RI-57

UNITED STATES GOVERNMENT

Memorandum

BUREAU OF SPORT FISHERIES AND WILDLIFE

TO : Leader, Colorado Cooperative Fishery Unit DATE: October 24, 1973
Fort Collins, CO.

FROM : Director, Fish Cultural Development Center,
Bozeman, Montana 59715

SUBJECT: West Slope Cutthroat Trout

Attached is the information on west slope cutthroat trout Jack Larmoyeaux requested that I send to you. It is rather jumbled, since it is taken from our quarterly reports, but the S.I.E. project number identifies each report. I hope it will be of some value to you.

Bob Piper

Robert G. Piper

Attachment

In the opinion of many environmental engineers with whom we have talked, the ultimate pollution abatement method will necessarily involve physical-chemical treatment processes. We are attempting to interest commercial firms in investing some research in the physical-chemical treatment of fish hatchery effluent. Several have shown interest up to the point where we inform them that we cannot contribute any funds to a joint venture.

FH-2001-4: The Effects of Metabolites on Fish Quality

This project will be terminated next quarter. At this time gills will be excised and examined histologically to see if pathological changes are apparent in fish maintained for six months in ammonia nitrogen concentrations of approximately 0.5 and 0.75 ppm. This experiment should define more accurately the ammonia nitrogen level which will induce gill pathology in rainbow trout.

FH-2002-8: The Effect of Silt and Dow Co. Polymers on Rainbow Trout Gills

A cooperative study with the Alchesay National Fish Hatchery was completed during the quarter. Our part of the study was to determine if polymers currently being used at the hatchery to flocculate silt from the water have a pathological effect on the fish gills. Histological examination of gills from fish exposed to an anionic polymer showed that there was no deleterious effect.

FH-2004-5: Cutthroat - Cultural Methods

Kidneys and livers from cutthroat fingerlings fed the SD-4, Oregon Moist Pellet and Silver Cup Salmon diets were examined histologically. Organs of fish fed the Oregon Moist and Silver Cup feeds were normal. Fish fed the SD-4 diet had mild hydropic degeneration of kidney tubules and mild to moderate degenerative changes in liver cells. Fingerlings on the SD-4 continue to show poor growth and higher mortalities.

It is interesting that fingerlings started and carried at a temperature of 50° F have continued the same growth rate for over two months after being changed to 55° F water and the feed correspondingly increased. This is in line with previous observations that the fish

started in warmer water appeared to have lower early feeding stage mortality and greater vitality.

FH-2005-3: The Effect of Population Density on Cutthroat Trout in Rearing Units

A description of this project was presented in the Quarterly Report for July 1 through September 30, 1971.

The design and operation of the rotating baskets in the 6 foot circular tanks is successful. Oxygen concentration varies from 7.4 - 7.6 ppm around the circumference of the tank and ammonia nitrogen ranges up to 0.15 ppm. There is positive water exchange through all the baskets as they move around the tank.

To date we have seen no reduction in growth rate due to high fish density. There has been a lower growth rate in the lowest density group (0.25 x fish length, in lbs. per $ft.^3$). Control groups of fish, reared in 4 foot diameter circular tanks did not grow as well as fish in the wire baskets. Addition of partial covers on the tanks to avoid disturbances of the fish by movements of the hatchery personnel appears to have improved their growth.

FH-2001-4: The Effects of Metabolites on Fish Quality

The project has been terminated. Histological preparation and examination of fish tissue samples will be conducted during the next quarter. Analysis of growth and performance data will be completed and a final report submitted. This will include data collected from two series of experiments conducted over a two year period.

FH-2005-3: The Effect of Population Density on Cutthroat Trout in Rearing Units

Growth data has been collected for this project. Fish quality will be evaluated using parameters of fin condition, stamina performance and range of fish size between test groups.

FH-2000-5: Water Treatment Systems - Cooperative Army Corps of Engineers and National Marine Fisheries

Preliminary testing of several filter media as bacterial substrate is being conducted for the Army Corps of Engineers. Koroseal, Flocor and Microfloc tubes are being tested in concrete raceways, utilizing effluent from production lots of rainbow trout. Further testing of filter media efficiency in the pilot plants is being considered by the Corps.

FH-2004-5: Cutthroat - Cultural Methods

Test groups of cutthroat trout fingerlings are being continued on the Silver Cup salmon and SD-4 diets. Fish being fed the SD-4 diet continue to grow at a slower rate than those fed the Silver Cup salmon diet. Those started at lower temperatures and raised to higher temperatures, have not, after several months, achieved the same growth rate as those started at higher temperatures.

still apparent that these fish will, within limits, continue on established growth rates even though the water temperature is reduced, if fed to satiation.

