

OREGON WILDLIFE

January-February 1989



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The Cover

Three mule deer approach a feeding station on the Elkhorn Wildlife Management Area near Baker. ODFW conducts feeding programs only where necessary to minimize damage to crops.

Photograph by Pat Wray.

HUNTER EDUCATION PROGRAM

October-November 1988

Instructors Approved 23
Total Active 1,074
Students Trained 1,130
Total to Date 339,477
Hunting Casualties Reported in 1988
Nonfatal 18
Fatal 2

Big Game Controlled Hunt Regulations

The Oregon Fish and Wildlife Commission has approved early 1989 controlled big game hunting seasons, with improved hunting opportunities for antelope, bighorn sheep, black bear and elk.

Regulations were adopted by the commissioners following a public hearing at ODFW headquarters in Portland on Saturday, February 11, following a three-week public input time period. Printed regulations for these early seasons will be available at license agencies by early March.

General season deer and elk regulations and most late season controlled hunts will be proposed on May 12 and then set on June 3 after a similar three-week time frame for public input.

Improved production and survival have led to increases in the numbers of tags available for bighorn sheep, pronghorn antelope, black bear and elk. However, two straight years of drought conditions in eastern Oregon contributed to reduced deer production and poor physical condition for those fawns born. Reduced fall greenup kept deer in many locations from becoming physically ready to survive the winter; certainly they were not ready for a winter like we have experienced thus far.

Total numbers of 27,020 controlled deer hunt tags reflect a reduction of 555 tags from last year. A further reduction may also be possible once winter survival data is evaluated following counts conducted in March or April.

Hunters must mail in their controlled hunt application by April 3 for all hunts except the spring bear hunt, which has an application date of March 15.

Hunters successful in drawing an antelope tag must wait 5 years before applying again. Bighorn sheep tags are once-in-a-lifetime occurrence in Oregon. Successful applicants may never apply again.

Hunters are reminded that the controlled seasons set in February constitute a small part of the total opportunities available. They consist of early seasons which must be established early for the convenience of the hunters. Far more are scheduled during the June commission meeting.

Regulation Summary

Antelope

General rifle season — August 19-25: 2,175 tags
Bow hunts — early August and early September:
660 tags
Muzzleloader hunts — early and late August: 50 tags

Deer

Controlled buck — September 30-October 11:
20,300 tags
High Cascade hunt — September 9-17: 3,500 tags
Controlled muzzleloader hunt — late September-
November, 2,400 tags
Bow season — Late August-early September
Controlled antlerless hunt-mid-August: 720 tags

Bighorn sheep

Bighorn hunts occur early to mid-September: 51 tags

Elk

Controlled bull hunts during general season hunt
periods: 23,890 tags
Either sex hunts: 3,950 tags
Antlerless hunts: 935 tags
Controlled bow hunts: 4,000 tags

Dates to Remember:

March 15 ... Deadline for postmark of spring bear hunt application.

April 3 ... Deadline for postmark of other early controlled hunt applications.

Update

Summer Hosts Sought

Would you like to spend part of your summer helping fish and wildlife? If you have a camper, motorhome or trailer, and a few weeks open between May and September, the department can offer you an enjoyable and rewarding opportunity.

The agency will provide free hook-ups at selected hatcheries or wildlife areas around the state in exchange for your part-time volunteer assistance in a variety of fish and wildlife activities. The program is similar in concept to the campground host program operated by the Forest Service and the State Parks division. For more information, contact Cliff Hamilton at Oregon Department of Fish and Wildlife, PO Box 59, Portland, OR 97207, or call 229-5409.

A Real Fish Story

Want to know when and where salmon, steelhead and sturgeon fishing is best? The department can help you, but first you must provide some information. Anglers who turn in their salmon/steelhead or sturgeon tags at the end of the year are the ones who tell the story. For many years, these tag returns are the only way of developing accurate catch figures.

Since 1975, the average annual return rate has been about 21 percent of the tags sold. The department is seeking to increase that return rate since more returns mean better quality information. Even if you did not fish, or caught nothing — turn in the tag anyway. That sort of data is also needed.

Biologists use the tag data as a tool to evaluate such things as hatchery programs, effectiveness of regulations and long-term population or catch trends. In addition, reports generated from these returns give anglers some history on when and where fish were caught in years past. By late spring, the department will have a publication available showing catch information from 1987 tag returns. Look in the March-April edition of OREGON WILDLIFE for a sample and details on how to receive the report. Right now, turn in those tags. The 1988 results should be out by this fall.

Angling Proposals Sought

Public proposals for changes or additions to the 1990-91 Oregon Sport Fishing Regulations must be turned in to the department by April 1. Persons wishing to submit proposals should use forms available through department offices around the state.

Public meetings will be held around the state in mid-summer. The Fish and Wildlife Commission will hear contested issues and set the two-year regulation package in early fall.



Ron Stacy

Managing Oregon's Fish and Wildlife

By Jim Gladson Oregon Wildlife editor



Pat Wray

Wildlife populations are limited not by the good times, but by those periods when the going gets rough.

