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CACHUMA UNIT OF THE SANTA BARBARA COUNTY PROJECT, CALIFORNIA

LETTER

FROM

THE SECRETARY OF THE INTERIOR

TRANSMITTING

A REPORT AND FINDINGS ON THE CACHUMA UNIT OF THE SANTA BARBARA COUNTY PROJECT, CALIFORNIA

APRIL 1, 1948.—Referred to the Committee on Public Lands and ordered to be printed with illustrations

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LETTERS OF TRANSMITTAL

ILLUSTRATIONS

COMPREHENSIVE BASIN PLAN, SANTA BARBARA COUNTY PROJECT, CALIFORNIA

UNITED STATES DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
Region II, Sacramento, Calif., November 20, 1947.

To: The Commissioner, Bureau of Reclamation.
From: Regional director, region II, Sacramento, Calif.
Subject: Comprehensive Basin Plan for Santa Barbara County, Calif.

TRANSMITTAL

1. On October 30, 1945, copies of the Secretary of the Interior's proposed report, Comprehensive Basin Plan—Santa Barbara County Project, California, dated June 1945, were transmitted to the State of California and to the Secretary of War pursuant to section 1 of the Flood Control Act of December 22, 1944, with a request to each agency for written views and recommendations. Also, in accordance with established procedures of the Federal Interagency River Basin Committee, copies of the proposed report were transmitted to the Department of Agriculture and the Federal Power Commission. A copy of the proposed report was sent also to the chairman of the Board of Supervisors of Santa Barbara County, which agency contributed financially to the investigations. The written views and recommendations of the State and the various agencies have been received and copies are transmitted herewith.

2. As a result of the comments, views, and recommendations received from the State and the Federal agencies, and as a result of further conferences with prospective water users, it has been found desirable to make certain revisions in the regional director's letter of June 18, 1945, which letter was a part of the report mentioned above. This letter supersedes that of June 18, 1945. In this revised letter Cachuma Reservoir on Santa Ynez River is recommended for initial construction instead of Camuesa Reservoir proposed in the original letter at a site higher up on the same stream. The principal reasons for the change were: (*a*) Camuesa dam site is located within the existing water supply reservoir of the city of Santa Barbara, and construction difficulties from high water and trouble in maintaining water service to the city during construction were feared; (*b*) the yield of Camuesa Reservoir would not have been sufficient to meet the demands of the water users.

PRESENTATION

3. The tentative plan for development of the water resources of Santa Barbara County, Calif., given in the following pages, is designed to advance the maximum beneficial use of the water resources of the county. The report has been prepared as a Department of Interior

34. Cachuma Reservoir would have considerable recreational value. Picnic and camp grounds along the shorelands could be provided, as could sites for summer cabins and group camps. Boating and angling on the reservoir probably would prove popular. The relocated highway would become a scenic drive. Because the reservoir would be used to a large extent for domestic water supply, the local officials have indicated that swimming should not be permitted, but water released below the reservoir might be channeled through a pool suitable for swimming. The National Park Service has estimated that if suitable facilities are provided the recreational benefits from use of picnic areas, camp grounds, summer cabins, and group camps attributable to the reservoir would total $99,000 annually, not including benefits from fishing in the reservoir, estimated by the Fish and Wildlife Service at $10,000 annually. Whether the recreational benefits are realized to the extent estimated by the National Park Service will depend on the degree to which the local interests wish to develop the recreational potentialities of the reservoir. The National Park Service recommends that development, administration and maintenance of the recreational facilities and opportunities, which will be created by the reservoir, be by Santa Barbara County or some other local agency. Appended to this report are the conclusions and recommendations of the National Park Service as contained in its report of November 1947 on Cachuma Reservoir project, California, Code No. XIV/108.

35. The Fish and Wildlife Service has estimated that construction and operation of Cachuma unit will result in an annual loss of $80,000 due to the reduced spawning grounds available to steelhead and an annual benefit of $10,000 from the increased fish production in the reservoir. This represents a net annual loss of $70,000 to fish and wildlife conservation.

36. The average annual net direct benefits, computed upon the indicated rate of increase in water use shown under repayment, are $1,424,000 from irrigation and $1,066,000 from municipal water as computed above. Deducting the annual loss of $70,000 in fish and wildlife benefits, the total annual net direct benefits amount to $2,420,000. Such net direct benefits exceed the annual cost of the development ($1,372,000) in the ratio of 1.76 to 1. The comparison of benefits and costs for this unit is clearly favorable without including the other direct benefits of flood control and recreation, or any of the important indirect benefits.

FEASIBILITY OF CACHUMA UNIT

37. The engineering feasibility of the Cachuma unit of Santa Barbara County project has been amply demonstrated through water supply studies, reservoir and dam site surveys, drilling of the dam site, testing of construction materials and investigation and location of the tunnel, conduit and distribution systems. Estimates based on 1947 prices give a total cost for Cachuma Reservoir, Tecolote tunnel and the south coast conduit of $28,610,000. The lateral distribution systems for Goleta and Carpinteria water districts would cost an additional $3,700,000. A preliminary estimate drawing of Cachuma Dam is found facing page 50 and a tabulation showing the estimate of cost for the dam is on pages 48–50.

38. The part of the estimated cost of Cachuma unit which can properly be allocated to irrigation and probably be repaid by the water users is $16,464,000, and the part which can properly be allocated to municipal water supply and probably be returned to the United States is $12,146,000, a total of $28,610,000. The entire cost of the lateral distribution systems for Goleta and Carpinteria County water districts, $3,700,000, would be allocated to irrigation and would be repaid by those districts.

