F-17-22

REPORT ON THE EFFECTS OF 90 MW AND 50 MW PEAKING POWER TEST SPILLS ON LAKE HELENA, THE CAUSEWAY, HAUSER LAKE, AND TROUT CREEK.

Test Spills from Canyon Ferry Dam

Occurring 7/21-7/23, 1981.

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Eleven stakes were placed in Lake Helena at about 4 p.m. on July 21, 1981 prior to drawdown for the 90 mw test spill. These stakes were placed at the waters edge on the maximum extension of point bars wherever possible. The distance from the stakes to water's edge was measured at about 7:00 a.m. on July 22 following the drawdown of the 90 mw test and again at about 7:00 a.m. on July 23 following drawdown for the 50 mw test. Results of this were as follows:

Stake No.	Distance to Water's Edge 7/22-7:00 a.m.	7/23-7:00 a.m.
1	0.45 ft.	0.9
2	6.0	6.5
3	0.15	0.2
* 4	84.0	86.0
5	47.0	47.0
** 6	284.0	282.0
7	0.3	0.4
8	7.5	7.8
9	8.3	7.8
10	38.0	38.0
*** 11	1.8	1.9
Avg.	43.41 ft.	43.50

* See Photo #3
** See Photos #1, #2
*** See Photos #4, #5

Lake Helena did not fill after the 90 mw test to levels that it had achieved prior to this test and thus the amount of shoreline exposure following the 50 mw drawdown was at least as great as that occurring after the 90 mw test. All flow measurements taken at eight equally spaced stations 2.2 feet apart from Hauser side of Causeway.

Flows were calculated by averaging 16 instantaneous measurements taken at 0.2 and 0.8 x depth and multiplying by the cross-sectional area. Thus we're assuming uniform flow which is not quite true but due to error in not setting up sampling stations correctly this was the best available approximation.

Staff Gauge Readings - Lake Helena Causeway

One gauge set on either side of Causeway near West end.
Not set at the same water level.

	Date	Time	Staff Gauge Lk. Helena	Staff Gauge Hauser
Before Test	7/21	13:00	2.04	1.38
	7/21	16:30	2.10*	1.29
		Causeway flowing out (into Hauser) Moderate Flow		
90 mw Test	7/22	06:30	1.86	0.66
	"	09:00	1.85	0.58*
		Causeway Flowing Out - High Flow		
	"	11:30	1.82 x	1.10
	"	16:00	1.91	1.54*
		Causeway flowing into Lake Helena - moderate flow		
	"	17:00	1.93	1.47
50 mw Test	7/23	06:30	1.87	0.85
	"	07:45	1.84	0.81
	"	09:30	1.82	0.74
		Causeway Flow Out - High Flow		
	"	12:00	1.84	1.16
		Causeway Flow Out - Moderate Flow		

* Peak High Readings
X Peak Low Readings

Causeway Flows — Into Lake Helena

#1. 7/22 @ 16:30 Hrs.
Depth 9.5 ft.

Hauser Staff gauge - 1.54
Lake Helena staff gauge - 1.91

Station	Depth	
	1.9 ft.	7.6 ft.
1	1.40 fps	1.40
2	1.25	1.50
3	1.20	1.35
4	1.00	1.00
5	0.75	0.65
6	0.75	0.80
7	0.65	0.80
8	0.70	0.75

Avg. Velocity - 0.997 fps
Cross-Sectional Area - 209 $ft.^2$

Flow = 208 cfs

#2. 7/23 @ 17:30 Hrs.

Hauser Staff and Lake Helena Staff pulled out

Station	Depth	
	2.0 ft.	8.0 ft.
1	2.20 fps	2.30
2	2.35	2.40
3	2.05	2.35
4	1.75	2.25
5	1.60	1.55
6	1.60	1.60
7	1.50	1.55
8	1.30	1.45

Avg. Velocity - 1.86 fps
Cross-Sectional Area - 215.6 $ft.^2$

Flow = 402 cfs

Trout Creek

The delta at the mouth of Trout Creek was examined before and after the 90 mw test drawdown. At about 9 p.m. on July 21 the drawdown had already begun and two stakes were placed on point bars at the mouth of the creek. We returned to the site at about 10 a.m. on July 22 after the water level of Hauser Lake had already begun to rise again following drawdown for the 90 mw test spill. The two stakes were 16' and 25' from the water's edge at this point and the water level was down 0.9 feet from the previous day.

