Finding of No Significant Impact

Wapato Lake Unit Addition
Tualatin River National Wildlife Refuge
Washington and Yamhill Counties, Oregon

U.S. Department of the Interior
Fish and Wildlife Service
Region 1
Portland, Oregon

The U.S. Fish and Wildlife Service (Service) has completed the *Tualatin River National Wildlife Refuge Wapato Lake Unit Addition, Land Conservation Plan and Environmental Assessment*. The Environmental Assessment discloses the environmental consequences of protecting and restoring up to approximately 4,310 acres of fish and wildlife habitat in Washington and Yamhill Counties, Oregon, as the Wapato Lake Unit of the Tualatin River National Wildlife Refuge. The Land Protection Plan complements the Environmental Assessment by providing information on land acquisition priorities and management programs that could be implemented on the Refuge Unit addition.

The Service has selected Alternative D, the Preferred Alternative, for implementation because it best meets the Service's goals for the project which are to:

- Protect and restore a diversity of rare and native habitats and associated populations of fish, wildlife, invertebrate, and plant species.
- Protect, restore, and develop a diversity of habitats for migratory birds such as neotropical songbirds, wading birds, and shorebirds, with special emphasis on wintering waterfowl.
- Protect and restore floodplain benefits associated with the Wapato Lake wetland complex and Tualatin River Basin including water quality, flood storage, water recharge, and floodplain habitats.
- Protect, restore, and develop habitats for and otherwise support recovery of federally-listed threatened and endangered species and help prevent the listing of candidate species and species of management concern.
- Provide opportunities for high quality priority public uses of the National Wildlife Refuge System.

Summarized below are the reasons why the No Action Alternative and Alternatives B, C, and E were not identified as the Preferred Alternative:

- The No Action Alternative provides little likelihood that important wildlife habitats would be protected, restored, and managed.

- Alternatives B and C provide an opportunity for the Service to protect, restore, and manage the historic Wapato Lake lakebed, however, they provide minimal opportunity to protect and

restore meandering riverine channels and riparian forest habitat along steam banks. These Alternatives do not provide any protection to intact riparian habitat along the Tualatin River and existing wetlands which play an important role in the improvement of water quality, stream temperature regulation, and control of sediment erosion. Additionally, these two Alternatives lack the diverse habitat types that support a much wider range of resident and migratory fish and wildlife species.

- Alternative E allows the Service to provide much needed protection and restoration of habitat for migratory birds, anadromous fish, and other wildlife species. However, this Alternative includes property close to the city of Forest Grove which could expose the proposed Wapato Lake Unit to urban runoff, disturbances, trash, and vandalism problems. The Service determined that the risk of encroachment to the new Wapato Lake Unit is too high to justify selecting this Alternative as the Preferred Alternative. In addition, much of the land in the northern part of Alternative E is owned and managed by Metro and Clean Water Services, and will likely be restored under their wildlife habitat programs. Providing wildlife habitat is an important program for these public agencies, but unlike lands of the Refuge System, they do not have a wildlife first mission allowing for greater flexibility in program policies. These policies could provide a means for granting an easement to construct and maintain a proposed raw water pipeline of the Joint Water Commission presently being planned for routing across the Tualatin River floodplain from Highway 47 to Clean Water Services facilities south of Fernhill Wetlands. This project would be subject to review under the compatibility policy of the Refuge System if proposed as a new easement on lands owned and administered by the Service.

Public input was solicited throughout the entire planning process, including the decision-making process. The Service identified issues and concerns relating to the project through a public scoping period beginning in November and December 2001. During development of draft planning documents, planning updates were mailed to government agencies, interested citizens, community groups, and landowners seeking their participation in the planning process. As part of the public notice and review process, the *Tualatin River National Wildlife Refuge Proposed Wapato Lake Unit, Draft Land Conservation Plan and Environmental Assessment* was available for a 30-day review and comment period starting in April 2006. A public open house was held on May 4, 2006 in Gaston, Oregon, where Service employees were available to discuss the project, answer questions, and receive public comments. The public comment period concluded on May 31, 2006.

Comments received during the public review period indicate overwhelming public support for the Wapato Lake Unit addition to the Tualatin River National Wildlife Refuge. No additional analysis was required as a result of the comments received during the 30-day review period; responses to public comments were primarily to reiterate or clarify content in the public review document.

As described in detail in this EA, the proposed Wapato Lake Unit in concert with other Service, Metro, and Clean Water Services land and habitat protection efforts in the area, would have long-term cumulative benefits for wildlife and their habitats throughout the northern Willamette Valley. However, the benefits of land acquisition and associated habitat restoration and management would be limited in light of continuing development and commensurate loss of open space within the northern Willamette Valley. Thus, the proposed acquisition and management of lands in the Wapato Lake Unit as part of the National Wildlife Refuge System does not represent a significant impact on the human environment.

Based on my review and evaluation of the information contained in the supporting references, I have determined that protecting and restoring up to approximately 4,310 acres of fish and wildlife habitat in Washington and Yamhill Counties, Oregon, as the Wapato Lake Unit of the Tualatin River National Wildlife Refuge is not a major Federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969. Accordingly, the preparation of an environmental impact statement is not required.

This Finding of No Significant Impact (FONSI), the Environmental Assessment, and other supporting documents are available for public inspection upon request by contacting:
U.S. Fish and Wildlife Service, Division of Planning and Visitor Services, 911 NE 11th Avenue Portland, Oregon, 97232, and are posted on the Internet at http://www.fws.gov/pacific/planning.

Supporting Reference

U.S. Fish and Wildlife Service. July 2006. *Tualatin River National Wildlife Refuge Wapato Lake Unit Addition, Land Conservation Plan and Environmental Assessment*. Portland, Oregon.

Acting

Regional Director, Region 1

1/23/07
Date

Tualatin River National Wildlife Refuge Wapato Lake Unit Addition

Land Conservation Plan and Environmental Assessment

Washington and Yamhill Counties, Oregon

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February 2007

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CHAPTER 1. PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The U.S. Fish and Wildlife Service (Service) is the primary Federal agency responsible for conserving and enhancing the nation's fish and wildlife populations and their habitats. Although the Service shares this responsibility with other Federal, State, Tribal, local, and private entities, the Service has specific trust responsibilities for migratory birds, federally-listed threatened and endangered species, and certain anadromous fish and marine mammals. Service efforts over the last 100 years to protect wildlife and their habitats have resulted in a network of protected areas that form the National Wildlife Refuge System (Refuge System). This network of protected areas is the largest and most diverse in the world. Refuge System lands provide essential habitat for numerous wildlife species, wildlife-dependent recreational opportunities for the public, and a variety of benefits to local communities.

1.2 Proposed Action

The Service intends to establish the Wapato Lake Unit (Unit) Tualatin River National Wildlife Refuge in Yamhill and Washington Counties, Oregon. In this Land Conservation Plan and Environmental Assessment (LCP/EA), the Service describes the purpose and need for protecting the wildlife and habitat associated with the Wapato Lake Unit and analyzes the consequences of a range of alternatives for accomplishing the needed protection. This document was prepared in compliance with the National Environmental Policy Act of 1969 (NEPA).

1.3 Need for Action

Numerous species of shorebirds and marsh birds frequent the Wapato Lake area for foraging and resting during their spring and fall migrations. The Northern Pacific Coast Regional Shorebird Management Plan specifically identifies the need to acquire or protect agricultural and pasture lands adjacent to Wapato Lake as well as additional lands in the central and southern Willamette Valley to provide needed freshwater habitat for shorebirds (Drut 2000).

Riparian and wet deciduous swales of mixed deciduous/coniferous forest support breeding neotropical landbirds. American bald eagles, peregrine falcons, red-tailed hawks, northern harriers, American kestrels, black-tailed deer, and species of special concern including northern red-legged frogs and western pond turtles, use the wetland habitats in the Wapato Lake area.

Restoring the Wapato Lake Unit would improve habitat conditions for a number of native fish species. Endangered Species Act (ESA) listed anadromous species include Upper Willamette River Chinook salmon (*Oncorhynchus* tshawytscha*)*, and Upper Willamette River steelhead (*Oncorhynchus myki)*, both listed as threatened species (ODFW 2005). Coho salmon (*Oncorhynchus kisutch*) in the Tualatin River are not ESA listed although coho in the adjacent Clackamas River basin were for threatened status in 2005 (ODFW 2005). The historic range of Oregon chub (Oregonichtyys crameri), listed as endangered, included the Tualatin River, but they are now considered extinct in this basin (ODFW 2005). Other salmonids inhabiting the

Tualatin River are coastal cutthroat trout (*Oncorhynchus clarki*), and resident rainbow trout (*O. mykiss*) (Friesen and Ward 1995). Pacific lamprey (*Lampetra tridentata*) and Western brook lamprey (*Lampetra richardsoni*), both occur in the basin as do a number of native minnows (*Cyprinidae*) including redside shiners (*Richardsonius balteatus*), speckled dace (*Rhinichthys osculus*), and northern pike minnow (*Ptycochelius oregonensis*) (Friesen and Ward 1995). The Tualatin River is also occupied by many nonnative fish species including largemouth bass, black and white crappie, yellow and brown bullhead, and mosquito fish (Friesen and Ward 1995). Most of the nonnative introduced fish prefer warm water habitat, which becomes more prevalent within a basin as development and disturbance proceed. Although habitat preservation and restoration efforts may not preclude the presence of introduced species, it could be an important factor in limiting further spread within the basin.

The Wapato Lake Unit contains portions of the Tualatin River and tributary streams that are identified as rearing habitat for cutthroat trout, steelhead and resident rainbow trout, (ODEQ 2001). Given the location of the Wapato Lake Unit, stream and riparian restoration activities could link adjacent spawning habitat, and possibly extend the extent of spawning habitat available into the restored areas. In particular, the upstream location and extent of the Unit could, upon restoration, extend cold and cool water habitat further downstream in the basin resulting in improved conditions for resident and anadromous species, including the listed steelhead trout.

When flooded in the fall and winter, the Wapato Lake lakebed supports large numbers of tundra swans, mallards, pintails, canvasbacks, ring-necked ducks, lesser scaup, and Canada geese including lesser, Taverners, cackling, and Aleutian. A variety of other waterfowl species including Pacific white-fronted geese use the wetland complex as well. Overall, the Pacific Flyway annually winters almost 5.3 million ducks, geese, and swans (Trost et al. 2004); and the Wapato Lake area continues to be an important wintering ground for waterfowl, especially for tundra swan, in the Pacific Flyway. Thus, protection and restoration of the Wapato Lake lakebed and associated habitats would help maintain the duck, geese, and swan populations of the Pacific Flyway.

The Pacific Coast Joint Venture Implementation Plan (PCJVIP) (Roth 2004) specifically targets the extensive Tualatin River Basin floodplain and historic riparian areas for restoration in the vicinity of: Wapato Lake near Gaston, Oregon; Fernhill wetlands in Forest Grove, Oregon; Jackson Bottom wetlands in Hillsboro, Oregon; and the Tualatin River National Wildlife Refuge near Sherwood, Oregon. The PCJVIP goals for these restoration areas are to restore native plant communities and hydrology and to protect, restore, and develop a diversity of habitats for migratory birds, including songbirds, wading birds, shorebirds, wintering waterfowl, and resident and anadromous fish. The PCJVIP further states that Wapato Lake, located at the headwaters of the Tualatin River Valley, was historically one of the most important waterfowl sites in Willamette Valley and is still used extensively in the winter by dabbling ducks, Canada geese, and swans. Additionally, the PCJVIP concludes that the Wapato Lake lakebed, approximately 1,000 acres, has high potential for wetland restoration. The PCJVIP recommends the Service

pursue establishing a new national wildlife refuge unit in the historic Wapato Lake area and restoring wetlands and riparian habitats.

1.3.1 Background

Historically, seasonal flood waters from the Tualatin River filled the Wapato Lake basin creating Wapato Lake. Wapato Lake had a surface area of about 1,500 acres and held water to a shallow depth through most of the year (Baar and Cunningham 1920). Wapato Lake soils contain an organic peat substrate that once supported a scrub-shrub wetland community. The wapato plant, (*Sagittaria latifolia*), dominated the stands of seasonally flooded herbaceous plants in the upper marsh areas. Oregon ash riparian hardwood forests historically occupied floodplains adjacent to streams and the Tualatin River.

In the mid-1930s, local landowners formed the Wapato Improvement District (WID). The WID constructed ditches, dikes, and drainage tiles to drain Wapato Lake, and prepared the land for agriculture, using water from the Tualatin River for irrigation. Currently, crops include winter wheat, onions, corn, pasture grass, and various berries. Small orchards exist on drier slopes. In spite of this intensive conversion to agricultural land use, remnant communities of riparian forest and several freshwater wetland habitat types–emergent, shrub, and forested–still exist (Cowardin et al. 1979). These remnant habitats support a diverse association of flora and fauna.

Scientists and policy makers recognize the value of wetland restoration. In 1989, President Bush stated that “no net loss” of wetlands was an administration goal. Nationally, wetlands have declined by more than 52 percent. At the time of European settlement, the area that is now the conterminous United States contained an estimated 221 million acres of wetlands. Frayer et al. (1983) estimated the rate of wetland loss between the mid-1950s and the mid-1970s at 458,000 acres per year. Dahl and Johnson (1991) reported that from the mid-1970s to the mid-1980s, the rate of wetland loss had declined to 290,000 acres per year. Dahl (2000) estimated the annual loss rate between 1986 and 1997 at 58,500 acres per year with 105.5 million acres of wetlands remaining in 1997. Ninety-eight percent of all wetland losses between 1986 and 1997 were freshwater wetlands. Nationally, freshwater wetland losses occurred due to conversion to the following land uses: 30 percent urban development, 26 percent agriculture, 23 percent silviculture, and 21 percent rural development.

Daggett et al. (1998) reported that the Willamette Valley in 1982 was comprised of 50 percent upland agriculture, 22 percent other uplands, 12 percent urban development, 9 percent wetlands, 5 percent deepwater habitats, and 2 percent rural development. Wetlands covered 272,952 acres and all were palustrine (freshwater) wetlands of the following types: 34 percent forested, 29 percent emergent, 27 percent farmed, and 10 percent other. A net wetland loss of 6,459 acres (2.4 percent) occurred in the Willamette Valley from 1982 to1994. These wetland losses are attributed to conversion to the following land uses: 64 percent agriculture, 23 percent upland urban and rural development, 11 percent other uplands, and 2 percent upland forest plantation. Additionally, just one-tenth of one percent of the Valley’s native grasslands and oak savannas remain (Noss and Peters 1995).

Shaich (2000) examined whether these identified wetland changes were subject to, or in compliance with, Oregon's Division of State Lands (DSL) Removal-Fill permit requirements. He found that 35 percent of wetland changes were subject to permit requirements and of these, 70 percent were apparent violations. Shaich (2000) also found that agricultural conversions were responsible for 81 percent of all unauthorized wetland changes.

The Willamette Valley is home to more than 70 percent of the State's population, the majority of its industry, and almost half of its farmland. The Valley is also the fastest growing area in the State, with the human population expected to double in the next 25 years (Gregory and Sedell 1994).

The Tualatin River is a tributary of the Willamette River and enters above the Willamette Falls. In the Tualatin River watershed, drainage for agriculture and the development of dams and log cribs caused the loss of over 60 percent of the original freshwater wetlands (Tualatin River Watershed Council 1999). As discussed in Chapter 3, Affected Environment, 3.1.1 Water Resources, under Affected Environment: Water Resources, the State of Oregon Department of Environmental Quality designated the Tualatin River as "water quality limited."

The loss of wetland and wildlife habitats within the northern Willamette Valley metropolitan area continues. Commercial and residential encroachments into floodplains and wetlands have increased over the past years resulting in fragmented and degraded habitat. Many of these wetlands are important to migrating and wintering waterfowl. Many other migratory bird, mammal, fish, reptile, amphibian, and invertebrate species also depend upon floodplain, wetland, and riparian habitats.

1.3.2 Purpose for Proposed Action

The purpose of the Wapato Lake Unit would be to protect, manage, and restore habitats for migratory birds, fish, and other native fish and wildlife of the Willamette Valley; maintain and enhance the biological diversity of native plant communities and animals key to watershed health and function; and provide opportunities for people of all ages to enjoy wildlife-dependent recreation and further awareness about the natural world.

Due to the dramatic habitat losses which have occurred within the northern Willamette Valley, and the fact that the Wapato Lake wetland complex supports a variety of regionally and nationally important wildlife species including waterfowl, shorebirds, and anadromous fish, the Service intends to protect and improve habitat conditions in this area through establishment of the Wapato Lake Unit. Establishing the Unit would:

- contribute to efforts across the Tualatin River basin to improve watershed health and function;
- protect patches of remnant rare native habitat such as emergent and scrub-shrub wetlands, wet meadow prairie, and Oregon ash riparian hardwood forests;
- allow for the restoration of rare native habitats;

- protect important migratory bird habitat, especially for wintering waterfowl and breeding neotropical songbirds;
- improve and protect habitat for anadromous fish such as upper Willamette winter run steelhead and spring run Chinook salmon; coho salmon, and coastal cutthroat trout,
- provide opportunities for people of all ages to enjoy all six priority wildlife-dependent public uses.
- enhance protection of cultural resources under federal administration.

Traditionally, fish and wildlife agencies have focused their efforts on managing lands and waters outside of urban areas where the majority of fish and wildlife resources occur. However, habitats of regional and national significance often occur in urban areas and are of great value to fish and wildlife. These habitats also provide important public benefits such as open space, recreation, environmental education, aesthetics, flood control, and water quality enhancement.

The Wapato Lake Unit's proximity to the urban environment of Forest Grove and Gaston would heighten public appreciation for the benefits wetland riverine habitats provide such as flood control, aesthetics, and open space. Natural areas protected on public lands are an essential component of the area's quality of life. In some cases, these lands need to be restored. One of the benchmarks adopted for measuring Oregon's "livable environment" is to maintain 100 percent of the 1990 wetland resource base (Dagget et al. 1998).

The interim goals of the Wapato Lake Unit reflect the core mission of the Service to protect wildlife resources of national importance and the purpose for which the Wapato Lake Unit would be established. The interim goals are to:

- Protect and restore a diversity of rare and native habitats and associated populations of fish, wildlife, invertebrate, and plant species.

- Protect, restore, and develop a diversity of habitats for migratory birds such as neotropical songbirds, wading birds, and shorebirds, with special emphasis on wintering waterfowl.

- Protect and restore floodplain benefits associated with the Wapato Lake wetland complex and Tualatin River Basin including water quality, flood storage, water recharge, and floodplain habitats.

- Protect, restore, and develop habitats for and otherwise support recovery of federally-listed threatened and endangered species and help prevent the listing of candidate species and species of management concern.

- Provide opportunities for high quality priority public uses of the National Wildlife Refuge System.

1.4 Study Area

The Wapato Lake Unit Study Area (Study Area) includes approximately 6,400 acres in Washington and Yamhill Counties, Oregon. Immediately south of the city of Forest Grove, the Study Area is roughly bounded on the west by State Highway 47, on the east by Spring Hill Road, and extends approximately 1.4 miles south of Flett Road. The Study Area includes the historic Wapato Lake lakebed and portions of Wapato Creek, Ayers Creek, Gales Creek, and the Tualatin River (see maps on pages 7 and 9).

1.5 Related Actions

The 1,358-acre Tualatin River National Wildlife Refuge, established in 1992, is located primarily along State Highway 99W in Washington County, immediately north of Sherwood, Oregon, and 10 miles southwest of Portland. The Wapato Lake Unit lies within the lower-middle section of the Tualatin River basin at the northern end of the Willamette Valley. The Service owns and/or manages through easement a total of 140 acres of land in and adjacent to the Wapato Lake lakebed acquired from the Farm Home Administration in 1992.

The Metropolitan Service District (Metro) is an elected regional government covering the urban and urbanizing areas of Clackamas, Multnomah, and Washington Counties, Oregon. Metro is responsible for land use, transportation, open space, and water resource planning in its area of jurisdiction. Under the 1995 Open Spaces, Parks and Streams bond measure, Metro acquired more than 8,000 acres of natural areas, trails, and greenway corridors, and 74 miles of stream and river frontage. As part of this effort, Metro manages 606 acres along Gales Creek, south of the city of Forest Grove, in western Washington County. This area is managed for green space values and connectivity to the Tualatin River. Other open space areas in the vicinity include the 243-acre Fernhill Wetlands complex owned by the city of Forest Grove, and managed by Clean Water Services, and a 362-acre area owned and managed by Clean Water Services. Metro plans to purchase another 775 acres in the Gales Creek target area for further greenway connections, water quality and quantity benefits, public recreation, and education and stewardship opportunities.

1.6 Decisions to be Made

Based on the analysis documented in this LCP/EA, the Director of the Service will determine whether or not to establish the Wapato Lake Unit. If the Director determines that establishing the Wapato Lake Unit is appropriate, a decision will also be made regarding the boundary of the Wapato Lake Unit and whether the selected boundary would have significant impacts on the quality of the human environment.

The authorities for this habitat protection effort are the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended by the National Wildlife Refuge System Improvement Act of 1997; Endangered Species Act of 1973 (16 U.S.C. 1531-1544) as amended; and the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j) as amended. The National Wildlife Refuge System Administration Act authorizes the acquisition and

Figure 1. **Tualatin River NWR**

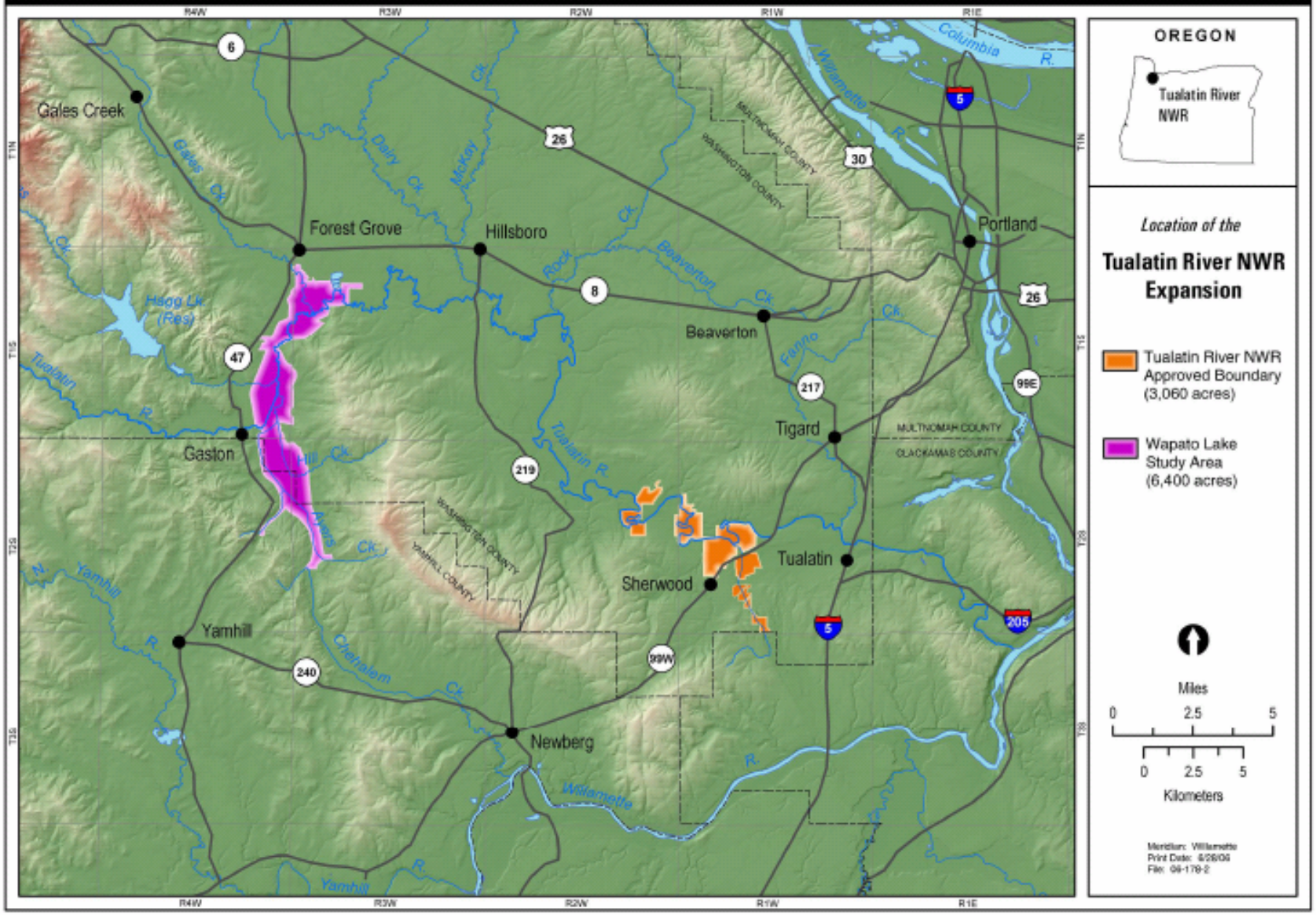
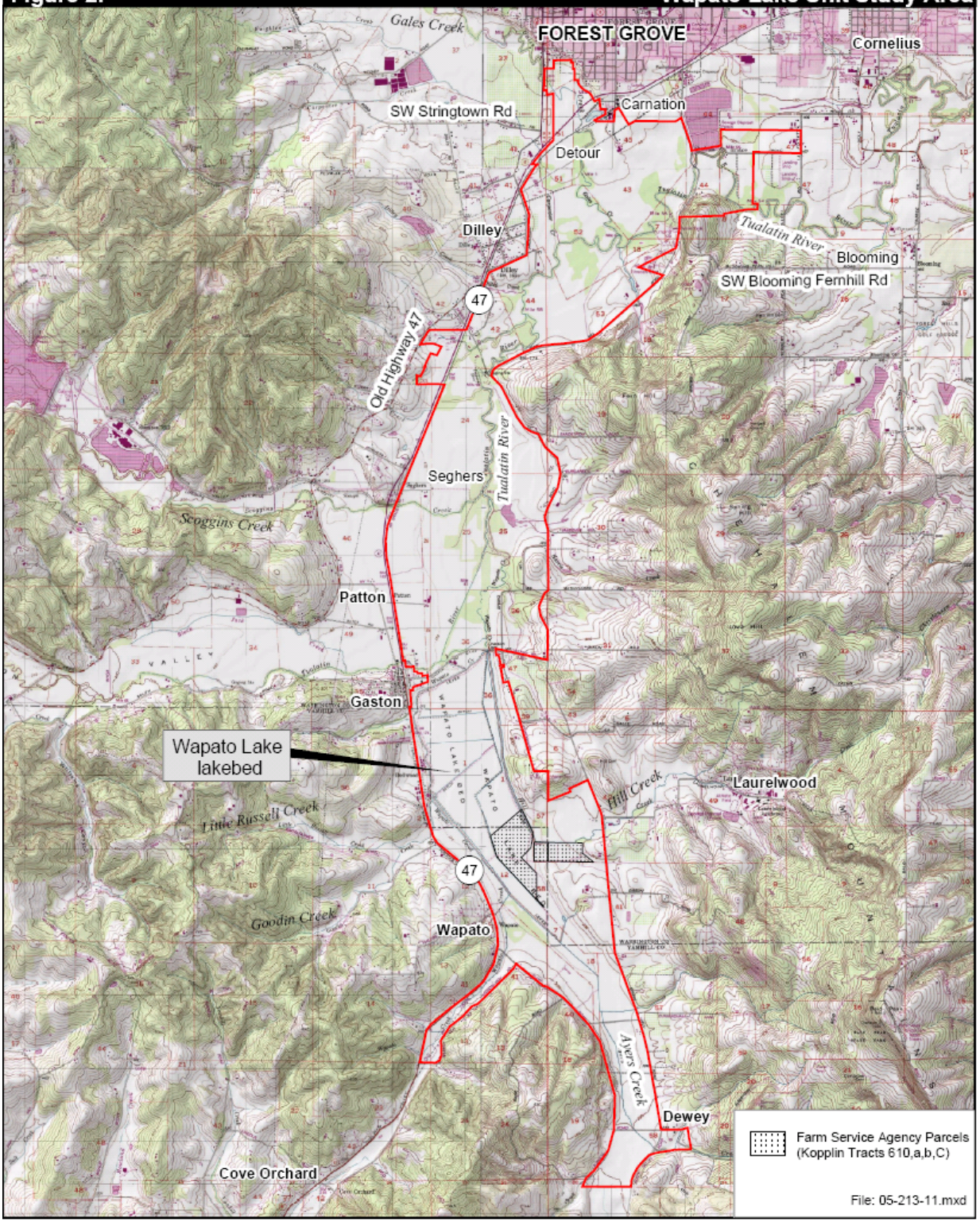


Figure 2. Wapato Lake Unit Study Area



management of land for the National Wildlife Refuge System. The Endangered Species Act authorizes the acquisition of land for the conservation of listed species with Land and Water Conservation Fund monies. The Fish and Wildlife Act authorizes the acquisition of refuge lands for development, advancement, management, conservation, and protection of fish and wildlife resources with Land and Water Conservation Fund monies.

