Volume III, Chapter 13
Columbian White-tailed Deer

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13.0 Columbian White-tailed Deer (*Odocoileus virginianus leucurus)*

13.1 Introduction

The Columbian white-tailed deer (*Odocoileus virginianus leucurus*) is one of 38 recognized subspecies of *O. virginianus*. Columbian white-tailed deer is one of the largest terrestrial mammals associated with the Columbia River estuary (NPPC 2002). Columbian white-tailed deer are prevalent in the upper estuary and along the river corridor. Low-lying mainland areas and islands in and along the Columbia River from about Skamakowa, Washington, to Port Westward, Oregon are the preferred habitats of the Columbian white-tailed deer.

The Columbian white-tailed deer, a subspecies of the white-tailed deer, is on the Endangered Species List. It is classified as endangered in Washington and Oregon. This deer once ranged from Puget Sound to southern Oregon, where it lived in floodplain and riverside habitat. The conversion of much of its homeland to agriculture and unrestricted hunting reduced its numbers to a just a few hundred in the early 20th century. Habitat conversion and losses coupled with the low prdocutivity of the population are the most important threats now to the population. It now lives in a few scattered populations, and its numbers have climbed to approximately 300-500 in the lower Columbia and over 5,000 in the Roseburg area. Recovery goals outline the need to secure additional habitat for population re-introduction (USFWS 1976).

13.2 Life History & Habitat Requirements

13.2.1 Life History

13.2.1.1 Diet

Recent studies have indicated the importance of grasses and forbs in the diet of white-tailed deer in North America (Allen 1968, Coblentz 1970, Segelquist *et al.* 1972, Sotala and Kirkpatrick 1973, Harder and Peterle 1974, McCaffery *et al.* 1974, Anthony and Smith 1977). Gavin *et al.* (1984) concluded that water foxtail provided forage of high quality and that Columbian whitetails preferred to graze rather than browse.

Whitetails on the Columbian White-Tailed Deer National Wildlife Refuge (CWTDNWR) were observed grazing on forbs and grasses almost exclusively during the early and mid-1970s. Suring (1974) and Suring and Vohs (1979) reported that grazing was detected in 99% of their nearly 18,000 observations of deer feeding. Stomach contents from 32 whitetails collected from all seasons during 1972–77 consisted of grasses (59%), forbs (16%) and browse (25%) (B.B. Davitt personal communication: 1981). Essentially, all browse consumed was nonwoody (such as blackberry leaves). Dublin (1980) concluded that Columbian whitetails on the refuge selected for browse in every season except spring and selected for forbs in all seasons, but selected against grass (relative to its availability) in autumn, winter, and spring. It is possible that at least part of this paradox in describing the food habits of these deer is due to a change in vegetation height, productivity, and availability on the refuge between the early and late 1970s (Gavin 1984).

13.2.1.2 Reproduction

Rutting activity begins the first week of November and probably reaches a peak during the second week. By the end of the month, reproductive behavior by males decreases noticeably, although some deer are apparently capable of breeding as late as March. This conclusion is based on an observation of twins born sometime in late September–early October in 1974, assuming the gestation period of Columbian whitetails approximates that of eastern white-tailed deer (210 days) (USFWS 1976).

Observations (spring 1975) indicated that the peak of fawning was the second week in June. This correlates well with the observed rutting period of the second week of November, and corroborates a gestation of about 7 months. Available data indicate that nearly all adult females become pregnant and give birth to one or two fawns. However, recruitment into the population, based on fawn:doe ratios of marked females in November, is relatively low. Fawns comprised 21-33% of the November population from 1972–77 (no data for 1973), while yearling and adult males comprised 18-21%. There was no evidence that female fawns were fecund (USFWS 1976).

13.2.1.3 Home Range

Severinghaus and Cheatum (1956) summarized the literature published prior to 1956 and generalized that seasonal range of an individual whitetail rarely exceeded one mile in diameter; this has been supported generally by studies conducted since that time. Home ranges of whitetails in Texas (Thomas *et al.* 1964, Michael 1965, Alexander 1968) and the Southeast (Marshall and Whittington 1968, Byford 1969, Kammermeyer and Marchinton 1976) seemed most similar to those of Columbian whitetails on the CWTDNWR with respect to size and temporal stability (Gavin *et al.* 1984).

Gavin *et al.* (1984) estimated the home range size among sex-age classes of whitetails on the CWTDNWR mainland and found that the mean home range size for females was 391.6 acres; for males, the mean area of home ranges was 475 acres. Home ranges of males tended to increase in size as males became older, but there was no significant trend with age among females. There was no apparent relationship between the geographic location or size of a marked female's ($\geq$ 3.5 years old) home range and her success in recruiting fawns.

In Oregon, Smith (1985) found that the average home range size was 109 acres for does and 116.3 acres for bucks in the Roseburg area.

Observation of marked deer on the CWTDNWR mainland indicated that individual whitetails had the same home ranges in successive years (Gavin 1979). The average home range was 391.5 acres for does and 474.7 for bucks. The area traveled by a deer in any 24-hour period, however, was considerably smaller than these averages. No movement by marked deer off the refuge was ever observed (Gavin 1984).

13.2.1.4 Migration

The Columbian white-tailed deer is a non- migratory species that exists in the historic floodplain areas of the lower Columbia River from Longview, Washington, to the mouth of the Columbia River.

13.2.1.5 Mortality

On the CWTDNWR, Gavin *et al.* (1984) found that the oldest ages at death observed for females and males coupled with the tertiary sex ratio of 3 females:1 male strongly indicated that annual mortality among yearling and adult males was about twice as high as for yearling and adult females (Figure 13-1). Estimation of mortality rates for marked males and females also indicated a higher rate of mortality for males. Gavin *et al.* (1984) summarized the relative importance of proximate causes of mortality of whitetails on the CWTDNWR in Table 13-1.

