[DRAFT} Appendix I: Some Invasive Non-Native Species in the San Francisco Bay Region to Avoid Planting or Exclude in Wetland Mitigation Sites (Dec

(note that a second listing of the same species in blue indicates a different opinion on the status of invasiveness.)

Important Note: Native spcies in wetland ecosystem mitigation sites are preferred over non-natives to preserve biodiversity and the unique vegetation of the San Francisco Bay Region. The following list of invasive exotic species is intended to (1) increase awareness of exotics (2) identify the worst exotics and (3) identify potential exotics before they become uncontrollable.

This list is intended to provide general guidance only and does not serve as regulation. Wetland mitigation sites -- including associated buffers and transitional areas -- should ultimately provide native vegetation species unless the project goal is specifically fon non-natives (e.g., for some acceptable wildlife food). There may be some non-native species that are exceptions to the guidelines below based on professional opinions or actual variables that might make a species more or less agressive in different habitat types, micro-climates, or plant communities among other things. There may also be aggressive non-natives that are only ephemeral and will not persist. **The project applicant responsible for the mitigation site should provide site conditions that prevent agressive non-native species from persisting as dominants over the long term.** Some native species (e.g., cattails, bulrush) may also require control depending on the target habitat, though this list deals only with non-native vegetation. For advice, consult a professional botanist or wetland consultant and review the updated CALEPPC lists (reference provided below). This appendix is specifically for the San Francisco Bay I

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TIER 1 = HIGHLY INVASIVE NON-NATIVE SPECIES TO AVOID PLANTING AND KEEP OUT OF WETLAND MITIGATION SITES

Latin Name	Common Name	Wetland Status [a]	Invasive [b]	On Cal EPPC List [c]	Habitat Type [d]	Source	Comments
Arundo donax	Giant reed	Fac+	Yes	A-1	FM, R	2, 5, 7, 9, 11	
Agostris avenacea	Australian bent grass (or Pacific or Oat bent grass)	FacW*	Yes	NMI	TM, BM, SM	7, 12	In North SF Bay (2005); not yet widely recognized as strongly invasive.
Carpobrotus edulis	Ice plant, sea fig	NG	Yes	A-1	TM	6, 7, 9	Especially on dunes
Centaurea solstitialis	Yellow star thistle	NG	Yes	A-1	Gr, U, TA	4, 5, 7, 9	
Cortaderia selloana (or C. jubata)	Pampas grass	NG	Yes	A-1	U or TA	4, 5, 6, 7, 9, 11, 12	
Cynara cardunculus	Arthichoke thistle	NG	Yes	A-1	Gr	5, 7	
Cytisus scoparius	Scotch broom	NG	Yes	A-1	Up, TA	7, 9	
Delairea odorata	Cape ivy	NG	Yes	A-1	R	5, 7, 9, 11, 12	Formerly *Senecio mikanoides*
Egeria densa	Brazilian waterweed	Obl	Yes	A-2	OW	7, 11	
Eichhornia crassipes	Water hyacinth	Obl	Yes	A-2	CW	7, 11	
Elytrigia pontica	Tall/Rush Wheatgrass	NG	Yes		TM, BM (?)	12	In Coyote Hills & Mare Island areas (2005); not yet widespread but potential to spread to high marsh
Ehrharta erecta	Veldt grass	NG	Yes	B	R, Gr, TA	5, 12	Especially invasive in semi-shaded riparian or coastal habitats

Latin Name	Common Name	Wetland Status [a]	Invasive [b]	On Cal EPPC List [c]	Habitat Type [d]	Source	Comments	
Eucalyptus globulus	Tasmanian blue gum	NI		A-1	R, Gr	7		
Foeniculum vulgare	Fennel	FacU-	NA		DB, U or TA	2, 4, 12	Keep very low or out of transition areas for first five years.	
Foeniculum vulgare	Fennel	FacU-	Yes	A-1	Up or TA; Gr	7, 9		
Genista monspessulana	French broom	NG	Yes	A-1	SW; U or TA	4, 5, 7		
Hydrilla verticillata	Hydrilla	Obl	Yes	RA	OW	7, 11		
Lepidium latifolium	Broadleaf Peppergrass	FacW	Yes	A-1	DB, BM; FM, SW, Gr, VP, Up or TA	2, 4, 5, 6, 7, 9, 11		
Lythrum salicaria	Purple loosestrife	Obl	Yes	RA	TM, FM, SW, R ??	2, 5, 6, 7, 11		
Myriophyllum spicatum	Eurasian watermilfoil	Obl	Yes	A-1	OW, R	7, 11		
Pennisetum setaceum	Fountain grass	NG	Yes	A-1	Gr	7		
Rubus discolor	Himalayan blackberry	Fac +	Yes	A-1	R, FM, DB	5, 7, 8, 11		
Salvinia molesta	Giant salvinia	NG	Yes	RA	OW	7, 11, 12	Present only in Central Valley (but has potential to spread to SFBay Area)	
Spartina alterniflora	Smooth cordgrass	Obl	Yes	A-2	TM	2, 5, 7, 11	Contact Invasive Spartina Program for control methods [www,spartina.org]	
Spartina anglica [?]	Cordgrass	Obl	Yes	RA	TM	7	Contact Invasive Spartina Program for control methods [www,spartina.org]	
Spartina densiflora	Dense-flowered cordgrass	Obl	Yes	RA	TM	6, 7, 11	Contact Invasive Spartina Program for control methods [www,spartina.org]	
Tamarix chinensis	Tamarisk (salt cedar)	FacW	Yes	A-1	R	7, 11		
Ulex europaeus	Gorse	NG	Yes	A-1	Gr	7		
Vinca major	Periwinkle	NG	Yes	B	R	5, 7, 11		

