

William L. Finley National Wildlife Refuge
Modified Deer Hunt Program
Supplemental Environmental Assessment

*A consolidated analysis from the
Willamette Valley National Wildlife Refuges
Final Comprehensive Conservation Plan and Environmental Assessment
of September 2011.*

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Chapter 1. Purpose and Need

Introduction and Background

The Willamette Valley National Wildlife Refuge Complex, consisting of Ankeny National Wildlife Refuge, Baskett Slough National Wildlife Refuge and William L. Finley National Wildlife Refuge, was created in the 1960s primarily for the benefit of wintering dusky Canada geese and other migratory waterfowl and birds. The three refuges that comprise the Complex are spread north to south through the Willamette Valley (Map 1) with the northernmost being Baskett Slough NWR located near Salem; Ankeny NWR located near Jefferson; and William L. Finley NWR to the south of Corvallis.

In September 2011 the U.S. Fish and Wildlife Service (Service) adopted a Comprehensive Conservation Plan for Ankeny, Baskett Slough, and William L. Finley National Wildlife Refuges. The CCP was adopted for implementation after developing a Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) for the three Refuges. This CCP/EA evaluated three management options (alternatives) for the CCP and disclosed anticipated effects for each alternative, pursuant to the National Environmental Policy Act of 1969 (NEPA), as amended ([42 U.S.C. 4321-4347](#)). Appendices provided supporting information. The CCP/EA was available for public comment and review from May 25, 2011 through June 30, 2011. After evaluating comments received on the CCP/EA and responding to public comments, the Service adopted Alternative 2 in the CCP/EA, which had been identified as the Service's Preferred Alternative, for implementation.

The goals, objectives, and strategies under Alternative 2 were determined to best achieve the purpose and need for the CCP while maintaining balance among the varied management needs and programs. Alternative 2 addressed the issues and relevant mandates, and is consistent with principles of sound fish and wildlife management.

The CCP sets forth management guidance for the Refuges over the next 15 years, as required by the National Wildlife Refuge System Administration Act of 1966 ([16 U.S.C. 688dd -688ee](#), as amended by the National Wildlife Refuge System Improvement Act of 1997). The Improvement Act mandated that CCPs be developed for all refuges in the National Wildlife Refuge System.

As part of setting forth future management guidance, the CCP and accompanying hunt plan introduced and evaluated minor modifications to the deer hunting program at William L. Finley National Wildlife Refuge (W.L. Finley Refuge or NWR).

Purpose and Need for the CCP

The purpose of the CCP is to provide reasonable, scientifically-grounded guidance for ensuring that over the next fifteen years, the refuges:

- Maintain areas to contribute to healthy, viable wintering Canada goose populations (especially dusky Canada geese) in the Willamette Valley while minimizing depredation on private agricultural lands in the Valley;
- Enhance and restore native habitats representative of the historic Willamette Valley (including wet prairies, wetlands, upland prairies, oak savannas, oak woodlands, mixed forests, and riparian and riverine habitats), and provide for the plants and wildlife that utilize

these habitats, i.e., ducks, swans, neotropical migratory birds, wading birds, mammals, reptiles, amphibians, and fish;

- Contribute to the protection and recovery of federally threatened and endangered species and their habitats within the Willamette Valley;
- Provide compatible wildlife-dependent recreation opportunities for visitors, fostering an appreciation and understanding of the refuges' fish, wildlife, plants, and their habitats;
- Protect and interpret the cultural heritage and resources of the refuges;
- Collect scientific information (inventories, monitoring, research, or scientific assessments) necessary to support adaptive management decisions; and
- Actively engage in off-refuge conservation efforts in the Willamette Valley.

The CCP established the management direction for these three refuges; primary among these are the appropriate role of these refuges within the context of the entire Lower Columbia/Willamette Valley wintering Canada goose area and to ensure that the refuges continue to provide plentiful and reliable forage supplies for the goose population and minimal disturbance during the wintering period. In addition, the CCP identified where and how additional on-refuge native habitat restoration work should best occur, to determine the desired habitat conditions to be achieved in these native habitats over the next fifteen years, and to identify and deal with key threats to these habitats, including invasive species. The CCP identified which actions will best maintain and increase populations of rare species, as well as to design a strategy, in concert with other affected/involved parties, for elk management.

The CCP also identified how best the refuges should manage and maintain historic and other cultural resources on the refuges and addressed the question of managing ongoing refuge programs and commitments with limited budgetary and staffing resources.

The CCP analyzed the refuges' public-use programs to ensure that adequate consideration of the six Refuge System wildlife-dependent uses (wildlife observation, wildlife/nature photography, environmental education, interpretation, hunting, and fishing) had occurred. In addition, the CCP identified improvements or alterations to be made to the current programs and services offered to Refuge visitors, especially in light of a growing regional population, changing demographics, desired outcomes for visitor experiences, and new compatibility requirements.

As part of the effort to provide improved programs, a new option to hunt either sex deer (more consistent with State of Oregon regulations and management plan) was planned to be added on W.L. Finley Refuge and new upland locations are slated to be available for deer hunting during a portion of the restricted firearms season. These program modifications are designed to be more consistent with State of Oregon regulations and black-tailed deer management plan (ODFW 2008). Details of the modified deer hunting program follow.

Modified Deer Hunting at W.L. Finley Refuge

Deer hunting is currently allowed at W.L. Finley Refuge and minor expansion of the deer hunt program does not require any additional infrastructure development on the part of the refuge. Since additional infrastructure development was not needed in order to offer additional deer hunting opportunities during the 2012-2013 deer hunting season the Service elected to satisfy all the planning requirements needed to offer additional hunting opportunities at W.L. Finley Refuge through the CCP/EA planning process.

Thus, as part of the CCP/EA, the Service included a Hunt Plan (Appendix G) addressing the modified hunting opportunities for black-tailed deer at the refuge plus goose hunt and youth waterfowl hunts planned for Baskett Slough Refuge and developed a compatibility determination (Appendix B) which concluded that modifying the deer hunt at W.L. Finley Refuge would not materially interfere with or detract from achieving refuge purposes and National Wildlife Refuge System Mission.

Detailed descriptions of existing hunt program and modified deer hunting program and the environmental effects associated with providing modified deer hunting opportunities at W.L. Finley Refuge were described in the hunt plan, the compatibility determination, in the rationale for changing the deer hunting in Refuge Objective 10d (CCP/EA Chapter 2), and in the Environmental Consequences Chapter (Chapter 6) of the CCP/EA.

This document, tiered from the Final CCP/EA (September 2011), has been developed to consolidate the information pertaining to modified deer hunting opportunities at W.L. Finley Refuge in an effort to provide reviewers a more succinct evaluation and analysis of the effects on the human environment associated with modified black-tailed deer hunting opportunities at W.L. Finley Refuge.

Chapter 2. Alternatives

This chapter describes the deer hunt program at W.L. Finley Refuge as currently managed (the No Action or No change alternative), alternatives considered in response to requests for additional deer hunting opportunities, and the modified deer hunt program at W.L. Finley Refuge as adopted under the CCP.

Conformance with Statutory Objectives

Any use of a national wildlife refuge must be compatible with resource protection and conform to applicable laws, regulations, and Service policies. Recreational use, in this case hunting, is allowed under the Refuge Recreation Act of 1962 (16 U.S.C. 460K, amended), which authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use. The Refuge Recreation Act requires: 1) that any recreational use permitted will not interfere with the primary purpose for which the refuge was established; and 2) that funds are available for the development, operation, and maintenance of the permitted forms of recreation.

Likewise, statutory authority for Service management and associated habitat/wildlife management planning on units of the National Wildlife Refuge System (NWRS) is derived from the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C. 668dd-668ee). The National Wildlife Refuge System Improvement Act provided a mission for the NWRS and clear standards for its management, use, planning, and growth. The National Wildlife Refuge System Improvement Act recognizes that wildlife-dependent recreational uses—hunting, fishing, wildlife observation and photography, environmental education, and interpretation—when determined to be compatible with the mission of the NWRS and the purposes of the refuge—are legitimate and appropriate public uses of National Wildlife Refuges. Sections 5(c) and (d) of the National Wildlife Refuge System Improvement Act states “compatible wildlife-dependent recreational uses are the priority general public uses of the NWRS and shall receive priority consideration in planning and management; and when the Secretary [of the Interior] determines that a proposed wildlife-dependent recreational use is a compatible use within a refuge, that activity should be facilitated, subject to such restrictions or regulations as may be necessary, reasonable, and appropriate.”

Current Management - Big Game Hunting (No Action Alternative)

Currently, big game hunting for black-tailed deer takes place only at W.L. Finley Refuge under special regulations. The W.L. Finley Refuge deer hunt provides a recreational opportunity for hunting that is not crowded and is used by families; however, the hunt is characterized by a low success rate. The hunt program consists of an early season archery hunt and a later season shotgun hunt. The program is not designed to meet a biological purpose but is simply available as a sustainable recreational opportunity. Deer hunting is not currently offered at the Ankeny and Basket Slough Refuges or at W.L. Finley’s Snag Boat Bend Unit due to the small size of those refuges.

Program Details

William L. Finley Refuge is open to deer hunting under specific refuge regulations, in accordance with State regulations. There is an early archery hunt for either sex and a later shotgun hunt for buck deer under the Western Oregon General Season.

