

ELK MANAGEMENT PLAN ENVIRONMENTAL ASSESSMENT (*DRAFT*)

for the

Willamette Valley National Wildlife Refuge Complex



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The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.



The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations.

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1.0. Introduction

1.1 Overview and Background

The U.S. Fish and Wildlife Service's (Service) Willamette Valley National Wildlife Refuge Complex (WVNWRC), consisting of Ankeny National Wildlife Refuge (NWR), 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 WVNWRC are spread north to south through the Willamette Valley (Valley) with the northernmost being Baskett Slough NWR located near Salem; Ankeny NWR located near Jefferson; and William L. (W.L.) Finley NWR located 10 miles south of Corvallis. The refuges, covering a total of 11,110 acres, comprise a small percentage of the overall Valley acreage of approximately 2.5 million acres, but they are disproportionately important as reservoirs of the Valley's biological diversity.

The 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 savannah, 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. Their 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

At W.L. Finley NWR, 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) is the largest remaining example of this habitat found in the state. The prairies of Baskett Slough NWR support the largest population of the endangered Fender's blue butterfly within its range, and support some of the largest concentrations of declining grassland birds, as well as several species of listed and rare plant species. Oak woodlands are another important habitat found on the WVNWRC, and are managed to support a diversity of wildlife species, especially migratory songbirds.

Roosevelt elk are indigenous to the Willamette Valley and Western Oregon. Sightings of Roosevelt elk were uncommon at W.L. Finley NWR when the Refuge was established in 1964. In 1989, the elk herd numbered around 20, with their origin thought to be from the Coast Range foothills west of the Refuge. The herd grew to approximately 100 animals over the next decade (based on Refuge staff surveys). In 2002-03 an Oregon State University student conducted informal population surveys with the assistance of Oregon Department of Fish and Wildlife (ODFW). Those surveys indicated a minimum population estimate of 122, with a 35 calf/100

cow ratio and a bull to cow ratio of 48/100. Since 2010 the elk population has been estimated at 140-160 (WVNWRC estimates), depending on calf production/survival, off-refuge harvest, and transient animals from the Coast Range. In February 2013, 163 elk were observed on W.L. Finley NWR during an ODFW aerial survey. The herd size on Refuge has been considered generally stable by Refuge staff biologists for the past five years.

Elk use of Ankeny NWR was first noted about 10 years ago, but was considered transient and intermittent. Although use has become more regular in recent years, it still appears that the small herd moves between the east side of Ankeny and the Salem Hills to the Northeast/East. Use of Refuge agricultural fields occurs primarily after dark, with daylight use limited to the riparian woodlands adjacent to Sidney Ditch. Thirteen elk were observed east of Ankeny NWR during a February 2013 ODFW aerial survey.

Elk use of Baskett Slough NWR is consistent but transitory between Refuge and adjacent private lands to the north and east. Elk were first observed on Baskett Slough NWR in 2003, with sightings of individual bulls once or twice a year. Cows with calves were observed in 2005. A few years later a small herd of 12-20 animals was occasionally seen off-Refuge on private lands north of Smithfield Road. Currently elk use of Refuge lands is concentrated within the woodlands of the North Butte where they move freely between the refuge and private lands to the east. Use of the Baskett Slough agricultural lands on the north end of the refuge is primarily after dark. Elk have also been seen crossing Hwy 99 near the intersection of Smithfield Road. In February 2013, 23 elk were observed just north of Baskett Slough NWR during an ODFW aerial survey.

The ODFW has designated the Willamette Valley Management Unit, including the WVNWRC, as an Elk De-Emphasis Area (EDA). EDAs are characterized by high percentages of private land with on-going elk damage to private property and agricultural crops, or high potential for such damage. Hunter access to these areas is often limited. The management focus for EDAs is to reduce both numbers and damage caused by elk.

1.2 Purpose and Need for the Action

The purpose and need for this Environmental Assessment (EA) is to implement the Elk Management Plan for WVNWRC as agreed to in the Comprehensive Conservation Plan (CCP) which the Service adopted in September 2011 for Ankeny, Baskett Slough, and William L. Finley NWRs. The CCP was adopted for implementation after developing a Comprehensive Conservation Plan and Environmental Assessment (CCP/EA) for the three Refuges (USFWS 2011). 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.

The CCP/EA for WVNWRC evaluated three management options (alternatives) and the

anticipated effects of 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. As part of setting future management guidance, Alternative 2, Objective 10e in the CCP identified the development of an Elk Management Plan in conjunction with ODFW with the following goals:

- Establish target elk herd sizes within /adjacent to each Refuge. Consider adjacent land owner concerns, i.e. damage. Consider recreational value of elk (such as watchable wildlife, hunting, etc.) to Refuge users and nearby land owners.
- Be consistent with other wildlife, habitat, and public use objectives of the Refuges. Include sound monitoring strategies for measuring population trends, herd ratios, and hunting success. Consider implementing elk hunts on the Refuges to meet objectives in the elk management plan.

Due to the small herd size at both Ankeny and Baskett Slough NWRs, and with the herds predominantly remaining off-refuge, no management action, other than monitoring, is currently being proposed for these refuges. Therefore, the focus of this EA will be on management actions proposed for implementation on W.L. Finley NWR. If in the future more intense management actions are required to meet the objectives in the Elk Management Plan, the Elk Management Plan and EA may need to be amended.

1.3 Legal Authorities

The National Wildlife Refuge System Improvement Act, which amended the Refuge System Administration Act in 1997, identified six wildlife-dependent recreational uses for the Refuge System (known as the "Big Six"): hunting, fishing, wildlife observation and photography, environmental education and interpretation. These six wildlife-dependent public uses receive special consideration in the management of National Wildlife Refuge System. The Service is directed to make extra efforts to facilitate these priority wildlife-dependent public use opportunities. The WVNWRC Elk Management Plan complies with this direction by following goals and objectives that provide "Big Six" recreational opportunities.

Based on the analysis documented in this EA, tiered from the CCP/EA for WVNWRC, the WVNWRC Project Leader for the U.S. Fish and Wildlife Service will determine whether or not to implement the Elk Management Plan as prepared (Appendix A) and whether or not an

Environmental Impact Statement (EIS) is necessary. If the Project Leader determines that the Elk Management Plan should be implemented as prepared and that an EIS is not necessary, a Finding of No Significant Impact (FONSI) would be prepared, which would highlight the alternative selected for implementation. Following the signing of the FONSI, the preferred alternative in this EA would be implemented.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section outlines three alternatives for managing elk on W.L. Finley NWR. The current W.L. Finley NWR elk population has the potential to continue to increase either through immigration and/or by reproduction. Based on existing elk biology, recent elk population changes throughout the Willamette Valley, and historical patterns of elk on W.L. Finley NWR, it is unlikely elk herd sizes will decrease over time under existing management. Alternative B is identified as the proposed action.

2.1 Alternative A. No- Action Alternative (Continue Current Refuge Elk Management)

Under this Alternative, the WVNWRRC would continue the existing elk management framework on W.L. Finley NWR. This consists primarily of allowing elk dispersal and density patterns to fluctuate in response to weather, forage availability, other ecological processes, off-refuge hunting, and refuge management activities. Under this Alternative it is likely off-refuge damage complaints would continue and/or potentially increase with herd growth and expansion. The ODFW would retain sole management responsibility for the elk herds within the vicinity of the refuge boundaries, but would be limited to implementation of population control strategies outside the refuge boundaries. Under the No Action Alternative, there would be no change in current Refuge implementation of the “Big Six” wildlife dependent public uses that are allowed on National Wildlife Refuges, which currently include wildlife viewing and photography.

2.2 Alternative B. Implementation of the WVNWRRC Elk Management Plan (Proposed Action)

The Proposed Action will manage the W.L. Finley NWR elk population according to the WVNWRRC Elk Management Plan, the details of which are found in Appendix A. The Elk Management Plan has three goals for the WVNWRRC:

Goal 1. Manage for Refuge elk population levels compatible with WVNWRRC purposes, adjacent land use practices and current habitat conditions.

Goal 2. Manage for healthy Refuge elk populations with a balanced age distribution and bull/cow ratio within the WVNWRRC.

Goal 3. Maintain and enhance quality wildlife-oriented recreational and educational

opportunities (elk viewing, hunting) at W.L. Finley NWR.

As stated previously, because elk herds remain mostly off-refuge at Ankeny and Baskett Slough NWRs, current implementation of the Elk Management Plan would focus solely on W.L. Finley NWR.

Planned management actions under the goals above would include; setting a target herd size and working with ODFW to implement strategies to achieve that target as well as healthy elk populations; ensure adequate monitoring is in place to make scientifically sound management decisions; and promote all of the compatible “Big Six” wildlife dependent public uses that are allowed on National Wildlife Refuges, including wildlife viewing, photography, and hunting.

2.3 Alternatives Considered but Not Developed

Options that were considered during the environmental assessment process but were eliminated as nonviable management options were hazing and live trapping and relocation.

Alternative C: Hazing

Hazing proposes to manage elk on W.L. Finley NWR by using hazing methods such as propane exploders, dogs, all-terrain vehicles or people to disturb and disperse elk from the Refuge. Propane exploders can prevent elk from using sites for several weeks, after which the elk lose interest and go elsewhere. Hazing elk would most likely disperse elk from the refuge and force them to move off-refuge to areas where they could be hunted. Use of exploders, all-terrain vehicles, dogs, or people to disperse elk from W.L. Finley NWR would be an unacceptable nuisance to visitors and to other wildlife on the NWR. In addition, hazing would not address the issue of a balanced herd age distribution and bull-cow ratio, and in fact could skew the population even further towards cows if bulls move off refuge more readily and are shot by hunters. The effectiveness of hazing may decline through time as elk learn that they can remain in cover, frustrating hazing efforts.

