THE Mokelumne Current

Celebrating 20 years of Storm Drain Detectives

Editor's note: Established in 2000, the Storm Drain Detectives are a group of teachers, students, community members and City of Lodi, Public Works staff who monitor Lodi Lake and the Mokelumne River monthly at several different sites where stormwater enters the river. As the program celebrates 20 years, students reflect on what they've learned and what Storm Drain Detectives means to them.

Anna Weigel, an AP Environmental Science student at Lodi High School, wanted to celebrate the 20th anniversary of the Storm Drain Detectives program. So she came up with a sweet idea: a birthday cake. After she took photos of the cake, she and her family took the celebration a step further and ate their fill of the sugary treat.

COURTESY PHOTOGRAPHS

Our water is important!

By Jasmine Mayo
LODI HIGH SCHOOL

Have you ever wondered how runoff from the streets affects the Mokelumne River? Well that's where Storm Drain Detectives come in. SDD is a program that has been sponsored by the City of Lodi for 20 years, helping students learn how the runoff affects the river.

Every two weeks, Storm Drain Detectives meet at the Discovery Center at Lodi Lake to test the Mokelumne River and Lodi Lake at five different sites, conducting six different water quality tests. The students first calibrate their equipment, then form teams of six. Then each team goes to one of the five sites.

Once at the site, students grab a bucket of water, then begin the testing. Mokelumne River water is tested for dissolved oxygen, water temperature, electrical conductivity, pH, turbidity, and nitrates. We also make visual observations around the site, looking for trash, recording the weather, and noticing anything that can change water quality.

Dissolved oxygen is the amount of oxygen in the water, which is important because organisms need oxygen to live. The data is collected by a CheMet kit and a D.O. meter, which dangles in the water for data. Temperature is measured by the D.O. meter and a thermometer probe. An electrical conductivity, or E.C., probe measures the salt in the water. We measure pH with two pieces of equipment, a pH strip and a probe, which helps us learn how

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Heritage students get to test the waters at San Joaquin River

By Dylan O'Ryan
SAN JOAQUIN DELTA COLLEGE

On a blustery day in October of last year, Heritage fifth grade Storm Drain Detective students; Janine Jacinto, their teacher; Kristine Stepping, the Program Manager for Outdoor Education for the San Joaquin County Office of Education (SJCOE); and myself, a Storm Drain Detectives leader who has been a part of SDD for about four years, set out to test water quality at Durham Ferry.

We all met at the Durham Ferry Outdoor Education Center, which is a "center for STEM and environmental exploration, owned and operated by SJCOE," as stated on the SJCOE website. We set off on a 0.75-mile hike to a part of the San Joaquin River, which eventually flows into the Pacific Ocean by way of the Delta.

A select few of Jacinto's fifth-grade class usually tests at Lodi Lake, which is part of the Lower Mokelumne River Watershed. However, the students were able to test at a new river system at Durham Ferry. This unique experience showed the students that more water sources are essential to test for water quality.

An important distinction between the Lower Mokelumne River Watershed and San Joaquin River is that they have different stream bed sizes. The San Joaquin River near Durham Ferry has a significantly wider stream bed, which can contribute to lower water levels, as noted on our testing day. This distinction created some issues in testing,

where we were unable to test Dissolved Oxygen (DO) using the meter at Durham Ferry due to the shallowness.

It is important to note that both river systems' water quality is graded by the same scale, which is published by the San Joaquin Basin Plan; therefore, we can compare values of water quality as a distinction from the water sources.

The water quality parameters tested at both locations were similar in data we would expect; however, Electrical

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EBMUD biologists share fins and outs of the job with students

By Leonardo Salazar, Max Hernandez, Yaneisy Roman Ortiz, Eduardo Lopez, Paul Roman Ortiz and Jaylene Guerrero
HERITAGE ELEMENTARY SCHOOL

Students at Heritage Elementary School used Zoom, a distance learning software, to interview Ed Rible and Alan Webster, biologists who work for the East Bay Municipal Utility District.

Q: How is COVID-19 affecting the wildlife?

Ed: COVID-19 is actually having the opposite effect on wildlife compared to the effect on humans. There is less pressure from people on the wildlife, and more room for the wildlife to roam.

Q: How has COVID-19 affected how you do your job?

Ed and Alan: As EBMUD employees we are following their strict protocol, including wearing masks, and working from home when possible.

KATHY GRANT/COURTESY PHOTOGRAPH

A small boat is ready to carry East Bay Municipal Utility District biologists Ed Rible and Alan Webster to a screwtrap, which captures fish for monitoring.

Q: What is one specific machine that is used to observe the salmon?

