Appendix A

Project Location Map
and
Typical Planting Schedule

From:
CDWR 2006, Biological Assessment for Levee Repair of 8 Critical Sites

Figure 1. Map of the action area and 8 CDWR critical levee erosion repair sites.

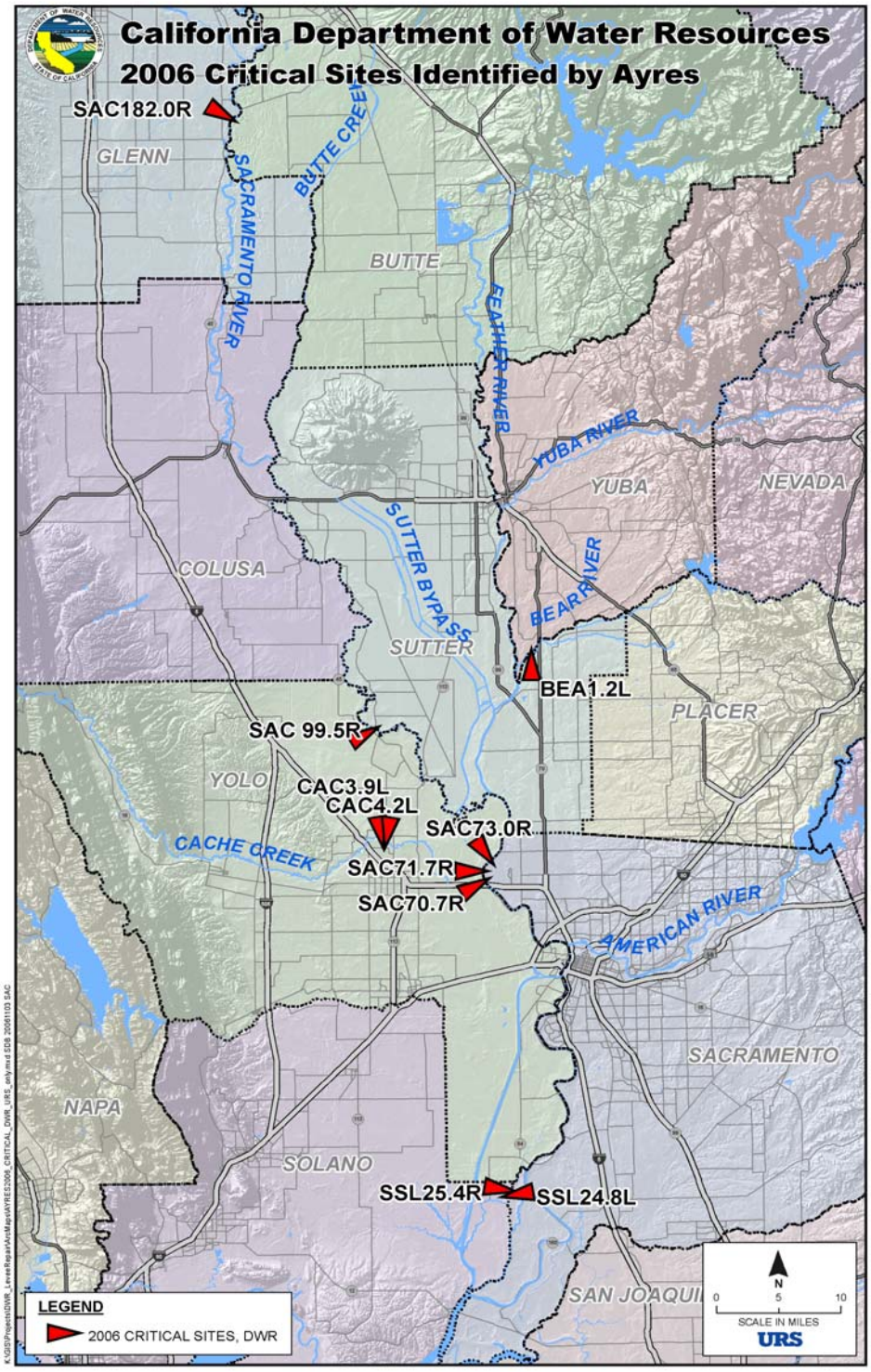

Figure 2. Typical Planting Schedule

PLANTING SCHEDULE – DWR LEVEE REPAIR

ZONE & ELEVATION (FT ABOVE AUGUST MEAN WATER SURFACE LEVEL)	BOTANICAL NAME	COMMON NAME	PROPAGATION METHOD	SIZE	REMARKS		AMOUNTS (CAS16.5L)	AMOUNTS (CAS21.8R)	AMOUNTS (STE16.2R)	AMOUNTS (SAC20.8L)	AMOUNTS (SAC26.5L)	AMOUNTS (SAC32.5R)
ZONE 1 (RIPARIAN BENCH) 1 FT TO 4 FT	CEPHALANTHUS OCCIDENTALIS VAR. CALIFORNICUS	CALIFORNIA BUTTONBUSH	CONTAINER	T8	PLANT @ 10 FT O.C.	PLANT IN LOWER AREAS OF ZONE 1	55	406	31	151	175	317
	HOITA MACROSTACHYA	LARGE LEATHER ROOT	CONTAINER	T4	PLANT @ 10 FT O.C. INSTALL ONE NEAR EACH BUTTONBUSH		55	203	15	76	88	159
	LEERSIA ORYZOIDES	RICE CUTGRASS	CONTAINER	DP			55	203	15	76	88	159
	EUTHAMIA OCCIDENTALIS	WESTERN GOLDENROD	CONTAINER	DP	CLUSTER BY SPECIES @ 3 FT O.C.		61	451	34	168	195	352
	JUNCUS BALTICUS	BALTIC RUSH	CONTAINER	DP			61	451	34	168	195	352
	JUNCUS EFFUSUS	SOFT RUSH	CONTAINER	DP			61	451	34	168	195	352
	JUNCUS XIPHIOIDES	IRIS-LEAVED RUSH	CONTAINER	DP			61	451	34	168	195	352
	ELEOCHARIS MACROSTACHYA	COMMON SPIKERUSH	CONTAINER	DP			61	451	34	168	195	352
	SCIRPUS ACUTUS	COMMON TULE	CONTAINER	T8			61	451	34	168	195	352
	SCIRPUS CALIFORNICUS	CALIFORNIA BULRUSH	CONTAINER	T8			61	451	34	168	195	352
	CAREX BARBARAE	SANTA BARBARA SEDGE	CONTAINER	D6		PLANT IN HIGHER AREAS OF ZONE 1	61	451	34	168	195	352
	POLYGONUM HYDROPIPEROIDES	WATERPEPPER	CONTAINER	D6			61	451	34	168	195	352
	EQUISETUM LAEVIGATUM	SMOOTH HORSETAIL	CONTAINER	D6			61	451	34	168	195	352
	ACER NEGUNDO	BOXELDER	CONTAINER	T8	VARY SPACING, CLUSTER SOME, AVERAGE 20 FT O.C.		5	34	3	13	15	27
	ALNUS RHOMBIFOLIA	WHITE ALDER	CONTAINER	T8			5	34	3	13	15	27
	FRAXINUS LATIFOLIA	OREGON ASH	CONTAINER	T8			5	136	3	13	15	27
	SALIX LAEVIGATA, S. LASIOLEPIS, S. GOODDINGII S. LUCIDA ssp. LASIANDRA, S. EXIGUA	WILLOW SPECIES	POLE CUTTINGS	AS PROVIDED	VARY SPACING, CLUSTER SOME, PLACE DENSELY ADJACENT TO WOODY DEBRIS, AVERAGE 5 FT O.C. ELSEWHERE		218	1,624	122	603	700	1,265
	AGROSTIS EXARATA	SPIKE BENTGRASS	SEED	NA	10 LBS/AC		1.25 LBS	9.32 LBS	0.70 LBS	3.46 LBS	4.02 LBS	7.26 LBS
	DESCHAMPSIA ELONGATA	SLENDER HAIRGRASS	SEED	NA	10 LBS/AC		1.25 LBS	9.32 LBS	0.70 LBS	3.46 LBS	4.02 LBS	7.26 LBS
	DISTICHLIS SPICATA	SALTGRASS	SEED	NA	10 LBS/AC		1.25 LBS	9.32 LBS	0.70 LBS	3.46 LBS	4.02 LBS	7.26 LBS
	EUTHAMIA OCCIDENTALIS	WESTERN GOLDENROD	SEED	NA	5 LBS/AC		0.63 LBS	4.66 LBS	0.35 LBS	1.73 LBS	2.01 LBS	3.63 LBS
	HORDEUM BRACHYANTHERUM SSP. BRACHYANTHERUM	MEADOW BARLEY	SEED	NA	10 LBS/AC		1.25 LBS	9.32 LBS	0.70 LBS	3.46 LBS	4.02 LBS	7.26 LBS
	JUNCUS EFFUSUS	SOFT RUSH	SEED	NA	10 LBS/AC		1.25 LBS	9.32 LBS	0.70 LBS	3.46 LBS	4.02 LBS	7.26 LBS
	LYCOPUS AMERICANUS	AMERICAN BUGLEWEED	SEED	NA	5 LBS/AC		0.63 LBS	4.66 LBS	0.35 LBS	1.73 LBS	2.01 LBS	3.63 LBS
	PASPALUM DISTICHUM	KNOTGRASS	SEED	NA	10 LBS/AC		1.25 LBS	9.32 LBS	0.70 LBS	3.46 LBS	4.02 LBS	7.26 LBS
ZONE 2 (LOWER BANK SLOPE) 4 FT TO 10 FT	APOCYNUM CANNABINUM	CLASPING LEAF DOGBANE	CONTAINER	T4	VARY SPACING, CLUSTER SOME, AVERAGE 10 FT PLANT DOGBANE IN HIGHEST AREAS		8	48	6	14	15	45
	BACCHARIS SALICIFOLIA	MULE FAT	CONTAINER	T4			8	48	6	14	15	45
	CORNUS SERICEA	RED TWIG DOGWOOD	CONTAINER	T4			8	48	6	14	15	45
	ARTEMISIA DOUGLASIANA	MUGWORT	CONTAINER	DP	VARY SPACING, CLUSTER SOME, AVERAGE 3 FT O.C. INSTALL IN SOIL-FILLED CREVICES IN RIPRAP AS SHOWN ON DETAIL 7 ON DWG L-11		67	396	43	112	123	373
	CAREX BARBARAE	SANTA BARBARA SEDGE	CONTAINER	DP			67	396	43	112	123	373
	CAREX PRAEGRACILIS	DEER SEDGE	CONTAINER	DP			67	396	43	112	123	373
	LEYMUS TRITICOIDES	CREEPING WILDRYE	CONTAINER	DP			67	396	43	112	123	373
	SALIX LASIOLEPIS, S. GOODDINGII, S. EXIGUA	WILLOW SPECIES	FASCINE BUNDLES POLE CUTTINGS	AS PROVIDED DO NOT TRIM	1 BUNDLE PER 3 LINEAR FEET EMBED INTO RIPRAP AVERAGE 1 POLE CUTTING/5 FT. O.C., STAGGER.		150 96	810 570	100 62	220 160	260 176	777 537
	AGROSTIS EXARATA	SPIKE BENTGRASS	SEED	NA	5 LBS/AC		0.28 LBS	1.63 LBS	0.18 LBS	0.46 LBS	0.51 LBS	1.54 LBS