A primer on what managers do, and why

Wildlife Management: The Science

The scene is a college classroom at the state university. The subjects under discussion are the fundamental principles of wildlife management. Like students everywhere, the people attending this class are probably thinking about their weekend date as much as the topic at hand. The year is 1939.

These scientists-to-be have much in common with other students at the school. Their studies will soon be interrupted by war. Some will not return. There are differences, however. The main distinction is that they are learning a new science. No early Greek, Roman or Arab scientific foundations here. They sit at the cutting edge of discovery. What becomes of this young discipline, and how it matures will depend on their commitments. What becomes of the

country's wildlife and fish will likewise be their responsibility.

Here sit future agency directors, wildlife chiefs, builders of hatchery systems and researchers destined to refine management tools. Their hearts are bound to the conservation movement of the 19th Century represented by Theodore Roosevelt. Their minds are turned to the possibilities of future scientific management methods as described by leading professionals such as Aldo Leopold.

Leopold, a college professor in Madison, Wisconsin, wrote the now classic textbook for the field in 1932; titling it simply, *Game Management*. In his preface to the book he wrote: "The central thesis of game management is this: game can be restored by the *creative use* (italics by the author) of the same tools which have heretofore destroyed it — axe, plow, cow, fire and gun. A favorable align-

ment of these forces sometimes came about in pioneer days by accident. The result was a temporary wealth of game far greater than the red man ever saw. Management is their purposeful and continuing alignment."

The conservation movement of decades past had sought to restore wildlife "by the control of guns alone, with little visible success," according to Leopold. "Management seeks the same end, but by more versatile means," he said. These ideas and approaches to Management with a capital "M" carried the risk of being new and lightly tested. But the risk was necessary, thought Leopold. "We seem to have two choices: try it, or hunt rabbits," he said.

What follows is a systematic look at the various components of management, and how the tools and techniques of this science are used

"It is the mission of the Oregon Department of Fish and Wildlife to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations."

to protect and enhance Oregon's fish, wildlife and their habitats.

Back to the Basics

As with any scientific discipline, there are certain basic principles of wildlife management that form the foundation on which all else is built. The most basic of the basics is the need for habitat.

Without a place to live, feed and reproduce, no species can survive. These needs break down into three categories:

Food: All animals must eat. Survival is dependent on having the right kinds of foods available at appropriate times of the year. Both quality and quantity of these supplies are important. They must also be available at sufficient levels year-round unless a species has learned to handle periods of scarcity through adaptive traits such as migration or hibernation.

Water: As they must eat, so must they drink. Although some desert species have developed ways to pro-

duce their own water internally, the vast majority of wildlife need readily available supplies in their environment.

Cover: All wildlife needs a home — a place, or series of places, where they can hide from predators; bear and raise their young; and find shelter from summer sun and winter storms.

Good habitat for any given species will have all of the above in the right combination to provide consistent support. Not only must the basics be there, but they must also be properly situated one to the other. If water and food are too far from a cover area, for example, then some animals risk extreme exposure to predators. While the basics may be present in some form, they are not always arranged to benefit all species.

Okay, let's assume that all the right things are in the right places to benefit a certain species. The question then becomes how many of this species can the area support. This leads to another basic principle.

Nobody Likes a Crowd

The conservation movement in the late 19th and early 20th centuries focused heavily on refuges and protection of species from the gun. But Leopold and other wildlife managers found a weakness in this single-minded approach. They pointed out that any given habitat can only support a limited number of animals without ultimately harming the animals or the habitat through overpopulation. They called this principle **Carrying Capacity**.

This was one of the new ideas that questioned existing assumptions that left alone, wildlife would prosper indefinitely. Wildlife managers agreed that some level of protection would bring prosperity to a deer herd, for example, but at some point deer numbers would outstrip the ability of the habitat to provide for the herd. The result: over-crowding among the animals, destruction of the food supply and ultimately death by starvation or disease.

Rather than having more animals,

This article on "Managing Oregon's Fish and Wildlife" is part one of a six-part series that will be published in each issue of Oregon Wildlife this year. The aim is to give our readers a better understanding of fish and wildlife management principles, examples of translating concepts to practice, information people can use to be more involved in decision-making and a sense of the challenges and opportunities facing wildlife managers in the years ahead. Coming attractions include:

Part Two — Choosing Wildlife Management Strategies

Part Three — Habitat: Its Protection, Enhancement and Restoration

Part Four — Fishery Management: The Basics

Part Five — Choosing Fishery Management Strategies

Part Six — Beyond Leopold: A Look Over the Management Horizon



Al Miller

Having the right mix of food, water and cover is essential to wildlife survival.

the ultimate outcome could be fewer deer living in a habitat that now had less ability to support the herd than before.

A wildlife manager faces the challenge of determining what a particular carrying capacity of a habitat is, then using the tools of the science to either keep the wildlife populations at acceptable levels, or increase the capacity through habitat improvement or other forms of intervention. This is particularly complex when a migrating species depends on different habitats depending on the time of year.