Currently, hunting can occur anywhere on the W.L. Finley Refuge outside of the areas closed for safety reasons (see Map 4). In the areas where hunting is allowed, there is a potential for different user groups (hunters and birdwatchers) to occupy the same areas, each disrupting the quality of the experience for the other. Hunting is allowed seven days per week from one-half hour before sunrise to one-half hour after sunset. Hunters must have a current State hunting license and possess a State deer tag. Hunters under 18 years old must have their hunter safety card on their person. There are currently no fees to hunt on the refuge. Hunters must check in and out of the refuge by use of self-serve permits. Possession limit is one deer.

The archery hunt extends over the State-specified open season, usually lasting approximately a month from the end of August to the end of September. Archery hunt regulations reflect established State regulations. Either sex may be taken.

The shotgun season begins at the start of the Western Oregon Coast Buck Area season, generally in early October. Although in other parts of western Oregon this season usually extends through the first week of November, hunting on the refuge is prohibited after October 31st, when access is closed to all visitors over much of the refuge to provide sanctuary for wintering waterfowl. During shotgun season, only shotguns using buckshot or slugs are allowed. Only bucks may be taken and they must not have less than one forked antler.

Approximately 70 percent of W.L. Finley Refuge is open to deer hunting. The portions that are currently closed include high-use public and maintenance areas, such as the Fiechter House and Cabell Lodge area, Refuge Complex Headquarters and shop area, and the western portions of the refuge near Mill Hill and Woodpecker Loop Trail (see Map 4). These closed areas are used frequently by refuge staff and visitors and are closed to hunting for safety reasons. The hunt season on William L. Finley Refuge currently occurs prior to the wintering sanctuary period, and other visitors are free to explore most refuge areas while hunting is underway.

Hunter success during the last five years is detailed in Table 5-3. Only 9 deer were harvested on Finley Refuge from 2005 to 2009. The number of people hunting on William L. Finley is small and has been declining in recent years, a trend also seen for hunting regionally and nationally (USFWS 2007a, ODFW 2008). The number of deer reported harvested on William L. Finley has totaled less than three per year in each of the last 10 years.

Number of Visits: During the 2009 hunting season there were a total of 46 individuals who hunted W.L. Finley Refuge 77 times. Two deer were taken during the shotgun season in October 2009.

Table 1.1 Black-tailed Deer Hunt Summary (2005-2009)

	2005	2006	2007	2008	2009
Total Hunters	30	29	42	48	46
Total Hunt Days	62	105	100	97	77
Total Hunt Hours	168	307	291	214	257
Total Deer Harvested	0	1	3	3	2

Facilities: There are two seasonal hunter sign-in stations where Refuge Hunting Harvest Cards are obtained. The stations are located south of Turtle Flats restroom area and another at McFadden Marsh parking area. The harvest cards provide staff with information about hunt success and other statistics.

Management Considerations: A new map was created in 2009 for the deer hunt program to better indicate the hunt zone and the closed area (containing heavily used hiking trails) to reduce the potential for conflicting uses between visitors and hunters.

Alternatives Considered

In response to requests to provide additional deer hunting opportunities at the Willamette Valley Refuges, an option to provide deer hunting was considered at both Snag Boat Bend Unit of W.L. Finley Refuge and Baskett Slough Refuge. Adding this use would have allowed another opportunity for a Big Six use.

However, Ankeny, Baskett Slough, and Snag Boat Ben lack of sufficient habitat to support significant big game populations and allowing deer hunting would create safety conflicts and use conflicts with the existing wildlife observation and photography programs, especially considering the small size of the areas. Thus, a deer hunting program was not developed for these other areas.

In evaluating the hunting program at W.L. Finley Refuge, the CCP/EA included a deer hunting objective which reads as follows.

Objective 10d “Provide expanded opportunities for quality deer hunting”

Maintain existing and provide expanded opportunities for the public to participate in a quality deer hunt on William L. Finley Refuge that:

- Places a priority on safety (> 95% of all hunters and other Refuge visitors report feeling safe during hunting season).
- Includes clear and concise regulations readily available at the Refuge website and posted clearly in the field.
- Poses minimal conflict with wildlife/habitat objectives.
- Poses minimal conflict with other Big Six activities.
- Poses minimal conflict with neighboring lands.
- Accessible to a broad spectrum of visitors.
- Promotes stewardship & conservation.
- Promotes understanding and appreciation of natural resources and the Service’s role.
- Provides reliable/reasonable opportunity to experience wildlife.
- Uses accessible facilities that blend into landscape.
- Uses visitor satisfaction to define and evaluate programs.

As described in the CCP/EA, the strategies developed to meet this objective include:

- Continue to allow archery deer hunting at Finley main unit during early fall season (approximately the last weekend in August until approximately September 30) (See Map 4).
- Modify restricted firearms deer season available at Finley by scheduling the hunt from approximately last week of October through approximately the first week of November.

During the first week, this hunt would be located within the same location as it is under Alternative 1. During the second week of this hunt, Bald Top and Mill Hill trail areas would be the only areas open to hunting, and would be closed to all other public use activities. Beginning November 1, all trails and management roads in close proximity to wintering goose areas would be closed to all public use, including hunters. See Map 4.

- Allow either sex harvest at Finley for the deer hunt period open at the Refuge.
- Develop hunt modification package and publish Federal Register notice revising hunting areas and seasons.
- Modify hunt maps, regulations, signing, etc., and construct additional hunt check stations as needed.
- Consider deer hunt on additional areas as more area is protected under the Refuge System.

The strategies provide additional deer hunting opportunity by opening new areas at W.L. Finley. The strategies also address the success rates through providing the either sex option, which is not currently available at the Refuge. The strategies also address the success rates through providing the either sex option, which is not currently available at the Refuge.

The timing and locations of the hunts were designed so as to avoid disturbance to waterfowl, especially geese and the existing sanctuary areas on Ankeny, Baskett Slough and W.L. Finley will be honored for the full wintering period.

The shotgun deer hunt at Finley is being changed to a restricted firearms hunt in order to allow the use of muzzleloaders consistent with State of Oregon definitions and regulations. The basis for changing the dates of the restricted firearms deer hunt at Finley were to: 1) Reduce the potential conflict between hunters and non-consumptive users being in the same area at the same time, and 2) Potentially improve hunter success by concentrating hunter use within a shorter season and thus increasing deer movement during hunt days.

Description of the Deer Hunt Program

Facilities: The refuge office would serve as the check station where hunters would be required to check in and check out. Refuge staff would operate the check station and check in/check out procedures.

The refuge will evaluate the number and location of hunt sites each year and make any changes or adjustments to the program each season based on these evaluations.

Table 2.1 Deer Archery Hunt Proposed Program

Aspect	Description
<i>Location</i>	<i>Finley main unit – selected locations. See Map 4.</i>
<i>Season</i>	Approximately last weekend in August until approximately September 30.)
<i>Sex</i>	<i>Either</i>
<i>Days/Week</i>	<i>Seven</i>
<i>Fees</i>	<i>None</i>
<i>Possession Limit</i>	<i>1 deer</i>

Aspect	Description
<i>Permits</i>	<i>On-site self-registration required</i>
<i>Other hunt regulations</i>	<i>Per state (ODFW) rules</i>

Table 2.2 Restricted Firearms Hunt Proposed Program

<i>Aspect</i>	<i>Description</i>
<i>Location</i>	W.L. Finley main unit. During the first week, this hunt would be located within most of the main unit of W.L. Finley Refuge except for two closed areas near refuge facilities (See Map 4). During the second week of this hunt, Bald Top and Mill Hill trail areas would be the only areas open to hunting, and these areas would be closed to all other public use activities during this week.
<i>Season</i>	Approximately last week of October through the first week of November.
<i>Sex</i>	<i>Either</i>
<i>Days/Week</i>	<i>Seven</i>
<i>Fees</i>	<i>None</i>
<i>Possession Limit</i>	<i>1 deer</i>
<i>Permits</i>	<i>On- site self-registration required</i>
<i>Other hunt regulations</i>	Per state (ODFW) rules. In addition, only shotguns using buckshot or slugs or muzzleloaders are allowed.

Hunter Requirements and Regulations:

- (1) Allowable equipment: Deer hunters may use portable or climbing deer stands. Stands must be removed daily. Driving or screwing nails, spikes, or other objects into trees or hunting from any tree into which such an object has been driven is prohibited. Limbing of trees is prohibited.
- (2) Wearing hunter orange is required for youth hunters as per State regulations.
- (3) Open fires are not allowed.
- (4) License and permits: Hunting permits are required.
- (5) Reporting harvest: Deer hunters would be required to complete a Big Game Harvest Report (FWS Form 3-2359) at designated self-serve kiosks where hunt maps and regulations would be available.
- (6) Hunter safety requirements: Wearing hunter orange would be required for all youth hunters as per State regulations.
- (7) Restricted firearms and archery deer hunting would be allowed on designated dates from ½ hour before sunrise until ½ hour after sunset.
- (8) Only shotguns using buckshot or slugs or muzzleloaders would be allowed for the deer hunt.

