

# memorandum

DATE: July 26, 2016

REPLY TO  
ATTN OF: ECF-4

SUBJECT: Supplement Analysis for the Columbia Estuary Ecosystem Restoration Program Final EA (DOE/EA-2006/SA-1)

TO: Anne Creason  
Project Manager – EWL-4

**Proposed Action:** Kerry Island Estuary Restoration

**Proposed by:** Bonneville Power Administration (BPA)

**Location:** Columbia County, OR

**Project No.:** 2010-073-00 / **Contract No.:** 70448

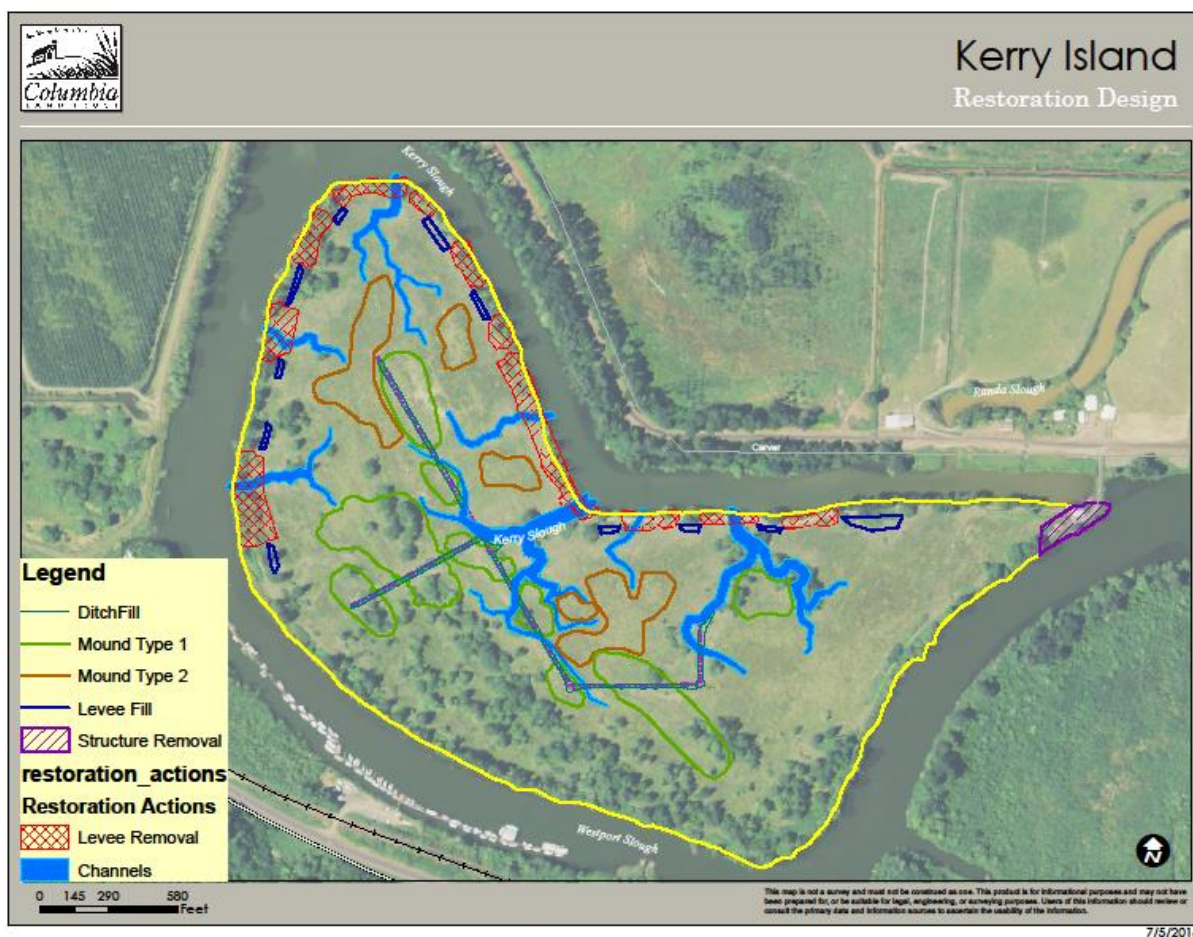
## **Introduction**

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 Kerry Island Estuary Restoration (Kerry Island project) that would restore habitat within the Columbia River estuary on Kerry Island in Columbia County, Oregon. The SA was prepared to analyze the site-specific impacts of the proposed Kerry Island 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:**