Ed: There are cameras on either a fish ladder or a weir to count the returning salmon. Another machine that is used is a rotary screw trap that captures the salmonids and other fish that are heading downstream.

Q: What is your career or job title?

Alan: Fisheries and wildlife technician.

Ed: Fisheries and wildlife biologist II.

Q: Where did you attend college?

Ed: Humboldt State.

Alan: UC Davis.

Q: What degree did you receive?

Ed: Fisheries biology.

Alan: Wildlife, fish and conservation biology.

RIBLE

WEBSTER

Q: In what way do you work with the watershed and the Mokelumne River?

Ed: We are part of a six-person crew that monitors the salmon run. We also do habitat enhancement projects, such as moving gravel to create redds.

PLEASE SEE EBMUD, PAGE 4

Tokay High students help local ecosystem by raising salmon

Classroom aquarium gives inside look at salmon's life cycle

By Kali Anema
TOKAY HIGH SCHOOL

At first glance, the rectangular glass box sitting in my environmental science class at Tokay High School seemed to hold little significance. However, students soon discovered that it held an essential role in securing the future of our local ecosystem.

The aquarium, lined with fine gravel and equipped with chillers to keep the water at a cool 55 degrees fahrenheit, annually serves as a temporary home for 40 salmon eggs.

INSIDE: Read more about Salmon in the Classroom. **Pages 2 & 8**

In January, after the eggs were reared by the Mokelumne Fish hatchery for 30 days, students excitedly received a first-hand glimpse of this federally protected species. Looking through the walls of the tank, my classmates and I eagerly watched the eggs hatch into plump, bottom dwelling alevins. Under the direction of our teacher, Sandra Starr, we calculated the date of their hatching based on the temperature of the water, and became familiar with the life cycle of a salmon.

Throughout the development of the salmon fry, we not only learned about the shockingly low survival rate of young salmon, but also their irreplaceable role in California ecosystem. In fact, for every 5,000 salmon hatched in the wild, only 5 will survive the journey out to the ocean and return to their hatching grounds to reproduce. Known as a keystone species, these fish provide essential sustenance for carnivores, keep soils rich with nutrients, and support thousands of jobs and local economies.

After approximately 2 months, the alevins developed into fast swimming fry, seemingly eager to be released into their natural habitat. Buses full of high schoolers departed to the Mokelumne Fish Hatchery to bid farewell to the temporary classroom residents. After witnessing the fry begin to explore the Mokelumne River for the first time, I think we could all agree that this salmon project was so much better than simply reading about it in a textbook.

Thanks to this experience, I hope that others will realize the unique opportunity Lodi residents have to see this iconic species in the surrounding local rivers. Due to constant destruction of their habitats, salmon need our help, and with the protection of salmon we in turn help our forests, rivers, food security, and economies.

> "Known as a keystone species, these fish provide essential sustenance for carnivores, keep soils rich with nutrients, and support thousands of jobs and local economies."

Watershed's birds fly high

Students celebrate the birds who live in the local watershed in art, along with the Sandhill cranes that migrate to the area each winter. 3

'Toy Story 4' sets a trend

Inspired by the character of Forky and a teacher's challenge, students create their own "quarantine buddies" using recycled items. 5

Marine science adventure time!

Students share their trips aboard the Marine Science Institute's research vessel in San Francisco Bay. 7

STORM DRAIN DETECTIVES

EBMUD

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Q: What interested you to work as a fisheries biologist?

Alan: I've always been a fisherman. I grew up near Vacaville, raised by a single mom who was a teacher and also environmentally conscious. Our school didn't take us on field trips, but my mom always took us out into nature and taught us about the importance of being a good steward.

Ed: I grew up in Stockton, but my family always went up to the Sierra hiking, fishing and camping. Even as a kid I noticed that the Stockton-area waterways were polluted compared to the pristine water in the high country.

Q: What are the most rewarding aspects of your job?

Ed: I love the years with the big salmon runs because you see the results of the work we do with the whole ecosystem.

Alan: For me, it's the salmon run as well, but also it's seeing groups of people coming out for events like Coastal Cleanup to pick up trash and help take care of the environment.

Q: What are the least rewarding?

Alan: As much as I love being out on the river in a kayak as part of my job, there are times in the winter when it's cold and rainy that I don't love being out there.

Ed: I am not a fan of "bad water" years (when there is little rain, the water level is low, and the water is too warm). I also don't like the pollution that I come across from homeless encampments.

Q: What is your favorite thing about the Mokelumne River?

Ed: My favorite thing about the Mokelumne is the riparian corridor that runs along the river. It's the trees and plants of the riparian corridor that create shade and cool water for the salmonids.

Alan: My favorite thing about the Mokelumne River is the salmon run. For example, in 2017, almost 30% of the total commercial salmon catch came from the Mokelumne River.

Q: Are there any interesting stories that influenced you to work helping the Earth?

Ed: I grew up backpacking in the Sierra, and went fishing often at the Port.

Alan: I used to fish at Liberty Island, and saw how much trash was in the waterways.

Q: Who are some of your personal heroes, and why?

Alan: My personal hero is my mom. She raised us as a single mom, teaching us about the environment.

Ed: The people who volunteer to take care of the environment, picking up trash.

Q: What activities do you enjoy in your spare time?

Ed: Fishing, hunting, hiking, camping, baseball; any outdoor activities with my kids.

Q: What would you like the people of Lodi to know about the Mokelumne River, salmon, and ways they can protect them?

Alan: I would like people to be conscious of what they put down the drain, and also for them to know that the Mokelumne River contributes more than 20% of the salmon that are in the ocean off the coast of California.

COURTESY PHOTOGRAPH

A screwtrap used to monitor fish populations.

O'RYAN

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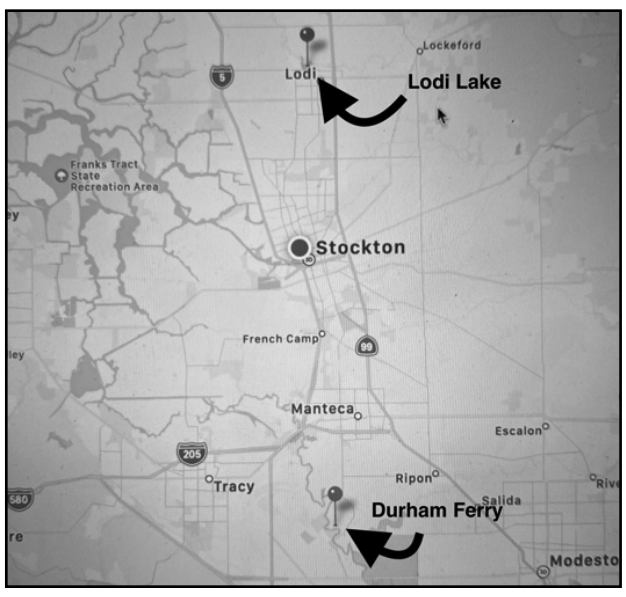
Conductivity (EC) was significantly elevated from values we see at Lodi Lake. We recorded a value of 310 uS at Durham Ferry, where on average, we record values of 40 uS around the Lodi area. Electrical Conductivity can be thought of as the amount of salt, or salinity, in the water. Some questions that arise when pondering this elevated value of salinity: is there brackish water or tidal influence on the San Joaquin River? Are draining agricultural fields affecting this value?

These questions would have to be further researched and studied before making a conclusive decision. However, the Heritage SDD students were left with a question to ponder: how do changes in location affect our water quality, and what impact could we potentially be having on our waterways? This trip, among others, allows for students to make observations that water quality is dynamic and changes with location.

The Storm Drain Detectives program hopes to foster an interest in water-quality related issues and create a stream of future adults who will better our environment, both locally and globally.



COURTESY MAP

The two locations where Heritage students tested water quality with Storm Drain Detectives.

MAYO

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acidic or basic the water is. Nitrates are measured with a different type of test strip, which shows how much nitrogen is in the water. The final test is turbidity, which tells us how clear or muddy the water is. A sample is put into a small bottle, and brought back to the Discovery Center, then put into a machine that measures the turbidity.

Once we are finished gathering data, we give each site a letter grade, comparing SDD data to the San Joaquin River Basin water quality plan, which tells us if the streets' runoff is affecting the Mokelumne River.

We also help in many events like Love Lodi, Coastal Cleanup, and the NorCal Science Festival at Tokay High, working to clean up trash or educate people so that they learn how runoff can cause water pollution.

Each fall, we also go on a boat trip in San Francisco Bay, where we learn that all rivers in Northern California drain into the bay then into the ocean.

A goal of the SDD program helps people understand how each individual affects the river, so help us and keep our water clean!

To learn more about the SDD program, go to *www.lodi.gov/492/Storm-Drain-Detectives*.

COURTESY PHOTOGRAPH

Storm Drain Detectives — including Jasmine Mayo, second from right — pose for a photo.

Cruz and Luca Martinez on life as junior Storm Drain Detectives

SPECIAL TO THE CURRENT

Editor's note: Cruz and Luca Martinez are the third generation of their family to get involved with the City of Lodi's Storm Drain Detectives program, along with their mother Melanie Martinez and their grandmother Janine Jacinto. The pair — two of the program's youngest volunteers — answered a few questions about Storm Drain Detectives.

Q: How many years have you participated in Storm Drain Detectives?

Cruz: I have been at SDD for 4 or 5 years.

