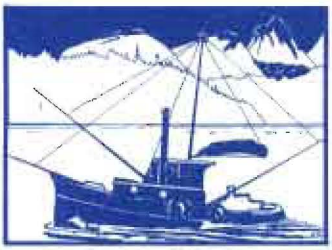
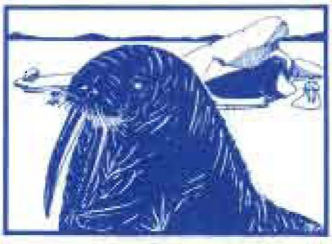
1963-64 PROGRESS REPORT

Alaska Fish and Game





ALASKA DEPARTMENT OF FISH AND GAME
PROGRESS REPORTS

PROGRESS REPORT

for the years
1963 and 1964

STATE of ALASKA

William A. Egan, Governor

ALASKA DEPARTMENT OF FISH and GAME

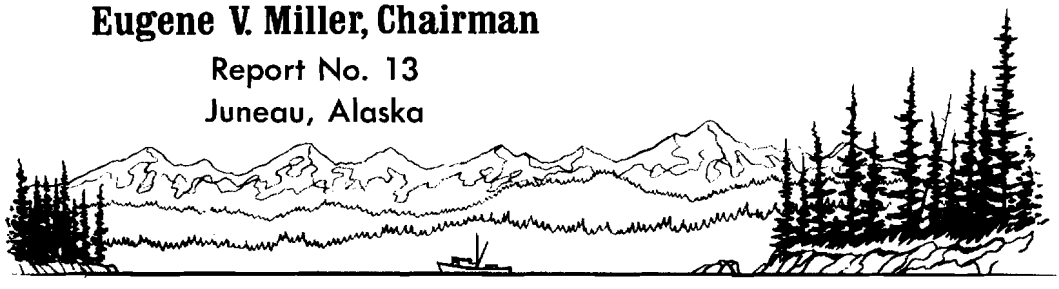
Walter Kirkness, Commissioner

ALASKA BOARD OF FISH and GAME

Eugene V. Miller, Chairman

Report No. 13

Juneau, Alaska



THIS REPORT IS A CONTINUATION OF THE "ANNUAL REPORT" SERIES BEGUN IN 1949, BUT COVERS A TWO-YEAR PERIOD. REPORT NO. 12 COVERED 1960, 1961, AND 1962.

Editor
Alan M. Courtright

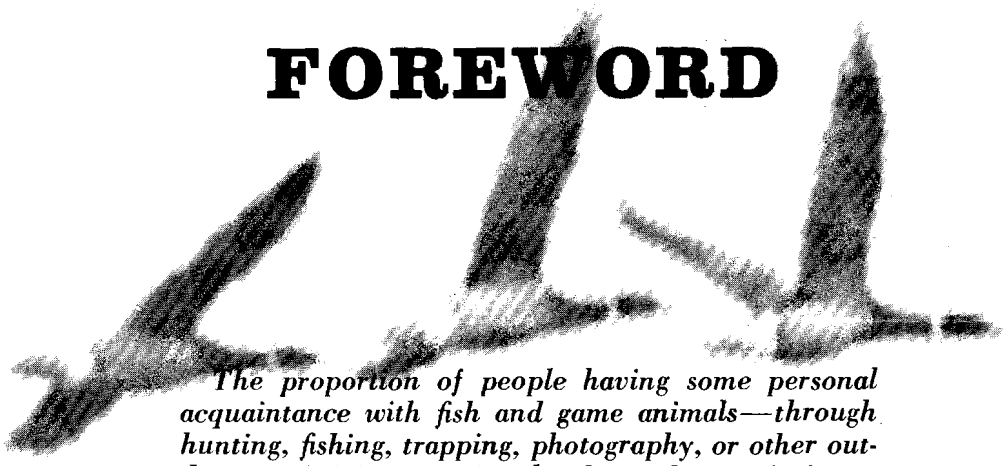
Cover by
E. J. Cramer

Art by
Herb Bonnet
and
R. T. Wallen

Photo Editor
R. T. Wallen

TABLE of CONTENTS

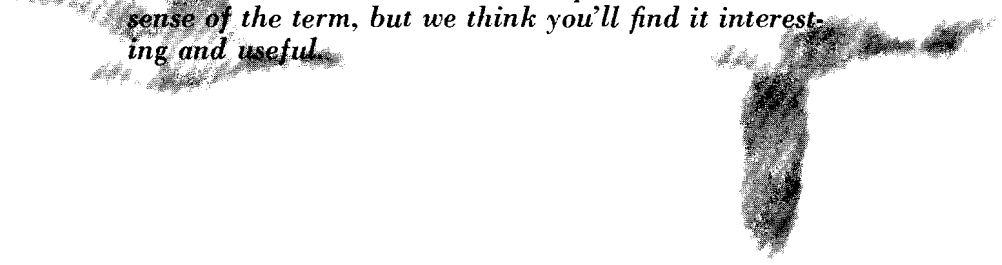
FOREWORD



The proportion of people having some personal acquaintance with fish and game animals—through hunting, fishing, trapping, photography, or other outdoor activities, or simply through proximity—is probably higher in Alaska than in any other State. It could hardly be otherwise when salmon spawn under highway bridges and moose wander around even the biggest city in the winter time.

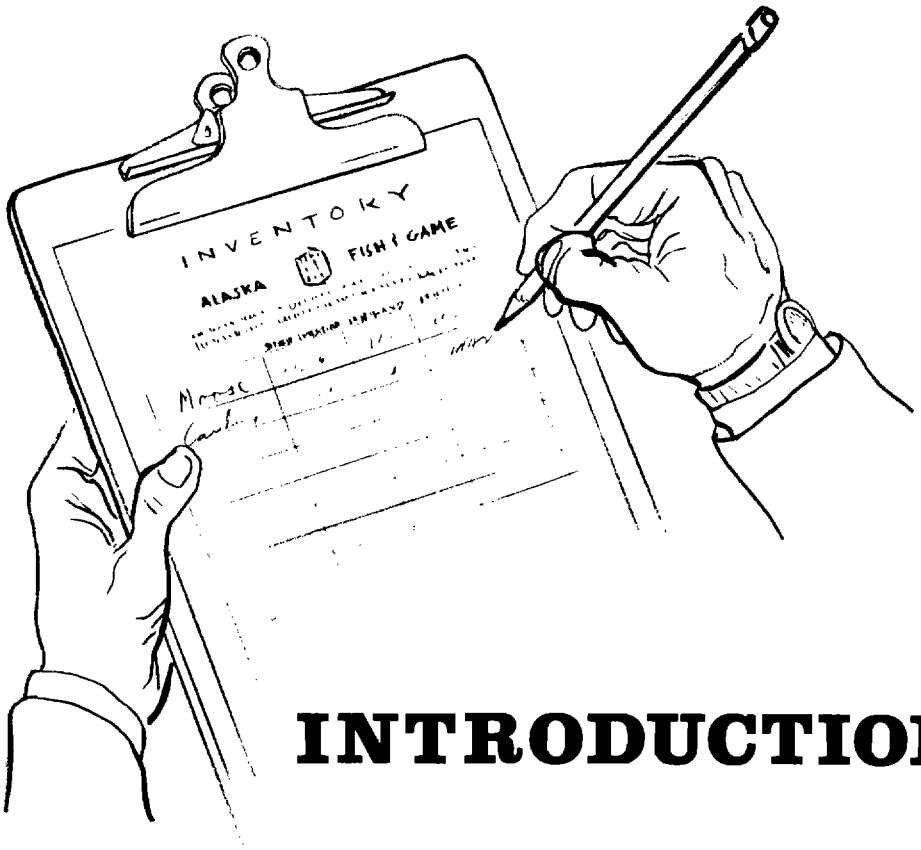
Even so, Alaska is so big and her wildlife resources so varied and scattered that relatively few people know just where walrus are found or how many caribou groups there are or how many kinds of game birds are common in Alaska, or what kinds of salmon run up the Yukon.

This report tells some of these things, for those many Alaskans who on seeing a moose in the back yard or a salmon under the bridge want to know more about them and about all their fish and game resources. It's not an "annual report" in the usual sense of the term, but we think you'll find it interesting and useful.

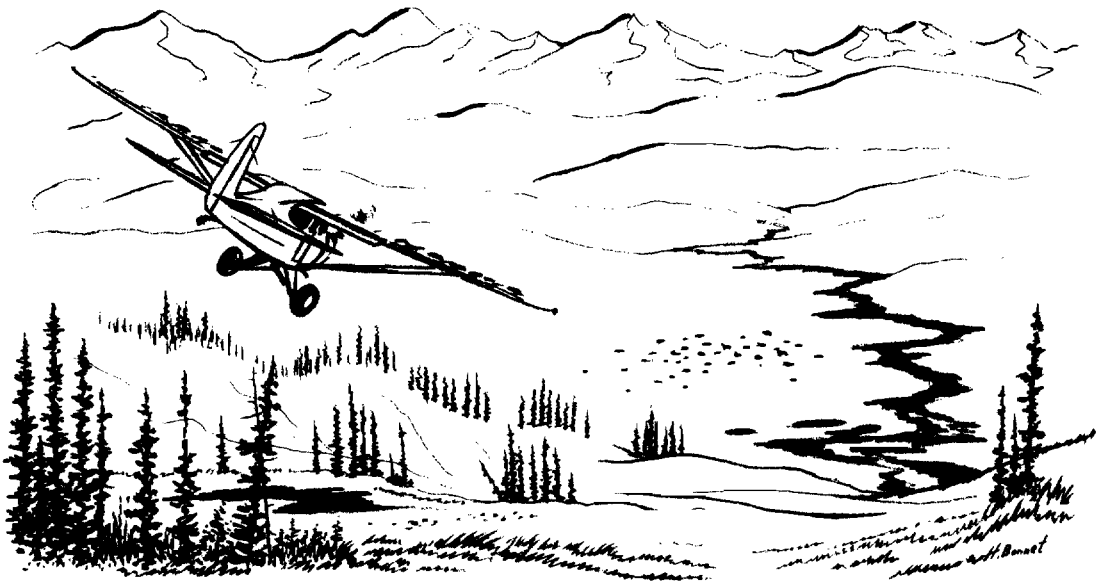


Walter Kirkness

COMMISSIONER



INTRODUCTION



Fish and Game management in Alaska

is essentially a business. All Alaskans are stockholders in this "company" and the Department of Fish and Game is "management."

The products of this "company" are now worth an estimated minimum of one hundred and fifty million dollars in money annually, plus an incalculable amount in pleasure and other dividends. Counting only the money, that's a return of over fifteen dollars for every dollar spent on operations in 1963 and 1964. Few businesses can boast such a high earnings ratio.

But then, few businesses have this advantage: the stock reproduces itself! Not only that, but stockholders collect their own dividends. Managing the business consists of providing the best conditions possible for reproduction and growth of the stock, and of seeing to it that the dividends are equitably distributed and ethically collected.

Inventory is a periodic necessity in any business. It's especially important when the "warehouse" and the "factory" are one and the same -- when the goods themselves are the only source of more goods. If any inventory item is ever used up in the fish and game business, it's impossible to order more. Only healthy, vigorous fish and game stocks can produce more fish and game indefinitely: the best that man can do is try to create habitat and other conditions favoring the desired level of production and availability.

1964 was the fifth year of state control of fish and game in Alaska. Biologically speaking, five years is only a hiccup. Many salmon which hatched in 1960 hadn't yet returned to spawn by 1964. A walrus born in the first spring of statehood may have another year or two to go before becoming capable of producing another walrus in turn.

In five years many animal populations, if they're prone

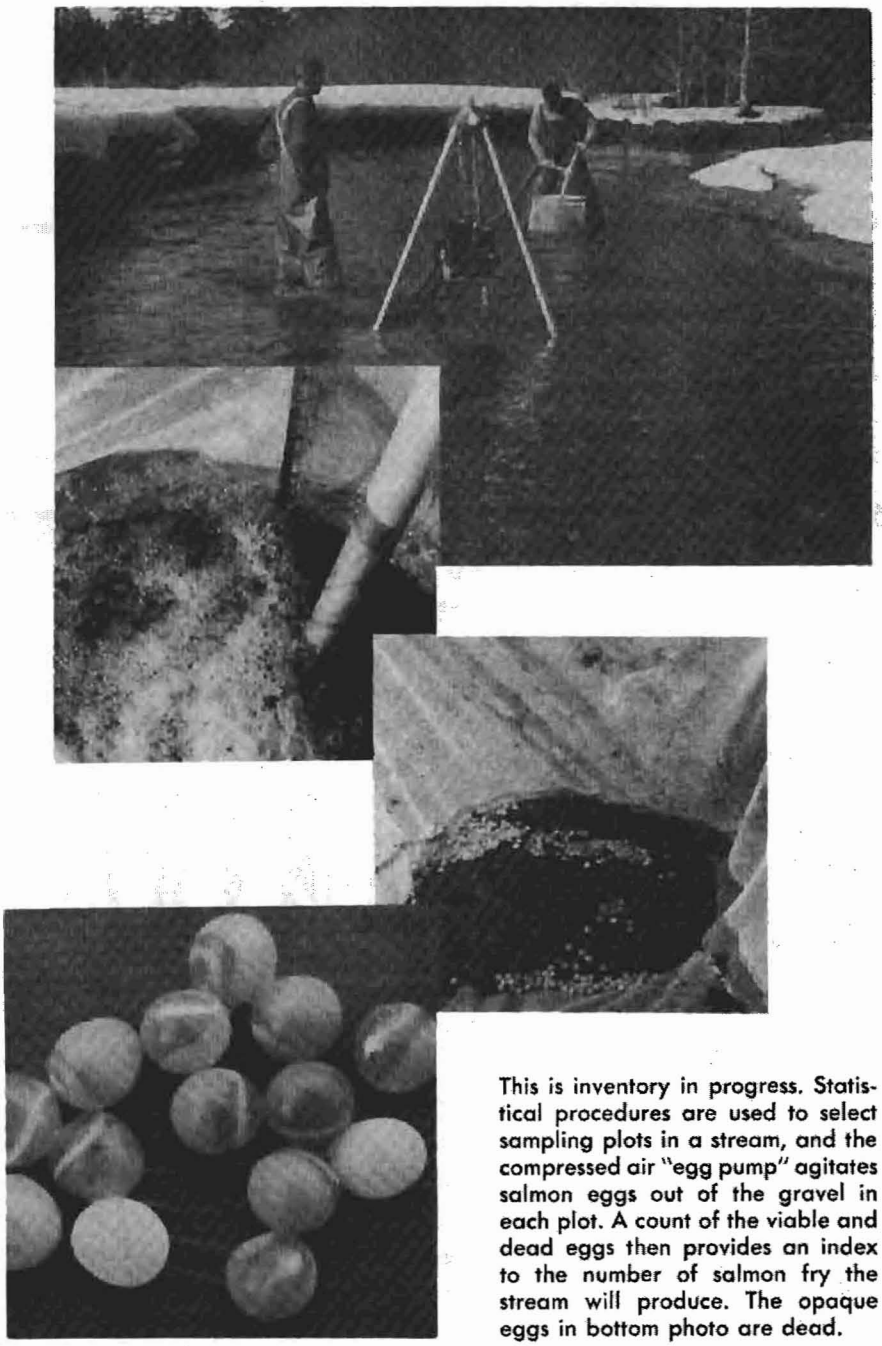
to rise or decline at all, are just as likely to do so in spite of man's manipulation as because of it.

Because of past research, though, we can interpret population and habitat changes in terms of what they'll do to or for tomorrow's hunter or fisherman. And the future welfare of a species is the only frame of reference in which an inventory of its present distribution and abundance has any real meaning. As the State Constitution puts it, the objective of renewable resource management in Alaska is to provide sustained yield.

This inventory is devoted mainly to harvestable fish and game - those species requiring acting management (including much biological research) to help assure their perpetuation. There are many other animals in Alaska, some of them as important in their own ways as those which are "utilized": they may even be essential to the existence of the animals which are harvested. Mainly, these nonharvested species right now need protection, to make sure they remain a part of the unique Alaska scene.

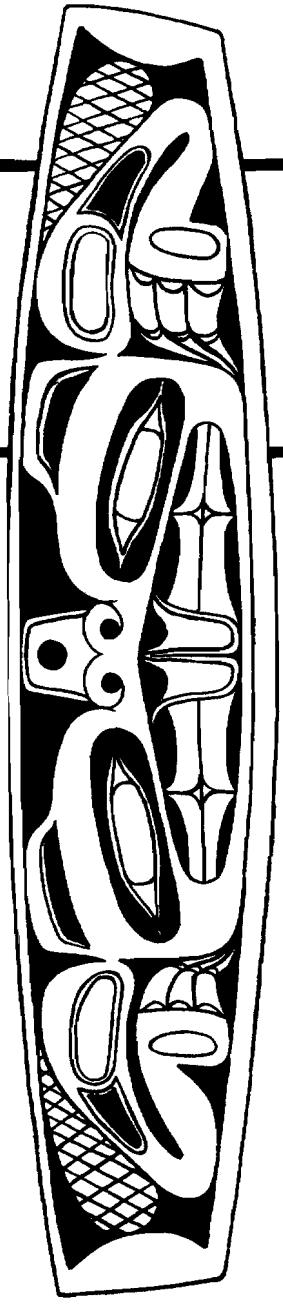
Most of Alaska's 586,400 square miles are occupied by one or more kinds of animals, and the surrounding seas shelter many additional species. An animal inventory of this vast domain, if it's to be kept from becoming a mass of endless detail, must necessarily focus on the larger or more heavily utilized fish and game populations, on those which current knowledge indicates will afford relatively large harvesting opportunities in the near future, and on those which are in some way unique or notable.

Here, so focused, is the 1963-64 fish and game inventory report to the stockholders of Alaska.



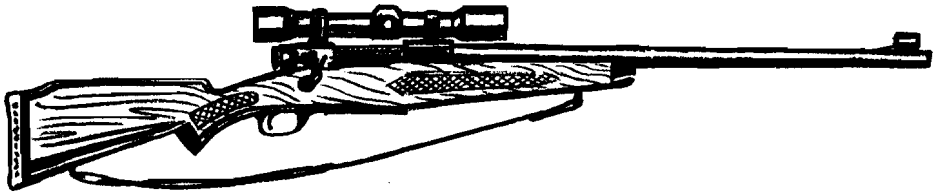
This is inventory in progress. Statistical procedures are used to select sampling plots in a stream, and the compressed air "egg pump" agitates salmon eggs out of the gravel in each plot. A count of the viable and dead eggs then provides an index to the number of salmon fry the stream will produce. The opaque eggs in bottom photo are dead.

PART I-GAME



Alaska's Game Regulations list nearly 50 kinds of animals. For regulatory purposes, these are grouped into "big game," "small game," "marine mammals," "fur animals," and "unclassified game." The "unclassified" group contains "all species of game not otherwise classified . . ." which covers a multitude of mostly small creatures, all of which are accorded some kind of protection under the regulations.

The animals in the first four classes -- big game, small game, marine mammals, and fur animals -- are the main contributors to game harvests in Alaska. They range from the little red squirrel to the gigantic moose, from the beluga whale inhabiting the coastal seas to the Dall sheep in the high mountains. Many attempts have been made in the past to compute and estimate the dollar value of both harvested and "on the hoof" game animals in Alaska, ranging from the estimated value per pound of game meat to the estimated expenditures per camera-toting tourist or nonresident hunter. With the exception of the fur animals, which have a direct annual commercial value of some $2.5 million when net State fur seal receipts are included, such figures are useful only in an academic sort of way. Many people object to converting esthetic value into cash, though certainly the esthetic value of game is in many ways one of its main values. If one wishes to put a money value on the over ten million pounds of game meat Alaskans consume annually, and to compute the average expenditure by nonresident hunters at ten million dollars per year, as has been done in the past, then this total added to the $2 million-plus annual fur value is still way short of the true total value of game in Alaska. To put it simply, Alaska wouldn't be Alaska without its game, and no computed cash value will change that.



BIG GAME

There are as many species of big game animals in Alaska as in all the rest of the United States put together. The little Sitka blacktailed deer is found on the extreme southeastern tip of the State. Off the northwest coast the polar bear, which shares with the brown bear the title of world's largest carnivorous land mammal, roams the ice pack in search of seals and an occasional beached whale. In the 1500 miles between, there are moose, barren ground caribou, Dall sheep, mountain goat, bison, elk, wolves, wolverines, brown and grizzly bears, black bears, and muskoxen. The large game animals inhabiting Alaska's coastal seas are classed as marine mammals, though many of them could certainly be called big game as well.

Altogether, the big game population of Alaska has been estimated at between 750,000 and 1,000,000 head. That may sound like a terrific lot of big animals, but actually it works out to less than two per square mile -- which is the reverse of the human population's one per two square miles.

Many Alaskan big game populations are hard to get to: this is the main reason that Alaskans and visitors are harvesting only about 50,000 of the 100,000 or more animals that are produced annually. Natural mortality -- some of it induced by animal populations too large for the habitat to support properly -- may currently exert more influence on Alaska's total big game population than does the harvest by man. It's dangerous, though, to apply generalities to Alaska's game, for each species, even each local population of a species, has its own peculiarities, that may demand special management procedures.

