Post-Delisting Monitoring Plan
for the
Douglas County Distinct Population Segment
of the
Columbian White-tailed Deer

(*Odocoileus virginianus leucurus*)

Prepared by the U.S. Fish and Wildlife Service
Oregon Fish and Wildlife Office
Portland, Oregon
May 2006

Acknowledgements
The Post-Delisting Monitoring Plan for the Douglas County Distinct Population Segment of the Columbian White-tailed Deer was prepared by biologists of the U.S. Fish and Wildlife Service (Cat Brown, Oregon Fish and Wildlife Office, Portland; David Peterson [retired], Roseburg Field Office; and Kathy Hollar, Pacific Regional Office). We wish to acknowledge the assistance we received in preparing this plan from the following people: Steve Denney, DeWaine Jackson, and Tod Lum biologists with the Oregon Department of Fish and Wildlife in Roseburg; Colin Gillin, State Wildlife Veterinarian, Oregon Department of Fish and Wildlife in Corvallis; and Ralph Klein and Marci Todd with the Bureau of Land Management in Roseburg. We received comments from two independent peer reviewers on an earlier draft of this plan; their comments were invaluable in substantially revising the plan.

Recommended citation:
U.S. Fish and Wildlife Service. 2006. Post-delisting Monitoring Plan for the Douglas County Distinct Population Segment of the Columbian White-tailed Deer (*Odocoileus virginianus leucurus*). Portland, Oregon. 25 pp.

Table of Contents

1. Background

1.1. History and Ecology

The Douglas County distinct population segment of Columbian white-tailed deer (*Odocoileus virginianus leucurus*) was removed from the Federal List of Threatened and Endangered Wildlife and Plants on July 24, 2003 (U.S. Fish and Wildlife Service 2003). The population, which is one of just two surviving populations of Columbian white-tailed deer, was determined to be recovered and no longer in need of the protections of the Endangered Species Act (Act) due to robust population growth and amelioration of threats to its survival.

The Columbian white-tailed deer is the westernmost representative of 30 subspecies of white-tailed deer in North and Central America (Halls 1978; Baker 1984). It resembles other white-tailed deer subspecies, ranging in size from 39 to 45 kilograms (85 to 100 pounds) for females and 52 to 68 kilograms (115 to 150 pounds) for males (Oregon Fish and Wildlife Commission 1995). Generally, a red-brown color in summer and gray in winter, the subspecies has distinct white rings around the eyes and a white ring just behind the nose (Oregon Fish and Wildlife Commission 1995). Its tail is relatively long, brown on top with a white fringe, and white below (Verts and Carraway 1998).

The subspecies was formerly distributed throughout the bottomlands and prairie woodlands of the lower Columbia, Willamette, and Umpqua River basins in Oregon and southern Washington (Bailey 1936; Verts and Carraway 1998). Early accounts suggested this deer was locally common, particularly in riparian areas along major rivers (Gavin 1978). The decline in Columbian white-tailed deer numbers was rapid with the arrival and settlement of pioneers in the fertile river valleys (Gavin 1978). 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 1978). By 1940, a population of 500 to 700 animals along the lower Columbia River in Oregon and Washington, and a disjunct population of 200 to 300 in Douglas County, Oregon, survived (Crews 1939; Gavin 1984; Verts and Carraway 1998). These two remnant populations remain geographically separated by about 320 kilometers (200 miles), much of which is unsuitable or discontinuous habitat.

The Columbian white-tailed deer in Douglas County are most often associated with riparian habitats, but studies have shown that the deer uses a variety of lower elevation habitat types. Radio-tagged deer in a recent study selected riparian habitats more frequently than any other habitat type, but were also found using all the other habitat types in the study area (i.e., grassland, grass shrub, oak savannah, oak-hardwood woodland, oak-hardwood savannah shrub, oak-hardwood conifer, conifer, and urban/suburban yards) (Ricca 1999). This study found that the areas of concentrated use within a deer's home range were generally located within 200 meters (650 feet) of streams (Ricca 1999), which confirms earlier work suggesting a strong preference for riparian habitats (Smith 1981). Open areas (grasslands and oak savanna) are used for feeding between dusk and dawn (Ricca 1999). The diet of Columbian white-tailed deer consists of forbs (broad-leaved herbaceous plants), shrubs,

grasses, and a variety of other foods, such as lichens, mosses, ferns, seeds, and nuts (Whitney 2001).

1.2. Population Trends

Population estimates conducted by the Oregon Department of Fish and Wildlife (ODFW) for the Douglas County Columbian white-tailed deer have demonstrated a long-term upward trend since management for the population began. In the 1930s, the Columbian white-tailed deer population in Douglas County was estimated at 200 to 300 individuals within a range of about 79 square kilometers (31 square miles) (Crews 1939). By 1983, the population had increased to about 2,500 deer (U.S. Fish and Wildlife Service 1983). The population has continued to grow and is currently estimated at over 6,000 deer (Lindsay Ball, Oregon Department of Fish and Wildlife, *in litt.*, 2005). Along with this increase in numbers, the range also has expanded to the north and west, and the population now occupies an area of approximately 800 square kilometers (309 square miles) (Oregon Fish and Wildlife Commission 1995). In 2005, the ODFW estimated that there were 5.5 deer per mile along their standard census routes in the core of the population's range, and 0.5 deer per mile on survey routes outside of the core zone (S. Denney, Oregon Department of Fish and Wildlife, *in litt.*, 2005).

Since 1975, the ODFW has conducted spring and fall surveys to estimate population size, recruitment, and sex ratios (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005; T. Farrell, Oregon Department of Fish and Wildlife, *in litt*., 2005). The ODFW has established standard routes for spotlight surveys along 210 kilometers (130 miles) of road within the known range of the population (Figure 1) (T. Farrell, Oregon Department of Fish and Wildlife, *in litt*., 2005; L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2002). Survey routes are divided into the core area (the area which encompassed the historical center of the Columbian white-tailed deer range in Douglas County; routes C, D, and F on Figure 1), the non-core expansion area (the area into which the Columbian white-tailed deer population has expanded in the last 15 years; routes A, B, E, and G on Figure 1) and the translocation area (the target habitats for translocation efforts from the core area; routes H and I on Figure 1). Although annual counts fluctuate, the overall trend of the population is increasing; a regression analysis of the data collected from 1975 to 2005 in the core area shows a strong upward trend (Table 1, Figure 2, and Figure 3).

