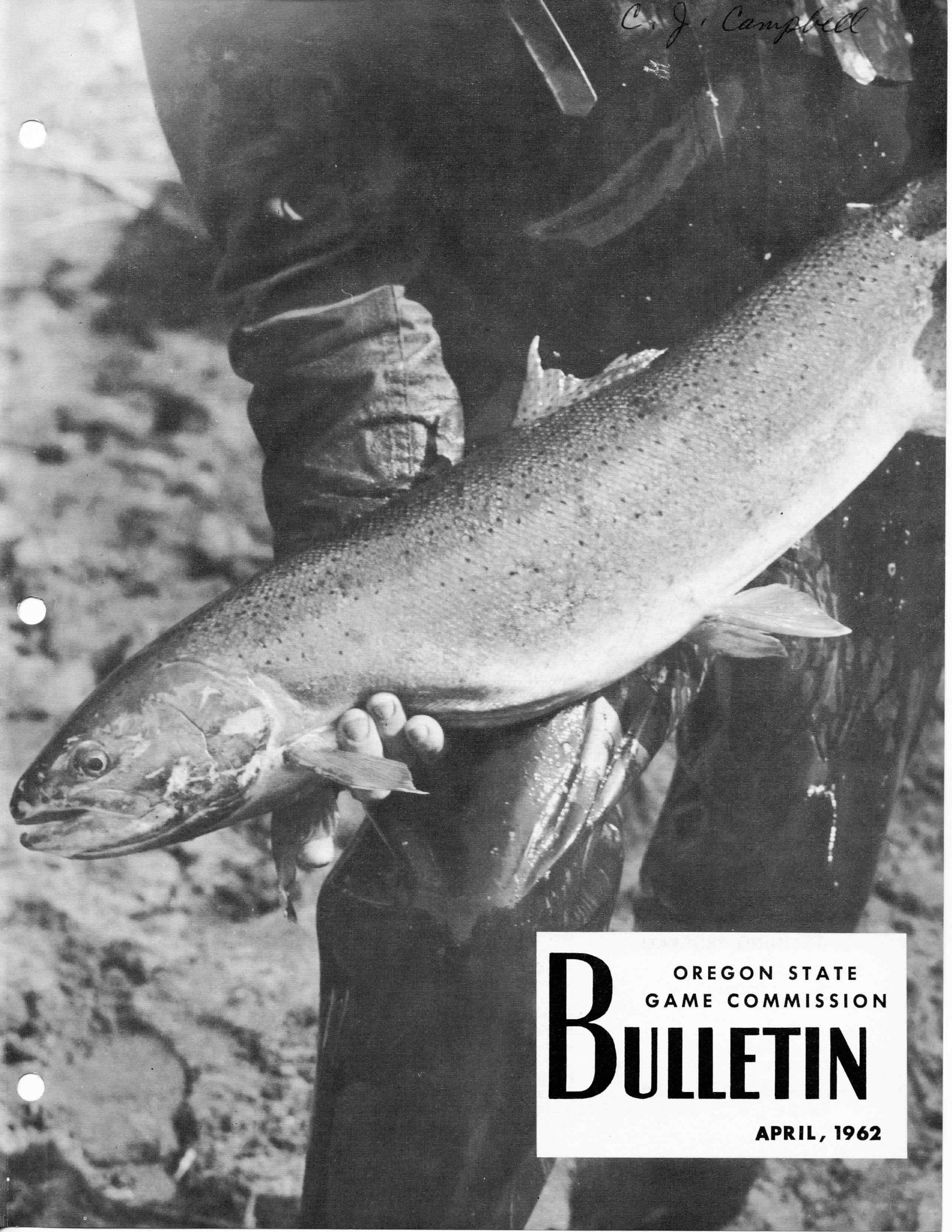


*C. J. Campbell*



OREGON STATE  
GAME COMMISSION

# BULLETIN

APRIL, 1962

# OREGON STATE GAME COMMISSION BULLETIN

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Number 4, Volume 17

*Published Monthly by the*  
OREGON STATE GAME COMMISSION  
1634 S. W. Alder Street — P. O. Box 4136  
Portland 8, Oregon  
MIRIAM KAUTTU SUHL, Editor  
H. C. SMITH, Staff Artist

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Entered as second-class matter September 30, 1947, at the post office at Portland, Oregon, under the act of August 24, 1912.

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At the present time the Bulletin is circulated free of charge to anyone forwarding a written request.

## the cover

Female steelhead taken in fish trap at the Alsea Hatchery. Fish measured 35 inches.  
(Photo by Harold C. Smith.)

## BULLETIN HUNTER SAFETY TRAINING PROGRAM

### Instructors Approved

Month of February.....185  
Total to Date.....2,898

### Students Trained

Month of February.....4,594  
Total to Date.....24,056

### Firearms Accidents Reported 1962

Fatal.....1  
Nonfatal.....0

## DELBERT F. GILDERSLEEVE . . .

Former member and chairman of the Oregon State Game Commission, Delbert F. Gildersleeve, died on February 18 in Baker following a heart attack suffered two weeks earlier.

Appointed to the Game Commission in July, 1949 because of his interest in wildlife conservation, he served until July, 1957. For two terms he was chairman of the Commission.

