

# Mokelumne River Salmon

The Epic Journey



Welcoming home the  
salmon.

- Early October starts the annual migration of the fall-run chinook salmon. These fish are preparing to go on an imperative journey to the Mokelumne River, their birth place, to start a new generation.

Does anyone know what  
this word means?

a·nad·ro·mous

Anadromous means:

The act of fish migrating up rivers from the sea  
to spawn.

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# A long Journey ahead.

- Each year between 200 and 20,000 salmon attempt the 120 mile journey from the Pacific Ocean to the Mokelumne River Hatchery.



# On their journey upstream there are many predators and obstacles to get through.

- This sea lion sure is enjoying his fresh caught lunch. Sea lions are one of the largest marine animals that will follow the migration of salmon into the fresh water. Low water conditions, warm water temperatures, fallen trees and rocks can make a long journey even harder.





What are some other animals that like to eat salmon on their way up the river?

Humans also love catching and eating salmon. Chinook salmon have been a main source of protein for humans dating all the way back to the middle ages.

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# Looking for places to spawn.

- In order to develop properly, the eggs are dependent on a well built redd (the fish nest that the salmon spawn on), oxygen from flowing water, and cold water temperatures. The cracks and crevices of the redd hides and protects the eggs from predators and allows for water to flow around the eggs. The water temperatures need to be between 50°F and 60°F because anything below or above this temperature range will stress or kill the eggs.





The perfect spot.

- Spawning usually takes place during October through December and peaks in mid-November. Spawning starts with a female salmon building a redd. As the female builds the nest, the males chase away predators and fight for dominance.



•Female chinook salmon produce between 3,000 and 12,000 eggs, averaging around 5,000. They do not lay all these eggs at once in one redd, but rather disperse the eggs between 3 or 4 redds over several days.





Many birds and fish dine on the freshly deposited salmon eggs and fry. Fishermen often use salmon eggs to catch steelhead, as it is a main part of their diet once back into freshwater.





Hatcheries save the day

- Without hatcheries, we would not have many thriving salmon populations. With most of the historical salmon spawning grounds blocked by dams, hatcheries were built to make up for the numbers of fish that would have naturally spawned in the upper watersheds.

## Making their way into the hatchery.

- Chinook salmon and steelhead will make their way up into the hatchery by a series of step and pool style fish ladders.



The end on one's journey is the start of another's.



- Adult salmon are sorted by gender and prepared for spawning.
- Milt from male salmon is added to the eggs to complete the fertilization process.





Salmon in the wild as well as in the hatchery all die after spawning. CDFW & EBMUD perform surveys to see how many fish have naturally spawned in the river. Carcass survey employees search the shorelines for carcasses of salmon that have completed their journey as do the turkey vultures.





