SUPPLEMENT TO APPLICATION FOR INDIVIDUAL PERMIT
TO U.S. ARMY CORPS OF ENGINEERS
SAN FRANCISCO DISTRICT

GIACOMINI WETLAND RESTORATION PROJECT
FILE: 27398N
MARIN COUNTY, CALIFORNIA

FEBRUARY 11, 2008

PROJECT TITLE: GIACOMINI WETLAND RESTORATION PROJECT – PHASE II: RESTORATION OF HYDROLOGIC AND ECOLOGICAL PROCESSES AND FUNCTIONS

PROJECT APPLICANT: NATIONAL PARK SERVICE (GOLDEN GATE NATIONAL RECREATION AREA/POINT REYES NATIONAL SEASHORE) AND CALIFORNIA STATE LANDS COMMISSION

FILE #: 27398N

INTRODUCTION: The National Park Service, Point Reyes National Seashore, 1 Bear Valley Road, Point Reyes Station, California, 94956 (Contact: Lorraine Parsons, Project Manager, 415-464-5193) and the 100 Howe Ave., Suite 100-South, Sacramento, California, 95825 (Contact: Eric Gillies, Environmental Planner, 916-574-1897), have applied for a United States Army Corps of Engineers (Corps) permit to conduct Phase II of the Giacomini Wetland Restoration Project, Point Reyes Station, Marin County, California. The proposed project would involve restoration of hydrologic and ecological processes and functions through 1) removal of levees, tidegates, culverts, ditches, and other agricultural infrastructure; 2) topographic modifications aimed at creating special status species habitat and floodplain functionality; 3) improvement of hydraulic connectivity through tidal channel creation, channel realignment, and excavation; and 4) improvement of conditions for reestablishment of native vegetation. In addition, it would include enhancement of existing public access or creation of new access opportunities. This application is being processed pursuant to the provisions of Section 404 of the Clean Water Act (33 U.S.C. Section 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. Section 403).

PROJECT AREA LOCATION/OWNERSHIP: The Project Area is located approximately 40 miles northwest of San Francisco in the town of Point Reyes Station, County of Marin, California, and is comprised of the Waldo Giacomini Ranch (Giacomini Ranch) and Olema Marsh (Figure 1). The Park Service owns the 550-acre Giacomini Ranch (Figure 1). A portion of Lagunitas Creek and some tidal lands are owned and managed by the California State Lands Commission (CSLC), who is the lead agency under the California Environmental Quality Act (CEQA). The Park Service also owns a small portion of the 63-acre Olema Marsh; the other portion is owned by the non-profit organization, Audubon Canyon Ranch (ACR), which is actively working with the Park Service and CSLC on the proposed project.

Adjacent landowners include to the south: 1) Wildlife Conservation Board (lands are leased to County of Marin Department of Parks and Open Space for White House Pool and Green Bridge County parks) and 2) private residences along Levee Road/Sir Francis Drake Boulevard. To the north are CSLC-owned marshlands and open waters that are part of the southern portion of Tomales Bay. To the east and west are private residences that are part of Point Reyes Station and Inverness Park communities, respectively. Four private residences directly adjoin the Giacomini Ranch property on its western boundary.

PROJECT AREA DESCRIPTION/BACKGROUND: The Giacomini Ranch and Olema Marsh lies at the very southern end of Tomales Bay, a 6,800-acre, 12-mile-long, approximately 1-mile-wide estuarine embayment that runs along Point Reyes National Seashore (Seashore)'s northern perimeter (RWQCB 2001; Figure 1). The largest subwatershed within Tomales Bay is Lagunitas Creek, which flows through the center of the Giacomini Ranch, dividing the ranch into the East (adjacent to Point Reyes Station) and West (adjacent to Inverness Park) Pastures (Figures 1 and 2). Olema Creek and Bear Valley Creek, which flows through Olema Marsh, are two large tributaries that join with Lagunitas Creek within the Project Area (Figures 1 and 2).

Excessive sedimentation in the Tomales Bay watershed during the late 1800s from logging and agricultural development resulted in large-scale conversion of open water and mudflats to vegetated marsh, nearly doubling vegetated wetland acreage in the bay. However, many of Tomales Bay's tidal marshes were subsequently filled or hydrologically disconnected from creeks and the bay by construction of levees or earthen berms for roads, railroads, livestock ponds, and duck clubs. The largest loss of hydrologically connected wetlands in Tomales Bay came with diking of approximately 550 acres for operation of the Waldo Giacomini dairy ranch and pastures in 1946 (Figures 1 and 2). A portion of this wetland complex had already been lost around the turn of the 20th century, when a levee was constructed across the mouth of Bear Valley and Olema Creeks for a road (Figures 1 and 2).

Since then, the Project Area has been subjected to numerous alterations for maintenance and operations purposes, including: rip-rapping, realignment of creeks, installation of tidegates and culverts, diversion of Lagunitas Creek waters for pasture irrigation, straightening of former tidal creeks, excavation and maintenance through dredging of drainage and borrow ditches, filling and leveling of wetlands, manure spreading, removal of riparian vegetation, and introduction of non-native herbs and forbs to increase forage for approximately 500-800 head of grazing dairy cattle. In some cases, lack of maintenance can be the problem as is seen in highly altered systems such as Olema Marsh, where lack of culvert maintenance has allowed water levels within the marsh to steadily increase during recent years.

The Giacomini Ranch was purchased by the National Park Service (Park Service) in February 2000, although the property is still being operated as a dairy ranch by the Giacominis until 2007 under a Reservation of Use agreement. The Giacomini Ranch is in the north district of the Golden Gate National Recreation Area (GGNRA), which is managed by the Seashore.

NEED FOR PROJECT : Since early 1900s, levees constructed at the southern end of Tomales Bay for roads and dairy farms have served to hydrologically disconnect Lagunitas Creek and its tributaries from their floodplains. Infrastructure such as levees, tidegates, and culverts, as well as intensive agricultural management, has degraded the condition of these wetlands and substantially reduced hydrologic and ecological functionality of what was once of the largest integrated tidal marsh complexes in Tomales Bay. Hydrologically connected, natural wetlands provide many important functions and services for humans and wildlife, including floodwater retention, water quality improvement, wildlife habitat and food supply, recreational opportunities, and support of mariculture and fisheries industries.

Within the Project Area, levees have dramatically reduced floodwater retention in floodplains of Lagunitas Creek and Tomasini Creek, with levees along Lagunitas Creek potentially exacerbating flooding of adjacent private properties. Removal of riparian vegetation on levees has also decreased the ability of riparian systems to dissipate the energy of flood flows, leading to faster, more turbulent, and erosive flows. In Olema Marsh, steadily increasing water surface levels created by poor drainage of Bear Valley Creek flows have not only reduced the potential volume of floodwater that can be stored, but threaten to increase flooding of adjacent county roadways such as Levee Road and Bear Valley Road.

While the Giacomini Ranch and Olema Marsh are still largely wetland and home to at least two federally listed threatened or endangered species, their value to the larger Lagunitas Creek and Tomales Bay ecosystems has been greatly diminished by land degradation and the lack of hydrologic connectivity. Wetlands on the Giacomini Ranch largely consist of monotypic expanses of wet pasturelands created through seeding of non-native grasses and herbs and lack the structural habitat diversity so important to wildlife. The conversion of Olema Marsh to freshwater marsh through diking has ostensibly increased its attractiveness to some wildlife species, such as waterbirds, but it likely has also displaced species that could have historically occurred in the transitional zone between fresh and salt water, such as the federally listed endangered species, tidewater goby (*Eucyclogobius newberryi*).

The issue of wetland and floodplain functionality is particularly important in Tomales Bay. The largely rural nature of this watershed has not rendered it immune to impact from human uses, including failing septic systems, agriculture, mercury mining, landfill operations, and oil spills. The failure of Tomales Bay to consistently meet water quality standards for designated beneficial uses such as oyster mariculture and public recreation and wildlife needs prompted the San Francisco District of the Regional Water Quality Control Board

(RWQCB) to designate the bay and some of its subwatersheds as impaired for sediment, nutrients, pathogens, and mercury under Section 303(d) of the Clean Water Act. The RWQCB is in the process of finalizing or developing several new water quality standards for Tomales Bay through the Total Maximum Daily Load (TMDL) process, which sets maximum limits of loading to designated water bodies for pollutants of concern such as sediment, nutrients, pathogens, and mercury.

Water quality problems threaten not only the oyster fisheries and humans using the Bay for recreational purposes, but the freshwater, estuarine, and marine wildlife species that use Tomales Bay for breeding or foraging habitat. Because of its importance to wildlife, Tomales Bay is not only part of the Golden Gate Biosphere Reserve and a California Critical Coastal Area, but in 2002, it was nominated as a "Wetland of International Importance" under an international treaty called the Convention on Wetlands (commonly known as the Ramsar Convention). Tomales Bay is also one of 16 wetland areas that qualify for inclusion as a wetland of regional importance under the Western Hemisphere Shorebird Reserve Network because of its large number of wintering and migrating shorebirds (Kelly 2001).

These threats have galvanized community-led efforts to improve the health of Tomales Bay. The Tomales Bay Watershed Council, which is composed of watershed stakeholders from many different agencies and organizations in Marin and the surrounding San Francisco Bay region, recently developed a stewardship plan that has established water quality improvement and restoration and preservation of the integrity of natural habitats and native communities as key goals (TBWC 2003). These goals are consistent with those of the Park Service, which has begun to incorporate enhancement and restoration, as well as preservation and conservation of natural resources, into its stewardship mission. The Seashore and the GGNRA have embarked upon a number of enhancement and restoration projects that focus on improving the quality of natural resources within these parks, with the proposed project being one of the largest.

In addition to improving resource conditions within the Giacomini Ranch and Olema Marsh, restoring or improving functionality may also improve the health of the overall Tomales Bay ecosystem. Within the Project Area, restoration of natural hydrologic processes through removal or replacement of levees, tidegates, and culverts and increased connectivity with historic floodplains would potentially reduce flooding within the local community by increasing the amount of floodplain available for storage or conveyance of floodwaters. Increased connectivity of floodwaters with floodplains could also improve water quality, because floodwaters carry sediments, nutrients, pathogens, and contaminants that could now be deposited onto floodplains rather than transported downstream to Tomales Bay. The potential value of the Project Area to improvement in downstream water quality is underscored by the fact that two-thirds of water flowing into the Bay comes from Lagunitas Creek (Fischer et al. 1996), which is currently leveed to run through the middle of the Giacomini Ranch. Restoring these wetlands would not only benefit flooding and water quality, but would increase habitat and food resources for wildlife within the Project Area and the entire Tomales Bay watershed.

ARMY CORPS JURISDICTION: While the Giacomini Ranch and Olema Marsh are both leveed and have been for more than 60 years, both areas remain largely wetland, although functionality of these wetlands have been negatively impacted by agricultural and other types of management activities. A wetland delineation for the Giacomini Ranch and Olema Marsh was performed by the Seashore and verified by the Corps in 2005 (Parsons 2005). Based on this delineation, 536.6 acres of wetlands and waters subject to Section 404 jurisdiction under the Clean Water Act exist in the Project Area, with 249.3 of those acres also subject to Section 10 jurisdiction under the Rivers and Harbors Act (Table 1; Figure 3; Parsons 2005). Another wetland delineation was performed by the Seashore in 2007 to determine acreage of wetlands in the quarries slated for restoration using soils excavated from the Giacomini Ranch and Olema Marsh (Parsons et al. 2007): this delineation was verified by the Corps on January 11, 2008. Acreage of wetlands within the quarry restoration areas totaled 0.25 acres of adjacent and 0.02 acres of non-tidal wetlands (Figures 4a-4e).

Section 404 Jurisdictional Waters **(Parsons 2005).** Within the Project Area, jurisdictional tidal features were defined as wetlands and waters that fell below the High Tide Line (HTL), which was calculated as 8.06 ft NAVD88 (Table 1; Figure 3). Jurisdictional tidal waters present in the Delineation Study Area consisted of unvegetated (<5 percent vegetation cover) areas below the High Tide Line (HTL) in Lagunitas Creek and the downstream portions of Tomasini, Fish Hatchery, Bear Valley, and Olema Creeks. Jurisdictional non-tidal waters consisted of unvegetated areas below the Ordinary High Water (OHW) elevation. Non-Tidal Waters were mapped in small portions of Fish Hatchery Creek, Tomasini Creek, 1906 drainage, and a small drainage

near White House Pool. Potential jurisdictional Section 404 "adjacent" waters consisted of one small portion of a historic slough in the Giacomini Ranch East Pasture that has been hydrologically disconnected from Tomales Bay by the Lagunitas Creek levee.

***Section 404 Jurisdictional Wetlands* (Parsons 2005).** Jurisdictional tidal wetlands were comprised of vegetated areas (>5 percent vegetation cover) below the HTL (Table 1; Figures 3 and 4). Within the Project Area, tidal wetlands included the undiked marsh plain north of the Giacomini Ranch, fringing marsh along Lagunitas Creek, and fringing marsh along the downstream portions of Tomasini Creek and the Silver Hills drainage outlet. It also included diked portions of Fish Hatchery Creek in the northern portion of the West Pasture that are flooded during high tides. Jurisdictional Non-Tidal Wetlands consisted of vegetated areas (vegetation cover > 5 percent) below the OHW. Within the Project Area, Non-Tidal Wetlands included vegetated, upstream portions of Fish Hatchery Creek, the Old Slough in the Giacomini Ranch West Pasture, and Tomasini Creek. Some Non-Tidal Wetlands also occurred along one of the access routes to McClure DG in the Keyes North drainage (Figure 4b). By far, the largest portion of Non-Tidal Wetlands occurred in Olema Marsh, which largely falls below OHW and is heavily vegetated (Figure 3).

Jurisdictional Section 404 "adjacent" wetlands represented most of the jurisdictional features delineated in the Project Area (Figure 3). "Adjacent" wetlands consisted of vegetated areas directly adjacent to Tidal and Non-Tidal Waters and Wetlands that could be considered connected either through hydrology (e.g., surface water connection or groundwater movement) or ecologically (e.g., movement of organisms). Specifically, these jurisdictional features included most of the wetlands in the Giacomini Ranch pasturelands and in County Park lands near White House Pool and the Green Bridge/dairy facility area. Adjacent wetlands also occurred along some of the established access routes to the sediment disposal quarries on the Point Reyes Peninsula (Figures 4b-4d).

***Section 10 Jurisdictional Waters* (Parsons 2005).** Jurisdictional Section 10 waters consisted of navigable waters either presently or historically subject to tidal influence that fall below Mean High Water (MHW; Table 1; Figure 3). In the Project Area, jurisdictional Section 10 waters included Lagunitas, Tomasini, Fish Hatchery, Bear Valley, and Olema Creeks. In addition, it included portions of the Giacomini Ranch, Olema Marsh, and Olema Creek floodplains that were historically subtidal or intertidal and therefore below MHW before being diked or culverted/bridged.

TABLE 12. ACREAGES OF JURISDICTIONAL AND POTENTIAL JURISDICTIONAL SECTION 404 WETLANDS AND WATERS AND SECTION 10 WATERS

	Section 404 Waters			Section 404 Wetlands			Section 10
	Tidal	Non-Tidal	Adjacent	Tidal	Non-Tidal	Adjacent	Waters
Jurisdictional	43.88	0.36	4.03	54.99	49.87	385.88	249.28

Source: Parsons 2005, Parsons et al. 2007

PROJECT DESCRIPTION: The Giacomini Wetland Restoration Project is separated into two phases. Phase I was conducted and completed in fall 2007 under Nationwide Permit #27 (North District San Francisco Corps staff person: Bryan Matsumoto). It focused on removal of agricultural infrastructure and conditions (e.g., scraping of manure disposal pastures and pastures dominated by non-native forage grasses and herbs), as well as creation of freshwater marsh and ponded areas for the federally threatened California red-legged frog (*Rana aurora draytonii*) as mitigation for ongoing and projected losses of existing freshwater marsh habitat from increases in salinity. Removal of agricultural infrastructure and conditions (such as scraping of the manure disposal pastures) in 2007 ensured that enhanced flood flow action from lowering of the south levee of the East Pasture did not result in transport of manure-laden soils or barbed-wire fencing and other agricultural facilities downstream to Tomales Bay.

Phase II of the proposed project would substantially restore natural hydrologic and ecological processes in the Giacomini Ranch and Olema Marsh and increase functionality of these wetland systems. In addition to improving resource conditions within the Giacomini Ranch and Olema Marsh, these actions would be expected to have an even greater benefit than Phase I on health of the overall Tomales Bay ecosystem.

Restoration of natural hydrologic processes through removal or replacement of levees, tidegates, and culverts and increased connectivity with historic floodplains would potentially reduce flooding within the local community by increasing the amount of floodplain available for storage or conveyance of floodwaters. Increased connectivity of floodwaters with floodplains could also improve water quality, because floodwaters carry sediments, nutrients, pathogens, and contaminants that could now be deposited onto floodplains rather than transported downstream to Tomales Bay.

Phase II involves complete removal of levees in both the West and East Pastures of the Giacomini Ranch. It also incorporates additional removal of agricultural infrastructure such as culverts and ditches; tidal channel creation; grading to restore more stable creek banks and heavily disturbed area; excavation to lower higher elevation areas to active floodplain and intertidal marshplain elevations; and active revegetation in areas where natural colonization by native plant species is expected to be low or possibly outcompeted by fast-establishing, non-native or even invasive species (Figure 5). In addition, the proposed project includes restoration actions at Olema Marsh, which is located south of the Giacomini Ranch and White House Pool and is owned by ACR and the Park Service. Under this project, the Bear Valley creek channel that flows through the Olema Marsh would be excavated to allow for better passage of salmon and other fish species, with possible future replacement of the Levee Road and/or Bear Valley Roads culverts should initial restoration efforts not achieve the desired degree of hydrologic connectivity between Olema Marsh and Lagunitas Creek (Figure 5). Public access components include the improving the existing southern perimeter spur trail system in the East Pasture and extending the Tomales Bay Trail directly northeast of the Giacomini Ranch through creation of a small spur trail on the former railroad grade that borders the ranch on the east (Figure 6). Phase II would be conducted starting in June 2008, with all wetland, riparian, and creek-related restoration components completed by October 31, 2008.

Restoration – East Pasture

- ***Removal of Agricultural Infrastructure (Eliminate Road, Fill Drainage Ditch, Maintain Infrastructure; Figure 5):*** Remaining agricultural infrastructure present in the East Pasture after completion of Phase I and in the West Pasture would be removed.

  As part of this effort, the 3.37-acre drainage ditch network in the East Pasture would be eliminated, except for some sections of the East Pasture Old Slough (Figure 7). To ensure that drainage ditches do not continue to channel drainage flows in the East Pasture, dense clay materials excavated during enhancement or creation of tidal creeks (see below) would be placed strategically in drainage ditches as “blocks” to retard lateral flow (Figure 8). Depending upon the expected inundation frequency of the site by tides, either wet topsoil materials or dry, non-anoxic topsoil materials from levee removal and other components would be required to fill the ditch to slightly above the surrounding pasture grade, which would help to offset expected compaction of soils over time (Figure 8). Approximately 14,500 CY of soils would be required to fill the ditch system. Approximately 200 linear feet of culverts that currently channel irrigation and surface runoff waters through the drainage ditches would also be removed through excavation (Figure 7), and the 20 CY of culvert material would be recycled or disposed of at a municipal landfill.

  To enable the ditches to be filled, temporary coffer dams would be placed at opposite ends in 300-foot sections of ditch starting in the southern portion of the East Pasture. Water would be pumped from these “cells” into adjacent sections of ditch: once these other sections of ditch are filled, dewatering would be performed as described under Dewatering in the Construction section and in Appendix A. Partial dewatering would be conducted at the offset to enable better seining of the ditches by fisheries and aquatic resources personnel to allow for better surveying and recovery of special status and common aquatic organisms. Work areas would not be fully dewatered until the Environmental Monitor has given the notice to proceed. Pumps would be screened with a mesh size not to exceed 1/8-inch to ensure protection of special status species such as tidewater goby. The majority of work on this component would not begin until after July 1.

  The 0.08-acre tidegate and culverts on the northernmost end of the East Pasture Old Slough adjacent to Lagunitas Creek would also be removed (Figure 9). During the first phase of deconstruction, the existing levee would be expanded to the south by 0.2 acre into the East Pasture Old Slough Pond. Prior to levee widening, the work area would be isolated with placement of a fisheries net, and

clearance surveys would be performed within the work area to remove all species status species and other aquatic organisms. Approximately 1,600 CY of material will be used to create the widened levee section. Dewatering would be performed on the inboard side of the levee by pumping waters from the East Pasture Old Slough Pond into the remaining sections of the drainage ditch network and/or Shallow Shorebird Habitat as described under Dewatering in the Construction section and in Appendix A. Pumps would be screened with a mesh size not to exceed 1/8-inch to ensure protection of special status species such as tidewater goby, and seine nets with a similar mesh size would be established at the perimeter of the construction area to ensure that goby and other organisms do not move into the construction area. This work component would not be conducted until after July 31. Once the new levee section is constructed, this area will be used as a platform for construction equipment to remove the four (4) culverts, tidegates, and associated riprap and sheetpiling material. This component would generate 180 linear feet of culvert and approximately 20 CY of metal material for recycling or disposal. Following removal of the culvert/tidegates and associated earthen material overlaying the culverts, the newly constructed levee will remain as part of the high tide refugia berm being created around the perimeter of the East Pasture Old Slough Pond to improve habitat for both tidewater goby and rails (see *Creation of High Tide Refugia Berm* below under East Pasture).

Other infrastructure such as the concrete spillway (3,100 SF or 0.07 acre), Tomasini Creek railroad car-type bridge (384 SF or 0.008 acre), electrical lines, transmission poles, and pumphouses (3000 CF of pumphouse and 800 linear feet of pipe and poles) would also be dismantled, and the materials totaling approximately 340 CY either recycled or disposed of at the appropriate facilities. These structures would be removed, and the areas would be brought back to surrounding pasture or creek bed grade (Figure 10). Approximately 32,500 square feet or 0.75 acre of compacted ranch roads would be shallowly graded or ripped to remove compaction, and any excess soils generated would be used to fill in drainage ditches.

- ***Recontouring of the Natural Point Reyes Mesa Topography at the Dairy Facility (Figure 5)***: The natural contours and topography of the Point Reyes Mesa bluff would be recreated at the Dairy Facility by decreasing the steepness of the slopes outboard of the Dairy Facility and eliminating the road from the Dairy Facility leading down into the pastures (Figure 11). The slopes would be no more than a 7:1 slope (Figure 12). The softness of the natural topography would be enhanced through selective and fill and grading just outboard of the former manure ponds. Approximately 35,200 CY of material will be used in this component, and the material would all come from on-site sources such as the levee removal, shallow excavation of the East Pasture southwestern corner, and other excavation and fill activities. Once completed, the regraded area will be stabilized using appropriate erosion control measures such as coir logs or straw wattles and revegetated with locally collected native plant species and seed characteristic of the Point Reyes Mesa bluff and other mesic scrub environments. These species include ledum (*Ledum glandulosum*), hazelnut (*Cornus sericea*), wax myrtle (*Myrica californica*), red elderberry (*Sambucus racemosa*), coyote brush (*Baccharis pilularis*), and, in the wettest areas, small-fruited bulrush (*Scirpus microcarpus*).