Black Bear

Until just a few short years ago, Alaska black bears -- the same species found over much of the rest of North America -- were classed as fur animals rather than as trophy game. Early in the present century, pelt prices averaging up to $16 stimulated black bear harvests of well over a thousand animals annually, and even before Alaska was purchased from Russia, up to 2,000 bears were exported in a year. Had they continued to be as important for fur as they were early in Alaska's history, we might know much more about them than we do. Most Alaskan knowledge of the species is based not on studies made here, but on what biologists have done in Michigan, Wisconsin, New York, and other states. In Alaska, because of the glamorous competition from the "big" bears -- brown, grizzly, and polar -- and from the large variety of other trophy game, the blackie simply hasn't received the attention that it does in places where it's one of only two or three species of big game.

The black bear is mainly confined to the approximately 60 per cent of Alaska where timber is found. There are none on the major islands of southeastern Alaska north of Frederick Sound, on the Aleutian Islands or other offshore islands west of Prince William Sound, nor in the treeless Arctic tundras. Based on general observations, the total Alaska population has been estimated at around 20,000 animals, and the annual harvest is believed to be 1,200 or so.

Prince of Wales Island and the Kenai Peninsula are areas with higher than average populations of black bears. Anan Creek, near Ketchikan, is becoming well known as a bear-watching site: the blackies concentrate there during the time pink salmon are entering the stream. The area is closed to bear hunting for the benefit of bear-watchers and photographers.

The Glacier Bear is a rare color variation of the black bear, usually found only in the area between Lynn Canal and Icy Cape in the northern part of southeast Alaska. Bear hunters are allowed only one glacier bear among a total black bear limit of three. Only a very few of the blue bears are taken in any one year. The proportion of bears of this color born in the black bear population is unknown, but apparently very small.

Brown and Grizzly Bear

These days, sportsmen and scientists often refer to the giant bears of Alaska as "brown-grizzly" bears, rather than as one or the other. This is in considerable contrast to the system in vogue only a few years ago, when not only were the browns and grizzlies regarded as separate species, but practically every local population of bears, sometimes having minor distinct color or skull characteristics, was listed at least as a separate sub-species. For trophy scoring purposes, bears taken north of the Wrangell Mountains (beginning at Mt. Natazhat) on the east, the Alaska Range, and the 62nd parallel (beginning at Houston Pass) on the west, are now scored as grizzly bears, while those taken south of this line are called brown bears.

The brown bears of Kodiak Island and the Alaska Peninsula have become famous as the "Kodiak" bear. In these areas the bears grow to such gigantic size -- well over a half-ton -- that they have long been known as the largest land carnivores in the world. In the light of recent information, they must share this title with the polar bear, but that doesn't make a brown bear, whose nose may tower ten feet in the air when he's standing on his hind legs, seem any smaller to a hunter confronting one.

Since 1961 a hide sealing program has provided accurate

information on the brown-grizzly harvest in Alaska. Sealing, which must be done within 30 days or before bear hides are shipped out of Alaska, gives Department biologists a chance to measure the hide (and often the skull too, which provides data on age), find out where and when the bear was taken, and obtain other biological information. This information is the basis on which seasons are set each year for these unique trophies.

The sealing program has shown that the annual brown-grizzly harvest is about 500 to 600 animals, which is certainly not excessive in view of the estimated population of 10,000 or more. The harvest is usually split fairly even between spring and fall, and between resident and nonresident hunters.

Since the sealing program went into effect, about ten to fifteen per cent of the harvest has come from southeast Alaska, about an equal proportion from the Interior and Arctic, and seventy to eighty per cent from the southcentral area. One-half or more of the southcentral harvest is regularly taken from Kodiak and Afognak Islands and the Alaska Peninsula. A good indication that the bear population is not over-exploited is the fact that the world's record brown bear taken on Kodiak Island as recently as 1952 was almost bumped from the top spot in 1961, although Kodiak has been more heavily hunted for a longer time than any other portion of the State. Over-exploited populations do not ordinarily produce trophy-size animals.

Polar Bear

The polar bear is probably Alaska's best-known wild creature, even though it rarely sets foot on Alaskan soil, preferring the frozen Arctic seas most of the time.

Polar bears are wanderers. No one is sure yet just how far they go, but it's not unlikely that a bear born on Wran-

gell Island north of Russia will one day show up in Greenland on the other side of the world. Northern sea ice moves constantly clockwise around the pole, so a sitting polar bear would move westward whether he wanted to or not. They don't make a habit of sitting, though--aircraft sometimes follow fresh bear tracks 75 miles or more before overtaking the bears that made them--so if a Wrangell Island bear *does* arrive in Greenland, no one knows how much of that distance he covered on his own hook, or which way he went. He might have visited Alaska for awhile on the way.

At birth, polar bears seem improbable candidates to become such travellers. When they're born, in dens along the shores of remote northern islands or in thick old sea ice, the cubs weigh only eight to ten ounces. Even when they emerge from the den with their mother in March, April, or May (they're born in December or late November) they probably weigh only six to eight pounds, and may be no bigger than large house cats.

The one or two (usually: sometimes three) cubs may stay with their mother for up to two years (or perhaps more; nobody knows for sure) learning to catch seals and an occasional bird and walrus calf. Dead beached whales sometimes provide an excuse for an ursine beach party, but most of the time, except for mothers and cubs, polar bears are solitary.

No one can presently say how many polar bears there are in the Arctic regions of the world. Some authorities have tried, but their estimates have usually proven acceptable only to the men that made them. Until more is known, it may be necessary to shorten the season or impose other restrictions if the Alaskan harvest increases much beyond the 150 to 250 bears per year now being taken.

Kotzebue has become the major polar bear hunting center in Alaska; much hunting is also done out of Pt. Barrow and Teller. A few guides use Pt. Hope and Wainright as bases. Regardless of where they start, polar bear hunters usually must go a considerable distance from shore before getting a chance at a bear: the average distance from the Alaska coast that bears are now being killed is 60 to 70 miles.

Bison

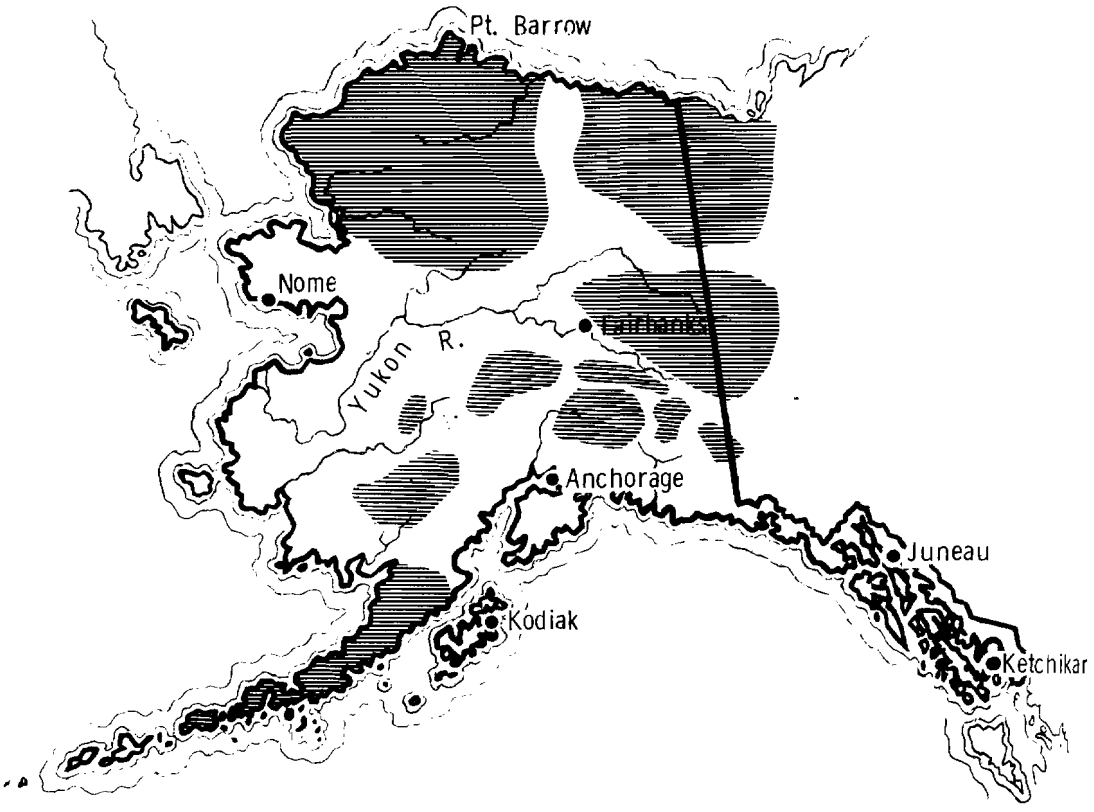
From a transplant of 23 Montana bison in 1928, Alaska now has an estimated 500 animals in two, and possible three, herds. The original range in the Delta-Clearwater area (southeast of Fairbanks) has shrunk considerably since the original transplant, and it's now believed that the 350 or so animals on this range are all that the natural food supply will support on a year round basis.

Mostly grasslands in the 1920's, much of the area has become overgrown with shrubs and trees since then, and homesteads and military installations have also cut into the once-extensive bison forage. The thousands of bison which the transplant was supposed to produce never materialized; the herd reached 500-plus in 1941, then dropped to an estimated 265 in 1955. To help guard against a similar drop in the future, surplus animals are now being hunted, transplanted, or given to qualified homesteaders who wish to try raising them. As a result, the stabilized herd in the Delta Junction area now appears healthier than in many years, with better reproduction. The herd is also causing much less trouble to farmers' crops than was the case before hunting was allowed, and fewer animals are being lost to such unnatural causes as digestive troubles arising from eating hardware at local garbage dumps.

Over 3,000 people applied for the 50 permits issued for the first state bison hunt in 1961. In 1962, 35 bison were transplanted to the Chitina area to supplement a herd started from a plant in 1950. Twenty hunting permits were issued for the Delta area in 1963 and 1964, and 30 animals were also captured and given to homesteaders in 1963. The first hunt ever held in the Copper River area took place in 1964; 14 bison were taken.

The Chitina or Copper River herd is now known to exceed 100 bison. There is also another small herd in the Healy Lake area, but it's not yet known whether the animals seen there represent a wandering element of the Delta herd to the east, or whether they are now a totally separate group.

Caribou



All of the approximately half million caribou in Alaska are of the "Barren Ground" variety. There has never been a substantiated record of a Woodland caribou in Alaska. A more-or-less distinct race, the 'Grant's caribou' inhabits the Alaska Peninsula, but the differences between this and the other caribou in Alaska are laboratory differences, found by taxonomists measuring skulls and other features.

At one time or another introduced reindeer -- stocky, domesticated Eurasian caribou -- have interbred with almost all caribou populations in Alaska. The so-called Western Arctic herd has been more exposed to this cross-breeding

than the other herds, because of the concentration of reindeer breeding on the northwest coast. The effects of this interbreeding on the caribou have not been studied, but are probably slight if they exist at all.

Eleven more-or-less distinct caribou herds are presently recognized in Alaska. These are the Arctic herd (in the western arctic, with about 200,000 animals); the Porcupine herd (eastern arctic; 130,000); the Nelchina (75,000 animals, usually found in the area bounded by the Richardson, Denali, and Glenn highways and the Alaska Railroad); the Steese-Fortymile group of 50,000 which wanders into Canada in the winter, and in Alaska is generally confined to that part of the Yukon-Tanana triangle east of Fairbanks; the McKinley-Minchumina herd (12,000); Alaska Peninsula (8,000), Mulchatna-Rainy Pass and Delta-Wood River herds (5,000 animals in each); the Mentasta-Mt. Sanford group of 4,000; and the 3,000-animal Beaver Mountains and Chisana-Wood River herds. Several thousand caribou are scattered throughout the Kuskokwim Mountains, and about 1,000 caribou and/or feral reindeer inhabit the area at the base of the Seward Peninsula.

Of approximately 100,000 caribou born to Alaska's herds each year, less than 30,000 are being taken annually by hunters. Other mortality factors are taking the remaining surplus in only one or two of the smaller herds, with the result that most Alaskan herds are getting bigger.

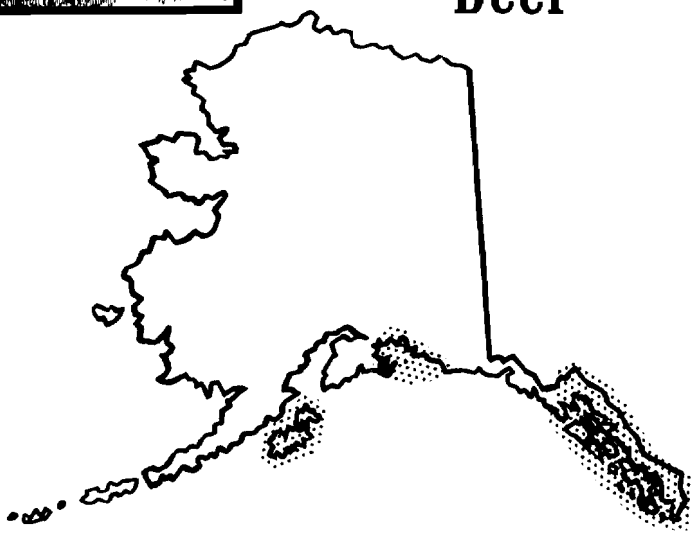
The results of this growth are worrisome rather than pleasing, for it obviously can't continue without causing damage to a limited food supply, and perhaps other undesirable results. Particularly in winter, caribou favor a food--lichens, or "reindeer moss"--that is extremely slow to replenish itself: estimates for complete regrowth on a heavily grazed area range up to 100 years. This type of food may not be essential to caribou existence but if it's absent from an area a herd may move in search of it. The Nelchina herd, most accessible group in the State, may be near this point. If these animals, or a substantial portion of them, leave their present range, there will be a large drop in the numbers of animals readily available to the hunters of Anchorage, Fairbanks, and other communities on the road system.

If the already-inadequate Nelchina harvest of 4,000 to 8,000 animals annually were to decrease even further through inaccessibility, this herd could well begin to suffer from the serious consequences of overpopulation which may now be affecting the Arctic herd. In the western Arctic, brucellosis (also known as Bang's disease) and foot rot are beginning to appear. A full scale study was launched in 1963 to determine just how serious the effects of these diseases may be. Both adult deaths and birth difficulties have resulted so far, but how widespread such effects may be will not be known until the study has been longer under way.

In 1963, 6,000 caribou were harvested from the Nelchina area, second only to the estimated 20,000 taken in the Arctic; the 1964-65 harvest was a bit larger, at 8,000. None of the other herds provided a harvest of more than 500 animals in 1963 or 1964. Human development and caribou overpopulation are distinctly more of a threat to the future existence of caribou than hunting, which can be easily regulated.

Inventories of range plants may provide valuable keys to big game population trends. This biologist used modern statistical procedures to select the caribou range quadrat he's "reading." Complex statistical analysis will show how accurate his results are.

Deer



An estimated 200,000 to 250,000 Sitka blacktailed deer inhabit Southeastern Alaska, several islands in Prince William Sound, and Kodiak Island. The southeast Panhandle is the native habitat of these small relatives of the mule deer: north and west of this area, the animals are descended from introductions made between 1916 and 1954.

Deer are more numerous on the islands of the Panhandle than on the mainland. The mainland is colder than the islands, and snow builds up instead of melting off periodically, which keeps the deer from building up excessively as on the islands. The mainland populations, while smaller, frequently produce the largest individuals.

A population of 250,000 deer on an area of less than 50,000 square miles of habitable ground isn't excessive in the summertime when all the forage from lowlands to mountaintops can be utilized. In the winter, however, snow sometimes forces deer down into a narrow strip near sea level, drastically reducing the available food supply. The more severe the winter, the narrower this strip will be; at times, deer may actually be forced to live on seaweed and a few other plants

which are washed free of snow by the tide. If this happens after an extended series of mild winters, so many deer are competing for the available food that almost all of them suffer, and many die, from malnutrition and associated factors. To complicate matters, when a series of mild winters has allowed a large population to build up, increasing numbers of deer browse on lowland vegetation all summer long, reducing the amount of forage that will be available in winter.

Deer at the end of 1964 were more abundant in Alaska than at any time since 1945, having thoroughly recovered from a wholesale reduction brought about by five successive severe winters ending in 1950. Unless a series of winters of moderate severity keeps the population from building any higher, another drastic population crash may be in the offing when really bad winters do again occur. The annual harvest of 10,000 to 14,000 deer is having little effect on the total population, for several times that number are being born every year. Access problems and an insufficiently large number of hunters keep the harvest at a low level in spite of the super-abundance of deer, a bag limit of four animals, and a season of five months duration.

Because deer have a high reproductive capacity the results of any forthcoming severe winter die-off will be evident only for a few years, unless population gets so high as to cause long-lasting damage to forage plant reproduction and growth. In 1963 and 1964 only a few areas of Alaska showed evidence of having been utilized this heavily. Until hunting pressure becomes much greater than it is now, weather will continue to be the number one "manager" of the deer population.

Elk

Elk are not native to Alaska, though the species did exist here in prehistoric times. Alaska's Afognak Island population of some 1,200 to 1,400 animals comes from a transplant of eight elk in 1929 from Washington's Olympic Peninsula.

In 1963, the Afognak herd in turn furnished nine animals for a transplant to Neets Bay on Revillagigedo Island, north of Ketchikan. More animals joined these in 1964. Early attempts to introduce elk to southeast Alaska, at about the same time as the plant on Afognak, were not successful: the number of animals introduced was, however, too small to have much chance of success. More recently an attempted transplant failed because the semi-domesticated elk calves ran afoul of an irate landowner.

The elk on Afognak, like many of Alaska's game populations, are relatively inaccessible. Boats and aircraft are the only means of reaching Afognak, and fall weather is not often favorable for doing so. Once the island is reached, there still remains an often-formidable back-packing trip to hunt and bring out an animal. The result of all this is that only about 100 to 125 elk are taken in Alaska yearly.

Of the relatively few parts of Alaska where new introductions of elk would be expected to thrive, without at the same time posing a threat to native big game species, the Panhandle is probably the most favorable. The Neets Bay plant is expected to provide valuable information on the potential benefits and drawbacks of introductions in this area, and other moves may be made in the future if the results are favorable.

Goat

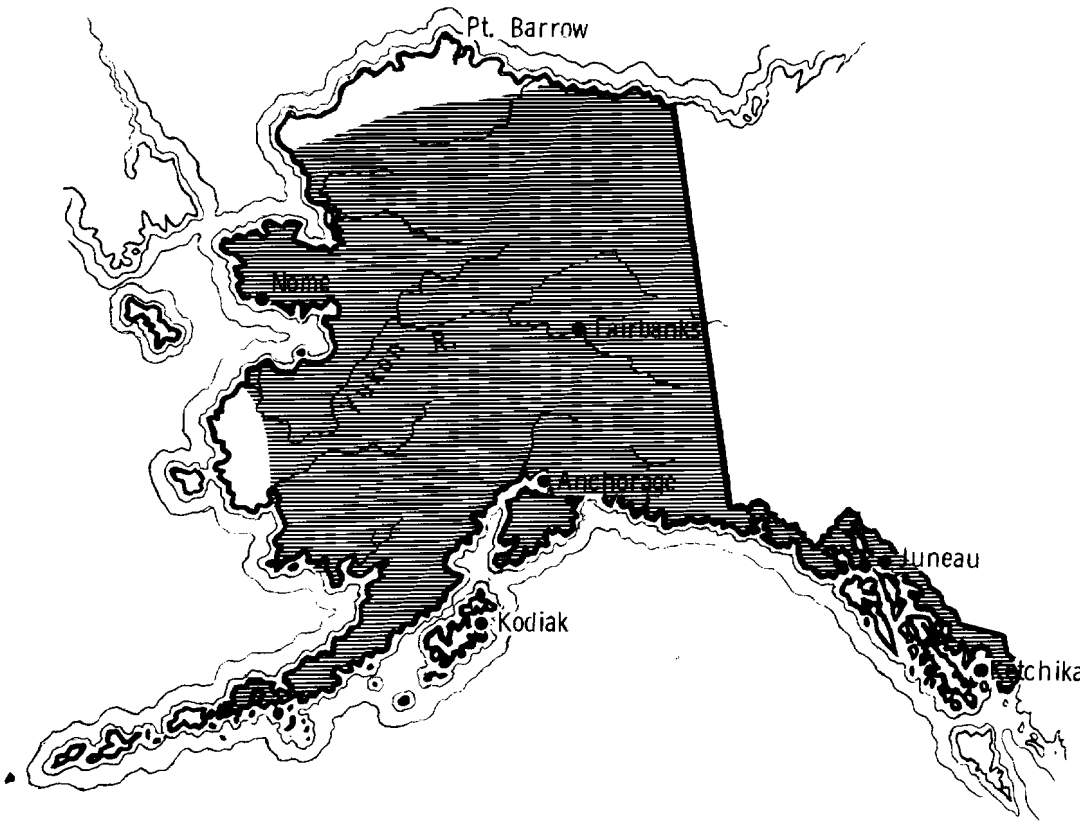
As writers and biologists have become fond of pointing out recently, the mountain goat is not a true goat at all, but a relative of the European chamois. Even the American pronghorn ("antelope") is thought by some to be closer kin to the mountain goat than is the true goat. All scientific argument aside, however, the billy mountain goat during the rut is reputed to be at least olfactorily akin to the "real" goat.

The Alaska mountain goat population has been estimated

at 15,000 animals. During the four to five month seasons in 1963 and 1964, with a limit of two goats effective in all areas, approximately 600 goats are believed to have been taken each year.

