
CHAPTER IV C

Delevan National Wildlife Refuge Alternative Plans



*U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
MID-PACIFIC REGION*

CHAPTER IV C

DELEVAN NATIONAL WILDLIFE REFUGE

Delevan National Wildlife Refuge (NWR) was authorized in 1962 under the Migratory Bird Conservation Commission. Initially, 5,583 acres were purchased with Migratory Bird Hunting Stamp Act funds. In 1963, an additional 80 acres was acquired with Duck Stamp Act funds. The land was purchased as a refuge and breeding ground for migratory birds and wildlife. The refuge provides wintering and resting areas for ducks and geese and reduces waterfowl damage to crops on neighboring farms. The refuge is located about seven miles east of Maxwell in Colusa County, to the east of Interstate Highway 5 and to the west of the Sacramento River. The Delevan NWR which is managed by the Service, is part of a group of refuges located in the Colusa Basin, as discussed in Chapter IV B. Delevan NWR is located midway between Sacramento and Colusa NWR's.

Delevan NWR consists of ponds, millet fields, and irrigated pasture. Approximately 60-percent of the water requirement is used in the millet fields which provide waterfowl food. The irrigated pasture is a feeding area for geese. The natural ponds also support sources of waterfowl food such as timothy grass and invertebrate populations. The upland areas of the refuge provide habitat for geese, upland birds, and other wildlife species. The amount of land used for fields, ponds, and upland uses varies depending upon the amount of water available.

A. WATER RESOURCES

Delevan NWR has no firm water supply. The refuge currently receives interim supplies of Central Valley Project (CVP) water which is conveyed to the refuge through the Tehama-Colusa Canal and Glenn-Colusa Irrigation District (GCID) facilities. The estimated total water requirement for all lands within the refuge boundaries for full resource development under the existing management plan is 30,000 acre-feet.

1. Surface Waters

Delevan NWR holds no water rights and receives CVP water on an as-available basis. The CVP water is transported from the Sacramento River at the Red Bluff Diversion Dam through the Tehama-Colusa Canal to the western Sacramento Valley. Diversions from the Tehama-Colusa Canal provide water to Stony Creek, the Wasteway Cross Channel, and the Williams Outlet. The Wasteway Cross Channel and the Williams Outlet convey water to GCID facilities. The Wasteway Cross Channel has a capacity of 1,000 cfs and is used to divert water to the GCID facilities that serve the refuge. The Williams Outlet is located approximately 15 miles south and 6 miles west of the southern borders of the refuge. However, water cannot be delivered to the refuge through this outlet. The GCID facilities are described in Chapter IVB.

The GCID conveys CVP water or provides GCID water through exchange agreements with the CVP to the Colusa Basin refuges. A portion of the water supplied by GCID is from agricultural return flows. Under Contract 14-06-200-8181A with the Service, GCID conveys a maximum of 30,000 acre-feet to the Delevan NWR. The contracts provide for a 25 percent conveyance loss. Water quality of the water delivered by GCID appears to be suitable for irrigation under most conditions. Agricultural return flows are generally of poorer quality especially for flows that are reused several times. The historical water supplies to Delevan NWR are summarized in Table IV C-1.

Hunter's Creek flows parallel to the northern boundary of Delevan NWR and was used as a source of water from Maxwell Irrigation District until 1979. At that time, water quality was poor and therefore an agreement between the refuge and GCID was signed. Water is not always available from the Hunters Creek Drain during July and August due to the lack of water or low water levels.

Reclamation District 2047 was formed in 1919 to construct a master drain, known as the Colusa Basin Drainage Canal or the 2047 Drain. The 2047 Drain conveys agricultural return flows from an area south of Willows to the Sacramento River at the Knights Landing outfall gates. The design capacity of the 2047 Drain is 1450 cfs with a water elevation of 1-foot below the adjoining land. Water in the 2047 Drain is used as a supply for adjacent lands. In the winter, the 2047 Drain transports stormwater runoff from the Colusa Basin. Delevan NWR could apply to the State Water Resources Control Board for a permit to divert water from the 2047 Drain from September through June, however the appropriation would be subject to prior appropriations. Quality of water in the 2047 Drain is influenced by the quality of agricultural return flows. Previous water quality analyses have detected DDT and toxaphene at concentrations above National Academy of Science action levels (SWRCB, 1984). During the winter, the quality of the 2047 Drain water is adequate for the refuge.

