Ron Lamb

KNOW YOUR ROGUE RIVER FISHERIES

by

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FOREWORD

This is a treatise on the Rogue River fisheries and its management. We know of no other subject on which the general public has so many varied opinions or keener interest.

It is the author's and this Commission's hope that the facts presented here will aid in the broad understanding of the Rogue River, its fish life and the general social and economic development of this great river.

The material presented here is in no way complete in all aspects. Many elements are merely skimmed, leaving it to the reader to seek out more detailed truths. If the puzzling questions whet the reader's appetite, general reports are available in public libraries and any representative of this department will assist in clarifying any details in which the reader might desire more information.

In the over-all picture, major emphasis is placed on important factors. The sport fishes of the Rogue are highlighted as are the factors influencing their management and abundance.

The author has been a resident in the Rogue Basin for 18 years, throughout which he has conducted biological investigations on the fishes of the Rogue River drainage. He knows the Rogue, its tributaries, its fish life, from source to sea. We know of no other person more qualified to discuss the Rogue River fisheries, its problems and management.

P. W. Schneider
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KNOW YOUR ROGUE RIVER FISHERIES

ARTICLE I

ROGUE RIVER STEELHEAD

Steelhead are rainbow trout that have acquired the seagoing habit. The red flesh is obtained from the kinds of feed they thrive on in the Pacific ocean. Unlike salmon, steelhead can successfully spawn, migrate back to the ocean, and return to spawn again. Some have been found returning on a third and fourth spawning migration.

Rogue steelhead are smaller than most steelhead found in other streams of the Pacific Northwest. The smaller size is attributed to the early stage at which they mature and return to the river on their first spawning migration. Generally, steelhead return from the ocean to spawn for the first time in their fourth year of life, but Rogue River runs contain a large percentage of fish returning to spawn for the first time in their second and third year after spending only 3 to 5 months at sea. Larger fish are usually those that are returning in their fourth year or are returning the second or third time to spawn.

The Rogue River has three separate runs of steelhead. Each comes into the river at a different time of the year, motivated by various physical and biological characteristics of each race. The three runs are (1) spring steelhead which enter the river in the spring when water temperatures are on the rise, (2) fall steelhead which start up the river in August when hot summer temperatures decline, and (3) winter steelhead which come into the river through the winter months just prior to spawning time. The Rogue is one of the few rivers in Oregon that can boast of three distinct runs of steelhead.

The term "summer run" is commonly used to refer to steelhead running in Hood River, Umpqua River, and a few other streams in which steelhead make a spring or summer migration, hold over in the upper reaches of the basin and spawn the following spring. Most anglers commonly refer to steelhead found in the upper Rogue through the summer as "summer run", but other fishermen use the same term for fish showing up in the lower Rogue in August and September. However, since each group of fish constitutes a distinct run, the Game Commission separates the two races into "spring" and "fall" steelhead to avoid confusion.

With the exception of the Applegate and Illinois River systems where only winter-run fish are found, steelhead are migrating in the Rogue through the entire year. The only time gaps between the runs are found in the lower 50 to 60 miles of the Rogue. In this section of river there is a definite lapse of time between the various races as each enters the river on its upstream migration. However, above the canyon these races intermingle, with the up or downstream migration of one race overlapping that of another.

Steelhead are counted at Gold Ray Dam the year around. As the stragglers of the winter-run steelhead which spawn immediately upon reaching the headwaters are counted, the first of the spring run make their appearance. These latter fish hold over through the summer to spawn the following winter. Spawnouts from this run migrate back down river toward the sea and through the middle section of the Rogue pass fresh fish of the winter run that are moving upstream to the spawning beds.

Spring-run steelhead begin spawning activities in late December along with fall-run fish and early arrivals of the winter run. Although the peak spawning month is usually March, stragglers of the winter run extend the spawning period into June.

After hatching and emerging from the gravel, Rogue steelhead spend their first year in fresh water. Most of the juveniles concentrate in the

middle section of the Rogue and remain into the spring of their second year of life. Nearly all of the "trout" caught in the middle Rogue in the summer months are these juvenile steelhead which linger in the stream a year or more before migrating to the sea.

Most of the "half-pounders" that make up the bulk of the fall run are steelhead that have entered the ocean in May of their second year and return to spawn three to five months later along with fish of other runs.

As a protection to the three races, the Game Commission manages the Rogue River steelhead on an individual run basis. Management measures that are necessary for the more important runs are given first priority. Regulations that are desirable for other fish are carefully weighed and sorted when conflicts occur. In following articles of this series, management methods for all Rogue River fish will be discussed.

Spring Steelhead

Spring-run steelhead enter the mouth of the Rogue in early spring as water temperatures begin to rise. They migrate up the main river at a fairly rapid rate. Because of high water flows in the river and the apparent reluctance of the fish to bite at this time, few anglers realize that these fish are passing through. Only a few are incidentally hooked by salmon anglers on spinners or by trout anglers that are rigged too light to hold them.

The first of these fish cross the Gold Ray counting station in April. The run peaks in July and tapers off in September. Spring steelhead establish themselves in the upper Rogue in preferred summer-holdover areas. They do not start ambitious feeding until August, and it is at this time the attention of anglers is first attracted to them. Greatest catch occurs with the use of single eggs fished behind spawning spring chinook salmon in September.

The average size of the spring steelhead taken by anglers is small, running 15 to 20 inches. Many 23- to 25-inch fish are in the run, but these are seldom landed on the light trout gear used by most anglers.

When compared with other runs of steelhead in the Rogue system, the spring fish have a slow rate of growth. After maturity, much of their life is spent in fresh water. Some fish spawn every year; others come back every other year. There is evidence that spring fish do not always return as spring-run fish but instead come back to spawn the second time with fall or winter-run steelhead.

This run of steelhead is at a very low ebb. The counts at Gold Ray have ranged from 5,768 in 1943 to 905 in 1959. Management is made difficult by heavy angling pressure both on upstream adults and downstream migrants. Preferred tributaries used for spawning have been torn by logging and poor land-use practices of the past. They suffer losses in turbine systems. They must negotiate warm water, disease and predation in the lower canyon. Because of their long-term residency in fresh water before and after maturity, this is one race of fish that must run all the gauntlets facing migratory fish in the Rogue River system.

Fall and winter runs of salmon and steelhead, or those runs using mainly the lower Rogue to fulfill their life cycle, are in much better shape than spring-run fish. They must suffer the natural stream hazards, but these runs do not have to face the many man-made dangers encountered by the spring steelhead and spring chinook. Most of the runs using the lower river have shown substantial increases during the past decade.

Spring steelhead are highly preferred fish in the Rogue River system. They are fished for and caught at a time of year when the public's interest in outdoor recreation is high. In dollars and cents and pound for pound, spring-run steelhead are probably the most valuable fish in the Rogue Basin.

Research, hatchery operations, and rearing pond development programs are being concentrated on the spring steelhead in an effort to revive this valuable run of fish.

The next article will describe the fall and winter runs of steelhead.

ARTICLE II

FALL AND WINTER STEELHEAD OF THE ROGUE

Fall Steelhead

Fall-run steelhead enter the lower Rogue when the river has started to cool off from hot, summer temperatures. A few fish enter the mouth and mill around pools in the lower six miles of the river as early as late July, but a definite movement upstream does not usually start until the last week in August.

