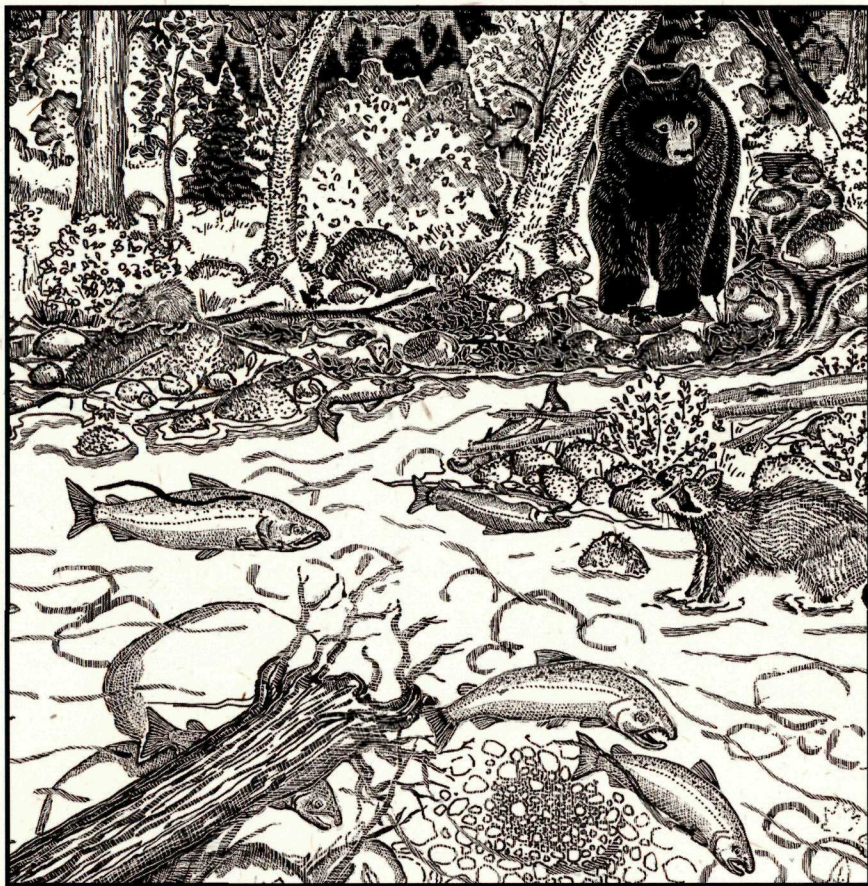


# Salmon

## Swimmers in the Forest



**A**seldom seen creature inhabits the forested rivers of Olympic National Park, one whose life history and migrations are unique among Olympic's wildlife—the wild salmon. You may be lucky enough to catch a glimpse of a salmon during your visit. But even if you don't, you can easily see the elements of their story along Olympic's rivers and streams and understand the role salmon play in the forest ecosystem.

## Hidden Life of the Forest

Salmon are forest animals. Although these silver swimmers spend most of their lives ranging in the blue-green pastures of the Pacific, salmon spawn and begin their lives in the deep shade and clean-washed gravels of forested watersheds.

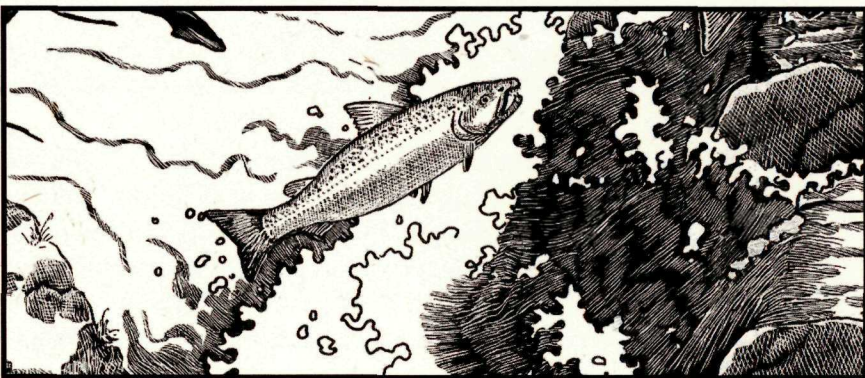
Olympic National Park supports some of the most extensive runs of wild salmon, trout and char remaining in the Pacific Northwest. Five species of Pacific salmon plus steelhead and cutthroat weave their magic through nearly every major river and stream in the park. Salmon have long been entwined with Northwest tribes and continue to be important to everyone.

