
CHAPTER IV O

Kern National Wildlife Refuge Alternative Plans



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

CHAPTER IV O

KERN NATIONAL WILDLIFE REFUGE

The Migratory Bird Conservation Commission created the 10,628 acre Kern National Wildlife Refuge in 1961. The refuge was established to restore a small segment of the wetland habitat impacted by the drainage of Buena Vista, Kern, Goose, and Tulare Lakes. As shown in Figure IV O-1, the refuge is divided in half by the Goose Lake Canal which flows from south to north and terminates in the Tulare Lake basin. The refuge is located 35 miles northwest of Bakersfield and 19 miles west of the City of Delano, and is managed by the Service.

Land uses at the refuge can be classified as wetlands, croplands, or uplands. Approximately 2,000 acres are seasonally flooded and managed as a marsh. There are 2,260 acres set aside as a natural research area for desert plants, and to provide a critical habitat for two endangered species, the blunt-nosed leopard lizard and the San Joaquin kit fox. The refuge has the potential to provide 7,000 acres for migratory waterfowl habitat.

Due to its strategic location along the Pacific Flyway, the refuge serves as winter waterfowl habitat for the thousands of early migrant pintail ducks which concentrate in the Tulare Lake Basin during August and September. Major food plants grown include wild millet alkali bulrush, and swamp timothy. It partially replaces and preserves some of the vast waterfowl habitat of Tulare Lake, Buena Vista Lake, and Goose Lake, which have been reclaimed for agriculture, industry, and commercial enterprises. Over 5,000 acres of the refuge remains undeveloped (USFWS, 1978).

Refuge management is directed towards the production of moist soil food plants such as wild millet and alkali bulrush as discussed above. No row crop production occurs on the refuge. Grazing by cattle is permitted when winter rains are sufficient to provide adequate forage from winter annual grasses (USBR, 1986).

A. WATER RESOURCES

The refuge primarily produces wild millet, smartweed, and alkali bulrush for migratory waterfowl. The plants are irrigated in the spring and summer and then flooded with 6 to 9 inches of water in the fall for waterfowl feeding (USFWS, 1978). The refuge currently does not have a firm supply of water; 25,000 acre-feet is estimated as needed for full development.

