
Community Science at the — Salton Sea —

Thriving Salton Sea Communities



Salton Sea communities thrive when we have supportive natural and built environments. We are introducing multi-benefit infrastructure that is responsive to community needs and demonstrates an innovative approach to addressing climate issues facing our region.



Salton Sea communities thrive when we address poor health outcomes. We are conducting community science to produce publicly available data and inform solutions to the challenges of the receding Salton Sea and improve health outcomes for residents.



Salton Sea communities thrive when we unleash and align our shared economic power. The Imperial, Eastern Coachella, and Palo Verde Valleys face many of the same societal challenges. We are working to ensure our regional economies are connected, creating the conditions for the region to be more successful in attracting public and private investments that benefit all of us.

Salton Sea Environmental Time Series

saltonseascience.org

The Salton Sea Environmental Time Series is a community science initiative led by a team of community members and non-local scientists conducting water and air quality monitoring research on the Salton Sea. This research will be used for community capacity building and advocacy efforts, and is facilitated and convened by local non-profit organization, Alianza Coachella Valley.





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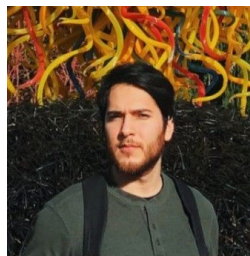
Aydee
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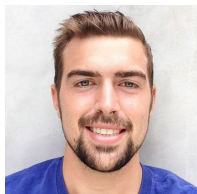
Gerardo
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Kaily Heitz



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What is Community Science and why do we use it?



Concern or question: The community is concerned about the rotten egg smell in the air.



Collaboration: Community scientists work together with academic scientists to collect water and air quality data from the Salton Sea.



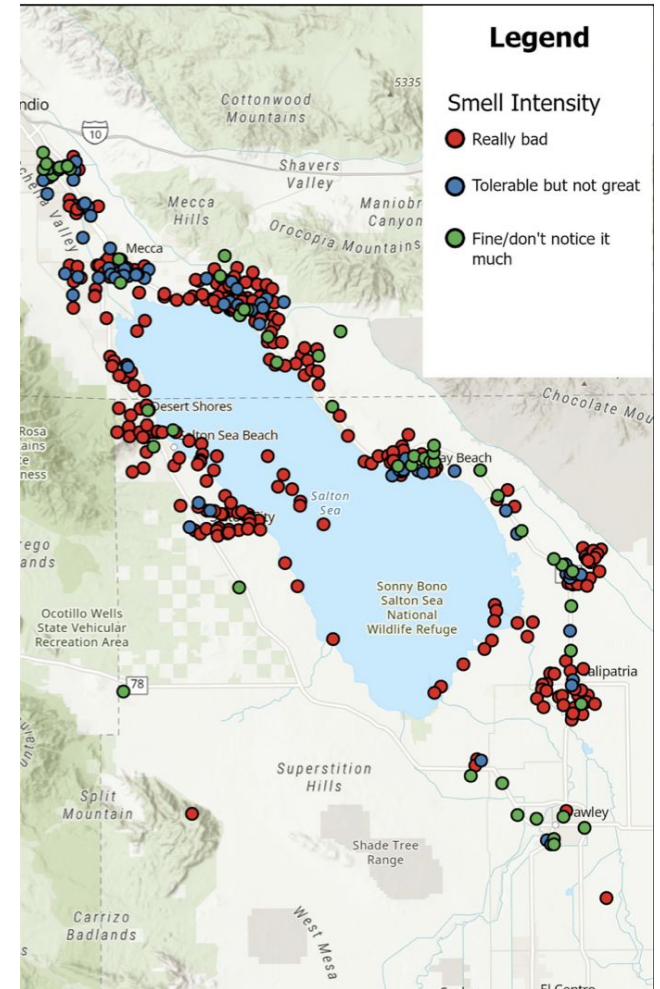
Analyzing and sharing data: Collected data is shared in an accessible database and then analyzed to be shared again through community events and infographic material



Actionable change: Community members can share their lived experiences and voice their concerns to affect policy.

How did we get here?

- The work that guided us to research was lead by the ongoing questions, misconceptions and concerns around the Salton Sea.
- Two common topics brought up when discussing the Salton Sea are, its heyday in 1950s/60s when it was a tourist attraction, and the smell. We noticed when it comes to ongoing data around the lake revolving air quality, the smell isn't often addressed, there was a gap of information. We felt that this was something worth exploring.