An active hunter and angler, he was past president of the Eastern Oregon Game Protective Association and of the Powder River Sportsmen's Club.

Mr. Gildersleeve was born February 17, 1906 in Washtuckna, Washington, and attended schools in Spokane. He had farmed in the Wingville community near Baker since 1943 and also owned a ranch

## Big Game Hearing Set for May 22

The Game Commission's hearing on big game regulations for 1962 will start at 10 a.m., Tuesday, May 22, at the Portland headquarters, 1634 S.W. Alder Street. Consideration will be given to regulations pertaining to the hunting of big game animals only.

Tentative regulations will be announced following the hearing, which will be recessed until Friday, June 8. At that time the final regulations will be adopted.

in North Powder.

Immediate members of his family surviving are his widow, Mrs. Bernadine Gildersleeve, and his daughter, Mrs. Kenneth Errend of North Powder.

## SUMMER-RUN STEELHEAD

By Robert L. Borovicka, Coordinating Biologist

THE sea-going rainbow called "steelhead" provide variety to the angler through the migration habits of some races. The season at which adult steelhead leave the ocean and enter the rivers has been responsible in Oregon for the common names—"spring," "summer," "fall," and "winter" steelhead. Fish entering rivers from spring through fall are generally referred to as "summer-run."

The summer-run fish might well be classed as the "jewel" of the steelhead races. There are many reasons for the statement. The fish enter the rivers and remain through the normal summer recreation season while weather is good and angling is pleasant. The summer steelhead has probably become most famous because it will take artificial flies in contrast to winter-run fish which are rarely taken by fly fishing. The summer-run fish also support nearly all of the steelhead angling in the Columbia River and tributaries above Bonneville Dam.

### Life History

A brief description of the life history of the summer steelhead might shed some light on why it is such a desirable fish. The summer fish enter the rivers before they are sexually mature. If you have caught and cleaned a prime summer fish, you may have noticed that the egg skein is very small, in fact, hardly noticeable. Contrast this to the winter fish with large skeins of eggs. The summer fish normally migrate slowly through the river system until they find suitable resting pools in the headwater streams. Some of the early run fish enter streams in April and May, stay all summer, fall, and winter, and do not spawn until March through May of the following year. With such a long time

in fresh water, it is easy to see that these adult fish are extremely vulnerable to fishing intensity and man's use of water.

There are several different races of summer fish that have peculiarities in their migration that would be too lengthy to explain in a short discussion. These fish pose some very complex problems to fishery researchers and managers. Even slight changes in the water-use pattern might destroy individual races of fish.

The spawning act of the summer fish is the same as for other races of steelhead. The development of the eggs in the gravel and stream rearing of small fish is not changed. There is evidence that in most populations of summer steelhead the young fish stay in fresh water from one to two years before migration to the ocean.

### Characteristics

Summer steelhead prefer to rest during their travels in rather fast water along deep rock channels, at the edge of a slick near large boulders or at the tail of a long pool. The skill of any fisherman is tested to the maximum while he is trying to present a lure in these locations. Preferred lures for the summer fish are spinning lures of all types and various kinds of spinners. Some prefer bait in the form of worms, crayfish, or artificial eggs. The summer and fall steelhead on such rivers as the Rogue, North Umpqua, and lower Deschutes, provide world-famous fly fishing that is unexcelled for excitement. The world record for fly fishing, a 27-pound specimen, was caught in the Deschutes River.

### Distribution

Summer steelhead are found in a limited area.  
(Continued on Page 6)



# STEELHEAD MANAGEMENT

By Fred Locke, Chief, Lake & Stream Management

**T**HROUGH A SAMPLING program in the ocean, fishery scientists have been successful in predicting the approximate number of mature salmon returning to certain streams in the Pacific Northwest. Steelhead, on the other hand, are seldom taken in the Pacific Ocean and very little is known about their migration routes once the young fish enter salt water. The ocean does provide a good habitat as most steelhead entering salt water as 5 to 10-inch fish return from one and one-half to three years later as adults weighing from 4 to 12 pounds.