Fry started in 57° F water have done very well, with reduced mortalities. Much of the trouble in the past has undoubtedly been due to poor initial feeding on dry feeds in cold water.

Similar experiments have been set up at the Lewistown, Montana State Fish Hatchery to determine if techniques developed at the Center are applicable on a production basis.

FI-2004-9: Effects of Starvation on Rainbow Trout

Some work has been done on the effects of starvation on salmonids (personal communications - Bobby C. Combs, Daniel H. Bumgarner; Bilton and Robins, 1971).

During fiscal year 1972 we found it necessary to drastically reduce feeding of rainbow trout because of funding problems. This opportunity was utilized to investigate the effects of both reduced feeding and starvation on the physiology and stamina of rainbow trout.

Groups of fish were starved for a 40 day period. Hematocrit, serum protein and stamina performance were determined at the start, midpoint and end of the starvation period. Other groups of fish were put on intermittent feeding, receiving food every third day for a 40 day period. Hematocrit, serum protein and stamina performance were also determined for these fish. "Control" groups of fish were fed daily on a hatchery constant of 10.0. Water temperature was 50° F.

A final report is being prepared.

FI-2005-5: The Effects of Population Density on Rainbow Trout in Rearing Units

As part of a continuing study concerned with the effects of population density, rainbow trout fingerlings are being reared in a series of rearing densities established as proportions of fish length. Westslope

Preliminary data has shown ammonia nitrogen concentrations ranging from 5.0 - 11.0 ppm at the termination of several eight hour distribution trips. Water temperature and duration of pre-trip starvation were related to ammonia nitrogen build-up.

Initial work will include a comprehensive literature survey.

FH-2003-4: Length-Weight Relationships of Selected Salmonids

At the request of the Regional and Central Offices, length-weight data was accumulated for Westslope cutthroat trout, spring and fall chinook and coho salmon.

A comparison of two measuring techniques was also made: 1) group weight to obtain an average with individual lengths, and 2) individual weights with individual lengths. In all cases the condition factor for fish weighed as a group was higher than for fish weighed individually. Presumably, more water is retained in a group of fish being drained in a net than on individual fish being handled separately. We found better correlation between actual length and calculated length using the condition factor of individually weighed fish.

The steelhead length-weight tables which are currently being used with cutthroat trout compared very closely in condition factor to our Westslope cutthroat data.

A final report is in preparation.

FH-2004-5: Cutthroat - Cultural Methods

This is a continuing project to develop better cultural methods for the Westslope cutthroat trout, a rare and endangered species.

A group of fast-growing individuals selected from last year's test lot continue to outgrow our production rainbows even though they have been placed in 51° F water. They have averaged .036"/day which is approximately three times the normal rate for cutthroat trout. It is

FH-2001-10: Effects of Chronic Nitrite Exposure on Rainbow Trout

During the past quarter, rainbow trout fingerlings were exposed to toxic and subtoxic concentrations of sodium nitrite. The purpose was to determine at what level methemoglobin formation occurs.

FH-2003-5: Comparative Histopathology of Bacterial, Environmental and Nutritional Gill Disease

In order to compare histopathology of nutritional gill disease with that of bacterial and environmental gill disease, fingerling trout were fed a synthetic pathothenic acid deficient diet. Gill sections have been prepared and examined histologically. A final report is in preparation.

FH-2004-5: Cutthroat Culture

The growth study comparing Westslope and Yellowstone cutthroat performance in 56° F water at the Lewistown State Fish Hatchery has been completed and data is being analyzed. A review of the data without statistical analysis indicates:

(1) Feeding at rates 25% below those established at Bozeman gives best conversions but poorer quality fish.

(2) Westslope strain can be grown at rates similar to that of Yellowstone strain.

(3) Mortalities of both strains are similar under similar culture corditions.

Feeding and loading trials of the Westslope strain are being continued at Bozeman. At 57° F, growth stabilized at about .012 per day. For some as yet unexplained reason, growth at Bozeman was lower than that at Lewistown on the same feed and at the same temperature. Egg source was the same.

The current phase will examine the effect of lowered water temperature after initial growth has been established at a higher temperature and efficiency of Abernathy dry feed for this subspecies.

