

**ER P5 (23 CCR § 5009) Avoid Introductions of and Habitat Improvements for Invasive Nonnative Species.**

- (a) The potential for new introductions of or improved habitat conditions for nonnative invasive species, striped bass, or bass must be fully considered and avoided or mitigated in a way that appropriately protects the ecosystem.*
- (b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers a proposed action that has the reasonable probability of introducing or improving habitat conditions for nonnative invasive species.*

The proposed project is on the interior of Sherman Island. Water intakes for the proposed project are screened to eliminate fish species including non-native species such as striped bass from entering the project site.

**Vegetation**

The Project Area vegetation is composed of ruderal upland areas, pasture and crop fields, irrigation canals and ditches, ponds, Himalayan blackberry (*Rubus armeniacus*) brambles, and dredge spoils. These habitats are summarized below.

**Ruderal Upland.** Ruderal upland vegetation occurs in areas where there has been a high degree of disturbance which allows for opportunistic invasive species to establish. In the Project Area, ruderal upland areas are situated in the southern portion, where it is associated with Sherman Island East Levee Road, a section in the northern portion where it is associated with an area assumed to be a site of dredging spoils deposition, and along several canal crossroads. The canal crossroad locations are too small to be mapped. The vegetation within these areas are dominated by a mosaic of non-native, ruderal and often invasive species, which do not appear to form distinct vegetation alliances as described in the Manual of California Vegetation (CNPS 2018b). Dominant species include ripgut brome (*Bromus diandrus*), slim oat (*Avena barbata*), prostrate knotweed (*Polygonum aviculare* spp. *aviculare*), Canada horseweed (*Erigeron canadensis*), yellow star thistle (*Centaurea solstitialis*) fennel (*Foeniculum vulgare*), dwarf mallow (*Malva neglecta*), and smooth crabgrass (*Digitaria ischaemum*).



**Pasture Fields and Crop Fields.** Crop fields consist primarily of monocultures of corn (*Zea mays*), broom corn (*Sorghum bicolor*), and safflower (*Carthamus tinctorius*). These crop fields are part of an active agriculture operation and are managed to maximize production. The pasture fields and crop fields within the study area provide limited habitat sufficient to support special-status plant species due to the degree of disturbance and density of planted crop species.

Pasture fields dominate the Project Area and consist primarily of Bermuda grass (*Cynodon dactylon*). Associated species included alkali mallow (*Malvella leprosa*), bird's foot trefoil (*Lotus corniculatus*),

barley (*Hordeum marinum*), and perennial pepperweed (*Lepidium latifolium*). Italian rye grass (*Festuca perennis*) common mustard (*Brassica rapa*), western goldenrod (*Euthamia occidentalis*), and hairy leaved sunflower (*Helianthus annuus*) also occur in scattered locations within the pasture fields. There is no described Bermuda grass vegetation alliance (CNPS 2018b).



**Irrigation Canals and Ditches.** Irrigation canals and ditches are man-made and located throughout the Project Area. These areas likely supplied water to crops before the land was converted for grazing. Vegetation present on the banks and within the channels includes two vegetation alliances: broadleaf cattail marsh (*Typha latifolia* Herbaceous Alliance) and California bulrush marsh (*Schoenoplectus californicus* Herbaceous Alliance) (CNPS 2018b). Dominant species include broadleaf cattail, California bulrush with associated species of poison hemlock (*Conium maculatum*), perennial pepperweed, barnyard grass (*Echinochloa crus-galli*), Himalayan blackberry, tall cyperus and common reed (*Phragmites australis*). In areas of still water, pondweed (*Potamogeton nodosus*), and mosquito fern (*Azolla filiculoides*) occurred on the water surface. The banks and channel walls of the canals and ditches were observed to be either heavily vegetated with little bare ground exposed or only exposed soil with no water.

**Himalayan Blackberry Brambles.** Several large, monotypic patches of Himalayan blackberry occur in the northeast and southern portions of the Project Area and can be classified as Himalayan Blackberry Brambles (*Rubus armeniacus* Shrubland Semi-Natural Alliance) (CNPS 2018b). Several smaller patches occur in mesic areas, especially adjacent to the irrigation ditches; however, they are not large enough to be mapped. Due to the dense growth structure of Himalayan blackberry few species grow within the brambles.



