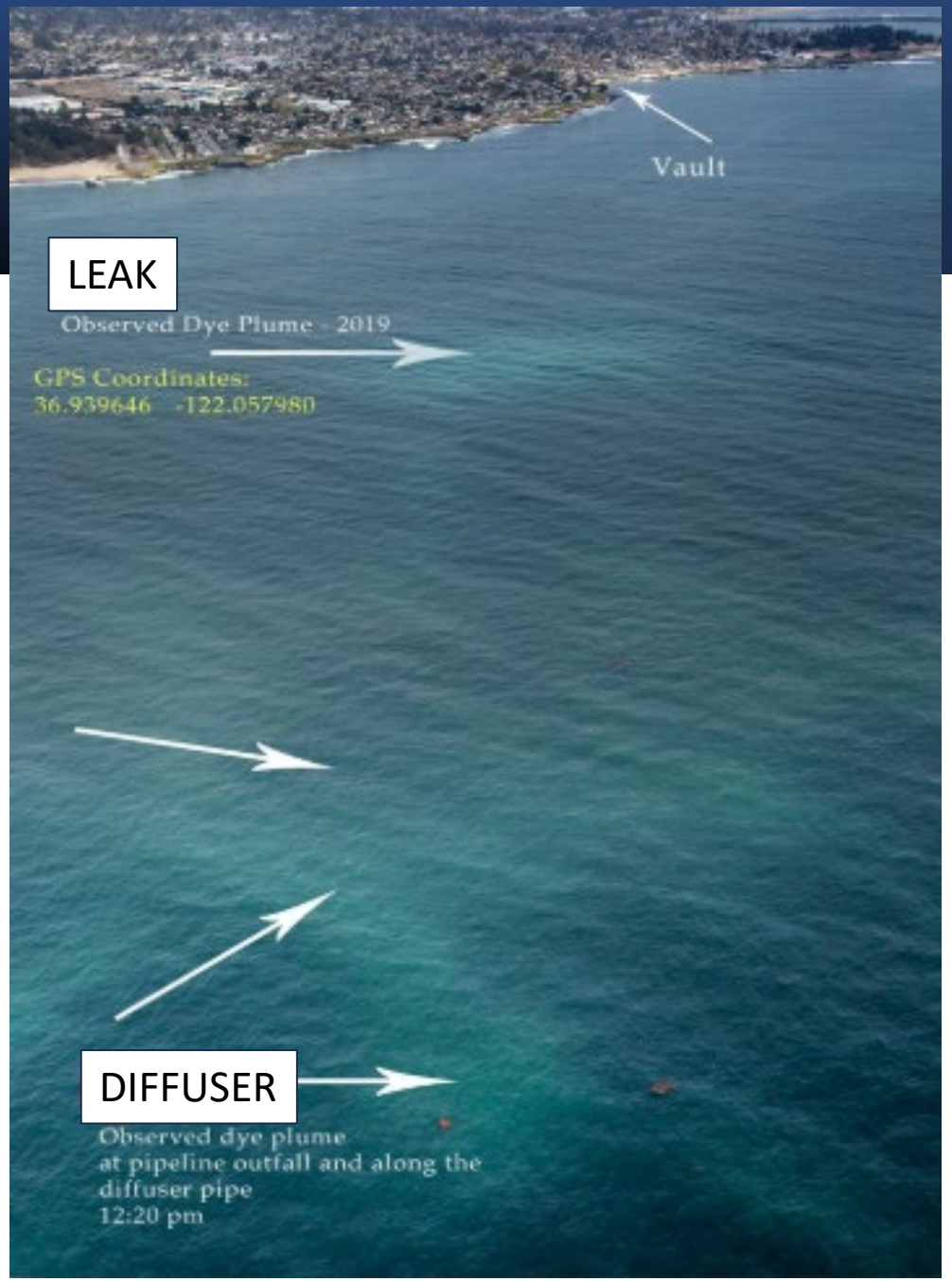
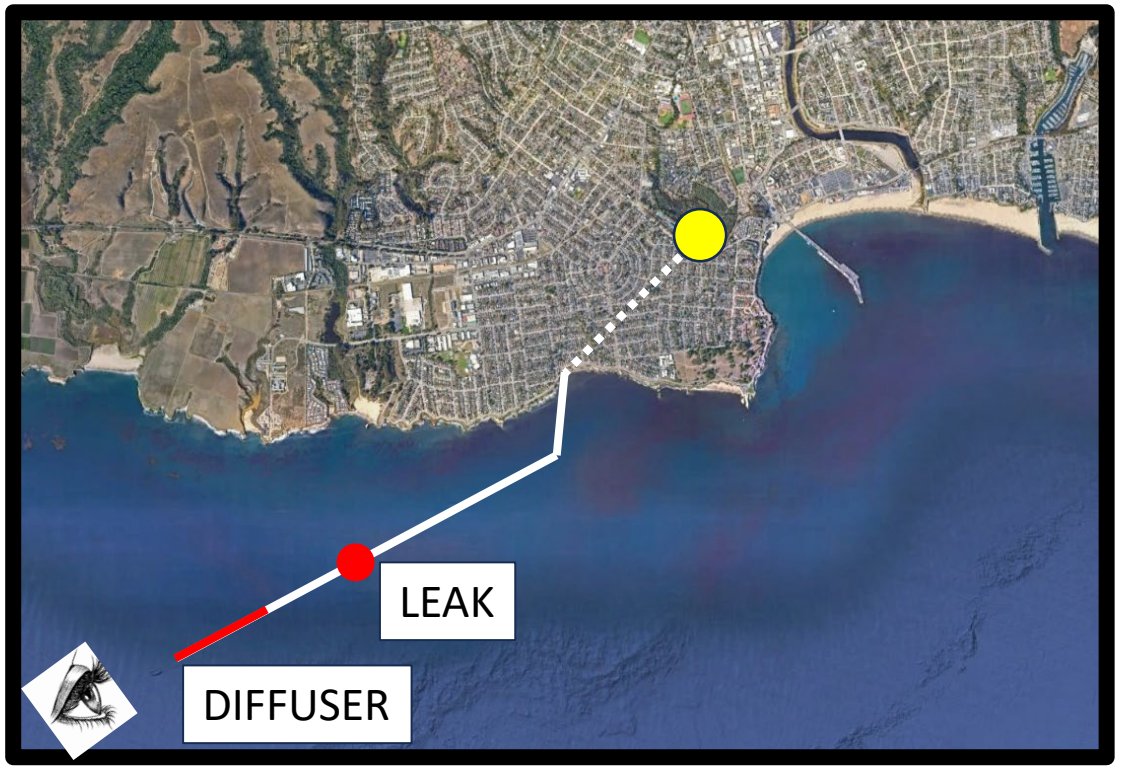
Quantifying Potential Pollutant Discharge in Near Shore Central Coast

