



# Appendix B Compatibility Determinations

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## **Appendix B. Compatibility Determinations**

### **B.1 Introduction**

The compatibility determinations (CDs) developed during the comprehensive conservation plan (CCP) planning process evaluate uses that are projected to occur under Alternative 2, the preferred alternative. The evaluation of funds needed for management and implementation of each use also assume implementation as described under Alternative 2. Chapter 6 of the draft CCP/EA contains analysis of the impacts of public uses to wildlife and habitats. That portion of the document is incorporated through reference into this set of CDs.

#### **B.1.1 Uses Evaluated at This Time**

The following section includes full CDs for all refuge uses that are required to be evaluated at this time. According to Service policy, compatibility determinations will be completed for all uses proposed under a CCP that have been determined to be appropriate. Existing wildlife-dependent recreational uses must also be reevaluated and new CDs prepared during development of a CCP.

According to the Service's compatibility policy, uses other than wildlife-dependent recreational uses are not explicitly required to be reevaluated in concert with preparation of a CCP, unless conditions of the use have changed or unless significant new information relative to the use and its effects have become available, or the existing CDs are more than 10 years old. However, the Service planning policy recommends preparing CDs for all individual uses, specific use programs, or groups of related uses associated with the proposed action.

#### **B.1.2 Compatibility—Legal and Historical Context**

Compatibility is a tool refuge managers use to ensure that recreational and other uses do not interfere with wildlife conservation, the primary focus of the refuge. Compatibility is not new to the Refuge System and dates back to 1918 as a concept. As policy, it has been used since 1962. The Refuge Recreation Act of 1962 directed the Secretary of the Interior to allow only those public uses of refuge lands that were “compatible with the primary purposes for which the area was established.”

Legally, refuges are closed to all public uses until officially opened through a compatibility determination. Regulations require that adequate funds be available for administration and protection of refuges before opening them to any public uses. However, wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, and environmental education and interpretation) are to receive enhanced consideration and cannot be rejected simply for lack of funding resources unless the refuge has made a concerted effort to seek out funds from all potential partners. Once found compatible, wildlife-dependent recreational uses are deemed the priority public uses at the refuge. If a proposed use is found not compatible, the refuge manager is legally precluded from approving it. However, a use found not compatible may be modified such that it can be found compatible. Economic uses that are conducted by or authorized by the refuge also require compatibility determinations.

Under compatibility policy, uses are defined as recreational, economic/commercial, or management uses of a refuge by the public or a non-Refuge System entity. Uses generally providing an economic return (even if conducted for the purposes of habitat management) are also subject to compatibility

determinations. The Service does not prepare compatibility determinations for uses when the Service does not have jurisdiction. For example, the Service may have limited jurisdiction over refuge areas where property rights are vested by others, where legally binding agreements exist, or where there are treaty rights held by tribes. In addition, aircraft overflights, emergency actions, some activities on navigable waters, and activities by other federal agencies on “overlay refuges” are exempt from the compatibility review process.

New compatibility regulations, required by the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act), were adopted by the Service in October 2000 (<http://refuges.fws.gov/policymakers/nwrpolicies.html>). The regulations require that a use must be compatible with both the mission of the Refuge System and the purposes of the individual refuge. This standard helps to ensure consistency in application across the Refuge System. The Act also requires that compatibility determinations be in writing and that the public have an opportunity to comment on most use evaluations.

The Refuge System mission emphasizes that the needs of fish, wildlife, and plants must be of primary consideration. The Improvement Act defined a compatible use as one that “... in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the Refuge.” Sound professional judgment is defined under the Improvement Act as “... a finding, determination, or decision, that is consistent with principles of sound fish and wildlife management and administration, available science and resources ....” Compatibility for priority wildlife-dependent uses may depend on the level or extent of a use.

Court interpretations of the compatibility standard have found that compatibility is a biological standard and cannot be used to balance or weigh economic, political, or recreational interests against the primary purpose of the Refuge (*Defenders of Wildlife v. Andrus* [Ruby Lake Refuge]). The Service recognizes that compatibility determinations are complex. For this reason, refuge managers are required to consider “principles of sound fish and wildlife management” and “best available science” in making these determinations (House of Representatives 1997).

Evaluations of the existing uses on the Tualatin River National Wildlife Refuge are based on the professional judgment of refuge and planning personnel, including observations of refuge uses and reviews of appropriate scientific literature.

In July 2006, the Service published its Appropriate Refuge Uses Policy ([603 FW 1](#)). Under this policy, most proposed uses must also undergo a review prior to compatibility. Uses excepted from the policy include the “Big Six” uses and uses under reserved rights—see the policy for more detail.

## References

*Defenders of Wildlife v. Andrus* (Ruby Lake Refuge I). Case 2098 (D.D.C. 1978). Environmental Reporter 11:873.

House of Representatives. 1997. Report 105-106 on National Wildlife Refuge System Improvement Act. Available at: [http://www.fws.gov/Refuges/policiesandbudget/HR1420\\_part1.html](http://www.fws.gov/Refuges/policiesandbudget/HR1420_part1.html).

## **B.2 Compatibility Determination for Wildlife Observation, Wildlife Photography, and Interpretation at Tualatin River National Wildlife Refuge**

**Use:** Wildlife observation, wildlife photography, and interpretation

**Station Name:** Tualatin River National Wildlife Refuge (the refuge)

**Date Established:** 1992

### **Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S. Code [U.S.C.] § 742a. et seq.)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

### **Refuge Purpose(s):**

“ ... for the development, advancement, management, conservation, and protection of fish and wildlife resources ... ” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“ ... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ... ” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“ ... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ... ” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

### **National Wildlife Refuge System Mission:**

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

### **Description of Use:**

This compatibility determination (CD) examines wildlife observation, wildlife photography, and interpretation as proposed under Preferred Alternative 2 of the Tualatin River National Wildlife Refuge (refuge) draft comprehensive conservation plan (CCP)/environmental assessment (EA). There is substantial overlap between activities associated with wildlife observation, wildlife photography, and interpretation where participants are engaged in self-directed learning about the natural and cultural resources on the refuge, and as such these uses are evaluated together in this CD. This use would foster an aware and involved citizenry that would take an active role in conservation.

Visitors typically engage in wildlife observation, wildlife photography, and interpretation uses at the refuge Wildlife Center, along the year-round and seasonal trails, at a number of overlooks, and at the wildlife photography blind—all located on the Atfálat’i Unit of the refuge. Projections indicate that refuge public facilities could serve an estimated 200,000 to 300,000 visitors annually (U.S. Fish and

Wildlife Service [Service; USFWS] 2003a). Currently, nearly 100,000 people visit the refuge annually. See Sections 5.3 and 5.4 of the refuge CCP/EA for a complete description of visitor use statistics.

The highest visitor use generally occurs spring through fall, though there is some use throughout the year. The seasonal trail is open from May 1 through September 30 to minimize disturbance to migrating and wintering waterfowl. Visitor use is limited to developed facilities, and other areas of the refuge remain closed to general public use. Visitors are limited to pedestrian use only—bicycling, dog walking, and jogging are prohibited. Maps, brochures, kiosks, and directional and regulatory signs would be provided to visitors to communicate activities that are encouraged and those that are prohibited.

Group size is usually small (families, individuals, and couples constitute the majority of groups) but occasionally larger groups use the refuge. Local nonprofit groups (e.g., Audubon Society, walking clubs, parent groups) as well as for-profit organizations (tour buses) frequently visit the refuge and lead field trips on the trails and/or visit the Wildlife Center. As is currently the case, groups of 15 people or more must: make advance reservations; be limited to no more than 50 people; break up into subgroups of 15 people or less when on trails; strive to carpool or provide group transportation; follow all refuge regulations; and not charge any fee to their participants. Any organization that charges a fee to their participants would be subject to the stipulations in the commercial visitor services CD. Fundraising activities (including providing guided tours and hosting special events and meetings) conducted by Friends of the Tualatin River National Wildlife Refuge (Friends of the Refuge) are not subject to the commercial visitor services CD, but are subject to refuge approval, per the memorandum of understanding (MOU) between the Service and the Friends of the Refuge.

Preferred Alternative 2 provides more opportunities for developing wildlife observation, photography, and interpretation programs and structured visitor experiences with enhanced facilities and improved access. Proposed actions are as follows.

Up to three additional wildlife photography blinds would be constructed on the Atfálat'i Unit of the refuge. Access trails to the blind(s) would be developed with minimal footprint and be constructed out of gravel or other low-impact and low-maintenance material. Use of the blind(s) would be managed on a reservation basis for up to two people at a time. Blinds would be available up to three days a week, from dawn to dusk. For both wildlife photography and observation areas, the refuge would maintain “viewing lanes” by selectively trimming branches, mowing tall grass, and/or occasionally removing vegetation. In addition, areas around these facilities may be enhanced to maximize wildlife use of the area. Examples of enhancements include planting vegetation for additional habitat; providing habitat structure such as basking logs; increasing vegetation cover to serve as a natural blind; and adding trees and/or shrubs to minimize “urban noise” from off-refuge sources (i.e., roads, industrial activities). Though no public use facilities currently exist at the Wapato Lake Unit, one or two additional kiosks are proposed and have potential to be developed off-refuge in partnership with local city and county jurisdictions.

Several regional land and water trail systems outside of the refuge being studied by local jurisdictions and organizations have the potential of connecting to the refuge. However, at this time, no specific location for connection has been proposed; therefore, additional appropriateness and CDs for new trails would be completed at a later date. The refuge supports providing additional wildlife observation, photography, and interpretation opportunities by linking to regional trail systems and plans to continue working with local organizations to explore this further.

Wildlife observation, photography, and interpretation would continue to occur primarily informally as self-guided activities on the refuge. Refer to Section 5.4 in Chapter 5 for a complete description of existing programs. In addition, regular staff-, volunteer-, or partner-led tours, workshops, and demonstrations would be expanded to diversify the visitor experience and opportunities for these uses. Increased outreach and program offerings would likely result in increased visitation to the refuge. Refuge-approved and guided activities may include the use of the Wildlife Center or other refuge public use facilities, and may occasionally occur after dark when the refuge is normally closed to the public. The Friends of the Refuge may also conduct similar activities in support of wildlife observation, photography, and interpretation. These programs would require preapproval by the refuge manager and would be subject to all of the same regulations as the general public (i.e., no special access to closed areas would be granted) and stipulations of this CD.

Virtual geocaching (drawing people to specific sites via electronic means) is considered a legitimate form of interpretation under this CD. Physical geocaching (the actual placement of objects in the landscape by the public) is not appropriate (see Appendix A) and is not included as a form of interpretation.

A number of existing and new special events, hosted by the refuge or in partnership with the Friends of the Refuge, could occur on the refuge in support of wildlife-dependent recreation and education activities. Examples include, but are not limited to, Tualatin River Bird Festival, National Wildlife Refuge Week, Spring Break Exploration Days, native plant sales, and one-time celebratory events such as dedications, groundbreakings, and grand openings. Special events typically last anywhere from 4 hours to all day, and may include multiple back-to-back days. Past events have attracted over 1,200 a day and may attract more, up to 2,000 people a day, in the future. Special event activities typically include, but are not limited to, guided nature walks; evening programs; indoor and outdoor temporary exhibits; self-guided tours/walks; hands-on educational activities; live animal shows; workshops; nature-related music (generally in the plaza area of the Wildlife Center); awards ceremonies for nature photography contests; and keynote speakers. Activities are limited to the areas of the refuge open to the public. Any special event activity occurring outside the public use areas would be subject to case-by-case refuge manager approval and, if necessary, a special use permit (SUP).

In support of enhanced wildlife observation, photography, and interpretation programs proposed in Preferred Alternative 2, the refuge would continue to pursue additional volunteers and interns. This would include providing bunkhouses or recreational vehicle (RV) pads to support long-term housing on the refuge. These facilities would be located in areas such as the maintenance and shop facility on the Tualatin River Unit and/or within proximity of existing or newly acquired quarters buildings.

### **Availability of Resources:**

Estimated costs for operating the environmental education program as envisioned under Alternative 2 are displayed in the following table. Estimated costs for operating the wildlife observation, photography, and interpretation programs as envisioned under Alternative 2 are also displayed in the following table. With assistance from Friends of the Refuge, grants, volunteers, and other partners, the refuge currently has sufficient staff and funding to support these programs at their current levels. Additional resources would be needed to fully implement the uses and strategies described in the CCP/EA.

**Costs to Administer and Manage Wildlife Observation, Wildlife Photography, and Interpretation under the Preferred Alternative (Alternative 2)**

<b>Activity or Project</b>	<b>One-time Expenses (\$)</b>	<b>Recurring Expenses (\$/year)</b>
Volunteer Coordinator		55,000
Law Enforcement Officer		78,500
Develop new kiosks at Wapato Lake Unit	20,000	
Maintain Wildlife Center and exhibits		5,000
Host special events		5,000
Transportation study		30,000
Maintain parking lots, trails, overlooks, blinds, signs, outdoor exhibits		15,000
Construct up to 3 additional photo blinds and associated trails		40,000
Construct RV pads and bunkhouse	300,000	5,000
Maintain existing and develop new signage and publications	5,000	5,000
Program oversight: Visitor Services Manager		20,000
<b>Total</b>	<b>327,000</b>	<b>258,500</b>

**Anticipated Impacts of Use:**

***General Impacts Expected:***

A general assessment of impacts resulting from wildlife observation, photography, and interpretation uses has been compiled from the literature and is briefly summarized below.

*Disturbance intensity (frequency, distance, etc.):* Human activities on recreational lands, trails, and other access points can result in direct effects on wildlife. Disturbance responses can depend upon the activity type, recreationists' behavior, and the distance, duration, frequency, predictability, timing, and visibility of the use (Knight and Cole 1995). Disturbance to migrant shorebirds on eastern coastal bays was found to increase as the total number of disturbances and recreationists increased and the duration of the disturbance and distance from the disturbance decreased (Burger 1986). Flushing, especially repetitive flushing, can strongly impact patterns of many bird species. Migratory birds have been observed to be more sensitive than resident species to disturbance (Klein 1989), and in the case of the eastern coastal migrant shorebirds, the percentage of observed shorebirds that were flushed and did not return increased by 53 percent from 1982 to 2002, suggesting that the birds were not adapting to the presence of people by habituation and were being affected in the long term (Burger et al. 2004).

Nest predation for songbirds (Miller et al. 1998), raptors (Glinski 1976), colonial nesting species (Buckley and Buckley 1976), and waterfowl (Boyle and Samson 1985) tends to increase in areas

more frequently visited by people where disturbance flushes birds away from their nests and creates vulnerabilities during nesting seasons. Frequency is a major factor, and songbirds have been found to alter behavior after repeated human disturbance, particularly red-winged blackbirds, goldfinches, and American robins, which became much more aggressive toward humans who repeatedly visited their nests (Knight and Temple 1986a, 1986b, 1986c).

