Supplement Analysis
for the
Columbia Estuary Ecosystem Restoration EA
(DOE/EA-2006/SA-6)

South Bachelor Island Restoration
BPA project number 2010-070-00
BPA contract number 74314 REL 41

Bonneville Power Administration
Department of Energy

Introduction

In July 2016, Bonneville Power Administration (BPA) and the U.S. Army Corps of Engineers (Corps) completed the Columbia Estuary Ecosystem Restoration Program Environmental Assessment (DOE/EA-2006) (Programmatic Estuary EA). The Programmatic Estuary EA analyzed the potential impacts of restoration actions in the Columbia River estuary that occur under the BPA-Corps Columbia Estuary Ecosystem Restoration Program to support more efficient environmental review of site-specific restoration projects. The program was instituted to undertake the activities necessary to evaluate, protect, monitor, and restore fish and wildlife habitat in the estuary. The Programmatic Estuary EA facilitates the environmental review of routine actions with well-understood and predictable environmental impacts common to restoration projects in tidal and riverine systems.

Consistent with the Programmatic Estuary EA, this supplement analysis (SA) analyzes the proposed South Bachelor Island restoration actions (SBI project) that would create more natural habitat within the Columbia River estuary on South Bachelor Island (SBI) in Clark County, Washington. The SA was prepared to analyze the site-specific impacts of the proposed SBI project and determine if the project is within the scope of the analysis considered in the Programmatic Estuary EA. It also evaluates whether the proposed project represents significant new circumstances or information relevant to environmental concerns. The findings of this supplement analysis determine whether additional NEPA analysis is needed pursuant to 40 Code of Federal Regulations (CFR) § 1502.9(c).

Proposed Action

BPA proposes to fund Washington Department of Fish and Wildlife (WDFW) to implement the second phase of a restoration project on the southwest side of Bachelor Island along the Columbia River at River Mile (RM) 90 in Clark County, Washington. Bachelor Island is located on the east bank of the Columbia River, directly across from Sauvie Island and immediately north of United States Fish and Wildlife Service (USFWS) Ridgefield National Wildlife Refuge (RNWR), in what has been labeled 'Reach F' of the Columbia River Estuary (CRE). Reach F is shown in Figure 1, where the proposed project area is identified, and the matrix of adjacent land ownership is overlaid.

The first phase of the project was completed in 2018 and was funded by the Washington Department of Natural Resources (WDNR) as part of the State's obligation to mitigate the impacts of dredge material to

State Owned Aquatic Lands (SOAL). The SBI project is located on SOAL and managed by WDNR, who wholly funded the first phase of this project in 2018. In the first phase, 20,000 cubic yards (CY) of material was removed from the proposed channel and placed in Fill Areas A and B (Figure 2). The SBI project area can be accessed by boat from the Columbia River or by walking in from the USFWS RNWR—Bachelor Island Unit.

When completed, the SBI project would restore tidal processes typical of estuarine shorelines, and provide shallow water rearing and foraging habitat to juvenile salmonids. The SBI site has been identified as a candidate for restoration because the area historically provided access to juvenile salmonids in the Lower Columbia estuary, and there is an opportunity to restore that access. Juvenile Chinook salmon are the primary target species for this project, as they are the most dependent on shallow water habitats, and have the longest residence in the estuary where they reside and feed extensively in shallow, tidal-fluvial waters during their transition from freshwater to marine environments. A major function of shallow water habitats for small size classes (fry, fingerlings) is to support their feeding and growth, and high growth rates can help individuals avoid some of the predation these fish experience due to their small size. The project would include excavation of a channel through previously deposited dredge materials to connect existing emergent marsh wetlands to the Columbia River main stem. It is anticipated that restoring tidal hydrology to existing emergent marsh wetlands would help reduce infestation of invasive plant and fish species, and provide additional estuarine habitat function. The project would also address the habitat lost in the estuary as a result of operation of the Federal Columbia River Power System.