In most years the Delevan NWR receives approximately 60 percent of the water needed for full development under Level 4. This water is provided on an as-available basis and may not always be available when the ponds need to be flooded.

Water supply problems are related to the shut down of the Tehama-Colusa Canal and the GCID Main Canal during the winter, as discussed in Chapter IV B (Sacramento NWR). Without the water from the Tehama-Colusa Canal, water must be provided to the GCID Main Canal from other sources. Water could be provided to the eastern portion of the refuge from the 2047 Drain if unappropriated water could be obtained. Groundwater also could be used during the winter to provide 6,400 acre-feet of water which is needed to maintain the existing managed lands from November through March.

TABLE IV C-1
WATER DELIVERIES
DELEVAN NWR
(acre-feet)

Year	Maxwell Irrigation District	Glenn-Colusa Irrigation District	Total
1977	14,939	0	14,939
1978	17,182	0	17,182
1979	16,864	0	16,864
1980	0	17,093	17,093
1981	0	18,226	18,226
1982	0	15,530	15,530
1983	0	14,466	14,466
1984	0	14,625	14,625
1985	0	12,756	12,756
1986	0	17,902	17,902

Source: USBR, 1986a

2. Water Conveyance Facilities

The GCID conveys water from the Wasteway Cross Channel to GCID Main Canal. The water is transferred to Hunters Creek and diverted into the refuge near the northwest corner through Hunters Creek No. 2 Weir, as shown in Figure IV C-1. This weir is used to back up water in Hunters Creek for diversion to the refuge. During floods, GCID may remove the weir boards to allow passage of the floodwaters and debris to prevent flood damage. The weir boards are generally not replaced until the spring when the water levels have receded in Hunters Creek. During irrigation season, Hunters Creek also conveys agricultural return flows.

Approximately 385 acres of land along the southeastern boundaries, Tracts 25, 31, 35, and 41, are separated from the rest of the refuge water delivery system by the Maxwell Irrigation District Canal. This area is currently undeveloped due to a lack of a water supply.

The refuge conveyance system is in relatively good condition, but allows for little reuse of water. The main delivery ditches on the northern and eastern boundaries need to be improved to increase conveyance capacity. Additional maintenance work is needed to repair levees and ditches which are damaged during periodic flooding.

3. Groundwater

Delevan NWR is located in flood plain deposits of the Sacramento River flood basin underlain by the Tehama Formation. No wells currently exist on the refuge. However, shallow wells located in the vicinity of the refuge have produced less than 400 gpm and have experienced significant drawdowns. Wells drilled to depths of more than 400 feet may enter the Tehama Formation aquifer and may produce 1,000 gpm. Based upon existing data, the water quality appears to be suitable for irrigation and waterfowl needs. The safe yield of the aquifer under Delevan NWR has been estimated by the USBR to be 6,800 acre-feet. Groundwater is not currently used for a refuge water supply.

B. FORMULATION AND EVALUATION OF ALTERNATIVE PLANS

Delevan NWR has historically relied upon available water supplies to meet its water demands. To provide for full development of the refuge, an annual requirement of 30,000 acre-feet is estimated to be needed. However, for the purposes of assessing the impacts of water delivery alternatives, four levels of water supply have been identified, as presented in Table IV C-2.