On July 21 the creek spread out in a fan-shaped configuration on July 22 the fan had been reduced to three main channels as the creek cut down into the delta. Some mud and silt had been moved downstream causing increased turbidity in the immediate vicinity of the creek mouth.

See photos #7, 8, 9, and 10.

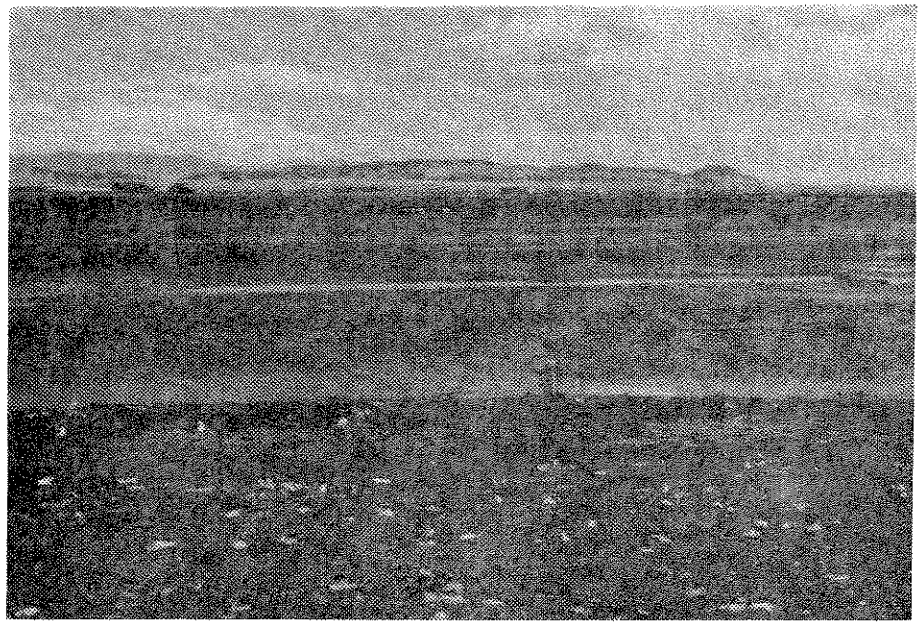
Hauser Lake

The drop in water levels caused noticeable impacts around the Lakeside area and around the housing development immediately below the Causeway on the northwest shoreline. Boats in shallow water were temporarily stranded in both tests and some difficulty in launching boats on the existing ramp would have been experienced. At Lakeside Marina two boat slips were made inoperable by the test flow fluctuations.

#1

Stake #6 - 7/21-4 p.m.

Showing placement of stake at water's edge in Lake Helena prior to drawdown. Note gulls resting on mud bar that is barely under water.



#2

Stake #6 - 7/22-7 a.m.

After drawdown for 90 mw test. Note fieldworker standing at same place as gulls in previous photo, mud bar now exposed.

#3

Stake #4 - 7/22-7 a.m.

After 90 mw drawdown. Stake placed at water's edge on 7/21 prior to drawdown is now 84 ft. from point where fieldworker is standing.

