DIGEST OF

REPORT OF STREAM IMPROVEMENT

DURING THE SUMMER OF 1935

SISKIYOU NATIONAL FOREST

by

Fred C. Ziesenhenne
Junior Biologist

November 1935

IMPROVEMENTS RECOMMENDED FOR RANGER DISTRICT

As a result of the preliminary survey conducted in the Siskiyou National Forest, the following recommendations have been made for the individual Ranger Districts. In their natural conditions most of the streams of the Rogue River, Smith River and smaller drainages are excellent producers of fish and are good fishing streams. The streams are well shaded, have deep pools for protection and shelter, and a forest cover that furnishes terrestrial food. The riffles are many and well balanced with relation to pools. They afford splendid spawning areas and produce large quantities of aquatic foods. As stated elsewhere in this report the creeks are not in need of "stream improvements" like those being installed in the East and Midwest.

With the gold rush in the fifties and the following of settlers and pioneers continually since, nature's balance of the streams has continually been upset by man; and fishes, once so abundant, have diminished to a great degree. The settlers cleared the land of timber cover for farming, lumber, and its destructive methods laid barren the land; cattlemen burning the brush for more grass destroyed thousands of acres of young timber as did miners in search of mineral deposits. Mining and its dams, sluicing, and diversions not only destroyed spawning grounds and shelter, but installed many barriers to fishes. Irrigation projects have destroyed fishes, as dams have been barriers and inefficient screens and open ditches have stranded thousands of fishes in the fields, besides taking the largest supply of water from streams during the summer when the water is normally low. Commercial fishing has helped to deplete the waters, but now that the Smith and Rogue Rivers are closed to fishing, that situation is remedied. It is the man-made structure, no longer in use or those deficient, that are mentioned as improvements in this list of recommendations along with some natural obstructions.

COQUILLE RIVER, SOUTH FORK

1. Removal of a natural rock slide in the narrows one mile above Johnson Creek. Seventy yards from the road so an air compressor could easily be used in drilling.

2. Four miles below China Flat Camp on the high road, rock cut boulders have been washed down stream by the heavy water forming several small impassable falls that are holding up the summer run of chinook salmon. The boulders are small and can easily be blased without much drilling.

3. In several places along the cut mentioned above loose talus from road slides have cut off the channel, causing the water to run under the talus while the surface is dry. The talus could be eaily moved by hand.

4. At the Rock Creek bridge site the river is being choked by road construction and should be kept open to fish migration.

5. A log jam at Hall Creek is now being removed by the lumber company. A check should be made to see that all of the accumulated debris is removed.

6. A final check should be made on the river when the road construction is completed to see that the channel is clear.

7. Recommend a better enforcement of the fish and game laws. There has been much evidence of dynamiting of pools; salmon, trout and other forms of life have been killed and found dead in the pools. The opening of the road has increased the fishing the past year and a patrol should be kept during the year.

8. Stocking of the South Fork of the Coqille River above the series of falls. Steelhead trout are only recommended. The fish should be planted above the falls from the trail and from the Eden Valley guard station that can be reached.

EIGHTEEN-MILE POST LAKE

On the South Fork Coquille River Trail two and a half miles above Rock Creek. A trail should be cut to the lake (400 yds.) and be properly posted with signs. Eastern Brook trout should be stocked in the lake.

BALD MT. CREEK OF ELK RIVER

1. Removal of a rock slide falls two hundred yards up from the mouth. Some of it has been removed but much more can be cleared away to open a channel.

2. Two hundred yards above the falls is a log jam which is clogged with small drift debris allowing water but not fish to pass. Sawing of the key logs will aid the high water in removing the jam.

3. Above the road bridge one half mile on the (old Campbell) new Fernald ranch is a log jam of old standing that should be be removed as it is a fish barrier. Care must be taken in disposing of the logs so as not to wash the bridge out.

JOHNSON CREEK of the COQUILLE RIVER

1. Removal of the boulder slide below Smith Dam.

2. Removal of a log jam on Wagoner's mine claim, two and one-half miles above the mouth of Johnson Creek. Reached by trail via Wagoner's cabin trail.

3. Removal of a small brush mining dam, abandoned, a half mile below Sucker Creek.

4. Smith Dam is a barrier on the river during low water. A good high water will wash it out as it is very rotten and weak.

5. Stocking with trout.

ROCK CREEK of COQUILLE RIVER

1. Removal of fallen trees and opening of a stream channel when road construction is completed.

2. Stocking with trout.

COAL CREEK of the COQUILLE RIVER

1. Quarter mile up stream is a large log jam of old standing. A section of the jam could be removed to open up a channel as all the water now is seeping through below the surface. Blasting would leave too many loose logs that may endanger the Coquille River road bridge.

2. One-half mile up stream is a small falls caused by boulders being washed down stream. A small blasting job would remove the barrier.

3. Several smaller log jams could be removed so as to prevent the collecting of debris thus eliminating the possible damming of the creek.

4. Stocking with trout.

ROGUE RIVER

1. Removal of more rock so as to make the Rainie Falls passable to fish in all stages of the water flow. September would be the best time for the work before the water begins to rise again. The job is a large undertaking that will require a lot of drilling and blasting.

LONG TREE CREEK of TAYLOR CREEK, ROGUE RIVER

1. Removal of an old rotted log dam an eighth of a mile above the mouth of Lone Tree Creek.

2. There is little mining on the Creek which is in need of more pools. Thirty rock and log dams the length of the

Creek would create pools and offer protection to the fishes during the summer when the stream is low.

