

ATTACHMENT 3

PRIMARY AND SECONDARY OBJECTIVES FOR THE ELSIE ROEMER ENHANCEMENT PROJECT WITH ASSOCIATED MONITORING AND MAINTENANCE NEEDS

Primary and secondary objectives for the Elsie Roemer Enhancement Project, with associated monitoring and maintenance needs

	<i>Objective</i>	<i>Description</i>	<i>Action</i>	<i>Monitoring & Maintenance</i>
1.	Provide additional native vegetative cover for clapper rail for 3-5 years			
		Provide grindelia and pickleweed for cover.	Raise elevation of marsh to approximately MHHW – MHW, to support <i>grindelia</i> and pickleweed respectively.	Survey in berm elevation during construction. Monitor for premature berm breakdown or slumping. Consider repairing low or broken spots in light of other factors.
			Densely plant suitable areas with <i>grindelia</i> .	Monitor survival success and percent cover. Replant and/or seed areas with insufficient cover.
2.	Provide other CLRA functions if possible			
	Movement corridors	Provide protected channel corridors for clapper rails to move from high tide refuge to foraging flats (right now they move without corridors under cover of hybrid <i>Spartina</i>).	Construct channels perpendicular to shoreline, from high mid-marsh to mudflat.	Incorporate features into design and confirm during construction. Survey clapper rail populations annually.
		Provide sufficient corridors for multiple breeding clapper rail pairs (one per each channel, since they prefer non-overlapping territories)	Build a minimum of three channels to support three pairs of clapper rails.	Incorporate features into design and confirm during construction.
	Foraging areas	Provide open channel areas and/or mudflats rich in invertebrates (such as mussels, clams, crabs, snails, amphibods, insects, and worms) and fish adjacent to covered areas.	Continue eradication of invasive <i>Spartina</i> and maintain channel line clear of vegetation.	Continue monitoring for invasive <i>Spartina</i> and remove all remaining and new plants. Encourage UC Davis and/or SFEI to monitor invertebrate species & abundance.
	Nesting habitat	Provide densely vegetated (with grindelia or pickleweed) areas at approximately MHHW within 2 m of 1 st order channel and 100 m of marsh shoreline (Albertson 1999)	Construct channels perpendicular to shoreline and plant densely with vegetation.	Incorporate features into design and confirm during construction. Monitor vegetation and replant to achieve desired density. Survey clapper rail population annually to determine number and location of territories. Consider nest surveys if considered appropriate and permitted by FWS.

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3.	Provide support for other species of concern			
	California black rail (<i>Laterallus jamaicensis coturniculus</i>)	Uses the dense cover of brackish tidal marsh, and prefers mixed <i>Salicornia</i> vegetation. It nests in tall grasses and grass-like vegetation as well as mixed <i>Salicornia</i> stands well above ordinary high tides. Black rails are not expected at this site because salinity is generally too high and there is insufficient high marsh refugium.	Although black rails are not expected at this site, all work supporting clapper rails would similarly support black rails.	No additional monitoring is proposed for black rails. Any detection during clapper rail monitoring or other events will be documented and reported.
	Alameda song sparrow (<i>Melospiza melodia pusillula</i>)	Typically inhabits the <i>Salicornia</i> marsh zone above the native <i>Spartina</i> zone, especially in channels or sloughs where <i>Grindelia</i> stands provide song perches and nesting above spring tides. Hybrid <i>Spartina</i> adversely affects the sparrow by reducing the amount of its preferred habitat. It also reduces the sparrow's reproductive success because nests placed in <i>Spartina</i> are more likely to flood, and because it encourages the presence of marsh wrens (<i>Cistothorus palustris</i>), which are known nest predators. In 2002, surveyors at Elsie Roemer marsh found 14 song sparrow territories and 57 nests, but only four of the 57 were successful.	Provide pickleweed above native <i>Spartina</i> zone, and <i>Grindelia</i> above the elevation of spring tides for perches and nesting. Note that native <i>Spartina</i> will not actually be allowed or introduced to the site for several years, pending complete eradication of the hybrid.	Review and augment protocols for clapper rail monitoring as necessary to optimize the opportunity for song sparrow detections during surveys. Coordinate with UC Davis, San Francisco Estuary Institute, and San Francisco Bay Bird Observatory and encourage their participation in multiple seasonal surveys. No nest surveys will be proposed within the first two years to reduce impact on all species.
	Western snowy plover (<i>Charadrius alexandrinus nivosus</i>)	Uses beaches, tidal flats and salt pans for foraging. Snowy plovers roost on the salt pans of dry or partially dry salt evaporators, on barren to sparsely-vegetated interior salt pond levees, and on sandy tidal flats, and young may use adjacent vegetation for hiding and foraging.	Provide beaches, tidal flats for foraging; sandy tidal flat with adjacent vegetation for young.	No additional monitoring is proposed for plovers. Any detection during clapper rail monitoring or other events will be documented and reported.
	Salt marsh wandering shrew (<i>Sorex vagrans haliocoetes</i>)	Uses wet, medium-high salt marsh where it is provided dense, low cover, an abundant invertebrate food source, and nesting sites. It prefers areas of mixed driftwood and <i>Salicornia</i> within the wet middle marsh, and is not found in drier high marsh areas or native <i>Spartina</i> dominated low marsh, as these areas are too dry and provide little cover, respectively.	Provide wet middle marsh, pickleweed, invertebrates, & driftwood (i.e., discourage removal of driftwood from suitable areas).	No additional monitoring is proposed for shrews. Encourage UC Davis and/or SFEI to monitor invertebrate species & abundance in middle marsh area. Discourage removal of driftwood.
	Salt marsh harvest mouse (<i>Reithrodontomys raviventris</i>)	Uses pickleweed as its primary habitat as long as it has non-submerged, salt-tolerant vegetation for escape	Provide large, dense, pickleweed-dominated diverse marsh habitat	Monitor abundance and density of pickleweed, and seed areas between

