

**APPENDIX K: MITIGATION MONITORING AND
REPORTING PROGRAM:
INVASIVE SPARTINA PROJECT, SPARTINA
CONTROL PROGRAM**

SEPTEMBER 2003

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1.0 INTRODUCTION

BACKGROUND

Assembly Bill 3180 became law in California in January 1, 1989. This bill requires all public agencies to adopt monitoring or reporting programs when they approve projects subject to Environmental Impact Reports (EIRs) or Negative Declarations that identify significant impacts. The reporting or monitoring program must be adopted when a public agency makes its findings under the California Environmental Quality Act (CEQA) so that the program can be made a condition of project approval in order to mitigate significant effects on the environment. The program must be designed to ensure compliance during project implementation to mitigate or avoid significant environmental effects.

This MMRP includes both a complete listing of all required mitigation measures identified in the San Francisco Estuary Invasive Spartina Project: Spartina Control Plan EIS/EIR, and a table describing who is responsible for monitoring the implementation of those measures, and how that monitoring shall be implemented.

Mitigation measures are grouped by the impact categories used in this EIR, and numbered sequentially below. This Monitoring and Reporting Program includes a Checklist designed to facilitate verification and monitoring of project compliance with required mitigation measures. This document will be used by the California Coastal Conservancy to verify inclusion of required project design features and ongoing mitigation measures. The Checklist serves as a summary so that public officials, the Applicant, and the public can easily determine which measures have been complied with, and to what extent.

2.0 MITIGATION MONITORING AND REPORTING PROGRAM CHECKLIST

The Mitigation Monitoring and Reporting Program Checklist is proposed for monitoring the implementation of the mitigation measures contained in the Environmental Impact Report (see Attachment 1 for a listing of mitigation measures). The Conservancy should implement the monitoring program as follows:

- The Program Coordinator, or designee, should be responsible for coordination of the monitoring program including the monitoring checklist (Attachment 2).
- Each responsible individual or agency will be responsible for determining whether the mitigation measures contained within the checklist have been complied with. Once all mitigation measures have been complied with, the responsible individual or agency should submit a Verification Report Form (Attachment 3), or similar form, and a completed checklist to the Coordinator.

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- If a responsible individual or agency determines that a non-compliance has occurred, a written notice should be delivered to the Coordinator describing the non-compliance and requiring compliance within a specified period of time.

3.0 IMPLEMENTATION

The Invasive Spartina Project Program Coordinator shall be responsible for overall implementation and administration of the Mitigation Monitoring and Reporting Program Checklist for the proposed Spartina Control Program.

Duties of the Coordinator would include the following:

- Coordinate with applicable agencies that have mitigation monitoring and reporting responsibilities.
- Assure follow-up and response to citizens' complaints.
- Develop forms and checklists for reporting. A sample Verification Report Form is included (Attachment 3).
- Maintain the Mitigation Monitoring and Reporting Program Checklist or other suitable mitigation compliance summary.

As described in the Checklist table, most of the actual on the ground monitoring for implementation of mitigation measures will be undertaken by the ISP Field Supervisor or the agency implementing the measures. In all cases, these monitors shall submit verification forms to the Program Coordinator.

**ATTACHMENT 1: MITIGATION MEASURES IDENTIFIED IN THE SAN FRANCISCO ESTUARY
INVASIVE SPARTINA PROJECT: SPARTINA CONTROL PLAN EIS/EIR**

This section lists all of the mitigation measures identified in the Final Invasive Spartina Project Spartina Control Program EIS/EIR, by topic, for Alternative 1, the CEQA proposed project.

HYDROLOGY AND GEOMORPHOLOGY

MITIGATION GEO-1: In sites of cordgrass removal where unacceptable increases in erosion rates (significantly greater than background levels or threatening the stability of existing infrastructure such as access roads or utility structures) are likely, temporary physical erosion controls shall be established until sediments either consolidate or stabilize naturally. In mudflats, revegetation as a stabilization measure is precluded because it would be infeasible or defeat the purpose of eradication. In some situations natural lag armor materials such as shell fragments (too heavy to be eroded) may be spread over erosion-susceptible surfaces such as excavation scars to increase resistance to further scour. Other standard erosion control methods for terrestrial environments (such as jute netting, silt fences, coir fabric, etc.) would be ineffective and unstable (rapidly removed) in energetic tidal environments, and could cause nuisances or hazards where they are redeposited. For tidal creeks, monitor following removal for return of adequate channel dimensions. If tidal creek banks require revegetation after adequate dimensions are restored by erosion, they shall be replanted with sprigs of native Pacific cordgrass.

MITIGATION GEO-2: Unless the treatment method specifically requires it, vehicle travel in the tidal marsh and mudflat shall be minimized. Mats shall be used to distribute the weight of vehicles on marsh surfaces wherever feasible. Sensitive sites, or sites surrounded by sensitive habitat that could be significantly impacted by erosion or sedimentation from overland vehicles shall be accessed by boat providing those access methods have less overall adverse environmental impact.

MITIGATION GEO-3: Resumed erosion at sensitive locations shall be mitigated by one or both of the following shoreline stabilization measures:

- Sand nourishment (artificial placement of suitably textured sand [appropriate grain size for local wave climates]) may be appropriate along relatively low-energy estuarine shorelines. Sand nourishment may be suitable if cordgrass is removed by excavation, leaving extensive temporary erosional scars and deficits in local sand budgets. Excavated cordgrass-infested sand could be stockpiled at upland or non-sensitive diked baylands long enough to desiccate and kill cordgrass rhizomes. When inert, it could be replaced in the foreshore to be made again available for waves to rework.
- Repair or replacement of rock slope protection or other existing erosion protection structures. It should be noted that these measures may result in secondary impacts on biological and other resources that would need to be analyzed in project-specific environmental reviews.

MITIGATION GEO-4: Sediments dredged or otherwise removed from treatment sites shall be disposed of as prioritized in the Corps of Engineers' 1998 Long Term Management Strategy (LTMS) for Bay dredged material. These sediments shall not be disposed of in dredge disposal sites in the Estuary or offshore where seeds may be dispersed elsewhere in the Estuary or to other coastal

estuaries. They shall be disposed of in upland disposal sites or at depths in sites proposed for tidal marsh restoration. If the latter approach is selected, cordgrass-contaminated sediments shall be overlain by at least two feet of sediments that are free of invasive cordgrass seed or other invasive cordgrass matter. Regional strategic coordination between eradication and tidal marsh restoration projects may also allow a synergy among multiple projects involving sediment removal (flood control, eradication) and sediment deposition (tidal marsh restoration in salt ponds).

WATER QUALITY

MITIGATION WQ-1: Herbicides shall be applied directly to plants and at low or receding tide to minimize the potential application of herbicide directly on the water surface. Herbicides shall be applied by a certified applicator and in accordance with application guidelines and the manufacturer label.

The Control Program shall obtain coverage under the State NPDES Permit for the Use of Aquatic Herbicides and any necessary local permits. A monitoring program shall be implemented as part of the NPDES permit, and shall include appropriate toxicological studies to determine toxicity levels of the herbicide solutions being used. The Control Program shall use adaptive management strategies to refine herbicide application methods to increase control effectiveness and reduce impacts. The Control Program shall continue to investigate improved herbicide formulations with lower ecological risk.