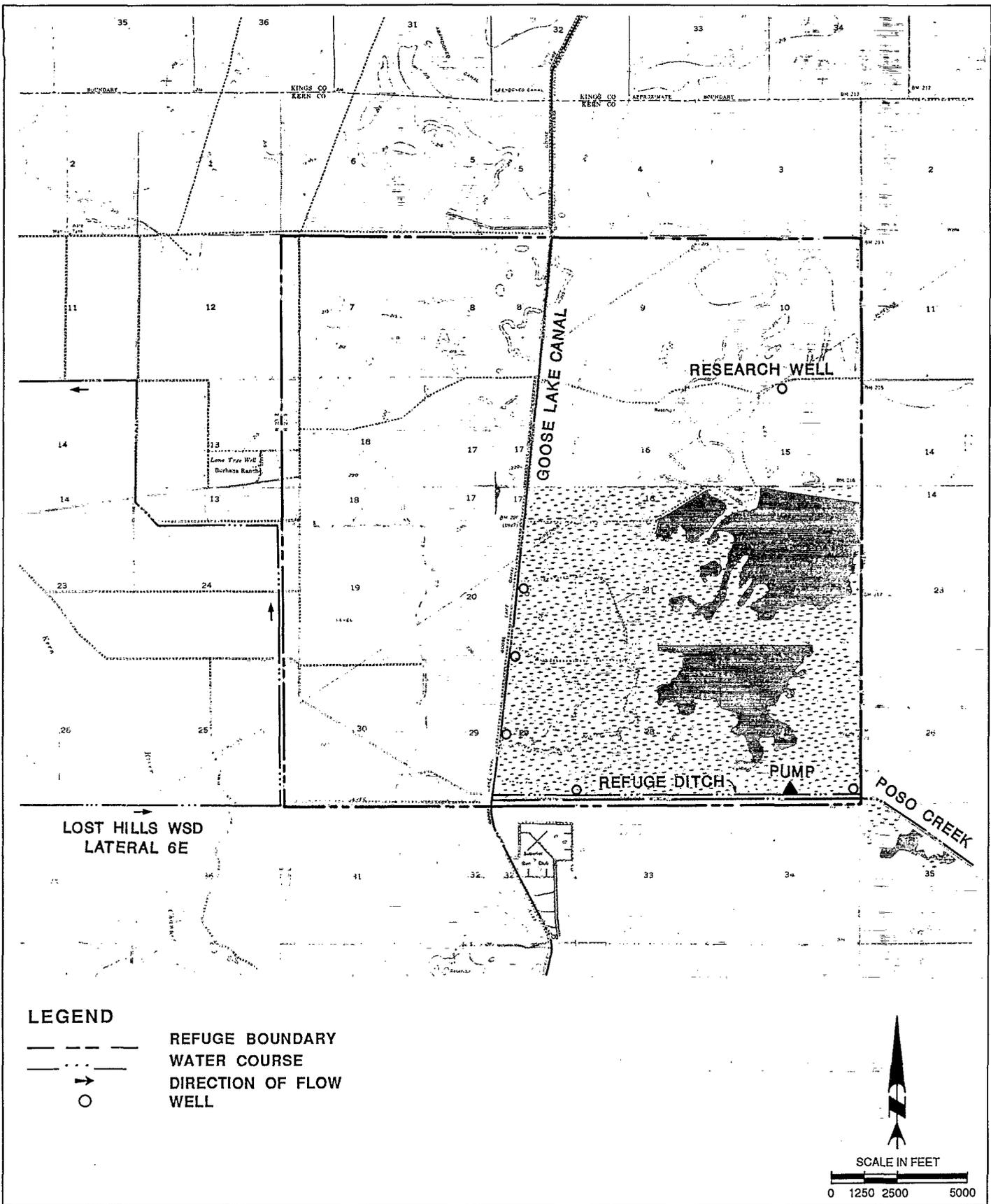


FIGURE IV 0-1

KERN NATIONAL WILDLIFE REFUGE

EXISTING WATER SUPPLY FACILITIES



1. Surface Waters

The refuge has purchased water in the past from the Federal Friant-Kern Canal (delivered via Poso Creek), and from the Kern County Water Agency (State Water Project water). Groundwater has also been utilized.

The majority of water for Kern NWR has been surplus State Water Project water purchased from the Kern County Water Agency. This water is delivered through the State's California Aqueduct to the Buena Vista Water Storage District facilities. These contracts are renewed annually. Another current source of water is from Poso Creek, an intermittent stream, which spills floodwaters onto the refuge during wet years--about one out of every five years. The historic annual water supplies to Kern NWR are summarized in Table IV O-1. The existing surface water quality appears to be good for use on the refuge. Estimated annual water requirements and existing water supply for the Kern NWR are 25,000 acre-feet, as presented in Table IV O-2.

The State Department of Water Resources has stated that no additional water is available from the State but that the State would continue to deliver water obtained from Kern County Water Agency (KCWA) through the State aqueduct (USFWS, 1978).

No water is available for appropriation in Poso Creek from June 15 until the fall rains. Securing an appropriative right on these floodwaters would not give a firm supply but would be advantageous and guarantee the refuge's right to the water. However, it is unlikely that the State would issue a permit for diversion anywhere along the stream.

Poso Creek has posed flood control problems in the past. The creek's artificial termination point is now Kern NWR. The refuge and the Pond-Poso Soil Conservation District have agreed to receive all floodwaters that reach the refuge. When the volume of water does not spill over the dike, this agreement benefits both the farmers and the refuge. However, in the winter of 1982-83, floodwaters damaged refuge facilities significantly (USBR, 1986).

