Joint Permit Application Supplemental Attachment

Bay Unit Tide Gate Replacement and Wet Pasture Enhancement Project – Phase 2

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1.0 PROJECT OVERVIEW

The U.S. Fish and Wildlife Service (USFWS) is proposing the second phase of a habitat enhancement project at the Bay Unit of the Nestucca Bay National Wildlife Refuge (Refuge) in Tillamook County, Oregon (Figure 1). Phase 1 of the Bay Unit Tide Gate Replacement and Wet Pasture Enhancement Project (project), which was completed in the summer of 2021, removed accumulated sediment from existing interior channels and ditches to improve water conveyance, water quality, and fish habitat; reconfigured portions of interior pastures (i.e., filled existing linear ditches, excavated new sinuous swales and shallow depressions) to improve water conveyance and habitat complexity for fish and wildlife; installed large wood in interior channels to improve aquatic habitat complexity; planted a native riparian corridor along the main channel to reduce sediment runoff and decrease water temperature through shading[1]; replaced failed culverts under a two-track dirt road; installed a crossing over a channel to improve access between pastures; and installed fencing along pastures and the new crossing to limit livestock access to the channel. Phase 2 of the project would expand upon these improvements by replacing an existing failing tide gate on the Little Nestucca River with a new Muted Tidal Regulator (MTR); installing two new culverts within the interior cross levee that separates the north and middle pastures to improve water conveyance and water quality; and enhancing additional pasture areas (i.e., widening channels, filling a linear ditch, installing large wood) to improve habitat complexity for fish and wildlife.

Similar to Phase 1, all work proposed under the Phase 2 project would be located on federal lands associated with the Refuge, and would be consistent with the habitat management objectives provided in the Nestucca Bay National Wildlife Refuge Comprehensive Conservation Plan (CCP) (USFWS 2013).

1.1 Responsible Parties

USFWS is the landowner and manager of the Refuge, and the applicant / proponent of the project. USFWS is also acting as the federal lead agency responsible for compliance with Section 106 of the National Historic Preservation Act (NHPA) and the Coastal Zone Management Act (CZMA).

Funding for the project is provided by USFWS, the Oregon Watershed Enhancement Board (OWEB), and The Nature Conservancy (TNC).

Ducks Unlimited, Inc. (DU) is providing engineering design, environmental compliance, and construction management support for the project.

Regulatory and resource agencies with jurisdiction over Phase 2 project work include the U.S. Army Corps of Engineers (USACE), National Marine Fisheries Service (NMFS), Oregon Department of Environmental Quality (ODEQ), Oregon Department of Fish and Wildlife (ODFW), and Oregon Department of Land Conservation and Development (DLCD). USFWS believes the project is exempt from Oregon's Removal-Fill Law as a Voluntary Habitat Restoration Project on a federal National Wildlife Refuge (Oregon

[1] Phase 1 riparian planting is still in progress.

Administrative Rule [OAR] 141-085-0534(5)) and is submitting this JPA to the Oregon Department of State Lands (DSL) to request a "No Permit Needed Letter". In addition, because all Phase 2 work would be completed on federal land, land use permits from Tillamook County are not required (Absher pers comm. 2022).

Table 1 provides a list of permits / certifications required to implement the Phase 2 project; the regulatory agency contact for that permit (based on contacts established during the Phase 1 project and/or subsequent conversations with staff from those agencies); and a status of the permit application packet.

Table 1. Required Certifications or Approval (Box 8)

Required Certification / Approval	Agency Contact	Status
Nationwide Permit 27 (Anticipated)	Kinsey Friesen, USACE kinsey.m.friesen@usace.army.mil (503) 808-4378	Concurrent JPA submission to USACE, ODEQ and DSL
Water Quality Certification	Haley Teach, ODEQ haley.teach@deq.state.or.us (503) 229-5051	Concurrent JPA submission to USACE, ODEQ and DSL
Environmentally Beneficial Activity Exemption (15 CFR 930.33(a)(4))	Patty Snow, DCLD Patty.Snow@state.or.us	Submission anticipated for April 2022
Append Project to 2018 Tidal Area Restoration Program (TARP) Programmatic BO and EFH Assessment	Kate Wells, NMFS Kathleen.wells@noaa.gov (503) 230-5437	Consultation through USACE review of NWP 27
Fish Passage Review (MTR)	Greg Apke, ODFW Greg.D.Apke@state.or.us (503) 947-6228	Fish passage review materials to ODFW February 2022
Scientific Take Permit; In-Water Work Window Variance	Robert Bradley, ODFW Robert.bradley@state.or.us (503) 842-2741, x253	STP to relocate fish from ditches prior to installing the new culverts and MTR to be submitted prior to construction. Variance to construct project in summer / early fall (July 15 to October 31) outside of approved in-water work window for estuaries (November 1 – February 15) submitted as part of JPA.
NHPA Section 106 Compliance	Kelly Moroney, USFWS kelly_moroney@fws.gov (541) 867-4550	No effect determination complete.

2.0 PROJECT LOCATION AND BACKGROUND

The Refuge is located in southern Tillamook County about 3 miles southeast of Pacific City, Oregon (Figure 1). The Refuge was established in 1991 to support goose populations, including the then federally endangered

Aleutian cackling goose (formerly known as the Aleutian Canada goose) (*Branta hutchinsii leucopareia*) and the only wintering area for dusky Canada geese (*B. canadensis occidentalis*) on the Oregon coast at that time. The riverine, estuarine, seasonal wetland and riparian habitats associated with the Refuge also provide important habitat for other species of waterfowl and shorebirds; fish, including federally-listed Oregon coast Coho salmon (*Oncorhynchus kisutch*); native amphibians and reptiles; various mammals; and a plethora of insects and plants (USFWS 2013).

Prior to purchase by USFWS, the Bay Unit was comprised of diked former tidelands in private ownership that were managed as pasture for cattle / dairy production. During the acquisition process, USFWS recognized that Refuge establishment was not anticipated to take lands out of agriculture, as farming practices were largely compatible with habitat management goals for geese (USFWS 2013). Accordingly, much of the Bay Unit, including the twelve pastures within the project area, continue to be actively managed for dairy production and goose habitat.

The 116-acre project area is bound to the west by Nestucca Bay; to the south by the Little Nestucca River; to the north by private agricultural property; and to the east by U.S. Highway 101 (Figure 1). There are twelve individual pastures within the project area that are generally divided into two groups: Pastures 1-6 are referred to as the "north pastures" and Pastures 7-12 are referred to as the "middle pastures". For the reasons noted above, pasture management is an important element for meeting goose habitat management objectives at the Bay Unit. Management strategies utilized in the project area include grazing though Cooperative Agricultural Agreements with local diary operators (April 15th through October 31st); mowing and "green chopping" (bailing or bulk removal of mowed grass for silage production); application of manure and commercial fertilizer within a 35-foot setback from ditches; herbicide application to control invasive plant species; and periodic cleaning of ditches to maintain drainage and water flow.

2.1 Comprehensive Conservation Plan

Habitat management objectives for the project area are provided in the Refuge CCP (USFWS 2013). The CCP sets forth management guidance for Refuge staff for a period of 15 years, and includes a description of the purposes of the Refuge; an overview of fish, wildlife and plant populations and their habitats on the Refuge; a description of problems that may adversely affect wildlife populations and habitats, and ways to correct or mitigate those problems; and identification of areas suitable for compatible fish and wildlife-dependent recreational uses. Table 2 provides a summary of the specific goals, objectives and management strategies identified in the CCP that were used to inform the desired outcomes and design of the project.

Table 2. Consistency of Project with Nestucca Bay NWR CCP

CCP Goal	CCP Objective	Management Strategy	Phase 2 Project Activity
Goal 1: Protect and maintain agricultural lands supporting	Objective 1.1 - Protect and maintain lowland pastures: Protect and maintain 346 acres of lowland pastures on Nestucca Bay NWR for the benefit of wintering Canada	▪ Maintain drainage ditches, dikes, and water control structures using heavy equipment to provide adequate drainage and flood protection.	▪ Installation of new culverts between north and middle pastures to improve water conveyance

CCP Goal	CCP Objective	Management Strategy	Phase 2 Project Activity
wintering migratory birds	geese (e.g., dusky, Aleutian Canada geese), other waterfowl (e.g., American wigeon, northern pintail, mallard), and other migratory birds (e.g., bald eagle, peregrine falcon, American kestrel) throughout the life of the CCP.	▪ Rehabilitate pastures as needed using standard agricultural practices (e.g., seeding with appropriate pasture mix, fertilizing, liming) to maintain optimum productivity and plant species mix.	▪ Pasture enhancement (fill linear ditch) to improve habitat and grazing opportunity
Goal 8: Enhance, protect, and maintain instream aquatic habitat for all dependent species including anadromous and estuary-dependent fish.	Objective 8.1 Enhance, protect, and maintain instream aquatic habitat Enhance, protect, and maintain instream aquatic habitat within the Refuge throughout the life of the CCP for anadromous fish and other estuary-dependent fish common in the Nestucca estuary and refuge tributaries, including fall Chinook salmon, chum salmon, coho salmon, winter steelhead, and cutthroat trout.	▪ Installation and maintenance of large woody debris (i.e., logs and root wads) in stream channels to promote diverse hydrological and physical structure ▪ Provide spawning (cutthroat trout) and rearing habitat (salmon) ▪ Plant and maintain streamside vegetative cover to reduce water temperatures. ▪ Work cooperatively with ODFW and adjacent landowners to address fish passage and water quality issues ▪ Coordinate with ODFW, U.S. Forest Service, and other partners to support physical habitat restoration actions listed in the Oregon Coast Coho Conservation Plan for the Nestucca watershed.	▪ Replacement of existing failing tide gate on Little Nestucca River ▪ Installation of new culverts between north and middle pastures to improve water conveyance ▪ Pasture enhancement (widen channels, fill linear ditch) to provide off-channel habitat for fish ▪ Installation of large wood in channels ▪ Establish 4.8 acre riparian setback to reduce sedimentation and improve water quality

