

Appendix C. Revegetation Strategies

Table 1
Revegetation Goals and Strategies for Site Areas
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

AREA	ACTION	DIMENSIONS OF DISTURBED AREA	SQ. FT.	ACRE	REVEGETATION GOALS	STRATEGIES	TIMELINE
Old Ballfield	Levee Removal	970'x50'	48500	1.1	<ul style="list-style-type: none"> * Augment natural successional processes for riparian habitat in graded area * Minimize colonization of disturbed soil by non-native weedy species * Enhance migratory songbird habitat * Prevent soil erosion 	<ul style="list-style-type: none"> * Clumped container plantings of riparian shrub species, esp. berry-producers; follow-up removal of Cape ivy and other weeds; observe need for specific areas of erosion control 	Dec-07 thru Mar-08
	Setback Levee	930'x20'	18600	0.4	<ul style="list-style-type: none"> * Prevent soil erosion 	<ul style="list-style-type: none"> * Straw mulch (at least 6") to increase water retention, minimize erosion, and suppress weed growth. 	Sep-07
					<ul style="list-style-type: none"> * Establish dense cover of native shrub vegetation * Minimize colonization of disturbed soil by non-native weedy species 	<ul style="list-style-type: none"> * Dense container plantings of hardy perennial shrub species * Use of weed-suppression mats 	Dec-07 thru Mar-08
	Floodplain Microtopography Enhancement	1.5 acre <i>Festuca arundinaceae</i> removal overlaps with grading of broad channels	65340	1.5	<ul style="list-style-type: none"> * Expand riparian habitat 	<ul style="list-style-type: none"> * Large wood placed in floodplain and on top of mounds 	Sep-07
					<ul style="list-style-type: none"> * Reduce colonization of disturbed soil by non-native weedy species 	<ul style="list-style-type: none"> * Broadcast seeding of early successional species after soil preparation 	Oct-07
					<ul style="list-style-type: none"> * Enhance migratory songbird habitat, let canopy develop at its own pace 	<ul style="list-style-type: none"> * Sparse clumped container plantings of understory hardy berry-producing shrubs; allow natural recruitment of other native species 	Dec-07 thru Mar-08

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AREA	ACTION	DIMENSIONS OF DISTURBED AREA	SQ. FT.	ACRE	REVEGETATION GOALS	STRATEGIES	TIMELINE
Lower Field	Levee Removal	150'x22' + 85'x22'	5227	0.12	<ul style="list-style-type: none"> * Augment natural successional processes for riparian habitat in graded area * Minimize colonization of disturbed soil by non-native weedy species * Enhance migratory songbird habitat * Prevent soil erosion 	* Clumped container plantings of riparian shrub species, esp. berry-producers	Dec-07 thru Mar-08
	Floodplain Microtopography Enhancement	5' strip on either side of graded areas, approx. 29000 linear ft	145200	3.3	* Expand cover by native riparian and wetland species	* Large wood placed in floodplain	Sep-07
					* Reduce colonization of disturbed soil by non-native weedy species	* Broadcast seeding of early successional species after soil preparation	Oct-07
					<ul style="list-style-type: none"> * Maintain definition of high-flow channels, provide mechanism for scour * Increase vegetation structural diversity (i.e. patchiness, height, edge) in floodplain * Establish continuity of vegetative cover from hillsides to creek 	* Clumped willow staking at broad intervals along high-flow channel margins. Consider hydro-drilling to 6 ft.	Nov-07
					* Minimize colonization of disturbed soil by non-native weedy species	* Timed mowings of non-native grasses to reduce seed production	Jun-08 thru Aug-08
					* Reduce spread of non-native perennial grasses into newly graded areas	* Scrape key areas (about 1 acre) and plant grass plugs * Create burn piles, burn, and plant plugs or seed area.	Dec-08 thru Mar-09
	* Compare revegetation methods on constructed mounds	* Treatments include: grass establishment by seeding vs. plugs; grasses vs. shrubs; mulched vs. unmulched; revegetation vs. no-action	Dec-08 thru Mar-09				
	Frog Pond Berm	900'x5'	4500	0.10	* Establish overhanging vegetation in accordance with red-legged frog habitat preferences	* Clumped willow staking	Nov-07

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AREA	ACTION	DIMENSIONS OF DISTURBED AREA	SQ. FT.	ACRE	REVEGETATION GOALS	STRATEGIES	TIMELINE
					* Reduce visibility of berm around pond	* Container plantings of <i>Cornus sericea</i> & <i>Sambucus racemosa</i>	Dec-07 thru Mar-08

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Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

