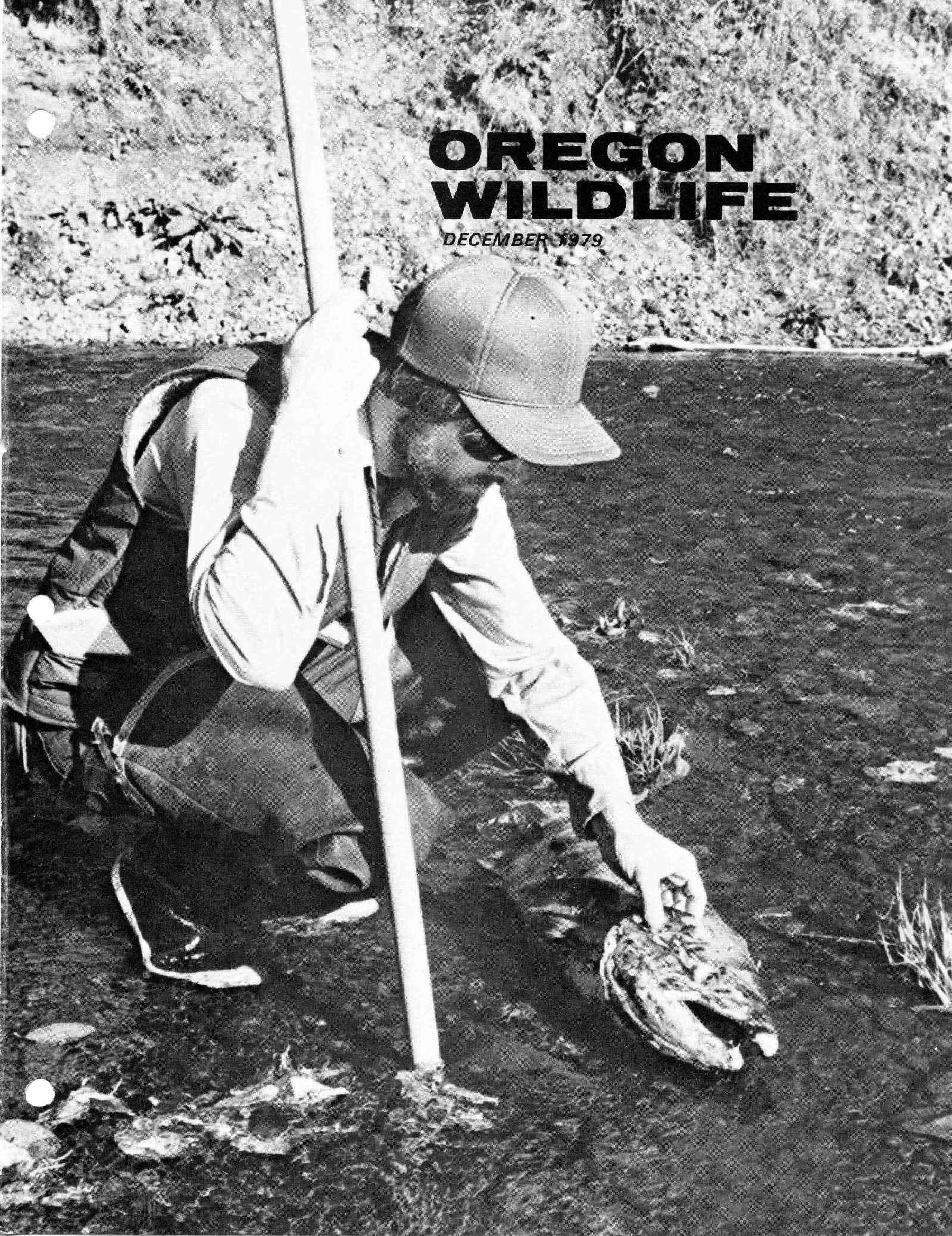


# OREGON WILDLIFE

DECEMBER 1979



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DECEMBER 1979  
Volume 34, No. 12

## OREGON FISH AND WILDLIFE COMMISSION

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# OREGON FISH AND WILDLIFE COMMISSION MEETINGS 1980

January 17	Thursday	Compact – General Regulations and Winter Season – <i>WASHINGTON HOST</i>
January 18	Friday	Opening Dates for 1980 Hunting Season
February 15	Friday	General Business
March 20	Thursday	Antelope, Cougar, Bighorn Sheep Regulations and 1981-83 Biennium Budget Policy Direction
March 21	Friday	Ocean Salmon Season – Troll and Sport
April 21	Monday	Compact – Spring Chinook Status Report
April 22	Tuesday	General Business
May 9	Friday	General Business
May 10	Saturday	1980 Game Mammal Regulation Proposals
May 29	Thursday	General Business
May 30	Friday	1980 Game Mammal Regulation Hearing
May 31	Saturday	1980 Game Mammal Regulation Decisions
June 20	Friday	Furbearer Regulations and General Business
July 24	Thursday	1981-83 Budget Report and Review
July 25	Friday	Compact – August Gillnet Season and Indian Fall Season – <i>WASHINGTON HOST</i>
August 14	Thursday	General Business
August 15	Friday	1980 Waterfowl and Upland Bird Hearing
September 4	Thursday	Compact – Late Fall Gillnet Season
September 12	Friday	Compact – Indian Fall Season Adjustments- <i>WASHINGTON HOST</i>
September 19	Friday	General Business
September 20	Saturday	1981 Angling Regulation Proposals
October 17	Friday	1981 Angling Regulation Hearing
October 18	Saturday	1981 Angling Regulation Decisions
November 14	Friday	General Business
December 12	Friday	General Business

Unless otherwise noted, all meetings will be held in the Commission Room, Oregon Department of Fish and Wildlife, 506 SW Mill Street, Portland, Oregon. Washington Compact meetings will be held in the Vancouver City Council Chambers, 210 East 13th, Vancouver, Washington. Compact meetings begin at 10 AM. Commission meetings begin at 9 AM. If you have questions regarding agendas, the time or place of meetings, please call Judie Neilson, 229-5406.□

**Cover** – Annual surveys of spawning grounds tell biologists how many “wild” salmon have escaped sports and commercial fisheries and survived to spawn in coastal rivers.

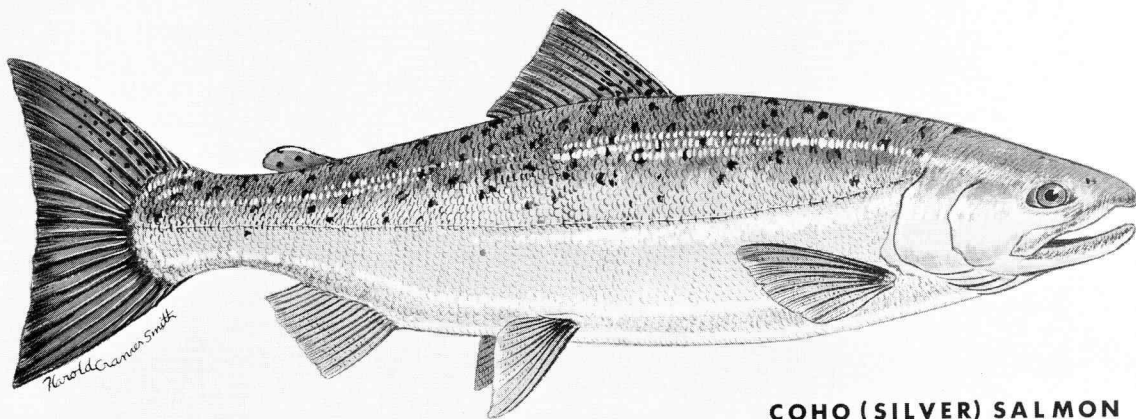
HUNTER EDUCATION  
PROGRAM  
INSTRUCTORS APPROVED  
Month of October . . . . .30  
Total Active. . . . .1,690  
STUDENTS TRAINED  
Month of October . . . . .1,834  
Total to Date . . . . .270,257  
HUNTING CASUALTIES  
REPORTED IN 1979  
Fatal . . . . .2  
Nonfatal . . . . .16

## COMMISSION MEETINGS

The Fish and Wildlife Commission will conduct a general business meeting on Friday, December 14, at Fish and Wildlife Department headquarters, 506 S.W. Mill Street in Portland. The meeting will begin at 9 a.m.□

DECEMBER 1979





**COHO (SILVER) SALMON**

*Oncorhynchus kisutch* (Walbaum)

# WHY WILD COHO?

*By Harry Wagner  
Assistant Chief  
Fish Division*

There has been much talk in the past year about wild coho. This has caused people to ask, "What's so special about wild fish?" Let's take a look at the reasons why Oregon's remaining wild coho stocks are an important natural resource. The reasons discussed most often fall into three general categories: cultural and aesthetic, economic, and biological. Most of the discussion that follows relates to why the maintenance of wild stocks is a biological necessity to insure the long-term abundance not only of naturally but artificially produced runs. Other reasons for wanting wild coho will be discussed briefly to help put the biological concerns in perspective.

