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FISH EXPERIMENTS CONCLUDED AT BAKER DAM

BAKER DAM PROVIDES SITE FOR STUDY OF MIGRATING SALMON IN BUILDING RUNS

A combined experimental project in which the State Fisheries Dept., the International Salmon-Sockeye Commission and Puget Sound Power & Light Co. delved into the long standing problem of getting a fish run over a high dam was closed last week end at the Baker dam here. While results of some of the experiments were disappointing due to unusual water conditions, the general program produced a number of definite conclusions that will be of great value in planning future dams, and in altering present dams so that both water power and fish runs can be maintained without conflict.

Of particular interest on the Baker river is the sockeye run, which is deemed of great value. The run taken over the dam by the trap method has been about 3,000 a year. The silver run is about 12,000 a year. In the past year some 61,000 Chinook were planted in the lake in hopes of getting this species started.

Guide By Electricity

The work of the Canadian boys under direction of Fred Andrews of the Salmon Commission was to try out the proven theory that fish can be guided to a pre-selected spill by use of electric current. Previous experiments made in small streams found this idea successful up to 90% of a fish run.

At Lake Shannon they installed a substation to convert the power to direct current, then ran charged wires suspended on

cork floats for 250 feet from the shore line to a special trap on a spillway in the center of the dam. The lines were placed two feet apart with the positive side upstream. Small wires were suspended from the charged lines, dropping 50 feet down into the lake and forming a lane through which the fish were guided.

It was found that the fish are attracted to the positive pole of the electric current and effected according to the size of the fish. Some of the larger fish were killed by the 48 volt current, but the majority were guided into the trap without injury.

While the experiments proved the theory workable, high water and technical problems made the results disappointing in that the system was inoperable at the time when the most fish were present in the forebay of the dam. Further laboratory experiments are expected to take out the "bugs" brought to attention in the actual field work here.

Fish Tattooed

A very interesting part of the experimental work was use of a new development in marking the small fish – a tattooing machine! Fish trapped at the spillway of the dam were given an anesthetic to quiet them, then placed against a vibrating needle which marked the back with a spot of white pigment. When the fish were released over the spillways and through the turbines and caught again in nets and traps below the

dam, an accurate check could be made on survival, number by-passing nets and the electrical guides at the dam, etc.

The system has not been in use long enough to see if the pigment will stay as a permanent marking through the cycle of going to salt water and the return to spawn.

State Checks Depth

The experiment conducted by the State Fisheries, under funds furnished by the Army Engineers, was to determine accurately at just what level the fish naturally swam in seeking return downstream over a dam. These fish are from 1½ to 5 inches long, so specially woven gill nets were secured for the check.

These nets were hung across the forebay of the dam in series and at varied depths. It was found that the majority of the fish netted were between the surface and a depth of 30 feet. Below that depth very few appeared, although some were netted as deep as 50 feet.

Working in conjunction with the Salmon Commission men, Bill Rees of the State Dept. was able to come up with a very definite behavior pattern of the small fish. From these findings recommendations will be made for modification of present fishways and for building more perfect installations on future dams.

The state crew made an attempt to trap fish by use of a large pump on a float in the lake, but found the fish avoided the current set up by the suction. The pump was finally used to provide an artificial current that would direct the fish toward the spillway from the quiet water near shore.

To Provide "Ski Jump"

Another experiment was made in the rate of survival of fish going over the dam on the water spilled from the gates. On the Baker dam it was found that a great mortality

occurred due to the fish hitting the surface of the dam on the way down. Those who had a free-fall lived through seemingly without damage.

From this finding plans are now being made for a "ski-jump" to be placed on the face of the Baker dam to shoot the stream of water (and fish) far out from the base of the concrete so that the fish will fall into the deep water pool rather than against the dam itself.

Also under way at present are plans for immediate building of an artificial spawning grounds on the upper Baker, above Baker lake, at which area the fish from the Baker dam will be propagated and allowed to return downstream. This experiment has also proved successful on smaller streams and if it can be carried on in the upper Baker it will be invaluable when the new Baker dam is built and the level of Baker Lake (the present spawning area) is raised 50 to 60 feet.

If fish will spawn under artificially constructed conditions, it will be possible to trap incoming runs here at Concrete and transport them directly to the spawning area.

In closing the experiments here a final press party was held last Friday at which reporters from the various newspapers were invited to get the complete story. Dick Pressy represented the State Fisheries with Bill Rees; Fred Andrews and Pete Johnson did the review of the work by the Salmon Commission; and Andy Miller represented the power company. All were enthusiastic over the high degree of cooperation that had been achieved in the experiments and the successful conclusions that had been reached.

The findings are expected to go a long way toward speedy approval of the new Baker dam by the fisheries authorities.