	AMBROSIA PSILOSTACHYA	WESTERN RAGWEED	SEED	NA	5 LBS/AC		0.28 LBS	1.63 LBS	0.18 LBS	0.46 LBS	0.51 LBS	1.54 LBS
	ARTEMISIA DOUGLASIANA	MUGWORT	SEED	NA	5 LBS/AC		0.28 LBS	1.63 LBS	0.18 LBS	0.46 LBS	0.51 LBS	1.54 LBS
	BACCHARIS SALICIFOLIA	MULE FAT	SEED	NA	5 LBS/AC		0.28 LBS	1.63 LBS	0.18 LBS	0.46 LBS	0.51 LBS	1.54 LBS
	DESCHAMPSIA ELONGATA	SLENDER HAIRGRASS	SEED	NA	5 LBS/AC		0.28 LBS	1.63 LBS	0.18 LBS	0.46 LBS	0.51 LBS	1.54 LBS
	ELYMUS TRACHYCAULUS	SLENDER WHEATGRASS	SEED	NA	5 LBS/AC		0.28 LBS	1.63 LBS	0.18 LBS	0.46 LBS	0.51 LBS	1.54 LBS
	HORDEUM BRACHYANTHERUM SSP. BRACHYANTHERUM	MEADOW BARLEY	SEED	NA	10 LBS/AC		0.55 LBS	3.27 LBS	0.35 LBS	0.92 LBS	1.01 LBS	3.08 LBS
	LEYMUS TRITICOIDES	CREEPING WILDRYE	SEED	NA	20 LBS/AC, SOAK 3 DAYS BEFORE SEEDING		1.10 LBS	6.54 LBS	0.71 LBS	1.84 LBS	2.02 LBS	6.16 LBS
	MARAH FABACEOUS	WILD CUCUMBER	SEED	NA	5 LBS/AC		0.28 LBS	1.63 LBS	0.18 LBS	0.46 LBS	0.51 LBS	1.54 LBS
ZONE 3 (UPPER SLOPE) 10 FT TO TOP OF REPAIR	BACCHARIS PILULARIS	COYOTE BRUSH	CONTAINER	T4	VARY SPACING, CLUSTER SOME, AVERAGE 20 FT O.C. INSTALL IN PRE-SET, MARKED PLANTER BOXES AS SHOWN ON DTL. 3/L-10, NOTE 3		10	42	6	9	58	66
	RHAMNUS TOMENTELLA OR CALIFORNICA	HOARY COFFEEBERRY OR CALIFORNIA COFFEEBERRY	CONTAINER	T4			10	42	6	9	58	66
	ACHILLEA MILLEFOLIUM	COMMON YARROW	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	ELYMUS GLAUCUS	BLUE WILDRYE	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	ELYMUS TRACHYCAULUS	SLENDER WHEATGRASS	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	ESCHSCHOLZIA CALIFORNICA	CALIFORNIA POPPY	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	HETEROTHECA GRANDIFLORA	TELEGRAPH WEED	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	HORDEUM BRACHYANTHERUM SSP. CALIFORNICUM	CALIFORNIA BARLEY	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	LOTUS PURSHIANUS	SPANISH LOTUS	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	LUPINUS BICOLOR	MINIATURE LUPINE	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	MELICA CALIFORNICA	CALIFORNIA ONION GRASS	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	NASSELLA PULCHRA	PURPLE NEEDLE GRASS	SEED	NA	10 LBS/AC		2.05 LBS	7.68 LBS	1.04 LBS	1.63 LBS	2.73 LBS	12.01 LBS
	POA SECUDA SSP. SECUNDA	ONE SIDED BLUEGRASS	SEED	NA	10 LBS/AC		2.05 LBS	7.68 LBS	1.04 LBS	1.63 LBS	2.73 LBS	12.01 LBS
	TRIFOLIUM WILDENOVII	TOMCAT CLOVER	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS
	VULPIA MICROSTACHYS	SMALL FESCUE	SEED	NA	5 LBS/AC		1.03 LBS	3.84 LBS	0.52 LBS	0.81 LBS	1.36 LBS	6.00 LBS

NOTES:

1. INSTALL PLANT MATERIALS IN QUANTITIES AS SHOWN ON DRAWINGS. PLANT MATERIALS (T8, T4, D6, DP, SEEDS, FASCINE BUNDLES & POLE CUTTINGS) SHALL BE PROVIDED BY OTHERS.

2. NO PLANT, CUTTING OR SEED SPECIES OR VARIETY CAN BE SUBSTITUTED, ALTERED OR DELETED FROM THIS PROJECT WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

3. DO NOT PLANT SHRUBS WITHIN 15 FT OF ROAD PAVEMENT EDGE.

ABBREVIATIONS:

D6 – DEEPOT 16 = 2 IN DIA x 7 IN LONG (16 CU IN)

DP – DEEPOT 40 = 2.5 IN DIA x 10 IN LONG (40 CU IN)

T4 – TREEPOT 4 = 4 IN SQ x 14 IN LONG (180 CU IN)

T8 – TREEPOT 8 = 8 IN SQ x 18 IN LONG (550 CU IN)

NA – NOT APPLICABLE

LICENSED LANDSCAPE ARCHITECT GEORGE STRNAD, NO. LA 4296 STATE OF CALIFORNIA
SIGNATURE 2-28-07 EXPIRATION DATE DATE

REV	DATE	DESCRIPTION	SUB.	APPD
1	6-05-06	ADDENDUM NO. 1: E2, E4, F1 TO F6, G1 TO G8, H2	GS	SS

DESIGNED G. KOLI
DRAWN K. LEE
CHECKED E. KOFORD

APPROVAL RECOMMENDED G. STRNAD REG. NO. LA- 4296
APPROVAL BY S. SALAH-MARS REG. NO. CE-50445

URS

REVIEWED FRANK DUBAR REG. NO. CE-13687
DATE 05-25-06
APPROVAL RECOMMENDED RONALD LEE REG. NO. CE-30515
APPROVED PROJECT MANAGER DONALD KUROSAKA REG. NO. CE-29366

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING
FLOOD MANAGEMENT

STATE EMERGENCY EROSION REPAIR PROJECT
EMERGENCY LEVEE EROSION REPAIR
CACHE SLOUGH–MILE 16.5L & 21.8R, STEAMBOAT SLOUGH–MILE 16.2R, AND SACRAMENTO RIVER–MILE 20.8L, 26.5L & 32.5R
PLANTING SCHEDULE

SPEC NO. 06-17
DRAWING NO. L-09
REV. 1
SHEET NO. 034

MESAVANG Jun 07, 2006 - 4:41pm
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Appendix B

