

## APPENDIX C. PHOTOGRAPHS



13. Upper Belding Lateral looking west from Razorback Siphon



14. Looking north along drain intersecting Upper Belding Lateral at Razorback Siphon



15. Upper Belding Lateral west of Razorback Siphon showing gravel/rip-rap bottom typical of this reach



16 Upper Belding Lateral looking east from railroad at western terminus (junction with Upper Belding Lateral)



17. Looking north along railroad at junction of Upper Belding Lateral and Belding Extension



18. Looking south along railroad at junction of Upper Belding Lateral



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19. Upper Belding Lateral looking west from railroad at eastern terminus



20. Upper Belding Lateral looking east from 90 degree bend toward railroad at eastern terminus



21. Looking west along canal extending from Upper Belding Lateral at 90 degree bend



22. Upper Belding Lateral looking south from 90 degree bend



23. Upper Belding Lateral looking north from Garcia Check



24. Upper Belding Lateral looking south from Garcia Check



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25. Looking north along toe-drain adjacent to and west of Upper Belding Lateral near Garcia Check



26. Looking east along drain intersecting Upper Belding Lateral at Garcia Siphon



27. Upper Belding Lateral looking south from Garcia Siphon



28. Upper Belding Lateral looking north from Garcia Siphon



29. Looking south along drain adjacent to and west of Upper Belding Lateral near Garcia Siphon



30. Looking west along drain extending from Upper Belding Lateral at Afton Road/Riceton Highway intersection



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31. Upper Belding Lateral looking east from 90 degree bend at Afton Road/Riceton Highway intersection



32. Upper Belding Lateral looking south from 90 degree bend at Afton Road/Riceton Highway intersection



33. Looking east along drain intersecting Upper Belding Lateral approximately 0.5 mi south of Afton Road/Riceton Highway intersection



34. Upper Belding Lateral looking south from approximately 0.5 mi south of Afton Road/Riceton Highway intersection



35. Upper Belding Lateral looking north from Fields Flume



36. Looking east along drain extending from Upper Belding Lateral near Fields Flume

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37. Upper Belding Lateral looking south from Fields Flume



38. Looking west along drains extending from Upper Belding Lateral at Fields Flume



39. Upper Belding Lateral looking north from Farris Road



40. Looking east along Farris Road at intersection with Upper Belding Lateral



41. Upper Belding Lateral looking south from Farris Road



42. Looking east along drain adjacent to and south of Farris Road from intersection with Upper Belding Lateral



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43. Upper Belding Lateral looking southeast at North Weir



44. Upper Belding Lateral looking southwest from south of North Weir



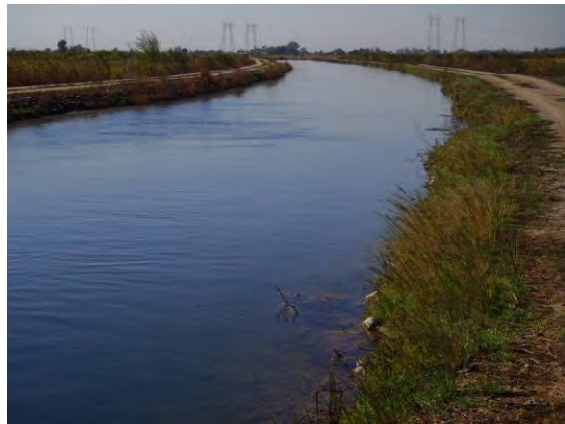
45. Upper Belding Lateral looking southwest from Farm Crossing



46. Looking northeast along drain adjacent to and northwest of Upper Belding Lateral approximately 1,165 feet northeast of junction with Taylor Lateral



47. Looking east along drain intersecting Upper Belding Lateral approximately 1,165 feet northeast of junction with Taylor Lateral



48. Upper Belding Lateral looking southwest from approximately 1,165 feet northeast of junction with Taylor Lateral

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49. Upper Belding Lateral looking northeast from junction with Taylor Lateral



50. Taylor Lateral looking south from junction with Upper Belding Lateral



51. Junction at Upper/Lower Belding Laterals looking southwest



52. Lower Belding Lateral looking west from Junction with Upper Belding Lateral



53. Looking northwest at wetland adjacent to and northwest of Lower Belding Lateral from approximately 0.45 mi west of junction with Upper Belding Lateral



54. Lower Belding Lateral looking northeast from first check/weir west of junction with Upper Belding Lateral



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55. Lower Belding Lateral looking southwest at first check/weir west of junction with Upper Belding Lateral



56. Lower Belding Lateral close-up of bank near first check/weir west of junction with Upper Belding Lateral



57. Lower Belding Lateral looking east at first crossing west of junction with Upper Belding Lateral



58. Lower Belding Lateral looking west from first crossing west of junction with Upper Belding Lateral



59. Lower Belding Lateral looking east from second check/weir west of junction with Upper Belding Lateral



60. Lower Belding Lateral looking west from second check/weir west of junction with Upper Belding Lateral



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61. Looking north along drain extending from Lower Belding Lateral at second check/weir west of junction with Upper Belding Lateral



62. Lower Belding Lateral looking west across Riley Road Bridge



63. Lower Belding Lateral looking southeast at first crossing west of Riley Road Bridge



64. Lower Belding Lateral looking west from first crossing west of Riley Road Bridge



65. Looking north along drain extending from Lower Belding Lateral halfway between Riley Road and Farris Road



66. Looking south at drain extending from Lower Belding Lateral halfway between Riley Road and Farris Road



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67. Lower Belding Lateral looking west from halfway between Riley Road and Farris Road



68. Lower Belding Lateral looking east from crossing approximately 525 feet east of Farris Road



69. Lower Belding Lateral looking west from crossing approximately 525 feet east of Farris Road



70. Lower Belding Lateral looking east from Farris Road



71. Lower Belding Lateral looking west across Farris Road



72. Looking north along canal extending from Lower Belding Lateral adjacent to and east of Farris road



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73. Lower Belding Lateral looking west from Farris Road



74. Lower Belding Lateral looking east from approximately 0.35 mi west of Farris Road



75. Lower Belding Lateral looking west from approximately 0.35 mi west of Farris Road



76. Lower Belding Lateral looking east from east of Bonslett Bridge



77. Looking south along canal extending from Lower Belding Lateral east of Bonslett Bridge



78. Lower Belding Lateral looking west from east of Bonslett Bridge



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79. Schwind Lateral looking north from flume/farm crossing approximately 0.21 mi north of Colusa Highway



80. Schwind Lateral looking south from flume/farm crossing approximately 0.21 mi north of Colusa Highway



81. Looking east along drain intersecting the Schwind Lateral approximately 0.21 mi north of Colusa Highway



82. Looking west along drain (in background) intersecting the Schwind Lateral approximately 0.21 mi north of Colusa Highway



83. Looking south-southeast across Schwind Lateral toward wetland approximately 0.25 mi south of Colusa Highway



84. Close-up of wetland east of Schwind Lateral approximately 0.25 mi south of Colusa Highway



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85. Schwind Lateral looking north from approximately 0.31 mi north of West Liberty Road



86. Schwind Lateral looking south from approximately 0.31 mi north of West Liberty Road



87. Cassady Lateral looking north from West Evans Reimer Road



88. Cassady Lateral looking southwest from West Liberty Road approximately 0.36 mi west of junction with Rising River Lateral



89. Cassady Lateral looking east along West Liberty Road approximately 0.26 mi west of junction with Rising River Lateral



90. Rising River Lateral looking southwest from West Liberty Road at junction with Cassady Lateral



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91. Traynor Lateral looking north from West Liberty Road



92. Traynor Lateral looking north from approximately 0.35 mi south of Colusa Highway



93. Traynor Lateral looking south from approximately 0.35 mi south of Colusa Highway



94. Looking southwest along drain extending from Traynor Lateral approximately 0.35 mi south of Colusa Highway



95. Looking northwest along drain extending from Traynor Lateral approximately 0.14 mi south of Colusa Highway



96. Looking southeast along drain extending from Traynor Lateral approximately 0.14 mi south of Colusa Highway

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97. Traynor Lateral looking south from Colusa Highway



98. Traynor Lateral looking north across Colusa Highway



99. Traynor Lateral looking south from approximately 0.5 mi north of Colusa Highway



100. Traynor Lateral looking north from approximately 0.5 mi north of Colusa Highway



101. Traynor Lateral looking south from approximately 0.75 mi north of Colusa Highway



102. Traynor Lateral looking north from approximately 0.75 mi north of Colusa Highway



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103. Looking east along drain extending from Traynor Lateral approximately 0.75 mi north of Colusa Highway



104. Looking west along drain extending from Traynor Lateral approximately 0.75 mi north of Colusa Highway



105. Traynor Lateral looking north across Nugent Flume (approximately 0.52 mi south of junction with Upper/Lower Belding Laterals)