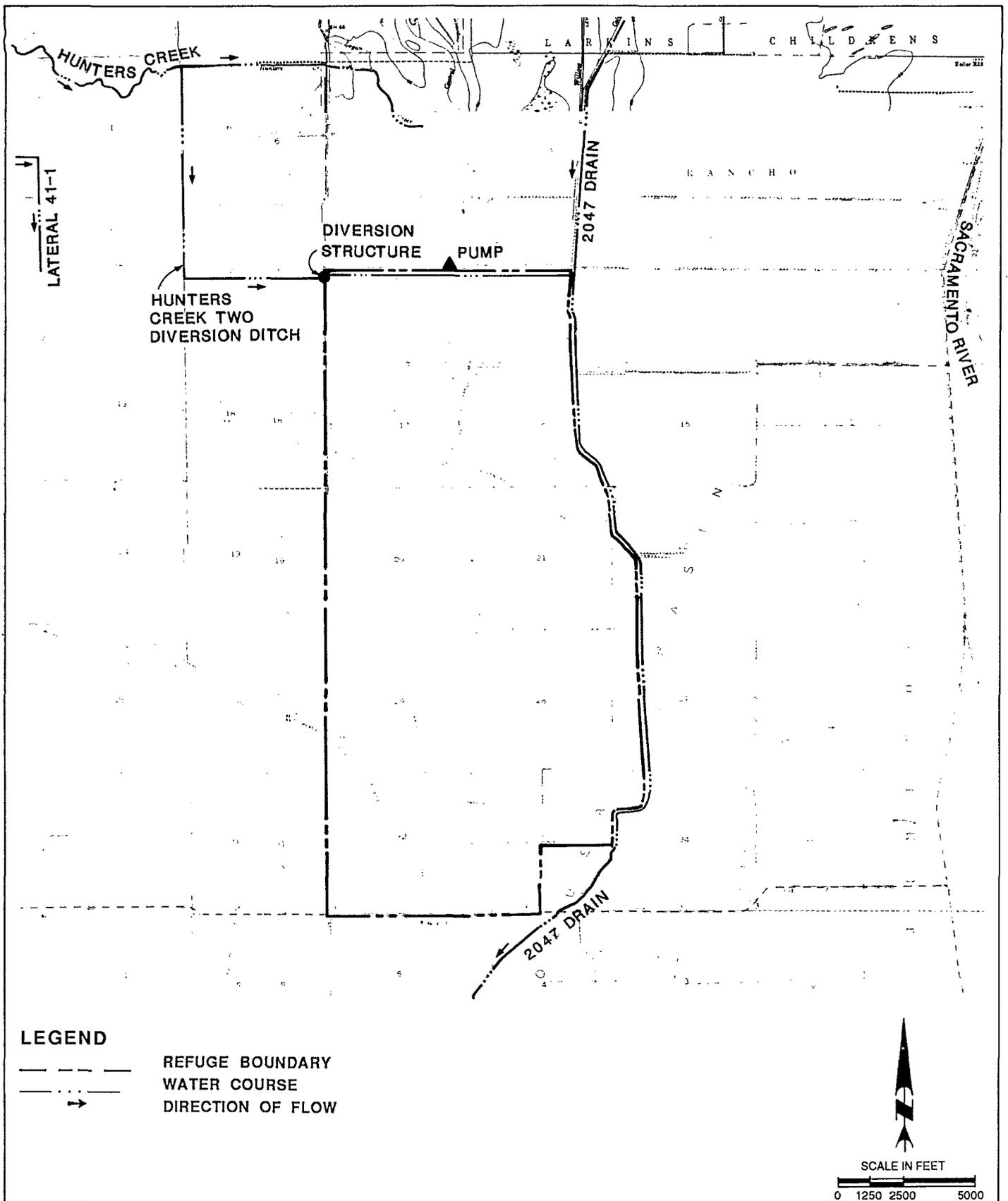


FIGURE IV C-1
DELEVAN NATIONAL WILDLIFE REFUGE
EXISTING WATER SUPPLY FACILITIES



Each of the water supply levels provide a different rate and volume of water, and are summarized as follows:

Level 1 - Existing firm water supply

Level 2 - Current average annual water deliveries

Level 3 - Water supply needed for full use of existing development

Level 4 - Water delivery needed for optimum management

Multi-objective project evaluation procedures, in accordance with concepts outlined by the Water Resources Council, is one of the tools used in evaluating and comparing alternatives. The Water Contracting EIS's will evaluate the national, regional, and site specific environmental impacts of providing water to the refuges and other users under the different water supply levels. Based on the results of the Water Contracting EIS's, water supply levels will be identified for each refuge. Following completion of the Water Contracting EIS's, the plans to meet the identified water level will be compared under the National Economic Development Account, Environmental Quality Account, and Social Account.

The beneficial and adverse effects of each alternative to provide additional water for Water Supply Levels 3 and 4 were compared with respect to many criteria. A summary comparison of the alternatives to provide additional water to the refuge is presented in Table IV C-3.

