BEFORE THE STATE ENGINEER OF OREGON

Lane and Douglas Counties

IN THE MATTER OF APPLICATIONS NOS. R-30073, R-30179 AND 29820 IN THE NAME OF INTERNATIONAL PAPER COMPANY.

STATEMENT, FINDINGS OF FACT, CONCLUSIONS AND ORDER

STATEMENT

- 1 -

International Paper Company has filed Application No. R-30073 for storage of 15,070 acre-feet of water in Siltcoos Lake, Application No. R-30179 for storage of 16,580 acre-feet of water in Tahkenitch Lake, and Application No. 29820 for permit to appropriate 12.42 cubic feet per second from Siltcoos Lake and 36.65 cubic feet per second from Tahkenitch Lake for a pulp and paper mill to be located near Gardiner, Oregon.

- 2 -

Protests against the granting of said applications were filed by residents of the area, the Oregon State Game Commission and the Fish Commission of Oregon.

- 3 -

A hearing on the protests was held by the State Engineer in Reedsport, Oregon on March 2, 1960, at which all protestants were given an opportunity to be heard. Testimony and evidence were presented in favor of and opposed to the granting of the permits.

- 4 -

Based upon the evidence submitted at the hearing, upon hydrologic studies by the State Engineer since the hearing, and upon the official records of his office, the State Engineer finds:

FINDINGS OF FACT

- 1 -

Siltcoos Lake has a water area of about 2,500 acres at low water and about 4,250 acres at the maximum recorded high water. Low water

elevation is near 2.00 feet M.S.L. and high water is 14.75 feet M.S.L., recorded January 21, 1953. The lake has a drainage area of 72.7 square miles. Its outlet is through the Siltcoos River, approximately 2 miles long, into the Pacific Ocean. During late August or early September winds and tides form a sand bar across the outlet of the Siltcoos River, restricting the flow. The bar is overtopped and washed out when the fall rains begin.

- 2 -

Tahkenitch Lake has a water area of about 1,600 acres at a low water elevation of 7.9 M.S.L. and about 2,700 acres at a maximum high water elevation of 20 M.S.L. The drainage area is 35.5 square miles and abuts the Siltcoos Lake drainage area on the south. Tahkenitch Lake has an outlet through Tahkenitch Creek, approximately 2 miles long, to the Pacific Ocean.

- 3 -

Both lakes support substantial populations of trout, salmon and spiny ray fishes and are popular sport fishing areas. The lakes also are used for boating and aquatic sports. On their shores are many resort areas with facilities for recreationists and various public and private establishments and homes.

- 4 -

There is a considerable acreage of farm or pasture land located in bays or along tributary streams which will receive some damage by longer periods of inundation as a result of maintaining higher-than-normal lake levels during the spring and summer months.

- 5 -

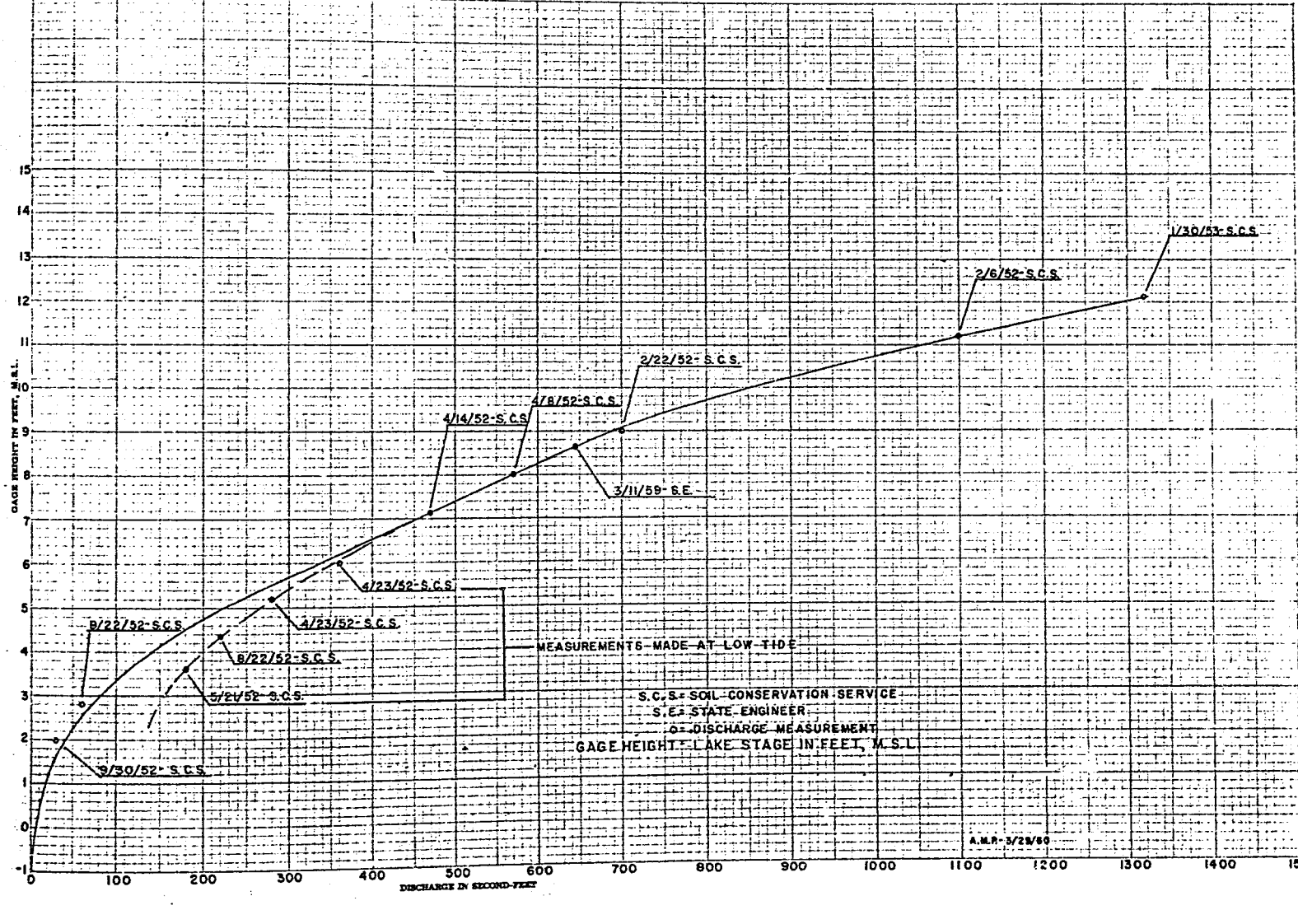
There is no record of the inflow or outflow of Siltcoos Lake. A few miscellaneous measurements of the outflow give some indication of the relationship between lake water elevation and Siltcoos River discharge, but it is not possible to establish a firm and accurate relationship because of backwater effects of the ocean tides. At time of high tides and