AREA	ACTION	DIMENSIONS OF DISTURBED AREA	SQ. FT.	ACRE	REVEGETATION GOALS	STRATEGIES	TIMELINE
Upper Alley	Channel and Floodplain Widening	0.48 acres	20909	0.48	* Augment natural successional processes of riparian vegetation in graded areas	* Willow staking in some areas; willow mattresses at newly cut outside edges of meander bends	Nov-07
					* Minimize colonization of disturbed soil by non-native weedy species * Enhance migratory songbird habitat * Prevent soil erosion	* Clumped container plantings of riparian shrub species, esp. berry-producers	Dec-07 thru Mar-08
Upper Field	Alluvial Fan/ Cypress Removal	1.3 acres	56628	1.3	* Establish broad cover of native coastal scrub vegetation, focusing on shrub species found on adjacent hill slope.	* Dense container plantings of coastal scrub species.	Dec-07 thru Mar-08
					* Minimize colonization of disturbed soil by non-native weedy species	* Straw mulch (at least 6") to increase water retention, minimize erosion, and suppress weed growth. * Remove <i>Eucalyptus</i> sp on adjacent hillside.	Sep-07 Oct-07
Pond	Shallow Edges	900'x5'	4500	0.10	* Establish emergent wetland vegetation in accordance with red-legged frog habitat preferences	* Transplant <i>Typha</i> , <i>Carex</i> , <i>Scirpus</i> , <i>Juncus</i> rootstock to shallow pond margins	Dec-07

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AREA	ACTION	DIMENSIONS OF DISTURBED AREA	SQ. FT.	ACRE	REVEGETATION GOALS	STRATEGIES	TIMELINE
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Table 2
Timeline of Revegetation Activities
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

MONTH	AREA	SITE	ACTION
Sep-07	Old Ballfield	Setback Levee	* Straw mulch (at least 6")
	Old Ballfield	Floodplain	* Large wood placed in floodplain and on top of mounds
	Lower Field	Floodplain	* Large wood placed in floodplain
	Upper Field	Alluvial Fan	* Straw mulch (at least 6") to increase water retention, minimize erosion, and suppress weed growth.
Oct-07	Old Ballfield	Floodplain	* Broadcast seeding of early successional species after soil preparation
	Lower Field	Floodplain	* Broadcast seeding of early successional species after soil preparation
	Upper Field	Alluvial Fan	* Remove <i>Eucalyptus</i> sp on adjacent hillside.
Nov-07	Lower Field	Floodplain	* Clumped willow staking at broad intervals along high-flow channel margins. Consider hydro-drilling to 6 ft.
	Lower Field	Frog Pond Berm	* Clumped willow staking
	Upper Alley	Channel/Floodplain	* Willow staking/mattresses in certain areas
Dec-07	Pond	Shallow Edges	* Transplant <i>Typha</i> , <i>Carex</i> , <i>Scirpus</i> , <i>Juncus</i> rootstock to shallow pond margins
Dec-07 thru Mar-08	Old Ballfield	Levee Removal	* Clumped container plantings of riparian shrub species, esp. berry-producers
	Old Ballfield	Setback Levee	* Dense container plantings of hardy perennial shrub species
	Old Ballfield	Floodplain	* Sparse clumped container plantings of hardy berry-producing shrubs
	Lower Field	Levee Removal	* Clumped container plantings of riparian shrub species, esp. berry-producers
	Lower Field	Frog Pond Berm	* Container plantings of <i>Cornus sericea</i> & <i>Sambucus racemosa</i>
	Upper Alley	Channel/Floodplain	* Clumped container plantings of riparian shrub species, esp. berry-producers
	Upper Field	Alluvial Fan	* Dense container plantings of coastal scrub species.
Jun-08 thru Aug-08	Lower Field	Floodplain	* Timed mowings
Dec-08 thru Mar-09	All	All	* Follow-up plantings/treatment (TBD)
	Lower Field	Floodplain Mounds	* Treatments include: grass establishment by seeding vs. plugs; grasses vs. shrubs; mulched vs. unmulched; revegetation vs. no-action
	Lower Field	Floodplain	* Scrape key areas (about 1 acre) and plant grass plugs
Ongoing	Lower Field	Floodplain	* Create burn piles, burn, and plant plugs or seed area.