Standardized Assessment Methodology (SAM)
Input Values for Existing Conditions/With-project Conditions
and
Modeling Results

From:
CDWR 2006, Biological Assessment for Levee Repair of 8 Critical Sites,
Revised March 2007

Table 1a. Sacramento River 70.7R – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	9.8	19.8	11.3	9.8
2-year Flood WSEL (Q_2, ft NGVD29)		28.5		
Q_2 ½-width (W_{Q2}, feet)		300		
Channel ½-Width (W_{Qavg}, feet)	276	288	277	276
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.09	1.04	1.08	1.09
Shoreline Site Length (L, feet)		640		
Wetted Area (A=L×W_{Qavg}, square feet)	176,640	184,320	177,280	176,640
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2.13	1.26	1.24	2.13
Bank Substrate Size (D_{50}, inches)	0.25	0.25	0.25	0.25
Instream Structure (IWM, percent shoreline)	40	40	40	40
Vegetation (V, percent shoreline)	0	90	0	0
Shade (S, percent shoreline)	30	25	40	30

Table 1b. Sacramento River 70.7R – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	9.8	19.8	11.3	9.8
2-year Flood WSEL (Q_2, ft NGVD29)		28.5		
Q_2 ½-width (W_{Q2}, feet)		295		
Channel ½-Width (W_{Qavg}, feet)	250	279	255	250
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.18	1.06	1.16	1.18
Shoreline Site Length (L, feet)		640		
Wetted Area (A=L×W_{Qavg}, square feet)	176,640	184,320	177,280	176,640
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2	2	2	2
Bank Substrate Size (D_{50}, inches)	8	0.25	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	40	40	40	40
Year 5	40	40	40	40
Year 15	40	40	40	40
Year 25	40	40	40	40
Year 50	40	40	40	40
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	50	50	0
Year 5	0	90	90	0
Year 15	0	90	90	0
Year 25	0	90	90	0
Year 50	0	90	90	0
Shade (S, percent shoreline)				
Year 0	20	10	20	20
Year 1	20	10	20	20
Year 5	100	25	100	100
Year 15	100	30	100	100
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 2a. Sacramento River 71.7R – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	9.9	20.1	11.5	10.1
2-year Flood WSEL (Q_2, ft NGVD29)		29.0		
Q_2 ½-width (W_{Q2}, feet)		232		
Channel ½-Width (W_{Qavg}, feet)	197	213	199	197
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.18	1.09	1.16	1.18
Shoreline Site Length (L, feet)		900		
Wetted Area (A=L×W_{Qavg}, square feet)	177,300	191,700	179,100	177,300
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2.00	1.92	1.34	2.00
Bank Substrate Size (D_{50}, inches)	0.25	0.25	0.25	0.25
Instream Structure (IWM, percent shoreline)	5	25	5	5
Vegetation (V, percent shoreline)	0	60	0	0
Shade (S, percent shoreline)	0	20	0	0

Table 2b. Sacramento River 71.7R – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	9.9	20.1	11.5	10.1
2-year Flood WSEL (Q_2, ft NGVD29)		29.0		
Q_2 ½-width (W_{Q2}, feet)		223		
Channel ½-Width (W_{Qavg}, feet)	169	203	172	169
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.32	1.10	1.30	1.32
Shoreline Site Length (L, feet)		900		
Wetted Area (A=L×W_{Qavg}, square feet)	177,300	191,700	179,100	177,300
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2	2	2	2
Bank Substrate Size (D_{50}, inches)	8	0.25	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	30	40	40	30
Year 5	30	40	40	30
Year 15	30	40	40	30
Year 25	30	40	40	30
Year 50	30	40	40	30
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	50	50	0
Year 5	0	90	90	0
Year 15	0	90	90	0
Year 25	0	90	90	0
Year 50	0	90	90	0
Shade (S, percent shoreline)				
Year 0	0	5	0	0
Year 1	20	5	20	20
Year 5	100	20	100	100
Year 15	100	30	100	100
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 3a. Sacramento River 73.0R – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	9.9	20.2	11.6	10.3
2-year Flood WSEL (Q_2, ft NGVD29)		29.8		
Q_2 ½-width (W_{Q2}, feet)		285		
Channel ½-Width (W_{Qavg}, feet)	231	244	233	231
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.23	1.17	1.22	1.23
Shoreline Site Length (L, feet)		437		
Wetted Area (A=L×W_{Qavg}, square feet)	100,947	106,628	101,821	100,947
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2	1.54	1.63	2
Bank Substrate Size (D_{50}, inches)	0.25	0.25	0.25	0.25
Instream Structure (IWM, percent shoreline)	30	10	30	30
Vegetation (V, percent shoreline)	0	80	25	0
Shade (S, percent shoreline)	10	25	30	10

Table 3b. Sacramento River 73.0R – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	9.9	20.2	11.6	10.3
2-year Flood WSEL (Q_2, ft NGVD29)		29.8		
Q_2 ½-width (W_{Q2}, feet)		256		
Channel ½-Width (W_{Qavg}, feet)	208	236	211	208
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.23	1.08	1.21	1.23
Shoreline Site Length (L, feet)		437		
Wetted Area (A=L×W_{Qavg}, square feet)	100,947	106,628	101,821	100,947
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2	2	2	2
Bank Substrate Size (D_{50}, inches)	8	0.25	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	30	40	40	30
Year 5	30	40	40	30
Year 15	30	40	40	30
Year 25	30	40	40	30
Year 50	30	40	40	30
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	50	50	0
Year 5	0	90	90	0
Year 15	0	90	90	0
Year 25	0	90	90	0
Year 50	0	90	90	0
Shade (S, percent shoreline)				
Year 0	0	5	10	0
Year 1	20	10	20	20
Year 5	100	25	100	100
Year 15	100	30	100	100
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 4a. Sacramento River 99.5R – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	19.2	28.5	21.5	20.4
2-year Flood WSEL (Q_2, ft NGVD29)		37.1		
Q_2 ½-width (W_{Q2}, feet)		194		
Channel ½-Width (W_{Qavg}, feet)	157	174	161	159
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.24	1.11	1.21	1.22
Shoreline Site Length (L, feet)		720		
Wetted Area (A=L×W_{Qavg}, square feet)	113,040	125,280	115,920	114,480
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2.5	1.69	2.21	2.33
Bank Substrate Size (D_{50}, inches)	0.25	3	8	0.25
Instream Structure (IWM, percent shoreline)	0	0	0	0
Vegetation (V, percent shoreline)	0	10	0	0
Shade (S, percent shoreline)	0	5	0	0

Table 4b. Sacramento River 99.5R – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation(WSEL,feetNGVD29)	19.2	28.5	21.5	20.4
2-year Flood WSEL (Q_2, ft NGVD29)		37.1		
Q_2 ½-width (W_{Q2}, feet)		194		
Channel ½-Width (W_{Qavg}, feet)	146	169	148	148
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.34	1.15	1.28	1.31
Shoreline Site Length (L, feet)		720		
Wetted Area (A=L×W_{Qavg}, square feet)	113,040	125,280	115,920	114,480
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2.19	1.88	2.76	2.14
Bank Substrate Size (D_{50}, inches)	8	0.25	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	30	40	40	30
Year 5	30	40	40	30
Year 15	30	40	40	30
Year 25	30	40	40	30
Year 50	30	40	40	30
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	50	50	0
Year 5	0	90	90	0
Year 15	0	90	90	0
Year 25	0	90	90	0
Year 50	0	90	90	0
Shade (S, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	0	0	0
Year 5	30	20	30	30
Year 15	75	30	75	75
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 5a. Sacramento River 182.0R Segment 1 – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	92.5	100.0	97.1	94.0
2-year Flood WSEL (Q_2, ft NGVD29)		104.7		
Q_2 ½-width (W_{Q2}, feet)		215		
Channel ½-Width (W_{Qavg}, feet)	175	193	185	180
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.22	1.12	1.16	1.20
Shoreline Site Length (L, feet)		1500		
Wetted Area (A=L×W_{Qavg}, square feet)	262,500	289,500	277,500	270,000
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2.26	2.59	1.74	2.33
Bank Substrate Size (D_{50}, inches)	3	0.25	3	3
Instream Structure (IWM, percent shoreline)	0	0	0	0
Vegetation (V, percent shoreline)	0	90	80	0
Shade (S, percent shoreline)	0	5	0	0