- ***Complete Removal of Levee in East Pasture (Remove or Breach Levee; Figure 5):*** The remainder of the levees in the East Pasture would be removed. Prior to construction, a combination of silt fencing and turbidity curtain would be installed to minimize incidental fallback of excavated sediment into Lagunitas Creek, with turbidity curtain used in more eroded areas or areas where the levee directly abuts the creek. Approximately 5,940 linear feet of levee would be excavated to the adjacent pasture elevations (Figure 13). Certain portions of the creek bank, where levees are lower and have established riparian vegetation, would not be excavated to preserve erosion protection for banks and existing habitat for aquatic and terrestrial wildlife species. This includes an approximately 900-foot section near White House Pool bend in Lagunitas Creek.

  The top 1 foot of the levee would be cleared and grubbed first to remove vegetation. Next, 0.5-foot to 2.0 feet would be excavated in layers to bring the levee to a final elevation of 7.5-foot NAVD88 (Figure 14). A 7.5-foot elevation would ensure that the pasture interior does not become tidal during higher high tides that would be expected during the construction season: most of the extreme tides occur in the winter. After this excavated material is hauled away to an on-site fill location, the remainder of the levee below 7.5-feet NAVD88 would be graded to maintain a 1- to 3-foot-high berm 2 feet in top width on the outboard portion of the levee with a 3:1 slope created on the inboard side (Figure 14). A shallow trench approximately 2 feet deep and approximately 6 feet wide would be excavated on the inboard side of the berm in the area where the inner part of the levee was formerly located.

Temporary stockpiling needs would be minimized through direct placement of excavated soils into off-road dumptruck. Initial excavation would generate approximately 22,300 CY. Excavated levee materials would be re-used as on-site fill for Dairy Mesa recontouring, regrading of the former Dairy facility on the Point Reyes Mesa, and topsoil for ditch removal.

After all other components in the East Pasture have been completed and during a neap tide series, approximately 2,386 CY of remnant "berm" material would be pushed into the ditch using a bulldozer and graded to match adjacent pasture grades (Figure 14).

- ***Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Conduct Revegetation; Figure 5)***: Approximately 1,525 lineal feet or 1.86 acres of bank along Lagunitas Creek in the southwestern portion of the East Pasture would be graded to convert the current moderately steep slope (3:1) into a terraced floodplain bench at the top of bank within this reach of Lagunitas Creek (Figures 15 and 16). Prior to construction, silt fence would be installed temporarily creekward of the work area to minimize the potential for incidental fallback of graded soils into Lagunitas Creek. Approximately 0.33 acres of additional bank stabilization and/or invasives removal, and revegetation would be conducted on portions of Lagunitas Creek opposite or just downstream of White House Pool.

  Grading and stabilization activities would focus on portions of the creek bank that are currently dominated by non-native invasive plant species such as Himalayan blackberry, avoiding adjacent areas and lower elevation areas that support mature arroyo willow shrubs and trees, thereby preserving instream habitat for aquatic species such as central California coastal steelhead (*Oncorhynchus mykiss*; FT) and coho salmon (*Oncorhynchus kisutch*; FE), California freshwater shrimp (*Syncaris pacifica*; FE), and other aquatic species. Approximately 4,200 bulk CY would be removed as part of this component, including spoil material that had been placed on top of the bank during ranching operations. Excavated material would be used to as fill material for Dairy Mesa recontouring. This work component would not be conducted until after July 15.

  Following completion of grading, the exposed soil would be stabilized using techniques that may include placement of erosion control blanket or biotechnical stabilization measures such as willow mattresses, and revegetation would be conducted through sprigging and installation of container plants grown from locally collected material. Plant species to be planted include arroyo willow (*Salix lasiolepis*), red alder (*Alnus rubra*), box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), hazelnut (*Cornus sericea*), wax myrtle (*Myrica californica*), twinberry (*Lonicera involucrata*), red elderberry (*Sambucus racemosa*), coyote brush (*Baccharis pilularis*), and California blackberry (*Rubus ursinus*). An on-site irrigation system may be used for the first three years to increase survival of plantings, as the bank has naturally aggraded due to historic sediment deposition and is some distance above the summer water table.

- ***Removal of Riprap and Regrading of Creek Bank in Southern Portion of East Pasture (Remove or Breach Levee; Figure 5)***: An approximately 300-foot section of the East Pasture Lagunitas Creek bank was riprapped following the 1982 flood, which involved use of large rock or boulders on creek banks to minimize erosion or loss of levee. More than 75 percent of the estimated 700 cubic yards of riprap above the Mean High Water (MHW) mark would be removed and hauled off-site to the Seashore's maintenance yard at the Bear Valley administrative complex (Figures 17 and 18). The remaining 23 percent (160 bulk CY) would be used to stabilize an approximately eroded 100-foot or 0.001 acre section of creek bank just upstream through excavation of a trench just below MHW (no deeper than -4 feet NAVD88). Rock would also be placed at the toe of the slope below MHW and packed tightly with soil (Figures 17 and18). The approximately 8,000 square feet or 0.18 acre of creek bank exposed by removal of riprap and an approximately 100-foot section of non-rip rapped, highly eroded creek bank just upstream would be regraded above MHW to a more stable topographic profile.

  The toe of the regraded slope would be planted with willow sprigs, while the upper slopes would be stabilized with erosion control blanket, a geotechnical fabric, or other appropriate stabilization measure and revegetated with native riparian plant species. Plant species to be planted or sprigged include arroyo willow (*Salix lasiolepis*), red alder (*Alnus rubra*), box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), hazelnut (*Cornus sericea*), wax myrtle (*Myrica californica*), twinberry (*Lonicera involucrata*), red elderberry (*Sambucus racemosa*), coyote brush (*Baccharis pilularis*), and California blackberry (*Rubus ursinus*).

Prior to construction, a combination of silt fencing and turbidity curtains would be installed to minimize the potential for incidental fallback of excavated soils into Lagunitas Creek. Work would be conducted during low tides, when possible. Plantings of native riparian tree and shrub species would be conducted to increase bank protection afforded by establishment of vegetation. This work component would not be conducted until after July 15.

- ***Remove Portion of Tomasini Creek Berm and Reconnect Tomasini Creek to Historic Channel Alignment (Remove or Breach Levee, Excavate; Figure 5)***: Tomasini Creek would be entirely realigned into one of its historic alignments (Figures 19 and 20). Just downstream of the Worker Housing, which is west of Mesa Road, an approximately 0.18-acre section (no more than 8,000 sq ft) of levee that separates Tomasini Creek from the East Pasture would be cleared and grubbed and then removed, generating approximately 300 bulk CY. Approximately 200 CY of excavated materials would be used to construct a new berm measuring approximately 5,400 square feet or 0.16 acre in the existing, leveed Tomasini Creek channel that would allow flood overflow during storm events exceeding a 2-year return interval. Approximately 770 linear feet or 1.0 acre of creek channel would then be created through the Tomasini Triangle to the north of the new freshwater marsh, generating an additional 900 bulk CY. In addition, approximately 170 linear feet or 0.08-acre of upstream portions of Tomasini Creek in its current alignment would be shallowly graded by 1- to 2-feet to improve hydraulic connectivity, generating another 258 CY of material.

  The adjacent creek banks would be revegetated with native riparian plant species either through container plantings or spriggings, including arroyo willow (*Salix lasiolepis*), red alder (*Alnus rubra*), box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), hazelnut (*Cornus sericea*), wax myrtle (*Myrica californica*), twinberry (*Lonicera involucrata*), red elderberry (*Sambucus racemosa*), coyote brush (*Baccharis pilularis*), and California blackberry (*Rubus ursinus*).

  During the summer and early fall, this section or creek is usually dry, however, should surface water flow be present at the start of construction, these waters would be bypassed around the construction area work site to the section of Tomasini Creek near the Giacomini Hunt Lodge (Appendix A). Any bypass equipment will have screens no larger than 1/8-inch to ensure the protection of special status species such as tidewater goby. With the exception of the coffer dams and the berm, the remainder of the current or existing Tomasini Creek channel would be left as is and allowed to function as a backwater slough, with tidal flow and spring and seep groundwater flow as the primary hydrologic sources. This work component would not be conducted until after July 31.

- ***Deepening of Historic Slough (Deepen Historic Slough; Figure 5)***: Tidegates, levees, and berms would be removed to allow tidal flows into the northern portion of the restored East Pasture. To create a gradient that would encourage drainage of creek flows during low tides, existing vegetation and at least 1- to 2 – feet of sediment would be removed from approximately 2,700 linear feet or 3.0-acres of historic slough in the northern end of the East Pasture to continue this gradient upstream and improve tidal circulation in the central portion of the restored East Pasture (Figures 21 and 22). This excavation would generate approximately 9,500 CY of material. All of this very wet excavated material would be spread over approximately a 1.96-acre area adjacent to the East Pasture Old Slough Pond and allowed to dewater prior to construction of the high tide refugia berm constructed around the perimeter of the East Pasture Old Slough Pond. The material would be spread in a layer no more than 3-foot high, however, the material would be expected to compact at least 50 percent from dewatering, leaving a final elevation of +1.5 feet above existing pasture grade. The berm would be constructed on top of this compacted material as described under *Creation of High Tide Refugia Berm* below under the East Pasture.

  As with the ditch system, excavation in the Old Slough would be constructed using the “cell” approach, with sheet piling or a coffer dam installed at the southern end of the work area. The northern end is already bounded by an earthen berm installed by the Giacominis. The work area may be partially dewatered by pumping water into the adjacent ditch system after installation of a coffer dam or sheet piling at a former, now deteriorated road crossing area. To assist with special status species surveys and recovery of special status and common aquatic organisms, work areas would be partially dewatered at first and would not be dewatered further until the Environmental Monitor has given the notice to proceed. Pumps would be fitted with screen with a mesh size not to exceed 1/8-inch to protect special status species such as tidewater goby. More detail on dewatering can be found under dewatering in the Construction section or in Appendix A. This work component would not be

conducted until after July 31.

- ***Realignment of Tomasini Slough Terminus with Lagunitas Creek (Excavate; Figure 5)***: The lower portion of the new Tomasini Creek or Tomasini Slough channel would be realigned so that the channel's downstream reach does not necessarily follow the entire East Pasture Old Slough alignment, but curves around the East Pasture Old Slough Pond and then flows through the former outlet into Tomales Bay/Lagunitas Creek, which was one of the historic channel alignments prior to leveeing (Figures 23 and 24). The existence of a large gravel bar slightly westward of this outlet precludes placement of this outlet further west of the EPOS Pond, because the gravel bar would dampen tidal amplitude and, therefore, tidal prism and could, therefore, jeopardize functionality and long-term persistence of created tidal channels. Realignment of the downstream reach of Tomasini Slough would enable preservation of the existing habitat in the currently bermed off section of the East Pasture Old Slough for tidewater goby, which are believed to have been washed into the pond created by construction of an in-channel levee by the Giacominis. Preservation of existing habitat will be enhanced by enhancement of the existing and construction of a new berm on the perimeter of the East Pasture Old Slough Pond (See *Creation of High Tide Refugia Berm* below; Figures 23 and 24).

  Channel width for the 1,200–linear-foot realigned section of Tomasini Slough will be 50 feet, and the area will be excavated approximately 4 feet to bring bottom elevations of the new channel to between 0- and 1 feet NAVD88. Excavation will generate approximately 8,890 CY of material, all of which will be used for the High Tide Refugia Berm. The channel excavation area may need to be dewatered. During the summer, the groundwater table would be at or slightly below the target elevation grades. To minimize surface inflow, earthen material near the created channel's terminus with the outlet to Lagunitas Creek would be left in place until construction of the rest of the channel is completed. Any groundwater that flows into the channel under construction would be pumped to nearest ditch or to the Shallow Shorebird Habitat, depending up on the channel's location. A complete explanation of dewatering plan can be found under dewatering in the Construction section or in Appendix A. This work component would not be conducted until after July 31.

- ***Creation of High Tide Refugia Berm (Create Habitat; Figure 5)***: As described above in *Realignment of Tomasini Slough terminus*, the terminus of Tomasini Creek or Tomasini Slough would be realigned to preserve the East Pasture Old Slough Pond, a section of the historic slough that was partially leveed by construction of an in-channel berm for duck hunting purposes. Tidewater goby was recently been found in this pond after apparently being washed in from Tomasini Creek during one of the more recent large storm events. In addition to preserving the pond, the muted tidal or impounded nature of this pond will be enhanced by creating a berm around the entire perimeter of the pond that will limit the frequency of tidal inflow, as goby tend to flourish more under impounded conditions (Figures 23 and 24). This berm is intended to maintain existing habitat during the early phase of restoration in order to allow time for the natural recruitment of goby into new habitats, as well as to allow time for direct outplanting and captive propagation efforts to become effective in establishing subpopulations in other on-site and off-site areas. In addition to benefitting tidewater goby by maintaining impounded conditions, a portion of the berm, which will be constructed at varying heights, will serve as high tide refugia habitat for California black rail and potentially California clapper rail, similar to habitat being created on the West Pasture.

  Approximately 11,175 CY of materials from excavation of the East Pasture Old Slough, the new Tomasini Slough terminus, and the adjacent East Pasture levee excavation would be used to create a 2.28-acre berm of varying heights around the pond. The top of the western portion of the berm would be constructed at an 8- to 9-foot elevation NAVD88 to enhance its usefulness as rail habitat, while the northern, southern, and eastern portions would be constructed at a 6-foot elevation NAVD88 to allow tidal inflow into the pond during high tide events. Construction at the southern end would involve reinforcing the existing berm and building up to an elevation of 6 feet NAVD88. The base of the berm would be built with excavated sediment and vegetative materials from the East Pasture Old Slough excavation (see above) that would be allowed to dewater over a period of time and compact to 50 percent of the initial volume. Materials from creation of the new Tomasini Slough terminus would then be placed on top and compacted in lifts. Finally, dry, granular material from the East Pasture levee excavation would be placed as surface or topsoils to ensure appropriate conditions for revegetation.

  This area would be actively revegetated with native salt marsh and upland ecotone plant species at

the appropriate elevations. These species include saltgrass (*Distichlis spicata*), jaumea (*Jaumea carnosa*), and pickleweed (*Sarcocornia* or *Salicornia virginica*). Higher elevation marsh areas would be more actively revegetated using container plant species or seed from species such as gumplant (*Grindelia stricta*), arrow-grass (*Triglochin maritima*), saltgrass, red rescue (*Festuca rubra*), and alkali heath (*Frankenia salina*). The highest elevations that would only occasionally be potentially exposed to tides would be planted with species such wildrye (*Leymus triticoides*), coyote brush (*Baccharis pilularis*), and gumplant (*Grindelia stricta*). Prior to construction, silt fencing or turbidity curtains would be installed to minimize the potential for incidental fallback of excavated soils into Lagunitas Creek.

- ***Creation of New Tidal Channels (Create Tidal Channel; Figure 5)***: Approximately 10,280 linear feet of new tidal channel would also be excavated in the northeastern, central, and western portions of the restored East Pasture (Figure 25). The average width and depth for each channel starts out at 6 feet wide and 2.0 feet deep and tapers to 4 feet wide and 1 foot deep at its terminus: slope would be 1:1 and similar to most other deltaic tidal channels in geomorphology to most other natural channels in the undiked marsh to the north (Figure 25). Overall, construction and deepening of existing sloughs would be designed to create a balance in water residence time such that ponded areas are retained during low tide for aquatic species such as tidewater goby, but flushing occurs regularly enough that water quality and intertidal mudflat conditions are maximized.

  In addition to the tidal channels draining to the realigned Tomasini Creek, a so-called "starter" channel would be constructed in the southern end of the East Pasture on the west side of the New Duck Pond to allow for creation of a tidal channel that would drain to Lagunitas Creek. The starter channel would be located roughly in the same alignment as a historic slough that roughly overlay the San Andreas Fault trace. Length of the starter channel would total approximately 1,800 feet, some of which would utilize the alignment of the current ditch in that area.

  Excavation for all tidal channels would total approximately 8.72 acres and would generate 9,860 CY, with much of the excavated material being used to fill adjacent ditches. Channels would be dug such that connection to hydrologic source (e.g., realigned Tomasini Creek, Lagunitas Creek, etc.) would occur last.

  As with excavation of Old Slough, channel excavation areas would probably need to be dewatered. During the summer, the groundwater table would be at or slightly below the target elevation grades. To minimize surface inflow, earthen material near the created channel's terminus with a larger slough would be left in place until construction of the rest of the channel is completed. Any groundwater that flows into the channel under construction would be pumped to nearest ditch or to the Shallow Shorebird Habitat, depending up on the channel's location. A complete explanation of dewatering plan can be found under dewatering in the Construction section or in Appendix A.

- ***Excavation of Southwestern Portion of East Pasture to Marshplain/ Floodplain Elevations (Excavate; Figure 5)***: Currently, the southern portion of the East Pasture is above elevations subject to regular tidal and floodplain processes due to large amounts of sediment deposited by past flooding and past fill and grading activities. The southwestern portion of the East Pasture where elevations equal or exceed approximately 5 feet NAVD88 would be excavated anywhere from up to 0.5- to 2 feet to create mid-marsh, high-marsh, and floodplain elevations ranging from 4.5- 8 feet NAVD88 (Figures 27and 28). Elevations between 10- and 11 feet NAVD88 would be scraped up to 1 foot to eliminate roots, seed banks, and fragments of weedy, non-native species. The extent of excavation would be ultimately dependent on funding, however, at its fullest extent, the excavation area could total up to 32.5 acres and would be graded to mimic natural topography of the East Pasture by creating a gradual downward slope from south to north. Excavation of this entire area would generate approximately up to 59,600 cubic yards of soil, some of which would need to be disposed of off-site at quarries on the Tomales Point that are slated for restoration. More detail on off-site hauling can be found under the Construction section. Should less excavation be performed, construction activities would focus on creating a larger watershed for the Lagunitas Creek created tidal channel or lowering higher elevation areas in the middle and eastern portions of this area to active floodplain and intertidal marshplain elevations, generating closer to between 10,000 and 20,000 CY of soil. The extent and approach to revegetation would depend on the degree of excavation.

  Lower elevation areas would be expected to revegetate naturally, although this process might be accelerated through spreading of fragments of rhizomatous, stoloniferous, or above-ground materials

from locally collected native salt marsh plant species. These species include saltgrass (*Distichlis spicata*), jaumea (*Jaumea carnosa*), and pickleweed (*Sarcocornia* or *Salicornia virginica*). Higher elevation marsh areas would be more actively revegetated using container plant species or seed from species such as gumplant (*Grindelia stricta*), arrow-grass (*Triglochin maritima*), saltgrass, red rescue (*Festuca rubra*), and alkali heath (*Frankenia salina*). The highest elevations that would only occasionally be potentially exposed to tides would be planted with species such wildrye (*Leymus triticoides*), coyote brush (*Baccharis pilularis*), and sedge (*Carex barbarae*).

- ***Creation of Off-Channel Habitat for Special Status Species (Create Habitat; Figure 5***). One of the new tidal channels constructed off of Lagunitas Creek will occur directly adjacent to the New Duck Pond, a depressional basin that was bermed and flooded annually in the fall for duck hunting purposes. The potential for the New Duck Pond to serve as impounded off –channel habitat for tidewater goby using the new Lagunitas Creek side channel will be enhanced through retention, repair, and enhancement of the low-elevation berm (Figure 29). The six (6) duck blind structures will be removed to ground level, but any underlying concrete weir structure present in this area will be allowed to remain. Up to approximately 600 CY of dry, granular soil material excavated elsewhere (e.g., non-weedy soils from levee removal) will be used to reinforce and rebuild the 0.4-acre berm, which has degraded since duck hunting was discontinued, to 1- to 2-feet above the surrounding pasture grades. The berm will not exceed 6 feet NAVD88 in elevation, which would make it 2 feet higher than the surrounding pasture or future marshplain grade and 2- to 3 feet higher than the bottom of the deepest portions of the pond (Figure 29). The berm would be expected to be overtopped during high tide events and would therefore be expected to become high marsh. Active revegetation would jumpstart this process. Species incorporated would be the same as described for the High Tide Refugia Berm described above.

Restoration-West Pasture

- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Remove Fence; Figure 5):*** The amount of agricultural infrastructure present in the West Pasture is much less than that in the East Pasture. The 120 linear-foot culverted tidegate and headwall structure on Fish Hatchery Creek would be removed, which would generate approximately 60 bulk CY (Figure 30). During deconstruction of this 0.08-acre infrastructure, sheet piling or coffer dams would need to be installed at downstream and/or upstream locations to help dewater the construction work area. Waters within the dewatering area would be pumped either to downstream portions of the West Pasture Old Slough or outboard portions of Fish Hatchery Creek. Waters pumped to downstream portions of Fish Hatchery Creek would be required to meet background turbidity and pH levels in the creek or to be filtered until they do. More detailed information on dewatering can be found in the Construction section or in Appendix A. This work component would not be conducted until after August 31 due to its proximity to rail habitat.

  In addition to culverts, infrastructure in the West Pastures includes a 3,100 square-foot or 0.07-acre concrete spillway at the northern perimeter, which would generate approximately 115 CY (see typical cross-section Figure 10). Approximately 50 linear foot or 0.004 acre of culvert would also be removed from the southernmost portion of the West Pasture Old Slough, which would generate another 20 CY (see typical cross-section Figure 9). Non-soil material would be recycled or disposed of off-site at an appropriate landfill. This work component would not be conducted until after August 31 due to its proximity to rail habitat.

- ***Removal of Eastern Levee in West Pasture (Remove or Breach Levee; Figure 3)***: The entire approximately 5,240 linear feet of levee bordering Lagunitas Creek would be removed from the eastern perimeter of the West Pasture (Figure 13). The levees would be excavated to the adjacent pasture elevations. Prior to construction, a combination of silt fencing and turbidity curtain would be installed to minimize incidental fallback of excavated sediment into Lagunitas Creek, with turbidity curtain used in more eroded areas.

  Similar to the East Pasture levee removal strategy, the top 1 foot of the levee would be cleared and grubbed first to remove vegetation. Next, 0.5-foot to 2.0 feet would be excavated in layers to bring the levee to a final elevation of 7.5-foot NAVD88 (Figure 14). A 7.5-foot elevation would ensure that the

pasture interior does not become tidal during higher high tides that would be expected during the construction season: most of the extreme tides occur in the winter. After this excavated material is hauled away, the remainder of the levee below 7.5-feet NAVD88 would be graded to maintain a 1- to 3-foot-high berm 2 feet in top width on the outboard portion of the levee with a 3:1 slope created on the inboard side (Figure 14). A shallow trench ditch approximately 2 feet deep and 6 feet wide would be excavated on the inboard side of the berm in the area where the inner part of the levee was formerly located.

