

# NAAMC

## Quantifying Salton Sea's Harmful PM During High Wind Events

August 24<sup>th</sup>, 2022



# The Salton Sea

Southern California

**SCS ENGINEERS**

# Salton Sea

- Imperial Valley and Riverside Valley, California.
- 40 miles from Mexicali, BC, Mexico.
- A 1905 irrigation accident caused Colorado River to flow into the Salton Basin for two years.
- Increased lake size to approximately 36 miles long and 13 miles across.
- Fresh water flow from Alamo and New River.

Imperial County sources its agricultural water supply from an irrigation system branching from the Colorado River.

# An Oasis

- Sonny Bono Wildlife Refuge was established in 1930 as a sanctuary for birds and wetland species.
- A popular celebrity destination during the 1950s and 60s.



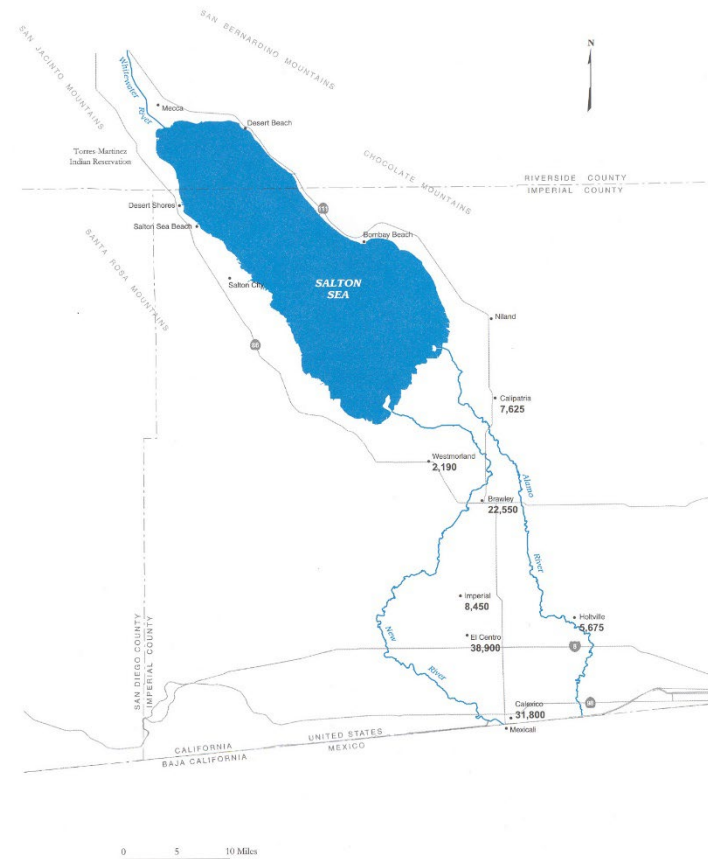
# The Pollution

- Carcinogenic chemicals from agricultural runoffs into both the Alamo and New rivers.
- Mexicali waste drainage flows into the New River.
- Increased oxygen and salinity levels created dangerous algae blooms and causing fish and wildlife die-off's.

# Reduced Water Levels

- Water transfers: Quantification Settlement Agreement
- On-farm efficiency
- Climate change.
- Evaporation.

Decreased water flow from the Alamo and New Rivers have been unable to sustain Salton Sea water levels.



January 1, 2003 Population Estimate  
California Department of Finance

# Exposed Playa

- Decreased water levels cause the shoreline to recede exposing harmful particulate matter.
- Chemical and industrial waste sits on the playa as water evaporates.
- Playa dust blows into neighboring communities during the high wind events.

**PM increases resident's chances of developing lung and heart diseases.**



# Arid Desert Region

- Prone to extreme heat waves.
- Sandy loose top soil.
- Minimal vegetation.
- ORV recreational activity further loosens soil.



Off-roading creates high levels of PM and has been restricted on the Salton Sea playa.



# High Wind Events

- Predominantly West winds at >20-mph
- Powerful dust storms travel across the arid desert region and Salton Sea basin.
- Poor visibility restricting residents to stay indoors.
- Can cause power outages due to infrastructure damage.

**Dangerous conditions affect the neighboring communities.**



# Quantification Settlement Agreement

- Transfers conserved Colorado River water to SDCWA, CVWD, MWD, and IID.
- Implementation and funding for environmental impact mitigation.



