

**OREGON
WILDLIFE**

APRIL 1979

OREGON WILDLIFE

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OREGON FISH AND WILDLIFE COMMISSION

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Ron E. Shay, Editor
Ken Durbin, Managing Editor

Cover-

Few readers will recognize the "wildlife" on the cover this month. Shown are the spores of *Ceratomyxa shasta* magnified many times. In actuality, the spores measure about .014 mm in width. These innocuous looking agents cause one of the most serious fish diseases in Oregon.

HUNTER EDUCATION PROGRAM

INSTRUCTORS APPROVED

Month of February 6
Total Active.....1,542

STUDENTS TRAINED

Month of February 405
Total to Date 262,479

HUNTING CASUALTIES REPORTED IN 1979

Fatal 1
Nonfatal 1

In Appreciation

The winter is almost over and it seems appropriate at this time to say than you to all of the folks who showed concern for the big game during the recent cold spell. Many city folks donated money while a great many of the landowners in the most severely hit areas not only spent money, but also time and effort to help out struggling big game herds and bird populations. Private efforts coupled with those of the Department hopefully helped some of the animals to survive.

The effects of the winter will be reflected in the spring counts of big game and more than likely in the hunting season recommendations submitted by the field biologists. The severity of winter conditions varied considerably from area to area east of the mountains. The mortality caused by the cold and snow will linger well into the spring months as the animals go on the new, green grass and perhaps don't adjust well.

The feeding efforts no doubt did help some of the animals. Unfortunately great numbers of them are never seen or helped by such programs. Additionally, certain numbers of them that do take advantage of the feed still don't survive. The range and numbers of animals involved is simply so vast that feeding efforts can reach only a small percentage of them.

In addition to actually feeding deer and elk, many of the landowners were extremely tolerant of the animals that were down in their feed lots and haystacks.

Proper hunting seasons designed to crop the herds down to carrying capacity of the winter ranges help limit concentrations of animals in the wrong places and die-offs during normal winters. This certainly has not been a normal winter. Game bird and animal losses are going to be greater than normal because the "pinch period" we've discussed in past issues pinched harder than usual.

But regardless of what the weather does, thanks for the concern, assistance and cooperation of many individuals are in order. It's appreciated. □

RES

Town Hall Meetings Scheduled

The Fish and Wildlife Commission has scheduled a series of town hall meetings to hear public comments on 1979 Game Mammal Regulations. On May 5, prior to any of the town hall meetings, the Commission will hear recommendations from the Department's wildlife division, and these proposals will be reviewed at the meetings.

Four meetings are scheduled as follows:

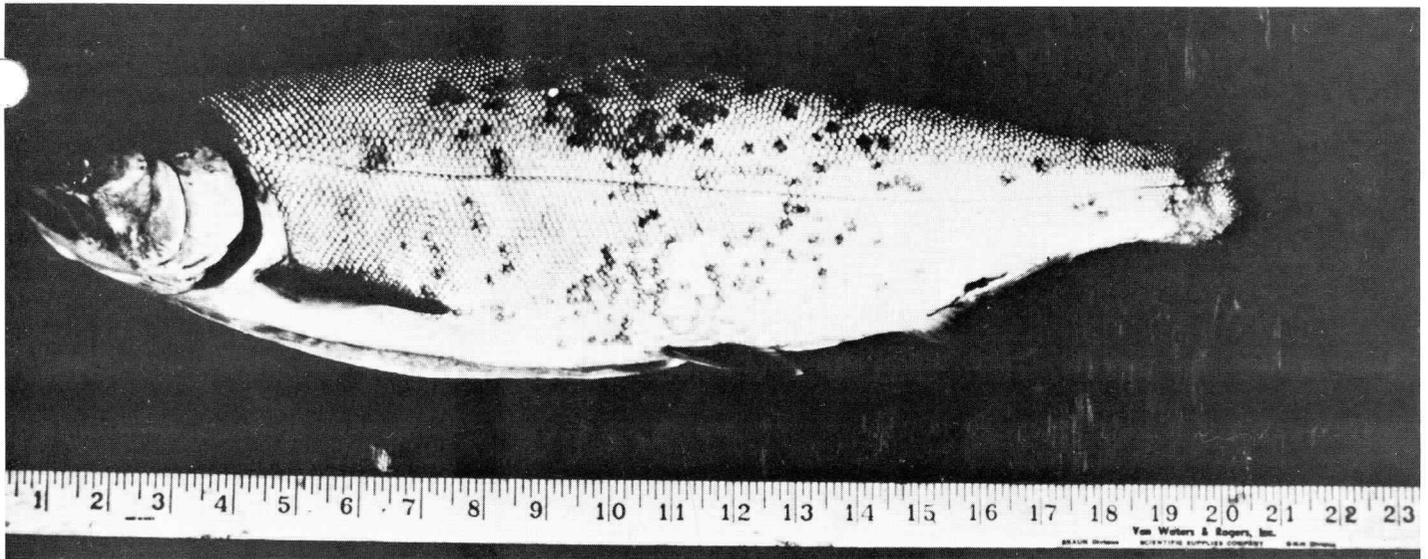
Eugene	May 11	7:30 p.m.	Harris Hall, Lane County Courthouse, 125 E. 8th St., Eugene
Grants Pass	May 12	1:00 p.m.	Arts & Crafts Bldg., Josephine County Fairgrounds, Grants Pass
Baker	May 18	7:30 p.m.	Baker Community Center, 1640 Campbell Street, Baker
Bend	May 19	7:30 p.m.	Bend City Hall, 750 NW Wall Street, (City Police Department) Bend

Last year town hall meetings were conducted in Salem, Astoria, The Dalles, Pendleton, La Grande, Baker, Ontario and Burns. □

Commission Meetings

The Columbia River Compact will meet on Monday, April 23, in Vancouver City Council Chambers, 210 E. 13th, Vancouver, Washington, to review status of the spring chinook run. The meeting will begin at 10:00 a.m.

On Tuesday, April 24, the Fish and Wildlife Commission will conduct a general business meeting beginning at 9:00 a.m. in Fish and Wildlife Department headquarters, 506 SW Mill Street in Portland.



These wart-like structures on adult coho or rainbow trout are caused by the protozoan, *Myxosoma squamalis*. Strangely, chinook salmon are not affected.

What's Wrong With This Fish?

R. A. Holt and J. E. Sanders
Fish Pathologists
Infectious Disease Section

Fish like all other animals suffer from a variety of diseases. These diseases may be caused by numerous things including parasites, pollution, excessive water temperatures, nutritional deficiencies and others, some of which are unknown.

A parasite is an organism that lives on or within some other living organism from which it derives nourishment and the proper environment for growth and/or reproduction. In nature, parasites are very common. It is a rare fish that does not contain one or more types. All tissues of the fish can be possible sites of parasite infection. Damage in most instances may be virtually unnoticeable or at the other extreme be so severe as to cause death.

Groups of organisms that can parasitize fish include viruses, bacteria, fungi, protozoa, flukes, tapeworms, nematodes, leeches, mollusk larvae and small crustaceans. Viruses and bacteria, although the smallest in size, usually cause the greatest losses among fish populations throughout the state. Deaths caused by these two groups are usually rapid, frequently

of epidemic proportions and are often reported in newspapers.

Parasites from other groups mentioned generally cause few fish deaths, but their presence is revealed by nodules or blisters in the skin, cotton-like patches on the body surface or fins, soft areas in the muscle or "worms" on the body surface or in the viscera and muscles.

