2003-2010
Post-Delisting Monitoring Report:
Douglas County Distinct Population Segment
of the Columbian White-tailed Deer

(*Odocoileus virginianus leucurus*)

Prepared by the U.S. Fish and Wildlife Service
Roseburg Office
Roseburg, Oregon
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COLUMBIAN WHITE-TAILED DEER
POST-DELISTING MONITORING REPORT 2003 - 2010

This Post-delisting Monitoring Report fulfills the requirement in the Post-delisting Monitoring Plan for the Douglas County Distinct Population Segment (DPS) of the Columbian White-tailed Deer (CWTD), finalized in July 2005 (USFWS 2005) and presents data collected for calendar years 2003 to 2010, with more specific summarization for the more recent years of the post delisting monitoring period. This report, as is the case with previous reports (2003-2005, 2006, and 2009), is available to all cooperators and posted on the webpage of the U.S. Fish and Wildlife Service's (Service), Oregon Fish and Wildlife Office:
http://www.fws.gov/oregonfwo/Species/Data/ColumbianWhiteTailedDeer/Delisting.asp

The Post-delisting Monitoring Plan (PDMP) requires the Service to provide information on: I. Population Trends, II. Disease Occurrence and III. Habitat Status for each calendar year of the post-delisting monitoring period. Updates on the deer harvest and trap and transplant programs conducted by the Oregon Department of Fish and Wildlife's (ODFW) Roseburg District as well has habitat improvement efforts conducted by the Roseburg District of the Bureau of Land Management (BLM) and other entities are included herein. Per earlier reports, the Post-delisting monitoring period is in effect through 2012, to allow time to collect habitat and population data on secured habitat and elsewhere in the county

In this report, we provide:

- background information on CWTD listing and delisting;
- summary of data covering the post-delisting monitoring period per the monitoring elements of population trend, disease occurrence and habitat status;
- review the status of the population with respect to the five listing factors considered in Section 4 of the Endangered Species Act; and
- recommendations extending the monitoring period through 2012.

Background

Table 1. Timeline of major events in the history of CWTD recovery.

Date	Action
March 11, 1967	The species was listed under the Endangered Species Preservation Act of 1966.
March 8, 1969	The species is included on a list of fish and wildlife species threatened with extinction under the Endangered Species Conservation Act of 1969.
1973	Species automatically included in the Lists of Endangered and Threatened Wildlife when the Endangered Species Act was enacted in 1973.
October 21, 1976	The first recovery plan for the species was finalized
1978	State of Oregon determined the white-tailed deer in the Roseburg area belonged to the Columbian species.
1983	The revised recovery plan for the species is finalized.
1987	The species is listed as endangered by the state of Oregon with the passage of the Oregon Endangered Species Act in 1987.

Date	Action
1994	BLM acquires North Bank, the largest publicly owned secured parcel providing habitat for CWTD and is the linchpin for delisting and recovery.
November 1995	Oregon Fish and Wildlife Commission voted unanimously to remove the CWTD from the State of Oregon List of Threatened and Endangered Species; the subspecies was placed on the State's Sensitive Species List for continued monitoring.
2001	Finalization of North Bank Habitat Management Area (NBHMA) Plan
July 24, 2003	Service delists the Douglas County DPS of the CWTD

Recovery and Delisting

The CWTD Recovery Plan (1983) identified the following objectives for the Douglas County population: (1) To downlist the population to threatened, the Recovery Plan recommended the maintenance of 1,000 Columbian white-tailed deer in a viable status on lands within the Umpqua River basin of Douglas County, while keeping the relative proportions of deer habitat within the known range of the subspecies from further deterioration; and (2) to delist the population, it recommended the maintenance of a minimum population of 500 animals from the larger population, to be distributed on 5,500 acres of suitable, secure habitat within the Umpqua River basin of Douglas County on lands owned, controlled, protected, or otherwise dedicated to the conservation of the species (USFWS 1983).

The Recovery Plan defined secure habitat as those areas protected from adverse human activities (*e.g.*, heavy, unregulated grazing by domestic animals, clearing of woody plants) in the foreseeable future, and are relatively safe from natural phenomena that would destroy their value to the subspecies (USFWS 1983). The Recovery Plan did not define secure habitat to include only publicly owned lands; rather, it provided further guidance on secure habitat by stating that local entities, including planning commissions, county parks departments, and farm bureaus, could secure habitat through zoning ordinances, land-use planning, parks and greenbelts, agreements, memoranda of understanding, and other mechanisms available to local jurisdictions (USFWS 1983). The Recovery Plan also recommended private conservation organizations be encouraged to secure habitat for Columbian white-tailed deer through easements, leases, acquisitions, donations, or trusts (USFWS 1983).

The Recovery Plan identified a series of tasks the Recovery Team recommended to meet the downlisting and delisting objectives for the Douglas County population of CWTD (USFWS 1983). These tasks fall into five main categories: (1) Tracking population status; (2) Ensuring viability of the population through enforcement of existing laws and regulations; (3) Securing and protecting habitat to allow the population to increase; (4) Studying the ecology of the population and assessing the threat of hybridization with Columbian black-tailed deer; and (5) Encouraging public support for Columbian white-tailed deer restoration.

A major contributor in the Service's ability to successfully recover and delist the deer in 2003 was the 1994 acquisition of the 6,581 acre North Bank Habitat Management Area

(NBHMA) by the Bureau of Land Management (BLM) and finalization of the management plan for the NBHMA in 2001 (BLM 2001). See section III, pages 11 and 12 for more information regarding the management objectives and importance of the NBHMA to the continued restoration of the deer in Douglas County.

Post-delisting Monitoring Plan Elements
I. Population trends

Much of the following information was provided by ODFW, who has cooperative responsibility to help monitor CWTD during this monitoring period.

Deer per mile - spotlight survey information
Since 1975, the ODFW has conducted spring and fall spotlight surveys to estimate population size, recruitment, and sex ratios. The ODFW has established standard routes along 130 miles of road within the known range of the deer (Figure 1). In 2010, the ODFW estimated there were 6.3 deer per mile along their standard spring time census routes (47.5 miles) in the core area of the population's range, and 0.9 deer per mile on survey routes (85.5) outside of the core area (Appendix A, Spreadsheets 1 and 2) (Tod Lum, pers. comm. 2011). The lower value outside of the core area may be explained by the recent expansion of the deer into these historic, but only recently occupied segments of the deer's range.

While the NBHMA, a key component of secure habitat, is within the core area for the deer, spring and fall surveys are not conducted within the NBHMA; though a route (North bank Road/Whistler's Bend) has been established adjacent to the west and south boundaries of the NBHMA. To address this situation, with ODFW's assistance, BLM recently established survey spotlight routes within the NBHMA. The initial routes totaled 11 miles in length for 2007 and were expanded to 17 miles in 2008, and this has become the standard survey route with the NBHMA. Results of these pre-hunting season surveys are provided in (Table 2).