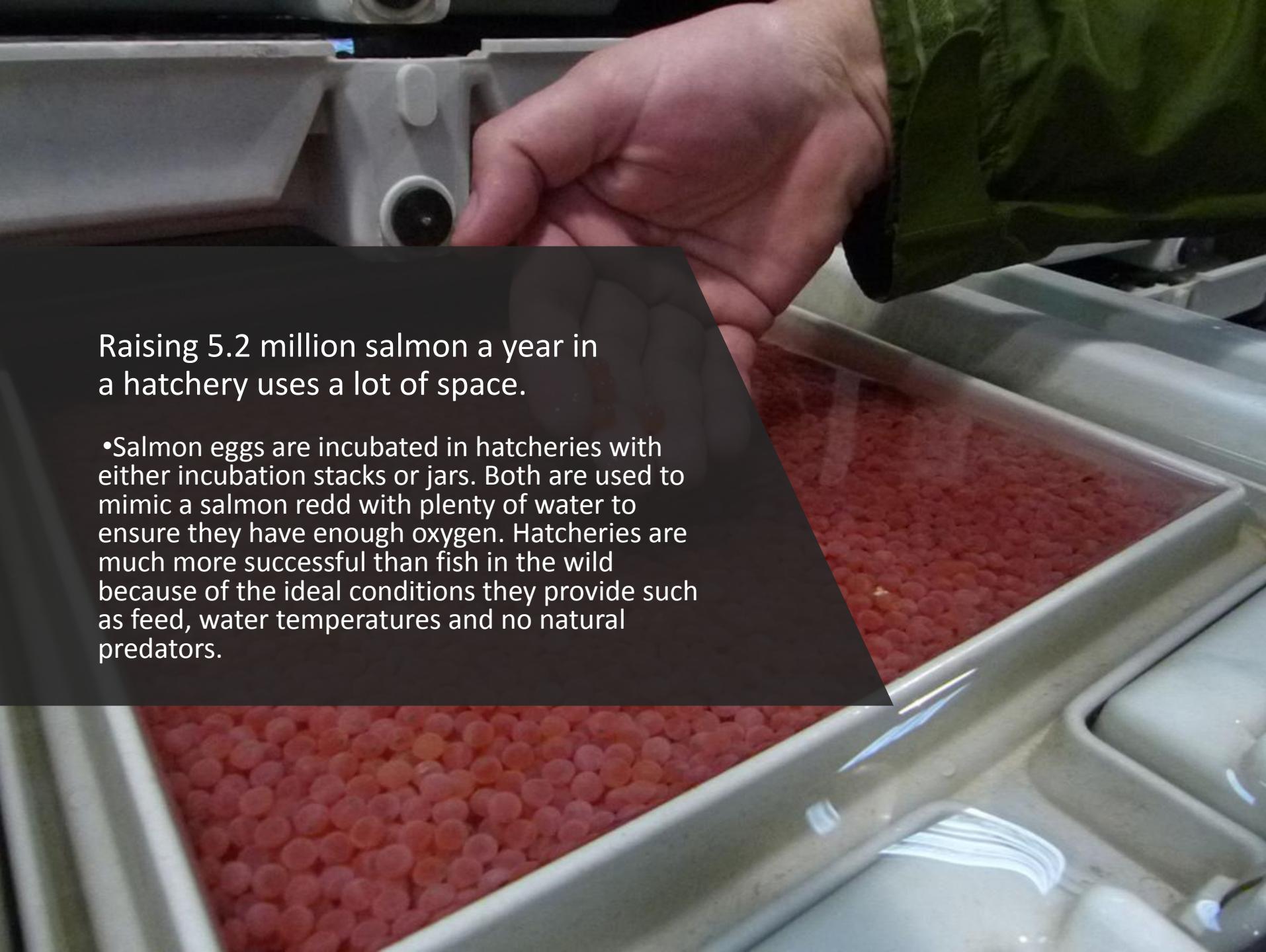


The dead salmon provide lots of nutrients to the forest and feeds many different species of animals and aquatic life.



Giving back to the people of  
California.

- Just as wild fish give back to nature after they spawn, the hatchery gives the left over salmon meat to local food banks to help feed the hungry.

A close-up photograph of a person's hand, wearing a green sleeve, adjusting a white plastic tray. The tray is filled with a layer of small, reddish-orange salmon eggs. The background shows other similar trays in a hatchery setting.

Raising 5.2 million salmon a year in a hatchery uses a lot of space.

- Salmon eggs are incubated in hatcheries with either incubation stacks or jars. Both are used to mimic a salmon redd with plenty of water to ensure they have enough oxygen. Hatcheries are much more successful than fish in the wild because of the ideal conditions they provide such as feed, water temperatures and no natural predators.





## Starting to develop.

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- The eggs hatch in less than two months. The exact time of hatching depends on water temperature (the colder the water the longer it takes for the eggs to hatch). The young fish, called alevins, have an orange colored pouch known as a yolk-sac attached to their bellies. In the redd, the alevins will feed from the nutrient filled sack as they continue developing into fingerlings. It takes approximately 30 days to absorb the yolk-sac and become a fully developed fingerling. The fingerlings are ready to leave the redd to find their own food such as small insect larvae and small invertebrates.