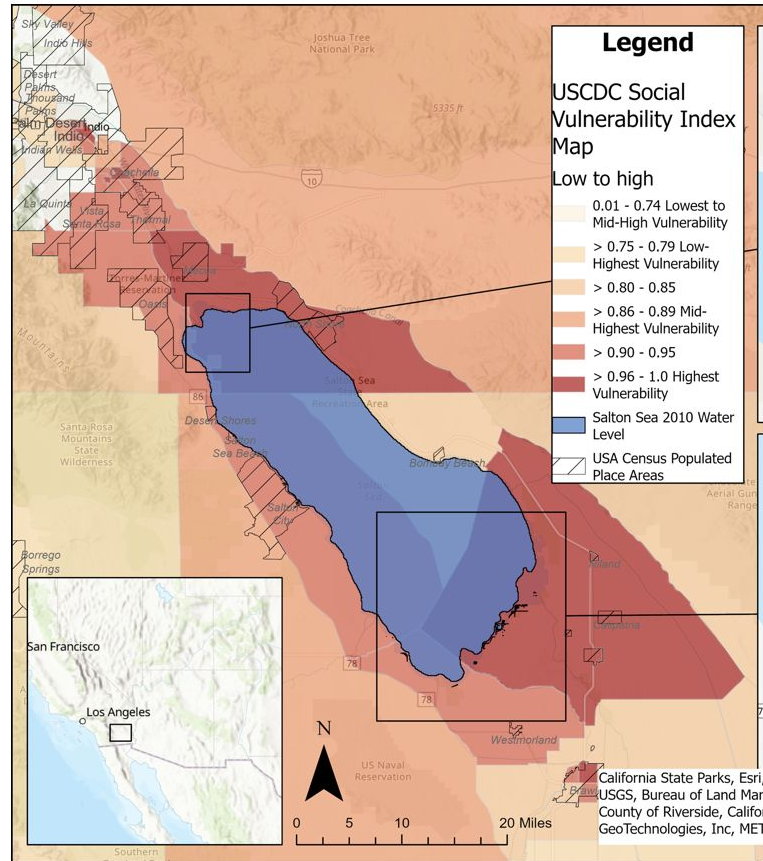


**Socioeconomic
Status**

**Household
Characteristics**

**Racial & Ethnic
Minority Status**

**Housing Type &
Transportation**



**Mostly Latinx
and Indigenous.**

**Over 30% live
below the
poverty line (US
Census)**

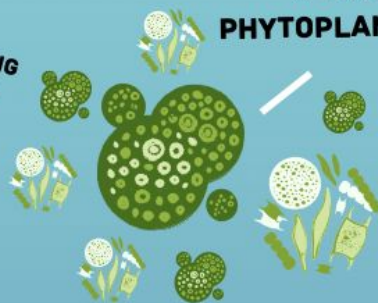
NUTRIENTS

NITRATES, AMMONIA, SULFIDE,
SULFATE, PHOSPHATE

A SIGNIFICANT SOURCE OF NUTRIENT
CONTAMINATION COMES FROM WASTE
WATER & AGRICULTURAL RUNOFF

EXCESSIVELY FEED EXISTING
ALGAE + PHOTOSYNTHETIC
ORGANISMS

ALGAE,
PHYTOPLANKTON



HIGH LEVELS OF
NUTRIENT RICH
WATER INCREASE
HYDROGEN SULFIDE
LEVELS, RESULTING
IN SMELLY SULFIDE
BLOOMS



SULFIDE RISES =
DEAD FISH, ROTTEN
EGG SMELL



EUTROFICATION (HIGH
NUTRIENT LEVELS)
DECREASE OXYGEN LEVELS,
RESULTING IN HYPOXIA OR
ANOXIC ENVIRONMENTS

WHEN PHYTOPLANKTON
CELLS DIE, THEY SINK TO
THE BOTTOM AND ARE
EATEN BY BACTERIA,
WHICH ALSO CONSUME
OXYGEN, RESULTING IN AN
ANOXIC ENVIRONMENT

BACTERIA
+ ALGAE



DECOMPOSITION

VISIT OUR
DASHBOARD!



