DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

WATER RESOURCES BRANCH

V. L. & W. CO. FILE

328 Custom House,
San Francisco, Cal., March 15, 1915.

Volcan Land & Water Co.,
San Francisco, Cal.

Gentlemen:

Enclosed is a gage height book for Matagual Creek near Warner Springs for the quarter April 1 to June 30, 1915. As soon as you have finished with the book for the quarter ending March 31, kindly mail it to this office.

Very truly yours,
H. D. McGlashan
District Engineer.

Enc.

V. L. & W. CO.

usgs.

April 20, 1915.

Mr. H. T. McGlashan,
U S Custom House,
San Francisco, Cal.

Dear Sir:-

I am inclined to believe that the discharge data of Dulzura Conduit near Jamul as published in Bulletin No. 300 is not accurately rated. For instance, Mr. Whitney told me on one occasion that there was over one foot of sand in the bottom of the conduit at the gage. I also find that the records are in the hands of Wueste, Supervisor of the Water Department, who is not in accord with the Engineering Department and delays the handing in of gage heights a year at a time, and when turned in, they are based on his calculations and not on those of a man who has any hydrographic knowledge.

I first encountered this difficulty in checking up the safe yield for 1912 which produced an apparent loss of 210% in the Otay Reservoir which was manifestly absurd, this reservoir being supplied by the Dulzura conduit. My own interest in the matter is primarily because we are obliged with our measurements to meet on a comparative basis these surprising results. You will understand that I have not made any comment on this to any one but yourself and to Mr. Ebert to whom I am sending a copy of this letter, and it is not with the idea of changing the published record which states the authority on which it is made, but to make the suggestion that the gage heights should be turned in weekly by the City and frequent checks be made of the rating of the station in order that the published data will not depend so much upon the personality of one man who perhaps is not a free agent.

Very sincerely yours.

WSP-BK

CC to F C Ebert.

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UNITED STATES

DEPARTMENT OF THE INTERIOR

Geological Survey

303 Customhouse,
San Francisco, California,
December 31, 1925.

Mr. Ed. Fletcher,
Fletcher Building,
920 Eighth Street,
San Diego, California.

Dear Mr. Fletcher:

Reference is made to your preliminary permit for Project No. 217 from the Federal Power Commission covering proposed power development on Boulder Creek:

It is my understanding that you have sold the Cuyamaca properties to the La Mesa - Lemon Grove Irrigation District and probably are no longer interested in this permit. I shall be pleased to learn if you are to retain this permit in order that I may make the necessary report to the Federal Power Commission.

Very truly yours,

H. McGlachan [should be McGLASHAN csm]
District Engineer.

FOR VICTORY BUY UNITED STATES WAR BONDS AND STAMPS

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY 625 Market Street Bldg.,
San Francisco 5, Calif.
November 11, 1944.

Senator Ed. Fletcher, Member,
Joint Committee on Water Problems of California Legislature,
San Diego, California.

Dear Senator Fletcher:

Enclosed is a copy of a statement which I presented to your Committee at its meeting in San Francisco on October 26, 1944. This was done in an effort to explain to your Committee the necessity for increasing the cooperation between the State of California and the Geological Survey for the investigation of the water resources of California.

For a number of years our work has been conducted on a very limited budget. Now it seems very necessary to increase the item for our work in the State Engineer budget to $45,000 annually if we are to maintain it on a satisfactory basis. Of course the State fund will continue to be matched by a similar amount of Federal funds. This increase will provide the necessary money to keep our gaging stations in good repair, do more field work which will increase the accuracy of the records, and provide a small fund for ground water investigation.

At the present time the suggested increase in the State budget is of especial importance. The other item in the statement outlines a post-war program which includes the establishment of about 50 additional stations. The records from these stations will be needed by the State Engineer and Federal activities in order to plan future developments in the State.

It is believed that if your Committee will sponsor this plan and recommend it to the Director of Finance and the Legislature it should receive favorable support by the State.

For many, many years you have realized the importance of our work and all this time you have been extremely helpful to this office. For this reason I feel that you may be anxious to support this program.

I was much disappointed that you were not present at the meeting of the Committee in San Francisco for I would have very much enjoyed a visit with you. With best regards, I am,

Very truly yours,

Enc.