Various delivery alternatives have been considered to convey the identified levels of water supply described above. The alternatives presented for Levels 2, 3, and 4 were developed based upon the assumption that water would be available during the winter. At that time, water may be obtained from Black Butte Reservoir, as described under the plan for Sacramento NWR, Delivery Level 2, Alternative A. That plan would require construction of a removable flood gate and use of the existing pumps to transfer water from Stony Creek into the GCID Main Canal. All of the alternatives include the request to continue to obtain CVP water through GCID facilities on a long-term basis.

1. Delivery Alternative for Level 1 (No Action Alternative)

Because the Delevan NWR does not have a firm water supply, no facilities are required.

TABLE IV C-3
SUMMARY COMPARISON OF WATER DELIVERY ALTERNATIVES
DELEVAN NWR

	Supply Level 3			Supply Level 4	
	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Availability of Water Supply	Yes	Yes	Maybe	Yes	Yes
Ability to Convey Water	Yes	Yes	Yes	Yes	Yes
Need New Water	Yes	Yes	No	Yes	No
Need New Conveyance Agreements	Yes	Yes	No	Yes	No
Type of Water Supply	Fresh Water	Fresh Water	Groundwater	Agricultural Return Flow	Refuge Flows
Operational Flexibility	Yes	Yes	Yes	Yes	Yes
Wildlife Habitat	Improve	Improve	Improve	Increase Ponds	Increase Ponds
Public Use	No Change	No Change	No Change	Increase	Increase
Total Annual Costs (\$) ^(a)	75,820	85,750	118,520	117,640	4,970

Notes: Alternative A: Construct cross-over on Glenn-Colusa Irrigation District Lateral 41-1.
Alternative B: Improve Hunters Creek No. 2 Diversion Weir.
Alternative C: Conjunctive Use Plan.
Alternative D: Construct Pump Station on the 2047 Drain.
Alternative E: Construct siphons under the Maxwell Irrigation District Canal.

(a) Total Annual Costs includes annualized construction cost, annual operation and maintenance cost, annual power and wheelage cost.

2. Delivery Alternative for Level 2

This level of water delivery represents the current average water deliveries needed to maintain the refuge as it is currently managed. The existing facilities could be used if water can be supplied during the winter from Black Butte Reservoir or pumped from the 2047 Drain.

3. Delivery Alternatives for Level 3

The alternatives discussed below have been developed to increase the dependability of the water deliveries during the winter months. The alternatives were based on the assumption that the diversion gates at the Red Bluff Diversion Dam would remain open during future winter seasons and that a Sacramento NWR plan for Level 2 would be implemented which would deliver winter flows from Black Butte Reservoir through Orland Project Facilities. Although the facilities discussed below are not needed to convey water during the summer months, the facilities would improve water conveyance for the refuge and for GCID. Alternative C would provide for conjunctive use of groundwater (as described in Chapter II) during drought periods or for several months during the winter.

Alternative A - Construct Cross-over on Glenn-Colusa Irrigation District Lateral 41-1 Under this alternative, a cross-over ditch could be constructed to allow delivery of water to the northwestern corner of the refuge from the GCID Main Canal when the Hunters Creek No. 2 Weir is removed to allow passage of floodwaters. Water could be diverted from the Main Canal into Lateral 41-1. A 5,250-foot long ditch and two siphons would be constructed from the GCID Lateral 41-1 to the existing ditch that conveys water from Hunters Creek No. 2 Diversion Canal to the refuge, as shown in Figure IV C-2. The siphons would transport the water under a road and Hunters Creek. This alternative also would reduce the need for use of agricultural return waters in Hunters Creek during the late summer and fall months.

Alternative B - Improve Existing Hunters Creek No. 2 Diversion Weir. Under this alternative, water would continue to be delivered to the Main Canal and diverted to Hunters Creek. A radial gate could be installed at Hunters Creek No. 2 Weir to allow continued operation of the weir during the winter. The radial gate could be easily opened to allow passage of flood flows and closed even if water is present in the canal. At the present time no CVP water is introduced into Logan or Hunters Creeks. During the winter months when GCID is not diverting from The Sacramento River, the alternative assumes that the water would be provided from Black Butte Reservoir or the The Tehama-Colusa Canal.

