APPENDIX H

SALT RIVER BAY NATIONAL HISTORICAL PARK

AND ECOLOGICAL PRESERVE

Appendix H: Salt River Bay National Historic Park and Ecological Preserve

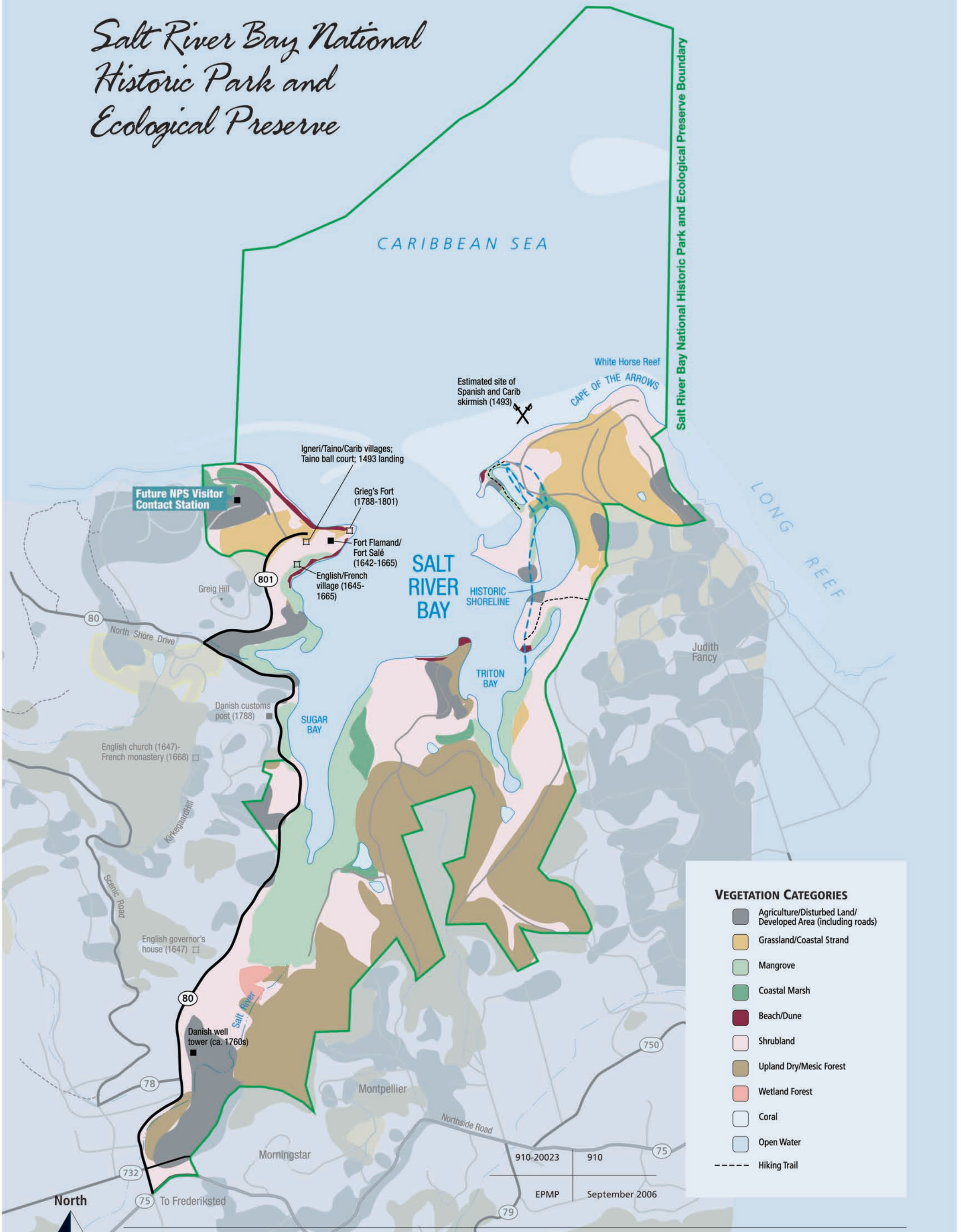
Maps

Tables

Summary Description of Vegetation Categories Referenced in Appendix

Vegetation Category	Vegetation Subcategories
Agriculture / Disturbed Land / Developed Area	Agriculture areas, barren lands, mixed grasslands, drought-deciduous shrublands, shrub and brush lands, and exotic plants.
Grassland / Coastal Strand	Dry prairies, coastal grasslands, coastal strands, and coastal uplands.
Mangrove	Mangrove fringe, mangrove forest and woodland, and mangrove shrubland.
Coastal Marsh	Salt marshes, salt flats, and salt ponds.
Beach / Dune	Beach and dune areas.
Shrubland	Sclerophyllous evergreen shrublands, mixed dry shrublands, gallery shrublands, thicket scrub, coastal scrub, thorn scrub, and coastal hedge. In the Virgin Island parks it includes gallery shrublands, mixed, dry shrublands, and coastal hedge.
Upland Dry / Mesic Forest	Tropical hardwood hammocks, pine flatwoods, south Florida rocklands, mixed hardwood/pine forests, coastal hammock, xeric oak scrub, oak-saw palmetto scrub, drought-deciduous forests, semi-deciduous forests, gallery semi-deciduous forests, semi-evergreen forests, evergreen woodlands, gallery semi-deciduous woodlands, semi-deciduous woodlands, drought-deciduous woodlands, upland moist forests, and gallery moist forests.
Wetland Forest	Mixed cypress strands, cypress sloughs, cypress domes, bay swamps, hardwood swamp forests, basin moist forests, mixed swamps, and shrub swamps.

Salt River Bay National Historic Park and Ecological Preserve



South Florida and Caribbean Parks Exotic Plant Management Plan and Environmental Impact Statement

Salt River Bay National Historic Park and Ecological Preserve