MITIGATION WQ-2: Herbicides shall be applied by or under the direct supervision of trained, certified or licensed applicators. Storage of herbicides and adjuvants/surfactants on-site shall be allowed only in accordance with an approved spill prevention and containment plan; on-site mixing and filling operations shall be confined to areas appropriately bermed or otherwise protected to minimize spread or dispersion of spilled herbicide or surfactants into surface waters.

MITIGATION WQ-3: Fueling operations or storage of petroleum products shall be maintained off-site, and a spill prevention and management plan shall be developed and implemented to contain and clean up spills. Transport vessels and vehicles, and other equipment (e.g., mowers, pumps, etc.) shall not be serviced or fueled in the field except under emergency conditions; hand-held gas-powered equipment shall be fueled in the field using precautions to minimize or avoid fuel spills within the marsh. Other, specific best management practices shall be specified as appropriate in project-specific Waste Discharge Requirements.

MITIGATION WQ-4: For projects where dredging or excavation methods are used, a preliminary assessment shall be performed to determine the potential for contamination in sediments prior to initiating treatment. The preliminary assessment shall include (1) review of existing site data (e.g., from Regional Monitoring Program) and (2) evaluation of historical site use and/or proximity to possible contaminant sources. If the preliminary assessment finds a potential for historic sediment contamination, an appropriate sediment sampling and analysis plan shall be developed and implemented. If contaminants are present at levels of possible concern (but below levels that might trigger site cleanup), an alternative treatment method (that shall not disturb sediment) will be implemented, or the project shall apply to the Regional Water Board for site-specific Waste Discharge Requirements. If significant contamination that warrants site cleanup is found, sampling information shall be turned over to the U.S. Environmental Protection Agency or other appropriate authority.

BIOLOGICAL RESOURCES

MITIGATION BIO-1.1: Vehicle and foot access pathways in marsh invaded by salt-meadow and English cordgrasses, including marsh access to invaded mudflats shall be minimized. Seasonal timing of glyphosate treatment of *S. patens* shall be adjusted to minimize impacts to non-target native marsh vegetation. When treating small, discrete colonies of salt-meadow cordgrass or English cordgrass, adjacent vegetation shall be buffered against spray drift by temporarily placing geotextile fabric segments (aprons or fence-like fabric barriers) adjacent to colonies at the time of spraying. Adjacent vegetation also could be buffered against spray drift by pre-application of bay mud suspensions to coat leaf surfaces. Oversprayed non-target vegetation could be irrigated with muddy bay water applied by portable pumps or truck tanks. Geotextile covers shall be stabilized by stakes and weights, and monitored after high tides or high wind events. Standard best management practices for herbicide application in wildlands (e.g. field crew training, clear marking of spray boundaries in the field, expert ecological supervision during field operations, restricting operation to optimal low-wind times, nontoxic spray markers, etc.) shall be used to minimize incidental overspray and drift. Cleared patches shall be monitored for recruitment of invasive perennial pepperweed until native vegetation has become dominant. In patches highly vulnerable to spread of contiguous perennial pepperweed, treated areas shall be replanted with saltgrass and pickleweed in the following spring to discourage seedling microhabitats for perennial pepperweed. Salt-meadow cordgrass and English cordgrass mown, cut, or shredded shall be prevented from dispersal by mounding cut debris and on-site composting under heat-retaining geotextile fabric or black plastic in warm weather. Optimal combinations of treatment shall be used to minimize repeat entry to marsh and re-treatment (e.g. mowing or burning followed by spot-application of herbicide to low densities of survivors). Where Atlantic smooth cordgrass is removed from high marshes where native species other than cordgrass are dominant, native vegetation may be replanted.

MITIGATION BIO-1.2: Vehicle and foot access pathways in marsh invaded by Atlantic smooth cordgrass, including marsh access to invaded mudflats shall be minimized. Equipment working in marsh plains shall be restricted to mats and geotextile fabric covers. Non-viable excavated non-native cordgrass and excavated sediment shall be stockpiled and removed from marsh. Non-target vegetation shall be covered with fabric adjacent to areas sprayed with herbicide, or non-target vegetation shall be pre-treated with protective films of silt-clay. Smothering geotextile mats shall be stabilized with stakes and weights, and inspected frequently. Optimal combinations of treatment shall be used to minimize repeat entry to marsh and re-treatment (e.g. mowing or burning followed by spot-application of herbicide to low densities of survivors). Herbicide spray dose requirements for effective treatment shall be minimized by pre-treatments (mowing, crushing, or burning) that reduce live cordgrass density and increase exposure of receptive young growth following pre-treatment. Removal methods other than helicopter applications of herbicide shall be used whenever feasible and less environmentally damaging. If new technology is available and feasible, non-spray application techniques (e.g., modified cut-stump herbicide paste or wicking techniques) shall be used to reduce herbicide dose and minimize non-target contact. Dispersal of viable seed shall be minimized by performing removal prior to seed set or maturation, or if natural or artificial conditions constrain seed set prior to eradication.

MITIGATION BIO-1.3: Mitigation BIO-1.1 also would apply to Chilean cordgrass.

MITIGATION BIO-1.4: Large deposits of mown cordgrass shall be raked and removed during the growing season if tidal marsh pans supporting submerged aquatic vegetation occur in the vicinity; or temporary water-permeable debris barriers (i.e. silt fences) shall be installed around vulnerable pans. Transporting tanks of spray solution near pans shall be avoided to prevent contact by accidental spills.

MITIGATION BIO-2: Pre-project spring surveys for sensitive plants shall be conducted the same year as eradication work at treatment sites (for annual species), or at least the prior year (for perennial species). GPS data and stake locations of sensitive plant populations shall be recorded, and field crews on foot or in vehicles shall be instructed to avoid and protect sensitive populations. Qualified, experienced on-site botanical supervision shall be required if sensitive plants occur in the vicinity of eradication work. If sensitive plant populations occur near the high tide line, rake and large deposits of mown cordgrass shall be removed during the growing season. Burning in marshes supporting sensitive plant species shall be prohibited. Smothering geotextile mats shall be stabilized with stakes and weights, and inspected frequently. Non-target vegetation shall be covered with fabric adjacent to areas sprayed with herbicide, or spray-drift barriers made of plastic or geotextile (aprons or tall silt fences) shall be installed. If accidental exposure to spray drift occurs, affected plants shall be thoroughly irrigated with silt-clay suspensions.

Refrain from rapid replanting Pacific cordgrass (native *Spartina foliosa*) in both new restoration sites or invasive cordgrass-eradicated sites, until pollen flow and seed rain from hybrid Atlantic smooth cordgrass to the site is confirmed to be minimal for purposes of subsequent detection and control. Use natural cordgrass seedling recruitment rates to monitor “invasion pressure” (ratio of non-native to native cordgrass seedlings) to determine both eradication effectiveness for a tidal marsh subregion, and the earliest date for active replanting with native clones, if needed. In patches highly vulnerable to spread of contiguous perennial pepperweed, treated areas shall be replanted with saltgrass and pickleweed in the following spring to discourage seedling microhabitats for perennial pepperweed.

