

INTRODUCTION

The higher elevations of the Sierra-Nevada Mountains within Region II of the Department of Fish and Game are blessed with a great number of small natural lakes, most of which provide suitable habitat for trout. These lakes are found in Plumas, Sierra, Nevada, El Dorado, Placer, Amador, and Alpine Counties usually above 7,000 feet in elevation. Currently, the Fisheries Management Section of Region II plants approximately 373 of these lakes on an annual basis with fingerling rainbow and/or brook trout.

Although most of these lakes provide a stable environment for the development of fisheries, in many cases, the small streams draining from these lakes are intermittent in flow in the August-November period. The drying up of sections of the streams during the low flow months often results in a considerable loss of fish life, generally limits the fish production potential of these lotic environment and reduce their value as spawning areas for lake fishes. In some cases, the lakes themselves pose fish management problems. If adequate depth of water is not present, fish kills from oxygen depletion occurs during heavy winters when the ice and snow cover is above normal. There are other lakes that are never managed to provide fisheries due to their general shallowness.

In many cases, the solution to the above described problems can be found through the construction of small rock masonry "streamflow and lake level maintenance dams". These are small dams complete with regulating valves built on the outlet of the lake.

This report, in binder form, records the accomplishments of this currently continuing program. Also included in the binder are the results of surveys conducted on proposed projects along with a cost-benefit evaluation based on current standards.

Financing of existing projects has been largely through the WCB. The initial appropriation was made in 1947 when funds were allotted for the construction of dams on lakes in three different areas. These are listed as follows: with summaries of accomplishments in the different national forests:

1. WCB#1: EL Dorado National Forest Flow Maintenance Dams: Under this program, streamflow maintenance dams were proposed on 65 lakes and rough fish barrier dams proposed on two lakes. Engineering surveys were made on 42 of these lakes.

Twenty-one stream flow maintenance dams were constructed, and two rough fish barrier dams were constructed, one on Miller Lake, Placer County, and one on Richardson Lake, El Dorado County.

SUMMARY OF DAMS CONSTRUCTED

(as of 1964)

Streamflow Maintenance Dams

Number

Constructed by Fish and Game Using WCB Funds 20

Streamflow Maintenance Dams Constructed by Fish and Game Using Mt. Ralston
Fish Planting Club Funds 1

Streamflow Maintenance Dams Constructed Before WCB-10

Total Streamflow Maintenance Dams 31

Streamflow Maintenance Dams Operated By Department 27

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the success of any business and for the protection of the interests of all parties involved. The document also highlights the need for transparency and accountability in all financial dealings.

In addition, the document outlines the various methods and procedures for recording transactions. It provides detailed instructions on how to properly document each transaction, including the use of receipts, invoices, and other supporting documents. The document also discusses the importance of regular audits and reconciliations to ensure the accuracy of the records.

Finally, the document concludes by reiterating the importance of maintaining accurate records and the need for transparency and accountability. It encourages all parties to adhere to the guidelines and procedures outlined in the document to ensure the success of their business and the protection of their interests.

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Approved and signed by:

Signature: _____ Date: _____

Printed Name: _____

Witnessed and signed by:

Signature: _____ Date: _____

Printed Name: _____

	<u>Number</u>
Streamflow Dams Operated by PGE (Water exchanged in South Fork American)	4
Total Acre Feet of Storage Developed	4,143
Total Miles of Streams Benefited	178
Total Number Rough Fish Barrier Dams	2

2. WCB #16: Emigrant Basin Flow Maintenance and Stream Improvement Program:

This program called for the construction of rubble masonry dams on 27 lakes. The repair of two existing dams, and stream improvement devices on two streams. Engineering surveys were made on 25 of these lakes. All the proposed projects are within the Stanislaus National Forest except Burnside Lake, Alpine County, which is on private property within the Toiyabe National Forest. Eight of these proposed projects are in Region II, the balance in Region IV.

