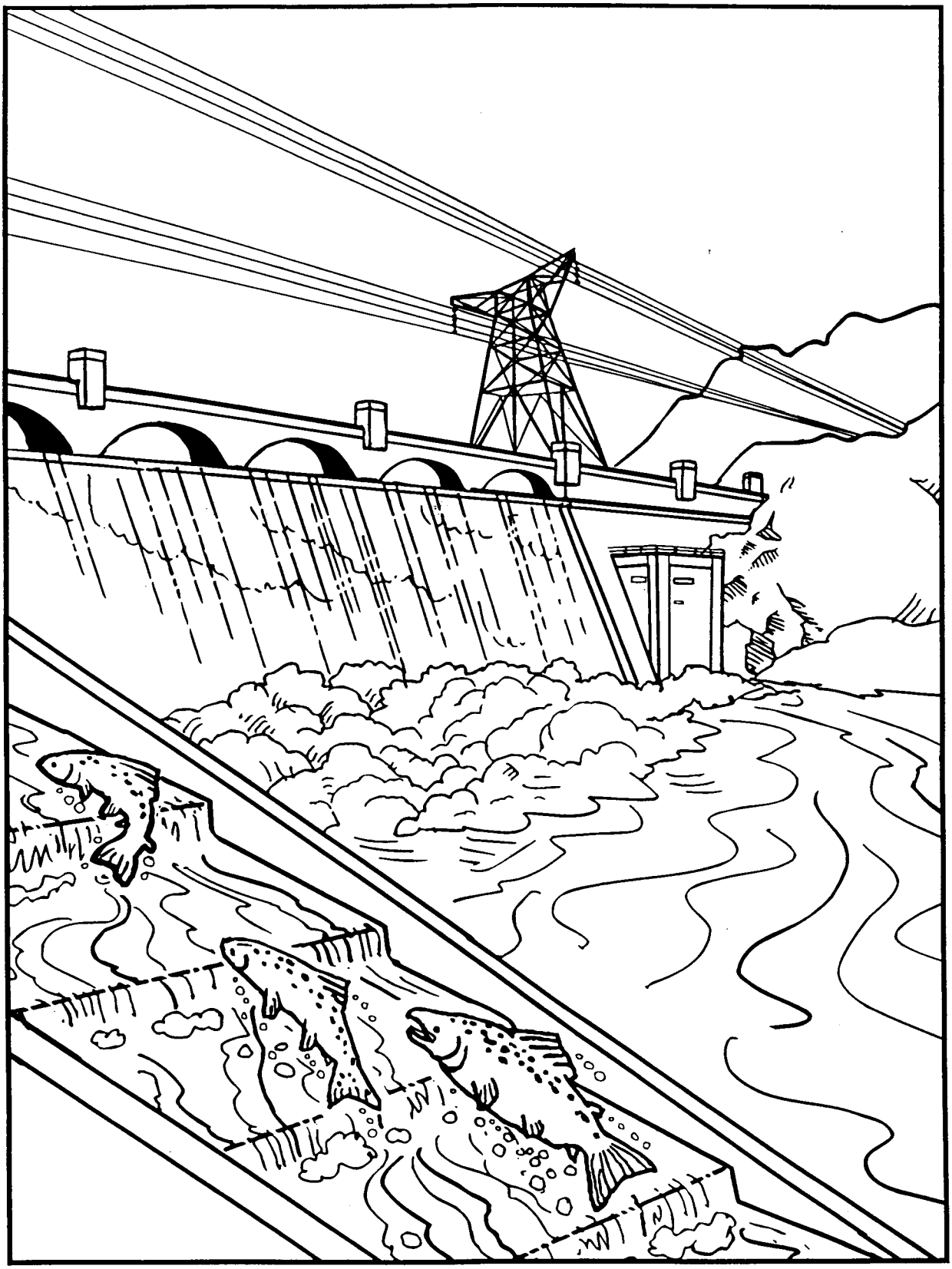
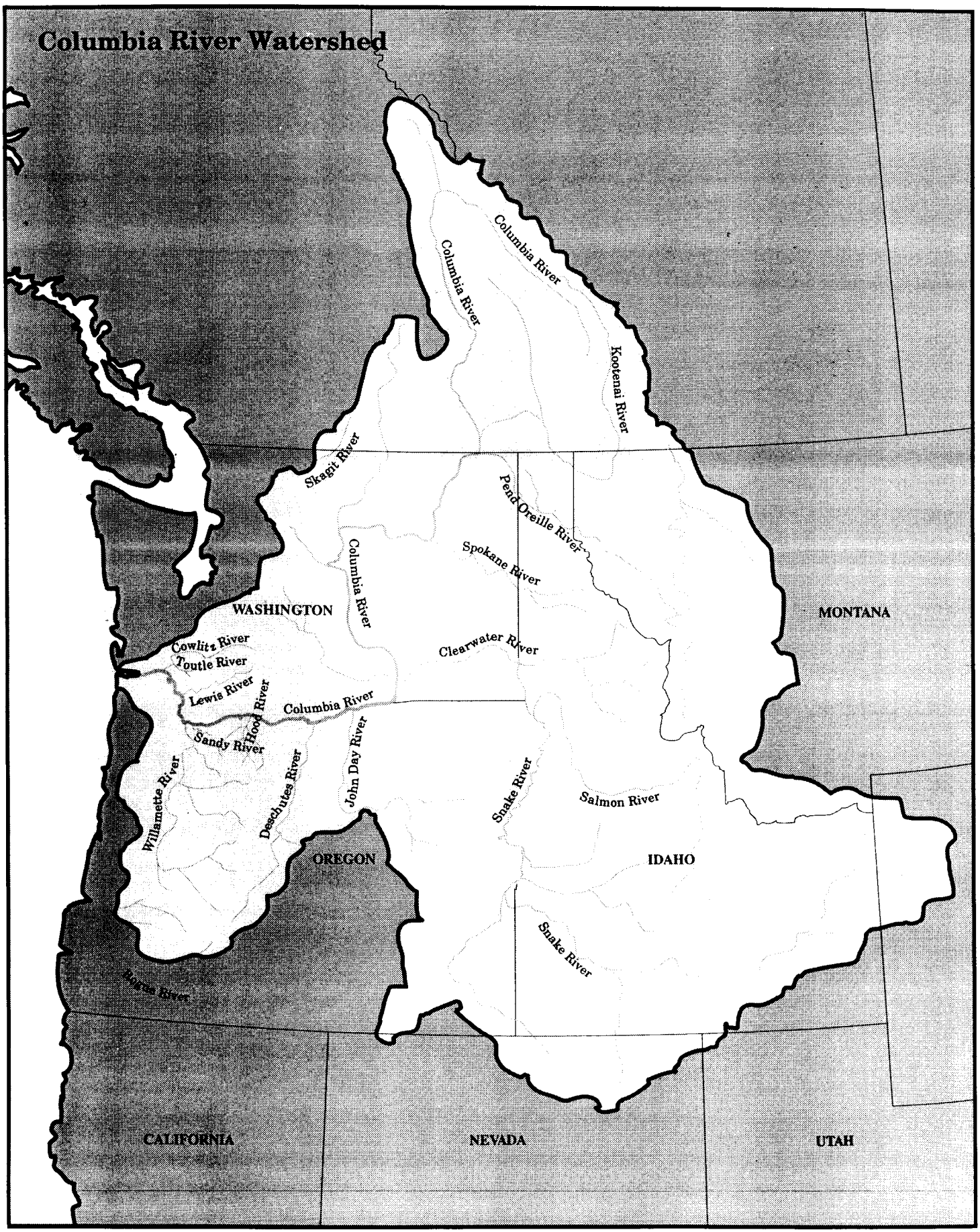
JOURNEY OF THE *ONCORHYNCHUS*