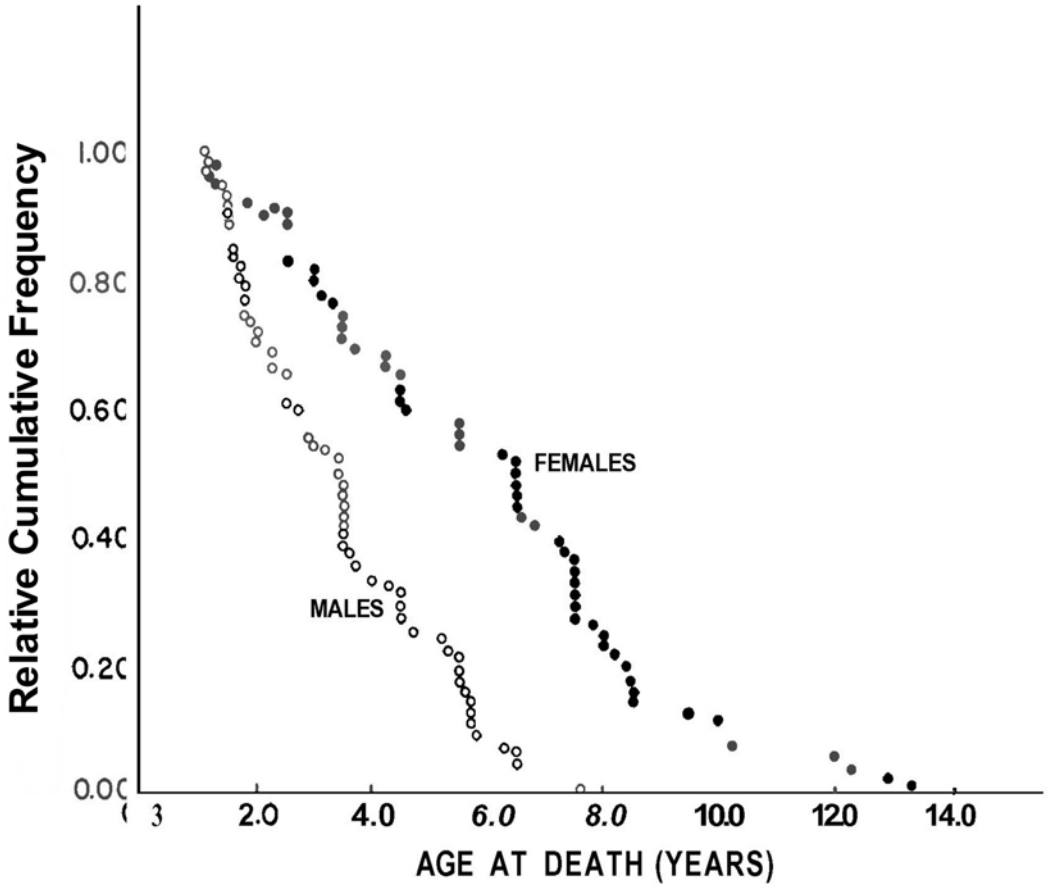

Figure 13-1. Relative cumulative frequency of ages at death for males and females > 1 year old at death on the CWTDNWR (Gavin *et al.* 1984).

Table 13-1. Proximate causes of mortality of white-tailed deer on the CWTDNWR mainland during June 1974-December 1977 (Gavin *et al.* 1984).

Cause of death	# dead Males	Females	Fawns	# with symptoms of necrobacillosis
Automobile	5	3	0	1
Capture attempt	5	4	1	5
Coyote	0	0	9	0
Dog	5	0	0	4
Drowning	0	2	1	2
Fence	1	0	1	0
Necrobacillosis (bacterial)	1	1	2	4
Nutritional stress	9	3	0	6
Poached	6	2	0	4
Unknown	26	28	40	23
Total	*58*	*43*	*54*	*49*

Gavin *et al.* (1984) further concluded that the temporal distribution of natural mortalities of yearlings and adults in this population suggested that mortality of these age classes resulted ultimately from the activities and stress associated with reproduction (Table 13-2). For males, natural mortality was heaviest after peak activity in rutting (November). At least 22 yearling and adult males died during November–January (1974-76), nearly twice as many male deaths as any other 3-month period.

Table 13-2. Temporal distribution of natural mortalities (plus road kills) of white-tailed deer on CWTDNWR mainland, June 1974–December 1977 (Gavin *et al.* 1984).

	Nov-Jan	Feb-Apr	May-July[a]	Aug-Oct
Fawns	6	3	6	8
Adult and yearling males	22	13	6	9
Adult and yearling females	6	4	9	15
Total	*34*	*20*	*21*	*32*

[a] No fawn mortahties were found in May

Because white-tailed fawns are not fully weaned until at least 3 months old (Moen 1973:144) and energy requirements of the female are greatest at the peak of lactation (Moen 1973:362), Columbian whitetail females that were successful in raising fawns were probably under greatest physiological stress in late summer-early autumn. Females whose fawns failed to survive after birth would have been under peak stress at late gestation or parturition in late May or June.

Klein and Olson (1960) found higher natural mortality among males than females in a lightly hunted population of black-tailed deer in Alaska and associated this with an unbalanced sex ratio favoring females. Flook (1970), who studied differential sex ratios in elk in Canada, concluded that nonhunting mortality of males older than yearlings contributed to ratios heavy to females.

Mortality rates of white-tailed deer fawns tend to be high in unhunted populations. Cook *et al.* (1971) found a mean annual mortality rate of 71.5% from birth to 3 months of age during a 2-year study of radio-marked fawns in Texas (Gavin *et al.* 1984). White (1973:467) estimated a 60% mortality rate of fawns during summer on the Aransas National Wildlife Refuge in Texas. Hunted populations of whitetails generally have fawn mortality rates less than half as high as those from the unhunted populations (O'Pezio 1978).

