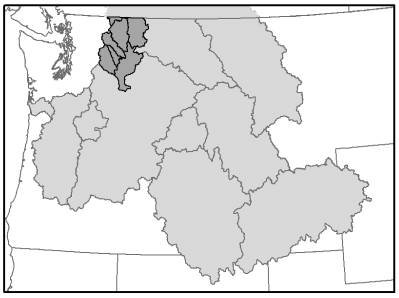
Columbia Cascade Province

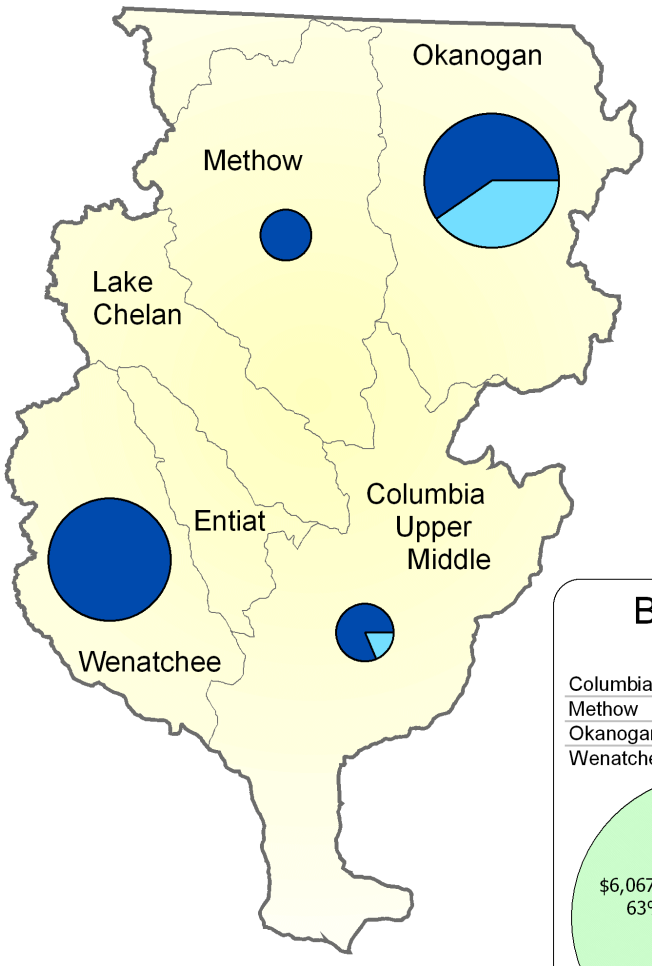
Columbia Basin Fish and Wildlife Authority



Columbia Cascade Province

BPA Spending, FY 2001-2003

FY 2001	$2,617,829
FY 2002	$3,539,115
FY 2003	$3,497,160
Total Spending	$9,654,104



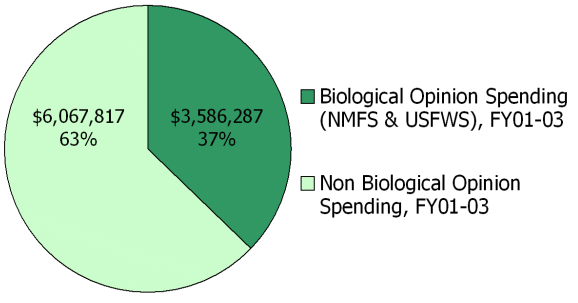
Legend

- Anadromous (80%)
- Resident (0%)
- Wildlife (20%)

NOTE: Diameter of pie represents relative funding levels in each subbasin.

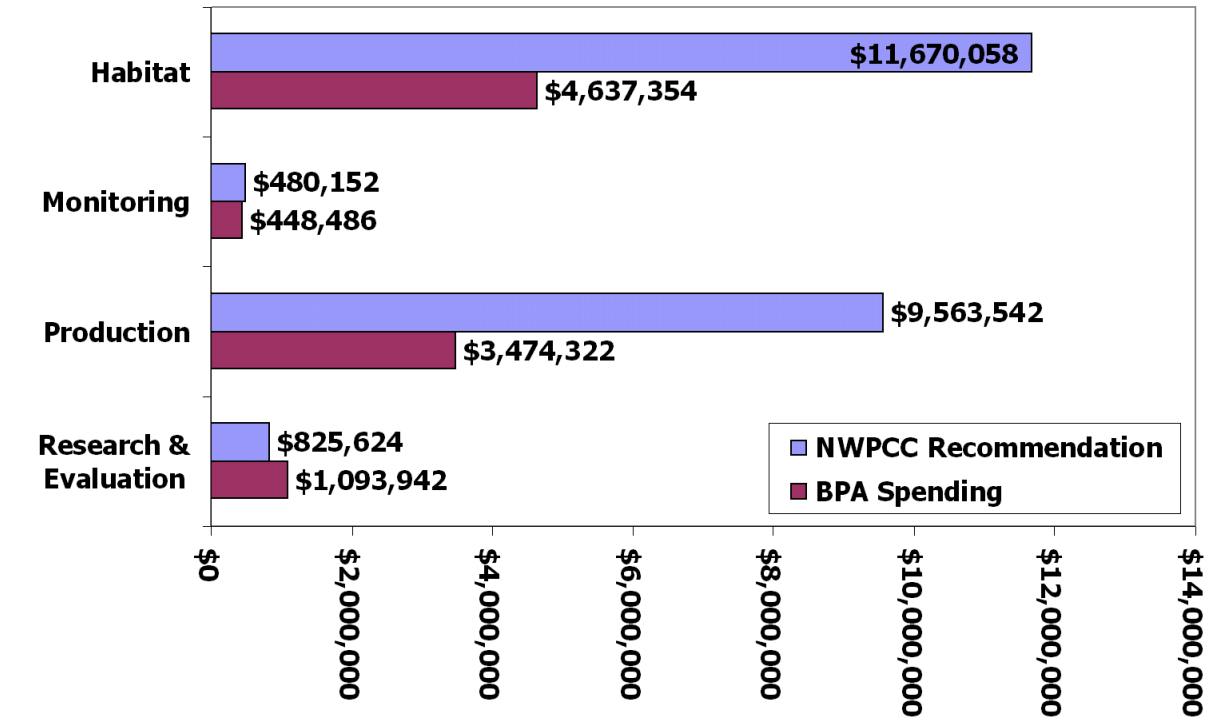
Biological Opinion Funding

	BiOp	Non BiOp
Columbia Upper Middle	$79,230	$740,357
Methow	$0	$640,754
Okanogan	$2,409,471	$2,059,887
Wenatchee	$1,097,586	$2,626,819