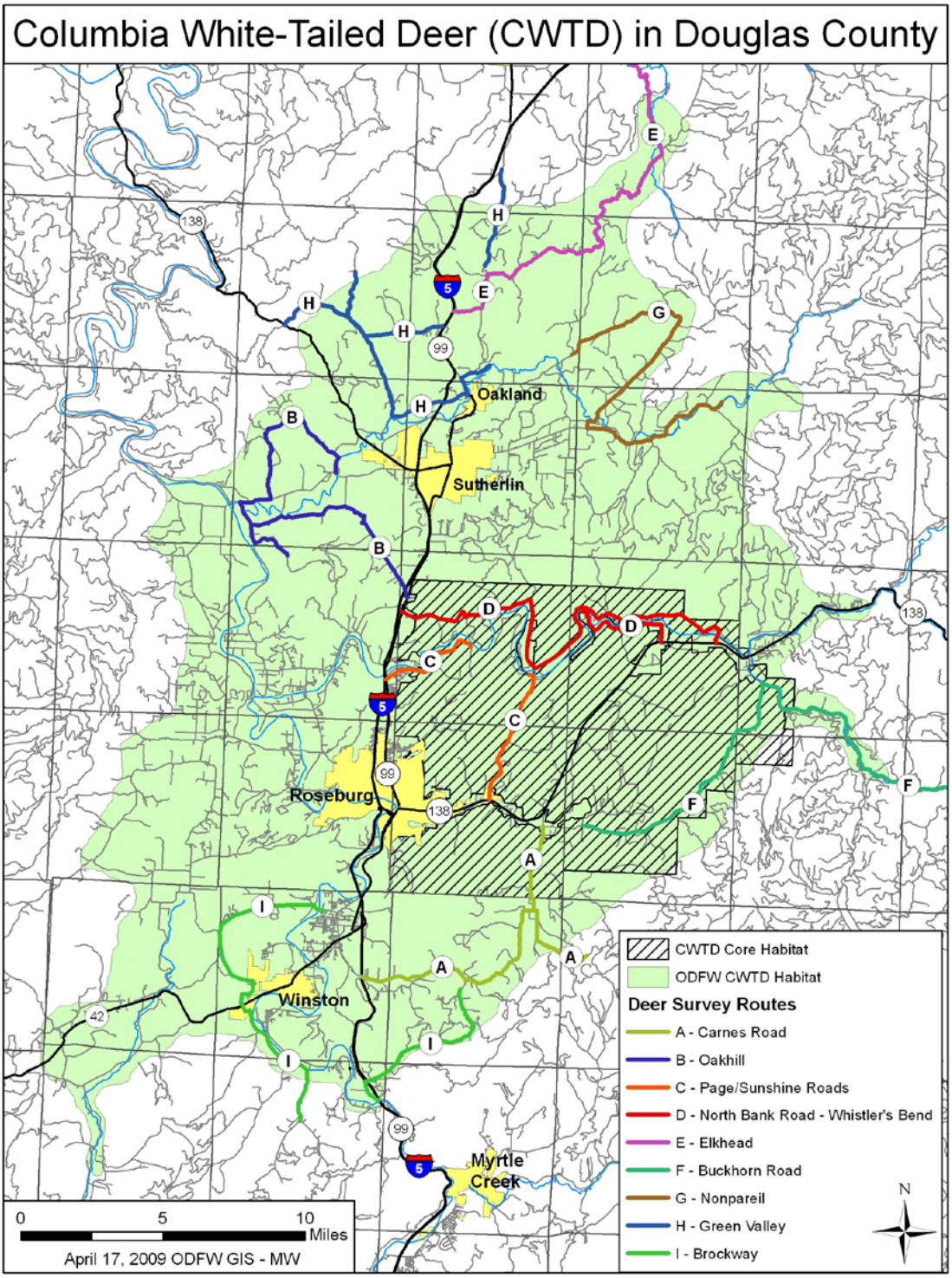
Table 2. North Bank Habitat Management Area CWTD census. These estimates are for August and September surveys combined.

Year	CWTD/mile	Comments
2007	4.9	Only partial route survey
2008	3.8	
2009	4.1	
2010	4.1	

The survey results for NBHMA are generally lower than the ODFW standard core routes with results ranging up to 8.9 deer/mile within the past 4 years. This difference may be explained by the disparity in miles surveyed (47.5 miles for core versus 11 miles and recently expanded to 17 miles for NBHMA). Another variable possibly affecting the NBHMA information is the prescribed burns that occur during the summer, with some burns conducted between August and September which could, in the short-term, affect deer use of the area leading up to the September survey effort. Continued survey of NBHMA is needed before a reliable trend within the area can be identified.

Overall, since 1975, the number of deer per mile, county/range-wide, has shown a steady, increasing trend (Appendix A, Spreadsheet 2).

Figure 1. CWTD Core Area and ODFW Spotlight Routes



Buck and fawn per 100 doe ratios
The buck/doe ratios (bucks per 100 does) in 2009 and 2010 were 28 and 26, respectively (Appendix A, Spreadsheet 3). Since 1980, buck/doe ratios have averaged 22.6 with a range of 0 to 57. Over the past decade, the range is 18 to 30, with empirical counts being relatively constant and with an average of 23.4 bucks per 100 does. An average buck ratio of 20 (1 buck per 5 does) is sufficient to provide enough breeding males in the deer population (Tod Lum, pers. comm. 2009).

The fawn/doe ratios (fawns per 100 does) in 2009 and 2010 were 26 and 27, respectively (Appendix A, Spreadsheet 3). Since 1980, fawn/doe ratios have averaged approximately 32 with a range of 14 to 57. For the past decade, the range is 14 to 41 with an average of approximately 27 fawns per 100 does. The deer have been protected for many years and only since 2003, have a limited number of bucks been allowed to be harvested. Does however, are still protected from hunter harvest. Doe mortality comes from road kills, predation, disease and poaching. It is plausible that the low deer fawn ratios may be indicative of an aging doe population where older does are less likely to have fawns. It may also be a function of a population approaching carrying capacity where there is less room for the population to expand due to limitations on available habitat (Tod Lum, pers. comm. 2009).

Annual population estimates
Annual population estimates by ODFW for the deer have demonstrated a long-term upward trend since management for the deer population began in 1975 (Figure 2). The deer population estimate for 2009 and 2010 is 6,568 and 6,570 deer, respectively (Tod Lum, pers. comm. 2011), continually showing modest gains (Appendix B).

Range
The range of the deer continues to expand to the north and west, and the population occupies an area of approximately 530 square miles compared to an area estimated at 308 square miles in 2002 (Figure 3). The expansion can be attributed to a combination of natural movement along with the ODFW transplant program; page 19 and Table 3.

In summary, the Douglas County population has increased, and its range has expanded. In the 1930s, the Columbian white-tailed deer population in Douglas County was estimated at fewer than 300 individuals within a range of about 31 square miles (Crews 1939). By 1983, the population had increased to about 2,500 deer (USFWS 1983). For secure habitat, it appears that deer numbers have been stationary for the past few years.

Figure 2: Deer Population Estimate 1975-2010.

