

Chapter 2

Alternatives, including the Preferred Alternative



Overview of Alternatives

The following five alternatives have been developed for the Giacomini Wetland Restoration Project DEIS/EIR:

- **No Action Alternative** – Management of Project Area as Specified Under Current Management Plan and Existing Agreements, Including Mitigation as Required by Existing Mitigation Agreement and Maintenance of Existing Public Access Facilities
- **Alternative A** – Limited Restoration of the Giacomini Ranch East Pasture Only with Expanded Public Access, Including Culverted Earthen Fill Trail on Eastern Perimeter;
- **Alternative B** – Moderate Restoration of the Giacomini Ranch East Pasture and Limited Restoration of the West Pasture with Expanded Public Access, Including Boardwalk Trail on Eastern Perimeter;
- **Alternative C (Preferred Alternative)** – Full Restoration of the Giacomini Ranch East and West Pastures and Restoration of Olema Marsh, with Moderate Public Access;
- **Alternative D** – Extensive Restoration of the Giacomini Ranch East Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access

Project Planning and Alternatives Development Process

NEPA and CEQA require project proponents to identify a range of reasonable project or action alternatives within an EIS/EIR. Reasonable action alternatives must be economically and technically feasible and demonstrate common sense. With the exception of the No Action alternative, alternatives must meet, to a large degree, stated purpose and objectives for taking action and should not conflict with federal, Park Service, state, and local laws, regulations, and policies or constraints identified during scoping. A No Action – or No Project – alternative must be analyzed under NEPA and CEQA: this alternative evaluates future conditions under existing management plans or agreements and allows the public to evaluate the implications of what would happen if no project were implemented.

Since purchasing the property in 2000, the Park Service and CSLC have conducted a comprehensive NEPA/CEQA planning process that has involved extensive interaction with the public and agencies, as well as completion of numerous resource studies. Information from scoping and baseline studies was used to develop preliminary alternatives and refine them for eventual inclusion in this document. The project planning process started in 2001, with initiation of baseline studies designed to assess existing conditions and resource values of the Giacomini Ranch. These studies included topography, hydrology, wildlife (birds, fish, invertebrates, etc.), plants, vegetation communities such as wetlands and riparian habitat, water quality, sediment contaminants, and cultural resources such as archaeological sites and historic structures. This information is crucial to not only understanding existing conditions, but potential constraints on design of restoration and other components of the project.

In developing wetland restoration projects, one of the important initial considerations involves topography within the Project Area and adjacent properties.

For example, in developing wetland restoration projects, one of the important initial considerations involves topography within the Project Area and adjacent properties. The Park Service contracted with the U.S. Geological Survey to produce a topographic map of the Project Area. Results of the topographic survey provided project proponents with several important pieces of information. First, elevations within the Giacomini Ranch are higher than most diked wetland areas such as in San Francisco Bay or the Sacramento Delta, which are often extremely low topographically due to subsidence or decreases in surface elevations from compaction of soils and/or breakdown of undecomposed organic material (peat). Elevations range from +2 to +12 feet NAVD88 in the Giacomini Ranch. These topographic conditions within the Project Area would place some significant logistical constraints on using historic conditions as a framework for restoration or



alternative design, because the amount of excavation required to return the Giacomini Ranch to subtidal-low intertidal conditions that were present in the 1860s would be prohibitive.

Secondly, unlike restoration of deeply subsided diked wetlands, removal of levees in the Project Area would not necessarily create open water conditions, but rather would favor almost immediate establishment of mid- to high marsh and even upland communities. Olema Marsh is also higher in elevation than was assumed at first, although, in this case, higher elevations have been maintained by a substantial build-up in peat due to the fact that permanent flooding precludes breakdown of organic material (KHE 2006a). This topographic difference between the Project Area and other diked wetlands has significant implications for design and phasing of restoration. The lack of subsidence greatly increases the feasibility of developing alternatives where levees can be immediately removed rather than having to be partially breached or removed over a period of several decades, thereby greatly increasing the pace restoration in the Project Area relative to deeply subsided areas.

One of the largest issues raised during scoping concerned the scale and appropriateness of public access in the restoration project.

The Park Service and CSLC conducted formal public scoping during the fall and winter of 2002-2003. A more detailed list of issues can be found in Chapter 5, but some of the primary issues raised during scoping by agencies and the public consisted of concerns about increases in flooding of adjacent properties and roads; increased saltwater intrusion into local municipal groundwater wells; impacts to the rural character of the local community; increased traffic, noise, and visitation within the local community; potential for incorporating Olema Marsh into the restoration project; and impacts to special status wildlife and plant species. One of the largest issues raised during scoping concerned the scale and appropriateness of public access in the restoration project. As a result, following scoping, the Park Service and CSLC elected to develop a specific public access-related project goal that focused on creating public access components within the Project that would allow the public to experience and enjoy the restoration process without compromising the Project purpose and restoration-related objectives. Another change that resulted from public

scoping was inclusion of Olema Marsh, which was once integrated with the Giacomini Ranch into a large tidal marsh system, into the restoration project.

Scoping also formed the basis for identifying the primary constraints on restoration and public access that were discussed in Chapter 1, which are issues that needed to be factored into alternatives design. These primary constraints include not aggravating flood risk to adjacent private residences and public roads above current or existing conditions; not increasing salinity intrusion into municipal groundwater wells above currently existing levels; and minimizing or offsetting impacts to habitat for tidewater goby and California red-legged frog (*Rana aurora draytonii*) and other special status species with the understanding that the exact location of habitats such as fresh or brackish marsh may shift following implementation of restoration. Another constraint on restoration design is that current Seashore policy advocates not using chemicals to treat or remove invasive or non-native plant species during or after construction.

As noted above, reasonable alternatives are those that fall within or do not exceed boundaries of stated constraints, are economically and technically feasible, and display common sense. Although “display common sense” is not defined by the CEQ or Park Service NEPA regulations, it is generally accepted to mean alternatives that meet stated purpose or objectives and do not violate any regulations, laws, MOUs, or other legal agreements. For the proposed project, criteria that were considered and used to screen alternatives and restoration and public access elements during design were:

- Mitigation requirements stipulated in the agreement between CalTrans and the California Coastal Commission;
- Park Service’s stated objectives at the time of the agreement;
- Mission and policies of the Park Service, including protection and restoration of watershed processes, wetlands, and floodplains, and incorporation of public access into areas with sensitive natural resources;
- Purpose, Objectives, Planning Criteria, and Constraints of the proposed project;
- Federal, state, and local laws, regulations, and policies;



- Feasible from a technical perspective;
- Feasible from an economic perspective;
- Sustainable over the long-term such that alternatives incorporate actions that would not require extensive future maintenance or remediation.

In 2003, a hydrologic consulting firm, Kamman Hydrology & Engineering (KHE; San Rafael, California) was hired to assist with alternatives development and to perform hydrodynamic modeling of preliminary and refined alternatives. Park Service and CSLC staff and the hydrologic consultants worked through a series of meetings and workshops to develop and evaluate various potential restoration and public access components. The topographic information and results of other baseline studies and scoping were used by the planning team to guide development of alternatives that would meet the purpose and objectives of the proposed project, as well as the other screening criteria such as mitigation requirements; laws, regulations, and policies; and project constraints.

When the Park Service and CSLC had developed a range of preliminary alternatives that met these criteria, they began a series of meetings in February 2004 with regulatory and local and state agencies, adjacent landowners, special interest groups, and technical wetland restoration experts to get feedback on the range and appropriateness of these preliminary alternatives. The culmination of this series of internal, agency, technical expert, and adjacent landowner meetings was a workshop for the public, held in June 2004.

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In response to the considerable number of comments received on the public access portion of the proposed project, the Park Service and CSLC conducted a more detailed evaluation of public access. First, potential hydrologic, biological, and cultural resource impacts associated with multiple potential public access alignments and infrastructure locations were evaluated by KHE and LSA Associates (KHE et al. 2004). From analyses of resource impacts, the consultants narrowed the number of potential public access alignments and infrastructure locations that should be considered in the future to those 1) that would appear not to constrain or impinge upon the project purpose and objectives and 2) that would appear to have the lowest potential environmental impacts. Based on these recommendations, the Park Service and CSLC elected to carry forward only those public access alignments and locations rated as having low to moderate impacts on hydrologic, biological, and cultural resources for a second phase of study. The second study, prepared by LandPeople Landscape Architects (Benicia, Calif.), specifically focused on technical feasibility, land use impacts, and costs of selected public access alignments evaluated under Phase I (LandPeople 2005).

Following the workshops in 2004 and completion of the public access and further technical studies on Olema Marsh in 2005, the Park Service and CSLC worked with its consultants throughout the spring and summer of 2005 to refine preliminary restoration and public access components. In August 2005, the Park Service and CSLC held a Value Analysis process to ensure that it had developed a reasonable range of alternatives that met the screening criteria identified above and were cost-effective and to select a preliminary preferred alternative (Alternative C) for analysis in the environmental document. The Value Analysis team, which consisted of representatives from the Park Service, CSLC, and other partner agencies, maintained the existing range of alternatives, but suggested some modifications to increase potential benefits and cost-effectiveness. The Park Service presented the finalized alternatives and the Value Analysis team's recommendations to the Development Advisory Board in November 2005, which approved the Park Service's request to move forward with design.

Alternatives

As described, the Park Service and CSLC underwent an extensive and comprehensive alternative development process for both the restoration and public access components. As a part of this development process, at least eight full-scale alternatives and several minor to moderate variations to design of existing alternative



restoration and public access components were considered. Of these eight alternatives, five are fully analyzed in this document. The other three were considered, but rejected because they would not adequately meet the project's purpose and objectives or were considered too similar in scope or duplicative to other existing alternatives. These alternatives and some of the more substantial variations to existing alternative design assessed are briefly discussed in the section, *Alternatives Considered But Not Analyzed Further*, at the end of this chapter.

The five proposed alternatives involve some combination of geomorphic and topographic alterations aimed at restoring natural hydrologic and ecological processes.

With the exception of the No Action Alternative, the alternatives selected for analysis meet the Mission and policies of the Park Service and the purpose and objectives of the proposed project to an acceptably large degree and are within constraints imposed by regulations and policies, potential risks to adjacent homes and roads and the municipal water supply through increasing the extent of area open to tidal and fluvial (creek) flooding, and technical and funding limitations. Although DEIS/EIR alternatives must meet objectives and resolve planning issues to a large degree, they can vary in their methods, or in the degree to which each objective is met. This is the case with this project. For Alternatives A through D, alternatives generally range from the least amount of restoration to the greatest amount of restoration, with alternatives building upon each other such that restoration components or elements from Alternative A are generally (but not always) carried forward to Alternative B and are often expanded. For example, tidal creek creation and enhancement in Alternative A is carried forward to Alternative B, and the amount of tidal creek creation is expanded under Alternative B relative to Alternative A. As a result of comments received during initial scoping, the Park Service and CSLC decided to incorporate restoration of Olema Marsh, a diked freshwater marsh that was once part of a large historic tidal wetland complex that included Giacomini

Ranch, into two project alternatives, Alternatives C and D.

The five proposed alternatives involve some combination of geomorphic and topographic alterations aimed at restoring natural hydrologic and ecological processes. These alterations would change the current hydrologic regime within the Project Area, leading either to muted tidal action, full tidal action, and/or natural creek action (i.e., allowing creeks to meander naturally). Emphasis was placed on those alternatives that would create the most sustainable and dynamic ecosystems. Due to the comparatively high elevations in the Project Area relative to many other diked marshes, restoration of natural hydrologic and ecological processes would likely result in development of a complex mosaic of habitat types within the Project Area, including salt marsh, brackish marsh, freshwater marsh, riparian, and open water.

For the public access component, the extent of constructed infrastructure is highest under Alternatives A and B and decreases under Alternatives C and D, such that the least extent of constructed infrastructure occurs in Alternative D. This approach to public access is consistent with the project purpose and objectives, which states that public access opportunities should not conflict with the project's purpose of restoring natural hydrologic and ecological processes and functions. The highest degree of restoration of natural process and function occurs in Alternatives C and D, and this, combined with the fact that most of the Giacomini Ranch, including its perimeters are wetland and/or riparian areas, led to public access being scaled back to varying degrees under the Full and Extensive Restoration Alternatives (Alternatives C and D) relative to the Limited and Moderate Restoration Alternatives (Alternatives A and B).

Originally, the Park Service and CSLC intended to extend one of the proposed trails to Inverness Park on the west side of the Project Area. However, based on some of the logistical constraints identified in the public access studies and discussions with the county, the Park Service and CSLC have elected to focus on public access components on Park Service and CSLC lands in this project and potentially collaborate in the future with the County of Marin on a project that would extend the southern perimeter trail to Inverness Park, as originally envisioned. This decision to focus on public access components on Park Service-CSLC lands was predicated on two factors. First, most of the southern perimeter trail between White House Pool County Park and Inverness Park would or could occur on lands largely or entirely owned or managed by the County of Marin. This includes road right-of-ways, which are subject to County regulations and, therefore, would necessitate that the County either take the lead or actively partner on the public access project. Secondly, engineering analysis of the section of road near White House Pool showed that the creek is actively eroding towards Sir Francis Drake Boulevard, and repairs and revetment of the road should be completed before



constructing facilities to accommodate public access (LandPeople Landscape Architects 2005). Because a portion of this extended trail could impact the restored Project Area either through removing riparian vegetation and expanding the Sir Francis Drake road berm or through construction of a boardwalk, the potential future impacts from these activities are addressed programmatically in this document, but would need to be addressed in greater depth in subsequent studies and documents.

For this DEIS/EIR, the No Action alternative represents conditions that would be expected to develop if only the minimum amount of restoration necessary to meet mitigation requirements was performed (3.6 acres) when the Giacomini Ranch dairy closes in 2007. It is important to note that continuation of the dairy is not included – and is not feasible – under any of the alternatives, including the No Action, because the sale essentially split the ranch and left a portion of the dairy facility in the Giacomini family ownership. However, under the No Action Alternative, some leased grazing could possibly occur, although pastures would not be irrigated.

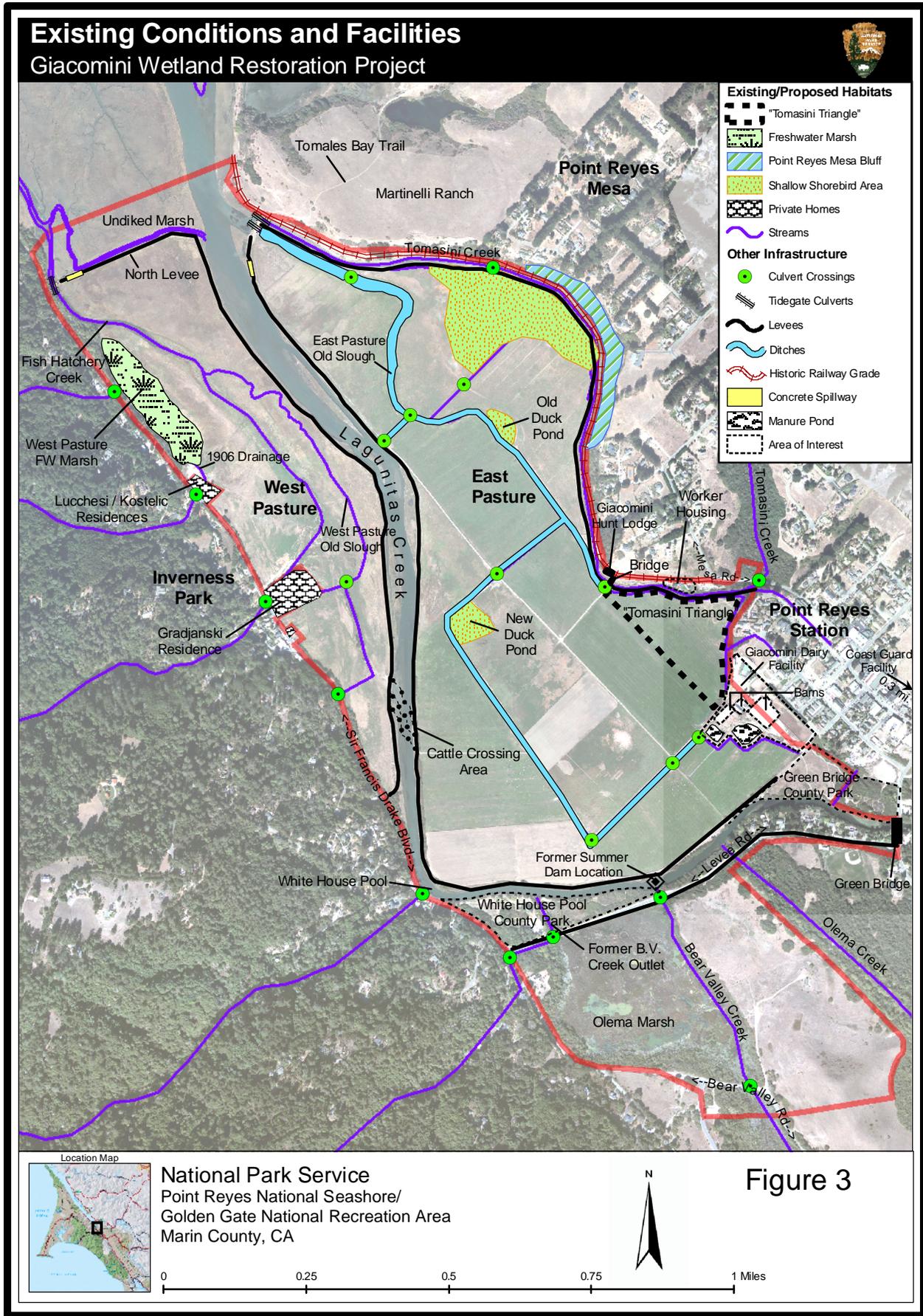
One of the critical assumptions – and principal benefits – in developing alternatives that are based on restoring process and function is that it allows for a considerable amount of change in future conditions without requiring maintenance, intervention, or remediation. By definition, natural processes are extremely dynamic ecosystem components that result in change either on seasonal, annual, decadal, or other long-term time scales. In transitional zones such as the upper portion of the Tomales Bay watershed, where freshwater and saltwater environments mix, the dynamism can be even greater than in other aquatic ecosystems. Given this dynamism, the Park Service and CSLC recognized that its task was to remove impediments to natural process, not engage in an endless – and probably futile – battle to create and maintain ecological status quo through dictating the types of habitats, specific acreages and locations of habitats, and creek alignments. While certain restoration tasks within alternatives may focus on creating creeks or realigning creeks into historic channels as a way of removing impediments to natural process, the Park Service and CSLC acknowledge that it is possible, because of the nature of natural fluvial or creek processes, particularly in deltaic systems, that the creek could change course or meander out of the constructed course in the future or fill in with sediment and cease to function as a channel. The Park Service and CSLC recognize this type of change or ecological evolution as inherent to the proposed project and not cause for maintenance or remedial action. In addition, should natural process result in change that affects public access infrastructure, the Park Service and CSLC would focus on adaptively managing public access to fit the changed environment rather than adapting the environment to fit public access. The only factors that would trigger future maintenance or intervention would be if 1) the project somehow did not successfully remove impediments to natural process or function or 2) if special status species habitat enhancement and creation efforts were not fully successful.

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Detailed Project Area Description

The Project Area is located in coastal Marin County at the head of Tomales Bay between the towns of Point Reyes Station and Inverness Park (Figure 2). The Project Area lies at the confluence of Lagunitas, Olema, and Bear Valley Creeks with Tomales Bay. Lagunitas Creek flows in a northerly direction from the upper portions of its watershed in the Coast Range mountains through largely local- and state- owned lands to the headwaters of Tomales Bay where it curves to the west for a short distance before resuming its northward course. Lagunitas Creek bisects the Giacomini Ranch into two pastures – the East and West Pastures (Figure 3). Both of these pastures are leveed.





The 200-acre West Pasture is bordered by the town of Inverness Park and Sir Francis Drake Boulevard (Figure 3), which is the only road connecting the town of Inverness and the rest of the Point Reyes Peninsula to other areas within west Marin and the county. While most of the businesses and homes occur on the west side of Sir Francis Drake Boulevard at the base or along the steep hillsides of the

Inverness Ridge, several private residences have been built on the east side of Sir Francis Drake Boulevard directly adjacent to the pastures. Several creeks and drainages, including Fish Hatchery Creek, drain off the Inverness Ridge and into the West Pasture, many of which flow through or close to private properties. Notable features within the West Pasture include the extensive freshwater marsh in the northern portion of the pasture, Fish Hatchery Creek, and the north levee, which is currently used as an informal social path.

The 350-acre East Pasture is bordered by the town of Point Reyes Station and the outlying residential community north of the town on the Point Reyes Mesa (Figure 3). The town is located on a mesa or coastal terrace, with all of the homes and businesses are elevated anywhere from 30- to 100 feet above the East Pasture. The lowest elevation portion of the mesa near the downtown portion of Point Reyes Station, which is almost triangular in shape, houses the Giacomini Dairy facility, including milking barns, loafing barns, hay barns, and corrals, as well as several small houses. The dairy runs parallel to C Street, located in the southwestern portion of the town. A number of homes, businesses, and agencies exist within the immediate vicinity of the dairy, including a Sheriff's substation and firehouse. The main commercial street in the town of Point Reyes Station is State Route 1, which is located two city blocks east of the dairy.

Below the Mesa is the remnant of the historic railroad grade which splits from Mesa Road near Tomasini Creek and hugs the base of the Mesa along most of the eastern perimeter of the East Pasture to Railroad Point. Railroad Point is a promontory located at the northernmost extent of the ranch (Figure 3). Several worker houses are adjacent to this historic railroad grade, as well as the Giacomini Hunt Lodge, a small building currently owned by the Park Service and leased long-term to the Giacomini family. Tomasini Creek, the primary drainage to the East Pasture, was leveed by the Giacomini family in the 1960s to parallel the Mesa and historic railroad grade until its confluence with Lagunitas Creek and Tomales Bay near Railroad Point. Railroad Point is the terminus of GGNRA's Tomales Bay Trail that originates off State Route 1. This trail winds through GGNRA lands that are currently leased to the Martinelli family for beef cattle grazing (Figure 3).

Residents of and visitors to Point Reyes Station often use an informal social path that has developed on the southern portion of the East Pasture levee and roughly ends near the location of the old summer dam (Figure 3). The Giacomini family used to install a gravel dam in this location on Lagunitas Creek every summer to obtain freshwater from the creek for use in irrigating the pastures to improve forage conditions. The Giacomini family was required to discontinue this practice in 1997 by the State Water Resources Control Board.

North of the Giacomini Ranch is undiked marshland owned by the CSLC (Figure 3). Several hundred acres of marsh formed between 1860 and 1950 extend outward into the southern portion of Tomales Bay before reaching largely unvegetated subtidal and intertidal lands. CSLC also owns the diked and undiked portions of Lagunitas Creek, as well as the area directly north of the Martinelli Ranch known as the Bivalve area. From Railroad Point, the historic railroad grade extends northeastward towards State Route 1, creating a diked area that is largely intertidal mudflat.

South of the Giacomini Ranch is the Levee Road area, a section of Sir Francis Drake Boulevard that was built through construction of a levee during the late 1800s (Figure 3). The northeastern half of Levee Road is residential, with more than 15 homes directly adjacent to Lagunitas Creek and across the creek from the East Pasture. The northwestern half of the southern bank of Lagunitas Creek is owned by the Wildlife Conservation Board (WCB) and leased and managed by the County of Marin Parks and Open Space District. This area is referred to in this document as the White House Pool County Park, because this is where Lagunitas Creek makes a 90 degree turn before resuming its northward course to Tomales Bay. The County also leases



East Pasture – View from Lagunitas Creek



another WCB parcel directly south of the Giacomini Ranch Dairy facility downstream of the Green Bridge, which is referred to as the Green Bridge County park. The Green Bridge is a large, permanent steel, green-painted bridge on State Route 1 that crosses over Lagunitas Creek and connects the town of Point Reyes Station with the towns of Olema and Inverness Park. Directly upstream of the Green Bridge on the eastern bank of Lagunitas Creek is a commercial building and a propane storage tank. Further upstream is the Coast Guard facility where North Marin Water District (NMWD) has installed municipal groundwater wells. On the west bank upstream of the Green Bridge is the Genazzi Ranch.

The southwestern half of Levee Road borders Olema Marsh, a 63-acre marsh jointly owned by the Seashore and Audubon Canyon Ranch (Figure 3). Bear Valley Creek currently flows on the eastern perimeter of the marsh through culverts underneath Levee Road to its confluence with Lagunitas Creek near the location of the old summer dam. The marsh is bordered on the west and south by Bear Valley Road, which is also culverted to allow passage of flows from the upstream end of Bear Valley Creek into the marsh. One residence adjoins the marsh on its western side near the intersection of Bear Valley and Levee Roads. The eastern half of the marsh is bordered by the shutter ridge or a low earthen hill that has been created through episodic movement along the San Andreas Fault.

Existing or Baseline Conditions

NEPA and CEQA require that alternatives be evaluated with respect to baseline or existing conditions. The baseline can be, but is not necessarily, the same as the No Action alternative (Bass et al. 2001). The baseline is essentially a description of the affected environment at a fixed point in time, whereas the No Action

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alternative assumes that other things will happen to the affected environment even if the proposed action does not occur (Bass et al. 2001). The purpose of Chapter 3, Affected Environment, is to provide the public with a detailed description of baseline conditions. Often, baseline conditions in NEPA and CEQA are considered the conditions that existed at the time the NOI or NOP was issued (Bass et al. 2001).

For the proposed project, baseline and No Action conditions are not the same, because the existing Reservation of Use agreement that was signed with the Giacomini family at the time the ranch was purchased includes discontinuation of the Giacomini Ranch dairy in March 2007. Because the structure of the purchase split future ownership of the dairy facility between the Park Service and the Giacomini family, continuation of any dairy operations would not be possible after March 2007, although there would be potential for leased grazing under a separate environmental review process. Baseline conditions, then, for the proposed project was assumed to be the conditions that have developed under -- and exist currently -- from long-term operation of a dairy. Baseline conditions were defined as those existing around the time that the Park Service issued a NOI to produce an environmental document in September 2002, and the CSLC issued a NOP, the CEQA equivalent of a NOI, in January 2003. Because many of the action alternatives involve changes to existing infrastructure or land management practices and are essential to understanding some of the proposed changes, these elements are described in Chapter 2, while a more detailed description of existing resource and socioeconomic conditions are provided in Chapter 3.

The Giacomini Ranch has supported a large-scale dairy cattle operation since 1946, when the Giacomini family diked a substantial portion of the historic tidal and subtidal wetland complex that once encompassed all of the ranch and Olema Marsh. Prior to the Giacominis, a smaller dairy reportedly operated on a portion of the site, but the Giacominis increased the scale of dairying operations substantially. Since the Park Service purchased the Giacomini Ranch in 2000, the Giacomini family has been operating under a Reservation-of-Use Agreement that enabled them to continue to manage 450 of the 550 acres transferred to NPS ownership until March 20, 2007. The remaining 100 acres, which are located in the northwestern portion of the West Pasture, are already under full Park Service ownership and management.

At least currently, the East Pasture has been much more actively managed through grazing, land leveling or grading, ditching, manure spreading, irrigation, mowing and other land management practices than the West Pasture. Many areas in the northern portion of the West Pasture have become ruderal through lack of active management. The Giacominis maintain both active (milking) and inactive (dry) dairy cattle herds in the East



and West Pastures (see Figure 3). Typically, three herds are rotated through fenced portions of the East and West Pastures, with two herds in the East Pasture and one often in the West Pasture. The inactive cows are herded across Lagunitas Creek to the West Pasture. Twice a day, the active or milking herds in the East Pasture are moved into the barns near C Street in the town of Point Reyes Station for milking. Olema Marsh, which is jointly owned by Audubon Canyon Ranch and the Park Service, is not actively managed, but appears to have been used for disposal of flood-related sediments during past decades.

As will be discussed in greater detail in Chapter 3, diking and other land management practices have not eliminated wetlands on the Giacomini Ranch or in Olema Marsh. The extent of wetlands may have been augmented in the East Pasture under existing conditions to some degree by extensive flood- and spray-irrigation of pastures during the summer to increase forage for cattle, although efforts were made during delineation of wetlands to determine which areas would be wetlands under natural conditions.

Irrigation waters for the East Pasture come currently from waters pumped via pipeline from the NMWD's Downey Well. However, historically, the Giacomini family, which maintains a 2.0 cfs appropriative water right on Lagunitas Creek, installed a temporary gravel dam in the creek each summer across from the White House Pool County Park to create a large freshwater pool from which irrigation waters were drawn through pumping. The Giacomini family was forced to discontinue this practice in 1997 by the SWRCB.

Irrigation and surface run-off waters are channeled through the East Pasture through a drainage ditch system that is actively maintained by the Giacomini family through dredging to remove sediments and aquatic vegetation that hinder movement of water. Dredged materials are sidcast to the side of the ditch, which were either actively dug or were former tidal sloughs that developed when the Project Area was not diked. In the past, waters from this ditch system were at least occasionally pumped into Lagunitas Creek. The West Pasture is not irrigated; however, the Giacomini family does have a 0.5 cfs appropriative water right on Fish Hatchery Creek that can be used for cattle watering and other purposes.



Cows and Dairy Facility

The Giacomini family performed regular maintenance on the extensive levee system for many decades, however, in recent years, levees are only repaired when severely damaged, and there is no routine maintenance. The levees, which are 4- to 6-feet higher than the adjacent pastures, reduce the amount of flooding from storm-related freshwater flooding and/or extreme tide events to large storm events occurring on average every three to 10 years. Floodwaters that do overtop the levees tend to flow northward due to sloped topography of the site and exit either through tidegates or concrete spillways installed in the northern edge of both the East and West Pastures. Flooding from Tomasini Creek has been minimized through construction of a levee during the 1960s that rerouted the creek to run along the eastern perimeter of the East Pasture along the Point Reyes Mesa bluff. The creek enters Tomales Bay at the very northern end of the East Pasture through a one-way tidegate/culvert flashboard dam system. This system is currently malfunctioning and allowing waters to flow in, as well as out. Off-site materials are typically imported to repair these levees when they are severely damaged: these materials are often sediments excavated by County of Marin Public Work crews from creeks following large storms.

Another creek, Fish Hatchery Creek, flows through the West Pasture, but it has not been leveed, although it is occasionally dredged to remove sediments and improve drainage of the pasture. Similar to Tomasini Creek, the one-way tidegate system on Fish Hatchery Creek has failed at some point and is allowing some tidal flows into the West Pasture, which particularly the northern portion. In addition to these larger creeks, there are several smaller creeks and drainages in the West Pasture that have been culverted, straightened or ditched, and/or are actively dredged to maintain drier conditions. Lastly, several areas of the Giacomini Ranch perimeter have been ditched to contain groundwater or seep or spring flow originating from the Point Reyes Mesa and Inverness Ridge. At one point, the Giacominis maintained an access road on the historic railroad grade at the base of the Point Reyes Mesa on the eastern perimeter of the East Pasture. Maintenance of the culverts necessary to divert all the groundwater flow from this portion of the Mesa proved too difficult, however, and the Giacominis discontinued maintenance.

In addition to ditching and levee maintenance for both Lagunitas and Tomasini Creeks, topography of the Project Area has been altered and continues to be altered through land management practices such as grading



and manure spreading. Most of these activities occur only in the East Pasture. Both the East and West Pasture are mowed once annually prior to flooding to produce additional forage for dairy cattle. At some point, the Giacomini may have actively sown seed for many of the herbs and grasses occurring in the pastures, many of which are considered pastoral species. Herbicides or pesticides may have been used as on other farms to control spread of unwanted plant or animal species. Primary efforts to control mosquito populations apparently involved intermittent introductions of non-native mosquitofish (*Gambusia affinis*) into the ditches and some of the creeks. Native aquatic floating emergents such as pennywort (*Hydrocotyle*) and mosquitofern (*Azolla*), which densely cover some portions of the ditches during the summer, appear to be managed through dredging rather than herbicides.

Most of the structures on the dairy ranch are located at the dairy facility and include an old calf barn, a milking barn and ranch office, a loafing barn, hay barn, and several homes. There are also several corrals and two manure ponds used for storing manure waste. The Giacomini family houses some of its dairy workers in homes located near Inverness Park and along the historic railroad grade near Mesa Road. It also has a 25-year Reservation of Use agreement on the Giacomini Hunt Lodge, an old house on the railroad grade adjacent to the East Pasture and northeast of the worker housing.

Other than dairying, the only activity that occurred in the pasturelands slated for restoration was hunting by the Giacomini and guests. Hunting ceased in 2003 following the death of Waldo Giacomini, but prior to his death, the Giacomini hunted for waterfowl during the fall. It is possible that hunting for deer also took place on the Giacomini Ranch.

Since baseline conditions were established in 2001-2002, there have been other activities that have occurred, some of which have modified conditions within the Project Area. Following purchase of the Giacomini Ranch by the Park Service and continued management and operation of most of the pasturelands and the dairy by the Giacomini family under the Reservation of Use Agreement that expires in 2007, the Park Service has restricted most of its active management to emergency maintenance actions required for reducing flooding to adjacent private properties and for maintaining suitable diked conditions for grazing of the Giacomini cattle. In fall 2003, the Park Service performed an emergency replacement and repair of the tidegate and culvert for Fish Hatchery Creek, which had collapsed during the previous winter and appeared to be allowing much greater amounts of muted tidal inflow into the West Pasture. The Park Service replaced this tidegate with a modified structure designed to mimic the degree of muted tidal inflow that was already occurring prior to the culvert collapse. However, without any quantitative information on the degree of prior muted tidal inflow, exact replication of prior conditions was difficult, and it appears that the new tidegate is allowing slightly more tidal inflow into the West Pasture.

In 2006, the Park Service is planning a habitat enhancement project in the 100 acres that it already owns and manages designed to increase habitat for two special status species that occur in the Giacomini Ranch. The existing freshwater marsh in the northern portion of the West Pasture that supports California red-legged frog would be expanded by 0.27 acres to offset continuing loss of freshwater marsh habitat from encroachment of brackish marsh habitat due to increases in salinity intrusion into the marsh. Approximately 1.11 acres of alternate high tide refugia for wildlife would be created in the northwestern end of the West Pasture, which would help to compensate for habitat that is currently trampled during the winter by cattle and visitors. Approximately 1,061 linear feet of temporary fence would be constructed roughly halfway through the West Pasture to minimize disturbance to the constructed high tide refugia and expanded freshwater marsh in the northern portion of the West Pasture. This fencing would be removed once cattle grazing in the West Pasture ceased.

No Action Alternative, including Actions Common to All Alternatives

An alternative in which there is no project or "Action" is required under NEPA and CEQA and allows the public to determine what would happen relative to baseline conditions if there was no proposed project or change in management direction from that specified in current or existing management plans or agreements. Because the No Action Alternative does represent the continuation of current management programs or plans such as the General Management Plan (NPS 1980) and compliance with terms of existing agreements, it often does include several "actions" despite its name. There are several existing (as of the time the Notice of Intent was published in the Federal Register) agreements that the Park Service or other agencies would be subject to or obligated to comply with under all alternatives:



- **Mitigation Agreement with CalTrans and the CCC:** The Park Service also entered into an approved agreement with CalTrans to provide mitigation for the Lone Tree Slide road repair in exchange for monies used for purchasing the Waldo Giacomini Ranch property and planning and implementation of a wetland restoration project. Under this agreement, as described in depth in Chapter 1, the Park Service is required to mitigate at least 3.6 acres of wetlands required to meet conditions specified by the California Coastal Commission (CCC) and CalTrans.
- **Purchase and Reservation of Use Agreement with Giacomini Trust:** As part of the purchase agreement with the Giacomini Trust signed in 2000, the Park Service agreed to a 7-year Reservation of Use Agreement that allowed the Giacomini family to continue to operate the dairy and manage 450 acres of pastureland until March 2007, at which time the agreement expires, and the dairy is required to be closed. The Park Service would follow through on its stated intent at the time of the property purchase to re-designate the appropriate water right obtained as part of the purchase with the Giacomini Trust for beneficial in-stream uses.
- **Water Supply Agreement with North Marin Water District:** Concurrently, NMWD also has an agreement with the Giacomini family for supplying irrigation waters pumped from the Downey Well upstream on Lagunitas Creek to the Giacomini Ranch. This agreement would expire with close of the dairy in 2007.

