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Eagles and Salmon



at
Lower McDonald Creek
GLACIER NATIONAL PARK

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Each autumn in Glacier National Park, kokanee salmon and bald eagles arrive at Lower McDonald Creek — the salmon to spawn and the eagles to feed on the salmon. Salmon begin to arrive in mid-September; eagles begin appearing in late September, with the largest concentration in mid-November, after the peak of spawning.

Kokanee salmon were introduced to Flathead Lake in 1916 and throughout the Flathead drainage in the early 1920's, but spawning runs were not reported from Lower McDonald Creek until 1935. Few eagles were reported until the autumn of 1939, when 37 birds were sighted. By the early 1950's, 90 eagles were counted along the creek. Since 1959 bald eagles along the creek have been counted weekly during the fall by researchers in a canoe, following a standardized procedure.

Salmon numbers are estimated periodically by a snorkeling team of experienced biologists. Due to a complex set of factors, the number of spawning salmon fluctuates annually, in turn affecting the size of the eagle gathering. In years with a larger food base, the eagles stay in the park longer, and the peak builds (a single day record count of 639 was taken in 1981).

The Area and its Wildlife

Early in this century the original forests of western red cedar and hemlock were logged and then swept by wildfire. A small surviving stand of the original forest still remains near park headquarters. Today the area is dominated by lodgepole pine, some of which was planted by the Civilian Conservation Corps in the 1930's. In recent years mountain pine beetles have killed some of the older lodgepoles, allowing more rapid growth of the young spruce, fir, hemlock, and cedar that are characteristic of this moist valley.

The North Fork of the Flathead River originally flowed through the valley between Lake McDonald and West Glacier until about 15,000 years ago when a large glacier diverted it to its present course west of the Apgar Mountains. Glaciers also deposited a thick layer of sand and gravel between the Apgar Mountains and the Belton Hills, damming McDonald Creek and forming the present Lake McDonald.



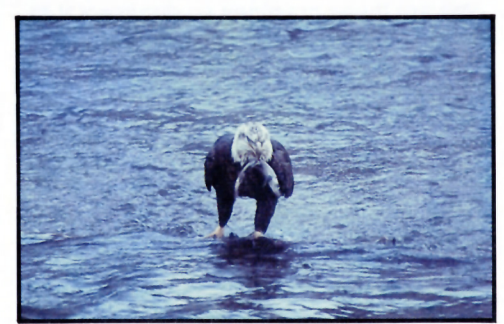
Today McDonald Creek meanders along the western edge of the McDonald Valley to the Middle Fork of the Flathead River. The creek is flanked by low willows, conifers, and cottonwood. The tallest trees, particularly the weathered snags, provide perches for eagles. Gravel bars and shallow water provide ideal feeding grounds for many birds and mammals. Elk and deer, beaver and muskrat frequent this diverse habitat. A small, gray bird, the water ouzel or dipper, searches for aquatic insects on submerged rocks near the banks, while the rattling call of the belted kingfisher can often be heard as the bird flies to a perch above the water. In the fall, numerous animals feed on the salmon and their eggs. Bald eagles and several species of gulls circle over the river, and waterfowl of many varieties feed in the riffles. Magpies, ravens, coyotes and an occasional grizzly or black bear scavenge along the gravel bars. Even white-tailed deer have been seen eating salmon.

Daily Activities

Dawn. The eagles have flown to the creek from their nighttime roosting areas and noisily contest for favorite perches before they begin a few hours of intense feeding. Utilizing keen eyesight, adults locate a salmon, fly over the stream, skillfully pluck the fish from the water in mid-flight, and return to a perch where they announce their success with high-pitched chatter. Young eagles, not as adept as this aerial capture, try it less frequently. Instead, they wade into the water, grasp a fish, and return to the bank to eat. After eating all but the head of the salmon, an eagle often cleans its bill by wiping it on its perch. One eagle may eat about five salmon each day.