Most of Alaska's goats live within about 50 miles of salt water. They are mainland animals entirely, except for transplanted populations on Baranof, Chichagof, and Kodiak Islands. They occur from the very southeast end of Alaska up around the coast to Cook Inlet. The Department's mountain goat studies are presently limited to locating concentrations and to occasional production and trend counts in selected areas. Hunting pressure is not expected to have any effect on the mountain goat population for some years to come, and the goats' rugged habitat prevents excessive range-damaging increases in goat numbers.

Moose



The moose is the largest living member of the deer family--and the Alaska-Yukon moose is the largest representative of the species in the world. A really big bull may stand well over seven feet at the shoulder, weigh 1400 pounds, and have an antler spread of more than six feet. Hunters obtain 400 to 900 pounds of meat from each animal.

The quantity of meat is matched by its quality, and as a consequence the moose is probably hunted more avidly by more hunters than any other big game animal in Alaska. Some 30,000 nimrods expressed at least a preliminary intention of going moose hunting in 1963 and again in 1964, by picking up

a Moose Harvest Ticket. These tickets became a necessary prerequisite to moose hunting on July 1, 1963. In 1963, 24,000 hunters--more than half the hunting license holders in Alaska --actually did go moose hunting, and almost 9,000 were successful. Moose hunters usually go out in parties of two or three or even more, and when one party member gets a moose they all stop hunting to help take care of the big job of dressing and packing out the meat. A "hunter success ratio" approaching forty per cent can therefore be considered excellent, at the least. In 1964, the number of hunters dropped slightly to 21,000, but almost as many moose were taken. Alaska's moose populations are obviously doing well.

Moose and civilization get along well together, and the big animals can be hunted within reasonable distances from roads, rivers, and railroads. This accessibility is another reason, along with palatability and size, for the moose's popularity with hunters.

The popularity and accessibility of the moose combine in turn to cause it to be the most intensively managed big game species in Alaska. In the 1963 and 1964 Game Regulations, there was almost as much space taken up by moose seasons and bag limits as by all other species together. Hunting pressure varies from one area to another, from intense to negligible, depending on accessibility and sometimes, but not always, on moose abundance. Thus it's necessary to set a split season of slightly over two months total in one area, with only a weeklong antlerless moose season, while another area has a continuous season more than four months long, including a two-month either-sex season. The goal in each case is to allow full utilization by humans while keeping the moose population in reasonable balance with the amount of food available in winter. Good management can stimulate production and provide for higher harvests than would be possible in an unmanaged population.

Moose are probably the most evenly and widely distributed big game animal in Alaska, except perhaps for the much scarcer brown-grizzly bear. They are, moreover, extending their range even further or increasing in regions of former scarcity. More and more moose are being seen on the Seward

Peninsula, where not long ago they were very rare. Moose are showing up in the Arctic in increasing numbers. In southeastern Alaska, moose populations at Yakutat and Haines are expanding: only a few years ago a moose in either area was, if not a rarity, certainly not the ever-present beast he has now become. A population at Berner's Bay, 30 miles north of Juneau --this one stemming from a man-made, rather than a natural, range extension--had grown sufficiently in only five years to allow hunting seasons in 1963 and 1964, and the animals are expected to spread into the area immediately north of Juneau. Another transplant, this one carried out in 1963 and supplemented in 1964, may soon provide hunting along the Chickamin River near Ketchikan.

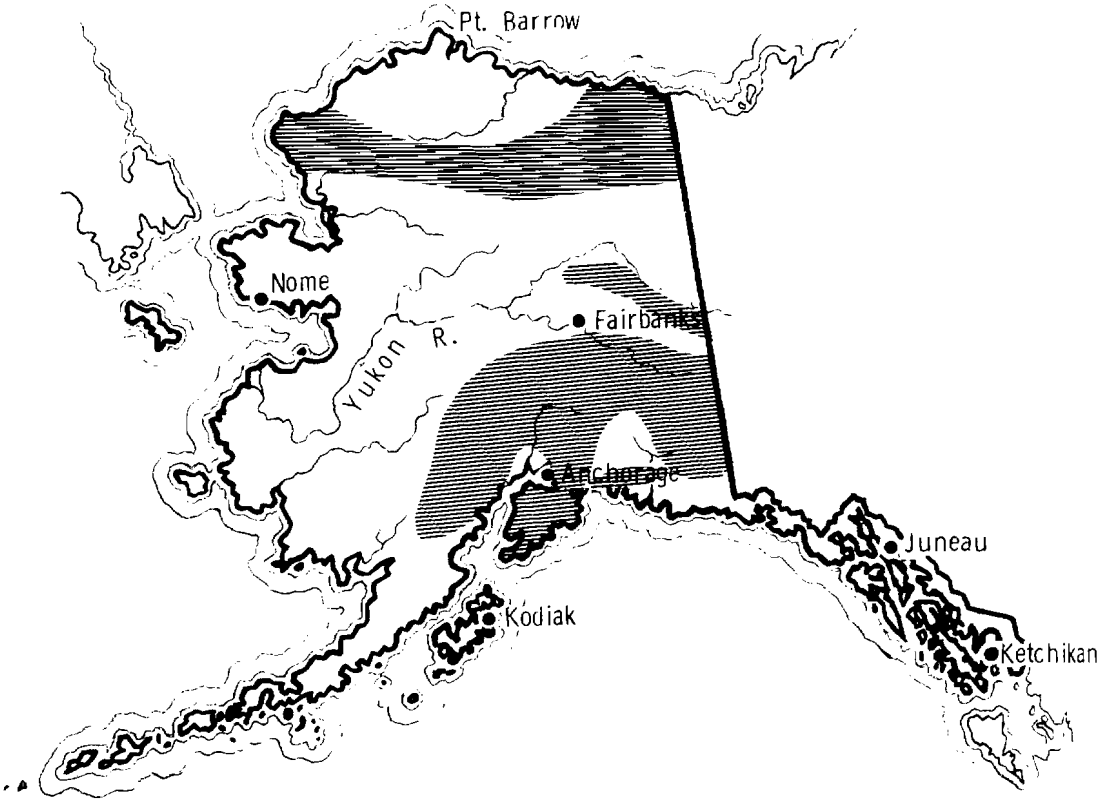
The future of the moose in Alaska appears to be quite secure. Properly managed, a moose population presently estimated at 120,000 should be able to support a harvest of at least 35,000 animals a year. That's four times the present level, and won't of course be reached until Alaska has many more roads and many more people.

Muskox

Muskoxen, once native to Alaska, were extinct here by about the middle 1800's. In 1930, 34 animals were brought to Alaska from Greenland: they were held at College, near Fairbanks, for scientific observation for a few years, and in 1935 and 1936 the then-existing 31 animals were transferred from College to Nunivak Island.

The Nunivak herd has slowly built up to an estimated 450 to 500 animals. Twenty-three animals were moved back to the University of Alaska in 1964, and a few more will probably be moved in 1965: these will be used in domestication experiments. The Department plans to establish a herd on the mainland which may result eventually in a harvestable population. The animals on Nunivak are in a National Wildlife Refuge, and may not presently be hunted.

Sheep



Alaska's Dall sheep, all-white relatives of the Desert Bighorn and Stone sheep, are considered by many to be the State's top trophy animal. They probably receive more hunting pressure than any of the other species that are hunted mainly for trophies rather than for meat (although one reason for their popularity as trophies is their palatability, which can serve as added incentive). Over 8,000 people expressed at least a hope of going sheep hunting in 1963 and 1964, being issued one of the Sheep Harvest Tickets which became mandatory in 1962.

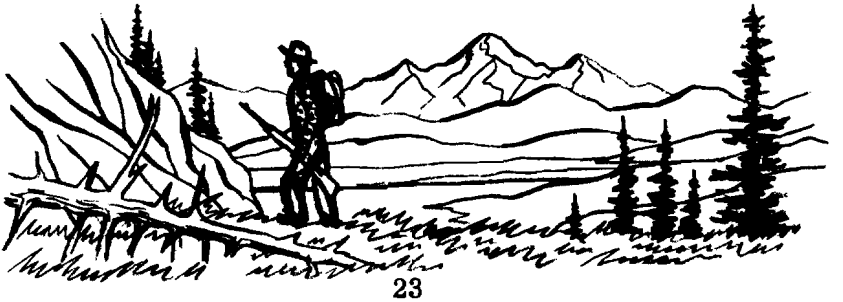
According to the ticket returns, over 3,500 people actually did hunt sheep in each of the last two years and almost

1,000 of them (over 26 per cent) connected. Considering the fact that only rams with horns of at least 3/4 curl are legal--which means rams at least five years old--that's a very high success ratio, and is evidence of the healthy condition of Alaska's sheep population.

That population, estimated at around 35-40,000 head, is scattered through the Alaska Range, the north end of the Aleutian Range, the Talkeetna, Chugach, and Wrangell mountains, the Brooks Range, the White and Kenai Mountains, and the Tanana Hills. The Wrangells, Talkeetnas, and Chugach's and the Alaska Range are the most popular hunting areas, but in spite of heavy hunting pressure there, a new world's record sheep was taken in the Wrangells in 1961, and near-records are collected almost every year.

Harvest ticket returns indicated that the 977-head harvest in 1963 was forty-five per cent higher than the 1962 take. This may be misleading though, because 1962 was the first year the ticket was needed to hunt sheep, and some hunters may not have known of the new requirement, even though it was well publicized. The 1964 harvest of 939 was slightly under the 1963 take, probably because of poor weather during the hunting season.

Because the harvest tickets showed, on first being used in 1962, that the Brooks Range was contributing comparatively little to the total sheep harvest, the bag limit was boosted to two rams in that area in 1963. As a result, Brooks Range sheep contributed over eighteen per cent of the harvest in 1963 vs. less than thirteen per cent in 1962. The Brooks Range has good sheep populations (an aerial survey in the drainages of a single river, the Koyukuk, resulted in a count of over 1,000 sheep in 1962), and should be able to provide many more sheep annually than the 178 taken in 1963 or the 110 taken in 1964.



Wolf and Wolverine

Over the past few years, the wolf and wolverine have become more and more important as trophy animals. Aerial wolf hunting is becoming a popular sport, and increasing numbers of guides are offering such hunts as "extras" to polar bear or grizzly bear hunts in the spring.

The Board of Fish and Game, taking note of the new popularity of these species, classified them as Big Game in 1963. Both species still can be, and are, taken for fur with conventional trapping methods; in most areas, they are still more important for their fur than as big game trophies.

The wolf occurs throughout the state, with the exception of island areas in southcentral and southwestern Alaska. No estimates of the total population have ever been made, but there is no evidence that current harvests of about 700 to 800 animals yearly -- for fur, for bounties, and for trophies -- will have any long-lasting effects on the total population. In the past, as many as 3,000 wolves were taken in Alaska in some years.

Wolverines are as widely distributed as wolves, but are less abundant, being solitary animals. There is an open season which in 1963 and 1964 varied from one to five and a half months long, depending on area. Hunters may obtain permits to take a wolverine before the usual season opening in November. Very few trophy wolverines are believed to be taken after November, when trappers start taking them.

The wolverine harvest was 551 animals in fiscal year 1964, all except a few of which were taken mainly for the fur and the bounty. The total population is unknown, but judging from the way the harvest is holding up, is remaining stable.

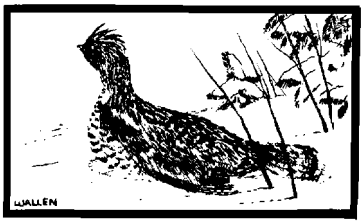
This young moose, with a new tag in his ear, is now an especially valuable co-operator in the never-ending inventory process. Tag recoveries and sightings of bright plastic streamers (right ear) provide data on movements, longevity, age composition of the harvest, and other information essential to good management.

SMALL GAME

Because of the wealth of large game animals in Alaska, the state's equally varied small game populations don't get as much outward attention as those in many other states. Even so, in numbers, if not in bulk, Alaska's small game harvest overwhelms the big game take, for some 200,000 or more ducks, geese, hares, ptarmigan, and grouse are taken annually. According to a survey made in 1961, about 35 per cent of Alaska's licensed hunters hunt small game. About 25 per cent hunt both big and small game, and 66 per cent hunt big game alone.

Small game hunting will no doubt increase in popularity and importance in Alaska, as it has elsewhere, as more and more people take advantage of the outdoor recreation afforded by these animals. Where big game hunting can often take on the nature of an expedition, the pursuit of small game affords opportunities for numerous pleasant outings.

Most of the major kinds of small game animals in Alaska are widely distributed, but hunting is often confined to local areas of relative abundance. For example, there are grouse in the Anchorage area, but if an Anchorage nimrod wants to go grouse hunting he will often drive to the Kenai Peninsula rather than hunt locally. This "necessity" for driving some distance to find small game populations which are "worth hunting" has led, in Alaska no less than elsewhere, to demands for the introduction of exotic species which will provide truly "local" hunting. A number of such introductions have been attempted in the past, including snowshoe hares to Southeast Alaska, Chukar partridge to the Matanuska Valley, and repeated plants of pheasants in several places. None of the transplants have been successful except for populations of rabbits on a few small islands. So far, no exotic small game animals seems to be adapted to Alaskan conditions, except those which might displace (or even replace) native species.

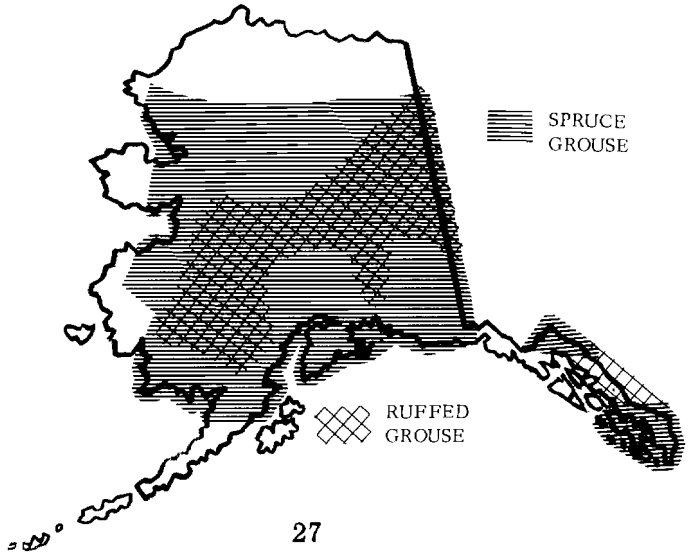


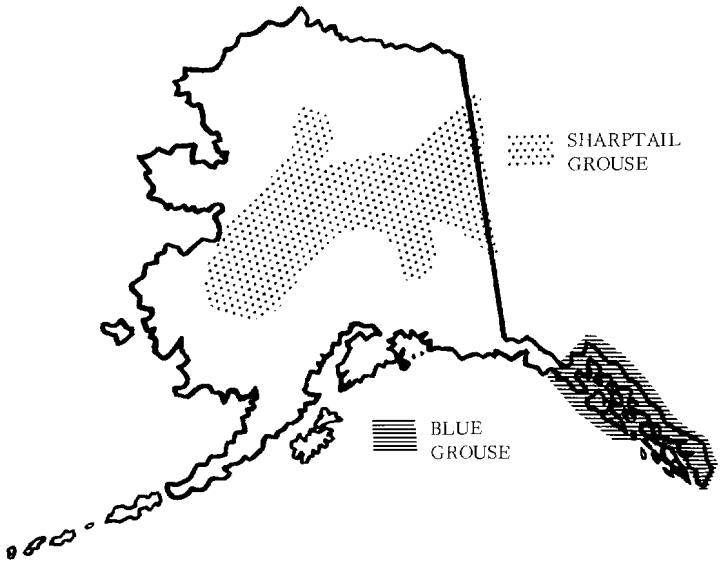
Grouse and Ptarmigan

There are three species of ptarmigan and four species of grouse in Alaska. Each of these occupies a different kind of habitat, though at some time during the year the ranges of two or more species may overlap. All are native to Alaska, and one or the other is found in almost every part of the state where there is vegetation.

Spruce grouse and blue grouse are found mainly in areas of evergreen timber, the former in the north and the blue grouse in the southeast Panhandle. Ruffed grouse and sharp-tailed grouse, on the other hand, like areas where instead of a solid and enduring cover of evergreens there are occasional openings and plenty of hardwood trees and shrubs. Periodic fires, land clearing, changes in river courses, and other vegetational disturbances are needed to provide this kind of habitat; otherwise, the evergreens would eventually crowd out the hardwoods.

All of the three ptarmigan species in Alaska are adapted to the treeless country beyond or above timberline.



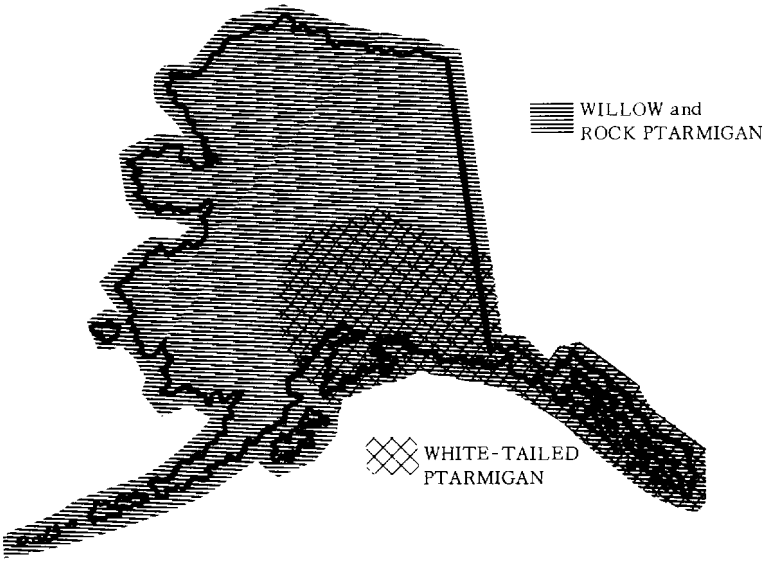


Nearly all ptarmigan live in treeless arctic or alpine areas in summer. Even when all three species live on one mountain, each occupies a different part of the tundra. In winter, distinctions in habitat become less obvious and mixed flocks are not rare.

Judging from a survey made in 1962, ptarmigan and grouse are each being harvested at a level of about 50,000 or more birds annually. Both, however, are subject to cycles of abundance and scarcity, and past records show that annual ptarmigan harvests may at times approach 150,000, and grouse harvests 75,000.

The **blue grouse** is the largest upland game bird in Alaska, with males sometimes weighing over three pounds. Its natural range in Alaska is confined to the Panhandle. In 1963 and 1964, experimental work was conducted which may lead to establishment of blue grouse on Kodiak Island. Like most grouse, the big blues are hard to transport because they are so nervous. They're not easy to capture in quantity, so it will be necessary to work out some method of lowering postcapture mortality before it will be possible to move enough birds to Kodiak to have a good chance of success.

Blue grouse are hunted most avidly in the spring, when their "hooting" makes it possible to find enough birds to make hunting worthwhile; many are also taken in the fall and



winter, however. There is no evidence that hunting is having any effect on blue grouse numbers. Judging from the results of a mail survey of hunters in 1961-62, only about 1,500 blue grouse are now being taken annually. This harvest is not expected to increase greatly in the near future. No biological studies of the blue grouse had been undertaken in Alaska before the Department began a study of grouse (all species) in 1963.

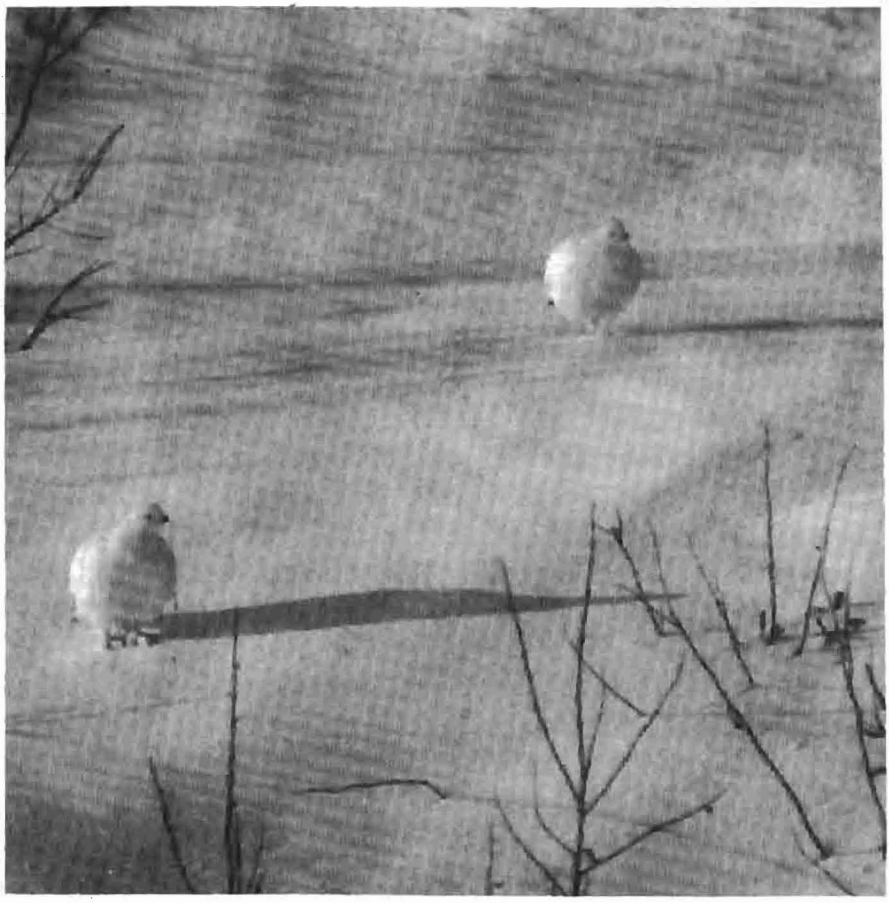
Spruce grouse occupy, in central Alaska, the same general type of habitat occupied by the blue grouse in Southeastern. Generally though, the southcentral and interior forest areas where the spruce grouse is found are not as densely timbered as southeastern Alaska. The annual spruce grouse harvest is unknown, but very likely constitutes at least one-half of the grouse harvest in Alaska, or a minimum of about 20 to 25 thousand birds a year. Probably most of these are taken incidental to big game hunting. Because the spruce grouse is more widely distributed than the other Alaskan grouse, the grouse studies launched by the Department in 1963 will emphasize this species.

Ruffed and sharp-tailed grouse occupy the same general area in Alaska, although their local habitats are probably different. They occupy the valleys of the Yukon and Kuskokwim rivers and their tributaries, and a few other local areas. Both species are extremely popular upland game hunting targets in a number of states, but "suffer" from much competition in

Alaska. Together, they probably furnish less than one-half of the grouse harvest here.

The **willow ptarmigan** and the **rock ptarmigan** are found at least locally in every major geographic region in Alaska. The **white-tailed ptarmigan**, smallest of the three Alaskan species, is more narrowly distributed, occurring mainly in the higher parts of the Alaska Range, the Kenai Mountains, and in parts of the Coast Range in the Panhandle. The willow ptarmigan is probably the most abundant of the three, as well as the largest. It is Alaska's state bird.

The Department has had a full-scale ptarmigan research program going since 1959, designed to provide information for managing these birds in that not-too-distant time when hunting begins to remove a number of birds approaching the annual natural production.



Migratory Birds

Over 25 species of migratory birds are produced and regularly hunted in Alaska. The majority of these are game ducks, the most important (to hunters) being the mallard, pintail, baldpate or American widgeon, green-winged teal, and shoveler. Among the larger birds, the Canada goose, white-fronted goose, and black brant are most often taken, the last being harvested mainly at Cold Bay at the base of the Alaska Peninsula. In 1961, the little brown crane became legal game in Alaska. In spite of having been protected for many years, these large birds had lost none of their natural wariness, and probably no more than 300 have been harvested in any one year.

Waterfowl and other migratory birds nest in almost every part of Alaska, for river deltas, lakes, ponds, and pot-holes abound here. There are a few areas, though, which are especially noted as waterfowl breeding grounds, just as a relatively few places are well known for the duck hunting they provide. The most outstanding nesting areas include the Yukon-Kuskokwim Delta and the vast wet tundra between them, the Yukon flats between Stevens Village and Fort Yukon, the Copper River Delta, and a number of smaller areas like the Minto Lakes near Fairbanks. The vast Arctic coastal plain also produces thousands of birds annually.

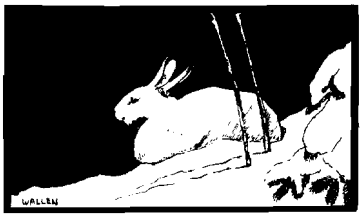
A number of trumpeter swans--once considered to be a threatened species--are known to nest in Alaska, and some do not leave the State at all, wintering in the Panhandle. One nesting area is on the Copper River Delta, which by agreement between the State and the U. S. Forest Service has been set aside as a waterfowl management area.

Also set aside in a similar agreement is the Stikine River Delta near Wrangell in the Panhandle, which is both a

migration resting area and a top duck-hunting spot. Two other areas, Izembek Bay and the Yukon-Kuskokwim Delta, are National Wildlife Refuges.

Among the better-known duck and goose hunting places, in addition to the Stikine, are Cold Bay, Minto Lakes, the Copper Delta near Cordova, and the Chickaloon Flats near Anchorage. Many other spots would be just as well known if they were easier to get to.

A hunter survey in 1962 indicated that about 60,000 to 75,000 ducks and perhaps 10,000 geese are being harvested annually in Alaska. This is an extremely small fraction of the birds produced here, and the Department has for many years been petitioning the federal government to liberalize the bag limit. (Waterfowl, being migratory birds, are covered by treaties between the United States, Canada, and Mexico, and by federal laws implementing those treaties. Consequently, the federal government sets the outside limits on seasons and bag limits for ducks, geese, and other migratory birds). Since Alaska became a State, waterfowl hunters here have been allowed a daily bag limit of only five game ducks and six geese, and not more than three of the geese can be white-fronts or Canadas. These low limits, together with the early 'natural' closing of the season in many areas caused by freeze-up, has kept the average season take per hunter to only a little over five ducks and less than one goose. This is far below the average season take in other Pacific flyway states where the season actually closes when man says it's supposed to, rather than when Nature decrees.



Hares and Rabbits

Arctic and snowshoe hares are native Alaskans, while the rabbit is mentioned in the game regulations only because an introduced population is found on Middleton Island in the Gulf of Alaska. Altogether, hares and rabbits provide a harvest of an estimated 50,000 or more per year. Population "highs" existed in some parts of the State in 1963 and 1964, and the harvest may have been much larger.

The snowshoe, or varying hare, is found mainly in the wooded parts of Alaska, while the Arctic hare is a creature of the open tundras, occurring outside the limit of spruce tree growth from the Alaska Peninsula north along the coast to the Arctic. A few snowshoes occupy some of the larger river deltas of the Panhandle, but they are not abundant in this area of heavy timber. They have become established on the Kodiak-Afognak Island group from transplants made in 1934.

The average weight of a snowshoe hare is probably about three pounds, while the Arctic hare may weigh six to twelve pounds. Obviously, these northern denizens can furnish considerable meat for Alaskans' larders, and do so during periodic years of abundance. Hares and rabbits can also furnish popular recreation, as is attested to by the growing popularity of rabbit hunting flights to Middleton Island by an Alaskan airline.

Since the State took over control of Alaska's fish and game on January 1, 1960, the Department has made an annual grant to the Alaska Cooperative Wildlife Research Unit at the University of Alaska. Part of this money has financed snowshoe hare studies which may eventually help solve the mystery of "cycles", and make these animals a better understood part of the Alaskan scene.

FUR ANIMALS

If the fur era which brought the first adventurers to Alaska had been chronicled by the likes of Rex Beach and Jack London, the later gold rush would have had difficulty competing for fame. In the nearly 100 years that records have been kept, some $250 million worth of peltries (including fur seal) have been exported from Alaska. In 1963 and 1964, the value of land animal furs taken in Alaska -- almost $3 million -- exceeded the gross value of the State's gold exports.

Beaver and mink continued to supply the major share of trapping income in 1963 and 1964. The muskrat, as usual, contributed the greatest number of pelts to the harvest. Altogether, a dozen kinds of fur animals provided a significant catch in 1963 and 1964, excluding the fur seal of the Pribilof Islands whose welfare continues to the concern of the Federal Government. (Alaska gets seventy per cent of the net proceeds from the sale of fur seal skins).

Some 8,500 Alaskans were licensed to trap in 1963 and over 9,600 in 1964. Probably less than half of them were full-time trappers. Even among the relative handful of really serious trappers, fur income was not evenly distributed, and there is probably no such thing as a meaningful "average income per trapper." In the areas of good fur-animal habitat, a few trappers probably earn over $2000 from their lines, while in other places the season's take may amount to only a few hundred dollars.

There were no particularly notable price changes on any furs in 1963 or 1964, except on one species--the hair seal--which is not even classified as a fur animal in the game regulations. By the end of the year, some hides of this marine mammal were bringing over $40 -- several times their value a few years ago. There was also a fair increase in the average prices being paid for lynx. White fox prices, on the other hand, declined somewhat in 1963 as did mink prices in 1964.

Fur dealers must report their purchases on forms provided by the Department, and both dealers and trappers must report the exportation of raw furs from the State. On beaver, the most intensely managed fur animal in Alaska, there is an additional check on the number taken, for every pelt must be sealed before leaving the State. On the other hand, neither fur buyers nor trappers are required to report prices paid or received, so while the number of each species taken is known, the average price per pelt, and the total value of each species and the season's take, must be estimated. Based on the best available information, in 1963 and 1964 wolf pelts, at an average $ 35 each, were the most valuable furs individually, followed by wolverine at $ 30, mink at about $ 25, otter at $ 22, beaver at $ 20, arctic and blue fox at $ 18, marten at $ 16, and lynx at $ 13. Other species were worth considerably less on the average: coyote sold for about $ 6, fox for $ 5, and muskrat and weasel at about a dollar each.

Beaver

In 1963 slightly under 20,000 beaver, valued at some $ 400,000, were taken in Alaska; in 1964 bad weather cut the take to 14,000, one of the lowest on record. The middle Yukon area (Game Management Unit 21) produced the largest number of beaver, mainly because there are more trappers there than in any other Unit. The Prince William Sound area (Unit 6) yielded the largest average number of beaver per trapper (almost 28), with the lower Susitna (Unit 16) a not-too-close second at slightly under 20 beaver per trapper.

The beaver is found in all parts of the state where hardwood trees exist, and in a few places where "tree" is a less appropriate term than "tall bush". The species is absent from the Aleutian Islands, and most of the treeless Arctic Slope.

Every beaver pelt taken in Alaska must be sealed, and in the process the Department obtains information on pelt size, area taken, and the number of beaver taken by each trapper. The pelt size is, within known limits, an indication of the

beaver's age, and together with data on trapping effort and success provides a basis for setting seasons and bag limits. For example, if the catch from a particular area shows an increasing proportion of young beaver over several seasons, this is usually an indication of overtrapping, and the season length and bag limit would be reduced accordingly. Sealing information is analyzed in late summer, and beaver seasons and bag limits are then set by the Board of Fish and Game in December.

Because the harvest of beaver can be so closely controlled, in spite of their vulnerability to trapping they will be a part of the Alaskan scene for the foreseeable future, even if a rise in fur prices should bring about increased trapping effort.

Mink

An estimated 22,000 mink, worth an average of about $25 each, contributed some $660,000 to the income of Alaska trappers in 1963. About the same number were taken in 1964, but a price drop cut the value to about $500,000. In both years it was the most valuable single fur species in the State, though in other years it vies with beaver for that honor.

Absent only from a few islands (mainly the Aleutians and St. Lawrence) and from the waterways flowing to the Arctic Ocean from the Brooks Range, the mink is one of the most widely distributed of Alaska's abundant fur-bearing animals. Probably only the less-abundant wolf and fox occupy so much of the state.

The mink harvest has remained fairly stable over the past few years, indicating a healthy population. There has been no need to impose a bag limit, and the season has not required cutting back within the limits of fur primeness. In southeastern Alaska, where alternate-year trapping has long been the rule because mink are vulnerably concentrated on the beach areas, studies were begun to determine whether, with

trapping at present levels, this protection is still necessary. If local populations are found able to maintain their numbers when trapped every year, the Board of Fish and Game will undoubtedly allow such trapping.

Other Fur Animals

Beside the $1 million-plus trapper receipts from mink and beaver, the $400,000 income from all other furs appears relatively small. The ten other species which provided that $400,000, however, are widely distributed and often locally abundant, and without them many a trapper would be forced to look for other sources of income.

One or another of the canines--wolf, coyote, fox--occurs in virtually every part of Alaska, and even far out on the arctic ice pack in winter. The wolf is probably the most widely distributed of all, being absent only from some of the islands. The wolf population is in healthy condition, and in both 1963 and 1964 provided harvests of about 750 pelts valued at $35 each, in addition to the $50 bounty. In some areas, restrictions have been placed on the taking of wolves--one area has been closed en-

tirely--because they are needed as a check on caribou populations which might otherwise deplete their own forage and spread disease.

The **red fox** (and its silver, cross, and black color variations) is also widely distributed, but is probably less abundant on the Arctic plain and in southeastern Alaska than is the wolf. Trapping at current levels is having little or no effect on the fox population. The current price of about $5 for fox pelts is not much inducement for trapping them, and only about 1,000 were reported taken in 1963 and 1964--far below the 20,000 to 30,000 annual harvest of many years ago, when red fox sometimes brought over $50, and cross and silver fox even more. The fox is so adaptable that there need be little fear that advancing settlement in Alaska will affect its numbers.

The Arctic or **white fox** and its **blue** variation also seems to get along reasonably well with mankind. True, its coastal habitat--from the Aleutians northward--hasn't been much altered by man's settlement, but at least the presence of man causes the fox no problems. Arctic and blue foxes are not infrequently seen in coastal villages, and a whale, seal, or walrus carcass on the beach is likely to be visited no matter how close it is to human habitation.

This trait sometimes makes the white and blue fox easy prey for the trapper, but the population as a whole is probably not particularly vulnerable as long as trapping is confined to the season when pelts are prime, for during this time the animals have the vast arctic ice pack to roam on. Only about 1,500 white and blue foxes were taken in Alaska in 1963 and 1,100 in 1964, each pelt being worth about $18. A high--for recent years--price of about $40 per pelt two years before lasted but a short time. In the past, as many as 20,000 blue and white fox skins have been shipped from Alaska in a single year, but many of these were from captive or semi-captive animals. Now that fox farms are not profitable, the harvest will probably continue to fluctuate between about 1,000 and 3,000 depending on how much the pelts are worth.

The **coyote** contributes little to the fur harvest in

Alaska: only about 250, valued at $6 each (plus a $30 bounty; were taken in 1963. The coyote was unknown here before the turn of the century. Following its first occurrence, it spread rapidly over a large part of Alaska, but after a peak in 1940, when over 2,000 were trapped, its numbers declined again. Coyotes are not now abundant anywhere in the State.

In addition to the mink, the weasel family also contributes the **otter, marten, weasel** and **wolverine** to Alaska's fur harvest. In 1963 and 1964 the wolverine was the most valuable of these individually, the average pelt being worth about $30 in contrast to about $22 to $25 for otter and $15 to $16 for marten. Weasel skins brought trappers about $1 each.

In total value, the marten was the second most valuable member of the weasel family in 1963 and 1964 with a harvest of some 8,000 animals in 1963 and 6,200 in 1964 worth an estimated $128,000 and $93,000, respectively. The otter harvest was 3,000 in 1963 and 2,300 in 1964 for a total value of $66,000 and $57,000, respectively, while 450 wolverine pelts earned $13,500 for trappers and 1,000 to 1,500 weasel pelts earned $1,000 to $1,500.

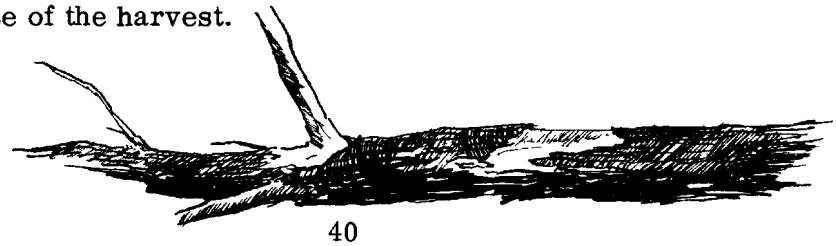
In the past, marten pelts have often been more valuable

than any other skins from the weasel family, including mink, and one year--1946--fur dealers paid an astonishing $80 each for marten. Barring an unlikely succession of such high-value years, it's improbable that marten, otter, wolverine, or weasel will be trapped down below the level where simple closed seasons during the "unprime" period will be sufficient protection for them.

There were more **muskrats** trapped in 1963 than all other fur animals combined: 85,000 vs. about 60,000. In total value of the catch, muskrats ranked fourth at $85,000. The record total value for muskrats in the past was over $800,000 in 1941, when pelts brought $1.60 each. The record average value per skin was $2.25 in 1946. The total yearly number of muskrat skins exported from Alaska has exceeded half a million twice, in 1932 (when they were worth a near-record low of 36 cents each) and again in 1941. The harvest is characterized by large fluctuations over periods of several years, and the annual take has at times dipped below 40,000.

The muskrat, like the beaver, is in some areas taken for food as well as for its pelt, and its economic importance is thus greater than the fur statistics tend to show.

The 1963 **lynx** harvest of 2,500 animals, worth an estimated $32,500 at an average of $13 each, was double the 1962 harvest. In 1964 the take nearly doubled again, to 4,700. A decline is expected in the next year or two. A rise in prices, to the benefit of trappers, accompanied the increased availability of lynx, the latter being mainly a result of a "high" in the hare population in some areas. In two successive years in the past--1916 and 1917--the lynx take in Alaska rose above 21,000, and single pelts have on occasion been worth over $60 to trappers. The lynx population will undoubtedly continue to fluctuate along with the hare population, in cyclic fashion, quite independent of fur prices and the size of the harvest.



Sea Otter

In 1963 and 1964, the sea otter took a long step toward reascending the throne as king of furs. For the first time since 1911, when the taking of sea otters was outlawed to allow the remnant few to recover from years of over-exploitation, a small harvesting operation was carried out in the Aleutians. True, the harvest was experimental, and conducted by the Department; and true, the fur world will have to be "re-educated" to the luxury and uniqueness of sea otter, a process that won't be accomplished overnight: nevertheless, it's considered inevitable that sea otter will again reign supreme among furs. After all, seventy-five years ago when a dime was worth today's dollar, a sea otter pelt sold in London for over $1,100--though of course the average price was considerably less. At the end of 1964, about 450 sea otter pelts were in storage, being processed, being used in preliminary promotion, or were being evaluated by persons in the fur industry. Most of the 450 were collected off Amchitka Island, in the Aleutians.

Sea otters had by 1964 become fairly common as far east as Prince William Sound, though the Aleutians, particularly the Rat and Andreanof Islands, are the main centers of abundance. Sea otters are becoming increasingly common in the Kodiak Archipelago. Transplants to the Pribilofs in the last decade were apparently unsuccessful, probably because not enough animals were moved.

Plans were laid in 1963 for an experimental reintroduction of sea otters to southeastern Alaska, where they once were fairly common. In 1964 studies were made to find the best release site and to test methods of capturing, holding, and transporting sea otters. In addition to providing plenty of food, proper water depths and shoreline characteristics, and other habitat requirements, the release site was chosen

so as to minimize the difficulty of protecting the transplanted otters from seal hunters. Under some light conditions it's difficult to distinguish the two animals in the water. An experimental transplant is planned for 1965.

The present sea otter population is estimated to be large enough to support an annual harvest of 1,000 or more animals. Whether that many will actually be taken will depend partly on whether a properly-distributed harvest effort can be conducted at reasonable cost in the rugged and extensive coastal terrain inhabited by these animals. Regardless of the size of future harvests, the sea otter has obviously returned to stay.

An inventory of potential sea otter habitat in southeast Alaska in 1964 provided information that will make possible a reintroduction of this valuable fur bearer to an area where there have been no sea otters for over half a century.

MARINE MAMMALS

Along vast stretches of Alaska's coastline, marine mammals are still crucial to the existence of people whose ancestors were here long before Alaska was ever "settled" in the modern sense. Skin boats--umiaks--are still covered with split walrus hide, mukluks and many other items are still made of sealskins, and seals, walrus, and beluga whales still furnish vital meat.

State game regulations classify seals, sea lions, walruses, beluga whales, and porpoises as marine mammals. Two other species--the sea otter and polar bear--which make extensive use of marine habitat are classified as fur animals and big game, respectively.

One or more of Alaska's marine mammals is found in all of the State's coastal waters (and sometimes even well inland along various rivers) from Dixon Entrance in the south clear around to Demarcation Point. In parts of this huge area, people use these animals today in the same ways they did fifty years ago, but in other places the winds of change were quite apparent in the past two years. Hair seal hides began to bring prices which were bound to create new interest in harvesting them. The beginning could be seen of what many hope will be an increasing utilization of the walrus as a trophy species. Stirrings of interest were felt in the harvesting of sea lion pups for their hides, leading to hopes of useful, rather than wholly destructive, control of an animal which can play hob with fishing gear.

Utilized in the old ways or in new ways, Alaska's marine mammals will continue to be an important part of the natural resource picture for the foreseeable future.

Walrus

The most recent estimate of the minimum size of the Pacific walrus population is 70,000 animals. They are inhabitants of the Bering and Chuckchi Seas, not being found (with rare exceptions) east of Pt. Barrow in the north and Bristol Bay in the south.

At one time the walrus population extended further south than it does today; the range shrank as a result of excessive exploitation during the last century and early 1900's. By 1963 the Pacific walrus had so far recovered that reappearances on old, long-abandoned "hauling grounds" were being reported with some regularity, although the Walrus Islands in Bristol Bay were still the only area where the huge beasts regularly "haul out" on land in any numbers.

In 1963 the walrus harvest was higher than average: 1600 to 1700 animals with a calculated value of about $ 200,000. The 1964 spring harvest at some villages was the lowest on record because of ice conditions, but the total harvest for the year was about average--some 1300 to 1500. King, St. Lawrence, and Diomede Islands were as usual the main harvesting points (except during the poor spring of 1964) with some animals also being taken from Wales, Wainright, Pt. Hope, Barrow, Tununuk, and Kipnuk on the mainland, and from Mekoryuk on Nunivak Island. At the traditional hunting centers--King and Diomede Islands, and Gambell and Savoonga on St. Lawrence Island--spring hunting in 1963, was as usual the most rewarding. Hunters at Pt. Hope, Wainwright, and Pt. Barrow, on the other hand, continued to do their harvesting mainly in the summer.