1.7 Public Participation and Issue Identification

Issues and concerns were identified through public comments received during meetings, and in letters, faxes, and e-mails during scoping in November and December 2001 and through public review and comment ending May 31, 2006. These issues and concerns are outlined below and in other sections of the EA where they were considered in developing the objectives and alternatives for the Wapato Lake Unit. Appendix C of this document contains detailed responses to comments received during the public review and comment period on the draft Land Conservation Plan and Environmental Assessment.

1.7.1 Wapato Lake Unit Management

Many people voiced support for public uses such as canoeing, hiking, photography, biking, wildlife observation, hunting, and wetland plant identification. Some said they saw the benefit of the Wapato Lake Unit to local schools as an outdoor classroom. A few people noted the absence of public hunting lands in the area and thought a portion of the Wapato Lake Unit should be open to hunting. Other people expressed concern that hunting could cause injury to nearby nursery workers and suggested only nonconsumptive uses be allowed. A few people thought the Wapato Lake Unit should be off-limits to public access. Some people had concerns that increased wildlife populations could cause damage on adjacent lands. Others pointed out the Wapato Lake Unit could provide an opportunity to protect sites of cultural and historical significance.

1.7.2 Water Rights

Water is critical to the establishment of the Wapato Lake Unit. Several citizens expressed concern about the effects the Unit would have on the water users within the WID and the Tualatin Valley Irrigation District (TVID). Some people noted previous agreements between the Bureau of Reclamation (BOR), TVID, and WID on the maintenance of ditch systems and the continued delivery of water inside and outside the WID. Others stated that a determination should be made on who would maintain the ditches within the WID to insure water is delivered to those within and outside the WID. Some citizens asked if the dike system might be altered or drainage patterns changed. Others were concerned that if the Wapato Lake Unit is established, water costs would become prohibitive to other users within the delivery area of TVID. Some people wanted to address the effects endangered species might have on the available water. One commenter wanted assurances that the water supply would be uninterrupted. Other citizens were concerned the Wapato Lake Unit would affect the water temperature and amount of debris in the Tualatin River. A few people questioned whether restored wetlands would cause contamination of shallow wells that provide drinking water. Some noted that potable water lines need to be

protected. Others questioned how water rights would be affected if only a portion of a property is sold to the Service.

1.7.3 Socioeconomic Values

Stakeholders submitted several questions regarding the effects the Wapato Lake Unit would have on the social and economic values in the area. Specific questions included how would the local and regional farm economies, the growth of local communities, the local tax base, and other businesses be affected. Other people asked how the rural and agricultural "flavor" of the area would be affected. Some landowners were concerned about depredation of crops from an increase in migratory birds and asked about the availability of compensation if losses occurred. Several people pointed out the benefits to the local economy from Wapato Lake Unit visitation.

1.7.4 Land Acquisition

Many people asked for clarification of the land acquisition process and about various methods of acquiring an interest in land. Some specific questions were: What happens if a person does not want to sell? How will the loss of tax revenues be compensated? If a landowner currently does not want to sell, can the landowner sell in the future? If land acquisition occurs all around my property, how is my land affected? How will land values change around the Wapato Lake Unit? How are properties prioritized? How long does the acquisition process take? Will land be condemned? Would acquired lands be under Federal or State control? How are buildings affected? Does the Service expect to purchase all the land in the Study Area?

1.7.5 Alternatives Identified During Public Scoping

Some people said they preferred to have the entire Study Area remain in farmland. Others thought only the original Wapato Lake lakebed should become a Wapato Lake Unit. A few people said they wanted to see the Wapato Lake Unit include the area south of Ayers Creek, while others said they wanted to see the area from Burgess Road south to Flett Road included in the Wapato Lake Unit boundary. Some people suggested that the Fern Hill Wetlands south of Forest Grove be included. One person recommended the areas near the transmission line south of Forest Grove be excluded.

1.7.6 Scoggins Dam Raise and Raw Water Pipeline

The Joint Water Commission (JWC), comprised of the cities of Hillsboro, Forest Grove, Beaverton, and the Tualatin Valley Water District, has been contemplating the construction of a raw water pipeline from Henry Hagg Lake for many years. The pipeline would allow stored reservoir water from Henry Hagg Lake to be transmitted by gravity to the JWC water treatment plant. Partners in this project include the JWC, the city of Tigard, and Clean Water Services. This pipeline project has been closely coordinated with the Tualatin Valley Irrigation District. The final report from Phase 1 of the raw water pipeline project described basic alignment alternatives and other key recommendations in support of property acquisition and permitting activities. Phases 2, 3, and 4 are preliminary engineering, final design, and project construction,

respectively. The Environmental Impact Statement being prepared for the broader Tualatin Basin Water Supply Project will thoroughly address environmental conditions and impacts. The pipeline is scheduled to be on line by the year 2008 (Final Report–Routing Analysis and Preliminary Environmental Review 2004).

1.8 National Wildlife Refuge System and Authorities

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.

The broad goals of the National Wildlife Refuge System further describe a level of responsibility and concern for the nation's wildlife resources for the ultimate benefit of people. The goals of the Refuge System are:

- To fulfill our statutory duty to Refuge purpose(s) and further the Refuge System mission.
- Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, interjurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife, and plants.
- Conserve and restore, where appropriate, representative ecosystems of the United States, including the ecological processes characteristic of those ecosystems.
- To foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use. Such uses include hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

1.9 Habitat Protection and the Land Acquisition Process

If the Director of the Fish and Wildlife Service approves a Wapato Lake Unit boundary, land could be acquired from willing sellers using the following methods: purchase of fee title or conservation easement, no-cost transfer, long-term lease, donation, or exchange. The basic considerations in acquiring land are the biological significance of the land, existing and anticipated threats to wildlife resources, and landowners' willingness to sell or otherwise make land available for the Wapato Lake Unit. The purchase of Wapato Lake Unit lands would proceed according to availability of funds.

It is the established policy of the Service to acquire land or interests in land from willing participants under authorities such as the Migratory Bird Conservation Act of 1929 (16 U.S.C.

715-715d, 715e, 715f-715r) as amended; Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742) as amended; and the Refuge Recreation Act of 1969 (16 U.S.C. 460k-460k-4) as amended. Funding could be made available from the Land and Water Conservation Fund, Migratory Bird Conservation Fund, or other sources to acquire lands, waters, or interest therein for fish and wildlife. Landowners within the Wapato Lake Unit boundary who do not wish to sell their property or any other interest in their property are under no obligation to enter into negotiations or to sell to the Service.

In all cases, the Service is required by law to offer 100 percent of fair-market value for lands to be purchased as determined by an approved appraisal that meets professional standards and Federal requirements.

Under the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended, landowners who sell their property to the Service are eligible for certain benefits and payments including: reimbursement of reasonable moving and related expenses or certain substitute payments; replacement housing payments under certain conditions; relocation assistance services to help locate replacement housing, farmland, or business property; and reimbursement of certain necessary and reasonable expenses incurred in selling real property to the Federal government. Under provisions of the Refuge Revenue Sharing Act (Public Law 95-469), the Service would annually reimburse Yamhill and Washington Counties for tax revenue lost as a result of acquisition of private property. This law states that the Secretary of the Interior (Secretary) shall pay to each county in which any area acquired in fee title is situated, the greater of the following amounts:

- An amount equal to the product of 75 cents multiplied by the total acreage of that portion of the fee area that is located within such county.

- An amount equal to three-fourths of one percent of the fair market value, as determined by the Secretary, for that portion of the fee area that is located within such county.

- An amount equal to 25 percent of the net receipts collected by the Secretary in connection with the operation and management of such fee area during such fiscal year. If a fee area is located in two or more counties, however, the amount for each county shall be apportioned in relationship to the acreage in that county.

Some payments to the counties have been less than the legislated amounts because of funding deficits. Congress may appropriate, through the budget process, supplemental funds to compensate local governments for any shortfall in revenue sharing payments. The Refuge Revenue Sharing Act requires Service lands be reappraised every five years to ensure that payments to local governments remain equitable. Payments under this Act would be made only on lands that the Service acquires in fee title. On lands where the Service acquires only partial interest through easement, all taxes would remain the responsibility of the individual landowner.

CHAPTER 2. ALTERNATIVES GIVEN DETAILED STUDY

Five alternatives, including the No Action alternative, were considered and are described in detail as follows. Under the four action alternatives (Alternatives B, C, D, and E), a Wapato Lake Unit is established. The action alternatives differ in the number of acres identified for protection and the distribution of land that could be acquired in fee title or conservation agreement, or managed by the Service under an agreement. The alternatives' boundaries generally follow parcel lines. Not all lands in the Study Area are included in the alternatives. For example, most homes were excluded from the alternatives because land that has not been developed normally provides better opportunities for habitat protection and/or restoration. Some of the criteria used to determine which lands contain the highest habitat and natural resource values to include within an alternative follows:

- Habitat restoration need and feasibility
- Presence of rare native plant communities
- Connectivity to other important wildlife habitat
- Potential to enhance habitat for migratory birds and anadromous fish
- Available or obtainable water rights and associated water delivery costs

Survey data from 1851 served as a baseline to assess the types of habitat conditions for restoration (Christy et al. 2005). All the action alternatives entail protecting existing intact habitat and restoring degraded habitat.

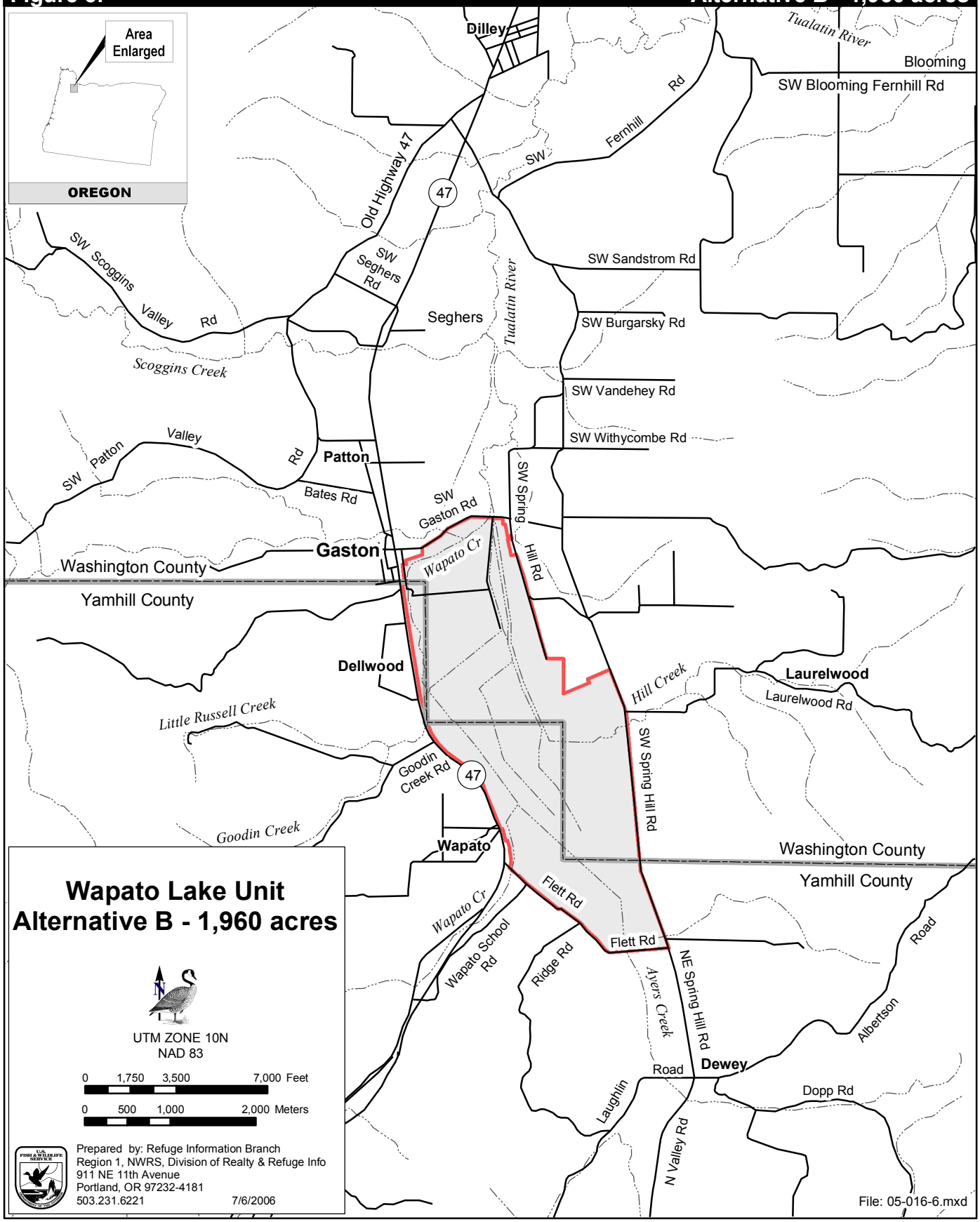
2.1 Alternative A, the No Action Alternative

Under this alternative, the Service would not establish the Wapato Lake Unit. The lands would remain in private ownership, landowners would not have the option of selling lands to the Service, and protection or development within the Study Area would be managed through existing land-use regulatory controls administered by Washington and Yamhill Counties, the State of Oregon, and Federal agencies. The No Action alternative is required by the NEPA and serves as a baseline to compare the action alternatives.

2.2 Alternative B, a 1,960-Acre Wapato Lake Unit

Alternative B proposes a 1,960-acre Wapato Lake Unit boundary around a contiguous block of habitat including the historic Wapato Lake lakebed, areas outside the lakebed, and areas outside the 100-year floodplain (see map on page 16). This alternative includes most parcels of land bounded on the north by Gaston Road, west to Highway 47, south to Flett Road, and east to Springhill Road. It is the smallest of the alternatives and the minimum land area manageable for Wapato Lake Unit purposes. Wapato Lake historically supported large numbers of migrating and wintering waterfowl including tundra swans. Wapato Lake derives its name from wapato, an aquatic plant with potato-like tubers that waterfowl and other wildlife use for food. Restoring this area would likely attract thousands of waterfowl and other wildlife to the area. This Unit could provide opportunities for priority public uses including hunting, fishing, wildlife

Figure 3. **Alternative B - 1,960 acres**



observation and photography, and environmental education and interpretation. In addition, a restored Wapato Lake lakebed would enhance aquatic habitats for anadromous fish such as steelhead. This alternative includes upland habitats that would support mammals such as black-tailed deer and migratory songbirds.

Table 1 displays the acres of habitat types within Alternative B, based on the survey data recorded in 1851 (Christy et al. 2005) and the current estimated costs for restoration.

Table 1. Alternative B Habitat Types and Estimated Restoration Costs

Habitat Type	Acres	Restoration Cost Per Acre*	Total Restoration Cost
Riparian Forest	154	$5,500	$847,000
Scrub Shrub Wetland	90	$1,500	$135,000
Wet Prairie	96	$475	$45,600
Upland Prairie	460	$325	$149,500
Herbaceous Wetland	1,000	$1,500	$1,500,000
Woodland	81	$950	$76,950
Total	1,881		$2,754,050

* Cost estimates are based on current project costs at Tualatin River National Wildlife Refuge. Total number of individual projects and economy of scale could lower costs.

2.3 Alternative C, a 2,430-Acre Wapato Lake Unit

Alternative C includes all land in Alternative B, plus Wapato Creek south of Flett Road between Highway 47 and Wapato School Road, and Ayers Creek from Flett Road south about 1.4 miles (see map on page 16). Including the lands along Wapato and Ayers Creeks could improve the water quality entering Wapato Lake and protect additional valuable habitat. Riparian areas along the Creeks would support fish and provide habitat for numerous songbird species such as the willow flycatcher and American robin.

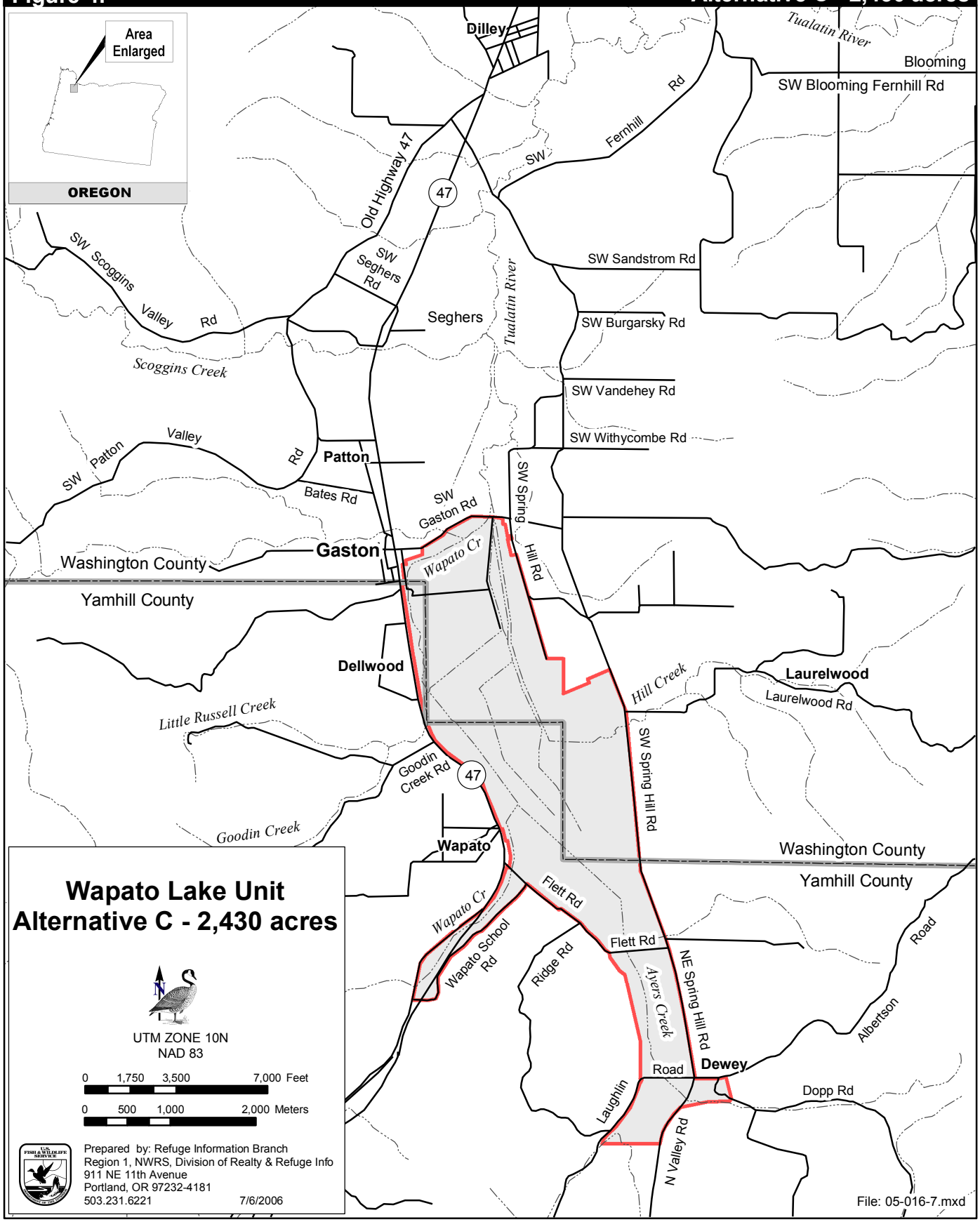
Table 2 displays the acres of habitat types within Alternative C, based on the survey data recorded in 1851 (Christy et al. 2005) and the current estimated costs for restoration.

Table 2. Alternative C Habitat Types and Estimated Restoration Costs

Habitat Type	Acres	Restoration Cost Per Acre*	Total Restoration Cost
Riparian Forest	154	$5,500	$847,000
Scrub Shrub Wetland	90	$1,500	$135,000
Wet Prairie	153	$475	$72,675
Upland Prairie	581	$325	$188,825
Herbaceous Wetland	1,159	$1,500	$1,738,500
Woodland	205	$950	$194,750
Total	2,342		$3,176,750

* Cost estimates are based on current project costs at Tualatin River National Wildlife Refuge. Total number of individual projects and economy of scale could lower costs.

Figure 4. **Alternative C - 2,430 acres**



2.4 Alternative D, a 4,310-Acre Wapato Lake Unit (Preferred Alternative)

Alternative D includes all land in Alternative C plus the lands north of Gaston Road between Highway 47 and Springhill Road to their intersection (see map on page 18). The additional lands in this alternative include intact riparian habitat along the Tualatin River and existing wetlands. These areas currently support various wildlife including songbirds, waterfowl, and raptors such as red-tailed hawks. This area would also be suitable for restoration of a variety of native habitat types. Historically, this area supported riparian forest, emergent and forested wetland, and upland prairie habitats. This alternative, with habitat restoration, would provide important habitat for resident and migratory fish and wildlife.

Table 3 displays the acres of habitat types within Alternative D, based on the survey data recorded in 1851 (Christy et al. 2005) and the current estimated costs for restoration.

Table 3. Alternative D Habitat Types and Estimated Restoration Costs

Habitat Type	Acres	Restoration Cost Per Acre*	Total Restoration Cost
Riparian Forest	735	$5,500	$4,042,500
Scrub Shrub Wetland	90	$1,500	$135,000
Wet Prairie	460	$475	$218,500
Upland Prairie	930	$325	$302,250
Herbaceous Wetland	1,200	$1,500	$1,800,000
Woodland	461	$950	$437,950
Total	3,876		$6,936,200

* Cost estimates are based on current project costs at Tualatin River National Wildlife Refuge. Total number of individual projects and economy of scale could lower costs.

2.5 Alternative E, a 6,280-Acre Wapato Lake Unit

Alternative E includes all land in Alternative D plus the lands north of Springhill Road to the southern city limits of Forest Grove (see map on page 19). As the largest area of consideration, this alternative includes most lands within the Study Area. Much of the land in the northeast portion of this alternative is currently owned by Metro and Clean Water Services. These agencies may embark on restoration projects complementary to Service efforts; therefore, the potential exists for reducing overall costs of restoration. Restoring this area could provide connectivity to habitats located in Fernhill Wetlands, Gales Creek, and downstream areas of the Tualatin River. Much of this area was riparian forest according to historic records and would support a multitude of fish and wildlife species.

