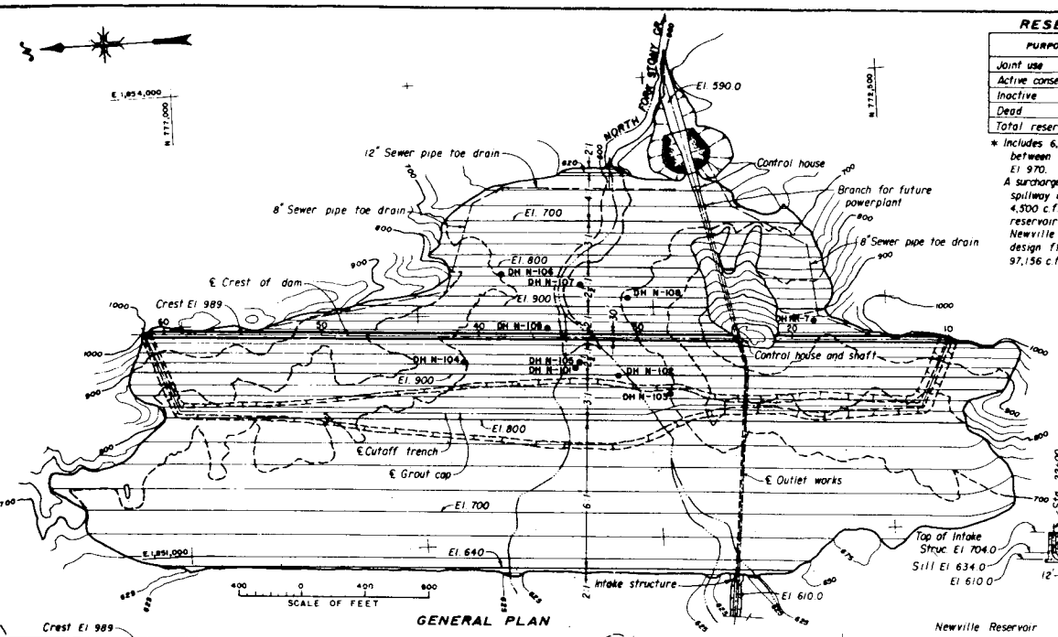
Artist's view of Newville Dam and Reservoir

## RESERVOIR CAPACITY ALLOCATIONS

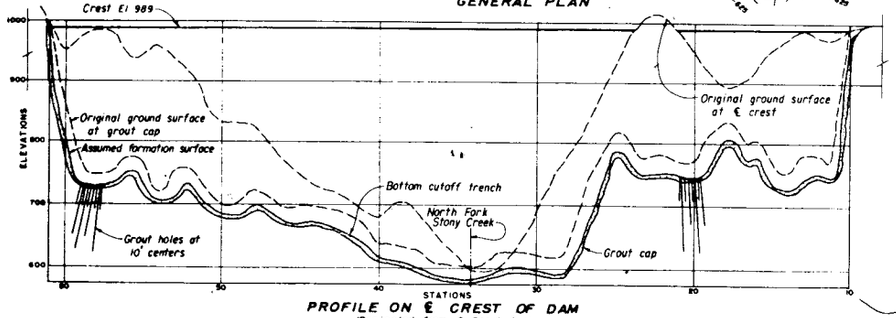
| PURPOSE | ELEVATIONS | CAPACITY ACRE-FEET |
|---|---|---|
| Joint use | 970 to 974.85 | 80,000 |
| Active conservation. | 704 to 970 | 2,806,600 |
| Inactive | 634 to 704 | 99,000 |
| Dead | Streambed to 634 | 1,100 * |
| Total reservoir capacity | | 2,986,000 * |

* Includes 6,315 a.f. allowance for 100-year sediment deposition between streambed and El 983.3, of which 315 a.f. is above El 970.

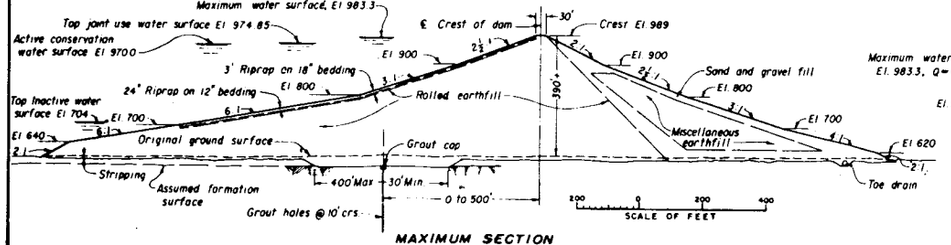
A surcharge of 140,951 a.f (Maximum water surface El 983.3) plus a spillway discharge of 17,830 c.f.s. and an outlet works discharge of 4,500 c.f.s. is provided to protect against the Paskenta reservoir design flood routed over the Paskenta spillway into Newville reservoir and combined with the Newville reservoir design flood. The combined floods have a peak discharge of 97,156 c.f.s. and a 72 hour volume of 228,900 a.f.



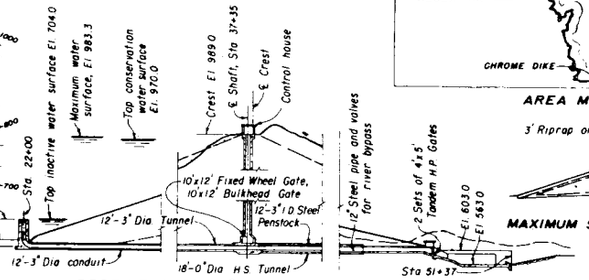

GENERAL PLAN



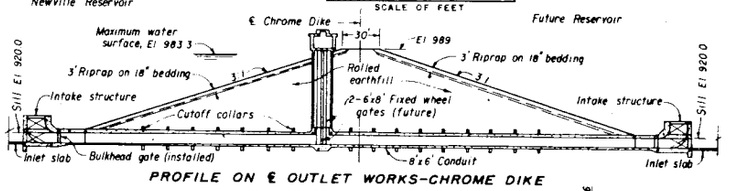

PROFILE ON ℄ CREST OF DAM
(Projected from ℄ Grout Cap)



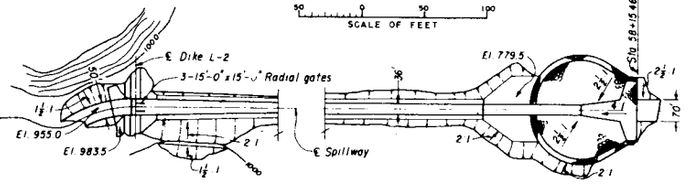

MAXIMUM SECTION

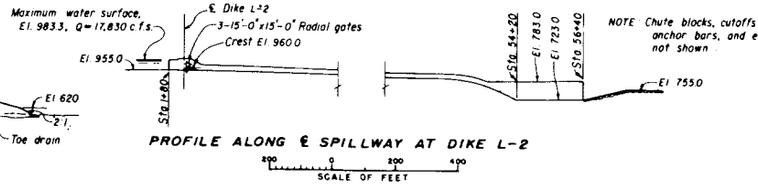



PROFILE ALONG ℄ OUTLET WORKS-NEWVILLE DAM

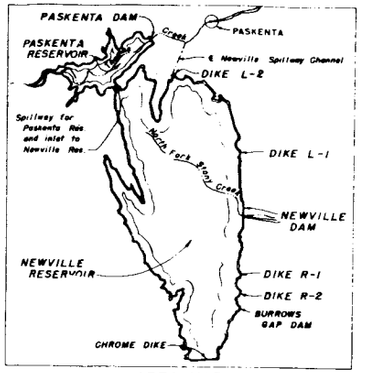



PROFILE ON ℄ OUTLET WORKS-CHROME DIKE

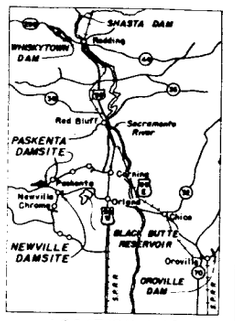


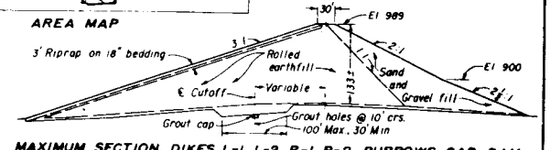

PROFILE ALONG ℄ SPILLWAY AT DIKE L-2



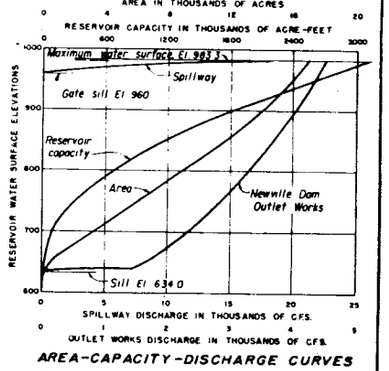

AREA MAP




LOCATION MAP




MAXIMUM SECTION, DIKES L-1, L-2, R-1, R-2, BURROWS GAP DAM




AREA-CAPACITY-DISCHARGE CURVES

| | |
|---|---|
| 11-1-67 D-LWD | REVISED TITLEBLOCK PER 2-212, LETTER DATED 10-24-67 |
| 3-5-67 J-LWD | SPILLWAY CAPACITY AND SURCHARGE CORRECTED. |

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT
SACRAMENTO RIVER DIVISION
PASKENTA-NEWVILLE UNIT--CALIFORNIA

# PASKENTA AND NEWVILLE RESERVOIRS NEWVILLE DAM AND DIKES

## FEASIBILITY DESIGN DRAWING

| | | | |
|---|---|---|---|
| DRAWN | LWD | SUBMITTED | R.T. Larsen |
| TRACED | RAL JR | RECOMMENDED | T.M. Hollgarth |
| CHECKED | RBM; FDW; HWR | APPROVED | Gordon H. Johnson |
| | | | ACTING REGIONAL ENGINEER |

DENVER, COLORADO, SEPT. 7, 1966
SHEET 6 OF 8

1107-D-2

8-11-70 D-GAF TRACED

Paskenta North Canal would branch from Paskenta South Canal approximately half a mile east of the Paskenta Dam outlet works, would cross Thomes Creek, and wind along the north side of the valley. Its size would be 69 cubic feet per second initially and would reduce during its 20-mile length to 15 cubic feet per second where it would terminate into the distribution system. This canal would serve lands along the north side of Thomes Creek.

Burch Creek Canal would branch from the Paskenta South Canal near the head of Squaw Hollow and follow a southerly direction until it would terminate in Jackson Spring Creek and Burch Creek Laterals. The canal's capacity would be 45 cubic feet per second initially and would reduce to 14 cubic feet per second at its termination. It would serve the southeast portion of the Paskenta service area.