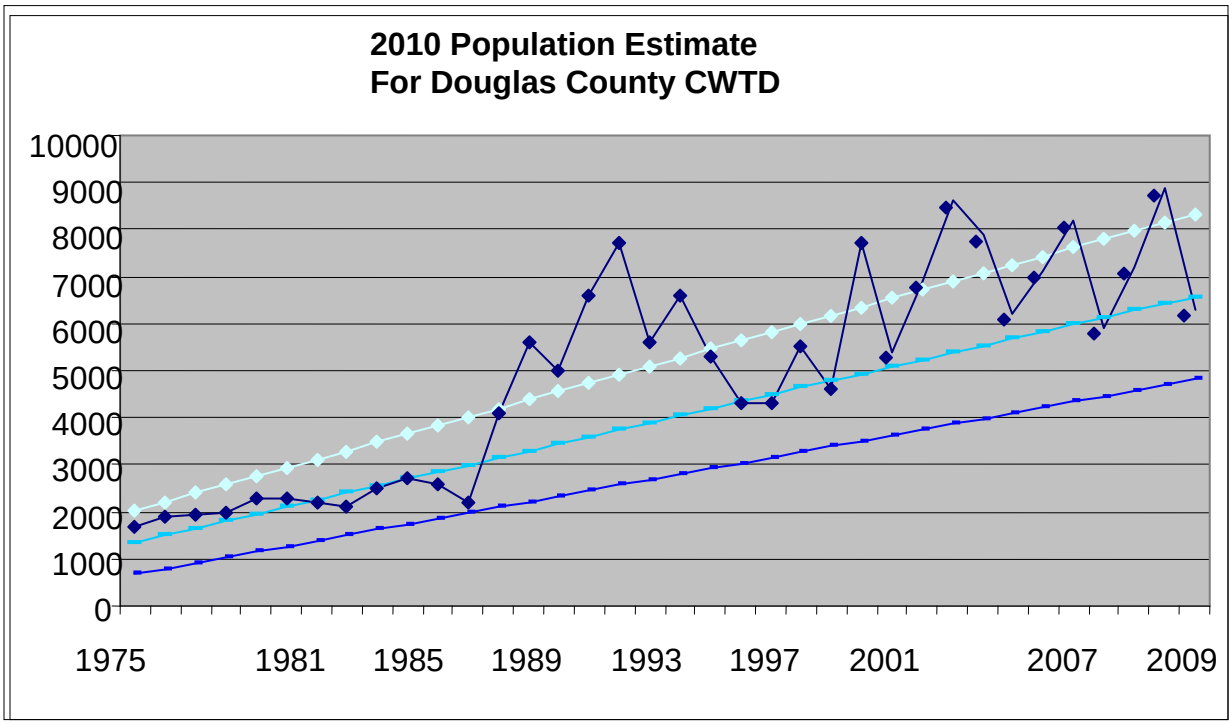
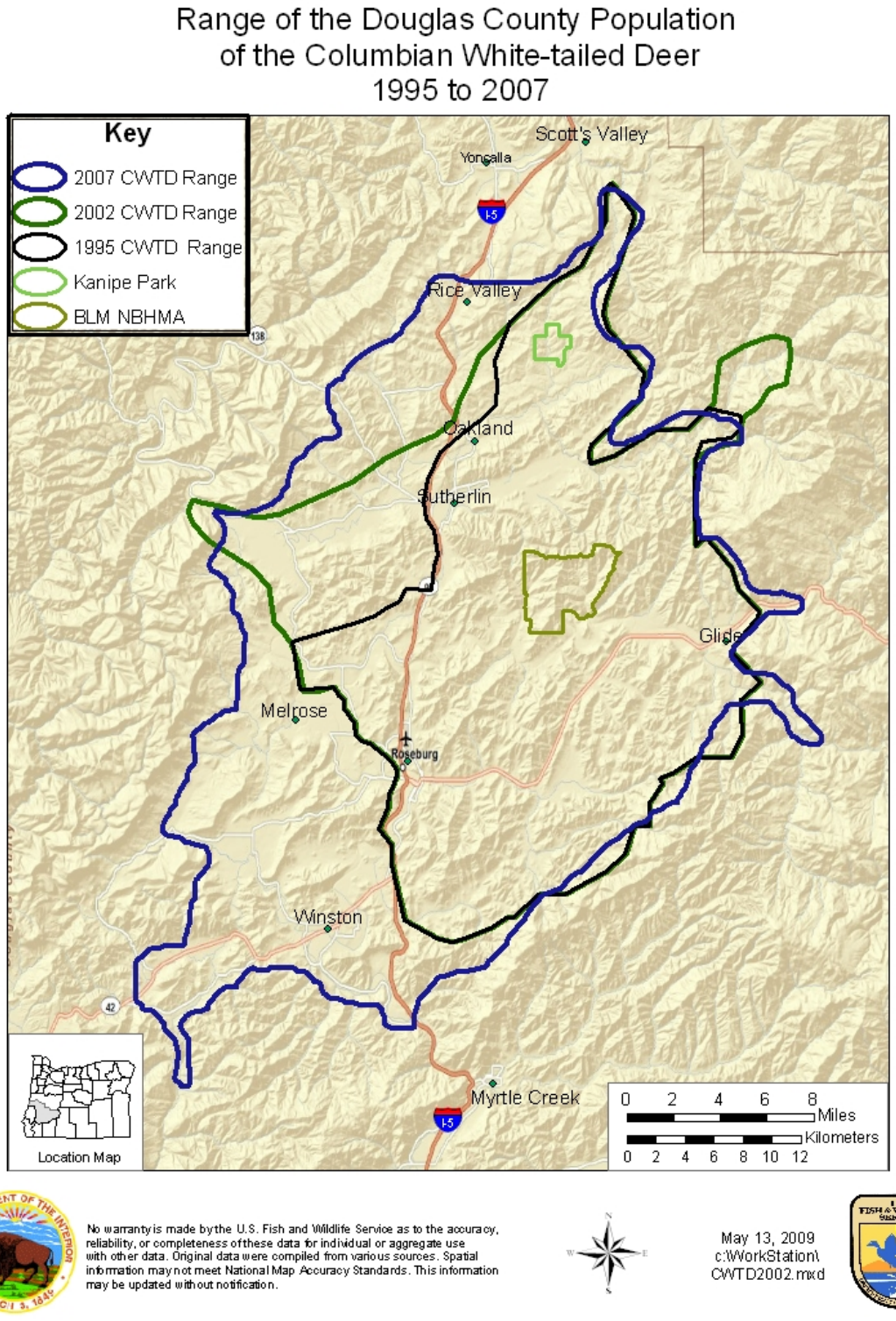


Figure 3. Range Expansion of Douglas County Population of Columbian white-tailed deer based on information provided by Oregon Department of Fish and Wildlife. 1995-2010.



II. Disease Occurrence and Disease Outbreak Early Alert System

Three diseases are monitored as part of the ongoing post-delisting monitoring program, two diseases (adenovirus hemorrhagic disease and deer hair-loss syndrome) are endemic in the population, and are monitored as part of ODFW's standard disease monitoring efforts. ODFW has provided the following information regarding the Douglas County deer population:

1. Adenovirus hemorrhagic disease

Sampling by ODFW has found adenovirus titers (evidence of past exposure) are present throughout the deer population. ODFW considers this disease to be present in the herd at low levels (endemic) and currently poses no real concern (Tod Lum, pers. comm. 2011).

2. Deer hair loss syndrome

Deer with hair-loss syndrome are noted by ODFW on the twice annual population surveys. Deer hair-loss syndrome is not currently considered to be a threat to the population, but the post-delisting monitoring program is tracking the incidence of this condition. In 2007, 0.4 percent (1 occurrence in 254 deer) of the deer population had this syndrome (Tod Lum, pers. comm. 2008 and 2011). During the past four years, the prevalence of hair loss has been minor (Appendix A, Spreadsheet 1).

3. Chronic wasting disease

This disease has not been detected anywhere in Oregon to date (Tod Lum, pers. comm. 2011). This disease will continue to be monitored because should it ever be detected, the disease could pose a significant threat to the deer.

In summary, current data (from 2003 through 2010) show no evidence of increased mortality due to adenovirus hemorrhagic disease or deer hair loss syndrome. These diseases are present in the population at low levels, but at this time are not showing evidence of becoming more prevalent. Chronic wasting disease has not been detected in Oregon, and therefore is not currently a threat to the deer.

III. Habitat Status

The Recovery Team recognized conversion of habitat to rural residential homesites and intensive livestock grazing as the prime threats to Columbian white-tailed deer habitat in Douglas County (USFWS 1983). A large area of habitat used by the deer has been protected, which contributed to the deer's recovery. Since 1978, over 7,000 acres have come into public ownership within the deer's range. This acreage includes the BLM's NBHMA and Douglas County's Mildred Kanipe Memorial Park. In addition, several smaller parcels owned by the county and private landowners provide important refuge or hiding cover for deer.