A recent 3-year study of the population found somewhat low annual survival rates for adult deer (74 percent over 3 years), although the results were within the range of white-tailed deer survival rates in other parts of the country (Ricca *et al.* 2002). Fawn survival rates in this study were on the lower end of rates reported for other white-tailed deer populations (Ricca *et al.* 2002); the authors of the study suggest that poor fawn survival may be linked to high deer density in Douglas County. Annual population surveys indicate that deer density has doubled in the last 20 years, and the population may be at or near carrying capacity in portions of its range within Douglas County (Ricca 1999). However, management to improve habitat quality (at the North Bank Habitat Management Area, for example) could foster increases in the population in the core area.

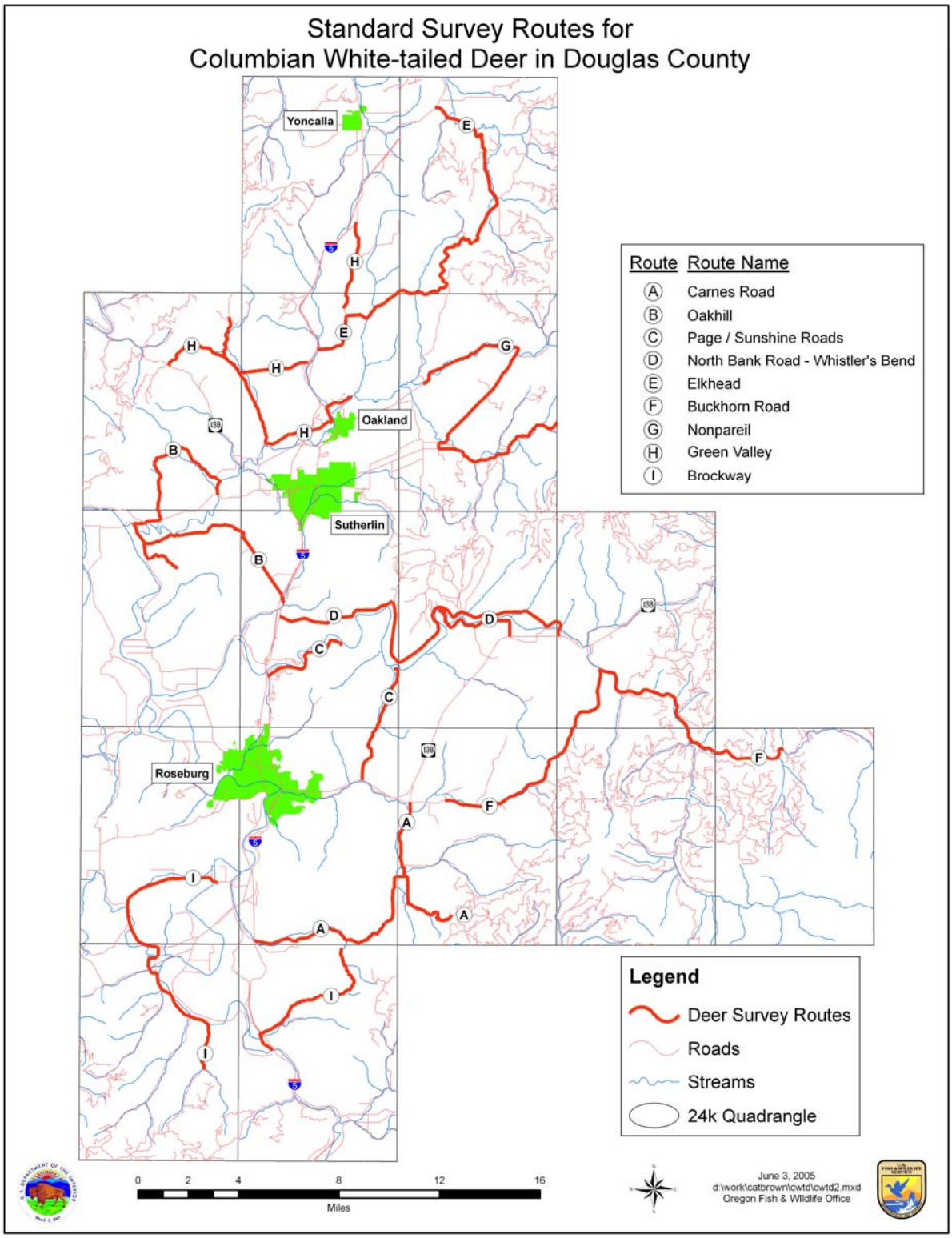


Figure 1. Standard Survey Routes for Columbian White-tailed Deer in Douglas County

Table 1. Columbian white-tailed deer population trends based on spotlight counts conducted on core and non-core area survey routes (from S. Denney, Oregon Department of Fish and Wildlife, *in litt*., 2005).

Year	Core Area*			Non-Core Area**		
	Route Miles	CWTD Count	Trend (deer/mile)	Route Miles*	CWTD Count	Trend (deer/mile)
1975	40	67	1.68	90	0	0.00
1976	40	75	1.88	90	0	0.00
1977	40	30	0.75	90	0	0.00
1978	40	79	1.98	90	0	0.00
1979	40	93	2.33	90	0	0.00
1980	40	90	2.25	90	0	0.00
1981	40	61	1.53	90	0	0.00
1982	40	86	2.15	90	0	0.00
1983	40	101	2.53	90	0	0.00
1984	40	106	2.65	90	0	0.00
1985	40	101	2.53	90	0	0.00
1986	40	76	1.90	90	0	0.00
1987	47.5	203	4.27	90	0	0.00
1988	47.5	268	5.64	90	0	0.00
1989	47.5	237	4.99	90	2	0.02
1990	47.5	315	6.63	90	0	0.00
1991	47.5	369	7.77	90	0	0.00
1992	47.5	283	5.96	90	4	0.04
1993	47.5	297	6.25	90	9	0.10
1994	47.5	224	4.72	90	10	0.11
1995	47.5	199	4.19	90	2	0.02
1996	47.5	202	4.25	90	no data	0.00
1997	47.5	259	5.45	90	0	0.00
1998	47.5	188	3.96	90	31	0.34
1999	47.5	332	6.99	90	33	0.37
2000	47.5	235	4.95	90	73	0.81
2001	47.5	297	6.25	90	26	0.29
2002	47.5	367	7.73	90	30	0.33
2003	47.5	282	5.94	90	92	1.02
2004	47.5	251	5.28	90	39	0.43
2005	47.5	259	5.45	90	49	0.54

* Core area: From 1975 to 1986, two routes were surveyed (North Bank Road and Buckhorn Road). From 1987 to present, the core area survey routes were modified to include Page and Sunshine Roads.