These canals, shown on plate 1--the plan of development map, were designed with concrete lining. Canal capacities in the various reaches were based on average requirements for the month of maximum demand, assuming an 11-percent conveyance loss with a 10-percent peaking factor added.

Each canal would have a gravel-surfaced operating road as part of its berm. Fencing would be provided along the canals as a barrier to livestock. Major siphons would be constructed across Thomes, Houghton, Parker, Mill, and McCarty Creeks. The canals would be protected by wasteways at approximately 5-mile intervals. Checks would maintain proper water-surface elevations throughout

the canal system. Siphons and culverts were located along the main canals to provide for cross drainage.

The canals would traverse lands which generally are used for pasture and dry-farmed grain; therefore, no unusual problems are anticipated in right-of-way acquisition.

Black Butte - Sacramento River Conveyance Canal

The Black Butte - Sacramento River Conveyance Canal would begin at the outlet works of Black Butte Dam and follow an easterly course to Rice Creek, which would require channelization to its junction with the Sacramento River. The canal would convey 2,500 cubic feet per second of the Newville Reservoir releases, which would normally be made during the spring and early summer months. The conveyance features would be about 14.0 miles long, and the Rice Creek channelization about 3.9 miles.

Distribution System (Local Service Area)

The distribution system would consist of 85 miles of pipe laterals, with metered turnouts on the main canals and laterals, and other structures as required. Of the 11,500 acres of irrigable lands in the service area, about 10,800 acres could be served by gravity. The remainder would be served through the pumping plant at Newville Dam when the reservoir level would be below elevation 874 feet.

The capacity of the distribution system would range from 15 to 1.5 cubic feet per second, with minimum-size turnouts of 1.5 cubic feet per second. Each ownership with 10 or more irrigable acres

would be provided with a turnout; additional turnouts would be included for each 80-acre parcel or one-half mile of distribution system. The distribution system was designed to provide for complete irrigation of each 80 irrigable acres in 10 days.

Drainage System (Local Service Area)

No project drainage facilities would be required as natural drainage channels would provide outlets for most farms. There are no alkali or saline problems in this area of relatively high rainfall.

CONSTRUCTION PLANS AND COSTS

Design Considerations

U.S. Geological Survey quadrangles at a scale of 1 foot equals 62,500 feet, with contour intervals of 50 feet, were available for the service area and river conveyance routes. Advance copies of recently completed mapping in the 7-1/2-minute series (1:24,000 scale) topographic quadrangles with 10-foot contour interval became available in summer of 1967. The reservoir areas were mapped photogrammetrically by the California Department of Water Resources on a scale of 1 inch equals 400 feet, with a 20-foot contour interval. Mapping for Paskenta Reservoir was done during earlier Bureau of Reclamation studies to a scale of 1 inch equals 500 feet, with a 10-foot contour interval. Paskenta damsite was also mapped in 1945 along with the saddles to the north and south. Newville Dam and Burrows Gap were mapped at 1 inch equals 100 feet, with 10-foot contour interval.

## Plans and Estimates

In the location and design of the features of the Paskenta-Newville Unit, appropriate measures, as outlined in Executive Order 11296, were taken to alleviate flood damage. Of necessity, some of the unit's features would be located on or near the flood plains. However, both dams and reservoirs were designed with spillways and outlet works to provide adequate flood protection. Conveyance facilities in general would be located on the ridges away from the flood plains and necessary stream crossing structures were designed in accordance with sound engineering practices with adequate provisions for passing floodflows without damage.

The construction of the proposed unit requires the relocation of existing county roads in the reservoir areas. Relocated roads would be constructed to the then current standards for traffic in accordance with Public Law 87-874. Final design studies on the relocated roads would include requirements developed in cooperation with State and local highway departments.

The Bureau of Outdoor Recreation has recommended that during project preconstruction activities, archeological salvage be made at an estimated cost of $160,000. Allowance for this has been included in the estimate.

All parts of the construction area would be accessible by paved highways or improved county roads, except for Paskenta damsite which would require an additional 2 miles of new road. Paskenta damsite is about 26 road miles west of the nearest railroad shipping terminal

at Corning, California. Newville damsite is located about 22 road miles west of the Southern Pacific railhead at Orland, California.

Impervious and pervious material for Paskenta Dam are available within 2 to 3.5 miles from the damsite. Riprap and rockfill may be obtained from the ridge above the upper right abutment of the damsite.

Impervious and pervious material for Newville Dam are available within 3.5 miles of the damsite. Riprap and rockfill are available from Rocky Ridge about 1 mile from the main dam. Structural timber and lumber are available from mills at Paskenta, Elk Creek, and Red Bluff or from retail yards in Orland and Willows.

Rocky Ridge would form the east side of Newville Reservoir for about an 8-mile length. The ridge consists of a series of conglomerate and sandstone beds flanked chiefly by shaly mudstone. To assure a water-tight reservoir along this thin ridge, extensive curtain grouting has been included in the unit design. No other unusual problems in the dams, canals, or conveyance construction are anticipated.

Obtaining geologic data, and mapping of the damsites, canal locations, and conveyance channels were done by the Bureau of Reclamation and the California State Department of Water Resources.

In the canal excavation, a minor amount of rock would be encountered.

Right-of-way

Of the land required for operational purposes, 24,565 acres would be acquired for reservoir operation and management; an additional 1,430 acres would be acquired for borrow areas.

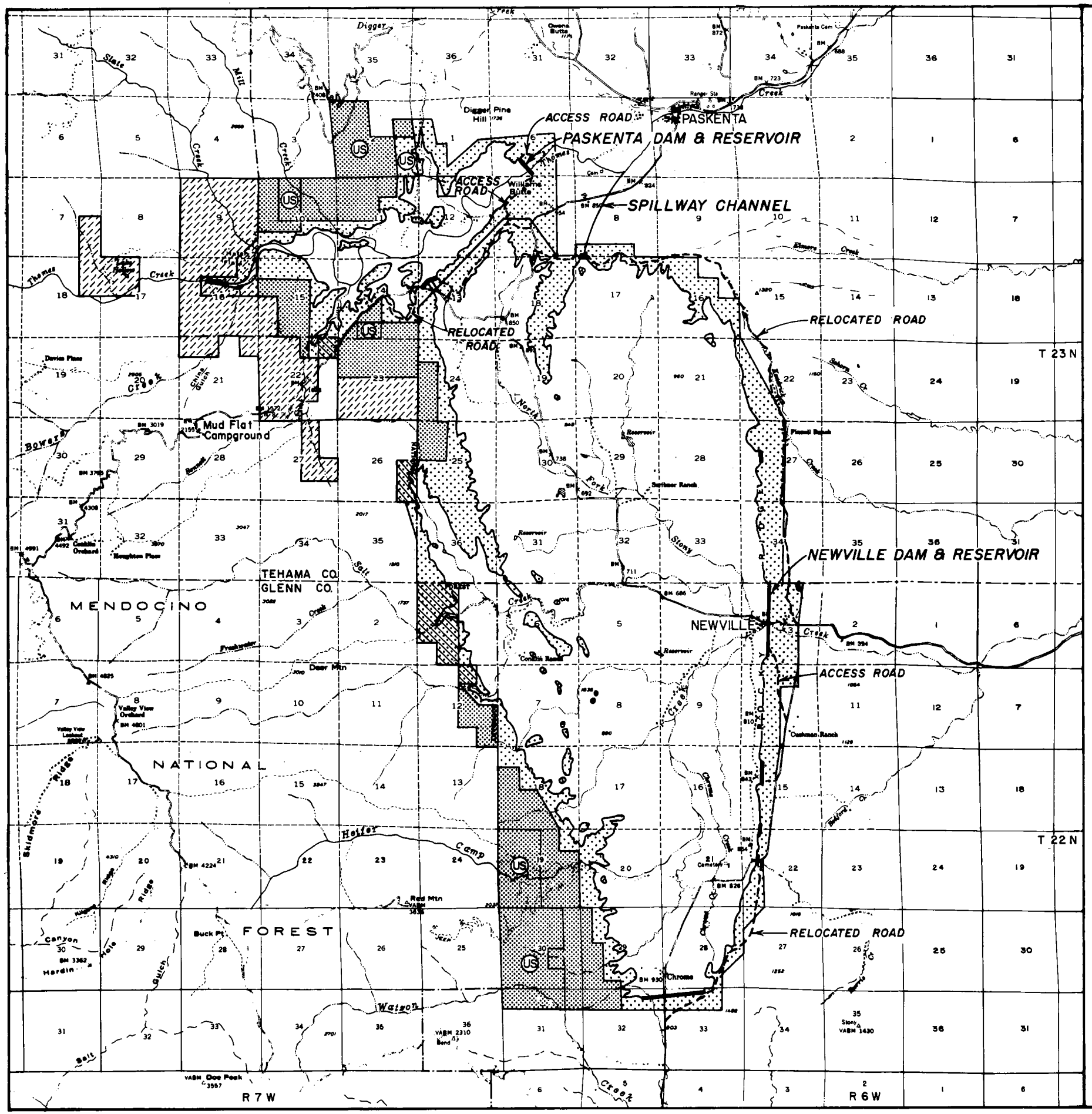
The reservoir formed by Paskenta Dam would be about 4 miles long and up to a mile wide at maximum water elevation; 3,280 acres, including lands required for management and freeboard, would be acquired. Of this, about 117 acres is government land under the jurisdiction of the Bureau of Land Management, and 40 acres are in the Mendocino National Forest.

The reservoir formed by Newville Dam would be about 9.5 miles in length and up to 4 miles wide at maximum water elevation; 21,285 acres, including lands for management and freeboard, would be acquired. Some 400 acres of land are in the Mendocino National Forest.

For recreation purposes, as recommended by the Bureau of Outdoor Recreation, an additional 3,885 acres adjacent to both reservoir areas would be required. Holdings totaling 2,489 acres are in private ownership, with the balance in government ownership under the jurisdiction of the Bureau of Land Management and the U.S. Forest Service, as shown on plate 5.

The Bureau of Land Management has evaluated the effect of the unit on lands under its jurisdiction in its impact report dated June 1967.

Wildlife mitigation lands, as recommended by the Bureau of Sport Fisheries and Wildlife, amount to 2,680 acres, including 225 acres that would also be used as reservoir operation lands. About 650 acres which would be developed for deer range mitigation lands




N

RESERVOIR AREA

| | |
|---|---|
| Newville water surface (El. 974.85) | 16,560 Acres |
| Paskenta water surface (El. 1006) | 1,940 Acres |

RESERVOIR OPERATIONAL LAND

| | |
|---|---|
| Newville Reservoir | 4,725 Acres |
| Paskenta Reservoir | 1,115 Acres |

RECREATION AND WILDLIFE LAND

| | |
|---|---|
| Recreation land | 3,885 Acres |
| Fish and wildlife land | 2,455 Acres |
| Joint fish and wildlife and reservoir operational land | 225 Acres |

PUBLIC LAND

| | |
|---|---|
| US Bureau of Land Management | 1,513 Acres |
| National Forest | 440 Acres |

0 1 2 3
MILES

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CENTRAL VALLEY PROJECT
SACRAMENTO R. DIV. - PASKENTA - NEWVILLE UNIT - CALIF.