Excavation of the non-berm portions of the levee would generate approximately 18,533 bulk CY. Approximately 3,707 CY would be used to expand the high tide refugia that was initiated in 2006 as a separate Habitat Enhancement Project (1-1-06-F-0286), but that was not completed due to weather and bad site condition issues. The remainder (14,826 CY) would be hauled off-site to one of the quarries on the Tomales Point slated for restoration (see Off-Site Hauling under Construction). Temporary stockpiling needs would be minimized through direct placement of excavated soils into off-road dumptruck.

After all other components in the East Pasture have been completed and during a neap tide series, approximately 1,929 CY of remnant "berm" material would be pushed into the ditch using a bulldozer and graded to match adjacent pasture grades (Figure 14).

- ***Removal of North Levee in West Pasture and Filling of Borrow Ditch (Remove or Breach Levee, Grade Creek Bank, Fill Ditch; Figure 5)***: One levee removal area is in the northern portion of the West Pasture where the entire approximately 950-foot North Levee would be removed (Figure 31). The levees would be excavated 2 feet and regraded to allow for temporary construction equipment access, generating 1,520 BCY. Ultimately, the entire levee would be removed, generating an additional 22,300 BCY.

  Excavated levee material would be used to fill the 0.46-acre borrow ditch to the north, which was the ditch created by "borrowing" of material for levee creation (Figures 31 and 32). In addition, approximately 0.5 acres of fringe marshplain between the levee and the borrow ditch would be excavated shallowly (1 foot), and approximately 1,278 CY of excavated topsoils would be stockpiled nearby in the West Pasture for reuse as topsoil once grading has been completed (Figure 32).

  The approximately 770-foot borrow ditch would be filled with approximately 1,607 CY from levee removal and tidal channel creation (see below) to just slightly below adjacent marshplain grade or elevations (~ -0.5 feet; Figure 32). The stockpiled topsoil from the marshplain fringe would be placed on top to create a grade slightly above adjacent marshplain grade to account for expected compaction of soils overt time. Stockpiled topsoil would provide a source of seed and vegetative fragments, as well as appropriate soil conditions, to promote vegetation establishment. This work component would not be conducted until after August 31 due to its proximity to rail habitat.

  Prior to filling of the borrow ditch, this area would need to be dewatered. During a low tide of a neap tide series, the borrow ditch would be allowed to drain to the maximum extent practicable, and then a coffer dam would be placed on both ends of the section to be filled. Height of the coffer dam would be sufficient to ensure that the lower high tides that occur during a neap tide series would be sufficient to keep most of the waters out of the work area during construction except for groundwater infiltration. Any remaining waters or waters that come into the work area after construction starts would be pumped southward for spray irrigation into the diked pasture. Prior to complete dewatering, seining would be performed to assist with special status species surveys and recovery of special status and common aquatic organisms. Work areas would not be completely dewatered until the Environmental Monitor has given the notice to proceed. Pumps would be fitted with screen with a mesh size not to exceed 1/8-inch to protect special status species such as tidewater goby. More detail on dewatering can be found under dewatering in the Construction section or in Appendix A

- ***Creation of Additional High Tide Refugia for Rails (Create Habitat; Figure 5)***: The remaining soils from levee excavation would be used as a second phase of expansion of the high tide refugia for rails, the first phase of which was initiated under a separate habitat enhancement project that was approved and partially constructed in 2006 (1-1-06-F-0286). Approximately 0.1-acre of high tide refugia would be created separately under this project north of the 2006 habitat enhancement area (Figure 33). This refugia would essentially connect the enhanced refugia created in the 2006 project with the natural alluvial levee directly north or bayward of the the borrow ditch to be filled,

gradually tapering down in elevation to meet the lower elevations of the alluvial levee. This component would involve fill of approximately 850 CY in addition to that described above for filling the borrow ditch, which it would cross. This work component would not be conducted until after August 31 due to its proximity to rail habitat. This area would be actively revegetated with native salt marsh and upland ecotone plant species at the appropriate elevations. See High Tide Refugia under the East Pasture for a list of species.

- ***Creation of New Tidal Channels (Create Tidal Channel; Figure 5):*** Approximately 840 linear feet or 0.78 acres of new tidal channel would be excavated in the northeastern corner of the West Pasture and connected to an existing tidal channel in the undiked marsh to the north (Figure 25). The new channel would be created in an existing topographic linear depression that may be the historic remnant of the undiked tidal marsh channel. Morphology of constructed channels would be similar to East Pasture tidal channel creation, with the average width and depth for each channel starting out at 6 feet wide and 2.0 feet deep and tapering down to 4 feet wide and 1 foot deep at its terminus. Slope would be 1:1 and similar to most other deltaic tidal channels in geomorphology to most other natural channels in the undiked marsh to the north (Figure 26). Overall, construction and deepening of existing sloughs would be designed to create a balance in water residence time such that ponded areas are retained during low tide for aquatic species such as tidewater goby, but flushing occurs regularly enough that water quality and intertidal mudflat conditions are maximized. Approximately 790 cubic yards of soil would be excavated to recreate this feature. This work component would not be conducted until after August 31 due to its proximity to rail habitat.

- ***Realignment of Fish Hatchery Creek into its Former Alignment (Figure 5):*** The Giacominis realigned Fish Hatchery Creek from one of its more recent alignments on the western perimeter of the West Pasture into the West Pasture Old Slough through creation of a connecting in the middle of the pasture (Figure 34). This component would involve realigning Fish Hatchery Creek into its old alignment by plugging the connecting ditch with dense clay materials excavated from the tidal channel creation and overlaying those soils with excavated surface soils from the levee removal that are not anoxic (Figure 34). During a low tide, coffer dams or earthen plugs would be installed at either end to improve construction work area conditions through dewatering: Waters in the dewatering area or that enter the work during construction would be pumped northward for spray irrigation onto the diked pasture. Length of ditch to be filled is approximately 250 linear feet or 0.06 acre, and elimination of the ditch would require approximately 151 CY of fill.

Restoration-Olema Marsh

- ***Implement Adaptive Restoration in Olema Marsh***: As noted earlier, the project boundary has been expanded to include Olema Marsh, which is owned by the Park Service and Audubon Canyon Ranch (Figure 3). The Park Service, CSLC, and Audubon Canyon Ranch are proposing to implement an adaptive restoration approach that would involve sequential phasing of potential construction components, with more intensive construction components implemented only if the desired degree of restoration success is not achieved through initial measures.

  The determination of success would be based on the degree to which natural hydrologic and ecological processes and functions have been restored, given that full or extensive restoration would be constrained by a number of factors in this system. These constraints include Levee Road; Bear Valley Road; potential effects on salinity intrusion into local groundwater wells; and potential effects on salmonids in Bear Valley Creek, which flows through the marsh.

  In the FEIS/EIR, the Park Service elected to delay implementation of **major** adaptive restoration actions in Olema Marsh such as culvert replacements to minimize the potential for major impacts to North Marin Water District (NMWD) operations that could result from restoring tidal influence and increasing tidal prism in this once fully tidal system. Based on hydrodynamic modeling, increasing tidal prism in Olema Marsh could elevate salinities in upstream portions of Lagunitas Creek that are adjacent to the NMWD Coast Guard municipal groundwater wells. Currently, NMWD performs off-tide pumping when predicted tides at Inverness exceed 5.9- to 6.0 feet MLLW to avoid intrusion of chlorides into the groundwater supply system, therefore, an increase in salinities could increase the duration of pumping or the time needed for freshwater recharge to reduce chlorides in the alluvial

aquifer once high tides have passed.

The Park Service stated in the environmental document that it will move ahead with minor restoration actions if hydrodynamic modeling and the results of existing monitoring suggest that these actions would have the potential for no more than a minor impact on NMWD operations. These minor restoration actions will also help in assessing what the true impact of fully restoring Olema Marsh would be on salinities in upstream portions of Lagunitas Creek by monitoring changes in salinities associated with these actions. Monitoring of salinities in Lagunitas Creek both at the mouth of Bear Valley Creek and upstream of the Green Bridge will be performed after these restoration actions are implemented to ensure that salinities do not exceed expected levels. If they do, corrective measures would be taken to avoid these impacts during future high tide events.

- ***Adaptive Restoration Component #1A: Create Notch in Earthen Berm to Improve Hydraulic Connectivity (Excavate; Figure 5)***: As part of the minor restoration actions described above, a notch 24 feet wide by 50 feet long and 6 feet deep or 0.03 acre (1,200 square-feet) would be excavated in the existing earthen berm that limits outflow of Bear Valley Creek from Bear Valley Marsh (Figure 35). This berm, which is probably a remnant of sidecast channel excavation material -- past fill events, appears to be reducing outflow of the creek and causing impounding of water within the marsh by funneling streamflow through a very narrow gap in the berm. This excavation would generate approximately 267 cubic yards of soil that will be disposed of off-site at one of the quarry sites on the Point Reyes Peninsula slated for restoration. Should monitoring results following excavation indicate that salinities in upstream portions of Lagunitas Creek are being elevated to levels considerable unacceptable in terms of potentially having major impacts on NMWD operations, the notch in the berm would be filled to limit further impact. No dewatering would be performed as part of this component, however, silt fence or turbidity curtain would be established to minimize impacts to water quality from construction and to minimize the presence of aquatic organisms in the work area. This work component would not be conducted until after August 31 to minimize impacts to special status species, and pre-construction clearance surveys, including seining and trapping to the extent possible, would be performed.

- ***Adaptive Restoration Component #1***: ***Excavate Vegetated Earthen Berm and Create More Defined Flow Path for Bear Valley Creek (Excavate; Figure 5):*** To improve hydraulic connectivity and access for salmonids, the remaining 0.27 acre of the berm (see Adaptive Restoration Component #1A) would be removed thorugh excavation (Figure 35). The berm would first be cleared and grubbed, and, then, the 275-foot-long, 24-foot-wide berm would be excavated approximately 5- to 6 feet (Figure 35). Excavation would generate approximately 1,500 CY of soil that would be hauled off-site to quarries on Tomales Point slated for restoration. Silt fencing and/or turbidity curtains would be installed both to the west, north, and south to minimize turbidity plumes from excavation spreading out into the marsh, as well as downstream in Bear Valley Creek. In addition to berm removal, shallow excavation (~ 2 feet) would be performed in a 20-foot corridor along the entire length of Bear Valley Creek in Olema Marsh (approximately 2,000 linear feet) to improve flow and hydraulic connectivity in this section of Bear Valley Creek and potentially improve passage conditions for salmonids (Figure 35). Excavation of the creek would generate approximately 2,963 CY of soil, the majority of which would be sidecast back into the marsh. This work component would not be conducted until after August 31 to minimize impacts to special status species, and pre-construction clearance surveys, including seining and trapping to the extent possible, would be performed.

Land Management

- ***Maintenance Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate; Figure 5)***: During the Giacomini ownership and management of the West Pasture, the Giacominis have worked with residents living adjacent to the Inverness Ridge creeks such as the 1906 Drainage and Fish Hatchery Creek to remove excess sediments so that creek flows do not back up onto the properties and cause flooding of the homes. The 1906 Drainage flows off the Inverness Ridge into the West Pasture, ending in a 250-foot section at the southern end of the Freshwater Marsh. Fish Hatchery Creek flows off the Inverness Ridge into the West Pasture further south on the north side of another residence. Both drainages often carry high sediment loads due to the unstable nature of geologic conditions in the upper part of this small

watershed. Under the EIS/EIR, the Park Service proposed to continue to perform maintenance of the downstream portion of these creeks on an annual or periodic basis as needed to ensure that it does not elevate flood risk to adjacent properties above currently existing levels, as specified in current Park Service Management Policies (2006) and Director's Order 77-2 (Figure 36) .

Approximately 5,000 CF or 190 CY of sediment would be typically excavated along 250 linear feet of a 0.06-acre section of the 1906 drainage, and approximately 5,800 CF or 220 CY of sediment would typically be excavated along 335 linear feet of a 0.05-acre section of Fish Hatchery Creek on a periodic basis during average to wet years (Figure 37), but it is possible that, during very wet years, it would need to be excavated more than once annually to ensure that properties are not flooded. Maintenance may be less frequent than annually during dry years. Under the term limit of this permit, the Park Service proposes to excavate no more than twice in each of the drainages, although excavation would not be performed if capacity appears sufficient. The maximum excavation would generate a total of 810 CY, which would be disposed of either at the quarries or hauled to the Seashore's Maintenance Yard.

Excavation to improve conveyance would not be performed prior to August 1 in the 1906 Drainage or July 15 in Fish Hatchery Creek. Prior to construction, pre-construction clearance surveys would be conducted for special status species such as California red-legged frog or salmonids. At the 1906 Drainage, construction monitoring would be performed on a daily basis. Any species located in the work area would be relocated outside of the construction in habitats with appropriate water quality, water salinity, and habitat conditions. In addition, silt fencing would be established at a downstream location to minimize turbidity impacts to downstream water quality conditions and movement of aquatic organisms into the work area. A bypass may be set up at Sir Francis Drake Boulevard to divert flows from the excavation area. At the 1906 Drainage, sheet piling or a coffer dam would be installed at the northern end before the terminus with the West Pasture Freshwater Marsh, and the channel would be dewatered through pumping to an area of the marsh just upstream of the silt fencing. All pumps would have a mesh screen no larger than 1/8-inch in diameter to minimize impacts to special status species.

Public Access

- ***Creation of Southern Perimeter Spur Trail from Point Reyes Station to Location of Former Summer Dam (Construct New Improved Trail, Construct Fence; Figure 6):*** The approximately 2,000-linear-foot southern perimeter spur path leading to the location of the former summer dam would be enhanced through improved grading and relocation of approximately 1,750 linear feet of the trail further away from the creek and associated riparian corridor (>50 feet from former alignment; Figure 35). Even when improved, the path will be maintained at its current 8-foot-wide diameter. Because of the potential for flooding during large storm events, use of this path would be weather-dependent. A vegetative barrier composed of native shrub species would be constructed between the restored area and the path to minimize traffic by people and dogs into the restored grassland areas, with a wire fence potentially used in the interim to protected planted species. An 860-foot, 8-foot-wide new decomposed granite trail would be constructed at the top of the Dairy mesa to allow people to walk to the western edge of the former dairy facility and view the southern portion of the restoration area (Figure 38). None of the proposed improvements or construction would affect Corps' jurisdictional wetlands or waters.

- ***ADA-Compliant Access (Construct ADA-Compliant Trail; Construct Public Access Infrastructure, Figure 6):*** ADA-compliant access would be provided through improvement of trail facilities originating from the White House Pool parking lot to Lagunitas Creek and construction of a small viewing platform at White House Pool County park, which is intended to allow the public to experience and enjoy the restoration project (see Viewing Areas, Overlooks, and Interpretative Exhibits; Figure 39). This portion of the trail, which is approximately 130 feet in length, would be constructed and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. The trail would be constructed to ensure that the grade and surfacing is compliant with standards regarding access for people with disabilities such as those established by the Access Board for Outdoor Recreational Facilities. As part of this project, the vault toilet facilities would be replaced and upgraded to provide access to those with disabilities, and handicapped parking would be provided in the parking lot. None of the proposed improvements or

construction would affect Corps' jurisdictional wetlands or waters.

- ***Creation of Eastern Perimeter Spur Trail through Extension of Tomales Bay Trail (Construct New Improved Trail-Soil; Figure 6):*** The existing unimproved Tomales Bay Trail originates on Highway 1 and runs through GGNRA lands leased to the Martinelli family to Railroad Point. This new through-trail would be extended approximately 1,800 feet south along the historic and defunct railroad grade that runs along the eastern perimeter of the East Pasture at the base of the Point Reyes Mesa, some of which falls below the High Tide Line (HTL; Figure 40). It would allow better viewing of the shallow shorebird area that attracts hundreds of shorebirds of waterfowl during the mid-winter, particularly when tides are high in Tomales Bay. This TBT spur trail, which would be an improved soil, weather-dependent trail, would involve some minor grading and drainage improvements totaling approximately 130CY, but would not involve placement of imported fill (Figure 40).

- ***Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure; Figure 6)***: A total of four viewing areas, overlooks, and interpretative exhibits will be constructed along the eastern perimeter of the Project Area (Figure 41). Two of these viewings areas will be at the westernmost point of the Dairy Facility; at the top of Railroad Point bluff on the Tomales Bay Trail. The third will be along Sir Francis Drake Boulevard near the entrance to the West Pasture north levee, which would be removed. This viewing area would potentially be constructed as a blind to minimize disruption to avian species that use this portion of the Project Area. The footprint will not exceed approximately 300 square feet. A fourth viewing area will be constructed as part of the ADA-compliant component described above. The footprint would be approximately 1,000 square feet, including the low-elevation platform and ADA-compliant ramp. None of the proposed improvements or construction would affect Corps' jurisdictional wetlands or waters.

Construction

- ***Construction Scheduling***: Construction for Phase II will be conducted from June 1, 2008, through October 31, 2008. During Phase II, timing of construction of individual components will be staggered to ensure that there is strict adherence to construction scheduling constraints related to breeding periods for special status species such as California red-legged frog, tidewater goby, salmonids, California black rail and clapper rail, and nesting/migratory birds proposed by the Park Service and confirmed in Biological Opinions issued by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (Table 2). Because funding for public access components has not been obtained yet, the Park Service anticipates that public access alignments and infrastructure would be constructed either simultaneous with or after restoration and that construction would take an additional one to two construction years. Construction hours for Phase II will be 8:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under authorization by the Seashore, Point Reyes National Seashore Association, and CSLC. These hours include time for start-up and shutting down of construction equipment. Equipment cannot begin warming up until 7:45 a.m. and must be shut down by 6:15 p.m.

TABLE 2. Scheduling constraints related to special status species clearance or prohibitions on construction in habitat or potential habitat of species.

	June	July	August	September	October	November
Nesting/Migratory Birds						
Aquatic Organisms						
Tidewater Goby						
Salmonids						
Calif. Red-Legged Frog						
Calif. Black/Clapper Rails						
Clearance Required						
Construction in Habitat or Potential Habitat Prohibited						

- ***General Description of Construction-Equipment***: Construction equipment that would be expected to be used in construction includes, but is not limited to, excavators, front loaders, bulldozers, graders, dump trucks, water trucks, and street sweepers: some of this equipment may need to be specialized for use in muddy or aquatic areas due to the shallow groundwater table. The water truck would be used for dust control in the Project Area. Ancillary equipment that may be used would include a diesel generator, water pump, and a piledriver.

  Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, 5th Street, B Street, Mesa Road, State Route 1, Levee Road, Sir Francis Drake Boulevard, Pierce Point Road, and Point Reyes-Petaluma Road (see further description under Total On-Site and Off-Site Disposal below). Occasional delivery of supplies and materials will be necessary, such as for erosion control materials, water diversion equipment, pumps, and fuel. Water trucks will refill three to five times per day, necessitating a drive offsite.

- ***General Description of Construction- Water Control Measures and Dewatering:*** :During construction, coffer dams, sheet piling, or temporary impoundments and pumping of accumulated groundwater and construction water will be required to adequately dewater areas for optimal construction results. Actions possibly requiring dewatering include 1) filling of drainage and borrow ditches in East and West Pastures; 2) shallow excavation of the East Pasture Old Slough to improve hydraulic connectivity through removal of dense vegetation; 3) removal of culverts or tidegates/culverts in the East Pasture Old Slough Pond, drainage ditches, Fish Hatchery Creek, and West Pasture Old Slough; 4) creation of tidal channels in West and East Pasture; 5) realignment of a portion of Tomasini Creek into one of its historic alignments; and 6) replacement of the structurally unsound Tomasini Creek railroad car bridge with a temporary earthen culverted crossing (Figure 42). These activities will be timed to occur after the breeding of tidewater goby and outmigration of salmonids has occurred in mid-summer (late June to mid July; Table 2).

  Dewatering in the East Pasture would rely on use of coffer dams or sheet piling installed in construction work areas, with most of the water being pumped to the adjacent drainage ditch system. In almost all areas, dewatering would only be partial initially to allow for fisheries and aquatic resources staff to perform necessary surveys and removal of special status and common aquatic organisms prior to full dewatering. Only after the Environmental Monitor gives the notice to proceed can full dewatering and construction begin in these areas. All pumps would be screened with a mesh size that would not exceed 1/8-inch to protect special status species such as the tidewater goby. The largest dewatering requirements would occur in the East Pasture, and one of the most complex dewatering components involves filling of the existing drainage ditches used by the dairy for conveying and storing irrigation waters. Filling of drainage ditches would occur through installation of coffer dams at opposite ends of 300-foot sections of ditch or “cells,” with water being pumped to adjacent sections of drainage ditch. Once water levels within the ditches reach close to capacity, water would be pumped from the ditches into the Shallow Shorebird Habitat, which would be used as a storage basin for initial non-construction dewatering and construction dewatering waters. See Appendix A for more details.

- ***General Description of Construction-Equipment- Access, Staging, and Stockpiling***: Construction activities would occur in the East and West Pastures of the Giacoomini Ranch and Olema Marsh. Construction equipment will most likely access the East Pasture from one or both of the following two locations: 1) the existing access entrance on 5th and C Street in Point Reyes Station used during Phase I; and 2) the ranch access road near the Giacomini Hunt Lodge, which connects to Mesa Road in Point Reyes Station (Figure 40). Use of the ranch access road near the Giacomini Hunt Lodge will require removal of the approximately 550-square-foot Tomasini Creek railroad car bridge (See East Pasture – Removal of Agricultural Infrastructure), which is structurally unsound, and replacement with a temporary 40-foot-linear feet, 48-inch CMP temporary earthen culverted crossing for hauling of sediments and other materials from the East Pasture (Figure 44). This would result in a temporary fill of 290 CY in 0.06 acre. In the East Pasture, equipment will be staged at the Dairy Facility and near the Giacomini Hunt Lodge along the ranch access road (Figure 43). Stockpiling of excavated sediments will be minimized through use of excavator and dump struck simultaneously for construction of most components, with the exception of the excavation of the southwestern portion of the East Pasture to lower elevations, which will probably involve use of a scraper. There may also be

some temporary stockpiling associated with removal and reuse of topsoils and dense estuarine muds for fill of drainage and borrow ditches.

Construction equipment will potentially access the West Pasture from potentially three locations: 1) the very southern end; 2) directly north of the Gradjanski residence across from the commercial area in Inverness Park; and 3) the very northern end at the north levee. Equipment will most likely be staged near the access road entrance (Figure 43). Stockpiling of excavated sediments will be directed, where possible, to upland areas in the West Pasture, but some stockpiling of the excavated topsoils will need to occur near the North Levee and near levee removal areas.