CHINA CREEK OF TAYLOR CREEK, ROGUE RIVER

1. China Creek is small, but with ample pools for protection. Fish could live in the creek the year around. Construction of ten or more dams of one log could easily be constructed. Materials are at hand and a trail parallels the creek for its entire length. There is no mining to interfere with the work.

TAYLOR CREEK of the ROGUE RIVER

1. Removal of log jams in the narrow box canyon just inside the forest boundary.

2. Above Sappe's place the creek widens out over some very good spawning beds on which the salmon used to spawn. This area is lacking in pools and could be improved by dam construction. Mining is still carried on so the work may best be postponed till a later date.

3. Stocking with trout.

HOWARD CREEK of the ROGUE RIVER

1. Stocking above the falls is recommended.

WHISKEY CREEK of the ROGUE RIVER

1. Rocks should be replaced in the stream bed to provide shelter for the fish and stream life.

2. The splash dam should be improved for fish migrations.

GALICE CREEK of the ROGUE RIVER

1. Removal of deserted mining dams.

2. Screening of diversion ditches.

Work Program of Stream Improvement for Page Creek Ranger District

ILLINOIS RIVER

1. Blasting out of the Illinois Falls at Anderson Ranch at the Chetco trail take off of Oak Flat road. This could best be worked on at low water in September.

2. Falls on Illinois River above Josephine Creek is a barrier at low water. It could easily be stepped down so fish could climb the falls at all seasons of the year.

BOLAN LAKE

1. Construction of a dam to bring the level of the lake up to its original height, which miners destroyed by digging the mouth deeper to obtain more water.

2. Stocking annually with Eastern Brook trout.

WEST AND EAST FORKS OF THE ILLINOIS RIVER

No improvements, save stocking with trout.

TANNEN LAKES

Possibilities of building dams to raise the water levels might be considered.

Work Program for Stream Improvement for Agness Ranger District

GAME LAKE

This is one of the few lakes suitable for trout. Before stocking it would be advisable to construct and earth fill dam at the outlet to raise the level of the lake and insure a good depth to the deep pools. Springs in the lake would be ideal spawning areas for Eastern Brook trout, which are recommended for stocking.

SHASTA COSTA CREEK, ROGUE RIVER

1. A falls of eight feet two miles upstream is a barrier and should be removed.

2. Four miles upstream is a barrier falls that would be difficult to remove. Stocking with trout above the falls is recommended.

3. Stocking with trout.

INDIGO CREEK, ILLINOIS RIVER

A rock slide at the trail bridge has blocked the channel, preventing fish from reaching the spawning beds. Removal of the slide would open over fifteen miles of good spawning areas.

STAIR CREEK, ROGUE RIVER

1. A fifty foot falls is a decided fish barrier at the mouth of the creek. Scenic values are too great to recommend the removal of the falls.

2. Stocking with trout above the falls.

MULE CREEK, ROGUE RIVER

1. Three miles upstream on the East Fork is an old abandoned mining dam over twenty feet high that is a fish barrier and should be removed.

2. After the removal of the dam a check should be made to see that the logs have not formed jams in the narrow box canyon.

3. Stocking with trout.

BIG WINDY CREEK, ROGUE RIVER

Stocking with trout.

LITTLE WINDY CREEK, ROGUE RIVER

Stocking with trout.

JENNY CREEK, ROGUE RIVER

Stocking with trout.

Work Program for Stream Improvement for Gasquet Ranger District

PATRICK CREEK, SMITH RIVER

1. One-fifth of a mile upstream is a diversion ditch that should be screened.

2. Fifty log and rock dams could be constructed below the forks to the mouth to form pools deep enough for fish protection.

3. Annual stocking with trout.

SHELLEY CREEK

1. A quarter of a mile above the mouth is a series of barrier falls. Two miles upstream is a twenty foot barrier falls. The falls are of recreational value and should not be destroyed.

2. Stocking with trout, below the falls and above the falls, from the Oregon Mountain road.

BALDFACE CREEK, NORTH FORK SMITH RIVER

Stocking with trout.

MUSLATT LAKE

1. This lake is large enough to be stocked with Eastern Brook trout. Food life is abundant and there are no fish in the lake at present.

2. The lake is located below Muslatt Peak and is five miles from the Big Flat road. A trail could be cut from the old old Kelsey trail in the saddle just below Muslatt Peak down to the lake.

SOUTH FORK, SMITH RIVER

1. There are numerous rocks that have slid into the rock channel in the first two miles above the mouth that could be easily removed by blasting.

2. Road construction has caused several slides that have partially filled the channel and they should be removed as soon as possible.

3. Upon completion of the road the river should be checked for barriers and kept open as this is an important spawning river.

4. This is the best spawning stream on the forest and should be kept open and well protected.

HURDY GURDY CREEK, SOUTH FORK

Stocking with trout.

BUCK CREEK, SOUTH FORK

Stocking with trout.

QUARTZ CREEK, SOUTH FORK

1. Removal of log and debris jams in the narrow canyons. Burning of the jams would be most suitable as it would eliminate the possibility of causing jams farther down stream.

WILLIAMS CREEK, SOUTH FORK

Stocking with trout.

EIGHT MILE CREEK, SOUTH FORK

Stocking with trout.

MONKEY CREEK, MIDDLE FORK

1. Two miles above the mouth is a twenty foot barrier falls that is being used and should be improved to allow the migration of fishes. The diversion ditch should be screened.

2. The pool above the dam flooded all of the vegetation, causing a rotting of the plants and production of tannic acid in the quiet waters. Logs and debris should be removed from the pool and burned on the banks.

3. Stocking with trout.

GOOSE CREEK, SOUTH FORK

Stocking with trout.

JONES CREEK, SOUTH FORK

Stocking with trout.