Figure 1 - Kerry Island Restoration Design



Under the proposal, BPA would fund Columbia Land Trust (CLT) to conduct restoration actions on Kerry Island, a 99-acre island located along Westport Slough approximately one mile east of Westport, Oregon. Kerry Island is owned by CLT and is located two miles upstream from the confluence of Westport Slough with the Columbia River. Kerry Island historically had tidally-influenced freshwater wetlands and tidal channels. Westport Slough was historically connected to approximately 10 square miles of mature surge plain. Currently, that connectivity is limited to less than 1 square mile. Dikes and tide gates are used extensively in Westport Slough to drain land for agriculture and infrastructure protection. Much of this drained land has subsided several feet due to soil compression and oxidation.

Over 50 years ago, a levee was constructed on Kerry Island disconnecting it from the slough. The property was graded and ditched to allow for cattle grazing, so there is no longer fish access to the wetlands and tidal channels that used to run through Kerry Island and connect to Westport Slough. In addition, cattle grazing and the lack of riparian tree cover on the island contribute to degraded water quality in Westport Slough by increasing soil erosion and nutrient discharge.

Proposed restoration actions include levee removal, tidal channel development, drainage ditch filling, increasing topographical complexity, subsidence recovery mound creation, revegetation, large wood placement, and downstream bank treatments to restore tidal function. The

restoration would improve habitat for 13 Endangered Species Act (ESA)-listed salmon and steelhead species and ESA-listed eulachon (smelt) as well as other fish and wildlife species. The proposed restoration actions are consistent with the actions considered in the Programmatic Estuary EA, including the following Columbia River estuary (CRE) module management actions developed by NOAA's National Marine Fisheries Service (NMFS) with the intent of aiding in the recovery of salmon and steelhead throughout the region:

- CRE-1: Protect intact riparian areas in the estuary and restore riparian areas that are degraded.
- CRE-3: Protect or enhance estuary instream flows influenced by Columbia River tributary or mainstem water withdrawals and other water management actions in tributaries.
- CRE-9: Protect remaining high-quality off-channel habitat from degradation and restore degraded areas with high intrinsic potential for high-quality habitat.
- CRE-10: Re-establish or improve access to off-channel habitats.
- CRE-15: Reduce the introduction and spread of invasive plants.

### **Public Scoping, Comments, and Responses:**

To help determine issues to be addressed in this supplement analysis, BPA conducted public scoping between March 2 and April 4, 2016. A letter describing the proposed project, including public notification and conceptual design maps, was sent to local landowners, Tribes, local, state and federal agencies, and other interested parties.

Three individual letters were received during the public scoping period. BPA received the following questions, and has provided responses in *italics* below:

- What is the nexus of the levee removal project to the operation of the Federal Columbia River Power System?
  - *The project's intent is to improve off-channel habitat for ESA-listed salmon and steelhead species, with the intent of aiding in their recovery. The project is one of many proposed under the Columbia Estuary Ecosystem Restoration Program. The program was developed to assist the agencies in meeting their commitments under the NMFS Biological Opinion (BiOp) for the operation and maintenance of the Federal Columbia River Power System. The BiOp was developed in 2008 and was supplemented in 2010 and 2014.*
- The proposal is reducing already limited farmland in Columbia County for the benefit of salmon.
  - *Historically, Kerry Island contained tidally-influenced freshwater wetlands and tidal channels that were connected to Westport Slough and the Columbia River. Only upon construction of the levee surrounding Kerry Island was it made suitable for grazing habitat. Removal of the levee would remove this ability to graze on the island, but it would improve water quality, improve habitat for ESA-listed salmon and steelhead, and decrease the need for ongoing levee maintenance. This action is consistent with BPA's obligations under the 2008/2010/2014 NMFS BiOp for the Federal Columbia River Power System. Please see the Land Use and Recreation section below for additional discussion on impacts to farmland.*
- Suggestion to install a culvert under the road leading onto Kerry Island, to increase flows, reduce accretion, and promote fish passage.