I would like to make a distinction at the start between wild coho stocks and runs of coho produced from the natural spawning of hatchery fish. The difference will become more apparent as you read on, but basically wild coho are more diverse genetically and are better adapted — more fit for survival, growth, and reproduction in the stream and ocean — than are the progeny of hatchery fish. The degree to which the progeny resulting from the natural spawning of hatchery fish differ from the progeny of wild fish will depend on the amount of selection that has taken place in the hatchery and the number of genera-

tions that the stock has been exposed to the hatchery environment.

## LAWS AND POLICY

Before discussing the reasons that wild coho are needed, we should perhaps define the Department's responsibilities for the conservation of wild populations of fish (coho salmon in the present discussion) and wildlife.

Oregon law provides for the conservation of all our wild fish and wildlife resources. Statutes say that "fish and wildlife of the state shall be managed to provide optimum benefits to present and future generations of Oregonians; that all species of fish and wildlife shall be maintained at optimum levels; and that indigenous (native) species shall not be depleted or made extinct." The Oregon Fish and Wildlife Commission was created by the Legislature to implement the intent of the above statutes. The Commission has further defined and emphasized the need for and value of wild fish generally in a written policy. The policy states in part: "The protection and enhancement of wild stocks will be given first and highest consideration in the fish management program of the Department of Fish and Wildlife. Hatchery or foreign stocks of fish will be released only where deemed necessary

to provide optimum benefits from the resource."

Laws are really not reasons why we need wild coho; instead they represent a way to insure that wild coho continue to exist at a level to meet society's needs and desires now and in the future. The statutes and policies already mentioned were adopted only because of concerns of Oregonians about the cultural and aesthetic, economic, and biological aspects of maintaining wild populations. Also, laws and policies can be changed or interpreted differently as society's needs and values change.

The current wording of the various statutes and policies allows the Department considerable flexibility in interpreting and providing for the needs and values of Oregonians. For example, the wording "optimum benefits" and "optimum levels" are value judgments and consequently mean different things to different people. The difficult task that the Department faces is not only to manage for the needs and desires of various user groups today but to manage in a way that maintains options for future users.

## CULTURE AND AESTHETICS

Wild coho stocks are important to many Oregonians for cultural, aes-



One coho looks much like another, but there are important differences between strains that aren't visible to the naked eye. Wild fish have adapted over the centuries to the living conditions in their particular stream and may not do well when placed in another stream with differing conditions.

thetic, and even moral reasons. The preamble to the Wild Fish Policy addresses these and associated reasons: "Native wild fish are a heritage that merit being preserved in natural habitat in at least part of their original range. Managing for wild fish encourages man to do what is best for the resource and it places environmental concerns ahead of proposed trade-offs. The presence of cold-water fish usually indicates good water quality and a healthy environment not only for the fish but for man. The aesthetics of fishing for, seeing, or at least having the potential to catch or see, wild fish is widely treasured; the fewer wild fish there are, the more they will be valued."

How many Oregonians support a management program for wild coho for cultural or aesthetic reasons only, and how much they are willing to pay directly or indirectly for the maintenance of these populations, is not known. This justification for maintaining wild coho probably would be the first to be compromised when it comes to "push and shove" as society reorders its priorities.

### ECONOMICS

Probably the most obvious reason for Oregon to maintain wild coho stocks is so that the available habitat

will be producing as many fish as possible. Oregon has been blessed, on the coast alone, with over 6,000 miles of stream capable of producing large numbers of coho salmon. Naturally produced coho are not "free" because of the cost associated with stream protection. While not all the benefits and cost associated with maintaining water quality and quantity in our streams can be assigned to wild coho production, there is no doubt that this production is an important economic factor in maintaining streams in a condition so that fish can grow and reproduce.

### BIOLOGICAL

The "biological" reason for preserving wild coho stocks is the most important. The availability of wild stocks is fundamental to achieving our socioeconomic goals in coho salmon management now and in the future.

It is now recognized that the narrow genetic base of our highly selected coho hatchery stocks can make them dangerously vulnerable to disease, competition, predation, and fluctuations in the physical environment that would limit their survival — and wild stocks that provide the genetic base for diversification have been severely reduced by man's activ-

ities. In a real sense, our scientific achievements in aquaculture have put us in a vulnerable position in which a rather narrow genetic base — represented by our hatchery stocks — currently makes up the bulk of the coho produced and harvested. A relatively few hatchery stocks have been widely adopted, resulting in a uniformity that makes broad areas susceptible to the same destructive forces.

The problems associated with monocultures are well recognized in agriculture but less so in aquaculture. Agricultural monocultures are characterized by marked fluctuations in abundance and require the constant attention of man (e.g., development of new strains or varieties), as well as high energy input (e.g., fertilizer, herbicides, and pesticides) to maintain production. Considerable effort by horticulturists is occurring worldwide to preserve basic genetic resources, particularly the collection and conservation of wild species and primitive varieties of plants that carry the genes for traits we may desperately need in the future. Fortunately for the agriculturist much of the genetic material can be preserved in the form of seeds that are more easily stored than the reproductive products of fish. Aquaculturists will have a much more difficult problem in preserving salmon gene pools; that is, maintaining wild stocks over a wide range of environmental conditions.

In recent years the Department either directly or indirectly by funding research at Oregon State University has attempted to inventory some of our salmon and steelhead stocks for genetic differences and determine the significance of some of the differences observed. To support the notion that wild coho salmon exist that are distinct genetically and that these stocks are a biological necessity, three things must be established:

1. The wild (and hatchery) coho stocks returning to various streams (and hatcheries) have to possess different traits, and the traits are inherited and are not an immediate response to the environment. If the stocks are all the same, then they should be interchangeable among river systems (and from hatchery to stream) and



all show similar responses to environmental conditions.

2. The inherited traits are important to our use of those stocks now (and in the future). It does not make sense to go to the expense and effort of preserving various stocks if the inherent differences are not important with respect to man's use of those stocks.
3. Many of the differences will be lost when a given stock is artificially cultured generation after generation for part of its life in a hatchery.

The characteristics (phenotype) of all living things are a response of inherited traits (genotype) to the environment. For example, if you take young fish from a distinct stock known for large body size and place them in an environment where food is scarce, the fish will be smaller than those grown under conditions more favorable for growth. Fish in both groups inherited the same capacity for growth but the environment controlled the response in this example. Perhaps not so obvious is the fact that if you take young fish from another stock known for small body size (inherited trait) and place them in the environment that is favorable for growth, they will not achieve the same size as the fish from the stock known for its large body size.

Many people believe that we no longer have distinct stocks of wild coho, only fish that are the result of natural spawning of hatchery fish. In other words, a coho is a coho. Evidence shows this is not true. Despite the earlier management practice of stocking fish originating from one stream into another watershed — a practice, by the way, that led to the decline and/or extinction of some stocks early in this century — Oregon coastal streams continue to have coho salmon that possess different inherited traits. For example, a study completed recently at Oregon State University showed a number of differences. The traits evaluated included two enzyme gene frequencies, the life history characters of time of peak spawning and proportion of females in the population, and the meristic characters of scales in the lateral series, scales above the lateral line, anal rays, gill rakers, branchiostegal

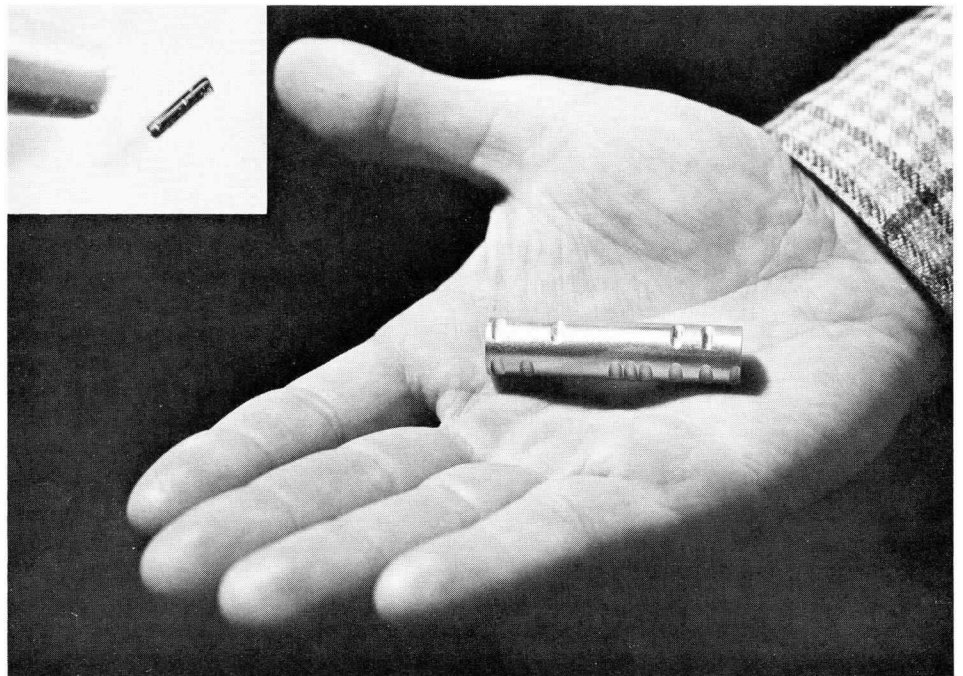
#### OREGON WILDLIFE

rays and vertebrae. Coho salmon stocks from similar environments were found to be phenotypically similar for these traits. The groups of stocks found to be similar by analysis were: (1) wild stocks from the north Oregon coast; (2) wild stocks from the south Oregon coast; (3) stocks from hatcheries using wild coho salmon for an egg source; (4) stocks from large stream systems; and (5) hatchery stocks from the north Oregon coast. There were three trends involved with these patterns: (1) stocks that are geographically close tend to be similar; (2) stocks from large stream systems were more similar to each other than to stocks from smaller stream systems, independent of geographic nearness; and (3) hatchery stocks were more similar to each other than to wild stocks, even those in their respective stream systems, and wild stocks were more similar to each other than to hatchery stocks, even those in their respective stream systems.

The reasons differences remain despite some of our past stocking practices is in part I believe explained by the fact that in many situations the young coho that were released did not survive to reproduce, particularly prior to the 1960's. In many

cases this was due to stocking fish at the wrong time and/or size; stocking fish that were of poor quality because of disease and diet problems that existed earlier; stocking fish into streams that were already seeded to capacity with salmon and trout, or nearly so; and, last but not least, stocking fish that were poorly adapted genetically for the environment into which they were placed.

We have some recent examples where we attempted to stock fish adapted to one environment into a river system where conditions were different. For example, the Nehalem River contains a protozoan parasite, *Ceratomyxa shasta*, that is common in the Columbia River system but has been found in only one other coastal stream, the Rogue River. Attempts to augment the coho and steelhead runs in the Nehalem River using stocks from the Alsea River failed. We now know that fish from the Alsea River are very susceptible to the parasite. An analogy would be the devastation of the Indian people when exposed to smallpox, measles, etc., brought to this country by Europeans. Indians had not evolved any resistance because of the absence of these disease organisms in their environment.



This palm-sized object is a model of the coded wire tags now being used by fisheries managers to learn more about salmon populations. The inset photo shows an actual coded wire tag compared with the point of a sharp lead pencil. Tags are inserted into the snouts of young fish before they migrate to sea and are recovered with use of metal detection devices upon their return.

All coho, or for that matter all salmon, may look alike to the casual observer, but there are differences recognized by fishermen and biologists alike. Some of these differences are important to us now. For example, some coho stocks have different ocean migration patterns and consequently differ in how well they contribute to Oregon fisheries; some stocks differ in their resistance to various diseases; and some stocks differ in their time of entry into fresh water and when they spawn. We do not know the significance of some of the biochemical differences (e.g., enzyme patterns) that have been demonstrated recently and there are no doubt important differences among stocks that we are not even aware of yet.

Coho salmon are closely related to other Pacific salmon, such as chinook, chum, pink, and sockeye. But coho are considered a distinct species

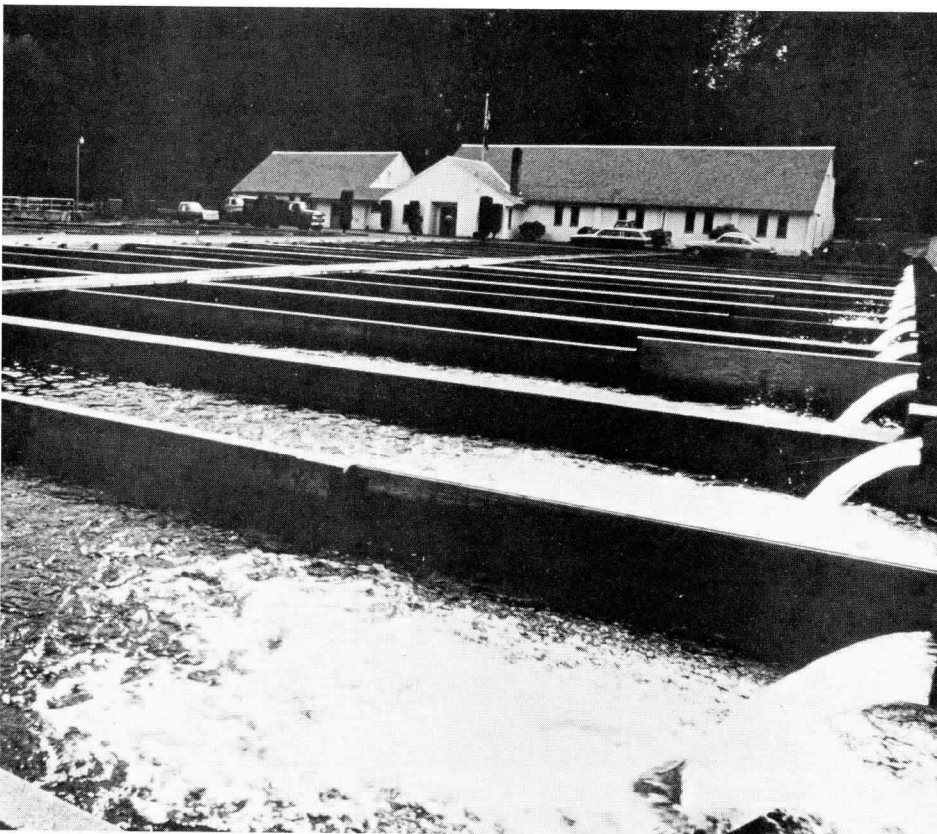
as are the chinook, chum, etc. While most stocks of coho may look alike there are important biological differences as discussed above. Most of these differences are not readily apparent (e.g., disease resistance). The fact that we cannot "see" or "feel" some of these differences does not mean they are not important. In contrast, we are not only readily able to distinguish between breeds of cattle or dogs based on visual traits but we also recognize the breeds as being different with respect to traits we wish to use. No one looking for a sheep dog would go out and buy a Pekingese, although both the Pekingese and sheep dog belong to the same species. Nor would someone starting a dairy farm accept a truckload of Hereford beef cattle as a substitution for Holstein dairy cattle. Nor, based on past experience, would we want to put Alsea coho in the Nehalem River for purposes of restoration or enhancement of the natural run.

The differences between Holstein and Hereford cattle are extreme and the result of years of selection, mostly by man. Some of the difference between coho (e.g., disease resistance) are just as extreme biologically and are the result of thousands of years of selection by nature.

The question that must be asked now is how effective can the hatchery be in maintaining genetic diversity. Most people would agree that we need this "genetic insurance" but can't we do it simply by diversifying our hatchery brood stocks? The answer is, yes to some degree. We can increase the genetic diversity of our existing hatchery stocks, and are doing so now by collecting locally adapted fish for brood stock at new hatcheries, and modifying other hatchery practices. It is the "to some degree" that needs to be questioned. Taking a given wild stock of coho and dividing it into two components, one that will continue to be reared in the varied environment of the stream and the other to be reared for part of its life cycle in the more uniform hatchery environment, will result in two populations differing in certain traits in time. Selective pressures in the hatchery are different than those that occur under natural conditions. Changing our hatchery practices will not only help to maintain genetic diversity in the stock and make the hatchery fish resemble a wild fish more but will also make the hatchery product more expensive over the short term because many of the changes result in higher operational costs. However, the long-term cost could be considerably greater if we do not carry out a program to increase the genetic diversity of our hatchery stocks.

Our current understanding of genetics and hatchery practices leads us to believe that the only practical and ecologically safe way to preserve genetic diversity is to maintain wild stocks — the natural spawning and rearing of stocks adapted to local conditions.

Currently, fishery biologists are wrestling with the problem of whether or not surplus hatchery coho (adults, released for natural spawning; presmolts, released for natural rearing in the stream; and/or



The hatchery has become an important tool in fisheries management, but it cannot and should not replace the natural spawning of wild fish in the streams.



smolts, released in a stream where upon their return as adults they will spawn) can be used to reseed streams to capacity immediately, or in the next cycle, where the escapement of wild coho in recent years is believed to be inadequate. The inadequate escapement of wild stocks is a serious problem where we have wild and hatchery produced fish intermingled and subjected to a common fishery.

We can probably maintain some level of production if we are careful about the hatchery stock we use (e.g., cannot put Alsea stock in the Nehalem River). The degree to which the indigenous stock will be changed to resemble the hatchery stock will depend on the level of stocking and eventual opportunities for interbreeding, the status of the wild population (it will usually be low, otherwise we would not be stocking the stream in the first place), and the degree to which the wild and hatchery fish differ in characteristics. The outcome will probably be a stream that is dependent on annual stocking and whose population is at best only one generation removed from the donor hatchery stock. The above will lead to the widespread loss of genetic diversity.

We have no doubt lost much of the genetic diversity present in our coho stocks, but there is still much that remains. This material is the "genetic insurance" or legacy that must be maintained for future use, if not in our generation then in those to follow. I do not believe that society will condone or can afford the continued loss of this genetic material in our remaining wild stocks. Again, it is this genetic resource that future generations of Oregonians will (1) reinfuse into existing hatchery stocks, (2) use to develop new hatchery stocks, (3) use to try to reestablish natural runs where opportunities occur, and (4) use to optimize the natural production of coho in streams. The intensive and extensive stocking of surplus hatchery fish in all forms (adults, presmolts, and smolts) away from the hatchery streams is ecologically dangerous as well as impractical and should not be substituted for a management program that allows adequate escapement of most wild coho stocks.□

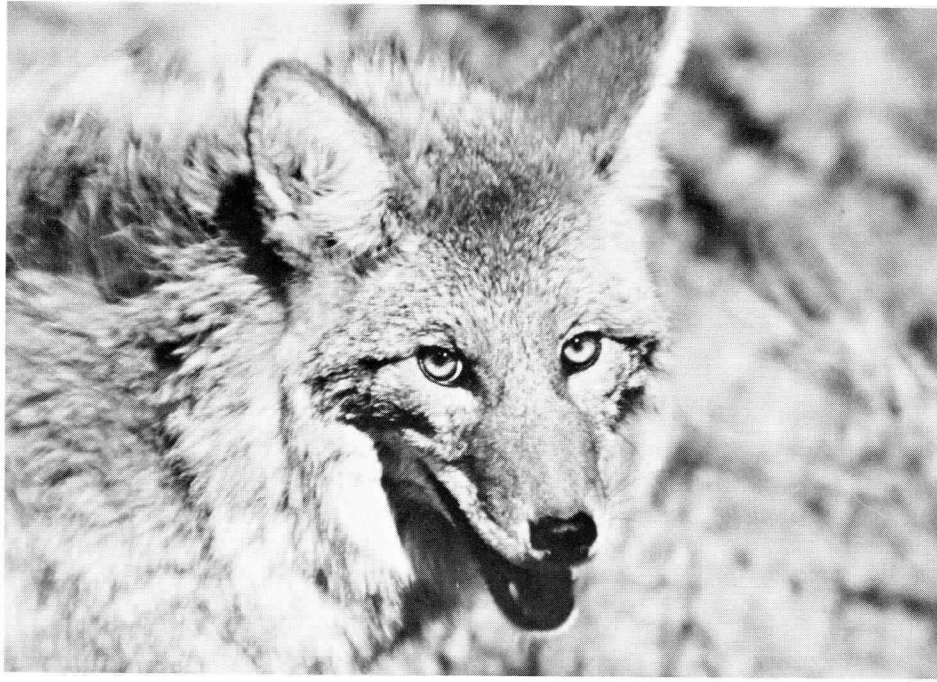
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The coho is an important resource, both to the sports fisherman and to the commercial industry. There have been many long and often heated discussions about its management in the last year.



The end of one generation marks the beginning of another. Nature's marvelous cycle of salmon reproduction insures the natural selection over many generations of those traits that best adapt a fish to its home stream. Unwise use of hatchery fish can dilute naturally selected characteristics.



## WILD PETS AND RABIES

*By David E. John and Charles J. Issel, D.V.M.  
(Reprinted in part courtesy of Louisiana Conservationist)*

In 1977 an Oklahoma shop foreman took home a baby skunk that two of his workers captured in the woods. Since it was still small, the foreman's wife fed the skunk with an eyedropper and often put her fingers into its mouth to keep it from choking. In moments of play, the couple allowed the animal to crawl over their four month old son. When word got out that a skunk was in the neighborhood, six children came over to play with it. The skunk crawled over all of them and lightly bit one girl on the hand.

Days later the skunk died. The shop foreman sensed something wrong and had it checked for rabies. The result was positive — the skunk had the disease.

In an unrelated incident, a two-year-old descented, vaccinated pet skunk bit a man and exposed two children before it was killed and taken to a lab. The animal was also positive for rabies.

As a result of these exposures to skunks, the 15 persons involved had

to undergo a total of 360 injections at a cost of \$7,500, not to mention the time lost and discomfort involved. Happily all survived; but was the pleasure of owning a wild pet worth it?

### WILD PETS

Wild animals are just that — *wild*. They are not domesticated and they do not make good pets in the same sense that dogs and cats do. Outwardly, the young are as cute and fetching as any baby animal. They are curiosities that capture the attention of everyone; they are like people-magnets, making young and old alike want to smile, to chatter, and to cuddle. Inwardly, though, wild pets are still untamed with all the same wild instincts, urges, and shortcomings as their free relatives in the field.

In spite of these problems, wild animals have become so popular that it is possible to buy nearly any kind from anteaters to zebras. You can buy burros, bears, buffalos, chipmunks, cougars, foxes, llamas, monkeys, por-

cupines, raccoons, skunks, and wallabies. Trade in the more expensive exotic animals is limited, but the skunk and raccoon business is thriving. The market for them is good enough to keep many operators in business, both legally and illegally. Not only is the trade active, but any baby animal captured in the wild is likely to end up in someone's home as a pet. People have snatched up "orphan" skunks and raccoons from the woods and have quickly given them away or sold them as novelty items for high prices. As the Oklahoma shop foreman learned, his free skunk carried a high price indeed.