A STORY OF THE PACIFIC NORTHWEST SALMON

BONNEVILLE POWER ADMINISTRATION


Columbia River Watershed
Columbia River
Columbia River
Kootenai River
Skagit River
Pend Oreille River
Spokane River
Columbia River
WASHINGTON
MONTANA
Cowlitz River
Toutle River
Clearwater River
Lewis River
Hood River
Columbia River
Sandy River
John Day River
Deschutes River
Willamette River
Snake River
Salmon River
OREGON
IDAHO
Snake River
Rogue River
CALIFORNIA
NEVADA
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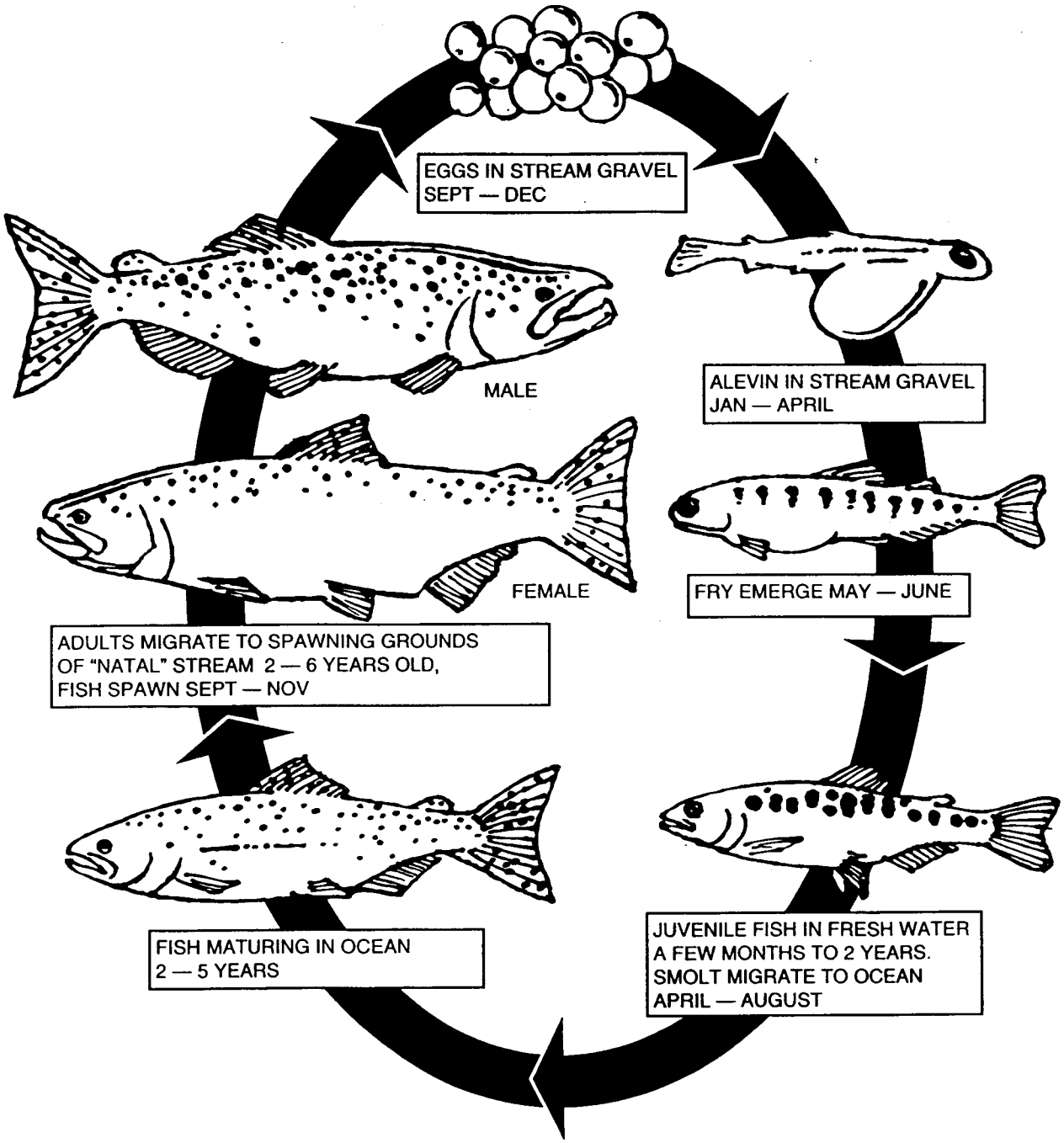
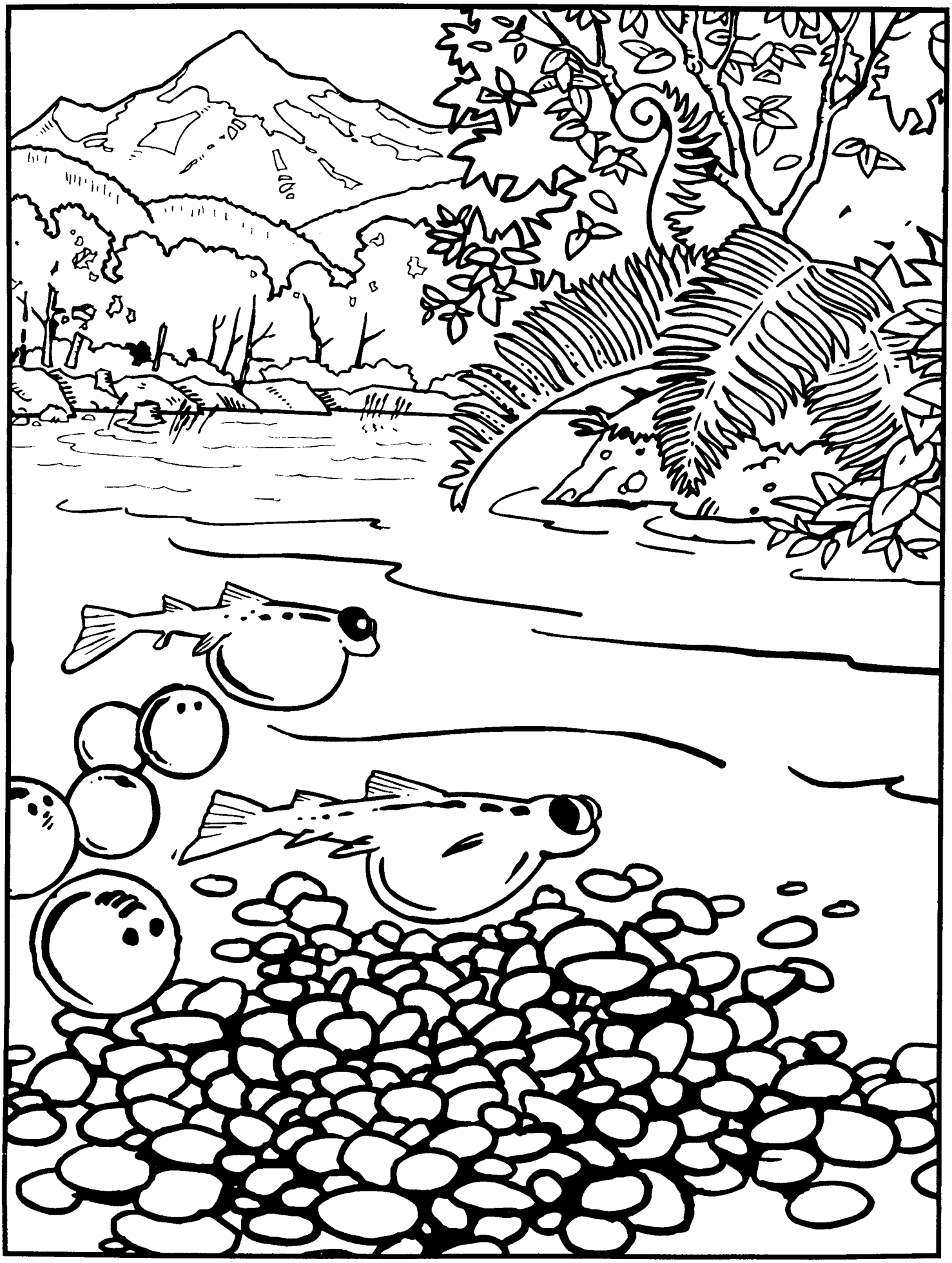
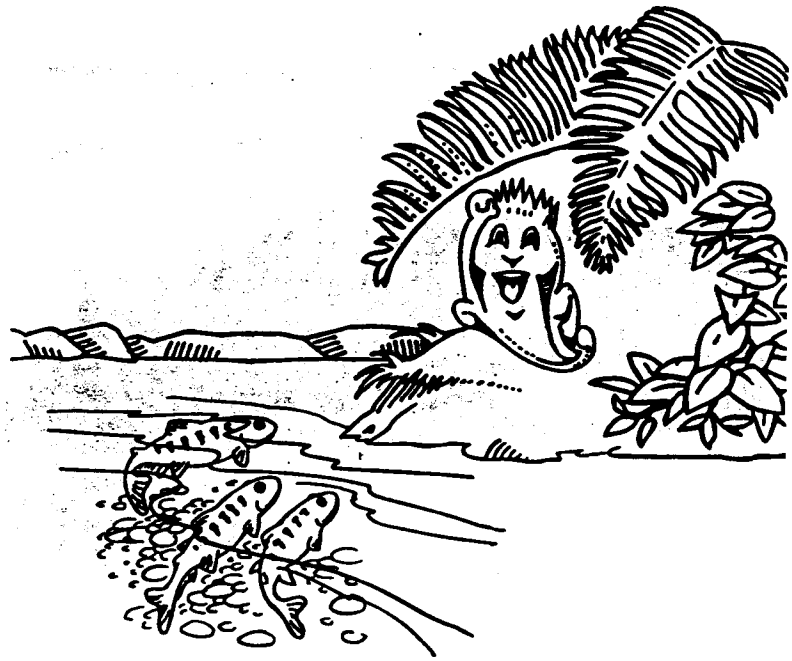


