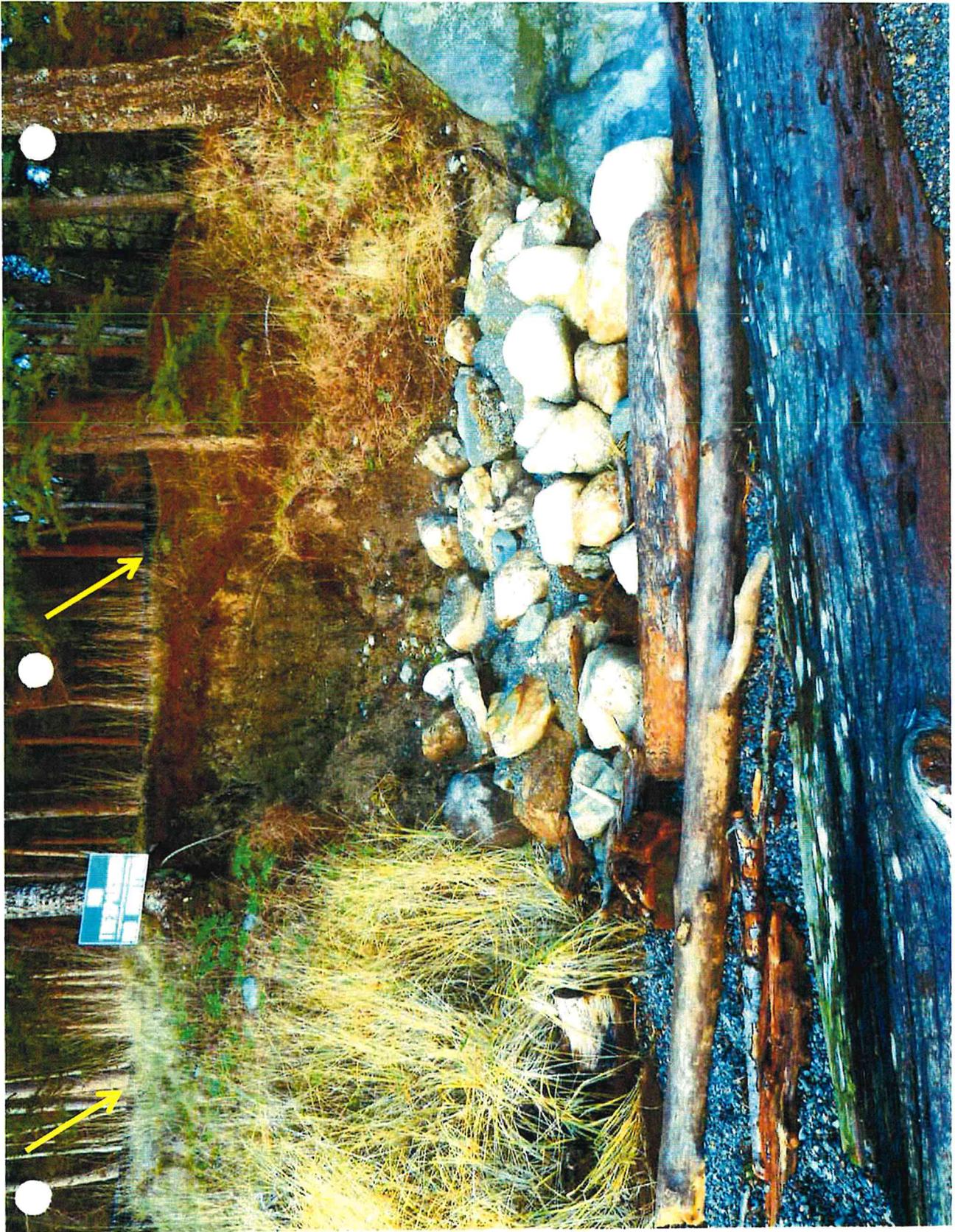


**EXHIBIT A**

**Driveway and Utilities  
Reach 3**



**Driveway and Utilities  
Reach 3**

**EXHIBIT B**



Driveway and Utilities  
Reach 3