# RECREATION, WILDLIFE, & RESERVOIR LANDS

DECEMBER 1967

1107-208-83

are in private ownership, within or adjacent to the Mendocino National Forest.

All the private lands would be purchased in fee.

Canals and laterals would require acquisition of 725 acres for rights-of-way, ranging in width from 15 to 165 feet, small portions of which are now dry farmed. The conveyance channel right-of-way requirement, ranging in width from 120 to 135 feet, is included in the 725 acres. This land would be purchased in fee.

Cost Estimates

Estimated construction costs are summarized in table 4 and shown in detail on table 5, the control schedule. Costs, based on unit prices prevailing as of January 1970, include an allowance for contingencies, engineering, administration, and supervision. Estimated construction periods for the various features and the sequence of construction for the entire unit are also shown on table 5.

The estimated annual operation, maintenance, and replacement costs expected to occur under full operating conditions are shown in table 6. The costs include allowances for the wages of operators, ditchriders, maintenance labor, and administrative personnel, together with the cost of material and supplies.

Project facilities would be operated from the Bureau of Reclamation office at Willows; the distribution system would be operated by a local entity.

Power for pumping was assumed to be supplied from the Central Valley Project, wheeled over facilities of the Pacific Gas and Electric Company.

Environmental Considerations

The impact of the unit on water quality was analyzed in compliance with Executive Order 11288. During the construction of project facilities, adequate measures would be taken to protect both surface and ground waters from pollution. Provisions would be included in contract specifications so contractors would be required to protect water quality in the work area. All construction activities affecting water quality would comply with local and State water quality control regulations. Project plans and specifications would be coordinated with the Environmental Protection Agency during preconstruction activities.

Recommendations in the January 1965 Public Health Service Report, "Prevention and Control of Vector Problems Associated with Water Resources," would be used as a guide in planning, construction and operation of the project.

Table 4. Construction costs

| | | Costs |
|---|---|---|
| Storage and conveyance facilities | | $136,589,000 |
| Paskenta Dam and Reservoir | $33,880,000 | |
| Newville Dam and Reservoir | 85,380,000[a] | |
| Newville Pumping Plant and Substation | 419,000 | |
| Paskenta North Canal | 2,931,000 | |
| Paskenta South Canal | 2,505,000 | |
| Burch Creek Canal | 650,000 | |
| Black Butte-Sacramento River Conveyance and Rice Creek channelization | 10,824,000 | |
| Recreation lands and facilities | | 5,513,000 |
| Fish and wildlife lands and facilities | | 596,000 |
| Main project facilities | | 142,698,000 |
| Distribution facilities | | 7,071,000 |
| Total construction costs | | $149,769,000 |

[a] Includes $160,000 for archeological salvage.

**LEGEND: Types of Activity**

Preconstruction and Other Work — Construction

| LINE NO. | CLASS AND ACCOUNT | PROGRAM ITEM | QUANTITY | UNIT | ESTIMATED TOTAL | ESTIMATED TOTAL TO JUNE 30, 1972 | FISCAL YEARS 1 | 2 | 3 | 4 | 5 | 6 | 7 | BALANCE TO COMPLETE | ESTIMATED COMPLETION DATE | LINE NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | |
| 1 | | Irrigation Service Land - Full | 11,500 | Ac. Irrig. | | | | | | | | 10,100 Ac. | 1,400 Ac. | | | 1 |
| 2 | | | | | | | | | | | | | | | | 2 |
| 3 | | M & I Service (Export) | 312,000 a/ | A.F. | | | | | | | | | | 312,000 A.F. | | 3 |
| 4 | | | | | | | | | | | | | | | | 4 |
| 5 | 108 | CONSTRUCTION PROGRAM | | | | | | | | | | | | | | 5 |
| 6 | | PROJECT FACILITIES | | | | | | | | | | | | | | 6 |
| 7 | 01.01 | Paskenta Reservoir and Dam | 129,800 | A.F. | 33,880,000 | 70,000 | 240,000 | 500,000 | 5,940,000 | 10,000,000 | 12,000,000 | 5,130,000 | | | | 7 |
| 8 | 01.02 | Newville Reservoir and Dam | 2,986,700 | A.F. | 85,220,000 1/ | 165,000 | 300,000 | 300,000 | 8,000,000 | 20,000,000 | 30,000,000 | 20,000,000 | 4,960,000 | 1,495,000 2/ | | 8 |
| 9 | 03.01 | Newville Pumping Plant | 425 | H.P. | 403,000 | 1,000 | | | | | | 40,000 | 362,000 | | | 9 |
| 10 | 05.01 | Paskenta North Canal | 20.0 | Mi. | 2,931,000 | 22,000 | | | | 300,000 | 1,300,000 | 1,309,000 | | | | 10 |
| 11 | 05.02 | Paskenta South Canal | 14.5 | Mi. | 2,505,000 | 22,000 | | | | 90,000 | 1,250,000 | 1,143,000 | | | | 11 |
| 12 | 05.03 | Burch Creek Canal | 4.5 | Mi. | 650,000 | 2,000 | | | | | 80,000 | 568,000 | | | | 12 |
| 13 | 05.04 | Black Butte - Sacramento R. Conveyance | 14.0 b/ | Mi. | 10,076,000 | 9,000 | | | | 590,000 | 2,820,000 | 3,330,000 | 3,327,000 | | | 13 |
| 14 | 09.01 | Channelization (Rice Creek) | 3.9 b/ | Mi. | 748,000 | 2,000 | | | | | | 63,000 | 683,000 | | | 14 |
| 15 | 13.01 | Newville Pumping Plant Substation | | | 16,000 | 1,000 | | | | | | 4,000 | 11,000 | | | 15 |
| 16 | 15.01 | Recreation Lands and Facilities | 3,885 | Ac. | 5,513,000 3/ | — | | | | | 250,000 | 1,230,000 | 456,000 | 3,577,000 4/ | | 16 |
| 17 | 15.02 | Fish and Wildlife Lands and Improvements | 2,455 | Ac. | 596,000 5/ | | | | | | | 320,000 | 276,000 | | | 17 |
| 18 | 15.03 | Archeological Salvage | | | 160,000 | — | 60,000 | 100,000 | | | | | | | | 18 |
| 19 | | SUBTOTAL | | | 142,698,000 | 294,000 | 600,000 | 900,000 | 13,940,000 | 30,980,000 | 47,700,000 | 33,137,000 | 10,075,000 | 5,072,000 | | 19 |
| 20 | | DISTRIBUTION FACILITIES | | | | | | | | | | | | | | 20 |
| 21 | 06.01-03 | Paskenta Lateral System | 10,100 | Ac. | 5,687,000 | 4,000 | | | | 495,000 | 2,594,000 | 2,594,000 | | | | 21 |
| 22 | 06.04-05 | Newville Lateral System | 1,400 | Ac. | 1,384,000 | 2,000 | | | | | | 534,000 | 848,000 | | | 22 |
| 23 | | SUBTOTAL | | | 7,071,000 | 6,000 | | | | 495,000 | 2,594,000 | 3,128,000 | 848,000 | | | 23 |
| 24 | | | | | | | | | | | | | | | | 24 |
| 25 | | TOTAL CONSTRUCTION COST | | | 149,769,000 | 300,000 | 600,000 | 900,000 | 13,940,000 | 31,475,000 | 50,294,000 | 36,265,000 | 10,923,000 | 5,072,000 | | 25 |
| 26 | | | | | | | | | | | | | | | | 26 |
| 27 | | TOTAL PROJECT COST | | | 149,769,000 | 300,000 | 600,000 | 900,000 | 13,940,000 | 31,475,000 | 50,294,000 | 36,265,000 | 10,923,000 | 5,072,000 | | 27 |
| 28 | | Consolidated Expenditures and Credits | | | -300,000 | -300,000 | | | | | | | | | | 28 |
| 29 | | TOTAL EXPENDITURES | | | 149,469,000 | | 600,000 | 900,000 | 13,940,000 | 31,475,000 | 50,294,000 | 36,265,000 | 10,923,000 | 5,072,000 | | 29 |
| 30 | | | | | | | | | | | | | | | | 30 |
| 31 | | TOTAL OBLIGATIONS | | | 149,469,000 | | 600,000 | 900,000 | 13,940,000 | 31,475,000 | 50,294,000 | 36,265,000 | 10,923,000 | 5,072,000 | | 31 |
| 32 | | | | | | | | | | | | | | | | 32 |
| 33 | | | | | | | | | | | | | | | | 33 |

Notes:

1/ Includes $490,000 for future use of Chrome Dike outlet works equally divided for a 5 year period.

2/ Deferred costs for grouting saddle dikes.

3/ Recreation facilities $4,993,000 estimated by BOR, lands $520,000 estimated by USBR.

4/ Ultimate facilities to be provided progressively over the period from project year 10 through year 50.

5/ $33,000 mitigation land improvement, $15,000 fishery enhancement, estimated by BSF & WL. Lands $548,000 by USBR.

a/ Increased yield of CVP system by integrated operation.

b/ Conveyance facilities required to export reservoir releases to enhance the CVP yield.

Price base - January 1970

Recommended: W. J. McCrystle (Supervising Office, Mccg) 3/29/67 (Date)

Recommended: MAC R. J. Vallance Jr. (Regional Director) 3-29-67 (Date)

Recommended: _____ (Chief, Div. of PC & F) _____ (Date)

Approved: _____ (Commissioner) _____ (Date)

Revised: April 22, 1970 (Date)

SHEET 1 OF 1 SHEETS

Form PF-2

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

CONTROL SCHEDULE
CENTRAL VALLEY PROJECT
SACRAMENTO RIVER DIVISION
PASKENTA-NEWVILLE UNIT - CALIF.