A high elevation deer summer range may support 1,000 animals, but carrying capacity must also be measured by the ability of the lower-elevation range to support these animals through the winter pinch period. Likewise, waterfowl managers in Oregon may provide excellent wintering areas for ducks, but the population can still decline if breeding areas in the north are lost.

The manager must also be alert to habitat changes caused by human or natural means. Activities or events ranging from timber removal and grazing to volcanic eruptions and drought can have profound effects on the ability of habitats to support wild populations.

Everything Has a Limit

No wildlife population is a fixed quantity. There is a constant ebb and flow of numbers depending on the time of year, condition of the habitat and the gamut of other elements that influence survival in both the short and long terms. It is a basic assumption that most populations will experience high annual losses. With birds, for example, the yearly death rate could approach 80 percent or more even under average circumstances.

Many species typically over-produce during their breeding period and — for a time — exceed the habitat carrying capacity. Then the work of what managers call **Limiting Factors** begins. Starvation, attacks by

predators, severe weather and hunting all play a part in pairing down the populations.

Wildlife scientists recognized this seasonal cycle of overabundance and decline, and saw that hunting, fishing and trapping could play a role as management tools if carefully regulated. Within an otherwise healthy population, there is a **harvestable surplus** that would still be lost even if no hunting was allowed. Rather than damaging game numbers, harvesting appropriate amounts of certain species would actually help wildlife while also providing recreation and livelihoods.

Putting Theories to Work

The concepts of habitat components, carrying capacity and harvestable surpluses make sense, but management based on these principles relies on gathering information. It is the primary job of wildlife managers to observe and analyze populations and their habitats. What they find shapes the management options they choose.

To gather this critical data, biologists rely heavily on **inventories**. Methods may vary, but the objectives are similar. Managers approach this work in much the same way a business person would take stock of goods on hand and survey market conditions.

Also, like a business, a field biologist has got to know his or her territory — including populations of various species and the types and conditions of habitats.

By plane, helicopter, boat, horseback, pickup and foot, wildlife managers cover their territory. While this effort may appear random, it is not. Let's use deer and elk as an example.

At certain times each year, biologists go afield to count and/or classify the herds in their area. They travel the same routes each time, which gives them the ability to get comparable results from year to year. Observations may include ratios of males to females or fawns to females. They also note condition of



Unknown

When populations surpass the ability of a habitat to support them, losses are inevitable.



Jim Gladson

Management techniques traditionally reserved for hunted species are now serving nongame wildlife as well.

the habitats, and what changes may be occurring.

Checking the fawn ratio in the fall and again in spring gives a clear picture of winter survival. Carefully tracking the male to female comparison also helps spot trouble areas where the buck or bull harvest may be too high to sustain a healthy herd. Trends in overall numbers also signals decline, balance or over-expansion.

Similar observation routes are used to assess upland bird production in the spring by spotting newly hatched broods. Even noting the number of birds heard calling on a route gives a good indication of population size.

Traditionally, these tools have been used primarily for game animals since the people who buy fishing and hunting licenses and tags are the primary funding base for management agencies. Over the last decade, however, inventory and habitat assessment techniques have also been concentrating on non-hunted species ranging from bald eagles to snowy plovers.

Managers have learned a lot about game populations and their needs over the last 50 years, but similar data on nongame species — particularly those who may be threatened or endangered — is sadly lacking. The advent of tax check-off donations and the willingness of legislators to appropriate tax dollars is helping close the information gap, but much more is needed to help shape management decisions.

Information is the fuel that drives the decision-making process. Without it, managers are in the dark about what programs or regulations can be useful. With it, they — in conjunction with the public and policymakers — can act to protect and enhance wildlife populations and their habitats.

Part 2 of the series *Managing Oregon's Fish and Wildlife* in the March-April edition of *Oregon Wildlife* will address how wildlife managers use this information to develop management strategies. 

A Cold Time At SUMMER LAKE

Written and Photographed
by Pat Wray

It is dawn at Summer Lake.

The sun will not show itself for another hour but already the imperceptible brightening of the new day reveals shadowy figures moving through the bullrushes, over the dikes, flashlight beams dancing before them. Their unhurried gait is misleading, a result of the bulky loads they carry — shotguns, stools, lunchpails, decoys, vacuum bottles. It belies the excitement they feel, an excitement intensified by the non-stop symphony of waterfowl noises that surrounds them.

A light breeze ruffles the cattails. The figures stop momentarily and turn away from it because a "light breeze" at Summer Lake is 25 to 40 miles per hour. And this breeze wields the sub-freezing temperature like a scythe, ripping painfully through clothing and turning exposed flesh to cardboard.

Whoever named Summer Lake did not do so in December.

But these are typical conditions for the waterfowler, and these hunters are happy to put up with them for an opportunity to hunt in one of the finest duck and goose hunting areas in the Pacific Northwest.

