

4.3 BIOLOGICAL RESOURCES

4.3.1 Impact Criteria and Methodology

Standards of significance are used to analyze potential project impacts and include factual and scientific information and regulatory standards of county, state, and federal agencies, including any regional guidelines. A threshold is used to differentiate whether there is a significant environmental impact or not. As this assessment is focused primarily on biological habitat and species, impact thresholds are based on factual evidence of physical disturbance of habitat, loss of habitat, and the loss or disturbance of listed species. Impact thresholds are reached and could have significant impact on biological resources if activities within the project area result in the following:

- A population of a threatened, endangered, regulated, or other sensitive species is adversely affected, for example, by reduction in numbers, by alteration in behavior, reproduction, or survival, or by loss or disturbance of habitat. Any “take” of a listed species is considered significant;
- Loss of a substantial number of individuals of a nonlisted species or loss that could affect abundance;
- A substantial adverse effect on a species, natural community, or habitat that is specifically recognized as biologically significant in local, state, or federal policies, statutes, or regulations;
- A substantial adverse effect on a species, natural community, or habitat that is recognized for scientific, recreational, ecological, or commercial importance;
- Permanent loss or significant degradation of any designated critical habitats, breeding areas, or any sensitive coastal, pelagic, or benthic habitats especially for any endangered, threatened, or rare species;
- Any impedance of fish or wildlife migration routes lasts for a period that significantly disrupts that migration;
- Any alteration or destruction of habitat prevents reestablishment of biological communities that inhabited the area prior to the project;
- Extensive alteration or loss of biological communities in high-quality habitat lasts longer than one year;
- Harassment (take) of a special status marine mammal species. There are two levels of harassment defined in the MMPA. Level A is defined as “any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild”; Level B is defined as “harassment having the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering”;

- Disruption of the feeding, breeding, nesting or roosting habits, directly or indirectly, of special status species (including federally and state-listed species, California fully protected species, and species of concern) or their habitats, as designated by federal, state, or local agencies;
- Result in substantial loss, reduction, degradation, or disturbance in native species habitats or in their populations. These impacts could be short- or long-term impacts; for example, short-term or temporary impacts may occur during project implementation, and long-term impacts may result from the loss of vegetation and thereby loss of the capacity of habitats to support wildlife populations. Degradation of native species could also result from introduction of invasive exotic species;
- Result in a net loss of wetland area or habitat value, either through direct or indirect impacts to wetland vegetation, loss of habitat for wildlife, degradation of water quality, or alterations in hydrological functions. This includes riparian habitat and federally protected wetlands;
- Result in substantial loss, reduction, degradation, or disturbance of sensitive plant communities and habitat types;
- Result in substantial interference with the movement of any resident or migratory species of fish or wildlife or with established native resident or migratory wildlife corridors;
- Conflict with any local policies or ordinances protecting biological resources; or
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

Impacts, whether they are significant or not, can be direct or indirect. Direct impacts to biological resources result when biological resources or critical habitats are altered, destroyed, or removed during the course of project implementation. Indirect impacts to biological resources may occur when project-related activities result in environmental changes that indirectly influence the survival, distribution, or abundance of native species (or increase the abundance of undesired nonnative species). Examples of indirect impacts may include effects of noise, presence of chemical contamination, or incidence of human activity levels that may disturb or harm wildlife. It is also possible to have beneficial impacts, directly or indirectly. Finally, impacts may be short- or long- term. Short-term impacts are generally not considered significant, by definition.

4.3.2 Riparian Alternative

Activities associated with the proposed action would occur within habitat for several listed species. Dredging and disposal would occur for approximately three months per

year over four to seven years. This alternative would affect riparian forest, upland, salt marsh, and intertidal habitat.

Significant Impacts

During construction, dredging would increase suspended sediment in the vicinity of dredging activity, increasing turbidity of the water. This in turn could reduce water clarity in the lagoon. This would be a significant impact for biological resources as it would affect survival of phytoplankton and zooplankton, which form the prey basis for many of the wildlife, fish, and bird species in the lagoon. Dredging processes could disrupt activities of wildlife around Bolinas Lagoon, and the presence of the pipeline and barge, as well as tugboat and barge movements, could affect biological resources in Bolinas Bay for the duration of the dredging. Noise, human disturbance, mechanical barriers from equipment and boats, all would affect wildlife, fish, and birds in the lagoon. Finally, some sediments in the lagoon may contain toxic compounds that, when suspended, could affect water quality, which in turn could affect biological resources. Highly toxic drilling fluid additives could contaminate local ponds, either by washing down natural drainages or binding to soil or via aeolian forces. Over time, this increase in toxicity could destroy microorganisms in the water or affect larger wildlife, fish, and bird species. Long-term impacts could come about from the loss of intertidal mudflat habitat as a result of dredging. This is a potentially significant impact because most of the benthic invertebrates that provide the main forage for birds are located in this important habitat type.