Fawn mortality at the CWTDNWR in the early 1990s was believed to be limiting the population growth. Studies were undertaken in 1996 and 1997 where fawns were radio-collared soon after birth and followed until collar loss or death. In 1996, all 12 collared fawns died within 45 days of capture. Coyote control the next spring removed nine coyotes from the refuge and that year, three of the 17 radio-collared fawns were killed by coyotes (USFWS 1997). Public concern over the trapping of coyotes has stopped the program and fawn recruitment is now low (Miller, pers. comm.).

13.2.2 Habitat Requirements

O'Neil *et al.* (2001) found that the Oregon habitat type with which Columbian white-tailed deer is most closely associated is westside oak within 200 meters of a stream or river (Table 13-3).

Table 13-3. Habitat types with which Columbian white-tailed deer is associated (O'Neil *et al.* 2001).

Habitat Type	Association	Activities	Confidence	Comments
Westside lowlands conifer-hardwood forest	Generally associated	Feeds & breeds	High	None noted
Westside grasslands	Generally associated	Feeds & breeds	High	None noted
Agriculture, pastures, & mixed environs	Generally associated	Feeds & breeds	High	None noted
Westside oak & dry douglas-fir forest & woodlands	Closely associated	Feeds & breeds	High	Strong association with oak within 200m of a stream or river.
Urban & mixed environs	Generally associated	Feeds & breeds	High	None noted
Herbaceous wetlands	Generally associated	Feeds	High	None noted
Westside riparian-wetlands	Generally associated	Feeds & breeds	High	None noted
Southwest Oregon mixed conifer-hardwood forest	Generally associated	Feeds & breeds	High	None noted

The relative preference of vegetative communities by Columbian whitetails on the CWTDNWR mainland was documented by Suring (1974) and Suring and Vohs (1979). The study identified 12 different plant communities and concluded that Columbian whitetail use was greatest in communities that provided both forage and cover (USFWS 1976). Plant communities on the refuge that provided cover taller than 70 cm in the vicinity of forage were used more frequently than communities that provided cover or forage alone (Suring and Vohs 1979). Deer showed a preference for the park forest community—especially in the fall, winter, and spring. The primary activity in the park forest was feeding (66% of the observations), followed by resting (22%), and movement (12%) (USFWS 1976). Other plant communities that received high whitetail deer use were open canopy forest, sparse rush, and dense thistle. Open canopy forest or dense thistle (*Cirsium arvense*) communities were preferred to closed canopy forest or improved pasture, for example (Gavin *et al.* 1984). Higher percentages of deer were observed resting and moving in the forest than in non-forest communities. The high frequency of resting behavior in forest communities is probably related to the thermal protection of woody cover.

O'Neil *et al.* (2001) found that Columbian white-tailed deer are generally associated with certain forest structural conditions for feeding and breeding (Table 13-4).

In general, browse is chosen in summer, fall, and winter while forbs are most heavily utilized in spring, summer, and early fall. Grasses are not preferred at any time of the year but are eaten in proportion to their availability only in the early spring (Dublin 1980). Heavy use of forbs occurs as they emerge in the spring and throughout the summer. O'Neil *et al.* (2001) summarized Columbian white-tailed deer associations with grass/scrubland structural conditions inTable 13-5.

Table 13-4. Forest structural conditions with which Columbian white-tailed deer is associated (O'Neil *et al.* 2001).

Structural Condition	Activity	Association	Confidence	Comments
Grass/forb-open	Feeds	Generally associated	High	Predominately feeds in this structural condition.
Small tree-single story-closed	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Medium tree-single story-open	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Medium tree-single story-moderate	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Medium tree-single story-closed	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Small tree-multi-story-open	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Small tree-multi-story-moderate	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Small tree-multi-story-closed	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Grass/forb-closed	Feeds	Generally associated	High	Predominately feeds in this structural condition.
Medium tree-multi-story-open	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Medium tree-multi-story-moderate	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Medium tree-multi-story-closed	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Shrub/seedling-open	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Shrub/seedling-closed	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Sapling/pole-open	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Sapling/pole-moderate	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Sapling/pole-closed	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Small tree-single story-open	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.
Small tree-single story-moderate	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Forested structural conditions also used for cover.

Table 13-5. Shrub/grassland structural conditions with which Columbian white-tailed deer is associated (O'Neil *et al.* 2001).

Structural Condition	Activity	Association	Confidence	Comments
Grass/forb-open	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Medium shrub-open shrub overstory-mature	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Medium shrub-open shrub overstory-old	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Medium shrub-closed shrub overstory-seedling/young	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Medium shrub-closed shrub overstory-mature	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Medium shrub-closed shrub overstory-old	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Tall shrub-open shrub overstory-seedling/young	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Tall shrub-open shrub overstory-mature	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Tall shrub-open shrub overstory-old	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Tall shrub-closed shrub overstory-seedling/young	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Tall shrub-closed shrub overstory-mature	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Grass/forb-closed	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Tall shrub-closed shrub overstory-old	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.
Low shrub-open shrub overstory-seedling/young	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Low shrub-open shrub overstory-mature	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Low shrub-open shrub overstory-old	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Low shrub-closed shrub overstory-seedling/young	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Low shrub-closed shrub overstory-mature	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Low shrub-closed shrub overstory-old	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition.
Medium shrub-open shrub overstory-seedling/young	Feeds & breeds	Generally associated	High	May feed & breed in this structural condition. Also used for cover.

13.3 Population & Distribution

13.3.1 Population

Population declines led to the classification in 1967 of Columbian white-tailed deer as endangered under the ESA (32 FR 4001). The subspecies was automatically included in the lists of threatened and endangered species when the ESA was authorized in 1973 (16 US C. 1531 *et seq.*). Prior to 1977, only the Columbia River population was listed as endangered since the Douglas County population was considered by Oregon to be a black-tailed deer (*Odocoileus hemionus columbiana*) or a hybrid between the black-tailed deer and the whitetail. In 1978, Oregon recognized the white-tailed deer population in Douglas County as the Columbian white-tailed deer and prohibited hunting the species in that county (ODFW 1995) (WDOT 2001).