STATE OF OREGON
OFFICE OF STATE ENGINEER—WATER RESOURCES DEPARTMENT

RATING CURVE FOR SILTCOOS RIVER

File No.

CHART 1



Yrs. Mea. Nos.
Max. G.H.
Min. G.H.
Plotted by
Checked by

a lake water elevation of 3.0 M.S.L. or lower, reverse flows have been observed causing salt water to enter the lake. The miscellaneous measurements heretofore made are as follows in Table 1:

TABLE 1
Miscellaneous Measurements of Siltcoos River

Date	Lake Level M.S.L.	Discharge c.f.s.	Source
Sept. 10, 1935	-	5.3	State Engineer Bulletin No. 9
Sept. 17, 1936	-	4.3	State Engineer Bulletin No. 9
Feb. 6, 1952	11.2	1,100	Soil Conservation Service
Feb. 22, 1952	9.0	700	Soil Conservation Service
April 8, 1952	8.0	570	Soil Conservation Service
April 14, 1952	7.15	470	Soil Conservation Service
April 23, 1952	6.0	360	Soil Conservation Service
May 5, 1952	5.2	280	Soil Conservation Service
May 21, 1952	3.6	180	Soil Conservation Service
Aug. 22, 1952	4.35	220	Soil Conservation Service
Sept. 22, 1952	2.80	60	Soil Conservation Service
Sept. 30, 1952	2.0	30	Soil Conservation Service
Jan. 20, 1953	14.80	2,060	Soil Conservation Service
Jan. 30, 1953	12.1	1,320	Soil Conservation Service
March 11, 1960	8.68	647	State Engineer

Using the data from Table 1, and a good measure of judgment, a synthetic rating curve was developed as the best approach to determination of the flows of Siltcoos River at various lake levels. This developed rating curve is designated as Chart 1 which follows page 2.

Records of water levels in Siltcoos Lake are available from observations by Mr. James Christensen, a private individual, covering the years 1956 to 1959. These readings are not continuous daily readings, but are sufficiently frequent to present a fair picture of lake flucuations for the periods of record. These readings have been plotted and are shown as "Unregulated Lake Level" on Charts 2, 3, 4, and 5, following page 3.

Average annual precipitation at the small town of Canary, located 3.5 miles northeasterly from Siltcoos Lake, is 80.29 inches. Average