Alternative D: Live Trapping and Relocation

Under alternative D, elk would be live trapped and relocated to new areas of the State, thereby reducing local herd sizes and the overall population on the refuge complex. This technique could reduce elk numbers, but would be cost prohibitive to implement and would be inconsistent with other wildlife, habitat, and public use objectives of the W.L. Finley NWR. For these reasons, this alternative was rejected as a viable strategy and received no further consideration.

3.0 AFFECTED ENVIRONMENT

The alternatives have the potential to affect biological resources, visitor use, and the social and economic environment.

3.1 Plant and Wildlife Communities

3.1.1 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 NWR 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.

3.1.2 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 NWR 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 WVNWRC.

3.1.3 Wet Prairie

William L. Finley NWR 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 Euro American 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.

3.1.4 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 in 2015 (USFWS 2010). 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.).

3.1.5 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. 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.

3.1.6 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.

3.1.7 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 W. 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 the 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 W.L. Finley Refuge.

3.1.8 Riverine

Muddy Creek flows north-south through W.L. Finley NWR for approximately 3.5 miles. It is a low 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.

3.1.9 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 non-passerines (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 W.L. Finley NWR. 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.

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 2007). Oak restoration efforts at Baskett Slough and W.L. Finley NWRs, which result in more open savanna or woodland conditions, may therefore benefit some reptile species.

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) 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 W.L. 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.

Bryophytes: The protection of natural and pre-settlement plant communities at W.L. 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.

3.2 Elk

The interspersed forests, grasslands, and water on W.L. Finley NWR 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.

3.3 Special Status Species

Special status species are species for which State or Federal agencies provide an additional level of protection by law, regulation, or policy. Included in this category are species that are protected under the Federal Endangered Species Act, species designated as State endangered or threatened by ODFW, and State species of concern identified by ODFW.

3.3.1 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 outplanting in order to work towards sustainable populations specified in the Recovery Plan (USFWS 2010).

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 W.L. Finley NWR and Oak Creek, with the population at Oak Creek the largest in Oregon.

The populations at W.L. 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 W.L. 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 W.L. 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.

3.3.2 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. There is one natural population and two introduced populations at W.L. Finley NWR.

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 2010).

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. Baskett Slough and W.L. 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 Threatened status.

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 W.L. Finley NWR (ODA 2013). In 2004, peacock larkspur tubers were out-planted at Finley and Ankeny NWRs with limited success. Surveys at W.L. Finley NWR have shown that prescribed fire benefits the species (Finley and Ingersoll 1994).

3.4 Refuge Visitor Use

Nationwide national wildlife refuges pumped \$2.4 billion into the economy, supported more than 35,000 private-sector jobs and produced \$792.7 million in job income for local communities in Fiscal Year 2011 (Carver and Caudill 2013). W.L. Finley NWR received approximately 100,000 visitors in 2009. William L. Finley is a favorite birding location for residents in Corvallis and Eugene as well as travelers visiting the Willamette Valley in the summer months. Woodpecker Loop, Mill Hill Trail, McFadden Marsh Observation Blind, and Homer Campbell Memorial Trail are open year round and are popular with hikers. Additionally the scenic auto tour route is popular in the winter during the frequent rainy weather that settles in and accounts for all visitation. Pedestrian traffic on trails draws in about 75% of those visiting, with photography, educational and interpretive programs, three special events, and the visitor contact station pulling in around 20%.

During the period of November 1st through March 31st the interior of the refuge is closed to the public to provide sanctuary for wintering waterfowl. Numerous trails, kiosk and overlooks are available to the public for wildlife-dependent recreation during the closure. During the open season, April 1st – October 31st, Refuge visitors are able to explore all parts of the Refuge (unless posted closed at all times).

William L. Finley is open for a deer hunting season that coincides with the season established by Oregon Department of Fish and Wildlife. There is an early archery season and a later shotgun season. Hunting is allowed every day during regular Refuge hours for the state-specified open season. Hunting on the Refuge is prohibited after October 31st, when the refuge closes the interior to provide sanctuary for wintering waterfowl. There are currently no fees to hunt the Refuge. Archery hunt regulations reflect established state regulations. During shotgun season, only shotguns using buckshot or slugs are allowed. Bucks taken must have not less than a forked antler. Possession limit is one deer for each season. 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.

A large portion of the Refuge is available for deer hunting. Some high-use public and maintenance areas are closed to hunting, such as the Refuge headquarters and Fiechter House area, Refuge shop area, and the western portions of the refuge near Mill Hill and Woodpecker Loop Trail. In 2013, 68 hunters reported to self-service kiosks between August 24 and October 31. This excludes closure (furlough) days October 1 through October 16, resulting in a 52 day hunt season. One buck deer was harvested on August 24 in Zone 1 with a general archery tag.

The WVNWRC provides visitors with excellent opportunities to view wildlife up close via trails, automobile tour routes, observation and photography blinds, and scenic overlooks. During winter months, large concentrations of wintering waterfowl attract bird watchers, photographers, and wildlife enthusiasts. Visitors may see the uncommon Dusky Canada geese, a species of concern due to habitat loss and degradation. Roosevelt elk are another popular attraction. During other months, a proliferation of wildflowers and other native plants provides a stunning backdrop for the endangered Fenders Blue butterfly, a wide variety of birds, beaver, fox, coyotes, bobcats, and numerous other wildlife species that make their home on the Refuges.

3.5 Social and Economic Environment

The WVNWRC is located in northwestern Oregon, within the Willamette Valley. W.L. Finley NWR is located on the western edge of the Willamette Valley within Benton County. The Willamette Valley serves as the largest concentration of vineyards and wineries in Oregon (Oregon Wine Board, 2013). The abundance of the rivers, lakes, and waterfalls provide numerous recreation and tourism opportunities in the Willamette Valley area.

The Willamette Valley is home to almost 800 farms, mostly family-owned and operated, with an average of 700 acres per farm.

Grass Seed: The Valley is a leading producer of grass seed, producing nearly two-thirds of the United States' cool-season grasses. Over 60 percent of the nation's annual ryegrass supply comes from the Willamette Valley (OSU 2013). Grass seed farming is ideal in the region thanks to its wet, fertile soil.

Wineries: The Valley is home to a growing wine industry. Over 200 wineries and 10,000 planted acres are located in the Valley, which is home to two-thirds of the state's vineyards and wineries.

Tourism: Travel and tourism is one of the most important industries in Oregon. (Dean Runyan Assoc. 2013). Total 2012 traveler expenditures varied across the four counties from approximately \$113 million in Benton County to \$350 million in Marion County

Agriculture Revenue – Importance to local counties: Of the four counties in the study area, Benton has the smallest number of farms, 906 in 2007. Total agricultural production in the county was \$101.8 million in 2012. Benton County is the state's second largest producer of cut

Christmas trees (by value sold) and the fifth largest producer of vegetables, melons, potatoes, and sweet potatoes (USDA 2013).

Population: Oregon's population in 2012 was 3,899,353, an increase of 1.2% from 2010. According to the U.S. Census Bureau (2013), the population of Benton County increased by 9.5% from 78,153 to 85,579 from 2000 to 2010. The population of the city of Corvallis, 10 miles from W.L. Finley NWR, was 54,462 in 2010; an increase of 10.4% over the 2000 figures.

Employment and Income: Manufacturing, health care, education, and government are all major employers in the study area (U.S. Census Bureau 2013). Government employment (local, state and federal) comprised 13% of total county employment in Linn County and 27% of total employment in Benton County. Major employers in the town of Corvallis (Benton County) include CH2M Hill, Good Samaritan Hospital, and the Corvallis Clinic. Oregon State University is also located in Corvallis (City of Corvallis 2013).

4.0 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 Elk Management Plan, specifically the elk hunt.

The information used in this EA was primarily obtained from the CCP/EA and the Elk Management Plan. 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.

4.1 Anticipated Effects of the Elk Management Plan at W.L. Finley Refuge

Effects to Elk Population

Effect to the elk population in the Willamette Valley would be negligible from the proposed action. Elk populations and elk hunting are managed by the ODFW. Annual elk surveys are generally conducted by ODFW 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, Elk De-Emphasis Zone. The Roosevelt elk population on W.L. Finley NWR is estimated at 160 animals. A primary goal of the Elk Management Plan is to decrease the herd size by 20% over five years.

Direct mortality to elk associated with the hunt would result. Some wounding could occur. Disturbance to the elk herd may result in increased movement off-refuge, where additional hunting occurs that could increase harvest opportunities. Harvest as a result of elk hunting removes a small amount of prey from the prey base for predators such as mountain lions. However, even if on-refuge hunter success was 100% (one elk harvested for each of the 15 permits), this would equate to less than a 10% reduction in the W.L. Finley elk herd. This would reduce the reproductive capacity of the herd in future years and move us closer towards 5 year management objective of a 20% reduction in the number of elk.

Effects to Non-Target Wildlife

Non-target wildlife would include non-hunted migratory birds such as geese, ducks, 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 elk hunt are designed so as to avoid disturbance to waterfowl, especially geese. Existing sanctuary areas will be honored for the full wintering period (November 1-March 31).

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. A limited number of hunters may cause minor disturbances to non-target species because of the movement and vehicular traffic used for this activity.

Effects to Refuge Habitats

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

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, elk 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.

Social and Economic Effects

Effects to Other Priority Public Uses

Implementation of the Elk Management Plan may increase quality viewing and photographing opportunities for W.L. Finley NWR visitors over time if implementation of the plan results in a higher percentage of mature bulls on the Refuge. In working towards a balanced age distribution of the herd by focusing hunting on antlerless elk, bulls will grow larger and healthier and may potentially provide higher quality viewing and photography opportunities. Contrarily, wildlife observation/photography opportunities for elk could decrease during the time period they are being hunted on the Refuge if the elk hunting pressure causes elk to move away from public viewing areas in search of denser more inaccessible cover.