Health Hazards of H₂S Exposure

Respiratory Irritation



Eye Irritation and Damage

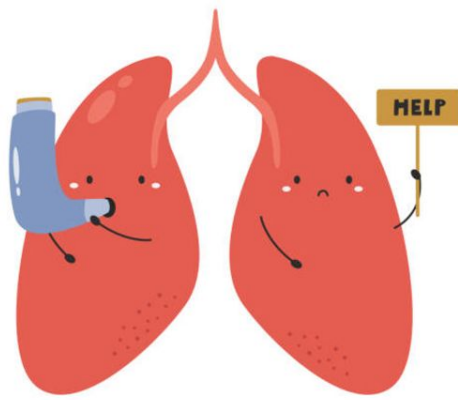


Nervous System Effects

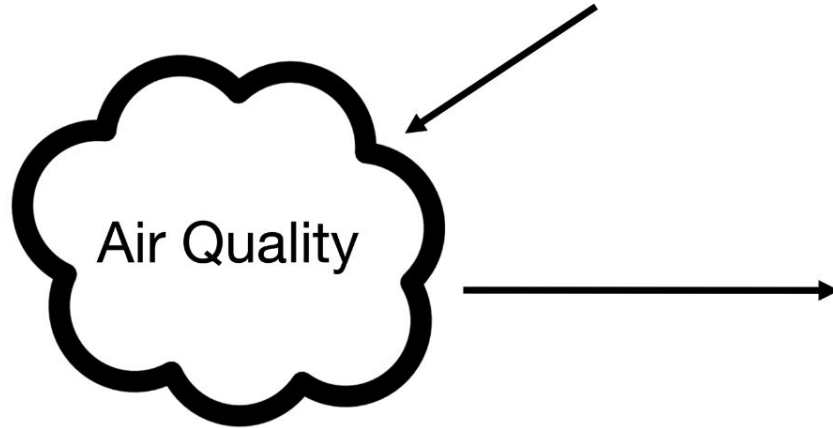


Long-term Health Effects





Community Concern



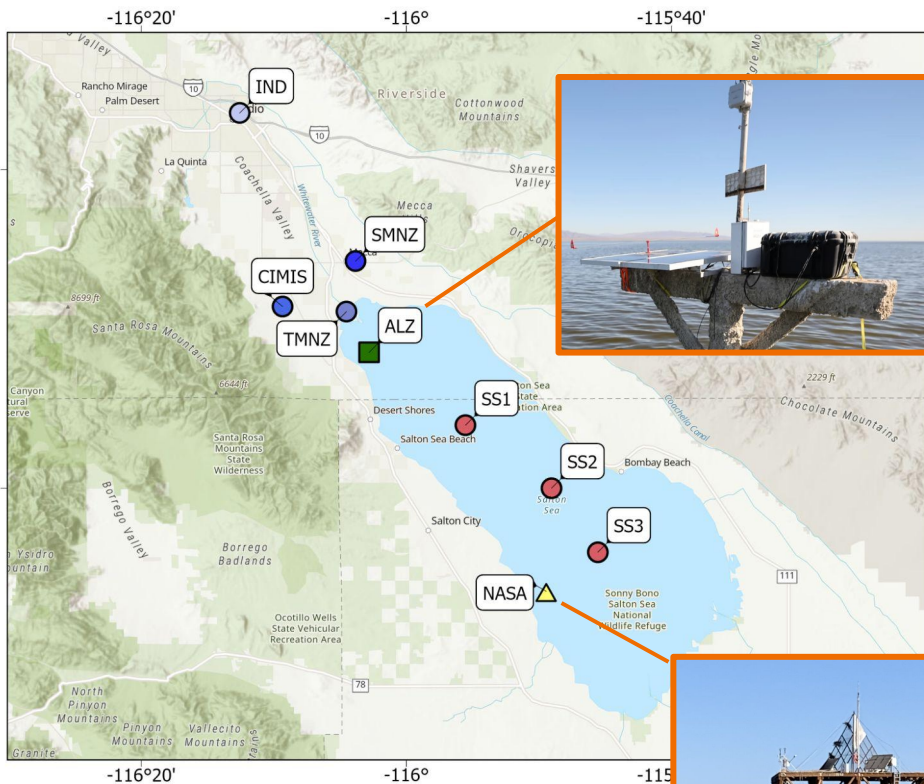
Water Quality



Hypereutrophication, Hydrogen Sulfide, and Environmental Injustices:
Mechanisms and Knowledge Gaps at the Salton Sea
<https://doi.org/10.1029/2024GH001327>



Diego Centeno, Alejandra G. Lopez, Aydee Palomino, Juliana Taboada, Ryan Sinclair, Quinn Montgomery, Consuelo Marquez, Migdalia N. Sanchez, Isabella B. Arzeno-Soltero, Mara A. Freilich