### THE MAIN PROBLEM

Wild animal pets cause a profusion of problems depending on what kind you happen to have. Previously tame deer may attack without warning as they mature. Monkeys will bite and have even killed small children. Skunks like to nip fingers. Raccoons get into everything unless you chain them. Wild pets are unpredictable,



sometimes biting and attacking for no apparent reason. Even if you can live with their uncertain personalities, the threat of rabies, especially with foxes, skunks, and raccoons, overshadows all other concerns.

A skunk owner might argue indignantly, "If I take my pet to a veterinarian for all the proper shots, why should rabies even be a consideration?" The answer to this question is as simple as it is surprising — **THERE IS NO LICENSED RABIES VACCINE FOR WILD-LIFE!** What protects dogs and cats does not necessarily protect wild animals. Vaccines that immunize domestic animals may even prolong or mask existing rabies infections in wild animals. In fact, live virus rabies vaccines, developed and proven to protect domestic animals for as long as three years, have actually *caused* rabies in wild pets — for this reason, such vaccines must never be used in wildlife.

#### DOMESTIC AND WILD ANIMAL RABIES

The progress of rabies and its clinical signs in domestic animals is fairly predictable. Should a dog encounter a rabid fox, the virus in the fox's saliva will enter the dog's body at the location of any bite wound. The virus multiplies, penetrates a nerve cell, and slowly moves up the nerve at no more than 3mm per hour to the spinal cord and then to the brain. From the brain, the virus moves to the salivary glands. At this point the dog becomes dangerous — if he bites now he can transmit the disease by his infected saliva. Normal time for the virus to move from the bite wound to the salivary glands is 15-25 days after exposure. Indications of rabies in the dog include one or more of the following behavior and physical changes: restlessness, aggressiveness, lethargy, change in vocal quality, persistent howling, paralyzed lower jaw, convulsions, profuse ropy saliva, and paralysis. Dogs usually die in ten days or less after the virus reaches the salivary glands. **THAT IS THE REASON FOR WATCHING DOGS CLOSELY AFTER THEY BITE SOMEONE.** If the dog shows no symptoms and survives 10 days after the biting incident, it does not have the disease. The 10-day waiting period

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is very reliable in dogs ... but not in wildlife. (*Ed note — the above statements also apply to cats.*)

Rabies in wild animals is considerably less predictable. An infected animal can undergo a variable incubation period where the virus remains long dormant in the wound. Furthermore, when the animal does become infective, it may not show any symptoms of the disease while still releasing great amounts of virus. No 10-day waiting period here. By the time the animal becomes ill, the person who has been bitten could be beyond help.

Wildlife may show some or none of the signs of rabies until the final stages. In general, a wild animal which shows aggressiveness or an unusual lack of fear is suspect. Raccoons in particular are dangerous because they are less likely to display furious behavior — but this is not a consistent finding either. The only constant among the signs of rabies are the inconsistencies. As in domestic animals and man, death is the usual end result of the disease in all wildlife species.

#### DISTRIBUTION

Rabies is a worldwide infection primarily affecting dogs, cats, and other carnivores, but man and all warm-blooded animals are susceptible. Canada's three main reservoirs of rabies are foxes, skunks, and bats. In Mexico, where pet vaccination requirements and leash laws are lax or nonexistent, most of the reported rabies cases occur in dogs, cattle, and cats. From Mexico through Uruguay, vampire bats comprise a huge reservoir of rabies. They infect and kill from 0.5-1 million cattle a year at a cost to ranchers of \$250 million annually.

Most cases of rabies in man and domestic animals in the United States today originate from contact with an infected wildlife host — mostly skunks, bats, raccoons, and foxes. Fox rabies was once a serious problem in this country, but fox hunting and trapping, as well as habitat reduction, have probably contributed to the appreciable reduction of fox rabies cases. Rabies seems to be more associated with particular species in certain parts of the country.

Skunks are the most important wildlife reservoir in north central and

south central United States and in California. Surveys have indicated that up to 15 percent of all wild skunks are rabid — that is about one in seven.

Raccoons are the most important rabies host in the southeast. Of the total U.S. reported raccoon cases in 1977, 87 percent of them were from Georgia and Florida.

Foxes are important rabies carriers in south central U.S. and the Appalachian region. Rabies is known in the majority of insectivorous bat species. In 1977, California reported 26 percent of the total U.S. bat cases.

There are no particular hotspots in Louisiana at present.

#### SUSCEPTIBILITY

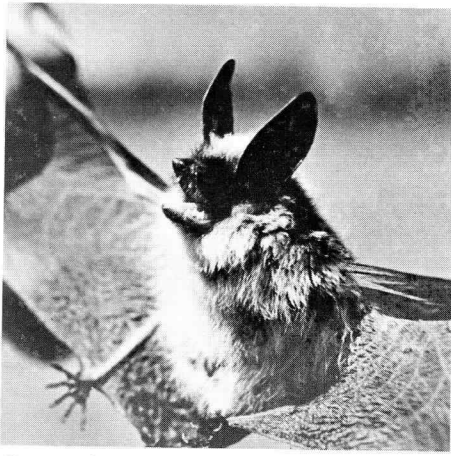
Species susceptibility to rabies is variable with foxes the most susceptible, skunks, cats, raccoons, and bats next in line, then cattle, man, horses, and dogs and finally opossums which are quite resistant. Because rodents such as rats, mice, squirrels, chipmunks, hamsters, gerbils, and guinea pigs only rarely acquire rabies under natural conditions, post-exposure treatment for their bites is seldom justified. Of the more than 13,000 rodents and rabbits checked in 1977, only one North Dakota woodchuck was positive. In addition, no human rabies cases have ever been attributed to a rodent bite.

#### TRANSMISSION

Rabies virus is most often transmitted when, the virus in the saliva enters a bite wound. The closer the bite, scratch, or abrasion is to the face, the more severe the wound, the quicker the virus will attack the brain. Infected foxes, dogs, and skunks pose a greater threat for bite transmission because they generally have a greater concentration of virus in their saliva than other species.

Another means of transmission is by inhaling the virus. The air in bat caves can be as infective and deadly as the rabies aerosols produced in laboratories; however, the risk of acquiring the infection under these conditions is very much lower than that following a bite exposure. (*Ed. Note: "Cave Air" transmission has been proven in only one place, Frio Caves, Texas.*)

Other unlikely, but possible, modes of transmission include an animal



Oregon is a "low incidence" rabies state, although the disease is found and outbreaks can occur without warning. The bat is Oregon's most frequent "wild" animal carrier.

eating a dead or dying rabid animal, and a sick mother infecting her entire litter by her milk, or by licking them.

### CONTROL

To reduce the threat of rabies in man at least four control measures are possible. The first and most important is the vaccination of domestic dogs and the control of stray dogs and cats. Investigators have estimated that a 70 percent vaccination rate of dogs is sufficient to control urban rabies. In Laredo, Texas, 54 dogs were reported rabid from November 1977 to March 1978. Health officials halted the disease by initiating a massive vaccination program (13,000 dogs, 1,000 cats) and by capturing over 1,700 strays. To date, officials still do not know what started the Laredo epidemic, but they do know that vaccination and roundup of strays stopped it before any human rabies cases occurred.

A second control measure is to reduce contact between infected wildlife hosts and man or his animals. This is difficult when recreational activities bring campers, hikers, hunters, and other outdoorsmen in to wild habitats, thereby increasing their chances for rabies exposure. Common sense, knowledge of the disease, and strictly enforced leash laws to prevent pets from running loose will all help to minimize wildlife contacts.

Third, considering the different rabies hotspots in the country, and

reduction in movement of susceptible wild animals from those areas is in the best interest of public health. Also, because there is presently no safe, sure way to immunize wildlife, the states should enact and enforce laws to prohibit wild animal ownership and to prevent their interstate trade.

Fourth, as wild animals are the source of most cases of rabies in domestic animals and man in the U.S. today, it seems logical to attack the source of infection — logical but not yet practical. A number of states have tried, most without success, to reduce infected wild populations by shooting, poisoning, or gassing. In Mexico, a special anti-bat campaign using anticoagulants has greatly reduced the cases of rabies in cattle. Many times, though, an innocent species ends up the loser. The black-footed ferret, for example, was nearly exterminated in parts of the United States because of poison bait set out for other animals.