Impact 4.3.1: Impact on Benthic Invertebrates

The most basic, and potentially most significant, impact of dredging and increased turbidity would be on benthic (bottom- or mud-dwelling) and aquatic invertebrates in the vicinity of the cutterhead. Although no threatened or endangered invertebrates are reported to exist in the lagoon, these species are of vital importance because of the link that they provide in the food chain of the lagoon. Many of these species are filter-feeders, meaning that they feed by filtering organic matter out of water that passes through their bodies. Although most filter-feeders are adapted to a moderate amount of turbidity, as found under normal conditions, heightened levels of turbidity can clog their filters, making it difficult or impossible for them to continue feeding. This could result in mortality of many individuals of these species.

Invertebrates could be affected in other ways. A direct impact would come from the loss of invertebrates via mortality during dredging and removal of sediment. A disruption of habitat or life cycle of phytoplankton, benthic diatoms, and zooplankton, which form the very basis of the food chain and provide prey for filter-feeders, could occur.

Because invertebrates, particularly benthic invertebrates, form one of the first links in the food chain in the lagoon, the health of the invertebrates will influence the health of the rest of the species throughout the food chain. Any impacts to this level of the food

chain would culminate in an indirect impact on the bird species that are at the top of the food chain.

It is impossible to fully assess the degree to which invertebrates would be affected by the project because there is no published material available that is specifically related to invertebrate ecology in Bolinas Lagoon. Furthermore, several factors may influence the degree to which this impact is realized. The first is that, of the 750 acres of lower inter-tidal (intermittently-exposed mudflat) habitat in the lagoon, approximately 174 acres would be dredged. This represents approximately 23 percent of the mudflat habitat in the lagoon. Dredging would take place over nine years, meaning that approximately 2.5 percent of the mudflat habitat available for habitation by benthic invertebrates and foraging by birds would be affected at any given time. Estimates regarding regeneration times for benthic invertebrates vary, but the HEEP estimates that these communities could begin to regenerate within two years. In this case, which is the best-case scenario, approximately five percent of the benthic habitat would be unavailable for invertebrates or the birds that feed on them during the project period. Total regeneration of benthic communities under this scenario would therefore occur within eleven years of the onset of the project, with varying levels of regeneration in dredged areas in the intermediate years.

A more probable scenario is that while total regeneration of certain components of benthic communities would take longer than two years (for example certain hardshell clams that may take up to twenty years to achieve maturity [Fong 2002]), other species, such as tubeworms and soft-shelled organisms, would begin to come back sooner. In such a case, while the quality of foraging habitat for birds and other organisms in the food chain would be compromised, this effect would become less pronounced over time.

It is possible that benthic invertebrate communities would experience significant regeneration within two years of dredging in any given area on their own, in which case the impacts would be diminished. However, because of the extremely important role these organisms play in the ecology of Bolinas Lagoon, impacts to them resulting from project activities are considered significant and unmitigable.

Mitigation 4.3.1: Impacts to benthic invertebrates are considered unmitigable because the project involves dredging and removing the habitat in which these species reside, as well as direct mortality (from mechanical processes or increases in turbidity or toxicity of their habitat) to individuals in the populations. Most of these species are found in the substrate throughout the year; therefore, there are no work windows that can be established to offset impacts to these species.

Impact 4.3.2: Loss of Jurisdictional Wetland

Jurisdictional wetland and waters of the US are found throughout the project area. Waters of the US include all unvegetated intertidal and subtidal areas within the lagoon, while wetlands are found in the vegetated salt marsh, freshwater marsh, and riparian

areas of the uplands. Approximately 100 acres of wetland would be affected in PGC Delta and Kent Island. During the design phase of the restoration project, the Corps will comply with the requirements of the CWA and the Rivers and Harbors Act.