Set-back distances for public use facilities have been found to be important in limiting human disturbance to wildlife. In Florida, 15 species of colonial waterbirds nesting at 17 colonies were exposed to three different human disturbance mechanisms to determine recommended set-back distances for protecting mixed-species nesting assemblages (Rodgers and Smith 1995). In general, a recommended set-back distance of about 100 meters (m) for wading bird colonies and 180 m for mixed tern/skimmer colonies was found to be adequate to effectively buffer sites from human disturbance caused by approach of pedestrians and motor boats (Rodgers and Smith 1995). In Nebraska, roosting sandhill cranes avoided sites near human disturbance features at 500 m from nearest paved road, 400 m from nearest gravel road, and 400 m from a single dwelling structure (Norling et al. 1992). Klein (1989) studied the effect of visitation on migrant and resident waterbirds at Ding Darling National Wildlife Refuge, finding that resident birds were less sensitive to human disturbance than migrants. Migrant ducks were particularly sensitive when they first arrived on-site in the fall. They usually remained at a distance of more than 80 m [from a visitor footpath on a dike], even at very low visitor levels. Herons, egrets, brown pelicans, and anhingas were most likely to habituate to humans, thus exposing them to direct disturbance as they fed on or near the dike. Shorebirds showed intermediate sensitivity. Strauss (1990) observed piping plover chicks spent less time feeding (50% versus 91%) and more time running (33% versus 2%), fighting with other chicks (4% versus 0.1%), and standing alert (9% versus 0.1%) when pedestrians or moving vehicles were closer than 100 m than when they were undisturbed. In addition, plover chicks spent less time out on the feeding flats (8% versus 97%) and more time up in the grass (66% versus 0.1%) during periods of human disturbance.

Conversely, wildlife tends to habituate best to disturbance that is predictable, as indicated by sandhill cranes in Florida and in Nebraska that nested within 400 m of highways, railroads, mines, and power lines, which provided a predictable background disturbance (Dwyer and Tanner 1992; Norling et al. 1992). Taylor and Knight (2003) found that for mule deer, the area of influence around off-trail areas was much greater than for on-trail areas, suggesting habituation to trails. However, the time it takes for wildlife to habituate, and what wildlife use is like compared to pre-disturbance uses, remains a question.

*Group size:* Disturbance impact to wildlife in relation to visitor group size is not a well-documented research area; however, a few studies have analyzed these impacts. Most animals flee from humans, and large groups of people may represent greater perceived risk of predation (Geist et al. 2005). Remacha et al. (2011) analyzed visitor group size influences on the number and variety of birds observed during guided educational tours in a forested area in central Spain, with group sizes ranging from 7 to 20 people. The study showed that increasing visitor group sizes had an impact on wildlife, as large groups were associated with decreased bird numbers; additionally, the study found that birds may demonstrate reduced tolerance when faced with large groups of visitors, not only reducing their frequency of occurrence but also reducing the number of individuals. The study concluded that reducing the group size of visitors helps minimize the negative impacts on wildlife and also allows visitors to watch more wildlife (Remacha et al. 2011).

Another study by Beale and Monaghan (2004) on human disturbance effects to seabird colonies at St. Abbs Head National Nature Reserve in Scotland examined the variation in nesting success for two birds, kittiwakes and guillemots, as a function of different disturbance regimes, including varying the average number of people per hour and people load, which takes into consideration the number of visitors and their distance from the nest. Human disturbance was found to have a significant negative effect on nesting success in both species of birds. Increasing visitor numbers by 8.5 percent resulted in a 22 percent increase in the failure rate of kittiwakes and a 13 percent increase in the failure rate for guillemots. Beale and Monaghan concluded that perhaps the most likely explanation is that nesting birds perceive people to be a potential predator and show appropriate anti-predator physiological responses, which interferes with energy resources available for nesting. The results showed that safe distances, or buffer zones, depend on the numbers of people visiting an area and that both numbers and distance matter in determining disturbance effects.

In addition to group size, loudness has also been found as an important variable in whether birds altered their behavior. A study was conducted at the Arthur B. Marshall Loxahatchee National Wildlife Refuge in Florida between 1992 and 1994 to observe foraging behavior of birds at the refuge and understand how people affect foraging birds (Burger and Gochfeld 1991). Variation in feeding behavior was largely explained by whether people were present, the number of people present, and the amount of noise made by the people (Burger and Gochfeld 1991). For all species, time devoted to feeding and number of strikes or pecks decreased while people were present and as the noise made by people increased; interestingly, loudness was found to be more important than the number of people present (Burger and Gochfeld 1991). Noise level is not necessarily correlated with number of people present, but larger groups might be more prone to producing noise than small groups or individuals.

Literature suggests that organizing visitors in small numbers is recommended for groups, but also spreading out visits and locations of visits is recommended to mitigate disturbance across the landscape.

*Pedestrian (hiking) versus vehicular access:* It is widely accepted that wildlife are frequently more sensitive to disturbance from people on foot than in vehicles (Grubb and King 1991; MacArthur et al. 1982; Pease et al. 2005; Skagen 1980). Numerous studies have confirmed that people on foot can cause a variety of disturbance reactions in wildlife, including flushing or displacement (Erwin 1989; Fraser et al. 1985; Freddy 1986; Pease et al. 2005), heart rate increases (MacArthur et al. 1982), altered foraging patterns (Burger and Gochfeld 1991), and even, in some cases, diminished reproductive success (Boyle and Samson 1985).

A study on seven species of dabbling ducks at the Back Bay National Wildlife Refuge in Virginia found a significant difference between vehicular (diesel truck and electric passenger tram) and nonvehicular (pedestrian and bicyclist) treatments in the number of ducks that were flushed. In this study, 90 percent of the birds showed an observable response to nonvehicular treatments, of which 43 percent flew; the proportion of ducks that flew was greatest when they were located less than 100 m from the disturbance (Pease et al. 2005). In a review of several studies of the reaction of waterfowl and other wetland birds to people on foot, it was found that distances greater than 100 m in general did not result in a behavioral response (DeLong 2002). Mule deer in sagebrush-grassland habitat in Utah showed a 96 percent probability of flushing at 100 m from the line of movement of off-trail recreationists, with the probability not dropping to 70 percent until the perpendicular distance increased to 390 m (Taylor and Knight 2003).

These studies and others have shown that the severity of the effects depends upon the wildlife's distance from the disturbance and its duration, frequency, predictability, and visibility to wildlife (Knight and Cole 1995). In a logistic regression analyzing mule deer, pronghorn antelope, and bison response to mountain biking and hiking on- and off-trail, Taylor and Knight (2003) found that the variables best explaining wildlife response included wildlife species, perpendicular distance of animals to trail (closest distance of animal to trail, regardless of recreationist position), trail position (on-trail or off-trail), and degree of vegetation cover.

*Wildlife photography:* Wildlife photography in particular can be a more disturbing activity because photographers are more likely to leave vehicles and wander off-trail, approach wildlife, and remain close for an extended period of time to capture a detailed photograph, as observed at Ding Darling National Wildlife Refuge and other places (Dobb 1998; Klein 1993; Morton 1995). This may also apply to the experience of the user, as avid wildlife viewers tend to intentionally seek out rare or spectacular species and/or are more eager to see the most viewing opportunities in the limited amount of time (e.g., bird listing), and thus potentially pose a larger negative impact to wildlife (Knight and Cole 1995). People engaged in wildlife observation and photography react to the presence of birds and thus are generally more unpredictable on foot depending on excitement level, curiosity, and desire to observe closely.

***Refuge-specific Impacts:***

People engaging in wildlife observation, photography, or interpretation generally access the refuge by motorized vehicles traveling on public roads and parking lots. Additional wildlife photography blinds and associated access trails of less than a 0.25 mile each would be added under the preferred alternative. Minimal effect as a whole would occur as a result of new wildlife observation and photography facilities constructed under Preferred Alternative 2. Interpretive signs were not included as an impact as the assumption is that signs do not displace habitat.

*Pedestrian access:* Pedestrian use of the refuge creates the highest potential for disturbance or damage to natural resources. Foot travel associated with wildlife observation or photography could potentially result in temporary and minor vegetation trampling. Foot travel may also potentially create disturbance in or near any habitat. During the wintering season, pedestrian access is limited to the year-round trail. This limits pedestrian human disturbance during the season of highest waterbird activity at the vast majority of key wintertime wildlife congregation areas (primarily wetlands and upland fields) and allows wildlife to habituate to the few areas where humans and wildlife may both be regularly present. Outside the winter season, people may access the seasonal trail as well.

Some interpretive programs are large, organized special events that differ in character from the more informal day-to-day observation and interpretive activities. These types of programs create more disturbance and can overflow parking facilities to the point where parking lots fill and off-site parking and shuttle service is necessary to avoid safety issues and parking off roadways.

Both refuge visitation and the number of facilities and emphasis devoted to wildlife observation, photography, and interpretation are projected to increase under the Preferred Alternative 2. Given this, future disturbance effects are likely to be somewhat higher than present. Most studies cited above have demonstrated immediate, rather than long-term responses to disturbance. Long-term responses are inherently more difficult and expensive to determine. Given that wildlife observation, photography, and interpretation are not typically loud or intense kinds of activities, the area of habitat within a known distance of human activity centers (trails, kiosks, blinds, etc.) is considered a

reasonable indicator to evaluate the disturbance effects of public uses on refuge wildlife. As mentioned previously, in a review of several studies of the reaction of waterfowl and other wetland birds to people on foot, distances greater than 328 feet (100 m) generally did not result in a behavioral response (DeLong 2002).

Public education that informs photographers of ethical and least intrusive methods could reduce some impacts. Careful placement and camouflaging of additional photography blinds would likely reduce disturbance from wildlife photographers.

Although disturbance to wildlife from these activities would be higher than at present, the overall effect to refuge wildlife is expected to be minor. In addition, if disturbance to wildlife or damage to habitat reaches unacceptable levels, the refuge would limit access to areas where unacceptable impacts occur (see stipulations).

***Impacts to Listed Species:***

No direct impact to listed species is anticipated to occur as a result of the wildlife observation, photography, or interpretation programs. Any unanticipated future impacts would be reduced by ensuring that the public avoids or severely limits activity in areas hosting rare species.

***Impacts to Other Priority Public Uses:***

Wildlife observation, photography, and interpretation generally result in little disturbance to other visitors. However, some wildlife observers may inadvertently flush animals being observed or photographed by others. This conflict would be expected to be minimal

No significant effects to roads, trails, or other infrastructure from wildlife observation, photography, and interpretation programs are foreseen. Normal road, trail, and facility maintenance would continue to be necessary. Additional facility construction or upgrade, if needed, is addressed in the Availability of Resources section.

**Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

**Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

- Motorized vehicles and bicycles would be limited to designated public roads and parking lots. Bicycles would not be allowed.
- Registration would be required for organized groups of 15 people or more.
- Electric wheelchairs shall be allowed on trails for persons with disabilities.

- During special events, tours must avoid sensitive sites occupied by rare species.
- Wintertime sanctuary closures would be maintained. The refuge would be open dawn to dusk daily. Evening guided activities are approved by the refuge manager on a case-by-case basis.
- Dogs are not allowed outside of vehicles. Registered service animals are an exception.
- Signs, pamphlets, and verbal instructions from refuge staff and volunteers would promote appropriate use of facilities to minimize wildlife and habitat disturbance.
- Periodic monitoring and evaluation of sites and programs would be conducted to assess if objectives are being met and ensure that the resource is not being unacceptably degraded. If disturbance to wildlife or damage to habitat reaches unacceptable levels, the refuge would avoid or limit activities in areas where unacceptable impacts occur.

**Justification:**

As wildlife-dependent recreational uses, wildlife observation, photography, and interpretation receive enhanced consideration in the CCP planning process. Given the location of wintertime sanctuary closed areas and the locations of wildlife viewing, photography, and interpretation facilities, these uses would be expected to have a minor direct impact on refuge resources. The associated disturbance to wildlife from these activities under Alternative 2, though larger than at present, is also expected to be minor. It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the refuge would not be measurably lessened from allowing these activities to occur. The relatively limited number of individual animals and plants expected to be adversely affected would not cause populations to materially decline, the physiological condition and production of refuge species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing wildlife photography, observation, interpretation to occur under the stipulations described above would not materially detract from or interfere with the purposes for which the refuge was established or the refuge mission. Wildlife observation, photography, and interpretation provide visitors with the joy of experiencing wildlife on their public lands, and as such, help fulfill the mission of the National Wildlife Refuge System (Refuge System).

**Mandatory 10- or 15-year Re-evaluation Date (provide month and year for “allowed” uses):**

2027 Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

\_\_\_\_\_ Mandatory 10-year re-evaluation date (for all uses other than wildlife-dependent public uses)

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**Signatures:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval: \_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

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### **B.3 Compatibility Determination for Waterfowl Hunting at Tualatin River National Wildlife Refuge**

**Use:** Waterfowl hunting

**Station Name:** Tualatin River National Wildlife Refuge

**Date Established:** 1992

**Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S.C. § 742a. *et seq.*)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

**Refuge Purpose(s):**

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

**National Wildlife Refuge System Mission:**

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

**Description of Use:**

The Service proposes to allow hunting of ducks, geese, coots, and snipe in accordance with state and Federal regulations and refuge-specific special conditions. A youth waterfowl hunt would be conducted on the Oleson parcel of the Riverboat Unit, and general waterfowl hunting would be conducted at Wapato Lake on the Wapato Lake Unit once restoration activities are completed and infrastructure for hunting is in place. It is estimated that up to 48 youth hunters per year would participate in youth hunts, and up to 1,920 hunters per year would participate in waterfowl hunting at the Wapato Lake Unit. Youth waterfowl hunting would occur on approximately 50 acres in the Riverboat Unit, or on about 2 percent of refuge lands. Waterfowl hunting at the Wapato Lake Unit would likely occur on no more than 800 acres, or about 37 percent of current refuge lands.

Hunting would take place during regular state seasons, which generally run from October to January, but dates are subject to change annually. Youth hunts would be conducted on selected Saturdays

only, on no more than two days per month. General waterfowl hunting at Wapato Lake would be conducted no more than three days per week. Youth hunting would be allowed using two to five blinds on the Riverboat Unit. A maximum of two youth and two supervising (but nonhunting) adults would be accommodated in each blind. Blind assignments would be conducted via lottery prior to each hunt date. At the Wapato Lake Unit, it is anticipated that there would be up to 20 hunting blinds. Blinds would be assigned via lottery or on a first-come first-served basis. Although dogs are generally prohibited for all other uses on the refuge, they are a vital part of the waterfowl hunting tradition and can reduce the loss of waterfowl, thus reducing the overall impact to the resource. Because of their role in retrieving waterfowl, dogs used for waterfowl retrieval purposes are allowed on the refuge during hunting.