Fall steelhead are voracious feeders. They strike on many forms of tackle that resemble some type of food. They are fat and strong from feeding on an abundance of aquatic insects. When hooked they show their zest by a spectacular display of acrobatics.

Thousands of anglers pursue this run and more fish are taken than from any of the other runs in the Rogue system. To a large degree, the fall-run steelhead, along with the spring-run, has made the Rogue a famous fishing stream, primarily because the fish are readily taken and show a preference for artificial flies. Another reason, as claimed by many anglers who fish waters all over the world, is that pound for pound they fight as hard, if not harder, than any other sports fish.

A high percentage of the fall run is taken by anglers. Most are caught in the lower canyon with the heaviest take around the Illahe-Agness area. Fair to good catches are made upstream through the canyon as far as Robertson Bridge. Sample catch figures indicate that 25,000 were taken from the large 1959 run.

Fall steelhead are small fish. They average slightly over 17 inches with some as small as 10 inches in length. Weights average around a pound and a quarter with some weighing up to 7 pounds.

Small fish of this run are largely those that go to sea in the early part of their second or third year of life and return on their spawning run several months later. Larger fish are either those that migrate early to sea and return a year and a half later or those that are returning to spawn the second or third time.

That these small fish actually are going to mature and spawn has been questioned. There is evidence that a few are on a false migration, but most have been found developing to sexual maturity by late March or early April.

This run of steelhead shows a preference for tributaries in the middle section of the Rogue and, therefore, only a part of the run is counted over the Gold Ray Dam. During a year with a peculiar water pattern, the run has been found using the main channel of the Rogue. Only a scattered few fish of the fall run use the Applegate or Illinois River systems.

The low ebb of fall steelhead that occurred in the recent 10-year period can be almost directly attributed to logging practices employed in the Rogue Basin during the 1940's. Few tributaries throughout the mid-basin area escaped the destruction of cover, silt loads, and debris-choked channels.

The large 1959 run is believed to have resulted from (1) tributary recovery and soil stabilization, (2) screens over the turbine intakes at Savage Rapids, and (3) the occurrence of two preceding mild winters. All three factors, or combinations thereof, could have contributed to the large numbers of fish in that run.

Winter Steelhead

Winter-run steelhead nose into the Rogue after sufficient rain has fallen to raise the river above fall levels. The main motivation of migration is sexual development. Cold water periods through the winter months retard both the rate of sexual development and the rate of migration. When water temperatures are warmer than 40°F., they move upstream. The warmer the water,

the faster they migrate. When water temperatures drop below 40°F., they stop in deep holes and refuse to move until temperatures rise again.

The first winter fish start up the river in November; the bulk comes in December, usually on a warm southwest storm. The run reaches the middle section of the Rogue in early or mid-January and peaks at Gold Ray in March. Winter fish migrate to nearly all portions of the Rogue Basin that can be reached. Heaviest use for spawning occurs in mid and lower sections of the basin, with lightest use in upper river areas.

Branches of this winter run, called races, travel into the Illinois and Applegate River systems. The Illinois race starts early and continues through February and March. These fish are similar to the steelhead that are found in other coastal streams of Oregon. They average 7 pounds and a few are taken at 16 pounds or better.

Because of the unique features of the Illinois canyon from Kerby to the mouth of Briggs Creek and the numbers and size of the fish, Illinois River steelhead produce the second most popular fishery in the Rogue Basin.

The Applegate race is a late runner with the bulk not showing until March and April. A few of the forerunners appear in the catch in late January and early February.

Rogue River winter steelhead are large fish which follow the normal 4-year life pattern of most coastal stream steelhead. Even those that return to spawn in their third year have grown to slightly larger size than spring and fall-run fish because they have spent from four to seven months longer in the ocean before returning.

Many of the late winter fish produce young that prefer to make their downstream migration to the ocean during their first year of life, resulting in an even longer salt water growing period than the spring and fall races.

The winter run makes up the largest part of the Rogue Basin's steelhead population. Because of high water through the winter months, many of these fish are never exposed to anglers and a good spawning escapement is the general rule.

Heavy catches are made in the Agness-Illahe area, particularly when the run is stopped by cold water conditions. A reasonable harvest is realized by sports fishermen in the middle section of the Rogue when weather and resulting water conditions permit.

ARTICLE III

SALMON OF THE ROGUE RIVER

Spring Salmon

Spring-run chinook enter the Rogue on the rise of water temperatures in February or early March. The run continues at the mouth of the river into June. These fish migrate to preferred spawning areas in the main channel of the upper Rogue and establish a summer holdover. Early runners go high in the basin and later arriving fish choose areas progressively lower. Spawning does not occur until September and October.

The head of the run is found where and when the water first reaches 50°F. This temperature is first found near the mouth of the river, and as the water warms upstream the leading fish can be found following that 50°F. line of demarcation.

The run appears in the Grants Pass area between March 5 and 20 and peaks there in May. The first fish at the Gold Ray counting station arrive in mid-April with a peak formed in June. Some of the run is still being tallied in September. Only a few stragglers of the run fail to go above Gold Ray.

Preferred sections of the upper river used for summer holdover are located from points above McLeod down to below Bybee Bridge with heaviest use in the Rogue Elk to Shady Cove section. A portion of the run moves into Big Butte Creek which is the only tributary of the Rogue Basin used by these salmon.

The flesh of the Rogue spring chinook is considered the most palatable on the Pacific Coast. Highly preferred, these fish are sought after by thousands of spring fishermen.

At the mouth of the river the peak of the fishery occurs in April and May. Since 1949 when the lower river catch was first measured, the annual take

has averaged 4,900 fish. More of these spring fish are caught upstream. The annual catch from salmon boards ranges from 300 to 800 fish in the middle section of the river. Above Gold Ray surveys in 1958 disclosed that nearly 1,900 spring salmon were taken by anglers from this section of stream. The total annual spring chinook run entering the Rogue averages about 29,000 fish.

In addition to water temperatures previously mentioned, observations indicate that the pattern of seasonal runoff influences the rate of migration of spring chinook and steelhead. In other words the fish seem able to predict what the water flows will be two or three months later. In the spring prior to a summer with below average water flows, these fish make a frantic rush to holding areas in the headwaters. On good water seasons they take their own sweet time getting there, lingering in the holes and riffles along the way.

A question frequently asked by upriver fishermen is how long will it take a spring salmon to arrive from Gold Beach. The height of the river, temperature of the water, and turbidity will shorten or lengthen that time. With average flows in the spring, at least three weeks are generally required between Gold Beach and Robertson Bridge.

The rate of migration, or progress the fish makes in miles per day, is governed largely by climb in altitude. The faster the climb, the slower the rate of travel in miles per day. As an example, a spring salmon migrating up the Umpqua River appears at Winchester Dam in much less time than it takes for a spring chinook moving up the Rogue to Savage Rapids. The distance in river miles is the same, but in altitude the fish on the Rogue must climb twice as high. The 50°F. line of water temperature is, of course, more or less associated with altitude too. The rate of travel is also reduced after the fish negotiate a ladder system at a dam.