In a stunning aerial display, eagles often try to steal fish from each other. One eagle may either dive on another successful eagle, forcing it to release its catch and attempt to recapture the fish before it reaches the water; or it may fly in from the rear, flip over, and try to take the fish from the other's talons. When salmon are scarce or lie in deep pools, eagles sometimes use gulls or other birds as a fishing fleet, diving on them after they surface with a fish and flying off with their pilfered catch.

Throughout midday eagles feed intermittently, spending most of their time resting on perches. Occasionally eagles wade in the water for a bath. Like backyard songbirds, they flap their wings splashing water over themselves, wade to shore, shake some more, and then laboriously flap to a branch, perching with wings drooped to dry in the breeze. On clear, windy days, some eagles spiral skyward. Their soaring attracts others. This display, visible for miles, perhaps serves notice to other migrants that food is plentiful in the area.

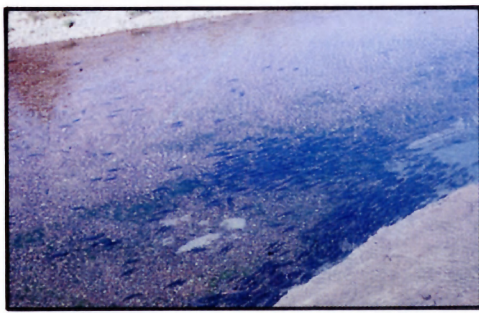


With the approach of sunset, eagles return to their nighttime roosts on the shores of Lake McDonald, the Middle Fork of the Flathead River, and the lower slopes of the Apgar Mountains.

Kokanee Salmon

These freshwater fish are a dwarfed, landlocked form of the ocean-going sockeye salmon. Sometimes referred to as bluefish, red salmon or silver salmon, they average about one half pound (1/5 kilogram) in weight and 12 inches (30 centimeters) in length.

In Flathead Lake the silver-sided kokanees feed on microscopic animals and occasionally ingest larger insects and aquatic worms. In the fall of their fourth year, they stop eating, gather in large schools, and move upstream to the small, shallow tributaries where they originally hatched, perhaps attracted by the unique chemistry of the stream water. The salmon labor upstream through riffles, resting in the deep pools. As the time to spawn approaches, both sexes develop reddish bodies and greenish heads; males also develop distinctly humped backs and hooked jaws. Females are the first to move to the shallow waters where gravelly spawning beds are found. Each chooses a nesting site and begins construction of the shallow depression, or redd, by fanning the gravel with her tail. This behavior attracts a male which then defends this area from other males. Soon, the female lies on her side and, quivering for a few seconds, deposits

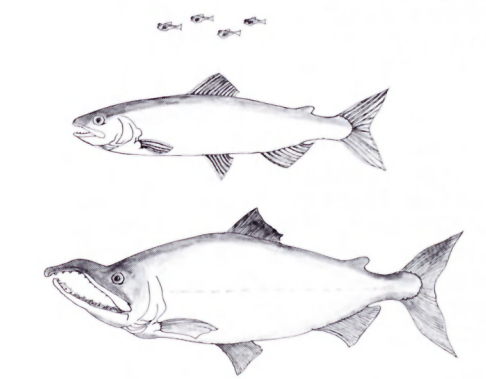


eggs onto the gravel. The male hovers slightly to the rear of her side to release milt for fertilization. This behavior is repeated many times until nearly 700 eggs have been laid. She then covers the eggs with gravel. The adults have completed



their life cycle and a few weeks later they will die as their internal organs deteriorate. Death is accompanied by growth of a fungus that appears as white, cottony patches on their bodies.

Some of the eggs of the new generation are destroyed by abrasion from stream gravel, but those that survive hatch in the cold water of late March and early April. The young fish, or fry, wriggle upward through the gravel and migrate downstream before the spring high water. Three and one half years later, some will return.



Since the salmon are an introduced species, how do they interact with the native fish? We do not know the whole story. Throughout most of their lives in the lakes, they provide food for larger predatory fish such as the bull and lake trout, but the effects of their brief appearance in the rivers and creeks and their complete role in the lakes is mostly unknown.

