

HELPING THE WATERSHED

Salmon run levels appear connected to global warming

Victor Meza Reyes
LODI HIGH SCHOOL

Global warming is defined as the global rising of average temperatures worldwide.

The number of Chinook salmon that returned to the Mokelumne River this year to spawn (breed and lay eggs) in this 2023 fall run was 20,000-plus — a record number in more than 80 years since the East Bay Municipal Utility District started keeping numbers.

In previous years, the drought in California was reflected in the number of salmon returning to the Mokelumne River to spawn. A drought is a prolonged period of dry

weather with little rain. In 2020-2022, the drought levels in California reached the severe drought classification in many counties along the Mokelumne River. The lack of rain resulted in less water in the Mokelumne River and resulted in an increased temperature of the Mokelumne River.

Salmon rely on the temperature of the water in rivers to develop and hatch from their eggs. Salmon on average need anywhere from 480 to 540 thermal units to hatch, and require more to fully develop once they have reached their ocean stage. One thermal unit is equal to one degree Celsius, which is a unit of measurement to record

temperature equivalent to 33.8 degrees Fahrenheit.

Keeping the average temperature of the water stable is important to ensure the healthy development of a salmon, and to ensure their development is either fast or slow enough to ensure they hatch during the spring. If the development of the salmon is sped up, the salmon could hatch weak and not yet ready to survive outside of the egg, resulting in a higher death rate and weakened salmon that could be more affected by disease and predators.

The record number of salmon that returned to the Mokelumne River in this past

fall's salmon run could have been due to increased rainfall, and a larger snowpack with all the winter storms, and rains that we received last year. These storms resulted in an increased amount of water in the Mokelumne River as demonstrated by the speed of the current last year during the spring and the summer.

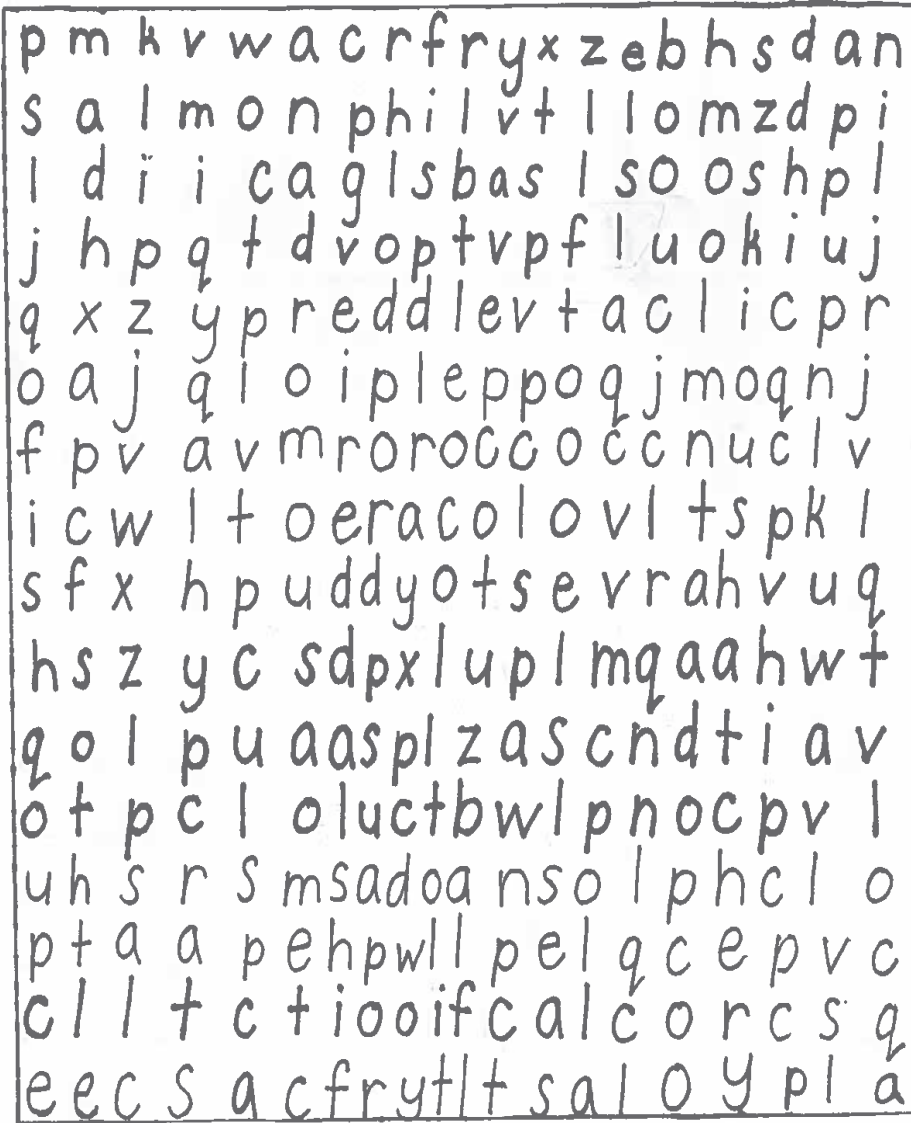
Salmon also rely on how big the river is during their upstream migration to spawn, because a decreased size in the river could result in fewer salmon being able to spawn and not completing their journey, affecting next year's fall salmon run.