Although many hundreds of parasites are known to infect fish, only a few of these are known to infect man and most are easily killed by ordinary cooking. Here we will briefly describe some of the more common parasites and disease symptoms in fish that the angler may encounter.

Fungus

The appearance of grayish-white furry or cotton-like patches on the fins or body surfaces of fish indicate a fungus infection. The fungus growth consists of a mass of thread-like plants that lack chlorophyll. This is most often seen on spawning fish in areas of the body where the fish is injured or where the mucus coat has been removed. Several common

aquatic fungi cause this disease.

Protozoa

These are microscopic animals which feed primarily on debris in the water; however, several members of this group can cause disease in fish. These creatures can be found in cysts on the gills, in muscle tissue and skin or free on the surface of the body. The cysts are often large enough to be visible without the aid of a microscope. Members of the class Sporozoa contain a group referred to as myxosporidians which form the largest group of protozoa parasitizing the fish. Three representatives of this group and the diseases they cause are described below.

Myxosoma squamalis — Fishermen who have caught adult coho salmon may have seen fish with what appears to be warts on their skin. These actually are cysts in the scale pockets. This parasite is also found on rainbow trout but not on chinook salmon.

Henneguya salmincola — This parasite forms white cysts up to ¼ inch in diameter in the muscle tissue. These cysts contain a milky white

fluid consisting of many spores and tissue debris. Unfortunately, when large numbers of these cysts are present, it renders the fish less desirable for consumption. When these fish are smoked, the tissue appears to be riddled with holes. Coho, chinook and steelhead are often infected with this organism.

Ceratomyxa shasta – This myxosporidan is one of the most serious disease agents in Oregon. Its life cycle is not completely understood but it is known that the infective stage occurs in very specific geographical areas usually show some level of resistance. Fish brought in from other areas and exposed to water containing the organism suffer severe losses.

Affected fish usually have a large swollen intestine and sometimes sores on the liver, kidney and other organs. Fish dying of this disease will often have a swollen, hemorrhaged anus.

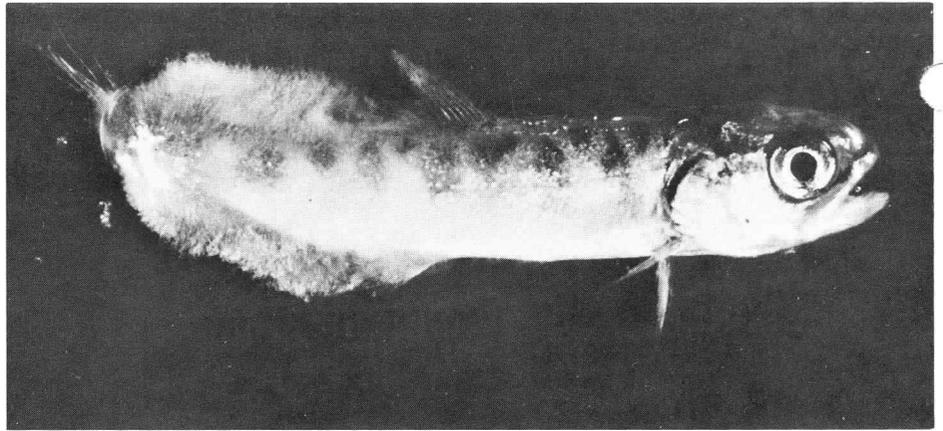
In Oregon, the distribution of the infective stage includes certain Cascade mountain lakes, (Suttle, Davis, Odell and Crescent), and the Deschutes River, lower Columbia River, mainstem of the Willamette River and the lower Nehalem and Rogue rivers. Because of this parasite, few planted rainbow trout survive in Suttle Lake while kokanee and brown trout do not appear to be affected.

There is no treatment available for fish infected with *Ceratomyxa shasta* so the only method of prevention is to avoid planting susceptible stocks in infected waters. Recently, resistant strains of fish have been used successfully to enhance fish populations where this occurs.

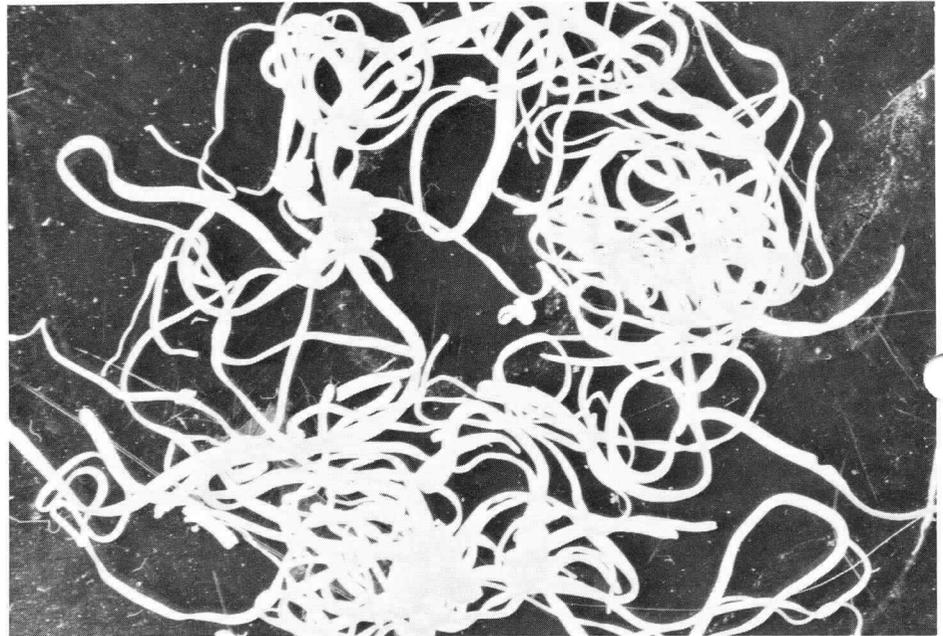
Salmon Poisoning Fluke

There are a great number of different flukes or flatworms which, during part of their life cycle, infect fish. One of the most prevalent in western Oregon is the salmon poisoning fluke, *Nanophyetus salmincola*, which is found in northern California, in Oregon west of the Cascade Mountains and in the Olympic Peninsula in Washington. Distribution of the parasite is limited to areas where a particular snail species called *Oxytrema silicula* is found.

The fluke requires three hosts for completion of its life cycle. The adult fluke is found in the intestine of some mammals such as dogs, foxes and



This young chinook salmon is infected with fungus. The "fuzz" is caused by a mass of thread-like plants which have no chlorophyll. Fungus growths are often seen on salmon and steelhead near spawning time.



Tapeworms are very common in fish, but often go unseen by the angler if they are inside the intestine.

raccoons, and in certain birds. Eggs from the adult fluke are shed with feces into water where they hatch into an intermediate stage (miracidium) which bores into the snail. There it multiplies and develops into a second stage, which leaves the snail and eventually enters susceptible fish. This stage penetrates into the fish and encysts.