Bald Eagles

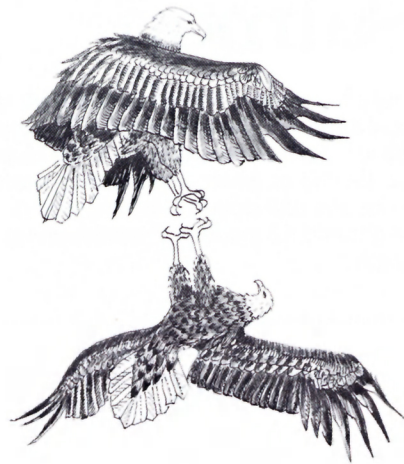
Bald eagles display the well-known white head, white tail, and yellow bill when they mature in their fifth or sixth year. Many of the birds you see are immatures, ranging in color from dark brown with a black bill during their first year to birds which resemble adults except for a white mottling of the body feathers and some brown in their head and tail feathers.



Bald eagles have a wingspan of nearly seven feet (over two meters) and weigh an average of 10.5 pounds (five kilograms). Golden eagles are similar in size and appearance to immature bald eagles. Should you see an eagle in migration, check its wing position. Bald eagles hold their wings as flat as a board, whereas golden eagles fly with a slight upsweep of their wings. Young golden eagles can be distinguished from immature bald eagles by a broad black band at the tip of their tail and white patches which look like windows in their wings. Whereas bald eagles are usually found along waterways, golden eagles inhabit the high mountains and plains, thus are rarely seen along McDonald Creek.



Bald eagles feed primarily on fish and carrion. In the Northwest, salmon dying at the end of their life cycle are the fall and winter sustenance. Farther south, jackrabbits, coots and waterfowl provide winter prey.



During early spring, eagles court with a grand aerial display consisting of dives, chases, and much calling. Sometimes they circle skyward, grasp each others talons, and tumble downward in cartwheels with wings outstretched. Eagles probably mate for life. The large stick nest, usually in a tall, living tree near a body of water, is repaired yearly by both parents and can increase from a modest 200 pounds (90 kilograms) to a structure of over one ton (900 kilograms), ten feet (three meters) across and 20 feet (six meters) deep. After the usual two eggs are laid, incubation takes about five weeks with the brooding done primarily by the female. Both male and female guard and rear the eaglets for nearly twelve weeks of the spring and summer.

Only a few pairs of eagles nest in Glacier. Most of the eagles you see migrate from the Canadian provinces north of Glacier. Taking advantage of favorable winds, they may fly as many as 400 miles (over 650 kilometers) a day. They begin to arrive on the Middle Fork of the Flathead River in late September. Adults generally return later in the fall than the immatures and predominate in the November concentration. With the disappearance of salmon in late November, or the approach of winter storms, the eagles wing southward toward Flathead Lake. We know that some of them disperse to the Yellowstone River, west-central Utah, the San Luis Valley of Colorado, eastern Oregon, northern Nevada and Idaho.

A National Emblem Endangered

When the bald eagle was chosen as our national emblem in 1782, it inhabited the entire continent. Today the eagle still occurs in substantial numbers in Canada and Alaska where it is relatively isolated from man. Unfortunately the number of bald eagles nesting south of the Canadian border have been drastically reduced. They occupy only a limited part of their former range.



Protection of a bird without protection of its habitat does not insure its survival. Not until 1973 was a mandate for habitat protection set forth by the Endangered Species Act. Human disturbance by habitat destruction and alteration have reduced the area that is suitable for eagles. We subdivide, especially on choice waterfront areas; we recreate in former wilderness; we contaminate our land and waterways.

Why are these practices so detrimental to eagles? Because, unlike more adaptable species such as robins, eagles are not able to recover quickly from a reduction of their numbers.

Eagles reproduce slowly. They lay only a single clutch of one to three eggs annually and disturbance anytime during the 16 to 20 weeks of incubation and rearing can cause the eagles to abandon their eggs or young. In addition, many of the young die during their first year, primarily from starvation. Those that survive need six years to reach adulthood.