106. Traynor Lateral looking south from junction with Upper/Lower Belding Laterals



107. Traynor Lateral looking north toward junction with Upper/Lower Belding Laterals

# APPENDIX D: HABITAT EVALUATION AND SCORING FORM (GIS)

## Giant Garter Snake (*Thamnophis gigas*)

Site Name: _____	Site ID: _____
General Characteristic: _____ Permanent/Transient <sup>1</sup>	
USGS 7.5' Topo Quad _____	Township _____ Range _____
Surveyor/Affiliation: _____	Date(s): _____

Scores: 0=absent/none 1=present/low (0-25%) 2=moderate (25-75%) 3=high (75-100%)

Factor	Score
1. Still or slow-flowing water over silt substrate	+ ( ) <sup>2</sup>
2. Flowing water over sand, gravel, rock or cement substrate	-- ( ) <sup>2</sup>
3. Water available <sup>3</sup>	
a) Winter only (runoff) or sporadic availability	+ ( ) <sup>2</sup>
b) April through October only (e.g. irrigation)	+ ( ) <sup>2</sup>
c) All year (e.g. perennial marsh or channel)	+ ( ) <sup>2</sup>
4. Banks are sunny	+ ( )
5. Banks shaded by overstory vegetation	-- ( )
6. Aquatic or emergent vegetation present	+ ( )
7. Terrestrial vegetation present	
a) On banks	+ ( )
b) In adjacent uplands	+ ( )
8. Subterranean retreats present <sup>3</sup>	
a) In banks	+ ( ) <sup>2</sup>
b) In adjacent uplands	+ ( ) <sup>2</sup>
9. Prey fish present	+ ( ) <sup>2</sup>
10. Introduced gamefish present	-- ( ) <sup>2</sup>
11. Prey amphibians present	+ ( ) <sup>2</sup>
12. Site subject to severe seasonal or tidal flooding	-- ( ) <sup>2</sup>
13. Adjacent land use <sup>3</sup>	
a) Rice, marsh, or wetland	+ ( ) <sup>2</sup>
b) Upland	+ ( ) <sup>2</sup>
c) Row Crop or horticultural	-- ( ) <sup>2</sup>
d) Urban or developed public area	-- ( ) <sup>2</sup>
14. Disturbance due to human recreational or maintenance activities	-- ( ) <sup>2</sup>
15. Connectivity to known populations of GGS	+ ( ) <sup>2</sup>

<sup>1</sup> transient habitat designation results in a total adjusted score of 0 points

<sup>2</sup> indicates presence/absence only

<sup>3</sup> factors within these fields are scored cumulatively

Total:

Adjusted Total<sup>1</sup>:



## **APPENDIX E: INSTRUCTIONS FOR COMPLETING THE HABITAT EVALUATION**

### **Giant Garter Snake (*Thamnophis gigas*)**

#### **1. Still or slow-flowing water over silt substrate**

This category is checked if bank habitat adjacent to water is composed of soil, silt, or mud in flows no greater than 3 mph. Water in this category will often be dark or murky rather than clear, of the type observed in marshes, sloughs, or irrigation canals. This category is determined by presence or absence only and receives a positive score.

#### **2. Flowing water over sand, gravel, rock or cement substrate**

This category is checked if channel or bank habitat is composed of an impermeable substrate of the type listed above defining this category, and may include the presence of bank side cinders or fine concrete riprap placed for erosion control. Water in this category will often be clear, associated with flows exceeding 3 mph, of the type typically observed in flowing streams or rivers where silt or sediment will not persist. This category is determined by presence or absence only and receives a negative score.

#### **3. Water available:**

**a) Winter only (runoff) or sporadic availability**

**b) April through October only (e.g. irrigation)**

**c) All year (e.g. perennial marsh or channel)**

Factors in this category are based upon the persistence of all water within 200 feet of observed habitat. Factors in this category are cumulative, are determined by presence or absence only, and receive positive scores.

#### **4. Banks are sunny**

This category is checked if bank habitat adjacent to water receives direct sunlight. Availability of sunlight is determined by the ability of GGS to access sun for basking, and does not include areas where vegetation or topography prevents such access. This category receives positive scores determined by percentage of sunlight present. Percentage classes and corresponding point values are included on the Habitat Evaluation and Scoring Form.

## **APPENDIX E: INSTRUCTIONS FOR COMPLETING THE HABITAT EVALUATION**

### ***5. Banks shaded by overstory vegetation***

This category is checked if bank habitat adjacent to water receives shade obstructing direct sunlight. This category is designed to complement and weight category 4, and receives negative scores determined by percentage of shade present. Percentage classes and corresponding point values are included on the Habitat Evaluation and Scoring Form.

### ***6. Aquatic or emergent vegetation present***

This category is checked if bank side aquatic habitat is characterized by aquatic vegetation which persists above the water level (e.g. cattails, bulrushes, primrose or hyacinth). This category receives positive scores determined by the percentage of aquatic vegetation present. Percentage classes and corresponding point values are included on the Habitat Evaluation and Scoring Form.

### ***7. Terrestrial vegetation present***

#### ***a) On banks***

#### ***b) In adjacent uplands***

This category is checked if bank habitat or adjacent uplands within 200 feet of aquatic habitat are characterized by vegetation (e.g. grasses, brush, low shrubs or Himalayan blackberry). This category receives positive scores determined by the percentage of terrestrial vegetation present. Percentage classes and corresponding point values are included on the Habitat Evaluation and Scoring Form.

### ***8. Subterranean retreats present***

#### ***a) In banks***

#### ***b) In adjacent uplands***

This category is checked if bank habitat or adjacent uplands within 200 feet of aquatic habitat are characterized by burrows, holes, or cracks either in the soil or under debris. Factors within this category are cumulative, are determined by presence or absence only, and receive positive scores.

### ***9. Prey fish present***

This category is checked if small aquatic prey fish (e.g. carp, mosquitofish, or blackfish) are present within aquatic habitat. This category is determined by presence or absence only and receives a positive score.



## **APPENDIX E: INSTRUCTIONS FOR COMPLETING THE HABITAT EVALUATION**

### ***10. Introduced gamefish present***

This category is checked if large, predatory gamefish (e.g. black bass, striped bass, channel catfish) are present within aquatic habitat. This category is determined by presence or absence only and receives a negative score.

### ***11. Prey amphibians present***

This category is checked if amphibians (e.g. bullfrog, treefrog, red-legged frog) are present within or near aquatic habitat. Note that toads do not constitute preferred prey for the giant garter snake and are not included when scoring this category. This category is determined by presence or absence only and receives a positive score.

### ***12. Site subject to severe seasonal or tidal flooding***

This category is checked if habitat is subject to prolonged inundation of upland terrestrial habitat by seasonal floodwaters or persistent tidal flows. This category is determined by presence or absence only and receives a negative score.

### ***13. Adjacent land use***

***a) Rice, marsh, or wetland***

***b) Upland***

***c) Row Crop or horticultural***

***d) Urban or developed public area***

Factors in this category are based upon dominant land use within 200 feet of observed habitat. Factors in this category are cumulative, are determined by presence or absence only and receive positive or negative scores as indicated on the Habitat Evaluation and Scoring Form.

### ***14. Disturbance due to human recreational or maintenance activities***

This category is checked if habitat is subject to prolonged or regular intense disturbance by human recreational or maintenance activities (e.g. fishing, boating, walking, or farming, mowing, burning, or scraping of bankside vegetation). Activities are considered regular if they occur more than 50% of the time between March and November. This category is determined by presence or absence only and receives a negative score.

## **APPENDIX E: INSTRUCTIONS FOR COMPLETING THE HABITAT EVALUATION**

### ***15. Connectivity to known populations of GGS***

This category is ranked by distance, with occurrence records falling within 10, 5, and 1 mile(s) of the observed habitat receiving scores of 1, 2, and 3 points, respectively. The date of the last recorded observation associated with the record is not considered.