Hunting has the potential to disturb Refuge visitors engaged in other priority public uses such as wildlife viewing and photography. However, the potential for conflict should be minimized for several reasons; the limited number of elk hunters allowed on the refuge at any one time (5); the fact that elk hunting activity will most often occur in wooded areas less frequented by other users; and archery hunters rely on stealth and camouflage, such that their presence may be unnoticed by other public users. In addition, elk hunting will only occur for three months of the year. As with most of the deer season, other visitors would not be precluded from using areas where elk hunting

may occur. Safety problems as a result of overlapping public uses are not anticipated.

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.

Economic Effects

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 2013) reported that more than 46 million visits were made to national wildlife refuges in FY 2012 which generated \$2.4 billion of sales in regional economies. Accounting for both the direct and secondary effects, spending by refuge visitors generated nearly 35,000 jobs, and over \$792.7 million in employment income. Approximately 72 percent of total expenditures were from non-consumptive activities, 21% from fishing, and 7% from hunting (Carver and Caudill 2013).

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 2013) that were derived from the 2011 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (NSHFWR) (USDI 2011). 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 (2013) 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). Average daily spending profiles for nonresident visitors to Region 1 for big game hunting (\$201.03 per-day), migratory bird hunting (\$109.26 per-day), and fresh water fishing (\$79.40 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 (\$155.11 per-day).

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).

It is anticipated that elk hunting will result in an increase 62 hunting days on the refuge and thus we would expect a commensurate increase in spending of \$ 12,463.86 (\$201.03 per hunt day x XX hunt days). The revenue increase is negligible in the context of the Benton County economy dominated by agriculture production (\$85 million in 2002) and tourism (\$89 million in 2007).

A potential increase in movement of elk in and out of WL. Finley NWR onto adjacent private lands may contribute to property damage (e.g., crop depredation, fencing). The ODFW could experience effects to its hunting license revenue sources as a result of elk management strategies within W.L. Finley NWR (e.g., hunting outside the Refuge and increases in hunting licenses; then a decrease as initial reduction is complete). Elk management strategies also have the potential to affect socioeconomic conditions of gateway communities related to hunting and tourism in the general area (e.g., revenues from lodging, restaurants, guide and other recreational services, etc.).

4.2 Environmental Effects Summary

Effect	Conclusion
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 elk hunt is designed to avoid disturbance to waterfowl, especially geese.
Effects to refuge habitats	Negligible to minor. Approximately 95% of W.L. Finley Refuge would be open to hunting. However, because elk hunting is expected to remain a low intensity use with 15 - 25 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. 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	Minor. Approximately 95% of W.L. Finley's main unit would be open for hunting during archery season. Hunting has the potential to disturb Refuge visitors engaged in other priority public uses such as wildlife viewing and photography. However, the potential for conflict should be minimized for several reasons; the limited number of elk hunters allowed on the refuge at any one time (5); the fact that elk hunting activity will most often occur in wooded areas less frequented by other users; and archery hunters rely on stealth and camouflage, such that their presence may be unnoticed by other public

	<p>users. In addition, elk hunting will only occur for three months of the year. As with most of the deer season, other visitors would not be precluded from using areas where elk hunting may occur. Safety problems as a result of overlapping public uses are not anticipated.</p> <p>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.</p>
Effects to economy	<p>Minor to moderate. Spending associated with recreational visits to national wildlife refuges generates significant economic activity. A potential increase in movement of elk in and out of WL. Finley NWR onto adjacent private may contribute to property damage. Hunting pressure on-refuge may force more elk off-refuge, thereby increasing hunting opportunities for nearby landowners.</p>

Despite the direct and indirect impacts associated with sport hunting, elk populations are unlikely to be affected significantly by the hunting program on the W.L. Finley NWR. Elk population objectives and allowable harvests are determined by the State of Oregon. Limited hunt seasons at W.L. Finley NWR, no hunt zones, and established winter sanctuary ensure that elk, 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 W.L. Finley NWR 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.

5.0 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 NWR 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) elk populations have already been addressed above. Biologically, examining the effects of elk 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 elk habitat and elk hunting at W.L. Finley NWR.

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 Pacific Northwest 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. Changes in habitat conditions are not likely to dramatically affect Willamette valley elk populations in the near future because elk 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, and reduce forage as plant species composition changes. If climate change does lead to habitat changes, it would also affect the distribution of species.

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 elk. Although elk are able to use and survive in a wide variety of habitats, the continuing loss of elk habitat to urbanization over time will likely result in smaller elk populations in the Willamette Valley.

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6.0 CONSULTATION AND COORDINATION WITH OTHERS

Oregon Department of Fish and Wildlife

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Appendix A. WVNWRC Elk Management Plan

WVNWRC Elk Management Plan

Chapter 1. Introduction

1.1 Purpose, Scope and Need for Elk Management Plan

At the time of establishment of the three Willamette Valley refuges in the mid-1960's, Roosevelt elk within the Willamette Valley (Valley) were rare. However, almost 50 years later elk populations have expanded greatly and moved into Valley bottomland habitats where the dominant ungulate had been black-tailed deer. During the last two decades, elk herds have immigrated into the Willamette Valley from the Cascade and Coast mountain ranges to the east and west. The Willamette Valley elk population grew from 100 to a minimum of 600 individuals during the last decade (Oregon Department of Fish and Wildlife (ODFW) population modeling). Throughout this period of elk expansion into the Valley, there have been increasing complaints of fence and agricultural damage from farmers and other private landowners, especially from hunting clubs growing corn as an attractant for waterfowl. The ODFW considers the Willamette Wildlife Management Unit portion of the Willamette Valley an "Elk De-emphasis Area" (EDA). Elk De-emphasis Areas are characterized by high percentages of private land with on-going elk damage to private property and agricultural crops, or high potential for such damage. The management focus for EDAs is to reduce both numbers and damage caused by elk. Elk damage to agricultural lands increased in the vicinity of large elk herds in the Willamette Valley, including the one at W.L. Finley NWR. To address this issue, ODFW adaptively changed their hunting programs from 1998 thru 2009.

By 2010 the elk herd on W.L. Finley National Wildlife Refuge (NWR) had grown to one of the largest elk herds found in the Valley, estimated at approximately 150 animals. At the same time, small numbers of elk were using Ankeny NWR and Baskett Slough NWR on a periodic basis. The W.L. Finley NWR elk herd has been one of the most popular wildlife viewing features on the Refuge for the visiting public for over a decade. The open visibility of agricultural lands and oak savannahs has allowed consistent viewing and photographic opportunities, especially in the winter months. Currently no elk hunting is permitted on Refuge lands in the Valley.

In 2010 the USFWS and ODFW agreed to cooperatively develop an "Elk Management Plan" for the Willamette Valley NWR Complex (WVNWRC) (under guidance from the Willamette Valley National Wildlife Refuges Final Comprehensive Conservation Plan and Environmental Assessment, 2011) to examine alternatives to manage the population. Two primary issues have emerged for management consideration:

- 1) Large elk herds (i.e. >50) that reside in or around agriculture and crop dominated landscapes in the Willamette Valley can be detrimental to adjacent private landowners if the elk feed on crops and/or cause damage to fences on private property. Large elk herds are known to reside or seek sanctuary on W.L. Finley NWR and utilize and/or at times cause damage to neighboring private property. Elk are also observed on a regular basis on Baskett Slough and Ankeny NWR's, however these are typically transitory groups of elk that use these areas for short periods of time as part of regular movement patterns travelling between private lands and the federal refuges.
- 2) Bull ratios of 10 bulls per 100 cows should include a healthy age class distribution with an adequate number of older bulls contributing to the fitness of the herd. On-Refuge bull ratios were 10, 9, and 17 respectively in 2009, 2011, and 2013 however the presence of bull elk classified as "large" is currently lacking for the W.L. Finley NWR elk herd (Table 1). Modification of the age structure of bull elk is needed to meet objectives for high quality elk viewing opportunities on the Refuge.

1.2 Relationship to the WVNWR Comprehensive Conservation Plan

The WV NWRC completed a Comprehensive Conservation Plan (CCP) in September 2011. The purpose of the CCP is to provide management direction for the Refuge Complex for the next 15 years. Management of Roosevelt elk, especially on W.L. Finley NWR, was considered a major issue for the Refuge in the pre-planning process. Under the selected alternative, the WVNWR proposed to develop an elk management plan cooperatively with ODFW within 1-2 years of CCP implementation. The guidance for elk management is found within 2 objectives under CCP Goal 10: "Provide compatible, wildlife-dependent recreation opportunities for visitors, fostering appreciation and understanding of the Refuges' fish, wildlife, plants, and their habitats". Objective 10a. states "Provide high quality wildlife observation and wildlife/nature photography opportunities", with elk listed as a focal species. Objective 10e states "Address elk population management issues on lands managed by the National Wildlife Refuge System in the Willamette Valley, working with the Oregon Department of Fish and Wildlife". The Oregon Elk Management Plan specified under Objective 10e includes the following:

- Establish target elk herd sizes within /adjacent to each Refuge.
- Consider adjacent land owner concerns, i.e. damage.
- Consider recreational value of elk (such as watchable wildlife, hunting, etc.) to Refuge users and nearby land owners.
- Be consistent with other wildlife, habitat, and public use objectives of the Refuges.
- Include sound monitoring strategies for measuring population trends, herd ratios, and hunting success.
- Consider implementing elk hunts on the Refuges to meet objectives in the elk management plan.