Eagles require specific types of feeding, roosting, and nesting areas. Unless carefully planned, timber harvesting may remove the large trees that eagles require for nesting. Suburban, industrial and recreational developments usurp nesting, roosting, and wintering sites; dams can disrupt fish migration and spawning; logging can increase siltation which hinders the reproduction and feeding of fish; by-products of industry and agriculture can contaminate streams; and power lines can electrocute eagles.

Despite strong federal laws, direct human depredation continues. Enforcement of these laws has been difficult and, at times, unpopular. Shooting, trapping, and poisoning cause nearly half of the deaths of adult eagles. Between 1966 and 1970, an estimated 2000 eagles were shot, 350 were caught in steel traps, and many were poisoned by baits set out for coyotes.

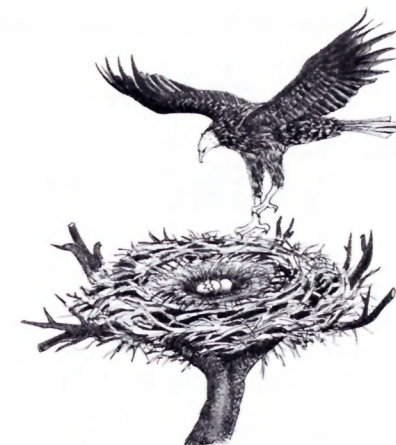
Some of these man-caused problems are more subtle. Pesticides and other chemicals drain into rivers and lakes and are absorbed by aquatic plants. Invertebrates and fish eat the plants and store some of these pesticides in their fatty tissues. Continued ingestion of contaminated food may result in a buildup of the pesticide in their bodies. Moreover, each larger animal in the food chain consumes proportionately more contaminated prey, and through this pyramid of supply a pesticide, once diluted in a stream, reaches deadly concentrations in an eagle.

The tragic history of DDT illustrates the unexpected results that may attend the introduction of a new chemical to the natural environment. This potent insecticide was introduced in 1940 but its effects were not fully understood until years later. While DDT does not kill eagles directly, it causes them to lay eggs with thin shells — shells too fragile to withstand the long period of incubation. As a result, few young are hatched, leading to a reduction in the eagle population. Although DDT was banned in

1972, only recently has recovery been noticeable. Levels of DDT have declined in fish and, therefore, in adult eagles. Now, other chemicals may pose new and yet-to-be-discovered threats to these and other birds of prey.

Eagles scavenge waterfowl killed or crippled by hunters, and may die of lead poisoning after ingesting lead shot contained in these birds.

The future may be brighter for the bald eagle. Many public and private organizations are beginning to manage land more wisely, to support research enhancing our understanding of eagle habitat require-



ments, and to control the use of dangerous chemicals — all for the benefit of eagles and other wildlife. Even minor changes in land management can be advantageous to eagles. Research has shown that redesigning the pylons supporting power transmission lines could save many of the dozens of eagles electrocuted annually. Some companies are modifying the transmission poles to alleviate this problem. Artificial nesting and roosting perches are also being placed in critical habitats where large trees have been lost. Eggs free of DDT are being transferred to nests where parents strive to hatch their own infertile eggs. Conversion to use of steel shot by waterfowl hunters can help alleviate lead poisoning of eagles that scavenge on hunter-crippled ducks and geese.

You Can Help

At Glacier National Park an eagle management plan reserves land in the McDonald Valley for eagles to feed and roost during their autumn migration. Human activity is restricted along Lower McDonald Creek during this time for the benefit of the eagles and to enhance your opportunities



for viewing this spectacle. By means of radio telemetry and marked birds, researchers at Glacier have learned more about migration routes along which habitat should be protected, the extent of local movements, and how human disturbance affects the eagle. Certain eagles from Glacier have been identified by orange markers placed on their wings next to the body. You can help by watching for these marked eagles throughout the western United States.

Information on the bald eagle research and on the natural history of the park can be obtained at the Appar Information Center and from interpretive rangers. Only through our awareness, understanding, and action will bald eagles once more flourish throughout the United States.