CARIBBEAN SEA

Salt River Bay National Historic Park and Ecological Preserve Boundary

White Horse Reef

Estimated site of Spanish and Carib skirmish (1493)

CAPE OF THE ARROWS

#1

Igneri/Taino/Carib villages; Taino ball court; 1493 landing

Future NPS Visitor Contact Station

#2

Grieg's Fort (1788-1801)

Fort Flamand/ Fort Salé (1642-1665)

English/French village (1645-1665)

801

Greig Hill

80

North Shore Drive

SALT RIVER BAY

HISTORIC SHORELINE

LONG REEF

Judith Fancy

TRITON BAY

#4

Danish customs post (1788)

SUGAR BAY

English church (1647)- French monastery (1668)

Kirkegaard Hill

Scenic Road

#3

English governor's house (1647)

751

80

Salt River

Danish well tower (ca. 1760s)

750

78

Montpellier

Northside Road

75

Morningstar

732

75 To Frederiksted

79

North

Treatment Areas

- Areas Appropriate for Active Restoration
- Treatment Area #1
- Treatment Area #2
- Treatment Area #3
- Treatment Area #4
- Hiking Trail

910-20022	910
EPMP	September 2006

South Florida and Caribbean Parks Exotic Plant Management Plan and Environmental Impact Statement

APPENDIX H: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE

TABLE H-1: ACRES WITHIN VEGETATION CATEGORIES THAT COULD POTENTIALLY BE RESTORED UNDER ALTERNATIVES[a] A, B, and C

	Alternative A	Alternative B	Alternative C	
Vegetation Category	**Potential Acres Passively Restored**	**Potential Acres Passively Restored**	**Potential Acres Passively Restored**	**Potential Acres Actively Restored**
Salt River Bay National Historic Park and Ecological Preserve				
Agriculture / Disturbed Land / Developed Area (including roads)	46	46	0	46
Grassland / Coastal Strand	53	53	1	52
Beach / Dune	0	0	0	0
Mangrove	<1	<1	<1	0
Coastal Marsh	17	17	7	10
Shrubland	136	136	37	98
Upland dry / Mesic Forest	134	134	0	134
Wetland Forest	3	3	3	0
Total	**389**	**389**	**49**	**340**