An alternative in which there is no project or "Action" is required under NEPA and CEQA and allows the public to determine what would happen relative to baseline conditions if there was no proposed project or change in management direction.

Continued compliance with various policies and management plans or actions already approved by the Park Service and the Seashore, including the Park Service Management Policies (NPS 2006), General Management Plan (Seashore 1980) and Exotic Plant Management Plan (Seashore 1989), are also considered part of the No Action alternative, as well as the other action alternatives. As part of this compliance, the Park Service would continue to perform certain maintenance activities such as removal of excess sediment from creeks that are required to ensure that flooding of adjacent private properties is not elevated above currently existing levels, as specified in Park Service Management Policies (2006) and Director Order's 77-2.

Described below are actions or conditions expected to occur that are either unique to the No Action Alternative or that would be undertaken under all alternatives (Figures 4 and 5).

Restoration and Management Actions Common to All Alternatives

- **No Agricultural Land Management:** Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, and fences.
- **Removal of Main Dairy Structures from Upland Areas:** Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the Park Service property will be removed from the premises. Standard erosion control practices will be implemented in these areas to stabilize the area. Removed materials will either be recycled or transported to a municipal landfill such as Redwood Landfill in Petaluma, Calif.
- **Removal of High Priority Invasive Species (Conduct Invasives Removal and Revegetation; Figure 4):** Under the No Action and all four Action Alternatives, the Park Service would continue the Seashore's Exotic Plant Management Plan (1989) for prioritizing and eliminating invasive plant species. Some of the Category I or top priority species identified in this plan include pampas grass (*Cortaderia jubata*), English ivy (*Hedera helix*), periwinkle (*Vinca major*), and fennel (*Foeniculum vulgare*; Seashore 1989). Under the No Action, removal of high priority invasive species would be limited to that identified under the current Exotic Plant Management Plan (Seashore 1989) and would include 0.39 acres of cape ivy (*Delairea odorata*) and less than 0.007 acres of pampas grass. Cape



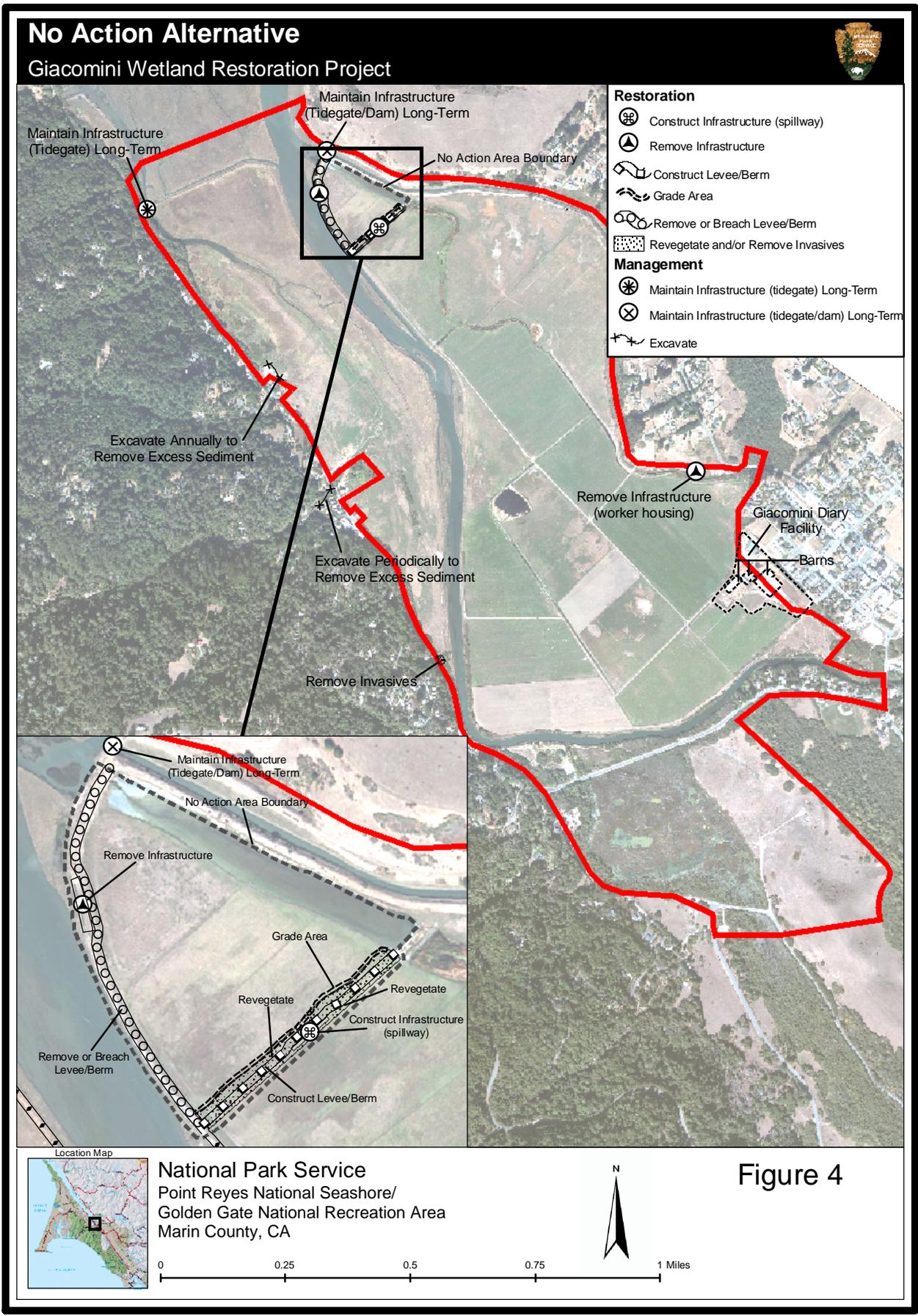
ivy patches occur exclusively in the riparian habitat on the western perimeter of the West Pasture adjacent to Sir Francis Drake Boulevard. Pampas grass occurs in one occurrence in the riparian habitat along Sir Francis Drake Boulevard and one occurrence on the Tomasini Creek levee in the East Pasture. The Park Service treats cape ivy using a non-chemical approach by manually limbing infested trees and removing all ground cover species. Maintenance involves follow-up monitoring and treatment, if necessary, to ensure that the species does not reestablish.

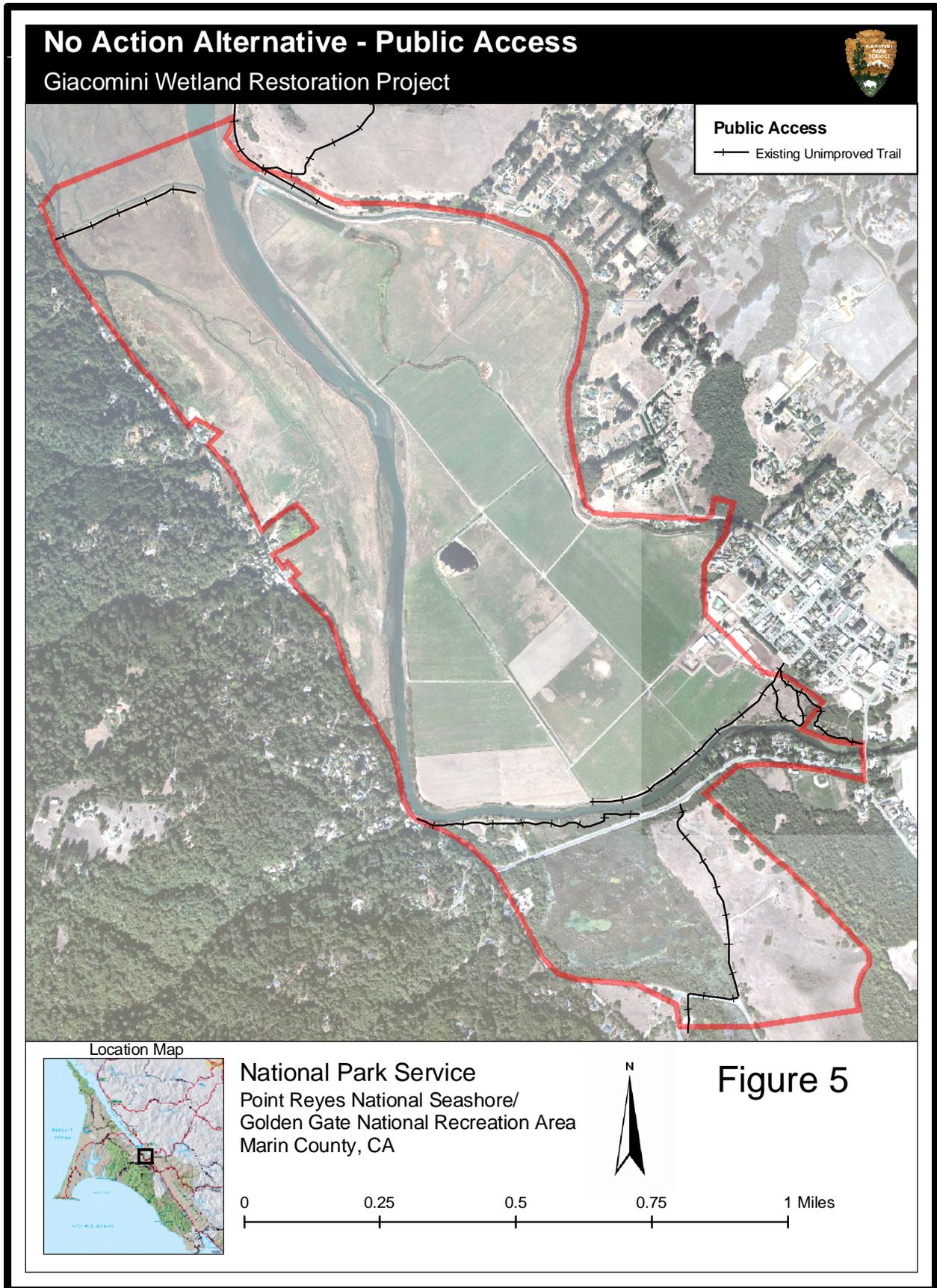
- Recover the Tomales Bay Tidewater Goby Population:** One of the surviving, federally endangered tidewater goby populations inhabits Tomasini Creek with occasional occurrences in adjoining areas. This population is genetically distinct from other goby populations (Jacobs 2004); its genetics reflect its long isolation and recent bottleneck conditions. Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in the vicinity of the Project Area. Final actions will be determined through formal consultation with the USFWS. They will likely include the following: 1) identification of sites with suitable habitat for tidewater gobies in the Tomales Bay watershed, and 2) evaluation and implementation of either direct introduction of fish collected from Tomasini Creek and other areas within the Project Area or introduction in conjunction with artificial propagation of collected fish. Finally, should an artificial propagation program be initiated, the Park would work with a public aquaria to combine propagation efforts with a public education program to increase awareness of endangered species and estuarine wetland restoration.
- Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses:** The Giacomini family maintains a 2.0 cfs senior appropriative water right on Lagunitas Creek. As part of the purchase of the Giacomini Ranch, the Park Service received this appropriative water right. Historically, the Giacomini family installed a temporary gravel dam during the summer to create a freshwater pond from which irrigation waters were pumped, however, the SWRCB ordered the Giacomini family to discontinue installation of the dam in 1997. Since 1997, the Giacomini family has received irrigation waters from the NMWD Downey Well upstream on Lagunitas Creek. This water is pumped via a pipeline to the Giacomini Ranch and then routed through the East Pasture in drainage ditches. Following expiration of the Reservation of Use agreement and closure of the dairy ranch, no irrigation activities will be warranted, and the Park Service proposes to convert its appropriative water right from agricultural to instream uses for the benefit of wetlands habitat, fish and wildlife resources, and recreation. This was approved by the SWRCB in 1992 as a valid purpose of water right use under State Water Code Section 1707.

*One of the surviving,
federally endangered
tidewater goby
populations inhabits
Tomasini Creek with
occasional occurrences in
adjoining areas.*

- Lease Subtidal and Intertidal Portions of Lagunitas Creek within Project Area from CSLC:** The Park Service would lease subtidal and intertidal portions of Lagunitas Creek within the Project Area from the CSLC, which currently owns these lands, as well as subtidal and intertidal lands north of the Giacomini Ranch. The northern boundary of the lease would be the Giacomini Ranch north levee and the northern extent of Park Service ownership. The southern boundary would be just north of the Green Bridge,







- Maintenance Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate; Figure 4):** During the Giacomini ownership and management of the West Pasture, the Giacomini 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 at the southern end of the Freshwater Marsh, and often carries high sediment loads due to the unstable nature of geologic conditions in the upper part of this small watershed. Fish Hatchery Creek flows off the Inverness Ridge into the West Pasture further south on the north side of another residence. Under the No Action and all Action Alternatives, the Park Service proposes 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. Approximately 200 cubic yards of sediment is typically excavated on an annual basis during average to wet years, 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.
- Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek:** Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacomini will have up to 90 days to remove personal property from the premises. Part of the Giacomini's personal property includes trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.

Mitigation/Restoration and Management Actions Unique to the No Action Alternative

- Mitigation Requirements Completed Through Wetland Restoration in the East Pasture (Breach or Remove Levee, Remove Infrastructure, Construct Levee, Construct Infrastructure, Conduct Revegetation; Figure 4):** Approximately 11 acres of wetland restoration would be performed in the northwestern corner of the East Pasture. This would ensure that the Park Service met the requirement specified in its agreement with CalTrans and the California Coastal Commission of at least 3.6 acres of wetland restoration. The additional 7.4 acres of wetlands is included to ensure that the Park Service meets its mitigation obligation and does not need to perform remedial measures in the future. It also lessens the amount of new levee or infrastructure that would be needed to connect with an existing levee or berm (Figure 4).

The culverts and levee that block connection of the Old Slough Pond with Lagunitas Creek and the southern end of Tomales Bay would be removed, as well as a large section on the northern and southern sides of the concrete spillway. Levee removal would total 660 lineal feet. Approximately 544 feet of new levee would be constructed at approximately the southernmost extent of the historic slough ponded area, creating approximately 11 acres of undiked wetland and waters that would be open to tidal flooding and flooding from Lagunitas Creek. The concrete spillway that allows floodwaters to drain out of the East Pasture into Lagunitas Creek would be removed, and a new 140x9-foot concrete spillway would be constructed as part of the new levee. Plant establishment on the new marsh floodplain would be expected to occur



Undiked Salt Marsh



naturally due to the favorable intertidal elevations and proximity of the Project Area to a seed source – the undiked marsh north of the Giacomini Ranch owned by the CSLC.

The base of the new levee would be tapered to create a high marsh transition zone ranging from 6-8 feet NAVD88 between the restored wetland (~ 4 feet NAVD88) and the new levee (8-10 feet NAVD88), which would function as an upland ecotone. The high marsh transition zone and upland ecotone levee would be revegetated to improve the potential for successful establishment of native vegetation communities and reduce the amount of non-native species establishment. In salt marsh areas, higher elevation and upland ecotone zones are more likely to become dominated by non-native or invasive plant species due to the reduced salinity and better aeration of soils. Irrigation may be used during the first two summers to enhance survival of plantings.

- ***No Dairy Operation or Agricultural Land Management, But Potential for Leased Grazing Contingent upon Public Review:*** As described earlier, dairy operations will cease when the Reservation of Use Agreement expires on March 20, 2007, and the Park Service will assume full management of the 550 acres that it purchased in 2000. Under the No Action Alternative, there is no potential for continuation of a dairy operation due to splitting of the dairy facility ownership. However, there would be the potential to continue grazing of dairy cattle heifers or beef cattle contingent under a lease agreement upon a separate public review process, as no wetland restoration beyond the 11 acres described above would occur. Under any lease agreement, grazing would potentially be subject to stocking density and seasonal or area use restrictions designed to minimize impacts from cattle upon wetlands and riparian zones.

In addition to changes in grazing, current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc.

- ***Tidegates and Levees Retained, But Generally Not Maintained (Figure 4):*** Under the No Action Alternative, approximately 16,650 lineal feet of levees on the East and West Pasture would be retained, but levees would generally not be actively maintained. Currently, levees are only repaired when a failure or breach appears imminent. In addition, maintenance and cyclic replacement of the culverts, tidegates, and other hydrologic control infrastructure would not continue, except on Tomasini Creek. Maintenance of the Tomasini Creek tidegate and flashboard dam structure would continue under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture

Public Access Unique to the No Action Alternative

- ***Existing Public Access Maintained along Informal Paths (Maintain Existing Unimproved Trail; Figure 5):*** Public access would continue to be informal under the No Action Alternative along existing informal dirt paths on the north levee of the West Pasture (450 lineal feet) and the southeastern portion of the East Pasture (740 lineal feet). There would be no linkage between east and west sides of Lagunitas Creek or between Tomales Bay Trail and Mesa Road in Point Reyes Station or established viewing areas, overlooks, or interpretative exhibits.
- ***ADA-Compliant Access:*** There would be no ADA-compliant component, as it does not currently exist.

Construction

- ***Construction Scheduling:*** Construction for the restoration required for mitigation under the agreement with CalTrans would be conducted from August through October during one year. Construction would not start until after August to preclude impacts to special status rail species in the undiked marsh north of Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat between February 15 and August 1, and there are regulations regarding timing of construction or proximity of construction to active nests during the breeding season for other birds, as well. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under special circumstances authorized by the Seashore and CSLC.



- **General Description of Construction, including Staging, Stockpiling, and Access:** Under the No Action Alternative, construction activities would be limited to the very northwestern end of the East Pasture (Figure 4). Construction equipment would most likely access the East Pasture from the road near the Giacomini Hunt Lodge, which connects to Mesa Road in Point Reyes Station. Equipment would most likely be staged near the Giacomini Hunt Lodge and in the East Pasture. Construction equipment that would be expected to be used in construction includes, but is not limited to, excavators, front loaders, graders, and dump trucks. 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 State Route 1. Any stockpiling of excavated sediments would occur in the East Pasture. During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough. These temporary actions would conform with Best Management Practice (BMPs) protocols outlined at the end of this chapter for minimizing impacts to water quality and aquatic species.
- **Total Cut/Fill:** Although additional cut and fill would take place if any of the action alternatives were selected, all alternatives, including No Action, which includes actions already approved under existing management plans and agreements, would result in a certain minimum amount of cut and fill. Actions that are part of the existing mitigation agreement with CalTrans would result in excavation of approximately 3,800 cubic yards of soil and 120 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of approximately 2,900 cubic yards of soil (Figure 9). Excavation would result from removal of the levees, while construction of a new levee and creation of high marsh habitat at the southern end of the hydrologically reconnected wetlands would account for all of the fill activities. Building removal would generate additional non-soil materials.
- **Total On-Site and Off-Site Disposal:** On-Site Disposal and Off-Site Disposal related to cut and fill for the No Action Alternative total approximately 2,900 and 880 cubic yards of soil, respectively (Figure 9). In addition, non-soil materials totaling 120 cubic yards would also need to be disposed of off-site. As noted above, building removal would generate additional non-soil materials. There is a possibility that some or all the non-soil materials could be recycled; non-soil materials that cannot be recycled would be disposed of at a municipal landfill. Soils removed off-site would be hauled from the East Pasture to an abandoned quarry in the Tomales Point portion of the Seashore. Most of these materials hauled off-site would be weedy materials that would be buried at the bottom of the quarries and overlain with clean fill materials to minimize potential environmental impacts. A separate environmental document is being prepared by the Seashore detailing specific restoration plans for these quarries; however, this planning process is not required to be completed before disposal takes place. Non-soil materials would be disposed of at a municipal landfill approximately 40 miles away in Petaluma, California.

Alternative A – Limited Restoration of the Giacomini Ranch East Pasture Only with Expanded Public Access, Including Culverted Earthen Fill Trail on Eastern Perimeter, Including Actions Common to All Action Alternatives

As described earlier, restoration actions conducted in Action Alternatives build upon each other such that, to a large extent, the restoration actions in one alternative are carried forward into the next. Alternative A would involve selective breaching of the East Pasture levee, while levees and tidegates in the West Pasture would not be removed. A limited amount of tidal channel creation, creek bank grading, and revegetation would be performed in the East Pasture, as well (Figure 6). Restoration actions in Alternative A encompass actions common to all Action Alternatives and are carried forward into Alternatives B-D. These common actions are described here and not described again in descriptions of Alternatives B through D, unless there are changes



or additions. Public access components, however, differ to some degree between all the Action Alternatives and are described separately.

Restoration

East Pasture

- ***Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure; Figure 6)***: Agricultural infrastructure present in the East Pasture and in certain other areas of Park Service lands would be removed. Roads would be shallowly graded or ripped to remove compaction, and soils generated would be used to fill in drainage ditches. 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. Culverts that currently channel irrigation and surface runoff waters through the drainage ditches would be removed and recycled or disposed of at a municipal landfill. Other infrastructure such as concrete spillways, bridges, electrical lines, transmission poles, pipes, pumphouses, and fencing would also be dismantled and disposed of at the Redwood Landfill (Petaluma, California). The Old Calf Barn, which is located at the top of the mesa at the dairy facility, would also be torn down, and the materials would be disposed of at the Redwood Landfill. The septic system underneath the Worker Housing along Tomasini Creek would be removed and disposed of at the Redwood Landfill. Removal of infrastructure would generate approximately 700 cubic yards of non-soil material.

Under all the Action Alternatives, the tidegate and flashboard dam structure at Tomasini Creek would be retained, but not actively maintained, for a period of 10- to 20 years to maintain existing habitat for the federally endangered fish species, the tidewater goby. Prior to its discovery in Tomasini Creek during baseline studies for the proposed project, tidewater goby had not been sighted in the watershed since 1953. The Tomasini Creek population was the only known occurrence of this species in Tomales Bay until 2005, when it was also found in the West Pasture Old Slough. The existing tidegate-dam structure allows the full upper range of high tides, but minimizes drainage during low tides. By retaining this structure, the Park Service and CSLC believe that they can maintain existing habitat during the early restoration process, while additional habitat begins to develop in other portions of the Project Area.

- ***Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation; Figure 6)***: The Giacomini have disposed of manure from dairy cattle operations using a combination of temporary storage in two manure disposal ponds at the dairy facility with permanent disposal in selected manure disposal pastures that have been subjected to heavy applications of manure. Because of repeated applications of manure, these areas, which total approximately 13 acres, appear to be above the grade of the surrounding pastures. To some degree, manure has been and is spread in other pastures, as well, but, based on staff observations and testing of soils (Park Service, unpub. data), loading rates in these pastures appear to be much lower. In higher elevation portions of the manure disposal pastures (>6 feet NAVD88), approximately 1- to 2.5 feet of soil would be excavated and hauled less 0.25 miles to the Manure Disposal Ponds. Excavated material would total 38,000 cubic yards.

Approximately 3,700 cubic yards of the manure material would be used to fill the Manure Disposal Ponds through fill and compaction to within 1 foot of the surrounding grade of the dairy facility. Clean materials excavated from a nearby levee breach (See Levee Removal) would be used to “cap” the Manure Disposal Ponds. Following fill of the ponds, the entire Park Service-owned portion of the dairy facility would undergo fine grading. Because nutrient-rich conditions tend to favor establishment of weedy, ruderal non-native species, active revegetation would be conducted in the southern portion of the Manure Disposal Pasture that falls above intertidal elevations. The northern portion would be subject to tidal flooding, and increases in soil salinity would preclude or at least minimize establishment by ruderal non-native species.



- **Limited Breaching of Levee in Southern and Northern Portions of East Pasture (Remove or Breach Levee; Figure 6):** Approximately 2,700 lineal feet of levee would be breached in the East Pasture at four locations. Two are in the northern portion of the East Pasture near the outlet of the existing historic slough-concrete spillway and the pumphouse. The other two are in the southern portion near the existing cattle-crossing location (where cattle cross from the East Pasture to the West Pasture) and across from White House Pool. The levees would be excavated to the adjacent pasture elevations. The top 1-2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2-3 feet would be disposed of on-site through loose spreading of excess material.
- **Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Conduct Revegetation; Figure 6):** Approximately 1,400 lineal feet 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) to a more gradual bank slope (approximately 8:1). The grading would be conducted such that existing large, mature willows established adjacent to Lagunitas Creek would not be disturbed, thereby preserving instream habitat for aquatic species such as steelhead and coho salmon, California freshwater shrimp (*Syncaris pacifica*; FE), and other aquatic species. Some of the graded material would be used to provide clean fill material to “cap” the manure ponds on the Dairy Mesa. Following completion of grading, the exposed soil would be stabilized using techniques that may include placement of erosion control blanket, and revegetation would be conducted through sprigging and installation of container plants. 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.
- **Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 6):** 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, the mouth of Tomasini Creek and the historic slough would be excavated approximately 1- foot from 2 feet NAVD88 to create a linkage with the deepest portion of Lagunitas Creek, which averages 1 foot NAVD88 in this portion of the creek. In addition, existing vegetation and at least 1- to 2 – feet of sediment would be removed from approximately 1,200 lineal feet 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. Approximately 700 feet of new tidal channel would also be excavated in the northeastern portion of the restored East Pasture. 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.
- **Removal of Invasive Species (Remove Invasive Species; Figure 6):** As described under the No Action Alternative, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication. However, under this alternative, species other than cape ivy and pampas grass would be subject to monitoring and eradication. These species include non-native invasive cordgrass (*Spartina*) and cordgrass hybrids and Himalayan blackberry (*Rubus discolor*).
 - **Atlantic cordgrass (*Spartina alterniflora*); Atlantic cordgrass – Pacific cordgrass (*Spartina foliosa*) hybrids; and dense-flowered cordgrass (*Spartina densiflora*):** Atlantic cordgrass and Atlantic cordgrass-Pacific cordgrass hybrids, which have spread through large portions of central and south San Francisco Bay, have not been documented in the Project Area or Tomales Bay to date, but have been found in Drake’s Estero. Another cordgrass species that is not native to the region, dense-flowered cordgrass, has sprung up twice along Tomales Bay’s shorelines, but has been quickly eliminated. The Invasive Spartina Council, along with the Park Service, Audubon Canyon Ranch, and others, have been conducting annual monitoring for invasive and non-native cordgrass species and hybrids. The Park Service would continue to monitor for the presence of non-native cordgrass species and hybrids as part of its ongoing effort to eliminate this species. The Park Service uses non-chemical methods to eradicate non-native cordgrass, specifically tarping of “patches” with



follow-up treatment over the next three to five years to ensure that there is no clonal “creep” beyond the tarped area.

- **Himalayan blackberry (*Rubus discolor*):** Under Alternative A, the Park Service would remove and treat up to 4.6 acres of Himalayan blackberry occurrences on the southwestern of the East Pasture levee and Lagunitas Creek bank and the Dairy Mesa slope. In this location, Himalayan blackberry would be removed manually by cutting down aboveground portions of plants and digging out the rootball. Maintenance involves follow-up monitoring and treatment, if necessary, to ensure that the species does not reestablish.
- **Revegetation in East Pasture (Conduct Revegetation; Figure 6):** Selected portions of the East Pasture would be actively revegetated as described under earlier restoration tasks (Excavation and Restoration of Manure Disposal Pastures, Creek Bank Graded). Revegetation efforts in the 13-acre Manure Disposal Pastures would focus on removing “hot” or nutrient-rich soils to the extent possible and conducting limited revegetation with moist grassland or upland ecotone plant species such as wildrye (*Leymus triticoides*). Approximately 3 acres on the southern Lagunitas Creek bank would be graded to a more stable topographic profile, revegetated, and potentially irrigated for the first three summers to improve survival of plantings. This area would be revegetated with riparian tree and shrub species using a combination of sprigging with arroyo willow and red alder and container plantings of other native riparian species such as box elder (*Acer negundo*), Oregon ash (*Fraxinus latifolia*), twinberry (*Lonicera involucrata*), red elderberry (*Sambucus racemosa*), coyote brush (*Baccharis pilularis*), etc. Because top-of-bank elevations are considerably above the summer water table, irrigation may be performed during the first three summers to improve survival of plantings. Also, 1.6 acres on the Dairy Mesa slope, which has been heavily disturbed by agricultural activities, would be revegetated following invasives removal with low- to medium-height coastal scrub species that are adapted to wetter conditions: portions of the Dairy Mesa appears to be influenced by an active spring. Plant species selected would be those that would continue to allow views of the restored Project Area from the proposed viewing area at the top of the Dairy Mesa (see Public Access).

West Pasture

- There would be no restoration conducted in the West Pasture other than the removal of high priority invasive species described under the No Action Alternative and Alternative A – East Pasture.

Olema Marsh

- There would be no restoration conducted in the Olema Marsh.

Management

- **No Agricultural Land Management:** Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Removal of Main Dairy Structures from Upland Areas:** Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the NPS property will be removed from the premises as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek:** Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacomini will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.



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- **Tidegates Maintained (Maintain Infrastructure Long-Term, Maintain Infrastructure Short-Term; Figure 6):** Maintenance and cyclic replacement of the culverts, tidegate, and supporting wooden infrastructure such as flashboards would be continued on both Fish Hatchery and Tomasini Creeks, although maintenance of the Tomasini Creek tidegate would only be continued under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure for more detailed discussion).
- **Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate; Figure 6):** Excess sediment from the 1906 Drainage and Fish Hatchery Creek would be excavated on an as needed basis as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses:** As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to an instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Recover the Tomales Bay Tidewater Goby Population:** Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives

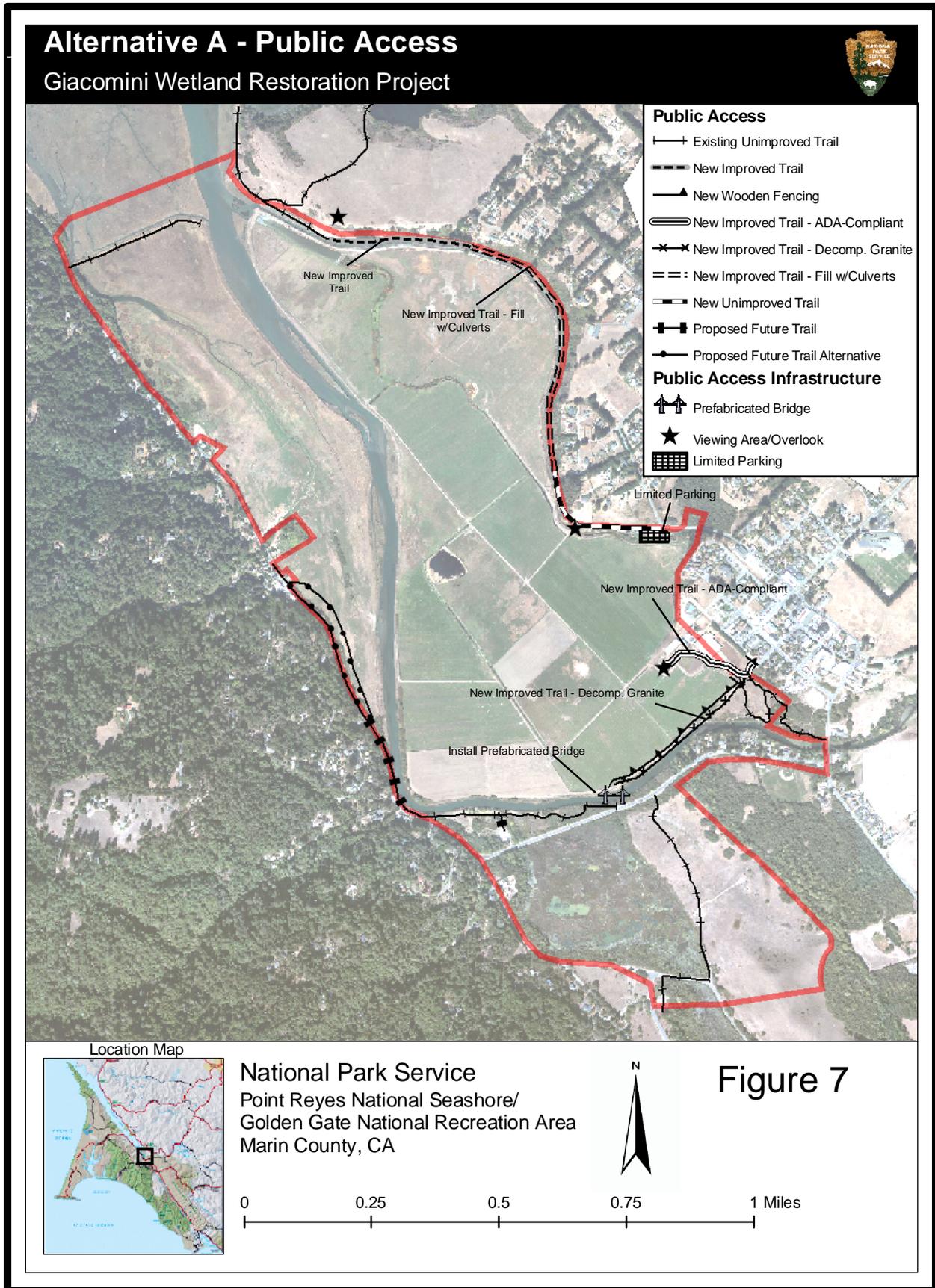
Public Access

- **Creation of Southern Perimeter Trail from Point Reyes Station to existing White House Pool County park via a permanent pedestrian/bike bridge near the location of the old summer dam (Construct New Improved Trail- ADA-Compliant, Construct New Improved Trail-Decomposed Granite, Construct Bridge, Construct Fence; Figures 7 and 8):** The southern perimeter path would connect Point Reyes Station with the White House Pool County park. A decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed from C Street in the vicinity of 3rd Street along an easement to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay (see Viewing Areas and Exhibits). The trail would continue along the edge of the East Pasture and Lagunitas Creek bank as does the existing informal social path. The existing dirt path in the Green Bridge County Park would be improved and would connect to the proposed trail. The approximately 2,750-foot improved trail from the Dairy Mesa would lead to a 200-foot, 8-foot-wide bridge on Lagunitas Creek at the location of the old summer gravel dam that the Giacomini used to install for irrigation purposes (Figure 8). On the north side, the trail would connect to the existing dirt path in the White House Pool County Park. It would also connect via a crosswalk to the Olema Marsh Trail, which runs on the east side of Olema Marsh towards Limantour Road. Because of the potential for flooding during large storm events, use of this path would be weather-dependent. Length of the southern perimeter trail would total approximately 3,000 linear feet.
- **Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County (Construct Proposed Future Trail, Construct Proposed Future Trail Alternative-Boardwalk, Construct Proposed Future Trail-ADA Compliant; Figure 7):** The Park Service would collaborate with the County of Marin on a future project to extend the southern perimeter trail described above to Inverness Park by connecting to the existing informal path in the White House Pool County park with a path along Sir Francis Drake that would either run alongside Sir Francis Drake Boulevard or move off the road at the southern end of the unrestored West Pasture onto a low-elevation boardwalk that would join back with Sir Francis Drake Boulevard in Inverness Park. The future project could include a potential elevated overlook at White House Pool County park that would connect to the existing parking lot with an ADA-compliant path.