- *Although installation of a culvert under the road leading onto Kerry Island was considered, it was eliminated as an aspect of the proposal to focus attention on the larger goal of restoration and creation of off-channel habitat within Kerry Island itself. The Expert Regional Technical Group (ERTG) assigns Survival Benefit Units (SBUs) to assign project benefits for estuarine habitat restoration projects. In this case, the ERTG focused its scoring on benefits accruing from work on and within Kerry Island. Installation of a culvert underneath the Kerry Island road would impact flows substantially and would require additional hydrologic modeling. Removal of the road may be considered in a future phase of the project.*

## **Environmental Impacts**

The typical environmental impacts associated with the Columbia Estuary Ecosystem Restoration Program are described in Chapter 3 of the Programmatic Estuary EA, and are incorporated by reference and summarized in this document. Below is a description of the potential impacts of the Kerry Island project and whether they are consistent with the impacts described in the Programmatic Estuary EA. Much of the site-specific analysis cited in the environmental impacts section below comes from the Kerry Island Final Basis of Design Report, published June 1, 2016.

### **1. Fish**

The overall impacts to fish from the proposed Kerry Island project would be beneficial. ESA-listed species in the project area may include coho, Chinook, and chum salmon, as well as cutthroat trout and Pacific lamprey. Detrimental impacts such as increased turbidity and injury or mortality from fish salvage and work-area isolation would exist, but are short-term and related to project construction. Beneficial impacts such as improvements in hydrological regimes, enhanced water quality, and increased habitat area and access for fish should develop post-construction. 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 would use the Habitat Improvement Program III (HIP III) process to provide programmatic ESA coverage for impacts to ESA-listed fish for the Kerry Island Project. Categories of action included in the HIP III and relevant to the Kerry Island project include those in the ‘River, Stream, Floodplain and Wetland Restoration’ category, including:

- 2a – Improve Secondary Channel and Wetland Habitats
- 2b – Set-back or Removal of Existing Berms, Dikes, and Levees
- 2d – Install Habitat-Forming Natural Material Instream Structures
- 2e – Riparian Vegetation Planting
- 3a – Manage Vegetation using Physical Controls
- 3b – Manage Vegetation using Herbicides
- 9d – Plant Vegetation

BPA’s Restoration Review Team (RRT) screens projects to ensure that the obligations set forth in the NMFS and FWS Biological Opinions are met. The RRT reviewed the Kerry Island project and recommended the project for approval in April 2016. The RRT process provided

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.

## 2. Hydrology and Hydraulics

The hydrology at Kerry Island is dominated by the diurnal tidal cycle of the Lower Columbia River Estuary. Surface water in tidal channels and wetlands on the site are governed by water surface elevations (stage) in the Columbia River and Westport Slough. Flows and stage of the Columbia River at the project site are subject to diurnal tidal fluctuations as well as the seasonal variation and flood regime of the Columbia River.

Hydrology at Kerry Island has been significantly altered from historical conditions as a result of ditching, diking, vegetation management, grazing, and other anthropogenic impacts. The tide gate in the west channel and the damaged and undersized culvert in the east channel allow a small amount of surface water to enter the site. Water likely also enters the site via hyporheic or groundwater inputs, as well as by precipitation falling onto the site and ponding. Kerry Island is currently surrounded by a levee that ranges from 12.6- to 22-feet in elevation. Since 2002, tide elevation has exceeded the lowest levee elevation of 12.6 feet 23 times, primarily in December and January with two occurrences in May and February. The highest stage recorded at Wauna, a community downstream along the Columbia River, was 14.1 feet, which occurred on January 1, 2006. The interior of Kerry Island is currently as low as 6.0 feet elevation, indicating subsidence since levee construction.