1.3 ODFW Willamette Valley Elk Management Goals

The Oregon Department of Fish and Wildlife was granted authority by the Oregon Legislature to manage wildlife populations. The ODFW follows the “Wildlife Policy” found in Oregon Revised Statute (ORS) 496.012, the Wildlife Damage Policy 2008), and the Oregon Elk Management Plan (ODFW 2003). While directed to manage wildlife populations at optimal levels, ODFW is also directed to manage populations in a manner consistent with the primary uses of the lands and waters of the state. The Oregon Elk Management Plan (ODFW 2003) guides elk management policies and strategies for population structure, recreational use, compatibility with habitat capacity and adjacent land use, and contribution to a healthy landscape. The ODFW manages specific geographic regions of the state as distinct wildlife management units. The proposed elk population structure, objectives, bull and calf ratios, and approaches to address elk damage vary for each of the management units. At times, wildlife and land use information is combined and reported by Zone (i.e. Willamette De-emphasis Area)

The Willamette Wildlife Management Unit (WMU) is managed as an Elk De-Emphasis Area (EDA). EDAs are characterized by high percentages of private land with on-going elk damage to private property and agricultural crops, or high potential for such damage. The Willamette EDA does not have an elk population objective. Lack of a management objective does not mean that ODFW is striving to eliminate elk in the Valley. Realistically, the objective is to maintain smaller, isolated herds that are compatible with the both the urban and agricultural landscapes. This recommendation is made because the high human population and extensive changes in land use have rendered these areas unsuitable for elk. The ODFW’s management objective for the Willamette EDA is to ensure that wildlife damage is addressed in a timely manner and that wildlife damage is minimized in both short and long term time frames (to the extent practical).

Continued growth of elk herds in the Willamette EDA has been documented to increase conflicts with adjacent land use, especially agriculture. Population control methods are utilized that both remove the elk causing damage and reduce the elk populations to sustainable levels (compatible with adjacent land uses). To address elk damage in the Willamette EDA, ODFW authorizes haze permits, special hunting programs and tags, and even kill permits as necessary to address and help resolve elk damage within the Willamette EDA. Again, the goal is to ensure that the population is maintained at a level compatible with roads/highways, residential and commercial developments, and agricultural crops in this highly populated region of the state.

The elk herds that use the WVNWRC and the adjacent private lands overlap the Willamette, Alsea, Santiam, and/or Stott Wildlife Management Units (Figure 1). Refer to Table 2 for details of the ODFW elk management objectives for each of these wildlife units. The population management objectives of the adjacent wildlife management units are significantly higher because the carrying capacity of the forested land base can sustain larger populations of elk without conflict. Willamette Valley elk herds that cross into adjacent management units (i.e. Alsea, Santiam, and/or Trask) are managed at higher population levels to achieve multiple resource values (aesthetics,

recreation, wildlife viewing) as outlined in the Oregon Elk Management Plan.

Hunting is one of the most effective tools for managing elk damage. However, hunter access in the Willamette Valley is often limited by landowners who can subsequently decrease hunter effectiveness at reducing elk damage or create daytime safe zones on properties where hunting isn't allowed. Therefore, ODFW actively pursues cooperative solutions with landowners and land management agencies. Damage situations that extend over large acreages require cooperation from multiple landowners as well as public land managers in order to develop long term solutions. Through cooperative management, balanced population levels can produce multiple objectives: wildlife viewing, education, and reduced damage to adjacent landowners' property.

Chapter 2. Background

2.1 History of Elk Establishment on WVNWRC

W.L. Finley NWR

Sightings of Roosevelt elk were uncommon at W.L. Finley NWR when the Refuge was established in 1964. In 1989, the elk herd numbered around 20, with their origin thought to be from the Coast Range foothills west of the Refuge. The herd grew to approximately 100 animals over the next decade (based on Refuge staff surveys). In 2002-03 an Oregon State University student conducted informal population surveys with the assistance of ODFW. Those surveys indicated a minimum population estimate of 122, with a 35 calf/100 cow ratio and a bull to cow ratio of 48/100. Since 2010 the elk population has been estimated at 140-160 (USFWS WVNWRC estimates), depending on calf production/survival, off-refuge harvest, and transient animals from the Coast Range. In February 2013, 163 elk were observed on W.L. Finley NWR during an ODFW aerial survey. The herd size on Refuge has been considered generally stable by Refuge staff biologists for the past five years.

Ankeny NWR

Elk use of Ankeny NWR was first noted about 10 years ago, but was considered transient and intermittent. Although use has become more regular in recent years, it still appears that the small herd moves between the east side of Ankeny and the Salem Hills to the Northeast/East and across I-5. Use of Refuge agricultural fields occurs primarily after dark, with daylight use limited to the riparian woodlands adjacent to Sidney Ditch. Thirteen elk were observed east of Ankeny NWR during a February 2013 ODFW aerial survey.

Baskett Slough NWR

Elk use of Baskett Slough NWR is consistent but transitory between Refuge and adjacent private lands to the north and east. Elk were first observed on Baskett Slough NWR in 2003, with sightings

of individual bulls once or twice a year. Cows with calves were observed in 2005. A few years later a small herd of 12-20 animals was occasionally seen off-Refuge on private lands north of Smithfield Road. Currently elk use of Refuge lands is concentrated within the woodlands of the North Butte where they move freely between the refuge and private lands to the east. Use of the Baskett Slough agricultural lands on the north end of the refuge is primarily after dark. Elk have also been seen crossing Hwy 99 near the intersection of Smithfield Road. In February 2013, 23 elk were observed just north of Baskett Slough NWR during an ODFW aerial survey.

2.2 Elk Damage Complaints and ODFW Response

Sightings of Roosevelt elk were uncommon when W. L. Finley NWR was established in 1964. Since that time, elk populations utilizing the refuges and adjacent private lands have grown dramatically. During the 1970s through the early 1990s, most of the private landowners viewed the elk as a novelty and enjoyed their presence on their property. As the Willamette Valley elk herds increased and expanded geographically to include most forested ridges and drainages, private landowners with both large acreages and vulnerable commercial crops became increasingly frustrated as the elk herds damaged agricultural crops and/or field fences. Elk damage to corn crops on duck clubs adjacent to W.L. Finley NWR was documented when the elk population was estimated at 36 animals (ODFW/USFWS files). As the population grew, elk damage expanded to additional duck clubs growing corn, Christmas tree farms, and grass seed fields. Hazing, repellents, and archery hunts failed to resolve the depredation problem. Crops less palatable to the elk were planted, but they were subsequently eaten by waterfowl.

In the early 1990s, ODFW and WVNWR staff met with neighboring landowners and other interested citizens to discuss elk depredation and other matters. At that time, the elk population was estimated at 60-80 animals (ODFW files) and was collectively referred to as the Muddy Creek hunt area. Attendees discussed setting a population level for the W.L. Finley NWR elk herd that would potentially balance wildlife viewing opportunities and minimize damage to adjacent agricultural landowners. As a result of this meeting ODFW initiated an antlerless elk hunt for the Willamette Unit in 1998. In addition, ODFW continued to issue local emergency hunts and kill permits as well as advocate for additional hazing and fencing.

In 2001, because elk damage in the W.L. Finley NWR area and other locations was continuing, ODFW expanded the antlerless Willamette Unit hunt to an eight month season (Aug-March).

In 2002 ODFW changed the bag limit in the Willamette Unit to one elk in response to damage to Christmas trees and riparian areas from bachelor groups of bull elk rubbing their antlers on trees. Antlerless only seasons did not address tree damage and issuing kill permits for bull elk were unpopular with hunters and the public so a change was implemented to allow harvest of either a bull or cow elk. A consequence of this change was that hunters preferentially harvested bull elk, which did not address reducing herd size through reduced recruitment.

The ODFW and WVNRC staff met with neighboring landowners and interested citizens again in 2003 to discuss the W.L. Finley NWR elk herd and depredation on surrounding private lands. A general consensus from that meeting was that the Finley elk herd should be reduced. An additional 50 antlerless-only tags were authorized in 2004 (Muddy Creek).

The elk population continued to increase in the Valley during 2003-08, and the agencies met again with the landowners near W.L. Finley NWR to advise them of their efforts to address elk damage through hunting, use of fencing, and kill permits. As elk population concerns were similar in other portions of the Willamette unit, in 2009 ODFW deleted the Muddy Creek antlerless hunt (50 tags in the vicinity of W.L. Finley NWR) and replaced it with the Willamette Plus #2 hunt (150 antlerless tags valid throughout the Willamette Unit). In addition, many additional landowners applied for the landowner preference elk tags.

The ODFW and landowners implemented a variety of methods to alleviate or prevent damage. The methods used involved hazing (shell crackers, propane cannons), temporary and permanent fencing, emergency hunts and landowner preference hunts, and controlled either-sex and antlerless hunts. Despite these efforts, the geographic range of elk (and subsequent damage complaints) has expanded near WVNRC lands as well as other locations in the Willamette Valley. In most cases disturbance from hazing and hunting has caused the elk to become nocturnal thus limiting hunting success and the effectiveness of hazing.

Resolving elk damage to private land in the Willamette Unit has been difficult because many landowners either restrict public hunting access or view the elk as an asset and the properties become a safe zone during daylight hours for the local elk populations. Therefore elk use frequently increases due to productivity of the existing herd and/or immigration from outside sources. When harvest is limited, elk damage often continues to be a problem for adjacent landowners.

2.3 Cooperative Management Efforts (ODFW/USFWS)

As outlined in Section 2.2, ODFW and WVNRC staff have met with interested landowners several times over the past two decades to discuss expanding elk populations and damage in the vicinity of W.L. Finley NWR. During that time, hunting was an option on private land, but the WVNRC was closed to hunting to bolster elk viewing opportunities on the refuge.

In 2003, WVNRC, ODFW, and Oregon State University personnel made considerable effort to track, capture, and radio tag elk calves. However, the effort was unsuccessful and no calves were tagged.

W. L. Finley NWR staff have collected elk population data from periodic ground counts since the mid-1990's. ODFW conducted aerial elk surveys over the Refuges in 2009, 2011, and 2013.