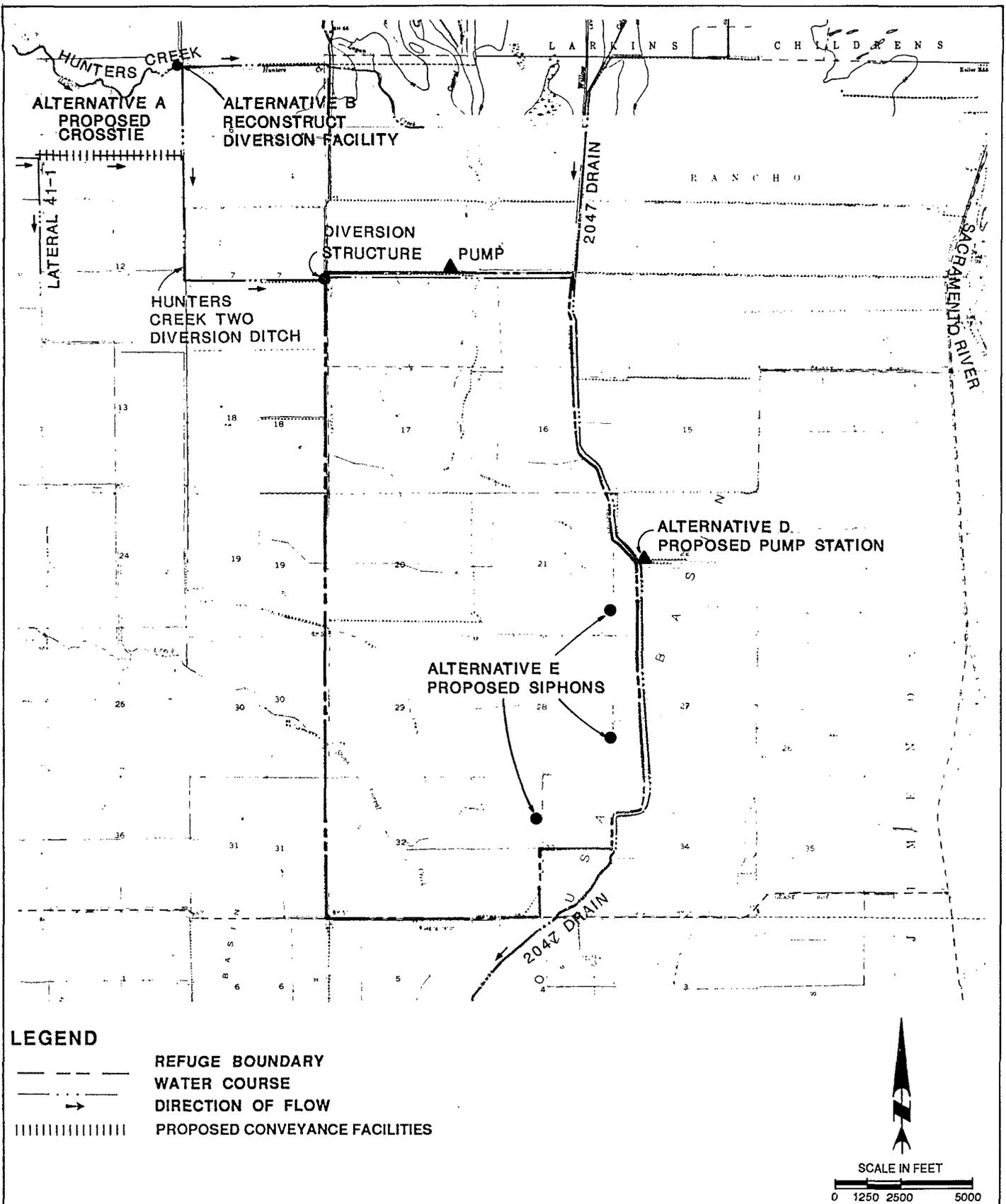


FIGURE IV C-2

DELEVAN NATIONAL WILDLIFE REFUGE

**PROPOSED WATER SUPPLY FACILITIES
ALTERNATIVES A, B, D, & E**



Alternative C - Implement a Conjunctive Use Plan. A well field could be developed inside of the refuge boundaries as a conjunctive use program (as described in Chapter II) or to provide a portion of the needed winter supply when the Tehama-Colusa Canal is shut down. The wells would be designed to produce 1,500 gpm each. The water would be discharged directly to the refuge conveyance ditches.