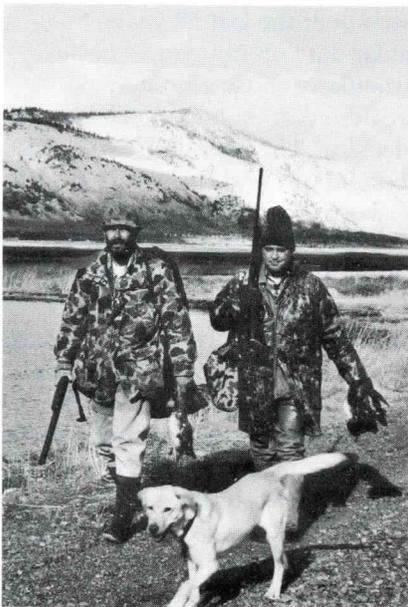


Summer Lake Wildlife Management Area is one of 17 areas managed by the Oregon Department of Fish and Wildlife (ODFW) to protect and conserve various species of wildlife throughout the state. Known primarily as a stopping-off point for snow geese on their way from nesting grounds in Canada and Russia to California's Sacramento Valley, Summer Lake is also a temporary and permanent home to dozens of other species of birds and mammals.

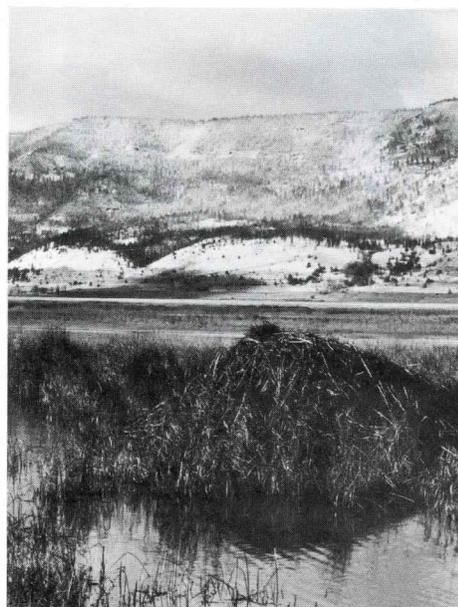
The management area consists of 18,000 acres of alkaline marshland, situated in the shadow of the Gearhart Mountain range on the western edge of Oregon's high desert. Much of the area is maintained as a refuge while the rest is managed for hunting.



This slough at Summer Lake was dug by Oregon Department of Fish and Wildlife as part of a major habitat improvement project for the thousands of migrant and permanent waterfowl that inhabit the wildlife management area. The surrounding bullrushes and cattails were planted to provide feed and nesting cover.



A pair of successful hunters head south along a dike at Summer Lake.



Muskrat houses at Summer Lake double as safe nesting platforms and as hunters' blinds. The little rodents' digging activities cause damage to the dikes, however, and are controlled with a trapping program.

The hunters are moving down the dikes, some are stopping to erect makeshift blinds, others simply huddle on the backside of the earthen mounds, hidden from the thousands of cackling waterfowl that spent the night in the refuge portion of the management area. The birds are becoming louder now and noticeably more excited with the approaching dawn. The hunters hope to intercept the birds as they fly across the dikes, historically a very effective method.

The dikes were originally constructed by cattle ranchers as a means of providing a year-round water supply for the irrigation of feed crops. They have since been supplemented by ODFW construction designed to give area manager Martin St. Louis the ability to create a "year-round wetland that provides food, cover and nesting habitat" for the thousands of resident and migrant ducks, geese, raptors and non-game species of birds that frequent Summer Lake.

The dikes provide ideal hiding and shooting spots but also serve to channel the hunters along them, creating an unfortunate hunting phenomenon called a "gun line." A gun line might consist of several hundred hunters stretched the length of a dike, some only yards apart. The close proximity of the hunters sometimes brings out the worst in them, highlighting the human vagaries of excitement, competition and greed. The occasional result is a "reach waaay out and

touch someone" style of hunting that might politely be called optimistic but is usually referred to as sky busting, barrel stretching or something even more creative.



A flock of snow geese take off from Summer Lake Wildlife Management Area. As many as 80,000 of these beautiful waterfowl stop in at Summer Lake during their winter migration from nesting grounds in Canada and Russia to California's Sacramento Valley.

Not all of the hunters stay on the dikes. The morning light shows some boarding small boats and canoes to move further into the marsh. There they will set up decoys and blinds in a more traditional waterfowling arrangement.

Others clamber on top of sturdy muskrat houses. Summer Lake hosts a large muskrat population and though their houses provide safe platforms for nesting birds and hunters, their digging activities in the dikes are cause for concern. St. Louis allows trapping on a contractual basis each winter to keep the muskrat numbers at a manageable level.

The sound from the waterfowl is almost deafening now. Small groups of birds begin to move and the hunters disappear into their blinds and behind the dikes, waiting for legal shooting hours.

It is impossible to tell what sets the flock to flight. Perhaps one of the resident bald eagles wandered by or maybe it was just an agreeable time to depart for the morning feeding. Whatever the cause, the result is an eruption of thousands of ducks, geese and swans, some of which stay low as they fly toward the feeding areas, bringing happiness and joy to a very cold group of men and women huddled on the dikes and muskrat houses and in the blinds of Summer Lake Wildlife Management Area.