SISKIYOU FORK, MIDDLE FORK

1. Three miles upstream is a log jam barrier through which water seeps but there is no fish channel. The jam should be removed to allow for passage of fish migrations.

COON CREEK, SOUTH FORK

1. Two and a half miles upstream is a twenty foot log jam barrier that should be removed.

2. An unscreened abandoned mining ditch should be closed as many fish are trapped in it.

3. Stocking with trout.

GORDAN CREEK, SOUTH FORK

1. A mile and a quarter upstream is a rock slide causing a series of falls twenty feet high. Removal of the slide would eliminate the barrier.

2. Stocking with trout.

ROCK CREEK, SOUTH FORK

Stocking with trout.

MIDDLE FORK, SMITH RIVER

Due to the Redwood Highway the river is over-fished and should be stocked annually with trout.

DIAMOND CREEK, NORTH FORK

Stocking with trout.

NORTH FORK DIAMOND CREEK, NORTH FORK SMITH

Stocking with trout.

Work Program of Stream Improvement for Gold Beach Ranger District

CHETCO RIVER

No improvements; present stocking should continue.

NOOK CREEK, SOUTH FORK CHETCO RIVER

1. One-fourth of a mile upstream is a six-foot barrier falls that should be removed.

2. Half a mile upstream is a ten-foot barrier falls in the form of a log jam that should be removed.

3. A mile and a half above the mouth is a fifteen foot log jam barrier that should be removed.

4. Stocking with trout.

MISLATNAH CREEK, CHETCO RIVER

Stocking with trout.

BOULDER CREEK, CHETCO RIVER

Stocking with trout.

EAGLE CREEK, CHETCO RIVER

Removal of a twelve foot falls on the right fork.

NORTH FORK, PISTOL RIVER

Stocking with trout.

LOBSTER CREEK, ROGUE RIVER

Stocking with trout.

BEAR CREEK, WINCHUCK RIVER

Stocking with trout.

FOURTH OF JULY CREEK, WINCHUCK RIVER

Stocking with trout.

WHEELER CREEK, WINCHUCK RIVER

Stocking with trout.

VULCAN LAKE

Stocking with Eastern Brook trout.

Recommendations for Improvement Supervisors

Recommendations for future stream improvement supervisors. Preliminary survey work was conducted over the forest with the conclusion

that there is no need for standard improvements. Since all of the streams are used by anadromous fishes it would be advisable to make an annual check on the streams to see that:

1. The main streams are free from obstructions that would prevent the migrations of fishes. Clearing of log jams, rock rock slides, and channel obstructions that may have formed during the year.

2. Mining and irrigation dams have workable fish ladders in good repair and that the diversion ditches are properly screened.

3. Streams mined down to the bed rock and deserted could be improved by replacing the boulders to form pools and offer shelter to the life of the stream.

4. Road constructions paralleling streams should be checked so that no slides or fills have impaired the stream channel in any way.

5. Rainnie Falls on the Rogue River and the Illinois River Falls at Lange's Ranch should be checked annually to see whether or not the fish are able to migrate above these obstructions.

REPORT ON STREAM IMPROVEMENT WORK CONDUCTED

DURING THE SUMMER OF 1935

IN THE MOUNT HOOD NATIONAL FOREST

STATE OF OREGON

by

Elbert H. Ahlstrom
Assistant Biologist

December 31, 1935

INTRODUCTION

Supervised stream improvement work was carried on in the Mount Hood National Forest in northern Oregon from June 10 to October 10, 1935. This is the first year that stream improvement has been given sympathetic attention on the Pacific Coast. It was originally planned to have a survey party investigate the streams in Mount Hood National Forest, report on the conditions in the streams, and recommend improvements before stream improvement work be undertaken. However, as appropriations for the survey crews were not approved, this desirable feature had to be neglected temporarily. It was realized that much desirable stream improvement work could be done in the Pacific forests before the survey parties investigated the streams. For this reason stream improvement supervisors were placed in four national forests in Region 6, none of which had been covered by a survey party.

A preliminary survey was made of the streams in the western portion of the forest that flow into the Sandy River. This investigation was, of necessity, hasty and inadequate. The streams of the Sandy Drainage are near to the two CCC camps in the forest, Co. 928 at Zigzag, Oregon and Co. 615 at Summit Meadows near Government Camp, Oregon and are thus more accessible for improvement than the other streams in the forest. Several of the streams, particularly Camp, Still, and Clear Creeks and the Salmon River are favorable subjects for stream improvement for a portion of their length. Crews of CCC boys were obtained from the two CCC camps, a 3- 5 man crew from Zigzag Camp working on Camp, Still, and Clear Creeks, while a 7- 10 man crew from Summit Meadows Camp improved the upper Salmon River. A detailed summary of the barriers installed is given later in this report.

Few observations were made on the streams outside of the Sandy River drainage. Transportation facilities were limited, consequently observations were confined to the streams in the Zigzag Ranger District.

PROBLEMS OF STREAM IMPROVEMENT IN THE MT. HOOD FOREST

A number of environmental factors influence fish life in a trout

stream. A good trout stream must have a continuous flow of pure water of favorable temperatures, adequate fish food, adequate spawning grounds, and adequate pools and shelter into which the trout may retire when not feeding. In Mount Hood National Forest the essential environmental feature in which most trout streams are deficient is a lack of pools. All streams of the western slope of Mount Hood have a continuous flow of pure water, as there is no industrial waste nor mine refuse entering any stream in the Mounty Hood National Forest. The trout streams within the forest are almost all of favorable temperatures to support a large trout population. Fish food in most streams is adequate. A trout stream is seldom adequately pooled. One object of stream improvement (and it is perhaps the primary one) is to obtain the proper proportion of pools to riffle in as much of a trout stream as possible, and thus increase the carrying capacity of the stream for trout by furnishing a more satisfactory environment for the fish population. Theoretically we desire to break up all extended riffle in favorable trout streams with an adequate number of pools. Practically, this is not possible.