H. D. McGlashan
District Engineer.

STATEMENT TO JOINT COMMITTEE ON WATER PROBLEMS

OF THE CALIFORNIA LEGISLATURE

State Building, San Francisco, California

October 26, 1944

Proposed Current and Post-War Programs for Basic Surface and Underground Water Resources Investigations in California

The United States Geological Survey very much appreciates the opportunity afforded by your Chairman to present briefly to the Committee a matter that surely is of real interest to you and one which you may very well wish to sponsor and recommend to the State Director of Finance and the Legislature.

It relates to the basic program of recording the flow of the streams and the maintenance of closely related water resources investigations as now carried on throughout the State by the Water Resources Branch of the Geological Survey in cooperation with the Division of Water Resources, State Department of Public Works, and several counties, municipalities, and irrigation, municipal utility, and conservation districts. All cooperative money is matched by Federal funds.

These records of water resources are needed for the studies and development of plans for domestic and industrial uses, irrigation, power, flood control, drainage and navigation as well as planning for recreation, wild life, and waste disposal projects.

It is believed that your Committee fully realizes that our cooperative program, which provides records of stream flow and other basic water information,

constitutes in a very large measure the source of material upon which all water plans for the State are based. They include the State-wide Water Plan as well as those for flood control and multiple-purpose basin development throughout California. Thus the many projects either currently authorized or projected, which may well accrue investments running into very large sums, are predicated fundamentally on the adequacy and reliability of these water records and facts. Compared with these costs, the expenditures which have been made and must continue to be provided to obtain the basic water information for these projects are very small indeed.

On July 1, 1921, the year in which the State Engineering Department began its studies to develop a State-wide water plan, there were being maintained under the cooperative stream gaging program 81 gaging stations on streams in Sacramento and San Joaquin River basins, and a total of 155 on all streams in California. It was then recognized that many more stream-flow records would be needed for the development of the plan and provision was made for the establishment of additional stations from time to time. The total on July 1, 1944 was 535 stations which includes 52 maintained entirely at Federal expense for Bureau of Reclamation and Corps of Engineers, U. S. Army, and 80 for licensees of the Federal Power Commission who pay the total cost. Present state cooperative program with a small expansion to permit the initiation of certain ground-water investigations, which are explained further on. This would be made effective by provision for an increase in the amount of the cooperative item in the next biennial budget of the State Division of Water Resources. The amount of any such increase would, of course, be matched by an equal Federal contribution.

Historical Review

The measurement of the flow of streams in California was begun by the State Engineer in 1878. In 1884 that office was discontinued and practically no further stream measurements were made until 1894 when engineers of the Geological Survey made their first measurements in the State. In 1905 the State Legislature

The second element, proposed as a post-war project, is concerned with

authorized the cooperation with the Geological Survey which has continued to date. The first State appropriation was $7,500 for each of the years of the biennium ending June 30, 1935. As the need for additional stream-flow data became apparent, the appropriations were gradually increased to a maximum of about $50,000 in 1932. For later years the allotments were gradually reduced and since 1932 they have varied between about $25,000 and $35,000 annually. The present fund is not adequate to keep equipment in repair, meet materially increased costs of operation, and provide some small increase in the work to meet present needs. Apart from the maintenance of the present program there is the consideration also of means to meet the requirements for early establishment and operation of many new gaging stations which the State and other agencies have indicated will be essential not only to the future planning of ultimate development but also to the efficient operation of projects, or units of projects, such as Central Valley, as they are completed. In addition, the State of California has carried on investigations to determine the supplemental program proposed for the fiscal period 1945-47, in accordance with the Flood Control Act of 1944. In view of these considerations, a two-element program is here proposed for consideration by the Joint Committee. The first is concerned with adequate maintenance of the present State cooperative program with a small expansion to permit the initiation of certain ground-water investigations, which are explained further on. This would be made effective by provision for an increase in the amount of the cooperative item in the next biennial budget of the State Division of Water Resources. The amount of any such increase would, of course, be matched by an equal Federal contribution.

The second element, proposed as a post-war project, is concerned with

the construction and subsequent operation of a substantial number of new gaging stations as well as with the rehabilitation and improvement of some of the present stations. This could be carried out either as a part of the State's post-war progrem, for which the legislature may be asked to appropriate funds, or by an appropriate increase in the funds budgeted for the Division of Water Resources and thus the increase could be matched by Federal funds. In either case in order to assure proper and continued maintenance and operation of the new stations when completed, there should be an advance commitment on the part of the State to bear one-half of the added cost.