39. The benefits of flood protection have not been estimated and no allocation of costs to flood control is proposed at this time.

40. Navigation is not involved and production of power is not feasible.

41. A future allocation to recreation would be justified, if enabling legislation for this type of allocation is enacted by Congress, but no allocation is proposed at this time.

42. Since the Cachuma unit has engineering feasibility and the repayable allocations to irrigation and municipal water supply equal the estimated cost, the project is qualified for authorization under reclamation law. If, in the future, legislative provision is made for nonreimbursable allocations to various additional purposes, the allocations herein proposed to municipal and irrigation water uses may be recomputed.

43. Local participation and interest in the preparation of plans for comprehensive water development has been excellent ever since Santa Barbara County entered the first of a series of contracts with the Bureau of Reclamation to share in the cost of the investigations for this report. The initial program herein proposed has been well received locally. An act was passed by the State legislature creating the Santa Barbara County water agency. This agency embraces the whole of Santa Barbara County, and as previously stated, is empowered, through the county board of supervisors, as ex officio directors thereof, to enter into contracts with the United States or others for construction of works, sale of water, and repayment of the reimbursable costs.

RELATED INVESTIGATIONS

44. (*a*) In order to obtain basic facts related to both surface water and ground water of Santa Barbara County, the Geological Survey has recommended a continuation of the investigational program which it is now carrying out for the county, estimated to cost about $16,000 annually, with an additional cost for rehabilitation, readjustment, and expenses of $55,000 over a 2-year period. It is anticipated that Santa Barbara County will pay one-half the cost of the continuing program, or $8,000 to $12,000 annually, as it has been doing since the inauguration of the cooperative program in November 1940 when the first steps were taken toward preparation of a comprehensive plan. The basic water facts obtained and to be obtained by the Geological Survey are needed for use not only in the design, construction, and operation of the plan herein recommended, but also in the future planning, construction, operation, and administration of other structures, involving the development of additional water for the region. The Survey's investigations should be actively prosecuted so that the data secured shall be continuous and representative. Also, the Geological Survey

has recommended that plan and profile surveys be made of the Santa Maria, Cuyama, Sisquoc, and Santa Ynez Rivers and some of the larger tributaries at a cost of $16,000. The State in its comments advocated additional studies of flood control and ground water.

(*b*) The streams of Santa Barbara County are at the extreme southern range of the steelhead, an anadromous variety of rainbow trout. Angling for them is a sport of considerable importance. The Fish and Wildlife Service has made preliminary studies of the streams of the county in connection with this report, and as a result has made a number of specific recommendations designed to improve conditions for fish life. The Bureau of Reclamation concurs in the objectives of these proposals. However, due to the very limited streamflows which prevail during the long series of dry years which occur in this area, it is impossible in some cases to assure the release of as much water as recommended for fish. In other cases, the recommended releases could only be made by the exclusion of irrigable land of high productive value. The Fish and Wildlife Service has recognized the high priority of uses of water for irrigation and municipal purposes and the high cost of construction necessary to convert the flashy flood flows of these streams to a dependable supply for such uses, and in a report on Cachuma unit made in November 1947 it has scaled down its previously requested releases from Cachuma Reservoir for fish. Also, the fish hatchery formerly requested in connection with that reservoir has been eliminated. A copy of this new report by the Fish and Wildlife Service, prepared in cooperation with the State division of fish and game, is appended. Every effort will be made to provide water and to so operate Cachuma Reservoir as to maintain the existing spawning grounds below the proposed Cachuma Dam. The reservoir, with a minimum water surface area of 900 acres at dead-storage level and a maximum water surface area of 3,020 acres, would provide increased upstream angling to help offset the loss of spawning grounds between Cachuma and Gibraltar Dams.

(*c*) As mentioned previously, the studies of the National Park Service have shown that Cachuma Reservoir would offer good recreational opportunities. The National Park Service, in cooperation with the Bureau of Reclamation and the local interests, should prepare a master plan for the reservoir area to insure that the recreational potentialities will be considered fully in developing the project, keeping in mind the effect on the water supplies for municipal use.

(*d*) Investigations of the Department of Agriculture, and others, indicated a real and important need for the adoption and improvement of widespread upstream watershed conservation practices, and this resulted in recommendation of measures for the prevention of fires and soil erosion, and the reforestation and revegetation of burned-over areas. The Bureau of Reclamation concurs with these recommendations because the useful life of any reservoir built in this area will be prolonged if the presently high rates of silt accumulation are reduced. Other upstream watershed conservation practices proposed certainly will be valuable to the county and to the Nation. In the Flood Control Act of December 22, 1944 (Public Law 534, 78th Cong.), the Congress has authorized a program for waterflow retardation and prevention of soil erosion on the Santa Ynez River watershed. This program, on which work already has started, should be carried out promptly.

under section 9 (a) of the Reclamation Project Act of 1939; and that thereupon, unless the comments of the Secretary of the Army or of the State of California set forth objections thereto, the project herein recommended be deemed authorized.

47. It is further recommended that the investigation of the Santa Maria drainage basin be actively continued.

RICHARD L. BOKE.

SANTA BARBARA COUNTY PROJECT

UNITED STATES BUREAU OF RECLAMATION RECOMMENDATIONS FOR FISHERY MAINTENANCE, SANTA YNEZ RIVER, CALIF.[1]

In its river basin report on water developments in Santa Barbara County[2] the United States Bureau of Reclamation proposed three dams, Cameasa, Cachuma, and Santa Rosa, for the Santa Ynez River, and one dam for Salsipuedes Creek. Two dams—Vaquero and Round Corral—were proposed for Santa Maria River.