Today, these are the only two populations of any consequence west of the Cascades—the one along the lower Columbia River and the second near Roseburg, Oregon (NPPC 2002).

Approximately 300-400 whitetails live in four major and one minor subpopulations along the lower river in Oregon and Washington from Wallace Island (RM 50) downstream to Karlson Island (RM 32). Each subpopulation is separated from the next by a main river channel or patches of unfavorable habitat that limit consistent interchange. The largest subpopulation occurs on the Washington mainland near Cathlamet. Establishment of the CWTDNWR in 1972 secured about 4,800 acres of this prime habitat. The refuge population on the Washington mainland has been declining since 1977.

13.3.1.1 Washington

The population on the 1,952-acre mainland portion of the CWTDNWR was estimated at 200-230 during the winter of 1972–73 (Suring 1974). This was an average density of 65.6-75.4 deer/mi^2. Gavin (1979) conservatively estimated the population in the Novembers of 1974, 1975, 1976, and 1977 to be 214, 180, 164, and 202, using a mark-recapture technique (Schnabel). The November–December population during 1978, 1979, and 1980 was estimated at 212, 191, and 159, respectively (Columbian White-tailed Deer Recovery Team 1982). Population estimates for Columbian whitetails on off-refuge islands in the Columbia River near the refuge include 50-75 for Puget Island, 70-80 for Wallace Island-Westport, and 8-12 for Karlson Island (Columbian White-tailed Deer Recovery Team 1982).

Today, lower Columbian whitetails comprise five herds: Tenasillahe Island reserve, the CWTDNWR (mainland), Puget Island, Westport, and Wallace Island. Table 13-6 summarizes herd composition and population survey information for the mainland, Puget Island, Tenasillahe Island, and Westport herds.

The Columbian whitetail throve under the protection of the refuges and in 1995, was even a candidate for downlisting. However, in February of 1996, both Tenasillahe Island and the mainland deer refuge experienced severe flooding. At the height of the floods, when 2 to 3 feet of water inundated the refuge mainland and 6 inches to a foot covered Tenasillahe Island, more than 75% of the deer population was estimated to have left the refuge seeking higher ground. Deer populations before the flood were estimated at between 115 and 120 on the mainland and more than 200 on Tenasillahe Island. After the flood, biologists estimated a population of 60 deer on the mainland unit and 100 deer on 2,000-acre Tenasillahe Island in the Columbia River. The unaccounted-for deer are presumed to have died (USFWS 1996).

Table 13-6. Deer counts and fawn:doe ratios by subpopulation: 1985–2002*

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Mainland		
Year	Deer Count	Fawn:Doe Ratio
1985	208	62
1986	216	43
1987	227	34
1988	173	14
1989	158	29
1990	146	30
1991	118	21
1992	117	28
1993	73	11
1994	49	1
1995	47	14
1996	37	16
1997	52	61
1998	53	43
1999	26	15
2000	44	34
2001	38	49
2002	44	25

Puget Island		
Year	Deer Count	Fawn:Doe Ratio
1985	143	40
1986	129	40
1987	122	59
1988	135	53
1989	135	40
1990	104	55
1991	84	38
1992	100	58
1993	82	48
1994	88	55
1995	133	47
1996		
1997		
1998		
1999	60	45
2000	58	70
2001	48	49
2002	39	40

Tenasillahe		
Year	Deer Count	Fawn:Doe Ratio
1985		
1986	13	27
1987	22	38
1988	25	48
1989	27	43
1990	35	67
1991	41	55
1992	55	67
1993	66	47
1994	71	52
1995	76	53
1996		
1997		
1998		
1999	38	6
2000	32	8
2001	30	18
2002	11	0

Westport		
Year	Deer Count	Fawn:Doe Ratio
1985	54	40
1986	53	40
1987	66	57
1988	53	66
1989	57	29
1990	61	56
1991	56	30
1992	69	58
1993	54	42
1994	100	57
1995	91	23
1996		
1997		
1998		
1999	45	11
2000	28	23
2001	36	39
2002	36	29

* Claskanie Flats also had deer but only in 2002; 11 deer were counted with a fawn:doe ratio of 84.

Several recent attempts to re-introduce Columbian white-tailed deer have taken place in the Lower Columbia region. Twelve deer were transplanted to Fisher and Hump Islands in the spring of 2003 (Miller, pers. comm.).

13.3.1.2 Oregon

From 1928–52, whitetails found northeast of Roseburg, Oregon, in an area containing approximately 30.5 mi^2 were considered by ODFW part of the refuge population (Gavin 1984). Hunting was prohibited. Crews (1939) estimated the number of whitetails in this high-density area at 200-300 in 1938. This refuge was dissolved in 1952, and hunting was resumed. In 1970, ODFW estimated that 450-500 whitetails existed in the old refuge area, at a density of 14.8-16.3 deer/mi^2 (Smith 1985). In a detailed study of Roseburg whitetails, Smith (1985) estimated the density in his 6,783-acre study area along the North Umpqua River to be 59-70 deer/mi^2 in 1979–80. He used a mark-recapture technique similar to that used by Gavin (1979) for the Columbia River population.

In 1970, ODFW estimated 450-500 deer and by 1983, the number had increased to about 2,500 (Smith 1985). The population is now estimated to be 5,900-7,900 deer (ODFW 1999). The range also has expanded to an area of approximately 308 mi^2 (ODFW 1995). Approximately 9,586 acres of suitable Douglas County habitat are considered secure on federal, county, and private lands. (For delisting, habitat is considered secure if it is protected by legally binding measures or law from adverse human activities for the foreseeable future.) The current total population is estimated as approximately six times the population size required for downlisting, which greatly reduces the risk to the population. The Douglas County population has met the objectives in the recovery plan, and greatly exceeded the habitat objectives (USFWS 1999).