** Non-core area: In 1989, CWTD began to show up outside of core routes as they expanded their distribution. Non-core survey routes include Carnes Road, Oakhill, Elkhead, and Nonpareil.

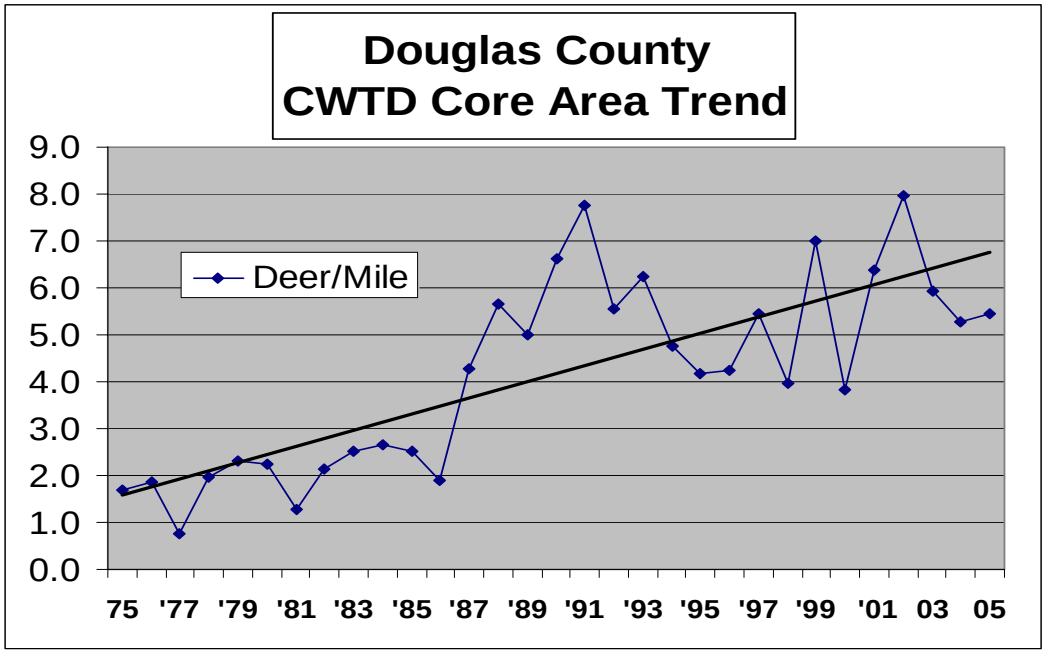


Figure 2. Core area population trend (r^2 = 0.622, p < 0.0001, F = 47.8) (from L. Ball, Oregon Department of Fish and Wildlife, *in litt.*, 2005; D. Jackson, Oregon Department of Fish and Wildlife, *in litt.*, 2005a).

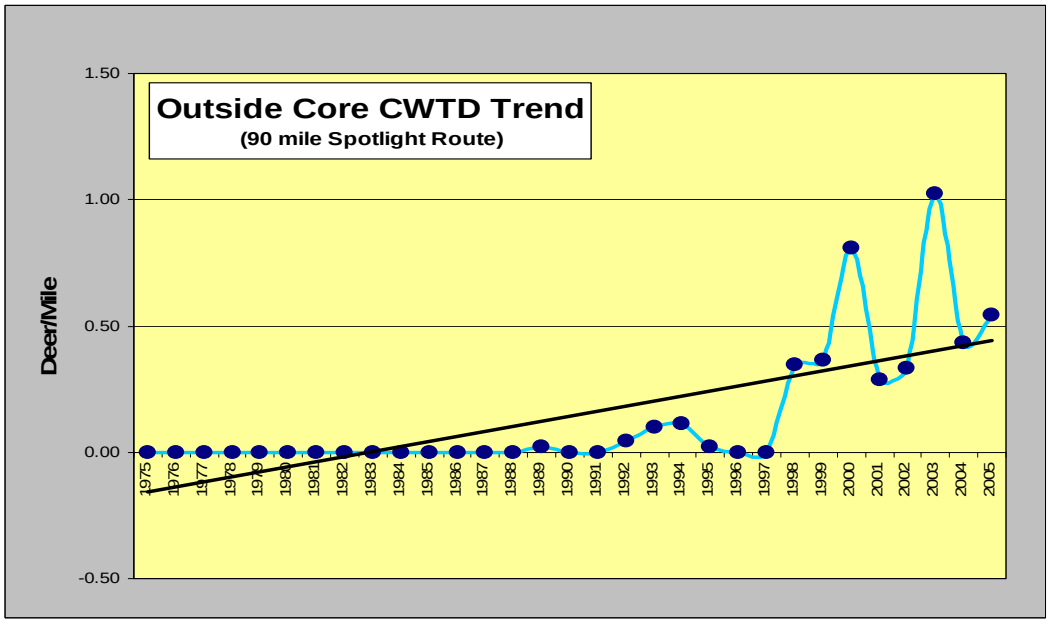


Figure 3. Non-core area population trend (r^2 = 0.494, p < 0.001, F = 28.3) (from L. Ball, Oregon Department of Fish and Wildlife, *in litt.*, 2005; D. Jackson, Oregon Department of Fish and Wildlife, *in litt.*, 2005a).

1.3. Disease Incidence

In the final rule to delist the Douglas County Columbian white-tailed deer population (U.S. Fish and Wildlife Service 2003), the U.S. Fish and Wildlife Service (Service) noted that disease outbreaks could threaten the health of the deer population, and that disease monitoring would be one element of the post-delisting monitoring program. Two diseases (adenovirus hemorrhagic disease and deer hair-loss syndrome) are endemic in the population, and will be monitored.

Sampling by ODFW has found that adenovirus titers (evidence of past exposure) are present throughout the Columbian white-tailed deer population; ODFW considers this disease to be endemic in the herd (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005). Outbreaks of adenovirus in other deer populations have killed large numbers of deer; mortality among fawns is often high, with lower rates of death from the disease among infected adult deer (Tapscott 1998; Oregon Department of Fish and Wildlife 2005a). If a major outbreak of this disease were to occur in the Columbian white-tailed deer herd, it could depress population numbers. The ODFW intends to continue monitoring for periodic outbreaks of adenovirus, but does not consider the disease to be a substantial threat to the population (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005).

