

SUPPLEMENT TO STANDARD
OPERATION AND MAINTENANCE
MANUAL

SACRAMENTO RIVER
FLOOD CONTROL PROJECT

UNIT NO. 132
BACK LEVEES OF
RECLAMATION DISTRICT NO. 108



U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

CORPS OF ENGINEERS
U. S. ARMY

SUPPLEMENT TO STANDARD
OPERATION AND MAINTENANCE MANUAL
SACRAMENTO RIVER FLOOD CONTROL PROJECT

UNIT NO. 132
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Sacramento District
Corps of Engineers
U. S. Army
October 1959

**SUPPLEMENT TO STANDARD
OPERATION AND MAINTENANCE MANUAL
SACRAMENTO RIVER FLOOD CONTROL PROJECT**

UNIT NO. 132
BACK LEVEES OF RECLAMATION DISTRICT NO. 108

LOCATION	ADDITION OR REVISION	DATE
1-04	Add subparagraph d.	Jan 1985
Section II, page 6	Add paragraph 2-05	Jan 1985
Exhibit B	Add drawing no. 50-4-5595	Jan 1985
Exhibit F	Add copy of letter of transfer dated 19 Jun 1984 and 18 Oct 1984	Jan 1985
1-04 e.	Add subparagraph e.	Sep 1990
Exhibit B	Add drawing no. 50-4-5798	Sep 1990
Exhibit F	Added transfer letters dated 22 Nov 1989	Sep 1990
Exhibit F	Add copy of letter of transfer letter dated 23 Apr 2001	15 Apr 2010
Exhibit F	Add copy of letter of transfer letter dated 20 Jul 2001	15 Apr 2010
Section 1-04	Add subparagraph f	15 Apr 2010
Exhibit F	Add copy of letter of transfer dated 8 Dec 1951	22 Dec 2010
Exhibit F	Add copy of letter of acceptance dated 18 Dec 1951	22 Dec 2010
Exhibit F	Add copy of letter of acceptance dated 26 Jan 1959	22 Dec 2010
Exhibit F	Add copy of letter of transfer dated 16 Sep 1959	22 Dec 2010
1-04	Add subparagraph g	22 Dec 2010
Exhibit B	Add drawing no. 50-4-5568	22 Dec 2010
Exhibit F	Add copy of letter of transfer dated 6 Jan 1981	22 Dec 2010
1-04	Add subparagraph h	22 Dec 2010
Exhibit F	Add copy of letter of transfer dated 3 Feb 1987	22 Dec 2010
Exhibit B	Add drawing regarding specification no. 9893E	22 Dec 2010
Exhibit F	Add copy of letter of acceptance dated 27 Mar 1990	8 Mar 2011

Unit 132
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* January 1985

EXHIBITS

<u>Exhibit</u>	<u>Description</u>
A	Flood Control Regulations Unattached (Contained in Standard Manual)
A-1	Location Map 1 Sheet
B	"As Constructed" Drawings Unattached
C	Plates of Suggested Flood Fighting Methods. Unattached (Contained in Standard Manual)
D	Check List No. 1 - Levee Inspection Report. Unattached (Contained in Standard Manual)
E	Check Lists - Levees, Channel and Structures. Sheets 1 thru 8
F	Transfer to the State Reclamation Board Sheets 1 thru 5
G	Suggested Semi-Annual Report Form Sheets 1 & 2

**SUPPLEMENT TO STANDARD
OPERATION AND MAINTENANCE MANUAL
SACRAMENTO RIVER FLOOD CONTROL PROJECT**

**UNIT NO. 132
BACK LEVEES OF
RECLAMATION DISTRICT NO. 108**

SECTION I

1-01. Location. The improvement covered by this manual is that part of the Sacramento River Flood Control Project that is located in Yolo and Colusa Counties on the left bank of the Colusa Trough Drainage Canal and westerly of the Sacramento River in the general area between the towns of Knights Landing and Colusa. Reclamation District Nos. 787, 108, 479 and an unorganized area lie adjacent to and easterly from the levee within this unit. The location of the completed unit covered by this manual is shown on Exhibit A-1 and drawings of Exhibit B.

1-02. Project Works. The flood control improvement covered by this manual is a part of the Sacramento River Flood Control Project authorized by the Flood Control Act of 1917, as modified by the Acts of 1928, 1937 and 1941, and consists of the easterly levee of the Colusa Trough Drainage Canal that extends from the Knights Landing Outfall Gates upstream to high ground near Colusa, a distance of about 36.2 miles.

1-03. Protection Provided. The levee of this unit provides direct protection to about 100,000 acres of adjacent developed agricultural lands against flood waters in the Colusa Basin. There are only a few scattered buildings and residences in the area protected. The grade of the adopted flood plane profile within this unit varies from elevation 40.6 at Knights Landing to elevation 50.5 at the upper and near Colusa (elevations are referred to U.S. Corps of Engineers datum). The authorized project flow in Knights Landing Ridge Cut at the lower end of the completed project levee, which diverts the flood flow from the Colusa Trough Drainage Canal to the Yolo Bypass is 20,000 cubic feet per second. The levee provides for a freeboard of at least 3 feet above the adopted flood plane profile within this unit.

1-04. Construction Data and Contractor. Construction necessary to build new levees and to bring locally built levees of this unit to project standards was accomplished under the following contracts:

a. Levee construction along the back levee of Reclamation District No. 108 between Knights Landing and the S.P.R.R. Bridge near College City was accomplished under Contract No. DA-04-167-CIVENG-56-35 by H. Earl Parker, Inc., Contractor, during the period from 17 April 1956 to 16 July 1956.

- b. Levee construction, Back Levees of R.D. No. 108 in Colusa County, California was accomplished under Contract No. DA-04-167-CIVENG-58-62 by Elmer G. Wendt, Contractor, during the period from 5 May 1958 to 17 December 1958.
- c. Emergency levee repairs, Back Levee of R.D. 108, in Colusa and Yolo Counties, California was accomplished under Contract No. DA-04-CIVENG-59-128 by P. H. Vincilione, Inc., Contractor, during the period from 7 May 1959 to 10 August 1959.
- d. Emergency repairs to project levees on the Colusa Basin drain – Reclamation District 108 were accomplished under Contract No. DACW05-84-C-0037 by Wayne Grist, Inc. Specification No. 6874 Drawing No. 50-4-5595.
- e. Bank Sloping, stone protection and select clearing on the left bank of the Colusa Basin Drain at Site Mile 8.5 (a portion of Contract 43) was accomplished on 14 November 1989. Specification No. 8367, Drawing No. 50-4-5798.
- f. Levee construction, West Bank of Sacramento River and Colusa Basin Drain Back Levee in Reclamation District 108, California was accomplished under Contract No. DACW05-97-C-0134, Specification No. 9893E, completed on November 31, 1997.
- g. Emergency repairs to the project levee consisting of reconstruction of 3050 feet of levee at two sites along the left bank of the Colusa Trough Drainage Canal was completed on 25 November 1980 under Contract No. DACW05-81-C-0014. Drawing No. 50-4-5568, Specification No. 6001.
- h. Emergency repairs, left bank of the Colusa Basin Drain in Reclamation District 108, and left and right banks of the Knights Landing Ridge Cut was completed on 2 December 1986 under Contract No. DACW05-86-C-0017. Drawing No. 50-25-5772.

1-05. Flood Flows. For purposes of this manual, the term “flood” or “high water” shall refer to flows when the water surface in the Colusa Trough Drainage Canal reaches or exceeds the reading of 30.0 on the State Department of Water Resources continuous water stage recorder and staff gage (set on U.S. Corps of Engineers datum) located on the left abutment of the Knights Landing Outfall Gates one-quarter mile west of the Sacramento River. An automatic short wave radio water stage broadcaster is maintained at this station. Flood stage is also defined as 30.0 on the State Department of Water Resources continuous water stage recorder and staff gage (U.S. Corps of Engineers datum) located on the Colusa Trough Drainage Canal at the Tule Road near College City.

1-06. Assurances Provided by Local Interests. Assurances of cooperation by local interests is provided by State legislation as contained in Chapter 3, Part 2, Division 5 of the State Water Code. (See paragraph 2-02a of the Standard Manual).

1-07. Transfer to the State Reclamation Board. Responsibility for the maintenance and operation of this unit was officially transferred to the Reclamation Board of the State of California on 7 September 1956, 15 December 1958, and 29 April 1959, as shown on the attached letters of transfer, EXHIBIT F.

1-08. Superintendent. The name and address of the Superintendent appointed by local interests to be responsible for the continuous inspection, operation and maintenance of the project works, shall be furnished the District Engineer, and in case of any change of Superintendent, the District Engineer shall be so notified.

SECTION II

FEATURES OF THE PROJECT SUBJECT TO FLOOD CONTROL REGULATIONS

2-01. Levee.

a. Description. The levee for this unit is located as described in paragraphs 1-01 and 1-03 and extends for a total distance along the crown of about 36.2 miles. The levee has been constructed with slopes of 1 on 3 waterside and 1 on 2 landside with a crown width of 20 feet. Construction also included 4 inches of gravel road surfacing 12 feet wide on top of the levee. The necessary drainage structures, road approaches and appurtenances were also included in the work. For more complete detail in construction of the above-mentioned levee, refer to the "As Constructed" drawings of EXHIBIT B.

b. For pertinent Requirements of the Code of Federal Regulations and other requirements see the following:

- (1) Maintenance - paragraph 4-02 of the Standard Manual.
- (2) Check Lists - Exhibit E of this Supplement Manual.
- (3) Operation - paragraph 4-04 of the Standard Manual.
- (4) Special Instructions - paragraph 4-05 of the Standard Manual.

2-02. Drainage and Irrigation Structures.

a. Description. Drainage and irrigation structures which extend through the levee are listed as follows:

See drawings of Exhibit B for other details.

Levee Mileage	Size and Kind of Pipe	Other Description	Elev. of Invert at Pipe
<u>R. D. No. 787</u>			
0.04	36" Concr.	Pumphouse W.S.	31.0
<u>R. D. No. 108</u>			
0.08	5-6'x8'	Concrete culvert drains	17.0
16.03	42" Concr.	3 pumps W.S.	18.0
18.55	24" C.M.P.		27.1
18.55	18" C.M.P.		27.4
20.49	60" C.M.P.	Riser unit W. S.	25.0

Drainage and Irrigation Structures (Cont'd)

Levee Mileage	Size and Kind of Pipe	Other Description	Elev. of Invert at Pipe
<u>Maintenance Area (R. D. No. 479 and Davis Levee)</u>			
0.22	14" Steel	Standpipe L. S.	44.0
0.49	24" C.M.P.		34.2
1.40	24" C.M.P.		35.2
1.53	18" Steel	Pump W.S.	46.2
1.72	24" C.M.P.		36.0
1.80	48" C.M.P.	Riser unit W. S.	30.0
2.02	24" C.M.P.		36.0
2.19	60" C.M.P.	Riser unit W. S.	28.0
3.22	24" C.M.P.		36.7
3.78	48" C.M.P.	Riser unit W. S.	28.0
4.25	36" C.M.P.		37.0
4.32	24" C.M.P.		43.8
4.87	36" C.M.P.		34.0
5.12	48" C.M.P.		36.0
6.04	48" C.M.P.		33.0
6.10	48" C.M.P.		33.0
6.13	3-18" Steel	Pumphouse L. S.	50.3
7.76	24" Steel		50.5
9.24	18" Steel	Pump L. S.	49.2
9.24	36" C.M.P.	Pump L. S.	37.5
9.25	24" Steel		50.5
9.33	36" C.M.P.		38.0
11.17	24" C.M.P.	Riser unit W. S.	45.6

Note on abbreviations:

C.M.P. = Corrugated Metal Pipe
L. S. = Landside
W. S. = Waterside
Concr. = Concrete

b. For pertinent Requirements of the Code of Federal Regulations and other requirements see the following:

- (1) Maintenance - Paragraph 5-02 of the Standard Manual.
- (2) Check Lists - Exhibit E of this Supplement Manual.
- (3) Operation - Paragraph 5-04 of the Standard Manual.
- (4) Additional Requirements - Paragraph 5-05 of the Standard Manual.

(5) Safety Requirements - Paragraph 5-06 of the Standard Manual.

2-03. Channel.

a. Description. The channel of the Colusa Trough Drainage Canal is confined by a levee only on the easterly side. With exception of a reach of about 3 miles on the upper end, the low water channel lies adjacent and parallel to the levee. The low water channel along a reach of about 6,450 feet in the vicinity of the Prize Bridge (3,250 feet downstream and 3,200 feet upstream) was widened about 100 feet to increase the flowage area. No other channel improvement or clearing was provided except that incidental to obtaining borrow for construction of the levee. The project design capacity of the channel is 20,000 cubic feet per second.

b. For pertinent Requirements of the Code of Federal Regulations and other requirements see the following:

- (1) Maintenance - Paragraph 6-02 of the Standard Manual.
- (2) Check Lists - Exhibit E of this Supplement Manual.
- (3) Operation - Paragraph 6-04 of the Standard Manual.
- (4) Safety Requirements - Paragraph 6-05 of the Standard Manual.

It shall be the duty of the Superintendent to maintain a patrol of the project works during all periods of flood flow in excess of a reading of 30.0 on the gage at Knights Landing Outfall Gates and a reading 30.0 on the gage at Tule Road near College City, as indicated in paragraph 1-05 of this manual. The Superintendent shall dispatch a message by the most suitable means to the District Engineer whenever the water surface at the Outfall Gates reaches the gage reading indicated above. The Superintendent shall cause readings to be taken at intervals of two to four hours during the period when the water surface is above the flood-flow stage and record the time of the observations. One copy of the readings shall be forwarded to the District Engineer immediately following the flood, and a second copy transmitted as an inclosure to the semi-annual report in compliance with paragraph 3-05 of the Standard Manual.

2-04. Miscellaneous Facilities.

a. Description. Miscellaneous structures or facilities which were constructed as a part of, or existed in conjunction with, the protective works, and which might affect their functioning, include the following:

(1) Bridges.

- (a) Timber bridge at station 163+29.
- (b) Timber bridge at station 827+88.
- (c) Timber bridge at station 1012+45.
- (d) Hillgate Road bridge at station 1233+37.
- (e) Southern Pacific Railroad bridge at station

1284+07.

- (f) Prize Bridge (Hahn Road) at station 1422+36.

(2) Utility Relocations. None.

(3) Hydrologic Facilities.

(a) State Department of Water Resources gage on left bank of the Knights Landing Outfall Gates.

(b) State Department of Water Resources gage on the Tule Road near College City.

b. For pertinent Requirements of the Code of Federal Regulations and other requirements see the following:

- (1) Maintenance - Paragraph 7-02 of the Standard Manual.
- (2) Check Lists - Paragraph 7-03 of the Standard Manual.
- (3) Operation - Paragraph 7-04 of the Standard Manual.

For location of stations referred to above see the drawings of Exhibit B.

* 2-05. Environment Protection.

a. Vegetation preserved as a part of selective clearing on the waterside berm or slope above the bank protection during prosecution of the contract shall not be removed as a part of normal maintenance. * Dead trees with wildlife value will be retained except where they constitute a hazard to existing flood control works. * JAN 1985

SECTION III

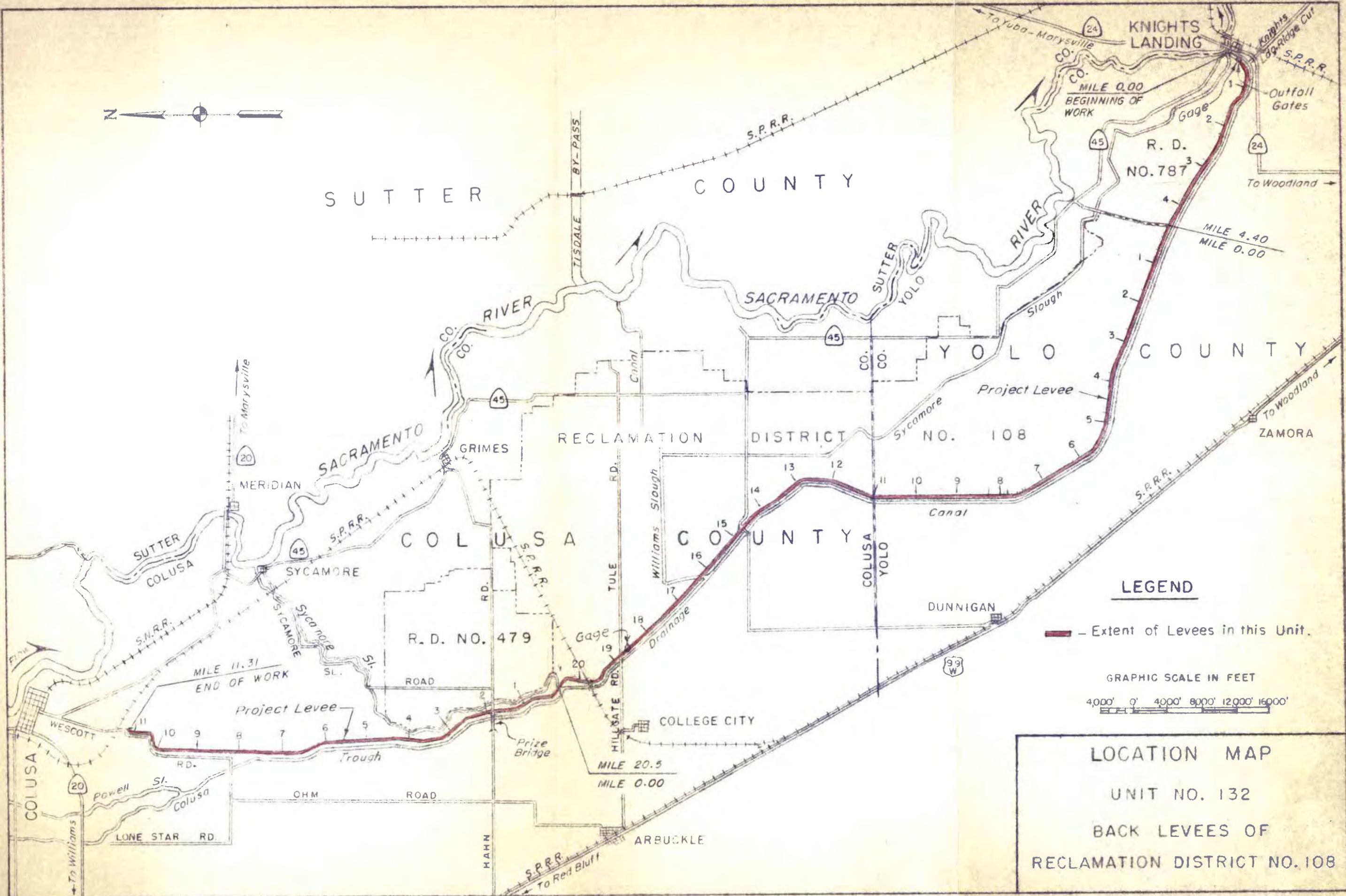
REPAIR OF DAMAGE TO PROJECT WORKS AND METHODS OF COMBATING FLOOD CONDITIONS

3-01. Repair of Damage. In the event of serious damage to the project works, whether due to flood conditions or other causes, and which may be beyond the capability of local interests to repair, the Superintendent will contact a representative of the Department of Water Resources, State of California who coordinates maintenance of project works of the Sacramento River Flood Control Project. The State representative will give assistance or advice, or will determine appropriate action to be taken.