Figure 5. **Alternative D - 4,310 acres**

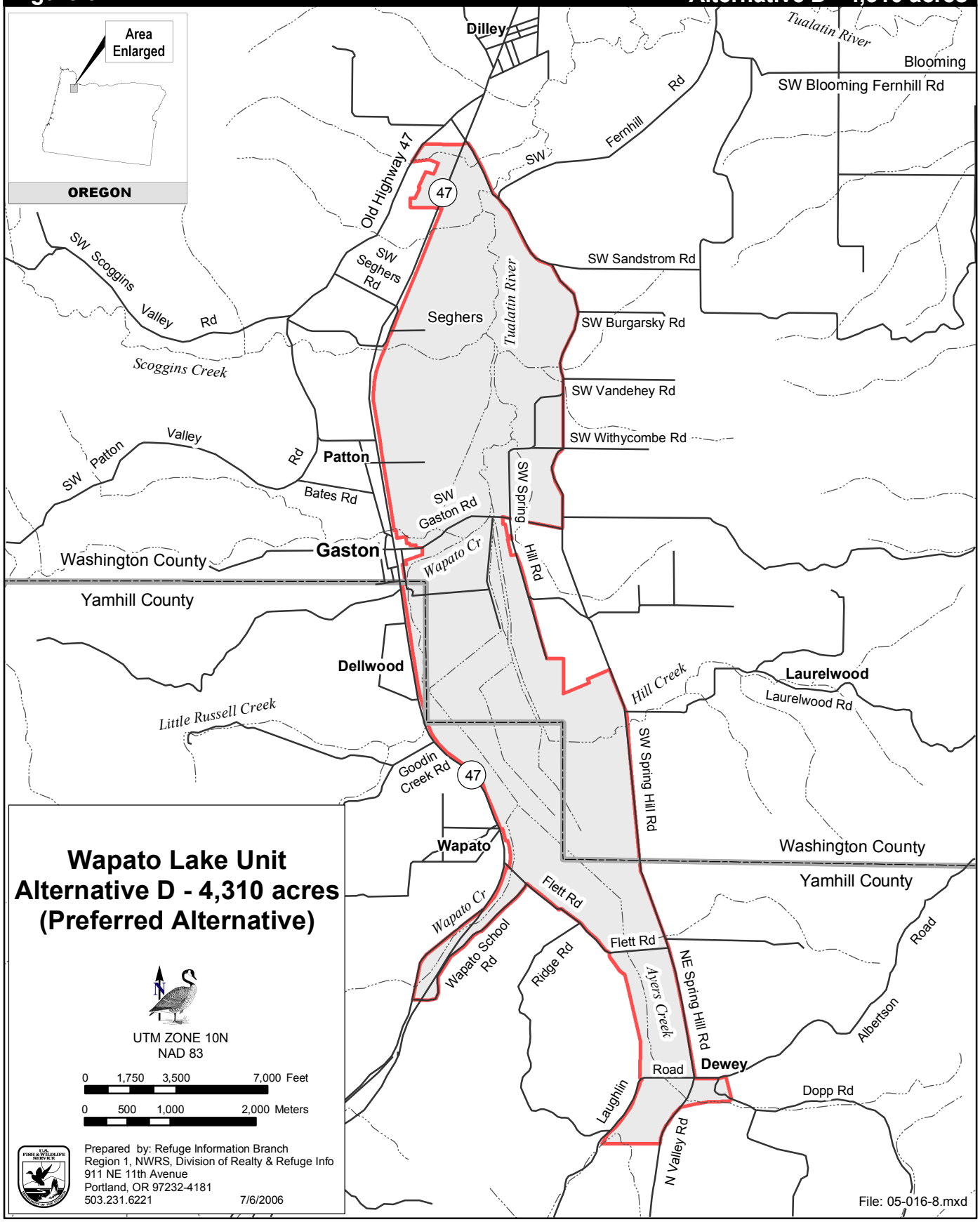


Figure 6. **Alternative E - 6,280 acres**

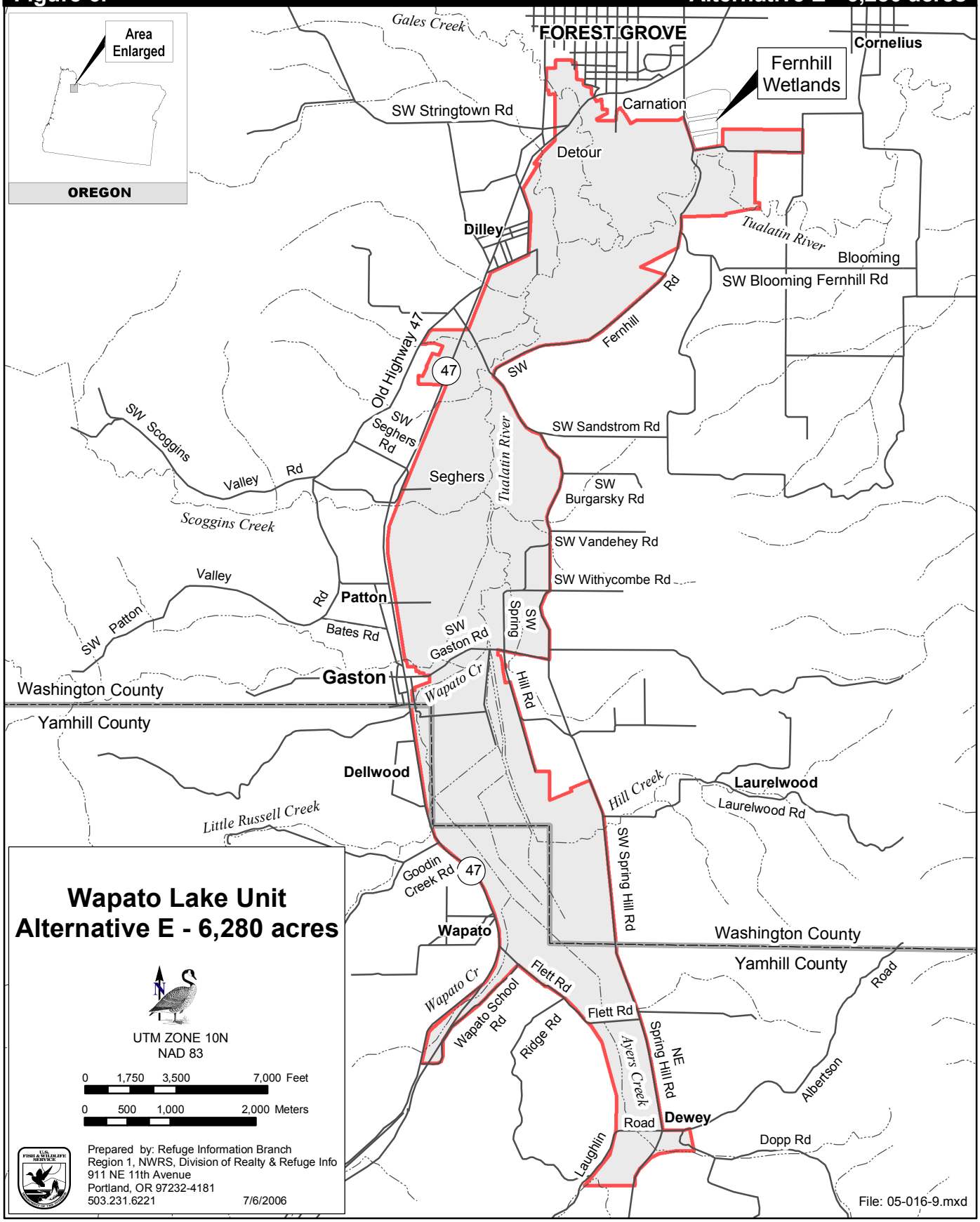


Table 4 displays the acres of habitat types within Alternative E, based on the survey data recorded in 1851 (Christy et al. 2005) and the current estimated costs for restoration.

Table 4. Alternative E Habitat Types and Estimated Restoration Costs

Habitat Type	Acres	Restoration Cost Per Acre*	Total Restoration Cost
Riparian Forest	1,459	$5,500	$8,024,500
Scrub Shrub Wetland	291	$1,500	$436,500
Wet Prairie	568	$475	$269,800
Upland Prairie	1,315	$325	$427,375
Herbaceous Wetland	1,200	$1,500	$1,800,000
Woodland	752	$950	$714,400
Total	5,585		$11,672,575

* Cost estimates are based on current project costs at Tualatin River National Wildlife Refuge. Total number of individual projects and economy of scale could lower costs.

2.6 Alternatives Considered but Not Selected for Detailed Analysis

The following two alternatives were considered but not analyzed in detail because they did not meet the needs or the purpose of the Unit: (1) proposing a Wapato Lake Unit which would consist of the historic Wapato Lake lakebed only, bounded by levees, was considered but not evaluated in detail because the area was too small to be a manageable unit of the National Wildlife Refuge System; and (2) proposing a Wapato Lake Unit over the entire Study Area was considered as an alternative but not evaluated in detail because it would include areas that are too developed for inclusion in a national wildlife refuge.

2.7 Features Common to All of the Action Alternatives

The following features are common to Alternatives B through E, but would not be implemented as part of Alternative A, the No Action Alternative.

2.7.1 Wapato Lake Unit Administration

If lands are acquired by the Service from willing sellers, funding for operations and maintenance of the Wapato Lake Unit would be needed for staff, administrative support, program and facility development, and maintenance. The Wapato Lake Unit's budget may also include funding for detailed planning to ensure that programs and facilities foster the purpose for establishment of the Wapato Lake Unit and to involve the public in the Wapato Lake Unit management planning process.

The Wapato Lake Unit's staffing, programs, and facilities would be phased in over time as the land base and management responsibilities expand. Wapato Lake Unit staff and program development are anticipated to take several years and would reflect availability of funds appropriated by Congress to support the Wapato Lake Unit. Congressional funding for refuge operations and maintenance lags behind the establishment of a new refuge or addition of lands to existing refuges by several years. In the interim, the Service usually provides limited start-up

funding from current appropriations or by incurring budget increases. However, start-up funds are not adequate to immediately develop facilities and programs at new refuges. The Wapato Lake Unit would be administered by the Refuge Manager at Tualatin River National Wildlife Refuge.

During the start-up period, the Refuge Manager and staff would initiate land acquisitions and may operate certain programs as an interim form of management. The goals during interim management are to provide essential resource protection and enhancement within the Wapato Lake Unit and scaled-downed public use. Because of the time lag between land acquisition and base funding for Wapato Lake Unit operations and maintenance, there may be a perception that the Service is more focused on acquiring land than implementing programs for wildlife and public use. However, the interim start-up period provides both the Service and public with an opportunity to ensure that the Wapato Lake Unit is developed with sound planning to conserve wildlife and meet the community's and the nation's long-term expectation for quality programs. The public's involvement in planning would assist the Service in defining long-term goals and objectives for the Wapato Lake Unit and in identifying future programs and facilities through the development of a Comprehensive Conservation Plan (CCP).

Public concerns about water issues and refuge management, expressed during the scoping period, have been taken into account, explicitly with regard to existing land uses within the WID, traditional water delivery and maintenance responsibilities of the TVID, and water rights in general.

The WID has traditionally allowed only cultivation practices which foster and promote agriculture and farming. To promote these practices, the WID has constructed, operated, and maintained infrastructure such as dikes, ditches, bridges, roads, and a small concrete dam. Funds to maintain some of these facilities have been derived from an annual assessment applied to all individual landowners within WID's boundary. Recognizing the need and desire to facilitate an orderly transition from traditional farming to Wapato Lake Unit management, WID members amended the purpose statement in the WID's existing by-laws by a 75 percent majority vote. The amendment added the clause "and/or restore and manage native habitats to conserve fish and wildlife" to the existing purpose of WID. This amendment allows acquisition, restoration, and management of habitats to proceed should the Wapato Lake Unit be established. Operations of the WID and collection of annual maintenance assessments from landowners would continue to support existing farming and future Wapato Lake Unit management purposes through the land acquisition process. Only a 75 percent majority vote of WID's members could determine the WID purpose and original land use practices as obsolete.

The BOR operates Scoggins Dam, a dam project authorized to store irrigation water, provide for recreation, and maintain regulated in-stream flows for the Tualatin River. The organization responsible for delivery of irrigation water is the TVID. To fulfill this delivery responsibility, the TVID constructed and presently operates and maintains a network of water delivery infrastructure. It serves the irrigation needs of landowners within the TVID boundary which includes the area south of Gaston. To receive irrigation benefits, each landowner must make an annual payment as a water duty assessment, to the TVID to cover delivery costs whether water is

used or not. From a historical perspective, the WID had water delivery infrastructure in place upon establishment of Scoggins Dam. Existing infrastructure made it mutually beneficial for the TVID, BOR, and the WID to enter into an agreement. The existing agreement authorizes the TVID use of infrastructure owned by the WID for delivery of water to TVID members located both inside and outside the WID boundary. Furthermore, the agreement conveys payment to the WID using revenues from annual water duty assessments in exchange for carrying out routine operations and maintenance responsibilities of the TVID. From a conceptual perspective, an agreement could be arranged between the BOR, the TVID, and the Service whereby use of infrastructure for delivery of water would continue and routine operations and maintenance responsibilities would revert back to the TVID. This type of agreement could be developed upon purchase by the Service of infrastructure presently owned by the WID. Major improvements to existing infrastructure would become the responsibility of the Service. Current water delivery to landowners and associated annual water duty assessment payments to the TVID would continue for landowners located both inside and outside the WID boundary.

Water rights would be a critical component of Wapato Lake Unit management if water dependent habitats and initial establishment of woody plantings are to be successfully restored and maintained. These consist of primary rights in the Tualatin River appropriated by the State of Oregon and secondary rights managed through the TVID on behalf of the BOR. Together, these rights are considered “one right” and may not be separated for use at a different location other than the original intended point of use. The season of use for primary appropriated rights is May 1 to September 30, while secondary rights may be extended beyond September 30 to November 30. Another difference between these rights includes a demonstration of use required for primary rights but not for secondary rights. Also, an annual duty assessment fee is imposed on secondary rights but not on primary rights. Annual assessment fees associated with secondary rights of the TVID could be partially offset by temporarily leasing a portion to Clean Water Services for use in maintaining minimum in-stream flows for the Tualatin River.

A combined office/maintenance shop along with storage, visitor contact stations, and recreation and education facilities would likely be needed for the new Wapato Lake Unit. Existing buildings on acquired properties may be used or new facilities may be constructed to meet this need. Initial priority staffing for the Wapato Lake Unit would include personnel with refuge management and maintenance backgrounds. Additional staff skills covering administration, biology, public use, environmental education and interpretation, law enforcement, and fire management programs along with overall management support and guidance would be provided by the Tualatin River National Wildlife Refuge staff located in Sherwood, Oregon, during the start-up phase of management.

Annual operation and maintenance budget estimates to properly fund the Wapato Lake Unit during the start-up phase of management amount to $200,000. The budget would cover all salary costs for an Assistant Refuge Manager and Maintenance Specialist ($130,000); all fixed costs for operating a small office and shop ($25,000); and existing as well as future annual assessments covering water delivery and infrastructure maintenance services provided by the WID and the TVID ($45,000), pending acquisition of lands within the Wapato Lake Unit boundary.

The long-term budget for the Wapato Lake Unit would include funds for salaries, facilities, capital improvements, equipment and infrastructure maintenance, biological surveys, public use management, habitat restoration and maintenance, fire management, and supplies. Wapato Lake Unit staff could include various skilled position disciplines in administration, biology, law enforcement, public use, environmental education and interpretation, and maintenance. Whenever possible, the talents and skills of volunteers would be used for specific projects. Staff positions would be incrementally added as lands are acquired and funds become available.

2.7.2 Key Areas of Management Focus

Key areas of initial focus for the Wapato Lake Unit would be protection of existing habitat and restoration and maintenance of native habitats. The Wapato Lake Unit would operate under interim management until a formal habitat management plan or CCP is in place. Interim management would include nonnative and invasive species management using integrated methods and means for control; habitat protection and restoration of native plant species; wildlife surveys; law enforcement patrols; and limited wildlife-dependent recreation including environmental education and interpretation. Under all the alternatives, the Service would manage the cultural resources in accordance with the National Historic Preservation Act, other cultural resource preservation laws, and Department of Interior and Agency policy.

Native Plant Communities

The Service would protect patches of remnant native habitat such as scrub-shrub wetland, Oregon ash riparian forest, seasonal herbaceous wetlands, and specific reaches of the Tualatin River within the Wapato Lake Unit. Historically, the upper marsh areas of Wapato Lake supported dense stands of wapato with fringed areas of Oregon ash. Central portions of the Wapato Lake lakebed supported scrub-shrub woody plants. Oregon ash riparian forests and scrub-shrub wetlands are representative of severely depleted habitats in the Willamette Valley. They are considered among the rarest of communities and highest in priority for protection due to their former historical status and range of importance for promoting biological diversity on a landscape scale. In addition to these plant communities, the main stem Tualatin River historically provided passage and rearing habitat for anadromous fish such as winter steelhead.

Rare plant communities and additional native habitats including upland and wet meadow prairie, as well as mixed deciduous/coniferous woodland, would generally be managed for migratory birds such as neo-tropical songbirds, wading birds, and shorebirds, with special emphasis on wintering waterfowl, particularly cackling Canada geese as well as mallard and pintail ducks. Management of these habitats would also benefit fish and other resident wildlife species.

Water rights are a critical component of Wapato Lake Unit management if water dependent habitats and initial establishment of woody plantings are to be successfully restored and maintained. These rights consist of primary rights in the Tualatin River appropriated by the State of Oregon and secondary rights managed by the TVID on behalf of the BOR. Both rights could be applied by irrigating plants in their early stage of growth within herbaceous wetlands, as well as irrigating woody plantings to enhance survival in a variety of habitat types. In

addition, these rights could be applied to begin initial flood-up of herbaceous wetlands in preparation for fall flights of migratory birds. To facilitate these requirements in water management, the Service would pursue acquisition of one of the most significant primary appropriated rights in the Tualatin River watershed owned by the WID. Water rights to support the vast majority of herbaceous wetland flooding in fall and winter could be met through application of new water storage rights as presently done at Tualatin River National Wildlife Refuge. These rights, regulated by the State, allow for storage at one specific location from November 1 to May 31.

Active modification and manipulation of intact native plant communities would be avoided as appropriate. In native plant communities that have suffered some form of limited disturbance, management actions may involve eradicating nonnative plant species, replanting native plants, and restoring historic hydrologic conditions. On severely degraded sites, intensive restoration projects involving heavy equipment, herbicide application, native plantings, and long-term monitoring may be required. Restoration and maintenance actions by habitat type, and associated guilds of fish and wildlife species, are presented in Table 5.

Although the focus of management would be on restoring and maintaining native plant communities, some level of pasture and/or cropland management may be used to provide forage and sanctuary to encourage greater use of Wapato Lake Unit lands by geese versus the use of adjacent agricultural lands. Restoration of native forest plant communities could encourage expansion of black-tailed deer populations using these habitats as cover.

Riparian Forest

Bottomland riparian forests are one of the most biologically rich and productive ecosystems in North America which historically occurred in Oregon throughout the floodplains of the Willamette River and Tualatin River Valleys. However, less than 8 percent of this important riparian habitat remains today (Chapell et al. 2001). The habitat type is characterized by an overstory canopy of vegetation greater than 18 feet in height with Oregon ash (*Fraxinus latifolia*) as the dominant tree species, but stands can contain a diverse species composition consisting of black cottonwood (*Populus trichocarpa*), western red-cedar (*Thujia plicata*), western hemlock (*Tsurga heterophylla*), big leaf maple (*Acer macrophyllum*), Douglas-fir (*Pseudotsuga menziesii*), and red alder (*Altus rubra*). The native shrub layer of riparian forests generally forms dense thickets that can include red-osier dogwood (*Cornus stolonifera*), Douglas spirea (*Spiraea douglasii*), Pacific ninebark (*Physocarpus capitatus*), and vine maple (*Acer circinatum*). The forest floor forb layer can be abundant and diverse. A healthy functioning riparian system promotes streambank and channel stability, surface sediment filtering, shade, and temperature buffering for streams and rivers, and provides wildlife habitat for a variety of species. During flood events, riparian forests can provide off-channel backwater habitat for sensitive and listed salmon and steelhead. Neotropical migratory landbirds, resident birds, and raptors use riparian areas for foraging and breeding. Cavity nesting waterfowl utilize large hollow trees in mature stands as nest sites. Reptiles, amphibians, and resident mammals benefit from the diversity of the forest vegetation structure by fulfilling their life cycle requirements.

Table 5. Restoration and Maintenance Actions Common to All Alternatives

	Habitat Type					
Restoration Actions	Riparian Forest	Scrub/Shrub Wetland	Upland Prairie	Wet Meadow Prairie	Herbaceous Wetland	Woodland
Mowing/Haying	X	X	X	X	X	X
Discing	X	X	X	X	X	X
Herbicide Application	X	X	X	X		X
Native Grass Seeding	X		X	X		X
Tree Planting	X					X
Shrub Planting	X	X				X
Prescribed Fire			X	X		
Remove or Develop Dikes, Levees, Structures		X			X	
Excavate Ponds/Swales		X			X	
Water Delivery		X			X	
Woody Plant Irrigation	X					X
Maintenance Actions						
Mowing/Haying		X	X	X	X	
Discing		X			X	
Integrated Pest Mgmt	X	X	X	X		X
Prescribed Fire		X	X	X	X	
Water Delivery		X			X	
Species Supported by Restoration and Maintenance Actions						
Small Mammals	X	X	X	X	X	X
Large Mammals	X		X	X		X
Resident Birds	X		X	X		X
Migratory Landbirds	X	X	X	X	X	X
Migratory Waterfowl	X	X			X	
Wading/Marsh Birds		X		X	X	
Shore Birds		X			X	
Reptiles/Amphibians	X	X	X	X	X	X
Raptors	X	X	X	X	X	X
Fish	X	X			X	

Primary management goals for this habitat type would focus mainly on restoration of altered sites. Initial habitat restoration actions may include mechanical removal of nonnative plants and Service-approved herbicides. Upon completion of site preparation, a seeding of native grass and forbs would be conducted. Shrubs and trees would be hand planted. Once planted, maintenance of woody species would be critical to ensure their survival. Maintenance activities could include irrigation, mowing, spot spraying of herbicide, and remulching. Upon establishment, this vegetation community would be self-sustaining, regulated by the dynamics of river flooding and weather events.

Scrub-shrub Wetland

Scrub-shrub wetlands are a vegetation cover type associated with surface hydrologic features within or along edges of open water areas. They are usually dominated by willow species, especially sitka willow (*Salix sitchensis*) and Hooker's willow (*S. hookeriana*). Douglas spirea (*Spirea douglasii*), red-osier dogwood (*Cornus sericea*), snowberry (*Symphoricarpos albus*), and black hawthorn (*Crataegus douglasii*) are also common to this wetland type. Scrub-shrub wetlands provide important habitat for neotropical migratory landbirds such as the willow flycatcher (*Empidonaz traillii*) and common yellowthroat (*Geothlypis trichas*). Marsh birds, wading birds, waterfowl, water-dependent mammals, reptiles, and amphibians benefit from this plant community as well.

Restoration of this habitat type would focus mainly on the control of reed canarygrass (*Phalaris arundinaceae*) and other nonnative invasive species. Nonnative seed banks would be exhausted by using mechanical means such as mowing, discing and the application of Service-approved herbicides. Effective management of scrub-shrub wetlands requires the capability to deliver and discharge water effectively, and to control water depths at a specific level. This can be accomplished through dikes or levees, shallow swales, and water control and delivery systems. Once infrastructure is in place to replicate natural hydrological regimes, native wetland shrub species would be planted at high densities to discourage invasion of shade intolerant nonnative species, such as reed canary grass. Weed control efforts involving both hydrological and mechanical actions would need to be implemented to assist in the establishment of a desirable plant community. Once established, periodic prescribed burning in combination with controlled flooding may be used as a tool to set back plant succession and to create a more dynamic and diverse plant structure.

Upland Prairie

Historic upland prairies of the Willamette River and Tualatin River Valleys have largely been converted into agricultural areas or developed for homes and communities leaving only small patches of highly fragmented habitat. Typical native grass and forb species associated with upland prairies include blue wildrye (*Elymus glaucus*), California brome (*Bromus carinatus*), California oatgrass (*Danthonia californica*), Roemer's fescue (*Festuca roemeri*), and lupine (*Lupinus* spp.). Throughout most of the interior valley settings, upland prairie is the transitional area from river floodplains to mixed woodlands and coniferous forests. Historically this cover type benefited from periodic fires, but increased fire suppression in the last century has led to the invasion by conifers in what little upland prairie remains. Wildlife and plant species dependent on this habitat type have experienced serious declines. Oregon's state bird, the western meadowlark *(Sturnella neglecta*), was once abundant in the Willamette Valley but is rarely seen today. Plant species such as Kincaid's lupine (*Lupinus sulphureus* spp. *kincaidi*), and Nelson's checker mallow (*Sidalcea nelsoniana*) are rare endemic species of Western Oregon upland prairies. Other grassland dependant wildlife including songbirds, raptors, mammals, reptiles and amphibians count on upland prairies for food, shelter, and breeding sites.

Management objectives for this habitat would be to restore prairie habitat. Preparation of the site prior to planting is, by all accounts, the most important part of prairie restoration. Weed control can be achieved through mechanical means such as mowing and repeat tillage as well as applying Service-approved herbicides. Once completed, seeding of native grasses and forbs would be performed using a native seed drill. Long-term management of the upland prairie plant community could include the use of prescribed fire under a Wapato Lake Unit fire management plan (see page 29). The burn cycle to be used would depend on the type of weed and woody species control that becomes necessary as the prairie matures.

Wet Meadow Prairie

During settlement of the Willamette Valley, expansive wet meadow prairies quickly disappeared as they were converted to productive farmland. Wet meadows are treeless open areas with wet or clay soils, often located near a high water table. They may or may not have standing water. Some have expanses of hummock-forming sedges which make them look lumpy and slows water movement through the area (Gosselink and Tiner 1978). Wet meadows occur with a great variety of plant species; therefore, it is not possible to generalize individual species composition. Several genera common to wet meadows include *Carex*, *Juncus*, *Salix* and *Scirpus*. Important grass and grass-like species include sedges, tufted hairgrass, and spikerush as well as a diversity of forbs. Wet meadows support a wide variety of flowering plants, grassland dependent migratory songbirds, small mammals, reptiles, and amphibians including several species of frogs. This prey base attracts large wading birds such as egrets and herons, as well as birds of prey like hawks and owls.

Restoration efforts would focus on the control of nonnative invasive species as well as their seed bank by mechanical means such as mowing and discing. Applications of Service-approved herbicides would also be used. Once completed, a seeding of native wet meadow prairie grasses, sedges, rushes, and forbs would be performed using a seed drill. Prairie grasslands composed of native cool-season grasses and forbs must be periodically rejuvenated to maintain vigor. Without rejuvenation, grasslands are slowly invaded by woody plants. Long-term maintenance activities are crucial to success of perpetuating a woody free community (USFWS, 2000). Prescribed fire or a combination of burning, mowing, and herbicide application are the methods most suitable for rejuvenation and maintenance of prairies.

Herbaceous Wetland

Herbaceous wetlands have been subject to a long history of manipulation throughout the Willamette and Tualatin River Valley floodplains. Subsurface drain tiles and surface ditches were installed to facilitate drainage of soils for agricultural purposes wherever possible, thus impeding the ability of floodplains to capture and retain surface runoff from rainfall and floodwaters of rivers. Herbaceous wetlands are comprised of medium tall (2 to 4 feet) to tall (4 feet or more) grass or grass-like plants that occur with various substrates and water depths (Adamus, 2001). Herbaceous plants commonly associated with this habitat type are wapato (*Sagittaria latifolia*), cattail (*Typha latifolia*), several bulrush species (*Scirpus* spp.), burreed (*Sparganium* spp.), smartweed (*Polygonaceae* spp.), wild millet (*Echinochloa crusgalli*) and

water plantain (*Alisma plantago-aquatica*). Along peripheral edges of wetlands, numerous sedges (*Carex* spp.) and rushes (*Juncus* spp.) dominate. Typical grasses that are commonly associated with this wetland type are tufted hairgrass (*Deschampsia caespitosa*), reed canary grass, and American sloughgrass (*Beckmannia syzigachne*). Although sometimes undervalued, herbaceous wetlands are crucial habitats and provide many benefits to wildlife. Red-wing blackbirds (*Agelaius phoeniceus*) breed and nest in cattail marshes, as do many other neotropical migratory landbirds. Wading and marsh birds such as the American bittern (*Botaurus lentiginous*) and Wilson's snipe (*Gallinago delicata*) use wetlands to find food and shelter. Migratory waterfowl depend on moist soil plants and emergent vegetation for feeding and shelter. Mammals such as river otters (*Lutra canadensis*) utilize wetlands to feed, while smaller burrowing mammals take advantage of the soft soils. Some reptiles and amphibians feed, breed, and overwinter in herbaceous wetlands.

Restoration of this habitat type would focus on the reestablishment of a hydroperiod that mimics the natural floodplain process. Managing water could be accomplished through dikes or levees, shallow swales, and water control and delivery systems (USFWS, 2000). Water depth, timing of flooding, duration of flooding, and mechanical treatments such as mowing and discing, can be used to promote the growth of desirable plants, discourage the growth of other undesirable plants like reed canarygrass, and make plants, seeds, or aquatic invertebrates available to wildlife at specific times of the year. Long-term management could implement a disturbance regime involving mechanical treatments and controlled burns to limit or exclude invasion of large woody plants.

Woodland

Mixed deciduous/coniferous woodland was likely much more prevalent in the surrounding uplands than its limited spatial area of occurrence today. The woodland overstory is composed of co-dominant conifer, generally Douglas-fir (*Pseudotsuga menziesii*) and grand fir (*Abies grandis*). Deciduous species such as red alder (*Alnus rubra*) and/or big leaf maple (*Acer macrophyllum*) are also common. This type of forest structure is generally classed as an old clearcut, or young forest. Tree canopies are single story and closed. The deciduous component is a remnant of earlier clearcut succession as well as where red alder and big leaf maple dominate the canopy overstory. Over time, conifers out-compete deciduous trees making them a minor component in mature conifer forests of Western Oregon (Adamus, 2001). Understory vegetation is sparse as the tightly crowded canopy makes penetrating sunlight almost impossible. Mixed deciduous/coniferous woodlands appear to have a more diverse wildlife component than other habitat types. The diversity of forest structure and successional stages across numerous landscapes is what provides the variety of habitats for many different species of plants and animals. Neotropical migratory landbird species composition varies with the successional stage of the forest. Younger stands support species, such as wood warblers and hummingbirds, which are associated with more deciduous woody vegetation. Older, more mature stands provide needed nesting habitat for bird species such as the Vaux's swift (*Chaetura vauxi*) and pileated woodpecker (*Dryocopus pileatus*). This habitat also supports reptiles, amphibians, and resident mammals such as black-tailed deer (*Odocoileus hemionus*). Wildlife species all benefit from the diversity of the forest's vegetation structure that helps meet their life cycle requirements.