The Kern River located 1.5 miles west of the refuge, is considered a critical stream by the State Water Resources Control Board. Decision 1196 by the State Water Resources Control Board determined that no water is available for appropriation from Kern River at any time (USFWS, 1978). This source of water has therefore been removed from consideration.

TABLE IV O-1
WATER DELIVERIES
KERN NWR(a)
(acre-feet)

Year	Refuge Wells	KCWA Purchase(b)	USBR Purchase	La Hacienda Purchase	Kern Tulare Purchase	Total(c)
1977	6,733	0	0	0	0	6,733
1978	133	0	0	8,917	0	9,050
1979	820	6,137	0	0	0	6,957
1980	0	7,400	0	0	0	7,400
1981	596	8,300	0	0	0	8,896
1982	0	0	6,345	0	0	6,345
1983	0	0	0	5,959	0	5,959
1984	631	0	0	0	5,157	5,788
1985	0	0	3,100	0	3,100	6,200

(a) All water purchased was delivered by Buena Vista Water Storage District

(b) Kern County Water Agency

(c) Does not include water delivered through refuge to other water uses

Sources: USBR, 1986a and USFWS, 1986j

TABLE IV O-2
DEPENDABLE WATER SUPPLY NEEDS
ALTERNATIVE SUPPLY LEVELS FOR THE KERN NWR

Month	Supply Level 1		Supply Level 2		Supply Level 3		Supply Level 4	
	ac-ft	cfs	ac-ft	cfs	ac-ft	cfs	ac-ft	cfs
January	0	0.0	0	0.0	0	0.0	1,000	16.3
February	0	0.0	0	0.0	0	0.0	1,000	18.0
March	0	0.0	0	0.0	0	0.0	0	0.0
April	0	0.0	0	0.0	0	0.0	400	6.7
May	0	0.0	1,900	30.9	2,900	47.2	1,200	19.5
June	0	0.0	850	14.3	1,250	21.0	1,800	30.3
July	0	0.0	0	0.0	0	0.0	1,600	26.0
August	0	0.0	0	0.0	0	0.0	5,500	89.4
September	0	0.0	2,400	40.3	3,600	60.5	4,000	67.2
October	0	0.0	1,200	19.5	1,800	29.3	3,500	56.9
November	0	0.0	1,800	30.3	2,800	47.1	3,000	50.4
December	0	0.0	1,800	29.3	2,700	43.9	2,000	32.5
Total	0	0.0	9,950	164.6	15,050	248.9	25,000	413.3
Maximum	0	0.0	2,400	40.3	3,600	60.5	5,500	89.4

Notes:

- Alternative 1 Existing firm water supply
- Alternative 2 Current average annual water deliveries
- Alternative 3 Full use of existing development
- Alternative 4 Optimum management

Source: USBR, 1986a

2. Water Conveyance Facilities

Currently the Buena Vista Water Storage District's No. 1 North Lateral which has a capacity of 90 cfs, transfers water from the California Aqueduct during January to mid-March (pre-irrigation season) to either the Main Drain or the West Side Canal which then conveys the water to the refuge through the Goose Lake Canal.

Water from the Federal Friant-Kern Canal is released to Semitropic Water Storage District's Poso Creek, 20 miles upstream from the refuge. Both conveyance systems have sufficient capacity to transport the water to Kern NWR during the fall, winter, and spring months. However, during the summer irrigation season, capacity is not available in the Friant-Kern Canal. Additional constraints to the Poso Creek system include conveyance losses due to percolation, evaporation, and diversions along the creek. Kern NWR's internal distribution system is generally in good condition although minor improvements are recommended.

3. Groundwater

The refuge, located in the basin and lake deposits of the Tulare Basin, has nine groundwater wells. These wells were used to supply water to the refuge until the early 1970's. At this time a receding water table coupled with escalating energy costs, led to the discontinuance of three of the wells (USFWS, 1986b).