Table 5b. Sacramento River 182.0R Segment 1 – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation(WSEL,feetNGVD29)	92.5	100.0	97.1	94.0
2-year Flood WSEL (Q_2, ft NGVD29)		104.7		
Q_2 ½-width (W_{Q2}, feet)		195		
Channel ½-Width (W_{Qavg}, feet)	159	184	173	162
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.23	1.07	1.14	1.22
Shoreline Site Length (L, feet)		1500		
Wetted Area (A=L×W_{Qavg}, square feet)	262,500	289,500	277,500	270,000
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	1.81	2.70	3.74	1.52
Bank Substrate Size (D_{50}, inches)	8	0.25	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	30	40	40	30
Year 5	30	40	40	30
Year 15	30	40	40	30
Year 25	30	40	40	30
Year 50	30	40	40	30
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	50	50	0
Year 5	0	90	90	0
Year 15	0	90	90	0
Year 25	0	90	90	0
Year 50	0	90	90	0
Shade (S, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	5	0	0
Year 5	30	20	30	30
Year 15	75	30	75	75
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 6a. Sacramento River 182.0R Segment 2 – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	92.5	100.0	97.1	94.0
2-year Flood WSEL (Q_2, ft NGVD29)		104.7		
Q_2 ½-width (W_{Q2}, feet)		180		
Channel ½-Width (W_{Qavg}, feet)	256	258	257	257
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.02	1.01	1.01	1.02
Shoreline Site Length (L, feet)		2300		
Wetted Area (A=L×W_{Qavg}, square feet)	588,800	593,400	591,100	591,100
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	0.31	0.35	0.22	0.31
Bank Substrate Size (D_{50}, inches)	3	0.25	3	3
Instream Structure (IWM, percent shoreline)	0	0	0	0
Vegetation (V, percent shoreline)	0	90	80	0
Shade (S, percent shoreline)	0	5	0	0

Table 6b. Sacramento River 182.0R Segment 2 – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation(WSEL,feetNGVD29)	92.5	100.0	97.1	94.0
2-year Flood WSEL (Q_2, ft NGVD29)		104.7		
Q_2 ½-width (W_{Q2}, feet)		161		
Channel ½-Width (W_{Qavg}, feet)	250	268	264	258
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.13	1.03	1.05	1.08
Shoreline Site Length (L, feet)		2300		
Wetted Area (A=L×W_{Qavg}, square feet)	588,800	593,400	591,100	591,100
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	4.90	1.52	2.00	6.18
Bank Substrate Size (D_{50}, inches)	8	0.25	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	30	40	40	30
Year 5	30	40	40	30
Year 15	30	40	40	30
Year 25	30	40	40	30
Year 50	30	40	40	30
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	50	50	0
Year 5	0	90	90	0
Year 15	0	90	90	0
Year 25	0	90	90	0
Year 50	0	90	90	0
Shade (S, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	5	0	0
Year 5	30	20	30	30
Year 15	75	30	75	75
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 7a. Sutter Slough 24.8L – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	2.6	6.1	3.6	3.2
2-year Flood WSEL (Q_2, ft NGVD29)		11.3		
Q_2 ½-width (W_{Q2}, feet)		135		
Channel ½-Width (W_{Qavg}, feet)	122	129	126	122
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.12	1.05	1.08	1.12
Shoreline Site Length (L, feet)		1510		
Wetted Area (A=L×W_{Qavg}, square feet)	184,220	194,790	190,260	184,220
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	4.2	2.35	4.0	4.2
Bank Substrate Size (D_{50}, inches)	3	0.25	3	3
Instream Structure (IWM, percent shoreline)	20	0	20	20
Vegetation (V, percent shoreline)	5	85	5	5
Shade (S, percent shoreline)	70	20	70	70

Table 7b. Sutter Slough 24.8L – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	2.6	6.1	3.6	3.2
2-year Flood WSEL (Q_2, ft NGVD29)		11.3		
Q_2 ½-width (W_{Q2}, feet)		125		
Channel ½-Width (W_{Qavg}, feet)	94	115	96	94
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.33	1.09	1.30	1.33
Shoreline Site Length (L, feet)		1510		
Wetted Area (A=L×W_{Qavg}, square feet)	184,220	194,790	190,260	184,220
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2	7	2	2
Bank Substrate Size (D_{50}, inches)	8	3	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	10	10	10	10
Year 5	10	10	10	10
Year 15	20	20	20	20
Year 25	20	20	20	20
Year 50	20	20	20	20
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	10	50	10	10
Year 5	50	90	50	50
Year 15	80	100	80	80
Year 25	80	100	80	80
Year 50	80	100	80	80
Shade (S, percent shoreline)				
Year 0	15	5	15	15
Year 1	15	5	15	15
Year 5	30	25	30	30
Year 15	75	30	75	75
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 8a. Sutter Slough 25.4R – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	2.6	6.1	3.6	3.2
2-year Flood WSEL (Q_2, ft NGVD29)		11.3		
Q_2 ½-width (W_{Q2}, feet)		117		
Channel ½-Width (W_{Qavg}, feet)	103	108	105	103
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.13	1.09	1.12	1.13
Shoreline Site Length (L, feet)		1150		
Wetted Area (A=L×W_{Qavg}, square feet)	118,450	124,200	120,750	118,450
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	1.45	1.22	1.53	1.45
Bank Substrate Size (D_{50}, inches)	3	3	3	3
Instream Structure (IWM, percent shoreline)	10	0	10	10
Vegetation (V, percent shoreline)	5	95	5	5
Shade (S, percent shoreline)	70	20	70	70

Table 8b. Sutter Slough 25.4R – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	2.6	6.1	3.6	3.2
2-year Flood WSEL (Q_2, ft NGVD29)		11.3		
Q_2 ½-width (W_{Q2}, feet)		109		
Channel ½-Width (W_{Qavg}, feet)	77	98	79	77
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	1.43	1.11	1.38	1.43
Shoreline Site Length (L, feet)		1150		
Wetted Area (A=L×W_{Qavg}, square feet)	118,450	118,450	118,450	118,450
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2	7	2	2
Bank Substrate Size (D_{50}, inches)	8	3	8	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	10	10	10	10
Year 5	10	10	10	10
Year 15	20	20	20	20
Year 25	20	20	20	20
Year 50	20	20	20	20
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	10	50	10	10
Year 5	50	90	50	50
Year 15	80	100	80	80
Year 25	80	100	80	80
Year 50	80	100	80	80
Shade (S, percent shoreline)				
Year 0	15	5	15	15
Year 1	15	5	15	15
Year 5	30	25	30	30
Year 15	75	30	75	75
Year 25	100	40	100	100
Year 50	100	40	100	100

Table 9a. Bear River 1.2L – SAM Input Values for Existing Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation (WSEL, feet NGVD29)	26.4	32.9	30.5	26.1
2-year Flood WSEL (Q_2, ft NGVD29)		47.5		
Q_2 ½-width (W_{Q2}, feet)		63		
Channel ½-Width (W_{Qavg}, feet)	30.7	38.8	36.6	30.7
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	2.42	1.79	1.96	2.42
Shoreline Site Length (L, feet)		1200		
Wetted Area (A=L×W_{Qavg}, square feet)	36,840	46,560	43,320	36,840
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	2.58	0.91	0.98	2.58
Bank Substrate Size (D_{50}, inches)	0.25	0.25	0.25	0.25
Instream Structure (IWM, percent shoreline)	5	5	5	5
Vegetation (V, percent shoreline)	0	70	70	0
Shade (S, percent shoreline)	30	10	30	30

Table 9b. Bear River 1.2L – SAM Input Values for With-Project Conditions

	Fall	Winter	Spring	Summer
Water Surface Elevation(WSEL,feetNGVD29)	26.4	32.9	30.5	26.1
2-year Flood WSEL (Q_2, ft NGVD29)		47.5		
Q_2 ½-width (W_{Q2}, feet)		62		
Channel ½-Width (W_{Qavg}, feet)	20.8	33.1	29.4	20.8
Floodplain Inundation Ratio (W_{Q2}:W_{Qavg}, feet)	3.45	2.09	2.37	3.45
Shoreline Site Length (L, feet)		1200		
Wetted Area (A=L×W_{Qavg}, square feet)	36,840	46,560	43,320	36,840
Bank Slope from WSEL to [WSEL-3 ft] (dW:dH, dimensionless)	1.60	1.22	1.22	1.60
Bank Substrate Size (D_{50}, inches)	8	4	6	8
Instream Structure (IWM, percent shoreline)				
Year 0	0	0	0	0
Year 1	30	40	40	30
Year 5	30	40	40	30
Year 15	30	40	40	30
Year 25	30	40	40	30
Year 50	30	40	40	30
Vegetation (V, percent shoreline)				
Year 0	0	0	0	0
Year 1	0	50	50	0
Year 5	0	90	90	0
Year 15	0	90	90	0
Year 25	0	90	90	0
Year 50	0	90	90	0
Shade (S, percent shoreline)				
Year 0	5	0	5	5
Year 1	5	5	5	5
Year 5	30	20	30	30
Year 15	75	30	75	75
Year 25	100	40	100	100
Year 50	100	40	100	100