Olema Marsh construction areas would be accessed from the south end parking lot, as well as directly from Levee Road. Equipment will be staged in the Olema Marsh parking lot and in the grassy upland area adjacent to the marsh. Any stockpiling of excavated sediments will occur in upland areas adjacent to Olema Marsh.

- ***Total Cut/Fill and On-Site and Off-Site Disposal***: Restoration and public access actions would result in excavation of approximately 102,050 cubic yards of soil and other materials from the East and West Pasture. To decrease impacts and costs associated with off-site disposal, the Park Service, PRNSA, and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. Approximately 28,550 CY would be hauled off-site, and the remainder would be re-used on-site through selective fill activities. Fill would involve re-use of excavated sediments on-site for 1) filling drainage and borrow ditches; 2) recontouring the top of the Dairy Facility manure ponds and adjacent Park Service-owned lands; 3) recontouring the natural mesa slope contours and topography outboard of the Dairy Facility; 4) creating a new berm or creek bank in the current Tomasini Creek channel alignment; 5) creating high tide refugia for endangered and threatened rail species in the West and East Pastures; 6) creating impounded off-channel habitat for tidewater goby in the East Pasture through enhancement of an existing degraded berm; 7) creation of temporary stream crossings for construction equipment; and 8) grading related to trail and public access facility improvement. Fill activities for public access components would be negligible and restricted to minor grading activities.

  Soils removed off-site will be hauled to several defunct quarries in the Point Reyes Peninsula or Tomales Point portion of the Seashore that the Park Service is actively trying to restore (Figure 4a). Most of these materials hauled off-site will be weedy materials that will be buried at the bottom of the quarries and overlain with clean fill materials to minimize potential environmental impacts. Excavated sediment would be used to restore the Evans-Abbotts, Evans, McClure DG, McClure Flat, and Grossi quarries (Figure 4a). Sediments will be hauled to these quarries using local connector roadways and state highways such as Mesa Road, C Street, 4th Street, 5th Street, B Street, State Route 1, Levee Road, Sir Francis Drake Boulevard, and Pierce Point Road. From Pierce Point Road, trucks will use existing unpaved ranch roads and, in one case, potentially a pasture to reach quarries. There will be no changes to access roads, and the extent of fill would not extend beyond the quarries. Non-soil materials will be hauled to a municipal landfill in Petaluma, Calif., or to another appropriate landfill or recyclery, depending on the type of material.

IMPACT AVOIDANCE/MINIMIZATION MEASURES: Impact avoidance and mitigation measures refer to measures and practices adopted by a project proponent to reduce or avoid adverse effects that could result from construction or operation of the proposed features. The Park Service, Point Reyes National Seashore Association (PRNSA), and CSLC have proposed a number of avoidance and minimization measures to reduce impacts to air quality, water quality, noise and soundscapes, native vegetation communities, wildlife, cultural resources, recreational resources, and social services. Only those measures that would reduce impacts to waters and wetlands are summarized below:

Water Quality-Related Measures

- Conduct construction activities during the dry season.
- Conduct construction work in accordance with site-specific construction plans that minimize the potential for increased delivery of sediment to surface waters.

- Ensure that concentrated runoff and concentrated discharge are diverted away from channel banks.
- Minimize removal of and damage to native vegetation.
- Install temporary construction fencing to identify areas that require clearing, grading, revegetation, or recontouring, and minimize the extent of areas to be cleared, graded, recontoured, or otherwise disturbed.
- Grade and stabilize spoils sites to minimize erosion and sediment input to surface waters and generation of fugitive dust (see discussions under Measures to Protect Air Quality below).
- As appropriate, implement erosion control measures to prevent sediment from entering surface waters, including the use of silt fencing, turbidity curtains, erosion control blanket, coir logs or straw wattles, and mulching to trap sediments on slopes and channel banks.
- Avoid operating equipment in flowing water by using temporary cofferdams and sheetpiling and conducting dewatering with appropriate downstream turbidity controls or bypass upstream flows around the work area.

Wetland-Related Measures

- Where possible, construction access and staging shall occur in uplands and non-riparian habitat.
- If construction access or staging must occur in wetlands and riparian habitat, access within these areas shall be kept to the minimum road width and acreage possible. Contractors would work with Park Service personnel to minimize impacts to wetlands and riparian habitat.
- Construction access routes would be flagged to ensure that construction equipment does not detour from authorized entry points and access routes.
- Where possible, construction equipment would work from upland locations to minimize impacts to wetlands and riparian habitats.
- Any temporary “fill” or staging material placed in wetlands would be removed to upland locations at the earliest possible date.
- Construction equipment would be cleaned prior to construction start to ensure that no seeds or vegetative fragments of invasive, non-native species are introduced into the Project Areas.
- Tires or tracks of trucks and equipment entering and leaving project sites will be washed to prevent seed transport.

Spill Prevention and Response-Related Measures

- Workers are trained to avoid and manage spills;
- Construction and maintenance materials are prevented from entering surface waters and groundwater;
- A spill kit with boom and sorbent materials would be on site at all times during construction;
- Spills are cleaned up immediately and appropriate agencies are notified of spills and of the cleanup procedures employed;
- Staging and storage areas for equipment, materials, fuels, lubricants, solvents, and other possible contaminants are located at least 100 feet away from surface waters;
- No vehicles are fueled, lubricated, or otherwise serviced within 100 feet of the normal high-water area of any surface water body;
- Vehicles are immediately removed from work areas if they are leaking; and
- No equipment is operated in flowing water (suitable temporary structures are installed to divert water around in-channel work areas).

FILL AND/OR EXCAVATION WITHIN ARMY CORPS JURISDICTION AND REASONS FOR DISCHARGE:

***Fill with Permanent Loss of Wetlands and "Other Waters*:"** The proposed project will result in approximately 3.75 acres of permanent loss of jurisdictional Section 404 tidal, non-tidal, and adjacent wetlands and upland historic Section 10 waters from fill 1) used to create a high tide refugia for special status species in the West and East Pastures; 2) restoring natural mesa topography/slope near the Dairy Facility; 3) filling of **certain** drainage ditches in former pastures (southern portion of East Pasture); 5) creation of a berm in existing Tomasini Creek channel to direct creek into historic, non-leveed alignment; 6) rebuilding and repair of a berm around the New Duck Pond in the East Pasture to create impounded off-channel habitat for tidewater goby; 7) grading and fill associated with construction of ADA-compliant trail at White House Pool County park; and 8) construction of viewing areas at White House Pool County park and at the terminus of the former North Levee on Sir Francis Drake Boulevard. With the possible exception of some of the trail materials, fill would come from materials excavated on-site and would be comprised primarily of alluvial materials (sand, fine gravel, silts) and clay-dominated estuarine muds.

Approximately 0.1-acre of high tide refugia would be created north of the 2006 habitat enhancement area through placement of 850 CY of soil excavated from the West Pasture levees. Another 2.08 acres of high tide refugia would be created through placement of 9554 CY of excavated material in the northern portion of the East Pasture adjacent to the East Pasture Old Slough pond with the intent of maintaining impounded conditions in existing tidewater goby habitat, as well as increasing refugia habitat for rails. Restoration of the natural mesa/slope topography adjacent to the dairy facility would cause loss of approximately 0.77-acre of jurisdictional wetland through more than 4 feet of fill with sediments excavated on-site. Removal of drainage ditches used to convey irrigation waters in the southernmost portion of the East Pasture will require fill of approximately 14.560 CY of excavated sediment to bring to surrounding grade and will eliminate approximately 0.61 acre of adjacent wetlands that were created through impoundment of irrigation waters.

Realignment of Tomasini Creek into its historic alignment will require construction of a small berm totaling 0.12 acre to redirect flow from the old channel into the new channel: the berm will be low enough to allow some of the floodwaters on the downstream end to overtop and flow into the old Tomasini Creek channel, which will be maintained as a backwater slough. Fill for public access components listed above would exclusively occur in upland or non-wetland historic Section 10 areas and would account for 0.07 acres.

Fill with No Loss of Jurisdictional Wetlands and "Other Waters:" In addition to the 3.75 acre of permanent loss of wetland through fill, construction of Phase II would also result in permanent fill of another 5.86 acres, however, these areas would remain jurisdictional wetlands, although the type of wetland might change. These components include: 1) filling of the borrow ditch north of the North Levee (0.46 acre; conversion of Tidal Water to Tidal Wetland); 2) filling of the drainage ditch in the West Pasture between Fish Hatchery Creek and West Pasture Old Slough (0.06 acre; Non-Tidal Wetland to Adjacent Wetland); 3) placement of salvaged riprap at toe of eroded Lagunitas Creek bank along southern end of East Pasture (0.001 acre; Tidal Water); 4) filling of drainage ditches in the East Pasture (2.76 acres; Adjacent Wetland to Tidal Wetland); 5) creation of additional impounded off-channel habitat for tidewater goby through reinforcement or rebuilding of a degraded berm around the New Duck Pond that would be adjacent to one of the new tidal channels (0.4 acre; Section 404 Adjacent Wetland/Historic Section 10 Waters to Section 404 Tidal Wetlands/Historic Section 10 Waters); 6) creation of a 6-feet NAVD88-elevation berm at the northern end of the East Pasture Old Slough Pond to maintain existing impounded conditions within the pond for tidewater goby and create refugia habitat for rails, with berm overtopping expected during high tide events (0.2 acre; Section 404 Adjacent Waters/Historic Section 10 Waters to Section 404 Tidal Wetlands/Historic Section 10 Waters); and 7) minor grading associated with earthen trail extension of Tomales Bay spur trail (0.04 acre; Tidal Wetland – no change).

Excavation in Current or Historic Section 10 Waters: Because much of the Giacomini Ranch was once subtidal prior to the excessive influx of sediment believed to be caused by logging and other watershed disturbances in the late 1800s, impacts related to excavation in current or historic Section 10 waters would be larger than those for other types of activities and jurisdictional types and would total approximately 16.62 acres. As with some of the fill activities, excavation in current or historic Section 10 waters would also cause some conversion in aquatic habitat types. Removal of the levees would result in excavation in 11 acres of current and historic Section 10 waters and either cause no change in wetland type or convert non-jurisdictional

upland/historic Section 10 waters to Section 404 Tidal Wetlands. Approximately 0.12 acre in the West Pasture and 1.58 acres in the East Pasture of Section 404 Adjacent Wetland/Historic Section 10 Waters would convert to Section 404 Tidal Waters/Section 10 waters through new tidal channel creation and Tomasini Slough terminus realignment. Realignment of Tomasini Creek would involve approximately 0.005 acre of excavation in Section 404 Non-Tidal Wetland/Section 10 waters and 0.02 acre of excavation in historic Section 10 waters and cause these areas to convert Section 404 Tidal Waters/Wetland with reintroduction of tidal action to the realigned Tomasini Creek through removal of culverted tidegates on the East Pasture Old Slough. Regrading and bank stabilization activities on the East Pasture Lagunitas Creek bank at the southern end of the East Pasture would result in excavation of 1.8 acres of historic and current Section 10 waters, but would cause no change in wetland type.

In addition to restoration-related excavation, the Park Service also needs to ensure that flooding of adjacent private properties and, most importantly, residences is not exacerbated beyond currently existing levels by sediment accumulation in some of the smaller creek channels in the West Pasture. Drainages flowing off the Inverness Ridge often carry high loads of decomposed granite material that deposit rapidly in channels in the West Pasture because of the abrupt decline in channel gradient. Periodic excavation of these channels to remove sediment and increase conveyance capacity was formerly conducted by the Giacominis. Since assuming ownership, the Park Service has agreed with the adjacent residents to continue periodic maintenance of these creeks, particularly after large storm events. During the next three years, the Park Service anticipates that both Fish Hatchery Creek and the Lucchesi drainage, which are located in historic Section 10/Section 404 Non-Tidal Waters may need to be excavated twice, resulting in an impact to 0.11 acre or a collective impact of 0.22 acre.

Excavation Through Mechanized Land-Clearing of Jurisdictional Wetlands and "Other Waters:" Excavation of the southwestern portion of the East Pasture to lower intertidal and floodplain elevations would most likely occur through use of a scraper or bulldozer or other form of mechanized land-clearing. This type of excavation activity would impact approximately 15.9 acres of Section 404 adjacent wetland, however, it would not cause any loss of wetland or a conversion in wetland type. Because of levee removal, this area, along with most of the West and East Pastures, would convert from Adjacent Wetland to Tidal Wetland.

Temporary, Construction-Related Fill of Jurisdictional Wetlands and "Other Waters:"
Construction activities would result in up to approximately 3.0 acres of temporary, construction-related fill impacts to jurisdictional waters and wetlands for 1) the c onstruction of coffer dams or other temporary water diversion structures in areas where tidegates and other infrastructure would be removed; 2) construction of a temporary earthen road culverted crossing; and 3) temporary stockpiling and staging of construction materials, primarily excavated sediments from on-site.

MITIGATION: If the wetland restoration project is successful, it will be self-mitigating. While the restoration project will have a considerable impact on wetland processes and functions, the amount of wetland to be created by the proposed project is relatively small and limited to excavation of fill from the few upland or upland historic Section 10 areas in the Project Area. Through levee removal, the project will convert approximately 8 acres of upland or non-wetland historic Section 10 waters to Section 404 Tidal Wetlands. In addition, decompaction through ripping of non-jurisdictional ranch roads would also lead to creation of 2.96 acres of Section 404 Tidal Wetlands in the central and northern portions of the East Pasture once levees are removed. These actions would result in a net gain of 7.21 acres of jurisdictional – and highly functional -- Section 404 wetlands. This represents a 2.9:1 mitigation ratio for permanent wetland loss of 3.75 acres. Should funding become available for excavation of the southwestern portion of the East Pasture, the net gain in wetland acreage could increase as high as 11.81 acres, resulting in a 4.2:1 mitigation ratio.

COMPLIANCE WITH THE CLEAN WATER ACT SECTION 404(b)(1) GUIDELINES

Under Section 404 (b)(1) as set forth in Title 40, Code of Federal Regulations, Part 230, no discharge of dredged or fill material maybe permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. An applicant must show that, to the extent practicable, steps have been take to 1) avoid wetland impacts; 2) minimize potential impacts on wetlands; and 3) provide compensation for any remaining unavoidable impacts. Impacts of Phase II of the proposed project are discussed below, followed by an analysis of alternatives to each proposed components and efforts to avoid, minimize, or mitigate these impacts. The discussion of impacts is largely pulled from the

Final Environmental Impact Statement/Environmental Impact Report (FEIS/EIR), which was certified/approved in the summer of 2007.

Potential Impacts on the Physical and Chemical Characteristics of the Aquatic Ecosystem

Changes in Substrate, Suspended Particulates Turbidity, Water, Current Patterns and Water Fluctuations, Normal Water Fluctuations, and Salinity Gradients

Phase II of the proposed project would involve disturbance of the existing substrate due to both excavation and fill activities, although a large proportion of the 613-acre Project Area would not be altered topographically. Unlike many San Francisco Bay and Sacramento Delta diked wetlands, the ground surface in the Giacomini Ranch has not subsided or dropped in elevation appreciably (at most 1 foot in northern portion of Project Area) since these former wetlands were diked and has, in fact, accreted in certain areas due to flood-related sediment deposition and past fill and land-leveling activities conducted as part of agricultural management. For this reason, restoration of natural hydrologic and ecological processes and functions must rely more on excavation than fill to achieve these objectives.

Approximately 16.62 acres of current and historic Section 10 Waters would be excavated as part of removing 2.4 miles of remaining levee; creating new tidal channels and sloughs in the East and West Pasture; realigning the leveed Tomasini Creek into one of its historic alignments; removing culverts, tidegates, bridges, and earthen berms on creeks and drainage ditches; and maintaining flow conveyance on Giacomini Ranch portion of creeks directly adjacent to private properties. Most of these components would involve more than 2- to 6 feet of excavation. In addition, approximately 15.9 acres of Section 404 adjacent wetland would be shallowly excavated 1- to 2.5 feet through use of a scraper or bulldozer to lower an area that has aggraded because of flood-related sediment deposition and past fill events to more hydrologically active intertidal and floodplain elevations.

Permanent fill would affect no more than 9.67 acres, and most of that (5.92 acres) would remain jurisdictional wetland, although, in some cases, the type of wetland might change. Fill components involve creation of additional high tide refugia and off-channel impounded habitat for special status species in the East and West Pastures; filling of drainage and borrow ditches; restoration of the natural mesa hillside topography near the Dairy Facility; creation of a berm to redirect Tomasini Creek into one of its historic alignment; spreading of excavated wet sediments near East Pasture Old Slough; and minor fill associated with construction of some of the public access components (most of which occurs in upland or non-wetland historic Section 10 areas). Temporary fill would affect no more than 3.0 acres and would be completely removed at the end of the construction season.

Giacomini Ranch: In the Giacomini Ranch, these excavation and fill components would ultimately result in beneficial changes in water circulation, current pattern, and water fluctuation by reintroducing full tidal action to non-tidal or muted tidal diked wetlands, as well as natural freshwater or creek hydrologic processes. Through these excavation activities, the historic Giacomini Ranch floodplains would regain much of their former functionality. The extent of area in the East Pasture inundated twice daily by tides would increase to 193 acres, with the amount of increase for the entire Project totaling 250 acres (KHE 2006a).

Water levels in the Giacomini Ranch would increase during flood and high tide events and, thereby, reduce flood water and extreme high tide levels in adjacent Lagunitas Creek. Based on results of hydraulic modeling, the minimum flood event capable of overtopping the creek bank would drop from a 3.5-year event in the East Pasture and a 7-year event in the West Pasture to a 2-year event (KHE 2006a). Cumulative flood volume during a 2-year event would increase 2,000 percent in the Giacomini Ranch relative to existing conditions and would decrease by approximately 20 percent in Lagunitas Creek (KHE 2006a).

In addition, during flood events, sediment transported by flood flows would be transported onto the newly reconnected floodplains and thereby decrease downstream transport of sediment and other pollutants to the already pollutant-impaired Tomales Bay. Based on cumulative floodwater volume (KHE 2006a) and sediment rating curve (H. Esmaili & Associates 1980) estimates, the percentage of suspended sediment from Lagunitas Creek potentially moving through the East and West Pastures could account for 20 percent or approximately 9,830 tons/day of sediment transported by Lagunitas Creek during a 2-year event (Parsons, *in prep*.). The

sudden loss in stream power suggested by hydraulic modeling once floodwaters crest the levees would suggest that trapping efficiency, at least under smaller flows, would be high and could result in approximately 9,525 tons/day of sediment being deposited on the Giacomini Ranch floodplains. Increased rates of floodplain deposition could have a moderate beneficial effect on the Bay by reducing sediment delivery by as much as 19 percent and pollutant delivery by as much as 2- to 18 percent (Parsons, *in prep*.).

Restoration would also improve soil and water quality in the Giacomini Ranch. The discontinuation of agricultural management and grazing eliminates sources of pathogens and nutrients to creek, drainages, and ditches, which have consistently suffered from poor water quality. Agricultural management practices have dramatically affected water quality conditions in the Project Area, particularly the East Pasture. Within the Project Area, monitoring has shown occasional, regular, or consistent exceedance of Basin Plan or USEPA objectives for fecal coliforms, unionized ammonia, nitrates, nitrites, dissolved oxygen, and pH. Water quality conditions within the Project Area are generally not eutrophic, but there are occasionally spikes in nutrients and toxic nutrients, and concentrations of pathogen indicators such as fecal coliform are consistently high. Certain ditches within the Giacomini Ranch have extremely poor water quality, with oxygen levels at levels low (<< 5 mg/L) enough to cause mortality to aquatic organisms.

Removal of levees, culverts, and tidegates increase tidal currents in existing or constructed tidal channels and decrease residence time relative to existing muted tidal or non-tidal conditions, thereby having a beneficial effect on water quality within these water bodies by decreasing water temperature, moderating pH levels, increasing dissolved oxygen, and decreasing the potential for sharp fluctuations in diel patterns of dissolved oxygen that can lead to so-called “fish kill” events. Elimination of frequent ditch maintenance will also decrease the potential for the chronic biological oxygen demand-related hypoxia and anoxia observed in some Giacomini Ranch waters associated with churning up of organic material. Salinity patterns in Giacomini Ranch creeks and drainages would also begin to more strongly resemble those of adjacent undiked creeks and drainages, with mixed, fresh to brackish water conditions generally predominating in the winter and spring followed by strong to weak stratification of fresh and saline waters in the summer, and an eventual transition to more uniform saline conditions in the fall.

There may be some short-term adverse impacts to water quality within and downstream of the Giacomini Ranch immediately after construction due to a temporary increase in erosion or slumping of channels as the existing and constructed channels come into equilibrium with the changed conditions. This slumping and erosion could increase turbidity in and downstream of the Project Area and cause downstream transport of manure-containing soils, as well as other agricultural-related pollutants such as pathogens, nitrogen, and phosphorous. It could also maintain or elevate biological oxygen demand in hydrologically reconnected or created channels due to the influx of vegetation and organic matter with erosion. However, these adverse impacts are expected to be limited in both duration and magnitude, because most of the densely matted or rooted existing pasture grass vegetation in the Giacomini Ranch would remain during the transitional period, thereby helping to stabilize soils during this period of change. In addition, the background levels of turbidity, pathogens, and nutrients in the receiving water body (Lagunitas Creek) are already high. Over time, these impacts are expected to decline as conditions stabilize, and the reconnected floodplains would act more as a sink than a source of pollutants to Tomales Bay, thereby improving health of not only the Project Area, but the watershed.

Olema Marsh: The initial adaptive restoration components proposed for Olema Marsh all involve excavation. Initially, a small notch would be excavated in an earthen berm that currently limits the outflow of Bear Valley Creek from Olema Marsh. Should this action be demonstrated not to have any adverse effects on salinities in upstream portions of Lagunitas Creek and NMWD water supply operations, the entire berm would subsequently be removed, and the flow path of Bear Valley Creek shallowly excavated. These actions would improve hydraulic connectivity of Bear Valley Creek and Olema Marsh with Lagunitas Creek, which is just downstream. Improved hydraulic connectivity would reduce impoundment of waters within the marsh, which have increased potentially by as much as 6 feet in approximately 10 years (KHE 2006a). Water levels within the marsh could drop by as much as 4 feet to the elevation of the culvert invert at Levee Road following full removal of the berm (KHE 2006b).