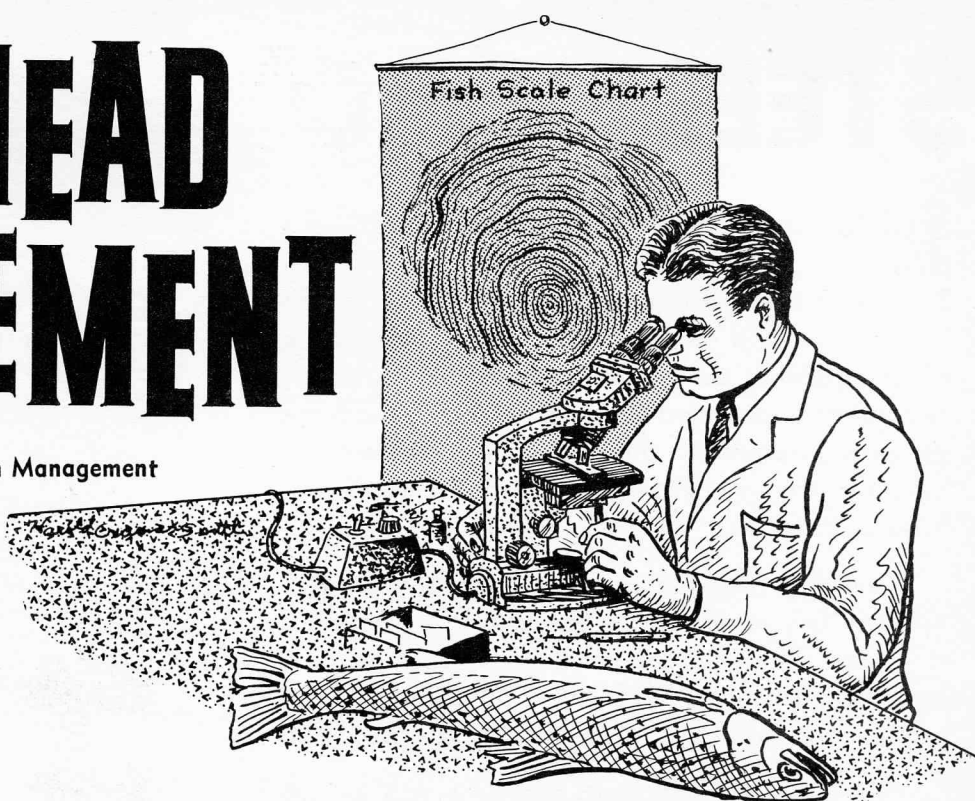
Since so little is known about steelhead in their marine habitat and so few are taken in the offshore commercial or sport fishery, the management of this species is confined to brackish and fresh-water environment.

In order for the steelhead to reproduce successfully, it is essential that adequate numbers escape the fishery and reach suitable spawning riffles. Once there, these fish must be protected while on the spawning beds. Regulations which protect adult steelhead through closed seasons, bag limits, and spawning sanctuaries have been effective in maintaining steelhead runs in Oregon streams.

Protection of small steelhead while they are in fresh or brackish water in coastal streams has been gained through regulations which permit the major portion of seaward migrants to reach the ocean before the trout season is opened. An 8-inch minimum length limit offers further protection to the small steelhead which have not reached migrant size.

**Fishery biologists** are constantly on the alert to detect conditions which are detrimental to steelhead. Pollution is often a serious menace to both young and adults. Waste material from wood products plants, waste oil, and silt are a few pollutants frequently encountered by fishery biologists in routine stream examinations.

Methods of providing free fish passage over natural or artificial barriers are included among the tools of the fishery



workers concerned with steelhead production. Diversions on anadromous fish streams for hydroelectric power and irrigation are examined for the loss of small fish. When the loss of downstream migrants can be shown, proper screening facilities must be installed and maintained. The Commission maintains and operates over 1,200 screens on irrigation diversions in order to prevent the loss of salmon and steelhead.

A recent law passed by the legislature will enable fishery workers to minimize the removal of spawning gravel in streams with anadromous fish.

The success or failure of any management practice is measured by the success of the angler and an inventory of mature fish on the spawning grounds. The success of the angler is commonly measured in catch per unit of effort. In steelhead angling, the fishery worker calculates the number of hours of angling effort to catch one fish. The average catch rate under ideal conditions may be as low as one fish in four hours of effort, while the rate of catch at other times may be as high as 40 to 50 hours per fish. Both extremely low flows and high and turbid water usually result in poor steelhead catches. If it were not for these adverse stream flows, the winter steelhead angler would be forced to accept more restrictive angling regulations.

In view of the fact that steelhead spawn over a long period of time—December to May—it is difficult to determine the number of adult fish spawning in any

given stream. Quite often, high stream flows make it impossible for biologists to see the fish on spawning riffles. Many spawning areas are examined throughout the spawning season and counts of fish and spawning redds are made when conditions permit.

**Many anglers feel** that the salmon and steelhead punch card is primarily a law enforcement tool, but information from punch cards, when compiled and reduced to month and stream, is an invaluable tool in the management of steelhead and salmon. Although punch cards cannot be relied upon to give the exact number of salmon and steelhead caught in each stream, we can use the data for comparing the catch in different watersheds and trends in the catch from year to year.

A physical and biological inventory of all streams having anadromous runs is being conducted throughout the state. This inventory is being done on a unit basis since it is impossible to examine all of the thousands of miles of stream frequented by anadromous species in a single year. With the inventory on a stream system completed, the Game Commission will have a record of all barriers (natural and artificial), the square yards of suitable spawning gravel, the percentage of riffles and pools, and other data pertinent to the management of anadromous species in the system.