Restoring full hydrological connectivity between Kerry Island and Westport Slough would significantly increase the inundation of Kerry Island compared to what it currently experiences in its leveed state. Existing hydraulic conditions were compared with proposed conditions using a two dimensional hydraulic model. Based on this modeling, the Kerry Island project is expected to increase the tidal prism in Westport Slough by approximately 11%. This is expected to result in an increase in shear stress associated with the increased tidal prism and an increase in the channel cross-section of Westport Slough, which is expected to result in increased erosion.

Output from hydraulic modeling led to additional analyses for several areas where effects could be magnified or where existing infrastructure could be at risk. Downstream areas included outside meander bends, the Wahkiakum Ferry Terminal, a public boat ramp, and Westport Slough banks. Upstream areas included the marina adjacent to the south of the project area, the bridge over Westport Slough, and Westport Slough banks. Further analysis was conducted at four locations that had either increased velocity under proposed conditions or were located in areas with important infrastructure. In these locations, bank stability analysis was conducted to further assess risk associated with erosion.

This bank stability analysis determined that under both existing and proposed conditions, modeled erosion mainly occurred on the gentle slope towards the center of the channel. No erosion of the vertical banks was seen in the model under existing or proposed conditions. The model results suggest that deformation of the bed toward the center of the channel would be the most likely scenario as the channel adjusts to increased tidal prism. While the model results are a line of evidence that suggest minimal erosion should be expected along the downstream vertical banks as a result of the project, there is some uncertainty both in the measured soil parameters and in the expected variation in hydraulic parameters as the bed adjusts to the increased tidal

prism volume. Observations in the field suggest that banks with the most vegetative cover are more likely to resist erosion, both due to root strength as well as the low velocity boundary layer created by overhanging vegetation. Sloughing in the field was mainly observed on banks with minimal woody vegetation cover. Proposed project revegetation would assist in reducing erosion potential and increasing bank stability.

The impacts associated with the increased tidal prism and erosion potential are moderate, consistent with those analyzed in the Programmatic Estuary EA, Section 3.3.3.

### **3. Water Quality**

The project would result in overall positive impacts to water quality, including increased composition of native vegetation and vegetation cover, increased quantity of tidal marsh habitat, and increased flows, tidal exchange, and flushing. Impacts associated with construction activities at Kerry Island could result in increases to localized turbidity but would be short-term and limited to the duration of construction and subsequent site stabilization. As part of the HIP III process, conservation measures would be implemented to ensure that increases in suspected sediment are not exceeding compliance limits. The impacts associated with the Kerry Island project are low to moderate, consistent with those described in the Programmatic Estuary EA Section 3.4.3.

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

Kerry Island was formed by a combination of physical processes and human alterations. Analysis of mainstem Columbia River channel geometry and meander migration patterns suggests that Westport Slough was originally formed by floodplain scouring driven by historical Columbia River flooding. Following initial formation, it is possible the Clatskanie River (in possible combination with Beaver Creek) occupied Westport Slough. Therefore, it is plausible a combination of pre-Holocene Columbia River flooding, Clatskanie/Beaver Creek hydrology, and tidal forces have all played a role in creating, maintaining, and modifying Westport Slough.

The landforms visible at today's project area have been altered by a variety of anthropogenic impacts including vast flood control systems (dams and levees), dredging navigation corridors, infrastructure development, and vegetation change. Within the project area, tidal floodplains have been isolated by levee systems. The ditching and leveeing in the project area has driven two noteworthy geomorphic changes. First, ditching and leveeing has disconnected the surface from regular flood inundation. This has resulted in the associated loss of inundation benefits including sediment deposition, reduction in contributions to the vegetation seed bank, reduction in particulate and nutrient exchange, and lack of scouring flood flows. Second, ditching and leveeing has contributed to the lowering of the groundwater surface elevation. This lowering has led to further subsidence of the project area (an increase in soil aeration and decrease in buoyancy, which leads to soil consolidation), and a subsequent lowering of the ground surface.

Soils data for Kerry Island and the surrounding area were obtained from the Natural Resources Conservation Service. All soil in the study area is Locoda silt loam (protected). The Locoda series consists of deep, very poorly drained soils that formed in recent silty alluvium. This soil is found on the floodplain with slopes of 0-3% and at elevations of 0-10 feet (USDA-NRCS, Smythe 1986).