Legend

Air Sensors

- CIMIS
- IND
- SMNZ
- TMNZ
- ALZ
- ▲ NASA

Sampling Sites

- BOR Sampling Sites



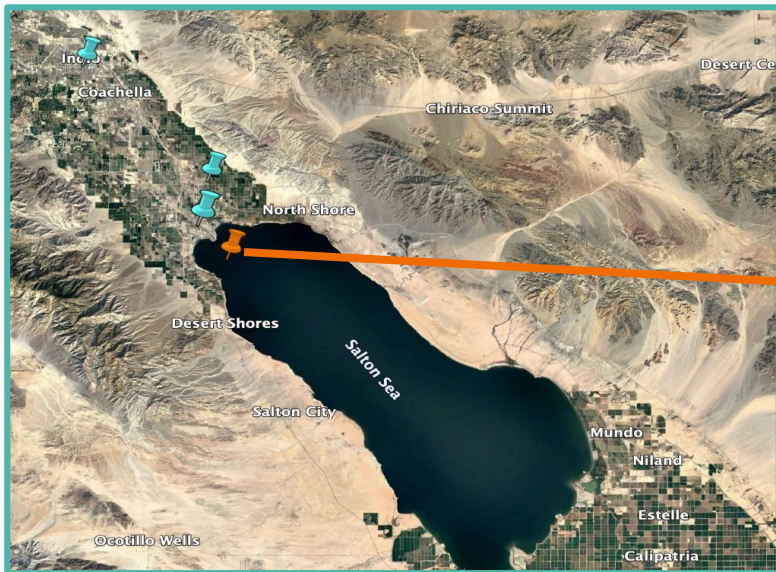
9 18 27 Kilometers



Data from air monitors, water sampling, and satellites were used to observe how H_2S behaves in the Coachella and Imperial Valleys

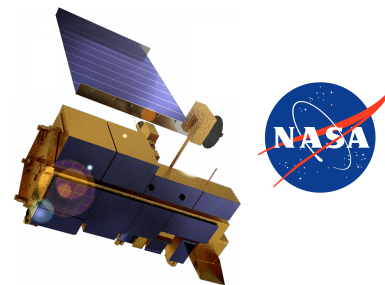
Sensors Measure Air Quality

- Currently SCAQMD has 4 active sensors in the Coachella Valley that collect H_2S (one installed in North Shore in May 2025)
- These sensors measure but do not provide a forecast for the Eastern Coachella Valley (ECV) communities
- SSET installed an air quality sensor in August 2023 to address ECV community concerns
- The sensor continues to monitor H_2S and other air pollutants