Primary management goals for this habitat type would focus mainly on restoration of altered sites. Initial habitat restoration actions may include removal of nonnative plants through the use of manual, mechanical, and Service-approved herbicides. Upon completion of site preparation, a seeding of native grass and forbs would be conducted. Shrubs and trees would be hand planted. Once installed, maintenance of the plantings would be critical to ensure their survival. Maintenance activities could include irrigation, mowing, spot spraying of herbicide, and re-mulching. Upon establishment, this vegetation community would be self-sustaining.

Fire Management

A fire management plan (FMP) would be developed for the new Wapato Lake Unit. The FMP, developed with public input, would address initial response, fire crew dispatch, wildfire suppression, cooperative agreements for firefighting support, and prescribed burning for use as a habitat management tool. Fire management planning could also include an agreement with Tualatin Valley Fire and Rescue and other appropriate agencies for fire suppression support. The Service would maintain certain existing roads and trails as fire breaks, and would evaluate needs for additional fire management facilities.

Fire plays a major role in succession and maintenance for some native plant communities. Historic fire dependent communities identified as occurring on the Wapato Lake Unit consist of upland and wet meadow prairies. The Service may use prescribed burning as a tool to restore and maintain these habitats or other mechanical techniques to reduce fuel loads and minimize wildfire hazards associated with woody plant communities. The role and implementation of prescribed burns in resource management and fuel reduction, and compliance with applicable air quality standards, would also be addressed in detail as part of the fire management plan.

Pest Control

Integrated pest management approaches for control of nonnative, invasive, and noxious species may include the use of Service-approved herbicides, manual removal of plants, mechanical treatments such as mowing and discing, and release of biological control agents approved by the State of Oregon. Areas that have undergone vegetation control would be revegetated with native species.

Population Monitoring

Wildlife management would include monitoring for distribution and abundance patterns of migratory waterfowl, songbirds, wading and marsh birds, shorebirds, reptiles, amphibians, fish, and other resident wildlife.

It is the policy of the Service to collect baseline information on plants, fish and wildlife. The Refuge System plays a critical role in collecting, monitoring, and keeping an inventory of data on wildlife populations from simple presence/absence and seasonal data checklists to the use of rigorous repeatable scientific methods. Extensive surveys are conducted yearly to track

population trends and use of habitats providing a baseline for making habitat management decisions.

A Wapato Lake Unit inventory and monitoring program may be structured using standardized techniques that determine presence, distribution, and status of species. Inventory and monitoring surveys can be quantitative or qualitative in nature. Quantitative surveys can be conducted on species or groups by planning a series of visits at fixed times and intervals. Observers consistently record data at a predetermined time. Examples are waterfowl migration surveys and nongame landbird point counts.

Wildlife-Dependent Priority Public Uses

National wildlife refuges are managed first and foremost for the benefit of fish, wildlife, plants, and their habitats. In addition, refuges are closed to public uses unless specifically and formally opened. Other Federal land management systems are managed under a multiple-use mandate (e.g., national forests administered by the U.S. Forest Service and public lands administered by the U.S. Bureau of Land Management). Hunting, fishing, wildlife observation and photography, and environmental education and interpretation are priority public uses of the Refuge System. These uses must receive enhanced consideration over other general public uses in refuge planning and management.

As part of the National Wildlife Refuge System, the Wapato Lake Unit would provide opportunities for wildlife-dependent priority public uses that are compatible with the Wapato Lake Unit purpose. The Wapato Lake Unit could provide the local community, the greater Portland metropolitan area, and the nation with opportunities to gain a better appreciation for and understanding of the region's unique wildlife heritage.

The Compatibility Standard

Before a public use is allowed on a national wildlife refuge, Federal law requires a written compatibility determination be completed which states that the use is compatible. A compatible use is defined as a or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System’s mission or the purposes of the national wildlife refuge. Sound professional judgment is defined as a decision that is consistent with the principles of fish and wildlife management and administration, available science and resources (funding, personnel, facilities, and other infrastructure), and adherence to the requirements of 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), and other applicable laws.

If resources are not available to design, operate, and maintain priority public uses that are otherwise compatible, the refuge manager will take reasonable steps to obtain outside assistance from the state and other conservation interests. If adequate funding or staffing assistance cannot be identified, then the use is not compatible and cannot be allowed. Unlimited public access and

use of Wapato Lake Unit lands could easily degrade resources. High quality wildlife-dependent priority public use opportunities are predicated on healthy habitats and healthy populations of fish, wildlife, and plant species.

Wapato Lake Unit Purpose(s)

The purpose(s) for which the Wapato Lake Unit would be established would have special significance relating to compatible public uses. The Wapato Lake Unit's purpose may be specified in or derived from a Federal law or proclamation, an executive order, an agreement, a public land order, a donation document, or an administrative memorandum (U.S. Fish and Wildlife Service Manual, 602 FW 1.4M.). In addition to providing a basis for making compatibility determinations, the Wapato Lake Unit's purpose would also serve as a vision or mission statement for refuge managers and the public. It provides a broad, long-term statement of management direction and priorities (see Chapter 1, Section 1.3.2)

Preacquisition Compatibility Determinations

The Service is required to identify, prior to acquisition of new refuges or refuge additions, existing owner-authorized, wildlife-dependent priority public uses that would be allowed to continue on an interim basis during the time period following Service acquisition to the completion of a CCP. This is required by the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee). The priority wildlife-dependent public uses are hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

The Service is not required to complete preacquisition compatibility determinations for uses that did not previously exist and were not owner-authorized. Determination of what qualifies as an existing priority public use is a judgment call by the refuge manager. In general, occasional personal use of property, such as allowing family or friends to hunt or photograph wildlife, would not be considered an existing priority public use. In contrast, properties that are generally open to the public, such as hunt clubs or a military reservation that allows fishing by military personnel and their family members would be considered to have an existing priority public use. No owner-authorized priority public uses have been identified as previously existing within the Unit based on information from public scoping meetings, comments received from the public, and follow-up communications.

The Wapato Lake Unit would initially be open to limited staff-led public use, providing interpretative and educational opportunities. There would also be the opportunity for the public to enjoy wildlife observation and photography during these visits. In order to protect sensitive resources, the area would initially be open to the public only through staff-led tours and volunteer programs. Group size would be limited in size to approximately 20 people and groups would be supervised by staff to ensure that resources are protected.

Public Use Program Development

Priority wildlife-dependent recreational and educational opportunities that may be offered include hunting, fishing, wildlife observation and photography, and environmental education and interpretation. For each public use implemented, supporting programs and infrastructure would be developed consistent with compatibility and environmental compliance guidelines and to meet the expected degree of use.

All public uses would require basic facilities and features such as safe access onto the Wapato Lake Unit, parking areas, restrooms, and informational signs and/or publications. To the greatest extent possible, facilities would be developed to be accessible in accordance with the Americans with Disabilities Act. Additionally, entrance and user fees would be considered based on the Federal Lands Recreation Enhancement Act as approved by Congress in December 2004.

Opening a national wildlife refuge to hunting and/or fishing requires publishing a proposal and the final approval in the Federal Register. Detailed hunting and/or fishing proposals would be completed in close coordination with Oregon Department of Fish and Wildlife and would be largely based on statewide regulations. Refuge staff would also actively seek out the participation and input of local hunting and fishing organizations to shape the programs. Game species of wildlife to be considered under a Wapato Lake Unit hunting program and in accordance with Oregon hunting regulations would include waterfowl, mourning dove, snipe, ring-necked pheasant, California quail, and black-tailed deer. Species of game fish under a Wapato Lake Unit fishing program would likely include only finned fish as regulated by the State. The best fishing opportunities could be associated with the warm water fishery of the Tualatin River. Hunting and fishing of game species on Wapato Lake Unit lands would be managed to sustain healthy natural reproducing populations of fish and wildlife, therefore, programs to artificially supplement populations would be discouraged. Hunting and fishing programs can typically include waterfowl hunting blinds, boat launch and/or bank access facilities, and publishing brochures containing refuge-specific hunting/fishing regulations and general refuge information.

Wildlife observation and photography and environmental education and interpretation often can be supported by many of the same facilities which could include walking trails, observation platforms and overlooks, viewing scopes, roadway pullouts, auto tour routes, and general refuge publications. Specific to the Wapato Lake Unit, facilities could be developed promoting calm water boating activities in support of wildlife observation and fishing programs. Special public events such as International Migratory Bird Day and National Wildlife Refuge Week would likely be celebrated on the Wapato Lake Unit to enhance these public uses.

Wildlife photography could be augmented by the addition of photography blinds specifically designed to meet the needs of amateur and professional wildlife photographers. Such blinds would likely be managed on a reservation-only basis to provide high quality experiences for visitors.

Interpretation and environmental education programs often complement one another. Developing informational and interpretive signs, interpretive leaflets, wildlife and plant species checklists, and staff and volunteer led tours could support both programs. To develop a high quality environmental education program, Wapato Lake Unit staff would collaborate with local educators to design curriculum that meets both national and State learning requirements for K-12 students. Curriculum materials would include pre-visit, on-site, and post-visit activities for students, as well as learning extensions and resources for teachers to plan further study. To maximize experiential learning for students, teacher workshops would be conducted to familiarize educators with the Wapato Lake Unit, curriculum activities, and learning opportunities available. Environmental education study sites and shelter areas could be constructed to facilitate on-site learning. Local universities and college students would also be encouraged to visit the Wapato Lake Unit to study habitat and wildlife management techniques. More than any other priority public use, the on-going involvement of volunteers would be critical to the management of high-quality interpretive and educational programs on the Wapato Lake Unit.

Given the rich cultural heritage of the Wapato Lake area, the Service would seek to develop compatible education and interpretative programs on the cultural history and land use of the Wapato Lake area as an integral part of the public use program for the Wapato Lake Unit.

In the future, public hunting opportunities, one of the six priority wildlife-dependent public uses for the National Wildlife Refuge System would be considered during development of the CCP. Hunting could be used as a means for partial control of goose and black-tailed deer populations to offset potential damage to crops. In addition, the Department of Agriculture could provide technical assistance and tools used in hazing operations to reduce concentrations of wildlife.

As part of the CCP, the Service would develop goals, objectives, and strategies for resource management and public use programs. During the planning process, the Service would actively seek public participation and input to complete a quality plan guiding future management of the Wapato Lake Unit. At that time, the Service will examine potential opportunities for all wildlife-dependent priority public uses deemed compatible with the Wapato Lake Unit purpose(s). Any public use allowed would be in strict conformance with applicable Federal and State statutes.

2.7.3 Rights-of-Way and Easements

Lands for the Wapato Lake Unit would be acquired subject to existing rights-of-way and easements. The Service has an application process for granting new rights-of-way and easements across Wapato Lake Unit lands. This process would also be used if holders of existing rights-of-way and easements on Wapato Lake Unit lands want to expand or modify the terms and conditions of their rights. New rights-of-way and easements or modifications to existing rights-of-way and easements must be compatible with the purpose for which the Wapato Lake Unit was established.

2.7.4 Law Enforcement

Enforcement of Federal and State laws on the Wapato Lake Unit would be important to safeguard visitors, protect public and private property, and to conserve natural resources. Refuge law enforcement support could come from either future staff of the Wapato Lake Unit, Tualatin River National Wildlife Refuge, or refuge zone officers. Refuge officers would work with local and State jurisdictions to control trespass and enforce fish and wildlife laws. Lands acquired by the Service would be posted with refuge signs. Boundary signs and fencing Service owned lands depicting the Wapato Lake Unit boundary would be important tools to control trespass.

2.7.5 Facilities Development and Management

An office/maintenance shop, storage building, trails, outdoor education sites, and visitor viewing structures with access support facilities may be needed for the Wapato Lake Unit. Establishing an office/maintenance shop would be highest in priority and could possibly be satisfied using existing buildings purchased during land acquisitions. Depending on availability of existing buildings, new facilities may need to be built. Costs for an office/maintenance shop, visitor contact facilities, trails and outdoor education sites, parking lots, and other facilities are not known at this time. Planning and design of visitor facilities would be subject to a public involvement process. Long-term needs would be analyzed as part of the development of the Tualatin River National Wildlife Refuge's CCP.

Some wetland restoration projects would require development of new water delivery and retention infrastructure, and some facilities already exist which could be used with a minimum level of retrofitting. Existing water diversions and control structures would likely require modification to meet conservation needs of fish such as winter steelhead.

Fencing or other types of barriers may be constructed to control trespass in areas where damage could occur to habitat or endangered species.

2.7.6 Interagency and Public Coordination

The Service will continue to work closely with the WID, TVID, Clean Water Services, and the BOR.

The Tualatin River Watershed Council has completed and is implementing a watershed plan for the Tualatin River Basin that includes conservation measures to improve fish and wildlife habitat and promote management practices to improve watershed health and function. Establishment of the Wapato Lake Unit, and the potential subsequent acquisition and restoration, would directly support and help fulfill goals and objectives of the watershed plan.

Potential partners in acquisition and wetlands restoration for the Wapato Lake Unit include The Nature Conservancy, the Trust for Public Lands, The Conservation Fund, River Network, Bonneville Power Administration, Metro, Portland General Electric, BOR, and Ducks Unlimited in cooperation with the Natural Resources Conservation Service. Partnerships could be explored

which focus on potential purchase with partner funding and donation to the Service, and/or habitat restoration. Organizations may also be interested in forming partnerships for development of public use programs and facilities. Partnerships with organizations do not require partner ownership of lands within the Wapato Lake Unit boundary.

Tualatin River National Wildlife Refuge has numerous partners participating in habitat restoration and public use projects which would likely become involved with the Wapato Lake Unit. Friends of Trees, Tualatin Riverkeepers, and the Friends of the Tualatin River National Wildlife Refuge are all active partners providing financial resources as well as in-kind contributions.

CHAPTER 3. AFFECTED ENVIRONMENT

This chapter describes the physical, biological, and socioeconomic factors within the Wapato Lake Study Area which could potentially be affected by implementing the action alternatives.

3.1 Physical Environment

In this section, the Service describes the physical environment that would be affected by implementing the action alternatives. Due to the fact that the Unit would largely involve protecting and restoring wetland habitats, water resources are looked at in detail. Contaminants and hazardous waste are discussed as well.

3.1.1 Water Resources

Groundwater aquifers exist in confined and unconfined conditions under the Tualatin Valley. During winter and spring, unconfined groundwater occurs beneath a large portion of the Tualatin Valley, usually at a depth less than 10 feet. Surface ponds are common in wetter months. During the summer and fall months the groundwater table ranges from 15 to 30 feet below the surface. Wells must extend below the yearly water-table fluctuation, which averages 20 feet. Deep wells (below 1,500 feet) provide the principal aquifers for irrigation, industrial-commercial, and municipal water supplies.

Tualatin River flows are mainly dependent on rainfall. The distinct precipitation pattern causes highly variable stream flows. Flooding occurs on the river floodplains in winter months; the average flow is over 3,500 cubic feet per second (cfs). In late summer and fall, low stream flows averaging 132 cfs result from a lack of rain and mountain snowpack. Consumptive water uses further deplete river flows. A dam on Scoggins Creek modifies these variable flows.

Most of the valley consists of farms or urban centers. Effluent from sewage treatment plants and storm water runoff from developed and agricultural areas are mainly responsible for the ammonia-nitrogen and phosphate levels in the river. A pollution problem exists during the summer months when the low flows in the Tualatin River are inadequate to carry runoff nutrient loads. Septic tank drain fields compound this problem when constructed in impervious soils and where the groundwater table is at or near the surface. As a result, the State of Oregon Department of Environmental Quality gave the Tualatin River a designation of “water quality limited.” Present and future demand for water greatly exceeds availability during the low-flow summer months and leads to restrictions on water use. Clean Water Services and the BOR are preparing a study to address the feasibility of increasing water flows in this part of the Tualatin basin.

Many governmental entities and special interest groups are developing and implementing strategies to improve the health of Oregon’s watersheds. The Oregon Plan for Salmon and Watersheds is based on State and Federal laws, and calls upon governmental agencies, industries, and citizens to work together to address issues (Oregon Watershed Enhancement Board 2003). In January of 1999, Governor Kitzhaber issued an Executive Order clarifying the

scope of the Oregon Plan to include water quality, watershed health, and native salmonids statewide. In 2001, the Willamette Restoration Initiative (WRI), a citizen group established in 1998, presented the Willamette Chapter of the Oregon Plan to the Legislature and Governor. The Oregon Plan includes 27 detailed recommendations on critical actions needed to protect and restore the health of the Willamette basin.

3.1.2 Wapato Improvement District (WID)

The WID operates under sanctioned by-laws governing land use within their legal boundary. Nearly all of the land within this boundary falls within the historic Wapato Lake lakebed. The WID has traditionally allowed only cultivation practices which foster and promote agriculture and farming. To promote these practices, the WID has constructed, operated, and maintained infrastructure such as dikes, ditches, bridges, roads, and a small concrete dam. Some of these features are owned by the WID and are located on lands owned by the WID. Funds to maintain some of these facilities have been derived from an annual assessment applied to all individual landowners within the WID's boundary. Recognizing the need to facilitate an orderly transition from traditional farming to refuge management, WID members amended the purpose statement in the existing WID bylaws by a 75 percent majority vote. The amendment added the clause "and/or restore and manage native habitats to conserve fish and wildlife" to the existing purpose of WID. This amendment allows acquisition, restoration, and management of habitats to proceed should the Wapato Lake Unit be established. Operations of the WID and collection of annual maintenance assessments from landowners would continue to support existing farming and Unit management functions and practices until determined obsolete through a 75 percent majority vote of WID members.

3.1.3 Tualatin Valley Irrigation District (TVID)

The BOR operates Scoggins Dam, a dam project originally authorized to store irrigation water, provide recreation, and maintain regulated in-stream flows for the Tualatin River. The TVID is responsible for delivery of irrigation water. The TVID operates and maintains a network of water delivery infrastructure serving the irrigation needs of landowners within the TVID boundary ranging from the area around Gaston to Shamburg Bridge crossing the Tualatin River in the lower watershed. To receive irrigation benefits, each landowner must make an annual payment, as a water duty assessment, to the TVID to cover delivery costs whether water is used or not. Given that the WID already had water delivery infrastructure in place upon establishment of Scoggins Dam, it was mutually beneficial for the TVID, BOR, and WID to enter into an agreement. This existing agreement authorizes TVID use of WID infrastructure for delivery of water to TVID members located both inside and outside the WID boundary. Furthermore, the agreement conveys payment to the WID using revenues from annual water duty assessments in exchange for carrying out routine operations and maintenance responsibilities of the TVID. From a conceptual perspective, an agreement could be arranged between the BOR, the TVID, and the Service whereby use of infrastructure for delivery of water would continue and routine operations and maintenance responsibilities would revert back to the TVID. This type of agreement could be developed if the Service were to acquire infrastructure presently owned by the WID. Major improvements to existing infrastructure would become the responsibility of the

Service. Current water delivery to landowners and associated annual water duty assessment payments to the TVID would continue for landowners located both inside and outside the WID boundary.

3.1.4 Water Rights

Water rights are a critical component of the Wapato Lake Unit development if water dependent habitats and initial establishment of woody plantings are to be successfully restored and maintained. These rights consist of primary rights in the Tualatin River appropriated by the State of Oregon and secondary rights managed through the TVID on behalf of the BOR. The source of secondary rights stem from reservoir waters of Hagg Lake located on Scoggins Creek, operated by the BOR. These rights together are considered one right and may not be separated for use at a location other than their original intended point of use. The primary appropriated rights season of use is May 1 to September 30, while secondary rights may be extended beyond September 30 to November 30. Another difference between these rights includes a demonstration of use required for primary rights, but not for secondary rights. Also, an annual duty assessment fee is imposed for secondary rights but not for primary rights.

Both primary and secondary rights could be applied to habitats being managed to restore and maintain seasonal wetlands, through summer irrigation of germinated plants as well as summer irrigation of woody plantings, to enhance survival in a variety of habitat types. In addition, these rights could be applied to begin initial flood-up of seasonal wetlands in preparation for fall flights of migratory birds. To facilitate these requirements in water management, the Service would pursue acquisition of one of the most significant primary appropriated rights in the Tualatin River watershed owned by the WID. Water rights to support the vast majority of seasonal wetlands flooding in fall and winter could be met through application of new storage rights as is presently carried out at the Tualatin River National Wildlife Refuge. These rights regulated by the State of Oregon allow for storage at one specific location from November 1 to May 31. Finally, operating costs associated with secondary rights of the TVID could be partially offset by temporarily leasing these rights to Clean Water Services for use in maintaining minimum in-stream flows for the Tualatin River.

3.1.5 Contaminants and Hazardous Wastes

As of October 2005, the Study Area is not on the Environmental Protection Agency's (EPA) National Priority List or in their Comprehensive Environmental Response, Compensation, and Liability Information System. The historic Alvin T. Smith house within the Study Area contained an illegal methamphetamine laboratory in the basement. The owners of the property paid for the testing and clean up of the contaminants associated with the laboratory.

An overview Level I Contaminant Survey would be conducted on the Unit, to identify potential contaminant sources. Potential contaminant sources include highways, industrial areas, agricultural land, and electrical powerlines which could create non-point source pollution. Potential hazardous materials from industrial areas and highways may include oil, grease, gasoline, and battery acid, among others. The EPA has found storm water runoff to be a

significant pollution source, particularly from highways. Certain electrical transformers contain hazardous materials. Potential pollutants contained in nursery and farmland runoff may include fertilizers, pesticides, herbicides, and animal waste. Electrical powerlines also pose an electrocution and strike hazard to birds.

3.2 Biological Environment

Humans have substantially modified the Tualatin Valley. Since the late 1800s, a majority of the Valley floor forests and wetlands have been cleared and/or drained, converting them to agriculture and urban use. While most of the mountainous regions remain in forest, they have been logged at least once. Almost all of the habitats within the Unit have been modified, some to a greater extent than others.

The Wapato Lake lakebed currently has moderate wildlife values. When flooded in fall and winter, the area provides foraging and roosting winter habitat for significant numbers of tundra swans. In December 1987, there were 800 swans as well as mallards, pintails, canvasbacks, ring-necked ducks, and lesser scaup using the Wapato Lake lakebed. Canada geese (western, dusky, lesser, Taverner's, cackling, and Aleutian) occur at Wapato Lake. White-fronted geese also occasionally use the historic Wapato Lake basin.

Numerous species of shorebirds and marsh birds frequent the basin for foraging and resting during spring and fall migration. Riparian areas, wet deciduous swales of mixed hardwood species, and mixed deciduous/coniferous forest provide breeding habitat for neotropical migratory birds. Raptors observed within the area include red-tailed hawks, northern harriers, and American kestrels. Mammals using the area include black-tailed deer, coyote, skunk, and numerous species of small rodents. Other wildlife species, either federally-listed or species of management concern, known or likely to frequent the project area include peregrine falcon, American bald eagle (threatened), dusky Canada goose, northern red-legged frog, and the western pond turtle. Restoration efforts would enhance population recovery efforts for all of these species.

The diverse habitats of the Tualatin River floodplain just north of the Wapato Lake lakebed presently support large numbers of waterfowl and other species. Farmed wetlands, vegetated wetlands, and forested riparian habitat occur on the Tualatin River floodplain. Crop production alters the soil surface of farmed wetlands, but wetland plants will reestablish if farming stops. When flooded in winter and spring, the farmed wetlands of this floodplain support considerable numbers of wintering waterfowl and shorebirds. Upland birds and raptors use these lands in the summer after harvest.

Vegetated wetlands, such as marshes, are scattered in backwater areas on the Tualatin River floodplain. Originally forested, landowners cleared many of these areas to create pasture. Some small marshes in upland areas result from groundwater seepage; others collect precipitation and runoff in depressions. Disturbance from grazing has favored the dominance of reed canary grass (*Phalaris arundinacea*), a European invasive. Reed canary grass forms thick monotypic stands and is not particularly valuable for providing diverse wildlife habitats. Marshes help moderate

groundwater and surface water flow; control sediment transport, erosion, and deposition; and mediate physical and chemical processes affecting water quality and nutrient cycling. Marshes also have value as open space, an aesthetically pleasing feature of the landscape.

Typical tree species of forested riparian habitats along the Tualatin River include red alder (*Alnus rubra*), willow (*Salix* spp), Oregon ash (*Fraxinus latifolia*), Garry oak (*Quercus garryana*), big leaf maple (*Acer macrophyllum*), western red-cedar (*Thuja plicata*), cottonwood (*Populus trichocarpa*), and Douglas-fir (*Pseudotsuga menziesii*). Less common species include grand fir (*Abies grandis*), Pacific yew (*Taxus brevifolia*), black locust (*Robinia pseudoacacia*), and an occasional ponderosa pine (*Pinus ponderosa*). The shrub layer typically includes snowberry (*Symphoricarpos albus*), ocean spray (*Holodiscus discolor*), elderberry (*Sambucus racemosa*), vine maple (*Acer circinatum*), Oregon grape (*Berberis* spp. [aka *Mahonia*]), Douglas spirea (*Spiraea douglasii*), rose (*Rosa* spp.), red-osier dogwood (*Cornus stolonifera*), honeysuckle (*Lonicera* sp.), Indian plum (*Oemleria cerasiformis*), Pacific dogwood (*Cornus nutalii*), and cascara (*Rhamnus purshiana*). Less common species include chokecherry (*Prunus virginiana*), serviceberry (*Amelanchier* spp.), hazelnut (*Corylus cornuta*), currant (*Ribes* spp.), hawthorn (*Crataegus* spp.), pacific ninebark (*Physocarpus capitatus*), poison oak (*Toxicodendron diversilobum*), thimbleberry (*Rubus parviflorus*), and salmonberry (*Rubus spectabilis*). Scotch broom (*Cytisus scoparius*) and blackberry (*Rubus discolor*) are common invasive nonnative plants on disturbed areas.

The root systems of riparian vegetation stabilize river banks, prevent erosion, and trap sediments when streams overtop their banks. As sediments are trapped and stabilized by grasses and sedges, the streambank builds in height and the channel narrows increasing the amount of pool habitat, and reconnects the stream with its floodplain. In conjunction with restoring meander bends, as the stream recovers, a greater proportion of flood flows are stored within the floodplain and metered into the stream as flows recede. As a result summer base or low flows may be increased, and summer stream temperatures should decrease. Woody vegetation adds organic matter and associated nutrients to the river while providing the cover, shade, and cool temperatures essential for fish survival. Riparian alder improves soil microbiology and nutrient cycling. Wetland ecosystems enhance water quality by metabolizing and filtering excessive nutrients and pollutants. Woody riparian habitat also supports a diverse assemblage of birds, mammals, fish, amphibians, and reptiles.

According to Dahl (2000), the acreage of freshwater wetlands continues to decline. The Service is committed to protecting these wetland types pursuant to the Emergency Wetland Resources Act of 1986 and the North American Wetlands Conservation Act of 1989.

Upland forests are dominated by coniferous species such as Douglas-fir, western hemlock (*Tsuga heterophylla*), grand fir, and western red-cedar. Big leaf maple and red alder may also be common. The most common understory shrubs are salal (*Gaultheria shallon*), Oregon grape, snowberry, and vine maple. Sword fern (*Polystichum* spp.) is ubiquitous. Like forested riparian areas, these upland forests provide important wildlife habitats.

The lower Tualatin River is dominated by a warm water fishery consisting of nonnative crappie,

bluegill, catfish, and bass. The upper Willamette River populations of steelhead (*Oncorhynchus mykiss*) and low numbers of Chinook salmon (*Oncorhynchus tshawyscha*), federally-listed as threatened, occur in the Tualatin River and tributaries such as Gales Creek and Scoggins Creek (Friesen and Ward 1995). Low summer flows combined with low gradient areas result in slow moving waters where sediments are deposited and high temperatures prevail producing a low dissolved oxygen condition. These factors, combined with high nutrient loads, create conditions unfavorable for native fish migration and reproduction. As mentioned above, restoring riparian habitat, meandering river channels, and floodplain wetlands will improve water quality and fish habitat in the Tualatin River system.