U.V filtration and chiller unit  
at Mokelumne Hatchery.

- Ultraviolet filtration aids in the hatcheries success by eliminating fungus and harmful bacteria that in nature would decrease their survival.
- A large chiller unit keeps the eggs/fish at the ideal temperatures.



Whether the young salmon grow in the wild or in the hatcheries, they are preparing themselves for their journey to the ocean.



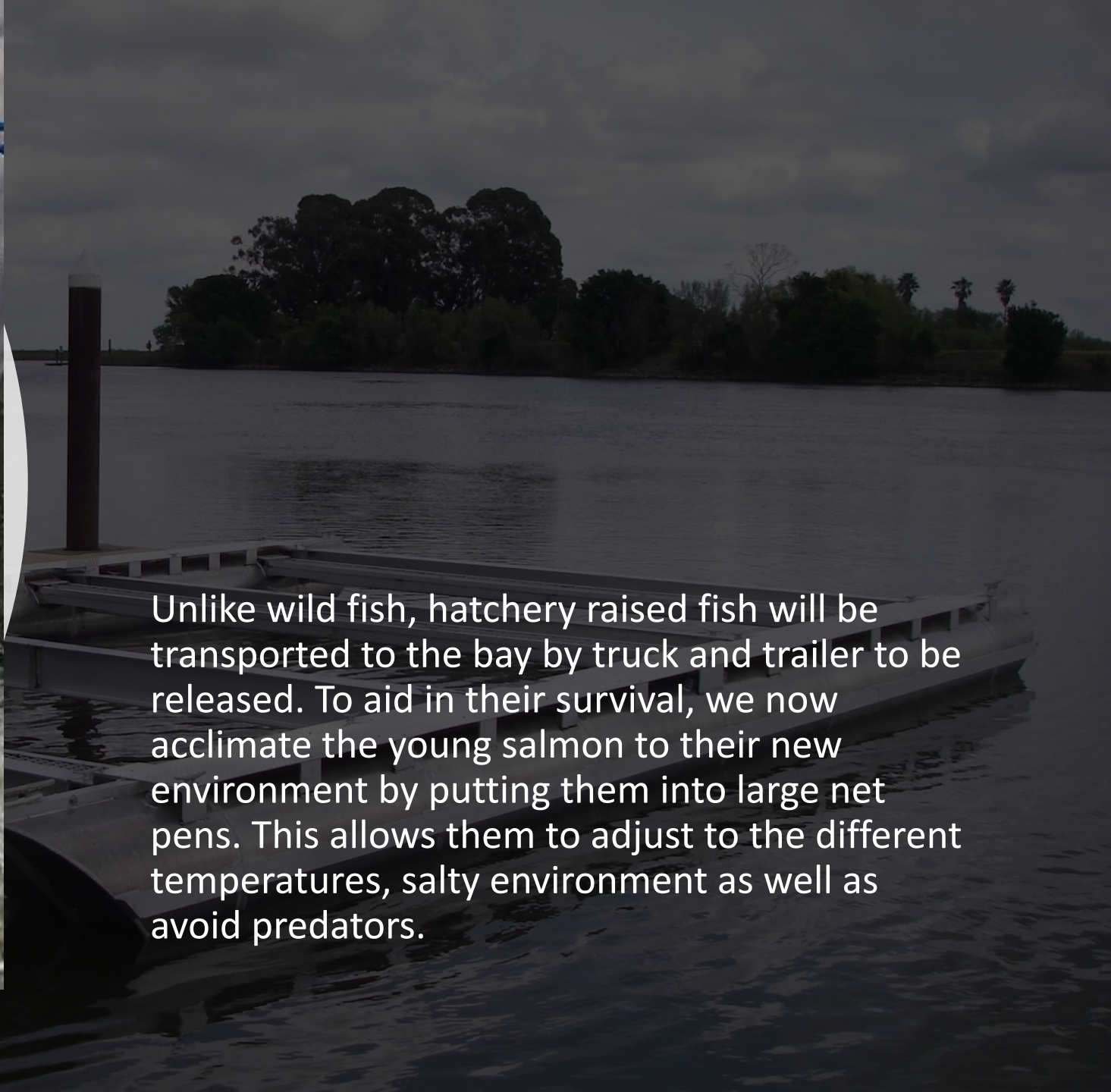
Once hatchery fish reach the appropriate size, they are loaded up and driven past many of the predators and obstacles that their parents faced on their journey upstream.