A report recommending facilities for fish protection, in the event these dams were built, was prepared by the Fish and Wildlife Service and submitted to the Water Resources Committee on February 21, 1945. It was included as an appendix to a second basin development report issued by the Bureau of Reclamation in June, 1945.[3] This report placed particular emphasis on the needs for fish protection above and below Cameasa Dam, the uppermost dam on the Santa Ynez River, which was to have been built as the first unit in the comprehensive plan.

More recent water development plans for the Santa Ynez River project recommend Cachuma Reservoir for immediate construction. It will be formed by an earth-fill dam 185 feet high to crest of the spillway sill) across Santa Ynez River immediately above the mouth of Hilton Canyon Creek, and 3.6 miles upstream from the mouth of Santa Agueda Creek in the general vicinity of the town of Santa Ynez, Calif. Eighteen feet of storage capacity above the spillway sill level will be provided to temporarily store flood flows in excess of spillway capacity. This storage would be used only in occasional years.

The reservoir will have a storage capacity of 210,000 acre-feet, a dead storage reservation of 34,000 acre-feet, and an annual yield of 33,000 acre-feet. Water from the reservoir will be drawn off at dead storage level (90 feet below spillway crest), and will be transported through a tunnel (Tecolote tunnel) to the city of Santa Barbara and its surrounding agricultural communities. Water would be released down the channel of Santa Ynez River as required to meet downstream senior rights, and there exists the possibility of releasing an additional 3,300 acre-feet annually in addition to that released to satisfy outstanding rights, for use in Santa Ynez Valley, provided the water users decide to subscribe to that amount.

All of the firm yield of Cachuma Reservoir will not be used by contracting interests at the beginning of project operation. However, as the area develops, additional water will be required so that ultimately the entire yield will be used. The Bureau of Reclamation estimates that this full utilization stage will be reached in 37 years or less.

Santa Ynez River is of major importance as a spawning ground and nursery stream for the largest steelhead trout run in southern California. It is also the source of many game fish stocked in the waters of Santa Barbara, Ventura, and San Luis Obispo Counties.

The average size of the spawning run of steelhead in Santa Ynez River is estimated by competent personnel of the California State Division of Fish and Game at 20,000. The size of individual annual runs ranges between 13,000 and 25,000 fish. These fish and their progeny are eagerly sought after by sportsmen in California. Statistics compiled by the California Division of Fish and game show approximately 262,000 trout caught by 4,375 anglers in 1941; 129,000 trout caught by 3,219 anglers in 1942, and 146,000 trout taken by 2,700 anglers in 1943 in the waters of Santa Barbara County. Steelhead trout are included in these

[1] Report prepared by James W. Moffett and Reed S. Nielson, U. S. Fish and Wildlife Service, Central Valley Investigations, Stanford University, Calif.

[2] U. S. Bureau of Reclamation, Region II, Basin Report Santa Barbara County, Calif., Water Resources and Utilization, Sacramento, Calif., January 1945.

[3] Comprehensive Basin Plan, Santa Barbara County project, Calif.; Santa Maria, Santa Ynez, and related basins; water resources and utilization. Region II, U. S. Bureau of Reclamation, Project Planning Report 2-3.1-1. June 1945.

totals and cannot be segregated. Their offspring are also included since they constitute the bulk of the catch made by summer anglers. Not all of the fish taken were supplied by Santa Ynez River and its tributaries. But, since it is the major stream in the county, it can be safely assumed that the majority of the catch came from that stream.

It is difficult to appraise the value of this fishing and that of the brood stock which keeps it supplied. However, it is believed that each adult steelhead entering Santa Ynez River is worth about $10. The average annual value of the steelhead run is approximately $160,000. In every dry years the steelhead run does not gain access to Santa Ynez River in any degree of success during the fishing season (season ends February 28). Because of this condition, the total value of $200,000 annually cannot be realized.

Cachuma Dam will remove from availability about two-thirds of the best spawning grounds in the Santa Ynez River system. Since the dam's height will make unlikely the construction of a functional fishway over it, maintenance of the present steelhead run must be attempted in that portion of the river below this obstruction.

Subsequent to project construction there will remain about 11 miles of good spawning stream between the dam and the town of Solvang and 22 miles of stream of doubtful quality between Solvang and the mouth of Salsipuedes Creek. The remaining 14-mile section of stream between the mouth of Salsipuedes Creek and the ocean is entirely unsuited for steelhead spawning. Some spawning can be expected to occur in tributary streams below Cachuma Dam during years when run-off is sufficiently large to result in stream flow during the period February through June. Spawning areas remaining in Santa Ynez River below Cachuma Dam will be insufficient to accommodate the present runs of steelhead. It is estimated that these runs will suffer losses amounting to approximately 50 percent, or $80,000 annually.

Maintenance of a segment of the present runs of steelhead in Santa Ynez River, when Cachuma Dam is constructed, will require water flows adequate to make the 33 miles of stream below the dam satisfactory spawning and nursery grounds. Flood and winter run-off below the dam will provide sufficient water in most years to enable the steelhead to enter the river. But Cachuma Dam will retain virtually all of the stream flow originating above it, and will leave the stream bed, immediately below, practically dry except for the rather insignificant contributions of Santa Agueda, San Lucas, Sanja Cota, and Quiota Creeks.