- ADA-Compliant Access:** A decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed as part of the Southern Perimeter Trail from C Street in the vicinity of 3rd Street along an easement to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay (see Viewing Areas and Exhibits). This portion of the trail would be constructed and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. As part of the potential future extension of the Southern Perimeter Trail to Inverness Park, an elevated overlook could be constructed at White House Pool County park that would be ADA-compliant and connect to the existing parking lot via an ADA-compliant path.
- Creation of Eastern Perimeter Trail Through Extension of Tomales Bay Trail from Railroad Point to Mesa Road (Construct New Unimproved Trail, Construct New Improved Trail-Soil, Construct New Improved Trail-Fill w/Culverts; Figure 7):** 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 1,700 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. Approximately 1,700 feet south of the existing terminus of the Tomales Bay Trail, a new improved trail, approximately 3,200 lineal feet in length, would be constructed through removal of riparian vegetation, placement of earthen fill overlain with decomposed granite, and installation of culverts where needed to direct surface and groundwater flows originating from the adjacent Point Reyes Mesa into Tomasini Creek. At the southern end, the trail would connect to the existing informal path, which leads to Mesa Road via the paved access road that runs alongside the Giacomini Hunt Lodge, a house that was constructed by the Giacomini family and is under a 25-year Reservation of Use Agreement. Up to five (5) parking spaces may be created at the junction of the railroad grade and Mesa Road. Length of the Eastern Perimeter Trail would total approximately 6,000 lineal feet.
- Existing Public Access Maintained along Informal Path (Existing Unimproved Trail; Figure 7):** Public access would continue along the existing informal dirt path on the north levee of the West Pasture.
- Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure; Figure 7):** A total of three viewing areas, overlooks, and interpretative exhibits would be constructed along the eastern perimeter of the Project Area. A viewing area and interpretative exhibits would be constructed at the edge of the Dairy Mesa along the southern perimeter trail. This viewing area would consist of simple facilities such as benches, picnic table, and interpretative exhibits. A second viewing area would be constructed adjacent to the Giacomini Hunt Lodge along the eastern perimeter trail. This might potentially be a slightly raised overlook to allow a better view of the restored Project Area, as well as interpretative exhibits. A third viewing area would be constructed along the existing Tomales Bay Trail at the top of Railroad Point and would also be very simple, consisting potentially of a wooden bench and interpretative sign.





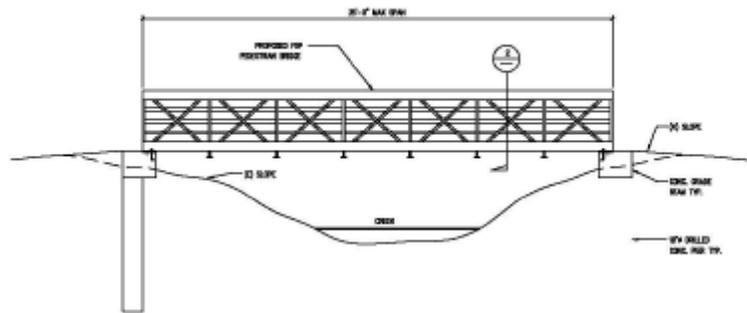


FIGURE 8. EXAMPLE OF PREFABRICATED BRIDGE STRUCTURE (LANDPEOPLE 2005)
THIS GRAPHIC DOES NOT REPRESENT FINAL DESIGN AND/OR APPEARANCE.

Construction

- Construction Scheduling:** The restoration components would be conducted from June 1 through October 31 during one construction year, starting in the southern end and moving north in the fall. Construction would be staggered such that components in the southern end of the Project Area would be initiated first to ensure that construction activities do not disturb special status rail populations that occur in the undiked marsh north of the Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat between February 15 and August 1, and there are regulations regarding timing of construction or proximity of construction to active nests during the breeding season for other birds, as well. Depending on when funding is obtained for public access, construction of public access alignments and infrastructure would occur either during or after restoration. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under special circumstances authorized by the Seashore and CSLC.
- General Description of Construction, including Staging, Stockpiling, and Access:** Under Alternative A, construction activities would occur only in the East Pasture (Figure 6). Construction equipment would most likely access the East Pasture from two locations: 1) the road near the Giacomini Hunt Lodge, which connects to Mesa Road in Point Reyes Station, and 2) C Street in Point Reyes Station. Equipment would most likely be staged near the Giacomini Hunt Lodge and in the East Pasture. Construction equipment that would be expected to be used in construction include, but are not limited to, excavators, front loaders, backhoes, bulldozers, graders, and dump trucks. Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local connector roadways such as Sir Francis Drake Boulevard and Levee Road and state highways such as State Route 1. Any stockpiling of excavated sediments would occur in the East Pasture. During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough. These temporary actions would conform with Best Management Practice (BMPs) protocols outlined at the end of this chapter for minimizing impacts to water quality and aquatic species.
- Total Cut/Fill:** Actions proposed under Alternative A would result in excavation of approximately 86,000 cubic yards of soil and more than 680 cubic yards of concrete, pipe, demolition debris, and other non-soil materials and fill of approximately 35,500 cubic yards of soil (Figure 9). Fill primarily involves re-use of excavated materials on-site such as fill of manure ponds on the Dairy Facility Mesa and fill of drainage ditches. Under Alternative A, the center portion of the Eastern Perimeter Trail, which is approximately 3,200 feet in length, would also need approximately 1-2 feet of earthen fill overlain with gravel to create a passable trail.
- Total On-Site and Off-Site Disposal:** To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without



negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site Disposal for Alternative A total approximately 40,250 and 46,200 cubic yards of soil, respectively (Figure 9). In addition, excavated non-soil materials totaling more than 680 cubic yards would also need to be recycled or disposed of off-site. Soils removed off-site would be hauled from the East Pasture to several abandoned quarries in the Tomales Point portion of the Seashore. There are at least three quarries that would be prioritized for restoration -- Grossi Pit at M Ranch, Evans Pit at Pierce Point, and McClure Pit near L Ranch – as well as several medium to low priority quarries – Evans Pit at Abbott’s Lagoon, L Ranch Quarry, and several off Limantour Road (Figure 10). Most of these materials hauled off-site would be weedy or manure materials that would be buried at the bottom of the quarries and overlain with clean fill materials to minimize potential environmental impacts. A separate environmental document is being prepared by the Seashore detailing specific restoration plans for these quarries. Completion of this document is not required for the proposed project to proceed. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

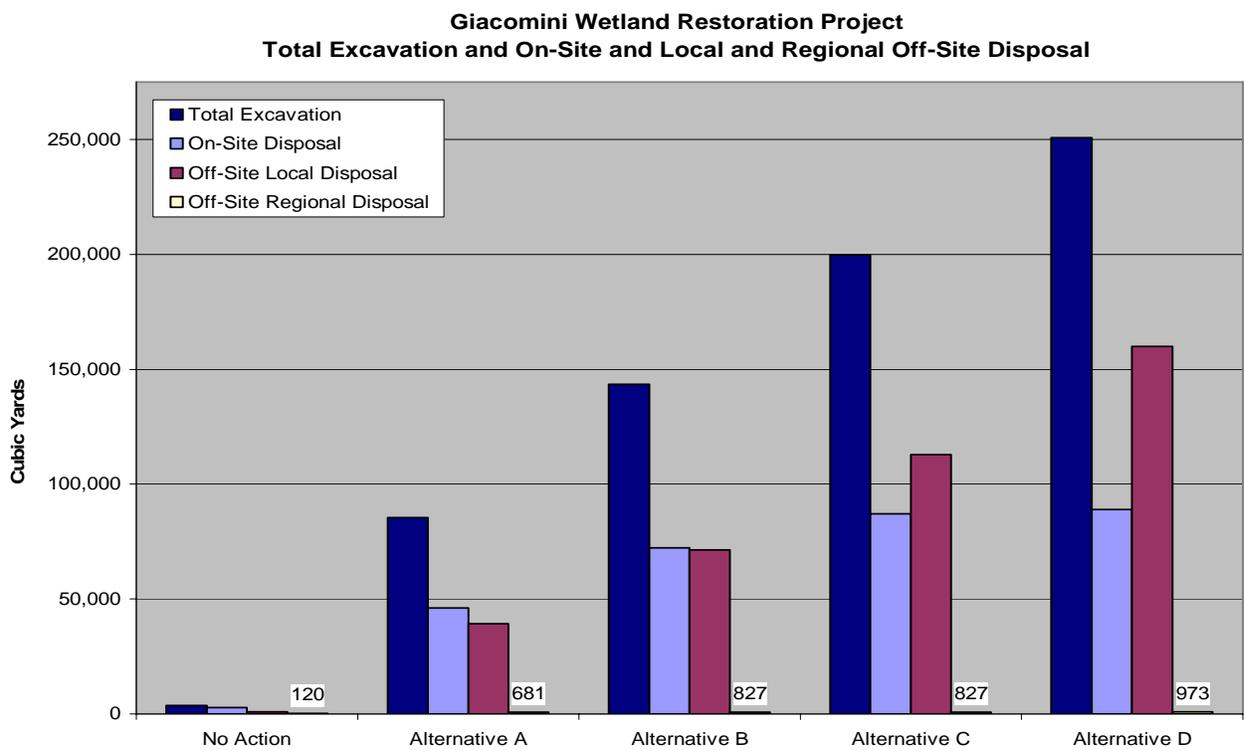
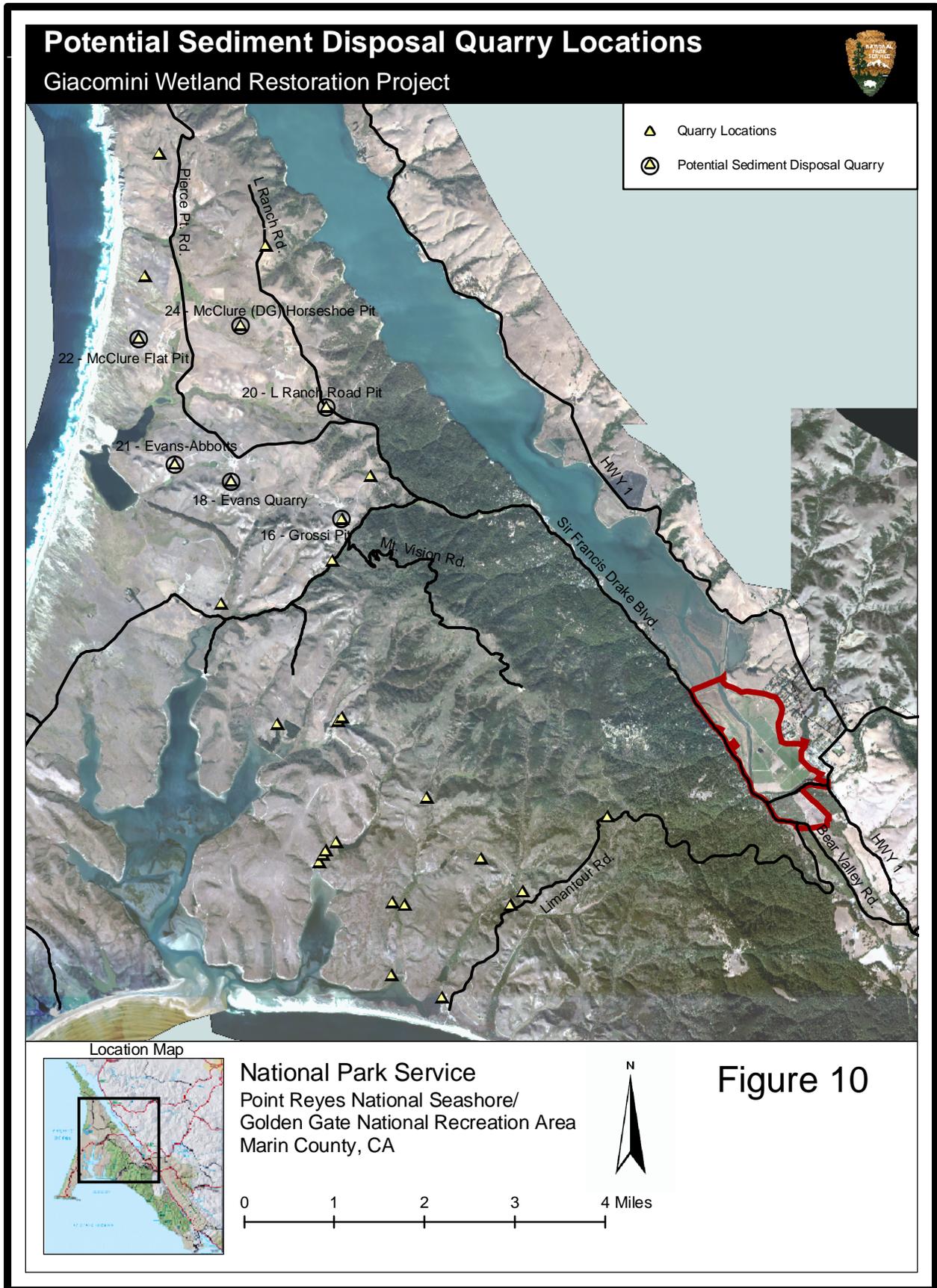


FIGURE 9. TOTAL EXCAVATION AND ON-SITE AND LOCAL AND REGIONAL OFF-SITE DISPOSAL





Alternative B – Moderate Restoration of the Giacomini Ranch East Pasture and Limited Restoration of the West Pasture with Expanded Public Access, Including Boardwalk Trail on Eastern Perimeter

This alternative would completely remove the East Pasture levees and create several breaches in the West Pasture levee, as well as remove the tidegate on Fish Hatchery Creek (Figure 11). In general, this alternative builds upon the actions proposed in Alternative A by increasing tidal channel creation, grading, and revegetation. Public access components of Alternative A and B are similar, but the culverted-earthen fill portion of the Eastern Perimeter through-trail in Alternative A is replaced with a boardwalk in Alternative B (Figures 12 and 13).

Restoration

East Pasture

- **Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure Short-Term, Eliminate Road Through Regrading):** Activities conducted under Alternative B would be identical to that described under Alternative A, with the exception that the road leading up to the dairy barn facility would be regraded using material excavated on-site to recreate natural hillside topography, stabilized using erosion control material, and revegetated.
- **Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation):** Activities conducted under Alternative B would be identical to that described under Alternative A.
- **Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Remove Invasive Species, Conduct Revegetation; Figure 11):** Bank grading and stabilization activities conducted under Alternative B would be very similar to that described under Alternative A. Approximately 0.2 acres of additional bank grading, stabilization, invasive plant 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 currently dominated by non-native invasive plant species such as Himalayan blackberry, avoiding adjacent areas supporting mature arroyo willow shrubs and trees.
- **Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture (Remove or Breach Levee; Figure 11):** 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. Under Alternative B, most of the estimated 650 cubic yards of riprap would be removed and hauled off-site to the Seashore's maintenance yard at the Bear Valley administrative complex. The riprapped area and an approximately eroded 100-foot section of creek bank just upstream would be regraded to a more stable topographic profile. The regraded slope would be stabilized, possibly with biostabilization techniques that may include placement at rock at the toe of slope, sprigging of willows and/or construction of so-called "willow walls" (construction of "fence" using willow material that is backfilled with soil), permanent vegetation maps, or other appropriate stabilization measures. A coffer dam may be needed to adequately dewater this area to allow for

Alternative B would completely remove the East Pasture levees and create several breaches in the West Pasture levee, as well as remove the tidegate on Fish Hatchery Creek.



trench excavation. Plantings of native riparian tree and shrub species would be conducted to increase bank protection afforded by establishment of vegetation.

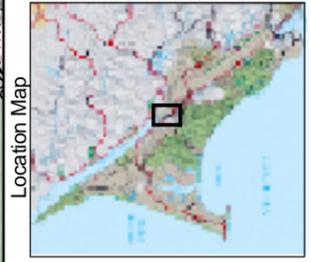
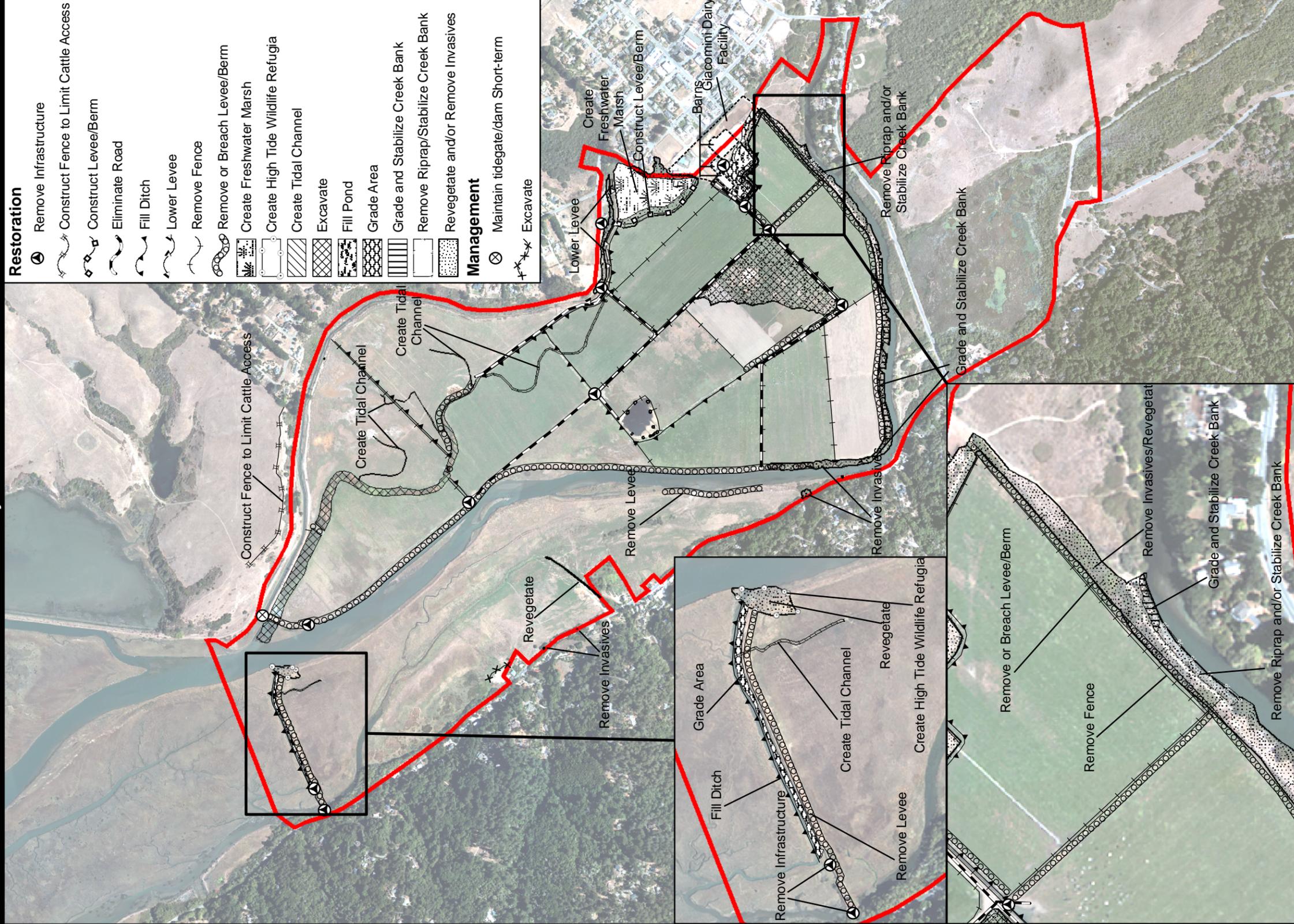
Given the history of flooding and erosion along this section of Lagunitas Creek, the Park Service acknowledges that these stabilization attempts may not be able to prevent future erosion in this area, particularly during larger storm events such as 10-year, 50-year, or 100-year floods. Hydrologists have even debated the potential for Lagunitas Creek to dramatically change course in the future by cutting through the East Pasture in this location. However, in keeping with the project's purpose and its focus on restoring process, should the bank erode or the creek change course in the future, there would be no attempts to repair any damage to the creek bank or move the creek back into its original course. In addition, any public access facilities such as trails or viewing areas would be adaptively managed such that facilities would be rerouted or reconfigured to work with changes in resource conditions.

- **Complete Removal of Levee in East Pasture (Remove or Breach Levee; Figure 11):** Under Alternative B, levees in the East Pasture would be completely removed. Approximately 9,600 lineal feet of levee would be excavated to the adjacent pasture elevations. The top 1-2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2-3 feet would be disposed of on-site through spreading. 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.
- **Lowering of Tomasini Creek Berm (Lower Levee; Figure 11):** Under Alternative B, a section of the levee that separates Tomasini Creek from the East Pasture would be lowered to allow overflow from Tomasini Creek into the East Pasture during periods when water levels in the creek rise substantially during storms. Approximately 1,600 lineal feet of levee near the Giacomini Hunt Lodge would be lowered 4 feet. Another approximately 80 feet upstream of the existing worker housing would also be lowered 4 feet. This lowering would allow waters from Tomasini Creek to spill out onto the East Pasture floodplain during storm events where flows equal or exceed Ordinary High Water or bankfull discharge (flood events that recur on average every 1.5 years). The top 2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2 feet would be disposed of on-site through spreading.
- **Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 11):** In addition to the tidal channel enhancement and creation activities under Alternative A, approximately 2,200 feet of new tidal channel would also be excavated in the northeastern and central portions of the restored East Pasture, recreating some of the historic meander or sinuosity that was once present in the historic slough before it was artificially straightened to act as a drainage ditch. 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.



Alternative B - Restoration and Management

Giacomini Wetland Restoration Project



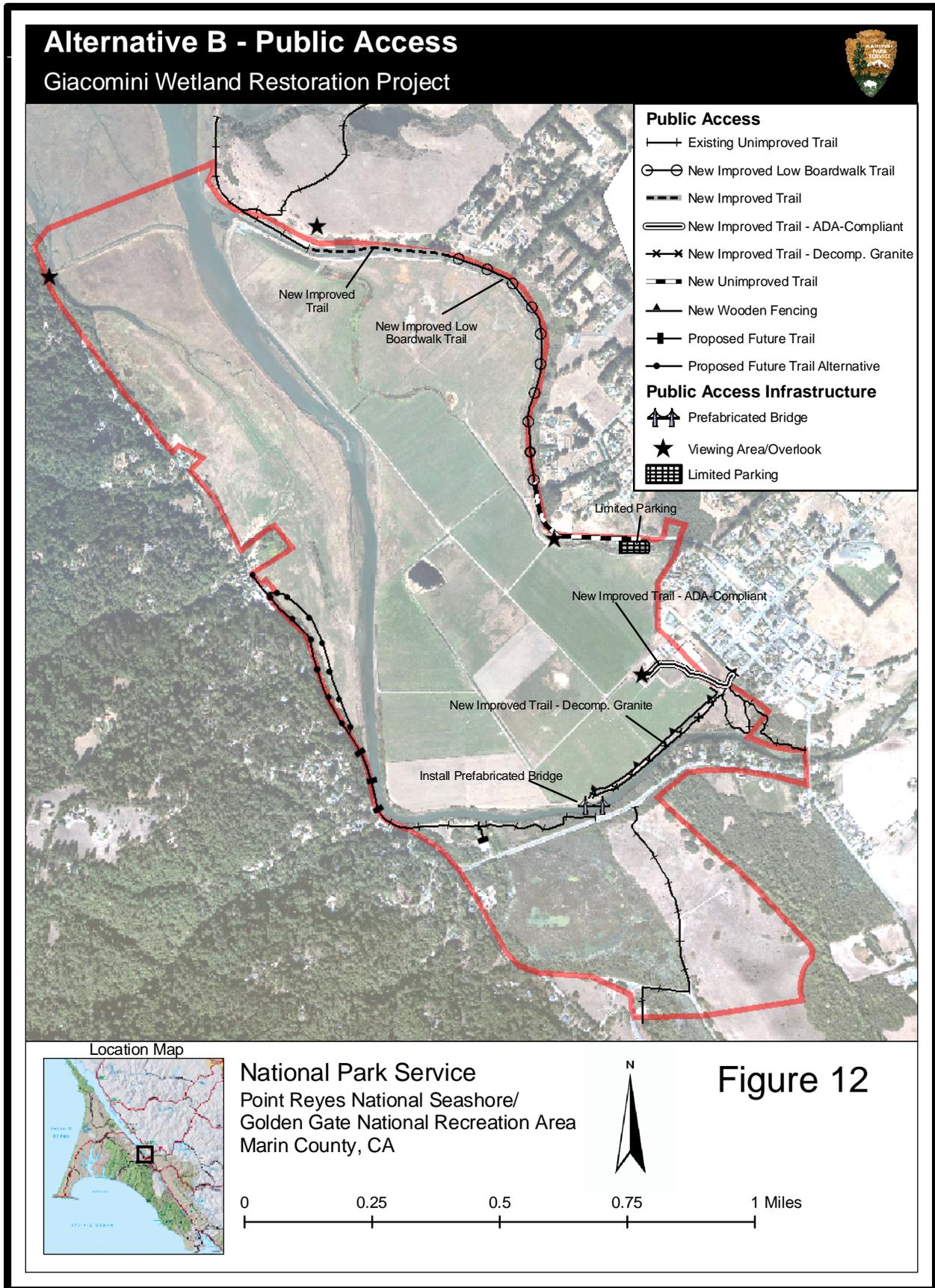
National Park Service
 Point Reyes National Seashore/
 Golden Gate National Recreation Area
 Marin County, CA



Figure 11

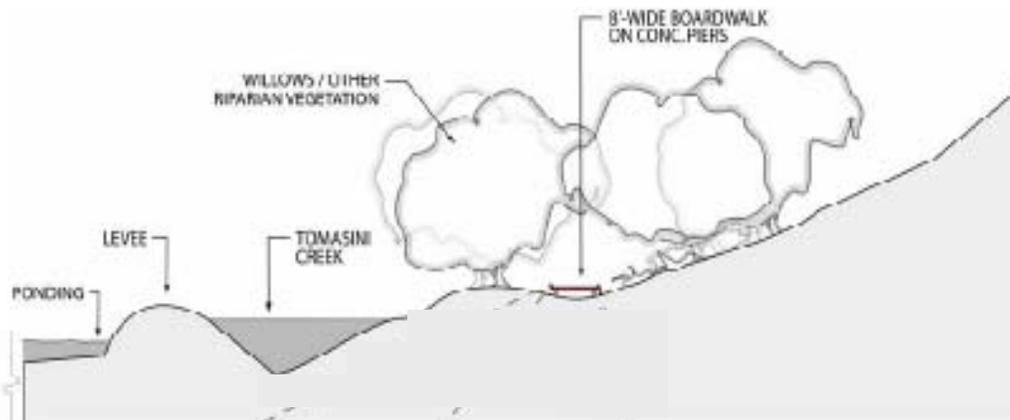
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FIGURE 13. LANDPEOPLE TRAIL GRAPHIC



- Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle (Create Freshwater Marsh, Create Low Freshwater Marsh Berm; Figure 11):** Restoration actions in the West Pasture have the potential to impact existing breeding habitat for the California red-legged frog in the Freshwater Marsh, a natural drainage- and seep-fed feature on the western perimeter of the West Pasture. Salinities in this marsh have stayed artificially low because of the construction of levees and tidegates in the West Pasture. These freshwater conditions have encouraged establishment within the marsh by California red legged frog, which are, in many cases, sensitive to higher salinities, particularly during juvenile stages. To offset anticipated increases in salinity in the northernmost portions of the Freshwater Marsh with breaching of the West Pasture levee and removal of the Fish Hatchery Creek tidegate, the Park Service and CSLC are proposing to create a 5.4-acre freshwater marsh on the eastern perimeter of the East Pasture in between Tomasini Creek and the dairy facility. Based on hydraulic modeling, the so-called Tomasini Triangle would be above intertidal elevations or the influence of tides except perhaps during the most extreme storm tides (extreme tides combined with high freshwater flows from storm events). Perennial seep and spring groundwater flow from the Point Reyes Mesa would provide a sustained source of freshwater through the summer which is important for maturation of juvenile California red-legged frogs.

Creation of freshwater marsh in the Tomasini Triangle would involve excavating anywhere from 1- to 4 feet to create a perched surface water pond. Principal hydrologic sources for this marsh would be surface run-off from the relatively small 13-acre watershed, direct precipitation, groundwater from springs on the Point Reyes Mesa hillside, and occasional flood overflow from Tomasini Creek. The marsh bottom would be sloped such that the deepest portion would be on the eastern perimeter of the triangle, where several groundwater springs emerge from the sides and base of the Point Reyes Mesa, with marsh depths gradually decreasing in 1-foot increments toward the marsh's western perimeter. Excavation would total approximately 17,000 cubic yards. In areas where excavation exceeds 2 feet, the marsh would be overexcavated by 1 foot to allow replacement of salvaged topsoil once excavation is completed. Salvaged topsoil would be stockpiled on-site directly adjacent to the marsh during this phase of construction.

Because this area was historically influenced by tides much more than would occur under current conditions, soils at deeper depth in the Tomasini Triangle appear to be relatively high in salts despite the freshwater environment that has predominated since diking of the Giacomini Ranch. To minimize migration of salts from these soil strata into overlying surface waters, salvaged topsoil from the eastern portions of the marsh would be mixed with bentonite to decrease permeability and connectivity with the saline groundwater table and increase the amount and duration of surface water ponding.



An approximately 80-foot section of the Tomasini Creek levee upstream of the existing worker housing would be partially lowered to allow flood overflows into the Tomasini Triangle during the winter and spring and provide another source of freshwater for the marsh.

To increase the duration and depth of surface water ponding and decrease the potential impact of extreme storm tides on salinity structure of the created marsh, a 1.7-acre berm would be constructed on the marsh's entire western perimeter. The berm would be developed using approximately 4,100 cubic yards of soil excavated to create the freshwater marsh, as well as materials from lowering of the Tomasini Creek levee. To the extent possible, the berm would be graded to create a more subtle, gradual topography on the western side that would enable creation of high marsh and upland ecotone habitats. The berm would have a top elevation of approximately 9 - 10 feet NAVD88, approximately 5 feet above the deepest portion of the marsh and approximately 1.5 – 2 feet above the surrounding marshplain elevations. This feature would not only increase surface ponding depth and duration and minimize tidal intrusion into the created freshwater marsh, but provide refugia for wildlife during extreme high water periods.

Once construction is completed, the freshwater marsh and berm would be revegetated using native species characteristic of freshwater marsh and high marsh/upland ecotone communities, respectively.

- **Installation of Fencing on Martinelli Ranch (Construct Fence to Limit Cattle Access; Figure 11):** Approximately 1,800 linear feet of fence would be constructed at the top of the Point Reyes Mesa on GGNRA lands leased to the Martinelli family for cattle grazing. Fencing would preclude cattle grazing on the south-facing slope, which, if trampling impacts were decreased, could provide valuable breeding habitat for northwestern pond turtles, which occur in the Giacomini Ranch.
- **Removal of Invasive Species (Remove Invasive Species; Figure 11):** As described under the No Action Alternative and Alternative A, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. These species include invasive cordgrass and cordgrass hybrids, cape ivy, pampas grass, and Himalayan blackberry. Removal efforts for these species are described under the No Action Alternative and Alternative A. Under Alternative B, these efforts would be expanded to include additional occurrences of Himalayan blackberry in the East Pasture. Removal of invasive species in the West Pasture is described below.
 - o **Himalayan blackberry:** Under Alternative B, the Park Service would remove and treat additional blackberry occurrences in the East Pasture and perimeter. These areas total up to 8.9 acres and include occurrences along the entire southern perimeter of the East Pasture levee and creek bank adjacent to Lagunitas Creek. Depending on the location, Himalayan blackberry would be removed using either mechanized equipment to excavate the above- and below-ground portions of the shrub or, particularly on hillsides or areas with sensitive biological resources, manual labor to cut down aboveground portions and dig out the rootball. Follow-up treatments may be conducted to remove resprouting plants.
- **Revegetation in East Pasture (Conduct Revegetation; Figure 11):** Selected portions of the East Pasture would be actively revegetated as described under Alternative A. In addition, revegetation would be conducted on the entire northern bank of Lagunitas Creek (approximately 6.0 - 7.0 acres) following removal of invasive plant species, levee removal, and/or regrading of the creek bank to a more stable topographic profile. This area would be revegetated using a combination of sprigging with arroyo willow and red alder and container plantings of other native riparian species such as box elder, Oregon ash, twinberry, red elderberry, coyote brush, etc. Because top-of-bank elevations are considerably



Lagunitas Creek



above the summer water table, irrigation might be performed during the first three summers to improve survival of plantings.

Vegetation establishment in the created 5.4-acre Tomasini Triangle freshwater marsh would be jumpstarted through planting of appropriate freshwater marsh plant species such as various rush species (*Scirpus microcarpus* and *americanus*) and bur-reed (*Sparganium erectum* ssp. *stoloniferum*). These mid- to tall emergent plant species spread at a moderate to rapid rate through expansion of underground stems (rhizomes) and seed dispersal, so they would be expected to spread fairly rapidly once established in the marsh. In addition, low-growing species such as hydrocotyle (*Hydrocotyle ranunculoides*), water parsley (*Oenanthe sarmentosa*), and tall emergents such as cattails (typically *Typha latifolia* and *angustifolia*) would also be expected to colonize rapidly on their own as they already occur in the area. The lower elevations of the west-facing slope of the approximately 1.7-acre freshwater retention berm would be planted with species characteristic of the high salt marsh or upper intertidal zones that are typically flooded by tides only during some of the highest high tides. These species include saltgrass (*Distichlis spicata*), red fescue (*Festuca rubra*), gumplant (*Grindelia*), western marsh rosemary (*Limonium californicum*), and pickleweed (*Salicornia virginica*). Above intertidal elevations, the berm would be planted with wildrye and gumplant. Both saltgrass and wildrye spread primarily through expansion of aboveground or belowground stem systems.

West Pasture

- Removal of Agricultural Infrastructure (Remove Infrastructure, Remove Fence; Figure 11):** The amount of agricultural infrastructure present in the West Pasture is much lower than that in the East Pasture. Under Alternative B, the culverted tidegate on Fish Hatchery Creek would be removed, as well as the 90-foot concrete spillway and adjacent concrete ditch. Approximately 700 feet of temporary fence constructed earlier to minimize cattle impacts on restoration activities in the northern portion of the West Pasture would be removed in 2008. Removal of infrastructure would generate approximately 120 cubic yards of non-soil material that would need to be disposed of off-site at the Redwood Landfill (Petaluma, Calif.).
- Limited Breaching of Levee in Southern and Northern Portions of West Pasture and Filling of Borrow Ditch (Remove or Breach Levee, Grade Creek Bank, Fill Ditch; Figure 11):** Approximately 1,600 linear feet of levee would be breached in the West Pasture in two principal breach locations. One breach is in the northern portion of the West Pasture where the entire approximately 950-foot North Levee would be removed. The levees would be excavated to the adjacent pasture elevations. Levee material excavated from this area would be used to fill the borrow ditch to the north, which was the ditch created by "borrowing" of material for levee creation. In addition, approximately 0.5 acres of fringe marshplain between the levee and the borrow ditch would be excavated shallowly (1 foot), and the excavated topsoils would be stockpiled nearby in the West Pasture. The approximately 770-foot borrow ditch would be filled to just slightly below adjacent marshplain grade or elevations (~ -0.5 feet) to allow sedimentation to create more natural topography. Approximately 3,000 cubic yards of soil would be used to fill the borrow ditch. The stockpiled topsoil from the marshplain fringe would be scattered over the top to provide a source of seed and vegetative fragments to promote vegetation establishment. The remaining soils from levee excavation would be used to expand the high tide refugia for rails (see description below) or loosely spread over the West Pasture, with the weedy upper portions of the levee disposed of off-site.