The chief barrier to stream improvement is low, inadequate banks. A stream with good banks almost always offers some possibilities for a stream improvement. Although the banks of some streams in Mount Hood National Forest are unfavorable for installing barriers, the banks of other streams are favorable and for longer stretches of stream than is true of the streams of many other national forests on the Pacific Coast. However, even in the Mount Hood National Forest low banks unfavorable for installing barriers are a serious drawback to improving many stretches of stream.

Another barrier to stream improvement is obstruction of the stream by log jams. Log obstructions occur in most streams in the Mount Hood National Forest, and are quite numerous in some streams. They are often of such size as to block upward migration of fish. On the other hand they are valuable in forming pools, more pools being formed by log obstructions in the tributaries of the Sandy River that by all other means. Stretches of stream where log obstructions are common are impractical to improve. Log obstructions furnish a pertinent problem in several streams, such as Clear Creek, upper Camp Creek, the South Fork of the Salmon River, and portions of Still Creek.

Several of the streams of the Sandy drainage have their headwaters at glaciers on Mount Hood; Sandy River, Zigzag River, and the Salmon River. These streams carry quite a bit of glacial sand at times, carrying their heaviest loads during the warmest weather. The sand and silt tends to decrease the available fish food in these streams, and fills up the pools. The Sandy River gets its name from the large amount of sand it carries, the sand imparts a milky appearance to the water.

All of the streams of the western slope of Mount Hood National Forest flood badly during the winter and spring months of some years. Because of this fact barriers must be built low and strong and be well tied into the banks, otherwise they will be washed out during floods. Floods also lead directly or indirectly to the formation of new channels for portions of some streams. This furnishes a serious problem in stream

improvement, for if the channel shifts in an improved portion of a stream it would leave the barriers installed in this portion high, dry, and valueless.

The streams of the western slope of Mount Hood National Forest have very few sea run fish. There is a small run of steelhead in the spring in the Sandy River and its tributaries. The fall run of Salmon is negligible in both the Sandy and Clackamas River drainages, due to obstructions in the streams outside of the forest by power dams with inadequate fish ladders or none at all.

The preceding is a generalized account of some problems of stream improvement found in the streams of the Sandy drainage in western Mount Hood National Forest. Most of the data concerns obstacles to improvement. Recommendations for stream improvement are given in another section of this report. Further stream improvement work should be undertaken on the Sandy River and its tributaries in western Mount Hood Forest. When the Clackamas River drainage of western Mount Hood Forest is investigated more possibilities for stream improvement work in the forest will undoubtedly be found. As most streams in Mount Hood Forest are heavily fished, all work tending to increase the carrying capacity of the streams is valuable. However, stream improvement in Mount Hood National Forest should be accompanied by a more adequate system of stocking the heavily fished streams. Stream improvement, no matter how extensively carried out cannot do much toward increasing the number of fish in an over-fished stream. The site for a fish hatchery within the forest has been tentatively selected at Clackamas Lake. If the hatchery is installed there should be close cooperation between the stream improvement worker for the forest and the personnel of the hatchery.

PROJECTS UNDERTAKEN

Four streams within the Mount Hood National Forest were improved in a portion of their length. Camp Creek was worked upon near its mouth, Clear Creek near its mouth, Still Creek for two miles above the end of Vine Maple Road, and Salmon River for one and a half miles in the Summit Meadows region. Of these streams Still Creek and Camp Creek are the better trout streams. They both flow through the summer home area near their mouths. Barriers installed in the various streams are listed in a condensed tabular form.

Camp Creek - 7 barriers

No.	Type	Location	Length barrier
2	Rock dam	Lower end Camp Cr. Camp Gr.	34'
3	Nonsilting dam	100 yds. downstr. from #2	18.5' & 16.5'
4	Rock Dam	200' " " #3	40'
5	Rock Dam	150' " " #4	33'
6	Rock Dam	200 yds. " " #5	31'
7	6 log pyr. V dam	Ab. ¼ mi. " " #6	27' plus 28'
8	Rock dam	Ab. ¼ mi. " " #7	34'

The structures in Camp Creek required 140 man days.

(Non-silting rock-filled crib dam is not very satisfactory)

Camp Creek- more work was planned in the summer home area, but was discontinued for reasons given later in this report.

Still Creek - 4 barriers

No.	Type	Location	Length barrier
1	9 log pyr. truss dam	1 7/8 mi upstream from Vine Maple Road	20', 12.5', 18'
2	9 log pyr. truss dam	100' downstr. from #1	23', 10.5', 22'
3	6 log pyr. V dam	100' " " #2	28' & 27'
4	9 log pyr. truss dam	Ab. ½ mi." " #3	24', 11', 24'

Structures in Still Creek required 67 man days

Clear Creek - 2 barriers

No.	Type	Location	Length barrier
1	Rock dam	Upper end Clear Cr. Camp Gr.	37'
2	Rock dam	Lower " " " " "	

Structures in Clear Creek required 27 man days.

Salmon River - 22 barriers

Salmon R. in the Summit Meadows region - 22 dams in 1½ miles of stream.