### TREATMENT

Louis Pasteur developed the first antirabies vaccine in the 1880's. His regimen is the basis for our modern day treatment of the disease. Basically, a person bitten by a rabid animal takes two types of inoculations. First he receives Rabies Immune Globulin (RIG) — half infiltrated around the wound and half administered intramuscularly in the buttocks — in an attempt to destroy the virus directly. RIG is a passive immunizing agent prepared from the blood of hyperimmunized donors. Then the person receives from 14 to 21 daily injections of Duck Embryo Vaccine (DEV) plus two boosters to stimulate his own bodily production of antibodies against the disease (active immunity). The physician gives the vaccine doses subcutaneously (under the skin) in the abdominal region, lower back, or side of the thighs. The reason for using those locations instead of the shoulder area is to lessen the impact of soreness, swelling, and itching which often occur. Other possible side effects from DEV are redness, headache, asthma, fever, and nausea.

A recently developed vaccine, called Human Diploid Cell Strain (HDCS), promises to be a major advance in human rabies treatment. HDCS requires only six injections to

stimulate a higher antibody response with less adverse side effect than DEV. The Food and Drug Administration will probably license the new vaccine for use in the United States soon.

Pasteur once figured that no more than 16 percent of the people exposed to a known rabid animal would get the disease. Twenty seven years ago in Iran, however, 15 of 32 persons (47 percent) bitten by a rabid wolf died. Either way, the odds are not good. Some 30,000 people in the United States each year who do not wish to chance the odds undergo post-exposure rabies treatments at a cost of about \$500 per person. In many of these cases however, treatments follow exposures which could *not* have resulted in the disease. The Center for Disease Control (CDC) in Atlanta, Georgia, has long suspected that as many as 25,000 vaccinations each year may be unnecessary. As a result, years ago CDC set up a consultative service for private physicians and health departments regarding recommended post-exposure treatment. CDC suggests that physicians consider the following criteria before prescribing specific antirabies treatments: species of biting animal, provoked or unprovoked bite, severity of exposure, vaccination status of the animal, and presence of rabies in the region.

Persons in high risk categories such as animal handlers, wildlife biologists, veterinarians, and their assistants often elect to be immunized for rabies as a precaution. Three weekly injections of DEV in the shoulder, plus a booster later on, usually stimulate detectable antibodies. After a known rabies exposure, the vaccinated person still receives at least five additional shots. □

### About the Authors:

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*Dr. Issel is an Associate Professor of Veterinary Virology and Veterinary Science at Louisiana State University in Baton Rouge, Louisiana.*



# RABIES IN OREGON

by

Leslie Paul Williams, JR, DVM, Dr. PH  
Public Health Veterinarian  
Oregon State Health Division

Unlike Louisiana, Oregon is a low incidence rabies area. The map shows the distribution of rabies cases by county in Oregon since 1960. Note well that our last cases of terrestrial rabies was in a dog in 1975 and the last documented case in a four-footed wild species was in 1967.

The table shows the number of animal species examined each year. Most of these were examined because of human exposures. Since these animals must be tested anyway it is the most economical and practical method of rabies surveillance that we can devise. Many more dogs and cats would be killed and examined if it were not for the frequent use of the 10-day isolation period supervised by the animal control agencies and/or health departments throughout the state.

## If You Are Bitten

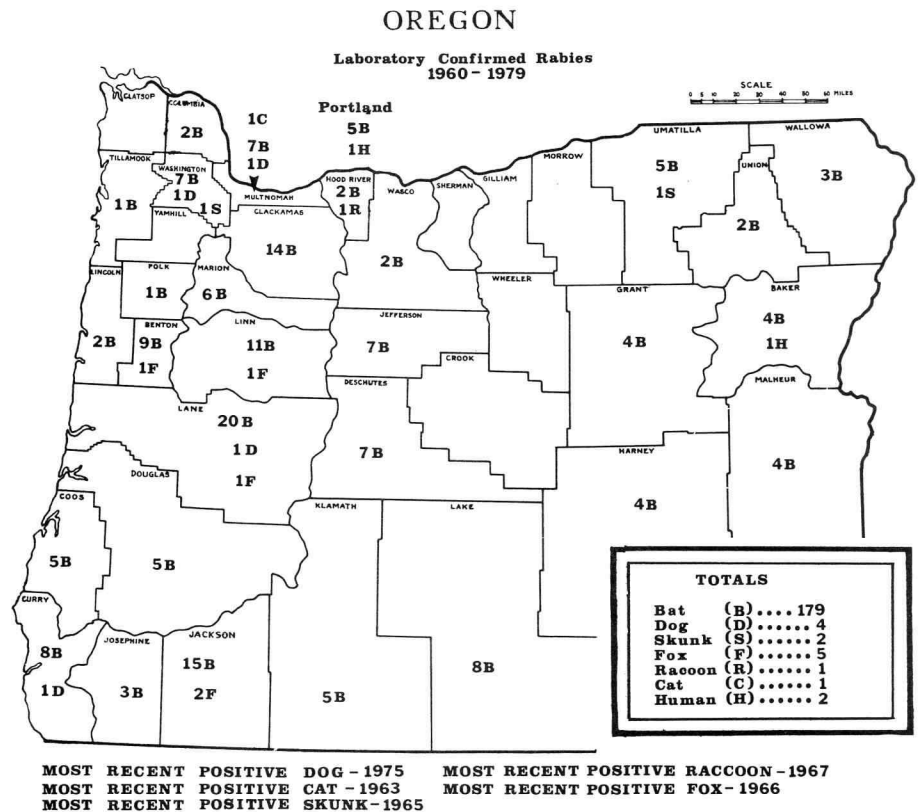
If you are bitten or have contact with any animal's saliva, wash the area thoroughly with soap and water and irrigate the wound freely, even if the wound is up to three hours old. Consult your physician or an emergency room. Capture the animal (if this can be done with safety) or contact your animal control officer or the county sheriff. If the bitor is a dog or cat and appears healthy it can be observed for 10 days for signs of rabies. At the end of this period if the animal is still well, there was no exposure to rabies. If the animal must be killed, the local health department will evaluate the necessity for the brain to be examined. If the biting animal is not available for examination, your physician and the health department will cooperate with you in determining the need for post-exposure treatment.

## In Conclusion

We agree completely with the reprinted article that wildlife species should not be kept as pets. In the closing days of the legislature a statute was passed prohibiting the sale, barter or giving of skunks, raccoons

or foxes as pets in the State of Oregon, effective July 1, 1980. The wisdom of such a statute was manifest a few months later when two "pet" skunks from a Minnesota game farm were proven rabid after biting their owners.

As a result of the extensive sale of these "critters" in the state, over 125 were killed and examined for the presence of rabies virus in the brain and at least 15 people went through the post-exposure rabies prophylaxis.



## SPECIES OF ANIMALS EXAMINED FOR RABIES AND RESULTS OBTAINED IN THREE LABORATORIES IN OREGON.

Animal Species	Number Examined	Number Positive	Percent Positive
Bats	142	13	9%
Dogs	112	0	0
Cats	110	0	0
Skunks	24*	0	0
Raccoons	16*	0	0
Foxes	4	0	0
Miscellaneous	44**	0	0
Total	422	13	3%

\*Including "pet" skunks and raccoons

\*\*Rodents - 27 (seven caged rodent pets), large domestic species - 10, wild canines - 6, and one "pet" wolf.