2.1.1 Removal-Fill Exemption for Certain Voluntary Restoration Projects

As described above, OAR 141-085-0534(5) exempts Certain Voluntary Habitat Restoration Activities from having to obtain a Removal-Fill permit from DSL:

> *(5) Refuge Management. A permit is not required for habitat management activities located on a National Wildlife Refuge or State Wildlife Area that are consistent with an adopted refuge or wildlife area management plan. Fill or removal in waters of this state for non-habitat management activities such as roads and building is not covered by this exemption*

The entirety of the Phase 2 project would be located on the Refuge, which is managed in accordance with the Refuge's CCP. As summarized in Table 2, the CCP specifically discusses the types of targeted habitat and water conveyance improvements associated with the Phase 2 work, including replacement of a failing tide gates with a more fish-passable MTR, and enhancement work in channels, ditches, and wet pastures.

Accordingly, the project would be exempt from Removal-Fill permitting as a voluntary habitat restoration project, located on a federal Refuge, that is consistent with the adopted management plan for that Refuge.

3.0 PROJECT PURPOSE AND NEED (BOX 5)

The purposes of the project are to enhance pasture conditions for wintering geese and other wildlife and to improve aquatic conditions for native fish, including salmonids, by improving water management capabilities and habitat complexity in the Bay Unit.

3.1 Pasture Conditions

All of the pastures in the Bay Unit (about 95 acres) are seasonally managed as goose habitat to support sustained waterfowl use from fall through spring. To minimize depredation of private pastures by wintering geese, management of pastures on the Refuge is focused on providing short grass habitat, comprised of a mix of orchard grass, annual rye, and white clover, with a maximum height of 2- to 4-inches by the end of October.

Prior to Phase I, many of the pastures in the Bay Unit supported extensive areas (up to 25% cover) of Pacific rush (*Juncus efficus L.* var. *pacificus*) which are not preferred forage for geese. Soil sampling completed in 2019 indicate soil pH is strongly acidic, which may be affecting species composition and overall pasture health. High pH levels may be attributed to poor drainage within fields, where siltation in the primary channels around the periphery of the site encumber drainage from the pastures and contribute to the less than desirable vegetation composition. Improvements to the drainage network implemented during the Phase 1 project were completed, in part, to improve the health of pasture grasses in the project area. Other Phase 1 project actions to improve habitat complexity in pastures included filling strait line ditches and constructing meandering swales and shallow depressions in the middle pastures. The Phase 2 project also proposes limited pasture enhancement work (filling a straight line ditch segment, installing large wood) to expand on the improvements associated with Phase 1. Design and operation of the new MTR on the Little Nestucca River also accounts for ongoing pasture operations, where tidal inundation would be managed to a water surface elevation designed to limit salt encroachment into the root zone of managed pasture areas.

3.2 Aquatic Habitat Conditions

The primary limiting factors for production of salmonids in waters associated with Bay Unit pastures include: (1) lack of fish access due to poorly sized and functioning tide gates; (2) lack of a connected/developed channel network with access to feeding areas; (3) poor hydrological function within the current ditch network which results in poor water quality; and (4) poor aquatic habitat complexity (USFWS 2019). Aquatic habitat limiting factors targeted by the Phase 1 project included improving the hydrologic function and habitat complexity of existing channels by removing accumulated sediment, installing large wood, and planting a riparian corridor adjacent to a main channel. The Phase 2 project would target replacement of the existing failing tide gate on the Little Nestucca River and improve water conveyance between the north and middle pastures by installing culverts in an interior cross levee that separates to the two areas. Additional pasture improvements would also provide off-channel habitat for fish during higher water periods. Figures 5a-5c

illustrate the relative amount of fish-accessible habitat (i.e., water depth greater than 12-inches) available at two different inundation levels (2.5 feet and 5.0 feet) before and after the project is completed.

4.0 EXISTING RESOURCES (BOX 6)

4.1 Waters of the U.S. and State

A reconnaissance-level wetland delineation of the project area was completed by DU in December 2019. In general, wetland boundaries within the 116-acre project area were mapped using historical and recent (2018) National Agricultural Inventory Program (NAIP) aerial imagery, as well as review of the National Wetland Inventory (NWI) and Natural Resources Conservation Service (NRCS) soil maps. As described in the attached report, the delineation conservatively assumed all but built infrastructure (roads, levees) would be considered waters of the U.S. and state subject to regulation by USACE and ODEQ. Of note, the December 2019 wetland delineation map and report were not updated for this permit application to reflect the Phase 1 improvements completed in August 2021(i.e., fill placed in linear ditches in the middle pastures and construction of swales in the middle pastures). Accordingly, existing acreages and figures in this JPA reflect pre-Phase 1 site conditions.

Four aquatic habitat types are found in the project area (Table 3, Figure 3).

- **Managed wet pasture** encompasses 94.7 acres of the project area and includes twelve distinct pastures (Pastures 1-12). These areas are actively managed and maintained by USFWS through seasonal grazing, mowing, and shallow flooding to favor establishment of pasture grasses preferred by foraging geese. Managed wet pastures within the project area are dominated by a mix of pasture grasses, including orchard grass (*Dactylis glomerata*), annual ryegrass (*Lolium* spp.), and white clover (*Trifolium repens*), interspersed with less desirable / invasive species, such as reed canary grass (*Phalaris arundinacea*), Himalayan blackberry (*Rubus armeniacus*) and Pacific rush.

- **Riparian Forest/Forested Wetlands** are located along the northeastern boundary of the project area, the western side of the primary drainage ways, and adjacent to the interior cross levee that separates Pastures 1-6 from Pastures 7-12. Common tree and shrub species found in this community include Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), red alder (*Alnus rubra*), and various species of willow (*Salix* spp.). Understory vegetation includes wetland species (slough sedge [*Carex obnupta*], skunk cabbage [*Lysichiton americanus*]) and non-wetland species (salal [*Gaultheria shallon*], red huckleberry [*Vaccinium parvifolium*]) (USFWS 2013). About 9.3 acres of riparian forest/forested wetlands are mapped in the project area.

- **Other Waters** include the two primary channels that deliver water to and from the pastures, and that drain the site through existing tide gates. These channels include a defined bed and bank apparent on aerial photographs, and exhibit standing or ponded water within the confined bank of the channel throughout the year. Herbaceous vegetation (typically pasture grasses and reed canary grass) is found along the banks of both channels, and limited riparian vegetation, including small Sitka spruce, red alder, and Himalayan blackberry, are located adjacent to some sections of both alignments. Other

waters also include a portion of channel that extends towards the Little Nestucca River from an existing tide gate (i.e., exterior of the perimeter levee but within the Refuge boundary). A total of 7.2 acres of other waters are mapped in the project area.

- **Ditches** include linear, man-made features used to convey water to and between managed wet pastures. Vegetation in ditches is generally limited, as they are relatively deep and incised, although pasture grasses and reed canary grass have encroached into some sections. Ditches comprise 1.8 acres in the project area.

Outside of these four aquatic habitat types, the project area also includes portions of two, two-track dirt roads (generally at-grade) that are used by USFWS and the lease farmer to access the project area from Highway 101, as well as levees that divide the north and middle pastures and border the western edge of the project area. About 1.0 acre of road and 1.9 acres of levees are mapped in the project area (Table 3).

Table 3. Wetlands and Waters in the Project Area

Habitat Type	Acres in Project Area[1]
Waters of the U.S. / State	
Managed Wet Pasture	94.7
Riparian Forest/Forested Wetland	9.3
Other Waters	7.2
Ditch	1.8
Subtotal	**113.0**
Built Environment	
Road	1.0
Levee	1.9
Subtotal	**2.9**
TOTAL (Project Area)	**115.9**

[1] Acreages based on December 2019 site conditions. Modifications to account for Phase 1 project improvements not included.

4.2 Existing Hydrology

Although some fresh water is delivered to the site from small streams and drainages that flow from the east towards the Little Nestucca River and Nestucca Bay, the project area and vicinity receive water primarily from direct precipitation and ground water (DU 2019; NHC 2022). Between 2000 and 2022, the mean annual precipitation recorded at the WETS station closest to the project area (Cloverdale, OR [351682]) was 78.09 inches (NRCS 2022). The majority (55%) of annual precipitation recorded occurred during late fall and winter (November to February); by comparison, very little rain (6% of annual precipitation) was recorded between June and August (NRCS 2022). During low flow periods, groundwater, likely from under-dike seepage, is the

dominant source of water to the project area and vicinity and provides steady inflow volumes driven by average sea levels rather than precipitation (NHC 2022).