With respect to water occurring beneath the land surface in California, very substantial volumes are pumped from wells for municipal needs, for industries, and for irrigation. The State-wide use of these ground-water resources is in the general order of several million acre-feet a year or several billion gallons a day. Since the early twenties, the State of California has carried on investigations to determine the amounts of such water that are available for use in several areas, particularly where overdraft has occurred or has threatened owing to withdrawals for extensive irrigation. This work has not involved cooperative participation by the Geological Survey. In recent years, however, several urgent ground-water problems have been investigated by the Geological Survey in cooperation with county and municipal agencies.

1. In the field of ground-water supply for municipal and industrial uses, few substantial appraisals have been made although problems of water shortage and of water quality are developing at widely scattered places. Thus: (1) certain new

a) Obtain more complete field data at all stages of the stream, particularly during high water and peak flood flows.

industrial processes require water of very high purity and low temperature, commonly of higher purity and lower temperature than the water of the streams; (2) locally along the coast, the heavy withdrawals are drawing salt water inland from the ocean; and (3) oil-field brines and industrial wastes seem to be invading the ground-water bodies in various districts of heavy use. The utility of the ground-water supply is deteriorating at these places and the availability of water suitable for prospective new industrial and additional public uses is unknown.

With respect to these considerations, it is contemplated that a comprehensive inventory of municipal and industrial ground-water supplies and investigations of their problems can be undertaken in the post-war period. In preparation for such an undertaking it is proposed, through cooperation between the State Division of Water Resources and the Geological Survey as provided herein, to explore some of the fundamental and perplexing problems related to the chemical character of ground waters. These problems are now known only in general terms; early exploration of a critical few would permit orderly and effective progress in the post-war program contemplated.

First Element - Increase in Biennial Budget

With respect to the first element, additional funds for that part concerned with stream gaging and surface water investigations are needed for and will be used to provide:

1. Adequate repairs and replacement of instruments and equipment and satisfactory operation of the stream gaging stations.

2. Sufficient personnel to:

   a) Obtain more complete field data at all stages of the streams, particularly during high water and peak flood flows.

b) Analyze the records and make them promptly available to water development and operating agencies.

c) Prepare and make available to interested water agencies, in the form of water bulletins, monthly and annual review of water conditions, forecasts of spring and summer water supplies, and, during winter and early spring months, appraisals of the possibility and magnitude of floods. This service would be largely confined to southern California basins since a somewhat similar service is already afforded to northern California basins by the Snow-Survey Bulletins and Forecasts issued by the State Division of Water Resources.

d) Extend to other southern California basins under a small continuing program, hydrological studies similar to those currently being conducted for the upper Santa Ana River basin. The latter are being carried on at the request of and in cooperation with the San Bernardino County Flood Control District. By analyzing and evaluating rainfall-runoff relations, ground-water storage in the mountainous sub-basins, and other hydrological elements as related to particular basin characteristics, data are developed respecting the nature, occurrence and probable frequency of critical events such as floods of various magnitude, and droughts, and respecting also the long term safe water yield of the basins. These data are essential to proper planning both for flood control and conservation.

With respect to that part of the immediate cooperative program that is herein proposed and that is concerned with ground-water problems, funds would be directed toward:

1. In selected areas of intensive industry, as in the vicinity of San Francisco Bay and Los Angeles, evaluation of the utility of ground waters to meet the rigorous requirements of existing and prospective new industrial enterprises. This would be accomplished by critically sampling and analyzing the waters of existing wells, and by coordinating these analytical data with other factual information available.

2. By research in the coastal areas of Orange, Los Angeles, and Santa Barbara Counties determination of effective methods of distinguishing ground

Of this total, $15,000 would be provided by the State in the budget of the Division

waters that have or may have been contaminated by ocean water, from those that have or may have been contaminated by oil-field brines or other industrial wastes. No simple but fully effective method is now known, because the contaminating waters seem to change profoundly in chemical character as they invade the fresh ground-water zones. Thus, commonly it is not known whether measures to protect the integrity of a fresh ground-water body should seek to correct inadequate disposal of wastes or to check the inland movement of ocean water.