Impacts from the project are moderate in the short-term, with long-term beneficial impacts, consistent with those analyzed in the Programmatic Estuary EA Section 3.5.3. These impacts include temporary erosion and sedimentation; altered channel form; structure and density of soils; localized changes in velocity, flow, and circulatory patterns; and increased groundwater exchange resulting in changes to soil structure and porosity. Analysis of these impacts is included above in Section 2, Hydrology and Hydraulics.

## **5. Sediment Quality**

The Kerry Island project would remove approximately 48,495 cubic yards of material from the interior of the island and 10,775 cubic yards from the levee currently protecting the island. Material removed from the interior of the island would be placed in ditches and on the floodplain surface, while the levee material would be placed on the landward side of the remaining levee to eliminate transport after the levee is breached. Dredging and the relocation of dredged sediments, and dike/levee removal would stir up sediments, re-suspend them in the water column, and redistribute them within the estuarine system. Overall impacts on sediment quality are moderate in the long term. Though there may be some short-term adverse impacts from disturbing and redistributing sediments, the actions proposed would increase organic material in the estuarine sediments over time, increasing their capacity to store nutrients as well as toxic chemicals. While this may lower sediment quality, water quality could improve the water column, thus improving the health of the aquatic biota. Such impacts have been previously analyzed in the Programmatic Estuary EA Section 3.6.3 and are consistent with the impacts at the Kerry Island project.

## **6. Air Quality**

Temporary impacts to air quality associated with the Kerry Island project would result from the transportation and operation of construction equipment, as well as emissions related to travel to and from project areas for maintenance purposes. Impacts would be low and would not result in long- or short-term violations of state air quality standards. Project impacts on air quality would be low both in concentration and duration, consistent with the impacts described in the Programmatic Estuary EA, Section 3.7.3.

## **7. Wildlife**

A population of Columbian white-tailed deer (CWTD) resides in the Westport Slough area. This population is reproducing successfully and maintains a stable population estimated at approximately 150 animals on the 1,400 acres between Westport Slough and the Columbia River. A section of the Julia Butler Hansen National Wildlife Refuge for the Columbian White-Tailed Deer is located in Westport Slough east of the Kerry Island project area. Inundation of the Kerry Island project area may displace CWTD, although mound creation on the project site is expected to have the largest positive impact on CWTD adults and juveniles. These mounds would provide some available habitat at or near mean higher high water (MHHW). Areas of remaining, non-breached levee would also provide higher elevation, continuous habitat for CWTD. All areas would be planted with native species. Topographic and vegetative diversity would increase with restoration actions which would benefit CWTD by providing forage and

cover habitats within the same area.

As described in the 'Fish' section above, BPA's use of the HIP III programmatic provides coverage for potential impacts to any ESA-listed species that may occur within the Kerry Island project area. During the RRT review, BPA determined that the Kerry Island project may affect, but is not likely to adversely affect, CWTD. However, to avoid and minimize impacts within and around the project areas, the following measures would be followed:

- To avoid and minimize impacts to CWTD during the fawning period, restoration activities would not occur from June 1 to July 15.
- To avoid and minimize impacts to CWTD and their movements, fencing projects would use only three-strand barbed wire and have a maximum fence height of 42 inches, with lower strands 18 or more inches above the ground.
- Project personnel would be instructed to not approach CWTD adults or fawns at any time and reduce vehicle speeds around project sites where CWTD occur to avoid vehicle-deer collisions.
- Herbicides would not be used in CWTD fawning areas from June 1 to July 15. Within suitable or occupied habitat use only herbicides listed under General Conservation Measures for Terrestrial Species and Critical Habitats in the HIP III Biological Opinion.

Impacts on wildlife resulting from the Kerry Island project would be moderate, and would relate to construction. The conversion of pasture grass to emergent vegetation, intertidal channels, and mudflats would permanently displace most upland species. Semi-terrestrial mammals such as beaver, as well as amphibians, waterfowl, shorebirds, and insect-eating birds would have expanded and much improved wetland and aquatic habitat for breeding and feeding. Species favoring riparian forest would benefit from the planting of native tree and shrub species in areas bordering the restored tidal wetland.