Currently, all pastures in the project area are drained by open ditches that generally flow to one of the two large drainages within the project area: (1) a 2,850 foot long drainage that borders the western edge of the middle pastures; and (2) a 2,870 foot long drainage that borders the north and west sides of the north pastures. The drainage adjacent to the north pastures also extends 4,000 feet north of the Refuge boundary, through private agricultural land, to a tide gate on Nestucca Bay. These two large drainages are currently hydrologically separated by a cross levee that divides the north and middle pastures.

Minimum water depth in the drainage along the western edge of the middle pastures is governed by minimum water levels on the Little Nestucca River (NHC 2022). Under current conditions (which account for the presence of a sill west of the existing tide gate), minimum water levels are about 3.0 feet. If the sill is eroded after the MTR is installed, water levels would be expected to match those for the Little Nestucca River, or about 2.5 feet, as observed downstream at the USFWS Upton Slough gage. The depth of water in the drainage that borders the western edge of the north pastures is around 2.5 feet, but is frequently lower during dry periods of the year.

4.3 Water Quality

Designated beneficial uses for the North Coast Basin are provided at OAR 340-41-0230. The following beneficial uses are identified for all streams and tributaries that flow to estuaries in the North Coast Basin:

- Public Domestic Water Supply
- Private Domestic Water Supply
- Industrial Water Supply
- Irrigation
- Livestock Watering
- Fish and Aquatic Life
- Wildlife & Hunting
- Fishing
- Boating
- Water Contact Recreation
- Aesthetic Quality

Beneficial uses for fish in the North Coast Basin are provide in Tables 230A and 230B. For the Little Nestucca River, beneficial uses for fish are identified for Salmon[2] and Trout Rearing and Migration, with

[2] Includes all salmon species: steelhead, rainbow and cutthroat trout

salmon and steelhead spawning from October 15 to May 15. Water contact recreation and shellfish harvesting are also identified as beneficial uses for Nestucca Bay and the portions of the Little Nestucca River proximate to the project area (Figure 230H).

The Nestucca Bay estuary is listed as impaired for fish and aquatic life; water contact recreation; and fishing (ODEQ 2021). Total Maximum Daily Loads (TMDL) have been developed for temperature, bacteria (fecal coliform, e. coli) and sediment.

The only existing impervious surfaces within the project area are associated with the existing two-track roads and levees (compacted dirt and gravel), and surface of the existing tide gate. No new impervious surfaces would be created by the project, although impervious areas associated with the MTR and re-compaction of the levee over the new culverts would represent a replacement of impervious surface. There are no known NPDES permits or other water quality degrading activities occurring in the vicinity of the project site. The project site is not located in a ground water management area or an EPA-designated sole source aquifer.

5.0 PROJECT DESCRIPTION (BOX 4)

5.1 Project Components (Box 4B)

As described below, Phase 2 project work include replacing an existing failing tide gate on the Little Nestucca River with a new MTR; installing two new culverts within the interior cross levee that separates the north and middle pastures; and implementing additional enhancement work within interior pastures. Figure 4 illustrates the location of these project components relative to the waters of the U.S. and state mapped in December 2019.

- **Replace Existing Tide Gate with MTR**. The existing tide gate located on the Little Nestucca River (including the 48-inch diameter culvert, tide gate, and associated appurtenances) would be removed and replaced by a dual 60-inch diameter culvert and MTR. The MTR would allow USFWS to manage incoming tide waters to provide fish access to the Bay Unit while minimizing the potential for pasture grasses to be adversely impacted by saline tidal water. The MTR design was informed by hydraulic modeling that contemplated a series of configurations associated with culvert diameters, number of culverts (dual or single), invert elevations, and set point elevations to ensure compliance with state and federal fish passage guidelines (NHC 2022).

  The proposed MTR design would include dual 60-foot long, 5-foot diameter culverts with an invert elevation of -1.0. The MTR would be placed on 1-foot of foundation rock and backfilled with dirt compacted to match the adjacent existing ground surface elevations. Riprap would be placed along the outboard and inboard slopes of the MTR to stabilize the bank and for anti-buoyance of the system; riprap would also be placed at the discharge location of the interior channel to minimize erosion and stabilize the bank. The interior channel crossing / access point to the MTR would also be moved from north of the existing tide gate to south of the MTR. The relocated crossing would require removal of an existing 48-inch diameter culvert and associated earthen fill in the ditch, and relocation of the same to the new

southern location. The new crossing would also be placed on 1-foot of foundation rock and backfilled with compacted dirt.

- **Cross Levee Culverts**. Currently, a cross levee prohibits water flow between the main channel that borders the north and middle pastures (See Section 4.2). The project would install two 73-foot long, 5-foot diameter culverts in the cross levee at the main channel to improve water quality and allow for water conveyance between the pasture systems. The culverts would include canal gates to allow USFWS to close the culverts if needed for onsite management or maintenance. The culverts would be installed on 1-foot of foundation rock and backfilled with compacted soil.
- **Channel Widening.** The project would widen the main channel at the northwest corner of Pasture 12 (at the 90-degree bend of the main drainage channel) to improve water conveyance and hydraulics, and to provide habitat complexity for fish and wildlife species. To widen the channel, about 350-linear feet of bank would be laid back at a 10:1 side slope into the adjacent pasture. The project would also widen the channel adjacent to a swale constructed during Phase 1 in Pasture 9. Sediment removed to widen these channels would be used to fill a linear ditch and backfill for the new MTR; excess spoils would be spread thinly (less than 6-inches) in the adjacent pasture to ensure wet pasture conditions are maintained.
- **Fill Ditch**. A 450-foot long ditch in Pasture 9 would be filled. Prior to filling, muck would be removed and allowed to dry adjacent to the ditch, and then used as fill within that ditch. Additional fill material would be derived from the widened channels described above. Fill would be placed to about 6-inches above the existing ground surface elevation to allow for settlement. An existing culvert within the ditch would also be removed prior to backfilling.
- **Large Wood**. One large wood habitat structure would be installed in a swale constructed in Pasture 9 during Phase 1 (and near the new widened channel described above). The structure would be secured in place using pin logs driven into the substrate at angles not to exceed 45 degrees. Detail on large wood installation are provided in the design plan set for the project.

5.2 Construction Methods (Box 4C)

Project construction is proposed to occur in the summer / early fall (July 15 to October 31) when the pastures are dry and the water table associated with the interior ditches is lower. Enhancement activities would take approximate 6-8 weeks to complete within that window.

5.2.1 MTR Installation

The MTR would be installed during a single low tide cycle. Associated work would include removal of the existing culvert and tide gate; construction of the structure foundation (rock and compacted dirt to match the adjacent existing ground surface elevation); placement of the new culverts to the design invert elevation; installation of the MTR; and backfill of the culverts with soil and rock to ensure they don't move / float away as the tide comes in. Any remaining work associated with installing the MTR would be completed on subsequent low tide cycles, as necessary, to minimize in-water work at the new structure.

Prior to initiating work on the MTR, fish would be salvaged from areas near the tide gate replacement location and block nets would be installed to prevent aquatic species from reentering the work area (see Sheet

5 in the design plan set). The existing earthen sill located to the west of the MTR would also be leveraged to limit fish access from the Little Nestucca River; if necessary, a block net would be installed across the sill to prevent fish from entering the work area on a rising tide.

5.2.2 Other In-Water Work

Other in-water work would be limited to pasture enhancement activities adjacent to existing channels and installation of the culverts in the interior cross levee. These activities would be completed in the dry by leaving the portion of the work area closest to the water's edge intact, where it would effectively act as a barrier between any standing / flowing water and ground disturbing work. As a result, in-water work would minimal and be limited to final excavation or grading to remove a small amount of soil.

5.2.3 Construction Equipment, Staging and Access

Proposed activities would be implemented using heavy equipment, including excavators, backhoes, haul trucks and front loaders (low ground pressure equipment where possible). Construction materials and equipment would be temporarily staged in the dirt turn out areas adjacent to Highway 101 or along the interior access roads. Construction access would be provided from Highway 101 and the existing two-track farm road in the project area. Access to work areas would be provided through pastures.

5.2.4 Construction Sequence

The following work sequence would generally be followed to implement the project.

- Install erosion control measures, as needed.
- Mark excavation limits and verify location of components, as needed.
- Complete fish salvage / relocation near MTR work area. Install block nets to prevent aquatic species from reentering work area.
- Remove and relocate interior channel crossing/ access point to MTR.
- Remove existing culvert / tide gate and install MTR on a single low tide cycle.
- Complete MTR installation (e.g., rip rap installation at interior tidal channel) on subsequent tide cycles, as needed.
- Install culverts in cross levee (base materials, culverts, compacted fill). Isolate work area from channel by leaving portion of existing berm at water's edge as de-facto cofferdam.
- Remove muck from ditch and place adjacent to bank. Remove/dispose of culvert in ditch.
- Widened channels adjacent to Pastures 9 and 12. Place excavated sediment in ditch; spread remaining spoils in thin lifts (6-inch or less) in adjacent pasture if necessary. Isolate work areas from channels by leaving portion of work area at water's edge in place as de-facto cofferdam.

- Install large wood structure.
- Replace dry muck in ditch and compact.
- Re-contour areas temporarily disturbed during construction and reseed with native seed mix or pasture grass in actively managed pastures.
- Remove construction materials from site and staging areas.

5.3 Avoidance and Minimization Measures (Box 9)

All work will be performed during the summer / early fall (July 15 to October 31) when the pastures are dry and accumulated water in ditches is low. An in-water work window variance is requested from NMFS and ODFW to construct the project outside of the approved estuary work window (November 1 – February 15).