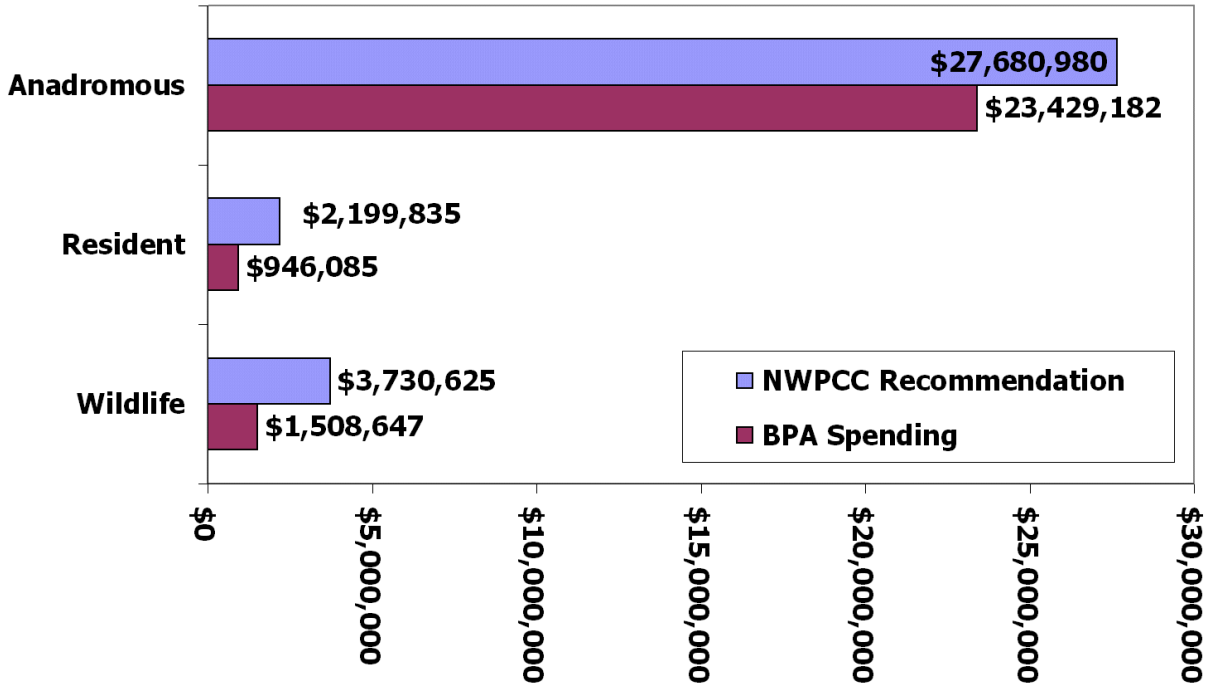


Columbia Cascade Province FY 2001-2003 Spending Summaries

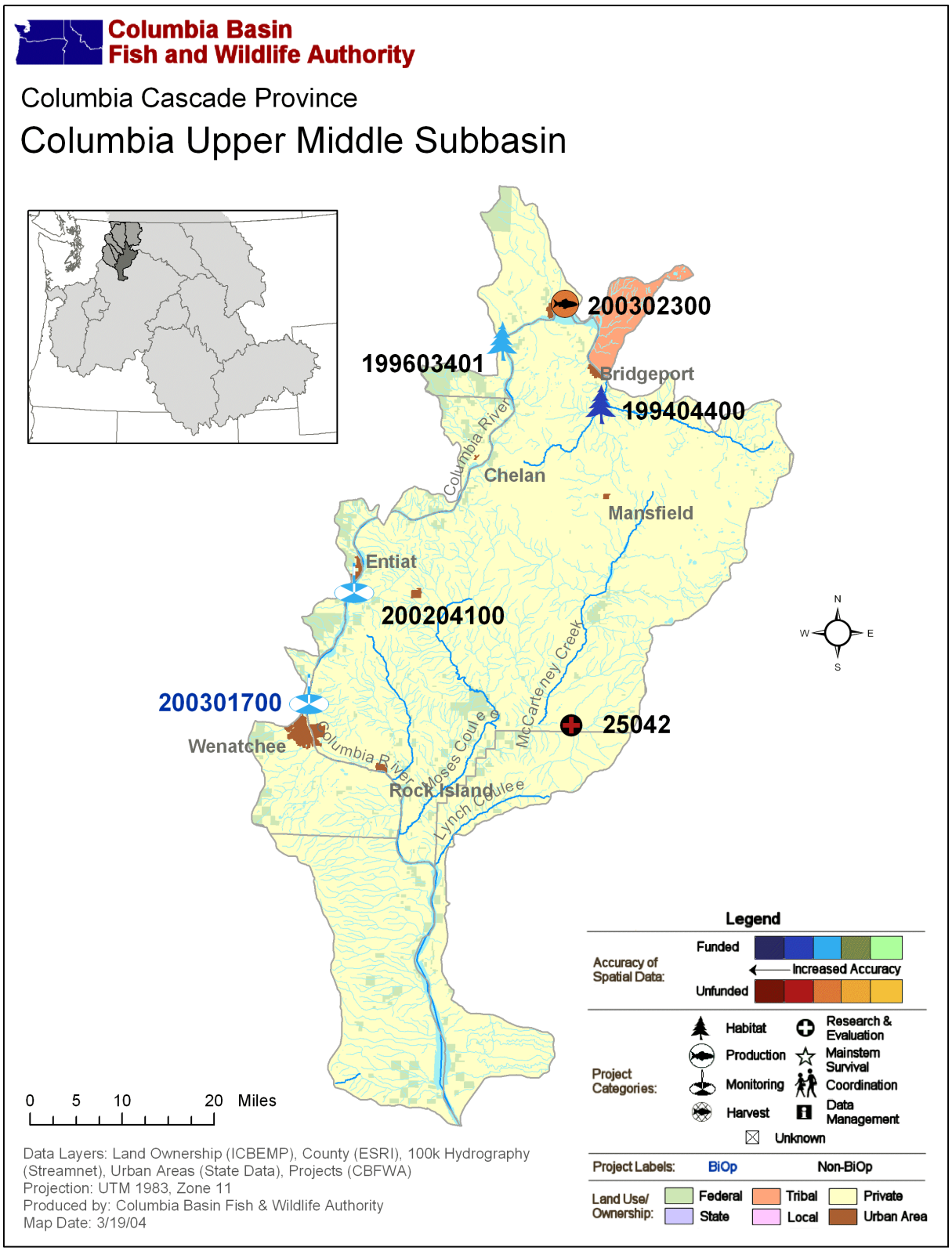
NWPCC Recommendations and BPA Spending by Project Category, FY01-03



NWPCC Recommendations and BPA Spending by Project Type, FY01-03



Columbia Upper Middle Subbasin



Projects in the Columbia Upper Middle Subbasin

ProjectID	*ProjectTitle*					*Biop?*	*Review Cycle*
25042	**pygmy rabbit recovery - captive breeding**					**no**	**Columbia Plateau**
	Rec 01-03	$ 0	$220,914	$120,102	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$ 0	Research & Evaluation	Wildlife	area
199404400	**Enhance, protect, and maintain shrubsteppe habitat on the Sagebrush Flat Wildlife Area (SFWA)**					**no**	**Columbia Plateau**
	Rec 01-03	$ 0	$908,375	$249,363	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$79,669	$72,878	Habitat	Wildlife	area
199603401	**Methow River Valley Irr Dist**					**no**	**FY 1997**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$20,232	$160,112	$38,210	Habitat	Anadromous	stream
200204100	**Columbia Cascade Stream Gauge**					**no**	**FY01 Action Plan**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$11,090	$358,166	Monitoring	Anadromous	stream
200301700	**Develop and Implement a Pilot Status and Trend Monitoring Program for Salmonids and their Habitat in the Wenatchee and Grande Ronde River Basins**					**yes**	**Mainstem/ Systemwide**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$79,230	Monitoring	Anadromous	stream
200302300	**OK-11 Develop And Propagate Local Okanogan River Summer/Fall Chinook**					**no**	**Columbia Cascade**
	Rec 01-03	$ 0	$ 0	$393,500	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$ 0	Production	Anadromous	stream

Projects highlighted in a darker shade have preliminary results data included in this report.

199404400— *Enhance, Protect, and Maintain Shrubsteppe Habitat on the Sagebrush Flat Wildlife Area*

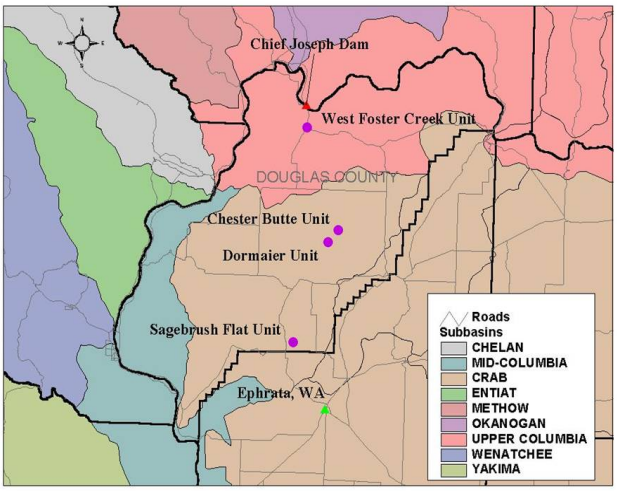
2002 Project Objectives

- Protect and increase the pygmy rabbit population to at least 500 and 100 on the Dormaier and Chesterbutte units, respectively, by 2010
- Monitor sharp-tailed grouse, pygmy rabbit, and sage grouse populations on the Sagebrush Flat Wildlife Area

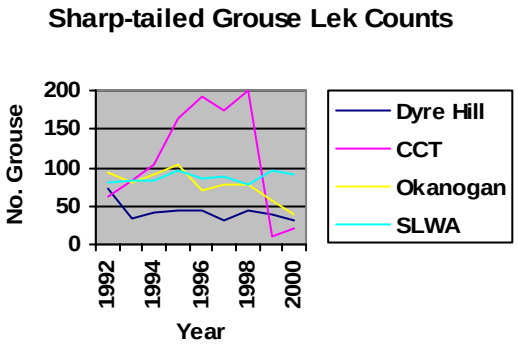
Habitat Enhancement and Population Trends - Preliminary Results

Sagebrush Flat Unit

- 355 acres of abandoned cropland seeded and contoured to replicate pygmy rabbit burrow sites and to provide nesting and feeding habitat
- Weeds controlled on 25 acres of shrubsteppe habitat along 11 miles of roads
- Constructed 17 miles of fire breaks, planted "green strip" fire breaks, and developed fire control water reservoirs at strategic locations



Locations of wildlife management units in the Crab Creek Subbasin.