In accordance with the National Wildlife Refuge System Administration Act of 1966, as amended, hunting is a priority wildlife-dependent public use. Public land for waterfowl hunting is in limited supply, especially near large metropolitan areas (U.S. Department of the Interior [USDOI] et al. 2007) such as Portland. In general, there has been a static or declining trend in hunting participation relative to population growth in the United States (USFWS 2004) since 1985. The trend also indicates a declining number of young hunters. From 1991 to 2001, the number of Americans 16 years of age and older who hunted declined by 7 percent. However, in Oregon from 1991 to 2001, hunter participation increased by 2 percent (USFWS 2004). According to Raftovich et al. (2011) there were approximately 21,400 active waterfowl hunters in Oregon during 2010. Opportunities to hunt in the greater Portland area are increasingly scarce due to an ever-growing population, urbanization, and a relative lack of public lands open to these uses. Hunting (both for and against) was the subject of more letters and e-mails received during scoping for the CCP than any other topic. In particular, the community has expressed a very strong interest in sharing hunting traditions with youth. Opening the refuge to waterfowl hunting would provide the public an opportunity to hunt in proximity to the urban area, in uncrowded and relatively natural environments, and at a reasonable cost. The habitat and wildlife objectives for Wapato Lake Unit are very likely to support quality waterfowl hunts as the refuge would be restoring riparian habitat used by waterfowl. Refuge hunting opportunities would be offered consistent with relevant state hunting regulations, and with management plans for applicable species and the Pacific Flyway Council's (PFC's) plans for cackling Canada geese (PFC 1999) and dusky Canada geese (PFC 2008).

Hunters have helped buy land for the Refuge System for nearly 70 years through the purchase of Migratory Bird Hunting and Conservation Stamps—also known as Duck Stamps—and continue to support and advocate for refuges and conservation. Hunters also participate and share in wildlife photography, education, and interpretation while hunting. These activities would tend to promote and support the mission of the Refuge System.

Tualatin River National Wildlife Refuge was established under, or to fulfill the purpose of, the Migratory Bird Conservation Act (16 U.S.C. § 715a-715r), or through approval of the Migratory Bird Conservation Committee, as an “inviolate sanctuary for migratory birds, or for any other management purpose, for migratory birds.” On units of the Refuge System or portions thereof established as an “inviolate sanctuary,” the Service may only allow hunting of migratory gamebirds on no more than 40 percent of that refuge, or portion, at any one time unless the Service finds that taking of any such species in more than 40 percent of such an area would be beneficial to the species (National Wildlife Refuge System Administration Act and Migratory Bird Conservation Act).

**Availability of Resources:**

Administering the refuge hunt program requires substantial staff time, equipment, and funding. To provide a quality hunting experience, access trails, parking lots, signs, and other facilities must be maintained annually. The refuge does not have a law enforcement officer on staff and must rely on zone officers or partnering law enforcement agencies to ensure compliance with state and Federal regulations and refuge-specific special conditions. A portion of the funding to support this program could be provided by monies collected as part of a hunt lottery or by blind fees charged to participants. Funding associated with facilities maintenance (roads, parking areas, signs, etc.) is included in other refuge programs requiring the same support.

Increased volunteer assistance, stronger existing partnerships, and new partnerships would be sought to support these programs in an effective, safe, and compatible manner. Refuge staff would increase volunteer recruitment efforts. Volunteers, interns, and various user groups when provided appropriate training can assist the refuge with monitoring, education and interpretation programs, and maintenance projects. With additional assistance as described above, staffing and funding is expected to be sufficient to manage these uses.

**Costs to Administer and Manage Hunting under the Preferred Alternative**

<b>Category and Itemization for Waterfowl Hunting Program</b>	<b>One-time Expenses</b>	<b>Annual Expenses</b>
Develop youth hunting program opening package	\$10,000	
Develop general hunting program opening package	\$10,000	
Construct youth hunting blinds (Riverboat Unit)	\$15,000	
Construct general hunting blinds (Wapato Lake Unit)	\$50,000	
Develop signage and brochures	\$5,000	\$1,000
Administration and management		\$20,000
Maintenance		\$4,000
Law enforcement staff		\$25,000
<b>Total one-time expenses for youth hunt</b>	<b>\$25,000</b>	
<b>Total one-time expenses for general hunt</b>	<b>\$65,000</b>	
<b>Total annual expenses for waterfowl hunting program</b>		<b>\$50,000</b>

**Anticipated Impacts of the Use:**

*Short-term Impacts:*

Short-term impacts include disturbance to wetland habitat to install hunting blinds. Blinds would be installed during late summer when wetland water levels are low or dry, migratory waterfowl are not present, and locally nesting birds have hatched their young. Short-term impacts would also include disturbance of migratory waterfowl and other wildlife during hunting activities. Direct take of waterfowl would occur, and take of some non-target species might also occur. The presence of

hunters and dogs, sounds of gunfire, and the sight of hunters traveling to and from hunt areas can disturb wildlife species such as pied-billed grebe, great blue heron, bald eagle, and tundra swan, which forage in refuge wetlands. This disturbance, especially when repeated over a period of time, may result in some wildlife species altering their behavior or moving to other areas. Hunting would occur outside of the breeding season. No significant effects are expected for refuge fish populations.

***Long-term Impacts:***

Long-term impacts include loss of some vegetation surrounding hunting blinds and impacts to migratory waterfowl and other wildlife species from repeated disturbance. The hunting blind itself would have a “footprint” of vegetation disturbance and trampling of vegetation by hunters using the blind. Migratory waterfowl and other wildlife species would be disturbed during times when hunting is occurring, and to some extent some would avoid the hunt area during nonhunting days as well. Annual maintenance of hunting blinds would also cause disturbance to both habitat and wildlife in the vicinity of the blinds.

Although hunting directly impacts individuals, the amount of waterfowl harvest is not expected to change or to have a measurable effect on refuge, Willamette Valley, or Pacific Flyway populations, as waterfowl hunting activity is not extremely high in the highly urbanized Willamette Valley. Hunting may be either compensatory or additive to natural mortality (Anderson 1995). Compensatory mortality occurs when hunting substitutes for other forms of mortality (disease, competition, predation, severe weather, etc.). Additive mortality occurs when hunting compounds the total mortality. In some cases, hunting can be used as a management tool to control populations. In concert with Canada, Mexico, and multi-state flyway councils, the Service and state wildlife agencies regulate hunting so that harvest does not reduce populations to unsustainable levels.

Direct effects of hunting on waterfowl are mortality, wounding, and disturbance (DeLong 2002). Hunting can alter behavior (e.g., foraging time), population structure, and distribution patterns of wildlife (Bartelt 1987; Cole and Knight 1990; Madsen 1985; Owens 1977; Raveling 1979; Thomas 1983; White-Robinson 1982). In Denmark, hunting was documented to affect the diversity and number of birds using a site (Madsen 1995). Avian diversity changed from predominantly mute swan and mallard to a more even distribution of a greater number of species when a sanctuary was established. Hence, species diversity increased with the elimination of hunting. There also appears to be an inverse relationship between the numbers of birds using an area and hunting intensity (DeLong 2002). In Connecticut, lesser scaup were observed to forage less in areas that were heavily hunted (Cronan 1957). In California, the numbers of northern pintails on Sacramento Refuge’s non-hunt areas increased after the first week of hunting and remained high until the season was over in early January (Heitmeyer and Raveling 1988). Following the close of hunting season, ducks generally increased their use of the hunt area; however, use was lower than before the hunting season began.

Human disturbance to wintering birds and other wildlife using the open waters of the refuge would occur as a result of hunting activity. Migratory and wintering waterfowl generally attempt to minimize time spent in flight and maximize foraging time because flight requires considerably more energy than any other activity other than egg laying. Human disturbance associated with hunting includes loud noises and rapid movements, such as those produced by shotguns and boats powered by outboard motors. This disturbance, especially when repeated over a period of time, compels waterfowl to change food habits, feed only at night, lose weight, or desert feeding areas (Madsen 1995; Wolder 1993). Disturbance levels from hunting activity outside Chincoteague Refuge were found to be high enough to force wintering black ducks into a pattern of nocturnal feeding within

surrounding salt marsh and diurnal resting within refuge impoundments (Morton et al. 1989a, 1989b). Unhunted populations have been documented to behave differently from hunted ones (Wood 1993).

The impacts noted above can be reduced by the presence of adjacent sanctuary areas where hunting does not occur, and birds can feed and rest relatively undisturbed. Sanctuaries or non-hunt areas have been identified as the most common solution to disturbance problems caused from hunting (Havera et al. 1992). Prolonged and extensive disturbances may cause large numbers of waterfowl to leave disturbed areas and migrate elsewhere (Madsen 1995; Paulus 1984). In Denmark, hunting disturbance effects were experimentally tested by establishing two sanctuaries (Madsen 1995). Over a five-year period, these sanctuaries became two of the most important staging areas for coastal waterfowl. Numbers of dabbling ducks and geese increased fourfold to 20-fold within the sanctuary (Madsen 1995). On the refuge, all units except the Atfálat'i and Riverboat Units would be closed to public entry, and with numerous wetlands and sloughs available, these units act as a sanctuary during the waterfowl season.

***Cumulative Impacts:***

The hunting of waterfowl in the United States is based upon a thorough regulatory setting process that involves numerous sources of waterfowl population and harvest monitoring data. Waterfowl populations throughout North America are managed through an administrative process known as flyways, of which there are four (Pacific, Central, Mississippi, and Atlantic). Oregon is included in the Pacific Flyway.

National Environmental Policy Act (NEPA) considerations incorporated by the Service for hunted migratory gamebird species are addressed by the programmatic document *Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds*, which was filed with the U.S. Environmental Protection Agency (EPA) on June 9, 1988. The Service published the record of decision for this document on August 18, 1988 (53 Federal Register [FR] 31341). This document is in the process of being updated; in August 2009, the *Draft Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Hunting of Migratory Birds* was released (USDOJ 2009). Annual NEPA considerations for waterfowl hunting frameworks are covered under a separate environmental assessment and finding of no significant impact.

The Migratory Bird Treaty Act stipulates that all hunting seasons for migratory gamebirds be closed unless specifically opened by the Secretary of the Interior. The Service annually promulgates regulations establishing the Migratory Bird Hunting Frameworks. The frameworks are essentially permissive in that hunting of migratory birds would not be permitted without them. Thus, in effect, Federal annual regulations both allow and limit the hunting of migratory birds.

The Migratory Bird Hunting Frameworks provide season dates, bag limits, and other options for the states to select that should result in the level of harvest determined to be appropriate based upon Service-prepared annual biological assessments detailing the status of migratory game bird populations. In North America, the process for establishing waterfowl hunting regulations is conducted annually. In the United States, the process involves a number of scheduled meetings (Flyway Study Committees, Flyway Councils, Service Regulations Committee, etc.) in which information regarding the status of waterfowl populations and their habitats is presented to individuals within the agencies responsible for setting hunting regulations. In addition, public

hearings are held, and the proposed regulations are published in the Federal Register to allow public comment.

For waterfowl, annual assessments used in establishing the frameworks include the Breeding Population and Habitat Survey, which is conducted throughout portions of the United States and Canada. This survey is used to establish a Waterfowl Population Status Report annually. In addition, the number of waterfowl hunters and resulting harvest are closely monitored through both the Harvest Information Program and the Parts Collection Survey. Since 1995, such information has been used to support the adaptive harvest management (AHM) process for setting duck-hunting regulations. Under AHM, a number of decision-making protocols determine the choice (package) of predetermined regulations (appropriate levels of harvest) that constitute the framework offered to the states that year. Each state's wildlife commission then selects season dates, bag limits, shooting hours, and other options from the Pacific Flyway package. Their selections can be more restrictive but not more liberal than AHM allows. Thus, the level of hunting opportunity afforded each state depends on the annual status of waterfowl populations.

Season dates and bag limits for national wildlife refuges open to hunting are never longer or larger than state regulations. In fact, season dates and bag limits may be more restrictive than the state allows. Each national wildlife refuge considers the cumulative impacts to hunted migratory species through the Migratory Bird Hunting Frameworks published annually in the Service's regulations on migratory bird hunting.

According to Raftovich et al. (2011) total waterfowl harvest in Oregon during 2009-2010 was estimated at 464,500 out of a total Pacific Flyway harvest of 3,458,700, or approximately 13 percent of the flyway total. It is estimated that refuge youth hunters would harvest approximately 144 waterfowl and general hunters would harvest 5,760. The total estimated annual harvest of both programs would be about 1 percent and 0.002 percent of the Oregon and Pacific Flyway harvests, respectively.

The cumulative effects of disturbance to nonhunted birds and other species under the proposed action are expected to be minor. Hunting seasons would not coincide with the nesting season; thus, reproduction would not be reduced by hunting. Disturbance to foraging or resting migrating or resident birds might occur, but would be minor because of the small amount of area allowed for these hunts relative to the size of the refuge and the limited time parameters for hunting. Disturbance to other taxa would be unlikely or negligible. Encounters with reptiles and amphibians in the early fall would be few and should not have cumulative negative effects on reptile and amphibian populations. Refuge regulations further mitigate possible disturbance by hunters to nonhunted wildlife. Vehicles would be restricted to roads, and the harassment or taking of any wildlife other than the game species legal for the season would not be permitted.

Hunting has the potential to disturb refuge visitors engaged in other priority public uses, and mitigation measures to avoid user conflict would be undertaken. For example, the youth waterfowl hunt would be conducted on the Riverboat Unit, a location that is not open to other public uses. The Wapato Lake Unit general waterfowl hunt would be conducted in the Wapato Lake lake bed, and future other priority public uses would be managed with waterfowl hunting to minimize user conflicts.

Waterfowl hunting opportunity helps to better provide a priority public “big six” use, and this use is currently not provided at the refuge. Providing opportunities for youth is an important initiative in the Service and helps address a public desire to see more hunting opportunities for youth.

There could be some indirect beneficial impacts from implementing a hunting program on the refuge. Refuge hunting can contribute to wildlife and habitat conservation and provide educational and sociological benefits. The hunting community in general remains the largest support base for funding land acquisitions in the Refuge System through the purchase of Duck Stamps. Refuges provide an opportunity for a high-quality waterfowl hunting experience to all citizens regardless of economic standing. Many individual refuges have developed extensive public information and education programs bringing hunters into contact with refuge activities and facilitating awareness of wildlife issues beyond hunting.

***Summary of Effects:***

The Service believes that hunting on the Tualatin River National Wildlife Refuge, as proposed under Alternative 2, would not have a significant impact on local, regional, or Pacific Flyway waterfowl populations because the percentage likely to be taken on the refuge, though possibly additive to existing hunting take, would be a tiny fraction of the estimated populations. In addition, overall populations would continue to be monitored and future harvests would be adjusted as needed under the existing flyway and state regulatory processes.

This hunt would not add to cumulative impacts to waterfowl stemming from hunting on national wildlife refuges. Several points support this conclusion: 1) the proportion of the national waterfowl harvest that occurs on national wildlife refuges is only 6 percent (USDOJ 2009); 2) there are no waterfowl populations that exist wholly and exclusively on national wildlife refuges; 3) annual hunting regulations within the United States are established at levels consistent with the current population status; 4) refuges cannot permit more liberal seasons than provided for in Federal frameworks; and 5) refuges purchased with funds derived from Federal Duck Stamps must limit hunting to 40 percent of the available area.

**Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

**Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

- Hunting would be conducted in accordance with all Federal, state, and refuge-specific regulations.
- Only ducks, geese, and coots may be taken in accordance with state regulations.
- Hunting would only be allowed from established blinds or blind sites.

- The hunting program would be conducted as outlined in Chapter 2 of the CCP/EA and follow a step-down hunting management plan.
- Hunting program leaflets and [50 Code of Federal Regulations \[CFR\] 32](#) would be updated as necessary.
- Law enforcement patrols would be conducted on a regular basis to ensure compliance with state, Federal, and refuge regulations.
- The refuge would ensure safety and minimize conflict with other priority public uses by providing information about hunting boundaries and seasons to the general public and those engaging in other refuge programs. Information would be provided at interpretive kiosks, on the refuge website, and in refuge offices.
- Camping, overnight use, and fires would be prohibited.

**Justification:**

Under the National Wildlife Refuge System Administration Act of 1966, as amended, hunting is a wildlife-dependent recreational activity, which receives enhanced consideration in the CCP planning process and is to be encouraged on national wildlife refuges if compatible with refuge purposes. This refuge hunting program is designed to provide a high-quality, safe experience, with a reasonable opportunity to harvest waterfowl. Despite the direct and indirect impacts associated with waterfowl hunting, waterfowl populations are unlikely to be affected significantly by the hunting program. Waterfowl population objectives and allowable harvests are determined on a flyway basis using an established annual regulatory process as described above. Limited hunt seasons and days, no-hunt zones, and established winter sanctuary on the majority of the acreage of the Tualatin River National Wildlife Refuge ensure that wintering and migrating waterfowl, as well as non-target species, find adequate food and rest areas on the refuge even during the hunting season.

In addition, by respecting seasons and limits, purchasing all required licenses, and paying Federal excise taxes on hunting equipment and ammunition, individual hunters make a big contribution toward ensuring the future of many species of wildlife and habitat for the future. By paying the Federal excise tax on hunting equipment, hunters are contributing hundreds of millions of dollars for conservation programs that benefit many wildlife species, both hunted and nonhunted. Each year, nearly \$200 million in hunters’ Federal excise taxes are distributed to state agencies to support wildlife management programs, the purchase of lands open to hunters, and hunter education and safety classes. Since 1934, the Service has spent more than \$1 billion Migratory Bird Conservation Fund dollars from sales of Federal Duck Stamps (USFWS 2011f). Proceeds from the Federal Duck Stamp, a required purchase for migratory waterfowl hunters, have purchased more than five million acres of important waterfowl habitat, including land in the Wapato Lake Unit—these lands support waterfowl and many other wildlife species, and are usually open to hunting (USFWS 2011g). Thus, allowing waterfowl hunting under the stipulations described above would not materially detract from or interfere with the purposes for which the refuge was established or the refuge mission.

**Mandatory 10- or 15-Year Re-evaluation Date (provide month and year for “allowed” uses only):**

2027 Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

\_\_\_\_\_ Mandatory 10-year re-evaluation date (for all uses other than wildlife-dependent public uses)

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**Signatures:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval: \_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor: \_\_\_\_\_  
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Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

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## **B.4 Compatibility Determination for Research, Scientific Collecting, and Surveys at Tualatin River National Wildlife Refuge**

**Uses:** Research, scientific collecting, and surveys

**Research:** Planned, organized, and systematic investigation of a scientific nature

**Scientific collecting:** Gathering of refuge natural resources or cultural artifacts for scientific purposes

**Surveys:** Scientific inventory or monitoring

**Station Name:** Tualatin River National Wildlife Refuge

**Date Established:** 1992

### **Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S.C. § 742a. et seq.)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

### **Refuge Purposes:**

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

### **National Wildlife Refuge System Mission:**

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

### **Description of Uses:**

Refuge staff receives periodic requests from non-Service entities (e.g., universities, state agencies, other Federal agencies, non-governmental organizations) to conduct research, scientific collecting, and surveys on refuge lands. These project requests can involve a wide range of natural and cultural resources as well as public use management issues including basic absence/presence surveys, collection of new species for identification, habitat use and life history requirements for specific species/species groups, practical methods for habitat restoration, extent and severity of environmental

contaminants, techniques to control or eradicate pest species, effects of climate change on environmental conditions and associated habitat/wildlife response, identification and analyses of paleontological specimens, wilderness character, modeling of wildlife populations, bioprospecting, and assessing response of habitat/wildlife to disturbance from public uses. Projects may be species-specific or refuge-specific, or evaluate the relative contribution of the refuge lands to larger landscapes (e.g., ecoregion, region, flyway, national, international) and issues and trends.

The Service’s Research and Management Studies and Appropriate Refuge Uses policies indicate priority for scientific investigatory studies that contribute to the enhancement, protection, use, preservation, and management of native wildlife populations and their habitats as well as their natural diversity. Projects that contribute to refuge-specific needs for resource and/or wilderness management goals and objectives, where applicable, would be given a higher priority over other requests.

Research, scientific collecting, and surveys may be conducted on any and all refuge-managed lands during any part of the year as appropriate. Research, scientific collecting, and surveys may be conducted in cooperation with other Federal, state, or local agencies; colleges and universities; nonprofit organizations; consultants; or individuals. These studies are conducted to better inform refuge management decisions and increase general knowledge about the flora, fauna, and abiotic factors affecting refuge habitats.

**Availability of Resources:**

Refuge staff responsibilities for projects by non-Service entities would primarily be limited to the following: review of proposals, preparation of SUPs and other compliance documents (e.g., Section 7 of the Endangered Species Act of 1973, Section 106 of the National Historic Preservation Act), and monitoring of project implementation to ensure that impacts and conflicts remain within acceptable levels (compatible) over time. Additional administrative, logistical, and operational support may also be provided depending on each specific request. Estimated costs for one-time (e.g., SUP preparation) and annually recurring tasks by refuge staff and other Service employees would be determined for each project. Sufficient funding in the general operating budget of the refuge must be available to cover expenses for these projects. The terms and conditions for funding and staff support necessary to administer each project on the refuge would be clearly stated in the SUP(s).

The refuge has the following staffing and funding to administratively support and monitor research that is currently taking place on refuge lands (see table below). Any substantial increase in the number of projects would create a need for additional resources to oversee the administration and monitoring of the investigators and their projects. Any substantial additional costs above those listed below may result in finding a project not compatible unless expenses are offset by the investigator(s), sponsoring agency, or organization.

**Current Refuge Staffing and Funding to Support and Monitor Research**

Category and Itemization	One-time Expenses	Annual Expenses
Administration and management		\$10,000

## **Anticipated Impacts of the Uses:**

Use of the refuge to conduct research, scientific collecting, and surveys would generally provide information that would benefit fish, wildlife, plants, and their habitats. Scientific findings gained through these projects provide important information regarding life history needs of species and species groups, and identify or refine management actions to achieve resource management objectives in refuge management plans (especially CCPs). Reducing uncertainty regarding wildlife and habitat responses to refuge management actions to achieve desired outcomes reflected in resource management objectives is essential for adaptive management in accordance with [522 DM 1](#).

If project methods impact or conflict with refuge-specific resources, priority wildlife-dependent public uses, other high-priority research, and refuge habitat and wildlife management programs, then for the project to be compatible it must be clearly demonstrated that the project's scientific findings would contribute to resource management and that the project cannot be conducted off refuge lands. The investigator(s) must identify methods/strategies necessary to minimize or eliminate potential impact(s) and conflict(s) in advance. If unacceptable impacts cannot be avoided, then the project would not be determined compatible. Projects that represent public or private economic use of natural resources of any national wildlife refuge (e.g., bioprospecting) must contribute to the achievement of the national wildlife refuge purposes or the Refuge System mission to be compatible.

Impacts would be project- and site-specific, where they would vary depending upon the nature and scope of fieldwork. Data collection techniques would generally have minimal animal mortality or disturbance, minimal habitat destruction, no introduction of contaminants, and no introduction of nonindigenous species. Projects involving the collection of biotic samples (plants or animals) or requiring intensive ground-based data or sample collection would have short-term impacts. To reduce impacts, the minimum number of samples (e.g., water, soils, vegetative litter, plants, macroinvertebrates, vertebrates) would be collected for identification and/or experimentation and statistical analysis. Where possible, researchers would coordinate and share collections to reduce sampling needed for multiple projects. For example, if one investigator collects fish for a diet study and another researcher examines otoliths, then it may be possible to accomplish sampling for both projects with one collection effort.

Investigator(s) obtaining required state and Federal collecting permits would also ensure minimal impacts to fish, wildlife, plants, and their habitats. If projects result in long-term or cumulative effects to federally listed species and/or critical habitat, the Section 7 consultation under the Endangered Species Act would be required. Only projects that have no effect or that have "not likely to adversely affect" determinations would be considered compatible.

There is the potential for the spread of invasive plants and/or pathogens from ground disturbance and/or transportation of project equipment and personnel, but it would be minimized or eliminated by requiring proper cleaning of investigator equipment and clothing as well as quarantine methods, where necessary. If after all practical measures are taken, unacceptable spread of invasive species is still expected to occur, the project would be found not compatible without a restoration or mitigation plan.

There also could be localized and temporary effects from vegetation trampling, collecting of soil and plant samples, or trapping and handling of wildlife. Impacts may also occur from infrastructure necessary to support a project (e.g., permanent transects or plot markers, enclosure devices, monitoring equipment, solar panels to power unattended monitoring equipment). Some level of

disturbance is expected with these projects, especially if investigators enter areas closed to the public and collect samples or handle wildlife. However, wildlife disturbance (including altered behavior) would usually be localized and temporary in nature. Where long-term or unacceptable cumulative effects cannot be avoided, the project would not be found compatible.

At least 3 months before initiation of fieldwork (unless an exception is made by prior approval of the refuge manager), project investigator(s) must submit a detailed proposal. Project proposals would be reviewed by refuge staff and others, as needed, to assess the potential impacts (short, long-term, and cumulative) relative to the benefits of the investigation to refuge management issues and understanding of natural systems. This assessment would form the primary basis for allowing or denying a specific project. Projects that result in unacceptable refuge impacts would not be found compatible. If allowed and found compatible after approval, all projects would also be assessed during implementation to ensure impacts and conflicts remain within acceptable levels.

If a proposal is approved, the refuge manager would issue an SUP(s) with required stipulations (terms and conditions) of the project to avoid and/or minimize potential impacts to refuge resources as well as conflicts with other public use activities and refuge field management operations. After approval, projects would also be monitored during implementation to ensure impacts and conflicts remain within acceptable levels based upon documented stipulations.

The combination of stipulations identified above and conditions included in any SUP(s) would ensure that proposed projects contribute to the enhancement, protection, conservation, and management of native fish and wildlife populations and their habitats on the refuge. As a result, these projects would help fulfill refuge purpose(s); contribute to the mission of the Refuge System; and maintain the biological integrity, diversity, and environmental health of the refuge.

Projects that are not covered by the CCP (objectives under Goal 8 [Collect scientific information—surveys, scientific assessments, and research]) would require additional NEPA documentation.

### **Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

### **Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

### **Stipulations Necessary to Ensure Compatibility:**

Each project would require an SUP. Annual or other short-term SUPs are preferred; however, some permits would be for a longer period, if needed, to allow completion of the project. Renewals would be subject to refuge manager review and approval based on timely submission of and content in progress reports, compliance with SUP stipulations, and required permits.

- Projects would adhere to scientifically defensible protocols for data collection, where available and applicable.
- Investigators must possess appropriate permits and comply with conditions of state or Federal permits for their projects.
- If unacceptable impacts to natural resources or conflicts arise or are documented by refuge staff, then the refuge manager can suspend, modify conditions of, or terminate an ongoing project already permitted by SUP(s) on the refuge.
- Progress reports are required at least annually for multiple-year projects. The minimum required elements for a progress report would be provided to investigator(s).
- Final reports are due after completion of the project unless negotiated otherwise with the refuge manager.
- Continuation of existing projects would require approval by the refuge manager.
- Refuge staff would be given the opportunity to review draft manuscript(s) from the project before manuscripts are submitted to a scientific journal(s) for consideration of publication.
- Refuge staff would be provided with copies (reprints) of all publications resulting from a refuge project.
- Refuge staff would be provided with copies of raw data (preferably electronic database format) at the conclusion of the project.
- Upon completion of the project or annually, all equipment and markers (unless required for long-term projects) must be removed and sites must be restored to the refuge manager's satisfaction. Conditions for clean-up and removal of equipment and physical markers would be stipulated in the SUP(s).
- All samples collected on refuge lands are the property of the Service even while in the possession of the investigator(s). Any future work with previously collected samples not clearly identified in the project proposal would require submission of a subsequent proposal for review and approval. In addition, a new SUP would be required for additional project work. For samples or specimens to be stored at other facilities (e.g., museums), a memorandum of understanding would be necessary.
- Sampling equipment as well as investigator(s) clothing and vehicles (e.g., all-terrain vehicles [ATVs], boats) would be thoroughly cleaned (free of dirt and plant material) before being allowed on refuge lands to prevent the introduction and/or spread of pests.
- The Refuge System, specific refuge, names of refuge staff, and other Service personnel that supported or contributed to the project would be appropriately cited and acknowledged in all written and oral presentations resulting from projects on refuge lands.
- Refuge staff may accompany investigator(s) in the field at any time.
- Investigator(s) and support staff would follow all refuge-specific regulations that specify access and travel on the refuge.
- There may be other permits or paperwork required in addition to the SUP.

### **Justification:**

Research, scientific collecting, and surveys on refuge lands are inherently valuable to the Service because they expand scientific information available for resource management decisions. In addition, only projects that directly or indirectly contribute to the enhancement, protection, use, preservation, and management of refuge fish and wildlife populations and their habitats would generally be authorized on refuge lands. By allowing the use to occur under the stipulations described above, it is anticipated that fish and wildlife species would experience minimal disturbance. Additionally, it is anticipated that monitoring, as needed, would prevent unacceptable or irreversible impacts to fish,

wildlife, plants, and their habitats. Allowing the use as described above would not materially detract from or interfere with the purposes for which the refuge was established or the mission of the Refuge System.

**Mandatory 10- or 15-Year Re-evaluation Date (provide month and year for “allowed” uses only):**

\_\_\_\_\_ Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

2022 Mandatory 10-year re-evaluation date (for all uses other than wildlife-dependent public uses)

**Signatures:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval: \_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

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## **B.5 Compatibility Determination for Mosquito and Disease Vector Management on Tualatin River National Wildlife Refuge**

**Use:** Mosquito and disease vector management

**Station Name:** Tualatin River National Wildlife Refuge

**Date Established:** 1992

### **Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S.C. § 742a. et seq.)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

### **Refuge Purpose(s):**

“ ... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“ ... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“ ... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

### **National Wildlife Refuge System Mission:**

“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

### **Description of Use:**

With the spread of mosquito-borne diseases across the country, national wildlife refuges have come under increasing pressure to manage mosquito populations that are bred or harbored within refuge boundaries. The Service has produced interim guidance for refuges (USFWS 2005b) to be used until the Service policy document is finalized. Tualatin River National Wildlife Refuge would adhere to the interim guidance, and our mosquito management program would follow the response matrix presented in the following table. The refuge currently has sufficient staff and funding to support this use.

