Appendix 2
Vegetation Management of Tidal Marsh Edges

Photo-illustrated Weed List and Guide
For Tidal Marsh Edge Vegetation, Western San Francisco Estuary

The following guide is a list of widespread, common non-native invasive plant species (weeds) found in the tidal marsh-terrestrial ecotones of the San Francisco Estuary. Representative photographs are provided for recognition of most species, emphasizing the earlier life-history stages (vegetative to flowering, prior to seed set) that are most likely to be observed during weed control activities. Nomenclature generally follows 2008 taxonomic treatments of Flora of North America (www.efloras.org). For diagnostic keys to species and genera, refer to state, regional, or county floras. Selected relevant information on field recognition characters and habitat, geographic distribution, for non-technical identification purposes, is provided. Plants are listed in alphabetical order by botanical name for ease of reference with text, and are divided into broad-leaf weeds and grass weeds.

BROAD-LEAF WEEDS

**Bassia hyssopifolia**

*Bassia*

Chenopodiaceae (Amaranthaceae), amaranth family (formerly goosefoot family)

Annual erect forb, invasive on levee crests, disturbed alkali or subsaline soils. Seldom persist in competition with dense vegetation. *Narrow gray-green pubescent leaves.*
Beta vulgaris
Wild beet, wild Swiss chard
Chenopodiaceae (Amaranthaceae), Amaranth family (formerly goosefoot family)

Minor shoreline weed, short-lived perennial, of disturbed high tide drift-lines, mostly central and south SF Bay.

Brassica nigra, black mustard. Brassicaceae, mustard family.

Abundant annual on levees, paths, disturbed soils above tide line.
**Cakile maritima**  
*Sea-rocket*  
Brassicaceae, mustard family  
Minor shoreline annual to perennial weed, mostly Central Bay, sandy shorelines.  
*Succulent lobed hairless leaves.*

**Carduus pycnocephalus**  
*Italian thistle*  
Asteraceae, aster family  
Noxious annual weed of levees, grasslands, disturbed soils, throughout estuary. *Gray-green downy and spiny leaves and stems.*

**Carpobrotus edulis × chilensis**  
*Iceplant*  
Aizoaceae, purslane or carpetweed family  
Noxious perennial succulent shrub, most invasive in foggy microclimates, Central and North Bay, above and below high tide line.
**Centaurea solstitialis**  
**Star-thistle**  
Asteraceae, aster family

Noxious annual to biennial weed of grasslands, disturbed soils, levees, throughout estuary; most abundant in North Bay, Suisun Bay areas.

*Spiny seed-heads, gray-green hairy leaves.*
**Chenopodium ambrosioides**  
**Mexican-tea**  
Chenopodiaceae (Amaranthaceae), Amaranth family (formerly goosefoot family)

Occasional annual or perennial weed of levees, disturbed soils. *Aromatic, slightly fleshy dark green leaves.*

**Cirsium vulgare**  
**Bull thistle**  
Asteraceae, aster family

Locally abundant in disturbed grasslands, seasonal wetlands. *Coarse spiny leaves in clumps.*
**Conium maculatum**  
**Poison-hemlock**  
Apiaceae, carrot family

Noxious robust annual weed of levees, disturbed soils with late-spring moisture; often in extensive stands. *Purple-blotched stems, fetid scented dissected fern-like foliage. Highly toxic if ingested; toxins in sap may be absorbed through skin.*

**Convolvulus sepium**  
**Bindweed**  
Convolvulaceae, morning-glory family

Prostrate clonal perennial forb, hard-packed levee soils, paths with sparse cover. *White to pinkish small morning-glory flowers.*
**Dipsacus sativus**  
**Teasel**  
Dipsacaceae, teasel family

Occasional weed of disturbed grasslands, seasonal wetlands.  
*Distinctive comb-like seedhead.*

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**Dittrichia graveolens**  
**Stinkwort, stinkweed**  
Asteraceae, aster family