# DON'T FORGET TO RENEW YOUR LICENSE(s)

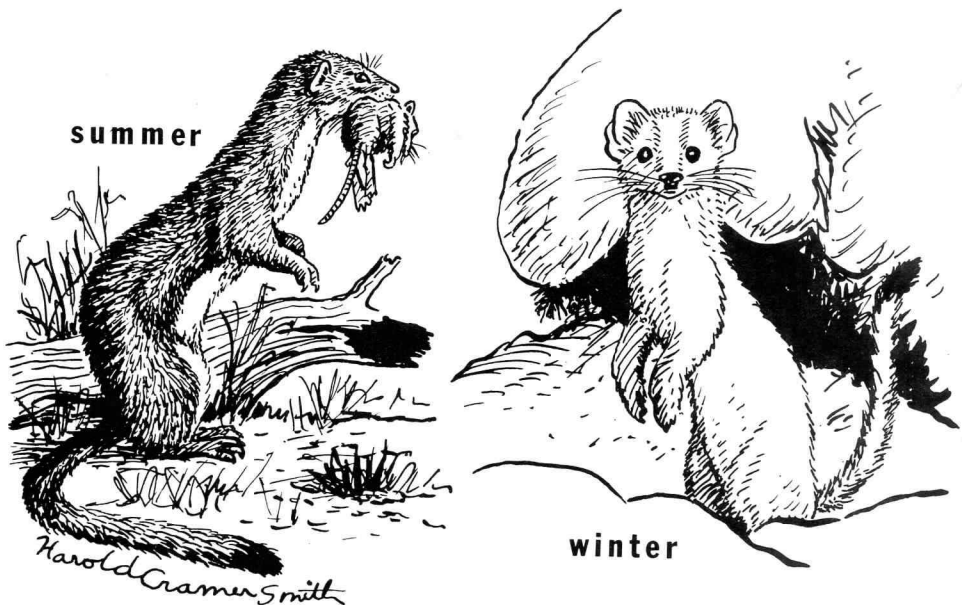
Hunting and fishing licenses, salmon-steelhead tags and the furbearer hunting licenses expire the end of this month and it's time to think about replacements. Big game tags, the trappers license, and some other licenses issued by the Department, as well as the migratory waterfowl stamp (duck stamp) remain good through the end of June.

Quite a few people make a tradition of giving hunting and/or fishing licenses and salmon-steelhead tags as Christmas gifts. You can do this through any of the state's 1,000 or so license vendors. All you need (besides the fee) is the recipient's name and address, and date of birth. You will be asked to fill out an affidavit in which you state you know the recipient has been a resident of the state for at least six months (if you are buying a resident license or tag.) When you give the license the recipient signs it, fills in the years and months of residency and is set to go hunting or fishing.

Hunting and fishing licenses and salmon-steelhead tags should be available by now from license vendors throughout the state.

For several years the Department has been issuing permanent pioneer and senior citizen hunting and fishing licenses. If you have one of these, don't worry about renewal. You are fixed for life. From now on the Department will also be issuing permanent, free disabled veteran and blind angler licenses.

Commercial salmon trollers, Columbia River gillnetters and commercial shrimp fishermen are reminded again that moratorium bills were passed by the 1979 Legislature which may have a direct bearing on their future participation in those occupations. For further information on this see the November issue of OREGON WILDLIFE, or contact the Department.□



## WEASEL

The weasel, of which there are two species in Oregon, has a bad reputation as an animal that kills not just for food but for the fun of it. As with most reputations, the weasel's is partially earned, yet largely exaggerated. There are many stories of weasels killing scores of chickens at one time when eating few of its victims. But in nature the weasel kills more than it can eat so the excess can be stockpiled in the den for later. So the weasel is not so much bloodthirsty as it is a good planner.

Regardless of stories, the weasel is a quick, smart and successful predator that really prefers mice and other rodents as its main food source. The long, agile body of the weasel makes it perfect not for just catching rodents above ground, but for going right into burrows after them.

The weasel kills swiftly with a bite to the base of the skull or throat, then carries its prey back to the den for more leisurely consumption.

Oregon's short-tailed weasel is the smallest true carnivore (meat eater) in the Northwest. Also known as the ermine, this weasel weighs in at around four ounces and has a body length of 11 inches or less from head to tip of tail. Females are usually 20 to 25 percent smaller than the males.

Oregon is also home to the long-tailed weasel. While the short-tailed variety is found only in certain mountainous areas, the long-tailed weasel is found in many types of habitats throughout the state.

The markings of both species are similar with a dark brown fur back and a light underside. The underparts of the long-tailed weasel are likely to be yellowish-white while the ermine's is pure white. In some colder areas of the Northwest the winter coats of both species may turn entirely white, except for a black tip on the tail. As the names imply, the tail of one weasel species is longer in proportion to body than the other. The long-tailed weasel is also about 25 to 50 percent larger than the ermine.

Both species mate in the early summer, but birth of young does not happen until the following spring. For some reason, the growth of the fertilized eggs is help up for months.

A litter of weasels usually includes from six to nine young. They emerge well developed and quickly become independent. This growth period is when weasel damage around farms is likely to be noticed. A young weasel will eat half its body weight in 24 hours. The folks are kept busy finding food, and returning to the den.

A weasel home may be found beneath tree roots or in rock piles. The entry hole to the den may be no more than one inch in diameter.□

Jim Gladson  
DECEMBER 1979



# THIS AND THAT

Compiled by Ken Durbin

**GUIDE TO THE NATIONAL WILDLIFE REFUGES** by Laura and William Riley 653 pages. Illustrated with photographs and maps. Published by Anchor Press/Doubleday, Garden City, New York; 1979. Price \$14.95.

This is a guide to America's almost 400 national wildlife refuges. It tells where they are located, how to get there, what to see and do, where to camp or stay, the best times to visit, how to dress, and what equipment to take. Also included are birding highlights for every region of the country.

The book is illustrated with 181 maps to help locate each refuge, quickly and accurately, and 27 color photographs of animals for which key refuges are famous. It is based on hundreds of interviews as well as personal trips by the authors to more than 200 refuges.

\*

## A Wise Use of Owls

Two New Jersey cities, Morristown and Bloomfield, have substituted owls for poison in their rodent control programs. Adult owls can eliminate up to 35 rats and mice each day.

Although barn owls are native to the state, they had abandoned the area when roosting places became scarce and their food supply poisoned. Reintroduced fledglings have been provided with nesting boxes and a renovated barn to call home, and all poisoning has been stopped.

Now there's a wise use of owls.

\*

## A Seed Bearing Mammal?

I've been honestly puzzled, at times, trying to decide whether I had any function at all in nature, other than as one of the ambulatory creatures to which burrs cling, thus enabling certain weeds to get their seeds distributed.

—Vance Bourjaily,  
*Country Matters*

**OREGON WILDLIFE**

## Endangered Whooping Crane Killed by Eagle

A preliminary investigation by the U.S. Fish and Wildlife Service has indicated a six-month-old endangered whooping crane was attacked in flight and killed by an eagle October 13 southwest of Rangely, Colorado.

Special Agent in Charge Harry Stiles said the initial examination of the bird and interviews with observers indicated the whooping crane died as a result of talon wounds inflicted by a large raptor.

According to a party of nine hunters, the white whooping crane rose from a small pond with two darker birds — apparently sandhill cranes. When the birds attained altitude, the whooper was struck by a large dark bird, presumed to be a golden eagle.

The hunting party recovered the whooping crane carcass, and upon noting that it was banded and had a radio transmitter attached, turned it over to Colorado Division of Wildlife Officer Lou Vidakovich of Dinosauro, Colorado.

The Special Agent said that while eagles have been known on rare occasions to take geese and other birds in flight, to his knowledge it was the first observed taking of a whooping crane by an eagle. Less than 100 whooping cranes remain in the wild.

\*

## Who Pays for Play?

Taxes paid by American hunters have purchased more than 3.2 million acres and put another 51 million acres under state wildlife management programs. According to the Wildlife Management Institute, these lands are used much more for nonhunting activities than for hunting. A 1971 survey, the last year for which the Institute has data, showed hunting accounted for only nine percent of the recreational use of these areas across the nation.

Here is the breakdown on the nonhunting activities on North America's wildlife agency lands; sightseeing — 28 percent, fishing — 19 percent, picnicking — 18 percent, camping — 15 percent, boating — 7 percent, nature study — 1 percent, swimming — .5 percent, water sports — .4 percent and hiking — .3 percent.

Colorado Outdoors

## Who Paints The Leaves?

Some of the magic of autumn's beautiful transformation is lost when you scientifically pick apart the whys and wherefores of the color change, but let's do it anyway.

The process is a complex one of gradual transformation. It starts with the very content of the leaves themselves. Chlorophyll, the miraculous green substance that converts water, carbon dioxide, various minerals and sunlight into sugars, is quite unstable, and must be renewed by nature almost constantly. In addition to the greens in the leaves, two yellow pigments, carotene and xanthophyll are abundant but hidden by the greens for much of the year.