Although the 1963 harvest was somewhat above the average of about 1300 taken during the past few years, it is not considered excessive. A limit imposed on the number of females which may be taken (residents may take up to five females, nonresidents males only) should gradually promote further recovery of the walrus population.

Seals

There are four kinds of "hair" seals in Alaskan waters. The most numerous of these is the harbor seal, while the largest is the bearded seal or oogruk. The ring seal replaces the harbor seal as the most numerous species along the northwest and Arctic coasts. The ring seal, the rather scarce ribbon seal, and the bearded seal are found only north of the Alaska Peninsula, while the harbor seal (also called spotted seal) is most common south of the Peninsula, though found in all coastal waters from Ketchikan to Barrow.

The hair seals of Alaska have been little studied, and no reliable estimate of their numbers has been made. Bounty records provide some information on the total number of seals taken, but do not indicate the harvest of each species. In fiscal year 1963, almost 24,000 seals were bountied, and the number rose to over 38,000 in 1964. For various reasons,

If all seals would regularly come out on the beach like this to be counted, inventory would be a simple process. Lacking such cooperation, biologists must sometimes use complex sampling methods.

some hunters do not claim a bounty on the seals they take, so the total harvest was somewhat higher than the bounty figure indicates. In the northwest coastal area (from Kuskokwim Bay north), where 11,000 seals were bountied during the 1962-63 hunting year, it was estimated that the total harvest was 16,500 to 18,000 animals.

Partly as a result of a depletion of Atlantic seal stocks, seal pelt prices began rising in 1962 and continued to rise in 1963 and most of 1964. By the end of 1964, the average pelt was probably worth at least $18, and large, well-cared-for pelts were bringing $25 or even more.

Bounty records indicate that for a number of years the seal harvest fluctuated between about 12,000 and 24,000. There has never been a closed season or a bag limit on seals in Alaska, and the population apparently is able to produce a regular annual surplus of this magnitude. What effect the price rise on seal pelts will have on the total population is unknown, but certainly the Department will watch the situation closely. A closed period may be imposed in some areas during the time of year when the pelts are of less than maximum value.

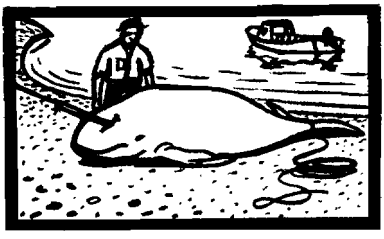
Sea Lion

From Dixon Entrance north and west along the coast to St. Lawrence Island the sea lion is common in Alaska waters. North of the Pribilofs and Bristol Bay, the sea lion is only a summer visitor.

The species found in Alaska is the Steller sea lion, which occurs from California around the coast to Russia's Okhotsk Sea. The world population of Steller sea lions has been estimated at between 240,000 and 300,000; about 200,000 inhabit Alaskan waters at one time or another during the year.

Because in some areas large numbers of sea lions concentrate at certain times of the year, and because these animals often raise cain with fishing gear, efforts have been

made to find some profitable way of utilizing sea lions commercially. Experiments and studies to determine whether the meat--which can be used by fur farms--can be profitably harvested indicated that under present conditions it would be a decidedly marginal undertaking. In 1963, there were definite stirrings of interest in the possibilities of obtaining sea lion pup hides, and some harvesting was done in 1964 by private individuals. The pups, which unlike the older animals are covered with a downy hair which gives the hides commercial potential, can be harvested on a number of rookeries throughout most of the sea lion's range.

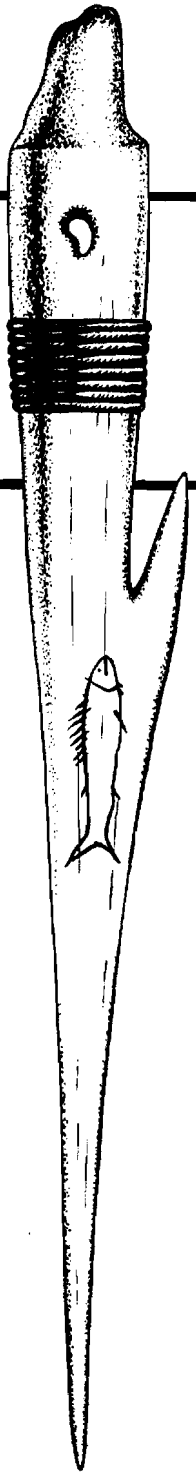


Porpoise and Beluga

The Dall porpoise and Pacific Harbor porpoise occur in Alaska's coastal waters from Dixon Entrance north and west to the Aleutians, while the beluga, or white whale, is most common off the Yukon-Kuskokwim Delta and northward, though some are found in the vicinity of Kodiak Island and Cook Inlet. Both the porpoise and the beluga are members of the whale family.

The beluga is regularly utilized for food almost everywhere it can be profitably hunted in Alaska, while the porpoises are not used at all. Very few studies have been conducted on any of the three species of porpoises, and no one knows much about their distribution or how many there are. They are in no apparent need of management for the production of sustained yield, and the present year-round season and no bag limit are expected to continue in force in the foreseeable future.

PART II-FISH



Anglers, commercial fishermen, and subsistence fishermen regularly catch more than twenty kinds of fish and shellfish in Alaska. Another half-dozen or so species provide more sporadic, but sometimes locally important, food, sport, or profit. Some species are taken almost exclusively for sport, for subsistence, or for commercial purposes, but many other are taken for two or all three of these purposes.

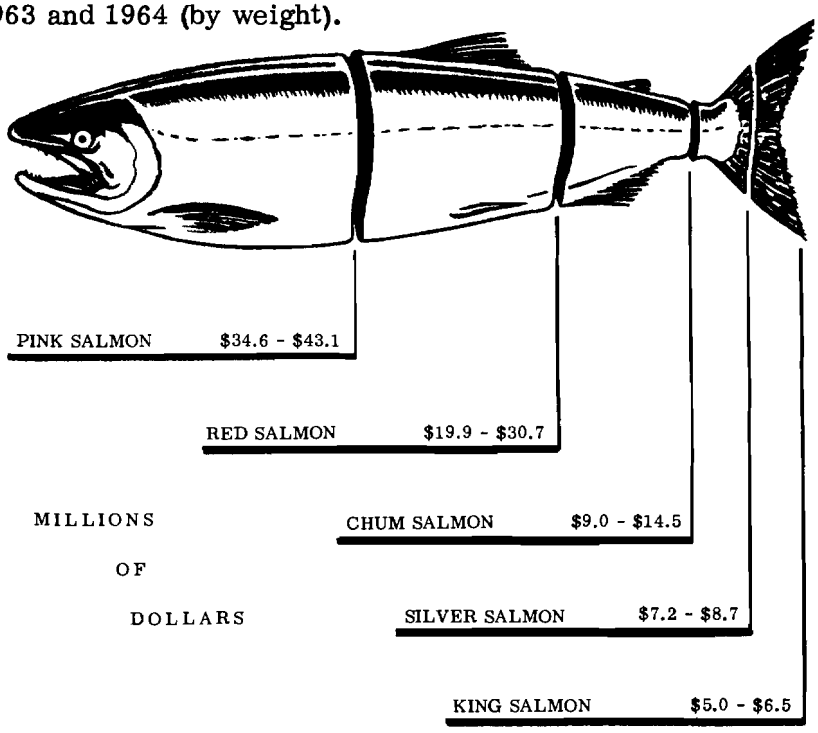
No species of fish in Alaska is classified as a sport, commercial, or subsistence species; it's the method and the purpose of taking that are classified. "Commercial fishing" means taking for profit or commercial trade or barter. "Sport fishing" is taking by hook and line or certain other methods for recreation and personal use only; and "subsistence fishing" means taking for personal use (and for dog food for sale or barter in the Arctic) by means of nets, fish wheels, and certain other methods which are prohibited when sport fishing. Thus a king salmon, for example, is not a "commercial fish" nor a "sport fish," but is taken for commercial purposes or by sport fishing methods, or for subsistence use.

In each of the last two years over 63,000 anglers participated in the sport harvest of Alaska's fishes, while almost 18,000 commercial fishermen harvested $109 to $141 million worth (wholesale value) of finned and shelled sea creatures. About 27 per cent of the sport fishermen came from other states and from foreign countries, while 37 per cent of the commercial fishermen were non-Alaskans. Permits for subsistence fishing are required only in certain areas, so there is no record of the number of subsistence fishermen in Alaska in 1963 and 1964.

Detailed statistics are kept on the commercial take of fish in Alaska and on those taken for subsistence purposes under authority of a permit, but not on the sport harvest except where knowledge of the number taken is important for proper management. Surveys of the more intensively fished waters, rather than compulsory statewide reporting as required of the commercial fishing industry, provide information needed for sport fish management.

The 1963 commercial fisheries catch in Alaska was almost 400 million pounds, and the 1964 harvest amounted to nearly 500 million pounds in spite of the earthquake. About three-fifths of the catch was salmon (57 % in 1963 and 64 % in 1964) while shellfish constituted 27 per cent of the catch in 1963 and 22 per cent in 1964. A number of species made up the remainder. Over half of the salmon catch was pink salmon, while king crab constituted three-fourths or more of the shellfish harvest.

Where statistics are available on the sport fish catch and fishing effort, they show that the chars (mainly Dolly Varden, but also Lake trout and Arctic char) receive a major share of attention, with trout and salmon of about equal importance and grayling third. The silver (coho) and king salmon are by far the most important members of the salmon family in the sport fishery, in contrast to the commercial catch where they made up, together, only 10 to 12 per cent of the total salmon take in 1963 and 1964 (by weight).

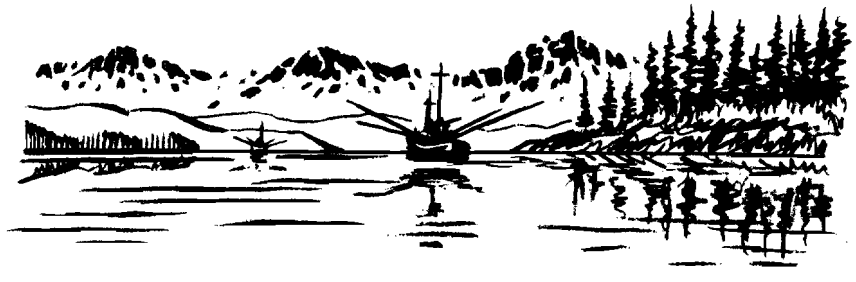


The pink or humpback salmon led the salmon pack in total value in both 1963 and 1964. This chart shows the comparative market values of the five salmon species: the first figure is 1963, the second, 1964.

SALMON

Five species of salmon--king, coho, red, pink and chum--are found in Alaskan waters. All are born in fresh water, grow to adulthood in the ocean, and return to fresh water to spawn and die. The amount of time spent in fresh water before migrating to sea, and the time then spent in the ocean before returning to the parent stream or lake to spawn, vary considerably not only by species but to some degree within each species. All Pacific salmon, though, either spawn or are caught by the time they are seven years old. One or two years in fresh water is normal (except for pinks and chums which migrate to sea after emerging from the gravel) and then from one to four years may be spent in the ocean.

The king salmon is the largest of the five Pacific species, while the chum salmon is the most widely distributed, and pink salmon the most numerous. The sport fishing harvest is mainly of kings and cohos--mostly taken in salt water but also taken in fresh water where salt water fishing is not practical --while pinks, chums, and reds make up the great bulk of the commercial take (88% in 1963 and 90% in 1964, by weight).



King Salmon

The aptly-named king salmon, also known as the chinook, is found from extreme southeastern Alaska all round the coast (and in many rivers, during migration) as far north and west as Kotzebue Sound. The Southeast Panhandle is a main center of abundance, though large numbers also migrate up the Yukon and Kuskokwim every year, and a fair number are also taken in Bristol Bay. In Cook Inlet king salmon numbers have declined considerably in the last decade and late in 1963 the Board of Fish and Game was forced to close this area to the taking of king salmon. Elsewhere (with local exceptions) the Alaskan king salmon appears to be at least holding its own, and few drastic measures are expected to be necessary to protect the stocks until present research efforts bear fruit by indicating ways to increase them. It has been found necessary, though, to impose a one-to-three-fish bag limit on the sport harvest in addition to providing weekly closed periods on the commercial harvest, and to close southeastern Alaska to all king salmon sport fishing in fresh water.

Southeastern Alaska, from Dixon Entrance north to Cape Fairweather, is the area where both anglers and commercial fishermen take the majority of the king salmon caught in Alaska. This region produced a commercial catch of almost 259,000 king salmon in 1963 and over 357,000 in 1964, compared to about 242,000 (1963) and 282,000 (1964) taken in all the rest of the state. The annual sport harvest was estimated at about 10,000 kings, this being probably about 75 per cent of the statewide take. Except in the Panhandle, most king salmon sport fishing is in freah water rather than salt water, because good salt water fishing isn't accessible to anglers.

The king salmon is the least abundant as well as the largest of Pacific salmon. It is also the most valuable individually and per unit of weight; in 1963 and 1964 commercial

fishermen received an average of over 30 cents per pound, or about $ 6 per fish, for kings, while no other species returned more than an average of 20 cents per pound and $ 1.50 per fish. In southeastern Alaska, kings sold for an average of almost 50 cents per pound, and over $ 8 per fish.

Although no exact figures are available for sport-caught king salmon, it's highly probable that their value for this purpose is at least as great as their commercial value, and perhaps even larger, for sport fishermen spend large amounts of money in the pursuit of their quarry.

Coho

The coho, or silver salmon, is Alaska's most widely distributed salmon, occurring from Dixon Entrance north at least as far as Kotzebue Sound. It rivals the king salmon in importance to the sport fishery, and in commercial value it was also approximately equal to the king, as well as the chum salmon, in 1963, at just over three million dollars (value to fishermen: the wholesale value was $ 7.2 million, compared to about $ 5 million for kings and $ 9 million for chums.)

Current commercial fisheries statistics show that southeastern Alaska is by far the most important coho producing area. The southeast catch was almost 1.3 million fish in 1963, compared to 627,000 taken in Central Alaska and only 120,000 in the Western region: the proportions were comparable in 1964. The northern half of the Panhandle produced the major portion of the 1963 silver salmon catch. This area is also a prime coho area for salt water sport fishermen, as is Resurrection Bay near Seward. Cook Inlet is the major fresh-water coho sport fishing area in Alaska.

The condition of silver salmon stocks in Alaska can be illustrated to some extent with commercial catch statistics. The landed (round) weight of the 1964 catch, at almost 21 mil-

lion pounds, was the highest since 1954, when 22.5 million pounds were caught, and was also the fourth consecutive year of increased catches, starting from a low of 9.5 million pounds in 1960. The 1963 catch was over 17.5 million pounds.

The Resurrection Bay coho sport fishery is the largest in southcentral Alaska. Coupled with a small commercial fishery which takes about 22 percent of the total, this intensive harvest has evidently caused some depletion of local coho stocks. The 1963 sport catch of just over 7,000 silver salmon was only half the 1962 harvest, for example, and while ups and downs are normal in year-to-year salmon catches, the recent trend appears downward in Resurrection Bay. In 1963, Bear Lake near Seward was "rehabilitated"--treated with a toxicant to remove all fish--and then restocked with 150,000 young silver salmon. Another 43,000 were stocked in 1964. The lake outlet was blocked to prevent reinfestation with undesirable fish which would compete with the cohos. The control structure is built so that ingoing and outgoing fish can be counted each year.

Bear Lake has the greatest salmon-rearing potential in the Resurrection Bay area. If the project is successful, coho runs in the Bay could be markedly increased. It was encouraging to see that some 8,000 one-year-old cohos migrated to sea in 1964: very few cohos of that age had been migrating from Bear Lake before the rehabilitation.

Pink Salmon

Pink or humpback salmon are the most numerous of the five salmon species in Alaska: of the 47.5 million salmon caught commercially in the State in 1963, over 34 million were pink salmon; a similar ratio prevailed in 1964.

The "humpy" is almost entirely a commercial fish the sport catch is small and incidental. It migrates to sea right

Habitat inventory may lead to attempts to increase stocks. This "steeppass" fishway, developed by a Department engineer, provides access to spawning area previously blocked by waterfalls. Unique baffle system, shown in lower photograph, slows water flow enough to let salmon swim up in spite of steep pitch of the fishway.

after hatching and then spends the rest of its two year life cycle in salt water before returning to spawn. In no other species can the results of proper management be assessed so soon.

Of course, just as many variables can affect pink salmon production and catches as affect the other salmon: eggs can be smothered with silt, fry can be swept to sea before they're ready, and many unknown factors can decimate a population in the vast reaches of the sea. The difference is that these factors (except those which affect eggs and very young fish) don't have as long to operate as they do on other salmon.

Pink salmon occur in Alaska from Dixon Entrance north and west around the coast to Kotzebue Sound. In 1963, Southeast Alaska produced just over 19 million of the almost 34.3 million-fish harvest, while slightly under 15 million were caught in Central Alaska (Cape Suckling and westward along and around the Alaska Peninsula to Cape Menshikof, and including the Aleutians) and about 154,000 in Western Alaska (from the north side of the Aleutians and the Alaska Peninsula on northward). In 1964 the proportion of pinks caught in the Southeast was a bit smaller: 18.6 million compared to a bit over 45 million for the rest of the state.

The State's management of pink salmon since 1960 (when Alaska first acquired the right to manage her own resources) has borne fruit rapidly. The 1963 harvest was more than 40 per cent above the average for the previous ten years, the 1964 take was even higher, and good production is expected to continue. And this is more than just "government optimism": the predicting of salmon runs (so that canneries and fishermen can gear up to make full use of "surplus" fish) has been the object of much research lately and pink salmon run forecasting, in particular, is becoming more and more reliable.

Red Salmon

The red salmon has about it an aura of glamour not pos-

sessed by the other Pacific salmon species. Why this should be so is not fully explainable: reds are only the second most valuable per unit of weight (after kings), only the second most numerous (after pinks), are no more widely distributed than the other species and average only about fourth largest, just ahead of the pink salmon. Perhaps the euphonious name of "sockeye" salmon has something to do with it, or maybe it's because the sockeye long provided the greatest yearly commercial value of any salmon. Whatever the cause, the red salmon in the eyes of many is the salmon.

The sockeye, like the pink and chum, is almost entirely a commercially-caught fish. It occurs in Alaska from the waters of Dixon Entrance to Norton Sound, but is not common north of the Kuskokwim River. Unlike other salmon it spawns in lakes as well as streams, seeming to prefer the former. For this reason and because the juveniles require a lake for rearing, Bristol Bay's lake-surrounded waters are the world's greatest sockeye salmon producing area. Even in 1963, when the Bristol Bay pack was the smallest in recorded history, nearly half of Alaska's sockeye pack was put up there--and the Alaska pack was some 80 per cent of the United States total.

About 35.5 million pounds of sockeye salmon were caught in Alaskan waters in 1963. On a case pack basis this was __ per cent of the total Alaska salmon pack: the extent of the "disaster" at Bristol Bay is shown by the fact that over the previous ten years, the red salmon pack averaged about 30 per cent of the salmon pack and at times approached 50 per cent. The true causes of the 1963 run failure are still unknown.

Outside of Bristol Bay the 1963 and 1964 red salmon harvests were fair, being a bit under the average for the previous four years in 1963 and a little over the same average in 1964. Cook Inlet was as usual second only to Bristol Bay in total catch, with 74,185 cases packed in 1963 and 74,700 in 1964. (A standard case consists of 48 one-pound cans).

Because red salmon live up to seven years, it will be several years yet before the results of State management, begun in 1960, will be really evident. Nevertheless, the sockeye should be on the way back to abundance.

Chum Salmon

The chum or dog salmon is the most widely distributed of the five Pacific salmon species, entering practically every stream in Alaska between Dixon Entrance and Demarcation Point. This distribution causes it to be widely used for subsistence in the less-populated parts of the State, and its importance is greater than its volume in the commercial pack (16 per cent in 1963 and 20 per cent in 1964) would indicate. Only a few chum salmon are caught by sport fishermen.

Of some 4.5 million chum salmon commercially caught in Alaska in 1963 and 7.3 million in 1964, over half were taken in the Central region--from the south side of the Alaska Peninsula east to Icy Cape. Most of the remainder, just under 1.5 million in 1963 and slightly over 1.9 million in 1964, were taken in southeastern Alaska, while about 15 per cent (635,000 in 1963 and almost 1.2 million in 1964) were caught from the north side of the Alaska Peninsula and northward.

Partly because it is the least valuable of the salmon (per unit of weight) the chum salmon is the least studied of the five Pacific salmon. (Of course, research on the other species will yield information which will also be useful in the management of chums.) Probably the main reason that chum salmon are of comparatively low value is because the flesh is pale pink to yellowish, rather than "salmon colored." This has no effect of course on the quality of the flesh; it's just that housewives have become conditioned to salmon being of the "proper" color, and refuse to pay as much for salmon of any other hue. The same prejudice operates against the sale of white-fleshed king salmon, though there is no difference in food quality or taste between it and kings with red flesh.

Though the chum salmon may be less valuable than other species when canned, it is especially valuable--because of its availability and its suitability for smoking and curing--to people in remote areas who rely on it for winter food for themselves and for their dog teams. Many thousands of pounds are smoked and cured along the Yukon and other rivers every year.