Highly invasive summer-green resinous annual forb, spreading on levee roads, paths, disturbed subsaline or alkali soils, grasslands, mostly in southern San Francisco Bay; rapidly spreading elsewhere. *Strong camphor scent, linear sticky glandular leaves, regularly branched erect plant.*  
*Fall-flowering.*
**Foeniculum vulgare**  
**Fennel**  
Apiaceae, carrot family

Highly invasive tall, robust perennial of levees, dry soils, often in dense or dominant stands. *Anise-scented foliage, flowers, seeds; highly dissected feathery, fern-like leaves with thread-like segments.*

**Genista monspessulana**  
**French broom**  
Fabaceae, pea family

Noxious invasive shrub, often dominant in extensive stands. Abundant, persistent seed banks. Occurs in estuary primarily above tide line, Marin County.
**Hypochaeris radicata**  
Cat’s-ear  
Asteraceae, aster family

Widespread, locally common to abundant, but seldom dominant in grasslands, disturbed soils, and levees above tide-line.

**Lepidium latifolium**  
Perennial pepperweed, broadleaf pepperweed  
Brassicaceae, mustard family

Highly invasive clonal perennial, sprouting from creeping roots. Forms large colonies on levees, high tide lines, brackish marsh plains, and alkali or subsaline seasonal wetlands throughout the estuary. Most abundant in southern San Francisco Bay, Suisun and Martinez marsh areas, and northern San Pablo Bay. *Large, fleshy taproots have strong scent of horseradish.*
Limonium ramosissimum  Mediterranean sea-lavender
Richardson Bay – L. r. ssp. confusum (?)
San Francisco Peninsula – L. r. ssp. provinciale, Algerian sea-lavender (?)
Plumbaginaceae, leadwort family

Low-growing, dwarf branching rosettes with very small, succulent leaves (blunt – ssp. *confusum*; acute – ssp. *provinciale*) forming dense mats in the high tide line, but capable of spreading below and above the high tide line. Do not confuse with native sea-lavender, which has broad, large, wavy-margin leaves on mostly unbranched, stout, tall plants.
**Lotus corniculatus**  
*Bird’s-foot trefoil*  
Fabaceae, pea family

Taprooted perennial weed, low-growing weed of seasonal wetlands, upper edges of brackish marshes, levees. *Bright yellow pea flower, green foliage May-summer.*

**Malva neglecta**  
*Cheeses, mallow*  
Malvaceae, mallow family

Low-growing annual weed, disturbed soils; seldom persisting in dense vegetation. *Fruits resemble cheese rounds.*

Do not confuse with similar native gray pubescent species, alkali-mallow (*Malvella leprosa)*

**Medicago species**  
*Bur-clovers*  
Fabaceae, pea family

Low-growing annual minor weeds of disturbed soils. *Most species have bur-like fruits.*
White sweet-clover, melilot
*Melilotus alba*
Fabaceae, pea family

Annual tall weed of disturbed soils, levees, paths; seldom persisting in competition with dense perennial or shrub vegetation.

*Melilotus indica*
Yellow sweet-clover, small melilot
Fabaceae, pea family

Annual weed of disturbed soils, levees, paths; seldom persisting in competition with dense vegetation. *M. officinalis* is similar, with smaller flowers and broader, slightly toothed leaves.

*Mesembryanthemum nodiflorum*
Annual iceplant
Aizoaceae, purslane or carpetweed family

Succulent annual, abundant to dominant weed only on interior slopes of salt ponds with sparse vegetation; minor weed of tidal marsh edges, levees. *Nearly cylindrical succulent leaves; plants bright red during and after flowering.*
**Nicotiana glauca** [see photo, preceding page]
**Tree-tobacco**
Solanaceae, nightshade family

Moderately invasive soft-wooded tree, often sprouting from suckers on disturbed alkali flats, levees; mostly southern San Francisco Bay, occasionally elsewhere. *Glaucous gray-green slightly fleshy leaves; clusters distinctive tubular yellow flowers on mature plants.*