a. Although treatments would occur under alternative A to control exotic plant species, it is assumed that within the life of the plan all acres may not be restored. Under alternatives B and C, it is assumed all acres would be restored due to re-treatment of exotic plant species under an optimal re-treatment schedule (see the "Alternatives" Chapter, Alternative B, Maintaining Treated Sites section).

Key to Table H-2 below

a. Gross infested acres of exotic plants within Salt River Bay National Historic Park and Ecological Preserve were based on data provided by EPMT and park staff.

b. Initial treatment methods for each area under alternative A were assumed to be the same as those that occur in other Caribbean parks (see the "Alternatives" Chapter, Alternative A, Initial Treatment section). Initial treatment methods for alternatives B and C were determined by application of the treatment method decision tool (see the "Alternatives" Chapter, Alternative B, Treatment Method Decision Tool section).

c. Re-treatment methods under alternative A were assumed to be the same as initial treatment (see the "Alternatives" Chapter, Alternative B, Maintaining Treated Sites section). Re-treatment methods under alternatives B and C were determined by application of the new treatment method decision tool (see the "Alternatives" Chapter, Alternative B, Treatment Method Decision Tool section).

d. Herbicides that could be applied under alternatives A, B, and C are based on prior treatment data in other Caribbean parks provided by EPMT staff.

e. The potential herbicide use under alternative A was calculated based on the average use of each herbicide within the parks in the past 5 years as provided in the APCAM database. The average application rate of glyphosate was 0.14 undiluted gallons and triclopyr was 0.91 undiluted gallons. To determine the range of potential herbicide use for treatment areas under alternatives A, B, and C, the average application rate was multiplied by the gross infested acres.

f. Under alternatives A and B all treatment areas would be restored passively. Under alternative C, areas within the park where active restoration could take place was based on a decision framework described in the "Environmental Consequences" Chapter, Alternative C, Proposed Restoration Program.

TABLE H-2: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
ALTERNATIVE SUMMARY TABLE OF TREATMENT AREAS WITHIN THE PARK

Treatment Area ID	Priority for Treatment	Exotic Species	Gross Infested (acres)[a]	Initial Treatment Methods[b]	Re-treatment Method[c]	Herbicides[d]	Total Initial Herbicide Applied to Treatment Area (undiluted gal.)[e]	Vegetation Category	Sensitive Resources	Restoration[f]
Alternative A										
1	—	Guinea grass	54	Foliar ground and leave	Same as initial treatment	Glyphosate	8	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Shrubland	—	Passive
2	NA	Tan tan	59	Basal bark and leave Foliar ground leave Manual pulling	Same as initial treatment	Triclopyr	54	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Coastal Marsh Shrubland Wetland Forest	Sensitive natural area Cultural resources Visitor use areas	Passive
3	NA	Guinea grass	11	Foliar ground and leave	Same as initial treatment	Glyphosate	2	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Coastal Marsh Shrubland	Sensitive natural area Cultural resources Visitor use areas	Passive
4	NA	Tan tan	269	Basal bark and leave Foliar ground leave Manual pulling	Same as initial treatment	Triclopyr	245	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Shrubland Upland Dry / Mesic Forests	—	Passive

TABLE H-2: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE ALTERNATIVE SUMMARY TABLE OF TREATMENT AREAS WITHIN THE PARK (CONTINUED)