**Dredge Spoils.** Sandy dredge spoils were placed in a large area in the southern portion of the Project Area. The vegetation on the dredge spoils was a matrix of dense narrowleaf willow (*Salix exigua* var. *exigua*) patches and bare ground with sparse Bermuda grass. Additional species observed on the dredge spoils include bristly ox-tongue (*Helminthotheca echioides*), spring vetch (*Vicia sativa*), seaside

heliotrope (*Heliotropium curassavicum* var. *oculatum*), arroyo willow (*Salix lasiolepis*), rose clover (*Trifolium hirtum*), and short-podded mustard (*Hirschfeldia incana*).

**Pond.** Two small ponds are located in the southern portion of the Project Area, adjacent to the dredge spoils. Vegetation along the perimeter of the ponds was dominated by common reed, narrow leaf cattail (*Typha angustifolia*), poison hemlock, western goldenrod, perennial pepperweed, and California bulrush. Vegetation associated with the ponds can be best classified as Common Reed Marsh (*Phragmites australis* Herbaceous Alliance) (CNPS 2018b). The banks of the ponds were heavily vegetated, with the smaller pond nearly absent of open water due to dense vegetation.

### **Desired Habitat Conditions**

The desired habitat conditions include a restored wetland with permanently flooded emergent vegetation dominated by hard stem bulrush and cattails with a diverse mosaic of associated upland habitat types. Berms will attain a cover of grasses with shrubs and trees which may be planted on the berm slopes, which will be maintained for site access. Habitat restoration areas will be planted in a diverse complex of shrubs, trees, and grassland, which will provide valuable ecological complexity. Habitat areas will be designed to maximize habitat value while minimizing the maintenance required to manage for invasive weeds.

Overall, the project is anticipated to be a large net reduction of invasive species both from a non-native invasive species diversity and aerial coverall stand point as demonstrated by the habitat conditions or Sherman Island Whale's Mouth Project and Twitchell Island East End Project.



### **Vegetation Management**

Regular maintenance of the desired wetland vegetation will be necessary following its successful establishment. The project's goal for a permanent wetland condition supporting quality wildlife habitat can only be achieved in the long-term through proper maintenance and management of both wetland and upland vegetation. Ideally, the project should require only minimal management of wetland vegetation and limited annual management of upland vegetation. The desired wetland vegetation community consists of approximately 70% vegetative cover from cattails and tules along with seasonal wetland vegetation located on the islands and submerged aquatic vegetation in the deeper water. The desired upland vegetation is perennial and annual grasses and forbs on the perimeter and interior berms and uplands.

**Mowing and Herbicides.** Mechanical and chemical removal of problematic vegetation is an important component for habitat management. Wetland vegetation will need to be controlled if plant coverage expands beyond 80% or if the swales and potholes become overgrown with emergent vegetation. Aerial

photos can be used to evaluate the percentage of vegetation coverage. Any unit with a vegetation problem will need to be drawn down and dried to allow mower access.

Upland vegetation on the tops of berm should be mowed annually to provide vehicular access to water control structures for regular maintenance, and access by larger equipment for special maintenance needs. Upland vegetation should not be mowed during the avian nesting season between March 1 and June 30.

Annual control of weedy vegetation will be required on annual basis to promote the desired wetland and upland vegetation communities and avoid and control exotic/invasive species. These exotic/invasive species include Himalayan blackberry (*Rubus armeniacus*), common reed (*Phragmites australis*), perennial pepperweed (*Lepidium* sp.), cocklebur (*Xanthium strumarium*), and other species as identified in the field. Each of these species has the capability to overtake both wetland and upland communities. Deeper water levels within the wetland area will help to control the spread of these species. These species can be problematic if not controlled vigorously along the edges of the wetland areas. In areas in which mowing is not practical, chemical control using an herbicide labeled for application in wet environments is recommended. Glyphosate formulated herbicides are effective for controlling annual weeds as well as common reed if applied correctly. Perennial pepperweed can be controlled with imazapyr or chlorsulfuron formulated herbicides. Himalayan blackberry can be controlled using triclopyr in dry areas. All herbicide applications must follow application rates and procedures identified on the packaging label and will be applied by a certified/licensed applicator. PEST

Overall, the project is anticipated to be a large net reduction of invasive species both from a non-native invasive species diversity and aerial coverall standpoint as demonstrated by the habitat conditions on Sherman Island Whale's Mouth Project (~600 acres) and Twitchell Island East End Project (~740 acres). The proposed project builds on the methods of these previous projects.

Additionally, the CEQA project description and appended Habitat Management Plan (Appendix F) and the adaptive management plan for the Sherman Island Belly Wetland Project includes monitoring metrics, management triggers, and potential management responses regarding invasive plants.