The six operating wells are located along the southern boundary of the refuge and along the Goose Lake Canal. These wells are used on an as-needed basis in conjunction with surface water. The irrigation wells are 800 to 1,200 feet deep. Water levels in these wells were at least 280 feet below the surface in 1977. Very little groundwater is pumped in years when surface water supplies are adequate. Groundwater resources in the refuge area are experiencing overdraft conditions. The present groundwater quality for the refuge appears to be good for irrigation of moist soil units only.

B. FORMULATION AND EVALUATION OF ALTERNATIVE PLANS

For the purposes of assessing the impacts of water delivery alternatives, five levels of water supply have been identified and are presented in Table IV O-2. Each of the water supply levels provide a different rate and volume of water, 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 outlines 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 to the refuge also were compared with respect to many criteria. A summary comparison of the alternatives to provide additional water to the refuge for Water Supply Levels 1,2,3, and 4 is presented in Table IV O-3.

The following delivery alternatives have been developed, as shown on Figure IV O-2, to convey the identified levels of water supply described above. The internal distribution system improvements apply to all of the firm water supply conveyance alternatives. The improvements would include two lift pumps, 8.5 miles of new dikes, and eight miles of dike repairs.

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

Since this level represents the existing firm water supply, of which there is none, no additional facilities are required. The existing limited supply, is not dependable. Groundwater pumping would continue to occur when surface supplies are not available which exacerbates the current overdraft situation in the southern San Joaquin Valley. Some energy is currently required for groundwater pumping although the energy requirements are not significant, the energy cost is.

2. Delivery Alternative for Level 2

Since this level represents the current average annual water supplied, additional facilities would not be necessary.

TABLE IV O-3
SUMMARY COMPARISON OF WATER DELIVERIES ALTERNATIVES
KERN NWR

	Supply Levels 3 and 4			
	Alternative A	Alternative B	Alternative C	Alternative D
Availability of Water Supply	Yes	Probably Not	Yes	Maybe
Ability to Convey Water	Most of Year	Most of Year	Most of Year	No
Need New Water	Yes	Yes	Yes	Yes
Need New Conveyance Agreements	Yes	Yes	Yes	No
Type of Water Supply	Fresh Water	Fresh Water	Fresh Water	Fresh Water Blended with Groundwater
Operational Flexibility	Some	Some	Good	Some
Wildlife Habitat	Improve	Improve	Improve	Improve
Public Use	Increase	Increase	Increase	Increase
Total Annual Costs (\$) ^(a)	278,440	282,790	278,440	506,400

Notes: Alternative A: CVP Water via BVWSD Facilities
Alternative B: SWP Water via LHWSO Facilities
Alternative C: Friant-Kern Water via Poso Creek
Alternative D: Conjunctive Use Plan