Sacramento (OFFICE) April 1970 (DATE) 2 (REGION)

☐ GENERAL INVESTIGATIONS ☐ CONSTRUCTION ☐ OPERATION & MAINTENANCE ☐ OTHER

TABLE 5

1107-208-99

Table 6. Annual operation, maintenance, and replacement costs under full development

| Project facilities | | Costs |
|---|---|---|
| Paskenta and Newville Dams and Reservoirs | | $ 35,000 |
| Black Butte-Sacramento River Conveyance | | 38,700 |
| Pumping plant and main conveyance canals | | 51,000 |
| Transmission (power) | | 700 |
| Total, project facilities | | $125,400 |
| Wildlife mitigation lands | $ 7,500 | |
| Recreation land and facilities | 321,000 | |
| Water rights | 5,000 | $333,500 |
| | | $458,900 |
| Distribution system | | 85,100 |
| Total annual OM&R costs | | $544,000 |

# PART IV

# WATER SUPPLY AND UTILIZATION

## WATER SUPPLY

The Paskenta-Newville Unit reservoirs, through integrated operation with other Central Valley Project reservoirs, would make possible the delivery at the Sacramento-San Joaquin Delta of a water supply of 400,000 acre-feet, and would supply 43,000 acre-feet of irrigation water for the local service area. The export water storage operation is depicted on plate 6.

### Surface Water

The Thomes Creek basin lies in the eastern edge of the Coast ranges. Months of highest rainfall--December, January, and February--account for about 56 percent of the average annual rainfall.

Most of the basin runoff occurs in the winter and early spring from rain, with some snowmelt in the higher elevations. Ninety percent of the runoff occurs during the period January through June, as shown by records from the Thomes Creek gage at Paskenta, in operation since 1921. The average annual runoff at the gaging station during the period of record is 196,000 acre-feet from the 194-square-mile drainage area. The recorded runoff varied from 32,500 acre-feet in water year 1924 to 456,400 acre-feet in water year 1958.

## Water Supply and Utilization

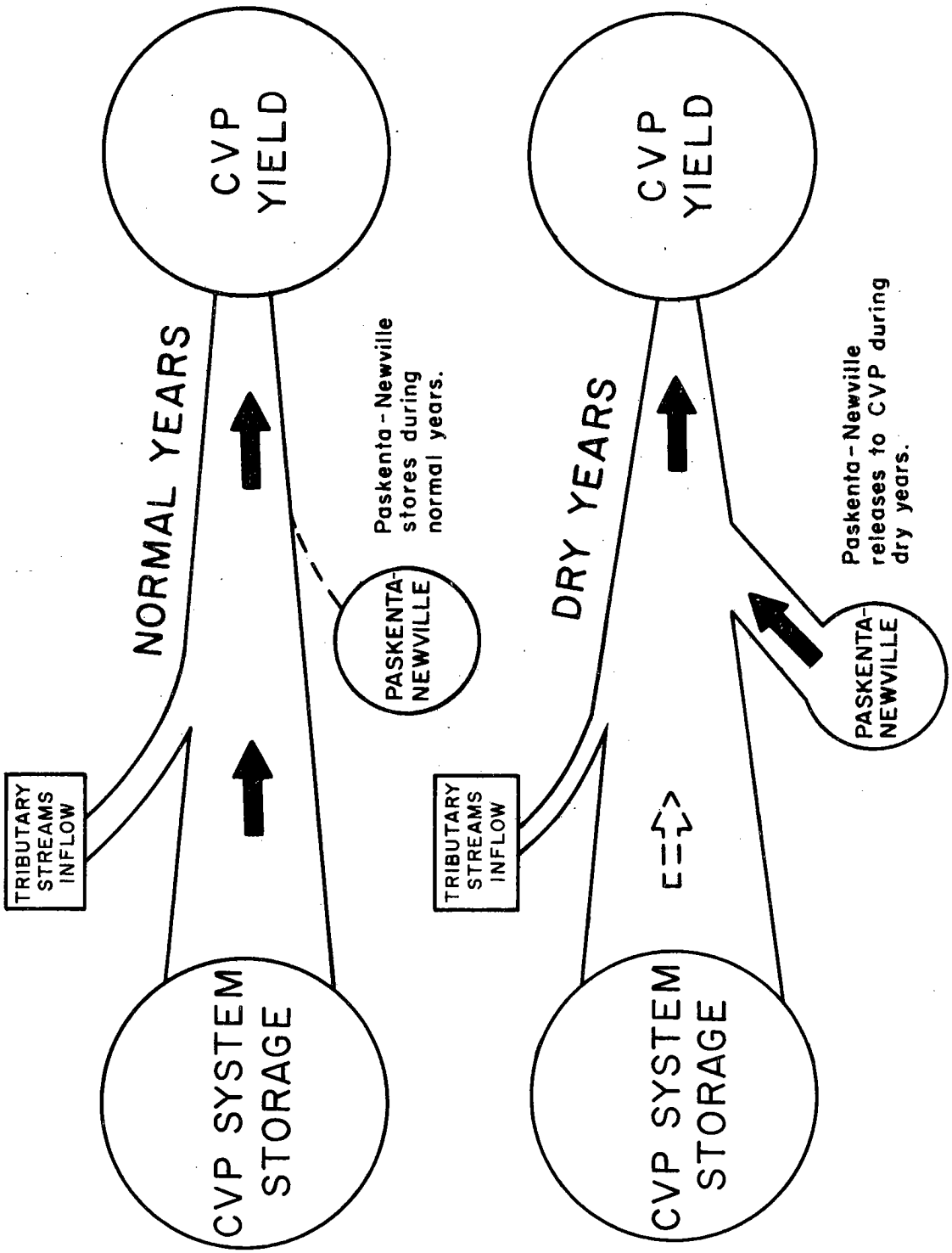
North Fork Stony Creek above Newville damsite drains an area of 55 square miles. A gaging station on the North Fork Stony Creek near Newville has been maintained since the summer of 1963. Average runoff at Newville Dam is estimated at 26,000 acre-feet per year; the amount of rainfall is similar to that recorded at Paskenta Ranger Station 7 miles north.

### Water Quality

Water from Thomes Creek at Paskenta has been sampled monthly since October 1958 by the California State Department of Water Resources, and chemical analyses are reported in Bulletin 130. For this study, 46 samples taken from October 1958 to September 1964 were used. Flows ranged from 2.2 to 1,660 cubic feet per second.

Water from Thomes Creek was found to be calcium bicarbonate type. Total dissolved solids content ranged from 63 to 279 parts per million, the total hardness as $CaCO_3$ from 52 to 198 parts per million, and the sodium ratio from 9 to 12 percent.

An operational study for a 44-year period for both reservoirs was made to determine the range of total dissolved solids. The results are:




# PASKENTA-NEWVILLE AND CENTRAL VALLEY PROJECT
## EXPORT WATER STORAGE OPERATION

DECEMBER 1967

1107-208-100

| Items | Maximum | | Minimum | |
|---|---|---|---|---|
| | Paskenta | Newville | Paskenta | Newville |
| TDS (p.p.m.) | 103 | 146 | 77 | 85 |
| $CaCO_3$ (p.p.m.) | 80 | 105 | 60 | 65 |
| Sodium ratio (%) | 11 | 13 | 9 | 10 |

The analyses indicate that the water would be suitable for sustained irrigation without damage to crops or salt buildup.

Ground Water

The principal ground-water source in the service area lies along and adjacent to Thomes Creek and extends about 5 miles upstream from the eastern boundary of the service area. Ground-water pumpage sometimes supplements stream diversion and, in absence of streamflow, is relied on entirely although it represents only a small portion of the total water requirement.

Existing wells, drilled by the cable-tool method, vary in depth from 180 to more than 500 feet. Production generally ranges from 300 to 600 gallons per minute; one exceptional well was reported to produce 1,000 gallons per minute.

The present and ultimate safe average annual ground-water supply is estimated to be about 1,000 acre-feet, assuming a live stream in Thomes Creek.

WATER REQUIREMENTS

In determining the water requirements for the unit, reservations for future use above the reservoir, and the existing local diversion rights were considered. In addition, provision

was made for sufficient flows to maintain a live stream below Paskenta Dam during the winter months, primarily to ensure recharge of ground water, but also to provide some incidental control of water quality as well as the attendant esthetic values of a live stream.

The winter stream releases, tributary inflow in the service area, and project irrigation return flow would satisfy existing ground-water recharge needs.

Irrigation farm delivery demands are estimated to total 37,450 acre-feet annually. Part of the irrigation demand would be met by the average annual safe ground-water supply of 1,000 acre-feet. Deducting the 1,000 acre-feet of ground water and assuming a 15 percent loss for the conveyance and distribution systems, would result in an irrigation demand on the reservoirs of 43,000 acre-feet annually. The local irrigation requirement to be met from Paskenta Reservoir would be 38,000 acre-feet; and the local requirement met from Newville Reservoir would be 5,000 acre-feet.

Flows surplus to the local needs and for filling Paskenta Reservoir would be diverted to Newville Reservoir, stored for carryover, and released to the Sacramento River in years of seriously deficient runoff.

## Water Supply and Utilization

Water requirements and source of supply for the local service areas and the proposed export are:

| | Farm delivery demand | Losses | Reservoir | |
|---|---|---|---|---|
| | | | Paskenta | Newville |
| | | (acre-feet) | | |
| Irrigation | | | | |
| Reservoir | 36,450 | 6,550 | 38,000 | 5,000 |
| Ground water | 1,000 | - | - | - |
| Upstream requirements | - | - | 1,500 | 0 |
| Downstream requirements | - | | 12,000 | 7,000 |
| Streamflow maintenance and ground-water recharge | - | - | 8,000 | - |
| Export | - | - | - | 400,000[a] |
| Total | 37,450 | 6,550 | 59,500 | 412,000 |

[a] Export to Delta during critical dry period 1928-1934 for use by the Central Valley Project.

The Newville storage would be integrated with the Central Valley Project to produce a water supply of 400,000 acre-feet for export to the Delta as the need for such water service becomes necessary.

### WATER UTILIZATION

Present use of Thomes Creek water for irrigation is limited and inefficient because water is available only during the early part of the summer. The proposed reservoirs would provide seasonal and long-term storage, allowing water usage throughout the irrigation season. Water surplus to the area needs would be stored and integrated with the Central Valley Project system to produce an export supply during critical dry periods.

## Watershed of Origin Concept

The State of California is committed to the "watershed of origin" concept of water rights. Since the Bureau of Reclamation plans and operates Federal facilities to deliver water in the Central Valley Basin it will recognize the watershed of origin concept, if such recognition does not subjugate Federal laws.

Under this watershed of origin concept, the storage required to develop a supply for local in-basin demand is a function of the inflow and prior water rights within the local basin, and is not subject to export rights, regardless of date of application. A project to meet in-basin demand would be required to recognize only the prior water rights within the basin. Local in-basin development would not necessarily be required to provide 6-1/2 years of carry-over storage to protect the exports from the Delta, as has frequently been the case in the past. This is also consistent with the present means of protesting new water rights applications since the Bureau of Reclamation has not been able to utilize the 7-year dry period, 1928 to 1935, as a means of supporting protests.

Operation studies of the present and authorized Central Valley Project facilities use basin hydrology that has been depleted to reflect this watershed of origin concept.