Deer have been re-introduced into the lower Columbia River in Oregon at Crimms Island and Lord Island near Longview, Washington. Deer from the Crimms Island project have become established in the Willow Grove area near Longview. The deer at Lord Island were released in early 2003 (Miller, pers. comm.).

13.3.2 Distribution

Columbian white-tailed deer were formerly distributed throughout the bottomlands and prairie woodlands of the lower Columbia, Cowlitz, Willamette, and Umpqua River basins in Oregon and southern Washington (Bailey 1936). Early accounts suggested this deer was locally common, particularly in riparian areas along the major rivers (Gavin 1978). The number of deer declined rapidly with the arrival and settlement of pioneers in the fertile river valleys. Conversion of brushy riparian land to agriculture, urbanization, uncontrolled sport and commercial hunting, and perhaps other factors apparently caused the extirpation of this deer over most of its range by the early 1900s (Gavin 1984). Only a small herd of 200-400 animals survived in Clatsop, Columbia, Cowlitz, and Wahkiakum Counties in Washington, along with a disjunct population of unknown size in Douglas County, Oregon. The two populations are geographically separated by about 200 miles of unsuitable or discontinuous habitat (USFWS 1999).

Today, there are only two whitetail populations of any consequence west of the Cascade Mountains. One is located along the lower Columbia River on the CWTDNWR. The other—the Roseburg herd—is located in Douglas County, Oregon (Figure 13-2) (Gavin 1984). Recently, deer have been transplanted into islands in the Columbia River near Longview, Washington. A few scattered deer also exist in the Willow Grove area near Longview. These scattered

populations may form the nucleus for populations to become established in the future (P. Miller, pers.comm.).

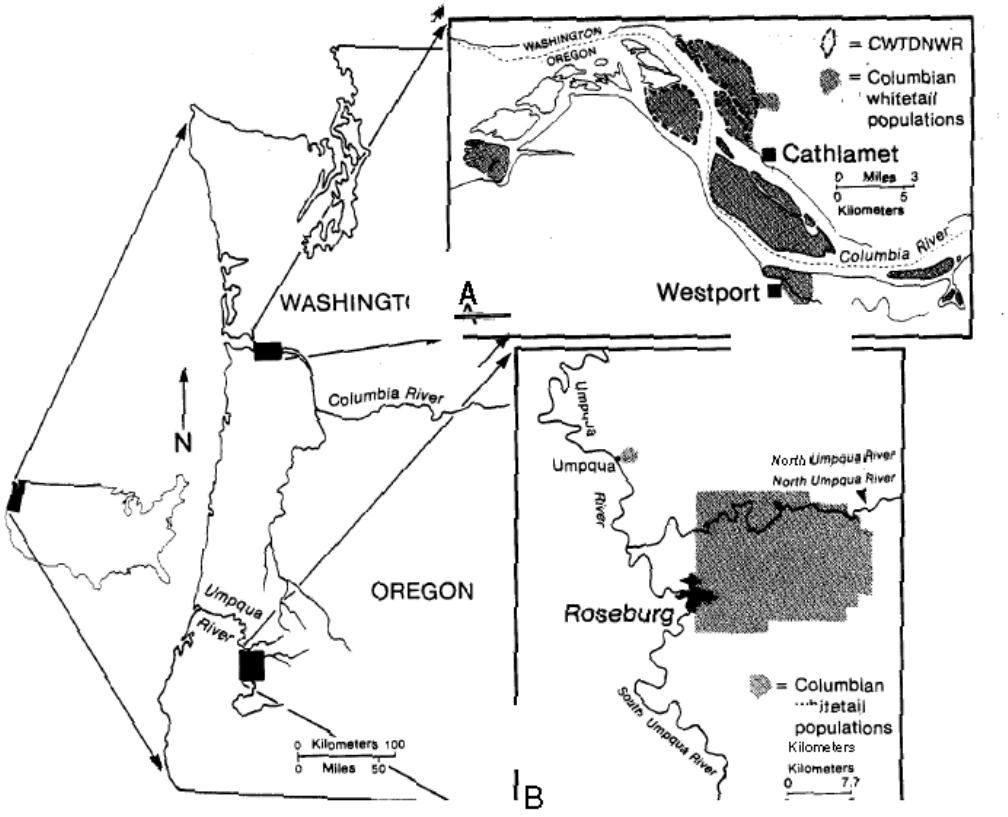

Figure 13-2. Distribution of white-tailed deer in western Washington and Oregon, 1983.

13.4 Status & Abundance Trends

13.4.1 Status

Population declines led to classification of Columbian white-tailed deer as endangered in 1967 under the ESA (32 FR 4001). The subspecies was automatically included in the lists of threatened and endangered species when the ESA was authorized in 1973 (16 US C. 1531 *et seq.*). Prior to 1977, only the Columbia River population was listed as endangered since, as mentioned above, the Douglas County population was considered a black-tailed deer or a hybrid. In 1999, USFWS proposed to delist the Columbian white-tailed deer in the entire range. Public concern over delisting caused USFWS to withdraw the proposal. The Roseburg population recently has been proposed for delisting but this has not been adopted by USFWS. The lower Columbia population is not proposed for any listing change at this time (David, pers. comm.).

13.4.2 Trends & Productivity

The lower Columbia River population exhibits a long-term decline. Populations in all the major areas were affected by flooding in 1996 and conversion of pastures and woodlots to homes. Deer counts from the mainland refuge have declined from a mean of 159 from 1985–93 to a mean of 43 from 1994–2002 (Table 13-6).