The other breach location is in the very southern end of the West Pasture, where approximately 650 feet of levee would be removed. The levees would be excavated to the adjacent pasture elevations. The top 1-2 feet of the excavated material, which would have the most weeds and roots and seeds from ruderal, non-native species, would be disposed of at an off-site location, while the bottom 2-3 feet would be disposed of on-site through loose spreading of excess material.

- Creation of New Tidal Channels (Create Tidal Channel; Figure 11):** Approximately 300 feet 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. The new channel would be created in an existing topographic linear depression that may be the historic remnant of the undiked tidal marsh channel. Approximately 300 cubic yards of soil would be excavated to recreate this feature.



- **Removal of Invasive Species (Remove Invasive Species; Figure 11):** As described under the No Action Alternative and Alternative A, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication. These species include invasive cordgrass species and cordgrass hybrids, cape ivy, pampas grass, and Himalayan blackberry. Under Alternative A, most of the invasive removal efforts would be focused on cape ivy and pampas grass, which occurs primarily in the riparian habitat alongside Sir Francis Drake Boulevard. Alternative B includes removal of English ivy.
 - **English ivy (*Hedera helix*):** The Park Service would eradicate English ivy from riparian habitat in the West Pasture alongside Sir Francis Drake Boulevard. English ivy patches total approximately 0.04 acres. English ivy is typically treated non-chemically by manually cutting ivy at shoulder height and slightly above ground level to remove from trees and then clearing an area at least 6 feet from the base of the tree on all sides. In areas where no native or desirable vegetation occurs, ivy roots would be chopped back with a sharp spade, and the ivy would be rolled up. In areas where native or desirable vegetation does occur, ivy would be carefully cleared from around these plants first, trying to remove as much of the roots as possible as ivy can resprout from root pieces. A thick application of rice straw is sometimes applied on the exposed soils to decrease soil erosion during subsequent winter rains. Maintenance involves follow-up monitoring and treatment, if necessary, to ensure that the species does not reestablish.
- **Revegetation in West Pasture (Conduct Revegetation; Figure 11):** Some limited revegetation would also occur on the upstream portions of Fish Hatchery Creek within the Giacomini Ranch. Riparian species such as arroyo willow and red alder would be installed through use of pole cuttings just downstream of the established riparian stand that occurs within private property.

Olema Marsh

- There would be no restoration conducted in the Olema Marsh.

Management

- **No Agricultural Land Management:** Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Removal of Main Dairy Structures from Upland Areas:** Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the NPS property will be demolished and removed from the premises as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek:** Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacomini will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.
- **Tidegates Maintained (Maintain Infrastructure-Short-Term; Figure 11):** Maintenance of the Tomasini Creek tidegate would be continued under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure under Alternative A for more detailed discussion).
- **Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate; Figure 11):** Excess sediment would be removed from the 1906 Drainage and Fish



Hatchery Creek on an as-needed basis (annually during average to wet years) as described under the No Action Alternative, including Actions Common to All Alternatives.

- ***Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses:*** As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to an instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.
- ***Recover the Tomales Bay Tidewater Goby Population:*** Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives

Public Access

- ***Creation of Southern Perimeter Trail from Point Reyes Station to existing White House Pool County park via a permanent pedestrian/bike bridge near the location of the old summer dam (Construct New Improved Trail- ADA-Compliant, Construct New Improved Trail-Decomposed Granite, Construct Bridge, Construct Fence; Figure 12):*** The southern perimeter path would connect Point Reyes Station with the White House Pool County park as described under Alternative A.
- ***ADA-Compliant Access:*** As described under Alternative A, a decomposed granite trail that would be compliant with the Americans with Disabilities Act would be constructed as part of the Southern Perimeter Trail from C Street in the vicinity of 3rd Street to the edge of the Dairy Mesa, where there would be a viewing area to allow the public to experience and enjoy the restoration project and views of Tomales Bay. As part of the potential future extension of the Southern Perimeter Trail to Inverness Park, an elevated overlook could be constructed at White House Pool County park that would be ADA-compliant and connect to the existing parking lot via an ADA-compliant path.
- ***Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County (Construct Proposed Future Trail, Construct Proposed Future Trail Alternative-Boardwalk, Construct Proposed Future Trail-ADA Compliant; Figure 12):*** The Park Service would potentially collaborate with the County of Marin on a future project to extend the southern perimeter trail described above to Inverness Park as described under Alternative A.
- ***Creation of Eastern Perimeter Trail Through Extension of Tomales Bay Trail from Railroad Point to Mesa Road (Construct New Unimproved Trail, Construct New Improved Trail-Soil, Construct New Improved Trail-Elevated Boardwalk; Figures 12 and 13):*** An eastern perimeter through-trail connecting to the existing Tomales Bay Trail would be constructed on the historic railroad grade largely as described under Alternative A. However, the center section of the trail, which is approximately 3,200 lineal feet in length, would be constructed as a slightly elevated boardwalk rather than an earthen fill-culverted trail as described under Alternative A (Figure 13). The boardwalk would be approximately 8-feet-wide and 12- to 18 inches above the existing grade of the railroad grade. The boardwalk would allow direct surface and groundwater flows originating from the adjacent Point Reyes Mesa into Tomasini Creek to flow underneath the boardwalk. The boardwalk would be constructed of either pressure-treated wood or recycled plastic lumber. The boardwalk would be supported on concrete pier footings. An asphalt chip seal material may be used to coat the boardwalk surface if wood is selected as the construction material, because it would minimize potential slippage of and wear and tear from horses. Because of the low elevation of the boardwalk, railings would not be needed for safety purposes.
- ***Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure; Figure 12):*** A total of four viewing areas, overlooks, and interpretative exhibits would be constructed along the perimeter of the Project Area. Three of these would be identical to those described under Alternative A. A fourth viewing area would be added along Sir



Francis Drake Boulevard near the entrance to the West Pasture north levee, which would be removed under Alternative B. This viewing area would potentially be constructed as a blind to minimize disruption to avian species that use this portion of the Project Area.

Construction

- **Construction Scheduling:** For Alternative B, restoration would be conducted in two years. The first phase would be restoration of the East Pasture, which would be conducted from June through October during the first construction year. The second phase would be restoration of the West Pasture, which would be conducted from July through October in the second construction year. During the first and second construction years, construction would be staggered such that components in the southern end of the Project Area would be initiated first to ensure that construction activities do not disturb special status rail populations that occur in the undiked marsh north of the Giacomini Ranch. ESA regulations prohibit construction or other disturbances within 100 feet of rail habitat between February 15 and August 1 of each year, and there are regulations prohibiting timing of construction between March 1 and August 15 and proximity of construction to active nests during the breeding season for other birds, as well. Depending on when funding is obtained, public access alignments and infrastructure would be constructed either during or after restoration. It is anticipated that construction of public access would take an additional two construction years. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under special circumstances authorized by the Seashore and CSLC.
- **General Description of Construction, including Staging, Stockpiling, and Access:** Under Alternative B, construction activities would occur in the East and West Pastures (Figure 11). Construction equipment would most likely access the East Pasture from two locations: 1) the road near the Giacomini Hunt Lodge, which connects to Mesa Road in Point Reyes Station, and 2) C Street in Point Reyes Station. Construction equipment would 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 would most likely be staged near the Giacomini Hunt Lodge and in the East and West Pastures. Construction equipment that would be expected to be used in construction include, but are not limited to, excavators, front loaders, backhoes, bulldozers, graders, and dump trucks. Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local and connector roadways such as Mesa Road, C Street, Sir Francis Drake Boulevard, and Levee Road and state highways such as State Route 1. Any stockpiling of excavated sediments would occur in the East and West Pastures. During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough, removal of tidegate/culverts on Fish Hatchery Creek in the West Pasture, and removal of riprap and bank stabilization in the riprapped area along the southern portion of the East Pasture.
- **Total Cut/Fill:** Actions proposed under Alternative B would result in excavation of approximately 144,000 cubic yards of soil and more than 850 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of 45,000 cubic yards of soil (Figure 9). Fill would involve re-use of excavated sediments on-site for filling drainage ditches, the manure ponds at the Dairy Facility, and other restoration and public access components. The fill total assumes that, for most of the public access components, fill activities would be negligible and restricted to minor grading activities.
- **Total On-Site and Off-Site Disposal:** To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site Disposal for Alternative B total approximately 72,200 and 71,300 cubic yards of soil, respectively (Figure 9). In addition, excavated non-soil materials totaling more than 850 cubic yards would also be recycled or need to be disposed of off-site. Soils removed off-site would be hauled to several defunct quarries in the Tomales Point portion of the Seashore that the Park Service is actively trying to restore



as described under Alternative A. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

Alternative C (Preferred Alternative) – Full Restoration of the Giacomini Ranch East and West Pastures and Restoration of Olema Marsh, with Moderate Public Access

This alternative involves complete removal of levees in both the West and East Pasture. In general, this alternative builds upon the actions proposed in Alternative B by increasing tidal channel creation, grading, and revegetation (Figure 14). In addition, the project boundary for this alternative has been expanded to include Olema Marsh, which is located south of the Giacomini Ranch and White House Pool and is owned by ACR and the Park Service (Figure 14). Olema Marsh and the Giacomini Ranch once formed an integrated tidal wetland complex. In Alternative C, 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 (Figure 14). In addition, an adaptive restoration approach is proposed that would possibly include future replacement of the Levee Road and Bear Valley Roads culvert should initial restoration efforts not achieve the desired degree of hydrologic connectivity between Olema Marsh and Lagunitas Creek. Public access components of Alternative C include the southern perimeter path and proposed future trails as described under Alternatives A and B, but there would be two spur trails rather than a through-trail on the eastern perimeter of the Giacomini Ranch (Figure 15).

Restoration

East Pasture

- **Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure Short-Term, Eliminate Road Through Regrading):** Activities conducted under Alternative C would be identical to that described under Alternatives A and B.
- **Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation):** Activities conducted under Alternative C would be identical to that described under Alternative A.

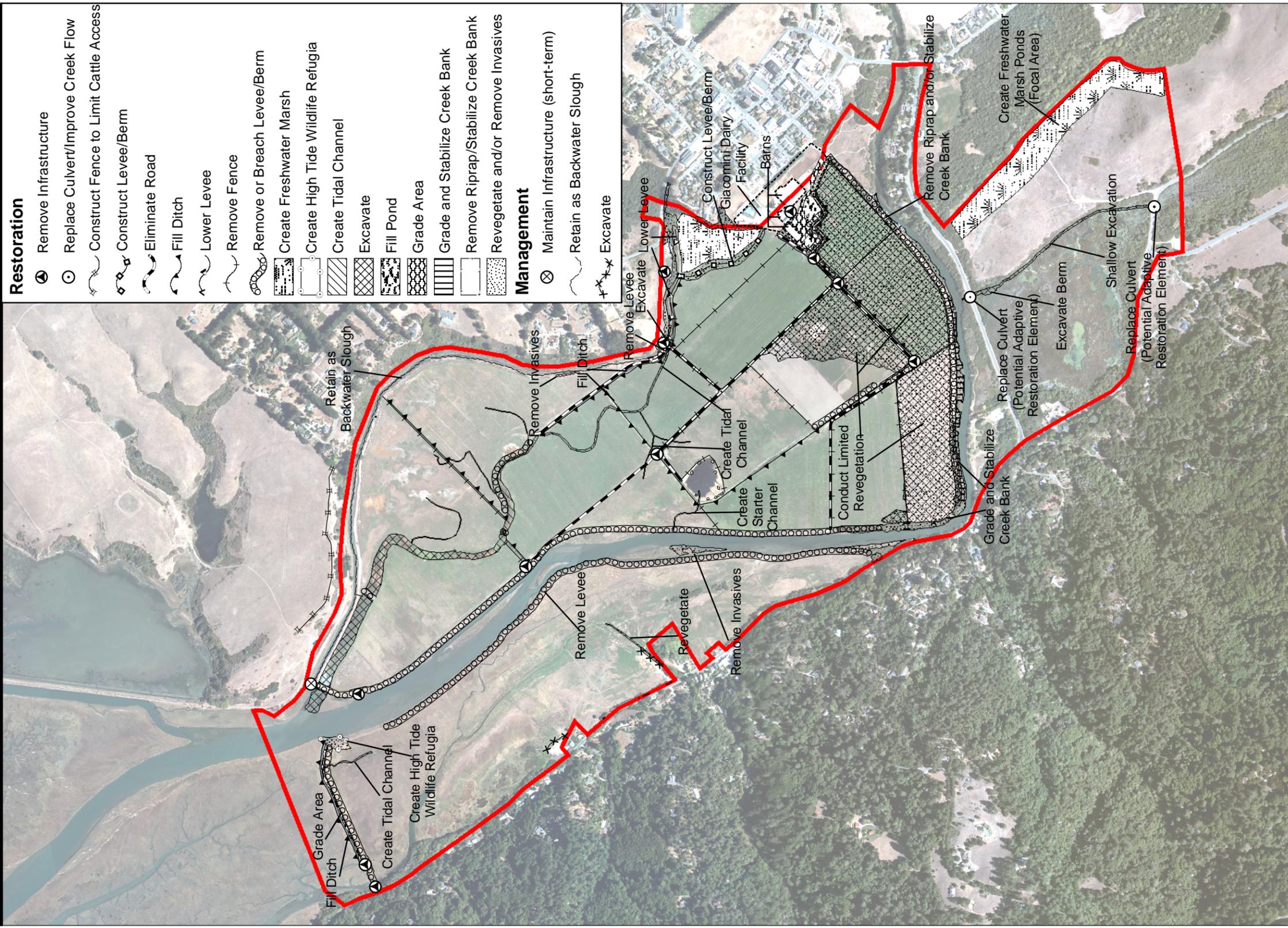
Alternative C involves complete removal of levees in both the West and East Pasture. The project boundary for this alternative has been expanded to include Olema Marsh.

- **Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Remove Invasive Species, Conduct Revegetation):** Activities conducted under Alternative C would be identical to that described under Alternative B.
- **Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture (Remove or Breach Levee):** Activities conducted under Alternative C would be identical to that described under Alternative B.
- **Complete Removal of Levee in East Pasture (Remove or Breach Levee):** Activities conducted under Alternative C would be identical to that described under Alternative B.



Alternative C - Restoration and Management

Giacomini Wetland Restoration Project



- Restoration**
- ⊙ Remove Infrastructure
 - ⊙ Replace Culvert/Improve Creek Flow
 - ⊙ Construct Fence to Limit Cattle Access
 - ⊙ Construct Levee/Berm
 - ⊙ Eliminate Road
 - ⊙ Fill Ditch
 - ⊙ Lower Levee
 - ⊙ Remove Fence
 - ⊙ Remove or Breach Levee/Berm
 - ⊙ Create Freshwater Marsh
 - ⊙ Create High Tide Wildlife Refugia
 - ⊙ Create Tidal Channel
 - ⊙ Excavate
 - ⊙ Fill Pond
 - ⊙ Grade Area
 - ⊙ Grade and Stabilize Creek Bank
 - ⊙ Remove Riprap/Stabilize Creek Bank
 - ⊙ Revegetate and/or Remove Invasives
- Management**
- ⊗ Maintain Infrastructure (short-term)
 - ⊗ Retain as Backwater Slough
 - ⊗ Excavate



National Park Service
 Point Reyes National Seashore/
 Golden Gate National Recreation Area
 Marin County, CA

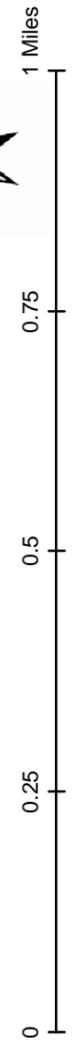
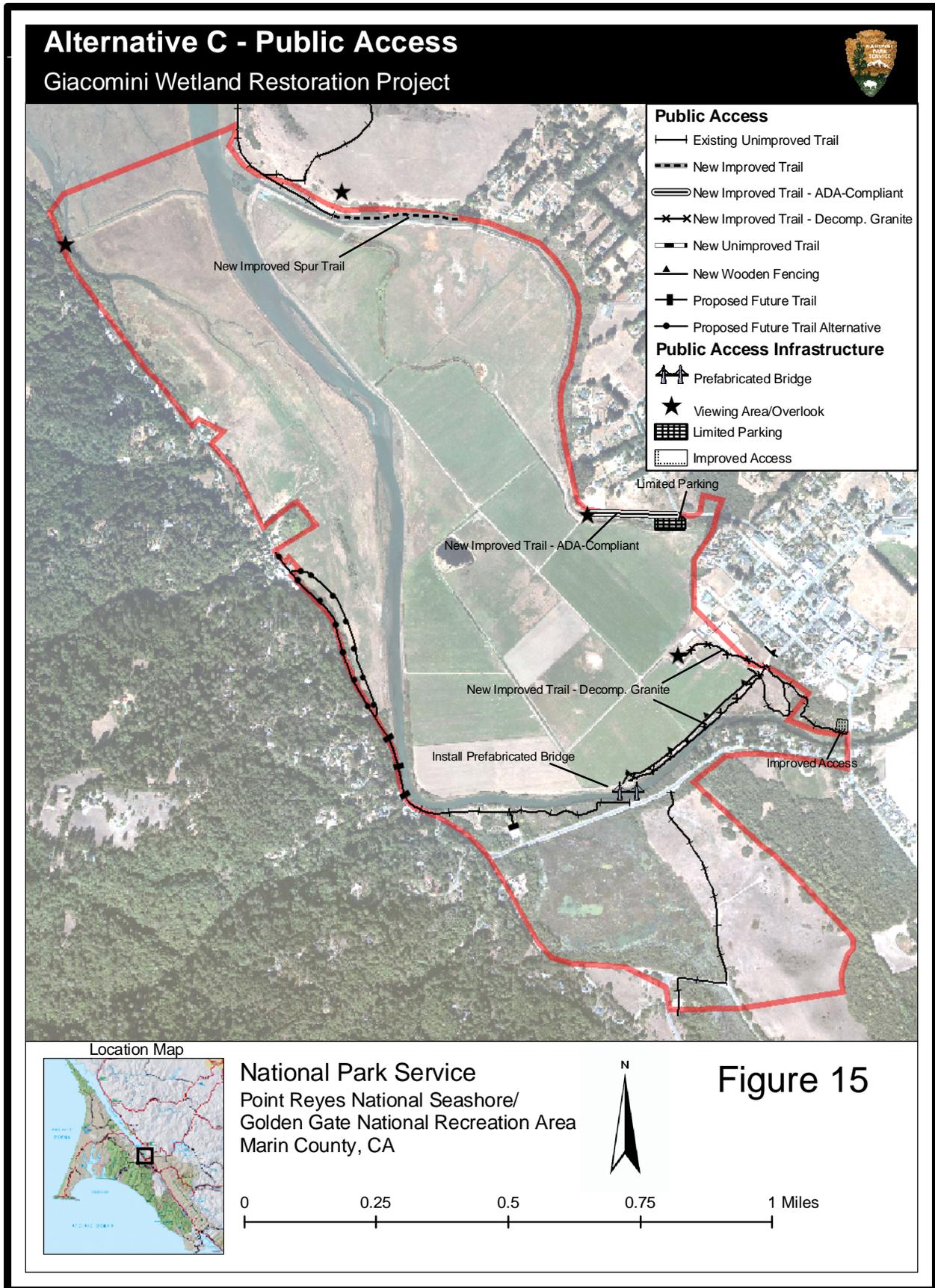


Figure 14

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- Remove Portion of Tomasini Creek Berm and Reconnect Tomasini Creek to Historic Channel Alignment (Remove or Breach Levee, Excavate; Figure 14):** Under Alternative C, a section of the levee that separates Tomasini Creek from the East Pasture would be removed rather than lowered as under Alternative B to allow for reconnection of Tomasini Creek with one of its historic channel alignments. Approximately 60 linear feet of levee near the Giacomini Hunt Lodge would be removed. Once the section of berm is removed, a 220-foot connection channel would be excavated between the existing Tomasini Creek channel and the created tidal channel in the historic slough within the East Pasture marshplain. 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. The backwater slough channel would be disconnected from Tomasini Creek through construction of a small earthen berm or levee on the north side of the realigned Tomasini Creek, however, the berm would be deliberately constructed to allow for overspill of flood flows during larger storm events. Material for this berm would come from channel excavation, which would generate approximately 360 cubic yards of soil, and removal of the existing Tomasini Creek levee, which would generate approximately 225 cubic yards of soil. The remaining excavated materials would be spread on-site, used to construct the freshwater marsh retention berm, and hauled for off-site disposal.
- Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 14):** In addition to the tidal channel enhancement and creation activities under Alternatives A and B, approximately 1,200 feet of new tidal channel would also be excavated in the central portion of the restored East Pasture. The headwaters or starting point of the new tidal channels would be just east of the New Duck Pond and would drain to the realigned Tomasini Creek, connecting just north of the Giacomini Hunt Lodge. Excavation would generate approximately 250 cubic yards of soil, and some of these excavated materials would be spread on-site or used as block or plug material for filling of drainage ditches because of the high clay content. As with the other channels, efforts would be made to recreate some of the curves or sinuosity that was once present in the historic tidal sloughs before they were artificially straightened to act as drainage ditches. 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.
- Creation of New Lagunitas Creek Tidal Channel (Create Tidal Channel; Figure 14):** 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 550 feet. The channel bottom elevations at the end of the starter channel would be slightly lower in elevation than other portions of the channel bottom to allow for residual ponding of waters for aquatic species that may use this type of off-channel habitat. Excavation would generate approximately 200 cubic yards of soil and would be disposed of through spreading on-site, use as block or plug for filling of drainage ditches, and hauling to off-site disposal.
- Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle (Create Freshwater Marsh, Create Low Freshwater Marsh Berm):** Activities conducted under Alternative C would be identical to that described under Alternative B.
- Installation of Fencing on Martinelli Ranch (Construct Fence to Limit Cattle Access):** Activities conducted under Alternative C would be identical to that described under Alternative B.
- Scraping of Southern Portion of East Pasture to Remove Non-Native Species (Excavate; Figure 14):** Under Alternative C, the southern approximately 40 acres in the East Pasture that are above intertidal elevations would be scraped approximately 6 to 12 inches to remove a large portion of the roots, seed bank, and other vegetative material in two pastures which is dominated by non-native grasses and herbs. Scraping would generate approximately 32,500 cubic yards of soil, all of which would be disposed off-site due to the substantial amount of weedy material in the soils.



- **Removal of Invasive Species (Remove Invasive Species; Figure 14):** As described under the previous action alternatives, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. These species include invasive cordgrass and cordgrass hybrids, cape ivy, pampas grass, Himalayan blackberry, and English ivy. Removal efforts for these species are described under the No Action Alternative and Alternatives A and B. Under Alternative C, removal efforts for Himalayan blackberry would be expanded in the East Pasture.
 - **Himalayan blackberry:** In addition to the areas treated under Alternative B, the Park Service and CSLC would remove Himalayan blackberry from approximately 1.5 acres of riparian habitat along Tomasini Creek adjacent to the old railroad grade and Mesa Road. Total acreage of Himalayan blackberry removal under Alternative C totals up to 10.5 acres. Depending on the location, Himalayan blackberry would be removed using either mechanized equipment to excavate the above- and below-ground portions of the shrub or, particularly on hillsides or areas with sensitive biological resources, manual labor to cut down aboveground portions of plants and dig out the rootball. Monitoring and follow-up treatments, if necessary, would be conducted to ensure that removal efforts have been successful.
- **Revegetation in East Pasture (Conduct Revegetation; Figure 14):** Active revegetation under Alternative C would be identical to that described under Alternatives A and B, with the exception of the very southern portion of the East Pasture. The southern approximately 40 acres would first be scraped 6- to 12 inches to remove a substantial portion of the roots, seed bank, and other plant material in the soils. Because this area is naturally above intertidal elevations, this area is likely to develop into an upland ecotone that could be used for wildlife species during high tides. To ensure establishment of some native vegetation, clusters of wildrye would be installed through container plantings or other means, however, because of the size of this area, planting density would be relatively sparse (10' centers). However, wildrye spreads primarily through expansion of belowground stem systems, not seed. Coyote brush would be planted on the perimeters.

West Pasture

- **Removal of Agricultural Infrastructure (Remove Infrastructure, Remove Fence):** Activities conducted under Alternative C would be identical to that described under Alternative B.
- **Complete Removal of Levee in West Pasture and Filling of Borrow Ditch (Remove or Breach Levee, Grade Creek Bank, Fill Ditch; Figure 14):** Under Alternative C, the entire approximately 7,200 linear feet of levee would be removed from the West Pasture. The levees would be excavated to the adjacent pasture elevations. The top 2 feet of excavated material, which contains most of the weedy material, would be disposed off-site, while the bottom 2- to 3-feet would be disposed of on-site through spreading.

Filling of the borrow ditch north of the Giacomini Ranch West Pasture and associated activities would be conducted identical to as described under Alternative B.

- **Creation of New Tidal Channels (Create Tidal Channel):** Activities conducted under Alternative C would be identical to that described under Alternative B.
- **Removal of Invasive Species (Remove Invasive Species; Figure 14):** Activities conducted under Alternative C would be identical to that described under Alternative B.
- **Revegetation in West Pasture (Conduct Revegetation; Figure 14):** Active revegetation in the West Pasture under Alternative C would be conducted identical to that described under Alternative B, except that revegetation would also be performed on the southern bank of Lagunitas Creek. Approximately 0.7 acres of riparian revegetation would be conducted along this southern portion of Lagunitas Creek, tying into existing low-elevation floodplain riparian habitat south of the Giacomini Ranch. Plant species installed would consist of many of the same plant species that would be planted – or that already occur – on the East Pasture Lagunitas Creek bank. These species include arroyo



willow, red alder, with perhaps a few Oregon ash and box elder. Understory species in this area would likely to be dominated by herbs that would recruit naturally without active revegetation.

Olema Marsh

- Implement Adaptive Restoration in Olema Marsh:** As noted earlier, in Alternative C, the project boundary has been expanded to include Olema Marsh, which is owned by the Park Service and Audubon Canyon Ranch (Figure 14). 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. Should this alternative be implemented, a detailed adaptive restoration program would be prepared that would specify how adaptive management decisions would be made and what measurable criteria would be used to determine whether further restoration actions are necessary. Under this approach, the initial restoration component would be excavation in and alongside Bear Valley Creek in Olema Marsh to decrease impoundment of waters and allow for better passage of salmon and other fish species. Should this action not achieve the desired level of success, future restoration actions would include replacement of the Levee Road and/or Bear Valley Roads culverts. These adaptive restoration actions are described in more detail below.
- Pre-Adaptive Restoration Component – Olema Marsh-Olema Creek Frog Habitat Creation:** Several seasonally flooded ponds would be created on the west side of Olema Creek less than 0.5 miles from Olema Marsh to offset potential short- and long-term impacts to California red-legged frog breeding habitat in Olema Marsh. The lower reaches of the Olema Creek watershed just above its confluence with Lagunitas Creek recently began supporting breeding red-legged frogs after the creek reestablished connectivity with its historic eastern floodplains and converted pasture to a complex marsh system with both permanently and seasonally flooded habitats. Several years prior to implementation of restoration in Olema Marsh, ponds totaling approximately 2 acres would be excavated on the west side of Olema Creek. The construction approach to these ponds would be somewhat similar to that described for the created freshwater marsh in the Tomasini Triangle (Alternative B) such as stockpiling excavated topsoil and mixing topsoil with a material such as bentonite to ensure that ponds retain at least some areas of inundation through July or August. Ponds would be excavated to create varying water depths that would support emergent and open water habitats.
- Adaptive Restoration Component #1: Excavate Vegetated Earthen Berm and Create More Defined Flow Path for Bear Valley Creek (Excavate; Figure 14):** Under Alternative C, the Park Service and CSLC would expand the Project Area boundary to include restoration of Olema Marsh. To improve hydraulic connectivity and access for salmonids, an approximately 0.2-acre earthen berm that is vegetated currently with riparian vegetation at the northern end of Bear Valley just upstream of Levee Road would be excavated approximately 3 feet. This berm, which is probably a remnant of past fill events, appears to be reducing outflow of the creek and causing impounding of water within the marsh. In addition, shallow excavation (~ 2 feet) would be performed in a 20-foot corridor along the entire length of Bear Valley Creek in Olema Marsh (approximately 1,650 linear feet) to improve flow and hydraulic connectivity in this section of Bear Valley Creek and potentially improve passage conditions for salmonids. Excavation of the berm and creek would generate approximately 3,650 cubic yards of soil, the majority of which would be sidecast back into the marsh. The material would be sidecast so as to create a low earthen berm between Bear Valley Creek and other portions of Olema Marsh. Approximately 1,200 cubic yards of soil would be disposed of off-site.





Olema Marsh

- **Adaptive Restoration Components #2 and/or 3: Potential Future Replacement of Levee Road and/or Bear Valley Culvert with Small Causeway or Bridge as part of Adaptive Restoration Approach (Proposed Future Culvert Replacement, Proposed Future Excavation; Figure 14):** Under Alternative C, the Park Service, CSLC, and ACR would potentially work with the County of Marin to adopt an adaptive restoration approach to Olema Marsh. Excavation of the vegetated earthen berm and flow path would occur during the initial construction period. In the three to five years after excavation is completed, response of Olema Marsh to completed restoration actions would be evaluated in conjunction with the ACR and the County of Marin. Should the desired degree of restoration success not be achieved in terms of improving

hydraulic connectivity between Olema Marsh and Lagunitas Creek and lowering water levels within the marsh, the Park Service, CSLC, and ACR would pursue working with the County of Marin on implementing one or both of two adaptive restoration components or actions.

The first potential adaptive restoration component is to replace the existing box culvert at the eastern outlet of Bear Valley Creek under Levee Road with a 50-foot-long by 30-foot-wide bridge. Levee Road, the portion of Sir Francis Drake Boulevard that runs on the north side of Olema Marsh, is a county-owned and maintained road. The Bear Valley Creek channel at Levee Road would be excavated down to an elevation of 2.9-feet, approximately 0.6-feet deeper than the existing culvert invert elevation. The Bear Valley Creek channel bed would also be lowered to the 2.9-foot elevation for a distance of approximately 170-feet upstream of the road. The outboard channel between the new bridge and Lagunitas Creek would also be widened by 10 feet to existing outboard channel bed elevations. Excavation of the outboard channel would potentially require replacement of the existing wooden footbridge over the existing Bear Valley Creek in White House Pool County Park with a pedestrian causeway component that would be integrated into the road causeway. Excavation of Levee Road berm and the creek channel connecting Olema Marsh to Lagunitas Creek would generate approximately 210 and 285 cubic yards of soil, respectively. This material would be disposed of primarily off-site.

The second potential adaptive restoration action or component is replacement of Bear Valley Road culvert on the south end of Olema Marsh. The culvert would be replaced either simultaneously or after the Levee Road culvert has been replaced. Should the desired degree of restoration success not be achieved in terms of improving hydraulic connectivity between Olema Marsh and Lagunitas Creek, increasing fish passage potential, and lowering water levels within the marsh, the Park Service, CSLC, and ACR would pursue replacing the existing 6-foot culverts on Bear Valley Road with a 50-foot-long by 30-foot-wide bridge. The created channel bed would be excavated down to an elevation of approximately 2.2-feet, approximately 0.1- to 1.8-feet deeper than the existing culvert inverts. In addition, shallow excavation (~2 feet) of the Bear Valley Creek channel upstream of Bear Valley Road would be conducted in a 20-foot-wide corridor extending approximately 300 feet upstream to improve hydraulic connectivity and passage of flows and salmonids. Excavation of Bear Valley Road berm and creek channel would generate approximately 220 and 445 cubic yards of soil, respectively. Approximately two-thirds of this material would be sidecast during excavation, but the approximately 220 cubic yards from road berm excavation would be disposed of off-site.

Management

- **No Agricultural Land Management:** Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.



- **Removal of Main Dairy Structures from Upland Areas:** Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the NPS property will be demolished and removed from the premises as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek:** Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacomini will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.
- **Tidegates Maintained (Maintain Infrastructure-Short-Term; Figure 14):** Maintenance of the Tomasini Creek tidegate would be continued under all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure under Alternative A for more detailed discussion).
- **Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate):** Excess sediment would be removed from the 1906 Drainage and Fish Hatchery Creek on an as-needed basis (annually during average to wet years) as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses:** As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Recover the Tomales Bay Tidewater Goby Population:** Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives

Public Access

- **Creation of Southern Perimeter Trail from Point Reyes Station to existing White House Pool County park via a permanent pedestrian/bike bridge near the location of the old summer dam (Construct New Improved Trail-Decomposed Granite, Construct Bridge, Construct Fence):** Under Alternative C, the southern perimeter path would connect to an improved access point at the entrance to the Green Bridge County park trail near the Green Bridge rather than connecting to C Street (Figure 15). Access to C Street would be eliminated through fencing and signage. The alignment of the path to viewing areas and interpretative facilities on the Dairy Mesa would remain, as well as the alignment of the path connecting to the constructed bridge, but the connection to Point Reyes Station would occur along State Route 1 rather than C Street. The existing steep entrance to the Green Bridge County Park along State Route 1 would be improved to allow easier access through flattening the grade with a bermed trail component or stairs. The ADA-compliant trail would be moved to the spur trail on the eastern perimeter originating from Mesa Road.
- **Potential Future Extension of Southern Perimeter Trail to Inverness Park in Collaboration with County (Construct Proposed Future Trail, Construct Proposed Future Trail Alternative-Boardwalk, Construct Proposed Future Trail-ADA Compliant):** The Park Service would potentially collaborate with the County of Marin on a future project to extend the southern perimeter trail described above to Inverness Park as described under Alternative A.
- **Potential Replacement of Existing Wooden Footbridge over Bear Valley Creek in Olema Marsh with Pedestrian Causeway Integrated into Levee Road Causeway:** Should future



restoration actions in Olema Marsh include replacement of the Levee Road culvert and excavation of the Bear Valley Creek channel connecting Olema Marsh to Lagunitas Creek, the existing wooden footbridge on the east side of White House Pool County park would be replaced, potentially with a pedestrian causeway component that would be integrated into the road causeway.

- **Creation of Eastern Perimeter Spur Trails through Extension of Tomales Bay Trail and Mesa Road (Construct New Unimproved Trail, Construct New Improved Trail-Soil; Figure 15):** Unlike Alternatives A and B, public access along the eastern perimeter would be constructed as two spur trails. One would originate from the existing Tomales Bay Trail and would extend southward on the historic railroad grade approximately 763 feet. This TBT spur trail, which would be an improved soil, weather-dependent trail, would involve some minor improvements and would be constructed as described under Alternative A. It would allow better viewing of the shallow shorebird area in the eastern portion of the East Pasture. The other spur trail would originate from Mesa Road and would extend along the current road that ends at the Giacomini Hunt Lodge and the proposed viewing area. It would be constructed as an ADA-compliant trail with improvement of the existing road through grading and installation of decomposed granite. There would continue to be parking for approximately five (5) cars at the corner of the railroad grade and Mesa Road.
- **ADA-Compliant Access:** The ADA-compliant trail would be moved to the spur trail on the eastern perimeter originating from Mesa Road. It would be constructed as a decomposed granite trail compliant with the Americans with Disabilities Act that would extend from the small parking lot near Mesa Road to the Giacomini Hunt Lodge and proposed viewing area, which is intended to allow the public to experience and enjoy the restoration project (see Viewing Areas and Exhibits). This portion of the trail would be constructed and maintained to improve mobility for people with disabilities, who might be using wheelchairs or other assistive devices. There would still be a potential for construction of an ADA-compliant elevated overlook and path as part of the Southern Perimeter Trail if this trail is extended to Inverness Park as part of a possible future collaborative project with the County of Marin.
- **Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure):** A total of four viewing areas, overlooks, and interpretative exhibits would be constructed along the perimeter of the Project Area as described under Alternative B.