All in all, the increased

salmon fall run could have been due to many factors, including increased snowpack, rainfall, and in turn decreased river temperatures.

Most importantly, though, the East Bay Municipal Utility District has worked with the California Department of Fish and Wildlife to ensure that the salmon have better nesting grounds and hatcheries from which to release fish once they have hatched and developed to ensure their survival. These combined efforts in the future could result in more years like 2023, and with more help, these precious Chinook salmon could become an unthreatened species.

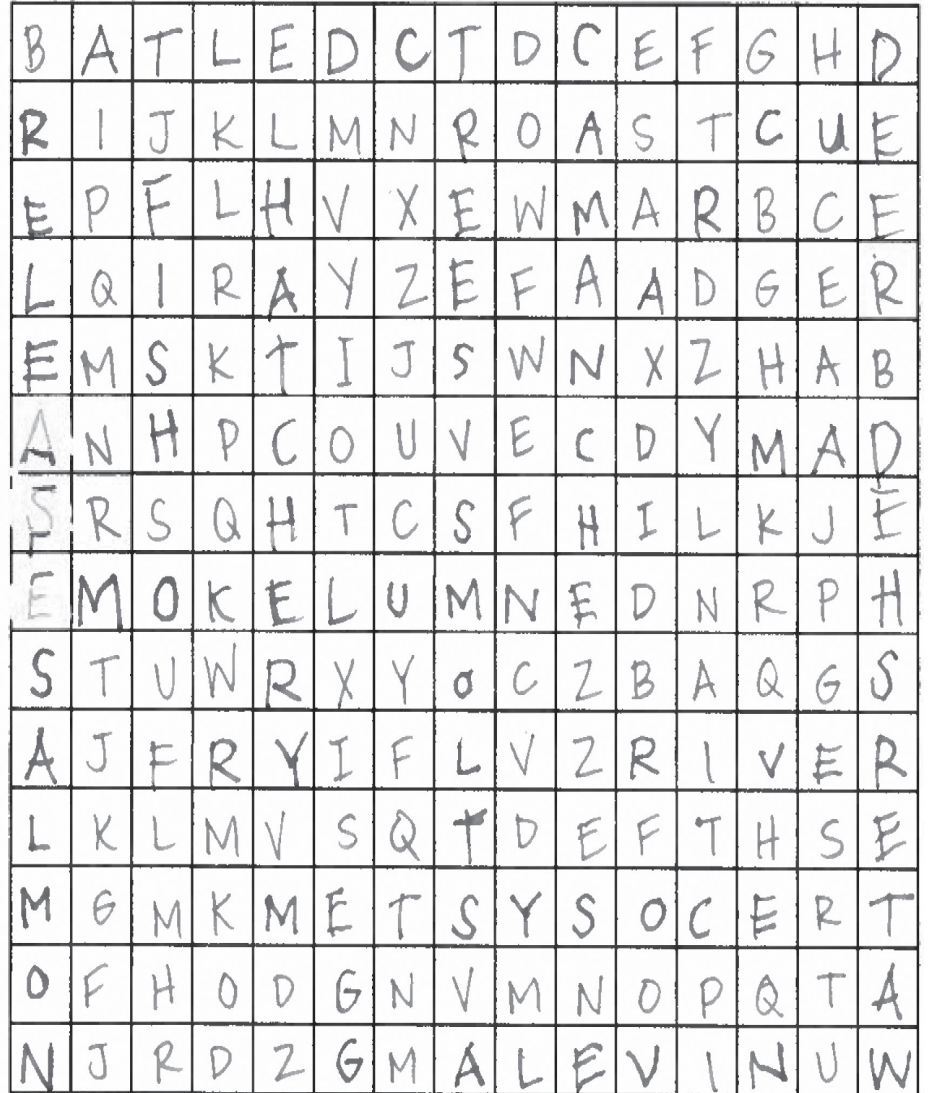
Watershed Word Search



HANNA XU/JOHN MUIR ELEMENTARY SCHOOL

- salmon
- spawn
- redd
- fish
- anadromous
- sac fry
- smolt
- fry
- hatchery
- harvest
- dam
- fish ladder