LIFE CYCLE OF CHINOOK SALMON



Journey of the *Oncorhynchus*

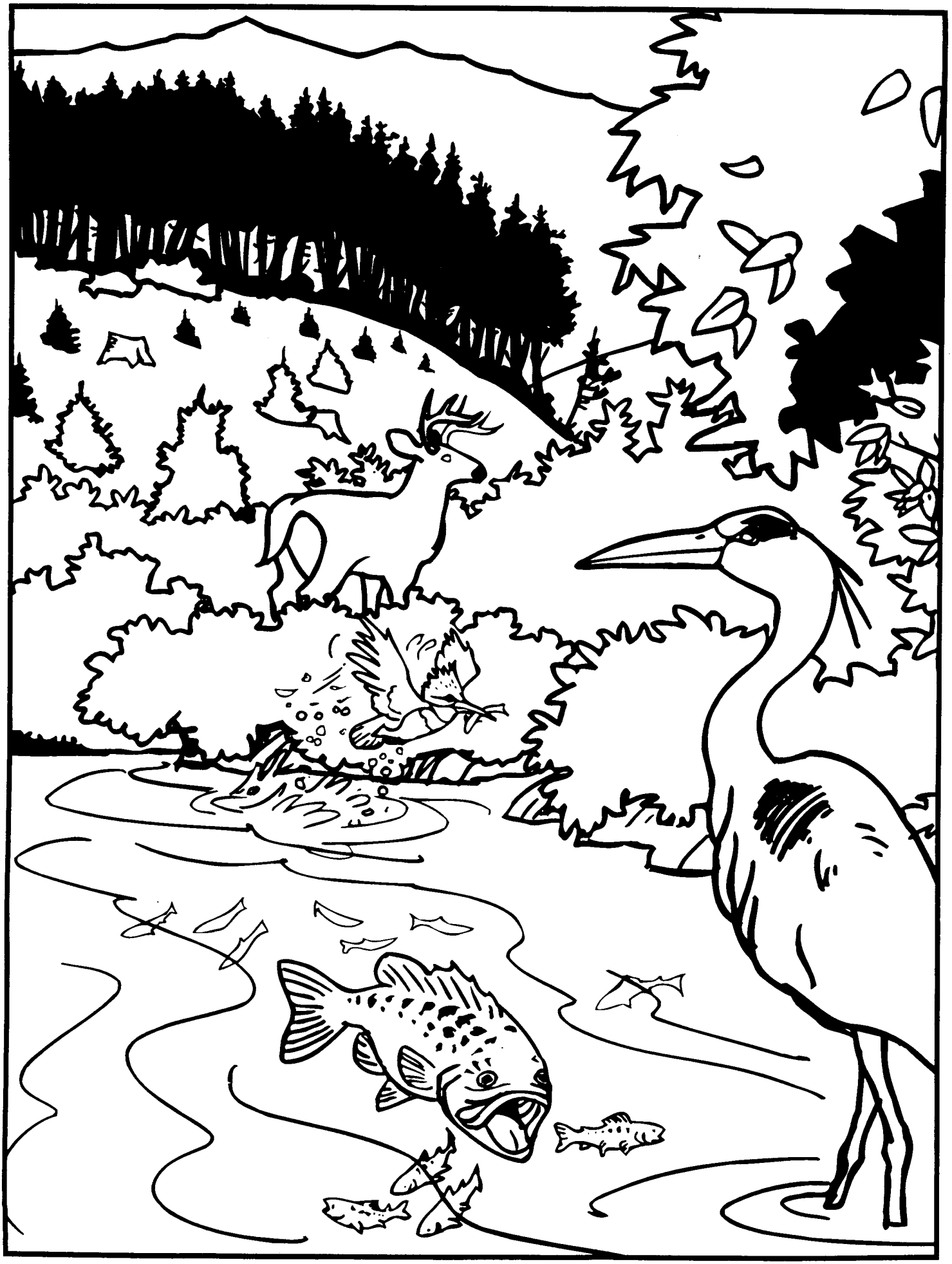
A Story of the Pacific Northwest Salmon

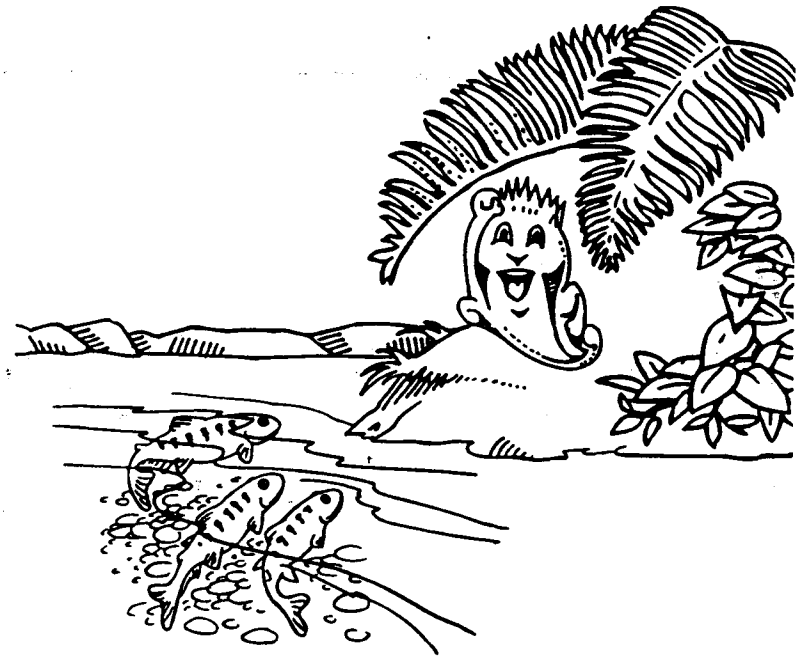


It's December. Rain falls on a small stream low on the mountain's northeast slope. Several drops hit the arching blades of grass shading a shallow pool at the edge of the stream. One hangs at the tip, lingers for a moment then pulls itself into a droplet we'll call "Hydroid."

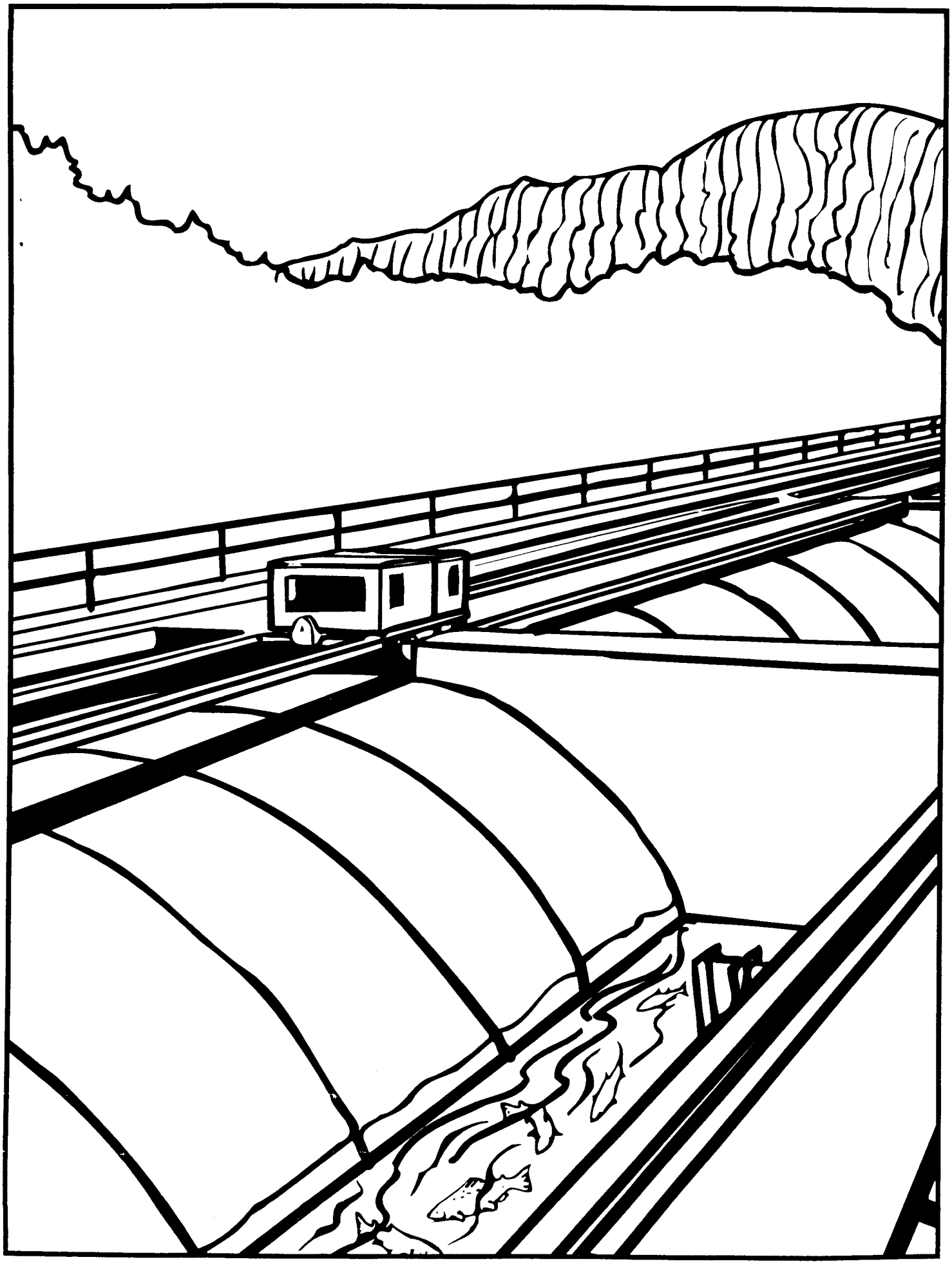
The water below Hydroid is shallow, only 12 inches deep. But it is cool and clear, even in the pools where the water is still. It's easy for Hydroid to see the gravel bottom. Some of the rocks are arranged in a circle, about two feet in diameter. Below the rocks are small red, round pebbles about the size of peas. Hydroid counts 5,000 of them when it sees that some pebbles have eyes! These are eggs. Each *eyed egg* is a fertile egg. And each *fertile egg* has a chance of becoming a salmon. Hydroid landed right over a fish nest. Fish nests are called *redds*. Hydroid knows the salmon in this small stream are all chinook.

The tiny fish are a little more than one inch long. They are called *alevins*. Each has an orange pouch on its belly. The pouch is a yolk sac that provides food during the first few weeks of the salmon's life. The alevins hide deep in the gravel. One night in March, the young fish slip up through the gravel. The yolk sacs are gone. The young fish, now called *fry*, are hungry and ready to eat, but do not stray far from the clump of grass where Hydroid is perched.