3-02. Applicable Methods of Combating Floods. For applicable methods of combating flood conditions, reference is made to Section VIII of the Standard Manual and Maintenance Manual, revised May 1955, where the subject is fully covered.

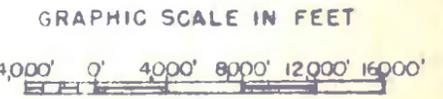
EXHIBIT A

FLOOD CONTROL REGULATIONS
(See Standard Manual)



LEGEND

— Extent of Levees in this Unit.



LOCATION MAP
UNIT NO. 132
BACK LEVELS OF
RECLAMATION DISTRICT NO. 108
EXHIBIT A-1

EXHIBIT B

“AS CONSTRUCTED”
DRAWINGS

See separate folder for the following drawings:

<u>Drawing No.</u>	<u>Title</u>
50-4-3073	Back Levee of R.D. No. 108 between Knights Landing and S.P.R.R. Bridge, in 29 sheets.
50-4-3081	Back Levee of R.D. No. 108 S.P.R.R. Bridge to High Ground, in 20 sheets.
50-4-3532	Emergency Levee Repair, Back Levee of R.D. No. 108, Yolo County, in 12 sheets.
50-4-5595	Emergency Levee Repairs, Colusa Basin Drain, RD 108, and Sutter Bypass, RD 1500, in 2 sheets.
50-4-5798	Bank Protection, Contract 43, Right and Left Banks Feather River, Colusa Basin Drain, Yolo and Sutter By-pass, in 35 sheets.
50-4-5568	Emergency Levee Repair, Colusa Trough Drainage Canal.
No Number	R.D. 108, West Bank Sacramento River, River Mile 48.12 – 48.30, and Colusa Basin Drain “Back Levee”, L.M. 9.10 – 9.12. Spec. No. 9893E, in 12 sheets.

EXHIBIT C

PLATES OF SUGGESTED FLOOD FIGHTING METHODS
(See Standard Manual)

EXHIBIT C
Unattached

EXHIBIT D

CHECK LIST NO. 1
LEVEE INSPECTION REPORT
(See Standard Manual)

EXHIBIT D
Unattached

EXHIBIT E

CHECK LISTS OF LEVEES,
CHANNELS AND STRUCTURES

For definition of "flood" or "high water period,"
see paragraph 1-05 of this manual

CHECK LIST NO. 2
UNIT NO. 132

Inspector's Report Sheet No. _____

Inspector _____

Date _____

Superintendent _____

Item	:	Remarks
(a) Location	:	
(b) Settlement, sloughing, or loss of grade	:	
(c) Erosion of both levee slopes	:	
(d) Condition of roadways, including ramps	:	
(e) Evidence of seepage	:	
(f) Condition of farm gates and fencing	:	
(g) Maintenance measures taken since last inspection	:	
(h) Comments	:	

INSTRUCTIONS FOR COMPLETING SHEET 2, EXHIBIT E
(To be printed on back of sheet 2)

- Item (a) Indicate levee station of observation, obtained by pacing from nearest reference point; indicate right or left bank.
- Item (b) If sufficient settlement of earthwork has taken place to be noticeable by visual observation, indicate amount of settlement in tenths of a foot. If sloughing has caused a change in slope of the embankment sections, determine the new slope. Note areas where erosion or gullyng of the section has occurred.
- Item (c) If sufficient erosion or gullyng of bank face of back toe of levee has taken place to be noticeable by visual inspection, indicate area affected and depth.
- Item (d) Note any natural change in any section of roadway or ramps. Indicate any inadequacy in surface drainage system.
- Item (e) Indicate any evidence of seepage through the embankment section.
- Item (f) Indicate the serviceability of all farm gates across the embankments and roadway, and indicate if repainting is required.
- Item (g) Indicate maintenance measures that have been performed since last inspection and their condition at the time of this inspection.
- Item (h) Record opinion, if any, of contributory causes for conditions observed and also any observations not covered under other columns.

NOTE: One copy of the Inspector's Report is to be mailed to the District Engineer immediately on completion, and one copy is to be attached to and submitted with the Superintendent's semi-annual report.

CHECK LIST NO. 3

CHANNEL AND RIGHT-OF-WAY
UNIT NO. 132

Inspector's Report Sheet No. _____

Inspector _____

Date _____

Superintendent _____

Item	Remarks
(a) Name of channel and location by stations	
(b) Vegetal growth in channel	
(c) Debris and refuse in channel	
(d) New construction with right-of-way	
(e) Extent of aggradation or degradation	
(f) Condition of riprapped section	
(g) Condition of bridges	
(h) Measures taken since last inspection	
(i) Comments	

INSTRUCTIONS FOR COMPLETING SHEET 4, EXHIBIT E
(To be printed on back of sheet 4)

- Item (a) Indicate station of observation obtained by pacing from nearest reference point.
- Item (b) Note nature, extent, and size of vegetal growth within the limits of flood flow channel.
- Item (c) Note nature and extent of debris and refuse that might cause clogging of the conduits of the irrigation intake works, fouling of the tainter gates, or the bridges over the channel.
- Item (d) Report any construction along the diversion channel or above the diversion works that has come to the attention of the inspector and that might affect the functioning of the project.
- Item (e) Indicate any change in grade or alignment of the channels, either by deposition or sediment or scour, that is noticeable by visual inspection. Estimate amount and extent.
- Item (f) Indicate any change that has taken place in the riprap such as disintegration of the rock, erosion, or movement of the rock. Note the presence of vegetal growth through the riprap.
- Item (g) Note any damage or settlement of the footings of the bridges. Indicate condition of wooden structures and if repainting is required. Indicate condition of bridge approaches, headwalls, and other appurtenances.
- Item (h) Indicate maintenance measures that have been performed since the last inspection and their condition at time of this inspection.
- Item (i) Record opinion, if any, of contributory causes for conditions observed, also any observations not covered under other columns.

NOTE: One copy of the Inspector's Report is to be mailed to the District Engineer immediately on completion, and one copy is to be attached to and submitted with the Superintendent's semi-annual report.

CHECK LIST NO. 4

DRAINAGE AND IRRIGATION STRUCTURES

UNIT NO. 132

Inspector's Report Sheet No. _____

Inspector _____

Date _____

Superintendent _____

(a) Location by levee mileage	(b) Bank	(c) Debris or other obstruction to flow	(d) Damage or settlement of pipe or conduit	(e) Condition of concrete headwall or invert paving	(f) Condition of right-of-way adjacent to structure	(g) Repair Measures Taken since last inspection	(h) Comments
3.78	Left						
4.25	"						
4.32	"						
4.87	"						
5.12	"						
6.04	"						
6.10	"						
6.13	"						
7.76	"						
9.24	"						
9.24	"						
9.25	"						
9.33	"						
11.17	"						

Maintenance Area (Cont'd)

INSTRUCTIONS FOR COMPLETING SHEET 6 and 7, EXHIBIT E
(To be printed on back of Sheet 6 and 7)

- (1) Enter station of all structures under Column (a) for check list.
- (2) Inspect inlet, barrel, and outlet for accumulation of sediment, rubbish, and vegetal matter. Note condition under Column (c).
- (3) If any settlement or damage to the pipe, barrel, or invert of the drain has occurred, estimate the location and amount. Note particularly if any backfill has come into the pipe or been disturbed. Record observations under Column (d).
- (4) Inspect the concrete portions of the structures for evidence of settlement, cracks, "pop-outs", spaces, abrasive wear, or other deterioration. Record conditions under Column (e).
- (5) Inspect backfill area adjacent to structure for evidence of erosion caused by over flow of the drainage structure and note conditions in Column (f).
- (6) Under Column (g) indicate physical measures that have been taken to correct conditions reported in last inspection, and their condition at time of this inspection.
- (7) Under Column (h) record opinion, if any, of contributory causes for conditions observed, also any observations not covered under other columns.
- (8) A copy of the inspector's report is to be mailed to the District Engineer immediately on completion, and a record copy shall be attached to the Superintendent's semi-annual report.

EXHIBIT F

LETTERS OF TRANSFER TO
THE STATE RECLAMATION BOARD

EXHIBIT F

C
O
P
Y

C
O
P
Y

SPKKO-P 824.3 (Sac. Riv. F.O.P.)

7 September 1956

The Reclamation Board
State of California
1215 "O" Street
Sacramento, California

Gentlemen:

Reference is made to the District Engineer's letter dated 5 June 1956, suggesting a joint inspection of certain levee units of the Sacramento River Flood Control Project, for the purpose of transferring them, when completed, to the jurisdiction of the State of California for operation and maintenance. Reference is also made to the joint inspection of said units made on 12 June 1956.

The levee units referred to above are described as follows:

<u>Unit No.</u>	<u>Location and Description Referred to Dwg. No. 50-4-3073</u>
485	Levee Construction, Back Levee of Reclamation District No. 787, Sta. 0+00 to 121+34.8
486	Levee Construction, Back levee of Reclamation District No. 108, Sta. 234+00 to 1262+30

The units of work, Nos. 485 and 486 described above, were completed on 16 July 1956, under Contract No. DA-04-167-eng-56-35, Specification No. 1974 and Drawing No. 50-4-3073, and now meets the requirements of the Sacramento River Flood Control Project. Therefore, said units Nos. 485 and 486 together with the waterway banks contiguous thereto, are hereby transferred to the State of California for operation and maintenance.

EXHIBIT F
Sheet 1 of 5

C
O
P
Y

C
O
P
Y

SPKKO-P 824.3 (Sac. Riv. F.O.P.)
The Reclamation Board

The maintenance work required under the provisions of the Sacramento River Flood Control Project shall be performed in accordance with existing Flood Control Regulations, inclosed herewith, which have been prescribed by the Secretary of the Army pursuant to Section 3 of the Act of Congress, approved 22 June 1936, as amended and supplemented by the current issue of the Standard Operation and Maintenance Manual for the Sacramento River Flood Control Project. As provided under Paragraph 208.10 (10) of these regulations, a supplement to the Standard Operation and Maintenance Manual covering these units of work is in process of preparation and will be furnished to you upon completion.

A copy of this letter is being transmitted to the Department of Water Resources.

C
O
P
Y

C
O
P
Y

SPKKO-P 824.3 (Sac Riv FOP)

15 December 1958

The Reclamation Board
State of California
1215 "O" Street
Sacramento, California

Gentlemen:

Reference is made to the joint inspection made on 13 November 1958 of a certain levee unit pertaining to the Sacramento River Flood Control Project for the purpose of transferring it to the jurisdiction of the State of California for operation and maintenance.

The required work, consisting of construction of the levee unit referred to above was completed 10 December 1958 in accordance with Specification No. 2008, Contract No. DA-04-167-CIVENG-58-62 and Drawing No. 50-4-3081.

The levee unit referred to above, designated as Unit No. 630, is described as the Back Levee, R.D. No. 108, S.P.R.R. Bridge to High Ground, and extends for a distance of approximately 12.5 miles.

The unit of work, No. 630, described above now meets the requirements of the Sacramento River Flood Control Project. Therefore, said unit No. 630 together with the waterway banks contiguous thereto, is hereby transferred to the State of California for operation and maintenance.

The maintenance work required under the provisions of the Sacramento River Flood Control Project shall be performed in accordance with existing Flood Control Regulations, inclosed herewith, which have been prescribed by the Secretary of the Army pursuant to Section 3 of the Act of Congress, approved 22 June 1936, as amended and supplemented by the current issue of the Standard Operation and Maintenance Manual for the Sacramento River Flood Control Project. As provided under Paragraph 208.10 (10) of these regulations, a supplement to the Standard Operation and Maintenance Manual covering these units of work will be furnished to you upon completion.

C
O
P
Y

C
O
P
Y

SPKKO-P 824.3 (Sac Riv FOP)
The Reclamation Board

A copy of this letter is being transmitted to the Department of
Water Resources.

C
O
P
Y

C
O
P
Y

SPKKO-P

29 April 1959

The Reclamation Board
State of California
1215 "O" Street
Sacramento 14, California

Gentlemen:

Reference is made to the District Engineer's letter dated 7 September 1956 transferring Levee Units Nos. 485 and 486, located on the Colusa Basin Drainage Canal, to the State of California for operation and Maintenance.

The levee unit, between those above mentioned, extending from Sta. 121+34.8 to Sta. 234+00 where no work was done under Contract No. DA-04-167-eng-56-35 was not included in the transfer.

This unit, together with the waterway banks contiguous thereto, designated No. 640, meeting the requirements of the Sacramento River Flood Control Project is hereby transferred to the State of California for operation and maintenance.

The maintenance work required under the provisions of the Sacramento River Flood Control Project shall be performed in accordance with existing Flood Control Regulations, inclosed herewith, which have been prescribed by the Secretary of the Army pursuant to Section 3 of the Act of Congress, approved 22 June 1936, as amended and supplemented by the current issue of the Standard Operation and Maintenance Manual for the Sacramento River Flood Control Project. As provided under Paragraph 208.10 (10) of these regulations, a supplement to the Standard Operation and Maintenance Manual covering these units of work is in process of preparation and will be furnished to you upon completion.

A copy of this letter is being transmitted to the Department of Water Resources.

REGISTERED MAIL
Receipt Receipt
Requested

Letter No. 12

12

SPKKA 824,3(Sac. Riv. F.C.P.)

8 DEC 1951

The Reclamation Board
State of California
1100 "O" Street
Sacramento 16, California

Gentlemen:

Reference is made to your letter of 22 June 1951 acknowledging that certain reaches of the levees of the Sacramento River Flood Control Project and the waterway bank contiguous to said levee reaches meet the requirements of the project as authorized prior to the Flood Control Act of 1944.

The levee reaches in question are located as follows:

140. a. Northerly levee of the American River from Jibboom Street Bridge to Sacramento River. 118.2 (?)

b. Easterly levee of the Sacramento River.

Reach 15 141. (1) American River to Natones Out. 60.25 to 79.0 124

Reach No. 11 142. (2) At Moulton Weir. (man 2) 154

143. (3) Mile 158.5 (North End Moulton Weir) to Mile 164.4 (Princeton Ferry). (man 2) ? 134

144. (4) Mile 168.5 to Mile 168.9 (at Dutch City). (man 2) ? 138

c. Westerly levee of the Sacramento River.

145. (1) Mile 59.9 to Mile 60.75. 116

146. (2) Mile 61.8 to Mile 62.65 (at Drye Bend) 116

62.65

Accepted by letter dated 9 March 1953

Letter 12 Items 140 to 198

12

SPKRA 024,5 (Sac. Riv. F.C.P.)
The Reclamation Board

Letter No. 12

12

c. Westerly levee of the Sacramento River, (cont'd)

- ✓ 147. (8) Mile 62.65 to Mile 63.1 (South End Sacramento Weir). 116
- ✓ 148. (4) At Sacramento Weir. 158
- ✓ 149. (5) Mile 63.5 (North End Sacramento Weir) to Mile 67.11. 122
- ✓ 150. (6) Mile 68.42 to Mile 70.9. 122
- ✓ 151. (7) Mile 76.5 to Mile 81.7 (East End Fremont Weir). 123
- ✓ 152. (8) Along Fremont Weir. 157
- ✓ 153. (9) Mile 84.0 (West End Fremont Weir) to Mile 85.3. 128
- ✓ 154. (10) Mile 85.5 to Mile 85.9. 128
- ✓ 155. (11) Mile 87.6 to Mile 88.4. 128
- ✓ 156. (12) Mile 89.2 to Mile 89.8 (Knights Landing Highway Bridge). 128
- ✓ 157. (13) Mile ^{89.2}89.8 (Knights Landing Highway Bridge) to Sycamore Slough. 89.9 128
- ✓ 158. (14) Mile ^{100.6}100.6 to Mile 101.4. 128
- ✓ 159. (15) Mile 110.9 to Mile 111.2. 128

Reach No. 5

Reach No. 4

d. Westerly levee of the Feather River.

- Reach 39 ✓ 160. (1) Sutter Bypass to Nicolaus Bridge. 143
- ✓ 161. (2) From a point 3.31 miles northerly from Nicolaus Bridge to the Fifth Street Bridge between Marysville and Yuba City. 143, 144
- Reach 38 ✓ 162. (3) From a point 1,400 feet northerly from the Fifth Street Bridge between Marysville and Yuba City to Station 774+00 "Y.C.N.B." Traverse. 144
- ✓ 163. (4) From a point east of Station 1188+00 "Y.C.N.B." Traverse to high ground just northerly from the Western Canal Headgate. 144

- Reach 42 ✓ 164. a. Easterly levee of the Sacramento River from Natomas Cut to Feather River. 141.1

12

Letter No. 12

12

f. Easterly levee of the Feather River.

- Reach 42 ✓ 165. (1) Sacramento River to a point 2.37 miles southerly from Nicolaus Bridge. 141 Pt 1
- Reach 41 ✓ 166. (2) Bear River to Mile 14.4. } 145
- ✓ 167. (3) Mile 14.4 to Mile 14.7.
- ✓ 168. (4) Mile 14.7 to Mile 21.5.
- ✓ 169. (5) Mile 21.5 to Mile 22.75.
- ✓ 170. (6) Mile 22.75 to Mile 26.5 (Point where levee and S.M.R.R. meet). 145

g. Levees protecting the City of Marysville. All 147

- Reach 43 ✓ 171. (1) From the W.P.R.R. at Simerly Slough easterly to the Yuba River.
- ✓ 172. (2) Along the Yuba River from the "D" Street Bridge to the back levee near the Valley Meat Company.

h. Levees protecting Reclamation District No. 10.

- Reach No. 40 ✓ 173. (1) Northerly levee of Simerly Slough from the W.P.R.R. to the S.P.R.R. 151
- ✓ 174. (2) Easterly levee of the Feather River from Simerly Slough to a point 4.3 miles northerly from Simerly Slough. 151

Reach 46 ✓ 175. i. Northerly levee of the Yuba River from the back levee of the City of Marysville to a point 1.3 miles easterly from said back levee. 147

Reach 47 ✓ 176. j. Southerly levee of the Yuba River from Feather River (i.e. S.M.R.R.) easterly to the S.P.R.R. Main Line. 147

45 ✓ 177. k. Northerly levee of Bear River from Feather River easterly to the W. P.R.R. Interceptor. 145

45 ✓ 178. l. Westerly levee of the W.P.R.R. Interceptor and Clark Slough Interceptor (i.e. back levee of Reclamation District No. 784) from Bear River to the southerly end of the Clark Slough Interceptor. 145

12

SPIKA 824.3 (Sac. Riv. P.C.P.)
The Reclamation Board

Letter No. 12

12

m. Southerly levee of the American River.