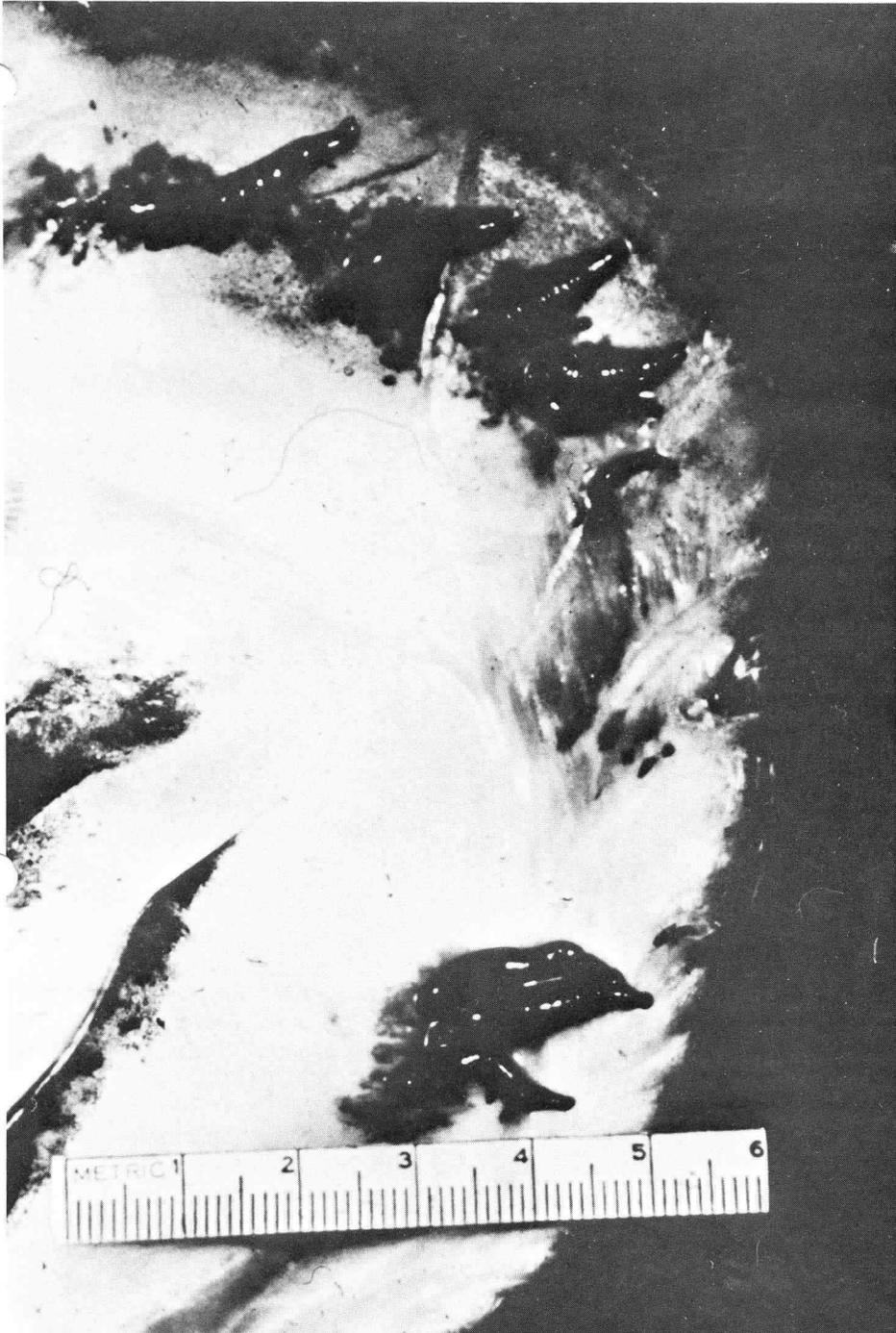
All salmon and trout along with several other fish species and the Pacific giant salamander can become parasitized. Fish are often heavily infected and can suffer symptoms such as damaged eyes, fins, tails or gills. The cycle is completed when a bird or mammal eats the fish. The immature parasites break away from

their cysts and attach to the intestine where they mature into adults.

The adult fluke carries a small bacterial organism called *Neorickettsia helminthoeca* which is responsible for the salmon poisoning disease occurring in canines. Dogs that become sick after eating raw fish should receive prompt medical attention. Both the fluke and rickettsia are carried in salmon when they go to sea and return.

Tapeworms

These very common parasites are found as either larval or adult form in most fish populations. The larval tapeworms are found in cysts, internal organs or free in the body cavity



Leeches found on the inside of the gill-cover of an adult coho salmon apparently cause little harm to the fish and can simply be discarded by the angler when he cleans the fish.

of fish while the adult worms inhabit the intestine. *Proteocephalus salmondicola* is probably the most common flatworm occurring as an adult in trout. It is found in the intestine of a large percent of rainbow trout from lakes in central Oregon.

A copepod crustacean is the intermediate host for this parasite. Large numbers of these long, white worms can be seen in the intestine of very

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active and healthy fish.

Another widespread flatworm called *Diphyllobothrium sp.* has occasionally caused fish losses in mountain lakes such as Elk, South Twin, and Clear Lake (Wasco County). This parasite is found in the stomach wall or free in the body cavity. The adult tapeworm parasitizes gulls while the copepod crustacean and fish are its intermediate hosts.

Roundworms

These are very common parasites of fish. The larval stage may be found in cysts or coiled on or in the internal organs. The adult worms generally attach themselves to the intestine or under the skin or fins. They are long, spindle-shaped and unsegmented with a smooth glistening outer surface. One nematode often seen in trout is *Bulbodacnitis occidentalis*. In some cases, as many as 100 worms may be present in the small intestine with no apparent damage to the fish.

Leeches

These segmented worms with an oral sucker are external blood feeding parasites. In Oregon, the species commonly seen on adult salmon is *Piscicola salmositica*. The leech does not appear to seriously affect its host and can simply be discarded when the fish is cleaned.

Copepods

This highly diversified group of parasites are found embedded in the flesh, attached to the gills or fins or moving over the surface of the body. Representatives of this group most often seen on fish in Oregon are:

Salmincola edwardsii – This copepod, commonly called gill or body lice, is seen attached to the gills, fins, or general body surface of brook and rainbow trout. Sometimes great numbers of these ¼-inch long, white grub-like organisms can be seen attached to the gills. This is the female which bears a pair of egg sacs. The young hatch and swim freely until they can attach to a fish host.

Lernaea or anchor worms have a slender worm-like body with the anterior end embedded in the fish. The embedded head bears branching processes that resemble an anchor. The main injuries to the fish are caused by blood loss and skin damage which allows entry of secondary pathogens such as bacteria and fungi.

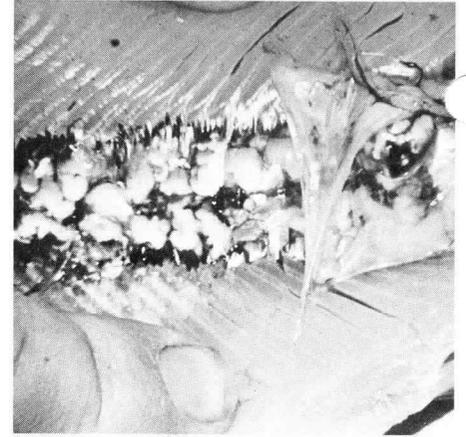
Two disk shaped copepods also referred to as "sea" lice are *Argulus* and *Lepeoptherius*. These are frequently seen on salmon in salt water or on those that have just entered fresh water from the ocean.



Scientists call this copepod *Salmincola edwardsii*. To anglers it is more commonly known as body or gill lice and can commonly be seen attached to the gills, fins, or general body surface of brook and rainbow trout.



Lernaea, the anchor worm, has a slender body, but the front end of the body has two anchor-like processes that are imbedded in the fish. Large numbers of anchor worms can cause blood loss and skin damage to the host fish.