- (9) No overnight camping or after-hours parking is permitted on the refuges.
- (10) No hunting is permitted from refuge structures, observation blinds, boardwalks, etc.
- (11) All vehicles must remain parked in designated areas.
- (12) Persons possessing, transporting, or carrying firearms on national wildlife refuges must comply with all provisions of State and local laws. Persons may only use (discharge) firearms in accordance with refuge regulations (50 CFR 27.42 and specific refuge regulations in Part 32).

Chapter 3. Affected Environment

This chapter describes the habitat types and representative plant and animal species which could potentially be affected by modifying deer hunting opportunities at W.L. Finley Refuge.

Overview

The Willamette Valley Refuges include a diversity of native habitats and agricultural lands. Approximately 40 percent of the land is managed in cultivated croplands to provide forage for wintering Canada geese. The other 60 percent of the land base is occupied by wetlands, wet prairie, upland prairie/oak savanna, oak woodlands, mixed deciduous/coniferous forests, riparian, and riverine habitats.

The refuges support some of the largest and most ecologically significant blocks of native habitat in the Willamette Valley. The refuge's seasonal wetlands and farmed agricultural fields provide important resting and feeding areas for migrating waterfowl and shorebirds within the Pacific Flyway and they support the core populations of wintering geese in the Valley. In particular, the refuges hold the largest number of wintering dusky Canada geese within their range. At peak numbers, the refuges also hold more wintering ducks than any location in western Oregon south of the Columbia River (USFWS 2010b).

At W.L. Finley Refuge, the Muddy Creek floodplain and tributaries cover one of the most intact riparian floodplain woodlands remaining. The 366-acre tract of mature wet prairie found in the Willamette Valley Floodplain Research Natural Area (RNA) (Map 2) is the largest remaining example of this habitat found in the state, and supports some of the largest concentrations of declining grassland birds. Oak woodlands are another important habitat found on the refuge, and is managed to support a diversity of wildlife species, especially migratory songbirds.

The combination of native and agricultural habitats on the Willamette Valley refuges results in a diversity of lands which support more than 300 species of birds, mammals, fish, reptiles, and amphibians, 9 of which are federally listed as threatened or endangered. Overall, the refuge lands are key to healthy populations of wildlife dependent on these rare habitats, as well as the opportunity to recover listed species.

Map 3 shows the distribution of habitat types currently existing at W.L. Finley Refuge (Alternative 1 – No Change) and habitat distribution proposed under the CCP (Alternative 2). Map 2 shows the Special Designation Areas and Historical Features at W.L. Finley Refuge.

Croplands

The primary agricultural crops grown on the refuges are grass seed (annual ryegrass, perennial ryegrass, and fescue) grown as green forage for wintering Canada geese. A small area on W. L. Finley NWR is maintained in pasture, and small acreages of wheat, corn, beans, or clover are occasionally also grown. There are approximately 1,922 total acres of agricultural lands on W.L. Finley (this does not include areas termed non-agricultural grassland, which are areas that may have been farmed in the past that have not yet been restored).

Key Species Supported: Cultivated grass fields or seed crops such as corn are maintained to provide food for wintering Canada geese.

Wetlands

Wetlands on W.L. Finley NWR cover approximately 570 acres, associated with the low lying areas within the floodplains of Gray Creek, Brown Creek, and Muddy Creek. Many of the wetlands on W.L. Finley Refuge are permanent and managed with dikes and water control structures. Cabell Marsh is the second largest and oldest impoundment, with the dike originally constructed in the mid-1960s. McFadden Marsh is the largest wetland on Finley Refuge and is managed as a seasonal wetland. McFadden Marsh is located within the Muddy Creek floodplain and was specifically designed to allow fish passage between the impoundment and floodplain of Muddy Creek. The premise is that cutthroat trout will sense when water levels are dropping and instinct will direct them back to the main creek channel before they would be entrapped behind the low-head dike. Cabell Marsh and McFadden Marsh traditionally hold the largest concentrations of wintering waterfowl on the refuge. Several seasonal wetlands are located within agricultural fields as a lure to increase use of the fields by wintering Canada geese.

Key Species Supported: Wetland habitats are used heavily by a diversity of wildlife including migratory waterfowl, shorebirds, wading birds, raptors, fish and amphibians. Wetlands are the primary focus of the public wildlife viewing areas on the Refuge Complex.

Wet Prairie

William L. Finley Refuge contains a 366-acre block of wet prairie, contained within the 487-acre Willamette Floodplain RNA. This is the largest contiguous tracts of historic (remnant) wet prairie habitat left within the Willamette Valley. Grazing of this area occurred until it was established as a RNA in 1966, at which time prescribed burning became the preferred management treatment. Prescribed fire within the RNA was used sparingly until 1990, when a structured prescribed fire plan was implemented to set back succession and maintain the prairie habitat structure. In addition, woody vegetation has been cut with chain saws, particularly in Middle Prairie, to promote herbaceous growth and help carry prescribed fire through the unit. This treatment was necessary because Middle Prairie had been retained as an unburned “control” site for approximately 20 years in the 1980s-90s, which lead to the woody vegetation encroachment. Selective mowing has also been used to help carry fire through rose thickets. All mechanical work, including mowing and removal of felled trees/shrubs, is done using a low ground pressure (LPG) skid-steer tractor. This has less ground disturbing effects than a traditional wheel tractor and significantly less compaction. Felled woody vegetation is removed from the prairie, as burning it in-place risks scorching the soils and damaging plant communities. Historically, fires would not have had such large quantities of woody vegetation because of the fire frequency. Although fires occurred annually prior to Euroamerican settlement, the preferred fire interval on prairie management units is 2-4 years.

Small areas of wet prairie, some with significant native plant communities, can be found throughout the Muddy Creek floodplain. These areas are gradually being overtaken by woody vegetation and riparian woodland. These areas have not been well inventoried and are in need of release using extensive mowing to avoid complete loss to succession.

Active wet prairie restoration in some retired agricultural fields has been on-going since 1999. Field 1 (50 acres) and Field 31 (80 acres) are in active restoration. These fields are located adjacent to the Willamette Floodplain RNA on the north and west sides. Typical restoration involves herbicide treatments for two successive growing seasons (often with prescribed fire in one or both seasons depending on herbaceous cover) and no-till drilling native wet prairie grasses and forbs in the second fall. First year follow-up treatment may involve late spring mowing to reduce seed set of non-native annuals, spot herbicide treatment of invasive plants that may impact native establishment, and supplemental seeding to increase species diversity.

Key Species Supported: Wet prairies are important habitats for grassland birds and several rare plant species, including Bradshaw's desert parsley and peacock larkspur. The large Willamette Floodplain RNA tract supports populations of grassland bird species, many of whose populations have severely declined. Surveys for grassland birds in the late 1990s found no nesting meadowlarks on Finley Refuge (Altman 1999). Since that time, meadowlarks have responded so well to prairie management over the past 10 years that Finley now supports one of the largest breeding populations found in the Valley (B. Altman pers. comm.)

Upland Prairie/Oak Savanna

Oak savanna is characterized by widely spaced Oregon white oak trees with grassland habitats (upland prairie) residing between them. Native grasses commonly found in upland prairies include Roemer's fescue, blue wildrye, California oatgrass, and prairie junegrass. Common forbs include camas, spurred lupine, rose checkermallow, and cat's ear lily. W.L. Finley NWR has several tracts of low diversity upland prairie under mature oak savanna (remnant disturbed). The Baldtop and Woodpecker Loop area contain a large number of savanna form trees, many well over 100 years old. The best remnant upland prairie is located on the west slopes of Pigeon Butte. This area has a significant population of spurred lupine and is identified in the Recovery Plan as a re-introduction site for Fender's blue butterfly (USFWS 2010a). One 20-acre site (Field 29) has been undergoing restoration efforts since 2005 with moderate success.

Key Species Supported: Two federally listed plants, Kincaid's lupine and Willamette daisy, are native to upland prairies along with the endangered Fender's blue butterfly. These species are only located on the upland prairie/oak savanna habitat found on the Baskett Slough NWR. This habitat also supports obligate or semi-obligate oak/prairie species (acorn woodpecker, white-breasted nuthatch, etc.).

Oak Woodlands

Large tracts of oak woodlands (50-300 acres) are found on W.L. Finley Refuge. Over the last 150 years, due to the decreasing frequency of disturbance like fire, some areas that were formally oak savanna have transitioned into oak woodlands. Additional trees have filled in the spaces formerly occupied by grasslands. The younger oaks are usually smaller diameter and have more uniform growth patterns, being straight with few large lateral branches because of the reduced sunlight (Pacific Northwest Research Station 2007). Oak woodlands on the refuges are often mixed with Douglas-fir, resulting in site competition where the firs gradually overtop the oaks.

Key Species Supported: Oak woodland has been identified explicitly as a priority for protection and restoration in nearby regions and specifically in the Willamette Basin. Although no federally listed

species use oak woodland predominantly, several may use it periodically or as part of an overall mosaic of natural habitats. Kincaid's lupine and Fender's blue butterfly (both federally listed) occur along oak woodland edges. Wildlife species that may have used oak woodland regularly before vanishing (as breeders) from the Willamette Basin include Lewis's woodpecker, black-billed magpie, and lark sparrow. Thirteen of 27 plant associations listed as occurring in oak woodlands in the National Vegetation Classification are considered globally imperiled or critically imperiled by the Oregon Natural Heritage Program. The Service's Species of Concern that use oak habitats on refuges include the western bluebird, Lewis' (non-breeding) and acorn woodpeckers, white-breasted nuthatch, bandtail pigeon, and several species of bats.