13.5 Habitat

Columbian white-tailed deer were formerly distributed throughout the bottomlands and prairie woodlands of the lower Columbia, Cowlitz, Willamette, and Umpqua River basins in Oregon and southern Washington (Bailey 1936). This discussion focuses on habitat in the region of the lower Columbia River in Washington.

Extensive losses of habitat have occurred in the lower Columbia and estuary provinces as a result of dredging, filling, diking, and channelization. Figure 13-3 illustrates the status of historic habitat types of the lower Columbia subbasin (IBIS 2003).

The floodplain and lowlands likely were much more heavily forested, with hardwood and perhaps some coniferous riparian species. There were many more lakes, ponds, sloughs, overflow channels, backwaters and wetlands. Openings were likely associated with the wet areas, accreting lands or lands having recently experienced a scouring flood. These openings would have been dynamic in location; they would not have remained stationary in the landscape. Uplands were likely characterized by a coniferous forest. Fish and wildlife were much more abundant and diverse.

Based on the available information and excluding the Columbia River itself, it may not be unreasonable to speculate that the composition of the landscape types at the time of the Lewis and Clark expedition was in the range of:

- 60-70% forest (hardwood, conifer and mixed forest);
- 15-25% openings (meadows, accreting lands, recently scoured lands); and
- 15-25% water and wetlands (lakes, ponds, sloughs, wetlands, streams) (NPPC 2002).

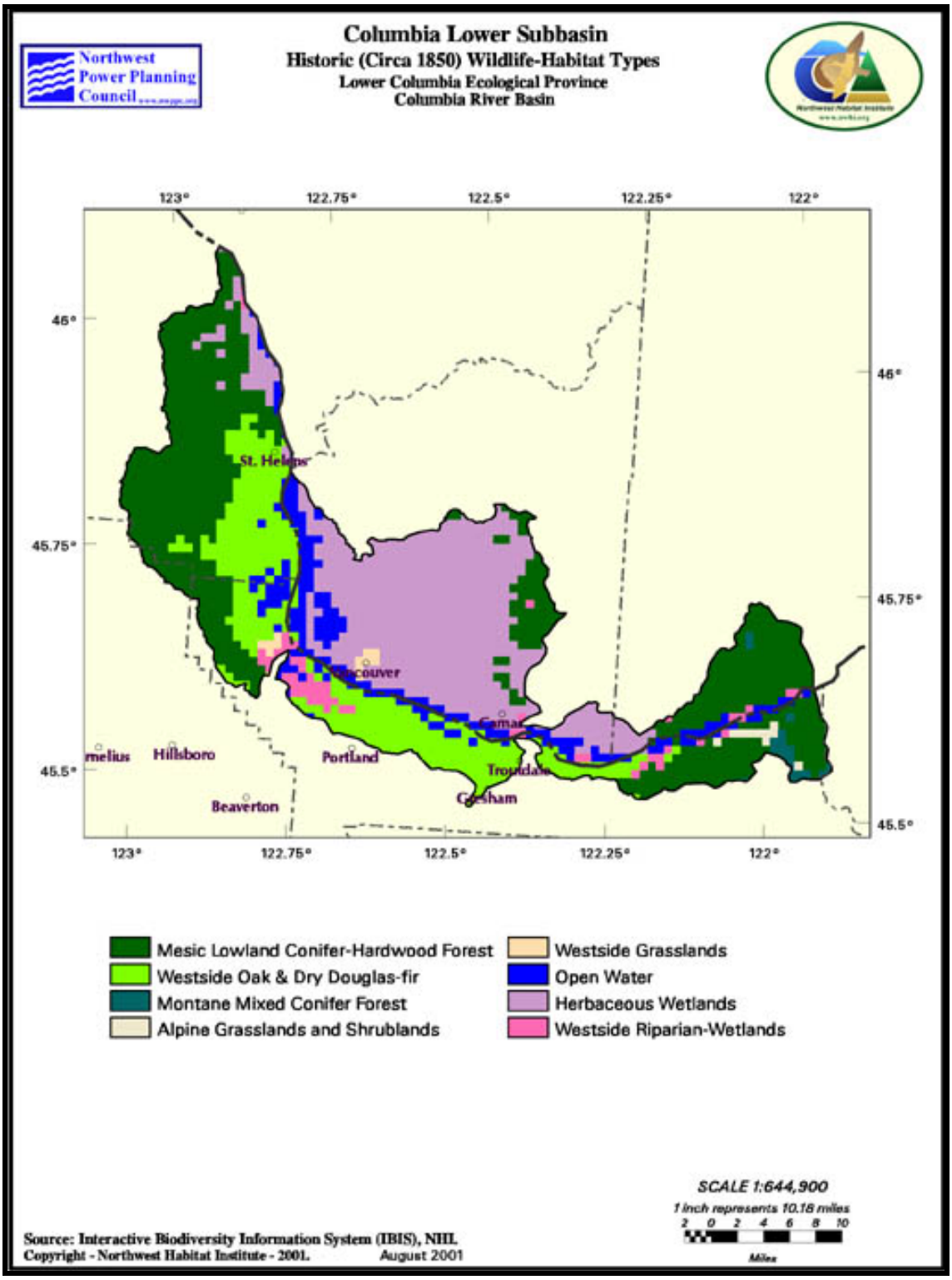

Figure 13-3. Status of historic wildlife habitat types in the Lower Columbia subbasin (IBIS 2003).

Figure 13-4 illustrates the status of current habitat types of the Lower Columbia subbasin (IBIS 2003). Estimates from 1870–1970 indicate that 20,000 acres of tidal swamps (with woody vegetation; 78% of estuary littoral area), 10,000 acres of tidal marshes (with nonwoody vegetation) and 3,000 acres of tidal flats have been lost (NPPC 2002).