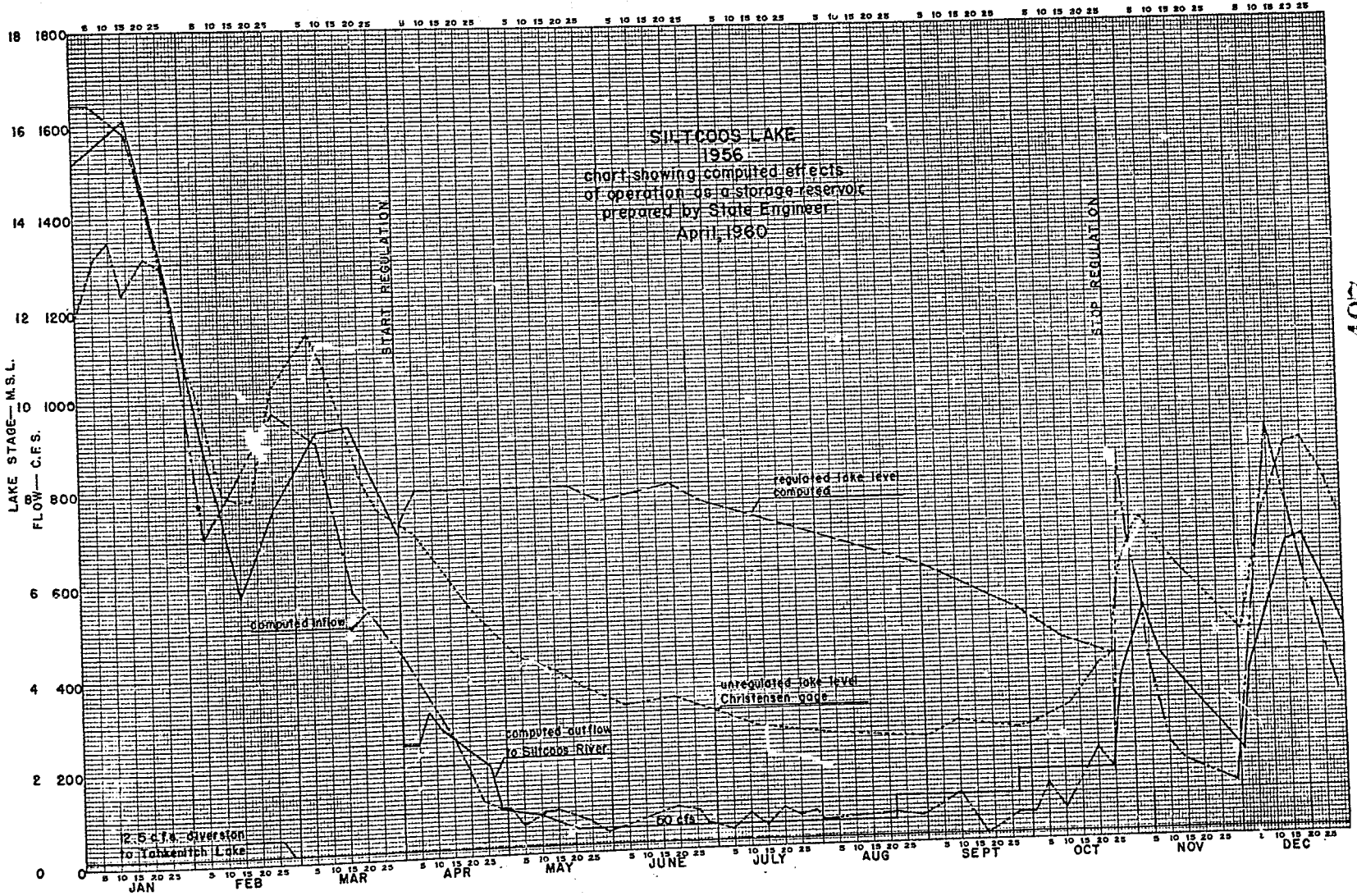
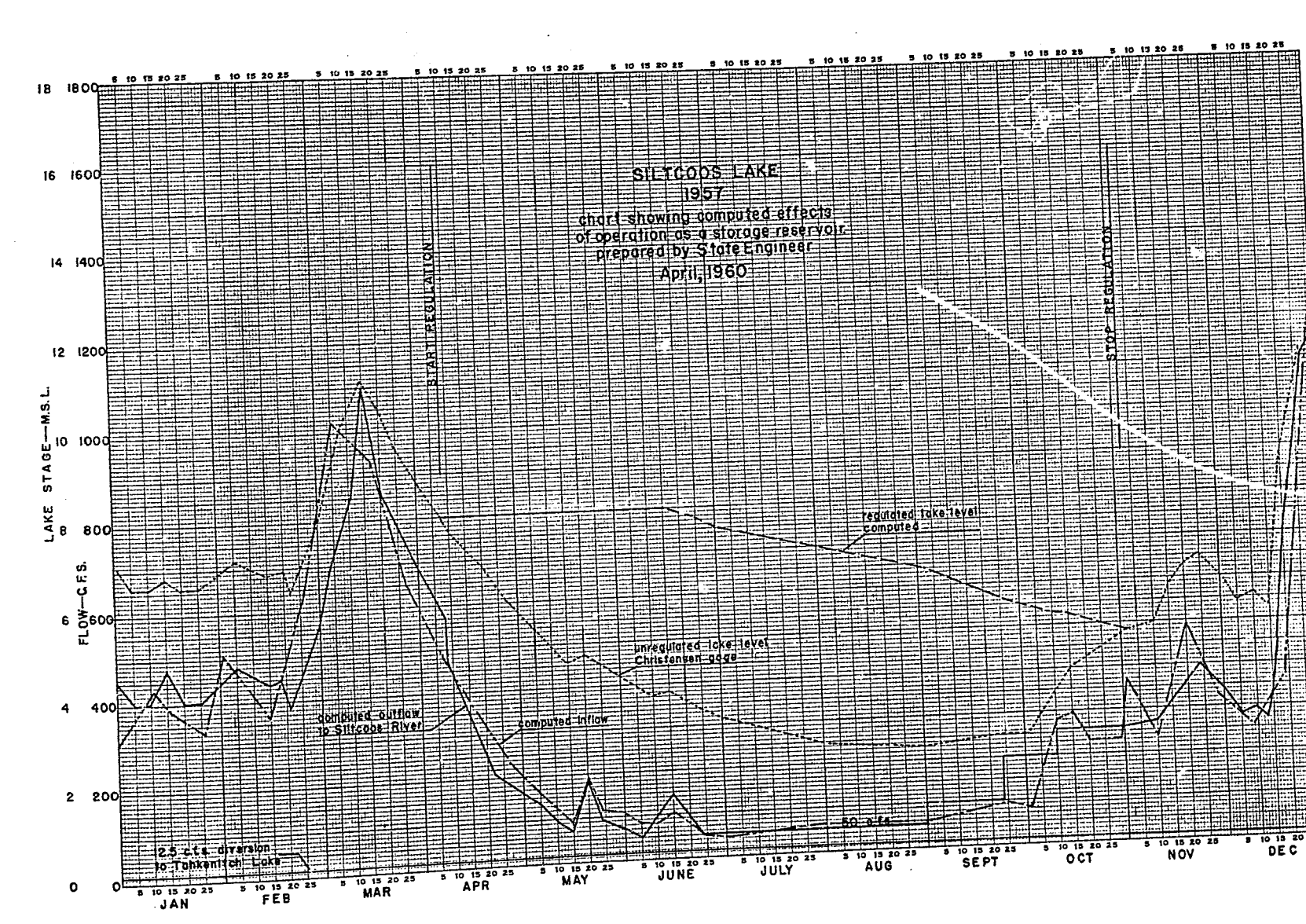

SILTCOOS LAKE
1956
chart showing computed effects
of operation as a storage reservoir
prepared by State Engineer
April, 1960
LAKE STAGE — M.S.L.
FLOW — C.F.S.
START REGULATION
STOP REGULATION
regulated lake level computed
computed inflow
unregulated lake level Christensen gage
computed outflow to Siltcoos River
60 cfs
2.5 c.f.s. diversion to Tahkenitch Lake
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC

CHART 2


SILTCOOS LAKE
1957
chart showing computed effects
of operation as a storage reservoir
prepared by State Engineer
April, 1960
START REGULATION
STOP REGULATION
regulated lake level computed
unregulated lake level Christensen gage
computed outflow to Siltcoos River
computed inflow
50 c.f.s.
25 c.f.s. diversion to Tahkenitch Lake
LAKE STAGE—M.S.L.
FLOW—C.F.S.
18 1800
16 1600
14 1400
12 1200
10 1000
8 800
6 600
4 400
2 200
0 0
JAN
FEB
MAR
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MAY
JUNE
JULY
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SEPT
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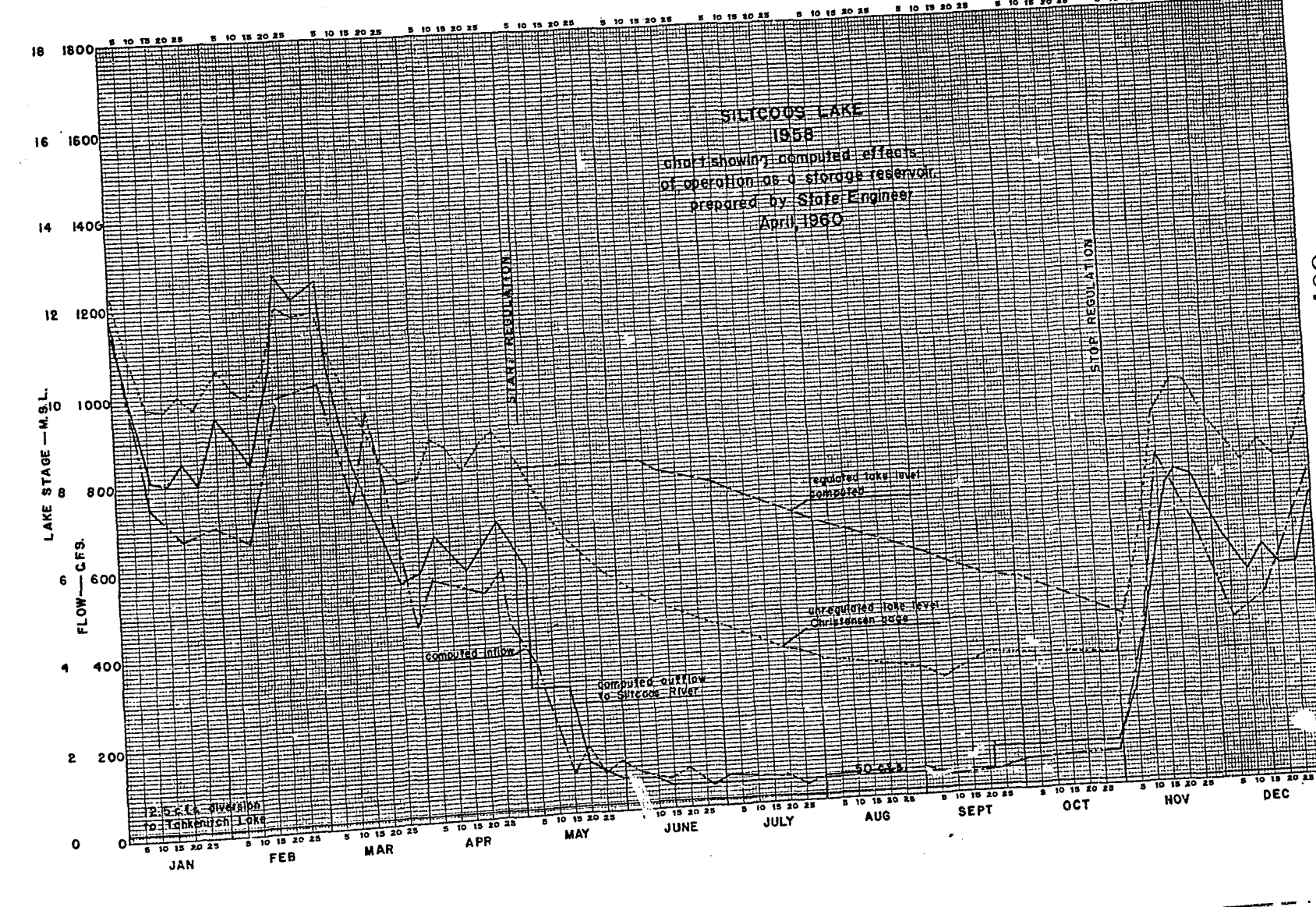
DEC