Latin Name	Common Name	Wetland Status [a]	Invasive [b]	On Cal EPPC List [c]	Habitat Type [d]	Source	Comments	
TIER 2 = MODERATELY INVASIVE NON-NATIVE SPECIES TO AVOID PLANTING AND KEEP OUT OF WETLAND MITIGATION SITES								
Latin Name	**Common Name**	**Wetland Status [a]**	**Invasive [b]**	**On Cal EPPC List [c]**	**Habitat Type [d]**	**Source**	**Comments**	
Ailanthus altissima	Tree of heaven	FacUn		A-2	U or TA	7		
Avena fatua	Wild oat	NG	NA		Gr	2, 5		
Avena fatua	Wild oat	NG		AG		7		
[Brassica &] Hirschfeldia inc	Mustard	Upl	NA	NMI	DB	2		
Brassica nigra	Black mustard	NG		B	SW, U or TA	7		
Bromus diandrus	Ripgut brome	NG	NA	AG	Gr	2, 5, 7		
Bromus hordeaceus	Soft chess	FacU-	NA		Gr	2		
Carduus pycnocephalus	Italian thistle	NG		B	Wide, Gr	5, 7		
Cirsium vulgare	Bull thistle	Fac		B	R, SW	7		
Conium maculatum	Poison hemlock	Fac	NA		DB	2, 12	Keep very low or out of transition areas for first five years.	
Conium maculatum	Poison hemlock	Fac	Yes	B	Up, TA	5, 7, 9		
Cotoneaster pannosus	Cotoneaster	NG	Yes	A-2		7		
Dittrichia graveolens	Stinkwort	NG	IA		DB, U, TA	2, 15		
Hordeum marinum	Barley	Fac or Upl	NA		DB, U or TA	2, 9		
Iris pseudacorus	Iris	Obl		B	TM	6, 7		
Lolium multiflorum	Italian ryegrass	Fac*		AG	Gr	5, 7, 9, 13, 15	On wetland plant list under L.perenne (?); see comment for L.perenne below.	
Lolium multiflorum	Italian ryegrass	Fac*	NA		Gr	2, 12		
Lolium perenne	Perennial ryegrass	Fac*	Yes?				In special cases can be used as a smother crop to prevent star thistles, picris, and other invasive species from becoming established until native speices dominate. However, it should not persist as dominant species for more than 10 years. Never allow in vernal pools.	

Latin Name	Common Name	Wetland Status [a]	Invasive [b]	On Cal EPPC List [c]	Habitat Type [d]	Source	Comments	
Lythrum hyssopifolia	Hyssop loosestrife	FacW	NA		DB, VP, Gr	2	Sometimes only a pioneer species on sites with summer flooding or perennial vegetation that will die out after about 10 years. Should not be allowed to persist as a dominant species after 10 years unless specifically for wildlife food.(?)	
Oxalis pes-caprae	Bermuda buttercup	NG		NMI	Gr	5, 7		
Pennisetum clandestinum	Kikuyu grass	FacU		NMI	Gr	2, 5		
Phalaris aquatica	Harding grass	Fac		B	VP?, Gr	7		
Raphanus sativus	Radish	Upl			U or TA	9, 12	Keep very low or out of transition areas for first five years.	
Salsola soda	Mediterranean saltwort	FacW+		NMI	TM	6, 7		
Spartina patens	Salt meadow cordgrass	Obl		RA	TM	7	Contact Invasive Spartina Program for control methods [www,spartina.org]	
TIER 3 = UNAGRESSIVE NON-NATIVE SPECIES TO AVOID PLANTING IN WETLAND MITIGATION SITES UNLESS FOR WILDLIFE OR OTHER ACCEPTABLE REASON								
Latin Name	**Common Name**	**Wetland Status [a]**	**Invasive [b]**	**On Cal EPPC List [c]**	**Habitat Type [d]**	**Source**	**Comments**	
Anagallis arvensis	Scarlet pimpernel	Fac				14		
Chenopodium berlandieri	Goosefoot	NG	NA		DB	2	Waterfowl food.	
Cotula coronopifolia	Brass buttons	FacW+	NA		DB	2, 15, 16		
Convolvulus arvensis	Bind weed	NG				15, 16, 17	Can be invasive, so be careful to control spread.	
Crypsis schoenoides	Swamp timothy	Obl			FM?	17	Wildlife food.	
Erodium spp.	Filaree	NG			15, 16			
Heterotheca grandiflora	Telegraph weed	NG			15, 16			
Lotus corniculatus	Bird's foot trefoil	Fac			SW, DB, U or TA	2, 4, 15, 16		
Paspalum dilitatum	Dallis grass	Fac			VP			