**Example of Mosquito-borne Disease Health Threat and Response Matrix**

Current Conditions		Threat Level	Refuge Response
Health Threat Category <sup>1</sup>	Refuge Mosquito Populations <sup>2</sup>		
No documented existing or historical health threat/emergency	No action threshold	1	Remove/manage artificial mosquito breeding sites such as tires, tanks, or similar debris/containers. Allow compatible monitoring.
Documented human health threat/emergency	Below action threshold	2	Response as in threat level 1, plus: evaluate compatible nonpesticide management options such as water level management and vegetation removal to reduce mosquito production.
	Above action threshold	3	Response as in threat level 2, plus: allow compatible site-specific larviciding of infested areas as determined by monitoring.
Officially determined existing human health emergency	Below action threshold	4	Response as in threat level 2, plus: increase monitoring and disease surveillance.
	Above action threshold	5	Response as in threat levels 3 and 4, plus: allow compatible site-specific larviciding, pupaciding, or adulticiding of infested areas as determined by monitoring data. Identify ways to minimize treatment area to avoid non-target effects

<sup>1</sup> Health threat/emergency as determined by Federal and/or state/local public health or wildlife management authorities with jurisdiction inclusive of refuge boundaries and/or neighboring public health authorities.

<sup>2</sup> Action thresholds represent mosquito population levels that may require intervention measures. Thresholds would be developed in collaboration with Federal and/or state/local public health or wildlife management authorities and vector control districts. They must be species- and life stage-specific.

Annual precipitation and water management fill many wetlands on the refuge. This water and vegetation provides egg-laying sites for mosquitoes. When high water levels recede, the eggs hatch, larvae grow rapidly, and adults feed for two weeks or more until they breed, lay eggs, and then die. Under certain conditions the refuge may provide suitable habitat for multiple hatches of mosquitoes in a single summer.

Arboviral (arthropod-borne viral) diseases are a potential concern. These include West Nile virus, western equine encephalitis, and St. Louis encephalitis. Between 1964 and 2010 there has only been

one reported case of human infection by western equine encephalitis in Oregon (Centers for Disease Control [CDC] 2012a). St. Louis encephalitis in a human was documented in Oregon in 2003, the first case in more than 30 years (Oregon Department of Human Services 2012).

Although West Nile virus was first documented in the eastern states, it has been moving west since that time. West Nile virus first appeared in Oregon in 2004. The first human, avian, and equine West Nile virus cases in Oregon were all diagnosed in August 2004. In 2010, no humans were diagnosed with West Nile virus infection (Oregon Health Authority Office of Disease Prevention and Epidemiology 2011). Moreover, less than 1 percent of humans who are exposed to and infected with West Nile virus become seriously ill. The fatality rate of those who do develop serious illness is 3 to 15 percent. Most human infections of West Nile virus are asymptomatic or characterized by mild flu-like symptoms. The elderly (persons over 50 years of age) are more likely to develop severe illness (CDC 2012b).

The refuge, in cooperation with Washington County Health and Human Services (HHS) and Yamhill County Public Health (YCPH), proposes to monitor and control larval mosquito species that have been determined to have a negative effect on public health adjacent to the refuge. Monitoring generally takes place between early April and late September.

The HHS/YCPH staff proposes to monitor and control mosquito larvae with *Bacillus thuringiensis* var. *israelensis*, which is frequently referred to as *B.t.i.* (EPA Registration No. 73049-10), when established thresholds are exceeded and human health risks exist as indicated through monitoring. Monitoring and larval treatments would be restricted to shallowly flooded (<8 inches) vegetation that represents mosquito breeding habitat. From 2005 through 2008, refuge staff conducted monitoring for mosquito larvae on the Atfalat'i, Tualatin River, and Riverboat Units of the refuge (Figure D-1), and the results were given to Washington County's vector control.

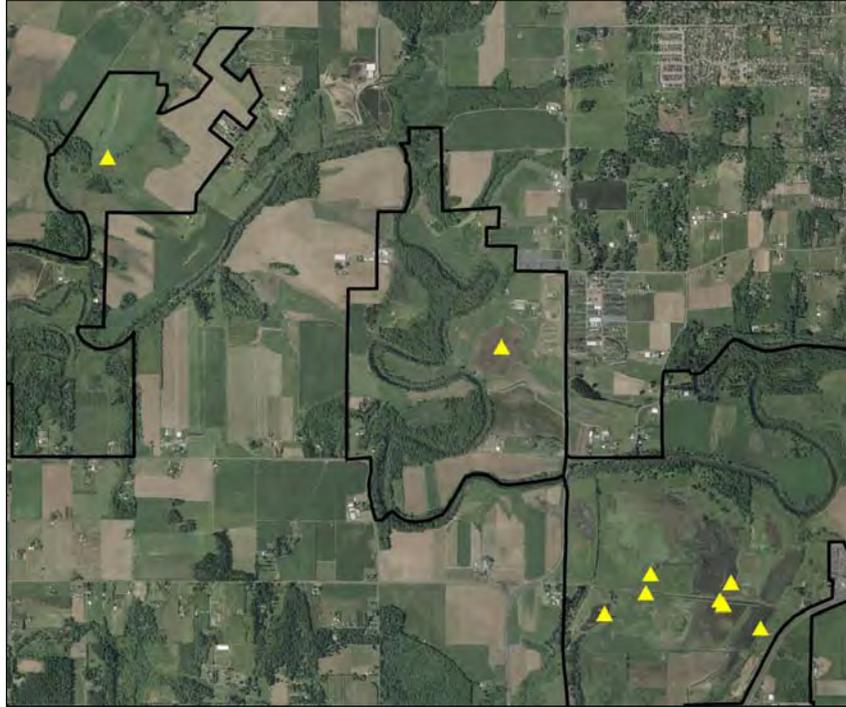
To protect sensitive resources such as eagle nesting and roosting areas and listed plant species, and to reduce the spread of invasive plant species, sampling periods and frequency as well as type of access (four-wheel-drive vehicle, ATV, foot traffic only) would be determined by the refuge in late winter/early spring. Because the locations of sensitive resources may change over time, the refuge would establish sampling and treatment stipulations on an annual basis through the SUP process.

The HHS/YCPH may also monitor adult mosquito populations from May to September using dry ice traps, or other approved methods, as part of the county-wide surveillance for the presence of mosquito-borne human health diseases.

The protocol for mosquito control when monitoring wetlands for mosquito larvae is to treat with the larvicide *B.t.i.* when the larvae reach established threshold levels and a human health threat has been documented. The treatment threshold used by the HHS/YCPH would be determined and specified in the annual SUP.

Mosquito larvae numbers within the refuge are affected by a number of factors such as weather conditions, precipitation, and time of year. The primary factor contributing to the production of mosquitoes, however, is the water level fluctuation along shorelines, where mosquitoes lay their eggs. Water level fluctuations are primarily due to precipitation and refuge water management activities. Due to the uncertainty of water levels resulting from the above factors, and subsequent mosquito hatches, the total amount of larvicide to be used and the times, dates, and exact locations of

application (magnitude and frequency) cannot be predicted. In some cases, certain areas may need repeated treatments.



**Figure D-1. Mosquito monitoring locations.**

The refuge and the HHS/YCPH would establish larval abundance thresholds associated with human health threats through the SUP process to protect public health and reduce impacts to fish and wildlife populations. If mosquito larvae dip numbers reach threshold levels and a human health risk is present, HHS/YCPH staff would request approval from the refuge manager to apply *B.t.i.*, at a rate of 2.5 to 5 lbs/acre; this would be done as soon as possible after a threat to human health is documented.

As proposed, *B.t.i.* may be applied (2.5 to 5 lbs/acre) as often as once every two to three weeks until a human health threat is removed. The bacteria are grown on high-protein bases (fishmeal, soy flour), which are then formulated onto corncob pellets, enabling them to be broadcast over the treatment area by a handheld or ATV-mounted spreader. *B.t.i.* is a selective microbial insecticide targeting mosquito larvae; however, studies during the mid-1990s in the Midwest (Hershey et al. 1995) found that other Dipteran species (flies) can also be impacted, including chironomids, an important fish and wildlife food source. *B.t.i.* has practically no acute or chronic toxicity to mammals, fish, birds, or vegetation (EPA 1998a). It produces protein endo-toxins that, when ingested by the susceptible insect, cause paralysis of cells in the gut, interfering with normal digestion and feeding.

All applications are required to be reported to the refuge and included in an annual report submitted to the refuge by the HHS/YCPH. The extent and frequency of treatments is likely to vary annually in response to water levels, weather conditions, and larvae distribution.

In accordance with the 2005 Interim Mosquito Management Policy and the response matrix (see table titled *Example of Mosquito-borne Disease Health Threat and Response Matrix*), the Service

may also permit the use of approved adulticides and/or pupacides on refuge lands in response to a declaration of a human health threat or emergency by a Federal, state, or local public health agency. A health emergency indicates an imminent risk of serious human disease or death and represents the highest level of mosquito-associated health threats. Health emergencies would be determined by Federal, state, or local public health authorities and documented with local and current mosquito population and disease monitoring data. With the exception of vaccines to protect horses against West Nile virus and western equine encephalomyelitis, there are no vaccines that provide specific protection against these diseases. Mosquito control is the only practicable method currently available to protect the public from these diseases.

To date, refuge staff has not needed to permit the application of larvicides, pupacides, or adulticides due to public health concerns.

The refuge would continue to evaluate measures to control mosquitoes that pose a threat to human health while limiting the risk associated with the use of chemical control. Water level manipulation is possible in many refuge wetland basins where mosquito larvae have been found. In the event that a human health emergency is declared and the use of pesticides is authorized, the refuge would work with the HHS/YCPH to identify which portions of the refuge are supporting species of mosquitoes that may serve as disease vectors and reduce the treatment area to the extent practicable.

**Availability of Resources:**

The HHS/YCPH is responsible for staffing and expenditures for sampling and pesticide applications (mainly *B.t.i.*). Refuge staff resources are needed to review annual proposals, prepare SUPs, and monitor HHS/YCPH personnel to ensure compliance (see table below).

**Costs to Administer and Manage Vector Control Programs at the Refuge.**

Activity or Project	One-time Expenses (\$)	Recurring Expenses (\$/year)
Development and issuance of SUP		\$500.00
Total		\$500.00

**Anticipated Impacts of Use:**

This use has three principal, potential impacts on refuge lands, waters, or interests.

1. The disturbance of wildlife caused by monitoring efforts and application of pesticides.
2. The impacts on wildlife from periodic elimination of mosquito larvae from the wetland community.
3. The impacts of pesticides on non-target organisms.

**Impacts Associated with Disturbance of Wildlife Caused by the Monitoring Efforts:**

Disturbance of wildlife by HHS/YCPH staff is minimized to the extent practicable by restricting access to sensitive areas and by controlling the type of access (four-wheel-drive vehicle, ATV, or foot traffic). Impacts anticipated from the logistical activities resulting from proposed monitoring and

treatment actions on wildlife are minimal. One or two HHS/YCPH employees would conduct these activities, and they would be restricted to refuge service roads and a minimum of off-road areas. The speed limit for HHS/YCPH staff using vehicles on service roads is 15 miles per hour and ATVs are restricted to 5 miles per hour. Any necessary treatments would occur as soon as possible after monitoring activities. These activities cause short-term and temporary disturbance to wildlife. In the event of an identified public health threat or emergency by the Oregon Health Authority, the data from these monitoring efforts would be used by the refuge for determining an appropriate course of action.

***Impacts Associated with Application of Pesticides:***

Where necessary and in accordance with the response matrix (see table titled *Example of Mosquito-borne Disease Health Threat and Response Matrix*), pesticides (larvicides, pupacides, and adulticides) would only be used on refuge lands for mosquito control after approval of a Pesticide Use Proposal (PUP). The Service's Pest Control Policy ([7 RM 14](#)) requires preparation and approval of a PUP before pesticides can be applied on refuge lands. In general, proposed pesticide uses on refuge lands would only be approved where there would likely be minor, temporary, or localized effects to fish and wildlife as well as minimal potential to degrade environmental quality. Potential effects to listed and non-listed species would be evaluated with quantitative ecological risk assessments and other screening measures. Potential effects to environmental quality would be based upon pesticide characteristics of environmental fate (water solubility, soil mobility, soil persistence, and volatilization) and other quantitative screening tools. Ecological risk assessments as well as characteristics of environmental fate and potential to degrade environmental quality for pesticides would be documented in chemical profiles. These profiles would include threshold values for quantitative measures of ecological risk assessments and screening tools for environmental fate that represent minimal potential effects to species and environmental quality. In general, only pesticide uses with appropriate best management practices on refuge lands that would potentially have minor, temporary, or localized effects on refuge biological and environmental quality (threshold values not exceeded) would be approved. However, pesticides may be used on refuge lands where substantial effects to species and the environment are possible (exceed threshold values) in order to protect human health and safety when a documented threat exists (e.g., mosquito-borne disease). The Service does not anticipate any short-term effects of the proposed use directly on non-target invertebrates or indirectly to fish.

The refuge has developed an integrated pest management (IPM) plan (see Appendix G) to manage mosquito populations. Based on adult mosquito control conducted in Washington County, pyrethroids such as Anvil are the most likely adulticides to be used to address a human health emergency. Pyrethroids are synthetic molecules that mimic natural pyrethrins that are extracted from plants in the chrysanthemum family. Pyrethroids are generally less toxic to terrestrial wildlife than other families of adulticides such as organophosphates. However, they are toxic to fish and aquatic invertebrates. The county has not used pupacides in recent years. Methoprene, a commonly used pupacide, is an insect growth regulator that prevents pupae from metamorphosing into adults. Methoprene has been found to be practically nontoxic to people and terrestrial vertebrates and poses minimal chronic and acute risk to fish, freshwater invertebrates (other than mosquitoes and closely related chironomids), and estuarine species at the doses tested (EPA 2001). Detailed mapping of areas where disease-carrying mosquitoes are present and the use of an ultra-low volume fogger would reduce the impacts to nontarget organisms. Other practices to reduce impacts to nontarget wildlife include application in the evening hours (when many insect pollinators are less active) and conducting applications when wind speeds are steady and low, and temperatures are lower.