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

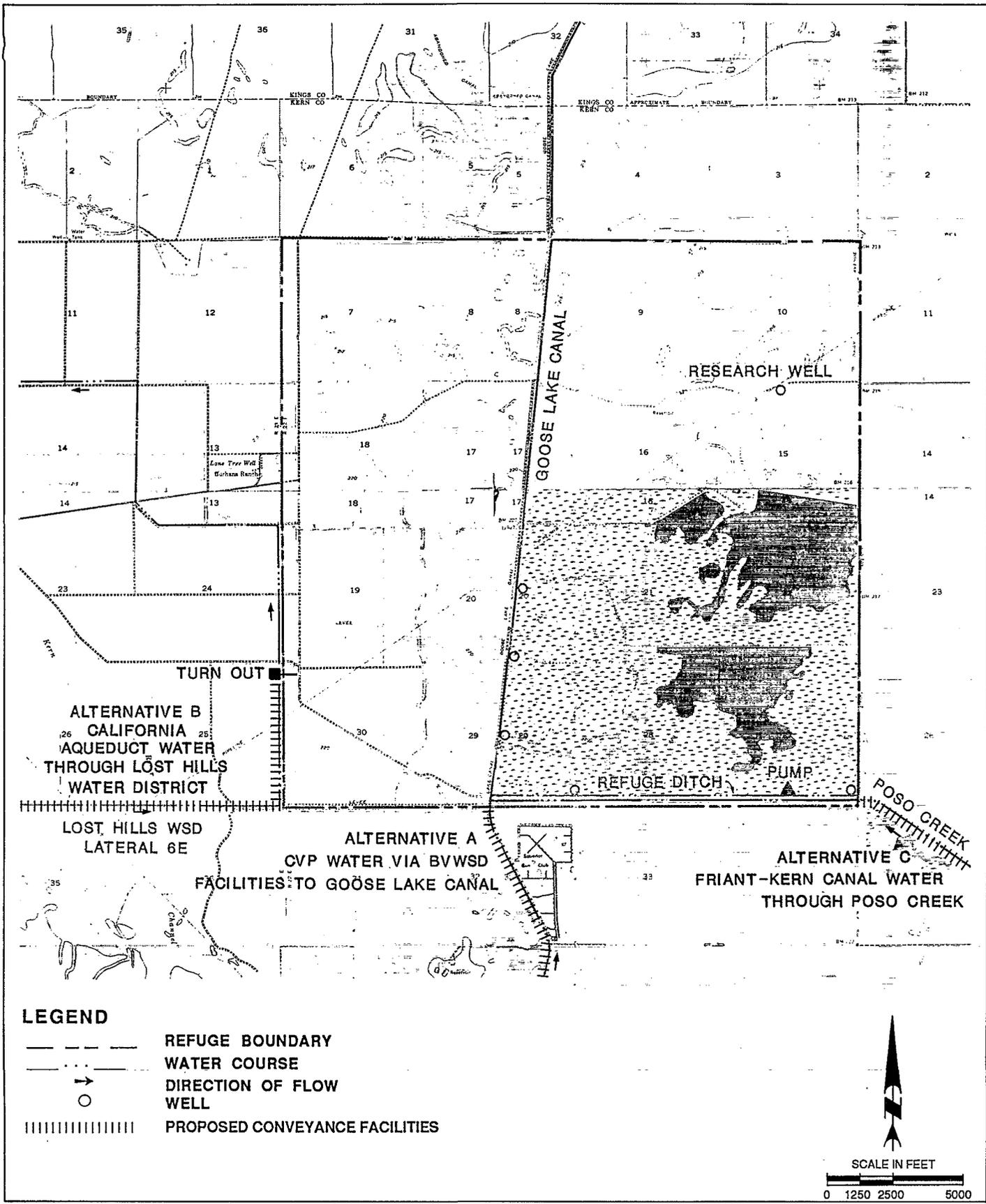


FIGURE IV 0-2

KERN NATIONAL WILDLIFE REFUGE

**PROPOSED WATER SUPPLY FACILITIES
ALTERNATIVES A, B, & C**



3. Delivery Alternative for Level 3

Under this level, some construction and/or the use of existing conveyance facilities may be required to fully serve the existing refuge with an increase in water supplied. Because the Federal and KCWA water is not provided as a dependable supply, and sufficient groundwater is not available to meet refuge needs entirely, all of the alternatives require long term contracts to receive water.

Alternative A - Transport Federal Water Through the Buena Vista Water Storage District Facilities. CVP water can be delivered from the California Aqueduct to Goose Lake Canal through Buena Vista Water Storage District (BVWSD) facilities. These facilities consist of the Number 1 North Lateral from the California Aqueduct to three canals: West Side Canal, Main Drain Canal, and Goose Lake Canal. The first two mentioned canals feed into the Goose Lake Canal. The Goose Lake Canal conveys the water to the refuge.

Water could also be conveyed from the California Aqueduct to the three BVWSD canals through the Semi-Tropic Water Storage District's (STWSD) intake canal, located parallel to the Number 1 North Lateral. This supplemental conveyance facility would require two to three cross-connection facilities from the STWSD's intake canal to the West Side Canal, the Main Drain, or directly into Goose Lake Canal. This would provide flexibility in providing water to the refuge in the event that maintenance is conducted on the North Lateral facility. Since the STWSD facilities would be a supplemental alternative which would probably be used infrequently, it will not be analyzed further.