Once the fishery worker has this record of natural barriers, he no longer needs to

(Continued on Page 6)

# STEELHEAD

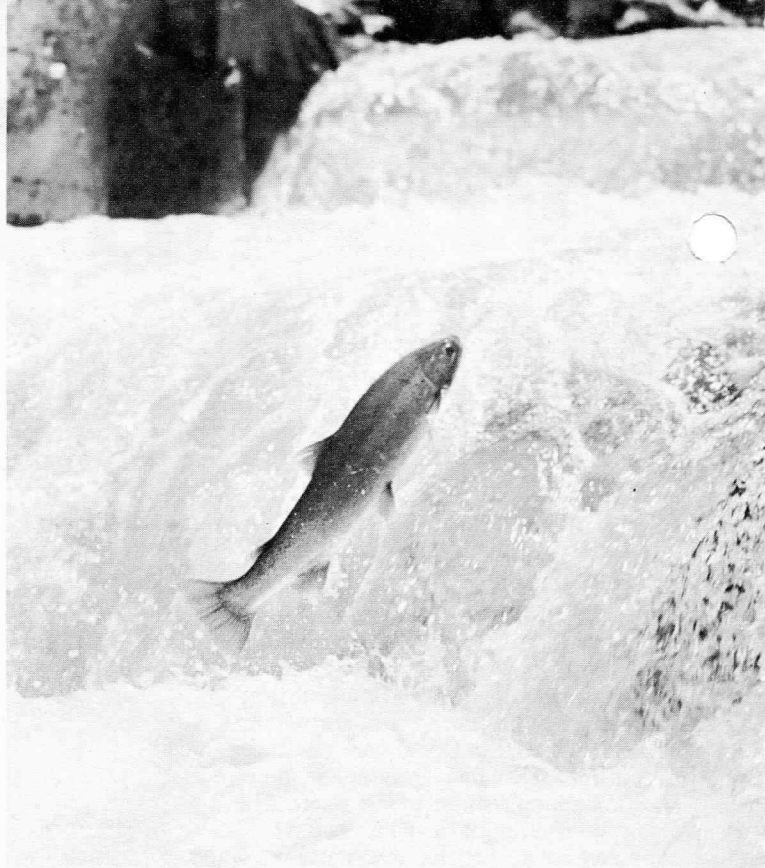
SINCE one of Oregon's most valuable and popular fish is the steelhead trout, this issue of the Bulletin is devoted entirely to it. Even so, all the life history and management details concerning this fish cannot be covered completely. However, the material prepared by staff members and the pictures do point up the importance of the steelhead and the big part it plays in the Game Commission program.

Everyone is concerned with keeping this magnificent fish in its high place among our natural resources. This is exemplified by articles pertaining to management, life history, research, artificial propagation, and just plain fishing for steelhead.

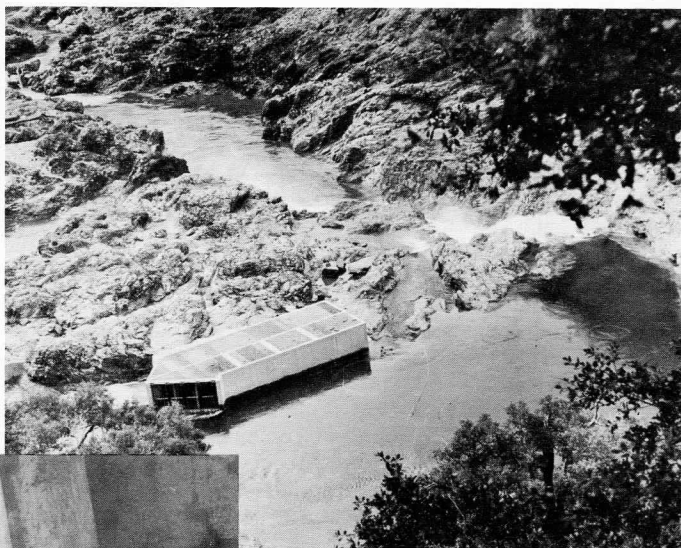
We hope some of your questions will be answered, and that your respect for the steelhead will be increased. We also hope that when you catch a steelhead marked by missing fins or bearing a tag, you will more readily realize the importance of reporting this information to the Game Commission.

Good Steelheading!

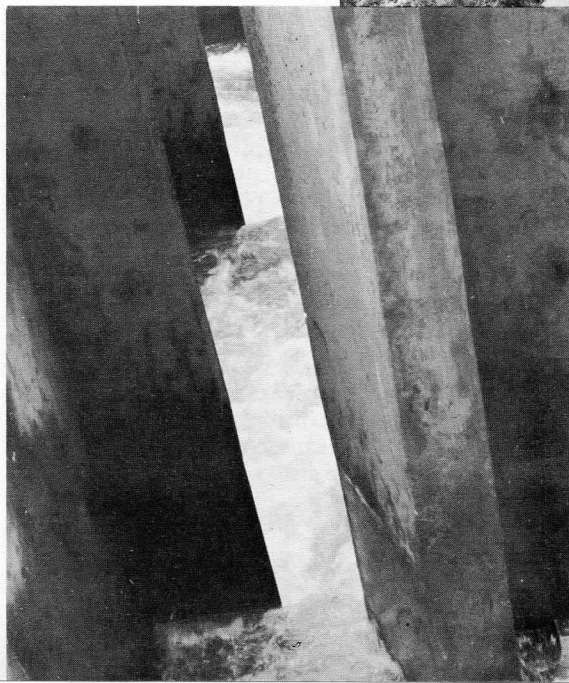
**C. J. Campbell**  
*Chief of Operations,  
Fishery Division*



Steelhead going over Willamette Falls at Oregon City.