This decrease in water surface levels in Olema Marsh has strong implications for both short-term and long-term changes in topography, soils, and water quality. Because excavation would decrease drainage of ponded waters, water surface elevations within Olema Marsh would drop immediately after construction,

exposing the thick layer of peat or organic rich-soils to air. Aeration of the underlying peat materials would cause rapid decomposition or breakdown of organic materials, which would start to drop the topographic surface elevation of the marsh relative to existing topographic conditions. Based on hydraulic modeling, excavation of the berm and channel and replacement of the culverts would decrease permanently impounded areas in Olema Marsh from 37.4 acres to 16 to 2.2 acres (KHE 2006a), thereby leaving the remainder of the marsh vulnerable to oxidation and marsh surface subsidence. Marsh surface elevations are approximately 1-2 feet higher than the culvert invert elevation, which suggests that compaction could range anywhere from 0.7 to 1.7 feet. Subsidence of peat soils also has implications for the expansion of tidal influence into the marsh, increasing the extent of area affected by daily tidal action up to 20 acres with a tidal prism ranging from 21 to 32 acre-feet depending on the adaptive restoration components implemented (KHE 2006a).

Oxidation of peat and mineral soils triggers a range of biogeochemical reactions, some of which have important implications for soil and water quality. Oxidation of impounded soils, particularly peat soils or soils that were historically exposed to tidal influence, can dramatically affect nutrient conditions within soils. Rapid decomposition of peat and organic-rich mineral soils can generate a pulse in mineralization or production of inorganic nutrients, with pH often driving which nutrient forms are the most prevalent (Delaune and Smith 1985, Anisfeld and Benoit 1997, Portnoy 1999, Sommer and Horwitz 2001, Parsons and Martini-Lamb 2003). Oxidation often results in a lowering in soil pH because of the production of humic acids and other types of acids, and these acids can shift the nutrient pathway away from nitrification or the production of nitrates towards ammonia. In addition, introduction of saltwater can decrease binding of ammonium in soils through the higher ionic strength of saltwater (Portnoy 1999). Nutrients produced through breakdown of organic matter or such as ammonium and phosphate can either remain in drained soils, or they can be flushed into overlying waters when soils are flooded again (Delaune and Smith 1985, Portnoy 1999). Often, these pulses are very sharp, but relatively short-lived, lasting a matter of weeks (Anisfeld and Benoit 1997, Parsons and Martini-Lamb 2003). Nutrient efflux into overlying waters may also be spatially variable, with areas exposed to tidal influence having higher rates of efflux because of increased cation exchange.

In addition to causing nutrient fluxes, decreases in soil pH often result in releases of sediment-bound contaminants to overlying waters. However, this effect is less pronounced in freshwater wetlands (Delaune and Smith 1985), and Olema Marsh's predominantly freshwater nature, combined with the naturally low levels of contaminants expected from anthropogenic sources in this subwatershed, would suggest that the risk of contaminant release from oxidation of peat soils in Olema Marsh would be negligible. Ph changes are not restricted to just the substrate. Inundation of recently dewatered or drained soils can cause pH within overlying waters to plummet, at least temporarily. Permanent Bear Valley Creek inflow, combined with persistent subsurface groundwater inflow from the Inverness Ridge, would be expected to buffer acids within a short time of being produced, although there could be some spatial variability within the marsh where lower pHs would persist. Decomposition of peat soils can also affect water quality by releasing soluble, partly decomposed organic matter into overlying waters, thereby increasing oxygen demand and decreasing dissolved oxygen levels (Anisfeld and Benoit 1997).

Over time, subsidence would be expected to reach some kind of equilibrium with water surface levels, but while subsidence can occur relatively rapidly, the long-term effects of drainage on sediment nutrient pools and fluxes can persist for some time, with effects noted in some marshes even 10 years after marshes had been drained (Portnoy 1999). During this period, there would be some negligible to moderate adverse effects to water quality over the short-term in Olema Marsh from lowering of water surface levels within this highly impounded system and the associated biogeochemical reactions to dewatering and oxidation of peat soils. In the case of nutrients, these short-term adverse effects would impact not only Olema Marsh, but Lagunitas Creek and southern portions of the watershed in the form of sharp spikes potentially in nutrient loading rates. However, these effects would be expected to be either very transient (pH) or to decline with time (nutrients) as the marsh comes into equilibrium with its new conditions. From an overall project perspective, the impact of these adverse effects during the short-term would be buffered by the steady improvement in water quality conditions within the Giacomini Ranch and Tomasini Creek.

Over the long-term, the proposed restoration actions would be expected to have a beneficial effect on soil and water quality within Olema Marsh, as the marsh comes into equilibrium with changed water surface level conditions. Currently, Olema Marsh occasionally (>25 percent and <50 percent) exceeds Basin Plan objectives for minimum oxygen levels within waters, with long residence times and high primary productivity apparently causing episodes of hypoxia or low oxygen, even during the day (Parsons, *in prep*.). As with Lagunitas Creek, Bear Valley Creek and Olema Marsh also regularly exceed AWWA (1990) standards for

minimization of eutrophic conditions within estuaries, with nitrate concentrations exceeding 1 mg/L more than 50 percent of the time (Parsons, *in prep*.). Ultimately, these topographic, soil, and water changes would be considered beneficial, because, currently, ongoing increases in water surface levels -- and potentially surface elevations through continual build-up of undecomposed peat material -- continues to drive Olema Marsh even further away from its historic condition as an intertidal marsh, with water and ground surface elevations currently precluding almost all tidal influence.

Potential Impacts on Biological Characteristics of the Aquatic Ecosystem, including Special Aquatic Sites

Changes to Threatened and Endangered Species, Fish, Crustaceans, Mollusks, Aquatic Organisms, and Other Wildlife

In general, wildlife habitat diversity within the Project Area is relatively high, primarily because of the mix or mosaic of habitat types occurring along and adjacent to the Project Area perimeter (ARA et al. 2002). While the Giacomini Ranch is largely dominated by Pasture-Grasslands, the edges of the ranch support a mix of Freshwater Marsh, Muted Tidal Brackish Marsh, Meadows, Forested and Riparian and Scrub Shrub. Many of these habitats are considered High Value Wildlife Habitats in that they support an abundance of different types of wildlife and/or high numbers of particular types of wildlife (i.e., shorebirds, waterfowl) or that they provide important breeding, nesting, or adult habitat for endangered or threatened species. Habitat diversity along the ranch's edge largely appears to result from the substantial groundwater inflow, as well as a decrease in agricultural management. Habitats are less diverse in Olema Marsh, with Freshwater Marsh and Forested and Scrub-Shrub Riparian habitats dominant, but all represent important High Value Wildlife Habitats.

While moderate to intensive development and management of the Giacomini Ranch and Olema Marsh may have caused wildlife resources to decline relative to historic conditions, the Project Area nonetheless supports a diverse array of animal species, a large proportion of which are special status because their populations are considered at risk (ARA et al. 2002). Extensive surveys were conducted to document use or occurrence by special status wildlife and plant species between 2001-2005 (ARA et al. 2002, Fellers and Guscio 2002, Fellers and Kleeman, unpub. data, Fong 2003, Fong et al. 2006, Stallcup and Kelly 2004, Parsons 2003, Parsons and Allen 2004a, Parsons 2005), with monitoring of fish, avian, vegetation, and invertebrate communities continuing beyond 2004 annually or bi-annually. A list of federally threatened and endangered species and Critical Habitat in the entire Project Area (all phases) is shown in Table 3. During baseline surveys, six (6) reptile, four (4) amphibian, 32 fish, and 194 bird species were observed in the Project Area (ARA et al. 2002).

At least five (5) federally endangered and two (2) federally threatened species have historically or recently been documented in the Project Area. These species include the tidewater goby (*Eucyclogobius newberryi*; FE), central coast coho salmon (*Oncorhynchus kisutsch*; FE), California clapper rail (*Rallus longirostris obsoletus*; FE, SE), California brown pelican (*Pelecanus occidentalis californicus*; FE, SE), Least Bell's vireo (*Vireo bellii pusillus*; FE; SE); California red-legged frog (FT), and central coast steelhead salmon (*Oncorhynchus mykiss*; FT). The northwestern pond turtle is listed as a Regional Species of Concern. State-listed endangered and threatened species total at least nine, many of which were also federally listed (see above). Species that are only currently listed by the state currently include American peregrine falcon (*Falco peregrinus anatum*; SE, FD); California black rail (*Laterallus jamaicensis coturniculus*; ST), bank swallow (*Riparia riparia*; ST; former FSacSC), and sandhill crane (*Grus canadensis tabida*; ST).

The Park Service and CSLC have completed the formal biological consultations for both Phase I and Phase II of the proposed project with the U.S. Fish and Wildlife Service (September 24, 2007) and National Marine Fisheries Service (September 11, 2007). Since completion, the Park Service has made some changes in project design at the request of the Tidewater Goby Recovery Group for the purpose of retaining and improving existing habitat for tidewater goby while new habitat begins to develop from restoration actions: the USFWS has determined that these actions are consistent with the existing Biological Opinion (C. Nagano, *pers. comm*., March 27, 2008). These opinions have been submitted to the California Department of Fish and Game (CDFG) for a Consistency Determination under the California Endangered Species Act along with a separate Biological Assessment on effects for state-only listed species.

The most extensive habitat change would be conversion of non-native Pasture-Grassland to Tidal Salt and Brackish Marsh habitats. Most of the Giacomini Ranch would undergo a short-term transitional phase in which grasslands would start dying back in response to increased tidal influence and become temporarily dominated by a mix of weedy, opportunistic low-growing brackish marsh species. Dewatering and increased tidal influence within Olema Marsh would cause extensive dieback of existing Freshwater Marsh vegetation and possible colonization of weedy, opportunistic species. These transitional changes would result in negligible to moderate adverse changes to High Value Wildlife Habitats over the short-term.

Over the long-term, however, High Value Wildlife Habitats would expand and be enhanced as infrastructure is removed or replaced, and monotypic habitats in both the Giacomini Ranch and Olema Marsh are replaced by a more dynamic and diverse ecosystem. As natural hydrologic processes reestablish and wetland-related habitats mature, the restored area would experience dramatic increases in the extent of High Value Wildlife Habitats, their quality, and their continuity or lack of fragmentation. Lower elevation areas in the Giacomini Ranch would convert to Tidal Salt Marsh or Tidal Brackish Marsh habitats. Higher elevation areas or areas along the perimeter would probably remain a mix of Freshwater Marsh, Meadows, and Forested and Scrub-Shrub Riparian habitats due to the decreased tidal influence and increased influence of creeks and groundwater from the Inverness Ridge and Point Reyes Mesa. Freshwater Marsh and Muted Tidal Brackish Marsh would begin to reestablish within Olema Marsh as topographic, soil, and hydrologic conditions readjusted to the dramatically lower water levels. The extent of Muted Tidal Brackish Marsh in Olema Marsh could be increased by approximately 10- to 20 acres with adaptive restoration. These long-term changes would have universally beneficial effects on High Value Wildlife Habitats, with High Value Habitat increasing by as much as 396 percent.

The increase in High Value Wildlife Habitats would benefit the diversity and abundance of wildlife species within the Project Area, at least over the long-term. During construction, there would be potentially some adverse impacts resulting from direct or indirect disturbance to wildlife and their habitats. Appendix B lists specific mitigation measures and monitoring that would be incorporated as part of the proposed project to eliminate or reduce adverse impacts. Over the short-term, the discontinuation or reduction in grazing and discontinuation of agricultural management practices in the Giacomini Ranch would have at least negligible beneficial effects on general wildlife use, although use by some species such as savannah sparrows, western meadowlarks, roosting Canada geese, and amphibians and reptiles would probably decrease. However, the extensive die-back in vegetation associated with dewatering of Olema Marsh could offset these negligible beneficial effects to some degree.

Over the long-term, however, discontinuation of agricultural management, combined with the removal of aquatic and terrestrial barriers, would promote establishment of more natural ecological gradients and generally support a more diverse and possibly abundant wildlife community. The use by certain species or groups of species such as landbirds and unique freshwater-related species such as California red-legged frog (*Rana aurora draytonii*; FT) and northwestern pond turtle (*Clemmys marmorata marmorata*; former FSacSC) may decrease with conversion of pasturelands to marsh, but generally numbers and diversity of fish (including salmonids), benthic and pelagic invertebrates, shorebirds, and rare marsh passerines such as saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*; former FSacSC; CSC) and California black rails (*Laterallus jamaicensis coturniculus*; ST) would be expected to increase. These beneficial effects may be countered to some degree by impacts associated with minor Increases in visitation from expansion of public access facilities, particularly along the White House Pool reach of Lagunitas Creek.

Closure of the dairy and improved water quality conditions would result in short-term negligible beneficial improvements to wildlife conditions at the watershed scale. The restoration would not only improve conditions downstream, but increase accessibility and habitat quality of the Project Area for use by marine and estuarine organisms that move up occasionally into the southern end of Tomales Bay.

With any disturbance, there is the potential for invasive wildlife species to move into or expand within the Project Area. Hydrologically reconnecting or increasing the connection between the Project Area and Tomales Bay increases the potential for establishment by invasive non-native aquatic species. Because the Project Area has already been invaded, the potential for increases in the number or extent of invasive species would be considered to be minor. In addition, the Project Area's proximity to rural residential areas increases the potential for feral or non-feral domestic animals to enter the Project Area and potentially have adverse effects on nesting or juvenile wildlife.

The proposed project would not be expected to substantially disrupt or impede aquatic life movements during construction. Construction in or adjacent to creeks known to have salmonids would occur after July 15 to ensure that peak outmigration to Tomales Bay is completed. Construction on Lagunitas Creek would be expected to have no to very minimal potential on aquatic life movement, while impacts for construction and potential associated potential dewatering activities on other creeks (Fish Hatchery, Tomasini Creek, and Bear Valley) would be minimized by proposed measures to survey, trap/seine, and relocate fish, amphibians, reptiles, and native macroinvertebrates (Appendix B).

Detailed Description of Impacts on Federally Listed Endangered and Threatened Species

California red-legged frog: Some of the largest remaining populations of the federally threatened California red-legged frog occur on the Point Reyes peninsula and adjacent areas. Within the Project Area, breeding populations of red-legged frog occur principally in two areas: 1) the Freshwater Marsh-Fish Hatchery Creek complex in the West Pasture and 2) Olema Marsh. There have been sporadic occurrences of adult red-legged frogs in the East Pasture, but no breeding has been documented there (Fellers and Guscio 2002).

Implementation of Phase II would result in some level of short-term and/or long-term adverse impact to documented breeding habitat of the California red-legged frog. However, over the short-term, impacts would probably be negligible and offset to some degree by natural Freshwater Marsh expansion with discontinuation of agricultural management and eventual maturation of the 5.2-acre freshwater marsh in the East Pasture Tomasini Triangle and the 0.71-acre Olema Creek Frog Ponds that were constructed as frog habitat as part of Phase I in 2007. These habitat mitigation measures, along with other proposed habitat enhancement and creation efforts in the Seashore-owned and managed-portions of the Point Reyes Peninsula Core Area, would reduce long-term effects of Phase II.

Most of the intensive construction activities would occur in the East Pasture, which has been documented to support only a few adult red-legged frogs during past surveys and no breeding (Fellers and Guscio 2002 *in* ARA et al. 2002). Red-legged frog can use open areas as migration or dispersal corridors during fall and summer months. Intensive construction in the West Pasture, which does support breeding frogs, would occur principally at the northern and eastern perimeters of the pasture adjacent to tidal channels and Lagunitas Creek, respectively. These areas are very saline in nature and, therefore, unlikely to support or act as dispersal corridors for frogs.

Tidewater goby: Until 2002, tidewater goby, a small estuarine fish species found in only a few remaining coastal watersheds in California, had not been seen in the Tomales Bay watershed since 1953. During baseline studies, however, a small population was found in the Giacomini Ranch portion of Tomasini Creek. Since then, the species has been observed in two other areas: the West Pasture Old Slough and the East Pasture Old Slough Pond. Numbers of tidewater goby have been relatively low within these areas, ranging from five (5) individuals to 22 at most (Fong 2002; NPS, unpub. data). The importance of this population to species recovery is underscored by the fact that Critical Habitat was proposed in November 2006 to be expanded to include certain portions of the Giacomini Ranch, including Tomasini Creek, as well as the undiked portions of Lagunitas Creek and marshlands north of the Giacomini Ranch.

Construction would not directly impact spawning habitat in Tomasini Creek and West Pasture Old Slough, but it would directly affect some of the marginal habitat in the drainage ditches and leveed, ditched portions of the East Pasture Old Slough. Some of these impacts would be avoided by retention of the bermed-off section of the East Pasture Old Slough Pond, where gobies appeared after some of the most recent flood events, and realignment of the Tomasini Creek or Slough outlet around the pond. In addition, a berm of varying heights would be constructed around the perimeter of the pond to maintain impounded tidal conditions for goby, with tidal exchange limited to high tides exceeding 6 feet MLLW. To the extent practicable, construction in these areas will be timed towards the fall, when most of the spawning has been completed. In addition, the impact avoidance and mitigation measures proposed in the Mitigation Monitoring and Reporting Program (Appendix B) include measures to perform extensive surveys for tidewater goby in partially dewatered ditches immediately prior to construction and to trap and relocate individuals located. In addition, as part of the project, the Park Service and the U.S. Geological Survey are conducting a project that was approved under the BO with USFWS to expand the distribution of tidewater goby in the vicinity of the Project Area through either relocation, captive propagation, or both (Fong et al. 2006).

In general, the proposed project would benefit this estuarine species. Long-term benefits would result from gradual conversion of Pasture-Grassland to tidal and brackish marsh and maturation of created or naturally developing tidal creek channels within the Giacomini Ranch. The proposed project would result in expansion of tidal slough and channel habitat, allowing for brackish, low energy areas to become established. In addition, impounded off-channel habitat for tidewater goby would be enhanced by reestablishment or reinforcement of a degraded berm around the New Duck Pond, which would be directly adjacent to one of the new tidal channels and would receive tidal overflow on a regular basis. Increased hydraulic connectivity and tidal influence would also increase the potential for tidewater goby to establish in Olema Marsh. The Park Service is working with the U.S. Geological Survey (USGS) and the USFWS to conduct a captive propagation and relocation project in which these agencies would work to expand the extent of goby occurrences within the Project Area and/or southern Tomales Bay watershed.

There may be adverse effects to the goby during construction and over the short-term, because of the combination of direct impacts to existing habitat during and following construction and the fact that restored habitats would take time to establish. However, some of the direct impacts to existing habitat would be avoided by retaining the tidegate and flashboard dam structure on Tomasini Creek for at least 10- 20 years. This structure currently allows the full upper range of high tides into the current Tomasini Creek channel, but truncates the lower range, maintaining subtidal or ponded almost lagoon-type conditions. Despite being almost fully tidal, salinities within this reach remain brackish even when creek flow is intermittent, because the water regime is highly influenced by seeps and groundwater flow from the Point Reyes Mesa. With realignment of Tomasini Creek, this created channel would be maintained as a backwater slough feature. Through combination of the broodstock program and restoration-related habitat expansion, the proposed project is expected to provide at least minor, if not moderate, benefits over the long-term to the tidewater goby and its habitat.

Central California Coast Steelhead, Coastal California Chinook Salmon, and Central California Coast Coho Salmon: Three federally protected salmonids occur within the Lagunitas Creek watershed: steelhead (*Oncorhynchus mykiss*), chinook salmon (*O. tshawytscha*), and coho salmon (*O. kisutch*). The Lagunitas Creek watershed, including Olema Creek, is believed to support 10 to as much as 20 percent of the Central California Evolutionarily Significant Unit (CCESU) coho population (Brown et al. 1994, NPS, unpub. data).

While many salmonid projects are focused upstream on fish passage, habitat, and structure, the Project Area does not represent a potential breeding or spawning area for steelhead, coho, or Chinook salmon. These types of salmonids typically breed in the upper portions of the watershed in medium- to high-gradient tributaries. The Project Area does represent estuarine feeding habitat for outmigrating smolts, as well as a staging area for adults as they migrate upstream for spawning. However, currently, levees, culverts, and tidegates on Lagunitas, Bear Valley, Fish Hatchery, and Tomasini Creeks constrain opportunities for foraging and refugia within -- as well as migration through -- the Project Area.

The proposed project would benefit salmonid species by dramatically increasing access to potential foraging and refugia habitat. Long-term survival of smolts is tied to their size at outmigration. Increasing the amount of area available for feeding would benefit salmonids leaving Lagunitas Creek, Olema Creek, and Bear Valley Creek, potentially enhancing their chances of survival. Restoration actions would result in moderate increases (31 percent) in the amount of tidal channel perimeter or total aquatic edge available for salmonids. Removal of dairy infrastructure, ditches, and other materials would improve localized water quality conditions and decrease disturbance of existing aquatic habitats. Phase II would also include removal or replacement of fish passage impediments or barriers to upper portions of the watersheds through eliminating the tidegate on Fish Hatchery Creek, realigning Tomasini Creek to avoid the tidegate and flashboard dam on the current channel, and improving hydraulic connectivity for Bear Valley Creek. Impacts during construction would be negligible due to incorporation of standard Best Management Practices (BMPs) to limit adverse effects on creeks and other water bodies that potentially support salmonids.

California Black Rail and California Clapper Rail: Early in the 20th century, California black rails (ST) were apparently very common in the tidal marshes near Point Reyes Station, and California clapper rails (FE, SE) also reportedly occurred in Tomales Bay (Grinnell and Miller 1944). However, these species have been negatively impacted by large-scale habitat loss of coastal wetlands in California, as well as local losses of wetlands in Tomales Bay.

In 1994, the undiked marsh north of the Giacomini Ranch supported at least seven (7) pairs of breeding California black rails (Evens and Page 1986; Evens and Nur 2002), and black rails have also been detected intermittently in Olema and Bear Valley Marshes (ARA et al. 2002). There is no recent information on the number of breeding pairs of black rails, although numbers have possibly decreased (J. Evens, ARA, *pers. comm*.). Clapper rails are even less common in Tomales Bay. Clapper rail individuals were sighted for several years in the undiked marsh north of the Giacomini Ranch between 1995 and 2001 (J. Evens, R. Stallcup, unpub. field notes). However, there are no recent breeding records for this species in Tomales Bay (ARA et al. 2002).

The proposed project has opportunities to expand breeding and foraging habitat for rails with breaching or removal of levees, expansion of tidal and brackish marsh habitats, and potentially a decrease in water impoundment within Olema Marsh. Over the short-term, these changes would result in negligible beneficial effects on rails, because vegetation communities would be in a transitional phase marked by extensive vegetation dieback and temporary establishment by weedy, opportunistic species. However, over the long-term, establishment or reestablishment of Tidal Salt Marsh and Tidal Brackish Marsh would benefit rails, with major beneficial effects expected under Phase II with possible expansion of breeding and foraging habitat by as much as 250 to 350 acres. In addition to breeding and foraging habitat, another important habitat for rails is high tide refugia, which is typically higher elevation upland or upland ecotone areas. Currently, rails near the Giacomini Ranch use the levee system as refugia. Under the proposed project, some portion of levees would be retained both in the West and East Pasture for high tide refugia – the Tomasini Creek levee in the East Pasture and the northernmost portion of the West Pasture Lagunitas Creek levee. An additional high tide refugia area would be created on the western perimeter of the East Pasture Old Slough Pond in the northern portion of the East Pasture. These areas would be enhanced through revegetation with native plant species to improve habitat quality for rails and would not be subject to potential impacts or disturbance from public access. Construction would have the potential to have some impacts on rails, although standard construction BMPs involving pre-construction surveys and delays of construction near breeding habitat during the spring and summer would be observed.