EXHIBIT C



**Erosion Upper Driveway  
Reach 3**

**EXHIBIT D**





**Illustrative for**  
**Vladimir Shepsis**  
**Testimony**

# **Runstad Property – Shoreline Erosion Protection**

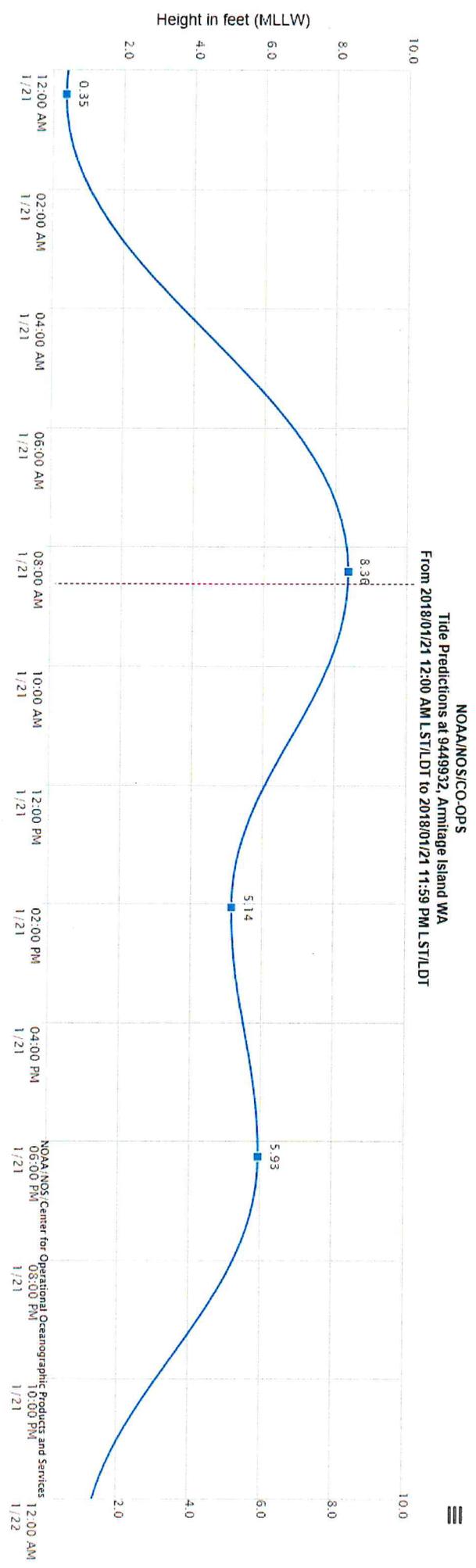
Professional Opinion by Coastal Engineer

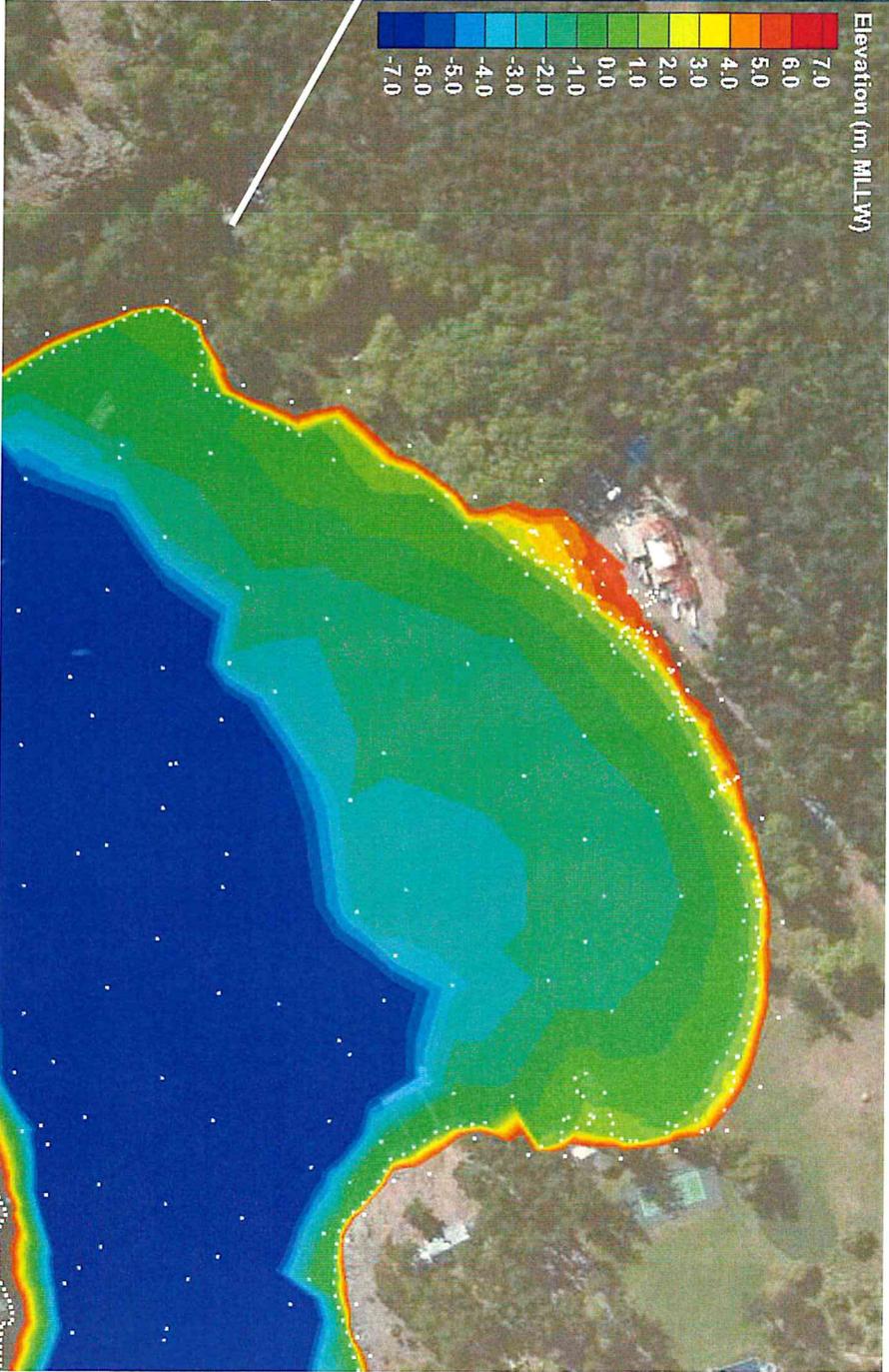
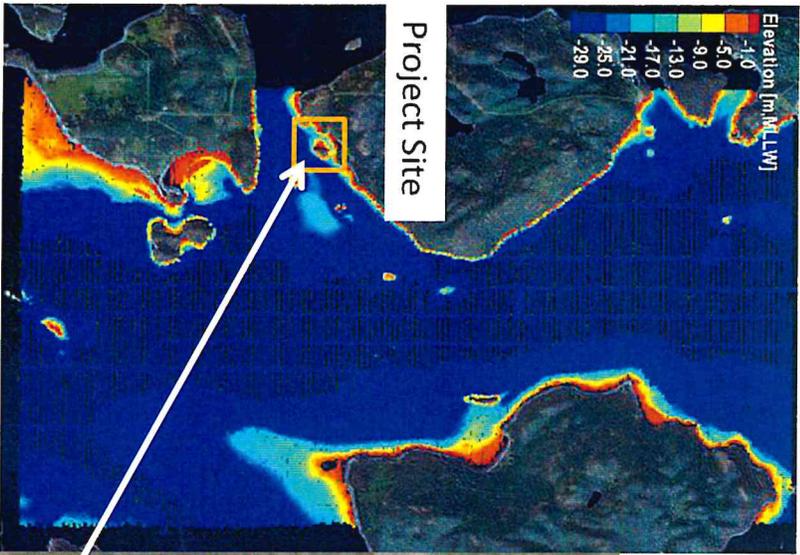
Dr. Vladimir Shepsis Ph.D., P.E.