Diluent water used for the test averaged 13° C, 172 ppm alkalinity, 7.6 ppm dissolved oxygen, pH 7.9, 0.4 ppm ammonia nitrogen and 0.3 ppm nitrate nitrogen.

Results of the replicate runs agreed very well. The 96 hour LC_{50} was 0.2 ppm nitrite nitrogen (NO_2-N). A lethal threshold concentration (the level of the toxicant which is lethal for 50% of individuals exposed for periods sufficiently long that acute lethal action has ceased) of 0.15 ppm NO_2-N was obtained.

In preliminary studies we found that small trout are more resistant to nitrite than larger trout. In a 10 day toxicity test using 6 tanks of 20 rainbow trout, each averaging 2.3 g, the 96 hour LC_{50} was 0.4 ppm NO_2-N. The 240 hour LC_{50} was 0.2 ppm NO_2-N.

Charlie E. Smith

FH-2002-9: The Effects of Cropping on Fish Populations When Used to Maintain Rearing Environments

In order to maintain uniform environmental conditions in trout rearing units it is necessary to 1) increase space and water flow into the container; or 2) reduce the number of fish. Since space is a limiting factor in small rearing units, it becomes necessary to remove fish to maintain a loading factor.

The above two methods were compared and initial examination of the data suggests that there was no difference in growth rates between the two groups.

A final report is in preparation.

Joseph C. Lientz

FH-2004-5: Cutthroat Trout Cultural Methods

Three dry diets were evaluated for rearing Westslope cutthroat trout after they attain 4 - 5 inches in length. Previous testing has shown that Silvercup Salmon diet is superior to other diets for starting the Westslope cutthroat fry.

FH-2004-5: continued

The current diet tests compared Silvercup Salmon diet, Abernathy formula and PR-6 production diet as possible production diets for advanced fingerlings. All three diets produced gains in weight over a 110 day period. Silvercup Salmon formula showed a higher increase in fish length and lower feed conversion rate than the PR-6 diet. The higher feed cost of the Silvercup diet makes it slightly more expensive per pound of fish gained, however. The Abernathy diet also showed a better increase in fish length, but resulted in a lower cost per pound of fish.

Data for the dual replicated test follows:

	PR-6	Silvercup	Abernathy
Fish length - end	6.99	7.42	7.29
Fish length - start	5.02	5.14	5.16
Total length gained	1.97	2.28	2.13
Conversion	1.77	1.43	1.47
Food cost/pound*	$ .1109	.1415	.1320
Cost/pound of fish	$ .196	.202	.194

* January, 1973 price quotations

Melvin J. Osborne

FH-2004-10: Substitution of Meat and Soybean Meals for Herring Meal in the PR-6 Diet

This study has been terminated and a final report submitted.

The results of the 164 day study demonstrated that substitution of over 50% of the fish meal with varying combinations of soybean and meat meals gave growth almost comparable to that of fish fed PR-6. Had the diet been fed on an isocaloric, isoprotein basis, growth may have equaled that of the control groups.

Charlie E. Smith

TABLE 3 - Strains of Rainbow Trout and the Percent Mortality Encountered in Formalin Treatments, as Reported in the Questionnaire

Rainbow Trout Strain	Percent Mortality Reported By Hatcheries*			
	1	2	3	4
Wytheville, VA	<1	1	1	-
Saratoga, NY	-	10	-	-
Crawford, NB	-	20-25	-	-
Manchester, IA	-	35-60	10-15	10
Donaldson (Univ. of Washington)	-	-	-	1
New Castle, VA	-	-	1	-
Eagle Nest, NM	30-35	-	25-50	-

* 1 - Walhalla, SC National Fish Hatchery
2 - Pisgah Forest, NC National Fish Hatchery
3 - Chattahoochee Forest National Fish Hatchery, Suches, GA
4 - Manchester, IA National Fish Hatchery

From our annual report for 1972

Culture Methods for Westslope Cutthroat Trout (FH-2004-5)

The Montana Westslope cutthroat trout, a rare and endangered species, is a difficult fish to raise by usual hatchery methods. In view of this and the possibility that the solution of problems in producing this strain may be helpful in culturing other salmonids, a continuing study of cultural methods is underway.

Studies to date have shown:

(1) Feeding can be started equally well with brine shrimp, Oregon moist diet and Silver Cup salmon starter. Early mortalities were very high with the SD-4 diet and growths were consistently lower than with the other diets tested.