Water discharges at Lompoc during the period 1928–44, were great enough to allow immigration of spawning steelhead in all years except probably 1929 and 1931. Normally, a bar forms across the mouth of Santa Ynez River during periods of low flow and an extensive lagoon is formed. This bar prevents access to the river from the ocean. It is either washed out by the river or it is removed by the Southern Pacific Co. each winter. Immigrant steelhead apparently await the break in the bar and move into the river whenever the break occurs. Upstream migrations are likely to occur in December, January, February, March, or even April. With Cachuma Reservoir in operation, it seems certain that the bar at the mouth of the stream will remain intact for extended periods.

Because of erratic run-off and precipitation cycles in the drainage of Santa Ynez River, a relatively large reservoir must be constructed to provide a rather small firm yield of water. The reservoir will fluctuate greatly and will hold over, from one season to another, large quantities of water. At times, the hold-over will extend for several years. During such dry cycles, the reservoir will never fill and will approach dead storage level each year.

According to operational studies made by the Bureau of Reclamation for the years 1917–42, the reservoir would have spilled water in only 5 winters out of 25. These spills would have occurred in 1918, 1922, 1938, 1941, and 1942. From 1918 to 1922, the reservoir surface would have fallen 45 feet with minor seasonal changes. In 1922, run-off would have filled the reservoir and spilled 9,373 acre-feet of water downstream. The reservoir level would have fallen 56 feet from 1922 to 1926 and then risen to within 1.6 feet of the spillway crest in 1926 and 1927. After 1927, the reservoir surface level would have dropped each year until 1932 when it would have been only 2 feet above dead-storage level and some 88 feet below the spillway crest. From 1932 to 1937 the reservoir level would have remained between 35 and 81 feet below the spillway crest. Precipitation in the winters of 1937 and 1938 would have filled the reservoir to capacity and, in 1938, 198,777 acre-feet of water would have spilled. After 1938 and until the end of the operation period the reservoir level would have fluctuated only 24 feet. In 1941, the reservoir would have spilled 360,311 acre-feet of floodwater.

The production of fish in a reservoir of this type would vary extremely. The only dependable reservoir volume in which production could be assured is that reserved for dead storage. On the basis of river-basin evaluations, the fish production in the dead storage of Cachuma Reservoir (area 960 acres) would be worth about $10,000 annually.

In the Service's report on fish and wildlife which was appended to the Bureau of Reclamation report: "Comprehensive Basin Plan, Santa Barbara County Project, California," dated June 1945, a minimum release of 15 second-feet from Cachuma Reservoir was recommended for fishery maintenance. Such a release would require 10,840 acre-feet or 32.8 percent of the firm yield (33,000 acre-feet) each year. Despite the desirability of, and need for, the stated flow to maintain adequate steelhead trout stocks below that dam, the delivery of that amount of water for fishery maintenance is not possible if the project is to serve its purpose.

In consideration of present Bureau of Reclamation plans for Cachuma Reservoir, the following recommendations are made. They recognize the fact that the section of Santa Ynez River below the dam is insufficient to support present steelhead populations.

1. Flow in Santa Ynez River as measured just below the mouth of Santa Agueda Creek should be maintained as follows:

   (*a*) December 16 to February 28—15 second-feet as long as natural runoff below the dam is sufficient to maintain a flow of 25 second-feet at Robinson Bridge. Whenever the flow at Robinson Bridge becomes less than 25 second-feet during this period, supplemental releases should be made from the reservoir sufficient to maintain such a flow.

   (*b*) March 1 to May 31—10 second-feet.

   (*c*) June 1 to December 15—5 second-feet. During the period of construction and initial filling, releases should be made from Cachuma Reservoir in accordance with this schedule.

2. The flow in Santa Ynez River from Cachuma Dam to the mouth of Santa Agueda Creek should never be less than 2 second-feet as measured immediately above the junction of the two streams.

3. Surplus water over present and future contractual needs should be reserved by enabling legislation to the State for use in fishery maintenance until contracted for by water users.

4. Water for all downstream use should be released so as to benefit fish whenever practical.

5. A concrete, box-type culvert should be constructed through the bar at the mouth of Santa Ynez River leading from normal lagoon level to low-tide level outside. Such a structure would aid in the maintenance of normal lagoon levels and provide passageway for fish at all times.

6. Water releases from the reservoir should be made at the lowest practicable level in the dam.

7. A stilling basin should be incorporated in the outlet works to avoid excessive turbulence and to aerate water.

8. Trapping and holding facilities should be provided below the stilling basin for salvage of adult steelhead and to effect the transfer of same to the reservoir and stream above the dam. These facilities should be operative by December 1, following the start of dam construction.

9. Outlet tunnel should be as fully screened against passage of fish as possible.

10. The use of Santa Ynez River as a dumping place for construction debris must be prevented, and all unnecessary pollution of the stream should be avoided.

11. The reservoir area should be open to free public use and leases of land within the area should stipulate the right of public access for the purpose of hunting, fishing, and other recreational uses.

12. Management of the fishery resources on the project should be vested in the State of California.

EXCERPT FROM REPORT BY NATIONAL PARK SERVICE "CACHUMA RESERVOIR PROJECT, CALIFORNIA. CODE NO. XLV/108," DATED NOVEMBER 1947

CONCLUSIONS AND RECOMMENDATIONS

(*a*) The proposed Cachuma Reservoir will fulfill a present need for additional domestic water supply for the city of Santa Barbara as well as turn much irrigable land into a productive status.

(*b*) By creation of the reservoir very desirable recreational areas adjacent to the reservoir will be formed. The Cachuma Reservoir will assist in fulfilling the

levees even in conjunction with surface storage, consideration should be given to the immediate construction of levees as an initial step in the development, and the flood control surface storage be constructed and utilized for additional degree of protection in connection with the necessary conservation storage, if found feasible and economically justified.