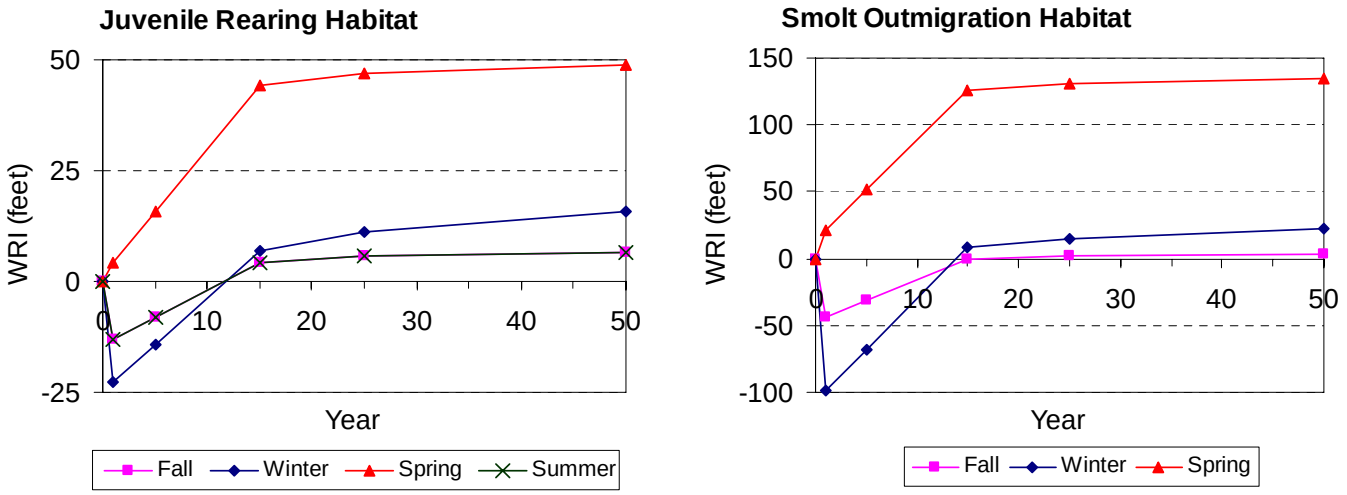

Figure 1. SAM WRIs for Chinook salmon habitat at Sacramento RM 70.7

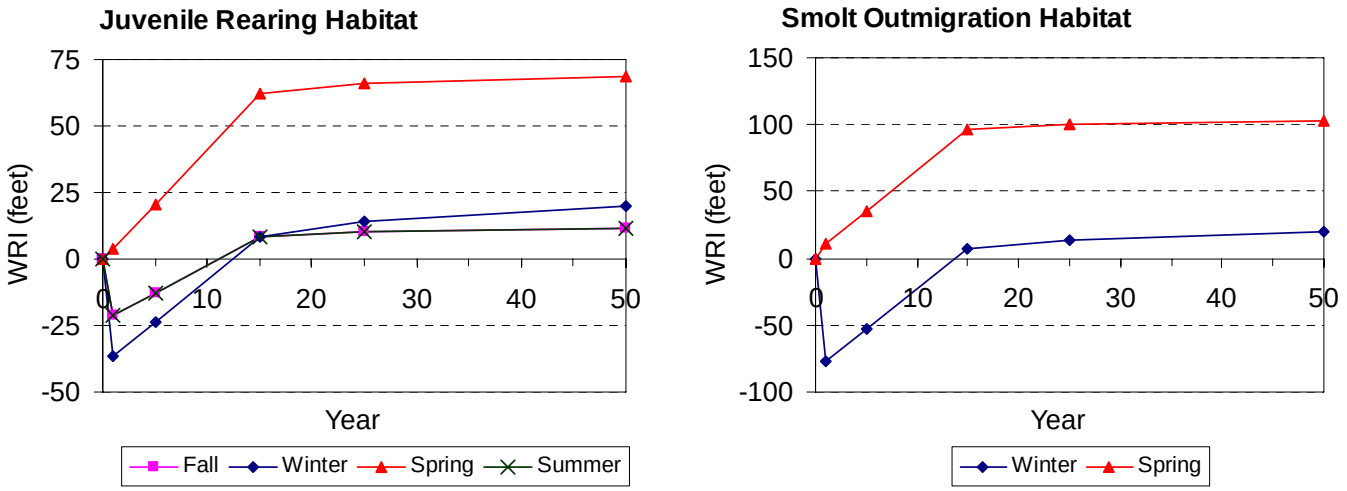

Figure 2. SAM WRIs for steelhead habitat at Sacramento RM 70.7

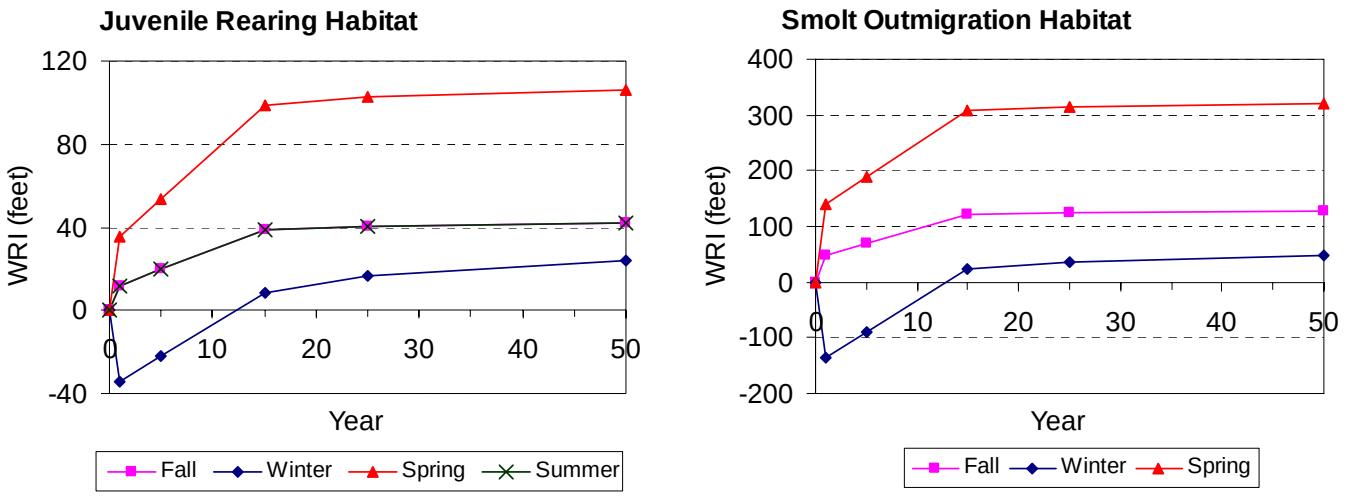

Figure 3. SAM WRIs for Chinook salmon habitat at Sacramento RM 71.7

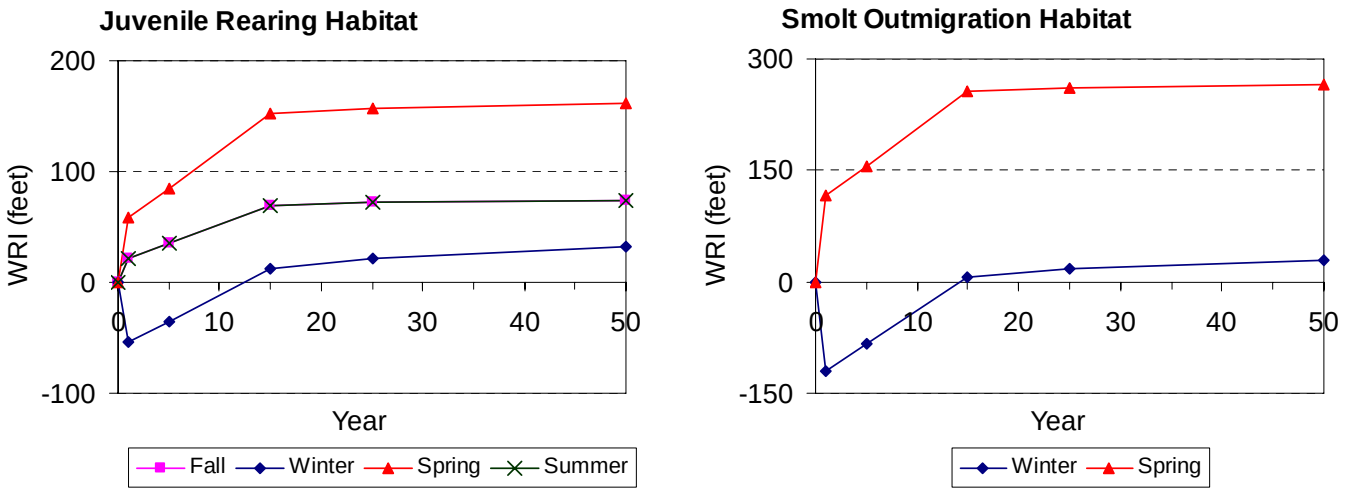

Figure 4. SAM WRIs for steelhead habitat at Sacramento RM 71.7