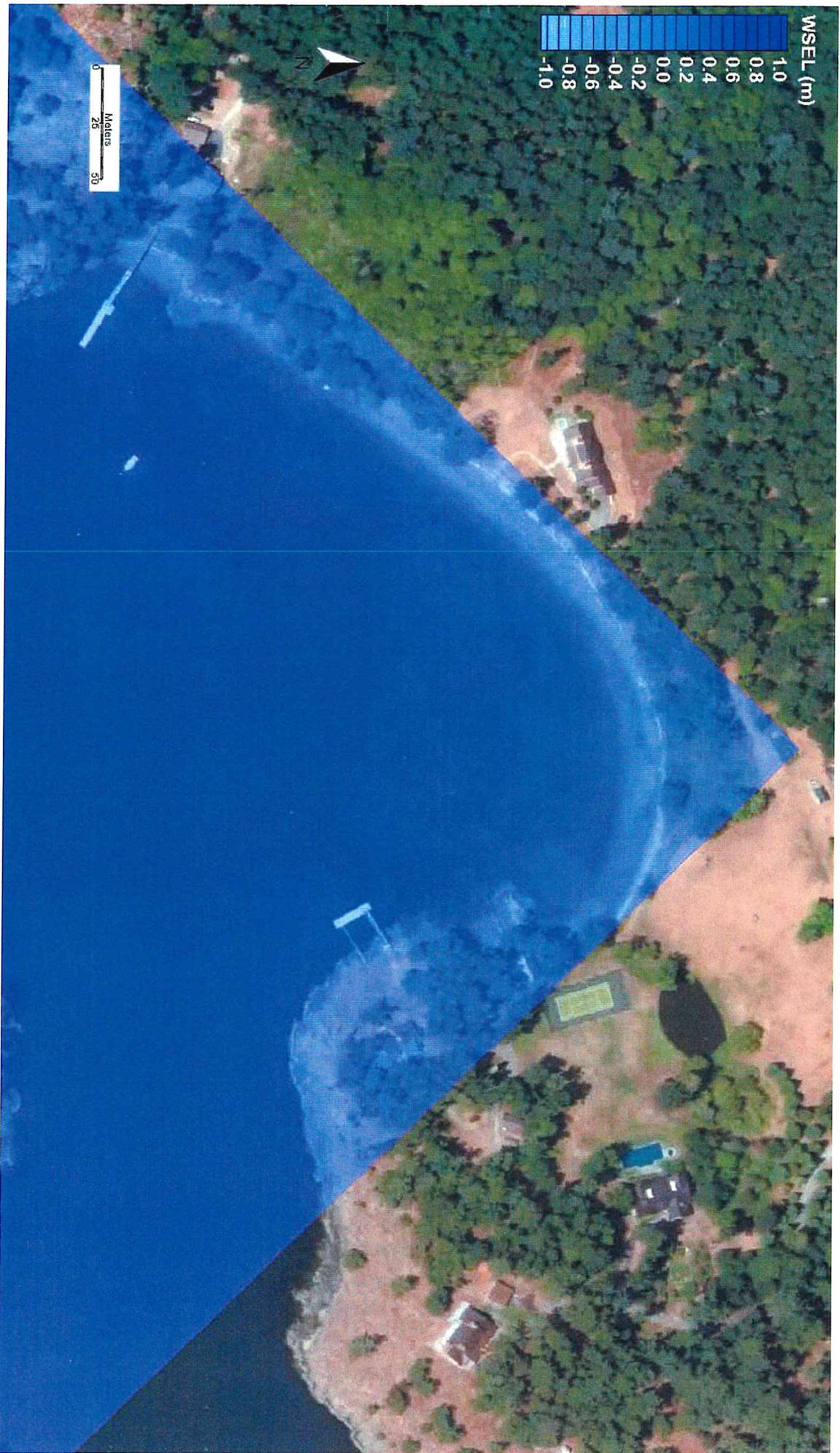
January 21, 2018

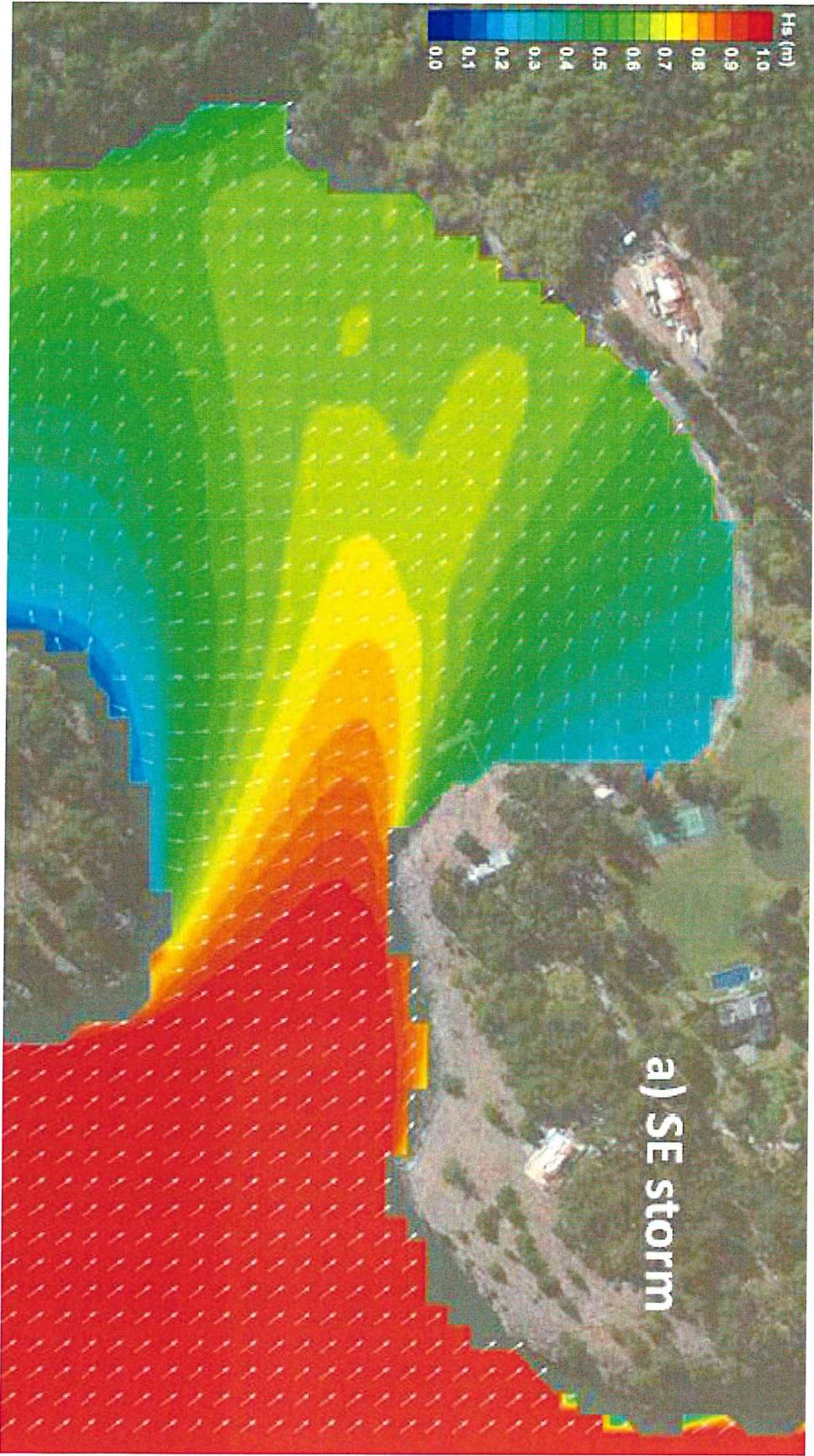


# Wind, Max 26 miles per hour, from SE Direction

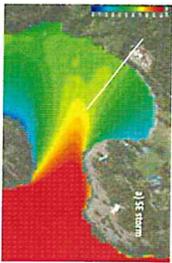