The Programmatic Estuary EA acknowledged the potential for restoration projects to impact ESA-listed species. If ESA-listed species are potentially impacted, the Programmatic Estuary EA describes the need for consultation, including the implementation of mitigation measures, conservation measures, or project design features identified to minimize impacts.

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

In the Kerry Island area, vegetation communities transition between spruce forested wetlands found downstream and deciduous trees such as Pacific willow, Oregon ash, and black cottonwood. Vegetation communities are heavily influenced by tidal cycles and tend to occur at distinct elevation bands. Emergent wetlands are typically found under MHHW (9.4 feet), while scrub-shrub is found in a narrow band from 9.4-9.7 feet. Forested wetlands and upland habitats are found above 9.7 feet.

A vegetation survey at Kerry Island was completed by CLT on July 30, 2015, to characterize existing weedy species. This survey identified seven different weed species on Kerry Island, covering 60 acres of the 100-acre project site. Bull thistle, Himalayan blackberry, and tansy ragwort were the most dominant species; each covering just under 20 acres. Cutleaf blackberry, purple loostrike, reed canarygrass, and yellowflag iris each covered less than half an acre.



The entire Kerry Island project site would be revegetated with species appropriate to elevation ranges or zones. Such vegetation is needed for supporting accretion, marsh development, and hydrological complexity and would reduce the likelihood for invasive species to dominate and simplify the site.

The impacts to wetlands and vegetation from projects envisioned in the Programmatic Estuary EA, Section 3.9.3 are intended to be moderate and beneficial by design, since wetland restoration, invasive species control, and estuarine habitat improvement are the intent of these actions. The Kerry Island project would result in beneficial impacts to native vegetation, wetlands, and estuarine habitats in the proposed restoration area consistent with those considered in the Programmatic Estuary EA.

## 9. Land Use and Recreation

Historically, Kerry Island is within the historical territory of the Chinook Indians, who were hunter-gatherers living off seasonally-available wild game and plants. Euroamerican settlement in the area by the 1840s significantly reduced much of the Chinook population. Historical survey maps from 1870 show Kerry Island as a peninsula, with a tidal channel running along the north end of the project area and a connection to the mainland in the northeast corner. Kerry Island is depicted as an island from 1929 to 1951, and was owned by Kerry Timber Company according to a real estate atlas from 1928. The land between Kerry Island and the mainland may have been excavated for log drives, which are apparent in photographs from 1929 to 1948. Diking of Kerry Island likely began as early as 1939.

The aerial photo shows a small section in the southeast corner of the property that appears to have been cleared and light coloration of the perimeter in that area suggests placement of dredge spoils and dike building. The 1941 United States Geological Survey 15-minute map depicts a levee around the perimeter of the island and a structure along the water on the southeast edge. The tidal channel to the north of the project area has been disconnected from Westport Slough by levee construction by this time. Aerial imagery from 1951 appears to depict Kerry Island as a high marsh with mature vegetation. A tidal network is not visible in the interior of Kerry Island likely due to ditching, and tall trees appear to surround the border of the island. By 1964, the island was purchased by Chester and Cleo Jenks, who used the area for agriculture and cattle grazing. Aerial imagery from 1961 is very similar to the 1974 imagery shown here. Much of Kerry Island has been logged, and the causeway connecting Kerry Island to Carver Road is visible. A clearly defined agricultural field occupies the center of the island and was likely used for hay farming. Much of the vegetation had been cleared by 1961 and the ditches that currently occupy the center of the island are clearly visible. Thick vegetation is still visible in the southern portion of the island, and the tall border of vegetation around the island is still visible and appears unchanged from the 1951 photo.

The land was purchased by CLT with BPA funding in 2013. Recent imagery from 2014 shows the existing ditches in the center of Kerry Island and cleared vegetation. Vegetation in the southern portion of the island seems to have been thinned relative to previous images, and the levee is clearly visible.

The Natural Resources Conservation Service has assigned farmland classifications to areas based on soil properties and other factors that directly influence the specific use of the land. Kerry Island is classified as Farmland of Statewide Importance.