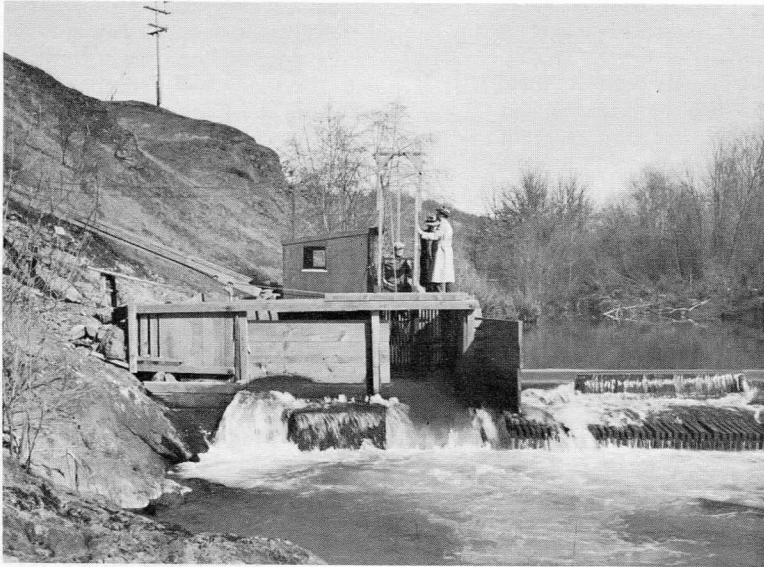


Recently completed fish ladder at Illinois Falls (Illinois River, tributary of the Rogue). This is the first major vertical baffle type of ladder in Oregon and is designed to work over a wide range of water levels.



Close-up of the vertical baffles in the Illinois Falls fish ladder. These will ease the passage of steelhead and salmon to extensive spawning areas above the falls.

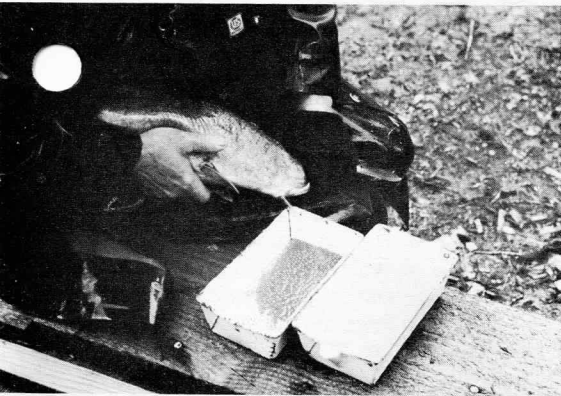




Steelhead and salmon counting station operated by the Game Commission on the North Umpqua River in Douglas County. Records of runs have been kept since 1946.



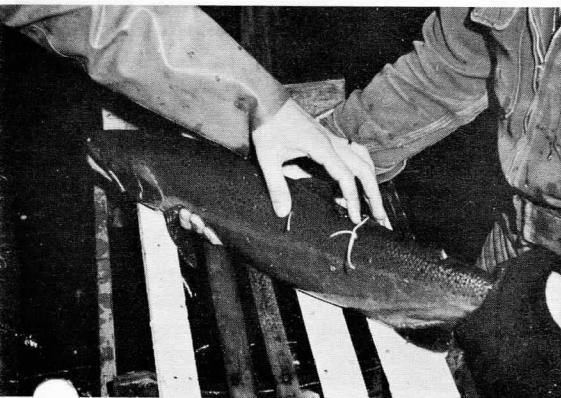
By-pass at Westland Canal screen (Umatilla River) annually saves up to 50,000 fish, both young and adults, from going down the irrigation ditches.



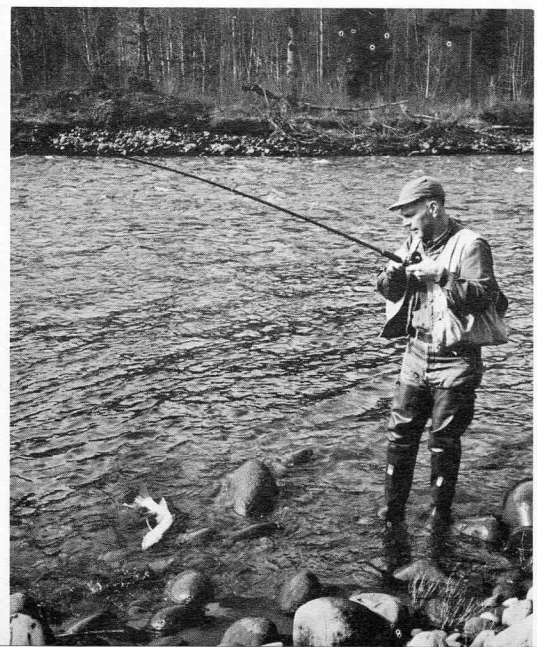
Steelhead eggs being taken at the Alsea Hatchery.



Steelhead marked by removal of ventral fins.



"spaghetti" tag affixed to an adult steelhead.



A successful steelhead angler on the Sandy River.

# STEELHEAD RESEARCH

By Harry H. Wagner, Research Biologist

**S**TREAMS ON WHICH winter steelhead are presently being studied are the Alsea, Sandy, and Wilson Rivers. The rivers are part of the "key stream" program and are being planted with large numbers of hatchery fish. This program is aimed at determining the survival of hatchery-reared steelhead trout and their contribution to the fishery. Unless a fairly high proportion of hatchery juveniles reappear as adults in the future winter catch, the cost involved in producing such fish could be prohibitive.