Pat Wray is a department information representative.

Here's Looking At You!

The wildlife viewing opportunities at Summer Lake are, if anything, superior to the hunting. In addition to the thousands of ducks, geese and swans that visit or have settled in the 18,000 acre management area, Summer Lake boasts bald eagles, a variety of hawks, pheasants and innumerable non-game species of birds, mammals and reptiles.

Plans are being laid by the Oregon Department of Fish and Wildlife for an easily accessible wildlife viewing area. Construction time will depend on when funding becomes available.

Protecting Oregon's Investment

A Program to Restore and Enhance Oregon's Recreational and Commercial Fisheries

What is this
program?

This will be the first step in a far-reaching fisheries restoration program that would ultimately double Oregon's fish runs. Phase One, as proposed here, is expected to take at least six years. The work would be done by a cooperative team of department employees, contractors and a corps of volunteers.

The Restoration and Enhancement Program is a comprehensive effort to move ahead; to build and not retreat. The benefits of acting are many. Doing nothing brings only loss — fewer fish, less fishing opportunities and acceptance of a downward spiral that may be difficult to reverse later. The department proposes positive action to:

- Enhance natural habitats
- Gather critical information on stream environments
- Expand fishing opportunities and access
- Increase natural and hatchery fish production
- Repair deteriorated hatcheries and fishways

Accomplishing the objectives of this program will support an already large investment in the natural and artificial production of salmon, steelhead, trout and warmwater fish in Oregon and have significant economic benefits for state residents.

Why is this
necesssary?

Many of Oregon's state-owned salmon, steelhead and trout hatcheries were built more than 50 years ago. Tight budgets in recent years have forced delay and deferral of critical maintenance and upgrading. Deterioration of some facilities has become so bad that failure to repair and improve them now will mean lost fish production.

Trucks used for transporting fish for release also need to be modernized and expanded if the department is expected to carry fish safely and efficiently.

Although habitat improvement work to enhance natural fish habitats has expanded greatly in recent years, there remains a lot of work to be done. At current budget and staffing levels, potential spawning grounds and rearing areas will go undeveloped. An opportunity to greatly increase natural production, particularly for salmon, steelhead and resident trout is being lost.

In many areas, there are good populations of several fish species but little access opportunity for handicapped anglers or those without boats. Correction of this situation would also be covered under the program.

What will
it cost?

In round figures, the six-year program will cost about \$15 million to accomplish. Projects will be designed, and activities planned, to spread that total cost over the next three biennial budget periods. Priorities on what sort of work will be done first have been developed in cooperation with a special public taskforce representing various groups whose interests range from commercial salmon harvest to wild trout production.

During the first two-year budget period, the department proposes to spend about \$4.7 million. About two-thirds of that total will go to restoration work at hatcheries, stream surveys and inventories, fish passage improvements and public access. The remainder will be focused on natural habitat improvement projects.

Who will pay?

Since the rewards of the work will benefit both commercial and sport fisheries, both user groups would share the costs of funding the program. As proposed, about \$12 million of the total \$15 million program would be raised over the six-year period through increased recreational user fees, commercial permit charges and commercially-caught salmon poundage fees. Funds have also been committed from established department revenues and the Oregon State Lottery.

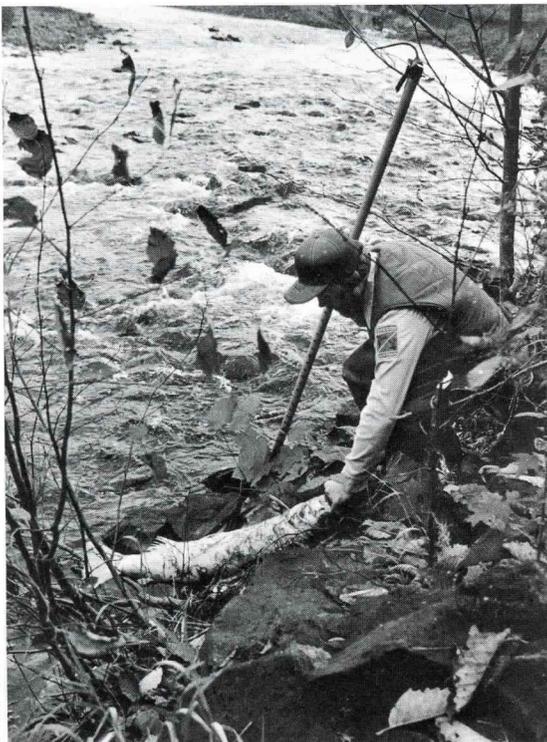
As proposed, the revenue raised from these increased fees would be dedicated solely to the Restoration and Enhancement Program. The increases would also be considered surcharges designed to expire at the end of six years unless renewed or modified by legislative action.