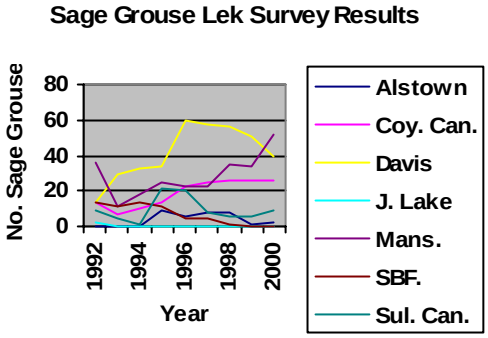
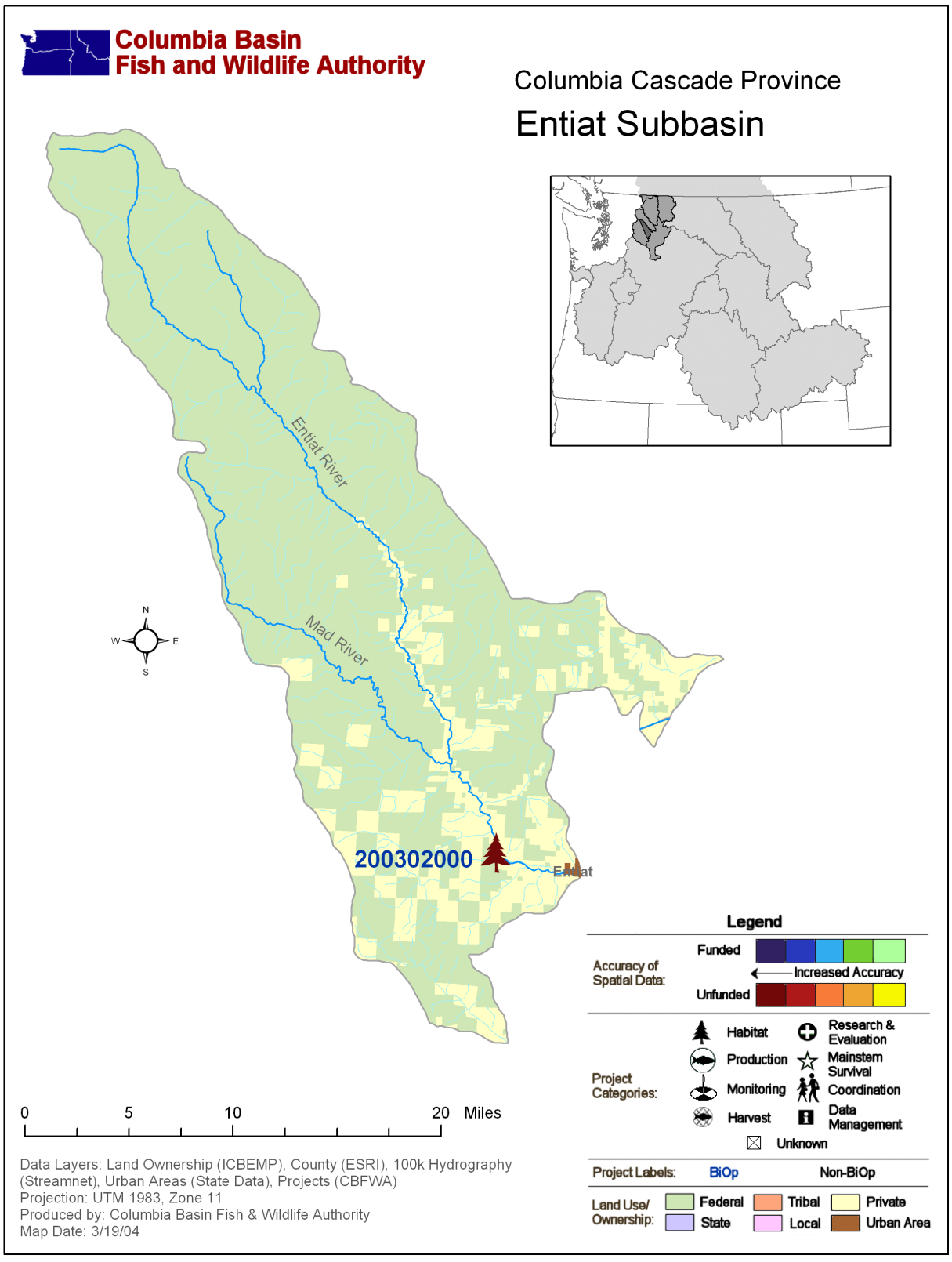


Photo: Courtesy Washington Department of Fish and Wildlife

Through creative efforts such as replication of burrow sites, the Washington Department of Fish and Wildlife is attempting to provide suitable burrow and nest habitat for the imperiled pygmy rabbit.