Rhodamine Detection in Municipal Wastewater Outfall Plumes from the City of Santa Cruz

Dave Martin, City of Santa Cruz, Environmental Compliance Inspector, PhD

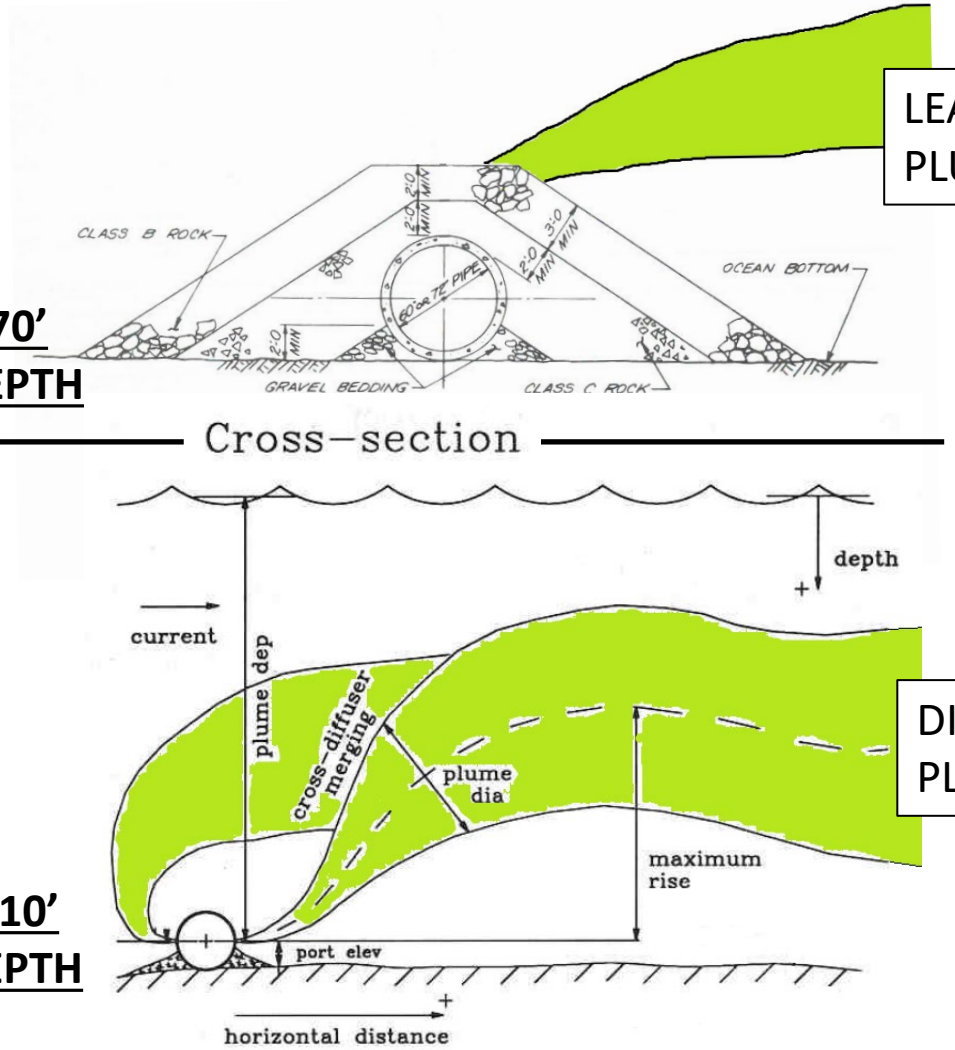
Aerial Observations of Plumes Using Dye





(photo point of view)