Treatment Area ID	Priority for Treatment	Exotic Species	Gross Infested (acres)[a]	Initial Treatment Methods[b]	Re-treatment Method[c]	Herbicides[d]	Total Initial Herbicide Applied to Treatment Area (undiluted gal.)[e]	Vegetation Category	Sensitive Resources	Restoration[f]
Alternative B										
1	2	Guinea grass	54	Foliar ground and leave	Foliar ground and leave	Glyphosate	8	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Shrubland	—	Passive
2	1	Tan tan	59	Basal bark and leave Cut stump leave or remove Foliar ground leave or remove Manual pulling	Foliar ground and leave Manual pulling	Triclopyr	54	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Coastal Marsh Shrubland Wetland Forest	Sensitive natural area cultural resources Visitor use areas	Passive
3	1	Guinea grass	11	Foliar ground and leave	Foliar ground and leave	Glyphosate	2	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Coastal Marsh Shrubland	Sensitive natural area Cultural resources Visitor use areas	Passive
4	2	Tan tan	269	Basal bark and leave Cut stump leave or remove Foliar ground leave or remove Manual pulling	Foliar ground and leave Manual pulling	Triclopyr	245	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Shrubland Upland Dry / Mesic Forests	—	Passive

TABLE H-2: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE ALTERNATIVE SUMMARY TABLE OF TREATMENT AREAS WITHIN THE PARK (CONTINUED)

Treatment Area ID	Priority for Treatment	Exotic Species	Gross Infested (acres)[a]	Initial Treatment Methods[b]	Re-treatment Method[c]	Herbicides[d]	Total Initial Herbicide Applied to Treatment Area (undiluted gal.)[e]	Vegetation Category	Sensitive Resources	Restoration[f]
Alternative C										
1	2	Guinea grass	54	Foliar ground and leave	Foliar ground and leave	Glyphosate	8	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Shrubland	—	Passive Active
2	1	Tan tan	59	Basal bark and leave Cut stump leave or remove Foliar ground leave or remove Manual pulling	Foliar ground and leave Manual pulling	Triclopyr	54	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Coastal Marsh Shrubland Wetland Forest	Sensitive natural area Cultural resources Visitor use areas	Passive Active
3	1	Guinea grass	11	Foliar ground and leave	Foliar ground and leave	Glyphosate	2	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Coastal Marsh Shrubland	Sensitive natural area Cultural resources Visitor use areas	Passive Active
4	2	Tan tan	269	Basal bark and leave Cut stump leave or remove Foliar ground leave or remove Manual pulling	Foliar ground and leave Manual pulling	Triclopyr	245	Agriculture / Disturbed Land / Developed Area (including roads) Grassland Shrubland Upland Dry / Mesic Forests	—	Passive Active

TABLE H-3: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
AMOUNT OF HERBICIDE TO BE APPLIED OVER TIME UNDER ALTERNATIVE A

Vegetation Category	Total Acres to be initially Treated	Potential Minimum Application of herbicide for Initial Treatment[a] (gallons)	Potential Maximum Application of herbicide for Initial Treatment[b] (gallons)	Potential Minimum Application of Herbicide Over Time[c]				Potential Maximum Application of Herbicide Over Time[c]			
				Initial Treatment (gallons/acre)	36 (months)	72 (months)	108 (months)	Initial Treatment (gallons/acre)	36 (months)	72 (months)	108 (months)
Agriculture / Disturbed Land / Developed Area (including roads)	46	2	42	2	2	2	2	42	38	34	30
Grasslands / Coastal Strand	53	3	48	3	2	2	2	48	44	39	34
Beach / Dune	—	—	—	—	—	—	—	—	—	—	—
Mangrove	—	—	—	—	—	—	—	—	—	—	—
Coastal Marsh	17	1	15	1	1	1	1	15	14	13	11
Shrubland	136	7	124	7	6	6	5	124	113	100	88
Upland Dry / Mesic Forest	134	7	122	7	6	5	5	122	111	99	87
Wetland Forest	3	<1	3	<1	<1	<1	<1	3	2	2	2
Total	**389**	**19**	**354**	**19**	**18**	**16**	**14**	**354**	**322**	**287**	**251**

a. Potential minimum application of herbicide is calculated by taking the average minimum concentration of herbicide that could be applied (0.05 undiluted gallons/acre) multiplied by the acres to be treated. See the "Environmental Consequences" Chapter, General Methodology, Treatment and Re-treatment of Exotic Plants section for a discussion on the average rate of herbicide application.