TROUT

Alaska's seven kinds (by one method of reckoning) of trout are not all really trout according to the books. The lake trout and the Dolly Varden, as well as the Arctic Char, are classed as char by scientists, some of whom maintain that the "dolly" and Arctic Char are the same species, and all of whom regard the Steelhead and rainbow trout as the same species. In other words, there are either three or four or five or six or seven kinds of trout in Alaska, depending on who's doing the classifying. Leaving scientific considerations aside, anglers in Alaska commonly refer to the cutthroat, Dolly Varden, steelhead, rainbow, Arctic char, lake trout, and brook trout as trout. All except the brook trout, an eastern import, are native Alaskans.

The Dolly Varden-Arctic Char is the most widely distributed and most numerous "trout" in Alaska by far, while the Steelhead is the largest (at least in average weight). Except for the lake trout and the Dolly, Alaska's trout are mainly found near the coast, not occurring much north of the Alaska Range. Except for the lake trout and brook trout all of these species are anadromous - they're born in fresh water and spend part of their lives in salt water. (Some people say that Arctic Char spend their entire lives in fresh water and that this is the difference between Arctic Char and Dolly Varden Char, but that has not been proved).

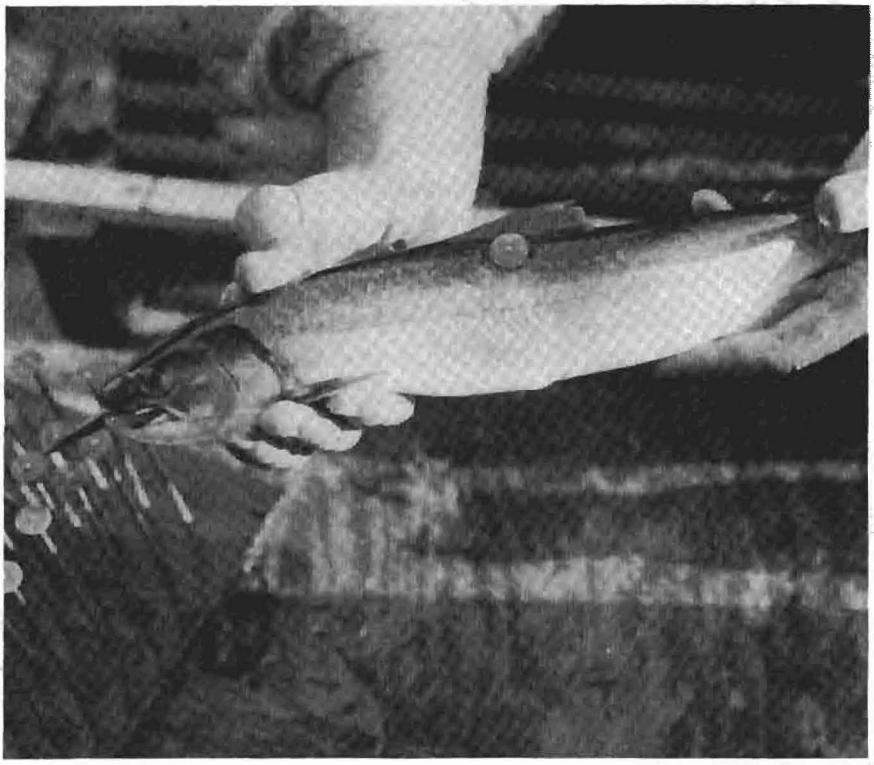
In 1963, 3600 lbs. of Dolly Varden, 16,330 lbs. of steelhead, and 1,650 lbs. of lake trout were caught for commercial purposes in Alaska: the 1964 figures were 6,550 lbs. of Dollies, 10,140 lbs. of steelhead, and 4,450 lbs. of lake trout. Almost all of the steelhead take consisted of fish taken unintentionally in salmon nets. The commercial take is small, all trout being taken mainly for recreational purposes, though at one time steelhead were fairly important in the commercial fishery.

Rainbow-Steelhead

The rainbow trout and its sea-run brother the steelhead are among the most prized of all sporting fish. These fish are aerialists; and the delighted whoops of a dedicated angler are never louder than when the fish on the end of his line is leaping and twisting out where he can be seen.

The rainbow-steelhead is found in Alaska from Dixon Entrance around the coast to the streams draining into Bristol Bay. It's not found in the Aleutians, nor the streams of Prince William Sound. In most 'steelhead streams' there are 'resident rainbows' which stay in freshwater streams all year. In southeast Alaska, however, comparatively few of these are taken, and mostly steelhead are caught in the Panhandle. There are of course, many streams and lakes in which all the rainbows are freshwater residents all year 'round.

Among the streams in Alaska particularly noted for steelhead fishing are the Naha and Karta Rivers near Ketchikan; the Situk River at Yakutat; the Anchor, Ninilchik, and Russian Rivers and Deep Creek on the Kenai Peninsula; and the Kvichak, Naknek, and Copper Rivers, Talaric Creek, and Lake Iliamna tributaries in the Bristol Bay area. Steelhead populations in these places--which in the aggregate provide fishing area equal to the entire land area of some states--are apparently holding up well in the face of increasing fishing pressure. One stream, Peterson Creek near Juneau, has been depleted of steelhead only because conditions prevent more than a few fish from spawning each year. To provide a renewed steelhead run in Peterson Creek, in spite of the fact that several waterfalls keep the fish from reaching the lake at its head, the Department is planting young steelhead in Peterson Lake each year. These fish are expected to migrate to sea, (the falls block upstream, but not downstream, migration) and then provide a good sport fishery on their return into Peterson Creek. A preliminary assessment of results should be possible in the spring of 1965.



The Peterson disk tag is one of several methods of marking fish to provide information on migration and movements, population characteristics, spawning, and other facets of fish life history.

Among Alaskan streams providing top-drawer rainbow fishing are the Moose, Swanson, and Russian Rivers on the Kenai Peninsula, the Deshka River, Lake Creek, and Alexander Creek in the Susitna area and the outlets of the Wood, Nushagak, Kvichak, and Naknek Rivers and their connecting lakes in Bristol Bay. The Gulkana River along the Richardson Highway is very popular. Stocked rainbows provide good fishing in Johnson and Scout Lakes on the Kenai, in Finger, Echo, and Bonnie Lakes in the Matanuska Valley, and in Jan, Craig, and Lisa Lakes in the Interior. Many other lakes and streams provide excellent rainbow fishing also, some being less known only because they are relatively inaccessible.

Like the steelhead, the rainbow is holding up well under current fishing pressure. As pressure increases, results of the Department's research programs should help to increase productivity to meet it.

Dolly Varden-Arctic Char

While those scientists who specialize in classification continue to argue about the relationship between Dolly Varden and arctic char, anglers go on rapidly catching one or the other, or both, and calling them what they please. Highly colored fish are frequently called Arctic char, while those without fancy hues are called Dollies; actually, the males of both species (or subspecies, or races, depending on which authority you believe) assume gaudy red, white, pink, and green vestments during the spawning period, so color is no distinguishing characteristic.

One recent authority says that Arctic char range from Arctic Alaska (and Canada) south to the Gulf of Alaska, and the Dolly Varden char (for it is a char, not a trout), while also found in Arctic Alaska, ranges further south, to California. According to this authority, the Arctic char's red spots are about the size of the fish's eye, while the Dolly has smaller-than-eye-size spots.

Whatever the true classification may be, the two fish together are most certainly more widely distributed, and probably are more numerous, than all the other chars and trouts in Alaska put together. There is hardly a lake or stream in the State that doesn't have 'Dollies' in it, at least during part of the year.

The Dolly Varden (and probably some races of the Arctic char also) is anadromous--it normally spawns in fresh water, and does part of its growing up in the sea. One school of thought holds that landlocked fish are Arctic Char, while the sea-run variety are all Dollies, but this hasn't been proved. At any rate, the Dolly-Arctic char is certainly able to thrive wherever it's found. Sea-run fish do, on the other hand, sometimes grow considerably larger than those which are landlocked.

As the Dolly continues to provide excellent fishing in the

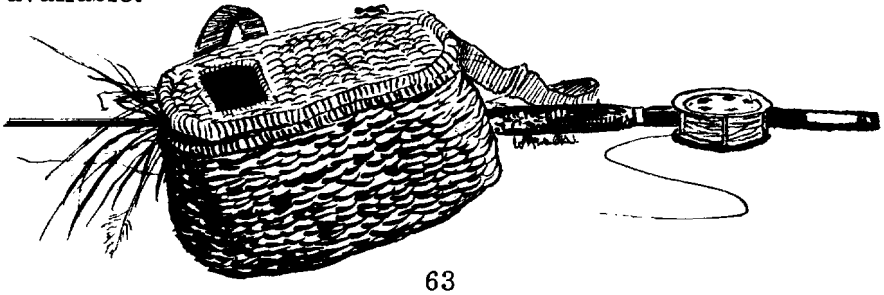
face of mounting pressure, appreciation of its sporting and culinary qualities continues to rise. At one time, (partly because commercial fishermen believed it preyed heavily on salmon eggs, and partly because of its very numbers) it was regarded as only a cut or two above a 'trash fish' in some parts of Alaska. The last vestiges of this undeserved reputation are certain to disappear in the near future, for the Dolly seems better able to hold its own than any other sporting member of the salmon-trout family.

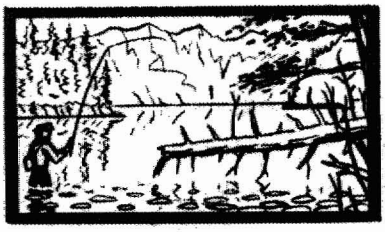
Brook Trout

Like the Dolly Varden, the "brookie" is a char, rather than a trout. The difference between trout and char is mainly a technical matter, however--trout have teeth on a bone in the roof of the mouth, and often have black spots on the body, while chars do not--and since it looks like a trout, anglers are unlikely to begin calling it the brook char.

The brook trout is the only member of the salmon-trout family which has been successfully transplanted to Alaskan waters. Its distribution is limited: brookies occur in Salmon Creek reservoir near Juneau, Lower Dewey Lake near Skagway, in Swan, Green, Hart and Thimbleberry Lakes near Sitka, and in the Ketchikan area's Ward Creek Lakes. The original stocking was done by the federal government in Territorial days.

Fishing pressure on the brook trout in Alaska is light at present, and having no apparent effect on the number of fish available.



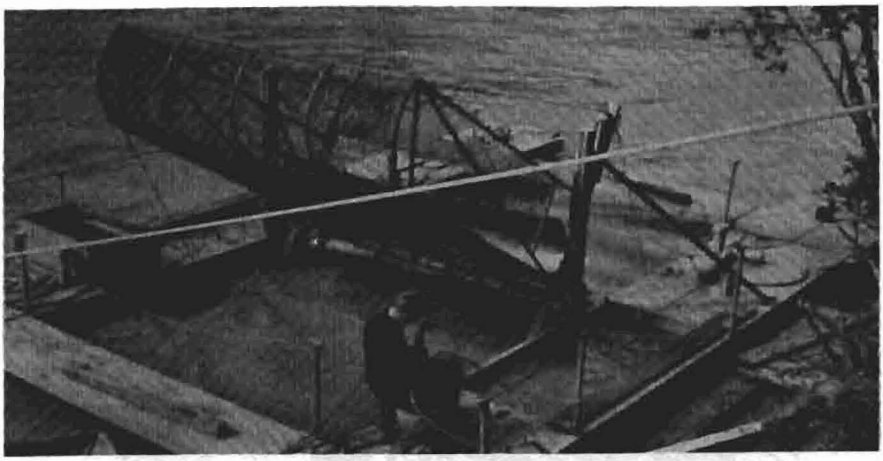


Lake Trout

The lake 'trout,' too, is a char, and like the brook trout is entirely a fresh water species. It is not found in southeast Alaska.

The lake trout or mackinaw is usually found where its name indicates it will be, though it can sometimes be taken in streams at the outlets of lakes. Many of the larger central- and interior-Alaska lakes support mackinaws, from Bristol Bay (including Naknek, Iliamna, Kukaklek, and Tikchik Lakes) to the Copper and upper Susitna River Basins (Lake Louise, Paxson, and Summit Lakes are accessible by road, and mackinaws are found in many other lakes in this area also); even the Arctic provides good lake trout fishing, in such lakes as Walker and Chandler.

Even in those few Alaskan lakes that are accessible by road--Lake Louise possibly excepted--the State's lake trout are not heavily fished. Nothing approaching the hundred-pound mark, such as are occasionally caught in the Great Lakes area, has ever been taken in Alaska, but there could well be some giants in the many lakes here that have hardly been fished at all.



Sometimes old methods can be useful for inventory purposes. An Indian fishwheel was the model for this modern metal one on floats. River current provides the power for sampling fish runs by this old-new method.

Cutthroat

The cutthroat trout is the most confirmed southerner among Alaska's salmon-trout family representatives. The northern limit of its range is the Eshamy Lake area, on Prince William Sound; this is also the western limit, except for a reported population on Kiska Island, in the Aleutians.

Like so many of their relatives, most cutthroats are anadromous wherever opportunity affords, but are capable of both good growth and reproduction when confined entirely, whether by necessity or "choice," to fresh water. Many streams in Alaska therefore provide year-round cutthroat fishing, as well as spawning-run angling during the spring and early summer.

Within the range of the cutthroat in Alaska, only the Dolly Varden is more numerous. There is good-to-excellent cutthroat fishing near almost every town within its range, and at Sitka, Swan Lake even provides top-drawer angling within the city limits! Their ready availability has not caused a decline of cutthroat stocks in the State, partly perhaps because the availability of salt-water angling for king and coho salmon in southeastern Alaska keeps fresh water streams from being overfished.

These small fish are being counted on their way to sea. Some will be marked before continuing their journey, and will then provide vital information on return one to five years later.

SHEEFISH

Once one of Alaska's least-known sporting fish, taken mainly by the Eskimos of the northwest coast, the sheefish has in the past few years been building up a well-deserved reputation as something very special for the angler. Appreciation of its culinary qualities has been growing also, for equally good reasons. Improvements in transportation have brought the somewhat restricted range of the sheefish within reach of more and more fishermen.

A large member of the whitefish family, the sheefish is called 'white salmon' in Russia and Inconnu (French for 'unknown') in much of the Canadian portion of its range. In Alaska, it is sometimes caught in fishwheels far up the Yukon, and a few occur in the lakes of the Bristol Bay area, but the center of abundance is Kotzebue Sound and the rivers draining into it: the Kobuk, Selawik, and Noatak, and a few other streams.

Though anglers are taking increasing numbers of sheefish, and a few are taken for commercial purposes, their main use is still for subsistence. For this purpose, they are caught in nets and fishwheels set mainly to catch salmon. Up to four feet long and fifty pounds or more in weight, they may provide as much food as six or seven chum salmon. Near Kotzebue, sheefish are caught through the sea ice by jigging, mainly in late winter and early spring; this fish spawns upriver, and spends most of the remainder of the year in brackish water or inshore saltwater (or in large lakes when landlocked or far from the sea).

The sheefish has been little studied, and the full effect of the fishery on available stocks is not known. No diminishing of numbers has been noted, however.

GRAYLING

The large, colorful 'sail' which is the grayling's dorsal fin, the remote northern habitat of the species and its association with the purest sparkling waters, and a delicate flavor combine with sporting quality to give this fish an allure that is unique. Other Alaskan fish may be bigger, or more free-wheeling on the end of a line, or more colorful, but somehow the grayling retains an air of graceful, almost dainty distinction attainable by few other fish.

Alaska's grayling is entirely an angler's fish, being taken neither for commerce nor subsistence. With the species being considered extinct in Michigan, Alaska and Montana are the only States where grayling now are found, and Alaska has by far the larger stock. The fish's confinement to northern waters still leaves it with a tremendous range around the world. In Alaska, it is more widely distributed than any other sporting fish except perhaps the Dolly Varden-Arctic char. There are no grayling on the Aleutians, and they don't occur naturally in southeast Alaska or on the Kenai Peninsula, but in the State's remaining half-million square miles, most of the habitable clear-flowing streams and lakes contain grayling.

Transplants in 1963 and 1964 have resulted in establishing the species in southeast Alaska waters where it did not previously exist. In spite of its penchant for disappearing from waters containing pollution, there is no record of the desertion of any Alaska stream.

Now considered to be a member of the salmonid family along with the salmons, trouts, chars, and whitefish, the grayling is not a large fish, the world record being a five-pounder taken in Canada's Great Slave Lake in 1959. Two to three pounders running around 20 inches or so are fairly common

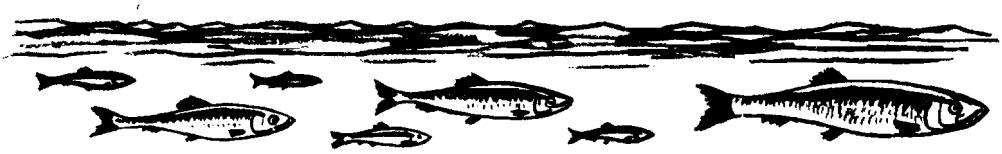
in Alaska. Bristol Bay's Tikchik and Ugashik River drainages probably contain the most record-breakers. The grayling has been as intensely studied as most any other fish in Alaska except the salmon, and if the State's stocks of this remarkable fish ever show signs of depletion, the knowledge to determine why and to apply corrective measures is almost certain to be at hand.

NORTHERN PIKE

The Northern Pike is a fish of the shallow, weedy interior lake areas and river sloughs. It's not found in the drainages into the Gulf of Alaska, in southeastern Alaska, or the Aleutian Chain, or (with a few local exceptions) on the Arctic slope of the Brooks Range. The myriad streams, sloughs, and lakes of the enormous Yukon and Kuskokwim Valleys, and the drainages into Kotzebue Sound, are home to Alaska's pike, and may someday yield a North American record fish, when and if anglers make some real effort to take the species.

Were there less competition in Alaska, the pike would undoubtedly be the esteemed angler's adversary here that it is in the midwest and parts of Canada. Here, anglers devote themselves so singlemindedly to other fish that even the distribution of the pike is imperfectly known. If a fish to match the 100-pounders of northern Europe and Asia is ever caught in one of the many Alaskan lakes where legend claims the existence of giant pike, anglers will undoubtedly begin furnishing distribution data at an accelerated pace. In the meantime, Alaska's sole representative of the pike-pickerel-muskellunge family will undoubtedly continue to furnish rare sport for those who pursue it, and considerable quantities of food for those who inhabit the remote parts of its range.

The length of a fish in relation to its age can reveal a great deal about the habitat. Good habitat provides fast growth. Habitat improvement is important in modern fishery management.



HERRING

Herring are circumpolar in distribution and closely related forms are to be found in most northern waters of both the Atlantic and Pacific Oceans. These small fish attain lengths up to 13 inches and occur in enormous schools. The schooling habit and the tremendous numbers of individuals involved have been the basis for some of the oldest and most important fisheries in the world. In addition to their direct commercial importance herring also are of great indirect importance as a food supply for many other commercially important predacious species of fish such as king and coho salmon, cod fish and halibut. They are also extensively preyed upon by whales, seals, sea lions, birds, and by other fishes.

Herring occur in commercial abundance in virtually all coastal areas of Alaska, and in past years fisheries have taken place along the Alaska Peninsula, Kodiak, Cook Inlet, Prince William Sound and southeastern Alaska. During recent years, however, including 1963 and 1964, the commercial fishery has been restricted to southeastern Alaska because of economic and marketing problems.

Even in Southeastern, the herring fishery now is of minor importance compared to the other species. There are three segments:

1. Purse seining for reduction to meal (for animal food) and oil (for paint, as a food additive, and other uses);
2. Purse seining for halibut, sablefish and salmon bait; and
3. collection of herring spawn on kelp for human consumption.

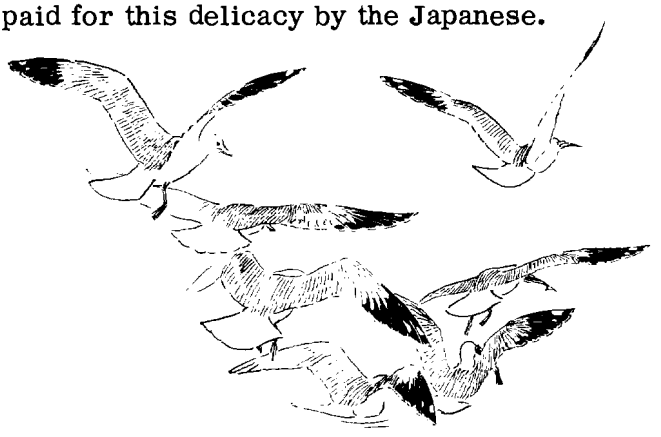
The reduction fishery once flourished in Kodiak, Prince William Sound and Southeastern Alaska. In 1963 only one plant, located in Washington Bay on Kuiu Island, was operated. Four boats landed a total of 13,522 tons of the 35,000 tons quota in 1963. This quantity of fish, taken mostly in the western portion of Frederick Sound, the southern portion of Chatham

Strait, and Larch Bay on the west side of Baranof Island, was sufficient to keep the plant running at near capacity throughout the season.

In 1964, two reduction plants operated and a fleet of nine boats landed a total catch of 22,128 tons at the two plants out of a catch quota of 35,000 tons. Economic and marketing problems, rather than abundance of herring, are the limiting factors for this fishery at the present time.

The bait fishery is centered in the Ketchikan area, where seiners took 2,897,830 pounds of herring in 1963 and 3,218,591 pounds in 1964. Most of this catch was frozen in Ketchikan, although a small quantity was taken to Petersburg for freezing. Minor quantities of bait were taken in both 1963 and 1964 near Juneau, and in the Sitka area. The live pound in Indian Cove north of Juneau was operated again in 1963 and 1964, and supplied fresh bait to halibut fishermen, trollers, and sportsmen. A small quantity of selected herring from this pound was specially frozen and processed and exported for sport fish bait in the "outside" states.