Outfall Construction and Expected Plumes

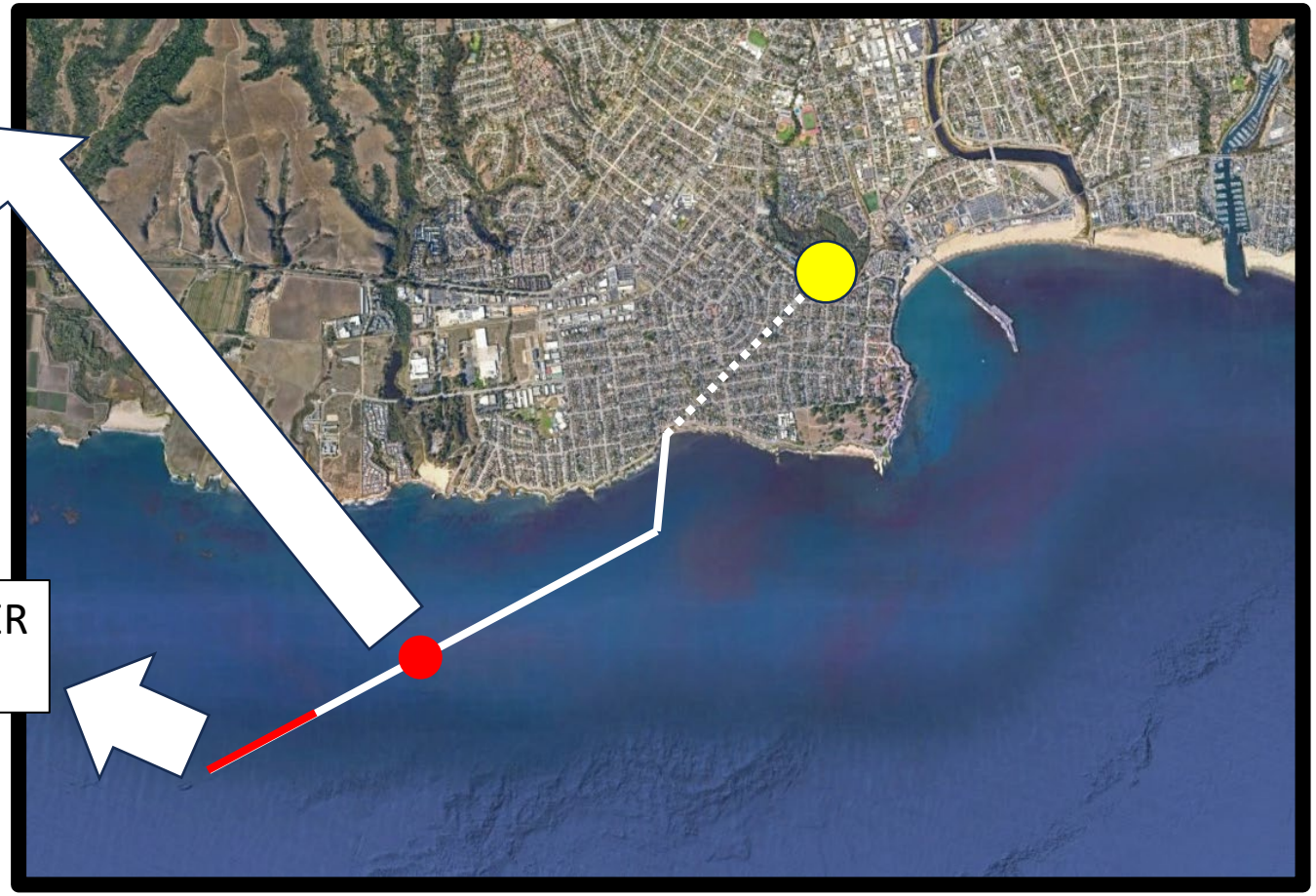


70’ DEPTH

110’ DEPTH

LEAK PLUME

DIFFUSER PLUME



Recycled Water, Brine, and an Order

PUREWater Soquel

Water Transformed™

Recycling Final Secondary Effluent