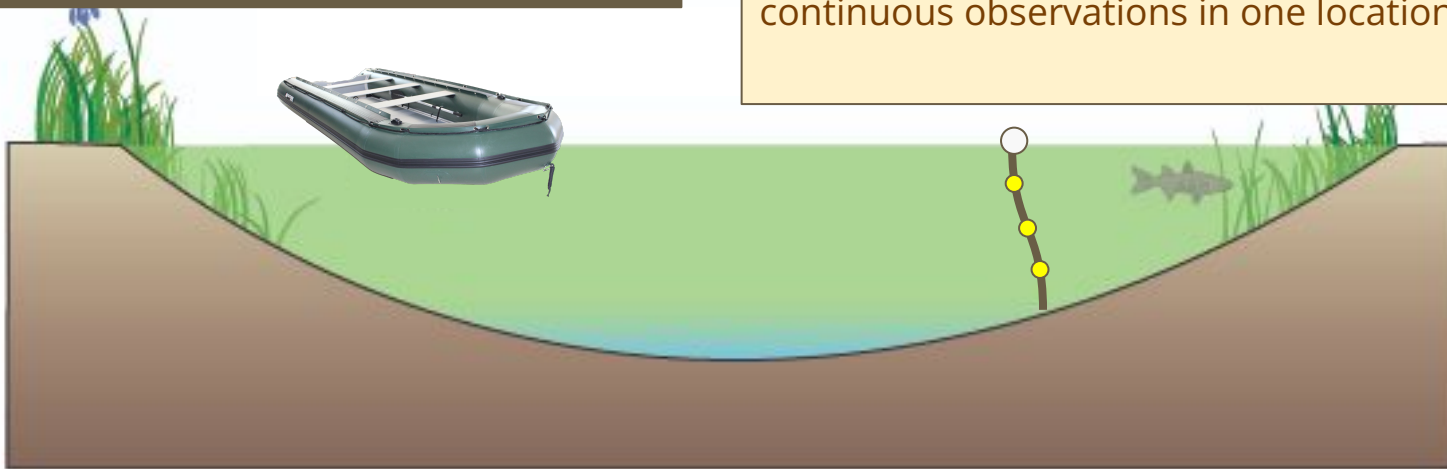
Measuring more of the Salton Sea

Satellite: 1 image every
day of the whole lake

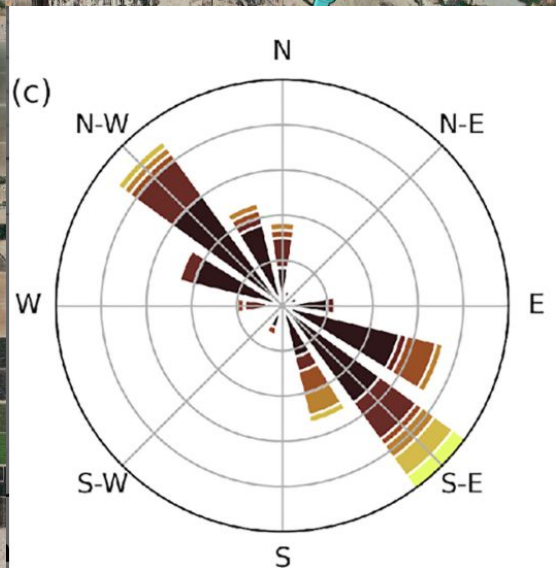
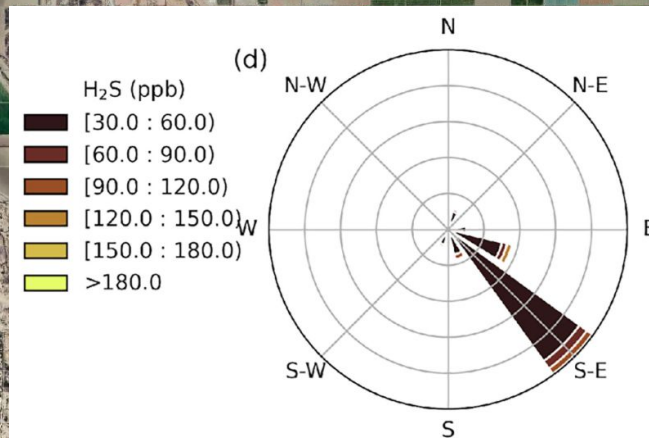


Samples: 4 times per year in ~8 locations.
We use samples to measure nutrients.

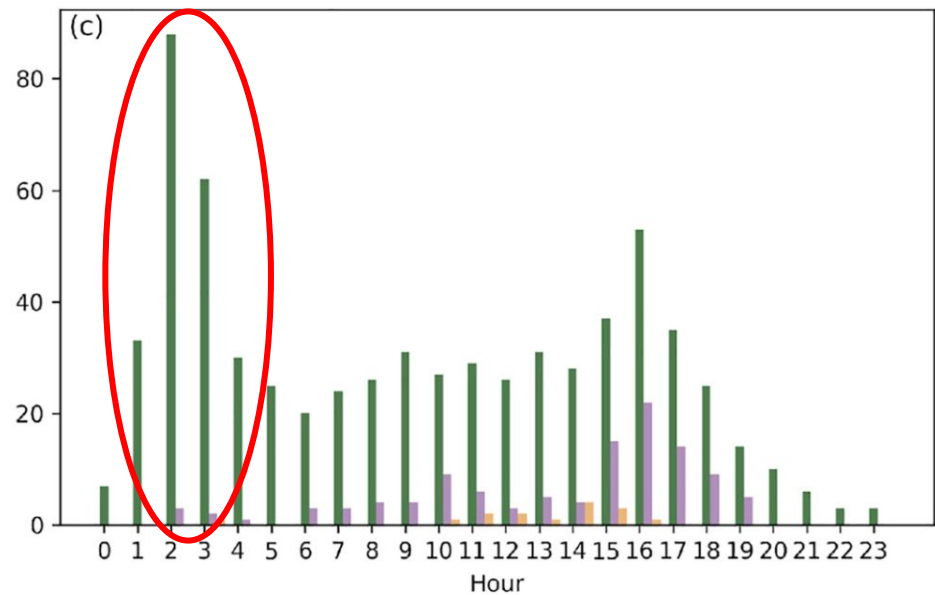
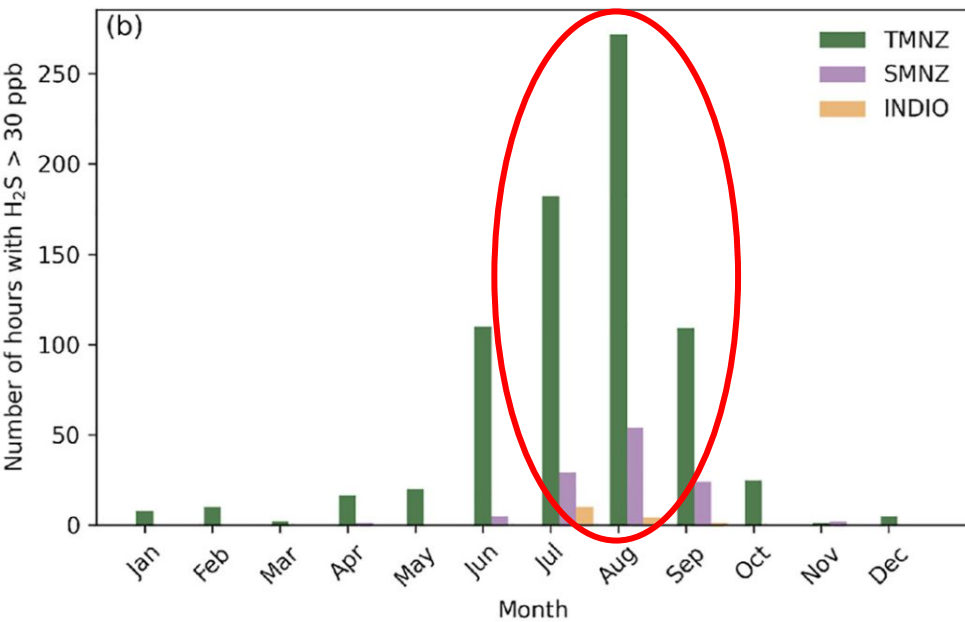
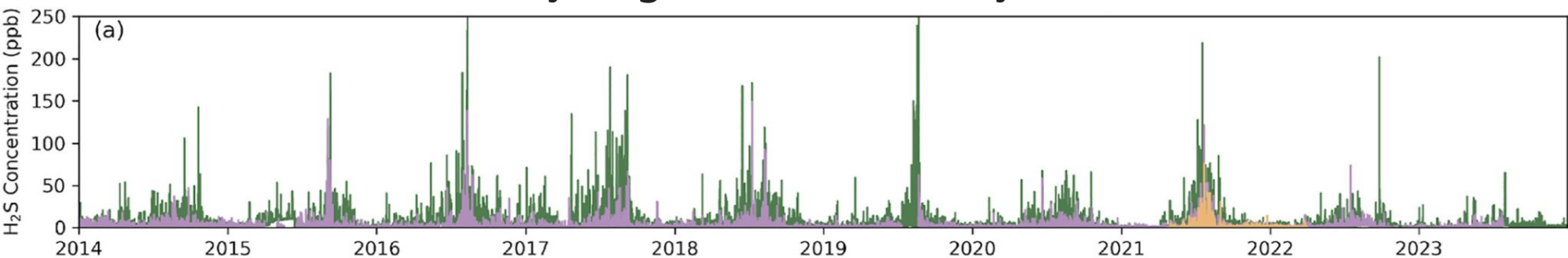
Continuous observation station (mooring):
continuous observations in one location