SUMMARY OF DAMS CONSTRUCTED (in Region II)

	<u>Number</u>
Lake Level Maintenance Dams	1
Streamflow Maintenance Dams	1
Total Storage of Streamflow Maintenance Dams (In acre feet)	138
Miles of Stream Benefited	7

3. WCB #49: Tahoe National Forest Flow Maintenance Program:

Under this program, 22 streamflow or lake level maintenance dams were proposed. Engineering surveys were made on 18 of the proposed projects. One streamflow maintenance dam (Big Downey Lake) and three small lake level maintenance dams were constructed (Maria, Lower West, and Upper West Lakes).

SUMMARY OF DAMS CONSTRUCTED

	<u>No.</u>
*Lake Level Maintenance Dams	3
Streamflow Maintenance Dams	1
Total Storage in Streamflow Dams	168
Miles of Stream Benefited	5

The following table shows the results of the survey of the general public in 1988.

Table 1: Results of the survey of the general public in 1988.

Table 2: Results of the survey of the general public in 1988.

Table 3: Results of the survey of the general public in 1988.

Table 4: Results of the survey of the general public in 1988.

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Table 5: Results of the survey of the general public in 1988.

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Table 7: Results of the survey of the general public in 1988.

Table 8: Results of the survey of the general public in 1988.

Table 9: Results of the survey of the general public in 1988.

Table 10: Results of the survey of the general public in 1988.

Table 11: Results of the survey of the general public in 1988.

Table 12: Results of the survey of the general public in 1988.

Table 13: Results of the survey of the general public in 1988.

Table 14: Results of the survey of the general public in 1988.

Table 15: Results of the survey of the general public in 1988.

Table 16: Results of the survey of the general public in 1988.

Table 17: Results of the survey of the general public in 1988.

Table 18: Results of the survey of the general public in 1988.

Table 19: Results of the survey of the general public in 1988.

Table 20: Results of the survey of the general public in 1988.

Table 21: Results of the survey of the general public in 1988.

Table 22: Results of the survey of the general public in 1988.

Table 23: Results of the survey of the general public in 1988.

Table 24: Results of the survey of the general public in 1988.

Table 25: Results of the survey of the general public in 1988.

Table 26: Results of the survey of the general public in 1988.

PLUMAS NATIONAL FOREST

In addition to the three WCB projects, one dam (Gold Lake) was constructed in Plumas National Forest using support funds. The lake stores 1147 acre feet of water; benefits 7 miles of stream.

LASSEN NATIONAL FOREST

There are several streamflow maintenance and lake level maintenance dams in the Lassen National Forest which were constructed using Butte and Plumas County fine money and money donated by the Pacific Gas and Electric Company and constructed by the Division of Forestry using Magalia Conservation Camp labor.

SUMMARY OF DAMS

Number of Lake Level Maintenance Dams-	2
Number of Streamflow Maintenance Dams-	2
Total Acre Feet of Storage Developed-	147
Miles of Stream Benefited	- 8

STANDARD OPERATING PROCEDURE

The purpose of this document is to provide a clear and concise description of the standard operating procedure for the [redacted] process. This document is intended for use by all personnel involved in the [redacted] process.

SCOPE AND PURPOSE

This document describes the standard operating procedure for the [redacted] process. The purpose of this document is to ensure that all personnel involved in the [redacted] process are aware of the correct procedures to follow. This document is intended for use by all personnel involved in the [redacted] process.

DEFINITIONS

- 1. [redacted] - [redacted]
- 2. [redacted] - [redacted]
- 3. [redacted] - [redacted]
- 4. [redacted] - [redacted]