Nephrocalcinosis

The exact cause of this disease is unknown although it is suspected to be nutritional because it is seen only in hatchery reared fish, primarily rainbow but sometimes brook and cutthroat trout. The kidneys (dark organ along the back of the body cavity) of affected fish have large white streaks or spots sometimes resembling large, white worms which when crushed, feel gritty. These deposits are thought to be calcium phosphate.

Strawberry Disease

In lakes and reservoirs throughout the state, anglers occasionally catch rainbow trout that have large external "bruises" or swollen hemorrhaged areas. These areas are often bright red in color, hence the name "strawberry disease". The lesions only involve the surface layer of the skin and do not appear to affect the general health of the fish. As of yet, no disease agent has been isolated from these fish. This disease has also caused problems for some commercial fish producers because the bruised areas are not aesthetically desirable to someone buying the fish.

Disease Control

The Oregon Department of Fish and Wildlife has certain regulations regarding the transfer of game fish and fish eggs into the state or between certain watersheds within the state. These regulations are necessary to protect resident fish from the introduction of additional parasites. By rigorous enforcement of these regulations, serious fish losses due to introduced parasites can be minimized and in many cases, eliminated. □

A Tally of Eagles

If one had to pick five states of the lower 48 where the chances of seeing a bald eagle are better than average, then Oregon should be among the choices.

Oregon, Washington, Minnesota, Wisconsin, and Michigan are the only states besides Alaska where the symbol of this country is at least holding its own.

In the terminology of the federal Endangered Species Act, the bald eagles of these five states are "threatened" while the eagles of the other 43 states are "endangered" and near extinction over much of their historical range.

Back in mid-January, a comprehensive count of bald eagles was made statewide. The early totals show that Oregon is a popular wintering area for birds from as far away as northern Canada.

While an estimated 40 nesting pairs of eagles make Oregon a permanent home, almost 900 of the birds were using some area of the state during the January tally.

A large percentage of those birds were found in the Klamath Basin of southern Oregon and northern California.

Other areas of fairly good bird concentrations include Sauvie Island, the lower Columbia River, some locations in northeast Oregon and the Malheur Refuge in the southeastern part of the state.

The bald eagle is primarily a fish eating bird, but when surface water is frozen solid, the preferred food is not available. Then the eagle turns to scavenging whatever food is accessible.

The primary attractant for the wintering eagles in the Klamath areas is the abundant food supply provided by wintering waterfowl. During the hunting season, natural death and cripples provide a good diet for the ever vigilant eagles.

After the hunting season, any place where waterfowl is concentrated will also provide a good supply of birds, which, for one reason or another fail to survive the rigors of winter.

In the Klamath Basin, waterfowl home in on patches of open water in

the ice. Hundreds of birds may be packed into a space less than 100 yards in diameter.

It is not an unusual sight to see a dozen or more eagles standing like sentries around the edges of such concentrations, aloof and patient. The chances are good, with so many ducks and geese in one spot, that supper is there somewhere.

This carrion eater side of our national bird may tarnish its reputation, but likewise helps secure its continued existence.

Reputation or not, the bald eagle is driven to survive. Even in Oregon, where the going may be easier, the battle is still uphill.□

Jim Gladson





Looking To The Future



Last year we ran a story concerning the work of the Young Adult Conservation Corps on Sauvie Island. They worked on building a trail, sprouting rose bushes and general clean up in an area being developed for wildlife viewing.

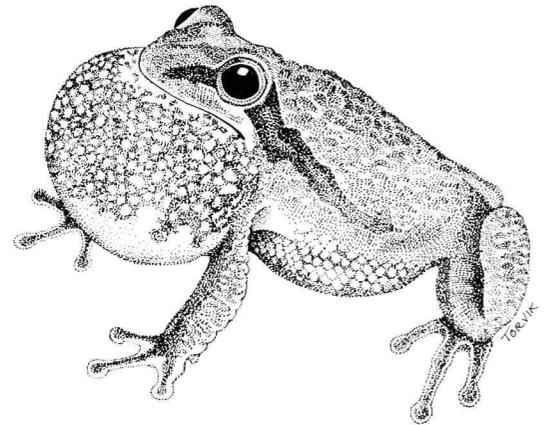
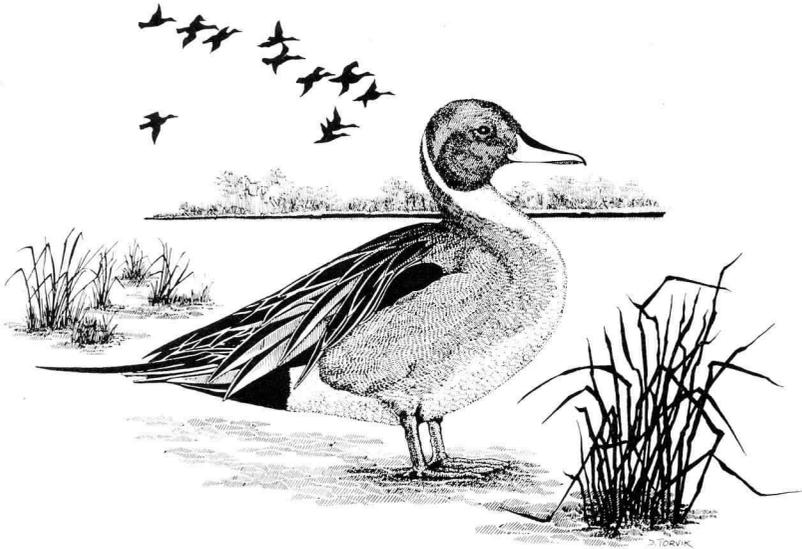
Last month we introduced you to the Watchable Wildlife program. Actually, the two activities tie together in that the Sauvie Island development would be one of the projects that are listed statewide.

It is hoped that eventually we will be able to construct a Wildlife Center adjacent to the trail areas that were developed last year. The center would be a focal point for students