b. Potential maximum application of herbicide is calculated by taking the average maximum concentration of herbicide that could be applied (0.91 undiluted gallons/acre) multiplied by the acres to be treated.

c. It was assumed that re-treatment on average would occur every 3 years and that the number of stems treated would decline by a rate of approximately 11%. See the "Environmental Consequences" Chapter, General Methodology, Treatment and Re-treatment of Exotic Plants section.

TABLE H-4: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
AMOUNT OF HERBICIDE TO BE APPLIED OVER TIME UNDER ALTERNATIVE B

Vegetation Category	Total Acres to be Initially Treated	Potential Minimum Application of Herbicide (gallons)[a]	Potential Maximum Application of Herbicide (gallons)[b]
Agriculture / Disturbed Land / Developed Area	46	2	42
Grassland /Coastal Strand	53	3	48
Beach / Dune	—	—	—
Mangrove	—	—	—
Coastal Marsh	17	1	15
Shrubland	136	7	124
Upland Dry / Mesic Forest	134	7	122
Wetland Forest	3	0	3
Total	**389**	**19**	**354**

a. Potential minimum application of herbicide is calculated by taking the average minimum concentration of herbicide that could be applied (0.05 undiluted gallons/acre) multiplied by the acres to be treated. See the "Environmental Consequences" Chapter, General Methodology, Treatment and Re-treatment of Exotic Plants section for a discussion on the average rate of herbicide application.

b. Potential maximum application of herbicide is calculated by taking the average maximum concentration of herbicide that could be applied (0.91 undiluted gallons/acre) multiplied by the acres to be treated.

TABLE H-5: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
AMOUNT OF HERBICIDE TO BE APPLIED OVER TIME UNDER ALTERNATIVE B[a]

Vegetation Category	Initial Treatment	Potential Minimum Application of Herbicide (gallons/acre)											
		Number of Months											
		6	12	18	24	30	36	42	48	54	60	66	72
Agriculture / Disturbed Land / Developed Area (including roads)	2	1	1	<1	0	0	0	0	0	0	0	0	0
Grassland / Coastal Strand	3	1	1	<1	0	0	0	0	0	0	0	0	0
Beach / Dune	—	—	—	—	—	—	—	—	—	—	—	—	—
Mangrove	—	—	—	—	—	—	—	—	—	—	—	—	—
Coastal Marsh	1	<1	0	0	0	0	0	0	0	0	0	0	0
Shrubland	7	3	2	1	<1	0	0	0	0	0	0	0	0
Upland Dry / Mesic Forest	7	3	2	1	<1	0	0	0	0	0	0	0	0
Wetland Forest	<1	<1	0	0	0	0	0	0	0	0	0	0	0
Total	**19**	**10**	**5**	**2**	**1**	**1**	**<1**	**0**	**0**	**0**	**0**	**0**	**0**
		Potential Maximum Application of Herbicide (gallons/acre)											
Agriculture / Disturbed Land / Developed Area (including roads)	42	21	10	5	3	1	1	<1	0	0	0	0	0
Grassland / Coastal Strand	48	24	12	6	3	2	1	<1	0	0	0	0	0
Beach / Dune	—	—	—	—	—	—	—	—	—	—	—	—	—
Mangrove	—	—	—	—	—	—	—	—	—	—	—	—	—
Coastal Marsh	15	8	4	2	1	<1	0	0	0	0	0	0	0
Shrubland	124	62	31	15	8	4	2	1	<1	0	0	0	0
Upland Dry / Mesic Forest	122	61	30	15	8	4	2	1	<1	0	0	0	0
Wetland Forest	3	1	1	<1	0	0	0	0	0	0	0	0	0
Total	**354**	**177**	**88**	**44**	**22**	**11**	**6**	**3**	**1**	**1**	**<1**	**0**	**0**

a. It was assumed that re-treatment on average every 6 months would result in 50% less the number of stems that would need to be treated and therefore only 50% of the prior herbicide use would be applied. See the "Environmental Consequences" Chapter, General Methodology, Treatment and Re-treatment of Exotic Plants section.