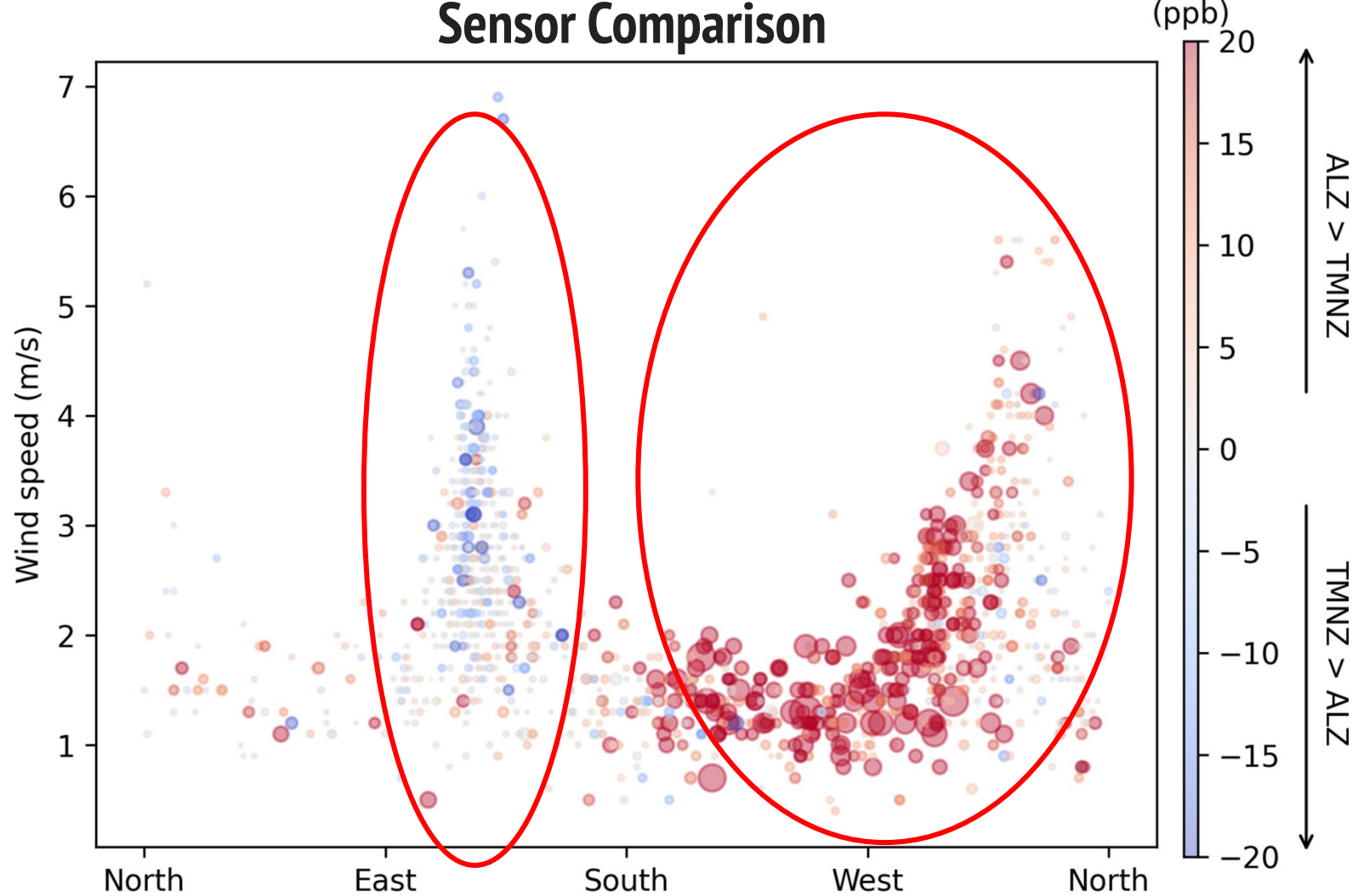
Hydrogen Sulfide detected from SE at even low speeds