Reach No. 25 ✓

- ✓ 179. (1) Sixteenth Street Bridge to the S.N.R.R. 118.1
- ✓ 180. (2) From a point 800 feet easterly from the W.P.R.R. to Mayhew Station. 118.1

n. Westerly levee of the Yolo Bypass.

- ✓ 181. (1) Sacramento River to Knights Landing Ridge Cut. 127
- ✓ 182. (2) Knights Landing Ridge Cut to the northeast corner of the Cache Creek Settling Basin. 126
- 28 ✓ 183. (3) S.N.R.R. Woodland Branch to a point 1.6 miles southerly from said railroad. 121
- 28 ✓ 184. (4) From a point 1.6 miles southerly from the S.N.R.R. Woodland Branch to the Willow Slough Pipes. 121
- 28 ✓ 185. (5) From a point 1.48 miles southerly from the Willow Slough Pipes to a point 1.9 miles southerly from said pipes. 121
- 28 ✓ 186. (6) From a point 1.9 miles southerly from the Willow Slough Pipes to the Willow Slough Interceptor. 121
- 28 ✓ 187. (7) From the Willow Slough Interceptor to Highway U.S. 40. 120
- ✓ 24 ✓ 188. (8) From Highway U.S. 40 to Putah Creek. 119

27 ✓ 189 o. Easterly and Westerly training levees of Cache Creek Settling Basin from Cache Creek southerly. 126

28 ✓ 190 p. Northerly and Southerly levees of the Willow Slough Interceptor from the S.P.R.R. to the Yolo Bypass. 120

29 ✓ 191 q. Northerly levee of Putah Creek from Yolo Bypass westerly to high ground. 119

✓ 192 r. Southerly levee of Putah Creek from high ground on Dixon Ridge westerly to high ground. 119

s. Southerly levee of Knights Landing Ridge Cut. 127

- 26 ✓ 193 (1) From Yolo Bypass westerly 600 feet. Also covered under Unit 96-A
- 26 ✓ 194 (2) { From a point 2,500 feet westerly from Yolo Bypass to a point 2,900 feet westerly from Yolo Bypass. 127
Also covered under 96-A

12

SPKKA 824.3(Sac.Riv.F.C.P.)
The Reclamation Board

Letter No. 12

12

s. Southerly levee of Knights Landing Ridge Cut. (cont'd)

- 26 ✓ 195 (S) { From a point 3,300 feet westerly from Yolo Bypass to a point 7,100 feet westerly from Yolo Bypass. 127
Also covered under Unit No. 96-A
- 35 ✓ 196 t. That portion of the back or westerly levee of Hastings Tract which runs east and west along the County Road for a distance of approximately one mile. 107
- ✓ 197 u. Northerly levee of Sycamore Slough from Sacramento River to Knights Landing Outfall Gates. 130
- ✓ 198 v. Southerly levee of Sycamore Slough from Sacramento River to Knights Landing Outfall Gates. 132

The records of this office show that your Board has accepted the levees and/or works covered by Items b.(1), b.(2), b.(3), c.(2), c.(4), c.(8), c.(11), c.(12), c.(14), d.(1), d.(3), d.(4), f.(3), f.(5), g., h., i., l., m., n.(1), n.(2), n.(3), n.(6), n.(7), n.(8), o., p., q., r. and s.(1) above, as complete. Accordingly the waterway bank contiguous to said Items is hereby transferred to the State of California for maintenance and operation.

The levee covered by Items a., b.(4), c.(1), c.(3), c.(5), c.(6), c.(7), c.(9), c.(10), c.(13), c.(15), d.(2), e., f.(1), f.(2), f.(4), f.(6), j., k., n.(4), n.(5), s.(2), s.(3), t., u. and v., above, although complete has not been formally transferred as contemplated by the Project documents. Accordingly the levee covered by said Items, together with the waterway bank contiguous thereto, is hereby transferred to the State of California for maintenance and operation.

The maintenance work required under the provisions of the Sacramento River Flood Control Project shall be performed in accordance with existing Flood Control Regulations which have been prescribed by the Secretary of the Army pursuant to Section 3 of the Act of Congress approved 22 June 1936, as amended and supplemented. As provided under paragraph 208.10(10) of these regulations, a maintenance manual covering these works is in process of preparation and will be furnished your Board upon completion.

A copy of this letter is being transmitted to the State Engineer.

FOR THE DISTRICT ENGINEER:

Sincerely yours,

Copy Furnished:
Office, Chief of Engrs.
So. Pac. Div. Engr.
State Engineer
Engr. Div. (2)
C. de Arrieta

H. R. Reifsnnyder
Lt. Colonel, Corps of Engineers
Executive Officer

12

This copy was furnished on 24 Feb. 1953 B. de A.

Accepted Items

December 18, 1951

The Board accepted the transfer from the Corps of Engineers, in letters of dates listed below, the following reaches of levees and their contiguous waterway banks where applicable for flood control operation and maintenance, as complete and meeting the requirements of the Sacramento River Flood Control Project.

No.	Date of Letter	Levee Location	Remarks
1-2	1 Dec. 1951	N. and S. Training* Levees Moulton Weir*	Maintained by State
3-4	Do	N. and S. Training* Levees Colusa Weir*	Maintained by State
6	3 Dec. 1951	W. Levee Sacramento River, Mile 177.5 Mile 174.1	Maintained as Maintenance Area No. 2
9	4 Dec. 1951	E. Levee Yolo By-pass Fremont* Weir to Miner Slough*	N. 2 mi. maintained by State. Remainder by local districts. Conditioned upon completion of levee section and no acceptance of banks of Sacramento Deep Water Channel.
10 11	Do	N.&S. Levees Sacra- mento By-pass*	Maintained by State. Waterward slopes on 4 to 1 not required.
21a	6 Dec. 1951	Back levee Egbert District*	Maintained by R. D. No. 536
22	6 Dec. 1951	W. Levee Yolo By-pass Lindsey* Slough to Watson Hollow Drain*	Maintained by R. D. No. 536
24	Do	N. Levee Watson Hollow Drain*	Do
16	6 Dec. 1951	W. Levee Sacramento River Mile 59.0 to Lake Wash- ington Barge Canal	Maintained by R. D. No. 900
18	Do	W. Levee Sacramento Riv. Mile 50.8 to 50.5	Bank protection contract. Maintained by R. D. No. 765

Copy to USED.

1 21b

Accepted Items

No. Date of Letter

Levee Location

Remarks

6 6 Dec. 1951

Levees of Wadsworth Canal*
South levees of E. and W.
Intercepting Canals.

Maintained by State. Water-
ward slopes on 4 to 1 not
required.

(12) (13) (14) (15)

7 7 Dec. 1951

Site 2 Part A. W. Levee
Sacramento River-Mile
28.5 -Grand Island.

Maintained by R.D. No. 3.
Completed contract.

= 329

(87-A)

= 331

(89-A)

Site 1, Part B. E. levee
Sacramento River-Mile 15.0
Brannan Island.

Maintained by R.D.No. 2067
Completed contract.

8 8 Dec. 1951

W. levee Sacramento River
Mile 163.8 to Mile 143.5
except 320 ft. at Colusa
Warehouse & Mile 146.1
to Mile 146.4.

Maintained as Maintenance
Area No. 1.

(51) (52) (53) (54) (55) (56) (57)

8 Do

E. levee Sacramento River,
Mile 153.3 to Mile 152.7;
Mile 149.9 to Mile 149.7;
Mile 149.4 to Mile 149.0;
at Colusa Weir; Mile 143.3
to Mile 140.2; Mile 139.3
to Mile 138.2.

Maintained by State
Separate completed contracts.

(58) (59) (60) (61) (62) (63)

8 Do

E. levee Sacramento River
Mile 138.2 to Mile 137.9;
Mile 136.9 to Mile 133.8;
Mile 133.2 to Mile 132.3;
Mile 131.8 to Mile 125.9;
Mile 125.8 to Mile 123.1;
Mile 122.6 to Mile 122.0.

Maintained by R.D.No. 70,
Completed contracts.

(64) (65) (66) (67) (68) (69) (70)

8 Do

West levee, Sutter By-pass*

Maintained by R.D.Nos. 70,
1660, 1500. Condition upon
completion of remaining
part to standard section.

(71) (72) (73)

8 Do

North levee Tisdale
By-pass†

Maintained by R.D.No. 1660.
Waterward slope of 4 to 1
not required.

(74)

8 Do

South levee Tisdale
By-pass†

Maintained by R.D.No. 1500.
Waterward slope of 4 to 1
not required.

(75)

8 Do

East levee Sutter
By-pass*.

Maintained by State.

(76)

9 Do

W. levee Sacramento River
Mile 35.15 to 35.86.

Maintained by R.D.No. 150
(Merritt Island). Completed
contract bank protection.

(81)

Accepted Items

No.	Date of Letter	Levee Location	Remarks
(91) 10	8 Dec. 1951	Cross levee Steamboat Slough to Sacramento River.*	Maintained by R.D. No. 3 (along U.S.spoil bank).
(140) 11	Do	N. levee American River from Jibboom St. Bridge to Sacramento River.	Maintained by R.D. No. 1000.
(141) 11	Do	E. levee Sacramento River American River to Natomas Cut.	Maintained by R.D.No. 1000.
(142) 11	Do	E. bank Sacramento River At Moulton Weir.	Maintained by State.
(143) 11	Do	E. Levee Sacramento River Mile 158.5 to Mile 164.4.	Maintained partly by State; remainder by Levee District.No. 3, Glenn County, Completed Contract.
(146) 11	Do	W. levee Sacramento River Mile 61.8 to Mile 62.65.	Maintained by Maintenance Area No. 4. Completed contract.
(147) 11	Do	W. Levee Sacramento River Mile 62.65 to Mile 63.1.	Maintained by R.D. No. 537 Completed contract.
(148) 11	Do	Sacramento Weir.	Maintained by State.
(152) 11	Do	Fremont Weir.	Maintained by State.
(153) 11	Do	W. Levee Sacramento River Mile 87.6 to Mile 88.4; Mile 89.2 to Sycamore Slough	Maintained by R.D. No. 730 Completed contracts.
(155) (156) (157) 11	Do	W. Levee Sacramento River Mile 100.6 to Mile 101.4	Maintained by Sacramento River West Side Levee District. Completed contract.
(160) (161) (162) (163) 11	Do	W. Levee Feather River except: 3.31 Mi. North from Nicolaus Bridge; 1400 ft. in Yuba City; from Sta.774+80 to Sta. 1188+00 of "Y.C.H.B" Traverse.	Maintained by Maintenance Area No. 3, Levee Dist. Nos. 1 & 9 of Sutter Co. Recl. Dist.No. 777 and State.
(164) 11	Do	E. Levee Sacramento River, Natomas Cut to Feather River	Maintained by Recl.Dist.No.1001.
(165) (166) (167) (168) (169) (170) 11	Do	E. Levee Feather River from mouth to Mile 26.5, except from 2.37 miles of Nicolaus Bridge to Bear River	Maintained by R.D. Nos. 1001 and 784.

Accepted
Items

5

No.	Date of Letter	Levee Location	Remarks
(171) (172)	11 8 Dec.1951	Marysville levees from W.P.R.R. at Simmerly Slough E. to Yuba River and from D St. Bridge on Yuba River upstream to Valley Meat Co.	Maintained by Marysville Levee Commission.
(173) (174)	11 Do	N. Levee Simmerly Slough from W.P.R.R. to S.P.R.R. and E. Levee Feather River from Simmerly Slough upstream 4.8 miles	Maintained by R.D. No. 10 Completed contract.
(175)	11 Do	N. Levee Yuba River from back levee of Marysville upstream 1.8 miles	Maintained by Marysville Levee Commission.
(176)	11 Do	S. Levee Yuba River from S.N.R.R. to S.P.R.R.	Maintained by R.D. No. 784.
(177)	11 Do	N. Levee Bear River from Feather River to W.P.R.R. Interceptor	Maintained by R.D. No. 784.
(178)	11 Do	E. Levee R.D.784 (W. Levee W.P.R.R. Interceptor) Bear River to intersection with W.P.R.R. in S $\frac{1}{2}$ Sec.17, T.14 N., R. 4 E.	Maintained by R.D. No. 784.
(179) (180)	11 Do	S. Levee American River from 16th St. Bridge to Mayhew except from S.N.R.R. to a point 800 ft. E. of W.P.R.R.	Maintained by American River Flood Control District.
(181) (182) (183) (184) (185) (186) (187) (188)	11 Do	W. Levee Yolo By-pass from Sacramento* River to Putah Creek except from N. line Cache Cr. Settling Basin to S.N.R.R. & from old Willow Slough pipes south 1.48 mi.*	Maintained by State and R. D. #2035.
(190)	11 Do	N.&S. levees Willow Slough Interceptor*	Maintained by State and R. D. No. 2035.
(191) (192)	11 Do	N.&S. levees of Putah Creek	Maintained by State.
(197) (198)	11 Do	N.&S. levees Sycamore Slough from Sacramento River to Knights Landing Outfall Gates	Maintained by R.D. 730 and Sacramento River West Side Levee District.

(21)

4

Accepted
Items

No.	Date of Letter	Levee Location	Remarks
-----	----------------	----------------	---------

12 8 Dec. 1951

Five reaches of Ryer Island levee along Miner Slough as follows:

a. Junction Miner and Sutter Sloughs westerly 5000 feet.

b. From State Highway Bridge West. 3035 ft.

c. Spec. 1473, Sta. 53+00 to 64+00 about one mi. No. of Ryde Road. *Mile 29.4 to 29.6*

d. Spec. 1473, Sta. 0+00 to 12+00 being 600 ft. each side of Ryde Road. *Mile 30.4 to 30.6*

e. Ryer Island cut-off levee beginning at east bank of Cache Slough and extending upstream 3,300 feet at junction of Cache and Miner Sloughs.

Maintained by R.D. No. 501. All are completed separate contracts.

Covered by letter dated 16 Nov. 1951

321 → (79A) ✓

303 Covered by letter dated

(53A) ✓

304 17 Nov. 1951

(54A) ✓

(23) ✓

(50) ✓

*No waterway banks contiguous to these levees.

GOODWIN J. KNIGHT
GOVERNOR

A. R. GALLAWAY, JR., SACRAMENTO
PRESIDENT
GROVER SHANNON, YUBA CITY
VICE PRESIDENT
GEO. H. HOLMES, CLARKSBURG
SECRETARY
W. P. HARKEY, GRIDLEY
GEO. R. WILSON, WALNUT GROVE
GEO. E. LODI, ARBUCKLE
DOUGLAS B. COHEN, BANTA

THE RECLAMATION BOARD
OF THE
STATE OF CALIFORNIA
1215 O STREET
SACRAMENTO 14, CALIFORNIA
TELEPHONE: HI 5-4711

A. M. BARTON
CHIEF ENGINEER AND GENERAL MANAGER
EDMUND G. BROWN, ATTORNEY GENERAL
LEGAL ADVISER
HOWARD S. HITCHCOCK
ASSISTANT CHIEF ENGINEER
WILLIAM A. CARVER
ASSISTANT SECRETARY
ROBERT W. JAMES
ASSOCIATE COUNSEL

January 26, 1959

District Engineer
Sacramento District
U. S. Corps of Engineers
P. O. Box 1739
Sacramento 8, California

Dear Sir:

Reference is made to your letter of December 15, 1958, SPKKO-P 824.3 (Sac Riv. FCP), regarding the responsibility of operation and maintenance of the Unit No. 630, Back Levee, Reclamation District No. 108, S.P.R.R. Bridge to High Ground, a distance of approximately 12.5 miles.

The Reclamation Board at its meeting of January 21, 1959, formally accepted the maintenance responsibility of the Unit No. 630 in the area described in the third paragraph of your letter under the conditions outlined in your letter.

Yours very truly,

THE RECLAMATION BOARD
A. M. BARTON
Chief Engineer and General Manager

By William A. Carver
WILLIAM A. CARVER
Assistant Secretary

WAC:lb

285/68C
Unit 132
OL
wbh

16 SEP 1959

SPKKO-P

59-128

Emergency Work

The Reclamation Board
State of California
1215 "O" Street
Sacramento 14, California

537

OPERATIONS BRANCH

Gentlemen:

Reference is made to the emergency repair program on the Sacramento River Flood Control Project requested by Reclamation District No. 108 and formulated as a result of joint inspections and investigations participated in by State, local and Corps of Engineer's representatives.

Emergency repairs have been completed under the general authority of Public Law 99, 84th Congress, 1st Session, on the Back Levee of Reclamation Districts 108 and 787 located on the Colusa Basin Drainage Canal in Colusa and Yolo Counties, California.

The emergency work consisted of repair of levee slopes and was completed 10 August 1959 in accordance with Specifications No. 2475A, Contract No. DA-04-167-EIVENG-59-128 and Drawing No. 50-4-3522.

A copy of this letter is being transmitted to the Department of Water Resources.

Sincerely yours,

Copy furnished:
Dept Water Resources
23rd & "R" Sts.
Sacramento, Calif.
O.C.E.

H. A. MORRIS
Colonel, CE
District Engineer

S?P.D.

cc: Engrg Divn-Levees & Channels Sec.
Operations Branch

Assurance E-21
Unit 132

Contract #59-128

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

SPKGO-0

6 January 1984



The Reclamation Board
1416 - Ninth Street, Room 335-18
Sacramento, CA 95814

Gentlemen:

You are hereby notified that the Corps of Engineers has completed emergency repairs on the project levee in Reclamation District 108 under authority of Section 5 of the Flood Control Act of 18 August 1941, as amended (Public Law 99, 94th Congress, 1st Session). The work was completed on 25 November 1980 and consisted of reconstructing 3050' + of the project levee at 2 sites along the left bank of the Colusa Trough Drainage Canal in accordance with Contract No. DACW05-81-C-0014, Drawing No. 50-4-5568 and Specification No. 6001.

The Sacramento River Flood Control Project Standard Operation and Maintenance Manual and the Supplement thereto for Unit 132 covers this area. The completed work shall be maintained in accordance with the assurances which your Board provided for the Sacramento River Flood Control Project.