Other Special Status Species: Most of the other federally and state-listed endangered and threatened species are only occasional visitors or vagrants to the Project Area, with the exception of peregrine falcon, a state endangered species and federally delisted species that has been regularly observed foraging over the Giacomini Ranch.

Species in this section include California freshwater shrimp (*Syncaris pacifica*, FE; common upstream in freshwater portions of Lagunitas Creek, rare in Project Area); California brown pelican (*Pelicanus occidentalis californicus*, FE; foraging on Lagunitas Creek shoreline); Least Bell's vireo (*Vireo bellii pusillus*, FE, SE; extremely rare vagrant in riparian habitat); green sturgeon (*Acipenser medirostris*, FT; forages rarely in Lagunitas Creek); peregrine falcon (*Falco peregrinus*, SE; regularly observed foraging over the Giacomini Ranch and undiked marsh); sandhill crane (*Grus canadensis*, ST; very rare visitor to wet pastures in Giacomini Ranch); and bank swallow (*Riparia riparia*, ST; rare transient over Giacomini Ranch in fall). In addition, this section includes species that are not federally or state-listed as endangered or threatened, but that were until recently listed as species of concern by the regional USFWS office (FSacSC) and are known to occur in the Project Area. These species include: northwestern pond turtle (*Clemmys marmorata marmorata*, former FSacSC) and saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*, former FSacSC).

The impacts of restoration and/or public access actions would vary depending upon the species. Most species would experience negligible to minor adverse effects during construction due to noise and habitat disturbances caused directly and indirectly by earthmoving activities. Over the short- and long-term, discontinuation of agricultural management practices such as levee maintenance, freshwater diversions, operation of tidegates, ditching, and grazing would negligibly benefit a number of species, including saltmarsh common yellowthroat, southwestern river otter, California brown pelican, green sturgeon, and Least Bell's vireo. Conversely, the northwestern pond turtle would suffer moderate adverse impacts as the pasture ditches and freshwater areas they currently use are filled or converted into brackish or saline creeks through reintroduction of tides. For the California freshwater shrimp, there would potentially be a minor adverse effect associated with restoration of Olema Marsh due to increased salinities in upstream portions of Lagunitas Creek because of increased tidal prism in Olema Marsh and connectivity to Lagunitas Creek. In addition, negligible to moderate adverse effects would be expected over the long-term for certain freshwater- and grassland-associated special status species. While "flushing" of voles and other rodents may benefit the American peregrine falcon during construction,

over the long-term, loss of grassland habitat would reduce rodent numbers and have a negligible adverse effect on this raptor. Species such as sandhill crane and bank swallow may also respond negatively to grassland conversion.

Table 3. Federally Listed Threatened and Endangered Species and Critical Habitat That May Be Affected by the Giacomini Wetland Restoration Project

Common Name	Scientific Name	Listing Status
USFWS-Regulated Species and Habitats		
California red-legged frog	*Rana aurora draytonii*	T
Tidewater goby	*Eucyclogobius newberryi*	E
Tidewater goby Proposed Critical Habitat		PX
California clapper rail	*Rallus longirostris obsoletus*	E
California freshwater shrimp	*Syncaris pacifica*	E
Myrtle's silverspot butterfly	*Speyeria zerene*	E
California brown pelican	*Pelecanus occidentalis californicus*	E
Least bell's vireo	*Vireo bellii pusillus*	E
NMFS-Regulated Species and Habitats		
Central California coast coho salmon	*Oncorhynchus kisutch*	E
Central California coast coho salmon Critical Habitat		X
Central California coastal steelhead	*Oncorhynchus mykiss*	T
Central California coastal steelhead Critical Habitat		X
California coastal chinook salmon	*Oncorhynchus tshawytscha*	T
Magnuson-Stevens Fishery Conservation and Management Act – Essential Fish Habitat		

Listing status: E = Endangered , T = Threatened, P = Proposed, X = Critical Habitat

Potential Impacts on Special Aquatic Sites

The only special aquatic sites currently existing within the Phase II Project Area are wetlands. With restoration of the Giacomini Ranch, areas below Mean High Water will become part of the Gulf of the Farallones National Marine Sanctuary, as well as a unit of the National Park Service. Phase II of the proposed project would improve both resource conditions and functionality of these wetlands. Phase II components -- removal of levees, tidegates, and culverts; realignment of leveed creeks, creation of tidal channels; and excavation to lower intertidal and floodplain elevations -- will increase within the Project Area the natural tidal and freshwater hydrologic processes that are key to most of the critical functions played by wetlands. These functions include floodwater retention, dissipation of erosive force of flood flows, water quality improvement through retention, assimilation, and transformation of sediment, pollutants, and/or nutrients. During the transitional phase, existing vegetation communities would die back due to increased saltwater influence, however, these communities are largely monotypic expanses of non-native grassland dominated by sown forage grass and herb species such as bentgrass (*Agrostis stolonifera*), bluegrass (*Poa palustris*), bull clover (*Trifolium repens*), and fescue (*Festuca arundinacea*). These communities would be expected to largely convert to Tidal Marsh and Tidal Brackish Marsh, with high marsh and Upland Ecotone vegetation communities dominating on the southern perimeter. A very small percentage of existing wetlands would be lost permanently either directly through minor fill or indirectly from discontinuation of agricultural management, but the minor increase in wetland acreage, along with the major increase in wetland functionality, more than offset these losses. The dramatic physical and hydrologic beneficial changes discussed earlier would be expected to boost the quality of Project Area and Tomales Bay wetland ecosystems, as well as their biological productivity.

Potential Effects on Human Use Characteristics

Municipal and Private Water Supplies

Excavation and fill activities would not be expected to directly impact municipal and private supplies. Water discharges in terms of stormwater and shallow groundwater pumped from the Giacomini Ranch to Lagunitas Creek would be required to meet background levels of turbidity and pH: groundwater would be filtered prior to discharge, and, during pumping, the turbidity and pH of filtered waters would be monitored regularly prior to discharge into the creek.

During analyses conducted for the FEIS/EIR, it was determined, however, that excavation in Olema Marsh could indirectly affect municipal and private supplies by potentially increasing salinities in upstream portions of Lagunitas Creek. The Project Area is located within the North Marin Water District (NMWD) West Marin Service Territory. Within the West Marin area, NMWD services the towns of Point Reyes Station, Olema, Bear Valley, Inverness Park, and Paradise Ranch Estates. Currently, NMWD currently obtains its water supply for the West Marin service area from two groundwater wells located adjacent to Lagunitas Creek on the U.S. Coast Guard (USCG) property in Point Reyes Station. These groundwater wells draw from groundwater within the alluvial aquifer of Lagunitas Creek, as well as possibly from the terrace groundwater aquifer.

Currently, the NMWD faces problems with occasional intrusion of salts into the Coast Guard wells, although institution of management practices such as off-tide pumping have appeared to decrease frequency of these events. Salts pose problems for several reasons. Chlorides can affect the taste of the water. The California Department of Health Services (DHS) has established secondary drinking water standards for chloride in potable water ranging from 250 (recommended) to 500 (maximum) mg/L, however, NMWD has instituted stricter standards of 100 mg/L, which is often at the lower range of what people can discern by taste. Minerals in saline water such as bromide can also combine with disinfection agents to create disinfection by-products: DHS recently established primary drinking water standards for disinfection by-products (MCL = 1.0 mg/L).

While there has been a considerable amount of study into the salinity intrusion problem, the exact cause or mechanisms by which salinities become elevated is still not totally understood. However, salinity intrusion appears to be controlled by a combination of factors, including tidal height, streamflow discharge, pumping rates, and possible influence from the adjacent terrace groundwater aquifer (KHE 2006a). Salinity intrusion events appear to correlate with low creek flows of less than 9-10 cfs; maximum well-pumping rates; and spring tides exceeding 5.5 - to 5.7 feet MLLW and often lag behind spring or high tide events by as much as 5- 7 days.

Two project components would appear to have the most effect on surface water salinities in the upper portion of Lagunitas Creek: 1) the proposed conversion of the Giacomini appropriative water right use dedication from irrigation to beneficial in-stream uses; and 2) the proposed adaptive restoration component for Olema Marsh. The Park Service is dedicating the 2.0 cfs appropriative water right that it purchased from the Giacominis to beneficial instream uses, which would increase the amount of downstream freshwater flow by 20 percent during the summer and early fall months (KHE 2006a). Even with the increase in tidal prism from restoration of the Giacomini Ranch, discontinuation of use of the appropriative water right for irrigation still results in a net decrease of 14 percent in salinities in upstream portions of Lagunitas Creek during both normal-year and dry-year streamflow conditions (KHE 2006a).

Conversely, based on results of hydrodynamic modeling, full restoration of Olema Marsh could increase salinities in upstream portions of Lagunitas Creek by as much as 27- 32 percent during dry-year and normal-year streamflow conditions, respectively. The difference in effects between these restoration components appears to relate to the point of exchange with Lagunitas Creek. While the potential tidal prism or volume of waters is much smaller in Olema Marsh than that of the Giacomini Ranch, the point at which these waters would be exchanged with Lagunitas Creek is much closer to the Coast Guard wells and is located in a deep, pooled section of Lagunitas Creek that potentially has greater exchange with reaches upstream of the Green Bridge. Most of the tidal exchange in the Giacomini Ranch would occur within the lower-elevation northern portion of the East Pasture, where marshplain elevations are lowest, and the primary tidal creek inlet would be located. These areas are almost 2- 2.75 miles downstream of the Coast Guard wells.

While chloride concentrations may increase relative to existing conditions with full restoration of Olema Marsh, the frequency or duration of events conveying saline waters upstream of the Green Bridge would not, because the current thresholds of 5.5- to 5.7 feet MLLW at which chloride concentrations become problematic appear related more to tidal waters reaching a specific location within the creek where infiltration occurs than to a critical chloride volume. However, to ensure that there are no impacts to municipal water supply, the Park Service and CSLC are not implementing major adaptive restoration elements in Olema Marsh until 1) further monitoring and modeling show that elevated salinities would not pose a threat to water supply operations or that restoration in Olema Marsh would not elevate salinities in upstream portions of Lagunitas Creek or 2) NMWD receives funding and moves ahead with construction of a pipeline to one of its existing upstream, emergency wells (Gallagher Well) for use during off-tide pumping conditions. The major adaptive restoration actions include replacement of the Levee Road and Bear Valley Road culverts.

The Park Service, ACR, and CSLC have been working with their hydrologic consultants to identify through further monitoring and modeling limited restoration actions that could be implemented without causing major impacts to upstream Lagunitas Creek salinities and NMWD operations. One of these actions involves creating a notch in the earthen berm that currently limits outflow of Bear Valley Creek through the Levee Road culvert. In Phase II, a notch would be constructed that would increase outflow and hydraulic connectivity of Bear Valley Creek with Lagunitas Creek. Simultaneously, the Park Service and hydrologic consultants would monitor salinities in upstream portions of Lagunitas Creek to determine accuracy of salinities predicted by hydrodynamic modeling and to further refine the model for modeling of additional, future adaptive restoration elements. Should construction of a notch in the earthen berm and the increased hydrologic exchange cause an increase in upstream salinities that could cause major impacts to NMWD operations, the berm would be repaired to pre-project conditions.

Recreational and Commercial Fisheries.

Fill and excavation components of Phase II of the proposed project would not impact recreational and commercial fisheries or mariculture. While restoration may have short-term impacts on the quality of water transported by Lagunitas Creek downstream to Tomales Bay because of erosion or mixing with Project Area waters, these effects would be short-lived, minor in magnitude relative to ambient creek conditions, and would not be expected to extend as far northward down the Bay as the commercial oyster-growing operations. Over the long-term, improved hydraulic connectivity of Lagunitas Creek with its historic floodplains on the Giacomini Ranch would result in an improvement of the quality of water transported downstream through retention, assimilation, and/or transformation of sediment, nutrients, pathogens, and contaminants.

Recreational fishing for salmon is not allowed in the Lagunitas Creek, Olema Creek, or Bear Valley Creek subwatersheds or in the adjacent portions of Tomales Bay. The outer portions of Tomales Bay do support a small commercial herring fishery. Project actions would only improve conditions for these fisheries by improving downstream water quality.

Water-Related Recreation.

Phase II of the proposed project would not adversely impact water-related recreation. Currently, most water-related recreation in the Project Area occurs in Lagunitas Creek and is limited to kayaking, small boating, and swimming by dogs. Because of water quality problems related to upstream sources of pollutants, swimming in this section of creek is not encouraged. Fill and excavation components proposed under Phase II would not limit water-related recreation relative to existing conditions and could, in fact, increase kayaking and small boating opportunities through reconnection of the Giacomini Ranch with Lagunitas and Fish Hatchery Creeks. As discussed above under Physical and Chemical Impacts and Recreational and Commercial Fisheries, over the short-term, restoration activities may lead to minor, adverse impacts to water quality from erosion and mixing of Project Area waters with creek waters that are subsequently transported downstream. However, over the long-term, the proposed project would improve conditions for water-related recreation by decreasing the amount of pollutants transported downstream.

Aesthetics.

The proposed project would remove agricultural infrastructure that disrupts the integrity and unity of the existing Pastoral Landscape and restore a more Natural Landscape within the Project Area. Construction

would temporarily adversely affect visual resources through the presence of earthmoving equipment, earthmoving activities, and spoil and equipment piles, with the intensity and degree of impact related to the areal extent and intensity of earthmoving activities. After construction, the Project Area would go through a short-term transitional, ruderal phase as the Giacomini Ranch and Olema Marsh adapt to changed conditions. In the Giacomini Ranch, pastures would respond to the absence or decreased intensity of grazing, discontinuation of agricultural management, and elevated soil nutrient levels through a shift to plant communities dominated by weedier, more opportunistic plant species, as well as an overall increase in plant biomass or height of vegetation. In Olema Marsh, which would be partially restored through a slight improvement in hydraulic connectivity, vegetation dieback would be expected to occur in response to changes in water levels, topographic elevations, soils, and soil and water chemistry. Over the long term, the proposed project would result in a conversion of heavily managed agricultural lands or impounded marshes to Natural Landscapes characterized by a much wider diversity of wetland and riparian habitats and wildlife species. The minimalist public access elements incorporated would not detract from the visual appeal of these landscapes.

Construction of Phase II of the proposed project would result in impacts to short-term negligible to moderate air quality impacts associated with construction dust and vehicle exhaust. Mitigation measures that would be incorporated into Phase II to reduce air quality impacts are discussed in more detail in the Mitigation Monitoring Program Report in Appendix B. The Park Service and CSLC have received confirmation from the Bay Area Air Quality Management District in June 2007 that impacts from construction to Bay Area Basin air quality would be *de minimis* and in conformance with the State Implementation Plan. There will be no long-term impacts to air quality.

In terms of the Giacomini Ranch, the proposed project would have long-term beneficial effects on odors in the local community with conversion from the dairy to open space. There may be some adverse effects during construction and over the short-term following construction from disturbance of wetland (anoxic) and manure-laden soils. Dewatering of Olema Marsh could exacerbate short-term impacts from odor due to drainage-related decomposition of organic matter and related biogeochemical changes in Olema Marsh soils and waters, but these effects would be temporary.

Construction activities, including excavation, scraping/grading, pile driving, and hauling on-site and off-site, have a potential for disturbing nearby sensitive noise receptors. In the FEIS/EIR, the Park Service and CSLC completed a detailed analysis of potential impacts from noise to adjacent residents from both on-site construction activities and off-site hauling to the Tomales Point quarries. Through this analysis, the Park Service and CSLC identified Sensitive Construction Zones, where mitigation measures would need to be employed to reduce impacts to less than significant under CEQA and less than major under NEPA. Construction in the southern portion of the East Pasture – most of which was completed under Phase I – and in the southern portion of the West Pasture would fall within these Sensitive Construction Zones. Identified mitigation measures to reduce noise impacts in Sensitive Construction Zones include limiting construction hours, reducing the number of simultaneously operating pieces of construction equipment, and limiting idling of construction equipment to 5 minutes. (Many of these mitigation measures were similar to those proposed for reducing construction-related air quality impacts.) All other noise impacts were considered negligible to minor because of attenuation due to distance and/or noise barriers. The proposed project will not result in any significant impacts to existing geologic conditions.

Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.

The Project Area falls within a unit of the National Park Service (GGNRA) and is managed by the Seashore. There are no National or Historical Monuments present. All of the elements proposed under this restoration project would enhance the aesthetic, educational, historical, recreational, and/or scientific qualities of this park area, particularly relative to existing condition as a former dairy ranch. None of these components would reduce or eliminate the uses for which these parks are set aside and managed and, in fact, would actually enhance these values.

Cumulative Effects on the Aquatic Ecosystem

Cumulative impacts, as defined at 40 CFR 1508.7, are, in part, "the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." Cumulative impacts for Phase II with other proposed projects would be expected to potentially occur for the following resources: air quality, noise, traffic, and wildlife.

The County of Marin Department of Public Works has proposed one project that may be implemented in 2008: excavation of the western culvert near Olema Marsh that directs flow from Silver Hills drainage through White House Pool County park to Lagunitas Creek. During this period, the Park Service may be hauling excavated sediments from the Giacomini Ranch East Pasture to quarries in Tomales Point. Should these projects be constructed simultaneously, there is potential for minor cumulative temporary impacts on traffic and noise and negligible to minor cumulative temporary impacts on air quality. The Park Service will work with the County to try and stagger implementation of these projects to minimize these impacts. In addition, the culvert cleaning project has the potential to affect California red-legged frog, which occurs in the adjacent Olema Marsh. Implementation of this County project simultaneously with implementation of the initial adaptive restoration component in Olema Marsh could have negligible to minor temporary impacts on non-breeding habitat and distribution. Construction in Olema Marsh would not occur during the breeding season for red-legged frog. As described in Appendix B, the Park Service would implement pre-construction surveys for California red-legged frog by qualified biologists no more than one (1) week before construction. Frogs encountered would be relocated by a qualified biologist outside of the Phase II Project Area.

Expansion of tidal marsh habitats in the historic wetlands of the Giacomini Ranch—including low-marsh, mid-marsh, high-marsh, and high-marsh/upland ecotone habitats -- would also have a cumulatively beneficial effect with the large number of proposed and ongoing wetland restoration projects in greater San Francisco Bay on California black rail regional populations, as well as on populations of shorebirds, waterfowl, and other regionally based species. Some of these projects include Hamilton Wetland Restoration Project, Napa-Sonoma Marsh Restoration Project, and the South Bay Salt Pond Restoration Project. The increase in marsh area and elevational diversity, as well as in quality of existing marsh and subtidal habitat, in both Tomales and San Francisco Bay will greatly benefit many wildlife species that move back and forth between the two watersheds or that would use Tomales Bay as alternative habitat in the event of stochastic events such as floods or oil spills.

EVALUATION AND TESTING

More than 95 percent of the soil materials used for fill in the Giacomini Ranch or exported as fill for restoration of the quarries on Tomales Point would come from the Giacomini Ranch. The only components that might use materials that do not originate from the Giacomini Ranch would be the public access ones. If public access improvements are conducted after 2008, some soil or decomposed granite materials may need to be brought from off-site to do minor grading and improvements. A sediment screening evaluation was conducted as part of baseline studies for the Project Area, with the potential contaminants of concern being lead shot from decades of hunting on the Giacomini Ranch and mercury from redistribution of contaminated sediments near the outer portion of Tomales Bay eventually into the southern portion of the watershed. The only contaminant detected in the Project Area was cadmium, which actually occurred outside the Giacomini Ranch in Tomasini Creek directly upstream of Mesa Road (Parsons and Allen 2004b). Mercury, methylated mercury, and lead were not detected in the Project Area – even, in the case of methylated mercury, with extremely low detection limits.

ACTIONS TO MINIMIZE ADVERSE EFFECTS

The mitigation and monitoring plan prepared to satisfy CEQA requirements is provided in Appendix B.

ALTERNATIVES ANALYSIS

Under Section 404 (b)(1) as set forth in Title 40, Code of Federal Regulations, Part 230, no discharge of dredged or fill material maybe permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. An applicant must show that,

to the extent practicable, steps have been take to 1) avoid wetland impacts; 2) minimize potential impacts on wetlands; and 3) provide compensation for any remaining unavoidable impacts. An analysis of alternatives to the proposed project elements is provided.

Alternatives evaluated FEIS/EIR include: a No Action Alternative and four (4) action Alternatives (Alternative A-D) that varied inversely in the degree or amount of restoration and public access proposed. The document also identified restoration and management elements that were common to all alternatives, which included discontinuation of agricultural land management, removal of buildings and structures from the dairy facility, and removal of worker housing. The Park Service and CSLC selected Alternative D, the environmentally preferred alternative, for implementation. The document also identified that, due to seasonal and special status species constraints, implementation of the selected alternative would need to be phased over several years.

Alternatives to the elements proposed in Alternative D or the selected alternative would largely involve 1) taking no action or, in some cases, 2) reducing the size of the area affected. The No Action and potential alternative actions to are described below for the largest excavation and fill elements affecting areas potentially subject to oversight as wetlands, as well as the potential feasibility and issues associated with these alternative actions:

1) ***Excavating levee system to surrounding grade (1.54 acres of Section 404 Tidal and Adjacent Wetlands and 8.0 acres of Historic Section 10 waters)***: Most of the levees are upland (8.0 acres) and would only be considered jurisdictional as historic Section 10 waters, although the base of some portions of the inboard and outboard portions of the system are classified as Section 404 adjacent and tidal wetlands, respectively (1.54 acres). If these areas or the Historic Section 10 areas were not excavated, all or part of the levee system would remain. The levee system or remnant levee sections would be subject to erosion over time without continual maintenance, causing sediments to be carried downstream to Tomales Bay, which has been declared impaired under Section 303(d) of the Clean Water Act. In addition, they would reduce, if not entirely eliminate, the proposed improvements to wetland functions such as floodwater storage, water quality improvement, and wildlife habitat, as well as the aesthetics of the restored natural landscape***.***

2) ***Removal of Culverts and Tidegates (0.08 acre of Section 404 Tidal/Section 10 Waters; 0.02 acre of Section 404 Adjacent/Historic Section 10 Waters):*** Culverts and tidegates would be removed from two locations: one at the outlet of Fish Hatchery Creek from the West Pasture and one at the outlet of the Old Slough from the East Pasture. The Giacominis installed a one-way tidegate in the West Pasture north levee near Sir Francis Drake Boulevard, however, at some point, this gate began to malfunction and allow some tidal waters into the pasture. The tidegates on Fish Hatchery Creek in the West Pasture reduce amplitude of both the low and high tides (KHE 2006a). The lowest water levels measured just inside the West Pasture in Fish Hatchery Creek are 3.25 feet NAVD88, while the upper portion of the tidal range is truncated at 5.25 feet NAVD88 (KHE 2006a). Muted tidal flushing in the West Pasture has resulted in reduced tidal prism, with prism currently estimated at 8.1 acre-feet at MHW based on hydrologic modeling (KHE 2006a). Tidegates on East Pasture Old Slough have largely functioned to eliminate tidal exchange of Lagunitas Creek on the East Pasture.