(2) Fry started to feed at 55° F do much better than those at 50° F. Fry started at lower temperatures tend to keep the same growth rate for long periods even after temperature is raised and food increased.

(3) Fry started to feed better in the light than in the darkness of covered tanks.

(4) Although first-feeding fry react little to the feeding movements of personnel, they become progressively wary with age, indicating that better results might be obtained with automatic feeders than by hand feeding. Partial tank covers are also helpful after the fish are about 2.5 inches in length.

(5) There was little difference in growth rate or mortality between tanks at 0 and 0.5 ft./sec. water velocities.

(6) Although individual fish are highly variable in size, group growth rate was consistent in terms of length increase at a constant temperature and feeding rate.

(7) Fingerlings showed no reduction of growth when held at densities used when rearing rainbow trout.

Comparison of Vegetable Protein as a Substitute for Fish Meal Protein in Rainbow Trout Diets (FH-2004-7)

Good quality fish meals are the principle source of protein in trout and salmon feeds. Due to the increased cost and high demand for quality fish meal, there is a need for a high quality protein to serve as it's replacement in trout and salmon diets.

In cooperation with the Diet Testing Development Center, Spearfish, S. D., rainbow trout were fed diets in which a combination of soybean and cottonseed meals replaced 57% of the herring meal (See Table 1). The experiment was run over a 30 week period. Water temperature was maintained at $50^{\pm 1^{\circ}}$ F. Results of feeding these diets are shown in Table 2.

The experimental data show that soybean and cottonseed meals, when combined and fed according to the X95-25 formula, can be substituted for as much as 57% of the fish meal normally fed in the PR-6 diet without significantly affecting growth rate.

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

WASHOE PARK TROUT HATCHERY (ANACONDA)

1 Nov. 71 - Cutthroat trout planted from this station, since its inception, were mostly from Georgetown Lake. An exception would be eggs from Ashley Lake and Yellowstone River Trout Hatchery (Big Timber) which were hatched at Washoe Park Trout Hatchery and planted in Georgetown Lake. Over the years, the following cutthroat strains were introduced into Georgetown Lake: Ashley Lake, Yellowstone Lake, Lake Tahoe and Lahontan. The last egg-take from Georgetown Lake was about 1959. Prior to 1970 all cutthroat from this station should be coded 02, cutthroat undesignated.

hybrids

Flathead - Kootenai R.

2 W. S.
Jack. Crk. - ①

3 - White R. stock
Flathead R.
+ 1 ♂
+ 1 ♀

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

FLATHEAD LAKE SALMON HATCHERY (SOMERS)

1 Nov 71 - This hatchery took 30,000 cutthroat eggs from Bitterroot Lake in 1934 and 160,000 in 1935. From the 1940's until 1958 it received eggs from Washoe Park Trout Hatchery (Anaconda) which in turn were from Georgetown Lake (see Washoe Park Trout Hatchery). Flathead Lake Salmon Hatchery took eggs from Ashley Lake from 1921 until 1964 (over the years Ashley Lake had introductions of various cutthroat strains including Yellowstone Lake, Georgetown Lake and Lake Tahoe). Ken MacDonald, Fish and Wildlife Service, and Walt Allen advised on June 12, 1959 that Ashley Lake had pure strain cutthroat when spawning station established there in 1921 and that only in "recent" years were Georgetown Lake fish planted in Ashley Lake.

In 1957 cutthroat trout fry were procured from Creston National Fish Hatchery (see write-up for this station). These were planted in Lauri Lake in October 1958 and were progenitors of Lauri Lake cutthroat stock. Flathead Lake Salmon Hatchery started taking cutthroat eggs from Lauri Lake in 1960. In 1965 cutthroat from Lauri Lake were transplanted into Spoon (Ninemile) Lake. All fish in Spoon Lake were killed out with chemicals prior to this introduction. In winter of 1968-69 Lauri Lake winterkilled. From 1960 through 1970 eggs were taken from Lauri or Spoon Lakes. Lauri-Spoon Lake stocks were not used for eggs after 1970 except for a small number taken in 1971 and planted in Plummer Lake.

All cutthroat planted from Flathead Lake Salmon Hatchery before 1971 will be considered cutthroat undesignated, code 02. In 1971 this station started stocking west-slope cutthroat, code 12.