Prior to construction and in compliance with an ODFW-approved fish salvage plan, an ODFW district biologist or Refuge biologist will conduct/oversee fish and amphibian salvage efforts to remove aquatic species from the MTR work area. After salvage efforts are complete, work areas will be isolated with block nets to prevent aquatic species from reentering the site.

Standard construction best management practices (BMP) will also be implemented to reduce impacts to water quality and sensitive habitats during construction including:

- Where possible, low ground pressure equipment will be used onsite. For example, fill generated onsite will be placed in a low ground pressure tracked dump truck, transported to a designated spoil or fill area, and gently graded into the pasture.
- As needed, moveable mats may be used to reduce impacts on the ground surface from heavy equipment operating in work areas.
- Biodegradable hydraulic oil will be used in all heavy equipment.
- Any unintentional depressions associated with heavy equipment operation will be rehabilitated by either connecting them to constructed swales to ensure drainage, or grading and contouring them to the adjacent pasture elevation.
- The staging area will be contained using absorbent booms, and hazardous materials spill kits will be kept onsite to respond to any spill of petroleum products.
- Areas temporarily disturbed during construction will be recontoured to pre-project conditions and reseeded with native seed to reduce erosion and facilitate revegetation.

6.0 REMOVAL AND FILL (BOX 4F – 4I)

Tables 4 through 6 summarize removal and fill activities associated with the project. Figure 4 illustrates the location of the project components relative to the waters of the U.S. and state mapped in the project area in December 2019.

Permanent removal activities in waters of the U.S. would be associated with removing the existing tide gate and widening the channels in Pastures 9 and 12. These activities would permanently impact up to 0.35 acre of aquatic resources (0.03 acre of tidal slough and 0.32 acre of wet pasture). Temporary removal activities in waters of the U.S. would be associated with excavating the channel interior of the MTR; removing existing crossing infrastructure; and removing muck from an existing ditch. These activities would temporarily impact 0.13 acre of aquatic resources (0.03 acre of channel and 0.10 acre of ditch). These impacts are considered temporary because disturbed areas would continue to function as ditches or channels immediately after the work is complete.

The project would also permanently fill up to 0.2 acre of aquatic resources (0.03 acre of tidal slough, 0.07 acre of channel, and 0.10 acre of ditch). Permanent fill would be associated with installation of the MTR and associated infrastructure (i.e., riprap); relocation of the interior channel crossing; installation of the new cross levee culverts; and fill of a ditch in Pasture 9. Temporary fill (0.31 acre) would be associated with placement of muck and spoils in wet pasture, where muck would be dried and repurposed as compacted fill in the ditch, and spoils would be spread thinly (less than 6-inches) and allowed to revegetate as wet pasture habitat.

Table 4. Summary of Impacts to Aquatic Resources

Permanent Fill		
Wetland / Water	**Acres**	**CY**
Tidal Slough	0.03	490
Channel	0.07	483
Ditch	0.10	417
TOTAL	**0.20**	**1390**
Permanent Excavation		
Wetland / Water	**Acres**	**CY**
Tidal Slough	0.03	623
Managed Wet Pasture	0.32	1022
TOTAL	**0.35**	**1645**
Temporary Disturbance		
Wetland / Water	**Acres**	**CY**
Managed Wet Pasture	0.31	771
Channel	0.03	141
Ditch	0.10	83
TOTAL	**0.44**	**995**

Table 5. Removal Volumes and Dimensions (Box 4f)

Aquatic Resource Type	Project Component	Removal Dimensions				Duration of Impact	Material
		Acres	SF	LF	CY		
Unnamed Tidal Slough	Remove Existing Tide Gate, Install MTR	0.03	1375	60	623	Permanent	Culvert, tide gate, salvaged rip rap, soil
Unnamed Channel	Excavate Channel Interior of MTR	0.01	400	20	22	Temporary[1]	Soil
	Remove Existing Ditch Crossing	0.02	800	80	119	Temporary[1]	Soil
Ditch	Excavate Muck	0.10	4500	450	83	Temporary[2]	Soil, Vegetation
Wet Pasture	Widen Channel (Pasture 12)	0.18	7748	--	605	Permanent	Soil
	Widen Channel (Pasture 9)	0.14	6240	--	417	Permanent	Soil
	TOTAL	**0.48**	**21063**	**610**	**1869**		

[1] Impact considered temporary because disturbed areas would continue to function as a channel or ditch as soon as proposed work is complete.

[2] Impact considered temporary because muck would be returned to ditch as compacted fill under project.

Table 6. Fill Volumes and Dimensions (Box 4h)

Aquatic Resource Type	Project Component	Removal Dimensions				Duration of Impact	Material
		Acres	SF	LF	CY		
Unnamed Tidal Slough	Install New MTR	0.03	1375	60	490	Permanent	MTR, soil, gravel, riprap
Unnamed Channel	Riprap on Bank of Interior Channel at MTR	0.007	300	20	33	Permanent	Riprap
	Relocate Interior Channel Crossing	0.05	2280	70	346	Permanent	Soil, gravel, culvert
	Install Cross Levee Culverts	0.01	70	14	103	Permanent	Soil, gravel, riprap, culvert
Ditch	Fill Linear Ditch	0.10	4500	450	417	Permanent	Soil, muck
Managed Wet Pasture	Ditch Muck Placement	0.10	4500	450	83	Temporary (6 months)[1]	Soil
	Spoils Placement	0.21	9148	--	688	Temporary (6 months)[1]	Soil
	TOTAL	**0.51**	**22173**	**1064**	**2161**		

[1] Impact considered temporary because disturbed areas would function as part of the managed wet pasture after the project is complete and site has revegetated, which is anticipated to take up to 6 months.

Table 7 summarizes aquatic resource types in the project area before and after Phase 1 and Phase 2 enhancement work. Differences in habitat types are attributable to enhancement activities that covert one aquatic resource type to another (e.g., placing fill in a ditch would convert that ditch to managed wet pasture). The approximate 3.5 acre increase in riparian forest / forested wetland reflects ongoing planting the riparian corridor along the main channel that abuts the middle pastures. Figures 5a-5c also illustrate the relative amount of fish-accessible habitat (i.e., water depth greater than 12-inches) available at two different inundation levels (2.5 feet and 5.0 feet) before and after the project is completed.

Table 7. Pre- and Post-Project Aquatic Resources

Habitat Type	Existing Acres	Post-Project Acres (Phase 1)	Post Project Acres (Phase 2)
Waters of the U.S.			
Managed Wet Pasture	94.7	91.4	91.2
Riparian Forest/Forested Wetland	9.3	12.7	12.7
Other Waters	7.2	7.7	8.0
Ditch	1.8	1.2	1.1
Subtotal	**113.0**	**112.9**	**112.9**
Built Environment			
Road	1.0	1.1	1.1
Levee	1.9	1.9	1.9
Subtotal	**2.9**	**3.0**	**3.0**
TOTAL (Project Area)	**115.9**	**115.9**	**115.9**

7.0 PROJECT SPECIFIC CRITERIA AND ALTERNATIVES ANALYSIS (BOX 7)

The criteria used to evaluate alternatives to the project include:

- The ability to meet the project purpose – i.e., the ability to enhance pasture conditions for wintering geese and other wildlife and to improve aquatic conditions for native fish by improving water management capabilities and habitat complexity in the Bay Unit.
- Potential impacts of enhancement activities on pasture conditions and pasture management, including the effects of saline water on pasture grasses and how changes in habitat types (e.g., ditch configurations, riparian plantings) would impact operations by lease farmers (e.g., the ability to mow).
- Implementation costs.
- Management and operational costs.

In May 2019, USFWS completed a pasture management review process for the Bay Unit (USFWS 2019). The review process was used to identify management issues and recommendations for improving pasture health and aquatic habitat conditions in the project area, consistent with the management mandates for the Refuge. The review process, which involved a two-day workshop attended by 23 participants from eight agencies and organizations, identified a suite of options for improving habitat conditions on site, including:

- Replacement of an existing tide gate to improve velocity, reduce siltation, and improve water quality. The review process recommended consideration of both an MTR and a side hinge tide gate.
- Repair or modification of two additional tides gates, including one west of Pasture 2 on Nestucca Bay, and one at the far northern end of the main channel west of the northern pastures, also on Nestucca Bay, and outside of Refuge property.
- Moving the tide gate on the Little Nestucca River to a different location to improve tidal flow.
- Removal of accumulated silt and vegetation from ditches and channels in the project area.
- Modified water level management in the spring and summer months to increase DO, allow nutrient flushing and reduce temperatures in channels. The review process noted that increases in water levels must not impact pasture grasses by introducing saline water into the root zone.
- Improving aquatic habitat complexity by installing large wood in main channels.
- Planting riparian vegetation along main channels to reduce sediment runoff and decrease water temperature through shading.
- Reconfiguring straight-line ditches in pastures to meandering swales to increase ecological function and habitat value, while maintaining pasture drainage and providing comparable pasture management efficiency.
- Improving flow between the northern and southern pastures by removing, breaching, or installing a culvert in the cross-levee between the two areas.
- Various pasture management techniques, such as lime application and establishment of more salt tolerate pasture grass species (e.g., desert saltgrass).