Proposed increases

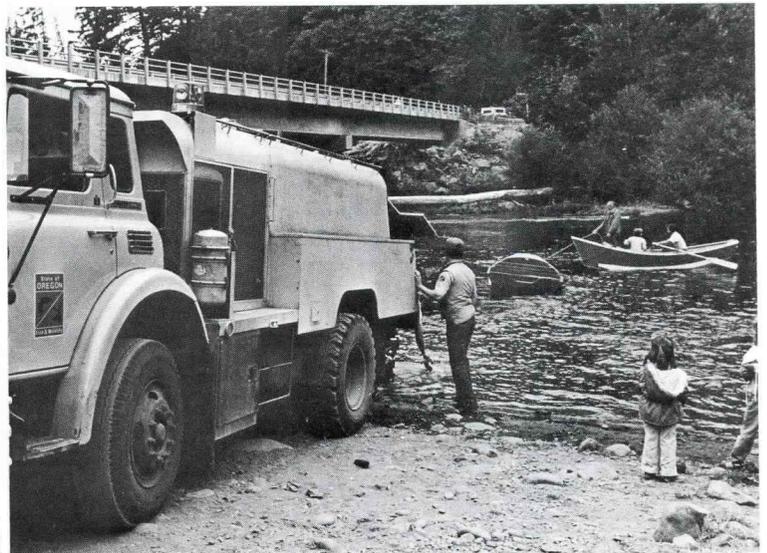
SOURCE OF REVENUE	CURRENT	PROPOSED
RECREATIONAL		
Resident Comb.	19.00	21.00
Resident Angler	12.00	14.00
Resident Juvenile	4.00	5.00
Daily Angler	3.50	4.50
Nonresident	30.00	35.00
10-Day	18.00	20.50
COMMERCIAL		
Troll Salmon Permit	10.00	100.00
Gillnet Permit	1.00	100.00
Salmon Poundage Fee	.05/lb	.10/lb

The recreational increases would raise about \$1.3 million annually, while the increased commercial fees would yield about \$750,000 of additional revenue annually.

This proposal would be the first recreational angling license increase in eight years, and the first commercial poundage fee increase since 1980. All increases would go into effect on January 1, 1990.



Jim Gladson



Jim Gladson

Many ODFW "Lib" Or "Liberator" trucks need repair or replacement in order to expand the transportation and release of hatchery fish.

← Spawning counts like the one being conducted above provide information critical to Oregon's restoration and enhancement program.

A WINTER'S NAP

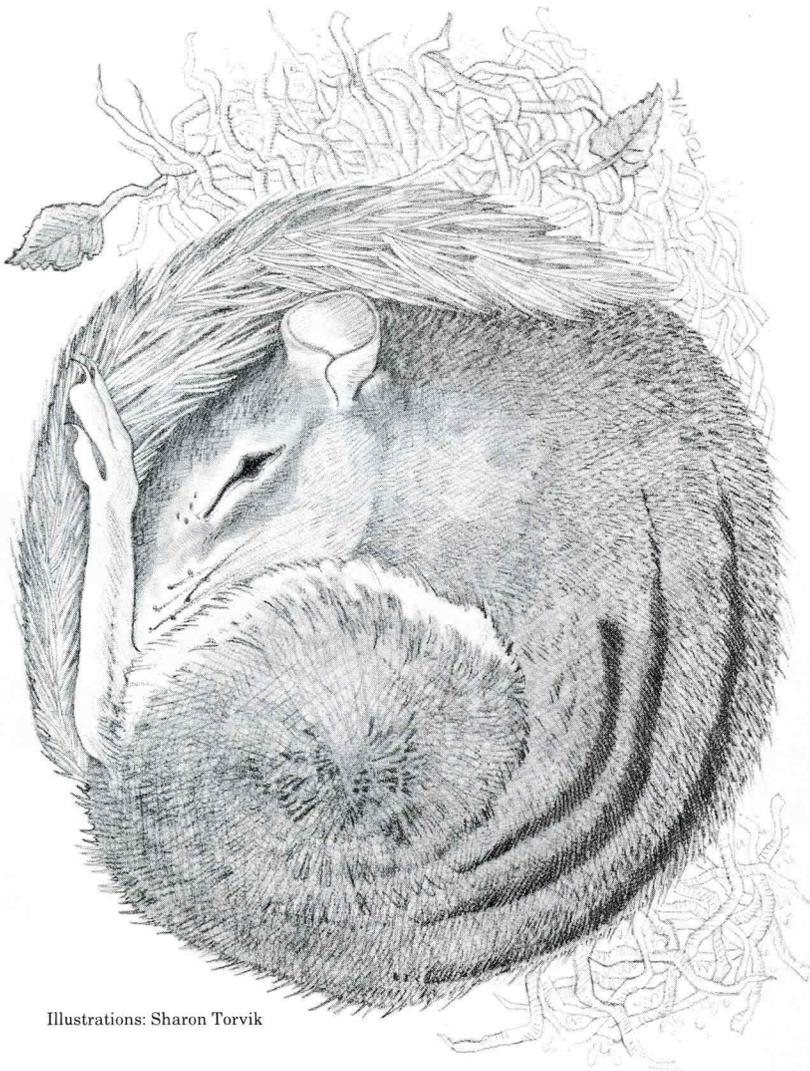
by Pat Wray

Have you ever had one of those days when everything goes wrong, nobody likes you, your pimples flare up and you spill lasagna on your lap at lunch? The only way to handle a day like that is to go to sleep early, things will look better in the morning.