## Wild Olympic Salmon

Over 50 stocks of wild salmon spawn throughout the rivers of Olympic National Park, each one unique to its home river. This represents a greater diversity than any national park outside Alaska.

Chinook, the largest Pacific salmon, spawn in cobble-sized gravels of the park's large, west-side rivers: the Soleduck, Bogachiel, Hoh, Queets and Quinault. Steelhead also favor the fast-moving waters of coastal rivers. Sockeye salmon spawn in the tributary streams of two large coastal lakes, Quinault and Ozette. Pink and chum salmon generally spawn in the lower reaches of rivers. Coho salmon spawn in tributary streams and side channels throughout the park.

At one time, all these salmon species were common to the Elwha River, but two dams built before the park was established blocked all but five miles of the lower river to salmon spawning. Work has begun that will eventually remove both dams and restore salmon to the Elwha watershed.



## A Thousand Keys

Newly hatched salmon become imprinted with the scent of the mix of minerals in their particular stream. This memory, along with the earth's magnetism and, possibly, location of the sun, guides them back to their native gravels from far out in the North Pacific.

Over thousands of years distinct races of wild salmon have adapted to the conditions of their ancestral spawning streams. Like "a thousand keys to a thousand different locks," wild salmon are informed by the evolutionary wisdom of their forested watersheds.

Salmon embody the unity of the mountains, forest and sea. The bounty of nutrients they bring from the ocean when they return to their native streams to spawn—nitrogen, carbon and phosphorous among others—is essential to maintain forest health and diversity. These nutrients are shared throughout the ecological community.



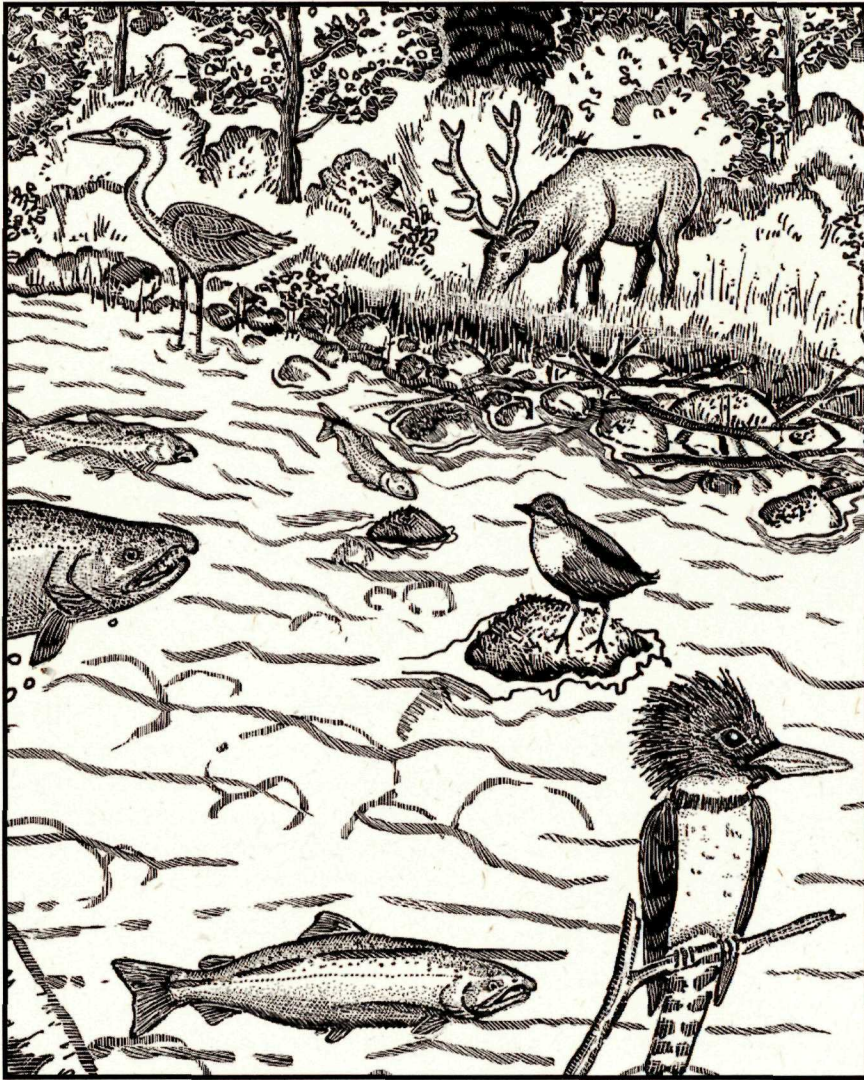
## At Home in the Woods

It wasn't until old-growth forests reclaimed these steep mountain valleys, following the retreat of Ice Age glaciers, that salmon were able to thrive here. Large trees fall across fast-moving waters and create pools where salmon can rest and find shelter from predators. Riffles that form downstream from these pools harbor aquatic insects that feed young salmon and provide spawning gravels.

Fallen trees also create log jams, which are common in park rivers. These jumbled piles often stack up across a river. They slow floodwaters and divert high flows into stable side channels, which are essential for coho and other young salmon.

## Streamside Gardens

**L**eafy trees—alders, willows, cottonwoods and maples—thrive along riverbanks. This riparian growth shades streams in summer and keeps water temperatures optimal for salmon and trout. Overhanging roots, leaves and branches offer fish cover from winged predators like belted kingfishers. Fallen leaves also serve as food for diverse populations of aquatic insects, which in turn feed salmon fry. Riparian corridors are important migratory routes for birds and small mammals, and they serve as protected calving and fawning areas for elk and deer.



## The Spawning Ground

**F**emale salmon scour deep nests, or redds, in river gravels with powerful kicks of their tails. Females and males then release eggs and milt simultaneously into the redds. Females bury their fertilized eggs in gravel coarse enough to allow a continuous flow of oxygenated water and deep enough to protect them from flushing. A single female can carry thousands of eggs. Most salmon die within days of spawning. Their redds often remain visible through the fall, winter and spring. Look for lighter-colored patches of gravel on river bottoms.

## A Riverine Nursery

**S**almon eggs and hatchlings, or alevins, spend two to four months in stream gravels, often overwintering there. Subsurface currents bathe them with cold oxygen-rich water and carry away organic waste.

When young salmon emerge as fry, they feed on zooplankton. As salmon grow, they feed on the rich drift of crustaceans and insect larvae—stoneflies, mayflies, caddis flies and midges—carried in the stream.

Some salmon, like chum, head for the ocean upon emerging from gravels. Others, like coho, remain feeding in their natal streams for a year or more. Steelhead spend two years in streams. This is a perilous time for young salmon. Competition is intense and predators abound. Only two or three in a thousand will return as adults to spawn.



## Seasonal Refuges

**D**uring the dry months of summer and early fall tributary streams slow, and some side channels dry up completely. Salmon fry then seek cool, deep pools in the main stems of rivers. Here they find cover from predators and feed on abundant invertebrates washed loose from upstream riffles or insects fallen from streamside trees and shrubs.

In winter and spring side channels serve as refuges for coho fry and other overwintering fingerlings. Here they can feed and take shelter during high water. These natural rearing channels are often the first to be lost when river valleys are altered by human activity.





*"...great salmon threshed in the  
water all night long, in their  
efforts to ascend the stream.*

*Wild animals which I could not  
see snapped the bushes in all  
directions, traveling up and down  
in search of fish. At every few yards  
was to be seen the remains of a fish  
where cougar, coon, otter, or  
eagle had made a meal."*

Private Harry Fisher, Queets River, September 1890



## Guests at the Banquet

**A**fter salmon spawn and die, their nutrient-laden carcasses are a gift to the forest community. Bear, river otter, raccoon, bald eagle and mink feed on spawned salmon, often dragging the carcasses from the stream bed. Here smaller animals such as winter wren, deer mouse, squirrel and water shrew can also share in the season's bounty.

Over 100 wildlife species are known to benefit from the salmon's largess. For many this extra source of protein comes at a critical time of year. The leftovers add necessary nitrogen and carbon to forest soils, promoting the growth of riparian vegetation. These plants in turn aid in the growth and survival of salmon. Even stream dwellers like fish, amphibians and invertebrates benefit from ocean-born nutrients carried inland by salmon. In a host of ways, salmon make the watershed circle complete.