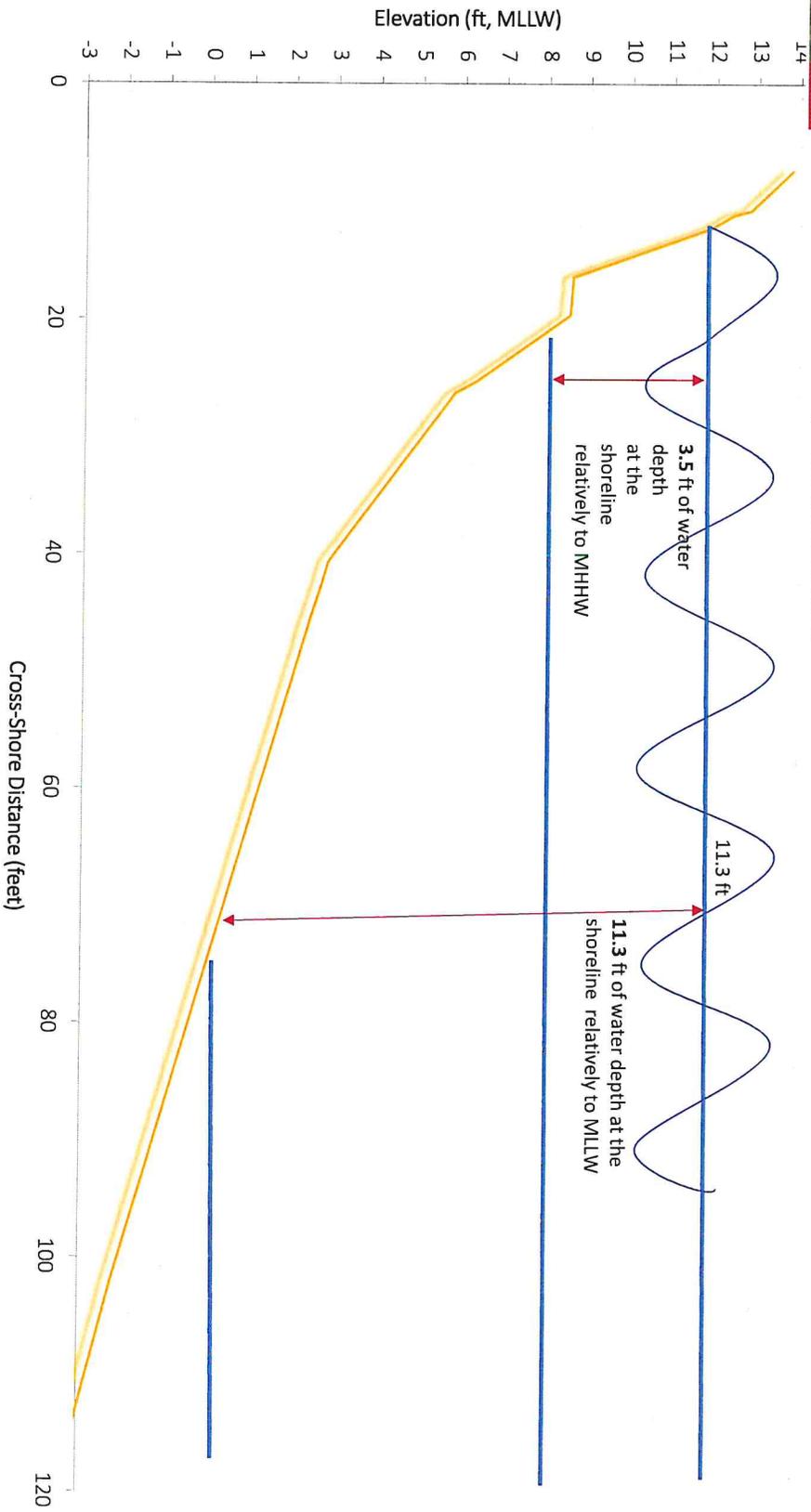








**CHE Report: "during high tide when water depth at the shoreline is 2-4 feet of depth, a significant amount of wave energy that enters the bay is delivered to the bank"**