In 2020, USFWS and DU developed three conceptual alternatives that reflected various combinations of the management recommendations from the pasture management review process. Those alternatives included:

- Alternative 1. This alternative would replace the southern tide gate with a new MTR; removed accumulated sediment from channels and ditches; replace culverts under the farm access road in the northern pastures; and plant a 10-foot riparian buffer around the main channel in the middle pastures.
- Alternative 2. Similar to Alternative 1, this alternative would also replace the southern tide gate with an MTR, clean channels and ditches, and replace culverts under the farm access road in the northern pastures, but would expand the width of the riparian corridor around the main channel in the middle pastures to 30-40 feet. Alternative 2 would also modify the tide gate adjacent to Pasture 2 on Nestucca Bay to include a combination tide/screw gate; install a culvert with a screw gate in the cross-levee that separates the north and middle pastures; install large wood in the main channels; and complete a "moderate" amount of interior channel realignment (i.e., ditches modified to meandering swales) in both the north and middle pastures.

- Alternative 3. Similar to Alternative 2, this alternative would replace the southern tide gate with an MTR; modify the tide gate on Nestucca Bay to include a combination tide/screw gate; install a culvert in the cross levee between the north and middle pastures; install large wood in the main channels; clean channels and ditches; and replace culverts under the farm access road in the northern pastures. The riparian corridor around the main channel in the middle pastures would be increased to 100-feet wide, and interior channel reconfiguration in both the north and middle pastures would be the most extensive under Alternative 3.

The interior pasture improvements contemplated in Alternative 2 above are most representative of the Phase 1 project described in this permit application. The additional interior channel reconfigurations (swales replacing ditches) and wider riparian corridor associated with Alternative 3 were determined to not be feasible alternatives by USFWS because they would adversely impact the ability for the Refuge to efficiently manage pastures as habitat for wintering geese.

Finally, in 2021/2022, USFWS, DU and Northwest Hydraulic Consultants (NHC) completed additional hydraulic modeling of the project area to refine the design of the MTR and cross levee culverts. That analysis considered various sizes of culverts; dual or single culvert configurations; varying culvert invert elevations; and two set point elevations for the MTR. The proposed project design reflect the structure configurations that most cost effectively meet the ODFW criteria for fish passage, including velocity, water depth, and gate open time. The 2021 hydraulic analysis also determined that the tide gate adjacent to Pasture 2 was not well suited for replacement due to its location on an expansive mudflat and lack of channel connection to Nestucca Bay, which limits fish access and would require long-term maintenance to ensure adequate and ongoing operation.

8.0 NATIONWIDE PERMIT COMPLIANCE

This pre-construction notification (PCN) is provided in part to support USACE review and verification of the project under Nationwide Permit (NWP) 27. As described above, project-related work in waters of the U.S. would be associated with enhancing pasture conditions for wintering geese and other wildlife and improving aquatic conditions for native fish. The following addresses the ecological reference site and improved wetland function requirements provided in NWP 27, and well as the approach to ESA and NHPA compliance.

8.1 Ecological Reference Site

To be authorized under NWP 27, the project must be "planned, designed, and implemented so that it results in aquatic habitat that resembles an ecological reference. An ecological reference may be based on the characteristics of an intact aquatic habitat or riparian area of the same type that exists in the region…[or] a conceptual model developed from regional ecological knowledge of the target aquatic habitat type or riparian area."

Prior to reclamation, the project area was part of the estuarine marsh and tidelands associated with Nestucca Bay. Approximately 75-100 years ago, the project area was diked, ditched, and leveled to convert estuarine wetlands to lowland pasture. In the late 1980's, USFWS identified the Nestucca Bay estuary and associated diked former tidelands as important habitats for waterfowl and other wetland-dependent species due to commercial and residential encroachment into coastal wetlands (USFWS 2013). In 1991, the project area, which had been

operating as a dairy farm for many years, was acquired by USFWS. The property included diked wetland pastures used predominantly by dusky Canada geese, a species listed as sensitive and undergoing serious populations declines. In establishing the Refuge, USFWS stated it did not anticipate taking lands out of active dairy production as dairy farming practices were largely compatible with habitat management goals for wintering geese. As a result, enhancement of existing habitats at the Bay Unit is focused on maintaining or enhancing pasture conditions for wintering waterfowl. The use of an intact, natural estuarine wetland as an ecological reference for the habitat type targeted by this project is therefore not appropriate.

A more appropriate reference site comparison may come from considering other wetland areas specifically managed as habitat for wildlife – i.e., the target habitat type for this project. These areas – which are often located on Refuges and state-managed Wildlife Areas – are managed to maintain forage conditions most beneficial to migrating and wintering waterfowl, as well as other native wildlife. At the Bay Unit, these techniques include grazing though Cooperative Agricultural Agreements with local diary operators (mid-April through late October) and employing other practices (mowing, cleaning ditches) that support desired pasture conditions (USFWS 2013). The resulting wet pasture habitat is the habitat type targeted under the current project.

The Bay Unit has been managed by USFWS as pasture for about 30 years. The enhancement actions proposed under the project would maintain pasture conditions preferred by wintering geese, consistent with the management mandates for the Refuge, while enhancing aquatic and wetland habitat complexity for aquatic species and other wetland-dependent wildlife. As noted above, the pastures in the project area serve as an important overwintering site for various species of geese, as well as shorebirds and mammals that forage in marshes and wetter pastures. The channels in the Bay Unit provide habitat for fish, including Coho salmon, and riparian patches and valley forested wetlands support small mammals, amphibians, and reptiles (USFWS 2013), and would expand into the pastures after the Phase 2 project is complete (Figures 5a-5c). Project improvements in how water is conveyed through the project area and targeted actions to increase habitat complexity (including installation of swales and depressions in pastures, establishment of a riparian corridor, and installation of large wood in channels) will result in improved aquatic habitat conditions for native and migratory fish and wildlife, while maintaining pasture conditions preferred by wintering geese.

8.2 Aquatic Resource Functions

The purposes of the project are to enhance pasture conditions for wintering geese and other wildlife and to improve aquatic conditions for native fish. The installation of the MTR on the Little Nestucca River and culverts in the cross levee that currently isolates the north and middle pastures would notably improve fish access into and through the Bay Unit (Figures 5a-5c), and would benefit both water conveyance and water quality. Filling straight-line ditches in pastures and expanding the footprint of off channel habitat would increase ecological function and habitat value for both fish and wildlife, while maintaining pasture drainage and providing comparable pasture management efficiency. These long-term improvements in aquatic resource functions and services would offset the minimal permanent impacts to wetlands (0.32 ace) and waters (0.23 acre) and temporary impacts associated with project construction. As a result, the project is anticipated to increase the habitat value and water quality functions in the 116-acre project area, consistent with the terms and conditions of NWP 27.

8.2.1 On-and Off-Site Hydrologic Impacts of the Project

As described above, the project would install culverts in the cross levee that separate the north and middle pastures. The culverts would allow water to flow freely in both directions through a continuous drainage extending from the MTR on the Little Nestucca River to the tide gate located 4000 feet north of the project area boundary on private property / Nestucca Bay. The addition of these culverts would improve drainage and floodplain connectivity from the north when the MTR is open but would not alter minimum water surface elevations in the channel, which would be controlled by water levels on the Little Nestucca River at around 2.5 feet (see Section 4.2). The addition of the MTR and cross levee culverts would also not impact high water levels in or north of the project area when the tide gate is closed or during high tide events. In those instances, surface and ground water flows would equalize in the channel and inundate pastures at levels similar to current conditions (but would drain more quickly when the MTR opens on receding tides). It would also allow for recharging the channels during the incoming tide when the MTR is open. The MTR would be managed at a level that prevents water levels from impacting adjacent pastures.

Because proposed infrastructure would not impact minimum water surface elevations and would allow for comparable high water events when the MTR is closed, it is not anticipated the project would adversely impact the hydrologic condition of wetland vegetation in or upstream of the project area. Wetlands would continue to receive direct precipitation and ground water inputs year round and would have access to a comparable level of water in drainages during the driest summer months. Although project infrastructure would allow surface water to drain from the north pastures more quickly, precipitation and other surface water flow would remain onsite when the MTR is closed and/or during other high water events. Refer to Figures 5a-5c for a depiction of surface water inundation at elevation 2.5 feet (minimum water surface elevation) (pre- and post-project conditions) and elevation 5.0 (the elevation when water begins to spread into fields) (post-project conditions).

8.3 ESA and Magnuson-Stevens Compliance

Three federally-listed bird species have the potential to occur in the project vicinity – marbled murrelet (*Brachyramphus marmoratus*; FT); northern spotted owl (*Strix occidentalis caurina*); FT); and western snowy plover (*Charadrius nivosus*; FT). No critical habitat for these species is designated in the project area. The project would have no effect on these species because the project area does not support, and would have no direct or indirect impact on, their preferred habitats (i.e., late-seral forests [murrelet and spotted owl] and open sand areas for foraging and nesting [plover]). In addition, project construction would not occur proximate to their preferred habitats so construction noise and/or visual disturbances would not directly or indirectly impact these species (Moroney pers. comm. 2021).

One federally threatened fish species managed by NMFS, Oregon Coast Coho Salmon, is known to occur in Nestucca Bay, the Little Nestucca River, and within the channels associated with the Bay Unit / project area. The project area and vicinity also support essential fish habitat (EFH) for federally managed fish stocks described in three Fishery Management Plans: Pacific Coast salmon, Coastal Pelagic Species and Pacific Coast Groundfish.