This concept has had a substantial effect on the Paskenta-Newville Unit, since water to provide the consumptive use requirements of the local area has already been deducted from the Delta inflows. Paskenta-Newville storage, previously assumed necessary to develop local requirements, can now be used to develop surpluses for export.

The Paskenta-Newville Project was evaluated using this concept. The in-basin downstream water rights were recognized; no water was stored from June 15 through September 30 of any year. Water to meet prior water rights on Thomes and North Fork Stony Creeks was released during any period of the year it was required.

Flows in excess of the downstream water rights requirement on Thomes Creek were stored to meet the local service area demand, regardless of indicated surpluses in the Delta. Flows surplus to the entire Central Valley Basin, including the Delta, were then storable in developing the exportable yield.

Integrating the operation of Paskenta-Newville Unit with the existing and authorized Central Valley Project facilities enhances its ability to develop an export yield.

The use of the watershed of origin concept results in an exportable yield of 400,000 acre-feet for the Paskenta-Newville Unit, when integrated with the Central Valley Project and coordinated with the California State Water Project.

Reservoir Operation Study

The reservoirs would store the local runoff available at the damsites on Thomes and North Fork Stony Creeks. Paskenta Reservoir on Thomes Creek is sized at about 130,000 acre-feet with 112,000 acre-feet available for operational use. Releases made for local irrigation use would be 38,000 acre-feet annually, and for water rights and stream maintenance would average 20,000 acre-feet annually. Flows not storable in Paskenta Reservoir would be spilled to Newville Reservoir on North Fork Stony Creek.

Newville Reservoir has a gross capacity of 2,986,700 acre-feet, with 80,000 acre-feet joint-use storage, and 100,000 acre-feet inactive. The 80,000 acre-foot joint-use space would be used for flood control from September 1 to June 1, with the maximum flood reservation pool required from October 1 to March 1 of each year. All flood spills from Newville would be released to Thomes Creek, using the Corps of Engineers' recommended release of 5,000 c.f.s. for the project storm. The outlet rate through Newville Dam would be restricted to the natural flood inflow rate or less, with potential for some minor improvement in flood control on Stony Creek when operated in conjunction with Black Butte Reservoir. Any flows stored in Newville that previously were stored in Black Butte would be replaced by Central Valley Project releases via the Tehama-Colusa Canal when needed by the Black Butte service area. The effect of the unit on Black Butte

Reservoir would be negligible. Black Butte Dam, built and operated by the Corps of Engineers primarily for flood control, provides some conservation storage, the yield from which is marketed by the Bureau of Reclamation.

The supply for Newville Reservoir would include the spillage from Paskenta and minor local inflow. The releases from Newville Reservoir required in adverse dry years to support a firm annual yield of 400,000 acre-feet for Central Valley Project use would be made from accumulated storage. Releases made annually from Newville Reservoir would be 5,000 acre-feet for the local service area, and all inflow estimated at 7,000 acre-feet from local drainage from March 15 to November 1 for water rights.

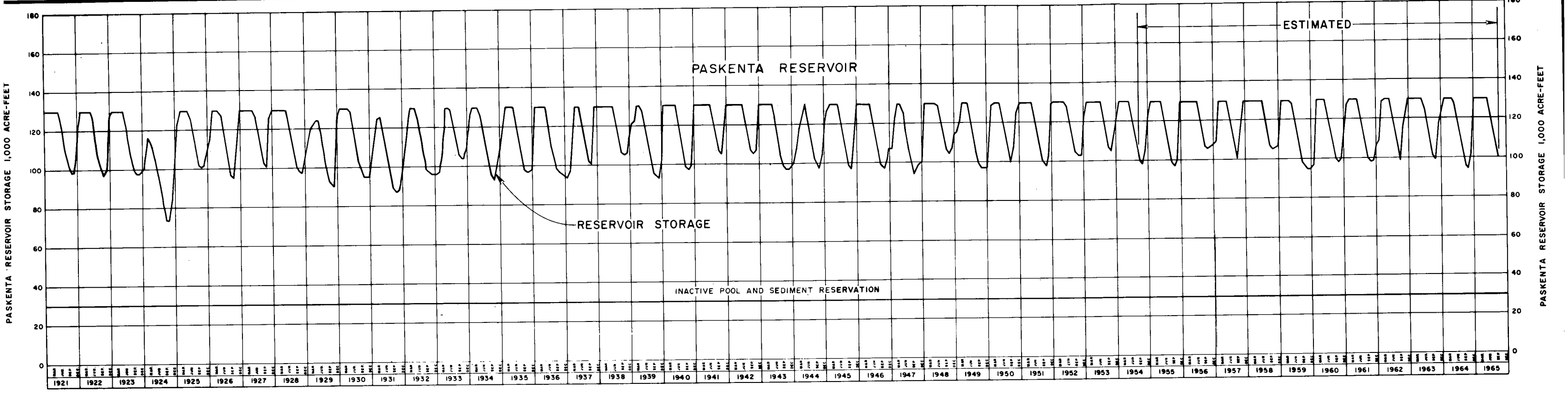
The proposed plan of operation would have Paskenta-Newville Unit fully integrated with the Central Valley Project and coordinated with the State Water Project. Shasta and Trinity Reservoirs would be reoperated in conjunction with Delta surpluses. In this integrated operation, Central Valley Project releases would supply the added project demand during wet years while flows from Thomes Creek and North Fork Stony Creek were being stored for carryover. When Central Valley Project storage was reduced to or approaching a critical level during the dry period, releases would be made from Paskenta-Newville to meet a part of the project demand. Studies of the reservoir operation and extended runoff estimates indicate that initial filling of Newville Reservoir would require 15 to 25 years.

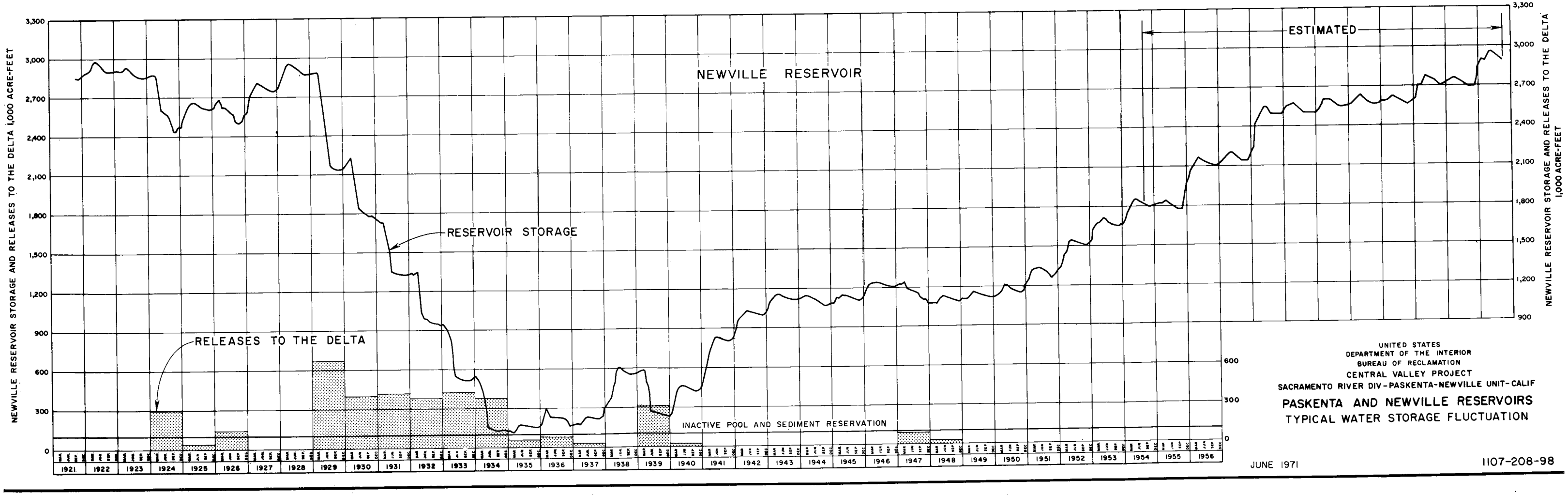
Plate 7 illustrates the reservoirs' operation during the period of study, 1921 to 1965. Estimates of runoff prior to 1921 show an extended period of 25 years with an average runoff significantly greater than that for the study period.

Yield Derivation

Paskenta and Newville Reservoirs, with a combined active capacity of 2,919,000 acre-feet, would store surplus flows for release to the local service areas annually and export to the Delta during the critical dry period.

The combined yield of the two reservoirs when integrated with the Central Valley Project would average 443,000 acre-feet annually, based on the unit operation study. The local service areas would require 43,000 acre-feet; 400,000 acre-feet would be made available at the Delta. The 443,000 acre-feet annual yield assumes irrigation use in the local service areas, various conservation uses in the Delta, and a combined active reservoir water storage of 2,832,000 acre-feet available in April 1928 at the beginning of the dry period. The yield computed for the critical dry period, April 1928 to February 1935, or the equivalent of 6.83 years, would be:




UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT
SACRAMENTO RIVER DIV-PASKENTA-NEWVILLE UNIT-CALIF

# PASKENTA AND NEWVILLE RESERVOIRS
## TYPICAL WATER STORAGE FLUCTUATION

JUNE 1971

1107-208-98

Water Supply and Utilization

| | Acre-feet |
|---|---|
| Stored water available at both reservoirs | 2,832,000 |
| Combined inflow | 689,000 |
| Evaporation | - 337,000 |
| Required releases | - 340,000 |
| Delta surplus stored | 240,000 |
| Net supply | 3,084,000 |
| Safe yield | 443,000 |
| Annual use of stored water: | |
| Newville service area | 5,000 |
| Paskenta service area | 38,000 |
| Delta export | 400,000 |
| Total | 443,000 |

Storage Utilization

Paskenta-Newville Unit would make maximum use of the local storage available in the northern half of the Glenn Reservoir Complex. When North Coast import water becomes available, the complete complex of Paskenta, Newville, and Rancheria Reservoirs could be utilized. The Paskenta-Newville Unit is designed so that it could be operated as an increment of this total complex, and would provide increased yields through regulation of import supplies.

# PART V

# PASKENTA AND NEWVILLE SERVICE AREAS

## GENERAL DESCRIPTION

### Location

The Paskenta-Newville Unit is located in Glenn and Tehama Counties between the North Fork Stony Creek and Thomes Creek. It extends from the small town of Paskenta on the west to the Corning Irrigation District on the east. The unit is about 130 miles northwest of Sacramento, and some 175 miles north of San Francisco.