Destruction of over 0.5 acre of any wetlands is considered a significant impact, according to the CWA. Furthermore, salt marsh habitat of the type that would be removed is an important source of food for small organisms in the lower intertidal area (intermittently exposed mudflats), which then provide food for birds. Salt marsh, especially in the PGC Delta, is also an important refugia for certain sensitive bird species, such as the black rail and the salt marsh common yellowthroat.

Mitigation 4.3.2: No feasible mitigation has been identified for this impact. Appropriate mitigation for loss of approximately 100 acres of jurisdictional wetlands is creation of similar wetlands, on-site. However creation of this amount of intertidal wetlands within the lagoon restoration area is not physically possible as it would conflict with the basic objectives and purposes of the project, which is intended to increase tidal volume in Bolinas Lagoon. Wetlands are upper intertidal habitat, and creation of such habitat would lower tidal prism rather than increase it. As a result, there is no feasible on-site mitigation for the loss of wetlands.

Off-site mitigation would require the creation of 200 acres of wetlands at the 2:1 ratio preferred by the CWA. This is infeasible as well because it would be inconsistent with County policies regarding keeping the mitigation in geographic proximity to the project site, there are no acceptable locations close to Bolinas Lagoon, and the cost of creating, restoring or enhancing this amount of wetland offsite could prevent completion of the lagoon restoration project as proposed.

The goal of the project is to restore valuable lower intertidal and subtidal habitat, found at a lower elevation than salt marsh. Although dredging would eliminate jurisdictional wetlands, this loss would be replaced by more than 2 million cy of new or restored highly ecologically valuable lower intertidal and subtidal habitat in furtherance of the project's purpose and need. While this does not technically constitute mitigation for the loss of jurisdictional wetlands, there would be an overall substantial net environmental benefit derived from the increase of these other types of habitat, which otherwise significantly offsets the loss of the jurisdictional wetland/intertidal habitat. Additionally, some salt marsh vegetation is expected to reestablish in the zone between 2 and 4.5 feet NGVD, and this would also partially offset impacts caused by the loss of salt marsh. (This re-established salt marsh in the lagoon margin would not fully mitigate the loss of jurisdictional wetlands to less than significant).

Impact 4.3.3 Loss of Black Rail Habitat

Excavation of salt marsh habitat would have significant impacts on the state-listed as threatened California black rail. Although salt marsh habitat is found in many parts of the lagoon, the largest patches are around the apron of PGC Delta. This area offers the best habitat for this species and is where informal surveys have detected the most

members of the species (HEEP 2001). Furthermore, as the habitat available for this species diminishes on a regional basis, remaining patches, such as that found in PGC Delta, become increasingly important. PGC Delta offers uniquely suitable habitat for the black rail in that bulrush is found near the pickleweed salt marsh there, a combination preferred by the species.

Mitigation 4.3.3: The only way to mitigate for loss of black rail habitat would be to restore salt marsh vegetation that would be lost as a result of project activities. As there are no plans to mitigate for the loss of salt marsh habitat, impacts on the black rail are unmitigable.

Less than Significant Impacts

Foraging and resting habitats of many bird species, including the federally listed endangered brown pelican and the federally listed threatened western snowy plover, are found in the project area.

Sensitive Bird Species

Brown pelican: The affected areas for the brown pelican would be in the north basin and open water areas of the central and south lagoons. Activities such as dredging, equipment installation, and lights and noise from equipment may cause minor impacts to pelicans. Breeding and nesting would not be affected, as pelicans do not conduct those activities in northern California. Pelicans are in the proposed project area from late June through October.

The pelican's ability to forage would be slightly compromised near the dredge due to noise from the equipment and turbidity from the dredging process, and lights and noise may disturb them while they are roosting. Increased turbidity is not expected to be a significant impact, in that pelicans feed on surface fish, and turbidity would be greatest toward the bottom of the lagoon around the cutterhead. The duration of impacts to the pelican in this area would not exceed two months per year in the North Basin. The central lagoon would be excavated from July through October, most of the time that the pelican is present, while the south lagoon would be open for dredging from July through February. The GFNMS would retain final discretion regarding times when dredging equipment could enter the lagoon. Overall impacts to the pelican would be considered short-term and nonsignificant. The proposed action presents a relatively low amount of impact at any given time, and the impacts at any given time are confined to an area that is only a small percentage of the available habitat at Bolinas Lagoon.