SILTCOOS LAKE
1958
chart showing computed effects
of operation as a storage reservoir.
prepared by State Engineer
April, 1960
LAKE STAGE — M.S.L.
FLOW — C.F.S.
18 1800
16 1600
14 1400
12 1200
10 1000
8 800
6 600
4 400
2 200
0 0
START REGULATION
STOP REGULATION
regulated lake level computed
unregulated lake level Christensen gage
computed inflow
computed outflow to Siltcoos River
50 c.f.s.
12.5 c.f.s. diversion to Tahkenitch Lake
JAN
FEB
MAR
APR
MAY
JUNE
JULY
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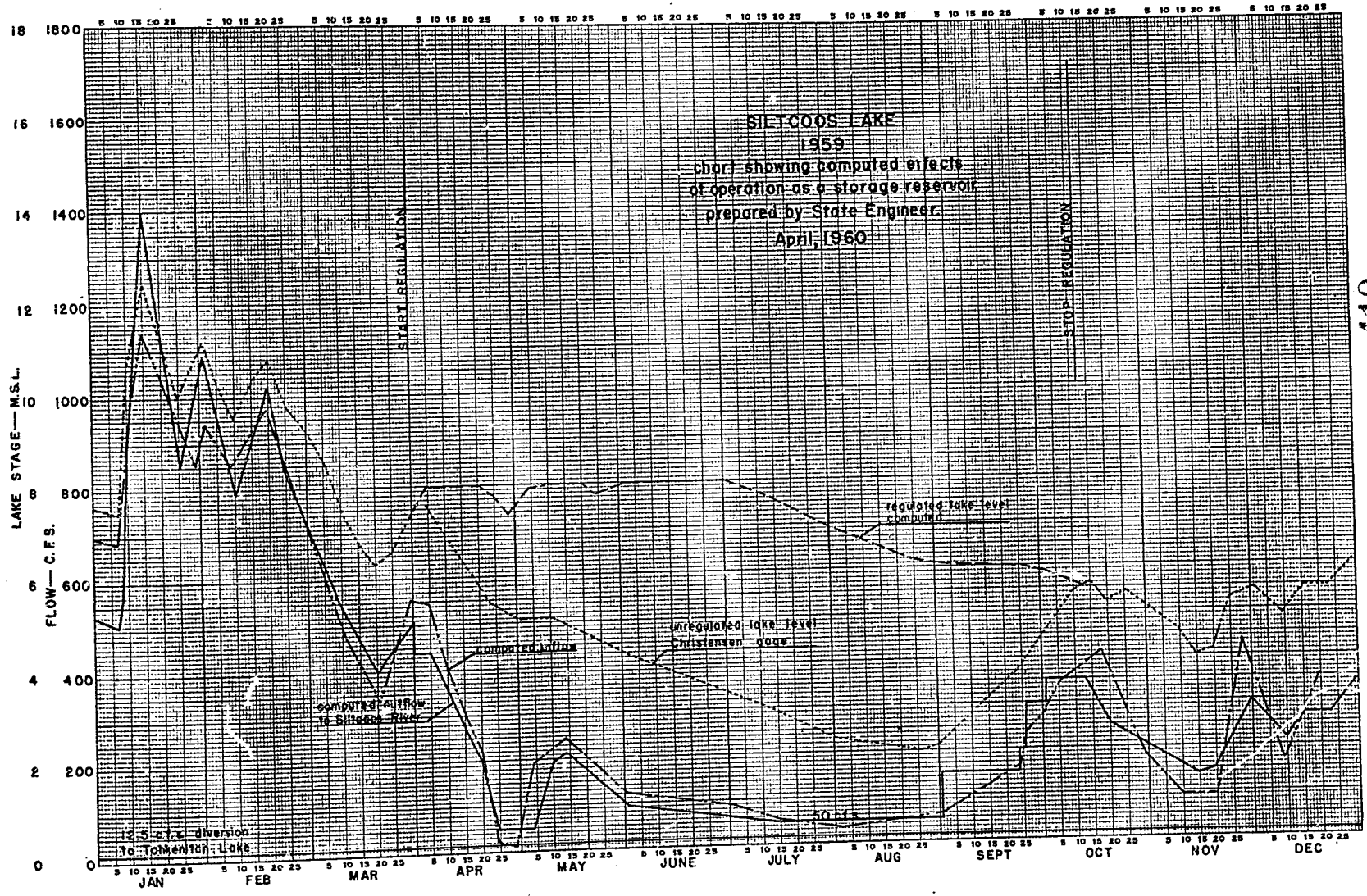
SEPT
OCT
NOV
DEC


SILTCOOS LAKE
1959
chart showing computed effects
of operation as a storage reservoir
prepared by State Engineer.
April, 1960
START REGULATION
STOP REGULATION
LAKE STAGE — M.S.L.
FLOW — C.F.S.
18 1800
16 1600
14 1400
12 1200
10 1000
8 800
6 600
4 400
2 200
0 0
regulated lake level computed
unregulated lake level Christensen gage
computed inflow
computed outflow to Siltcoos River
12.5 c.f.s. diversion to Tahkenitch Lake
50 c.f.s.
JAN
FEB
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MAY
JUNE
JULY
AUG
SEPT
OCT
NOV
DEC

monthly precipitation, based on 28 years of continuous records, is shown in the following Table 2:

TABLE 2:
Average Monthly Precipitation (inches) at Canary

January	12.99	April	5.18	July	0.90	October	7.28
February	10.40	May	3.51	August	0.93	November	10.79
March	9.79	June	2.41	September	2.73	December	13.38

- 9 -

Based on the synthetic outflow curve (Chart 1), the measured precipitation at Canary, the measured evaporation at Corvallis, and changes in storage as evidenced by lake level readings, hydrographs of Siltcoos Lake have been computed for the period of record and are shown by Charts 2, 3, 4 and 5, following page 3.

- 10 -

The hydrographs show that the inflows to Siltcoos Lake are sufficient to provide for the diversion of 12.42 c.f.s. as requested by Application No. 29820 and maintain a minimum flow of 50 c.f.s. in the Siltcoos River and at the same time maintain lake level no lower than 3.0 M.S.L., provided that a dam be constructed in the Siltcoos River which will regulate outflows when the lake level is lower than 8.0 M.S.L.

- 11 -

There is no ideal elevation of water level in Siltcoos Lake which will afford the maximum values; however, the lake is just as attractive and usable for recreation at elevation 8.0 M.S.L. as at any lower elevation. The artificial manipulation of lake levels may or may not effect the present natural biological balance which exists in the lake. Extreme low water, about elevation 2.0 M.S.L. is not desirable as mud flats are exposed. Regulation of lake levels between 8.0 M.S.L. and 3.0 M.S.L. will keep it within normal and desirable limits.

- 12 -

At low stages of water level in Siltcoos Lake and when high tides occur in the ocean there are, under existing conditions, reverse flows from the ocean into the lake. When these conditions occur it will be impossible

to maintain a discharge from the lake. However, during such periods the channel of Siltcoos River will contain adequate water and no releases are necessary.