Most of the steelhead planted in 1962 will return in two years to the stream in which they were stocked. Before release from the hatchery, the fish will be carefully examined, graded, and marked by removing a fin or a combination of fins for the purpose of future identification.

During the winter months of the past three years, personnel of the Research Division have made an intensive creel census of the key streams to obtain catch data from the fishermen so that estimates of the total catch of marked and wild steelhead can be made. Data on the size of fish caught are also recorded so that growth rate of wild and hatchery fish can be compared. In addition, a comparison will be made of the size at maturity of different release groups of hatchery fish. Scale samples are taken from the angler's catch to determine the age of the wild and hatchery fish, their life histories, and as a check on the identification of the mark.

Fortunately for the biologist, the scales of the fish have growth rings somewhat like those laid down by a tree. For approximately each year of growth, an annulus or year mark is present. Fresh and salt

water growth can also be distinguished.

**Creel sampling results** in the 1961-62 season for the months of December, January, and February have shown the three streams under study to differ greatly in the quality of fishing. For the 2,489 anglers interviewed on the Alsea River, there was a catch of 456 fish, or 0.18 fish per angler, of which 61.4 per cent were of hatchery origin. There were 4,985 anglers interviewed on the Wilson River with a catch of 382 steelhead, or approximately 0.08 fish per angler. Approximately 33 per cent of the Wilson River catch was made up of hatchery-reared steelhead. Fishermen on the Sandy River have not fared as well as those on the Alsea and Wilson. For a sample of 1,251 fishermen using that stream, there were 68 fish observed, that is, 0.05 fish per angler and no hatchery fish were observed although a few reports have been received of marked fish taken from the Sandy. One possible reason for the poor return of hatchery fish to the Sandy is the trout fishery which may have been responsible for the taking of considerable numbers of the downstream migrants during the spring months following release.

This winter on the Wilson River, in addition to the regular sampling program of measuring the catch, a large fyke net was operated to determine the feasibility of capturing sufficient numbers of adult steelhead for tagging with spaghetti and dart tags. These will be used for estimating the size of the run of wild and hatchery fish, and the rate of movement upstream, among other things.

The November, 1961 commercial catch in Tillamook Bay was also sampled to determine the take of marked steelhead

A smaller run of summer steelhead is present in the Siletz River. These fish rest during the summer and fall months in deep pools in the main river and some tributaries.

The summer-run is the most important race of steelhead entering the Columbia River, providing a sport fishery almost the entire year. For example, fish enter Hood River in the lower Columbia as early as March. The summer run also provides the steelhead fishery in the winter and early spring in northeast Oregon and Idaho streams.

Columbia River tributaries containing summer-run fish are Hood River, Deschutes, John Day, Umatilla, Walla Walla, Snake, Grande Ronde, Minam, Wallowa, Imnaha, and Wenaha Rivers and several smaller streams.

destined for the Wilson River. Of 337 steelhead observed, 11 per cent were marked fish originating from Wilson River plants in previous years.

**A new study** has been added to the steelhead research program for improving the return of hatchery fish to the creel. The steelhead juvenile undergoes a physiological transformation in preparation for changing its environment from fresh to salt water. The study will determine how and when those physiological changes take place in the young fish. Under normal hatchery operations, 10 to 15 per cent of all steelhead reared for one year do not reach a size at which migration takes place and therefore do not move seaward upon release. Examination of the fish population in the stream during the summer after release indicates that even some of the larger hatchery fish do not migrate, but remain in the stream. It is known from age studies that the few hatchery fish which remain in the stream survive to migrate down in the following spring. With an increased understanding of the physiological changes which take place in fish moving seaward, a more efficient hatchery fish might possibly be obtained and a greater subsequent return of adults could then be expected.

It is only through continued research that better methods in steelhead rearing and management can occur with the final results being more fish in the anglers' creel.

## STEELHEAD MANAGEMENT . . .

*(Continued from Page 3)*

make a special field investigation to learn whether a certain stream section lies above or below a natural barrier and if fish passage is or is not required through proposed road culverts. Completed reports have already been put to practical use in new road construction projects.

**Artificial propagation** of steelhead is another part of the steelhead management picture. In the past it did not prove to be the panacea that many expected, and as a result more recent years have seen much experimental work done to determine how to produce the fish in hatcheries more successfully and particularly how to use the resultant product in order to get the best return. Where, when, and if such fish can be used to augment present runs or replace lost ones, they become valuable management tools.

Regulation and enforcement, physical and biological inventory, habitat improvement, and hatchery operations are all part of steelhead management. The end results of a successful management program are steelhead in the creel and on the spawning grounds each year, and Oregon has both.

## SUMMER RUN STEELHEAD . . .

*(Continued from Page 2)*

ed number of Oregon streams. On the Oregon coast we find the fish in the Rogue, Umpqua, and Siletz Rivers.

The Rogue River contains good runs of summer steelhead that may enter the river in early spring, with other races following until late fall. Boat fishing on the Rogue has become world famous because of summer steelhead angling.