MITIGATION BIO-3: Treatment activities occurring within 1,000 feet of mudflats shall be scheduled to avoid peak fall and spring Pacific Flyway stopovers. Optimal combinations of treatment shall be used to minimize repeat entry to sites near sensitive shorebird roosts or preferred foraging areas, and to minimize need for re-treatment. Field crews shall be mobilized to project sites soon after high tide, before mudflats emerge to discourage shorebird presence. Field crews shall haze shorebird flocks downwind of spray sites to minimize potential direct contact with drifted glyphosate spray mixes. Hazing shall be maintained until flood tide to minimize potential indirect contact with shorebirds returning to sprayed or drift-exposed areas. Spilled herbicide, surfactant, or solution on marsh or mudflats shall be immediately remediated by application and removal of adsorbent materials, suction using portable wet vacuum or pumping equipment, or by other suitable method. Shorebirds will be kept away from the spill area by hazing until the spill is remediated. Broadcast spraying by helicopters shall be restricted to meadows and large stands of cordgrass, or where there is no other reasonable access. Targeted helicopter application of herbicide by “spray ball” will be a preferred treatment option to reduce all negative treatment impacts to shorebirds. Helicopters will not be operated within 1,000 feet of active major roosting or foraging sites.

MITIGATION BIO-4.1: Even where environmental conditions indicate low probability of presence, and low potential abundance of the salt marsh harvest mouse, the species shall be presumed to be present in project areas containing mixed pickleweed vegetation. This presumption is a precaution against avoidable “take” of this endangered species. Use of vehicles in potential tidal marsh habitat of the salt marsh harvest mouse and tidal marsh shrew species shall be minimized. Shortest possible access paths shall be determined prior to marsh entry, and shall be flagged to limit travel patterns of vehicles to areas with mats or geotextile covers. Use of optimal combinations of treatment shall be implemented to minimize repeat entry to marsh and re-treatment (e.g. mowing or burning followed by spot-application of herbicide to low densities of survivors). When possible, work shall be scheduled in suitable small-mammal habitat soon after natural mass-mortality events caused by extreme high tides.

If site-specific evaluations indicate that potential take of salt marsh harvest mouse individuals is excessive, or degradation of habitat is unacceptable despite avoidance and minimization measures, then compensatory mitigation shall be planned and implemented. Appropriate compensatory mitigation may include construction of pickleweed marshes (acreage and location to be determined) at or slightly above the plane of contemporary mean higher high water, to increase the resilience of resident salt marsh harvest mouse populations to natural extreme tidal flooding and sea level rise. Providing tidegates to choke tidal circulation to optimal levels needed to maintain optimal salt marsh harvest mouse habitat quality (with reduced risk of tidal flooding mortality) is an additional mitigation option, depending on mitigation site conditions. These and/or other options shall be proposed as mitigation in consultation with the U.S. Fish and Wildlife Service and California Department of Fish and Game.

MITIGATION BIO-4.2: Vehicle and foot access pathways in marsh within 1,000 feet of seal haul-outs shall be minimized, and approaching haul-outs within 2,000 feet, or any distance that elicits vigilance behavior when pups are present shall be avoided. Marine mammal experts shall be consulted to determine seasonal variation in sensitivity to disturbance. Equipment working in marsh shall be restricted to prescribed paths. Optimal combinations of treatment shall be used to minimize repeat entry to marsh and re-treatment (e.g. mowing or burning followed by spot-application of herbicide to low densities of survivors). Treatment combinations that minimize the need for re-entry of the vicinity of the haul-out shall be used. Low-flying aerial spray helicopters shall be prohibited within 2,000 feet of seal haul-outs. Spray tanks containing pre-mixed solutions of herbicide shall be transported in impact-resistant sealed containers to prevent accidental tank rupture during transport or loading/unloading. In case of herbicide/surfactant solution spill, small volumes of spilled solutions on mudflats shall be remediated to the greatest extent feasible by suction of surface muds, using portable wet vacuum, or pumping equipment.

MITIGATION BIO-5.1: Although some project impacts on clapper rails cannot be reduced to less than significant levels, the following measures shall be implemented to reduce project impacts as much as possible. This EIS/R includes Best Management Practices for reducing project impacts to California clapper rails in Appendix G. These clapper rail mitigation requirements may be modified by the US Fish and Wildlife Service in its Biological Opinion.

Treatment projects shall be planned to avoid disturbance outside of treatment areas. Access routes for personnel and equipment shall conform to avoidance protocols. Treatment in occupied clapper rail habitat shall be conducted outside of the clapper rail breeding season. Avoidance measures shall be based on current survey and map data.

For unavoidable significant impacts to clapper rails, compensatory mitigation shall address loss of individuals, population reproductive potential, and population viability (resilience or probability of persistence following perturbations) at both local and regional scales. Compensatory mitigation is based on enhancing or restoring habitat, populations, or reproductive success in the larger regional population.

One method for increasing breeding success in California clapper rail populations offsite (outside of eradication project areas) is to apply rigorous predator population controls to areas invaded by non-native predators such as red fox and Norway rats. Habitat modifications that enhance shelter from predators during high tides, such as replacing annual weeds with tall, native perennial salt marsh edge vegetation, and increasing adult survivorship has a large, positive effect on breeding success: clapper rails are prolific breeders when adult survival is high.

Where tidal marsh can be restored near occupied proposed treatment sites without becoming significantly invaded by additional non-native cordgrass (i.e. where invasion pressures and seed sources are minimal), alternative rail habitat shall be enhanced or restored in advance of eradication operations. Rails affected by eradication operations may be allowed to disperse into newly provided habitat, or if necessary they could be experimentally translocated to suitable alternative habitat, if required by the U.S. Fish and Wildlife Service and California Department of Fish and Game. Where large blocks of habitat are proposed for eradication work, compensatory mitigation for clapper rails must be planned and implemented at larger regional scales. A potentially feasible regional compensation strategy would be to establish accelerated, large-scale clapper rail habitat restoration in the nearest subregion of the Estuary that is subject to minimal invasion pressure from non-native cordgrass. High-impact, large-scale eradication projects would be phased to coincide with or follow successful establishment of viable clapper rail populations of sufficient size in new “rail refuges.” All compensation strategies would be at the discretion of the U.S. Fish and Wildlife Service and California Department of Fish and Game, to be determined by formal consultation.

All dredging proposals would require individual authorization and review by the Dredge Materials Management Office, a multi-agency panel of regulatory agencies (Corps of Engineers, Regional Water Quality Control Board, BCDC, EPA). Sediment screening criteria for contaminants of sediments placed in wetlands, and more recent criteria from the California Toxics Rule, would be used to evaluate sediment samples from proposed cordgrass dredge sites. In addition, the U.S. Fish and Wildlife Service would review and regulate dredging in clapper rail habitat through formal endangered species consultation. These stringent reviews and subsequent authorizations would prevent dredging in areas of excessive contaminant mobilization risk, and reduce the risk of mercury and other contaminant impacts to clapper rails to less than significant levels. In treatment areas within 15 feet of tidal creek banks at Southhampton Marsh, treated areas shall be replanted with local gumplant, saltgrass, and pickleweed in the following spring to hasten growth of improved cover for black rails.