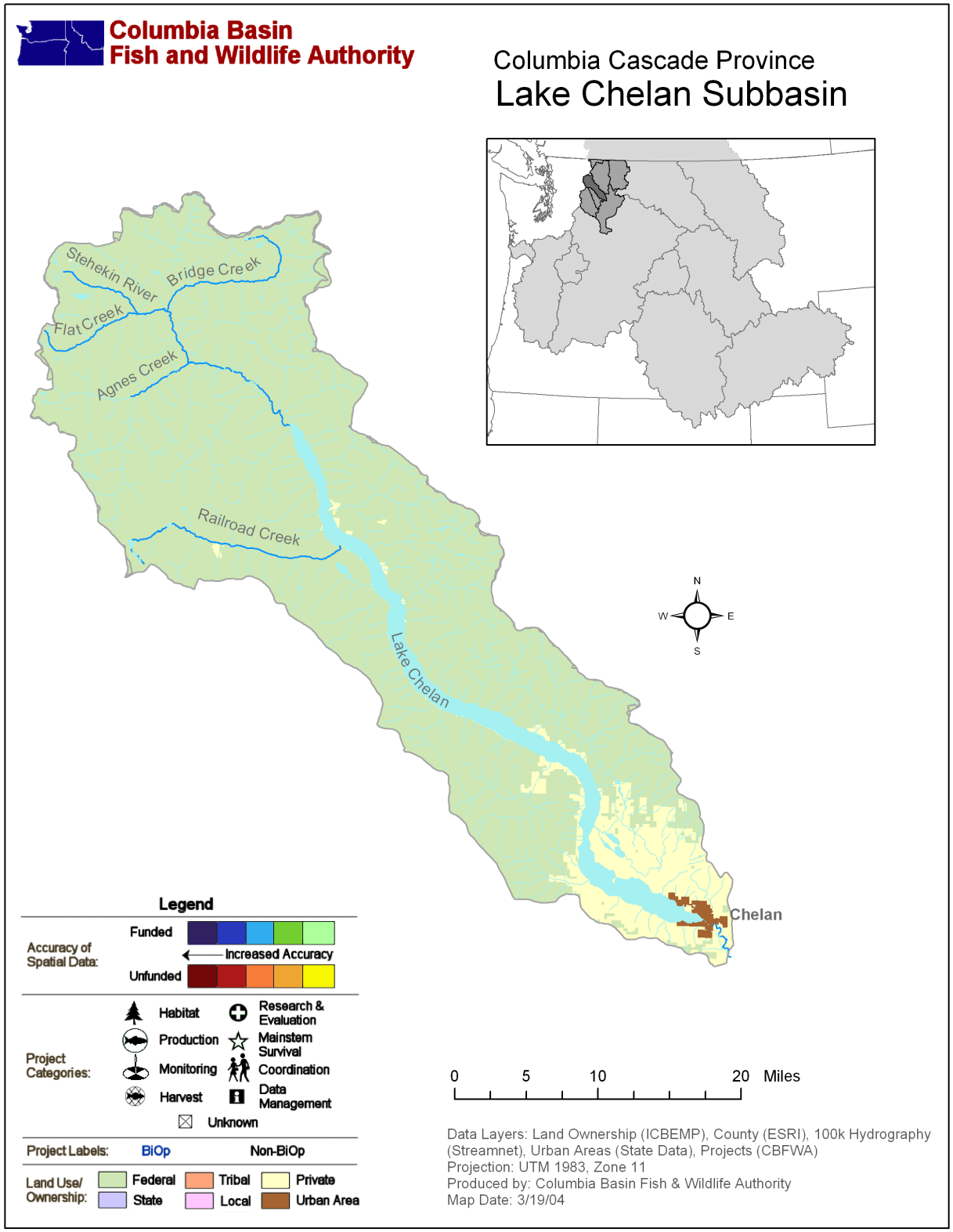
Entiat Subbasin



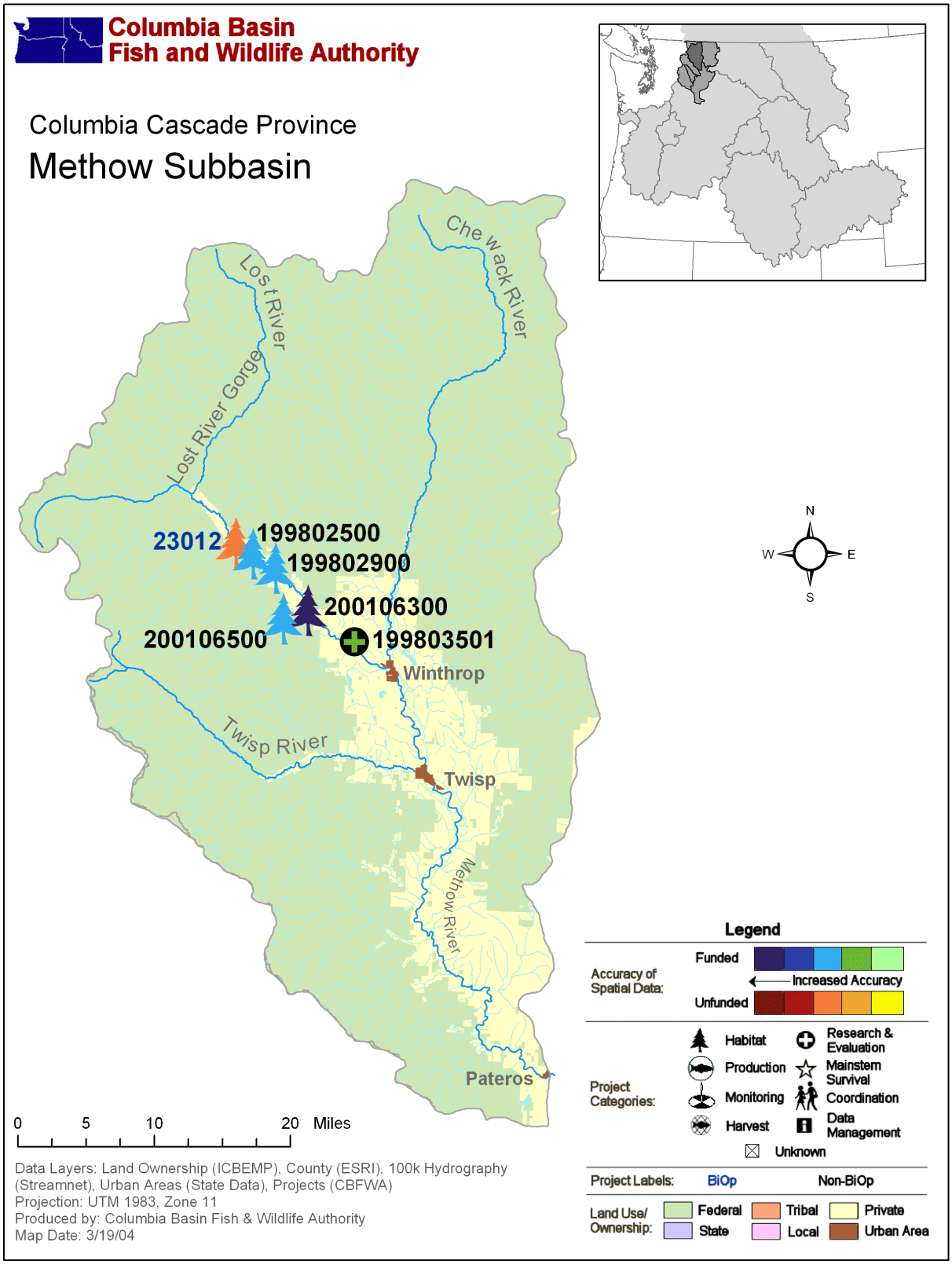
Projects in the Entiat Subbasin

ProjectID	*ProjectTitle*					*Biop?*	*Review Cycle*
200302000	**Hanan-Detwiler Passage Improvements**					**yes**	**Columbia Cas-cade**
	Rec 01-03	$ 0	$ 0	$85,000	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$ 0	Habitat	Anadromous	point

Lake Chelan Subbasin



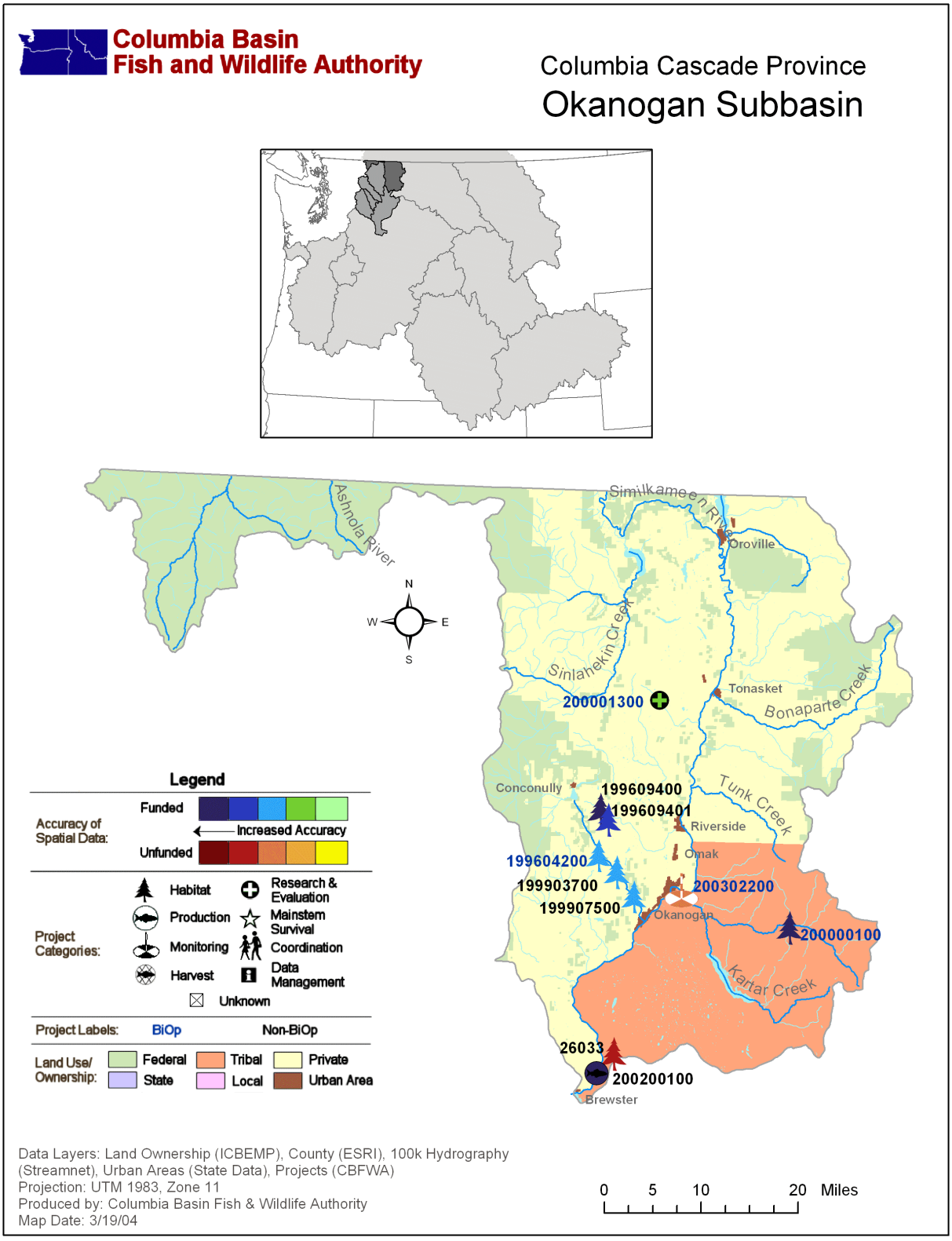
Methow Subbasin



Projects in the Methow Subbasin

ProjectID	*ProjectTitle*					*Biop?*	*Review Cycle*
23012	**Arrowleaf/Methow River Conservation Project**					**yes**	**FY01 High Priority**
	Rec 01-03	$2,500,000	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$ 0	Habitat	Anadromous	stream
199802500	**Restore Early Winters Cr Hab**					**no**	**FY 1997**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$26,840	$23,798	$8,420	Habitat	Anadromous	stream
199802900	**Restore Goat Cr In-Stream**					**no**	**FY 1997**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$21,223	$149,263	$19,427	Habitat	Anadromous	stream
199803501	**WS Response Hab To Mine Waste**					**no**	**FY 2000**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$29,780	$57,965	$52,761	Research & Evaluation	Anadromous	subbasin
200106300	**Methow Basin Screening**					**no**	**FY01 Action Plan**
	Rec 01-03	$250,000	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$211,578	$18,099	Habitat	Anadromous	point
200106500	**Hancock Springs Passage and Habitat Restoration Improvements**					**no**	**FY01 Action Plan**
	Rec 01-03	$49,941	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$21,600	Habitat	Anadromous	stream