Deer hair-loss syndrome has also been documented in the Columbian white-tailed deer population in Douglas County. Strictly speaking, the condition is called a syndrome, not a disease, because illness is caused by several factors acting together (Oregon Department of Fish and Wildlife 2005c). This syndrome appears to be caused by a combination of internal and external parasites; internal parasites such as *Dictyocaulus viviparus* and *Parelaphostrongylus* sp. invade the lungs of infected deer, resulting in a low-grade pneumonia (Washington Department of Fish and Wildlife 1999; Biederbeck 2002; Oregon Department of Fish and Wildlife 2005c). The pneumonia infection may suppress the deer's immune system, making infected deer more susceptible to external parasites. The condition is not necessarily fatal, but hair-loss can result in death due to hypothermia in winter (Washington Department of Fish and Wildlife 1999; Biederbeck 2002). Deer that appear to be suffering from deer hair-loss syndrome are noted by ODFW on the twice annual population surveys (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005). Deer hair-loss syndrome is not currently considered to be a threat to the population, but the post-delisting monitoring program will track the incidence of this condition.

A third disease will also be included in the post-delisting monitoring program. Chronic wasting disease, a transmissible spongiform encephalopathy of deer and elk, has been detected in several western States, but has not been found in Oregon (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005; Oregon Department of Fish and Wildlife 2005b). Because of the potential for this devastating disease to occur in Oregon, this disease will be included in the disease monitoring program.

1.4. Habitat Status

The Columbian White-tailed Deer Recovery Plan recognized conversion of habitat to rural residential homesites and competition with livestock as threats to the Columbian white-tailed deer's habitat in Douglas County (U.S. Fish and Wildlife Service 1983). The collaborative efforts of the Service, ODFW, the Bureau of Land Management (BLM), Douglas County, and others to recover the population, focused on protecting and restoring important habitats for the Columbian white-tailed deer. Since 1978, over 2,830 hectares (7,000 acres) have come into public ownership within the range of the Douglas County Columbian white-tailed deer population. This acreage includes the BLM's North Bank Habitat Management Area and Douglas County's Mildred Kanipe Memorial Park. In addition, a number of Federal, State, and local programs have assisted private landowners in Douglas County who wish to protect and restore the natural habitat values on their lands. In 2004, 88 landowners protected or enhanced 1,742 hectares (4,304 acres) of habitat under these programs within the range of the Columbian white-tailed deer in Douglas County (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005). Additionally, a private landowner entered into a perpetual conservation easement with the McKenzie River Trust in 2003 to protect 82 hectares (202 acres) of Columbian white-tailed deer habitat (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005). Continued management and protection of key habitats is essential to the long-term maintenance of the population.

2. Justification and Purpose

Section 4(g)(1) of the Act requires the Service to implement a system, in cooperation with the States, to monitor for no fewer than 5 years the status of all species that have recovered and been removed from the List of Threatened and Endangered Wildlife and Plants (50 CFR 17.11 and 17.12). The purpose of this post-delisting monitoring is to verify that a species delisted due to recovery remains secure from risk of extinction after it has been removed from the protections of the Act. The post-delisting monitoring fulfills the final process of species recovery.

Section 4(g) of the Act explicitly requires cooperation with the States in development and implementation of post-delisting monitoring programs, but the Service remains responsible for compliance with section 4(g) and therefore must remain actively engaged in all phases of the monitoring program. The Service also seeks active participation of other entities that are expected to assume responsibilities for the species' conservation after delisting or have natural resources management mandates. In keeping with that mandate, we developed this draft monitoring plan in cooperation with the ODFW and BLM. A draft of this plan was peer reviewed by two experts familiar with white-tailed deer ecology. Their comments have been incorporated into this draft of the monitoring plan. The post-delisting monitoring plan for the Columbian white-tailed deer is a continuation of the population monitoring that has been conducted by the ODFW and the Service over the past 30 years.

We intend to monitor the status of the Douglas County population of Columbian white-tailed deer in cooperation with ODFW and BLM. The monitoring program will consist of the following three components: 1) population trend monitoring, 2) disease outbreak early alert system, and 3) habitat status review. If data from this monitoring effort, or from some other

source, indicate that the Columbian white-tailed deer is experiencing significant declines (as defined in section 5.1) in abundance or distribution, that a potentially catastrophic disease threatens the survival of the population, that substantial habitat has been lost or degraded, or that it requires protective status under the Act for some other reason, the Service can initiate procedures to re-list the population, including, if appropriate, emergency listing.

The duration and frequency of monitoring were selected in consultation with ODFW. The monitoring will be conducted over a period of 5 years. We have determined that a 5-year period is sufficient based on a review of the deer's life history and an analysis of 30 years of Columbian white-tailed deer population data collected by ODFW (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005). The population trend monitoring will be implemented in spring and fall of each year for the duration of the post-delisting monitoring period. The disease early warning system will be established at the beginning of the monitoring period and will be in place throughout the term of the monitoring plan. The habitat status review will be accomplished by tracking proposals for development and by annual contact with the land managers of key parcels.

At the request of ODFW, we will consider the post-delisting monitoring period to have begun in 2003, immediately following delisting; this is appropriate because the monitoring plan essentially continues the monitoring program that has been in place since long before the population was delisted. It is also important to note that monitoring of the population will not cease with the completion of the post-delisting monitoring program, because the Columbian white-tailed deer is an "… important game mammal that has been monitored by ODFW since 1975 and will continue to be monitored into the foreseeable future since this species is important to the citizens of Oregon, both economically and socially." (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005). The continuing commitment by ODFW to monitor and manage the Columbian white-tailed deer will ensure that the population will not be at risk of overexploitation, as happened in the early 20th century.

3. Implementation

Post-delisting monitoring is a cooperative effort between the Service, the ODFW, and the BLM. Funding of post-delisting monitoring presents a challenge for the partners committed to ensuring the continued viability of the Columbian white-tailed deer following removal of the Act's protections. To the extent feasible, the Service intends to provide funding for post-delisting monitoring efforts to ODFW through the annual appropriations process (see Appendix 1 for the proposed budget). Nonetheless, nothing in this plan should be construed as a commitment or requirement that any Federal agency obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. 1341, or any other law or regulation.

The Service's Roseburg Field Office in Douglas County, Oregon, is the Service's lead for this monitoring effort, which will be accomplished with occasional assistance from the Oregon Fish and Wildlife Office in Portland. The Roseburg Field Office will be responsible, with the cooperation and assistance of ODFW, to ensure that the monitoring requirements outlined in the Plan are accomplished, including the final report.

The role of the Oregon Fish and Wildlife Office is to:

- prepare a draft post-delisting monitoring plan;
- incorporate peer review comments on the draft PDM plan from scientific experts and cooperators into the plan;
- prepare and distribute the draft PDM plan for public comment;
- consider all comments on the draft PDM plan and produce the final PDM plan;
- distribute the final PDM plan to all cooperators; and
- work with the Roseburg Field Office to provide partial funding for ODFW's spring and fall surveys, disease investigations, and data analysis.