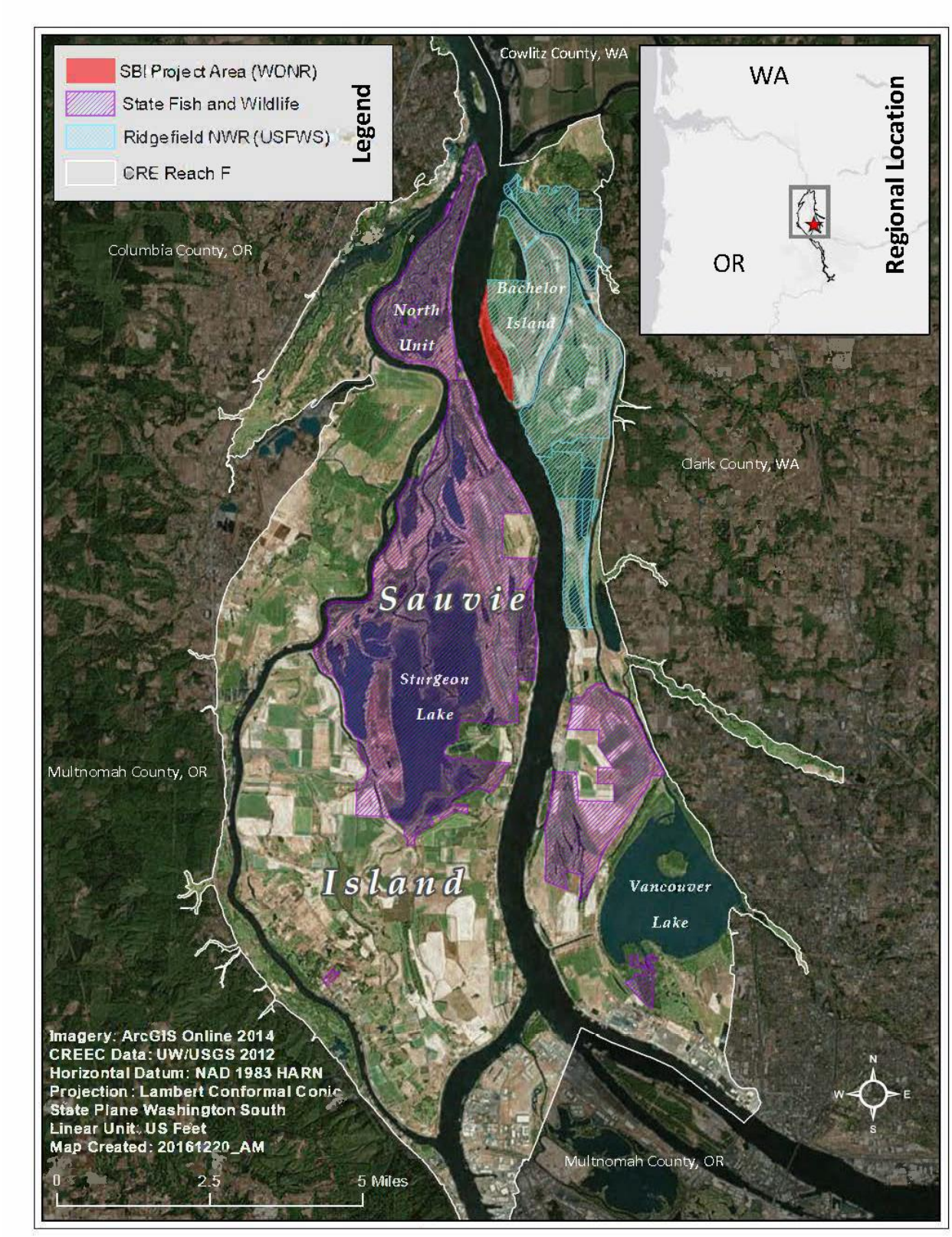

Figure 1: South Bachelor Island (in red) and adjacent land ownership in the Columbia River Estuary (CRE) Reach F

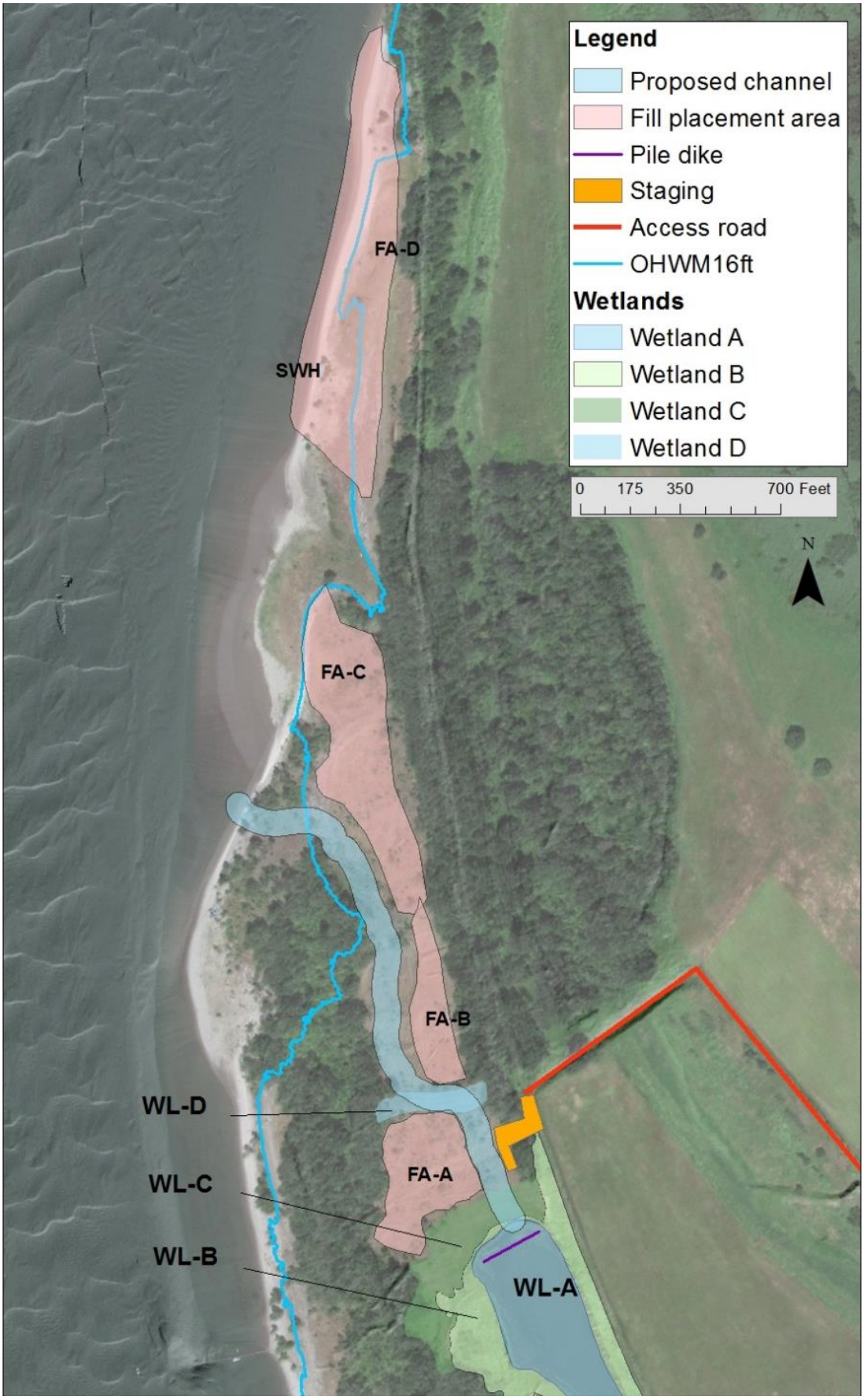

Figure 2: Proposed action of the South Bachelor Island Project (WDFW). Future plantings would take place within the delineated fill placement areas.

Currently, access to habitat for juvenile salmonids at the SBI project site is severely restricted. Salmonids can only access the interior wetlands during rare high water events, when the main stem water elevation reaches above 22 ft. (approximately once every 30 years). Historically, SBI provided shallow water channel habitat for migrating juvenile salmonids and other native aquatic and terrestrial species; but this environment changed with the installation of pile dikes and subsequent placing of dredge material from the Columbia River onto SBI by the Corps. Historical records indicate that pile dikes were proposed in 1918, and sediment placement began sometime between that year and the 1930s. It is estimated that approximately 1.5 million CY of dredge material was deposited along the shore from 1951 to 1975; though the exact amount of material has not been quantified. As shown in Figure 3, the time stamped photographs depict the growth of the island in the proposed project area. Dredge placement ceased in 1975 when the outer shoreline of the island was completely filled, and the Corps determined the site to be at capacity for sediment deposition. The SBI project would restore historical conditions by connecting the isolated and manmade pond (locally named Turtle Lake) to be tidally reactive with the Columbia River main stem. The Corps has been involved in the design and permitting of this project, and is not expected to resume deposition of dredge materials in this area at any point in the future.