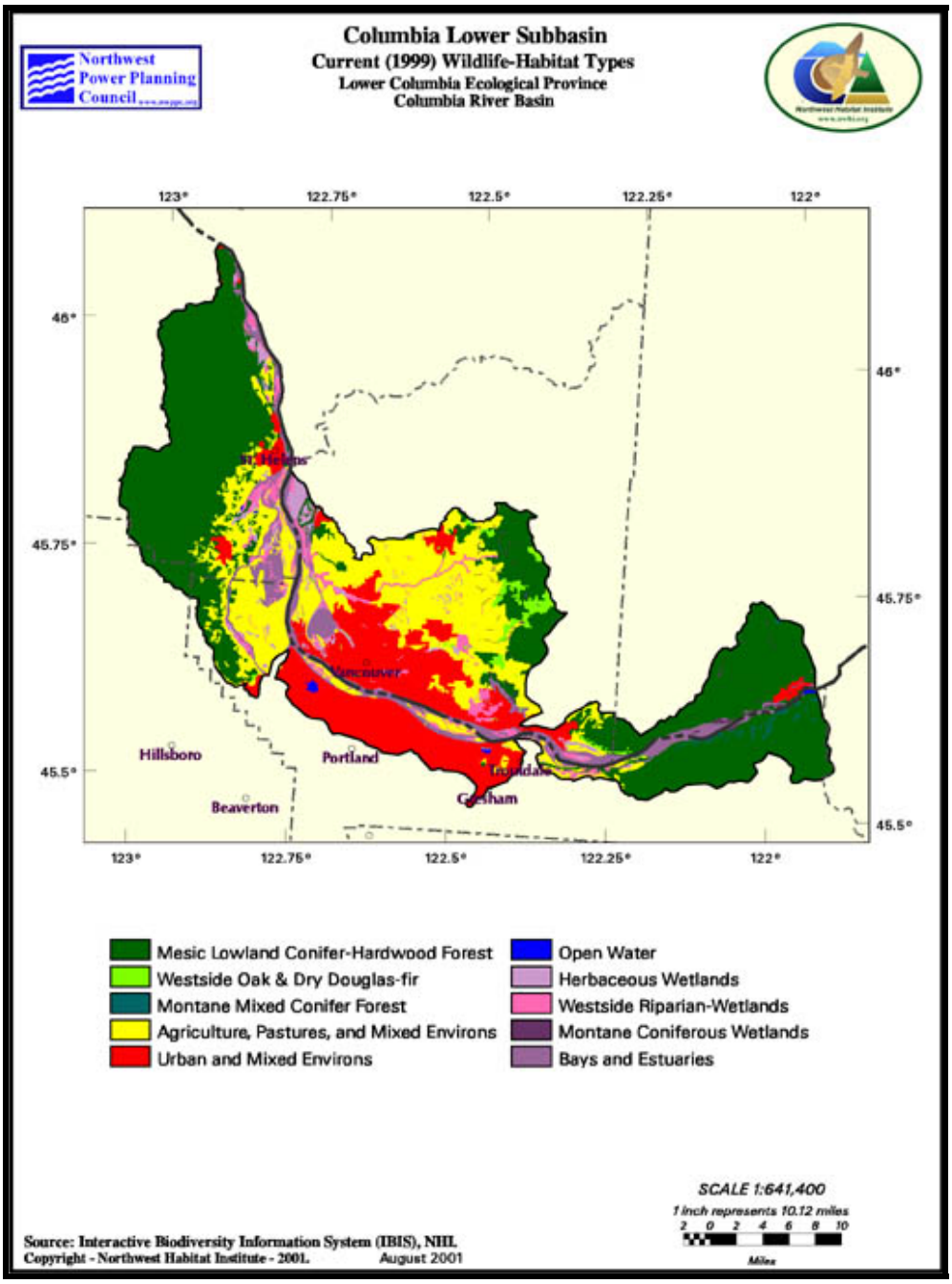

Figure 13-4. Status of current wildlife habitat types of the Lower Columbia subbasin (IBIS 2003).

The Oregon Natural Heritage Program's 1992 inventory determined that the primary tree species on the lower Columbia River floodplain are cottonwood, ash and Pacific willow, and Sitka spruce would have been found in the lower river.

On the Washington side of the Columbia River, the amount of woody cover has changed significantly (Suring 1974). In 1939, 70% of the land now contained in the mainland portion of the CWTDNWR was classified as wooded. In 1972 however, only 17% was classified as wooded; the remainder had been converted to pasture. This reduction of year-round riparian cover is typical on Columbia River and Willamette Valley floodplains. Over most of the region, the acreage left in woodlots is far less than 17% (Gavin 1984).

Native vegetation of the Columbia River tidelands consists of dense, tall shrub or tree community containing Sitka spruce, red-osier dogwood, black cottonwood, red alder and willow (Franklin and Dyrness 1973). Most of the bottomlands have been cleared of trees and brush, and seeded to grasses and forbs that provide feed for beef and dairy cattle. Plants commonly found in the pastures include fescue, orchardgrass, clover, bluegrass, velvetgrass, creeping buttercup and ryegrass. Reed canary grass and water foxtail are common invaders on wet sites. Blackberries, rushes, sedges, roses, American elder and snowberries are common plants utilized as food or cover by deer (Gavin 1984).

Davison considers the tidal spruce community to be the historical habitat of Columbian white-tailed deer for forbs and grass in open pastures, as observed by Suring (1974) and Gavin (1979), and may actually be an adaptation to available habitat rather than on actual feeding preference (USFWS 1976).

13.6 Factors Affecting Population Status

The USFWS (1976) reported that the integrity of the Columbia River population of Columbia white-tailed deer and their habitat is threatened by a variety of factors, including both natural and man-caused phenomena including:

- Degradation of riparian habitats through logging and brush removal (Crews 1939; Scheffer 1940; Gavin 1978),
- Recent interest in development of riparian zones for beef production, cottonwood and alder harvest and for marina development,
- Automobile collisions,
- Poaching,
- Entanglement in barbed wire fences,
- Competition with livestock,
- Introduction of feral swine on Wallace Island in 1980,
- Major flooding,
- The inundation of over 1,400 acres for nearly 1.5 years due to a dike failure,
- High tides which are a limiting factor on undiked islands of the lower river,
- Disease (foot rot) and parasites (stomach worms), two threats common to the Columbia River population,
- The potential threat of black-tailed deer to Columbian white-tailed deer by direct competition for available food sources and by hybridization, and
- Presence of Roosevelt elk on the mainland portion of the CWTDNWR.