Fall Chinook Salmon

Fall-run chinook and silvers start to develop sexual maturity at sea, and they make a wild dash up the Rogue. They start entering the river in early

September with the bulk of fish coming in after the first showers in early October. Some chinook continue coming into the river as late as January.

These fall salmon prepare to spawn almost immediately upon reaching the gravel of their choice. The term "choice" is used loosely because there is evidence that they will spawn wherever maturity stops them or water conditions permit them to migrate. The bulk of the fall chinook spawn in the main channel of the Rogue from points overlapping those used by stragglers of the spring run down river to bars located close to tidewater.

A segment of the fall chinook run migrates into the Applegate River, but during most years they must wait in the Rogue for a rise in water level before they can enter. These fish, over a period of years, have adapted themselves to this waiting period, and some of the latest spawning chinook in Oregon are found here. A few are still actively spawning in January and early February.

Another race of fall chinook uses the Illinois River. The delayed access to preferred spawning areas occurs here, too, at the Illinois Falls. A greater range to more suitable spawning areas will be possible for these fish with the completion of the new Illinois Falls fishway.

Nearly all of the fall chinook taken in the Rogue system are caught at the jaws of the river and at the mouth of the Illinois. The average annual catch is about 4,000 fish. Total numbers entering the river average about 52,000.

Silver Salmon

Silvers enter the Rogue with the fall chinook. Most of the catch is made in the lower 30 miles of the river. Some concentrated effort is spent for them on the Illinois River in the vicinity of the Illinois Falls. The total annual run of silvers entering the Rogue is estimated to be 9,000, with the annual catch around 800 fish.

Most silver salmon on the Pacific Coast make short migrations into river systems. The runs using the Rogue are unique in that they migrate to the headwaters of the Applegate (130 miles), up Little Butte Creek (147 miles), and a few go 165 miles into Big Butte Creek and Elk Creek. More characteristic of the typical silver migration are those fish using the Illinois system.

Even though many silvers depend upon the main Rogue channel for spawning they definitely prefer tributary streams. This preference for small tributaries is an important factor relating to the conditions of the stocks of silvers in the Rogue system. Tributaries have been abused and are rarely in good condition for spawning in December and January.

The subject of salmon will be continued in the next article appearing in this series.

ARTICLE IV

BIRTH AND DEATH OF ROGUE RIVER SALMON

The first spawning of spring chinook in the Rogue system takes place in early September in the extreme reaches of the upper river. Week by week, the peak of spawning activity can be traced down river to places occupied by stragglers of the spring run and the overlapping head of the fall run. This spawning pattern continues on down through the lower river into late November with stragglers of fall chinook. Early silver salmon start spawning in December and late spawners are still active in March.

Unlike the steelhead trout, all salmon die after spawning. Even those late-season fish in excellent condition which spawn near the head of tidewater die upon completion of the life cycle.

The rate of incubation of the eggs in the gravel is governed by the temperature of the water. Temperatures of the Rogue usually permit hatching in about 90 days.

Spring chinook salmon fry start emerging from the gravel in late December and continue through April or into early May. A large portion of the juvenile chinooks spend their first year migrating slowly down river, holding through the first winter in the lower 30 miles and entering the Pacific Ocean in the spring of their second year of life. Most silvers, which leave the gravel about the same time as the last of the chinooks, spend their first year in the main Rogue channel and do not start their downstream migration until spring of their second year of life.

Most Rogue River chinook mature and return to the river in their fourth year. An average year's run contains 15 per cent jacks (fish in their third year of life), 78 per cent in their fourth, 5 per cent in the fifth, and

2 per cent in their sixth year of life. Most silvers are 3-year-old fish. About 10 per cent of the silver run is made up of 2-year-old jacks and another 10 per cent are 4-year-olds.

Greater age doesn't necessarily mean a larger salmon. Some fish naturally grow faster or enjoy better feeding conditions at sea than others. The growth of fish is often compared to that of humans. There are large and small people. Too, some of us can eat and eat without putting on weight, while others put it on in spite of a starvation diet.

All Pacific salmon have jacks in their runs. A jack salmon is not a separate species. It is a chinook, silver, or other salmon that has matured sexually at an earlier age or before it has matured in growth. A chinook jack in the Rogue is usually a 3-year-old and a silver jack is a 2-year-old. Nearly all are males (a rare few being females) which are capable of spawning just as successfully as full-grown adults. In other words, a jack can attend an adult female just as effectively as a large 4-year-old male, that is, if he can find a female without being chased away by a large male.

To many anglers adult silvers and chinook salmon are often confused, yet each is easily identified. The two fish can readily be told apart by the examination of the gum or tooth line. The inside of a chinook's mouth is all black or dusky (it is often called "blackmouth") while the mouth of a silver is dark or dusky but the gum or tooth line is white.

There are many ideas on the subject of why salmon bite or strike. Basically, salmon do not feed after entering fresh water. It would be safer to say that they do not particularly need to feed on the spawning migration. One of the most popular theories is that it is difficult for them to get out of the habit of striking after spending several years at sea where they have fed voraciously on anything and everything. Another idea that bears mentioning is that with sexual development they become progressively more irritated. The

longer the fish is in, the more advanced its stage of development . . . and the more sensitive it becomes to aggravations. These two reasons help explain why the spinner blade (resembling a small fish) is hit on the lower Rogue and why cluster eggs (milking estrogens) are taken in the upper Rogue. The most truthful statement would be to say that nobody knows for sure.

Chum, sockeye, and Atlantic salmon have been introduced into the Rogue system, but few ever returned. One chum salmon was found recently in the catch at the mouth of the river. Almost every year a few anglers believe they have landed an Atlantic salmon, but none of these specimens have been identified as such. Atlantic salmon look much like steelhead or female silver salmon and it wouldn't be difficult to be mistaken. Field agents of the Game Commission are always anxious to check fish that may be thought to be one of these introduced salmon.

Combining the average annual migration of all of the salmon that enter and use the Rogue today (90,000 fish) indicates that the numbers of salmon and steelhead must have been enormous before major declines occurred. The factors responsible for those declines will be covered in other articles of this series.

ARTICLE V

TROUT OF THE ROGUE RIVER

The species of trout in the Rogue watershed are rainbow, cutthroat, eastern brook, and German brown. Rainbow are present in two forms, resident rainbow and the steelhead, its migratory cousin. Cutthroat are here in three forms, namely the resident coastal cutthroat, the migratory coastal cutthroat, and the Montana black-spotted cutthroat.

Rainbow

Resident rainbow are the original native trout of this area. They are abundant in all headwater portions of rivers and creeks and down the main stem of the upper Rogue. The upper reaches of migratory steelhead overlap the downstream ranges of resident rainbow. When resident trout are found at points lower in the basin, they have either been planted from the hatchery or are occasional drifters from above. There is evidence that the farther downstream into migratory range resident rainbow drift, the more likely they will pick up the migratory habit of steelhead and move out to sea.

Rainbow trout have a comparatively small head and mouth, small round spots high on the sides, back, and fins. Sometimes there is a red stripe on each side. The maxillary (the bone on the upper lip of the mouth) extends back to a position below the middle of the eye.

These fish are the most abundant trout in the Rogue basin. For fishery management, they are the best trout for reproduction, survival, growth, and general hatchery use. They exceed all other trout in return to the angler's creel.