MITIGATION BIO-5.2: Protocols for minimization and avoidance of California clapper rails (Appendix G) for work in infested marshes known to support populations of California black rails (currently one: Southhampton Marsh, Benicia) shall be adopted, emphasizing pre-project surveys (call detection), minimization of marsh disturbance (Mitigation BIO-1.2), and occupied habitat shall be avoided during the breeding season.

MITIGATION BIO-5.3: Adapt protocols for minimization and avoidance of California clapper rails (Appendix G) for work in infested marshes known to support populations of Alameda song sparrows, San Pablo song sparrows, Suisun song sparrow, and the salt marsh common yellowthroat, emphasizing pre-project surveys, minimization of marsh disturbance (Mitigation BIO-1.2), and avoidance of occupied habitat during the breeding season.

MITIGATION BIO-5.4: Prior to levee access in areas where snowy plovers may breed, levee routes shall be surveyed for potential nests, including nests in salt pond beds near levee roads. Dredging and excavation of cordgrass shall be conducted either after least terns have migrated out of San Francisco Bay, or during middle to lower tidal stages that allow navigation of barge and crane operations, while exposing the maximum extent of cordgrass above standing tides.

MITIGATION BIO-5.5: Use of helicopters to apply glyphosate herbicide solution in mid- and upper-marsh plains shall be minimized during raptor nesting season. If helicopters are used at these locations during the nesting season, a survey for raptors shall be performed by a qualified biologist, and any identified nests shall be provided a buffer of at least 500 feet from spray helicopters.

MITIGATION BIO-6.1: Dredging of infested intertidal channels shall be limited to: (1) tidal stages when target areas are emerged above water level, and (2) during seasons when winter- and spring-run Chinook salmon and steelhead migration times minimize their risk of exposure at project sites, particularly juveniles. Water intakes for impoundments shall have intake elevations limited to tides above mean high water (extreme tides overtopping marsh plain) to minimize entrainment and trapping. Alternatively, fish screens shall be installed on any new tidegates used to impound and drown large cordgrass-infested marshes in former diked baylands. Herbicide methods shall be minimized or avoided near channels and mudflats during migration periods of winter-run and spring-run Chinook salmon and steelhead. Glyphosate/surfactant spray application requirements shall be minimized by pre-treating target cordgrass stands with mechanical methods that reduce cordgrass biomass and density, increase receptivity and coverage of spray, and increase mortality response to glyphosate. In case of herbicide/surfactant solution spill, small volumes of spilled solutions on mudflats shall be remediated to the greatest extent feasible by suction of surface muds, using portable wet vacuum or pumping equipment.

MITIGATION BIO-6.2: For work in infested North Bay marshes where delta smelt or Sacramento splittail may occur (currently only Southhampton Marsh, Benicia), impoundment techniques shall be eliminated and spray drift near tidal creeks shall be minimized (Mitigations BIO-1.1, 1.2). Any intertidal excavation or dredging in tidal creeks shall be restricted to tidal stages when target areas are emerged above water level.

MITIGATION BIO-6.4: Dredging of infested intertidal channels shall be limited to tidal stages when target areas are emerged above water level, or appropriate measures shall be taken to isolate the dredged area from adjacent Bay or channel waters. Herbicide methods shall be minimized near channels. Glyphosate/surfactant spray application requirements shall be minimized by pre-treating target cordgrass stands with mechanical methods that reduce cordgrass biomass and density, increase receptivity and coverage of spray, and increase mortality response to glyphosate. In case of herbicide/surfactant solution spill, small volumes of spilled solutions on mudflats shall be remediated to the greatest extent feasible by suction of surface muds, using portable wet vacuum or pumping equipment.

MITIGATION BIO-8: Access routes in marshes shall be monitored to detect formation of undrained depressions in tire ruts or foot trails. Access-related shallow marsh depressions shall be backfilled or incised with narrow drainages so they do not impound small, sheltered areas of standing water. Where impoundments are used, impoundments shall be of sufficient size and depth to minimize mosquito breeding habitat.

AIR QUALITY

MITIGATION AQ-1: Apply dust control measures where treatment methods may produce visible dust clouds and where sensitive receptors (i.e., houses, schools, hospitals) are located within 500 feet of the treatment site. The following dust control measures should be included in the site-specific work plans:

- Suspend activities when winds are too great to prevent visible dust clouds from affecting sensitive receptors.
- Limit traffic speeds on any dirt access roads to 15 miles per hour.

MITIGATION AQ-2: For prescribed burns, notify the BAAQMD and the Agriculture Commissioner prior to initiating the burn, and/or obtain a burn permit.

MITIGATION AQ-3: For areas targeted for aerial application of herbicides that are within 0.5 mile of sensitive receptors (i.e., houses, schools, hospitals), prepare and implement an herbicide drift management plan to reduce the possibility of chemical drift into populated areas. The plan shall include the following elements:

1. Coordination. Coordinate aerial applications with the County Agricultural Commissioner.
2. Sensitive Receptors. Identify nearby sensitive areas (e.g., houses, schools, hospitals) or areas that have non-target vegetation that could be affected by the herbicide and provide advanced notification.
3. Equipment Use. Identify the type of equipment (e.g., nozzle types) and application techniques (i.e., nozzle angle and airspeed) to be used in order to reduce the amount of small droplets that could drift into adjacent areas (smaller droplets are subject to greater drift). Consult with herbicide manufacturer for proper application instructions and warnings.
4. Meteorological Conditions. Avoid spraying when winds exceed 10 miles per hour, consistent with California supplemental labeling. Herbicide applications should not be conducted when surface-based inversions are present (usually in fall and winter early mornings or late evenings). The site-specific work plan should identify how meteorological conditions would be obtained (e.g., National Weather Service).
5. Buffer Zones. Establish buffer zones to avoid affecting sensitive receptors. The buffer zones are established based on wind conditions, droplet size, application height above ground, as well as proximity to sensitive receptors.
6. Restriction on Public Access. Ensure that the public will not be present in the treatment area during treatment activities, and for a period (of up to 12 hours) after application of the herbicide. The re-entry period should be identified in the site-specific work plan.

7. Alternate Spray Method. Consider ground application near buffer zones and areas adjacent to sensitive receptors when prevailing conditions would increase potential for drift. Application of herbicide shall be temporarily terminated if conditions change and present drift potential at sensitive receptor sites.

NOISE

MITIGATION N-1: Disturbance of Sensitive Receptors. The following measures shall be implemented to reduce project noise impacts:

N1-A. The use of equipment and machinery shall comply with all applicable local noise ordinances and policies. At a minimum, use of equipment and machinery in cordgrass removal shall be limited to weekdays (Monday to Friday) between the hours of 7:00 a.m. to 7:00 p.m. within 500 feet of sensitive receptors.

N1-B. Helicopters shall not be used within 1,500 feet of sensitive receptors.

HUMAN HEALTH AND SAFETY

MITIGATION HS-1: Worker Injury from Accidents Associated with Manual and Mechanical Non-native Cordgrass Treatment. Appropriate safety procedures and equipment, including hearing protection, shall be used by workers to minimize risks associated with manual and mechanical treatment methods. Workers shall receive safety training appropriate to their responsibilities prior to engaging in any treatment activities.