When is Hydrogen Sulfide Mostly Detected?



Sensor Comparison



What Does This Mean?

1. Sulfate reduction in the Sea leads to production of H_2S
2. Hydrogen sulfide is emitted at high levels from the Salton Sea mostly during the summertime
3. Wind direction plays a more important role in the detection (not emission) of H_2S than wind speed
4. A large part of the Sea's emissions remain unobserved
5. High levels of H_2S above shallow water, suggesting emission from shallow regions
6. Exposure to H_2S can cause headaches and nausea and the effects of chronic low level exposure is less well-known

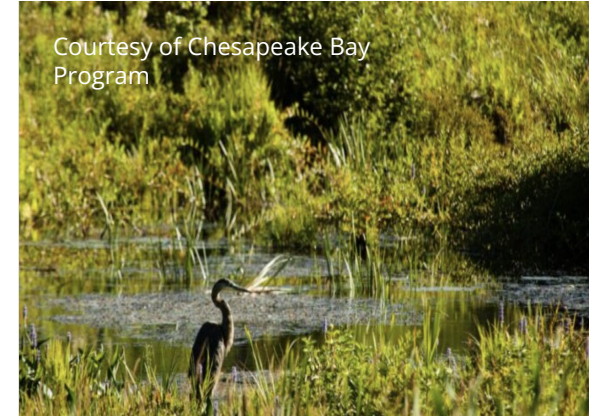
Research needs

- Science-based strategy for sensor placement to understand the magnitude and spatial distribution of H₂S impacts
- Develop and evaluate solutions to **reduce** hydrogen sulfide emissions
 - Nature-based solutions, like wetlands and bioremediation, as well as changing land management
- And **mitigate** impacts on communities
 - Home air filtration
 - Community resilience infrastructure
- Evaluate whether existing standards, which vary depending on jurisdiction, are appropriate. Research suggests impacts at lower levels.

Remediation and Mitigation

Chesapeake Bay wetlands restoration project

- CB is an estuary in the U.S. The mixing of seawater and freshwater causes high nutrient levels in water levels and the sediments
- Dead zones(low oxygen levels), agriculture runoff, and ongoing air pollution etc
- Wetlands act as natural filters for water quality, protect the groundwater and keep pollutants as bay. This programs has two types of wetlands that address the weather conditions within the region. The Tidal and Inland wetlands, “absorb the energy of storm surges and overflow due to heavy rains” acknowledging the climate challenges that exist within the region and that can potentially affect nearby communities.



Remediation and Mitigation cont.

Lake Elsinore Aeration and Mixing System (LEAMS)

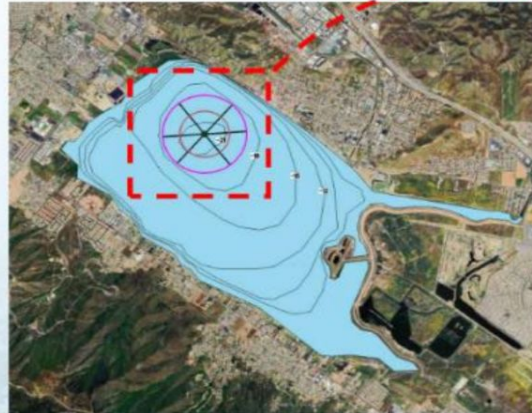
- SoCal Inland freshwater lake that experiences H_2S outgassing
- Oxygenate the bottom of the lake to increase dissolved oxygen concentrations
- Will prevent sulfate reduction and production of H_2S