4. Delivery Alternatives for Level 4

Surface drainage from the main portion of the refuge to Tracts 25, 31, 35, and 41 is blocked by the Maxwell Irrigation District Canal. Due to a lack of water, this southeastern portion of the refuge is currently not developed. The alternatives for Level 4 water deliveries provide for conveyance of water to this undeveloped area.

Alternative D - Construct Pump Station on the 2047 Drain. Under this alternative, a 25 cfs pump station could be constructed on the Reclamation District 2047 Drain. The pump station could transfer water from the 2047 Drain directly to the southeastern portion of the refuge. The water delivered under this alternative would consist of CVP water comingled with agricultural return flows. Therefore, the water will be of lesser quality than 100-percent CVP water, but adequate for the refuge uses.

Alternative E - Construct Siphons Under the Maxwell Irrigation District Canal. The Maxwell Irrigation District Canal hydraulically separates Tracts 25, 31, 35, and 41 from the rest of the refuge. To allow water to flow to the southeastern portion of the refuge, approximately three siphons would be constructed under the Maxwell Irrigation District Canal at the natural drainage courses. Under this alternative, CVP water would be provided to the refuge through the Hunters Creek No. 2 Weir during the winter or by methods outlined in Alternative A.

5. Summary of Alternatives

There are no alternatives for Levels 1 and 2. Alternatives A, B, and C are the alternatives for Level 3. Alternatives A and B were primarily developed to provide water to the refuge during the winter when the Hunters Creek No. 2 Weir is opened. Alternative C was developed to provide groundwater to the refuge during a drought or during the winter when the Tehama-Colusa Canal is shut down. Alternatives D and E were developed to provide water to the southeastern portion of the refuge.

Because CVP water is not provided as a firm supply and sufficient groundwater is not available to meet the total refuge needs, Alternatives A and B for Level 3 and Alternatives D and E for Level 4 would require long-term contracts to receive CVP water and additionally, long-term conveyance agreements with GCID to transport water to the Refuge.

Of the two alternatives to transport water from GCID canals to the refuge under Level 3, Alternative A does not require construction and operation of additional lift stations and therefore has a lower operating cost than Alternative B. In addition, Alternative A also would provide higher quality water than Alternative B. Alternative C would provide water to the refuge as part of a conjunctive use program. However, the operations cost to pump is significant.

Under Level 4, Alternatives D and E would provide water to the southeastern portion of the refuge. Alternative E does not involve construction and operation of additional lift stations, therefore, Alternative E would have lower operating costs than Alternative D. Alternative E would allow water from the main part of the refuge to flow to the southeastern portion. Alternative D may provide water of lower water quality than water distributed to the main portion of the refuge because Alternative D would provide water from the 2047 Drain which contains agricultural return flows during portions of the year. Alternative plans E and A under Level 4 provide low capital and operation costs, high reliability, and consistent water quality.

C. COSTS AND ECONOMICS ANALYSIS

Costs for the alternative plans to provide adequate water supplies under Water Supply Levels 3 and 4 are presented in Table IV C-4 and the Design Estimates Appendix. The construction costs include factors to cover engineering, contingencies, and overhead costs. During the advanced planning phase, these costs will be refined further. The capital, operation and maintenance costs for Black Butte Dam are not considered for computing annual costs.

Construction of the ditches and siphons under Alternatives A and E, or construction of the wells under Alternative C would result in additional money being spent in the economy of Colusa County during the construction period. The construction could be completed within one summer season by construction workers who reside within the area.

Currently, the annual public use at Delevan NWR is about 8,800 visits per year. If additional water is provided the public use levels are not anticipated to increase significantly.