Mitigation HS-2: Worker Health Effects from Herbicide Application. Appropriate health and safety procedures and equipment, as described on the herbicide or surfactant label, including PPE as required, shall be used by workers to minimize risks associated with chemical treatment methods. Only certified or licensed herbicide applicators shall mix and apply herbicide.

MITIGATION HS-3:

- Herbicide application shall be managed to minimize potential for herbicide drift, particularly in areas where the public could be affected. Herbicide shall not be applied when winds are in excess of 10 miles per hour or when inversion conditions exist (per Supplemental Labeling for Aquamaster for Aerial Application in California Only), or when wind could carry spray drift into inhabited areas. This condition shall be strictly enforced by the implementing entity.
- Colored signs shall be posted at and/or near any public trails, boat launches, or other potential points of access to herbicide application sites a minimum of 24 hours prior to treatment. These signs shall inform the public that the area is to be sprayed with glyphosate herbicide for weed control, and that the spray is harmful if inhaled. They will advise “no entry” for humans and animals until a minimum of eight (8) hours after treatment, and that date and time will be stated. A 24-hour ISP contact number shall be provided.
- Application of herbicides shall be avoided near areas where the public is likely to contact water or vegetation as follows:
 - A. Application of herbicides in or adjacent to high use areas shall not be allowed within 24 hours prior to weekends and public holidays.

B. If a situation arises (due to weather or other variables) that makes it necessary to treat high-use areas on weekends or holidays, the areas shall be closed to the public for 24 hours before and after treatment.

- At least one week prior to application, signs informing the public of impending herbicide treatment shall be posted at prominent locations within a 500-foot radius of treatment sites where homes, schools, hospitals, or businesses could be affected. Schools and hospitals within 500 feet of any treatment site shall be separately noticed at least one week prior to the application.
- No aerial spraying shall be conducted within 0.25 mile of a school, hospital, or other sensitive receptor location.

MITIGATION HS-4: Health Effects to Workers or the Public due to Accidents Associated with Non-native Cordgrass Treatment. Appropriate health and safety procedures and equipment shall be used to minimize risks associated with non-native cordgrass treatment methods, including exposure or spills of fuels, petroleum products, and herbicides. These shall include:

- Preparation of a contingency plan including a Spill Prevention, Control and Countermeasures (SPCC) plan (see also the mitigation measures in Section 3.2 *Water Quality*) and
- Participation of the local fire department during prescribed burning activities

Short-term, acute exposure to hazardous chemicals could occur during accident or upset conditions. Exposures could result from accidental spills or improper disposal of chemicals. The risk of health effects is highest for workers during non-native cordgrass treatment. With appropriate mitigation measures, health and safety impacts due to upset conditions would be less than significant.

VISUAL RESOURCES

MITIGATION VIS-1: The ISP will integrate signage into all treatment areas that are adjacent or within areas accessible or visible to the general public, whenever the treatment of nonnative Spartina will result in a substantial change in the visual character of the area. Signage will vary depending upon the site-specific components of treatment methods, availability and nature of public access and visibility, extent of the infestation, and other factors. Signage will therefore range from simple signs providing a brief description of the nature and reason for the change (e.g. where there is little public visibility or the extent of infestation is small) to more detailed interpretive signs highlighting the ecological effects of Spartina and the need for control (e.g. where there is significant public access and high visibility, and infestation is broad).

CULTURAL RESOURCES

MITIGATION CUL-1:

a. For all sites proposed for ground-disturbing control methods and ground-disturbing access (other than manual removal and smothering) a qualified archaeologist shall conduct a Phase I prehistoric and historical resource site record and literature search to assess the site's cultural resource sensitivity and the potential for project-related impacts. The literature search shall include a review

of historic maps to determine whether the site is located on construction fill and whether historic buildings or structures are or were located within its boundaries. The record search shall identify all recorded prehistoric and historic sites in the site and identify previous cultural resource studies conducted in or adjacent to the site. The Phase 1 report shall assess potential impacts and, if needed, recommend site-specific measures to avoid or reduce potential impacts to less than significant levels. If evaluation requires excavations at any prehistoric or historic cultural resource sites, then excavations will be monitored by local Native American representatives identified by the Native American Heritage Commission. If the Phase 1 report finds that there are significant cultural resources, then an alternative treatment method that does not disturb the cultural resources (i.e. herbicide treatment) must be used. Otherwise, if the resource is determined significant and impacts cannot be avoided, then the lead Federal agency shall consult with the California Office of Historic Preservation (OHP) to identify appropriate mitigation measures (e.g. data recovery, recordation) to reduce impacts to less than significant levels.

b. For sites involving manual removal or smothering of invasive cordgrass and not requiring ground-disturbing access, if prehistoric or historic cultural resources are discovered during digging, the project sponsor will suspend all work in the immediate vicinity of the find pending site investigation by a qualified archaeologist or historic resources consultant to assess the materials and determine their significance. If the qualified archaeologist/historic resource consultant determines that the find is an important resource, the project sponsor will provide funding and time to allow recovering an archaeological sample or to implement avoidance measures. Work could continue at other locations while archaeological mitigation takes place.

MITIGATION CUL-2: The potential for erosion impacts to archaeological sites may be minimized by implementing the following:

Project implementation and erosion control measures shall be designed to avoid damaging potentially significant cultural resource sites. Priority shall be placed on (1) early screening to detect the locations of sensitive prehistoric marsh remnants or near-surface buried prehistoric marsh surfaces (see mitigation measure CUL-1); (2) selecting non-native cordgrass control methods that minimize and avoid the potential for damage to such sites. If this is not feasible, then relevant portions of mitigation measure CUL-1 shall be implemented to reduce impacts to less than significant levels.

Implementation of mitigation measures CUL-1 and CUL-2 in combination with mitigation measures in Section 3.1, *Hydrology and Geomorphology* would reduce residual impacts to cultural resources from project-generated ground disturbance and erosion to less than significant levels. Collectively, these measures would ensure that archaeologically sensitive areas are identified and surveyed prior to ground disturbance. They also would ensure that any cultural resource located within the area of potential effect is recorded and avoided if feasible.

CUMULATIVE IMPACTS

MITIGATION CUM-1: The potential for cumulative impacts may be reduced by implementing the following: The Coastal Conservancy and US Fish and Wildlife Service shall internally review each proposed wetland restoration project other than control to assure that they are properly sequenced with cordgrass treatment and do not contribute to the increased spread of invasive cordgrass to newly restored wetlands. In addition the ISP/Coastal Conservancy and USF&WS shall encourage all

agencies with permitting authority to utilize their discretion to assure proper sequencing of restoration projects with the Control Program.

MITIGATION CUM-2: Mosquito abatement districts generally propose annual work plans to regulatory agencies, as the Control Program also proposes. The potential for cumulative impacts may be minimized by implementing the following: mosquito abatement agencies shall cooperate joint planning and field coordination to avoid or minimize cumulative impacts. This planning, in addition to the mitigations identified elsewhere in this EIS/R, would reduce impacts to less than significant levels.