TABLE H-6: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
POTENTIAL MINIMUM AMOUNT OF HERBICIDE TO BE APPLIED OVER TIME UNDER ALTERNATIVE C

Vegetation Category	Potential minimum application of herbicide (gallons) for initial treatment	Potential minimum application of herbicide (gallons) for re-treatment[a]	Potential Minimum Application of Herbicide (gallons/acre)[b]											
			Number of Months											
			6	12	18	24	30	36	42	48	54	60	66	72
Agriculture / Disturbed Land / Developed Area (including roads)	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Grassland / Coastal Strand	3	<1	<1	0	0	0	0	0	0	0	0	0	0	0
Beach / Dune	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mangrove	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Coastal Marsh	1	<1	<1	0	0	0	0	0	0	0	0	0	0	0
Shrubland	7	2	1	<1	0	0	0	0	0	0	0	0	0	0
Upland Dry / Mesic Forest	7	0	0	0	0	0	0	0	0	0	0	0	0	0
Wetland Forest	<1	<1	<1	0	0	0	0	0	0	0	0	0	0	0
Total	**19**	**2**	**1**	**<1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

a. It was assumed for the analysis that only those acres that would be allowed to passively restore would continue to be re-treated with herbicides.

b. It was assumed that re-treatment on average every 6 months would result in 50% less the number of stems that would need to be treated and therefore only 50% of the prior herbicide use would be applied. See the "Environmental Consequences" Chapter, General Methodology, Treatment and Re-treatment of Exotic Plants section.

TABLE H-7: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
POTENTIAL MAXIMUM AMOUNT OF HERBICIDE TO BE APPLIED OVER TIME UNDER ALTERNATIVE C

Vegetation Category	Potential maximum application of herbicide (gallons) for initial treatment	Potential maximum application of herbicide (gallons) for re-treatment[a]	Potential Maximum Application of Herbicide (gallons/acre)[b]											
			Number of Months											
			6	12	18	24	30	36	42	48	54	60	66	72
Agriculture / Disturbed Land / Developed Area (including roads)	42	0	0	0	0	0	0	0	0	0	0	0	0	0
Grassland / Coastal Strand	48	1	<1	0	0	0	0	0	0	0	0	0	0	0
Beach / Dune	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mangrove	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Coastal Marsh	15	6	3	2	1	<1	0	0	0	0	0	0	0	0
Shrubland	124	34	17	8	4	2	1	1	0	0	0	0	0	0
Upland Dry / Mesic Forest	122	0	0	0	0	0	0	0	0	0	0	0	0	0
Wetland Forest	3	3	1	1	<1	0	0	0	0	0	0	0	0	0
Total	**230**	**44**	**22**	**11**	**5**	**3**	**1**	**1**	**<1**	**0**	**0**	**0**	**0**	**0**

a. It was assumed for the analysis that only those acres that would be allowed to passively restore would continue to be re-treated with herbicides.

b. It was assumed that re-treatment on average every 6 months would result in 50% less the number of stems that would need to be treated and therefore only 50% of the prior herbicide use would be applied. See the "Environmental Consequences" Chapter, General Methodology, Treatment and Re-treatment of Exotic Plants section.

