or MBPU. Members of the MBPU represent the diverse interests in the Methow Valley, and the group has been meeting regularly for about five years.

The MVID represents about 200 members. The Methow Valley Canal Associates (MVCA) is also represented on the MBPU and has about 90 members. I have represented the MVID and the MVCA for just about 5 years. I have concerns with the Methow Subbasin Plan (MSP). Why wasn't the MBPU involved in the MSP? Its true a meeting was set up between the MBPU and the MSP but this happened only after the plan came out for public review and after many comments and complaints over this. The group of MBPU members that attended the meeting were given a lot of lip service. We were told that you realized things were not done right, but tough you were going forward anyway. I guess we'll see if any of our comments will be incorporated in the next draft.

The legislature felt that the local development of watershed plans for managing water resources and for protecting existing water rights was vital to both state and local interests. The development of such plans serves the state's vital interests by ensuring that the state's water resources are used wisely, while protecting existing water rights and ESA listed fish, and by providing for the economic well-being of the state's citizenry and communities.

Okanogan County was sent a letter of concern from members of the MBPU, and I was one of those concerned members that signed on to the letter. Okanogan County Water Resources replied to the letter, but did not address the concerns of the MBPU members. The counties reply was just a whitewash. This sends up red flags of warning.

On page iii – you state coordinators delivered briefings to interest groups, and you have a list of interest groups that were included in the MSP. The MBPU is a much larger interest group with about 26 stakeholder groups being represented. The MBPU was told over a year ago we would be included in the MSP and would have a member sitting on your board, this never happened. The MBPU was latter told the MSP group would be attending a MBPU meeting to get input from the MBPU, it never happened. It appears you have misrepresented your intentions and were purposely avoiding the MBPU.

On page iv – you mention EDT, the model used to develop your management strategies. The EDT model is a black box, the public is keep in the dark as to how it works. The MBPU TAG rejected the EDT modeling technique as a valid tool for assessing habitat conditions and functions in the Methow Basin. The MBPU TAG recommended that an actual habitat assessment be completed focused on what the fish are doing in relation to existing habitat conditions. Furthermore the model runs were already done without citizen or planning unit input. When asked for the information that was feed to the model I was not supplied with it but was told there was to much paper to deal with. At this time I do not know what information was feed to the EDT model. Was the information any good? Was the information controversial? There was no information/input from the MBPU, nor from local citizens that went into the EDT model. Models can be manipulated just like a crooked roulette wheel, the person in control of the wheel will get the numbers he wants. More red flags.

On page xii – the Methow Basin Summary is mentioned. The Methow Basin Summary was done using the limiting factors review. The MBPU was to have input on the Limiting Factors Review, MBPU TAG member Ken Williams reviewed it, Ken stated it should not go to print in its presently written form. Many MBPU members also had input on the Limiting Factors review and were waiting for Ken to finish his review so all input from the MBPU could be included at one time. The review and the comments from the MBPU were never looked at because the Limiting Factors Review was completed without the MBPU input being allowed. The MBPU was never told what the comment closing date was. The County Water Resources head at that time was Dennis Beich, Beich was also the county representative to the MBPU and at this time MBPU chair. Carmin Andonaegui, Washington Conservation Commission, was writing the limiting factors review. Carmin was living with Beich as his girl friend at the time the Limiting Factors Review was written. Beich was dealing with Ken Williams and was the MBPU go between. When the review was completed Beich said sorry to late for comments the Limiting Factors is finished and its being printed. So errors in the Limiting Factors Review were never corrected these errors then were included in the Methow Basin Summary, then were they feed into the EDT model? Garbage in garbage out.

I gave input on the Methow Basin Summary, I asked that winter be recognized as the bottle neck for fish production, I asked that Mullan and Williams statement “Irrigation at current levels in the Methow River Basin, may be more beneficial than detrimental to salmonoid habitat because of its positive influence on groundwater” be included and researched. I thought these were key elements in planning but they were not included in the final product, except Ken Williams review was put in an appendix after much debate with Dennis Beich now the regional head for WDF&W. All three of the above mentioned plans had a very limited amount of time in which to do them. It was rush, rush, rush, no time for this, not enough time to do that. Why is the BPA in such a hurry to spend rate payers money. From the Limiting Factors Review to the Methow summary to the Methow Subbasin Plan the whole process has been questionable and there are a lot of red flags.

On page xii – at the bottom of the page are a number of important heading s that are not complete, why? If you don't know what the Subbasin Goals, Recovery Goals, and the Vision Statement is by now there is a problem. Why didn't you complete all these headings? The plan is incomplete, how did you even make the model runs without some of this information, and the model should have provided the information for the rest. More red flags.

On page 22 – the plan talks about the lining of irrigation canals, you say this plan is based on science, what science has been done in the Methow Basin, that is worth anything, where it has been determined unlined irrigation canals are detrimental. Those of us that have been involved in water planning know, in the Methow Basin unlined canals are beneficial. Transportation water does recharge the water table. This recharge occurrence is but one of the multiple benefits derived from irrigation water rights.

Data provided by the USGS shows that recharge water is significantly delayed in its return to the river. Because of the delay in returning to the river, and other factors, the MBPU has determined that recharge water has many benefits. These benefits have been known by local residents, and were mentioned in previous studies by Mullan and Willams and by Buell & Asso. The DOE has refused to recognize these benefits, and has even denied their existence.

We have seen the negative affects caused by piping unlined canals in the Wolf Creek area. The lowering of the water table, loss of wet lands, and unseen at this time or at least not admitted to, the lost of instream flows for fish during the winter bottle neck. Everyone on the valley floor is a secondary water user of water from an unlined irrigation canal. Wake up, don't screw with our ground water. All of these benefits are supposed to be protected by state agencies like the DOE and WDF&W. I'll bet none of this recharge information went into the EDT model.

<u>The plan and the whole process should to be reevluated.</u>

I have not had time to fully review this plan, its doubtful if anyone has had sufficient time to fully review the MSP.

The plan is incomplete and should not have been set out for review until it was complete.

The final USGS data was not incorporated into the plan nor does it look like the final USGS data was feed to nor part of the EDT modeling.

Information fed to the EDT model may have been incorrect. If information from the limiting factors review was used, or if information from the Methow Subbasin Summary was used, that information may have been wrong because of errors found by the MBPU TAG review. These errors in the Limiting factors Review were never corrected and were passed on to the Methow Subbasin Summary and would have corrupted the EDT models findings.

Information submitted by me on irrigation benefits and the winter bottle were not included in the Methow Subbasin Summary. This was information key to the EDT model and it appears this information may have been purposely left out.

Transportation water from unlined irrigation canals has multiple benefits which need to be protected and not ignored nor done away with as suggested on page 22. Recharge projects will increase instream flows for fish through the entire year, particularly during winter, the bottle neck for fish production. Groundwater recharge projects should be at the top of the funding list. Recharge projects are not mentioned in the MSP, why?

Ratepayer monies are being spent on this process so make sure the process is done right, and is above board. Right now the process is very questionable.

Michael D Gage

Cc:

Rep. Cary Condotta	Rep Cathy McMorris
PO Box 40600	PO Box 40600
414 John O'Brien Bldg.	MOD 2 BLDG – Rm 110-E
Olympia, WA 98504-0600	Olympia, WA 98504-0600
Sen Linda Evans Parlette	Rep Mike Armstrong
PO Box 40412	PO Box 40600
Olympia, WA 98504-0412	424 John O'Brien Bldg
	Olympia, WA 98504-0600
Sen Bob Morton	Rep Bob Sump
PO Box 40407	PO Box 40600
Olympia, WA 98504-0407	406 John O'Brien Bldg
	Olympia, WA 98504-0600

Public comments submitted for inclusion in Methow Subbasin Plans

Prepared by: Larry Bailey, Michelle Boshard Phone: 509 486 2400

Submitted to J. Dagnon, Okanogan County Water Resources Coordinator

May 10, 2004

Methow Subbasin Plan

General comments:

1) The plan is grossly incomplete in content (many sections and/or discussion of critical tables and reference documents are not provided in the text where they are brought up—to the point where it is not ready for presentation / understandable). Some sections appear to just be incomplete with notes left for what to include, which might indicate the writers have not met time deadlines for production. This document is marginally better in places than the Okanogan plan in terms of pointing out and acknowledging things like gaps in knowledge which need to be addressed to better implement priorities and projects.

2) Plan is incomplete in presentation (critical tables and figures are missing which makes it impossible for full understanding by public, not to mention that not all the supporting material was made available)

3) Plan lacks professionalism, even for a draft (spelling errors, formatting issues which make it difficult to navigate the document)

4) The document was dated April 23, 2004. The deadline for public review is May 10th, 2004. The article in the newpaper (Omak Chronicle) letting the public know the plan was even available for review did not occur until April 28th. This left effectively 10 days for the public to review the document, which was not posted on the internet in all the places it said it would be (not on County Water Resources website as of April 30, 2004) and copies not easily made available for pickup for public to review when they could (i.e. they would have to photocopy the 400 of 1600 pages made available themselves, or sit in the library for hours). Additionally, the full document was not made available. This is a grossly insufficient amount of time even for the “pared down” version of the document. It took a team of agency people and consultants a year to produce the document and it still appears to be incomplete. The fact community groups and/or local governments could not take this back to regular monthly meetings because they did not have enough time, and that they did not have access to major sections important for understanding the document make it impossible for the kind of review needed to approve the plan and claim stakeholders were involved.

5) There is no evidence that this plan has been based on anything that the public or stakeholders desire(s) or consider(s) important, despite the fact NWPPC and these planning exercises were “created by Congress to give the citizens of Idaho, Montana, Oregon and Washington a stronger voice in determining and balancing the future of key resources”. There is a complete lack of appendices of any public feedback, opinion, questionnaires, responses to inquiries or requests for public input anywhere in the document. No information is available on the already completed public review that was supposed to have occurred during the development of the plans.

6) This plan vastly out of step with current thinking regarding the way agencies in the Columbia Basin should be approaching planning exercises such as the Subbasin process. Executive Director of the Columbia Basin Fish and Wildlife Authority, told the Columbia Basin Bulletin, 'Agencies have to come to grips with the idea that they have to let loose of the controls. They have to lead from behind. This is not about controlling people and making them do things. It's about enabling them to do their best. People really respond to that. The vast majority of people want to do things to make things better. But mostly they don't have the ideas of how to do it. Or they don't have the resources to get it done.' ".

Response: Comment noted. An extensive and responsive public outreach program was conducted. The subbasin plan needs to be edited to be more concise, rather than to include more technical information. Supporting technical information can be found in the references cited by the plan. See response to comment S3-S4 regarding public involvement. Prioritization for fish and wildlife is being developed and will be included in the formal draft plan that will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

7) Executive Summary: Vision. The vision statement in this plan is verbatim what is stated as in the Okanogan Plan. The Methow and the Okanogan subbasins are different landscapes physically, socially and economically and require very different solutions tailored to suit the people/demographics, landscapes/impacts and local resource retoration needs. The vision statements of both the Okanogan and Methow plans, if truly based on the individual subbasin and the stakeholders in it, are not likely to be exactly the same. This indicates that the vision comes from the writers of the plan rather than from a collective understanding and agreement reflected in a statement generated by stakeholders based on that basin’s needs. What is written just sounds good and is generic enough not to really mean anything in either basin. It does not reflect useful vision which achievement can be measured against in any real terms, which is the point of this plan.

Response: The vision statement is intended to provide broad guidance for future desired conditions. The objectives and strategies are specific to the subbasins and stream reaches.

8) See other comments in Okanogan Subbasin Plan “General Comments” Section.

Specific comments:

1) Section 2.1 Subbasin Assessment--Subbasin Overview. Plan states it will solve challenges facing the Methow by "providing a compendium of resource information and the tools to empower planners and decision-makers to implement programs appropriately and in a coordinated manner at the local level". The goal of this document was to provide such a plan, not the tools for others to make the plan.

Response: The subbasin plan is not intended to be prescriptive but to provide a framework for implementation.

2) Section 2.1 –Methow watersheds. No simplified comparative impact scale summary provided to help understanding of prioritization of restoration projects and funding expenditures.

Response: The subbasin plan is not intended to address impacts but to assess current condition of habitat for fish and wildlife recovery. It does not identify and prioritize specific projects or funding.

3) Section 2.1 –Anthropogenic Disturbances. No inclusion of public / landowner perspective on results of these disturbances and impact to them as given by the public/ landowners. Neither is there recognition of the considerations resulting from those issues that later will affect the plan implementation, and how to deal with them. This plan is not occurring in a vacuum and will need to deal with these realities. There is no background or linkages to other major initiatives in the area involving public in watershed planning and dealing with anthropogenic disturbances, nor inclusion of reports on already accumulated consensus on how to deal with anthropogenic and social issues.

Response: The subbasin plan is based on an objective habitat assessment and an extensive and responsive public outreach program; see plan section XXX and appendices. The Subbasin Core Team sought public involvement to address the issues raised in this comment.

4) Section 2.1—Terrestrial Wildlife Relationships, Special Plant Species. Not provided.

5) Section 2.2—Focal Species: Population Characterization and Status. Although technical reasons for species selection (and the impacts causing the selections) are provided, there is no information on what implications plans for restoration of these species will have for public, landowners and other stakeholders, nor is there information on how or where the restoration will occur and who will be responsible, which is what the plan is meant to do. Sections such as "Population Management Regimes and Activities ", "Ecologic Effects / Relationships", "Relationship with Other Species" and other more basic technical information are not provided for some species. The prioritized list of limiting factors for each species and how these limiting factors compare to the limiting factors of other selected focal species in order to determine which species to fix first is neither provided nor discussed in the text in this section. It is impossible for the public to assess and provide feedback on these plans and their impacts to the public when no

information is provided to the public on these issues. If it is not completed, it also seems difficult for agencies to determine priorities based on this information and comes across as a regurgitation of what is already known.

Response: Focal species were selected to be representative of a broad range of habitat types located within the basin. It does not exclude other species from consideration. The subbasin plan develops strategies for species recovery; it is not intended to address the effects of species recovery on landowners and other stakeholders. It addresses action strategies; it does not identify specific projects. Prioritized limiting factors will be provided in the formal draft plan that will be posted for public review from June 5 through August 12, 2004 on the NPCC website. S3, S4: An extensive and responsive public outreach program was conducted; see plan section XXX and appendices.

6) Section 2.3—Environmental Conditions, Changes in Wildlife Habitats. Plan only briefly states that major land use changes have cause shifts in critical habitat-type shifts which affect the focal species, but does not discuss or reference technical or objective documents which demonstrate what these implications mean. Neither does it provide references to support the statement that "subbasin wildlife managers, however, believe that significant physical and functional losses have occurred to these important wetland habitats from hydroelectric facility construction and inundation, agricultural development, and livestock grazing." This seems to be either a subjective impression by agency employees which is unsupported or contradicted by their own data, or an unexplained "group conclusion" of the SCT for which no explanation was provided.

It appears landowners or industries influencing the land use changes and habitat itself were not consulted despite the fact their livelihoods depend on having a significant amount of this knowledge. While feedback from such sources is not scientific in nature, the plan writers themselves admit that the technical bases which agency employees use to make their determinations (eg IBIS databases etc) are not accurate. This results in a "we don't have a clue, and we haven't asked anyone who lives there, but we're going to plan anyway" approach which is no longer a scientific debate but a political contest in which the public and landowners don't have an even footing, and often lose.

Response: The comment is not clear.

7) Section 2.3—Environmental Conditions, Re-iteration and Expansion of the Guiding Principles. The plan begins this section by stating "The economic, cultural, and social valuation of fish resources is derived from the characteristics of the ecosystem that supports them" and then launches into technical prioritizations of ecological objectives set by agencies and their technicians (most of which were developed without specific or broad public input in regards to the impacts at local levels where priorities would be applied). The premise that this argument is built on—the statement that economic values are determined by the ecosystem—is

fundamentally untrue. It is not surprising that fish and wildlife scientists writing this plan do not have a firm grasp on economic realities, which are determined by social, cultural and market values not in their realm of expertise. But this affects the appropriateness of the plan because the logic thread proposed by the technical people seems to be basically that "the economy is based on the health of the environment/ watershed and its capacity, which we measure in focal / indicator species performance, and that if we set and meet the objectives we set for how a certain fish does it therefore improves (or meets objectives set by community for) the economy, and furthermore that science technicians would know best about that without asking the local community or researching what economic plans are already in place". There is no true inclusion of economic, social or cultural values referenced or included at all in the priorities set by the Regional Technical Committee (RTT), likely because the RTT is a strictly (and self-admittedly) defined technical body that doesn't deal with non-science issues. There is a vast amount of economic and cultural information in relation to the environment and economy, derived locally and paid for with public money in order that they be specifically included in plans like this, which are not included in this plan. Yet the writers of this plan insist the priorities set by the RTT "reflect a synthesis of goals and objectives from the various management plans directing tribal, state and federal agency policies within the Methow Basin." This is a specific demonstration of how science and government agencies are using their argument (made later in the paper) for separating policies (which they say specifically in the plan should be based on public goals) from the "how to get there" (the guiding principles for technical priorities). This excludes the opportunity for public to comment on specific application. This is a kind of sleight of hand saying "we want technically sound plans and we are technical people so we didn't collect social data--that's the policy department" while the policy department says " we

base our policies on scientific data and broad public goals our agency is given" without referencing or collecting the local economic and social community information a specific subbasin plan should be tied to and of which there is a vast amount. This process therefore never allows for the ground-truthing and reality checking and may cause Public

subbasin plans to be rejected by the public due to conflicts with community interests and ongoing initiatives, not to mention they will be useless to project proponents in seeing where they fit in the big picture in this regard.

Response: The subbasin plan presents broad guiding values and goals in its vision statement. It is not intended to develop these in the body of the plan. The formal draft plan will be edited with this in mind.

8) Section 2.3—"Relationship of Scientific Conceptual Foundation to Subbasin Goals" Not provided (see above—affects publics ability to understand how exactly their needs and interests have been considered or not).

9) Section 2.3—Historical conditions, current conditions, no-action conditions, or future desired conditions are not provided.

10) Section 2.3—"Out-of-Subbasin Effects" and "Environment/Population Relationships" not provided.

11) Section 2.6— Synthesis Of The Most Important Factors For Decline. Plan states it will "summarize and compare some of the central findings and conclusions offered in a number of key reports". Although a lengthy regurgitation of ideas from obviously libraries of information, this section does not then provide a meaningful discussion or prioritization of what the central findings of the current knowledge base mean, or indicate what should be done further based on common knowledge. The plan subsequently states that "to date no quantitatively structured analysis of limiting factors has been reported in the documents discussed here. Such analyses are being considered or planned using EDT or QHA. Until those analyses are published these qualitative assessments will have to suffice." This seems to mean that this subbasin plan, although it could not provide what it was supposed to, was done anyway, and without public input. It does therefore not meet the task assigned for the plan, and admits to itself this plan is not what it is supposed to be. The public cannot make an assessment of this plan based on either its content, or how it meets the goals set out for itself if it is has not been written to respond to the goals set out for it. Even if it manages to get by the public because of the short review period, it will likely never gain true public support and implementation, but instead will either sit on a shelf or draw lawsuits and opposition.

Response: Prioritization for fish and wildlife is being developed and will be included in the formal draft plan that will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

12) Section 2.6—Synthesis and Interpretation of Assessment in regard to Terrestrial / Wildlife. Plan states "Subbasin assessment conclusions are identical to those found at the Ecoprovince level for focal habitat types and species. An assessment synthesis is included in section 6 in Ashley and Stovall (unpublished report 2004)." The draft then has a comment which reads "Need more wildlife material summarizing conclusions

here??". This is evidence of the derivative "cut and paste" nature of the document and unnecessary padding after conclusions are already drawn, perhaps to distract from the obvious lack of content in the plan. This section does not draw ecosystem linkages across fish and wildlife priorities in assessment units or discuss how separate fish and wildlife projects will be prioritized for maximization of funding efficiency.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. Missing information will be included in the formal draft plan will be posted for public review from June 5 through August 12, 2004 on the NPCC website. Agree that linkages across fish and wildlife priorities are not made, and *represent an unfinished agenda that should be addressed in future plan update or implementation.*

13) Section 2.6—Fisheries Assessment Methodology. Section does not provide the rationale for the basis of the "exceptions" made during technical prioritizations, was this because they didn't fit the model? If so, how do those exceptions relate to real life impacts on fish—which is the priority, not making the model run smoothly.

14) Section 2.6—Strengths and Weakness of Assessment Methods / Data Availability and Quality. Not provided. This section is critical to public's ability to assess the plan in terms of the appropriateness of use based on the model used and the data it generates, on which assumptions for plan are based. Just like the IBIS database, we cannot make plans on incorrect models—no crosscheck process is outlined to verify findings.

Response: Missing information will be included in the formal draft plan will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

15) Synthesis of Key Findings. Not provided. Social and economic implications for landowners and public not discussed.

Response: Missing information will be included in the formal draft plan will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

16) Integrated Priority Assessment Units. Plan states "The integrated priority list for restoration and protection can be seen in tables Table 50 and Table 51, respectively." Not provided.

Response: Missing information will be included in the formal draft plan will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

17) Plan states "We also integrated the inter-species priority list with the assessment unit limiting habitat attribute summary analysis to provide a matrix of "where" and "what" needs restoration in the Methow Subbasin." Not provided.

Response: Missing information will be included in the formal draft plan will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

18) Section 3. Inventory of Existing Activities. This section provides a text summary (some of which is inaccurate) of the groups in the region, but does not provide an assessment of what projects are fulfilling what priorities found in the analysis, how they will be tied together, cost-saving analyses etc for review. Although this would be the foundation piece to a sound management strategy acceptable to the public (is not provided for their consideration), a detailed management strategy and approach is then subsequently proposed for consideration in the following sections. This seems to indicate that despite needing to work with existing bodies and stakeholders already undertaking activities / implementing plans or listening to the public about what will work on the ground in consideration of technical issues, planners are forging ahead alone. The management strategies later proposed do not refer to or link to appropriate sections of other plans by other groups. The writers then refer to their own flawed argument of "mixing of conceptual foundations" (ie keeping public policy and technical separate) as

the reason things aren't working, and as a reason for ignoring anything but technical considerations. The plan states "Too often in the past, the implementation of inappropriate strategies was made possible by altering the science (conceptual foundation) until it was consistent with the favored strategy. That was possible as long as the conceptual foundation remained unstated and hidden from view. In some hatchery and harvest management programs, as well as salmon restoration programs, scientific knowledge was suppressed or "bent" in order to justify the desired strategies". While this is an expectable backlash by science to political decisions which have damaged salmon stocks in the past, it implies another "technical only" solution created in a vacuum rather than a balanced one. Generally judgments made are inappropriate, and the plan's proposed directions do not even live up to its stated plan goal of balancing science, policy and on-ground local community/public needs, concerns and interests (economic and social issues).

19) Section 4. Management Plan. Our Vision for the Methow subbasin. Given the fact that any local and specific watershed based data, public involvement and conceptual conflicts discussed above are not provided or do not exist, the entire Section 4—the Management Plan for the future—becomes entirely suspect as to whether it will work in the Methow at all. Likewise for the Okanogan plan, despite the fact that both plans state in their "Specific Planning Assumptions" portion that "the ultimate success of the projects, process, and programs used to implement the sub basin plan will require a cooperative and collaborative approach that balances the economies, customs, cultures, subsistence and recreational opportunities within the basin with the federal/state mandates to protect fish and wildlife." This plan does not reach this goal in process, content, or direction.

Response: Comment noted.

20) This plan does and will not allow the specific goals in the "Specific Planning Assumptions" section to be reached, including 1) that "The Bonneville Power Administration should make available sufficient funds to implement projects developed within the framework providing by this plan in a timely fashion", because it does not provide the list for funding, and 2) "participation of stakeholders, local and regional planning organizations and/or groups in implementation of subbasin plans should be fostered to the fullest extent possible or where appropriate", for reasons discussed above.

Response: Comment noted.

21) Section 4.1 Recovery Goals. These goals and opinions are not goals as reflected by landowners and public to truly make this plan a reality, but rather either the incompleted or unprovided technical / scientific agency-based goals and priorities (sections 4.2 through 4.4) which may or may not be reachable, given local realities and considerations not incorporated in this plan. Of the five criteria listed presumably for determining for recovery goals (none of which are actually provided or discussed for comment), the community and social considerations (a.k.a. "social based criteria" which presumably

refer to the direct impacts to the landowners and public this plan will have) are listed last, below even the way agencies administrative way will handle the money to come for the projects they have not prioritized yet. This shows exactly the level of interest by planners in ensuring the local community and stakeholders are involved in the plan.

Response: An extensive and responsive public outreach program was conducted; see plan section XXX and appendices. The Subbasin Core Team sought public involvement to address the issues raised in this comment.

22) Section 4.7—Recommendations For Monitoring In Subbasin Plans. Plan states "Both top-down, and bottom-up approaches are necessary to develop a regional monitoring plan. Generally, subbasin plans embody the bottom-up approach, as they will contain input from a wide range of stakeholders and provide professional input from those who are most familiar with the logistical needs for these programs. When first written two years ago, the requirements for the monitoring components of subbasin plans also followed this philosophy, recognizing that the majority of on-going monitoring activity is at the project and subbasin scale." This plan does not provide a strategy for this. Plan lacks specificity on monitoring needed for this basin and the priority projects planned or ongoing that require monitoring. Misses one of the most cost-effective and beneficial strategies for accomplishing monitoring by not including where, when or how community can be involved in the monitoring, its synthesis, priority development, projects or initiatives to effect improvement of habitat as a result of good monitoring. Noone knows their river or their land better than the landowner or local community members. The public is a vast untapped resource which enjoys and would like to help in resource protection and restoration. Employing volunteer monitoring programs provides cost-effective leverage, relationship building, public outreach opportunities that can never be realized by conventional agency approaches. Well developed, coordinated, supported and funded it can even reach the landscape scale at which the agencies cannot. It requires training, quality assurance and control measures, and consistency in funding support but is a far more cost-effective mechanism for monitoring than currently spent monitoring dollars can do when used in a conventional manner. There are many regional, statewide and national organizations ready to help with a program that makes sense. The fact that this is not included in the plan is a major omission and flies in the face of the plan's stated goals of "inclusion of communities of science, interest and place".

Response: The monitoring plan was completed in April 2004 is now available for public review of the NPCC website.

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Public Comments on Okanogan Basin Draft Subbasin Plan

Public comments submitted for inclusion in Okanogan Subbasin Plans Prepared by: Larry Bailey, Michelle Boshard Phone: 509 486 2400

Submitted to J. Dagnon, Okanogan County Water Resources Coordinator

May 10, 2004

Public Comments on Okanogan Basin Draft Subbasin Plan

Okanogan Subbasin Plan

General comments:

1) Plan is incomplete in content (many uncompleted sections—to the point where it is not ready for presentation, some sections appear to be incomplete or hold some outdated information). It does not draw conclusions for the reader to consider and debate.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

2) Plan is incomplete in presentation (tables and figures are missing which makes it impossible for full understanding by public, not to mention that not all the supporting material was made available).

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

3) Plan lacks professionalism, even for a draft (spelling errors, formatting issues which make it difficult to navigate the document)

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

4) The document was dated April 23, 2004. The deadline for public review is May 10th, 2004. The article in the newpaper (Omak Chronicle) letting the public know the plan was even

available for review did not occur until April 28th. This left effectively 10 days for the public to review the document, which was not posted on the internet in all the places it said it would be (not on County Water Resources website as of April 30, 2004) and copies not easily made available for pickup for public to review when they could (i.e. they would have to photocopy the 400 of 1600 pages made available themselves, or sit in the library for hours). Additionally, the full document was not made available. This is a grossly insufficient amount of time even for the "pared down" version of the document. It took a team of agency people and consultants a year to produce the document and it still appears to be incomplete. The fact community groups and/or local governments could not take this back to regular monthly meetings because they did not have enough time, and that they did not have access to major sections important for understanding the document make it impossible for the kind of review needed to approve the plan and claim stakeholders were involved.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

5) There is no evidence that this plan has been based on anything that the public or stakeholders desire(s) or consider(s) important, despite the fact NWPPC and these planning exercises were "created by Congress to give the citizens of Idaho, Montana, Oregon and Washington a stronger voice in determining and balancing the future of key resources". There is a complete lack of appendices of any public feedback, opinion, questionnaires, responses to inquiries or requests for public input anywhere in the document. No information is available on the already completed public review that was supposed to have occurred during the development of the plans.

Response: Extensive public outreach was conducted (see plan section XXX). Public review comments are provided in Appendix XXX.

6) Plan does not provide an overall clear prioritization of fish and wildlife initiatives, projects and activities in basin for funders to contribute towards as their funding envelopes allow.

Response: Prioritization for fish and wildlife is being developed and will be included in the formal draft plan that will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

7) Plan's "Vision" and foundational principles seem to be limited to tribal and tourist perspectives—those of residents and community organizations and initiatives of their interest are not included at all, or are not referenced. This does not reflect the citizenry of the region as shown in the demographic profiles.

Response: The vision statement was created in a collaborative process through the Subbasin Core Team and included a broad range of interests.

8) Plan does not articulate (or give examples of) how this plan will relate to, or help coordinate multiple existing operational and budgetary linkages of other planning and program documents at all the levels of government. It does not identify how any or all of these plans relate to, or could leverage cost-saving opportunities in conjunction with, major efforts and initiatives by non-profit and community organizations. This plan is supposed to provide a prioritized list of

projects and initiatives for the future, inclusive of those of non-agency community origin, which all regional partners and the public agree can be participated on and that hydropower mitigation and other funding should be spent on. This plan does not include the community projects and initiatives into that prioritization.

Response: The subbasin plan's relationship to other concurrent planning process is addressed in plan section XXX. The subbasin plan is not intended to propose specific projects and initiatives.

9) Overall quality of the plan is neither commensurate with the time and energy, technical knowledge and ability of bureaucrats, staffers, and consultants working on it, nor the level of funding spent to date considering what has yet to be spent and the drastic improvements needed.

10) Overall this comes across as a very expensive library "cut and paste" exercise with nothing new learned and no strategies or action plans proposed for the future, and is unequal in value to the amount of time, energy and funding put into it. It is derivative in approach and contains little new information. The holes that leaves are important, as it does not address vast gaps in knowledge, particularly community knowledge, which creates a plan of dubious value at best.

Response: The subbasin planning process is designed to use existing information.

11) As stated succinctly by international river restoration expert Dr. Bob Newbury who resides in the Canadian portion of this river basin and who has worked on this river system "much of what needs to be done is obvious, simple and locally doable" –this plan does not clarify a plan of attack for what is already known to be important to be done.

Response: The subbasin plan provides a framework to support implementations actions.

Specific Comments

1) Executive Summary. Not Provided.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

2) Section 1.1. Not Provided.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

3) Section 1.1—Participation. Despite the fact public outreach was assigned to the Okanogan County, all key leads on the planning process have access to public outreach

capacity and bear responsibility for lack of public and stakeholder participation, not just

Okanogan County. It is doubtful, for example, for Okanogan County to be expected to reach regular tribal members and constituents regarding the plan and its impacts—something better done by CCT themselves. Likewise, WDFW should use existing and partner programs it is involved with (such as the WDFW hosted and State legislated RFEG program to assist in public outreach) to support the plan regionally. There is no documentation provided on exactly what public outreach occurred, the specific outreach, education or involvement strategies employed and explanation of why they were most effective, and no estimate in any change in level of understanding of those reached. There was no copy of the flier provided to the public to determine if it contained all the information needed for the public. There was no compilation of notes and results on public feedback. There was no list of specific groups spoken with or amount of public reached in the document. The approach to public outreach was a "we'll tell you" rather than "what do you have to say" exercise that effectively blocked true guidance and grounding of the plan which would have provided it the foundation for public acceptance of subsequent plans to spend recovery funds. Other methods and opportunities for collection of this input offered by organizations outside the SCT wishing to partner and who were experts in this arena were specifically declined by Okanogan County.

Response: An extensive and responsibe public outreach plan program was conducted; see plan section XXX and appendices.

4) Section 1.1—Infrastructure and Organization, Subbasin Core Team (SCT). There is no evidence that at any time did the SCT ever provide regular detailed (not summary) updates to the public or specific stakeholders about their intended technical approach and considerations being made in the development of the plan, nor how stakeholders could contribute to the SCT efforts. There was no effective way that stakeholders could input on or affect the approach in which SCT made the plans. 5) Section 1.2—Socioeconomic conditions. The plan state that "dealing with constraints will require both institutional and technical approaches, and links between communities of science, interest and place", but does not indicate how the plan will address or link to those already addressing the critical issue of large existing gaps in communications and coordination between scientists, government and tribal agents and landowners / communities in this region. The public will not accept the plan if it conflicts with their interests in this regard.

Response: An extensive and responsibe public outreach plan program was conducted; see plan section XXX and appendices.

5.)Section 1.2 – Socioeconomic conditions. The state that "dealing with constraints will require both institutional and technical approaches, and links between communities of science, interest, and place", but does not indicate how the plan will address or link to those already addressing the critical issue of large existing gaps in communications and coordination between scienticist, government and tribal agents and landowners / communities of science in this region. The public will not accept the plan if it conflicts with their interest in this regard.

Response: Comment noted.)

6) Section 1.4—Key findings and conclusions. Not Provided.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

7) Section 1.5—Plan Goals. Not Provided.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

8) Section 1.7— Synopsis of Major Findings and Conclusions. Not Provided.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

9) Section 1.8—Review of Recovery Actions. Not Provided.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

10) Section 1.9—Review of Recovery Commitments. Not Provided.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

Public Comments on Okanogan Basin Draft Subbasin Plan

Bailey / Boshard, submitted May 10, 2004

Page 4 of 8

11) Section 2.1—Subbasin Overview, Socioeconomic conditions. Although it provides background on tribal socioeconomic impact backgrounds, this section does not assess how the current economic climate in the region might influence the prioritization of funding to be spent based on this plan, which was one of the points of the plan. It does not even mention (or reference available documents that do) any of the many non-tribal related economic issues, including massive changes in economic trade which has regionally and largely affected agricultural patterns in the apple, cattle, and logging industries. These industries have key habitat and resource impacts. It would appear from this that either no-one but tribal members live in the

Okanogan, or that there are no other considerations from a non-tribal perspective considered important in the plan.

Response: The subbasin plan is not intended to provide an economic analysis.

12) Section 2.1—Subbasin Overview, Agriculture. The plan states that as “Agriculture is not a focal wildlife habitat type and there is little opportunity to effect change in agricultural land use at the landscape scale, Ecoprovince and subbasin planners did not conduct a full-scale analysis of agricultural conditions”. This boils down to an untrue excuse to avoid looking at one of the foremost and key issues in the US portion of the Okanogan ecosystem. Most of the major impacts to the most sensitive salmon habitat and overall to watersheds have occurred as a result of agriculture and not addressing this issue is a complete failure by planners. The assertion that there is no way to change things at a landscape scale is untrue—the writers either must not know how, or will not work with the partners necessary to do so. Working with all landowners on all parcels can be done and is currently being worked on, with very little or no support from agencies. If salmon recovery is to take effect in the Okanogan, there is no other way to fix habitat than to deal with individual landowners and involve communities and other land ownership partners. This applies also to the other major land-use impacts discussed in the rest of this section.

13) Section 2.1—Subbasin Overview, Tourism. The plan states that the “most potentially developable land (including many areas formerly covered by wetlands) in the basin has now been developed…” While this might be true in the Canadian portion of the Okanogan basin where impacts are extreme in comparison with the relatively pristine US river conditions, it is extremely untrue that land development has reached its maximum capacity. Regional economic development efforts are in fact pushing development of the region. For example, there is a major development proposed for waterfront and other sensitive habitat on Osoyoos Lake, a critical habitat for the most impacted and limiting lifestage of one of the last two wild Sockeye salmon runs in the Columbia Basin. Additional examples include major landowners planning to do hundreds of property developments in the headwaters of Bonaparte Creek, which has already been recognized in the regional Water Quality Implementation Plan as the single largest contributor of sediment to the Okanogan River in the US portion of the basin. These issues are swept away with the broad statement that somehow development has reached a peak in the US portion of the Okanogan, when in fact it is only beginning. Anyone that goes to the Methow or the Canadian portion of the Okanogan can see the future of this watershed.

and the potential impacts to these resources. Clearly the US portion of the Okanogan is the next target for regional development, and none of these factors are considered in the plan or its priorities for monitoring actions, protection of existing habitat, and restoration efforts.

14) Section 2.2— Focal Wildlife and Fish Species and Representative Habitats. There needs to be more reference to or inclusion of more detailed scientific information on the overall “indicator habitat & indicator species” approach being used to base plans on, such as examples of where it

has been employed to date and how it worked. Also, more information on or reference to specific sections of documents explaining monitoring protocols and procedures, and adaptive management processes would be employed to ensure subbasin plans are always relevant to the on-ground habitat restoration realities discovered by monitoring. Plan does not mention how the public involvement in monitoring (well established as useful in other ecosystems), and does not touch on or consider key strategies that would provide cost-effective support and leverage opportunities to on-ground recovery, general agency knowledge and benefit community relationship building. In the end, it would cost way less if you involved landowners and communities. This plan as stands instead is the kind of plan that draws lawsuits instead of partnership. The minor initial cost of involving public from the beginning saves more in the end. This is given lip-service by agencies but no true in this plan, as exampled by statement by Executive Director of the Columbia Basin Fish and Wildlife Authority, told the Columbia Basin Bulletin, 'Agencies have to come to grips with the idea that they have to let loose of the controls. They have to lead from behind. This is not about controlling people and making them do things. It's about enabling them to do their best. People really respond to that. The vast majority of people want to do things to make things better. But mostly they don't have the ideas of how to do it. Or they don't have the resources to get it done.' ". The specific selection of focal fish and wildlife species identified in this section for recovery focus, including the comparative scientific criteria and processes employed by reviewers and others involved to put them in this plan, are neither explained in the text or appendices, nor referenced elsewhere to provide scientific basis for this approach. A brief rationale for selection is given with each species as to why they are generally selected, but no comparative prioritization for restoration purposes is provided between species, nor is a reference to documents that do. Most of the information contained in this section is a “cut-and-paste” repeat of prior and assembled information and does not fulfill the plan’s goal of providing new and coordinated direction and guidance to restoration priorities. The public can not make an assessment of the appropriateness of this plan on this information.

Response: The subbasin plan needs to be edited to be more concise, rather than to include more technical information. Supporting technical information can be found in the references cited by the plan. See response to comment S3-S4 regarding public involvement. Prioritization for fish and wildlife is being developed and will be included in the formal draft plan that will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

15) Section 2.3 Environmental Conditions, Descriptions of Focal Wildlife Habitat. All major sections relating to fish are not provided, including: In-channel condition and function, Riparian/floodplain condition and function, Water quality, Water quantity,

Flow, Future No-action Conditions (2050). This completely disallows public ability to provide feedback on whether they feel the plan is appropriate for the existing conditions or not.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

16) Section 2.3 Environmental Conditions, Synthesis of Environment / Population Relationships. This part of the plan states what is already known—that we need to fix things, and we know what is important. It does not provide general or specific recommendations for prioritization and debate. It lists the wildlife species of importance and what their situation is but does not provides a prioritization of (or reference to documents that prioritize) projects to be funded with mitigation money and how this money will leverage additional money. Although it contains wildlife, this section does not provide the aquatically related species of importance and what their desired future condition is, much less a prioritization of projects to be funded. The plan states "To move forward on either (mitigating hydropower development or stopping degradation of ecological function) alone, or delay efforts in one sector, may constrain the rate of recovery, or even prevent it. Implementing improvements in hydro and habitat in tandem should maximize productivity by compounding survival improvements across several life stages in lock-step. We think this interaction will maximize the potential for a swifter recovery of these ESUs." but provides no plan as to how to do these things which is the point of the plan itself. It covers objectives and strategies that are already well known and in place, and is basically a repeated laundry list of things everyone knows should be done but is not structured in a useful way to prioritize which projects get what money when or how to fill gaps in order to proceed through priorities.

Response: The subbasin plan does provide recommendations for prioritization and debate. It is not intended to identify or prioritize specific projects. Desired future conditions for aquatic species will be provided in the formal draft plan that will be posted for public review from June 5 through August 12, 2004 on the NPCC website. The subbasin plan identifies the linkage between habitat and hydro but is limited to addressing habitat; it is not intended to develop a plan for hydro and the other "H's".

17) Most sections of Section 2.6, HAVE NOT BEEN WRITTEN including:

Synthesis of Key Findings

Status of species

Status and Health of the Environment

Biological Performance of the Environment

Summary Key Limiting Factors

Working Hypothesis

Description of Key Assumptions

Key Decisions and Rational

Desired Future Conditions

Reference Conditions

Species Loss from Historic Conditions

Estimated Species Abundance and Productivity

Relationship to Subbasin Goals

Opportunities and Challenges

Despite the technical background information that is included on specific species, this section is supposed to provide "the point" and is one of the most critical section to the

plan for the public in terms of understanding what the basis and background for management is. It does not provide understanding of the basis of the prioritization of future actions and spending of funding which the plan is meant to provide. If this has not been synthesized already after a year, the management plans provided in section 4 become suspect. If it has been synthesized, then the plan should include it for public review. The public can not make assessments based on this level of information.

18) Section 3. Inventory of Existing Activities. GROSSLY INCOMPLETED, with outdated information included. No summary of how these plans or ongoing initiatives interrelate or will be coordinated for the accomplishment of subbasin priorities is provided. No summary of ongoing initiatives outside of government and tribal agents are listed. This is an insult to community efforts and non-profit initiatives making some of the biggest differences to habitat improvement on ground, and who in comparison to agencies have no resources. Some of the most extensive studies on the largets stretchs of the most important habitat has been coordinated by or done by non-profit groups and is not really mentioned or discussed. The public cannot decide whether it wants to participate or support the plans if they don't know the players and the scene correctly—they also cannot determine if the plan's priorities are appropriate based on this incomplete and in places inaccurate picture of efforts in the basin.

Response: Comment noted.

19) Section 4 Management Plan—Definition of Conceptual Foundation. The plan states that its "Goals are a result of a public process, while the conceptual foundation is result of a scientific process. Strategies are derived from the combination of goals (what we want to achieve) and conceptual foundation (the ecological condition needed to achieve the goals)." While once public sets the goals science can provide the answer to "how we get there", this section seems to completely inappropriately infer that public should not, is not capable of, or has no place in being involved in developing and determining if the "how we get there" answer is appropriate one or will have the most cost-effective and/or beneficial results to the public. This is often used to effectively block community involvement in salmon recovery and watershed planning which

results in the very clash that is even specifically recognized in the plan between strategy and on-ground implementation. It is, in fact, imperative that the public be involved in the “how we get there” in order to point out ground truths that will affect the effectiveness of the strategies employed. There is no mechanism for this proposed in the plan. Science and government / tribal bureaucrats argue their tactical reasons for keeping technical or logistical planning and policy development on separate tracks, which ends up continually creating the well-known and almost universally acknowledged difference between having a plan with goals that doesn’t really result in getting something done or spending money well. What it does result in is the ability of science and government to control the plans, spend money on

their portions of the plans and programs without public interference, and keep Public communities excluded to the detriment of the entire process. This plan reflects the needs of the consultants and bureaucrats writing it and not the best interest of public money expenditure. Rather than developing this strategy and have the public continually reject it, the public should be involved the development of the strategy (not just goal setting) so the plan that results is automatically accepted and well-coordinated at the ground level for maximum cost-effectiveness. This has been done in other areas and can be done if the scientists, agencies and tribes embrace it.

Response: An extensive and responsive public outreach program was conducted. The Subbasin Core Team sought public involvement to address the issues raised in this comment.

20) Section 4 Management Plan, Management and Recovery goals. NOT PROVIDED FOR FISHERIES SECTION. The public cannot make a determination on the appropriateness of this plan if there is no information.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

21) Section 4 Near-Term Opportunities AND Prudent Strategies. GROSSLY INCOMPLETE.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

22) Section 4.5 and 4.6 NOT PROVIDED

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

23) Section 4.7 Recommendations for Monitoring. Lacks specificity on monitoring needed for this basin and the priority projects planned or ongoing that require monitoring. Misses one of the most cost-effective and beneficial strategies for accomplishing monitoring by not including where, when or how community can be involved in the monitoring, its synthesis, priority development, projects or initiatives to effect improvement of habitat as a result of good monitoring. No-one knows their river or their land better than the landowner or local community members. The public is a vast untapped resource which enjoys and would like to help in resource protection and restoration. Employing volunteer monitoring programs provides cost-effective leverage, relationship building, public outreach opportunities that can never be realized by conventional agency approaches. Well developed, coordinated, supported and funded it can even reach the landscape scale at which the agencies cannot. It requires training, quality assurance and control measures, and consistency in funding support but is a far more cost-effective mechanism for monitoring than currently spent monitoring dollars can do when used in a conventional manner. There are many regional, statewide and national organizations ready to help with a program that makes sense. The fact that this is not included in the plan is a major omission and flies in the face of the plan's stated goals of "inclusion of communities of science, interest and place".

Response: The monitoring plan was completed in April and is now available for public review on the NPCC website.

# #

COMMENTS ON PRELIMINARY DRAFT METHOW SUB-BASIN

Submitted by: Dick Ewing

25B Snowberry Lane

Winthrop, WA 98862

509.996.2098

fawn@mymethow.com

Date: May 10, 2004

In general it is not possible to devote the time necessary to review the plan and suggest rewrites for all the sections I am concerned about. In general I feel the plan adopts the usual environmentalist position that: 1) population must be limited, 2) the best way to preserve the environment is to keep it away from human intrusion, 3) government management of lands is better than private ownership and the resulting human activities on it and 4) addresses problems in environmentalist generalities which are not true or specific to the Methow. If we are to succeed as humans in living well with our environment more time and credibility needs to be given to how human activity improves the environment including activities on private lands.

Response: This paragraph addresses several generalities beyond the scope of this planning effort. Thanks for comment.

Below is a snapshot of what I have seen through out the document. If I had the time to be complete in my comments you would have another document of similar size to read.

P. 19 Regulation of land use: The planning assumptions associated with regulation of land use presuppose that only government owned or tribal lands contribute to restoration. None of the planning assumptions addressed the positive contribution of private land ownership to the environment or species recovery. It appears that all human ownership and use of private lands do not contribute to the environment.

Response: The document does not address comparative benefits of public versus private ownership.

P.40 This wording needs to replace the paragraph beginning with "The natural flow..:

The USGS completed in July 2003 a natural flow watershed model. The resulting Water-Resource Investigation Report 03-4246 simulated current, natural flows and the effect of irrigation canal seepage on stream flow. Irrigation- canal seepage contributes to streamflow throughout the year with the greatest effect during the irrigation season.[16]

Response: Wording will be considered by technical reviewers/editors for inclusion. USGS water quality study was not released to subbasin team for review

P. 41 Delete paragraph beginning with "Leaking irrigation canals are expected.." Then add:

Field studies have shown that 50 per cent or more of the canal discharge can be returned to the ground-water system through canal seepage. Data modeled on the Chewuch and Twisp rivers showed that there is an increasing gain in streamflow from May through October 7. When the canals are shut off after October 7 the net gain begins to decrease, but remains throughout the year[17].

Response: Wording will be considered by technical reviewers/editors for inclusion. USGS water quality study was not released to subbasin team for review

P. 41 Delete paragraph beginning with "To date the timing…" replace with:

The seepage from irrigation canals recharges the unconsolidated aquifer during the late spring and summer and may contribute as much as 38,000 acre ft. annually to aquifer recharge to the basin[18]. This represents about 9 percent of annual non-fluvial ground-water recharge in the basin simulated by the water model for years 1992 to 2001. Seepage from the canals is likely to have

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[16] Precipitation-Runoff Simulations of Current and Natural Streamflow conditions in the Methow River Basin, Washington; Water Resources Investigations Report 03-4246; USGS, 2003 p. 1 of Abstract
[17] Precipitation-Runoff Simulations of Current and Natural Streamflow conditions in the Methow River Basin, Washington; Water Resources Investigations Report 03-4246; USGS, 2003 p. 27
[18] Hydrology of the Unconsolidated Sediments, Water Quality and Ground-water/Surface-water Exchanges in the Methow River Basin, Okanogan County, Washington; Water Resources Investigations Report 03-4244, USGS, 2003 p. 1 Abstract.

the greatest effect on stream flow in September and October when streamflow and diversions are relatively low but ground-water flow from the seepage is still relatively high. A transient increase in ground-water discharge of about 30 cfs to the Methow River from Winthrop to Twis and of about 10 cfs to the lower Twisp River was observed in late summer and early autumn correspond to winter[19].

Response: Wording will be considered by technical reviewers/editors for inclusion. USGS water quality study was not released to subbasin team for review

P. 41 Delete the last paragraph beginning with "There is a great deal of conflicting.." Replace with:

Golder Associates as part of the Phase II Assessment of Watershed Planning made an assessment of agriculture uses including water rights, claims, certificates, and actual acreage of irrigated lands. An assessment of municipal, industrial and domestic uses was made as well.

Response: Wording will be considered by technical reviewers/editors for inclusion. USGS water quality study was not released to subbasin team for review

P.45 Water and Habitat Quality. This section failed to mention the USGS study on water quality which concluded: Surface and ground-water generally was of high quality. Water temperature measurements at all surface water sites at the time of sampling was within the criteria for class AA streams[20]. This statement should call into question that more data is needed for the stated 303 (d) listings mentioned and the associated effects of low stream flows or absence of flows associated with natural aquifer properties. Perhaps natural occurrences should be considered when designating a 303(d) listing.

Response: Wording will be considered by technical reviewers/editors for inclusion. USGS water quality study was not released to subbasin team for review.

P. 52 References to anthropogenic disturbances: It is important to note that not all human disturbances are negative, in fact they may improve habitat. For example Mullan, *et. al.* notes the positive contribution of rip rap at certain sites. Conversion of riparian areas to agriculture and residences is not necessarily a negative. There needs to be more of an attitude of a case by case evaluation of human activity.

Response: Agree in concept, but more recent studies and independent scientific review do not support conclusions of Mullen.

P.63 No one has explained why just after the ESA listing of Chinook Salmon there have been good returns up to the present. Mullen *et.al* and later evaluations by Ken Williams showed that spawner recruitment for the Methow was at restocking levels based upon the harvest catch. Harvest and later the dams, not degradation of the Methow basin is more the issue on why salmon returns were low in the Methow.

[19] *Ibid*, USGS, p. 55.
[20] *Ibid*, USGS, p. 22.

Response: Factors outside the subbasins such as ocean conditions and harvest regulations may account for strong returns

P. 113 References to grazing show an ignorance of various activities by the Okanogan Conservation District, NCRS and rancher which have changed grazing practices and have fenced off livestock from critical riparian areas. The tone and direction of these statements give no credence to the many changes in agricultural practices that have occurred in the Methow since 1988.

Response: Grazing discussion is based on existing published information; authors would appreciate any additional references to be incorporated in subbasin plan.