The proposed aquatic enhancement activities associated with the Phase 2 project would require operation of heavy equipment in channels to install the MTR and (minimally) to install the cross levee culverts and widen channels in the middle pastures. Fish in the vicinity of these activities could be directly injured, killed or displaced

by equipment, or adversely impacted by temporary degradation of water quality if sediment or other construction materials are mobilized to surface waters. In addition, fish may become stranded during work area isolation activities or injured or killed during relocation.

The 2018 Programmatic Biological Opinion and Essential Fish Habitat Assessment for the Tidal Area Restoration Program (TARP) (WCR-2018-8958) provides incidental take coverage for federally-listed salmonids resulting from certain restoration actions in tidally influenced areas of the Oregon Coast. Restoration actions permitted by USACE under NWP 27 may be appended to the Programmatic BO if the stated goal of the project is to provide long-term benefits to covered species and their critical habitat; if the project meets the definition of one or more of the categories of activities covered in TARP; and if the project will implement all applicable general and category-specific project design criteria (PDC) provided in the consultation.

As described above, the aquatic components of the Phase 2 project are proposed to improve aquatic conditions for native fish, including salmonids, and are anticipated to verified by USACE under NWP 27. In addition, all of the proposed enhancement work is categorically included as a covered activity in TARP:

- **Category 1 – Tide/Flood Gate Removal, Replacement or Retrofit.** The existing tide gate on the Little Nestucca River would be replaced with an MTR. As described in NHC (2022), the MTR would meet all ODFW and NMFS criteria for fish passage, and would benefit both fish passage (i.e., lowered culvert velocities, increased gate open time) and habitat conditions in channels (increased depth and extent of tidal channel inundation; see Figure 5a-5c).
- **Category 2 – Set Back or Removal of Dikes and Levees.** A portion of a levee that hydraulically separates the north and middle pastures would be removed and replaced with dual culverts to allow free flow of water into and north of the Bay Unit. Similar to the MTR, the new culverts would meet all ODFW and NMFS criteria for fish passage and would increase fish access to channels adjacent to the north pastures and extending north / east outside of Refuge boundaries.
- **Category 3 - Large Wood.** One additional large wood structure would be placed in a swale constructed in Phase 1. The wood would be located to increase channel complexity and floodplain function in an area where structure is currently lacking. The structure would comprise less than 25% of the bankfull area of the associated swale.
- **Category 6 – Off- and Side-Channel Habitat**. Channel widening in Pastures 9 and 12 would be used to expand side-channel habitats near main drainages and swales constructed during Phase 1 work.
- **Category 11 – Wetland Restoration**. Fill of an existing linear ditch would increase the complexity of adjacent wet pasture habitat and simplify pasture management operations.

All applicable General Construction and Category-Specific PDC would be implemented by the Project.

8.4 NHPA Compliance

In March 2021, USFWS completed a review of the project in compliance with NHPA Section 106 and determined the project would have no potential to cause effects on historic properties (Raymond pers. comm. 2021). In addition, USFWS consulted with the Confederated Tribes of Siletz Indians (Siletz) and the

Confederated Tribes of Grand Ronde (CTGR). At the request of the Siletz Tribe, an archaeological monitor will be present during ground disturbing activities and the Siletz Cultural Resource Director will provide training to field crews prior to implementation. A copy of the USFWS NHPA determination is included as an attachment to this permit application package.

9.0 LITERATURE CITED

Absher, Sarah, Planning Director. 2022. Land Use Compatibility Statement signed by Absher, Tillamook County, to Kelly Moroney, USFWS, indicating project is not subject to local land use review. March 11.

Moroney, Kelly, Nestucca Bay NWR Complex Manager. 2021. Phone conversation with Moroney, USFWS, and April Zohn, Ducks Unlimited, regarding potential project effects on USFWS-jurisdictional ESA-listed species. March 22.

Natural Resources Conservation Service (NRCS). 2022. Agricultural Applied Climate Information System (AgACIS) - WETS Table Station Cloverdale, Oregon (Station 351682) (1971-2000). Available at: http://agacis.rcc-acis.org/. Accessed: May 25.

Northwest Hydraulic Consultants (NHC). 2022. Bay Unit Enhancement, Nestucca NWR – Phase 2 Hydraulic Modeling Analysis (Revision 2). March 15.

Raymond, Anan, Regional Archaeologist. 2021. Letter from Raymond, USFWS, to Kelly Moroney, USFWS, regarding NHPA Section 106 compliance for the Nestucca Bay NWR Pasture Project, Tillamook County, Oregon. March 23.

U.S. Fish and Wildlife Service (USFWS). 2019. Nestucca Bay National Wildlife Refuge Pasture Management Review. May.

_____. 2013. Nestucca Bay National Wildlife Refuge Comprehensive Conservation Plan. Prepared by the Oregon Coast NWR Complex and Pacific Northwest Planning Team. April.

Figures

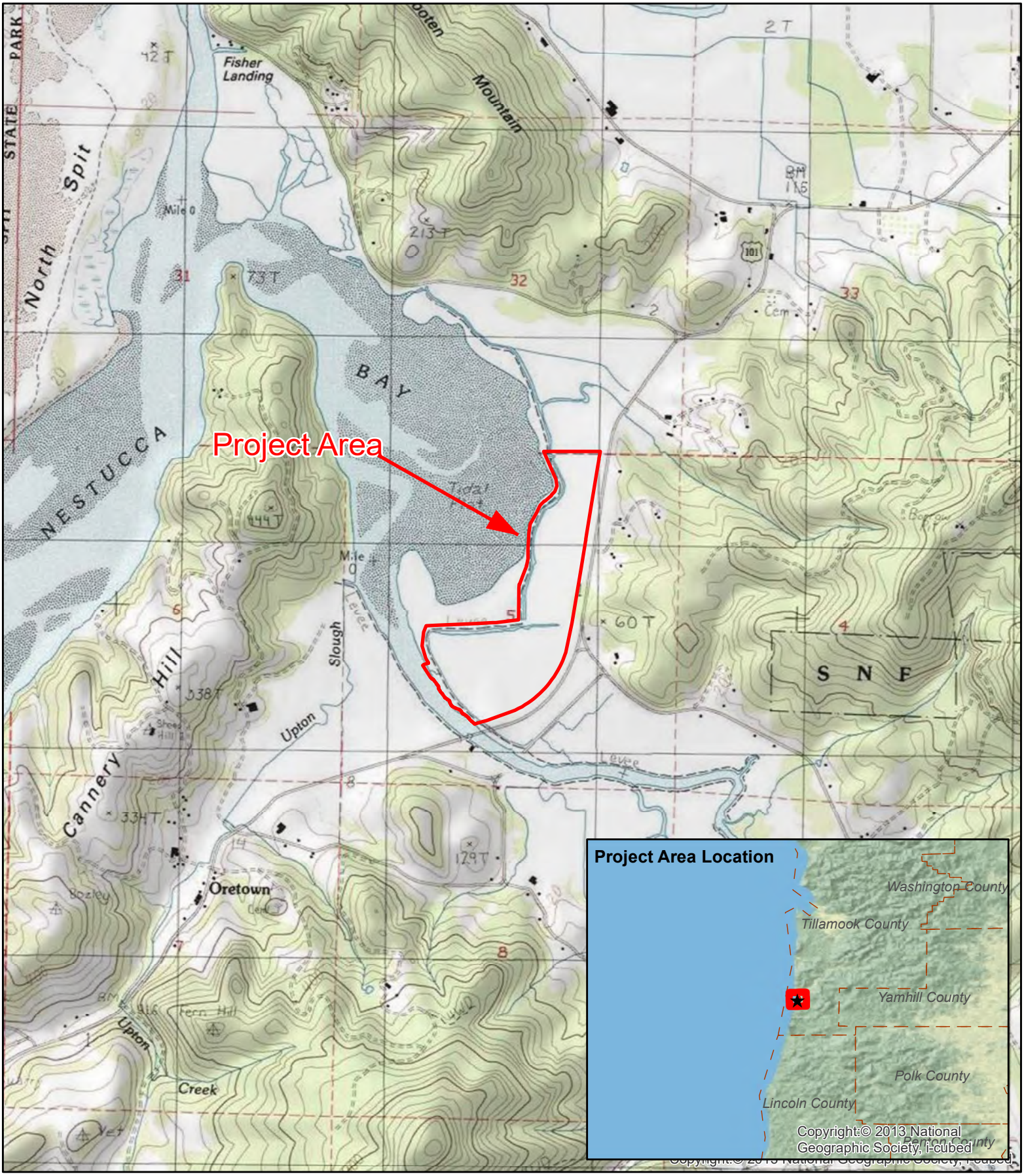

Figure 1. Project Vicinity Map

Bay Unit Tide Gate Replacement and Wet Pasture Enhancement Project

USACE No.:
Applicant Name: U.S. Fish and Wildlife Service
Location: Tillamook County, OR
Lat/Long: 45.16825°, -123.934129°
Section / Township / Range: S 5 / T5S / R10W & S 32 / T4S / R10W
Prepared by: Ducks Unlimited, Inc.
Date of Map: 11/27/19