Watershed Word Search



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- Camanche
- crane
- hatchery
- dam
- ecosystem
- river
- trees
- release
- Delta
- fish
- fry
- egg
- deer
- alevin
- salmon
- watershed
- smolt

Populations of Chinook salmon and steelhead trout in the Mokelumne River

Hope Carson
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In The Mokelumne River, the number of fish in the river changes. The two big kinds that show these changes are steelhead trout and Chinook salmon. These fish are really important to the environment and people surrounding this river.

The number of Chinook salmon and

steelhead trout depend on their habitat, and what we are doing to help them.

The population levels of Chinook salmon and steelhead have dropped because they don't have anywhere to live. For example, the Woodbridge Dam has prevented the fish from passing through, and the hot waters don't help either.

The salmon also have a hard time migrating because of natural barriers,

but the steelhead trout don't have this problem because they are smaller and better swimmers.

The number of steelhead and Chinook salmon are going back up because we are being more mindful. Organizations like the East Bay Municipal Utility District, California Department of Fish and Wildlife and U.S. Fish and Wildlife Services are working to improve the river's habitat.

Another way that people are working to improve the Mokelumne habitat is by rebuilding the Woodbridge Dam so that fish can pass through easier.

Students are helping the fish too by keeping track of the river's conditions through Storm Drain Detectives! This shows that you too, no matter how old you are, can help the Chinook salmon and Steelhead trout.

Mokelumne River watershed residents could learn a lot from the Plains Miwok people

Rebecca Welch
LODI HIGH SCHOOL

Long before paddleboards crossed Lodi Lake or fishermen sat on the shores of the Mokelumne River, the watershed was home to the Plains Miwok people.

With the arrival of the Spanish first and later on the Gold Rush, the Miwok tribe was ultimately decimated and taken away from their ancestral home, but they have a very unique history that deserves to be told. They were the original people of the river and surrounding land, and we could learn a lot from their traditions and practices.

For at least a thousand years

before the arrival of the first European settlers and explorers, the Plains Miwok people roamed the region between the Cosumnes and Calaveras rivers. Upon the founding of Spanish missions in Coastal California, the Miwok people frequently worked as laborers to build and expand the mission system.

It was widely known that the Miwok had aversions to the mission system and did not want anything to do with it. Their resistance eventually diminished as a result of the population decline brought on by malaria, and approximately 2,100 Plains Miwok were pushed into the mission

system prior to its destruction. Native Americans were frequently sold into slavery during this period, and the Plains Miwok were among the many Indians who were murdered during the height of the Gold Rush.

By the end of the 19th century, the Miwok people of Lodi were essentially gone. Small artifacts from the Plains Miwok, including fragments of arrowheads, can still be found today.

The Plains Miwok people had intricate hobbies and traditions that our society today could learn from. They were very known for their craft in basketry; it's essentially the

symbol of all the California Indians. The Plains Miwok people were very skilled in their craft, and took basket-weaving very seriously. They would sometimes spend multiple seasons just finding materials for their baskets, which shows how devoted they were to creating the most intricate and perfect baskets they could.

This is something that our society today could learn from. Nowadays, most people don't spend as much time perfecting their hobbies, let alone spend much time on hobbies in general. Today's society is largely urbanized and technological with little time spent

connecting with nature.

The Plains Miwok people were largely connected with their land, taking great care of the Mokelumne, and with nature. We could learn a lot from this way of life.

Overall, we could greatly improve our ways of living if we took some inspiration from the Miwok tribe. Their unique traditions and love for nature is something that we as a society can look up towards, since urbanization has largely taken away our connection with nature. If we decided to practice traditions more similar to the Miwok, we could likely improve the quality of the Mokelumne River together.

The students of Beckman, Davis, Erma B. Reese, Heritage, John Muir, Lois E. Borchardt, Vinewood and Woodbridge elementary schools, Lodi Christian School, and Lodi High School would like to thank the following sponsors for their support:

