FISHES
of
Yosemite National Park

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Fishes of Yosemite National Park

By Willis A. Evans, Ranger Naturalist, 1941

Introduction

Could you, as the average American angler, recognize the various kinds of fish you caught on that trip last summer? Are you familiar with the life and habits of those speckled beauties that covered the bottom of your creel? To be quite honest, most of our national park visitors will answer, "No," and display the desire for knowledge by asking many questions. It is the purpose of this paper to present in simplified form, avoiding long scientific descriptions, an account of the fishes of Yosemite National Park, and their propagation, both natural and artificial. The visiting angler may not be interested in knowing the differences in anatomical structure which characterize a certain trout, but he is interested in knowing the visible characters which determine whether a trout is a Rainbow, a Loch Leven, or an Eastern Brook Trout. To facilitate such recognition, keys and descriptions are presented in this guide.

The author wishes to express his indebtedness to the following persons for suggestions and aid rendered: Mr. Malcolm E. Wilson and Mr. Richard S. Croker, California Division of Fish and Game; Mr. W. I. Follett, Icthyologist; Mr. Otto Brown and Mr. M. B. Evans, Wildlife Rangers and the naturalist staff of Yosemite National Park, United States National Park Service.

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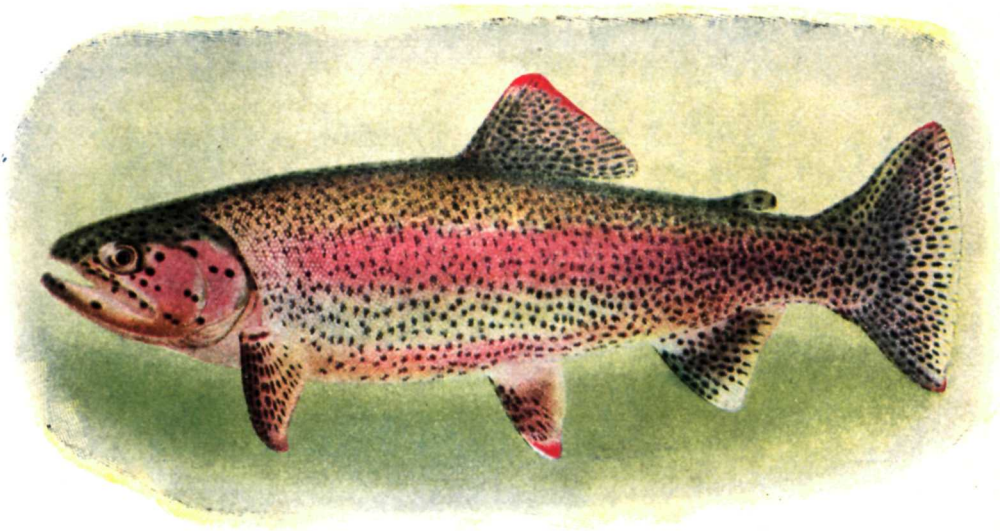
THE SPECIES OF TROUT IN YOSEMITE

The trout belong to the family Salmonidae, which includes salmon, trout, charr, whitefish and grayling. This great group can be neither called one of modern nor ancient lineage in zoological classification. They occupy a position nearly midway between our primitive sharks with cartilaginous skeletons and the higher types of true fishes with bony skeletons, such as cods or bass. Colors of nearly every hue may be found in this family which ranges worldwide throughout the north temperate regions and below the Arctic Circle.



RAINBOW TROUT (Salmo gairdnerii)—Courtesy Calif. Fish and Game

Rainbow Trout

(Salmo gairdnerii)

The rainbow is the only species of trout native to the waters of Yosemite National Park, all other kinds having been introduced. It is usually conceded to be the most gamy of trout, being widely famous for its fighting ability. This trout may be distinguished by the uniform, tiny black spotting on its sides and back, plus the rose-colored band extending the body length along either side.

One of the most adaptable of all trout, it is able to withstand both warmer and colder temperatures than any other species within the park. This hardiness is most apparent in streams where it is present with other kinds of trout. In Yosemite, the rainbow may thrive in certain places where species such as the Eastern Brook Trout appear thin and unhealthy. This may be due to the fact that rainbows seem to be able to forage for food more successfully than other species.

An intricate set of conditions keeps a trout in balance with its environment. Fluctuations in volume and temperature of water; lack of food; pollution; abundant predators; disease; and lack of shelter or spawning areas are just a few of the factors which make trout necessarily a highly adaptive creature. For its splendid survival under a variety of conditions and also since it is the native species in Yosemite, most emphasis in artificial propagation and planting is placed on the Rainbow Trout.

Rainbow Trout spawn in the

spring from February to June, depending upon the locality and water temperature.* They will tend to move up-stream and seek the smaller tributaries, or, in the case of those inhabiting lakes, inlets may be utilized.

From the Merced River in the floor of the Valley up to our alpine lakes, this species is established. In size it is somewhat limited, as even lake specimens are rarely caught which weigh more than three pounds. Nevertheless, it is more valuable from the sportsman's standpoint than any other trout in the park and is much sought after wherever it becomes established.

Loch Leven or Brown Trout
(Salmo trutta)

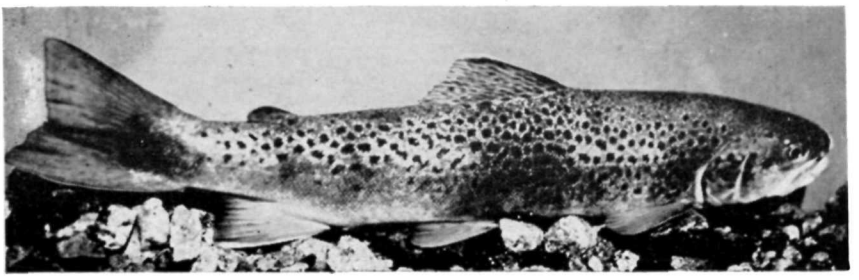
The Loch Leven Trout was introduced into this country from Scotland at an early date. Fish culturists interbred it with a similar species, the Brown Trout, a native of Europe. At the present time these two are so thoroughly mixed that no one should attempt to distinguish between them. Consequently, it is just as correct to call this species a Brown Trout as a Loch Leven.

Its general color is brownish yellow with the sides covered by many large dark spots, often very black, with a few red ones intermingled. In young ones, the black spots have no white ring and red spots are prevalent along the sides. With increasing age these crimson dots turn dark brown or almost black and a lighter colored ring surrounds most of the black spots like a halo. A simple rule to remember is that the Loch Leven is the only trout with both black and red spots on its sides.

This trout does particularly well in the lower reaches of our larger streams, being seldom found higher than seven to eight thousand feet. In the Merced River throughout Yosemite Valley and below, the Loch Leven have adapted themselves quite well. Where Loch Leven and Rainbow occupy the same river, the former seems to prefer the slower moving stretches, while the latter is found in riffles and faster water.

Specimens up to seven and eight pounds are occasionally taken dur-

* In the high country, where waters are cold, Rainbow Trout may spawn as late as midsummer.



LOCH LEVEN TROUT (Salmo trutta)—Courtesy Calif. Fish and Game

ing the summer in the larger pools. The largest one of record was taken in the Merced River near El Capitan Meadow July 17, 1932, by Mr. F. Hatch. It measured twenty-seven and one-half inches and weighed twelve pounds and nine ounces. It has been preserved in alcohol and is on exhibit at the Yosemite Museum.

Noted for their smartness and being difficult to catch, these large ones are a match for the best of anglers. They seldom rise well to flies and tend to be bottom feeders. It is really beneficial to remove these huge individuals as they are predacious and feed on smaller trout, making waters difficult to stock with fingerlings. And of course, such "whoppers" are always a joy and cause for much story telling among anglers.

The planting of Loch Leven in our high country where low water temperatures prevail has done more harm than good. They are not readily adaptable to cold waters and do not compare in such environment with the native Rainbow. However, in its proper home, it is an important fish. The Loch Leven is one of the most extensively stocked trout in California as a whole. Other species may be fished out with extensive angling but the wary Loch Leven maintain themselves.

The Brown Trout or Loch Leven spawns in the fall and consequently works in nicely from the propagation standpoint in the Happy Isles Hatchery. Its eggs are received in the latter part of October and November and must be cared for in the troughs where they obtain a fairly large size before summer planting. This, plus the spring supply of Rainbow eggs, puts the hatchery on a nearly year round basis. All of the park supply of Loch Leven eggs are shipped in from other state hatcheries as no adequate natural supply is available in local waters.

The planting of Loch Leven at present is limited to our large rivers such as the Merced and comprises a small percentage, compared to Rainbow, of the total number of trout liberated in the park.

Eastern Brook Trout

(Salvelinus fontinalis)

Eastern Brook Trout, along with other species such as the Lake Trout, are often called Charrs. All are characterized by the boat shaped structure of the tooth-bearing bone in the roof of the mouth. The scales are small and fine compared to other trout such as the Rainbow and Loch Leven.

The mottled olive and black blotches on a dark background are distributed over the back, as well as on dorsal fins and tail. This, together with the reddish-orange lower fins margined in white, sufficiently distinguishes this beautiful trout. In the eyes of some it competes with the Golden Trout for vivid coloration, especially during the spawning season. Males are more colorful than females.

The Eastern Brook, as the name

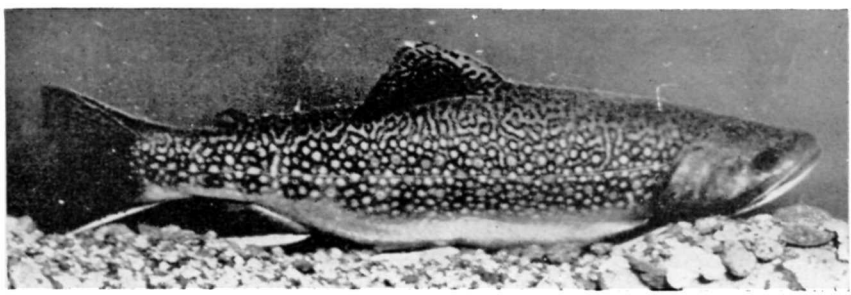
implies, is native to the eastern part of our country, originally extending as far west as the Great Lakes region. However, with modern methods of transporting eggs and fry they have been widely distributed. Consequently they have now been introduced successfully throughout the western mountain areas. This trout, often called "Speckled Trout" in the East, provides excellent fly fishing as it tends to be more of a surface feeder.

Its beauty is only rivaled by the beauty of its environment, which is among the swifter, colder mountain streams or gem-like, alpine lakes. Eastern Brook are commonly found in Yosemite above seven thousand feet and seldom do well at lower elevations or in warmer waters. It was widely planted in the early days throughout the headwaters of the Merced and Tuolumne Rivers and can still be caught there in considerable numbers today. In some lakes especially, they seem to do very well; but in most respects never become as completely at home as native Rainbow in the same waters.

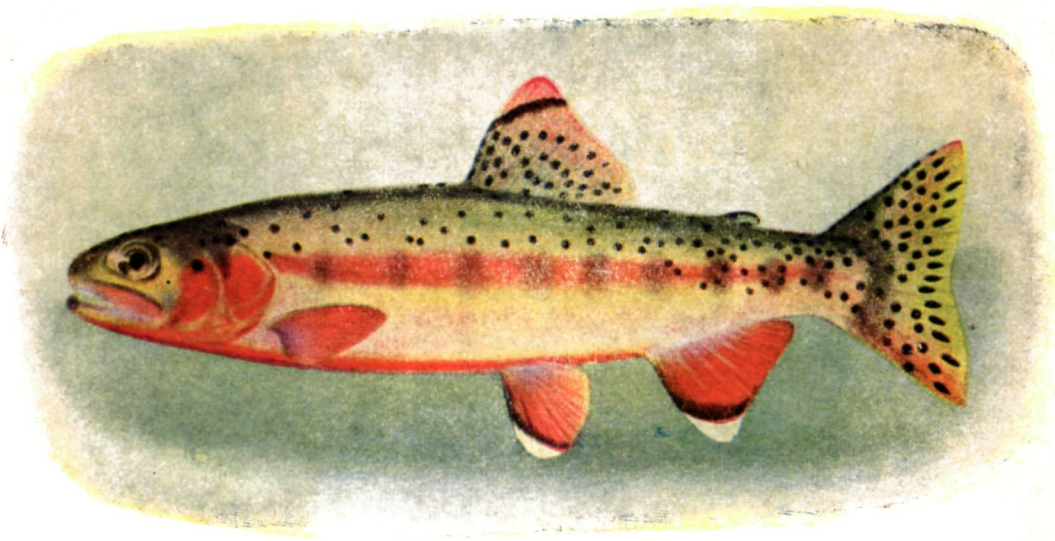
Few Eastern Brook are planted in Yosemite National Park at the present time. According to Mr. Otto Brown, Wildlife Ranger in Yosemite, "The principal reason for the discontinuance of Eastern Brook, other than that it is not in line with the fish planting policy,* is that in most lakes where they are now present, the streams do not flow at the seasons when they spawn making artificial stocking necessary, whereas there is nearly always sufficient flow to permit Rainbow to spawn. Also the fact that roads and trails to the high country lakes are not open early, constitute a serious crowding condition at the hatchery for Rainbow when Eastern Brook are held so long."

Eastern Brook Trout, like the Loch Leven, spawn during the fall. Natural reproduction is maintaining certain stream and lake populations in the high country, since no plants are being made. Other waters surrounding the park also show that natural reproduction has done so well that extensive planting was not needed.

*See "National Park Service Fish Policy"—page 16.



EASTERN BROOK TROUT (Salvelinus fontinalis)—Courtesy Calif. Fish and Game



GOLDEN TROUT (Salmo aqua-bonita)—Courtesy Calif. Fish and Game

Golden Trout

(Salmo aqua-bonita)

It is granted by common opinion among most fishermen that the prize for striking beauty belongs to the Golden Trout. (See color illustration). The catching of one's first "goldie" is always a memorable event. The brilliant coloration of bright golden-yellow sides with reddish belly and fins is usually not apparent until the trophy is removed from the water. Dark olive bars or parr marks parallel each other vertically on both sides. The black spots, when present, rarely extend below the midline on the sides.

Its specific scientific name, "aqua-bonita," means "pretty waters" and is quite appropriate in describing its aquatic home. Once this beauty was found only in a few of the high mountain streams of the Kern River drainage; especially Volcano Creek (now called Golden Trout Creek) in Sequoia National Park. It is thought that perhaps the Golden Trout was derived from the Kern River Rainbow (Salmo gilberti), through isolation. Many of the rocky slopes of Volcano Creek are volcanic in origin, containing bright reds and yellow-browns. This may have influenced the coloration of the Golden Trout.

At the present time, they have been planted widely throughout the surrounding bodies of water, as well as in many other localities in the High Sierra. Eggs obtained from the Mt. Whitney Trout Hatchery were planted at Upper Fletcher Lake and Adair Lake in Yosemite National Park in 1919-20.

Here in a land of long winters and a short summer growing season, they are found inhabiting a number of our alpine lakes and streams today. Headwaters of both the Tuolumne and Merced Rivers contain such stocked waters. Golden Trout seldom reach a size larger than seven or eight inches in our streams, but lake specimens often exceed one foot in length.

Tahoe Trout

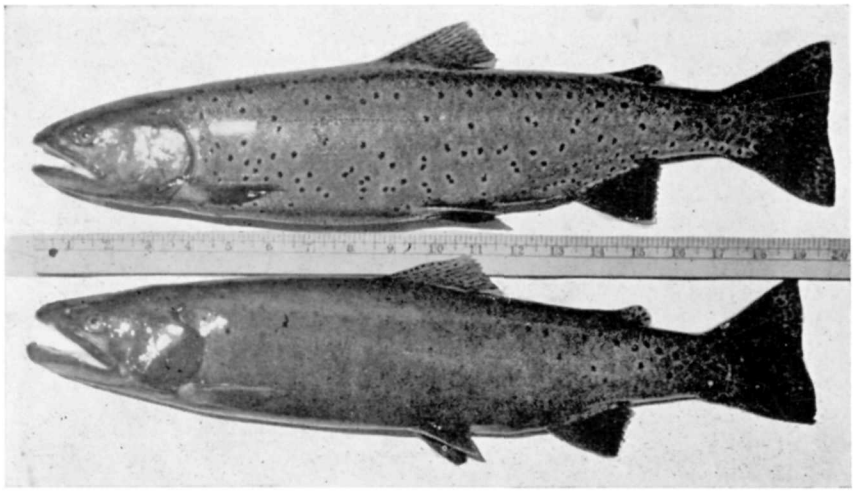
(Salmo henshawi)

The Tahoe Trout, also known by the names Black-spotted Trout and Silver Trout, belongs to the group known as the Cutthroat series. All of the several species of this series are characterized by the red dashes on the membrane of the lower jaw; hence the name Cutthroat.*

Lake Tahoe and surrounding area of the Truckee River drainage is the native home of this species. Its range has been extended artificially to include western Nevada and lakes and streams of the eastern slope of the Sierra.

Information concerning the Tahoe Trout in Yosemite National Park is very indefinite. Nevertheless, it is believed to have been introduced into the lakes in the Tuolumne Meadows area of Yosemite about 1892. Additional plantings were probably made but no record of introduction exists until 1928 when the California Division of Fish and Game stocked Yosemite waters

* In young fish the red dash may be absent and consequently they may be difficult to distinguish from Rainbow Trout. However, the presence of teeth at the base of the tongue (hyoid bone) is a diagnostic feature.



TAHOE TROUT (Salmo henshawi)—Courtesy Calif. Fish and Game

with 228,000 fingerlings.** During this one year Chilnualna, Ostrander, and Tenaya Lakes; the Merced River, and Hetch-Hetchy Reservoir were stocked.

The Tahoe Trout have done better in lakes than in streams. Lake specimens occasionally reach three to six pounds in weight. Mature adults ascend small streams in the spring or early summer in order to spawn in the shallows. Many regard the Cutthroats as inferior to other species in gaminess. At present, this trout is of minor importance in Yosemite, being found in moderate numbers only through the Gaylor Lakes group near Tioga Pass.

OTHER SPECIES OF FISH OF LESSER IMPORTANCE

Sacramento Sucker

(Catostomus occidentalis)

The sucker is a common fish of the lower Merced and Tuolumne Rivers. It is seldom, if ever, found at home above the lower valley levels. The yellow-brown throughout, plus the disc-like protuberances of the upper lip, which is flattened and protruding, will distinguish a Sucker. They are primarily bottom feeders, acting as scavengers, and seldom rise for any floating object. Occasionally they are captured, mainly by bait fishermen, but never in great numbers.

Hardhead

(Mylopharodon conocephalus)

The Hardhead or Kaweah Club is a true minnow belonging to the family Cyprinidae. In correct usage the term minnow refers not merely to any small fish but designates a member of this large family. Not all minnows, however, are necessarily small for the Hardhead often reaches a length of two or three feet.

The warm waters of the Sacramento-San Joaquin River drainage throughout their lowland valleys is the native home of this species. This habitat preference makes it rarely taken within the park boundaries. The only specimen known to the author from the park area was taken July 26, 1934, from the Merced River just within the western boundary and is now preserved in the Yosemite Museum.

California Roach

(Hesperoleucus symmetricus)

This small minnow is more commonly, though incorrectly, termed "chub" by fishermen. To distinguish one from another of the smaller members of the minnow family is no easy task. It will suffice in this article to describe the California Roach as a small fish, about the length of the forefinger, possessing a long head, pointed snout, narrow tail, long fins and large eyes. It is a native of the lower reaches of the

** It is quite possible that Montana Cutthroat (Salmo clarkii lewsii) eggs or fish may have been shipped by the Park Service into Yosemite from the Yellowstone Hatchery in the early days.

San Joaquin River drainage.

As far as the Yosemite region is concerned, Hetch Hetchy Reservoir is the only known body of water that this Roach inhabits. It appeared first around 1930, being undoubtedly introduced by some careless bait fisherman, who dumped the contents of his live bait bucket in the reservoir when through fishing.

Regulations are strictly enforced prohibiting the liberation of any such exotic fishes within the park boundaries. (See Fishing Regulations for Yosemite National Park). This is necessary to prevent wholesale introduction of many undesirable species which might destroy the native fish fauna. Many cases of this happening in other areas are commonly known.

Wildlife Ranger Brown makes this comment regarding the Hetch-Hetchy Reservoir situation: "Although it cannot be said that the introduction of this exotic minnow has been definitely detrimental to native fish, it has brought about certain changes. It has destroyed much of the fly fishing here. Large trout in this reservoir will no longer rise to flies but have found a substantial source of food in the Roach. Large Loch Leven Trout caught here frequently contain several of these Roaches.

TROUT FOODS

The normal diet of a trout may be determined primarily from a study of the stomach contents of a number of specimens. Availability is probably the main factor governing the type of food eaten. The kinds of aquatic organisms present vary greatly with the type of bottom, swiftness of water and its temperature, and season of the year. During spring and summer, surface foods consisting of emerging aquatic insects and terrestrial forms such as beetles, ants or flies are the principal foods; while winter finds feeding restricted to the aquatic forms entirely. Little is known about the food habits of Yosemite trout, especially during the winter.

Taking the year as a whole, most of a trout's food consists of aquatic insects. These insects belong primarily to five groups, viz.: Caddiceflies, Mayflies, Stoneflies, True Flies and Alderflies. Some forms are large, others minute. But these little forms make up in numbers what they lack in individual size. Just turn over a large stone, or stir up the gravel of a stream bed and you will find innumerable types of tiny insects being washed away from their places of anchorage or concealment.

In the Merced River throughout Yosemite Valley, Mayflies are probably the most important trout food, with Caddiceflies and Stoneflies of secondary value. Some trout, however, from high lakes where food

tends to be more homogeneous, seem to feed largely on True Flies (midges).

In general, feeding habits are dependent upon local conditions. Trout, like most animals, must take advantage of whatever type of food presents itself, although some selection is noticeable.

Little is known at present about the extent and conditions governing natural reproduction in our lakes and streams. Natural spawning in many of our less accessible areas is largely responsible for maintaining the trout populations. Therefore, it should be aided and encouraged wherever possible.

NATURAL REPRODUCTION

The trout of our mountain areas such as the Sierra Nevada are resident; that is, they do not make long migrations to the spawning grounds as do salmon and trout of many coastal streams. An interesting thing to note is the fact that salmon spawn once and die, while trout may spawn for several successive seasons.

The time of spawning among all trout varies with the temperature, season, locality and strain of fish. They tend to move upstream and seek the smaller tributaries, or in the case of those inhabiting lakes, inlets may be utilized. (Outlets and occasionally gravelly lake shores may be used if there is no suitable inlet.)

Eggs of trout are laid in nest-like depressions known as redds, built by the female in gravel bottomed areas, where currents are fairly swift. In choosing a spawning place, a permanent water supply of even temperature is the most important factor. Digging of the nest is accomplished by vigorous head and tail movements of the female as she lies on her side. The male usually spends his time during this period pugnaciously driving off other males from the nesting area.

When the nest is prepared, both the male and female occupy a position directly above it. At the same moment that the eggs are deposited, sperm or milt is discharged over them by the male. The then fertilized eggs fall into the pit of the nest, after which the female covers them by further digging movements that stir up the surrounding gravel. One female may dig nests and deposit eggs several times within one season's spawning period. All parental care of the offspring ceases with the covering of the nests.

TROUT CULTURE

On capturing a trout along the lakes and streams did you even think for a moment of its early development? If caught in the high country of Yosemite it is possible that it may have begun life as a tiny

egg deposited in a gravel bottomed stream bed. Later it would develop into a small fingerling trout. Or on the other hand, if a trout were captured from the heavily fished areas such as Yosemite Valley, it more than likely spent its early life in the fish hatchery at Happy Isles.

VALUE OF ARTIFICIAL PROPAGATION

In an area like Yosemite Valley the river is so heavily fished that few trout ever become old enough to spawn or lay eggs before being captured. Therefore, to maintain a constant trout population, great numbers must be planted each year. The valley floor is stocked with some 450,000 trout annually. The threefold purpose of our hatcheries is to help sustain fishing in heavily fished areas, as well as to stock barren waters, and to produce superior breeds of trout which have greater vitality and disease resistance.

Fish Hatchery & Exhibition Pool

All of Yosemite's so called High Country, above the floor of the valley was undoubtedly barren of fish life after the Ice Age and before the coming of white man. Glaciers descending the river canyons destroyed whatever aquatic life might have been present. The high waterfalls we now enjoy acted as impassable barriers which no fish could surmount in upstream migration. It is only due to extensive plantings that we have fine fishing today all throughout the alpine lakes and streams.

Yosemite National Park has one fish hatchery within its boundaries located in the floor of the valley at Happy Isles. This hatchery is maintained by the state of California's Division of Fish and Game. All fish planted in the park are reared at this hatchery. An agreement exists between the state and National Park Service whereby at least half the trout raised in the hatchery from eggs supplied by the state must be utilized to plant waters within the park. In actual practice, however, practically all of the fish raised in the local hatchery are planted in the streams and lakes of the park. Likewise, all fish produced from eggs secured in the park are available for park use, except that as Yosemite's needs are filled, excess eggs may be shipped to other state hatcheries; there to be reared for planting in other California national parks.

EGG TAKING

The egg source for the hatchery depends upon the kind of trout concerned. Two species primarily, the Rainbow and the Loch Leven, are being raised for liberation at the present time. The Loch Leven trout eggs are obtained outside the park. Rainbow trout eggs are collected from an egg taking station located at Lake Eleanor in the northern section of the park. Lake Eleanor is the only body of water within the park boundaries closed to fishing at the present time; this being necessary of course to preserve the breeding stock.

During the spring of the year large numbers of native Rainbows run upstream out of Lake Eleanor into the tributaries to spawn. At the mouth of a large tributary, Frog Creek, the National Park Service has constructed a dam with fishways and traps in order to capture the migrating trout.

After a sufficient number have been captured in the live traps, operations begin.* The first task is to place the males and females into separate holding tanks by netting them out of the trap. Males may be distinguished by their brighter coloration, conformation or feel of the body, and the sharply hooked lower jaws. The females must be further subdivided into those which are ready to spawn and those which must be held a few days.

After pans, buckets and other necessary equipment have been assembled, the spawning action begins. The operator first dons woolen mittens to prevent injury to the fish during handling. A large female Rainbow is then selected and by gently squeezing the abdomen (called stripping), the eggs are forced out into a small enamel pan. By similar procedure the milt or sperm of the male is forced out over the eggs, fertilizing them. Usually a gentle stirring of the mass insures a high percentage of fertile eggs.

The trout eggs are thus collected until actual bucketfuls are obtained.** (The average sized pail will hold around 100,000 trout eggs). Eggs are very tender at first and must be left standing quietly in water for at least 3/4 of an hour before being transported.

In contact with water an egg will absorb a great deal thereby causing the outer shell to become hardened. This period is known to hatchery men as the "freeze" or "water harden" stage. Once past this danger period, eggs may be safely transported back to the hatchery.

* Fish culture practices described, with slight variations, are those in common application everywhere and not restricted to Yosemite.

** Freshly spawned eggs are often referred to as "green eggs."

HATCHERY ACTIVITIES

Hatchery rearing of trout consists mainly of raising them under rigid protection from enemies, disease and other adverse conditions so that a greater number can be assured of reaching maturity than under natural conditions. Within the hatchery building are a number of long narrow troughs filled with pure cold running water. Into these troughs are placed wire-mesh baskets each containing around 20,000 - 25,000 eggs.

Other than the necessary transportation of "green eggs" from spawning station to hatchery troughs, all movement of eggs is minimized for some time. Eggs become so tender and sensitive when about three days old that even a slight jarring will kill many. Any attempt to ship at this stage would be fatal to all. The eyes of the young developing trout first appear visible through the transparent shell membrane when the eggs are approximately two weeks old at a temperature of 54 degrees Fahrenheit. This is known as the "eyed stage," at which time the eggs are no longer sensitive and may be transported great distances.

Upon hatching, the fry, as they are called, are able to wriggle through the wire mesh of the egg basket into the trough below. A trout fry is a curious looking creature, with a large yolk sac consisting of stored food attached to the abdomen. During the first stage of its life this yolk sac, which gradually becomes absorbed, furnishes all its food

With the sac entirely gone, the young trout swim up toward the surface of the water as if in search of food. This is the cue for the hatchery man to begin feeding. Finely ground beef liver comprises the main diet of these tiny fish. Even the larger fish are fed the same kind of food in larger pieces. Growth is fairly rapid and in two to three months after hatching, the young are perhaps 1½ to 2 inches long, or what are termed fingerlings. This is the size at which trout are planted in the waters of Yosemite.

To count each trout individually is, of course, impossible. Therefore, the fingerlings are weighed and numbers calculated from the known number present per ounce, (by actual count). After loading in large fish cans, each containing one to three thousand trout, they are ready to be transported anywhere in the park. Some of the waters are easily accessible and can be reached by truck. This entails the loading of cans in the truck and hooking up the aerator, which keeps the air circulating throughout the water of each can. Sufficient oxygen and constant, though moderate, water temperature (40-50°F), are the two main factors considered in transporting trout. Twenty-four hours before shipment, feeding of the trout is dis-

continued, which aids in conditioning them for travel. Clean planting cans and pure water (particularly unchlorinated) are other vital essentials.

FISH PLANTING

To stock the lakes and streams of the back country accessible only by trail, the cans are loaded on pack animals. Modern planting of trout by approved methods is far different than that of two decades ago. The planter's worries were over as soon as the canfuls of fingerlings were literally dumped anywhere in the lakes and streams that happened to be convenient. Large losses resulted, as naturally many trout in a small area created definite food competition and provided easy meals for fish predators. Nowadays fish planting is done more scientifically and requires a great deal more time and effort. Such factors as temperature equalization of waters when planting, food supply, predators, and spawning conditions are given considerable attention.

However, the results of additional effort are gratifying in most instances due to the increased survival. Young fingerlings are released a few at a time along the main marginal extent of a lake or stream. Quiet water provided with sufficient food and shelter can be found with a slight bit of patience. That at least gives the small trout a fair start in life. In Yosemite National Park about a million trout are planted in this manner each season.

With this vast number planted, one might wonder why all of our lakes and streams do not offer excellent fishing. Many fishermen are d i s a p p o i n t e d with their small catches (small in both size and numbers) from the Merced River in Yosemite Valley. As Dr. J. O. Snyder states it, "Depletion of the trout has lately attracted attention to almost every possible cause except the increased activities of anglers." The answer is simply that fishing intensity often badly overbalances the natural increase of trout. For instance, a Rainbow Trout does not spawn until it is three years old and around ten inches in length. Consequently, the majority of fish planted in the Merced River never mature before being captured. In the author's opinion, no heavily fished stream can long depend on light artificial stocking alone, but must be backed by natural reproduction, which is more effective than some people will concede.

Even before planting is undertaken, stream and lake surveys of all potential waters important to fishing would be beneficial. This would alleviate much waste of time and money by seeing that fish are stocked in waters providing a biologically sound environment for that particular species or strain. Many such survey programs are be-

ing conducted in various parts of the country today and their value has been amply demonstrated.

Research along such lines, plus creel censuses and fishermen questionnaires, have greatly increased our working knowledge of the game fish of inland waters. Only through public cooperation in promoting proper legislation, submitting accurate information, and abiding by legal restrictions, can our fisheries resources be restored to numbers which once existed and can be made to exist again.

FIRST PLANTINGS OF TROUT IN YOSEMITE

Before the planting of trout in the high mountain streams and lakes of the park, the only species of trout in Yosemite waters was the native rainbow. These, however, were confined to the waters of the Merced River in Yosemite Valley and below, together with that portion of the Tuolumne River in Hetch Hetchy Valley and below. The great height of the waterfalls in both Yosemite and Hetch Hetchy Valleys acted as barriers to prevent the trout from going higher.

It is believed that some of the early day sheep herders may have removed trout from some streams to other waters accessible to their summer campgrounds. According to Colonel H. C. Benson, one of the early Superintendents of the Park in the early 90's when the area was under army supervision, there was not a fish in any of the waters outside of Yosemite Valley and Hetch Hetchy with the exception of Lake Eleanor, where a Mr. Kibbe had planted some fish in 1877. John L. Murphy is said to have planted trout in Lake Tenaya in 1878. The Wawona Hatchery was built by the California Fish and Game Commission in 1895 and began distributing fish in and around Wawona. The first fish to be sent in from outside were some Eastern Brook Trout from Colorado and these were planted in Alder Creek in 1892.

Nevada Fall—594 ft. drop

Colonel Benson, during his service in the park beginning in 1896, took a

great interest in the distribution of fish, as did most of the army Superintendents who followed him. By 1914, the end of the army administration, the greater number of streams and lakes in the high country of the park had been planted. In 1918 an experimental hatchery was established at Happy Isles and after finding that the location was suitable a modern demonstration hatchery with fifty-four troughs was built on this site in 1927.

The output of this hatchery is well over a million fry yearly. It functions as a cooperative project between the State and the National Park Service and for that reason a state fishing license is required for fishing within the park.

NATIONAL PARK SERVICE FISH POLICY

The taking of fish in our national parks is the one exception in our wildlife policy of complete protection and preservation of all native animal species. Fish can be more readily replaced than any other type of animal and this exception is justifiable when we consider the high recreational use of our parks which angling brings about. In fourteen national parks, as well as several national monuments, fishing is permitted. A variety of species may be captured, all the way from deep sea fishing in Acadia to catching Golden Trout in Sequoia or Yosemite.

In the early days many different kinds of exotic fish were carelessly introduced into our national parks as well as outside areas. Much of this resulted in waste, as many species were not adapted to the type of waters in which they were planted. To safeguard against such introductions and to protect the native species, the Service formulated the following fish policy, which was approved in 1939:

1. No introduction of exotic species of fish or other exotic aquatic life shall be made in national park or monument waters now containing only native species.
2. In waters where native or exotic species now exist, the native species shall be definitely encouraged.
3. In waters where exotic species are best suited to the environment and have proven of higher value for fishing purposes than native species, plantings of exotics may be continued with the approval of the Director and of the Superintendent of the park in which such waters are located.
4. The wider distribution of exotic species of fish within the national parks and monuments shall be prohibited, and a thorough study of the various park waters shall be encouraged to the end that a more definite policy of fish planting may be reached.
5. The number of species of native non-game fish should not be reduced even where such reduction may be in the interest of better fishing.
6. All forms of artificial stream improvement which would change natural conditions should be avoided, but the restoration of streams to their natural condition is permissable where thorough investigation indicates the desirability of such action.
7. In cases where a lake or stream is of greater value without the presence of fishermen, there should be no stocking of such waters.

FISHING REGULATIONS IN YOSEMITE NATIONAL PARK

(1946 Season)*

The following regulations relative to fishing in Yosemite National Park are derived from, or issued under the authority of, Rules and Regulations made, published, and approved by the Secretary of the Interior.

Persons over the age of 18 years desiring to fish in the waters of the Yosemite National Park must secure a sporting fishing license, as required by the laws of the State of California. Fishing license fees are $2.00 for any citizen of the United States who is a resident of California; $3.00 for any citizen of the United States who is not a resident of California; and $5.00 for any person who is not a citizen of the United States. All fishing must be done in conformity with the laws of the State of California, except as otherwise provided in the following paragraphs. (N. B. The State of California prohibits fishing for trout with snag or gaff hooks, set lines, or lines having more than two attractor blades, or more than three hooks.)

OPEN SEASON: MAY 30 TO OCTOBER 15, INCLUSIVE.

CLOSED WATERS: The waters of Lake Eleanor, its tributaries for a distance of one mile from the Lake, and Eleanor Creek for approximately one-half mile below the dam, are closed to fishing. All other lakes and streams are open to fishing.

LIMIT: The number of fish that may be taken by any one person in any one day shall not exceed 15 fish, or 10 pounds and 1 fish, except that the number of golden trout which may be taken by any one person in any one day shall not exceed 10. Possession of more than one day's catch limit by any one person at any one time is prohibited.

No fish less than six inches long may be retained. All fish hooked less than such limit in length shall be carefully handled with moist hands and returned at once to the water if not seriously injured. Undersized fish retained because seriously injured shall be counted in the number of fish which may be taken in one day.

Fishing with nets, seines, traps, or by the use of drugs or explosives, or for merchandise or profit, or in any other way than with hook and line, the rod or line being held in hand, is prohibited.

The possession of live or dead minnows, chubs, or other bait fish, or the use thereof as bait is prohibited.

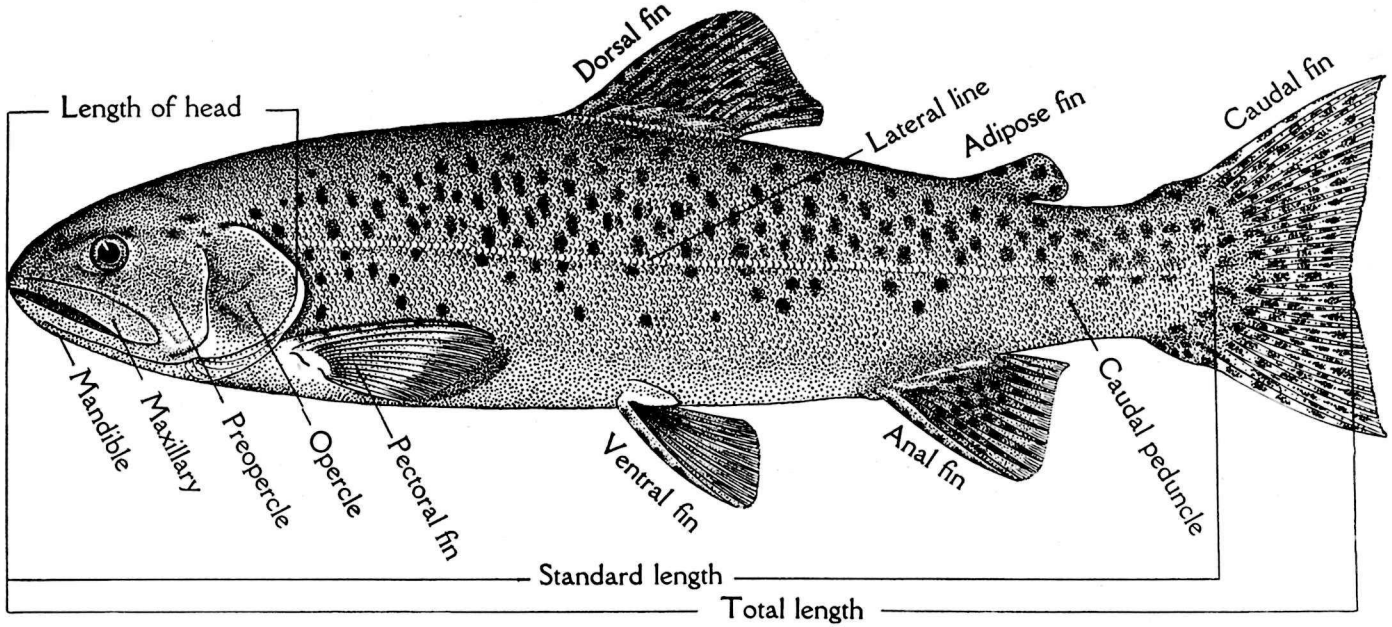
The digging of worms for bait is prohibited.

The canning or curing of fish for the purpose of transporting them out of the park is prohibited.

The possession of fishing tackle or fish upon or along any waters closed to fishing shall be prima facie evidence that the person or persons having such fishing tackle or fish are guilty of unlawful fishing in such closed waters.

State fishing licenses and all fish taken must be exhibited upon demand to any person authorized to enforce the provisions of the fishing regulations.

* Fishermen are requested to check at the Ranger Office or Museum for any subsequent change in these regulations.



Drawing of a trout for use with identification key.—Courtesy Calif. Fish and Game

A KEY TO THE FISHES OF YOSEMITE NATIONAL PARK

(The most important single recognition character is in **dark type)**

This key is designated to assist the sportsman in identifying any fish caught in Yosemite waters. It is a key of alternate characters: that is, if the character opposite 1-a is not typical of the specimen, you then proceed to 1-b which is the alternate character. For example—To identify the Loch Leven Trout it would be necessary to use the following characters: 1-a, 2-b and 5-a.

1-a. Adipose fin present.

2a. No red or brown spots present. Black spots on a background of lighter color.

3a. Black spots relatively abundant.

4a. **Red stripes on sides of body.** No red dash of color below lower jaw on each side. Body profusely covered with black spots.

Rainbow Trout, Salmo gairdnerii.

4b. No red stripes on sides. Body usually covered with black spots. **Red dash of color in cleft under each side of lower jaw in adults.**

Tahoe Trout, Salmo henshawi.

3b. Black spots relatively few and mainly above midline. A **yellowish-orange band on sides grading into golden-yellow further down and finally orange on the abdomen.** Body of stream fish with distinct bars or parr marks throughout life. Ventral and anal fins tipped with white.

Golden Trout, Salmo aqua-bonita.

2b. Red or brown spots present. Background either brownish-yellow or strongly mottled with olive and black.

5a. **General color brownish-yellow.** A few red or brown spots present on sides. Back covered with brown spots. Lower fins and abdomen yellow to white.

Loch Leven or Brown Trout, Salmo trutta.

5b. Red spots on a background of darker color. **Back unspotted but mottled with olive and black wavy lines.** Lower fins edged with white stripe; bright red or orange behind this.

Eastern Brook Trout, Salvelinus fontinalis.

1-b. Adipose fin absent.

6a. Mouth directed downward, excessively protractile, **sucker-like lips.**

Common Sucker, Catostomus occidentalis.

6b. Mouth not especially directed downward. Lips not enlarged and sucker-like.

Hardhead, Mylopharodon conocephalus.

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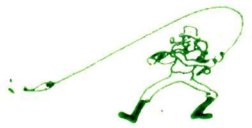

FISHERMAN'S LUCK

I fished today 'long a rollicking stream,
I caught no fish but I caught the gleam
Of the sun on the water as it frollicked along,
And I caught overhead the lilting song
Of a bird that sang from a treetop tall,
And I caught the sound of a waterfall.
I caught a glimpse of the cloud-ships high,
As they sailed the seas of the boundless sky;
I caught the sound of the buzzing bees,
And the song of the winds through the tall pine trees.

I caught no fish this summer morn,
But much that I caught I would not scorn;
For I caught the joy of a day well spent
Of hours that brought a sweet content;
A glimpse of God in the woodland plan,
A renewed faith in my fellow man;
And better health and a zest for life,
New strength to meet and conquer strife.
So go out fishing, you city man;

Though you catch no fish you'll find you can
Catch the spirit of a world that is clean,
And the unnamed joys of things unseen.
You'll catch new strength for the tasks ahead,
You'll find new life in hopes you thought dead.

Though you catch no fish from the turbulent streams,
You may recatch youth's wavering dreams;
So go to the woods where the bluebird sings,
And the sun's hues show in the butterfly's wings;
And when you return you'll say with your might,
That God's in His place and the world's all right.

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DIGEST OF THE PURPOSES OF THE

YOSEMITE NATURAL HISTORY ASSOCIATION

Yosemite National Park, California

ORGANIZED for the purpose of cooperating with the National Park Service by assisting the Naturalist Department of Yosemite National Park in the development of a broad public understanding of the geology, plant and animal life, history, Indians and related interests in Yosemite National Park and nearby regions. It aids in the development of the Yosemite Museum and library, fosters scientific investigations along lines of greatest popular interest, offers books on natural history applicable to this area for sale to the public, and cooperates in the publication of

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