Mixed Deciduous/Coniferous Forests

These forested stands have a mix of Douglas-fir, oak, and maple, with a shrub understory occupied by hazelnut, snowberry, and sword fern. For the most part these habitats are a result of Douglas-fir encroachment in historic oak habitat to the extent that the oaks are suppressed or have died out completely. Woodlands with a significant conifer and/or big-leaf maple component are found on the Mill Hill area of W.L. Finley Refuge. The fir stands are generally between 40-65 years old, representing regeneration after the last logging that occurred prior to refuge acquisition. At that time a majority of the oaks were retained, some being savanna-form trees in excess of 100-150 years old.

Key Species Supported: Three key species supported by mixed deciduous forests are Swainson's thrush, pileated woodpecker, and western gray squirrel. There is overlap for these species in coniferous and oak habitats. Big-leaf maples are a favorite habitat of early migrating warblers for foraging on small caterpillars. These habitats are also frequently used by large mammals including blacktail deer, elk, and black bear.

Riparian

Riparian vegetative communities in the Willamette Valley are hardwood forest, dominated by species such as black cottonwood, Oregon ash, and willow. Many other trees and shrubs make up riparian forests, including big-leaf maple, red-osier dogwood, blue elderberry, Douglas spirea, nootka rose, and Oregon white oak. Plant community composition is dependent on soil type, deposition, hydrology, duration and depth of flooding, and seed source. The riparian vegetation found along the slow moving valley streams are dominated by Oregon ash, with Oregon white oak on streambank edges that are slightly higher and better drained. In contrast, the riparian zones adjacent to the Willamette River in well drained gravelly soils are primarily composed of black cottonwood and willow.

Riparian habitats at William L. Finley Refuge are present along Muddy Creek and its tributaries throughout the refuge. Some of these riparian zones represent some of the best remaining riparian habitat in the mid-Valley. These plant communities are predominantly Oregon ash woodlands, with small pockets of Douglas spirea, willows, red-osier dogwood, black cottonwood, and Oregon white oak interspersed throughout. Edges and openings adjacent to the riparian woodlands are slowly succeeding to riparian vegetation through natural volunteer seeding, dominated by Oregon ash. A number of small fields and wetland sites on Finley Refuge have been planted with riparian species with moderate success. At this time 1,388 acres of riparian exist on W.L. Finley Refuge.

Key Species Supported: Species closely associated with riparian habitats on the Valley refuges include yellow and Wilson's warbler, willow flycatcher, wood duck, great blue heron, western pond turtle, red-legged frog, and cutthroat trout. In addition, the riparian zones are favored habitat for elk, especially the Muddy Creek floodplain on Finley.

Riverine

Muddy Creek flows north-south through W.L. Finley NWR for approximately 3.5 miles. It is a slow moving valley stream, dominated by a low gradient pool structure with abundant in-stream woody debris. Flood events occur regularly in the winter months such that the flow tops the bank height and spreads across the riparian floodplain. This periodic flooding helps maintain the plant communities found within the floodplain.

W.L. Finley Refuge has several small creeks that flow from the western slopes off private land, eventually emptying in to Muddy Creek. Brown Creek and Gray Creek have seasonally variable but year-round flow. Several other small drainages are intermittent.

Key Species Supported: While Muddy Creek does not support anadromous fish within the confines of the refuge, resident cutthroat trout occupy the creek and its tributaries. Beaver and river otter are two important mammals that depend on riverine habitats. Western pond turtles depend on riverine habitats for dispersal and as seasonal movement corridors.

Threatened, Endangered, and Rare Species

Federally Listed Plants

Golden paintbrush: Golden paintbrush is a federally threatened species that had been extirpated from Oregon. The historic range included the upland prairies of the Willamette Valley. As part of a common garden experiment developed to determine appropriate seed sources and recovery sites, golden paintbrush was out-planted on several sites at Baskett Slough and W.L. Finley NWR. Although the study has been completed, experimental populations were retained on both refuges. Management has included fall mowing and in some years, prescribed fire. It appears that plants are surviving well at both refuges, and future plans include expansion of those populations with out-planting in order to work towards sustainable populations specified in the Recovery Plan (USFWS 2010a).

Bradshaw's desert parsley: Also known as Bradshaw's lomatium, this species was federally listed as endangered in 1988. It is a perennial forb that occurs in seasonally saturated or flooded prairies with dense soils. Once widespread in the Willamette Valley, Bradshaw's desert parsley populations declined due to land development for agriculture, industry, and housing. Bradshaw's desert parsley is found at both Finley NWR and Oak Creek, with the population at Oak Creek the largest in Oregon. The populations at Finley NWR occur along North Prairie Road, on the edges of the Willamette Floodplain RNA near Muddy Creek, and there is a newly established population in Field 31. Management actions to increase the distribution and abundance include prescribed fire, mowing, and supplemental seeding. Vole herbivory is one of the current management challenges, but site disturbance that reduces thatch and provides sites for seedlings has been effective.

Kincaid's lupine: Kincaid's lupine, a threatened species, was also listed in 2000. It is found in native upland prairie of the Willamette Valley and is the key host species for the endangered Fender's blue butterfly. Small out-planted populations are present on Pigeon Butte on Finley NWR. Similar to other prairie forbs, degradation of native prairie habitat from the encroachment of woody vegetation and invasive species is a significant threat to Kincaid's lupine.

Nelson's checker-mallow: Nelson's checker-mallow was federally listed as threatened in 1993. Within the Willamette Valley, Nelson's checker-mallow most frequently occurs in Oregon ash swales and meadows with wet depressions or along streams. It also populates wetlands within remnant prairie grasslands and roadsides. Due to an intolerance of encroachment of woody vegetation, Nelson's checker-mallow has declined. Efforts to conserve and restore this threatened species have been undertaken at Finley, Ankeny, and Baskett Slough NWRs, including annual mowing, prescribed fire, extensive out-planting of nursery plants, protection of roadside populations, and plant relocation as needed to prevent mortality from flooding or agricultural activities.

Federally Listed Fish and Wildlife

Oregon chub: The Oregon chub is a small minnow endemic to the Willamette River Basin in western Oregon and was listed as endangered in 1993. Critical habitat was designated for Oregon chub in 2010 and includes portions of both Ankeny and W.L. Finley Refuges.

Oregon chub favor off-channel habitats such as beaver ponds, oxbows, side channels, backwater sloughs, low gradient tributaries, and flooded marshes (USFWS 1998). These habitats have been fragmented and/or lost through river channelization, wetland drainage, agriculture, and settlement. The introduction of non-native warm water fishes into the Willamette Valley has resulted in depredation and competition problems for Oregon chub.

The refuge has been working closely with ODFW on chub management since the mid-1990s, including population monitoring, genetic studies, and population introduction and supplementation. One natural population and two introduced populations at W.L. Finley NWR totaled an estimated 3160 chub in 2009, although counts vary annually (Oregon Department of Fish and Wildlife 2009).

Fender's blue butterfly: The Fender's blue butterfly is a Willamette Valley endemic species thought to be extinct until it was rediscovered in 1989 in native prairie remnants. In 2000, the butterfly, along with its required larval food plant, Kincaid's lupine, were listed as endangered under the U.S. Endangered Species Act. Pigeon Butte on Finley has suitable habitat for Fender's but is not currently inhabited. That site has been identified as a major re-introduction site in the Recovery Plan (USFWS 2010a).

Other Rare Species

Streaked horned lark: The streaked horned lark, a subspecies of the horned lark, has undergone extensive range retraction and probable population decline in the previous half-century. The streaked horned lark was listed in 2008 as a Candidate for protection under the U.S. Endangered Species Act. Fewer than 1,000 individuals may remain (Stinson 2005).

The streaked horned lark prefers flat, sparsely vegetated ground on which to forage and nest. If the vegetation is above a few inches high, the lark will avoid the habitat because of a decrease in

foraging and predator detection abilities. The Willamette Valley NWRC provides large tracts of suitable habitat for the streaked horned lark. Flat fields planted with grass seed crops but then intensely grazed by wintering geese, are preferred foraging grounds for the lark. During the breeding season, the three Willamette Valley Refuges provide 3 of only 5 known geographically consistent breeding sites for the streaked horned larks (Moore 2008).

The Willamette Valley NWRC, specifically Finley and Baskett Slough NWRs, have the potential to increase the abundance of streaked horned larks with selective management. If Baskett Slough and Finley NWRs are considered crucial breeding sites and management activities are implemented to support these birds, this may help facilitate the removal of the lark from the Candidate list (Moore 2008). The refuge is currently working with Oregon State University and streaked horned lark researchers to monitor and assess breeding success in agricultural fields. In addition, efforts are being made to provide suitable horned lark habitat in agricultural fields where extensive grazing by geese has eliminated crop yields for cooperative farmers. These include Field 8/12 on W.L. Finley NWR and Dusky Prairie at Baskett Slough NWR.