The SBI project would reconnect 39 acres of existing wetlands to the Columbia River, and provide secure ingress and egress to functional intertidal wetland habitat and marshlands. To restore that connection, a meandering backwater tidal channel would be created to provide year-round access for juvenile salmonids. This wetland habitat would be self-sustaining and fully influenced by tidal and fluvial forces on the main stem Columbia River. With the assistance of a local volunteer group *Friends of the Refuge*, WDFW also plans to seed the project area with native grasses and plant willow cuttings once the area

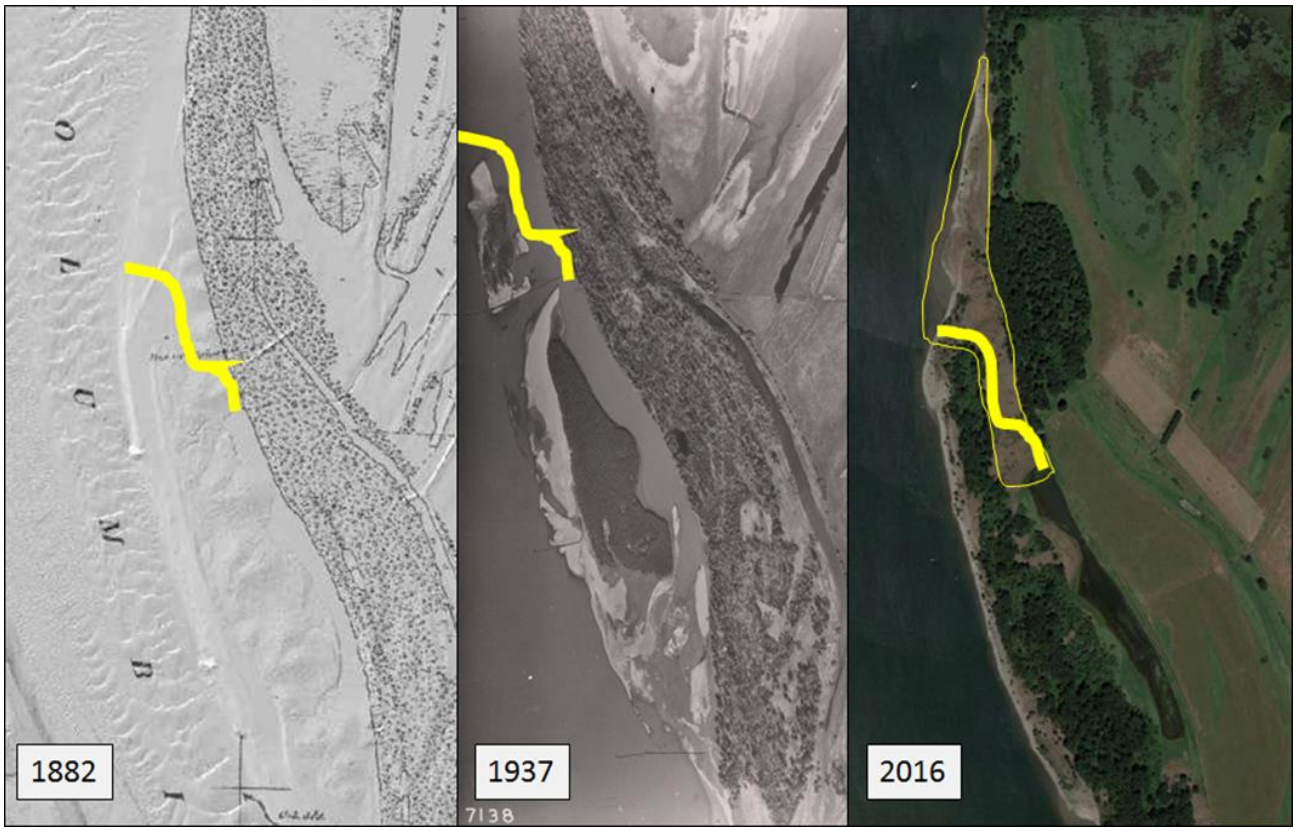

Figure 3: The above sequence shows the change in this site over the last nearly 150 years, overlaid with the proposed channel and in the last photo, the approximate boundary of the project area.

has had sufficient interaction with the Columbia River main stem, and conditions permit for successful vegetation efforts. BPA does not intend to provide funding for this component of the proposal at this time; however, this activity has been included as it is a connected action likely to occur in years following implementation.

Proposed restoration activities are shown in Figure 2, and historical maps of the SBI project area are presented in Figure 3 to show the development of the site pre- and post-dredge sediment deposition. The proposed channel excavation is represented by the yellow line drawing. The proposed project includes the following primary components, which are described in more detail following maps of the proposed action:

1. Site access and staging
2. Reconnect existing wetlands to the Columbia River
3. Create shoreline and shallow water habitat
4. Pile dike removal
5. Native vegetation enhancement
6. Long-term monitoring

Site access and staging

The project area would be accessed via an existing gravel road located west of the RNWR Shop on Bachelor Island, or via barge from the Columbia River main stem. Due to ongoing work on the nearby Lake River Bridge, road access would be limited and most equipment would be transported via barge. If the road is used for project access, equipment would travel across an earthen berm to the site at the end of the existing road. Heavy equipment would be staged and materials stockpiled on dredge material near the area of channel excavation and fill (Figure 2). Prior to construction, the boundaries of all the wetlands and project area would be clearly marked. All equipment and personnel would remain within the project boundaries.