Latin Name	Common Name	Wetland Status [a]	Invasive [b]	On Cal EPPC List [c]	Habitat Type [d]	Source	Comments
Polypogon monspeliensis	Rabbit's foot grass	FacW+			BM, SW, FM	12, 15, 16, 17	In some habitat types such as a brackish tidal marsh, it generally does not persist as a dominant after the first 5 years, once native perennial vegetation is established. However, it should not be allowed to persist as a dominant species after 10 years unless specifically planted for wildlife food (?).
Phyla nodiflora	Frog-fruit	FacW		NMI	VP	7	
Picris echiodes	Bristly ox tounge	Fac		CBNL		7, 12, 17	Noxious persistent weed on urban rubble, but cannot compete in shaded areas.
Plantago coronopus	Cutleaf plantain	Fac			U or TA	4, 15, 16	
Plantago lanceolata	English plantain	Fac-				15, 16	
Rumex crispis	Curly Dock	FacW-			DB	2, 17	
Rumex crispis	Curly Dock	FacW-	Yes?		FM?, SM, VP? Up or TA?	9, 13	Can be invasive; keep out of vernal pools. Should this be in Tier 2 or Tier 3???
[a]Wetland Status indicating probable estimated occurance in wetlands (from Reed 1998 anr RMG 1993):							
Obl= Obligate =99%							
FacW = Facultative Wet = 67% - 99%							
Fac Facultative = equally likely to occur in wetlands and nonwetlands (34% - 66%)							
Fac U = Facultative Upland = 1% - 33%							
Up = Upland = < 1%							
NG = Not given (so does not occur in wetlands >1%); NA = No Agreement; NI = No Indicator (not enough information);							
+ = more/ - = less; * = a tentative assignment.							
[b] Invasive is based on one of the sources below. Note: Source 2 (Goals Report 1999) distinguishes between:							
NA = naturalized alien (less threatening to native species)							
IA = invasive alien (more threatening to invasive species)							
[c] CalEPPC List (Source #8):							
A-1 = Most Invasive Wildland Pest Plant							
A-2: Most Invasive Wildland Pest Plants; Regional [in SF Bay]							
B = Pest Plants of Lesser Invasiveness							

Latin Name	Common Name	Wetland Status [a]	Invasive [b]	On Cal EPPC List [c]	Habitat Type [d]	Source	Comments	
RA = Red Alert: Species with potential to spread explosively								
NMI = Need more information								
AG = Annual Grasses [of concern??]								
Habitat Types: TM = Tidal Marsh; BM = Brackish Marsh; FM = Freshwater Marsh; SM = Seasonal Marsh; VP = Vernal Pool; R = Riparian; Gr = Grassland; U or TA = Uplands or Transitional Area; DB = Diked Baylands; CW = Coastal Waters; OP = Open Water; Wide = Widespread.								
Sources:								
1. Common Wetland Plants, Faber (1993)								
2. Baylands Ecosystem Habitat Goals Report (1999)								
3. Species & Community Profiles (2000)								
4. Martin Luther King Wetland Restoration Fourth Year Monitoring Report (2003), Wetlands and Water Resources.								
5. Jepson Herbarium "Pest Plants in the East Bay" (no date)								
6. "Introduced Tidal Marsh Plants of the SF Bay Estuary", SFEI (1998)								
7. CALEPPC List: Exotic Pest Plants of Greatest Ecological Concern in CA (1999)								
8 = Invasive Plants of CA Wildlands, Bossard et al. (2000)								
9. Evaluation of Vegetation of Wetland Restoration Projects, BMP Ecosciences (2003)								
10. Resource Management Group (1993) based on Reed's National List of Plant Species in Wetlands (1988; updated 1998).								
11. Practical Handbook for the Identification…of Invasive Aquatic and Wetland Plants. SFEI (2003).								
12. Personal Communication, Peter Baye, (Nov. 2005)								
13. Personal Communication, John Callaway, (Nov. 2005)								
14. Personal Communication, Bruce Pavlik, (Nov. 2005)								
15. Personal Communication, Brad Olson, East Bay Regional Park District, Nov 23, 2005								
16. Personal Communication, Jeff Olberding, **[verify 1999 list]**								
17. "Plant species observed at Stone Lakes National Wildlife Refuge, 7/26/04. Jones & Stokes, Sacramento. (list notes non-natives planted as ornamentals or for wildlife food)								
18, [ASK CARL WILCOX, LARRY WYCOFF, ART FEINSTEIN, DAVID LEWIS TO REVIEW & COMMENT ON LIST]								