Peacock larkspur: Peacock larkspur, though not federally listed, is considered a Service Species of Concern and is listed as endangered under the Oregon Endangered Species Act. A native, perennial forb in the buttercup family, peacock larkspur is a Willamette Valley endemic species adapted to prairie conditions. The largest population within its range is found on Finley NWR (McKernan 2004). In 2004, peacock larkspur tubers were out-planted at Finley and Ankeny NWRs with limited success. Surveys at Finley NWR have shown that prescribed fire benefits the species (Finley and Ingersoll 1994).

Extirpated species: The Oregon spotted frog was last found on W.L. Finley NWR, but currently is considered extirpated from the Willamette Valley.

Other Wildlife and Plants

Other fish species: Carp are found in the lower Gray Creek drainage on Finley and crappie and bluegill are also located within several wetlands on Finley. A number of small native minnows can be found in the Muddy creek drainage on W.L. Finley NWR. According to a survey performed by the Department of Environmental Quality in 2001, reticulate sculpin were the most abundant vertebrates in Muddy Creek (DEQ 2001).

Land birds: Landbirds can be found in all habitats of the refuges, including riparian woodlands, agricultural farm fields, oak savanna, and seasonal and permanent wetlands. Over 128 species of resident and migrant landbirds have been observed on the Willamette Valley refuges, including 22 species of raptors (owls, hawks, falcons, and eagles), 15 nonpasserines (woodpeckers, hummingbirds, kingfishers, doves, and pigeons), and 91 species of passerines (e.g., sparrows, finches, warblers, flycatchers, and swallows). Long-distance migrants travel between breeding grounds in temperate North America and wintering grounds in Central and South America. Resident species both breed and winter in the local area, migrating short distances.

Land mammals: Forty-three species of land mammals have been documented on the refuges ranging from large mammals such as elk, black-tail deer, black bear, and coyotes, to small shrews and several species of bats. Native western gray squirrels can be found in oak woodlands on Baskett Slough and W.L. Finley NWR. An occasional mountain lion has been reported at both Finley and Baskett

Slough. Bobcats are common at Finley. River otter, mink, and beaver inhabit the wetlands and stream channels at all three refuges. Coyotes are also found at all three refuges. Bats such as the little brown bat and Townsend's big-eared bats are present at Finley as the historic buildings and barns provide good nesting and roosting habitat. Other bats also inhabit snags throughout the refuges.

The interspersion of forests, grasslands, and water on Finley provide excellent habitat for black-tailed deer. Black-tailed deer are an edge adapted species using dense hiding cover during the day, emerging in the morning and evening to feed in more open areas (Maser et al. 1981). Throughout much of western Oregon, black-tailed deer reside year-round in relatively flat areas at mid to low elevations, on south facing slopes dominated by vine maple (*Acer circinatum*), huckleberry (*Vaccinium* spp), and salal (*Gaultheria shallon*) plant communities. These areas provide the preferred forage, minimal duration of snow cover, and protection from cold winds (Russell 1932, Zwickel and Brent 1953, Dasmann and Taber 1956, Crouch 1968, Gilbert et al. 1970, and Miller 1970). Although black-tailed deer may inhabit higher elevations, in northwest Oregon they preferred sites less than 1500 feet in elevation, with deep soils, and vine maple and sword fern (*Polystichum munitium*) understories because these sites provide relatively mild conditions with the maximum production of winter forage (Hines 1973). Black-tailed deer populations (carrying capacity) are limited by habitat; different habitats will produce different densities of deer (deer/mile square).

In many areas of western Oregon the natural forage for black-tailed deer has been replaced by agricultural crops including vineyards, reforestation areas, Christmas tree farms, nurseries, field crops and row crops. At times agricultural areas which are irrigated and fertilized are selected in preference to natural vegetation.

When Finley NWR was established in 1964, black-tail deer were abundant but in recent years deer numbers on W.L. Finley Refuge are estimated to be less than 100 (J. Beall pers.comm). Since the late 1980's the total black-tailed deer population in western Oregon appears to be declining based on ODFW data including hunter harvest, hunter success rate, and field surveys conducted by biologists (ODFW 2008). While the ODFW believes there has been a widespread decline, it should be noted declines are not apparent or to the same extent in all areas. In western Oregon, the reduction is likely related to the quality and quantity of habitat, increased incidences of disease, low recruitment, and possibly displacement by an increasing elk herd. ODFW does not believe hunting is a significant factor in the observed long-term decline of black-tailed deer populations in Oregon (ODFW 2008).

The interspersion of forests, grasslands, and water on Finley also provide excellent habitat for Roosevelt elk. In 1989, the herd numbered around 20, with their origin thought to be from the Coast range foothills. The herd grew to approximately 100 animals over the next decade. In 2010 the population was estimated at 140-160 (J. Beall pers.comm.), depending on calf production and survival and off-refuge harvest during hunting season. During spring and summer, the herd is split up with many elk found in the prairie and riparian areas. In the winter, elk can be found in larger numbers traveling between upland forest, grass fields, and riparian areas. The prairies are a common location for calving in late May and early June.

Black-tailed deer and Roosevelt elk co-occur in much of western Oregon. There is little documented evidence that Roosevelt elk (*Cervus elaphus roosevelti*) impact forage availability for black-tailed deer, however, in areas (such as western Oregon) of high quantity but poor quality forage, elk may have some impact on black-tailed deer populations, particularly in ranges where both species co-occur throughout the year (Happe 1990).

Reptiles and Amphibians: Twenty-one species of reptiles and amphibians occur in the Willamette Valley, most of which have been observed on the Valley refuges. Northern red-legged frogs and Pacific chorus frogs inhabit riparian areas and utilize many of the seasonal and permanent wetlands as breeding habitat. Rough skinned newts, northwestern salamanders, and the introduced bullfrog are other common amphibians found on the refuges. The Oregon spotted frog was last found on W.L. Finley NWR, but is now extirpated from the Willamette Valley. Much of the native wetland habitat in the Valley has been degraded due to exotic plants like reed canary grass (McAllister and Leonard 1997), and drained or ditched for agriculture. The agricultural development and use of pesticides and fertilizers has led to elevated nutrient levels in Muddy Creek, degrading aquatic conditions for amphibians and turtles (USFWS 2007b). Many reptiles found in the Willamette Valley occur more frequently in open habitats, suggesting that succession to closed canopy conditions (e.g., the loss of oak savanna) may be restricting their range and numbers (Pacific Wildlife Research Inc. 1999). Oak restoration efforts at Baskett Slough and Finley NWRs, which result in more open savanna or woodland conditions, may therefore benefit some reptile species.

Western fence lizards can be found on Pigeon Butte in the remnants of the old quarry. Other common reptiles present in the grassland habitats on the refuges include gopher snakes, garter snakes, and racers.

William L. Finley NWR, including Snag Boat Bend, provides important habitat for the western pond turtle (Service Species of Concern) and supports a small but apparently stable population. Turtles reside primarily in slow-moving streams, sloughs, wetlands, and ponds but need terrestrial habitat for nesting, dispersal, and dormancy during the heat of the summer and in winter months (Hays et al. 1999). Emergent logs or boulders on which to bask are important habitat features for the western pond turtle. Individuals have been observed at various wetlands and along Muddy Creek, and in the river backwaters at Snag Boat Bend. Studies conducted by Pitkin (1993) and Drut (1995) at W.L. Finley NWR showed that the turtles overwintered on the refuge and, though no nests were located, the telemetry data was highly suggestive of nesting behavior. The extensive wetlands and high quality nesting habitat at W.L. Finley NWR suggest that the refuge could support a larger population of western pond turtles (Rosenberg 2009).

The Willamette Valley NWRC provides vital habitat for the northern red-legged frog, also a Service Species of Concern. Red-legged frogs have declined due to a number of factors including habitat loss, hydrological alteration of wetlands, establishment of non-native predators, and widespread application of fertilizers and pesticides. Management of permanent and seasonal wetlands with adjacent riparian areas on the refuge provides quality habitat. Ankeny and Finley NWR have a number of northern red-legged frog breeding sites and have been the focus of numerous surveys and reproductive monitoring efforts. Continuing studies by the USGS at both refuges provide important biological data on the northern red-legged frog, which is especially important in light of the paucity of data available on this species. The surveys revealed that the presence of red-legged frogs was closely associated with riparian woodlands and wetlands in close proximity to riparian woodlands. Measures to protect these populations have included retaining water in seasonal wetlands through the end of June in order to avoid stranding tadpoles prior to emergence.

Invertebrates: Both terrestrial and aquatic invertebrates are an important food source for many species found on the refuges. A number of studies have been conducted over the past decade, but there is no comprehensive list of invertebrates found on the Refuge Complex. Aquatic invertebrate surveys were conducted in 2007 and 2008 by USGS researchers in refuge wetlands as part of a

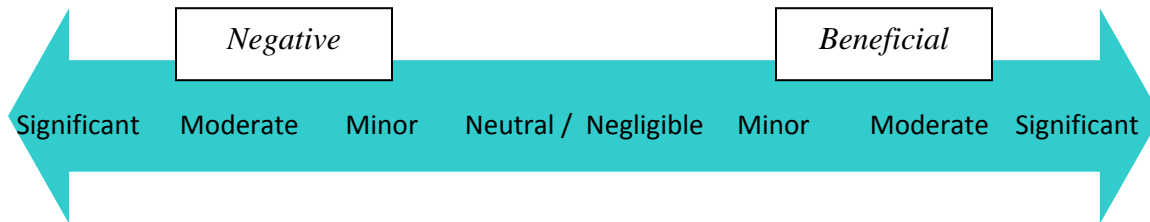
valley-wide study. Additional aquatic invertebrate sampling was conducted by the Xerces Society as part of an OWEB grant (Xerces Society 2008). A two-year butterfly composition study was completed in 2001 on W.L. Finley NWR. Dragonflies and damselflies were inventoried across the complex in 2005 to help with preparation of an identification guidebook (S. Gordon pers. comm.). Fender's blue butterflies are surveyed annually on Baskett Butte.