GENERAL INFORMATION ON STREAMFLOW AND LAKE LEVEL MAINTENANCE DAMS CONSTRUCTED UNDER WCB PROGRAMS

1. **Engineering Surveys:** Some of the lakes were surveyed for proposed dams after preliminary investigations were carried out to determine their feasibility. After investigating the various proposed projects, a considerable number were abandoned because of poor dam sites, lack of sufficient storage to keep the outlet streams alive during the dry summer and fall period, and lack of need for additional water. The surveys were made under contract with the former Division of Water Resources. Engineering plans were made up on each project surveyed, and dams were built on lakes where the surveys showed that enough storage could be obtained and that the projects were economically feasible.
2. **Special Use Permits:** As all the lakes that were dammed were on United States Forest Service property, 20 year term permits were obtained covering each project except that in the El Dorado National Forest a separate permit was issued for each project within or adjacent to the Desolation Valley Wild Area, and a blanket permit issued covering all the other projects.
3. **Water Rights:** Although the dams that were constructed are owned by the Department of Fish and Game, Water rights were applied for and obtained by the U. S. Forest Service for the storage created by the dams since the lakes are all located on their property.

4. Setting of Dam Heights

Most of the proposed WCB #1 projects were within the Desolation Valley Wild Area. At the start of the program, there was considerable opposition to the construction of artificial structures in the wild areas, even though the regulations allowed for small inconspicuous dams.

The Forest Service set the maximum heights at which each dam could be built, usually at the natural high water mark on the lakes except in locations where there was no danger of flooding trees surrounding the lakes. In some cases, additional height could have been added to the dams at a slight increase in cost had we not been required to abide by this regulation.

5. Debris Clearance and Dead Tree Removal

Even though most dam heights were set at high water level, many trees died on some lakes due to their exposure to water for a longer period of time. The Forest Service required that the trees that were flooded be removed and disposed of when it was certain that they would not survive.

6. Type of Construction

All of the dams that were built were of rubble masonry construction. The Forest Service required that the dams be constructed with native rubble. Cut or finished rocks could not be used. The mortar was to be recessed to make the dams as inconspicuous as possible.

7. Method of Construction

The first two dams under the WCB program were constructed in [1949] on Stony Ridge and Crag Lakes, El Dorado County. Department of Correction, Youth Authority, parolee labor, were used on these projects. This did not prove too satisfactory, and was very expensive due to the high packing costs of maintaining a large camp in a remote area.

1. The first part of the document discusses the general principles of the program. It outlines the objectives and the scope of the project. The document is divided into several sections, each covering a different aspect of the program. The first section discusses the overall goals and the mission of the program. The second section describes the organizational structure and the roles of the various participants. The third section details the operational procedures and the methods used to collect and analyze data. The fourth section discusses the results of the program and the impact it has had on the community. The final section provides a summary of the findings and offers recommendations for future work.

2. The second part of the document provides a detailed description of the program's activities. It includes a list of the various projects and initiatives that have been undertaken. Each project is described in terms of its objectives, its methods, and its results. The document also includes a list of the various organizations and individuals that have participated in the program. This information is provided to give a more complete picture of the program's reach and impact. The document is intended to provide a comprehensive overview of the program's activities and to serve as a resource for those interested in learning more about the program.

3. The third part of the document discusses the program's impact on the community. It includes a list of the various organizations and individuals that have benefited from the program. The document also includes a list of the various challenges that have been faced by the program and the ways in which these challenges have been addressed. This information is provided to give a more complete picture of the program's impact and to serve as a resource for those interested in learning more about the program's impact on the community. The document is intended to provide a comprehensive overview of the program's impact and to serve as a resource for those interested in learning more about the program's impact on the community.

4. The fourth part of the document provides a summary of the findings and offers recommendations for future work. It includes a list of the various conclusions that have been drawn from the program's activities and a list of the various recommendations that have been made. This information is provided to give a more complete picture of the program's findings and to serve as a resource for those interested in learning more about the program's findings. The document is intended to provide a comprehensive overview of the program's findings and to serve as a resource for those interested in learning more about the program's findings.

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The possibility of contracting the construction of the dams was explored but no contractors were found who wished to bid on the jobs due to the remoteness of most of the areas and the numerous problems involved. However, the rough fish barrier dams on Miller and Richardson Lakes were constructed by contract as they were accessible by road.