Through 1997, the Oregon Department of Fish and Wildlife (ODFW) stocked the Tualatin River and its tributaries with winter steelhead (*Oncorhynchus mykiss*), coho salmon (*Oncorhynchus kisutch*), and rainbow trout (*Oncorhynchus mykiss*). The ODFW continues to stock hatchery rainbow trout into Henry Hagg Lake, Dorman Pond, Commonwealth Lake, and Bethany Lake for the public sport fishery.

3.3 Socioeconomic Environment

Some of the most productive agricultural lands in the nation are found in the Willamette Valley. The region is also home to nearly 70 percent of Oregon's population and accounts for 75 percent of the State's economy (Daggett et al. 1998).

3.3.1 Population Growth

The population of Washington County continues to experience one of the most rapid growth rates in the country. In 1950 the county population was 61,269; in 1990 the population was 311,554; in 2000 the population was 445,342; and in 2003 the population was 472,600. The population of Washington County in 2000 represents a 42.9 percent increase over 1990. The Washington County population will probably continue to grow faster than both the national and the State's average rate. The Cedar Hills-Beaverton-Tigard area has the majority of the county population.

In 1950 the Yamhill County population was 33,484, and in 1990 the population was 65,551. By 2000 the population was 84,992, and in 2003 the population was 88,150. The population of Yamhill County in 2000 represents a 29.7 percent increase over 1990. During the same time period, the increase in population for Oregon was 20.4 percent, and for the entire United States it was 13.1 percent.

3.3.2 Economic Growth

In the last 30 years, Washington County's economy has grown at rates exceeding that of Oregon and the nation. Since 1980, employment grew nearly three times as fast as the national employment rate, and more than twice as fast as employment in Oregon as a whole. In 2002, the unemployment rate in Washington County was 6.7 percent. Since 1980, employment in Yamhill County grew at the same rate as Oregon's, but 20 percent faster than employment nationwide.

Yamhill County's unemployment rate was 7.4 percent in 2002, whereas the unemployment rates for Oregon and the nation were 7.5 percent and 5.8 percent, respectively.

In 2003, Washington County farm and ranch gross sales totaled nearly $223 million, placing the county fourth in the State in total farm sales; Yamhill County gross sales were over $225 million, placing third in the State (Oregon Agricultural Statistics Service 2003-2004). In nursery and greenhouse crops Washington County ranked third with sales of nearly $164 million, while Yamhill County ranked fourth at nearly $107 million. Nursery and greenhouse crops accounted for 74 percent of commodity sales for Washington County, and 48 percent for Yamhill County. Agriculture is still the main economic activity within the Wapato Lake Unit Study Area. However, in Washington and Yamhill Counties, growth and diversification of the non-farm economy has reduced the relative contribution agriculture makes to the Counties' total economy.

The principal industries of Yamhill County are agriculture, lumber, education, international aviation, dental equipment, manufactured homes, pulp and paper, and steel. The Evergreen Aviation Museum in McMinnville is home to Howard Hughes' Spruce Goose. The county's primary industry is agriculture, specifically wheat, barley, horticulture, and dairy farming. Yamhill County is the major supplier of hazelnuts in the United States. This county is also the center of Oregon's wine industry. Thirty-six wineries represent the largest concentration of wineries in any county and produce the greatest number of award-winning wines in the State. One-third of the county is covered with commercial timber, and the economic mainstay of the western part of the county is logging and timber products.

The expanding Portland metropolitan area has extended to the eastern boundaries of Yamhill County and brought an increase in property values and demand for greater services from the private sector and county government. Nearly one-fifth of the county's workforce commutes to the Portland metropolitan area. Yamhill County is meeting these demands by developing long-range plans for transportation, water, land use, criminal justice, and human services.

In Washington County, three technology-based industries are the cornerstone of the county's economy. These three are machinery, including computing equipment and peripherals; electrical equipment and components, including semiconductors; and instruments, including electrical measuring devices, oscilloscopes, and industrial controls. Other technology-based manufacturers produce optical instruments and lenses, engineering instruments, and photographic equipment and supplies. Production in technology-based industries results in employment in the fabricated metals industry. The limited amount of mining activity in Washington and Yamhill Counties makes it a minor contributor to the total economy. Tourism and recreation are becoming more important economic factors. Area residents live within a two-hour commute to either the Cascade Mountains or the Pacific Coast. Year-round, residents and tourists can enjoy the region's abundant natural resources to boat, water ski, fish, camp, climb, backpack, snow ski, raft, and many other outdoor activities.

3.3.3 Land Use

Washington County contains approximately 465,280 acres; Yamhill County is of comparable size at 459,520 acres. Most land outside the Tualatin Valley is forested. Development for agriculture, residential housing, or light industrial use occupies much of the land in the Valley. In 2004, the top five commodities in Washington County were nursery and greenhouse crops, farm forest products, tall fescue, and dairy products. In Yamhill County the top five commodities were nursery crops, tall fescue, perennial ryegrass, dairy products, and farm forest products (OSU Extension Service, Oregon Agricultural Information Network). In the Wapato Lake lakebed farmers historically grew onions. Although onion production in western Oregon rose 120 percent from 1987 to 1997, the value of onions continued to decline, and many farmers have decided to plant other crops.

Acreage in farms has generally decreased due to the pressures of urbanization. In Washington County, farm acreage totaled 140,884 acres in 1997, and 130,683 acres in 2002, a decline of 7.2 percent. In Yamhill County, farmed acreage totaled 204,739 acres in 1997, and 196,298 acres in 2002, a decline of 4.1 percent (2002 Census of Agriculture County Data). During the same time, acreage of land in Conservation Reserve or Wetlands Reserve Programs declined in Washington and Yamhill Counties by 25.6 percent and 24.2 percent, respectively.

Washington County currently has Federal land administered by Bureau of Land Management (BLM), BOR, and the Service; three State parks; and two county parks. The Tualatin Hills Parks and Recreation District is a special entity that owns and/or manages more than 200 parks and more than 35 miles of trails in Washington County. Yamhill County contains 4 State parks and 15 county parks. Both counties have several public golf courses. Many people enjoy Henry Hagg Lake, in Washington County, for boating and fishing. No designated wilderness areas and no “wild and scenic” river reaches exist in either county.

The Wapato Lake study area shares its north border with Metro's urban growth boundary for the Forest Grove-Cornelius region. Metro has purchased 606 acres along Gales Creek near its confluence with the Tualatin River. All of the newly acquired land provides greenspace value; connectivity between existing natural areas (Tualatin River, the 243-acre Fernhill Wetlands Complex, and a 363-acre wetland mitigation bank owned by Clean Water Services); water quality and quantity benefits; and recreation, education, and stewardship opportunities.

The Washington County Department of Land Use and Transportation regulates private land use outside the urban growth boundary. The Rural/Natural Resource Plan guides conservation and development according to the potential of the land and in accord with State and regional requirements. In Yamhill County, the Department of Planning and Development governs private land use. The Comprehensive Land Use Plan guides the county’s growth and development. In both counties, land use plans must be in compliance with statewide planning regulations administered through the Oregon Department of Land Conservation and Development.

Taxes are assessed on all taxable property by the County Assessor's office. In addition to property taxes on private lands, the counties receive revenues from the BLM and Service land holdings in the form of payment-in-lieu-of taxes.

All factors seem to point to continued population and economic growth in Washington and Yamhill Counties, however, at a reduced rate from the past few years. Demands upon the land base for industrial and residential development will increase accordingly. Substantial programs are in place to support and further encourage urban growth and development whereas efforts to protect and restore wetland and wildlife values in urban areas have thus far been somewhat limited. Extensive development could easily detract from the counties' attractiveness as a place to live and work. Amenity issues are increasingly important in the business and residential location decision-making process as well as land development decisions. The establishment of accessible open space, such as the Wapato Lake Unit may help to enhance the climate for future economic growth in Washington and Yamhill Counties.

A number of other agencies have recognized the biological and cultural values of wetlands and open space. The Oregon Department of Fish and Wildlife has numerous programs to promote wetland protection for fish and wildlife. The Oregon Division of State Lands, by virtue of its Wetland Fill and Removal Permit Program, has recognized the biological and economic values of Oregon wetlands. The Oregon Department of Water Resources has adopted statewide policies promoting protection of water-related functions of riparian areas on public lands and protection of instream flows. The Washington County Comprehensive Plan and the Yamhill County Comprehensive Land Use Plan recognize the ecological and social values that wetlands and riparian habitats provide. These habitats offer economic and environmental benefits other resources cannot provide, including water quality enhancement, recreation, fish and wildlife habitat, and aesthetic features.

3.3.4 Cultural Resources

The Service conducted a record search for the Wapato Lake Unit Study Area using the records on file at the Oregon State Historic Preservation Office. A few documented historic properties were identified within the Study Area boundary, including the historic A.T. Smith house built in 1856 which is listed on the National Register of Historic Places. The house was purchased by the Friends of Historic Forest Grove in 2005 for preservation and to serve as an interpretative center. The other cultural resource sites that were identified are prehistoric and their location is confidential. Several Tualatin Native American villages, described in the ethnographic record, are reported to have existed in the vicinity.

CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

This section analyzes and compares the environmental consequences anticipated from the implementation of each alternative. The environmental consequences likely to occur if the Service does not establish the Wapato Lake Unit are described under Alternative A, the No Action Alternative. The effects of the action alternatives, Alternatives B through E, involving establishing the Wapato Lake Unit are analyzed using the physical, biological, and socioeconomic factors relevant to the issues described in Chapter 1.

4.1 Alternative A: No Action Alternative

The No Action Alternative represents no change from the existing management of lands in the Study Area. The No Action Alternative is the baseline to which the other alternatives are compared. Under this alternative, the Service would not acquire interest in the lands in the Study Area for the purpose of establishing the Wapato Lake Unit.

The existing Federal land already under management by the Service in and adjacent to Wapato Lake lakebed may not be restored and may be placed into a cooperative farming agreement as an interim management practice. The Service would study the options for long-term management and evaluate these options as well as possible disposal of the property.

4.1.1 Physical Consequences

The distribution, general location, and extent of land use in the Study Area and vicinity would be guided by the appropriate county comprehensive plan and zoning ordinances. The comprehensive plan is the official overall policy statement of a county relating to land use and planning issues and provides a broad outline of future land use patterns. The zoning ordinance regulates land use by dividing the unincorporated areas of a county into districts or zones and specifies the uses that are permitted or prohibited within each district. Under the No Action Alternative, existing land use patterns in the Study Area would remain under the authority of Washington and Yamhill Counties.

Under the No Action Alternative, the Service may place existing Service lands (108 fee title acres and 32 easement acres), in and adjacent to the Wapato Lake lakebed, into an interim cooperative farming agreement, similar to the surrounding landscape. The Service may not restore the property because, as a habitat fragment, the potential of the area to function ecologically is limited. Without restoration, the property is not likely to contribute to floodplain habitat diversity or improved water quality. However, the Oregon Department of Water Resources would continue its efforts to protect and enhance water in the vicinity. The Service would study options for the long-term including disposal of the property. In this case, the land would likely be purchased for agriculture, as long as the area remains zoned for agricultural use.

4.1.2 Biological Consequences

Under the No Action Alternative, habitat restoration or management may not be provided for migratory waterfowl and resident fish and wildlife. Wildlife may not be provided secure habitat which is managed specifically for their benefit. Wildlife populations would change depending upon land use and habitat changes which take place within the Study Area. As with any land modification, habitat changes may benefit some species and be detrimental to others.

Wetlands are afforded some protection from development under Federal and State wetland use regulations and county land use regulations. In spite of the above regulations, wetlands continue to be lost, especially in urbanizing areas. Without additional protection, there is little indication the wetland loss trend of past years will not continue. In many ways, agricultural activities are exempt from wetland regulations and often reduce wetland values to wildlife and may reduce other public benefits that wetlands provide. Riparian habitat would also likely continue to be lost due to land clearing activities such as logging or for agricultural purposes.

Fragmentation of the existing natural habitat is likely to continue without landowner incentives. Two major forces are at work which could continue to remove suitable wildlife habitat from the Study Area: urban expansion and conversion of agricultural lands to non-wildlife compatible crops such as nursery stock or vineyards. Metro's land protection efforts (Section 1.5) will continue to provide important habitat conservation in the vicinity of the Wapato Lake Unit. However, without the additional protection that the Wapato Lake Unit would provide, these lands could well become isolated islands of natural habitat amidst development and/or agriculture practices.

Existing Service lands in and adjacent to the Wapato Lake lakebed may not be restored. The Service may place the property under a cooperative farming agreement and study options for the long-term, including disposal. The land under Service management now, in and of itself, does not warrant restoration or long-term management. The limited size of the property does not allow the Service to fulfill the purpose of the Wapato Lake Unit or the mission of the Refuge System.

4.1.3 Socioeconomic Consequences

There would be no changes to the local communities due to Service activities under the No Action Alternative. No lands would be removed from the tax rolls; therefore, tax revenues would remain unchanged. Public use would remain restricted by private land ownership and outdoor recreation opportunities would remain limited within the area. The 108 acres of existing fee title land already under management by the Service in and adjacent to Wapato Lake lakebed would still be subject to revenue sharing payments. In 2004, county revenue sharing payments for these lands was as follows; Yamhill County totaled $742.00 for 97.16 acres and Washington County totaled $113.00 for 11 acres. These lands would not be restored and may be placed into a cooperative farming agreement as an interim management practice.

The overwhelming majority (97.4 percent) of the Study Area is zoned agriculture, therefore, under the No Action Alternative the study area is expected to remain in agricultural use.

4.2 Environmental Consequences Common to All the Action Alternatives

Under the four action alternatives, Alternatives B through E, the Service would establish the Wapato Lake Unit. The following environmental consequences apply to the implementation of the four alternatives.

Protection and restoration of the habitats described would help maintain populations of ducks, geese and swans in the Pacific Flyway. Although it is not possible to quantify the increment of benefit to the migratory bird resource from this proposal, failure to protect and restore these habitats would result in population declines in the future. However, based on the relatively small size of the Wapato Lake Unit, and in the context of continuing regional habitat losses and habitat degradation, implementing the action alternatives would not result in significant environmental effects.

Federal acquisition of private lands on which cultural resources are located would have a positive effect on those resources by bringing them under the protection afforded by the National Historic Preservation Act and other cultural resource preservation laws. To ensure refuge management activities do not have adverse effect on historic properties, the Service would follow established procedures and comply with Federal laws and policies for considering the impacts of any character-altering of buildings and/or ground disturbance, including habitat restoration, on a case-by case basis.

4.2.1 Land Acquisition

For each of the action Alternatives, it is important to note that land acquisition would be occurring over an extended period of time. Since acquisition is governed by the willingness of landowners to sell to the Service, and availability of funds, management and public use may be limited until such time as a manageable unit of land is acquired. The uncertainty of land acquisition under the willing seller policy, coupled with the unpredictability of the future economic and social climate prevents the impact analysis from being an exact science.

4.2.2 Habitat Management

The Service would only restore lands purchased and/or managed by the Service for the Wapato Lake Unit. For example, the Service would begin restoring the natural hydrology of the Wapato Lake lakebed once a manageable amount of contiguous property is acquired from willing sellers and the restoration would not affect private property. Restoration efforts would focus on removing nonnative plant species and establishing native plant communities for the benefit of fish and wildlife.

Although the focus of management would be on restoring and maintaining native plant communities, some level of pasture and/or cropland management may be used to provide forage

and sanctuary to encourage greater use of Wapato Lake Unit lands by geese versus the use of adjacent agricultural lands. Restoration of native forest plant communities could encourage expansion of black-tailed deer populations using these habitats as cover.

As is the case with all other action alternatives, restoration activities may cause short-term erosion problems similar to those existing under current agricultural activities, but would provide long-term positive benefits to erosion and land stabilization.

4.2.3 Wildlife-Dependent Public Use

The Service would start with modest Service guided wildlife-dependent public use. Then, once the Service has an adequate land base, the Service would expand public use as appropriate. Priority wildlife-dependent recreational and educational opportunities that may be offered include hunting, fishing, wildlife observation and photography, and environmental education and interpretation. Public use would be allowed where consistent with the Refuge System mission, and the purposes for establishing the Wapato Lake Unit. For each public use implemented, supporting programs and infrastructure would be developed consistent with compatibility and environmental compliance guidelines and to meet the expected degree of use.

Wildlife-dependent public use opportunities on the Wapato Lake Unit would be relatively small compared to the other opportunities available in the county and the surrounding community. Also, public use would be allowed only where it would be compatible with Wapato Lake Unit purposes and the Refuge System mission; therefore, the impacts would not be significant.

4.2.4 County Tax Revenue

Fee acquisition would remove lands from Washington County and Yamhill County tax rolls. Nearly all the land in each of the action alternatives, Alternatives B through E, is zoned for exclusive farm use and has a deferred tax status. In the first three alternatives, Alternatives B through D, the areas zoned for uses other than agriculture are negligible. In the largest alternative, Alternative E, only 2.6 percent of the entire area is zoned for uses other than agriculture.

The Service would make annual payments to the Counties through the Refuge Revenue Sharing Act to compensate for lost tax revenues. The nationwide formula used to calculate revenue sharing payments to Counties is detailed in Chapter 1, Section 1.9. The annual payments the Service would make to the Counties would be roughly the same as the taxes that would have been collected for these properties. Because of these annual revenue sharing payments there would be no significant impact to the tax base of the Counties as a result of implementing any of the action alternatives.

4.2.5 Wapato Lake Unit Tourism and Spending in the Local Economy

The Service anticipates a minor increase in tourism could occur if the Wapato Lake Unit is established which would bring income to the local economy. Visitors would likely support

recreation-oriented businesses. This would include purchasing lodging at local hotels, meals at local restaurants, fuel, and purchase of other goods and services related to nature tourism such as film, binoculars, and clothing. Refuge staff would support local businesses throughout the course of conducting Unit operations.

4.2.6 Land Use Zoning

Incorporating these lands into the Wapato Lake Unit boundary would not create any new zoning, land use regulations, or changes to permitted uses. It would not affect the ability of private landowners and local jurisdictions to implement adopted land use plans. Local jurisdictions would be under no Service requirement to amend their land use plans to conform to the Wapato Lake Unit boundary, nor would landowners be under any obligation to sell their land or interest in their land to the Service. Therefore, implementation of this alternative would not have a significant effect on land use zoning in the area.

4.2.7 Agricultural Production

Since almost all the land under the action Alternatives (Alternatives B through E) is in agricultural production, fee acquisition would keep these lands in open space but remove them from farm production. The number of acres removed from production and the monetary value removed from the total monetary value generated by agriculture in Washington and Yamhill Counties is not significant. See the following estimates:

Table 6. Washington and Yamhill Counties' Agricultural Acreage within the Wapato Lake Unit

Alternative	Acres in Agricultural Production within the Unit	Percent of Counties' Acres within the Unit
Alternative B	1,845 acres	.01 %
Alternative C	1,885 acres	.01 %
Alternative D	2,879 acres	.04 %
Alternative E	4,408 acres	.16 %

Agriculture operations in the Wapato Lake Study Area support local and regional businesses by purchasing: seed for planting; feed; petroleum and chemical products; farm building and equipment construction, supplies, and repair; animal housing; veterinary services; production inspection and licensing; food processing, packaging, storing, and shipping; and accounting, legal, and payroll services. Under the four action alternatives, these industries would be minimally affected by removing the acreages being considered for the Wapato Lake Unit from agricultural production. In light of the total amount of farmland in Washington and Yamhill Counties (130,683 acres and 196,298 acres respectively), the amount of agricultural land that would be removed under even the largest Wapato Lake Unit proposal (4,408 acres under Alternative E) would not cause a significant impact to the Counties' agricultural production.

Most of the farms in and around the Wapato Lake lakebed support a certain amount of wildlife on pastureland, woodlands, and/or wetlands. In fact, to a degree, the wildlife habitats interspersed with agricultural production on these farms have helped maintain wildlife populations for generations. If the Wapato Lake Unit was established, the Service would seek opportunities to collaborate on wildlife conservation with neighboring farms.

The next section details the anticipated consequences of each action alternative (Alternatives B through E).

4.3 Alternative B, a 1,960-Acre Wapato Lake Unit

Alternative B encompasses the historic Wapato Lake lakebed as well as a small amount of land beyond the historic lakebed and outside of the 100-year floodplain (see map page 15). This area is roughly bounded by Spring Hill Road to the east, Gaston Road to the north, State Highway 47 on the west, and Flett Road to the south.

4.3.1 Physical Consequences

Currently the lakebed area is in agricultural use. Thus, restoring native habitats would locally improve water quality because it would mean less herbicides and pesticides being applied to the landscape, and the restored native vegetation would metabolize the nutrients and contaminants before they reach the creeks or ground water. Water quality improvement from Wapato Lake Unit wetland restoration would be localized, and would not result in significant environmental effects. Restoration activities may cause short-term erosion effects not entirely different from current farming practices, but restoration may reduce erosion in the long-term.

4.3.2 Biological Consequences

Service restoration of the Wapato Lake lakebed and vicinity to herbaceous and scrub-shrub wetland habitats would provide habitat for a variety of waterfowl, wading birds, shorebirds, and songbirds. The Wapato Lake lakebed used to have an abundance of swans that would likely return if the lakebed was restored. Cackling and dusky Canada geese and pintails would also benefit. Weasels, mink, beaver, black-tailed deer, and raptors such as red-tailed hawks would benefit as well.

A comparable example is the Steinborn Unit of the Tualatin River National Wildlife Refuge in Sherwood, Oregon, where 450 acres were restored to similar habitat types and now support up to 30,000 ducks and geese. Thus, a similar response might be expected at the Wapato Lake Unit. The Steinborn Unit is one half the size of the Wapato Lake lakebed, therefore, restoration of wetlands could provide habitat for as many as 60,000 ducks, geese, and swans.

Pending funding and willing sellers, the Service could acquire the lands identified under Alternative B if this alternative is selected for implementation. The protection of these lands through acquisition, or other mechanisms, would allow for the conservation, protection, and restoration of wildlife habitats which support migratory birds and resident wildlife, improve

biodiversity, and support wildlife-dependent public use activities. Protection of these lands would have a positive impact on the natural environment.

4.3.3 Socioeconomic Consequences

Land Use

Under Alternative B, approximately 1,069 acres of cropland in Washington County and 776 acres of cropland in Yamhill County could be removed from agriculture and restored and managed as wildlife habitat. This represents an average of 0.8 percent total cropland in Washington County and 0.4 percent total cropland in Yamhill County. These percentages are not a significant impact on the local economy compared to the total number of acres of cropland in each County. Landowners would not be required to sell to the Service and may choose to use their land under current State and local regulations. Willing sellers within the boundary of this alternative would have the opportunity to sell their land to the Service. If the Service acquires property from willing sellers, acquired lands would be managed for fish and wildlife habitat.

In order to restore and maintain native wetland habitats in the Wapato Lake lakebed, the Service would need to secure primary State-appropriated water rights and secondary water rights managed through TVID on behalf of the BOR. Lands under Alternative B fall under the operation authority of the WID. The WID owns all physical water conveyance and drainage systems and is responsible, through an agreement with the BOR and TVID, for the maintenance and operations associated with measuring, diverting, conveying, and delivering water to all landowners of the district on a daily basis. Funds to maintain some of these facilities have been derived from an annual assessment applied to all landowners within the WID's boundary.

From a conceptual perspective, if the Service began to acquire property a new agreement could be arranged between the BOR, the TVID, and the Service, whereby use of infrastructure for delivery of water would continue and routine operations and maintenance responsibilities would revert back to the TVID. This type of agreement could be developed upon purchase by the Service of infrastructure presently owned by the WID. Major improvements to existing infrastructure would become the responsibility of the Service. Current water delivery to landowners would not be impacted and associated annual water duty assessment payments to the TVID would continue for landowners located both inside and outside the WID boundary. The land use would gradually be converted from almost entirely agriculture to native Willamette Valley habitat types that support a variety of wildlife species. Over time, the area under Alternative B would remain in open space type use which would result in local communities continuing with the rural lifestyle.

4.4 Alternative C, a 2,430-Acre Wapato Lake Unit

This proposal essentially includes the Wapato Lake lakebed (included in Alternative B) and adjacent bottomland to the south including the areas around Ayers and Wapato Creeks. The area includes all the land in Alternative B, lands along Wapato Creek between Wapato School Road and State Highway 47, and lands along Ayers Creek west of Spring Hill Road south to about a

half-mile south of Laughlin Road (see map on page 16). If lands were acquired from willing sellers, the Service would restore the lakebed as previously noted, the adjacent bottom land to native wetland, riparian forest along the creeks, and upland grassland communities for the benefit of fish and wildlife.

4.4.1 Physical Consequences

The Service, through establishment of the Wapato Lake Unit, could contribute to enhanced water quality through wetland enhancement and by restoring riparian areas along creeks. Should the Service be able to acquire manageable units of land for wetland enhancement, water from various tributaries flowing onto the Wapato Lake Unit would be filtered through Wapato Lake Unit wetlands. Nutrients such as nitrates would be metabolized by wetland vegetation, resulting in higher quality water entering the Tualatin River.

Irrigation water rights are appurtenant to some of the land within the Wapato Lake Unit. These water rights could be used in the Wapato Lake Unit water management program through irrigation under existing or transferable rights to support wildlife enhancement.

The potential exists for the Service to purchase, lease, or transfer water rights with a conservation easement or a fee title purchase. Transferring irrigation rights to other out-of-stream uses could benefit habitat, recreation, and water quality. Purchase, lease, or transfer of irrigation rights for instream purposes could enhance streamflows for the benefit of fish, aquatic wildlife, riparian habitat, water quality, and wetlands.

4.4.2 Biological Consequences

Simply protecting habitat from development and degradation provides wildlife with benefits. A stable habitat base which provides wildlife with the necessary food and cover may allow populations to flourish. Under Service management, habitats could be modified to provide better habitat conditions, thereby enhancing species populations. Based on the Service's primary responsibilities, the Service would be seeking to restore and enhance wetland and riparian habitats for migratory waterfowl, other migratory birds, and resident fish and wildlife. Habitats would be managed for the benefit of diverse wildlife species wherever practicable.

Specific benefits to wildlife and habitats from this alternative would be to: protect wetland and riparian habitat from drainage, filling, and other degradations; provide habitat for many species of water-dependent birds such as waterfowl, shorebirds, and wading birds; provide perching sites and foraging grounds for birds of prey; and provide habitat for songbirds, furbearers, big game, and other land mammals. As in Alternative B, cackling and dusky Canada geese and pintails would benefit from wetland habitat restoration.

With riparian areas protected and restored along Wapato and Ayers Creeks under this alternative, there would be an increase in habitat for numerous songbird species such as willow flycatcher and American robin. Raptors such as red-tailed hawks, northern harriers, and American kestrels would benefit as well.

4.4.3 Socioeconomic Consequences

Land Use

Up to 1,069 acres of cropland in Washington County and 816 acres of cropland in Yamhill County could be removed from agriculture and restored and managed as wildlife habitat under Alternative C. This represents an average of 0.8 percent total cropland in Washington County and 0.4 percent of cropland in Yamhill County. These percentages are not a significant impact on the local economy compared to the total number of acres of cropland in each county.

Landowners with land located within Alternative C would not be required to sell to the Service and may choose to use their land under current State and local regulations. Willing sellers within the boundary of this alternative would have the opportunity to sell their land to the Service. If the Service acquires property from willing sellers, acquired lands would be managed for fish and wildlife habitat.

The land use would gradually be converted from almost entirely agriculture to native Willamette Valley habitat types that support a variety of wildlife species. Over time the land within Alternative C would remain in open space type use which would result in local communities continuing with the rural lifestyle.

As in Alternative B, water rights held by landowners who do not wish to sell their land to the Service and/or who own land outside the Wapato Lake Unit boundary but rely on water conveyance and drainage systems under the operation of the WID would not be affected. Landowners along Wapato and Ayers Creeks will continue to utilize their existing water rights under the delivery authority of TVID, but the potential exists for the Service to purchase, lease, or transfer water rights with a conservation easement or a fee title purchase.

4.5 Alternative D, a 4,310-Acre Wapato Lake Unit (Preferred Alternative)

The Service's preferred alternative includes the Wapato Lake lakebed, adjacent bottomland to the south (all lands included in Alternatives B and C), plus bottomland to the north. Additional lands to the north encompass the area roughly bounded by Spring Hill Road to the east and north, State Highway 47 to the west, an area of wetland immediately west of State Highway 47 (east of Old Highway 47 and Lookingglass Drive), and Gaston Road on the south (see map on page 18). The action under this alternative is to restore: the Wapato Lake lakebed to herbaceous and scrub-shrub wetland habitats for migratory waterfowl and marsh and shorebirds; adjacent bottomland to native wet meadow and upland grassland communities for migratory marsh and wading birds and grassland birds; and riparian habitat for neotropical migrant songbirds, raptors, and other riparian-dependent species.

Applicable to Alternatives D and E, a Joint Water Commission including the cities of Hillsboro, Forest Grove, Beaverton, and Tigard as well as the Tualatin Valley Water District and Clean Water Services are presently planning and investigating land acquisition options along a route for an eight-foot diameter pipeline that would intersect a small section of Alternative D and a

larger section of Alternative E. Following Scoggins Creek and upon intersecting with Highway 47, the pipeline would follow the eastern edge of the highway through the northwest portion of the Wapato Lake Unit boundary. Near Spring Hill Road, it would head easterly crossing the floodplain and terminate at one of the water treatment facilities. Acquisition options inside the Wapato Lake Unit boundary could include purchase of an easement for the footprint portion of the pipeline or purchase in fee of an entire property. Clean Water Services, a waste-water and storm-water public utility, has indicated an interest in exploring options of either selling or donating to the Service, portions of purchased properties if pipeline acquisitions are to proceed and determined later to be excess to their needs. Properties would need to be within the approved Wapato Lake Unit acquisition boundary and be approved for a lot line adjustment or partition by Washington County. This type of land use action is presently authorized by Washington County for the Tualatin River National Wildlife Refuge.

4.5.1 Physical Consequences

The Service could contribute to enhanced water quality through wetland enhancement and by restoring riparian areas along the Tualatin River. Should the Service be able to acquire manageable units of land for wetland enhancement, water from tributaries and surface runoff flowing onto the Wapato Lake Unit would be filtered through its wetlands. Nutrients such as nitrates would be metabolized by wetland vegetation, resulting in higher quality water entering the Tualatin River.

Irrigation water rights are appurtenant to some of the land within the Wapato Lake Unit. These water rights could be used in the Wapato Lake Unit water management program through irrigation under existing or transferable rights to support wildlife enhancement.

The potential exists for the Service to purchase, lease, or transfer water rights with a conservation easement or a fee title purchase. Transferring irrigation rights to other out-of-stream uses could benefit habitat, recreation, and water quality. Purchase, lease, or transfer of irrigation rights for instream purposes could enhance streamflows for the benefit of fish, aquatic wildlife, riparian habitat, water quality, and wetlands.

Plant communities will be managed to provide long-term soil stabilization in most areas. Management of nonnative plant species may include mowing, discing, licensed herbicide application, or other similar treatments.

4.5.2 Biological Consequences

Under this alternative, the Service would protect the areas described under Alternatives B and C. The additional lands in this alternative include intact riparian habitat along the Tualatin River and existing emergent and forested wetlands. Areas also exist that have the potential to be restored to riparian, wetland, wet meadow, and upland prairie habitat types. These areas would support a number of habitats rich in a diversity of species. Wetlands will provide habitat for many species of water-dependent birds, such as waterfowl, shorebirds, and wading birds. Some of the species that would benefit from forested habitats include birds of prey such as western

screech owls, Cooper's hawks, ospreys, and bald eagles; neotropical landbirds such as wood warblers, flycatchers, and vireos; and year round resident birds such as pileated woodpeckers, and chickadees. Riparian areas also support cavity nesting species and provide perch sites. Prairie habitats would support rare species endemic to western Oregon such as Kincaids lupine, Nelson's checker mallow, and western meadowlarks. Amphibians such as salamanders and red-legged frogs; reptiles such as western pond turtles; and mammals such as river otters; would benefit from aquatic habitat restoration under this alternative.

4.5.3 Socioeconomic Consequences

Land Use

Up to 2,063 acres of cropland in Washington County and 816 acres of cropland in Yamhill County could be removed from agriculture and restored and managed as wildlife habitat. This represents an average of 1.6 percent of the total cropland in Washington County, and 0.4 percent of all cropland in Yamhill County. These percentages are not a significant impact on the local economy compared to the total number of cropland acres in each county.

Willing sellers within the boundary of this alternative would have the opportunity to sell their land to the Service. If the Service acquires property from willing sellers, acquired lands would be managed for fish and wildlife habitat.

The land use would gradually be converted from almost entirely agriculture to native Willamette Valley habitat types that support a variety of wildlife species. Over time, the Unit under Alternative D would remain in an open space type use which would result in local communities continuing with the rural lifestyle.

Under the preferred alternative, as in alternatives B and C, landowner's water rights would not be affected if they do not wish to sell their land to the Service. Landowners outside the Wapato Lake Unit boundary and/or the boundary of the WID who rely on water conveyance and drainage systems of the district, will continue to utilize their existing water rights under the delivery authority of TVID. Both State-appropriated and TVID water rights associated with parcels inside the Wapato Lake Unit boundary would be eligible for purchase, lease, or transfer upon completion of a conservation easement or a fee title purchase.

4.6 Alternative E, a 6,280-Acre Wapato Lake Unit

This is the alternative with the largest amount of acreage and includes most of the land within the original Study Area. The area includes all lands described in Alternatives B, C and D. In addition, lands to the north of Alternative D bounded by State Highway 47 on the west, a portion of Gales Creek between State Highway 47 and Old Highway 47, land south of the Forest Grove city limits, land south and east of Fern Hill Wetlands, and lands roughly west of Fern Hill Road are included in this alternative (see map on page 19). The action proposed under this alternative is to restore habitats within the previous alternatives as described and additional herbaceous wetland habitats, native wet meadow and upland grassland communities, and riparian habitat.

Alternative E encompasses the largest Wapato Lake Unit acreage. The additional portion of property is closest to urbanization. The close proximity to an urban area would expose the Wapato Lake Unit to feral animals such as dogs and cats that could disturb or kill wildlife. Additional factors associated with urban areas include trash, vandalism, and lights and noise that may disturb wildlife.

Applicable to Alternatives D and E, a Joint Water Commission including the cities of Hillsboro, Forest Grove, Beaverton, and Tigard as well as the Tualatin Valley Water District and Clean Water Services are presently planning and investigating land acquisition options along a route for an eight-foot diameter pipeline that would intersect a small section of Alternative D and a larger section of Alternative E. Following Scoggins Creek and upon intersecting with Highway 47, the pipeline would follow the eastern edge of the highway through the northwest portion of the Wapato Lake Unit boundary. Near Spring Hill Road, it would head easterly crossing the floodplain and terminate at one of the water treatment facilities. Acquisition options inside the Wapato Lake Unit boundary could include purchase of an easement for the footprint portion of the pipeline or purchase in fee of an entire property. Clean Water Services, a wastewater and storm-water public utility, has indicated an interest in exploring options of either selling or donating to the Service portions of purchased properties if pipeline acquisitions are to proceed and determined later to be excess to their needs. Properties would need to be within an approved Wapato Lake Unit acquisition boundary and be approved for a lot line adjustment or partition by Washington County. This type of land use action is presently authorized by Washington County for the Tualatin River National Wildlife Refuge.

4.6.1 Physical Consequences

The Service could contribute to enhanced water quality through wetland enhancement and by restoring riparian areas along Tualatin River. Should the Service be able to acquire manageable units of land for wetland enhancement, water from tributaries and surface runoff flowing onto the Wapato Lake Unit would be filtered through the Unit's wetlands. Nutrients, such as nitrates, would be metabolized by wetland vegetation, resulting in higher quality water entering the Tualatin River.

4.6.2 Biological Consequences

Gales Creek is part of Alternative E only. The creek and surrounding area would provide additional riparian habitat as well as the potential for restoring associated wetlands. This creek currently supports federally-listed threatened winter run steelhead trout. Restoration of lands adjacent to Gales Creek would likely improve water quality in both Gales Creek and the Tualatin River, benefiting steelhead and other native fish. Restoration of additional wetland, wet meadow, upland prairie, and riparian forest would provide additional habitat for species listed previously under Alternatives B, C, and D.

4.6.3 Socioeconomic Consequences

Land Use

Up to 3,592 acres of cropland in Washington County and 816 acres of cropland in Yamhill County could be removed from agriculture and restored and managed as wildlife habitat. This represents an average of 2.7 percent of the total cropland in Washington County and 0.4 percent of cropland in Yamhill County. These percentages are not a significant impact on the local economy compared to the total number of acres of cropland in each county.

Willing sellers within the boundary of this alternative would have the opportunity to sell their land to the Service. If the Service could obtain funding to acquire property from willing sellers, acquired lands would be managed for fish and wildlife habitat.

Land in this alternative may be subject to future expansion and annexation of Forest Grove and/or expansion of the Urban Growth Boundary. As this city grows it is possible that expansion will occur within the Wapato Lake Unit boundary.

The land use would gradually be converted from largely agriculture to native Willamette Valley habitat types that support a variety of wildlife species. Over time, the land under Alternative E would remain in an open space type use which would result in local communities continuing with the rural lifestyle.

Under Alternative E, as in the other alternatives, landowner's water rights would not be affected if they do not sell their land to the Service. Landowners outside the Wapato Lake Unit boundary and/or the boundary of the WID who rely on water conveyance and drainage systems of the WID will continue to utilize their existing water rights under the delivery authority of TVID. Both State-appropriated and TVID water rights associated with parcels inside the Wapato Lake Unit boundary would be eligible for purchase, lease, or transfer upon a conservation easement or a fee title purchase.

4.7 Rationale for Selection of the Preferred Alternative

The smallest alternative, Alternative B, encompasses the core of the Wapato Lake Unit, the historic Wapato Lake lakebed. Each successive Wapato Lake Unit size (Alternatives C, D, and E) contains additional wildlife habitat and other attributes that were considered in the comparison of Alternatives as discussed below.

Alternative D was selected as the Preferred Alternative because it would contribute the most to the purpose and need for establishing the Wapato Lake Unit. Immediately below is a discussion on the reasons why the No Action Alternative and Alternatives B, C, and E were not identified as the Preferred Alternative, followed by a discussion outlining why Alternative D was selected as the Preferred Alternative.

- The No Action Alternative provides little likelihood that important wildlife habitats would be protected, restored, and managed.

- Alternatives B and C provide an opportunity for the Service to protect, restore, and manage the historic Wapato Lake lakebed, however, they provide minimal opportunity to protect and restore meandering riverine channels and riparian forest habitat along steam banks. These Alternatives do not provide any protection to intact riparian habitat along the Tualatin River and existing wetlands which play an important role in the improvement of water quality, stream temperature regulation, and control of sediment erosion. Additionally, these two Alternatives lack the diverse habitat types that support a much wider range of resident and migratory fish and wildlife species.

- Alternative E allows the Service to provide much needed protection and restoration of habitat for migratory birds, anadromous fish, and other wildlife species. However, this Alternative includes property close to the city of Forest Grove which could expose the Wapato Lake Unit to urban runoff, disturbances, trash, and vandalism problems. The Service determined that the risk of encroachment to the new Wapato Lake Unit is too high to justify selecting this Alternative as the Preferred Alternative. Much of the land in the northern part of Alternative E is owned and managed by Metro and Clean Water Services, and will likely be restored under their wildlife habitat programs. Providing wildlife habitat is an important program for these public agencies, but unlike lands of the Refuge System, they do not have a wildlife first mission allowing for greater flexibility in program policies. These policies could provide a means for granting an easement to construct and maintain a raw water pipeline of the Joint Water Commission presently being planned for routing across the Tualatin River floodplain from Highway 47 to facilities of Clean Water Services south of Fernhill Wetlands. This project would be subject to review under the compatibility policy of the Refuge System as a new easement on lands owned and administered by the Service.

Alternative D has been identified as the Preferred Alternative because implementation of this Alternative would provide the greatest opportunity to:

- Support the wide diversity of wildlife habitat types that could be protected and restored without exposing the Wapato Lake Unit to external threats while enhancing and contributing to habitat protection efforts on lands owned by Metro and Clean Water Services located to the north. Resource restoration and conservation efforts between Metro, Clean Water Services, and the Service could complement one another as well as leverage greater protection of wildlife habitat both inside and outside the Preferred Alternative boundary through collaborative partnership opportunities in securing grants and other financial resources.

- Contribute to efforts across the Tualatin River basin to improve watershed health and function by protecting and restoring patches of rare remnant native habitat such as scrub-shrub wetlands and Oregon ash riparian forest. These plant communities are representative examples of severely depleted habitats of the Willamette Valley. The Oregon Division of State Land's Natural Heritage Program has referenced Oregon ash and scrub-shrub habitats

as among the rarest which remain in the Valley and suggests they be considered the highest priority for protection because of their former historical status and range of importance for promoting biological diversity on a landscape scale.

- Improve and protect fish habitat for two federally-listed species, spring-run Chinook salmon and winter-run steelhead. Mainstem and upper tributaries of the Tualatin River historically provided spawning, passage, and rearing habitat. This Alternative provides the opportunity to restore meandering riverine channels and riparian habitat along steam banks as well as wetlands within the historic Wapato Lake lakebed that will improve water quality and enhance migration passage functions of the Tualatin River.

- Protect and restore important migratory bird habitat, especially for wintering waterfowl. The bald eagle, a federally listed species under the Endangered Species Act, would benefit from restored habitats and enhanced foraging opportunities. When flooded in fall and winter, the Wapato Lake lakebed provided foraging and roosting winter habitat for large numbers of tundra swans (800 were counted in December 1987), mallards, pintails, canvasbacks, ring-necked ducks, lesser scaup, and several varieties of Canada geese. Six of the seven Canada goose subspecies present in western Oregon have been recorded at Wapato Lake; western, dusky, lesser, Taverner's, cackling, and Aleutian. Aleutian Canada geese have been sighted several times. Numerous species of shorebirds and other marsh birds frequent the area for foraging and resting habitat during spring and fall migration. In addition, riparian areas and mixed deciduous/coniferous forest located in this Alternative provide breeding habitat for neotropical landbird species and raptors, and shelter for resident mammal, amphibian, and reptile populations.

- Provide high-quality wildlife-dependent recreation and environmental education to enhance public appreciation, understanding, and enjoyment of the Wapato Lake Unit's fish, wildlife, and plant habitats.

- Contribute to the goals of the National Wildlife Refuge System to benefit present and future generations of Americans.

- Support the goals of the 1986 North American Waterfowl Management Plan, the 1986 Emergency Wetland Resources Act, the 1989 North American Wetlands Conservation Act, and the 2000 Northern Pacific Coast Regional Shorebird Management Plan.

The Land Protection Priorities Table and Tract Maps (see Appendix A) identify and prioritize the tracts located in the action Alternatives (Alternatives B through E). The tracts are identified in the Table first by Tract Map # and secondly by Landowner Name. The last column of the Table identifies the protection priority of each tract, as Priority 1, Priority 2, Priority 3, or Priority 4 based on a combination of factors such as existing habitat values, habitat restoration potential, location within the Unit, and current and anticipated land use.

4.8 Cumulative Impacts

As described in detail in this EA, the Wapato Lake Unit in concert with other Service, Metro, and Clean Water Services land and habitat protection efforts in the area would have long-term cumulative benefits for wildlife and their habitats throughout the northern Willamette Valley. However, the benefits of land acquisition and associated habitat restoration and management would be limited in light of continuing development and commensurate loss of open space within the northern Willamette Valley. Thus, the acquisition and management of lands in the Wapato Lake Unit as part of the National Wildlife Refuge System does not represent a significant impact on the human environment.

CHAPTER 5. COORDINATION, CONSULTATION, AND COMPLIANCE

5.1 Public Involvement

The establishment of the Wapato Lake Unit has been discussed with landowners; conservation organizations; Federal, Tribal, State, county, and city governments and other local organizations, interested groups, and individuals.

The Service has invited and continues to encourage public participation through the public involvement process consisting of public notices and meetings with potentially affected landowners, government agencies, private organizations, and individuals. Public meetings were held on November 7 and December 5, 2001, at Gaston High School. Planning updates were distributed in October 2001, April 2002, December 2002, December 2003, and December 2005. As part of the public notice and review process, the *Tualatin River National Wildlife Refuge Wapato Lake Unit, Draft Land Conservation Plan and Environmental Assessment* was available for a 30-day review and comment period starting in April 2006. A public open house was held on May 4, 2006 in Gaston, Oregon where Service employees were available to discuss the project, answer questions and receive public comment. The public comment period concluded on May 31, 2006.

5.2 Environmental Review and Consultation

In establishing the Wapato Lake Unit, the Service will comply with Federal laws, regulations, and executive orders. The following section describes specifically how the establishment of the Wapato Lake Unit is in compliance with the NEPA, National Historic Preservation Act, Endangered Species Act, and other Federal laws, regulations, and executive orders.

5.2.1 National Environmental Policy Act

As a Federal agency, the Service must comply with provisions of the 1969 NEPA, as amended (42 U.S.C. 4321-4347). An environmental analysis is required under NEPA to evaluate reasonable alternatives that will meet stated objectives, and to assess the possible environmental, social, and economic impacts to the human environment. The environmental assessment serves as the basis for determining whether implementation of the proposed action would constitute a major Federal action significantly affecting the quality of the human environment. The environmental assessment facilitates the involvement of government agencies and the public in the decision making process.

5.2.2 National Historic Preservation Act

The Service would follow established procedures for protecting cultural resources if the Wapato Lake Unit is established. This includes complying with the National Historic Preservation Act of 1966 (16 U.S.C. 469) and other cultural resource preservation laws, and consulting with the

State Historic Preservation Office and appropriate Native American Tribes for any future restoration and management actions which may have the potential to affect historic properties.

5.2.3 Endangered Species Act

Establishment of an approved refuge boundary does not represent a Federal action which would affect species listed under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1544). The Service will conduct consultation under Section 7 of the Endangered Species Act for any refuge management program actions which have the potential to affect listed species.

5.2.4 Other Federal Laws, Regulations, and Executive Orders

In undertaking the proposal, the Service will comply with the following Federal laws, executive orders, and legislative acts: Intergovernmental Review of Federal Programs (Executive Order 12372); Protection of Historical, Archaeological, and Scientific Properties (Executive Order 11593); Floodplain Management (Executive Order 11988); Protection of Wetlands (Executive Order 11990); Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 U.S.C. 9601 et seq.); Management and General Public Use of the National Wildlife Refuge System (Executive Order 12996); Departmental Policy on Environmental Justice (Executive Order 3127); Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, as amended; Refuge Recreation Act of 1962, as amended; National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997; and Consultation and Coordination with Indian Tribal Governments (Executive Order 13175).

5.2.5 Distribution and Availability

Copies of this LCP/EA have been distributed to Federal and State legislative delegations, Tribes, agencies, county and city governments, affected landowners, private groups, and other interested individuals (see Appendix B for the notification list). Copies of the final document are available by contacting U.S. Fish and Wildlife Service, Division of Refuge Planning, 911 NE 11th Avenue, Portland, Oregon 97232 (telephone 503-231-2231). The documents can also be viewed on the Service's website at http://pacific.fws.gov/pacific/planning.

CHAPTER 6. REFERENCES

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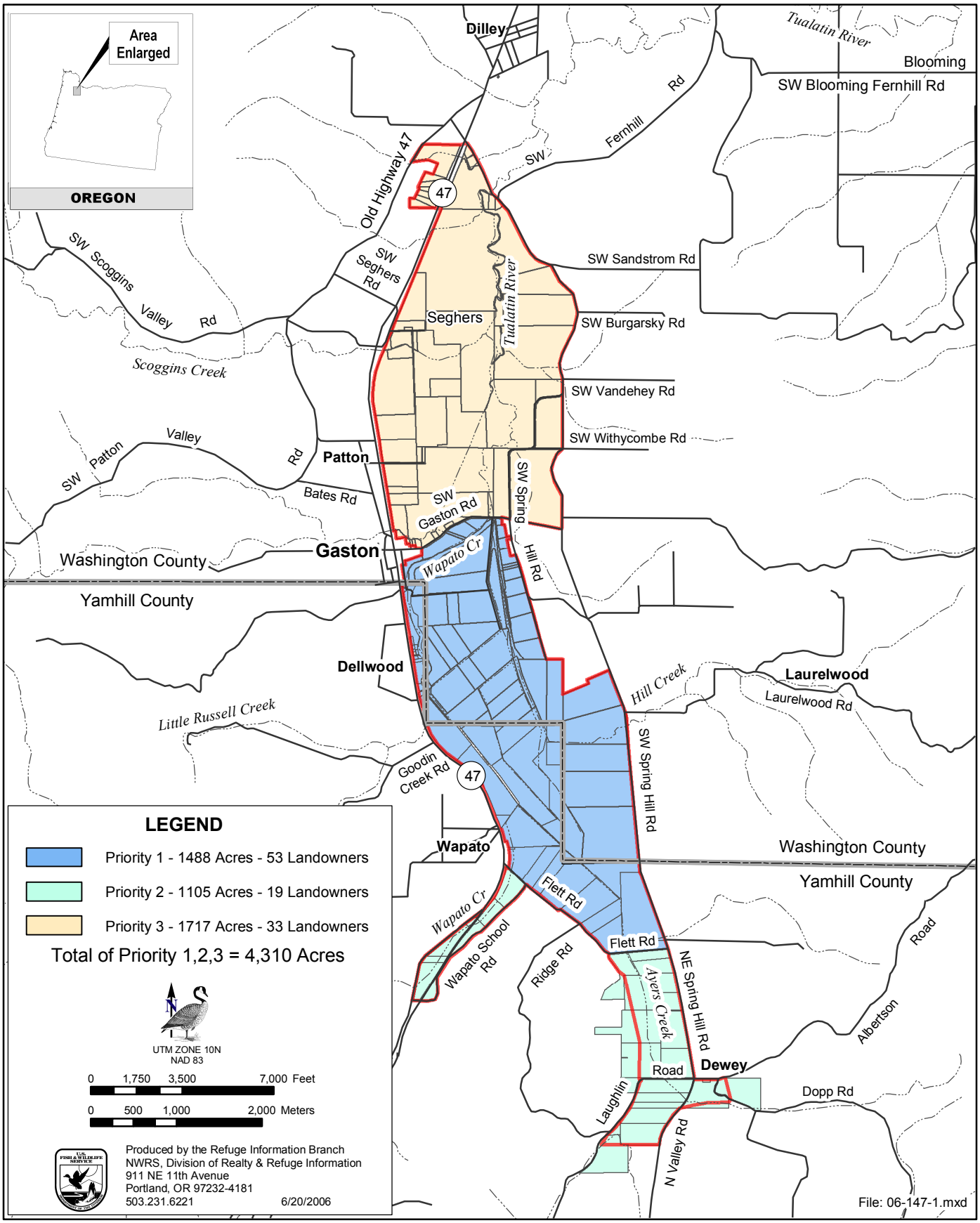
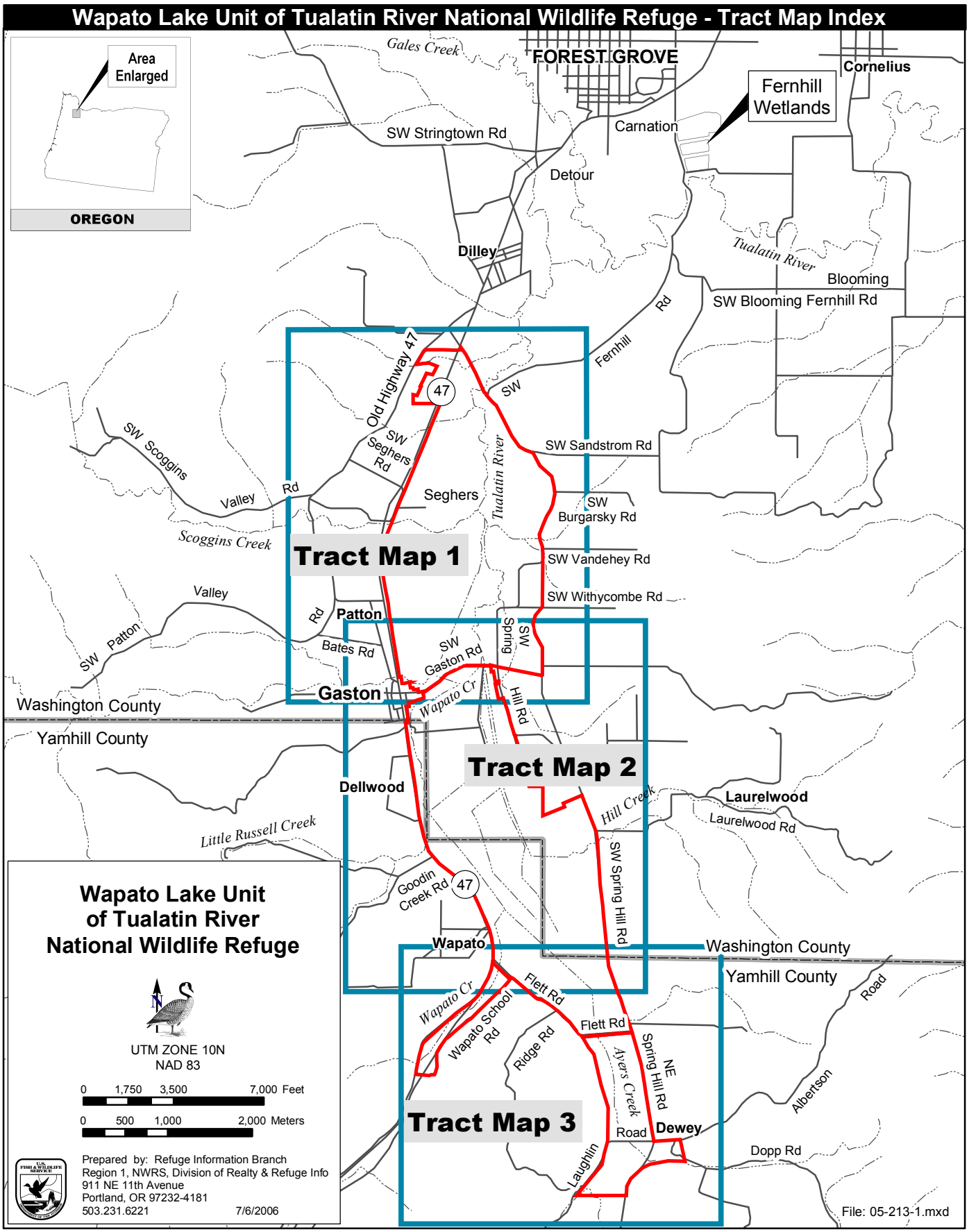
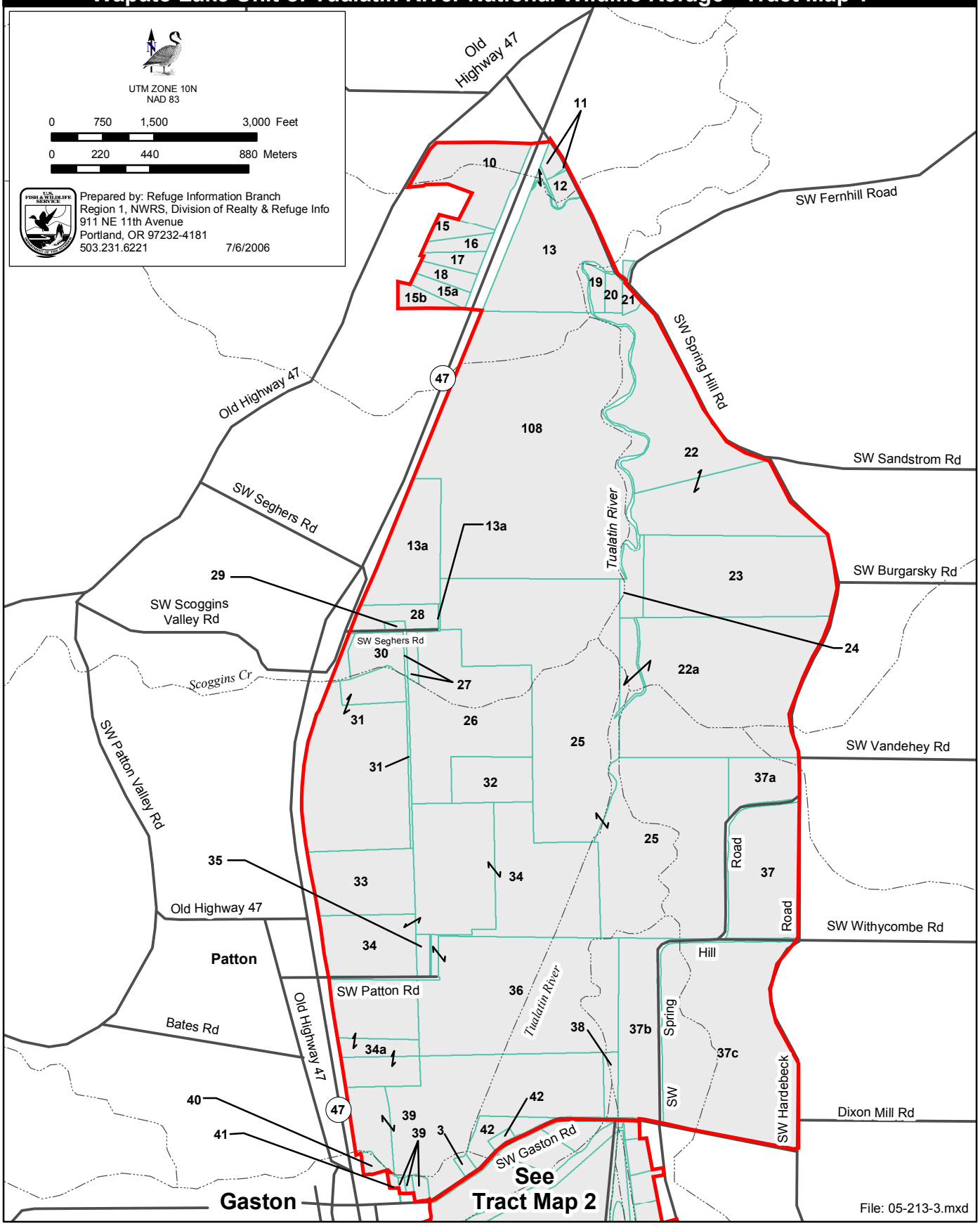
Appendix A.
Land Protection
Priorities Map, Tract Maps,
and Priorities Table