Reconnect existing wetlands to the Columbia River

Construction crews would excavate a 2,300 ft. long by 100 ft. wide channel (7.9 ac) to an elevation of 5 feet NAVD88[1]. A 30 ft. wide channel bottom is expected to form a low marsh and re-open 39 acres of off-channel habitat extending from the northern end of existing open water wetlands to the Columbia River. An estimated total of 100,000 CY would be moved to create the channel. Dredged material would be placed onto the remaining un-vegetated areas north of the excavated channel to fill areas C and D in Figure 2. Less than 65,000 CY of sand would be excavated and placed below the ordinary high water (OHW) of the river (~6.6 ac) north of the proposed channel, or until the fill areas reach capacity. The remaining portion of the total dredge material (up to 50,000 CY) excavated to create the channel would be returned to the river to re-create shallow water habitat that has been lost at the channel confluence with the river. The dredge material from channel excavation would also be used for shallow water habitat creation adjacent to the channel confluence area and used to fill low depression areas to grade relative elevations and further expand the area of inundation. The movement of additional dredge material is anticipated to have positive impacts to the shoreline habitat quality of other restoration sites downstream in the estuary, and WDFW would continue to work closely with the Corps to coordinate

[1] The North American Vertical Datum of 1988 (NAVD 88) is the vertical control datum of orthometric height established for vertical control surveying in the United States of America based upon the General Adjustment of the North American Datum of 1988.

and implement a long-term monitoring plan of South Bachelor Island and the surrounding sites. The remaining material would be placed onsite on adjacent un-vegetated dredge-sediment areas.

Excavation and sediment transport would be performed by heavy machinery when conditions are dry in the summer and early fall 2019 with a professional team of third–party contractors. Excavation work would require the following equipment where appropriate: barge (materials and equipment transportation), industrial scrapers[2], 290 or 490 excavator, D85 bulldozer, and haul trucks. The channel would be excavated starting at the north end of Turtle Lake, where a 5 foot wide invert would be created two feet below the mean low water elevation. Excavation would progress within the proposed channel (Figure 2) towards the main stem Columbia River. The channel would remain dry until the Columbia River water levels rise later on in the season and water is naturally pushed into Turtle Lake and the surrounding wetlands. By maintaining a higher elevation for the channel, Turtle Lake would not be drained and there would be no de-watering or salvage of the existing flora and fauna.

Create shoreline and shallow water habitat

Some of the excavated dredge material, depending on the relative fill of placement areas, would be placed downstream of the new channel along the shoreline of the Columbia River. The intent is for a portion of the surplus material to remain in place, and some to be mobilized by high river flows for downstream benefit of other sites in the estuary[3]. This proposal has been negotiated between WDFW and the Corps in hopes that the mobilized material would serve to promote and extend shallow water habitat along the shoreline. Shallow water habitat provides nutrients, food supply, and refuge from predators and high-river flows, and is key habitat for out-migrating salmonids and other aquatic species.

Piling removal

A pile dike structure that was installed by the Corps in the early 1930s to hold dredge material in place is located at the north end of the existing open water wetland area (Figure 4), and would be partially removed where the invert to the channel would be located. The structure consists of approximately 120 derelict untreated pilings, which were constructed prior to dredge spoils placement. An excavator located on dry land would be used to pull approximately one-third of the pilings from the wetland.

[2] A scraper or wheel-tractor scraper is a piece of heavy equipment used in earthmoving and excavation. The rear part of the scraper has a vertically moveable hopper with a sharp horizontal front edge which can be raised or lowered. The front edge cuts into the soil and fills the hopper. When the hopper is full it is raised, closed, and the scraper can transport its load to the fill area where it is dumped.

[3] Downstream off the main stem of the Columbia River, the Lewis River suffers from a lack of sediment available for similar shoreline water habitat sites, and WDFW with the Corps would incorporate sites on the Lewis River in the long-term monitoring plan of this project.

Figure 4: Photograph of pile dikes proposed for partial removal.

Native vegetation establishment

Restoration and enhancement of native vegetation along the new tidal channel, and other disturbed areas is incorporated into the project concept; however, BPA is not proposing to fund vegetation planting at this time. Volunteers would be used for revegetation efforts 1-5 years after project completion. Based on the plans, about eight acres of channel shoreline vegetation would be established post-construction.

Long term monitoring

The SBI project is one of several experimental projects designed to address sediment placement throughout the estuary for the recovery of critical transitory habitat for salmonids, and as such would be closely monitored after the completion of the project to measure sediment deposition and transportation from the site. WDFW and the Corps have an existing team to manage the effectiveness monitoring of the SBI project, and the Corps' Woodland Island Project[4], with the objective to characterize changes to the following resources post-implementation: structural landforms, substrate and channel sediments, benthic and epibenthic communities, native and non-native vegetation, fish, native birds, and changes in hydrography. For each of these monitoring categories, indicators and outputs have been identified, as well as the lead organization for data collection. Monitoring for the SBI project would be carried out by WDFW, the Corps, WDNR, and the Columbia River Estuary Study Task

[4] The Woodland Island Project has been proposed by the Corps to be constructed in fall 2019. The project would place and shape dredged sand into complex habitat features and effectively enhance side-channel habitat to shallow-water, wetland habitat (sandy beach up to scrub shrub).

Force (CREST). Funding for long-term monitoring of the SBI project would come from multiple sources, with an undetermined portion thereof provided by BPA contributing to these costs.

The SBI project is also consistent with the following CRE management actions from the *Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead*[5] outlined in Table 1 below. Monitoring of the SBI project would be comprehensive and quantify changes or improvements according to CRE management actions as well.

Table 1: CRE Project Categories applicable to the SBI project

Project Category	Action Description
CRE 1.4	Restore and maintain ecological benefits in riparian areas, and maintain vegetation on dikes and levees
CRE 3.2	Protect or enhance instream flows to support fish and wildlife
CRE 6.2	Beneficial use of dredged materials, including notching or scraping-down of existing materials; also includes placement of new materials for habitat enhancement or creation
CRE 9.4	Restore degraded off-channel habitats with high intrinsic potential for increasing habitat quality
CRE 10.1	Improve access to off-channel habitats by breaching, lowering the elevation, or relocating dikes and levees to restore tidal marsh and shallow water habitats and tidal channels
CRE 15.3	Implement projects to reduce the introduction and spread of invasive plants

Public Scoping, Comments, and Responses

BPA did not conduct independent public scoping for this project due to the project's consistency with the analysis provided in the Estuary EA, which was finalized in 2016. WDFW has conducted public meetings and meetings with landholding agencies, and the project is fully supported by local stakeholders including: WDFW, WDNR, the Corps, the Bachelor Island Conservation Farm, the Canvasback Lake Duck Club, and USFWS at RNWR. For WDFW's compliance with the State Environmental Policy Act (SEPA) process for Washington, WDFW published a public press release in *The Columbian* newspaper and others that described this work as part of the larger (both phases) restoration project. WDFW did not receive any concerns warranting further investigation of the impacts of this project, and WDFW issued a Determination of No Significance in 2018.