P. 114 References to Timber management are important. However, I would stress that logging has for the most part been terminated from the Okanogan National Forest. What is left is a forest that in some places has been over harvested and needs restoration and in areas where the forest has returned it is thick dog hair trees. Both situations do not allow for good precipitation capture and water retention which is needed in order to have higher stream flows later in the season. I saw no comments which stressed the need for restoration and management of forests for their potential to increase stream flows.

Response: References are needed for assertions made regarding termination of timber harvest and regarding precipitation capture and retention. Timber harvest management is beyond scope of subbasin plan.

P.114 This particular statement is untrue based upon the USGS water quality study completed in 2003 which said that Methow waters meet drinking water standards. They did not find any levels of pesticides or herbicides that warrant this conclusion Agricultural operations have increased sediment loads and introduced herbicides and pesticides into streams. Its also doubtful that Agricultural activity whether grazing or raising of crops has contributed to the sedimentation load. The Chewuch is naturally high in sediments. Most of the man made influence on sedimentation may come from road banks. Lastly there is a contingent of the WDFW that is seeking to preserve or increase the sediment loading during high flows. So there appears to be a contradiction of fact among the agencies on this one.

Response: USGS water quality study was not released to subbasin team for review. Water quality needs differ for aquatic life (e.g., bioaccumulation due to long exposure) and human consumption.

P.116: This statement: “Channelization and development along water courses has eliminated riparian and wetland habitats.” would be more honest if it said: “Where development along stream banks has occurred riparian and wetland habitat has been confined to the existing channel.”

Response: This will be reworded for accuracy.

P.116: The comments on environmental and ecologic relationships is definitely biased in its conclusions that humans have only done bad things. Current data shows that water quality is high in Methow streams. If that is so how has residential development degraded water quality? Also I would point out that a holistic management of forests by MAN that includes harvest, proper thinning, restoration and use of fire would be a better statement. Is it really true that species are forced out of their habitats due to human development? Initially I would say yes during the development stages, but later once normal human is maintained species return. How do you account for the return of birds, deer, raccoons coyotes etcs. where humans are present? Its more an issue of whether or not people welcome these species and restore habitat they can use after they have built their home. Even the Audubon Society knows this and provides books on how you can do this.

Response: Subbasin plan data is based on objective findings of fact. Additional scientific information has invited through SCT review and public comment.

P.145 In reference to how human land management affects the environment it might also be pointed out that man made decisions to restore the environment by lining canals or doing other activities has negatively impacted the environment because cumulative effects were not considered. This factor of net benefit is never discussed in the document. This evaluation should include both the positive contribution that human presence provides as well as negative and the evaluation of whether or not returning an ecosystem back to its perceived original native state is a better benefit than what now exists.

Response: Subbasin plan did not analyze effects of activities, but assessed current habitat conditions and modeled historic conditions.

P. 145 This statement is a good example of environmental propaganda:

Response: This will be reworded to improve accuracy.

Seasonal naturally occurring and human influenced low stream flows and occasional dewatering can alter fish passage to upstream spawning and rearing habitat. Low flows also affect water quality by contributing to higher stream temperatures in summer months. Stream borne sediment also degrades overall water quality. In addition, low stream flows tend to concentrate any toxic materials or other contaminants entrained in the stream flow.

These are generalized statements which cause the uniformed reader to conclude that low flows and dewatered areas are bad, sediment is always bad, low flows always mean higher stream temperatures etc. For the Methow this is not the case. Most low flows are natural. Its not clear that human use of water has caused low flows that have been passage barriers when fish need it, and water temperatures in the Methow don't necessarily correlate with low flows as much as a streams orientation towards the path of the sun and its not been proven that there are toxic materials and other contaminants in the Methow basin to concentrate. Lately on a project I am working it has just been stress to me that sedimentation recruitment is needed in order to rejuvenate fish habitat each year not to mention the need for significant enough flows to move boulders downstream to rearrange the stream channel. So such statements above are not truthful and of the sort that should be in a plan like this.

# #

May 7, 2004

Okanogan County Water Resources

123 North 5^{th} Ave., Room 110

Okanogan, WA 98840

Attn: Julie Dagnon, OCWR Manager

Mark Walker, Director of Public Affairs
Northwest Power and Conservation Council
851 SW 6th Ave., Suite 1100
Portland, OR 97204

Subject: Subbasin Watershed Planning Recommendations and Comments on two plans

Please accept the following recommendation and comments on behalf of over 800 members of Kettle Range Conservation Group, whose mission is to defend wilderness, protect biodiversity, and restore ecosystems of the Columbia River Basin.

Recommendation

The goals of the Subbasin Watershed Planning Process should remain flexible through the years. Attandance at several meetings during the current effort indicate that the process is being viewed as a "solution" rather than a "process". To meet this recommendation would require that the Subbasin Watershed Planning Process include a means for incorporating changes. What we found at the meetings was more akin to a few spreadsheets with no formalized procedure or designation of authority. The document provided at your website titled "Considerations for Monitoring in Subbasin Plans", by the Pacific Northwest Aquatic Monitoring Partnership make the mistake of equating a programmatic approach with a coarse-scale approach. This is a serious flaw which will result in wasted expenditures, because it doesn't incorporate "adaptive management".

Response: Adaptive management is integral to the subbasin plan; it is intended to be flexible. The intent is to be strategic, rather than opportunistic in management. The subbasin plan process does incorporate changes through its monitoring program and the use of objectives and working hypotheses.

Yet this is exactly what is being proposed--to move away from project-specific pilot projects toward state and regional models. The document claims that "these pilot projects demonstrate how the top-down approach can work to create monitoring projects that have systemwide applications." We can only accept this if the program to continue with pilot projects that deliver money to the ground rather than to remove beltway bureaucrats is continued.

The list of projects is then divided into top-down and bottom-up categories, yet these categories are never defined, nor does the document indicate if coarse scale measurements will be applied to time series as well as spatial data. In other words, we believe this is a veiled attempt to keep money within the agencies rather than disbursing it to the collaborators. While there may be good reasons to minimize the huge costs to disbursing funds to individuals or non-profit groups, you can obtain the same results by simply defining the parameters of “monitoring” to define who makes what decision when. What needs to be specifically described are a roadmap of the plan and checkpoints along the way, that identify who will be making decisions and what the criteria will be for “success”.

We believe that it is in the best interest of both the Northwest Power and Conservation Council as well as the public interests to establish a clear and concise process for incorporating changes in input parameters, and hope you can honor our recommendation with specific answers.

Response: The subbasin does not propose projects. The comments in paragraphs 1-3 address the PNAMP document, which is one of a number of sources used to develop the subbasin plan monitoring section. The monitoring section develops a framework that addresses the watershed environment against the objectives of the subbasin plan, rather than specific projects. Adaptive management and criteria are both developed in the subbasin plan monitoring section. The subbasin plan is silent on implementation and funding.

Comments on the Methow Subbasin Plan

We would like to prioritize increased aquifer and groundwater storage within the basin to benefit both fish, wildlife and agricultural uses.

We would like to prioritize restoration of beaver dams and beaver habitats throughout the basin. Basic research on the benefits of beaver dams and their habitats is lacking throughout the northwest. Research should include surveys on the quality and quantity of beaver dams as they relate to water storage, fish habitat, flood protection and wildlife habitat. More research is needed on the value of beaver dams to downstream water users and fisheries.

More funding is needed for protecting riparian and floodplain integrity. Problems continue to increase with flooding, sedimentation, stream gravel embeddedness, lack of quality pools, lack of LWD, and debris flows resulting from managed landscapes. There should be incentive programs to protect these resources and disincentives for shoreline development.

There needs to be more emphasis on shoreline restoration projects that increase fisheries and beaver dam habitats. Funding needs to be targeted toward endangered species restoration. Bull trout should receive special protection as an indicator species for clear water habitats. Projects are needed for restoration of side channels and breeding habitats off of the main channels, including native plant species restoration.

Increase protection for all native fish species including bull trout in all the areas where they historically occurred. Maintain separate demographic tallies for native species and hatchery fish. Do not fund projects that spend funds to count wild and hatchery fish together.

There should be increased funding to support the lower reaches of the Methow River, from Carlton to the mouth, and including tributaries Gold Creek, Libby Creek and Squaw Creek.

Some studies should be concerned with the relationship of upland ponderosa pine and shrub-steppe habitats to the riparian ecosystems. A number of key species may be linked to the protection of both these ecosystems, including moose, beaver, black and grizzly bear.

There should be funding for research on the distribution and abundance of Western Gray Squirrels, a State listed species that occurs in the southern portion of the Methow subbasin. Funding for conservation and restoration projects should be prioritized to protect and enhance Western Gray Squirrel habitat.

There should be more funding for non-chemical noxious weed control programs and plans. The Noxious Weed Control Boards have shown that there is insufficient encouragement from the state to use more sensitive methods of weed control, and as a result, there are a number of areas where healthy ecosystem values along sprayed roads are being lost due to denudification of the ground and vegetation. Areas treated are sometimes directly in streams, and the county Weed Boards do not have the resources to address the technical aspects of the chemical industry.

Response: The suggestions made in these sections of the comment letter exemplify the kind of project that are expected would be conducted during subbasin plan implementation. The subbasin plan does identify specific projects.

Comments on the Okanogan Subbasin Plan

We would like to prioritize increased aquifer and groundwater storage within the basin to benefit both fish, wildlife and agricultural uses.

We would like to prioritize restoration of beaver dams and beaver habitats throughout the basin. Basic research on the benefits of beaver dams and their habitats is lacking throughout the northwest. Research should include surveys on the quality and quantity of beaver dams as they relate to water storage, fish habitat, flood protection and wildlife habitat. More research is needed on the value of beaver dams to downstream water users and fisheries.

More funding is needed for protecting riparian and floodplain integrity. Problems continue to increase with flooding, sedimentation, stream gravel embeddedness, lack of quality pools, lack of LWD, and debris flows resulting from managed landscapes. There should be incentive programs to protect these resources and disincentives for shoreline development.

There needs to be more emphasis on shoreline restoration projects that increase fisheries and beaver dam habitats. Funding needs to be targeted toward endangered species restoration. Bull trout should receive special protection as an indicator species for clear water habitats. Projects are needed for restoration of side channels and breeding habitats off of the main channels, including native plant species restoration.

Increase protection for all native fish species including bull trout in all the areas where they historically occurred. Maintain separate demographic tallies for native species and hatchery fish. Do not fund projects that spend funds to count wild and hatchery fish together.

Some studies should be concerned with the relationship of upland ponderosa pine and shrub-steppe habitats to the riparian ecosystems. A number of key species may be linked to the protection of both these ecosystems, including moose, beaver, black and grizzly bear.

There should be funding for research on the distribution and abundance of Western Gray Squirrels, a State listed species that occurs in the southern portion of the Methow subbasin. Funding for conservation and restoration projects should be prioritized to protect and enhance Western Gray Squirrel habitat.

There should be more funding for non-chemical noxious weed control programs and plans. The Noxious Weed Control Boards have shown that there is insufficient encouragement from the state to use more sensitive methods of weed control, and as a result, there are a number of areas where healthy ecosystem values along sprayed roads are being lost due to denudification of the ground and vegetation. Areas treated are sometimes directly in streams, and the county Weed Boards do not have the resources to address the technical aspects of the chemical industry.

Response: The suggestions made in these sections of the comment letter exemplify the kind of project that are expected would be conducted during subbasin plan implementation. The subbasin plan does identify specific projects.

Thank you. We appreciate the opportunity to participate and comment on these issues.

Sincerely yours,

George Wooten, Botanist
Kettle Range Conservation Group
<gwooten@kettlerange.org>
509-997-6010

# #

From: "Lee Bernheisel" <owl@mymethow.com>

To: "Julie Dagnon" <jdagnon@co.okanogan.wa.us>

Date: Sun, May 9, 2004 7:37 AM

Subject: Subbasin Plan

Julie

Here's a couple of quick comment on the Draft

1. Pateros Dam

On page 42 and 81 the plan still says that the dam in the Methow near Pateros blocked all passage for fish.(Impoundment and Irrigation Projects) This is incorrect and has remained in the literature long enough its time to correct it in this plan with the fisheries agency's addressing its past mistakes. Please contact me if you need more information than I have already submitted.

Response: This will be reworded to improve accuracy.

2. Irrigation Districts

The Methow Valley Irrigation District was reorganized in and around 2000 and at that time the acreage was reduced to about 850 acres. The MVID is not required to supply 12cfs to the Barkley ditch. Their agreement is for the Barkley to supply water to the MVID ditch for its patrons along the ditch. (For conformation or more info check with me or Bob Barwin,WDOE)

Response:Discussion of MVID will be researched and revised.

The Skyline ditch is now completly lined or piped (p44 check with Greg Knott, BPR for details)

Response: The lowest ¼ mile not yet lined/piped.

That's it for now, good luck

Lee Bernheisel

# #

Methow Valley Citizens'Council

P.O. Box 774, Twisp, WA 98856

Okanogan County Water Resources, May 10, 2004

123 North 5th Ave., Room 110

Okanogan, WA 98840

Attn: Julie Dagnon, OCWR Manager

Subject: Subbasin Watershed Plan Draft Comments

We feel the main priority of watershed planning is to increase aquifer surface and groundwater storage for overall subbasin ecosystem health.   Areas for which we support funding include:

<u>Removal of bank armoring/dikes/riprap etc.</u>

<u>Riparian and floodplain integrity preservation</u>. Funding for monetary incentive programs that protect and restore fisheries habitat. Disincentives for shoreline development including removal of riparian vegetation, subdivision or any kind of bank armoring.

<u>Shoreline restoration projects to increase suitable fisheries habitat</u>. Funding for projects that will nurture endangered species restoration. Funding of projects for research and restoration of side channel restoration for breeding habitat, water storage and riparian area improvement, including native plant species restoration.

<u>Native fish species protection</u>. Increase protection for all native fish species including bull trout in all the areas where they historically occurred. Keep native species categorized separately from hatchery fish when assessing threatened and endangered species status.

<u>Restoration of beaver habitat</u>. This needs to include funding of research projects such as inventory of existing beaver dams and development of historical data. Also more research is needed on the value of beaver dam induced water storage on downstream water users, benefits to widlife, and fisheries.

<u>Conservation easements and public land aquisition in critical habitat areas.</u>

<u>Funding to support further study of the lower reach of the Methow river, from Carlton to the mouth.</u>

We also believe that the conservation of upland Ponderosa Pine and Shrub- Steppe habitat is crucial to the health of the subbasin. Areas for which we support funding include:

Funding for research on the distribution and abundance of Western Gray Squirrels, a State listed species, in the southern portion of the Methow subbasin. Funding for conservation and restoration projects that protect and enhance Western Gray Squirrel habitat.

Funding to study the local distribution and abundance of focal species identified in the Draft Subbasin Plan, and to conserve key habitat that provides connectivity for these species.

Funding for educational programs that assist private landowners in the Shrubsteppe and Ponderosa Pine habitat types to integrate habitat conservation with forest restoration and fire prevention activities.

Funding that supports landowners and the Okanogan County Weed Board in performing non-toxic noxious weed control for such species as knapweed, white top, toadflax, etc.

Response: The suggestions made in these sections of the comment letter exemplify the kind of project that are expected would be conducted during subbasin plan implementation. The subbasin plan does not identify specific projects.

The draft Subbasin Plan document is missing information under key headings such as "Key findings and Conclusions;" "Synopsis of Major findings;" and "Plan Scope." We expect that these and other headings in the document will be completed before the Final draft, in time for public review.

Response: We recognize that information is missing and will be incorporated in the draft that will be posted for public review from June 5 through August 12, 2004 on the NPCC website.

We appreciate the opportunity to participate and comment on this important plan.

Sincerely,

Vicky Welch, Chairman, MVCC

# #

OKANOGAN COUNTY FARM BUREAU

May 10, 2004

10 Wilson Ranch Rd

Riverside, WA 98849

Julie Dagnon, Water Resource Division Manager

Okanogan County Water Resources

123 N 5th Avenue – Room 110

Okanogan, WA 98840

Re: Okanogan County Farm Bureau Comments on 2nd Draft Subbasin Plans: Okanogan/Similkameen and Methow

Dear Ms. Dagnon:

Following are the Okanogan County Farm Bureau comments and concerns.

Local Concerns

<u>County Commissioners' Concerns:</u> Okanogan County Commissioners met on 5/3/04 to outline county concerns about the content and tone of the subbasin plans. Those in attendance (county staff, public outreach contractor, and representatives from WDFW and the Colville Tribe) agreed with the concerns and the need to rewrite large segments prior to submitting the plans to Northwest Power Conservation Council (NPCC). Extensive and repetitive attacks on agriculture, grazing, irrigation and forestry throughout the plans were a major concern and remain very troubling.

Response: Comment noted.

Okanogan County Farm Bureau agrees with the concerns expressed by Okanogan County Commissioners and we support the need for considerable revisions to the plans. The following comments are based on the 4/23/04 draft as the public will not have access to the revised plans before they are submitted to NPCC.

<u>Process Concerns/EDT:</u> Subbasin plans are heralded as *local plans* in spite of inadequate local public involvement and lack of information provided to the public even when requested. The Habitat Working Group (referred to as the "technical folks") met outside public purview for approximately seven months to make assessments relying on "expert opinion." After defining and describing 148 stream reaches, rating 46 habitat attributes for those reaches, reforming those reaches into 21 Assessment Units, the information was fed into the controversial Ecosystem Diagnosis and Treatment (EDT) Model to determine the working hypothesis and management strategies. Excerpts from a scientific review outlines the *pitfalls of the EDT Model* used in subbasin planning (See Appendix A). The review states, "EDT exemplifies how modeling should not be done."

The Methow Watershed Planning Unit elected <u>not</u> to use the EDT because of the problems associated with the model.

Response: All Habitat Work Group meetings were open to the public and were advertised through the County. The habitat assessment relied on the full range of data available, including empirical data, expanded and derived information, expert opinion/local knowledge. The documentation is transparent as to what level of data was available, the confidence associated with the data used, and identifies where more information is needed. EDT is the preferred model authorized by the NPCC for the subbasin planning process.

Local Watershed Planning Ignored: The Methow Watershed Planning Unit that includes years of work and research by local volunteers and experts was virtually ignored in the subbasin process. No direct contact was solicited for input and key on-the-ground studies that were conducted in the Methow were discredited and/or minimized in the Methow subbasin plan and replaced with hypothetical analysis.

Response: The Methow watershed planning unit was invited to participate, and opportunities were made available for their involvement. USGS water quality study was not released to subbasin team for review.

It is of interest also that the Methow USGS study was previously disregarded because it had not been published, and the subbasin plans are riddled with unpublished data.

Summary: The plans touch on some of the limitations of the process with the "compressed process that has allowed little flexibility in stakeholder involvement" [Page 4] but does not give an accurate picture of the difficulties those who tried to participate experienced. The closed-door assessment process by the technical Habitat Working Group, the lack of handouts of information, difficulty in obtaining any core information throughout the process, unanswered requests and disregard for reasonable public input makes these plans "local" in name only. This is just another case of the state and federal agencies and tribe writing the plan; the only difference is that they came to the county to do it. Credibility of information and accountability to the public are lacking.

Response: All Habitat Work Group meetings were open to the public and were advertised through the County. Requests for information were honored and opportunities for reasonable public input were provided throughout the process.

General Concerns

Due to the complexities of the subbasin planning process and plans, repeated revisions, significant data gaps and access to only approximately 378 pages of the 1,600-page plans, it is extremely difficult for Okanogan County Farm Bureau members and other stakeholders and groups to make substantative comment. Many of our comments will be general in nature where continued review has raised several topics of overriding concern.

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan and supporting materials in plan appendices will be posted for public review from June 5 through August 12, 2004 on the NPCC website. The subbasin plan is not 1600 pages in length.

Our previous comments stressed the importance that *subbasin plans not be extended to land management planning and management due to fundamental limitations of the plans* (Appendix B). In spite of the severe limitations of the plans:

The original purpose of subbasin planning to direct NPCC funding has been expanded to function as a general "framework" for future projects, actions, activities and land use planning throughout the county.

Subbasin plans expand land management beyond legal mandates for Endangered Species Act (ESA) listed species to include management of all fish and wildlife.

Subbasin plans and the NPCC Fish and Wildlife Program are elevated to ESA and Clean Water Act status, creating another layer of federal land management extended to all fish and wildlife.

Subbasin plans will be used for federal recovery plans.

Response: Subbasin plans are not land management plans, as such. Local land use management continues to be the responsibility of local government. State government has existing land use regulatory responsibilities in certain cases. The subbasin plans provide a framework for proposed projects. That framework recognizes existing legal mandates and may inform ongoing updates to existing regulations. It also provides recommendations to local and state government and willing landowners, that may be implemented by them. Effective species recovery will need to include land use management considerations. The subbasin plan guides Bonneville's actions under the existing Biological Opinion, but has no regulatory authority and is not characterized as having regulatory authority. It does not expand the legal mandates of the ESA. Background information developed through subbasin planning will be used in recovery planning, however implementation of a federal recovery plan is strictly voluntary.

Expanded Purpose: The purpose stated over and over to the public was that subbasin plans would be used by NPCC to prioritize and direct <u>Bonneville Power Administration NPCC</u> mitigation project funding. Language now shows that the NPCC subbasin plans will be used as a "framework" for all actions and activities in the Okanogan and Methow Subbasins:

"Actions taken in the subbasin[s] should be consistent with, and designed to fulfill the vision of the Okanogan [and Methow] subbasins." "This vision and subbasin plan…is intended to provide a framework under which future projects can be developed and implemented.*" [Okanogan, Page 207 – Methow, Page 19]*

Response: Subbasin plans will be used as a framework for <u>all BPA-funded</u> actions and activities, not "all actions and activities" in the Okanogan and Methow. The mission statement and introduction language will be clarified.

Expanded to All Fish and Wildlife: NPCC mitigation reaches beyond listed species and includes all fish and wildlife. Use of subbasin plans as a framework for county projects, actions and land management goes beyond legal mandates and expands all fish and wildlife to ESA-listed recovery status.

"Future land use planning and activities that involve potential impacts to fish and wildlife and their habitats should be fully discussed with the agencies and tribes with management authority prior to implementation."

[Okanogan, Page 207 - Methow Page 19]

<u>Subbasin Plans Expand Federal Land Management</u>: The following indicates subbasin plans are being developed as a back-door land management authority despite the lack of openness and credibility of the process and the plans and the limitations of the process, methods and results and elevates NPCC and the Fish and Wildlife Program to federal ESA/CWA status.

Actions taken in the sub basin should be consistent with the Okanogan sub basin plan, the NPCC Columbia Basin Fish and Wildlife Program, Clean Water Act, and the Endangered Species Act."[Okanogan, Page 2]

Use of Subbasin Plans Extended to Federal Recovery Planning: Again in spite of the limitations, the plans will be used as the foundation for NOAA (National Marine Fisheries Service) and US Fish and Wildlife Service ESA federal recovery planning requirements.

Response: Background information developed through subbasin planning will be used in recovery planning.

Management Plans

Conflict of Interest: The plans will direct future project funding and the writers of the plans are the recipients of the project funds. Several project needs continued to resurface throughout the Okanogan plan that are known to be "pet projects" of the agencies and tribe. Among those specifically noted are Salmon Creek, Omak Creek, and the Conservation Reserve Program (CRP). It appears there may be a conflict of interest in order to receive funding.

Response: The subbasin plan is silent on implementation and funding.

Land acquisitions and purchase of water rights are also common management tools throughout the plans.

Wildlife Section: This is the first opportunity the public has had to review the Wildlife portion of the plans. The Wildlife portion was produced outside the public and Subbasin Core Team process and information requested by the public throughout the process was not provided.

The focal species descriptions do not apply to our area and cannot be viewed as "local information." At least one focal species does not inhabit the Okanogan or surrounding areas. Many references are outdated or unpublished and mostly unavailable to the public.

The focal species and broad management appears to follow the information from Partners In Flight referenced in the plan, which is a group of agencies, environmentalists, consultants and academia with established focal species and management plans. It appears the wildlife section for focal bird species used much of the information from Partners in Flight. The wildlife portions were written outside the county with little application to our specific area and no public input, which is a disservice to our county.

Further research will determine whether the wildlife portions of the plans were re-writes of the Partners In Flight information. Regardless, the wildlife portion is far from "local."

Response: These comments respond to an early draft of the subbasin plan, made available in order to increase the opportunity for public review. The formal draft plan including the wildlife section will be posted for public review from June 5 through August 12, 2004 on the NPCC website. The focal species were selected as indicative of habitat types that occur in the subbasins.

Missing Information: As noted above, agriculture, grazing, forestry, irrigation and any human contact with the land are viewed as damage to the environment compared to "natural pre-

European conditions. Agency mismanagement is not listed, such as lack of predator control or predator introduction, bird impacts on migrating smolts, state-required removal of LWD from streams and rivers, etc.

Response: Comment notes. The subbasin plan does not consider land ownership or impacts, but only assesses the current condition of the land and its ability to support fish and wildlife.

Summary

Please refer to the comment letter by Okanogan County Farm Bureau dated March 11, 2004 for further comments and concerns that have yet to be addressed.

We will continue to review the subbasin planning process and make further general and specific comments during the NPCC comment period when it is anticipated the complete plans will be available. We look forward to the NPCC scientific review with the hope that further direction will solve some of the local conflicts and credibility issues.

Sincerely,

Mike Wilson, President

Attachments: Appendix A and B

Cc: Washington Farm Bureau

Okanogan County Commissioners

7th and 12th District Legislators

Northwest Power and Conservation Council

Emphasis added throughout.

[ ] Writer's comments

Appendix A

Excerpts from the

SALMON RECOVERY SCIENCE REVIEW PANEL

Report for the meeting held

December 4-6, 2000

Northwest Fisheries Science Center

National Marine Fisheries Service

Seattle, Washington

II. MODELS

A. STYLES OF MODELS AND THEIR UNDERLYING PHILOSOPHIES

The management of natural populations is an exercise in quantitative science; hence mathematical models are essential and invaluable tools. However, they must be used wisely and with understanding of limitations. Fisheries biology, in particular, has been a a rich breeding ground for mathematical descriptions ever since the great mathematician Vito Volterra turned his attention to the fluctuations of the Adriatic fisheries. Volterra's models were simple in structure, but complex in dynamics; this duality made them powerful aids in understanding key features of complex population fluctuations. Years later, William Ricker, perhaps the most innovative and influential of fishery scientists, showed how fairly simple age-structured models of fish populations could exhibit even more complicated dynamics (Ricker 1954); indeed, his simulations were probably the first demonstrations in ecology of chaotic population dynamics, whose importance was clarified twenty years later in a landmark paper of Robert May (1974).

The lessons of these seminal studies are inescapable: Models can play a fundamental role in demonstrating the mechanisms underlying observed phenomena, but even simple models can have complicated dynamics. The more complex models become, the more easily one can twist them to do almost anything, and the less reliable they become. Ludwig and Walters (1985) explored these truths in detail for fishery models in particular, taking into account explicitly the problems associated with parameter estimation. Their work demonstrated that, although models must include enough detail to capture the essential, unique aspects of a problem, too much detail can render models useless. The key to intelligent modeling is to find the optimal level of detail and to suppress confounding statistical noise. This is basically the approach that has worked so effectively in physics, in which statistical mechanical methods allow one to capture robust macroscopic features in terms of the collective dynamics of large numbers of unpredictable parts. This is the only approach that makes sense for modeling large-scale, intrinsically complex and dynamic systems.

The conclusions to be derived are that large-scale models that attempt to capture the dynamics of many species, or that rely upon the measurement of massive numbers of parameters, are doomed to failure. They substitute sledgehammer simulation for analytical investigation and efforts to identify the few key driving variables. Large models are bedeviled by problems of parameter estimation, the representation of key relationships, and error propagation. When the phenomena are fundamentally non-linear, this leads naturally to path dependence and to sensitivity of results to parameter estimates. As the number of parameters increases, the potential for mischief increases.

Thus it is essential to rid models of irrelevant parameters, and to identify key relationships. It also emphasizes the importance of locating what aspects of the model are most likely to lead to the expansion of error, and to focus on representing these as accurately as possible. This can only be done reliably through data-driven methods, with attention to appropriate statistical methodology.

When the data are not available for the needed estimates of parameter values, there is a tendency to insert values based on opinion or expert testimony. This practice is dangerous. The idea that opinion and "expert testimony" might substitute for rigorous scientific methodology is anathema to a serious modeler and clearly represents a dangerous trend. Indeed, there are limitations even to what can be done on the basis of data: the fact that relationships are often nonlinear, and further that interest often rests on understanding the behavior of populations beyond the range of variables that has been observed, creates vexing problems for the modeler. It provides a compelling argument for experimentation in order to elucidate underlying mechanisms, for the recognition of limits to predictability, and for the use of adaptive assessment and management (Ludwig and Hilborn 1983; Holling 1978).

EDT is a case study of the problems just discussed. The current version which uses 45 habitat variables might be a useful list of things to consider, but the incorporation of so many variables into a formal model renders the predictions of such a model virtually useless. Even more vexing is that EDT depends upon a large number of functional relationships that are simply not known, (and cannot be known adequately) and yet they play key roles in model dynamics. The inclusion of so much detail may creates an unjustified sense of accuracy; but actually it introduces sources of inaccuracy, uncertainty and error propagation. Subjective efforts to quantify these models with "expert opinion" compound these ills. (Pages 4-5)

EDT exemplifies how modeling should not be done. It is overparameterized, includes key functional relationships that cannot be known and cannot be tested, creates a false sense of accuracy, yet introduces error and uncertainty. Its very complexity makes it difficult to determine the effect of various assumptions and parameter values on the model’s behavior and relation to data. The attempt at quantification through subjective “expert opinion” compounds these fatal weaknesses, especially the model's inability to confront and improve with confrontation of data. (Page 8)

Emphasis Added

The entire document can be viewed at: http://publicnwfsc.afsc.noaa.gov/trt/rsrpdoc2.pdf

Appendix B

Subbasin Planning Limitations

Okanogan County Farm Bureau Comment Letter – March 11, 2004

Subbasin Planning Limitations: The reported purpose of subbasin planning is to direct Bonneville Power Administration mitigation funding through the Northwest Power and Conservation Council. It is important that subbasin plans not be extended to land management planning and management due to fundamental limitations of the plans, which include:

Subbasin plans are being developed solely for the benefit of fish and wildlife, with no consideration of costs, economic losses or conflicting human interests, which results in faulty findings.

The "ecosystem approach" used does not make any distinction between public land and privately owned land in its determination of fish and wildlife management plans.

Private property rights and land rights including water rights are not recognized.

Management plan goals are based on comparisons to "historic" or perfect, untouched conditions that are thought to exist prior to European settlement, which are not attainable, sensible or necessary.

Goals are widely based on data with significant information gaps and unmeasurable outcomes with minimal public involvement.

The cumulative effects of restrictions and regulations on private property ownership and land use are not measured.

The economic losses to the private landowner, agriculture, natural resource-based industries and county economic viability are not considered.

The subbasin planning process bypasses land management planning safeguards and requirements such as economic review, public notice and public involvement.

There is no legislative oversight of back-door ecosystem approaches to manage lands.

# #

TO: Okanogan County Water Resources

Northwest Power and Conservation Subbasin Planning

123 North 5th Avenue Rm. 110

Okanogan, WA. 98840

RE: Comments on Methow Subbasin Plan

This document should not be called a plan because it's not a plan. It's a bunch of philosophical statements, most of which have nothing to do with the Methow Basin. It's also made up of policy judgements and a lot of assumptions. Where is the science you claim this plan is based on? Policy judgements and assumptions should not be funded with rate payer monies, and flowery philosophical statements that have no relationship to what really needs to be done in the Methow Basin are nothing but filler for the document. You don't really say anything in this document, it's a complete waste of ratepayers monies. What you do do in this document is leave the door open to do anything you wish. The plans a blank check with nothing but a signature, the citizenry is supposed to trust that the state will do the right thing with it, haven't seen it happen yet. This is why we have a public comment period so we can weed out the garbage. In this case you were afraid of getting caught so you didn't include the garbage "yet", even though what you do present I also consider garbage of another type. The people responsible for this garbage should be fired and put into positions fitting their abilities, garbage collectors.

Again this document is incomplete, the following categories have all been left out.

1.2 Local and Regional Scio-economic Conditions

1.3 Overall Direction and Goal of Subbasin Plan

1.4 Key Findings and Conclusions

1.5 Plan Goals

1.6 Plan Scope

1.7 Synopsis of Major Findings and Conclusions

1.8 Review of Recovery Actions

1.9 Review of recovery Commitments

The above list is the meat of the plan. What you have us reviewing is nothing, you wasted our time, you wasted our money, and you've destroyed your credibility.

I sat on the MBPU for the last five years. We had preliminary information supplied to us by the USGS, which the MBPU wished to incorporate into our plan. John Storman the DOE representative to the MBPU was adamantly opposed to this incorporation of information supplied by the USGS even though it was based on very good science. He stated that USGS information could not be used until the USGS report had been reviewed and completed. I see John Stormon is listed on the Habitat Work Group list representing the DOE. It appears the DOE is now willing to use policy judgements, assumptions and Philosophical statements in place of good science. What ever it takes to get them where they want to be.

You make a statement on page 145 about low flows affecting water quality by contributing to higher stream temperature in summer months. I assume you are claiming this condition is occurring in the methow Basin or why would you have put it in the Methow Subbasin Plan. Well the USGS state that irrigation withdrawals on the Twisp River “were not” raising water temperatures. They also state that they had not done the work to say whether or not recharge water was cooling the Twisp River, but studies have been done that show recharge water from groundwater aquifers helps cool stream flows. I’m sure the folks on the Habitat work Group are aware of this occurrence but I don’t see where you included this language in the plan, I guess it doesn’t fit in with your policy goals.

You seem to think natural or what was here before the white mans settled the area was better than what is here today. You hammer everything the white man has touched. In those times before the white man came the Methow Basin was a very harsh place for all species of life to make a living in. Dry and hot in the summers (high Desert), it lie’s in the coldest of the 24 western climate zones, even the native Americans left the valley in the winter time. In early times the Methow Basin was not the Garden of Eden, we were thrown out of the Garden of Eden because of a liar and manipulator, does this remind you of someone. Today the Methow Basin is a friendlier place to all forms of life due to mans influence on the inviroment. Sure there has been some thing’s done that were not beneficial, hell, Washington State agencies are still doing them under the guise of fish recovery. Today there is more riparian habitat, more habitat of all kinds due to mans influence. There is 10% to 30% more fish being reared naturally in the rivers because of nutrients from mans activities entering wasteways. Recharge water from unlined irrigation canals recharge groundwater aquifers that in turn recharge instream flows. “Salmon populations are greatest in streams that receive high groundwater input, which sterilizes base flows and water temperatures, and promotes greater water fertility” (Hendrickson and Doonan 1972; White et al. 1976; Meisner et al. 1988). This is happening today here in the Methow Basin. Its time to stop hammering the things man has influenced in the basin and start realizing the benefits of mans influence in the basin. These beneficial influences need protection from those that would destroy them. This plan does not recognize the benefits of mans influence on the environment and would destroy 100 years of beneficial influence. The Methow Basin Watershed Planning Units Plan did recognize these benefits, if the Northwest Power and Conservation Council really wants to protect and enhance habitat, fish and wildlife they should contact the MBPU for funding direction.

Michael D Gage

Methow Subbasin Plan

Supplement to Appendix H

The following comments were submitted to the Northwest Power and Conservation Council during the public review period from early June through mid-August 2004. The subbasin planners were not required to address the public comments for the subbasin plans to be adopted, however, Okanogan County staff are committed to incorporating public comment and addressed the comments as well as possible, given the limited time and funding. The following letters are comments from the U.S. Fish and Wildlife Service, Yakama Nation, and Methow Conservancy.

United States Department of the Interior

Fish and Wildlife Service

Mid-Columbia River Fishery Resource Office

7501 Icicle Road

Leavenworth, WA 98826

Phone: (509) 548-7573

Fax: (509) 548-5743

Mark Walker

August 12, 2004

Director of Public Affairs

Northwest Power and Conservation Council

851 SW Sixth Ave. Suite 110

Portland, OR 97204-1348

Dear Mr. Walker:

The U.S. Fish and Wildlife Service (Service) appreciates the opportunity to comment on the May 28, 2004 Draft Methow Subbasin Plan (MSP). The Colville Tribes and Okanogan County in conjunction with KWA Ecological Sciences, Inc., coordinated this planning effort. This effort was initiated in May 2003 and was completed with the presentation of the document to the Northwest Power and Conservation Council (Council) on May 28, 2004.

The Methow Subbasin is located in north central Washington in Okanogan County. The Methow River enters the Columbia River between Wells and Chief Joseph Dams at RM 523.9. The subbasin comprises 12.78% of the Columbia Cascade Province encompassing 1,167,764 acres.

The Methow Planning effort faced many challenges including diverse opinions from fish and wildlife managers, tribal interest, irrigation districts, farmers and other interested parties. Other challenges faced by this planning group included limited staff resources and a compressed time frame.

The Service actively participated in the development of the Methow Subbasin Plan. We focused our time and attention on native fish and wildlife as well as activities that may coordinate or correspond with our mandated programs and responsibilities. Service biologist assisted subbasin coordinators through information and data dissemination. Additionally, they participated in workshops as well as provided review and comments on draft materials provided to them by the coordinators.

The Methow Subbasin Core Team developed a Management Plan as a component of this process. The Management Plan uses Assessment Unit Summaries as a way to convey pertinent information. This information includes focal species, subwatersheds, unit descriptions, level of certainty, limiting factors, working hypotheses and strategies. We would encourage the subbasin coordinators to go one step further and identify the types of projects or studies in specific locations that are necessary to achieve the goals identified within the Plan. Additionally, we would encourage the coordinators to develop a prioritized list of actions within each Assessment Unit.

We have evaluated the effects of the Methow Subbasin Management Plan on the Service's activities. In general, we have found this plan to be consistent with our Federal mandates.

Tribal Trust Responsibilities

The Service implements our fish and wildlife programs in a way that reflects our Federal trust responsibilities to Native American Tribes, respect of tribal rights, acknowledgement of the treaty obligations of the United States toward the Tribes, and protection of the natural resources the Federal government hold in trust for the Tribes. We are held to these principles through numerous treaties between the Tribes and the Federal Government. These include Executive Order 13175 requiring government to government relations, Secretarial Order 3206 relating to Federal/Tribal trust Responsibilities, and the Native American Policy of the U.S. Fish and Wildlife Service. Throughout the Methow Subbasin Planning effort, we have worked cooperatively with the Tribes including the Colville Confederated Tribes (CCT) to ensure that this planning effort protects the trust responsibilities. We believe that the Methow Subbasin Plan is consistent with our tribal trust responsibilities.

Hatcheries

The Winthrop National Fish Hatchery (WNFH), built in 1941, is part of the Service's National Fish Hatchery System in the Columbia Basin. The WNFH operates programs under regional agreements established pursuant to legislative mandates and judicial court proceedings such as *US vs. Oregon*. Additionally, the WNFH facility was built and is being operated to compensate for anadromous fish loss under the Grand Coulee Fish Maintenance Project of April 3, 1937 which was re-authorized by the Mitchell Act (52 Stat. 345) on May 11, 1938. The overall value of the WNFH can be summarized in the following manner:

The WNFH missions is to "*To produce high quality spring Chinook salmon and summer steelhead smolts commensurate with the production goals established by the Columbia River Fisheries Management Plans (FWS 2002a).*

Recommendations for artificial production in the Methow Subbasin Plan may be considered in the management activities of the WNFH provided that they are consistent with the hatcheries mandated responsibilities.

ESA

After reviewing the MSP, we find the goals, objectives and management recommendations to be consistent with the Service's Draft Bull Trout Recovery Plan (BTRP). The MSP identified habitat restoration, protection and information needs that have been identified in the BTRP and will assist in the recovery of bull trout.

It would be helpful for the MSP to have the same amount of detail for listed plants and wildlife species. The MSP did not provide actions specific to the needs of these species, many of which were not considered at the appropriate level of detail.

Other Programs

Many of the management recommendations are consistent with the intent of several of the Service's restoration programs, such as, Partners for Fish and Wildlife and the Fish (PFFW) and Federal Irrigation Mitigation Act of 2000 (FRIMA). These restoration programs should be considered in conjunction with other funding sources to implement some of the identified management strategies such as providing fish passage, riparian restoration and in-stream habitat restoration.

Summary Comments

The Service commends the Methow Coordinators on their efforts to produce a draft subbasin plan. This planning process provided limited opportunities for public involvement from interested land owners through conducting open meetings, updates provided through an extensive e-mail list and a dedicated website. Opportunities were limited because of the compressed time frame of this planning effort. Participation in the MSP included the Colville Tribes, U.S. Forest Service, Washington Department of Fish and Wildlife, Okanogan County, the Service and local interest groups and individuals. With that in mind, The Service has some concerns involving the process and subsequent draft document. The Methow Subbasin Planning process began in May of 2003. We believe that it was unrealistic for the Council to expect a subbasin plan to be developed in a watershed of this size in twelve months. Additionally, this schedule did not allow sufficient time for federal, state, tribal, local agencies and public involvement in the process or adequate review of the final draft prior to being forwarded to the Council. This lack of comprehensive involvement has resulted in a document that falls short of all the necessary requirements for a subbasin plan.

The Service has the following general comments on the document:

- The MSP failed to address native plant and wildlife issues adequately. The plan emphasizes fish but is somewhat general on plants and wildlife. Using ICBEMP as a template was a good starting point, however we feel that subbasin-specific information on plants and wildlife should be include in this planning effort. This plan needs to address the plant and wildlife species listed under the Endangered Species Act of 1973, as amended.
- The MSP Subbasin Plan has many editorial and formatting errors.

We have provided additional specific comments in Appendix A and a species list for Okanogan County in Appendix B.

Despite the MSP short comings, we believe that the MSP is a good first draft but it could be and needs to be greatly improved. The Methow Subbasin Coordinators need a substantial amount of additional time (6 months) along with adequate funding to produce a complete final document that would address all of the components necessary for a subbasin plan.

Thank you again for the opportunity to comment. If you have any questions or comments please contact Kate Terrell at (509) 548-7573

Sincerely,

/s/

Brian Cates

Project Leader

USFWS Comments on the Methow Subbasin Plan

General Comments:

Westslope cutthroat trout and bull trout are not capitalized.

Some clarification on bull trout is need. In this plan, they are listed as a *resident fish*. There are three bull trout life form exhibited in the Columbia Cascade Province, fluvial, adfluvial and resident.

When discussing focal species, little to no information is presented on fish stocking and potential impacts to focal species.

There is very little or no discussion on hybridization in discussion of species interactions. Hybridization has genetic consequences and thus population restoration impacts.

There is very little discussion on fishing regulations and their effect on focal species.

The plan is pulls together a huge amount of information and has much more detail on wildlife issues than the Wildlife Assessment and Inventory dated February 2004. The plan is strong on fish but somewhat general on wildlife. Using ICBEMP as a template was fine but it was obvious that less effort was placed on this discipline.

Please include the following program descriptions for both fish and wildlife in the Okanogan Subbasin Plan

> <u>Partner's for Fish and Wildlife Program</u>
>
> Partner's for Fish and Wildlife is a federal cost-share program to implement voluntary on-the-ground habitat improvement projects on private lands for the benefit of Federal trust species and the landowner. The program is run by the U.S. Fish and Wildlife Service who provides financial and technical assistance.
>
> <u>Fish Restoration and Irrigation Mitigation Act of 2000 (FRIMA)</u>
>
> FRIMA is a federal cost-share program to implement voluntary fish screening and fish passage at water withdrawal projects in Washington, Idaho, Oregon, and western Montana. The program is implemented by the U.S. Fish and Wildlife Service in cooperation with State and Tribal partners within the north western U.S.

1. Executive Summary

Page iii: *Dave Hooper- United States Forest Service* should be changed to Dave Hopkins

Page xix: Need to include a brief description of QHA as one of the tools used in the planning effort.

3.1 Subbasin Overview

Page 4: Need to include the property owned by USFWS Winthrop National Fish Hatchery.

Page 15: First full paragraph, please include the following statement: The confluence of the Methow River is located at RM 523.9 of the Columbia River.

Page 17: Methow Subbasin Ditches should be changed to Chewuch Watershed Ditches

Page 18: Gorman 1899 reference is not included in the reference section.

3.2 Habitat Areas and Quality by SubWatershed

Goat Creek

Page 19: First paragraph, third sentence states: *Goat Creek supports a tenuous population of bull trout in the upper reaches*. This should be changed to: Goat Creek supports small resident and migratory bull trout populations in the upper reaches.

Wolf Creek

Page 20: First sentence delete the word major.

Second Sentence change to the following: Wolf Creek provides spawning and rearing habitat for resident and fluvial bull trout, westslope cutthroat trout, summer steelhead and spring Chinook.

Early Winters

Page 20: Second Paragraph: *The lower half-mile of the river has been riprapped and diked to keep the channel in a stable location in order to accommodate Highway 20 and to protect private property. Levels of LWD in the first two miles are low and pool quality and quantity is poor. Severe low flows persist in the lower 1.4 miles of the creek. Low base flows are naturally occurring during the winter months; however, low flows during late summer and early fall may be exacerbated by two irrigation diversions (USFS 1998c).* In 2000 or 2001, the USFS completed a restoration project on this reach of the creek. The restoration included an increase of large woody debris, pools and quality habitat.

Third Paragraph: *The Early Winters Ditch on Early Winters Creek is currently meeting NMFS* (and: USFWS) *target flow of 35 cfs (*add: for spring Chinook and bull trout), *and the irrigation district is using wells, that are not in* (add: continuity with) *groundwater and surface water to meet the remainder of its irrigation needs.*

Chewuch River

Page 20: Second Paragraph: Add: Bull Trout use of the Lower Chewuch is unknown with the exception as a migratory corridor, *however, it is known that they use the Lower Middle Chewuch and the Lake Creek Tributary for spawning and rearing.*

Middle Methow

Page 21: First Paragraph: Add: Bull trout and westslope cutthroat trout use this portion of the mainstem as a migrational corridor and for over wintering.

Beaver Creek

Page 21: Beaver creek in not a major tributary in this assessment unit. Also fish use need to be included in this description. Suggested language: Steelhead, spring Chinook and bull trout have had limited access to Beaver Creek due to its many obstructions. Most of these obstructions have been removed or are in the process of being modified for passage. The introduction of brook trout may have reduced the historic populations of bull trout.

Twisp River

Page 22: First Paragraph, last sentence: *Bull trout are found in the upper Twisp River and several of its tributaries.* Change to: Bull trout are found throughout the mainstem and several of its tributaries. Bull trout use the lower mainstem for overwintering and as a migrational corridor. Most of the spawning areas for bull trout are located in the upper watershed. Westslope cutthroat trout are found in these areas as well.

Fish Species/Aquatic Relationships

Page 23: Second Paragraph change *bull trout (Endangered*) to bull trout (threatened).

Page 24: Table 12: need to include westslope cutthroat trout and interior red band trout.

Page 25: Need to include information on westslope cutthroat trout.

Focal Species: Population characterization and status

Table 15: Need to include westslope cutthroat trout.

3.3.1 Fish Focal Species

Page 30: Need to include westslope cutthroat trout as a species of concern.

3.3.2 Wildlife Focal Species

Page 31: Table 16: Pygmy rabbits are not located in the Methow Subbasin.

3.4.4 Bull Trout

Page 56: First Paragraph, second sentence: suggested changes: The Methow river subbasin in know to support fluvial, adfluvial and resident populations of bull trout.

Delete second paragraph and add: Adfluvial population of bull trout are found in the Lost River and Lake Creek. Fluvial populations of bull trout are found throughout the Methow subbasin. Resident populations are found in many other streams including upstream of many natural barriers.

Key Life History Strategies, Relationship to Habitat

Page 57: Delete second paragraph and replace with the following: Bull trout have more specific habitat requirements that do other salmonids. Their habitat components requirements are summed up by the "Four C's" – clod, clean, complex and connected. Bull trout are believed to be among the most temperature sensitive cold-water species found in western North America (Dunham et al. 2003). Water temperatures above 15 degrees Celsius (59 degrees Fahrenheit) are believed to limit bull trout distribution, a limitation that may partially explain their patchy distribution within a watershed (Fraley and Shepard 1989; Rieman and McIntyre 1995; Dunham et al. 2002).

Page 58: Delete first paragraph and replace with the following: Bull trout normally reach sexual maturity in 4 to 7 years and have a life span of 12 or more years. Repeat and alternate year spawning has been reported, although repeat spawning frequency and post spawning mortality are not well documented (Leathe and Graham 1982; Fraley and Shepard 1989: Pratt 1992; Rieman and McIntyre 1996).

Page 58: Delete third paragraph and replace with the following: Migration of bull trout from the Columbia River into the Methow subbasin occurs in May through June (BioAnalysts 2002, 2003). Spawning begins in headwater streams in mid-September and continues through October, with temperatures during spawning of 41 to 48 degrees Fahrenheit (3 to 9 degrees Celsius) (Goetz 1989; Brown 1994).

Page 59: Table 24 should be replaced with the following: See below

Table 24 Bull trout survey summary for the Methow subbasin (1992-2003)

Stream	**'92**	**'93**	**'94**	**'95**	**'96**	**'97**	**'98**	**'99**	**'00**	**'01**	**'02**	**'03**
Chewuch River Mainstem										9	11	6
-Lake Creek up stream of Black Lake				22	13*	9	8	0	8	21	11	10*
-Lake Creek down stream of Black Lake									4	1		4
Methow River												

-Goat Creek				0					11*		4	3
-Lost River	5*		0	0*			0					
-Monument Creek	2*	0										
-Crater Creek					2*	2	1	0		0	1	0
-Wolf Creek					3	3*	27	29	15	20	15	18*
-Early Winters Creek					9*	1*	2	0	3	5	6	0*
-Cedar Creek					1	2*		0				
-West Fork Methow River				27	15	13*	11*	1	2	19	54	
Twisp River												
-Twisp River North Fork to Barrier Falls	3*	5*	4*	18	0*	2*	67	38	72	53	67	30
-Twisp River Reynolds Creek to South Creek										19	13	16
-East Fork Buttermilk				4*	0*		0	0*	0	2	3	3
-West Fork Buttermilk											7	9
-Reynolds Creek	1*				0*					1*	0	
_North Creek				3*			19	63	33	0	2	29

- Incomplete counts as to time(single survey) and/or space (only part of index area surveyed)

Page 59: Delete the last two paragraphs. This is a repeat of previous information

Page 60: First paragraph should be included in the section below, titled: Relationship with Other Species.

Population Delineation and Characterization

Page 60: Delete the first paragraph. It is confusing and not correct.

Page 61: First paragraph, change to: The USFWS Draft Bull Trout Recovery Plan (2002) delineated 8 local populations of bull trout within the Methow Core Area. However; the Upper Columbia Bull Trout Recovery Team has modified their delineation to 9 populations. These populations include Gold, Beaver, Wolf, Goat, and Early Winters creeks and Twisp, Chewuch, Lost and Upper Methow rivers (Barbara Kelly-Ringel 2004, pers.comm.). Comprehensive redd surveys, coupled with preliminary radio telemetry work in the Wenatchee basin, suggests the 9 remaining spawning populations may not be complete genetic isolates of one another but rather possibly co-mingle to some degree. It is possible that the nine spawning aggregates represent the Methow subbasin, but more monitoring and DNA analysis is necessary. The Lost River aggregate gene flow occurs only in high water years and not always between all represented groups. Assumptions regarding the historic and current distribution of bull trout in the Methow subbasin as part of the QHA Analysis are summarized in Appendix J.