### Physical Geography

The local service area of the Paskenta-Newville Unit is situated on the eastern slope of the Coast Ranges. West of the service area, the Coast Ranges rise abruptly to form a series of ridges and summits ranging from 5,000 to 7,000 feet above the service area. Streams rising in these mountains flow eastward to the Sacramento River, crossing the dissected uplands. The major streams are Thomes Creek to the north and North Fork Stony Creek to the south. Various smaller streams head at lower elevations in the dissected uplands between the major streams. The terrain slopes toward the east, with flatter valley lands occurring on the eastern edge of the area.

The areas proposed for irrigation service are several narrow valleys from 1/4 to 1-1/2 miles wide which trend in a west-east direction, separated by rolling hills.

The valley soils were formed from outwash from the Coast Ranges by the intermittent streams of Thomes, Jewett, Houghton, Parker, Elmore, Jackson Springs, Sehorn, North Fork Stony, and Brannin Creeks, and from deposition of alluvium from the bordering hills. The topography of the main body of land along Thomes Creek is gently undulating. The area on the north side of the creek is made up of several terraces which parallel the streams and merge into the bordering rolling and hilly upper terrace lands. The remaining scattered irrigable areas border the many small creeks which drain areas of rolling to steep lands.

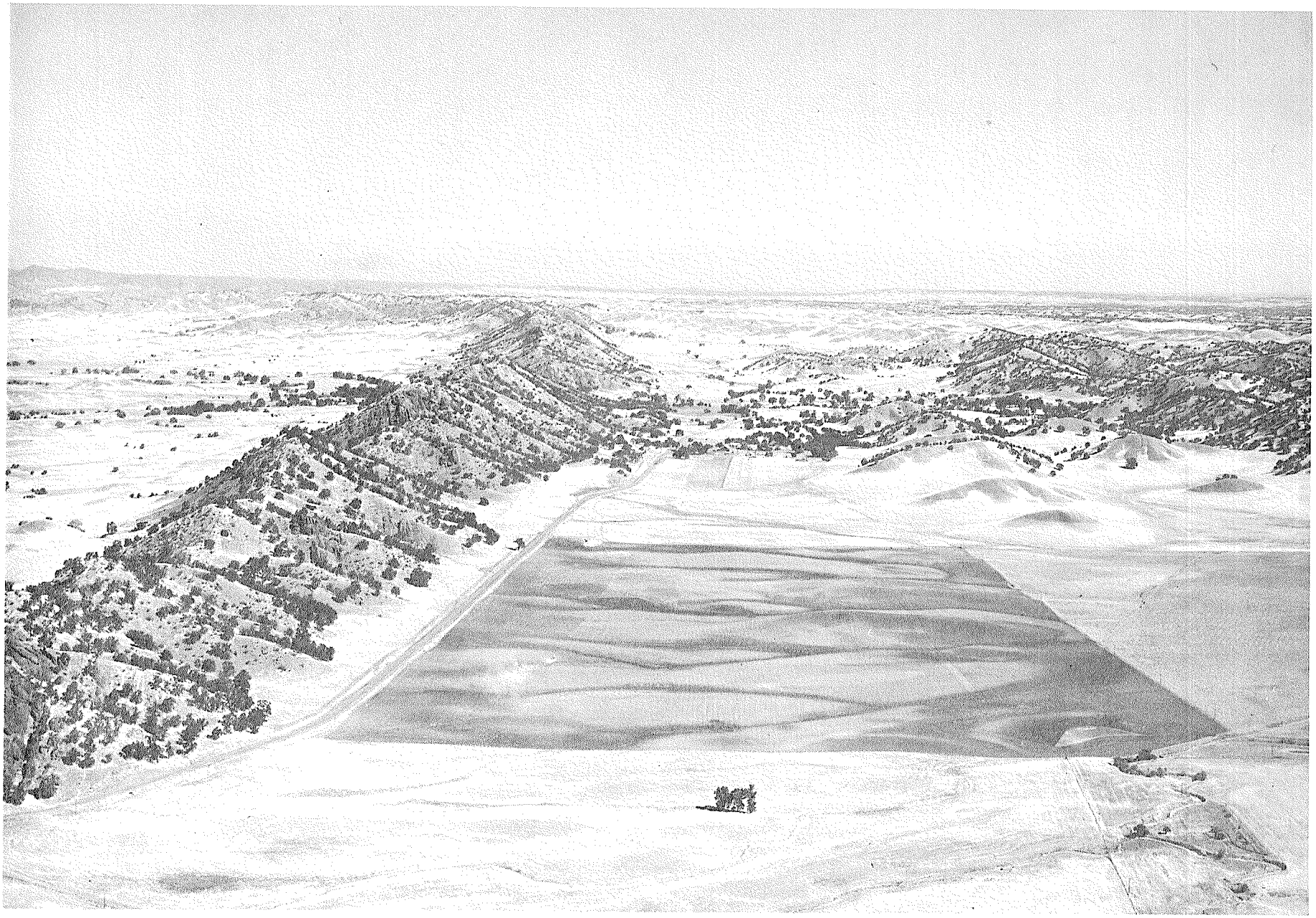
The proposed irrigable areas range in elevation from about 750 feet at Paskenta to 400 feet along the eastern margin abutting the service area of the existing Corning Canal of the Sacramento Canals Unit. The valleys slope to the east at about 35 feet per mile in the upper portion and some 25 feet per mile at their lower ends.

The area is primarily agricultural, and is sparsely populated, with no large towns in the study area. Paved county roads traverse the area and connect with the main highway a few miles to the east. The main north-south line of the Southern Pacific Railroad is roughly parallel to Interstate 5 about 6 miles east of the service area. The towns of Corning, Red Bluff, and Orland, all within 30 miles, serve the area.

Climate

Summers are dry and hot, and winters are relatively wet and cool. Precipitation is about 20 inches with practically no snowfall;

Service Area along Thomes Creek



Bedford Creek Service Area

however, there is fog, especially during the rainy season in the winter months.

The Ranger Station at Paskenta records precipitation. The Orland and Red Bluff stations, which provide complete weather data, are about 22 and 30 miles, respectively, from the project area. Summers are warm, with Orland having a 40-year maximum temperature of 120° and a minimum of 17°, and Red Bluff a maximum of 115°, a minimum of 17°, with the average year having 93 days with temperatures over 90° F. The growing season is about 270 days, beginning in early March and ending in late November.

The rainfall, averaging approximately 20 inches for the service area and over 23 inches at Paskenta, usually occurs in the fall, winter, and spring. Very little rain occurs during the summer months; approximately 90 percent of the seasonal total is received in the 7 months from October through April.

Table 7 summarizes the climatological data for Orland and Red Bluff and the precipitation records for Paskenta.

History

The general area was explored in the early 1800's by the Spanish, followed by the American explorer, Jedediah Smith, and the pioneer, Peter Lassen. Until the discovery of gold in 1848, Indians, hunters, and trappers roamed the area. After gold was discovered, gold-seekers migrated into the area and some of them stayed to take up farming.

Paskenta and Newville Service Areas

Table 7. Climatological data

| | Paskenta | Orland | Red Bluff |
|---|---|---|---|
| Elevation (feet) | 755 | 254 | 287 |
| Precipitation record (years) | 27 | 83 | 88 |
| Annual precipitation (inches) | | | |
| Maximum | 44.21 | 37.34 | 43.19 |
| Minimum | 12.05 | 7.95 | 11.15 |
| Mean | 23.26 | 19.24 | 22.05 |
| Mean snowfall (inches) | 2.0 | 1.4 | 2.9 |

Rainfall at Paskenta (inches) (1940-1966)

| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Max. | 8.97 | 17.62 | 11.51 | 7.02 | 2.47 | 2.14 | 0.70 | 1.06 | 1.78 | 6.31 | 7.82 | 11.95 |
| Min. | 0.53 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| Avg. | 4.22 | 3.94 | 2.77 | 2.03 | 0.88 | 0.50 | 0.08 | 0.14 | 0.25 | 1.38 | 2.80 | 4.27 |

| | Orland | Red Bluff |
|---|---|---|
| Temperature (degrees) | | |
| Mean maximum | 75 | 75 |
| Mean minimum | 49 | 51 |
| Mean annual | 62 | 63 |
| Frost-free period | | |
| Maximum days | 337 | 325 |
| Minimum days | 188 | 200 |
| Mean frost-free days | 259 | 272 |
| Mean days 90° or above | 96 | 100 |
| Mean days 32° or below | 32 | 19 |

## Paskenta and Newville Service Areas

During the late 1890's and early 1900's development along Thomes Creek reached the point where demand for water from the stream exceeded the supply and after a series of suits, the courts adjudicated individual rights to Thomes Creek flows. The economy in the area then stabilized until the 1930's when the dry period caused many farmers to leave. At that time the transition began to the present range and dry-land grain operations on larger consolidated land holdings.

During the 1920's and 1930's, land along the northeastern part of the service area was subdivided into 10-acre parcels. Although many of the parcels were sold, most of this land at the present time is used for pasture or dry-land grain.

The population of Glenn and Tehama Counties is increasing, but not as rapidly as the population in the State; this slow growth trend is expected to continue. The only industrial development in the local service area at present is a lumber mill in the community of Paskenta. The Mendocino National Forest Ranger Station is located at Paskenta. Chrome mining and gravel operations have been undertaken on a small scale in the past, but there are now no commercial operations.

The present economy of the service area stems principally from the production and marketing of agricultural products. The beef cattle industry is dominant; with some sheep, grain, hay and

orchard crops raised. Cropland harvested within Tehama and Glenn Counties has increased during the last few years.

Previous Investigations

The area was first investigated by the Bureau of Reclamation in 1945-46 as part of the Sacramento River Tributary Plan. The plan was developed to study the alternative of providing tributary flood control capability in lieu of the Iron Canyon Dam on the Sacramento River above Red Bluff. Paskenta was one of a group of damsites on tributary streams selected for more study. Potentials for flood control, irrigation yield, recreation, and fish and wildlife enhancement were considered in this early plan.

Later the area was studied in conjunction with the Glenn Reservoir Complex for development of a water supply for the West Sacramento Valley and for export to the east side of the San Joaquin Valley.

In 1961, Clair A. Hill and Associates, consulting engineers, made a report for the Tehama County Flood Control and Water Conservation District on a plan of development for irrigation along Thomes Creek, and fishery enhancement and recreation. The District was then considering an application for a loan under the Small Reclamation Projects Loan Act and a grant under the Davis-Grunsky Act.

Paskenta-Newville Project is described in the Department of Water Resources Bulletin 136, "North Coastal Area Investigation,"

September 1964. A later and more complete study of the plan is contained in Bulletin 150, "Upper Sacramento River Basin Investigation, Preliminary Edition," dated March 1965.

The Bureau of Reclamation made a reconnaissance study of Paskenta-Newville Unit as part of the West Side conveyance and storage facilities for water imported from the North Coast.