## The Plight of Wild Salmon

**W**ild salmon are not faring well in the Pacific Northwest. Salmon numbers have plummeted in recent decades. Currently at risk are 214 wild salmon and steelhead stocks that return to Pacific Northwest and northern California rivers. Over 100 of these are at high risk of extinction, and more than 50 are at moderate risk. Several salmon runs in the Northwest are listed as threatened under the Endangered Species Act. Some of these, as well as threatened bull trout, spawn in park waters.

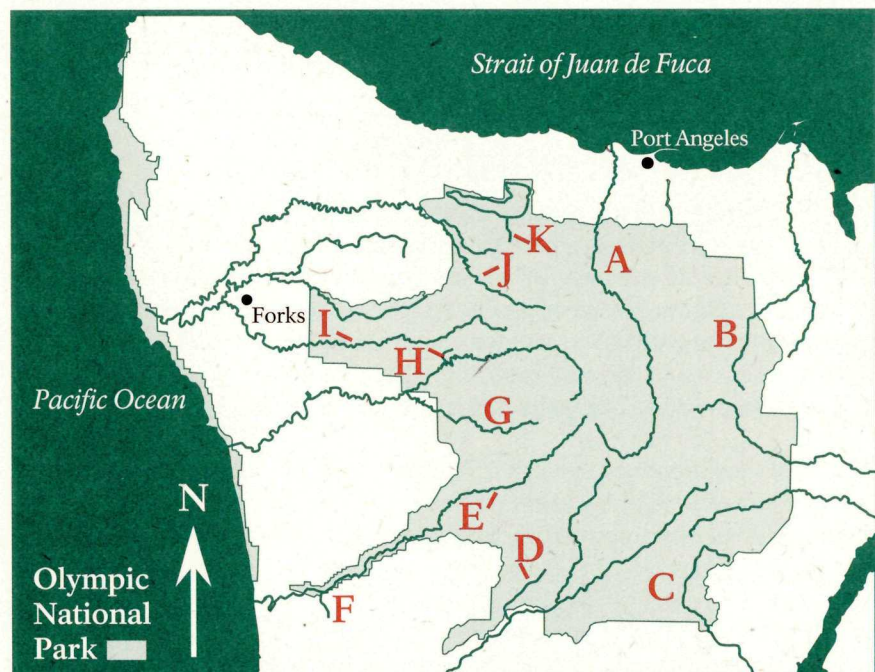
The causes of these declines are varied. Hydroelectric dams, such as the two on the Elwha River, block salmon from reaching spawning areas. Clear cutting, road building and other developments can damage critical riparian habitat and erode silt into spawning gravels. Pollution, irrigation and overfishing can decimate stocks. Even efforts to help salmon can go awry. Competition and disease from introduced hatchery-produced salmon have taken a toll on wild runs in countless Northwest streams.

## Where Can I See These Legendary Fish in Olympic National Park?

Olympic is home to all salmon species native to the Pacific Northwest. Pacific salmon and their relatives include: chinook, coho, chum, pink and sockeye salmon, rainbow or steelhead trout, cutthroat trout, Dolly Varden, bull trout and mountain whitefish. One or more of these fish can be found in nearly all the park's rivers and streams at some time during the year.

Wild fish are elusive and blend well with their environments. But with patience, observers can see them throughout the park. In spring and summer, juvenile fish are found along stream margins. In fall, winter and early spring, migrating adult salmon bring new life to the park's rivers. Look for them in deep pools along river bends or near log jams. Their nests, or redds, appear as patches of lighter-colored gravel on darker river bottoms.

Move slowly and look beneath the surface—polarized sunglasses are a big help. A sudden glimmer or flickering shadow may be a wild salmon. Here are some good places and times to see these phenomenal fish.



**A Elwha River.** One of the park's largest watersheds, the Elwha used to be home to all native species of Pacific salmon. When two salmon-blocking dams are removed over the next several years, salmon can once again claim this extraordinary river.

**B Gray Wolf River.** Pink salmon flood the Gray Wolf in odd-numbered years. In August and September, watch for them beginning at Twomile Camp along U.S. Forest Service trail #834.

**C North Fork Skokomish River.** The Staircase Rapids trail above Lake Cushman offers late-autumn glimpses of bull trout and their redds. In dry years look for these fish in deep pools.