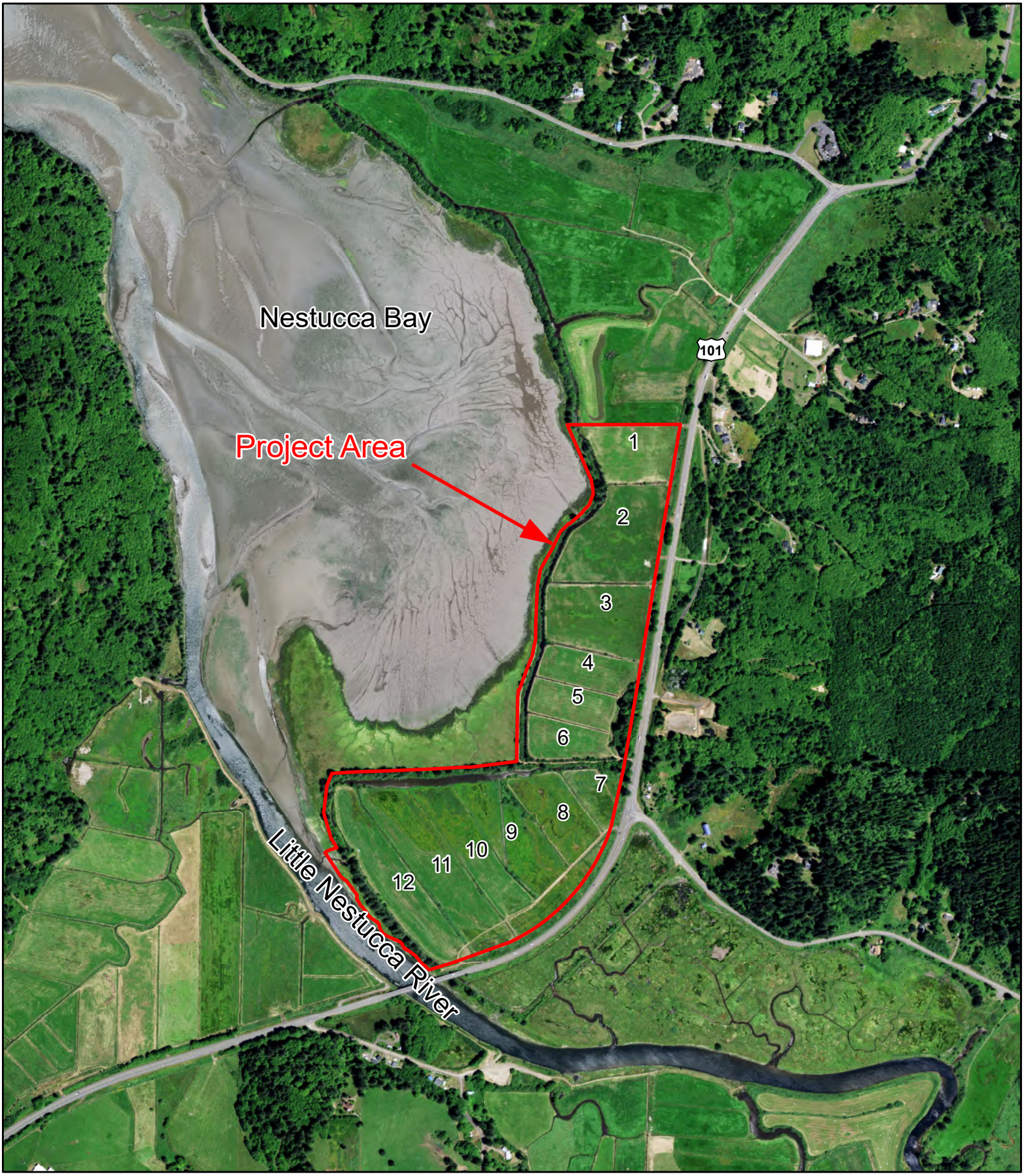

Figure 2. Aerial Photo

Bay Unit Tide Gate Replacement and Wet Pasture Enhancement Project

USACE No.:
Applicant Name: U.S. Fish and Wildlife Service
Location: Tillamook County, OR
Lat/Long: 45.16825°, -123.934129°
Section / Township / Range: S 5 / T5S / R10W & S 32 / T4S / R10W
Prepared by: Ducks Unlimited, Inc.
Date of Map: 12/18/19