**Oxalis pes-caprae**
**Bermuda-buttercup**
Oxalidaceae, oxalis family

Invasive from clonal spread of seed-like bulbils (bulbs formed instead of seeds in mature flowers) and below-ground bulbs on fleshy roots. Emerges in fall, flowers in winter. Forms extensive, dense colonies, usually in disturbed soil with imported fill near residential areas.
**Picris echioides**  
**Bristly ox-tongue**  
Asteraceae, aster family

Widespread coarse erect annual, moderately invasive in disturbed soils; seldom persistent in dense perennial vegetation. *Flowerheads like dandelions; harsh bristly broad leaves with raised bristly bumps.*

**Plantago coronopus**  
**Buck’s-horn plantain**  
Plantaginaceae, plantain family

Locally abundant in disturbed high tide lines, usually in wave-eroded but well-drained saline soils. *Hairy, cut-edged or lobed leaves in a low rosette of leaves from crown of taproot.*

**Plantago lanceolata**  
**Lance-leaf plantain**

Plantaginaceae, plantain family

Usually a minor weed of levees, disturbed grasslands, soils above tide line. *Narrow leaves in a rosette on top of a taproot.*
Raphanus sativa
Wild radish
Brassicaceae, mustard family

Widespread, often dominant taprooted annual (or weakly perennial in moist soil) on levees and disturbed high tide lines or high tidal marsh, mostly North Bay; occasional in disturbed soils at and above tide line throughout the estuary. *Flowers may be white to lavender or dull yellow or brownish-yellow. Leaves lobed, rough.*

Rumex crispus
Curly dock
Polygonaceae, buckwheat family

Widespread, common perennial forb; abundant in seasonal wetlands, moist grasslands, occasional in levees.

In brackish marshes, do not confuse this with the native western dock, *R. occidentalis*, which lacks the inflated papery sac in the dry fruit around the seed.
Salsola soda, Mediterranean saltwort
Chenopodiaceae (Amaranthaceae)

Highly invasive annual weed of high tide lines and high tidal marsh, especially in drift-lines with debris or disturbed saline soils. *Succulent leaves and stems, nearly cylindrical; stems redden (often dark-striped) by mid-summer or under physiological stress. Seedlings have opposite leaves; mature plants have alternate leaves.*

Senecio vulgaris
Common groundsel
Asteraceae, aster family

Minor annual weed of disturbed soils, paths; often on levees.
Sonchus oleraceus (left), S. asper (right)
Sow-thistle
Asteraceae, aster family

Minor annual weed of grasslands, levees, disturbed soils. Jagged, lobed leaves, milky sap; blowball” seed-heads. *S. asper* is similar, with prickly leaves and rounded leaf bases.

Tetragonia tetragonioides
New Zealand spinach
Aizoaceae, purslane or carpetweed family

Fleshy, spreading perennial plant of high tide lines, lower slopes of levees. Locally abundant; edible when tender.
GRASS WEEDS

*Agrostis avenacea*
**Australian bentgrass, oat bentgrass**
Poaceae, grass family

Highly invasive in seasonal pond beds, seasonal wetlands, ditches; at least moderately invasive on levees, upper edges of tidal marshes below high tide line. Range is expanding rapidly in North Bay. *Thread-like branches of seed-heads detach and blow in flossy “tumbleweed” masses that accumulate on vegetation, ditch beds, fences.*

*Avena sativa*
**Wild oat**
Poaceae, grass family

Widespread, often abundant or dominant annual tall grass of well-drained to arid terrestrial grasslands, levees, disturbed soils. *Plants are often over 3 feet tall, spikelets (“seeds”) with long awns*
**Bromus diandrus**  
**Ripgut brome**  
Poaceae, grass family


**Cortaderia jubata**  
**Jubata grass**  
Poaceae, grass family

Invasive massive clump-forming grass of levees, seasonal wetlands; highly invasive on marine bluffs, outer coast. *Feathery, reed-like seed-heads, long, stiff leaves with harsh saw-like edges. Similar to Pampas grass (C. selloana), which has whiter seed-heads and hairless leaf sheath-bases.*

**Ehrharta erecta**, erect veldtgrass
Poaceae, grass family
Highly invasive perennial clump-forming grass with matted growth habit and tenacious roots, abundant small seeds, and exceptional tolerance to many physiological stresses (drought, shade, wind) and competition. Resembles superficially some woodland species of melic-grass (Melica torreyana, Melica spp.). Spreading from established Central Bay populations in Marin, San Francisco, San Mateo, and Berkeley-Oakland shorelines.