Sincerely,

PAUL F. KAVANAUGH
Colonel, CE
District Engineer

for ROMPALA/LR/R
MCDONNELL
A. SMITH
HEIN
FAST
LEE
KAVANAUGH

X Copy furnished:
DWR, ATTN: G. PIAZZA

X SPKGO-0

cc:
Ops Br
Engr Div (Levee & Chan/Nolan)
Valley Res Ofc



met

Unit 132

SACRAMENTO, California 95814



DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
650 CAPITOL MALL
SACRAMENTO, CALIFORNIA 95814

June 19, 1984

REPLY TO
ATTENTION OF
Navigation and Flood Control Unit

The Reclamation Board
State of California
1416 - 9th Street, Room 455-6
Sacramento, California 95814

Members of the Board:

You are hereby notified that the Corps of Engineers has completed emergency repairs on two project levees under authority of Section 5 of the Flood Control Act of August 18, 1941, as amended (Public Law 99, 84th Congress, 1st Session). The work was completed on May 29, 1984 and consisted of repairing project levees along the Colusa Basin drain left bank R.D. 108 and along the Sutter Bypass right bank R.D. 1500 in accordance with Contract Number DACW05-83-C-0037 and Drawing Number 50-4-5595. Additional work will be accomplished in R.D. 1500 to repair a slide area in and adjacent to the repaired site this year. This work shall be maintained in accordance with the assurances which your Board provided for the Sacramento River Flood Control Project. This portion of the work will be added by amendment to the Operation and Maintenance Manual, Supplement Numbers 129 and 132, Sacramento River Flood Control Project. Copies will be furnished your office at a later date.

Sincerely,

Arthur E. Williams
Colonel, Corps of Engineers
District Engineer

Copy Furnished:
Commander, South Pacific Division, ATTN: SPDCO-C

JAN 85
EXHIBIT F
1 25 2



DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
650 CAPITOL MALL
SACRAMENTO, CALIFORNIA 95814

REPLY TO
ATTENTION OF

October 18, 1984

Navigation and Flood Control Unit

The Reclamation Board
State of California
1416 Ninth Street, Room 455-6
Sacramento, California 95814

Members of the Board:

Reference is made to our letter to you, dated June 19, 1984, notifying you of the completion of emergency repairs on project levees in Reclamation District 108 (left bank of Colusa Basin Drain) and Reclamation District 1500 (right bank of Sutter Bypass) and the need to accomplish additional work in Reclamation District 1500 to repair additional damage. This is to advise you that the additional work in Reclamation District 1500 has been completed. This work shall be maintained in accordance with the assurances which your Board provided for the Sacramento River Flood Control Project. This portion of the work will be added by amendment to the Operation and Maintenance Manual, Supplement Number 129, Sacramento River Flood Control Project. Copies will be furnished your office at a later date.

Sincerely,

Albert E. McCollam, Jr.
Lieutenant Colonel, Corps of Engineers
Acting District Engineer

Copy Furnished:

Commander, South Pacific Division, ATTN: SPDCO-C

JAN 85
EXHIBIT F

February 3, 1967

Navigation and Flood Control Unit

CERTIFIED
No. 785701
RETURN RECEIPT REQUESTED

The Reclamation Board
State of California
1416 - 9th Street, Room 433-6
Sacramento, California 95814

Members of the Board:

You are hereby notified that the Corps of Engineers has completed emergency repairs to project levees under authority of Section 5 of the Flood Control Act of August 18, 1941, as amended (Public Law 99, 84th Congress, 1st Session). The work was completed on December 2, 1966, and consisted of restoring portions of the Colusa Basin Drain left bank levee in Reclamation District 108 and portions of the Knights Landing Ridge Cut left and right bank levees in Knights Landing Ridge Drainage District, in accordance with Contract Number DACW03-66-C-0017 and Drawing Number 50-25-5772. This work shall be maintained in accordance with the assurance which your Board provided for the Sacramento River Flood Control Project. This portion of the work will be added by amendment to the Operation and Maintenance Manual, Supplement Numbers 127 and 132, Sacramento River Flood Control Project. Copies will be furnished to your office at a later date.

Sincerely,

cc:
E.M. (Garrett)
Ops Br
Engr Div (Civ Des Sec D - Pahl)
Valley Res Ofc (Cameron)

Wayne J. Scholl
Colonel, Corps of Engineers
District Engineer

Copies Furnished:

DWR, ATTN: J. ANGLE
DWR, ATTN: G. SNOW
Commander, South Pacific Division, ATTN: SPDCO-0

JW 2-3
ROMPALA/th

JM for
KELLY

[Signature]
A. SMITH

[Signature]
HEIN

[Signature]
FAST

[Signature]
DENNIS

[Signature]
MCQUEEN

[Signature]
SCHOLL

WANG #6374a

not

Units 127, 132

November 22, 1989

Navigation and Flood Control Unit

The Reclamation Board
State of California
1416 - 9th Street, Room 455-6
Sacramento, California 95814

done

Members of the Board:

This is in regard to the joint inspection of November 14, 1989, made for the purpose of transferring a portion of the Sacramento River Bank Protection Project (Unit 43) to the State of California for operation and maintenance. The flood control work consists of bank sloping, placement of stone protection and miscellaneous work on the Feather River right bank at Site Mile 51.1; Colusa Basin Drain left bank at Site Miles 8.5; Sutter Bypass right bank at Site Mile 64.0 and Yolo Bypass left bank at Site Mile 54.1.

The sites were completed on November 14, 1989, in accordance with Contract Number DACW05-88-C-0063, Specification Number 8367 and Drawing Number 50-4-5798.

The work was performed under general authority of the Flood Control Act of 1960, 86th Congress, 2nd Session (PL 86-645, July 14, 1960), Section 2304(a), Title 10, and the Water Resources Development Act of 1986 (PL 99-662, October 17, 1986), and now meets the requirements of the Sacramento River Bank Protection Project. Therefore, said work together with the waterway bank contiguous thereto is transferred as of November 14, 1989 to the State of California for operation and maintenance.

11-20
ROMPALA/mt
[Signature]
KELLY
[Signature]
A. SMITH

This portion of the work will be added by amendment to the Operation and Maintenance Manual, Supplement Numbers 123, 129, 132 and 152, Sacramento River Flood Control Project. Copies will be furnished to your office at a later date.

[Signature]
HELM
[Signature]
FAST
[Signature]
DENNIS
[Signature]
MASON

cc:
~~C-O Div~~; ~~Fld Cntrl Unit~~;
~~Central Valley Sec~~; ~~Prog~~
~~Dev~~; ~~F&A Br~~; ~~Valley Res~~
~~Ofc~~; ~~Reading~~
Copies Furnished:

Sincerely,

Jack A. Le Cuyer
Colonel, Corps of Engineers
District Engineer

DWR, ATTN: G. Snow; DWR, ATTN: G. Qualley; Cdr, SPD, ATTN: CESP-D; *[Signature]*
~~Cdr~~, USACE, ATTN: DAEN-CECW-OM Le CUYER

PC#LTRUNIT43

*Units
123, 129,
132, 152*

02

THE RECLAMATION BOARD

1416 Ninth Street, Room 455-6
Sacramento, CA 95814
(916) 445-9454



MAR 27 1990

Colonel Jack A. Le Cuyer
District Engineer
Sacramento District
U. S. Army Corps of Engineers
650 Capitol Mall
Sacramento, CA 95814-4794

Dear Colonel Le Cuyer:

Reference is made to your letter of November 22, 1989, concerning the transfer of a portion of the Sacramento River Bank Protection Project in Contract 43 to the State of California for operation and maintenance.

The flood control work consisted of selective clearing, bank sloping, placement of stone bank protection, and such miscellaneous work as necessary to complete the construction at the following sites:

1. Site Mile 51.1, Right Bank, Feather River.
2. Site Mile 8.5, Left Bank, Colusa Basin Drain
3. Site Mile 54.1, Left Bank, Yolo Bypass
4. Site Mile 64.0, Right Bank, Sutter Bypass

The sites were completed on November 14, 1989. The work was constructed in a workmanlike manner and in conformance with Drawing No. 50-4-5798, Specification No. 8367, and Contract No. DACW 05-88-C-0063, insofar as could be determined visually.

The Reclamation Board, at its regular meeting of December 15, 1989, formally accepted the completed work on the above referenced sites from the District Engineer for operation and maintenance.

If you have any questions concerning the above, please contact me at the above address or call Richard Goodnight at (916) 445-9335.

Sincerely,

A handwritten signature in cursive script, appearing to read "Raymond E. Barsch".

RAYMOND E. BARSCH
General Manager

*Units 123,
129, 132, 152*

*Copies to VRO
C.D. WILLIAMS*



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

Navigation and Flood Control

APR 23 2001

Mr. Peter D. Rabbon, General Manager
The Reclamation Board
State of California
1416 - 9th Street, Room 1601
Sacramento, California 95814

Dear Mr. Rabbon:

This letter is to transfer a portion of work of the east side of the Colusa Basin Drain "Back Levee" from L.M. 0.00 at the Knights Landing outfall gates to L.M. 4.40 at Road 98A, RD 108, in RD 787, to the State of California for operation and maintenance.

The work consisted of restoring the Colusa Basin Drain "Back Levee" on the landside at L.M. 0.50 damaged by the January 1997 Flood by placing and compacting levee fill to restore the levee to its pre-flood condition. Benching and keying the eroded area to restore it to its pre-flood condition restored the east side of the Colusa Basin Drain levee. The work, as listed in the enclosure, was completed on November 31, 1997 in accordance with Specification No. 9893E, Contract No. DACW05-97-C-0134.

The work was performed under the general authority of 33 U.S.C. 701n (69 Stat. 186) PL 84-99 and now meets the requirements of the Operations and Maintenance Manual for the Sacramento River Flood Control System in RD 787. Therefore, said flood control work, together with the waterway banks contiguous thereto, are transferred as of the date of this letter to the State of California for operation and maintenance.

This portion of the project work will be added by amendment to the Operation and Maintenance Manual, Sacramento River Flood Control Project, which is being transferred under separate cover.

Sincerely,

Robert A. O'Brien III
Lieutenant Colonel,
Corps of Engineers
Deputy District Engineer

Enclosure

THE RECLAMATION BOARD

1416 NINTH STREET, ROOM 1601
 SACRAMENTO, CA 95814
 (916) 653-5434 FAX: (916) 653-5805
 Permits: (916) 653-5726 FAX: (916) 653-5805



FILE Transfer File
 JUL 20 2001

Mr. Peter Spahr, Trustee
 Reclamation District No. 787
 41758 County Road 112
 Knights Landing, California 95645

Dear Mr. Spahr:

The U.S. Army Corps of Engineers has completed the 1997 flood-damage repair on the east side Colusa Basin Drain levee (Levee Mile 0.00 to LM 4.40) in Reclamation District No. 787. Mr. Ron Bertoli of the Department of Water Resources' System Integrity Section contacted Mr. Richard Jenness, District Engineer of RD 787, by telephone on June 28, 2001 and received assurance of acceptance for the completed repair. The Corps has transferred the completed repair to the State of California for operation and maintenance (see enclosed letter). At its July 20, 2001 meeting, on behalf of the State of California, The Reclamation Board accepted the completed repair.

The Board hereby transfers the completed repair to RD 787 for operation and maintenance. The Corps has advised the Board that the completed repair will be added by amendment to the Operation and Maintenance Manual, Sacramento River Flood Control Project. In the interim, RD 787 will perform operation and maintenance in accordance with the current O&M Manual. As-designed drawings are enclosed. When we receive the as-constructed version, we will forward a copy to you for your records.

If you have any questions, you may contact Peter Rabbon, General Manager of The Reclamation Board, at (916) 653-5434, or your staff may contact Debbie Carlisle, Chief of DWR's System Integrity Section of the Division of Flood Management, at (916) 574-0634.

Sincerely,

ORIGINAL SIGNED BY
 Betsy A. Marchand
 President

Enclosures

<p>cc: Colonel Michael J. Walsh ✓ District Engineer Sacramento District U.S. Army Corps of Engineers 1325 J Street Sacramento, California 95814-2922</p>	<p>Mr. Kell Cloward, Chief Readiness Branch Sacramento District U.S. Army Corps of Engineers 1325 J Street Sacramento, California 95814-2922</p>
---	---



EXHIBIT G

SUGGESTED SEMI-ANNUAL REPORT FORM

U. S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
Wright Building, 1209-8th Street
Sacramento, California

TO: The District Engineer (1 May 19__)
U. S. Army Engineer District, Sacramento (1 Nov 19__)
Corps of Engineers
1209-8th Street
Sacramento, California

Dear Sir:

The semi-annual report for the period (1 May 19__ to 31 October 19__)
(1 November 19__ to 30 April 19__) Sacramento River Flood Control Project,
Unit No. 132, the Back Levee of R.D. No. 108 is as follows:

a. The physical condition of the protective works is indicated by
the inspector's report, copies of which are inclosed, and may be sum-
marized as follows:

(Superintendent's summary of conditions)

It is our intention to perform the following maintenance work
in order to repair or correct the conditions indicated:

(Outline the anticipated maintenance operations for the follow-
ing 6 months.)

b. During this report period, major high water periods (water level
at 30.0 on the gage at Knights Landing Outfall Gates and 30.0 on the gage
at Tule Road) occurred on the following dates:

<u>Dates</u>	<u>Maximum Elevation</u>
_____	_____
_____	_____
_____	_____

Comments on the behavior of the protective works during such high water periods are as follows:

(Superintendent's log of flood observations)

During the high water stages when the water level reached a height of _____, on the gage or excess thereof (dates) _____, it was necessary to organize and carry out flood operations as follows:

(See Maintenance Manual _____.)

c. The inspections have indicated (no) or (the following) encroachments or trespasses upon the project right-of-way.

d. (No) (_____) permits have been issued for (the following) improvements or construction within the project right-of-way.

Executed copies of the permit documents issued are transmitted for your files.

e. The status of maintenance measures, indicated in the previous semi-annual report as being required or as suggested by the representatives of the District Engineer, is as follows:

(Statement of maintenance operations, item by item with percent completion.)

f. The fiscal statement of the Superintendent's operations for the current report period is as follows:

	<u>Labor</u>	<u>Material</u>	<u>Equipment</u>	<u>Overhead</u>	<u>Total</u>
1. Inspection					
2. Maintenance					
3. Flood fighting operations					
TOTAL					

Respectively submitted,

Superintendent of Works

Comments on the behavior of the protective works during such high water periods are as follows:

(Superintendent's log of flood observations)

During the high water stages when the water level reached a height of _____, on the gage or excess thereof (dates) _____, it was necessary to organize and carry out flood operations as follows:

(See Maintenance Manual _____.)

c. The inspections have indicated (no) or (the following) encroachments or trespasses upon the project right-of-way.

d. (No) (_____) permits have been issued for (the following) improvements or construction within the project right-of-way.

Executed copies of the permit documents issued are transmitted for your files.

e. The status of maintenance measures, indicated in the previous semi-annual report as being required or as suggested by the representatives of the District Engineer, is as follows:

(Statement of maintenance operations, item by item with percent completion.)

f. The fiscal statement of the Superintendent's operations for the current report period is as follows:

	<u>Labor</u>	<u>Material</u>	<u>Equipment</u>	<u>Overhead</u>	<u>Total</u>
1. Inspection					
2. Maintenance					
3. Flood fighting operations					
TOTAL					

Respectively submitted,

Superintendent of Works

**SUPPLEMENT TO STANDARD
OPERATION & MAINTENANCE
MANUAL
SACRAMENTO RIVER
FLOOD CONTROL PROJECT**

**UNIT NO. 132 PART NO. 1 FOR
NATIVE GRASS AND STONE BIOTECHNICAL LEV
PROTECTION
BACK LEVEES OF RECLAMATION DISTRICT NO.**



March 2003

**SACRAMENTO DISTRICT
U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA**

**CORPS OF ENGINEERS
U.S. ARMY**

**SUPPLEMENT TO
STANDARD OPERATIONS AND MAINTENANCE MANUAL
SACRAMENTO RIVER FLOOD CONTROL PROJECT**

**UNIT NO. 132 PART NO. 1 FOR
NATIVE GRASS AND STONE BIOTECHNICAL LEVEE PROTECTION
BACK LEVEES OF RECLAMATION DISTRICT NO. 108**

**Sacramento District
Corps of Engineers
U.S. Army
March, 2003**

SUPPLEMENT TO
STANDARD OPERATION AND MAINTENANCE MANUAL
SACRAMENTO RIVER FLOOD CONTROL PROJECT

UNIT NO. 132 PART NO. 1 FOR
NATIVE GRASS AND STONE BIOTECHNICAL LEVEE PROTECTION
BACK LEVEES OF RECLAMATION DISTRICT NO. 108

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SUPPLEMENT FORMAT & CONTENT

The organization and format of this exhibit is written to be consistent with the Standard Operations & Maintenance Manual for the Sacramento River Flood Control Project (Revised May 1955), and is intended to provide supplemental information that is not presently addressed.

TABLES

Table 1 Sac Bank - Colusa Basin Drain Contract 42D (RD108), _____2
List of Site Acreage

EXHIBITS

<u>Exhibit</u>	<u>Description</u>	<u>Location</u>
A	Flood Control Regulation (contained in Standard Manual)	Unattached
A1	Location Map	1 Sheet
B	"As Constructed" Drawings	Unattached
C	Check List - Vegetation on Mitigation Area	1 Sheet
D	Letter of Transfer to or Acceptance by the Reclamation Board	Unattached
E	Pest Ratings of Noxious Weed Species & Noxious Weed Seed	in 8 Sheets
F	"As-Maintained" Final Report -Sacramento River Bank Protection Project, Colusa Basin Drain Contract 42D (RD 108)	Unattached
G	Example of Sampling Transect Measurement	1 Sheet
H	Performance Standards and Goals	1 Sheet
I	Table of Environmental Commitments	1 Sheet
J	Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat	in 6 Sheets
K	"Monitoring Plan for Giant Garter Snakes..."	in 10 Sheets

SUPPLEMENT TO THE
STANDARD OPERATION AND MAINTENANCE MANUAL
SACRAMENTO RIVER FLOOD CONTROL PROJECT

UNIT NO. 132 PART NO. 1 FOR
NATIVE GRASS AND STONE BIOTECHNICAL LEVEE PROTECTION
BACK LEVEES OF RECLAMATION DISTRICT NO. 108

SECTION I

INTRODUCTION

1-01 AUTHORITY

This work was performed under the Second Phase of the Sacramento River Bank Protection Project, authorized by the Flood Control Act of 14 July 1960, Eighty Sixth Congress, Second Session, Senate Document No. 103 Project authorization was supplemented by the River Basin Monetary Authorization Act of 1974, approved by the Second Session of the 93rd Congress as Public Law 93-251. In 1982, the project authorization was further supplemented by a joint resolution of Congress as Public Law 97-377.

Additional information pertaining to authority for this project, project works, and the protection to be provided by this project are provided in the Standard Operations and Maintenance Manual and the Supplement To Standard Operation and Maintenance Manual, Sacramento River Flood Control Project, Unit No. 132 Back Levees of Reclamation District No.108.