Capacity problems may exist in BVWSD's Goose Lake Canal above the confluence of the West Side Canal and the Main Drain Canal in the month of August during the cotton irrigation season but are cleared up by September. Conveyance agreements are required with BVWSD for Alternative A to transport water to the refuge.

Alternative B - Transport State Water through the Lost Hills Water Storage District Facilities. The Lost Hills Water Storage District (LHWSD) operates a lateral which terminates at the Kern NWR's western boundary. With the construction of a turnout facility, up to 150 cfs of water purchased from the KCWA and transported through the California Aqueduct could be delivered to the western side of the refuge. Pumping facilities may be needed on the refuge to distribute the water internally. Water delivered through these facilities could be used as a supplemental supply for the western side of the refuge when capacity limitations are reached with the other canals. Costs associated with this alternative would be high due to the pumping facilities and turnouts required. Alternative B would

only deliver water to the west side of the refuge unless ditching is provided or the Poso Creek flows are reversed to transport the water to the refuge ditch located parallel to Poso Creek.

Alternative C- Transport Federal Water Through the Friant-Kern Canal and Poso Creek. Water from the Friant-Kern Canal could be conveyed to the refuge through Poso Creek. Pumping facilities currently exist to transfer the water from the creek to the refuge ditch which then conveys the water through the refuge. Poso Creek is operated by the STID and has adequate capacity to convey the Federal water. However, the Friant-Kern Canal has severe capacity limitations. The limiting reach of the Friant-Kern Canal approximately 80 percent of the time period between 1975 and 1983 is at Poso Creek (USBR, 1985).

Alternative D - Implement a Conjunctive Use Plan. Groundwater could be used in conjunction with surface water for meeting Kern NWR water supply needs during the drought years and when there are capacity limitations with the Friant-Kern Canal. Conjunctive use has been described in Chapter II. Use of the six existing wells would require the construction of a distribution system to transfer the water through the refuge. Pumping costs would be high. Overdrafting of the groundwater is a regional problem which may be lessened if the pumping is not conducted during the irrigation season.

4. Delivery Alternative for Level 4

Under this level, construction and/or the use of the existing conveyance facilities may be required to fully serve the already developed areas as well as areas which have not yet been developed within the refuge. The water would be used in approximately 6,700 acres of wetland units, leveled and natural marsh, and for riparian plants. The improved habitat would increase the number of nesting pairs of waterfowl and upland birds. Water Level 4 can be accommodated with the delivery alternatives for Level 3.

5. Summary of Alternatives

There are no alternatives for Level 1 and 2. Alternative A, B, and C would require long-term conveyance agreements with the respective water agencies. Alternatives A and B require capital and operation costs. Alternative C would require minimal capital and operation costs. However, capacity in the Friant-Kern Canal is limited and would restrict the availability of water for the refuge during the summer months. Alternative D would require annual pumping costs. This alternative would also contribute to the current overdraft situation.

C. COSTS AND ECONOMIC ANALYSIS

Costs for the alternative plans to provide adequate water supplies under Water Supply Levels 1,2,3, and 4 are presented in Table IV O-4 and the Cost Estimating Appendix. The construction costs include factors to cover engineering, contingencies, and overhead costs. During the advanced planning phase, these costs will be refined further.

Construction of the improvements under the alternative plans to provide Level 3 and 4 water deliveries would result in additional money being spent in Kern County during construction. The construction could be completed within one summer season by construction workers who reside in Kern, Kings, or Tulare Counties.

Currently, the annual public use to Kern NWR is approximately 200 non-consumptive visitors per year. If the additional water is provided, the attendance levels would increase to 4,700 non-consumptive visitors and 2,000 consumptive visitors per year under Level 3.