Okanogan Subbasin



Projects in the Okanogan Subbasin

ProjectID	*ProjectTitle*					*Biop?*	*Review Cycle*
26033	**Okanogan Watershed Land and Water Rights Acquisition**					**no**	**FY01 Action Plan**
	Rec 01-03	$3,437,000	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$ 0	Habitat	Anadromous	area
199604200	**Restore and Enhance Anadromous Fish Populations and Habitat in Salmon Creek**					**yes**	**Columbia Cascade**
	Rec 01-03	$2,030,000	$353,790	$365,819	*Category*	*Type*	*Accuracy*
	Spent 01-03	$62,640	$445,611	$651,929	Habitat	Anadromous	stream
199609400	**Increase sharp-tailed grouse and mule deer populations and enhance shrubsteppe/riparian habitats on the Scotch Creek Wildlife Area.**					**no**	**Columbia Cascade**
	Rec 01-03	$261,622	$270,517	$279,715	*Category*	*Type*	*Accuracy*
	Spent 01-03	$1,202,172	$ 0	$ 0	Habitat	Wildlife	point
199609401	**Scotch Creek Wildlife Area**					**no**	**Related to Reviewed Project?**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$100,345	$467,699	$34,880	Habitat	Wildlife	area
199903700	**Salmon Cr Flow/Hab Survey**					**no**	**Related to Reviewed Project?**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$159,516	$24,183	$ 0	Habitat	Anadromous	stream
199907500	**Salmon Cr Fish Barrier Removal**					**no**	**Related to Reviewed Project?**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$29,950	$ 0	$ 0	Habitat	Anadromous	stream
200000100	**Improvement of Anadromous Fish Habitat and Passage in Omak Creek**					**yes**	**Columbia Cascade**
	Rec 01-03	$113,266	$117,116	$121,098	*Category*	*Type*	*Accuracy*
	Spent 01-03	$106,976	$71,944	$116,935	Habitat	Anadromous	point
200001300	**Evaluate An Experimental Re-introduction of Sockeye Salmon into Skaha Lake**					**yes**	**Columbia Cascade**
	Rec 01-03	$229,357	$237,155	$18,096	*Category*	*Type*	*Accuracy*
	Spent 01-03	$291,719	$576,321	$85,396	Research & Evaluation	Anadromous	subbasin
200200100	**Okanogan River spring /summer chinook acclimation facility**					**no**	**FY01 Action Plan**
	Rec 01-03	$ 0	$118,676	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$41,142	Production	Anadromous	point
200302200	**Design and Conduct Monitoring and Evaluation Associated With Reestablishment of Okanogan Basin Natural Production**					**yes**	**Columbia Cascade**
	Rec 01-03	$ 0	$ 0	$480,152	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$ 0	Monitoring	Anadromous	stream

Projects highlighted in a darker shade have preliminary results data included in this report.

200001300— *Reintroduction of Sockeye Salmon into Skaha Lake*

2002 Project Objectives

- Evaluate potential negative impacts to existing sockeye/kokanee populations if sockeye are reintroduced past McIntyre Dam (i.e., disease) and limiting factors (i.e., exotic species risk assessment and habitat assessment)
- Develop a sockeye life-cycle model

Existing Conditions and Life-Cycle Model - Preliminary Results

Species	Osoyoos	Vaseux	Skaha	Okanagan
Black crappie	Present	Absent	Absent	Absent
Bluegill	Present	Present	Absent	Absent
Tench	Present	Present	Absent	Absent
Largemouth bass	Absent	Absent	Absent	Absent
Walleye	Absent	Absent	Absent	Absent
Mysis shrimp	Present	Present	Present	Present

Disease Risks

- IHNV type 1—present
- IHNV type 2—present
- EIBS—present
- IPNV—absent
- Whirling disease—absent
- *Parvicapsula*—present

Exotic Species

- Yellow perch, black bullhead, smallmouth bass, pumpkinseed, brook trout, and carp are distributed throughout the basin

Kokanee preparing to spawn in the Okanogan Subbasin

Habitat Assessment

- Lake spawning habitat is marginal
- Tributary spawning habitat is limited
- Okanogan River spawning habitat limited
- Osoyoos Lake habitat marginal (temperature and oxygen extremes restrict useable rearing location)

Life-cycle Model

- Okanagan sockeye and Skaha kokanee would benefit from mysid removal
- Okanagan sockeye and Skaha kokanee would benefit from additional spawning habitat
- Reintroduction of sockeye fry up to 1000 fry/ha would have no effect on kokanee survival

200000100— *Improvement of Anadromous Fish Habitat and Passage in Omak Creek*

2002 Project Objectives

- Restore fish habitat via reduction (e.g., fencing, spring developments, hardened rock sites, streamside erosion efforts, road closures, culvert improvements) of impacts

Anadromous Fish Habitat Restoration - Preliminary Results

Fencing

- 23.6 miles of riparian fencing completed
- 13.9 of 32.6 miles of cross-fencing completed

Spring Developments

- 22 of 41 springs completed

Hardened Rock Sites

- 2 sites completed in 2003

Example of an exclusionary fencing effort implemented in the Omak Creek watershed by the Confederated Tribes of the Colville Reservation.

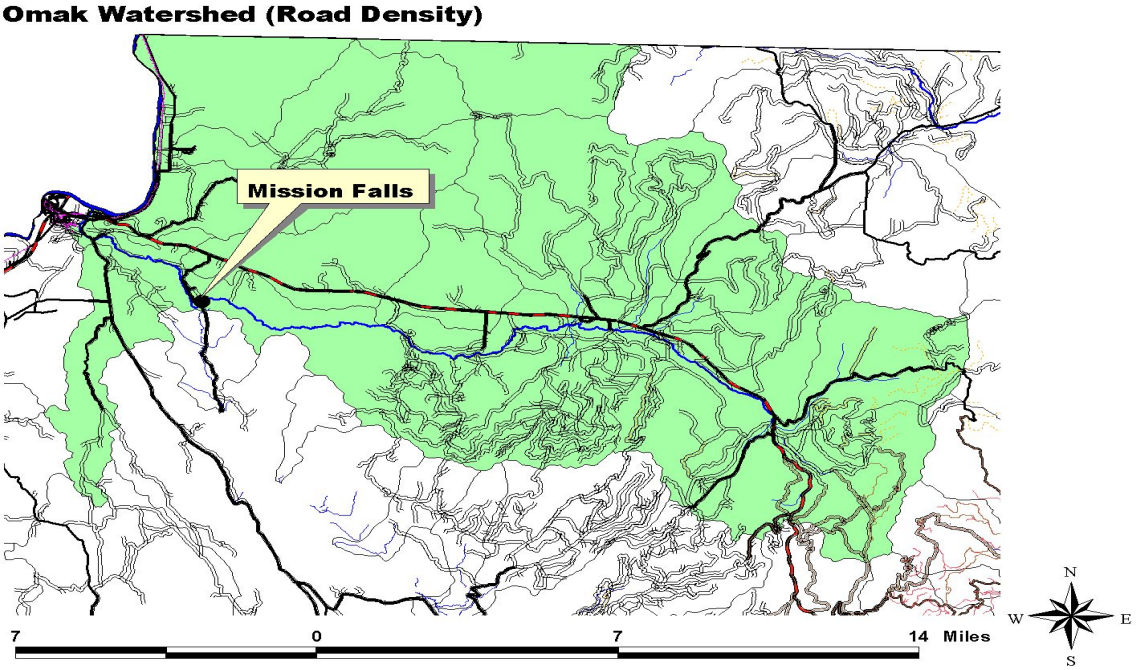
Example of resloping and revegetation techniques implemented in Omak Creek by the Confederated Tribes of the Colville Reservation to reduce streamside erosion.

Streamside Erosion Points

- 5.3 miles of stream work completed
- Increase in canopy closure from 8.4% to 30%

Riparian improvements have led to an increase in canopy closure in Omak Creek.

Anadromous Fish Habitat Restoration - Preliminary Results



Locations of known roads in the Omak Creek watershed.

Road Closures

- Ideal road density = ≤ 3 miles per square mile
- Ripped, drained, and reseeded 43 miles of roads
- an additional 400 miles of roads should be closed

Culvert Improvments

- Five culverts removed or replced since 2001
- 10 additional culverts identified that need immediate repairs/modifications
- 38 miles of stream of not been inventoried

Road "ripping" efforts by the Confederated Tribes of the Colville Reservation aids in mimicking natural infiltration rates.