# Salton Sea Air Quality Mitigation Program

- Imperial Irrigation District (IID) launches the Salton Sea Air Quality Mitigation Program (SSAQMP).
- Air Monitoring.
- Dust Suppression.
- Field Scale Pilot Studies

The SSAQMP, Roundshot® Cameras, and data collected at Air Monitoring stations is funded through the Quantification Settlement Agreement Joint Powers Authority with members including IID, San Diego County Water Authority, Coachella Valley Water District, and California Department of Fish and Wildlife.

# Air Monitoring

## Air Quality Stations

- TEOM 1405-D
- MET Tower
- Campbell Data Loggers w/ network connectivity
- Partisol 2025-I (at two sites)



## Portable MET Stations

- 1m, 2m, and 6m wind speed
- 6m wind direction
- Rugged all-weather housing for Campbell Data Logger w/network connectivity



# PQ 200

- Used for collecting PM10 samples during forecasted high wind events.
- Near surface roughening areas or potential areas of concern.
- Comparable data for AQS data.

Deployed for collecting upwind and downwind samples.



# Roundshot® Cameras

- Four cameras are currently deployed.
- Provide photographic evidence of wind events.



Used for watching how dust storms travel across the region.

# Roundshot® Captures

Anza-Borrego



Bombay Beach



Salton South



Vail Drain



Can be sequenced for following wind event dust progression throughout the Salton Sea.

# Wind Rose

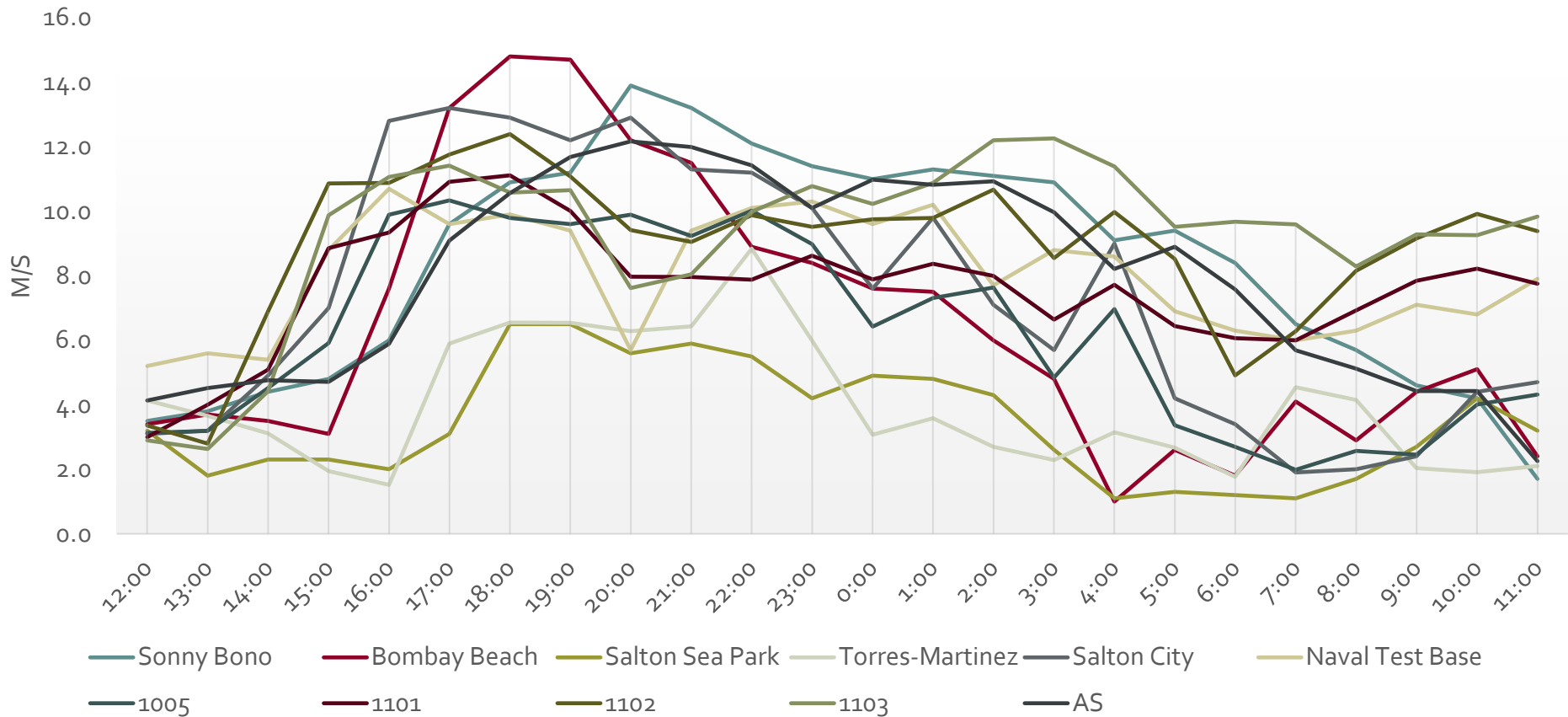


AQS data for wind roses aid in understanding PM concentration trajectory.