The largest publicly owned parcel providing habitat for deer is the NBHMA. The NBHMA was previously managed as a working cattle ranch. It was acquired by the BLM in 1994 through a land exchange (BLM 1998) specifically to secure habitat for the deer

since it lies within the Douglas County core habitat. The NBHMA is located east of Roseburg in the North Umpqua River basin (Figure 3) and is characterized by four distinct habitat types: Grasslands and oak savannah (29 percent); hardwood/conifer forest (52 percent); oak woodlands (17 percent); and other habitat such as rock outcrops, riparian areas, and wetlands (2 percent) (BLM 1998). The ODFW estimated deer occurrence on the NBHMA ranged from 154 to 348 individuals during 1994 through 1997 (Steve Denney, pers. comm. 1997). No active habitat management occurred at the NBHMA in the period between its acquisition in 1994 and the completion of a management plan in 2001; and this lack of management resulted in a decline in habitat quality (BLM 2000).

Buildup of thatch (rank vegetation) in grassland areas, invasion of undesirable shrub species, cedar encroachment in meadow areas, and conifer seedling establishment in oak woodlands contributed to the decline in habitat quality by inhibiting forb production for deer forage, and by reducing the availability of preferred cover (BLM 1998). The delay in initiation of management activities resulted from the need to develop and approve a management plan for the parcel. A final management plan was approved in June 2001 (BLM 2001).

The primary goal of the Habitat Management Plan is to ensure habitat for the deer, while special status species are managed to maintain species viability over time (BLM 2001). Management objectives identified in the final NBHMA management plan include: (1) Increased availability, palatability, and nutritional quality of deer forage and browse; (2) maintenance of mature oak, shrub, and herbaceous vegetation components; (3) control of noxious weeds; and (4) development of water sources (BLM 2001). Prescribed burning, thinning thick conifer stands, timber management, seeding and planting, and livestock grazing are some of the management tools available to achieve these objectives (BLM 2001). These activities will be scheduled to avoid sensitive periods (such as fawning and nursing) for the deer (USFWS 2001). Prescribed burning and seeding will be used to increase the abundance of desirable forage plants; thinning of oaks and removal of encroaching conifers will provide more preferred open canopy hiding cover for the deer (BLM 2001; USFWS 2001).

Mildred Kanipe Memorial Park (1,100 acres), managed by the Douglas County Park Department (DC Park Dept), is the second largest parcel of publicly owned land within the deer's range. The park lies about 10 miles north of the NBHMA (Figure 3). Douglas County prepared a Coordinated Resource Management Plan with recommendations for the Park, although there has been no effort to estimate deer numbers in the Park.

Whistler's Bend County Park is directly south of the NBHMA, across the North Umpqua River. The park is 175 acres in size and has a population of about 100 Columbian white-tailed deer (Steve Denney, pers. comm. 2001). The park is managed for human recreation needs (DC Park Dept 1999), but also provides hiding cover for deer, which make forays onto adjacent private lands to forage in the pastures and suburban yards surrounding the park (Steve Denney, pers. comm. 2001). Small parcels such as this park function as important refugia for deer that meet many of their foraging requirements on adjacent private lands (Recovery Team, *in litt.* 2001).

Douglas County implemented land-use plans and zoning ordinances that apply to private lands to protect habitat and assist in deer recovery (Douglas County Planning Department

(DCPD) 1995; Douglas County Board of Commissioners 2002). These protective measures include retention of existing land uses that maintain essential habitat components. Minimum lot sizes for farm use and timberlands, as well as building setbacks along riparian zones, have been established to ensure maintenance of habitat and travel corridors (ODFW 1995; Douglas County Board of Commissioners 2002). Douglas County's Columbian White-tailed Deer Habitat Protection Program was established in 1980 (Douglas County Board of Commissioners 2002). The County, in conjunction with the ODFW and the Service, identified the range of habitat with the greatest density of Columbian white-tailed deer, and 73,495 acres were designated as Essential Habitat Areas (DCPD 1995). Potential conflicting uses within the Essential Habitat Areas were identified as: (1) Residential development in native riparian habitat; (2) additional livestock development in lowland river valleys; and (3) brush clearing, aimed at creating and improving pastures for livestock, that removes cover for deer (Douglas County Board of Commissioners 2002). To address these concerns, 96.5 percent (70,555 acres) of the resource lands (agricultural or farm/forest) within the Essential Habitat Area are subject to a minimum parcel size of 80 acres; and any land division requests of less than 75 acres must be reviewed by the ODFW (Douglas County Board of Commissioners 2002). Land zoned as non-resource lands within the Essential Habitat Area (3.5 percent) is limited to single family dwellings, and rural residential development is limited to 2-acre and 5-acre lots (DCPD 1995; Douglas County Board of Commissioners 2002). Another component of Douglas County's program to conserve habitat for the subspecies is a 100-foot structural development setback from streams to preserve riparian corridors within the Essential Habitat Area (Douglas County Board of Commissioners 2002).

1. Management Actions within Secure Habitat Areas

a. North Bank Habitat Management Area: General management actions have been implemented before and since de-listing of the deer (from 2001-2010) to restore stream, riparian and upland habitat. These management actions include prescribed burning, seeding, forage plot development, noxious weed treatment, mowing, planting, and installation of water developments (guzzlers) (Figure 5). Extensive work has been accomplished on stream headcuts and crossings along with associated road improvements to improve stream and riparian habitat (Figure 6). Please refer to Table 3 for management actions accomplished from 2001-2010 (Ariel Hiller, pers. comm. 2010).

Monitoring

The following monitoring efforts are occurring within the NBHMA:

- Stream and riparian monitoring has been implemented with the establishment of baseline stream channel and greenline surveys. Greenline surveys are designed to measure vegetation trends on streambanks and rely upon identification of riparian plant community types on a line intercept transect (Cagney 1993).
- Vegetation condition monitoring has been implemented with the establishment of permanent photo plots and transects within different habitat types. Plots and transects have been and will be re-visited as various management actions have taken place across the area.
- With the assistance of ODFW, BLM established and surveyed deer census spotlight routes within the NBHMA in 2007. The initial routes totaled 11 miles in length with expansion to 17 miles in 2008. Surveys are conducted twice, in late August and early September, prior to hunting season.

Table 3. North Bank Habitat Management Area Management Actions 2001-2010.

Management Activity	Unit of Measure	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Prescribed Burning	Acres	490	586	640	730	570	634	32	250	480	152
Post-burn Seeding											
Hand or ATV				5	50			10	5	160	
Aerial	Acres					400	450				
Firetrails	Miles	10	10	10	10	10	0				.5
Forage Plots, new installation	Net Acres					17	15		92	20	18
Non-native/native	Acres					all non	all non		51/ 41	12.5/ 7.5	14.8/ 3.3
Forage Plot maint: burning, mowing, weed treat. Seeding	Net Acres										
Water Developments	Each		1	3	1	1	3				
Weed Treatment (thistles, Scotch broom, hawthorn, Himalayan blackberry)	Acres									114	70
Upland	Acres			64	70	112	30	10	30	24	138
Streamside	Miles			1	1.3	1.5	2	15	15	2	7
Planting (white oak, willow, snowberry, spirea, elderberry, ninebark, ash, maple, white alder, redstem ceanothus, buckbrush, dogwood)											
Upland	Acres		15	25	15			3	5	5	2
Streamside	Miles			1	1.3	0.3	2	1	6	3	3
Oak Restoration	Acres								30	45	15
Mowing	Acres	45	30	45	45	30	30	30	62	70	70
Stream Restoration (log & boulder placements)	Miles								1	2	1
Headcuts	Each			4	3	0	0	2	0		
Associated road work	Miles			2	2	0	0	3.3mi., 7 culvert	0		
Culverts											1
Armored dips										9	
Monitoring											
Stream Channel and Greenline Surveys	Each				8	0					
Permanent Vegetation transects	Each			11	12	10	4	0	7	9	5
Spotlight route	Miles							22	34	34	34
FLIR(Forward-looking infra-red)flights	Each	1994								2009	
Human disturb. on CWTD (retro)- OSU											2010 2011

Figure 5. Prescribed burning at NBHMA 2007.