Cutthroat

Cutthroat trout also have profuse small spotting and are most easily distinguished by a comparatively large mouth with a long maxillary that extends to a position below and behind the eye. The red dash on the bottom of the lower jaw is sometimes a yellowish color. On some specimens, the dash is difficult to see at all.

Resident coastal cutthroat are found in headwater portions of tributaries located at higher elevations and are also the original native trout of the Pacific Coast. Because they prefer residence in small streams, they rarely grow to a large size. Cutthroat trout like heavy shade and deep holes with overhanging banks.

Small dark trout found in headwater tributaries in the back country are often called "native trout". These are not a different species of trout. Some are resident cutthroats, but most are resident rainbow. The dark coloration, fat body, and small size of these fish result from adaption to a small stream with heavy shade and cover and slow rate of growth in cold mountain water.

Not much is known about the true habits of the migratory coastal cutthroat in the Rogue. These cutthroat come into the river from the sea in late spring or early summer and move up the main channel of the Rogue, sometimes up as far as McLeod. Fresh-run fish are difficult to find until November and December when they show up again ready to go up tributaries of their choice to spawn.

Montana black-spotted cutthroat are found at Squaw Lakes. They were introduced in the early '20s. After many generations of cross-breeding with the native form of the coastal cutthroat, only a few of their original characteristics remain.

Eastern Brook

Eastern brook trout are found in drainage systems of the North and South Fork Rogue and in tributaries heading high in the Cascades. They are not native to the area but were introduced by the U. S. Bureau of Fisheries and the Forest Service many years ago. The fish that remain replenish their own numbers by natural propagation and are doing well in cold water areas where the habitat is ideal for them.

The eastern brook is a charr, not a true trout. These fish prefer the use of spring outlets for laying eggs and do not require running stream water that true trout must have. Brook trout can be recognized by a mottled pattern on the back, white edges on the fins, and red spots without a halo on the sides and body.

Most of the lakes in the Cascade chain between Crater and Fourmile Lakes are stocked annually with eastern brook by the Game Commission. They have been planted again into Fish Lake in Jackson County. Bolan and Tannen Lakes in the Siskiyous are stocked regularly with them.

German Brown

The German brown (often called Lock Leven) is another trout that has been introduced. These fish were released into the North Fork of the Rogue many years ago. Populations have never grown to a high level, but some are taken each year by early season anglers fishing in deep holes between Prospect and Union Creek. It is generally agreed that German browns are the smartest of all the trout. Because of extreme wariness brown trout are difficult to catch and are not fish the average or novice angler can enjoy.

German browns are true trout. Dusky or muddy coloration, small red spots with a white halo on the sides along with large black spots are distinguishing characteristics. These fish are considered the most hearty of the trout, and if the habitat is ideal, they will thrive, take over and crowd out other fishes.

Numerous requests have been received to establish brown trout in the middle section of the Rogue to furnish more trout fishing in the summer months. As mentioned before, if they became established, the browns would provide little fishing for the average or novice fisherman. Many would escape even the expert fly fisherman because with heavy fishing pressure they are known to become tacklewise and grow to a large size and old age.

Authorities on German brown trout in the United States and in Germany believe the Rogue is too warm for these fish to exist in any numbers. If this were not true and the habitat in the main Rogue suitable, brown trout would have backed down from the North Fork before now and established themselves throughout the Rogue system.

Although brown trout adults can normally withstand higher water temperatures than other trout, they require cold, spring-fed streams and tributaries to spawn and reproduce young. Brown trout are also fall spawners, a time of year when water temperatures in the Rogue are fairly high. Scouring, winter high waters could also limit survival.

Brown trout are well known predators on small fishes, and there is much concern over the degree of predation that might occur on young salmon and steelhead if a few browns refused all anglers' lures and grew to a ripe old age.

Many hard lessons have been learned in the United States in that exotics are often found more harmful than good. The rule that has almost become a maxim is that the fish that will do best is the one that is native. In many instances, irreparable harm has resulted by the introduction of a new fish that is not native to the area. Not even the new fish or the natives do well in the same water together.

ARTICLE VI

WARM-WATER GAME FISH

Warm-water fish, or spiny-rays, is a term used to describe the group of pan and pond fish made up of bass, crappie (pronounced crop-ee), bluegill, pumpkinseed, sunfish, perch, and catfish. Interest in and use of these fish by sport fishermen and pond owners are increasing.

With the present-day problem of furnishing enough fishing in proper places, spiny-rays are valuable. These fish can serve more anglers and produce more fish per unit of water than trout. Where trout and salmon must have cold waters, so must the spiny-rays have warm and quiet waters. Neither group can thrive abundantly in the other's habitat.

Large increases in the number of fishermen in the Rogue Valley during the past decade have created a shortage of fish and fishing water at certain times of the year. The trout lakes are producing maximum quantities of fish, but they cannot supply all the demand for fishing. One of the solutions to proper distribution of anglers and to fulfill individual preferences is to develop more spiny-ray waters in the basin.

An old expression frequently used by fishery workers is that a warm-water fishery cannot be overfished. Generally, this is true because heavy fishing pressure results in a rapid turn-over of the fish population. Spiny-rays are efficient in filling up the gap left by the harvest. The more fish removed, the more productive the remaining fish become. A general danger exists with anglers not being able to harvest sufficient numbers each year to prevent these fish from crowding themselves out of house and home. Stunting is common and then few fish over 3 or 4 inches in length can be found.

Largemouth bass, bluegills, and catfish have been established in the ponds on the Camp White Management Area, and good fishing has become available there. The backwater slough areas above Gold Ray Dam are popular haunts for hundreds of anglers each year. Many anglers enjoyed Emigrant Reservoir for warm-water fishing, and they will do so again upon completion of the Talent project.

Hyatt Reservoir is the most important body of water for warm-water fishing in the Rogue area. It was drawn down this fall to install the screen in the outlet under the provisions of the Talent project. Because of a heavy population of small crappies and sunfish, the Game Commission was going to treat the reservoir at the low water stage so that a balanced population of bluegills, largemouth bass, and catfish could be established. To make the necessary screen installation, the Talent Irrigation District was required to draw all the water from the reservoir, and the treatment project was not necessary.

Under the operation schedule of the Talent project, Hyatt Reservoir will not be used excessively except in extremely dry years. Even though crappies are a highly desirable and preferred fish, under the new operation it is doubtful that these fish could be kept from becoming overcrowded. Their rate of reproduction couldn't begin to be controlled by largemouth bass and anglers.

Some people believe that fishing will never be good again at Hyatt Reservoir without crappies. Others believe bluegills to be far superior to crappies in their ability to provide recreation for anglers of all age groups. The fact remains that crappies in Hyatt with its relatively stabilized surface levels will overpopulate the lake, become stunted, and furnish little fishing for anyone. There is a much better chance for a good fishery with the black bass-bluegill-catfish combination.

Because several years will be required for new stocks of bluegills and bass to become established, trout will be planted to furnish some angling

through this waiting period. The spiny-rays will eventually crowd them out, and a productive and enjoyable warm-water fishery will be available once more.