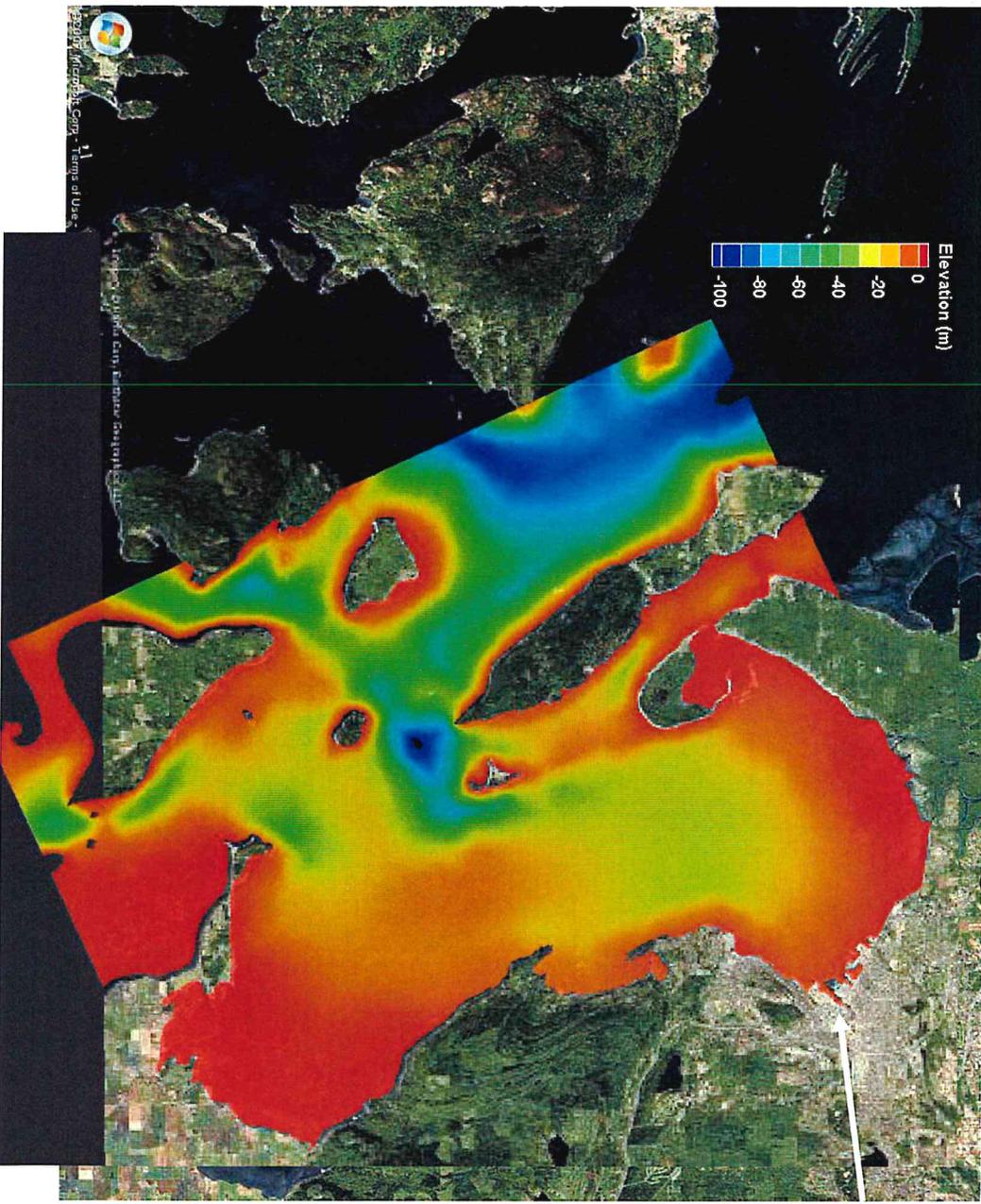


## Accuracy of Wave Modeling

Excerpts from CGS report:

- Page 9 “...the preliminary (and admittedly not accurate) wave modeling...”
- Page 12: “Site conditions were not adequately described or documented ... incomplete wave model...”