## APPENDIX F: TABLE OF ATTRIBUTES FOR THE LINEAR HABITAT EVALUATION

ID	Feature Name	H2O Char	Substrate	Winter H2O	Irrigation	Perennial	Exposure	Overstory	Aqua Veg	Bank Veg	Uplnd Veg	Bank Rtt	Uplnd Rtt	Prey Fish	Pred Fish	Amphib	Flooded	Wetland	Upland	Row Crop	Developed	Disturbed	Connect	Hab Score	Hab Rank	Length M	Length ft
0	Upper Belding Lateral	1	0	1	1	0	3	0	0	3	1	1	1	1	0	1	0	1	0	0	0	0	2	16	Suitable	785	2576
1	Upper Belding Lateral	1	0	1	1	0	3	0	0	2	0	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	980	3216
2	Lower Belding Lateral	1	0	1	1	0	3	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	650	2134
3	Lower Belding Lateral	1	0	1	1	0	3	-1	0	1	3	1	1	1	0	1	0	1	1	0	0	0	2	16	Suitable	326	1070
4	Upper Belding Lateral	0	-1	1	1	0	3	0	0	2	3	1	1	1	0	1	0	1	1	0	0	0	2	18	Suitable	527	1730
5	Upper Belding Lateral	1	0	1	1	0	3	0	0	1	3	1	1	1	0	1	0	1	0	0	0	-1	2	15	Suitable	405	1328
6	Upper Belding Lateral	0	-1	1	1	0	3	0	1	3	3	1	1	1	0	1	0	1	0	-1	0	0	2	18	Suitable	1385	4543
7	Upper Belding Lateral	0	-1	1	1	0	3	0	1	3	2	1	1	1	0	1	0	1	1	0	0	0	3	20	Suitable	950	3117
8	Upper Belding Lateral	0	-1	1	1	0	3	0	0	3	3	1	1	1	0	1	0	1	1	0	0	0	3	20	Suitable	78	256
9	Traynor Lateral	1	0	1	1	0	3	0	1	2	2	1	1	1	0	1	0	1	0	0	0	0	2	17	Suitable	700	2296
10	Traynor Lateral	1	0	1	1	0	3	0	1	1	0	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	677	2220
11	Traynor Lateral	1	0	1	1	0	3	0	1	1	0	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	400	1312
12	Traynor Lateral	1	0	1	1	0	3	0	0	1	0	1	1	1	0	1	0	0	1	-1	0	0	2	12	Marginal	396	1298
13	Traynor Lateral	1	0	1	1	0	3	0	0	2	2	1	1	1	0	1	0	0	0	-1	0	0	2	14	Suitable	1072	3517
14	Cassady Lateral	1	0	1	1	0	3	0	1	3	0	1	1	1	0	1	0	0	1	0	0	0	3	17	Suitable	867	2843
15	Traynor Lateral	1	0	1	1	0	3	0	0	1	0	1	0	1	0	1	0	0	0	0	0	-1	2	10	Marginal	371	1216
16	Cassady Lateral	1	0	1	1	0	3	0	0	0	0	1	1	1	0	1	0	1	0	0	0	-1	2	11	Marginal	473	1553
17	Rising River	1	0	1	1	0	3	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	2	11	Marginal	1112	3650
18	Rising River	1	0	1	1	0	3	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	2	12	Marginal	1017	3336
19	Schwind Lateral	1	0	1	1	0	3	0	1	1	3	1	1	1	0	1	0	1	1	0	0	0	3	19	Suitable	284	931
20	Schwind Lateral	1	0	1	1	0	3	0	1	2	3	1	1	1	0	1	0	1	1	0	0	0	3	20	Suitable	579	1899
21	Upper Belding Lateral	0	-1	1	1	0	3	0	1	3	3	1	1	1	0	1	0	1	0	0	0	0	2	19	Suitable	198	650
22	Upper Belding Lateral	0	-1	1	1	0	3	0	0	1	3	1	1	1	0	1	0	1	1	0	0	0	3	18	Suitable	65	212
23	Upper Belding Lateral	0	-1	1	1	0	3	0	0	2	3	1	1	1	0	1	0	1	1	0	0	0	3	19	Suitable	398	1305
24	Upper Belding Lateral	0	-1	1	1	0	3	0	0	2	0	0	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	18	59
25	Upper Belding Lateral	1	0	1	1	0	3	0	0	2	0	1	1	1	0	1	0	1	0	0	0	0	3	15	Suitable	292	956
26	Upper Belding Lateral	1	0	1	1	0	3	0	0	2	3	1	1	1	0	1	0	1	1	0	0	0	2	18	Suitable	730	2395
27	Traynor Lateral	1	0	1	1	0	3	-1	0	0	3	1	1	1	0	1	0	0	1	0	0	0	2	14	Suitable	108	354
28	Traynor Lateral	1	0	1	1	0	3	0	1	1	3	1	1	1	0	1	0	0	1	0	0	0	2	17	Suitable	317	1040
29	Traynor Lateral	1	0	1	1	0	3	0	0	1	2	1	1	1	0	1	0	0	1	-1	0	-1	3	14	Suitable	25	82
30	Cassady Lateral	1	0	1	1	0	3	0	0	2	0	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	841	2759
31	Cassady Lateral	1	0	1	1	0	3	-1	0	2	2	1	1	1	0	1	0	1	0	0	0	0	2	15	Suitable	131	429
32	Cassady Lateral	1	0	1	1	0	3	0	1	2	0	1	1	1	0	1	0	1	0	0	0	0	2	15	Suitable	857	2810
33	Cassady Lateral	1	0	1	1	0	3	0	1	3	0	1	1	1	0	1	0	1	1	0	0	0	3	18	Suitable	468	1534
34	Lower Belding Lateral	1	0	1	1	0	3	0	1	2	1	1	1	1	0	1	0	1	0	0	0	0	2	16	Suitable	385	1263
35	Lower Belding Lateral	1	0	1	1	0	3	0	0	1	2	1	1	1	0	1	0	1	1	0	0	0	2	16	Suitable	592	1943
36	Lower Belding Lateral	1	0	1	1	0	3	0	0	2	2	1	1	1	0	1	0	1	0	0	0	0	2	16	Suitable	44	144
37	Lower Belding Lateral	1	0	1	1	0	3	0	0	2	2	1	1	1	0	1	0	1	1	0	0	0	2	17	Suitable	287	941
38	Lower Belding Lateral	1	0	1	1	0	3	0	0	3	2	1	1	1	0	1	0	1	1	0	0	0	2	18	Suitable	1081	3546
39	Lower Belding Lateral	1	0	1	1	0	3	0	0	1	1	1	1	1	0	1	0	1	1	0	0	-1	2	14	Suitable	160	525
40	Lower Belding Lateral	1	0	1	1	0	3	0	0	2	0	0	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	40	130
41	Lower Belding Lateral	1	0	1	1	0	3	0	0	1	1	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	661	2167
42	Schwind Lateral	1	0	1	1	0	3	0	0	1	1	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	503	1651
43	Schwind Lateral	1	0	1	1	0	3	0	0	1	1	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	815	2673
44	Schwind Lateral	1	0	1	1	0	3	0	0	2	0	0	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	105	345