Many private landowners use their irrigation reservoirs or pump sumps for spiny-rays. Some of these impoundments become very productive fish ponds when stocked with proper numbers of the right kinds of fish. Usually, these ponds are overstocked to begin with, or they are not fished heavily enough to keep the population from getting out of control.

In Oregon, the Game Commission does not supply fish for private ponds. Stocks must be obtained from commercial ponds or from some other pond owner. A transportation permit is required to move fish from one body of water to another, and it may be obtained from the Commission. It is important to the pond owner to keep his fish from escaping and even more important to the state's management of the total game fish resource that his fish not be promiscuously broadcast to waters in which they might be undesirable.

Fishery agents check the security of ponds for their ability to hold warm-water fish before transportation permits are issued. Advice on pond construction and management is available from the Commission at any time.

The Game Commission is devoting more attention to warm-water fishery developments in the Rogue Valley. This program offers an opportunity to supplement the trout, salmon, and steelhead fisheries which already receive heavy fishing pressures. Expanded facilities could supply fishing for a greater number of people over a larger part of the year.

Most of the trout and spiny-ray lakes in the Rogue Basin are located in Jackson County. Because of the need to reduce the angling pressure on downstream migrant steelhead in the middle section of the Rogue, much interest has been directed to the development of reservoirs in Josephine County.

The Josephine County Court, through its Park Board, is building a 157-surface-acre reservoir on McMullen Creek, tributary to Deer Creek, near Selma.

This reservoir will serve multi-purpose recreation with fishing receiving highest priority. Spiny-rays will be stocked by the Commission to produce an estimated minimum of 5,500 angler days of warm-water fishing per year. Depending upon the public's acceptance and use of the project, that figure could be increased to 10,000 angler days per year. This project is an excellent example of progressive and cooperative development to meet the needs for more fishing facilities. More of these projects will be needed in the future.

ARTICLE VII

TRASH FISH

Trash fish is a term used to describe fish of no value to man in a particular locality. A fish that is enjoyed by some people in one part of the country may be considered a trash fish in another place.

The story of roach in lakes has been told many times. These fish multiply rapidly. They are so efficient in their competition for available food that trout cease to grow. When a sport fishery is thus reduced, complete removal of all fish is necessary before the lake or stream is restocked. In the Rogue drainage, Fish Lake has been treated for roach twice, once in 1951 and again in 1958. Bolan Lake was treated to rid the waters of catfish. Other ponds and reservoirs have been cleaned out to re-establish a balanced population of warm-water fish.

Bass, crappie (pronounced crop-ee), catfish, and bluegill are highly preferred in one body of water, but when they are introduced into a lake that benefits more people when managed for trout, they become less desirable. Some individuals who have enjoyed good fishing for warm-water fish at Hyatt and Emigrant Reservoirs, at the Camp White ponds and in the Gold Ray forebay, but who are not familiar with the basic requirements of warm-water fish, have attempted to sneak spiny-rays into good trout lakes. This is not only a violation of the law but a selfish slap at the majority of fishermen. Spiny-rays rarely provide good fishing in a cold water habitat and worse yet their presence deprives the lake of good trout fishing as well.

Squaw Lake is a good example where bluegills and crappies have been introduced illegally. The bluegills and crappie will never provide good angling because these waters are not warm-water fishery habitat.

Now, attempts are being made by other people to introduce these warm-water fish into Howard Prairie Reservoir, the body of water that should develop into one of the most productive trout fishing lakes in the state.

Some waters in the Rogue Basin have been going through physical and chemical changes which are caused by settlement and related land uses. Pollution, waste irrigation water, warm temperatures, and low summer flows are, for example, making some of the stream sections a better place for suckers and carp to live.

In the middle of the summer, a person can drift in a boat down the Rogue over any of the riffles below Grants Pass and observe the riffle changing color. This is caused by thousands of suckers scooting out and around the boat.

Biologists are striving to learn what damage these populations of suckers might do to salmon and steelhead. Suckers have been accused of digging eggs out of the gravel, but this is not true. With their sucker-type mouths, they suck up moss, algae, and the aquatic insects that this material contains. Studies will be made to determine if this feeding activity is in competition with young trout, salmon, and steelhead.

Carp are largely vegetarians which seek their food in sections of the river that contain aquatic plants and weeds. Because these weed beds are usually located in stagnant areas of the river and not in riffles that are important to members of the trout and salmon family, little harm is recognized. However, in lakes and reservoirs these fish become a real problem.

Another trash fish introduced to the Rogue system is the red-sided shiner. They are little fish, four to six inches in length at maturity. They are voracious feeders and are able to dart around as fast as trout. Some person brought these fish in from elsewhere illegally, probably to stock a private pond. They were first found in Jumpoff Joe Creek in 1957 and have multiplied a thousandfold in three years. They can now be found abundantly in the Rogue

from Marial to Savage Rapids Dam and all through the lower Applegate. What damage they might do is not yet known.

Research is under way to develop a series of selective chemicals that will kill one species of fish but not injure more desirable kinds in the same water. Some progress is being made, but nothing has been found yet that will separate the kill among suckers, carp, shiners, warm-water fish, trout, and salmon.

ARTICLE VIII

THE HATCHERY SYSTEM

Built in 1916, the Butte Falls Hatchery is one of the oldest hatcheries operated by the Game Commission. Located on the Fish Lake Road above Butte Falls, the hatchery is operated to supply stocks of fish for the Rogue River Basin. Periodic expansion and improvement are necessary to keep up with modern techniques and to meet the ever-increasing needs in the area.

The 1959 production at Butte Falls included 131,000 legal-sized rainbow, 396,700 fingerling rainbow, and 47,800 yearling spring chinook.

Additional numbers of fish raised at other state hatcheries and brought into the Rogue watershed for release were 35,000 yearling summer steelhead, 9,100 legal rainbow, 294,800 fingerling rainbow, 17,600 fingerling eastern brook, and 201,600 kokanee salmon fry. The total 1960 releases to the Rogue Basin was 1,131,600 fish, weighing 56,166 pounds.

At one time people were impressed by published numbers of fish that were hatched and released annually from hatcheries. General public opinion was that fish populations and fishing were kept at high levels by the release of large numbers of fingerlings and fry. We know now that this was not true.

Public opinion was dominated by this concept of large numbers before fishery methods and techniques were able to prove which operation produced fish and which ones were useless. Most people were surprised to learn that trout planted as fry or small fingerlings in streams produced few fish that could be harvested by the angler. Yearling trout were found to produce more fish at less cost to the angler than fingerlings. Conversely, it has been found that it is not necessary to plant large trout in most lakes.

Studies on the Rogue River showed that the large egg-takes of salmon and steelhead were doing more harm to the runs than good. With spring chinook salmon, the heaviest egg-takes resulted in a very weak run of adults returning to the egg-taking racks four years later.

All large-scale salmon and steelhead egg-takes on the Rogue were drastically reduced in 1947. The Game Commission decided to search for ways to hatch, raise, and release salmon and steelhead that would successfully produce returning adults at reasonable costs. To raise these delicate fish a full year in the hatchery before release, many problems had to be solved. When disease problems were corrected and improved facilities added, the program was possible to start.