The Umpqua River summer steelhead fishery is best in the North Umpqua River. The fish linger through the summer and early fall months in the most scenic sections of the river. Fly fishing for summer steelhead in the North Umpqua is probably Oregon's best challenge to expert anglers.



# HOW TO CATCH THEM

By Reino Koski, Aquatic Biologist, Fish Stocking

**T**O THE ANGLER who has never caught or fished for steelhead trout, there seems to be an aura of mystery surrounding the "expert" steelheader. This is a lot of malarky! The expert doesn't have some magic talent, a secret lure, or a psychic understanding with fish. He gets fish by dint of hard work, experimenting, and using his head to know when and where to fish. It's true that a small percentage of steelhead anglers take most of the fish, but they spend a great amount of time fishing. Their talents come from long experience.

It would be futile to attempt to discuss thoroughly the methods of taking steelhead, but an outline of types of angling and the correct gear needed can be given here. Elsewhere in this Bulletin are described the various "runs" of steelhead trout, in which streams, and at what times they can be taken.

Winter stream angling is the best-known type of steelheading. Almost all coastal streams and most Columbia tributaries below Bonneville Dam have runs varying from late fall to April. Drift-fishing and plunking are the two main methods.

In drifting, ordinarily a seven to eight-foot spinning or drift rod is employed. A matching reel with plenty of line is required. The lure is a matter of choice, with fresh or preserved salmon or steelhead eggs preferred by many. Fluorescent yarn, alone or combined with eggs, is popular. The above baits are usually used on a 1/0 or 2/0 hook. Artificial lures resembling a cluster of eggs are becoming popular and save much time in rebaiting. Wobblers and spinners are often used, and on many streams, drifting of nightcrawlers produces fish. Pencil weights are attached ahead of the lure, by light leader or by rubber tubing, and enough weight is needed to keep the lure right on the bottom. Casting upstream and across, the angler will "walk" the lure downstream through the "drift" bouncing over the gravel. With bait, the steelie usually mouths it gently, and it is hard to tell a "touch" from a temporary snag. With artificial lures, the fish will generally strike savagely.

In "plunking," most popular in coast streams when they are high and roily, the same type gear is used, but fresh eggs are best, and the cast is made in a likely hole or slick with heavier weight. It remains in one place in contrast to the drifting method.

In the Columbia River, where more than 10,000 steelies are taken each year,

several methods of angling are used. Bank casters, from sand bars and beaches, use any type of casting gear and fish their lure or bait just outside the shallow beach. In murky water, eggs, worms, or white meat is used but in clear water, the fluorescent spinners and flatfish-type lures are good. Boat anglers employ the same tactics but generally fish out in deeper water while anchored.

In the summer-run streams, the methods used are similar to those described above for drifting, with lighter gear necessary in the clearer waters. Fly angling is also popular, especially on the Umpqua and Rogue Rivers. Streamer flies are the most popular and tackle stores near those streams can supply a variety of the best patterns.

For the novice, it is well to make several trips with an experienced steelhead angler in order to learn the ropes. Guides are available on most large coast streams for both winter and summer angling, and for a moderate charge you can obtain expert advice and assistance in catching that first magnificent, battling steelhead. Keep your hooks sharp, and make sure your gear is in top shape before heading for the stream.



Planting Steelhead Trout

## STEELHEAD IN THE HATCHERY

By Christopher C. Jensen, Fish Culture Supervisor

**O**F the nearly one million steelhead reared to yearling size in seven Oregon Game Commission hatcheries, approximately 35 per cent are summer-run steelhead and 65 per cent are winter-run fish. Adult summer steelhead are trapped in the spring in selected streams and are held in a specially designed hatchery pond until the following spring when they mature. Winter steelhead are generally nearly ripe when they enter the stream, and the eggs are taken in the vicinity of capture and are then transferred to the hatchery. The Rogue, Umpqua, Siletz, and Hood Rivers are sources of summer steelhead while winter eggs are taken from the Umpqua, Alsea, Wilson, Sandy, and Big Creek.

Because adult steelhead enter a stream at different stages of maturity, there may be up to a 90-day interval between the first and last eggs taken from any one run. To offset this difference in the age of the eggs and to bring about a more even growth among the fish, it becomes necessary to speed up the hatching of the late eggs and to slow down the development of the earliest eggs. This is done at times by shipping the early eggs to a cold-water hatchery, thus delaying their development,

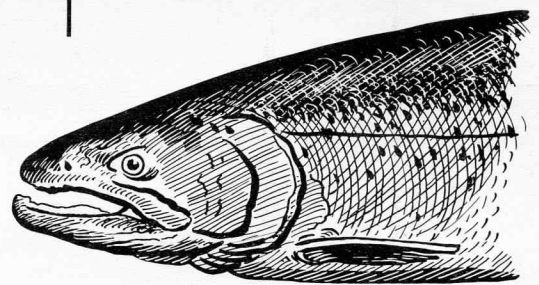
and holding the late eggs at the egg-taking station to develop at a normal rate; or the fry, as they are hatched, are transferred to stations with varying water temperatures to either speed up or slow down their growth.

Another control method recently employed involves heating the water running over selected groups of incubating eggs to advance the date of hatching. Icing of the eyed eggs will delay substantially their development.

