FEB 07 '90 09:51 DFG REGION 1

State of California — The Resources Agency

EXHIBIT

TRINCO 37

Memorandum

To : Inland Fisheries Branch - Region 1
Werner Jochimsen

Date: January 8, 1980

From : Department of Fish and Game
Trinity River Hatchery

Subject : Trinity River Hatchery Water Temperatures

Trinity River Hatchery began operation in 1963 and since that time water temperatures, both high and low, have had an impact on hatchery production. For many of the early years, temperatures were in the low to mid forties for much of each year. It has been difficult to rear some of the fish, particularly yearling steelhead, to the proper size at release time.

During the drought of 1976-77, and to some extent since, high water temperatures (to 71F) have on occasion caused extensive caprosse and fish mortality. Warmer springtime temperatures (when not too severe) have had a beneficial effect on growth rates and feed conversion ratios.

There are two principal, inter-related factors which determine water temperatures at the hatchery (1) weather conditions, including air temperature, amount of sunshine, and yearly precipitation totals and (2) the pattern of operation of Trinity and Carr Powerhouses by the Water and Power Resources Service. During the course of a 'normal' year when precipitation amounts have equaled or surpassed the yearly average for this area Trinity Reservoir will be filled to capacity in late spring or early summer. The reservoir begins to show temperature stratification during February each year and water temperature as it enters Lewiston Lake through the turbines at Trinity Power Plant is a constant 43-44F the year around. As the water flows the approximately 8 miles from Trinity Power Plant to our hatchery intake it, depending on weather conditions, either warms up or cools down. During the hot summer months temperatures increase by as much as 10-12 degrees if flows through the tunnel to Carr Powerhouse are more or less constant. If not, temperatures can rise to 70F and above in a short time. In winter, water temperatures at the hatchery have dropped to as low as 38F during periods of sub-zero air temperatures. Usually, however, temperatures remain pretty much the same throughout the length of Lewiston Lake during winter months.

Since Trinity Dam lacks any provision for selecting water at different depths we have no control over the temperature of water entering Lewiston Lake. The manner in which the WPRS operates its' powerplants, however, has a profound effect on water temperatures at our hatchery intake. This is especially true during the spring and summer months. During the drought of 1976-77 water temperatures at the hatchery reached 71F and the resulting stress and bacterial gill infection caused mortality of over half a million yearling king salmon and two hundred thousand large fingerling steelhead. These high temperatures were

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the result of surface water being drawn into the turbines from Trinity Reservoir and discharged into Lewiston Lake where low flows and solar energy further aggravated the situation. There is a by-pass tunnel at the bottom of Trinity Dam which was finally repaired and opened about September 7, 1977. This provided Lewiston Lake with 50F water but was too late to prevent the loss of the fish mentioned above.

The year following the drought brought considerably more precipitation but not enough to fill Trinity Reservoir. With pressure from a badly damaged recreation industry and possibly for other reasons as well, the WPRS released very little water from Trinity during the spring of 1978. Consequently, water temperatures in late April and May were beginning to reach critically high levels at the hatchery. After a considerable amount of time and experimentation the WPRS found that by drawing Lewiston Lake down two feet below the normal average elevation and "slugging" it with cold water from the bottom of Trinity Reservoir until it was two feet higher than the average normal elevation, the temperature of the water entering the hatchery could be maintained at a nearly constant 55-58F.

The same pattern of power plant operation and subsequent high temperatures occurred during this past spring. Since most of the WPRS people from Shasta Division who had been involved with the temperature manipulation the previous spring were gone, it took a considerable length of time to get the temperatures lowered to an acceptable level. This points to the need for a basic operational policy on the part of WPRS which takes into consideration the water temperature needs of the hatchery as a matter of course.

We've had various studies and evaluations of Trinity Hatchery over the years and each one of them has pointed to the need for warming hatchery water at some point in order to achieve accelerated egg development and fingerling growth so that fish will be at the proper size at release time. I believe our experience during the past two years shows that a good portion of the growth problems could be solved if the WPRS could continue to hold back Trinity water releases during the months of April, May, and June each year. Winter releases have little effect on hatchery temperatures and summer releases are essential in order that water temperatures do not become excessive for salmon and steelhead culture. There may also be a month or so in the fall when it would be

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beneficial to the hatchery to reduce flows through Lewiston Lake.

I believe an effort should be made to communicate with the WPRS, convince them of our needs, and perhaps make some progress toward improving our temperature situation.

Gerald W. Bedell
Fish Hatchery Manager II

GWB/vav

cc: Elton Bailey - Redding ✔