1-02 PURPOSE OF THIS SUPPLEMENT:

This is a supplement, part 1, to the Sacramento River Flood Control Project Standard Operation and Maintenance Manual for Unit No.132 Back Levees of Reclamation District No.108. This supplement is intended to provide information and guidance to the Non-Federal sponsor, the reclamation district and their maintenance personnel for operations and maintenance of the biotechnical native grass and stone levee protection described herein. The biotechnical native grass and stone levee protection has been constructed to protect the levee from wave wash erosion and at the same time provide habitat for the threatened Giant Garter Snake in compliance with environmental regulations. These guidelines shall be used in place of the Standard Operation and Maintenance Manual (1955) when managing the biotechnical native grass and stone levee protection. The 1955 Standard Operation and Maintenance Manual will continue to provide primary guidance for all public safety issues and decisions.

1-03 PROJECT DESCRIPTION:

The biotechnical Native Grass and Stone Levee protection was designed to establish a self-sustaining erosion resistant stand of perennial native grass on a soil layer placed on and through a layer of stone levee protection while at the same time providing habitat for the Giant Garter

Snake which is listed as a threatened species under the federal endangered species act. The integrity and effectiveness of this dual system is dependent upon the native grasses and stone protection working together. Neither one is sufficient to protect the levee without the other. The rock gradation is thinner and more uniform than would be used for typical rock riprap to allow more soil-filled voids for greater penetration of the rock layer by the roots of the native grasses. The loss in bank protection capacity by the uniform graded and thinner riprap is provided by the root system of the native grasses, which were selected for their strong soil binding and deep rooting characteristics.

The following table constitutes project sites and their acreages. Refer to Exhibit A-1 for location map.

Table 1 Sac Bank - Colusa Basin Drain Contract 42 D (RD108) List of Site Acreage				
Site No.	Station point and location description	Linear Feet	Protection Type	Acreage
1	Mile 0.0 to 3.5	18,375	Grass and soil over rock	25.31
2	Mile 4.6 to 5.8	6,283	Grass and soil over rock	8.65
3	Mile 5.8 to 6.1	1,742	Grass Only	2.40
TOTAL FOR ALL SITES				36.36

1-04 CONSTRUCTION DATA AND CONTRACTOR:

The contractor and construction data for the project sites are as follows:

Construction of Sacramento River Bank Protection Colusa Basin Drain Contract 42D at the location as shown on Exhibit A-1, was accomplished under contract No. DACW05-00-C-0034 by CKY during the period from October 2000 to January 2004. File No. 50-04-6059 and Specifications No. 9989

1-05 DEFINITIONS

- a. District Engineer: District Engine for the US Army Corps of Engineers, Sacramento District.
- b. Non-Federal Sponsor: State of California Reclamation Board as defined in the "Local Project Cooperation Agreement."
- c. Plant Establishment: Sustained self-sufficiency where the plant is able to sustain growth

without additional artificial watering, fertilizing, herbicide spraying, weeding, pruning, cultivation, or ornamental vegetation.

- d. Project: Sacramento River Bank Protection Project, Colusa Basin Drain Contract 42 D (RD108)

SECTION II

LOCAL COOPERATION

2-01 FEDERAL REQUIREMENTS:

Federal responsibility shall include the following:

- a. Prepare the appropriate environmental documentation (EA or EIS), when requested by, and in cooperation with, the Non-Federal Sponsor. As directed by the Fish and Wildlife Coordination Act (FWCA), coordinate with U.S. Fish & Wildlife Service, National Marine Fisheries Service and the California Department of Fish and Game. Determine mitigation requirements in consultation with these agencies using the Habitat Evaluation Procedure or other methodology.
- b. Prepare mitigation design, oversee implementation, and ensure maintenance of plants has achieved root establishment and obtained other success criteria prior to turnover to Non-Federal Sponsor. Refer to Section 9-02 for exceptions.
- c. Document with still or video photography the conditions of the site at the time of turnover to the non-Federal sponsor.
- d. In joint responsibility with Non-Federal Sponsor, ensure that environmental commitments such as riparian mitigation measures and monitoring requirements are successfully implemented in accordance with National Environmental Policy Act (NEPA), the Federal Endangered Species Act (ESA), the California Environmental Quality Act, and other applicable state statutes. (Refer to exhibit L for environmental commitments.)
- e. Provide As-Constructed drawings.
- f. Prepare a project Operations & Maintenance Manual, and revisions as they apply to the project.
- g. Coordinate appointment of a Mitigation Evaluation Team consisting of members of the US Army Corps of Engineers, the State of California Reclamation Board and Reclamation District 108 in cooperation with the US Fish and Wildlife Service and the State Department of Fish and Game.

2-02 NON-FEDERAL REQUIREMENTS:

Non-Federal responsibility shall include the following:

- a. Protect and preserve all biotechnical Native Grass and Stone Levee protection on site that has been turned over to the Non-Federal Sponsor. Allow the desired vegetation to grow to maturity within mitigation areas.
- b. Make semi-annual inspections and submit annual reports (which shall include text and a photographic documentation of plant progress) to the District Engineer. (Refer to section 3-09).
- c. Perform all operations, maintenance, monitoring and remedial requirements as stated herein.
- d. Over the life of the project (life of project = 50 years or until congress has de-authorized project), replant and replace all vegetation that has died as a direct result of vandalism, public use (accidental damage) and negligent maintenance practices, for example, herbicide overspray, and fire damage, other than 'Acts of God' to plants. All 'Acts of God' damage shall be revisited by all concerned agencies and decisions, relative to replanting, made on a case-by-case basis.
- e. The Non-Federal sponsor shall correct any deficiencies of maintenance required of the Reclamation District by this manual on the projects
- f. Coordinate all environmental documentation procedures with the respective local, state and federal resource and regulatory agencies.
- g. The Reclamation District (Local Maintaining Agency) for the sites listed in Table 1, pg 2 is as follows:

- (1) Reclamation District no. 108

SECTION III

GENERAL REQUIREMENTS

3-01 GENERAL RULES AND PROCEEDURES: The general rules for maintenance and operations of the mitigations site are as follows:

- a. The appropriate reclamation district will maintain and operate the mitigation site in accordance with regulations prescribed by the Secretary of Army as required by law, and shall be

responsible for, and directly in charge of, any organization responsible for the efficient operation and maintenance associated with the mitigation site, with appropriate cost allocation

b. No encroachment or trespass which will adversely affect the efficient operation or maintenance of the mitigation site, shall be permitted upon the rights-of-way of the facilities.

c. Improvements consistent with the intent of this Operation and Maintenance Manual are permitted within the limits of the mitigation site. Onsite improvements not consistent with the intent shall require approval by the District Engineer, Corps of Engineers, that such improvement, excavation, construction, or alterations as may be found to be desirable and permissible shall be constructed in accordance with standard engineering practices. Advice regarding the effect of proposed improvements or alterations on the functioning of the mitigation site and information concerning methods of construction acceptable under standard engineering practices shall be obtained from the District Engineer, or if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished to the District Engineer after completion of the work.

3-02 SAFETY REQUIREMENTS:

Although safety hazards are not expected on the site, it may be possible that operation and maintenance of the mitigation site may expose personnel to certain hazards. It is suggested that all pertinent safety codes be incorporated into the operating procedures and that employed personnel be given the necessary protective equipment and apparel together with instructions to conduct their work without undue exposure to existing hazards.

3-03 ANNUAL REPORT:

The Non-Federal Sponsor shall prepare an annual report for the project areas for submittal to the District Engineer by December 1st of each year. The Non-Federal Sponsor shall provide a copy of the report submitted to the District Engineer to the Corps' Environmental Resources Branch (CESPK-PD-R), and the Corps' Project Manager (CESPK-PM). The annual report shall compile information from the checklists that are prepared in coordination with the standard levee inspections during spring and fall. The annual report shall address all significant events that took place during the previous 12 months and shall include: the checklists, the GGS monitoring report, the Native Grass evaluation report, a photographic record from permanent locations, a photographic record of specific significant damage, proposed corrective measures to deal with deficiencies, and a summary statement of general plant progress for the period of time from the preceding report.

3-04 PERIODIC SEMI-ANNUAL INSPECTIONS:

Inspections of project areas shall be initiated by the Non-Federal Sponsor and made with interested agencies at the times specified below to compare progress with the goals of the project plans as stated in the environmental documentation and other project documents. As well,

during the semi annual inspections the project shall be evaluated by visually checking the entire length of the project for damage requiring repair as described in section 10-01. Provide the Corps written notice 30 days prior to all inspections and invite the Corps to participate in the inspection.

- a. Spring Inspection: At a minimum, inspection shall occur during May. Grass is green, actively growing and forming seed heads at this time making it a good time for identifying plant species, as well as evaluating general plant health and mortality. This is also a good time to identify areas that may be damaged by erosion and/or flooding during the winter.
- b. Fall Inspection: At a minimum inspection shall occur during September through October, just prior to the rainy season, typically when plant stress and dormancy are most prevalent. Native Grasses may appear dead but are actually dormant during this time of the year and are alive. Therefore, evaluations made during the spring inspection are generally more accurate. Also, seed heads have shattered making this a poor time for visual identification of grasses.

3-05 CHECKLISTS:

A specific checklist form for reporting results of inspections of these mitigation areas is contained in this supplement as Exhibit C. These checklists shall be completed during each semi-annual inspection.

3-06 DRAWINGS:

Exhibit B, As-built drawings (unattached).

3-07 FINAL REPORTS:

Final Reports/Revegetation Project Summaries are provided as Exhibit F.

3-08 TIMING OF REPAIRS:

Any damages to the Native grass and stone biotechnical levee protection requiring repair shall be repaired prior to the next growing season

SECTION X

NATIVE GRASS AND STONE BIOTECHNICAL LEVEE PROTECTION

10- 01 REPAIR OF THE BIOTECHNICAL LEVEE PROTECTION:

Once the native grasses have been established, damage to the levee will primarily occur due to

wind-generated waves. When seasonal damage does occur to the outer soil blanket and grasses, no repairs will be required until 10% of the bank width (approximately 6 feet measured along the slope) is impacted or damage greater than 0.5 acre (an area 150 foot on a side for example) in a single site has been affected. At such time, as soon as conditions permit, weed abatement, re-grading and seeding would be required to bring the soil grade and native grass establishment back to 100 percent of the project area.

- a. Minor Damage to Soil Layer: Minor damage to the soil layer (less than 6 inches) may be repaired by re-grading any high spots and reseeding with the appropriate native grass seeding mix. The newly planted area will be irrigated to germinate the seeds and thereafter for the next 1 years to establish the grasses.
- b. Major Damage to Soil Layer: Damage greater than 6 inches in depth including exposed riprap will require scarification of the eroded soil surface, the placement and compaction of additional soil to re-establish the original grade (12 inch soil layer), and reseeding with appropriate native grass seeding mix. Once planted, the grasses will be irrigated as specified in item (a) above.
- c. Damage to Riprap Layer: Damage to the riprap layer will require replacement to the original thickness (15 inches) with riprap meeting the stone protection specification provided in Appendix K.

10- 02 MAINTENANCE OF THE BIOTECHNICAL LEVEE PROTECTION (LONG TERM OPERATION AND MAINTENANCE):

Plants that have established themselves will continue to live with minimal support by maintenance personnel. The biotechnical grass and stone levee protection system is intended to provide Giant Garter Snake habitat. All maintenance activities, such as spraying mowing, burning and debris removal, shall be carried out in a manner that avoids impacts to threatened and endangered species. The following items shall be addressed by, and are the responsibility of, the Non-Federal Sponsor in maintaining acceptable site and plant conditions so that vegetative growth will continue to function as originally intended.

- a. Volunteer Growth: Preserve all native volunteer growth that is consistent with requirements and objectives of mitigation site plans and environmental documentation. This will consist of grasses and forbs native to the project area.
- b. Noxious Weed Control: The maintenance districts will be allowed to control noxious weeds within the guidelines of the State of California, Department of Food and Agriculture, Division of Plant Industry. The maintenance district shall notify the Department of Water Resources, Flood Control Project Branch before taking any action. For guidance refer to, Pest Ratings of Noxious Weed Species and Noxious Weed Seed, Exhibit E. Herbicides shall be applied in accordance with all State and local regulations.

- c. **Prescriptive Weed Control:** Weeds are easier and less expensive to control if they are not allowed to get out of hand. Preventative weed control methods such as prescribed burns or timed mowings shall be used. Should infestations start, additional effort shall be required using increased application of preventative methods or employment of herbicides. Timing of the implementation of weed control measures is crucial for maximum effect. Timing will vary based upon current weather conditions, close monitoring of site conditions to time weed control efforts will be required to realize maximum effects. The Maintenance District shall use the following methods for encouraging native grass growth and discouraging noxious exotic weeds:
- d. **Annual Evaluation:** An annual Native Grass evaluation (refer to section 10-6) shall be used to determine whether or not additional weed control measures beyond prescribed burning every third year shall be required. If the evaluation report indicates that the Native Grass is not meeting performance standards (Refer to exhibit H), remedial weed control methods shall be employed.
- e. **Burning:** Properly timed burning not to exceed 5 burns within a decade shall be used to reduce or eliminate annual weeds. Fires need to be timed for maximum impact to target weed species and minimal impact for desired perennial native grasses and forbes. Generally slow hot fires have more impact upon seeds than fast fires. For this reason burning downhill and against the wind are generally recommended. Slow burning into a mild wind in mid-afternoon with low relative humidity will provide the best conditions for killing weed seeds. Also, seeds are generally more effectively killed when their moisture content is still high. For grasses, this corresponds to the "dough" stage of seed formation. For Star Thistle, burns are most effective when about 10% of flower buds have opened. Seeds are less susceptible to damage by fire when they are dry and fully mature and also when they have dispersed onto the ground. Timing of burns will vary somewhat with the weather, however late spring burns are effective for star thistle (*Centaurea solstitialis*) and medusa head grass. Repeating the burn in the following year may be helpful in controlling major infestations of Star Thistle and Medusa Head grass, as well as other annual weeds that produce seed that remains viable for several seasons.

Burning also can be used in conjunction with herbicides. Burning may stimulate increased germination of weed seeds in the soil that are not killed in the burn in the season following the burn. This provides increased effectiveness of herbicide treatments following burns.

- f. **Herbicides:** Selective herbicides can be used to target specific types of weeds such as broadleaf weeds. Selective herbicides may be the most effective method for controlling perennial broadleaf weeds such as Pepper Grass (*Lepidium latifolium*). Selective herbicides can be applied to large areas by tractors with spray booms or in spot application by hand with a backpack sprayer depending on extent of infestation. Pre-emergent herbicides work by killing germinating seeds and are thus well suited to combat infestations of many types annual weeds. They are effective for annual grasses that cannot be treated with selective herbicides. Pre-emergent herbicides are generally applied in fall. Many pre-emergent herbicides require irrigation or rain following

herbicide application to wash the herbicide into the soil. They may require timing applications of herbicide to receive rain in the days following application. Pre-emergent herbicides should not be used where native grass re-seeding will be required within the time that the herbicide is active. All herbicide use shall be governed by state and local regulations

- g. Mowing. Properly timed mowing can reduce or eliminate seed head formation of annual weeds. Late spring mowings are effective for many weed species. Early Fall mowing can be helpful for late season annual weeds. Mowing equipment blade heights must be set to a minimum of 6 inches to minimize impact of mowing on Giant Garter Snakes.
- h. Schedule. Prescriptive weed control measures shall be carried out on the following schedule:

Control Method	Problem	Frequency of Application	Comments
Burning	Annual grasses and broadleaf weeds	Required every three years May be repeated in succeeding year for problem infestations. Number of Burns shall not exceed 5 per decade..	Late spring when weed seeds are still in dough stage, April through June depending on climate conditions Slow, hot burns from top down into light wind are most effective.
Selective Herbicide	Annual and perennial Broadleaf weeds	If required, in February-March	Spot spray minor infestations, Treat entire project or project sections for major infestations.
Pre-emergent Herbicide	Annual grasses and annual broadleaf weeds	If required, in fall	Use per manufacturer's recommendations in fall, just before seasonal rains commence
Mowing	Annual grasses and annual broadleaf weeds	If required, in Spring, not required after burn. Do not perform before spring burn.	Mow with blades set to not less than 6" in height in June

- i. Human Impacts: All damage as a result of these activities is the responsibility of the Non-Federal Sponsor and shall be repaired and replanted by the Non-Federal Sponsor as required to meet environmental commitments. The following categorizes the greatest potential for damage from human impacts and shall be policed by the Non-Federal Sponsor.

- j. **Public Use:** The public's impact on a site will be potentially disruptive to the vegetation. Ensure recreational activities do not impact the plants. If public use becomes destructive, the Non-Federal Sponsor shall take corrective measures to replace plants and to ensure their survival.
- k. **Local Maintenance District Damage:** Standard maintenance practices applied to the opposite side of the levee may pose a threat to the mitigation vegetation. The reclamation district shall assess its present maintenance practices and determine if it can continue these practices or if it needs to adjust these methods to be less detrimental to the vegetation. Some traditional practices are not appropriate, for some sites and different methods shall be implemented. The Non-Federal Local sponsor shall be responsible for repairing damage caused by the reclamation district's maintenance practices on adjacent land. Local maintenance personnel are the people most involved with the sites on a day-to-day basis and therefore stand the greatest risk of inadvertently damaging them. Current levee maintenance practices, such as burning, can quickly destroy years of work, if maintenance procedures get out of control. The most common methods used to control vegetative growth on the levee structure are evaluated as follows:
- (1) **Mowing:** Mowing is by far the safest method used to control vegetative growth and limits potential damage, and is encouraged, where feasible.
 - (2) **Discing:** Discing is another method, but is not as widely used due to its limited application to levee maintenance. Discing is most effective in maintaining a firebreak along the toe of the levee structure. Discing must be prevented on the native grass and stone biotechnical levee protection due to the fact that the perennial grasses will be greatly disrupted by any form of mechanical cultivation.
 - (3) **Spraying:** Chemical spraying is commonly used. Care shall be taken to prevent spray drift onto adjoining areas in accord with all applicable local, State and Federal laws.
 - (4) **Burning:** Generally, burning is an appropriate method to control vegetative growth, however, burning may injure native grasses if the fires get out of hand and burns the native grass areas at inappropriate times or repeatedly. Although burning is a method used to control weeds in native grass, the frequency and timing is important. Native grasses should not burn more than two consecutive years in a row.
- l. **Vandalism:** Vandalism is always a potential threat but generally decreases over time. Vandalism damage to signs, fences, and gates, are long-term problems and shall be repaired or replaced by the Non-Federal Sponsor in a timely fashion.
- m. **Trash:** Trash is disruptive to plant growth and wildlife. Trash shall be promptly removed from the site and discarded properly.