- 13 -

There is no record of the inflow or outflow of Tahkenitch Lake. Only a few miscellaneous measurements of the outflow have been made as disclosed by the record. They are as follows:

TABLE 3
Miscellaneous Measurements of Tahkenitch Creek

Date	Discharge c.f.s.	Source
Sept. 2, 1929	4.4	State Engineer Bulletin No. 8
Aug. 23, 1932	7.8	State Engineer Bulletin No. 9
Sept. 6, 1934	2.9	State Engineer Bulletin No. 9
Sept. 10, 1935	2.8	State Engineer Bulletin No. 9
Sept. 16, 1936	2.4	State Engineer Bulletin No. 9
Sept. 28, 1937	12.8	State Engineer Bulletin No. 10
Aug. 24, 1949	0.0	U.S.G.S. Water Supply Paper
Aug. 20, 1952	1.3	U.S.G.S. Water Supply Paper
March 11, 1960	302.0	State Engineer

- 14 -

Partial records of water level in Tahkenitch Lake have been kept by employees of Crown Zellerbach Company for the years 1956 and 1957. However, the lake has been regulated during the spring and summer of that period by a combination earth and timber dam which overtops and washes out each year. For this reason there is no actual record of unregulated lake levels. Tahkenitch Lake watershed abuts the Siltcoos watershed on the south. The two watersheds are quite similar in average elevation, topography and ground cover. Tahkenitch Lake watershed is approximately one-half the area of Siltcoos Lake watershed. Precipitation on the two watersheds is approximately the same and the watershed yield per square mile for the two watersheds will be approximately equal. Accordingly, the computed inflows for Siltcoos Lake were reduced to acre-feet per square mile and these yield values were used for the Tahkenitch Lake watershed and hydrographs were

developed for the period of record. These hydrographs are shown on Charts 6 and 7, following page 6.

- 15 -

It is not possible to determine one best elevation for water in Tahkenitch Lake. Maintenance of the lake level at 15.4 M.S.L. for as long as possible through the summer season will not detract from existing values for recreation but may effect the present natural biological balance which exists in the lake.

- 16 -

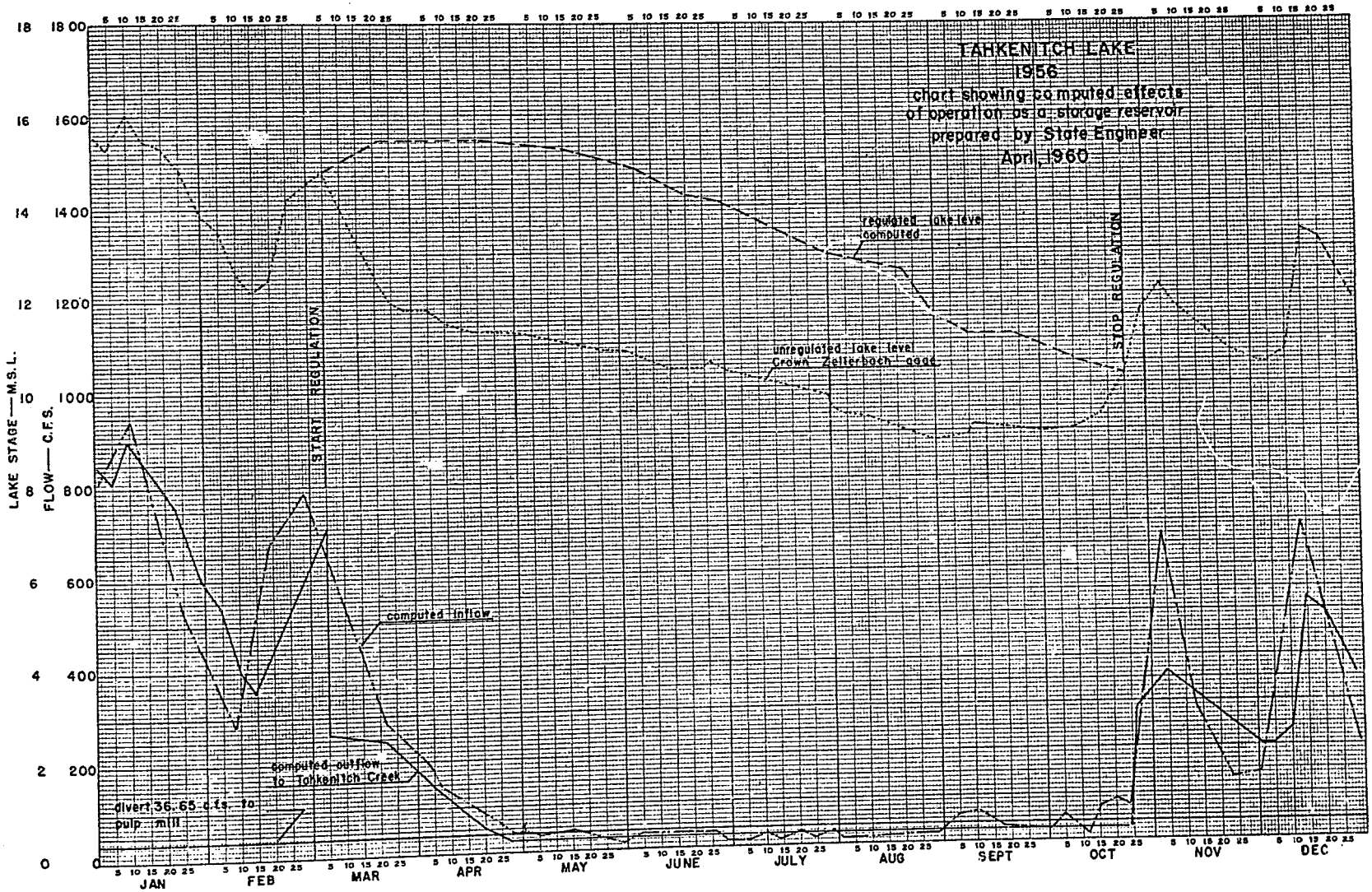
The inflows to Tahkenitch Lake are sufficient to provide for the diversion of 36.65 c.f.s. as requested by Application No. 29820 and maintain an outflow through Tahkenitch Creek of not less than 20 c.f.s. and at the same time maintain desirable water levels in Tahkenitch Lake, provided that a dam is constructed in Tahkenitch Creek which will regulate outflow when the lake level is 15.4 feet or lower.

- 17 -

Inlets to the pumping plants on Siltcoos and Tahkenitch Lakes will create currents in the lakes and downstream migrant salmonoids may be delayed in their migration unless properly screened and operated these pumping plants will result in loss of fish.

- 18 -

For future administration of these lakes in the interest of multiple uses of the water resource, it is necessary that a daily record of lake levels be obtained, and that a continuous water stage recorder be installed on the Siltcoos River below the dam.