Table 3
Vegetation Types for Revegetation Zones
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

CONTAINER PLANTINGS			
Revegetation Zone	Vegetation Type	Area (sq. ft.)	Number of Plants
Alluvial Fan	Wet Hillslope Scrub	56628	3733
Upper Alley Levee Removal	Riparian Shrubs/Trees	20909	498
Upper Alley - Outer Edge	Edge Shrubs/Trees	2000	223
Lower Field Levee Removal	Riparian Shrubs/Trees	5227	156
Old Ballfield Levee Removal	Riparian Shrubs/Trees	48500	1444
Old Ballfield Setback Levee	Edge Shrubs/Trees	18600	1244
Ballfield Excavation	Riparian Shrubs (modified palette)	65340	1180
Frog Ponds (deep edge)	Dogwood & Elderberry	4500	125
TOTAL		221704	8603

FIELD DIVISIONS			
Revegetation Zone	Vegetation Type	Area (sq. ft.)	Number of Plants
Frog Pond (shallow edge)	Shallow Pond Vegetation	3600	900
TOTAL		3600	900

BROADCAST SEEDING			
Revegetation Zone	Vegetation Type	Area (sq. ft.)	Number of Plants
Former Ballfield Excavation	Floodplain Seed Mix	65340	-
Former Flower Field Excavation	Floodplain Seed Mix	145200	-
TOTAL		210540	-

WILLOW STAKING			
Revegetation Zone	Vegetation Type	Area (sq. ft.)	Number of Plants
Frog Pond (deep edge)	Willow Staking	3600	135
Former Flower Field Excavation	Willow Staking	14520	8712
TOTAL		18120	8847

**Table 4
Native Plant Palettes
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration**

PLANTING PALETTES

Edge Shrubs	Common Name	%
<i>Artemisia douglasiana</i>	mugwort	10
<i>Lonicera involucrata</i>	twinberry	10
<i>Rhamnus californica</i>	coffeeberry	10
<i>Ribes sanguineum</i>	red-flowering currant	10
<i>Rubus ursinus</i>	blackberry	40
<i>Sambucus racemosa</i>	elderberry	10
<i>Symphoricarpus albus</i>	snowberry	10

Riparian shrubs	Common Name	%
<i>Artemisia douglasiana</i>	mugwort	5
<i>Cornus sericia</i>	dogwood	10
<i>Lonicera involucrata</i>	twinberry	10
<i>Marah fabaceus</i>	wild cucumber	5
<i>Polystichum munitum</i>	sword fern	15
<i>Rubus parviflorus</i>	thimbleberry	10
<i>Rubus ursinus</i>	blackberry	25
<i>Sambucus racemosa</i>	elderberry	10
<i>Symphoricarpus albus</i>	snowberry	10

Shallow Pond Vegetation	Common Name	%
<i>Juncus effusus</i>	spreading rush	5
<i>Juncus patens</i>	pacific bog rush	5
<i>Oenanthe sarmentosa</i>	water parsley	10
<i>Scirpus spp.</i>	bulrush	20
<i>Typha latifolia</i>	cattail	60

Deep Pond Vegetation/ Willow Staking	Common Name	%
<i>Cornus sericea</i>	dogwood	20
<i>Salix lasiolepis</i>	arroyo willow	60
<i>Sambucus racemosa</i>	elderberry	20

wet hillslope scrub		%
<i>Artemisia douglasiana</i>		5
<i>Baccharis pilularis</i>		10
<i>Ceanothus thrysiflorus</i>		3
<i>Cornus sericea</i>		5
<i>Heracleum lanatum</i>		5
<i>Holodiscus discolor</i>		3
<i>Juncus patens</i>		5
<i>Lonicera involucrata</i>		10
<i>Mimulus aurantiacus</i>		3
<i>Myrica californica</i>		3
<i>Polystichum munitum</i>		5
<i>Quercus agrifolia</i>		3
<i>Rhamnus californica</i>		10
<i>Ribes sanguineum</i>		5
<i>Rubus parviflorus</i>		1
<i>Rubus ursinus</i>		10
<i>Sambucus racemosa</i>		3
<i>Scrophularia californica</i>		5
<i>Symphoricarpus albus</i>		3

Edge Trees	Common Names	%
<i>Acer macrophyllum</i>	big leaf maple	20
<i>Aesculus californica</i>	california buckeye	20
<i>Quercus agrifolia</i>	coast live oak	30
<i>Umbellularia californica</i>	bay laurel	30

Riparian trees		%
<i>Acer macrophyllum</i>	big leaf maple	10
<i>Aesculus californica</i>	california buckeye	10
<i>Alnus rubra</i>	red alder	70
<i>Umbellularia californica</i>	bay laurel	10

Riparian shrubs (modified)		%
<i>Cornus sericia</i>	dogwood	10
<i>Lonicera involucrata</i>	twinberry	10
<i>Sambucus racemosa</i>	elderberry	10