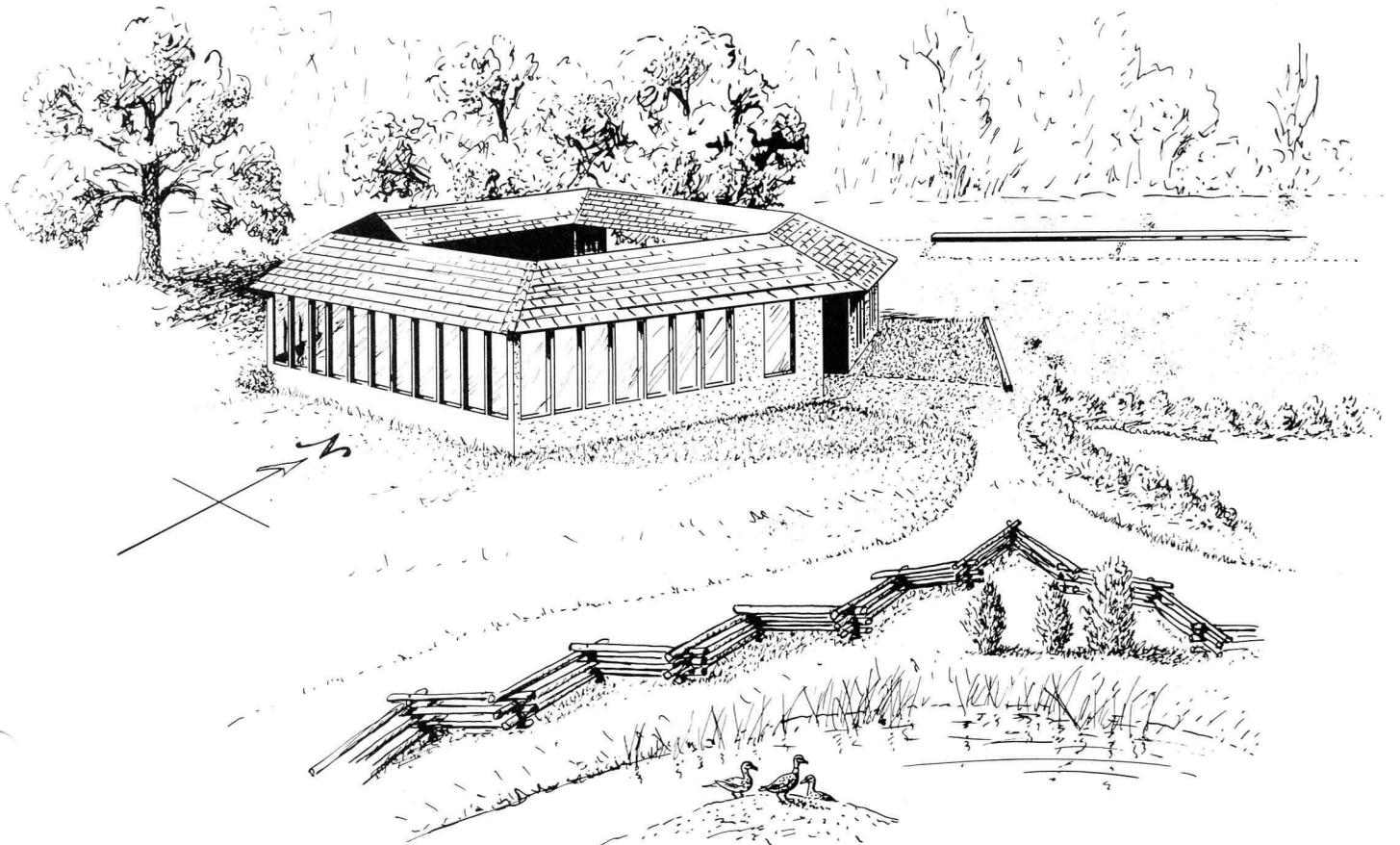
and visitors who want to watch the wildlife and learn more about the management programs on the Department lands on the island.

So far, the center is only on paper. How far it develops will depend largely on the interest and assistance received. The Sauvie Island Wildlife Center would be a major project in the north Willamette Valley. As was mentioned last month, a variety of projects are planned for other areas of the state. We hope by giving you a look at some of the ideas that have been put down, that we're giving you a look at the future.

Ron Shay—



*Art by Harold Cramer Smith
and Sharon Torvik*





The Octopus, Gentle Monster

by

C. Dale Snow

Assistant Marine Region Supervisor

Perhaps one of the marine animals least understood and most maligned by nonbiologists is the northern octopus (*Octopus dofleini* Wülker). Many writers and moviemakers have portrayed the octopus attacking divers and even submersible craft such as submarines. In reality the octopus is a shy, nonaggressive animal that does not attack people of its own volition. However, the octopus is equipped with a hard chitinous beak similar in appearance to the beak of a parrot. If an octopus is sufficiently provoked it can and will inflict a painful bite. The incidence of such bites, however, is quite low. In most cases bites have resulted when people put their hands near the beak or were trying to remove the animal from its den. In any event octopuses should be handled with care if you insist on handling them at all.

Against natural predators such as

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the wolf-eel, the octopus has another defense mechanism. When alarmed or about to be attacked, the octopus will eject an ink-like material that clouds the water and the octopus will "jet-propel" itself away from the danger by expelling water from the siphon funnel. This ink-like material is also believed to temporarily deaden the sensory organs of predators so that they can not find their would-be victim.

The third right arm of the male octopus is modified for transferring sperm to the oviducts of the female. The breeding season for the northern octopus in Japan is quite long with the peak season being October through December and breeding individuals have been observed in April. After mating, the males move into deep water and die several months later. It is assumed that the life history of this animal is similar in our

waters.

The female octopus lays 6,000 to 60,000 oval-shaped eggs with a filament at one end which the females use to tie the eggs together into string-like bunches. Then the eggs are attached to objects on the ocean bottom. The females blow water on the eggs with their funnels, keeping the eggs free of floating debris and aerating the water. They also protect the eggs from predators. This maternal behavior continues until the female dies at or about the time of hatching.

At hatching the young octopus is a little less than ¼-inch long (7 mm) and swims continuously for an undetermined length of time before settling to the bottom.

Growth of immature octopuses is quite rapid as witnessed in aquariums and from tagging. One animal weighed 2.2 pounds (1 kg) when tagged and when it was recovered 360

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days later, weighed 20.6 pounds (9.37 kg). Although one sees octopuses exceeding 100 pounds, most weigh less than 75 pounds with a stretch length of 15 feet or less. There have been undocumented reports of northern octopuses weighing several hundred pounds. The average natural lifespan is 4½ to 5 years.

Octopods are an important food item in Italy, Japan, Korea, Australia, and countries on the west coast of Africa. There is also a demand for octopus in the United States. Over \$400,000 worth of octopus was imported from Japan in 1966. Since 1966 imports have declined because the demand for octopus in Japan exceeds what their fishery can produce. Recipes for preparing octopus can be found in at least two publications available in most book stores. One is "Stalking the Blue-Eyed Scallop" by Euell Gibbons and the other "Edible? Incredible!" by Marjorie Furlong and Virginia Pill.

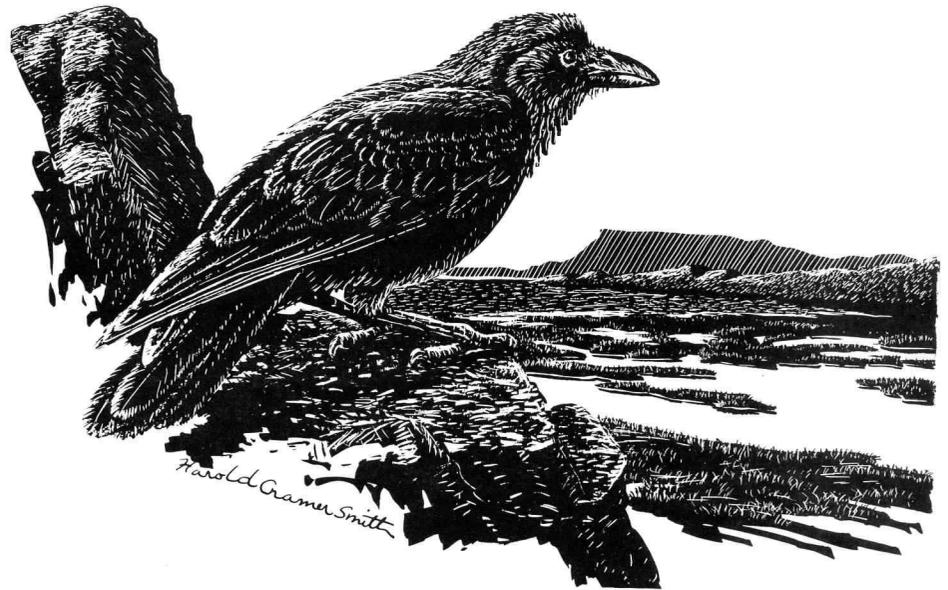
The northern octopus found in Oregon waters is a shy and retiring animal that likes to feed on crabs, fish and other octopuses. It can be occasionally found in rocky intertidal areas with its location given away by the piles of crab shells in front of its home under a rock or rock crevice.