Bryophytes: The protection of natural and pre-settlement plant communities at Finley NWR has resulted in diverse substrates that facilitate a rich bryophyte flora (Merrifield 2001). Eighty-four moss and 24 liverwort species have been collected and cataloged.

Chapter 4. Environmental Consequences

The effects analysis has been developed by a) identifying the species groups, habitats, refuge users, aspects of the physical environment, and other resources of interest; and b) identifying effects to these resources that could potentially result from implementing the deer hunt program as described in Chapter 2 above. Effects are described in terms of the change from current conditions, that is, the deer hunt program as currently administered at the Refuge. The no-action alternative (current management) is considered to have a neutral effect because minimal or no changes to deer hunting program would occur under this “no change” alternative.

The information used in this EA was primarily obtained from the CCP/EA. The information used in developing the CCP/EA was obtained from relevant scientific literature, existing databases and inventories, consultations with other professionals, and professional knowledge of resources based on field visits, and experience.



The terms identified below were used to describe the scope, scale, and intensity of effects on natural, cultural, social, and economic (including recreational) resources. Effects may be identified further as beneficial or negative.

- **Neutral or Negligible.** Resources would not be affected, or the effects would be at or near the lowest level of detection. Resource conditions would not change or would be so slight there would not be any measurable or perceptible consequence to a population, wildlife or plant community, recreation opportunity, visitor experience, or cultural resource. If an impact is not discussed, it is assumed to be neutral.
- **Minor.** Effects would be detectable but localized, small, and of little consequence to a population, wildlife or plant community, other natural resources; social and economic values, including recreational opportunity, and visitor experience; or cultural resources. Mitigation, if needed to offset adverse effects, would be easily implemented and successful, based on knowledge and experience.
- **Moderate.** Effects would be readily detectable and localized with measurable consequences to a population, wildlife, or plant community or other natural resources; social and economic values, including recreational opportunity, and visitor experience; or cultural resources. Mitigation measures would likely be needed to offset adverse effects, and could be extensive, moderately complicated to implement, and probably successful based on knowledge and experience.
- **Significant (major).** Effects would be obvious and would result in substantial consequences to a population, wildlife or plant community or other natural resources; social and economic

values including recreation opportunity and visitor experience; or cultural resources within the local area or region. Extensive mitigating measures may be needed to offset adverse effects and would be large-scale in nature, possibly complicated to implement, and may not have a high degree of probability for success. In some instances, major effects would include the irretrievable loss of the resource.

Time and duration of effects have been defined as follows:

- **Short-term or Temporary.** An effect that generally would last less than a year or season.
- **Long-term.** A change in a resource or its condition that would last longer than a single year or season.

Anticipated Effects of black-tailed deer hunting at W.L. Finley Refuge

Wildlife and Habitat Effects

Habitat management strategies under the CCP are expected to increase the number of acres of native habitats relative to the No Action Alternative. Under the CCP, the area of the refuge available for hunting would increase from approximately 70% of the refuge to approximately 85% of the refuge, increasing the huntable acreage by about 850 acres. The increasing availability and connectivity of wetlands, riparian habitat, upland prairie, and forest habitats coupled with the increase in area available for hunting is expected to result in enhanced opportunities for sighting and harvesting deer.

Impacts to Target Wildlife

Direct mortality to deer associated with the hunt would result. Some wounding could occur as well. Deer hunting removes a small amount of prey from the prey base for predators.

Deer populations and deer hunting are managed by the Oregon Department of Fish & Wildlife (ODFW, 2008). Annual deer surveys are generally conducted by Department biologists and hunting tags apportioned among the management units according to the results of these surveys and unit objectives.

W.L. Finley NWR lies within ODFW-designated Willamette Hunt Unit. The total harvest of deer in this unit for the 2008 hunt season was 2,838, with a success rate of 25 percent. There is no reliable population estimate or herd composition information for the Willamette Valley as the Willamette Valley is not surveyed by ODFW (B. Wolfer, pers. comm.). The table below, from ODFW's 2008 Black-tailed Deer Management Plan, identifies the management benchmarks for the Willamette Hunt Unit (15).

The black-tail deer population on W.L. Finley is estimated at less than 100 animals (J. Beall pers. comm.). The average annual harvest of deer from W.L. Finley Refuge over the last several years has been less than two.

Table 1. Management Benchmarks for Black-tailed Deer in Oregon by Wildlife Management Unit or Sub-unit.

Wildlife Management Unit (#)	Post season buck ratio benchmark (bucks per 100 does)	3-year average buck ratio 2004-2006	Population benchmark	Spring population benchmark (deer per mile)	3-year average deer/mile 2004-2006
Saddle Mtn. (10)	20	30	13,000	1.5	-
Scappoose (11)	20	16	10,000	1.5	-
Wilson (12)	20	35	8,500	1.0	-
W Trask	20	31	14,100	2.0	-
NE Trask	20	19	3,500	2.2	-
SE Trask	20	-	5,000	2.2	-
Trask (14)	20	25	22,600	2.2	-
Willamette (15)	-	-	8,000*	-	-
N Santiam	15	30	6,000	1.6	-
S. Santiam	15	35	18,000	1.8	-
Santiam (16)	15	33	24,000	1.7	-
E. Stott	20	31	4,000	2.0	-
W. Stott	20	41	2,500	2.0	-
Stott Mt. (17)	20	36	6,500	2.2	-
Alea (18)	20	49	55,500	2.2	-
N McKenzie	25	-	7,400	3.5	-
S McKenzie	25	-	29,600	3.5	-
McKenzie (19)	25	52	37,000	3.5	-
S Siuslaw	-	-	6,700	3.0	-
E Siuslaw	25	18	21,300	3.0	-
W Siuslaw	25	36	-	3.0	-
Siuslaw (20)	25	6	28,000	3.0	-
N Indigo	25	42	19,000	3.5	-
S Indigo	25	22	11,000	3.0	1.6
Indigo (21)	25	31	30,000	3.3	1.6
Dixon (22)	25	25	33,000	3.0	3.6
Melrose (23)	15	12	15,500	3.0	3.3
E Tioga	20	12	4,300	2.0	2.1
W Tioga	20	9	6,400	2.0	3.3
Tioga (24)	20	9	10,700	2.0	2.5
Sixes (25)	20	11	15,000	1.5	2.3
E Powers	20	14	3,000	2.0	0.6
W Powers	20	10	3,500	1.6	3.1
Powers (26)	20	10	6,500	1.6	2.0
E Chetco	15	18	6,000	1.5	-
W Chetco	15	15	9,000	1.5	-
Chetco (27)	15	19	15,000	1.5	-
E Applegate	20	33	6,600	13.0	4.2**
W Applegate	20	26	5,400	2.8	5.4**
Applegate (28)	20	29	12,000	5.7	3.0**
Evans Creek (29)	20	26	9,500	2.5	5.0**
Rogue (30)	15	26	24,000	11.5	6.8**

* Estimate, not a Benchmark

** 2-year averages (2005-2006)

Under the CCP, the total number of days available for deer hunting would decrease, but additional opportunity would be available by providing additional hunt areas and providing the opportunity to harvest antlerless deer. Due to shortened hunt season, the number of hunters visiting W.L. Finley Refuge could potentially drop from the current level of approximately 77 hunt days to a projected 56 hunt days annually. However harvest may go up, considering the addition of an antlerless option and new hunt areas opened. Even if harvest increased by a factor of 20, the effect on the local and regional population would be negligible. Although the opening of new hunt areas and the new provision of antlerless harvest may cause harvest to increase, the size and time available for the hunts would constrain harvest to a level small enough to be considered negligible within the Willamette Unit as a whole.

Impact to Refuge Habitats

Foot travel associated with deer hunting could potentially result in temporary and minor vegetation trampling; impacts may be concentrated in riparian habitats. However, since deer hunting would involve small numbers of hunters, this effect would likely have a negligible impact.

The hunt units designated on Map 4 include designated Research Natural Areas (Map 2). Recreational use within RNAs that threaten serious impairment of research or education values are discouraged under Refuge policy 8 RM 10. Since hunters would only be allowed in designated areas and will be limited to a short time period in early-mid fall, deer hunting is not likely to seriously impair research or education values and will be unlikely to contribute to substantial vegetation changes within the RNA itself.

Impacts to Non-target Wildlife

Foot travel associated with deer hunting could potentially result in temporary and minor disturbance to non-target wildlife such as geese, waterfowl, songbirds, wading birds, raptors, and woodpeckers; small mammals such as voles, moles, mice, shrews, and bats; medium sized mammals such as skunks and coyotes; reptiles and amphibians such as snakes, skinks, turtles, lizards, salamanders, frogs and toads; and invertebrates such as butterflies, moths, other insects and spiders.