The three counties just suggested afford an excellent research area because much pertinent factual information already has been acquired in connection with investigations of other objectives; findings in these areas would be applicable in other coastal areas of the State.

The proposed distribution to the above enumerated items of the total additional funds needed annually is shown as follows:

	Northern California	Southern California	Total
1. Equipment and operation	$6,000	$3,000	$9,000
2. a) Better coverage - high water and peak flood flows	3,000	1,600	4,600
b) Analyze and make records promptly available	1,000	800	1,800
c) Monthly and annual water reviews and bulletins	1,600	1,600	3,200
d) Extension of hydrological studies	3,000	2,000	5,000
3. Ground-water investigations	1,400	8,000	9,400
Total	$15,000	$17,000	$32,000

Of this total, $15,000 would be provided by the State in the budget of the Division

of Water Resources making the total increase for the biennium $50,000 which would be matched by Federal funds.

Although, as previously stated, the annual amount contributed by the State during the current biennium is about $25,000, it should be noted that based solely on the increase in compensation of personnel, occasioned by the War Overtime Pay Act of 1943, the State has already included an item, to meet its share of this increase, in the budget now being prepared for the next biennium. With this addition the annual amount set up for the State's cooperation is $50,000. It should be made clear that the annual amount of $15,000 needed for the first-element program here presented is additional to this $50,000. Therefore, the annual amount of this item in the State budget would be increased to $65,000.

Second Element - Post-war Program

Although the stream-flow records currently needed in connection with the planning of the larger units in the State-wide Water Plan are being obtained by existing gaging stations, there is an indicated need for the early establishment of a substantial number of additional stations before the complete plan of development can be formulated. Some appraisal of that need may be gained when consideration is given to the many additional storage, conveyance and other units contemplated in the ultimate plans for use and control of the waters of the State. Each unit of these proposed developments requires a record of the water supply that will be available, in order that capacities of reservoirs, spillways, and canals may be accurately and economically designed. Moreover, the runoff records are required not only for proper planning and design but also for determination of the economic

feasibility of the project and, in many instances, are essential for its operation upon completion of construction.

In addition to the larger units which constitute the key to the plans, there are many smaller units that will be considered in the future for the complete development of the water supply of the State.

As the result of conferences with the State Division of Water Resources, Federal and other agencies, it has been determined that there is need for the early establishment of some 50 additional gaging stations, largely in the Sacramento and San Joaquin River basins, in order that dependable runoff records shall be at hand when required. Proposed as a post-war project, it is estimated that the total cost of constructing the stations making up this total would be approximately $125,000. The construction could be spread over several years or it could be designed for a minimum of two years, contingent of course upon the availability of materials and manpower. In entering upon such a program it is essential that provision be made for the proper operation and maintenance of the stations when they are completed. Based upon present costs this may be estimated at an average of $500 per station, which would mean that upon completion of all of the 50 stations there would be required annually in addition to present cooperative funds, $25,000. It is contemplated that this additional amount would be provided by equal State and Federal funds in the same manner as at present; but before construction is started it would seem necessary that there be a clear understanding as to this future obligation and an advance commitment upon the part of the State to meet it.

Proposed also in this post-war program is the rehabilitation and improvement of some of the present gaging stations, as well as the reestablishment of

certain of those which were discontinued because of lack of funds or were destroyed by floods and have not since been rebuilt. At some stations equipment installed many years ago is in need of repairs and improvements; at others the original installation was of temporary type and should be replaced by permanent and more suitable structures.

It is estimated that the cost of the most urgent work of this character would be about $60,000, distributed in roughly equal proportions to northern and southern California stations. As in the case of the proposed new stations, this work could be extended over several years or it may be planned to be carried out in a minimum period of two years.

Summary

In brief, the program here presented for consideration by your Committee and such recommendations to the Director of Finance and the Legislature as you may care to make, is as follows:

(1) An increase of $15,000 in the State's cooperation for water resources investigations, making the total of the annual amount for this item to be included in the budget of the Division of Water Resources, $45,000.

(2) A post-war program of construction and improvement of stream-gaging stations amounting to $135,000.

(3) Commitment on the part of the State to assume one-half of the cost of operation and maintenance of the new gaging stations which it is estimated will amount to $12,500 annually.

Ed Fletcher Papers

1870-1955

MSS.81

Box: 18 Folder: 1

General Correspondence - McGlashan, H.D.