The herring egg and kelp fishery was concentrated in the Craig area during 1963 and 1964. The open season extended from April 3 to April 16 in 1963, and in this short time 200,176 pounds of herring eggs and kelp were collected; in 1964 the harvest was 398,686 pounds. The entire production was processed in Petersburg. Interest in this small but unique fishery has been growing because of great demand and high prices paid for this delicacy by the Japanese.



HALIBUT

Pacific halibut, which are closely related to the Atlantic species, are found in all waters of the eastern Pacific from Southern California to the Bering Sea. The greatest population densities are to be found in the Bering Sea and the Gulf of Alaska. Females, which are larger than the males, may attain weights close to 500 pounds and lengths in excess of eight feet. While chiefly of importance as a commercial species, salt water sport fishermen trolling for salmon commonly take halibut; frequently to the consternation of the angler because boating and disposal of a large halibut can be a formidable problem.

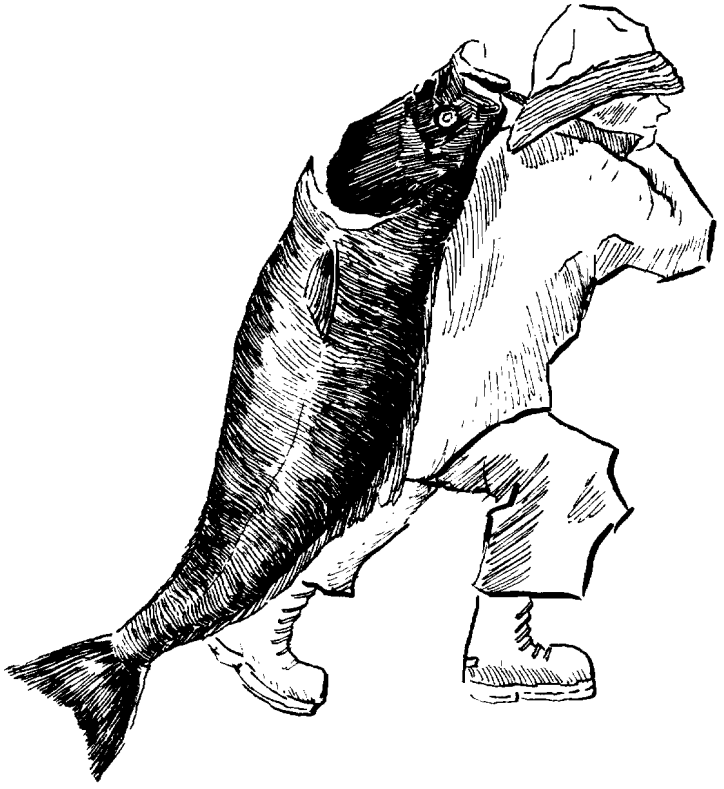
Halibut fishing in most North Pacific waters is regulated by the International Pacific Halibut Commission. This commission, which is composed of Canada and the United States, started out in 1923 as an investigating agency; it later acquired regulatory powers and has managed the halibut fishery of the Northeast Pacific since 1930.

The Commission has divided the eastern North Pacific into three regulatory areas. Opening and closing dates, and quotas in most areas, are set so as to provide as high a harvest as possible without risking overfishing in any area.

In 1963, halibut fishermen landed 28,707,000 pounds of halibut worth over $ 5.3 million, at Alaskan ports, and in 1964 the total was 21,620,000 pounds worth $ 4.4 million. Nearly two-thirds of the landings were made at southeastern Alaska ports. The North Pacific catch landed at ports in California, Oregon, Washington, British Columbia, and Alaska amounted

to just under 75 million pounds in 1963 and 60 million pounds in 1964. The Japanese, participating in the eastern Bering Sea halibut fishery for the first time in 1963, took 3.6 million pounds in that year and 3.4 million pounds in 1964. A scarcity of fish evidently cut the Japanese effort short.

Most halibut in the eastern North Pacific are taken by long-line vessels which ice their catches and stay out for ten to fourteen days per trip. Some are taken by smaller long-liners making short trips and a few are caught by salmon trollers. The Commission does not allow nets to be used for taking halibut.



SHELLFISH

The phenomenal rise in Alaskan shellfish production over the past decade is mainly due to development of the king crab fishery, and to a lesser extent to expansion of shrimp fishing. In the last two years, a resurgence in the dungeness crab pack has contributed substantially to the rise, but on the other hand razor clam production has declined sharply. Alaska's other shellfish with commercial potential--tanner crabs and hard-shell clams--continue to be harvested only at very low levels for reasons quite unconnected with their availability.

The 1963 Alaska shellfish harvest amounted to some 106.5 million pounds, landed weight, with a value to the fishermen of just under 10 million dollars; in 1964 the harvest was 107.3 million pounds also worth 10 million dollars to the fishermen. The market weight of the products was about 25 million pounds in 1963 and 29.9 million pounds in 1964, with a wholesale value of almost a dollar a pound. In comparison, the 1953 landed weight was only slightly more than 11 million pounds, with a value to the fishermen of around $1.1 million. Shellfish accounted for 27 per cent of the landed weight of commercially caught fish in Alaska in 1963 and a bit under 20 per cent in 1964 compared to less than 3 per cent in 1953.

Of the dozen species of shellfish which do now or potentially can furnish profitable catches in Alaskan waters, one or more may be found in virtually every coastal region of the State. Only the Arctic shelf is an unknown quantity in this regard, and even there commercial quantities of crabs or other shellfish may some day be found. Presently, the western Gulf of Alaska is the main center of shellfish production if quantity and total value are used as the main criteria, but shellfish are highly important all around the coast from Ketchikan to the Alaska Peninsula. Unlike salmon and halibut, shellfish provide year-round employment for the fishing fleets of Alaska.

Crab

Of the State's five crabs with commercial potential, two--the dungeness, and the king crab--are now being harvested on a volume basis. The "blue king" (called the blue crab in Kodiak) now constitutes a fair share of the "king crab" catch, and another species known as the golden king--which belongs to another genus of crabs entirely--has been showing up in Southeastern crab pots with increasing regularity. The tanner crab is presently unutilized because it presents processing difficulties (which are rapidly being overcome) and because no market has been developed for it.

Outside of a relatively small number taken for personal use, Alaska's crabs are entirely commercial species, and brought fishermen almost $9 million in 1963 and $9.7 million in 1964. Crabs constituted 85 per cent of Alaska's shellfish catch in 1963, and over 92 per cent in 1964 when the earthquake cut heavily into shrimp production.

To provide for the perpetuation of crab stocks, Alaskan regulations prohibit the taking of female crabs and softshell crabs, and require that king and dungeness crabs below a certain minimum size be returned to the water. The size limit, which varies by locality and species, allows males to help reproduce their kind for one to three years before being taken, while the prohibition on the taking of softshell crabs protects them when they are moulting and breeding, and of lowered commercial value.

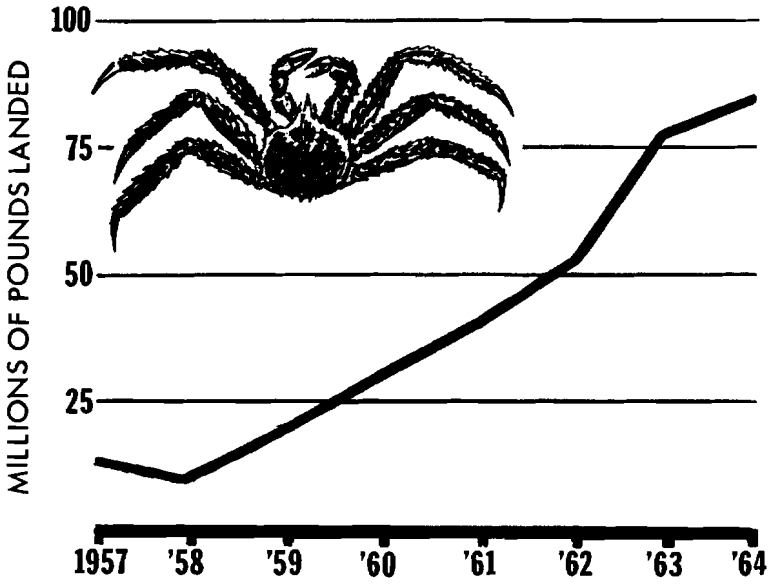
Observation of animals in their own habitat is one of the best ways to obtain information for inventory and other purposes.

Dungeness

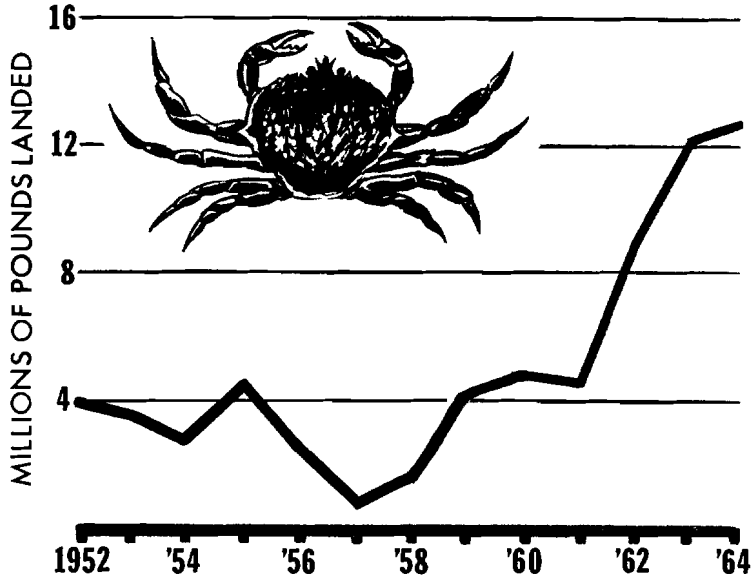
For many years after the inception of an Alaska crab fishery in 1905, the dungeness was taken almost to the exclusion of other species. When the king crab boom started in the early 1950's, dungeness catches started to decline (partly because of increased Pacific Northwest competition), reaching a low of just over a half million pounds in 1957. A resurgence began the next year, however, and by 1964 the catch had risen to 12.7 million pounds, 600 thousand pounds more than in 1963, and the highest catch on record. This far outstripped the declining catch in other Pacific Coast states, though only a few years before, Alaska was only fourth in dungeness production. The 1963 catch was worth $1,357,540 to Alaska's fishermen, and they earned $1.5 million from their 1964 dungeness catches.

The dungeness, one of the largest of North American edible crabs, is found in all the coastal waters of Alaska south of the Alaska Peninsula. About two-thirds of the 1963 and 1964 harvests were taken from Central Alaska coastal waters, mainly in the area from Kodiak eastward, with the other third being harvested in southeastern Alaska. Minimum size for dungeness crab in any area of Alaska is six and a half inches across the back, with a seven inch limit in effect in the Kodiak area. In much of the state, overfishing is further prevented by restrictions on the number of crab pots which may be used by any one vessel. Crab pots are the only legal means of taking dungeness crabs in Alaska.

Of Alaska's 4,856,700 market-ready pounds of dungeness crab meat prepared in 1963, only 40,690 pounds were sold fresh, while 4.5-plus million pounds were frozen and 305,350 pounds were canned. Alaska supplied almost half of the total U. S. dungeness crab catch in 1963 and a bit over half in 1964.



King crab landings have been growing rapidly in Alaska since 1957, and may soon reach the 100 million pound mark.



After reaching a low point in 1957, dungeness crab landings in Alaska have been climbing also, and production is now more than four times as high as it was ten years ago.

King Crab

The growth of Alaska's king crab fishery over the past decade has been one of the most spectacular developments in Pacific Coast fisheries of the last half century. From just over four and a half million pounds landed in 1953, the catch rose to nearly 20 times that amount--86.7 million pounds--in 1964. Only the blue crab of the Atlantic and Gulf coasts provided more crab for the American market in 1963 and 1964. The market weight of the 1963 Alaska king crab catch was well over 16, while 1964 production was 23 million pounds: the wholesale value is currently over a dollar a pound.

Alaska "king crab" catch statistics include three kinds of crabs; the red king, blue king or blue crab, and golden king or deepwater crab. The first two are closely related, while the third isn't even a member of the same genus. All three are members of the "lithode" or stone crab family. For marketing purposes, they're all called simply king crabs.

Scientifically, the lithode crabs aren't true crabs, but "anomurans," the outward difference mainly being that the fifth pair of legs is much reduced in size and sometimes tucked away out of sight, so that the creatures appear to have only four pairs of legs (including the front ones which carry big claws) rather than five as in the true crabs. It's doubtful, however, that crab fishermen are going to pay enough attention to such scientific niceties to switch to a name like "king anomurans" when speaking of their catch!

Considered all together without regard to species, king crabs are distributed through a large part of coastal Alaska, from the Panhandle clear around to the Bering Sea. The Kodiak area has long been a main center of the crab fleet, but crabs are also packed at Juneau, Petersburg, Homer, Seldovia, Seward, and several other towns. Due partly to an increasing number of floating processor ships, the Aleutian Islands and Alaska Peninsula area have been producing an increasing number of kings: the 1964 Aleutian harvest of 33.6 million

pounds doubled the 1963 take, and put this area ahead of all others in king crab production.

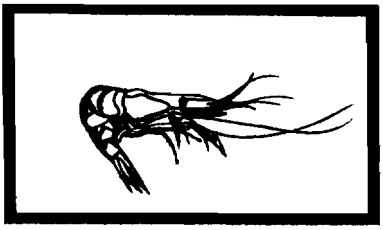
Alaska's king crabs provide the largest amount of edible meat per individual animal of any North American shellfish. A large king crab may weigh over 20 pounds and measure well over four feet between leg tips. Most king crab (almost half) is marketed frozen, removed from the shell. About a fourth or more of the meat is currently canned, while somewhat less than that proportion is sold as whole frozen crab. Frozen sections constituted four to five per cent of marketed king crab products in 1963 and 1964. Only a little over one per cent of the crab harvest is currently marketed fresh.

Tanner Crab

Although exploratory fishing indicates that the highly palatable tanner crab may be the most abundant marketable crab in Alaskan waters, the tanner crab harvest in Alaska is so small as to be almost unnoticeable. The commercial take dropped from 11,000 pounds in 1962 to zero in 1963, and was only 14,000 pounds in 1964.

The low harvests are due mainly to processing and marketing problems. Difficulties in separating the meat from the shell have kept the tanner from being profitable for canning, and the market for frozen crab is dominated by the king and dungeness. Newly developed processing methods give promise of change, if market conditions improve.

There are certainly enough Tanner crabs in Alaskan waters to support a fishery, and they occur all around the coast into the Bering Sea and northward. They are found mainly in shallow water also, mainly by personal-use fishermen. Tanner crabs average a bit smaller than king crabs, but they are considerably larger than dungeness crabs--two and a half feet between leg tips, and weights up to five pounds in some areas, are not uncommon. The amount of meat in relation to body size, and the percentage of meat which can be recovered by processing, are about the same as in the king crab.



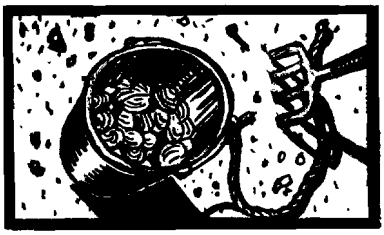
Shrimp

Five species of shrimp--pink, side stripe, coon-stripe, spot, and humpback--are taken commercially in Alaska, but the first three, in about equal proportions, constitute from 85 to 95 per cent of the total harvest. The spot or prawn shrimp is the largest, some growing to nine inches. The side stripe or giant red shrimp may reach eight inches.

The shrimp fishery is one of Alaska's oldest, reaching back to 1915 when a small operation started in the Petersburg area. Until a few years ago the southeast Panhandle continued to be the center of shrimping activity, with Petersburg and Wrangell the main processing sites. Quality hand picked shrimp are still primarily a Panhandle product, though since the advent of large-scale machine picking in 1959, Kodiak and Seward have passed the Panhandle in sheer volume of shrimp processed. In 1963 the total Alaska shrimp harvest was 15.13 million pounds; the earthquake cut this to 7.8 million pounds in 1964. Approximately one seventh of the pack in 1963 was put up in southeast Alaska, compared to a bit less than half in 1960, the last year that hand picked shrimp still constituted a major share of the pack. Since 1961 the total shrimp harvest has held steady at 15 to 17 million pounds except when production was cut by the 'quake: while this is a small pack in comparison with the U. S. catch as a whole, it's ten times the Alaska pack of less than ten years ago.

The pink, side stripe, and humpback or king shrimp inhabit areas of muddy bottom, while the coon-stripe likes sand-gravel bottoms with rapid tidal currents and the spot shrimp is found in rocky-bottom areas. The first four species are taken mainly by trawling, while shrimp pots are used to take the small number of spot shrimp. The coon-stripe is mainly found no further north than Sitka, the spot shrimp reaches Unalaska on the Aleutian chain, the side stripe and humpback occur as far north as the Bering Sea, and the pink shrimp is circumpolar in distribution, ranging from Puget Sound clear around to Massachusetts Bay. All are taken in fairly shallow

water--from 15 to 90 fathoms or so. There is no Alaska-based offshore fishery, though Japanese interests are taking many millions of pounds annually in the Bering Sea, and lesser amounts in other offshore waters around Alaska.



Clams

Razor clams, hardshell clams, and mussels are found on Alaskan beaches in considerable numbers. Only the razor clam is now being utilized commercially. Americans haven't developed a taste for mussels, and hardshell clams--a classification that includes butter clams, steamer clams, red-necked clams, and cockles--currently present a processing difficulty which makes it unprofitable to can them.

Alaska's razor clam harvests have been declining, as can be seen by contrasting the 1963 take (landed weight) of 410,280 pounds with the 1.35 million pounds landed in 1960. The earthquake which shook central Alaska in March, 1964 and altered land levels in much good razor clam territory further depressed the take, and only 97,500 pounds were taken.

In addition to the commercial take, many thousands of pounds of razor clams are taken annually for personal use under the sport fishing and subsistence fishery regulations. The Kenai Peninsula's western shore is a center of personal-use clam digging, while Cordova, Kodiak, and the Alaska Peninsula have long been centers of the commercial effort.

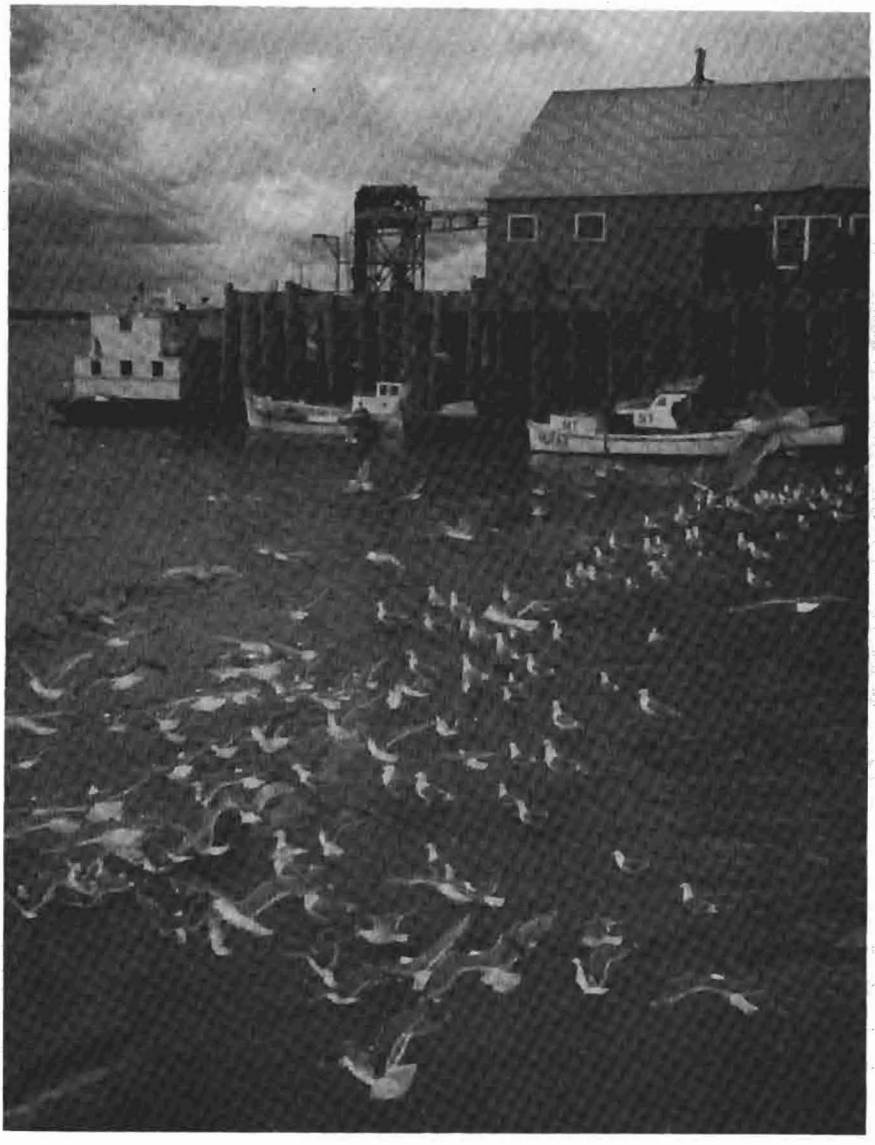
Hardshell clams occupy a different habitat than razor clams. An organism on which clams feed, which produces a toxic substance that clams have an unfortunate tendency to concentrate, is also found in the same habitat. The concentrated toxin doesn't hurt the clams, but does affect humans who eat a sufficient number of them. Processing the clams in a way that will render large volumes of them absolutely safe for human consumption adds enough to cannery costs to make hardshell clam canning an unprofitable operation at present. Hardshell clams are gathered in fair numbers for personal use, however. Ill effects are rare.