TAHKENITCH LAKE
1956
chart showing computed effects
of operation as a storage reservoir
prepared by State Engineer
April, 1960
LAKE STAGE — M.S.L.
FLOW — C.F.S.
18 1800
16 1600
14 1400
12 1200
10 1000
8 800
6 600
4 400
2 200
0 0
START REGULATION
STOP REGULATION
regulated lake level computed
unregulated lake level Crown Zellerbach gage
computed inflow
computed outflow to Tahkenitch Creek
divert 36.65 c.f.s. to pulp mill
5 10 15 20 25
JAN
FEB
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MAY
JUNE
JULY
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SEPT
OCT
NOV
DEC

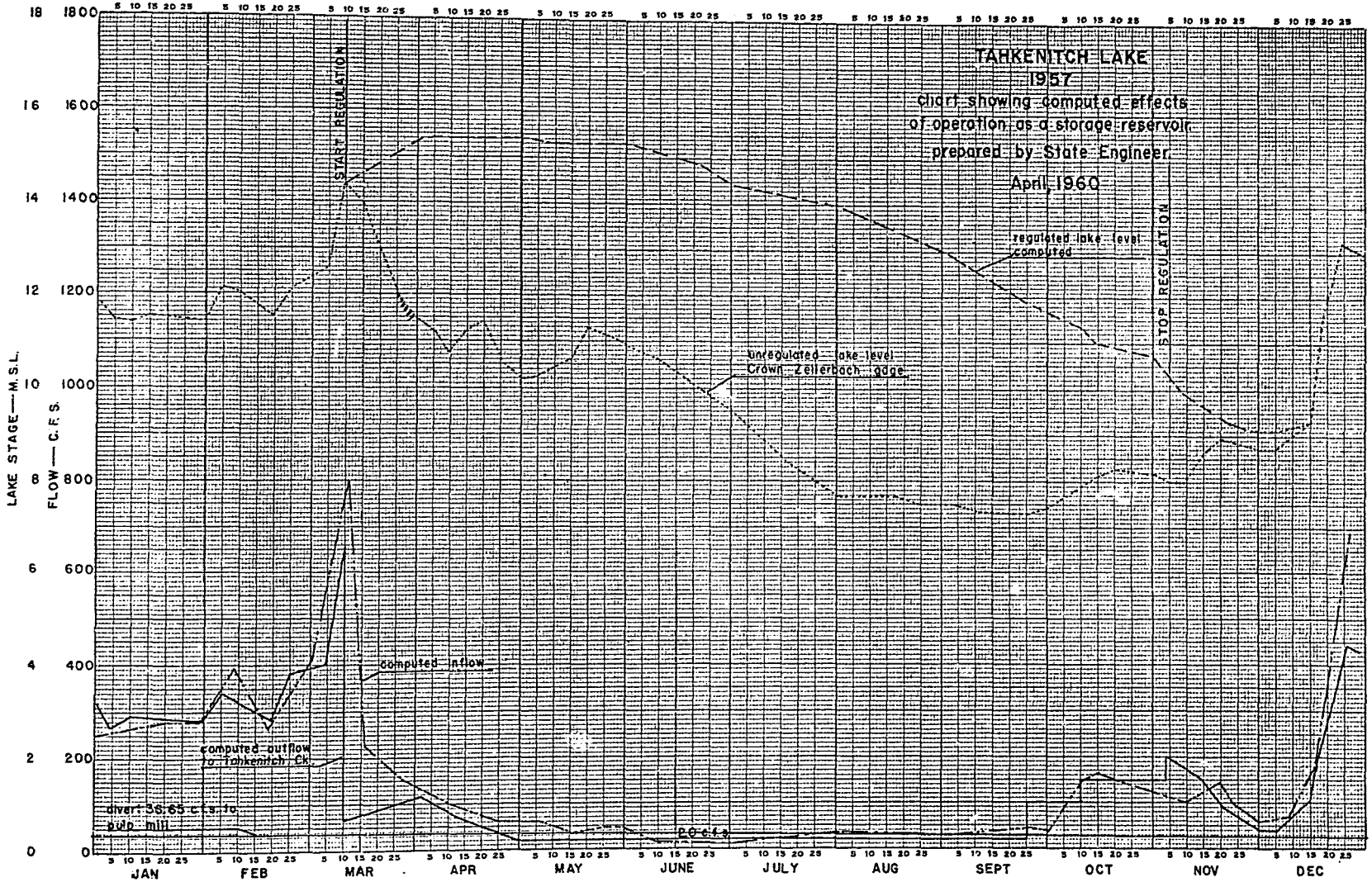
TAHKENITCH LAKE
1957
chart showing computed effects
of operation as a storage reservoir
prepared by State Engineer
April, 1960
START REGULATION
STOP REGULATION
regulated lake level computed
unregulated lake level Crown Zellerbach gage
computed inflow
computed outflow to Tahkenitch Ck.
diver 36.65 c.f.s. to pulp mill
20 c.f.s.
LAKE STAGE — M.S.L.
FLOW — C.F.S.
18 1800
16 1600
14 1400
12 1200
10 1000
8 800
6 600
4 400
2 200
0 0
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CHART 7 415

CONCLUSIONS

- 1 -

The waters of Tahkenitch and Siltcoos Lakes are public waters of the State of Oregon and subject to appropriation for beneficial uses.

- 2 -

Damage to public or private property and agricultural lands, if any, caused by maintenance of higher than normal levels in the lakes, is a subject which the State Engineer has no authority to consider except as such damage would affect fish and recreational values.

- 3 -

The water supply which feeds Tahkenitch and Siltcoos Lakes is adequate to supply the quantity of water for which application is made while still maintaining desirable levels in the lakes for fish and recreation, and also maintaining better than natural flow conditions in Tahkenitch Creek and Siltcoos River.

- 4 -

In order to avoid excessively high water in the lakes and to permit flood flows to escape as rapidly as under present conditions, the dams in Tahkenitch Creek and Siltcoos River should be so designed and constructed that they will not impede the natural outflows during the heavy rainfall season between November 1 and April 1.