The Department decided to construct the dams themselves using seasonal help. Each crew consisted of a stonemason, mason's helper, and three seasonal aids. This proved to be the most economical method of construction.

Currently, ¹⁹⁶⁴ dams are being constructed in the Magalia High Lakes area using Department of Corrections Magalia Conservation Camp labor supervised by the State Division of Forestry.

(1964)
Lake level maintenance dams are being constructed in the Tragedy Springs area in Amador County by Youth Authority labor, from the Pine Grove Conservation Camp, supervised by the State Division of Forestry.

The first sentence of the first paragraph of the Constitution of the United States of America is: "We the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do hereby constitute and ordain this Constitution."

The second sentence of the first paragraph of the Constitution of the United States of America is: "The said Constitution shall be subject to the Amendment of the said Constitution."

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(1787)

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LTBMU

Name of Dam: Gilmore Lake

County: El Dorado

Project: W.C.B. #1

National Forest: El Dorado

Date of Construction: August 1954

Drainage: Glen Alpine Creek, Fallen Leaf Lake

Location: T.12N., R.17E., Sec. 8. Located 3 miles by trail from Glen Alpine lodge on Mt. Tallac trail (Fallen Leaf Quad.)

Ownership of Dam: Department of Fish and Game under Special Use Permit from El Dorado Forest. Issued 3-12-54. Expires 3-12-74.



Size of Lake: 78.2 surface acres

Maximum Depth: 100'

Elevation: 8300'

Dam Dimensions-Height: 5'

Length: 130'

Bottom Width: 9.5'

Crest Width: 2'

Ground Level Width: 4'

Depth of Footing: 7'

Type of Construction: Rubble masonry

Cubic Yardage, Main Dam: 154

Cubic Yardage Saddle Dam(s): none

Valve: 12" Calco #101 slide headgate

Distance From Bottom of Valve to Spillway: 4'

Total Cost: \$7739.40

Cost Per Cubic Yard Construction: \$50.25

Active Storage: 310 acre ft. Cost Per Acre Feet Storage: \$24.96

Method of Construction: Hired labor

Project Purpose: Provides stream flow in outlet from lake 2 miles downstream to a point where storage from Susie and Heather Lake dams enters forming Glen Alpine Creek. Gilmore, Susie and Heather Lake dams provide stream flow to Glen Alpine Creek to Fallen Leaf Lake. Taylor Creek from Fallen Leaf Lake to Lake Tahoe is benefited. Glen Alpine and Taylor Creeks contain resident populations of eastern brook, rainbow and brown trout. Trout and kokanee salmon from Lake Tahoe use Taylor Creek for spawning. Before construction of dams flow was very low in Glen Alpine Creek.

Operation:

Recommended release 1.0 c.f.s. from time dam stops spilling (usually July 15) through October. Flush valve on first visit to dam (usually July 15). If lake has stopped spilling set valve at recommended flow as measured in weir 150' downstream from dam. Normally the dam should be checked again about last week of August and last week of September and the valve cleaned and reset if necessary. Currently (1963) warden headquartered at Al Tahoe operates dam.

Remarks:

The stream channel below the dam fills in occasionally and it should be cleaned out to fully utilize the storage in the lake.

LTBMV

Name of Dam: Heather Lake

County: El Dorado

Project: W.C.B. #1

National Forest: El Dorado

Date of Construction: August 1951

Drainage: Glen Alpine Creek, Fallen Leaf Lake

Location: T.12N., R.17E., Sec. 19 M.D.B.&M. Located 0.4 miles by trail from Glen Alpine lodge via Susie Lake (Fallen Leaf Quad.)