No.	Type	Location	Length barrier
1	3 log pyr. dam	Summit Meadows Region	31'
2	"	150' downstream from #1	27'
3	"	220 yds " " #2	31'
4	"	150' " " #3	28'
5	"	170 yds. " " #4	34'
6	"	150 yds " " #5	31'
7	"	100' " " #6	36'
8	"	200 yds. " " #7	34'
9	"	120 yds. " " #8	36'
10	"	100' " " #9	39'
11	"	170 yds. " " #10	35'
12	"	95 yds. " " #11	33'
13	"	165' " " #12	33'
14	"	80' " " #13	31'
15	"	50' " " #14	33'
16	"	110' " " #15	34'
17	"	100' " " #16	36'
18	"	175' " " #17	34'
19	"	170' " " #18	32'
20	"	150' " " #19	36'
21	"	150' " " #20	33'
22	"	75' " " #21	37'

Structures in the Salmon River required 212 man days.

All structures installed are marked with a four inch metal number tag, the numbers in black on an orange background. The number tags are placed on trees beside the various barriers. On all streams the barrier nearest to the headwaters is given the #1 position, and the barriers are numbered in consecutive order toward the mouth of the stream.

Photographs were attempted of various of the improvements. The deep shade along the streams resulted in the under exposure of the prints.

Detailed specifications on all approved barriers are on file at the office of Dr. Paul R. Needham, U.S. Bureau of Fisheries, Stanford University, Palo Alto, California.

OBSERVATIONS AND RECOMMENDATIONS FOR STREAMS OF THE SANDY DRAINAGE IN WESTERN MOUNT HOOD NATIONAL FOREST

For the guidance of future workers on stream improvement in Mount Hood National Forest the following notes and recommendations for streams of the Sandy River drainage are given. These notes are merely suggestions and do not cover any stream definitely.

Camp Creek (Tributary to the Zigzag River): More work could be done toward stream improvement in the stretch of this creek from the Camp Creek Camp Grounds to its entrance into the Zigzag River. Work was stopped on Camp Creek before all planned barriers were installed due to the apprehensions of a cottager that the structures would endanger his property. The barriers were all too low to cause bank erosion, and if anything tend to protect the banks of the streams near them. Above Camp Creek Camp Grounds the stream has many log obstructions and is rather well pooled. Stream improvement would not be practical in this portion of the creek.

Still Creek (Tributary to the Zigzag R.): No work was done in the summer home area of this creek although conditions are favorable for stream improvement. There are stretches of this creek between Vine Maple Road and the Summit Meadows that could be profitably improved, especially in the vicinity of Still Creek Guard Station. It is rather inaccessible to workers from either CCC camp, however. In the Summit Meadows region Still Creek has adequate shelter and pools. The stretch from Vine Maple Road to $2\frac{1}{2}$ miles upstream was improved where possible. The banks of the stream are often unfavorable for the installation of barriers. The stream floods badly. Structures installed should be low, strong, and tied quite far into the banks. Rock dams are impractical in this stream.

Little Zigzag River (Tributary to the Zigzag River): This stream has a rather high falls about $1\frac{1}{2}$ miles above its mouth. The stretch from the falls to the entrance of Little Zigzag into the Zigzag River is well pooled. This is a very cold stream never getting above 50 degrees F. Stream unfavorable for improvement.

Zigzag River (Enters the Sandy R. outside of forest): It is preferable to leave this stream alone. It floods very badly, erodes its banks in many places so much as to endanger property on its banks, and in several stretches often shifts its channel. If barriers were installed in this river it is doubtful whether they would remain for any length of time. About two miles above Rhododendron there is a large obstruction in the river that is a barrier to upward migration of fish. It is a log and brush jam. In the course of time the river will probably shift its channel to one side of this barrier.

Sandy River: In no stretches of the stream within the national forest are the banks favorable for the installation of barriers. Moreover the stream is shifty and carries a very large amount of glacial sand and silt.

Clear Creek (Tributary to the Sandy River): The portion of the creek flowing through the Still Creek Camp Grounds was improved. This is the only part of the stream favorable for stream improvement. The stream in government property above this is rather well pooled and has a very large number of log jams.

Salmon River (Enters the Sandy R. outside of forest): More work on stream improvement can be undertaken on this river. It is perhaps preferable to limit the work to the lower portions of the stream. Improvement has been attempted in the Summit Meadows region, and while this portion of the stream can stand much improvement, it is not as favorable a trout stream here as it becomes some miles downstream in the forest. The stream was found to carry and deposit more glacial silt during the warmer portion of the summer than was anticipated, and this shifting sand tends to obliterate pools and reduce very materially the available food. For this reason it is perhaps inadvisable to try to further improve the upper stretches of the Salmon River. It is doubtful whether the upper Salmon River could ever be made into a "good" trout stream.

Cheney Creek (Tributary to the Salmon River): An excellent nursery tributary, rather well pooled, free of log obstructions, but somewhat deficient in cover for larger fish. Improvement work on this stream should provide more cover. The stream supported a much larger number of fingerling trout than any other observed in the forest. It is suggested that this stream should be closed to fishing and set aside as a spawning creek to aid in restocking the Salmon River naturally.

South Fork of the Salmon River: This creek has adequate pools in most stretches of the stream. In the mile and a half of the lower portion of the creek are four rather large log obstructions that it would be advisable to open up as they block upward migration of fish. Both this creek and Cheney Creek are used for spawning grounds by spring run steelhead. This stream is also an excellent nursery stream.

Mud Creek (Tributary to the Salmon River): Not a very favorable trout stream. The lake at its head supports a number of trout, but the creek itself has few fish. The stream flows through marshy land for most of its length. It is perhaps inadvisable to try to improve this creek.

CONCLUSIONS

In western Mount Hood National Forest attention was given to streams of the Sandy drainage, and all observations in this report apply only to these streams.