The role of the Roseburg Field Office is to:

- determine budget requirements to carry out the monitoring;
- coordinate with the Oregon Fish and Wildife Office to provide partial funding for ODFW's participation in the monitoring program;
- maintain contact with ODFW's State Wildlife Veterinarian and other local experts regarding the early warning system for emerging epizootic disease threats;
- track projects affecting land use in Douglas County, including reviews of management of key parcels (North Bank Habitat Management Area, Mildred Kanipe Memorial Park, and Whistler's Bend County Park);
- prepare and distribute reports annually and at the end of the PDM period; and
- coordinate and convene an annual meeting, and other meetings as necessary, to discuss monitoring results, their interpretation, and appropriate response.

The role of the ODFW is to:

- conduct spring and fall surveys for Columbian white-tailed deer;
- compile all population survey results semi-annually and provide an annual report to the Roseburg Field Office;
- notify the Roseburg Field Office if the disease early warning system indicates an emerging disease threat in the population;
- notify the Roseburg Field Office of any actions that may significantly affect Columbian white-tailed deer habitat in Douglas County;
- assist the Roseburg Field Office in the preparation of the annual and final reports; and
- participate in the annual coordination meeting, and any other meetings or conference calls necessary to discuss monitoring results, their interpretation, and appropriate response.

The role of the BLM is to:

- implement actions in compliance with the North Bank Habitat Management Area management plan;
- provide an annual report to the Roseburg Field Office on habitat management projects implemented;
- work with ODFW and the Roseburg Field Office to develop a monitoring program to track Columbian white-tailed deer population trends at the North Bank Habitat Management Area, and to determine Columbian white-tailed deer population response to habitat management actions at the North Bank Habitat Management Area; and

- participate in the annual coordination meeting, and any other meetings or conference calls necessary to discuss monitoring results, their interpretation, and appropriate response.

4. Methods

4.1. Population Trend Monitoring

The Douglas County population of Columbian white-tailed deer was delisted in large part due to robust population growth. Thus, population trend monitoring will be the principal component of the PDM.

The ODFW conducts surveys that count both Columbian white-tailed deer and Columbian black-tailed deer (*Odocoileus hemionus columbiana*) on standard survey routes in Douglas County (Figure 1). Fall surveys are conducted from November 15 through December 15 in most years, on warm, rainy nights when the deer are most active. All deer observed are classified by species, sex, and age (i.e., fawns, does, or bucks by antler class). This allows an estimate of population size and minimum fawn production, and in the case of black-tailed deer, the post-hunting season buck survival (S. Denney, Oregon Department of Fish and Wildlife, *in litt*., 2001; T. Farrell, Oregon Department of Fish and Wildlife, *in litt*., 2005).

The spring survey is similar to the fall count. On warm, wet nights in March, ODFW conducts a spotlight count along the standard road routes (Figure 1), recording both white-tailed and black-tailed deer. All deer observed are recorded and classified as either adults or fawns; this provides an estimate of overwinter fawn survival and population size (expressed as deer per mile) (S. Denney, Oregon Department of Fish and Wildlife, *in litt*., 2001; T. Farrell, Oregon Department of Fish and Wildlife, *in litt*., 2005).

The data from the spring and fall surveys will be analyzed by ODFW using linear regression analyses. Separate analyses will be conducted for the data from the population core area, the non-core expansion area, and the translocation area.

4.2. Disease Outbreak Monitoring

In cooperation with the ODFW, we have established an early warning system to detect potentially devastating epizootic disease outbreaks in the Columbian white-tailed deer population or in the sympatric population of Columbian black-tailed deer.

Adenovirus, which is endemic in the population, will be tracked as part of ODFW's Deer and Elk Disease Risk Reduction protocols (L. Ball, Oregon Department of Fish and Wildlife, *in litt*. [Attachment 1], 2005). This protocol specifies a required number of samples to be taken from any deer and elk that are handled during capture events, relocations, and captures targeting animals exhibiting pathological clinical signs. All blood samples from captured deer and elk will be tested for adenovirus (L. Ball, Oregon Department of Fish and Wildlife, *in litt*. [Attachment 1], 2005).

Deer suffering from deer hair-loss syndrome will be noted on the ODFW's spring and fall population surveys. Incidental data on this disease is also collected by ODFW from landowner reports and opportunistic sightings.

Documenting the continued absence of chronic wasting disease in Oregon is a priority for ODFW (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005). Samples are collected from hunter-harvested elk (*Cervus elaphus*), black-tailed deer and, beginning in fall 2006, Columbian white-tailed deer for Chronic Wasting Disease testing (L. Ball, Oregon Department of Fish and Wildlife, *in litt*., 2005).

4.3. Habitat Status Review

In addition to monitoring the population trend and establishing an early warning system for potentially threatening disease outbreaks, monitoring the status of habitat managed for the Columbian white-tailed deer is also relevant to tracking the status of the population. Habitat loss was a key factor in the decline of the Columbian white-tailed deer. Protection and active management of riparian habitats and open space in Douglas County have allowed the population to recover; monitoring the status of those parcels which are considered important to the population and were managed for Columbian white-tailed deer at the time of delisting will help us evaluate whether the population will again be threatened by habitat loss.

Potential environmental impacts of major Federal projects must be reviewed under the National Environmental Policy Act (NEPA). Environmental Assessments and Environmental Impact Statements for such projects are reviewed by the Service. Impacts of Federal projects on the amount or quality of habitat available to the Columbian white-tailed deer thus can be tracked by the Roseburg Field Office through these incoming documents. NEPA document review will be a key tool for tracking potential changes in management at the BLM's North Bank Habitat Management Area, a critical parcel at the core of the population's range. In addition to NEPA documents, regular monitoring reports will be prepared by BLM under the terms of the Service's Biological Opinion on the North Bank Habitat Management Area Management Plan (U.S. Fish and Wildlife Service 2001).

Non-Federal projects, such as those undertaken by State or local governments, do not require review under NEPA, and their potential impacts may be more difficult to track. In these cases, staff from the Roseburg Field Office, with assistance from biologists with ODFW, will need to gather information from Douglas County and other sources on potential impacts to riparian and open space habitats important to the Columbian white-tailed deer. Each year, the Roseburg Field Office will contact the management authorities for an assessment of the habitat status of the key non-Federal parcels (Douglas County's Mildred Kanipe Memorial Park and Whistler's Bend County Park); Service staff will also coordinate with ODFW and others to track changes in habitat across the range of the population.