7. As nearly all present development in Santa Barbara County is based on utilization of ground water, the results of a comprehensive ground water investigation should be available prior to formulation of final plans for the control, conservation and utilization of the water resources of Santa Barbara County.

The development of any area that is based primarily on increased utilization of ground waters, such as has occurred in Santa Barbara County, is necessarily accompanied by a general lowering of the water plane. However, a general lowering of the water plane is not in itself evidence that an underground reservoir is overdrawn. It often means only that the water plane is being drawn low enough so that natural waste of ground water is reduced and converted to beneficial uses. In reaching a conclusion as to existence and amount of overdraft in any basin, it is necessary to develop complete data on input and output. Movement on lowering of water plane is only one item of a number necessary before a reliable conclusion can be reached.

The alluvial fills should be geologized in detail to develop information necessary for determination of maximum capacity for ground water storage and extent of present and ultimate depletion thereof. The amounts and locations of unused or incompletely developed ground water storage should be investigated. The respective boundaries of alluvium overlying free water table and pressure areas should be defined. Consumprive uses on irrigated land cannot be relied upon as the measure of water required to successfully grow crops, unless the area overlies free water table and 100 percent recovery of the unconsumed water can be effected. Insofar as use of irrigation water is confined to coastal plane pressure areas adjacent to the ocean, where it is physically impossible for the unconsumed water on such lands to rerurn to the pumping zone, gross water requirements should be used as a measure of draft on the proposed enhancement of water supplies.

The quality of ground waters throughout the areas of use and proposed use should be explored to determine the existence, extent, degree of toxicity and source of various types of contamination that may exist.

8. The State division of highways reports that a number of the proposed projects in the comprehensive basin plan will cause revision and relocation of State highway facilities, in some cases requiring major and extensive changes in routes and that additional review of the project plans will be made and later comment will be given as soon as enough data and costs and highway interests are obtained.

The division of highways reports further that the most serious conflicts occur where relocation causes appreciable deflection of routing through adverse terrain. For example, the interference with primary State Route 2 by the proposed Santa Rosa reservoir may require a crossing of the reservoir rather than a detour of its flood line; that a reasonable replacement in kind of existing facilities disturbed will, in practically all cases, justify a careful investigation and consideration of highway requirements and that it is assumed the opportunity to review and discuss later reports of the bureau will be afforded on subsequent stages of plan preparation of authorized projects.

9. The State division of fish and game has made the following recommendations for the protection of the fishery resources on the Santa Ynez and the Santa Maria Rivers:

(a) No fishway be provided over Camuesa Dam.

(b) From the time when storage begins above the dam to the time of first flow over the spillway, a maximum of 5,000 acre-feet of water be made available for release during each water year as may be required for minimum stream flow maintenance.

If Cachuma Dam is constructed it is recommended that—

(a) Adequate provision be made for the passage of fish upstream and downstream past the dam.

(b) The outlet tunnel be adequately screened to prevent the passage of fish.

(c) A minimum release of 15 cubic feet per second of water be provided at the dam throughout the year.

(d) Provision be made for this release both through the fishway or low-level outlet, as required.

(c) It is not recommended that a hatchery be constructed unless there is a certainty that stream flows can be maintained which will permit adult steelhead to pass upstream as far as Cachuma Dam. In any event construction of a hatchery should not be necessary until Cachuma Dam is constructed.

It is recommended that a survey be made to determine if the objectives sought by the construction of Santa Rosa Dam can be obtained by alternative methods. If Santa Rosa Dam is constructed it is recommended that—

(a) Adequate provision be made for the passage of fish upstream and downstream past the dam.

(b) A minimum release of 50 cubic feet per second of water be provided at the dam throughout the year.

It is recommended that—

(a) No fishway be provided over Vaquero Dam.

(b) Adequate provision be made for the passage of fish upstream and downstream past Round Corral Dam.

(c) During the winter season sufficient water be released from both Vaquero and Round Corral Reservoirs to permit steelhead to ascend from the ocean past Round Corral Dam.

(d) Provision be made for the release of water from Round Corral Dam both through the fishway or low-water level outlet, as required.

(e) Summer releases of water for ground percolation be spread over as long a period as possible to maintain proper conditions in the streams.

The director of natural resources, under date of November 13, 1945, in transmitting report of the division of fish and game, requested that "due consideration in future planning be given to the recommendations made therein in order adequately to conserve the run of fish in the streams involved."

It is desired to call attention to the water requirements recommended by the State division of fish and game for fish runs as compared to the requirements, for example, of the city of Santa Barbara and the dependable yields of the reservoirs proposed on the Santa Ynez River. In connection with the Camuesa Reservoir, a maximum of 5,000 acre-feet of water is recommended for release during each water year. This figure is one-fourth of the estimated dependable yield of the proposed Camuesa Reservoir and is almost equal to the present annual use of the city of Santa Barbara.

If the Cachuma Reservoir is constructed, it is recommended by the Commission that a minimum release of 15 second-feet be provided at the dam or a minimum of about 10,000 acre-feet annually, which is about one-half of the estimated dependable yield of the reservoir with Camuesa Reservoir constructed. If Santa Rosa is constructed, it is recommended by the Commission that a release of 30 second-feet be provided at the dam, or about 35,000 acre-feet per year.

10. In the report the direct benefits from irrigation are measured by the increase in gross-crop returns and not on net income to the irrigator. The soundness of calculating irrigation benefits on the basis of increased gross-crop returns is believed to be open to serious question.