- n. Wildlife and Domestic Animal Caused Damage: Wildlife damage is considered as an 'Act of God' and shall be revisited by all concerned agencies and decisions, relative to replanting, made on a case-by-case basis. Cattle, horses, sheep and goats shall be kept off the site and damage caused by domestic animals shall be the responsibility of the Non-Federal Sponsor.
- o. Natural Environmental Damage: Natural processes are inevitable and could occur at any time during the course of re-establishing the vegetation. However, over time the damage will likely be less, due to the maturity of the vegetation. All 'Acts of God' damage shall be revisited by all concerned agencies and decisions, relative to replanting, made on a case-by-case basis. Environmental damages caused by human impacts are events other than 'Acts of God' even though the results could be the same, i.e., a lightning fire versus a cigarette caused fire.
- p. Flood & Erosion: Flood and erosion damage could be an annual occurrence, such occurrences shall be documented in each annual report. Flooding may impact the native grass and could increase soil erosion.
- q. Fire: Fire damage from unplanned fires shall be documented in each annual report. Fire is a potential threat from both maintenance practices and public carelessness.
- r. Public Health and Safety: Vegetation will be managed to meet operation, maintenance, repair, replacement and rehabilitation (OMRRR) requirements of authorized flood control and other authorized project features. Vegetative management may include partial or complete removal of vegetation for OMRRR purposes. Local maintenance entities shall coordinate with the Non-Federal Sponsor and receive the Non-Federal Sponsor's approval prior to undertaking any action.
- s. Other Miscellaneous Items: Ensure access roads are kept in good passable order. Ensure that all other items associated with individual projects are maintained as per mitigation plans. Maintenance records of these items shall be presented as applicable in each annual report.

10-05 MANAGEMENT AND OPERATION OF THE NATIVE GRASS AND ROCK BIOTECHNICAL LEVEE PROTECTION (Adaptive Management)

- a. **General.** The operations and maintenance manual assumes the biotechnical native grass and stone levee protection will function as giant garter snake habitat. However, if the native grass and stone protection fails to provide giant garter snake habitat, or in the event of a structural failure, if the vegetation fails to meet long-term performance standards or is otherwise in noncompliance with project requirements the procedures and standards required by this operations and maintenance manual may be insufficient or ineffective. In such cases, the mitigation evaluation team will be responsible for reviewing monitoring reports, evaluating results, and recommending remedial measures to be implemented by the Non-Federal Sponsor. This process is known as "Adaptive Management". The remedial measures would provide information for the repair, replacement, or rehabilitation of vegetation and structural features required for creation of habitat. The standard operation and maintenance manual governs structural features required for flood control and public safety, refer to section 1-01 and 1-02..

Because the factors that might require remediation cannot be identified specifically, some potential factors will be briefly summarized herein. If it should become necessary, the mitigation evaluation team will prepare more specific information pertaining to the cause of the problem and the proposed adaptive management technique.

- b. **Determination of the Need for Adaptive Management.** The monitoring results and visual observations that are made during the annual and semi-annual inspections will determine noncompliance with long-term performance standards. The Non-Federal Sponsor will report this information to the mitigation evaluation team. Based upon review of the report, the current understanding about system dynamics, current site conditions, and the project's performance standards, the mitigation evaluation team will recommend what actions, if any, may be required.
- c. **Selection of Critical Areas.** The project site may be affected by a number of natural events or human impacts. Remedial action may be necessary throughout the biotechnical levee protection or only in specific areas. The selection of specific or critical areas will be based on the following considerations, or other factors not listed below that may affect project performance:
- (1) After remediation, is the area capable of providing self-sufficient levee protection in a reasonable period of time?
 - (2) If original vegetation mortality was a result of inappropriate species composition, would modifying the plant palette result in increased erosion protection?
 - (3) If original vegetation mortality was a result of berm or bank failure, would modifying the structures result in improved grass establishment?

d. Potential Reasons for Implementing Adaptive Management Actions. There are a number of possible circumstances that may require adaptive management actions. Such circumstances may include the following:

- (1) Extensive erosion of the soil layer caused by wave action.
- (2) Excessive damage by wildlife.
- (3) Competition with invasive, non-native weed species.
- (4) Human impacts, including vandalism, arson or inadvertent impacts.
- (5) Natural events, such as floods or wildfire.
- (6) Failure to meet performance standards

10-06. NATIVE GRASS EVALUATION AND REPORTING

The goal of the native grass and stone biotechnical levee protection projects is to provide adequate erosion protection and at the same time to create self-sustaining habitats per the specific requirements of the environmental documentation done in accordance with the National Environmental Policy Act (NEPA) and the U.S. Fish and Wildlife Service's biological opinion (if any) issued pursuant to the Federal Endangered Species Act (ESA) for that project. In order to maintain erosion protection and habitat values the reclamation district shall carry out a regular maintenance program. In order to effectively manage and maintain the native grasses, an annual evaluation of the native grasses shall be required.

During the three-year plant establishment period following project construction the Corps will perform the annual evaluation. After the three-year establishment, the Corps will transfer the responsibilities for evaluating and maintaining the native grasses. Evaluation shall be supervised or conducted by a qualified biologist. The Non-Federal Sponsor shall be responsible for attaining the performance standards for native grass for the project.

- a. Performance Standards and Goals. Performance standards are minimum objectives that must be achieved to meet project objectives. Failure to achieve performance standards may necessitate implementation of remedial measures to mitigate project impacts. In addition to performance standards for the end of the designated monitoring period, interim performance goals have been established for post plant establishment period monitoring years as designated in the monitoring schedule to identify the need for management changes to improve the success of re-establishment of native grass vegetation and ensure compliance with performance standards at the end of the designated monitoring period. Refer to Exhibit H for performance standards.
- b. Evaluation Schedule: The site will be evaluated annually in April.

c. Evaluation Methods.

- (1) Percent cover by native grasses and percent cover by non-native species shall be measured using permanent transects sequentially numbered at approximately 1/2 mile intervals. The transects shall run between the top of the slope to the toe of the slope. The transects shall be perpendicular to the levee and shall be permanently marked at the top of the slope. Percent cover by native grass shall be determined by the measurement of the length of the transects intersected by native grass cover. The same system shall be used to measure percent cover by non native species, as well, the percentage of bare and percent rock exposed shall be measured the entire length of each transect. Refer to exhibit G.**
- (2) A qualitative description of the vegetative cover shall be made including a discussion of desirable species present, relative composition of desirable species from most numerous to least numerous, weed species present, relative composition of weed species present from most numerous to least numerous.**

d. Native Grass Evaluation Reports:

- (1) Annual Native Grass Evaluation Reports monitoring reports for Colusa Basin Drain Contract 42D (RD 108) shall be submitted to the Non-Federal Sponsor, the Corps' Engineering Design Branch (CESPK-ED-D), the Corps' Environmental Resources Branch (CESPK-PD-R), and the Corps' Project Manager (CESPK-PM) by August 1 of each year. Monitoring shall be carried out each year for the life of the project. Monitoring reports will include the following:**
 - (a) A summary of monitoring data for the project site by transect number.**
 - (b) Photographic documentation of site at each transect location, at a minimum, this will include a photograph looking each direction (upstream and downstream) from the middle of the levee slope at each transect location.**
 - (c) Qualitative description of the growth and vigor of vegetation.**
 - (d) A description of how plantings are performing relative to performance standards and goals.**
 - (e) A description of how each species planted is performing.**
 - (f) A description of environmental factors that may be adversely affecting planting success.**
 - (g) A description of proposed and implemented remedial measures.**

10-07. GIANT GARTER SNAKE MONITORING AND REPORTING

The goal of the native grass and stone biotechnical levee protection projects is to provide adequate erosion protection and at the same time to create self-sustaining habitats per the specific requirements of the environmental documentation done in accordance with the National Environmental Policy Act (NEPA) and the U.S. Fish and Wildlife Service's biological opinion (if any) issued pursuant to the Federal Endangered Species Act (ESA) for that project. The native grass and stone levee protection will be considered self-sustaining if the site achieves, or is trending toward achieving, the performance standards and is determined successful in providing adequate habitat to offset losses from project construction.

Following project construction and the three-year plant establishment period the Corps will transfer the responsibilities for monitoring and reporting for the biological resources monitoring programs to the Non-Federal Sponsor. Monitoring shall be supervised or conducted by a qualified biologist. The Non-Federal Sponsor shall be responsible for attaining the performance standards for the project.

- a. **Performance Standards and Goals:** Performance standards are minimum objectives that must be achieved to meet project objectives. Failure to achieve performance standards may necessitate implementation of remedial measures to mitigate project impacts. Refer to Exhibit H for performance standards.
- b. **Monitoring Schedule:** The site will be monitored in year 1-6, which will begin the year following installation of the mitigation features. The monitoring period is expected to begin in 2003 and end in year 2008.
- c. **Monitoring Methods:** Monitoring during the first year of establishment will follow the United States Geological Survey's (USGS) "Monitoring Plan for Giant Garter Snakes (*Thamnophis gigas*) For the Bank Protection Project on the Left Bank of the Colusa Basin Drainage Canal in Reclamation District 108," refer to Exhibit K. Based upon their findings the USGS will then develop a Monitoring Plan for the succeeding five years.
- d. **Monitoring Reports:** Colusa Basin Drain Contract 42D (RD 108), Annual giant garter snake monitoring reports for Colusa Basin Drain Contract 42D (RD 108) shall be submitted to the Non-Federal Sponsor, the Corps' Environmental Resources Branch (CESPK-PD-R), and the Corps' Project Manager (CESPK-PM) by December 31 of each monitoring year. Monitoring is expected to begin in year 2003 and end in year 2008. Monitoring reports will include the following:
 - (1) A summary of monitoring data for the project site
 - (2) Numbers of Giant Garter snakes captured
 - (3) Location, date and time of capture(s)

- (4) Maps showing locations of traps, foot searches and captures
- (5) A summary of demographic features of the Giant Garter Snake(s) captured including size and sex
- (6) Density estimates derived from capture information
- (7) A description of environmental factors that may be adversely affecting planting success.
- (8) A description of proposed and implemented remedial measures.

REFERENCES

- U.S. Army Corps of Engineers, 1955. Standard operation and maintenance manual for the Sacramento River flood protection project. Revised version. May. Prepared by the U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA.
- U.S. Army Corps of Engineers, 1996. Addendum to the Standard Operation and Maintenance Manual for the Sacramento River Flood Protection Project. Revised version. October. Prepared by the U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA.
- U.S. Fish and Wildlife Service, 2000. Biological Opinion. Revised version. June. Prepared by the U.S. Fish and Wildlife Service, Sacramento, CA.

EXHIBIT A - Unattached

**FLOOD CONTROL REGULATIONS
(See Standard Manual)**

EXHIBIT A1
LOCATION MAP

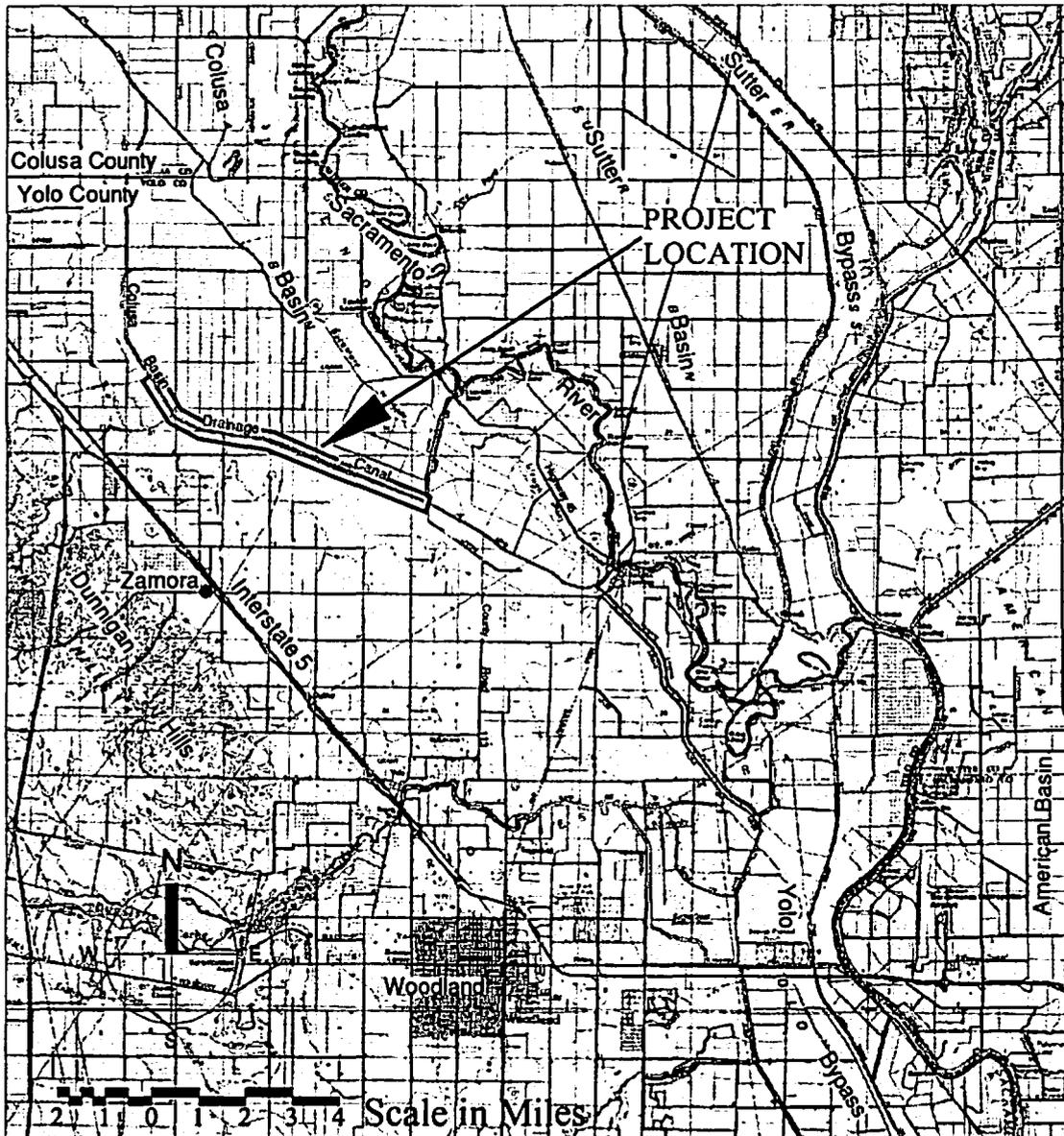


EXHIBIT B

“AS
CONSTRUCTED”
DRAWINGS

SEE
SEPARATE
FOLDER FOR
THE
FOLLOWING
DRAWINGS

NGS:

Title: Colusa Basin Drain Contract 42D (RD 108)
Contract No. DACW05-00-C-0034
File No. 50-04-6059

ADDITIONAL DRAWINGS OF CROSS-SECTIONS, STRUCTURES, AND MISCELLANEOUS FACILITIES ARE AVAILABLE IN THE OFFICE OF THE DISTRICT

ENGINEER.

EXHIBIT C

CHECK LIST NO. 1

VEGETATION ON MITIGATION AREA
SEMI ANNUAL INSPECTION FORM

Location of Area Inspected: Part No. __, Unit No.'s: _____ Date: _____
(including river mile(s)) _____
Inspected by: _____

Report below the condition of the site and those items requiring maintenance work. Opposite each item listed, indicate the appropriate response, yes or no, in the area provided. Provide an attachment, if necessary, describing the negative significant conditions and any proposed/implemented maintenance work for each item. Note any changes, positive or negative, from the previous inspections.

Reference O&M Unit No.

<u>Item No.</u>	<u>Description</u>	<u>Response</u>	<u>Yes</u>	<u>No*</u>
1:	Mitigation area erosion free.....	_____	_____	_____
2:	Vegetation is free of fire damage.....	_____	_____	_____
3:	Vegetation is free of flood damage.....	_____	_____	_____
4:	Vegetation is free of wind damage	_____	_____	_____
5:	Vegetation is free of herbicide damage	_____	_____	_____
6:	Vegetation is free of wildlife damage.....	_____	_____	_____
7:	Vegetation free of excessive weed growth	_____	_____	_____
8:	Vegetation & equipment is free of vandalism	_____	_____	_____
9:	Site is free of trash	_____	_____	_____
10:	Access roads clear.....	_____	_____	_____
11:	Access gate barriers & locks in good working order.....	_____	_____	_____
12:	New volunteer growth (native grass and forbes) observed.....	_____	_____	_____
13:	Site is free of major weed infestations.....	_____	_____	_____
14:	Other items: _____	_____	_____	_____

COMMENTS _____

*Requires explanation and estimate of extent of problem

EXHIBIT D - Unattached

**LETTER OF TRANSFER TO AND/OR ACCEPTANCE
BY THE RECLAMATION BOARD**

EXHIBIT E

**STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF PLANT INDUSTRY**

**PEST RATINGS OF NOXIOUS WEED SPECIES
AND NOXIOUS WEED SEED**

PURPOSE

To advise commissioners as to the Department's policy regarding any pest action.

DEFINITIONS

- "A"** An organism of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action.
- "B"** An organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner.
- or
- An organism of known economic importance subject to state endorsed holding action and eradication only when found in a nursery.
- "C"** An organism subject to no state enforced action outside of nurseries except to retard spread. At the discretion of the commissioner.

GUIDANCE

The district will be allowed to control noxious weeds classified as "A" and identified by the Department of Food and Agriculture as "(an) organism of known economic importance to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action."

The district will be allowed to control noxious weeds classified as "B" and identified by the Department of Food and Agriculture as (an) organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion to the individual

county agricultural commissioner.

EXHIBIT E

Before the district eradicates any plant belonging to either class "A" or "B", the plant to be eradicated must be identified as a noxious weed in either class "A" or class "B" by a qualified biologist or a representative of the county agricultural commissioner's office. The district shall notify the Department of Water Resources, Flood Control Project Branch before taking action.