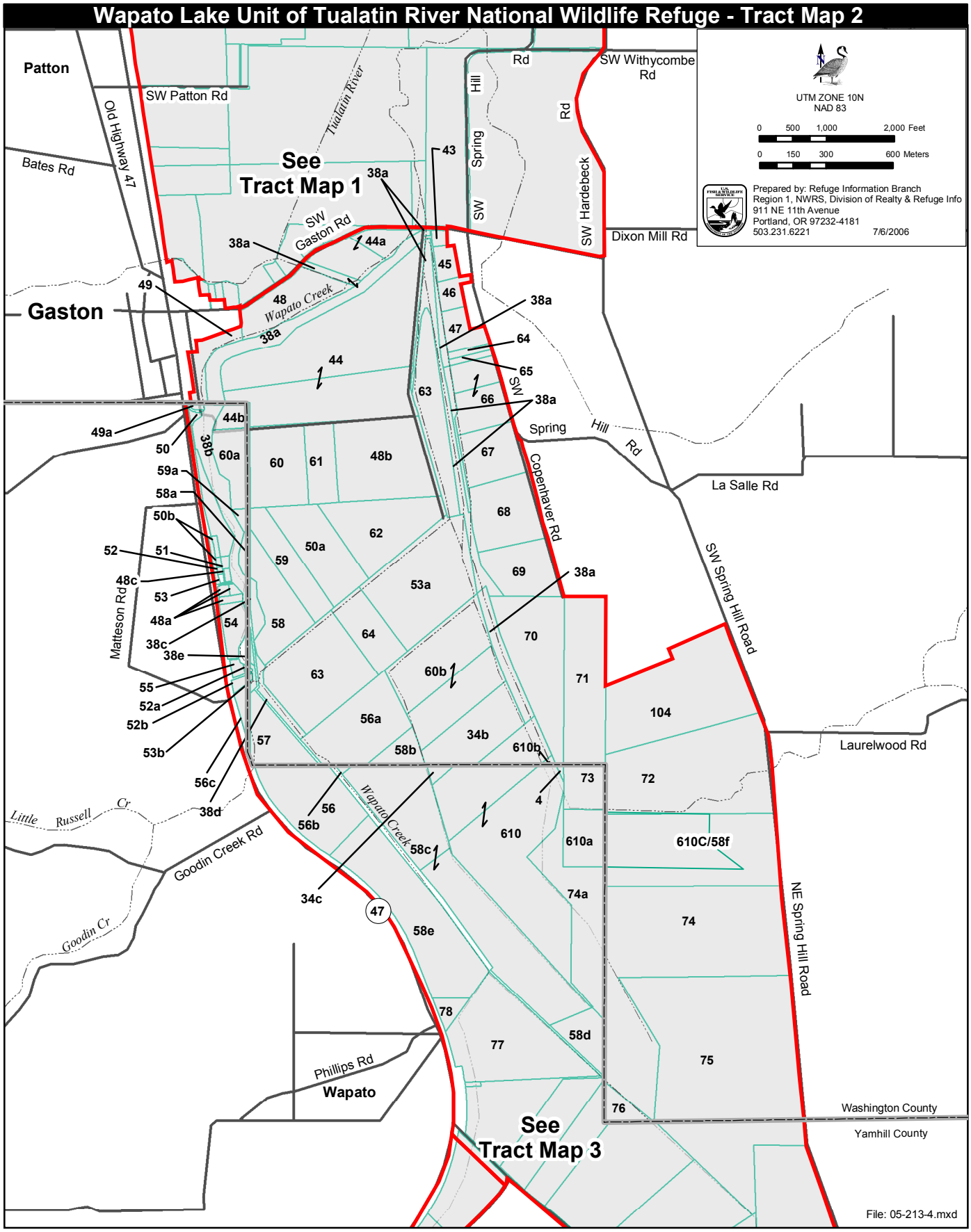
Wapato Lake Unit
Land Conservation Plan Priorities

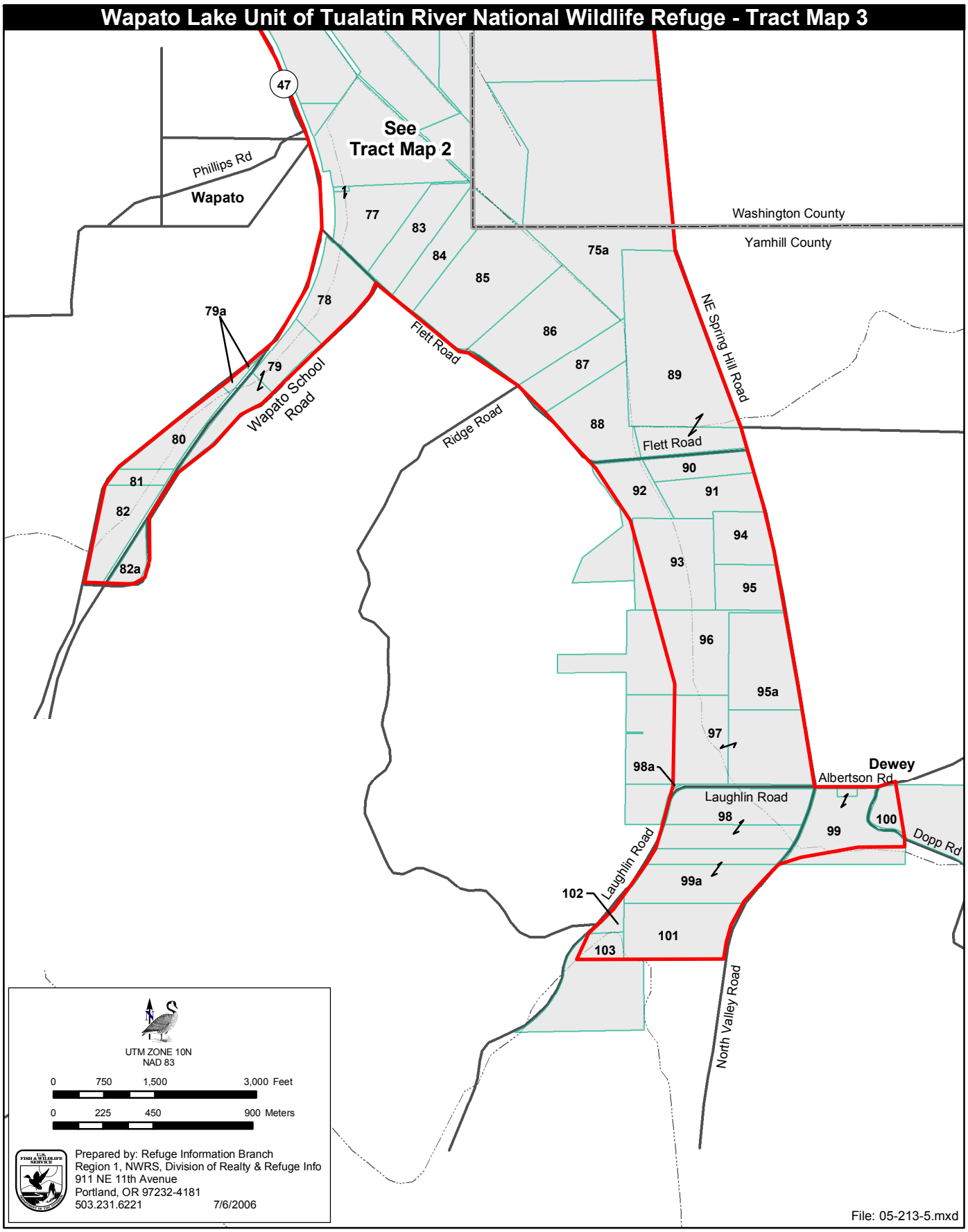



Wapato Lake Unit of Tualatin River National Wildlife Refuge - Tract Map Index
Area Enlarged
OREGON
Gales Creek
FOREST GROVE
Cornelius
Fernhill Wetlands
SW Stringtown Rd
Carnation
Detour
Dilley
Tualatin River
Blooming
SW Blooming Fernhill Rd
Fernhill Rd
Old Highway 47
47
SW Seghers Rd
SW Sandstrom Rd
SW Scoggins Valley Rd
Seghers
SW Burgarsky Rd
Scoggins Creek
Tract Map 1
SW Vandehey Rd
SW Withycombe Rd
Valley
Patton
SW Patton Rd
Bates Rd
SW Gaston Rd
SW Spring Hill Rd
Gaston
Wapato Cr
Washington County
Yamhill County
Tract Map 2
Dellwood
Hill Creek
Laurelwood
Laurelwood Rd
Little Russell Creek
Goodin Creek Rd
SW Spring Hill Rd
Wapato
Washington County
Yamhill County
Flett Rd
Wapato School Rd
Ridge Rd
Ayers Creek
NE Spring Hill Rd
Road
Dewey
Albertson
Dopp Rd
Laughlin
Tract Map 3
Wapato Lake Unit of Tualatin River National Wildlife Refuge
UTM ZONE 10N
NAD 83
0 1,750 3,500 7,000 Feet
0 500 1,000 2,000 Meters
Prepared by: Refuge Information Branch
Region 1, NWRS, Division of Realty & Refuge Info
911 NE 11th Avenue
Portland, OR 97232-4181
503.231.6221 7/6/2006
File: 05-213-1.mxd

Wapato Lake Unit of Tualatin River National Wildlife Refuge - Tract Map 1




Wapato Lake Unit of Tualatin River National Wildlife Refuge - Tract Map 2
UTM ZONE 10N
NAD 83
0 500 1,000 2,000 Feet
0 150 300 600 Meters
Prepared by: Refuge Information Branch
Region 1, NWRS, Division of Realty & Refuge Info
911 NE 11th Avenue
Portland, OR 97232-4181
503.231.6221
7/6/2006
Patton
SW Patton Rd
Old Highway 47
Bates Rd
Tualatin River
See Tract Map 1
SW Gaston Rd
Gaston
Wapato Creek
SW Hill Rd
SW Spring Hill Rd
SW Withycombe Rd
SW Hardebeck Rd
Dixon Mill Rd
Copenhaver Rd
La Salle Rd
Matteson Rd
Laurelwood Rd
NE Spring Hill Road
Little Russell Cr
Goodin Creek Rd
Goodin Cr
Phillips Rd
Wapato
See Tract Map 3
Washington County
Yamhill County
File: 05-213-4.mxd


Wapato Lake Unit of Tualatin River National Wildlife Refuge - Tract Map 3
47
See
Tract Map 2
Phillips Rd
Wapato
Washington County
Yamhill County
77
83
84
85
75a
78
79a
79
86
87
89
88
Flett Road
Wapato School
Road
Ridge Road
NE Spring Hill Road
Flett Road
80
81
82
82a
90
91
92
94
93
95
96
95a
97
98a
Dewey
Albertson Rd
Laughlin Road
98
99
100
Dopp Rd
Laughlin Road
99a
102
101
103
North Valley Road
UTM ZONE 10N
NAD 83
0 750 1,500 3,000 Feet
0 225 450 900 Meters
Prepared by: Refuge Information Branch
Region 1, NWRS, Division of Realty & Refuge Info
911 NE 11th Avenue
Portland, OR 97232-4181
503.231.6221 7/6/2006
File: 05-213-5.mxd

TRACT MAP #	COUNTY APN	TRACT #	LANDOWNER NAME	ACRES	COUNTY	PRIORITY
1	1S4250000800	34	BATES FARM FAMILY LTD PARTNERSHI	46.1	WASHINGTON	3
1	1S4250000900	34	BATES FARM FAMILY LTD PARTNERSHI	59.87	WASHINGTON	3
1	1S4350000300	34	BATES FARM FAMILY LTD PARTNERSHI	28.1	WASHINGTON	3
1	1S4350001400	34a	BATES FARM FAMILY LTD PARTNERSHI	25.62	WASHINGTON	3
1	1S4350001500	34a	BATES FARM FAMILY LTD PARTNERSHI	9.17	WASHINGTON	3
1	1S4350001600	34a	BATES FARM FAMILY LTD PARTNERSHI	16.65	WASHINGTON	3
1	1S4250000700	26	BOUNEFF ANTHONY B	67.71	WASHINGTON	3
1	1S4240000200	21	CASTER MARY LOU	2.15	WASHINGTON	3
1	1S423AA00200	16	CORNETT DAVID &	4.8	WASHINGTON	3
1	1S4360000704	42	EMBREE SHIRLEY	0.96	WASHINGTON	3
1	1S4360000709	42	EMBREE SHIRLEY	7.71	WASHINGTON	3
1	1S4240000400	19	FRAME HAROLD R & BETTY LOU	3.6	WASHINGTON	3
1	1S4130003300	11	FRANCK JACKIE D AND SHARON	3.13	WASHINGTON	3
1	1S4130003401	11	FRANCK JACKIE D AND SHARON	0.1	WASHINGTON	3
1	1S4360000600	3	GASTON CITY OF	1	WASHINGTON	3
1	1S4350003502	41	GATEWOOD CHARLES A/MARY H % GARZ	0.56	WASHINGTON	3
1	1S4260000301	30	GERDES STANLEY E & ALMEDA L	9.8	WASHINGTON	3
1	1S4130003200	10	GRAFT JIM	29.2	WASHINGTON	3
1	1S4250000300	37,a	HARDEBECK ANTONIOUS EDMUND &	62	WASHINGTON	3
1	1S4360000200	37b,c	HARDEBECK ANTONIOUS EDMUND &	148.26	WASHINGTON	3
1	1S4240000900	23	HAWORTH HALLY L & MARY L	79.12	WASHINGTON	3
1	1S4230002400	13	HUTCHINSON KENT & PEGGY	31.82	WASHINGTON	3
1	1S4240000500	13	HUTCHINSON KENT & PEGGY	51.08	WASHINGTON	3
1	1S4240000601	13	HUTCHINSON KENT & PEGGY	244.22	WASHINGTON	3
1	1S4260000101	13	HUTCHINSON KENT & PEGGY	0.26	WASHINGTON	3
1	1S423AA00100	15	KNECHT CLIFFORD C & SHARON K	4.8	WASHINGTON	3
1	1S423AA00500	15a	KNECHT CLIFFORD C & SHARON K	4.8	WASHINGTON	3
1	1S423AA0600	15b	KNECHT CLIFFORD C & SHARON K	5.4	WASHINGTON	3
1	1S423AA00300	17	KUPRES JOSEPH J	4.8	WASHINGTON	3
1	1S4250000600	32	LILLEGARD JAMES L & THOMAS LEE	19.7	WASHINGTON	3
1	1S4260000303	31	MCCARTHY CELINE	9.8	WASHINGTON	3
1	1S4260000304	31	MCCARTHY CELINE	37.5	WASHINGTON	3
1	1S4260001300	31	MCCARTHY CELINE	1	WASHINGTON	3

TRACT MAP #	COUNTY APN	TRACT #	LANDOWNER NAME	ACRES	COUNTY	PRIORITY
1	1S4240000800	24	MEIWES BETTY	5.7	WASHINGTON	3
1	1S4260000200	29	OEI ROY H & SHERIAN L	0.86	WASHINGTON	3
1	1S4250000501	27	OGLESBY DOUGLAS R AND	2.93	WASHINGTON	3
1	1S4250000400	25	OLD HAYES FARM LLC ET AL	149.48	WASHINGTON	3
1	1S4250000401	25	OLD HAYES FARM LLC ET AL	7.98	WASHINGTON	3
1	1S423AA00400	18	PAYNE ROGER M & BEVERLY D	4.8	WASHINGTON	3
1	1S4260001100	33	ROHRER DAVID C/CAROLE M	42.01	WASHINGTON	3
1	1S4350000200	35	SCOTT HAL W AND CLYTALEE	2.32	WASHINGTON	3
1	1S4260000100	28	TOLSON GERALDINE	9.3	WASHINGTON	3
1	1S435DB00101	40	VAN DYKE ARTHUR E & DORIS R	1.6	WASHINGTON	3
1	1S4240000300	20	VIRCHOW RICHARD C	3.45	WASHINGTON	3
1	1S4130003400	12	WARD MICHAEL/CAROLE	2.78	WASHINGTON	3
1	1S4350001700	39	WISMER FAMILY TRUST &	13.25	WASHINGTON	3
1	1S4350003500	39	WISMER FAMILY TRUST &	3	WASHINGTON	3
1	1S4350003503	39	WISMER FAMILY TRUST &	0.52	WASHINGTON	3
1	1S4350003504	39	WISMER FAMILY TRUST &	0.99	WASHINGTON	3
1	1S4360000500	39	WISMER FAMILY TRUST &	89.37	WASHINGTON	3
1	1S4350000100	36	ZAIGER JOHN EDITH	1.47	WASHINGTON	3
1	1S4360000300	36	ZAIGER JOHN EDITH	100.16	WASHINGTON	3
1	1S4240000600	22	ZURCHER GWENDOLYN L TRUSTEE	63	WASHINGTON	3
1	1S4240000701	22	ZURCHER GWENDOLYN L TRUSTEE	51.13	WASHINGTON	3
1	1S4250000100	22a	ZURCHER GWENDOLYN L TRUSTEE	132.04	WASHINGTON	3
1	1S4250000200	22a	ZURCHER GWENDOLYN L TRUSTEE	1	WASHINGTON	3
1,2	1S4360000400	38, 38a	WAPATO IMPROVEMENT DIST	7.03	WASHINGTON	3, 1
2	2S4010001305	60b	BATES DONALD	22.56	WASHINGTON	1
2	2S4010001306	60b	BATES DONALD	24.45	WASHINGTON	1
2	2S4010001307	34b	BATES FARM FAMILY LTD PARTNERSHI	21.54	WASHINGTON	1
2	21947	34c	BATES FARM FAMILY LTD PARTNERSHIP	2.5	YAMHILL	1
2	2S4010001504	60	BATES RONALD H	22.76	WASHINGTON	1
2	19148	60a	BATES RONALD H	10.97	YAMHILL	1
2	21935	77	BEECHER JAMES A & MARILYN G	45	YAMHILL	1
2	19147	59a	BEELER RUTH L TRUSTEE FOR	1	YAMHILL	1
2	2S4010001503	59	BEELER RUTH LILLIAN TRUSTEE	15.26	WASHINGTON	1

TRACT MAP #	COUNTY APN	TRACT #	LANDOWNER NAME	ACRES	COUNTY	PRIORITY
2	2S4010001301	63	BIGGINS GENE R & CAROLYN M	35.43	WASHINGTON	1
2	2S3070002100	75	BOUTARD ANTHONY & CAROLINE BLAC	111.74	WASHINGTON	1
2	2S4010001100	68	BRYANT RONALD L	28.68	WASHINGTON	1
2	2S4010000800	71	CATE WYMAN K	34.1	WASHINGTON	1
2	21936	78	COBLE JACKIE R & BEVERLY J	4	YAMHILL	1
2	2S4010001304	56a	CROP LOIS G REVOCABLE TRUST	24.91	WASHINGTON	1
2	21924	56	CROP LOIS G REVOCABLE TRUST	59.3	YAMHILL	1
2	21311	56c	CROP LOIS G REVOCABLE TRUST	77.4	YAMHILL	1
2	21945	56b	CROP LOIS G TRUSTEE FOR	1	YAMHILL	1
2	2S4010001400	57	CROP WILLIAM C LOIS G	13	WASHINGTON	1
2	29643	54	CROSSMAN DAVID L & EVELYN R	5.07	YAMHILL	1
2	2S4010001505	62	DAVIS CLAUD &	31	WASHINGTON	1
2	2S4010001200	66	FF ACQUISITIONS LLC	10.39	WASHINGTON	1
2	2S4010001201	66	FF ACQUISITIONS LLC	5.75	WASHINGTON	1
2	1S4360000701	49	FISHER DEAN	3.75	WASHINGTON	1
2	19142	49a	FISHER DEAN	0.3	YAMHILL	1
2	2S4010000900	70	FREEMAN DOUGLAS K	36.86	WASHINGTON	1
2	2S4010001303	53a,b	FURUKAWA MARGARET TR &	47.14	WASHINGTON	1
2	29505	52a	FURUKAWA NOBI & RENA J	1.75	YAMHILL	1
2	29506	52b	FURUKAWA NOBI & RENA J	1.75	YAMHILL	1
2	30275	52	FURUKAWA NOBI & RENA J 1/2	0.15	YAMHILL	1
2	30276	53	FURUKAWA PETER & MARGARET L TRUST	0.25	YAMHILL	1
2	1S4360000707	63	GONZALEZ SERGIO	23.59	WASHINGTON	1
2	1S4360000703	48	HEESACKER WILLIAM JR &	15.76	WASHINGTON	1
2	29644	48a	HEESACKER WILLIAM M JR & MADELYN	0.7	YAMHILL	1
2	29645	48a	HEESACKER WILLIAM M JR & MADELYN	0.75	YAMHILL	1
2	29646	48a	HEESACKER WILLIAM M JR & MADELYN	0.59	YAMHILL	1
2	30274	48c	HEESACKER WILLIAM M JR & MADELYN	0.41	YAMHILL	1
2	2S4010001501	48b	HEESACKER WM M JR ET AL	40	WASHINGTON	1
2	30273	51	HOCKERSMITH ROBERT	0.59	YAMHILL	1
2	21939	74a	HUSERIK F ANTHONY	32.43	YAMHILL	1
2	2S3070001500	74	HUSERIK F ANTHONY AND	125.45	WASHINGTON	1
2	1S436D001400	46	LOSEY GARY M & JOV	3.66	WASHINGTON	1

TRACT MAP #	COUNTY APN	TRACT #	LANDOWNER NAME	ACRES	COUNTY	PRIORITY
2	1S436D001900	64	MCELLIOTT RICHARD T &	1.36	WASHINGTON	1
2	1S436D001800	47	MELER JAMES A JR AND	6.27	WASHINGTON	1
2	2S4010001502	61	OTT PAUL F/WANDA M TRS	12	WASHINGTON	1
2	2S4010001000	69	PEDEMONTE MICHAEL D/GAYLE	15.94	WASHINGTON	1
2	1S436D002000	65	PERRY ROBERT N	1.39	WASHINGTON	1
2	1S436D001200	43	PRINCE JAMES S AND KAREN A	1.38	WASHINGTON	1
2	19145	44b	REESE DENNIS W & SUSAN	3.14	YAMHILL	1
2	1S4360000705	44	REESE DENNIS W/SUSAN	76.31	WASHINGTON	1
2	2S4010001508	44	REESE DENNIS W/SUSAN	1.22	WASHINGTON	1
2	1S4360000706	44a	REESE DENNIS W/SUSAN	6.5	WASHINGTON	1
2	2S4010001202	67	RICHTER TRACY M	12.61	WASHINGTON	1
2	2S3070001300	72	ROBB BETTY J TRUSTEE &	68.72	WASHINGTON	1
2	21937	73	ROBB CLARABELLE E TRUST 45.4% &	9.7	YAMHILL	1
2	2S4010001506	58	SPRY ALFRED	19.12	WASHINGTON	1
2	2S4010001300	58b	SPRY ALFRED	6.9	WASHINGTON	1
2	2S3070001400	58f	SPRY ALFRED	50.64	WASHINGTON	1
2	19150	58a	SPRY ALFRED	0.88	YAMHILL	1
2	21946	58c	SPRY ALFRED	29.1	YAMHILL	1
2	21933	58d	SPRY ALFRED L	8	YAMHILL	1
2	21930	58e	SPRY ALFRED L	97	YAMHILL	1
2	21943	58c	SPRY ALFRED L	43.2	YAMHILL	1
2	29507	55	STONECIPHER WAYNE & JANET P	1.1	YAMHILL	1
2	2S4010001309	610b	UNITED STATES OF AMERICA	12.35	WASHINGTON	1
2	2S4010001310	610b	UNITED STATES OF AMERICA	0.3	WASHINGTON	1
2	21941	610	USA OF THE INTERIOR SECRETARY	62.9	YAMHILL	1
2	21942	610	USA OF THE INTERIOR SECRETARY	24	YAMHILL	1
2	21938	610a	USA OF THE INTERIOR SECRETARY	11.7	YAMHILL	1
2	19146	50	VAN DYKE ALVIN & ELAINE	7.37	YAMHILL	1
2	2S4010001500	50a	VAN DYKE ALVIN J	25.36	WASHINGTON	1
2	30271	50	VAN DYKE ALVIN J	0.6	YAMHILL	1
2	30272	50	VAN DYKE ALVIN J	0.35	YAMHILL	1
2	2S3060000402	104	WALTERS THEODORE W/JOANNE R TRS	58.02	WASHINGTON	1
2	1S4360000702	38a	WAPATO IMPROVEMENT DIST	15.13	WASHINGTON	1