## APPENDIX F: TABLE OF ATTRIBUTES FOR THE LINEAR HABITAT EVALUATION

ID	Feature Name	H2O Char	Substrate	Winter H2O	Irrigation	Perennial	Exposure	Overtory	Aqua Veg	Bank Veg	Uplnd Veg	Bank Rtrt	Uplnd Rtrt	Prey Fish	Pred Fish	Amphib	Flooded	Wetland	Upland	Row Crop	Developed	Disturbed	Connect	Hab Score	Hab Rank	Length M	Length ft
45	Schwind Lateral	1	0	1	1	0	3	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	205	674
46	Schwind Lateral	1	0	1	1	0	3	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	164	537
47	Schwind Lateral	1	0	1	1	0	3	0	1	1	3	1	1	1	0	1	0	1	1	0	0	0	3	19	Suitable	7	23
48	Schwind Lateral	1	0	1	1	0	3	0	1	2	3	1	1	1	0	1	0	1	1	0	0	0	3	20	Suitable	226	743
49	Schwind Lateral	1	0	1	1	0	3	0	1	2	3	1	1	1	0	1	0	1	1	0	0	0	3	20	Suitable	15	50
50	Upper Belding Lateral	1	0	1	1	0	3	0	0	3	2	0	1	1	0	1	0	1	1	0	-1	-1	2	15	Suitable	189	620
51	Upper Belding Lateral	1	0	1	1	0	3	0	0	2	3	1	1	1	0	1	0	1	1	0	0	0	2	18	Suitable	50	164
52	Upper Belding Lateral	1	0	1	1	0	3	0	1	2	2	1	1	1	0	1	0	1	1	0	0	0	2	18	Suitable	719	2359
53	Traynor Lateral	1	0	1	1	0	3	0	0	1	2	1	1	1	0	1	0	1	1	0	0	-1	2	15	Suitable	149	488
54	Traynor Lateral	1	0	1	1	0	3	0	0	1	2	1	1	1	0	1	0	1	1	0	0	-1	2	15	Suitable	137	448
55	Traynor Lateral	1	0	1	1	0	3	-1	0	1	2	1	1	1	0	1	0	0	0	-1	0	0	2	12	Marginal	87	285
56	Traynor Lateral	1	0	1	1	0	3	0	0	1	0	1	0	1	0	1	0	0	0	-1	0	-1	3	10	Marginal	373	1225
57	Traynor Lateral	1	0	1	1	0	3	0	0	1	0	1	0	1	0	1	0	1	1	0	0	-1	2	12	Marginal	74	242
58	Rising River	1	0	1	1	0	3	0	0	1	2	1	1	1	0	1	0	1	1	0	0	0	2	16	Suitable	232	763
59	Cassady Lateral	1	0	1	1	0	3	0	0	2	0	1	0	1	0	1	0	1	0	0	0	-1	2	12	Marginal	128	420
60	Cassady Lateral	1	0	1	1	0	3	0	0	2	2	1	1	1	0	1	0	1	1	0	0	0	2	17	Suitable	49	161
61	Cassady Lateral	1	0	1	1	0	3	0	0	2	0	0	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	295	968
62	Cassady Lateral	1	0	1	1	0	3	-2	0	2	3	1	1	1	0	1	0	0	0	0	0	0	2	14	Suitable	173	569
63	Cassady Lateral	1	0	1	1	0	3	0	0	2	0	0	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	47	153
64	Cassady Lateral	1	0	1	1	0	3	-2	0	2	2	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	76	249
65	Cassady Lateral	1	0	1	1	0	3	0	0	2	2	1	1	1	0	1	0	1	1	0	0	-1	2	16	Suitable	134	440
66	Cassady Lateral	1	0	1	1	0	3	0	1	1	1	1	1	1	0	1	0	1	0	0	0	0	2	15	Suitable	178	585
67	Cassady Lateral	1	0	1	1	0	3	0	1	2	3	1	1	1	0	1	0	1	0	0	0	0	2	18	Suitable	74	242
68	Lower Belding Lateral	1	0	1	1	0	3	0	0	3	3	1	1	1	0	1	0	1	1	0	0	0	2	19	Suitable	154	504
69	Lower Belding Lateral	1	0	1	1	0	3	0	0	3	1	1	1	1	0	1	0	1	0	0	0	0	2	16	Suitable	633	2076
70	Lower Belding Lateral	1	0	1	1	0	3	0	2	1	2	1	1	1	0	1	0	1	1	0	0	0	2	18	Suitable	331	1085
71	Lower Belding Lateral	1	0	1	1	0	3	0	0	2	0	0	1	1	0	1	0	1	0	0	0	0	2	13	Marginal	261	855
72	Lower Belding Lateral	1	0	1	1	0	3	0	0	1	1	1	1	1	0	1	0	1	1	0	0	-1	2	14	Suitable	209	686
73	Schwind Lateral	1	0	1	1	0	3	0	1	1	0	1	1	1	0	1	0	1	0	0	0	0	3	15	Suitable	232	761
74	Schwind Lateral	1	0	1	1	0	3	0	1	1	3	1	1	1	0	1	0	1	1	0	0	0	3	19	Suitable	122	399
75	Upper Belding Lateral	0	-1	1	1	0	3	0	1	3	2	1	1	1	0	1	0	1	1	0	0	0	2	19	Suitable	230	755
76	Upper Belding Lateral	0	-1	1	1	0	3	0	0	2	0	1	1	1	0	1	0	1	0	0	0	0	2	14	Suitable	377	1237
77	Upper Belding Lateral	1	0	1	1	0	3	0	0	3	3	1	1	1	0	1	0	1	0	0	0	0	2	18	Suitable	612	2008
78	Upper Belding Lateral	1	0	1	1	0	3	0	1	3	3	1	1	1	0	1	0	1	1	0	0	0	2	20	Suitable	41	136
79	Upper Belding Lateral	1	0	1	1	0	3	0	0	1	2	1	1	1	0	1	0	1	1	0	0	-1	2	15	Suitable	27	87
80	Cassady Lateral	1	0	1	1	0	3	0	1	3	3	1	1	1	0	1	0	1	1	0	0	0	2	20	Suitable	57	188
81	Cassady Lateral	1	0	1	1	0	3	0	1	2	0	1	1	1	0	1	0	1	0	0	0	0	3	16	Suitable	62	205
82	Cassady Lateral	1	0	1	1	0	3	-2	0	2	2	1	1	1	0	1	0	0	0	0	0	0	2	13	Marginal	39	126
83	Traynor Lateral	1	0	1	1	0	3	0	1	1	3	1	1	1	0	1	0	0	1	-1	0	0	2	16	Suitable	147	481
84	Traynor Lateral	1	0	1	1	0	3	0	0	1	3	1	1	1	0	1	0	1	1	0	0	0	2	17	Suitable	203	666
85	Traynor Lateral	1	0	1	1	0	3	0	0	1	0	1	1	1	0	1	0	0	1	-1	0	0	2	12	Marginal	96	314



# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			

Occurrence No. 90	Map Index: 21411	EO Index: 27565	Dates Last Seen
Occ Rank: Good			Element: 1993-XX-XX
Origin: Natural/Native occurrence			Site: 1993-XX-XX
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2006-05-16

Quad Summary: Pennington (3912137/561D)
County Summary: Butte

Lat/Long: 39.31085° / -121.77650°	Township: 17N
UTM: Zone-10 N4351984 E605308	Range: 02E
Mapping Precision: NON-SPECIFIC	Section: 20 Qtr: SW
Symbol Type: POINT	Meridian: M
Radius: 1/5 mile	Elevation: 70 ft

**Location:** CANAL #21, NORTH OF FIELD #64, EAST OF PENNINGTON ROAD, GRAY LODGE WILDLIFE AREA.

**Location Detail:**

**Ecological:** HABITAT CONSISTS OF OPEN FIELDS WITH SEMIPERMANENT AND PERMANENT WATER AREAS AND CANALS. AREA MANAGED FOR WATERFOWL AND UPLAND GAME BIRDS (PHEASANTS).

**Threat:**

**General:** THREE ADULTS OBSERVED DURING 20 MAY 1992. UNKNOWN NUMBER OF SNAKES OBSERVED DURING 1993.

**Owner/Manager:** DFG-GRAY LODGE WA

<b>Sources</b>	
HAN96R0001	HANSEN, G. GPS COORDINATES FOR LOCATIONS OF THE GIANT GARTER SNAKE (THAMNOPHIS GIGAS) IN THE SACRAMENTO VALLEY AT THE TIME OF FEDERAL LISTING, 1996-09-12.
WOR92F0003	WORKMAN, M. & T. KING. FIELD SURVEY FORM FOR THAMNOPHIS GIGAS, 1992-05-20.

# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No. 95	Map Index: 32390	EO Index: 1630	Dates Last Seen
Occ Rank: Good			Element: 1993-10-01
Origin: Natural/Native occurrence			Site: 1993-10-01
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2002-11-20
Quad Summary: Butte City (3912148/561B), Sanborn Slough (3912138/561C)			
County Summary: Colusa, Butte			
Lat/Long: 39.37600° / -121.88165°		Township: 18N	
UTM: Zone-10 N4359099 E596326		Range: 01E	
Mapping Precision: NON-SPECIFIC		Section: 32 Qtr: NW	
Symbol Type: POINT		Meridian: M	
Radius: 1/5 mile		Elevation: 60 ft	
Location: NORTHERN PORTION OF BUTTE SINK; APPROX. 1.7 KM NORTHEAST OF THE INTERSECTION BETWEEN GRIDLEY ROAD AND BUTTE CREEK.			
Location Detail:			
Ecological: SEMI-PERMANENT WETLANDS WITH CREEK NEAR THE AREA; OLD RICE GROUND.			
Threat: FLOODING, EROSION.			
General: 1 JUVENILE OBSERVED.			
Owner/Manager: DFG-LITTLE DRY CREEK UNIT			
<b>Sources</b>			
ROC93F0030	ROCCO, C. FIELD SURVEY FORM & MAP FOR HIBISCUS LASIOCARPUS. 1993-06-30.		
ROC93F0057	ROCCO, C. (CDFG-REGION 2). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS (GIANT GARTER SNAKE). 1993-10-01.		
ROC93U0003	ROCCO, C. MEMO AND 3 MAPS WITH LOCATIONS FOR THAMNOPHIS GIGAS. 1993-XX-XX.		



# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No. 96	Map Index: 32391	EO Index: 7113	Dates Last Seen
Occ Rank: Good			Element: 1993-07-28
Origin: Natural/Native occurrence			Site: 1993-07-28
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 1995-08-10
Quad Summary: West of Biggs (3912147/561A), Pennington (3912137/561D)			
County Summary: Butte			
Lat/Long: 39.37631° / -121.86929°		Township: 18N	
UTM: Zone-10 N4359147 E597390		Range: 01E	
Mapping Precision: NON-SPECIFIC		Section: 33 Qtr: NW	
Symbol Type: POINT		Meridian: M	
Radius: 1/5 mile		Elevation: 65 ft	
Location: LITTLE DRY CREEK UNIT OF UPPER BUTTE BASIN WILDLIFE AREA; APPROX. 3.0 KM SOUTHWEST OF SCHOHR RANCH.			
Location Detail:			
Ecological:			
Threat: FLOODING, FIRE.			
General: 1 INDIVIDUAL OBSERVED AT SITE			
Owner/Manager: DFG-UPPER BUTTE BASIN WA			
<b>Sources</b>			
ROC93F0056	ROCCO, C. (CDFG-REGION 2). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS (GIANT GARTER SNAKE). 1993-07-28.		
ROC93U0003	ROCCO, C. MEMO AND 3 MAPS WITH LOCATIONS FOR THAMNOPHIS GIGAS, 1993-XX-XX.		

# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No: 103	Map Index: 32398	EO Index: 1634	Dates Last Seen
Occ Rank: Good			Element: 1993-10-03
Origin: Natural/Native occurrence			Site: 1993-10-03
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 1995-07-25
Quad Summary: Butte City (3912148/561B), West of Biggs (3912147/561A)			
County Summary: Butte			
Lat/Long: 39.38827° / -121.87683°		Township: 18N	
UTM: Zone-10 N4360466 E596724		Range: 01E	
Mapping Precision: NON-SPECIFIC		Section: 29 Qtr: NE	
Symbol Type: POINT		Meridian: M	
Radius: 1/5 mile		Elevation: 65 ft	
Location: EAST OF BUTTE CREEK; APPROX. 3.5 KM SSE OF THE INTERSECTION BETWEEN PRINCETON ROAD AND BUTTE CREEK.			
Location Detail:			
Ecological: SEMI-PERMANENT WETLANDS WITH IRRIGATION CANAL THROUGH THE AREA.			
Threat: FLOODING, FIRE.			
General: 1 JUVENILE OBSERVED.			
Owner/Manager: DFG-UPPER BUTTE BASIN WA			
<b>Sources</b>			
ROC93F0058	ROCCO, C. (CDFG-REGION 2). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS (GIANT GARTER SNAKE). 1993-10-03.		



# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No: 157	Map Index: 43217	EO Index: 43217	Dates Last Seen
Occ Rank: Unknown			Element: 1999-06-08
Origin: Natural/Native occurrence			Site: 1999-06-08
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2000-07-17
Quad Summary: Biggs (3912146/580B)			
County Summary: Butte			
Lat/Long: 39.44283° / -121.72595°		Township: 18N	
UTM: Zone-10 N4366594 E609632		Range: 02E	
Mapping Precision: SPECIFIC		Section: 03	Qtr: SE
Symbol Type: POINT		Meridian: M	
Radius: 80 meters		Elevation: 95 ft	
Location: ALONG RICETON ROAD, 1.6 MILES SOUTH OF RIZ ROAD (HIGHWAY 162), SOUTH OF RICHVALE			
Location Detail:			
Ecological:			
Threat:			
General: 1 ADULT MALE FOUND DOR ON 6 JUN 1989; DEPOSITED AT CAS (#210471)			
Owner/Manager: UNKNOWN			
<b>Sources</b>			
CAS99S0004	CALIFORNIA ACADEMY OF SCIENCES. 1999 CAS HERPETOLOGY HOLDINGS (INCLUDES STANFORD UNIVERSITY COLLECTIONS) FOR THAMNOPHIS GIGAS. 1999-XX-XX.		

# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No: 160	Map Index: 46872	EO Index: 46872	Dates Last Seen
Occ Rank: Excellent			Element: 2001-05-22
Origin: Natural/Native occurrence			Site: 2001-05-22
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2001-12-21
Quad Summary: Pennington (3912137/561D)			
County Summary: Butte			
Lat/Long: 39.36266° / -121.86775°		Township: 18N	
UTM: Zone-10 N4357634 E597542		Range: 01E	
Mapping Precision: SPECIFIC		Section: 33 Qtr: SW	
Symbol Type: POINT		Meridian: M	
Radius: 80 meters		Elevation: 65 ft	
Location: CHEROKEE CANAL, 6.3 MILES NW OF PENNINGTON; NEAR INTERSECT OF GRIDLEY ROAD AND CHEROKEE CANAL.			
Location Detail:			
Ecological: HABITAT CONSISTS OF TULE AND CATTAILS GROWING ALONG MARGIN OF CANAL. MATTED AQUATIC VEGETATION PRESENT WITHIN SLOW MOVING WATER. SURROUNDING LAND CONSISTS OF WILDLIFE REFUGE, RICE FIELDS AND MANAGED HUNT CLUBS.			
Threat: SITE NEAR A BUSY ROAD			
General: 22 MAY 2001: 1 ADULT OBSERVED.			
Owner/Manager: PVT			
<b>Sources</b>			
LAN01F0001 LANGLE, B. (ESSEX ENVIRONMENTAL). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 2001-05-22.			



# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No: 179	Map Index: 52032	EO Index: 52032	Dates Last Seen
Occ Rank: Good			Element: 1997-10-07
Origin: Natural/Native occurrence			Site: 1997-10-07
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2003-08-06
Quad Summary: Pennington (3912137/561D)			
County Summary: Butte			
Lat/Long: 39.34689° / -121.79673°		Township: 17N	
UTM: Zone-10 N4355960 E603511		Range: 01E	
Mapping Precision: SPECIFIC		Section: 12	Qtr: NE
Symbol Type: POINT		Meridian: M	
Radius: 80 meters		Elevation: 70 ft	
Location: PENNINGTON ROAD, ABOUT 135 FT SOUTH OF JUNCTION WITH WEST LIBERTY ROAD. GRAY LODGE WATERFOWL MANAGEMENT AREA.			
Location Detail:			
Ecological: AREA TO WEST OF ROAD IS A MANAGED WATERFOWL AREA WITH FRESHWATER MARSH, UPLAND LEVEES, IRRIGATION DITCHES, & SCATTERED EUCALYPTUS, WILLOW, & COTTONWOOD TREES. EAST SIDE OF ROAD IS IRRIGATION DITCH WITH GRAZED PASTURE BEYOND.			
Threat: THREATENED BY TRAFFIC ON ROAD			
General: 1 ADULT, 28 INCHES LONG, FOUND DEAD ON ROAD 7 OCT 1997.			
Owner/Manager: DFG-GRAY LODGE WA. PVT			
<b>Sources</b>			
GRE97F0002	GREVEN, J. (ESSEX ENVIRONMENTAL). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 1997-10-07.		

# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No. 181	Map Index: 52400	EO Index: 52400	Dates Last Seen
Occ Rank: Excellent			Element: 2003-06-11
Origin: Natural/Native occurrence			Site: 2003-06-11
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2003-09-09
Quad Summary: Sanborn Slough (3912138/561C)			
County Summary: Butte			
Lat/Long: 39.31816° / -121.88346°		Township: 17N	
UTM: Zone-10 N4352678 E596249		Range: 01E	
Mapping Precision: SPECIFIC		Section: 20 Qtr: NW	
Symbol Type: POINT		Meridian: M	
Radius: 80 meters		Elevation: 55 ft	
Location: BUTTE SINK, 1 MILE NORTH OF THE BUTTE/SUTTER COUNTY LINE			
Location Detail:			
Ecological: HABITAT CONSISTS OF A CANAL WITHIN A MANAGED WETLAND AREA, DOMINATED BY TULE, CATTAILS, WILLOWS, AND SCATTERED OAKS.			
Threat:			
General: 1 ADULTS (~44" IN LENGTH) OBSERVED FORAGING ALONG THE SLOUGH EDGE ON 11 JUN 2003.			
Owner/Manager: PVT			
Sources			
GIL03F0008	GILROY, M. (ESSEX ENVIRONMENTAL). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 2003-06-11.		



# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No: 183	Map Index: 52407	EO Index: 52407	Dates Last Seen
Occ Rank: Fair			Element: 2003-06-11
Origin: Natural/Native occurrence			Site: 2003-06-11
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2003-09-10
Quad Summary: Pennington (3912137/561D)			
County Summary: Butte			
Lat/Long: 39.34630° / -121.81967°		Township: 17N	
UTM: Zone-10 N4356093 E601704		Range: 01E	
Mapping Precision: SPECIFIC		Section: 02	Qtr: SE
Symbol Type: POINT		Meridian: M	
Radius: 80 meters		Elevation: 66 ft	
Location: JUST NORTH OF WEST LIBERTY ROAD AND 1.1 MILES WEST OF PENNINGTON ROAD, JUST NORTH OF GRAY LODGE WILDLIFE AREA			
Location Detail:			
Ecological: HABITAT CONSISTS OF A ROADSIDE DITCH, DOMINATED BY CATTAILS, THISTLE, REEDS, AND SMALL WILLOWS.			
Threat:			
General: 1 JUVENILE SNAKE (~20" IN LENGTH) OBSERVED ON 11 JUN 2003.			
Owner/Manager: PVT			
<b>Sources</b>			
COW03F0003	COWARD, J. (ESSEX ENVIRONMENTAL). FIELD SURVEY FORM FOR THAMNOPHIS GIGAS. 2003-06-11.		

# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150
giant garter snake		
<b>Status</b>		<b>NDDB Element Ranks</b>
Federal: Threatened	Global: G2G3	Other Lists
State: Threatened	State: S2S3	CDFG Status:
<b>Habitat Associations</b>		
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.		
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.		

\* SENSITIVE \*

Occurrence No. 213	Map Index: 61910	EO Index: 61946	Dates Last Seen
Occ Rank: Unknown			Element: 1998-06-10
Origin: Natural/Native occurrence			Site: 1998-06-10
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2005-07-08

Quad Summary: Biggs (3912146/560B)

County Summary: Butte

\* SENSITIVE \*

Lat/Long:	Township:
UTM:	Range:
Mapping Precision:	Section:
Symbol Type:	Meridian:
Radius:	Elevation:

Location: \*SENSITIVE\* Location information suppressed.

Location Detail: Please contact the California Natural Diversity Database, California Department of Fish and Game, for more information:

(916) 324-3812.

Ecological:

Threat:

General:

Owner/Manager:

Sources

USG04D0001 USGS - BIOLOGICAL RESOURCES DISCIPLINE. SHAPEFILE FROM BIOS (DS84) OF GIANT GARTER SNAKE COLLECTION RECORDS FROM 21 APR 1995 THROUGH 9 SEP 2004. 2004-09-09.



# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No: 242	Map Index: 64673	EO Index: 64752	Dates Last Seen:
Occ Rank: Unknown			Element: 1988-XX-XX
Origin: Natural/Native occurrence			Site: 1988-XX-XX
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2006-05-11
Quad Summary: Gridley (3912138/580C)			
County Summary: Butte			
Lat/Long: 39.33362° / -121.73436°		Township: 17N	
UTM: Zone-10 N4354564 E609079		Range: 02E	
Mapping Precision: NON-SPECIFIC		Section: 10 Qtr: E	
Symbol Type: POINT		Meridian: M	
Radius: 1/5 mile		Elevation: 80 ft	
Location: DRAIN ON NORTH SIDE OF WEST EVAN REIMER ROAD, 0.5 MILES WEST OF BLOCK ROAD, 2.5 MILES SW OF GRIDLEY			
Location Detail:			
Ecological:			
Threat:			
General: UNKNOWN NUMBER OF SNAKES OBSERVED DURING 1988.			
Owner/Manager: UNKNOWN			
<b>Sources</b>			
HAN96R0001	HANSEN, G. GPS COORDINATES FOR LOCATIONS OF THE GIANT GARTER SNAKE (THAMNOPHIS GIGAS) IN THE SACRAMENTO VALLEY AT THE TIME OF FEDERAL LISTING. 1996-09-12.		

# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No. 243	Map Index: 64674	EO Index: 64753	Dates Last Seen
Occ Rank: Unknown			Element: 1989-XX-XX
Origin: Natural/Native occurrence			Site: 1989-XX-XX
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2006-05-11
Quad Summary: Pennington (3912137/561D)			
County Summary: Butte			
Lat/Long: 39.36212° / -121.85015°		Township: 17N	
UTM: Zone-10 N4357594 E599058		Range: 01E	
Mapping Precision: NON-SPECIFIC		Section: 03	Qtr: XX
Symbol Type: POINT		Meridian: M	
Radius: 1/5 mile		Elevation: 66 ft	
Location: CANAL CROSSING GRIDLEY-COLUSA HWY, E OF HATCH ROAD, 7.5 MILES WEST OF GRIDLEY			
Location Detail: LSU SPECIMENS GIVE LOCATION ONLY AS "8 MI W GRIDLEY".			
Ecological:			
Threat:			
General: MUSEUM SPECIMENS AT LOUISIANA STATE UNIVERSITY MUSEUM OF ZOOLOGY (#20845 & 20943) COLLECTED 23 MAY 1963. UNKNOWN NUMBER OF SNAKES OBSERVED DURING 1989.			
Owner/Manager: UNKNOWN			
<b>Sources</b>			
HAN96R0001	HANSEN, G. GPS COORDINATES FOR LOCATIONS OF THE GIANT GARTER SNAKE (THAMNOPHIS GIGAS) IN THE SACRAMENTO VALLEY AT THE TIME OF FEDERAL LISTING. 1996-09-12.		
LSU05S0001	LOUISIANA STATE UNIVERSITY MUSEUM OF ZOOLOGY. PRINTOUT OF THAMNOPHIS GIGAS RECORDS. 2005-06-21.		

# APPENDIX G: CNDDDB FORMS FOR GGS OCCURRENCE RECORDS WITHIN 5 MILES

California Department of Fish and Game  
Natural Diversity Database  
Full Report with Sources for Selected Elements

<b><i>Thamnophis gigas</i></b>		Element Code: ARADB36150	
giant garter snake			
<b>Status</b>		<b>NDDB Element Ranks</b>	<b>Other Lists</b>
Federal: Threatened		Global: G2G3	CDFG Status:
State: Threatened		State: S2S3	
<b>Habitat Associations</b>			
General: PREFERS FRESHWATER MARSH AND LOW GRADIENT STREAMS. HAS ADAPTED TO DRAINAGE CANALS & IRRIGATION DITCHES.			
Micro: THIS IS THE MOST AQUATIC OF THE GARTER SNAKES IN CALIFORNIA.			
Occurrence No: 244	Map Index: 64675	EO Index: 64754	Dates Last Seen
Occ Rank: Unknown			Element: 1989-XX-XX
Origin: Natural/Native occurrence			Site: 1989-XX-XX
Presence: Presumed Extant			
Trend: Unknown			Record Last Updated: 2006-05-12
Quad Summary: West of Biggs (3912147/561A)			
County Summary: Butte			
Lat/Long: 39.42043° / -121.85368°		Township: 18N	
UTM: Zone-10 N4364060 E598672		Range: 01E	
Mapping Precision: NON-SPECIFIC		Section: 15 Qtr: NW	
Symbol Type: POINT		Meridian: M	
Radius: 1/5 mile		Elevation: 70 ft	
Location: LITTLE DRY CREEK AT AFTON ROAD, EAST OF AGUAS FRIAS ROAD (FORMERLY GOODSPEED-WATT ROAD), 7.5 MI WEST OF BIGGS.			
Location Detail:			
Ecological:			
Threat:			
General: UNKNOWN NUMBER OF SNAKES OBSERVED DURING 1989.			
Owner/Manager: UNKNOWN			
<b>Sources</b>			
HAN96R0001	HANSEN, G. GPS COORDINATES FOR LOCATIONS OF THE GIANT GARTER SNAKE (THAMNOPHIS GIGAS) IN THE SACRAMENTO VALLEY AT THE TIME OF FEDERAL LISTING. 1996-09-12.		



## **APPENDIX H: ASSUMPTIONS AND METHODOLOGY USED TO CALCULATE IMPACTS**

### **MINOR MODIFICATIONS**

#### **Temporary Upland Impacts for Minor Modifications**

Temporary upland impacts for minor modifications assumptions:

- 6-foot existing embankment height
- 100 feet of length per structure per side of canal

Each of the 69 structure modification or replacement sites were assumed to have an associated temporary upland impact on the existing embankment due to construction. A length of impact was assumed to be 100 feet along the embankment per side of the canal per structure. The temporary upland impact was estimated to be 100 feet multiplied by an assumed existing embankment height of 6 feet for each side of the canal. A factor of approximately 0.03 acres per structure was used to calculate temporary upland impacts for minor modifications.

#### **Permanent Upland Impacts for Minor Modifications**

Permanent upland impacts for minor modifications assumptions:

- 8-foot existing embankment height
- 100 feet of length per structure per side of canal
- Proposed Upland Impacts =  $100 \times 8$  feet
- Permanent Upland Impacts = Proposed Upland Impacts – Temporary Upland Impacts

The permanent upland impact for each of the proposed structure improvements was calculated by subtracting the temporary upland impacts from the proposed upland impacts, resulting in a net gain per structure of approximately 0.01 acres.

### **MAJOR MODIFICATIONS**

#### **Permanent Impacts based on Proposed Project Footprint**

The existing embankment toe boundary and the proposed embankment toe boundary were used in combination to calculate permanent impact areas. When the proposed toe boundary was outside of the existing toe boundary, the area was calculated and classified as a permanent impact. Permanent impacts areas were further classified as upland, aquatic, or marsh land based on land cover in the impacted area.