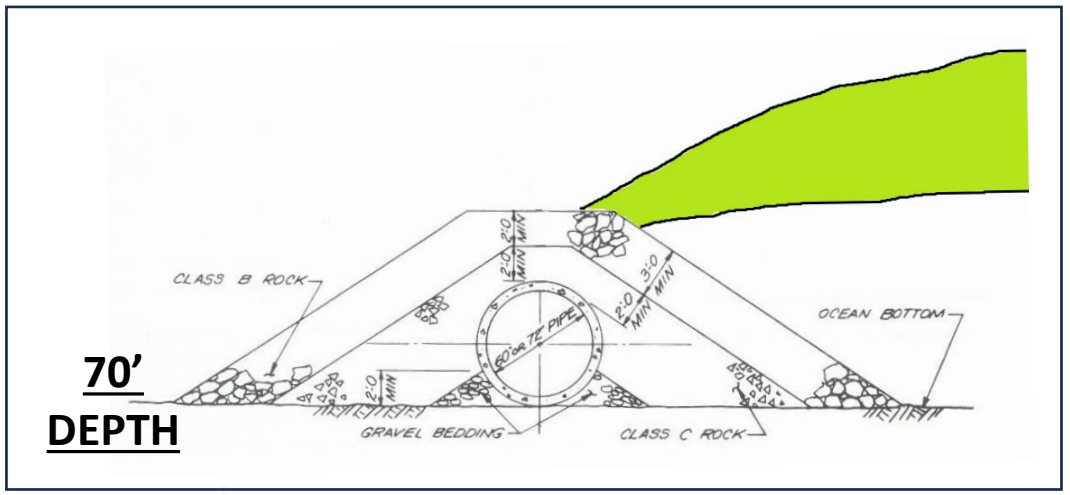
Resulting Brine Introduced to Existing Effluent and Ocean Outfall

CALIFORNIA WATER BOARDS Central Coast - R3

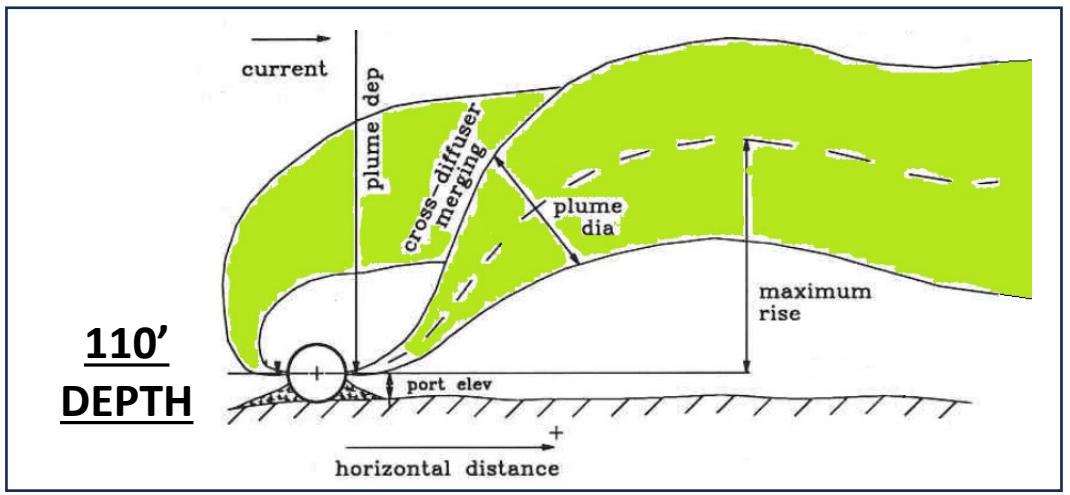
Central Coast Regional Water Quality Control Board of February 5, 2021:

"…Fluorometer measurements shall be collected…to provide data that helps record the magnitude of the leak…"

Fluorometry and Visual Detection Apparatus



70’ DEPTH



110’ DEPTH

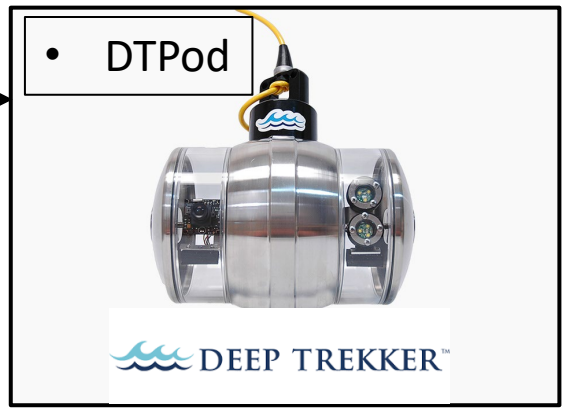
Fluorometer

Fluorometer

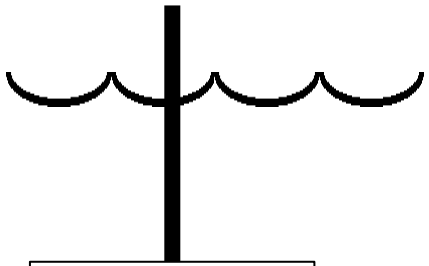
Drop Camera

- Cyclops-7F
- DataBank

- DTPod



Fluorometry and Visual Detection Apparatus



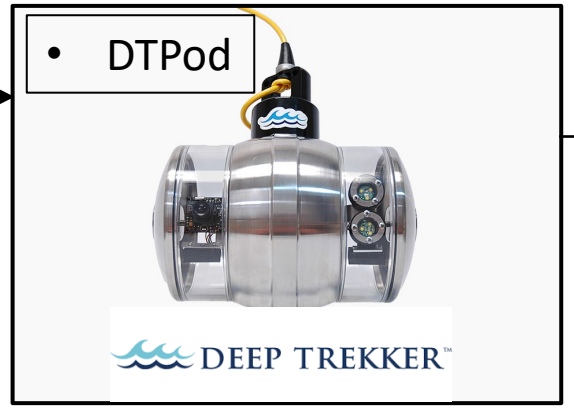
Fluorometer

Fluorometer