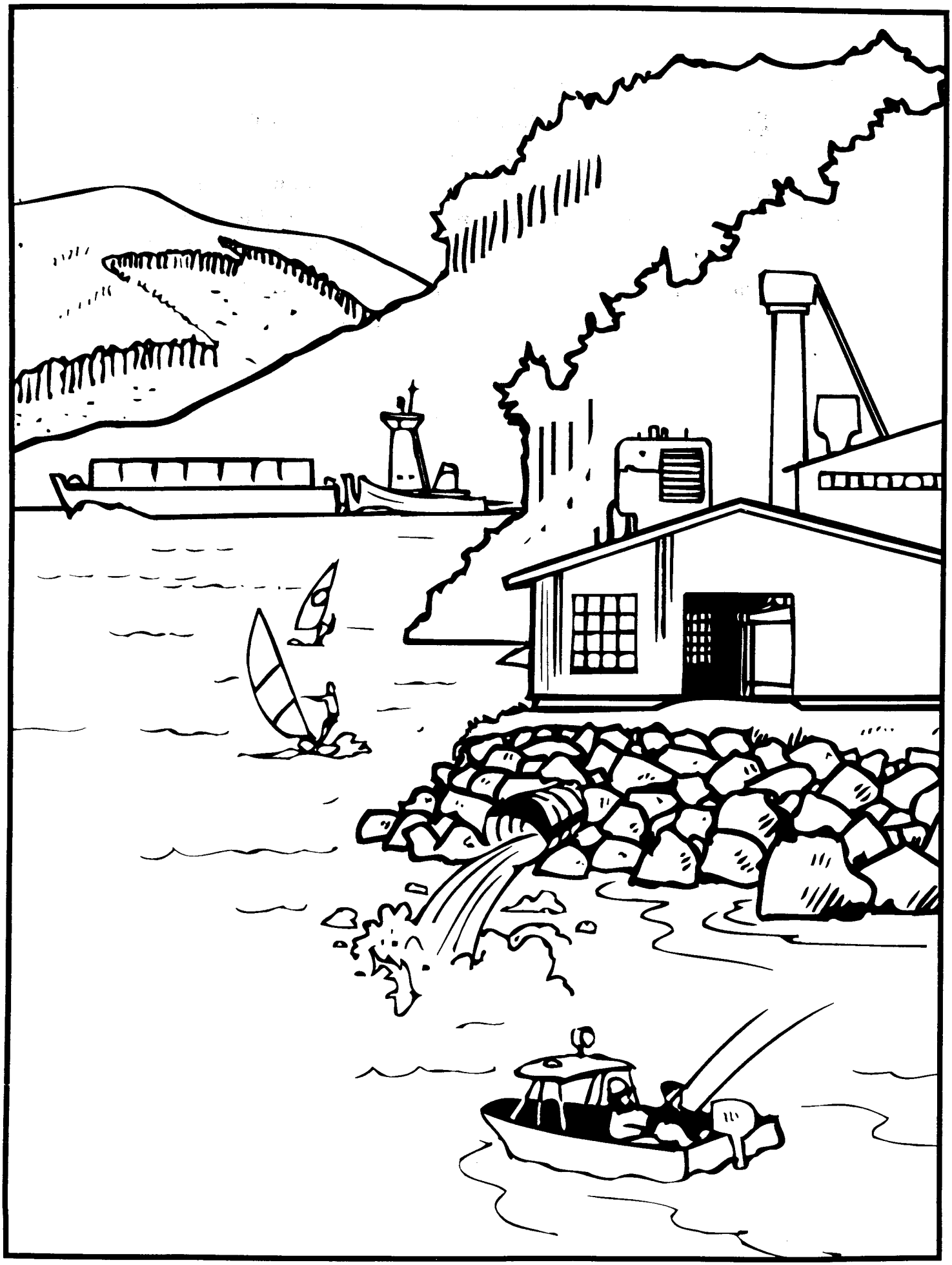
It's April. Hydroid's young friends still hide in the pools and slower water. Their sides now have dark bands or *parr* marks to *camouflage* them and to hide them from *predators.* They dart into the stream to grab small insects that live among the stream's rocks. As they move into the stream, they are wide open for attack. Fry are the favorite food of trout and other large fish. Not everything that looks like a branch is a safe hiding place. Some branches turn out to be the legs of great blue herons. Hydroid also warns the young chinook to beware of shapes darting out from trees. The shapes could be kingfishers. The bright blue birds are looking for young fish to feed their own young this time of year. The young chinook learn how to find food and avoid danger.



It's April, one year later. Each fish is now about the length of a human finger and are called *fingerlings*. Their parr marks are fading and the young fish are restless. As snow from the mountain above begins melting, the stream rises and the fish move into the swift current. The fish do not swim, they float with their heads pointed upstream. Hydroid travels along with his friends. Their small stream joins Hood River. The fish move down into the water and travel mostly at night to avoid predators. Along the way, they eat worms, flies and larger insects. The fish are growing quickly.

Hood River joins the Columbia River. Hydroid and the fish are in the *reservoir* created by Bonneville Dam. The dam makes enough electricity to heat all the homes and turn on all the lights in Portland. It does this without polluting the air. But the fish are not all that happy with the reservoir. There is no current to tell them which way to go. The slow water is warm. Chinook and other salmon like cold water. Bass, walleye and bigmouth minnows like warm water and they love to eat young chinook. But Hydroid knows the greatest danger lies ahead. Dams produce power by sending water past *turbines*. The blades are not likely to hurt the salmon, but dropping from the top to the bottom of the dam can. It's like falling from the top to the bottom of a nine story building in less than one second.

The current draws the fish to the mouth of a turbine when Hydroid spots a screen wall ahead. Hydroid flattens itself against the screen and cushions the young fish as they ride the screen up, past the turbine into a tunnel within the dam. But the danger is not over. The ride makes some fish dizzy. Gulls and other birds know this. They wait on the lower side of the dam and pick off the stunned fish. Hydroid quickly moves the Hood River chinook low in the river.



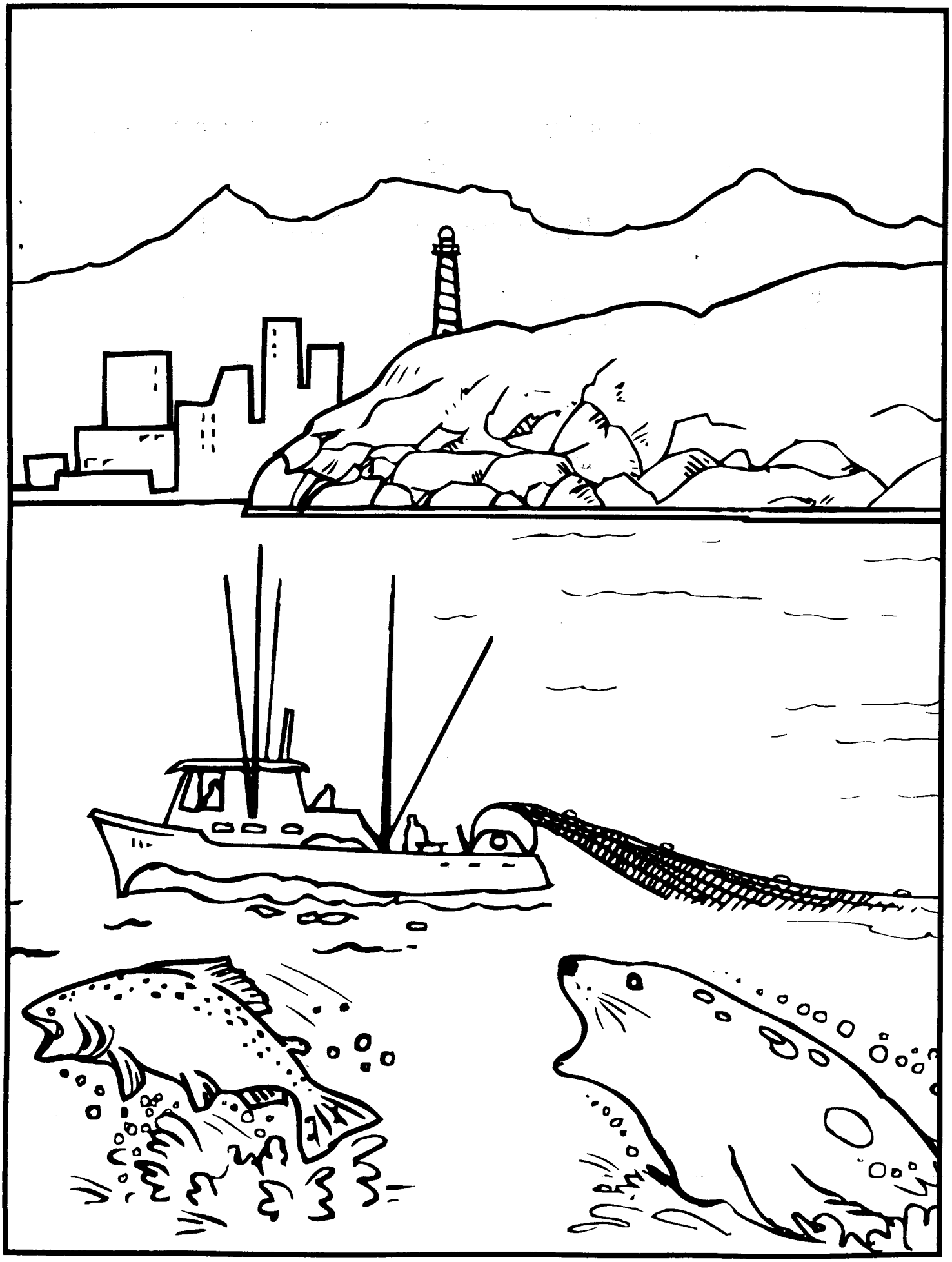
The fish are growing quickly. They are sleek and silver and almost four inches long. They are becoming *smolts*.

By midnight the next day they pass between Portland and Vancouver. In cities, rainwater hits parking lots and streets and shoots straight into the nearest storm drain. Along with it comes water leaking from old garbage dumps, soap from washing machines, chemicals from gardens and lawns. Someone has recently changed the oil in a car and poured the oil down the sewer. Hydroid coughs on the oil fumes and quickly steers the Hood River smolts away.