## **APPENDIX H: ASSUMPTIONS AND METHODOLOGY USED TO CALCULATE IMPACTS**

For the proposed canal realignment segment on the Upper Belding Lateral, from station 261+00 to 263+00, the permanent impacts were calculated as a net difference between the existing canal section, which will be converted to rice land and the proposed new canal section, which will be constructed through existing rice land.

The change (increase) in canal water surface area due to the project was estimated by comparing existing (pre-project) canal cross sections with the final design cross sections. The water surface width in each canal cross section was determined using the estimated normal operating water level elevations for each of these two scenarios. The water surface area between any two canal cross sections was estimated by multiplying the distance between the two cross sections by the average water surface width of the two cross sections. The water surface areas between all cross sections were then summed up to estimate the total water surface area for both the existing and final design scenarios. The difference between these two totals is the estimated change in canal water surface area due to the project.

### **Temporary Aquatic Impacts Methodology**

Temporary aquatic impacts assumptions:

- Assume an average 8-foot existing ditch width to be temporarily removed and replaced with an 8-foot ditch.

Existing toe ditches are proposed to be reconstructed at the new embankment toe. The temporary loss of the ditch was classified as a temporary aquatic loss. An average ditch width of 8 feet was assumed throughout the system in locations with toe ditches. The assumed ditch width was multiplied by the ditch length (calculated from project stationing in the centerline of the canal) to estimate the temporary aquatic impacts. Segments without toe ditches were not included in the calculation.

There will be a temporary aquatic loss from station 261+00 to 263+00, where the Upper Belding lateral is to be realigned through an existing rice field. The existing canal segment will subsequently be filled in and converted to rice field, thus replacing a portion of the aquatic habitat.

## **APPENDIX H: ASSUMPTIONS AND METHODOLOGY USED TO CALCULATE IMPACTS**

### **Temporary and Permanent Upland Impacts for Major Modifications**

Temporary and permanent upland impacts assumptions:

- 6-foot existing embankment height
- 8-foot proposed embankment height
- Temporary upland impact = (Length of segment x 6 feet) – (Minor Modifications temporary upland impact)
- Proposed upland impact = (Length of segment x 8 feet) – (Minor Modifications proposed)
- Permanent upland impact = Proposed upland impact – temporary upland impact = net increase in upland habitat

Temporary upland impacts were calculated by multiplying the length of the canal by an assumed average existing embankment height of 6 feet. This is the temporary loss of upland habitat during construction. The proposed upland impact was calculated by multiplying the length of the canal by the proposed average embankment height of 8 feet. The permanent upland impact is the difference between the temporary upland impact and the proposed upland impact which is a net increase in upland habitat. The impacts from the Minor Modifications were subtracted so as not to double count the embankment areas impacted by the structure improvements.



## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Upper Belding; Razorback Siphon; Plates 4.1 and 5.3, No. 1	Remove existing siphon. Install 2 cross-drainage box siphons, each 50 ft long, 8 ft wide, 6 ft deep.	Suitable aquatic and upland	0.01 / -0.22	-0.03 / 0.00
Upper Belding; UPRR Crossing; Plates 4.2 and 5.4, No. 2	Bore and jack two 8-ft-diameter pipe culverts adjacent to existing culverts.	Suitable aquatic and upland; snakes observed in 2011	0.01 / 0.00	-0.03 / 0.00
Upper Belding; Ashley Headgate; Plates 4.2 and 5.4, No. 3	Replace with similar sluice gate structure.	Suitable aquatic and upland; snakes observed in 2011	0.01 / 0.00	-0.03 / 0.00
Upper Belding; Garcia Check/Weir; Plates 4.2 and 5.5, No. 4	Remove existing check and replace with 70-ft long-crested weir. Weir to be 7-ft high and Include three 3.3-ft wide overshot gates, max opening 6.5 ft.	Suitable aquatic and upland	0.01 / -0.26	-0.03 / 0.00
Upper Belding; Garcia Flume/Siphon; Plates 4.2 and 5.6, No. 5	Remove existing canal siphon and replace with trapezoidal earthen canal section. Reconfigure RD 833 drainage by installing two cross-drainage box siphons, each 100 ft long by 8 ft wide by 6 ft deep.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Upper Belding; Biggs/Princeton (Afton Rd) Bridge; Plates 4.2 and 5.6, No. 6	Replace with 2-ft-thick flat slab bridge deck with at least 7-ft culvert opening. Assumes asphalt concrete (AC) driving surface will be applied.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Upper Belding; Turnout 29 Lateral; Plates 4.2 and 5.6, No. 7	Replace with similar structure. If possible, combine with Banion Check. Use single 48" gate and pipe.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Upper Belding; Banion Check/Weir; Plates 4.2 and 5.6, No. 8	Remove existing check and replace with 70-ft long-crested weir. Weir to be 6.4-ft high and include two 7-ft wide overshot gates.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Upper Belding; Fields Flume; Plates 4.3 and 5.8, No. 9	Replace with 26-ft-long flume with 8.5-ft-high embankment walls, each 6 inches thick. Install 2-ft-wide walkways. During final design, consider wasteway at this location to spill excess water.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Upper Belding; N. Farris Bridge; Plates 4.3 and 5.9, No. 10	Construct 12" concrete curb on each side of existing bridge.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Upper Belding; North Check; Plates 4.3 and 5.9, No. 11	Remove existing check and replace with 67-ft long-crested weir. Weir to be 6.5-ft high and include two 4.5-ft wide overshot gates.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Upper Belding; Farm Crossing #270; Plates 4.3 and 5.10, No. 12	Replace with precast bridge deck and pile foundations.	Suitable aquatic and upland; snakes observed in 2011	0.01 / 0.00	-0.03 / 0.00
Upper Belding; Farm Crossing #294; Plates 4.3 and 5.11, No. 13	Replace or extend existing box culverts to limits of canal improvements.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Upper Belding; Division 2 Headgate (Belding/Traynor Split); Plates 4.3 and 5.11, No. 14	Replace farm crossing with 2-ft-thick flat slab deck and 7-ft opening to canal bottom. Replace existing headgate structure with 3-bay sluice gate, each 4-ft wide by 7-ft depth. Increase height of adjacent canal banks to achieve 18 inches of freeboard.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Check #349 Weir; Plates 4.4 and 5.13, No. 15	Replace with 45-ft long-crested weir. Weir to be 5.3-ft high and include one 4-ft wide overshot gate, max opening 5 ft.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Farm Crossing #364; Plates 4.4 and 5.13, No. 16	Replace with precast bridge deck and pile foundations.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Check #376; Plates 4.4 and 5.13, No. 17	Replace with 83-ft long-crested weir. Weir to be 4.7-ft high and include 2 3.5-ft wide overshot gates, max opening 4.5 ft.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Riley Road Bridge; Plates 4.4 and 5.14, No. 18	Replace with precast bridge deck and pile foundations.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Check#397; Plates 4.4 and 5.14, No. 19	Extend existing headwall 6".	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00



## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Lower Belding; Farm Crossing #407; Plates 4.4 and 5.14, No. 20	Replace farm crossing with 2-ft-thick flat slab bridge deck and 8-ft opening to canal bottom. Assume deck and soffit will be raised by 1 ft to improve freeboard. Assume aggregate base backfill for driving surface.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Check #422; Plates 4.4 and 5.15, No. 21	Replace farm crossing with 2-ft-thick flat slab bridge deck and 8.5-ft opening to canal bottom. Assumes deck will be raised by 0.7 ft and soffit by 1 ft to improve freeboard. Assume AC driving surface.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Farm Crossing # 443; Plates 4.4 and 5.16, No. 22	Replace with precast bridge deck and pile foundations.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; S. Farris Rd. Bridge; Plates 4.4 and 5.16, No. 23	Replace bridge with open span, 1.7-ft thick slab deck with aggregate base backfill driving surface and 8.5-ft opening to canal bottom.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Bonslett Bridge; Plates 4.5 and 5.17, No. 24	Replace bridge with bridge-box culvert structure, with 2-ft thick slab deck and 6-ft by 5-ft culvert. Install 50-ft long-crested weir. Weir to be 7-ft high and include one 4-ft wide overshot gate with max opening 6.5 ft.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Lower Belding; Green Lateral Headgate; Plates 4.5 and 5.18, No. 25	Construct new control structure with long crested weir and two overshot gates.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Schwind; Check #027; Plates 4.5 and 5.19, No. 26	Remove structure (not used).	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; Farm Crossing #054; Plates 4.5 and 5.19, No. 27	Replace with concrete box culvert, 24-ft long by 9-ft wide by 4-ft high, with integrated farm crossing.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; Schwind Flume/Crossing; Plates 4.5 and 5.19, No. 28	Replace with 60-ft long by 8-ft wide by 5-ft deep flume. Install check bays on both sides of flume to allow for spill.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; Farm Crossing / Check #058; Plates 4.5 and 5.20, No. 29	Replace with 37-ft long crested weir. Weir to be 6.6-ft high and include one 3-ft-wide overshot gate, max opening 6.5 ft.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; Colusa Highway Bridge; Plates 4.5 and 5.20, No. 30	Construct 6" concrete curb on each side of existing bridge.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; Farm Crossing #071; Plates 4.5 and 5.20, No. 31	Replace with concrete box culvert, 20-ft long by 9-ft wide by 4-ft high, with integrated farm crossing.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; Check #088; Plates 4.6 and 5.21, No. 32	Replace with new control structure with 34 ft long crested weir and two 3-ft Wx5.6-ft H overshot gates	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; Farm Crossing #100; Plates 4.6 and 5.21, No. 33	Replace with concrete box culvert, 19-ft long by 7-ft wide by 4-ft high, with integrated farm crossing.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; W. Liberty Road Siphon; Plates 4.6 and 5.22, No. 34	Remove 26-ft-long by 4-ft- diam CMP culvert.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Schwind; W. Liberty Road Siphon; Plate 4.6 and 5.22, No. 35	Remove existing structure and install 132-ft-long by 6-ft-diam siphon. Single siphon will replace structures and accommodate flow between Farm Crossing #5021 and W. Liberty Road crossing.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Schwind; W. Liberty Road Siphon; Plates 4.6 and 5.22, No. 36	Remove two 140-ft-long by 3-ft-diam CMP culverts.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Traynor Headgates; Plates 4.3 and 5.11, No. 37	Replace with 62-ft long-crested weir. Weir to be 7.4-ft high and include two 3-ft-wide overshot gates, max opening 6.5 ft.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Nugent Flume; Plates 4.7 and 5.23, No. 38	Replace with 60-ft long by 22-ft wide by 10.5-ft deep flume. Install 2 check bays, one on either side of flume, to allow for spill.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; RD 833 Crossing #064; Plates 4.7 and 5.24, No. 39	Replace or extend existing pipe culvert to limits of canal improvements.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Farm Crossing #077; Plates 4.7 and 5.25, No. 40	Replace with 2-ft-thick flat slab bridge deck. Assumes asphalt concrete (AC) driving surface will be applied.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Check #102; Plates 4.7 and 5.26, No. 41	Install new overshot structure (no LCW).	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Drain Crossing #104; Plates 4.7 and 5.26, No. 42	Replace pipe culvert drain crossing.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Traynor; Colusa Hwy Bridge; Plates 4.7 and 5.26, No. 43	Replace bridge with flat slab, 3-ft deck height and 2-ft wide center pier. Maintain existing road height. Consider siphon under bridge. Assume AC driving surface.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; RD 833 Crossing #112; Plates 4.7 and 5.26, No. 44	Extend existing box culverts to limit of canal improvements. East side only (west toe of canal will not be relocated).	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Gerst Lateral Headgate; Plates 4.7 and 5.27, No. 45	Extend culvert to west, and add wing walls on upstream end as required to transition back to proposed canal slope.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; West Liberty Road Bridge; Plates 4.8 and 5.28, No. 46	Replace bridge with new cast-in-place prism shaped box culvert.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; RD 833 Crossing #157; Plates 4.8 and 5.28, No. 47	Replace existing pipe culverts and spill.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Check #158; Plates 4.8 and 5.28, No. 48	Replace control structure with new 45 ft long crested weir and two 4.0-ft Wx8.6-ft H overshot gates.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Farm Crossing #172; Plates 4.8 and 5.28, No. 49	Replace with precast bridge deck and pile foundations.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Traynor; Check #186; Plates 4.8 and 5.29, No. 50	Replace control structure with new 40 ft long crested weir and two 4.0-ft Wx8.3-ft H overshot gates	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00



## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Cassady; Cassady Headgate and Crossing; Plates 4.8 and 5.29, No. 51	Replace with similar headgate structure and pipe culvert crossing.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Farm Crossing #028; Plates 4.9 and 5.30, No. 52	Replace with precast bridge deck and pile foundations.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Farm Crossing #039; Plates 4.9 and 5.30, No. 53	Replace with precast bridge deck and pile foundations.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Check #041; Plates 4.9 and 5.30, No. 54	Replace with new control structure.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Peterson's Check; Plates 4.9 and 5.31, No. 55	Replace with new control structure.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Farm Crossing #075; Plates 4.9 and 5.31, No. 56	Replace with precast bridge deck and pile foundations.	Marginal to suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Farm Crossing #084 (Bonslett Driveway); Plates 4.9 and 5.31, No. 57	Replace with precast bridge deck and pile foundations.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Check #084 (Bonslett Weir); Plates 4.9 and 5.31, No. 58	Replace with new control structure.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Check and Crossing #104; Plates 4.9 and 5.32, No. 59	Replace with similar combined control structure and crossing.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Cassady; Check #122; Plates 4.9 and 5.33, No. 60	Replace with new control structure.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Check #127; Plates 4.9 and 5.33, No. 61	Replace with new control structure.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Check #129; Plates 4.9 and 5.33, No. 62	Replace with new control structure.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Check #143; Plates 4.6 and 5.33, No. 63	Replace with new control structure.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Cassady; Evans Reimer Road Bridge; Plates 4.6 and 5.35, No. 64	Replace bridge with clear span bridge with aggregate base backfill driving surface.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Rising River; Farm Crossing #222; Plates 4.9 and 5.36, No.65	Replace with precast bridge deck and pile foundations.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Rising River; Check #235; Plates 4.9 and 5.36, No. 66	Replace control structure with new 19 ft long crested weir with two 2ft W x 5ft H overshot gates.	Marginal aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Rising River; Foot Bridge #258; Plates 4.9 and 5.37, No. 67	Replace with new fabricated steel catwalk.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00
Rising River; Check #262; Plates 4.9 and 5.37, No. 68	Construct new control structure with 35 ft long crested weir and two 4.0-ft Wx5.4-ft H overshot gates.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX I: MINOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Structure Description and Location (Plate and Structure Number)	Modification Description	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Rising River; W. Evans Reimer Road Bridge; Plates 4.9 and 5.37, No. 69	Replace with bridge having 1-ft-thick center pier, 2-ft-thick slab with 7-ft opening to canal base. Bridge deck should have 2-3/8-inch thick AC road surface.	Suitable aquatic and upland	0.01 / 0.00	-0.03 / 0.00

## APPENDIX J: MAJOR MODIFICATIONS - DESCRIPTION, HABITAT SUITABILITY, AND QUANTIFICATION OF IMPACTS

Segment Location (Station End Points and Plate Numbers)	Length (Feet)	Right Bank	Left Bank	Existing Habitat for Giant Garter Snake	Maximum Acreage Permanent Impact Upland/Aquatic	Maximum Acreage Temporary Impact Upland/Aquatic
Upper Belding; 9+00 to 103+00; Plates 4.1 to 4.2, and 5.1 to 5.4.	9,300			Suitable aquatic and upland	+0.34 / -1.57	-1.01 / -0.96
Upper Belding; 110+00 to 118+00; Plates 4.2, and 5.4 to 5.5	800	X		Suitable aquatic and upland	+0.05 / -0.54	-0.16 / -0.21
Upper Belding; 118+00 to 140+00 (Garcia Check); Plates 4.2 and 5.5	2,200		X	Suitable aquatic and upland	+0.10 / 0.00	-0.30 / 0.00
Upper Belding; 140+00 to 148+00; Plates 4.2, and 5.5 to 5.6	800		X	Suitable aquatic and upland	+0.04 / -0.13	-0.11 / -0.15
Upper Belding; 148+00 to 157+00; Plates 4.2 and 5.6	900		X	Suitable aquatic and upland	+0.04 / -0.15	-0.12 / -0.17
Upper Belding; 157+00 to 173+00; Plates 4.2 and 5.6	1,600		X	Suitable aquatic and upland	+0.05 / -0.22	-0.15 / -0.20
Upper Belding; 173+00 to 197+00; Plates 4.2 to 4.3, and 5.6 to 5.7	2,400		X	Suitable aquatic and upland	+0.11 / -0.42	-0.34 / -0.45
Upper Belding; 197+00 to 222+00 (Fields Flume); Plates 4.3, and 5.7 to 5.8	2,500	X		Suitable aquatic and upland	+0.11 / -0.90	-0.32 / -0.43
Upper Belding; 224+00 to 253+00; Plates 4.3, and 5.8 to 5.9	2,900	X		Suitable aquatic and upland; snakes observed in 2011	+0.11 / -0.99	-0.36 / -0.44