*Hordeum murinum ssp. gussoneanum*
Wild barley
Poaceae, grass family

Annual grass often dominant in marginally saline seasonally wet or flooded soils; levees, grasslands [Caution: do not confuse nonnative wild barley with native meadow barley, *Hordeum brachyantherum*, above; meadow barley has long, lax, slender spikes, usually purplish-brown when mature]
**Lolium multiflorum**  
**Italian ryegrass**  
Poaceae, grass family

Widespread, invasive in moist grasslands, seasonal wetlands, levees, especially in North Bay, Suisun and Martinez Marshes. Often forms extensive stands mixed with native salt tolerant species. Similar species L. perenne lacks long awns in seedhead.

**Parapholis incurva**  
**Sicklegrass**  
Poaceae, grass family

Annual, clump-forming grass of saline soils, strongly curved leaves and stems. Usually a minor weed, occasionally abundant near the high tide line. Similar to salt-tolerant grass weed *Hainardia cylindrica*, which has straight seedheads.
*Phalaris aquatica*
**Harding grass**
Poaceae, grass family

Highly invasive clump-forming tall perennial grass, invading both dry and wet soils; green throughout summer except in highly arid sites.

*Piptatherum mileaceum* (syn. *Oryzopsis mileaceum*)
**Smilo grass**
Poaceae, grass family

Bunchgrass with stolon-like layering culms, often with “mops” of vegetative shoots at nodes of the culms. Levees, bayshores, disturbed riparian habitats.
Polypogon monspeliensis
Rabbit’s-foot grass
Poaceae, grass family

Primarily weed of seasonal wetlands and disturbed or winter-ponded depressions brackish tidal marshes; also minor weed on levees. Long soft awns of seedhead/flowerhead form “rabbit’s foot”.
*Puccinellia maritima*  European goosegrass

Mat-forming or lax, spreading clump-forming perennial grass with above-ground runners, similar to saltgrass, but lacking salt crystals on leaves, and bearing translucent membrane (ligule) protruding from top ends (collar) of leaf sheath. Found mostly in high marsh.
Appendix 1, Table 1.

List of Widespread Nonnative Weeds of Terrestrial-tidal Marsh Ecotones, San Francisco Estuary

Summary representative list of widespread nonnative weeds of tidal marsh-terrestrial ecotones, San Francisco Estuary, with assessments of invasive status and ranks of abundance. Based on author’s observations 1991-present. Nomenclature follows Hickman (1993), with synonyms provided for major taxonomic revisions. Selected highly invasive species (strongly dominant where present or severe management problem where established) are named in bold typeface.