Construction

- **Construction Scheduling:** For Alternative C, restoration would be conducted in two construction years as described under Alternative B. Depending on when funding is obtained, public access alignments and infrastructure would be constructed either during or after restoration. It is anticipated that construction of public access would take an additional two construction years. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under special circumstances authorized by the Seashore and CSLC.
- **General Description of Construction, including Staging, Stockpiling, and Access:** Under Alternative C, construction activities would occur in the East and West Pastures and Olema Marsh (Figure 14). Construction equipment would most likely access the East Pasture from two locations: 1) the road near the Giacomini Hunt Lodge, which connects to Mesa Road in Point Reyes Station, and 2) C Street in Point Reyes Station. Construction equipment would 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. Olema Marsh construction areas would be accessed from the south end parking lot, as well as directly from Levee Road and Bear Valley Road. Equipment would most likely be staged near the Giacomini Hunt Lodge, in the East and West Pastures, and in the Olema Marsh parking lot. Construction equipment that would be expected to be used in construction include, but are not limited to, excavators, front loaders, backhoes, bulldozers, graders, and dump trucks. Construction actions in Olema Marsh may require use of pile drivers and specialized equipment such as draglines. Dump trucks would be used to haul excavated sediment and infrastructure material from the Project Area to designated disposal sites using local and connector roadways such as Mesa Road, C Street, Sir Francis Drake Boulevard, Bear Valley Road, and Levee Road and state highways such as State Route 1. Any



stockpiling of excavated sediments would occur in the East and West Pastures and in upland areas on the east side of Olema Marsh.

During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. Actions possibly requiring construction of coffer dams include reconnection of the East Pasture Old Slough, removal of tidegate/culverts on Fish Hatchery Creek in the West Pasture, removal of riprap and bank stabilization in the riprapped area along the southern portion of the East Pasture, realignment of a portion of Tomasini Creek into one of its historic alignments; and shallow excavation and culvert replacement on Bear Valley Creek.

- **Total Cut/Fill:** Actions proposed under Alternative C would result in excavation of approximately 200,000 cubic yards of soil and more than 830 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of approximately 45,100 cubic yards of soil (Figure 9). Total excavation includes the approximately 3,650 cubic yards of shallow excavation in Olema Marsh, most of which would be sidecast. Fill would involve re-use of excavated sediments on-site for filling drainage ditches, the manure ponds at the Dairy Facility, and other restoration and public access components. The fill total assumes that, for most of the public access components, fill activities would be negligible and restricted to minor grading activities.
- **Total On-Site and Off-Site Disposal:** To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site Disposal for Alternative C total approximately 87,250 and 113,000 cubic yards of soil, respectively (Figure 9). In addition, excavated non-soil materials totaling more than 830 cubic yards would also be recycled or disposed of off-site. Soils removed off-site would be hauled to several abandoned quarries in the Tomales Point portion of the Seashore as described under Alternative A. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

Alternative D (Environmentally Preferred Alternative) – Extensive Restoration of the Giacomini Ranch East Pasture, Full Restoration of the West Pasture, and Restoration of Olema Marsh with Limited Public Access

This alternative is very similar to Alternative C with no changes in the West Pasture (Figure 16). The very southern end of the East Pasture would be excavated to bring elevations down to intertidal elevations. Tomasini Creek would be fully realigned into one of its historic channel alignments, and the Mesa Road culverts on Tomasini Creek would be replaced to improve hydraulic connectivity, creek flow, and potentially passage of salmonid species. As with Alternative C, there would be an adaptive restoration approach proposed for Olema Marsh that would include a phased approach to shallow channel excavation, vegetated berm removal, and potential replacement of Levee Road and Bear Valley Road culverts in the future should initial restoration efforts not achieve the desired degree of success (Figure 16). Public access components of Alternative D would include an improved spur trail leading to the edge of the Dairy Mesa and an improved spur trail on the southern perimeter following the existing alignment of the informal social path, but no bridge. On the eastern perimeter, a spur trail would be created on the historic railroad grade that would extend the existing Tomales Bay Trail (Figure 17).



Restoration

East Pasture

- **Removal of Agricultural Infrastructure (Remove Infrastructure, Eliminate Road, Fill Drainage Ditch, Remove Fence, Maintain Infrastructure Short-Term, Eliminate Road Through Regrading):** Activities conducted under Alternative D would be identical to that described under Alternatives A and B.
- **Excavation and Restoration of Manure Disposal Pastures and Disposal Ponds (Excavate, Fill Pond, Conduct Revegetation):** Activities conducted under Alternative D would be identical to that described under Alternative A.
- **Creek Bank Graded to More Stable Profile and Revegetated (Remove or Breach Levee, Grade Creek Bank, Remove Invasive Species, Conduct Revegetation):** Activities conducted under Alternative D would be identical to that described under Alternative B.
- **Removal of Riprap and Regrading of Creek Bank in southern portion of East Pasture (Remove or Breach Levee):** Activities conducted under Alternative D would be identical to that described under Alternative B.
- **Complete Removal of Levee in East Pasture (Remove or Breach Levee):** Activities conducted under Alternative D would be identical to that described under Alternative B.
- **Remove Portion of Tomasini Creek Berm and Reconnect Tomasini Creek to Historic Channel Alignment (Remove or Breach Levee, Excavate; Figure 16):** Under Alternative D, Tomasini Creek would be entirely realigned into one of its historic alignments. Just downstream of Mesa Road, an approximately 150-foot section of levee that separates Tomasini Creek from the East Pasture would be removed rather than lowered as under Alternative B. Approximately 525 linear feet of creek channel would be created through the Tomasini Triangle in the center of the new freshwater marsh. Excavated materials would be sidecast and regarded to create a small berm approximately 2.5 feet above the surrounding marshplain on either side of the new creek channel. The approximately 750-foot berm, which would extend slightly upstream and downstream of the created channel, would preclude drainage of the freshwater marsh into the creek. The berm would be graded to have relatively natural slope topography similar to alluvial levees and would be planted with riparian species. 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. Channel excavation would generate approximately 3,000 cubic yards of soil, and approximately 275 cubic yards of soil would be excavated in removing the section of the Tomasini Creek berm. In addition to creating the creek berm, excavated materials would be used to construct the freshwater marsh berm, used as fill to block or plug drainage ditches because of the high clay content, and disposed of off-site.
- **Replace Tomasini Creek Culverts at Mesa Road (Replace Infrastructure; Figure 16):** The two 6-foot culverts at Mesa Road would be replaced with an arched culvert or bridge to improve hydraulic connectivity of upstream and downstream portions of Tomasini Creek and possible increase passage potential for salmonid species. The existing berm and culvert would be removed, totaling approximately 450 cubic yards of soil and 150 of non-soil material. Following more detailed hydraulic analyses, the culvert would be replaced with either an arched culvert or small bridge.
- **Deepening of Historic Slough and Creation of New Tidal Channels (Deepen Historic Slough, Create Tidal Channel; Figure 16):** Activities conducted under Alternative D would be identical to

Alternative D is similar to Alternative C. The very southern end of the East Pasture would be excavated to bring elevations down to intertidal elevations. Tomasini Creek would be fully realigned into one of its historic channel alignments.



that described under Alternative C, except that there would be no starter channel in the southern portion of the East Pasture draining to Lagunitas Creek.

- Creation of Freshwater Marsh and High Water Refugia in Tomasini Triangle (Create Freshwater Marsh, Create Low Freshwater Marsh Berm; Figure 16):** Activities conducted under Alternative D would be identical to that described under Alternative B, except that the scale of marsh and berm creation would be reduced due to complete realignment of Tomasini Creek into one of its historic alignments. Under Alternative D, the freshwater marsh would be approximately 5.2 acres rather than 5.5 acres as under Alternatives B and C, and the freshwater marsh retention berm would be slightly smaller – approximately 1.6 acres. Approximately 0.2 acres of berm would also be constructed parallel to either side of the realigned Tomasini Creek in the created freshwater marsh to preclude rapid drainage of ponded waters. Otherwise, design and construction of the marsh would be identical to that described under Alternative B.
- Installation of Fencing on Martinelli Ranch (Construct Fence to Limit Cattle Access):** Activities conducted under Alternative D would be identical to that described under Alternative B.
- Scraping of Southern Portion of East Pasture to Remove Non-Native Species (Excavate; Figure 16):** Under Alternative D, the extent of scraping proposed in the southern end of the East Pasture to remove weedy plant species would be reduced from approximately 40 acres to 26.1 acres because of the excavation planned in the southwestern corner (see below). Otherwise, design, construction, and revegetation would be identical to that described under Alternative C.
- Excavation of Southwestern Portion of East Pasture to Intertidal Elevations (Excavate; Figure 16):** Currently, the southern portion of the East Pasture is above intertidal elevations due to past flooding and past fill and grading activities. Under Alternative D, the southwestern portion of the East Pasture where elevations exceed 6 feet NAVD88 would be excavated anywhere from 1-2 feet to create mid-marsh and high-marsh elevations ranging from 5-7 feet NAVD88. Elevations between 10- and 11 feet NAVD88 would be scraped 12 inches to eliminate roots, seed banks, and fragments of weedy, non-native species. The entire excavation area would total 23.5 acres and would be graded to mimic natural topography of the East Pasture by creating a gradual downward slope from south to north. Excavation would generate approximately 59,600 cubic yards of soil, most of which would need to be disposed of off-site.
- Removal of Invasive Species (Remove Invasive Species):** As described under the previous action alternatives, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. These species include invasive cordgrass and cordgrass hybrids, cape ivy, pampas grass, Himalayan blackberry, and English ivy. Removal efforts for these species are described under the No Action Alternative and Alternatives A through C. Under Alternative D, invasive species removal efforts would be expanded to include additional removal of Himalayan blackberry. Approximately up to 0.9 additional acres of Himalayan blackberry would be removed from the Dairy Mesa slope on the south side of the Tomasini Triangle. Under this alternative, Himalayan blackberry removal efforts would total approximately up to 11.4 acres. It would be removed using manual labor to cut down aboveground portions of plants and dig out the rootball. Monitoring and follow-up treatments, if necessary, would be conducted to ensure that removal efforts have been successful.
- Revegetation in East Pasture (Conduct Revegetation; Figure 16):** Active revegetation under Alternative D would be identical to that described under Alternative C, with the exception of the very southern portion of the East Pasture and the Tomasini Triangle freshwater marsh. The limited revegetation effort proposed for the upland ecotone area that would be scraped to remove weedy, non-species would be scaled back from 40.3 to 26.1 acres. Similarly, revegetation in the Tomasini Triangle and the freshwater marsh berm would also be scaled back to account for the fact that the marsh would decrease in size from 5.4 to 5.2 acres, and the berm would decrease from 1.7 to 1.6 acres. These restoration tasks are described in greater detail above. Other than a reduction in scale, the revegetation approach would remain identical to that described under Alternatives C and B, respectively.



New revegetation components in Alternative D would include planting of high marsh and upland ecotone plant species in the excavated approximately 23-acre intertidal area in the southwestern corner of the East Pasture. As with other high marsh/upland ecotone areas, plant species would consist of a mix of container planting and seeding of saltgrass, red fescue, gumplant, western marsh rosemary, and pickleweed. Above intertidal elevations, the excavated area would be planted with wildrye and gumplant. Both saltgrass and wildrye spread primarily through expansion of aboveground or belowground stem systems.

In addition, some planting would be conducted on the approximately 0.2-acre berm created adjacent to the realigned Tomasini Creek to preclude drainage of the freshwater marsh into the creek. Revegetation would principally involve installation of pole cuttings of arroyo willow and red alder. Other species would be allowed to recruit naturally into the developing riparian habitat.

West Pasture

- **Removal of Agricultural Infrastructure (Remove Infrastructure, Remove Fence):** Activities conducted under Alternative D would be identical to that described under Alternatives B and C.
- **Complete Removal of Levee in West Pasture and Filling of Borrow Ditch (Remove or Breach Levee, Grade Creek Bank, Fill Ditch):** Activities conducted under Alternative D would be identical to that conducted under Alternative C.
- **Creation of New Tidal Channels (Create Tidal Channel):** Activities conducted under Alternative D would be identical to that described under Alternative B.
- **Removal of Invasive Species (Remove Invasive Species):** As described under the No Action Alternative and Alternatives A and B, the Park Service would continue its Park-wide management strategy of eliminating invasive plant species that have been identified as a top priority for eradication and follow-up treatment to ensure that eradication efforts are successful. Removal efforts for invasive species would be identical to that described under Alternative C.
- **Revegetation in West Pasture (Conduct Revegetation):** Active revegetation in the West Pasture under Alternative D would be conducted identical to that described under Alternative C.

Olema Marsh

- **Implement Adaptive Restoration in Olema Marsh:** As described under Alternative C, the Park Service, CSLC, and Audubon Canyon Ranch would 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.
- **Pre-Adaptive Restoration Component -- Olema Marsh-Olema Creek Frog Habitat Creation:** Several seasonally flooded ponds would be created on the west side of Olema Creek less than 0.5 miles from Olema Marsh to offset potential short- and long-term impacts to California red-legged frog breeding habitat in Olema Marsh, as described under Alternative C.
- **Adaptive Restoration Component #1:** Excavate Vegetated Earthen Berm and Create More Defined Flow Path for Bear Valley Creek (Excavate; Figure 16): Activities conducted under Alternative D would be identical to that described under Alternative C.
- **Adaptive Restoration Components #2 and #3:** Potential Future Replacement of Levee Road and/or Bear Valley Road Culverts with Bridge or Small Causeway as part of Adaptive Restoration Approach (Proposed Future Culvert Replacement, Proposed Future Excavation; Figure 16): As described under Alternative C, an adaptive restoration approach would be taken with regards to Olema Marsh that would potentially include future replacement of Levee Road/or Bear Valley Road culverts with bridges.



Management

- **No Agricultural Land Management:** Current agricultural land management practices would cease, including irrigation of East Pasture, spreading of manure, mowing, ditching, and maintenance of infrastructure such as roads, pipes, fences, etc., as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Removal of Main Dairy Structures from Upland Areas:** Upon expiration of the Reservation of Use agreement and closure of the dairy ranch, structures on the upland portions of the Park Service property will be demolished and removed from the premises.
- **Removal of Personal Property from Premises, including Worker Housing Along Tomasini Creek:** Following expiration of the Reservation of Use agreement and closure of the dairy ranch, the Giacominis will have up to 90 days to remove personal property from the premises, including trailers for worker housing adjacent to Mesa Road and Tomasini Creek. With removal of the trailers, part of the ranch infrastructure cleanup will include removal of the trailer septic systems immediately adjacent to the creek.
- **Tidegates Maintained (Maintain Infrastructure-Short-Term):** Maintenance of the Tomasini Creek tidegate would be continued under Alternative A and all Action Alternatives for a period of 10- to 20 years to maintain existing tidewater goby habitat while new habitat is created through restoration of the remainder of the East Pasture (see Removal of Agricultural Infrastructure under Alternative A for more detailed discussion).
- **Removal of Excess Sediment from 1906 Drainage and Fish Hatchery Creek in West Pasture (Excavate):** Excess sediment would be removed from the 1906 Drainage and Fish Hatchery Creek on an as-needed basis (annually during average to wet years) as described under the No Action Alternative, including Actions Common to All Alternatives
- **Dedication of Lagunitas Creek Appropriative Water Right to In-Stream Flow Uses:** As intended since purchase of the Giacomini Ranch, the 2.0 cfs Lagunitas Creek appropriative water right purchased by the Park Service as part of the Giacomini Ranch acquisition would be converted from an agricultural to an instream flow use for the benefit of wetlands habitat, fish and wildlife resources, and recreation as described under the No Action Alternative, including Actions Common to All Alternatives.
- **Recover the Tomales Bay Tidewater Goby Population:** Because of the low numbers of tidewater gobies and its unique genetics, the U.S. Fish and Wildlife Service's Recovery Plan for the species recommends "immediate action" to translocate fish from this population into other areas within the Tomales Bay watershed (USFWS 2005). The USGS, in collaboration with the Park Service, will conduct a project to expand the distribution of tidewater goby in this area. A complete description of conditions is described under the No Action Alternative, including Actions Common to All Alternatives.

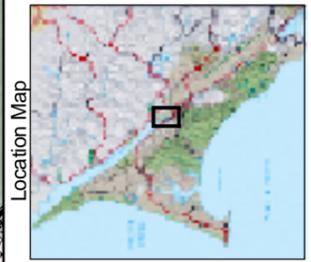
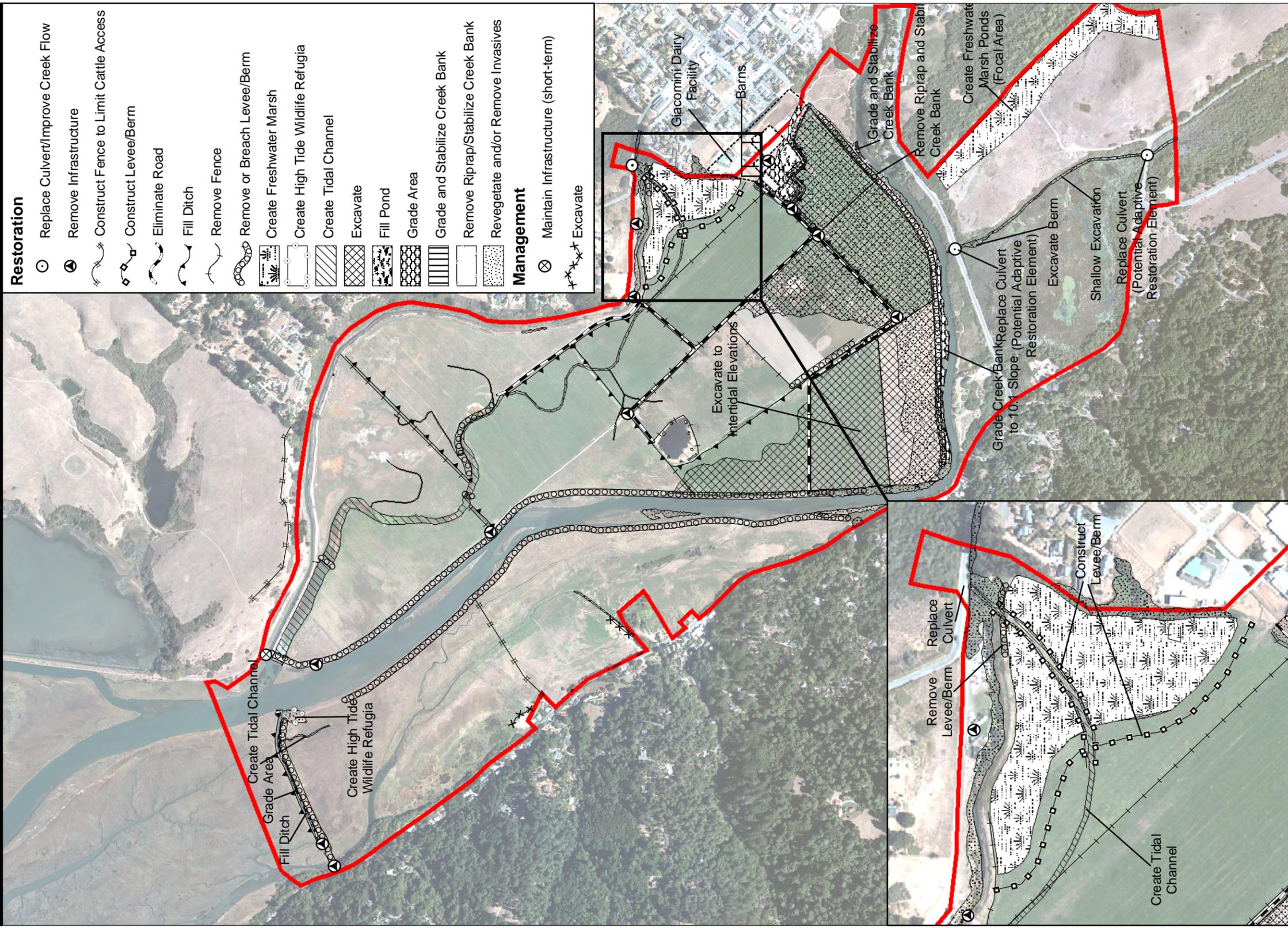
Public Access

- **Creation of Southern Perimeter Spur Trail from Point Reyes Station to Location of Former Summer Dam (Construct New Improved Trail- ADA-Compliant, Construct New Improved Trail-Decomposed Granite, Construct Fence; Figure 17):** The southern perimeter path would become a spur trail rather than a connection to White House Pool county park under Alternative D. The trail from Point Reyes Station to the location of the old summer dam would be constructed exactly as described under Alternative A, except that there would be no connection to White House Pool County Park and the Olema Marsh Trail via a permanent pedestrian bridge. There would be no ADA-compliant component on this portion of the southern perimeter trail.



Alternative D - Restoration and Management

Giacomini Wetland Restoration Project



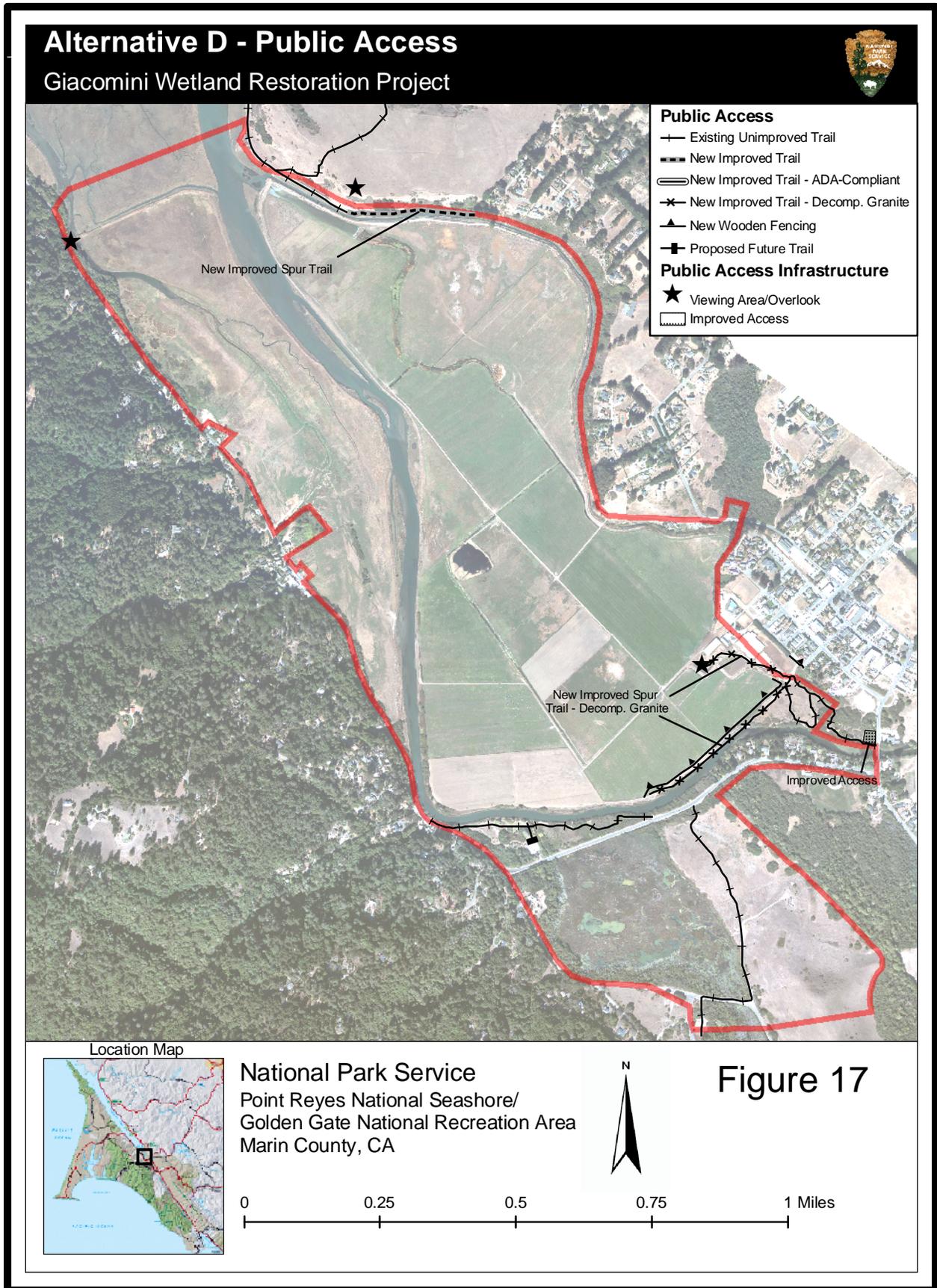
National Park Service
 Point Reyes National Seashore/
 Golden Gate National Recreation Area
 Marin County, CA



Figure 16

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- **Creation of Eastern Perimeter Spur Trail through Extension of Tomales Bay Trail (Construct New Improved Trail-Soil; Figure 17):** Unlike Alternative C, public access along the eastern perimeter would be constructed as one rather than two spur trails. The spur trail would originate from the existing Tomales Bay Trail and would extend southward on the historic railroad grade approximately 750 feet. This TBT spur trail, which would be an improved soil, weather-dependent trail, would involve some minor improvements and would be constructed as described under Alternative A. It would allow better viewing of the shallow shorebird area in the eastern portion of the East Pasture. There would be no ADA-compliant component on the eastern perimeter spur trail or small parking area near Mesa Road, because of the elimination of the Mesa Road spur trail.
- **ADA-Compliant Access:** There would be no ADA-compliant access component under this alternative.
- **Construction of Viewing Areas, Overlooks, and Interpretative Exhibits (Construct Public Access Infrastructure; Figure 17):** A total of three rather than four viewing areas, overlooks, and interpretative exhibits would be constructed along the perimeter of the Project Area: the proposed viewing area/overlook near the Giacomini Hunt Lodge would be eliminated, as there would be no spur trail connecting to this area.

Construction

- **Construction Scheduling:** For Alternative D, restoration would be conducted in two construction years as described under Alternative B, although it is probable that replacement of the Tomasini Creek culvert at Mesa Road would occur after restoration due to the need to raise additional funds for this component. Depending on when funding is obtained, public access alignments and infrastructure would be constructed either during or after restoration. It is anticipated that construction of public access components would take an additional one to two construction years. Construction hours would be 7:00 a.m. to 6:00 p.m. Monday through Friday, with weekends permissible only under special circumstances authorized by the Seashore and CSLC.



Salt Marsh Pasture

- **General Description of Construction, including Staging, Stockpiling, and Access:** Under Alternative D, construction activities, staging, stockpiling, and access would be almost identical to Alternative C. Replacement of the Tomasini Creek Mesa Road culvert would require staging and stockpiling areas close to Mesa Road, probably in the vicinity of the former Worker Housing area. During construction, there is a possibility that coffer dams or temporary impoundments and diversion of creek flow would be required to adequately dewater areas for optimal construction results. In addition to the actions described under Alternative C, actions possibly requiring construction of coffer dams include complete realignment of Tomasini Creek into one of its historic alignments and replacement of Tomasini Creek culverts on Mesa Road.
- **Total Cut/Fill:** Actions proposed under Alternative D would result in excavation of approximately 251,000 cubic yards of soil and more than 1,000 cubic yards of concrete, pipe, demolition debris and other non-soil materials and fill of approximately 45,600 cubic yards of soil (Figure 9). Total excavation includes the approximately 3,650 cubic yards of shallow excavation in Olema Marsh that would be sidecast. Fill would involve re-use of excavated sediments on-site for filling drainage ditches, the manure ponds at the Dairy Facility, and other restoration and public access components.



The fill total assumes that, for most of the public access components, fill activities would be negligible and restricted to minor grading activities.

- Total On-Site and Off-Site Disposal:** To decrease impacts and costs associated with off-site disposal, the Park Service and CSLC have tried to maximize the amount of on-site disposal without negatively impacting the potential for restoration. On-site disposal includes both direct fill activities such as filling of drainage ditches and manure ponds, as well as loose spreading of non-weedy excavated material throughout certain portions of the Project Area. On-Site Disposal and Off-Site Disposal for Alternative D total approximately 89,000 and 160,000 cubic yards of soil, respectively (Figure 9). In addition, excavated non-soil materials totaling more than 1,000 cubic yards would also be recycled or disposed of off-site. Soils removed off-site would be hauled to several defunct quarries in the Tomales Point portion of the Seashore that the Park Service is actively trying to restore as described under Alternative A. Non-soil materials would be hauled to a municipal landfill approximately 40 miles away in Petaluma, Calif.

Alternative or Alternative Components Considered, but Not Analyzed Further

During the alternatives development process, the project team may evaluate a wide range of options before selecting alternatives or alternative components that will be carried forward for further analysis. Decision-making on whether an alternative or component is reasonable and distinct during the alternative development process should be strongly tied to the ability of alternative or alternative components to meet the project purpose and objectives and available information on existing natural and cultural resources, conflicts with existing land uses, human health and safety needs, and potential for socioeconomic impacts. Through consideration of objectives and planning criteria and use of available information, the project team eliminates alternative approaches or frameworks (conceptual models for developing alternatives), alternatives (approach incorporating major actions that are developed based on a framework), or alternative components or actions (specific tasks or actions within alternatives) that are considered infeasible for technical or economic reasons and that are therefore not carried forward for further analysis. Listed below are some of the alternative framework, alternatives, and alternative actions that were considered, but not analyzed further.

Alternative approaches or frameworks, alternatives, or alternative components or actions considered infeasible for technical or economic reasons were not carried forward for further analysis.

- Alternative Framework: Restoration to Historic Conditions.** Many wetland restoration projects attempt to recreate historic conditions prior to disturbance from development and other negative impacts. This restoration framework was deemed infeasible. Since the 1860s, when Tomales Bay was first mapped by the U.S. Coast Survey, Tomales Bay -- and particularly the southern portion of Tomales Bay -- has been subject to a tremendous amount of sedimentation from disturbances in the upper portion of the watershed. In the late 1800s, almost one-third of the Giacomini Ranch was subtidal or intertidal mudflat. Since then, these areas have filled in, and the delta extends a considerable distance into the Bay. A tremendous amount of excavation would be required to return the Giacomini Ranch and Olema Marsh wetlands to this historic condition. Excavation would be exorbitantly expensive in terms of excavation and disposal costs and, ultimately, may not be feasible or self-sustaining within the current watershed context, such that the Project Area might fill in somewhat rapidly over time and move back towards existing topographic conditions. Because of the dynamism of this system, the project team felt that a framework based on restoring natural processes and functions was more sustainable in the long-term and might provide more benefits to the Project Area and surrounding watershed.
- Alternative: Phased Approach to Restoration.** The feasibility study prepared by Philip Williams & Associates (1993) advocated a phased approach to restoration that would have broken the Giacomini Ranch into restoration "cells" through construction of temporary levees. This approach was intended to assist with gradual phasing out of the existing dairy operation. It was eliminated from consideration, because a phased approach would have caused substantial temporary impacts from



construction and removal of temporary levees and would be extremely expensive, and it offered no environmental, technical or economic advantages. Because of the Park Service's agreement with the Giacomini family, phasing out of dairy operations is not required.

3. **Alternative: *Restoration of West Pasture Only*.** The alternatives carried forward for detailed analysis includes an alternative that incorporates restoration of the East Pasture only. This alternative was developed to avoid potential impacts to the federally threatened California red-legged frog, which breeds in a freshwater marsh in the West Pasture, and to private homes that directly adjoin the West Pasture. Restoring only the West Pasture would not result in impact avoidance and would bring less benefit to the southern Tomales Bay watershed from the perspective of total number of acres of wetlands restored. Because it would restore less than half of the Giacomini Ranch, it would not meet the project purpose of restoring a "significant portion" of the Project Area. For this reason, this alternative was considered, but eliminated from further analysis.
4. **Alternative: *Natural Degradation of Levees*.** Restoration costs could be reduced if all the levees were left and simply allowed to degrade naturally. This alternative was dismissed as an Action Alternative, because it is not considered active restoration. To some extent, Alternatives A and B, as well as the No Action Alternative, incorporate this idea, but Alternatives A and B involve an active restoration component, as well. The restoration response under conditions of natural degradation would be potentially too incomplete and unpredictable to restore a "significant portion" of the Project Area. In addition, natural degradation of levees was considered to increase potential water quality impacts to Tomales Bay of increased sedimentation over alternatives that remove part or all of the levees.
5. **Alternative Action-Restoration: *Filling of Existing Tomasini Creek Channel*.** Filling of the existing Tomasini Creek channel once it was realigned into one of its historic alignments was initially considered, because it would restore more of the natural conditions and would have been an excellent location for disposing of excess excavated material. However, it was dropped from consideration, because the federally endangered tidewater goby was found in the existing creek channel, and this action would be potentially incompatible with recovery efforts.
6. **Alternative Action-Restoration: *Removal and/or Regrading of Tomasini Creek Levee*.** Removal of the Tomasini Creek levee was considered, as well as regrading without removal. However, both these components were dropped, because of need to minimize construction impacts in the vicinity of the federally endangered tidewater goby and to keep excavation to the minimum critical to achieve the restoration purpose and objectives.
7. **Alternative Action-Restoration: *Tidal Channel Creation in West Pasture*.** Creation of tidal channels was initially considered for both the West and East Pastures, but creations was eventually eliminated from the West Pasture, because the soils present in the West Pasture are much more conducive than those in the East Pasture to natural channel formation and, therefore, were assumed to not require excavation to reestablish.
8. **Alternative Action-Restoration: *Build Berm around West Pasture Freshwater Marsh and Residences along Sir Francis Drake*.** Because of concerns regarding tidal flooding of the Freshwater Marsh and two private properties in the West Pasture, the concept of creating a low berm around the Freshwater Marsh and homes was discussed initially. However, it was discarded, because the berm would actually exacerbate the primary driver of flooding of the private properties by damming waters and sediment from a small drainage (1906 Drainage) that flows down off the Inverness Ridge between the two homes. The berm would also have been visually intrusive and contrary to the project purpose and objectives of restoring natural process and function. As for the Freshwater Marsh, the decision was made to focus efforts on creating alternative freshwater marsh habitat in sustainable locations that would not be subject to regular tidal influence.
9. **Alternative Actions-Restoration: *Olema Marsh*.**
 - *Causeway on Levee Road:* Construction of a causeway across the mouth of Olema Marsh on Levee Road was envisioned initially as an approach to enable more hydrologic interaction between the marsh and Lagunitas Creek and Giacomini Ranch. Baseline topographic surveys showed that this idea was infeasible due to the fact that the White House Pool county park area in between



Levee Road and Lagunitas Creek would also need to be excavated significantly to establish any floodplain interaction with Olema Marsh. The County of Marin Parks and Open Space District, which leases this land from the State of California's Wildlife Conservation Board, had concerns about losing some of the values and use of the existing park.

- *Excavating Secondary Channel Off Bear Valley Creek in Olema Marsh:* Excavation of a secondary channel off Bear Valley Creek just upstream of the Levee Road culvert was discussed, but dismissed due to concerns about potential impacts to federally threatened California red-legged frog, which have been observed on the western perimeter of the marsh, and a belief that the channel might develop naturally without excavation.