TABLE H-8: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
DISTRIBUTION OF APPROPRIATE TREATMENT METHODS BY VEGETATION CATEGORY UNDER ALTERNATIVE A

Salt River Bay National Historic Park and Ecological Preserve	Total Acres within Park	Total Potential Acres Infested within Park	Initial Treatment Methods[a]	Re-treatment Methods[a]
			Basal Bark, Foliar Ground and Leave, Manual Pulling	Basal Bark, Foliar Ground and Leave, Manual Pulling
Agriculture / Disturbed Land / Developed Area (including roads)	46	46	46	46
Grassland / Coastal Strand	53	53	53	53
Beach / Dune	3	0	0	0
Mangrove	48	<1	<1	<1
Coastal Marsh	17	17	17	17
Shrubland	136	136	136	136
Upland Dry / Mesic Forest	134	134	134	134
Wetland Forest	3	3	3	3
Total	**440**	**389**	**389**	**389**

a. It was assumed under alternative A that re-treatment methods occur approximately every 3 years and would therefore be the same as initial treatment methods (see the “Alternatives” Chapter, Alternative B, Maintaining Treated Sites section).

TABLE H-9: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
DISTRIBUTION OF APPROPRIATE TREATMENT METHODS BY VEGETATION CATEGORY UNDER ALTERNATIVE B

Salt River Bay National Historic Park and Ecological Preserve	Total Acres within Park	Total Potential Acres Infested within Park	Initial Treatment Methods[a]					Re-treatment Methods[a]
			Basal Bark	Foliar		Cut Stump		
			Leave in Place	Ground and Remove	Ground and Leave in Place	Remove	Leave in Place	Foliar Ground and Remove or Leave in Place; Manual Pulling
Agriculture / Disturbed Land / Developed Area (including roads)	46	46	38	38	46	38	38	46
Grassland / Coastal Strand	53	53	12	12	53	12	12	53
Beach / Dune	3	0	0	0	0	0	0	0
Mangrove	48	<1	0	0	<1	0	0	<1
Coastal Marsh	17	17	15	15	17	15	15	17
Shrubland	136	136	127	127	136	127	127	136
Upland Dry / Mesic Forest	134	134	133	133	134	133	133	134
Wetland Forest	3	3	3	3	3	3	3	3
Total	**440**	**389**	**329**	**329**	**389**	**329**	**329**	**389**

a. The distribution of appropriate treatment methods was determined based on application of a new treatment method decision tool described on the “Alternatives” Chapter, Alternative B, Treatment Method Decision Tool section.

TABLE H-10: SALT RIVER BAY NATIONAL HISTORIC PARK AND ECOLOGICAL PRESERVE
DISTRIBUTION OF APPROPRIATE TREATMENT METHODS BY VEGETATION CATEGORY UNDER ALTERNATIVE C

Salt River Bay National Historic Park and Ecological Preserve	Total Acres within Park	Total Potential Acres Infested within Park	Initial Treatment Methods[a]					Re-treatment Methods[b]
			Basal Bark	Foliar		Cut Stump		
			Leave in Place	Ground and Remove	Ground and Leave in Place	Remove	Leave in Place	Foliar Ground and Remove or Leave, Manual Pulling
Agriculture / Disturbed Land / Developed Area (including roads)	46	46	38	38	46	38	38	0
Grassland / Coastal Strand	53	53	12	12	53	12	124	1
Beach / Dune	3	0						0
Mangrove	48	<1	0	0	<1	0	0	<1
Coastal Marsh	17	17	15	15	17	15	15	7
Shrubland	136	136	127	127	136	126	126	37
Upland Dry / Mesic Forest	134	134	133	133	134	133	133	0
Wetland Forest	3	3	3	3	3	3	3	3
Total	440	390	329	329	390	329	329	49

a. The distribution of appropriate treatment methods was determined based on application of a new treatment method decision tool described on the “Alternatives” Chapter, Alternative B, Treatment Method Decision Tool section.

b. The acres to be re-treated are those that would be allowed to passively restore and are not subject to active restoration (see table H-1 for acres actively and passively restored).