

Warmer water affecting juvenile salmon, study suggests

NEWPORT — A new analysis of juvenile Chinook salmon in the Pacific Ocean documents a dramatic difference in their foraging habits and overall health between years of warm water and those when the water is colder.

The study found that when the water is warmer than average — by only two degrees Celsius — young salmon consume 30 percent more food than during cold-water regimes.

Yet they are smaller and skinnier during those warm-water years, likely because they have to work harder to secure food and the prey they consume has less caloric energy.

Results of the research, conducted by researchers from Oregon State University and the National Oceanic and Atmospheric Administration, are being published this week

in the journal PLOS One.

“When young salmon come out to sea and the water is warm, they need more food to keep their metabolic rate up, yet there is less available food and they have to work harder,” said Elizabeth Daly, an Oregon State senior faculty research assistant with the Cooperative Institute for Marine Resources Studies, a joint program of OSU and NOAA.

“Our long-term data set contradicts the long-held assumption that salmon eat less during warm-water regimes,” Daly added. “They actually eat more. But they still don’t fare as well. When the water is warm, salmon are smaller and thinner.”

Daly teamed with Richard Brodeur, a NOAA Northwest Fisheries Science Center researcher, to examine 19 years of juvenile salmon surveys,

from 1981-85 and 1998-2011.

The rich, long-term data set revealed the trophic habits, size and condition of yearling Chinook salmon caught soon after they migrated to the ocean.

The researchers found that during both warm- and cold-water regimes, the diet of the salmon is primarily fish, but when the water is cold, they also consume more lipid-rich krill and Pacific sand lance. When the water is warmer, the salmon’s diet had more juvenile rockfish and crab larvae.

Previous research led by Bill Peterson, a NOAA fisheries biologist and courtesy professor in OSU’s College of Earth, Ocean, and Atmospheric Sciences (CEOAS), found that the makeup of copepods during cold-water years differs greatly from during warm-water years. In cold years, these small crus-

taceans drift down from the north and are lipid-rich, with much higher nutrient levels than copepods from the south.

And though salmon may not directly consume these copepods, they are eating the fish that do consume them, noted Brodeur, also a courtesy faculty member in CEOAS.

“The warm years typically have less upwelling that brings the cold, nutrient-rich water to the surface,” Brodeur said. “Or in the case of 2005, the upwelling was so late that many of the salmon died because there was no food when they entered the ocean.”

“Salmon populations may be able to handle one year of warm temperatures and sparse food,” Brodeur added. “But two or three years in a row could be disastrous — especially for wild fish populations. They may have to travel much farther

north to find any food.”

Hatchery-raised salmon that are released in similar numbers in warm- or cold-water years may fare slightly better during bad ocean conditions, the researchers noted, because they tend to be larger when they enter the marine environment.

Daly and Brodeur, who work out of OSU’s Hatfield Marine Science Center in Newport, Oregon, said that the 19 survey years they analyzed included 10 warm-water years and nine cold-water years. In some cases, the warm water was a result of an El Niño, while in other years it was a lack of upwelling.

During the last two years, an unusually large, warm body of water has settled into the ocean off the Pacific Northwest that scientists have dubbed “The Blob,” which is forecast to be followed this winter by a fairly

strong El Niño event.

Though recent spring Chinook salmon runs have been strong due to cooler ocean conditions in 2012-13, the impact of this long stretch of warm water on juvenile fish may bode poorly for future runs.

“So far this year, we’ve seen a lot of juvenile salmon with empty stomachs,” Daly said. “The pressure to find food is going to be great. Of those fish that did have food in their stomachs, there was an unusual amount of juvenile rockfish and no signs of Pacific sand lance or krill.

“Not only does this warm water make it more difficult for the salmon to find food, it increases the risk of their own predation as they spend more time eating and less time avoiding predators,” she added.

Siuslaw from 1B

took on Philomath and narrowly lost to the Warriors in team scoring, 48-36. Siuslaw then moved on to round three, facing Douglas

and defeating the Trojans 42-36.

“That gave us some momentum,” said Wartnik. “Match by match, our top wrestlers were bringing it to the mats and our younger wrestlers kept getting better and more aggressive.”

After defeating South Umpqua 38-24, Siuslaw moved on to its final matchup, taking on Far West rival North Bend.

In that faceoff, freshman Murray Bingham provided a major upset in the 132-pound

match. Finding himself trailing 17-3 in the third round with time running out, Murray chose the “up” position to lead off.

“Murray is strong on top,” said Wartnik. “I knew if he could get a hold of his opponent he could pin

him.”

The whistle blew, with Bingham putting his opponent into an arm-and-bar before grabbing his wrist and putting the Bulldog onto his back. From there, Bingham was able to nab

the pin for the win as the clock expired.