11. One of the recommendations of the report is that the initial stage of the development be authorized for construction, operation, and maintenance pursuant to the Federal reclamation laws provided that any excess of the total estimated cost of the works over the aggregate of the estimated payments and returns together with any excess of actual costs over total estimated costs shall be nonreimbursable.

In connection with the foregoing recommendation, it may be pointed out that the Secretary of Interior has made no finding in the report on (1) the part of the estimated cost which can properly be allocated to irrigation and probably be repaid by the water users; (2) on the part of the estimated cost which can properly be allocated to municipal water supply or other municipal purposes and probably be returned to the United States as required by section 9 (a) of the Reclamation Act of 1939. Also, there is no financial statement or analysis in the report setting forth for the initial stage or the ultimate plan of development, the capital and annual costs, the nonreimbursable costs, the anticipated payments and returns, the sources of such payments and returns, and the deficits, if any, in such analysis.

Conclusions

The following conclusions are submitted with respect to the comprehensive basin plan, Santa Barbara County project, California, as reported by the United States Department of Interior:

1. There is immediate need for a supplemental water supply to the south-coast area of Santa Barbara County, including the city of Santa Barbara, and the

UNITED STATES DEPARTMENT OF THE INTERIOR
HAROLD L. ICKES, *Secretary*

COMPREHENSIVE BASIN PLAN
SANTA BARBARA COUNTY PROJECT, CALIFORNIA

SANTA MARIA, SANTA YNEZ, AND RELATED BASINS

WATER RESOURCES AND UTILIZATION

Report by the Department of the Interior
Sponsored by and prepared under the general supervision of

BUREAU OF RECLAMATION
HARRY W. BASHORE, *Commissioner*

Region No. II
Charles E. Carey, *Regional Director*

June 1945

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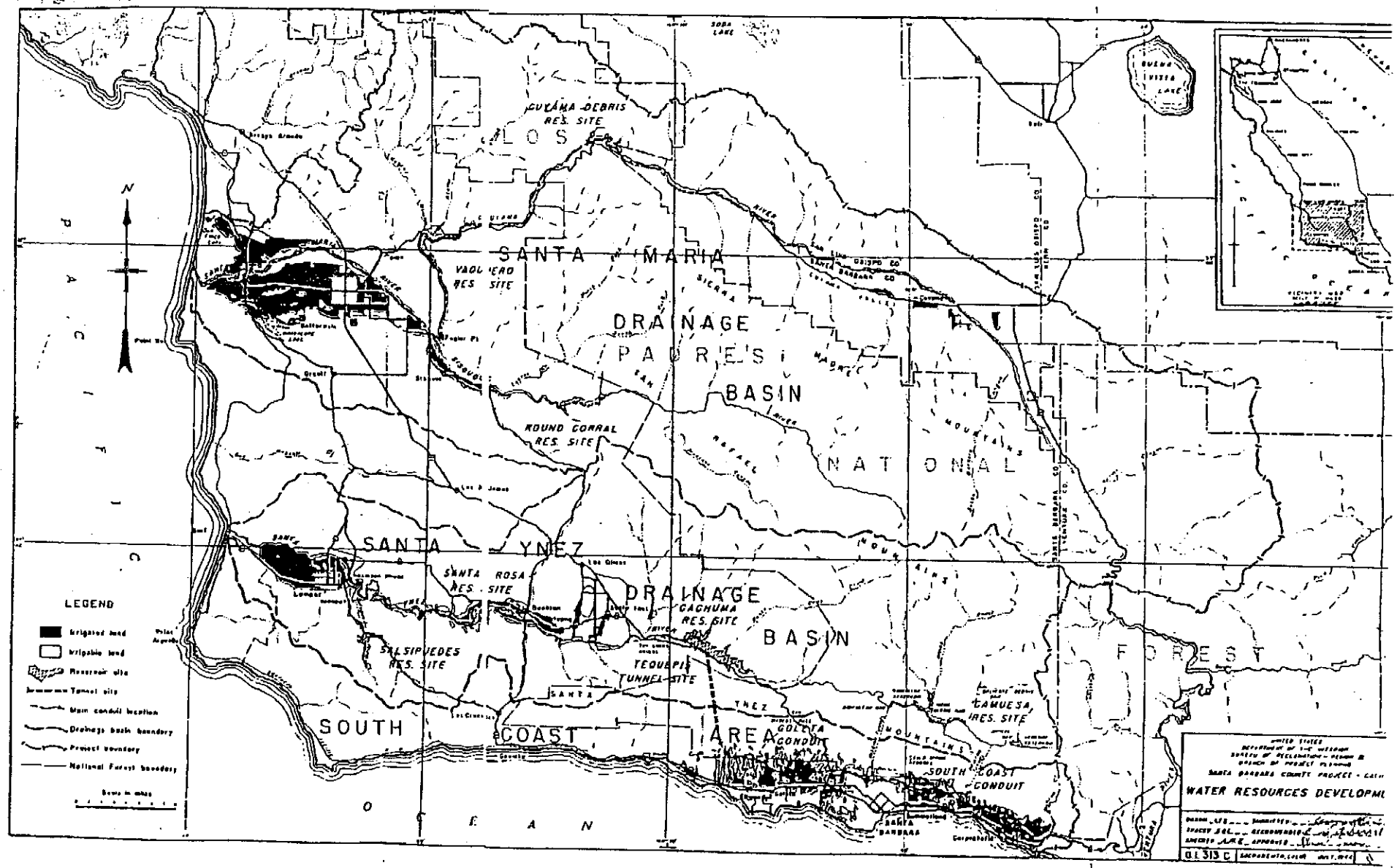
REPORT ON THE PROPOSED COMPREHENSIVE PLAN