# Bellingham Bay Wave Modeling

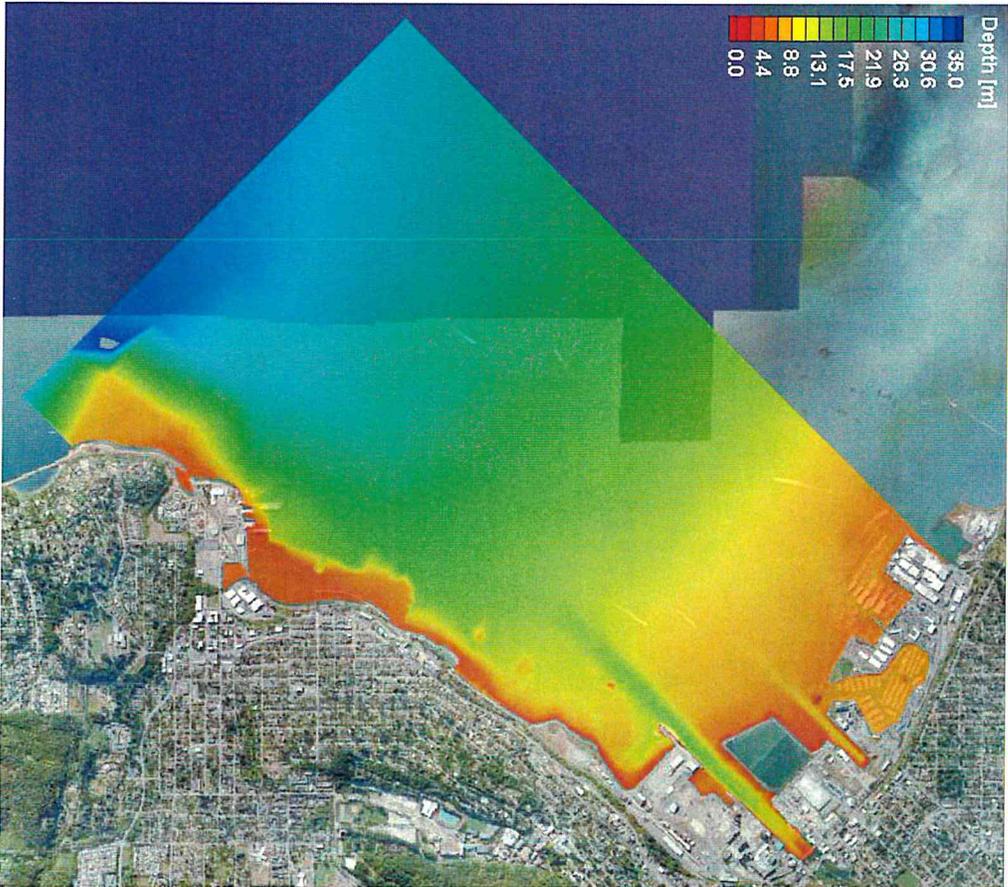


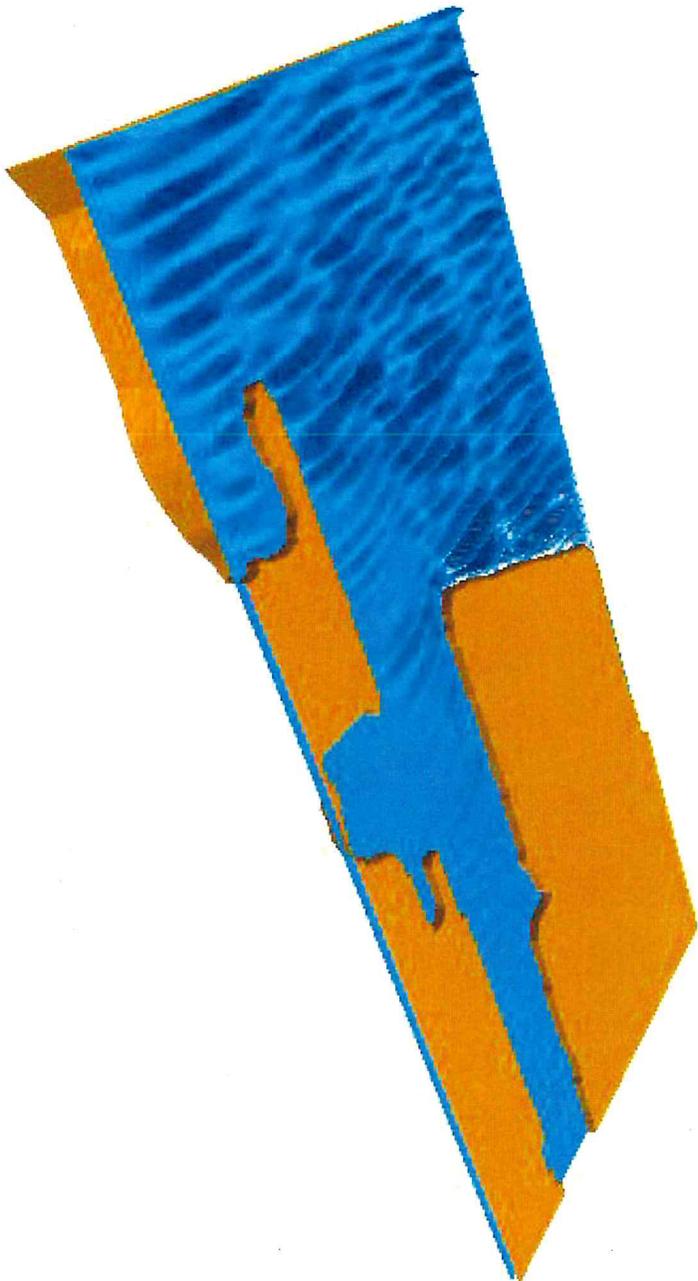
Project Site