Although the incidence of pimples and spilled lasagna has not yet been determined among other animal species, many types of wildlife have perfected the concept of sleeping through a difficult situation. The only difference is that instead of sleeping overnight, they may sleep for months.

This extended sleep in animals is called **hibernation**. It is an inactive state which involves a reduction of all metabolic activities (breathing and heart rate) and a lessening of the ability to regulate body temperature. Hibernating animals are in a coma-like state, it may take them hours to fully awaken.

Hibernation should not be confused with simple winter sleep, a lighter period of rest with a nearly normal metabolic rate. Bears, skunks and opossums are winter sleepers but do not enter into true hibernation.



Illustrations: Sharon Torvik

Causes of hibernation

A number of factors contribute to an animal's entry into hibernation; the importance of these elements varies by species and is not fully understood. In most cases, the process is probably triggered by a combination of the following circumstances.

Temperature: Although a drop in temperature associated with the onset of winter may not be the primary cause of hibernation, it is at least a strong contributor. Unseasonably cold early temperatures may send hibernators to their dens earlier than usual. Late season warmth often delays hibernation.

Food: Scarcity of food, or lack of proper foods also seems to influence the onset of hibernation among many mammals. Moisture content of plant foods is also a factor. Moisture content decreases during the fall and may help trigger the hibernation response.

Obesity: Although not considered a primary cause of hibernation, animals require a high fat content to enter into hibernation. Individuals which have not been able to store an adequate layer of fat during the summer will delay hibernation until well into the fall.

Confined Air: High carbon dioxide levels found in the enclosed spaces commonly used by hibernating mammals are thought to contribute to rapid onset of the hibernation reflex and to deepen their sleep.

In-born Trait: Some research has pointed to an internal, yearly clock, called a *Circannual rhythm*, which may trigger the desire to hibernate. Ground squirrels kept isolated from natural light at consistent temperatures and provided with 12 hours of artificial light plus a constant supply of food each day still entered hibernation at the typical date in the fall and awoke on time in the spring.

Characteristics of hibernating mammals

- Hibernators are heterothermal, that is, they are unable to control their internal body temperatures as completely as most warm blooded kin.
- Hibernators generally have lower normal breathing rates than non-hibernating mammals.
- Hibernating mammals usually depend on foods which are unavailable during the winter.
- Most mammals that hibernate are fossorial, or spend the bulk of their time underground.

What happens during hibernation?

Body temperatures drop to within a few degrees of the surroundings, occasionally within a degree or two of freezing. Extreme cold will normally cause the animal to wake up, but there are numerous instances of hibernating animals dying in their sleep due to the onset of extreme cold.

Respiration, or breathing is greatly reduced. Big brown bats, with a normal breathing rate of 200 per minute, may go for up to eight minutes without any evident breaths during hibernation.

Heart rate decreases markedly. A ground squirrel's normal rate of 225 beats per minute decreases to 17 and sometimes as low as five. Not only does the heart rate slow, there is also a decrease of blood volume in the vessels. An animal that has been hibernating for some time can have a limb cut off with almost no blood loss.

Blood that is in circulation is very low in red cells. During hibernation, the spleen acts as a reservoir for these cells. When the animal begins to awaken, one of its first physiological reactions is a reflexive dumping of the spleen, which pours the red blood cells back into circulation.

Preparation for hibernation

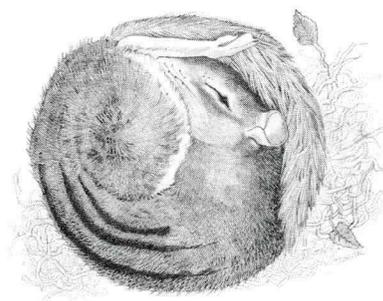
The animal will eat heavily to gain the weight and fat layer necessary to survive a long period without food. A week or so prior to hibernation, the animal may cease eating, or perhaps eat foods that serve to empty and clean the bowels.

The animal must also find a den and prepare it. The degree of preparation varies widely between species and between ranges.

Awakening

Awakening from hibernation seems to be largely regulated by temperature. Hibernators are very slow to awaken, even under strong stimuli. The process may take hours, amidst violent shivers and trembling that resemble a seizure, until the animal finally begins to move purposefully into a new world of springtime.

In nearly all cases, most of the pimples and lasagna have disappeared by then. 🍃



Tip of the Hat

So many good stories

of stiff sentences and fines for game law violators have come in recently that *Oregon Wildlife* is doubling up on honors to judges in this issue.

Tillamook County has a consistent reputation as one of the toughest places in the state to escape severe punishment for defying game laws. A recent sentence handed down there shows this tradition continues.

A person caught snagging salmon plead guilty as charged before District Court Judge Bert Gustafson.