OTHER FISH AND SHELLFISH

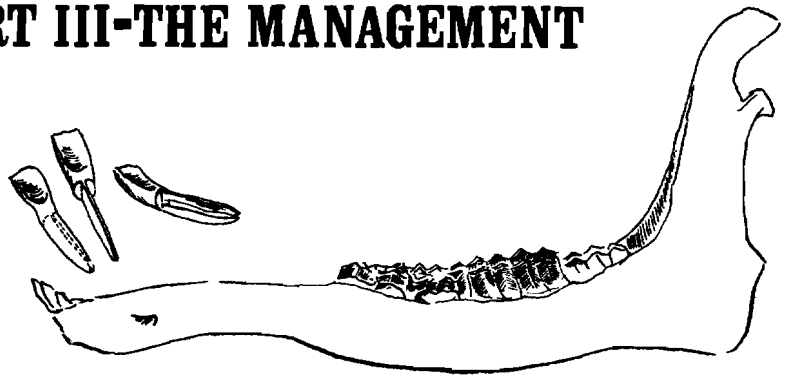
Abalone, octopus, scallops, sablefish, whitefish, lingcod (the only freshwater member of the cod family in Alaska), eulachon ("smelt"), 27 species of flatfish in addition to halibut, and 21 species of rock cod including the red snapper occur in Alaskan waters, fresh and salt. Some of these provide sport or commercial fisheries of considerable local importance, and some of them may even be vitally important to some areas at certain times. Potentially, many of them could in the not-too-distant future rise rapidly to prominent places in the Alaska scene. The octopus, for example, is a favored halibut bait, and is found in good numbers in several localities.

Changing climatic conditions or altered current patterns could affect the distribution of some species and make them worth harvesting commercially or for sport and expanded personal use. The abalone comes to mind as one species with latent potential: a few are being harvested in the Sitka area. A vast number of other kinds of fish and shellfish may not be of direct value for sport, subsistence, or commercial purpose but may be almost indispensable as food for other denizens of the sea. For example, the sea urchin is highly important as a food of the sea otter.

Whether expansion of the sport, subsistence, and commercial fisheries of Alaska comes through increased use of currently prominent species, or through more use of species now unused, expansion is certain. The Department's continually increasing fund of biological facts should enable the stocks and the habitat to be equal to the expansion.

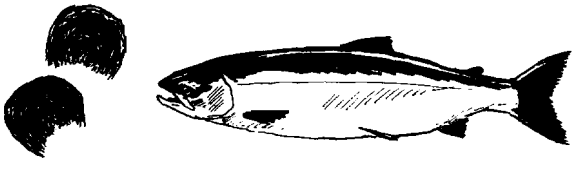


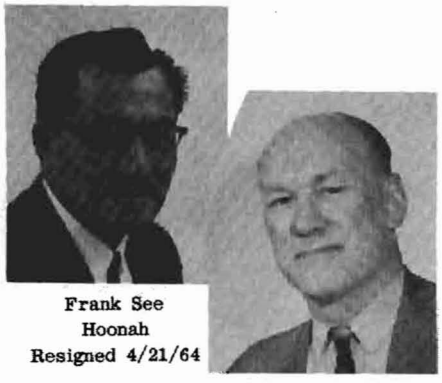
PART III-THE MANAGEMENT



In charge of Alaska's 586,400 square mile fish and game production facilities and warehouse is an organization which at the end of 1964 numbered 221 permanent employees. The picture chart on page 86 shows how these people were organized to carry out the wide variety of tasks required to manage Alaska's tremendous diversity of fish and game species and habitats.

Alaskans -- the "company stockholders" -- participated quite actively in "company affairs" in 1963 and 1964. There were 40 fish and game advisory committees at the end of 1964, and many Alaskans also voiced their needs and gave advice through the Board of Fish and Game directly. At its twice-yearly meetings the Board -- ten Alaskans appointed by the Governor -- acted on recommendations from both "stockholders" and "management" and established seasons, bag and catch limits, permissible methods and means of taking fish and game, and other rules governing the use of the "product," and helped establish policy for the Department. The result of this democratic process is sound, practical, scientific management of Alaska's fish and game, based on both biological knowledge and on the needs and desires of Alaskans.





Frank See
Hoonah
Resigned 4/21/64

Roy Selfridge
Ketchikan
Resigned 12/10/63

ALASKA BOARD OF FISH and GAME

DEPARTMENT ORGANIZATION

Walter Kirkness
Commissioner

E. S. Marvich
Deputy Commissioner

Administration
20 employees

Doug Terry
Administrative Officer

Division of
Commercial Fisheries
48 employees

Stan Swanson,
Director

Division of Game
43 employees

Jim Brooks,
Director

Division of
Engineering & Services
21 employees

Gil Ziemer,
Director

Division of
Protection
40 employees

C. A. Weberg,
Director

Division of
Biological Research
22 employees

Wallace Noerenberg,
Director

Sport Fish Divisi
27 employees

Alex Mc Rea,
Director

APPENDIX

Table 1

PRODUCTION OF ALASKA FISHERIES PRODUCTS IN 1963 AND 1964 (WHOLESALE VALUES, AS PREPARED FOR MARKET)

SPECIES	VALUE		POUNDS		VALUE/POUND*	
	1963	1964	1963	1964	1963	1964
Salmon (including roe, bait, & viscera)	$75,987,000	$104,764,080	$143,614.470	$208,645,100	$ .53	$ .50
King Crab	16,770,640	21,262,340	16,399,790	22,994,390	1.02	.92
Halibut	7,928,810	8,006,180	27,307,990	21,722,520	.29	.37
Shrimp	4,163,280	1,514,450	3,810,570	1,401,670	1.09	1.08
Dungeness Crab	3,031,940	3,578,960	4,856,700	5,452,110	.62	.66
Herring	755,160	1,069,650	13,061,860	15,433,750	.06	.07
Sablefish	248,120	373,220	1,086,110	1,381,740	.23	.27
Clams	136,700	7,540	107,530	6,600	1.27	1.14
Bottom Fish	7,240	6,570	43,170	56,120	.17	.12
Steelhead	5,490	4,560	16,330	9,450	.33	.48
Dolly Varden	1,570	3,930	3,600	6,550	.44	.60
Lake Trout	820	2,450	1,650	4,450	.50	.55
Whitefish	230	-	480	-	.48	-
Tanner Crab	-	3,840	-	12,800	-	.30
Abalone	-	1,640	-	1,090	-	1.50
TOTAL	$109,037,800	$139,236,410	$210,310,250	$277,178,340	$ .52	$ .50

* Varying "per-pound" values from one year to the next may be due mainly to changes in the species composition of the catch. This is especially true of salmon, as the species have different cycles. The value per pound figures are thus of interest mainly over long periods of time. The figures given here should not be interpreted as indicating trends in values when more than one species is included in a category.

Additional, more detailed commercial fisheries statistics may be obtained from the Department's annual "Commercial Fisheries Catch and Production Statistics" leaflets, available on request.

Figure 1.

ALASKA SALMON CASE PACKS AND VALUES, 1912-1964

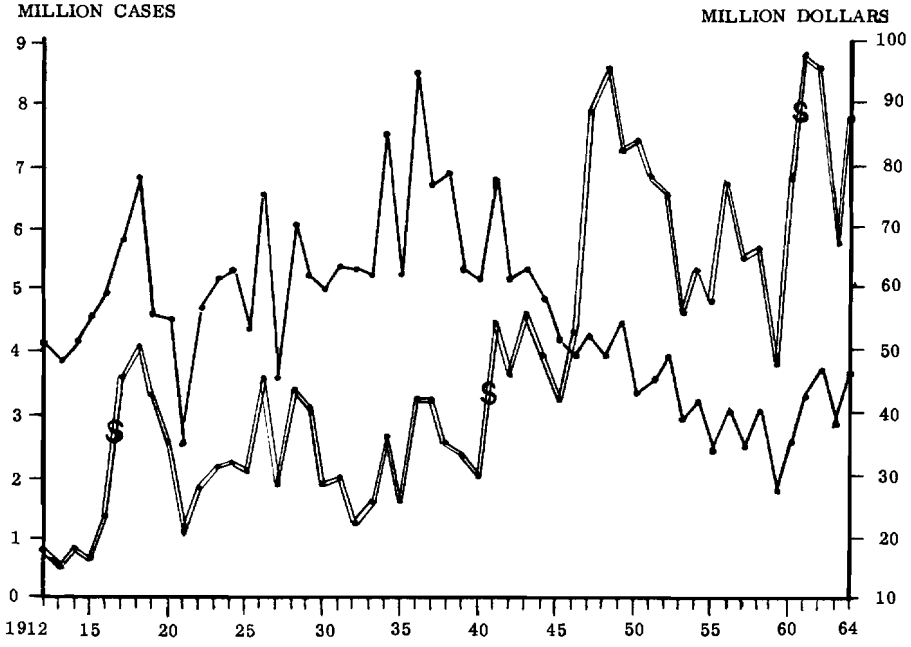


Figure 2.

POUNDS OF FISH AND SHELLFISH LANDED IN ALASKA AND VALUES TO FISHERMEN, 1927-1964

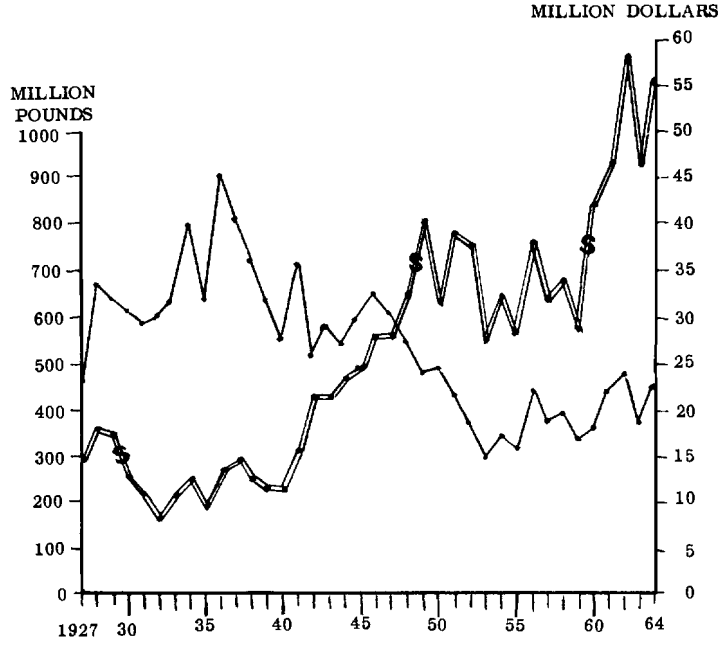


Table 2

ALASKA BIG GAME HARVESTS IN 1963 AND 1964.

Species	Number	
	1963	1964
Caribou	21,000	25,000
Deer	12,000	12,000
Moose	8,861	8,770
Walrus	1,500	1,500
Black Bear	1,200	1,200
Dall Sheep	977	939
Brown & Grizzly Bear	525	623
Mountain Goat	600	600
Polar Bear	167	251
Elk	100	85
Bison	20	34

Table 3

ALASKA FUR HARVESTS DURING THE 1962-63 AND 1963-64 TRAPPING SEASONS

Species	Number	
	1963	1964
Beaver	20,000	14,000
Muskrat	85,000	49,000
Mink	22,000	22,500
Marten	8,000	6,200
Land Otter	3,000	2,300
White and Blue Fox	1,500	1,200
Other Fox	1,000	1,000
Wolf	760	820
Wolverine	450	550
Lynx	2,500	4,700
Weasel (Ermine)	1,000	1,500
Coyote	240	350

Table 4

SOURCES AND AMOUNTS OF DEPARTMENT FUNDS FOR THE FISCAL YEARS 1962-63 AND 1963-64

SOURCE	AMOUNT	
	1962-1963	1963-1964
General Fund		
Operations	$3,127,267.00	$3,851,100.00
Capital Projects	68,000.00	25,000.00
Reapprop. for prior year obligations	545,334.43	359,558.66
Fish and Game Fund (1)		
Operations	620,741.00	752,200.00
Capital Projects	84,000.00	8,750.00
Reapprop. for prior year obligations	166,652.87	341,966.91
Federal Funds (2)	960,530.28	952,550.00
Other Sources (3)	29,848.54	41,500.00
Total	$5,602,374.12	$6,332,625.57

(1)*These funds come from the sale of sport fishing and hunting licenses.*

(2)*Federal Aid to Fish and Wildlife Restoration, Emergency Salmon Research, Salton-stall-Kennedy, and Industrial Crab Tagging funds. Federal Aid to Fish and Wildlife Restoration Funds come from federal excise taxes on sport fishing tackle and on sporting arms and ammunition.*

(3)*Including private donations and receipts from sales of fish taken in test netting.*

Table 5

DEPARTMENT EXPENDITURES IN FISCAL YEARS 1962-63 AND 1963-64

DIVISION OR ITEM	AMOUNT	
	1962-63	1963-64
Board of Fish and Game	$ 20,409.02	$ 19,026.60
Administration	200,091.73	238,987.12
International N. Pacific Fisheries Commission	7,333.38	9,971.78
Division Biological Research	292,912.73	427,995.15
Fed. Grants, Biol. Research	263,761.06	0.00
Division Commercial Fisheries	911,867.07	999,485.59
Division Protection	1,129,084.27	1,072,323.49
Bounty Payments	126,944.00	115,060.00
Division Game	736,672.04	839,975.09
Division Sport Fish	490,426.50	488,496.80
Division Engineering & Services	415,880.09	467,373.95
Frazer Project	72,696.26	36,390.74
Kitoi Water Supply	34,873.91	0.00
Big Lake Weir Planning	937.56	0.00
Bear Lake Development	0.00	300.00
Fire Lake Hatchery Quarters	18,474.34	54,228.13
Non-Lapsing Vessel Program	41,886.97	0.00
Totals	$4,764,250.93	$4,769,614.44

Table 6

ALASKA FISH AND GAME LICENSES SOLD IN FISCAL YEARS 1963 AND 1964.

Type of License	Number Sold	
	1963	1964
Resident Fishing	24,017	23,121
Resident Hunting	19,104	20,443
Resident Hunting and Trapping	1,230	899
Resident Hunting and Fishing	13,999	13,720
Resident Hunting, Fishing and Trapping	2,026	2,121
Resident Trapping	1,294	800
Nonresident 10-day Fishing	5,671	6,754
Nonresident Fishing	8,506	8,599
Nonresident Hunting	3,396	3,894
Nonresident Hunting and Fishing	981	1,047
Nonresident Hunting and Trapping	9	5
Registered Guide	282	273
Assistant Guide	130	122
Resident Fur Dealer	124	154
Nonresident Fur Dealer	5	3
Fur Farm	6	9
Subsistence Fishing	133	50
Subsistence Hunting, Fishing and Trapping	3,966	5,832
Commercial Fishing Vessel	11,382	8,993
Troll Line	1,817	1,807
Long Line	866	365
Drift Gill Net	4,573	3,310
Set Gill Net	3,549	2,759
Beach Seine	30	25
Purse and Hand Purse Seine	1,632	1,368
Beam Trawl	25	18
Otter Trawl	23	10
Shellfish Pot	496	529
Clam Digger	370	151
Resident Commercial Fisherman	13,522	11,835
Nonresident Commercial Fisherman	7,402	6,878

DEPARTMENT OF FISH AND GAME FILM LIBRARY

(All films listed are available for showing to organizations, school classes, and public meetings.)

DEPARTMENT OF FISH AND GAME PRODUCTIONS
(all in color, with sound)

Title	*Running Time*
The King Crab Story	*29 minutes*
Rainbows for the Sportsman	*14 minutes*
The Sea Lion	*20 minutes*
Valley of the Kings	*29 minutes*
Quest for Better Fishing	*11 minutes*
White Whales of Bering Sea	*11 minutes*
The Pink Salmon Story	*30 minutes*
Angling Under the Midnight Sun	*30 minutes*
Alaskan Big Game Safari	*29 minutes*
The Bristol Bay Story	*43 minutes*

FILMS PURCHASED BY THE DEPARTMENT (color and sound, unless otherwise noted)

Fisheries of the Great Slave . . . . . 18 minutes
(National Film Board of Canada)

Alaska and Its Natural Resources . . . . . 26 minutes
(Richfield Oil Co.)

Fish and the Seine Net (black and white sound) . 19 minutes
(Scottish Home Dept. and Marine Laboratory)

Adaq, King of Alaska Seas . . . . . 26 minutes
(Wakefield Fisheries)

Salmon—Catch to Can . . . . . 14 minutes
(U.S. Fish and Wildlife Service and Canned Salmon Institute)

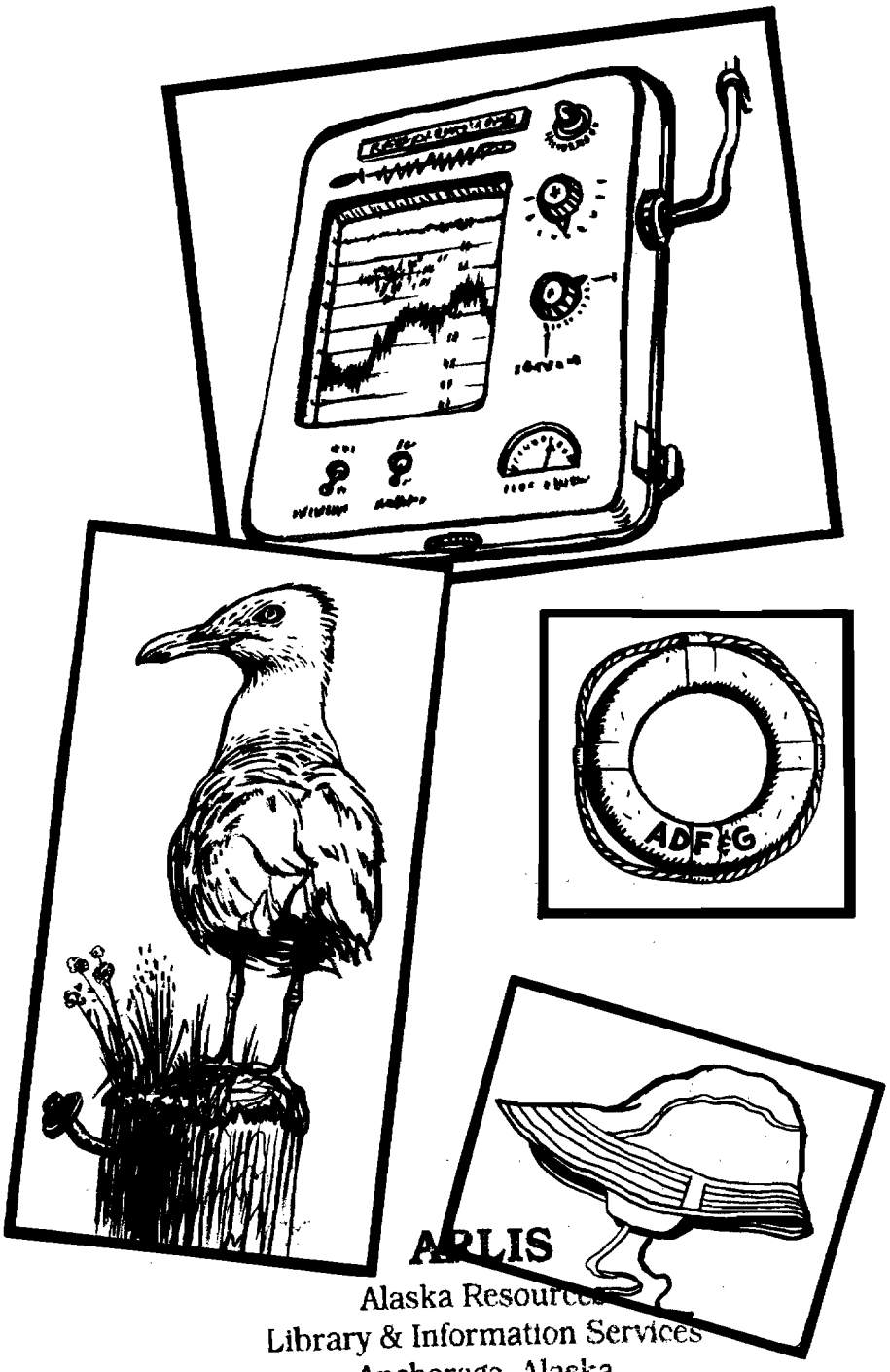
Take a Can of Salmon . . . . . 14 minutes
(U.S. Fish and Wildlife Service and Canned Salmon Institute)

Trawls in Action (black and white sound) . . . 26 minutes
(England: Ministry of Agriculture and Fisheries)

Animals of Alaska . . . . . 11 minutes
(Cecil Rhode: Northern Films)

Loon's Necklace . . . . . 11 minutes
(Crawley Films Ltd.)

Underwater Story (black and white sound) . . 19 minutes
(Crown Film Unit)



AR