One of the routes to convey water to the Sacramento Valley being studied as part of the Lower Trinity River Division, North Coast Project, would extend from the Trinity River at Helena Reservoir through the mountains to the Sacramento Valley, and then along the west side of the valley to Paskenta Reservoir.

Present Investigation

In the early phases of the route studies, it was determined that the combination of Paskenta and Newville Reservoirs conserving the local flows of Thomes Creek and integrated with the Central Valley Project could provide a substantial yield to the project. This finding, coupled with the urgent need for Thomes Creek flood control as evidenced by the December 1964 floods, prompted the initiation of an investigation of the Paskenta-Newville Unit as an increment of the Central Valley Project.

Funds were made available and work started on the investigation to feasibility standards in March 1965.

## PROBLEMS AND NEEDS

The damage caused during the December 1964 flood vividly demonstrated that the most pressing local need is protection from floods. Thomes Creek reached a peak flow of 37,800 cubic feet per second at the Paskenta gage on December 22, 1964, after 4.6 inches of rain had fallen in a 3-day period. In the reach of Thomes Creek from Henleyville to the Sacramento River, some 6,000 acres were flooded, including the town of Richfield, several commercial operations, and agricultural lands including some orchards. Floodwaters had a maximum depth of about 8 feet and remained on some of the land for an extended period. Losses along Thomes Creek were extremely heavy, and additional costs were incurred fighting the flood. The Corps of Engineers, in its "Report on Floods, December 1964, January 1965" estimates that if Paskenta Dam had been built and in operation then, it could have prevented damages estimated at over 2 million dollars.

Stream waters which flooded homes and farmlands also flowed over U.S. 99 West, the major north-south route through the Sacramento Valley, and threatened the main line of the Southern Pacific Railroad which parallels Highway 99W at that point. The floodwaters also created problems downstream after they entered the Sacramento River.

For many years farmers along the Thomes Creek and adjacent areas have been seeking an adequate water supply. Streamflows

in Thomes and North Fork Stony Creeks at the reservoir sites and in downstream reaches are intermittent. Flow is heaviest in late fall and winter and commonly diminishes to zero in late summer and early fall. Water for irrigation developments is thus restricted to the spring and early summer months.

A firm water supply is required to assure livestock feed at critical times, and to permit a more efficient livestock operation with better utilization of the rangelands. The native range now provides green feed in the early spring months, and dry feed in the hot rainless summer. Green feed is lacking during the summer months, and additional supplemental feed is needed during the winter months. Both green and supplemental feed could be grown if more water were available. With a dependable source of feed, greater flexibility in management would enhance the use of the rangelands.

Local interests have expressed their desire for development of a firm water supply to allow for agricultural expansion. If a dependable water supply is available, the rainless summers and long growing season are favorable for a wide variety of crops including row crops and orchard. The diversification of crops would also permit smaller holdings to operate profitably.

Water-oriented recreation for the local residents is presently being met by the Sacramento River, and the Red Bluff, Black Butte, Stony Gorge, and East Park Reservoirs. Although these are adequately

meeting the local demand for outdoor recreation, they will not meet the growing use expected from the major suburban areas, the Sacramento area, and the San Francisco Bay. Demand for outdoor recreational opportunities is expected to increase steadily.

Game fish populations are now insignificant within the portions of Thomes and North Fork Stony Creeks to be affected by the unit. A few trout are found in Thomes Creek as far downstream as the Paskenta site. Although fall-run chinook salmon have been known to enter Thomes Creek occasionally during wet years, their use of the stream is generally negligible. Heavy sediment and bed load deposited by the 1965 flood adversely affected the stream gravels required for anadromous fishery.

Governmental and private groups in the area recognize the need for multipurpose development of water resources. Local landowners, interested in the formation of a district, are anxious to have an assured water supply, and protection from floods.

## IRRIGATION

The area of local service for Paskenta-Newville Unit is shown on plate 8. It includes the Paskenta area and the Newville area. Paskenta area lands lying along Thomes Creek and the smaller parallel creeks to the south would be served from Paskenta Reservoir. Newville area includes the lands along the North Fork Stony Creek and in the headwaters of Bedford Creek drainage which would be served from Newville Reservoir.

### Lands

The arable lands of the Paskenta-Newville Unit occur adjacent to the streams, with the principal body on Thomes Creek. Along the smaller streams the arable lands occur as narrow bands and are widely scattered.

Soils. Soils along Thomes and Stony Creeks have developed from alluvium of sedimentary and metasedimentary rocks. They are brown to reddish brown soils with some gravel, have a tendency to be acidic, and contain little or no lime. Areas of fine-textured alluvium developed into clay soils which are heavy but well-drained. Areas closer to the creeks are recent alluvium with varying depths to gravel and cobbles. On many of the benches farther away from the creeks, the soils are more uniform, ranging from sandy loam to loams with slight to moderate amounts of gravel. Some of the benches are made up of clay-texture soils. Above the flood plain

itself, the rolling hilly country has soils with very strong profile development, having underlying hardpan or bedrock.

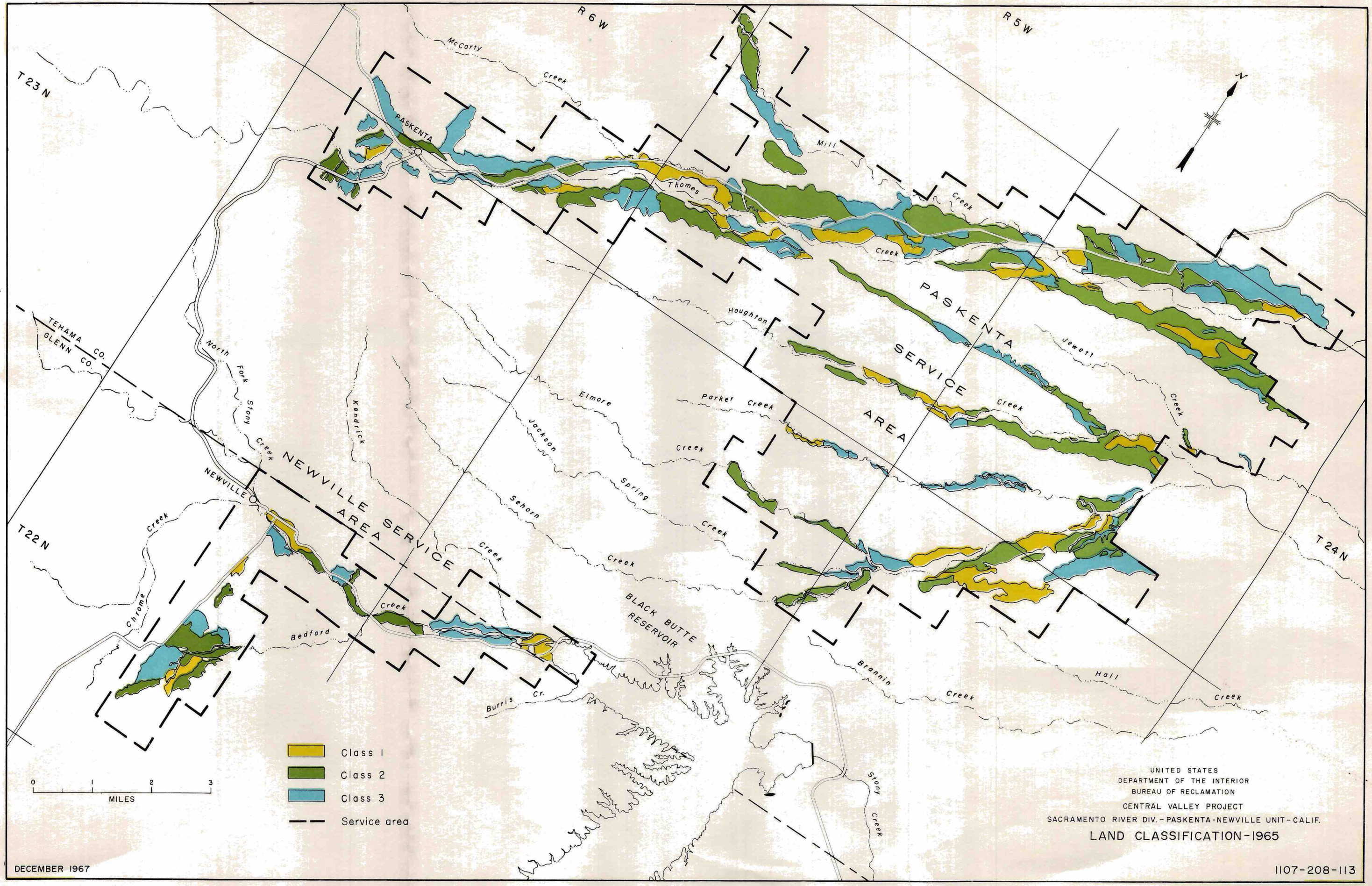
Topography. The terrain of the service area slopes toward the east, with flatter valley lands occurring on the eastern edge of the area.

Along Thomes Creek, the flood plains and terraces are nearly level to gently sloping. In some areas, a slight mound-depression microrelief is found. Elevations range from about 740 feet at Paskenta to 435 feet at Henleyville, at the eastern end of the service area. The flood plain along Thomes Creek ranges in width up to a mile wide.

Topographic deficiencies encountered are undulating topography, some steep slopes, and possible inaccessibility of land for delivery of irrigation water. In many cases light to medium leveling will be necessary.

Land classification. Land is classified to determine its suitability for sustained irrigated agriculture. Soil, topography, and drainage characteristics of the lands are examined. Their influence on crop yields, costs of land development, suitability for specific crops, and cost of production under irrigation are evaluated.

The semidetailed land classification was made in June and July of 1965. Lands adjacent to Thomes Creek had been classified by


R 6 W
R 5 W
T 23 N
T 22 N
T 24 N
McCarty Creek
PASKENTA
Mill Creek
Thomes Creek
PASKENTA SERVICE AREA
Houghton Creek
Jewett Creek
TEHAMA CO.
GLENN CO.
North Fork Stony Creek
NEWVILLE
NEWVILLE SERVICE AREA
Kendrick Creek
Elmore Creek
Jackson Creek
Parker Creek
Spring Creek
Sehorn Creek
Chrome Creek
Bedford Creek
BLACK BUTTE RESERVOIR
Burris Cr.
Brannin Creek
Hall Creek
Stony Creek
N
0 1 2 3
MILES
Class 1
Class 2
Class 3
Service area
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT
SACRAMENTO RIVER DIV. - PASKENTA-NEWVILLE UNIT - CALIF.
LAND CLASSIFICATION - 1965
DECEMBER 1967
1107-208-113

Clair Hill and Associates in 1960 in connection with an application for a Small Reclamation Projects loan. Advance copies of a soil survey begun in the 1950's for Glenn and Tehama Counties were also available.