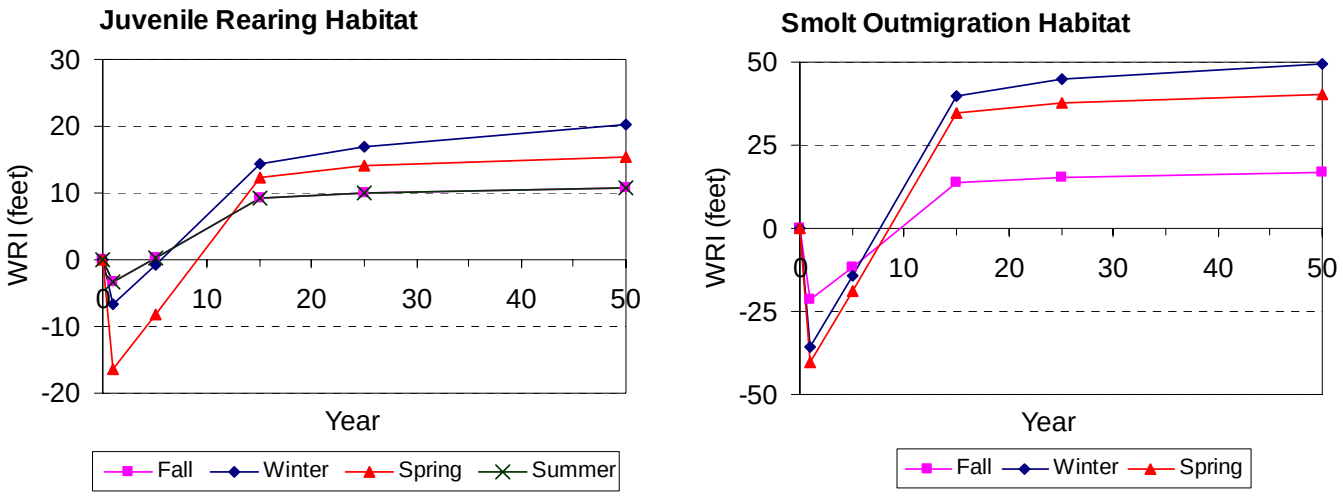

Figure 5. SAM WRIs for Chinook salmon habitat at Sacramento RM 73.0

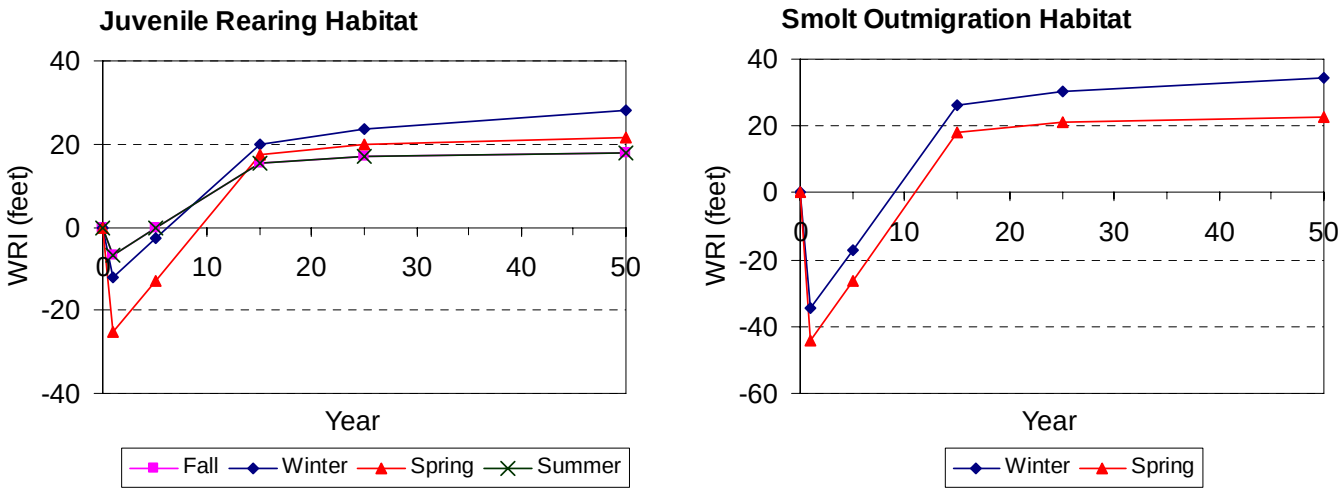

Figure 6. SAM WRIs for steelhead habitat at Sacramento RM 73.0

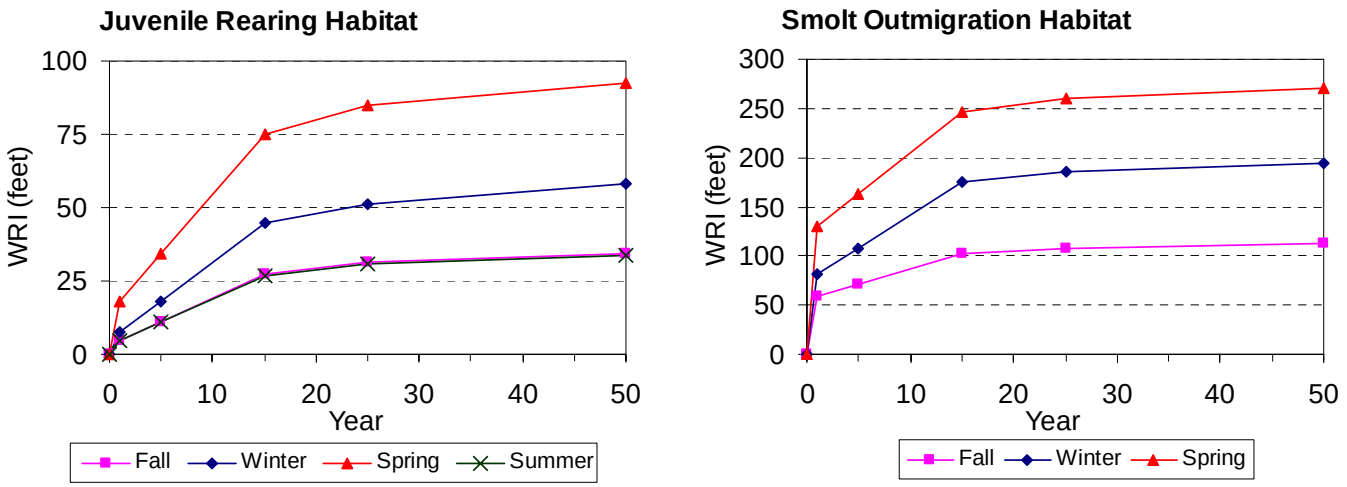

Figure 7. SAM WRIs for Chinook salmon habitat at Sacramento RM 99.5

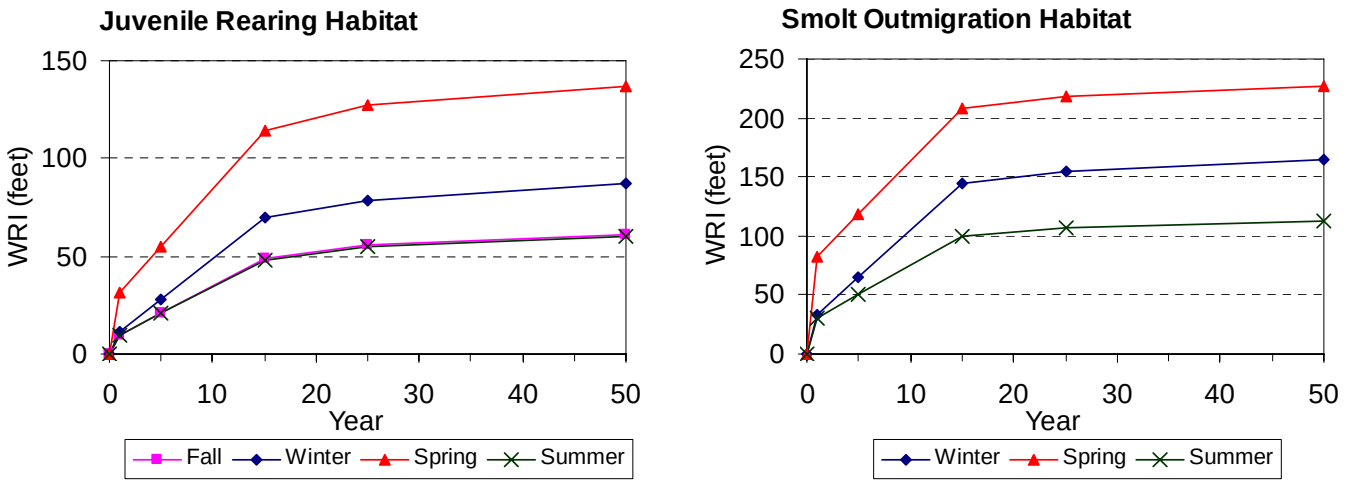

Figure 8. SAM WRIs for steelhead habitat at Sacramento RM 99.5