Western snowy plover: The western snowy plover forages within the project area, primarily at the tip of the Seadrift sand spit, just south of the mouth of the lagoon (Stallcup 2001) but also in the sand bars of the open water areas during low tide. Although the project area is in proximity to critical habitat for the snowy plover, the species does not nest or mate in the project area. The proposed action would involve placing a pipe across the northern end of Stinson Beach, in the area used as foraging

habitat by the western snowy plover, which would fragment the area in which the plover could forage without taking flight. Removing some tidally exposed sandbars would remove a small amount of foraging habitat for the western snowy plover. The annual placement of the pipe over the beach might temporarily disrupt the plover's foraging activities, but the amount of foraging habitat lost would be minimal, and no significant impacts to this species would occur as a result of project activities.

Northern harrier: The northern harrier would lose some nesting habitat when salt marsh is removed. This would be a temporary and less than significant impact, as the species would be able to find sufficient alternative wetland while the affected salt marsh regenerates.

Salt marsh common yellowthroat: The salt marsh common yellowthroat may be temporarily affected by project activities because it resides in salt marsh habitat. Impacts are expected to be less than significant because the species would be able to find sufficient alternative wetland while the affected salt marsh regenerates.

Other bird species: Other listed or sensitive bird species, such as the marbled murrelet and the northern spotted owl, are not expected to be significantly affected by the proposed project activities because these species lack habitat in the project area. Both of these species require old-growth temperate forest composed of redwood and Douglas fir trees, species that are not found in the project area. The California clapper rail is considered to be extirpated in the project area and therefore would not be affected by project activities (Stallcup 2001).

Sensitive Fish Species

Steelhead trout: Project activities that are most likely to affect the steelhead trout are removal of sediment east of the riparian area of the PGC Delta and removal of vegetation within the upland and riparian area itself. This area would be excavated between July and October, outside of the time that the steelhead would normally be present. Short-term effects would be disturbance from excavation in the delta and riparian area, as well as increased turbidity from sediment removal in the vicinity of the cutterhead. Permanent effects would be loss of marginal spawning habitat in the riparian zone.

In-migrating trout may encounter some turbidity in the excavation area of PGC Delta. This would occur between the mouth of the creek and the open water areas. Some loss of marginal spawning habitat may occur in areas that are cut to restore tidal flow. Removal of riparian vegetation may result in slightly higher water temperatures in Pine Gulch Creek. Access to spawning grounds would be increased after the sediment bar at the mouth of the stream was removed. Any sediment removal from the mouth of Easkoot Creek would enhance access to this stream. In this respect, the project would have a net beneficial impact on the steelhead trout.

Coho salmon: Project activities that are most likely to affect the coho salmon are removing sediment east of the riparian area of the PGC Delta and removing vegetation within the upland and riparian area itself. This area would be excavated between July and October, outside of the time that the coho would normally be present. Short-term effects would be disturbance from excavation in the delta and riparian area, as well as increased turbidity from sediment removal in the vicinity of the cutterhead. Permanent effects would be loss of marginal spawning habitat in the riparian zone.

Excavation in the PGC Delta would improve the coho's access to Pine Gulch Creek. Lowering sandbars and excavating open water channels would remove possible impediments to their historic spawning grounds, resulting in a beneficial impact to the species. Increased turbidity near the cutterhead is not expected to affect the coho, as it does not linger in the open water channels. Channels within Pine Gulch Creek would be disturbed in the short term during removal of upland and riparian vegetation. Vegetation removal may result in slightly higher water temperatures in the more easterly portion of the stream that is now shaded by willows and alders.

A colony of approximately 50 harbor seals is frequently found on the edge of the open-water channel in the east-central part of the lagoon. Increasing the size of these channels could improve the chances that fish would be able to make it through this area without being preyed on by seals.

Waterborne Invertebrates

Some invertebrates that exist in the water column may be present only seasonally. Furthermore, these species are generally more mobile than species that exist only in the mud and are therefore more able to avoid construction impacts. Impacts to species that exist in the water column could be mitigated by working only during windows that correspond to times when these species would not likely be present in the lagoon. In order to establish these windows, the lead agency would conduct surveys to determine the presence of these species.