#4

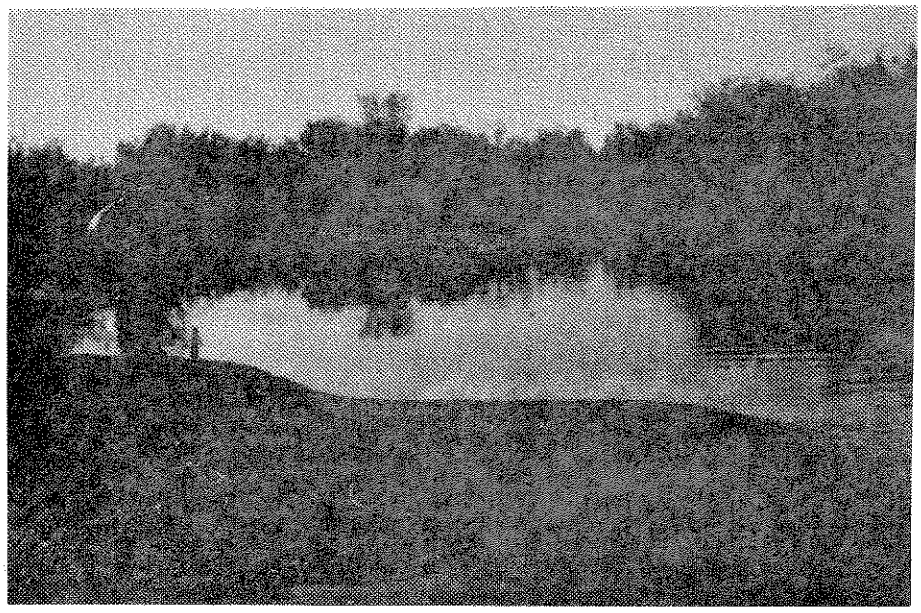
Stake #11 - 7/21-4 p.m.

Showing placement of stake at water's edge, prior to test spills.

#5

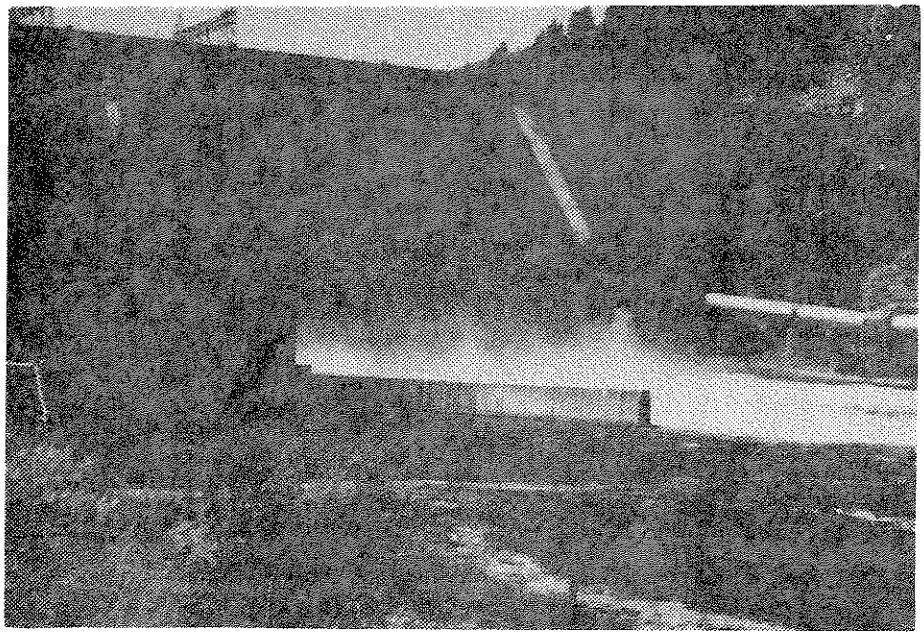
Stake #11 - 7/22-7 a.m.

After 90 mw test. Stake is only 1.8 feet from water's edge but note mud flat exposed in back of bay.