Environmental Effects

The typical environmental impacts associated with the Programmatic Estuary EA (DOE/EA-2006) are described in Chapter 3 of the EA, and are incorporated by reference and summarized in this document. Below is a description of the potential site-specific impacts of the SBI project and an assessment of whether these impacts are consistent with those described in the Programmatic Estuary EA.

1. **Fish**

The SBI project area is primarily dominated by non-native and other non-target fish species such as carp and bass, due to the higher temperature and isolated nature of Turtle Lake. Endangered Species Act (ESA)-listed fish in the project area may include coho, Chinook, and chum salmon, as well as cutthroat trout and Pacific lamprey; however, they are unlikely to be encountered directly since the channel would be excavated at a higher elevation than the channel. During project construction, increased turbidity and some incidental injury may occur, but would be short term and localized to the immediate

[5] The Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead was developed by the National Marine Fisheries Service (NMFS) under Section 4(f) of the ESA in 2011. 'The Module' identified a series of 23 independent management actions intended to address specific threats and limiting factors for salmon and steelhead in the estuary.

project area and adjacent shoreline. The proposed channel is not currently accessible to salmonids, and channel excavation would proceed from Turtle Lake north to the Columbia River main stem, at a time when the river is low and no isolation would be necessary. Therefore, no fish salvage is proposed, and the short-term impacts to fish are expected to be low.

Long-term, the project would improve hydrological regimes, enhance water quality, and increase habitat area and access for the benefit of native fish. These impacts are consistent with the analysis in the Programmatic Estuary EA, Section 3.2.3, which describes fish impacts as expected to be moderate and beneficial. As consistent with the Programmatic Estuary EA, BPA is using the Habitat Improvement Program III (HIP III) to provide programmatic ESA coverage for impacts to ESA-listed fish for the SBI Project. HIP III review was completed in May 2018. Categories of action included in the HIP III and relevant to the SBI project include those in the 'River, Stream, Floodplain and Wetland Restoration' category, including:

- 2a – Improve Secondary Channel and Wetland Habitats
- 2d – Install Habitat-Forming Natural Material Instream Structures
- 2e – Riparian Vegetation Planting
- 4 – Piling Removal

BPA's Restoration Review Team (RRT) screens projects for projected biological benefits to fish, and to ensure that the obligations set forth in NMFS' and USFWS' Biological Opinions are met. The RRT reviewed the SBI project and recommended the project for approval in May 2018. The RRT process provides coverage for impacts to ESA-listed species, by communicating the requirements of the HIP III programmatic ESA process, including best management practices and design features. The effects of the proposed project on fish are expected to be moderate or less, which is consistent with the Programmatic Estuary EA, Section 3.2.4, which concludes that impacts to fish would be moderate and beneficial due to improved ecosystem connectivity and reduced fragmentation, conversion of vegetation to more natural conditions, restored and improved hydrology, and enhanced water quality; all of which may increase Pacific salmon stocks during their migration.

2. **Hydrology and Hydraulics**

Hydrology at SBI has been significantly altered from historical conditions as a result of dredge material deposition, ditching, diking, vegetation management, grazing, and other anthropogenic impacts. The wetlands currently present at SBI are a result of the Corps' historic dredging activities and natural ponding that has occurred overtime in these sediment piles. The wetland at Turtle Lake receives flows from the main stem Columbia River rarely (approx. once every 30 years in typical flow regimes) and water most likely enters the site via the hyporheic zone[6] extending from the main stem, as well as by precipitation falling onto the site and ponding. Channel design would be engineered to accommodate high and low flows to provide and maintain consistent ingress and egress for juvenile salmonids at a variety of flow conditions, resulting in a long-term benefit to hydrologic processes in the CRE. Impacts to the hydrology of the area would not be apparently altered in the area until the CR stages up and flushes water into the wetland.

Despite some natural development of habitat (primarily cottonwood) at the SBI project site, in the time since dredge material deposition, a large area remains un-vegetated, and Turtle Lake remains disconnected from the river. The newly dredged channel would restore daily and seasonal inundation

[6] An area or ecosystem beneath the bed of a river or stream that is saturated with water and supports invertebrate fauna which play a role in the larger ecosystem.

patterns to the wetland area. The channel's orientation and connection to a protected backwater area would facilitate fine sediment deposition patterns necessary for successful wetland plant community development which would foster water retention and tidal marsh habitat.

The SBI project would result in a higher frequency and duration of inundation to the project site, which would permanently alter the structural and functional dynamics of the project area. Increased fine sediment deposition, development of riparian vegetation, and cooler water temperatures would be provided by the connection with the Columbia River main stem, and subsequent natural establishment of tidal marsh and wetland habitat. Long-term, the project would provide additional floodplain capacity and conveyance for flood flows, and may contribute to reductions in the local flood profile. Overall, impacts such as erosion, scour, and in-channel deposition; increased frequency and duration of inundation; localized changes in velocity, flow, and circulatory patterns; and reconnection of channel habitats are expected to be low to moderate, consistent with those same impacts described in the Programmatic Estuary EA Section 3.3.3.

3. **Water Quality**

Water temperatures recorded at the interior wetlands of the project are higher than those recorded on the Columbia River and seem to more closely reflect ambient air temperatures recorded at the site. These elevated temperatures are not suitable for juvenile salmonids. Water temperature on site is conducive to low dissolved oxygen levels, and the prevalence of aquatic vegetation and predatory warm water fish species.

The SBI project would result in overall positive impacts to water quality from increased composition of native vegetation and vegetation cover, increased quantity of tidal marsh and wetland habitat, and increased flows, tidal exchange, and flushing. Short-term impacts to water quality from sedimentation would occur near the invert and outlet of the new channel during construction; however, impacts are expected to be low to moderate.

Impacts associated with construction activities at SBI could result in increases to localized turbidity but would be short-term and limited to the duration of construction and shortly thereafter. WDFW plans to mitigate impacts to surrounding water quality by placing silt booms[7] at the confluence of the Columbia River and all activity sites (excavation and placement) along the shoreline. Also, as part of the HIP III process, conservation measures would be implemented to ensure that increases in suspected sediment are not exceeding compliance limits.