Sensitive plant species

Numerous sensitive, threatened, or endangered plant species are listed as possibly occurring in the project area. Those that occur in open water, salt marsh or riparian habitat would be most at risk of impact from the proposed action. Those that may occur in these habitats within the project area are listed below. During the planning phase, proposed excavation areas would be surveyed for the presence of sensitive, threatened, or endangered plant species. If it were determined that these species were present, the restoration alternatives would be planned in such a way that these plants would be avoided. The project proponent would salvage, grow, and replant any sensitive plants that could not be avoided during excavation.

Point Reyes bird's-beak: Figure 3-10 indicates that Point Reyes bird's beak is found on Kent Island, and would therefore be impacted by excavation of the island. The site

will be surveyed for this species before construction, and the project proponent will reestablish impacted populations in a different part of the lagoon, overseen by a qualified botanist. This revegetation effort will be monitored for five years to ensure that the population becomes established. Compliance with this mitigation will ensure that impacts to this species are less than significant.

Sonoma alopecurus: This species is known only to five native occurrences, totaling 200 individuals. This species has not been recorded in PGC Delta, and it is doubtful that it occurs there. There would be no impact to this species from project activities.

Marin knotweed: This species is known from only fifteen locations (CNPS 2001). Although not reported in the project area, it occurs in habitat such as that found in PGC Delta. If it were present, it would be affected by project activities. Construction in this area should be preceded by surveys for this species. If it were determined that the species is present, the project proponent will reestablish populations in a different part of the lagoon, overseen by a qualified botanist. Compliance with this mitigation would ensure that impacts to this species are less than significant.

No Impact

Harbor seals: There would be no impacts to harbor seals from dredging as no dredging would occur during the seal pupping and molting periods (March through July).

Other species: There would be no impact to any other species mentioned in Table 3-3. In all cases, either there is no habitat for the species in the project area, or the habitat that is available would not be impacted by project activities.

4.3.3 Estuarine Alternative

Impacts and mitigations occurring under the estuarine alternative would be the same as those for the riparian alternative, except that there would be additional impacts to the California red-legged frog. This is because the two alternatives are the same, except that the estuarine alternative also proposes removal of seven additional acres of riparian and 10 additional acres of upland and intertidal habitat in PGC Delta. This would result in a greater impact to jurisdictional wetlands: as much as 10 acres more would be lost under this alternative.

Significant but Mitigable Impacts

Impact 4.3.4: Impact to the California red-legged frog

The part of the proposed action area that offers best potential habitat for the California red-legged frog is a riparian zone that has formed in the PGC Delta. The proposed action would eliminate seven acres of riparian vegetation that offers abundant streamside vegetation, pools up to six feet deep, and undercut banks, all qualities preferred by the species. Although the frog is not known to inhabit this part of the PGC Delta, it does occupy other streams found nearby (Fellers 2001). If the

species were present, removal of this habitat would constitute significant impacts in the form of loss of foraging and breeding habitat, as well as take during construction.

Mitigation 4.3.4: The project proponent would conduct surveys to establish the presence of the species, in accordance with USFWS protocols. If the results of the survey indicated that the species were not present, the project proponent would restore suitable habitat for the species at a ratio of 3 to 1 on-site, for any riparian habitat that was destroyed as a result of the project, or at a ratio of 5 to 1 if the restoration were conducted off-site. If the survey indicated that the species is present in the proposed action area, the project proponent would consult with the USFWS to determine appropriate mitigation procedures, such as revegetation with native riparian plant species.

4.3.4 No Action

Significant Impacts

Impact 4.3.5: Loss of Habitats

Under the No Action Alternative, there would be no effort made to dredge or otherwise alter the lagoon. The lagoon would be allowed to siltify and eventually to close. This is a natural process in most lagoons, and under normal circumstances this would mean that there would be no significant impacts to biological resources, even though such sedimentation and closure would cause a drastic change in the ecological makeup of the lagoon. However, many of the reasons that Bolinas Lagoon is siltifying at an accelerated rate are due to human influence, either through human activity in the watershed or because of development that inhibits tidal flushing. Therefore, there is a strong argument that since human activities have strongly influenced the rate of ecological change in the lagoon, then the impacts of closure of the lagoon inlet should be considered significant and long-term. Under the No Action Alternative, sediment would continue to build up and fill in open water areas within the lagoon, which in turn would decrease the extent of tidal inundation, diminish water quality, and degrade existing habitat values. Over time, this would result in the loss of open water, salt marsh, riparian, and transitional habitats and associated plant and animal species. These would be direct significant impacts to biological resources based on the criteria presented in Section 4.3.1.