ATTACHMENT 2:
Mitigation Monitoring and Reporting Program
for the San Francisco Estuary Invasive Spartina Project Programmatic EIS/R

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
Hydrology and Geomorphology									
Mitigation GEO-1: Erosion or deposition of sediment. In sites of cordgrass removal where unacceptable increases in erosion rates (significantly greater than background levels or threatening the stability of existing infrastructure such as access roads or utility structures) are likely, temporary physical erosion controls shall be established until sediments either consolidate or stabilize naturally.	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP Field Supervisor	Prior to start of removal operations
Mitigation GEO-2: Erosion or topographic change by vehicles used in eradication. Vehicle travel in the tidal marsh and mudflat shall be minimized. Mats shall be used to distribute the weight of vehicles on marsh surfaces wherever feasible. Sensitive sites that could be significantly impacted by erosion or sedimentation from overland vehicles shall be accessed by boat.	Not Applicable	Applicable	Not applicable	Not Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP Field Supervisor	During removal operations
Mitigation GEO-3: Remobilization of sand. Resumed erosion at sensitive locations shall be mitigated by sand nourishment or repair or replacement of existing rock slope protection or existing erosion control structure.	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP Field Supervisor	During removal operations
Mitigation GEO-4: Sediment disposal. Sediments dredged from treatment sites shall be disposed of as prioritized in the Long Term Management Strategy for Bay dredged material. These sediments shall not be disposed of in dredge disposal sites in the Estuary or offshore where seeds may be dispersed elsewhere in the Estuary or to other coastal estuaries. They shall be disposed of in upland disposal sites or at depths in sites proposed for tidal marsh restoration.	Not Applicable	Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Treating contractor, agency, or organization	ISP Field Supervisor	During removal operations

ISP Field Supervisor – Field Operations Manager, Field Biologist, or designee assigned to specific project site.

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
Water Quality									
Mitigation WQ-1: Degradation due to herbicide application. Herbicides shall be applied under NPDES Permit from the State. Herbicides shall be applied directly to plants and at low tide to minimize the potential application of herbicide directly on the water surface, and shall be applied in accordance with application guidelines and the manufacturer label. Best management practices shall be applied at all times. The ISP Control Program shall monitor and evaluate projects.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Herbicide applicators	ISP field supervisor	During treatment operations
Mitigation WQ-2: Herbicide spills. Herbicides shall be applied under NPDES Permit from the State, and by or under the direct supervision of a trained, certified or licensed applicator. Spill prevention and containment plan shall be developed and implemented.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Herbicide applicators Treating contractor, agency, or organization	ISP field supervisor ISP field supervisor	During treatment operations Prior to treatment operations
Mitigation WQ-3: Fuel or petroleum spills. Fueling and storage of fuels will be maintained offsite. A spill prevention and containment plan shall be developed and implemented.	Not Applicable	Applicable	Not Applicable	Applicable	Applicable	Applicable	Treatment crews/contractors Treating contractor, agency, or organization	ISP field supervisor ISP field supervisor	During treatment operations Prior to treatment operations
Mitigation WQ-4: Contaminant remobilization. Site sediments will be researched and sampled (if needed) prior to initiating treatment of any site where there may be contamination. Waste Discharge Requirements shall be obtained for operations in a site where contamination is present.	Applicable	Applicable	Not Applicable	Usually Not Applicable	Not Applicable	Not Applicable	Treating agency or organization	ISP field supervisor	Prior to treatment operations

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
Biological Resources									
BIO-1.1. Bio 1.2, and Bio-1.3: Tidal marsh plant communities. Minimize vehicle and foot access pathways. Restrict equipment working in marsh plains to mats and geotextile fabric covers. Stockpile non-viable excavated non-native cordgrass and excavated sediment and remove from marsh. Cover non-target vegetation with fabric adjacent to areas sprayed with herbicide, or pre-treat with protective films of silt-clay. Stabilize smothering geotextile mats. Use optimal combinations of treatment to minimize repeat entry to marsh and re-treatment. Minimize herbicide spray dose requirements by pre-treatments. Use removal methods rather than helicopter applications of herbicide whenever feasible and less environmentally damaging. Use non-spray application techniques to reduce herbicide dose and minimize non-target contact.	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
BIO-1.4: Submerged aquatic plant communities. Remove large deposits of mown cordgrass during the growing season; or install temporary water-permeable debris barriers around vulnerable pans. Avoid transporting tanks of spray solution near pans.	Not Applicable	Not Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
BIO-2: Special-status plant species. Conduct pre-project spring surveys for sensitive plants and instruct field crews to avoid and protect sensitive populations. Require qualified, experienced on-site botanical supervision if sensitive plants occur in the vicinity. If sensitive plant populations occur near the high tide line, rake and remove large deposits of mown cordgrass during the growing season. Refrain from burning in marshes supporting sensitive plant species. Stabilize smothering geotextile mats. Cover non-target vegetation, or install spray-drift barriers. If accidental exposure to spray drift occurs, thoroughly irrigate affected plants with silt-clay suspensions. Refrain from rapid replanting of Pacific cordgrass until Atlantic smooth cordgrass pollen and seed rain is minimal.	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