In 1971 Joe Huston took cutthroat spawn from about 30 cutthroat (15-20 females) from Young Creek, tributary to Kootenai River (future Lake Koocanusa area). These were hatched at Flathead Lake Salmon Hatchery and 6,000 were planted in Cabin Lake (IBM code 07-5600) to hold them for possible future use. These are considered ad-fluvial (run from large river into tributary to spawn). At present about 300 two-inch fingerlings from this stock are being held at the hatchery. It is planned additional spawn will be taken from Young Creek in 1972 to broaden the hatchery stock.

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

CRESTON NATIONAL FISH HATCHERY

1 Nov 71 - The cutthroat stock at Creston started with cutthroat trout taken by shocker from the diversion tunnel below Hungry Horse Dam just before the dam was closed about 1956. During the time Blendon Cook was Superintendent, Yellowstone cutthroat males (Yellowstone cutthroat stock was also held at this station at this time) were used to fertilize eggs from the basic Hungry Horse stock when the Hungry Horse males failed to ripen early enough.[1/]

In May 1957 about 5,000 sac fry from the Creston stock were given to Somers station. In October 1948, 2,628 of these were stocked in Lauri Lake (hence the designation Lauri Lake stock). After Creston station was sterilized in February 1964 because of IPN (this included destroying all fish) select Lauri Lake stock was returned to Creston and was maintained there until February 1971 when the station was again disinfected, this time due to furunculosis. The westslope cutthroat brood stock at Creston is to be rebuilt starting with eggs from our Jocko River Trout Hatchery.

All cutthroat from Creston prior to 1971 are considered cutthroat undesignated - code 02.

[1/] Mr. Marvin Smith of Region I, BSFW, advised on 20 Nov 1970 that he had been told by Fred Howard that Blendon Cook, Superintendent at Creston Hatchery, had used milt from Yellowstone cutthroat to fertilize eggs of Hungry Horse stock at Creston.

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

JOCKO RIVER TROUT HATCHERY (ARLEE)

1 Nov 71 - The brood stock presently at this station is based on spawn of cutthroat taken from Hungry Horse Creek and another tributary to Hungry Horse Reservoir on June 29, 1965 and June 27, 1967. These brood fish were first spawned and planted in 1968. This is considered the only "pure" westslope cutthroat brood stock in our hatchery system. Progeny from this stock will be coded 12. Prior to 1968 cutthroat planted from this station were from Georgetown Lake and other sources and should be coded 02, cutthroat undesignated.

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

YELLOWSTONE RIVER TROUT HATCHERY (BIG TIMBER)

1 Nov 71 - This stock originally came from Yellowstone Lake and was maintained at Emigrant Hatchery until Emigrant was closed in 1965. It was then transferred to Big Timber. It is believed this stock was kept pure. All cutthroat planted from this hatchery starting in 1966 should be coded 13. Prior to this, cutthroat were received from Georgetown Lake and possibly other areas and all plants should be coded 02.

On 9 June 1969 with permission of Yellowstone National Park, cutthroat spawn was taken from McBride Lake in Park. Dr. Robert Behnke of Colorado State University investigated the meristic characters of a sample of these fish and of our original Yellowstone brood stock and in a letter dated October 25, 1971 advised us:

> "From the information I have now, I believe your Yellowstone brood stock is pure Yellowstone stock, but the McBride Lake stock has been slightly influenced by some other trout, probably rainbow - yet it is predominantly Yellowstone-like in most characters.
>
> "Concerning your plan to mix the two stocks - I see no strong arguments against it, as long as the hatchery fish are not stocked in waters where they could possibly contaminate pure populations of native stocks. In fact, I would predict that the mixing of the two brood stocks would produce a broader base of heterozygosity and be more successful when stocked into new waters than either of the parent stocks. The Yellowstone Lake cutthroat is a highly specialized form, evolving for the past several thousand years to precisely adapt to the conditions of Yellowstone Lake - a very atypical type of habitat in relation to the small mountain lakes most hatchery cutthroat are stocked in. Therefore, it is logical that a slightly altered genotype (as appears the McBride Lake stock is) would be better suited for most of your stocking needs."

In 1970 some fish from McBride Lake eggs were planted as Yellowstone cutthroat and coded 13. Waters receiving these fish included Lake Abundance and Section 2 of Boulder River (tributary to Yellowstone River).