Hydroelectric Effects

Page 64: Second Paragraph: Need to add - recent studies indicate that adult bull trout are passing the Mid-Columbia dams at rates similar to their anadromous salmonid counter parts (Bio Analysis 2003)

Third Paragraph: Add the following- A three year radio telemetry study was initiated in 2001 to track bull trout movement within the Upper Columbia region. A total of 79 bull trout were tag at the three Mid-Columbia Dams (Rock Island, Rocky Reach and Wells). During this study, no mortalities of bull trout associated with the dams were documented (BioAnalysts 2002, 2003).

Page 65: Last paragraph add- This maybe due to the limited sampling periods of juveniles in the by-pass facilities (Chelan PUD, unpublished data).

Harvest Effects

Page 66: Replace current section with the following

Currently, the harvest of bull trout is prohibited on all stocks in the Methow subbasin with the exception of the Lost River. Fishing may have been a leading factor in the decline of bull trout. In streams currently open to fishing of other species, bull trout are vulnerable to take due to misidentification, hooking mortality, poaching, and disturbance. Schmetterling and Long (1999) found that 44 percent of anglers correctly identified bull trout and anglers frequently confused similar species. Incidental hooking mortality varies from less than 5% to 24% for salmonids caught on artificial lures, and between16% and 58% for bait caught salmonids (Taylor and White 1992; Pauley and Thomas 1993; Lee and Bergersen 1996; Shcill 1996; Schill and Scarpella 1997). Eggs and alevins in redds are vulnerable to wading-related mortality which can cause mortality of up to 46% from a single wading event (Roberts and White 1992).

The Lost River, above Drake Creek, is open to bull trout harvest. It is thought that the strength of the healthy population and the remote location will keep harvest within a sustainable level. This fishery should continually be monitored for the effects of this fishery on the population.

Past steelhead fisheries may have negatively impacted migratory bull trout. The closure of steelhead angling in 1997, following the ESA listing, may have played a significant role in the increase of bull trout redds in the Methow subbasin.

Lee, W.C. and E.P. Bergersen. 1996. Influence of thermal and oxygen stratification on lake trout hooking mortality. North American Journal of Fisheries Management 16(1): 175-181.

Long, M.H. 1997. Sociological implications of bull trout management in northwest Montana: Illegal harvest and game warden efforts to deter. Pages 71-74 in Mackey, W.C., M.K. Brewin, and M. Monita, editors, Friends of the bull trout conference proceedings, Bull Trout Task Force (Alberta), c/o trout Unlimited Canada, Calgary.

Pauley, G.B. and G.L. Thomas. 1993. Mortality of anadromous coastal cutthroat trout caught with artificial lures and natural bait. North American Journal of fisheries Management 13(2): 337-345.

Roberts, B.C. and R.G. White. 1992. effects of angler wading on survival of trout eggs and pre-emergent fry. North American Journal of Fisheries Management 12:450-459.

Schill D.J. 1996. Hooking mortality of bait-caught rainbow trout in an Idaho trout stream and a hatchery: Implications for special-regulation management. North American Journal of Fisheries Management 16(2): 348-356.

Schill, D.J. and R.L. Scarpella. 1997. Barbed hook restrictions in catch-and-release trout fisheries. A social issue. North American Journal of Fisheries Management 17(4) 873-881.

Schmetterling, D.A. and M.H. Long. 1999. Montana Anglers' Inability to Identify Bull Trout and Other salmonids. Fisheries 24(7):24-27.

Taylor, M.J. and K.R. white. 1992. a meta-analysis of hooking mortality of nonanadromous trout. North American Journal of Fisheries Management 12(4):760-767.

3.4.5 Westslope cutthroat trout

Page 66: Delete 4th paragraph.

Page 69: 7th paragraph: delete *fall*. The statement should read: In the Methow, flooding has a high frequency of occurrence. Westslope cutthroat trout are spring spawners, therefore fall flooding is not an issue with eggs in the gravel.

3.5 Other fish species important to management in the Methow subbasin.

Page 74: Delete: *Broodstock are collected at Dryden and Tumwater dams and at the Leavenworth NFH in the Wenatchee Basin*. This is Wenatchee subbasin information, not the Methow

3.5.5 Redband trout

Page 79 Delete: *This may have occurred in the Icicle Creek Basin too, where a barrier dam was erected in 1939 for the hatchery*. This information belongs in the Wenatchee subbasin.

Current distribution

Onchorhynchus is mis-spelled. It is spelled *Oncorhynchus.*

3.10.2 Changes in fish habitat

Page 144: There are 29 fish and wildlife species listed as Endangered, Threatened or Species of Concern in the Methow subbasin.

3.12 Community structure

Table 42: Need to include interior redband trout.

Page 158: Need to include bull trout and westslope cutthroat trout.

3.13 Competition

Page 159: what effect will the re-establishment of coho have on bull trout and westslope cutthroat trout?

3.14 Predation

Page 159: Need to include information on the predation of mammals and birds on bull trout and westslope cutthroat trout.

Page 160: Delete first paragraph beginning Channel catfish also have…. This is duplicative.

3.16.1 Chinook/Steelhead

Page 161: What is meant by well-coordinated competition?

3.16.4 Various salmonids

Delete this section and insert section 3.16.11

3.16.11 See above

3.16.12 and 3.16.13 are duplicative of section 3.14

3.17 Habitat conditions and Limiting Factors to Fish Production

Sections: Irrigation and low flows, forest practices, roads, agricultural practices, and mining need to include the effects of steelhead and Chinook.

3.17.1 Summary of Limiting Factors

Page 177: *Instream and floodplain habitat degradation (fish).* Include and wildlife

3.18 The Form and Function of Ecosystem Change

Policy, Social, and Cultural

Page 180: Second paragraph delete last phrase: *and probably caused "bonus" returns in others (as recently occurred, in 2002 and 2003)*

Fishing

Page 181: Delete second paragraph. Information in duplicated in the third paragraph.

Fishing in the future

Page 184: Paragraphs 2, 3 and 5 need citations.

Mainstem Columbia River Dams

Page 186 and 187: Need to include the effect of the mainstem dams on bull trout and lamprey.

Tributary Habitat Degradation

Page 187: Need to include the effects of tributary habitat degradation on bull trout and westslope cutthroat trout.

Public Policy

Page 189: Forth paragraph: need to include the effects of human population growth on bull trout and westslope cutthroat trout.

3.19.2 Mortality Outside the ESU

Page 192: Need to include the out of basin effects on bull trout and pacific lamprey.

3.20 Synthesis and Interpretation of Assessment for Fish Ecosystems

Page 197: QHA needs to be included in this section.

Page 234: Table 50: Goat Creek should be in category B due to the presence of bull trout.

Page 235: Table 51: Goat Creek, Lower Twisp, and Lower Chewuch should be category B due to threaten and endangered species.

Comments on Tables 50 and 51 were based on descriptions provided on page 238.

4.4 .1 Federal Agencies and Programs

Page 248: Need to include language on the USFWS Partners for Fish and Wildlife, and the FIRMA programs.

4.5.4 Principal Policy Processes Managing Hatchery Fish Production

Grand Coulee Fish Maintenance Project (GCFMP)

Page 268: First sentence: change *replace* to mitigate for.

4.5.5 Current Fish Production Program Goals and Objectives

Winthrop National Fish Hatchery

Page 273: Need to include information on the Hatchery Genetic Management Plans.

5.5 Assessment Unit Summaries

Page 288: How are EDT outputs correlated to the QHA outputs in regards to the Limiting Factors Analysis.

Assessment Unit 1

Page 289: Westslope cutthroat trout needs to be included in the focal species.

Hypothesis 1: Include the following- bull trout for holding, migration and overwintering. Westslope cutthroat trout for migration and overwintering.

Page 291: Data Gaps: Include the following for westslope cutthroat trout- fish use activity and life stage, distribution and abundance.

Assessment Unit 2

Page 292: Westslope cutthroat trout needs to be included in the focal species.

Hypothesis 1: Include the following- bull trout for holding, migration and overwintering. Westslope cutthroat trout for migration and overwintering

Page 293: Hypothesis 2: delete *steelhead and Chinook and* replace with all salmonids.

Hypothesis 4: Include the following- bull trout for holding, migration and overwintering. Westslope cutthroat trout for migration and overwintering

Page 294: Hypothesis 6a: Include the following- bull trout for holding, migration and overwintering. Westslope cutthroat trout for migration and overwintering

Page 295: Data Gaps: Include the following for westslope cutthroat trout- fish use activity and life stage, distribution, abundance and genetics.

Assessment Unit 3

Page 296: Westslope cutthroat trout needs to be included in the focal species.

Hypothesis 1: include westslope cutthroat trout for migration and overwintering.

Page 297: Hypothesis 2-5include westslope cutthroat trout for migration and overwintering.

Page 299: Data Gaps: Include genetics for westslope cutthroat trout

Assessment Unit 4

Page 300: Hypothesis 1: Include bull trout and westslope cutthroat trout

Page 301: Hypothesis 2-4: Include bull trout and westslope cutthroat trout

Page302: Hypothesis 5: Include westslope cutthroat trout.

Page 303: Data Gaps: Include genetics for westslope cutthroat trout.

Assessment Unit 6

Page 308: Westslope cutthroat trout needs to be included in the focal species.

Page 309: Hypothesis 2: Need to include westslope cutthroat trout.

Page 310: Hypothesis 4: Include bull trout and westslope cutthroat trout.

Hypothesis 6: include westslope cutthroat trout

Page 312: Data Gaps: Include genetics for westslope cutthroat trout

Assessment Unit 7

Page 314: Hypothesis 3: Include bull trout

Page 315: Hypothesis 4 and 5: Include bull trout.

Page 316: Hypothesis 7: Include bull trout.

Data Gaps: Include genetics for westslope cutthroat trout.

Assessment Unit 8

Page 317: Westslope cutthroat trout needs to be included in the focal species

Page 318: Hypothesis 1: include bull trout and westslope cutthroat trout in all life stages.

Hypothesis 2: include bull trout for rearing, spawning and migration. Westslope cutthroat trout for rearing.

Hypothesis 3: include westslope cutthroat trout for egg incubation and fry colonization.

Hypothesis 4: include westslope cutthroat trout.

Page 319: Data Gaps: Include genetics for westslope cutthroat trout

Assessment Unit 9

Page 320: Westslope cutthroat trout needs to be included in the focal species

Hypothesis 1: include westslope cutthroat trout in all life stages.

Hypothesis 2: include bull trout and westslope cutthroat trout ant all life stages.

Page 321: Hypothesis 3-5: include westslope cutthroat trout.

Page 322: Hypothesis 6: include westslope cutthroat trout.

Page 323: Data Gaps: Include genetics for westslope cutthroat trout.

Assessment Unit 10

Page 324: Westslope cutthroat trout needs to be included in the focal species

Hypothesis 1: include bull trout and westslope cutthroat trout ant all life stages.

Page 325: Hypothesis 2-3b: include bull trout and westslope cutthroat trout.

Page 326: Hypothesis 4: include westslope cutthroat trout.

Hypothesis 5: include bull trout and westslope cutthroat trout ant all life stages.

Hypothesis 6: include steelhead and westslope cutthroat trout.

Hypothesis 7: include bull trout and westslope cutthroat trout.

Page 327: Hypothesis 8: include bull trout and westslope cutthroat trout.

Page 328: Data Gaps: Include genetics for westslope cutthroat trout

Assessment Unit 13

Page 329: Focal Species: add westslope to cutthroat trout.

Hypothesis: include westslope cutthroat trout migration.

Page 330: Hypothesis 3: include westslope cutthroat trout.

Page 331: Hypothesis 4: include westslope cutthroat trout.

Hypothesis 5: include migration.

Hypothesis 6: include cutthroat trout.

Page 332: Hypothesis 8: include bull trout migration and holding

Assessment Unit 11

Page 334 Focal Species: add westslope to cutthroat trout.

Hypothesis 1: include bull trout and westslope cutthroat trout at all life stages.

Page 335: Hypothesis 2: include bull trout and westslope cutthroat trout at all life stages

Hypothesis 3: include bull trout and westslope cutthroat trout at all life stages

Hypothesis 4: include westslope cutthroat trout

Page 336	Hypothesis 5: include bull trout for migration and rearing.

Hypothesis 6: include bull trout at all life stages

Hypothesis 7: include bull trout.

Assessment Unit 12

Page 338:	Focal Species: add westslope to cutthroat trout

5.9 Consistency with ESA/CWS

Columbia River Bull Trout ESU

Page 361:	ESU should be changed to DPS. Language on core populations should be included from the USFWS Draft Bull Trout Recovery Plan.

Relationship to Other Planning Efforts

Page 365:	Include the USFWS Draft Bull Trout Recovery Plan and Critical Habitat Designation for Bull Trout.

Winthrop National Fish Hatchery

Page 480:	Second paragraph, last sentence should read the following: Current production consists of an Endangered stock of spring Chinook, with a total release goal of 600,000 smolts annually.

Forth Paragraph, last sentence should read: Winthrop National Fish Hatchery developed an HGMP which was submitted to NOAA-fisheries November 2002.

Page 491:	Statement "*There is no HGMP for Winthrop NFH" is incorrect*. Winthrop National Fish Hatchery developed an HGMP which was submitted to NOAA-fisheries November 2002.

Appendix H: Public Comments:

Comments provided in this appendix are a mixture of comments for the Methow as well as the Okanogan subbasin plans.

Appendix B

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES,

CRITICAL HABITAT AND CANDIDATE SPECIES

THAT MAY OCCUR IN

THE COUNTIES OF EASTERN WASHINGTON

AS LISTED BY THE U.S. FISH AND WILDLIFE SERVICE

August 10, 2004

FWS Reference:

COMMENTS

Major concerns that should be addressed in your biological assessment of project impacts to listed threatened, endangered, or proposed animal species are:

1. Level of use of the project area by listed species.
2. Effect of the project on listed species' primary food stocks and foraging areas in all areas influenced by the project.
3. Impacts from project construction and implementation (e.g. increased noise levels, increased human activity and/or access, loss or degradation of habitat) which may result in disturbance to listed species and/or their avoidance of the project area.

Major concerns that should be addressed for listed or proposed plant species are:

1. Distribution of taxon in project vicinity.
2. Disturbance (trampling, uprooting, collecting, etc.) of individual plants and loss of habitat.
3. Changes in hydrology where taxon is found.

For information regarding species listed by the National Marine Fisheries Service, please call (206)526-6150 in Seattle, WA, or (503)231-2319 in Portland, OR.

<u>Please note the Species of Concern Lists may not be accurate and are currently being updated.</u>

OKANOGAN COUNTY

LISTED

Endangered

None

Threatened

Bald eagle *(Haliaeetus leucocephalus)*

Bull trout *(Salvelinus confluentus)*

Canada lynx *(Lynx canadensis)*

Gray wolf *(Canis lupus)*

Grizzly bear *(Ursus arctos = U.a. horribilis)*

Northern spotted owl *(Strix occidentalis caurina)*

Ute ladies'-tresses *(Spiranthes diluvialis)*, plant

Designated

Critical habitat for the northern spotted owl

PROPOSED

Critical habitat for bull trout

CANDIDATE

Fisher *(Martes pennanti)*, West Coast distinct population segment

Yellow-billed cuckoo (*Coccyzus americanus*)

Western sage grouse *(Centrocercus urophasianus phaios)*

SPECIES OF CONCERN

Animals

Black tern *(Chlidonias niger)*

California bighorn sheep *(Ovis canadensis californiana)*

California floater (mussel) *(Anodonta californiensis)*

Cascades frog *(Rana cascadae)*

Columbia pebblesnail *(Fluminicola (=Lithoglyphus) columbianus)* [great Columbia River spire snail]

Columbia spotted frog *(Rana luteiventris)* (= *Rana pretiosa*, eastern population)

Columbian sharp-tailed grouse *(Tympanuchus phasianellus columbianus)*

Fringed myotis (bat) *(Myotis thysanodes)*

Harlequin duck *(Histrionicus histrionicus)*

Interior redband trout *(Oncorhynchus mykiss gairdneri)*

Loggerhead shrike *(Lanius ludovicianus)*

Long-eared myotis (bat) *(Myotis evotis)*

Long-legged myotis (bat) *(Myotis volans)*

Northern goshawk *(Accipiter gentilis)*

Northern leopard frog (*Rana pipiens)*

Northern sagebrush lizard *(Sceloporus graciosus graciosus)*

Olive-sided flycatcher *(Contopus borealis)*

Pacific lamprey *(Lampetra tridentata)*

Pale Townsend's (= western) big-eared bat *(Corynorhinus (=Plecotus) townsendii pallescens)*

Small-footed myotis (bat) *(Myotis ciliolabrum)*

Tailed frog *(Ascaphus truei)*

Western burrowing owl *(Athene cunicularia hypugea)*

Western gray squirrel *(Sciurus griseus griseus)*

Westslope cutthroat trout *(Oncorhynchus clarki lewisi)*

Wolverine *(Gulo gulo luscus)*

Yuma myotis (bat) *(Myotis yumanensis)*

<u>Plants</u>

Crenulate moonwort *(Botrychium crenulatum)*

Stalked moonwort *(Botrychium pedunculosum)*

Triangular-lobed moonwort *(Botrychium ascendens)*

Peculiar moonwort *(Botrychium paradoxum)*

August 12, 2004

Mark Walker, Director of Public Affairs
Northwest Power & Conservation Council
851 SW 6th Avenue, Suite 1100
Portland, Oregon 97204-1348
fax 503-820-2370

Dear Mr. Walker:

The Confederated Tribes and Bands of the Yakama Nation (YN) support the submittal of the Okanogan, Methow, Lake Chelan, Entiat, Wenatchee, Yakima, Klickitat, White Salmon, Wind River, and Middle Mainstem Columbia including Rock Creek Subbasin Plans because they represent an advancement of integrated fish and wildlife planning. However, given the inadequate funding levels and arbitrarily constrained time limits, the wide scope and the concurrent nature of the planning effort within these and other subbasins across the YN ceded area, we have been unable to participate at a level we would have preferred; i.e. the YN had no resources to be involved in the development of the Okanogan, Methow, Lake Chelan, and Wind River subbasin plans.

We expect to use the next several months to consider the work done to date and the implications to our treaty reserved rights and resources, and to develop recommended revisions for Council consideration. We also expect that Council will articulate how they intend to assure a clear link between all the subbasin plans and other obligations in the Columbia Basin such as the Pacific Salmon Treaty between the US and Canada, the fish production and rebuilding obligations defined in the *US vs. Oregon* Columbia River Fish Management Plan, Pacific Northwest Salmon Recovery Planning under the Endangered Species Act, and meeting tribal treaty trust obligations.

The Yakama Nation echoes the concern expressed by the Columbia River Intertribal Fish Commission (CRITFC) that most subbasin plans do not include specific measures (actions or projects) which can be expected to be implemented for the protection, mitigation and enhancement of fish and wildlife. The Regional Act requires the NPCC, in amending its Fish and Wildlife Program, to request "recommendations from Federal and regional State and Tribal "for (A) measures which can be expected to be implemented …to protect, mitigate and enhance affected fish and wildlife and their habitat … (B) establishing objectives…(C) fish and wildlife management coordination and research and development (including funding) for fish at and between projects". Though required in the Act and in the 2000 Fish and Wildlife Program, the NPCC specifically deleted requests for budgets and actions in its 2001 Guide to Subbasin Plans that was used by the planners as a plan format. Specifically, the 2001 Guide stated: "Strategies will be implemented through specific projects and/or actions. Projects proposed for funding will not be identified within the subbasin plan. When a plan is approved, it will form the basis for project selection within the subbasin. Projects will be developed through the regional project funding process."

However, in its request for recommendations issued in August 2002, the NPCC requested recommendations in the form of subbasin plans and mentioned implementation strategies "which will guide or describe the actions needed to achieve the desired biological conditions."

This confusion has legal consequences in that specific tribal and fishery agency recommendations are entitled to deference under the Act; the NPCC can not reject them in developing a program without specific findings and, once in the Program, is required to use its funds consistent with the Program. Until such time as the YN is able to develop new measures for fish management in subbasins within our ceded area, we will continue to implement the measures contained in volume 2 of *Wy-Kan-Ush-Mi Wa-Kish-Wit*.

The Yakama Nation supports subbasin planning under the Council's Fish and Wildlife Program and we are committed to working with you and your staff to make the necessary revisions in preparation for amendment of these documents. Given the enormity of that task, however, we ask that you consider the significant challenges placed on the policy and technical staff capabilities of the co-managers and request that the greatest possible flexibility in the review process and schedule be allowed. The products of this investment, including the developing relationships that have been forged, need to be protected and nurtured as we move to integrate and implement these subbasin plans into a regional basin wide management and implementation tool.

Thank you for this opportunity to comment and please feel free to contact me for any questions or comments you may have.

Sincerely,

Steve Parker, Acting Program Manager

Yakama Nation Fisheries Resources Management Program

General statement pertinent to all Subbasin Plans within the Yakama Nation Ceded Area

The following statement must be in each subbasin plan within the YN ceded area, i.e. Wind River, White Salmon, Klickitat, Lower, Middle and Upper Middle mainstem, Yakima, Wenatchee, Entiat, Lake Chelan, Methow and Okanogan. It should be stated in the Executive Summary and at the beginning of the Management Plan sections.

> The Yakama Nation has treaty reserved rights to hunt and fish at all Usual and Accustomed places within the subbasin. The Yakama Nation has standing as a co-manager for fish and wildlife resources in the subbasin and under that responsibility has developed a management plan for fish stocks (*Wy-Kan-Ush-Mi Wa-Kish-Wit*). In the absence of any other measure defined in this subbasin management plan, the Yakama Nation intends to implement the measures defined in *Wy-Kan-Ush-Mi Wa-Kish-Wit*. It is the vision and goal of the Yakama Nation that tribal members will exercise their treaty right to harvest native species at all Usual and Accustomed sites within the subbasin, and toward that goal the YN will act to restore or reintroduce stocks of native species.

General comments regarding all subbasin plans

The Columbia River Intertribal Fish Commission comment letter contains eight Technical Comments with Recommendations. The Yakama Nation endorses those comments and recommendations.

Okanogan, Lake Chelan, Klickitat, White Salmon, Middle Mainstem and Rock Creek, and Wind River Subbasin

There were no staff resources available to review these plans to provide comments at this time.

Methow Subbasin

General

Page xxii: Second paragraph under Implementation. There is **not** universal consensus that the vision, goals, preliminary findings, and management plan that anchors this document outline a reasonable and strategic course for fish and wildlife in the subbasin. The YN has not had sufficient opportunity to review this plan.

Page xxiv. Second paragraph under section 2 Introduction. The last sentence should read, "In addition, both the Colville Tribes and the Yakama Nation have a long history of traditional resource use in the subbasin, and take an active **role** in fish, wildlife, and habitat management."

Page xxiv. First paragraph under section 2.1 Subbasin Planning. The last sentence should read, "…;it serves as a valuable tool to assist local fish and wildlife recovery coordination efforts led by stakeholder groups, Okanogan County, the Colville Tribes, and the fish and wildlife co-managers (Yakama Nation and WDFW).

Page xxx. Second paragraph from top of page. Artificial production of fish is also used to provide for lost treaty fishing opportunities.

Page xxxiii. Okanogan County Comments on Land Acquisition. This is an inappropriate place for this discussion. It would be better placed in an appendix. If it is included in the Executive Summary, then there should also be included the counter-point.

Page 2. First paragraph under Fig. 3. The second sentence should read. "Ancestors of tribes that are presently part of the Yakama Nation and the Colville Tribes…"

Page 3. There needs to be a paragraph added for the Yakama Nation. The YN has treaty rights to utilize Usual and Accustomed sites in the subbasin. Those treaty rights give the YN standing as a fish and wildlife co-manager under US vs. Oregon; standing that the Colville Tribes do not have.

Page 251. The Yakama Nation has also been conducting spawning ground surveys and smolt trapping for at least the last twelve years.

Spring Chinook, Steelhead and Summer Chinook (not coho) Production Comments

Page 39. "Hatchery Effects" – it should be noted that the genetic data showed more genetic difference between years than between populations within a year. The genetic data are somewhat suspect.

Page 40. "Hatchery Effects" – BAMP included the Twisp in managing stocks as a single population, not just the Chewuch and Methow. See page 87 of the BAMP.

Page 40. "Hatchery Effects" – Even in large run years, to date only the Twisp tributary trap is showing any promise as an effective trap. To count on the tributary traps is not appropriate at this time given their long and ineffective track record.

Page 184. Four solutions. Why get into solutions with harvest alteration when the mainstem habitat is the real problem?

Page 185. "The effects of Fishing on Population Characteristics". What is the citation for extirpation in the 1800s by harvest? First sentence of section.

Page 265. first full para. BAMP included the Twisp in managing stocks as a single population not just the Chewuch and Methow. See page 87 of the BAMP.

Page 265. 2nd to last para. Release sizes at the hatcheries is also dependent on trapping efficiencies and water availability at the hatcheries.

Page 267. PCSRF Section. Include Yakama Nation spring chinook pedigree study.

Page 277. Need to describe the coho fish production program at Winthrop NFH.

Page 280. Monitoring and Evaluation. Include Yakama Nation study to monitor summer chinook stock status funded by Alaska through CRITFC.

Pages 363-364. Given Ford et al (2001) and findings by the TRT, why are we managing for multiple sub-populations in the Methow? Is there a goal to manage for more than one genetic population as identified in the BAMP?

Page 460 or so; Table 64. List YN's pedigree study and summer chinook evaluation.

Technical Comments

Page xxi, Executive Summary **–** A recovery goal for coho salmon is not included. The recovery of coho salmon is listed as a priority in the tribal restoration plan and affirmed as a priority for the NPCC. An appropriate goal for coho salmon would include re-establishment of run sizes that provide for species recovery, mitigation of hydro-system losses and harvestable surpluses.

Page 24, 1st paragraph - Craig and Suomela (1941) reported that coho salmon were historically more abundant in the Methow River than chinook or steelhead.

Page 30, 2nd paragraph **–** Revise the status of coho salmon from extirpated to reintroduced. *For example*: Coho salmon were **once** extirpated but have since been **reintroduced** to the Methow River.

Section 3.4, Focal Fish Species - In **Table 15** coho salmon are listed as a focal species, however in the body of section 3.4, coho are not addressed as a focal species, but are included in section 3.5 'Other Species'. Consistent with Table 15, coho salmon should be considered a focal species. Coho salmon meet the criteria listed in paragraph 4 of section 3.3 for inclusion as a focal species. Criteria a): designation as a Federal Endangered or Threatened Species, or Management Priority as designated by a management authority. The recovery of coho salmon is a Management Priority for the Yakama Nation. The recovery of coho salmon to the Methow River is listed as a priority by the four Columbia River Treaty Tribes in the *Wy-Kan-Ush-Mi Wa-Kish-Wit* document (Tribal Restoration Plan), and has been affirmed as a priority by the Northwest Power and Conservation Council. Criteria b & c): Cultural and Local Significance – Coho salmon are a species of cultural significance to the four Columbia River Treaty Tribes and are of local significance within the Methow Basin. Mullen (1992) estimated the historic coho population in the Methow River to be between 23,000 and 31,000 annually. Craig and Suomela (1941) stated that coho were historically the most abundant anadromous salmon species within the Methow River Basin. Criteria d): Ecological significance or provide the ability to serve as indicators of species and ecosystem health – Coho salmon prefer and occupy different habitat types than the other focal species listed within the sub-basin plan. Habitat complexity and off-channel habitats such as backwater pools, beaver ponds, and side channels are essential for juvenile rearing, making the recovery of coho salmon a good, if not better, biological indicator for these habitat types than any of the other focal species presented in this document. Since coho salmon clearly meet all the criteria for focal species (and are considered a focal species in Table 15), coho salmon should be discussed in section 3.4 along with the other focal fish species. The format used to discuss coho salmon as a focal species should be consistent with the formats used for the other focal species, an example follows:

Focal Species: Coho Salmon

Rationale for Selection

Historically, the Methow River produced more coho than chinook or steelhead (Craig and Suomela 1941). Mullan (1984) estimated that 23,000-31,000 annually returned to the Methow River. Upstream of the Yakima River, the Methow River and Spokane River historically produced the most coho, with lesser runs into the Wenatchee and Entiat (Mullan 1984). Today, coho reintroduction is identified as a priority in the *Wy-Kan-Ush-Mi Wa-Kish-Wit* document (Tribal Restoration Plan) and has been affirmed as a priority by the Northwest Power and Conservation Council.

Coho salmon prefer and occupy different habitat types, selecting slower velocities and greater depths than the other focal species; Habitat complexity and off-channel habitats such as backwater pools, beaver ponds, and side channels are important for juvenile rearing making coho good biological indicators for these areas.

While the historic stock of coho salmon are considered extirpated in the Upper Columbia River (Fish and Hanavan 1948, Mullan 1984), the species has since been reintroduced to the Methow River Basin. In cooperation with the Washington Department of Fish and Wildlife, and the U.S. Fish and Wildlife Service, the Yakama Nation is currently leading coho salmon recovery efforts in the basin.

Representative Habitat

Currently, coho salmon returning to the Methow Basin are spawning in the mainstem Methow River and small tributaries such as Gold Creek. As the recovery program continues, reintroduction of coho to tributaries within the Methow Basin will help to aid in species dispersal. A map of known coho salmon distribution can be found in Figure ?.

Figure ?. Coho Salmon distribution in the Methow sub-basin

Key Life History Strategies, Relationship to Habitat.

Coho salmon enter the Methow River in mid-to-late September through late November. Adults ascended the tributaries in the fall and spawning occurred between mid-October and late December, although there is historical evidence of an earlier run of coho salmon (Mullan 1984). As cold water temperatures at that time of year preclude spawning in some areas, it is likely that coho salmon spawn in areas where warmer ground water up-wells through the substrate.

Coho entering in September and October hold in larger pools prior to spawning, later entering fish may migrate quickly upstream to suitable spawning locations. The availability and number of deep pools and cover is important to off set potential pre-spawning mortality. Intact riparian habitat will increase the likelihood of instream cover, and normative channel geofluvial processes will increase the occurrence of deeper pools.

Important habitat needs for redd building include the availability of clean gravel at the appropriate size, and proper water depth and velocity. Burner (1951) reported the range of depths for coho spawning to be between 8 and 51 cm. Coho salmon spawn in velocities ranging from 0.30 to 0.75 m/s and may seek out sites of groundwater seepage (Sandercock 1991).

The length of time required for eggs to incubate in the gravel is largely dependent on temperature. Sandercock (1991) reported that the total heat requirement for coho incubation in the gravel (spawning to emergence) was 1036 (±138) degree (°C) days over zero. The percentage of eggs and alevins that survive to emergence depends on stream and streambed conditions. Fall and winter flooding, low flows, freezing of gravel, and heavy silt loads can significantly reduce survival. Fall flooding may negatively affect incubation and emergence success, especially in years of extreme flow. Road building activities in the upper watersheds, as well as grazing and mining activities, may also increase siltation. All three factors were once more prevalent than they are now in the basin and the conditions have improved in most watersheds. In the Wenatchee subbasin, coho fry emerge from the gravel in April or May; it is likely that emergence timing is similar in the Methow River.

Juvenile coho salmon generally distribute themselves downstream shortly after emergence and seek out suitable low gradient tributary and off channel habitats. They congregate in quiet backwaters, side channels, and shady small creeks with overhanging vegetation (Sandercock 1991). Conservation and restoration of riparian areas and off channel habitat in natal streams within the Methow Basin would increase the type of habitat fry use.

Coho salmon prefer slower velocity rearing areas than chinook salmon or steelhead (Lister and Genoe 1970; Allee 1981; Taylor 1991) Recent work completed by the Yakama Nation supports these findings (Murdoch et. al. 2004). Juvenile coho tend to overwinter in riverine ponds and other off channel habitats. Overwinter survival is strongly correlated to the quantity of woody debris and habitat complexity (Quinn and Peterson 1996). Conservation of and restoration of high functioning habitat in natal tributaries and restoration of riparian and geofluvial processes in or near known and potential parr rearing areas will have the highest likelihood of increasing parr survival.

Naturally produced coho smolts in the Wenatchee Basin emigrate between March and May (Murdoch et. al. 1994). It is likely that naturally produced coho smolts in the Methow River have similar emigration timing. Suspected or potential impediments to migration and sources of injury or mortality should be identified and investigated. If areas are shown to unnaturally impede emigration or injure or kill fish, they should be fixed.

Population Delineation and Characterization

Coho salmon were once extirpated from mid-Columbia tributaries but have since been reintroduced. Reintroduction initially relied on transfers of coho pre-smolts or eggs from Lower Columbia River hatcheries, but is currently transitioning to reliance upon a developing locally adapted broodstock. The developing broodstock is genetically homogeneous with the Wenatchee River broodstock.

Long-run coho are unique among a species that usually migrates very short distances to spawn in freshwater. Historical pictures of the native Methow coho indicate the fish were equal in size to the spring chinook (Mullan et al. 1992b).

Population Status

Washington Water Power blocked the Methow River at Pateros between 1915 and 1929 preventing all fish passage during those years and by the time it was removed, the Methow River run of coho was extinct. By the 1930s, the coho run into the mid- upper Columbia was virtually extirpated (see Rock Island Dam counts above). Tributary dams on the Wenatchee, Entiat, and

Methow rivers appeared to be more destructive to coho than either steelhead (where genetic "storage" presided in resident forms) or chinook.

Because the native stock of coho salmon no longer occur in the Upper Columbia River system, the Methow basin coho are not addressed under the ESA or by the WDFW (1994) Salmon and Steelhead Stock Inventory. Coho salmon returning to the Methow Basin are primarily hatchery origin, but include an increasing naturally produced component as a result of ongoing reintroduction efforts (YN et. al. 2002). It is likely that continued broodstock development and hatchery supplementation will be necessary to prevent coho salmon from becoming extirpated in the future.

Population Management Regimes and Activities

In the early 1940s and the mid-1970s, the USFWS raised and released coho as part of their mitigation responsibilities for the construction of Grand Coulee Dam (Mullan 1984).

Recently the Yakama Nation (YN) has begun a more concerted effort to reintroduce coho into the Upper Columbia (Scribner et al. 2002); results so far are promising. Current efforts to rebuild coho populations in the Upper Columbia are concentrated in the Wenatchee and Methow Basins.

The ideal result would be to restore coho populations in these basins to their historical levels. Because of varying degrees of habitat degradation in each of these basins, historical numbers are unlikely ever to be achieved, but remain a goal towards which to strive.

The current coho reintroduction plan still in the feasibility stage through 2004 relies on existing or temporary facilities. Currently, coho smolts are acclimated and released in the Methow River from the WNFH for the sole purpose of broodstock development, although some natural production does occur. This phase of the program is expected to last through 2004 or 2005, after which the reintroduction program will expand to included acclimated releases in natural production areas of the basin in order to reach the tribal natural production goal.

Coho salmon are collected as volunteers into the Winthrop National Fish hatchery and from the run-at-large at Wells Dam west bank and/or east bank fish traps to support a 250,000 smolt program (YN et al. 2002). Methow basin coho broodstock may be supplement with eyed-eggs transferred from Wenatchee Basin incubation facilities or from hatcheries on the lower Columbia River (Cascade FH, Eagle Creek NFH, or Willard NFH) in years where broodstock collection falls short of production goals. Coho reared at Winthrop NFH are volitionally released into the Methow River or transferred to the Wenatchee River for acclimation and release. Under the current feasibility program, coho releases from the Winthrop National Fish Hatchery are design to contribute to the broodstock development process. Details on mating protocols, rearing and acclimation strategies, size at release and monitoring and evaluation can be found in the Yakama Nation's Mid-Columbia Coho HGMP (YN et al.2002).

Hatchery Effects

The first hatchery in the Methow Basin was built in 1889 (Craig and Suomela 1941) and raised primarily coho salmon. Releases of fish from non-indigenous sources began in the 1940s (Peven 1992CPb).

Between 1904 and 1914, an average of 360 females was used for broodstock from the Methow hatchery annually (Mullan 1984). With the building of a non-passable dam at the Methow River mouth in 1915, this hatchery was moved more towards the confluence with the Columbia.

Between 1915 and 1920, an average of only 194 females was taken, suggesting a 50% decline in the run between this and the previous period. After 1920, no coho were taken from this hatchery and it closed in 1931 (in Mullan 1984).

No further releases of coho into the Methow River occurred until the GCFMP in 1945. Of the 17 years of releases of coho from the Winthrop NFH between 1945 and 1969, in only four of those years did the broodstock originate from the Methow River (which were admixtures of various stocks originally captured at Rock Island Dam; Mullan 1984). Most of the coho released at Winthrop originated from Lower Columbia River stocks from the Eagle, Lewis, and Little White Salmon hatcheries (Mullan 1984).

Chelan PUD also had a coho hatchery program until the early 1990s. While some natural production may have occurred from these releases, the programs overall were not designed to re-establish a naturally spawning populations and relied upon lower Columbia River stocks.

Current coho reintroduction efforts focus on local broodstock development to select for traits which are successful in mid-Columbia tributaries with the long-term goal of restoring naturally reproducing populations. The mid-Columbia coho reintroduction feasibility study has a substantial monitoring and evaluation program to determine if the reintroduction of coho salmon into the upper Columbia basin may affect the production of chinook and steelhead. The results of extensive predation and competition studies indicate that a negative effect is unlikely to occur. Similarly, other researchers have found that the introduction of coho did not negatively affected the abundance or growth of naturally produced chinook or steelhead (Spaulding et. al. 1989; Mullan et. al. 1992)

Hydroelectric Effects

Habitat alteration, especially tributary dams in the Methow River mainstem, reduced the viability and capability of coho to rebuild themselves locally.

Prior to the 1940's, runs of Methow River coho salmon were essentially destroyed as a result of over-harvest, early hatchery practices, habitat degradation and impassable downstream dams. Much of the failure of the GCFMP to re-establish self-perpetuating populations may have been related to reliance upon stocks lacking genetic suitability (Mullan et al. 1992b).

Recent (after GCFMP) programs to restore coho in the mid-upper Columbia began in the 1960's with releases from WDFW hatcheries for Rocky Reach Dam mitigation. Although this program did produce some initial promising results, (Figure CP15), naturally producing runs were not established, primarily because the program was not designed to re-establish naturally producing runs. The coho were released from the Turtle Rock fish hatchery, located in the middle of the Columbia River above Rocky Reach Dam. The release location likely contributed to the inability to produce a naturally spawning coho run. This reach of the Columbia River dies not proved suitable coho spawning and rearing habitat. In the early 1990s, this program was abandoned.

According to the Chelan 2002 HCP, Rocky Reach Hatchery compensation for Methow River coho will be assessed in 2006 following the development of a continuing coho hatchery program and/or the establishment of a Threshold Population of naturally reproducing coho in the Methow Basin (by an entity other than the District and occurring outside this Agreement). The Hatchery Committee shall determine whether a hatchery program and/or, naturally reproducing population of coho is present in the Methow Basin. Should the Hatchery Committee determine that such a program or population exists, then (1) the Hatchery Committee shall determine the most appropriate means to satisfy the 7% hatchery compensation requirement for Methow Basin coho, and (2) the District shall have the next juvenile migration to adjust juvenile protection Measures to accommodate Methow Basin coho. Thereafter, Coordinating Committee shall determine the number of valid studies (not to exceed three years) necessary to make a juvenile phase determination.

Programs to meet NNI for Methow Basin coho may include but are not limited to: (1)provide operation and maintenance funding in the amount equivalent to 7% project passage loss, or (2) provide funding for acclimation or adult collection facilities both in the amount equivalent to 7% juvenile passage loss at the Project. The programs selected to achieve NNI for Methow Basin coho will utilize an interim value of project survival, based upon a Juvenile Project Survival estimate of 93%, until juvenile project survival studies can be conducted on Methow Basin coho.

Harvest Effects

Coho were relatively abundant in upper Columbia River tributaries streams prior to extensive resource exploitation in the 1860's. By the 1880's, the expanding salmon canning industry and rapid growth of the commercial fisheries in the lower Columbia River had heavily depleted the mid and upper Columbia Rive spring and summer chinook runs (McDonald 1895), and eventually the steelhead, sockeye, and coho (Mullan 1984, 1986, 1987; Mullan et al. 1992 CPa).

The runs of coho that ascended the Columbia River were initially reduced from over-harvest in the mainstem and habitat degradation associated with watershed development.

Page 72, 1st paragraph – Coho salmon are no longer considered extirpated in the Upper Columbia River. Coho salmon have been reintroduced, and are in need of continued recovery efforts.

Page 72, 3rd paragraph – Coho salmon are no longer considered extirpated in the CCP. Coho salmon have been reintroduced and are in need of continued recovery efforts.

Page 75, 8th paragraph - The Chelan PUD coho program which began in the 1960's with releases from WDFW hatcheries for Rocky Reach Dam mitigation did not result in naturally producing coho runs because the program was not designed to re-establish naturally producing runs. The coho were released from the Turtle Rock fish hatchery, located in the middle of the Columbia River above Rocky Reach Dam. The release location largely contributed to the inability to produce a naturally spawning coho run. This reach of the Columbia River does not provide suitable coho spawning and rearing habitat. The program was only designed for harvest augmentation. The use of 'maladapted' stocks was likely not the reason why the Chelan PUD program did not result in a naturally producing run of coho salmon.

Page 76, 4th paragraph – The Chelan PUD coho program which began in the 1960's with release from WDFW hatcheries for Rocky Reach Dam mitigation did not result in naturally producing coho runs because the program was not designed to re-establish naturally producing runs. The coho were released from the Turtle Rock fish hatchery, located in the middle of the Columbia River above Rocky Reach Dam. The release location largely contributed to the inability to produce a naturally spawning coho run. This reach of the Columbia River does not provide suitable coho spawning and rearing habitat. The program was only designed for harvest augmentation. The use of 'maladapted' stocks was likely not the reason why the Chelan PUD program did not result in a naturally producing run of coho salmon.

Page 162, section 3.16.3 – in addition to competition studies cited (Murdoch et al. 2004; Spauling et al. 1989), Mullan et al (1992) studied the growth and survival of juvenile coho, chinook, and steelhead in Icicle Creek and concluded that little interaction was apparent among age-0 chinook salmon, coho salmon, and steelhead, and that the introduced coho did not negatively affect the abundance or growth of chinook and steelhead.

Page 205, section 3.22 – As a focal species, coho salmon should be included in the EDT analysis.

Page 264, section 4.5.3, **Current fish production programs in the Methow subbasin** – A description of the coho reintroduction program should be included alongside the spring chinook, summer chinook, and steelhead programs in this section.

Page 289-341**, Assessment Unit M1-M12** – Focal species for these assessment units should include coho salmon.

Page 341, Section 5.7 – Coho salmon need to be addressed under 'Fish Species Objectives and Strategies'. Formerly the most abundant anadromous species in the Methow River, the recovery of coho salmon should be outlined with clear objectives and strategies, similar to spring chinook, summer chinook, and steelhead.

<u>Entiat Subbasin</u>

General Comments

The readability of this document is not very good, especially the Management Plan. There are numerous areas where language, format and content could be cleaned up. Perhaps the brevity of schedule for plan development challenged the authors to thoroughly edit the draft plan. It would be beneficial if time were taken to properly edit this document.

The sub-basin plan should better incorporate and more fully integrate the Entiat WRIA Management Plan (CCCD 2004). This could be done in a number of ways (e.g. excerpts, incorporate by reference).

There is little or no information concerning the role of artificial production within the subbasin nor a proposal for a future role. It is recommended that some description of hatcheries be displayed in the Assessment and Inventory and recommendations be advanced in the Management Plan. This conversation should discuss possibilities for all focal species.

There is little information about Pacific lamprey. This is an important species that has had little attention paid in either sub-basin or watershed plans.

Introductory Information

Additional emphasis should be made about the role of the Entiat Watershed Planning Unit (EWPU) in coordination of the implementation of future projects/activities. Additional language should be added the subbasin plan that illustrates the recent work by the Entiat Watershed Planning Unit and completion of the Watershed Plan, from which the subbasin plan was built.

Assessment

Aquatic / Fisheries

Table 15 (and other related tables) is qualitative in nature yet there are no definitions of the “High-Medium-Low” indicators. These definitions should be provided.

For each of the Assessment Units, the subsection “Environmental / Population Relationships” should be cleaned up and tightened up. The various descriptions for each of the AU’s are treated to various degrees – some much better than others. Achieving greater consistency in these descriptions and providing a tighter discussion for each of the focal species will provide a more solid foundation for the Synthesis, later on in the document.

There appears to be a difference in the way water resources (and use of) is characterized in the SBP and the Watershed Plan. Specifically – there seems to be discrepancies in the characterization of current flow patterns with respect to the “normalized” hydrograph and how the hydrograph may be altered with future increases in water withdrawals. This discussion needs to be consistent between both documents.

Terrestrial / Wildlife

The focal habitats used encompass a relatively small area within the subbasin. Additional habitat types should be incorporated to provide a more holistic evaluation of subbasin – even if the habitat type is as general as “mixed coniferous”.

Inventory

The inventory section does not seem to have done all the work required under sub-basin planning. A gap analysis needs to be done for each of the assessment units.

Aquatic / Fisheries

The Inventory is missing some of the work done by the US Forest Service – which manages almost 90% of the land base. This information should be included to better represent what has occurred in the subbasin. The Entiat WRIA Management Plan has a more thorough inventory of these activities.

Much of the work identified in the inventory is inadequately described, being much too brief. Additional description is needed for all AU's.

Terrestrial / Wildlife

There is no information concerning wildlife. This information should be included.

Synthesis and Interpretation

Statements describing wildlife seem to be unnecessarily broken into two sub-sections in this synthesis and interpretation section. It should be in one.

It seems reasonable to use the PFC standards as the basis for numeric objectives or as a theoretic target. However, it is common knowledge that not all of these standards are applicable to all areas. These standards are fine as an idealized goal, but modifications should be made where appropriate.

This is a good place to talk about reference conditions. RC's are developed from the fish perspective (VSP) but not in terms of habitat. A comparison should be made by AU's that describes which of the PFC attributes are currently within standards and which ones have dropped below the historic reference condition.

Table 24, page 158 needs to be better defined. It is not clear what this table is telling the reader.

It is not clear what purpose near-term opportunities play in this plan. They appear in the synthesis and interpretation section, but do not seem to be well reflected in the executive summary and management plan sections. Further, the near-term opportunities are sorted by species rather than geographically. The plan needs to pick either a geographic or target species organizational construct, and stick with it. As the Entiat WRIA management plan is geographically-based, perhaps this should be the standard to facilitate consistency.

Certain statements related to flow impacts seem over-stated or unsupported, and could lead to indefensible conclusions. Please cross-reference management recommendations and key findings with assessment information, and supplement with Entiat WRIA Management Plan assessment information to assure consistency throughout the sub-basin plan and between plans.

Management Plan

The overall layout of the Management Plan is cumbersome. Perhaps it is necessary to re-organize this section entirely to correct this problem. It would be helpful if there were some introductory discussion that describes how the Management Plan is laid out. The reader is left wondering about the different goals and objectives. The basic lay-out for fish and wildlife is fundamentally different and this is confusing. Efforts should be made that provide a more consistent discussion for these two areas.

The Management Plan should contain additional information that comes from the EPU Watershed document. The Mgt. Plan appears to be developed from a fish or wildlife perspective only and falls short of the human dimensions. Please draw language from the EPU Watershed Plan and incorporate directly into the subbasin plan. Please draw greater parallels between the EDT Alternative 5 contained in the Entiat WRIA Management Plan, and aquatic habitat recommendations in this sub-basin plan.

Page 174, the sub-title includes "near-term opportunities" which is a term used and addressed in Chapter 6. Perhaps this is where Chapter 6 near-term opportunities should occur within the Management Plan.

Page 175 begins a breakdown of the sub-basin by assessment unit. It is not clear to the reader if these breakdowns are the strategies, objectives, and/or near-term opportunity as this sub-chapter suggests will follow. This is a specific example of the cumbersome and confusing organizations structure mentioned previously. Perhaps the biologic objectives and management recommendations should be kept together, organized on a geographic basis (sub-basin or assessment unit). In this way the reader can find the information in one place rather than scattered throughout the Management Plan.

The reader is not provided information to understand which of the strategies/objectives is most important nor which geographic areas are to be prioritized. This should be apparent at the Sub-basin scale and within each of the Assessment Units.

It is not clear where the numeric objectives (standards and dates) are derived from. Some of these metrics appear to be difficult or impossible to achieve. Also, some of these standards appear to be inconsistent with those derived by the EWPU document.

Certain statements related to flow impacts seem over-stated or unsupported, and could lead to indefensible conclusions. Please cross-reference management recommendations and key findings with assessment information, and supplement with Entiat WRIA Management Plan assessment information to assure consistency throughout the sub-basin plan and between plans.

Bibliography

This section also needs editing. There are references made in the text of this document that do not show up in the bibliography. Also, there are citations listed in the bibliography that show nowhere in the text of this document.

Appendix

Appendices to this sub-basin plan were very limited. We recommend that the Entiat WRIA Management Plan be a primary appendix to this sub-basin plan. Further, appendices and references to the Watershed Plan should be appended to the sub-basin plan. These should include the EDT Analysis, the SNTEMP analysis, in-stream flow assessment work by Entrix and WDOE, and air photographic analyses of land-use by Central Washington University.

Specific Comments:

Page: 56
Coho should be added as a focal species as it is identified later as a focal species.
Page: 85
What does "those" refer to? Sentence does not make sense.
Page: 140
There should not be any habitat competition since all the hatchery releases are smolts which should be actively migrating.
Sequence number: 2
There is also the potential for increased competition for rearing habitat between hatchery and naturally spawned fish.

Wenatchee Subbasin

General Comments

In general the document reads well, although there are numerous areas where language, format and content could be cleaned up.

There is little or no information concerning the role of artificial production within the subbasin nor a proposal for a future role. It is recommended that some description of hatcheries be displayed in the Assessment and Inventory and recommendations be advanced in the Management Plan. This conversation should discuss possibilities for all focal species.

Introductory Information

Section 2.4: The Logic Path that is pictured here does not accurately reflect the contents of the Management Plan. The use of the terms Strategies and Objectives seems to be confused.

Section 2.5.2: Table 1 could provide more information by indicating, to some qualitative degree, the extent of the limiting factor (high-medium-low).

Section 3.2.5: Table 10 is incomplete. Chumstick AU information is missing.

Assessment

Aquatic / Fisheries

Section 4.8.2: Table 15 (and other related tables) is qualitative in nature yet there are no definitions of the “High-Moderate-Low” indicators. These definitions should be provided.