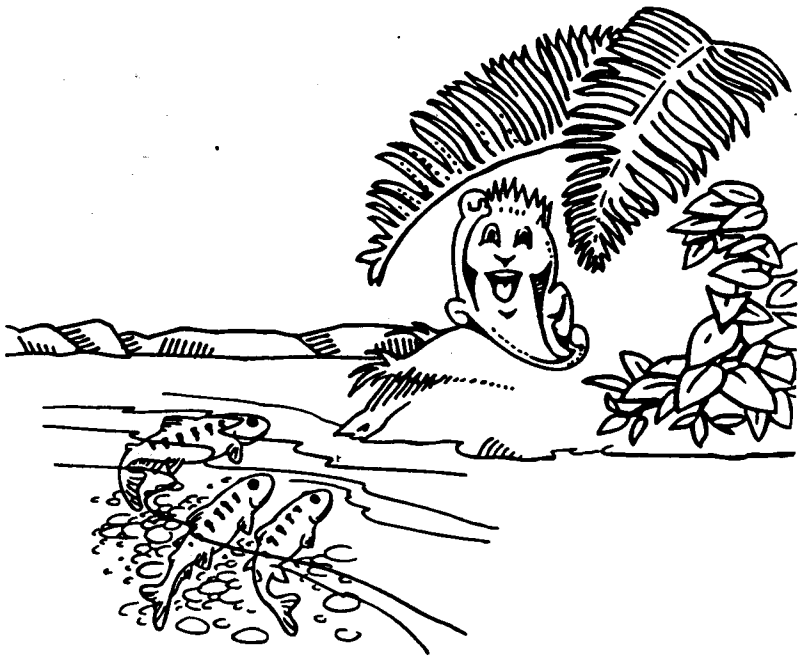
A huge number of fish come swimming in from the left. Most are chinook from the hatcheries of the Willamette River. Fish hatcheries replaced streams that were flooded when dams were built, or were paved over when cities were built. People hoped to replace wild fish with hatchery fish. But hatchery fish are raised in the protection of concrete ponds. Now they are in the stream, they are not as quick to hide from danger or as skillful in finding food. Not as many survive the journey.

Among the Willamette fish are some smaller salmon. These are the wild *coho* salmon of the Clackamas River.

A fat fly bobs on the water above. Hydroid notices a shiny spot on the fly and tries to warn the young fish away. Too late. An angler catches a young salmon. The Hood River chinook learn another lesson.



It's a beautiful day in late June. The river has suddenly become wide and shallow. And it tastes different – it's salty! The Columbia River is meeting the Pacific Ocean. The area where the salt water of the sea mixes with the fresh water of a river is called an *estaury.*

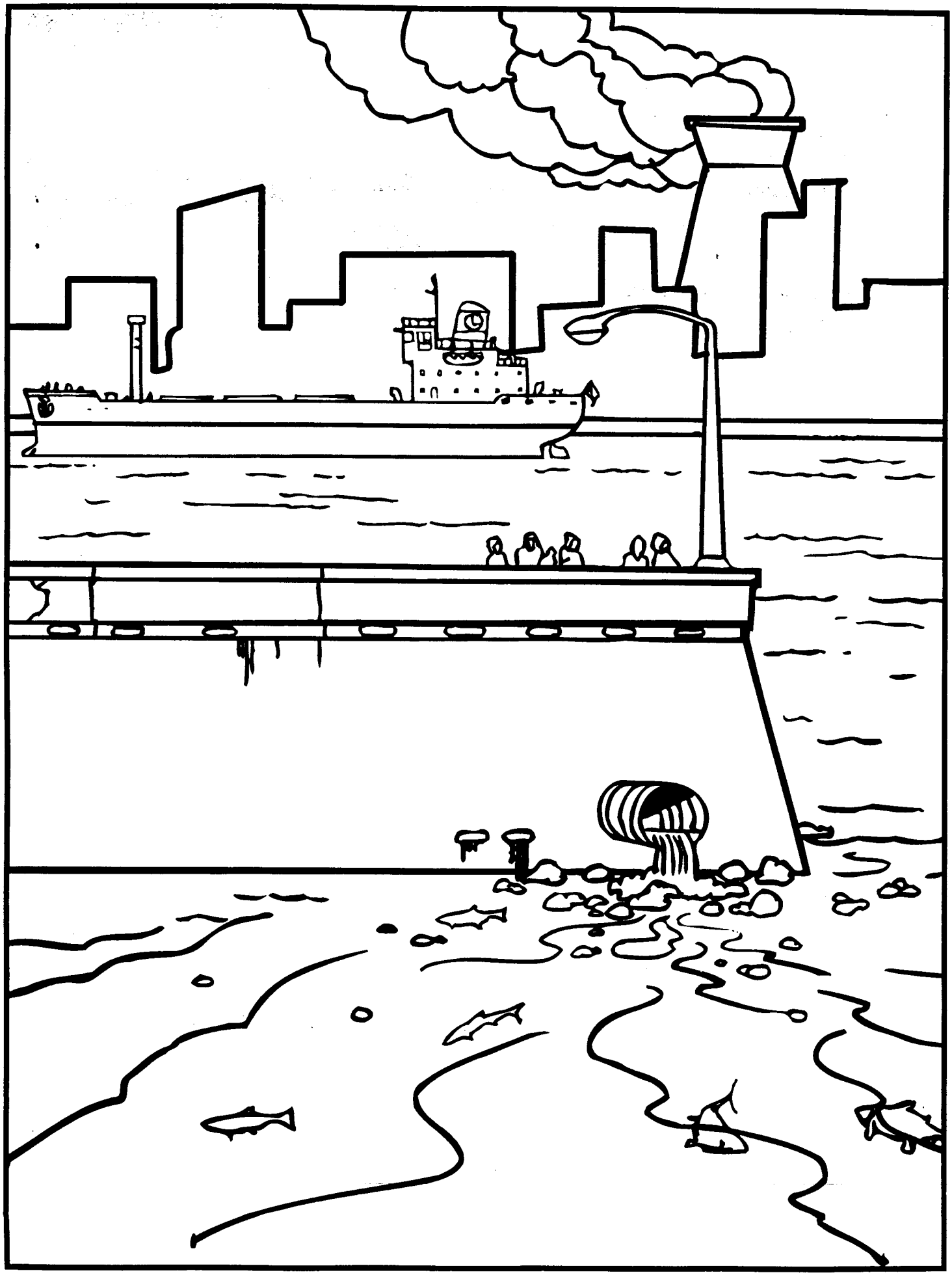


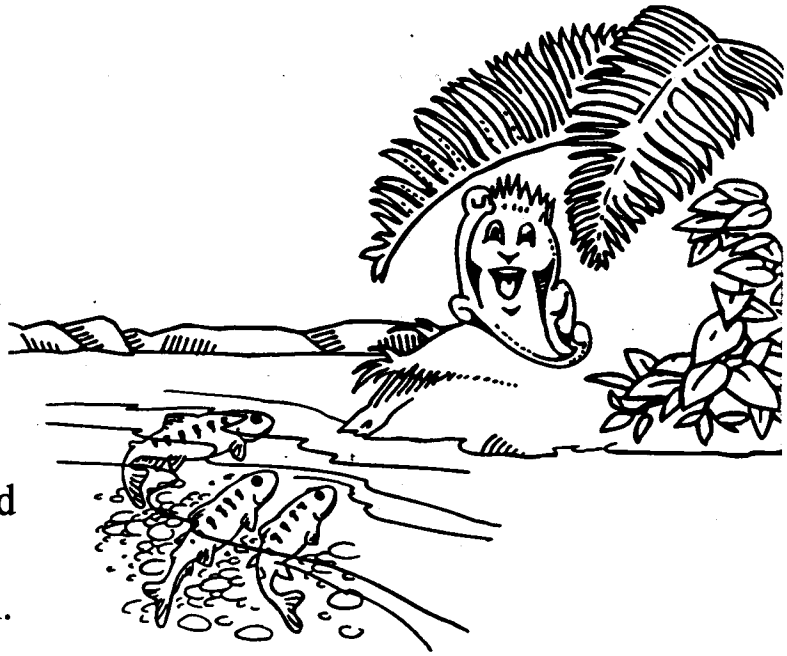
The bright June sun warms the water making Hydroid feel lighter and lighter. Hydroid evaporates and is soon floating in the air above the Pacific Ocean. The chinook swim head on into the cool ocean currents, following the schools of anchovies, herring and shrimp that will lead them north to the waters off Alaska.

A boat is stretching a long fine net along the water. The Hood River fish are small enough to swim through the openings in the net. This time next year, some will not be as lucky. They will be larger. They will find themselves among the fish now being pulled onto the deck of a fishing boat.

They swim with clouds of bright red *sockeye* salmon getting ready to return to their Alaska rivers. Near shore they meet up with the humpbacked *pink* salmon and *chum*, or dog, salmon. By their third year, Hydroid's friends are three feet long. Their skin is two-toned with a dark greenish back and silver sides and belly. Their backs and sides are freckled with dark black spots as camouflage. The marks on one fish are deep, ugly. These are not spots, but old wounds made by the teeth of a sea lion.