Floodplain Seed Mix	Common Name
<i>Bromus carinatus</i>	california brome
<i>Elymus glaucus</i>	blue wild rye
<i>Heracleum lanatum</i>	cow parsnip
<i>Juncus patens</i>	spreading rush
<i>Juncus effusus</i>	pacific bog rush
<i>Scrophularia californica</i>	california bee plant
<i>Stachys chamissonis</i>	chamisso's hedge nettle
<i>Urtica dioica</i>	stinging nettle

Table 4
Native Plant Palettes
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

<i>Umbellularia californica</i>	3
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**Table 5
Numbers of Nursery-Grown Plants Planned by Total Area Per Habitat Type
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration**

	Percent of Palette/Area	Ballfield Levee/ Cape Ivy Removal	Ballfield Setback Levee	Ballfield Excavation/ Tall Fescue Removal	Lower Field Levee Removal	Lower Field Excavation	Upper Alley	Alluvial Fan	Shallow Pond Edge	Pond Berm	Total Used on Site	NOTES	SPACING (ft o.c.)
		48500	18600	65340	5227	145200	20909	56628	4500	4500		area in sqft	
Wet hillslope scrub	100	0	0	0	0	0	0	33977	0	0	0	area in sqft	
<i>Artemisia douglasiana</i>	5							425			425		2
<i>Baccharis pilularis</i>	10							212			212		4
<i>Ceanothus thrysiflorus</i>	3							16			16		8
<i>Cornus sericea</i>	5							189			189		3
<i>Heracleum lanatum</i>	5							425			425		2
<i>Holodiscus discolor</i>	3							113			113		3
<i>Juncus patens</i>	5							425			425		2
<i>Lonicera involucrata</i>	10							212			212		4
<i>Mimulus aurantiacus</i>	3							113			113		3
<i>Myrica californica</i>	3							16			16	percentages based on estimated relative abundance of species on adjacent hillslope; composition based on species present at site and species ability to quickly establish cover	8
<i>Polystichum munitum</i>	5							189			189		3
<i>Quercus agrifolia</i>	3							16			16		8
<i>Rhamnus californica</i>	10							212			212		4
<i>Ribes sanguineum</i>	5							106			106		4
<i>Rubus parviflorus</i>	1							85			85		2
<i>Rubus ursinus</i>	10							378			378		3
<i>Sambucus racemosa</i>	3							64			64		4
<i>Scrophularia californica</i>	5							425			425		2
<i>Symphoricarpus albus</i>	3							113			113		3
<i>Umbellularia californica</i>	3							16			16		8
TOTAL PLANTS BY AREA								3733			3733		

Table 5
Numbers of Nursery-Grown Plants Planned by Total Area Per Habitat Type
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

	Percent of Palette/Area	Ballfield Levee/ Cape Ivy Removal	Ballfield Setback Levee	Ballfield Excavation/ Tall Fescue Removal	Lower Field Levee Removal	Lower Field Excavation	Upper Alley	Alluvial Fan	Shallow Pond Edge	Pond Berm	Total Used on Site	NOTES	SPACING (ft o.c.)
Edge shrubs	100	0	11160	16335	0	0	2000	0	0	0	27495	<i>area in sqft</i>	
<i>Artemisia douglasiana</i>	10		279	408			50				737		2
<i>Baccharis pilularis</i>	20		140				25				165		4
<i>Lonicera involucrata</i>	10		70				13				82		4
<i>Rhamnus californica</i>	10		70	102			13				184	percentages based on estimated relative abundance of species at rip cor edge;	4
<i>Ribes sanguineum</i>	10		70	102			13				184	composition based on species presence at site and species ability to quickly establish cover	4
<i>Rubus ursinus</i>	20		248				44				292		3
<i>Sambucus racemosa</i>	10		70				13				82		4
<i>Symphoricarpus albus</i>	10		124	182			22				328		3
TOTAL PLANTS BY AREA			1070	794			192				2055		
Edge trees	100	0	11160	16335	0	2000	0	0	27495	<i>area in sqft</i>			
<i>Acer macrophyllum</i>	20		35			6					41	composition based on similar plant communities at similar elevations within the watershed;	8
<i>Aesculus californica</i>	20		35			6					41	percentages based estimated relative abundance of species at rip cor edge	8
<i>Quercus agrifolia</i>	30		52			9					62		8
<i>Umbellularia californica</i>	30		52			9					62		8
TOTAL PLANTS BY AREA			174			31					206		
Riparian shrubs	100	12125	0	16335	1307	0	4182	0	0	29767	<i>area in sqft</i>		
<i>Artemisia douglasiana</i>	5	152			16		52				220		2
<i>Cornus sericia</i>	10	135		182	15		46				377		3
<i>Lonicera involucrata</i>	10	76		102	8		26				212		4
<i>Marah fabaceous</i>	5	67			7		23				98	composition based on similar plant communities at similar elevations within the watershed;	3
<i>Polystichum munitum</i>	15	202			22		70				294	percentages based on estimated relative abundance of species	3
<i>Rubus parviflorus</i>	10	76			8		26				110		4
<i>Rubus ursinus</i>	25	337			36		116				489		3
<i>Sambucus racemosa</i>	10	135		102	8		46				291		4
<i>Symphoricarpus albus</i>	10	76			15		26				116		3