Inundation of vegetated areas and soil with high organic contents is likely to introduce a pulse of nutrients (eutrophication) to the local area and degrade the water quality, reducing the oxygen available to benthic organisms. These impacts would be limited in duration as the project area is recolonized by native wetland vegetation. Ultimately, increasing the acreage for sediment development within the estuary also increases the estuary's binding and storing capacity for nutrients, contaminants, and water filtration, which would improve water quality over time. Therefore, the impacts associated with the SBI project, which include increased flows, tidal exchange, and flushing; increased channel complexity and alignment; and decreased invasive species, are expected to be low to moderate, consistent with those described in the Programmatic Estuary EA Section 3.4.3.

[7] A silt boom is a floating containment barrier designed to contain and control silt in a water location.

4. **Geomorphology, Soils, and Topography**

The current composition of soils within the project area is primarily a mixture of Sauvie silt loam, silty clay loam, and Pilchuck fine sand (NRCS, WSS 5/25/2019[8])—which is derived from dredge material deposition on the southwestern bank of the island. Figure 5 illustrates the current relative elevation of the project area, as well as the applicable restoration actions in implementation, as directed by the *Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead*.

Site topography and elevation would shift in response to sediment accretion, marsh development and succession, and localized patterns of erosion within the project area, as the Columbia River rises and water is pushed into the new channel. Short-term construction related impacts within the proposed channel would include increased soil compaction, erosion, and mixing of the soil horizons composed of previous periodic depositions of dredge material. Soil compaction would be limited to the construction window, and erosion of destabilized soils would decrease rapidly over time, as the site is repeatedly exposed to tidal inundation and vegetation is established.

The proposed elevation change would be a natural result of wetland successional processes, and a desired outcome from restoration project, because it provides for an increased diversity of wetland and riparian habitats and the fish and wildlife species they support. The anticipated effects of the proposed project to geomorphology, soils, and topography would be low to moderate, consistent with the Programmatic Estuary EA Section 3.5.3, including described impacts of: temporary erosion and sedimentation; altered channel form, structure, and density; localized changes in velocity, flow, and circulatory patterns; restored sediment transport; and restored spatial and temporal connectivity of streams and wetlands.

[8] Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural resource information system in the world.

Figure 5: Elevation map of proposed channel construction and the action area, with layers added by the type of restoration action expected as outlined in NMFS' 2011 Columbia River Estuary Module.

5. **Sediment Quality**

The SBI project area is almost entirely composed of previously dredged materials from the Columbia River. The Corps conducted a site visit on March 19, 2018, to assess the physical character of the sediments to be excavated in the footprint of the proposed channel, and determined that the sediments to be excavated consisted of the medium to coarse sand, which is consistent with the sand currently

dredged from the Columbia River. Historically, there have been no concerns with contamination of Columbia River sands from the federal navigation channel.

The Corps' Portland Sediment Evaluation Team (PSET) determined in March 2018 that sediment evaluation was not necessary per Subpart G of the Clean Water Act Section 404(b)(1) guidelines (see 40 CFR 230.60-230.61) which prevents the deposition of any contaminated materials. The scope of the PSET's sediment evaluation included the excavation of historically placed dredged sand from Turtle Lake, wetlands (0.8 ac), the Columbia River (0.5 ac), and its subsequent placement below the ordinary high water mark of the Columbia River.

The naturalized setting of the placement areas and the adjacent riparian ecosystem at RNWR provide limited potential sources of contamination to the sandy site sediments intended for transport within the project area. The only source of contamination to sediment quality on WDNR property is seasonal herbicide (triclopyr and glyphosate) application by volunteers to control invasive plants (blackberry and shiny geranium) in uplands. On RNWR land, USFWS refuge staff would also seasonally apply aminopyralid, 2-4, d, and dicamba mixtures to control invasive plants. The river and shoreline is seasonally used by fishermen and boaters, which is apparent by the refuse often left behind. Sites of potential contamination in Ridgefield, Washington are more than 2 miles to the east. No outfall, cleanup sites or spills have been reported in the vicinity of the site.

Tidal reconnection of the Turtle Lake wetland to the Columbia River main stem would alter the local flow patterns, temporarily suspend sediment within the water column, and redistribute sediments throughout the project area as well as downstream within the estuary. Sediment is likely to be scoured away in some locations, and ultimately deposited in others, which would be carefully monitored by WDFW in the project area, and by the Corps downstream. Sediment redistribution is an objective of the project and is anticipated to foster the creation of more shoreline shallow water habitat downstream of the project site. Mitigation measures would be in place to prevent high levels of turbidity in any area and the anticipated effects of the proposed project to sediment quality would be less than or equal to those described in the Programmatic Estuary EA Section 3.6.3, which addresses: changing hydrologic flow patterns and tidal floodplain reconnection.

6. **Air Quality**

Temporary impacts to air quality associated with the SBI project would result from the transportation and operation of construction equipment such as dust from unstable soils being suspended in the air for a limited duration, as well as emissions from construction equipment and travel to and from project area for monitoring. However, impacts would not result in long or short term violations of State air quality standards and the SBI project's impact on air quality would be low both in concentration and duration. This level of impact is consistent with the Programmatic Estuary EA and the impacts described in Section 3.7.3, which include: temporary and localized increase in dust, pollutants, and greenhouse gas emissions.

7. **Wildlife**

Bachelor Island is composed of various habitat types including some forested uplands, crop land, riparian corridors, and several seasonal lakes. The north end of the island is home to one of the largest blue heron rookeries in the Pacific Northwest and the area is frequently used by migrating waterfowl. The grassland and wetland habitats of the surrounding RNWR are known for spectacular concentrations of migratory waterfowl they attract during the winter. Seven subspecies of Canada geese occur there, and both trumpeter and tundra swans return every winter. In late winter, shorebirds flock in search of

food in the mudflats. Other nesting birds include herons, owls, ducks, songbirds, and sparrows. Twenty-three mammalian species have been verified through biological survey at RNWR, along with thirteen species of amphibians and reptiles.