10. **Alternative Action-Public Access: *Location of Bridge for Southern Perimeter Through-Trail near White House Pool.*** Rather than locating the permanent bridge incorporated into the Southern Perimeter Through-Trail at the location of the old summer dam, an alternate suggestion was to extend the trail along Lagunitas Creek to White House Pool and to construct a bridge just north of White House Pool. This approach would eliminate the need to have a section of cantilevered trail along Sir Francis Drake Boulevard at White House Pool corner, which would be a technically complex and expensive component of any trail between Point Reyes Station and Inverness Park. However, hydraulic modeling conducted as part of baseline surveys has shown that, at least currently, most of the overbank flooding of the Giacomini Ranch during larger storm events occurs at the southwestern corner of the East Pasture just near White House Pool. In addition, this bridge would have straddled or run perpendicular to the San Andreas Fault rather than parallel to it as is currently proposed. The San Andreas Fault is located in an Alquist-Priolo Earthquake Fault Zone, where development is strictly regulated by counties. Locating a trail and bridge in this location would increase risks to public safety and the potential for damage or loss of public access infrastructure.
11. **Alternative Action-Public Access: *Extending Proposed Southern Perimeter Through-Trail to Inverness.*** Some in the local community have advocated for a trail from Point Reyes Station that would extend all the way to Inverness. The feasibility of this alignment was originally studied as part of the West Marin Pathways study and was considered technically complicated to construct due to the narrowness, absence of a wide road berm, and proximity to subtidal and intertidal lands of Tomales Bay (Brian Wittenkeller & Associates and Copple Foreaker & Associates 1988). The Park Service and CSLC limited evaluation of public access alignments to those that either fell on or bordered Park Service and CSLC lands. From the north levee of Giacomini Ranch, the lands on the east side of Sir Francis Drake Boulevard, a County of Marin-maintained road, are largely under private ownership.
12. **Alternative Action-Public Access: *Seasonal Bridge for Southern Perimeter Through-Trail.*** Installation of a seasonal bridge rather than a permanent bridge at the location of the old summer dam as part of the Southern Perimeter Through-Trail was initially considered. This bridge would have been removed during the rainy season. However, this approach was ruled out due to complicated logistics associated with moving and storing the bridge and associated high cost, as well as interest of the public, particularly members of the local community, in using the bridge year-round on a weather-dependent basis, just as the unimproved trail in White House Pool County Park is used.

Alternative or Alternative Components Subjected to Additional Analysis to Determine Feasibility Prior to Elimination from Further Analysis

Some alternatives or alternative actions or components required more detailed technical and economic analysis before a decision could be made as to whether to carry these alternatives forward for analysis. Alternatives or alternative actions that required more detailed analysis are listed and described below.



Eliminated Alternatives – Public Access

In 2004, the Park Service and CSLC contracted for some further technical evaluation of public access in response to the considerable public scrutiny of the public access portion of the proposed project. This evaluation, which was prepared by the hydrologic consultant, Kamman Hydrology & Engineering, Inc. (San Rafael, Calif.) with technical assistance from its biological consultant subcontractor, LSA Associates (Richmond, Calif.), and the Park Service, focused specifically on hydrologic, cultural, and biological resources, as well as potential constraints to resource-related portions of the project purpose and objectives (Phase I report; KHE et al. 2004). The alignments and infrastructure locations included in the analysis came from suggestions received during public scoping, internal scoping, public access studies conducted in the past (West Marin Pathway Study; Wittenkeller & Associates and Copple Foreaker & Associates 1988), and other documents (e.g., draft County of Marin General Plan 2004). This technical evaluation recommended that the Park Service and CSLC narrow their consideration of potential public access alignments and infrastructure locations to those that do not constrain or impinge upon the project purpose and objectives of restoring natural hydrologic and ecological processes and functions and that have the lowest potential environmental impacts. After review of the report, the Park Service and CSLC went with this recommendation and carried forward those public access alignments and locations that were rated as having low to moderate environmental impacts for a second phase of study. The second phase of study specifically focused on technical feasibility, land use impacts, and costs of those public access alignments with low or moderate environmental and cultural resource impacts and was prepared by LandPeople Landscape Architects (Benicia, Calif.; 2005). Information from these studies was used to develop public access approaches and components or actions for each of the alternatives carried forward for more detailed analysis.

Public access alignments and infrastructure that were evaluated *in one or both* phases of study, *but not carried forward for further analysis* included:

- Extending proposed Southern Perimeter Through-Trail to Drakes View Drive in Inverness Park.*** This alignment was considered during both the Phase I and Phase II studies, but was not incorporated into an alternative carried forward for further analysis. These and other alignments on the western side of Tomales Bay would be evaluated as part of future, potentially collaborative project between the County of Marin and the Park Service (see Public Access under Alternative A for more detail).
- Routing the Proposed Southern Perimeter Through-Trail over the Green Bridge:*** This alignment was considered during both the Phase I and Phase II studies, but was not incorporated into an alternative carried forward for further analysis. This alignment would eliminate the need for a new bridge across Lagunitas Creek by improving the pedestrian causeway along the existing Green Bridge and then routing the trail along Levee Road. It would connect to the White House Pool County Park near Olema Marsh. This alignment raised substantial concerns from local residents regarding public safety along Levee Road, which is one of the main County thoroughfares in this area, and impacts from noise and traffic to landowners on Levee Road and in the town of Point Reyes Station.
- Connecting Mesa Road to Tomales Bay Trail through use of Tomasini Creek berm:*** This alignment was considered during the Phase I study, but not carried forward for further analysis in the Phase II study. Use of Tomasini Creek berm rather than historic railroad grade would require two bridges over the existing Tomasini Creek and improvement and widening in many areas of the degraded Tomasini Creek berm. In addition, it would make the berm a permanent feature. This



Undiked Salt Marsh



alignment was dismissed from further consideration, because it conflicted with the project purpose and objectives of restoring – or allowing for the development of – natural hydrologic and ecological processes and functions.

- **Connecting Point Reyes Station to western side of Tomales Bay using the historic railroad grade and a bridge at the north levee of the Giacomini Ranch:** This alignment was considered during the Phase I study, but not carried forward for further analysis in the Phase II study. This alignment was evaluated, but eliminated from further analysis, because of the high impacts that the alignment would have on natural hydrologic processes and special status species such as the California black rail and the California clapper rail. One of the most hydrologically dynamic zones in the southern portion of Tomales Bay is the northern end of the Giacomini Ranch (KHE et al. 2004). Installation of a trail and bridge in this location would increase risks to public safety and have a potentially substantial adverse effect on natural hydrologic processes, including tidal action (KHE et al. 2004).
- **Connecting Point Reyes Station to western side of Tomales Bay with a trail that would go through the middle of the Giacomini Ranch Project Area via a Bridge:** This alignment was considered during the Phase I study, but not carried forward for further analysis in the Phase II study. This trail alignment, which was proposed in the draft County of Marin General Plan document, but removed from subsequent versions of the Plan, was eliminated because of the high potential impacts to natural hydrologic processes and associated biological resources. In addition, long-term sustainability of a bridge in this location was perceived as low due to the dynamic nature of Lagunitas Creek in this area.

Eliminated Alternatives-Restoration: Olema Marsh

Since 2004, the Park Service and CSLC have been working with hydrologic consultants on technical studies evaluating topography, hydrology, and sediment dynamics of the Bear Valley Creek-Olema Marsh system. Early on, topographic information suggested that consideration of a causeway across the entire mouth of Olema Marsh was infeasible. The project team, then, focused efforts on removing constraints to natural hydrologic process by replacing culverts. During the alternative workshops in 2004, the Seashore presented two alternative designs for Olema Marsh restoration as part of Alternatives C and D.

- **Alternative C for Olema Marsh- 2004 Version:** Alternative C would have replaced the Levee Road culvert with a 26-foot arched culvert or bridge and deep excavation of the Bear Valley creek channel to Bear Valley Road. Excavated materials would have been used to create a berm on the west side of the creek to minimize drainage of the western portion of the marsh into the creek to maintain ponded conditions for California red-legged frog and other aquatic wildlife species.
- 1. **Alternative D for Olema Marsh-2004 Version:** Alternative D made more of an attempt to recreate historic conditions by maximizing tidal influence. The Levee Road culvert would have been replaced with a 120-foot causeway, and the channel mouth would have been widened to approximately 70 feet. A section of the marsh adjacent to Levee Road would have been excavated to increase tidal intrusion. This alternative also included deep excavation of the Bear Valley Creek channel to Bear Valley Road and construction of a retention berm/alluvial levee.

Following the workshops, the Park Service and CSLC began examining the feasibility and potential benefits of replacing the Bear Valley Road culverts, as well as the Levee Road culverts. This alternative action was included in subsequent representations of both Alternatives C and D, and the proposal to construct a 125-foot causeway on Levee Road in Alternative D was eliminated. Both Alternatives C and D now incorporated 26-foot arched culverts at both Levee Road and Bear Valley Road. In addition, the large excavation in Alternative D near Levee Road was dropped as not providing enough benefit for the potential cost, as well as potentially increasing threats to the California red-legged frog population that has been observed in the western portions of the marsh. In the spring of 2005, hydrologic consultants concluded additional technical feasibility studies that suggested that the culverts may not be the primary impediment to functioning hydrologic processes within Olema Marsh. A gravel sill, possibly a remnant from past fill events associated with sediment disposal after storms, appeared to be acting as a miniature dam and impounding water levels in Olema Marsh at elevations actually above that of the downstream culvert. Removal of this feature was added as a component to both alternatives.



During the Value Analysis process, the Value Analysis Team evaluated the current Olema Marsh alternatives using a cost-benefit analysis and proposed that the alternatives be modified to adopt a more adaptive management approach to restoration. The first step would involve the least costly – and, based on technical analyses, most potentially beneficial – restoration actions, specifically removal of the gravel sill and shallow rather than deep excavation of Bear Valley Creek to establish to a flow-path for the creek and increase hydraulic connectivity. These actions would be implemented and, then, should these actions not appear to achieve the desired level of restoration, the Park Service and ACR would pursue additional restoration actions such as replacing the culverts on Levee and/or Bear Valley Roads.

Impact Avoidance and Mitigation 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.

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. CEQ recommends consideration of five types of mitigation measures: avoiding, minimizing, rectifying, reducing, and compensating (40 C.F.R. 1508.20). Mitigation measures that are mandatory to implementation of the proposed project are discussed in this section and include Best Management Practices (BMPs) to avoid, minimize, or reduce the impact from construction. Optional mitigation measures that are subject to further discussions with regulatory agencies are discussed in Chapter 4 under individual impact topics. In some cases, mitigation measures were incorporated into the design of the alternatives and are not specifically identified. A number of BMPs would be adopted as part of the selected alternative and would be incorporated into construction documents (plans and specifications), providing a contractual requirement that any contractor retained for any phase of the action would abide by the conditions and procedures identified in this document and permits.

The following sections describe the impact avoidance and mitigation measures that would be implemented for the selected alternative.

Engineering Geologic/Geotechnical Measures

Should the proposed project involve construction of structures such as bridges, the Park Service and CSLC would retain a state-licensed engineering geologist to prepare a geotechnical report in conformance with the State Seismic Hazards Mapping Act and County regulations that evaluates soil, slope, and geologic conditions; availability of sufficient and suitable land for development within Alquist-Priolo Earthquake Zoning Act; potential mitigation measures to reduce risk; and on-site structural engineering. Design recommendations would be presented to the Park Service and CSLC in the form of written soils engineering and engineering geologic reports. The geologic and geotechnical personnel would also be responsible for monitoring earthwork and construction to ensure compliance with applicable codes and standards and with the recommendations of the soils and engineering geologic reports.

Design and Construction Commitments

The Park Service and CSLC would ensure that design and construction of project features, including earthwork and infrastructure, proceeds in accordance with the appropriate codes and standards. Applicable codes are as follows.

- Restoration and spoils disposal earthwork: Caltrans Standard Specifications (California Department of Transportation 1999).
- Structural features for water conveyance: relevant guidance of the American Waterworks Association.



- Other structural features, such as bridge or boardwalk: Uniform Building Code (International Conference of Building Officials 1997).

Measures to Protect Water Quality

During implementation of the selected alternative, contractors would abide by the following stipulations in order to protect water quality within the Project Area and downstream of the Project Area:

- 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 or fiber rolls to trap sediments and erosion control blankets on slopes and channel banks.
- Avoid operating equipment in flowing water by using temporary cofferdams and/or other suitable structures to divert flow around the channel and bank construction area.

Measures to Protect Wildlife

Measures for Migratory Birds

As noted in Chapter 1 in the discussion of the federal ESA and Migratory Bird Treaty Act (MBTA) and the state CESA, the presence of breeding or nesting endangered and threatened species or migratory bird species can affect construction phasing and implementation approach. Because the Project Area and adjacent lands support both federally and state-listed endangered and threatened species, as well as numerous bird species covered under the MBTA, project construction might not be able to start until summer -- and possibly even later summer -- depending upon regulatory mandates regarding the period of avoidance for particular special status species or the presence of active nests. To prevent disturbance of migratory birds, no project-related activities would take place during the migratory bird nesting season (March 1–August 15). To provide additional assurance, the Park Service and CSLC would conduct preconstruction surveys for migratory birds and their nests within the Project Area no more than 1 week prior to the initiation of site preparation, staging, or construction activity planned before August 15. If pre-construction surveys identify active nests belonging to common migratory bird species, a 100-foot exclusion zone would be established around each nest to minimize disturbance-related impacts on nesting birds. If active nests belonging to special-status migratory birds are identified, a no-activity buffer zone would be established around each nest. The radius of the no-activity zone and the duration of exclusion would be determined in consultation with the USFWS.

Measures for Aquatic Species

Before any potential de-watering activities begin in any creeks within the Project Area, the Park Service and CSLC would ensure that native aquatic vertebrates and larger invertebrates are relocated out of the construction area into a flowing channel segment by a qualified fisheries biologist. In deeper or larger areas, water levels would first be lowered to manageable levels using methods to ensure no impacts to fisheries and other special status aquatic species. A qualified fisheries biologist or aquatic ecologist would then perform appropriate seining or other trapping procedures to a point at which the biologist is assured that almost all individuals within the construction area have been caught. These individuals would be kept in buckets with



aerators to ensure survival. They would then be relocated to an appropriate flowing channel segment or other appropriate habitat as identified by the Park Service and CSLC in consultation with NMFS or the appropriate agency. Construction activities would be prohibited from unnecessarily disturbing aquatic habitat. Federally threatened or endangered aquatic species that occur within the Project Area either as residents or non-residents are coho salmon, steelhead salmon, chinook salmon, green sturgeon, tidewater goby, and California freshwater shrimp, in addition to other state or formerly listed species that would need to be protected such as the northwestern pond turtle and southwestern river otter.

To ensure against adverse impacts on the federally threatened California red-legged frog, which has been observed in both the West and East Pastures and Olema Marsh, the Park Service and CSLC would conduct pre-construction clearance surveys for this species. A biologist would survey the construction area on a daily basis to ensure that frogs or other species have not moved in during the night. Frogs that have moved into the area would be captured and relocated to habitat outside of the construction area.

Measures to Protect Vegetation and Prevent the Introduction and Spread of Invasive Plant Species

Best Management Practice standards (BMPs) to protect riparian and wetland vegetation during construction would be incorporated into construction documents (plans and specifications) for the proposed action. They would include, but may not be limited to, the following:

- Requiring the use of temporary construction fencing to delimit work areas. Requiring that fencing be installed before site preparation work or earthwork begins.
- Excluding foot and vehicle traffic from particularly sensitive areas by delimiting exclusion areas with temporary construction fencing and flagging tape in a conspicuous color.
- Washing off the tires or tracks of trucks and equipment entering and leaving project sites to prevent seed transport.

Measures to Protect Wetland Resources

BMPs to protect wetland resources during construction would be incorporated into construction documents (plans and specifications) for the proposed project. They would include, but may not be limited to, the following.

- 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.

Spill Prevention and Response Plan

Construction contractors would prepare a spill prevention and response plan that regulates the use of hazardous and toxic materials, such as fuels and lubricants for construction equipment. The Park Service or designated representatives would oversee implementation of the spill prevention and response plan. Elements of the plan would ensure that:



- workers are trained to avoid and manage spills;
- construction and maintenance materials are prevented from entering surface waters and groundwater;
- 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 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).

Measures to Protect Natural Quiet and Soundscapes

Construction contractors would implement the following measures to reduce construction noise and lessen the impacts of noise that cannot be avoided.

- Construction equipment would be required to have sound-control devices at least as effective as those originally provided by the manufacturer, and no equipment would be operated with an unmuffled exhaust. In general, construction would take place between 7:00 a.m. and 7:00 p.m., Monday through Saturday.
- In addition, Park Service would post signs at the Project Area and on the Park website providing the name and contact information for a Park Service staff member that the public can contact with noise concerns. This person would be responsible for recording and monitoring complaints related to construction noise and for ensuring that logged complaints are mitigated to the maximum extent possible. Construction times and contact information for noise concerns would also be publicized in the Park newsletter.

Measures to Protect Air Quality

Construction contractors would implement the following measures to control the generation of fugitive dust during site preparation and construction activities. These “Enhanced Control Measures” are contained in the Bay Area Air Quality Management District’s (BAAQMD’s) Feasible Control Measures for PM10 Emissions¹ from Soil Removal Activities (BAAQMD 1999).

- Cover trucks hauling soil, sand, or other loose materials, or require them to maintain at least 2 feet of freeboard.
- Sweep streets daily with water sweepers if visible soil material is carried onto adjacent public streets.
- Apply (nontoxic) soil stabilizers to inactive earthwork areas (previously graded areas inactive for 10 days or more).
- Enclose, cover, water twice daily, or apply nontoxic soil stabilizers to exposed stockpiles (dirt, sand, etc.) as necessary.
- Limit traffic speeds on unpaved roads to 10 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation or topsoil disturbed areas as quickly as possible.
- Limit the area subject to excavation, grading and other construction activity at any one time.

¹ *PM10* refers to particulate matter with a diameter of 10 microns or less. Material of this size is small enough to be drawn deep into the lungs when inhaled and thus poses a human health hazard.



- Maintain properly tuned equipment and limit idling time to 5 minutes.

Measures to Address Effects on Traffic

The construction contractor would be required to prepare and implement a traffic safety plan. The traffic safety plan would address appropriate vehicle size and speed, travel routes, closure plans, detour plans (if any), flagperson requirements (if any), locations of turnouts to be constructed (if any), coordination with law enforcement and fire control agencies, measures ensuring emergency access, and any additional need for traffic or speed-limit signs. Delivery and haulage access, including contractor mobilization and demobilization, would be scheduled to minimize impacts on traffic on area roadways. Construction worker parking and access would be managed to avoid impeding access for park visitors and emergency vehicles.

Measures to Protect Recreational Use

The Park Service and CSLC would take feasible measures to minimize the effects of project construction on recreational use. Information on upcoming closures, including closure dates and arrangements for alternate parking, restroom facilities, and trail access points would be posted on the park website, distributed at the Bear Valley Visitor Center, and posted at the construction site. Information on alternate recreational opportunities would be publicized on the park website, in the park newsletter, and in signage at the construction sites where closures are necessary. The Park Service and CSLC are committed to working with the birding community to develop informational signage that explains the reasons for the change and identifies other nearby birding opportunities.

Measures to Protect Cultural Resources

The Park Service would coordinate with the Federated Indians of Graton Rancheria (FIGR) to ensure that either a Park Service or FIGR representative is on-call during the construction activities. While the proposed alternatives would not appear to be affecting documented resource areas, with the exception of the historic railroad grade, a Park Service or FIGR would be on-call to ensure that construction activities do not impact cultural resources that have not been previously documented. In the case that resources are discovered during the course of construction, the Park Service would act immediately and appropriately as documented in 36 CFR 800.13 "Post-review discoveries" (<http://www.achp.gov/regis.html#800.13>).



Miwok Dancer

The Environmentally Preferred Alternative

Park Service policy regarding implementation of NEPA requires that an environmentally preferred alternative be identified in all NEPA analysis documents. Determination of this alternative takes place after the environmental analysis is complete. The environmentally preferred alternative is the alternative that would promote national environmental policy as expressed in NEPA and cause the least damage to the biological and physical environment. Essentially, this means the environmentally preferred alternative is the one that causes the least damage to the biological and physical environment or best perpetuates natural physical and biological processes. It also means that it is the alternative that is best suited to protect, preserve, and enhance historic, cultural and natural resources and process.



After analyzing the alternatives described in this document, the Park Service and CSLC have determined that Alternative D is the environmentally preferred alternative, although Alternative C has very strong environmental merits, as well. Alternative D includes the most extensive restoration of wetlands, riparian habitat, and other aquatic systems and minimizes the impacts associated with incorporating public access on the perimeter of the Project Area, which contains large amounts of wetlands and riparian areas due to the groundwater influence from adjoining terraces and mountain ridges. Although Alternative C would also provide a substantial amount of restoration of wetlands and riparian habitat, the degree of restoration is slightly less extensive as it would not fully remove Tomasini Creek from its levees, would not replace culverts on Tomasini Creek at Mesa Road, and would include construction of a bridge over Lagunitas Creek that may impact, to some degree, natural hydrologic processes. However, Alternative C would involve considerably less excavation, hauling, and off-site disposal, with differences in off-site disposal needs between Alternatives C and D estimated at approximately 50,000 cubic yards (Figure 9). Increases in the number of truck trips needed to haul excavated sediment to off-site disposal areas affect the environment through increasing air pollution, demand for non-renewable energy resources, and traffic in the local community and region. Of the five alternatives, the No Action Alternative would provide the least amount of restoration and public access opportunities.

Sections 101(b) and 102(1) of NEPA

The Council on Environmental Quality regulations requires that an EIS discuss how each alternative achieves the requirements of sections 101(b) of NEPA. This section states that federal agencies should, through the selection of the alternative to be implemented, attempt to:

- *Criterion 1:* Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- *Criterion 2:* Assure for all visitors a safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- *Criterion 3:* Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- *Criterion 4:* Preserve important historic, cultural and natural aspects of our national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice;
- *Criterion 5:* Achieve a balance of population and resource use which would permit high standards of living and a wide sharing of life's amenities; and
- *Criterion 6:* Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternatives C-D perform best on Criteria 1 and 2 in that they maximize through more extensive restoration in both the Giacomini Ranch and Olema Marsh benefits to the environment that can be enjoyed by succeeding generations and would produce more aesthetically pleasing surroundings. The No Action Alternative may also meet Criterion 2 if leased grazing was permitted in that it would continue – and perhaps even improve -- the existing Pastoral Landscape, which is considered from a visual point of view both aesthetically and culturally pleasing in the western portions of Marin County and elsewhere.

Alternatives C and D would offer the widest range of beneficial uses of the environment over the long-term, although there might be some short-term degradation during the transitional phase as the Giacomini Ranch and Olema Marsh adjust to changed conditions. Alternatives A and B would have less benefit to the environment with the most potential for degradation because of loss of wetland, riparian, and bluff habitat from construction of the eastern perimeter through-trail and possibly extension of the southern perimeter trail to Inverness Park at some point in the future, particularly if it were extended by widening the Sir Francis Drake Boulevard road berm.

Alternative B would, in many ways, offer the most in terms of decreasing existing risks to health or safety from flooding by reducing vertical flood elevations for adjacent homes along Levee Road and Sir Francis Drake Boulevard without any potential for causing other undesirable and unintended consequences. While Alternatives C – D would reduce potential flooding from both Lagunitas and Bear Valley Creeks for homes



along the western portion of Levee Road more than Alternative B, they would, conversely, potentially result in a slight increase in vertical flood elevations for undeveloped portions of properties along the east side of Sir Francis Drake Boulevard relative to existing conditions and, because of restoration of Olema Marsh, possibly increase the potential for salinity intrusion events in municipal groundwater wells operated by North Marin Water District. Increased flooding of the undeveloped portions of properties would not affect homes, driveways, or access roads and, therefore, would not increase risks to public health and safety. In addition, the Park Service, CSLC, and Audubon Canyon Ranch would not proceed with full restoration of Olema Marsh until it could be determined that restoration would not affect local water supply.

While none of the cultural landscape features is eligible for listing in the National Register of Historic Places, all five alternatives would preserve the historic railroad grade on the eastern perimeter of the Giacomini Ranch, while only the No Action Alternative would preserve the two manure lagoons on the Dairy facility mesa.

Criterion 5 discusses those alternatives that achieve a “wide sharing of life’s amenities.” In terms of the proposed project, this phrase was taken to mean those alternatives that offer the most benefits for plants and wildlife, as well as for humans with and without disabilities. These alternatives would offer opportunities for people, including those with disabilities, to experience, enjoy, and learn from the restored landscape through sensitively designed public access facilities that do not fragment important wildlife habitats or cause potential for disruption of natural processes and wildlife activities such as breeding, nesting, and foraging. From this perspective, Alternative C would appear to offer the best benefits in terms of sharing resource amenities, because it offers a moderate amount of public access facilities, including an ADA-compliant access component, that do not degrade or fragment important vegetation communities or wildlife habitat. Alternative B would be ranked second probably for Criterion 5. Criterion 6 is not applicable to the proposed project.

In addition to Section 101(b), Park Service policy also directs that all environmental analysis documents address compliance with Section 102(1) of NEPA. This section states that the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forward in NEPA. In the Park Service, this requirement is met by disclosing any inconsistencies between the alternatives analyzed in detail and other environmental laws and policies. None of the alternatives developed and analyzed in detail are inconsistent with other environmental laws and policies.

The Preferred Alternative

Alternative C has been selected as the alternative preferred by the Park Service and CSLC. The preferred alternative was selected during the Value Analysis process by the Value Analysis team, which was comprised of Park Service and staff from other lead or partner agencies such as the CSLC, the County of Marin, and the Gulf of the Farallones National Marine Sanctuary. The Seashore’s Superintendent has reviewed the five alternatives with respect to how well they meet the project purpose and objectives (Table 1) and their potential impacts on natural and social resources (Table 2) and approved Alternative C’s selection as the preferred alternative. Alternative C offers the best combination of restoration and public access benefits by incorporating a substantial amount of restoration, as well as providing resource-compatible public access opportunities on the southern and eastern perimeters of the Project Area that increase alternative transportation options and incorporates an ADA-compliant access component. It also provides other environmental benefits by decreasing the amount of excavated sediment that would be disposed of off-site and thereby minimizing impacts on air quality, demand for non-renewable energy resources, and traffic in the local community and region.



TABLE 1. DEGREE TO WHICH ALTERNATIVES MEET STATED OBJECTIVES OF PROPOSED PROJECT
IN ORDER OF BEST TO LEAST, ALTERNATIVES CAN 1) FULLY; 2) LARGELY; 3) PARTIALLY; OR 4) NOT MEET OBJECTIVES

OBJECTIVE	NO ACTION ALTERNATIVE: Continue Current Management, including Required Mitigation	ALTERNATIVE A: Limited Restoration; Expanded Public Access	ALTERNATIVE B: Moderate Restoration; Expanded Public Access	ALTERNATIVE C: Full Restoration; Moderate Public Access	ALTERNATIVE D: Extensive Restoration; Limited Public Access
<p>Restore natural, self-sustaining tidal, fluvial (streamflow), and groundwater hydrologic processes in a significant portion of the Project Area, thereby enabling reestablishment of some of the ecological processes and functions associated with wetland and riparian areas.</p>	<p>Would Not Meet Objective Wetland restoration within 11-acre mitigation component would NOT restore natural hydrologic and ecological processes and functions in a SIGNIFICANT portion of 550+-acre Project Area. Discontinuation of intensive agricultural management would allow for limited passive restoration in remainder of Giacomini Ranch.</p>	<p>Would Partially Meet Objective Alternative would actively and passively restore approximately 57 percent of Project Area through discontinuation of agricultural management, removal of infrastructure, and active restoration in East Pasture. There would be some passive restoration in 200-acre West Pasture, although retention of levees would reduce functionality. Olema Marsh would not be restored.</p>	<p>Would Fully Meet Objective Alternative would actively and passively restore approximately 90 percent of Project Area through restoration of entire 550-acre Giacomini Ranch. There would be no restoration of Olema Marsh. Restoration of natural processes and functions would occur within SIGNIFICANT portion of Project Area.</p>	<p>Would Fully Meet Objective Alternative would improve hydrologic and ecological functionality and conditions in Giacomini Ranch relative to Alternative B by removing more levees on Lagunitas and Tomasini Creeks, restoring upland and more riparian areas, and creating more tidal channels. Would also implement adaptive restoration component for Olema Marsh. Restoration of natural processes and functions would occur within SIGNIFICANT portion of Project Area.</p>	<p>Would Fully Meet Objective Alternative would improve hydrologic and ecological functionality and conditions in Giacomini Ranch relative to Alternative C by removing more levees and replacing culverts on Tomasini Creek, restoring more intertidal marsh, and creating more tidal channels. Would also implement adaptive restoration component for Olema Marsh. Restoration of natural processes and functions would occur within SIGNIFICANT portion of Project Area.</p>
<p>Pursue a watershed-based approach to restoration in that restoration planning for the Project Area will emphasize opportunities to</p>	<p>Would Not Meet Objective There would be no restoration within most of Project Area. The 11-acre wetland mitigation component would NOT incorporate watershed-based approach to restoration.</p>	<p>Would Largely Meet Objective Discontinuation of agriculture would reduce potential Giacomini Ranch contribution to pollutant loading within Tomasini Bay, listed as impaired under Clean Water</p>	<p>Would Fully Meet Objective Alternative would have very similar benefits for Tomasini Bay and watershed as Alternative A. Levee breaching in West Pasture and complete removal in East Pasture would further</p>	<p>Would Fully Meet Objective Alternative would have very similar benefits for Tomasini Bay and watershed as Alternative B. Complete levee removal in West Pasture and partial removal on Tomasini</p>	<p>Would Fully Meet Objective Alternative would have very similar benefits for Tomasini Bay and watershed as Alternative C. Complete levee removal on Tomasini Creek would slightly increase floodwater</p>



TABLE 1. DEGREE TO WHICH ALTERNATIVES MEET STATED OBJECTIVES OF PROPOSED PROJECT
IN ORDER OF BEST TO LEAST, ALTERNATIVES CAN 1) FULLY; 2) LARGELY; 3) PARTIALLY; OR 4) NOT MEET OBJECTIVES

OBJECTIVE	NO ACTION ALTERNATIVE: Continue Current Management, including Required Mitigation	ALTERNATIVE A: Limited Restoration; Expanded Public Access	ALTERNATIVE B: Moderate Restoration; Expanded Public Access	ALTERNATIVE C: Full Restoration; Moderate Public Access	ALTERNATIVE D: Extensive Restoration; Limited Public Access
improve ecological conditions within the entire Tomales Bay watershed, not just in the Project Area itself.		Act. Levee breaching in East Pasture would considerably improve floodwater storage, thereby reducing flooding within southern portion of watershed and increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Hydraulic modeling results point to East Pasture having largest potential role in floodwater retention and, therefore, water quality improvement. Limited active restoration in East Pasture and no restoration in West Pasture or Olema Marsh would reduce potential benefits for Tomales Bay wildlife.	improve floodwater storage within Giacomini Ranch relative to Alternative A, thereby further reducing flooding within southern portion of watershed and increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Expanded restoration in Giacomini Ranch would increase benefits in terms of food chain and habitat support for marine and estuarine species in Olema Marsh.	Creek would slightly increase floodwater storage within Giacomini Ranch relative to Alternative B, thereby further reducing flooding within southern portion of watershed and increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Restoration of Olema Marsh would also reduce flooding on Levee Road from Bear Valley Creek. Expanded restoration in Giacomini Ranch and Olema Marsh would increase benefits in terms of food chain and habitat support for marine and estuarine species in Tomales Bay.	storage within Giacomini Ranch relative to Alternative B, thereby further reducing flooding within southern portion of watershed and increasing potential for proposed project to reduce sediment and other water-borne pollutants transported downstream to Tomales Bay. Restoration of Olema Marsh would also reduce flooding on Levee Road from Bear Valley Creek. Expanded restoration in Giacomini Ranch and Olema Marsh would increase benefits in terms of food chain and habitat support for marine and estuarine species in Tomales Bay.
To the extent possible, incorporate opportunities for the	<u>Would Not Meet Objective</u> There would be no restoration within	<u>Would Partially Meet Objective</u> Public access would be expanded considerably	<u>Would Largely Meet Objective</u> Public access would be very similar to	<u>Would Fully Meet Objective</u> Public access would be very similar to	<u>Would Largely Meet Objective</u> Public access would be scaled back relative to



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 IN ORDER OF BEST TO LEAST, ALTERNATIVES CAN 1) FULLY; 2) LARGELY; 3) PARTIALLY; OR 4) NOT MEET OBJECTIVES

OBJECTIVE	NO ACTION ALTERNATIVE: Continue Current Management, including Required Mitigation	ALTERNATIVE A: Limited Restoration; Expanded Public Access	ALTERNATIVE B: Moderate Restoration; Expanded Public Access	ALTERNATIVE C: Full Restoration; Moderate Public Access	ALTERNATIVE D: Extensive Restoration; Limited Public Access
<p>public to experience and enjoy the restoration process as long as opportunities do not conflict with the project's purpose or with Park Service, CSLC, or other agency legislation or policies.</p>	<p>most of Project Area. Public access facilities would not be expanded beyond the informal facilities that currently exist, and there would be no ADA-compliant access component.</p>	<p>through construction of new facilities or improvement of existing facilities, including an ADA-compliant access component. As most of access would be along perimeter of East Pasture, which would be restored, access would allow opportunities for public to experience and enjoy restoration process. There is potential for extension of southern perimeter trail to Inverness Park in future, which would expand viewing and educational opportunities. Construction of eastern perimeter trail through importation of fill for a berm, however, would potentially conflict with directives of Park Service, LCP, and Point Reyes Station Community Plan policies, because it would impact protected wetlands, riparian, and bluff habitat.</p>	<p>Alternative A in that it would be expanded considerably through construction of new facilities or improvement of existing facilities, including an ADA-compliant access component. Trails and viewing areas or overlooks would allow opportunities for public to experience and enjoy restoration process. Construction of eastern perimeter trail would use a low-elevation boardwalk approach that would reduce the amount of impact to wetlands and hydrologic processes, although it would still impact riparian and bluff habitat and thereby potentially conflict with directives of Park Service, LCP, and Point Reyes Station Community Plan policies.</p>	<p>Alternative B in that it would be expanded through construction of new facilities or improvement of existing facilities, although to a lesser degree than under Alternatives A-B. Trails and viewing areas or overlooks would still allow opportunities for public to experience and enjoy restoration process. Southern perimeter through-trail would be retained, along with potential for possible future expansion to Inverness Park. However, eastern perimeter trail would be converted to two spur trails, which would have much less potential to conflict with directives of Park Service, LCP, and Point Reyes Station Community Plan policies. ADA-compliant access component would be retained, but shifted to the Mesa Road spur trail.</p>	<p>Alternatives A-C. There would be no through-trail or ADA-complaint access components, but rather existing spur trails would either be extended (Tomales Bay Trail) or improved (East Pasture levee informal path). These trails and viewing areas or overlooks would still allow opportunities for public to experience and enjoy restoration process, although viewing opportunities would be somewhat reduced relative to Alternatives A-C. While this alternative reduces potential for conflict with directives of Park Service, LCP, and Point Reyes Station Community Plan policies, the lack of an ADA-compliant access component would reduce this alternative's ability to fully meet objective.</p>