For each of the Assessment Units, the subsection “Environmental / Population Relationships should be cleaned up and tightened up. The various descriptions for each of the Assessment Unit’s are treated to various degrees – some much better than others. Achieving greater consistency in these descriptions and providing a tighter discussion for each of the focal species will provide a more solid foundation for the Synthesis, later on in the document.

Terrestrial / Wildlife

The focal habitats used encompass a relatively small area within the subbasin. Additional habitat types should be incorporated to provide a more holistic evaluation of subbasin – even if the habitat type is as general as “mixed coniferous”.

Section 4.7: These summaries should be provided in a more site specific manner, possible using the Assessment Units as described in the Aquatic/Fisheries sections.

Inventory

Aquatic / Fisheries

The Inventory is missing work done by the US Forest Service, which manages nearly three-quarters of the land base. This information should be included to better represent what has occurred in the Subbasin.

There is no mention of on-going work in Lake Wenatchee with respect to the Coho program, sockeye net-pens or species interactions.

Much of the work identified in the Inventory is inadequately described, being much too brief. Additional description is needed for all Assessment Units.

Terrestrial / Wildlife

There is no information concerning wildlife. This information should be included.

Synthesis and Interpretation

There is a disconnect in this section. Definitions in Section 6.2 appear to pertain to fisheries only. Terrestrial Key Findings are formatted in a different manner than fisheries.

Many of the terrestrial Key Findings appear to be based upon information not contained in the Assessment. Some of these findings appear to be more speculative and general in nature than factually based. Some discussion of where this information comes from and how the Key Finding was derived would be helpful.

In describing the Level of Confidence for Aquatic Key Findings, it would be helpful to provide a short description as to how (what bases) this “High-Moderate-Low” determination was made.

Key Findings are essentially habitat based. It would be helpful if there was a better tie between focal species and habitat for each of the Assessment Units. Maybe a brief discussion of habitat use by focal species prior to each of the Assessment Units would strengthen or highlight the importance of each of the Key Findings.

There should be some discussion in Key Findings concerning influence of artificial production on naturally reproducing populations.

Section 6.6: This section seems out of place. Maybe if it were to be at or near the beginning of the Synthesis it would help set the stage better.

Management Plan

Section 7.4: It would be helpful if there were some introductory discussion that describes how the Management Plan is laid out. The reader is left wondering about the different goals and objectives and how management strategies are related.

The basic lay-out for fish and wildlife is fundamentally different and this is confusing. Efforts should be made that provide a more consistent discussion for these two areas.

Aquatic / Fisheries

Lake Wenatchee appears to be a very important component of the subbasin yet there are relatively few recommendations.

Section 7.8.3: Please provide a description for each of the tables that summarize the Assessment Units. Please insure that the tie back to the Assessment and Synthesis is apparent.

There is not the ability for the reader to understand which of the strategies/objectives is most important nor which geographic areas are to be prioritized. This should be apparent at the subbasin scale and within each of the Assessment Units.

It might be helpful if there was a brief description provided under each of the key strategies outlining why the strategy is being advanced. This description should go back to the Key Finding and focal species that would benefit.

There appears to be some confusing format errors in the Near-Term Opportunities, making these sections a bit trying to read and understand.

Monitoring

The monitoring chapter looks good. Notably lacking is a component that describes how the information derived from the monitoring program will be stored, accessed, evaluated and reported. What relationship will monitoring information have to the adaptive management concept and how will this information become relevant to the general public?

Appendix

Although five Appendices are listed for Chapter 11, none of these documents are attached.

Chapter 8 (Monitoring) appears to be what is being referenced in Chapter 11.

There is not a clear link in the document that describes the basis of the information used in the Assessment. A summarization of the QHA materials should be made available in the Technical Appendix and referenced in the main body of the Assessment.

Specific Comments:

Page: 88
Seems a pretty high goal when the average has been one-seventh of it.
Page: 143
The migration corridor through the Tumwater Canyon seems to have the greatest negative impact on juvenile survival as indicated by recent pit tag data for coho and spring chinook.
Sequence number: 2
Tumwater Canyon migration corridor.
Page: 144
survival through the Tumwater Canyon
Page: 173
550 plus coho redds were in Icicle Cr. in 2003 below structure 2 and the mouth.

Page: 210

ISSUE OF MIGRATION CORRIDOR FROM UPPER BASIN AN ISSUE FOR ALL SPECIES.

Since the first coho releases in the Wenatchee Basin, the YN has measured emigrating smolt survival rates from point of release to McNary Dam. Initially these survival rates were measured only in the Icicle Creek releases, but in 2002 and 2003 PIT tag releases from coho acclimated in Nason Creek allowed us to evaluate survival rates of coho smolts released within the upper Wenatchee River basin (Table 1). We found a sizable discrepancy in survival rates between coho emigrating from Nason Creek and coho emigrating from Icicle Creek during both years. In 2002 we measured survival indices of 78% and 87% for two PIT tagged releases in Icicle Creek, and an index of 39% for Nason Creek. In 2003 we calculated a survival index of 62% for coho released in Icicle Creek and 37% for coho released in Nason Creek. In 2002 and 2003 lower Wenatchee basin survival rates were 1.7-2.2 times higher than upper basin survival rates (Murdoch, pers. comm.). We searched for comparable survival metrics from the other hatchery programs. Survival rates from release to McNary Dam for hatchery spring chinook emigrating from the Chiwawa River acclimation ponds have not been measured. However, WDFW measured a pooled survival index of 38% for wild spring chinook emigrating from the Chiwawa River in 2003, based on actively migrating PIT tagged chinook smolts (A. Murdoch WDFW personal communication.) This value is similar to survival indices calculated for hatchery coho salmon emigrating from Nason Creek. Hatchery spring chinook released from the LNFH in 2003 had a release to McNary survival rate of 64% (as measured by the DART website, M. Cooper USFWS personal communication.) Survival indices provided by WDFW and the USFWS comport well with survival indices measured for hatchery coho and support the observed trend of decreasing survival rates for salmonids emigrating from the upper Wenatchee Basin.

Page: 394

Why is the monitoring plan limited to just listed stocks? Other focal species should be included that occupy different niches in the habitat.

Yakima Subbasin

General Comments:

1. The Yakima Subbasin Plan has made an excellent effort at summarizing and documenting the vast amount of information that is available from the various reports regarding habitat and focal species status in the basin. The plan is based on the EDT model, with input from the Aquatic Technical Committee, and as such is a habitat-based model. The EDT model has the ability to produce prioritized listings of habitat factors that are limiting the distribution and productivity of focal species within the basin. Unfortunately these limiting factors are buried within the multi-page tables in the Management Plan (Chapter 4). There needs to be a summary table that identifies the highest priority limiting factors. This also applies or the Protection and Restoration Key Findings Tables.
2. There needs to be a numerical objective (spawning escapement plus total ocean, mainstem Columbia, and terminal Yakima harvest) for each of the focal species of salmonids in the basin. Without some numerical objective you cannot measure success of implemented projects. Obviously the numerical objectives should be based on the production capability of each individual subbasin, but they should cumulatively build towards the Council's and fishery managers' regional objective of rebuilding healthy, naturally producing anadromous fish runs to produce 5 million adult returns in 25 years which can withstand a harvest rate of at least 30%.
3. Harvest is prominently mentioned in the Yakima Subbasin Vision 2020 where it states "support self-sustaining and harvestable population of indigenous fish and wildlife… in the basin." However, there is no quantification of harvest objectives for any of the focal species of salmonids. Harvest is obviously an important mitigation component of the Power Act for the Yakama Nation, and as such should be addressed in more quantifiable terms for each species.
4. Supplementation research programs need to be more thoroughly discussed in the plan. There are two major objectives of supplementation within the Yakima subbasin. First, the habitat protection and restoration components identified in the tables may or may not achieve the numerical objectives that we propose be identified for each of the focal species. If these habitat measures fall short of meeting the objectives, supplementation should be used to increase the productivity of the populations. Secondly, several of the supplementation programs within the Yakima are research programs evaluating the efficacy of using supplementation while maintaining genetic integrity and keeping ecological interactions within specified limits, determining the feasibility of reintroduction of extirpated species, and evaluating domestication of multiple generations of hatchery rearing of salmonids. These research programs have been justified and approved through the NPCC processes and are scheduled to continue.
5. Lamprey as focal species – Lamprey are listed as a focal species and then largely ignored because there is very little local data. These treatments can be strengthened with an expanded discussion of lamprey ecology, more local information, and discussion of rebuilding efforts in other subbasins. Passage issues on the mainstem have reduced lamprey populations (more in next section). In many subbasins lamprey will clearly benefit from increasing the amount and complexity of channel habitat.
6. Mainstem issues have not been adequately addressed. No consideration is given to the extensive mortality that Yakima subbasin stocks of anadromous salmonids and lampreys suffer in the four

mainstem dams and associated reservoirs of the Columbia River. This invalidates the objectives and strategies of subbasin plans that need reductions in OOSE mortality to meet local goals and objectives. Obviously this issue is beyond the expertise of the local planners within each subbasin, and should therefore be developed for use in all subbasin plans by appropriate mainstem personnel.

Habitat Comments:

In the exec summary, in addition to the background information on the subbasin cultural and physical geography, stock productivity and existing conditions, I believe the plan should provide a concise summary of:

1. The priorities for habitat restoration, protection and assessment for the entire basin. In other words, where are the habitat protection priorities? The plan should describe how habitat protection in the key reaches compares to priorities by reach for riparian revegetation, stormwater control, instream improvements, etc.

   This provides the NWPPC, BPA, SRF Board, other funding sources and interested parties not familiar with the basin with the actions that managers believe will make the most cost-effective improvements to basin productivity in the short term. It would obviously be a difficult task to flesh these priorities out with plenty of disagreement, but at a coarse scale I believe we can come up with priorities to which most will agree.

2. The plan needs to describe habitat priorities within each reach. For example, say a new interest group forms in the Cowiche Drainage with the intent to make things better in their part of the watershed for fish and wildlife. The plan should lay out for them what the priorities are for the Cowiche. How does habitat protection needs measure up to riparian fencing, purchase of water, passage and screening, etc? This provides local elected officials, new resource managers, the public and other interest groups with the hit list of issues for their part of the watershed.

3. Most importantly, the plan needs to tell folks like the Cowiche group how the priority actions in that watershed compare to actions in the entire Yakima Subbasin. Is water acquisition in the Cowiche a priority for overall basin or not? This helps to avoid wasted effort on grant applications for projects that are out of sequence, or that are not even on the list. This is really just restating #1 above, but for the benefit of the folks here at home.

These needs are vitally important. Their inclusion will help secure funding for the best projects. It is also important to recognize that the priorities by reach and across the basin only relate to future watershed funding, and would not to be tied to regulatory issues for ongoing or proposed construction activities.

Specific Comments:

There are numerous minor inaccuracies within the document, and this is understandable due to the severely limited timeline for production of such an ambitious plan. Personnel from the Yakama Nation will be working with the subbasin planning team to identify and correct these errors over the next several months. Several examples are;

Ch 2-168 key findings. In the key findings the forth bullet states that tribal and sport harvest resulted from the CESRF for the first time in over 40 years. Table 2-14 shows more accurately that while this is true for non-tribal sport harvest, the tribal harvest has continued since 1982, albeit at very low rates in some years.

Ch 2 – 191 Steelhead hatcheries. The Steelhead Kelt Reconditioning Program is operated by the Yakama Nation under a contract with the Columbia River Intertribal Fish Commission, ***not*** under the YKFP.

Ch 2-209 Sockeye Reintroduction Potential. Midway through the paragraph a duplicate 'Yakima Subbasin Yakima Subbasin' occurs.

Ch 2-211 Lamprey current distribution. More recent data exists on observations of lamprey in the Yakima.

Ecosystem Diagnosis and Treatment (EDT) Specific Comments:

Ch 2-150. EDT Summary

States EDT model used as hypothesis generating tool. Should also include other utilities of the model: The model can also be used to assist management actions pertaining to restoration and preservation. The model can also be used to identify uncertainties leading to research proposals.

2. Ch 2-220. Map of EDT limiting factors related to sediment

Map displays areas with high quantities and percentages of fine sediment and turbidity but discussion of sediment is limited to sediment transport and does not address map descriptions or model outputs. Pages are also out of order.

3. Ch2-248. Key Uncertainties at the Subbasin scale:

An initial discussion of what the model is not capable of producing/or calibrated to produce. It would be wise to leave out negative connotations of what the model wasn't able to do based on one or two individual's opinion. This is also a section where uncertainties identified by the model could be included as well, and is not reflected in the current write up.

4. Ch 2-242 thru 245 - Maps with EDT limiting factors.

No discussion and interpretation of these maps exist

5. Preservation sections have very little detail of supporting documents or data sources that justifies the action. Another area that the EDT results generally agree with biological opinions in certain areas and could be used as a scientific justification tool.

6. All comments above can be inferred to all assessment unit write ups in the Yakima Subbasin plan

7. Ch 4-7 Limiting factors analysis

This section supplies key finding, focal species, hypothesis statement, etc but does not document or reference supporting material (field observation, expert opinion, conducted study, EDT). Might be helpful to put something like this in there.

Mark Walker
Director of Public Affairs
Northwest Power and Conservation Council
851 SW Sixth Avenue Suite 1100
Portland, OR 97204-1348
comments@nwcouncil.org
Fax: 503-820-2370

RE: Methow Conservancy comments on the Methow Subbasin Plan

August 5, 2004

Dear Mr. Walker,

I am submitting the following comments on behalf of the Methow Conservancy, a land trust and conservation organization based in Winthrop, WA. The Methow Conservancy is an independent non-profit organization with over 450 members, and we specialize in conservation easements, stewardship plans and conservation education. We currently hold 40 conservation easements and have protected 10.8 miles of shoreline in the Methow Watershed from the pressures of development, recreation, livestock grazing, large woody debris removal and invasive species.

Over the past 5 years we have received $4.2 million in Salmon Recovery Funding Board grants to help us acquire conservation easements in riparian areas. We have applied for additional funds to continue this incentive-based, voluntary conservation strategy in the Methow Valley. To date we have permanently protected 3,774 acres of private land, which we feel is a significant achievement given the size and age of our organization. This success shows that there is significant conservation interest and sophistication within our local community.

We believe that the Methow Conservancy represents a credible, capable organization, ready to help involve the local conservation community in land use plans, restoration projects and policy decisions that are practical for this Valley. I hope you will look to us as a resource and a community leader as you work to implement this Subbasin Plan.

Please consider the following comments regarding the 5/28/04 draft of the Plan:

Page: xix

The vision statement for this plan is weak as stated because it is so broad as to be impossible to fully achieve, monitor or account for over time. An additional vision for the Subbasin Plan would be helpful to state more prominently. Later in the document it is stated as “a reasonable and strategic course for fish and wildlife in the sub-basin,” or “a durable roadmap for future actions and priorities,” or “to guide BPA in meeting its mitigation obligations.” These statements pertain to a vision for this plan, and that is very useful for the community that is expected to follow it.

Page: xix

The federal government manages 85% of the watershed, the State (both DNR and WDFW) manages 5% and 10% is privately owned. The statement that 15% is privately owned is incorrect.

Page xx:

This statement will generate fear and resistance at the local level: "*To address factors limiting the focal wildlife species, the plan calls for protection of the full size and condition of core areas, physical connections between areas, and buffer zones to ameliorate impacts from incompatible land uses*." The paragraph further describes the monitoring that will take place after the "improvements." Protection of core areas for many of the focal species described in this report will directly depend on voluntary, private landowner cooperation. To ignore the vital role of private landowners so early in this report (in the Executive Summary, which many more people will read), is a serious mistake and will hinder the successful implementation of the plan.

Page xxiv-xxv:

"*These hypotheses….form the basis for management decisions which, based on public policy, will facilitate coordinated recovery planning for the Methow salmon ecosystem. The vision, goals, and supporting principles in this subbasin plan provide the foundation for the implementation of the plan by applying local public jurisdiction to local decisions.*" This is unclear. Please clarify this statement, and its implications.

Page xxv:

There is a typo in the second paragraph. It states: "*Okanogan County has been largely responsible for the technical aspects of the subbasin plan. WDFW has been largely responsible for the technical aspects of the subbasin plan.*"

Page xxvii:

The first paragraph refers to the challenges of managing the Okanogan subbasin, but this plan pertains to the Methow subbasin.

Page xxxii:

Point 3 states, "*High diversity promotes production and long-term persistence at the species level*." This is an ecological theory, and should be stated as such. What does this imply for areas dominated by a diverse population of invasive species? The complexity of the ecological interactions and successional stages that are present in the Methow Valley is not adequately stated or cited.

Page xxxiii:

The third paragraph states: "*Sustainable, harvestable, and diverse populations of fish and wildlife are dependent upon properly functioning environments and the processes that sustain them.*" These types of statements make this document 582 pages long. This statement is so broad as to be meaningless, and in our opinion, serves no purpose in this document.

Page xxxii:

We would like to make it clear that conservation easement acquisitions do not remove land from private ownership, or from the tax rolls of Okanogan County. Instead conservation easements have required private landowners to develop management plans for their property, and invest in land improvements such as weed control and forest thinning, which has a cumulative benefit for all lands (public and private) in the Methow Valley.

Page 4 (Section 3.1):

In the fifth paragraph, the plan states that the State manages 5% of the basin. Of this State land, 51% is managed by DNR, and 49% is managed by WDFW. This paragraph makes WDFW seem like a minor land manager, but they manage far more than just the Methow Wildlife Area.

Section 3.1, Figure 5:

This land use for the Methow Basin chart is from 1977. There have been significant changes in land use in the Methow Valley over the past 27 years. This chart should not be used to represent current conditions in the basin.

Page 8, Drainage area:

This section states that the Methow River drains 1,193,933 acres. On page 4, (Table 2) the total Subbasin area is said to be 1,167,794 acres. Which is the correct number?

Page 26, Table 13:

There are 252 bird species known to occur in the Methow Valley (not 221 as stated). Contact the Methow Biodiversity Project for more information or a species list.

Page 31, Table 16:

Pygmy rabbits do not presently occur in the Methow Valley, and there is significant uncertainty whether they were ever here. A rare/non-existent species such as this does not make a good focal species, as good habitat conditions may never have existed for this species in the Methow Basin. Focusing on protecting a species that may not have ever been here is not likely to result in the most conservation value for the amount of money invested in restoration and recovery.

Page 59

There is an omitted word in the last paragraph, first sentence.

Page 84

Grasshopper sparrows are extremely rare in the Methow Valley, and this rarity is not a recent or anthropocentric phenomenon. While they may be good focal species for the Okanogan region, they are not good indicators for Methow Valley shrub-steppe habitat condition.

Page 95

It would helpful to include mule deer population statistics specific to the Methow Valley in the subbasin plan. The effect of mule and white tailed deer on native vegetation can be dramatic and detrimental, and the carrying capacity for deer in the Methow Valley is unknown. It would be helpful to emphasize the need for deer carrying capacity research, and then to compare the current herd sizes to this carrying capacity.

Including Methow-specific information for all the focal wildlife species would add much important and useful information to this plan.

Page 97

The majority of cottonwood gallery forests in the Methow basin are privately owned, but the plan states (in the third paragraph) that the majority are in public ownership. This is an important point to clarify, because it underscores the importance of working with private landowners to protect riparian zones that so many wildlife species depend on.

In the seventh paragraph, the plan states that blackberry invasion is contributing to the reduction in available habitat for the red-eyed vireo in the Methow basin. This is not true. We have few to no blackberries (*Rubus* spp.) in vireo habitat in this basin.

Page 104

Table 31 is labeled "Specific habitat attributes for Beaver," but it is actually a list of all the focal species with their habitat types, key relationships and selection rationale.

Page 112

Pygmy nuthatches are not ponderosa pine obligate species in the Methow Valley. They occur throughout the valley floor, even in downtown Winthrop.

Page 118

Figure 34 is missing.

Page 127

The first paragraph states that the planners identified "rugged lands" as a habitat of concern. How are these lands defined? This statement is unclear as to the meaning and significance of rugged lands.

Page 132

The last paragraph states that shrub-steppe habitat has increased in the Methow Valley from 165-462% over historic amounts. This implies that shrub-steppe areas are healthy and expanding in the Methow Valley. The 1850 data that this is based on is likely comparatively inaccurate, and the rapid loss of shrub-steppe habitat and native species diversity needs to be emphasized. According to a local Forest Service wildlife biologist, shrub-steppe habitats are the most under-recognized and highly threatened habitat type in the Methow basin.

Page 137

The Methow Conservancy has permanently protected 10.8 miles of riverfront and 687 acres of riparian land with conservation easements. These easement agreements were mostly purchased through the State Salmon Recovery Funding Board. Table 38 is not an accurate depiction of the status of riparian protection in the Methow subbasin.

Page 138

In the second bullet point, one possible yellow-billed cuckoo has been seen in the Methow Valley. This is not an indicator of fragmentation and loss of habitat in the Methow Valley, instead it is a characteristic of cuckoo distribution.

Page 141

Why is a conservation easement considered “low” or “medium” protection? Conservation easements are considerably more enforceable and durable over time than County ordinances or zoning, which is likely to change over the long term.

Page 142

In the livestock grazing section, the plan states that there are about 100 mother cows in the subbasin. The actual number is over 1,000.

Page 144

Under Current Reference Conditions, in the sixth paragraph, the plan states that almost all the cottonwood gallery forests are in public ownership. This is incorrect. In the Methow basin the majority of cottonwood gallery forests are privately owned. See previous comment for page 97.

Page 147

Given the large amount of protected land that the Methow Conservancy holds in conservation easements (a total of 3,774 acres to date), it is important to include this successful voluntary private land conservation work in the Protection Status section.

Page 241

The shrub-steppe hypothesis does not acknowledge the effects of residential development. Development pressure is a major stressor because of the associated roads, clearing, pets, wildlife disturbance and invasive species.

Page 252

Planned developments are currently not permitted in the Methow basin because the DOE has placed a moratorium on community well permits. This should be made clear in the subbasin plan, so that there is greater awareness that this potential tool for creatively managing and clustering development is not currently available.

Pages 260 and 463

The information about the Methow Conservancy is incomplete. Please replace it with the following:

The Methow Conservancy is an independent land trust and conservation organization dedicated to voluntary protection of the natural and scenic resources in the Methow Valley. As of August 2004, the group has over 450 members and holds <u>40 conservation easements on 3,774 acres of private land</u>. The Methow Conservancy has received four State grants for riparian conservation easement purchases totaling <u>$4.27 million in the past 5 years</u>. The Methow Conservancy has also received a grant for one agricultural conservation easement to date.

In addition to conservation easements, the Methow Conservancy writes stewardship plans for private landowners, and each conservation easement requires a management plan that is updated annually. The Methow Conservancy published the Good Neighbor Handbook in 2001, a 33-page guide to land conservation for new landowners. The Conservancy sends these to all new landowners in the Valley, and has distributed over 3,500 Handbooks to date. The Conservancy also hosts a monthly natural history lecture series and maintains a conservation resource library.

The Methow Conservancy contracts with WDFW to monitor all WDFW conservation easements in the Methow Valley, and has conducted two landscape-level habitat surveys (the Songbird and Shrub-steppe surveys) for prioritization and outreach to landowners.

Page 355

These guidelines are useful, and should be frequently referred to by multiple agencies and stakeholders. This is a format of information (concise, organized) that can be more easily digested and implemented than the entire plan, which is too long for most people to read. This summary would benefit from a second printing in a separate document, so that more people could read it over and discuss the implications of these goals, objectives and strategies.

Thank you again for the chance to comment on this plan. There is a tremendous amount of information in this document, and by including public review this document should continue to become more meaningful as a management tool. The length of the document is a serious detriment to public involvement, and public involvement will be crucial to successful implementation of this plan.

The Methow Conservancy, as a non-governmental leader in local conservation, may be able to help find ways to involve the local community in implementing parts of this plan. We hope that you and the NWPCC will look to us as a resource. Please do not hesitate to contact me if you need any further clarification of the comments above.

Sincerely,

Katharine Bill

Executive Director

Appendix I: Listed and Proposed Endangered and Threatened Species, Critical Habitat, and Candidate Species that may occur in the Counties of Eastern Washington as listed by the U.S. Fish and Wildlife Service

August 10, 2004

FWS Reference:

COMMENTS

Major concerns that should be addressed in your biological assessment of project impacts to listed threatened, endangered, or proposed animal species are:

1. Level of use of the project area by listed species.
2. Effect of the project on listed species' primary food stocks and foraging areas in all areas influenced by the project.
3. Impacts from project construction and implementation (e.g. increased noise levels, increased human activity and/or access, loss or degradation of habitat) which may result in disturbance to listed species and/or their avoidance of the project area.

Major concerns that should be addressed for listed or proposed plant species are:

1. Distribution of taxon in project vicinity.
2. Disturbance (trampling, uprooting, collecting, etc.) of individual plants and loss of habitat.
3. Changes in hydrology where taxon is found.

For information regarding species listed by the National Marine Fisheries Service, please call (206)526-6150 in Seattle, WA, or (503)231-2319 in Portland, OR.

<u>Please note the Species of Concern Lists may not be accurate and are currently being updated.</u>

OKANOGAN COUNTY

LISTED

<u>Endangered</u>

None

<u>Threatened</u>

Bald eagle *(Haliaeetus leucocephalus)*

Bull trout *(Salvelinus confluentus)*

Canada lynx *(Lynx canadensis)*

Gray wolf *(Canis lupus)*

Grizzly bear *(Ursus arctos = U.a. horribilis)*

Northern spotted owl *(Strix occidentalis caurina)*

Ute ladies'-tresses *(Spiranthes diluvialis)*, plant

<u>Designated</u>

Critical habitat for the northern spotted owl

PROPOSED

Critical habitat for bull trout

CANDIDATE

Fisher *(Martes pennanti)*, West Coast distinct population segment

Yellow-billed cuckoo (*Coccyzus americanus*)

Western sage grouse *(Centrocercus urophasianus phaios)*

SPECIES OF CONCERN

<u>Animals</u>

Black tern *(Chlidonias niger)*

California bighorn sheep *(Ovis canadensis californiana)*

California floater (mussel) *(Anodonta californiensis)*

Cascades frog *(Rana cascadae)*

Columbia pebblesnail *(Fluminicola (=Lithoglyphus) columbianus)* [great Columbia River spire snail]

Columbia spotted frog *(Rana luteiventris)* (= *Rana pretiosa*, eastern population)

Columbian sharp-tailed grouse *(Tympanuchus phasianellus columbianus)*

Fringed myotis (bat) *(Myotis thysanodes)*

Harlequin duck *(Histrionicus histrionicus)*

Interior redband trout *(Oncorhynchus mykiss gairdneri)*

Loggerhead shrike *(Lanius ludovicianus)*

Long-eared myotis (bat) *(Myotis evotis)*

Long-legged myotis (bat) *(Myotis volans)*

Northern goshawk *(Accipiter gentilis)*

Northern leopard frog (*Rana pipiens)*

Northern sagebrush lizard *(Sceloporus graciosus graciosus)*

Olive-sided flycatcher *(Contopus borealis)*

Pacific lamprey *(Lampetra tridentata)*

Pale Townsend's (= western) big-eared bat *(Corynorhinus (=Plecotus) townsendii pallescens)*

Small-footed myotis (bat) *(Myotis ciliolabrum)*

Tailed frog *(Ascaphus truei)*

Western burrowing owl *(Athene cunicularia hypugea)*

Western gray squirrel *(Sciurus griseus griseus)*

Westslope cutthroat trout *(Oncorhynchus clarki lewisi)*

Wolverine *(Gulo gulo luscus)*

Yuma myotis (bat) *(Myotis yumanensis)*

SPECIES OF CONCERN

Plants

Crenulate moonwort *(Botrychium crenulatum)*

Stalked moonwort *(Botrychium pedunculosum)*

Triangular-lobed moonwort *(Botrychium ascendens)*

Peculiar moonwort *(Botrychium paradoxum)*

Appendix J: Final Hatchery and Genetics Management Plan for Mid-Columbia Coho Reintroduction Program

HATCHERY AND GENETIC MANAGEMENT PLAN

(HGMP)

Hatchery Program:	Mid-Columbia Coho Reintroduction Feasibility Project
Species or Hatchery Stock:	Coho salmon (*Oncorhynchus kisutch*)
Agency/Operator:	Yakama Nation/Washington Department of Fish and Wildlife
Watershed and Region:	Wenatchee, Methow, Entiat basins
Date Submitted:	December, 2002
Date Last Updated:	December 1999

HATCHERY AND GENETICS MANAGEMENT PLAN

MID-COLUMBIA COHO REINTRODUCTION FEASIBILITY PROJECT

December 2002

Contributors: T. Scribner, K. Murdoch, J. Dunnigan (YN); G. Ferguson (Sea Springs Co. for YN); Chris Pasley, Mark Ahrens, Julie Collins, Marc Jackson, Loren Jensen (USFWS); Robert Becker (ODFW); Nancy Weintraub (BPA); and members of the Technical Work Group

Editor: Judith Woodward

Yakama Nation   Washington Department of Fish & Wildlife   Bonneville Power Administration

Table of Contents

LIST OF FIGURES

LIST OF TABLES

SECTION 1. GENERAL PROGRAM DESCRIPTION

1.1) Name of Program: Mid-Columbia Coho Reintroduction Feasibility Project (Project #9604000)
1.2) Population (or stock) and species: Coho Salmon *(Oncorhynchus kisutch),* currently extirpated in mid-Columbia basins.
1.3) Responsible organizations and individuals:
Co-managers:

Tom Scribner, Yakama Nation (YN)
- **Address:** 4067 NE 23rd Avenue, Portland, OR 97212
- **Telephone:** 503-331-9850
- **Fax:** 503-331-9892
- **Email:** scribner@easystreet.com

Joe Foster, Washington Department of Fish and Wildlife (WDFW)
- **Address:** 1550 Alder Street, NW, Ephrata, WA 98823-9699
- **Telephone**: 509-754-4624
- **Fax:** 509-754-5257
- **Email:** fostejhf@dfw.wa.gov

Other organizations involved, and extent of involvement in the program:
Technical Work Group (TWG) Members:
- Bonneville Power Administration (BPA) (also is primary funding agency)
- Confederated Tribes of the Colville Indian Reservation
- National Marine Fisheries Service (NMFS) (NOAA Fisheries) (also has decision responsibilities for listed species)
- Northwest Power Planning Council (NPPC) (also makes Fish and Wildlife Program decisions under the Northwest Power Act)
- U.S. Fish and Wildlife Service (USFWS) (also has decision responsibilities for listed species)
- U.S. Forest Service (USFS) (also has decision responsibilities for facilities located on USFS land)
- Chelan Public Utility District (also owns and funds operation of some facilities used by the project)

1.4) Funding source: Bonneville Power Administration
Staffing level: 14 FTEs
Annual hatchery program operational costs: $802,000 (does not include planning/design, construction, or monitoring/evaluation)
Entire project budget: $2,200,000
1.5) Location(s) of hatchery and associated facilities:
Location of program: Feasibility phase (what this HGMP covers—see section 1.7.2): Wenatchee, Methow, and Entiat river basins in Washington State. See Figure 1.
Facilities that would be used (see figures 1-3):
This project is a feasibility study (see section 1.7) As such, it must rely on existing or temporary facilities. Most existing facilities are programmed for other species as their first priority. As a

result, when needs change in the priority program, the coho feasibility project must find another site. Since the coho program's inception in 1996, sites for most activities have changed, often several times. Until feasibility has been demonstrated and a long-term program is approved (see section 1.11.2), sites likely will continue to change. Listed below are facilities approved or formally proposed as of spring 2002.

1. Broodstock collection: Tumwater, Dryden, or Wells dams; Winthrop National Fish Hatchery (NFH) or Leavenworth NFH (fish ladder or Dam 5); mainstem dams above Priest Rapids; or Prosser Dam on the Yakima River.

2. Adult holding/spawning: Winthrop NFH will be used for adults returning to the Methow basin. In the Wenatchee basin, the Chiwawa Ponds were used to hold adult coho in 2000 and 2001; the Entiat NFH will be used to hold adult coho in 2002 and beyond.

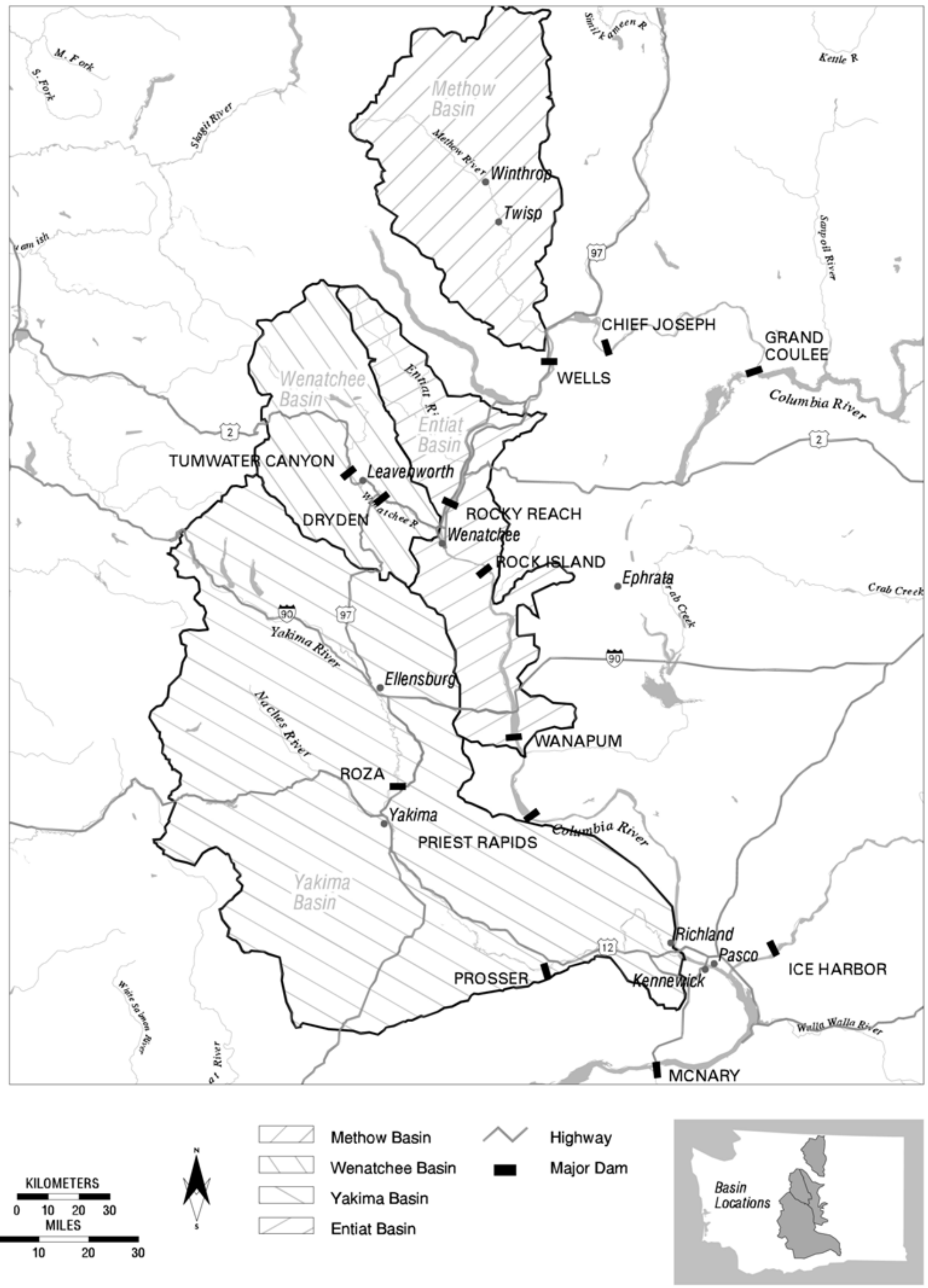
3. **Incubation/Early Rearing:**

Incubation sites include the following locations in the mid-Columbia region: Peshastin incubation facility, Entiat NFH, Leavenworth NFH, and Winthrop NFH. In the lower Columbia, Cascade Hatchery (ODFW) and Willard NFH are used.

Rearing sites include the following locations: Cascade Hatchery, Willard NFH, and Winthrop NFH. In-basin smolt production could be proposed in the future at an as-yet undetermined location. Options currently identified include Chiwawa, White River, Two Rivers (Little Wenatchee), Leavenworth NFH, Entiat NFH, and Dryden Dam, but others could be identified in the future.

4. Acclimation/release: Figures 2 and 3 show potential locations in the Wenatchee and Methow basins. Some sites shown on the maps, and others that may be proposed in the future, would be reviewed by the TWG and various regulatory agencies, and would be subject to environmental analysis of site-specific impacts. The project might not use every site identified. While specific sites in the Entiat basin have not yet been proposed or identified for this phase of the program, potential streams have (the Entiat and Mad rivers). Section 10 provides further details on sites in the Wenatchee and Methow basins.

FIGURE 1 MID - COLUMBIA COHO SALMON STUDY - LOCATION MAP



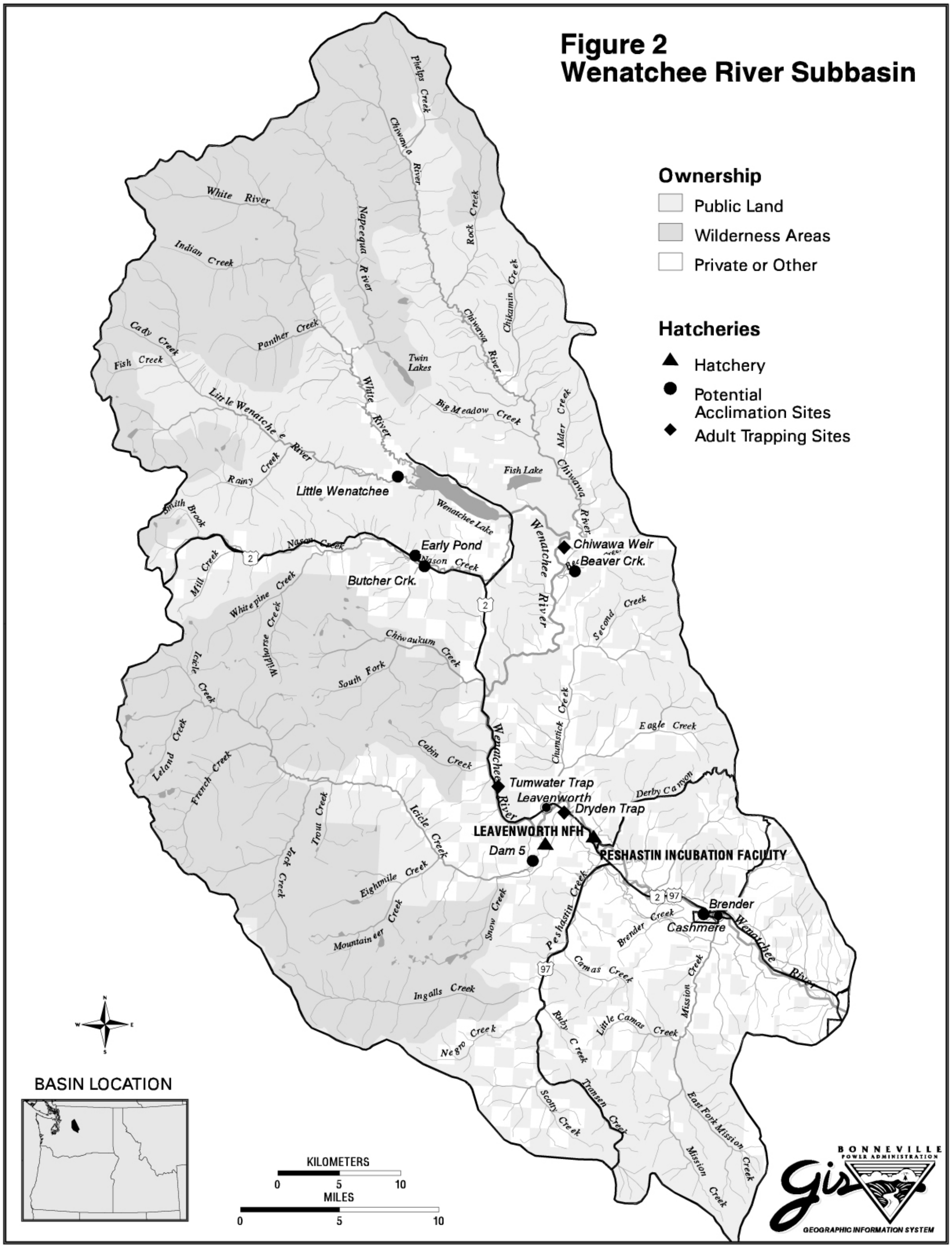


Figure 2
Wenatchee River Subbasin
Ownership
Public Land
Wilderness Areas
Private or Other
Hatcheries
Hatchery
Potential Acclimation Sites
Adult Trapping Sites
Little Wenatchee
Early Pond
Butcher Crk.
Chiwawa Weir
Beaver Crk.
Tumwater Trap
Leavenworth
Dryden Trap
LEAVENWORTH NFH
Dam 5
PESHASTIN INCUBATION FACILITY
Brender
Cashmere
Wenatchee Lake
Fish Lake
Twin Lakes
BASIN LOCATION
KILOMETERS
0 5 10
MILES
0 5 10
BONNEVILLE POWER ADMINISTRATION
GEOGRAPHIC INFORMATION SYSTEM

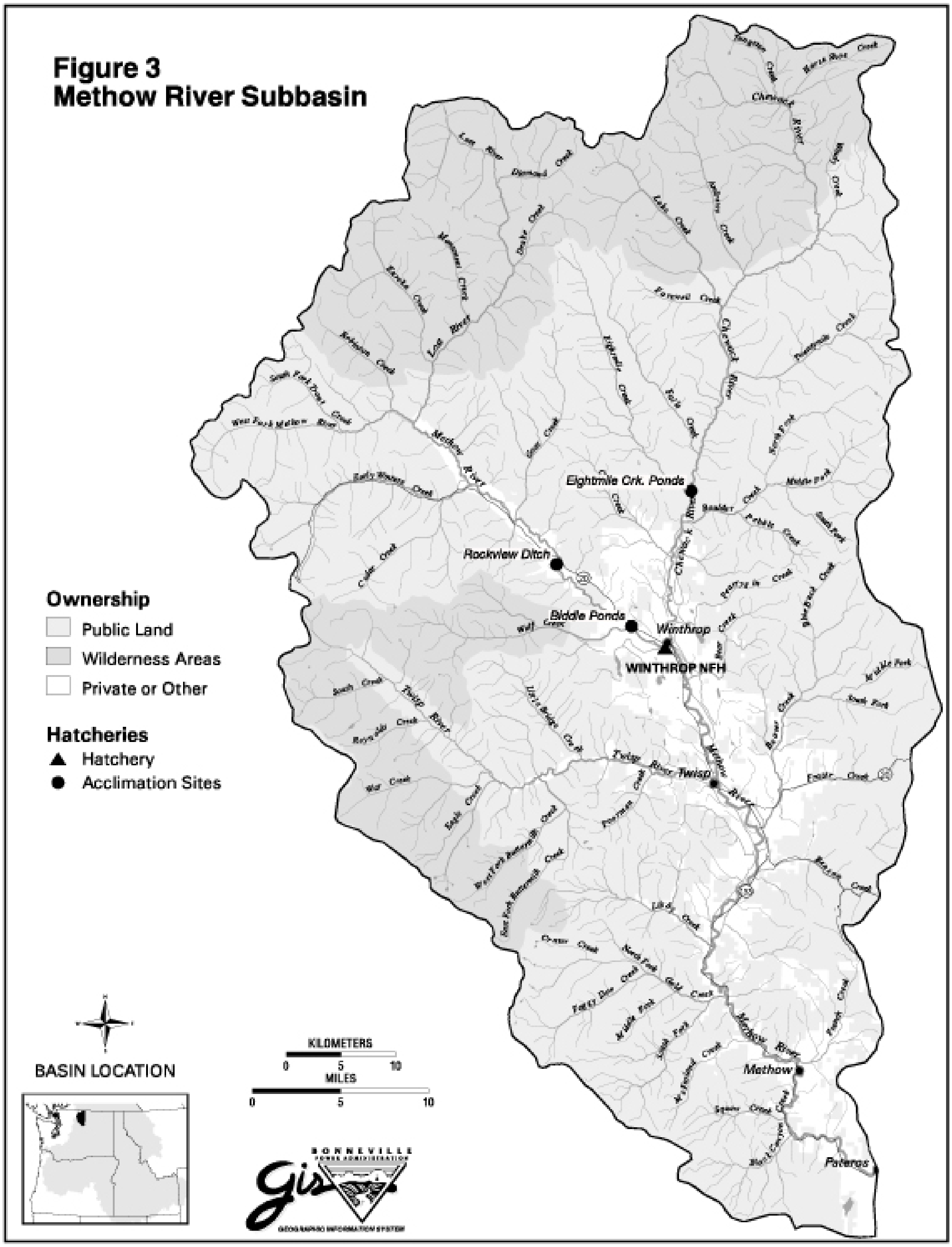


Figure 3
Methow River Subbasin

5. Other: Monitoring. Locations of various types of monitoring activities are identified briefly below. Section 11 describes the activities in detail.

Wenatchee basin:

- Juvenile out-migration and predation would be monitored using rotary traps located near the mouth of Nason Creek (predation on spring chinook) and at the Lake Wenatchee outfall (predation on sockeye). Weirs could be used on smaller tributaries such as Chumstick, Brender, and Beaver creeks. Alternatively, beach seining, tow-netting, or fyke nets could also be used to collect coho to analyze predation on sockeye.
- Juvenile distribution and abundance would be monitored using systematic snorkel surveys upstream, and especially downstream, of all release sites.
- Juvenile coho in Lake Wenatchee may be radio-tagged to determine their potential overlap with sockeye.
- Surveys using hydro-acoustic, beach seining, trawling, and/or purse seining gear would collect information on age-specific sockeye rearing distribution in Lake Wenatchee.
- If necessary, electro-fishing and/or snorkeling would be done in the following places: 1) for spring chinook and bull trout just below the release site near Lake Wenatchee (Two Rivers); and
  2) for spring chinook, steelhead, and naturally spawned coho in Nason Creek.
- PIT tag detection of juvenile coho mainstem survival would be done at existing facilities at Rock Island, McNary, John Day, The Dalles, and Bonneville dams.
- Coded wire tags (CWTs) would be collected from spawned broodstock and from carcasses found during spawning surveys, to estimate smolt-to-adult survival by release group.
- Adults will be monitored at Priest Rapids and Rock Island dams on the Columbia River, at Tumwater and Dryden dams on the Wenatchee, and at the adult broodstock weir on the Chiwawa River. Remote underwater video camera monitoring systems could be installed at some sites.
- Foot/boat redd surveys will be conducted to determine spatial distribution of returning coho adults in potential natural spawning areas including Nason Creek, Beaver Creek, Chumstick Creek, Brender Creek, and the Wenatchee and Little Wenatchee rivers. On smaller tributaries such as Chumstick, Brender, and Beaver creeks, weirs could be used to monitor adult returns.
- Radio telemetry and video monitoring will be used to determine distribution of coho adults returning to the Wenatchee River basin. They could be trapped and radio-tagged at Priest Rapids, Dryden, and/or Tumwater dams.

Methow basin:

- PIT tag detection would be done at the same locations as for Wenatchee fish, with the addition of Rocky Reach Dam.
- Adult monitoring would be done at Wells and Rocky Reach dams to determine conversion rates between dams.
- Juvenile distribution/abundance monitoring would be done using systematic snorkel surveys at all release sites.
- Foot/boat redd surveys along with radio-telemetry techniques may be used to determine the spawning distribution of coho returning to the Methow River basin.

Entiat basin: Locations not proposed at this time.

1.6) Type of program: Integrated Recovery

1.7) Purpose (Goal) of program:

The Mid-Columbia Coho Reintroduction Program encompasses a vision of an optimistic future that may take many years to achieve, as well as short-term goals that will provide information to enable decision-makers to assess whether the vision is achievable. This section has been divided into two parts to describe both long- and short-term (feasibility phase) goals. However, **the remainder of this plan focuses on tasks and impacts related to the short-term goals**. The long-term vision is provided to help reviewers understand the plan's overall context.

1.7.1) Long-term Vision

The long-term vision for this program is to reestablish naturally reproducing coho salmon populations in mid-Columbia river basins, with numbers at or near carrying capacity, that provide opportunities for significant harvest for Tribal and non-Tribal fishers.

The Yakama Nation believes that achieving this vision will be possible only with continued regional efforts to improve habitat for all anadromous species. Until significant improvements are made in conditions such as mainstem passage or agricultural water use, the mid-Columbia coho program, like other salmon programs in the Columbia basin, probably will need to supplement a locally adapted population for many years.

The vision is closely tied to the vision for reintroduction of coho to the Yakima basin and to other areas from which the species has been eliminated. Mid-Columbia coho reintroduction is identified as a priority in the *Wy-Kan-Ush-Mi-Wa-Kish-Wit* document (Tribal Restoration Plan) by the four Columbia River Treaty Tribes, and has been affirmed as a priority by the Northwest Power Planning Council (see section 3.2).

Mid-Columbia basins historically occupied by coho include the Wenatchee, Methow, Entiat, and Okanogan basins. Mullan (1983) estimated historical mid-Columbia River adult coho populations as follows:

- Wenatchee—6,000 - 7,000
- Methow—23,000 - 31,000
- Entiat—9,000-13,000
- Okanogan—Numbers were not identified, although their presence was documented

The ideal would be to restore coho populations in these basins to their historical levels. Due to varying degrees of habitat degradation in each of these basins, historical numbers are unlikely ever to be achieved, but remain a goal towards which to strive.

1.7.2) Goals of Feasibility Phase

This phase, which is expected to last at least through 2004, has two primary goals:

- to continue existing studies and to initiate new ones (adapting to changing needs, new information, and concerns of project participants) to determine whether a broodstock can be developed from Lower Columbia River coho stocks, whose progeny can survive in increasing numbers to return as adults to the mid-Columbia region; and
- to initiate natural reproduction in areas of low risk to sensitive species, and in other select areas to study the risks and interactions with sensitive species.

Studies done in this phase will inform future decisions about whether the long-term vision described in 1.7.1 can be achieved.

1.8) Justification for the program

The Mid-Columbia Coho Program is a phased approach to a "Restoration" program as defined in Part II.C of the NPPC's *Artificial Production Review* (NPPC 1999). This section states: "An extreme case of a restoration production program is where the natural population has been eliminated, and fish are reintroduced by artificial production when the problem causing the extirpation is removed. A restoration program is a temporary measure that will be withdrawn once the natural population is rebuilt or a determination is made that restoration is not possible." (NPPC 1999, p. 14)

Because there are listed species in this basin that, unlike coho, have not been extirpated, and because barriers to natural production have been reduced (not eliminated), this project is taking a phased approach to restoration by testing the feasibility of developing a naturally reproducing broodstock as well as testing the risks to other species, before implementing a full-scale restoration program.