5. Triggers and Responses

5.1. Population Trend Monitoring

Trigger: The ODFW evaluated several different scenarios of population survey results to determine the number of deer per mile that would result in a significant change in the current population trend. It was determined that for core area surveys, a value of less than four deer per mile for 5 consecutive years would be a threshold at which the trend becomes significantly different than the current trend ($P = 0.053$) (D. Jackson, Oregon Department of Fish and Wildlife, *in litt*., 2005). Our trigger for response will be a population decline to fewer than four deer per mile on core area surveys for 3 consecutive years. This trigger value will enable the Service and its cooperators to initiate a response to the population decline before deer numbers fall to critically low levels.

Response: If the threshold value of four deer per mile in the core area is detected in 3 consecutive years, the Service and ODFW will work together to determine the likely cause of decline. We will review the spring and fall survey data for clues to the cause of the decline; if a geographical bias is evident (i.e., deer have declined precipitously on certain survey routes), we would examine the density of the population in that portion of the range, increase disease sampling, and look for any changes in habitat quality in the area. In consultation with ODFW, we would determine the appropriate response, which could include enhancing habitat, manipulating population density (e.g., through selective removals, translocation, or limited hunts) in response to a density-dependent disease outbreak, or extending the monitoring period.

5.2. Disease Outbreak Monitoring

Trigger: The ODFW notifies the Service that a potentially significant disease outbreak has been detected and is threatening the health of the population.

Response: Work with ODFW and the State Wildlife Veterinarian to apply any necessary treatment to the population, which could include manipulating herd density or removing infected individuals. A major disease outbreak would likely be cause to extend population trend monitoring for several years to document recovery from the outbreak.

5.3. Habitat Status Review

Trigger: The Service receives notification that a project is proposed that would eliminate or degrade important deer habitats.

Response: Upon receiving notification of the proposed development of habitat important to the continued maintenance of the Columbian white-tailed deer in Douglas County, the Service and ODFW will use their available authorities to encourage protection of the habitat attributes necessary to support Columbian white-tailed deer. If the annual habitat status review indicates that the range of the Columbian white-tailed deer is contracting due to loss or degradation of habitat, then the Service and ODFW would take actions to ensure that

continued habitat loss does not threaten the population with decline toward threatened or endangered status again. Such actions include, but are not limited to implementing candidate conservation agreements and conservation easements, and making greater efforts to enhance habitat in the core areas of the population's range (e.g., BLM's North Bank Habitat Management Area).

6. Annual and Final Reports

An annual report summarizing the activities, data collected, and results of each component of the PDM plan will be prepared by the Roseburg Field Office. These reports must be prepared in a timely manner to ensure that adequate data are being collected, to allow evaluation of the efficacy of the monitoring programs and their modification, if necessary, and to allow periodic assessment of the status of the Columbian white-tailed deer. The annual report will be distributed to all cooperators. Each annual report will comment on the status of the Columbian white-tailed deer relative to the need for relisting; the report will briefly address the threats to the population with respect to the five factors considered when a species is proposed for addition to the Federal List of Threatened and Endangered Wildlife and Plants [i.e., A) the present or threatened destruction, modification, or curtailment of habitat or range; B) overutilization for commercial, recreational, scientific, or educational purposes; C) disease or predation; D) inadequacy of existing regulatory mechanisms; and E) other natural or manmade factors affecting its continued existence].

Annual reports for the first 3 years of the post-delisting monitoring period (2003, 2004, and 2005) have been completed by the Roseburg Field Office; the combined report is available on our webpage (http://www.fws.gov/oregonfwo/Species/ESA-Actions/CWTDPage.asp). The annual report for the 2006 monitoring efforts will be completed by March 31, 2007. This report will also be posted on our webpage.

At the end of the 5-year monitoring period in 2008, the Roseburg Field Office will work with ODFW and BLM to prepare a final report summarizing the results of the monitoring effort. The report will be made available to the public by fall 2008; a Notice of Availability of the final report will be published in the *Federal Register*. The final report will include a discussion of whether monitoring should continue beyond the 5-year period for any reason. If the results are inconclusive, monitoring should continue and the monitoring plan should be modified as appropriate. If there is no indication that the Columbian white-tailed deer population has declined significantly during the 5-year monitoring period and no reason to believe that it will decline in the foreseeable future, then monitoring can be discontinued at that time.

7. References

Literature Cited

Bailey, V. 1936. The mammals and life zones of Oregon. U.S. Govt. Print. Off., Washington. 416 pp.

Baker, R. H. 1984. Origin, classification and distribution. Pages 1-18 *in*: Halls, L. K., editor. White-tailed Deer: Ecology and Management. Stackpole Books, Harrisburg, PA.

Biederbeck, H. 2002. Monitoring deer hair loss syndrome in Columbian black-tailed and white-tailed deer in the northern Coast Range of Oregon, 2002. Oregon Department of Fish and Wildlife, Tillamook, Oregon. 10 pp.

Crews, A. K. 1939. A study of the Oregon white-tailed deer, *Odocoileus virginianus leucurus* (Douglas). Oregon State College. 46 pp.

Gavin, T. A., editor. 1978. Status of the Columbian White-tailed deer *Odocoileus virginianus leucurus*: some quantitative uses of biogeographic data. IUCN, Morges, Switzerland.

Gavin, T.A. 1984. Pacific Northwest. Pages 487-496 *in*: Halls, L. K., editor. White-tailed Deer: Ecology and Management. Stackpole Books, Harrisburg, PA.

Halls, L. K. 1978. White-tailed Deer. Pages 43-65 *in*: Schmidt, J. L. Gilbert D. L., editors. Big Game of North America: Ecology and Management. Stackpole books, Harrisburg, PA.

Oregon Department of Fish and Wildlife. 2005a. Adenovirus Hemorrhagic Disease of Deer webpage. Last updated 4/04/2005. <www.dfw.state.or.us/wildlife/diseases/andevirus> Accessed April 21, 2005.

Oregon Department of Fish and Wildlife. 2005b. Chronic Wasting Disease of Deer and Elk webpage. Last updated 04/04/2005. <www.dfw.state.or.us/wildlife/diseases/chronic_wasting> Accessed April 21, 2005.

Oregon Department of Fish and Wildlife. 2005c. Deer Hair-Loss Syndrome webpage. Last updated 04/04/2005. <www.dfw.state.or.us/wildlife/diseases/hairloss> Accessed April 21, 2005.

Oregon Fish and Wildlife Commission. 1995. Minutes of the November 22, 1995, meeting in Portland, Oregon. Portland, OR. 8 pp.