Stream improvement work should prove quite valuable in portions of some streams in the Mount Hood National Forest. However, it should be stressed that portions of streams only, as a rule, can be improved, not the whole length of the stream. Moreover stream improvement methods are not of equal value in all streams. Thus, in the Mount Hood National Forest it would be impractical to try to improve the Sandy River, Zigzag River, Little Zigzag River, and most of Clear Creek. On the other hand several portions of Still Creek could be profitably improved, more of Camp Creek, Cheney Creek, etc. Stream improvement methods can be applied to only a fraction of the total network of trout streams within the forest. If all streams were improved in their ameliorable areas in Mount Hood National Forest the carrying capacity of these streams for trout should be markedly increased. Since the Mount Hood Forest is situated in a region where there are half a million potential fishermen, any improvements on the streams that will materially aid the carrying capacity of these streams are of great value.

The more important barriers to stream improvement within streams of the Sandy drainage are: (1) low and inadequate banks along streams (favorable banks are the exception, not the rule), (2) tendency for the streams, especially the larger ones, to shift their channels, especially during flood conditions, (3) log obstructions within the streams (upper Clear Creek has 50 or more log jams to the mile, for example), and (4) inadequate food supply due to large quantities of glacial sand in the streams (true of only those streams who have their headwaters at glaciers on Mount Hood).

REPORT OF STREAM AND LAKE IMPROVEMENT WORK

DURING THE SUMMER OF 1935

ON THE FREMONT NATIONAL FOREST

STATE OF OREGON

By

D. M. Hatfield
Junior Biologist

September 21, 1935.

Introduction and Acknowledgements.

The primary purpose of any program of stream or lake improvement is the provision of better fishing conditions. Though man benefits indirectly, the problem is attacked directly as we attempt to make conditions more suitable for the fish. Methods will be taken up in the main body of this account.

The writer wishes to acknowledge the helpful guidance received from Dr. Paul R. Needham, in charge of the work in the Pacific Coast States, the assistance of Mr. E. P. Cliff of the Forest Service, and especially the whole-hearted cooperation received from Mr. W. O. Harriman, Supervisor of the Fremont National Forest.

- - - - - - - - - - - - - - - - - -

The Fremont National Forest, in Lake County, south-central Oregon, is more or less typical example of the open ponderosa pine forest. The streams are characteristic of the semi-arid conditions prevailing; approximately one-third of them are intermittent. The remainder, except for those fed by springs of any size, are reduced to small rivulets during the dry season of late summer and early fall. The recent drought has had a markedly deleterious effect on most of the streams, with consequently poorer conditions for the fish. It is to be hoped that the annual precipitation will continue to increase as it has during the past year.

Though the erosion and silting problem is not as bad in this region as it is in some parts of the West, it is bad enough to warrant serious consideration. The three principal factors causing erosion with consequent silting are fire, over-grazing, and logging. Of these it appears that the second is, by and large, the most harmful to the fishing streams. Burnt Creek furnishes an example of this, for; the area surrounding its headwaters are tramped to dust every year by sheep, and the stream carries a heavy load of silt each spring. Though there is plenty of trout food in nearby streams, here it is notable for its absence. Careless logging may,

as it does on the lower end of Drews Creek, ruin the fishing by choking the channel with slash. Fire, of course, fills the streams with debris, killing the insect and fish life.

All these factors are instrumental in the denudation of the watershed, and it is this spoliation which, in addition to the increasing aridity, has been effective in causing many former year-around streams to become intermittent.

In accordance with a pre-arranged program for stream improvement on the Fremont, the first three weeks were spent in a survey of the streams and lakes of the forst, and an analysis of the problems present. Of great aid in this work was a map, prepared by forest officers, of the fishing streams of the area, giving average width and stocking program for the past four years. This method of keeping records is recommended for the consideration of officers on other national forests, since it is concise, and of aid from the public relations standpoint.

At the completion of this admittedly hasty survey, work was begun, with a crew of ten C.C.C. men, on Willow Creek. Unfortunately, there were no foremen or leaders available for this work, so it was placed under the guidance of one of the abler of the crew.

As planned originally, work was to be done on three types of streams, and some time was to be spent on lake improvement. However, the dearth of available C.C.C. men and the bad fire season contributed toward a considerable curtailment of this program.

On Willow Creek, seven barriers were constructed. This stream, averaging five feet in width, has a flow of around 100 cubic feet per minute during the dry season. It has a relatively light spring, run-off, and where attempts at improvement were carried on, flows between low banks through a meadow.

Barrier 1.- a log and boulder deflector as diagrammed. Within five days, the channel off the end of this structure had deepened four inches, at which time a clay subsoil was reached. It is expected, with this as well as the following barriers, that the spring run-off will produce more notable results than are now evident.

Barrier 2.- a single log dam. The log, as in all barriers constructed, is a lodgepole pine (Pinus contorta) log. Though this has backed up a large pool, the most beneficial effect will undoubtedly be noted below the structure, where a 16-inch deep hole has already formed.

Barrier 3.- another log and boulder deflector practically identical with structure 1. It is apparently somewhat larger than is necessary in a stream of this size; a checkup during spring run-off may prove or disprove this assumption.

Barrier 4.- a single log dam. On the downstream side of this structure, the left side is lined with rocks to the spillway; the right side is bare of rocks. This was done to determine the digging action of the two types of fall during the spring run-off.

Barrier 5.- another single log dam with a low place on the right bank which will bear watching. It has backed up a pool 75 to 80 feet long but relatively shallow.

Barrier 6.- a rock and boulder dam which has backed up a deep pool and has dug a hole below approximately three feet deep. It is expected that this will be one of the most effective structures in the unit.