Different techniques were developed for each species. At Butte Falls, 50,000 spring chinook were raised to yearling size each year. Individual groups were marked with fin-clips and released at various times of the year at different locations in the basin. When these fish came back to the river as adults, they were checked for the marks to determine when and where they had been released. The best pattern of rearing and releasing was indicated and practices which produced poor returns were noted.

The study is continuing to determine the degree of influence of temperature, silt loads, high waters, and disease losses before and after release. Some of the patterns of rearing and releasing show encouraging results, and they indicate that under certain conditions, an expanded program may be economically feasible.

To expand this program, research on a new concept of salmon and steelhead management through the use of rearing ponds or reservoirs was initiated. For a number of years now fishery biologists throughout the state have been seeking out, surveying, appraising suitable sites for rearing pond development.

This new approach offers an additional technique to increase the numbers of fish going to sea. Trout in lakes or reservoirs often grow faster in natural habitat than they can be grown in hatchery ponds on force-fed diets. Normally they are hardier fish and more disease resistant. If salmon and steelhead can be grown in wild environment as successfully, many of the problems of disease, diet, crowding, and costs will be solved.

In the Rogue Basin, negotiations have been completed with the Medford Corporation to develop their woods pond on the Prospect-Butte Falls road into one of these rearing ponds. This reservoir has 76 surface acres and can be used to raise perhaps 200 thousand steelhead or spring chinook each year. Another site is being studied for the development of a 36-surface-acre reservoir in the same area. We could probably grow several times more salmon and steelhead successfully with the combined capacities of these two ponds as a supplement to existing production at the Butte Falls Hatchery.

With the continued increase of fishermen, streams in the Rogue Basin cannot supply all of the needs of the anglers. There is not a shortage of miles of streams but the quantity of wild fish that is produced is limited. The hatchery will continue to play an important role to supply the difference between wild production and the needs of the angling public.

Trout fishing in lakes is one of the tools to be used to provide fish and fishing to the ever-increasing numbers of anglers. More angler days and more trout can be produced per surface acre of a lake than many miles of streams. Lakes are preferred by many trout anglers. One reason is that they can be enjoyed by the entire family. Most trout lakes in the Rogue Basin are in maximum production. Howard Prairie Reservoir will support a large part of the increase in angler use that can be expected in the next ten years. Increased use of the high Cascade lakes between Crater and Fourmile Lakes will take care of another large segment of this increase.

There are other anglers who prefer stream fishing and who gain little recreational value from lake fishing. In the future, probably more of our streams will be classified as "key streams" which will be used for stocking legal-sized rainbow in large quantities to satisfy the bulk of stream fishermen. In the immediate future, this program will not necessarily require more fish being raised at the hatchery since other streams will be eliminated from the list of annual stocking to use the trout more efficiently in key streams.

It is not good economics to plant legal-sized rainbow in waters where small numbers of the planted fish are caught. Stocked fish that produce a low percentage return to the creel often cost as much as $2.00 or more each. When those same fish are placed in streams from which a large percentage is taken, the cost per fish is reduced to as low as $.20. Only those waters from which 35 per cent or more of the stocked fish can be taken by anglers will be considered key streams.

ARTICLE IX

ANGLING REGULATIONS

Angling regulations are formulated each January by the Game Commission to manage the sports fishing through the year. The purpose of regulations is to control the harvest of one of the state's most valuable renewable resources. Another purpose is to distribute a safe harvest among as many anglers as is possible.

Because of the many runs and kinds of fish, both resident and migratory, that are found in the same water, angling rules established for the Rogue River are varied and complex. Each group of fish is managed on an individual basis or as nearly so as possible. All are harvested at a maximum rate without endangering their numbers for future expansion and use.

A few people have difficulty understanding the angling charts for the Rogue River. Fortunately, most of the angling public take the time to read and study the material. With the aid of the maps to show where the deadlines are located in case the reader is not familiar with them, the answers to where and when they can go fishing are obvious.

The largest population of "trout" in the middle and lower sections of the basin in the spring consists of downstream migrant steelhead. The late opening of the trout season protects this concentration of steelhead until it is well down the river toward the sea. In the lower canyon and below, these same fish are protected with an 8-inch minimum size limit.

Many of the Rogue's adult steelhead are under 20 inches in length. In parts of the basin they are found in the same waters occupied by resident trout. The general state regulations do not recognize fish under 20 inches in length as steelhead so all Rogue steelhead are regulated as trout. The manipulation

of seasons and areas for "trout" controls the catch of steelhead but still allows the pursuit of resident trout in much of the same water.

The trout bag limit (10 fish but not more than 5 of which may be over 12 inches in length and not more than 2 over 20 inches) serves many purposes for various waters over the state. In the Rogue system, it is designed to (1) limit the catch of steelhead migrants in summer months, (2) allow full pursuit of resident and planted trout in streams, and (3) distribute trout taken from lakes among a greater number of anglers.

The early switch in the fall to a bag limit of two fish over 12 inches in length with appropriate deadline changes takes fishing pressure off the spring-run steelhead, controls excessive catch of the fall-run steelhead, and protects the juvenile steelhead in areas where they are in rearing concentrations.

Each of the changes in deadlines at various dates throughout the fall and winter seasons has a purpose. The fall run of steelhead receives extremely heavy fishing pressure, and it becomes necessary to remove that pressure to prevent an overcatch. Following behind the fall run is the large run of winter steelhead that generally needs no protection from anglers' catch because adverse water and weather conditions usually permit an adequate number to escape for spawning. The date and deadline changes allow as many of the winter run to be caught in the limited time that water and weather are right and at the same time relieves the fall run from additional catch.

In February when many bright, winter fish are still coming up the Rogue, the spent fish of the earlier spring and fall steelhead runs are backing down into the same waters. Actually, fishermen could continue their harvest of this winter run, but the season is closed to protect the spent fish of these valuable early runs.

Spawnouts from the spring and fall runs are given protection to allow their return as larger fish on their second or third spawning run. Every effort is made to increase the numbers of larger steelhead in spring and fall runs.

The steelhead season on the Applegate is allowed to offer people from the heavily populated sections of the basin some place to go for their winter steelheading without having to drive long distances. Only the first fish in the Applegate run are taken since most of the run does not arrive in the river until March, after the season is closed. According to the data from salmon and steelhead punch cards, the annual take of Applegate steelhead is less than 500 fish. Counts of redds (spawning beds) indicate that sufficient numbers of fish running in March and April escape to the spawning grounds.

The Illinois steelhead is a true winter-run fish similar to those present in the coastal streams. A full season is allowed from the time the first fish appears until the occurrence of the first spent fish.

The same regulation principles that apply to steelhead are applied to salmon. An excessive catch is prevented on some of the runs while others are protected in their summer resting areas. All are protected through their respective spawning seasons.

Dates and deadlines which are changed from year to year create aggravations and misunderstandings. Regulations would not be considered as complex if a firm set of seasons and deadlines could be maintained. However, the resource is changing from cycle to cycle; anglers change their methods and shift their pressure to various sections of the watershed; and development causes changes in fishery habitat. Because of these changes, many fish, or runs, are put in vulnerable positions. Each change is recognized and called to the attention of the Commission. Regulations are altered to modify the effects of the varying patterns of pressure and catch.