The arable land was separated into three classes:

Class 1 includes lands that have deep, permeable, well-drained soils at least 36 inches in depth to gravel, and in some locations 42 inches of sandy loam over gravel. Class 1 lands comprise 15.7 percent of the arable lands within the proposed service area, and occur along the flood plain and on the lower benches of all streams.

Class 2 lands have some deficiency which restricts their crop adaptability, or the cost to develop them for irrigation is greater than class 1. They generally occur as smooth, medium-textured soils in the surface, underlain by moderately compact, heavy-textured subsoils, or as gravelly, light to medium textured soils. Class 2 lands occupy 44.7 percent of the arable lands within the service area.

Class 3 lands occur as medium-textured soils with compacted subsoils, as coarse-textured or gravelly soils; or as soils with topographic deficiencies. These deficiencies would limit adaptability or be less productive or more costly to develop for irrigation. Within the study area, 39.6 percent are class 3 lands.

Class 6 or nonarable lands are below minimum standards.

The land classification conforms to the Bureau of Reclamation policy and methods. The gross area as compiled from planimetering the land classification photographs is 52,934 acres. The arable area comprises all lands delineated in the land classification which had sufficient payment capacity to warrant consideration for irrigation development; the gross area classified less class 6 land. The arable land under consideration is 13,456 acres. Irrigable lands are the arable lands under a specific plan of water service after deductions for future public roads, conveyance and distribution systems, and lands too costly to serve. The irrigable land totals 11,468 acres.

Productive land is the maximum acreage of irrigable area subject to irrigated cropping and provides the basis for determinations of water requirements. The productive land area comprises the irrigable area, less deductions for existing and projected farmsteads, farm roads, and farm ditches, or 10,700 acres. Table 8 summarizes the results of the land classification.

In any future studies, the land classification of the arable lands would be upgraded to standard detailed survey accuracy.

Water requirements. Irrigation has been practiced for a considerable time in the area, with the nearby Orland Project of the Bureau of Reclamation in operation over 50 years.

Paskenta and Newville Service Areas

Table 8. Acreage summary

| | Local service area | | Unit total |
|---|---|---|---|
| | Paskenta | Newville | |
| Gross acreage classified | 45,266 | 7,668 | 52,934 |
| Total arable acreage | 10,509 | 1,579 | 12,088 |
| Irrigable acreage | 9,995 | 1,473 | 11,468 |
| Class 1 | 1,698 | 258 | 1,956 |
| Class 2 | 4,850 | 648 | 5,498 |
| Class 3 | 3,447 | 567 | 4,014 |
| Productive acreage (rounded) | 9,500 | 1,200 | 10,700 |

## Paskenta and Newville Service Areas

Paskenta-Newville Unit is planned to provide for the local agricultural service requirements, with additional water for the Central Valley Project. Water requirements established for the local service area have also been used for other studies within the vicinity. The farm delivery requirements for the 10,700 productive acres would average about 3.5 acre-feet per acre, or 37,450 acre-feet annually. July is the month in which the peak usage of 22.2 percent, or 8,314 acre-feet would occur.

Drainage. Wintertime surface drainage in the service area and adjacent hills is afforded by the stream channels in each small, elongated valley. In no instances in these narrow valleys, which range from 0.25 to 1.5 miles in width, have these aggrading main channels and side inlet streams been rerouted, straightened, deepened, or leveed. As a result, lands near the main stream channels are subjected to overflow during the winter flooding season and have a shallow water table during this period. Those lands have been projected to shallow-rooted and annual crops, as the drainage deficiencies are considered noncorrectable.

In the valley areas above the flood stage of the main natural drains, subsurface drainage is not expected to be a major or serious problem. These areas, because of their topographic position, in most cases afford adequate gradient for subsurface ground-water movement to natural channels. Some open-ditch surface drains (to be provided by the district) would need to be developed where lands are not served by an adequate natural outlet.

On the higher benchlands having heavy soils and hardpans at shallow depths, some surface drains may be required mainly for tail-water control and because of the possibility that shallow perched ground-water levels could develop. This type of drainage development is considered a district responsibility and should be placed in a deferred drainage class. Such district drainage facilities should be installed at the time and in the areas that have demonstrated poor internal drainage problems under irrigation.

Sprinkler irrigation systems would be necessary on some lands near stream channels. Numerous old gravelly stream channels would intercept surface irrigation flows, making very short runs and very careful irrigation practices necessary if they are developed for gravity irrigation. Heavy benchlands with restricted soil permeabilities should be developed to sprinkler irrigation to reduce or minimize the potential drainage problems on such soils. At present, there are no alkali or saline problems in this area of relatively high rainfall.

Agricultural Economy

The present economy of the service area is based principally on the production and marketing of agricultural products. The beef cattle industry dominates the economy although a wide range of agricultural production is possible. Where irrigation permits, crops in the service area are fairly well diversified; some orchard crops are grown along Thomes Creek where both water and soil conditions are favorable.

Land use. Settlement in the area is typical of the foothill areas of the west side of the upper Sacramento Valley. Early farms were used for dry-farmed grains and grazing. In recent years the trend has been for irrigation development of local water supplies,

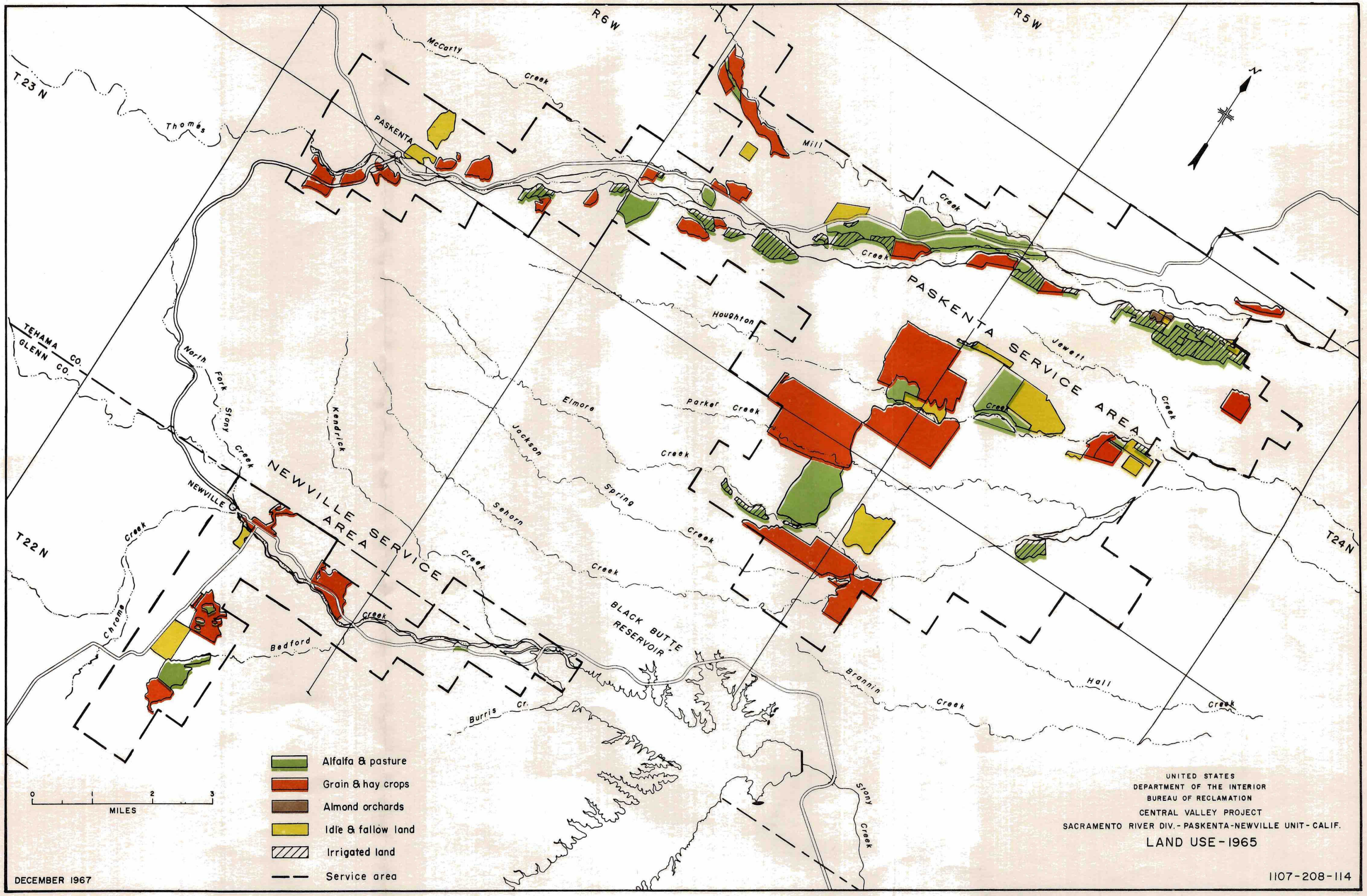
and a shift to irrigated pasture and other forage to support cattle. Grazing of sheep and cattle is the principal type of livestock enterprise.

The dry-farmed crops are small grains such as wheat and oats, orchard, and forage crops, with a large acreage of rangeland in the uplands and creek channels, as shown on plate 9.

The current ground-water supplies are roughly in balance with the safe pumpage, providing water for approximately 312 acres. The meager firm water supply has limited irrigation development. At present with limited supplies of water, some 1,064 acres are irrigated, all of which are producing forage crops. Some 11,000 irrigable acres in the service area are dry farmed.

With irrigation development, livestock production is expected to continue to dominate, with the raising of forage crops and some feed grains. About one-third of the acreage is expected to be used for orchard production, perhaps almonds and olives, both of which are grown in the close vicinity.

Land ownership. Ownership of arable lands was tabulated, using material from the County Assessors' records. Six individuals and one corporation own arable lands in amounts greater than 320 acres, as shown in the following tabulation:


R6W
R5W
T23N
T22N
T24N
McCarty Creek
Thomes Creek
PASKENTA
Mill Creek
Houghton
PASKENTA SERVICE AREA
Jewett Creek
TEHAMA CO.
GLENN CO.
North Fork Stony Creek
Kendrick
NEWVILLE
NEWVILLE SERVICE AREA
Elmore
Jackson
Parker Creek
Spring Creek
Sehorn Creek
Chrome Creek
Bedford Creek
BLACK BUTTE RESERVOIR
Burris Cr.
Brannin Creek
Hall Creek
Stony Creek
N
0 1 2 3
MILES
Alfalfa & pasture
Grain & hay crops
Almond orchards
Idle & fallow land
Irrigated land
Service area
DECEMBER 1967
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL VALLEY PROJECT
SACRAMENTO RIVER DIV.- PASKENTA-NEWVILLE UNIT- CALIF.
LAND USE - 1965
1107-208-114