<table>
<thead>
<tr>
<th>Species</th>
<th>common name</th>
<th>family</th>
<th>invasive status</th>
<th>abundance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia melanoxylon</td>
<td>blackwood acacia</td>
<td>Fabaceae</td>
<td>Invasive, but uncommon; spreading from plantings</td>
<td>locally abundant, hillslopes bordering tidal marsh (Newark, Novato)</td>
</tr>
<tr>
<td>Agrostis avenacea</td>
<td>Australian or oat bentgrass</td>
<td>Poaceae</td>
<td>Highly invasive, range expansion in North Bay, esp. in or near ditches, seasonal ponds; levees</td>
<td>Abundant to dominant in brackish seasonal wetlands; also on levees, moist grassland</td>
</tr>
<tr>
<td>Atriplex semibaccata</td>
<td>Australian saltbush</td>
<td>Chenopodiaceae (now placed in Amaranthaceae)</td>
<td>Moderately invasive</td>
<td>Seldom dominant, locally common</td>
</tr>
<tr>
<td>Avena barbata</td>
<td>bearded oat</td>
<td>Poaceae</td>
<td>Invasive</td>
<td>Abundant to locally dominant, levees, disturbed soils</td>
</tr>
<tr>
<td>Bassia hyssopifolia</td>
<td>bassia</td>
<td>Chenopodiaceae (Amaranthaceae)</td>
<td>Invasive, widespread; primarily on levees, edges of roads or trails</td>
<td>Locally abundant to dominant</td>
</tr>
<tr>
<td>Beta vulgaris</td>
<td>wild beet</td>
<td>Chenopodiaceae (Amaranthaceae)</td>
<td>Slightly invasive or negligibly so</td>
<td>Seldom if ever abundant, shorelines</td>
</tr>
<tr>
<td>Briza maxima</td>
<td>rattlesnake grass</td>
<td>Poaceae</td>
<td>Invasive, widespread</td>
<td>Abundant locally some years, primarily North Bay</td>
</tr>
<tr>
<td>Briza minor</td>
<td>small rattlesnake grass</td>
<td>Poaceae</td>
<td>Invasive</td>
<td>Locally abundant</td>
</tr>
<tr>
<td>Bromus diandrus</td>
<td>ripgut brome</td>
<td>Poaceae</td>
<td>Invasive, widespread, especially on levees</td>
<td>Abundant to dominant above high tide line</td>
</tr>
<tr>
<td>Bromus bordeaeus</td>
<td>soft brome</td>
<td>Poaceae</td>
<td>Invasive in seasonal wetlands, levees</td>
<td>Commonly abundant</td>
</tr>
<tr>
<td>Cakile maritima</td>
<td>sea-rocket</td>
<td>Brassicaceae</td>
<td>Negligibly invasive</td>
<td>Local, shoreline; minor species, gravel or sand shores.</td>
</tr>
<tr>
<td>Carduus pycnocephala</td>
<td>Italian thistle</td>
<td>Asteraceae</td>
<td>Highly invasive, grasslands, levees</td>
<td>Local, often dominant where present</td>
</tr>
<tr>
<td>Carpobrotus edulis (C. edulis x chilensis)</td>
<td>iceplant</td>
<td>Aizoaceae</td>
<td>Invasive to highly invasive, mostly in cool, fog-influenced microclimates</td>
<td>Local, but dominant or highly abundant clonal spread where present</td>
</tr>
<tr>
<td>Centaurea melicentis</td>
<td>Napa starthistle</td>
<td>Asteraceae</td>
<td>Highly invasive</td>
<td>Local, disturbed soils</td>
</tr>
<tr>
<td>Conium maculatum</td>
<td>Poison-hemlock</td>
<td>Apiaceae</td>
<td>Highly invasive, widespread</td>
<td>Local dominant, primarily North Bay and Suisun Bay areas</td>
</tr>
<tr>
<td>Cortaderia jubata</td>
<td>jubah grass</td>
<td>Poaceae</td>
<td>Highly invasive, Widespread, locally</td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Common Name</td>
<td>Family</td>
<td>Description</td>
<td>Location</td>