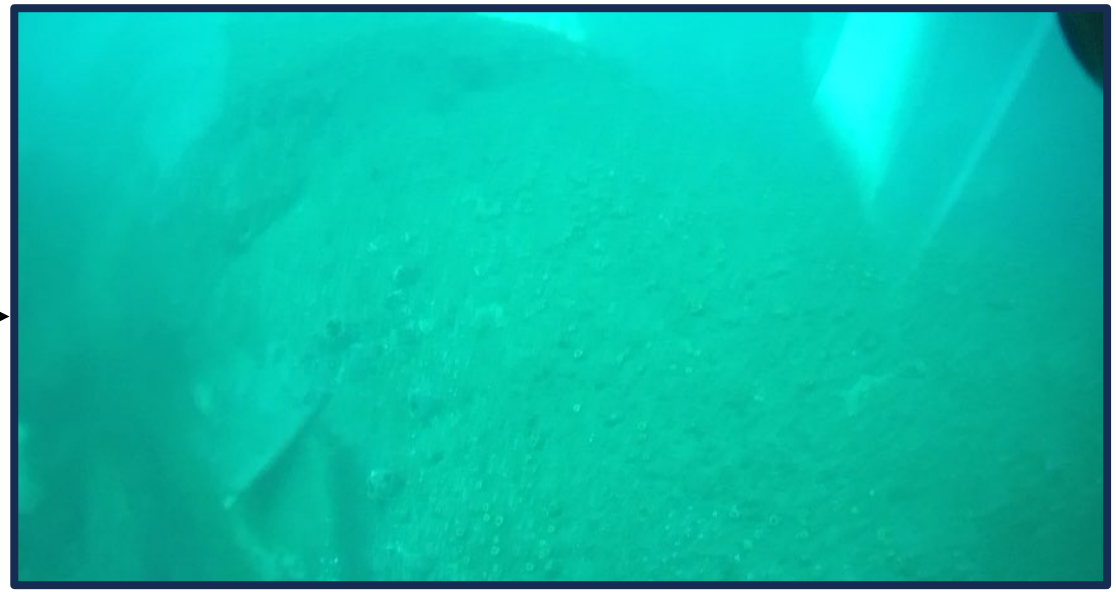
Drop Camera

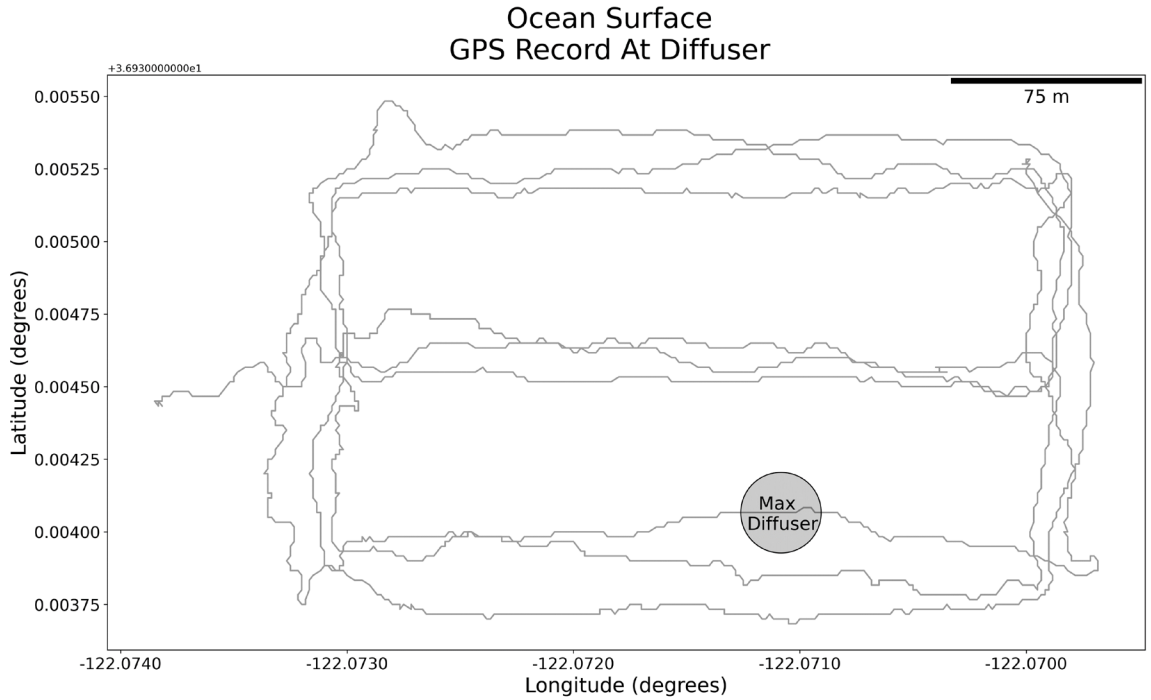
- Cyclops-7F
- DataBank

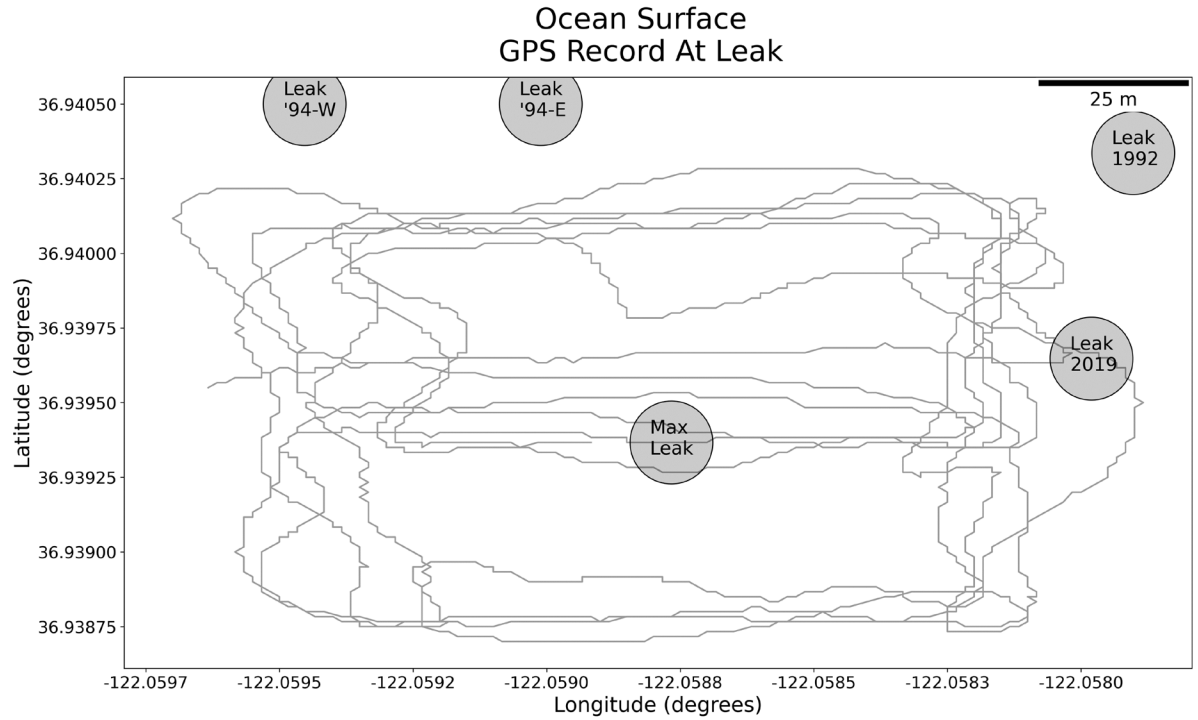
Time	Concentration	GPS
(2 sec) ↓	↓	↓
↓		



- DTPod




Ocean Surface
GPS Record At Diffuser
+3.6930000000e1
75 m
Max
Diffuser
Latitude (degrees)
Longitude (degrees)
0.00550
0.00525
0.00500
0.00475
0.00450
0.00425
0.00400
0.00375
-122.0740
-122.0730
-122.0720
-122.0710
-122.0700