"A" SPECIES

*Eradication, containment, rejection or other holding action at the state-county level.
Quarantine interceptions to be rejected or treated at any point in the state.*

<u>Acaena anserinifolia</u>	biddy biddy
<u>Acaena novae-zelandiae</u> (- <u>A anserinifolia</u> in part as used previously and of British and Australian authors.)	biddy biddy
<u>Acaena pallida</u> (- <u>A anserinifolia</u> in part as used previously.)	biddy biddy
<u>Achnatherum brachychaetum</u> (- <u>Stipa brachychaeta</u>)	punagrass
<u>Albago maurorum</u> (- <u>A pseudalhagi</u>)	camelthorn
<u>Alternanthera philoxeroides</u>	alligatorwood
<u>Arctotheca calendula</u>	capeweed, as seed or fertile plants
<u>Carduus acanthoides</u>	plumeless thistle
<u>Carduus nutans</u>	musk thistle
<u>Carthamus leucocaulos</u>	whitestem, distaff thistle
<u>Centaurea diffusa</u>	diffuse knapweed
<u>Centaurea iberica</u>	Iberian starthistle
<u>Centaurea maculosa</u>	spotted knapweed
<u>Centaurea squarrosa</u>	squarrosa knapweed

EXHIBIT E "A" - Pests Continued

<u>Chondrilla juncea</u>	skeletonweed
<u>Cirsium ochrocentrum</u>	yellowspine thistle
<u>Cirsium undulatum</u>	wavyleaf thistle
<u>Crupina vulgaris</u>	bearded creeper
<u>Cucumia melo</u> var. <u>dudain</u>	dudain melon
<u>Cuscuta reflexa</u>	giant dodder
<u>Euphorbia esula</u>	leafy spurge
<u>Euphorbia serrata</u>	serrate spurge
<u>Halimodendron halodendron</u>	Russian salttree
<u>Halogeton glomeratus</u>	halogeton
<u>Helianthus ciliaris</u>	blueweed
<u>Heteropogon contortus</u>	tanglehead
<u>Hydrilla verticillata</u>	hydrilla
<u>Linaria gonistifolia</u> spp. <u>dalmatica</u> (- <u>L. dalmatica</u>)	Dalmatian, toadflax
<u>Onopordum</u> spp.	onopordum thistles
<u>Orobanche ludoviciana</u> var. <u>cooperi</u> (- <u>O cooperi</u> (Gray) Heller, as used in Munz', A Flora of Southern California.)	Cooper's broomrape
(- <u>O multiflora</u> Nutt., as used in Correll and Johnston's Manual of the Vascular Plants of Texas.)	desert broomrape
<u>Orobanche ramosa</u>	branched, broomrape
<u>Peganum harmala</u>	harmel
<u>Physalis virginians</u> var. <u>sonorae</u> (- <u>p subglabrata</u> as used previously.)	smooth groundcherry

EXHIBIT E "A" - Pests Continued

<u>Prosopis strombulifera</u>	creeping mesquite
<u>Salsola vermiculata</u>	wormleaf salsola
<u>Salvia virgata</u> (- <u>S pratensis</u> as used previously.)	meadow sage
<u>Scolymus hispanicus</u>	golden thistle
<u>Solanum cardiophyllum</u> nightshade	heartleaf
<u>Solanum dimidiatum</u>	Torrey's nightshade
<u>Sonchus arvensis</u>	perennial sowthistle
<u>Sphaerophysa salsula</u>	Austrian peaweed
<u>Striga lutea</u> (- <u>S asiatica</u>)	witchweed
<u>Tagetes minuta</u>	wild marigold
<u>Zygophyllum fabago</u>	Syrian beancaper

"B" SPECIES

Eradication, containment, control or other holding action at the discretion of the commissioner.

<u>Acacia paradoxa</u> (- <u>A armata</u>)	kangaroothorn
<u>Acronitlon repens</u> (- <u>Centaurea repens</u>)	Russian knapweed
<u>Aegilops cylindrica</u>	jointed goatgrass
<u>Aegilops ovata</u> (- <u>A geniculata</u> and <u>A neglecta</u> in part)	ovate goatgrass
<u>Aegilops triuncialis</u>	barb goatgrass
<u>Aeschynomene rudis</u>	rough jointvetch

EXHIBIT E "B" - Pests continued

<u>Agropyron repens</u>	(see <u>Elytrigia repens</u>)
<u>Allium paniculatum</u>	panicked onion
<u>Allium vineals</u>	wild garlic
<u>Ambrosia trifida</u>	giant ragweed
<u>Araujia sericofera</u>	bladderflower
<u>Cardaria chalepensis</u>	lens-podded hoarycress
<u>Cardaria drabs</u>	heart-poddedhoarycress
<u>Cardaria pubescens</u>	globe-podded hoarycress
<u>Carthamus baeticus</u>	smooth distaff thistle
<u>Carthamus lanatus</u>	woolly distaff thistle
<u>Centaurea calcitrapa</u>	Purple starthistle
<u>Centaurea repens</u>	(See <u>Acroptilon repens</u>)
<u>Centaurea sulphurea</u>	Sicilian thistle
<u>Chorispora tenella</u>	purple mustard
<u>Cirsium arvense</u>	Canada thistle
<u>Coronopus squamatus</u>	swinecress
<u>Cucumis myriocarpus</u>	paddy melon
<u>Cynara cardunculus</u>	artichoke thistle
<u>Cyperus esculentus</u>	yellow nutsedge
<u>Cyperus rotundus</u>	purple nutsedge
<u>Elytrigia repens</u> (- <u>Agropyron repens</u>)	quackgrass
<u>Euphorbia oblongata</u>	oblong spurge

EXHIBIT E "B" - *Pests continued*

<u>Gaura coccinea</u>	scarlet gaura
<u>Gaura drummondii</u>	scented gaura
<u>Gaura sinuata</u>	wavyleaf gaura
<u>Gypsophila paniculata</u>	baby's breath
<u>Imperata brevifolia</u>	satintail
<u>Isatis tinctoria</u>	dyer's woad
<u>Lepidium latifolium</u>	perennial peppergrass
<u>Lythrum salicaria</u>	purple loosestrife
<u>Muhlenbergia schreberi</u>	nimblewill
<u>Nothoscordum inodorum</u>	false garlic
<u>Nymphaea mexicana</u>	banana waterlily
<u>Oryza rufipogon</u>	red rice
<u>Panicum antidotale</u>	blue panicgrass
<u>Physalis viscosa</u>	grape groundcherry
<u>Polygonum cuspidatum</u>	Japanese
<u>Polygonum polystachyum</u>	Himalayan knotweed
<u>Polygonum sachalinonae</u>	giant knotweed
<u>Rorippa austriaca</u>	Austrian fieldcress
<u>Salvia aethiopsis</u>	Mediterranean sage
<u>Senecio Jacobaea</u>	tansy ragwort
<u>Senecio squalidus</u>	Oxford ragwort
<u>Sesbania punicea</u>	Scarlet Wisteria, Rattlebox
<u>Setaria faberi</u>	giant foxtail

EXHIBIT E "B" - *Pests continued*

<u>Solanum carolinense</u>	Carolina horsenettle, knotweed
<u>Solanum elaeagnifolium</u>	white horsenettle
<u>Solanum lanceolatum</u>	lanceleaf nightshade
<u>Solanum marginatum</u>	white-margined nightshade
<u>Symphytum asperum</u>	rough comfrey
<u>Ulex europaeus</u>	gorse
<u>Viscum album</u>	European mistletoe

"C" SPECIES

State endorsed holding action and eradication only when found in a nursery: action to retard spread outside of nurseries at the discretion of the commissioner: reject only when found in a cropseed for planting or at the discretion of the commissioner.

<u>Carduus pycnocephalus</u>	Italian thistle
<u>Carduus tenuiflorus</u>	Italian thistle
<u>Cenchrus echinatus</u>	Southern sandbur
<u>Cenchrus incertus</u>	coast sandbur
<u>Cenchrus longispinus</u> (- <u>C pauciflorus</u> as used previously)	mat sandbur
<u>Centaurea solstitialis</u>	yellow starthistle

EXHIBIT F
Unattached

“As-Established Records”

Final Report

**Sacramento River Bank Protection Project
Colusa Basin Drain Contract 42D (RD 108)**

Prepared for

**U.S. Army corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814**

Contract No. DACW05-00- C-0034

Prepared by

**Sierra View Landscape
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EXHIBIT G

EXAMPLE OF SAMPLING TRANSECT MEASUREMENT

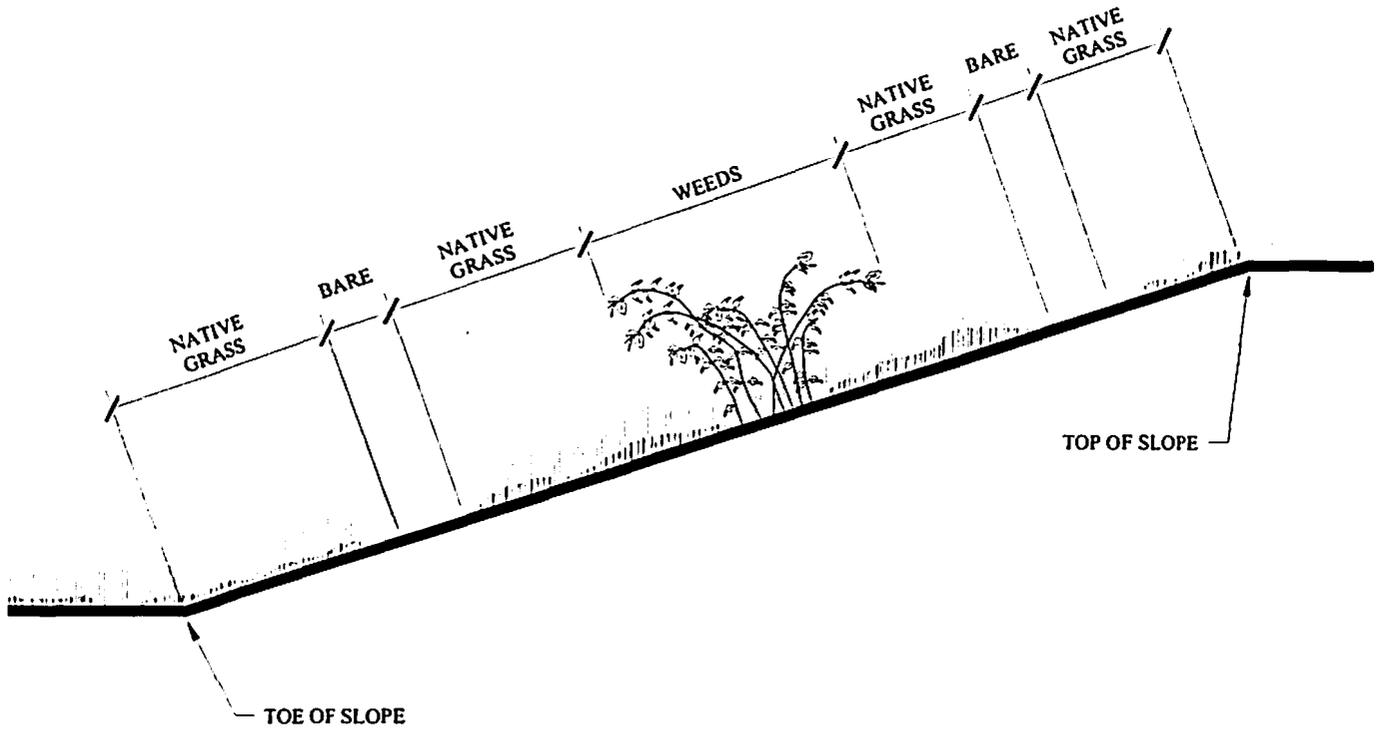


EXHIBIT H

Performance Standards and Recommended Performance Goals for

Sacramento River Bank Protection Project
Colusa Basin Drain Contract 42D (RD 108)

Vegetative Cover for Erosion Protection

monitoring regime	plant establishment period			post establishment period
performance criteria	Minimum % coverage by native grass and forbes			
monitoring year	year 1	year 2	year 3	year 4 and beyond
percentage required	30%	60%	90%	90%
performance criteria	Maximum % coverage by weeds			
monitoring year	year 1	year 2	year 3	year 4 and beyond
percentage required	20%	10%	10%	10%
performance criteria	Maximum % percent bare soil			
monitoring year	year 1	year 2	year 3	year 4 and beyond
percentage required	50%	30%	10%	10%
performance criteria	Damage to soil or rock layer (minor and Major damage) may not exceed 10% of slope width (approximately 6' wide) or damage is greater than 0.5 Acre (4' wide X 5,445' long for example)			

EXHIBIT I

Table of Environmental Commitments From Sacramento River Bank Protection Project
Colusa Basin Drain Contract 42D (RD 108)

Environmental Commitment	Source
a. No break in construction greater than 2 days after October 1 until construction is complete. A Service-approved biologist shall survey the project area for snakes prior to resumption of construction activities after each break in construction occurring after October 1.	BO Amendment
b. Confine clearing to minimum area necessary to facilitate construction activities. Flag and designate avoided snake habitat within or adjacent to the project area as Environmentally Sensitive.	BO Amendment
c. Prior to construction activities, a qualified biologist shall instruct all construction personnel in worker awareness training to recognize the snake and its habitat.	BO Amendment
d. A Service-approved biologist shall survey the project area for snakes, 24 hours prior to construction. Repeat the survey after any lapse of construction of 2 weeks or greater prior to October 1.	BO Amendment
e. If a snake is encountered during construction, activities shall cease until the biological monitor has determined the snake will not be harmed, and the snake has moved away. Capture and relocation shall not be attempted until and unless the snake has been given ample opportunity to move away on its own, and shall only be conducted by a Service-approved biologist who shall be named prior to groundbreaking.	BO Amendment
f. Confine movement of heavy equipment to and from the project site to existing roadways, to minimize habitat disturbance.	BO Amendment
g. Replace rock and filter fabric placed during 1998 with the 12 inches of soil over the larger-sized rock as described in the Description of the Proposed Action.	BO Amendment
h. Biotechnical soil/rock design consists of a rock layer not greater than 15 inches in thickness and a soil layer over the rock not less than 12 inches in depth.	Project Description
i. If construction occurs in 2000, the construction period would be about 20 weeks; about August 2000 to December 2000. The grass establishment period would be 3 years, about December 2000 to November 2003.	Project Description
j. During the construction period, the Corps would monitor the construction contractor's compliance with conservation measures and other environmental requirements. The primary goal of construction monitoring is to minimize impacts to all resources.	Project Description
k. A post-construction compliance report will be prepared and submitted to the Service within 60 days of project construction completion. The report will include (1) construction dates; (2) verification that all conservation measures were fully implemented by construction contractor; (3) identification of conservation measures that were not fully implemented, if any; (4) description of effects on the snake and its habitat; (5) known occurrences of incidental take, if any, and (6) other pertinent information.	Project Description
l. Water Quality Mitigation Measures: (1) Silt screens or other appropriate construction barriers would be erected between the construction area and the CBDC in order to prevent siltation in the CBDC. Air Quality/Traffic Safety Mitigation Measures: To reduce the amount of equipment and vehicle emissions, the following measures will be implemented: (1) Ensure that all internal combustion engine equipment is properly tuned to manufacturer's specifications; (2) Limit onsite idle time of heavy equipment to 10 minutes; (3) Encourage employees to rideshare or carpool to the job site to reduce the amount of vehicle traffic to and from the project site; and (4) contractor will prepare an environmental protection plan that includes sections that address control measures to reduce emissions and minimize traffic problems.	Environmental Assessment

2. Offsite Habitat Mitigation	
a. Implement Habitat Replacement Conservation Measure a., as described in Corps project description to protect a total of 40.54 acres of replacement habitat at a Service-approved site that supports an appropriate proportion of wetland and upland habitat for giant garter snake (appropriate means appropriate for the constraints and potential of the site, not any prescribed ratio) within the project area (first priority), or that would benefit the Yolo Basin population of giant garter snake (second priority). The Corps should provide quarterly status reports, beginning on issuance of the Final Biological Opinion on progress made in securing the replacement habitat.	BO Amendment
b. Within 4 months of securing an appropriate site, submit a plan for restoration and long-term management of the selected site to the Service. Implement the plan subject to final Service approval.	BO Amendment
3. Operation and Maintenance Phase	
a. Work with the Service, CDFG, RD 108, and The Rec Board to finalize the O&M manual for the soil-rock design within 30 days of completion of construction.	BO Amendment
b. The Corps shall incorporate into the O&M plan the enclosed Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat.	BO Amendment
c. The Corps shall incorporate into the O&M plan a long-term monitoring program for giant garter snake to document their use of the biotechnical design. This monitoring should occur a minimum of 3 years beyond the establishment period.	BO Amendment
d. The Corps shall incorporate into the O&M plan a provision that requires the Reclamation District to repair any portion of the waterside slope that incurs damage greater than 0.5 acre in a single site or 10 percent of the entire levee slope (4.7 miles) with the stone/soil design has been affected. At such time, re-grading and seeding would be required to bring the soil grade and native grass establishment back to 100 percent of the treated area.	BO Amendment
e. The Corps shall incorporate into the O&M plan a provision which states the Reclamation Board and/or the Corps of Engineers will correct any maintenance deficiencies by the Reclamation District.	BO Amendment
f. The Corps shall incorporate into the O&M plan a provision that any damages requiring repair be completed prior to the next growing season.	BO Amendment
g. The maintenance program includes two annual mowings (mower blades set to 6 inches or higher) in the summer and fall, and/or application of a contact broadleaf herbicide in January-March, to remove early weed competition.	Project Description
h. A plan for monitoring of the project will be developed in consultation with the Service, RD 108, and the Rec Board during the preparation of the O&M manual. The plan would outline reporting requirements, monitoring schedules and methods, performance success criteria and corrective measures. The Corps is responsible for monitoring following construction for not less than 3 years; a time period necessary for native grass establishment and establishment of any habitat compensation areas. The Rec Board would then assume responsibility for implementing monitoring and remedial measures for 3 additional years.	Project Description

EXHIBIT J

Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat

Endangered Species Div., Sacramento Fish & Wildlife Office, U.S. Fish & Wildlife Service

Replacement and Restoration Guidelines are provided together, as the two conservation measures may not be mutually exclusive. Replacement of habitat may also require restoration of some areas. Preserved habitat may additionally be improved for giant garter snake by using some of the restoration guidelines.

Reference sites

A nearby reference site should be chosen both for restoration of giant garter snake habitat and for creation of replacement habitat. The reference site will be used to determine the success of conservation efforts. For restoration of habitat, the pre-project condition may be used as a reference site if adequate documentation exists. For creation of replacement habitat or for restoration where pre-project conditions are not documented, the reference site should be nearby or adjacent and should represent high quality giant garter snake habitat.

Restoration of giant garter snake habitat

Restoration may include incorporating some of the Replacement guidelines to enhance habitat value for giant garter snake. Restoration should follow the guidelines outlined below:

1. Restoring giant garter snake habitat includes minimizing impacts of project activities to the existing habitat, including using silt fencing, designating environmentally sensitive areas, using protective mats, preventing runoff, and providing worker awareness training. Measures to minimize impacts include:
 - a. Avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat. Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.
 - b. Construction activity within habitat should be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move and avoid danger. Between October 2 and April 30 contact the Service's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.
 - c. Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or

adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.

- d. Construction personnel should receive Service-approved worker environmental awareness training. This training instructs workers to recognize giant garter snakes and its habitat(s).
 - e. 24-hours prior to construction activities, the project area should be surveyed for giant garter snakes. Survey of the project area should be repeated if a lapse in construction activity of two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Report any sightings and any incidental take to the Service immediately by telephone at (916) 414-6600.
 - f. Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
2. Remove all construction debris and stockpiled materials.
 3. Regrade area to preexisting contour, or a contour that would improve restoration potential of the site.
 4. Replant and hydroseed the restoration area. Recommended plantings consist of a) wetland emergents, b) low-growing cover on or adjacent to banks, and c) upland plantings/hydroseeding mix to encourage use by other wildlife. Riparian plantings are not appropriate because shading may result in lack of basking sites. Native plantings are encouraged except where non-natives will provide additional values to wildlife habitat and will not become invasive in native communities. The applicant should obtain cuttings, plantings, plugs, or seeds, from local sources wherever possible. The applicant should attempt to restore conditions similar to that of adjacent or nearby habitats.
 - a. Emergent wetland plants recommended for giant garter snake habitat are California bulrush (*Scirpus californicus*), cattail (*Typha* spp.), and water primrose (*Ludwigia peploides*). Additional wetland plantings may include common tule (*Scirpus acutus*), Baltic rush (*Juncus balticus*), or duckweed (*Lemna* spp.).
 - b. Cover species on or adjacent to the bank may include California blackberry (*Rubus vitifolius*) or wild grape (*Vitis californica*), along with the hydroseeding mix recommended below.