SUBSTANTIATING MATERIALS

SUBSTANTIATING MATERIALS—Continued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GOLETA CONDUIT
SOUTH COAST CONDUIT
SANTA BARBARA
LEGEND
Irrigated land
Irrigable land
Reservoir site
Tunnel site
Main conduit location
Drainage basin boundary
Project boundary
National Forest boundary
WATER RESOURCES DEVELOPM

(*b*) The proposed development will increase the annual agricultural income of Santa Barbara County by more than one-third. Irrigation of 30,000 acres of new land will result in an increase of nearly $7,500,000 annually in gross farm income, and the provision of a supplemental irrigation supply will prevent an annual loss of over $3,500,000 in agricultural income which will occur if a portion of the presently irrigated land is permitted to revert to dry-farming by reason of inadequate water supplies. This increased basic income of about $11,000,000 annually will result in increased requirements: for domestic and professional services; for common and skilled labor; for transportation and utilities; for processing and packing facilities; for the goods and services required by the hundreds of families who will participate directly in farming; and for an appreciably greater number of families who will provide services for the people. All this translates into increased purchasing and consuming power.

(*c*) Fish runs (steelhead) on the streams in Santa Barbara County have substantial commercial and recreational values, and constitute a resource which should be maintained, and if possible, improved as a part of the plan. In order to assure the maintenance of these runs during the interval of time between the construction of the Camuesa Reservoir and the Cachuma Reservoir, and in order to improve the value of these runs after Cachuma Reservoir is constructed, it is necessary to construct a fish hatchery estimated to cost $200,000, with an annual operation and maintenance cost estimated at $25,000; the hatchery to be located in the vicinity of Cachuma Dam site or at such other location as may be determined. While this facility is included in the cost of the plan, the values which will come from the maintenance of the steelhead runs may vary and are therefore not included in this report as a direct benefit. The annual value of the steelhead run now averages approximately $200,000, as estimated by the Fish and Wildlife Service. Without the hatchery there is grave danger that this resource may be lost or severely impaired. With the hatchery and the balance of the comprehensive plan, this fish resource may be benefited.

(*d*) Reconversion from a war to a peace economy will impose an extremely heavy burden on this west coast area. There will be a pressing demand for agricultural opportunity for both returning veterans and persons displaced from war aircraft and ship production and other war activities. The repercussion of reconversion on commercial enterprises will also be acute. The many jobs which will result from this program in construction, operation, and maintenance, and the stable income which will be available after completion will do much to assuage the difficulties of commercial interests and provide for the settlement and stabilization of many war-displaced persons.

(*e*) The extended benefits from the proposed increased reliable supply of domestic water will make possible an increase in excess of 150 percent of the present assessed valuation of urban property. In this area so richly endowed with climatic, scenic, and recreational resources, the supply of domestic water is one of the limiting factors in civic and industrial development. The difference in fire-insurance rates alone, for areas adequately supplied

(3) *Recommendations*

(a) Santa Maria River Basin: A completely new plan and profile survey of the basin is recommended. This would be for 30 miles of the main river, 60 miles of the Cuyama River, 25 miles of the Sisquoc River and about 10 miles of other tributaries, including some dam sites and reservoir sites not yet selected.

(b) Santa Ynez River Basin: A completely new plan and profile survey of the main stream for 60 miles with some work on the larger tributaries is recommended, similar in scope to that of the Santa Maria Basin.

For both of these basins, the surveys should be made on the standard scale of 1:24,000 with a contour interval of 25 feet on land and 5 feet on the water surface. The height to which topography should be taken will depend on conditions encountered, such as reservoir and dam sites. In general the topography should be taken up to 100 to 200 feet above the water surface as required.

No additional topographic mapping of quadrangle areas and extension of existing control is recommended, unless that which is available should prove insufficient. In general the quadrangle maps prepared by the Twenty-ninth Engineers do not show section lines and grant lines.

REPORT OF THE FISH AND WILDLIFE SERVICE

Effect on Fish and Wildlife Resources of the Proposed Projects in Santa Barbara County, Calif.[1]

The Santa Ynez River is the best steelhead (*Salmo gairdneri*) river in southern California. Not only does the run provide fine angling in the Santa Ynez River, but young steelheads from this river are used to stock other streams, less favored with spawning areas, in Santa Barbara, Ventura, and San Luis Obispo Counties. In 1944, over 1,000,000 young steelheads were rescued from drying portions of the Santa Ynez and distributed to the Santa Ynez and other streams. Ninety-two thousand were planted in the Santa Maria River. The run of adult steelheads, providing splendid fishing in the lower 34 miles of river, is estimated to average about 20,000 annually. These large gamey fish, comparable in size and fighting qualities to the Atlantic salmon, are worth conservatively $10 apiece, both as sport fish and as brook stock for this three-county conservation program. This yields an annual value of $200,000, which capitalized at 4 percent indicates a total value of $5,000,000.

The latest available data show that in 1941, 4,375 anglers took 262,000 trout including the above-mentioned adult steelhead in Santa Barbara County. The Santa Ynez and the Sisquoc (tributary to the Santa Maria) are the streams of greatest importance. It is difficult to appraise the value of this fishing for immature and resident trout, but it is comparable to the $5,000,000 for adult steelheads. The greater part of the Santa Ynez system and a large part of the Santa Maria Basin lie in the Los Padres National Forest and their sport fisheries constitute one of the chief attractions to visitors.