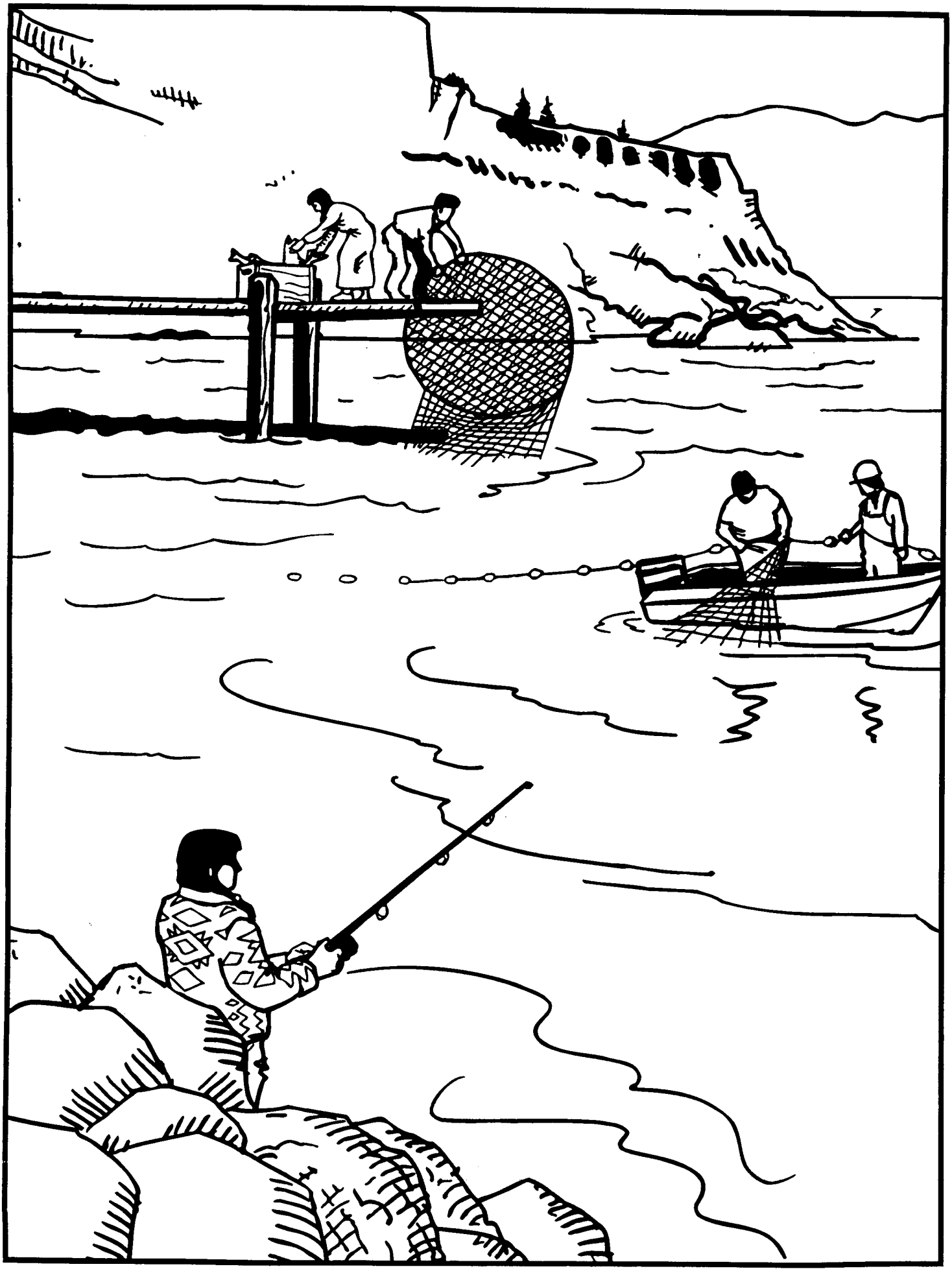
By their third year, a secret signal from Nature turns the Chinook south, back toward the Columbia River.

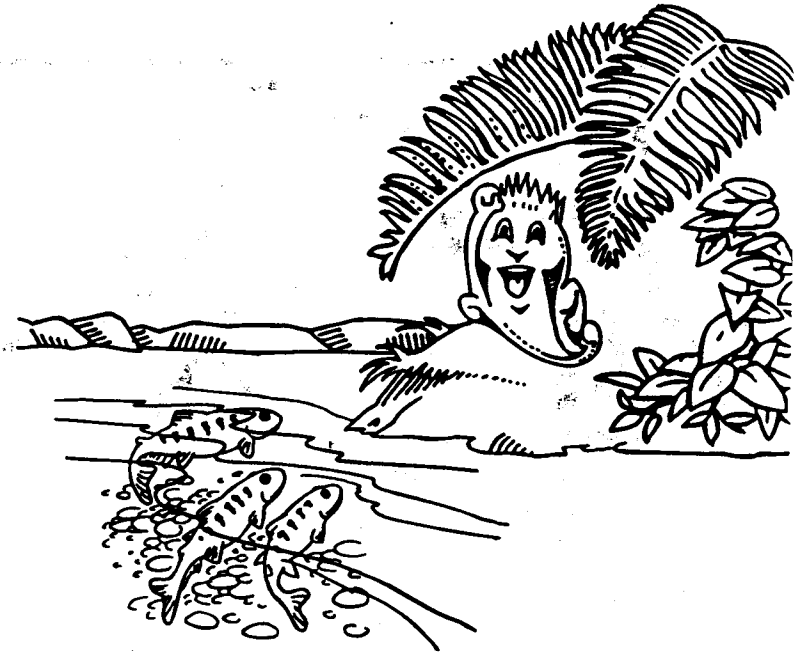




It's April. Below, Hydroid sees that nine of the Hood River chinook have avoided all the ocean's perils to come back to the Columbia. The clouds ahead of Hydroid meet cold air and rain on Oregon and Washington. The river rises and the chinook meet the current head on.
Suddenly, they are no longer hungry. All they want to do is swim, quickly, up the river to home, to their little stream off Hood River. They steer clear of the warm water released by factories and power plants near Camas, Portland, Longview, Kelso, and Rainier.

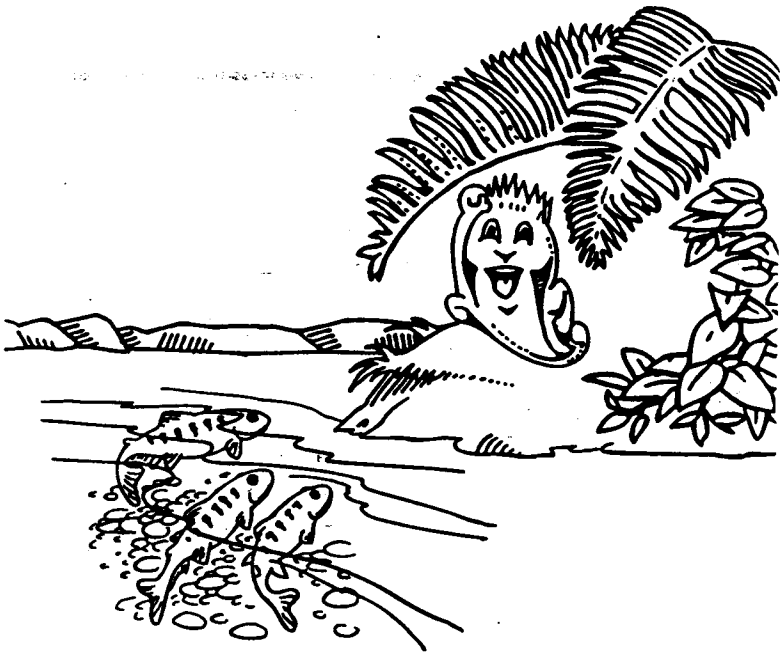
At Longview, a small group of chinook take a left turn up Washington's Toutle River. At Portland, another group takes a right. The surviving Willamette chinook are heading back to their hatcheries. The Hood River fish push straight ahead, toward home.