199609400— *Increase Sharp-tailed Grouse and Mule Deer Populations and Enhance Shrubsteppe/ Riparian Habitats on the Scotch Creek Wildlife Area*

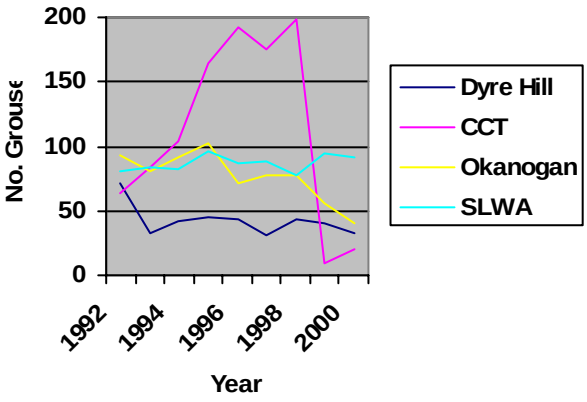
2002 Project Objectives

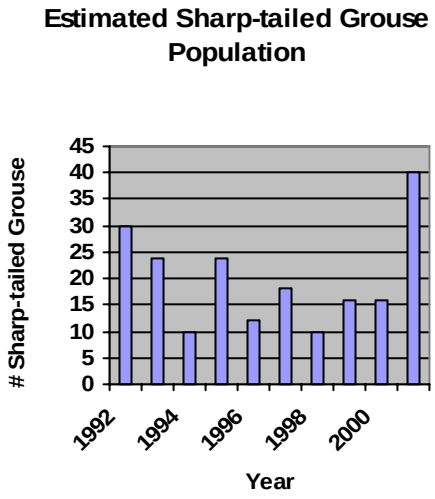
- Increase the number of sharp-tailed grouse to > 300 by 2010
- Monitor wildlife and habitat response to protection, enhancement, and maintenance efforts

Sharp-tailed Grouse Population Trends - Preliminary Results

The Scotch Creek Wildlife Area sharp-tailed grouse population was estimated to consist of 40 birds during 2002.

- Scotch Creek Wildlife Area sharp-tailed grouse population estimated to be at its highest level in at least 10 years
- Sharp-tailed grouse lek counts decreasing throughout most of the subbasin



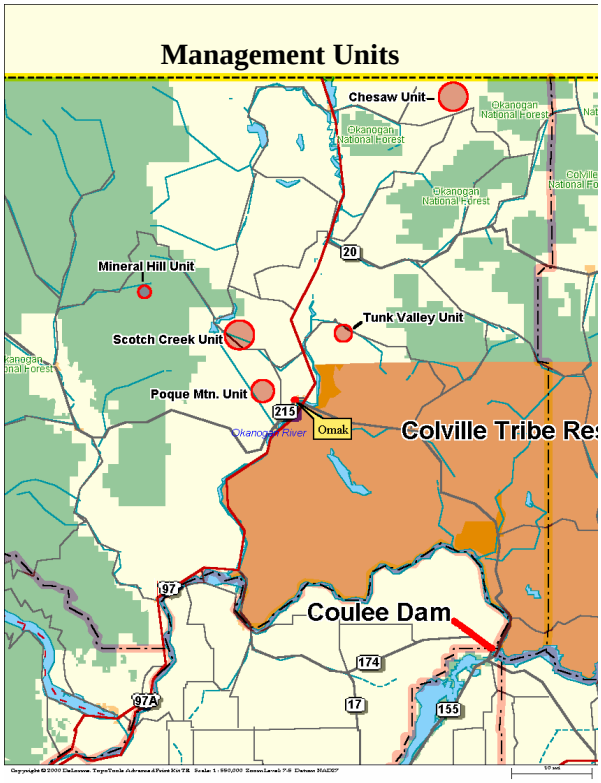


Habitat Protection, Enhancement and Maintenance - Preliminary Results

Enhancements Across all Management Units

- 58 miles of new fence
- 20 miles of fence restored
- 30 miles of interior fence removed
- 17 miles of additional fence required
- Controlled weeds on 1,630 acres
- 60,000 shrubs and trees planted since the project started
- 1,700 acres of agriculture land converted to grasslands
- established 125 acres of wildlife food plots

Washington Department of Fish and Wildlife applying agents to control weeds in the Okanogon Subbasin.

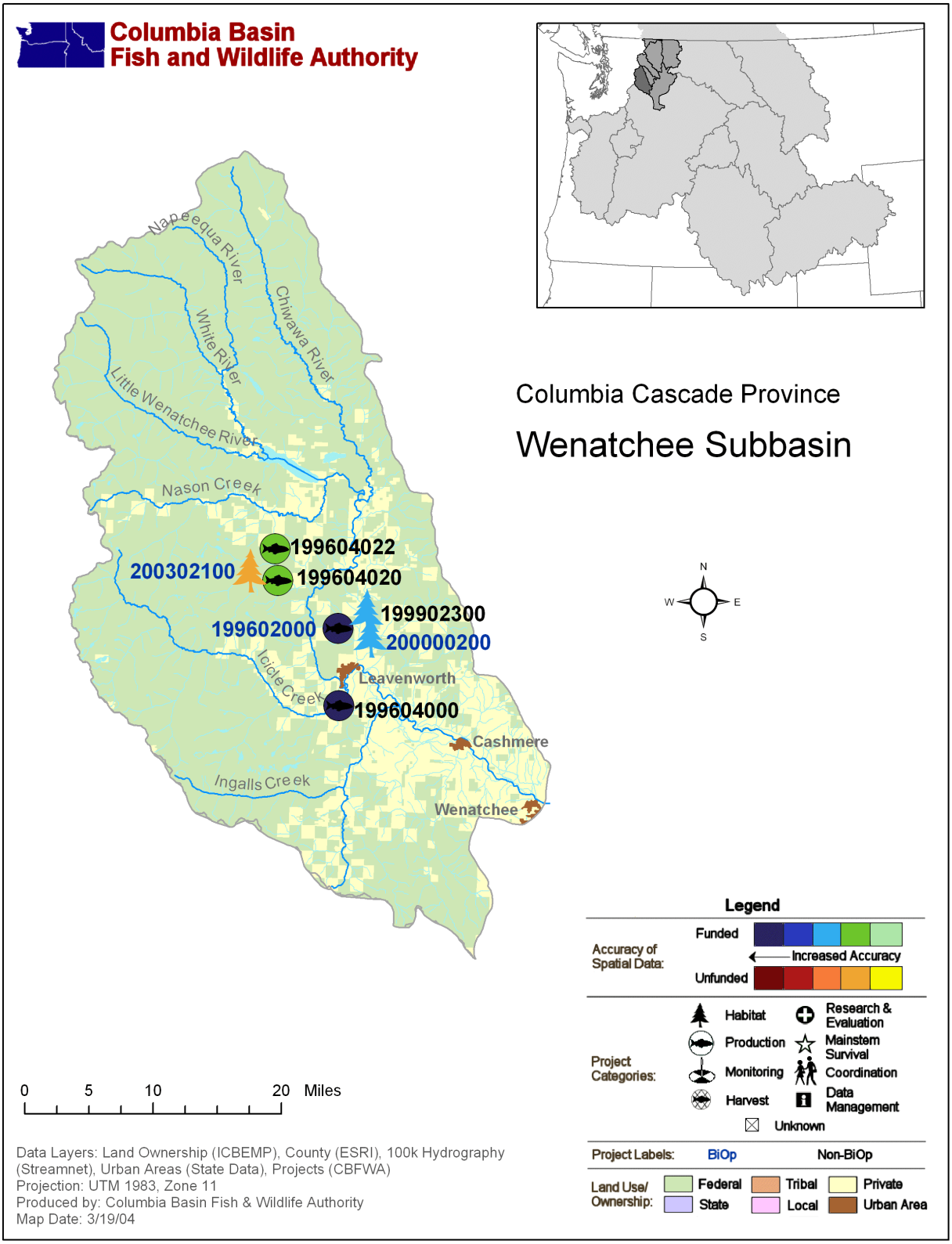


Management units managed by the Washington Department of Fish and Wildlife in the Okanogon Subbasin comprise almost 16,000 acres.

Example of a fence and signage installed by the Washington Department of Fish and Wildlife to protect sensitive wildlife habitat.

Food plots (125 acres) have been created by the Washington Department of Fish and Wildlife as a supplement for wildlife populations.

Wenatchee Subbasin



List of Projects in the Wenatchee Subbasin

ProjectID	*ProjectTitle*					*Biop?*	*Review Cycle*
199602000	**Comparative Survival Rate Study (CSS) of Hatchery Pit Tagged Chinook & Comparative Survival Study Oversight Committee**					**yes**	**Mainstem/ Systemwide**
	Rec 01-03	$851,979	$941,184	$941,184	*Category*	*Type*	*Accuracy*
	Spent 01-03	$354,050	$272,710	$300,226	Production	Anadromous	point
199604000	**Evaluate The Feasibility And Risks Of Coho Reintroduction In Mid-Columbia**					**no**	**Columbia Cascade**
	Rec 01-03	$2,053,201	$2,123,009	$2,140,809	*Category*	*Type*	*Accuracy*
	Spent 01-03	$2,992	$684,996	$1,576,779	Production	Anadromous	point
199604020	**Coho Supp In Mid Columbia O&M**					**no**	**Related to Reviewed Project?**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$162,042	$43,389	$ 0	Production	Anadromous	subbasin
199604022	**Coho Supp Mid Col Construction**					**no**	**Related to Reviewed Project?**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$35,996	$ 0	$ 0	Production	Anadromous	subbasin
199902300	**Chumstick Creek Northroad**					**no**	**unknown**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$11,356	$109,268	$ 1	Habitat	Anadromous	stream
200000200	**Final Phase of the Chumstick Culvert Replacement and Habitat Restoration Enhancement**					**yes**	**Columbia Cascade**
	Rec 01-03	$ 0	$ 0	$ 0	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$149,519	$21,081	Habitat	Anadromous	stream
200302100	**Comprehensive Inventory and Prioritization of Fish Passage and Screening Problems in the Wenatchee and Entiat Subbasins**					**yes**	**Columbia Cascade**
	Rec 01-03	$ 0	$ 0	$277,436	*Category*	*Type*	*Accuracy*
	Spent 01-03	$ 0	$ 0	$ 0	Habitat	Anadromous	subbasin

Projects highlighted in a darker shade have preliminary results data included in this report.