We are approaching an era of management that may require the regulation of resident and migratory fisheries separately. To realize this objective, the basin would have to be divided into three sections, upper, middle and lower. Each area would be regulated with a simple set of seasons and bag limits. In

principle, the upper section would allow full pursuit of resident trout, but no salmon and steelhead could be taken. The middle section would have limited pursuit of salmon and steelhead but no trout fishery. The lower section would be used for liberal pursuit of salmon and steelhead only.

Either the fishery resource or the pursuit of the sports fishery would have to be sacrificed to realize a simple set of regulations. Scientific management is not possible with a general arrangement of seasons, bag limits, and open areas. In an attempt to find a happy medium, Oregon's angling synopsis outlines a fair program of good, tight management.

ARTICLE X

DECLINE OF THE FISHERIES

The runs of salmon and steelhead in the Rogue River system today are far below their former population levels. Actually, there are only a few people living who can recall the almost unlimited abundance of these fish before the decline began.

Prior to man's invasion, weather and the amount of spawning gravel were probably the only factors that limited maximum populations. Records show this not to be the case since about 1870, when man began to change the face of the Rogue River Valley. But it was not until the sports fishery became popular in the 1920's did the general public become aware that salmon and steelhead were becoming scarce in the Rogue system. This was over 50 years after the decline actually started. Yet, the Rogue runs today are in far better shape and are better utilized than those runs remaining in many other streams in Oregon and the Pacific Northwest.

If readers would study thoroughly the Rogue's history in respect to its use and development they would understand the causes behind the decline and probably be amazed that any migratory fish remain. Truly, the Rogue salmon and steelhead are deserving of admiration. Slides in the lower canyon, dams built without fishways, unscreened irrigation ditches and power developments, early mining activities, heavy silt loads, extensive commercial and sports fishing, lack of protective laws and adequate enforcement, and heavy egg-takes suggest that we have hearty races of fish in the Rogue to still be present in the numbers we have today.

Too many words would be needed to describe in detail all of the factors that influenced the downhill trend, but a few of the major causes are described briefly.

Shortly after the turn of the century a dam was built across the Rogue immediately below the present Caveman Bridge at Grants Pass. At this dam, steelhead and salmon had to make a 9-foot jump to pass to upstream spawning areas.

The Ament Dam between Grants Pass and Savage Rapids seriously hampered the runs for 18 years, with an unsatisfactory ladder in operation during the last five years of the dam's existence. In 1927 the story goes, "some conservation-minded person floated a boatload of dynamite down on the dam. The result--no dam and free passage for salmon and steelhead."

Today, we know that salmon and steelhead that have trouble passing difficult barriers arrive in the headwaters with fungus infections, many dying as a result before they are able to spawn. In the past, these losses must have involved thousands of fish. Recent changes and improvements to fish ladders have eliminated most injuries and resultant losses.

Early packing records of commercial fishing at the mouth of the river tell a story in itself. Annual packs declined year after year despite the heavy plants made by state, federal, and private hatcheries. When the fishery could no longer be economically pursued, the river was closed to commercial fishing in 1935.

Because the runs of salmon and steelhead were thought to be inexhaustible, the U. S. Bureau of Fisheries in the early days took large supplies of eggs, many of which were shipped to all parts of the world. The records of these egg-takes show a decided decline and by 1938 all but one of the stations had to be abandoned because so few fish were returning to the racks.

General irrigation projects began in 1917 and 1918, but the big developments did not occur until after the drought of 1931 and 1932. Hundreds of ditches were developed, and only a few were provided with screens for the protection of downstream migrant salmon and steelhead. The losses of young

fish in these irrigation canals were extremely heavy until 1945 at which time the Game Commission began its screening program.

For the first four years after completion, the Savage Rapids Dam was without satisfactory fish ladders, seriously affecting a complete cycle of the salmon and steelhead runs. In addition, the turbine intakes and pumps took a heavy toll of downstream migrant fingerlings for 35 years before the installation of the link-belt screens in 1958.

The losses of fish at the Gold Ray and Gold Hill power plants went unobserved for years. Work toward obtaining corrections at these plants has been of recent history.

Many studies in the Northwest show that the rise and fall of salmon and steelhead populations are directly related to logging of the drainages and the changes that occur in the pattern of seasonal water runoff. Some of the decline of the silver salmon, steelhead, and cutthroat trout in the Rogue system follows this same pattern.

There is little doubt that the complexion of the Rogue Basin, with respect to cover and natural stream flows, has changed tremendously over the years. What were once stable tributaries now experience low and warm water flows during the summer months and scouring high waters in winter. With the wild scramble for available water, we are now facing critical shortages, not only in the tributaries but in the main Rogue channel as well.

Today, each salmon and steelhead that escapes to the spawning grounds becomes more valuable than ever. In spite of this, reports indicate that more spring chinook are being foul-hooked in the upper river sections than ever before. For every foul-hooked fish landed, better than four others are lost. Those that are lost usually die before spawning because of the serious wound which becomes infected and kills the fish. Reports indicate that pitchforking and gaffing of spawning salmon and steelhead from tributaries continue at an alarming rate.

Although a few appear in court each year, these flagrant violators are difficult for law enforcement agents to apprehend. In addition, most anglers turn their backs on the practice and refuse to report or appear against the gaffers, pitchforkers, or the foul-hookers.

The increased numbers of people that fish the Rogue annually, combined with the public's need for more outdoor recreation, are creating a fishing pressure problem. A smaller supply of fish and fishing waters in the valley must be distributed among a larger number of anglers. The problem becomes even more acute in southern Oregon where anglers insist on more fish per angler day to be satisfied than in any other section of Oregon.

The sports fishing industry has attracted thousands of residents to the Rogue Basin annually and it entertains large numbers of tourists each year. From three to five million dollars are spent annually in the pursuit of the Rogue's fishery--dollars on which the basin's economy is in part dependent.

Many river systems have completely lost their migratory salmon and steelhead runs. The disappearance and decline follow a pattern that is related to the rate and kind of development. With valuable segments of the Rogue's resources still intact, we have a great opportunity to benefit from the mistakes made elsewhere. Public agencies and much of the public at large are truly concerned about the fishery in the Rogue River system, and they are striving to work out a program of orderly development.

ARTICLE XI

STREAM PROTECTION

Stream protection is one of the most important phases of fishery management work. The most successfully proven method for maintaining fish populations, particularly salmon and steelhead, is to protect the natural characteristics of our streams and give Mother Nature a chance to do her job well. Hatcheries can be used to solve isolated problems, but the most effecti method to preserve and restore fish runs is to protect the habitat and let the fish do the job for themselves.

Poorly designed and carelessly constructed roads from the fish management standpoint can damage streams so that many years may be required for recovery. Some streams are already so badly damaged that they may never recover. Much progress has been made in the past decade to encourage road building agencies to modify their designs for the protection of streams and fish life.

Logging operations often destroy many miles of fish habitat in streams. The damage is commonly caused by skidding logs into the channel, stripping the banks of valuable cover, and leaving debris from which jams can be formed. Abandoned, exposed soils may erode and, as a result, fish eggs and aquatic fish foods in the gravel are smothered. Abusive disturbance of cover often causes changes in the pattern of runoff so that the streams suffer from scouring floods in the winter and dry beds in the summer.