Ocean Surface
GPS Record At Leak
Leak
'94-W
Leak
'94-E
25 m
Leak
1992
Leak
2019
Max
Leak
Latitude (degrees)
Longitude (degrees)
36.94050
36.94025
36.94000
36.93975
36.93950
36.93925
36.93900
36.93875
-122.0597
-122.0595
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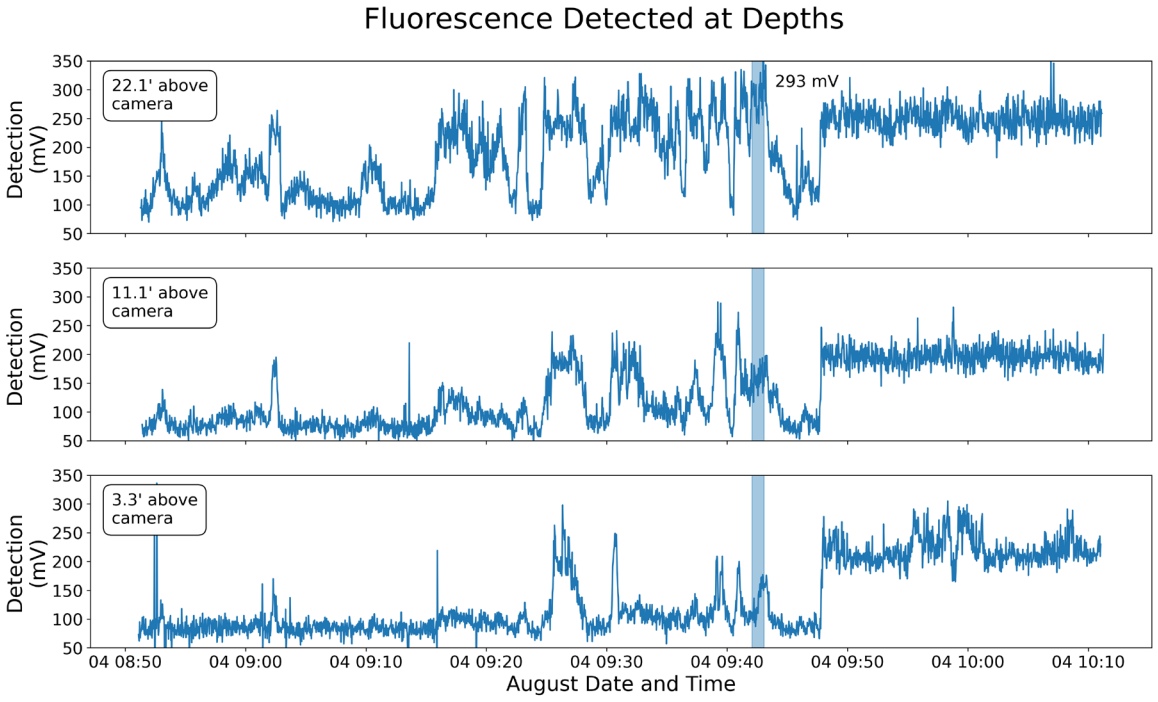
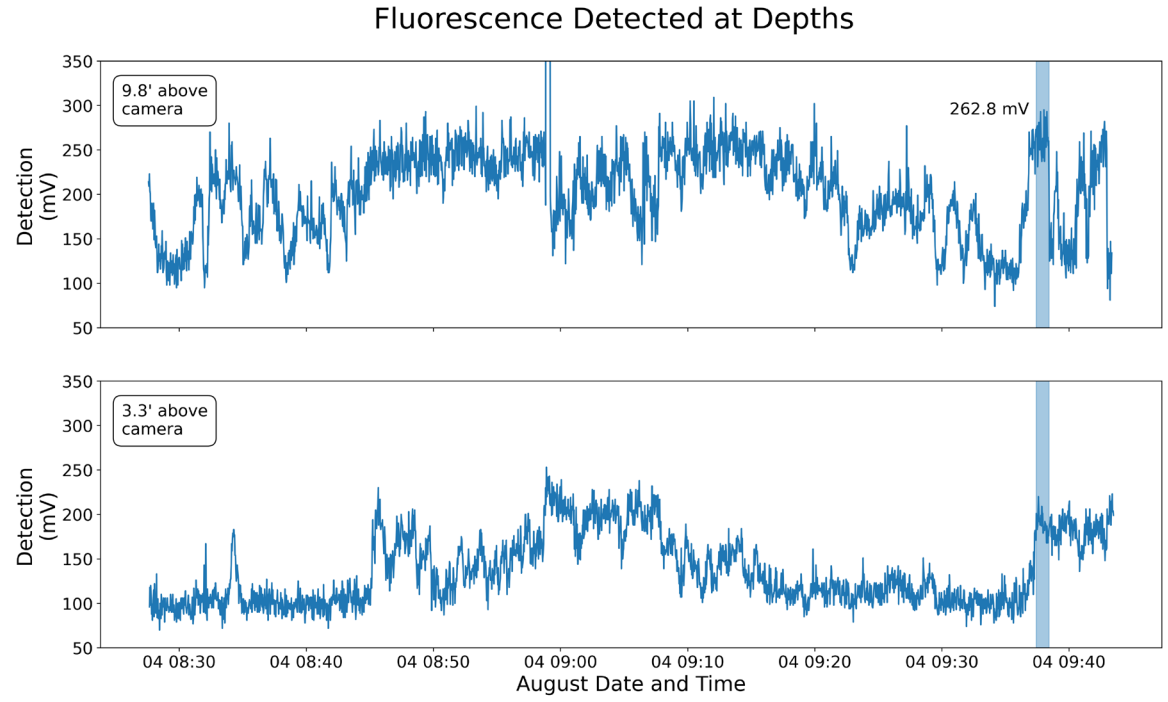
-122.0588
-122.0585
-122.0583
-122.0580


Fluorescence Detected at Depths
22.1' above
camera
293 mV
11.1' above
camera
3.3' above
camera
Detection
(mV)
04 08:50
04 09:00
04 09:10
04 09:20
04 09:30
04 09:40
04 09:50
04 10:00
04 10:10
August Date and Time


Fluorescence Detected at Depths
9.8' above
camera
262.8 mV
3.3' above
camera
Detection
(mV)
04 08:30
04 08:40
04 08:50
04 09:00
04 09:10
04 09:20
04 09:30
04 09:40
August Date and Time

Summary and Acknowledgements

Each plume has similar:

- Rhodamine concentration
- Dilution with seawater
- Health risk

Problem with Visual Plume Observation