   Removal of these culverts and tidegates would introduce full tidal flushing into both pastures, with Fish Hatchery Creek and the Old Slough/realigned Tomasini Creek both planned to be the major points of tidal exchange for the West and East Pastures, respectively. Alternatives to this action would include: 1) retention of the culverts and tidegates and/or 2) creation of other points of primary tidal exchange with Lagunitas Creek. Retaining the existing culvert and tidegates and simply creating another point of tidal exchange would have much more dramatic impacts on existing jurisdictional wetlands, because it would involve considerably more excavation to create entirely new tidal channels capable of being the primary point of tidal exchange for these two separate restored marsh systems. There is an option in the West Pasture to shift the primary point of tidal exchange to the tidal channel that would be constructed to the east of Fish Hatchery Creek, but the source channel that it would connect to is smaller than Fish Hatchery Creek and has less tidal energy.

   Retention of the culverts and tidegates without construction of other channels would considerably reduce the potential for the proposed project to improve wetland functionality, particularly in terms of reducing floodwater levels during storms and improvements to the extent and quality of wildlife habitat for species

such as California black rail, salmonids, estuarine and marine fish, benthic invertebrate communities, and mammals such as the southwestern river otter.

3) ***Excavating tidal channels and realigning terminus of Tomasini Slough (2.56 acres of Section 404 Adjacent Wetlands; 1.58 acres of Historic Section 10 Waters)***: Most of the tidal channel creation – 2.44 acres – is proposed for the East Pasture, because the dense, estuarine muds that underlie most of this pasture would tend to retard natural development of tidal channels, as would the dense cover of rhizomatous and stoloniferous pasture grasses (R. Kamman, KHE, *pers. comm*.). The East Pasture once supported an intricate network of sinuous tidal channels, particularly in its northern end, but most of these were eliminated through land-leveling and filling activities to improve pasturage. Without creation of tidal channels in the East Pasture, they would be unlikely to develop naturally (R. Kamman, KHE, *pers. comm*.). The extent of tidal channel creation was guided by the volume of water needed to maintain a dynamic and functional tidal channel system, as well as the interest in creating more habitats for aquatic organisms.

   The initial plan had been to route the realigned Tomasini Creek channel entirely through the East Pasture Old Slough to its terminus with Lagunitas Creek. The East Pasture Old Slough is a historic slough and possibly one of the former alignments of Tomasini Creek prior to its being leveed in the 1960s. However, at some point during recent flood events, tidewater goby dispersed from Tomasini Creek into the downstream-most section of the East Pasture Old Slough, which was bermed under ranch operations to create a pond for duck hunting. To avoid impacts to tidewater goby, the terminus of Tomasini Creek or Tomasini Slough would be rerouted to run around the East Pasture Old Slough Pond, which would preserved as impounded muted tidal habitat through construction or enhancement of existing berm. Alternatives to 1.38 acres of excavation for the new terminus would be: 1) to route the channel as was previously planned through the East Pasture Old Slough Pond; 2) to route the channel directly west somewhere in the vicinity of the former pumphouse; and 3) maintain Tomasini Creek current leveed alignment and outflow point and not create tidal channels in the East Pasture. Routing the channel through the East Pasture Old Slough Pond would increase potential construction- and project-related impacts to tidewater goby. Routing the channel westward to the old pumphouse location would reduce excavation, but, because the new channel would be upstream of a substantial gravel bar present in Lagunitas Creek, tidal amplitude in the new channel system would be reduced and could, therefore, affect long-term viability of created tidal channels, as well as the extent of wildlife habitat and use. The impacts associated with maintaining the current Tomasini Creek alignment are discussed below under *Excavation to realign and improve flow conveyance on Tomasini Creek.*

   Only a small proportion of the tidal channel creation proposed would be in the West Pasture (0.12 acre), because the alluvial soils that predominate in this area are more conducive to natural development of tidal channels (R. Kamman, KHE, *pers. comm*). The only tidal channel created would be one that would connect to what appears to be a remnant tidal slough. This remnant slough would be connected to a large tidal channel that runs through the middle of the CSLC undiked marshlands. Without active creation, the tidal channel would be unlikely to initiate naturally due to the densely compacted soils underlaying the north levee that would be between the remnant slough and the large tidal channel.

4) ***Excavating the East Pasture Old Slough to improve hydraulic connectivity (3.0 acres of Section 404 Adjacent Wetlands/Historic Section 10 Waters)***: Because the East Pasture Old Slough is currently diked and no longer open to tidal action, large stands of cattails (*Typha* spp.) and bulrush (*Scirpus californicus*) have established within 4.8 acres of this former tidal slough that has not been as frequently dredged during ditch maintenance as the remainder of the drainage ditch system. If the channel was not excavated to improve hydraulic connectivity, flow velocities, and tidal energy, it is likely that the East Pasture Old Slough and many of the created tidal channels off the Old Slough would begin to accumulate sediment and cease to function properly. Some “cleaning out” would occur during large storms when flow velocities and energy in Tomasini Creek, which would be reconnected to the East Pasture Old Slough, would increase substantially, but this would not be sufficient to maintain the created tidal channel network, as well as to create and maintain tidal channels with open, intertidal mudflat on banks during low tide that would have important wildlife value for invertebrates, shorebirds, and other species. Another alternative action would be to reduce the extent of area, but this would leave dense stands of tall emergents and cause rapid recolonization, as well as sediment accumulation and reduction in tidal energy.

Under this component, all 9,500 CY of excavated wet sediment and vegetated material would be spread on the westerm perimeter of the East Pasture Old Slough Pond in preparation for construction of the high tide refugia, resulting in permanent fill of 2.08 acres. Alternatives to this action involve either: 1) off-hauling all 9,500 CY; 2) treating 9.500 CY as a temporary fill by off-hauling after a period of being spread for dewatering; and 3) reducing the extent of material spread. Off-hauling immediately would be logistically complicated due to the wetness of the excavated material. Off-hauling the dewatered material at a later time would reduce long-term fill impacts, but would reduce size and height of the high tide refugia and increase construction-related disturbance to wildlife.

5) ***Excavation to realign and improve flow conveyance on Tomasini Creek (1.01 acres of Section 404 Adjacent Wetlands/0.02 acres of Historic Section 10 waters and 0.09 acres of Section 404 Non-Tidal Waters) and Construction of new Tomasini Creek bank (0.12 acre of Section 404 Non-Tidal Waters)***: Alternatives for realignment of Tomasini Creek would involve: 1) no realignment of the creek or 2) partial realignment. These alternative elements were actually incorporated into the alternatives analyzed in the FEIS/EIR. No channel realignment was proposed under the No Action Alternative and Alternatives A and B. Partial realignment was analyzed under Alternative C. Alternative D incorporated full realignment through the center of the Tomasini Triangle, however, during the early portions of the final design stage, hydrologists and engineers felt that having the channel run through the middle of the created marsh was not a stable, hydrologic design and instead suggest realigning into one of its historic alignments slightly downstream.

   Because of the presence of the federally endangered tidewater goby (*Eucyclogobius newberryi*), the Park Service and CSLC propose retaining the leveed channel and tidegate/flashboard dam system to minimize impacts to this listed species, however, under the proposed project, it would be a backwater slough feature, and Tomasini Creek would be realigned into one of its historic alignments. As discussed in the FEIS/EIR, without realignment, Tomasini Creek would continue to be a muted tidal system, because of the malfunctioning tidegate and flashboard dam structure that currently regulates flow at the creek's mouth. Natural hydrologic processes such as channel migration/avulsion, floodplain, and sediment deposition processes within the creek would continue to be limited or altered by the presence of the berm and the tidegate/flashboard dam structure. In addition, these structures would have negative impacts on other wildlife species such as coho and steelhead salmon, which have been sighted in this creek in recent years, as well as other native estuarine fish and invertebrate species.

   Partial realignment as described in Alternative C – realigned near the Giacomini Hunt Lodge rather than in the Tomasini Triangle – would have many of the same benefits, but it would not substantially reduce impacts to wetlands in terms of excavation.

6) ***Bank grading and riprap removal (0.07 acre of Section 404 Tidal/Section 10 Waters and 1.74 acres of Historic Section 10 Waters):*** The southern bank of Lagunitas Creek in the East Pasture has been one of the ones affected the most by previous flood scour damage and subsequent efforts to rebuild and reinforce through riprapping. Under these components, a 300-foot section of bank with riprap would be restored by removing riprap above MHW and regrading the exposed creek bank to a more stable profile (no steeper than 3:1). Some of the removed riprap would be used to reinforce the toe and mid-section of the adjacent 100-foot section of creek bank to the east, which has been damaged during past floods from erosion caused by scour. Following reinforcement of the lower bank, the remainder of the creek bank in this area would also be regraded to a more stable profile (no steeper than 3:1). Further downstream, a 1,525 linear-foot section of creek bank would also be regraded above MHW to a more stable profile (no steeper than 3:1). All of these areas would be stabilized following grading with some type of erosion control measure (e.g., erosion control blanket, vegetation mats, or biotechnical stabilization measures such as willow mattresses) and revegetated with native riparian plant species.

   Alternatives to these actions would include: 1) no bank grading or riprap removal; 2) bank grading and removal of all riprap; 3) partial removal of riprap with no bank grading; and 4) no riprap removal with bank grading in other non rip-rapped areas. Removing all of the riprap from the toe and lower portions of the creek bank slope could increase erosion and undercutting of this bank during future flood events and result in destabilization that could threaten adjacent sections of creek bank. Partial removal of riprap with no bank regrading would increase the potential for riparian habitat to establish both in formerly riprapped areas and areas that were not formerly riprapped, but the steepness of the current bank slopes could result in future slumping during the period when riparian plant species are just beginning to become

established and have not developed sufficient enough root systems to stabilize the banks. No bank grading or riprap removal would leave these sections of creek bank possibly more vulnerable to future erosion and slumping due to the unstable profile and lack of stabilizing vegetation. In addition, these areas would offer less wildlife habitat potential due to the lack of riparian vegetation and would not enhance the values of the existing established riparian vegetation in adjacent sections of creek.

7) ***Filling of drainage ditches (3.36 acres of Section 404 Adjacent Wetland):*** The ditches are proposed to be filled, because they are an agricultural remnant that would not encourage development of natural hydrologic processes. The ditches to be filled are linear, unnatural-looking features that would also detract visually from the natural landscape that would be restored as part of the proposed project. Not filling the ditches would mean that much of the flow within the East Pasture would continue to be captured by these features, and these features may reduce the potential for successful establishment, development, and maintenance of the created tidal channels, which would be excavated to mimic natural tidal channels in deltaic systems. Reducing the extent of ditch to be filled has already been accomplished to some degree by retaining the sinuous portion of the East Pasture Old Slough in the northern portion of the East Pasture and incorporating the ditch, when possible, into the realigned Tomasini Creek channel system. Most of the ditches would convert to Section 404 Tidal Wetland with the removal of levees, tidegates, and culverts, although 0.61 acre in the southern portion of the East Pasture would convert to upland.

8) ***Decreasing the elevation of topographically elevated areas to lower intertidal or floodplain elevations (15.9 acres of Section 404 Adjacent Wetland***): Under this component, up to 32 acres of the southwestern portion of the East Pasture would be shallowly graded (1- to 2.5 feet) to lower marshplain and floodplain elevations to improve hydraulic connectivity and associated floodplain functions. If this area was **not** excavated to lower elevations, it would simply reduce the amount of mid-marsh and high-marsh intertidal habitat and low-elevation floodplain and maintain a higher proportion of high-elevation floodplain that would only be flooded during moderate storm events (> 2-year flood event). This would reduce the value of this area, to some extent, for wildlife, as well as for water quality improvement and floodwater retention and dissipation of flood flow energy during smaller storm events (< 2-year flood event). Another alternative would be to reduce the extent of area. This may occur regardless, because of funding constraints. As part of the extensive alternative development and refinement process, this alternative element has already been revised to reduce the extent and depth of excavation.

9) ***Filling of borrow ditch (0.46 acre of Section 404 Tidal/Section 10 Waters) north of West Pasture North Levee with excavation of adjacent marsh (0.57 acre of Section 404 Tidal Wetland/Historic Section 10 waters)*:** This component would fill the borrow ditch from which soil materials were excavated to create the West Pasture North Levee with excavated levee materials. Because the outboard marsh "shelf" between the levee and the borrow ditch would be disturbed by earthmoving equipment, topsoils in this area would be removed, stockpiled, and replaced once construction is complete. Potential alternatives to these actions would principally consist of the No Action alternative, with the possible exception of the borrow ditch. The borrow ditch could potentially be retained even if the tidal channel in the CSLC undiked marsh was connected to the remnant tidal channel in the West Pasture. Channels perpendicular to the dominant flow pattern, which the borrow ditch is, are not typically common in deltaic systems. Retention of this perpendicular channel with restoration and enhancement of the natural tidal channel, which parallels Lagunitas Creek, creates a looped hydrologic design that might result in "null points" or problematic water circulation patterns that would lead the restored channel to fill in over time (G. Kamman, KHE, *pers. comm*.). Ultimately, this would compromise the function of not only the created section of channel in the West Pasture, but the natural tidal channel in the CSLC undiked marsh (G. Kamman, KHE, *pers. comm.).*

10) ***Creation by fill of High Tide Refugia and Impounded Off-Channel Habitat (0.1 acre of Section 404 Tidal Wetland; 0.2 acres of Section 404 Adjacent Waters/Historic Section 10 Waters; 2.48 acres of Section 404 Adjacent Wetland/Historic Section 10 Waters):*** In the West Pasture, some of the excavated levee materials would be used to create a land "bridge" between the enhanced high tide refugia for rails created as part of a 2006 project and the natural alluvial levee in the undiked marsh to the north. The bridge would be tapered to gradually descend to the lower elevation of the alluvial levee. Alternatives to this action include principally not constructing the land bridge, but leaving the enhanced section of levee and the alluvial levee separate. Because the borrow ditch would be filled, the two areas would be connected by tidal marsh. In addition, approximately 2.28 acres of high tide

refugia would be created as part of a berm that would be used to create impounded, muted tidal conditions for tidewater goby in the northern portion of the East Pasture around the East Pasture Old Slough Pond. A 0.4-acre lower elevation berm would be reconstructed and repaired around the perimeter of the New Duck Pond to create impounded off-channel muted tidal habitat for tidewater goby adjacent to one of the new tidal channels that connects directly to Lagunitas Creek.

Alternatives to refugia and off-channel berm creation involve: 1) no action or not creating berm or off-channel habitat or 2) reducing the size and the scope. The value of creating high tide refugia is that there are not many upland areas in the Project Area above the higher high tides that could serve as refugia for rails that are not directly adjacent to roads such as Sir Francis Drake Boulevard, residences, or public access areas (Tomales Bay Trail). In addition,creating refugia within the matrix of the restored tidal marsh eliminates or reduces disturbance pressures from people and domestic and feral animals. Reducing the size and the scope of these features reduces the value of these habitats to rails and tidewater goby.

11) ***Restoring Natural Mesa Topography (0.77 acre of Section 404 Adjacent Wetland)***: The mesa on which the former Dairy Facility is located has been altered by construction of manure waste ponds and other land management practices. This area would be restored by creating more natural slopes and contours on the mesa perimeter through selective fill and regrading, including regrading of the access road leading from the Dairy Facility to the pastures. The restored slopes would be stabilized using erosion control measures and revegetated with native plant species characteristic of mesic scrub vegetation communities. Alternatives to this action include principally 1) not restoring the natural mesa topography or 2) restoring only by regrading the existing slopes. Construction of the manure ponds has created unnatural hard angles along the slope's perimeter. Regrading without fill would address the unnaturally steep slopes, but leave the unnatural angles and decrease the potential for blending the Dairy Facility into the Point Reyes Mesa environment.

12) ***Excavating All or Part of Earthen Berm and Shallowly Excavating Flowpath on Bear Valley Creek (1.13 acre of Section 404 Non-Tidal Wetland)***: This component of the project is designed as an adaptive restoration project, such that initial, less-intensive components would be undertaken first, and the system would be given to some time to equilibrate before a decision is made whether to proceed with the more intensive culvert replacement elements on the basis of improvement in hydrologic and ecological processes and conditions. The initial adaptive restoration elements involve removing a portion of the small earthen berm that constrains outflow of Bear Valley Creek, and, should there be no impacts to NMWD operations because of increases in upstream water salinities, the remainder of the berm would be removed in subsequent years, and the flowpath of Bear Valley Creek would be shallowly excavated.

Alternatives to the initial adaptive restoration element would principally be the No Action alternative, although conceivably shallow excavation could be performed without removal of the berm and vice versa. If shallow excavation were not performed to improve the flow path of the creek and hydraulic connectivity with Lagunitas Creek, drainage from Olema Marsh via Bear Valley Creek, which runs through the marsh, would remain restricted by the dense cover of densely rooted tall and medium-sized emergent marsh species that now grow in the creek's primary flow path along the eastern perimeter of the marsh. If removal of the berm was not performed, the berm – which essentially chokes off most of the outflow area from Olema Marsh -- would continue to reduce outflow, even if Bear Valley Creek is shallow excavated. Implement of the initial adaptive restoration element would drop water levels to at least the culvert invert elevations.

A reduction in drainage would maintain the current impoundment condition in Olema Marsh in which water levels have continued to increase in response to reduced drainage and outflow capacity, with waters levels believed to have increased by as much as 10 feet over the last decade (KHE 2006b). This impoundment not only has implications for flooding of the adjacent Levee Road (Sir Francis Drake Boulevard) and Bear Valley Road during storms, but may reduce the ability of salmonids and other aquatic organisms to move effectively upstream and downstream, as well as continue to reduce riparian habitat by "drowning" vegetation on the perimeter of the marsh. The Olema Marsh riparian area supports one of the largest coastal breeding populations of saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*; CSC).

13) ***Excavation of Fish Hatchery Creek and Lucchesi Drainage for Maintenance Purposes (0.11 acre of Section 404 Non-Tidal Waters/Historic Section 10 Waters).*** This component would continue to maintain channel capacity within these small drainages, which are directly adjacent to

several private residences. During storm events, flood flows carry substantial amounts of sediment from the Inverness Ridge onto the flatter, lower gradient areas at the western perimeter of the West Pasture. Sediment deposition increases floodwater elevation and has caused flooding of adjacent homes in the past. During the Giacomini's ownership, these drainages were periodically dredged to remove excessive sedimentation and increase flood flow conveyance. Alternatives to this action include: 1) No Action; 2) constructing a barrier between the creeks and the homes, and 3) rerouting the creeks away from homes. The No Action alternative would not be acceptable, because it would exacerbate flooding of private residences above currently existing levels. Constructing a barrier between the creeks and the homes would be technically difficult, because any barriers might actually act to impound surface run-off and emergent groundwater flow from the Inverness Ridge, which is quite substantial. In the case of the 1906 Drainage, this creek actually runs through private property before flowing into the West Pasture, and there is currently not sufficient room to construct a barrier between creek and home. For this same reason, rerouting of creeks would also be difficult. Rerouting would require the creeks to be diverted to run alongside Sir Francis Drake Boulevard to a point at which flow could be conveyed to the pasture. In most of these cases, this action would increase flooding of this major connecting road by inducing sediment deposition at the base of the Inverness Ridge and could increase the amount of creekflow that would sheetflow into these private properties over the road. Rerouting would also increase the need for culvert and roadside ditch maintenance. At this time, the only viable option appears to be to maintain channel capacity downstream of the private properties.

14) ***Construction of Public Access Viewing Areas and Trails (0.11 acre of Historic Section 10 waters and 0.04 acre of Section 404 Tidal Wetlands).*** Impacts to Historic Section 10 waters from construction of public access viewing areas and trails would result from construction of ADA-compliant facilities at White House Pool County Park, including a decomposed granite trail from the existing parking lot and a low-elevation viewing overlook adjacent to the creek bank. Alternatives to routing of the ADA-compliant trail at this location would involve 1) more earthwork, because most of the areas in the vicinity do not have a sufficiently gentle grade at the entrance to support an ADA-compliant trail and/or would require much more extensive removal of riparian habitat or impact to wetland habitat. Expansion of the Tomales Bay Trail southward along the historic railroad would have very minor impacts to Section 404 Tidal Wetlands from minor grading and drainagework along this improved earthen trail. Alternatives to this action would be to leave the grade as currently exists or the move the trail above the High Tide Line. Leaving the trail as is could increase erosion from use by people, dogs, and horses and thereby impact water quality of the adjacent Tomasini Creek channel, which would become a backwater slough under Phase II. Moving the trail above the High Tide Line would require more extensive grading into the adjacent hillside as the railroad grade currently represents a narrow bench adjacent to the creek channel.

Based on this analysis of alternatives, no practicable alternative exists that are less damaging to the aquatic environment. Those alternatives that involve less construction-related excavation or fill often yield less benefit in terms of improvement in wetland condition and functionality.
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COMPLIANCE WITH VARIOUS FEDERAL AND STATE LAWS AND REGULATIONS:

National Environmental Policy Act of 1969 (NEPA): The Park Service has assessed the environmental impacts of the proposed action in accordance with the requirements of the National Environmental Policy Act of 1969 (42 U.S.C. Section 4371 et. Seq.), the Council on Environmental Quality's Regulations (40 CFR Parts 1500-1508), and the Corps' regulations (33 CFR Part 230 and Part 325, Appendix B). A final Environmental Impact Statement/Environmental Impact Report has been issued, and the 30-day review period under NEPA closed July 30, 2007. (The EIR prepared to satisfy the California Environmental Quality Act (CEQA) was approved by the CSLC commissioners for certification on June 28, 2007.) Unless otherwise stated, the Corps will prepare an Environmental Assessment that will describe only the impacts (direct, indirect, and cumulative) from activities within the Corps' jurisdiction. The documents used in preparation of the Environmental Assessment will be on file with the U.S. Army Corps of Engineers, San Francisco District, Regulatory Branch, 1455 Market Street, San Francisco, California.

Endangered Species Act of 1973 (ESA): Section 7 of the Endangered Species Act requires formal consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) if a Corps' permitted project may adversely affect any federally listed threatened or endangered species or its designated critical habitat. Species and critical habitat currently identified as potentially

impacted by the proposed project include those listed in Table 3 in the Impacts section above. The Park Service has already completed formal consultation with USFWS (September 24, 2007) and NMFS (September 11, 2007) for the species listed above. Since completion, the Park Service has made some changes in project design at the request of the Tidewater Goby Recovery Group for the purpose of retaining and improving existing habitat for tidewater goby while new habitat begins to develop from restoration actions: the USFWS has determined that these actions are consistent with the existing Biological Opinion (C. Nagano, *pers. comm*., March 27, 2008). The Park Service is currently seeking a consistency determination on joint federally and state-listed and a separate consultation for state-only listed species under the California Endangered Species Act (CESA) with CDFG.