Despite the potential commercial value of the octopus and its interest value to both lay and professional people, little is known of the biology of the animal in our waters. The biology of the northern octopus presented here has been extracted from "The Fishery Biology of *Octopus dofleini* (Wülker)" by Madelon Green Mottet and published by the Washington Department of Fisheries as Technical Report #16. The findings in it are based on published Japanese literature and it is an excellent treatise on the fishery and biology of the northern or "Giant" octopus.

Readers who are concerned about being bitten by an octopus should read the little two page information leaflet put out by Oregon State University Marine Science Center titled "On Octopuses: A Word To The Wise" by C. F. Lopod.

The octopus is a valuable natural resource and if encountered in the rocky intertidal areas should be left there undisturbed unless it is to be used for food or study.□

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The Common Raven

When most people see a large, black bird along the road or flying above a rimrock, they know they are either viewing a crow or a raven. No other Oregon bird fits that description. Many of those same people assume there is no real difference between the birds. Here they are wrong.

While the raven belongs to the same family as the crows, jays and magpies, it is distinct from them. The raven is the largest of all these birds. For example, the wingspread of the crow may reach a maximum of 39 inches while the raven may extend its wings to 56 inches.

Flight style is also a telling distinction between these two black birds. The crow paddles along alternately flapping and gliding. The wings are angled up in the glide, like the vulture.

The raven's flight is more glide and less frequent wing stroking. The wings are held flat in the glide like many hawks and eagles.

The raven, like the crow, is a deep bluish-green black. Even the beak is black. There are important differences here, as well, for those wishing to tell raven from crow.

The raven looks thicker to the eye than the crow. This is because the raven has extra plumage around its neck and on its belly that gives a fatter, more rumped appearance.

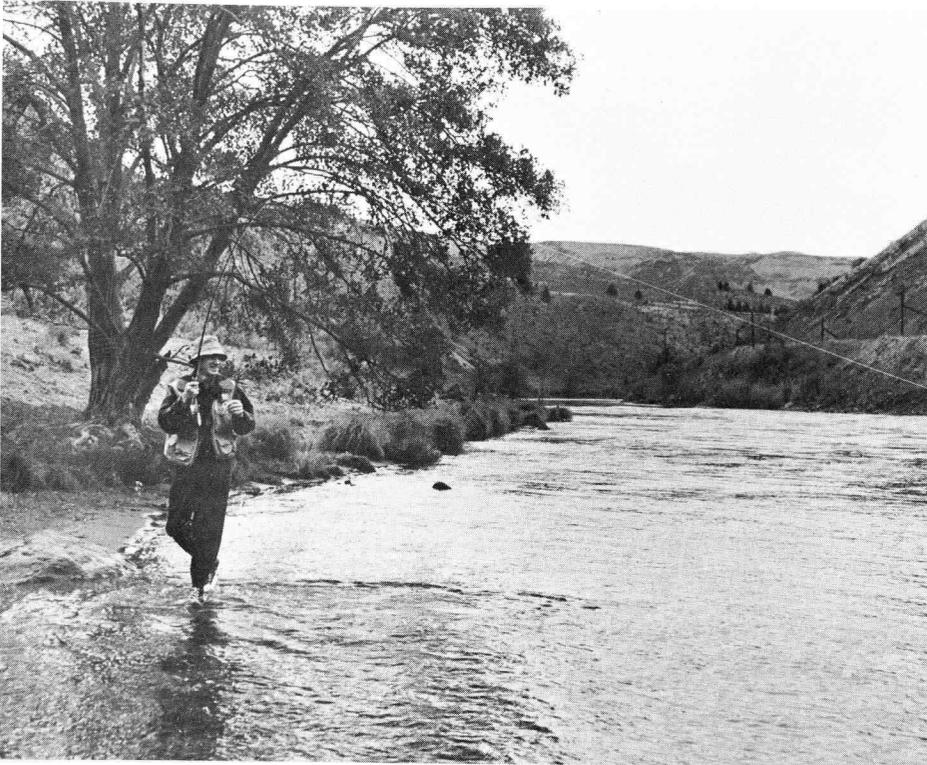
The crow beak is straight while the upper beak of the raven is more rounded.

The raven nests in trees, again like the crow, but the raven also nests on rocky cliff sides, fire towers, oil derricks and any other place considered suitable by the nestbuilder.

The nest is made of large sticks and lined with plant material and often hair from animals found in the area. Neither crows nor ravens are particularly clean when it comes to nests. One description of a raven nest included the information that this was one bird that would, and did, foul its nest without hesitation. The combination of hair from dead animals and excrement led one ornithologist to describe a nest as "a varitable abode of harpies." The same scientist added that some nests are also infested with fleas.

Ravens are found generally throughout Oregon, but are more common east of the mountains and on the coast.

Food for the raven can be almost anything, but animal matter is preferred. Much of the food is eaten as carrion. While crows will eat carrion, the roadside scene of several birds gathered around a fresh road kill is usually a cast of ravens.□



Late-season Deschutes steelhead gives angler a run for his money.

NEW DESCHUTES RULES

Probably no river in Oregon is better known or more revered than the magnificent Deschutes. Its deep-bodied native trout and fine run of summer steelhead (notwithstanding a temporary two-year setback) are known far and wide. The Deschutes offers more than mere fish. It offers an angling experience to be equaled nowhere else in Oregon.

Nearly all its trout and a large proportion of its steelhead and salmon are wild fish produced naturally in the stream. Construction of Pelton Dam ended all migration of salmon and steelhead above that point, and since then, hatchery fish have been used in mitigation for the losses of spawning and rearing caused by the dam.

But the lower 100 miles continues to have the natural capacity to grow fish equaled by few other streams in the state. New angling regulations

which take effect this year will put emphasis on management of wild stocks and on the sport of angling rather than the harvest of fish.

When general trout season opens on April 21, the entire river from Pelton Dam downstream will have a daily kill limit of two trout 12 inches or over. The possession limit is four trout 12 inches or over or in seven consecutive days. Because others must be released, and the use of bait causes much higher mortalities in released fish than lures and flies, the angling in this section is restricted to the use of artificial lures and flies. Hatchery trout will no longer be stocked (except possibly in a small area adjacent to a platform below Maupin built for handicapped fishermen). Bait will still be permitted in a small area from Sherar Falls downstream to the mouth of Buck Hollow

Creek because of the intensive salmon fishing that traditionally takes place there.

Last year the Deschutes steelhead season was closed on August 21 because of a very poor return of steelhead, particularly that segment of the run which had spent one year in the ocean. These fish came from the same group which will make up this year's "two-salt" run, those fish which spent two years in salt water. Thus another poor run is expected in 1979. Losses which caused the poor returns occurred to both the wild and hatchery portion of the run and were apparently caused largely by low flows during the 1977 drought.

Reflecting the anticipated poor run and the need to protect the wild segment of the run is a new regulation this year which permits the harvest of only one hatchery fish (those with healed fin clips) and requires the release of all wild steelhead. Two fin-clipped steelhead may be kept in possession or in seven consecutive days. All trout 20 inches or over are considered steelhead and under this year's regulations, must be released. Again, angling is restricted to the use of artificial lures or flies, except in the small bait area below Sherar Falls.

Salmon angling regulations remain unchanged except for the provision that bait is permitted only from Sherar Falls downstream to the mouth of Buck Hollow Creek. □

Ken Durbin



Under new rules all wild steelhead must be released, and trout limit is 2 fish 12" or over per day, artificial flies and lures only.