Q: How old are up?

Cruz: I am 8 years old.
Luca: 4.

Q: What do you do as a Storm Drain Detective?

Cruz: I usually sit down and do my homework while the older kids are testing the water.

Q: Who do you participate with?

Cruz: I participate with my mom, my mom's students, and my brother, Luca.

Q: What have you learned being a Storm Drain Detective?

Cruz: I have learned that the water that comes from your sprinklers goes down to Lodi Lake. If you hit a baseball and it went down the drain, then it would go to Lodi Lake. It's telling you that, for example, if you put a piece of trash on the sidewalk that the rain might wash it down the storm drain and it would go to Lodi Lake, and then the animals will think it's something to eat, then they'll eat it and then they'll die.

Q: What message would you like to tell other kids that they can do to help the environment?

Cruz: The message I would like to send to other kids is don't leave trash on the sidewalk.

Luca: Stay home! Because if someone else would get sick then you could get sick. Right now the coronavirus is not stopping!

Learning about how we use the watershed

By Katelyn Collete
TOKAY HIGH SCHOOL

Our watershed is comprised of water being delivered from a variety of sources. As the water travels downstream, it is accumulating chemicals, fertilizers, and so many more harmful wastes caught in its path. Our AP Environmental Science class along with students from other schools have been working with the City of Lodi to learn about and monitor the waterflow that travels through our community and into the Mokelumne River.

This program has given each of us the opportunity to work hands-on with the properties of the water and the equipment we use to measure that. This involvement brings light to potentially avoidable man-made issues surrounding the water quality where we learn to measure various sources of water pollution, components in the water that can make it difficult for aquatic organisms to survive, and attributes that can disable the water to be potable.

Throughout the process of our work, we are able to learn more about how we affect the environment and visa versa which, in turn, results in the further awareness of how people in the community can do their part to keep the water safe and clean including watching what we put down the drains and keeping the streets clean of harmful things that can wash down the sewer.

It's important to keep the community involved and knowledgeable about the characteristics of their water in order to keep it a healthy place for our swimming and floating members of the community, but also to keep it a functioning part of our society through our need for clean water.

Community buy-in is vital in caring for the watershed

By Benjamin Gobel
TOKAY HIGH SCHOOL

It's hardly arguable that the most important resource for human survival is clean, fresh water, yet too often we and our communities ignore our access to this valuable resource as a given right. To promote a more sustainable method of water consumption, the city of Lodi obtains a large percentage of its water from the Mokelumne River, helping to lower the rate at which water is pumped out of our aquifers and thus the rate at which our soil subsides. Unfortunately, however, the river we obtain our drinking water from is the very same one in which a great number of our storm drains run into.

This year I was given the opportunity to participate in the Storm Drain Detectives program, a partnership between teachers, students and Lodi Public Works to help ensure that the quality of our drinking water is kept at an acceptable level for public consumption. Using various tools and methods to collect, sample and test water for pH, nitrate concentrations, temperature, dissolved oxygen, salinity, turbidity and more has given me a greatly improved understanding of incredibly important real-world processes that we hardly notice due to how smoothly our city keeps them operating.

Seeing and interacting with the place that the water I've been drinking for most of my life comes from has also made me think much more about how much water I consume. When I brush my teeth or wash my hands, I now have seen and understand the maintenance of the exact area my water comes from and try to take greater care in using less water.

Seeing the resource you're depleting in person can have a massive impact on the way you think about resource use in general, as though water may be a sustainable resource in paper, it is only sustainable if the rate at which we use it at regularly is responsible. The more members of our community interact with our local resources, water being the most important of all, the more responsibly we will use them.

How I became a Storm Drain Detective

By Madalynn Westland
BENJAMIN HOLT MIDDLE SCHOOL

The Storm Drain Detective program is an amazing opportunity available to anyone. I am proof that any young person can join, even if your school does not currently participate in the joint City of Lodi Public Works and Lodi Unified School District programs.

From personal experience, I can share that I do not get school credit for my work at the various body of water locations. Most students are involved in SDD as part of their school curriculum and environmental sciences learning opportunities. I attend a charter school that is not currently connected with SDD.

However, when my mom first learned of SDD and all the cool things they got to do and learn, like calibrating specialized equipment, teamwork, journaling, practicing organizational skills, and especially being on the lake, I knew I wanted to sign up. Learning about nature, pollution and the environment is a passion of mine.

My family made a commitment to the program and I enjoyed all of my time with the staff, teachers, and other students. SDD has allowed me the opportunity to grow in a supervised environment.

I have enjoyed meeting new people and developing new skills. My lifelong goal is to be an environmental engineer. SDD is enabling me to meet my goal. Thank you, SDD.