Barrier 7.- an underpass deflector as diagrammed. It has been effective, even with the slight current now present, in digging to a depth of three feet.

These seven structures constitute the Willow Creek unit. Results so far have been anything but striking, but it is hoped the spring run-off will speed up the action.

On Deep Creek, a stream of greater width, volume, and heavier spring run-off than the preceding, it was naturally necessary to put in heavier structures. There is more gradient than in Willow Creek.

Barrier 1.- A two log dam as diagrammed. This has backed up a fairly deep pool, and the water over the spillway is rapidly digging a deep hole below.

Barrier 2.- a three log dam with wire facing. In this type of boulder-bottom stream, it is doubtful that wire is anything but a hindrance to proper chinking of the structure. Though the fall over the spillway is 2½ feet, trout have no trouble negotiating the jump; several, varying between two and eight inches in length, were seen to successfully complete the jump.

Barrier 3.- a rock and boulder dam which has backed a very small pool around 7 feet in diameter, but with possibilities of heavy digging action below.

Barrier 4.- a single log dam of small size, but potentially beneficial action. The low banks on the ends of this structure are its main weak points.

These four structures complete the Deep Creek unit in Section 35 of T. 40 S., R. 12 E., Willamette Meridian. Incidentally, 25,000 rainbow fingerlings were planted in the pools formed by these barriers. It is the opinion of the writer that there was a smaller percentage of loss in this stocking than there would otherwise have been. The shallow, weed-grown edges of the pools formed excellent shelter for the small fish.

This completes the work done on stream improvement. In addition, a small amount of lake improvement was carried on. It consisted of moving a number of species of lake plants, including Ranunculus, Nymphaea (polysepala?) Scirpus, from Dog Lake, around 6000 feet elevation to Deadhorse and Campbell Lakes, over 7000 feet elevation.

Deadhorse and Campbell Lakes are deficient in trout food. There are a few shrimp, mayflies and stoneflies present, but these lakes are relatively barren of aquatic insect life. Also, they are strikingly barren of vegetable matter of any kind other than fallen pine needles. The idea behind this planting is the hope that added plant food will lead to an increase in the available plant-eating insects upon which fish may feed.

Admittedly, the logical conclusion would be that, were conditions favorable for plant life, it would be present there naturally. However, it was deemed advisable to expend a minimum of time and effort on the project in the hope that the results will be favorable, on no matter how small a scale at first.

RECOMMENDATIONS

The above account includes all the improvement work carried on in the Fremont National Forest. In addition to this, a certain amount of survey work was done, which leads the writer to make the following recommendations. It is, of course, to be understood that these statements are based on surveys of a wholly extensive character. However, since the work is largely experimental, it is thought that these recommendations, though very probably wrong in many respects, may aid in future work on the Fremont.

Surveys

Of foremost importance in this regard is a complete and exhaustive survey of the waters of this forest. Until such is available, the work will continue to be loosely experimental in character. I need not emphasize the important part such a survey would play in stream improvement work.

Public Relations

Also of general aid in further work would be greater publicization of the improvement. Though this would tend to concentrate fishermen along the improved streams, it would carry with it, supposedly, a favorable public opinion. This public influence, it appears, may make or break a federal project extending over a period of several years.

Irrigation ditch screens

In an area, such as is covered by this report, where irrigation plays an important part in the welfare of the community, and where fishing is one of the most important recreational assets, there is apt to be a conflict between the two. Screening serves to satisfy both the fisherman and the ranch owner, but so far as known, there are no screens operating on the Fremont at the present time. It is thought that screens should be put in on parts of Dairy Creek, on the lower reaches of the Chewaucan River, and on the lower reaches of Deep Creek. There are numerous other points at which they would aid the fish, but they are necessary in the above instances. Many fish were seen in irrigation ditches, unable or unwilling to go back to the main stream; there is no doubt that many are lost in this way.

Specific recommendations for future stream improvement

It is with a certain hesitancy that the following recommendations are made, based as they are on but sketchy information. The streams will

be listed in apparent order of importance from the standpoint of betterment with a statement of size, relative heaviness of spring run-off, relative abundance of plant life, insect life, and fish life, and the types of improvement deemed necessary. Intermittent streams will not be considered.

Dairy Creek

One of the largest of the tributaries of the Chewaucan River. It appears to be the most heavily fished stream on the forest, and promises to become of even greater recreational significance when prospective road improvements are carried to completion and a proposed hatchery or rearing pond unit is constructed at the mouth of Deadhorse Creek.

This stream averages around 15 feet in width and has a medium spring run-off.

Ranunculus is the principal plant, as in all streams of this region, forming dense mats in the quieter portions of the stream. There is an abundance of algae, the slimecoat type being the most abundant, though the fringing algae are often abundant, especially where decaying wood is to be found in the stream.

Because specific identification of the aquatic insects present is difficult in the field, only the major groupings will be considered. Mayfly, somefly and caddis-fly larvae are abundant. Dragon fly, damsel fly and black fly larvae are present, but in fewer numbers.

As to fish life, forage fish, such as minnows and chubs, are present, but do not appear to compete seriously with trout. The primary fish is the rainbow trout, which would probably occur in greater numbers were the stream not fished so heavily. As it is, its numbers are greatly reduced during the first month or so of the season.

A program of improvement work on Dairy Creek should include a demonstration unit extending roughly from Deadhorse Creek downstream to the vicinity of Happy Forest Camp. This unit should probably include nearly all the barriers diagrammed in "Methods for the Improvement of Streams", Memorandum I-133 of the U. S. Bureau of Fisheries, since this is one of the most important vacation spots of the forest. In addition, a carefully controlled program of bank cleanup might be carried out on the north side of the stream so that the barriers may be seen.