Figure 6. Stream restoration work in Jackson Creek on NBHMA in 2008.

Information gaps and recommendations regarding deer and deer habitat on NBHMA.

With the effort to remove thatch to improve forage quality and availability, it is still unclear how deer are using treated habitat, including the forage plots. In addition to the long-term tracking of deer population indexes using a spotlight survey, BLM, ODFW, and the Service should consider other methods to monitor the deer's response to habitat altering activities; including, but not limited to:

- Continue the monitoring effort using GPS capable, radio collared deer to evaluate deer use of various habitat types including forage plots, as well as areas treated by prescribed fire, mowing, planting and seeding.
- Evaluate the effects of hunting on the CWTD population.
- Research the role of oak woodland/savannah restoration in relation to deer habitat use within the NBHMA.
- Evaluate the effects of the recreational activities (e.g., hunting, hiking, horseback riding) on the deer population occurring within the NBHMA.
- Examine the impacts of the ODFW NBHMA spring turkey hunt on fawning season.
- Determine the feasibility of providing targeted grazing by livestock to increase forage quality, palatability and availability.
- Compile data collected by ODFW on the results of camera stations and deer use of these areas
- Attempt to publish the results of the study: Impacts of human recreational activity on movement and distribution of female CWTD during fawning season on NBHMA. These results can be used to inform future recreational and transportation planning efforts by BLM

b. Mildred Kanipe Memorial Park: In 2007 and 2008, Douglas Soil and Water Conservation District (DSWCD) staff continued oak savanna restoration projects to restore 100 acres of oak savanna and oak woodland in the park. Treatments targeted non-native and invasive species (English hawthorn, Himalayan blackberry and Scotch broom) through cutting, spraying and burning. Reseeding these areas will also occur with native understory species.

c. Whistler's Bend County Park: At this time, deer habitat management has not been established for the park; although it does provide hiding refugia to the deer.

2. Management Actions within Private lands

Habitat conservation and restoration projects on private lands have direct and indirect benefits to deer. Riparian protection (such as fences and off-stream watering facilities) along with actions such as native plantings, grass seeding and conversion of orchards and pasture back to native riparian vegetation provide deer with valuable fawning and/or hiding cover and thermal refugia during the hot summer months.

Several of these projects were funded under the auspices of stream and riparian restoration for salmon and steelhead (such as Oregon Watershed Enhancement Board (OWEB), Partners for Fish and Wildlife and Jobs-in-the-Woods). These projects, because of the deer's affinity for riparian habitat have contributed and will continue to assist in the restoration of deer throughout their expanding and historic range. Some examples are:

a. Oerding Preserve at Popcorn Swale: The deer are known to utilize this 30-acre site which was received as a gift from the Oerding family to The Nature Conservancy. From fall of 2003 through 2010, work accomplished included:

- Removal of 1,350 pear trees, ash and English hawthorn on five acres.
- Removal of 200-300 pear trees on two acres.
- Removal of pear trees from an ash stand on 0.25 acre.
- Seven acres of teasel cut annually.
- Two acres of blackberry removed.
- Approximately 700 square yards of reed canarygrass (non-native) covered with landscape fabric.
- 35 pounds of native seed gathered and used to reseed 0.35 acres.
- Annual vegetation monitoring to evaluate species cover and diversity.
- Annual photo-point monitoring to visually document changes.

b. Marilyn Gill Oak Restoration Project: The Marilyn Gill oak restoration project occurred September 2004 through July 2005. A Service private stewardship grant was used to conduct treatments through the McKenzie River Trust and in cooperation with DSWCD.

- Treatments were completed on 61 acres to control noxious weeds (English hawthorn, Himalayan blackberry, Scotch broom, and exotic rose).
- Machine and hand thinning removal of conifers, dense oaks and brush to release oaks on 132 acres.
- Machine removal of Himalayan blackberry in a riparian area on 11 acres.
- Installed trial plots using an herbicide and native grass seeding to re-establish native bunchgrass.
- Installed trial using herbicide vs. hand cutting to thin oak seedlings in native bunchgrass.
- A perpetual conservation easement is in place on 202 acres to protect and enhance deer habitat.
- Continual restoration maintenance of the site is occurring.

c. Jobs-in–the-Woods Program: Funding for projects on private lands of four landowners was provided through the Service's Jobs-in–the-Woods program and in cooperation with DSWCD. Projects from 2003-2005 included:

- Invasive species removal (hawthorn, poison oak, blackberry, and Scotch broom) on 14 acres and replanted with conifers.
- Invasive species removal (hawthorn, blackberry, and Scotch broom) occurred on 58 acres and replanted with conifers on 39 acres out of 58 acres.
- Riparian planting with hardwoods and conifers on 12 acres, and fencing to exclude cattle.
- Removal of invasive species and conifer planting on 10 acres. Wetland enhancement work on 15 acres included backfill, enlarging a wetland area, planting hardwoods, conifers and shrubs.

d. Environmental Quality Incentives Program: The Natural Resources Conservation Service worked with landowners through the Environmental Quality Incentives Program to implement several projects from 2003 through 2008.

- Continuation of tree planting, riparian development, wildlife habitat development, pasture management, and grazing management on approximately 3,000 acres.

e. **Umpqua Basin Watershed Council:** The Umpqua Basin Watershed Council worked with eight landowners to implement projects from 2003-2008.

- Riparian planting with conifers and hardwoods on 28.5 acres.
- Riparian fencing on 7.2 acres.

f. Conservation Reserve Program (CRP), Continuous Conservation Reserve Program (CCRP) and Conservation Reserve Enhancement Program (CREP): The Farm Services Agency worked with several landowners enrolled in CRP, CCRP and CREP to implement projects through 2003-2010 (Cindy Bright. pers. comm. 2008, 2009, and 2010; David Chain. pers. comm. 2009).

- Converting crops to native cover on 400 acres.
- Riparian planting of trees and shrubs on 600 acres.
- In 2010, and addition 69.3 acres were enrolled in CREP; all projects contained riparian buffer protection along with an oak restoration component.

g. DSWCD: In addition to the specific projects listed above, the DSWCD also has implemented many projects since 2003 in cooperation with private landowners using several funding sources (such as OWEB, Oregon State Weed Board, Douglas County (SHIP [Salmon Habitat Improvement Program]) and Title II of the Payment to Counties Act) (Cindy Bright, pers. comm. 2008 2009, and 2010). Projects include:

- Noxious weed control with 65 landowners on 1,661 acres.
- Conifer, wetland and riparian planting on 218 acres.
- Planting and reestablishment of native vegetation on 290 acres of riparian and oak woodland habitat.
- Construction of fences along 9,800 feet of streams to appropriately manage stock grazing in riparian areas.
- Pond installation, watering facilities and spring development.
- In 2010, and addition 69.3 acres were enrolled in CREP; all projects contained riparian buffer protection along with an oak restoration component.

3. Development and Habitat Management within Douglas County

As previously discussed in the 2003-2005 Post-delisting Monitoring Report, there has been a change in the Douglas County land use restrictions in terms of the removal of the deer habitat overlay by the county. Originally, this was a building setback of 100 feet in Roseburg city limits and 50-foot setback in the rest of Douglas County. Vegetation removal could occur in the riparian areas and habitat was not protected. Currently, with this rule change, there is still a 50-foot setback in the entire county from a riparian area for building a structure; however, vegetation removal can still occur down to the creek or river. Therefore, this rule change has no additional effect on the deer population (Cat Brown, pers. comm. 2006).