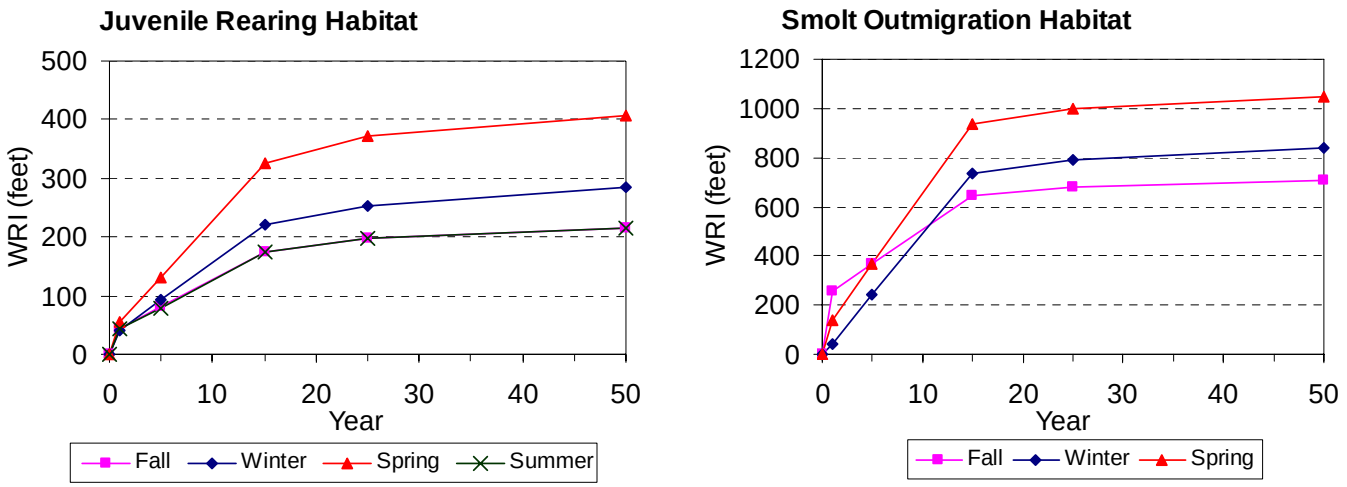

Figure 9. SAM WRIs for Chinook salmon habitat at Sacramento RM 182.0

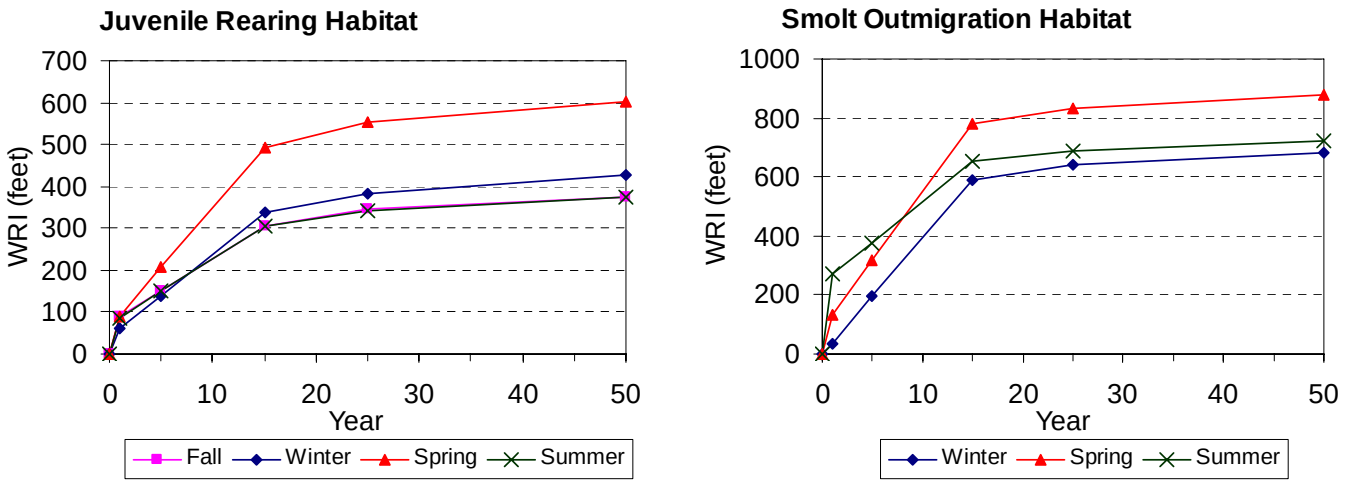

Figure 10. SAM WRIs for steelhead habitat at Sacramento RM 182.0

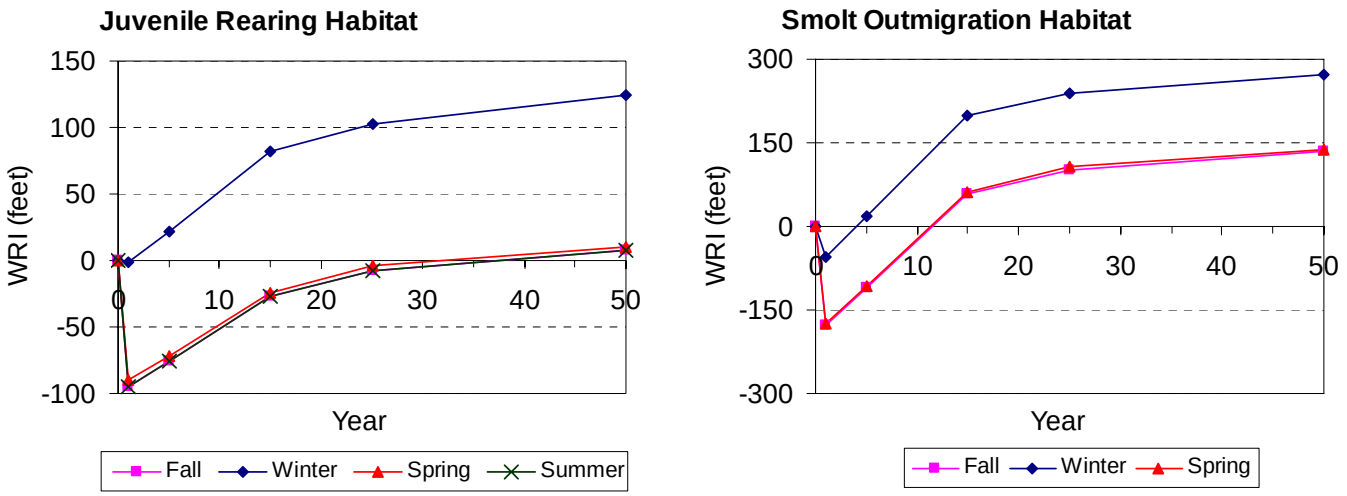

Figure 11. SAM WRIs for Chinook salmon habitat at Sutter Slough RM 24.8

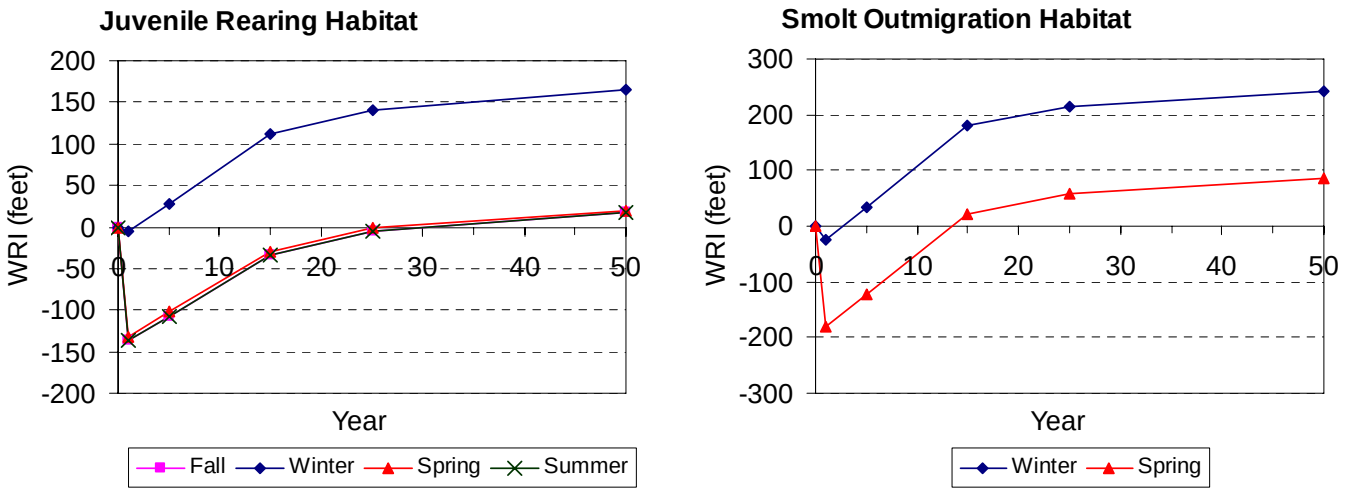

Figure 12. SAM WRIs for steelhead habitat at Sutter Slough RM 24.8