The timing and locations of the deer hunt is designed so as to avoid disturbance to waterfowl, especially geese. Existing sanctuary areas will be honored for the full wintering period under all alternatives. Disturbance to wintering geese from deer hunters would be minimized after November 1, by ensuring that the deer hunting zone is located well away from wintering goose areas and that deer hunting would only occur for the first week of November and only at Finley Refuge. See Map 4.

Occasionally, non-target species are illegally killed by hunters accidentally or intentionally. However, the potential effect to non-hunted wildlife is largely in the realm of disturbance. Hunting causes disturbances to non-target species because of the noise (shotgun), movement, and vehicular activity used for this activity.

Deer hunters walking in close proximity to wetlands and gunfire from hunting can result in behavioral responses by waterfowl and other wetland birds. Portions of the Refuge open to deer hunting would include wetlands. Most waterfowl and waterbird use, however, occurs earlier in the

year for breeding and nesting activities, or later in the year during fall and winter migrations. Thus, minimal impacts to waterfowl or waterbirds would be expected.

The cumulative effects of disturbance to other birds under the proposed action are expected to be minor for the following reasons. Hunting seasons do not coincide with the nesting season, thus reproduction will not be reduced by hunting. Disturbance to the foraging or resting activities of migrating or resident upland birds might occur during the deer hunt seasons, but would also be likely minor because of the low level of hunting that occurs, and the limited time period within which hunting is available.

Disturbance to other taxa would be unlikely or negligible for the following reasons. Mammals, including bats, are generally nocturnal, thus hunter interactions with mammals are rare. Encounters with reptiles and amphibians in the early fall would be few and should not have cumulative negative effects on reptile and amphibian populations. Invertebrates are also less active during fall and would have few interactions with hunters during the hunting season. Refuge regulations further mitigate possible disturbance by hunters to non-hunted wildlife. Vehicles would be restricted to roads and the harassment or taking of any wildlife other than the game species legal for the season would not be permitted.

Some species of bats, butterflies, and moths are migratory. Cumulative effects to these species should be negligible. These species are in torpor or have completely passed through the area by peak hunting season in November. Deer hunting would occur during September and October when these species are migrating; however, hunter interaction would be commensurate with that of non-consumptive users.

Impacts to Listed Species

This use is unlikely to pose more than a negligible impact to threatened and endangered species. Some trampling of listed plants could occur, but most of the listed species have senesced by the beginning of hunting season and are not as vulnerable to damage. Deer hunters would not be expected to be traversing wetlands where Oregon chub are present. Fender's blue butterfly is not present at W.L. Finley Refuge at this time of year.

Social and Economic Effects

Impacts to Other Priority Public Uses

Hunting has the potential to disturb Refuge visitors engaged in other priority public uses. To minimize this potential conflict, the Refuge has designated spatially and temporally defined hunting areas (see Maps 4 and 5). During the archery season and the first portion of the restricted firearms season, other visitors would not be prevented from using deer hunting areas but hunters would be prevented from using upland high use trail areas. During the last portion of the season, deer hunt locations would be restricted to upland areas to keep deer hunters from disturbing wintering waterfowl. To prevent safety problems and conflicts between users, this upland area would then be closed to other visitors. This would prevent trail users from using Woodpecker Loop, Bald Top, and Mill Hill Trails for approximately 7 days each year. This effect is considered minor in the context of trail availability at over the course of the year.

Other measures taken to avoid or reduce potential conflicts with these programs include posting hunt signs to maintain public awareness during hunting periods, and posting information about hunt periods on the refuge website. The restrictions on weapon type - archery and restricted firearms only for the deer hunt program - reduces trajectory and lowers the risk of third- party injury. Non-consumptive users would be prevented from accessing hunt areas through a portion of the deer hunt season. This would likely provide a higher quality hunting experience because the disturbance to wildlife during that week would be limited.

No significant effects to roads, trails, or other infrastructure from the hunting program are foreseen. Normal road, trail, and facility maintenance will continue to be necessary. Additional facility construction or upgrade, if needed, will be addressed as part of normal maintenance schedule.

Big game hunting could have an effect on the wildlife observation and photography programs. Although uncertain, it is possible that wildlife observation/photography opportunities could be increased as animals move away from the hunted zones toward no hunting zones. It is also possible that deer hunters could move animals off the Refuge entirely.

Other Effects

The hunt program has the potential to conflict with some of the normal management, maintenance, and biological monitoring activities that might be occurring in the same vicinity as the hunt program. Safety briefings for staff working in hunt areas would occur. Hunters would be warned of refuge activities that might be occurring in the hunt units. These measures would ensure the safety of refuge staff and Service authorized agents and allow the completion of refuge management activities as well as other refuge uses. The project leader would retain the discretion to close areas to hunting when necessary for the protection of refuge staff and authorized agents who are conducting refuge management activities or for the safety of hunters who could be at risk from refuge management activities (e.g., prescribed fire). Overall, there would be minimal administrative conflicts expected. Outreach about the new hunting programs will require minimal reprogramming of existing resources.

The existing hunting program is generally accepted locally and does not typically generate anti-hunting controversy. Nationally, there is a component of the population that is opposed to hunting, and some organizations are opposed to hunting, or at least the expansion of hunting, on national wildlife refuges and other public lands. During the review of the Draft CCP/EA during May-June 2011, some members of the public voiced objections to some or all of the hunts proposed for Willamette Valley refuges. There are some local hunters who strongly support expanded access and who would have liked to have seen an even larger expansion of the hunt program.

Economic Effects

Refuge Visitor Expenditures in Local Economy: Spending associated with recreational visits to national wildlife refuges generates significant economic activity. The report *Banking on Nature: The Economic Benefits of National Wildlife Refuges Visitation to Local Communities* (Carver and Caudill 2007) reported that more than 34.8 million visits were made to national wildlife refuges in FY 2006 which generated \$1.7 billion of sales in regional economies. Accounting for both the direct and secondary effects, spending by refuge visitors generated nearly 27,000 jobs, and over \$542.8 million in employment income. Approximately 82 percent of total expenditures were from non-consumptive activities, twelve percent from fishing, and six percent from hunting (Carver and Caudill 2007).

A visitor usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, restaurants, supplies, groceries, and recreational equipment rental. In this analysis we use average daily visitor spending profiles from the Banking on Nature report (Carver and Caudill 2007) that were derived from the 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (NSHFWR - USFWS 2008). The NSHFWR reports trip related spending of state residents and non-residents for several different wildlife-associated recreational activities. For each recreation activity, spending is reported in the categories of lodging, food and drink, transportation, and other expenses. Carver and Caudill (2007) calculated the average per-person per-day expenditures by recreation activity for each Service region. We used the spending profiles for non-residents for Service Region 1 (the region the Refuge Complex is located in), and updated the 2006 spending profiles to 2010 dollars using the Consumer Price Index Inflation Calculator (U.S. Bureau of Labor Statistics, 2011). Average daily spending profiles for nonresident visitors to Region 1 for big game hunting (\$92.07 per-day), migratory bird hunting (\$186.83 per-day), and fresh water fishing (\$63.96 per-day) were used to estimate non-local visitor spending for refuge hunting and fishing related activities. The average daily nonresident spending profile for non-consumptive wildlife recreation (observing or photographing fish and wildlife) was used for non-consumptive wildlife viewing activities (\$117.87 per-day).

Table 4.1 Estimated Annual Refuge Visitation by Activity at Finley Refuge

Visitor activity	Total number of visits	Percentage of non-local visits (%)	Total number of non-local visits	Number of hours spent at Refuge	Number of non-local visitor days*
No Action					
Fishing	2	5%	0	4	0
Big game hunting	77	0%	0	8	0
Nature trails/ other wildlife observation	330,469	20%	66,094	4	33,047
CCP					
Fishing	750	5%	38	4	19
Big game hunting	56	0%	0	8	0
Nature trails/ other wildlife observation	350,778	20%	70,156	4	35,078

*One visitor day = 8 hours.

Visitor spending profiles are estimated on an average per day (8 hours) basis. Refuge personnel estimate that non-local big game hunters spend a full visitor day (8 hours) while waterfowl hunters and anglers spend approximately 6 hours (2/3 a visitor day). Non-local visitors that view wildlife on nature trails or participate in other wildlife observation activities typically spend 4 hours (1/2 half a visitor day). Table 4.1 shows the number of non-local visitor days by recreation activity at W.L. Finley Refuge.

The anticipated reduction in hunting days from 77 to 56 represents an 18% reduction in hunting use days and thus we would expect a commensurate reduction in spending from approximately \$7089 (\$92.07 per hunt day x 77 hunt days) to approximately \$5155 ((\$92.07 per hunt day x 56 hunt days). The revenue reduction is negligible in the context of the Benton County economy dominated by agriculture production (\$85 million in 2002) and tourism (\$89 million in 2007).

Environmental Effects Summary

Potential effects of deer hunting to target populations, non-target species, listed species, refuge habitats, and other public use programs are summarized below in Table 4.2.