***Impacts on Wildlife from Periodic Elimination of Mosquito Larvae from the Wetland Community:***

The Service does not anticipate long-term impacts to result from the proposed use. Hershey et al. (1995) conducted a 6-year study on 27 wetlands in Wright County, Minnesota, consisting of three years of pretreatment sampling of aquatic invertebrates and other parameters, followed by 3 years of treatment with *B.t.i.* Insect densities and diversity were reduced by 57 to 83 percent in the second and third years of treatment, respectively. During this study, 179 genera of aquatic insects were examined, with chironomids (primarily midges) representing about half of the insect genera present at the beginning of the study. By the end of the study, however, only one to six genera dominated the treatment sites. Adverse impacts were primarily observed in the invertebrate tribes Chironomini and Tanytarsini. These tribes are ubiquitous and are represented in almost every wetland with chironomids. Although Hershey et al. (1995) found negative effects of *B.t.i.* on nontarget invertebrates; this study is not applicable in the case of Tualatin River National Wildlife Refuge for the following reasons.

1. Entire wetlands were treated with *B.t.i.* multiple times within and over several consecutive years in the Minnesota study. In contrast, the treatment area at Tualatin River National Wildlife Refuge would likely only include wetland margins where vegetation interfaces with open water.
2. Because of fluctuating water levels changing the location of the shallow flooded shoreline, it is unlikely *B.t.i.* applications would occur in the same area more than three times in a single year, and most areas would receive a single application. Stipulations in the SUP would limit the number of applications in a specific location during one season.

Recently completed invertebrate and salmonid research along the south Franz Lake shoreline (Franz Lake National Wildlife Refuge in Washington) has provided valuable information regarding the cumulative impacts of mosquito treatment and control measures that are applicable to the program at this refuge. The invertebrate study was conducted during the latter part of the application period (July to September). During this study, stable water levels from July to September resulted in three applications of *B.t.i.* to the same locations. No impacts to non-target invertebrates were reported as a result of these applications. Consequently, it is unlikely there would be negative cumulative direct impact on the invertebrate community or indirectly on fish and wildlife. Because there were no impacts to non-target invertebrates from *B.t.i.* treatment at Franz Lake, it is unlikely that native fish would be impacted from applications at the Tualatin River National Wildlife Refuge.

Although mosquito larvae were reduced as a result of *B.t.i.* treatments at Franz Lake, there were no significant differences in the numbers of over 40 taxa of invertebrates, with 50 percent of the taxa being other insects that had been represented at shallow water sites. Based on results of the invertebrate survey, it would be expected that alternative prey would be available for native fishes (including salmonids), as well as other wildlife that depend on larval or adult mosquitoes as forage.

Consequently, the Service believes that the proposed monitoring and subsequent applications of *B.t.i.* would not have substantial short-term, long-term, or cumulative impacts on refuge fish and wildlife resources.

***Impacts to Biological Integrity, Diversity, and Environmental Health:***

Biological integrity, diversity, and environmental health can be simply defined as native fish, wildlife, plants, and their habitats as well as natural processes that support them. As described above,

the impacts from larvicide application to most fish, wildlife, and plants would be temporary and localized. Mosquito populations that are part of the biological integrity, diversity, and environmental health of the refuge would be impacted from control actions. Although numbers of mosquitoes would be temporarily and locally reduced, there would likely be no long-term or cumulative effects to mosquitoes and the species that feed upon them at the refuge. As part of the refuge's mosquito management plan, the refuge would assess the impacts of adulticide applications on biological integrity, diversity, and environmental health.

**Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

**Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

- The HHS/YCPH must apply for and receive an SUP annually from the refuge manager. The permit would specify conditions including, but not limited to, access restrictions, timing of applications, and measures required to limit the spread of invasive plants.
- Mosquito management would follow an IPM approach, and any compatible cultural and/or mechanical control methods would be identified and implemented before chemical control is permitted.
- Larvae control is to be conducted only when the HHS/YCPH determines that breeding in specific units is widespread and poses a documented threat to human health.
- Only Service-approved pesticides may be applied on refuge wetlands and only after PUPs have been approved.
- The HHS/YCPH would contact the refuge manager at least one day in advance of each application. The refuge manager has final approval over all pesticide treatments.
- The HHS/YCPH would notify the refuge manager in the event that virus activity is detected within or near the refuge and would work with the refuge to determine whether additional surveillance or control actions are necessary.
- The HHS/YCPH must provide the refuge manager with a monthly report of all control activities on the refuge.
- The refuge may rescind this CD at any time based on future Service policy determinations or scientific studies of the effects of pesticides on the environment or nontarget organisms.
- This CD would be reviewed when the Service finalizes its pending policy on mosquito management, and a new CD would be issued if this CD is not in full compliance with the new policy.

## Justification:

Several suburban communities exist near the refuge within the flight range of adult mosquitoes (5 to 10 miles). Mosquito species capable of transmitting diseases to people may be present on the refuge, though the risk of transmission is generally low. The refuge's mosquito control program is consistent with the Service's 2005 Interim Mosquito Management Policy and would help manage mosquito populations that pose a threat to human health.

The refuge would ensure that its mosquito management program is consistent with national policies for disease control and would work with the HHS/YCPH to continue to identify new ways to use compatible mechanical and cultural control methods, reduce larvicide applications, and avoid impacts to sensitive resources.

In the event that compatible mechanical and cultural control methods are not effective or practicable, the use of the larvicide *B.t.i.* would help avoid ecologically significant impacts to nontarget organisms and help the HHS/YCPH avoid the need to apply adulticides, which are generally more toxic to nontarget organisms. For the following reasons, mosquito monitoring and *B.t.i.* treatments for control of mosquitoes on the refuge would not materially interfere with or detract from fulfilling the Refuge System mission or achieving refuge purposes.

- Under the worst-case scenario, a maximum of 18 acres or less than 1 percent of the total refuge acreage would be impacted by mosquito monitoring and treatment activities annually from April 1 through September 30.
- The invertebrate *B.t.i.* study indicated that no impacts to nontarget invertebrates were associated with three *B.t.i.* treatments for control of mosquito larvae on the shallowly flooded south shoreline of Franz Lake National Wildlife Refuge.
- Although mosquito larvae would be reduced from *B.t.i.* treatments, over 40 taxa of invertebrates, with 50 percent of the taxa represented by other insects, were found at shallow water sites (where treatments would occur) after treatment. Therefore, alternative prey is likely available for fish and other wildlife species.
- Monitoring and treatment activities would likely result in only temporary and localized disturbance to fish and wildlife.

## Mandatory 10- or 15-year Re-evaluation Date (provide month and year for “allowed” uses):

\_\_\_\_\_ Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

2022 Mandatory 10-year re-evaluation date (for all uses other than wildlife-dependent public uses)

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**Signatures:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval: \_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

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## **B.6 Compatibility Determination for Fishing at Tualatin River National Wildlife Refuge**

**Use:** Fishing

**Station Name:** Tualatin River National Wildlife Refuge

**Date Established:** 1992

### **Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S.C. § 742a. et seq.)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

### **Refuge Purpose(s):**

“...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

### **National Wildlife Refuge System Mission:**

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

### **Description of Use:**

Fishing is one of the priority public uses that promote traditional outdoor recreation opportunity for the surrounding community. Very few opportunities exist on the Tualatin River for public fishing, in particular for disabled anglers. Fishing in the Tualatin River would be implemented at the existing River Overlook on the Atfálat’i Unit of the refuge—a cantilevered platform would provide access to fishing on the river below.

A wide variety of fish inhabit the Tualatin River mainstem, including warm-water, cold-water, and anadromous species, and the river would support a fishery for these species. Fisheries in the Tualatin River could include cold-water species such as rainbow trout and cutthroat trout; anadromous species such as the upper Willamette River steelhead, Chinook salmon, and coho salmon; and warm-water species such as white crappie, bluegill, bullhead, and large-mouthed bass (Leader 2001). Generally, from May to August, under current Oregon Department of Fish and Wildlife (ODFW) regulations,

fishing could occur in the Tualatin River for trout species and coho salmon as identified in the special regulations for Tualatin River; a wide variety of warm-water species; crayfish; and bullfrogs. For purposes of regulations, ODFW considers rainbow trout over 20 inches to be steelhead (ODFW 2011d).

Recreational fishing would be allowed in accordance with all applicable laws and regulations of the State of Oregon; however, access would be limited to daylight hours only and cleaning of fish on-site would be prohibited. Access to the River Overlook from the public parking lot would be via the existing year-round trail. No other areas of the refuge would be open to fishing. The overlook and associated facilities would be provided during daylight hours and would be fully accessible to users under the guidelines of the Architectural Barriers Act. Limited removal or trimming of vegetation near the overlook would be necessary to minimize tangling of fishing lines. The overlook would comfortably accommodate three to four anglers at a time, plus up to 15 other visitors when fishing is not occurring. The maximum number of anglers anticipated annually would be 1,000, some of whom may be participants in special fishing events and clinics hosted by the refuge. Events would focus on fishing ethics and techniques, natural resource conservation, and environmental education.

**Availability of Resources:**

Direct annual recurring costs to administer and maintain a recreational fishing program are primarily in the form of staff time, publication of leaflets, and maintenance of overlook and trail facilities. Alternative 2 of the draft CCP/EA proposes that the desirability of a user fee be explored to help operate the fishing program and maintain and repair associated facilities. The refuge currently has sufficient staff and funding to offer the use.

**Costs to Administer and Manage Fishing under the Preferred Alternative**

Activity or Project	One-time Expenses (\$)	Recurring Expenses (\$/year)
Development of fishing plan	\$5,000	
Administration and maintenance of program		\$15,000
Total	\$5,000	\$15,000

**Anticipated Impacts of Use:**

**General Impacts:**

A general assessment of impacts resulting from fishing uses has been compiled from the literature and is briefly summarized below.

*Disturbance to Wildlife:* Fishing as a solitary and stationary activity tends to be less disturbing to wildlife than hunting or motorized boating (Tuite et al. 1983). Fishing has the potential to cause disturbance to birds and other wildlife using open waters and tributaries where fishing occurs. Fishing activities may influence the composition of bird communities as well as distribution, abundance, and productivity of waterbirds (Bell and Austin 1985; Bordignon 1985; Bouffard 1982; Bouffard and Hanson 1997; Cooke 1987; Edwards and Bell 1985; Tydeman 1977). Anglers often fish in shallow, sheltered bays and creeks that birds prefer, which can negatively impact distribution

and abundance of waterfowl, grebes, and coots (Cooke 1987). Increases in anglers and associated shoreline activity have been found to discourage waterfowl from using otherwise suitable habitat (Jahn and Hunt 1964). When compared to non-fishing days and/or non-fishing rivers, anglers influenced the numbers, behavior, and diurnal distribution of avian scavengers present at sites along the Skagit and Toutle Rivers in Washington, disrupted feeding, and increased energy expenditure through avoidance flights (Knight and Knight 1984; Knight et al. 1991).

*Stream Fishing Impacts:* Shoreline activities related to stream fishing, such as human noise, would cause some birds to flush and go elsewhere. Waterbirds and waterfowl in particular use shorelines seasonally for resting, feeding, and nesting. Furthermore, anglers frequently show long periods of inactivity interspersed with short periods of rapid movements, which has the potential to disturb nearby wildlife (Bell and Austin 1985).

***Refuge-specific Impacts:***

Anglers accessing and using the River Overlook may occasionally disturb resident mammals, but the impact would likely not exceed that which already occurs from other pedestrians using the trail. Neotropical migratory songbirds and resident birds may be disturbed, but would likely remain in the general area. Waterfowl and shorebirds would likely experience minimal disturbance due to the dense tree and shrub buffer planting that separates the trail and overlook area from seasonal wetlands.

***Impacts to Listed Species:***

Upper Willamette River steelhead and Chinook salmon were both listed as threatened species in August and March 1999, respectively (Federal Register 1999a, Federal Register 1999b), and critical habitat was designated in 2005 (Federal Register 2005) in the upper Tualatin River Basin (roughly defined as the Tualatin River and its tributaries upstream of Highway 219 near Hillsboro, excluding Rock Creek). The proposed use would not occur in designated critical habitat. No other listed species are known to exist in the area that would be designated for fishing. The recreational fishing program and associated facility are anticipated to have no effect on threatened species if anglers are held in compliance with ODFW and refuge regulations. The designated time for fishing for trout and coho salmon according to ODFW regulations is generally May 31 to October 31. During the winter, listed species are migrating upstream to spawn, and then in late winter and early spring, the smolts would be outmigrating. The spring-summer-early fall period proposed for fishing, especially at our location on the river, is too warm for these species to survive. By the end of April the temperature in our part of the river is reaching a lethal range for salmonids. Local rainbow and cutthroat trout move up into the tributaries that have cooler and oxygenated water for them to survive.

***Impacts to Nonlisted Species:***

The majority of fish species expected to be caught are nonlisted fish such as small-mouth bass and bluegill. It is anticipated that there would be some mortality of these nonnative species as a result from handling. However, with proper care and quick releases, these impacts are expected to be minimal.

***Impacts to Other Priority Public Uses:***

Fishing is expected to result in occasional disturbance to other visitors. In addition, anglers may inadvertently flush wildlife that are being observed by other visitors. Occasional crowding may occur on the overlook due to multiple public uses occurring simultaneously. No significant effects to roads, trails, and other infrastructure from the fishing program are foreseen. Normal facility maintenance would continue to be necessary.

**Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

**Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

- Fishing would be opened only after a fishing package is completed in coordination with ODFW and draft and final regulations are published in the Federal Register.
- Fishing would be allowed only during daylight hours.
- Fires, off-trail use, and littering are prohibited.
- Information signs and/or publications would be provided to ensure anglers have access to all regulations that apply to the refuge and to fishing activities.
- All persons fishing shall be required to have a valid Oregon State fishing license and follow all applicable state regulations.
- Law enforcement patrols would be conducted on a periodic basis to ensure compliance with state and refuge regulations.
- Access to fishing would be limited to foot traffic along the existing trail. Persons with disabilities who are unable to access the River Overlook to fish would be accommodated on a case-by-case basis. This would require prior notification to the refuge.
- If disturbance to wildlife or damage to habitat results in unacceptable levels, the refuge would limit fishing access to reduce impacts.
- If conflict with other priority public uses, or overcrowding by anglers occurs, the refuge may institute techniques to reduce negative impacts to visitor experience. These may include limiting fishing to specific days and/or times; developing signage to inform visitors of fishing program opportunities; developing a permit system for anglers; and/or other methods as appropriate to the situation.

**Justification:**

As a wildlife-dependent recreational use, fishing receives enhanced consideration in the CCP planning process. Despite direct and indirect impacts associated with fishing, refuge riparian and riverine species and their habitats are unlikely to be affected significantly by the fishing program on

the refuge at the levels of use anticipated in Preferred Alternative 2. Other riparian and stream areas not subject to fishing disturbance would be maintained on other portions of the refuge. State regulations, including bag limits, ensure that harvesting of fish does not harm long-term populations. It is anticipated that wildlife populations would find sufficient food resources and resting places, and their abundance and use of the refuge would not be measurably lessened from disturbance by fishing. The relatively limited number of individual animals and plants expected to be adversely affected would not cause wildlife populations to materially decline, the physiological condition and production of refuge species would not be impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing fishing to occur under the stipulations described above would not materially detract from or interfere with the purposes for which the refuge was established or the Refuge System mission.