Magnuson-Stevens Fisheries Conservation and Management Act: NMFS and several interagency fisheries councils have designated specific water bodies as Esssential Fish Habitat (EFH) in accordance with the Magnuson-Stevens Fisheries and Conservation Management Act. The Park Service has already completed consultation regarding impacts to EFH as part of its Section 7 formal consultation with NMFS (September 11, 2007).

Clean Water Act of 1972 (CWA):

a. **Water Quality**: Under Section 401of the Clean Water Act (33 U.S.C. Section 1341), an applicant for a Corps permit must first obtain a State water quality certification before a Corps' permit may be issued. The Park Service submitted its request for certification to the San Francisco Regional Water Quality Control Board concurrent with this submission. No Corps permit will be granted until the Park Service obtains the required water quality certification. The Corps may assume a waiver of water quality certification if the State fails or refuses to act on a valid request for certification within 60 days after the receipt of a valid request, unless the District Engineer determines a shorter or longer period is reasonable for the State to act. Those parties concerned with any water quality issue that may be associated with this project should write to the Executive Officer, California Regional Water Quality Control Board, San Francisco District by the close of the comment period of this Public Notice.

b. **Compliance with 404(b)(1) Guidelines**: Projects involving fill discharged into waters of the United States must comply with the guidelines promulgated by the Administrator of the Environmental Protection Agency under Section 404(b) of the Clean Water Act (33 U.S.C. 1344(b)). A table evaluating compliance with general and regional permit conditions of CWA permits is provided in Table 4. An evaluation pursuant to the guidelines indicates that the project is dependent on location in or proximity to waters of the United States to achieve the basic project purpose. The Park Service has submitted an Analysis of Impacts and Alternatives that will be reviewed for compliance with the guidelines.

Coastal Zone Management Act of 1972 (CZMA): Section 307(c) of the Coastal Zone Management Act of 1972, as amended (16 U.S.C. 1456(c)), requires a Federal applicant seeking a federal license or permit to conduct any activity occurring in or affecting the coastal zone to furnish a consistency determination that indicates the activity conforms with the State's Coastal Zone Management Act program. Generally, no federal license or permit will be issued until the appropriate State agency has concurred with the consistency determination or has waived its right to do so. The project does occur in the Coastal Zone, and the Park Service received a consistency determination for both Phase I and Phase II of the project dated September 10, 2007.

California Department of Fish and Game, Section 1601: The California Department of Fish and Game requires a Section 1601 Streambed Alteration Agreement for activities conducted in lakes, rivers, and streams on state, county, and private lands. The portion of Lagunitas Creek that runs through the Project Area is owned by the CSLC (and leased by CSLC to the Park Service), and some of the adjoining lands are owned by the Wildlife Conservation Board, a state agency. In addition, Audubon Canyon Ranch owns more than 50 percent of Olema Marsh. The Park Service and CSLC are preparing an application for a Lake and Streambed Alteration Agreement to CDFG for creek bank regrading and stabilization activities on Lagunitas Creek, as well as activities for improving hydraulic connectivity on Bear Valley Creek in Olema Marsh.

National Historic Preservation Act of 1966 (NHPA): Based on a review of survey data on file with various city, state, and federal agencies, no historic or archaeological resources with potential for listing by the State Historic Preservation Office (SHPO) are known to occur in the Project Area. SHPO has already reviewed and concurred with the Park Service's determination of no effect under Section 106 of the National Historic Preservation Act (letter dated August 21, 2006). If unrecorded resources are discovered during construction of

the project, operations will be suspended until the Park Service completes consultation with SHPO in accordance with Section 106.

TABLE 4. COMPLIANCE WITH GENERAL AND REGIONAL CONDITIONS FOR PHASE II OF THE GIACOMINI WETLAND RESTORATION PROJECT – REMOVAL OF AGRICULTURAL INFRASTRUCTURE AND CONDITIONS AND HABITAT CREATION.

		Meet?			
No.	**General Condition**	Yes	No	NA	**Comment**
1.	*Navigation*	√			Navigable waters in the Project Area principally include Lagunitas Creek and tributaries to Lagunitas Creek and Tomales Bay such as Olema Creek, Bear Valley Creek, Tomasini Creek, and Fish Hatchery Creek. There are also a number of smaller creeks that flow into Lagunitas Creek. The proposed project would not impede navigation through placement of structures and, based on hydraulic modeling (KHE et al. 2006), would not result in substantial aggradation of the channel bed that would cause shallowing of the creek and thereby reduce navigability.
2.	*Aquatic Life Movements*	√			The proposed project would not be expected to substantially disrupt or impede aquatic life movements during construction. Construction in or adjacent to creeks known to have salmonids would occur after July 15 to ensure that peak outmigration to Tomales Bay is completed. Construction on Lagunitas Creek would be expected to have no to very minimal potential on aquatic life movement, while impacts for construction and potential associated potential dewatering activities on other creeks (Fish Hatchery, Tomasini Creek, and Bear Valley) would be minimized by proposed measures to survey, trap/seine, and relocate fish, amphibians, reptiles, and native macroinvertebrates (Appendix B). California red-legged frog (*Rana aurora draytonii*; FT) can use open areas as migration or dispersal corridors during fall and summer months. Most of the intensive construction activities would occur in the East Pasture, which has been documented to support only a few adult red-legged frogs during past surveys and no breeding (Fellers and Guscio 2002 in ARA et al. 2002). Intensive construction in the West Pasture, which does support breeding frogs, would occur principally at the northern and eastern perimeters of the pasture adjacent to tidal channels and Lagunitas Creek, respectively. These areas are very saline in nature and, therefore, unlikely to support or act as dispersal corridors for frogs. After construction is completed, the proposed project would be expected to enhance passage for salmonids and other aquatic organisms through removal of tidegates on Fish Hatchery and East Pasture Old Slough, improvement of hydraulic connectivity on Bear Valley Creek, and realignment of Tomasini Creek around the existing tidegate/flashboard dam structure.
3.	*Spawning Areas*		√		No spawning areas for salmonids occur in the Project Area. Spawning occurs upstream of the Project Area in higher gradient portions of Lagunitas Creek, Olema Creek, Bear Valley Creek, Tomasini Creek, and potentially Fish Hatchery Creek. Tidewater goby (*Eucyclogobius newberrryi*; FE) does spawn in Tomasini Creek, the West Pasture Old Slough, and some of the drainage ditches and old slough remnants in the East Pasture, including the East Pasture Old Slough Pond. Construction would not directly impact spawning habitat in Tomasini Creek and West Pasture Old Slough, but it would directly affect some of the marginal habitat in the drainage ditches and ditched portions of the East Pasture Old Slough, although impacts would be minimized to the East Pasture Old Slough Pond through rerouting of Tomasini Creek or Slough terminus around the pond's perimeter. To the extent practicable, construction in these areas will be timed towards the fall, when most of the spawning has been completed. In addition, the impact avoidance and mitigation measures proposed in the Mitigation Monitoring and Reporting Program (Appendix B) include measures to perform extensive

					surveys for tidewater goby in partially dewatered ditches immediately prior to construction and to trap and relocate individuals located. In addition, as part of the project, the Park Service and the U.S. Geological Survey have proposed to conduct a project to expand the distribution of tidewater goby in the vicinity of the Project Area through either relocation, captive propagation, or both (Fong et al. 2007).
4.	*Migratory Bird and Waterfowl Breeding Areas*	√			As part of the impact avoidance and mitigation measures proposed in the Mitigation Monitoring Program, the Park Service and CSLC will ensure that, prior to August 15, pre-construction surveys are conducted immediately prior to start of construction in appropriate breeding areas for migratory birds (e.g., riparian and other stands of trees and marshes). Should nesting birds be located, no construction would be conducted within 100 feet of active nests or breeding areas.
5.	*Shellfish Beds*	√		√	The proposed project occurs on former dairy pasture lands (Giacomini Dairy), in a leveed freshwater marsh, and on County park lands at the very southern end or headwaters of Tomales Bay. The project will occur entirely behind active levees or in high elevation areas and will not occur in shellfish growing areas in Tomales Bay.
6.	*Suitable Material*	√			More than 90 percent of the fill material used in the Project Area would come from material excavated on-site, primarily alluvial and estuarine mud materials. Some existing riprap and concrete would be reused for stabilizing an eroded portion of the creek bank, and decomposed granite may be imported for improving trails, but no trash, debris, car bodies, or asphalt would be used, and none of the material would contain toxic pollutants in toxic amounts.
7.	*Water Supply Intakes*	√			The proposed project occurs approximately 1 mile downstream of public water supply intake. Hydraulic modeling results (KHE 2006) indicate that the proposed restoration of the Giacomini Ranch would not have an adverse impact on the potential for salinity intrusion into the alluvial aquifer that serves as the water supply for North Marin Water District's West Marin Service Area. However, modeling did suggest that restoration of Olema Marsh could potentially increase salinities in upstream reaches of Lagunitas Creek during higher high tide conditions, therefore, the Park Service has proposed to delay major adaptive restoration components of this portion of the restoration project until further monitoring and analysis indicates 1) that restoration of Olema Marsh not increase upstream water salinities; 2) or that an increase would not increase problems with salinity intrusion into the groundwater well system; or 3) NMWD develops additional water supply sources for use during high tide events. Under Phase II, the Park Services proposes to conduct a pilot project that will allow it to monitor the effects of increased tidal exchange in Olema Marsh on upstream salinities in Lagunitas Creek.
8.	*Adverse Effects from Impoundment*	√			During construction, potential impoundments of water could result from use of coffer dams or sheet piling during construction. Effects of these features would be minimized by reducing the use to the extent practicable and minimizing the extent of installation time. Silt fencing or turbidity curtains would be installed downstream to minimize turbidity impacts to downstream waters from disturbed sediments after dams or sheet piling are removed. In addition, impact avoidance and mitigation measures proposed in the Mitigation Monitoring Program would minimize impacts to wildlife through extensive surveys, trapping/seining, and relocation of fish, amphibians, reptiles, and native macroinvertebrates (Appendix B). A more detailed description of the dewatering plan can be found in Appendix A. Some components of project implementation would deliberately encourage impoundment of water for the purposes of maintaining habitat for tidewater goby. While this may cause decreases of water quality on a localized basis, this impact would be offset by the value these areas would provide to goby and other aquatic organisms.

					Both during construction and after implementation, the Park Service would work either independently or in concert with local vector control districts to monitor mosquito numbers and species to ensure that impounded areas are not substantially increasing risks to public health and safety from disease vectors such as mosquitoes.
9.	*Management of Water Flows*	√			The proposed project would not restrict or impede the passage ofnormal or high flows. The project would not begin construction until June 2008, and any work in creek areas would be completed by October 31, 2008.
10.	*Fills Within 100-Year Floodplains*	√			Most of the Project Area would fall within the 100-year floodplain. Fill placed within this floodplain would primarily be for high tide and wildlife refugia berms, reestablishment of the natural contour of the Point Reyes Mesa, filling of artificial drainage ditches, and creation or enhancement of low-profile public access trails and viewing areas and would be offset by removal of approximately 10 acres of levees that separate the Giacomini Ranch from Lagunitas Creek.
11.	*Equipment*	√			Equipment that may be used for construction includes excavators, bulldozers, graders, backhoes, front-end loaders, pile drivers, compactors, generators, trash pumps, air compressors, dump trucks, pick-up trucks, and jack hammers. Where soils are wet or there is a shallow groundwater table, special off-road equipment will be used to minimize impacts to soils in jurisdictional wetlands and waters.
12.	*Soil Erosion and Sediment Controls*	√			State and federal programs require project owners to prepare a Storm Water Pollution Prevention Plan (SWPPP), which includes identification and implementation of Best Management Practices (BMPs). Contractors will be required to submit a work plan addressing access to the work area, including a project-specific SWPPP. The SWPPP will need to incorporate impact avoidance and mitigation measures proposed by the Park Service and CSLC in the Mitigation Monitoring Program (Appendix B) and other requirements stipulated by the Corps and Regional Board. These measures include installation of silt fencing or turbidity curtains between construction areas and creeks, as well as installation of potential coffer dams or sheetpiling and/or diversion and dewatering of aquatic construction areas to minimize downstream turbidity.
13.	*Removal of Temporary Fills*	√			Approximately 3.0 acres of temporary fills would result from temporary stockpiling of excavated sediments and staging of materials and equipment, as well as construction of a temporary crossing of Tomasini Creek for construction equipment. All temporary fills will be removed in their entirety by the end of the construction period, and the affected areas would be returned to pre-construction contours or, in the case of Tomasini Creek, which previously had a bridge, will be restored to natural creek topography of adjacent areas.
14.	*Proper Maintenance of Structures and Fill*	√			All structures and fill shall be properly maintained to ensure public safety and to ensure that the quality of downstream waters and wetland areas are not impacted by excessive sedimentation.
15.	*Wild and Scenic Rivers*	√		√	The Project Area is not located in a component of the National Wild and Scenic River system or “study river.”
16.	*Tribal Rights*	√			No tribal rights of use are implied at this site. The Park Service will work with the Federated Indians of Graton Rancheria (FIGR) to ensure that the proposed project does not result in impacts to sensitive archaeological sites under NHPA and NAGPRA.
17.	*Endangered Species*		√		The proposed project will NOT jeopardize the continued existence of any listed species. It is not likely to have adverse effects on or jeopardize the continued existence of listed salmonid species (central California coast coho salmon, central California coast steelhead, California coastal chinook salmon) or to destroy or have adverse modifications of designated Critical Habitat for salmonids (central California coast coho salmon, central California coast steelhead) or Essential Fish Habitat. It is likely to have adverse effects, at least over the short-term, on two species: California red-legged frog and tidewater goby. There is a potential for some beneficial effect over the long-term for both of these species as a result of actions in the

					proposed project or proposed as mitigation. The restoration may affect, but would not be likely to adversely affect, California clapper rail, Myrtle's silverspot butterfly, California brown pelican, or Least bell's vireo, and, in fact, would be expected to have beneficial effects on California clapper rail, California brown pelican, and Least bell's vireo. It may also adversely modify some portions of areas proposed as Critical Habitat for tidewater goby, but primary habitat for the goby would be maintained, and the restoration is expected to result in potential development of additional goby habitat. The Park Service and CSLC have gone to great effort to avoid or minimize the potential for direct and indirect impacts to listed species through scheduling the project after breeding is typically completed and instituting a number of project- and construction-related conservation measures to either preclude or minimize impacts (Appendix B). The Park Service has received Biological Opinions following formal consultation with USFWS (September 24, 2007) and NMFS (September 11, 2007) on this project, and subsequent changes in design to maintain more existing tidewater goby habitat have been declared by the USFWS as consistent with the issued BO (C. Nagano, USFWS, *pers. comm*., March 27, 2008). The Park Service is currently seeking a consistency determination on these BOs and a separate consultation for state-only listed species under the California Endangered Species Act with the California Department of Fish and Game.
18.	*Historic Properties*	√			The project will not affect properties listed or eligible for listing in the National Register of Historic Places. The Park Service has received concurrence from the State Historic Preservation Office with its determination of no effect under Section 106 f the National Historic Preservation Act (letter dated August 21, 2006).
19.	*Designated Critical Resource Waters*	√			The Project Area is within the Tomales Bay, a designated Ramsar Wetland of International Importance, as will as a critical coastal area and part of the Gulf of the Farallones National Marine Sanctuary. The proposed project would not result in more than a minimal impact to critical resource waters during construction and, over the long-term, would actually be expected to have considerable benefits to the health of Tomales Bay by filtering pollutants and sediment; reducing the energy and erosive force of flood flows; increasing carbon export to the Bay for use by marine and estuarine species; and increasing the amount of habitat for both resident and non-resident wildlife species.
20.	*Mitigation*	√			The proposed restoration project will be self-mitigating. While there would be permanent loss of approximately 3.75 acres of jurisdictional wetlands and other waters for creation of high tide refugia and creek berms/banks, filling of drainage ditches, and restoration of natural mesa topography. There would also be 5.92 acres of permanent fill that would remain wetland, although some of these wetlands could change type. Most of this type conversion would consist of conversion of Section 404 adjacent "un-natural" wetlands that have been leveed and thereby reduced in functionality to their natural condition -- Section 404 Tidal Wetlands and Waters. Removal of levees and decommissioning of ranch roads would create approximately 10.96 acres of wetlands, resulting in a net gain of 7.21 acres or a 6.6:1 mitigation ratio. If the full amount of excavation in the southwestern portion of the East Pasture is conducted, the amount of wetland creation would increase to 15.56 acres for a net gain of 11.81 acres or a 4.2:1 mitigation ratio.
21.	*Water Quality*	√			The Park Service and CSLC are requesting certification under Section 401 of the CWA from the San Francisco Regional Water Quality Control Board concurrent with submission of this application.
22.	*Coastal Zone Management*	√			The Park Service has received a consistency determination from the California Coastal Commission for the project (September 10, 2007).
23.	*Regional Conditions*			√	No Regional Conditions are documented for Individual Permits that

	(San Francisco District)				would pertain to the proposed project.
24.	*Use of Multiple Nationwide Permits*			√	No NWP is being used.
25.	*Transfer of Nationwide Permit Verifications*			√	There has been no change in ownership of the properties.
26.	*Compliance Certification*	√			The applicants will comply with any compliance certifications required by the Corps.
27.	*Pre-Construction Notification*	√			This document constitutes Pre-Construction Notification.
28.	*Single and Complete Project*	√			The proposed project represents a second phase of a single and complete project with independent utility, because Phase II is a standalone because the elements proposed for implementation in 2007 are standalone actions that could and would be implemented even without implementation of the other elements.

REFERENCES:

American Water Works Association (AWWA) (1990). Water Quality and Treatment, McGraw-Hill, Inc.

Anisfeld, S. C. and G. Benoit (1997). "Impacts of flow restriction on salt marshes: an instance of acidification." Environmental Science and Technology **31**: 1650-1657.

Avocet Research Associates (ARA) (2002). Giacomini Wetland Restoration Site: special status animal species - reconnaissance and compliance, Final report to Point Reyes National Seashore, National Park Service.

Brown, L. R., P. B. Moyle, et al. (1994). "Historical Decline and Current Status of Coho Salmon in California." North American Journal of Fisheries Management. **14**(2): 237-261.

DeLaune, R. D. and C. J. Smith (1985). "Release of nutrients and metals following oxidation of freshwater and saline sediment." Journal of Environmental Quality **14**(2): 164-168.

Evens, J. and G. W. Page (1986). "Predation on black rails during high tides in salt marshes." The Condor **88**: 107-109.

Evens, J. G. and N. Nur (2002). "Black Rails in the San Francisco Bay Region: spatial and temporal variation in distribution and abundance." Bird Populations **6**: 1-12.

Fellers, G. M. and G. Guscio (2002). Red-legged Frog Surveys at Giacomini Wetlands, Point Reyes National Seashore. Point Reyes, California, National Park Service Report.

Fischer, D. T., S. V. Smith, et al. (1996). "Simulation of a century of runoff across the Tomales watershed. Marin County, California." Journal of Hydrology **186**: 253-273.

Fong, D. (2003). California Freshwater Shrimp (*Syncaris pacifica*) and Tirewater Goby (*Eucylogobius newberryi)* Surveys, Giacomini Ranch, Marin County., Golden Gate National Recreation Area / Point Reyes National Seashore.

Fong, D. L. Parsons and M. Reichmuth (2006). Tidewater Goby (*Eucyclogobius newberryi*) Surveys, Giacomini Ranch, Marin Co. Prepared for the Division of Resource Management Point Reyes National Seashore National Park Service.

Grinnell, J. and A. H. Miller (1944). "The distribution of the birds of California." Pacific Coast Avifauna **27**.

H. Esmaili and Associates (1980). Substrate Enhancement/Sediment Management Study, Lagunitas Creek, Marin County. Phase II: Sediment transport and substrate conditions 1979-1980.

Kelly, J. (2001). "Distribution and abundance of winter shorebirds on Tomales Bay, California: implications for conservation." Western Birds **32**: 145-166.

KHE (2006a). Hydrologic Feasibility Assessment Report: Giacomini Wetland Restoration Project. Point Reyes National Seashore. Point Reyes Station, California, Prepared for Point Reyes National Seashore.

KHE (2006b). Phase I Hydrology, Hydraulic, and Geomorphic Investigations and Engineering Design for Bear Valley Creek Watershed Enhancement and Fishery Restoration Project. Point Reyes National Seashore, California. Point Reyes Station, California, Prepared for Point Reyes National Seashore Association.

Parsons, L. (2003). Botanical Survey Report: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L. (*in prep.*). Pre-restoration water quality conditions in the Giacomini Wetland Restoration Project Area. Point Reyes Station, California, Point Reyes National Seashore.

Parsons, L. S. and J. E. Martini-Lamb (2003). Turning Waste Into Water: Use of Reclaimed Wastewater for Restoration and Wildlife Habitat Enhancement Purposes. Estuaries on the Edge: Convergence of Ocean, Land and Culture, Estuarine Research Federation Conference 2003.

Parsons, L. and L. Allen (2004a). Vegetation Communities Report: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L. and L. Allen (2004b). Final Report on Screening for Sediment Contamination in the Study Area: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L (2005). Delineation of Potential Jurisdictional Wetlands and “Other Waters.”: Giacomini Wetland Restoration Project. Point Reyes Station, California, Golden Gate National Recreation Area / Point Reyes National Seashore.

Parsons, L., A. Ryan, and L. Adler-Ivanbrook (2007). Delineation of Potential Jurisdictional Wetlands and “Other Waters.”: Giacomini Wetland Restoration Project. Olema Creek Frog Pond and Tomales Point Quarries. Point Reyes Station, California, Golden Gate National Recreation Area /Point Reyes National Seashore.

Portnoy, J. W. (1999). "Salt Marsh Diking and Restoration: Biochemical Implications of Altered Wetland Hyrdology." Environmental Management **24**(1): 111-120.

RWQCB (2001). Surface Water Ambient Monitoring Program (SWAMP) Workplan 2001-2002., San Francisco Bay Regional Water Quality Control Board.

Sommer, B. and P. Horwitz (2001). Using carbon cycling as a surrogate for wetland function in conceptual modelling. Paper presented at SIL 2001 (28th Congress).

Stallcup, R. W. and J. P. Kelly (2004). Point-Count Surveys of Bird Use in Olema Marsh: Spring and Autumn 2004, Prepared for Point Reyes National Seashore by PRBO Conservation Science and Cypress Grove Research Center.

TBWC (2003). Tomales Bay Watershed Stewardship Plan, Prepared for the Tomales Bay Watershed Council, July 2003.