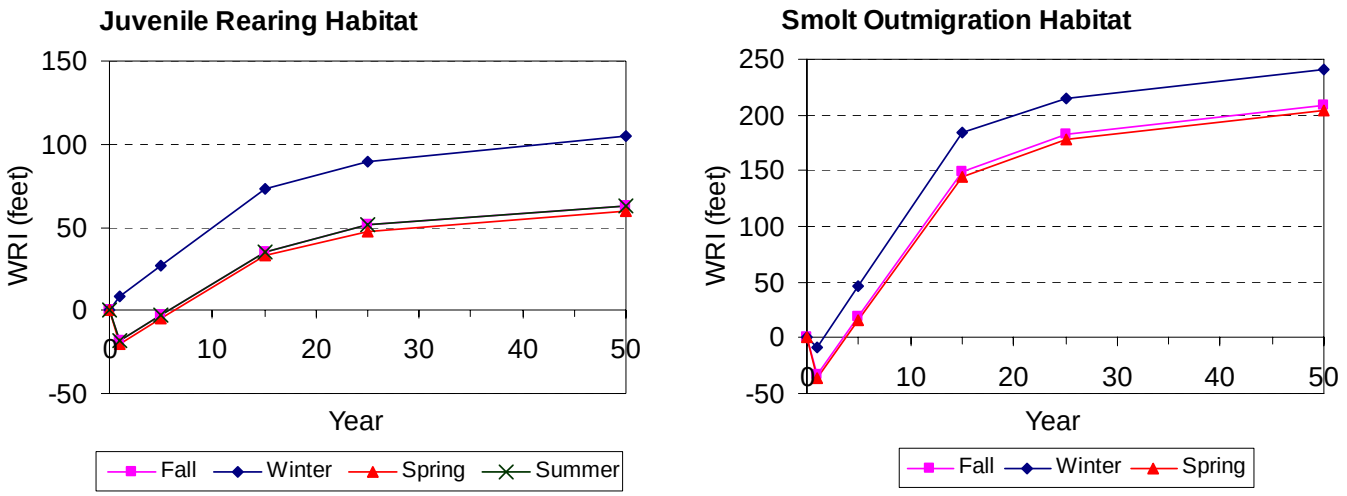

Figure 13. SAM WRIs for Chinook salmon habitat at Sutter Slough RM 25.4

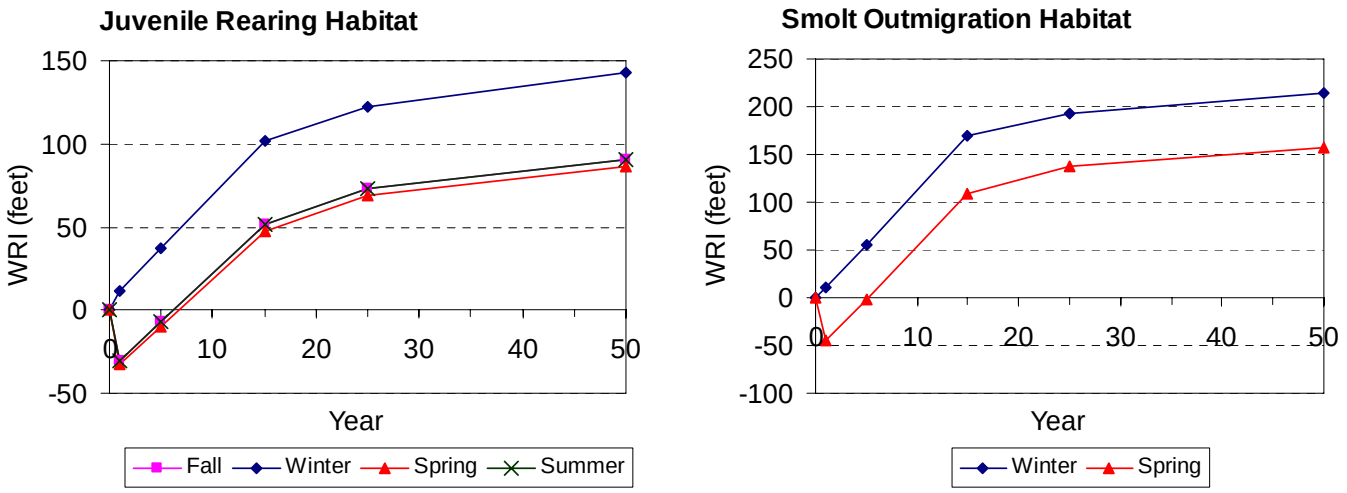

Figure 14. SAM WRIs for steelhead habitat at Sutter Slough RM 25.4

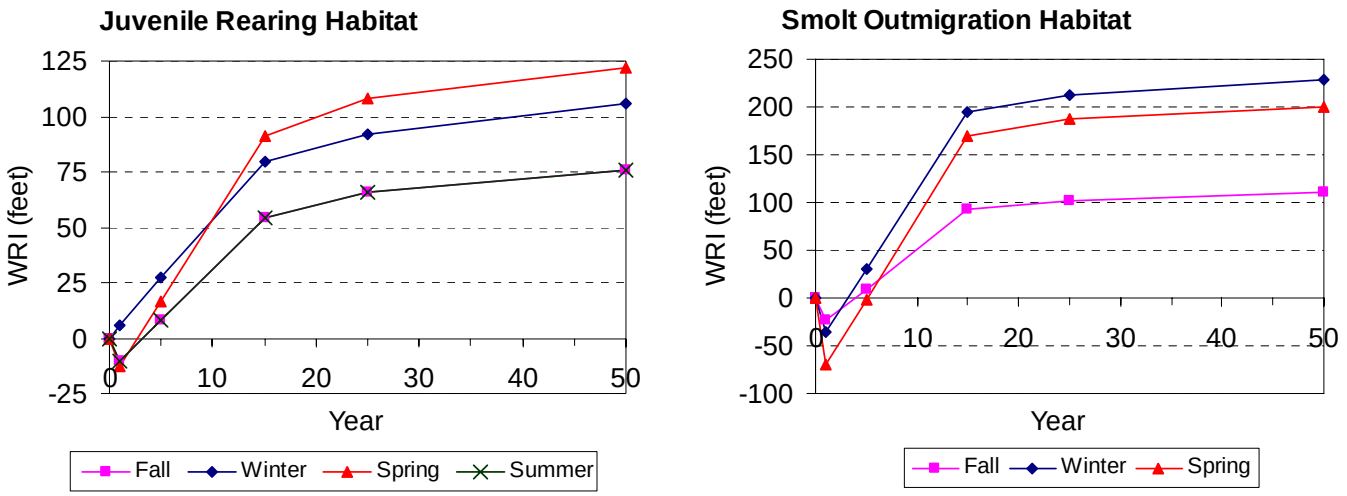

Figure 15. SAM WRIs for Chinook salmon habitat at Bear RM 1.2

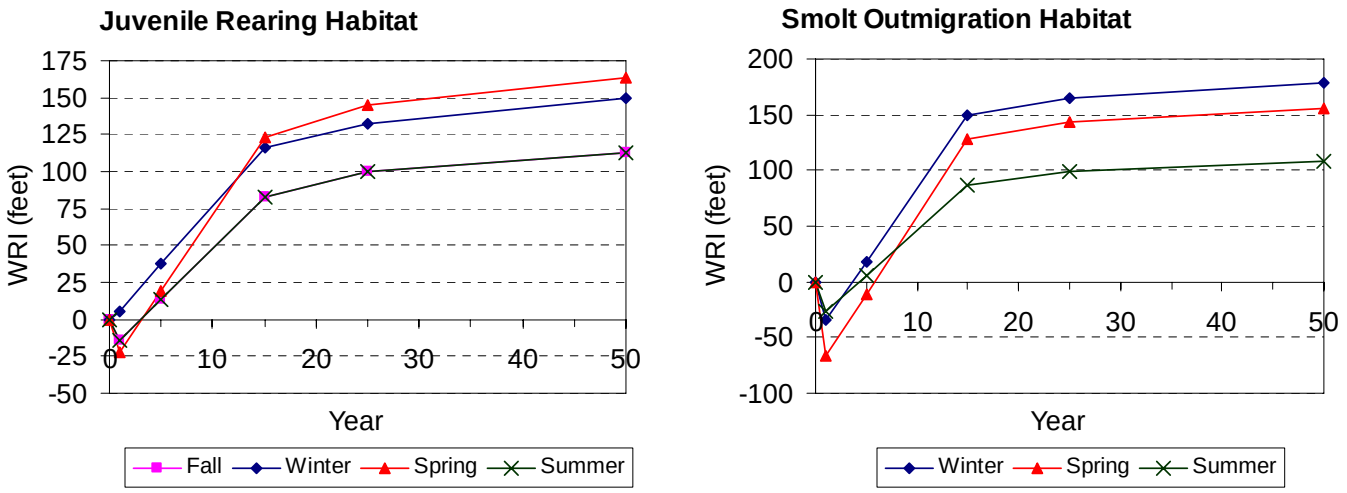

Figure 16. SAM WRIs for steelhead habitat at Bear RM 1.2