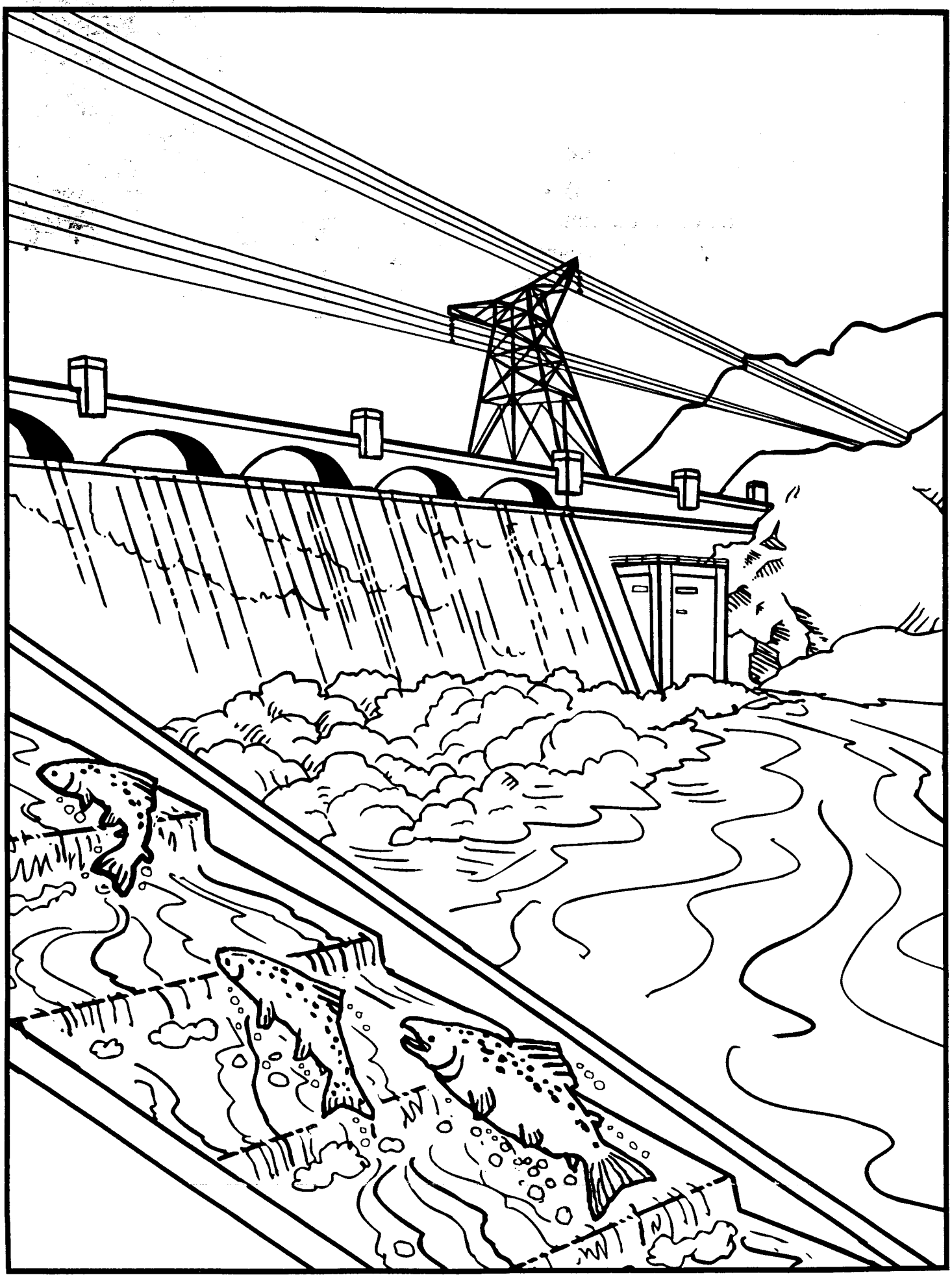
Not all the Willamette River spring chinook make it back to their hatcheries. Just south of Portland is Willamette Falls. But it's not the steep waterfall that worries the fish. It's the shadow of a wall of boats. And there is something new for the Willamette fish. A strange-looking net sweeps through a pool of water at the base of the falls. The person at the other end of the net is a member of the Yakama Indian Tribe. His net is called a dip net. For thousands of years, salmon have been part of tribal culture and religion. The fisherman stands all day, sometimes all night, sweeping the water with a net at the end of a 25-foot pole. He stays until he has enough fish for his family and his tribe.

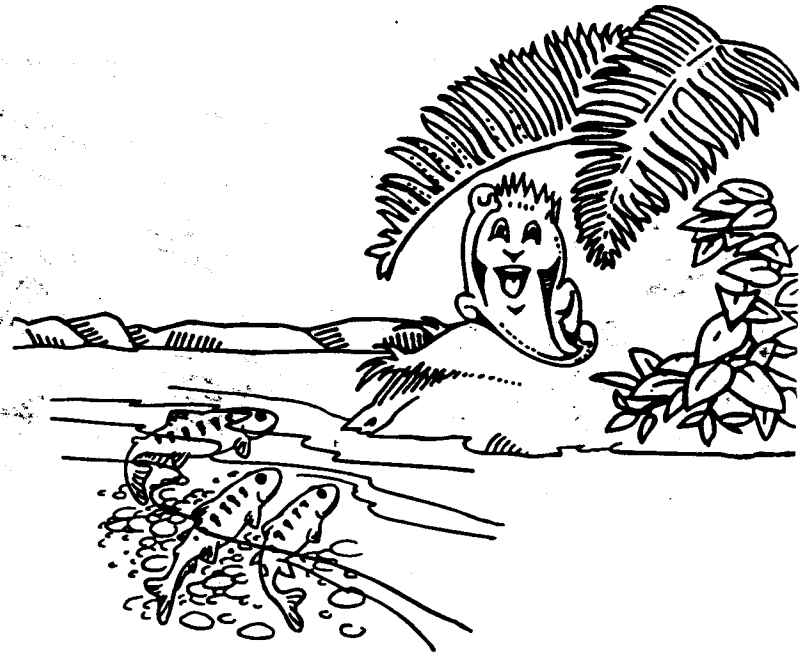
Two years ago, the little coho from the Clackamas River came back as adults. Seventy-five of them made their way to the Clackamas. Fifty of them survived to return to their home streams, build redds and lay eggs. Chinook may spend three years in the ocean. Coho most often spend only two years in the ocean. In fact, the eggs they laid hatched long ago. Another group of wild coho has already left the Clackamas and is on its way to the sea.



The salmon of the Toutle River have different story to tell. But the chinook that swam up that river 14 years ago did not live to tell the tale. Scientists were keeping a close watch on the mountain they call St. Helens. The Indian Nations have long known this mountain. They called it Loo-Wit, the keeper of the fire. On May 18, at 8:32 a.m., the mountain blew its top. Hot ash covered the Northwest from Washington to Montana. The blast blew down all the trees in its path. The hot mud washed the trees into the Toutle River. It boiled and buried everything in its path, including the river's brave salmon.

No one thought the salmon would ever return to the Toutle. But the salmon proved them wrong. Within two years, chinook found their way again to the river's mouth and began building their nests.



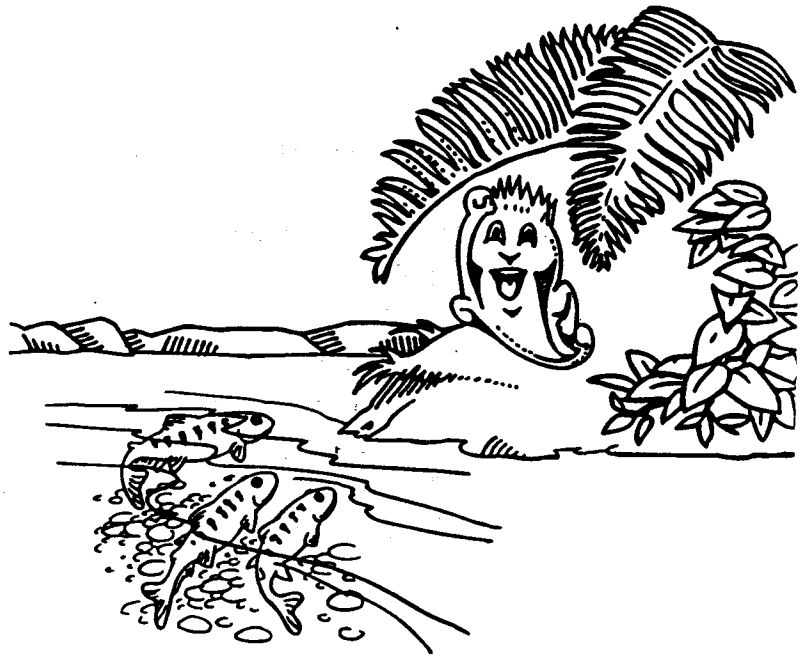


Hydroid has joined other water droplets to form a cloud over Mount Hood. Below, the final seven Hood River chinook are facing the last part of their journey home. They come face to face with a big wall. It is the front of Bonneville Dam. The fish must get past the dam. They search for the fastest water. The water is flowing over a set of stairs. The fish use all their strength and jump through the water over each smooth flat step. It's hard work. Two of the fish don't make it. Five reach the large lake of Bonneville Dam's reservoir.

Two of the chinook get lost in the reservoir. The last three chinook make it to the mouth of Hood River. They are weak from their travels. Their skin is dark. The male's snout is curved into a hook. They are thinner than when they entered the Columbia. Yet the sides of two of the fish are bulging. These are females full of eggs. They are in a hurry to build their nests.

Hood River changed in the four years they were gone. This winter, loggers cut a stand of trees from the side of the mountain. A farmer cleared forty acres of land to put in a new orchard. Others sent their cattle into the stream to drink. The cattle hooves trampled the stream bank and killed the plants, leaving a trail of mud. Spring rains washed a heavy load of dirt into the river. The water must run higher to clean the river.

The clouds next to Hydroid brush the top of Mount Hood and rain fresh water down the mountain side, through the streams and to the waiting fish. They begin to move up the river.



One of the females does not make it up Hood River. The other two move on. They have just one mile to go. There is not much time now. They must get home soon.

And there it is. A right turn and they are home at last. The stream of their birth. They were once little fish here. Now they are adult salmon, nearly four feet long. The female chooses a shallow spot in the shade of a clump of grass. The water runs fresh, but not too fast. She begins to build her nest. For the next hour, she moves over her chosen spot, flipping her tail to move the gravel into place. Finally it feels just right. She settles in one last time. The male swims up close to her and presses her side with his body. She lays her eggs. He fertilizes them. The female moves upstream of the nest. With one last effort, she flips up fine pieces of gravel to cover and protect her eggs.

Their work done, the fish rest in the stream. In a few days, they die. Hydroid watches as their bodies drift down the stream to become food for the crows, raccoons and smaller creatures of the water. The small creatures are food for the Hood River chinook that hatch next year. The droplet has been watching the fish so closely that it has not noticed that its cloud has moved closer to the mountain.