199604000— *Evaluate the Feasibility and Risks of Coho Reintroductions in the Mid-Columbia*

2002 Project Objectives

- Develop an upper Wenatchee River Basin coho broodstock
- Evaluate smolt-to-smolt survival rates for hatchery-reared coho released in the Wenatchee Basin
- Evaluate smolt-to-adult survival rates for hatchery-reared coho released in the Wenatchee Basin
- Determine the geographic spawning areas of returning and naturally produced spawners
- Determine the extent of residualism in hatchery-reared coho
- Evaluate the potential for direct predation of hatchery-reared coho smolts on salmonid fry
- Identify Macro– and microhabitat selection by coho, chinook, and steelhead and associated growth

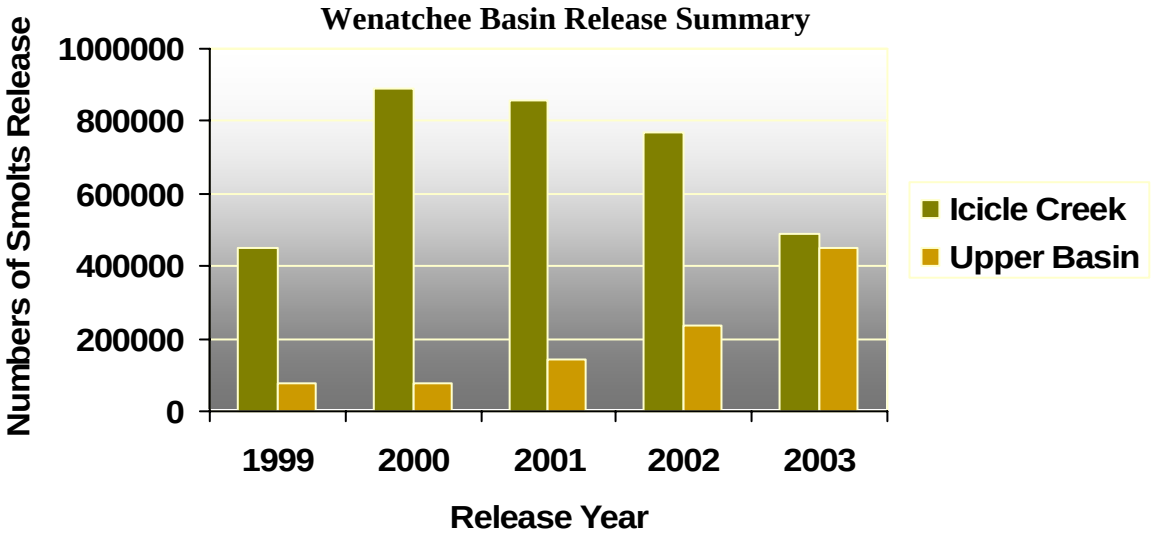
Wenatchee Basin Coho Broodstock Development - Preliminary Results

- Number of smolts released in natural spawning areas has increased while number of smolts released from Icicle Creek has been significantly reduced

2003 Acclimation Sites

- Icicle Creek - 490,600 smolts
- Nason Creek - 272, 700 smolts
- Little Wenatchee River - 100,800 smolts
- Beaver Creek - 75,000 smolts

In an effort to provide the best available rearing habitat, acclimation sites such as Beaver Creek (above) have been added to the broodstock development program.



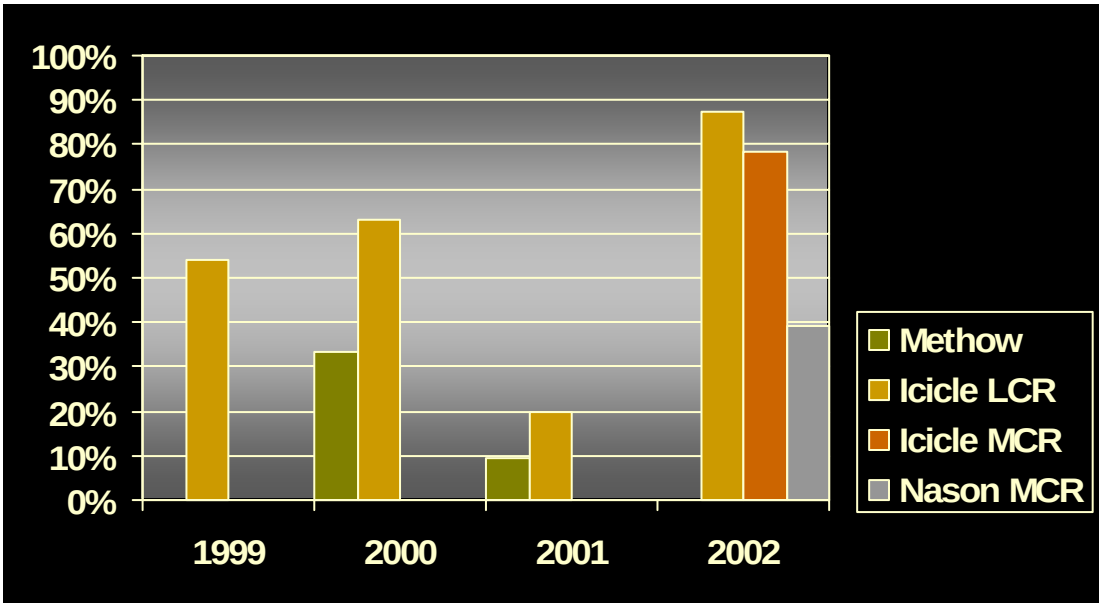
Wenatchee Basin Coho Broodstock Development - Preliminary Results

Broodstock Development Progress Report (2000-2003)

Birth year	Release year	Location	Brood source and number released	Return year
2000	2002	Methow	Lower Columbia River (186,000)	2003
		Dam 5	Middle Coulmbia River (350,000) Lower Columbia River (420,000)	2003
		Butcher Creek	Middle Coulmbia River (146,000)	2003
		Early Pond	Middle Coulmbia River (17,000)	2003
		Beaver Creek	Middle Coulmbia River (73,000)	2003
2001	2003	Methow	Lower Columbia River (244,000)	2005
		Dam 5	Middle Coulmbia River (453,000) Lower Columbia River (37,000)	2005
		Butcher Creek	Middle Coulmbia River (150,000)	2005
		Coulter Creek	Middle Coulmbia River (88,000)	2005
		Mahar Creek	Middle Coulmbia River (35,000)	2005
		Two Rivers	Middle Coulmbia River (100,000)	2005
		Beaver Creek	Middle Coulmbia River (75,000)	2005