D. WILDLIFE RESOURCES

The annual wildlife use on the Kern NWR is approximately 6,536,900 use-days. If the additional water is provided, wildlife use days would increase. Approximately 88 and less than 1 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 O-5. The only listed threatened and endangered species associated with Kern NWR are the San Joaquin kit fox, Vulpes macrotis mutica, and the blunt-nosed leopard lizard, Gambelia silus. Numerous candidate species may occur in this area and are also presented in Table IV O-6.

Implementation of any of the alternative plans would not adversely effect the listed and candidate threatened and endangered species of wildlife but would instead improve their habitat. Detailed field investigations would be completed during the advanced planning phase of the project. Implementation of the plan would result in overall beneficial environmental effects, as shown on Table IV O-7. The No Action Plan would result in the continued management of most of the refuge. The results of the preliminary environmental analysis for the alternative plans are presented in the Environmental Appendix. Additional environmental analyses would be completed as part of the Water Contracting EIS's.

TABLE IV 0-4
SUMMARY OF ESTIMATED COSTS OF ALTERNATIVES
KERN NWR

Items	Water Delivery Level 3 Alternatives				Water Delivery Level 4 Alternatives			
	A	B	C	D	A	B	C	D
Total Construction Costs	\$1,780,000	\$1,809,000	\$1,780,000	\$2,194,400	\$1,780,000	\$1,819,000	\$1,780,000	\$2,194,400
Power Costs (\$/acre-foot)	0.00	0.00	0.00	49.70	0.00	0.00	0.00	49.70
Water Wheeling Costs (\$/acre-foot)	4.25	4.25	4.25	0.00	4.25	4.25	4.25	0.00
Annualized Construction Costs (8.875%, 30 years)	171,240	174,030	171,240	211,100	171,240	174,990	171,240	211,100
Annual Operations & Maintenance Costs	1,000	1,500	1,000	22,000	1,000	1,600	1,000	22,000
Annual Power Costs	0	0	0	273,300	0	0	0	273,300
Annual Water Wheelage Costs	64,000	64,000	64,000	0	106,200	106,200	106,200	0
Total Annual Costs	\$ 236,240	\$ 239,530	\$ 236,240	\$ 506,400	\$ 278,440	\$ 282,790	\$ 278,440	\$ 506,400

Alternative A - CVP Water via BVWSD Facilities
Alternative B - SWP Water Via LHWSO Facilities
Alternative C - Friant-Kern Canal Water Via Poso Creek
Alternative D - Conjunctive Use

TABLE IV O-5
WILDLIFE RESOURCES
KERN NWR

Ducks

Pintail ^(a)	Cinnamon Teal ^(a)	Lesser Scaup ^(a)
Wigeon-American	Blue-winged Teal	Ring-necked Duck ^(a)
Shoveler ^(a)	Wood Duck	Bufflehead
Mallard ^(a)	Redhead ^(a)	Ruddy Duck ^(a)
Gadwall ^(a)	Canvasback ^(a)	Fulvous Tree Duck
Green-winged Teal	Greater Scaup	Common Goldeneye
		Common Merganser

Geese and Swans

Canada Goose	Snow Goose	White-fronted Goose
Ross Goose		

Coots

American Coot^(a)

Shore and Wading Birds

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

TABLE IV O-5
WILDLIFE RESOURCES

KERN NWR
(Continued)

Upland Game

Mourning Dove^(a)
California Quail

Ring-necked Pheasant^(a)
Cotton Tail Rabbits

Raptorial Birds

Turkey Vulture
Sharp-skinned Hawk^(a)
Rough-legged Hawk
Barn Owl^(a)
Burrowing Owl^(a)
Merlin

Black shouldered Kite^(a)
Cooper's Hawk^(a)
Ferruginous Hawk
Short-eared Owl^(a)
Swainson's Hawk
Golden Eagle
Bald Eagle

Northern Harrier
Red-tailed (Harlan Hawk)^(a)
American Kestrel^(a)
Great Horned Owl^(a)
Prairie Falcon
Peregrine Falcon
Merlin

Fish

Carp
Large-mouth Bass
Catfish

Goldfish
Threadfin Shad
Striped Bass

Blue Gill
Crappie

Furbearers

Raccoon
Badger

Skunk
Muskrat

Long-tailed Weasel
Coyote
San Joaquin Kit Fox

Others

Reptiles and amphibians

Blunt-nosed Leopard Lizard

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.