THIS AND THAT

compiled by Ken Durbin

Who Says There's No Justice?

Three men in Washington who collaborated to kill a 7-point bull elk illegally some 2½ miles inside the boundary of Mount Rainier National Park, were so proud of their achievement that one of them could not resist submitting a photo of himself with the magnificent prey in a popular northwestern fishing and hunting publication. Game men noted the absence of snow. Recalling the heavy snow during legal elk season in the area claimed as the kill spit, they started a year-long investigation. The three men were fined \$1,000 each, got one-year jail sentences, and lost hunting privileges for three years. The jail sentences were suspended.

China Tops Billion — And Outgrows India

The 1978 report of the Environmental Fund, a Washington-based private group with a high reputation for accuracy, puts China's population at 1,003,900,000.

Then come India with 656 million, the USSR with 261 million, the US with 230 million, Indonesia with 149 million, Brazil with 122 million and Japan with 115 million.

The fastest growing country is the United Arab Emirates at 8.9%, followed by Kuwait at 5.9% and Libya at 4.1%. One surprise is that China is reckoned to be growing faster than India: 2.3% as against 2.1%. Not far behind (another surprise) comes the US with 1.7%. But almost half this figure is accounted for by illegal immigrants, mainly from Mexico.

World population is estimated at 4,365,300,000 — an increase of 59 million on last year. (Other estimates put the increase at 70 million to 80 million.) In other words the global population, despite a slight easing off in the rate of climb, is continuing to grow every year by more than the population of the United Kingdom, one of the planet's more overcrowded countries.

IUCN Bulletin

OREGON WILDLIFE

Hunting Doesn't Affect Mallard Numbers

Research has shown that as long as hunter harvest of mallard ducks is below an unspecified critical level the same number of birds will die each winter regardless of whether they were hunted or not. Members of Utah State University and the U.S. Fish and Wildlife Service recently concluded a study which found that mallard survival did not increase during years of hunting restrictions. Hunting at the rate of past years apparently did not alter survival rates for the ducks. Death from natural causes cuts into surplus birds.

Texas Parks & Wildlife

Time of Death Can be Set For Deer

The Utah Division of Wildlife Resources has developed a technique for determining time of death in a deer. The technique could be valuable in prosecuting poaching cases. What's involved is analysis of the vitreous humor, the fluid between the retina and lens of the eyes. While the deer is still alive the potassium level in the blood and eye remains equal. At the time of death, the vitreous humor begins to absorb potassium at a constant rate. It goes from 130 parts per million at death to 1,000 parts per million after the deer has been dead for 108 hours. Similar techniques have been used to pinpoint time of death in humans to within a half hour.

Texas Parks & Wildlife

"Avoidable" Extinction

One species whose potential value has now gone beyond recall is the Tecopa pupfish, formerly found in small pools and thermal springs near the town of Tecopa, California. This 1.5-inch pupfish has now been removed (the first removal ever) from the US endangered species list. The reason? Extinction.

Secretary to the Interior, Robert Herbst, commented: "The most depressing thing about the loss of this species is that it was totally avoidable. The human projects which so disrupted its habitat, if carefully planned, could have ensured its survival."

IUCN Bulletin

Peregrine Preservation

Cornell University in Ithaca, N.Y., is raising peregrine falcons and releasing them, a project that is working quite well, though about one-third of the birds die before they reach the age of one year. They are lost to a variety of causes. One bird, released in New Hampshire, turned up dead one year later in a cattle feed lot in Saskatchewan. One apparently flew into a train, another into an airplane prop. One drowned in Chesapeake Bay, while another was found mortally injured on a suburban lawn in New Jersey. Raccoons killed two of the birds, and three were electrocuted on power lines. Illegal shooting and, most importantly, horned owls are the worst problems. Researchers know owls have killed seven of the young peregrines, and suspect the disappearance of other fledgling birds could be traced to the big owls. A man who shot one of the peregrines took it to a taxidermist, a mistake that cost him \$2,000. Researchers say that peregrines that can make it through the first crucial year of life have a good chance of successfully surviving the wild.

Missouri Conservationist

Mudminnow May Save Millions

Who says little-known fish aren't important? Cornell University scientists think the tiny, olive-colored central mudminnow is a prime test model for detecting possible genetic damage or cancer that could potentially be caused by industrial chemicals and pollutants. The small aquatic species is injected with a chemical enhancer similar to a component of chromosomal DNA, then injected with or allowed to swim in the suspected chemical. By examining the fish cells under a microscope, scientists can see whether chromosomes have switched places, an indication of the presence of mutagenic (able to cause genetic damage) or carcinogenic agents. The mudminnow's 22 chromosomes make it a better subject because other fish have more numerous, smaller chromosomes that are more difficult to study. Previous tests used the more costly and time-consuming method of cell cultures. Researchers hope the mudminnow will allow speedier chemical screening.

Conservation News

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Commission Sets Some Controlled Hunts, Bow Tag for Deer

Controlled hunts for antelope, bighorn sheep and cougar have been set by the Oregon Fish and Wildlife Commission, and a separate deer tag for bowhunters was authorized which would require hunters to choose between deer hunting with a rifle or with a bow, but not both.

The season for pronghorn antelope will run from August 18 through August 22 with 1,215 buck tags authorized in 23 areas. That is 75 tags more than were granted last year.

Two Gerber Reservoir antelope seasons for bowhunters were also set with no limit on the number of hunters allowed to participate in each. Last year the hunt was limited to 200 bowhunters but many of those tags went unused.

Thirty-seven permits were authorized for hunting bighorn sheep in five areas, two more permits than last year.

Cougar seasons were set for seven areas in northeastern and western Oregon, with 140 tags authorized.

When the deer hunter buys his tag this year it will have a box to be checked by the license agent to indicate whether the tag holder will hunt with a bow or with a rifle. The hunter will make his choice.

The bow tag would be good for any of the bow seasons in the state. Those who elect to buy the bow tag will not be able to hunt with the rifle.

Hunters who purchase a rifle tag will select one for either mule deer or black-tailed deer as in past years. In addition to authorizing a separate bow tag for deer, the Commission set an August 11 opening date for the 1979 bowhunting seasons.

Closing dates, open areas, bag limits and other regulations relating to bowhunting will be set late in May along with other big game hunting regulations.

Sportsmen who testified before the Commission on the proposed deer bow tag seemed split in their preference for or against it. At its annual meeting in Bend earlier this month, the Oregon Bowhunters indicated in favor of such a tag if it was part of a package which would include a longer bow season, season open state-

wide, with perhaps two deer allowed in areas where rifle hunters were permitted two deer, etc. Staff biologists with the Department will offer recommendations on these seasons as well as on deer and elk hunting regulations to the Commission when it meets in Portland on May 5.

A flyer listing seasons for antelope, bighorn sheep and cougar along with instructions for applying will be available from license agents.

The deadline for applications will be April 30 and the drawing will be held May 17.

These controlled seasons were set earlier than normal this year to enable the Fish and Wildlife Department to receive and process applications for antelope, sheep and cougar before the major influx of deer and elk applications which will come later in the year, and will also allow more time to insure hunters receive their permits well in advance of the seasons.