D. WILDLIFE RESOURCES

The annual waterfowl use on Delevan NWR is approximately 46,848,000 use-days based upon census data from 1980 and 1981. Approximately 75 and 20 percent of the waterfowl use are by ducks and geese, respectively, including many species which nest on the refuge. Wildlife and fishery resources associated with the refuge are presented in Table IV C-5. The listed threatened and endangered species associated with Delevan NWR are:

TABLE IV C-4
SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES
DELEVAN NWR

Items	Water Delivery Level 3 Alternatives		
	A	B	C
Total Construction Costs	\$127,000	\$225,000	\$257,500
Power Costs (\$/acre-foot)	0.00	0.02	12.50
Water Wheeling Costs (\$/acre-foot)	2.50	2.50	0.00
Annualized Construction Costs (8.875%, 30 years)	12,220	21,650	24,770
Annual Operations & Maintenance Costs	1,100	1,100	8,750
Annual Power Costs	0	500	85,000
Annual Water Wheelage Costs	62,500	62,500	0
Total Annual Costs	<u>\$ 75,820</u>	<u>\$ 85,750</u>	<u>\$118,520</u>

Alternative A - Construct crossover on GCID Lateral 41-1

Alternative B - Improve Hunter's Creek No. 2 Diversion Weir

Alternative C - Conjunctive Use of Water

TABLE IV C-4
(Continued)

SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES

DELEVAN NWR

Items	Water Delivery Level 4 Alternatives				
	A	B	C	D	E
Total Construction Costs	\$141,000	\$250,000	\$257,000	\$120,000	\$ 21,000
Power Costs (\$/acre-foot)	0.00	0.02	12.50	1.00	0.00
Water Wheeling Costs (\$/acre-foot)	2.50	2.50	0.00	2.50	2.50
Annualized Construction Costs (8.875%, 30 Years)	13,560	24,050	24,720	11,540	2,020
Annual Operations & Maintenance Costs	1,440	1,100	8,750	1,100	50
Annual Power Costs	0	500	85,000	30,000	0
Annual Water Wheelage Costs	75,000	75,000	0	75,000	2,900
Total Annual Costs	\$ 90,000	\$100,650	\$118,470	117,640	4,970

Alternative A - Construct crossover on GCID Lateral 41-1

Alternative B - Improve Hunter's Creek No. 2 Diversion Weir

Alternative C - Conjunctive use of Water

Alternative D - Construct Pump Station on 2047 Drain

Alternative E - Construct Siphons under Maxwell Irrigation District Canal

TABLE IV C-5

WILDLIFE RESOURCES

DELEVAN NWR

Ducks

Hooded Merganser	Blue Winged Teal ^(a)	Ring Necked Duck
Mallard ^(a)	Northern Shoveler ^(a)	Common Goldeneye
Gadwall ^(a)	Pintail ^(a)	Greater Scaup
European Wigeon	Wood Duck ^(a)	Lesser Scaup
American Wigeon	Redhead ^(a)	Buffle Head
Green winged Teal ^(a)	Canvasback	Common Merganser ^(a)
Cinnamon Teal ^(a)	Ruddy Duck ^(a)	

Geese and Swans

Snow Goose	White-fronted Goose	Cackling Goose
Ross Goose	Canada Goose	Lesser Canada
		Whistling Swan

Coots

American Coot^(a)

Shore and Wading Birds

Western Grebe ^(a)	Virginia Rail ^(a)	Common Snipe
Eared Grebe	Sora ^(a)	Long-billed Dowitcher
Pied-billed Grebe ^(a)	Common Gallinule ^(a)	Least Sandpiper
Double-crested Cormorant	Ring-billed Gull	Dunlin
White Pelican	Caspian Tern ^(a)	Western Sandpiper
American Bittern ^(a)	Forester's Tern	Greater Yellowlegs
Least Bittern ^(a)	Black Tern ^(a)	Long-billed Curlew
Great Blue Heron ^(a)	Wilson's Phalarope	Killdeer ^(a)
Great (common) Egret ^(a)	American Avocet	Black-crowned Night Heron ^(a)
Snowy Egret ^(a)	Black-Necked Stilt	Greater Sandhill Crane
Green Heron ^(a)		

TABLE IV C-5
WILDLIFE RESOURCES
DELEVAN NWR
(Continued)

Upland Game

Ringed-neck Pheasant ^(a)	Rock Dove	Mourning Dove ^(a)
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Raptorial Birds