Residential developments within City of Sutherlin include:

- Mont Claire-18.6 acres, development continues to the present.
- Forest Heights-25.6 acres, development continues to the present.

- Cooper Creek Estates-11 acres, development continues to the present.
- 6th Street Heights-5.2 acres, development continues to the present.
- Quail Run-6.5 acres, development started in 2006.
- Daffodil-preliminary approval for development.
- Pear Lane- preliminary approval for development.
- North of Sutherlin-217 acres added to the Urban Growth Boundary (UGB), initial phase of annexation completed and continuing to plan a proposed residential development.

Additions for the city of Roseburg Urban Growth Boundary include:

- Ramp Canyon-680 acres; development is underway with new housing units planned.
- Charter Oaks-350 acres
- Page Road-100 acres
- Dixonville-350 acres

Ramp Canyon currently has suitable deer habitat with housing developments planned for 2006 and beyond. Charter Oaks, Newton Creek and Page Road have existing housing developments and will be annexed in to the city of Roseburg. Dixonville has very little suitable deer habitat. This level of development should not affect the overall deer population. The deer continue to be present in the city limits and should continue to be present in the future, but deer carrying capacity should be reduced. With an estimated 197,000 acres of suitable habitat occupied by the deer in Douglas County, the above acres affect less than one percent of the total suitable habitat (Cat Brown, pers. comm. 2006).

In summary, important habitats such as riparian areas and oak woodlands are being managed for the deer at NBHMA and private lands throughout the deer's' expanding range in Douglas County. Some losses or changes in habitat condition and quality have been noted. At the time of delisting, some development was expected. Continued habitat restoration and conservation is occurring that offsets these habitat losses. Further monitoring and evaluation of overall habitat loss, habitat restoration and deer habitat use within the range of the deer should continue.

IV. Columbian white-tailed deer hunts in Douglas County

The ODFW is responsible for the state's management of wildlife and when appropriate, may offer recreational harvest opportunities of game animals to the public.

Population monitoring of the deer in Douglas County indicated stable to increasing numbers of deer during the pre- and post-delisting period. Offering a limited number of buck tags to the public would provide recreational harvest opportunity with little impact to the overall deer population (Tod Lum, pers. comm. 2009).

In 2005, the Oregon Fish and Wildlife Commission approved a limited number of rifle buck tags (Hunt # 123- Umpqua) for hunting white-tailed deer or Columbian black-tailed deer (black-tailed deer) within Douglas County, excluding the NBHMA. The oak woodland/savannah and riparian habitat areas heavily utilized by white-tailed deer meant the majority of hunting opportunity would be located at lower elevations on private lands.

Therefore, the general public would have fairly restricted access to hunting white-tailed deer. However, it was the first opportunity hunters would have to hunt white-tailed deer since their listing as an endangered species in 1978. Although the hunt was only 12 days long in early October, it was well received by landowners who supported white-tailed deer populations on their lands throughout the 25 year closure.

In 2005, 96 hunters participated in one hunt providing an opportunity to harvest a white-tailed deer within Douglas County. They harvested 51 white-tailed deer bucks and six black-tailed deer bucks.

In 2006, an archery hunt was added to the Douglas County hunt (Hunt # 123R1- Umpqua Bow) and it provided archery hunters two weeks of hunting opportunity in the late August through early September. The hunt was fairly restrictive as it was only two weeks long and limited archers to hunt in only this area and nowhere else. The bag limit for this archery hunt was a white-tailed buck or an either-sex black-tailed deer.

Up until 2006, hunting on NBHMA was geared towards the reduction of black-tail deer to reduce competition with white-tailed deer. There were three youth hunts (any black-tail bag limit) and one hunt for Master Hunters (antlerless black-tail only). In 2006, ODFW began to provide some limited public hunting opportunity for white-tailed deer on the NBHMA by creating three new hunts and modifying an existing one. The new hunts were for archery hunters (Hunt # 123R2- N Bank Habitat Bow), muzzleloader hunters (Hunt # 123M2- N Bank Habitat) and rifle hunters (Hunt # 123B- N Bank Habitat). The first youth hunt (Hunt # 623T1- N Bank Habitat) was modified to allow youth hunters the same opportunity as the three new hunts, to harvest a buck white-tailed deer or any black-tailed deer.

Archery hunters were limited to a short couple of weeks in the late summer when hot and dry conditions are not always conducive to harvesting deer. The first youth hunt (623T1) followed with 16 days of hunting in October under usually better hunting conditions. The next two youth hunts (623T2 & 623T3) were for black-tailed deer only, and took the hunting season into early December. The muzzleloader hunters (123M2) were given nine days to hunt in mid- December and were followed by rifle hunters (123B) who hunted the last week in December. The last hunt of the season was for Master Hunters (623B) hunting for antlerless black-tailed deer during 16 days in mid-January.

In 2006, 140 hunters participated in six hunts providing an opportunity to harvest white-tailed deer. They harvested 17 white-tailed deer bucks, 11 black-tailed deer bucks and one black-tailed deer doe. In 2006, 57 hunters participated in four hunts within the NBHMA (Hunt #s 123B, 123R2, 123M2 and 623T1) with an opportunity to harvest a white-tailed deer. They harvested 11 black-tailed deer bucks, one black tailed deer doe and 17 white-tailed deer bucks.

The season structure remained the same in 2007 and in 2008 a second Master Hunter antlerless black-tailed deer hunt was added (623B2).

In 2007, seven controlled hunts occurred in Douglas County from early September to late January of 2008. Four of those hunts allowed the taking of a white-tailed buck (having not less than a forked antler) or one black-tailed buck. Two hunts allowed the taking of a

black-tailed buck, and one hunt allowed the taking of antlerless black-tailed deer. At this time hunts targeting white-tailed does are not occurring.

In 2007, a total of 143 hunters harvested 23 black-tailed bucks and 45 white-tailed bucks. Six black-tailed does were taken during the hunting period. In 2007, within the NBHMA, four hunts (Hunt #s 123B, 123R2, 123M2 and 623T1) occurred with 61 hunters harvesting 13 black-tailed and 7 white-tailed bucks (Tod Lum, pers. comm. 2007 and 2008).

In 2008, 150 hunters harvested 32 black-tailed deer bucks, two black-tailed deer does and 38 white-tailed deer bucks. In 2008, again, four hunts (Hunt #s 123B, 123R2, 123M2 and 623T1) provided 57 hunters with an opportunity to harvest a white-tailed deer within the NBHMA, 17 black-tailed deer bucks, two black-tailed deer does and six white-tailed deer bucks were harvested (Tod Lum, pers. comm. 2009).

In 2009, 152 hunters harvested 18 black-tailed deer bucks, two black-tailed deer does and 30 white-tailed deer bucks. In 2009, similar hunts to the previous years were provided at the NBHMA and 66 hunters harvested 16 black-tailed deer bucks, four does, and seven white-tailed deer bucks (Appendix A, Spreadsheet 4).

In 2010, 131 hunters harvested 15 black-tailed deer bucks, one doe, and 41 white-tailed deer bucks. Similar to 2009, four hunts were provided at the NBHMA and hunters harvested nine black-tailed deer bucks, one doe, and seven white-tailed deer bucks (Appendix A, Spreadsheet 4).

Since 2005, when the harvest of a white-tailed buck was allowed, a total of 529 hunters have participated in 20 hunts offering an opportunity for the hunter to harvest a white-tailed buck. During this period, 151 white-tailed bucks have been harvested (Appendix A, Spreadsheet 4).