Ricca, M. A. 1999. Movements, habitat associations, and survival of Columbian white-tailed deer in western Oregon. Unpublished masters thesis. Oregon State University, Corvallis, OR. 170 pp.

Ricca, M.A., R.G. Anthony, D.H. Jackson, and S.A. Wolfe. 2002. Survival of Columbian white-tailed deer in western Oregon. Journal of Wildlife Management 66(4):1255-1266.

Smith, W. P. 1981. Status and habitat use of Columbian white-tailed deer in Douglas County, Oregon. Unpublished dissertation. Oregon State University, Corvallis, OR. 273 pp.

Tapscott, B. 1998. A review of the diseases and parasites of farmed cervids. Ontario Ministry of Agriculture, Food and Rural Affairs. 14 pp.

U.S. Fish and Wildlife Service. 1983. Columbian White-tailed Deer Recovery Plan. Region 1, Portland, OR. 75 pp.

U.S. Fish and Wildlife Service. 2001. Formal Section 7 Consultation on the North Bank Habitat Management Area Proposed Management Activities (Log #1-7-01-F-111). Portland, OR. 36 pp.

U.S. Fish and Wildlife Service. 2003. Final rule to remove the Douglas County distinct population segment of Columbian white-tailed deer from the Federal list of Endangered and Threatened Wildlife. Federal Register 68:43647-43659.

Verts, B. J. and L. N. Carraway. 1998. Land mammals of Oregon. University of California Press, Berkeley. 668 pp.

Washington Department of Fish and Wildlife. 1999. Fact sheet: black-tailed deer hair loss syndrome. Olympia, WA. 2 pp.

Whitney, L. 2001. Ecological relationships between Columbian white-tailed and black-tailed deer in southwest Oregon. Unpublished master's thesis. Oregon State University, Corvallis, OR. 106 pp.

Correspondence Cited

Ball, Lindsay A. Oregon Department of Fish and Wildlife. Comment letter on supplemental proposed rule to delist the Douglas County population of Columbian white-tailed deer to Kemper McMaster, Service. Dated August 15, 2002. 4 pp + attachments.

Ball, Lindsay A. Oregon Department of Fish and Wildlife. Letter regarding post-delisting monitoring program to Kemper McMaster, Service. Dated July 21, 2005. 3 pp + attachments.

Denney, Steve. Oregon Department of Fish and Wildlife. E-mail to Cat Brown, subject: CWTD information. July 27, 2001.

Denney, Steve. Oregon Department of Fish and Wildlife. E-mail to Cat Brown, subject: FW: cwtd pop data. August 16, 2005.

Farrell, Terry. Oregon Department of Fish and Wildlife. E-mail to Cat Brown, subject: White-tailed Deer Appendix 2. April 25, 2005.

Jackson, DeWaine. Oregon Department of Fish and Wildlife. E-mail to Cat Brown, subject: Stats for trend lines. August 9, 2005a.

Jackson, DeWaine. Oregon Department of Fish and Wildlife. E-mail to Cat Brown, subject: text for section 5.1 of PDM plan. August 17, 2005b.

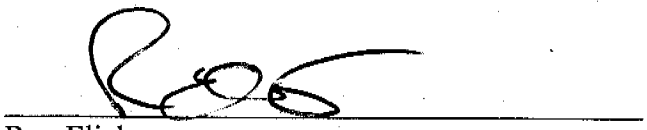
8. Approvals

The U.S. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife, and the Bureau of Land Management have approved this Post-Delisting Monitoring Plan for the Douglas County Distinct Population Segment of the Columbian White-tailed Deer. The signatures below attest to their agreement to implement this plan as described in Section 3 (Implementation).

05/15/06

Kemper McMaster
State Supervisor, Oregon Fish and Wildlife Office
U.S. Fish and Wildlife Service

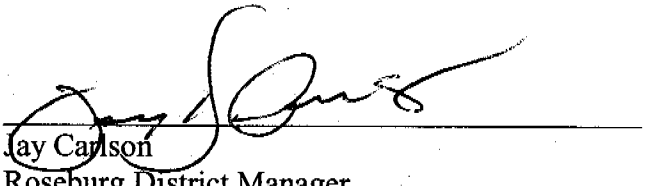
Date



6/19/06

Roy Elicker
Interim Director
Oregon Department of Fish and Wildlife

Date



5/25/06

Jay Carlson
Roseburg District Manager
Bureau of Land Management

Date

Appendix 1. Proposed budget

Annual U.S. Fish and Wildlife Service staff time	$1,000
Annual Oregon Department of Fish and Wildlife Expenses:	
Spring Survey	$2,500
Fall Survey	$2,500
Disease Investigations	
Necropsies	$2,500
Lab Analyses	$2,500
Assessment of monitoring data and report preparation	$2,500
Annual Expenses	13,500
Total Expenses for the PDM Plan (over 5-year period)	$67,500

Appendix 2. Response to Public Comments

The draft post-delisting monitoring plan for the Douglas County distinct population segment of the Columbian white-tailed deer was reviewed by two scientific experts familiar with the biology of rare subspecies of white-tailed deer. The recommendations of these scientific peer reviewers were incorporated into the draft monitoring plan before it was made available to the public for comment. We received three comments from the public on the draft post-delisting monitoring plan; one offered support for the delisting of the population, one opposed the delisting, and one had some questions about the approach and implementation of the post-delisting monitoring plan and provided suggestions for improving it. We thank these individuals for their comments. Comments suggesting clarifications have been incorporated into the final post-delisting monitoring plan. We provide responses to comments that raised questions about the plan below.

Issue: The commenter questioned a statement in the draft plan regarding a connection between poor fawn survival and high deer density in Douglas County. The commenter stated that studies showing poor fawn survival were conducted at the Bureau of Land Management's North Bank Habitat Management Area, which has generally poor habitat quality, and that higher densities could be expected if habitat quality were improved.

Response: We accept this comment, and have clarified the relevant section (Section 1.2) in the final plan. We also note that the studies cited by the commenter were conducted before Bureau of Land Management began its annual habitat improvement treatments on the North Bank Habitat Management Area. The Bureau of Land Management has been implementing its Habitat Management Plan and is an active participant in this monitoring plan.

Issue: The commenter takes exception to statements in the draft plan suggesting that intensive grazing is detrimental to the Columbian white-tailed deer, and points out the species does very well on ranch lands on which cattle are grazed.

Response: Statements regarding the adverse effects of livestock grazing came from the Columbian White-tailed Deer Recovery Plan, which identified competition with livestock as a threat to the population in Douglas County. We acknowledge that properly managed grazing can be an important tool in maintaining high quality habitat for the Columbian white-tailed deer. We have modified the final plan to make the distinction.