13.6.1 Availability of habitat

Columbian White-tailed Deer are resident in suitable habitat and show little tendency to wander outside the home range. Preferred habitat in the lower Columbia Subbasin is limiting. Extensive losses of habitat have occurred in the lower Columbia and estuary provinces as a results of dredging, filling, diking, and channelization. The floodplain and lowlands likely were much more heavily forested and historically there were many more lakes, ponds, sloughs, overflow channels, backwaters and wetlands. Between 1850 and 1999, 20,000 acres of tidal swamps (with woody vegetation, 10,000 acres of tidal marshes (with non-woody vegetation), and 3,000 acres of tidal flats have been lost along the lower Columbia River (BPA unpub. data).

Perhaps the greatest single man-caused threat to Columbia White-tailed Deer is the continued degradation of riparian habitats through logging and brush removal. On the mainland, in 1939 70% of the refuge was wooded; in 1972 it was 17% wooded, and there has been little change between 1972 and 2004 (A. Clark, pers. obs.). On private land, most bottomlands have been cleared of trees and brush, and seeded to grasses and forbs that provide feed for beef and dairy cattle. On Puget Island, which is in private ownership, woodlots are being cleared for agriculture and housing, and have decreased from 43% of the island in 1938 to 1% in 1977. On private land in 2004, degradation of riparian habitats through logging and brush removal is continuing.

Columbian White-tailed Deer use pastures less than other habitat types for feeding and reproduction, and there is more pasture and less woody vegetation than is needed by deer for cover and for naturally-occurring forage at the refuge. It is recognized that re-establishment of woody vegetation is necessary on the refuge, but is difficult to achieve in practice (A. Clark, pers. comm. October 2003), due to browsing pressure from deer and elk.

On the mainland portion of the federal refuge, white-tailed deer are not more common there now than they were in the 1970's, and numbers seem stable at moderate densities (40+/sq mi). For more than three decades, the national wildlife refuge has been managed for deer, without population increase or natural range expansion. It appears as if the long-term carrying capacity of the mainland portion of the refuge has been reached in relation to the types of habitats provided within refuge boundaries, namely a relative abundance of pasture and a relative scarcity of woody cover and browse.

13.6.2 Lack of Continuity Between Suitable Habitats

Preferred secure habitat is non-contiguous along the lower Columbia River. By themselves, deer cannot easily pioneer new habitat, because suitable non-occupied habitat is for the most part unavailable adjacent to occupied habitat. Therefore, deer have to be artificially reintroduced for range expansion to occur. However, some deer have moved from island sites to which they had been relocated in 2003, to the Washington mainland at Willow Grove near Longview. Other unoccupied habitat exists along the lower Columbia River, e.g., Vancouver bottomlands, to which deer could be relocated.

Lastly, there is limited suitable habitat to which deer can escape, and survive, when uncommon flooding events occur.

13.6.3 Occasional Low Productivity:

Fawn:doe ratios have been variable, low in some years, high in others. The data on fawn:doe ratios vis-a-vis predation are inconclusive. The ratio on the refuge mainland was high in 1997 with coyote control, but also high in 1984-85 and 2001 with no coyote control. The fawn:doe ratio has been consistently higher on Puget I. (private land where it is possible that coyotes are better controlled). Fawn production on Tenasillahe I. was satisfactory in the 80's and 90's, but has been low in recent years.

13.6.4 Disease

The incidence of parasites (liver flukes, stomach worms, etc.) suggests overcrowding and habitat at carrying capacity, but the incidence is considered moderate. Necrobacillosis (foot-rot), found in 1/3 of 155 carcasses examined, has been called probably a major debilitating factor

contributing to mortality of adult deer. However, Columbian white-tailed deer are adapted to marsh habitat, and may not be adversely affected by the observed levels of disease and parasites.

13.7 Inventory & Assessment of Existing Management Plans

- Columbian White-tailed Deer Recovery Plan.

The Recovery Plan for Columbian whitetails was written by the recovery team, which is composed of members of the USFWS, ODFW, WDFW, and OSU faculty. The plan outlines steps toward creation of three stable, secure, viable subpopulations of Columbian white-tailed deer so that delisting may proceed. Plan components include the need for new habitat acquisitions, transplanting of existing populations to create new populations, enforcement of hunting riles and management of publicly owned lands.

13.8 Inventory & Assessment of Existing Restoration & Conservation Plans

- Hunting rules and WAC of Washington

The WDFW Commission adopted rules to protect the Columbian white-tailed deer by closing hunting in the areas where Columbian white-tailed deer exist. These regulations substantially reduced the legal harvest.

- WAC of Washington

The Columbian white-tailed deer is listed as an endangered species and hunting is prohibited. Enforcement reduces illegal harvest.

- Population re-introduction

Recent attempts to re-introduce Columbian white-tailed deer in the lower Columbia region include transplanting 12 deer to Fisher and Hump Islands in spring 2003(Miller, pers. comm.). Deer were re-introduced into the lower Columbia River in Oregon at Crimms and Lord Islands near Longview, Washington. Deer from the Crimms Island project have become established in the Willow Grove area. The deer at Lord Island were released in early 2003 (Miller, pers. comm.).

- Refuge management

USFWS manages public lands near Cathlamet that are critical to the existing population of Columbian white-tailed deer. The lands are managed to provide food, water, and cover for a resident population of Columbian white-tailed deer.

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