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		during the highest tides. The value of pickleweed increases with depth, density and the degree of intermixing with fat hen (<i>Atriplex patula</i>) and alkali heath (<i>Frankenia grandifolia</i>). The characteristics of preferred habitat are as follows: (1) Areas should have 100% cover; (2) Vegetation depth of 30-50 cm at summer maximum; (3) A high percentage of pickleweed present. (4) No areas, or very few and small areas, of salt grass (<i>Distichlis spicata</i>), brass buttons (<i>Cotula coronopifolia</i>), alkali bulrush, other <i>Scirpus</i> species or <i>Typha</i> . Upland grasses are valuable as an upland edge but not as a dominant within the marsh; (5) No barriers of open ground or water dissecting the vegetation. (6) Large marsh areas. (7) Areas should receive minimal disruptive manipulation.	with adjacent high tide refuge, and minimal disturbance.	channels to encourage establishment of population. Minimize disturbance of vegetated areas after establishment.
	California grunion (<i>Leuresthes tenuis</i>)	Usually found only in southern California and Baja, in recent years grunion have made spawning runs at several locations in San Francisco Bay, including Crown Beach, to the west of Elsie Roemer. The grunion requires an undisturbed soft sand beach in which to dig a hole (tail first) and lay its eggs.	Provide protected open sand beach area.	No additional monitoring is proposed.
	White sturgeon, Chinook salmon, three-spined stickleback, prickly sculpin, Pacific staghorn sculpin, starry flounder, California horn snail, amphipods, California pay shrimp, Dungeness crab, mud crab	Use low and mid tidal marsh in the Central Bay for spawning, foraging, and/or protection. Channelization in marshes improves function and enhances support. In general, invasive <i>Spartina</i> is thought to have deleterious effects on support for fish and, possibly, aquatic invertebrates.	Create and enhance low and mid-tidal marsh with maximum channelization, free from invasive <i>Spartina</i> .	Same as above.
4.	Reduce mosquito breeding habitat			
	Winter salt marsh mosquito (<i>Aedes squamiger</i>)	Prefers coastal pickleweed tidal and diked marshes, especially salt marsh pools that are diluted by winter and early spring rains.	Construct and maintain channels to assure good drainage of marsh areas and reduce potential for ponded or stagnant water.	Monitor channels for blockages and restricted flow. Remove restrictions to reestablish tidal flushing.

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	Summer salt marsh mosquito (<i>Aedes dorsalis</i>)	Usually encountered in temporarily flooded tidal marsh pans, heavily vegetated ditches, and brackish seasonal wetlands. Adults prefer open habitats such as grasslands, open salt marsh, and the edges of woodlands.	Same as above.	Same as above.
	Winter marsh mosquito (<i>Culiseta inornata</i>)	Immature stages, found in a wide variety of habitats ranging from duck club ponds, ditches, seepages, rainwater pools, salt marshes, and manmade containers.	Same as above.	Same as above.
5.	Generally increase marsh habitat complexity and species diversity			
		High quality tidal marsh is a complex system of flats, channels, and low, mid, and high marsh zones, each populated with a unique mixture of plants and wildlife adapted to that zone. Currently the site is dominated by a monoculture of hybrid <i>Spartina</i> that stretches from mudflat to high marsh.	Remove hybrid <i>Spartina</i> and create a range of elevations and features that will support a variety of vegetation, fish, and wildlife.	No additional monitoring or maintenance proposed.