1.9) Program "Performance Standards"

Specific objective(s) of program (at least through 2004):

Experience with the project so far has shown that trying to define specific numeric goals for such an experimental project is unrealistic. Too little is known at this stage about the possibilities and risks of an attempt to re-establish a new population of formerly extirpated coho. The project has grappled annually with the study results to determine the significance of survival, interactions, and overall program feasibility and has found that annual agreements with the TWG on release numbers and other program specifics are most effective at meeting feasibility study needs. The list below identifies the feasibility study's objectives.

- Determine whether hatchery adults from lower Columbia River broodstock return in increasing numbers to the Wenatchee and Methow basins so that their progeny may be expected to reach replacement, thus significantly limiting the infusion of the Lower River hatchery stock, with the long-term goal of eliminating use of the Lower River stock altogether.
- Continue to develop a locally adapted broodstock in the Methow and Wenatchee basins.
- Continue coho smolt releases in areas where coho adults will be allowed to return to spawn naturally. These areas currently are expected to be in the Wenatchee basin in Nason, Beaver, Chumstick, and Brender creeks; and in the lower Wenatchee and Little Wenatchee rivers.
- Evaluate rearing and release procedures within the constraints of hatchery operations that maximize adult survival and the creation of naturally spawning populations.

- Study interactions among coho and listed and sensitive species, particularly spring chinook and sockeye salmon, steelhead, and bull trout. Such studies have required, and could continue to require, coho releases in habitat of sensitive species.
- Minimize potential negative interactions among coho and listed and sensitive species while also conducting necessary interaction studies.
- Annually evaluate project performance with TWG and resource managers and expand or adapt studies as data indicate are necessary or appropriate.
- Monitor hatcheries that raise program coho for compliance with IHOT guidelines.

1.10) List of Performance Indicators designated by "benefits" and "risks"

Monitoring studies of these performance indicators are described in detail in section 11.

1.10.1) Benefits to coho

- Trends in survival of hatchery coho as measured by PIT tags (smolt-to-smolt), and by counts at dams/facilities and CWTs (smolt-to-adult).
- Spatial distribution of returning adults in potential natural spawning areas as identified from radio telemetry, foot/boat redd surveys, and weirs.
- Reproductive success (initial evaluations only) of naturally reproducing coho using redd counts, redd capping, and smolt production estimates.
  - Changes made by out-of-basin stock, using genetic monitoring of neutral allelic frequencies; and physical and behavioral traits such as fecundity, body morphometry, maturation timing, and straying and homing to acclimation sites.

Risks to other listed species

- Predation on other species by program fish as indicated by stomach content analyses.
- Superimposition of spring chinook redds by spawning coho as measured by superimposition studies.
- Competition for food and habitat during freshwater rearing of naturally produced coho juveniles as measured through micro-habitat use and growth evaluations.
- Other potential ecological interactions as indicated by residualism studies or by F2 evaluations.

1.11) Expected size of program

1.11.1) Program size for the feasibility stage (this plan)

Table 1 shows smolt release numbers, broodstock requirements, and production so far. Total release numbers in the Wenatchee and Methow basins are defined under agreements as part of *U.S. v. Oregon*. Feasibility studies will identify ecological risks, broodstock requirements, and survival of out-of-basin stocks. Current plans are to release only smolts. In the future, however, if the Technical Work Group determines that study objectives would be better served—for example, in interaction studies—another life stage could be used. Total numbers released in each basin are not expected to change for the feasibility phase, although release sites in each basin could change. Release numbers at each site are evaluated and discussed among TWG members annually as study needs require and as facility availability changes.

1.11.2) Program size in the long term

Before implementation of the long-term vision described in section 1.7.1 can begin, a variety of decision processes must be completed, using the results of the feasibility studies. These processes most likely would include, at a minimum, a National Environmental Policy Act (NEPA) document if federal funding is involved, and a Step Two and Three review by the NPPC. Then, if the decision-making entities agree to continue the project, it is expected that release numbers would be calculated taking into account carrying capacity (see section 3.5.1), survival estimates of hatchery produced and naturally produced coho, harvest goals, and any reductions necessary to limit risks to other species. It is possible, however, that future coho releases would be less than the number required to fully seed the habitat, in order to limit interactions with listed species.

1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Program performance is shown in Table 1.

1.13) Date program started: Research into feasibility began in 1996.

1.14) Expected duration of program:

Program staff expect that results from feasibility studies could be sufficient by 2004 to allow managers to recommend options for the long term. While it is likely that some form of long-term program will be recommended, a number of options will need to be developed and considered in a variety of decision processes that could take several years to complete. Coho releases are unlikely to be suspended while these decision processes continue, and some feasibility studies are expected to continue beyond 2004. Such studies could contribute, for example, to NEPA or ESA analyses that would help resource managers determine specifics of a long-term program. Full-scale implementation could begin formally only after the following three conditions are met: a) initial feasibility and evaluation of the most important critical uncertainties related to coho re-introduction have been determined, b) the project co-managers propose such a program, and c) an Environmental Impact Statement (EIS), the NPPC Step Two and Three reviews, and other decision processes are completed, currently expected in approximately 2008.

Table 80. Summary of Coho Releases and Broodstock Development

Table 1a. Methow Basin Coho Program

Smolt Releases

Smolt Release Year	**Winthrop**	**Total**
1998	341,000	341,000
1999	0	0
2000	200,000	200,000
2001	180,000	180,000
2002	200,000	200,000
2003	250,000	250,000
2004	250,000	250,000
2005	250,000	250,000

All progeny derived from adults returning to the Methow will be released into the Methow basin unless the Wenatchee basin is short of local brood fish. In that case, Winthrop production would be released in the Wenatchee basin. See section 10.4 for detailed guidelines on source of releases.

Winthrop Adult Returns					**Smolt Production from Methow Returns**				
Adult Return Year	Adult Re-turns***	Prespawn Mortality	Broodstock	Natural Spawn-ing****	Females	Spawning Year	Eggs	Smolts	Outplant Year
1999	0*	0	0	0	0	1999	204,000	145,000	2001
2000	0*	0	0	0	0	2000	0	0	2002
2001	536*	54	334	202	93	2001	239,000	165,000	2003
2002**	209	21	130	58	0	2002	175,000	124,000	2004
2003-2005	TBD	TBD	TBD	TBD	TBD	2003	TBD	TBD	2005

* Actual observed numbers
** Adjusted for relatively poor downstream survival rates (9.9%) in 2001
*** Smolt-adult survival for 2001 (only year so far with returns): 0.17 – 0.27% (TWG meeting notes, 1/29/02)
**** This natural spawning is predicted as a result of capture efficiency at Wells and straying

Table 1b. Wenatchee Basin Coho Program

Smolt Releases

Smolt Release Year	Nason Cr. (TBD)	Early Pond	Butcher Cr.	Beaver Cr.	Little Wenat-chee	Chumstick Cr.	Brender Cr.	Leaven -worth	Total
1999			75,000					450,000	525,000
2000			75,000					925,000	1,000,000
2001			145,000					855,000	1,000,000
2002		23,500	150,000	75,000				751,500	1,000,000
2003	155,900*	0	150,100	75,000	100,800		37,500	453,100	1,000,000
2004	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	1,000,000
2005	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	1,000,000

Wenatchee Adult Returns					**Smolt Production from Adult Returns**				
Adult Re-turn Year	Adult Re-turns**	Pres-pawn Mort.	Brood-stock	Natural Spawn-ing	Females	Spawning Year	Eggs	Smolts	Outplant Year
2000	1,113***	111	919	83	407	2000	1,100,000	650,000	2002
2001	1,773****	177	1,219	377	499	2001	1,3000,000	835,000	2003
2002	1,773	177	1,350	246	608	2002	1,640,000	1,000,000	2004
2003	TBD	TBD	TBD	TBD	TBD	2003	TBD	TBD	2005
2004	TBD	TBD	TBD	TBD	TBD	2004	TBD	TBD	2006
2005	TBD	TBD	TBD	TBD	TBD	2005	TBD	TBD	2007

Source of Wenatchee Outplants

Smolt Release Year	Lower River	Wenatchee Production	Methow Production	Total
1999	1,000,000	0	0	1,000,000
2000	1,000,000	0	0	1,000,000
2001	856,000	0	144,000	1,000,000
2002	400,000	600,000	0	1,000,000
2003	0*****	837,000	163,000	1,000,000
2004	0*****	1,000,000	0	1,000,000
2005	0*****	1,000,000	0	1,000,000

* Includes fry plants and several sites in Nason Creek watershed
** Smolt-adult survival in 2001: 0.16%
*** Actual observed numbers
**** Expanded for the days we weren't trapping
***** Only if localized stock production is sufficient to meet total release numbers. See section 10.4 for guidelines.

1.15) Watersheds targeted by the program:

Short-term (this plan)

Wenatchee: Nason Creek, Wenatchee River, Little Wenatchee River, Icicle Creek, Chumstick Creek, Brender Creek, Beaver Creek

Methow: Methow River. In the first few years of this project, we released fish from sites on the Chewuch River (Eightmile and Fulton Ditch) and Wolf Creek (Biddle Pond).

Longer-term vision

Ideally, coho would be re-established into all suitable habitat in mid-Columbia basins and tributaries. Likely areas include:

Wenatchee: All streams targeted in the feasibility phase, plus White River, Chiwawa River, Peshastin Creek
Methow: In addition to Methow River, Chewuch River, Wolf Creek, Twisp River, Eight Mile Creek
Entiat: Entiat River, Mad River
Okanogan: Okanogan River and tributaries

1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

When BPA evaluated the proposed feasibility studies in its Environmental Assessment (EA) (USDOE BPA 1999b), it considered three alternatives to the program proposed by the Yakama Nation (the "Tribal Alternative"). The three alternatives to the proposal were: "Phased Study Alternative," which would have funded research in the Wenatchee basin only; "Hatchery Releases Alternative," in which the only question studied would have been whether adult coho could return in sufficient numbers to replace themselves, with no predation studies, and no acclimation or spawning in natural habitat; and "No Action Alternative," which anticipated continued releases of coho in the mid-Columbia region under *U.S. v. Oregon* but without BPA funding and with little or no research. The "Tribal Alternative" was selected as the proposed action because it best met the needs and purposes outlined in the EA (USDOE BPA 1999b, sections 1.1 and 1.2) and was found to have no significant environmental impacts. The December 1999 HGMP outlined the Tribal Alternative in as much detail as was possible at the time. Since then, the program has been modified in certain details, which are presented in this update, but the fundamental goals have not changed.

SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS

2.1) List all ESA permits or authorizations in hand for the hatchery program.

- NMFS Biological Opinion, April 27, 1999 specifies terms and conditions for project studies for one year. This Opinion required preparation of a long-term management plan, which resulted in the 1999 HGMP (NMFS 1999(b)).
- USFWS Biological Opinion 01-F-E0231, May 18, 2001 specifies terms and conditions to minimize incidental take of bull trout, including requirements for electro-fishing (USDI, FWS 2001).
- WDFW Section 10 Permit #1094. Coho broodstock collection is done in conjunction with WDFW steelhead broodstock collection under this permit. Under Modification 2 of this permit, radio tagging coho adults at Priest Rapids Dam is done in conjunction with WDFW adult steelhead radio tagging (NMFS 1998(b)).
- WDFW Section 10 Permit #1203. Coho smolt trapping for predation studies in the Wenatchee basin is done in conjunction with WDFW juvenile salmonid research under this permit.

2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1) <u>Description of ESA-listed salmonid population(s) affected by the program.</u>

- Identify the ESA-listed population(s) that will be <u>directly</u> affected by the program. *(Includes listed fish used in supplementation programs or other programs that involve integration of a listed natural population.)*

No listed species will be directly affected by the program. The program's target species is coho salmon, which has been extirpated from mid-Columbia basins and is not listed under ESA.

- Identify the ESA-listed population(s) that may be <u>incidentally</u> affected by the program.

(Includes ESA-listed fish in target hatchery fish release, adult return, and broodstock collection areas).

Information in this section includes status of species and potential impacts in the Entiat basin, as well as in the Wenatchee and Methow basins, although the project does not propose coho releases in the Entiat at this time. The information is offered to give reviewers a context for the long-term plans and to show similarities and differences among the basins in this region. As well, the information could be useful should adaptive management reviews suggest that studies or other work be undertaken in a basin other than those currently proposed.

Table 81. ESA-Listed Fish Species in the Wenatchee and Methow Basins

Common Name	Endangered Species Act	Washington Species Criteria
Spring chinook salmon (Upper Columbia River)	Endangered	Vulnerable/Species of Importance
Steelhead trout (Upper Columbia River)	Endangered	Species of Importance
Bull trout	Threatened	Vulnerable/Species of Importance

Table 82 lists spawning areas for listed species that are within 8 km (5 mi) of potential coho acclimation sites in the Wenatchee and Methow basins. Although not ESA-listed, sockeye and summer chinook are included in the tables and some of the analyses. Lake Wenatchee sockeye are one of only two sockeye populations remaining in the Columbia River system, and summer chinook are important because, though presently healthy, only a few historically numerous populations still exist in the Columbia River basin. Please see figures 2 and 3 for approved or proposed acclimation site locations as of spring 2002. Other known spawning areas in the two basins that are more than 8 km from acclimation sites are listed by species and stream below the table. Specific acclimation/release sites have not yet been proposed for the Entiat basin.

Table 82. Spawning Areas for Sensitive Anadromous Species Near Potential Coho Acclimation/Release Sites*

Basin/Water Body	Spring chinook	Summer chinook	Sockeye	Steelhead	Bull trout
Wenatchee					
Nason Cr.	**X**			**X**	**U**
Little Wenatchee R.	**X**		**X**	**X**	**U**
Wenatchee R. mainstem	**X**	**X**		**X**	
White R.	**X**		**X**	**X**	**X**
Chiwawa R.	**X**			**X**	**X**
Icicle Cr.				**X**	**U**
Beaver Cr.				**X**	
Brender Cr.				**X**	
Chumstick Cr.				**X**	
Methow					
Upper Methow R.	**X**			**X**	**U**
Methow R. mainstem	**X**			**X**	
Twisp R.	**X**			**X**	**U**
Chewuch R.	**X**			**X**	**U**
Wolf Cr.	**X**			**X**	**U**
Goat Cr.				**U**	

*Legend: X = spawning area overlaps with coho acclimation site
U = spawning area is no further than 8 km (5 mi) upstream of acclimation site

The following lists known spawning areas for listed species in addition to the streams listed in Table 3; they are all more than 8 km (5 mi) from coho acclimation and release sites evaluated for this project.

- **Spring chinook**: Methow basin—Lost River
- **Steelhead:** Wenatchee basin—Mission Creek, Peshastin Creek
  Methow basin—Gold Creek, Libby Creek, Beaver Creek, Early Winters Creek, Lost River

- **Bull trout:** Wenatchee basin—Ingalls Creek, Chiwaukum Creek, Mill Creek (tributary to Nason), White River, Panther Creek (tributary to White R.), Chickamin Creek, Rock Creek, Phelps Creek, Icicle Creek (resident population)

Methow basin—Foggy Dew Creek, Crater Creek, Buttermilk Creek, Reynolds Creek, Blue Buck Creek, Lake Creek, Goat Creek, Early Winters Creek, Cedar Creek, West Fork Methow River, Monument Creek, Lost River

Although potential acclimation and release sites have not been proposed in the Entiat basin, streams most likely to be targeted initially for coho reintroduction (should the long-term vision be implemented) would be the Entiat and Mad rivers. These streams are known to contain the following listed species (USDA FS 1996):

- **Spring chinook:** Lower Entiat, Lower-Mid Entiat (stronghold*), Upper-Mid Entiat, Lower and Middle Mad rivers.
- **Steelhead:** All of the Entiat except Upper; and Middle Mad rivers.
- **Bull trout:** Lower Entiat, Lower-Mid Entiat, Upper-Mid Entiat (stronghold*), all Mad River (stronghold).
- **Late-run chinook:** Lower Entiat, Lower-Mid Entiat (stronghold*), Upper-Mid Entiat.

* (as indicated in USDA FS 1996)

Table 4 shows the temporal overlap of life-history stages for species in these basins. Adult steelhead migrate at similar times to coho. They, like coho, are collected for broodstock at Dryden and Tumwater dams in the Wenatchee basin and at Wells Dam on the mainstem Columbia River. They may migrate up Icicle Creek to Leavenworth NFH, although none have been observed at the trap. Adult bull trout also could be in these broodstock collection areas. Spring chinook would not be affected at trapping sites because they pass these areas in May and June.

Table 83. Life History Timing of Methow and Wenatchee Salmonids

Species	Life Stage	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chinook (Spring)	Adult Immigration												
	Adult Holding												
	Spawning												
	Incubation												
	Emergence												
	Rearing												
	Juvenile Emigration												
Species	**Life Stage**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Chinook (Summer)	Adult Immigration												
	Adult Holding												
	Spawning												
	Incubation												
	Emergence												
	Rearing												
	Juvenile Emigration												
Species	**Life Stage**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Chinook (Fall)	Adult Immigration												
	Adult Holding												
	Spawning												
	Incubation												
	Emergence												
	Rearing												

	Juvenile Emigration												
Species	**Life Stage**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Sockeye	Adult Immigration												
	Adult Holding												
	Spawning												
	Incubation												
	Emergence												
	Rearing												
	Juvenile Emigration												
Species	**Life Stage**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Coho	Adult Immigration												
	Adult Holding												
	Spawning												
	Incubation												
	Emergence												
	Rearing												
	Juvenile Emigration												
Species	**Life Stage**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Steelhead (Summer)	Adult Immigration												
	Adult Holding												
	Spawning												
	Incubation												
	Emergence												
	Rearing												

	Juvenile Emigration												
Species	**Life Stage**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Bull Trout	Spawning												
	Incubation												
	Emergence												
	Rearing												

2.2.2) <u>Status of ESA-listed salmonid population(s) affected by the program.</u>

- Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds (*see definitions in "Attachment 1").*

- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.

- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

The following is a brief review of listed fish status in each basin, based on material already published, as noted. WDFW is developing HGMPs for all listed fish in mid-Columbia basins under the jurisdiction of the Mid-Columbia Habitat Conservation Plan (part of the re-licensing process for the mid-Columbia public utility districts). When completed, those documents will have the most up-to-date status of and plans for the listed fish.

UCR Spring Chinook

In general, recent total abundance of Upper Columbia River spring chinook has been quite low (NMFS 1999(a)). Spring chinook run estimates 1986 – 1998 for the Wenatchee, Methow, and Entiat basins are shown in tables 5 – 7 below.

Table 5. Run Estimates, Wenatchee River Spring Chinook

Year	Rock Island Dam Count	Rocky Reach Dam Count	Wenatchee Redd Counts
1986	21,001	4,138	441
1987	18,883	3,480	545

1988	16,212	4,823	491
1989	10,690	3,168	493
1990	7,721	1,909	446
1991	5,781	1,323	251
1992	15,634	2,714	491
1993	19,943	4,128	536
1994	2,041	349	125
1995	887	256	23
1996	2,150	569	72
1997	6,205	1,866	175
1998	3,324	842	78

Source: NMFS 1999(a)

Table 6. Run Estimates, Methow River Spring Chinook

Year	Wells Dam Count	Methow River System Redd Counts
1986	2,896	186
1987	2,272	673
1988	3,024	733
1989	1,633	517
1990	967	482

1991	687	250
1992	1,542	738
1993	2,601	647
1994	258	133
1995	82	15
1996	387	0*
1997	971	145
1998	406	0*

*All fish collected at Wells Dam.

Source: NMFS 1999(a)

Table 7. Run Estimates, Entiat River Spring Chinook

Year	Rocky Reach Dam Count	Wells Dam Count	Wenatchee Redd Counts
1986	4,138	2,896	105
1987	3,480	2,272	64
1988	4,823	3,024	67
1989	3,168	1,633	37
1990	1,909	967	83
1991	1,323	687	32
1992	2,714	1,542	42
1993	4,128	2,601	100

1994	349	258	24
1995	256	82	1
1996	569	387	8
1997	1,866	971	20
1998	842	406	15

Source: NMFS 1999(a)

UCR Steelhead

The following information on UCR steelhead is taken entirely from NMFS 1999(a).

The life history of this ESU is similar to other inland steelhead ESUs. However, smolt ages are some of the oldest on the west coast (up to 7 years old), likely as a result of the ubiquitous cold water temperatures (Mullan et al. 1992). Adults of this ESU spawn later than most downstream populations. Adults of Wenatchee and Entiat River populations return after one year in the ocean, those from the Methow River primarily after two years of ocean life. Adults remain in fresh water up to a year before spawning.

The entire ESU has been heavily hatchery-influenced, with a thorough mixing of stocks as a result of the Grand Coulee Fish Maintenance Project beginning in the 1940s (Fish and Hanavan 1948; Mullan et al. 1992). Until recently, hatchery releases composed of a composite of basin stocks continued. The Wells Hatchery stock is included in the listing. Currently, efforts are underway to develop hatchery programs from more locally adapted stocks, using naturally spawning fish.

Most natural production occurs in the Wenatchee River watershed and in the Methow/Okanogan river systems, with a small run returning to the Entiat River. A majority of fish spawning in natural production areas are of hatchery origin. Indications are that natural populations in the Wenatchee, Methow/Okanogan, and Entiat rivers are not currently self-sustaining.

In recent years it was determined that steelhead habitat in the upper Columbia region was over-seeded, primarily due to the presence of hatchery fish; on the average, hatchery seeding was nearly 110% of the level of production the habitat could support. In addition, it was estimated that the proportion of hatchery-origin steelhead in spawning escapements was 65% in the Wenatchee River and 81% in the Okanogan, and Methow rivers (Busby et al. 1996), a level much higher than that NMFS believes is acceptable to minimize adverse genetic effects to natural populations. This is likely a partial explanation for the low natural replacement rates estimated for the area; populations in the Wenatchee River have a recent Natural Cohort Replacement Rate of 0.3, while those in the Entiat River are no greater that 0.25 (Bugert 1997).

Table 8 shows steelhead counts at mid-Columbia dams. Table 9 shows seeding levels relative to capacity for the Wenatchee, Methow, and Entiat basins.

Table 8. Steelhead Counts at Mid-Columbia Dams

Year	Priest Rapids Dam		Rock Island Dam Count	Rocky Reach Dam Count	Wells Dam Count
	Count	Wild Origin			
1986	22,382	2,342	22,867	15,193	13,234
1987	14,265	4,058	12,706	7,172	5,195
1988	10,208	2,670	9,358	5,678	4,415
1989	10,667	2,685	9,351	6.119	4,608
1990	7,830	1,585	6,936	5,014	3,819
1991	14,027	2,799	11,018	7,741	7,715
1992	14,208	1,618	12,398	7,457	7,120
1993	5,455	890	4,591	2,815	2,400
1994	6,707	855	5,618	2,823	2,138
1995	4,373	993	4,070	1,719	946
1996	8,376	843	7,305	5,774	4,127
1997	8,948	785	7,726	7,726	4,107
1998	5,790	919	4,810	4,265	2,482

Source: NMFS 1999(a)

Table 9. Estimated Steelhead Smolt Production Capacities

Watershed	Smolt Production Capacity	Recent Ten-Year Seeding Levels	Seeding Levels' Percent of Production Capacity
Wenatchee	62,167	73,371	118.2%
Methow	58,552	65,586	112.0%
Entiat	12,739	10,728	84.2%
Total	**133,458**	**149,685**	

Source: NMFS 1999(a)

Bull Trout

The following information is taken entirely from USDI FWS 2001.

The mid-Columbia River region includes watersheds of four major tributaries of the Columbia River in Washington. USFWS identified 16 bull trout subpopulations in the four watersheds (number of subpopulations in each watershed)—Yakima River (8), Wenatchee River (3), Methow River (4), Entiat River (1) (USDI FWS 2001).

Bull trout in this region are most abundant in Rimrock Lake of the Yakima River basin and Lake Wenatchee of the Wenatchee River basin. Both subpopulations are considered "strong" and increasing or stable. The remaining 14 subpopulations are relatively low in abundance, exhibit "depressed" or unknown trends, and primarily have a single life-history form. USFWS considers 10 of the 16 subpopulations at risk of extirpation because of naturally occurring events due to isolation, single life-history form and spawning area, and low abundance (USDI FWS 1998).

Wenatchee River basin. USFWS identified three bull trout subpopulations in the Wenatchee River basin: 1) Lake Wenatchee, 2) Icicle Creek, and 3) Ingalls Creek. In 1995, the Chelan County Public Utility District video-recorded 15 bull trout ascending Tumwater Dam. Although migratory (fluvial) and possibly resident bull trout are present, USFWS believes that the majority of bull trout upstream of Tumwater are migratory (adfluvial) and use Lake Wenatchee.

Of the three subpopulations, the Lake Wenatchee subpopulation has the greatest number of fish in the Wenatchee basin (Brown 1992; K. Williams, WDFW, *in litt*. 1996; A. Murdoch, WDFW, *in litt*. 1997). Anecdotal accounts indicate that the Little Wenatchee River and tributaries to Lake Wenatchee once supported a popular bull trout fishery (WDFW 1997). The bull trout spawning in the Little Wenatchee River basin was last recorded in 1984, and this stock may be extirpated (WDFW 1997). Bull trout have been extirpated from the Napecqua River, a tributary to Lake Wenatchee (WDFW 1997). Four distinct spawning stream reaches remain in this subpopulation (K. MacDonald, USFS, *in litt.* 1996).

The Icicle Creek subpopulation consists of resident bull trout isolated above the Leavenworth NFH dam. A total of 11 bull trout were observed in surveys in 1994 and 1995 (Ringel 1997). Migratory bull trout are observed occasionally below the dam and are believed to originate from the subpopulation upstream (K. MacDonald, USFS, *in litt.* 1996). The Ingalls Creek subpopulation is composed primarily of resident fish. Eight bull trout were observed during snorkel surveys of the creek in 1995 (Ringel 1997). USFWS considers the Icicle and Ingalls creeks subpopulations to be at risk of stochastic extirpation due to their inability to be re-founded, their single life-history form and spawning area, and their low numbers.

Methow River basin. USFWS identified four bull trout subpopulations in the Methow River basin: 1) Methow River, 2) Lost River, 3) Goat Creek, and 4) upper Early Winters (K. Williams, WDFW, *in litt*. 1996).

The Methow River subpopulation is composed primarily of migratory (fluvial) fish. In the mainstem Methow River, up to 79 percent of the average flow is removed from a 40-mile reach, occasionally stranding and killing bull trout. Due primarily to temperature constraints in partially dewatered tributaries to the Methow River, 60 percent of the total spawning and rearing area for bull trout has been lost (Mullan et al. 1992). There appears to be sufficient connectivity to allow bull trout access to spawn in various reaches of seven tributaries (Gold, Wolf, and lower Early Winters creeks, and Twisp, West Fork Methow, lower Lost, and Chewack rivers) (WDFW 1997). The number of redds observed at 21 transects in the 7 streams was 0 to 27, with an overall mean of 9.4 per stream (K. Williams, WDFW, *in litt.* 1996).

The Lost River subpopulation is isolated in the upper portion of the watershed, which is considered to be a "stronghold" for bull trout. The subpopulation is composed primarily of resident bull trout, which in 1993 was estimated at over 1,000 resident and migratory fish (K. Williams, WDFW, *in litt.* 1996).

The Goat Creek subpopulation consists of low numbers of resident bull trout that are believed to be genetically distinct (WDFW 1997). They are isolated upstream by a culvert

6.8 miles from the confluence and, in dry years from July through October, by low flows across an alluvial fan at the confluence with the Methow River.

The upper Early Winters Creek subpopulation, also resident, is isolated above a waterfall 7.9 miles from the confluence with the Methow River. USFWS considers the Goat Creek and upper Early Winters Creek subpopulations at risk of stochastic extirpation due to their inability to be re-founded, their single life-history form and spawning area, and their low numbers.

2.2.3) <u>Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take</u>.

- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

- **Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish**.

- **Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**

- Broodstock collection between early September and early December could take steelhead adults and, less likely, bull trout adults, by handling and delaying migration. (Spring chinook do not migrate when the trap is operating.)
- Trapping for predation studies between March and June at the mouth of Nason Creek could take spring chinook, steelhead, and bull trout juveniles, either by exposing them to greater risk of predation while in the live box, or by handling.
- Weirs in small tributaries such as Chumstick, Brender, and Beaver creeks, could take juvenile or adult steelhead while monitoring juvenile coho emigration or adult returns.
- Tow-net sampling in Lake Wenatchee could take bull trout juveniles through injury or handling stress. A low potential exists for lethal take.
- Electro-fishing for carrying capacity and condition surveys could take bull trout, chinook and steelhead. Adverse effects could be caused by extra handling, or fish could be killed if improper shocking procedures are used.
- Trapping of returning coho adults at Priest Rapids and Tumwater dams for a radio telemetry study could encounter steelhead (and bull trout at Tumwater), causing minimal handling and migration delay.
- Snorkeling surveys could encounter all ages and species of listed fish. A very low potential exists for harassment.
- Juvenile trapping at the outlet to Lake Wenatchee and broodstock collection at Wells Dam would be done within the limits of existing permits, so those activities would not lead to additional take of listed species beyond what already occurs.

- Broodstock at Winthrop NFH are taken from coho that swim into the hatchery, so listed fish would not be affected.

Numbers of listed fish that might be taken during each activity are shown in the "take tables" in Appendix A. Details of the activities and potential take are described below. The risk of adverse ecological interactions between listed fish and coho smolts in the natural environment is discussed in section 3.5.

Wenatchee Basin

- Dryden Dam: The Dryden Dam trap is operated five days per week from July 1 to November 14 each year for steelhead broodstock collection under WDFW's Section 10 permit (#1094). The coho broodstock collection program has been operating within the parameters of that permit. In order to collect coho broodstock throughout the entire run, however, YN requested and was granted an extension of the trapping period from November 14 to December 7.

  Extending the trapping period an additional three weeks (November 14 – December 7) will result in additional handling of an unknown number of Upper Columbia River steelhead. WDFW's 2001 steelhead trapping at Dryden Dam terminated on November 9th and never extends beyond November 14th. Therefore, no data exist to project steelhead captures during the November 14 - December 7 period. During the six trapping days from November 1 – 9, 2001, 10 steelhead were observed, for an average of 1.66 steelhead per day of trapping. If this capture rate were indicative of the expected rate during the requested extension period (approximately 15 trapping days), an estimated 25 additional adult steelhead may be trapped, handled and released as a result of the trapping extension. If the steelhead passage timing observed during 2001 is indicative of a "normal year," then the lengthened trapping period would account for a relatively small proportion of the total steelhead migration. In fact, the low-flow conditions of 2001 delayed steelhead migration, so that in a normal year, even fewer would be encountered during coho trapping. In any event, we do not expect additional steelhead mortality, as no mortality has been observed during the existing trapping period.

  The trap is checked daily to identify captured steelhead as natural or hatchery origin. A Denil ladder is operated up to three hours per day to ensure upstream passage of fish released from the trap (NMFS 1998(b)).

  Bull trout are unlikely to be captured in the Dryden trap. Although USFWS estimated an annual lethal take of one adult bull trout and take by trapping of five adults for all broodstock collection activities (USDI FWS 2001), based on our experience, we expect no lethal take and only two captured and released, with minimal delay in their migration.
- Tumwater Dam: Coho broodstock collection at Tumwater Dam also has operated according to the parameters of the existing WDFW Section 10 permit (#1094) for steelhead broodstock collection. The trap currently operates three days a week, 8 hours a day (although we understand that it is permitted to operate 16 hours a day), and trapping ends in mid-November. YN requested and was granted an extension of the trapping period until December 7. The extension will allow broodstock collection, if necessary, over the entire run. In addition, it will allow more complete enumeration of "natural" adult coho returns to the upper Wenatchee and more opportunity to radio tag adult coho to help identify spawning locations. Recent modifications allow Tumwater, like Dryden Dam, to be operated passively.

  Extending the trapping period an additional three weeks (same time period as Dryden) may result in capture, handling and release of additional upper Columbia River steelhead from that which would have occurred under the existing trapping protocol. During the proposed trapping extension period (November 15 – December 7), 21, 0, 1, and 107 steelhead were observed passing Tumwater Dam in 1998 through 2001, respectively (K. Peterson, NOAA Fisheries, personal communication, September 2002). We do not anticipate any additional mortality as a direct result of the extended trapping operation, as no mortality has been observed during the existing trapping period.

Bull trout are fall spawners, typically in September and October for most populations (Pratt 1992). Video counts at Tumwater show that bull trout rarely migrate past the dam during September and October. Operation of the trap during the period of bull trout spawning is therefore not likely to impact their seasonal movement, since most likely will be spawning in headwater tributaries during this period. Any bull trout caught in the trap would be removed and released immediately. USFWS estimated an annual lethal take of one adult bull trout and take by trapping of five adults for all broodstock collection activities (USDI FWS2001); however, in our experience, bull trout have not been trapped, and there has been no lethal take.

- <u>Leavenworth NFH:</u> Coho would be trapped at Dam 5 or at the fish ladder, using both the right and left bank ladder traps. There is a very low potential to trap bull trout and steelhead while collecting coho broodstock. Steelhead in Icicle Creek are thought to be remnants of an old USFWS program. An average of 15-20 steelhead adults return per spawning season, most during March and April. The odds of catching one in the coho traps in the fall are extremely low (D. Carie, personal communication, 12/10/99). Bull trout spawn in the fall, but earlier than coho. The potential for catching one in a trap during the coho broodstock collection period is greater than for steelhead, but still low. Traps will be checked daily and any listed species released immediately.
- <u>Nason Creek Smolt Trap:</u> The rotary trap operated at RM 2 on Nason Creek probably will capture some spring chinook, bull trout, and steelhead juveniles. Take tables in Appendix A show numbers of chinook juveniles and eggs/fry expected to be taken for both the hatchery smolt predation and naturalized coho (fry plants) studies. During the 2001 study of coho smolt predation on spring chinook (see section 3.5.3), YN trapped and handled 133 spring chinook smolts and 126 spring chinook fry. Spring chinook runs past a WDFW smolt trap on the Chiwawa River as well as the Monitor trap showed that the spring chinook smolt migration peaked prior to the coho release and start of the predation study. As a result, only a limited number of spring chinook actually encountered our trap. All juvenile spring chinook captured were released and passed downstream within an hour. We observed no spring chinook mortality caused by the trap.

  However, by beginning the trap operation in March rather than May for the naturalized coho predation study, we likely will encounter the peak spring chinook out-migration. For this reason, the take tables in Appendix A show higher numbers of spring chinook encountered than would be indicated by our past experience with this trap.

  During a one-month period, the trap captured 8 juvenile bull trout and 303 juvenile steelhead, with no observed mortality. We estimate an annual incidental lethal take of one juvenile bull trout and the capture, handling, and release of 25 juvenile bull trout annually; and the capture, handling, and release of 500 juvenile steelhead, with a potential for an annual incidental lethal take of 10 steelhead juveniles (Appendix A).
- <u>Tributary weir traps:</u> Weirs might be set up to monitor juvenile emigration or adult returns at smaller tributaries, such as Chumstick, Brender, and Beaver creeks, where natural spawning is expected in the future. Such traps have not yet been used for the project, so we cannot report actual experience with take. Take tables in Appendix A

predict potential steelhead take, including a maximum potential unintentional lethal take of 5 juveniles. Listed spring chinook and bull trout are not expected to be encountered in these tributaries.

- Tow-net sampling: The tow nets proposed for this study (see section 11.1.1) are designed to capture sockeye fry. With the type of nets and the speed at which they would be towed (under 7 mph), bull trout older than one year are unlikely to be captured due to their size and ability to maneuver away from the nets (USDI FWS 2001). In addition, bull trout rear in tributary streams and typically do not migrate to the lake until they are larger than the size fish the nets are designed for (K. Murdoch, pers. comm. 2002).
  While the net is designed to create a safe reservoir for entrained fish, and all listed fish are removed after a 10-minute deployment, USFWS estimated an incidental lethal take of 5 juvenile bull trout and a trapping take of 15 juvenile bull trout (USDI FWS 2001). During 2002 YN staff captured only sockeye fry and sockeye smolts. All smolts were released uninjured (no descaling or visible injury). We encountered no bull trout or spring chinook in 2001 or 2002. If spring chinook are present in the lake, they are not pelagic and will not be found in the center as sockeye are (where we are tow netting). Spring chinook would be found only near the lake edges. Therefore, we estimate no take of spring chinook or bull trout from tow netting.
- Electro-fishing: Electro-fishing has the potential to injure fish. Although most, if not all stunned adult and juvenile fish appear to recover sufficiently to swim away, long-term effects or effects that do not result in immediate mortality are not well understood (USDI FWS 2001). During research in the Columbia River basin, an electro-shocking injury level for incidentally shocked juvenile salmon has been estimated at 10 percent (M. Schuck, fishery biologist, Washington Department of Fisheries, pers. comm. *in* Scholz 1992). Barton and Dwyer (1997) found that, for juvenile bull trout, electro-shock resulted in increased plasma glucose and plasma cortisol levels indicative of acute stress (*in* USDI FWS 2001).
  We estimate that 150 spring chinook juveniles and 150 steelhead juveniles could be captured and released during electro-fishing, with the potential for an unintended lethal take of 15 of each species annually. In its Biological Opinion on the coho feasibility studies, the USFWS assumed that all take of bull trout would be lethal take, to avoid underestimating the level of take, and estimated an annual lethal take of 3 adult and 10 juvenile bull trout; however, to date, we have not encountered bull trout in our electro-fishing activities. To reduce the potential for fish mortality, USFWS required that YN and BPA use the NMFS electro-fishing guidelines (NMFS 1998(a)) *and* guidelines found in Fredenberg (1992).

- Snorkeling surveys: Snorkeling surveys for coho juveniles and adults would be done near release sites. It is possible that a snorkeler could frighten a fish from its hiding place, causing it to be caught and eaten by a predator. However, the low number of surveys per year on any particular stream (up to three on Nason Creek), the short amount of time a snorkeler would spend in any reach, and the snorkeler's training to observe only, make it unlikely that the surveys would cause injury to or significantly disrupt normal behavior of listed fish as described in the NMFS definition of "harass" (NMFS 1996).

Methow Basin

Broodstock collection and snorkeling surveys could encounter listed fish (bull trout and steelhead) in the Methow basin. The effect of snorkeling surveys would be similar to that described for the Wenatchee basin.

Peak adult steelhead migration occurs in September and October, and extends from August through November (L. Brown, WDFW, personal communication, 1999). Wild steelhead adults destined for the Methow basin overwinter in the Wells pool on the Columbia River and spawn in April and May. During the coho broodstock collection period, there is an overlap in adult steelhead and adult coho migration timing past the upper mainstem projects. The overlap is most prevalent in late October and extends into November.

- Wells Dam: Beginning in fall of 1999, coho adults returning to the Methow basin were trapped at Wells Dam on the Columbia River. The dam is equipped with traps to collect adult fish. WDFW currently operates the traps to collect steelhead adults, which return at similar times to coho. The current steelhead protocol is to operate the trap for 3 days a week, up to 16 hours a day. If runs are large enough, we do not trap at Wells but rather allow the coho adults to swim to the WNFH. If the runs are predicted to be less than 150 fish for the Methow, we would trap at Wells as often as WDFW's permit (#1094) allows. We will be trapping at Wells in fall 2002. There has been no steelhead mortality associated with this trap.

  Adult bull trout distribution in the mainstem Columbia River near Wells Dam is unknown. In recent years, no bull trout have been observed via video monitoring at Wells Dam between September 15 and November 7 (R. Klinge, Douglas County Public Utility District, personal communication), probably due to temperature constraints in the mainstem Columbia River during that period. We do not anticipate handling any bull trout at Wells Dam during coho broodstock collection.

  Any listed fish caught in the trap will be released immediately.
- Winthrop NFH: Coho would swim directly into the hatchery, so listed species would not be affected. Because this is the only release site for coho smolts in the Methow basin, the coho are expected to be well-imprinted on the hatchery, resulting in good collection rates.

Priest Rapids Dam

The project is proposing to radio tag up to 400 adults over the next 4 or 5 years at Priest Rapids Dam in order to study homing and straying of coho adults. WDFW currently operates a trap at the dam for stock assessment. The coho project would trap during part of WDFW's trapping period, but also has requested an extension of the trapping date to November 21st from the current ending date of October 14th so that a statistically significant number of adult coho can be trapped and radio tagged. The number of days per week would remain at two.

When WDFW is not trapping for their purposes, steelhead will be incidentally collected in the adult trap at the dam. Tribal or WDFW personnel will be present to sort and handle the fish while the trap is collecting coho adults. There is no off-ladder holding area at the trap. Therefore, when listed steelhead are incidentally trapped, they will be returned immediately back to the fish ladder upstream of the trap. We expect the impacts to steelhead to be minor, with minimal migration delay and no increased mortality. The 50 adult steelhead shown in the take table in Appendix A indicates the number that might be captured during the trapping extension only.

- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

While YN does not anticipate exceeding any prescribed take levels during any M&E or broodstock collection activities, if they should happen to do so, they will cease the activity, immediately notify the proper regulatory agency, and proceed based on their decision. Options might include reducing trapping days or using other sites.

SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual* [sic] *Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

There is no ESU-wide hatchery plan for these basins. The *Biological Assessment and Management Plan, Mid-Columbia River Hatchery Program* (NMFS et al. 1998) identifies actions in mid-Columbia basins to address needs of several listed species. Although coho were included in general policy statements, specific actions were not identified for that species. The coho program is consistent with policies addressing restoration projects in NPPC document 99-15, although its phased approach to coho reintroduction is more conservative than the guidelines outlined in the *Artificial Production Review* (NPPC 1999).

3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

Since the 1990s, various entities in the Pacific Northwest have renewed the region’s focus on reintroduction of coho to mid-Columbia tributaries.

The four Columbia River Treaty Tribes (Nez Perce, Umatilla, Warm Springs, and Yakama) identified coho reintroduction in the mid-Columbia as a priority in the *Wy-Kan-Ush-Mi-Wa-Kish-Wit* document, commonly referred to as the Tribal Restoration Plan (TRP) (CRITFC 1995).

It is a comprehensive plan put forward by the Tribes to restore the Columbia River fisheries. This project is the initial phase necessary to determine the feasibility of implementing that long-term vision in the mid-Columbia region.

In 1996, the Northwest Power Planning Council (NPPC) recommended the tribal mid-Columbia reintroduction project for funding by BPA, which has responsibilities under the Northwest Electric Power Planning and Conservation Act of 1980 to protect, mitigate, and enhance fish and wildlife that have been affected by the construction and operation of the Federal Columbia River Power System. It was identified as one of fifteen high-priority projects for the Columbia River basin, and was incorporated into the NPPC's Fish and Wildlife Program (program measures 7.1H, 7.4A, 7.4F, and 7.4O) (as documented in NPPC 1994). The project received a partial Step-Two review by the Council in August 2000 and will be subject to full Step-Two and Step-Three reviews once the feasibility phase is completed and the time is ripe to consider full implementation of the long-term vision.

The release of coho from lower Columbia hatcheries into mid-Columbia tributaries is also recognized in the Columbia River Fish Management Plan, a court-mandated plan under the jurisdiction of *U.S. v. Oregon*, involving Federal, state and tribal fish managers in the Columbia basin (CTWSR et al. 1988). While this project is not mandated under that court order, fish produced under that plan supply the project.

The *Biological Assessment and Management Plan, Mid-Columbia River Hatchery Program* (NMFS et al. 1998) also recognizes the potential for coho reintroduction in mid-Columbia basins, although coho-specific plans and analyses were outside the scope of that document.

Plans for the initial feasibility research phase of this project were outlined, revised, and analyzed in several documents, primarily *Mid-Columbia Coho Salmon Study Plan* 11/25/98 (YIN 1998); *Mid-Columbia Coho Reintroduction Feasibility Project Final Environmental Assessment* (USDOE BPA 1999(b)) and *Supplement Analyses* (USDOE/BPA 2001(b) and USDOE/BPA 2001(d)); *Biological Opinion: 1999 Coho Salmon Releases in the Wenatchee River Basin by the Yakama Indian Nation and the Bonneville Power Administration* (NMFS 1999(b)); and *Biological Opinion: Mid-Columbia Coho Reintroduction Feasibility Project, FWS Reference: 01-F-E0231* (USDI FWS 2001). In addition, a Biological Assessment was prepared by BPA on the proposal to dredge the area behind Dam 5 at Leavenworth Hatchery (USDOE/BPA 2001(c); its findings received concurrence from NMFS in a letter dated September 28, 2001 and from USFWS in a letter dated November 16, 2001.

The U.S. District Court ruled on March 22, 1974 that the Yakama Nation and Washington Department of Fish and Wildlife co-manage fish resources in Washington state. This decision is commonly referred to as the Boldt Decision.

A Memorandum of Understanding, dated 12/27/93, stipulates that the Wenatchee National Forest (WNF) and the YN will cooperatively manage fish resources on the Wenatchee National Forest.

This HGMP is consistent with all these plans, analyses, agreements, memoranda, and court orders.

3.3) Relationship to harvest objectives

3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.

The long-term vision of the Tribes is to re-establish coho in sufficient numbers to provide significant harvest opportunities for Tribal and non-Tribal fishers in mid-Columbia tributary basins. For the period covered by this plan, however, the numbers of returning coho are not expected to be high enough to justify establishing a fishery in the mid-Columbia basins. Harvest levels of all existing Columbia River and ocean fisheries (Tribal and non-Tribal) could be adjusted once escapement goals for upriver coho are agreed to by all parties. Without a coho fishery in the target basins, listed species in those basins would not be at risk.

The marking protocol for program fish has changed from that outlined in the original HGMP (see Tables 19-21, section 11.1.1). The most significant change is a commitment to internally identify or mark with a coded wire tag 100% of the hatchery fish released in both the Methow and Wenatchee basins by 2002 (a year sooner than originally indicated in the HGMP); however, they will not be adipose-clipped, in order to limit their harvest in selective fisheries that target adipose-clipped hatchery coho. This change, combined with current monitoring practices in the relevant fisheries, means that the effect of harvest on survival of program coho will be accurately and effectively assessed.

3.3.1.1) Description of existing fisheries

During their life cycle, this project's research coho might be in waters that are subject to the following fisheries: ocean commercial troll fisheries, ocean recreational fisheries, Buoy 10 recreational fisheries, lower Columbia River commercial fisheries, lower Columbia River recreational fisheries, Zone 6 (Bonneville to McNary) Treaty Indian commercial fisheries, and above Bonneville Dam recreational fisheries.

Ocean fishing seasons and regulations are adopted annually by the Pacific Fisheries Management Council (PFMC). Ocean fisheries for coho are managed on a quota or total allowable catch basis pursuant to objectives in the PFMC's fishery management plan. Because of weak stock constraints, non-Indian commercial troll fisheries targeting coho (especially in areas where Columbia River coho are present) have been very limited since 1994. However, recreational coho fisheries have continued. In 1998, the PFMC adopted the first selective fisheries for coho in recreational fisheries off the mouth of the Columbia River. The states of Washington and Oregon also adopted selective fishery regulations for the popular Buoy 10 fishery in the Columbia River estuary. Washington and Oregon began mass marking (removing adipose fins from) hatchery coho in 1995. Selective fishery regulations required all retained coho to have a healed adipose fin clip. These fisheries generally begin in early August and run through late August to late September.

Mainstem Columbia River sport fisheries typically begin August 1, but generally target chinook and steelhead with minimal harvest of coho. Mainstem commercial fisheries in the lower Columbia River generally occur from mid-September through October. Treaty commercial fisheries in Zone 6 generally occur from late August through early October. Some coho (mostly late stock) are harvested in the latter part of this fishery.

Fisheries may also occur in tributary areas. The Yakama Nation regularly conducts fisheries in the Yakima and Klickitat rivers in the late fall (October to December) targeting fall chinook and coho. The state of Washington also reinitiated a late fall fishery in the Yakima River in 1998 which is expected to continue. The Yakama Nation and/or state of Washington may choose to adopt similar late fall fishing seasons in upper Columbia areas once coho populations are reestablished to levels which would support a fishery; however, adult returns are not expected in sufficient numbers in the next 5-6 years to support a coho fishery in the target basins.

3.3.1.2) Expected harvest rates

Upper Columbia River coho adult returns are a sub-component of the Columbia upriver early stock coho return. Average harvest rates in non-Indian ocean and Columbia River fisheries for marked and unmarked Columbia upriver coho can be estimated using data provided in 1999 by the joint staffs of the Oregon and Washington departments of fish and wildlife. Data include release locations, marking levels, and 1998 selective fishery surveys. Total harvest rates for upriver early coho average about 20% in ocean fisheries and 15% in mainstem Columbia River fisheries for a total harvest rate of about 35% on upriver early-stock coho. Harvest rates on marked (hatchery-released coho) are estimated to average about 30% in ocean fisheries and 20% in river fisheries for a total harvest rate on marked upriver early-stock coho of 50%. Harvest rates on unmarked coho are estimated to average about 12% in ocean fisheries and 11% in river fisheries, for a total harvest rate on unmarked upriver early-stock coho of 23%. Currently non-Indian fisheries are managed to assure that at least 50% of the total upriver coho return (combined early and late stocks) escapes above Bonneville Dam.

Harvest rates of 10% or more on upriver coho stocks in combined Treaty Indian Zone 6 and tributary area fisheries could also occur. Harvest rates for all ocean and Columbia River fisheries (Treaty Indian and non-Indian fisheries) would adjust annually to be consistent with escapement goals for upriver coho once these goals are established and agreed upon by all the parties.

In sum, the total harvest rate on non-adipose-fin-clipped coho is likely to be 20 – 25% due to the selective fisheries that are likely to remain in place for many years as a result of ESA constraints (Mid-Columbia Coho Reintroduction Feasibility Project, Responses to ISRP Comments on Partial Step-Two Review, August 2000).

3.4) Relationship to habitat protection and recovery strategies.

Mid-Columbia coho salmon populations were decimated in the early 1900s by impassable dams and unscreened irrigation diversions in the tributaries, along with an extremely high harvest rate in the lower Columbia River. The loss of natural stream flow degraded habitat quality and further reduced coho productivity. Over the years, irrigation, livestock grazing, mining, timber harvest and fire management also contributed to destruction of salmon habitat.

Mullan (1983) estimated historical mid-Columbia River adult coho populations as follows:

- Wenatchee—6,000 - 7,000
- Methow—23,000 - 31,000
- Entiat—9,000-13,000
- Okanogan—Presence documented but no numbers specified

Indigenous natural coho salmon no longer occupy the mid-Columbia river basins. Since Priest Rapids Dam was completed in 1960, the peak escapement of adult coho upstream of the dam was probably never greater than 10,000 coho and has not exceeded 1,300 since 1974 (WDFW/ODFW 1998). From 1988 to 1997, adult counts at Priest Rapids Dam averaged only 16 coho, probably a result of releases from Turtle Rock Hatchery, which annually released about 600,000 coho smolts, until the program was terminated in 1994 (WDFW/ODFW 1995).