BUCK ANTELOPE AUGUST 18-22

AREA	PERMITS
E. BEATY'S BUTTE	100
W. BEATY'S BUTTE	60
BEULAH	60
FORT ROCK-SILVER LAKE	20
GRIZZLY	5
INTERSTATE (Lake County)	50
JUNIPER	100
LOOKOUT MT.	5
MALHEUR RIVER	150
MAURY	35
MURDERER'S CREEK	50
OCHOCO	70
OWYHEE	75
N. PAULINA-WAGONTIRE	35
S. PAULINA-WAGONTIRE	25
SILVIES	25
STEENS MOUNTAIN	150
N. SUMPTER	10
S. SUMPTER	10
WARNER	35
WHITEHORSE	150
HART ANTELOPE REFUGE	15
Total	1,215

COUGAR

AREA	DATES	PERMITS
WALLA WALLA, WENAHA, SLED SPRINGS, CHESNIMNUS	DEC. 1-31	25
SNAKE RIVER, IMNAHA	DEC. 1-31	30
CATHERINE CR., MINAM, KEATING, PINE CR.	DEC. 1-31	40
SUMPTER, LOOKOUT MT.	DEC. 1-31	5
Portion SNAKE RIVER	DEC. 1-31	15
Portions MCKENZIE & INDIGO	DEC. 1-31	15
Portions DIXON & MELROSE	DEC. 1-JAN. 15	10
Total		140

BIGHORN SHEEP

AREA	DATES	PERMITS
STRAWBERRY MT.	SEPT. 8-23	3
HURRICANE DIVIDE #1	SEPT. 8-14	3
HURRICANE DIVIDE #2	SEPT. 15-21	3
OWYHEE	SEPT. 15-19	4
STEENS MT. #1	SEPT. 15-19	6
STEENS MT. #2	SEPT. 22-26	6
HART MT. #1	SEPT. 8-14	6
HART MT. #2	SEPT. 22-28	6
Total		37



Concept: Through time animals have established reproductive rates at a level necessary to maintain their population in relation to the hazards they face.

Spring is a time for the young. For wildlife it is a time when young are produced to fill a void created by a year of hazards. The effect of winter, predators, accidents, diseases and other such factors has left most animal groups at their lowest level. Spring brings a time when the habitat too is beginning its annual renewal.

Most birds are well into their nesting activities by now. Within the next month, the first young of rabbits, foxes, some of the waterfowl and even a few deer will be seen. For mammals and birds plus most reptiles and amphibians, it is no accident that young arrive with the warming days and an increasing availability of food and cover. This is the time when the necessities of life are most likely to be found and the greatest amount of time is available to grow and strengthen before the hazards of migration, hibernation, and winter must be faced.

Numbers of young each species produces are related to a number of factors. One of these is size. The larger the animal, the fewer young it will have. Part of this is due to the length of time it takes for the larger young to develop before birth. Large animals face fewer hazards from predators than do the small ones. Elephants for example, produce only one young every four years. Closer to home, grey whales bear a calf every other year.

OREGON WILDLIFE

Oregon's

WILDLIFE WINDOW

So do elk. Make a list of some animals in order of size and find out how many young they have each year. Plot this on a graph to see the direct relationship between size and number of young produced.

Defense mechanisms also relate directly to reproductive rate. The porcupine, for example, with its forest of protective quills, can maintain its population with only a single young per year. Animals like the raccoon or beaver which are similar in size to the porky must bring off up to a half a dozen offspring to keep their numbers up. The spotted skunk is about the size of a cottontail rabbit. The skunk bears 4 or 5 young once a year while the defenseless rabbit may have 4 to 6 litters of up to 8 young each to keep pace with annual losses. What other animals can you list of similar size that produce various numbers of

young because of differing defenses?

Efficiency of breeding makes a difference too. Mammals that carry their young and give birth to live offspring have the lowest overall birthrate of all vertebrate classes. Birds lay eggs but tend them and the young. This is less efficient than the mammals but not as bad as fish. Perhaps fish are the most inefficient of all. For the most part, eggs are deposited and abandoned. Their chance of being fertilized and given a chance to begin the journey of life is improbable in many cases. Some fish must produce a million eggs each year for just one or two to become adult fish. You can discover more about this relationship by comparing the number of eggs fish produce to how closely the eggs are tended, how they are fertilized and where they are deposited. □

THIS MONTH'S WINDOW

One Plus One

Locate some eggs suitable for hatching (chicken, frog, snake, etc.)

Study what conditions are necessary to hatch these eggs.

Set up an incubator or aquarium and hatch the eggs. Study and record your observations.

Now you are a "parent". Be prepared to care for the young before beginning the project. □

Restrictive Ocean Salmon Fishing Rules Adopted

Regulations for commercial salmon fishing in the ocean have been adopted by the Fish and Wildlife Commission, and at the same time, ocean salmon sport fishing rules for 1979 were modified from those adopted last November.

The new regulations apply out to three miles in the ocean off Oregon's coast. They are identical to regulations recommended earlier in March by the Pacific Fisheries Management Council for the zone from three to 200 miles offshore. And they are more restrictive than any fishing regulations previously imposed on either sport or commercial ocean salmon fishermen.

The tighter regulations come in response to another expected poor run of coho salmon, the need for improving escapement of wild coho to spawning streams, and also to the need for greater escapement of chinook salmon into the Columbia River.

Commercial trollers will have fewer fishing days, a mid-season closure, and restrictions during part of the season on taking coho. Sports fishermen will also have a shorter season as well as a reduction in the daily bag limit from three to two. Only in the north coast zone can three salmon be taken in one day, and then only if one of them is a species other than chinook or coho.

In order to insure that savings of fish resulting from the tighter ocean restrictions are passed on to inland hatcheries and spawning grounds, the staff of the Fish and Wildlife Department will recommend to the Commission this month a reduction in salmon bag limit in coastal streams from three to two, as well as some restrictions on taking coho.

The Oregon Commission adopted

1979 Ocean Salmon Fishing Regulations

Recreational Fishing

Season	So. of Cape Falcon May 12-Sept. 16	No. of Cape Falcon May 12-Sept. 16
Minimum Size:		
Chinook	22"	24"
Coho	16"	16"
Angling Gear	1 rod and 1 line	
Bag Limit	2	2 + 1*

*Three fish of which only two may be chinook or coho.

Commercial Troll Fishing

Season	So. of Cape Falcon May 1-31	No. of Cape Falcon May 1-31
Except coho	Sept. 16-Oct. 31	
All Salmon	July 1-Sept. 15	July 1-Sept. 8
Minimum Size:		
Chinook	26"	28"
Coho	16"	16"
Gear	Barbless single hooks prior to coho season (bait hooks may be barbed)	

the same regulations as recommended by PFMC in order to reduce confusion and permit for more orderly enforcement of ocean fishing regulations. However, the Commission expressed its intent to extend the sport fishing season through October 31 in State Marine Waters (within 3 miles) south of Coos Bay to the California border. Director Jack Donaldson was instructed to request the Secretary of Commerce to adopt the same sport fishing regulation for the Fishery Conservation Zone (3 to 200 miles offshore).

The extended season off the south coast is open only for chinook salmon, which in that zone do not need the additional protection. □

A Doff of the Fedora

This month a tip of the hat goes to District Court Judge Maurice Merten of Lane County. Two juveniles should be having plenty of time this year to contemplate their straying from the fishery rules.

Last summer the 16 and 18 year olds were attempting to foul hook salmon. Judge Merten suspended the sentence, but put the violators on probation for four years with the conditions that: 1. They violate no law and act as law abiding citizens, 2. Serve 20 days in the custody of Lane county jail, 3. Each pay a fine of \$305.00 and, 4. Not hunt or fish or make an application for a hunting or fishing license of any kind for 4 years. □



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