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

ENNIS NATIONAL FISH HATCHERY

1 Nov 71 - Called Bill Baker on 29 Oct 71. He advised that Ennis station has had Yellowstone cutthroat directly from Yellowstone Park and for a time had a Yellowstone brood stock. Yellowstone cutthroat were planted from this hatchery into Montana waters. The station also has had a Lahontan brood stock. The only Lahontan cutthroat planted into the state waters were 493 brood fish planted into Vigilante Pond on 13 July 67. To Bill's knowledge, Ennis station never received cutthroat from Montana hatcheries; therefore, all cutthroat from this station with the exception of the Lahontan brood stock planted into Vigilante Pond should be coded 13. Bill also mentioned that he worked at the Yellowstone Lake spawning station through 1941 and that the state took eggs there every year while he was there.

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

BOZEMAN FISH CULTURAL DEVELOPMENT CENTER

1 Nov 71 - Cutthroat planted by Bozeman National Fish Hatchery over the years for the most part are believed to be Yellowstone cutthroat. However, our records show this station received at least one shipment of cutthroat fry (eggs?) from our Washoe Park Trout Hatchery. This was in 1956. Therefore, we are coding all plants from Bozeman station up through 1971 as code 02, cutthroat undesignated.

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

EMIGRANT FISH HATCHERY

1 Nov 71 - Our IBM records indicate Emigrant station received cutthroat eggs from Georgetown Lake as late as 1957. We do not have a record of when the Yellowstone cutthroat brood stock was started; however, Bob Mitchell and Tom Morgan agreed that we would be safe in considering all cutthroat planted, starting in 1960, as code 13, Yellowstone cutthroat. Those planted prior to 1960 will be considered cutthroat undesignated, code 02. This station was closed in 1965 and the Yellowstone brood stock was transferred to the Yellowstone River Trout Hatchery.

HAMILTON FISH HATCHERY

1 Nov 71 - Hamilton Hatchery cutthroat stock was originally from Big Salmon Lake, i.e., from 50-100 adults that were taken through ice in early 1950's. There is apprehension that Yellowstone cutthroat were inadvertently added to this stock and also that milt from Yellowstone males was used to fertilize Big Salmon Lake females when Big Salmon males did not ripen soon enough. Also, cutthroat from Rattlesnake Creek near Missoula may have been added. When Hamilton Hatchery was closed in 1961, the stock was transferred to Libby Hatchery. In addition to the stocks held at this station, cutthroat eggs were shipped in from Georgetown Lake, and other sources. Cutthroat planted from Hamilton Hatchery over the years will be coded 02, cutthroat undesignated.

LIBBY FISH HATCHERY

1 Nov 71 - In 1961 when Hamilton station closed, its cutthroat brood stock was moved to Libby. John Cox, in his March 7, 1966 write-up, reports that adults from Lauri Lake stock were added to Libby station brood stock in 1961. Libby cutthroat were completely planted out into several waters in Fall 1969. Prior to receiving Hamilton cutthroat brood stock, Libby received cutthroat eggs from Washoe Park Trout Hatchery. All cutthroat planted from Libby Hatchery should be coded 02, cutthroat undesignated.

OVANDO AND POLSON FISH HATCHERIES

1 Nov 71 - It is assumed these stations never held cutthroat brood stocks and that cutthroat planted from them came from Washoe Park Trout Hatchery, Flathead Lake Salmon Hatchery and Creston National Fish Hatchery. These cutthroat should all be coded 02, cutthroat undesignated.

CUTTHROAT TROUT USED IN MONTANA HATCHERIES

OTHER FISH HATCHERIES

1 Nov 71 - McNEIL and MILES CITY hatcheries have handled mainly warmwater fish and no cutthroat trout. Our IBM records do not show any cutthroat planted by BLUEWATER CREEK TROUT HATCHERY up through 1969. In 1970, Yellowstone cutthroat (code 13) were transferred from Yellowstone River Trout Hatchery to Bluewater Creek Trout Hatchery and subsequently planted out in four plants. All cutthroat planted from BIG SPRINGS TROUT HATCHERY up through 1970 have been coded as 02. These were probably mostly from Washoe Park Trout Hatchery stock. Likewise through 1970, all cutthroat planted from GIANT SPRINGS TROUT HATCHERY should be coded 02, cutthroat undesignated. These also were probably obtained from Washoe Park Trout Hatchery.

WHITE RIVER CUTTHROAT STOCK

1 Nov 71 - This stock is based on spawn from one female and one male taken from White River, tributary to South Fork Flathead River in 1964 (206 eggs and 101 fry total). To our knowledge, no other fish have been added to this stock. The White River stock is now in Leon Lake which was treated with fish toxicant in preparation to receiving it. (This statement confirmed by Bob Schumacher 14 Oct 71) White River stock is considered code 12.