Elk monitoring activities conducted by both ODFW and WVNWR staff have focused primarily on quantifying herd numbers and distribution rather than focusing on quantifying complaints and damage. Assessing elk damage is difficult due to the range of response and recommendations provided to landowners to address property or crop damage. Staff response to damage complaints range from verbal recommendations describing hazing techniques, to ODFW implementation of controlled or damage hunts or issuing kill permits for removal of problem animals and herd dispersal. In some circumstances landowners experiencing damage are using available hunting seasons, LOP opportunities, or other options to address damage, negating the need to call for advice, however it should not be interpreted to mean the damage has gone away.

One index to project elk damage to private property is to quantify trends in both the number of landowners and number of tags purchased to hunt only on a landowner's property during a discrete time frame (Landowner Preference (LOP) tags). An increase in LOP tags sold in a specific area could indicate not only an increase in the local elk population, but also a corresponding increase in elk damage. Using this approach, ODFW projected elk damage to private lands surrounding the WV NWR Refuges (W.L. Finley, Ankeny, Baskett Slough) by enumerating both the number of unique land owners securing hunting tags for their properties and the total number of landowner tags purchased for hunting elk on these private properties in 2008-2012. During this five year time frame, the number of landowner tags purchased approximately doubled from 35 tags in 2008 to 66 tags in 2012. Similarly, the number of unique landowners that utilized the LOP program to facilitate hunting of elk on their properties in the home ranges of the WVNWR herds increased from 23 unique landowners in 2008 to 44 unique landowners in 2012. This doubling of landowners allowing elk hunts and doubling of LOP elk tags purchased in this area is likely due to the fact that elk populations have increased in number and expanded their range and potentially indicates that increased damage to agricultural properties is occurring. ODFW will be working on a better tracking system to document elk damage and harvest in the Finley area.

2.4 Willamette Valley Wildlife Management Unit Harvest Information

Hunting is the primary tool that ODFW uses to address elk damage to agricultural lands in the Willamette Valley. As noted earlier, ODFW elk hunts changed multiple times since 1998 to address expanding elk herds and ongoing agricultural damage. Table 3 reflects both the controlled elk either-sex and antlerless elk harvest within the entire Willamette WMU from Eugene to the Columbia River. Other than between 2005-08, harvest data specific to the W.L. Finley NWR herd is not available to measure impacts to the W.L. Finley NWR herd.

Another factor influencing the elk population size in the Willamette- WMU is that many landowners/designated hunters selectively harvest bulls with either sex tags. The ODFW has been encouraging tag holders to harvest the antlerless elk, to effectively regulate the size, composition, and density of the local elk population. Management emphasis on reducing numbers of antlerless elk should be used to control herd size to limit damage. The ODFW will continue to explore options that emphasize changes in elk tags and bag limits in the Willamette Valley to focus the harvest of cows. The harvest of cows will help maintain a cap on elk population in the Willamette EDA.

2.5 Current Population Status and Trends

Annual population inventories are conducted by ODFW to monitor the status of Oregon's elk herds. These inventories in NW Oregon are conducted during February, when elk are concentrated in habitat openings including agricultural lands, clear cuts, and floodplain habitat. This survey timeframe ensures that the data are collected prior to the bulls shedding their antlers. Herd composition data is collected via helicopter aerial surveys, with the observed elk classified by age (calf, yearling, adult and if male, by antler class) and sex. The GPS location of each elk herd is recorded. Data from herd counts and sex/age composition are entered into a POP II computer program to model the population dynamics of the herd.

Aerial surveys were conducted on W.L. Finley NWR in 2009, 2011, and 2013 (Table 1). These surveys indicate that elk populations have been stable to slightly increasing through time. In February 2013, 163 total elk were observed on the W.L. Finley NWR, with a bull/cow ratio of 17/100 and a calf/cow ratio of 33/100. Small herds of elk were also observed on the 2013 survey east of Ankeny NWR and north of Baskett Slough NWR, but none specifically on Refuge lands. The ODFW did not survey other WVNWR lands including the Snag Boat Bend Unit near Peoria or Oak Creek near Lebanon.

A majority of the W.L. Finley NWR elk herds spend their time within the Willamette WMU, with concentrations centered on the Refuge itself. There is, however, limited seasonal movement of elk between the Willamette WMU and the adjacent Alsea WMU to the west. This movement is most frequently related to hunting pressure in the Alsea WMU, as well as movement of elk during the breeding season in the early fall.

Since the mid-1990s, the elk population estimate for the Willamette Valley has risen from less than 100 to a minimum of 600 (ODFW population modeling). Elk populations near the three federal Willamette Valley Refuges have been steadily increasing for several reasons:

- 1) The agricultural lands near and adjacent to the Refuges produce highly nutritious and palatable forage which the elk preferentially seek out, including corn, grass seed crops, and wheat.
- 2) Research indicates that when forage availability and nutrition are high, Roosevelt elk fecundity rises (ODFW Report 1987). Subsequently, when the cows' nutritional status is high enough, they can conceive in successive years.
- 3) As elk have expanded locally in western Oregon, some have emigrated from adjacent wildlife management units to the Willamette WMU, where they quickly learn which areas within their new home range has minimal disturbance from hunting or harassment.
- 4) To date the WVNWR has not allowed elk hunting on Refuge lands, in effect creating a sanctuary. W.L. Finley NWR is large enough to sustain a herd within refuge boundaries. This is not the case at Ankeny and Baskett Slough NWR,

where, due to smaller refuge acreages, less suitable habitat, and substantial adjacent private lands without disturbance, the elk are more transitory and do not concentrate solely on refuge lands.

When the expanded season was implemented in 2002, a majority of the harvest for the first few years was large branch-antlered bulls. Generally local landowners have continued to favor harvesting bulls over cows. Over time the number of large bulls in the W.L. Finley NWR herd has declined such that it is presently dominated by cows and young bulls (see Table 1). The lack of mature bulls within the herd may be influencing movement and herd dispersal during rut as compared to 10 years prior. In the last three years, W.L. Finley NWR elk appear to remain in larger herds through Sept-Oct., rather than splitting up and dispersing when large bulls were more abundant. In addition, there appears to be less movement off Refuge during rut (and potentially other times of year), consequently providing reduced opportunities for off-Refuge harvest than 5-10 years ago.

Chapter 3. Goals/Objectives/Strategies

To ensure both high quality elk viewing opportunities on the Refuge and increase the opportunity to harvest a large bull for a very limited number of hunters in the Willamette Valley, it is desirable to shift the age class distribution to increase the representation of older bulls in the population while reducing total population size. Studies on Roosevelt elk completed in the Tioga Wildlife Management Unit lead to recommendations of six older bulls (two years old and older) per 100 cows for optimum level of herd fitness (ODFW 1987). Maintaining a higher proportion of bulls 3 years of age and older will ensure that the herd health and fitness are preserved, however additional harvest may be necessary if productivity increases.

The Willamette WMU does not have a population management objective or a targeted ratio for bulls/cows. However, to achieve more mature bulls for viewing and enhance herd health and fitness, which are management objectives for W.L. Finley NWR, a harvest management strategy should be implemented that increases the representation of older aged bulls in the population. It will be important to monitor the age class distribution of bulls considering the interest of the Refuge, general hunting public, and the landowners.

Goal 1. Manage for elk population levels compatible with WVNWRC purposes, adjacent land use practices and current habitat conditions.

Objective 1.1. Work cooperatively with ODFW and local landowners to establish target elk herd sizes within/adjacent to each Refuge.

Strategy 1.1. Set target elk herd sizes for each of the three WVNWRC refuges based on current knowledge of elk biology, home range, compatibility with adjacent land use, and public use objectives.

Objective 1.2 Work cooperatively with ODFW to identify and implement measures needed

to achieve target herd size identified under Objective 1.1. For the W.L. Finley NWR elk herd, implement measures to reduce the herd size (160 in 2012) by 20% within 5 years. Review this objective after 5 years and modify if needed to address damage.

Strategy 1.2a. Emphasize harvest opportunities on antlerless elk to limit/reduce herd recruitment as needed to achieve target herd size and minimize damage.

Strategy 1.2b. Consider providing limited elk hunting opportunities on W.L. Finley NWR in coordination with antlerless hunts off refuge to contribute to achieving target elk herd size, as compatible with Goals 2 and 3.

Objective 1.3. Identify and implement scientifically based monitoring strategies for measuring population trends, herd ratios, damage level, animal distribution, and hunting success.

Strategy 1.3a. Collect and summarize off-Refuge damage complaint information by time of year, type of damage (agricultural crop, tree plantings, or structural), and location including herd source.

Strategy 1.3b. Collect and summarize information regarding damage control efforts by specific zones including emergency hunts, kill permits, and hazing permits.

Strategy 1.3c. Collect and summarize elk hunter success by specific zone and county, including issued landowner preference tags.

Strategy 1.3d. Collect and summarize herd information using periodic ground counts at W.L. Finley NWR and annual aerial surveys over all WVNWRC Refuges each winter.

Rationale. Since the mid-1990s, the elk population for the Willamette Valley has risen from less than 100 to the current estimate of over 600. Elk populations near the three federal Willamette Valley refuges have increased over the past decade, including the largest elk herd that is associated with W.L. Finley NWR. Complaints from the agricultural community regarding crop damage from elk have continued. Hunting is the primary tool that ODFW uses to address elk damage to agricultural lands in the Willamette Valley. The ODFW actively pursues cooperative solutions with the landowners and land management agencies as resolution of damage situations require cooperation from multiple landowners. Through cooperative management, balanced population levels can produce multiple objectives: wildlife viewing, education, and reduced damage to adjacent landowners. There is a need to set herd size objectives and that strategies include Refuge lands to meet both the population targets as well as other goals.