In the Santa Ynez River the Camuesa Dam will flood out the present spawning grounds for trout in the old Gibraltar Reservoir. How-

[1] The principal source of material is a report by Drs. H. W. Rich and P. R. Needham of the U. S. Fish and Wildlife Service, and Mr. A. C. Taft and Dr. R. Van Cleve of the California Division of Fish and Game. Mr. E. E. Horn of the U. S. Fish and Wildlife Service reported on wildlife, which was not materially affected by these projects.

ever, the Camuesa Dam will provide a much larger reservoir for trout and the high water level will drown out the debris dam on Mono Creek, thus reestablishing this creek as a spawning area.

The greatest problem on the Santa Ynez River is the protection of the sea-run steelhead. These fish spawn in the main river and its tributaries, the major portion of the run spawning above Cachuma Dam and formerly ascending above the Gibraltar Dam. Since the Gibraltar Dam is impassable for fish, the Camuesa Dam will not cut off any more of the spawning grounds. However, these runs will be harmed to a considerable extent unless some provision can be made to provide for their reproduction after the flows in the main river have been curtailed by the storage and transportation out of the area of the large amounts of water to be stored in Camuesa Reservoir.

To maintain the present fishery a flow from Camuesa Reservoir would be needed during the winter and spring months in some years to permit the adult steelhead to spawn and the eggs to incubate without being washed out or dried up. During the summer months the portion of the Santa Ynez above Cachuma Dam often dries almost completely necessitating expensive fish-rescue operations.

Because of the intermittent character of the rainfall in this region, the Camuesa Dam, with an active storage capacity of 100,000 acre-feet, is estimated to have a safe yield of only 20,000 acre-feet due to the necessity of storing water to tide over the years of scant rainfall. This makes it difficult to provide sufficient stream flow for fish production without cutting down considerably the water available for other purposes.

A study of the flows at Camuesa, Cachuma (Santa Ynez gage), and in Santa Cruz Creek during the water year October 1941 to September 1942 shows clearly that to completely cut off the flow at Camuesa Dam would jeopardize the spawning of steelhead above the confluence of Santa Cruz Creek, except in years of above-average rainfall. As a safeguard against this condition it is proposed that supplemental water as needed be released from Camuesa Dam sufficient to insure flows in the Santa Ynez above the confluence of Santa Cruz Creek according to the following schedule: Flows to increase steadily from December 15 to a minimum of 20 cubic feet per second by January 15 and to be maintained at or above that level until May 1 and then be decreased steadily to 0, or whatever natural flow remained by June 1. In the water year studied this would have required about 3,500 acre-feet.

This flow would serve to protect the runs until the construction of Cachuma Dam. At that time a decision must be reached as to whether fishways for upstream and downstream migrants are to be constructed over Cachuma and water releases from Camuesa continued, or whether it would be practical to maintain the run by artificial propagation. In either case continuous releases of at least 15 cubic feet per second would be needed below Cachuma Dam.

A preliminary estimate of the cost of the hatchery is $200,000 for construction and $25,000 for annual operating costs.

The proposed Santa Rosa Dam will undoubtedly destroy the steelhead runs unless proper provisions are made for their up and downstream passage. Considering the great value of the fishery resources affected, it is questionable whether the Santa Rosa Dam should be constructed if the same objective can be otherwise accomplished.

The Santa Maria River is populated with both sea-run steelhead and resident trout. The steelheads spawn chiefly above the proposed site of the Round Corral Dam which will, therefore, need fishways. Because the Vaquero and Round Corral Dams are being constructed for flood control and ground-water percolation there will be no question of the streams receiving the full amount of the flows that are stored. This will undoubtedly have some beneficial effect during the drier months of the year. However, there will need to be provision for sufficient releases, in addition to that absorbed by the water table, during the months of upstream migration of the adult steelhead (December to April) to permit them to ascend from the ocean up the Santa Maria River and its tributaries.

It is recommended for the Santa Ynez River that—

1. No fishway be provided over Camuesa Dam.
2. Temporary provision be made for the maintenance of the valuable steelhead run that spawns chiefly above Cachuma Dam by supplemental releases of water from Camuesa Dam as described above, these releases to be continued until such time as an alternative practical method of protecting the runs can be provided.
3. If, when Cachuma Dam is constructed, provision is made for spawning above Cachuma Dam by means of supplemental winter releases of water from Camuesa Dam fishways be provided over Cachuma Dam. If propagation of the run above Cachuma Dam is by hatchery as described above, it is recommended that no fishways be provided, but 15 cubic feet per second be continuously released from Cachuma Dam, and releases from Camuesa Dam be no longer required.
4. A survey be made to determine if the objectives sought by the construction of Santa Rosa Dam can be attained by alternative methods.
5. If Santa Rosa Dam is constructed it be provided with adequate fishways and screens, and 50 cubic feet per second be released below the dam at all times.
6. A study be made of the needs of fish protection at the proposed Salsipuedes Dam.
7. That means be provided for releasing water from close to the bottom of the reservoirs to maintain low-stream temperatures.
8. That the necessity for screening be studied for Camuesa and Cachuma Dams.

It is recommended for the Santa Maria River that—

1. Adequate fishways be provided for the Round Corral Dam.
2. During the winter season sufficient water be released from Vaquero and Round Corral Reservoirs to permit steelheads to ascend from the ocean to the Round Corral Dam.
3. That the summer releases of water for ground percolation be spread over as long a period as possible to maintain proper conditions in the streams.
4. That the necessity for screening be studied.

It is further recommended for both the Santa Ynez and Santa Maria Rivers that for all reservoirs in which reservoir fishing can be maintained provision be made for sport fishing and recreation by means of suitable public roads, boating facilities, and recreational areas.