Mitigation	Manual Removal (Hand pulling and manual excavation)	Mechanical Removal (Excavation, dredging, and shredding)	Pruning, Hand-mowing, and Smothering	Flooding (Diking, drowning, and salinity variation)	Burning	Herbicide Application	Implementing Responsibility	Monitoring Responsibility	Mitigation Timing
<p>BIO-3: Shorebirds and waterfowl. For work within 1,000 feet of mudflats, schedule eradication activities to avoid peak fall and spring Pacific Flyway stopovers. Mobilize crews to project sites before mudflats emerge. Use optimal combinations of treatment to minimize repeat entry. Avoid helicopter applications of herbicide to mudflat colonies within 1,000 feet of major habitual roosting or foraging sites. As a last resort, haze shorebirds and waterfowl within 1,000 feet of spray operations. Remediate small volumes of spilled solutions on mudflats.</p>	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
<p>BIO-4.1: Salt marsh harvest mouse and tidal marsh shrew subspecies. Minimize vehicle and foot access pathways in potential tidal marsh habitat. Restrict equipment working in marsh to areas with mats and geotextile fabric covers. Use optimal combinations of treatment to minimize repeat entry re-treatment. Schedule work in suitable habitat soon after natural mass-mortality events caused by extreme high tides. Compensatory measures for incidental take include restoration of optimal habitat within large tidal marsh restoration projects.</p>	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
<p>BIO-4.2: Resident San Francisco Bay harbor seals. Minimize vehicle and foot access pathways in marsh within 1,000 feet of seal haul-outs, and avoid approaching haul-outs within 2,000 feet, or any distance that elicits vigilance behavior when pups are present. Consult with marine mammal experts to determine seasonal variation in sensitivity to disturbance. Restrict equipment working in marsh to prescribed paths. Use optimal combinations of treatment to minimize repeat entry to marsh and re-treatment. Refrain from use of low-flying helicopters within 2,000 feet of seal haul-outs. Transport any pre-mixed solutions of herbicide in double-lined containers. Remediate spilled solutions on mudflats to the greatest extent feasible.</p>	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
<p>BIO-5.1: California clapper rail. To minimize or avoid indirect impacts of eradication operations on clapper rails, follow "best management practices" in EIS/R Appendix G, as modified by the US Fish and Wildlife Service's Biological Opinion. These protocols are based on (1) current survey and map data to determine distribution and abundance of rails in relation to project sites, and local behavior of rails in occupied habitats; (2) training and expert biological supervision of field crews to detect clapper rails and identify habitat; (3) modification of timing and within-site location of operations to minimize or avoid disturbances to clapper rails. In addition, the mitigation measures generally used to minimize disturbances in MITIGATION BIO-1.2 and BIO-4.1 also apply.</p> <p>For unavoidable significant impacts due to eradication of Atlantic smooth cordgrass and hybrids which provide habitat currently occupied by clapper rails, proportional compensatory mitigation is necessary. Primary components of compensatory mitigation include: (1) large-scale, rapid restoration of suitable tidal salt marsh habitat (including all essential habitat components for colonization by clapper rails) in advance of large-scale habitat destruction, and within the same subregion as impacts, but at locations with low invasion pressure from non-native cordgrasses; (2) significantly increasing reproductive success of clapper rails within the same subregion as impacts, through management which reduces predation from non-native red fox, and enhances flood refugia (cover for rails during extreme high tides).</p>	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
<p>BIO-5.2: California black rail. Adapt protocols for minimization and avoidance of California clapper rails (Appendix G) for work in infested marshes known to support populations of California black rails (currently one: Southhampton Marsh, Benicia), emphasizing pre-project surveys (call detection), minimization of marsh disturbance (MITIGATION BIO-1.2), and avoidance of occupied habitat during the breeding season.</p>	Applicable	Potentially Applicable	Applicable	Not Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
BIO-5.3: Tidal marsh song sparrow subspecies and salt marsh common yellowthroats. Adapt protocols for minimization and avoidance of California clapper rails (EIS/R, Appendix G) for work in infested marshes known to support populations of Alameda song sparrows, San Pablo song sparrows, Suisun song sparrow, and the salt marsh common yellowthroat, emphasizing pre-project surveys, minimization of marsh disturbance (MITIGATION BIO-1.2), and avoidance of occupied habitat during the breeding season.	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
BIO-5.4: Western snowy plovers and California least terns. Prior to levee access in areas where snowy plovers and least terns may breed, levee routes should be surveyed for potential nests, including nests in salt pond beds near levee roads. Dredging and excavation of cordgrass should be conducted either after least terns have migrated out of San Francisco Bay, or during middle to lower tidal stages that allow navigation of barge and crane operations, while exposing the maximum extent of cordgrass above standing tides.	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
BIO-5.5: Birds of prey in tidal marshes. Minimize use of helicopters to apply herbicides over marshplains where raptors forage.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
BIO-6.1: Chinook salmon and steelhead (anadromous salmonids). Dredging of infested intertidal channels should be limited to: (1) tidal stages when target areas are emerged above water level, and (2) during seasons when winter- and spring-run Chinook salmon and steelhead migration times minimize their risk of exposure at project sites, particularly juveniles. Intakes for impoundments should be limited to tides above mean high water to minimize entrainment and trapping. Alternatively, fish screens could be installed on new tidegates used to impound and drown large cordgrass-infested marshes in former diked baylands. Herbicide methods should be minimized or avoided near channels and mudflats during migration periods of winter-run and spring-run Chinook salmon and steelhead. Minimize glyphosate/surfactant spray application requirements by pre-treating target cordgrass stands with mechanical methods that reduce cordgrass biomass and density, increase receptivity and coverage of spray, and increase mortality response to glyphosate. In case of herbicide/surfactant solution spill, remediate small volumes of spilled solutions on mudflats to the greatest extent feasible by suction of surface muds, using portable wet vacuum or pumping equipment.	Not Applicable	Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
BIO-6.2: Delta smelt and Sacramento splittail. For work in infested North Bay marshes where delta smelt or Sacramento splittail may occur (currently one: Southhampton Marsh, Benicia), eliminate impoundment techniques and minimize spray drift near tidal creeks (MITIGATION BIO-1.1, 1.2). Restrict any intertidal excavation or dredging in tidal creeks to tidal stages when target areas are emerged above water level.	Not Applicable	Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
<p>BIO-6.4: Shallow-water estuarine fish. Dredging of infested intertidal channels should be limited to tidal stages when target areas are emerged above water level. Water intakes for impoundments should have invert elevations limited to tides above mean high water to minimize entrainment and trapping. Alternatively, fish screens could be installed on new tidegates used to impound and drown large cordgrass-infested marshes in former diked baylands. Herbicide methods should be minimized near channels. Minimize glyphosate/surfactant spray application requirements by pre-treating target cordgrass stands with mechanical methods that reduce cordgrass biomass and density, increase receptivity and coverage of spray, and increase mortality response to glyphosate. In case of herbicide/surfactant solution spill, remediate small volumes of spilled solutions on mudflats to the greatest extent feasible by suction of surface muds, using portable wet vacuum or pumping equipment.</p>	Not Applicable	Applicable	Not Applicable	Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
<p>BIO-8: Mosquito production in tidal marshes. Monitor access routes in marshes to detect formation of undrained depressions in tire ruts or foot trails. Backfill access-related shallow marsh depressions or incise narrow drainages so they do not impound small, sheltered areas of standing water. Where impoundments are used, design impoundments of sufficient size and depth to minimize mosquito breeding habitat.</p>	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
Air Quality									
<p>Mitigation AQ-1: Dust emissions. Apply dust control measures where treatment methods may produce visible dust clouds and where sensitive receptors (i.e., houses, schools, hospitals) are located within 500 feet of the treatment site. The following dust control measures should be included in the site-specific work plans:</p> <ul style="list-style-type: none"> Suspend activities when winds are too great to prevent visible dust clouds from affecting sensitive receptors. Limit traffic speeds on any dirt access roads to 15 miles per hour. 	Not Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
<p>Mitigation AQ-2: Smoke and ash emissions. For prescribed burns, notify the Bay Area Air Quality Management District and the Agriculture Commissioner prior to initiating the burn, and/or obtain a burn permit.</p>	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Not Applicable	Treating contractor, agency, or organization	ISP field supervisor	Prior to treatment
<p>Mitigation AQ-3: Herbicide effects on air quality. For areas targeted for aerial application of herbicides that are within 0.5 mile of sensitive receptors (i.e., houses, schools, hospitals), prepare and implement an herbicide drift management plan to reduce the possibility of chemical drift into populated areas. Avoid spraying when winds exceed 10 miles per hour, consistent with California supplemental labeling. The plan shall include the following elements: coordination, sensitive receptors, equipment use, meteorological conditions, buffer zones, restriction on public access, and alternative spray method.</p>	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	Prior to treatment