Not many years ago, little was known on just how to prevent damages to streams by logging. Trial and error methods were studied by cooperating agencies, such as the private timber companies, Forest Service, Soil Conservation Service, and the Game Commission. Improved logging and road building techniques were found to protect water, soil, and cover.

Private landowners are usually interested in the protection of their own lands. They, too, are learning that stream protection practices, needed for fish, follow the principles of good land management.

Fishery people are attempting to secure the cooperation of private landowners and even greater cooperation with various county, state, and federal agencies engaged in land-use practices to protect the streams and watershed. More important is the need to inform the general public which methods are damaging and which procedures are beneficial.

Inventory of log jams and ladders, guiding fish passage at dams, recommending solutions to problems at bridges, culverts, and irrigation facilities are other routine responsibilities of fish managers.

When a method was found to prevent the extensive losses of downstream migrant steelhead and salmon in irrigation ditches, the Game Commission constructed a plant at Central Point to develop and manufacture the Oregon rotary fish screen. Because of metal shortages through World War II, the program was not started on a large scale until 1945. This is now one of the most time-consuming and expensive programs the Game Commission undertakes. Yet it ranks high in importance for the protection of salmon and steelhead. A state law requires that all ditches and diversions under eight feet in width be screened and maintained by the Commission. On larger diversions, this responsibility lies with the building agency.

As many as 194 fish screens have been operating in the Rogue watershed at one time. In 1960, 156 screens were being used and maintained.

The Game Commission feels that this screening program is well worth the expenditure involved. As many as 27,000 wild migrants have been counted from one screen on a tributary. Larger screens which divert migrants from ditches off the main channels of the Rogue and Applegate save many more in a season. A 1950 study showed that the numbers of fish saved from all screened

ditches in the Rogue system that year represented more fish than ten times the total production of the Butte Falls Hatchery. More important, these were rugged, wild salmon and steelhead that are known to be maintaining the Rogue River stocks.

Because of adverse flow conditions, not all screens can save 100 per cent of the migrants in a ditch. Many changes are being made every year to eliminate the escapement of fish through and around screens and to try to attain 100 per cent efficiency.

In the past, fish ladders were constructed along a common pattern. When it was realized that most of these old-type structures provided fish passage at only one stage of water, biologists, engineers, and hydrologists combined their knowledge to design ladders that could be used by fish at all stages of flow. The joint efforts of these specialists have also made it possible to remove fish from large volumes of water such as from canals and forebays above turbine intakes.

Generally, the laws which protect fishery habitat are inadequate in Oregon. The law that prohibits trees, logs, brush, and drift placed in or near a stream without "forthwith removing the same" is a valuable tool for controlling damage created by logging. There is no strong legislation to control silt loads. Laws do not exist to control the removal of gravel from valuable stream beds, but some operators are showing excellent cooperation with the Game Commission by separating their borrow area from the main stream flow with an undisturbed dike.

Stream protection work will become more important in the future as development of the Rogue Valley continues. Complete understanding and cooperation of the general public are necessary for the protection of natural stream characteristics. Without them, the use of the Rogue's fishery resource on a high recreational and economic level cannot continue.

ARTICLE XII

RIVER BASIN DEVELOPMENT

One of the primary responsibilities of the Game Commission is to assure the permanent welfare of our fish and game resources. The Commission would be negligent in its duties if it did not. In this respect, any existing or proposed land or water use is studied thoroughly to determine the influences on the welfare of the public's fish and game.

Because of this responsibility, the Commission has been unjustly accused of assuming a "No" attitude toward any plan for dam construction or reclamation project in general. Such razor-edged accusations are without foundation, for on the contrary, approval of projects is common but seldom publicized. It is only the proposed projects opposed by the Commission that receive headlines, and people learn of the opposition when facts on irreparable damage that would occur are given publicity.

Every project, whether it be proposed by local, private, or federal agencies, has features that are good and/or bad for wildlife. The task of weighing the effects of a plan of development on fish and game falls upon the shoulders of the Basins Section of the Game Commission. This department studies all projects and makes specific recommendations.

Uses and storage of water present a critical problem in the Rogue Basin. The runoff pattern is heavy in the winter and low in the summer. Because of the physical nature of the basin, feasible dam sites are generally too small to store the quantities of water in winter to satisfy all the needs for summertime use. High costs for storage create projects that are marginal at the outset. Even the best proposed development cannot justify a balanced cost-benefit ratio without government subsidy of power, flood control and fishery benefits.

Exhaustive investigations by federal agencies show that it is impossible to enjoy a high dam on the upper Rogue as big as the Shasta Dam on the Sacramento River. There is no one site, or series of sites, that could be constructed within the limits of economic feasibility that could store "all the water we need" in the Rogue Basin.

We are regularly asked the question, "Wouldn't a high dam on the upper Rogue be good for the fishery?" A yes (or no) answer would have to be clarified with many "ifs". The answer would depend upon the location of the dam in relation to important spawning areas, the methods and times of storage and release, the quantities of release during critical low-water periods, the points of diversion, and many other factors that would benefit or adversely affect the fishery.

With the Corps of Army Engineers' present proposals for a dam in the headwaters of the Rogue and/or its tributaries, attempts are being made to design a plan to benefit all water uses. For one of the first times in the United States, fishery agencies are being afforded the opportunity to study the program through the planning stages of the project.

The U. S. Fish and Wildlife Service, Oregon Water Resources Board, Oregon State Game Commission, Fish Commission of Oregon, and Corps of Engineers are cooperating with investigations to determine how much and what kind of water must be released at what time of the year to benefit the fishery. These agencies have had 112 special temperature and flow stations in operation through 1960 to help analyze proposed storage projects and to determine what kind of releases to the Rogue are necessary to benefit fish. Best benefits would come from an operation that could increase minimum summer flows and control high temperatures in the lower Rogue canyon.

The classic example of a dam which has been beneficial to fish life is the Shasta Dam on the Sacramento River in California. Often this dam and

its benefit to fish is brought forth by proponents of reclamation and flood developments on the Rogue. Yet, there is no set pattern on dams and their possible benefit to a fishery. There are so many variables that under identical plans of development, a dam that is beneficial on one river may be extremely damaging on an adjacent river system.

The people and organizations that are now actively working toward plans for storage on the upper Rogue are sincerely interested in finding a plan that will be beneficial to the needs of flood control, irrigation, and fish life. They are pursuing the true concept of multipurpose development.

No one can fight development. The best any of us can do is to encourage the progress in an orderly fashion. A point of view that is being heard more frequently all the time is that unless development is orderly with respect to all resources, we are not realizing true progress.

The Game Commission will continue to exercise its full responsibilities in the protection and management of the Rogue's fishery resource. Whether it be power or irrigation developments, protection of stream bank and flows, stream clearance and rotary screens, pollution, artificial propagation, research, or the many other programs, projects and related factors affecting fish life, all will be pursued vigorously for the welfare of the fisheries.

Its objective is not one of standing still or to just maintain fishery levels in a static condition. Its objective is one geared to increase and build these runs throughout the Rogue River system to a high recreational and economic level. We have the river and the basic stocks of fish. But success depends entirely on the public's understanding and assistance toward this goal.