TABLE 2. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Land Use and Planning					
Conflict with GMP Policies	<u>No Impact</u> GMP policies, land use standards, critical resources, and Park Service goals would not be affected.	<u>No Impact</u> GMP policies, land use standards, critical resources, and Park Service goals would not be affected.	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A
Modification of Natural Resources on Parklands	<u>Beneficial Moderate</u> Natural Resources would be altered by converting 11 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	<u>Beneficial Major</u> Natural Resources would be altered by converting ~189 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	<u>Beneficial Major</u> Natural Resources would be altered by converting ~200 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	<u>Beneficial Major</u> Natural Resources would be altered by converting ~200 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.	<u>Beneficial Major</u> Natural Resources would be altered by converting ~206 acres of Wet Pasture and Diked Brackish Marsh into tidal wetlands.
Conflict with Development Policies in Coastal Zone	<u>No Impact</u> Development in the Coastal Zone would not be affected.	<u>No Impact</u> Development in the Coastal Zone would not be affected.	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A
Conflict with Industrial Development Policies in Coastal Zone	<u>No Impact</u> There would be no industrial development in the Coastal Zone.	<u>No Impact</u> There would be no industrial development in the Coastal Zone.	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A
Conflict with County Land Use Policies	<u>Adverse Negligible-Minor</u> Conversion from dairy to grazing or Open Space would affect land use, but change would not conflict with County Land Use policies.	<u>Adverse Negligible-Minor</u> Conversion from dairy to grazing or Open Space would affect land use, but change would not conflict with County Land Use policies.	<u>Adverse Negligible-Minor</u> Same as Alternative A	<u>Adverse Negligible-Minor</u> Same as Alternative A	<u>Adverse Negligible-Minor</u> Same as Alternative A
Conflict with County Environmental Plans/Policies	<u>Adverse Negligible-Minor</u> Environmental plans/policies would be affected, but there would be no conflict.	<u>Adverse Negligible-Minor</u> Environmental plans/policies would be affected, but there would be no conflict.	<u>Adverse Negligible-Minor</u> Same as Alternative A	<u>Adverse Negligible-Minor</u> Same as Alternative A	<u>Adverse Negligible-Minor</u> Same as Alternative A
Alter Character of Community	<u>Adverse Minor</u> Loss of dairy would be noticeable change, but would not alter the rural character of the community.	<u>Adverse Minor</u> Loss of dairy would be noticeable change, but would not alter the rural character of the community.	<u>Adverse Minor</u> Same as Alternative A	<u>Adverse Minor</u> Same as Alternative A	<u>Adverse Minor</u> Same as Alternative A



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
General Land Use	Increase Demand for Parks	<u>No Impact</u> Demand for parks would not be affected.	<u>No Impact</u> Demand for parks would not be affected.	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A
	Increase Density Beyond Population Projections	<u>No Impact</u> Population density would not be affected.	<u>No Impact</u> Population density would not be affected.	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A
	Induce Substantial Growth Directly or Indirectly	<u>No Impact</u> Major or Substantial growth would not be induced either directly or indirectly.	<u>No Impact</u> Major or Substantial growth would not be induced either directly or indirectly.	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A
Agricultural Land Use	Displace Existing Housing	<u>Negligible</u> Worker housing would be displaced in two areas.	<u>Negligible</u> Worker housing would be displaced in two areas.	<u>Negligible</u> Same as Alternative A	<u>Negligible</u> Same as Alternative A	<u>Negligible</u> Same as Alternative A
	Conflict with GMP Policies on Agriculture or Agricultural Land Uses	<u>No Impact</u> GMP policies regarding agricultural land use would not be affected	<u>No Impact</u> GMP policies regarding agricultural land use would not be affected	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A	<u>No Impact</u> Same as Alternative A
	Discontinue Agriculture on Parklands or Continue at Level Not Compatible with Natural or Public Access Resources	<u>Beneficial Minor-Moderate</u> Agricultural management practices incompatible with resource protection would be discontinued or reduced.	<u>Beneficial Major</u> Agricultural management practices incompatible with resource protection would be discontinued.	<u>Beneficial Major</u> Same as Alternative A	<u>Beneficial Major</u> Same as Alternative A	<u>Beneficial Major</u> Same as Alternative A
Agricultural Land Use	Affect Use of Lands in Agricultural Production Zone	<u>Adverse Negligible-Minor</u> Giacomini Ranch would be retained as grazing land or converted to open space, an approved conditional use of agricultural lands.	<u>Adverse Minor</u> Giacomini Ranch would be converted to open space or wildlife refuge, approved conditional uses of agricultural lands.	<u>Adverse Minor</u> Same as Alternative A	<u>Adverse Minor</u> Same as Alternative A	<u>Adverse Minor</u> Same as Alternative A
	Conflict with Policies on Agriculture in Coastal Zone	<u>Adverse Negligible-Minor</u> Conversion would not conflict with Coastal Zone policies, because conversion would occur on wetlands that were not suited to agriculture prior to conversion.	<u>Adverse Negligible-Minor</u> Conversion would not conflict with Coastal Zone policies, because conversion would occur on wetlands that were not suited to agriculture prior to conversion.	<u>Adverse Negligible-Minor</u> Same as Alternative A	<u>Adverse Negligible-Minor</u> Same as Alternative A	<u>Adverse Negligible-Minor</u> Same as Alternative A



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Agricultural Land Use	Affect Agricultural or Open Space Contracts	<u>Adverse</u> Negligible/Minor Giacomini Ranch would be retained for grazing or converted to open space, an approved/conditional use of contract agricultural lands.	<u>Adverse</u> Negligible/Minor Giacomini Ranch would be converted to open space or wildlife refuge, approved/conditional uses of contract agricultural lands.	<u>Adverse</u> Negligible/Minor Same as Alternative A	<u>Adverse</u> Negligible/Minor Same as Alternative A	<u>Adverse</u> Negligible/Minor Same as Alternative A
	Affect Agricultural Resources, Operations, or Adjacent Agricultural Land Uses (LESA Analysis)	<u>Adverse</u> Negligible/Minor If grazing occurs, impacts considered negligible due to conversion of 11 acres to tidal wetlands. If grazing does not occur, impacts characterized as minor.	<u>Adverse</u> Minor Based on the LESA analysis, impacts to agricultural resources from conversion of the Giacomini Ranch from grazing to open space or wildlife refuge would be considered minor.	<u>Adverse</u> Minor Same as Alternative A	<u>Adverse</u> Minor Same as Alternative A	<u>Adverse</u> Minor Same as Alternative A
Geologic Resources						
Geologic Resources	Unique Geologic Resources	No Impact There are no unique geologic resources in the Project Area.	No Impact There are no unique geologic resources in the Project Area.	No Impact Same as Alternative A	No Impact Same as Alternative A	No Impact Same as Alternative A
	Topographic Resources	Beneficial Negligible Negligible changes (< 0.25 vertical feet) would occur in ~ 11 acres of Project Area through fill removal.	Beneficial Minor Minor changes (< 0.25 vertical feet) would occur in ~ 53 percent of Project Area through fill removal. Intense excavation would occur in 9 percent of Project Area.	Beneficial Minor Minor changes (< 0.25 vertical feet) would occur in ~ 76 percent of Project Area through fill removal. Intense excavation would occur in 9 percent of Project Area.	Beneficial Moderate Moderate changes (< 0.25 vertical feet) would occur in ~ 90 percent of Project Area through fill removal. Intense excavation would occur in 16 percent of Project Area.	Beneficial Moderate Moderate changes (< 0.25 vertical feet) would occur in ~ 91 percent of Project Area through fill removal. Intense excavation would occur in 17 percent of Project Area.
Geologic Hazards – Surface Fault Rupture and Impacts on Public Safety		No Impact No construction of habitable or non-habitable structures would occur within 50 feet of an active fault.	<u>Adverse</u> Minor Non-habitable facilities -- a Lagunitas Creek bridge -- would be constructed 100-300 feet from an active fault.	<u>Adverse</u> Minor Same as Alternative A	<u>Adverse</u> Minor Same as Alternative A	No Impact No bridge would be constructed over Lagunitas Creek, and no other facilities would be constructed near an active fault.
	Geologic Hazards – Groundshaking and Liquefaction and Impacts on Public Safety	<u>Adverse</u> Negligible Public safety threats would be negligible, because public access would remain minimal.	<u>Adverse</u> Minor Despite increasing public access, public safety threats would be minor, as probability of major earthquake low.	<u>Adverse</u> Minor Same as Alternative A	<u>Adverse</u> Minor Same as Alternative A	<u>Adverse</u> Minor Same as Alternative A



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Coastal Bluff Stability	No Impact Coastal bluff stability would not be affected.	Adverse Negligible/Minor Bluffs would not be developed, and invasives removal would not violate bluff-related policies in LCP.	Adverse Negligible/Minor Same as Alternative A	Adverse Negligible/Minor Same as Alternative A	Adverse Negligible/Minor Same as Alternative A
Soil Resources					
Sediment Nutrients – Project Area	Beneficial Negligible Reducing or eliminating agricultural operations would have negligible effects in the short-term as nutrient pools are slow to change.	Beneficial Negligible Eliminating agricultural operations would have negligible effects in the short-term as nutrient pools are slow to change.	Beneficial Negligible Same as Alternative A	Adverse Negligible Reducing water impoundment in Olema Marsh may cause changes in soil chemistry and short-term efflux of nutrients from sediment into waters.	Adverse Negligible Same as Alternative C
	Beneficial Minor With reduction or elimination of grazing, nutrient concentrations would decrease, though remain high relative to natural wetlands.	Beneficial Moderate Elimination of grazing would be expected to cause nutrient levels to drop to those of natural marshes over time, even in West Pasture.	Beneficial Moderate Nutrients levels would be expected to drop to those of natural marshes, possibly at slightly higher rates compared to Alternative A.	Beneficial Moderate Pulse of nutrients released from Olema Marsh soils would drop back to those of natural marshes. Effects in Giacomini Ranch same as Alternative B.	Beneficial Moderate Same as Alternative C
Sediment Nutrients – Watershed	No Impact Retention of the levees would maintain similar conditions to baseline ones in terms of effect on sediment nutrient dynamics in watershed.	Beneficial Negligible Levee removal would decrease downstream nutrient transport to Bay sediment through floodplain retention, but decrease would be offset by temporary increase in nutrient efflux from Project Area due to soil disturbance.	Beneficial Negligible Effects would be very similar to those described in Alternative A, but of slightly greater intensity due to more levee removal and floodplain restoration.	Beneficial Negligible Effects would be very similar to those described in Alternative B, but of slightly greater intensity due to more levee removal and floodplain restoration, including restoration of Olema Marsh.	Beneficial Negligible Same as Alternative C
	Beneficial Negligible-Minor Over time, degradation of the levees would allow increased retention of nutrients and sediments from Lagunitas Creek on Giacomini Ranch floodplains.	Beneficial Negligible-Minor Overflow of Lagunitas Creek onto East Pasture floodplains would trap nutrients and reduce downstream deposition in Tomales Bay.	Beneficial Negligible-Minor Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay relative to Alternative A.	Beneficial Negligible-Minor Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay relative to Alternatives A-B.	Beneficial Negligible-Minor Same as Alternative C



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Sediment Contaminants – Project Area		<u>Adverse</u> <u>Negligible</u> Contaminant concentrations low currently and would change negligibly with restoration of the 11-acre mitigation component or eventual levee degradation.	<u>Adverse</u> <u>Negligible</u> Limited levee breaching would increase fluvial and tidal influences and might slightly increase exposure of Project Area to contaminants such as mercury.	<u>Adverse</u> <u>Negligible</u> More extensive levee removal might further increase exposure of Project Area to contaminants such as mercury.	<u>Adverse</u> <u>Minor</u> Realignment of Tomasini Creek into pasture would increase possible contaminant exposure from closed landfill. Restoration of Olema Marsh would have little impact.	<u>Adverse</u> <u>Minor</u> Same as Alternative C
	Sediment Contaminants – Watershed	<u>No Impact</u> Retention of the levees would maintain similar conditions to baseline ones in terms of effect on watershed contaminant dynamics.	<u>Beneficial</u> – <u>Negligible</u> Limited levee removal in the East Pasture would trap upstream contaminants on restored floodplain and reduce deposition in Tomales Bay.	<u>Beneficial</u> – <u>Negligible</u> Effects would be very similar to those described in Alternative A, but of greater magnitude due to more levee removal and restoration of floodplain.	<u>Beneficial</u> – <u>Negligible</u> Effects similar to those of Alternative B, but of greater intensity due to more levee removal and floodplain restoration, including Olema Marsh restoration.	<u>Beneficial</u> – <u>Negligible</u> Same as Alternative C
Long-Term		<u>Beneficial</u> <u>Negligible</u> Over time, levee degradation would allow increased contaminant retention on Giacomini Ranch floodplains and reduce deposition in Bay.	<u>Beneficial</u> <u>Negligible</u> Overflow of Lagunitas Creek onto East Pasture floodplains would trap contaminants and reduce downstream deposition in Bay.	<u>Beneficial</u> <u>Negligible</u> Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay relative to Alternative A.	<u>Beneficial</u> <u>Negligible</u> Overflow of Lagunitas Creek onto East and West Pasture floodplains would further reduce downstream deposition in Tomales Bay relative to Alternatives A-B.	<u>Beneficial</u> <u>Negligible</u> Same as Alternative C
	Air Resources					
Air Quality	Air Pollutants- Construction Emissions	<u>Adverse</u> <u>Negligible</u> Construction would be limited in scope and duration, so emissions would be negligible.	<u>Adverse</u> <u>Negligible</u> – <u>Moderate</u> NOX emissions from construction in the East Pasture may cause moderate impacts to air quality, with other emissions having negligible to minor effects.	<u>Adverse</u> <u>Negligible</u> – <u>Major</u> or <u>Substantial</u> / <u>Significant</u> East Pasture construction may cause substantial or major impacts from NOX emissions. Other emissions would have negligible to minor effects.	<u>Adverse</u> <u>Negligible</u> – <u>Major</u> or <u>Substantial</u> / <u>Significant</u> Same as Alternative B	<u>Adverse</u> <u>Negligible</u> – <u>Major</u> or <u>Substantial</u> / <u>Significant</u> Same as Alternative C
	NEPA: Intensity Following Mitigation			Mitigation measures -- limiting number of concurrently operating machines, reducing idling -- would reduce NOX impacts to moderate.	<u>Adverse</u> <u>Moderate</u> Same as Alternative B	<u>Adverse</u> <u>Moderate</u> Same as Alternative B



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
CEQA: Significance Following Mitigation			<u>Adverse</u> Less than Significant Mitigation measures -- limiting number of concurrently operating machines, reducing idling -- would reduce NOX impacts to less than significant under CEQA.	<u>Adverse</u> Less than Significant Same as Alternative B	<u>Adverse</u> Less than Significant Same as Alternative B
Air Pollutants – Project-Generated Carbon Monoxide Emissions	<u>Adverse</u> Negligible Visitor and resident vehicles would be only source of CO, and visitation-related traffic would not be expected to exceed 33 vehicles/hour.	<u>Adverse</u> Minor Visitor and resident vehicles would be only source of CO. Visitation-related traffic would be expected to exceed 33 vehicles/hour, but not 66 vehicles/hour.	<u>Adverse</u> Minor Same as Alternative A	<u>Adverse</u> Negligible Visitor and resident vehicles would be only source of CO. A decrease in public access facilities would decrease visitation-related traffic relative to Alternative B, so vehicles/hour not would not be expected to exceed 33.	<u>Adverse</u> Negligible Same as Alternative C
Air Pollutants – Project-Generated Total Emissions	<u>Adverse</u> Negligible Visitor and resident vehicles would be only source of emissions, and visitation-related traffic would not be expected to exceed 1,000 vehicles/ day.	<u>Adverse</u> Negligible Visitor and resident vehicles would be only source of emissions, and visitation-related traffic would not be expected to exceed 1,000 vehicles/ day.	<u>Adverse</u> Negligible Same as Alternative A	<u>Adverse</u> Negligible Same as Alternative A	<u>Adverse</u> Negligible Same as Alternative A
Odors	<u>Beneficial</u> Minor Manure and other dairy odors would be reduced with discontinuation of the dairy.	<u>Adverse</u> Negligible Excavation of wetland and manured soils could result in temporary bad odors, however, close of the dairy would eliminate dairy odors and slightly offset impacts.	<u>Adverse</u> Negligible Same as Alternative A	<u>Adverse</u> Moderate In addition to odors generated by excavation in Giacomini Ranch, restoration of Olema Marsh could also produce temporary bad odors.	<u>Adverse</u> Moderate Same as Alternative C
Long-Term	<u>Beneficial</u> Minor Same as Construction/ Short-Term	<u>Beneficial</u> Minor Once restoration-related odors fade, an overall improvement in odor would occur with close of the dairy.	<u>Beneficial</u> Minor Same as Alternative A	<u>Beneficial</u> Minor Same as Alternative A	<u>Beneficial</u> Minor Same as Alternative A



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Noise and Soundscapes - Construction-Related Effects (Roadway/ Earthmoving)		Adverse Negligible-Minor Construction equipment on roadways would be expected to have a negligible impact (<3 dBA) on noise in Point Reyes Station and Inverness Park, but a minor (-4 dBA) impact may occur on Pierce Point Road.	Adverse Substantial/Significant Noise impacts from hauling would be similar to No Action Alternative. Earthmoving would generate major or substantial temporary increases in noise for residents at southern end of East Pasture (up to 86 dBA) and southern end of West Pasture (up to 75 dBA).	Adverse Negligible-Major or Substantial/Significant Same intensity as Alternative A, except duration of roadway hauling and earthmoving would be longer.	Adverse Negligible-Major or Substantial/Significant Same intensity as Alternative B, except duration of roadway hauling and earthmoving would be longer.	Adverse Negligible-Major or Substantial/Significant Same intensity as Alternative C, except duration of roadway hauling and earthmoving would be longer.
	NEPA: Intensity Following Mitigation		Adverse Moderate Mitigation measures – limiting number of concurrently operating machines, notifying residents in advance – would reduce impacts to moderate.	Adverse Moderate Same as Alternative A	Adverse Moderate Same as Alternative A	Adverse Moderate Same as Alternative A
	CEQA: Significance Following Mitigation		Adverse Less than Significant Mitigation measures – limiting number of concurrently operating machines, notifying residents in advance – would reduce impacts to less than significant levels.	Adverse Less than Significant Same as Alternative A	Adverse Less than Significant Same as Alternative A	Adverse Less than Significant Same as Alternative A
Noise and Soundscapes - Project-Related Effects		Beneficial Minor A slight decrease in overall ambient noise would result from elimination of noise associated with dairy operations.	Adverse Minor Noise from dairy operations would cease, but a slight increase in ambient noise would result from increases in visitation-related traffic. Levels would be below limits of 60 dBA-Ldn set by County noise ordinance.	Adverse Minor Same as Alternative A	Adverse Negligible Noise impacts from visitation-related traffic would be similar to Alternatives A-B, but would be slightly reduced because of the reduced volume of visitation-related traffic expected.	Beneficial Negligible Noise impacts from visitation-related traffic would be further reduced from Alternative C because of scaling back of public access and would be entirely offset by elimination of noise associated with dairy operations.



TABLE 2. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D	
Water Resources	Surface Tidal Hydrologic Processes	<u>Beneficial/Negligible</u> The wetland mitigation component would slightly increase number of tidally influenced acres slightly (10 acres).	<u>Beneficial/Moderate</u> Approximately 199 acres or 34 percent of the Giacomini Ranch and Olema Marsh would be influenced by tides on a daily basis.	<u>Beneficial/Moderate</u> Approximately 213 acres or 36 percent of the Giacomini Ranch and Olema Marsh would be influenced by tides on a daily basis.	<u>Beneficial/Moderate</u> Approximately 206 acres or 39 percent of the Giacomini Ranch and Olema Marsh would be influenced by tides on a daily basis.	
	Surface Freshwater Hydrologic Processes (Project Area/Watershed)	<u>Beneficial/Minor/Negligible</u> The discontinuation of intensive agricultural management would have minor beneficial effects on freshwater processes in the Project Area, but negligible effects for watershed.	<u>Beneficial/Minor/Moderate</u> Freshwater processes in Project Area and watershed would measurably benefit from discontinuation of intensive agricultural management and removal of agricultural infrastructure, including breaching of East Pasture levee.	<u>Beneficial/Moderate/Minor</u> Freshwater processes in Project Area would appreciably benefit from discontinuation of intensive management and expanded infrastructure removal, such as levee breaching in West Pasture, but benefits would remain minor for watershed.	<u>Beneficial/Moderate</u> Impacts on the freshwater hydrologic processes in the Project Area would be similar to Alternative B, with slight improvement due to complete removal of all levees. Benefits for watershed would increase considerably.	<u>Beneficial/Moderate</u> Impacts on freshwater hydrologic processes would be similar to Alternative C, with some improvement from additional restoration actions.
	Hydraulics and Hydrologic Processes	<u>Beneficial/Negligible</u> Over short-term, negligible change in floodwater retention would occur because levees would not be removed, except for 11-acre mitigation component. Overbank flooding would occur only \geq 3.5-year flood events.	<u>Beneficial/Moderate</u> Floodwater retention would increase appreciably with breaching of East Pasture levee, increasing frequency of overbank flooding to 2-year flood events and decreasing Lagunitas Creek floodwater volume by 10 percent.	<u>Beneficial/Major</u> Floodwater retention would increase substantially with expanded levee removal, increasing frequency of overbank flooding to 2-year flood events in both pastures and decreasing Lagunitas Creek floodwater volume by 19 percent.	<u>Beneficial/Major</u> Floodwater retention would increase substantially with expanded levee removal, decreasing Lagunitas Creek floodwater volume by 20 percent. Lowered static water levels would also increase retention potential in Olema Marsh.	<u>Beneficial/Major</u> Impacts would be similar to Alternative C, with some slight improvement in floodwater retention from additional restoration actions.
Hydrologic Processes – Sediment Transport (Project Area/Watershed)	<u>Beneficial/Negligible</u> During 2-year flood events, only 11-acre mitigation component would have potential for retaining floodwater-associated sediment and therefore barely detectable effect on transport in Project Area or watershed.	<u>Beneficial/Major/Minor</u> Breaching of East Pasture levees could divert up to 10 percent of floodwater-associated suspended sediment during ~2-year event onto floodplains, a major benefit for Project Area and minor one for watershed.	<u>Beneficial/Major/Minor</u> Levee removal in East and West Pastures could divert up to 19 percent of floodwater-associated suspended sediment during ~2-year flood event onto floodplains, a major benefit for Project Area, but minor for watershed.	<u>Beneficial/Major/Minor</u> Effects would be similar to Alternative B, but up to 20 percent of floodwater-associated suspended sediment during ~2-year event could be diverted.	<u>Beneficial/Major/Minor</u> Same as Alternative C	



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Water Quality (Project Area/ Watershed)	Construction	Adverse Negligible/ Negligible Levee removal and other activities during construction of 11-acre wetland mitigation component could cause some sediment fallback into Lagunitas Creek. Would have negligible effects in Project Area and watershed.	Adverse Negligible/ Negligible Construction activities would have barely detectable effects on water quality in Project Area and watershed, because of implementation of Best Management Practice mitigation measures.	Adverse Negligible/ Negligible Same as Alternative A	Adverse Negligible/ Negligible Same as Alternative A	Adverse Negligible/ Negligible Same as Alternative A
	Short-Term	Beneficial Negligible/ Negligible Discontinuation of intensive agricultural management would have negligible beneficial effect over short-term because of slow rate of decrease expected in pool of nutrients, pathogens, and potential sources in Project Area water bodies. Because of lack of hydrologic connection, this would result in negligible improvements in downstream water quality.	Beneficial Minor/ Negligible Discontinuation of intensive agricultural management would have beneficial effects over short-term by reducing nutrients and pathogens and stagnant water conditions. Approximately 10 percent of floodwaters transporting pollutants would overbank flood into East Pasture during ~2-year flood event, however, short-term vegetation changes could cause nutrient pulse to downstream waters.	Beneficial Minor/ Negligible Effects would be similar to those described under Alternative A, but both East and West Pastures would be hydrologically reconnected to Lagunitas Creek, thereby improving overall water quality relative to baseline conditions. This would have measurable benefits over the short-term for Project Area waters, but watershed effects would remain negligible.	Beneficial Negligible/ Minor Minor benefits from Giacomini Ranch would be offset by temporary adverse effects from lowering water levels in Olema Marsh and subsequent water quality problems expected with oxidation and decomposition of peat soils. Would reduce Project Area benefits to negligible. Realignment of Tomasini Creek into East Pasture would boost short-term benefits for watershed to minor.	Beneficial Negligible/ Minor Same as Alternative C
Long-Term		Beneficial Minor/ Negligible Discontinuation of intensive agricultural management would have measurable beneficial effect, because pool of nutrients, pathogens, and potential sources in Project Area water bodies would slowly decrease. Because of lack of hydrologic connection, this would result in negligible improvements in downstream water quality.	Beneficial Moderate/ Minor Discontinuation of intensive management and restoration would have appreciable beneficial effects by reducing nutrients, pathogens, sources, and stagnant conditions. Approximately 10 percent of floodwaters transporting pollutants would flood into East Pasture during ~2-year flood event, decreasing downstream transport.	Beneficial Moderate/ Moderate Impacts would be similar to Alternative A, but of greater intensity due to increased infrastructure removal and restoration in both West and East Pastures. Approximately 18 percent of floodwaters transporting pollutants would overbank flood into East Pasture during ~2-year flood event, decreasing downstream transport.	Beneficial Major/ Moderate Realignment of Tomasini Creek and restoration of Olema Marsh would further increase benefits to the Project Area relative to Alternatives A-B, raising them to Major, while these same actions would also slightly increase benefits to the watershed.	Beneficial Major/ Moderate Same as Alternative C



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Vegetation Resources					
Native Vegetation Communities	<p>Beneficial Negligible Certain native vegetation communities would expand in response to discontinuation of intensive agricultural management, but reduction in or elimination of grazing would cause sharp increase in weedy, opportunistic species within most areas that would slightly offset these benefits.</p>	<p>Beneficial Negligible Certain native vegetation communities would expand in response to discontinuation of intensive management and levee breaching, but elimination of grazing would cause a sharp increase in weedy, opportunistic species within most areas that would slightly offset these benefits.</p>	<p>Beneficial Negligible Same as Alternative A</p>	<p>Adverse Minor Lowering water levels in Olema Marsh would cause extensive die-back of existing vegetation as marsh adjusts to changes in water levels and salinity, potentially promoting establishment by weedy, opportunistic species. Overall, this would result in a measurable adverse effect over short-term.</p>	<p>Adverse Minor Similar to Alternative C.</p>
Long-Term	<p>Beneficial Minor Native-dominated communities would increase 11 percent, once vegetation fully responds to discontinuation of management and establishes in mitigation component area.</p>	<p>Beneficial Moderate Native-dominated communities would increase ~30 percent, mostly due to conversion of pastures into salt and brackish marshes typically characterized by fewer invasive species.</p>	<p>Beneficial Major Native-dominated communities would increase ~70 percent, mostly due to conversion of pastures into salt and brackish marshes typically characterized by fewer invasive species.</p>	<p>Beneficial Major Extent of native vegetation in the East and West Pastures would be very similar to Alternative B. Olema Marsh would become dominated by native species again once conditions stabilized.</p>	<p>Beneficial Major Native-dominated communities would increase slightly relative to Alternative C due to excavation in East Pasture.</p>
Wetlands	<p>Adverse Negligible Construction of 11-acre mitigation component would cause barely detectable adverse effects from temporary stockpiling.</p>	<p>Adverse Moderate There would be 0.25 – 1.0 acres of temporary impacts during implementation from construction of eastern perimeter trail and from temporary stockpiling.</p>	<p>Adverse Moderate There would be 0.25 – 1.0 acres of temporary impacts during implementation from construction of eastern perimeter trail and from temporary stockpiling.</p>	<p>Adverse Moderate There would be 0.25 – 1.0 acres of temporary impacts during construction from temporary stockpiling.</p>	<p>Adverse Moderate There would be 0.25 – 1.0 acres of temporary impacts during construction from temporary stockpiling.</p>
Short-Term/Long-Term	<p>Beneficial Minor The wetland mitigation component would result in a minor net gain of 0.4 acres of wetlands.</p>	<p>Beneficial Major Loss of 0.27 acre of wetland from construction of eastern perimeter trail would be offset by passive and active restoration, resulting in a net gain of ~9 acres.</p>	<p>Beneficial Major Loss of 1.74 acres of wetland from construction of high tide refugia would be offset by passive and active restoration, resulting in a net gain of ~14 acres.</p>	<p>Beneficial Major Loss of 1.74 acres of wetland from construction of high tide refugia would be offset by passive and active restoration, resulting in a net gain of ~19 acres.</p>	<p>Beneficial Major Loss of 1.82 acres of wetland from construction of high tide refugia would be offset by passive and active restoration, resulting in a net gain of ~26 acres.</p>



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Riparian and Bluff Habitat Construction/ Temporary	<u>No Impact</u> There would be no temporary impacts to riparian habitat.	<u>Adverse Minor</u> There would be temporary impacts to 0.34 acre of riparian habitat from eastern perimeter trail construction. Impacts could increase if southern perimeter trail extended to Inverness Park.	<u>Adverse Minor</u> Same as Alternative A.	<u>No Impact</u> There would be no temporary impacts to riparian habitat unless southern perimeter trail extended to Inverness Park by expanding Sir Francis Drake road berm.	<u>No Impact</u> Same as Alternative C.
Short-Term/ Long-Term	<u>Beneficial Negligible</u> An increase of less than 0.5 acres in the areal extent of riparian habitat would occur along creeks in Project Area with discontinuation of intensive agricultural management and reduced or eliminated grazing.	<u>Beneficial Moderate</u> Loss of 0.54 acres of riparian habitat would be offset by net increase of 2.5 acres from discontinuation of intensive agricultural management practices and active restoration and revegetation.	<u>Beneficial Major</u> Loss of 0.54 acres of riparian habitat would be offset by net increase of 10 acres from discontinuation of intensive agricultural management practices and active restoration and revegetation.	<u>Beneficial Major</u> Loss of 0.1 acre of riparian habitat would be offset by net increase of 11.6 acres from discontinuation of intensive agricultural management and active restoration and revegetation.	<u>Beneficial Major</u> There would be no loss of riparian habitat. An increase of 11.8 acres would occur with discontinuation of intensive agricultural management and active restoration and revegetation.
Special Status Plant Species Construction	<u>Adverse Minor</u> Levee removal could impact occurrences on outboard side of levees. Construction would impact less than a third of the reproduction season. BMPs would ensure that topsoils containing seeds would be stockpiled and replaced.	<u>Adverse Minor</u> Levee removal could impact occurrences on outboard side of levees. Construction would impact less than a third of the reproduction season. BMPs would ensure that topsoils containing seeds would be stockpiled and replaced.	<u>Adverse Minor</u> Same as Alternative A.	<u>Adverse Minor</u> Same as Alternative A.	<u>Adverse Minor</u> Same as Alternative A.
Long-Term	<u>Beneficial Minor</u> There would be an 11-acre increase in special status species habitat. This would potentially have a measurable effect on Project Area distribution of species, but not on regional distribution.	<u>Beneficial Major</u> There would be more than a 300-acre increase in special status species habitat. This would potentially have a substantial effect on Project Area distribution of species and an appreciable effect on regional distribution.	<u>Beneficial Major</u> There would be an ~ 350 acre increase in special status species habitat. This would potentially have a substantial effect on Project Area distribution of species and an appreciable effect on regional distribution.	<u>Beneficial Major</u> Same as Alternative B.	<u>Beneficial Major</u> Same as Alternative B.



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Invasive Plant Species Short-Term/ Long-Term		<u>Beneficial</u> <u>Negligible</u> Removal of invasive species would result in a 1.3 percent decrease in areal extent of non-native invasive species.	<u>Beneficial</u> <u>Minor</u> Removal of invasive species would result in a 16 percent decrease in areal extent of non-native invasive species.	<u>Beneficial</u> <u>Moderate</u> Removal of invasive species would result in a 30 percent decrease in areal extent of non-native invasive species.	<u>Beneficial</u> <u>Moderate</u> Removal of invasive species would result in a 35 percent decrease in areal extent of non-native invasive species.	<u>Beneficial</u> <u>Moderate</u> Removal of invasive species would result in a 38 percent decrease in areal extent of non-native invasive species.
Fish and Wildlife Resources						
High Value Wildlife Habitats	Construction	<u>Adverse</u> <u>Negligible</u> Construction would occur in only in 11-acre portion of East Pasture. It would cause no or negligible impact to extent or condition of high value wildlife habitats in Giacomini Ranch.	<u>Adverse</u> <u>Negligible</u> Impacts during construction in East Pasture such as filling of ditches and incidental fallback of sediment into creek would affect less than 5 percent of high value wildlife habitats in Project Area.	<u>Adverse</u> <u>Minor</u> Impacts during construction in East and West Pastures such as filling of ditches and incidental fallback of sediment into creek would affect less than 5 - 10 percent of high value wildlife habitats in Project Area.	<u>Adverse</u> <u>Minor</u> Even with addition of Olema Marsh, impacts during construction such as filling of ditches, channel excavation,, and incidental fallback of sediment into creek would affect less than 5 - 10 percent of high value wildlife habitats in Project Area.	<u>Adverse</u> <u>Minor</u> Same as Alternative C
	Short-Term	<u>Adverse</u> <u>Negligible</u> Discontinuation of intensive agricultural management would cause sharp increase in weedy, opportunistic species that would have a slight adverse effect on areal extent of high value wildlife habitats (<5%) over short-term.	<u>Adverse</u> <u>Negligible</u> Discontinuation of intensive management and conversion of pasture to marsh in East Pasture would cause sharp increase in weedy, opportunistic species that would have a slight adverse effect on areal extent of high value wildlife habitats (<5%) over short-term.	<u>Adverse</u> <u>Negligible</u> Discontinuation of intensive management and conversion of pasture to marsh in East and West Pastures would cause sharp increase in weedy, opportunistic species that would have a slight adverse effect on areal extent of high value wildlife habitats (<5%) over short-term.	<u>Adverse</u> <u>Moderate</u> Adverse effects in Giacomini Ranch would be slightly less than Alternative B, because of expanded revegetation. Extensive dieback of Olema Marsh vegetation in response to lowered water levels and increased tidal influence would cause short-term impacts to high value habitat, increasing overall intensity to moderate (10-25%).	<u>Adverse</u> <u>Moderate</u> Same as Alternative C
General Fish and Wildlife Resources	Long-Term	<u>Beneficial</u> <u>Minor</u> There would be ~6 percent increase in areal extent of high value wildlife habitats -- such as riparian and tidal salt marsh -- in Project Area.	<u>Beneficial</u> <u>Moderate</u> There would be more than 10 percent increase in areal extent of high value wildlife habitats in Project Area.	<u>Beneficial</u> <u>Major</u> There would be more than 40 percent increase in areal extent of high value wildlife habitats in Project Area.	<u>Beneficial</u> <u>Major</u> There would be more than 43 percent increase in areal extent of high value wildlife habitats in Project Area.	<u>Beneficial</u> <u>Major</u> There would be more than 46 percent increase in areal extent of high value wildlife habitats in Project Area.