**Mandatory 10- or 15-year Re-evaluation Date (provide month and year for “allowed” uses):**

2027 Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

\_\_\_\_\_ Mandatory 10-year re-evaluation date (for all uses other than wildlife-dependent public uses)

**References:**

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**Signatures:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval: \_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

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## **B.7 Compatibility Determination for Environmental Education at Tualatin River National Wildlife Refuge**

**Use:** Environmental education

**Station Name:** Tualatin River National Wildlife Refuge

**Date Established:** 1992

### **Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S.C. § 742a et seq.)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

### **Refuge Purpose(s):**

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

### **National Wildlife Refuge System Mission:**

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

### **Description of Use:**

Environmental education refers to formal, curriculum-based education opportunities primarily for students and organizations. Environmental education fosters an aware and involved citizenry that takes an active role in conservation. The environmental education program at the refuge would be administered as described in Goal 13 of the draft CCP/EA. Environmental education could occur in any season at the refuge. In practice, most environmental education would occur between September and June, during the school year. The total number of people served by the environmental education program is expected to grow to 10,000 over the 15-year life of the CCP. The program would continue to rely on volunteers for full implementation.

Environmental education activities would take place primarily within designated facilities designed to support the program. These include the year-round and seasonal trails, including overlooks; five

trailside environmental education study sites; the environmental education shelter; an environmental education classroom, and the Wildlife Center. Refer to Section 5.2 of the draft CCP/EA for a complete description of current facilities. An off-trail study area proposed in Alternative 2 of the draft CCP/EA would only be used by students who are participating in refuge lesson plans that include off-trail activities. This area would be clearly marked for student use only, and the use would be overseen by trained refuge staff and/or volunteers. Additional off-trail use may include occasional refuge-led field trips to areas generally closed to the public that would provide educational value not available in the designated public use areas. Examples include activities such as, but not limited to, access for secondary or collegiate-level students studying hydric soils along wetland edges, students accompanying refuge staff on biological monitoring activities such as bird banding, and habitat surveys such as conducting vegetation transects. A nature explore area for young children proposed in Alternative 2 of the draft CCP/EA would be limited to less than 1 acre, be located adjacent to the year-round trail in an area where limited additional wildlife disturbance would occur, be bound by a barrier to contain the use, be primarily constructed with natural and/or sustainable materials, and be signed appropriately to guide the use.

Students and educators of all ages and grade levels would participate in curriculum-based education on the refuge. In addition to formal classroom participants, the environmental education program would serve home-school groups/families, pre-school groups, youth groups such as scouts, after-school clubs, and other informal organized groups such as summer youth programs. Generally, no more than 100 students (plus teachers and chaperones) would be visiting any given unit of the refuge at any given time, and advance reservations would be required. Educators wishing to bring K-8 students would be required to attend a teacher workshop prior to the field trip or have trained volunteers and/or refuge staff accompanying the group. Educators bringing high school and collegiate students would be required to consult with refuge staff prior to their visit to both register and to obtain approval for planned activities. In all cases, educators would be instructed in how to teach and are expected to enforce “field trip etiquette” that is designed to minimize wildlife and habitat disturbance. To the greatest extent possible, the refuge would provide staff and/or volunteers to welcome and accompany field trips to the refuge.

The refuge would provide approved curricula and guidance to all teachers conducting education on the refuge. Activities generally fall into the same guidelines that are expected of all other visitors (refer to CD for wildlife observation, photography, and interpretation). However, additional activities may occur as part of refuge-approved lesson plans and when conducted by a trained volunteer or refuge staff. These may include, but are not limited to, capture, study, and release of small animals such as macroinvertebrates, frogs, snakes, insects, worms, etc; handling and return of features such as leaves, scat, and feathers; and collection of water, seeds, and soil taken either to the classroom or off-site for further study and analysis.

### **Availability of Resources:**

Estimated costs for operating the environmental education program as envisioned under Alternative 2 are displayed in the following table. With assistance from Friends of the Refuge, grants, volunteers, and other partners, the refuge currently has sufficient staff and funding to support these programs at their current levels. Additional resources would be needed to fully implement the uses and strategies described in the CCP.

### Costs to Administer and Manage Environmental Education under the Preferred Alternative

Activity or Project	One-time Expenses (\$)	Recurring Expenses (\$/year)
Environmental Education Specialist		67,500
Environmental Education Intern		25,000
Develop curricula resources for educators	10,000	2,000
Conduct annual teacher workshops		5,000
Provide and maintain educational equipment and materials	10,000	5,000
Conduct annual volunteer training		2,000
Maintain environmental education facilities		20,000
Develop additional signage and publications	5,000	1,000
Design and construct nature explore area	50,000	2,000
Program oversight: Visitor Services Manager		20,000
Total		158,500

### Anticipated Impacts of Use:

#### *General Impacts:*

A general assessment of impacts resulting from environmental education uses has been compiled from the literature and is briefly summarized below.

*Disturbance Impacts:* In general, impacts that could occur from environmental education programs would be similar to those expected from wildlife observation, photography, or interpretation activities. Such impacts would be expected to include temporary damage to vegetation resulting from trampling, disturbance to nesting birds, and disturbance to feeding or resting birds or other wildlife in the vicinity. Environmental education programs generally accommodate groups of participants, and studies have shown that increasing group size has an impact on wildlife (Beale and Monaghan 2004; Remacha et al. 2011). In addition to group size, loudness has also been found as an important variable to disturbance of wildlife, and loudness of people present can be more important than the number of people present (Burger and Gochfeld 1998). Studies showed that reducing group size, allowing safe distances, and reducing noise levels helps minimize negative impacts on wildlife (Beale and Monaghan 2004; Burger and Gochfeld 1998; Remacha et al. 2011). An unpublished study examined the effect of environmental education site activities at Blackhorse Lake on the Turnbull National Wildlife Refuge (Jose 1997). The study was designed to compare waterfowl presence and behavior patterns between the times when environmental education activities were occurring and when environmental education classes were not on-site. The study results indicated that fewer waterfowl were present in the study area when environmental education classes were on-site as compared to control times. The study also found more short flights undertaken by birds when classes were on-site. Redheads displayed the highest number of flight responses, followed by mallards.

Ruddy ducks almost never flew but had the highest increase in directional swimming away from classes. The study recommended that sites heavily used by smaller bodied birds, such as ruddy ducks, buffleheads, and teal, not be used as environmental education sites.

*Conservation Benefits:* Environmental education provides indirect beneficial impacts for visitors engaged in environmental education programs and activities. One study found that animal-oriented activities have an impact on the knowledge and attitudes of students involved in environmental education. Direct instruction methods in which children examined the anatomical and behavioral characteristics of live spiders and snakes promoted a positive attitude toward these animals (Kellert and Westervelt 1983; Kress 1975). Eighth graders engaged in wildlife-oriented activities were found to be more likely to recognize the importance of lower forms of animal life and preserving endangered species and to have greater tolerance for predators (LaHart 1974). Another study concluded, “if one were to try to change attitudes, education without an experiential component might not be very effective” (Baird and Tolman 1982:12).

***Refuge-specific Impacts:***

Environmental education activities would be more localized and would occur less frequently than general wildlife observation. Larger group sizes would likely result in greater magnitude of disturbance to feeding, resting, or nesting birds or other wildlife in the vicinity; however, having groups accompanied by staff or trained naturalists would help mitigate this disturbance. Most of the sites to be used by environmental education groups are already regularly used by other wildlife viewers, so the additional impact by the environmental education program would likely be small. However, to the extent that students are encouraged to conduct hands-on studies of vegetation, insects, water, or less mobile wildlife, more off-trail use would be expected for this activity than for any other non-consumptive use, with attendant impacts that could be higher than for more typical wildlife observation activity.

Participation in environmental education programs is growing throughout Oregon and Washington. With the growth of participation in environmental education programs and the emphasis on these programs under Preferred Alternative 2, future effects can be expected to be higher than present. Nonetheless, environmental education activities would occur outside of wintertime sanctuary areas and outside of fragile habitats.

***Impacts to Listed Species:***

No direct impact to listed species is anticipated to occur as a result of the environmental education program. Any unanticipated future impacts would be reduced by ensuring that environmental education groups avoid or severely limit activity in areas hosting rare species.

***Impacts to Other Priority Public Uses:***

Environmental education may result in disturbance to other visitors. School groups, especially those dominated by younger primary school children, may be loud and may flush wildlife being enjoyed by other visitors. This effect is expected to be fairly minimal, since the majority of other visitors use the refuge on weekends and school groups would generally be present on weekdays.

### **Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

### **Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

### **Stipulations Necessary to Ensure Compatibility:**

- Environmental education facilities and activity areas shall be designated and/or constructed in locations that consider the site's potential for contributing to a diverse and rich curriculum and minimizing impacts to sensitive resources, including listed species and wintering waterfowl.
- Advance reservations would be required for all groups participating in environmental education activities.
- Educators would be required to use refuge-approved curricula and/or lesson plans.
- Adult supervision would be required for students up to twelfth grade.
- All groups would be instructed in trail and off-trail etiquette and ways to reduce wildlife and habitat disturbance during a "welcome" session. During "teach the teachers" workshops, instructors would review trail etiquette and how to minimize wildlife disturbances.
- Generally, no more than 100 students (plus teachers and chaperones) would be allowed on any given unit of the refuge at any given time. Classes would be asked to break up into smaller groups averaging 15 students.
- Signs, pamphlets, and verbal instructions from refuge staff and volunteers would promote appropriate use of facilities to minimize wildlife and habitat disturbance.
- Periodic monitoring and evaluation of sites and programs would be conducted to assess if objectives are being met and ensure the resource is not being unacceptably degraded. If disturbance to wildlife or damage to habitat reaches unacceptable levels, the refuge would avoid or limit environmental education activities in areas where unacceptable impacts occur.

### **Justification:**

As a wildlife-dependent recreational use, environmental education receives enhanced consideration in the CCP planning process. Environmental education can provide students with the joy of experiencing wildlife on their public lands, and as such, helps fulfill the mission of the Refuge System. Based on the analysis presented above, this use would be expected to have a minor direct impact on refuge resources. By limiting the size of groups and locating environmental education activities in areas that are already regularly used, the additional disturbance to wildlife, though larger than at present, is also expected to be minor. It is anticipated that wildlife populations would find sufficient food resources and resting places such that their abundance and use of the refuge would not be measurably lessened from education activities. The relatively limited number of individual animals and plants expected to be adversely affected would not cause wildlife populations to materially decline, the physiological condition and production of refuge species would not be

impaired, their behavior and normal activity patterns would not be altered dramatically, and their overall welfare would not be negatively impacted. Thus, allowing environmental education activities to occur on selected areas of the refuge under the stipulations described above would not materially detract from or interfere with the purposes for which the refuge was established or the Refuge System's mission.

**Mandatory 10- or 15-year Re-evaluation Date (provide month and year for “allowed” uses):**

2027 Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

\_\_\_\_\_ Mandatory 10-year re-evaluation date (for all uses other than wildlife-dependent public uses)

**References:**

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**Signatures:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval: \_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

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## **B.8 Compatibility Determination for Cooperative Farming at Tualatin River National Wildlife Refuge**

**Use:** Cooperative farming

**Station Name:** Tualatin River National Wildlife Refuge

**Date Established:** 1992

### **Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S.C. § 742a. et seq.)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

### **Refuge Purpose(s):**

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

### **National Wildlife Refuge System Mission:**

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

### **Description of Use:**

Cooperative farming is an interim tool, and an effective one, that allows the refuge to manage invasive species while at the same time providing forage for wildlife. Prior to and during restoration of native habitats, invasive species can outcompete native plants, therefore reducing the success of native plants to become established. Cooperative farming would allow the refuge to control invasive plants, which would give native plants a greater chance of success when restoration occurs.

The refuge manages small grain croplands and pastures to:

- Provide wildlife habitat for migratory birds and other resident wildlife, and
- Prevent invasive plants from dominating the landscape prior to restoration of the land to native habitats.

Invasive plants have the potential to reduce habitat quality and forage opportunity and have been identified as one of the most serious threats to refuge habitats. Preventing infestation is the most effective strategy because if left without refuge intervention, agricultural lands acquired by the refuge would most likely convert to invasive weed parcels. Species such as reed canarygrass and Himalayan blackberry pose serious threats. The refuge continually monitors for new invasive plants as well. A variety of methods, including mechanical, herbicidal, and cultural treatments, are used to manage these invasive plant species. The refuge uses an IPM approach to control weeds (Appendix G), whereby management options are selected based on on-site conditions and not implemented until established thresholds are exceeded.

Various methods would continue to be evaluated for efficiency and appropriateness to treat invasive species. If one particular method is not expected to be effective or may have undesirable consequences (such as impacting grassland nesting birds), then the refuge would evaluate other methods until one is deemed appropriate for a particular situation.

Approximately 800 acres of the Wapato Lake and Onion Flats Units would be maintained in cooperative farming until restoration begins. The farming would occur through a cooperative farming program in which croplands would typically be planted and maintained by local area farmers who operate according to farming agreements. Farming typically occurs with planting in the late spring and early summer with harvesting in late summer and early fall. Cooperative farming agreements are a negotiated agreement between the refuge and the private farmer to manage the lands for both parties. To benefit wildlife, the refuge’s share of 30 percent would be left in the field where it would be available to wildlife, primarily waterfowl. The types of small grain crops and pasture grasses proposed under the cooperative farming program include, but are not limited to, plantings of corn, spring and winter wheat, and clover. Implementation of cooperative farming is dependent on weather and other environmental conditions. Determination of location, small grain crop species or pasture grasses, and timing of farming are made annually dependent on refuge needs.

**Availability of Resources:**

Estimated costs for operating the cooperative farming program as envisioned under Preferred Alternative 2 are costs associated with administrative functions and are displayed in the following table. These administrative functions include the personnel required to review farming proposals, execute cooperative agreements, and monitor the program. The refuge currently has sufficient staff and funding to support this use.

**Costs Associated with Operation of Cooperative Farming Program**

Category and Itemization	One-time Expenses (\$)	Recurring Expenses (\$/year)
Administrative support	0	\$5,000
Total expenses	0	\$5,000

**Anticipated Impacts of Use:**

Approximately 800 acres of land would be cooperatively farmed under Preferred Alternative 2 at the Wapato Lake and Onion Flats Units. These units would be farmed to manage for invasive species until such time that restoration begins.

***General Impacts:***

Direct impacts of cropland management include exposure of soils to wind erosion and impacts from farm machinery. During tillage, the soil is left bare prior to planting. The bare soil is exposed for much of the year to environmental factors that may alter its quality. Wind, heat, and precipitation are the most damaging factors that may affect the soil. Wind and precipitation can both lead to displacement of soil, increasing the rate of erosion, and heat can effectively bake the soil, causing it to become inhospitable to seed banks; it may even cause the soil to become dry and compacted, making it impossible for any vegetation to grow if tillage is not performed.

Compaction of the soil can also result from the use of farming equipment for seeding, causing undesirable increases in bulk density, while tilling may prevent the accumulation or accelerate the decomposition of organic matter and diminish earthworm populations.