Below this demonstration unit the stream becomes a series of long, unshaded riffles. Much good could be done with log dams and deflectors in such situations. Willows, if planted early in the year, might improve shade conditions.

Chewaucan River - one of the largest streams on the Fremont Forest. It averages around 25 feet in width. It appears to have a fairly heavy spring run-off, with consequent bank erosion in some of the meadows through which it flows.

Slimecoat and fringing algae are the most abundant forms of plant life; the current thrust is too heavy for most other plants. Along the edges may be found some scattered mats of Ranunculus.

The aquatic insect population consists largely of mayfly, stonefly, and caddis fly larvae. It may be said, however, that food conditions are not as favorable as they are in Dairy Creek.

In the upper end of the stream, the rainbow is the dominant fish; lower down the eastern brook appears to take its place.

Improvement work on the Chewaucan should by all means include some attempt at lowering the maximum temperature of the water. The river is throughout a good deal of its length of some 20 miles, a series of riffles, interspersed infrequently with pools. It is not well shaded, and consequently the water temperature reaches 60° F. on warm days. This may or may not be reflected in the fact that the trout become infested with parasitic round-worms in the late summer and early autumn. There appears to be need for some 150 barriers for the formation of pools in the stretch from the mouth of Elder Creek to Paisley. Rock and boulder dams and deflectors would very probably be the most satisfactory, since abundant material is at hand for this type of structure. In addition, improvement of shade conditions would be in order.

It would appear that improvement of this stream would reduce the drain on Dairy Creek to some extent so that both the Chewaucan and Dairy Creek would supply sufficient fish for the entire season.

Elder Creek - a stream about the size of Dairy Creek, and with superficially the same conditions prevailing except that there are fewer stoneflies present. Also, it is apparently in need of no improvement, being well shaded and pooled along most of its course.

Sycan River - a large stream averaging over 20 feet in width. It appears to have about the same amount of spring run-off as the Chewaucan, though it is doubtful that erosion is such an important factor here.

There is relatively less plant life in this stream than in those mentioned above. Slimecoat algae is present in some parts of the stream, but fringing algae and Ranunculus are rare.

Mayflies and caddis-flies are abundant, but stoneflies are very rare (August 15). It is interesting to note that, whereas Hydropsyche and Platyphylax (?) are the chief genera of caddis found in streams flowing to the east, Brachycentrus and Glossosoma are the chief genera in those flowing to the west. Damsel and dragonfly larvae are abundant.

The most abundant fish in the Sycan seems to be the rainbow trout. It is said that some few salmon come up in the early spring.

Improvement should very probably consist in the building of a series of log and boulder dams in the vicinity of Currier Camp Ranger Station, since there is an overabundance of shallow riffles in this portion of the river.

Sprague River-- a stream somewhat smaller than the Sycan, averaging around 15 feet in width within the forest boundary. There are two forks, the south and north, which are alike in most respects. There is apparently more available plant food in the south fork.

The only improvement recommended would be the construction of log dams on the north fork from Lee Thomas Crossing two miles down the stream. This unit would probably include around 30 barriers. Shade conditions could be materially improved.

There are numerous other small streams on the Fremont which would lend themselves to improvement of a minor sort. Cottonwood Creek presents a serious erosion problem; food is almost absent in the lower reaches of the stream above Cottonwood Reservoir. Extensive pooling and shading of the stream might improve conditions. The year around volume is kept fairly constant by two beaver-made check dams toward the head of the stream. Most of the smaller streams of the forst practically dry up during the dry season. A program of extensive check-damming might improve conditions in that respect.

It would seem that aquatic plants might profitably be transferred from streams which contain an abundance of them to those more barren. This is recommended in the case of Cottonwood and Burnt Creeks. Plants, such as Ranunculus, may be obtained from Willow Creek and from Crooked Creek.

Lake improvement recommendations

Of primary importance in this phase of improvement is a check-up on the status of the aquatic plants transferred from Dog Lake to Deadhorse and Campbell Lakes. If there is a satisfactory survival, it would appear that some further work should be attempted along this line. Also, a certain amount of shore clean-up would be in order, since the tangle of down-timber is unsightly and may in time be injurious to fish survival due to the acids given off by the decaying wood.

It is apparent to one visiting the lakes that the reduction in precipitation in recent years has lowered the water level considerably. In many places a formerly rocky shore-line is back some distance from the water. It is conceivable that the placing of some of these boulders back in the water would improve shelter and food conditions for both insects and fish. It is recommended that this be attempted on a small experimental scale.

Collecting during the summer has necessarily been somewhat of a sideline. However, collections of aquatic insects were made at 33 different points within the Fremont National Forest boundaries.

CONCLUSIONS

The streams of the type found in the Fremont National Forest lend themselves very well to improvement. It would appear that the east slope forests, which are heavily fished, should be given preference for improvement work of which they stand in need. At first glance it would seem that there would be ample fishing for the local people, as there no doubt would, but the fact that these streams supply recreation for the population of the desert country to the east plus numbers of people from the vicinity of Klamath Falls makes a program of stream and lake survey and improvement almost necessary if this recreational asset is to be placed on anything approaching a sustained yield basis.

It is therefore recommended that the Fremont National Forest be allotted one of the first survey parties available in Oregon, and that provision be made in its future work plans for stream and lake improvement.

Approved October 19, 1935

By (signed) Jack B. Hogan
Acting Forest Supervisor.

Submitted September 21, 1935

By (Signed) D. M. Hatfield
Junior Biologist.