The Viks will get a break before returning to the mats Jan. 7 to host the Far West League Round Robin tournament at Siuslaw High School.



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spawning. A small number of new fish may enter the basin over the next couple weeks.

Winter steelhead season has arrived. The best chances to hook a chrome steelhead at this time would be in the lower section below Five Rivers. Tossing spinners, or floating bait or a jig are good options during low clear flows.

SALMON RIVER: *Chinook, steelhead*

The fall Chinook fishery is very slow. Most remaining fish are actively spawning or already spawned out.

Winter steelhead season tends to kick in this time of year. A small number of fish are likely in the system now and look for the numbers to steadily increase over the coming month. Casting lures, bouncing the bottom or drifting jigs or bait under a bobber are good techniques to consider.

SILETZ RIVER: *Chinook, coho, steelhead*

The fall Chinook fishery is slow. A small number of new fish may be found in the lower river but most remaining fish

are actively spawning or spawned out.

The wild coho fishery is now closed for the season.

Winter steelhead season is just getting underway. This time of year typically sees the first few fish entering the river. Best chances early on during lower flows will come from below the town of Siletz.

Side drifting, bouncing bottom or bobber fishing can be productive.

WILSON RIVER: *Steelhead, Chinook*

The river was at flood stage through mid-week. When the river drops, fall Chinook and winter steelhead will be available. Fishing should be fair to good. Anglers are reminded that the river above Jordan Creek is closed to all salmon fishing.

YAQUINA RIVER: *Chinook, steelhead*

Anglers are having very little success for fall Chinook in the upper section of tide water. Most fish are now on the spawning grounds. The winter steelhead run is now underway.

The Big Elk tends to start seeing fish this time of year in small numbers. Look for the next good rain event to get the

fishery going. The wild coho fishery is now closed for the year.

COOS COUNTY LAKES and PONDS: *Trout, yellow perch*

Fishing for trout has been decent in Bradley Lake south of Bandon and in Butterfield Lake north of Coos Bay. Anglers have been catching some of the large trophy trout stocked this year on small flies or slowly trolling spinners. Trout will not be stocked again until the spring.

Yellow perch fishing has been good in lakes like Saunders Lake. Fishing a worm on the bottom in deep water should provide lots of bites for yellow perch.

UMPQUA RIVER, SOUTH: *Steelhead*

The South Umpqua is currently open to adipose fin-clipped steelhead harvest, and winter steelhead fishing should pick up with the recent rains. There will be excellent hatchery steelhead harvest opportunities on the South Umpqua as the season progresses, especially around Stanton Park in Canyonville.

TENMILE BASIN: *Trout, largemouth bass, yellow perch, coho*

Streams in the Tenmile Basin are now closed for trout fishing until May 22, 2016. Tenmile Lakes is open all year for trout but trout fishing has been slow.

Yellow perch fishing has been very good for anglers in boats and from the fishing dock at the County Boat Ramp. A worm or piece of cut bait fished near the bottom works well for catching yellow perch.

Wild coho season is open in Tenmile Lakes until Dec. 31. The bag limit is 1 wild coho per day and 5 wild coho for the season in aggregate with all other wild coho fisheries in the NW and SW zones. Anglers casting spinners have started catching coho in the upper arms of the lakes.

Steelhead fishing is open in

Tenmile Creek but does not open in Eel Creek until Jan. 1. A couple anglers have been out for steelhead in Tenmile Creek but so far there are no reports of any steelhead being caught.

WINCHESTER BAY: *Bottomfish, perch, crab*

Fishing for bottomfish in the Triangle and South jetty has been successful. Crabbing has been productive, but Chinook and coho fishing has slowed in the ocean off of Winchester Bay and in the lower Umpqua River.

PACIFIC OCEAN and BEACHES: *Bottomfish, Dungeness crab,*

The ocean is now closed to harvest of Dungeness crab.

Ocean salmon fishing is now closed.

Pacific halibut fishing is closed.

Fishing for bottom fish is now open to fishing at all depths. Fishing for black rockfish and lingcod continues to be very good from Charleston to Bandon when the ocean is calm enough for anglers to get out on the water. The marine fish daily bag limit is seven fish and a separate daily limit for lingcod (two). Anglers can only keep 3 blue rockfish and 1 canary rockfish as part of their daily limit and there will be no harvest of China, quillback, or copper rockfish.

Retention of cabezon is now allowed at 1 fish per day and at least 16-inches long.

BAY CLAMS:

Clamming for bay clams (not razor clams) along the entire Oregon Coast. For those who don't mind the dark, there will be minus tides during several evenings in December: take a headlamp or flashlight, warm clothing, and a spirit of adventure. Otherwise, during the day, several clam species can be found even when low tides aren't so low: softshell and purple varnish clams occur primarily above +1.0, and cockles, butters and gapers can be found at tides as high as +1.0.

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