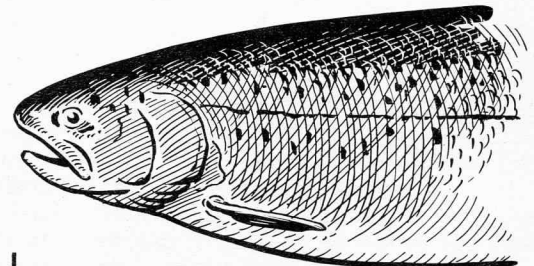
Steelhead fry, when they become large enough to start taking food, are started on a commercially produced pelleted food. The earliest foods taken consist of very fine particles, but as the fish grow larger the size of the food particles is increased until the fish are eating pellets up to 5/32 inches in diameter. To increase the rate of growth, the fish are sometimes fed 24 hours per day, utilizing lights during darkness. Pelleted foods are generally fed automatically by specially developed feeders.

Hatchery techniques are continually being developed and improved to provide the artificially propagated steelhead required by the research and management programs for this species.

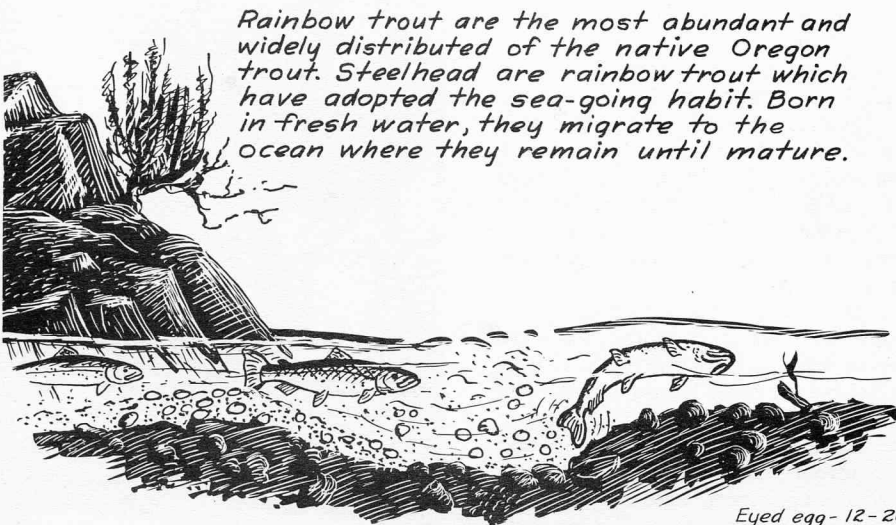
# Steelhead- RAINBOW TROUT



Breeding males have strongly developed teeth & a hooked snout.



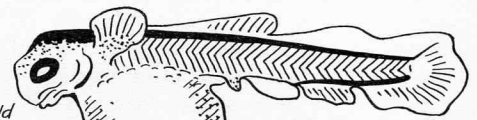
Mature females have short heads with round snouts & small mouths.



Rainbow trout are the most abundant and widely distributed of the native Oregon trout. Steelhead are rainbow trout which have adopted the sea-going habit. Born in fresh water, they migrate to the ocean where they remain until mature.

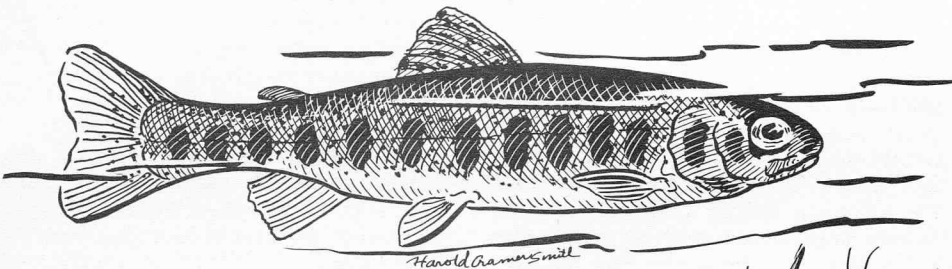
Rainbow spawn in gravel nests called redds. The female selects a spot in the gravel and digs a pit with her tail.

Eyed egg - 12-20 days old



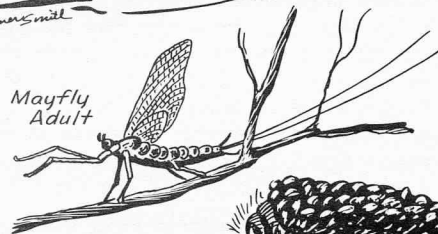
Newly hatched fish  
35-40 days.  
(Water 48°-54°)

The colder the water the longer it takes for the young fish to hatch.



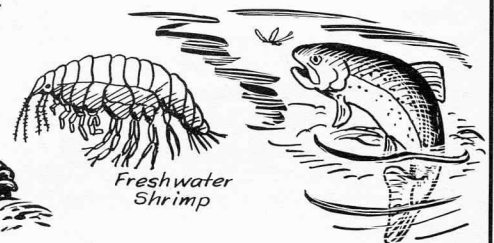
After about two months parr marks develop on both steelhead and rainbow. These marks later disappear.

Water and land insects form the most important source of fish food.



Mayfly Adult

"Perrywinkle" underwater form of Caddis Fly



Freshwater Shrimp

## Oregon State Game Commission Bulletin

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