Within the NBHMA, hunters have harvested 74 animals (30 white-tailed bucks, 41 black-tailed-bucks and three black-tailed does) since 2006 when hunting within the NBHMA was initiated (Appendix A, Spreadsheet 4).

V. Deer Transplant

Currently, ODFW is transplanting deer from occupied habitat into historic, but unoccupied habitat west of Roseburg near the communities of Melrose and Winston; and in the Rice Valley and Scotts Valley areas of northern Douglas County (Figure 3). Populations are being established on additional acreage which results in a net increase of occupied habitat. During 2010, a total of 77 deer were captured and relocated to areas where deer were released in previous years. This includes 7 deer that were relocated to Julia Butler Hansen National Wildlife Refuge in Washington State. This was done to augment a declining population and was in keeping with the results of a recently completed genetics study showing the Douglas County and Washington populations to be genetically similar (Piaggio and Hopken 2010). From 2004 through 2010, a total of 451 deer have been captured and relocated (Table 3).

Table 3. 2003-20010 Summary of Deer Transplant Program. Data provided by ODFW.

Year	Captured	Released*	Died	Euthanized	Relocated	
					Bucks	Does
2005	59	3	6	1	18	31
2006	79	3	0	0	32	44
2007	71	5	4	0	33	29
2008	79	5	2	0	39	33
2009	98	3	2	0	30	63
2010	77**	0	1	0	33	43
Totals	**463**	**13**	**12**	**1**	**113**	**168**

*Released at capture site

** Seven deer (1 buck and 6 does) were relocated to the Julia Butler Hansen NWR.

A portion of the deer from this relocation effort has been radio collared to allow for subsequent monitoring. Based on information collected by ODFW, it appears some of the deer have moved north into the southern Willamette Valley near Cottage Grove Reservoir (Tod Lum, pers. comm. 2008). ODFW is not ready to document a range expansion at this time, but if the deer transplant effort continues, the Service expects to see establishment of resident deer in the southern Willamette Valley in the next several years (Tod Lum, pers. comm. 2008).

VI. Status of the deer based on the five factors considered when a species is proposed for listing

Section 4 of the Endangered Species Act specifies five factors to be considered when determining if a species is threatened or endangered. These same five factors were reviewed in determining if the Douglas County population merited removal from the list in 2003. In this section, we briefly review the status of the five factors.

1. The present or threatened destruction, modification, or curtailment of habitat or range.

In Section I. Population Trends and Section V. Deer Transplant, deer population numbers continue an increasing trend through 2010. The current deer population estimate is over 6,500 individuals. This is the highest population estimate since monitoring of the deer population began (Figure 1 and Appendix B). Since 2003, the population trend continues to be positive, and the deer are well distributed throughout their expanding range in Douglas County, Oregon.

Figure 7. Rocket Nets being deployed over deer herd in area of North Bank Road, near Roseburg, Oregon.

Section III Habitat Status and Section V Deer Transplant shows that habitat continues to be managed for the benefit of the deer, and deer are utilizing additional habitats as a result of the transplant program. No new threats to habitat or range are apparent. However, to date, monitoring data is preliminary and it is too early ascertain the habitat quality within NBHMA and Mildred Kanipe with respect to restoration actions (i.e., removal of non-native invasive plants, prescribed burns); and other actions (such as forage plots within the NBHMA) so as to evaluate the effectiveness of management actions on the deer and their habitat. It is recognized that efforts are underway at NBHMA to improve forage palatability.

2. Overutilization for commercial, recreational, scientific, or educational purposes.

In Section IV, since 2005, when the harvest of a white-tailed buck was allowed, a total of 529 hunters have participated in 20 hunts offering an opportunity for the hunter to harvest a white-tailed buck. During this period, 151 white-tailed bucks have been harvested.

3. Disease or predation.

In Section II Disease Occurrence and Disease Outbreak Early Alert System, we reported adenovirus hemorrhagic disease and deer hair-loss syndrome disease, while present in the population, is not prevalent in the deer population. Chronic wasting disease has not been detected in Oregon, and poses no threat at this time. Monitoring by ODFW will continue as part of their standard disease monitoring effort.

4. Inadequacy of existing regulatory mechanisms.

No threats associated with this factor are apparent. Existing regulatory mechanisms are in place to manage a controlled deer harvest. While land use planning regulations are in place in Douglas County, continued development in areas of the county supporting deer is a concern. While some development was expected, continued habitat restoration and conservation is improving habitat quality, helping to ameliorate habitat losses. Monitoring efforts focusing on habitat loss, habitat restoration and deer habitat use should continue.

5. Other natural or manmade factors affecting its continued existence.

At this time, no other factors are identified as a concern to the deer population.

VII. Conclusion and Recommendations

Based on information presented in this report, we believe the threats to the deer do not cause concern, and conclude the deer in Douglas County remain secure absent the protections provided by the Act.

However, we also believe current monitoring data is limited to analyze the effects to deer from the following:

- The status of deer population trends on secure habitat,
- Role of habitat restoration activities in maintaining or improving deer condition, and or population levels, and
- The effects of interaction between deer and the human recreation activities (e.g., hunting, equestrian, hiking and biking) on deer condition and population levels.

To address these deficiencies we recommend the following:

1. To allow time to establish population trends on secure habitat, we find the Post Delisting Monitoring Period should continue through 2012. Prior to the end 2012, ODFW, BLM and FWS will consider convening a cooperators meeting of the agencies and other interested groups to consider whether extension is necessary.
   Additionally we specifically ask BLM and ODFW, with Service support, to:
   - Continue the spotlight counts within the NBHMA to establish trend data for deer occurrence with the NBHMA.
   - Analyze effects of hunts on the deer population on NBHMA.
   - Analyze data on deer health using information gathered from deer capture and harvest data.
   - Continue the monitoring effort on NBHMA using GPS radio–collars on deer to evaluate deer use of various habitat types including areas treated by prescribed fire, mowing, planting and seeding.
   - Evaluate and monitor the role of oak woodland/savannah restoration in relation to deer habitat use.

- Develop a monitoring program to evaluate the interactions within and between recreational uses and the deer populations occurring within secure habitat.
- Provide input regarding continued development in the range of the deer within Douglas County.
- Determine the feasibility of utilizing livestock grazing to improve forage quality and palatability.

To assist in the planning and implementation of these recommendations, ODFW, BLM, and the Service will continue to meet quarterly, and more frequent as necessary, to further enhance communication and cooperative management of the deer and their habitat. These agencies will also continue to commit to the NBHMA interdiscinplinary team and will make every attempt to attend these meetings and field tours.

With detailed information from these specific actions and commitments, we can better evaluate the continued stresses on local deer herds and the effectiveness of habitat restoration and the possible benefits derived by the deer depending on the secure habitat within the range of the deer.

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Appendix A. Spreadsheets

SPREADSHEET 1. 2007-2010 CWTD POPULATION COMPOSITION. Data provided by ODFW.