Ownership of Dam: Department of Fish and Game under Special Use Permit from El Dorado Forest. Issued 11-26-52. Expires 11-26-57. (See remarks)



9-30-65



OCT. '69

Size of Lake: 37.25 surface acres

Maximum Depth: 50'

Elevation: 7900'

Dam Dimensions-Height: 4'

Length: 40'

Bottom Width: 7.2'

Crest Width: 2'

Ground Level Width: 3.5'

Depth of Footing: 4'

Type of Construction: Rubble masonry

Cubic Yardage, Main Dam: 50.4

Cubic Yardage Saddle Dam(s): none

Valve: 12" Calco #101 slide headgate

Distance From Bottom of Valve to Spillway: 4'

Total Cost: \$2398.40

Cost Per Cubic Yard Construction: \$47.62

Active Storage: 141.8 acre ft. Cost Per Acre Feet Storage: \$16.92

Method of Construction: Hired labor

Project Purpose: To provide stream flow in outlet stream to Glen Alpine Creek, storage from Heather Lake dam and Gilmore and Susie Lake dams provide flow during dry period to Glen Alpine Creek to Fallen Leaf Lake. to Benefit's Taylor Creek from Fallen Leaf Lake to Lake Tahoe. Glen Alpine Creek contains a resident population of rainbow, brown and eastern brook trout. Catchable trout are planted in lower section. Rainbow and brown trout and kokanee salmon from Lake Tahoe spawn in Taylor Creek. Catchables are planted in Taylor Creek.

Operation: Recommended release 0.75 c.f.s. from time dam stops spilling (usually about August 1) through October. Flush valve on first visit to dam (usually last week in July). If dam has stopped spilling adjust valve to recommend flow as measured in weir 150' downstream from dam. Normally the dam should be checked again about August 1 and again about September 1 and the valve cleaned and reset if necessary. Currently (1963) the warden at Al Tahoe operates dam.

Remarks: There is quite a debris problem above this dam. It is necessary to clean the logs and debris from above the dam about every two years.

LTBMU

Name of Dam: Susie Lake

County: El Dorado

Project: W.C.B. #1

National Forest: El Dorado

Date of Construction: August 1951

Drainage: Glen Alpine Creek, Fallen Leaf Lake

Location: T.12N., R.17E., Sec. 17. Located two miles by road from Fallen Leaf Lake to Glen Alpine Springs. Three miles from Glen Alpine Springs by trail (Fallen Leaf Lake Quad.)

Ownership of Dam: Department of Fish and Game under Special Use Permit from El Dorado Forest. Issued 11-26-52. Expires 11-26-57. (See remarks)



SEPT. '65



OCT. '64

Size of Lake: 36.5 surface acres

Maximum Depth: 68'

Elevation: 7700'

Dam Dimensions-Height: 3.5'

Length: 25'

Bottom Width: 3'

Crest Width: 2'

Ground Level Width: 3'

Depth of Footing: 0.5'

Type of Construction: Rubble masonry

Cubic Yardage, Main Dam: 10.53

Cubic Yardage Saddle Dam(s): none

Valve: 12" Calco #101 slide headgate

Distance From Bottom of Valve to Spillway: 3.5'

Total Cost: \$561.84

Cost Per Cubic Yard Construction: \$55.33

Active Storage: 99 acre ft.

Cost Per Acre Feet Storage: \$5.67

Method of Construction: Hired labor

Project Purpose: Provides stream flow in outlet stream, Glen Alpine Creek, through Fallen Leaf Lake and Taylor Creek to Lake Tahoe, a total of seven miles of stream. Glen Alpine Creek contains a resident population of eastern brook, rainbow and brown trout. Taylor creek provides spawning area for trout and kokanee salmon from Lake Tahoe. Before construction of the dams (Susie, Heather and Gilmore Lakes) on the Glen Alpine Drainage, Glen Alpine Creek practically dried up during dry years.

Operation: Recommended release 0.5 c.f.s. from time dam stops spilling (usually about August 1) through October. Flush valve on first visit to the lake (usually around August 1) if dam has stopped spilling set valve at recommended flow as measured in the weir 50' downstream from dam. Normally the dam is again visited about September 1, and again about October 1. Currently (1963) the warden headquartered at Al Tahoe operates the dam.

Remarks: The department requested renewal of the Special Use Permit in 1957. To date (1963) the permit has not been renewed but is now in the process.