Most species at RNWR are not present within the project area, due to the low habitat quality of the site comprised of largely un-vegetated sands, especially in relation to that available on the adjacent refuge. However, given their proximity to the project area, some audio and visual disturbance of species at RNWR is expected. There is known to be a small wildlife community within the action area including small terrestrial mammalian predators, ungulates, birds, amphibians, and reptiles that are likely to be harassed or harmed in the implementation of SBI restoration if they are unable to move from the project area. Amphibians and reptiles would be the most vulnerable to harassment and harm from project actions, as they may be unable to move quickly enough, and their young may be more susceptible to stressors (noise and human presence). The project would not be implemented during amphibian breeding season, and the use of silt booms would decrease the turbidity experienced by these creatures within and around Turtle Lake.

Turtle Lake also has a number of invasive and non-native wildlife species that dominate the isolated, warmer environment of the disconnected body of water. These include fish previously mentioned (carp, bass etc.), and pond slider turtles, which can survive in the warmer waters of the isolated lake. Certain features, such as the lack of vegetation or tall forested cover area make the project area uninhabitable for many species inhabiting RNWR. Due to the availability of quality habitat at RNWR, and its proximity to the project area, impacts of the proposed project to avian and terrestrial wildlife species would be reduced, as they would be able to relocate to adjacent lands during project implementation.

In the short term, noise and visual disturbance during construction would likely cause wildlife to avoid the project area during the construction period. If present during construction, nesting birds, smaller ground-dwelling mammals, reptiles, and amphibians could be harmed or killed incidentally during construction. In the longer term, effects to wildlife are expected to be beneficial.
ESA-listed Columbian white-tailed deer adults likely use the project area, but suitable fawning habitat is not present. The action would avoid impacts by observing herbicide-buffer zones and timing restrictions developed by BPA and USFWS to avoid adverse effects to the deer. Streaked horned lark have a designated historical range that overlaps the action area; however, the project has been determined to have no potential to affect streaked horned lark since the available habitat does not meet suitability metrics[9].

Long-term improvements to topographic and vegetative diversity would increase with restoration actions, which would benefit certain wildlife; however, most upland species would be permanently displaced from the new channel area when it is converted from partially vegetated sand, to tidal marsh and wetland habitats. Overall, semi-terrestrial mammals such as beaver, as well as amphibians, waterfowl, shorebirds, and insect-eating birds would have expanded and improved wetland and aquatic habitat for feeding and breeding as a result of this project.

The impacts discussed in the Programmatic Estuary EA, Section 3.8.3 include: noise or visual disturbance leading to displacement of individual animals, and habitat conversion. These impacts are consistent

[9] Anderson, H. E., and S.F. Pearson 2015. *Streaked Horned Lark habitat characteristics*. Center for Natural Lands Management and Washington Department of Fish and Wildlife. 23 pp. These are the official guidelines used by the USFWS to determine suitable habitat for SHL.

with the Programmatic Estuary EA, Section 3.8.3, which concluded that effects to wildlife would be moderate and beneficial.

8. **Wetlands, Floodplains, and Vegetation**

The wetlands within the project area are unique in that they have developed only since the first dredge material placement in the early 1900s. By 1937, aerial imagery shows that cottonwood forest began to develop on top of the earliest dredge placement and sand that had accreted due to pile dikes. Subsequent dredge placement from the 1950s-70s left depressions between dredge cones[10], some low enough in elevation that they have since begun to transition into wetlands.

Lack of regular, fluctuating water levels creates a static rather than dynamic wetland habitat at present. The wetland is primarily groundwater and precipitation fed, providing appropriate conditions where reed canarygrass and other invasive plant species can gain an advantage. A more dynamic hydrologic connection could provide better conditions for colonization of native plant communities such as wapato and soft stem bulrush.

At the conclusion of the dredge placement from the Corps in 1975, there remained an approximately 16-acre section of the former river bed that was no longer connected to the river except during extreme high flow events (> 20-yr flow event). This is now a large wetland fed by groundwater and precipitation, with water levels that fluctuate with the river stage. The wetland bottom is likely a mix of river gravels and sand, with a mucky organic layer forming on top from decayed vegetation.

Vegetation surveys observed plant species common to this section of the river. The uplands surrounding the wetland are mixed stands of deciduous hardwoods, mainly black cottonwood, willow, and red osier dogwood, but also of other less dominant species such as Oregon ash. Reed canarygrass and pasture grasses fringe the majority of the wetted area. Patches of native vegetation (e.g., spikerush and *Eleocharis* spp.) exist that may help jump-start propagation and expand their extent after restoration. Vegetation along the 15-foot high levee is mainly herbaceous vegetation, mostly comprised of reed canarygrass and stinging nettles, as well as Himalayan blackberry.

Short-term construction-related impacts such as turbidity are expected; however, wetland quality would improve due to the restoration of natural flow patterns. The impacts discussed in the Programmatic Estuary EA, Section 3.8.3 include: alteration of wetland hydrology; restoration of wetland-forming processes; increased wetland area, habitat complexity, composition of native vegetation, riparian buffer area, vegetation cover, and quantity of tidal marsh habitat flows, tidal exchange, and flushing; and decreased composition, distribution, and quantity of invasive species. These impacts are consistent with the Programmatic Estuary EA, Section 3.9.3 which predicted beneficial impacts to wetlands, floodplains, and vegetation within the project area.

9. **Land Use and Recreation**

The project area is an inactive dredge material placement site located on SOAL managed by WDNR and as such, would continue to be open for public access before and after project implementation. The current primary use is open space for wildlife, largely thousands of migrating waterfowl. Invasive plant

[10] Dredge cones are created in the continuous piling of dredge material in one place. The pile creates a cone of material that is at a higher elevation than the surrounding area.

species are annually monitored and treated by Friends of Ridgefield Wildlife Refuge. The shoreline is actively used by boaters and fishermen. The wetland referred to as Turtle Lake is used by duck hunters accessing the site by boat. Channel reconnection would increase recreation areas for fishermen and other users.

South Bachelor Island is directly adjacent to the RNWR. Refuge managers perform a variety of management practices to maintain and enhance wintering waterfowl habitat with a specific emphasis on the habitat needs of dusky Canada geese, and Columbian white-tailed deer are also found on the refuge. Refuge managers regulate water levels with pumps and water control structures. They also mow, disk, and plant wetland and upland areas to promote desirable waterfowl forage and control invasive species.

Low impacts on land use and recreation are expected from the construction of a tidal channel within the island. The impacts discussed in the Programmatic Estuary EA, Section 3.10.3 include changes in access to recreational opportunities. These impacts are consistent with the Programmatic Estuary EA, Section 3.10, which described low to moderate impacts to land use and recreation.