Monitoring is critical to evaluate status, employ adaptive management strategies to adjust to changing conditions, and to measure progress towards achieving objectives such as herd size, reduced damage, etc. In addition, if herd size is reduced, it is important to be able to relate it to corresponding changes to damage (as measured through damage complaints) in type, location, and source. This information can also be used to fine tune specific strategies and locations where additional actions are needed related to elk issues, such as changes in hunting regulations.

Goal 2. Manage for healthy Refuge elk populations with a balanced age distribution and bull/cow ratio within the WVNWRC.

Objective 2.1. Maintain bull/cow ratios that achieve a balanced age class distribution for herd health, provide high quality elk viewing opportunities on the Refuge, and enhanced bull hunting experiences for a very limited number of hunters off-Refuge within the next 5 years. Within five years, the target bull/cow ratios for the W.L. Finley NWR herd will be 6-8 mature bulls (3 years or older) per 100 cows.

Strategy 2.1a. Emphasize harvest opportunities on antlerless and spike elk to maintain a higher proportion of mature bulls and a healthy bull/cow ratio.

Strategy 2.1b. Limit harvest of branch-antlered bulls associated with the W.L. Finley NWR herd to balance the age distribution and increase both the ratio and size of bulls and meet the desired objective.

Rationale. To ensure both high quality elk viewing opportunities on the Refuge and enhanced bull hunting experiences for a limited number of hunters in the Willamette Valley, bull age class distribution should be shifted to increase the number of older bulls in the population. The goal for a healthy bull ratio should include a minimum of 6 mature bulls per 100 cows with adequate carryover of younger age class bulls to maintain the objective. This age class distribution will ensure that the herd health and genetics are preserved. It is assumed there will be no net increase in the total number of bulls and the bull ratio will improve as the number of cow elk in the population is reduced. Fewer breeding cows result in lower recruitment. Refuge and ODFW staff look at season structure and bag limits that improve the ratio of mature bulls while reducing total herd size to address damage.

Goal 3. Maintain and enhance quality wildlife-oriented recreational and educational opportunities (elk viewing, hunting) at W.L. Finley NWR.

Objective 3.1. Provide year-round opportunity for wildlife viewing and photography for a majority of visitors to W.L. Finley NWR.

Strategy 3.1a. Continue to promote elk viewing on W.L. Finley NWR with observation pullouts, interpretive signage, public information, and habitat management.

Strategy 3.1b. Consider providing limited elk hunting opportunities on-Refuge that are compatible with Goals 1 and 2.

Rationale. Wildlife observation is a primary public use of National Wildlife Refuges, and the major visitor activity that occurs on the Willamette Valley Refuges. High quality wildlife observation opportunities are provided on the WVNWRC with observation structures, auto tour routes, vehicle pull-outs and trails. Elk viewing and photography on W.L. Finley NWR are two of the most popular public use activities on the refuge. Information regarding recent elk sightings is one of the most common requests from visitors. Viewing of large bull elk is an important component of wildlife observation on the Refuge. It is assumed that most bull elk greater than 3 years of age will be 5 point or larger and achieve the goal for viewing large bulls. Hunting is one of the “Big Six” wildlife dependent public uses that is allowed on National Wildlife Refuges. At present, the only hunting allowed on WVNWRC is deer hunting at W.L. Finley NWR.

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ODFW (Oregon Department of Fish and Wildlife). 1987. Ecology and Management of Roosevelt Elk in Oregon.

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Table 1. Summary of ODFW Aerial Elk Survey on W.L. Finley NWR, Benton Co., OR

Finley Area Elk Herd Comp Summary

Year	Unit	Subunit	Unit Name	Bulls			Bulls	Cows	Total			Per 100 Cows	
				Small	Medium	Large			Calves	Elk	Unclass	Bulls	Calves
2009	15	Finley	Willamette	9	1	0	10	103	26	139	0	10	25
2011	15	*N of Finley	Willamette	3	0	0	3	13	8	24	0	23	62
2011	15	Finley	Willamette	6	1	0	7	82	25	114	0	9	30
2013	15	Finley	Willamette	13	5	0	18	109	36	163	0	17	33

* elk detected off of Refuge lands

Table 2. ODFW Wildlife Management Units with Elk Management Objective and Bull Ratios

Wildlife Management Unit	Management Objective	Bull Ratio
Alsea	6500 (never adopted)	10 bulls/100 cows
Stott	1500	10 bulls/100 cows
Santiam	5200	10 bulls/100 cows
Willamette	EDA	EDA

Table 3. Willamette WMU Elk Hunting and Harvest Information 1998-2012. Source: ODFW files

Willamette Unit elk tags, hunters and harvest, 1998 - 2012.

Year	Hunt# (a)	Tags Auth (b)	Tags Sold (c)	# Hunters	Harvest	
					Cows	Bulls
1998	215	20	17	9	2	0
1999	215	30	35	28	5	0
2000	215	31	41	34	16	0
2001	215	33	48	37	9	0
2002	215	33	64	60	8	18
2003	215A	111	163	127	15	31
2004	215A	111	141	116	7	26
	215B	50	17	15		0
2005	215A	110	162	110	18	16
	215B	33	22	10	3	0
2006	215A	110	176	149	19	24
	215B	33	24	21	11	0
2007	215A	110	194	162	16	23
	215B	33	23	20	3	0
2009	215A1	110	193	189	15	46
	215A2	50	42	98	26	0
2008	215A	110	218	152	18	26
	215B	150	126	36	13	0
2010	215A1	110	199	175	12	32
	215A2	162	151	114	26	0
2011	215A1	109	236	180	16	48
	215A2	165	151	123	35	0
2012	215A1	107	232	178	25	37
	215A2	165	161	117	24	0

215A either sex tags
215B controlled antlerless hunt Finley area only

215A1 either sex tags
215A2 antlerless hunt entire Willamette Valley

A= hunt # in the Oregon Big Game Regulations.
Note that from 1998-2003 the hunt was for either sex elk. (215) In 2004, 215A= either sex elk, 215B was for cow elk tags in the Finley Area. In 2009, the cow damage hunt area was increased from the Finley area

B= tag #s authorized in the Oregon Big Game Regulations

C= Tags sold including recreational hunters and Willamette Valley landowners (>40 acres) experiencing elk damage

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Appendix B

**Elk Hunting Plan
for the Willamette Valley National Wildlife
Refuge Complex**

UNITED STATES FISH AND WILDLIFE SERVICE

November 2013

Recommended by _____ Date: _____
Project Leader

Reviewed by _____ Date: _____
Refuge Supervisor

Concurrence by _____ Date: _____
Regional Chief, NWRS

Approved: _____ Date: _____
Regional Director

B.1 Introduction

The Willamette Valley National Wildlife Refuge Complex (WVNWRC) 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 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.

The hunt programs addressed in this plan specify the hunt features (spatial layout, timing, types of hunts, etc.) to be included for consideration in Preferred Alternative B of the WVNWRC Elk Management Plan EA. Under this proposal, elk hunting would only be considered on W.L. Finley NWR. A detailed analysis of effects of this proposed hunt program is found in the Compatibility Determinations for Elk Hunting (Appendix C).

B.1.1 Species Covered By This Plan

The species listed below have populations sufficient to allow for recreational harvest. No commercial harvesting of wildlife or use of hunting guides would be allowed to assure continued healthy populations and general public opportunity.

- Roosevelt elk (*Odocoileus hemionus*).

B.1.2 Other Game Species Hunted

Hunting of other game species on WVNWRC is approved with restrictions on W.L. Finley NWR (deer) and Baskett Slough NWR (ducks, geese). No other hunting is allowed.

B.2.1 Conformance with Statutory Objectives

Any use of a national wildlife refuge must be compatible with resource protection and conform to applicable laws, regulations, and US Fish and Wildlife Service (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.”

B.2.2 Conformance with Refuge Purposes

Conformance of refuge uses with refuge purposes is determined through a formal compatibility determination process. Compatibility means that the use would not materially interfere with or detract from the fulfillment of the purposes of the refuge(s) or mission of the NWRS (See the compatibility determination in Appendix C for more detail).

B.3 Statement of Goals and Objectives

B.3.1 Refuge Goals

Thirteen goals were developed for the Willamette Valley Refuges during the 2011 Comprehensive Conservation Planning process. Two of these relate to implementation of the Elk Management Plan:

1. Provide compatible, wildlife-dependent recreation opportunities for visitors, fostering appreciation and understanding of the refuges’ fish, wildlife, plants, and their habitats.
2. Collect scientific information (inventories, monitoring, research, or scientific assessments) necessary to support refuge management.

<i>Aspect</i>	<i>Description</i>
<i>Location</i>	<i>W.L. Finley Refuge. Finley Main Unit, selected locations (See Map 1). The actual areas open in each year would be subject to change depending on progress towards elk management objectives and management discretion. Year by year maps would be made available to the public at the Refuge and on the Complex website.</i>
<i>Season</i>	<i>From the opening day of the ODFW elk season for the 215A2 Willamette Plus #2 Tag, generally August 1st through October 31st.</i>
<i>Sex</i>	<i>Antlerless Only</i>
<i>Weapon Type</i>	<i>Archery, Muzzle Loader, Shotgun with slugs</i>

<i>Fees</i>	<i>None</i>
<i>Days/Week</i>	<i>Seven</i>
<i>Permits</i>	<i>Five permits will be issued for each of the 3 hunts for a total of fifteen hunters the first year. Hunters would be selected through a drawing prior to the hunt dates (See section on application procedures). Only archery hunting will be allowed the first year. Harvest results and herd size will be monitored to determine permit numbers and weapon types allowed in future hunts.</i>
<i>Other hunt regulations</i>	<i>All hunters must have a valid state hunting license and a general archery elk tag or 215A2 Willamette Plus #2 elk tag (antlerless only) or comparable tag. Other hunt regulations per state (ODFW) rules apply.</i>

B.4. Proposed Hunt Program

B.4.1 Justification for a Permit-Only Hunt Program

The small size of W.L. Finley NWR creates the need for a permit program to carefully control any harvest of elk, avoid conflicts between hunters and potential safety issues. An established number of permits would allow desired hunter density, so as to provide un-crowded and safe hunting conditions.