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<td>---------</td>
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</tr>
<tr>
<td><em>Cortaderia selloana</em></td>
<td>Pampas grass</td>
<td>Poaceae</td>
<td>Highly invasive, primarily in fog influence, cool microclimates or seasonal wetlands</td>
<td>Uncommon in tidal marsh edges; occasional, diked baylands</td>
</tr>
<tr>
<td><em>Dittrichia graveolens</em></td>
<td>stinkweed</td>
<td>Asteraceae</td>
<td>Highly invasive, primarily on levees (road or trail edges), alkali grassland; early stages of regional invasion</td>
<td>Locally dominant to abundant, south San Francisco Bay;</td>
</tr>
<tr>
<td><em>Ehrharta erecta</em></td>
<td>erect veldtgrass</td>
<td>Poaceae</td>
<td>Highly invasive, primarily in fog influence, cool climates; spreading from old stabilization plantings</td>
<td>Early stages of invasion outside established populations Marin, San Mateo, San Francisco, and Berkeley</td>
</tr>
<tr>
<td><em>Elytrigia pontica</em> ssp. <em>pontica</em></td>
<td>Russian wheatgrass</td>
<td>Poaceae</td>
<td>Invasive; potentially highly invasive (early stages of regional invasion); spreading from old stabilization plantings</td>
<td>Locally abundant to dominant, but not widespread: Coyote Creek, Mare Island</td>
</tr>
<tr>
<td><em>Ficus carica</em></td>
<td>fig</td>
<td>Moraceae</td>
<td>Slightly invasive (eastern Suisun Marsh to Delta)</td>
<td>Locally dominant (eastern Suisun Marsh to Delta)</td>
</tr>
<tr>
<td><em>Foeniculum vulgare</em></td>
<td>fennel</td>
<td>Apiaceae</td>
<td>Highly invasive on levees, disturbed soils</td>
<td>locally abundant,</td>
</tr>
<tr>
<td><em>Genista monspessulana</em></td>
<td>French broom</td>
<td>Fabaceae</td>
<td>Highly invasive, primarily on coastal bluffs, hillslopes; locally on levees, Marin County</td>
<td>locally dominant, hillslopes, some levees near seed sources</td>
</tr>
<tr>
<td><em>Hainardia cylindrica</em></td>
<td></td>
<td>Poaceae</td>
<td>Moderately invasive, saline seasonal wetlands, disturbed saline soils</td>
<td>Locally common but seldom abundant</td>
</tr>
<tr>
<td><em>Hordeum murinum</em> ssp. <em>gussoneanum</em></td>
<td>foxtail barley</td>
<td>Poaceae</td>
<td>Invasive, primarily in seasonal wetlands</td>
<td>widespread</td>
</tr>
<tr>
<td><em>Hordeum murinum</em> ssp. <em>leporinum</em></td>
<td>foxtail barley</td>
<td>Poaceae</td>
<td>Invasive</td>
<td>Widespread</td>
</tr>
<tr>
<td><em>Hypochaeris glabra, H. radicata</em></td>
<td>cat’s-car</td>
<td>Asteraceae</td>
<td>Invasive</td>
<td>Widespread but seldom dominant; locally abundant, levees</td>
</tr>
<tr>
<td><em>Juncus gerardii</em></td>
<td>black rush</td>
<td>Juncaceae</td>
<td>highly invasive, brackish high marsh plain; possibly higher marsh edges with seeps</td>
<td>local (2008), Southampton Marsh and Point Pinole</td>
</tr>
<tr>
<td><em>Lepidium latifolium</em></td>
<td>perennial pepperweed</td>
<td>Brassicaceae</td>
<td>Highly invasive, levees, sandy shorelines, especially bordering brackish wetlands</td>
<td>Widespread, abundant to dominant</td>
</tr>
<tr>
<td><em>Limonium</em></td>
<td>Algerian sea-</td>
<td>Plumbaginaceae</td>
<td>Highly invasive in SF peninsula,</td>
<td></td>
</tr>
</tbody>
</table>