Table 5
Numbers of Nursery-Grown Plants Planned by Total Area Per Habitat Type
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

TOTAL PLANTS BY AREA	Percent of Palette/Area	
	Ballfield Levee/ Cape Ivy Removal	1255
	Ballfield Setback Levee	
	Ballfield Excavation/ Tall Fescue Removal	386
	Lower Field Levee Removal	135
	Lower Field Excavation	
	Upper Alley	433
	Alluvial Fan	
	Shallow Pond Edge	
	Pond Berm	
	Total Used on Site	2208
	NOTES	
	SPACING (ft o.c.)	

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	Percent of Palette/Area	Ballfield Levee/ Cape Ivy Removal	Ballfield Setback Levee	Ballfield Excavation/ Tall Fescue Removal	Lower Field Levee Removal	Lower Field Excavation	Upper Alley	Alluvial Fan	Shallow Pond Edge	Pond Berm	Total Used on Site	NOTES	SPACING (ft o.c.)
Riparian trees	100	12125	0	0	1307	0	4182		0	0	13432	<i>area in sqft</i>	
<i>Acer macrophyllum</i>	10	19			2		7				28		8
<i>Aesculus californica</i>	10	19			2		7				28	composition based on similar plant communities at similar elevations within the watershed and on seed availability	8
<i>Alnus rubra</i>	70	133			14		46				193		8
<i>Umbellularia californica</i>	10	19			2		7				28		8
TOTAL PLANTS BY AREA		189			20		65				275		
Shallow Pond Vegetation	100	0	0	0		0	0		3600	0	3600		
<i>Juncus spp.</i>	10								90		90		2
<i>Oenanthе sarmentosa</i>	10								90		90	these plants will be divided from existing "mother" plants on site or nearby; they will be planted on the same day or soon after removal	2
<i>Scirpus spp.</i>	20								180		180		2
<i>Typha latifolia</i>	60								540		540		2
TOTAL PLANTS BY AREA									900		900		
Deep Pond Vegetation/ Willow Staking	100	0	0	0		14520	0		0	3600	18120		
<i>Cornus sericea</i>	20									80	80	the willow will be planted as unrooted cuttings; the dogwood and elderberry will be grown as container plants in the nursery prior to outplanting	3
<i>Salix lasiolepis</i>	60					8712				135	8847		4
<i>Sambucus racemosa</i>	20									45	45		4
TOTAL PLANTS BY AREA										260	8972		
TOTAL PLANTS (container stock)		1444	1244	1180	156		721	3733		125	8603		

Table 5
Numbers of Nursery-Grown Plants Planned by Total Area Per Habitat Type
Lower Redwood Creek Floodplain and Salmonid Habitat Restoration

	Percent of Palette/Area	Ballfield Levee/ Cape Ivy Removal	Ballfield Setback Levee	Ballfield Excavation/ Tall Fescue Removal	Lower Field Levee Removal	Lower Field Excavation	Upper Alley	Alluvial Fan	Shallow Pond Edge	Pond Berm	Total Used on Site	NOTES	SPACING (ft o.c.)
PALETTE PERCENT FOR EACH GRADED AREA													
Wet hillslope scrub		0	0	0	0	0	0	60	0	0			
Edge trees and shrubs		0	60	25	0	0	10	0	0	0			
Riparian forest		25	0	0	25	0	20	0	0	0			
Riparian shrubs		25	0	25	25	0	20	0	0	0			
Shallow pond		0	0	0	0	0	0	0	80	0			
Deep pond		0	0	0	0	0	0	0	0	80			
Floodplain seed mix		0	0	40	0	90	0	0	0	0			
Willow Staking		0	0	0	0	10	0	0	0	0			
Bare Area		50	40	50	50	0	50	40	20	20			
TOTAL PLANTED AREA (container stock)		50	60	50	50	10	50	60	0	0			

area percentages were determined by appropriateness of each community to each graded area; bare (unplanted) area ensures appropriate patchiness