Turkey Vulture	White-tailed Kite ^(a)	Marsh Hawk
Sharp-shinned Hawk ^(a)	Cooper's Hawk ^(a)	Red-tailed Hawk ^(a)
Rough-legged Hawk	American Kestrel ^(a)	Barn Owl ^(a)
Great Horned Owl ^(a)	Red Shouldered Hawk ^(a)	Golden Eagle
Bald Eagle		Peregrine Falcon

Fish

Steel head	Salmon	Largemouth Bass
Catfish	Black Crappie	

Furbearers

Opposum	Gray Fox	Coyote
Raccoon	Beaver	Mink
Skunk	Muskrat	

Others

California Quail ^(a)	Black-tailed Deer
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Notes:

(a) Birds nesting on refuge

Source: USFWS computerized annual printout for NWR Birds, Department of Interior, USFWS (RF11650-2 9-79) (July 1973 to June 1974, NWRS Public Use Report (1)) and refuge records.

bald eagle, Haliaeetus leucocephalus; peregrine falcon, Falco peregrines; Aleutian Canada Goose, Branta Canadensis Leucopareia; and the valley elderberry longhorn beetle, Desmocerus Californicus Dimorphus. Candidate species associated with the Delevan NWR include the white-faced ibis, Plegadis chichi; tricolored blackbird, Agelaius tricolor; and California hibiscus, Hibiscus californicus, as listed in Table IV C-6.

Alternatives E and A would provide a more reliable water supply and an additional 9,000 acre-feet of water under water supply level 4 to improve habitat in the refuge and develop an additional 360 acres for ponds, seasonal marsh, and watergrass areas. The improved habitat would increase the number of water fowl use days and recreational benefits as indicated in Table IV C-7.

Implementation of the plans would not adversely effect the listed candidate, threatened and endangered species of birds and would improve habitat that could be used by the white-faced ibis and Aleutian Canada goose. Detailed field investigations will be completed during the advanced planning phase of the project. Implementation of the alternative would result in overall beneficial environmental effects. The No Action Plan could result in the loss of habitat if interim water supplies are not available in the future. The results of the preliminary environmental analysis for the preferred plans are presented in the Environmental Appendix. Additional environmental analyses will be completed as part of the Water Contracting EIS's and included in the Refuge Water Supply Planning Report.

E. SOCIAL ANALYSIS

The social consequences of constructing and operating the ditches and siphons, or new wells would be positive due to the potential increase in public use and the shared benefit to GCID of providing improvements to the water conveyance facilities. The local social environment is discussed in the Social Appendix.

F. POWER ANALYSIS

Pacific Gas & Electric Company (PG&E) serves the Delevan NWR under the PA-1 rate schedule for agricultural users. A facility must be an authorized function of the CVP to receive project-use power. The authority to deliver CVP power to the refuge is currently being examined and will be detailed in the Refuge Water Supply Planning Report. A detailed discussion of project-use power and wheeling agreements is provided in the Power Analysis Section of Chapter IV B.

G. PERMITS

Construction of the ditches, siphons, or wells would require several permits. Colusa County would issue permits for well construction under Alternative C. Colusa County also would

TABLE IV C-7

WILDLIFE RECREATIONAL BENEFITS AND RESOURCE IMPACTS

DELEVAN NWR

Item	Water Delivery Levels			
	Level 1	Level 2	Level 3	Level 4
Habitat Acres				
Permanent Pond	0	53	70	86
Seasonal Marsh	0	3,407	3,750	4,000
Watergrass	0	316	316	450
Rice	0	204	204	204
Bird Use Days				
Ducks	0	35,594,000	39,000,000	50,000,000
Geese	0	9,526,000	10,000,000	11,370,000
Waterbirds	0	1,728,000	1,890,000	2,060,000
Endangered Species	0	46	50	55
Public Use Days				
Consumptive	0	6,600	6,600	6,600
Non-Consumptive	0	2,200	2,200	2,200
Annual Recreational Benefits	0	190,610	\$ 190,610	\$ 190,610

require approvals for construction along stream banks and within natural drainage courses to ensure that existing drainage facilities would not be adversely effected by the new ditches and siphons. Construction of Alternative E facilities under the Maxwell Irrigation District Canal would require approvals and permits/easements from Maxwell Irrigation District. Construction within streams under Alternative A would require a Stream Alteration Permit from DFG and a Corps of Engineers permit for construction in wetlands or riparian corridors.

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