Issue: The commenter disagrees with the decision to consider the post-delisting monitoring period to have begun immediately after delisting in 2003. The commenter argues that no plan was in place in that time.

Response: The Oregon Department of Fish and Wildlife requested that the post-delisting monitoring period be considered to have begun in 2003 immediately following the delisting. Their rationale was that the post-delisting monitoring continues the tracking of population trends, disease incidence and habitat status that the Department has implemented for many years. We accept their argument and believe that a monitoring period that lasts for five years following delisting will be sufficient to determine if the population is holding its own following delisting. Even after the post-delisting monitoring period ends, the Oregon Department of Fish and

Wildlife will continue to monitor the status of the deer as it manages the health of the population, determines an acceptable harvest rate and pursues the establishment of other populations of the Columbian white-tailed deer through transplants.

Issue: The commenter observed that the post-delisting monitoring plan was inadequate because it failed to track fecundity levels, animal condition or density response to habitat management actions. The commenter further argues that additional surveys should be initiated on secure habitats used by the population.

Response: It is the policy of the Fish and Wildlife Service that post-delisting monitoring will not require more intensive monitoring than was needed to justify the decision to delist a species. The purpose of post-delisting monitoring is to demonstrate that a species was not delisted prematurely. A thorough analysis of the current status and threats to the Douglas County population of Columbian white-tailed deer was published in the final rule to remove the species from the Federal list of Endangered and Threatened Wildlife and Plants; that rule was favorably peer reviewed. In the post-delisting phase, we need only show that the population is not declining absent the protections of the Endangered Species Act. Additional research into fecundity, the effects of management actions, or the addition of new survey routes, while interesting, are not necessary as part of the post-delisting monitoring plan. However, these are research questions that the Oregon Department of Fish and Wildlife may pursue as it manages the population in the future.

Issue: The commenter expressed concern that local habitat protection mechanisms have been lifted since the delisting of the Columbian white-tailed deer, and that this has resulted in loss of habitat available to the population. The commenter argues that the trigger for action in the habitat status review component of the monitoring plan has been met with the repeal of the Douglas County's Columbian White-tailed Deer Habitat Overlay and the proposed annexation of open space into the urban growth boundary of the City of Roseburg.

Response: After the population was delisted, Douglas County eliminated its Columbian White-tailed Deer Habitat Overlay, which required a 100-foot building setback from water courses within an area of Douglas County that was considered core habitat for the deer. Without the Deer Habitat Overlay, the County's standard 50-foot building setback applies to those areas formerly covered by the overlay. The Deer Habitat Overlay and the standard setback both require only a building setback, but neither placed restrictions on vegetation clearing within the setbacks. The change is not likely to have any actual effect on the availability of suitable habitat for deer (Steve Denney, Oregon Department of Fish and Wildlife, Roseburg, pers. comm., 2006).

The proposed additions to the urban growth boundary of the City of Roseburg total 1,530 acres. Perhaps one half of that acreage contains suitable habitat for the Columbian white-tailed deer. If the urban growth boundary is adjusted as proposed, the action may result in some loss of habitat that is currently used by the deer. The Oregon Department of Fish and Wildlife estimates that about 197,000 acres of habitat are currently occupied by the Columbian white-tailed deer in Douglas County; the potential loss of 1,530 acres to the urban growth boundary adjustments would equal just 0.8 percent of the currently available habitat, and would likely have a negligible effect to the population (Steve Denney, Oregon Department of Fish and Wildlife, Roseburg,

pers. comm., 2006). The potential loss would probably be more than offset by the Oregon Department of Fish and Wildlife's active trap and transplant program, which is reintroducing Columbian white-tailed deer into historically occupied habitats in Douglas County.

Issue: The commenter doubts that the Bureau of Land Management will honor its responsibilities as shown in Section 3 of the monitoring plan. The commenter believes that in the past the Bureau of Land Management has not followed through on its commitments to manage the North Bank Habitat Management Area.

Response: The success of this monitoring plan depends on all parties executing the responsibilities they've accepted in the implementation section. The U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife and the Bureau of Land Management have all committed to implementing this monitoring plan, although management actions and staffing will always depend on agency funding, which cannot be guaranteed into the future. All of the participating agencies have an incentive to see the monitoring plan implemented, because if the Columbian white-tailed deer population does not continue to demonstrate a stable or increasing trend during the monitoring period, we may need to extend the monitoring period or even consider re-listing the population.

Issue: The commenter had a number of concerns about the habitat status review component of the monitoring plan. He stated that the draft monitoring plan failed to define quality habitat, did not specify the vegetative change which would have an effect on the deer, nor did the plan establish a baseline from which to quantify habitat loss.

Response: Contrary to the commenter's assumption, the monitoring plan does not require an assessment of habitat quality on habitats used by the Columbian white-tailed deer; that analysis was preformed in the delisting process, and is summarized in the final rule to delist the population. Rather, the post-delisting monitoring plan requires a review of the management status of habitats used by the deer. This review involves monitoring the status of those parcels which were considered important to the Columbian white-tailed deer and which were managed for the population at the time of delisting. This assessment would include an annual review of the implementation of management commitments at the Bureau of Land Management's North Bank Habitat Management Area, Douglas County's Mildred Kanipe Memorial Park and the status of open space in Douglas County. The elimination of Douglas County's Columbian White-tailed Deer Habitat Overlay (mentioned above) is an example of a change in status that would be reviewed in the annual report.

Issue: The commenter states that we have not defined the term, "potentially significant disease outbreak," which is the trigger for a response in the disease outbreak monitoring section.

Response: The disease monitoring component of the plan will be implemented in consultation with the Oregon Department of Fish and Wildlife's State Wildlife Veterinarian. Two of the diseases that will be monitored as part of this plan, Adenovirus and deer hair-loss syndrome, currently exist in the population at a low level which does not appear to threaten the health of the herd. A "potentially significant" outbreak of either disease would likely be one that was widespread (e.g., occurring at a high rate on several of the survey routes simultaneously), and

which affected the survival of affected individuals. There is clearly an element of professional judgment involved in this determination, as the potential significance of an outbreak would be considered in the context of conditions in the sympatric black-tailed deer population and cervids elsewhere in the state. We believe that it is appropriate to rely on the advice of the State Wildlife Veterinarian in responding to Adenovirus and deer hair-loss syndrome outbreaks. In the case of chronic wasting disease, which has not been detected in Oregon, a single confirmed case in the Columbian white-tailed deer or black tailed-deer populations would be cause for great concern, and would justify an aggressive response.