TRACT MAP #	COUNTY APN	TRACT #	LANDOWNER NAME	ACRES	COUNTY	PRIORITY
2	2S4010001308	38a,c,d,e	WAPATO IMPROVEMENT DIST	16.18	WASHINGTON	1
2	1S4360000700	38a	WAPATO IMPROVEMENT DISTRICT	1.81	WASHINGTON	1
2	1S4360000708	38a	WAPATO IMPROVEMENT DISTRICT	15.16	WASHINGTON	1
2	19144	38b	WAPATO IMPROVEMENT DISTRICT	11.3	YAMHILL	1
2	2S4010001302	64	WATENPAUGH J A & DARLENE M	15.32	WASHINGTON	1
2	2S3070002300	76	WOELL EDNA I AND	3.67	WASHINGTON	1
2	21940	4	YAMHILL COUNTY	0.66	YAMHILL	1
2	1S436D001300	45	YONTZ ERLING W	3.74	WASHINGTON	1
3	22249	77	BEECHER JAMES A & MARILYN G	0.34	YAMHILL	1
3	22250	77	BEECHER JAMES A & MARILYN G	26.1	YAMHILL	1
3	220582	75a	BOUTARDANTHONY & CAROLINE B	32.7	YAMHILL	1
3	220586	88	BULENE & MCGRAW	38.7	YAMHILL	1
3	220604	90	CARNAHAN SHIRLEY B LIVING TRUST	11.3	YAMHILL	2
3	220597	95	COOPER GARY N	26.2	YAMHILL	2
3	220686	95a	COOPER GARY N	31	YAMHILL	2
3	22276	81	CUNNINGHAM LORI M	4.55	YAMHILL	2
3	220595	92	DOLSEN FREDERICK J	26.9	YAMHILL	2
3	22252	84	FRUIN ROBERT L	37.5	YAMHILL	1
3	220599	94	GONZALES HILL DENISE S	40.3	YAMHILL	2
3	223143	103	JOHNS MICHAEL S & HOLLY I	75.4	YAMHILL	2
3	22275	82	KINNEY ALVIN L & CHARLOTTE L	42.82	YAMHILL	2
3	22274	82a	KINNEY ALVIN L & CHARLOTTE L	42.82	YAMHILL	2
3	220581	89	LMCA FARM LLC	315.2	YAMHILL	1
3	220587	89	LMCA FARM LLC	12.5	YAMHILL	1
3	220697	102	MAR VINEYARD LLC SO	40.48	YAMHILL	2
3	220684	97	OBERG MARION E & CHARLOTTE	30	YAMHILL	2
3	220685	97	OBERG MARION E & CHARLOTTE	46.6	YAMHILL	2
3	22253	85	REZVANI NADER	83.82	YAMHILL	1
3	221058	100	ROE CHARLES B JR 1/2 &	43	YAMHILL	2
3	220676	99	ROE E ELLEN & ROBERT B TRUSTEES FOI	70	YAMHILL	2
3	221059	99	ROE E ELLEN & ROBERT B TRUSTEES FOI	30.5	YAMHILL	2
3	221060	99	ROE E ELLEN & ROBERT B TRUSTEES FOI	1.01	YAMHILL	2
3	220679	99a	ROE E ELLEN REVOCABLE LIVING TRUST	12.25	YAMHILL	2

TRACT MAP #	COUNTY APN	TRACT #	LANDOWNER NAME	ACRES	COUNTY	PRIORITY
3	220681	98	ROE HARDING T 1/2	20.75	YAMHILL	2
3	220683	98	ROE HARDING T 1/2	34.5	YAMHILL	2
3	220682	98a	ROE HARDING T 1/2	34.5	YAMHILL	2
3	223167	101	ROE ROBERT B REVOCABLE LIVING TRUS	100.5	YAMHILL	2
3	220585	87	SHARP ETHEL M TRUSTEE FOR	21	YAMHILL	1
3	220584	86	STABLES JOHN D & CARLA J	43	YAMHILL	1
3	22270	80	STATE BANK COLUMBIA	12.8	YAMHILL	2
3	22260	78	STEELE ALEXANDER & WILLETTE	51.2	YAMHILL	2
3	22264	79	STEELE GEORGE S	30.8	YAMHILL	2
3	22269	79a	STEELE GEORGE S	30.8	YAMHILL	2
3	22261	79	STEELE GEORGE S	53.4	YAMHILL	2
3	32637	79a	STEELE GEORGE S	53.4	YAMHILL	2
3	220687	96	STILLER CHARLES G & REVA L	49.6	YAMHILL	2
3	22251	83	STILLER KORLY L & VICKI	21	YAMHILL	1
3	220596	93	TWIGG ROBERT E & DONNA J	38	YAMHILL	2
3	220601	91	YIELDING ALAN R & KATHLEEN	19.2	YAMHILL	2

Appendix B. Notification List for the Environmental Assessment

Federal and State Congressional Offices
U.S. Senator Ron Wyden
U.S. Senator Gordon Smith
U.S. Congressman David Wu

Federal Agencies
U.S. Department of Agriculture
    Natural Resources Conservation Service

U.S. Army Corps of Engineers, Portland District

U.S. Department of Commerce
    National Marine Fisheries Service

U.S. Department of Energy
    Bonneville Power Administration

U.S. Department of the Interior
    Fish and Wildlife Service
    Bureau of Land Management
    Bureau of Reclamation
    U.S. Geological Survey

Tribal Agencies
Confederated Tribes of the Grand Ronde

State of Oregon Agencies
Office of the Governor
Oregon Department of Agriculture
Oregon Department of Fish and Wildlife
Oregon Department of Environmental Quality
Oregon Department of Water Resources
Oregon Division of State Lands
Oregon Land Conservation and Development
Oregon Department of Transportation
State Historic Preservation Office
Oregon Department of Forestry

Local Agencies
Washington County Board of County Commissioners
Yamhill County Board of County Commissioners
Metropolitan Service District
Clean Water Services
Gaston Rural Fire District
Gaston School District
City of Forest Grove
City of Portland Bureau of Environmental Services

Organizations
Pacific University
Tualatin Riverkeepers
Friends of Trees
Ducks Unlimited, Inc.
Audubon Society of Portland
American Birding Association
Friends of the Tualatin River National Wildlife Refuge
Oregon Natural Heritage Program
Wapato Lake Improvement District
Upper Tualatin River Improvement District
Tualatin Valley Irrigation District
Tualatin River Watershed Council
Oregon Wetlands Joint Venture
Oregon Farm Bureau
Team Gaston
Trout Unlimited
Association of Northwest Steelheaders
The Conservation Fund
River Network
The Nature Conservancy
The Wetlands Conservancy
Hillsboro, Forest Grove, and Beaverton Utilities
Trust for Public Lands
Raindrops to Refuge
David Evans and Associates

Private Individuals
Landowners
Private Citizens

Appendix C. Response to Comments

In this section, we summarize and respond to the comments received on the *Tualatin River National Wildlife Refuge Proposed Wapato Lake Unit, Draft Land Conservation Plan and Environmental Assessment (April 2006)*. Copies of this document were distributed to the contacts listed in Appendix B as well as being posted on the Service's regional website. The public comment period was April 21–May 31, 2006. Midway through the public comment period, the Service held an open house on May 4, 2006, in Gaston, Oregon, to describe the proposed action, answer questions and receive and respond to public comments in person. The purposes of public outreach were to identify and analyze the public's perspective on proposed Unit management and alternatives being considered for protecting the Wapato Lake area. In addition to the public comments voiced at the open house, the Service received written comments in the form of letters and e-mail messages. The public comments received and Service responses, organized by subject area, are provided below.

Comment Topic: Establishment of the Wapato Lake Unit

Many commenters supported establishing the Wapato Lake Unit without specifying a preferred alternative. Several commenters specifically expressed support for habitat restoration at the Wapato Lake Unit.

One commenter stated a preference for Alternative C because there would be less loss of farmland, leaving out areas east of Tualatin River and north of Gaston Road, but still retaining the rural character of the Wapato Lake area, restoring wildlife corridors, and providing habitat for migratory birds.

Many commenters supported Alternative D, the Service's preferred alternative. Some commenters stated they agree with the rationale that led to choosing Alternative D during the planning process. One viewed Alternative D as more cost effective. Another supported Alternative D because the alternative encompasses the majority of the wetlands and upper drainage without overlapping with lands owned by other public agencies. One commenter supported Alternative D because it includes the historic Wapato Lake and upper Tualatin River floodplain as an addition to the Willamette Valley's very limited existing network of conservation lands, and for the fact that Service acquisition would protect valuable natural remnants of the Tualatin River floodplain and set the stage for large-scale restoration of important habitat types now rare in the Willamette Valley. Another commenter expressed that acquisition of the lands under Alternative D could create one of the most important wildlife habitat complexes in the Willamette Valley and provide benefits for the waterfowl associated with the historic Wapato Lake wetlands. A few commenters pointed out the benefits of Alternative D to water quality, flood hazard reduction, and compatible wildlife-dependent recreational uses.

The Joint Water Commission's (JWC) supports Alternative D but expressed concern that including JWC property within the refuge boundary could create serious obstacles to construction to the pipeline and would prefer that JWC property not be included in Alternative D. One commenter requested the Service add a piece of upland prairie/oak savanna east of

Spring Hill Road and south of SW Gaston Road to the proposed boundary and another commenter suggested that lands between the Clean Water Plant and Springhill Road be added to the proposed boundary.

Many comments the Service received supported Alternative E stating that this Alternative would provide the broadest conservation, connectivity, and partnerships. One commenter pointed out the importance of lower Gales Creek to native, wild, and federally-listed steelhead spawning and rearing as well as coastal cutthroat trout. Another commenter said Gales Creek supports the healthiest populations of federally-listed Upper Willamette River steelhead and spring Chinook salmon in the Tualatin River Basin. Other commenters brought out the conservation benefits of Alternative E to waterfowl, raptors, neotropical birds, mammals, amphibians, reptiles, wildlife-oriented recreation, greenway corridors, non-motorized trails, bottomland riparian forests, scrub shrub wetlands, water quality, and the Wapato lake/marsh wetland complex.

Several commenters said they wanted to see the Service compliment the efforts of Metro and the Fernhill Wetlands Council in implementing Alternative E to reduce costs, provide cohesive management and delivery of services, focus volunteers, and public access. Additional reasons commenters gave for Alternative E included benefits to the community around Forest Grove, temporary natural water storage, flood control, greater stream shade and water quality for fish and wildlife, and wildlife recreation.

Some commenters disagreed with the Service's rationale for preferring Alternative D suggesting instead that the impacts of adjacency to an urban area would be manageable. One expressed concern that Clean Water Services and Metro, who might otherwise purchase the property, have missions other than conservation. Some commenters said Alternative E would facilitate more partner collaboration, further more stewardship, and support much more education and research.

Service Response. The Service acknowledges the greater potential for wildlife conservation and partnerships associated with Alternative E, however, Alternative D remains the Service's preferred alternative based on issues described in the EA. We note that much of the northern area of Alternative E is already in public ownership and could be restored under Metro and Clean Water Services programs. In addition, we believe that through cooperative conservation efforts with Metro, cities, and other local organizations, the Service can achieve desired habitat protection and open space goals. Based on the Service's experience with other refuges, urban related concerns can be substantively problematic.

Another reason the Service identified Alternative D as the preferred alternative is because lands identified for the construction of a raw water pipeline have yet to be acquired for that purpose. If the Service acquired lands prior to pipeline rights of way being established, future construction of the pipeline across portions of Alternative E would likely present a substantial compatibility conflict for the Service (see page 10, section 1.7.6. of the LCP/EA).

Although the JWC already owns property within Alternative D, the JWC stated that it preferred that JWC property not be included within Alternative D due to concerns that being within the refuge boundary could create serious obstacles to construction of the pipeline. The Service recognizes the importance of the long-range planning of the JWC and other agencies for meeting

municipal needs of water through the year 2050. It is important to note that designation of the Service approved refuge boundary does not preclude landowners from developing or otherwise using their property in a manner consistent with local zoning and regulatory provisions. Landowners within an approved refuge boundary retain all the rights, privileges, and responsibilities of private land ownership including the rights to access the property, control trespass, sell to any party, and develop their properties. Since designation of an approved refuge boundary would not create obstacles for pipeline construction and since the pipeline is one of several alternatives being considered by the Bureau of Reclamation, State, and local jurisdictions for meeting municipal water needs through the year 2050, the Service believes modifying the preferred alternative boundary is not warranted.

Alternative D, the preferred alternative, supports the greatest biological diversity and array of wildlife and habitats without exposing the proposed Wapato Lake Unit to encroachment or external threats. Additionally, Alternative D, the preferred alternative, contributes to efforts across the Tualatin River basin to improve watershed health and function by protecting and restoring rare native habitats such as scrub-shrub wetlands, riparian forest, and wet meadow prairies, severely depleted habitats of the Willamette Valley. The Service believes there are opportunities for partnering even without the northern portion of Alternative E being included within the Refuge boundary and that the lands included in Alternative D are large enough for the Service to offer a full array of priority, wildlife-dependent public uses. After much deliberation, the Service concluded that Alternative D, the preferred alternative, offers the best balance for achieving the goals of the proposed Wapato Lake Unit in the context of other land use activities and plans for the area.

Regarding the suggestion that certain areas be added to the project area boundary, the Service acknowledges that there are numerous habitat areas outside the preferred alternative project boundary that would be worthy of protecting. The Service put considerable effort into identifying a proposed project boundary which we believe would offer the best balance for protecting important wildlife habitats within the context of area's current and near-future land use activities. Thus, we have not modified the preferred alternative boundary configuration.

Comment Topic: Land Acquisition Program

A few commenters asked how the Service's land acquisition program works and whether the Service would impose land use restrictions on their private properties if they choose not to sell their property to the Service. Another commenter wanted to know if the Wapato Lake Unit was established whether Flett Road would still remain adjacent to the historic Wapato lakebed and cross Ayers Creek.

Service Response. The Service's land acquisition program operates under a willing seller policy. Service land acquisition for the proposed Wapato Lake Unit would be prioritized based on the wildlife habitat value of the land (see Land Acquisition Priority Map in appendix A). If a landowner was willing to consider an offer from the Service to purchase any portion of their property and the Service was willing to pursue acquisition based on the property's habitat values, the Service would obtain and pay for an appraisal. The appraisal would typically be done by a local contract appraiser hired by the Appraisal Services Directorate of the Department of the

Interior. The appraisal would be prepared in accordance with uniform appraisal standards. The Service's purchase offer would be based on the full amount of the approved appraisal. The landowner would be under no obligation to accept the offer.

Landowners within an approved refuge boundary retain all the rights, privileges, and responsibilities of private land ownership including the rights to access the property, control trespass, sell to any party, and develop their properties. In other words, an approved refuge boundary does not preclude landowners from developing or otherwise using their property in a manner consistent with local zoning and regulatory provisions. Landowners within an approved refuge boundary can sell their land to any buyer at any time, even if the Service has acquired easement rights or fee title to land adjacent to private lands.

Land use regulating (i.e., restrictions on land use) does not expand when lands come within a refuge boundary. Service management of access, land use practices, habitat and public use management, and general use within a refuge boundary is limited to the lands the Service has acquired.

Funding sources for Service acquisition of lands for the Refuge System include the Land and Water Conservation Fund and the Migratory Bird Conservation Fund (MBCF). Given that migratory birds are a prominent wildlife species focus in the Wapato area, the Service would probably seek funding primarily from the MBCF. Projects for MBCF monies are submitted to the Migratory Bird Conservation Commission, established by Congress, for approval. The Service receives annual appropriations in the form of operations and maintenance funds for managing refuges through the Congressional budget process. The Service is able to use Congressional appropriated funds to leverage contributions through partnerships in order to create additional funding.

Lands purchased in fee title for a national wildlife refuge, like other Federal, state, and county-owned lands, are not subject to property taxes. However, under the provisions of the Refuge Revenue Sharing Act, the Service makes annual payments to counties for lost tax revenues. Thus, the Service would make revenue sharing payments to Washington and Yamhill Counties for properties owned by the Service. These payments would be roughly the same as the taxes that would have been collected for these properties. Additionally, communities benefit from refuge open space which does not burden the municipal infrastructure.

Regarding the question about Flett Road, this road would continue to cross Ayers Creek. The roads within the proposed Wapato Lake Unit are owned by the Counties and the Service does not have any plans to pursue negotiating control of any County roads with either Washington or Yamhill Counties.

Comment Topic: Waterfowl hunting

Several commenters supported establishing the Wapato Lake Unit and requested that the tradition of waterfowl hunting in the Wapato area be allowed to continue. One commenter requested that only passive recreation be allowed; no hunting.

Service Response. Under the National Wildlife Refuge System Administration Act, as amended, hunting is one of the six priority public uses for the National Wildlife Refuge System. As one of the priority public uses, it is the policy of the Service to plan and implement safe high quality public hunting programs when found to be compatible with refuge purposes and the mission of the Refuge System. Game species providing hunting opportunities within the proposed Wapato Lake Unit could include waterfowl, mourning dove, snipe, ring-necked pheasant, California quail, and black-tailed deer. It is the policy of the Service to allow the hunting of only self sustaining game species populations. Hunting program techniques to promote high quality hunting could include hunting by permit, hunting at designated sites, time of day and days per week restrictions, type of weapon designations, and shell limit restrictions. If the Wapato Lake Unit is established, recreational hunting would be evaluated during the comprehensive conservation planning process, scheduled to begin in 2009, in close coordination with the Oregon Department of Fish and Wildlife.

Comment Topic: Other Wildlife-Dependent Public Use

Many commenters stated they would like the Service to support wildlife observation and photography and environmental education and interpretation on the proposed Wapato Lake Unit. Several commenters requested blinds for bird watching and photography, overlooks, and interpretive signs.

Service Response. Wildlife observation and photography and environmental education and interpretation are priority public uses of the Refuge System. The Service would seek to facilitate wildlife observation and photography and environmental education and interpretation if compatible with Refuge purposes. These wildlife-dependent uses would be evaluated during the conservation planning process, scheduled to begin in 2009.

Comment Topic: Cultural Resources

A few commenters said they would like to see the Service preserve Native American history and cultural sites and offer related public education and interpretation. One commenter specified protection of Atfalati and Tualatin Indian historic sites, trails, and artifacts. Another commenter recommended the Service coordinate with the Grand Ronde tribe for the project. The Service also received a request to address the impacts of ground disturbing activities on cultural resources and known archaeological sites.

Service Response. The Wapato Lake area was the major habitation site of the Tualatin Native Americans, one of approximately thirteen groups of Kalapuya people. Prior to the 1800s when settlers began arriving, the population was approximately 10,000. Their territory extended throughout most of the Willamette River Valley as far south as the Umpqua River to as far north as the Wapato Lake area, an important seasonal community gathering place for the Kalapuyans.

On March 8, 2002, the Service conducted a record search for the proposed Wapato Lake Unit Study Area using the records on file at the Oregon State Historic Preservation Office. A few documented cultural resources were identified within the Study Area boundary, including the historic A.T. Smith house built in 1856 which is listed on the National Register of Historic

Places. The house was purchased by the Friends of Historic Forest Grove in 2005 for preservation and to serve as an interpretative center. The other cultural resource sites that were identified are prehistoric and their location is confidential. Several Tualatin Native American villages, described in the ethnographic record, are reported to have existed in the vicinity.

Federal acquisition of land on which cultural resources are located is not considered, in and of itself, an undertaking requiring compliance with Section 106 of the National Historic Preservation Act. Once under Federal ownership, cultural resources are protected under the National Historic Preservation Act and other cultural resource preservation laws. To ensure refuge management activities do not have adverse effect on historic properties, the Service would follow established procedures and comply with Federal laws and policy for considering the impacts of any character-altering of buildings and/or ground disturbance, including habitat restoration, on a case-by case basis. Overall, the Service would evaluate the effects of refuge management on the rural, cultural landscape of the Wapato Lake area.

Given the rich cultural heritage of the Wapato Lake area and the fact that environmental education and interpretation are priority public uses of the Refuge System, the Service would seek to develop compatible education and interpretative programs on the cultural history and land use of the Wapato Lake area as an integral part of the public use program for the Wapato Lake Unit. The Service has coordinated with the Confederated Tribes of the Grand Ronde throughout the planning process and would seek their involvement in developing cultural resource programs for the Wapato Lake Unit.

Comment Topic: Effects on the Economy

One commenter asked the Service to explain more of the economic benefits generated by national wildlife refuges, and more specifically, on the hunting dollars generated by refuges. A few commenters inquired about the revenue losses associated with taking farmland out of production to restore wildlife habitat.

Service Response. Although a detailed analysis for assessing the economic effects of establishing a refuge in the Wapato Lake area, and more specifically of providing a hunting program, has not been developed for this proposal, detailed analyses contained in the Service's *Banking on Nature* document provides insight on the economic effects associated with public use activities on National Wildlife Refuge System lands. For example, we can examine a similarly situated national wildlife refuge in the Pacific Northwest, the Umatilla National Wildlife Refuge (Umatilla NWR). Two units of Umatilla NWR are located in Morrow County, Oregon, and three units in Benton County, Washington. Upland, marsh, and open water habitats at Umatilla NWR support an abundance of wildlife including migratory birds during their spring and fall migrations. The Service manages a wildlife-dependent public use program including hunting, fishing, wildlife observation and photography and environmental education and interpretation. During the fiscal year 1995, the Service recorded 55,459 visits to the Umatilla NWR and waterfowl hunting accounted for 14,188 of these visits. Wildlife observation and photography and environmental education and interpretation accounted for 16,309 of these visits.

A number of small towns located close by the Umatilla NWR, including Paterson, Plymouth, Boardman, Irrigon, and Umatilla, benefit from Refuge visitor recreational expenditures on food, gas, lodging, sporting goods, and other items. Refuge visitor expenditures occurred primarily within the surrounding three counties, Morrow, Benten, and Franklin, and were estimated at $1,280,500 in the fiscal year 1995; non-residents accounted for $907,000, 71 percent of the total. Expenditures on fishing accounted for 53 percent of the total, hunting 43 percent, and non-consumptive use 4 percent. The monetary value of economic spending in the three-county area based on Refuge visitor spending generated 23 jobs (both full-time and part-time) with a total employment income of $388,100.

For the proposed Wapato Lake Unit, the Service examined the economic effects of taking farmland out of production and found that if all the lands were purchased from willing sellers and all necessary habitat restoration activities were completed under a given action alternative (Alternatives B, C, D, or E), the total percent acreage taken out of agricultural production in Washington and Yamhill counties would be .01%, .01%, .04%, or .16%, respectively. Although a monetary value has not been tied to percentages, it is believed that anything less than 1.0 % is thought to be insignificant. Public visitation of the Wapato Lake Unit would help off-set economic values lost in agricultural production by buying local goods and services in the community, a by-product of nature tourism.

Comment Topic: Water access and delivery to private landowners

One commenter expressed opposition to the establishment of the Wapato Lake Unit because of concern about Federal authority over access to their "water take out point" for irrigation and asked what would prevent the Service from appropriating their TVID water right entirely? Another commenter spoke about not wanting to be dependent on the Service for receiving their water. A few commenters wanted to know future managed water levels?

Service Response. Establishment of the Wapato Lake Unit would not add to or alter the prevailing land use laws and zoning regulations administered by the State of Oregon and the local jurisdictions. All existing easements for private access to private lands would also be unchanged.

Lands with water delivery infrastructure owned by the Wapato Improvement District (WID) and water entitlements served by WID would be Service priorities under an acquisition program. Tualatin Valley Irrigation District (TVID) is responsible for delivery of irrigation water stored behind Scoggins Dam to TVID-assessed lands in the area. TVID delivers water to lands that have primary and secondary irrigation rights in the Wapato Lake area through an agreement with WID to use WID infrastructure. The Service is not authorized nor does it have the resources or expertise to operate and administer the WID system and deliver irrigation water to WID and TVID patrons. The Service is investigating an arrangement with TVID that would transfer operation, annual maintenance, and administration of the WID distribution system to TVID. The Service is aware of the citizen concern that assessments to local WID and TVID patrons remain stable and closely related to the quality of services delivered. Lands within the existing TVID and WID boundaries, whether in Service or private ownership, would continue to be assessed duties for the delivery of irrigation water. When the majority of WID irrigated lands are finally

converted to refuge purposes, the Service would convert the water rights from irrigation to on-site refuge purposes. TVID will retain its ownership interest in water rights appurtenant to assessed lands converted to refuge purposes. The Service would not acquire primary and secondary water rights, attached to the deeds of private land ownerships, without the consent of the landowners because establishment of the Wapato Lake Unit would be based on a willing seller program.

If the Wapato Lake Unit is established with approval of the Director, the Service would seek to purchase land within the approved boundary from willing sellers. Due to the relatively flat contours of the Wapato lake basin, restoration of wetland habitats could not begin until a significant percentage of lands within the Wapato lakebed are under management authority of the Service. The duration of seasonal flooding of the lakebed would be managed to mirror historic hydrology as much as possible. Typically, flooding would begin in fall and remain at desired management levels through early spring. Water levels would then gradually recede through evaporation/transpiration or lake level manipulation until reaching a desired management elevation. When the Service considers lakebed restoration feasible, it would implement a restoration and management plan that would protect neighboring private lands from flooding or other hydrologic impacts. This could include structural changes, for example, a low elevation levee with associated toe drains, or management strategies such as manipulation of lake levels or source water contributions. Tualatin River National Wildlife Refuge has successfully implemented similar physical and management solutions to protect private lands near or adjacent to Federal land.

Comment topic: Mosquito control

One commenter inquired how the Service would manage the proposed Wapato Lake Unit to control mosquitoes.

Service Response. By policy, the Service recognizes mosquitoes as a natural component of most wetland ecosystems, and also, that under certain circumstances; their presence may cause a threat to human and wildlife health as vectors of disease. When necessary to protect the health and safety of the public or a wildlife population, the Service may manage mosquitoes on Refuge System lands using the least intrusive means possible. Compatible habitat management and pesticide uses for mosquito control must give full consideration to the integrity of non-target populations and be consistent with integrated pest management strategies and policies of the Department of the Interior and the Service.

Most mosquitoes breed in standing stagnant water and their movement as adults is fairly limited. Many species of wildlife forage on mosquito larvae with mosquito fish and dragon flies being the most aggressive of predators. The Service manages water and vegetated wetlands to create undesirable habitat for mosquitoes, and to break-up conditions required for fulfilling their reproductive cycle. Sample monitoring of mosquito larvae is performed on some refuges to determine species presence and relative abundance, baseline information which can be used to evaluate and improve management effectiveness.