- 5 -

If the level of Siltcoos Lake is maintained between elevation 8.0 and 3.0 M.S.L. during the period April 1 to November 1 of each year and held as high as possible (not exceeding 8.0 feet) until September 1, while maintaining not less than 50 cubic feet per second outflow through Siltcoos River, and then utilizing the surplus storage above elevation 3.0 to maintain higher than normal low water flows during the months of September and October, values of the lake and river for fish and recreation will be enhanced.

If the level of Tahkenitch Lake is maintained between elevation 15.4 feet M.S.L. and 8 feet M.S.L. during the period April 1 to November 1 of each year and held as high as possible (not exceeding 15.4 feet) until September 1, while maintaining not less than 20 c.f.s. outflow through Tahkenitch Creek, and then utilizing the surplus storage above elevation 8.0 to maintain higher than normal low water flows during the months of September and October, values of the lake for fish and recreation will be enhanced.

- 7 -

The plan of operation designed to best preserve the fish and recreation values of the two lakes cannot be firmly fixed at this time because of the lack of complete hydrologic information. Therefore, the plan described in the following order should be subject to review from time to time and the permittee should be required to comply with appropriate orders of the State Engineer with regard to the scheduling of storage and releases.

- 8 -

The proposed appropriations of water in accordance with the terms and restrictions to be imposed will not conflict with existing rights and will not be prejudicial to the public interest.

It is ORDERED that Applications numbered R-30073, R-30179 and 29820 be approved subject to the following conditions:

(a) The dams to be constructed in Tahkenitch Creek and Siltcoos River shall be gated structures so designed that when the gates are fully opened or removed the water passage areas shall be approximately equal to the areas and dimensions of the existing channels at the dam sites. The floor elevations of the structures shall be at or near the bottom elevations of the existing channels at the dam sites. The dams shall include fish ladders designed to pass fish upstream or downstream at any time when the gates of the dams are closed and at such times said ladders shall each carry not less than 12.5 cubic feet per second of water. The ladders shall be constructed and maintained in accordance with plans approved by the Oregon State Game Commission and the Fish Commission of Oregon. Plans and specifications for the dams shall be approved by the State Engineer before beginning of construction.

(b) The gates in the dams shall be fully opened on November first of each year and shall remain open until April first of the following year, or until Siltcoos Lake level has fallen to elevation 8.0 M.S.L. and Tahkenitch Lake level has fallen to elevation 15.4 M.S.L.

(c) Regulation of Siltcoos Lake level. During the period April 1 to November 1 of each year when the lake level is rising due to excess of inflow over outflow and when said lake level reaches 8.0 M.S.L., the gates in the dam shall be opened or partially opened so as to pass all excess water and maintain lake level at 8.0 feet. If the lake level continues to rise above 8.0 feet, all gates shall be completely opened and shall not be closed until the lake level has again fallen to 8.0 feet. During said period when the lake level is falling and reaches 8.0 feet, the gates in the dam shall be partially closed as necessary to maintain lake level at

8.0 feet as nearly as may be possible while an outflow of not less than 50 cubic feet per second at low tide is maintained. Of the 50 cubic feet per second, not less than 12.5 cubic feet per second shall be discharged through the fish ladder.

(d) The level of Siltcoos Lake shall not be lowered below elevation 3.0 M.S.L. Insofar as possible while maintaining the authorized diversion of 12.46 c.f.s. and minimum flows in Siltcoos River, the lake level shall not be lowered below elevation 5.0 M.S.L. before September first. During September and October the outflow through Siltcoos River shall be increased with the objective of furnishing more than normal flows in the interest of anadromous fish and maintaining an open channel through the bar which forms at the mouth of the river. The lake may be lowered between elevation 5.0 and elevation 3.0 during this two-month period.

(e) Regulation of Tahkenitch Lake level. During the period April 1 to November 1 of each year when the lake level is rising due to excess of inflow over outflow and when said lake level reaches 15.4 M.S.L., the gates in the dam shall be opened or partially opened so as to pass all excess water and maintain lake level at 15.4 feet. If the lake level continues to rise above 15.4 feet, all gates shall be completely opened and shall not be closed until the lake level has again fallen to 15.4 feet. During said period when the lake level is falling and reaches 15.4 feet, the gates in the dam shall be partially closed as necessary to maintain lake level at 15.4 feet as nearly as may be possible while an outflow of not less than 20 cubic feet per second is maintained. Of the 20 cubic feet per second, not less than 12.5 cubic feet per second shall be discharged through the fish ladder.

(f) The level of Tahkenitch Lake shall not be lowered below elevation 8.0 M.S.L. Insofar as possible while maintaining the authorized diversion of 36.65 c.f.s. and minimum flows in Tahkenitch Creek, the lake

level shall not be lowered below elevation 10.0 M.S.L. before September first. During September and October the outflow through Tahkenitch Creek shall be increased with the objective of furnishing more than normal flows in the interest of anadromous fish and maintaining an open channel.

(g) The provisions of paragraphs 1 (b), (c), (d), (e) and (f) of this order shall be subject to review from time to time and may be modified by order of the State Engineer as necessary or desirable in the interests of improving values for fish and recreation, provided that such order shall not reduce the quantity of water which the permittee may appropriate for beneficial use.

- 2 -

The permittee shall install and maintain adequate screens at the intakes to pumping plants in accordance with plans approved by the Oregon State Game Commission and the Fish Commission of Oregon.

- 3 -

The permittee shall maintain continuous daily records of lake elevations referred to mean sea level and shall furnish such records to the State Engineer at the close of each month and at such other times as requested by the State Engineer.

- 4 -

The permittee shall install and maintain in accordance with plans approved by the State Engineer a continuous water stage recorder on Siltcoos River within the first quarter mile below the dam. A similar installation shall be made on Tahkenitch Creek if ordered by the State Engineer.

Dated at Salem, Oregon, this 28 day of June, 1960.

Lewis A. Stanley

LEWIS A. STANLEY
State Engineer