Jet delivery

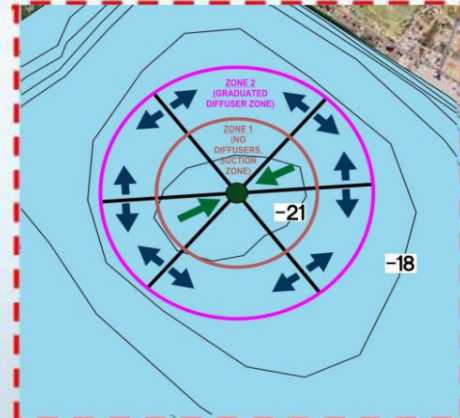


Spoke distribution

<https://sawpa.gov/wp-content/uploads/2025/01/Lake-Elsinore-In-Lake-Options-Study-update-to-LECL-Task-Force-011525.pdf>



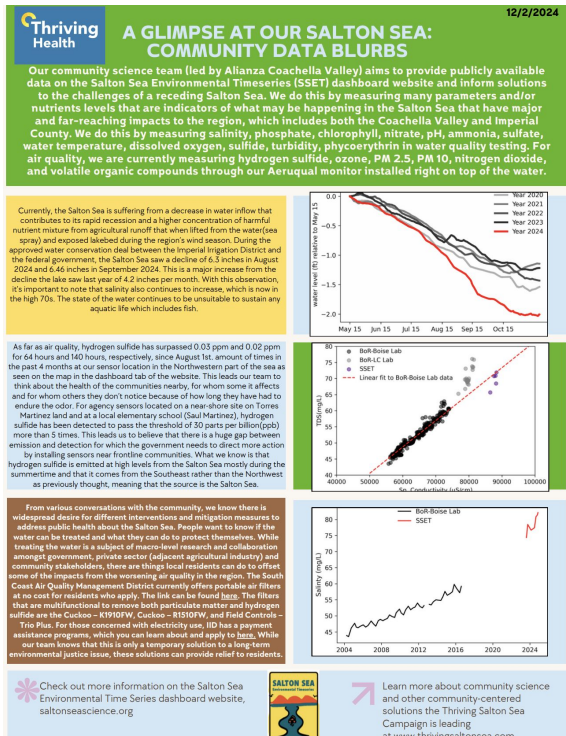
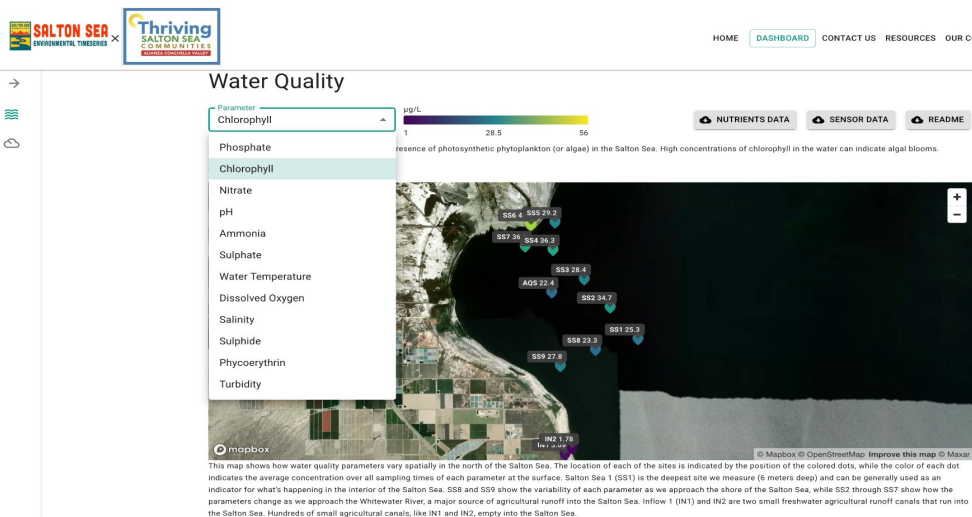
OVERALL PLAN VIEW



ENLARGED VIEW OF SPOKE SYSTEM

Community Dashboard

- The research we conducted is grounded in centering community, therefore we understand the importance of accessible data. Our research is readily available on the website, in our community dashboard, where both the water and air quality data is highlighted. As well as data blurbs distributed to community.



saltonseascience.org

Thriving Salton Sea Community Trail Network



- Connection between the North Shore community, the North Shore Beach & Yacht Club, & the Salton Sea State Recreation Area.
- Extension of the CV Link.
- Multi-modal transportation opportunities and lighting for increased community access and safety.
- Climate adaptation elements, such as solar powered shade structures & electric vehicle charging stations.
- Enhanced climate resiliency by offering solutions to the receding Salton Sea, such as revegetation and dust suppression infrastructure.
- Incorporates a community marketplace to support entrepreneurship, and community convening spaces such as play areas & art.

ENVISIONING A NETWORK TRAILS AND LINKS

- CV Link (Under Construction)
- CV Link Mecca-North Shore Extension (under study)
- Alianza Shores to Sea Trail** (under study)
- Audubon Lizard Trail (under study)

Federal Wilderness National Conservation Lands

Tribal Lands

Bureau of Land Management Land



Thank you!



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