As daylight hours become fewer in early September, the chlorophyll begins to break down and the more stable yellows prevail. Reds are produced by another fairly persistent material, anthocyanin. The interactions of the three basic materials along with the steady fading of the greens, produce the wide range of orange, bronze, purple and other hues.

\*

## Taxpayers Come Through Again

Colorado taxpayers can be proud of the commitment they are making toward the preservation and management of the state's nongame animals through the state tax check-off program. Figures compiled by the Colorado Department of Revenue show that nearly 119,000 taxpayers donated \$501,368.63 out of their refund checks this year to the Division of Wildlife to manage nongame wildlife.

The figure represents an increase of 43 percent over the \$350,000 donated in 1978. Approximately 12 percent of the state's taxpayers entitled to refunds donated either \$1, \$5 or \$10 to the nongame wildlife fund, an average contribution of \$4.22.

Colorado Outdoors

*(Oregonians will have an opportunity this year to follow Colorado's lead. See the back cover for more details)*

# WILDLIFE NEWS ON THE AIR

News and commentary concerning fish and wildlife in Oregon, the Nation and the World is being carried by a number of Oregon's radio stations. The 4½ minute weekly programs are provided by the Department and aired by the stations as a public service to Oregonians.

Originated in the mid 1950's as 15 minute programs, the taped series was later shortened to the 4½ minute format to better meet the needs of present radio programming. The weekly programs are prepared by Ron Shay of the Department's I & E staff.

Following is a list of the stations who indicated they are currently airing the series and the times they indicated it was on the air. If your favorite station is not on the list, they can start receiving the weekly free tapes by contacting Ron Shay at the Portland office of the Department of Fish and Wildlife.

<i>City</i>	<i>Station</i>	<i>Day and Time of Airing</i>
Astoria	KAST	5:15 p.m. Friday
	KVAS	4:05 p.m. Sunday
Baker	KBKR	7:25 p.m. Friday
Bend	KBND	5:25 p.m. Saturday
	KICE	5:00 p.m. Friday & 8:45 a.m. Saturday
Brookings	KURY	6:07 p.m. Tuesday
Corvallis	KLOO	7:23 a.m. & 4:50 p.m. Wednesday
Dallas	KROW	7:45 a.m. & 4:45 p.m. Thursday, Friday & Saturday
Eagle Point	KEPO	1:00 p.m. Wednesday and Friday
Enterprise	KWVR	4:10 p.m. Saturday
Eugene	KRVM	10:25 a.m. Friday
Grants Pass	KAGI	5:40 p.m. Saturday
	KAJO	6:20 a.m. Saturday
Hermiston	KOHU	9:40 a.m. Saturday
Hood River	KIHR	5:35 p.m. Saturday
John Day	KJDY	5:10 p.m. Tuesday
Klamath Falls	KLAD	2:00 p.m. Saturday
LaGrande	KLBM	6:05 p.m. Saturday
Lincoln City	KBCH	7:35 a.m. Saturday
McMinnville	KCYX	5:50 a.m. Friday
North Bend	KBBR	5:30 a.m. Thursday
Ontario	KSRV	6:25 a.m. Saturday
Pendleton	KRBM	6:00 p.m. Friday
Portland	KEX	5:20 a.m. Saturday
	KLIQ	no specific time
	KWJJ	10:55 p.m. Sunday
Prineville	KRCO	12:25 p.m. Sunday
Redmond	KPRB	7:15 a.m. Saturday
Reedsport	KDUN	12:15 p.m. Wednesday
Roseburg	KQEN	6:05 p.m. Tuesday
	KRSB	7:15 a.m. Sunday
Seaside	KSWB	7:30 a.m. Saturday
Tillamook	KTIL	7:15 a.m. Sunday
The Dalles	KODL	5-6 a.m. weekdays
Woodburn	KWRC	8:50 a.m. Saturday



Oregon's

# WILDLIFE WINDOW

Last month the Window looked at planting your backyard or school ground for wildlife. Even if you have been able to seriously begin development it will be awhile before the plantings start producing significant food and cover. Meanwhile, a simple feeder on the window sill or in the yard can give many hours of enjoyment while providing badly needed energy for wintering wildlife.

Attracting and feeding birds is a real art to those who do it regularly. For both beginner and veteran feeder, several guiding principles should be kept in mind. Winter feeding is an artificial situation. Larger numbers of birds, or animals such as squirrels and chipmunks, are concentrated into an area. They cannot be supported naturally. Once this happens these critters become the feeder's responsibility until spring foods begin to grow.

Wildlife are attracted to different kinds of foods. Most are adapted to eating only certain kinds too. For example, birds can be divided by food preference into three basic groups. Seed eaters such as finches and sparrows are perhaps the most common visitors to winter feeders. Protein eaters like woodpeckers, nuthatches and chickadees normally thrive on insects. In winter they will use suet in your feeder. Nectar feeders such as hummingbirds are not commonly thought of in a winter feeding program although some regularly return to western Oregon as early as mid-February. Knowing the birds or other wildlife in your area will help determine the kind of feeder to develop.

OREGON WILDLIFE

Commercial seed mixes are often expensive. Homemade mixes can be just as good and developing the mix can be part of the experience. Feed stores sell bulk quantities of feeds such as cracked corn, millet, sunflower seeds and chicken scratch. For a class or group activity, a quantity purchase of mix ingredients can be economical for all involved.

The Department of Fish and Wildlife has a free leaflet on building and using bird feeders. Write to us at the

Wildlife Window for your copy. You may also wish to visit your local library to learn more about wildlife food habits to better stock your feeder. A good reference to look for is *American Wildlife and Plants* by Martin, Zim, and Nelson. A handy field guide is helpful in identifying the visitors to your feeder too. One of the most popular is *Birds of North America* by Robbins, Bruun, Zim and Singer. Both are available in paperback from bookstores too. □

## THIS MONTH'S WINDOW

### FEEDERS

**Build a feeder and place it on the window sill or nearby in the yard where it can be observed.**

**Identify and record the birds or other wildlife that use the feeder. Keep records so you can compare them with future years.**

**Closely observe the birds using the feeder and study their habitat needs. What can the types of wildlife using your feeder tell you about your surrounding area?**





## THE NONGAME WILDLIFE FUND

The 1979 Oregon Legislature established a special nongame wildlife fund in the State Treasury. The purpose of the fund is to give the Department of Fish and Wildlife monies to protect and preserve nongame wildlife and their habitat.

The money for this fund is to come from contributions of Oregon income taxpayers who have a refund coming. On the 1979 income tax form (to be filed before April 15, 1980) there will be a line where each taxpayer who is to receive a refund will be able to donate \$1, \$3, or \$5 of this refund to the NONGAME WILDLIFE FUND. This donation can be reported as a tax exempt, charitable contribution on the next year's federal and state taxes.

Until now, the state's nongame activities have been financed by hunting and fishing license dollars. There are some 500 species of nongame birds and animals in Oregon. About \$150,000 per year from license fees is allocated to nongame management. This clearly isn't enough if the Department is going to do an adequate job of providing for the future of this group of creatures. The new funding source offers a chance for everyone to help.

**DO  
SOMETHING  
WILD!**

## THE NONGAME FUND...WHY CONTRIBUTE?

Animals are indicators of the quality of man's environment. Certain birds, for example, warned us of DDT in our foods and bodies and that it may have long term effects.

Animals have proven useful in agriculture, science and in the production of medicines. There is no way to predict which animal or bird may prove extremely valuable in the future. It is for our own benefit to preserve as varied wildlife populations as possible.

All living things are related to the world wide ecosystem. If a species is allowed to disappear there is no way to anticipate what effect it might have on the whole system.

The decline of many of the nongame species can be directly attributed to man's activities. We have a moral obligation to try to provide for the future of our fellow creatures.

The fate of Oregon's nongame, threatened and endangered species is in your hands. By giving \$1, \$3, or \$5 you will be doing something positive toward helping our nongame.

"DO SOMETHING WILD"... contribute to the nongame wildlife fund! ☐



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