For several reasons, self-sustaining coho populations were not established in mid-Columbia basins despite plantings of 46 million fry, fingerlings, and smolts from Leavenworth, Entiat, and Winthrop national fish hatcheries between 1942 and 1975:

- The construction and operation of mainstem Columbia River hydropower projects were detrimental to mid-Columbia River salmonid populations because of the number of dams and reservoirs through which they had to pass, leading to deaths from turbines, gas bubble trauma, and so forth.
- A substantial amount of critical physical fish habitat was lost or severely degraded (Tyus 1990; Petts 1980; Diamond and Pribble 1978).
- Existing coho programs were unsuccessful or lower priority than programs for other salmonid species. For example, the most recent coho hatchery program in the mid-Columbia region was at Turtle Rock Hatchery, funded by Chelan PUD. The coho program was terminated due to poor adult returns, thought to be caused in part by disease problems at the hatchery. Because fall chinook and steelhead were higher priority species, they were given priority use of the limited supply of high quality hatchery water. These species currently constitute the program at Turtle Rock. The last coho releases were in 1994.

Since that time, conditions and practices have changed to a certain degree. Some of the local habitat causes of coho depletion have been corrected, although there is still work to be done. For example, many irrigation diversions have been screened, tributary dams have been removed, mining has ended, and grazing practices have been improved. A few specific examples of projects designed to improve conditions for fish in the target basins include:

Wenatchee Basin:

- improvements in fish passage at Tumwater and Dryden dams
- fish screens at Dryden Dam
- replacement of Chumstick Creek culverts

Methow Basin:

- improvements to the Methow Valley Irrigation District system
- restoration of salmonid habitat in Early Winters and Goat creeks

Similar improvements have been made on the mainstem Columbia.

Another significant change in regional conditions is that the ESA listings of several salmonid species that migrate through the lower Columbia River have curtailed coho fisheries that once over-harvested the mid-Columbia stocks of coho. These fisheries restrictions are likely to be in effect for a number of years.

Recent improvements in artificial production methodology may also improve efforts aimed at supporting natural production. Supplementation techniques, featuring refined genetic objectives, the production of “natural-like” hatchery smolts, and acclimation/release in wild habitat, are being developed.

Because of these changed conditions, feasibility studies into restoring coho to these basins are consistent with guidance in NPPC’s document 99-15 (NPPC 1999).

3.5) Ecological interactions

One of the primary goals of the coho feasibility studies is to assess interactions with other species and to minimize any adverse effects identified. The NEPA document prepared on the feasibility studies (USDOE/BPA 1999(b)) assessed potential interactions based on information available at the time. Subsequent residualism and predation studies showed little or no adverse effect of hatchery coho smolt releases. Additional predation and F2 interactions studies are ongoing or planned. Results of existing assessments are summarized in the following sections. Because many negative impacts of ecological interactions among species are density-dependent, the estimated carrying capacities of selected Mid-Columbia rivers and streams (if the habitat were to be "fully seeded") are shown in Table 10 as an aid to assessing the near-term risks to other species. These carrying capacity estimates should be considered minimum for the basins, because they include only the main tributaries listed; the majority of fisheries experts agree that, in natural conditions, coho use small creeks in their early life history. Based on the following analysis, and on other discussions with the Mid-Columbia Technical Work Group, we expect that the numbers of hatchery coho released in the Wenatchee or Methow basins are unlikely to result in returning adults sufficient to produce natural origin juveniles in numbers that would exceed the carrying capacity of the tributaries/reaches near the release locations.

The method used to calculate the carrying capacities is presented below. Other methods used by Technical Work Group members have resulted in similar ranges of numbers.

3.5.1) Method for Estimating Carrying Capacities:

We compiled and summarized existing physical habitat inventory for the largest tributaries of the Wenatchee (Little Wenatchee, Nason Creek, White and Chiwawa rivers) and Methow (upper Methow, Chewuch and Twisp rivers) basins. We did not develop estimates for smaller tributaries, so these estimates likely underestimate the potential available habitat and therefore the coho smolt carrying capacity within these watersheds. The U.S. Forest Service collected the data using the Hankin and Reeves (1988) methodology. For each tributary of interest, we tabulated the total stream area by habitat type (pool, glide, riffle, side channel, etc.). We used summer stocking densities presented by Reeves et al. (1989) to estimate the total potential summer standing crop of coho parr within each tributary. In order to estimate adult coho escapement required to fully seed the habitat at these levels, we needed estimates of adult coho sex ratio (D. Dysart, personal communication), life-stage-specific survival rates, and coho fecundity (Yakama Nation, unpublished data). Life-stage-specific survival rates (L. Lestelle personal communication) were partitioned into the egg-to-emergent fry, emergent fry colonization, and summer and winter parr survival. These survival rates are considered to be near optimal and therefore likely overestimate survival within these watersheds.

Female escapement (FE) and adult coho escapement (AE) required to achieve coho smolt carrying capacities (CC) were estimated using the following formula:

$$FE = \frac{CC}{F \times EFS \times FCS \times SPS \times WPS}$$

$$AE = \frac{FE}{SR}$$

Where F = average fecundity (2750 eggs/female)

EFS = egg-to-emergent fry survival (60%),

FCS = emergent fry colonization survival (80%),

SPS = summer parr survival (75%),

WPS = winter parr survival to spring smolt (50%), and

SR = female sex ratio (percent females: 50%)

Assumptions

- Methodology presented by Reeves et al. (1989) accurately estimates potential natural coho summer parr stocking densities within these watersheds.
- Fecundity, sex ratios, and survival rates are realistic.
- Coho survival at life stages earlier than spring smolt will not limit spring smolt production.

Table 10. Estimated Coho Carrying Capacity of Selected Mid-Columbia Basins

Wenatchee	Summer Natural Stocking Capacity	Spring Smolt Natural Stocking Capacity	Female Escapement	Adult Escapement
Nason Creek	845,676	422,838	854	1,708
White River	681,656	340,828	689	1,377
Chiwawa River	887,348	443,674	896	1,793
Little Wenatchee	157,592	78,796	159	318

Total	2,572,272	1,286,136	2,598	5,196
Methow	**Summer Natural Stocking Capacity**	**Spring Smolt Natural Stocking Capacity**	**Female Escapement**	**Adult Escapement**
Methow River	2,638,180	1,319,090	2,665	5,330
Chewuch River	1,119,008	559,504	1,130	2,261
Twisp River	709,108	354,554	716	1,433
Total	4,466,296	2,233,148	4,511	9,024

Assumptions

1. Reeves et al. (1989) accurately estimates natural coho summer parr stocking densities
2. Fecundity = 2750 eggs/female
3. Egg to fry survival = 60%
4. Fry dispersal survival = 80%
5. Fry to summer parr survival = 75%
6. Over-winter survival = 50%
7. Adult sex ratio (female) = 50%
8. Estimates are minimum because they include only the mainstem tributaries listed

1. Physical habitat inventory for each tributary Hankin and Reeves (1988) collected by USFS
2. Sex ratio (Doug Dysart, personal communication)
3. Survival rates (Larry Lestelle, personal communication)
4. Fecundity estimates (Yakama Nation, unpublished information)
5. Coho summer stocking density estimates (Reeves et al. 1989)

3.5.2) Species that could negatively impact the success of the program:

Historically, bull trout and northern pikeminnow (*Ptychocheilus oregonensis*) were probably the most significant fish predators within the Methow, Wenatchee, and Entiat basins. Today bull trout abundance in most parts of these three basins is low and would not be expected to limit project success. However, Lake Wenatchee is a stronghold for the local bull trout population.

Predation rates by bull trout on coho smolts released into the Little Wenatchee or White River could be significant.

Although little information exists about the abundance of northern pikeminnow for the mainstem Methow, Wenatchee or Entiat basins, the abundance of this species is assumed to be relatively low and probably accounts for a small portion of juvenile mortality in freshwater. Several non-endemic centrarchid and ictalurid species are present in the mainstem Columbia River, but the potential impact of these species on project success is unknown.

River otters, mergansers, and bald eagles, among other non-fish predators, are known to eat coho smolts acclimating in uncovered, natural-style ponds, but exact numbers are unknown. Project staff are examining non-toxic, non-lethal methods to control predation by such species.

Project activities are not expected to appreciably change the functional or numeric response or the long-term abundance of predators within the Methow, Wenatchee, or Entiat basins, or in the mainstem Columbia River. This is due to the relatively large number of all species of hatchery fish that currently rear and/or migrate within these areas.

3.5.3) Species that could be negatively impacted by this program:

Ecological interaction risks include predation by coho on other species of concern, competition between coho and other species, residualism, straying, and transfer of disease.

In this section, analysis of ecological interactions focuses on those that could occur within the Wenatchee and Methow river basins, as these basins are where releases are most likely during the time period of this plan. The nature of the impacts in the Entiat basin, should coho be released there, would for the most part be similar to those expected in the Methow and Wenatchee. The species within each basin that potentially could be adversely affected by the project would be the same for F_2 and hatchery fish and are listed in section 2.2.1.

In addition to listed species in mid-Columbia basins, coho smolts encounter other listed stocks and species while migrating in the Columbia River and its estuary. The potential for adverse interactions between coho and other listed species in the mainstem is discussed at the end of this section.

Predation

Predation effects can be direct or indirect and are related to the release of hatchery smolts into the natural environment. For this analysis, direct predation refers to coho consumption of another species. Indirect predation refers to either the increased or reduced levels of predation on other species as a result of the release of large numbers of coho smolts. These indirect effects are being studied in the Yakima basin with inconclusive results so far (YN YKFP 2000). There is no evidence to suggest that an indirect predation risk exists in mid-Columbia basins.

Although the impact of predation on an individual prey animal is unambiguous, the impact on a population of prey is not. Depending on the abundance and productivity of the prey population, the impact of predation on the persistence and productivity of the prey population may range from negligible to serious. The relative impacts of predation on a prey population are determined by partitioning the sources of freshwater mortality and comparing the relative magnitude of each source. Size of hatchery fish appears to be relevant to whether or not the supplemented species will prey significantly on other fish species (Hillman and Mullan 1989).

Coho salmon have been shown to prey on several species of salmonids including sockeye salmon (*O. nerka)* fry (Ricker 1941; Foerster and Ricker 1953; Ruggerone and Rogers 1992); pink (*O.*

gorbuscha) and chum (*O. keta*) salmon fry (Hunter 1959); spring chinook fry (Dunnigan and Hubble 1998); and fall chinook salmon (Thompson 1966; Dunnigan and Hubble 1998).

In the mid-Columbia basins, the species most at risk for direct predation is spring chinook; sockeye salmon could be at risk in certain parts of the Wenatchee basin, especially downstream of any acclimation site above Lake Wenatchee. Spring chinook spawn in higher reaches of the watershed and emerge from the gravel later than summer/fall chinook, due to the colder water; and young-of-the-year spring chinook are smaller than coho when coho begin migrating. Sockeye emerge at about the same time as coho and rear in habitat proposed for coho acclimation in the Wenatchee basin. Summer/fall chinook spawn lower in the watershed, and emerge sooner than coho. They are smaller than coho, and there has been concern that summer/fall chinook would be prey for coho. However, studies in the Yakima basin, as discussed below, have shown that coho predation on fall chinook is very low. Most resident trout and steelhead are not considered to be at risk because these species generally emerge from the gravel after coho have migrated downstream, or, as in the case of bull trout, spawn in upper reaches of tributaries. See section 2.2.1.

The potential for impact to each listed or sensitive species is discussed in more detail below. We include summaries of research that studied coho predation on non-listed species because their findings are relevant to the feasibility questions in these basins.

Coho Salmon Predation on Fall Chinook

Studies of coho predation on fall chinook were conducted in the Yakima basin at the Chandler Juvenile Monitoring Facility (CJMF) in 1997 and 1998. They indicate that coho predation on fall chinook was 0.1% of all fall chinook smolts produced above Prosser, or the equivalent of 3.7 fall chinook adults. However, researchers believe that the artificial conditions associated with CJMF create abnormal opportunities for predation (the fish are at unnaturally high densities in unnatural habitat with no cover against predators, and fish are potentially held several hours in the livebox before being examined) (Dunnigan and Hubble 1998).

Coho predation studies were also conducted in 1997 and 1998 in the open Yakima River (Dunnigan and Hubble 1998). There the observed rate of coho predation on fall chinook was zero: none of the coho sampled in either year contained remains of fall chinook. Calculations were then made, using two different methods, to estimate what total coho predation on fall chinook in the Yakima River might have been. Because the 1997 sample size was small, calculations made from it were not precise and the estimates ranged to absurd numbers. However, despite the small sample size, it seems likely that sampling reflected actual consumption rates in the river during the 1997 coho outmigration (Dunnigan and Hubble 1998). Conditions were not conducive for sight-feeding predators such as coho to be highly successful. Flows were extremely high and the water was turbid. Coho salmon migrated rapidly during this period (averaging 160 kilometers [100 miles] in 3 days) so the potential time for predation was limited. Predation rates on fall chinook by other sight-feeding predators such as smallmouth bass and northern pikeminnow were also relatively low during this period in 1997. It also seems highly unlikely that impacts in the river during 1997 would have been high given that coho predation at CJMF in 1997 was low and CJMF is perhaps the worst-case scenario for fall chinook predation (see above) (Dunnigan and Hubble 1998).

Sample sizes in 1998 allowed for more precise estimates of the total number of fall chinook consumed in the open river. Statistical analysis shows that, given an observed predation rate of 0% and a sample size of 462 coho, there was a 5% chance of observing a predation rate equivalent to the consumption of no more than 349 smolts (or approximately 3.5 adult fall chinook) (Dunnigan and Hubble 1998).

Coho Salmon Predation on Spring Chinook

Yakima River Basin

In 1997, YN snorkeling surveys in the Methow basin generally found emergent spring chinook fry in association with shallow (less than 12 inches), low-velocity backwater and spring brook channels, or close to large woody debris along shallow stream margins (Dunnigan and Hubble 1998). Wild coho juveniles progress through a series of preferred habitat types beginning with back eddies, then moving to log jams, undercut banks, open bank areas, and finally to fast water habitat (Lister and Genoe 1970). Dunnigan and Hubble's observations generally agree with Lister and Genoe's (1970), in that coho prefer deeper and faster water conditions than do spring chinook fry. Minimal spatial overlap tends to indicate limited opportunity for direct predation or competition. However, more definitive studies were required.

In 1998 and 1999, the YN studied coho predation on spring chinook, analyzing the stomach contents of coho sampled at a rotary trap in the Easton reach of the upper Yakima River. In 1998, five coho among the 981 sampled had consumed fish. Two of the prey items were identified as *Oncorhynchus* spp, consumed by a single coho. In 1999, only two of the 1,757 coho smolts sampled had consumed fish, neither of which was *Oncorhynchus* spp. Based on fry consumption estimates using the He and Wurtsbaugh (1993) gut evacuation model, researchers estimate that the total number of adult spring chinook equivalents consumed by coho was no higher than 7 (or 0.38% of the potential number of adult chinook returning to the study reach), assuming a 0.14% egg-to-adult survival rate (Fast et al. 1986) (Dunnigan 1999).

Although data collected in the Yakima basin seem to indicate that direct predation by coho is not a significant risk to spring or fall chinook, because the studies were done in a different basin and results were limited, additional predation studies were done in the Wenatchee basin.

Wenatchee River Basin

In 2001, the YN studied coho predation on spring chinook, analyzing the stomach contents of coho sampled at a rotary trap located at river mile 0.8 on Nason Creek. As reported in Murdoch and LaRue (2002), a total of 4,309 coho smolts were trapped during the study. Of these, a random sample from throughout the run of 1,094 fish were retained for stomach content analysis. Two coho, collected on the same date, had consumed spring chinook fry. This indicates a 0.18% incidence of predation. Using the generic model of gut evacuation rates presented by He and Wurtsbaugh (1993), and the mean residence time of 15.8 days, researchers estimated that the total number of spring chinook fry consumed during the outmigration was 2,436. This number likely is an overestimate because the mean residence time was calculated from the time the barrier nets in the acclimation pond were removed to the time each fish was captured in the smolt trap. However, fish remained in the pond up to three weeks after the net was removed. The actual time each fish spent in Nason Creek after leaving the pond until capture in the trap is unknown, but in most cases it probably was less than the mean residence time used in the calculations.

One hundred spring chinook redds were counted in Nason Creek in 2000, the highest density of spring chinook redds observed within the previous six years. Similar high numbers were observed throughout the region and are thought to be due to exceptionally favorable ocean conditions the previous year. Assuming an average fecundity of 4,200 and egg-to-fry survival rate of 60.0% (Fast et.al. 1986), the estimated number of spring chinook fry consumed by coho during the 2001 smolt migration was less than 1% (0.97%) of the spring chinook fry population in Nason Creek. This study may represent a worst-case scenario for coho smolt predation on spring chinook fry in Nason Creek due to the known over-estimate of residence time and the unusually high density of spring chinook, which is not expected to recur every year (Murdoch and LaRue 2002).

Other factors will further limit the risk of coho predation on spring chinook. In the Wenatchee basin,

1) in the near term, most returning coho adults will be captured for broodstock; and
2) planned natural coho spawning either will be limited to less sensitive areas for spring chinook, like Icicle Creek, or will be carefully monitored to determine the risk of negative interactions with chinook (see section 11.1.1).

In the Methow,

1) a large proportion of adult spring chinook are being collected for an adult-based supplementation program; and
2) most coho adults would be collected for broodstock.

Consequently, the opportunities for predation by naturally spawning progeny of these released fish would be minimal.

Coho Salmon Predation on Summer Chinook

The Yakama Nation, in cooperation with WDFW, evaluated coho predation on summer chinook in the Wenatchee basin during the 2000 smolt out-migration. The study was similar to studies conducted in the Yakima basin on spring and fall chinook. Hatchery coho smolts released from acclimation sites on Icicle Creek and Nason Creek in the spring of 2000 were recaptured in a WDFW-operated 8-foot rotary smolt trap. The trap was located on the Wenatchee River at river mile (RM) 7.1, near the town of Monitor. The study results described below are taken from the annual report by Murdoch and Dunnigan (2001).

During spring 2000, 12,243 coho smolts and 69,239 summer chinook fry were captured in the Monitor smolt trap. Of the 12,243 coho caught, 837 were retained for stomach content analysis. Protocol for the study required that the trap's live box be emptied of fish hourly. Unfortunately, this protocol was violated during the latter part of the study (after May 27th) and the live box was emptied once every three hours. During the study, coho predation of fish generally was uncommon. Between the release date and May 27th, four coho in the sample (0.6%) had consumed summer chinook. This compares to 17 coho that had consumed fish (9.8%) after the protocol had been violated (Table 11). When all samples are grouped, the incidence of predation was 2.5%.

Table 11. Incidence of Predation on Summer Chinook

Time Period	Number of coho sampled	Number of samples containing fish	Incidence of predation
Release to May 27	663	4	0.0060
May 28 to June 18	174	17	0.0977
Release to June 18	837	21	0.0250

We believe that this study represents the worst case scenario for the 2000 out-migration. The study reach contained the highest density of summer chinook redds in the Wenatchee River basin. All hatchery coho released from the Icicle Creek and Butcher Creek acclimation sites passed through this stretch of river. Additionally, data collected from the trap indicated that approximately 10.2 million summer chinook fry migrated past the trap during 2000 (T. Miller, WDFW pers. comm.), so fry were abundant and available for predation during the study. Researchers measured a random sample of summer chinook fry captured in the trap and compared their lengths to those of summer chinook consumed by coho. Summer chinook fry consumed by coho were significantly smaller than summer chinook fry trapped in the live box. Results also indicated that the chinook fry consumed by coho were significantly smaller than the population of coho migrating past the Monitor smolt trap, implying that only the smallest of the fry, rather than the entire population, are vulnerable to predation by hatchery coho smolts.

Coho Salmon Predation on Sockeye Salmon

The risks of coho predation on sockeye salmon could be similar to spring chinook. Sockeye spawn upstream of most of the proposed release areas in the Wenatchee basin, but a significant number rear in Lake Wenatchee and would be present at times when coho smolts, if released above the lake as proposed, would be migrating through Lake Wenatchee (see Figure 2). Although not listed under ESA, sockeye in this area are considered a vulnerable species because they are one of only two populations remaining in the Columbia River system (the other is in Lake Osoyoos [Okanogan River]) (Ken MacDonald, USFS, personal communication, 1999). Sockeye are considered to be introduced in the Entiat basin (USDA FS 1996), most likely wanderers from the Okanogan (NMFS et al. 1998).

Before significant numbers of coho are released upstream of Lake Wenatchee, YN is investigating the risks. The first task is to determine the spatial and temporal distribution of juvenile sockeye within Lake Wenatchee, in order to assess the potential for interaction with hatchery coho smolts during the coho out-migration. The distribution of sockeye fry within the lake is determined by beach seining, snorkeling in the littoral zone, and tow-netting within the limnetic or pelagic zone. The route hatchery coho take through Lake Wenatchee and the amount of time they take to do so are being analyzed using radio-telemetry. A study of coho smolt predation on sockeye follows these baseline studies.

Studies began in 2001, with limited results. They are expected to continue through 2003. See section 11.1.1.

Coho Salmon Predation on Bull Trout

Potential for coho predation on young-of-the-year bull trout would be limited due to the lack of geographic overlap between bull trout spawning and rearing areas in the Wenatchee and Methow basins and proposed coho acclimation and release sites (Table 82). All proposed acclimation sites in the Wenatchee and Methow are lacustrine-type habitats that generally are not used by juvenile bull trout. In any event, bull trout tend to stay on the spawning grounds until they are large enough not to be a prey-sized item for coho smolts. Significant spatial overlap between the two species may occur in the long term if coho return to spawn upstream of their acclimation sites in significant numbers. Conversely, coho might also benefit bull trout in the long run as coho juveniles probably would become prey for adult bull trout.

Specific coho release sites have not been identified in the Entiat basin and studies are not proposed under this plan. If coho reintroduction is eventually initiated in the Entiat basin, two of the three target rivers (Entiat and Mad) contain bull trout (see section 2.2.1). In particular, the Mad River is considered a stronghold for bull trout by the USFS (USDA FS 1996). In the Entiat, the presumed spawning area for bull trout is within a mile of Entiat Falls (WDFW 1998). Downstream of the falls, which is a barrier to fish, lower gradients, higher temperatures and the presence of rainbow trout and chinook salmon suggest that the habitat may be unsuitable for bull trout spawning and initial rearing. In the Mad River, known spawning occurs in the upper middle reach, most above Cougar Creek (WDFW 1998). At this time, the potential for coho predation on bull trout in the Entiat basin is unknown but expected to be minimal, due to limited micro-habitat overlap and late emergence timing of juvenile bull trout. In fact, because bull trout are better predators than coho, it is much more likely that coho (naturally produced and hatchery) will become prey for bull trout, benefiting the bull trout population, rather than the other way around.

In summary, direct predation by coho smolts on other species is expected to be low either because coho would be actively migrating downstream and therefore be moving quickly away from other species' rearing areas; because habitat overlap is minimal; because fish densities in the habitat are low; or because coho would be too small to prey on other species. While some risk to spring chinook needs to be imposed in order to study the potential for long-term risk to sensitive species, implementing the following mitigation measures as appropriate would minimize that risk:

- working with other fish managers to determine release sites and numbers that minimize risk but that also meet research objectives;
- releasing coho smolts in low densities;
- attempting to release fish that more closely resemble sizes of wild coho, which tend to be smaller than hatchery fish[21] (our target size of 20-25 fpp equates to 110 – 120 mm);
- ensuring smolts are ready to actively migrate before volitionally releasing them from acclimation ponds; and
- monitoring predation and adapting feasibility studies and activities as necessary to minimize risks.

Competition

By definition, competition is a situation where the use of a common and limited environmental resource by two individuals or species causes the growth or survival of one individual or species to be reduced due to the shortage of this resource (Whittaker 1975). Direct competition for food and space between hatchery coho and other species can result in displacement of other fish into less preferred areas, which can potentially affect their growth and survival. For competition to have an adverse effect, the same limited resource must be used by more than one species. However, in some instances, competition for space and food may clearly alter patterns of microhabitat utilization while having no effect on productivity or viability (Spaulding et. al 1989). Indeed, the small-scale shifts in use of habitat niches may represent a significant benefit at the community level because environmental resources are used more efficiently (Nilsson 1966).

Juvenile coho salmon are known to be highly aggressive compared to other juvenile salmonids; thus they may compete with hatchery or naturally produced spring and summer/fall chinook, steelhead or rainbow trout, and resident fishes under certain conditions. For example, in a study conducted by Stein et al. (1972) in an artificial stream, coho socially dominated **fall chinook**, and fall chinook grew faster alone than with coho present. However, Lister and Genoe (1970) suggested that coho and fall chinook do not interact in the natural environment because of size-related differences in microhabitat selection. Coho salmon displaced **summer chinook** from preferred microhabitats in the Wenatchee River drainage but did not measurably affect their growth or survival (Spaulding et al. 1989). YN snorkeling surveys, as discussed under "Predation" above, showed that spring chinook and coho use different microhabitats (Dunnigan and Hubble 1998). Groot and Margolis (1991) also suggest that there is little habitat overlap between chinook and other salmonids including coho and sockeye, and that this habitat segregation provides a possible mechanism for reducing ecological interactions between the species.

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[21] Throughout the geographic range of coho salmon, length at smoltification is relatively consistent. Groot and Margolis (1991) reported that mean smolt size in yearling smolts ranged from 75 (Andersen and Narver 1975) to 122 mm fork length (McHenry 1981), and smolt size in Minter Creek, Washington ranged from 95-106 mm (Salo and Bayliff 1958).

Coho salmon have been shown to displace **cutthroat trout** from pool habitat into riffle habitat (Glova 1984; 1986; 1987; Bisson et al. 1988), even though both species preferred pool habitat in the absence of the other species. Tripp and McCart (1983) observed increasing negative impacts on cutthroat trout growth and survival as coho stocking densities increased.

Coho salmon and **rainbow/steelhead trout** are reported to share habitat along the western coast of North America from California to British Columbia (Frasier 1969; Hartman 1965; Johnston 1967; Burns 1971), with both species residing in freshwater for extended periods (Groot and Margolis 1991). However, the reported impacts of the presence of coho salmon on rainbow/steelhead trout are conflicting. Frasier (1969) observed that the survival rate of steelhead living sympatrically with coho salmon declined slightly as coho salmon densities increased. Coho were shown not to affect steelhead growth or habitat use in the Wenatchee River (steelhead occupied different microhabitats than salmon) (Spaulding et al. 1989), and coho affected steelhead habitat use only to a small extent in another Washington stream (Allee 1974, 1981). However, Hartman (1965) concluded that strong habitat selection occurred in the spring and summer as a result of aggressive behaviors which were differentially directed by coho against steelhead in pools and by steelhead against coho in riffle habitats.

Coho salmon may have a competitive advantage over steelhead when they coexist. Juvenile coho salmon tend to emerge from the gravel earlier than steelhead, which allows them to establish territories and reach larger sizes than steelhead of the same age class (Berejikian 1995). Both laboratory and stream studies indicate that these species use different stream microhabitats. In the absence of coho salmon, steelhead use more of the water column and more pool habitat than when coho salmon are present (Hartman 1965, Allee 1974, Bugert and Bjorn 1991). In the presence of coho salmon, age-0 steelhead generally occupy the shallower, faster water of riffles and pool slopes, while coho salmon occupy the deeper water of pools (Bugert et al. 1991).

The segregation of these species appears to be both actively maintained and adaptive (Nilsson 1966). Their habitat segregation is consistent with inter-specific morphological variation: juvenile steelhead are more fusiform in shape than coho salmon and therefore better able to cope with higher water velocities (Bisson et al. 1988). These differences may reduce competition and facilitate partitioning of stream resources during low summer flows in streams when competition is most intense (Hard 1996). Because of their different morphology and habitat use, it is expected that stream characteristics will be primary determinants of interactions between these species: steelhead are expected to thrive better in the presence of coho salmon in streams with higher gradients and velocities, while steelhead are likely to diminish in streams with lower gradients and velocities (Hard 1996); Stelle 1996).

In 1998, the YN conducted field experiments to address the impacts of coho on the growth, abundance, and broad-scale geographical displacement of cutthroat and rainbow/steelhead trout. Researchers found no evidence that coho salmon influenced the abundance of cutthroat or rainbow trout when they compared the abundance of each species at sites where coho were stocked as well as where coho were not stocked. Coho abundance was largely related to stocking location. In addition, they found no evidence that coho affected the growth of cutthroat or rainbow trout when they compared the condition factor of each species in areas with and without coho (Dunnigan and Hubble 1998). These streams were generally characterized as relatively high gradient (2-5%), and ranged from second- to third-order streams.

Researchers were unable to locate any studies that investigated competitive interactions between **bull trout** and coho salmon. However, Underwood et al. (1992) investigated competitive interactions between hatchery steelhead and spring chinook juveniles and juvenile bull trout and concluded that competition between these species of hatchery fish and bull trout was not affecting abundance of bull trout or their use of microhabitats.

Little competitive interaction is expected between bull trout and coho smolts released in the mid-Columbia tributaries. Bull trout typically spawn in tributaries to the Wenatchee and Methow Rivers, or in the middle to upper reaches of the Entiat and Mad rivers. Spawn timing in these tributaries is most likely similar to general patterns observed for the species, is related to water temperature and generally occurs from September to October (Pratt 1992). Spawning and rearing of bull trout is thought to be primarily restricted to relatively pristine and cold streams, often within the headwater reaches (Rieman and McIntyre 1993). The geographic overlap of the juvenile bull trout rearing habitat and the coho migratory path would be minimal for coho releases because the majority of juvenile bull trout rearing habitat is believed to occur upstream of proposed (or likely, in the case of the Entiat River) coho acclimation sites. Sites proposed in the future for the Mad River would take into account known bull trout spawning locations. Any opportunity for interaction with bull trout juveniles would be further limited due to the migratory behavior of coho smolts.

No published studies were found that demonstrated complete competitive exclusion (species extirpation) by coho of any species.

Rapid out-migration of hatchery fish is believed to decrease the risk of ecological interaction to wild fish (Steward and Bjornn 1990). Recent studies in the Yakima basin found that, on average, actively migrating PIT-tagged coho smolts migrated approximately 30.1 km (18.8 miles) per day. The later the fish were released and the higher the volume of water flowing in the river, the faster the fish moved. Migration rates for coho released in the mid-Columbia tributaries are expected to be similar.

Competition that results directly from the release of hatchery coho smolts would likely be negligible due to the fact that coho would be actively migrating downstream and therefore have limited time to interact with individual fish species. Implementing the following mitigation measures (which are similar to those for minimizing predation) as appropriate would minimize the risk further:

- releasing coho smolts in low densities;
- avoiding or delaying releases in habitat for sensitive species (except when the point of the research is to test interactions with a specific species or when YN and the TWG mutually agree such releases would be appropriate);
- attempting to release fish that more closely resemble sizes of wild coho, and
- ensuring smolts are ready to actively migrate before volitionally releasing them from acclimation ponds.

Coho will be released at levels that meet project goals and that will produce naturalized coho at levels consistent with the carrying capacity of the natural habitat (Table 10). From the one million coho smolts proposed to be released into the Wenatchee River basin in the next few years, approximately 1,000 returning adults are expected. Until 2003, a maximum of 380 coho are expected to spawn naturally near release sites; that number is approximately 6% of the historic population (6,000 - 7,000) in the basin.

Current carrying capacity of tributaries in the mid-Columbia is likely lower than historically for all species of salmonids, and therefore, competition between two species might still be severe at densities below the historic carrying capacity of the habitat. However, while estimating current carrying capacity is imprecise at best, estimates provided in Table 10 suggest that the coho escapement proposed under this plan would not threaten other species in the near term. In fact, in 2001, only three coho redds were found in Nason Creek downstream from the release site. If the project moves beyond feasibility studies and stocking or natural production significantly increases coho densities, the risk of adverse competition effects could increase. Project participants plan studies that will help assess the potential for inter-species competition, beginning with spawning ground surveys in fall 2001; habitat use by sub-yearling coho, spring chinook, and steelhead in summer 2002; and radio-telemetry studies in fall 2002/2003 (see section 11.1.1). It is expected that such studies would inform future decisions on release numbers and escapement goals for the long term. The challenge will be to make competition studies meaningful with the limited numbers of naturally produced coho expected in the near term.

Residualism

The spatial and annual incidence of residualism—the tendency of hatchery smolts to delay or avoid what otherwise would be normal outmigration in the spring—can be variable. When fish residualize, they become a part of the stream-reared fish community; they could potentially compete with resident fish for resources such as food and space and become potential predators (or prey).

To help determine the incidence of coho residualism, YN conducted snorkeling studies in 1999, 2000, and 2001 in Nason Creek; in 2000 in the Wenatchee River; and in 2000 and 2001 in the Methow River. Rates of residualism in Icicle Creek and the Wenatchee and Methow rivers were low. Few residual coho were observed during 1999 snorkel surveys in Nason Creek. During a complete survey (100% sample rate) between Swamp Creek (RM 4.5) and the mouth of Nason Creek, 8 (0.01%) coho were observed (Dunnigan 1999). No coho were observed in Nason Creek in 2000, but it is likely that the numbers of residual coho were too low to be detected with the 20% sample rate used. Similarly, no residual coho were observed in Nason Creek during the 2001 surveys, even though the sample rate was increased to 25%. If the relative abundance of residual coho in Icicle Creek (0.002%) were applied to the 75,000 smolts released into Nason Creek, it would result in approximately 1 to 2 residual coho (Murdoch and Dunnigan 2001). Based on the 1999 observations and the 2000 estimates in Nason Creek, and previously reported rates of coho residualism in the Yakima River (Dunnigan 1999), we believe that the proportion of hatchery coho that do not migrate during the spring is low. Recent experience with mid-Columbia coho releases shows that when researchers remove the barriers at coho acclimation sites, the fish leave quickly. The incidence of coho residualism is expected to be minimized through acclimation and volitional releases. Based on these results, the Technical Work Group deemed further residualism studies unnecessary.

Straying

At the start of feasibility studies, straying of Lower Columbia fish back to their natal hatchery (thus increasing competition with local populations) was not expected to be an issue. Johnson et al. (1990) found that coho smolts acclimated for similar periods used in our study (up to six weeks) strayed back to their natal hatchery at a rate less than 0.001% when released from another river system. Beginning in 2002, 100% of coho smolts released will be marked, thus allowing lower Columbia River hatchery managers to monitor strays of adult project fish to hatcheries where they were reared.

In the mid-Columbia region, returning coho have been observed spawning in tributaries to the Wenatchee where they were not released (Peshastin and Chiwakum), as well as in the Entiat River and Chelan Falls. YN proposes a radio-telemetry evaluation to collect data on stray rates of project fish in the mid-Columbia (see section 11.1.1).

In sum, broad geographical displacement and reduced survival of other salmonid populations is not expected because:

1) coho released during the period covered by this plan are expected to migrate quickly and therefore limit the risk of competition with other species;
2) studies have shown little residualism among hatchery coho smolts;
3) numbers of naturally spawning and rearing coho are expected to be well below the carrying capacity of the target streams;
4) the incidence straying and the numbers of naturally spawning fish would be monitored as carefully as technology allows; and
5) release numbers or rearing practices would be modified if necessary to limit effects on sensitive species.

Transfer of Disease

In general, artificially propagated fish are more prone to suffer from infectious diseases and parasites than their wild counterparts because they live under unnaturally crowded conditions where transmission of infectious agents is more efficient. In addition, hatchery rearing conditions and artificial diets may result in stress or nutritional imbalances that affect the physical condition of hatchery fish and their resistance to disease organisms. Concerns have been raised in the past that such diseases could be transmitted from hatchery-reared coho to wild fish of other species, thus increasing the incidence of infection among wild stocks.

The presumed risk is from two sources: first from hatchery coho smolts released into these locations and later, from adult fish returning to spawn. Upriver salmonids have been documented holding in the lower reaches of lower Columbia River tributaries where they may become exposed to infectious agents in that sub-basin and later show overt disease when they arrive at their upriver "home." Using genetic "fingerprinting" methods, researchers have documented the movement of strains of infectious agents within the Columbia River basin that are believed to be due to the migration of adult salmonids (Jim Winton, USFS, personal communication, 1999).

Because anadromous fish are already in the subject watersheds and because coho salmon are more resistant than steelhead or chinook salmon to many of the viral and bacterial pathogens of concern, the added risk from this source seems limited. Virtually all of the infectious diseases affecting hatchery coho salmon in the Columbia River basin are thought to occur in wild fish or in the natural environment. Most Columbia basins have or have had the major diseases of concern. For example, BKD is prevalent in essentially all hatchery and wild stocks of salmonids in the Columbia River basin (Jim Winton, USGS, personal communication, 1999).

A literature review by Miller et al. (1990) found that, in spite of the comparatively high incidence of disease among hatchery stocks, there is little evidence that diseases or parasites are routinely transmitted from hatchery to wild fish. This review found a number of studies indicating that bacterial kidney disease was *not* transmitted from infected hatchery outplants.

Among the normal suite of viral, bacterial, fungal and protozoan diseases known to infect salmonids in the Columbia River basin, the most important for coho is coldwater disease. Coldwater disease is a significant risk to coho, particularly in the higher-elevation tributaries of the mid-Columbia basins. Depending on fish life stage and specific rearing conditions, when water temperature in the hatchery cools in the fall and winter, potentially lethal bacterial outbreaks can develop. The disease is treated using antibiotics, but it is not always effective. Because the causative bacterium is already free-living in the watershed, other salmonids in the basin might not be placed at significantly greater risk from this disease due to the presence of coho.

Hatchery-reared fish are prone, through proximity, to contract a variety of fungal, protozoan, and helminth parasites that are relatively easy to diagnose, and chemical treatment of the holding water normally is effective. Any potential risk of transmitting most internal and external parasites of salmonid fish from hatchery to wild situations would be confined to the brief period during outmigration and would therefore be limited.

All phases of broodstock development, fish transfers, and smolt releases would follow the fish health policy documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (IHOT 1995(a)). Rigorous sanitation and use of disinfecting procedures combined with optimum husbandry, isolation and quarantine practices and a strong diagnostic and therapeutic program would minimize fish health concerns and reduce any potential for adverse effects from disease transmission by released coho to a low risk.

Migration Corridor/Ocean

Little is known about the effects of hatchery fish on listed fish in the migration corridor and ocean. Studies have shown that a significant portion of all hatchery fish released into the Columbia River basin do not survive the Snake and Columbia River migration corridors, for a variety of possible reasons (NMFS 1999(b)). In an attempt to address potential ecological effects of hatchery fish on listed fish in the migration corridor and ocean, NMFS has recommended an annual production ceiling for the Columbia and Snake rivers. NMFS determined, in its Biological Opinion on the project, that the proposed 1999 coho salmon release was consistent with its Columbia River basin production ceiling and that it would not jeopardize the continued existence of listed salmon and steelhead in migration corridors, the estuary, or the ocean (NMFS 1999(b)). The total release numbers have not changed since 1999, so the 1999 determination is assumed to be still valid.

SECTION 4. WATER SOURCE

To begin to develop a locally adapted coho population, the project is using existing hatcheries that have space available and no conflicts with existing programs. Where possible, these facilities are in mid-Columbia basins. So far, however, capacity in the region is not sufficient to accommodate project needs. Winthrop National Fish Hatchery on the Methow River is being used for part of the broodstock development, but ideally another hatchery in or near the Wenatchee basin is needed to meet broodstock development and egg quality goals. Beginning in 2002, Entiat NFH will be used for adult holding, spawning, and egg eye-up only. Full term rearing is not available at this time but could be an option if resource managers reduce or eliminate Entiat NFH spring chinook production for ESA reasons.

Primary rearing facilities:

Winthrop NFH – Water rights total 29,930 gpm from the Methow River, Spring Branch Spring and two wells. Water use ranges from 8,528 to 27,686 gpm, with the Methow River providing the majority of the flow. All rearing facilities are normally supplied with single-pass water; however, some serial re-use occurs in low-flow years (USDI FWS n.d.). The water supply at Winthrop NFH has frozen in the past. If that were to happen again, any coho at the hatchery would be released into the environment.

Lower Columbia River rearing facilities:

Willard NFH – see USFWS documents for water supply details.

Cascade (ODFW) – see ODFW documents for water supply details.

Adult holding facilities:

Entiat NFH – water rights total 15,340 gpm from three sources: the Entiat River, Packwood Springs, and wells. Approximately 7,786 gpm is available for hatchery use. The Entiat River and wells provide most of this water flow.

Leavenworth NFH – water rights total 25,551 gpm from wells, Icicle Creek, and Snow and Nada lakes. Average flow available to the hatchery is 18,170 gpm. There is insufficient water to operate all rearing facilities. Water from Snow and Nada lakes supplement Icicle Creek during low flow periods.

Chiwawa (WDFW) – see WDFW documents for water supply details.

Approved or proposed acclimation/release sites as of spring 2002:

Dam 5 – Icicle River [not expected to be available after 2003].

Little Wenatchee (Two Rivers) – Pumped ground and/or gravel pit water, discharged to the Little Wenatchee River (revised location since 2001, subject to environmental review).

Butcher Creek – Butcher Creek, tributary to Nason Creek.

Early Pond – Unnamed creek, tributary to Nason Creek.

Whitepine – Unnamed creeks, tributary to Nason Creek (subject to environmental review).

Beaver Creek – Beaver Creek, tributary to the Wenatchee River.

Eightmile Creek – Eightmile Creek, tributary to the Chewuck River.

Biddle Pond – Wolf Creek, tributary to the Methow River.

Other potential sites are being identified and, if proposed, will be subject to various environmental and TWG reviews before being used.

SECTION 5. FACILITIES

Section 1.5 describes the locations of physical facilities required for this feasibility study. No permanent hatchery will be built for these studies. Most facilities proposed for use already exist. The exceptions include some acclimation sites and a potential temporary production facility if existing facilities cannot be used. Impacts of construction and use of currently known acclimation and temporary production facilities are described in the following documents:

- *Mid-Columbia Coho Reintroduction Feasibility Project, Final Environmental Assessment and Finding of No Significant Impact* (USDOE/BPA 1999(b)) and *Supplement Analyses* (USDOE/BPA 2001(b) and USDOE/BPA 2001(d));
- Biological Assessment for Mid-Columbia Coho Reintroduction Feasibility Project, Chelan and Okanogan Counties, Washington (USDOE/BPA 1999(a));
- Biological Assessments prepared for USFWS in March 2001 (USDOE/BPA 2001(a)) and for NMFS and USFWS in August 2001 (USDOE/BPA 2001(c)).

5.1) Broodstock collection facilities (or methods).

Coho returning to the Wenatchee River Basin might be collected at one or more of the following facilities: Dryden Dam, Tumwater Dam, Dam 5 and the ladder at Leavenworth NFH, and Columbia River mainstem dams. For the Methow River, coho will be collected at Wells Dam and at the Winthrop National Fish Hatchery. If insufficient broodstock are trapped in the mid-Columbia sites listed, then Prosser Dam at RM 40 on the Yakima River may be used as an alternative to meet broodstock collection goals, rather than making up deficits with lower Columbia River fish. Prosser Dam is a coho broodstock collection site for the Yakima River coho restoration program. See section 7.2 for more detail.

5.2) Fish transportation equipment (description of pen, tank truck, or container used).

<u>Adult coho</u> are transported in a 930 gallon insulated stainless steel fish transportation tank. The tank is equipped with four microbubble ceramic plate oxygen diffusers and two aerators. In addition to the large transportation tank, a limited number of adult coho may be transported in a 200 gallon insulated fish tote equipped with one or two oxygen diffusers.

<u>Coho smolts</u> typically are hauled from lower Columbia River hatcheries to various acclimation sites in mid-Columbia basins by Oregon Department of Fish and Wildlife (ODFW). Fish are transported in 1,500-5,000 gallon (6,000-19,000 liter) transport tanker trucks. These units are insulated and typically maintain sub-50ºF (<10ºC) hauling temperatures and strive for no more than a 10ºF (6ºC) (<5ºF preferred) variation between tank temperature and release site temperature. Transport tanks are equipped with oxygen injection and water circulation systems. Dissolved oxygen levels are maintained at 9-15 ppm. Oxygen and temperature levels are monitored during transports. Hauling densities are targeted at or below 1 pound of fish per gallon of water. Length of transport ranges from 6-8 hours.

5.3) Broodstock holding and spawning facilities.

All coho collected at Dryden Dam, Tumwater Dam, and on Icicle Creek will be transported by Yakama Nation personnel to Entiat National Fish Hatchery. The adult holding ponds at ENFH will be used as a holding facility until all the fish are spawned. End dates will be determined each year in consultation with facility operators.
Fish collected at Wells Dam will be transported to Winthrop NFH for holding and spawning.

5.4) Incubation facilities.

Leavenworth NFH – Coho eggs are incubated in Marisource stack incubators with 6,000-6,500 eggs per tray. Total incubation capacity for coho at the LNFH is 720,000 eggs. The hatchery uses ground water and effluent is UV-sterilized prior to discharge.
Peshastin incubation facility – Two deep trough incubators were used for brood year 2001. Each trough contained 4 incubation cells. Chilled water was supplied to each incubator. Total incubation capacity at the Peshastin facility (a temporary facility at a former fruit warehouse) was approximately 864,000 eggs.
Entiat NFH – A total of three deep trough incubators supplied with chilled water will incubate coho eggs at the ENFH. Maximum incubation capacity at ENFH will be 1,728,000 green eggs.
Cascade Hatchery (ODFW) – Eyed eggs transported from green egg incubation sites will be hatched in existing facilities.
Willard NFH – Eyed eggs transported from green egg incubation sites will be incubated and hatched in existing facilities.
Winthrop NFH. – Normally eggs are incubated from adults spawned at the hatchery. If there is a shortfall in the target numbers for this hatchery using eggs from adult returns to the Methow, eyed eggs transported from lower river sites will be incubated and hatched here.

5.5) Rearing facilities.

Mid-Columbia brood eyed-eggs not reared in the region will be transported to lower Columbia River fish hatcheries for rearing. These hatcheries may include Cascade FH (ODFW) or Willard NFH. Please refer to HGMPs for these facilities for information on rearing conditions.

5.6) Acclimation/release facilities.

Figures 2 and 3 show locations of existing and known potential acclimation sites, listed below. Currently, coho pre-smolts are acclimated in semi-natural ponds or river side channels behind Dam 5 on Icicle Creek and at Butcher Creek, Beaver Creek, and Early Pond in the Wenatchee basin; and at Winthrop NFH in the Methow basin. Additional sites are proposed in the Wenatchee basin for 2002 and beyond. The program will lose use of the Dam 5 site after 2003. In the Wenatchee basin, specific acclimation and release sites in Chumstick and Brender creeks, a replacement for acclimation at Dam 5, and additional sites in Nason Creek have not been approved, although some options have been identified. Additional sites in the Methow beyond those identified in the 1999 EA have not been proposed. No specific sites in the Entiat basin are currently proposed. Before new, additional, or replacement sites are developed, they would be subject to NEPA and/or ESA review of site-specific impacts.

Wenatchee basin

- Dam 5 – an impoundment formed in the Icicle River channel by a dam. Fish screens added to the dam confine coho during acclimation.

- LNFH – above-ground temporary metal framed ponds or unused Foster/Lucas cement ponds. Potential replacement for Dam 5.
- Little Wenatchee (Two Rivers) – a proposed site at an operating gravel pit that will require construction of an earthen pond and a pumped water supply.
- Butcher Creek – an existing beaver pond with an outlet barrier added.
- Early Pond – an existing pond formed during construction of Highway 2. An outlet screen is fitted to an existing culvert to confine fish.
- Beaver Creek – an existing pond adjacent to Beaver Creek with inlet and outlet screens added to confine fish and regulate water flow.
- Whitepine – two proposed sites near the Whitepine campground. One is an existing pond on private land that would require a net barrier. The other is an existing beaver pond on USFS land that would need minor road improvements and a net barrier.
- Brender – an existing pond that will require the addition of a downstream barrier.
- Coulter Creek – an existing pond in the Nason Creek watershed proposed for use in 2003, requiring installation of an outlet pipe through a beaver dam and barrier nets.
- Mahar Creek Pond – an existing pond in the Nason Creek watershed proposed for use in 2003, requiring installation and removal of barrier nets.

Methow basin

- Eightmile Creek– an existing series of ponds with fish screens in place.
- Biddle Pond – an existing pond with fish screens in place.

5.7) Describe operational difficulties or disasters that led to significant fish mortality.

Coho reared at Winthrop NFH experienced an unusual botulism problem in 2001, after their rearing location was changed due to the extremely low water that year. The rearing location has been moved to inside the hatchery. There was no reported loss from botulism in natural or hatchery populations of other species. This problem is not expected to recur.

5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

Coho are not listed in these basins.

SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

6.1) Source

Because coho salmon have been extirpated in the Wenatchee and Methow basins, the research into the feasibility of reintroducing the species relies on development of a coho broodstock from lower Columbia River populations. No wild stock from the mid-Columbia exists to use, and wild stocks from other areas such as British Columbia currently are unavailable. The domesticated Lower Columbia River stock (which originated from the Toutle River stock, with recent infusions of Sandy River stock) is being used as initial broodstock. These fish would come as smolts from Willard or Cascade hatcheries. In 2000, 700,000 smolts came from Cascade and 400,000 from Eagle Creek, but Eagle Creek is no longer used as a source. The numbers from each hatchery are negotiated annually, but the fish are from essentially the same stock regardless of which of the three lower river hatcheries they come from.

Beginning in 1999, adult coho returning to the mid-Columbia from earlier releases in the Methow basin were collected at Wells Dam and Winthrop NFH for use as broodstock. Other collection points were added in later years (see section 1.5). Projected numbers of returning adults to be collected in 2002 are shown in Tables 14 and 15 (section 7.4). Broodstock collection goals are developed annually. As adult returns increase, the project will rely less on the Lower Columbia River stock.

To maximize the potential for genetic variability and naturalization of the returning population, the project would initially use most of the returning coho for broodstock, collected throughout the run. Hatchery fish that return to the mid-Columbia will have gone through a substantial selection process to survive the long migration and the variety of obstacles they encounter in the journey, which is expected to enhance the trend toward local adaptation.

Ideally, adults collected at Wells Dam would be used to develop a Methow basin broodstock, and adults collected at Dryden or Tumwater dams would be used to develop a Wenatchee basin broodstock. However, the number of adults returning is likely to constrain the program from meeting the ideal for much longer than the scope of this plan. For this period, in general, Wenatchee returns are incubated at Entiat NFH and then at lower river hatcheries and returned to the Wenatchee for acclimation. Methow returns are spawned and reared at Winthrop NFH, to the extent of their capacity. The localized stocks are supplemented with progeny of lower Columbia River hatchery stocks if necessary to meet production numbers. Release guidelines are specified in section 10.4.

6.2) Supporting information

6.2.1) History

The Lower Columbia River stock has been essentially a hatchery stock since the 1960s and is considered domesticated. The original source of the Lower River stock was the Toutle River stock. The LCR stock also has had recent infusions of Sandy River stock.

Ninety Years of Salmon Culture at Little White Salmon National Fish Hatchery (Nelson and Bodle, 1990, pp. 12-18), describes the early history of the Lower River stock. Tables 12 and 13 show more recent history.