Farming may also result in the use and introduction into the environment of chemical agents from herbicide and pesticide use. Weed issues may greatly increase from ground disturbance and from movement of cultivating and harvesting equipment from field to field, therefore spreading invasive species' seeds. In addition, small mammals, reptiles, and amphibians may be subject to mortality from farm equipment, and nesting birds may be disrupted and have nests destroyed.

***Refuge-specific Impacts:***

There would be no loss of native habitats due to farming since areas proposed for farming were already in production prior to refuge acquisition. There would be some continued impact to soil quality, but Preferred Alternative 2 would reduce the acreage under cultivation; thus, there would be a minor beneficial impact on soil and water quality, compared to the present. There would be a minor negative impact on farming as the amount of land under cultivation would decrease.

The introduction and spread of weeds is expected to be minimal through proper decontamination practices such as equipment cleaning, mowing to prevent seed set and dispersal, and treatments to any source populations that have the potential to infect a field. Early detection and rapid response methods would be employed to ensure any new populations are treated and eradicated immediately. Cooperators would be required to clean their equipment prior to moving it both on to the refuge and across units of the refuge. This would help minimize the spread of undesirable plants. The refuge would continue to monitor farming sites for invasive weeds and would maintain an aggressive approach to invasive species control. In addition, the refuge would work with the County Weed Board to prevent, identify, and eradicate new infestations.

For weed species that are or become established, mechanical, cultural, and biological controls would be evaluated as methods of treatment. If these methods are not expected to be effective, then herbicidal applications may be necessary. Chemical applications would be subject to the provisions of the IPM plan. This plan directs the refuge to select the most effective herbicide that would have the least environmental degradation to soils, surface water, and groundwater, and the least impact to native wildlife and vegetation. Each approved herbicide used would undergo a chemical profile analysis; active ingredients would be analyzed for their risk quotient and this value compared to a Level of Concern for surrogate species, as established by the EPA. All applications of herbicides would conform to the specific pesticide label requirements.

Employment of this approach would provide for a moderate to minor risk from chemical exposure. However, some risks may still occur from factors not assessed under current protocols, such as intermingling of unlike chemicals in the field; species-specific sensitivity that differs from surrogate species; exposure through inhalation; exposure through ingestion of pesticide-contaminated soil; and other factors as described in the IPM plan.

Positive short-term effects are also anticipated. In addition to providing high-carbohydrate forage for wintering waterfowl, crop fields can benefit other bird species by providing some foraging habitat for a variety of seed-eating migratory bird species.

***Impacts to Listed Species:***

Currently there are no listed species inhabiting farm fields. Should conflicts occur in the future, measures such as erecting protective barriers and/or transplanting listed populations out of harm's way would be enacted. Additionally, if deemed necessary, the cooperative farming program would be halted until all protective measures can be evaluated and implemented as necessary.

***Impacts to Other Priority Public Uses:***

Farming on the refuge does not occur in areas that are open to the public; therefore, there are no impacts to public uses.

**Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

**Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

- Cooperative farming agreements would be established with the cooperator per agency policy.
- Genetically modified seeds and other organisms would not be permitted for use in the farming program.
- Weeds would be controlled in accordance with the refuge's IPM program using methods such as crop rotation, mechanical treatment, biological controls, and approved pesticides.
- Herbicide applications may only be applied with prior refuge approval, and applicators must meet all state, Federal, and agency requirements.
- Equipment of cooperating farmers would be cleaned prior to being moved onto the refuge and between fields when working in areas with weed infestations.
- Cooperators would provide a record of herbicides used, including chemical name, amount used, date, location, and method of application.
- Diligence shall be exercised in the control of county-listed invasive weeds.

- Best management practices would be used to avoid fertilizer runoff into wetlands or leaching into groundwater and to minimize sedimentation of streams and water bodies. For example, nitrogen fertilizer applications would be avoided in the fall to help avoid waste and prevent fertilizer from leaching into groundwater, and buffer strips of dense vegetation would be left between farmland and wetlands to filter runoff and prevent sedimentation.
- Monitoring of the cropland farming program would be performed by qualified refuge staff.

**Justification:**

Cropland farming has been shown to be an effective habitat management practice performed to prevent invasive species from infesting a highly disturbed area until restoration of native vegetation can occur. Additionally, cropland farming provides high-quality food for wildlife species at the refuge. Wintering and migratory birds readily use agricultural crop fields to help meet their energy needs.

Although these large monocultures of planted grasses are not native, and do not support the diversity of species that native habitats do, it is critical to maintain these areas in production to keep them from becoming infested with noxious weeds. By conducting the farming program under the practices and stipulations above, it is anticipated that the program would contribute to the enhancement, protection, conservation, and management of native wildlife populations and their habitats on the refuge. As a result, cooperative farming contributes to achieving refuge purpose(s), contributes to the mission of the Refuge System, and helps maintain the biological integrity, diversity, and environmental health of the refuge. Allowing the use as described above would not materially detract from or interfere with the purposes for which the refuge was established or the mission of the Refuge System.

**Mandatory 10- or 15-year Re-evaluation Date (provide month and year for “allowed” uses):**

\_\_\_\_\_ Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

2022 Mandatory 10-year reevaluation date (for all uses other than wildlife-dependent public uses)

**Signatures:**

Prepared by: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval: \_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

## **B.9 Compatibility Determination for Commercial Visitor Services at Tualatin River National Wildlife Refuge**

**Use:** Commercial visitor services

**Station Name:** Tualatin River National Wildlife Refuge

**Date Established:** 1992

### **Establishing and Acquisition Authority(ies):**

Fish and Wildlife Act of 1956 (16 U.S.C. § 742a. et seq.)

Emergency Wetlands Resources Act of 1986 (16 U.S.C. § 3901-3932)

### **Refuge Purpose(s):**

“ ... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)

“ ... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...” 16 U.S.C. § 742f(b)(1) (Fish and Wildlife Act of 1956)

“ ... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...” 16 U.S.C. § 3901(b) (Emergency Wetlands Resources Act of 1986)

### **National Wildlife Refuge System Mission:**

“To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Administration Act of 1966, as amended [16 U.S.C 668dd et seq.]

### **Description of Use:**

This CD addresses nonconsumptive commercial uses related to wildlife observation, wildlife photography, interpretation, and environmental education. This CD does not address consumptive uses such as commercial guiding for hunting and fishing, nor activities that are not related to natural, historical, or cultural subjects. Additionally, a variety of nonprofit and for-profit organizations, educational institutions, and individuals engage in leading natural resource- and environmental education-based activities on the refuge. Some of these organizations may request to charge fees for services they intend to provide. This CD covers the fee collection and program quality aspects of commercial visitor services. Refer to the CDs for wildlife observation, wildlife photography, and interpretation and for environmental education for a complete compatibility examination of the wildlife-dependent activities that apply to commercial visitor services.

By regulation, the Service may only authorize public or private economic use of the natural resources of any national wildlife refuge, where it is determined that the use contributes to the achievement of the refuge's purpose or the Refuge System mission. Refuge System policy on management of specialized uses states that when monetary gain (profit) is the objective of a refuge recreational use, the use is to be managed as an economic and commercial use.

Commercial visitor services on the refuge cover a broad range of wildlife-dependent recreation and education activities that are led by any organization or individual that charges a fee to participate in the activity. Activities could include, but are not limited to, birding tours, plant identification, wildlife photography, art, interpretive programs, guided trail walks, training workshops, summer youth camp, nature classes, and other similar nonconsumptive uses. These uses would occur in areas and facilities that are open to the public and would support the identified wildlife-dependent public uses of the refuge. Organizations conducting commercial visitor services would require an SUP, except for the Friends of the Refuge commercial activities, which are governed by statute under an existing MOU.

Commercial visitor services most often would be expected to occur in groups. These uses may occur year-round on the refuge. They may be conducted on existing public use trails and overlooks and at times inside the Wildlife Center. It is not expected that uses would occur on closed areas of the refuge, unless specifically authorized and approved by the refuge manager.

An SUP would be required for all uses by organizations and/or individuals wishing to collect fees for services, regardless of for-profit or nonprofit status, with the exception of Friends of the Refuge. Friends of the Refuge fundraising and/or fee collection for providing programs would be governed by existing the MOU and/or partnership agreements between the Service and the Friends of the Refuge, except when the refuge manager determines that a proposed use falls outside the scope of any agreement. In such a case, an SUP would be required. In all cases, the refuge manager would require that any organization (including Friends of the Refuge) and/or individual requesting to charge a fee for visitor services complete a written request that includes the activity type, date(s) and time(s) requested, group size, purpose of visit, proposed fee structure, where the activity would occur, and other details determined necessary by the refuge manager.

The refuge would have the option to accompany any group on their activity to assess program quality, adherence to refuge regulations and SUP stipulations, and safety guidelines. The refuge may also provide training and/or materials to requestors to ensure that program participants and visitors are receiving high-quality information and services.

Refer to the Stipulations Necessary to Ensure Compatibility section in this document for more information.

### **Availability of Resources:**

Estimated costs for operating the commercial visitor services program as envisioned under Alternative 2 are displayed in the following table. These costs are to perform, review, and administer proposals and SUPs, and monitor those SUPs during the proposed action. With assistance from Friends of the Refuge, volunteers, and other partners, the refuge currently has sufficient staff and funding to support this use.

**Costs to Administer and Manage Commercial Visitor Services**

Activity or Project	One-time Expenses (\$)	Recurring Expenses (\$/year)
Visitor Services Manager and management of SUPs		\$5,000

**Anticipated Impacts of Use:**

The anticipated impacts of use are fully discussed in the CDs for wildlife observation, wildlife photography, and interpretation, and for environmental education.

***Refuge-specific Impacts:***

Disturbances to wildlife and their habitats would be the same as those discussed in the CDs for wildlife observation, wildlife photography, and interpretation and for environmental education. If disturbance to wildlife or damage to habitat reaches unacceptable levels, the refuge would limit access to areas where unacceptable impacts occur (see stipulations).

It is expected that many organizations could offer high-quality wildlife-dependent recreation and education activities on the refuge. These services may enhance visitor experience, learning, and appreciation of the refuge and its natural and cultural resources. These types of services, if provided in a high-quality manner, would likely reach more people than the refuge can.

***Impacts to Listed Species:***

No direct impact to listed species is anticipated to occur as a result of commercial visitor services. Any unanticipated future impacts would be reduced by ensuring that the public avoids or severely limits activity in areas hosting rare species.

***Impacts to Other Priority Public Uses:***

Both refuge visitation and the number of facilities and emphasis devoted to wildlife observation, wildlife photography, interpretation, and education are projected to increase under Preferred Alternative 2. Conflict between commercial visitor services groups would be expected to increase. If conflict between user groups reaches unacceptable levels, the refuge would limit access to areas where unacceptable impacts occur (see stipulations).

No significant effects to roads, trails, or other infrastructure from commercial visitor services are expected. Normal road, trail, and facility maintenance would continue to be necessary. Additional facility construction or upgrade, if needed, is addressed in the Availability of Resources section.

**Public Review and Comment:**

Various opportunities were provided for the public to engage with the planning process. Appendix K details public involvement undertaken during development of the CCP/EA. Written comments on this draft compatibility determination are welcome during the public comment period.

**Determination (check one below):**

Use is Not Compatible

Use is Compatible with Following Stipulations

**Stipulations Necessary to Ensure Compatibility:**

*General Stipulations*

- Stipulations in the CDs for wildlife observation, wildlife photography, and interpretation and for environmental education apply to commercial visitor services.
- Visitors are restricted to designated trails, sites, or facilities as determined by refuge staff. Use is open daily from dawn to dusk.
- All refuge rules and regulations apply, including group size and management, and safety guidelines.
- Commercial photographers/videographers should ensure proper credit is given to the refuge and the Service.
- Collection of natural objects such as plants, animals, minerals, antlers, and cultural resources is prohibited.
- If disturbance to wildlife or damage to habitat reaches unacceptable levels, the refuge would limit uses in areas where unacceptable impacts occur. Monitoring would be conducted to ensure that high-quality habitat for wildlife feeding, resting, and breeding is maintained.
- The refuge may provide training and/or materials to requestors to ensure that program participants and visitors are receiving high-quality information and services.

*Special Use Permit*

- An SUP would be required for all commercial visitor services. Guiding for hunting and fishing is not allowed on the refuge.
- Fee-based activities conducted by Friends of the Refuge would require approval by the refuge manager as governed by MOUs and/or partnership agreements.
- A standard permit form stipulating dates, times, and locations of use would be made available prior to the visit.
- SUPs for areas open to the public may be granted on a case-by-case basis or for up to 1 year, at the refuge manager's discretion.
- Special permission requests to closed habitat/wildlife sanctuary areas or other special considerations (e.g., access to the refuge after normal public visitation hours, setting up temporary equipment, requiring additional resources or staff) would require an SUP and permit fee, and may be granted on a case-by-case basis with no renewal.
- The SUP would be required to be readily available while conducting the permitted use on the refuge.
- Requests must demonstrate a means to enhance education, appreciation, and/or understanding of the refuge and the Refuge System. Failure to abide by any part of the SUP or regulations would be considered grounds for immediate revocation of the permit and could result in denial of future permit requests.

- Refuge can deny use for any reason such as to minimize crowding, avert conflict with other activities/visitors, and, if disturbance is excessive, the refuge reserves the right to scale the use appropriately.
- The refuge would have the option of accompany any group on their activity to assess program quality, adherence to refuge regulations and SUP stipulations, and safety guidelines.

**Justification:**

By allowing commercial visitor services as an economic use to occur under the stipulations described above, it is anticipated that wildlife species, which could be disturbed during the use, would find sufficient resources and resting places such that their abundance and use of the refuge would not be measurably lessened. Additionally, it is anticipated that use of SUPs would provide the refuge a tool for managing uses; protecting natural and cultural resources; reducing user conflicts; and mitigating disturbance impacts. The SUPs would also create an opportunity for communication and outreach between the refuge staff and users to increase knowledge and awareness of refuge regulations and ethical behavior. Commercial visitor services would provide visitors an organized and educational opportunity to view wildlife safely under the use stipulations. Additionally, providers of commercial visitor services may create end products that would provide an educational opportunity to a much broader distribution of people. Thus, the use would not materially interfere with or detract from the Refuge System mission, or the purposes for which the refuge was established.

**Mandatory 10- or 15-year Re-evaluation Date (provide month and year for “allowed” uses):**

\_\_\_\_\_Mandatory 15-year re-evaluation date (for wildlife-dependent public uses)

2022 Mandatory 10-year re-evaluation date (for all uses other than wildlife-dependent public uses)

**Signatures:**

Prepared by:

\_\_\_\_\_  
(Signature) (Date)

Refuge Manager/  
Project Leader  
Approval:

\_\_\_\_\_  
(Signature) (Date)

Concurrence:  
Refuge Supervisor:

\_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System:

\_\_\_\_\_  
(Signature) (Date)