- c. Upland plantings/hydroseeding mix: Disturbed soil surfaces such as levee slopes should be hydroseeded to prevent erosion. The Service recommends a mix of at least 20-40 percent native grass seeds [such as annual fescue (*Vulpia* spp.), California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), and needle grass (*Nassella* spp.)], 2-10 percent native forb seeds, five percent rose clover (*Trifolium hirtum*), and five percent alfalfa (*Medicago sativa*). Approximately 40-68 percent of the mixture may be non-aggressive European annual grasses [such as wild oats (*Avena sativa*), wheat (*Triticum* ssp.), and barley (*Hordeum vulgare*)]. The Corps will not include aggressive non-native grasses, such as perennial ryegrass (*Lolium perenne*), cheatgrass (*Bromus tectorum*), fescue (*Festuca* spp.), giant reed (*Arundo donax*), medusa-head (*Taeniatherum caput-medusae*), or Pampas grass (*Cortaderia selloana*) in the hydroseed mix. The Corps will not include endophyte-infected grasses in the mix. Mixes of one-hundred percent native grasses and forbs may also be used, and are encouraged.

Replacement of giant garter snake habitat

Location

Replacement location should be within the same population cluster boundaries (population clusters are defined in 58 FR 54053) as the habitat lost. For example: The boundaries of the Sacramento Basin population cluster are approximately, Highway 16 to the north, Sacramento River to the west, Twin Cities Road to the south, and the Folsom Aqueduct to the east. Habitat lost within this area must also be replaced within this area.

Habitat components

Giant Garter Snake Habitat. The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, other waterways and agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of (1) adequate water during the snake's active period, (early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; (3) upland habitat for basking, cover, and retreat sites; and (4) higher elevation uplands for cover and refuge from flood waters. For the purposes of this programmatic opinion, a basic giant garter snake habitat unit will incorporate 2.00 acres (0.81 hectares) of surrounding upland for every 1.00 acre (0.40 hectare) of aquatic habitat. The 2.00 acres (0.81 hectares) of upland also may be defined as 218 linear feet (66 meters) of bankside habitat which incorporates adjacent uplands to a width of 200 feet (61 meters) from the edge of the bank. Replacement habitat must provide the above mentioned essential habitat components and include the following:

1. All replacement habitat must include both upland and aquatic habitat components. Upland and aquatic habitat components must be included in the replacement habitat at a ratio of 2:1 upland acres to aquatic acres
2. A semi-permanent or permanent aquatic habitat which provides water during the active period for giant garter snakes (April through October) with suitable vegetative

cover present. Linear or meandering channels with slow flowing water over mud or silt substrate are preferred.

3. Upland basking and retreat sites with low growing vegetation cover adjacent to aquatic habitat, and upland retreats and flood refugia with partially buried broken concrete or animal burrows.
4. Small fish and amphibian larvae for foraging, but predatory "gamefish" (bass, *Micropterus* spp.; sunfish, *Lepomis* spp.; catfish, *Ictalurus* spp. and *Ameiurus* spp.) absent or controlled.
5. An adequate buffer (at least 200 feet) from roadways to reduce vehicular mortality.
6. Follow planting recommendation provided above under restoration guidelines.

Monitoring

Habitat restoration

Restoration of habitat should be monitored for one year following implementation. Monitoring reports documenting the restoration effort should be submitted to the Service: (1) upon completion of the restoration implementation; and (2) one year from restoration implementation. Monitoring reports should include photo documentation, when restoration was completed, what materials were used, plantings (if specified) and justification of any substitutions to the Service recommended guidelines. Monitoring reports should also include recommendations for remedial actions and approval from the Service, if necessary, and justification from release of any further monitoring, if requested.

Creation of replacement habitat

Replacement habitat should be monitored for 5 years following implementation. Hydrology should be monitored for the first two years after creation of wetlands. The monitoring effort should continue for three additional years to ensure success criteria are met. Monitoring reports documenting implementation of conservation measures should be submitted to the Service: (1) upon completion of wetland creation; (2) yearly for the first two years of monitoring; and (3) 5 years from implementation. Monitoring reports should include photodocumentation, when restoration was completed, what materials were used, plantings (if specified) and justification of any substitutions to the Service recommended guidelines. Monitoring reports should also include recommendations for remedial actions and approval from the Service, if necessary, and justification from release of any further monitoring, if requested.

Success criteria for replacement habitat:

1. At completion of monitoring, the cover measured on the habitat area should be 90 percent of cover measured on the reference site.

2. At completion of monitoring, the species composition measured on the habitat area should be 90 percent of that measured on the reference site.
3. At completion of monitoring, wetlands created on the site should meet Corps jurisdictional criteria.

Maintenance and management of replacement giant garter snake habitat

1. A final management plan of replacement habitat must be approved by the Service.
2. All maintenance activities should follow Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake Habitat.
3. Additional guidance includes:
 - a. Canal Maintenance - Hand clearing of canals is preferred for removal of excessive vegetation or debris. Any equipment should be operated from the bank top. Excavate from only one side of the canal during a given year. Avoid excavating the banks above the high water level. Preferably, one side of the canal should be left undisturbed indefinitely (the preferred side would be the west or north side) so that emergent vegetation and bank side cover is left in place.
 - b. Place the spoils from canal clearing in a designated location, rather than along bank tops. This will prevent burying or crushing snakes basking on the banks, or trapping snakes taking cover in burrows or bank-top soil crevices.
 - c. Vegetation control - Uplands should not be disced. Leave vegetation on levees and canal sides wherever possible. Mowing to control vegetation should take place July through September and mower blades should be raised at least six inches to avoid injuring snakes and to leave some grassy cover.
 - d. Traffic - Control vehicle access to avoid vehicular mortality of giant garter snakes.
4. Use a water maintenance regime that will maintain some open water to provide vegetated edge for giant garter snake to forage along.
5. Eradicate/control non-natives and invasive exotics.

Compatible uses of giant garter snake replacement habitat:

Rice farming is a compatible land use for adjacent properties.

Uses of giant garter snake replacement habitat that are incompatible with the habitat of giant garter snake, or represent threats to giant garter snakes include row cropping on uplands, orchards on uplands, OHV (off-highway vehicle) use, and combining with riparian habitat creation which requires dense cover or SRA (shaded riverine aquatic) habitat.

Endangered Species Div., Sacramento Fish & Wildlife Office, U.S. Fish & Wildlife Service

EXHIBIT J

**Monitoring Plan for Giant Garter Snakes (*Thamnophis gigas*)
For the Bank Protection Project on the Left Bank
of the Colusa Basin Drainage Canal in Reclamation District 108,
Sacramento River Bank Protection Project, Phase II**

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Introduction

In October 1998 the U.S. Army Corps of Engineers (Corps) began to place rock revetment (riprap) on the left bank of the Colusa Basin Drainage Canal (Colusa Drain) located in Reclamation District 108 (Yolo County, see map in Appendix A) which was damaged by flooding in the winter of 1997-1998. Upon inspection of this repair work by the U.S. Fish and Wildlife Service (Service), the Corps requested a Section 7(a)(2) (Public Law 84-99) consultation from the Service concerning impacts of the bank protection project on giant garter snakes (*Thamnophis gigas*), a federally and state listed threatened species. As a result of this consultation, the Corps agreed to apply as bank stabilization measures soil and soil over rock bank reinforcement with native grasses planted to stabilize the soil surface. The Corps also agreed to establish a long-term monitoring program for giant garter snakes to document their use of the bank stabilization design.

Scientific staff at the U.S. Geological Survey USGS Dixon Field Station (USGS) have been conducting research on the life history and habitat use characteristics of giant garter snakes since 1995 (e.g., Wylie et al. 2002, 1997, Wylie and Casazza 2000). In the course of our studies the USGS has developed protocols for trapping snakes as well as capturing them by hand (Casazza et al. 2000). Radio telemetry work by the USGS to examine habitat use and movement has been the first such effort for giant garter snakes and among the first for any snake in California. Because of this expertise the USGS began working with representatives of the Corps to address their needs for monitoring giant garter snakes for the bank protection project on the left bank of the Colusa Basin Drainage Canal (Colusa Drain) in Reclamation District 108 (Yolo County). This is the proposed monitoring plan.

Construction Project Description

The project site is an 8.3 km reach of the left (north) bank of the Colusa Drain in Yolo County. The bank stabilization design consists of a layer of riprap no greater than 38 cm in thickness, graded with larger stones to increase spaces between individual rocks. The space between the rocks was filled with a silty clay soil and more silty clay was layered over the rock/soil mix to a minimum depth of 30.5 cm. Perennial native grasses were planted in the surface soil layer. This bank stabilization design was applied to 7.8 km of the project site while a planting of native grasses without a riprap underlayment was applied to the remaining 0.5 km of the project site. Mowing and burning are the treatments used to control weeds and help to establish the native grasses.

Monitoring Methods

Capture Techniques:

The USGS will monitor for giant garter snakes in the project site from April through September, which encompasses the typical active period for this species. To trap giant garter snakes 200 floating funnel traps will be deployed (Casazza et al. 2000, see picture in Appendix B) along the left bank and vegetative edge of the Colusa Drain approximately 15-20 m apart. Traps will be moved monthly to sample the entire project area. In addition to the project area 100 traps will be set in the Colusa Drain above the project site and 100 traps will be set in the Colusa Drain below the project site to assess giant garter snake populations in areas unaffected by the bank stabilization procedures. Traps will be checked daily through the monitoring period. The USGS will also search for giant garter snakes on foot along the edge of the left bank of the Colusa drain to capture snakes by hand and with reptile snares. The foot searching will be done in the morning when snakes would potentially be out basking. The foot searching will be done by at least two members of the field crew along sections of the bank of the study area so that the entire bank of the study area is eventually searched during the week. In searching the bank and trapping in the water all habitats will be sampled where giant garter snakes might be found in the project site and in the reference areas upstream and downstream of the project site, based on past experience of USGS work. The location of each capture will be geo-referenced using GPS and capture information will be entered into an ARC/GIS data base which the USGS will develop for the project site.

This capture effort exceeds that required in the Biological Opinion, but the USGS feels it is necessary to adequately describe use by giant garter snakes of the project area over the active season. Sampling above and below the project site is one way to assess the status of giant garter snakes in areas unaffected by the bank stabilization procedures and compare them to the populations of snakes in the project area. Also,

continuous monitoring would encompass any weather anomalies and water flow fluctuations, which might bias results of a more limited effort. Particularly in the first year of monitoring it will be important to completely characterize snake use of the project area because no previous searches have been conducted for giant garter snakes in the vicinity.

Measuring and Identifying:

Each snake will be processed as soon as possible after capture to determine sex, weight to the nearest gram, and snout to vent length and total length to the nearest millimeter. Snakes will be positively identified using taxonomic determinations such as labial scale counts and dorsal scale counts at mid-body, as well as stripe and background color (Rossman et al. 1996). Snakes will be permanently marked using passively induced transponder (PIT) tags. Individuals will be scanned to detect PIT tags and previously unmarked snakes will be injected with PIT tags. The program CAPTURE will be used to estimate densities of snakes based on mark-recapture information. Characteristics of habitats used by snakes will be measured with the protocols used in other giant garter snakes projects (Wylie and Casazza 2000). After measuring and marking, snakes will be released at the point of capture.

Telemetry:

If sufficient giant garter snakes are captured during monitoring, radio telemetry will be used to evaluate habitat use of the project site. A taping method will be used to attach radios (BD2-SP, Holohil, Ltd.) to snakes supplemented with surgical implantation of radios (BD2G-SP), as necessary. Up to five individual giant garter snakes will be radio-marked in each of the areas representing different bank stabilization methods of large rock with earth fill, native grass plantings, and riprap with no fill. Also, up to 5 snakes above and 5 snakes below the project site would be radio-marked. A potential total of 25 snakes would be radio-marked at any one time. Snakes would be tracked and relocated at least five days per week. Vegetation type and structure along with substrate type will be recorded at the telemetry location determined for each snake each day. Each location will be geo-referenced with GPS and entered into the GIS for the project site. The radios used for the taping method have a six-week battery life. Marked individuals will be recaptured and their radios changed four times during the active season. If the radio quits before capture of an individual, new individuals will be radio-mark so the sample size remains constant.

If the taping method is successful in attaching the radios to snakes during the battery life of the transmitters, this attachment method will be used exclusively. If the taping method is not successful, radios will be surgically implanted in selected large (>250g) females. Only female giant garter snakes are big enough to accommodate the implanted radios. Up to 20% of the female snakes that are caught will be implanted with transmitters, given mortality risks of the surgery. A maximum of 15 snakes will be implanted based on past experience with availability of veterinarians and recovery time.

Mapping:

A map of the project site will be generated using coverages supplied by the Corps and from USGS sources using ARC/GIS. Locations of captures, traps, and foot searches will be determined with GPS for display on the project site background map.

Reporting:

We will inform the Corps (Michael Dietl) by email or telephone of the capture of any giant garter snakes on the same day of capture. We will also notify the U.S. Fish and Wildlife Service (Richard DeHaven and Kelly Hornaday) by email or telephone at the same time we contact the Corps about snake captures or sightings. At the discretion of the Corps and the U.S. Fish and Wildlife Service we will train Corps and FWS biologists in the handling and determination of taxonomic features for giant garter snakes. In addition, we will enter all giant garter snake data into the Natural Diversity Database for the state of California.

By the middle of October 2003 we will provide a draft report to the Corps of the results of the period of monitoring with a copy to the U.S. Fish and Wildlife Service. By the middle of November 2003 we will provide a final report to the Corps of the results of the period of monitoring. The report will contain information on numbers of giant garter snakes we captured, the locations and times of capture, maps showing the locations

of traps, foot searches and captures, a summary of demographic features of the giant garter snakes we captured, including size and sex, and density estimates derived from recapture information. The USGS will evaluate the habitat on the restoration sites as it compares to previously studied habitat for giant garter snakes. The USGS will also evaluate demographic and numeric data for giant garter snakes in relation to the success criteria for the bank restoration, particularly as these data illustrate recruitment and the likely source population of giant garter snakes in the project area. The annual report will have an executive summary, a conclusions section, and a section on recommendations. In these sections we will address our assessment of the various bank stabilization methods in restoring and maintaining giant garter snake habitat and specify our plans for continuing the monitoring study based on the results of this first field season. The Corps will be informed and involved in any use of the monitoring data outside the scope of the monitoring plan.

This monitoring plan is for the first year (2003) on the project site. The USGS has never worked in or near the project site, and anticipating results is problematic. Moreover, no characterization of the project site for giant garter snakes and their habitat was done before the bank stabilization work. The USGS will prepare for the full scope of the monitoring plan for 2003 and will carry out trapping and search efforts for giant garter snakes through the monitoring period so that negative results will have validity in determining future monitoring effort. If few or no snakes are captured in the project site and the telemetry is not done, the unused funds from 2003 can be carried into 2004 and applied to the monitoring efforts for that year. The USGS will develop a monitoring plan for the succeeding 5 years based on the 2003 results.

Literature Cited

- Casazza, M. L., G. D. Wylie, and C. J. Gregory. 2000. A funnel trap modification for surface collection of aquatic amphibians and reptiles. *Herpetological Review* 31(2), 91-92.
- Rossman, D. A., N. B. Ford, and R. A. Seigel. 1996. *The garter snakes: evolution and ecology*. University of Oklahoma Press, Norman, OK. 332 pp.
- Wylie, G. D., M. L. Casazza, and J. K. Daugherty. 1997. 1996 progress report for the giant garter snake study. USGS, Dixon Field Station, Dixon, CA. 16 pp.
- Wylie, G. D., and M. L. Casazza. 2000. Investigations of giant garter snakes in the Natomas Basin: 1998-1999. Final report to the U.S. Fish and Wildlife Service. USGS-BRD, Dixon, CA. 20 pp.
- Wylie, G. D., M. L. Casazza, and N. M. Carpenter. 2002. Monitoring giant garter snakes at Colusa National Wildlife Refuge: 2000 progress report. Progress report to the U.S. Fish and Wildlife Service. USGS-BRD, Dixon, CA. 15 pp.

APPENDICES

Appendix A. Map showing the project site.



Appendix B. Picture of the modified floating minnow traps used to trap giant garter snakes.



Appendix C. Budgets for giant garter snake monitoring with and without telemetry.

**2003 Budget
without Telemetry**

Personnel

GS-5 technician (6 months)	15,140
GS-7 biologist (9 months)	27,750
GS-11 GIS specialist (1 month)	6,460
GS-13 (Glenn Wylie, 3 months)	29,000

Vehicles

GSA truck	5,500
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Equipment and Supplies

Traps (400 @ \$20)	8,000
Boat	1,000
Trolling motors and batteries	500
Miscellaneous	1,500

Travel	1,000
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Subtotal	95,850
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USGS overhead (39%)	37,382
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Total	133,232
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Technician Hours in the field	2344
Data Management and Analysis hours	256
GIS hours	160
Project Management and Report Writing hours	600

**2003 Budget
with Telemetry**

Personnel

GS-5 technician (6 months)	15,140
GS-7 biologist (12 months)	37,000
GS-11 GIS specialist (1 month)	6,460
GS-13 (Glenn Wylie, 3 months)	29,000

Vehicles

GSA truck	5,500
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Equipment and Supplies

Radio Transmitters, 100@ \$200	20,000
Receiver	3,000
Traps (400 @ \$20)	8,000
PIT tags (300 @ \$5)	1,500
Boat	1,000
Trolling motors and batteries	500
Miscellaneous	1,500

Travel	1,000
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Subtotal	129,600
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USGS overhead (39%)	50,544
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Total	180,144
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Technician Hours in the field	2744
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Data Management and Analysis hours	376
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GIS hours	160
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Project Management and Report Writing hours	600
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Appendix D. 2003 time table for giant garter snake monitoring in the Colusa Drain.

Assembly and deployment of traps	1 April to 15 April
Traps checked	15 April to 30 September
Foot searching	1 April to 30 September
Telemetry (potential)	1 May to 31 December
Data analysis	15 September to 1 October
Draft report writing	1 October to 15 October
Draft report	15 October
Report revising	31 October to 14 November
Final 2003 report with monitoring plan for future years	14 November