> *Initial attempts to rear coho salmon with the native, late-running stock were made in 1919 and 1922. Attempts in 1930 and in the 1950s involved early-running stocks native to the Quinault, Quilcene, and Dungeness rivers of Puget Sound, Washington, as well as a native Toutle River stock. The Toutle River stock was considered responsible for establishing a successful run in 1956. In 1957 and 1958, eggs from Little White Salmon*

NFH were shipped to Willard NFH for incubation, after which the fry were returned for rearing. Additional eggs of the Toutle River stock were received from Eagle Creek NFH in 1962 and Bonneville State Fish Hatchery (SFH) in 1963.

Initially, these fish were released in their first summer; later, they were usually released as yearlings in February or March. Fish reared at Little White Salmon NFH were also shipped to Spring Creek, Eagle Creek, Carson, and Willard NFHs for finishing and distribution; others were released in the Columbia, Snake, Klickitat, and John Day rivers…

By 1965, a dependable run of Toutle River coho salmon stock was established… Increasingly larger numbers of eggs were moved to Willard NFH, until finally the Little White Salmon facility began serving its present function as an egg-taking station for Willard NFH. Eggs were also shipped to Entiat, Winthrop, Leavenworth, Carson, and Coleman NFHs; Washougal SFH; and [to other states and countries].

Table 12. Coho Genetic History at Eagle Creek Hatchery

Originally at hatchery beginning:	
BY '57	400,000 from Sandy River 200,000 from Little White Salmon NFH (Toutle)
BY '58	600,000 from Sandy River 467,000 from Big Creek
Since 1987 (released from ECNFH):	
BY '88	325,000 from Sandy River, released April '90
BY '90	292,000 from Sandy River, released April '92
BY '91	196,000 from Sandy River, released April '93
BY '93	579,000 from Toutle River, released May '95

Table 13. Willard NFH Coho Salmon Fish/Eggs Received From Other Hatcheries 1985-1999

Date	Number	Received From
01/28/94	187,556	Speelyai SFH, WA
12/04/94	589,433	Lower Kalama SFH, WA
12/24/96	883,000	Cascade SFH, OR
02/19/97	886,413	Bonneville SFH, OR
03/17/97	948,592	Klaskanine SFH, OR
06/12/97	268,002	Eagle Creek NFH, OR

6.2.2) Annual size

Broodstock collection of mid-Columbia adults began in 1999 at Wells Dam and Winthrop NFH. Table 1 (section 1.11) shows numbers of fish collected in each basin. In 2000, we estimate that 1,113 coho returned to the Wenatchee River Basin; of these, we trapped 919. We observed a pre-spawn mortality rate of 9.5% (87 fish). Based upon 2001 dam counts (Rock Island minus Rocky Reach), 8,555 adult coho returned to the mid-Columbia River and Wenatchee River Basin. This gives us a 0.86% survival rate. Based on numbers of coho collected further upstream at Dryden Dam and in Icicle Creek, Tumwater Dam video counts, redds in Icicle Creek, and coho carcasses collected in the Wenatchee River, 1,730 coho were known to return to the Wenatchee River basin and spawn, providing a minimum smolt-to-adult survival for the Wenatchee River of 0.16%. We collected 1,240 coho for broodstock in the Wenatchee River Basin in 2001.

Based upon Wells Dam counts, 536 coho returned to the Methow River in 2001. This gives us a 0.27% smolt-to-adult survival for the Methow River. Of the 536 coho counted at Wells Dam, 334 coho returned to the Winthrop National Fish Hatchery; 93 were females. Of the 334, 128 males were returned to the river to spawn naturally.

In future years, if too few adults return to maintain an effective population size, their numbers would be supplemented either by adding Lower River adults to the breeding pairs, by supplementing the next year's releases with Lower River smolts, or a combination of both.

6.2.3) Past and proposed level of natural fish in broodstock.

Currently, there is no natural population from which to collect broodstock. Once naturally reproducing coho salmon are re-established in mid-Columbia tributaries, natural fish will be incorporated into the broodstock, initially in their proportion to hatchery fish. As natural production increases, the percentage of naturally produced fish incorporated into the broodstock would be evaluated on an annual basis.

6.2.4) Genetic or ecological differences

There are no natural stocks of coho in the target area. Genetic studies will monitor divergence of natural spawners from hatchery broodstock if the project is successful at improving adult returns (see section 11.1.1).

6.2.5) Reasons for choosing

The primary reason for choosing Lower River broodstock to begin with is that it is the closest stock available geographically, and it is the only early stock in the Columbia River basin. For at least six years, the broodstock selection process would be entirely random, but as large a proportion as possible of the returning adults will be used in order to incorporate the characteristics that allowed the lower Columbia River fish to return to mid-Columbia basins. While the genetics monitoring program would study returning coho for traits associated with survival and adaptability, any proposal to select for certain traits in developing broodstock would be evaluated in future decision-making processes. See also section 6.1.

6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

Because coho are considered extirpated from mid-Columbia basins, introduction of a Lower River stock would not affect a listed population.

SECTION 7. BROODSTOCK COLLECTION

7.1) Life-history stage to be collected (adults, eggs, or juveniles).

Adults.

7.2) Collection or sampling design.

Include information on the location, time, and method of capture (e.g. weir trap, beach seine, etc.) Describe capture efficiency and measures to reduce sources of bias that could lead to a non-representative sample of the desired broodstock source.

Wenatchee River Basin
To maximize genetic diversity we will collect a representative sample of returning coho from throughout the run. Based on experience in 2000 and 2001, we expect the first coho to arrive at Dryden Dam as early as the first week of September and to continue through early December. Migration peaks in mid-October. Weekly broodstock collection goals will be developed on an annual basis based on the average distribution of returning coho (Table 16 [section 7.4]). If, during any week, the broodstock collection goal is not met, the deficit will be carried over to the following week.
If we are unable to meet our weekly broodstock collection goals through trapping efforts at Dryden Dam, adult coho will be trapped concurrently at Tumwater Dam and Leavenworth NFH Dam 5 or ladders on the Icicle River.

- Dryden Dam: Broodstock collection at Dryden Dam will take place daily in coordination with Eastbank Fish Hatchery Complex personnel. Currently, YN provides two people (fisheries biologist and/or fisheries technicians) each day during the trapping period to assist in trap operations. Number of personnel required for trap operation will be re-evaluated with facility operators on an annual basis. If the weekly coho broodstock collection goals are met prior to the end of the week, YN personnel will continue to assist in the operations and collections at Dryden Dam, to include enumerating and passing coho upstream. YN alone will operate the Dryden Dam fish trap after November 14th.
  The Dryden Dam fish trapping facility is operated by WDFW and Chelan County Public Utility District (CPUD) personnel from July 5 through mid-November to collect steelhead and summer chinook broodstock. The trap normally is operated 24 hours a day, 5 days a

week. BPA has proposed to extend the trapping period to December 7. This will help ensure broodstock are collected throughout the entire run.

To keep transportation stress to a minimum, no more than 65 adult coho will be collected and transported from Dryden Dam on any given day. Any coho in excess of 65 will be passed upstream.

- Tumwater Dam: Trapping efforts at Tumwater Dam will be coordinated with Eastbank Fish Hatchery personnel. Tumwater Dam trap normally is operated 3 days/week, 8 hours/day between July 19 and November 17th (Peterson 2001), although it is permitted to operate up to 16 hours a day. BPA has requested that operations be extended through December 7.

- Leavenworth NFH: If necessary, coho would be trapped at Dam 5 or the fishway, using both the right and left bank ladder traps. The trap could be operated between September 7 and December 7, by either YN or hatchery personnel.

Methow River Basin

Depending on run size, adult coho can either be trapped at Wells Dam and/or allowed to ascend the Methow River on their own. If insufficient numbers return to the Methow River basin, additional broodstock may be taken in the Wenatchee River basin to meet Methow basin project goals.

- Wells Dam: Beginning in fall of 1999, coho adults returning to the Methow basin were trapped at Wells Dam on the Columbia River. The dam is equipped with traps to collect adult fish. The traps are currently being operated by WDFW to collect steelhead adults, which would be returning at the same time as coho. Currently we allow coho adults to swim into Winthrop NFH rather than trap them at Wells. If the runs are predicted to be less than 150 coho for the Methow, we would trap at Wells as often as WDFW's permit (#1094) allows.
- Winthrop NFH: The Winthrop NFH fish ladder is opened on the first of October and allowed to attract and collect fish throughout the run. Coho swim directly into the hatchery. Because this is the only release site for coho smolts in the Methow basin, the coho are expected to be well-imprinted on the hatchery, resulting in good collection rates. Spawning generally begins during the last week of October and continues on a one-day-per-week basis for a period of approximately 5 weeks.

Sources of bias: The sources of bias are low at Tumwater and Wells dams and at Winthrop and Leavenworth hatcheries. The sources of bias at Dryden are unknown. Potential sources of bias may include fish size and ladder efficiency, particularly with regard to river discharge. Dryden is a low-head dam, so fish can jump over it during high flows.

7.3) Identity.

Describe method for identifying (a) target population if more than one population may be present; and (b) hatchery origin fish from naturally spawned fish.

The project will begin marking all hatchery fish with coded wire tags to distinguish them from any naturally produced fish that may return in future years. See section 11.1.1.

7.4) Proposed number to be collected:

7.4.1) Tables 14 and 15 show program goals for the Wenatchee and Methow basins for 2002. They are based on pre-spawn mortality, eye-up, and hatching rates observed during the 2000 and 2001 brood years. The program goals will be re-evaluated on an annual basis if eye-up, mortality rates, or sex ratios change.

Table 14. Wenatchee River Broodstock Collection Goals: 2002

Program Goal (smolts)	Egg-to-smolt survival rate	Green eggs required	Fecundity	Pre-spawn Mortality rate**	Adult Females Required	Total Broodstock Collection ***
1 million	.60	1.6 million	2750	.10	673	1464

* Based on projected egg-to-smolt survival rates observed in 2000 brood

** Observed pre-spawn mortality rate in 2000 and 2001

*** Assumes 54:46 male to female ratio as observed in 2001

Table 15. Methow River Broodstock Collection Goals: 2002

Program Goal (smolts)	Eyed-egg survival rate*	Eggs required	Fecundity	Pre-spawn Mortality rate**	Adult Females Required	Total Broodstock Collection ***
250,000	.70	357,143	2750	.10	144	497

* Based on projected egg to smolt survival rates observed in 2001

** Observed pre-spawn mortality rate in 2000 and 2001

*** Assumes a 71:29 male to female ratio as observed in 2001

Table 16 shows weekly broodstock collection goals for the Wenatchee basin in 2002. Weekly goals will be developed annually. In the Methow, the project captures all possible fish, but at some point might need to develop weekly goals.

Table 16. Weekly Coho Broodstock Collection Goals for Wenatchee Basin: 2002

Week ending	**9/8**	**9/15**	**9/22**	**9/29**	**10/6**	**10/13**	**10/20**	**10/27**	**11/3**	**11/10**	**11/17**	**11/24**	**12/1**	**12/8**	**Total**
Estimated	0.1	1.6	7.2	10.9	12.3	20.2	10.5	9.9	12.8	6.5	3.7	2.0	1.8	.50	100

% of run														
Broodstock collection goals	2	23	105	160	180	296	154	145	187	95	54	29	27	7	1464

7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:

See Table 1 (section 1.11) and section 6.2.2.

7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.

Fish collected in excess of broodstock needs at Dryden Dam will be passed upstream.

7.6) Fish transportation and holding methods.

Methow Basin: If adult fish are trapped at Wells Dam, they are transported by a 400-gallon tank truck in groups of 20 or less to the Winthrop NFH adult holding/spawning facility. The trip takes about an hour and a half. Also see section 8.3.
Wenatchee Basin (see tank description in section 5.2): Coho are transported from Dryden to Entiat in a 0.6% salt solution (by weight), and are released directly into the holding pond. The trip takes about 1.25 hours. All broodstock will be treated with a 167 ppm formalin drip as a fungal control measure. Initial treatments begin upon release of fish into the holding pond and will continue for three consecutive days past the last transfer of fish. Thereafter, fish are treated every two to three days or as needed to control fungus.

7.7) Describe fish health maintenance and sanitation procedures applied.

See section 7.6. The fish transportation truck is disinfected weekly.

7.8) Disposition of carcasses.

At Winthrop NFH, spawned carcasses are returned to streams in the upper Methow basin for nutrient enhancement. At Entiat NFH, fish might be injected with an anti-bacterium to keep them disease-free. In those cases, carcasses are buried on the hatchery grounds. Uninjected carcasses are returned to streams.

7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

Any listed fish caught in the traps would be removed and released immediately.

SECTION 8. MATING

8.1) Selection method.
Spawners will be chosen randomly from ripe fish once a week. Returns from mid-Columbia brood may be selected to mate with returns from Lower Columbia River (LCR) transplants or other mid-Columbia brood to eliminate crossing LCR returns with LCR returns.
8.2) Males.
Eggs will be fertilized with one primary male and one back-up male. Jacks (2-year-old males) will be randomly collected during broodstock collection in the relative proportion that they occur in the run and incorporated into the mating schemes.

8.3) Fertilization.

During fertilization procedures, we will follow a 1:1 mating protocol with a back-up male. In the event that five or fewer females are available for spawning on any single spawn date, the eggs from each female will be divided into 5 clutches, a different male fertilizing each clutch.

- **Leavenworth NFH, Entiat NFH and Peshastin incubation facility:** Green eggs will be transported to the incubation facility where fertilization will occur. After fertilization, Iodophor egg treatments will include a minimum of one 30-minute contact period prior to putting the eggs in the incubation trays.
    - **Winthrop NFH:** A minimum of six persons is required to carry out spawning operations at the adult holding/spawning facilities. For actual spawning, two fish killers select and kill males and females from pre-sorted fish. One spawner strips eggs from the females into numbered plastic zip-lock bags, one bucker spawns the males into numbered plastic bags, one egg transporter carries coolers containing gametes to the hatchery building, and one person fertilizes and places the eggs in an Iodophor solution (75ppm) in the isolation incubation buckets. Further details on spawning methods can be found in the Winthrop NFH Fish Culture Manual.

  Personnel from the USFWS Olympia Fish Health Center are present at most or all spawning days to collect viral and bacterial samples from the adults. They coordinate with the spawner and the bucker to get the proper amount of ovarian, blood, kidney, and spleen samples. After spawning, they immediately transport their samples back to the lab.

8.4) Cryopreserved gametes.

The program is cryopreserving gametes for a long-term genetics study. In 5-15 years, the project would use the gametes to determine if changes in genetic characteristics, run timing, or other behaviors result in measurable survival benefits.

8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

The mating scheme will not affect listed natural fish, as coho are not listed in these basins.

SECTION 9. INCUBATION AND REARING

At the outset of the feasibility studies, final incubation and rearing of coho to smolts was done only in lower Columbia River hatcheries. The smolts were then trucked to mid-Columbia acclimation sites.

Beginning in 1999, Winthrop NFH began incubation and rearing of eggs and juveniles from adults returning to the mid-Columbia. They have the capacity to rear up to 250,000 smolts per brood year, with two brood years on station at a time. As stated in section 1.5, additional capacity in the region is needed to maximize the potential to meet program goals for broodstock development and smolt quality. In the Wenatchee basin, initial incubation takes place at the LNFH. LNFH does not have space to incubate the program’s entire annual egg requirements; at this time, capacity for coho is limited to approximately 720,000 coho eggs. In 2001, coho eggs in excess of 720,000 were incubated at a temporary facility housed in a fruit warehouse in Peshastin. Beginning in 2002, coho eggs will be incubated at the Entiat NFH and/or at the Peshastin facility, transferred to lower Columbia hatcheries at the eyed egg stage for rearing to pre-smolts, and then returned to mid-Columbia basins for acclimation and release.

Physical characteristics of the rearing environment and fish growth and health in those environments depend on the hatchery. All hatcheries currently involved in this project use appropriate IHOT protocols and standards, including those for health and disease monitoring.

9.1) Incubation:

9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

Provide data for the most recent twelve years (1988-99), or for years dependable data are available.

Table 1 in section 1.11 shows eggs taken and survivals since 1999. Tables 14 and 15 in section 7.4 show egg take goals and survival rates expected for 2002. Goals will be adjusted annually (see section 7.4).

9.1.2) Cause for, and disposition of surplus egg takes.

To date, no surplus eggs have been taken.

9.1.3) Loading densities applied during incubation.

Provide egg size data, standard incubator flows, standard loading per Heath tray (or other incubation density parameters).

See 9.1.4 below.

9.1.4) Incubation conditions.

Describe monitoring methods, temperature regimes, minimum dissolved oxygen criteria (influent/effluent), and silt management procedures (if applicable), and any other parameters monitored.

Incubation procedures at all sites will follow IHOT recommendations for flow rates, loading densities, *Saprolegnia* control treatments, and water quality conditions. Incubation will occur at ground water temperatures; however, egg development will be retarded through the use of chillers in some cases. The purpose of this altered temperature regime will be to more closely match natural emergence times and to concentrate the range of time over which fry begin feeding in the hatchery.
Leavenworth NFH: The coho eggs are reared in an isolation unit (10'x 8'x 6') located inside the nursery building. This unit contains 8 Marisource heath incubator stacks with 16 trays per stack. To prevent silt build up, the top tray of each stack is not used, leaving 15 trays per stack for egg rearing. Each tray measures 15.5" x 12.5" x 2". Well water is provided to the incubator trays at a rate of 4 gallons per minute (gpm), with a temperature range of 45-48° F. Loadings are set at 2.5 females per tray, which is approximately 6,000-7,000 eggs. The maximum loading for the isolation unit is 750,000 eggs. Egg development is monitored using Daily Temperature Units (DTUs). The eggs remain in the Heath trays until they reach the eyed stage at approximately 500 DTUs. The eggs are then removed from the trays and shocked by pouring a basket of eggs from a height of 2 to 3 feet into another basket submerged in water. Twenty-four hours after shocking, the

eggs are picked with a Jensorter model H egg-picking machine. The following day the eggs are transported to another facility by Yakama Nation fishery staff.

Throughout the incubation period, the eggs are chemically treated to prevent fungus problems. Using a Masterflex peristaltic pump, a daily 15-minute dose of 1667 ppm formalin is pumped through ½ inch PVC pipe to the Heath incubators. Each Heath incubator stack has one micro-irrigation emitter, which is used to disperse the formalin treatment. Additionally, the isolation unit is equipped with an alarm system and a flow-through Ultra-Violet (UV) effluent treatment. The alarm detects any deleterious fluctuations in flow and/or temperature, and the UV system treats all effluent water from the isolation unit.

The LNFH staff maintain the incubators, temperature regime, and flow volumes and keep records on temperature units and egg numbers (eye-up).

Peshastin (2001): Groundwater is used for incubation. It has a CaCO3 hardness of 73, a pH of 7.7, and an average temperature of 52º F. Water temperature is monitored with an onset temperature recorder, which measures temperatures hourly. Temperatures are maintained at approximately 41ºF with a water chiller. The water is passed over a tote filled with bio-rings to ensure that adequate levels of dissolved oxygen and total dissolved gas are maintained prior to entering the incubators. Water is treated with activated charcoal and oyster shell prior to use in the incubators. Four gpm of flow is used per deep trough and the maximum green egg capacity per trough is 500,000.

Entiat NFH (2002 and beyond): Incubation facilities and conditions will be similar to those used in Peshastin in 2001.

Winthrop NFH: The eggs remain in the isolation incubation buckets until eye-up, which occurs approximately one month after spawning, or at 450-540 DTUs. After eggs are eyed, they are shocked and then picked by hand. Buckets containing a high mortality are picked with a mechanical egg picker.

After picking, and after receiving the Enzyme Linked Immunosorbent Assay (ELISA) results for each numbered bucket, the eggs are weighed and sampled on an electronic scale. A 200-500 egg sample is taken, to estimate the number per pound. Since coho salmon are quite resistant to bacterial kidney disease (BKD), eggs with differing ELISA values (lows, highs, and moderates) are tracked throughout incubation and rearing, but they are not isolated. After enumeration, the eyed eggs are placed in the Marisource stack-type incubator, using the 15.5" x 12.5" x 2" trays, 7 trays per stack.

Each tray is loaded with 4,000 eggs. Water flow is maintained at 3-5 gpm. Ground water is the primary incubation source and temperature remains quite constant in the range of 48 - 50º F. Dissolved oxygen levels are also constant at about 9.5 ppm inflow and not less than 8 ppm outflow.

Since fungus (i.e. Saprolegnia sp.) has not been a problem in the incubation of salmon and steelhead eggs at Winthrop NFH, formalin treatments are not required during incubation. Hatching begins after approximately 975 DTUs. Yolk sac mortality can be avoided by keeping incubation flows below 5 gpm. Significant yolk sac mortality has been observed in incubation units where flows exceed 6 gpm.

9.1.5) Ponding.

Ponding will occur after a majority have buttoned up (approximately 1375 temperature units). At ponding the coho will be approximately 1,100 fish per pound and 4 centimeters in length. Ponding will occur in February (Joe Blodgett, YN, personal communication).

9.1.6) Fish health maintenance and monitoring.

Regular iodophore treatments are the current method used to control fungus. Label regulations and recommendations are followed at all incubation locations. Eggs are shocked and picked after eyeing.

9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

Because coho are not listed, the primary concern would be disease transfer between coho and listed fish in any of the incubation facilities. There are no listed fish raised at Entiat NFH or Leavenworth NFH. At Winthrop, where spring chinook are raised, coho are kept in separate raceways and water used in coho rearing containers is not used for spring chinook.

9.2) Rearing:

The following information applies to the Winthrop NFH. It is representative of the rearing conditions at Willard, Cascade and additional production facilities that may be used in the future.

9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Experience is limited at this point. Survival rates based on this limited experience are shown in Tables 14 and 15 (section 7.4).

9.2.2) Density and loading criteria (goals and actual levels).

Table 17 shows rearing facilities at Winthrop NFH.

Table 17. Rearing Facilities at Winthrop National Fish Hatchery

Unit Type	Unit Length (ft)	Unit Width (ft)	Unit Depth (ft)	Unit Volume (cu ft)	Number Units	Total Volume (cu ft)	Construction Material
Brood Ponds	80	40	6	19,200	2	38,400	Concrete
Marisource Incubators					42		Fiberglass

Raceways	80	8		1,300	30	39,000	Concrete
Foster Lucas Raceways	76	17		2,200	16	35,200	Concrete
Raceways	102	12		2,200	16	35,200	Concrete
Starter Tanks	16	3		120	34	4,080	Fiberglass
Troughs	16	1.33	1	21	8	168	Concrete

Swim-up fry are expected to be ready to come out of the stacks with full yolk absorption after 1800 DTU. The nursery is presently equipped with 34 fiberglass tanks. Every tank is thoroughly cleaned and then disinfected with approximately 2 ppm Hyamine between year-classes. The tanks have a total capacity of 100 cubic feet; rearing space per tank is approximately 89 cubic feet. The tanks accommodate a flow of approximately 30 gpm. Ideally, 15,000 to 20,000 fry should be started per tank. However, at full production, initial loading of tanks may be closer to 30,000 fish per tank. Initial DI (Density Index) in past years has ranged from 0.05 - 0.41, and the FI (Flow Index) has ranged from 0.28 - 1.22. The target densities are similar to those used in steelhead rearing at this facility. The hatchery tries to keep the DI below .30 during early rearing (fry stage) and below .20 during later rearing (fingerling stage to smolt).
Since fry and fingerlings receive better cleaning and feeding, and treatable diseases are more easily observed in the hatchery building, fingerling spring chinook normally remain in the nursery until they are 200 - 300/lb. Coho salmon fry will also remain in the nursery until that size is reached unless space is not available.

9.2.3) Fish rearing conditions

Pond management strategies (e.g., Density Index and Flow Index) are used to help optimize the quality of the aquatic environment and minimize fish stress which can induce infectious and noninfectious diseases. For example, the Density Index is used to estimate the maximum number of fish (of a given length) that can occupy a rearing unit based on the rearing unit's size. The Flow Index is used to estimate the rearing unit's carrying capacity based on water flows.
The following parameters are currently monitored at Winthrop NFH:

- *Total Suspended Solids (TSS)* — 1 to 2 times per month on composite effluent, maximum effluent and influent samples. Once per month on pollution abatement pond influent and effluent samples.
- *Settleable Solids (SS)* — 1 to 2 times per month on effluent and influent samples. Once per week on pollution abatement influent and effluent samples.
- *In-hatchery Water Temperatures* — maximum and minimum daily.
- *In-hatchery Dissolved Oxygen* — as required by stream flow and weather conditions.

9.2.4) Indicate biweekly or monthly fish growth information (average program performance), including length, weight, and condition factor data collected during rearing, if available.

Table 18. Coho Growth Data (Average 1997-2001), Willard NFH

Month	Length Increase (inches)	Food Conversion	Water Temperature (F)
January	0.074	1.60	40.0
February	0.115	2.89	40.4
March	0.306	1.47	40.9
April	0.323	1.19	41.2
May	0.425	1.00	43.3
June	0.487	0.92	43.4
July	0.508	0.97	44.2
August	0.562	0.95	44.2
September	0.458	0.97	43.6
October	0.228	1.79	43.0
November	0.148	3.55	42.1
December	0.059	4.23	40.7

9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Winthrop NFH: At first feeding we generally start out at around 1.5% - 2% body weight per day until most of the fish are actively feeding. Feeding is spread out over 8 feedings each day. Once growth begins accelerating, feeding percentage is gradually decreased. Ground water in the nursery is quite constant at 47-51° F. At these temperatures we expect 50 Monthly TU/inch or about 0.33 inches per month. Once fish leave the nursery and begin rearing in raceways on river water, growth patterns change depending on temperature fluctuations. The following table illustrates average rates of coho growth in the first spring, and in the first and only fall on-station. The table includes averages from brood years 1999 and 2000.

		Average Growth (inches)	Average TUs/inch
Spring	April	0.489	31.0
	May	0.504	31.2
	June	0.341	64.9
Fall	October	0.364	49.3
	November	0.083	223.7
	December	0.057	339.4

9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Winthrop NFH: Feeds from Moore-Clark are used throughout rearing. Guidelines for matching size of feed with size of fish come from a combination of the manufacturer's recommendations and trial and error, and are as follows:

swim-up - 570/lb	#0 Nutra Starter
570/lb - 300/lb	#1 Nutra Starter
300/lb - 150/lb	#2 Nutra Starter
150/lb - 100/lb	1.2 mm Nutra Fry
150/lb - 90/lb	1.5 mm Clark Fry
100/lb - 50/lb	2.0 mm Clark Fry
50/lb - 20/lb	2.5 mm Clark Fry

9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.

Fish health is monitored by the Winthrop NFH staff. Monthly fish health checks are conducted by Olympia Fish Health Center personnel. All rearing units are cleaned on a regular basis to help prevent environmental fish health problems.
Health monitoring activities that normally take place at Winthrop NFH include the following:

- On at least a monthly basis, both healthy and clinically diseased fish from each fish lot are given a health exam. The sample includes a minimum of 60 fish per lot.
- At spawning, a minimum of 60 ovarian fluids and 60 kidney/spleens are examined for viral pathogens from each species.

- Prior to transfer or release, fish are given a health exam. This exam may be in conjunction with the routine monthly visit. This sample consists of a minimum of 60 fish per lot.
- Whenever abnormal behavior or mortality is observed, the fish health specialist will examine the affected fish, make a diagnosis and recommend the appropriate remedial or preventative measures.
- Reporting and control of specific fish pathogens are conducted in accordance with the Co-Managers Fish Disease Control Policy and the USFWS Fish Health Policy and Implementation Guidelines.

9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

When sampling fish at LNFH and Butcher Creek, we estimate the degree of smoltification by classifying pre-smolts as either parr, transitional, or smolt based on physical appearance. ATPase activity is not measured.

9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

At Winthrop NFH, final rearing occurs in outside raceways and ponds. Coho are moved out to C-bank 12' x 100' raceways at 150-400 fish per pound in April or May. The fish occupy two ponds until marking or a DI of .20 is reached, at which time the groups are split to occupy 5 ponds until release—approximately one year after they are moved outside. Release is volitional and generally starts the third week of April and ends the first week of May. The target release size is currently 20 to 22 fish per pound.
Water source during final rearing is primarily river water. Ground water is usually available if needed to clear up disease problems or regulate growth rates. River water temperatures fluctuate according to air temperatures, but normally stay in favorable ranges throughout summer and winter months.
On years when egg take goals are not met, fish are often transported from lower Columbia River coho hatcheries to make up the number for a final release of 250,000 smolts. Successful transfers have taken place in late winter and early spring to allow an adequate acclimation period.
Release strategies may be modified by YN, but in recent years have been volitional type releases directly out of the rearing units. The large drains of C-bank lead under the hatchery grounds to a bypass channel which leads to the river.
Natural rearing conditions are emphasized during the acclimation/release phase (see section 10). Camouflage netting is used to provide semi-natural cover during most of the outdoor rearing cycle. Covers are not used during mid-winter months due to snow load problems. Also, temperature and feeding are manipulated to help match hatchery smolt sizes and growth regimes to those of natural smolts. Other hatchery rearing technologies that produce a more natural-like smolt will be tested in the future. Options being considered include rearing in locations closer to acclimation sites, rearing in natural–style ponds, rearing at low densities, extending the acclimation period to include the second winter prior to smolting, and more culture adjustments to include very rapid growth just prior to release.

9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

No listed fish are propagated in this program.

SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

10.1) Proposed fish release levels.

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Yearling	751,500	19.2 (yr 2000)*	Volitional release, Apr 15 – May 30	Icicle Creek
Yearling	248,500	19.5 (yr 2000, at time of transport to site)*	Volitional release, Apr 15 – May 30	Nason Creek
Yearling	250,000	17.0 (yr 2000)*	Volitional release, Apr 25 – May 15	Methow River

* Source: K. Murdoch 2001

10.2) Specific location(s) of proposed release(s).

The following lists potential or approved release sites as of spring 2002. Others might be added in future years, depending on NEPA, ESA, TWG, and other reviews.

Stream, river, or watercourse: Nason Creek

Release point: Butcher Creek acclimation site, RM 8.2

Major watershed: Wenatchee River

Basin or Region: Mid-Columbia

Stream, river, or watercourse: Nason Creek

Release point: Early Pond acclimation site, RM 8.5

Major watershed: Wenatchee River

Basin or Region: Mid-Columbia

Stream, river, or watercourse: Nason Creek

Release point:	Whitepine acclimation site, RM 11.2
Major watershed:	Wenatchee River
Basin or Region:	Mid-Columbia

Stream, river, or watercourse: Beaver Creek

Release point: Beaver Creek acclimation site, RM 0.5

Major watershed: Wenatchee River

Basin or Region: Mid-Columbia

Stream, river, or watercourse: Icicle Creek

Release point: Leavenworth NFH, Dam 5, RM 2.8

Major watershed: Wenatchee River

Basin or Region: Mid-Columbia

Stream, river, or watercourse: Little Wenatchee R.

Release point: Two Rivers, RM 0.5

Major watershed: Wenatchee River

Basin or Region: Mid-Columbia

Stream, river, or watercourse: Wenatchee R.

Release point: Brender, RM 2

Major watershed: Wenatchee River

Basin or Region: Mid-Columbia

Stream, river, or watercourse: Chumstick Creek

Release point: Uncertain [possible direct stream release]

Major watershed: Wenatchee River

Basin or Region: Mid-Columbia

Stream, river, or watercourse: Methow River

Release point: Winthrop NFH, RM 50.4

Major watershed: Methow River

Basin or Region: Mid-Columbia

10.3) Actual numbers and sizes of fish released by age class through the program.

Leavenworth NFH

Release year	Yearling	Avg size
1996	N/A	
1997	N/A	
1998	N/A	
1999	450,000	
2000	891,845	19.2
2001	855,167	19.5
Average	732,337	

Nason Creek

Release year	Yearling	Avg size
1996	N/A	
1997	N/A	
1998	N/A	
1999	50,000	
2000	76,893	19.5
2001	142,291	19.5
Average	89,728	

Methow River

Release year	Yearling	Avg size
1996	335,300	
1997	74,200	
1998	341,146	
1999	0.00	
2000	199,763	17.0
2001	260,319	19.0
Average	201,788	

Source: K. Murdoch, 2001.

10.4) Actual dates of release and description of release protocols.

Table 1 (section 1.11) shows release numbers from each release site in the Wenatchee and Methow basins. All fish were volitionally released as smolts. Release dates in the Methow ranged from April 25 – May 15; release dates in the Wenatchee ranged from April 15 – May 30. In the Wenatchee, snorkel surveys confirmed that all fish had left acclimation sites. The date volitional release begins is determined by observing the migratory behavior of the smolts.
The program ideal is to have sufficient numbers of progeny of local returns to allow progeny of returns to the Methow released in the Methow, and progeny of Wenatchee returns released in the Wenatchee. We have not yet reached that ideal. In the interim, because our data show that smolt-adult survivals are much higher for Wenatchee releases than Methow releases, we propose the following release guidelines, as the way to make the best possible use of the fish that have survived to the mid-Columbia:

1) Progeny of Wenatchee returns are released in the Wenatchee.
2) If there are insufficient smolts from Wenatchee returns to meet the 1 million release number in the Wenatchee, they will be supplemented with progeny of Methow returns. This could leave the Methow with a shortfall, so Methow releases would be supplemented, as necessary, with lower Columbia River stocks.
3) If there are still insufficient numbers to meet the 1 million release numbers in the Wenatchee, even with Methow progeny, they will be supplemented with lower Columbia River juveniles, in which case all releases in the Methow would be lower Columbia River stocks.
4) If there is extra production of Wenatchee progeny and a shortfall in the Methow, the extra Wenatchee fish could be used to make up the shortfall in the Methow.

10.5) Fish transportation procedures, if applicable.

Coho smolts are typically hauled by ODFW from lower Columbia River hatcheries to various acclimation ponds in mid-Columbia basins. Fish are transported in 1,500-5,000 gallon (6,000-19,000 liter) transport tanker trucks. These units are insulated and typically maintain sub-50ºF (<10ºC) hauling temperatures and strive for no more than a 10ºF (6ºC) (<5ºF preferred) variation between tank temperature and release site temperature. Transport tanks are equipped with oxygen injection and water circulation systems. Dissolved oxygen levels are maintained at 9-15 ppm. Oxygen and temperature levels are monitored during transports. Hauling densities are targeted at or below 1 pound of fish per gallon of water. Length of transport ranges from 6 to 8 hours.

10.6) Acclimation procedures (*methods applied and length of time*).

To condition them to the wild, coho smolts are acclimated away from the hatchery whenever possible in a semi-natural rearing environment. These sites use surface water supplies that expose fish to cold water early in the acclimation period and a rising temperature as the release time approaches. Ponds usually have earth and rock bottoms, and surrounding natural vegetation provides some cover. A low level of predation by fish, birds, and mammals will be allowed. Juvenile coho are typically acclimated for 4-6 weeks prior to liberation, but depending on experimental objectives, could be acclimated from 2 weeks to 6 months. During that period, fish culturists periodically feed the pre-smolts a predetermined amount of fish food. This amount is calculated based on number and size of fish, and on water temperature. Typical fish culture activities include net and screen maintenance; pond cleaning (if applicable); predator control using such methods as nets, non-lethal live traps, propane and other noise emitters; mortality assessments; and growth and fish health measurements.

10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

In 2000, 26,394 of the 925,000 coho released from Icicle Creek were coded wire tagged and adipose-fin-clipped; 26,118 were coded wire tagged with no external mark. No Butcher Creek fish were marked or tagged. Of the 200,000 coho smolts released from Winthrop in 2000, 26,470 were coded wire tagged and fin-clipped. By 2002, 100% of the hatchery population will be internally marked with a coded wire tag. The current marking protocol is outlined in Table 19 (section 11.1.1). Fish marked with CWT are not adipose clipped in order to limit their harvest in selective fisheries that target adipose-clipped coho (see section 3.3). Since the program's emphasis during the feasibility studies is development of a localized coho broodstock, the program will attempt to maximize the number of adults collected, thereby allowing the project to estimate relative survival between mark groups by evaluating tags recovered from fish collected for broodstock. We expect natural coho production to be relatively low since we will attempt to collect a large proportion of the return. However, we will attempt to estimate the number of naturally produced fish by estimating the relative proportion of unmarked juvenile and adult fish, thereby providing a means to estimate the smolt-to-adult rates for both hatchery and naturally produced coho.

10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.

Not applicable. The program has no surpluses at this time.

10.9) Fish health certification procedures applied pre-release.

Fish health experts check the condition of fish prior to removal from the hatcheries (described in 9.2.7). Health checks are not performed at the acclimation sites unless obvious signs of disease are present.

10.10) Emergency release procedures in response to flooding or water system failure.

In the event of flooding, coho would be released early from acclimation ponds. Sites are designed to allow safe fish migration during floods. High-water exit paths are included near stream channels so that if ponds are overtopped during floods, fish can leave volitionally. Premature releases might reduce coho survival if they were not ready to migrate, but high water likely would move them rapidly downstream in turbid water, providing little opportunity for them to prey on other species or to be preyed upon themselves.

In the past, Winthrop NFH's water system has occasionally frozen in winter, requiring release of fish. The hatchery plans to install a new infiltration gallery, reducing the likelihood that coho would be released prematurely; however, unforeseen disasters such as freezing or pump failures could still result in emergency releases of fish (C. Pasley, personal communication, July 2002).

10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

Most resident trout and steelhead are not considered to be at risk because these species generally emerge from the gravel after coho have migrated downstream, or spawn in upper reaches of tributaries (i.e., bull trout).
Studies in these basins have shown little evidence of hatchery coho predation on spring chinook, possibly because coho smolts migrate rapidly once they are released. However, because of the nature of the project, biologists need to deliberately create some risk to listed or sensitive fish in order to test the degree to which coho predation on other species might occur if coho are reintroduced. These risks are minimized by implementing the following measures as appropriate:

- working with other fish managers to determine release sites and numbers that minimize risk but that also meet research objectives;
- releasing coho smolts in low densities;
- attempting to release fish that more closely resemble sizes of wild coho, which tend to be smaller than hatchery fish[22] (our target size of 20-25 fpp equates to 110 – 120 mm).
- ensuring smolts are ready to migrate before releasing them volitionally; and

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[22] Throughout the geographic range of coho salmon, length at smoltification is relatively consistent. Groot and Margolis (1991) reported that mean smolt size in yearling smolts ranged from 75 (Andersen and Narver 1975) to 122 mm fork length (McHenry 1981), and smolt size in Minter Creek, Washington ranged from 95-106 mm (Salo and Bayliff 1958).

- monitoring predation and adapting feasibility studies and activities as necessary to minimize risks.

SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

The studies listed below would be conducted in the Wenatchee, Methow and Yakima basins. Currently, direct predation studies are proposed only in the Wenatchee basin, although studies likely would be needed in the future in other basins.

Funding for this feasibility project is being provided by Bonneville Power Administration. The research is being implemented by the Yakama Nation, with assistance from other project participants.

11.1.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program (section 1.10).

Performance Indicator: Trends in survival of hatchery coho as measured by smolt-to-smolt (PIT tags) and smolt-to-adult (counts at dams/facilities) survival.

The smolt-to-smolt and smolt-to-adult survival rates for hatchery coho released in the Wenatchee and Methow basins would be studied in three ways.

- To estimate smolt-to-smolt survival to McNary Dam and other lower Columbia River mainstem projects, a portion of each release group (at least 8,000 fish annually in the Wenatchee, 8,000 every third year in the Methow) would be PIT-tagged (see "Marking" below).
- Smolt-to-adult survival would be monitored for the Wenatchee basin based on Rock Island minus Rocky Reach and/or Dryden Dam adult fish passage counts and redd counts. They would be based on Wells Dam counts for the Methow basin.
- Coded wire tags would be collected from all coho retained for broodstock and from carcasses collected during spawning ground surveys to allow for a comparison in smolt-adult survival rates between acclimation sites and local vs. lower river stocks.

Marking

The marking protocol to estimate the smolt-to-adult survival rate for coho juveniles released in the Wenatchee system is outlined in Table 19. Three internal-mark groups will be identified: lower Columbia River transfers, Wenatchee progeny and Methow returning progeny. Each mark group will receive a differential CWT code. All CWT marks will be snout tags and potentially alternate body tag locations (for example dorsal, anterior fins, cheek, etc.). Adipose fin clips will not accompany CWT marks. In 2001-2002, an unmarked group (Lower River returns) will be identified by subtraction (total returns collected minus marked returns). Beginning in 2002, all three mark groups of juvenile coho released in the Wenatchee will be marked with CWT. If it is determined that selective mating of in-basin vs. Lower River progeny will occur, then body tag locations will be added in order to non-lethally differentiate mark groups. All marks will be retrieved from spawned broodstock and spawning ground carcasses in order to estimate survival by group.

The project will use PIT-tagged juveniles in order to parse out that portion of the smolt-to-adult mortality that is occurring in the freshwater migrant lifestage. Mark groups identified are lower Columbia River transfers, Wenatchee progeny and Methow returning progeny. PIT-tagged juvenile coho were released in the Methow in 2000 and 2001 (Table 20). This will give us two consecutive years of juvenile survival from the Methow for Lower River smolts. PIT tag releases from that point will occur approximately every third year (Table 20), unless mainstem passage conditions change, or other conditions occur to make us suspect survival rates may have changed.

PIT-tagged juveniles will be released in the Wenatchee River every year until at least 2005 (Table 21). The project PIT tagged and released 8,000 fish in 2000 and 2001 in order to establish a baseline juvenile survival rate for Lower River coho smolts. In 2002, the project released 8,000 coho juveniles from the Leavenworth Dam 5 site, in addition to 8,000 Wenatchee progeny from the natural production areas, in order to assess differences in juvenile survival between the two groups. During the period 2004-2005, the project will release 8,000 PIT-tagged Wenatchee progeny in the natural production areas to monitor changes in juvenile survival potentially related to the local adaptation process.

Marking Protocol for the Mid-Columbia Coho Releases

Table 19. CWT Marking Scheme* for Mid-Columbia Coho Smolt Releases

	Lower River Transfers Methow	Lower River Transfers Wenatchee	Wenatchee Progeny	Methow Progeny
2001	100% (250,000)	0% (826,600 **not** marked)	N/A	100% (146,875)
2002	100% (250,000)	100% (678,524)	N/A	N/A
2003	100% (if used)	100% (if used)	100%**	100%)**
2004	100% (if used)	100% (if used)	100%**	100%**
2005	100% (if used)	100% (if used)	100%**	100**

*   Marks will be differential CWT (snout and potentially cheek) with no adipose fin clip.

** Actual numbers will depend on numbers produced, which is unpredictable at this time.

Table 20. PIT Tag Releases of Juvenile Coho from the Methow Basin

Release Year	Lower River Transfers
2000	8000
2001	8000
2002	0
2003	0
2004	8000*
2005	0

*Numbers depend on funding.

Table 21. PIT Tag Releases of Juvenile Coho from the Wenatchee Basin

Release Year	Lower River Transfers	Wenatchee Progeny	Methow Progeny
2000	8000	N/A	N/A
2001	8000	N/A	0
2002	8000	17,000*	0
2003	0**	24,000*	0
2004	0**	24,000*	0
2005	0**	24,000*	0

* Numbers depend on funding.

**A sample will be PIT tagged, if Lower River fish are used.

Performance Indicator: Spatial distribution of returning adults in potential natural spawning areas as identified from radio telemetry and foot/boat redd surveys.

Foot/boat redd surveys are conducted in the Wenatchee basin in several areas where adult coho are expected to spawn naturally (Nason Creek, Icicle Creek, and in the Little Wenatchee and Wenatchee rivers. In some of the smaller streams (Chumstick, Beaver, Brender), we might rely on weirs or traps to determine how many fish are returning to these streams. The Methow River is also surveyed.

Beginning in 2001 and continuing in 2002, the Yakama Nation is conducting a radio-telemetry evaluation to estimate the proportion of coho returning to the Wenatchee River that spawn in Beaver and Nason Creeks. Up to 75 adult coho randomly collected at the Tumwater Dam fish trap are anesthetized, gastrically tagged and released upstream of the dam. Fixed monitoring stations near the mouths of Nason and Beaver creeks determine how many of the tagged fish spawned in each creek. Mobile tracking determines the spawning locations of the tagged fish. Data are corroborated with spawning ground surveys. Video counts are used to estimate the total number of fish spawning above Tumwater Dam (Beaver Creek and Nason Creek). In 2004, the study will include adults spawning in the Little Wenatchee River.

The Yakama Nation conducts weekly spawning ground surveys in Nason Creek and bi-weekly surveys in Icicle Creek to identify the location and distribution of coho redds. Surveys began in fall 2001 and are conducted between about October 15th and December 15th. Surveys may extend beyond December 15th if spawning is not complete and river and weather conditions permit.

In Nason Creek, researchers attempt to count all coho redds. The surveys extend from Whitepine Creek (RM 15.4) to the mouth of Nason Creek (RM 0). The entire length of Icicle Creek below the hatchery (2.8 miles) is also surveyed. Elsewhere, surveys are conducted initially in stream reaches close to the smolt release sites, and branch out from these release sites if redds are not located; or researchers use radio telemetry results to guide them to likely spawning locations. Staffing and funding do not allow the entire basin to be searched for every coho redd.

Each redd identified is marked with a piece of surveyors tape. Locations of each redd are identified and mapped with a portable GPS unit. We also collect spawned coho carcasses during the surveys. From each coho carcass found, fork length and post-orbital hypural length are measured to the nearest millimeter. The sex is identified. The percentage of eggs remaining in each female coho carcass is visually estimated.

Physical data are recorded from a random sample of redds in each sub-basin.

Performance Indicator: Reproductive success (initial evaluations only) of naturally reproducing coho using redd counts, redd capping, and smolt production estimates.

Redd count methods are described in the previous section. The smolt production estimate comes from the Monitor smolt trap, operated by WDFW. Redd capping (placing a fine mesh net over the redd and capturing emerging fry in the cod end) is also done in selected areas.

Performance Indicator: Changes made by out-of-basin stock, using genetic monitoring of neutral allelic frequencies; and recording of such traits as fecundity, body morphometry, maturation timing, and straying/homing rates.

The genetics sampling and adaptation program would study:

- the naturalization of a hatchery fish stock (Lower Columbia River stock);
- allelic frequencies to determine the amount and rate of divergence of the mid-Columbia broodstock from the Lower River stock;

- physical traits and demographic information for introduced coho juveniles and adults and the contribution of those traits and other characteristics to survival.

The main goal driving the genetic and adaptation monitoring and evaluation is to determine the best implementation strategies that result in enhancing the natural production of coho salmon in mid-Columbia rivers. The genetic and adaptation M&E plan focuses on three major categories: 1) are there changes in the frequencies of neutral alleles in the population over time as the program and broodstock develop; 2) is there phenotypic divergence of localized coho and Lower River hatchery coho; and 3) are the introduced fish successful at producing progeny?

The following subsections describe the specific program for each of the genetic and adaptation monitoring studies listed above.

- *Assess changes in out-of-basin stock using genetic monitoring of allelic frequencies.*

  The main opportunity of the genetics M&E program is to determine the rate and direction of divergence in neutral allele frequencies of the coho stocks that are used for reintroduction in mid-Columbia rivers.

  A sound understanding of the genetic structure of the species of interest is a prerequisite to the assessment of the genetic impacts of human activities such as introductions, transfers or stock enhancement on natural populations. A measure to assess the impact of human activities on natural populations is the degree to which the population structure responds to applied management actions. This can be done by measuring the frequencies of alleles at specific loci through time and in a series of populations (Allendorf and Phelps 1981; Utter 1991; Allendorf 1995). Such a database permits the determination of temporal (and mostly stochastic) and geographic (degree of isolation) variance components. A series of samples will be taken of naturalized coho spawning in the wild (Naches and Upper Yakima Rivers), as well as from the Yakima, Wenatchee, and Methow hatchery broodstocks. An additional number of samples will be used to scale the level of variability within and beyond the Columbia River populations (Umatilla, Clearwater, Klickitat, Lower Columbia, and the Thompson River on the Fraser River system). Microsatellite DNA techniques will be the primary tool. Protein electrophoresis and mtDNA may also be used.

- *Monitor traits such fecundity, body morphometry, and maturation timing.*

  Because conditions in the mid-Columbia and Yakima are likely to be different than in the coastal streams and lower Columbia where the coho originate, life history characteristics of the introduced broodstock are likely to change. For one, the migration distance is very much greater into the mid-Columbia than, for example, to Eagle Creek. Optimal maturation rates and timing are likely to be different between these two areas. In order to determine if the stock used has adequate genetic variance and phenotypic plasticity to adapt to local conditions, the life history characteristics of the coho broodstock must be monitored over the length of the program.

  An important link to environmental condition is the water temperature profiles in the streams or hatchery setting. The coho stock will be exposed to a water temperature profile that may deviate from the ancestral stream. Although this does not represent a particular problem for controlled conditions (there is generally very little variation in development rate of the eggs, and the genetic variance is additive), it is necessary to determine if the broodstock used has sufficient variance in maturation schedules to match local conditions. A longer-term goal is to select the broodstock from successful wild-spawning fish, thereby enabling the broodstock to progress towards local maturation optima.

For this plan, we will monitor fitness-related phenotypic traits such as fecundity, body morphometry, and maturation timing.

- *Gene flow from program fish into natural populations.*

Monitoring done on mid-Columbia coho will contribute to answering broader questions about the rate of genetic drift when a broodstock is established in a subbasin. A regional sampling effort will collect samples of coho from all reintroduced populations (programs with the intent of establishing wild-spawning, self-recruiting populations) above Bonneville Dam. These samples will be used to extract alleles at a number of nuclear DNA loci. These will be used to estimate parameters of gene flow, diversity, and genetic differentiation.

- *Quantify stray rates and homing to acclimation sites.*

As shown in Table 1b, 1,773 adult coho returned to the Wenatchee basin in 2001. The Fish Passage Center indicates that 10,465 and 1,628 adult coho were counted at Rock Island and Rocky Reach dams, for a difference of 8,837 adults (M. Cooper, USFWS letter, July 1, 2002). Such results raise questions of what happens to the coho between these dams and the smolt release sites to which they would be expected to return.

1) The project will investigate straying and drop-out rates of transferred hatchery coho within the mid-Columbia basin. A sample size of up to 400 adult coho returning to mid-Columbia tributaries will be radio-tagged at Priest Rapid Dam. A combination of fixed sites and mobile tracking will be used to identify spawning areas, drop-out rates, and stray rates. We will also recover CWTs from all carcasses during spawning surveys in order to recover release group information. We will also coordinate with other fisheries agencies within the basin to aid in the recovery of marks to evaluate homing/stray rates.

2) The project also will investigate the rates at which transferred hatchery coho stray back to their natal hatcheries. All fish collected for broodstock at the lower Columbia River hatcheries are examined for the presence of a CWT regardless of the presence or absence of an adipose fin. Spawning surveys conducted by state and federal agencies in the vicinity of lower Columbia River hatcheries also check carcasses for the presence of CWT regardless of the presence of an adipose fin, and enter data into existing regional databases.