Table 4.2 Anticipated Effects of the Deer Hunts

Effects	Conclusion
Effects to target populations	Negligible; unlikely that more than 20 deer would be taken annually which equates to 0.2% of 2008 deer harvest in the Willamette Unit.
Effects to non-target species	Negligible to minor. Hunting occurs outside of the breeding season and the low level of hunting expected would be unlikely to pose any significant impacts to foraging or resting activities of resident or migratory species. The timing and locations of the deer hunt is designed to avoid disturbance to waterfowl, especially geese. Existing sanctuary areas would be maintained for the full wintering period under all alternatives.
Effects to refuge habitats	Approximately 85% of W.L. Finley Refuge would be open to hunting. However, because deer hunting is expected to remain a low intensity use with < 100 participants per year during a period when the vegetation is no longer actively growing, only temporary and minor effects are expected to vegetation from trampling. Riparian habitat may receive more visitation related disturbance from hunting than other habitat types.
Effects to listed species	Negligible impact; potential for minor trampling but any listed plants in the area will have senesced by the start of the season. No impact to Fender's blue butterfly habitat or listed fish.
Effects to other priority public uses	Approximately 85% of Finley's main unit would be open for hunting during archery season and during the first week of restricted firearms season. The impact to other priority public uses is expected to be minor, because the majority of other refuge users typically concentrate along trails and roads in the western part of the main unit, where hunting would remain closed. During the second week of the shotgun season, the Bald Top area and Mill Hill Trail would be closed for approximately 7 days each year to allow hunting in this area. Although other refuge users engaged in other priority public uses will experience some new restrictions, this effect is considered minor in the context of trail availability at the three refuges over the year.
Effects to the local economy	Projected revenue reduction due to an anticipated reduction in hunter use days are negligible in the context of the Benton County economy dominated by agriculture production (\$85 million in 2002) and tourism (\$89 million in 2007).

Despite the direct and indirect impacts associated with sport hunting, deer populations are unlikely to be affected significantly by the hunting program on the Refuge. Deer population objectives and allowable harvests are determined by the State of Oregon. Limited hunt seasons at the Refuge, no hunt zones, and established winter sanctuary ensure that deer, as well as non-target species, can find adequate areas for food and rest areas even in the midst of the hunting season. It is anticipated that wildlife populations will find sufficient food resources and resting places such that their abundance and use of the Refuge will not be measurably lessened. The relatively limited number of individuals of plant and animal species expected to be adversely affected due to hunting activities will not cause wildlife or plant populations to materially decline, the physiological condition and production of

refuge wildlife species will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall welfare will not be negatively impacted.

Cumulative Effects

Council on Environmental Quality (CEQ) regulations, which implement the provisions of NEPA, define several different types of effects that should be evaluated in an environmental document, including direct, indirect, and cumulative effects (40 CFR § 1508.7). Direct and indirect effects are addressed in the resource-specific section above. This section addresses cumulative effects.

According to the CEQ, cumulative effects can result from the incremental effects of a project when added to other past, present, and reasonably foreseeable future projects in the area, regardless of the entity undertaking the action. Cumulative impacts can result from individually minor but cumulatively significant actions over a period of time. This analysis is intended to consider the interaction of hunting activities at W.L. Finley Refuge and with other actions occurring over a larger spatial and temporal frame of reference.

It should be noted that a robust cumulative effects analysis was included in the CCP/EA by virtue of the comprehensive nature by which the direct and indirect effects associated with implementing the various CCP alternatives were presented in the environmental consequences chapter of the CCP/EA the various Compatibility Determinations (CCP/EA, Appendix C).

Effects to local (refuge scale) and regional (Willamette Hunt Unit scale) deer populations have already been addressed above. Biologically, examining the effects of deer hunting on larger geographic scale is unnecessary and meaningless. Thus the analysis in this section primarily focuses on effects associated with reasonably foreseeable future events and/or actions regardless of what entity undertakes that action in relation to deer habitat and deer hunting at W.L. Finley Refuge.

Effects from Reasonably Foreseeable Future Refuge Activities

Under the CCP, there is greater potential for more benefit to conservation of native species of the Willamette Valley and to recreational users, because the Service would develop a land protection plan. This plan could provide for further protection and restoration of habitats outside the current refuge area via easements, acquisition, cooperative agreement, and/or other means for further protection and restoration of native habitats that may presently, or could in the future support rare species. Such additional lands may eventually be opened to public use, providing direct opportunity for enjoyment of nature and wildlife. However, even if they are never opened to the public, managing additional lands for conservation values would increase and support native species populations in the Willamette Valley, indirectly benefiting consumptive and non-consumptive recreationists.

Potential Effects from Climate Change

Potential effects to refuge ecosystems resulting from warming: According to the Climate Impacts Group at the University of Washington, “Even subtle changes in PNW precipitation and temperature have noticeable impacts on the region’s mountain snowpack, river flows and flooding, the likelihood of summer droughts, forest productivity and forest fire risk, salmon abundance, and quality of coastal and near-shore habitat.” (www.cses.washington.edu/cig)

Warming, whether it results from anthropogenic or natural sources, is expected to affect a variety of natural processes and associated resources. However, the complexity of ecological systems means that there is a tremendous amount of uncertainty about the impact climate change will actually have. In particular, the localized effects of climate change are still a matter of much debate.

The following paragraphs attempt to identify the potential effects of warming on refuge-specific habitats and biota, utilizing the available science and predictions, combined with awareness of refuge-specific conditions. By necessity this brief assessment is incomplete and represents professional judgment rather than hard science. All predicted effects should be treated as hypotheses and tested over time using scientific methods.

Possible effects of warming to upland native habitats: Of the native upland habitats, many observers have noted the gradual loss of upland prairie and oak/savanna over the last 100 years, which has often coincided with succession on these sites to Douglas-fir forests. Investigators conducting a principal components analysis of topographic and soil variables in plots from Finley NWR concluded that remnant prairie/savanna plots only exist in areas with a high heat load (i.e., steep, south-facing), and shallow, low-nitrogen soils with high sand. Thus, harsh areas have avoided the succession of prairie/savanna areas to dense forests, even with broader scale landscape changes like fire suppression. In the study, edge plots are intermediate in character between forest and woodland plots and prairie/savanna plots (Murphy 2008). The same investigator found that available soil moisture appears to be a major limitation in the succession of prairie/savanna to forests (Murphy 2008). While these studies analyze only a few factors (and future temperature scenarios may result in entirely different outcomes), it is possible that upland successional changes that have resulted in more closed woodland or forest may be halted or reversed under a warming trend. The Willamette Sub-basin Plan (Willamette Restoration Initiative 2004) notes that climate change may result in increased frequency and severity of drought in the basin and predicts that the area of upland prairie might eventually increase, provided seed banks in the soil are still viable.

Wildfires: Wildfire frequency in western forests increased fourfold during the period 1987-2003 as compared to 1970-1986, while the total area burned increased six-fold (Westerling et al. 2006). The study demonstrated that earlier snowmelt dates correspond to increased wildfire frequency. Virtually all climate-model projections indicate that warmer springs and summers will occur over the region in coming decades. Although prolonged dry and hot periods are generally required for large fires in west-side forests (Gedalof et al. 2005), future conditions will likely make these periods, and resultant wildfires, more likely.

Potential effects to other biota: If warming happens, it could have a range of potential effects to wildlife and other biota. Obviously, habitat shifts that result in changed dominance in any particular habitat type, loss of habitat, or change in key habitat components can influence habitat availability and quality for dependent species. However, rising temperatures may affect other ecological interactions, such as sex ratios in reptiles (Janzen 1994), spring flowering times, or emergence timing and patterns for insect and pollinator species. Lawler et al. (2008) considers amphibians to be some of the most susceptible animals to climate change, partly because the microhabitats they depend on may be some of the most affected systems, and partly because they have limited abilities to disperse across a fragmented landscape. The changes in habitat conditions noted above are not likely to dramatically affect Willamette Valley black-tailed deer populations in the near future because black-tailed deer are adapted to using a wide variety of Willamette Valley habitat types, however, climate change may lead to changes such as expanding the range of diseases and parasites, such as lice which

contributes to Deer Hair Loss Syndrome, and reduce forage as plant species composition changes (ODFW 2008). If climate change does lead to habitat changes, it would also affect the distribution of species (ODFW 2008).

Other Reasonably Foreseeable Events and Activities from Others

Development and population growth: By 2050, an additional 1.7 million people are expected to live in the Willamette River Basin, bringing the total population to around four million (Willamette Basin Explorer 2009), equivalent to adding three more cities the size of Portland or 13 cities the size of Eugene. This population growth will continue to place stress upon the ecosystems of the Willamette Valley, both through direct loss of remaining habitats, and indirectly through fragmentation and degradation of the Valley's remaining parcels of wildlife habitat and demands on water. Refuge management can do nothing to stem this trend but refuges and other tracts of habitats will become even more important as repositories of biodiversity. Development and population growth are the events which are most likely to affect deer. Although black-tailed deer are able to use and survive in a wide variety of habitats, the continuing loss of deer habitat to urbanization over time will result in smaller deer populations in the Willamette Valley. Changing demographics and changes in public tastes for outdoor recreation suggest public participation in deer hunting will also decline (USFWS 2007a, and ODFW 2008).

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Appendix 1 - Maps

- Map 1 - *Willamette Valley NWRC Local Area*
- Map 2 - *Special Designation Areas and Historical Features*
- Map 3 - *William L. Finley NWR Habitat Alternatives*
- Map 4 - *William L. Finley NWR Hunt Plan Alternatives*
- Map 5 - *Habitat Subcategories*