Mitigation	Manual Removal (Hand pulling and manual excavation)	Mechanical Removal (Excavation, dredging, and shredding)	Pruning, Hand-mowing, and Smothering	Flooding (Diking, drowning, and salinity variation)	Burning	Herbicide Application	Implementing Responsibility	Monitoring Responsibility	Mitigation Timing
Noise									
<p>Mitigation N-1: Disturbance of sensitive receptors. N-1A. The use of equipment and machinery shall comply with all applicable local noise ordinances and policies. At a minimum, the use of equipment and machinery in cordgrass removal shall be limited to weekdays (Monday-Friday) between the hours of 7:00 a.m. to 7:00 p.m. within 500 feet of sensitive receptors. N-1B. Helicopters shall not be used within 1,500 feet of sensitive receptors.</p>	Not Applicable	Applicable	Applicable	Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
Human Health and Safety									
<p>Mitigation HS-1: Worker injury from accidents associated with non-native cordgrass treatment. Appropriate safety procedures and equipment shall be used by treatment workers. All workers shall be provided adequate training to ensure worker safety.</p>	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
<p>Mitigation HS-2: Worker health effects from herbicide application. Appropriate health and safety procedures and equipment, as described on the herbicide or surfactant label, including personal protective equipment, shall be used by workers to minimize risks associated with chemical treatment methods. Only certified or licensed herbicide applicators shall mix and apply herbicide.</p>	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
<p>Mitigation HS-3: Herbicide application shall be managed to minimize potential for herbicide drift, particularly in areas where the public could be affected. Herbicide shall not be applied when winds are in excess of 10 miles per hour or when inversion conditions exist (per Supplemental Labeling for Aquamaster for Aerial Application in California Only), or when wind could carry spray drift into inhabited areas.</p> <p>Colored signs shall be posted at and/or near any public trails, boat launches, or other potential points of access to herbicide application sites a minimum of 24 hours prior to treatment. They will advise “no entry” for humans and animals until a minimum of eight (8) hours after treatment, and that date and time will be stated. A 24-hour ISP contact number shall be provided.</p> <p>Application of herbicides shall be avoided near areas where the public is likely to contact water or vegetation as follows:</p> <p>A. Large-scale application of herbicides in or adjacent to high use areas shall not be allowed within 24 hours prior to weekends and public holidays.</p> <p>B. If a situation arises (due to weather or other variables) that makes it necessary to treat high-use areas on weekends or holidays, the areas shall be closed to the public for 24 hours before and after treatment.</p> <p>At least one week prior to application, signs informing the public of impending herbicide treatment shall be posted at prominent locations within a 500-foot radius of treatment sites where homes, schools, hospitals, or businesses could be affected. Schools and hospitals within 500 feet of any treatment site shall be separately noticed at least one week prior to the application. No aerial spraying shall be conducted within 0.25 mile of a school, hospital, or other sensitive receptor.</p>	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
Mitigation HS-4: Health effects to workers or the public from accidents associated with non-native cordgrass treatment. Appropriate health and safety procedures and equipment shall be used to minimize risks to the public from exposure to fuel spills or other petroleum products, and herbicides.	Not Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
Visual Resources									
Mitigation VIS-1: The ISP will integrate signage into all treatment areas that are adjacent or within areas accessible or visible to the general public, whenever the treatment of nonnative Spartina will result in a substantial change in the visual character of the area. Signage will vary depending upon the site-specific components of treatment methods, availability and nature of public access and visibility, extent of the infestation, and other factors. Signage will therefore range from simple signs providing a brief description of the nature and reason for the change (e.g. where there is little public visibility or the extent of infestation is small) to more detailed interpretive signs highlighting the ecological effects of Spartina and the need for control (e.g. where there is significant public access and high visibility, and infestation is broad).	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Treating contractor, agency, or organization	ISP field supervisor	Prior to treatment
Cultural Resources									
Mitigation CUL-1: Disturbance or destruction of cultural resources from access and treatment. a. For all sites proposed for ground-disturbing control methods and ground-disturbing access (other than manual removal and smothering) a qualified archaeologist shall conduct a Phase I prehistoric and historical resource site record and literature search to assess the site’s cultural resource sensitivity and the potential for project-related impacts. The literature search shall include a review of historic maps to determine whether the site is located on construction fill and whether historic buildings or structures are or were located within its boundaries. The record search shall identify all recorded prehistoric and historic sites in the site and identify previous cultural resource studies conducted in or adjacent to the site.	Applicable	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Treating contractor, agency, or organization	ISP field supervisor	Prior to treatment

<i>Mitigation</i>	<i>Manual Removal (Hand pulling and manual excavation)</i>	<i>Mechanical Removal (Excavation, dredging, and shredding)</i>	<i>Pruning, Hand-mowing, and Smothering</i>	<i>Flooding (Diking, drowning, and salinity variation)</i>	<i>Burning</i>	<i>Herbicide Application</i>	<i>Implementing Responsibility</i>	<i>Monitoring Responsibility</i>	<i>Mitigation Timing</i>
<p>The Phase 1 report shall assess potential impacts and, if needed, recommend site-specific measures to avoid or reduce potential impacts to less than significant levels.</p> <p>If treatment requires excavations at any prehistoric or historic cultural resource sites, then excavations will be monitored by local Native American representatives identified by the Native American Heritage Commission.</p> <p>If the Phase 1 report finds that there are significant cultural resources, then an alternative treatment method that does not disturb the cultural resources (i.e. herbicide treatment) must be used. Otherwise, if the resource is determined significant and impacts cannot be avoided, then the lead Federal agency shall consult with the California Office of Historic Preservation (OHP) to identify appropriate mitigation measures (e.g. data recovery recordation) to reduce impacts to less than significant levels</p>									
<p>b. For sites involving manual removal or smothering of invasive cordgrass and not requiring ground-disturbing access, if prehistoric or historic cultural resources are discovered during digging, the project sponsor will suspend all work in the immediate vicinity of the find pending site investigation by a qualified archaeologist or historic resources consultant to assess the materials and determine their significance. If the qualified archaeologist/ historic resource consultant determines that the find is an important resource, the project sponsor will provide funding and time to allow recovering an archaeological sample or to implement avoidance measures. Work could continue at other locations while archaeological mitigation takes place.</p>	Applicable	Applicable	Applicable	Applicable	Not Applicable	Not Applicable	Treating contractor, agency, or organization	ISP field supervisor	During treatment
<p>Mitigation CUL-2: Loss of cultural resources from erosion. Project implementation and erosion control measures shall be designed to avoid damaging potentially significant cultural resource sites, as specified in Mitigation CUL-1, above.</p>	Not Applicable	Applicable	Not Applicable	Applicable	Applicable	Not Applicable	Treating contractor, agency, or organization	ISP Field supervisor	Prior to and during treatment

Note: The mitigation measures are summarized in this table. The actual mitigation measures are attached as ATTACHMENT 1

VERIFICATION REPORT

Date: _____

Arrival Time: _____

Departure: _____

Location: _____

Discipline:

Archaeology

Dust/ Air

Biology

Quality

Noise

Soils/Geology

Construction Sheet No.: _____

Other _____

Condition: _____

Compliance: Acceptable

Unacceptable

Delay Activity

Remedial Action Implemented

Work Stop

Follow-up Conference Required

Activity: _____

Observations: _____

Recommendations: _____

By: _____ Report Approval: _____

Receipt by Project Supervisor:

Signature: _____ Date: _____ Time: _____

Comments/Actions: _____

Copies to: _____

Date Entered to Environmental Monitoring File: _____

By: _____