The sentence:

- \$300 fine
- \$250 payment to ODFW
- 20 days in jail, suspended
- 160 hours of community service
- Two-year suspension of angling license
- Three years probation
- A written apology to the community for publication in the local newspaper.

Game thieves beware in Harney County too. Two county residents came before Judge Gailard Biggs in county Justice Court guilty of six separate counts of taking deer illegally and wasting large amounts of meat in the process:

The judge gave equal sentences to each violator as follows:

- \$1,200 payment to ODFW
- \$860 fine
- Suspended hunting privileges for five years
- Five years probation
- 180 days in jail with 120 days suspended in lieu of 80 hours community service

The sentences were tough and, for the written apology, innovative. For their support of Oregon's fish and wildlife resources and for sending a clear message that criminals do pay, *Oregon Wildlife* offers a Tip of the Hat and thank you to Judges Gustafson and Biggs.

B A L D E A G L E



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Book Surveys Oregon's Environment

Is acid rain a problem in Oregon? Where is the cleanest air? What is the condition of our ground and surface waters? These may not be questions you ask every day, but even if you consider these or other questions occasionally — there is a new book that may be of interest.

It is called the Oregon Environmental Atlas; a joint venture publication developed and produced by the Oregon Department of Environmental Quality and the Cartographic Center at Portland State University.

This 11x17 inch, 64-page atlas with color maps, charts, graphs and photos traces the history of environmental management in Oregon and highlights specific areas of environmental concern.

If you are looking for some good clean information about Oregon, and some dirt too, write the Department of Environmental Quality, Public Affairs, 811 SW Sixth Ave., Portland, OR 97204. Enclose \$7.50 per copy with your order.

Greenway Access: What we did not say, but should have.

An article about the Willamette River cleanup in the November-December issue of *Oregon Wildlife* described the Willamette Greenway as a strip of parkland set aside for access to the river. This is true only for land in the Greenway owned by the state, such as state parks, roads and boat launch areas.

While private lands within the zone do have some development restrictions, the Greenway does not provide the public with access to private property. Anyone using private land without permission for activities such as camping, picnicking, or access to and from the river, is trespassing. *Oregon Wildlife* regrets not making this distinction clear in the article.

Black Bear - S, Townsend Chipmunk - H,
Striped Skunk - S, Gray Whale - M, Pintail
Duck - H, Raccoon - S, Yellow-Bellied Mar-
mot - H, Rocky Mountain Elk - M, Snow
Goose - M, Pocket Gopher - A, Beechey
Ground Squirrel - H, Mule Deer - M, Beaver -
M, Coyote - A, Opossum - S, Hummingbird -

Answers to Winter Quiz on page 15

Wondering What to Do in Winter

by Bill Hastie

It's getting C-O-L-D, food is scarce, and the days are getting short. Winter is here, and if you're a wild animal, you need to do something to survive it. Here are some of your choices.

One choice is migration (my-GRAY-shun). When animals migrate, they leave one area and go to another area, where it is easier to stay alive. Then, they move back again later when conditions improve. Usually, animals are forced to migrate because food is in short supply or the weather is too harsh. Animals also migrate to other areas to rear their young. Migrations usually involve moving from north to south during winter, but many animals also migrate from higher altitudes to lower altitudes to escape winter temperatures and food shortages.

Another choice involves entering a period called "winter sleep." During winter sleep, the animal spends several weeks in alternating periods of sleep and wakefulness. The animal can sleep through periods of harsh weather and food shortages. They awaken to stretch, eat some stored food, or even go out to forage (FOR-age). Unlike true hibernation, body temperatures remain about normal during winter sleep.

Still another choice is hibernation (hy-bur-NAY-shun). Hibernating animals go into a deep sleep. They actually lower their heart rate, breathing rate, and body temperature. For instance, if you hibernated, your heart rate would fall from the normal 72 beats per minute to about two or three per minute. Your normal body temperature is 98.6 degrees, but in hibernation it would be about 40 degrees. And your breathing rate would fall from 12-14 per minute to about one every four minutes! This big drop in heart rates,

breathing, and body temperature greatly reduces the amount of energy needed by the animal. It can then live through the winter from its fat reserves.

Some animals are active year-round. These animals have other special ways of surviving food shortages and cold. But death is common in winter. Death of some animals means survival for others. This is nature's way of making sure animal populations remain healthy year-round.

Below is a list of Oregon animals. See if you know how these animals try to survive the winter. Mark an "H" in front of those animals that hibernate, an "S" for winter sleepers, an "M" for migrators, and an "A" for animals that do *not* migrate but remain active year-round (variations to these habits can occur, depending on weather, food supply, or location). *Find answers on page 14*

- _____ Black Bear
- _____ Townsend Chipmunk
- _____ Striped Skunk
- _____ Gray Whale
- _____ Pintail Duck
- _____ Raccoon
- _____ Yellow-Bellied Marmot
- _____ Rocky Mountain Elk
- _____ Snow Goose
- _____ Pocket Gopher
- _____ Beechey Ground Squirrel
- _____ Mule Deer
- _____ Beaver
- _____ Coyote
- _____ Opossum
- _____ Hummingbird



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