TABLE IV O-6

LISTED, PROPOSED, & CANDIDATE, THREATENED & ENDANGERED SPECIES

KERN NWR

Listed Species

Birds

American Peregrine Falcon, Falco peregrines auatum (E)
Bald Eagle, Haliaeetus leucocephalus (E)

Mammals

San Joaquin kit fox, Vulpes macrotis mutica (E)

Reptiles

Blunt-nosed leopard lizard, Gambelia silus (E)

Proposed Species

None

Candidate Species

Mammals

Tipton kangaroo rat, Dipodomys n. nitratoides (2)

Birds

White-faced ibis, Plegadis chihi (2)
Tricolored blackbird, Agelaius tricolor (2)
Swainson's Hawk, Buteo swainsoni (2)
Mountain Plover, Eopoda montana (3)
Ferruginous Hawk, Buteo regalis (2)
Long-Billed Curlew, Numerius americanus (2)

Invertebrates

Hopping's blister beetle, Lytta hoppingi (2)
Moestan blister beetle, Lytta moesta (2)
Morrison's blister beetle, Lytta morrisoni (2)
A land snail, Helminoglypta callistoderma (2)

Plants

Lost Hills saltbush, Atriplex vallicola (2)
Hispid bird's-beak, Cordylanthus mollis subsp. hispidus (2)
California jewelflower, Caulanthus californicus (2)
Congdon's wooly-threads, Lembetia congdonii (2R)
Hoover's wooly-star, Eriastrum hooveri (2)

TABLE IV O-6

LISTED, PROPOSED, & CANDIDATE, THREATENED & ENDANGERED SPECIES

KERN NWR (Continued)

Source: USFWS, June 4, 1987

(E)—Endangered (T)—Threatened (CH)—Critical Habitat

(1)—Category 1: Taxa for which the Fish and Wildlife Service has sufficient biological information to support a proposal to list as endangered or threatened.

(2)—Category 2: Taxa for which existing information indicated may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

(2R)—Recommended addition to category 2.

TABLE IV O-7
WILDLIFE RECREATIONAL BENEFITS AND RESOURCE IMPACTS
KERN NWR

Items	Water Delivery Levels			
	Level 1	Level 2	Level 3	Level 4
Habitat Acres				
Seasonal Marsh	0	1,600	2,400	4,300
Irrigated Marsh	0	1,200	1,900	2,700
Bird Use Days				
Geese	0	14,000	21,500	35,000
Ducks	0	5,807,000	8,918,000	14,520,000
Waterbirds & Other Migratory Birds	0	715,700	1,099,100	1,789,200
Endangered Species	20,000	660,800	34,799,900	56,651,800
Public Use Days				
Consumptive	0	1,300	2,000	3,300
Non-consumptive	200	3,100	4,700	8,000
Annual Recreational Benefits	\$4,330	\$ 73,640	\$ 145,120	\$ 244,760

E. SOCIAL ANALYSIS

The social consequences of constructing and operating the alternative plans would be positive due to the potential increase in public use. The local social environment is discussed in the Social Appendix.

F. POWER ANALYSIS

Pacific Gas and Electric Company (PG&E) serves the Kern 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 more detailed discussion of project-use power and wheeling agreements is provided in the Power Analysis section of Chapter IV B.

G. PERMITS

Construction activities would require several permits. Kern County would issue approvals to ensure that the existing drainage facilities would not be adversely effected. If additional water is transferred through the California Aqueduct, approvals from the DWR would be required. If water is transferred through the BVWSD, LTWSD, or STWSD facilities, their approval is recommended. If water rights are to be obtained, the State Water Resources Control Board would be granting the permits. Stream Alteration Permits would be required from the DFG and an Army Corps of Engineers permit for construction activities in wetlands or riparian corridors.