**D Big Creek.** In November and December, sockeye salmon crowd the pools where this stream flows under the Big Creek bridge. From Highway 101, follow the Quinault North Shore Road for ten miles.

**E Queets River.** In summer, look for large spring chinook in pools above the Queets Campground.

**F Salmon River.** From October through December, look for spawning chinook and coho salmon above the Salmon River bridge, 1.4 miles up the Queets Valley Road from Highway 101.

**G South Fork Hoh River.** Watch for steelhead in spring and chinook in late summer as they spawn in the river upstream from Big Flat, two miles by trail from the road's end.

**H Taft Creek.** From November through January, this small tributary stream just behind the Hoh Visitor Center fills with spawning coho salmon. View them from the Hall of Mosses trail.

**I Bogachiel River.** In winter, serious hikers can see coho salmon spawning in side channels and tributaries of the upper Bogachiel. Chinook spawn in the main river in fall; steelhead spawn there in spring.

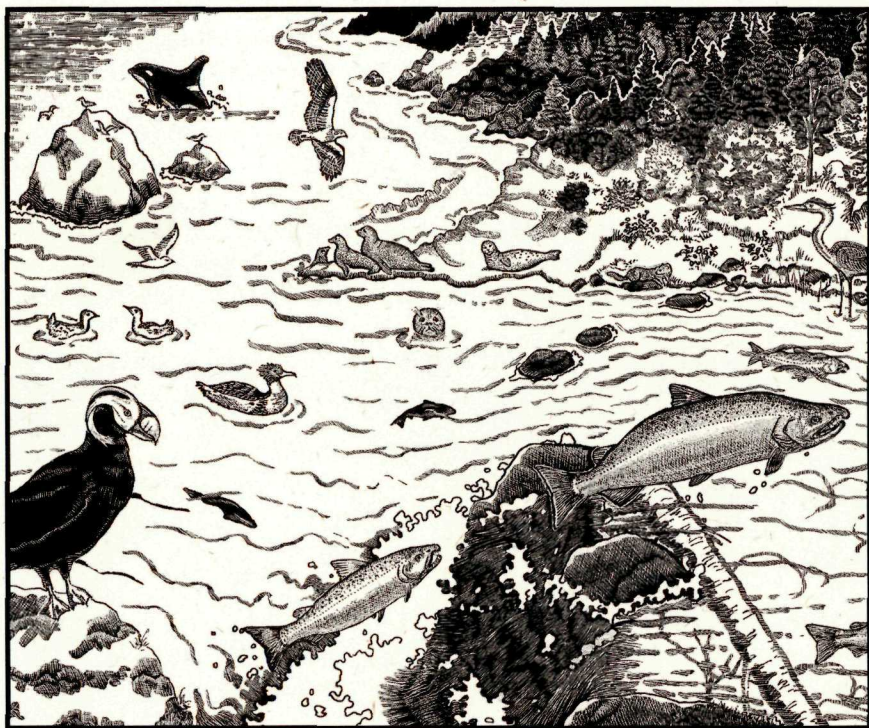
**J Sol Duc River.** The Sol Duc coho leap over Salmon Cascades, just off the Sol Duc Road, after the first rains in August, September and October. They spawn in the river and side channels above and below Sol Duc Hot Springs. In April and May, look for steelhead swimming in deep pools near Salmon Cascades.

**K Barnes Creek.** Lake Crescent's largest tributary hosts spawning Crescenti trout, a cutthroat unique to the lake, between February and May. Look for their redds along sections of the Marymere Falls trail.

# Making Sure the Cycle Continues

Olympic National Park plays a crucial role in preserving pristine natural habitats for wild fish. The park protects hundreds of miles of salmon streams. You can help, too, simply by being mindful of salmon's place in the forest and exercising care in and around their habitats. Even the smallest streams can be nurseries for eggs, alevins and fry.

As salmon return to their home rivers they complete a circle of reciprocity. These wild swimmers are rivers of nutrients reversing the downstream flow from forest to sea. Through their remarkable journey, salmon bind these rugged mountains to the ocean, forests and rivers that give them life.



“ceremonies were held to thank the  
soul of the salmon”

Viola Riebe and Helen Lee, Hoh Tribe

Tim McNulty, text; Sarah McNair, art; Laurel Black, map  
Janet Scharf, design/production; John Meyer, fisheries consultant