Marin Audubon Society
Tidal Marsh Edge Vegetation Management
Appendix 2
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Family</th>
<th>Invasiveness and Habits</th>
<th>Location Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Lolium multiflorum, L. perenne</em></td>
<td><em>Lolium multiflorum</em></td>
<td>Poaceae</td>
<td>Moderately invasive, mostly disturbed or wet soils</td>
<td>Common, grassland (2008)</td>
</tr>
<tr>
<td><em>Madia sativa</em></td>
<td><em>Madia sativa</em></td>
<td>Asteraceae</td>
<td>Locally invasive, usually ephemeral in succession to annual grasses; levees, disturbed soils</td>
<td>Locally abundant to dominant, North Bay</td>
</tr>
<tr>
<td><em>Medicago polymorpha</em></td>
<td><em>Medicago polymorpha</em></td>
<td>Fabaceae</td>
<td>invasive</td>
<td>Minor,</td>
</tr>
<tr>
<td><em>Lolium multiflorum</em></td>
<td><em>Medicago indica</em></td>
<td>Fabaceae</td>
<td>Moderately invasive following disturbance; seldom persisting</td>
<td>Minor</td>
</tr>
<tr>
<td><em>Medicago indica</em></td>
<td><em>Medicago indica</em></td>
<td>Fabaceae</td>
<td>Moderately invasive following disturbance; seldom persisting</td>
<td>Locally abundant</td>
</tr>
<tr>
<td><em>Medicago indica</em></td>
<td><em>Medicago indica</em></td>
<td>Fabaceae</td>
<td>Moderately invasive, disturbed sites</td>
<td>Minor, disturbed soil</td>
</tr>
<tr>
<td><em>Mesembryanthemum nodiflorum</em></td>
<td><em>Mesembryanthemum nodiflorum</em></td>
<td>Aizoaceae</td>
<td>Locally invasive only on interior slopes of salt pond levees; slightly invasive in disturbed tidal marsh edges</td>
<td>Locally abundant on hypersaline, arid dredge spoils; minor weed in competition with terrestrial vegetation</td>
</tr>
<tr>
<td><em>Oxalis pes-caprae</em></td>
<td><em>Oxalis pes-caprae</em></td>
<td>Oxalidaceae</td>
<td>Highly invasive but localized clonal spread from fill</td>
<td>Locally abundant, but colonies relatively rare on levees</td>
</tr>
<tr>
<td><em>Parapholis incurva</em></td>
<td><em>Parapholis incurva</em></td>
<td>Poaceae</td>
<td>Moderately invasive</td>
<td>Locally common seldom abundant, disturbed saline seasonal wetland soils bordering tidal marsh</td>
</tr>
<tr>
<td><em>Phalaris aquatica</em></td>
<td><em>Phalaris aquatica</em></td>
<td>Poaceae</td>
<td>Highly invasive and persistent, range increasing; levees, grasslands</td>
<td>Locally abundant to dominant, especially on levees, low grasslands</td>
</tr>
<tr>
<td><em>Piptatherum mileaceum</em></td>
<td><em>Piptatherum mileaceum</em></td>
<td>Poaceae</td>
<td>Invasive, disturbed shorelines</td>
<td>Spreading (2008) S and E SF Bay</td>
</tr>
<tr>
<td><em>Phoenix canariensis</em></td>
<td><em>Phoenix canariensis</em></td>
<td>Arecaceae</td>
<td>Persisting or locally spreading from plantings; slightly invasive</td>
<td>Very localized mature stands, mostly North Bay near residential or old homestead areas</td>
</tr>
<tr>
<td><em>Picris echioides</em></td>
<td><em>Picris echioides</em></td>
<td>Asteraceae</td>
<td>Widespread, disturbed soils, levees</td>
<td>Locally abundant, but seldom over extensive areas</td>
</tr>
<tr>
<td><em>Plantago coronopus</em></td>
<td><em>Plantago coronopus</em></td>
<td>Plantaginaceae</td>
<td>Invasive, levees, seasonal wetlands, disturbed subsaline soils</td>
<td>Occasionally abundant</td>
</tr>
<tr>
<td><em>Plantago lanceolata</em></td>
<td><em>Plantago lanceolata</em></td>
<td>Plantaginaceae</td>
<td>Invasive, levees, seasonal wetlands</td>
<td>Seldom dominant or abundant</td>
</tr>
<tr>
<td><em>Polygonum arenastrum</em></td>
<td><em>Polygonum arenastrum</em></td>
<td>Polygonaceae</td>
<td>Moderately invasive, mostly disturbed soils</td>
<td>Seldom abundant or dominant</td>
</tr>
<tr>