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
General Fish and Wildlife Resources	Changes in Wildlife Use	<u>Adverse Negligible</u> Reconnection of East Pasture Old Slough during construction of mitigation component could have negligible adverse effects on wildlife use (< 5%).	<u>Adverse Negligible</u> Construction noise, filling of ditches, and incidental fallback of sediment into creek during restoration of East Pasture could cause negligible adverse effects on wildlife use (< 5%).	<u>Adverse Minor</u> More extensive construction in West and East Pastures and associated noise and temporary and permanent habitat impacts could cause negligible adverse effects on wildlife use (5-10%).	<u>Adverse Minor</u> Effects would be very similar to Alternative B, but minor dredging of Bear Valley Creek in Olema Marsh could increase impacts to wildlife use slightly, however, still minor overall (5-10%).	<u>Adverse Minor</u> Same as Alternative C
	Short-Term	<u>Beneficial Negligible</u> As riparian habitat rapidly expands, wildlife use of Project Area would be expected to increase slightly. Effects would remain negligible due to conversion of pasture to ruderal grassland.	<u>Beneficial Negligible</u> Discontinuation of agricultural management and breaching of East Pasture levee would rapidly increase some high value wildlife habitats along perimeter, but most areas would undergo transitional phase during conversion characterized by weedy, opportunistic plant species.	<u>Beneficial Negligible</u> Effects would be similar to Alternative A, except that they would be expanded to encompass the West Pasture with breaching of its levee.	<u>Adverse Minor</u> Effects in Giacomini Ranch would be similar to Alternative B, but extensive dieback of Olema Marsh vegetation and temporary water quality problems associated with lowered water levels would have more effect on wildlife use over short-term, causing overall intensity to become minor (5-10%).	<u>Adverse Minor</u> Same as Alternative C
	Long-Term	<u>Beneficial Negligible</u> Increase in riparian and marsh and meadow habitats along perimeter would be expected to cause slight increase in wildlife use of Project Area (~3 percent increase).	<u>Beneficial Minor</u> Increase in riparian, tidal channel, and salt marsh habitats in East Pasture and, to a lesser degree, West Pasture would cause measurable increase in wildlife use of Project Area (5-10%).	<u>Beneficial Moderate</u> Increase in riparian, tidal channel, and salt marsh habitats relative to Alternative A because of East and West Pasture restoration would cause appreciable increase in wildlife use of Project Area (10-25%).	<u>Beneficial Moderate</u> Effects in Giacomini Ranch would be similar to Alternative B, but reestablishment of freshwater and brackish marsh in Olema Marsh would slightly increase wildlife use, although intensity would remain moderate (10-25%).	<u>Beneficial Moderate</u> Same as Alternative C
Invasive Wildlife Species	<u>Adverse Negligible</u> The 11-acre mitigation component could cause a barely detectable increase (<10%) in number of estuarine invasive species present in Project Area.	<u>Adverse Minor</u> Non-native wildlife already present would remain with possible minor expansion (10-25%) in abundance or occurrence of some aquatic invasives in new tidal areas.	<u>Adverse Minor</u> Effects would be similar to Alternative A, but with slight increase in estuarine invasives in West Pasture because of levee breaches and tidegate removal.	<u>Adverse Minor</u> Effects would be similar to Alternative B in Giacomini Ranch, but with slight increase of aquatic invasives in Olema Marsh due to increased tidal influence.	<u>Adverse Minor</u> Same as Alternative C	



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
General Fish and Wildlife Resources	Wildlife Conditions in the Watershed	Beneficial Negligible Discontinuation of intensive agricultural management would cause barely detectable benefits to downstream habitat conditions, but there would be no detectable effect during transitional phase on food resource conditions or species assemblages in southern Tomales Bay.	Beneficial Negligible Discontinuation of intensive agricultural management and restoration of tidal connectivity would cause some benefits to downstream habitat conditions, but there would be no detectable effect during transitional phase on food resource conditions or species assemblages in southern Tomales Bay.	Beneficial Negligible Effects would be very similar to Alternative A, except that tidal connectivity would be restored in West and East Pastures. The ruderal-dominated transitional phase in vegetation, as well as lag expected for establishment of estuarine species assemblages, would generate negligible benefits for watershed wildlife species over short-term.	Beneficial Negligible Effects would be very similar to Alternative B, except that tidal connectivity would be reestablished for Olema Marsh. The extensive dieback of vegetation as the marsh adjusts to lowered water levels and increased tidal influence could slightly increase carbon export, although the marsh would offer less foraging benefits.	Beneficial Negligible Same as Alternative C
			Beneficial Minor Establishment of fully functioning marsh in East Pasture with appropriate flora and fauna would increase benefits to wildlife in the watershed relative to short-term effects by increasing potential for export of carbon to Bay and the availability of food sources and prey for non-resident species.	Beneficial Moderate Effects for wildlife in watershed would be similar to Alternative A, but of greater intensity due to restoration of tidal and floodplain connectivity for West and East Pastures.	Beneficial Moderate Effects for wildlife in watershed would be similar to Alternative B, but of slightly greater intensity due to increased potential for carbon export and access by non-resident species to Tomasini Creek and restored Olema Marsh once it has adjusted to lowered water levels and increased tidal influence.	Beneficial Moderate Same as Alternative C
Special Status Species	California Red-legged Frog Construction	Adverse Negligible Impacts from construction of the 11-acre wetland mitigation component would be expected to be non-existent or negligible, because no breeding has been documented in East Pasture, and construction would occur outside breeding season.	Adverse Negligible Impacts from construction of the East Pasture component would be expected to be non-existent or negligible, because no breeding has been documented in East Pasture.	Adverse Minor Impacts from construction in West and East Pastures would be potentially measurable, because breeding occurs in West Pasture. Construction would not directly impact breeding habitat and would be conducted largely after breeding season.	Adverse Minor Effects in Giacomini Ranch would be very similar to Alternative B, but very minor excavation in Olema Marsh could slightly increase impacts during construction, although intensity would remain minor.	Adverse Minor Same as Alternative C



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
California Red-Legged Frog	<p>Adverse Negligible</p> <p>Ongoing conversion of a portion of primary breeding habitat in West Pasture from freshwater to brackish marsh would be expected to continue and therefore have measurable adverse effects relative to baseline conditions. There would be no or only negligible change in Olema Marsh. Overall, conversion would result in only negligible adverse effect on breeding habitat units and distribution of species in Core Area.</p>	<p>Adverse Negligible</p> <p>Same as the No Action Alternative, because no restoration would be conducted in West Pasture or Olema Marsh.</p>	<p>Adverse Moderate</p> <p>While freshwater marsh would be created in East Pasture to offset additional impacts of increased tidal influence in West Pasture freshwater marsh relative to Alternative A, appropriate conditions for breeding would be expected to take time to develop, leading to appreciable adverse impacts over short-term in Project Area and measurable adverse effects on breeding habitat units in Core Area.</p>	<p>Adverse Moderate</p> <p>Effects in Giacomini Ranch would be very similar to Alternative B. Extensive dieback of vegetation and temporary water quality problems in Olema Marsh would increase short-term impacts to breeding habitat, however, they would be offset to some degree by creation of breeding ponds adjacent to Olema Creek. Overall, intensity of impact would remain moderate.</p>	<p>Adverse Moderate</p> <p>Same as Alternative C</p>
Special Status Species	<p>Adverse Minor</p> <p>Impacts to breeding habitat could possibly become measurable over time, because levee degradation would increase tidal influence in the West Pasture.</p>	<p>Adverse Minor</p> <p>Same as No Action Alternative</p>	<p>Adverse Negligible</p> <p>Over time, appropriate conditions for breeding would develop in created freshwater marsh in East Pasture. Would still have a measurable effect on distribution of species in Project Area, because primary breeding habitat would be shifted from the West Pasture to the East Pasture, where breeding has not been documented. However, the effect on distribution and breeding habitat units in Core Area would be barely detectable.</p>	<p>Adverse Minor</p> <p>Effects in Giacomini Ranch would be very similar to Alternative B. Impacts to breeding habitat in Olema Marsh would decrease as large proportion (but not all) of freshwater marsh reestablishes within Olema Marsh, and mitigation habitats in East Pasture and Olema Creek become established. Would still have appreciable effects on species distribution within Project Area, because breeding habitats would be at least partially shifted to areas where breeding not previously documented.</p>	<p>Adverse Minor</p> <p>Effects would be very similar to Alternative C. Complete realignment of Tomasini Creek through created freshwater marsh in East Pasture would only slightly decrease habitat size (0.2 acres) and could increase available non-breeding habitat in immediate vicinity.</p>



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Special Status Species	Tidewater Goby	<u>Adverse Moderate</u> Impacts during construction would be expected to be minor to moderate at most, with implementation of mitigation measures to reduce potential or amount of incidental take from tidal reconnection of documented habitat in the East Pasture Old Slough.	<u>Adverse Moderate</u> Effects would be very similar to the No Action Alternative, except that the East Pasture Old Slough would be excavated in areas, as well as tidally reconnected. Implementation of mitigation measures would maintain intensity of impacts at moderate.	<u>Adverse Moderate</u> Effects would be very similar to Alternative A. Restoration of West Pasture could cause indirect impacts during construction to documented habitat. However, impacts still expected to remain moderate overall.	<u>Adverse Moderate</u> Effects would be very similar to Alternative B. Reconnection of Tomasini Creek to East Pasture Old Slough at Giacominini Hunt Lodge may cause additional negligible adverse impacts, but overall intensity still expected to remain moderate.	<u>Adverse Moderate</u> Effects would be very similar to Alternative C. Tomasini Creek would be reconnected to East Pasture Old Slough upstream of currently documented habitat. Overall intensity still expected to remain moderate.
	Construction					
	Short-Term	<u>Beneficial Negligible</u> Discontinuation of intensive agricultural management would slightly increase quality of existing habitat.	<u>Beneficial Minor</u> Discontinuation of intensive agricultural management and reconnection and creation of tidal channels in the East Pasture would be expected to increase the quality of existing habitats and to create new habitats, resulting in measurable beneficial effects.	<u>Beneficial Moderate</u> Discontinuation of intensive agricultural management and reconnection and/or creation of tidal channels in the West and East Pastures would be expected to increase the quality of existing habitats and to create new habitats, resulting in appreciable beneficial effects.	<u>Adverse Moderate</u> While the same beneficial effects would occur as under Alternative B, partial realignment of goby's primary habitat in Project Area, Tomasini Creek, could adversely affect species over the short-term by converting existing leveed channel into backwater slough with decreased freshwater inflow. Potential risk increases intensity of effects to moderate adverse.	<u>Adverse Moderate</u> Effects would be very similar to Alternative C. Tomasini Creek, goby's primary habitat in Project Area, would be completely realigned into one of its historic alignments. Intensity of effect expected to remain moderate.
	Long-Term	<u>Beneficial Moderate</u> Slow decay or sudden breaching of levees could increase benefits by considerably increasing amount of available habitat.	<u>Beneficial Moderate</u> Over time, benefits to goby in East Pasture would increase relative to short-term conditions due to natural expansion of tidal channels and further improvement in quality of existing and created habitat conditions through eventual establishment of prey assemblages.	<u>Beneficial Major</u> Over time, benefits to goby in West and East Pastures would increase relative to short-term due to natural expansion of tidal channels and further improvement in quality of existing and created habitat conditions through eventual establishment of prey assemblages.	<u>Beneficial Major</u> Effects would be similar to Alternative B. Expansion of habitat in East Pasture would eventually offset habitat loss from partial realignment of Tomasini Creek. Improved hydraulic connectivity and increased tidal influence in Olema Marsh could increase potential for expansion.	<u>Beneficial Major</u> Same as Alternative C



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Salmonids Construction-Related Effects	<u>Adverse Negligible</u> Construction of 11-acre mitigation component would have only negligible adverse effects on salmonids associated with potential incidental fallback of sediment into creek during levee removal. Would not take place until end of typical period for smolt outmigration.	<u>Adverse Negligible</u> Construction would have potential for slight adverse impacts associated with removal of levees along Lagunitas Creek, but would not take place until end of typical period for smolt outmigration.	<u>Adverse Negligible</u> Same as Alternative A	<u>Adverse Negligible</u> Same as Alternative A	<u>Adverse Negligible</u> Same as Alternative A
	Special Status Species	<u>Beneficial Negligible</u> Discontinuation of intensive agricultural management such as diversion of water from Lagunitas Creek for irrigation, levee maintenance, and crossing of creek by cattle would slightly benefit passage and rearing conditions.	<u>Beneficial Minor</u> Discontinuation of intensive agricultural management, along with removal of hydrologic control infrastructure in East Pasture, would have measurable benefits on passage and rearing conditions by increasing the quality of habitat in Lagunitas Creek and extent of rearing/refugia habitat in Project Area.	<u>Beneficial Moderate</u> Effects would be very similar to Alternative A, except that extent of created potential refugia/rearing habitat in East Pasture would increase, and salmonids could freely access existing habitat on Fish Hatchery Creek and associated tidal channels in the West Pasture. Would result in appreciable benefits to passage/rearing conditions.	<u>Beneficial Major</u> Effects would be very similar to Alternative B. Additional benefits to passage and rearing conditions would come from reduction of passage and rearing constraints on Bear Valley Creek and partial realignment of Tomasini Creek.
Rearing Habitat Extent Short-Term	<u>Beneficial Negligible</u> Slight increase in potential rearing habitat would occur with partial reconnection of East Pasture Old Slough Pond to Lagunitas Creek. Aquatic edge in Project Area would increase by ~3 percent.	<u>Beneficial Minor</u> Measurable increase in potential rearing habitat would occur with reconnection of East Pasture Old Slough and creation of additional tidal channels to Lagunitas Creek. Aquatic edge in Project Area would increase by ~13 percent.	<u>Beneficial Minor</u> Effects would be very similar to Alternative A, except that Fish Hatchery Creek and associated channels would be hydrologically reconnected to undiked portion of creek and would thereby slightly increase the extent of rearing habitat. Aquatic edge in Project Area would increase by ~28 percent.	<u>Beneficial Moderate</u> Effects would be very similar to Alternative C. Improved hydraulic connectivity in Olema Marsh with Lagunitas Creek, partial realignment of Tomasini Creek, and expanded tidal channel creation in East Pasture would increase extent of rearing habitat appreciably. Aquatic edge in Project Area would increase by ~31 percent.	<u>Beneficial Moderate</u> While generally very similar to Alternative C, additional tidal creation in East Pasture and complete realignment of Tomasini Creek could cause a very slight increase in rearing habitat.



TABLE 2. SUMMARY OF IMPACTS
DEFINITION OF IMPACT INTENSITY TERMS CAN BE FOUND AT END OF TABLE.

Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Special Status Species	Salmonids Rearing Habitat Extent Long-Term	<u>Beneficial</u> <u>Minor</u> Over long-term, levee degradation could increase extent of rearing habitat by hydrologically reconnecting existing channels to Lagunitas Creek and/or creating more tidal channels.	<u>Beneficial</u> <u>Moderate</u> Over long-term, levee degradation in West Pasture levees could increase rearing habitat by hydrologically reconnecting Fish Hatchery Creek and creating more tidal channels.	<u>Beneficial</u> <u>Major</u> Benefits would be expected to increase strikingly over the long-term due to natural development of new tidal channels and improvement in habitat and prey conditions within existing and created channels in Giacomini Ranch and Olema Marsh.	<u>Beneficial</u> <u>Major</u> Same as Alternative C
	Black and Clapper Rail Construction	<u>Adverse</u> <u>Negligible</u> Construction of 11-acre mitigation component would occur in vicinity of existing rail habitat, but would occur outside breeding season and would not impact breeding or non-breeding individuals or young. Indirect effects would be barely detectable.	<u>Adverse</u> <u>Negligible</u> Construction would occur in vicinity of rail habitat, but would not impact breeding or non-breeding individuals or young. Construction at northern end of East Pasture would be conducted outside breeding season. Indirect effects would be barely detectable.	<u>Adverse</u> <u>Moderate</u> Impacts during construction would increase to appreciable, because construction would occur in and adjacent to existing habitat at northern end of West Pasture. Construction would be conducted outside breeding season. Indirect effects would be measurable.	<u>Adverse</u> <u>Moderate</u> Effects would be similar to Alternative. Limited construction during non-breeding season in Olema Marsh would be expected to only slightly increase impacts.
	Short-Term	<u>Beneficial</u> <u>Negligible</u> The 11-acre mitigation component in the northern portion of the East Pasture would slightly increase breeding and refugia habitat for rails.	<u>Beneficial</u> <u>Negligible</u> During transitional period after construction, negligible to, at most, minor beneficial effects would be expected as pastures begin converting to brackish and tidal marsh, leading to temporary establishment of a weedy, ruderal habitat with fewer benefits for rails.	<u>Beneficial</u> <u>Negligible</u> Same as Alternative A	<u>Beneficial</u> <u>Negligible</u> Same as Alternative A



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Black and Clapper Rail Long-Term	<u>Beneficial / Minor</u> Eventual levee degradation and subsequent expansion of tidal marsh would expand foraging habitat, but reduced diked refugia habitat relative to baseline conditions. However, net effect would be measurable beneficial.	<u>Beneficial / Major</u> Restoration of East Pasture would result in appreciable benefit to rails by substantially increasing (>250 acres) appropriate breeding, foraging, and refugia habitat adjacent to existing rail habitat.	<u>Beneficial / Major</u> Restoration of West and East Pastures would result in appreciable benefit to rails by substantially increasing (>350 acres) of appropriate breeding, foraging, and refugia habitat adjacent to existing rail habitat.	<u>Beneficial / Major</u> Effects in Giacomini Ranch would be very similar to Alternative B. Eventual reestablishment of freshwater marsh vegetation in Olema Marsh after restoration would improve habitat quality for breeding black rails.	<u>Beneficial / Major</u> Effects would be very similar to Alternative C. There would be a slight increase in habitat in the East Pasture relative to Alternative C due to excavation of some grassland areas to lower intertidal elevations.
Other Special Status Species	<u>Adverse / No Impact / Negligible</u> Any temporary effects during construction of the 11-acre mitigation component would be extremely small.	<u>Beneficial / Adverse / Negligible / Moderate</u> Peregrine falcon may benefit slightly from flushing of prey. California freshwater shrimp and northwestern pond turtle could be impacted by construction, including ditch filling, levee removal, and channel excavation. Common yellowthroat could be impacted by clearing of riparian habitat for eastern perimeter trail in documented breeding area.	<u>Beneficial / Adverse / Negligible / Moderate</u> Effects would be very similar to Alternative A. Restoration of West, as well as East, Pastures, including expanded tidal influence and breaching of levees, would slightly increase impacts to northwestern pond turtle, California freshwater shrimp, and southwestern river otter. However, overall, intensity would remain the same as Alternative A.	<u>Beneficial / Adverse / Negligible / Moderate</u> Effects would be very similar to Alternative B. Impacts to saltmarsh common yellowthroat would be reduced through elimination of the through-trail component for the eastern perimeter trail in favor of two spur trails that would not result in removal of riparian vegetation along the Point Reyes Mesa bluff.	<u>Beneficial / Adverse / Negligible / Moderate</u> Same as Alternative C
Special Status Species	<u>Beneficial / Adverse / Negligible / Moderate</u> Discontinuation of agricultural management would slightly benefit California freshwater shrimp, saltmarsh common yellowthroat, green sturgeon, and southwestern river otter. Over long-term, levee degradation could have measurable adverse effect on northwestern pond turtles.	<u>Beneficial / Adverse / Minor / Moderate</u> Discontinuation of agricultural management and restoration of East Pasture would increase benefits for several species to being measurable, although increased salinity and loss of grassland could have negligible adverse effect on peregrine falcon feeding habitat and measurable adverse impacts on northwestern pond turtles.	<u>Beneficial / Adverse / Minor / Moderate</u> Effects would be very similar to Alternative A. Benefits for saltmarsh common yellowthroat, green sturgeon, and southwestern river otter would slightly increase with restoration of West Pasture. Would also slightly increase impacts to peregrine falcon and northwestern pond turtle. Intensity would still remain similar to Alternative A.	<u>Beneficial / Adverse / Minor / Moderate</u> Effects would be very similar to Alternative B. Restoration of Olema Marsh could slightly increase short-term and long-term impacts to California freshwater shrimp because of short-term water quality problems and long-term salinity changes. However, expansion of riparian habitat due to lowering of water levels would benefit yellowthroat.	<u>Beneficial / Adverse / Minor / Moderate</u> Effects would be very similar to Alternative C, with slight increases in benefits for saltmarsh common yellowthroat.



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Cultural Resources					
Cultural Landscapes	<u>No Impact</u> There would be no potential for impact to cultural landscape features in Project Area.	<u>Adverse Minor</u> Restoration of East Pasture would impact two cultural landscape features by filling manure lagoons (measurable) and creating eastern perimeter through-trail on historic railroad grade (negligible). Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.	<u>Adverse Minor</u> Effects on manure lagoons would be similar to Alternative A. The eastern perimeter trail would be constructed using a low-elevation boardwalk, which would have slightly less impact on historic railroad grade. Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.	<u>Adverse Minor</u> Effects on manure lagoons would be very similar to Alternative A. Through-trail component on historic railroad grade would be converted to two spur trails that would have slightly less impact in terms of construction/maintenance. Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.	<u>Adverse Minor</u> Effects on manure lagoons would be similar to Alternative A. One of the spur trails on historic railroad grade would be eliminated. The other spur trail would only require minimal enhancement. Neither manure lagoons nor railroad grade is eligible for listing in National Register of Historic Places.
Public Health and Safety					
Flooding Levee Road - East	<u>No Impact</u> There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East Pasture levee	<u>Beneficial Minor</u> Hydraulic modeling suggests that vertical flood elevations could decrease measurably from existing conditions through breaching of East Pasture levee, with flood height potentially reduced as much as 0.3 to 0.5 feet during 5- to 10- year flood events.	<u>Beneficial Minor</u> Effects would be very similar to Alternative A in upstream most portion of Project Area, even with restoration of West Pasture through levee breaching.	<u>Beneficial Minor</u> Same as Alternatives A-B	<u>Beneficial Minor</u> Same as Alternatives A-B
Flooding Levee Road - West	<u>No Impact</u> There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East and/or West Pasture levees.	<u>Beneficial Moderate</u> Hydraulic modeling suggests that vertical flood elevations could decrease appreciably from existing conditions through breaching of East Pasture levee, with flood height potentially reduced as much as 0.5 to 0.9 feet during 10- year flood events.	<u>Beneficial Moderate-Major</u> Hydraulic modeling suggests that vertical flood elevations could decrease appreciably relative to existing conditions through West Pasture levee breaching and East Pasture levee removal, with flood height potentially reduced as much as 0.6 to 1.1 feet during 10- year flood events.	<u>Beneficial Moderate-Major</u> Same as Alternative B	<u>Beneficial Moderate-Major</u> Same as Alternative B



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Flooding Sir Francis Drake Blvd- Inverness Park	<u>No Impact</u> There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East and/or West Pasture levees.	<u>No Impact</u> There would be no potential for change in flooding of adjacent properties, homes, and public roads by Lagunitas Creek unless there is eventual degradation of East and/or West Pasture levees.	<u>Adverse Minor</u> Hydraulic modeling suggests that effects of restoration would vary depending on flood event with breaching of West Pasture levee. During 2- to 10-year flood events, flood height in vicinity of private properties could drop by as much as 0.4 feet, however, it could increase as much as 1 foot during 50-year flood events. Increase in flood elevation would affect undeveloped portions of properties and would not negatively affect homes, driveways, or access routes to roads or pose threat to public health and safety.	<u>Adverse Moderate</u> Hydraulic modeling suggests that vertical flood elevations could increase relative to existing conditions during certain flood events with breaching of West Pasture levee. During 2- to 100-year flood events, flood height in vicinity of private properties could increase by as much as 1.6 feet. Increase in flood elevation would affect undeveloped portions of properties (e.g., open space, pastures, and backyards) and would not negatively affect homes, driveways, or access routes to roads or pose a threat to public health and safety.	<u>Adverse Moderate</u> Same as Alternative C
Disease Vectors	<u>Beneficial Minor</u> Discontinuation of intensive agricultural management such as irrigation, ditching, and pond maintenance would result in overall measurable reduction in extent and duration of conditions favorable to mosquito breeding, although some areas may become more favorable through increase in vegetation. There would no change in impounded conditions in Olema Marsh.	<u>Beneficial Moderate</u> In addition to discontinuation of agricultural management, restoration would remove ditches and ponds favorable for mosquito breeding and reduce extent of habitats characterized as having highest potential to support breeding by as much as 60 percent. Infrequently flooded tidal marshes may still support disease-carrying mosquito species, although most are not known carriers of West Nile Virus. There would be no change in Olema Marsh.	<u>Beneficial Moderate</u> Effects in Giacomini Ranch and Olema Marsh would be very similar to Alternative A, but, by restoring the West and East Pastures, would even further reduce habitats characterized as having the highest potential to support mosquito breeding by as much as 76 percent. Infrequently flooded tidal marshes may still support disease-carrying mosquito species, although most are not known carriers of West Nile Virus.	<u>Beneficial Moderate</u> Effects would be very similar to Alternative B. Extent of habitats with highest potential to support mosquito breeding would be reduced even further through expanded restoration of Giacomini Ranch and lowered water levels in Olema Marsh, with habitats decreased by as much as 80 percent. Infrequently flooded tidal marshes may still support disease-carrying mosquito species, although most are not known carriers of West Nile Virus.	<u>Beneficial Moderate</u> Same as Alternative C
Disease and Public Health					



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Public Services	Municipal Water Supply	Beneficial Major Discontinuation of irrigation and conversion of water right to beneficial instream uses would increase summer base streamflow by 20 percent. Based on hydraulic modeling, increased flow could decrease average salinity or chloride concentrations in upstream Lagunitas Creek during spring or higher high tides by 37 percent.	Beneficial Moderate As with No Action Alternative, water right conversion would increase summer streamflow by 20 percent, but this would be offset slightly by increase in tidal prism from restoration of East Pasture, which hydraulic modeling suggests could result in net 14 percent decrease in average salinities in upstream Lagunitas Creek during higher high tides.	Adverse Moderate Based on hydraulic modeling, increasing tidal prism in Olema Marsh could increase average salinities in upstream Lagunitas Creek during higher tides by 15-16 percent. There would be no change in frequency or duration of salinity intrusion events. Full Olema Marsh restoration would not proceed until Park Service assured no impact to municipal water supply.	Adverse Moderate Same as Alternative C
	Municipal Water Supply and Distribution				
Traffic and Transportation	Construction-Related Effects	Adverse Negligible Barely detectable and very temporary increase in traffic from construction-related equipment and hauling of excavated sediments would occur on local roadways during construction of 11-acre mitigation component in East Pasture. No change in Level of Service.	Adverse Minor Effects would be very similar to Alternative A. Incorporation of West Pasture into project would increase construction-related equipment and hauling impacts to traffic on local roadways to measurable.	Adverse Minor-Moderate Effects would be very similar to Alternative B. Incorporation of Olema Marsh into project could result in temporary appreciable impacts to local roadways such as Levee Road and/or Bear Valley Road through temporary road closures during replacement of culverts.	Adverse Minor-Moderate Same as Alternative C
	Project-Related Effects	Adverse Negligible Changes in traffic from implementation would be related to changes in visitation. Barely detectable increases in traffic would occur because there would be no increase or enhancement of public access facilities relative to existing conditions.	Adverse Negligible-Minor Construction and expansion of public access facilities, in addition to more extensive restoration, would potentially increase visitation and result in negligible to minor adverse effects in traffic on local roadways, with minor effects expected in Point Reyes.	Adverse Negligible-Minor Conversion of eastern perimeter through-trail to two spur trails and relocation of southern perimeter trail entrance would reduce impacts on traffic on local roadways in Point Reyes area, although impacts would still be minor.	Adverse Negligible Public access would be scaled back further relative to Alternative C, thereby increasing visitation only slightly relative to baseline conditions, which would result in barely detectable increases in traffic on local roadways.



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Impact Topics		No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Traffic and Transportation	Parking	<u>Adverse Negligible</u> Changes in parking demand would be related to changes in visitation. Barely detectable increases in parking demand would occur because there would be no increase or enhancement of public access facilities relative to existing conditions.	<u>Adverse Minor-Moderate</u> Improvement of public access facilities, in addition to more restoration, could increase visitation and result in minor to moderate adverse effects on parking demand, with moderate effects expected in Point Reyes Station because of lack of formal parking lots.	<u>Adverse Minor-Moderate</u> Same as Alternative A	<u>Adverse Minor</u> Conversion of eastern perimeter through-trail to two spur trails and relocation of southern perimeter trail entrance from C Street to Green Bridge would reduce parking demand in downtown Point Reyes, although there would still be minor impacts.	<u>Adverse Minor</u> Public access would be scaled back further relative to Alternative C, thereby increasing visitation only slightly relative to baseline conditions, which would result in barely detectable or, at most, minor increases in parking demand.
	Alternative Transportation	<u>No Impact</u> Alternative transportation would not be affected.	<u>Beneficial Moderate</u> Alternative transportation would be improved by connecting trails between Point Reyes Station and 1) Green Bridge County park (and possibly in future Inverness Park) and 2) Tomales Bay Trail.	<u>Beneficial Moderate</u> Same as Alternative A	<u>Beneficial Minor</u> Public transportation would be improved by connecting trail between Point Reyes Station and Green Bridge County park (and possibly in future Inverness Park), but there would be no through-trail to Tomales Bay Trail.	<u>Beneficial Negligible</u> Due to elimination of through-trails between communities, any benefits to alternative transportation from improvement of existing trails would be negligible.
Visitor and Resident Experience						
Public Access	Construction-Related Effects	<u>Adverse Negligible</u> Increased noise levels during 11-acre mitigation component could slightly disrupt visitor experience in and around Project Area. Not expected to affect experience in other areas of park.	<u>Adverse Minor</u> Temporary closure of East Pasture trails and increased noise could temporarily disrupt visitor experience in and around Project Area, as well as for those traveling to other areas in park.	<u>Adverse Minor</u> Same as Alternative A	<u>Adverse Moderate</u> Effects would be similar to Alternative A, but with increased impact due to potential temporary road closures on Levee and Bear Valley Roads during Olema Marsh restoration.	<u>Adverse Moderate</u> Same as Alternative C
	Project-Related Effects	<u>No Impact</u> Public access facilities would not change relative to baseline conditions.	<u>Beneficial Major</u> Facilities and attractions/uses would increase more than 50 percent through construction of two through-trails (with one having bridge over Lagunitas Creek) and three viewing	<u>Beneficial Major</u> Effects would be very similar to Alternative A. Existing spur trail in West Pasture would be eliminated and converted to viewing area or overlook, with number of viewing areas	<u>Beneficial Moderate</u> Effects would be very similar to Alternative B, although eastern perimeter through-trail would be converted to two spur trails, resulting in less than 50 percent increase in	<u>Beneficial Minor</u> Public access would be scaled back, resulting in less than 25 percent increase in facilities and attractions/uses. There would be no through-trail or bridge components,



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Public Access	Project-Related Effects (Cont.):	<p>Adverse Minor</p> <p>Possibility of extending southern perimeter trail to Inverness Park through cooperative project with County in future.</p>	<p>Adverse Moderate</p> <p>Possibility of extending southern perimeter trail to Inverness Park through cooperative project with County in future.</p>	<p>Adverse Moderate</p> <p>facilities and attractions/uses. Point Reyes Station entrance for southern perimeter trail would be relocated from C Street to Green Bridge.</p>	<p>Adverse Moderate</p> <p>only two spur trails – one extending Tomates Bay Trail and one where existing informal trail on East Pasture levee is currently located.</p>
Visual Resources and Viewsheds	Construction	<p>Adverse Negligible</p> <p>Presence of heavy equipment for less than two months in remote corner of East Pasture would have barely detectable effect on views of Project Area.</p>	<p>Adverse Moderate</p> <p>Construction would be even more extensive and of longer duration than in Alternative A, with inclusion of West Pasture in project expecting to require two or more construction seasons. This would have appreciable effect on views.</p>	<p>Adverse Moderate</p> <p>Construction would be even more extensive and of longer duration than in Alternative B, with inclusion of Olema Marsh in project expecting to require two or more construction seasons. This would have appreciable effect on views.</p>	<p>Adverse Moderate</p> <p>Construction would be even more extensive and of longer duration than in Alternative C, with inclusion of Mesa Road culvert in project requiring three or more construction seasons. This would have appreciable effect on views.</p>
	Short-Term	<p>Adverse Minor</p> <p>Discontinuation of intensive agricultural management with reduced or no grazing would either convert from highly managed Pastoral Landscape to a lightly managed one or to a Ruderal Landscape characterized by weedy grasslands.</p>	<p>Adverse Minor</p> <p>Discontinuation of agricultural management would convert highly managed Pastoral Landscape temporarily to Ruderal Landscapes of either weedy grassland or marsh with lower aesthetic value than baseline conditions, even with removal of infrastructure that would improve integrity and unity of visual resources.</p>	<p>Adverse Moderate</p> <p>Effects on Giacomini Ranch would be similar to Alternative B, but extensive temporary dieback in freshwater marsh vegetation in Olema Marsh with a decrease in water impoundment would increase short-term adverse effects to being appreciable.</p>	<p>Adverse Moderate</p> <p>Same as Alternative C</p>
Long Term	<p>Beneficial Minor</p> <p>Effects would be very similar to short-term, except that weediness would be expected to taper off over time, leading to a more natural appearance. In terms of cumulative impact, development along C Street would be expected to have only negligible effect due to</p>	<p>Beneficial Moderate</p> <p>Over time, low-quality Pastoral Landscape would convert to Natural Landscape, although West Pasture and higher elevations of East Pasture would remain largely Ruderal Landscape with decreased aesthetic appeal relative to baseline conditions.</p>	<p>Beneficial Moderate</p> <p>Effects would be very similar to Alternative A, except that restoration of West Pasture would result in expansion of Natural Landscape relative to Ruderal Landscape. Bridge may have negligible to minor adverse effect on views.</p>	<p>Beneficial Moderate</p> <p>Effects would be very similar to Alternative B, except that more extensive restoration in East Pasture would increase extent of Natural Landscape relative to Ruderal Landscape. Over time, Natural Landscape would reestablish in Olema Marsh.</p>	<p>Beneficial Moderate</p> <p>Effects would be similar to Alternative C, except that negligible to minor impacts of public access on views would be reduced with elimination of bridge component.</p>



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Impact Topics	No Action Alternative	Alternative A	Alternative B	Alternative C: Preferred Alternative	Alternative D
Long-Term (Cont.)	presence of dairy barns under existing conditions.	Bridge may have negligible to minor adverse effect on views.		Bridge may have negligible to minor adverse effect on views.	
Socioeconomics					
Construction-Related Effects	Adverse Negligible Effects of construction on local economy would be slight as there would be no to negligible effects on visitation from traffic delays, facility closure, and construction-related noise.	Adverse Negligible Effects of construction on local economy would be slight as there would be no to negligible effects on visitation from traffic delays, facility closure, and construction-related noise.	Adverse Negligible Same as Alternative A	Adverse Negligible Effects of construction on local economy would be slight as there would still be no to negligible effects on visitation expected even with potential traffic delays or detours during construction of Olema Marsh component.	Adverse Negligible Same as Alternative C
Project-Related Effects	Beneficial Negligible Any increase in visitation rates associated with implementation of project would be slight, so benefits to local economy would be negligible.	Beneficial Minor While public access would undergo major improvement, local economy would still experience only minor benefits as most use would come from local or incidental users.	Beneficial Minor Same as Alternative A	Beneficial Minor While public access would undergo only moderate improvement, local economy would still experience minor benefits from local or incidental users.	Beneficial Minor Public access would undergo only minor improvement, which would slightly reduce benefits to local economy from visitation, although they would still remain minor.
Park Management and Operations					
Construction-Related Effects	Adverse Negligible Construction would be paid by private monies. Base-funded support during construction would be expected to total less than 1 percent or \$50,000 annually.	Adverse Negligible Construction would be paid by private and grant monies. Base-funded support during construction would be expected to total less than 1 percent or \$50,000 annually.	Adverse Negligible Same as Alternative A	Adverse Negligible Same as Alternative A	Adverse Negligible Same as Alternative A
Project-Related Effects	Adverse Negligible Base-funded support following implementation would be expected to total less than 1 percent or \$50,000 annually.	Adverse Negligible Base-funded support following implementation would be expected to total less than 1 percent or \$50,000 annually.	Adverse Negligible Same as Alternative A	Adverse Negligible Same as Alternative A	Adverse Negligible Same as Alternative A



Definitions of Impact Intensity Used in Impact Analysis

No Impact	Causing no change
Negligible	Barely detectable change or change that is often within the range of natural variability
Minor	Causing small, but detectable or measurable change
Moderate	Causing apparent or appreciable change
Major or Substantial	Causing striking or highly noticeable change. Often considered a "significant" effect under CEQA



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