2007-2010 CWTD POPULATION COMPOSITION														
YEAR	UNIT	UNIT	BUCKS				BUCK	DOES	FAWNS	CLASS TOTAL	BUCKS PER 100 DOES	FAWNS PER 100 DOES	FAWNS PER 100 ADULTS	HAIRLOSS
	#	NAME	1	2	3	4	TOTAL							NO. / %
2007														
	21	**INDIGO**	0	0	0	0	0	4	2	6		50.0	50.0	0/0
	22	**DIXON**	2	4	0	1	7	23	3	33	30.4	13.0	10.0	0/0
	23	**MELROSE**	4	18	11	4	37	141	35	213	26.2	24.8	19.7	1/.47
2008														
	21	**INDIGO**	0	1	1	0	2	7	1	10	28.6	14.3	11.1	0.0
	22	**DIXON**	1	0	2	3	6	16	3	25	37.5	18.8	13.6	0.0
	23	**MELROSE**	5	7	14	1	27	167	52	246	16.2	31.1	26.8	6/2.44
2009														
	21	**INDIGO**	1	2	0	2	5	25	4	34	20.0	16.0	13.3	0/0.0
	22	**DIXON**	0	1	3	2	6	31	5	42	19.4	16.1	13.5	0/0.0
	23	**MELROSE**	3	18	17	5	43	140	41	224	30.7	29.3	22.4	1/0.5
2010														
	21	**INDIGO**	0	4	5	0	9	21	0	30	42.9	0.0	0.0	0/0.0
	22	**DIXON**	1	0	3	1	5	29	5	39	17.2	17.2	14.7	0/0.0
	23	**MELROSE**	6	14	10	10	40	159	51	250	25.2	32.1	25.6	0/0.0

Spreadsheet 2. Spring Deer Count 1975-2010 within Douglas County, Oregon. Data provided by ODFW.

Date	Deer/Mile
1975	1.7
1976	1.9
1977	1.95
1978	2
1979	2.3
1980	2.3
1981	2.2
1982	2.1
1983	2.5
1984	2.7
1985	2.6
1986	2.2
1987	4.1
1988	5.6
1989	5
1990	6.6
1991	7.7
1992	5.6
1993	6.6
1994	5.3
1995	4.3
1996	4.3
1997	5.5
1998	4.6
1999	7.7
2000	5.4
2001	6.9
2002	8.6
2003	7.9
2004	6.2
2005	7.1
2006	8.2
2007	5.9
2008	7.2
2009	8.9
2010	6.3

This data set is derived from total Columbian white-tailed deer counted in the district divided by 47.5 miles (core route mileage)

Spreadsheet 3. Fall Buck to Doe and Fawn to Doe Ratios 1980-2010 within Douglas County, Oregon. Data provided by ODFW.

Year	CWTD buck/100 does based on fall compositional counts	CWTD fawns/100 does based on fall compositional counts
1980	10	57
1981	57	48
1982	0	50
1983	18	30
1984	24	47
1985	16	71
1986	22	49
1987	31	42
1988	19	31
1989	21	31
1990	28	36
1991	30	36
1992	29	35
1993	29	44
1994	26	45
1995	21	44
1996	22	23
1997	22	33
1998	17	20
1999	32	35
2000	30	41
2001	22	34
2002	24	34
2003	22	25
2004	22	23
2005	20	14
2006	20	20
2007	26	24
2008	18	29
2009	28	26
2010	26	27

Spreadsheet 4. Summary of Results for Douglas County Deer Hunts 2005-2010. Data provided by ODFW.

Note: NBHMA Hunts are bolded

Hunt	Sold	LOP	Did Not Hunt	Hunted	Days Hunted	# Harvested	CWTD Buck	BTD Buck	BTD Doe	Days/ Hunter	Days/ Deer
2005											
123	121	99	15	96	332	57	51	6	N/A	3.5	5.8
2006											
123A	93	72	22	71	309	27				4.4	11.4
123B	**10**	**0**	**2**	**8**	**32**	**6**	**3**	**3**		**4.0**	**5.3**
123R1	14	0	2	12	70	6				5.8	11.7
123R2	**17**	**0**	**0**	**14**	**87**	**3**	**3**	**0**		**6.2**	**29.0**
123M2	**9**	**0**	**0**	**9**	**47**	**2**	**2**	**0**		**5.2**	**23.5**
623T1	**32**	**0**	**6**	**26**	**108**	**18**	**9**	**8**	**1**	**4.2**	**6.0**
2007											
123A	77	55	11	66	223	48	38	10	0	3.4	4.6
123B	**10**	**0**	**2**	**8**	**31**	**6**	**3**	**3**	**0**	**3.9**	**5.2**
123R1	19	0	3	16	71	11				4.4	6.5
123R2	**16**	**0**	**2**	**14**	**62**	**2**	**2**	**0**	**0**	**4.4**	**31.0**
123M2	**10**	**0**	**1**	**9**	**46**	**2**	**0**	**2**	**0**	**5.1**	**23.0**
623T1	**31**	**0**	**1**	**30**	**90**	**10**	**2**	**8**	**0**	**3.0**	**9.0**
2008											
123A	83	62	14	69	261	43	28	15		3.8	6.1
123B	**8**	**0**	**2**	**6**	**26**	**5**	**2**	**3**	**0**	**4.3**	**5.2**
123R1	25	0	2	23	102	4	4	0	0	4.4	25.5
123R2	**16**	**0**	**2**	**14**	**64**	**0**				**4.6**	**0.0**
123M2	**9**	**0**	**0**	**9**	**63**	**2**	**2**			**7.0**	**0.0**
623T1	**33**	**0**	**4**	**29**	**80**	**18**	**2**	**14**	**2**	**2.8**	**0.0**
2009											
123A	81	59	18	63	273	20	16	4	0	4.3	13.7
123B	**8**	**0**	**0**	**8**	**25**	**5**	**3**	**2**	**0**	**3.1**	**5.0**
123R1	26	0	3	23	101	10	7	0	3	4.4	10.1
123R2	**18**	**0**	**0**	**18**	**83**	**4**	**0**	**2**	**2**	**4.6**	**20.8**
123M2	**10**	**0**	**0**	**10**	**50**	**4**	**2**	**2**	**0**	**5.0**	**12.5**
623T1	**30**	**0**	**0**	**30**	**114**	**12**	**2**	**8**	**2**	**3.8**	**9.5**

Hunt	Sold	LOP	Did Not Hunt	Hunted	Days Hunted	# Harvested	CWTD Buck	BTD Buck	BTD Doe	Days/ Hunter	Days/ Deer
2010											
123A	**92**	**71**	**18**	**74**	**233**	**32**	**30**	**2**	**0**	**3.1**	**7.3**
123B	**5**	**0**	**0**	**5**	**15**	**2**	**1**	**1**	**0**	**3.0**	**7.5**
123R1	**31**	**1**	**14**	**17**	**138**	**8**	**4**	**4**	**0**	**8.1**	**17.3**
123R2	**9**	**0**	**5**	**4**	**6**	**0**	**0**	**0**	**0**	**1.5**	**-**
123M2	**4**	**0**	**1**	**3**	**36**	**3**	**1**	**2**	**0**	**12.0**	**12.0**
623T1	**28**	**0**	**0**	**28**	**89**	**12**	**5**	**6**	**1**	**3.2**	**7.4**

Appendix B. Population Trends 1975-2010. Data provided by ODFW.

Year	Lower Estimate	Population Estimate	Upper Estimate
1975	615	1317	2018
1976	738	1472	2206
1977	860	1628	2395
1978	982	1783	2584
1979	1105	1939	2773
1980	1227	2094	2962
1981	1349	2250	3151
1982	1471	2406	3340
1983	1594	2561	3529
1984	1716	2717	3717
1985	1838	2872	3906
1986	1961	3028	4095
1987	2083	3183	4284
1988	2205	3339	4473
1989	2328	3495	4662
1990	2450	3650	4851
1991	2572	3806	5039
1992	2694	3961	5228
1993	2817	4117	5417
1994	2939	4272	5606
1995	3061	4428	5795
1996	3184	4584	5984
1997	3306	4739	6173
1998	3428	4895	6361
1999	3550	5050	6550
2000	3673	5206	6739
2001	3795	5361	6928
2002	3917	5517	7117
2003	4040	5673	7306
2004	4162	5828	7495
2005	4284	5984	7683
2006	4406	6139	7872
2007	4529	6295	8061
2008	4651	6450	8250
2009	4951	6568	8483
2010	4812	6570	8329