#6

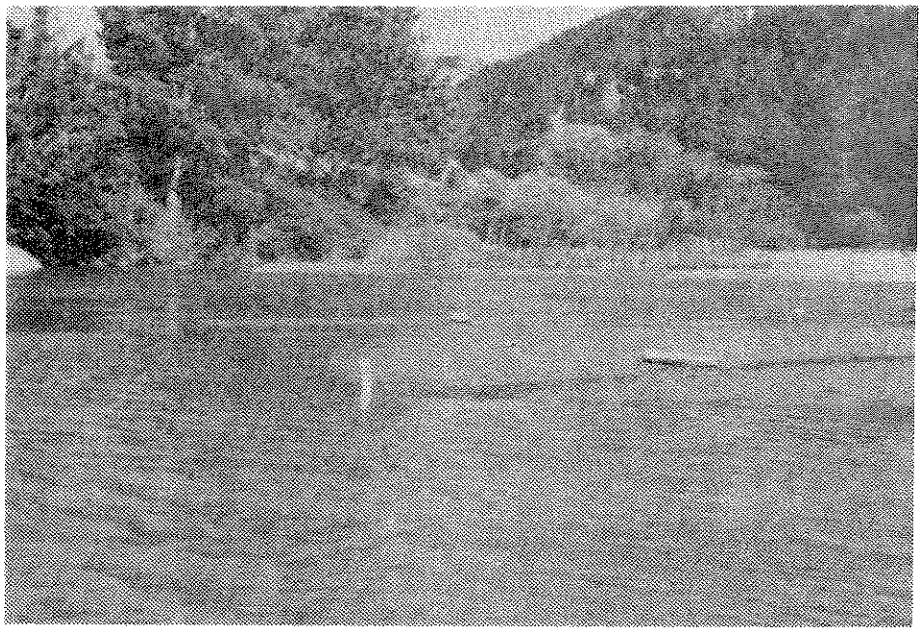
Canyon Ferry Dam at maximum discharge for 90 mw test spill, 2 p.m. on 7/22.



#7

Trout Creek - 7/21, 9 p.m.

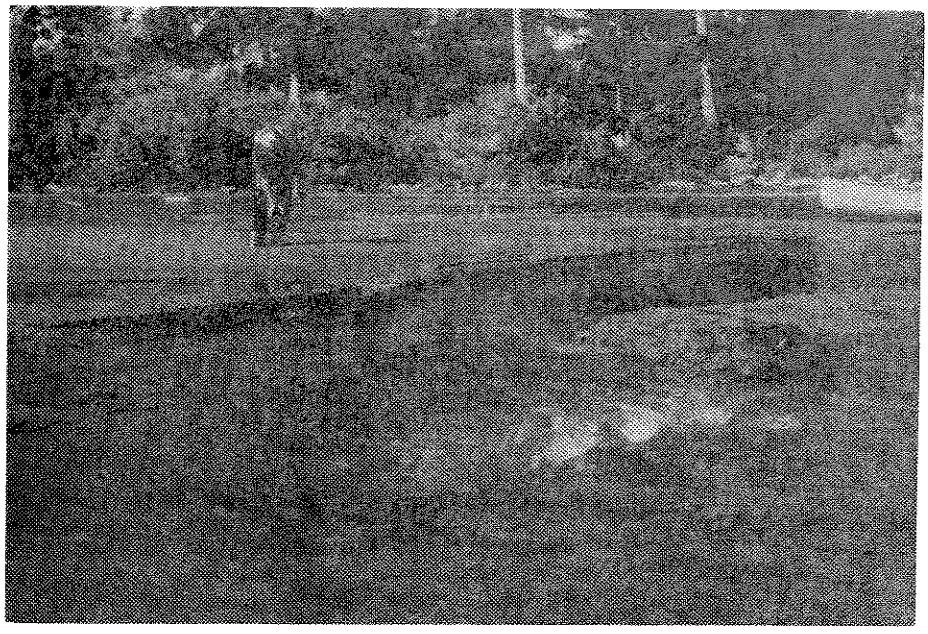
Showing placement of stake at water's edge. 90 mw test has begun and some drawdown has already occurred. Note rock and log in back of stake, compare to photo at bottom of this page.



Trout Creek - 7/22, 10 a.m.