Survival Rates - Preliminary Results

Downstream Smolt Survival to McNary

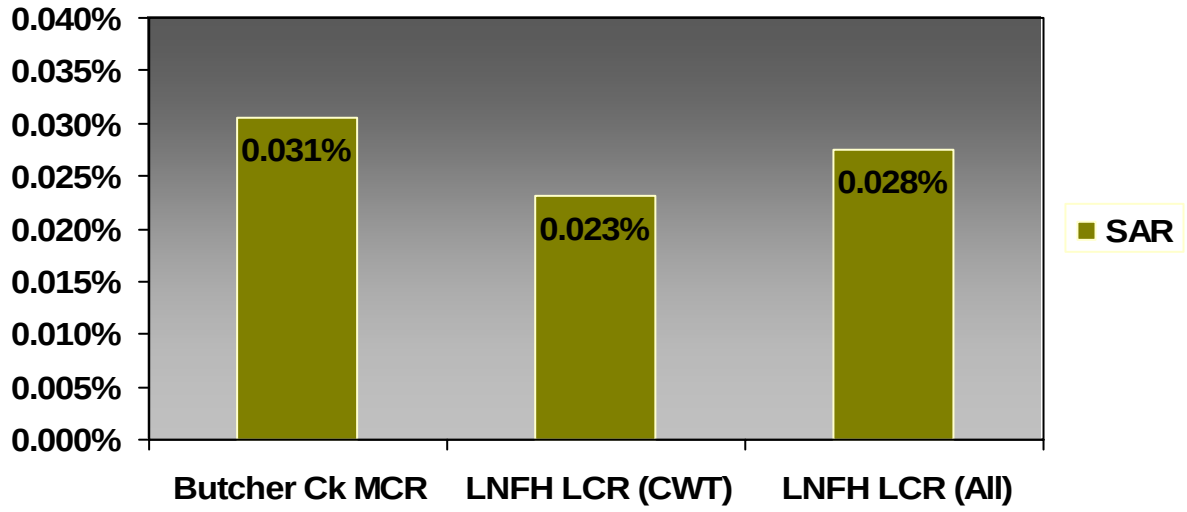


Survival Rates - Preliminary Results

Smolt-to-Adult Survival Rates for Middle Columbia River Coho

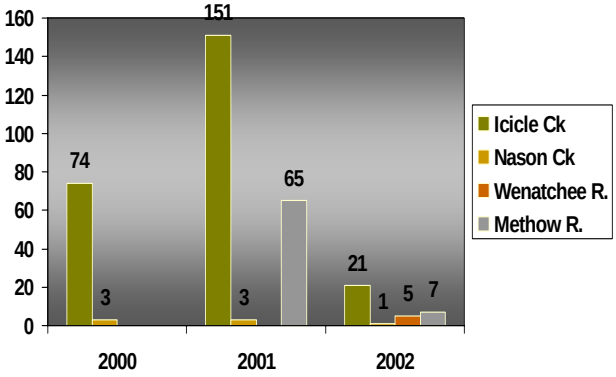
Release Year	Methow – McNary	Wenatchee - McNary	Methow SAR	Wenatchee SAR %
1999	N/A	53.9%	N/A	0.21-0.38
2000	33.3%	63.0%	0.17-0.27	0.17-0.86
2001	9.3%	19.8%	0.02- 0.05	0.03-0.13
2002	N/A	78-87% L 39% BC	N/A	N/A

Wenatchee Basin Smolt-to-Adult Survival Rates (2002)

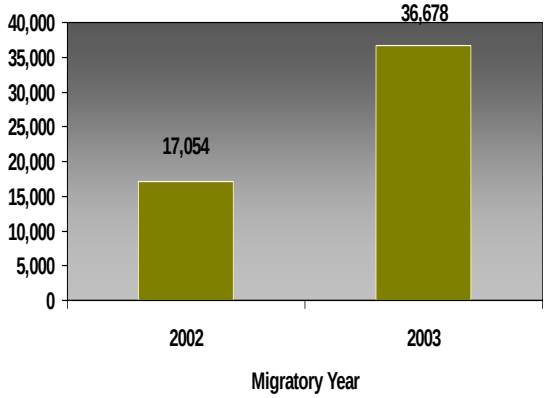


Natural Production - Preliminary Results

Wenatchee Basin Coho Redd Counts



Natural Coho Production
Smolt Emigration



Residualism and Predation - Preliminary Results

Residualism

- Low rates of residualism in acclimated coho released in Nason and Icicle creeks, and the Methow River
- Washington Department of Fish and Wildlife surveys confirm low rates of residualism in the Wenatchee River

Predation

Spring Chinook Predation Study

- Incidence of predation - 0.0018
- Mean residence time - 15.8 days
- Gastric evacuation rate - 40.5 days (mean river temperature during the study - 5.5° C)
- Estimated number of spring Chinook consumed by coho - 2,436
- Predation rates are below 1% of the spring chinook fry population

Lake Wenatchee

- No sockeye were consumed by hatchery coho
- Incidence of predation - 0

Nason Creek

Hatchery-reared Coho

- Sampled 1,105 coho - 3 contained chinook fry
- Incidence of predation - 0.0029 - 0.0069

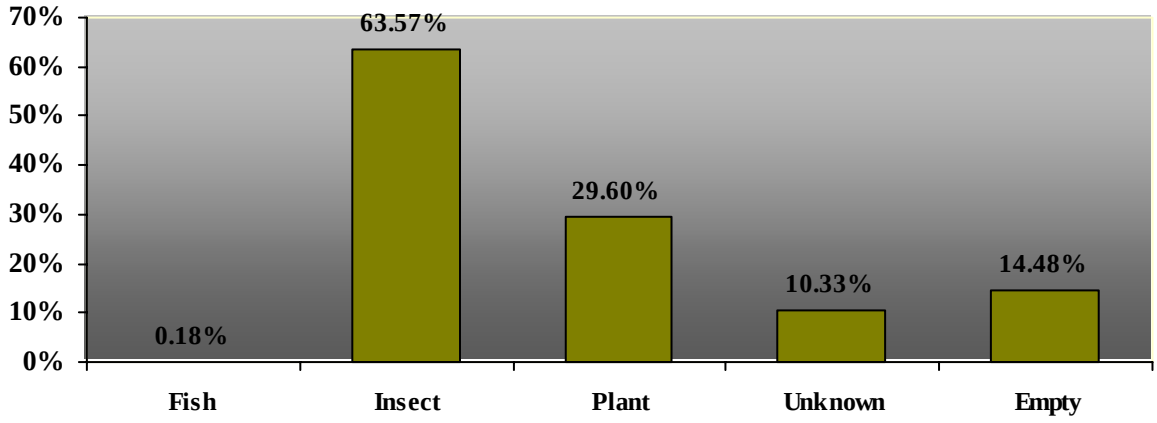
Natural Coho

- Sampled 100 coho - 1 contained a chinook
- Incidence of predation - 0.010

Yakima Indian Nation biologist performing snorkeling surveys to evaluate interaction between coho and chinook in the Wenatchee Basin.

To evaluate the predation by coho, the Yakima Indian Nation collected fish from throughout the Wenatchee basin using equipment such as rotary traps (above).

Contents of Coho Diets During Spring Chinook Predation Study



Micro– and Macrohabitat Selection - Preliminary Results

Macrohabitat

- Spring chinook and coho were found in less frequently in riffles and selectd pools and glides
- Steelhead were found less frequently in pools and glides and were selecting for riffles

Microhabitat

- Spring chinook and coho did not use the same microhabitat when they occurred together
- Coho used significantly slower velocities than spring chinook
- Coho used significantly shallower depths than spring chinook
- Coho were found under cover more often than spring chinook

Photos: Courtesy Yakima Indian Nation

Yakima Indian Nation biologists evaluating habitat use (top) and collecting fish (bottom) to evaluate growth and condition factors of coho, spring chinook, and steelhead.

Photo: Courtesy Yakima Indian Nation

General conclusions:

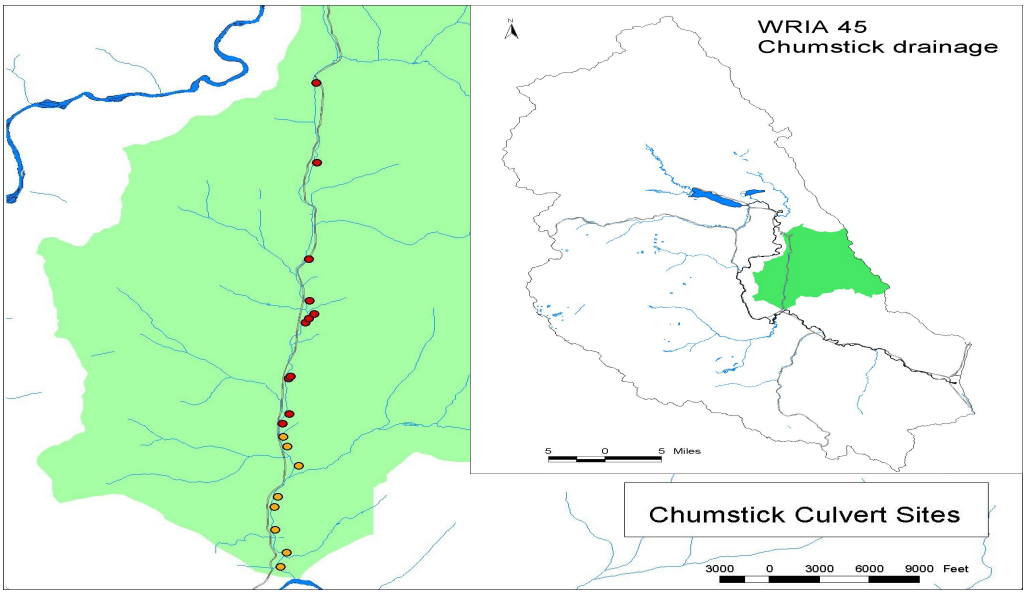
- Coho, spring chinook, and steelhead yearlings select different habitats when they exist
- Coho did not appear to displace spring chinook from preferred microhabitats
- Growth and condition factors of spring chinook in Nason Creek was unaffected by stocked coho

200000200— *Final Phase of the Chumstick Culvert Replacement and Habitat Restoration Enhancement*

2002 Project Objectives

- Replace eight culverts in the lower section of the Chumstick drainage through the construction of seven bridges and one bottomless culvert.

Culvert Replacements - Results



Locations in orange represent culverts that were replaced with bridges or bottomless culverts. The final culvert was replaced in Fall 2002. Locations in red were not completed due to a lack of funding.

Using bridges (above) and bottomless culverts, the Chelan County Conservation District replaced eight culverts that were barriers to anadromous fish.

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