10. **Cultural Resources**

There is an old derelict pile dike structure running through the northern end of the wetlands that continues out to the Columbia River where it reappears on the shoreline. The mid-section of this pile dike is completely buried under dredge material. In the photo below, the section of the pile dike that runs through Wetland A can be seen.

Site-specific National Historic Preservation Act Section 106 consultation for the SBI project was completed in April 2018, and BPA determined that there would be no adverse effect to historic properties as a result of the project. BPA archaeologists conducted a pedestrian survey, and evaluation of the Area of Potential Effect. No resources were found, and the pile dikes were determined not eligible for the National Register of Historic Places.
The impacts discussed in the Programmatic Estuary EA, Section 3.11.3 regarding cultural resources included: reestablishment of tidal channels, reestablishment of wetland and riparian plant communities, and removal of structures. Impacts to cultural resources as a result of this action would be low, which is consistent with the analysis in the Programmatic Estuary EA, Section 3.11.3.

11. **Socioeconomics**

The Programmatic Estuary EA did not anticipate that the projects would have adverse human health or socioenvironmental impacts or disadvantage low-income or minority populations, and discussed impacts in Section 3.12.3 including: short-term employment opportunities, local short-term traffic or lifestyle disruptions due to construction, land use conversion, and improvements to fisheries.

The SBI project area is remote and not easily accessible by the public; however, there would be a decrease in game fowl during project implementation which may impact hunters and/or birders trying to access the site. A small group of hunters that frequent this area would lose access to the site during construction, as well as any individuals attempting to recreate in the project area; however, local users have been notified of the closure and public use is typically minimal. Socioeconomic impacts would be limited in duration, and the adjacent lands would provide a surrogate space for both of these activities. The project area would be reopened to the public shortly following construction with improvements to the recreation value and presence of game fowl post-implementation through restoration of native vegetation and prey species.

The project would result in small, temporary, beneficial impacts to socioeconomics by providing jobs for construction workers, and long-term benefits could result from the improvement of fish runs and natural scenery. The SBI project would not displace residents or degrade residential suitability; nor would it cause changes to the local or regional tax base. The SBI project would result in low socioeconomic impacts, consistent with those described in the Programmatic Estuary EA Section 3.12.3.

12. **Visual Resources**

The project area can be seen from the North Unit of Sauvie Island and the Columbia River mainstem, and during construction, equipment and workers would be present on the site for a short period. Placement areas with some early successional vegetation would also be covered with transported materials from the excavated channel, and would appear differently for several months. Long-term, the wetland continuity and restoration of SBI to a more natural state would increase the quality and size of the wetland and near shore habitat within the project site. The project area would eventually be seeded and planted with native vegetation, resulting in a more natural-looking environment.

This alteration of the physical landscape through the removal of existing dredge material would shift the character of the site from a somewhat human-engineered landscape to a more natural-looking area, resulting in low impacts to visual resources. This finding is consistent with the visual resources analysis in the Programmatic Estuary EA, Section 3.13.3, which discussed: short-term visual impacts related to construction, and long-term impacts associated with changing the visual condition from a managed state to a more natural landscape.

13. **Noise, Hazardous Waste, Public Health, and Safety**

The SBI project would result in short-term and minimal noise and hazardous waste impacts related to construction and maintenance activities. Potential safety risks could be associated with increased surface area of flowing and standing water with daily tidal flooding in places where there was none in recent history. Flooding on restored sites would include daily tidal flooding or seasonal flooding of the newly excavated channel. The project would increase the surface area of flowing and standing water in places where there was none in recent history; however, the project area is currently only accessible to the public by boat, so there is little concern for any public safety hazards as a result.

The SBI project includes project designs that promote draining and ponding, and a long-term monitoring plan to ensure proper site drainage would be implemented to avoid increased breeding habitat for mosquitoes. The Programmatic Estuary EA, Section 3.14.3 describes low impacts to noise, hazardous waste, public health, and safety as a result of restoration actions within the estuary, and specifically addressed impacts of short-term noise during construction and maintenance, potential encounters with contaminated media during construction, and risks to safety due to change in hydrologic regime after construction. Impacts of the SBI projects are primarily associated with construction and maintenance, and would be low, consistent with those described in the Programmatic Estuary EA, Section 3.14.3.

14. **Transportation and Infrastructure**

The SBI project is expected to have minimal impacts on transportation or infrastructure, as access is through a non-public access gate owned by USFWS, leading across several unpaved berms to wetlands located on South Bachelor Island. This road is a spur with no connections. Public access is primarily via boat on the Columbia River main stem, and there is no existing infrastructure in the project area beyond

the access gate and the pile dike proposed for partial removal. The project is also not expected to have any impacts on navigability within the Columbia River.

These low impacts are consistent with or less than the analysis in the Programmatic Estuary EA, Section 3.15.3, which discussed effects to local roads, long-term maintenance of the project area, and navigability within the Columbia River.

15. **Climate Change**

Possible negative impacts to climate change include those relating to use of vehicles and equipment associated with construction and maintenance of the SBI project area. Positive impacts would include the creation of a carbon sink that would store carbon dioxide and help mitigate for the release of greenhouse gases. Overall, the long-term impacts on climate change from the project are expected to be low and beneficial, consistent with the impacts described in the Programmatic Estuary EA, Section 3.16.3 which described the effects of the project on greenhouse gas emissions, creation of tidal wetlands, sea level rise, and the restoration of native plant communities.

Findings

This SA finds that the types of actions and the potential impacts related to the proposed South Bachelor Island Restoration have been examined, reviewed, and consulted upon and are similar to those analyzed in the Columbia Estuary Ecosystem Restoration Program Environmental Assessment (DOE/EA-2006) and Finding of No Significant Impact. There are no substantial changes in the proposed action and no significant new circumstances or information relevant to environmental concerns bearing on the proposed action or its impacts within the meaning of 10 CFR § 1021.314(c)(1) and 40 CFR §1502.9(c). Therefore, no further NEPA analysis or documentation is required.

/s/ Tabatha Rood
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Reviewed by:

/s/ Chad Hamel
Chad Hamel
Supervisory Environmental Protection Specialist

Concur:

/s/ Sarah T. Biegel Date: *July 9, 2019*
Sarah T. Biegel
NEPA Compliance Officer