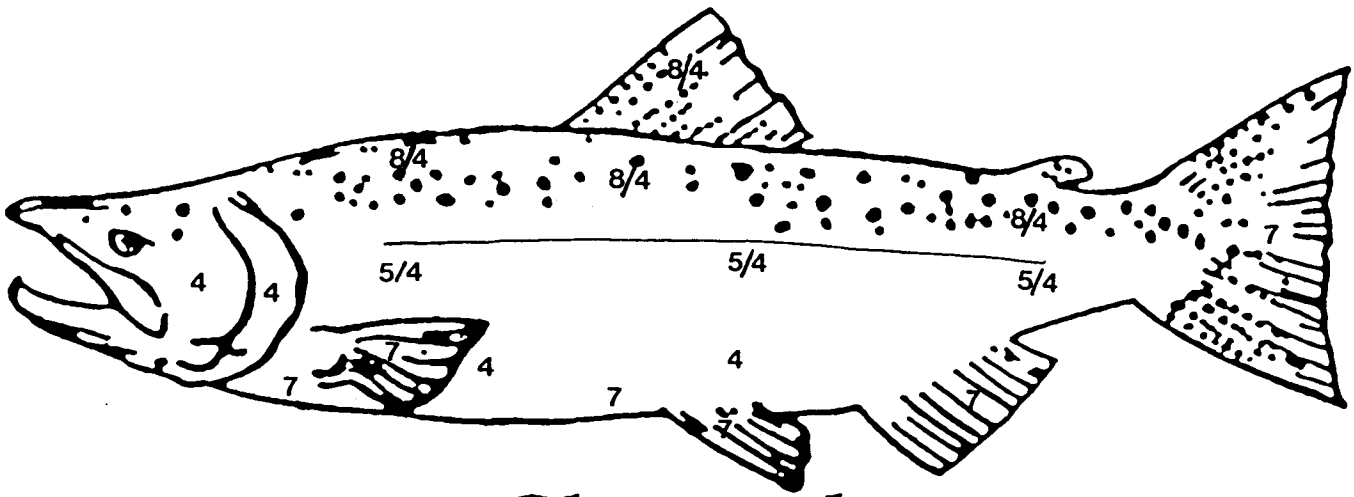
Hydroid's cloud brushes against the tip of Mount Hood. A gentle rain falls on a small stream low on the mountain's northeast slope, 50 miles east of Portland, Oregon. Several drops hit the arching blades of grass shading a shallow pool at the edge of the stream.

Spawning Colors of the Pacific Salmon

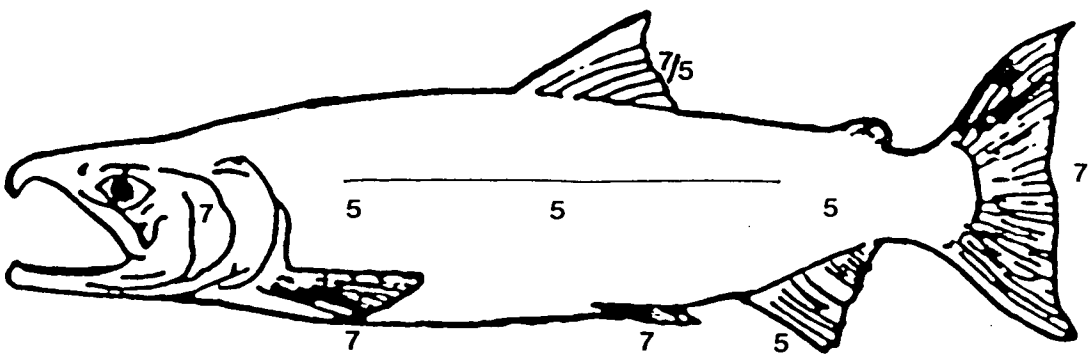
Using the color key provided, color the five Pacific Salmon.
After you are done, the salmon will be wearing their bright spawning colors

Color Key:

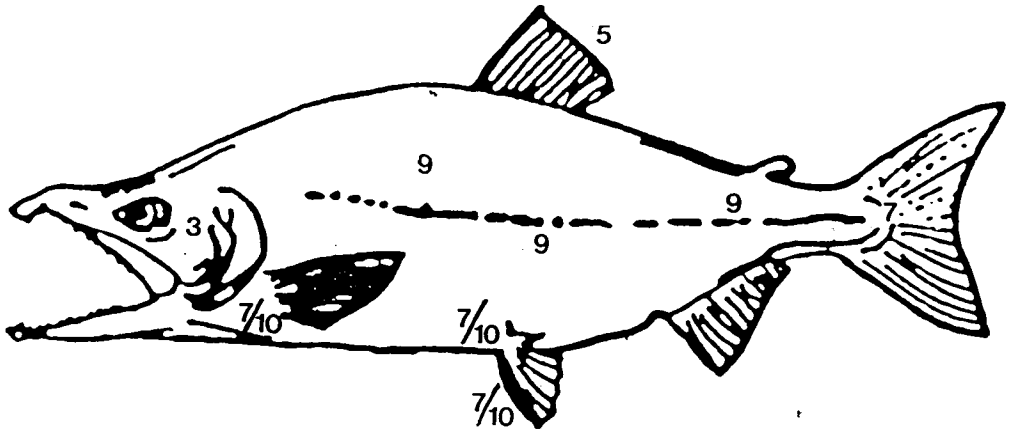
1. Purple
2. Yellow
3. Olive Green
4. Brown
5. Salmon Pink
6. Turquoise Blue
7. Silver/Gray
8. Black
9. Red
10. White



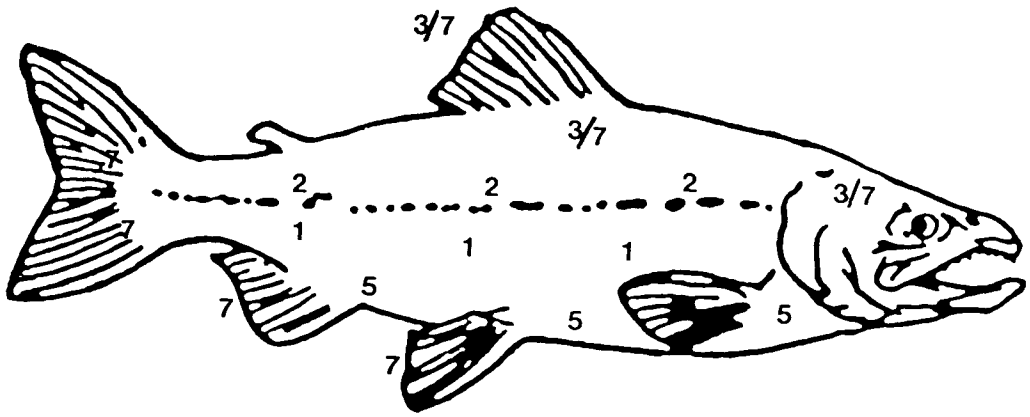
Chinook



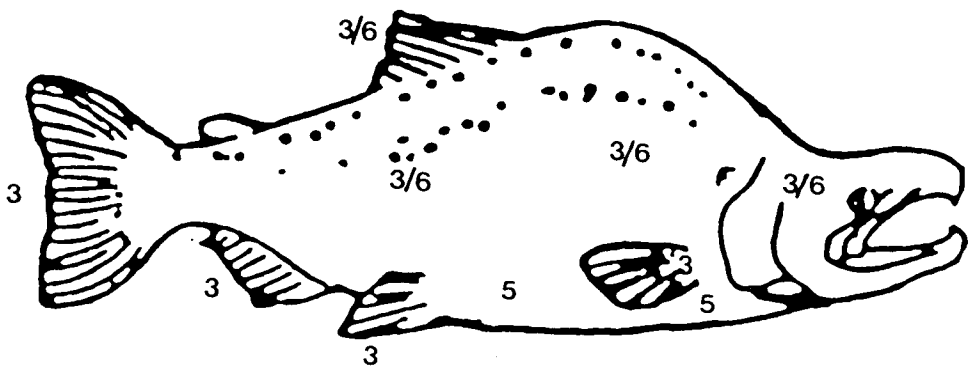
Coho



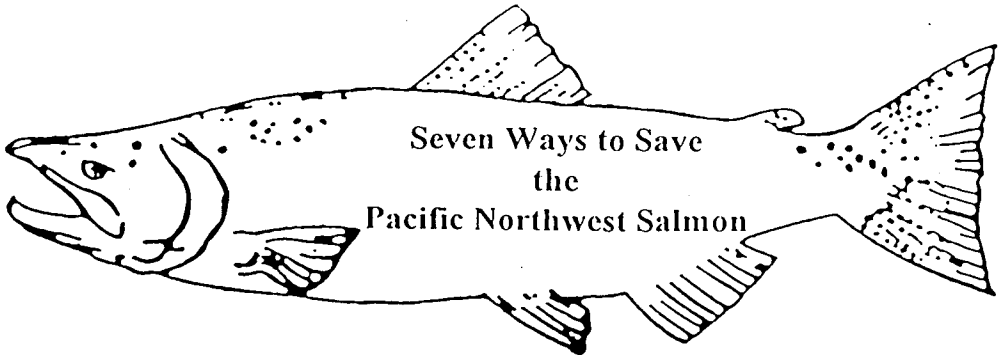
Sockeye



Chum



Pink



Following are seven examples of what each of us can do to help salmon.

1. **Conserve Water.**
   Use less at home to save more for fish!

2. **Do NOT dump any waste in streams or ditches.**
   Lawn grass, pet droppings, or trash in streams hurts fish and may spread disease.

3. **Do NOT pour anything into storm drains.**
   Storm drains lead to streams. Oil, gasoline and chemicals will kill fish.

4. **Use less chemicals.**
   Fertilizers, bug and weed killers, detergents and drain cleaners are all poisonous to fish and other wildlife.

5. **Use less electricity.**
   The Northwest uses rivers to make hydroelectric power which is our main source of electricity. Using less electricity leaves more water for fish in the rivers.

6. **Plant trees beside streams.**
   Salmon and trout need cool shady water to survive. Trees also stop erosion and provide more food for fish.

7. **Ask others to help.**
   Talk to other people about how to help streams and fish.

To order call 1-800-622-4520
For additional information call 230-3478
in Portland; or toll free 1-800-622-4519

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