<td><em>Prunus domestica cv. undet.</em></td>
<td><em>Prunus domestica</em></td>
<td>Rosaceae</td>
<td>Noninvasive, persisting from cultivation</td>
<td>Local, minor</td>
</tr>
<tr>
<td><em>Prunus cerasifera cv.</em></td>
<td><em>Prunus cerasifera</em></td>
<td>Rosaceae</td>
<td>Noninvasive, persisting from cultivation (clonal)</td>
<td>Local, minor</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>Common Name</td>
<td>Family</td>
<td>Description</td>
<td>Distribution</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>--------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Puccinellia maritima</td>
<td>European goosegrass</td>
<td>Poaceae</td>
<td>Highly invasive, high marsh</td>
<td>Local (2008), central San Francisco peninsula</td>
</tr>
<tr>
<td><em>Raphanus sativa</em></td>
<td>Wild radish</td>
<td>Brassicaceae</td>
<td>Invasive to highly invasive, especially levees, disturbed soils</td>
<td>Often stable dominant or occurring as persistent extensive single-species stands</td>
</tr>
<tr>
<td><em>Rubus armeniacus</em> (<em>R. discolor</em>)</td>
<td>Himalayan blackberry</td>
<td>Rosaceae</td>
<td>Invasive (highly invasive on levees in fresh-brackish estuary)</td>
<td>Abundance greatest in brackish reaches of estuary, especially Suisun Bay and east; local dominant</td>
</tr>
<tr>
<td>Rumex acetosella</td>
<td>Sheep-sorrel</td>
<td>Polygonaceae</td>
<td>Invasive, widespread but seldom abundant</td>
<td>Minor (grassland)</td>
</tr>
<tr>
<td>Rumex crispus</td>
<td>Curly dock</td>
<td>Polygonaceae</td>
<td>Invasive primarily weed of seasonal freshwater to brackish wetlands</td>
<td>Seldom dominant except in seasonal wetlands</td>
</tr>
<tr>
<td><em>Salsola soda</em></td>
<td>Mediterranean saltwort</td>
<td>Chenopodiaceae (Amaranthaceae)</td>
<td>Invasive,</td>
<td>Dominance above marsh plain is usually limited to high tide lines (drift-lines)</td>
</tr>
<tr>
<td>Senecio vulgaris</td>
<td>Common groundsel</td>
<td>Asteraceae</td>
<td>Invasive, mostly disturbed soils</td>
<td>Minor weed</td>
</tr>
<tr>
<td>Silene gallica</td>
<td>Windmill pink</td>
<td>Caryophyllaceae</td>
<td>Invasive, mostly disturbed soils</td>
<td>Minor weed of grasslands</td>
</tr>
<tr>
<td>Silybum marianum</td>
<td>Milk-thistle</td>
<td>Asteraceae</td>
<td>Invasive, mostly disturbed soils; occasional</td>
<td>Locally abundant,</td>
</tr>
<tr>
<td>Sisymbrium officinale</td>
<td>Hedge mustard</td>
<td>Brassicaceae</td>
<td>Invasive, mostly disturbed soils, levees</td>
<td>Minor</td>
</tr>
<tr>
<td>Spartina densiflora</td>
<td>Chilean cordgrass</td>
<td>Poaceae</td>
<td>Invasive, upper intertidal zone</td>
<td>Formerly locally abundant, Corte Madera and Point Pinole vicinity; declining under regional eradication program (2006)</td>
</tr>
<tr>
<td>Stellaria media</td>
<td>Chickweed</td>
<td>Caryophyllaceae</td>
<td>Invasive, mostly disturbed soils</td>
<td>Minor weed</td>
</tr>
<tr>
<td>Sonchus oleraceus, S. asper</td>
<td>Sow-thistles</td>
<td>Asteraceae</td>
<td>Invasive, mostly disturbed soils</td>
<td>Usually minor but frequent weed, disturbed levees, grasslands</td>
</tr>
<tr>
<td>Tetragonia tetragonioides</td>
<td>New Zealand spinach</td>
<td>Aizoaceae</td>
<td>Invasive, widespread</td>
<td>Locally abundant or dominant but seldom extensive</td>
</tr>
</tbody>
</table>

**Appendix 1, Table 2.** Recent highly invasive non-native plants established in tidal marsh edges, with localized current regional distribution, San Francisco Estuary.

*Agrostis avenacea*, Australian bentgrass  
*Dittrichia graveolens*, stinkwort  
*Ehrharta erecta*, tall veldtgrass  
*Elytrigia pontica* ssp. pontica, Russian wheatgrass  
*Limonium ramosissimum*, Mediterranean sea-lavender  
*Puccinellia maritima*, European goosegrass