Performance Indicator: Predation on other species by program fish as measured by stomach content analyses.

Currently, studies of predation by hatchery coho on sensitive species are planned only for the Wenatchee River basin. Predation studies would not be done in the Methow basin primarily because the opportunities don't exist to study predation on the species of concern—spring chinook, sockeye, and steelhead. All returning spring chinook adults in the Methow are collected and taken to the hatchery to be spawned under an adult-based supplementation program. Studies of hatchery coho predation on steelhead are not planned because steelhead emerge after yearling coho have migrated.

A rotary trap would be placed near two coho acclimation/release sites in the Wenatchee basin to monitor the level of predation on spring chinook and sockeye fry by coho smolts.

The stomach contents of up to 3,000 coho would be examined for each of two studies (one of coho predation on spring chinook, the other of coho predation on sockeye) (6,000 fish total).

- *Predation on spring chinook*

Methods are detailed in Mid-Columbia Coho Reintroduction Feasibility Study 2002/2003 F2 Study Plans (prepared by Keely Murdoch, YN):

Hatchery coho smolts released from acclimation sites on Nason Creek and naturally reared coho smolts scatter planted in Nason Creek approximately 9 months prior to the predation evaluation will be recaptured in a 5-foot rotary screw trap located at RK 1.3 on Nason Creek (Nason creek Campground). The trap will be operated between March 15 and June 15. The naturally reared coho will be marked with an adipose fin clip for quick identification.

The rotary smolt trap will be checked and the live box emptied hourly during the study. The frequent removal of coho from the trap is important in minimizing predation on chinook fry within the live box. Up to 1500 hatchery coho smolts and 1500 naturally reared coho smolts will be collected from throughout the run and retained for stomach content analysis, which will use methods similar to those used in previous years and documented in the 2001 annual report for the project (Murdoch and LaRue 2002).

- *Predation on sockeye*

A brief literature review of the life history of sockeye salmon indicates that they vary substantially in age at out-migration, in growth, and in rearing habitats throughout their geographic range (Groot and Margolis 1991). Such variation makes species-wide generalization difficult. Before attempting a study of coho predation on sockeye, life history information specific to Lake Wenatchee must be collected, in order to determine periods and locations that sockeye salmon in Lake Wenatchee are most susceptible to hatchery coho smolt predation. Sockeye life history collection began in 2001, with limited results; methods will be modified in 2002 as described below.

The YN used radio telemetry to estimate hatchery coho smolt spatial distribution within and travel time through Lake Wenatchee. Due to the short tag life of smolt-sized radio-transmitters (10 days), the data we gathered were limited—many of the tags died before the smolts left the lake. Of the fish we were able to track through the lake, mean travel time was 6.85 days. Telemetry technology is changing rapidly. During the 2002 spring emigration, a smolt-sized radio tag will be available with a tag life of approximately one month. This will allow a more complete data set to be collected.

We used snorkel surveys and beach seining to locate sockeye fry within the littoral zone of Lake Wenatchee. The first fry were observed on May 11 and were observed in the littoral zone from this point through the end of the study. Tow nets were used to capture sockeye fry in the limnetic areas of the lake. Only two fry were captured in the limnetic zone, both on May 16th. The size of the tow net may have been limiting. A larger tow net will be used in 2002 to more accurately assess the locations and distribution of sockeye fry during late April and May.

At the end of the data gathering period (2002), we will assess the information and determine potential risk to sockeye from coho predation and also the potential for monitoring success. If it is considered feasible to continue the study and coho are released upstream of the lake, YN would monitor the impact through a predation study similar to those done for spring chinook, possibly using a WDFW rotary trap at the Lake Wenatchee outfall, or beach seining or trawling in Lake Wenatchee.

Performance Indicator: Superimposition of spring chinook redds by spawning coho as measured by superimposition studies.

Due to concerns regarding the number of adult coho spawners returning to Nason Creek in 2001 and 2002, and possible superimposition effects on incubating spring chinook salmon eggs by later spawning coho salmon, the YN is monitoring the locations of spring chinook redds, identified by CPUD, and coho salmon spawning locations to gauge the potential for redd superimposition and associated adverse effects.

In 2001 we measured the exact locations of up to 50 spring chinook redds in each of two study reaches (100 total) in Nason Creek (Table 22). Each study redd was measured by triangulating from the upstream and downstream ends of the redd tailspill with two fixed points on the bank. The width of each study redd was measured at its widest point.

These measurements enabled us to accurately determine superimposition by spawning coho salmon on spring chinook redds. Each redd was relocated during coho spawning ground surveys and the percent of superimposition was visually estimated (0 through 100%).

During the 2001 coho spawning ground surveys, three coho redds were identified in Nason Creek. None was found to superimpose on spring chinook redds.

The studies will be continued in future years.

Table 22. Redd Superimposition Study Reaches

Reach	**Location**	**River Mile**	**Length**	**% of 2000 chinook spawning**
Butcher Creek	Butcher Creek Pond to Butcher Creek Rd. Bridge	8.3 to 7.1	1.2 RM	14%
Lower Nason	Fishing Pond to Campground	3.4 to 0.8	2.6 RM	16%

Performance Indicator: Competition for food and habitat during freshwater rearing of naturally produced coho juveniles as measured through micro-habitat use and growth evaluations.

To begin to evaluate the potential for naturally produced coho salmon to negatively affect steelhead or spring chinook salmon through competition for space and food, we will assess the distribution, habitat use, growth and abundance of juvenile steelhead and spring chinook in the presence and absence of coho. Potential micro–habitat overlap between sub-yearling coho, spring chinook, and steelhead will be evaluated every two weeks between July 1st and

September 15th, beginning in 2002. For the analysis, Nason Creek will be divided into 4 study reaches. Two reaches will be located upstream of the Butcher Creek acclimation site, and two will be located downstream of the site. This division of reaches was selected because the distribution of spring chinook redds identified during spawning ground surveys in 2000 indicated that 52% of the chinook spawned between the Butcher Creek acclimation site and Whitepine Creek, while 48% spawned downstream from the Butcher Creek acclimation site (Mosey and Murphy 2000). Within the four reaches we will snorkel a stratified random sample of habitat to collect information regarding microhabitat use and distribution of chinook, steelhead and coho.

Due to the low number of coho redds in Nason Creek in 2001, hatchery coho parr from mid-Columbia broodstock will be scatter planted into two of four study reaches in 2002 (treatment reaches). The four study reaches are listed in Table 1. While the scatter-planted coho salmon are not naturally produced, we propose to use them as a surrogate, providing information regarding possible interactions between juvenile coho and species of concern. Prior to scatter planting sub-yearling coho, the current, or baseline, distribution of 0+ spring chinook and steelhead will be evaluated, using the four reaches shown in Table 23. Each reach will be divided into 500 meter sections. We will randomly select 100 meters from each 500-meter section for distribution analysis through underwater observation (20% sample rate). Underwater snorkeling techniques will be conducted as described by Thurow (1994). All salmonids will be enumerated by species and size class. Macrohabitat (pool, riffle, or glide) will be noted and measured. Fish densities and distribution will be reported.

Table 23. Nason Creek Study Reaches

Reach Number	Location	Coho Scatter Plants	River Kilometer
1	Mouth to Kahler Creek Bridge	Yes	0.0 to 6.3
2	Kahler Creek Bridge to Butcher Creek	Yes	6.3 to 13.3
3	Butcher Creek to Merritt Bridge	No	13.3 to 17.9
4	Merritt Bridge to Whitepine Creek	No	17.9 to 24.8

Prior to scatter planting, baseline collections of fish for growth and condition factor information will be collected. Fish growth and condition factor sampling will be repeated once a month for two months.

Within each reach we will collect a sample of up to 25 sub-yearling chinook, steelhead, and coho using a back-pack electrofisher. After collection fish will be anesthetized, measured (fork length in mm), and weighed. Condition factors will be calculated for each fish

examined. Micro-habitat variable, abundance and condition factors of spring chinook and steelhead collected in allopatry and sympatry with coho will be compared using analysis of variance.
Comparisons in the change in growth will be made between chinook and steelhead parr in reaches 1 and 2 (sympatric with planted coho [treatment]) with the change in growth and condition factors for chinook and steelhead located in reaches 3 and 4 (allopatric with planted coho [control]).

Performance Indicator: Other potential ecological interactions as indicated by residualism surveys or F2 evaluations.

- *Residualism surveys*

Snorkeling surveys following a stratified random sampling design were done near acclimation/release sites to determine whether and how many coho do not migrate downstream after release. Few residual coho have been found (see section 3.5.3) and no further studies are proposed.

- *Other F2 evaluations*

Additional studies of interactions between naturally produced coho and other fish species—particularly listed fish—are anticipated when and if there are sufficient numbers of coho to allow a meaningful study to be conducted. Methods will be developed in consultation with the TWG.

11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

Project budgets have been approved by NPPC and BPA through 2005.

11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Some risk to sensitive species needs to be imposed in order to study the potential for long-term risk from coho reintroduction. Sections 3.5.3 and 10.11 list mitigation measures that would minimize the risk to listed species from coho releases.

During all monitoring and evaluation activities, any listed fish incidentally caught or handled will be released immediately to the location from which it was caught. During the operation of a rotary smolt trap, risk to listed fish can be minimized by frequent checking and emptying of the trap's live box. Experience has shown little or no mortality from broodstock collection procedures, as listed fish not subject to collection themselves are released upstream immediately. Risk of mortality from electro-shocking is reduced by using properly trained personnel and following NMFS guidelines for electro-shocking (NMFS 1998(a)) and additional guidance in Fredenberg 1992.

SECTION 12. RESEARCH

Because the Mid-Columbia Coho Reintroduction Feasibility Project is by definition a research project, there are no additional studies or descriptions to add to this section beyond what is covered in section 11.

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SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by______________________________ Date:_____________

APPENDIX A: TAKE TABLES

Listed species affected: Spring Chinook______________ **ESU/Population:**__UCR__________________________________ **Activity:**__Smolt Trapping____________________				
Location of hatchery activity: Nason Creek____________ **Dates of activity:**_3/15 – 6/15____________ **Hatchery program operator:**__________________				
	Annual Take of Listed Fish By Life Stage (*Number of Fish*)			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	500	1000		
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)	10	20		
Other Take (specify) h)				

Listed species affected: __Steelhead________________ **ESU/Population:** UCR_________________________________
Activity:_Smolt Trapping____________________

Location of hatchery activity:_Nason Creek_________ **Dates of activity:** 3/15 – 6/15_________________**Hatchery program operator:**_________________

Type of Take	Annual Take of Listed Fish By Life Stage *(**Number of Fish**)*			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		500		
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		10		
Other Take (specify) h)				

Listed species affected: __Bull Trout ________________ **ESU/Population:** UCR___________________________________ **Activity:**__Smolt Trapping___________________				
Location of hatchery activity: Nason Creek___________ **Dates of activity:** 3/15 –6/15________________ **Hatchery program operator:**__________________				
	Annual Take of Listed Fish By Life Stage *(Number of Fish)*			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		25		
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		1		
Other Take (specify) h)				

Listed species affected: _Spring Chinook ___________ **ESU/Population**:___UCR________________________________
Activity:__Electrofishing___________________

Location of hatchery activity:___Nason Creek____________________ **Dates of activity:**___7/1-9/30__________________
Hatchery program operator:_________________

	Annual Take of Listed Fish By Life Stage (*Number of Fish*)			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		150		
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		15		
Other Take (specify) h)				

Listed species affected: __Steelhead__________________ **ESU/Population:** UCR__________________________________ **Activity:**_Electro-fishing____________________				
Location of hatchery activity:___Nason Creek________ **Dates of activity:**__7/1-9/30___________________ **Hatchery program operator:**__________________				
	Annual Take of Listed Fish By Life Stage ***(Number of Fish)***			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		150		
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		15		
Other Take (specify) h)				

Listed species affected: __Bull Trout_________________ **ESU/Population:** UCR___________________________________
Activity:_Electro-fishing_____________________

Location of hatchery activity:__Nason Creek__________ **Dates of activity:**_7/1-9/30_____________________**Hatchery program operator:**__________________

Type of Take	Annual Take of Listed Fish By Life Stage (***Number of Fish***)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)		10	3	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)		10	3	
Other Take (specify) h)				

Listed species affected: Steelhead____________________ **ESU/Population**:___UCR________________________________
Activity:___Broodstock Collection_________________

Location of hatchery activity:_Dryden Dam__________ **Dates of activity**:__9/1-12/7_____________ **Hatchery program operator:**_________________

Type of Take	**Annual Take of Listed Fish By Life Stage *(Number of Fish)*** Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			30	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: Bull Trout___________________ **ESU/Population**:___UCR______________________________ **Activity:**___Broodstock Collection_________________					
Location of hatchery activity:_Dryden Dam__________ **Dates of activity:**_9/1-12/7__________________**Hatchery program operator:**_________________					
	Annual Take of Listed Fish By Life Stage *(**Number of Fish**)*				
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass	
Observe or harass a)					
Collect for transport b)					
Capture, handle, and release c)			2		
Capture, handle, tag/mark/tissue sample, and release d)					
Removal (e.g. broodstock) e)					
Intentional lethal take f)					
Unintentional lethal take g)					
Other Take (specify) h)					

Listed species affected: _Steelhead___________________ **ESU/Population**: UCR___________________________________
Activity:_Trapping – Radio-telemetry and/or broodstock collection____________________

Location of hatchery activity:___Tumwater Dam______ **Dates of activity:** 9/1/-12/7_____________________ **Hatchery program operator:**_________________

Type of Take	Annual Take of Listed Fish By Life Stage (***Number of Fish***)			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			30	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: Bull Trout____________________ **ESU/Population**:_UCR__________________________________
Activity: Trapping – Radio-telemetry and/or broodstock collection_____________________

Location of hatchery activity:_Tumwater Dam__________ **Dates of activity:**___9/15-12/7_____________ **Hatchery program operator:**__________________

Type of Take	**Annual Take of Listed Fish By Life Stage (*Number of Fish*)**			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			2	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: Steelhead___________________ **ESU/Population**:___UCR______________________________
Activity: Trapping-Radio-telemetry_________________

Location of hatchery activity:_Priest Rapids Dam________ **Dates of activity**:_9/15-12/7___________________ **Hatchery program operator:**_________________

Type of Take	**Annual Take of Listed Fish By Life Stage (*Number of Fish*)**			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)			50	
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: __ Bull Trout**_________________ ESU/Population**:___UCR**______________________________** **Activity**:___Tow-net sampling**________________**				
Location of hatchery activity:_ Lake Wenatchee**___ Dates of activity:____________________ Hatchery program operator:_________________**				
	Annual Take of Listed Fish By Life Stage *(Number of Fish)*			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)				
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: Spring Chinook_____________ **ESU/Population:**__UCR________________________________ **Activity:**__Weir Operation_________________				
Location of hatchery activity: Beaver Creek___________ **Dates of activity:**_3/15 – 6/1; 9/1 – 12/15___________ **Hatchery program operator:**_________________				
	Annual Take of Listed Fish By Life Stage ***(Number of Fish)***			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	0	0	0	0
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: Steelhead____________ **ESU/Population:**__UCR_______________________________
Activity:_Weir Operation_________________

Location of hatchery activity: Beaver Creek___________ **Dates of activity:**_3/15 – 6/1; 9/1 – 12/15___________ **Hatchery program operator:**_________________

	Annual Take of Listed Fish By Life Stage *(**Number of Fish**)*			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	0	150	15	0
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)	0	5	0	0
Other Take (specify) h)				

Listed species affected: Spring Chinook______________ **ESU/Population:**__UCR________________________________ **Activity:**__Weir Operation_________________				
Location of hatchery activity: Brender Creek___________ **Dates of activity:**_3/15 – 6/1; 9/1 – 12/15___________ **Hatchery program operator:**_________________				
	Annual Take of Listed Fish By Life Stage ***(Number of Fish)***			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	0	0	0	0
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: Steelhead	**ESU/Population:** UCR			
Activity: Weir Operation				
Location of hatchery activity: Brender Creek	**Dates of activity:** 3/15 – 6/1; 9/1 – 12/15	**Hatchery program operator:**		
	Annual Take of Listed Fish By Life Stage ***(Number of Fish)***			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	0	200	20	0
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)	0	5	0	0
Other Take (specify) h)				

Listed species affected: Spring Chinook_____________ **ESU/Population:**__UCR_______________________________ **Activity:**__Weir Operation_________________				
Location of hatchery activity: Chumstick Creek___________ **Dates of activity:**_3/15 – 6/1; 9/1 – 12/15___________ **Hatchery program operator:**_________________				
	Annual Take of Listed Fish By Life Stage *(Number of Fish)*			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	0	0	0	0
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)				
Other Take (specify) h)				

Listed species affected: Steelhead **ESU/Population:** UCR **Activity:** Weir Operation				
Location of hatchery activity: Chumstick Creek **Dates of activity:** 3/15 – 6/1; 9/1 – 12/15 **Hatchery program operator:**				
	Annual Take of Listed Fish By Life Stage *(__Number of Fish__)*			
Type of Take	Egg/Fry	Juvenile/Smolt	Adult	Carcass
Observe or harass a)				
Collect for transport b)				
Capture, handle, and release c)	0	200	20	0
Capture, handle, tag/mark/tissue sample, and release d)				
Removal (e.g. broodstock) e)				
Intentional lethal take f)				
Unintentional lethal take g)	0	5	0	0
Other Take (specify) h)				

Appendix I: Projects in the Methow subbasin by Assessment Unit and Survival Factor

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Yakama Nation	BPA Project #9208200		Eastern Washington Landowners Adopt-Stream Training	Groups were targeted for training in stream and watershed management to enhance habitat for anadromous fish. Six watershed-training meetings were held for target groups of Native Americans, ranchers, and foresters in eastern Washington. Conducted 6 watershed-training meetings for various groups in eastern Washington.		
Yakama Nation	Funding WDOE and BPA	1999 to 2000	Methow Valley Irrigation District, Reorganization to wells.	Lower ditch was shut off and individuals served by the lower ditch were converted to wells.	Middle Methow, Lower Twisp	Flow, Withdrawals, Obstructions

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Yakama Nation and Methow River Valley Irrigation District	BPA Project # 199603401	ongoing project		Examine the feasibility of alternatives and recommend a project to address water conservation, benefit fish and continue to provide water for irrigation.	All Assessment Units	Flow, Withdrawals, Obstructions
Yakama Nation	BPA Project #199802500		Early Winters Creek Habitat Restoration	Restored historic fish, riparian and floodplain habitat, identified methods to augment instream flow to increase spawner success and juvenile survival. Project was completed the summer of 2000 with some follow-up monitoring in 2001.	Upper Methow	Flow, Habitat Diversity, Key Habitat, Channel Stability
Yakama Nation	BPA Project #9604000	1996 ongoing	Mid-Columbia Coho Feasibility Reintroduction Study	This project was initiated in 1996. The project is designed to gather data and develop and implement plans for coho restoration in the Methow, Entiat, and Wenatchee river basins		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				in concert with various state and federal agencies. The project is centered on the development of a localized broodstock while minimizing potential negative interactions among coho and listed and sensitive species.		
Yakama Nation	BPA Project #23024	2002 ongoing	Hancock Springs Passage and Habitat Restoration Improvements, Yakama Nation	The project is designed to increase juvenile salmonid access to, and enhance the habitat of Hancock Springs, a spring fed off-channel to the upper Methow River. Project objectives are to 1) increase the number of juvenile spring chinook and steelhead utilizing Hancock Springs, and 2) increase the over-winter survival of juvenile spring chinook and steelhead in the Methow River.	Upper Methow	Obstructions, Habitat Diversity, Key Habitat

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Yakama Nation	BPA Project #199802900	Project is ongoing.	Goat Creek Instream Habitat Restoration	Instream habitat restoration work and instream rehabilitation.	Upper Methow	Channel Stability, Habitat Diversity, Key Habitat
Yakama Nation	BPA Project #200103700		Arrowleaf/Methow River Conservation Easement	Purchase prime riparian habitat in the form of a conservation easement.	Upper Methow	Channel Stability, Habitat Diversity, Key Habitat
Yakama Nation	BPA Project #200106300	Project is ongoing.	Methow Basin Screening	Provide fish screen facilities and new fish screen construction at Methow Subbasin irrigation diversions including Foghoorn, Rockview, McKinney Mountain, Kum Holloway. Some equipment upgrades are also included under the project.	Middle Methow	Obstructions
Yakama Nation	Douglas County PUD	Ongoing since 1987	Methow Basin spring chinook spawner surveys	Basin wide spawner surveys have been conducted. This information is summarized each year in an annual report		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				submitted to Douglas County PUD. The data set consists of redd counts by stream reach for each major tributary in which spring chinook spawn, estimated spawner escapement, plus bio-sample data (i.e. scale samples, recovery of CWTs, notation of external marks, sex, body length and extent of gamete retention).		
Yakama Nation	Douglas County PUD	1993 ongoing	Methow Basin Spring Chinook Salmon Supplementation Program (MBSCSP)	The Yakama Nation contracted with Douglas County PUD in 1993 to conduct monitoring and evaluation activities as part of the MBSCSP. The Methow Basin Spring Chinook Supplementation Plan dictates specific monitoring and evaluation tasks associated with the Program. Since 1993 the		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				spawner surveys have been incorporated into the MBSCSP.		
Yakama Nation and Methow Valley Irrigation District				Negotiations to resolve the issue of inadequate instream flows in the lower Twisp River.	Lower Twisp	Flows
Implemented by WDFW	BPA		Methow Watershed Project II	An ongoing $12 million effort to identify and secure more than 5,000 acres of critical riparian/floodplain habitat and linkages to protected upland through fee title acquisition and conservation easements. BPA contributed over $2 million to purchase conservation easements on portions of over 1000 acres of habitat.	Upper Methow	Channel Stability, Key Habitat, Habitat Diversity
USFS	BPA Project #9026,	Project is ongoing	Respect the River	Respect the River is an ongoing interpretive and public contact program		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				that started out with informational/educational signs along the Methow River and its tributaries. The program has been repeatedly expanded to include both media and one-on-one contacts with river users and to include numerous additional drainages within the Methow Subbasin.		
	BPA Project #199803500		Measure Mine Drainage Effects of Alder Creek	The project involved analyzing the leachable metals in the Methow River and Alder Creek drainages resulting from the abandoned Alder Mine. The Alder Creek Mine is on the western slope of McClure Mountain at 3600 feet on private land surrounded by National Forest. While it is clear that Alder Creek has been impaired, the extent of impact has not been	Middle Methow	Chemicals

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				determined.		
	BPA Project #199603450		Methow River Valley NEPA Study	NEPA archaeological and historical studies of the Methow Irrigation District. This contract provided for public involvement, communication and coordination support for the NEPA process.		
	American Bird Conservancy	1997	Conservations Strategy for Landbirds	Program identified important habitats and desired habitat conditions, and provided interim management targets and recommended management actions for land birds and their habitats.		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Methow Conservancy	Funded by State of Washington Interagency Committee for Outdoor Recreation	1997-2001	Methow Conservancy Riparian Habitat Project	For the facilitation or purchase of conservation easements that would protect riparian habitat in the Methow Watershed for perpetuity. By the summer of 2001, nine property owners, representing 526 acres and over $930,000 of donated easement value had completed these voluntary conservation restrictions on their properties. The areas include riparian/agricultural lands on the mainstem Methow River and the Little Cub Creek (Rendezvous) complex, an important, upland watershed of the Chewuch River, a tributary of the Methow. Landowners have created protective buffer zones along the critical riparian	Middle Methow, Upper Methow, Lower Chewuch	Habitat Diversity, Key Habitat, Sediment Load, Channel Stability

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				areas near the river and creeks, have agreed to forest management and land use plans to promote values of watershed and wildlife enhancement, and have agreed that this is to be done for perpetuity.		
Methow Conservancy	Funded by State of Washington Salmon Recovery Funding Board	2001	Methow Watershed Riparian Acquisition	To help protect spring Chinook salmon, bull trout and steelhead trout habitat in the Methow Subbasin. The award to the Conservancy provides financial assistance to landowners who want to assure that their lands along the Twisp, Chewuch and Methow Rivers remain as relatively pristine habitat for fish and wildlife. As of September of 2001, seventeen property owners, representing 870 plus acres and over four	Middle Methow, Upper Methow, Lower Chewuch, Lower Twisp, Upper Twisp	Habitat Diversity, Key Habitat, Sediment Load, Channel Stability

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				miles of riverfront in the areas identified by the Upper Columbia Regional Technical team and Washington State Conservation Commission's Limiting Factors Analysis as of the utmost importance to salmon recovery have signed Letters of Understanding to begin the easement process with the Methow Conservancy.		
Methow Conservancy		November 2000 to October 2001	Partners in Flight Habitat Prioritization	This Songbird Conservation Project brought a land trust (the Methow Conservancy) and several conservation biologists (from the U.S. Forest Service, American Bird Conservatory, and the Washington Department of Fish and Wildlife) together to survey and recommend ways to protect the best	Middle Methow, Upper Methow, Lower Chewuch, Lower Twisp, Upper Twisp	Habitat Diversity, Key Habitat, Sediment Load, Channel Stability

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				privately owned riparian areas in the Methow Valley. The Project allowed for detailed landscape-level mapping and analysis of Methow Valley songbird habitat, along with extensive one-to-one habitat conservation education and many hours of on-the-ground surveys, which formed an important foundation for future conservation easements, research and planning.		
Methow Valley Irrigation District	Funding WDOE and BPA, project is also listed under BPA funded projects	1999 to 2000.	Reorganization to wells	Lower ditch was shut off and individuals served by the lower ditch were converted to wells.	Middle Methow, Lower Twisp	Flow, Obstructions
Methow Valley	Funding WDFW	2001	Remeshing of MVID screens	Screens along both the Methow and Twisp rivers were remeshed to NMFS	Twisp and Methow AU’s	Obstructions

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Irrigation District				standard in the spring of 2001.		
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Wolf Creek Channel Restoration	Enhanced fish passage and created additional instream habitat during summer low flow for steelhead and chinook and bull trout in Wolf Creek.	Wolf/ Hancock	Obstructions, Key Habitat, Channel Stability
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Skyline Ditch Pipe Installation	Assisted in piping part of the 6.2 mile Skyline Ditch in high water loss areas. This irrigation diversion is located on the Methow River.	Upper Methow	Flows
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Airey/Risley Ditch Removal	Removed an irrigation diversion structure and reduced the length of conveyance on an irrigation canal on the Twisp River.	Lower Twisp	Flows
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Buttermilk Creek Ditch Fish Screen	Installed a fish screen on the Buttermilk Creek irrigation ditch on the Twisp River.	Lower Twisp	Obstructions

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Skyline Ditch repair	Repaired the headgate at the Skyline Ditch diversion on the Chewuch River and replaced the delivery ditch with pipe in a high water loss area.	Upper Methow	Flows
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Aspen Meadows Ditch Piping	Replaced a portion of the Aspen Meadows irrigation ditch with pipe to prevent water loss on Little Bridge Creek, a tributary to the Twisp River.	Lower Twisp	Flows
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Fulton Ditch Lining Project	Lined a portion of the Fulton irrigation canal to prevent seepage/water loss. The Fulton diversion is located on the Chewuch River.	Lower Chewuch	Flows
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Eagle Creek Ditch Fish Screen	Removed an irrigation ditch and installed a well on Eagle Creek, a tributary to the Twisp River.	Lower Twisp	Flows, Withdrawals
Okanogan	Salmon		Tourangeau Ditch	Abandoned the Tourangeau irrigation	Lower Twisp	Flows, Withdrawals

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
County	Recovery Act RCW 77.85/HB2496		retirement	canal and installed a well on Little Bridge Creek, a tributary to the Twisp River.		
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Early Winters Ditch Diversion Structure	Constructed a fish friendly diversion structure that ensures flow to the Early Winters irrigation canal.	Upper Methow	Obstructions
Okanogan County	Salmon Recovery Act RCW 77.85/HB2496		Little Bridge Creek Culvert passage	Provided engineering & design work to determine alternatives and costs associated with solving a culvert blockage problem on Little Bridge Creek.	Lower Twisp	Obstructions
Okanogan Conservation District	Department of Natural Resources	1997	Pete's Creek planting and fencing	Seeded 65 acres with grass and planted 880 cottonwood and dogwood whips. Also installed 7,745 feet of cross fence to control grazing and protect riparian areas in the upper watershed.		Sediment Load, Habitat Diversity
Okanogan Conservation	Department of Natural	1997	French Creek fencing	Installed 6,792 feet of fence to protect riparian zone.		Sediment Load, Habitat Diversity

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
District	Resources					
Okanogan Conservation District	Department of Natural Resources	1998	Pete's Creek planting and road deactivation	Project to control access road erosion control. Planted 2,000 cottonwoods, 100 pines, and 100 aspen. Developed spring for stock water outside the riparian zone.		
Okanogan Conservation District	Department of Natural Resources	1998	French Creek fencing & livestock watering	Installed 6,864 feet fence to protect riparian zone. Installed two miles of pipeline and two troughs for livestock water outside the riparian zone. Planted 6,000 cottonwoods and dogwood whips.		Sediment Load, Habitat Diversity
Okanogan Conservation District	Department of Natural Resources	1998	Cow Creek planting and erosion control	Instituted measures to control road erosion on an access road. Planted 2,000 cottonwoods, 6,000 dogwoods, 200 pine and stabilized headcut.	Lower Methow	Sediment Load, Habitat Diversity

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Okanogan Conservation District	Department of Natural Resources	1998	Texas Creek planting and livestock control	Planted 6000 dogwoods and 2,000 cottonwoods. Created livestock barriers in creek channel by felling trees.	Lower Methow	Sediment Load, Habitat Diversity
Okanogan Conservation District	Department of Natural Resources	1998	Wolf Creek fencing and livestock watering	Built 1.7 miles of fence to exclude livestock from the river. Drilled wells and installed 2,000 feet of pipe and two troughs for stock water outside of riparian zone.	Wolf/ Hancock	Sediment Load, Habitat Diversity
Okanogan Conservation District and the Pacific Watershed Institute	USFW	2000	Methow River, Lehman Site fencing, planting and livestock watering	Drilled a well and installed 500 feet of pipe and one trough for fall stock water outside the riparian zone. Installed 2,640 feet exclusion fence creating a 175-foot riparian buffer. Installed 2,000 feet of pipeline and two troughs for winter stock water outside the riparian zone. Removed corrals from riverbank and rebuild 350 feet away from the		Sediment Load, Habitat Diversity

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				river. Replanted the old corral site with native trees and shrubs.		
Okanogan Conservation District and the Pacific Watershed Institute	USFW	2000	Methow River, Konrad site planting and livestock watering	Fenced .75 miles of river bank and planted .25 miles of streambank and irrigate riparian plantings. Developed solar stock water system for trough and storage.		Sediment Load, Habitat Diversity
Okanogan Conservation District and the Pacific Watershed Institute	Salmon Recovery Funding Board	ongoing	Beaver Creek Fish Passage Barrier Amelioration	This project will provide fish passage that is compatible with irrigation needs on Beaver Creek in addition to eliminating one diversion dam and replacing it with a well.	Beaver/Bear	Obstructions, Withdrawals
Okanogan Conservation District and the Pacific Watershed Institute	Salmon Recovery Funding Board	ongoing	Okanogan County Fish Passage Barrier Survey	This project will inventory and access all potential fish passage barriers including unscreened diversions in Okanogan County. Identified barriers will be prioritized for correction	All AU's	Obstructions, Withdrawals

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				based on quality and quantity of habitat.		
Pacific Watershed Institute	Jobs for the Environment Program & USFS, USFWS, WDFW and PWI	1996 - 1998	Restored riparian vegetation in a mile long dispersed recreation area near the Chewuch River	Activities included road obliteration, fencing, seeding in meadow areas, stream bank re-grading and re-vegetation with associated large woody debris (LWD) placement in key locations. Construction of a bar apex jam to retain and encourage development of off-channel habitat areas. Placement of non-anchored log complexes within the off-channel area for cover.	Upper Chewuch	Habitat Diversity, Key Habitat, Channel Stability, Sediment Load
Pacific Watershed Institute	Jobs for the Environment Program & USFS, USFWS, WDFW and PWI	1996 - 1998	Enhanced and added road slope protection in a large side channel of Chewuch	Activities included: 1) development of a smaller pilot-channel across and island to deflect flow away from the road slope and provide future side channel development opportunities; 2) construction of lateral bar jams to deflect flow into	Upper Chewuch	Habitat Diversity, Key Habitat, Channel Stability, Sediment Load

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				the new side channel; and 3) construction of a large chaotic crib structure to protect the road slope while providing instream habitat and cover.		
Pacific Watershed Institute	Jobs for the Environment Program & USFS, USFWS, WDFW and PWI	1996 - 1998	Opened .5 mile side channel to increase year-round flow for juvenile rearing and flood refugia habitat	Enhanced the stream channel with 6 LWD complexes to provide summer and winter cover. Investigated ground water relationships to alluvial fan geomorphology as it relates to side channel development and winter habitat availability.	Upper Chewuch	Habitat Diversity, Key Habitat, Channel Stability
Pacific Watershed Institute	Jobs for the Environment Program & USFS, USFWS, WDFW and PWI	1996 - 1998	Restored access to flood channels on a channelized alluvial fan	Activities included the excavation of portions of constructed boulder berms to bankfill level and reshaping connections to the main flow to prevent sub-surface flow during summer.	Upper Chewuch	Habitat Diversity, Key Habitat, Channel Stability
Pacific	Jobs for the	1996 -	Chewuch off	Addition of 6 LWD	Upper	Habitat Diversity, Key

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Watershed Institute	Environment Program & USFS, USFWS, WDFW and PWI	1998	channel restoration	structures to a depositional area of the Chewuch in order to maintain an off–channel area, provide hiding cover and shading. Also, restoration of riparian area in a dispersed campsite.	Chewuch	Habitat, Channel Stability
Pacific Watershed Institute	Jobs for the Environment Program & USFS, USFWS, WDFW and PWI	1996 - 1998	Metho0w River native plant collection and propagation program for re-vegetation projects	Propagation methods include transplants, shrub, tree and forb rooted cuttings, and seed collection and propagation to container stock. Project includes work with local and regional nurseries to propagate plants.		
Pacific Watershed Institute	Jobs for the Environment Program & USFS, USFWS, WDFW and PWI	1998	Monitoring of 6 restoration projects completed in 1996 & 1997	Monitoring includes re-vegetation success, large woody debris structures, channel geometry, sediment, habitat condition, hydrology and fish presence.		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Upper Columbia Regional Fisheries Enhancement Group (UCRFEG)			Fraser Creek Riparian Fence	Installed 1.25 miles of fencing to prevent livestock access to the stream and riparian zone.	Beaver/Bear	Sediment Load, Habitat Diversity
UCRFEG			Black Pine Basin Riparian Fence	Installed 1.1 miles of fencing to prevent livestock access to the stream and riparian zone.	Upper Methow	Sediment Load, Habitat Diversity
UCRFEG			South Fork Beaver Creek Riparian Fence	Installed .1 miles of fencing to prevent livestock access to the stream and riparian zone.	Beaver/Bear	Sediment Load, Habitat Diversity
UCRFEG			Okanogan Fish Passage Inventory	Assisted Okanogan Conservation District with their assessment of barriers to fish migration.	All AU's	Obstructions, Withdrawals
WDFW	WWRP		Methow Corridors Project, Methow Corridors II Project, Methow Corridors Project III, Methow	Over $20 million of Washington Wildlife Recreation Program (WWRP) funding used to secure several thousand acres of critical lower elevation fish and	All AU's	Habitat Diversity, Key Habitat, Sediment Load

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
			Watershed Project	wildlife habitats.		
WDFW	Douglas County Public Utility District as part of the Wells Dam Settlement Agreement	ongoing	Spring chinook artificial supplementation and captive broodstock program	Artificial supplementation and captive broodstock for spring chinook		
WDFW		ongoing	Operation and Management of the Methow Fish Hatchery for the production of ESA-listed upper Columbia River spring chinook salmon	The program is responsible for broodstock collection spawning, rearing and releasing up to 550,000 spring chinook smolts into the Methow River Basin annually.		
WDFW		ongoing	Summer chinook artificial supplementation program	Operation and management of the Carlton Acclimation Pond and Eastbank Hatchery Facility for production of summer chinook (400,000 smolts) as a component of the summer chinook		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				supplementation program associated with mitigation for the construction and operation of Rock Island Dam. The program collects broodstock and spawns, incubates, and releases 400,000 yearling summer chinook into the Methow Subbasin annually.		
WDFW			Summer chinook supplementation program evaluation	The program is funded by Chelan County Public Utility District as part of the Rock Island Project Settlement Agreement. Implementation of the summer chinook supplementation hatchery evaluation program. The program monitors and evaluates the efficacy of supplementation efforts in the enhancement of summer the chinook population in the Methow Subbasin.		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
WDFW	Douglas County Public Utility District	ongoing	Summer steelhead hatchery supplementation program.	Operation and management of the Wells Dam Hatchery for the production of ESA-listed upper Columbia River steelhead in the Methow Subbasin. The program collects broodstock and spawns, incubates and releases approximately 350,000 steelhead smolts in to the Methow Basin annually. It also provides the egg source for the 100,000- steelhead smolts stocked annually in to Methow Subbasin from the Winthrop NFH.		
WDFW	Chelan, Douglas and Grant County PUDs		Adult steelhead migration and spawning disposition	WDFW participated in a steelhead radio telemetry study in the mid-Columbia Region to assess the upstream migration and eventual spawning disposition of Upper Columbia River ESA-listed summer steelhead. The radio tags		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				are applied at Priest Rapids Dam and monitored throughout migration and spawning, and includes the monitoring in Methow Subbasin.		
WDFW	WDFW	ongoing	Upper Columbia River steelhead stock assessment	The stock assessment project occurs at Priest Rapids Dam and collects biological data related to enumeration, origin (hatchery/wild), age (fork-length and scale), and record of marked/tagged steelhead migrating above Priest Rapids Dam, including those destined for the Methow basin.		
WDFW	WDFW	ongoing	Species abundance and distribution	WDFW fisheries personnel conduct annual and periodic species distribution abundance surveys in the Methow Basin.		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
WDFW	WDFW	ongoing	Creel Census Survey Information	Creel census information is gathered annually during the Methow River trout fishery season to assess angler success, angler effort, species assemblage, and population characteristics.		
WDFW	WDFW	ongoing	Methow Wildlife Area Management Plan	Plan developed for WDFW lands in the Methow Subbasin to conserve fish and wildlife resources and maximize wildlife-based recreation. Includes removing fish passage barriers and installing fish friendly irrigation components.	Upper Methow	Obstructions
WDFW	WDFW		Wildlife species management or recovery plans	Developed Sharp-tailed Grouse Recovery Plan, Lynx Recovery Plan, Elk Management Plan, Black Bear Management Plan, Bald Eagle Recovery		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				Plan.		
WDFW	WDFW		Lynx research	Completed ongoing research projects in the 1980s documenting lynx ecology and potential management conflicts.		
WDFW	WDFW & Northwest Ecosystem Alliance	ongoing	North Cascades Rare Carnivore Camera Survey	An ongoing volunteer partnership with Northwest Ecosystem Alliance to survey North Cascades backcountry areas with self-activated cameras for rare carnivores. Multiple occurrences of lynx and wolverine documented to date.		
WDFW & USFS	Trust for Public Lands		Townsend's Big-eared Bat Project	Project involved construction of a "bat house" to replace a currently occupied structure (Rattlesnake House) slated for demolition or relocation and site preparation in anticipation of new funds		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				to move an existing structure.		
WDFW & USFS			Mule Deer Research	Research projects in the 1970s and 1980s collected data on mule deer ecology and habitat needs for the West Okanogan herd.		
WDFW & USFS & National Park Service (NPS)	WDFW & USFS & National Park Service (NPS)		Grizzly Bear/Gray Wolf Investigations Project	Project evaluated the status of grizzly bears and gray wolves in the North Cascades, and the ability of the North Cascades Ecosystem to support a viable grizzly population		
WDFW & USFS & National Fish and Wildlife Foundation	WDFW & USFS & National Fish and Wildlife Foundation		Forest Carnivore Survey	Challenge cost-share project with National Fish and Wildlife Foundation to survey Okanogan National Forest lands for lynx, wolverine, fisher, and marten.		
WDFW & USFS	WDFW & USFS, USFWS &		Wolverine Investigations	Document wolverine distribution and reproductive status.		

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
	Skagit Environmental Endowment Commission					
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	1998	Barkley (Methow River)	Fish screen completed summer 1998. On line 1999 irrigation season, tuneup complete spring 2001.	Upper Methow	Obstructions
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	1998	Chewuch (Chewuch River)	Completed fall 1998. Tuneup completed. Contributed 10 cfs to river.	Lower Chewuch	Flows, Obstructions
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	1999	Larson Ditch (Libby Creek)	Completed spring 99, Cap funded, owner cost-share.	Gold/Libby	Flows, Obstructions
WDFW,	WDFW,	1999	WCRD (Wolf Creek)	Completed sprint 1999, did not divert until spring	Wolf/ Hancock	Flows, Obstructions

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Irrigation Districts, USFS, USFWS, others	Irrigation Districts, USFS, USFWS, others			2000, tuneup complete 5/31/00. Low flow season 10 cfs contributed to river due to Patterson Lake storage. Owner cost share SRFB. EI 75k, NMFS 25k.		
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	1999	Buttermilk (Buttermilk Creek)	Completed summer 1999, tuneup complete 5/31/00, (*) GSRO 17.5K, NMFS 11.5K, owner cost-share, (IAC not used)	Lower Twisp	Flows, Obstructions
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	1999	Eightmile (USFS, Eightmile Creek)	Completed spring 1999, USFS funded 18K. Point of diversion change contributed 8cfs to Chewuch.	Lower Chewuch	Flows, Withdrawals
WDFW, Irrigation Districts, USFS, USFWS,	WDFW, Irrigation Districts, USFS, USFWS,	2000	Twisp Power (Twisp River)	Completed spring 00, tuneup complete by 5/31/00, SRFB EI 80 K, NMFS 40K. WDFW negotiations returned 3 cfs to river.	Lower Twisp	Flows, Obstructions

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
others	others					
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	2000	Beaver Creek Basin (Beaver, Frazer, Storer)	IAC contract extension to 10/31/00, SRFB EI 100K, Proviso 50K. Will be completed Spring of 1991.	Beaver/Bear	Flows, Obstructions
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	2000	Fulton (Chewuch River)	Completed spring 00, tuneup complete fall 2000, SRFB EI 100K, NMFS 50K, SRFB early 2000 33.5K, NMFS 16.5K. Saved 6 cfs with WDFW negotiations.	Lower Chewuch	Flows, Obstructions
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	2000	Twisp Airey (Twisp River)	Conversion to pump completed spring 2000,GSRO 30K, [Cap Sup 25K, tuneup not yet completed, County has lead] 4 cfs returned to river, change of point of diversion.	Lower Twisp	Flows, Withdrwals
WDFW, Irrigation Districts,	WDFW, Irrigation Districts,	2000	Skyline (Chewuch River)	Completed summer 00, SRFB early 2000 100K, NMFS 40K, Proviso 25K. Lined ditch. Saved	Lower Chewuch	Flows

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
USFS, USFWS, others	USFS, USFWS, others			8 cfs.		
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	2001	Early Winters (Early Winters Creek)	Pre-design, scheduled construction spring 01, funded SRFB early 2000 100K, NMFS 36.5K, Proviso 14.5K. Creek rebuilt by USFW. Point of diversion changes negotiated and completed. Low flow trigger returned to creek. 6cfs.	Upper Methow	Flows, Withdrawals
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	2001	McKinney Mtn. (Methow River)	Re-screened with 3/32 perforated plate 1999. Meets current criteria, scoping stage, flows an issue, scheduled spring 2001. Cap funded 25K.	Upper Methow	Obstructions
WDFW, Irrigation Districts, USFS, USFWS,	WDFW, Irrigation Districts, USFS, USFWS,	2001	Fog Horn (Methow River)	USFWS responsibility, scoping stage, construction scheduled fall 2001. Cap support 65K, USFWS 100K.	Upper Methow	Obstructions

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
others	others					
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	2001	Rockview (Methow River)	Agency screen, re-screened with 3/32 mesh 2000 meeting criteria, pre-design 2001, Proviso 120K	Upper Methow	Obstructions, Withdrawals
WDFW, Irrigation Districts, USFS, USFWS, others	WDFW, Irrigation Districts, USFS, USFWS, others	2001	Kumn Holloway (Methow River)	Re-screened with 3/32 perforated plate 99. meets current criteria, scoping stage, construction scheduled spring 2001, Proviso 20K.	Upper Methow	Obstructions
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2000	Patterson Lake	Modified spillway to allow additional 450 acre-feet of water storage.	Wolf/ Hancock	Flows
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2000	Lower Wolf Creek	Modified creek channel to improve passage opportunities for migrating fish.	Wolf/ Hancock	Obstructions

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2000	WCRD Distribution System	Installed 1,100 feet of new 21" PVC piping. Estimated saving of 500 to 800 acre-feet per year.	Wolf/ Hancock	Flows
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2001	WCRD Distribution System	Installed 5,500 feet of new 18" PVC pipe in WCRD distribution system.	Wolf/ Hancock	Flows
Wolf Creek Reclamation District	SRF Board and National Wildlife Foundation Funds	2001	WCRD Distribution System	Reconstructed existing WCRD structure.	Wolf/ Hancock	Flows
U.S. Forest Service	U.S. Forest Service	1994	Doe Creek	Completed road cut and fill stabilization. Project shifted road further into the hill, seeded, matted, planted, created a drainage ditch and kept sediment laden water from reaching the stream.	Upper Methow	Sediment

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
U.S. Forest Service	U.S. Forest Service	1994	Chewuch Road	21 miles of non-system roads retired.	Upper Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1994	Chewuch	Survey done to identify the dispersed sites along the Chewuch. Modifying sites to reduce their impact on riparian and aquatic resources prioritized.	Upper/ Lower Chewuch	
U.S. Forest Service	U.S. Forest Service	1994	Chewuch	Installed two miles of electric fence, two miles of barbed wire fencing (E. Chewuch). Cattle guard installed to protect main Chewuch River from migrating cattle.	Upper Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1994	Poorman Creek	Completed variety of road obliteration, planting seeding, riparian rehabilitation projects.	Lower Twisp	Sediment, Habitat Diversity, Key Habitat, Channel Stability

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
U.S. Forest Service	U.S. Forest Service	1994	Eightmile Ranch	Pulled the fence line back from the river and planted ponderosa pine.	Lower Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1994	Lake Creek Trail	Rerouted short segments of trail and rehabilitated part that could deliver sediment into the river.	Lower Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1994	Chewuch Trail	Rerouted short segments of trail and rehabilitated part that could deliver sediment into the river.	Upper Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1994	East Chewuch	Completed riparian surveys.	Chewuch AU's	
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Pre-work for large woody debris material for Chewuch, includes low elevation flights, channel cross-sections and design.	Chewuch AU's	
U.S. Forest	U.S. Forest	1995	Chewuch	Dispersed sites. Rehab	Chewuch	

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
Service	Service		Campsites	work in 15-20 sites. Minor maintenance on work done previous year.	AU's	
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Contracted with Watershed Restoration Program at Wenatchee Valley College for road/culvert inventory in uplands.	Chewuch AU's	
U.S. Forest Service	U.S. Forest Service	1995	Bromas	Completed road stabilization project.	Upper Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Replaced culverts off East Chewuch.	Chewuch AU's	Obstructions
U.S. Forest Service	U.S. Forest Service	1995	Poorman Creek	Replanted riparian units and obliterated some road.	Lower Twisp	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1995	Falls Creek	Completed seeding and cut/fill of slopes. Tested various approaches to see	Lower Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
				what worked best. Results were variable depending on slope orientation.		Stability
U.S. Forest Service	U.S. Forest Service	1995	Chewuch	Installed 2 miles fencing.	Chewuch AU's	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1995	Chewuch?	Began Proper Functioning Condition survey for riparian areas and instituted appropriate responses.	Chewuch AU's	
U.S. Forest Service	U.S. Forest Service	1996	Chewuch	Implemented large woody material project, two sites included large wood jams in streams and re-vegetation of area.	Chewuch AU's	Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1996	Chewuch	Rehabilitation work on developed sites includes defining river access and moving use further away from shore.	Chewuch AU's	Sediment, Habitat Diversity, Key Habitat, Channel Stability

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
U.S. Forest Service	U.S. Forest Service	1996	Chewuch and others	Many small road fixes, some obliteration of roads, closure, culvert work. Includes Chewuch, Eightmile, Falls, Ortell, Island Mountain, Sherwood, Sweetgrass, War Creek, Little Bridge and Buttermilk.	Chewuch and Twisp AU's	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1996	Long Creek	Moved water troughs in Long Creek and Cub Pass.		Sediment, Habitat Diversity, Channel Stability
U.S. Forest Service	U.S. Forest Service	1996	Reynolds Landing	Rehabilitation work completed.		
U.S. Forest Service	U.S. Forest Service	1996	Rogers Lake	Research Natural Areas designation in process, results in compilation of biological and physical information about Rogers's lake and Chewuch above Andrews Creek.		

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U.S. Forest Service	U.S. Forest Service	1997	Chewuch River	Site 9 on Chewuch River, added large wood.	Chewuch AU’s	Habitat Diversity, Key Habitat
U.S. Forest Service	U.S. Forest Service	1997	Vanderpool Crossing	Removed culvert, made passage fish friendly and re-vegetated area.		Obstructions
U.S. Forest Service	U.S. Forest Service	1997	Eightmile	Dispersed and developed site rehabilitation.	Lower Chewuch	
U.S. Forest Service	U.S. Forest Service	1997	Blackpine Lake	Beaver Creek fence.	Beaver/Bear	Sediment
U.S. Forest Service	U.S. Forest Service	1997	Chewuch	Rehabilitation and maintenance of Chewuch sites.	Chewuch AU’s	
U.S. Forest Service	U.S. Forest Service	1998	Cub Creek	Road package prepared to determine which roads could be closed in preparation for implementation in 2000.		
U.S. Forest Service	U.S. Forest Service	1998	Twentymile Creek	Road rehabilitation.	Upper Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel

Responsible Agency	BPA Project # or Other Funder	Project Duration	Project Title	Project Description, Rationale, and Results	Assessment Unit	Survival Factor Assessed/Restored/ Protected (maintained)
						Stability
U.S. Forest Service	U.S. Forest Service	1999	Throughout	Modifications in campsites and campgrounds are revisited and maintained.	Chewuch AU's	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1999	Chewuch	Closed or obliterated USFS roads in Chewuch area.	Chewuch AU's	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	1999	Barney creek (Falls Creek)	Road obliteration halfway completed.	Upper Chewuch	Sediment, Habitat Diversity, Key Habitat, Channel Stability
U.S. Forest Service	U.S. Forest Service	2000	Throughout	Dispersed campsite maintenance	Chewuch/ Methow AU's	Sediment, Habitat Diversity, Key Habitat, Channel Stability