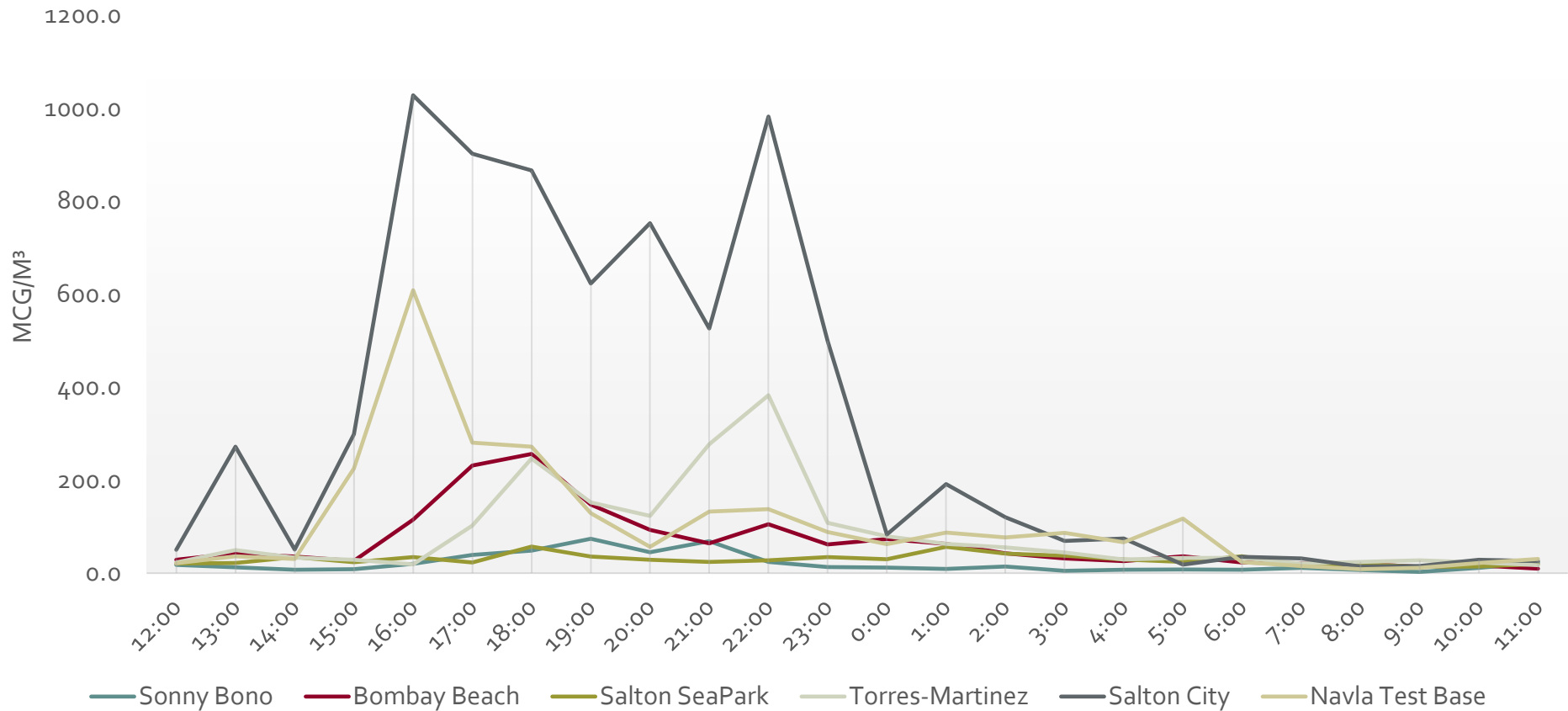
# AQS and PMS Wind Speeds

## Hourly Wind Speeds



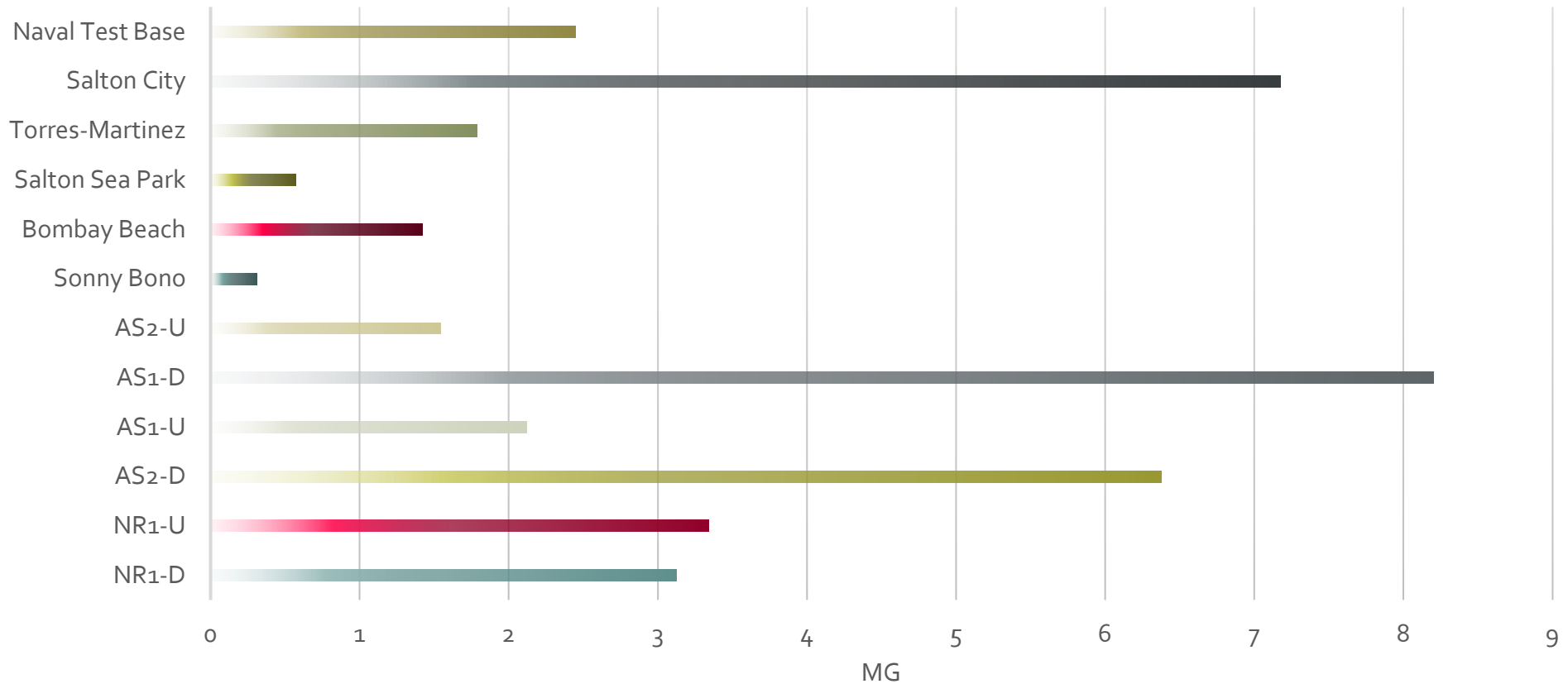
# AQS PM10 During Wind Event

TEOM 1405-D Hourly Concentrations

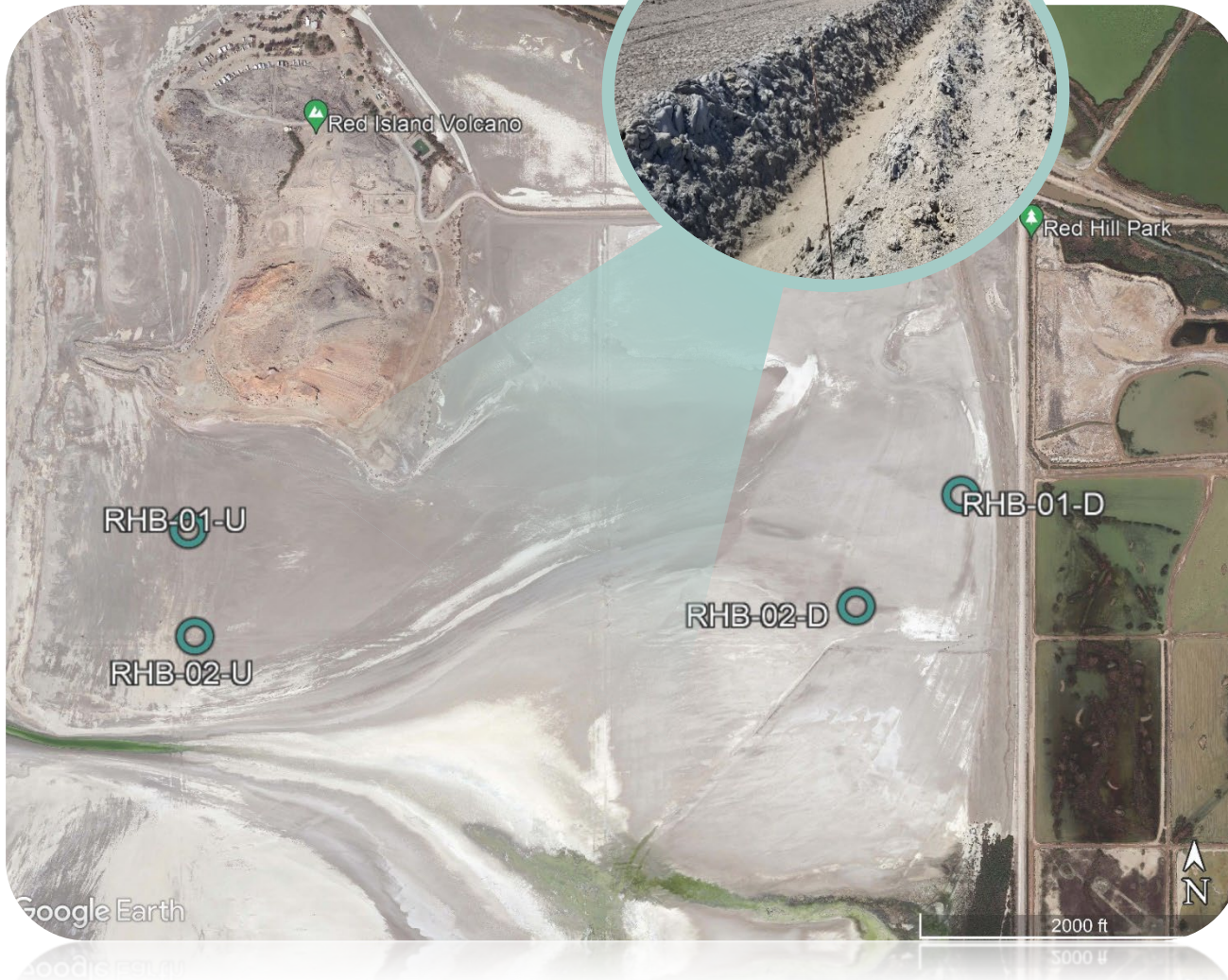


# TEOM 1405-D and PQ200

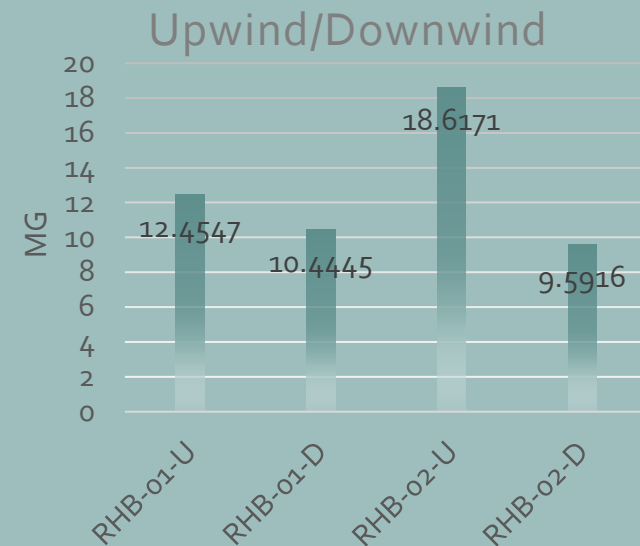
25-hr Concentrations



# Testing and Dust Suppression



Implementation of furrows and vegetation show reduced masses in upwind and downwind sampling data.



# Moving Forward

- Concentrations vary on surface composition, vegetation and distance from exposed playa and shoreline.
- Data is consistent with area properties.
- Results are comparable for future mitigation project results.
- Aides in identifying potential areas of concern.

# Sergio Valenzuela

AQ Technician  
svalenzuela@scsengineers.com

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