# Time to go!

- High water events from large rain storms and snow run off helps aid the wild fingerling salmon on their way to the estuaries in the lower river and bays.
- An estuary is defined by salinity (salt water % vs. fresh water %) rather than geography.
- Estuaries contain many nutrients and ideal water temps for the fingerlings to grow and prepare for living in the salt water.
- On their downward migration, many young fish will not survive.







Unlike wild fish, hatchery raised fish will be transported to the bay by truck and trailer to be released. To aid in their survival, we now acclimate the young salmon to their new environment by putting them into large net pens. This allows them to adjust to the different temperatures, salty environment as well as avoid predators.



Once hatchery fish are released and the wild fish leave the estuaries, they are now up against a 2-5 year battle to survive in the ocean. Many ocean mammals, fish, birds and humans depend on this large migration to survive.





Both wild and hatchery fish will search the ocean looking for food that will make them healthy and grow fast. Sometimes that search may take them as far north as Alaska. Krill and other fish make up a big part of their diet in the ocean.



Once the salmon reach 2-5 years of age, their body will tell them it is time to make the great journey, just as their parents did years prior. After passing under the Golden Gate Bridge, most of the salmon can now smell the water from their birth place, the Mokelumne River, for the final stretch of their “Epic Journey”.



# Trivia Questions

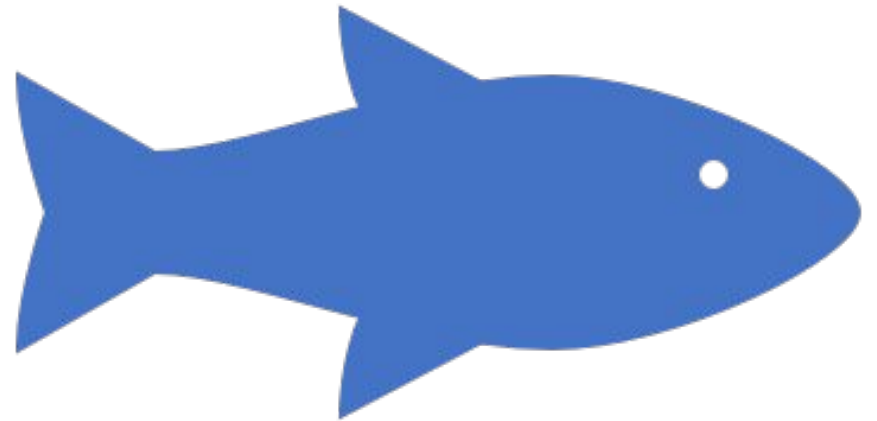
How many pounds do  
you think is the largest  
salmon caught by hook  
and line is?

The world record chinook salmon was 97lbs. It was caught on May 17, 1985, in the Kenai River, Alaska

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How many pounds is the largest commercially caught chinook?







The maximum known size of a commercially caught chinook salmon is 126 pounds measuring 4 feet 10 inches long. It was caught in a commercial trap near Petersburg, Alaska in 1949.



The image features a central green speech bubble with a white outline and a black drop shadow. The bubble is positioned over a background of several concentric circles, some solid and some dashed, in a light gray color. The text inside the bubble is white and centered.

How high do you think a  
chinook salmon can jump?



They have been recorded making vertical jumps as high as 12 ft. The height that can be achieved by a salmon depends on the position of the standing wave or hydraulic jump at the base of the fall as well as how deep the water is.



Any  
questions?