B.4.3 Procedures for Consultation and Coordination with ODFW

Service staff will coordinate with ODFW staff regarding annual hunt season dates, areas open to hunting, etc. The Service would request that ODFW publish information on the refuge elk hunt annually in the State hunting regulations.

B.5 Measures Taken to Avoid Conflicts with Other Management Objectives

B.5.1 Measures to Avoid Biological Conflicts

The timing and location of the elk hunt are designed so as to avoid disturbance to waterfowl, especially geese. Existing sanctuary areas will be honored for the full wintering period (November 1-March 31).

B.5.2 Measures to Avoid Public Use Conflicts

Various aspects of the proposed hunt programs, including temporal restrictions and spatial restrictions, combined with the seasonal nature of recreational activities on the refuges, would

reduce the potential for conflict. 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 to archery only and short range weapons (muzzle loader or shot guns with slugs) for the elk hunt program reduces the risk of third- party injury. The limitation to archery only in Zone 2 will reduce the potential safety risks associated with firearm hunting in proximity to the headquarters and the heavily used mill hill trail.

B.5.3 Measures to Avoid Administrative Conflicts

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 allows 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 program will require minimal reprogramming of existing resources.

B.6 Assessment

B.6.1 Compatibility with Refuge Objectives

Hunting is one of the six wildlife-dependent recreational uses included in the National Wildlife Refuge System Improvement Act of 1997. Conducting a well-managed hunt on W.L. Finley Refuge would assist the Refuges in meeting one of the Refuge System's primary goals (providing the public opportunities to participate in compatible wildlife-dependent recreational programs.)

Compatibility with other refuge programs is addressed below.

B.6.2 Biological and Other Considerations

Roosevelt Elk

Potential effects of elk hunting to target populations, non-target species, listed species, refuge habitats, and other public use programs are summarized in Table G-6. Section G.5 examines measures to avoid conflicts with other resources. See also the Compatibility Determination for Elk Hunting (Appendix C).

B.6.3 Funding and Staffing Requirements for the Hunt

The proposed elk hunt program at W.L. Finley Refuge would require staff time to coordinate and implement the hunt. Approximately \$2,000 in one-time costs are projected, and the total annual cost to administer the hunt with the changes proposed is projected to be approximately \$3,000 per year. There are currently enough funds in refuge operations to implement this program.

Table B-6. Anticipated Effects of the Elk Hunt

Effects	Conclusion*
Effects to target populations	Negligible; unlikely that more than 10 elk would be taken annually which equates to 6% of the 2012 ODFW elk population estimate for the W.L. Finley Herd in the Willamette Unit, which has an estimated reproductive rate of 35 calves/100 cows.
Effects to non-target species	Negligible to minor. Hunting occurs outside of the migratory bird 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 elk hunt is designed to avoid disturbance to waterfowl, especially geese.
Effects to refuge habitats	Approximately 95% of W.L. Finley Refuge would be open to hunting. However, because elk hunting is expected to remain a low intensity use with 15 - 25 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 95% of Finley's main unit would be open for hunting during archery season. Hunting has the potential to disturb Refuge visitors engaged in other priority public uses such as wildlife viewing and photography. However, the potential for conflict should be minimized for several reasons; the limited number of elk hunters allowed on the refuge at any one time (5); the fact that elk hunting activity will most often occur in wooded areas less frequented by other users; and archery hunters rely on stealth and camouflage, such that their presence may be unnoticed by other public users. In addition, elk hunting will only occur for three months of the year. As with most of the deer season, other visitors would not be precluded from using areas where elk hunting may occur. Safety problems as a result of overlapping public uses are not anticipated.

* (see Elk Hunting Compatibility Determination and EA for more detail).

B.7 Conduct of the Hunt

The timing, location, weapon type, and number of permits for this hunt have been designed to assure a quality hunt that will provide for the safety of visitors and the accommodation of other Refuge visitor uses. The Refuge elk hunt will be divided into 3 separate time periods.

Hunt #1 will be an early August hunt that corresponds to the start date of the ODFW's Willamette Plus #2 elk season and will be open until the start of the ODFW's general archery season (usually August 24th). Only holders of a Willamette Plus #2 tag or comparable tag may apply for Hunt #1.

Hunt #2 will be a general archery hunt with a restricted bag limit of one antlerless elk that corresponds with ODFW general archery season. Only holders of a general archery elk tag may apply for this hunt.

Hunt #3 will start the day after the general archery elk season closes and will run through October 31st. Only Willamette Plus #2 tag holders or comparable tag will be considered for this hunt. Hunters applying for Hunt #1 and Hunt #3 will be asked to indicate their order of preference on their application.

Only successful applicants will be contacted and will be issued a special use permit to hunt elk on the Refuge during the specific dates and locations for their hunt. They will be provided a map and specific information about Refuge rules, parking areas, and open hunt areas. They will be required

to check in at a hunt kiosk prior to hunting each day and to complete a hunt information card at the end of each days hunt.

B.7.1 Anticipated Public Reaction to the Hunt

The existing deer hunting program at W.L. Finley NWR is generally accepted locally and does not typically generate anti-hunting controversy. Many of the deer hunters on Finley in 2013 were very complimentary about the program and we did not receive any public complaints about the hunt. 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. Some members of the public voiced objections to some or all of the hunts as proposed within the CCP. Elk on Finley Refuge are often sought out by visitors and photographers. It is anticipated that some members of the public will express opposition that the Service is considering elk hunting on W.L. Finley NWR and will express concern that hunting will reduce opportunities to view and photograph elk. We are working closely with the Oregon Department of Fish and Wildlife towards an objective of having more mature bulls in the Finley herd in an effort to meet our objectives of elk herd quality and better viewing/photographing opportunities of big mature bulls.

B.7.2 Hunter Application Procedures

Oregon Department of Fish and Wildlife conducts an annual application for Big Game controlled hunts with a deadline in mid may. These hunts include Hunt #215A2, Willamette Plus No.2 for antlerless elk only in Hunt unit 15 which includes the W. L. Finley Refuge. ODFW will include a note in future Big Game Regulations to advise applicants that hunting on W.L. Finley NWR requires an elk hunting permit from the Refuge.

In late June or early July, after ODFW's controlled elk tag notifications have been sent to successful applicants, the Refuge will publicly announce an opportunity for hunters to apply for a Finley Refuge antlerless elk permit via the Refuge's web site. Only hunters that hold a valid state hunting license and a general archery elk tag or 215A2 Willamette Plus #2 elk tag (antlerless only) or comparable tag will be eligible to apply for a Refuge elk permit. Successful applicants will be notified a week prior to the opening of the Refuge elk season (anticipated to be Aug 1st).

B.7.3 Description of Hunter Selection Process

Permits will be limited entry drawn from applicants that possess a General Archery Elk tag or a 215A2 Willamette Plus #2 elk tag (antlerless only) or comparable tag. Five permits will be issued for each of three separate hunts in year one and the number of permits will be adjusted from year to year depending on progress towards the goals and objectives identified in the elk management plan.

B.7.4 Media Selection for Publicizing the Hunt

Newspapers and television stations throughout Oregon will be provided copies of an annual news release covering the hunts. Descriptive maps and hunt regulation information will be dispensed at refuge offices, brochure boxes at refuge parking lots, and will be available online at the refuge web site.

B.7.5 Description of Hunter Orientation

Elk hunters at Finley would be required to complete a Big Game Harvest Report at designated self-serve hunt kiosks where hunt maps and regulations would be available.

B.7.6 Hunter Requirements and Regulations

- (1) Allowable equipment: Elk hunters may use portable or climbing tree 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) Open fires are not allowed.
- (3) License and permits: A valid current ODFW Hunting License is required along with appropriate tag (either general archery or Willamette Plus #2 tag or comparable tag). A Finley Refuge hunting permit will be required. The license requirements are those required by the State of Oregon.
- (4) Reporting harvest: Elk hunters would be required to complete a Big Game Harvest Report at designated self-serve kiosks where hunt maps and regulations would be available.
- (5) Hunter safety requirements: Wearing hunter orange is required for youth hunters as per State regulations.
- (6) Archery elk hunting would be allowed on designated dates from ½ hour before sunrise until ½ hour after sunset.
- (7) Archery equipment must meet ODFW regulations.
- (10) No overnight camping or after-hours parking is permitted on the refuge.
- (11) No hunting is permitted from refuge structures, observation blinds, boardwalks, etc.
- (12) All vehicles must remain parked in designated areas.

Appendix C

Compatibility Determination for Elk Hunting on W. L. Finley NWR

RMIS Database Use: Hunting (big game)

Refuge Name: William L. Finley National Wildlife Refuge

Establishing and Acquisition Authorities:

- Migratory Bird Conservation Act of 1929, 16 U.S.C. 715 et. seq

Refuge Purposes - William L. Finley Refuge:

“for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.”
(Migratory Bird Conservation Act of 1929, 16 U.S.C. 715 et. seq.).

Additional detail on the purposes of this Refuge may be found in Chapter 1 of the Final CCP/EA (USFWS 2011).

National Wildlife Refuge System Mission: “The mission of the [National Wildlife Refuge] System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use:

Under Alternative 2 (Preferred) of the WVNWRRC Elk Management Plan EA, an elk hunting program would be implemented at W.L. Finley Refuge. Implementation of the elk hunting program is described within Appendix B. (Elk Hunt Plan) of the EA. Key features of the use would be as follows:

- Archery hunting would be allowed at the W.L. Finley main unit (Benton County) from approximately August 1 until approximately October 31. Approximately 95 percent of the Refuge will be available for hunting during this season.
- Antlerless only (cow elk) harvest will be allowed.
- Permits will be limited entry drawn from applicants that possess a General Archery Elk tag or a 215A2 Willamette Plus #2 elk tag (antlerless only).
- Five permits will be issued for each of three separate hunts, an early August hunt, a general

archery hunt (late August – late September to correspond with ODFW general archery season), and a late September – October 31st hunt for a total of 15 permits.