In Appendix C of the Programmatic Estuary EA, BPA reviewed land cover types from 2010 GIS mapping and determined Kerry Island to have land cover of approximately 40% agriculture, 20% forest, and 40% wetland.

Impacts on land use and recreation would result from the breaching of the existing levee and construction of tidal channels within the island. This removal would convert the lands from the historical agricultural uses to tidal marsh habitat, and therefore reducing access within the project vicinity. Restoring degraded farmlands to tidal marsh areas would restore accretion rates and position these areas to better respond to sea-level rise. The proposed action would impact the farmlands identified as of statewide importance. While estuarine restoration projects would have a low to moderate adverse effects to farmlands, the project is occurring in coordination with CLT as a willing landowner, which purchased the property from willing landowners themselves in 2013. Such impacts are consistent with those described in the Programmatic Estuary EA, Section 3.10.3 and Appendix C.

## **10. Cultural Resources**

Site-specific National Historic Preservation Act Section 106 consultation for the Kerry Island project was completed in 2016, and BPA determined that there would be no adverse effect to historic properties as a result of the project. Applied Archaeological Research conducted a pedestrian survey, shovel testing, and evaluation of built environment properties located within the Kerry Island Area of Potential Effect. One pre-contact site, one historic site, and three built environment resources were recorded. The site boundaries are protected by a 30-foot buffer area, and project designs would ensure that the sites are avoided and that there is no ground disturbance during construction. As a result, cultural resources would not be impacted with the implementation of the Kerry Island project. Because the negative impacts would be mitigated, cultural impacts are low, consistent with the analysis in the Programmatic Estuary EA, Section 3.11.3.

## **11. Socioeconomics**

Kerry Island was used for agriculture and grazing after the island was diked as early as 1939 (see 'Land Use and Recreation' above for additional information). Since the land was purchased by CLT in 2013, no farming or grazing has occurred. Negative impacts associated with the proposed project are that the dike breaches would modify the island into a tidally-influenced floodplain with native vegetation, excluding future farming or grazing opportunities. In addition, the acquisition of Kerry Island by CLT and the proposed restoration from agricultural to protected wetland would remove the property from the county tax base, reducing tax revenues. Small beneficial impacts would occur associated with the workers needed for construction, as well as long-term benefits associated with improvement of fish runs and natural scenery.

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.

For the Kerry Island project, socioeconomic impacts are low, consistent with those described in the Programmatic Estuary EA Section 3.12.3.

## **12. Visual Resources**

Kerry Island can be seen from Highway 30 to the south and Carver Road to the north. The removal of the levee and restoration of Kerry Island to a more natural state would increase hydrological connectivity resulting in an increase in the quality and size of the wetland within the project site. The island would 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 infrastructure 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 as is consistent with the visual resources analysis in the Programmatic Estuary EA, Section 3.13.3.

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

The Kerry Island project would result in 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 be daily tidal flooding or seasonal flooding of the island. The project would increase the surface area of flowing and standing water in places where there was none in recent history, which may result in safety concerns where roads or trails bring people in close proximity to new/restored hydraulics.

The Kerry Island project includes project designs with constructed marsh channels sloping downward to promote draining and ponding, and long-term monitoring to ensure proper site drainage would be implemented to avoid increased breeding habitat for mosquitoes. The existing levee road along the north side of the island would be breached and would no longer facilitate access to the areas proposed for restoration. As a result, the only impacts are associated with construction and maintenance, and are low, consistent with those described in the Programmatic Estuary EA, Section 3.14.3.

## **14. Transportation and Infrastructure**

The Kerry Island project is expected to have minimal impacts on transportation or infrastructure, as the road that currently exists on the north part of the levee would be breached. This road is a spur with no connections, and was likely historically used to facilitate livestock grazing on the island. The project is not expected to have any impacts on navigability within the Columbia River or within Westport Slough, consistent with the analysis in the Programmatic Estuary EA, Section 3.15.3.

## **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 Kerry Island project area. Positive impacts would include the creation of a carbon sink that would store carbon dioxide and