N

0 400 800

Feet

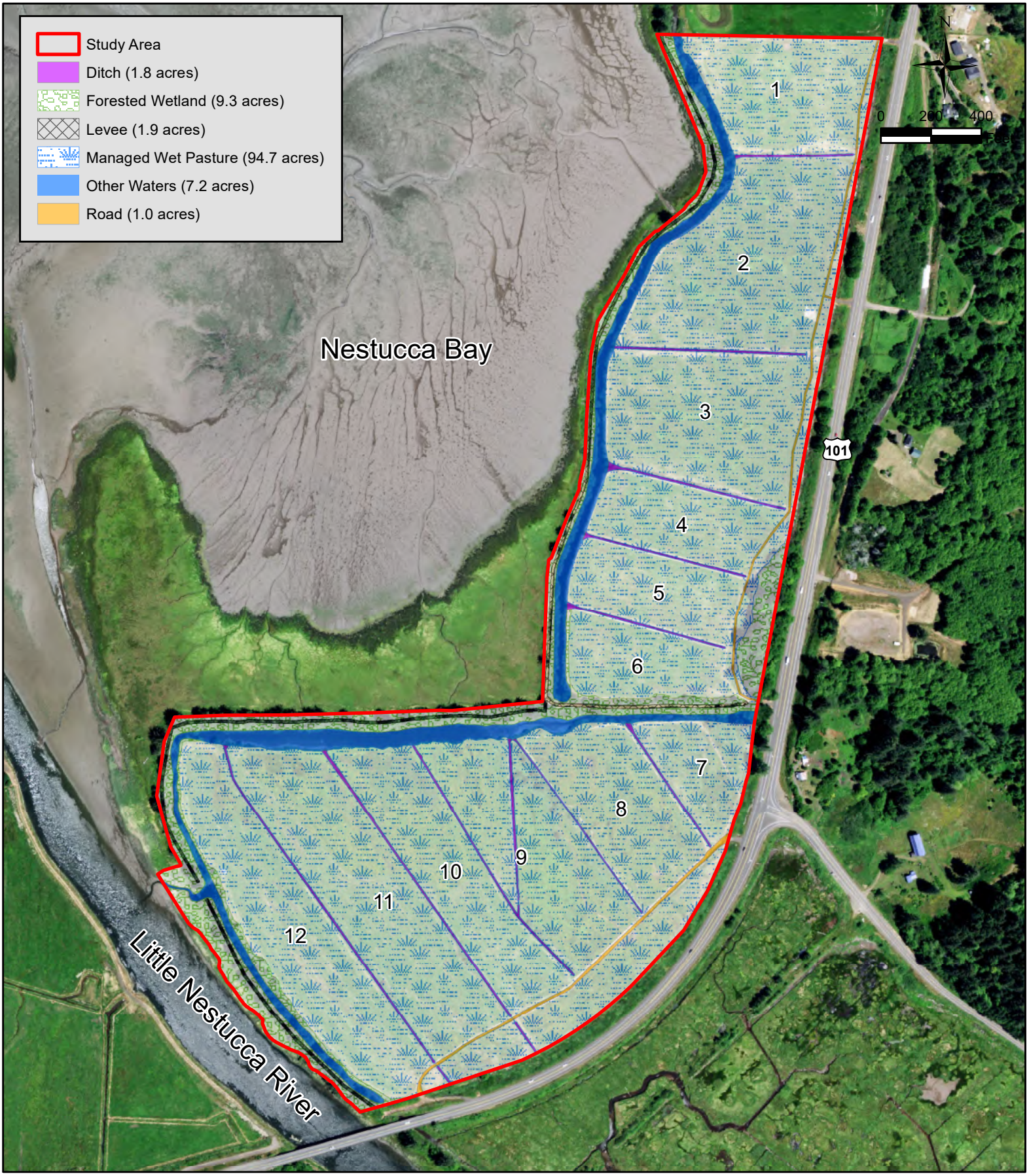

Figure 3 Wetland Delineation Map

Bay Unit Tide Gate Replacement and Wet Pasture Enhancement Project

USACE No.:
Applicant Name: U.S. Fish and Wildlife Service
Location: Tillamook County, OR
Lat/Long: 45.16825°, -123.934129°
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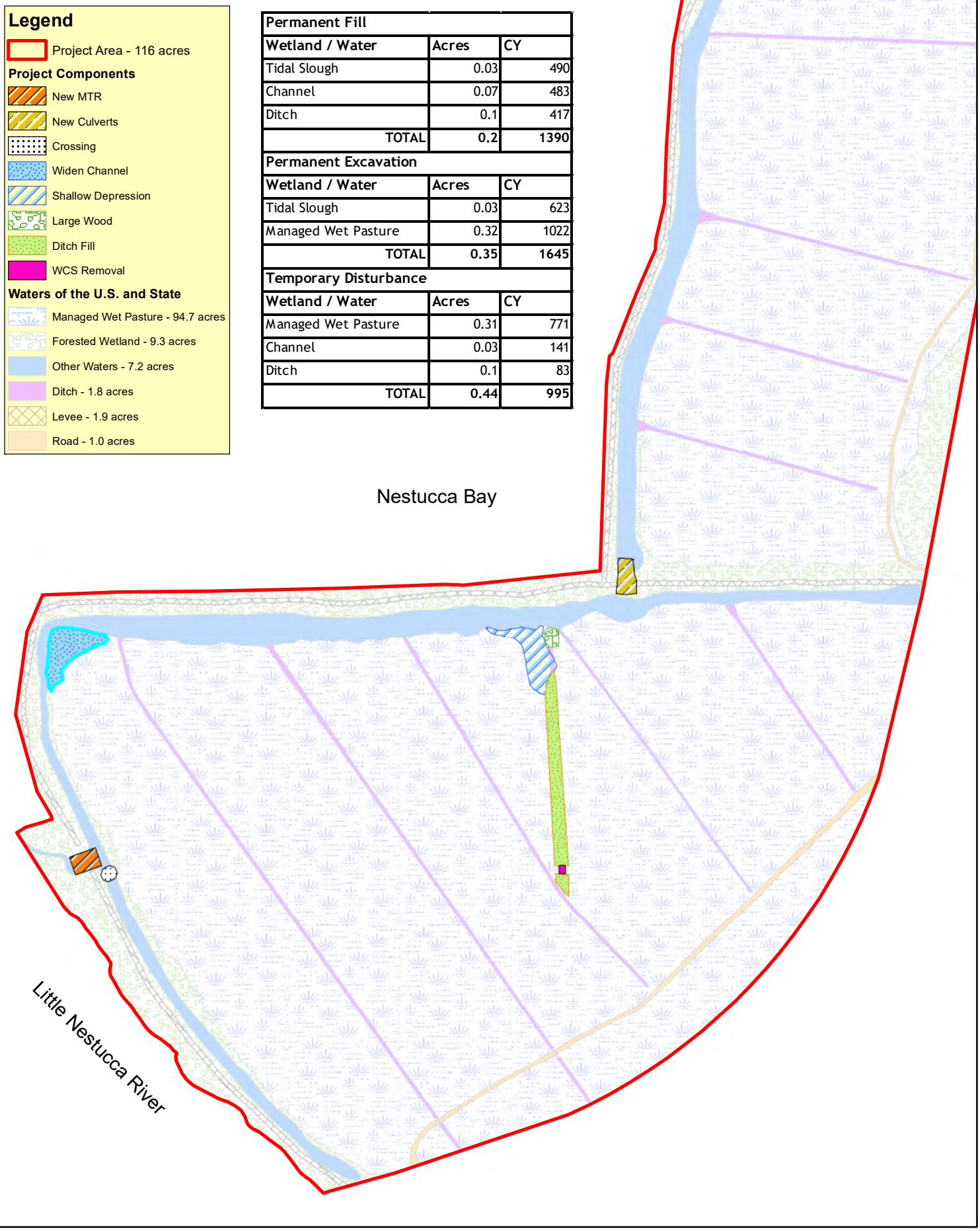
Prepared by: Ducks Unlimited, Inc.
Date of Map: 02/03/21



Permanent Fill		
Wetland / Water	**Acres**	**CY**
Tidal Slough	0.03	490
Channel	0.07	483
Ditch	0.1	417
TOTAL	**0.2**	**1390**

Permanent Excavation		
Wetland / Water	**Acres**	**CY**
Tidal Slough	0.03	623
Managed Wet Pasture	0.32	1022
TOTAL	**0.35**	**1645**

Temporary Disturbance		
Wetland / Water	**Acres**	**CY**
Managed Wet Pasture	0.31	771
Channel	0.03	141
Ditch	0.1	83
TOTAL	**0.44**	**995**

Figure 4. Impacts to Waters of the U.S. and State
Bay Unit Tidegate Replacement and Wet Pasture Enhancement Project (Phase 2)

USACE No.:
Applicant Name: U.S. Fish and Wildlife Service
Location: Tillamook County, OR
Lat/Long: 45.16825°, -123.934129°
Section / Township / Range: S 5 / T5S / R10W & S 32 / T4S / R10W
Prepared by: Ducks Unlimited, Inc.
Date of Map: 3/7/22

LEGEND

INUNDATION, WATER DEPTH > 12", SUITABLE FOR SALMONIDS. AREA = 0.04 ACRES

INUNDATION, WATER DEPTH < 12", UNSUITABLE FOR SALMONIDS.

0 750 1500 FEET

SCALE

Figure 5a.

Unauthorized Changes & Uses

The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes must be in writing and must be approved by the preparer of these plans.

DUCKS UNLIMITED

PROJECT NO. US-OR-23-7 DATE: 3/24/2022	DESIGNED BY: SWL
BAY UNIT ENHANCEMENT NESTUCCA NWR PHASE I & II	DRAWN BY: RGR SURVEYED BY: SWL CHECKED BY: DU
PRE PROJECT INUNDATION MAP	SHEET NO. 1 of 3

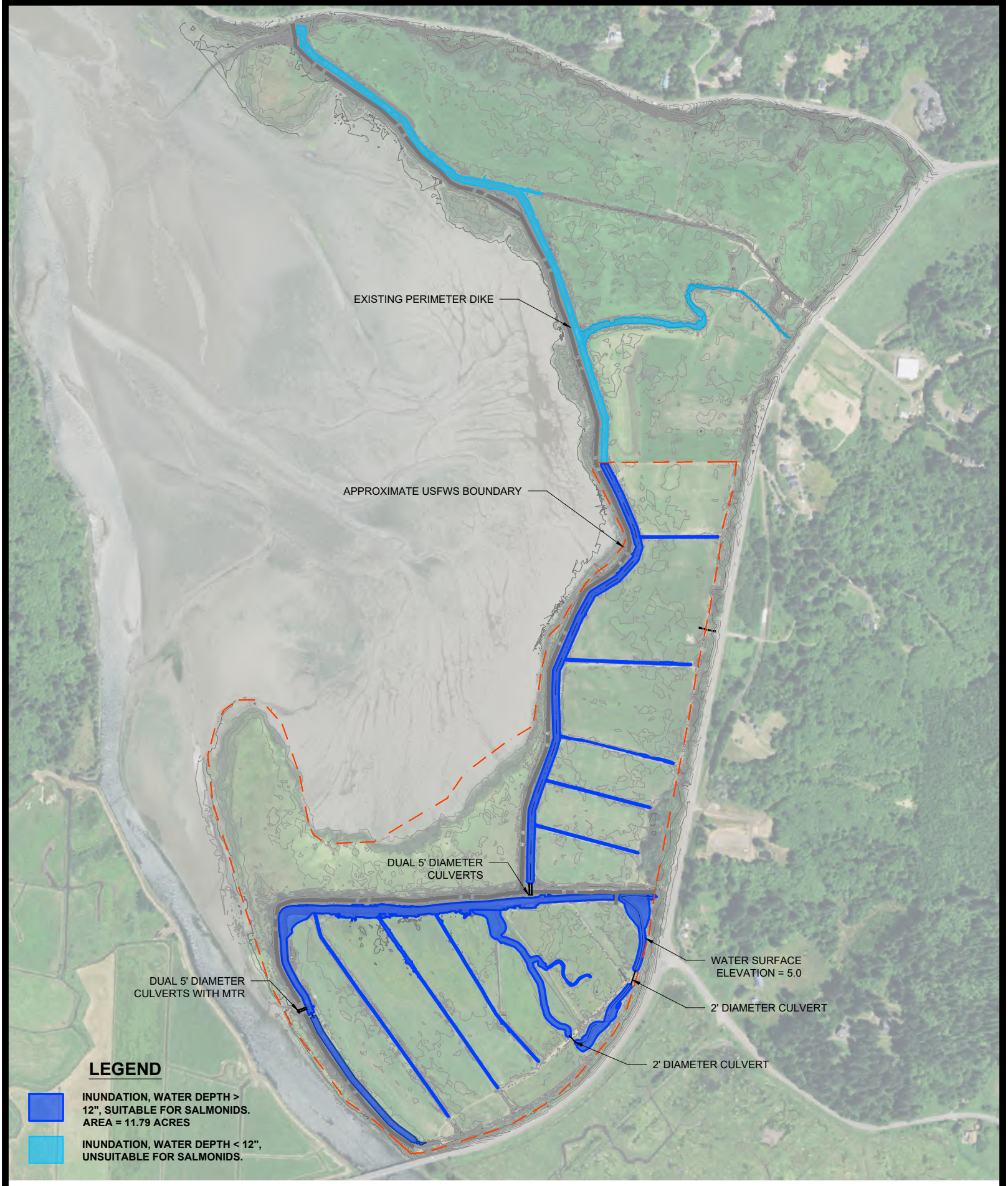
Figure 5b.

Unauthorized Changes & Uses

The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes must be in writing and must be approved by the preparer of these plans.

DUCKS UNLIMITED

PROJECT NO. US-OR-23-7 DATE: 3/24/2022	DESIGNED BY: SWL
BAY UNIT ENHANCEMENT NESTUCCA NWR PHASE I & II	DRAWN BY: RGR SURVEYED BY: SWL CHECKED BY: DU
POST PROJECT INUNDATION MAP	SHEET NO. 2 of 3



0 750 1500 FEET

SCALE

Unauthorized Changes & Uses

The engineer preparing these plans will not be responsible for, or liable for, unauthorized changes to or uses of these plans. All changes must be in writing and must be approved by the preparer of these plans.

Figure 5c.

DUCKS UNLIMITED

PROJECT NO. US-OR-23-7 DATE: 3/24/2022	DESIGNED BY: SWL
BAY UNIT ENHANCEMENT NESTUCCA NWR PHASE I & II	DRAWN BY: RGR SURVEYED BY: SWL CHECKED BY: DU
POST PROJECT INUNDATION MAP	SHEET NO. 3 of 3