- Results of the hunt and status of the population and associated management objectives will be monitored annually and adjustments to tag numbers, weapon type, and length of season will be considered to better meet objectives.

Table C-1. Costs associated with Elk Hunting Use

Proposed Activity or Project	One Time Expense (\$)	Recurring Expenses (\$/year)
Administer elk hunt		\$2,000
Develop new publications and signage	\$2,000	\$1,000
Totals	\$2,000	\$3,000

Note: recurring expenses include estimated annual salary, benefits/expenses for recreation and maintenance personnel involved in administering program.

The use would take place in all Refuge habitats. The number of users expected to engage in this use annually is estimated at 15 to 25. There will be a maximum of 5 elk hunters allowed at any one time on the Refuge.

Like other Refuge users, elk hunters rely on roads, parking lots, pulloffs, trails, and dikes while using the Refuge. Two sign-in stations will be seasonably available for hunters to complete Refuge hunting permits.

Availability of Resources: Estimated costs for operating the elk hunting program as envisioned under Alternative 2 and described in the Elk Hunt Plan (Appendix B) are displayed in the following

There are currently enough funds in Refuge operations to carry out this program.

Anticipated Effects of the Use:

Impacts to Target Wildlife: Direct mortality to elk associated with the hunt would result. Some wounding could occur. Disturbance to the elk herd may result in increased movement off-refuge, where additional hunting occurs that could increase harvest opportunities. Harvest as a result of elk hunting removes a small amount of prey from the prey base for predators such as mountain lions.

Elk populations and elk hunting are managed by the Oregon Department of Fish & Wildlife (ODFW). Annual elk 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. Specifically, annual winter aerial elk surveys are conducted by ODFW on W.L. Finley NWR.

W.L. Finley NWR lies within ODFW-designated Willamette Hunt Unit. The harvest of elk in Willamette Unit from 1998-2012 is listed in Appendix A-Table 3 of the Elk Management Plan. The most current population estimate, based on an ODFW aerial survey in February 2013, was 163. Prior to this proposal, elk hunting has not been permitted on the WVNWR Complex. Under the Elk Management Plan EA Appendix A and Hunt Plan Appendix B, the number of hunters visiting W.L. Finley Refuge would potentially be the same as the number of permits offered which will be 15 in year one and not exceed 25 in future years. No potential harvest was projected. However even if hunter success was 100% (one elk harvested for each of the 15 permits), this would equate to less than a 10% reduction in the Finley elk herd. This would reduce the reproductive capacity of the herd in future years and move us closer towards the plans 5 year objective of a 20% reduction in the number of elk.

Effects to Habitats: Foot travel associated with elk hunting could potentially result in temporary and minor vegetation trampling. Based on past history from deer hunting allowed on W.L. Finley NWR, and since elk hunting would involve fewer numbers of hunters, this effect would likely have a negligible impact.

Effects to Non-target Wildlife: Non-target wildlife would include non-hunted migratory birds such as geese, ducks, 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 elk hunt are designed so as to avoid disturbance to waterfowl, especially geese. Existing sanctuary areas will be honored for the full wintering period (November 1-March 31).

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. A limited number of hunters may cause minor disturbances to non-target species because of the movement and vehicular traffic used for this activity.

Elk hunters walking in close proximity to wetlands can result in behavioral responses by waterfowl and other wetland birds. Portions of the Refuge open to elk 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 additional impacts

to waterfowl or waterbirds would be expected beyond what already occurs from current permitted public uses.

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 elk hunt seasons proposed under Alternative 2, but would also be likely minor because of the low number of hunters that would be permitted, and the limited time period within which elk hunting is being proposed.

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 pass through the area for short periods of time. Elk hunting would occur during September and October when these species are migrating; however, hunter interaction would be commensurate with that of non-consumptive users.

Effects 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. Elk 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.

Effects to other priority public uses: Hunting has the potential to disturb Refuge visitors engaged in other priority public uses such as wildlife viewing and photography. However, the potential for conflict should be minimized for several reasons; the limited number of elk hunters allowed on the refuge at any one time (5); the fact that elk hunting activity will most often occur in wooded areas less frequented by other users; and archery hunters rely on stealth and camouflage, such that their presence may be unnoticed by other public users. In addition, elk hunting will only occur for three months of the year. As with most of the deer season, other visitors would not be precluded from using areas where elk hunting may occur. Safety problems as a result of overlapping public uses are not anticipated.

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.

Big game hunting could have an effect on the wildlife observation and photography programs. During the period of year that the elk hunting is occurring, it is possible that wildlife observation/photography opportunities could decrease, as the elk become more wary and move away from human activity. It is also possible that elk hunting activity could result in the herd splitting up into smaller groups and even temporarily moving off the Refuge entirely.

Other Effects: Elk hunting may occur within any of the three designated Research Natural Areas (RNAs) on the Refuge. Elk hunting is not expected to threaten serious impairment of research or education values in the RNAs or elsewhere on the Refuge.

Public Review and Comment: Public review and comment on the Elk Management Plan, which includes the potential for implementation of elk hunting, was allowed for a 30-day period with the draft EA.

Determination:

- Use is Not Compatible
 Use is Compatible with the following stipulations

Stipulations Necessary to Ensure Compatibility:

- The number of elk hunters on the Refuge at any one time will be limited to 5.
- In an effort to meet elk population objectives while also maintaining healthy herd bull/cow ratios and mature bulls for viewing and photography, no bull elk harvest will be allowed on the refuge.
- Camping, overnight use, and fires will be prohibited.

Justification: Under the National Wildlife Refuge System Administration Act, as amended, hunting is a wildlife dependent recreational activity which is to be encouraged on national wildlife refuges if compatible with refuge purposes. Considering the direct and indirect impacts associated with sport hunting, elk populations may be slightly affected by the hunting program on the Refuge. Elk population objectives and allowable harvests are determined by the State of Oregon. Limited hunt seasons at the Refuge and established winter sanctuary ensure that elk, as well as non-target species, can find adequate areas for food and rest areas even in the midst of the hunting season. Elk hunting can provide visitors with the joy of experiencing wildlife on their public lands, and as such, help fulfill the mission of the National Wildlife Refuge System. Thus, allowing elk hunting to occur under the stipulations described above will not materially detract or interfere with the purposes for which the refuge was established or the refuge mission.

Mandatory Reevaluation Date:

09/2026 Mandatory 15-year reevaluation date (for wildlife-dependent public uses)

NEPA Compliance for Refuge Use Decision:

X Environmental Assessment and Finding of No Significant Impact

DRAFT

Elk Hunting Compatibility Determination. Uses are compatible with stipulations.

Prepared by:

Signature Date

Approval

Refuge Manager/ Project Leader

Signature Date

Concurrence

Refuge Supervisor:

Signature Date

Regional Chief, National Wildlife Refuge System:

Signature Date

DRAFT

Appendix D. Determination of Effects to Federally Listed Species

Originating Person: Jonathan Beall, USFWS, Willamette Valley NWR Complex, Supervisory Wildlife Biologist, Corvallis, OR (541) 757-7236

Date: 5 November 2013

I. Region: 1

II. Service Activity: Implement WVNWRC Elk Management Plan

III. A. Listed Species and/or Their Critical Habitat

1. Within the action area that may be affected: None

2. Within the action area that will not be affected:

Bradshaw's desert parsley	<i>Lomatium bradshawii</i>
Kincaid's lupine	<i>Lupinus sulphureus</i> spp. <i>Kincaidii</i>
Nelson's checkermallow	<i>Sidalcea nelsoniana</i>
Willamette Valley daisy	<i>Erigeron decumbens</i> var. <i>decumbens</i>
Golden paintbrush	<i>Castilleja levisecta</i>
Fender's blue butterfly	<i>Icaricia icariodes fenderi</i>
Streaked horned lark	<i>Eremophila alpestris strigata</i>
Oregon Chub	<i>Oregonichthys crameri</i>

B. Proposed Species and/or Proposed Critical Habitat

1. Within the action area that may or may not be affected: None

2. Within the action area that will not be affected: None

C. Category 1 Candidate Species:

1. Within the action area that may or may not be affected: None

2. Within the action area that will not be affected: None

IV. Location

County and State:

- William L. Finley NWR, Benton County, Oregon
- Baskett Slough NWR, Polk County, Oregon
- Ankeny NWR, Marion County, OR

V. Rationale for No Effect Determination

The proposed project, implementing the WVNWR Elk Management Plan, plans no management actions or activity on Baskett Slough NWR or on Ankeny NWR other than monitoring. Therefore, no listed species will be affected on either refuge. The Fender’s blue butterfly is currently present only on Baskett Slough NWR.

Regarding Oregon chub, none of the proposed management actions would occur within chub habitat nor have any effect on Oregon chub.

Regarding the streaked horned lark, none of the proposed management actions would occur during the lark breeding season, such that nest trampling or disturbance would be an issue.

Regarding the five listed plant species (Kincaid’s lupine, Bradshaw’s desert parsley, Nelson’s checkermallow, Willamette daisy, and golden paintbrush) found on W.L. Finley NWR, they are past blooming and generally senesced at the time when trampling from foot travel could occur. In addition, any additional foot traffic that would occur as a result of this proposed project is minor compared to the foot traffic that occurs currently from existing public use on W.L. Finley NWR.

VI. Determination

No effect

This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. No concurrence from ESFO required.

CONCURRENCE

NONCONCURRENCE

_____ Date _____

Damien Miller, Project Leader, WVNWRC

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