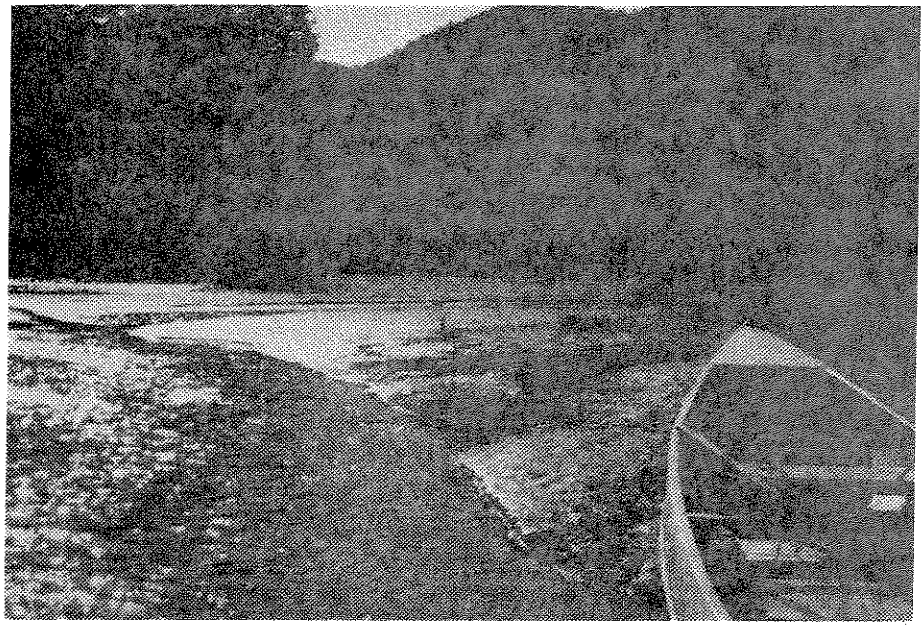
#8

Looking downstream towards mouth. This photo shows cutting that has occurred on delta. Turbidity was increased in immediate vicnity of creek mouth.



Trout Creek - 7/22, 10 a.m. #9

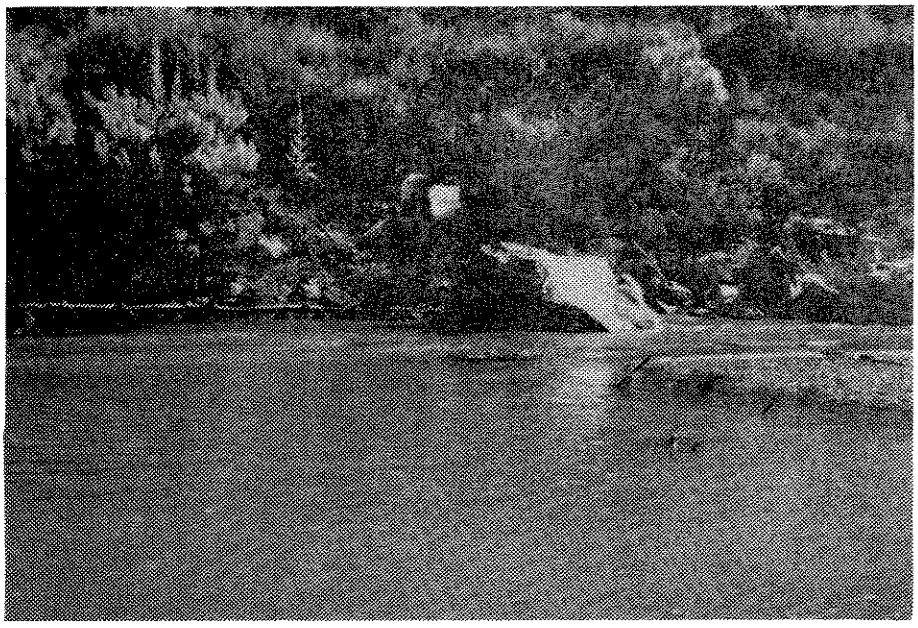
Note stake with rock and log in background as compared to photo at top of page. Water level is down 0.9 ft. leaving stake 25 ft. from water's edge.



#10

Trout Creek - 7/22, 10 a.m.

After drawdown for 90 mw test. Fieldworker is measuring distance from high-water mark of previous day on boulder, 0.9 ft. but has already come up some this a.m.



#11

Lake Helena Causeway
7/23 - 7 a.m.

Water flowing into Hauser Lake.