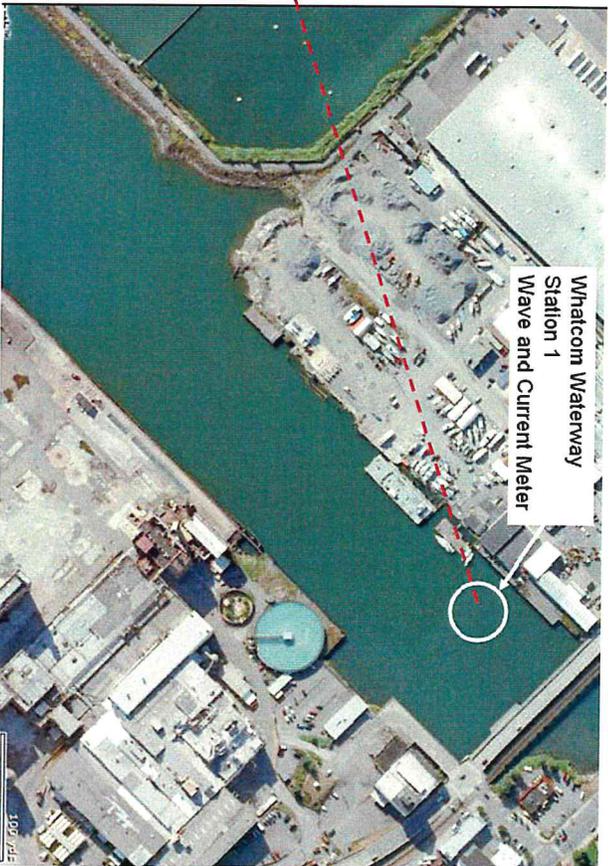
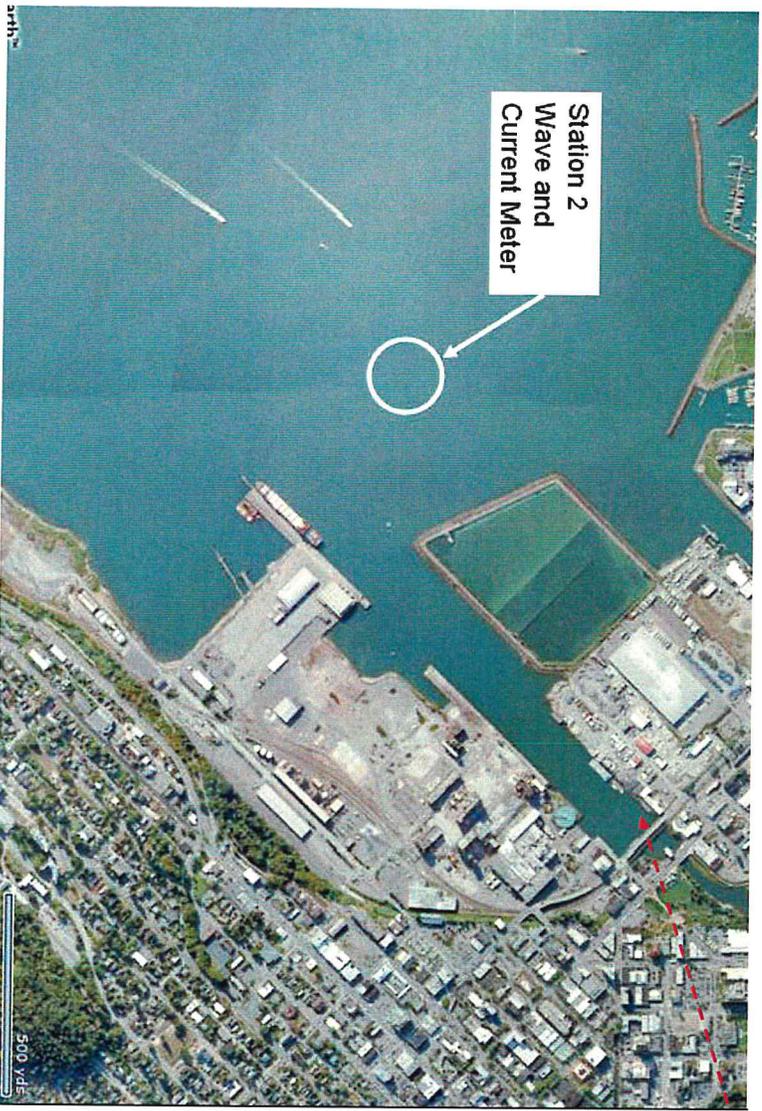
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Topographic Data from Digital Elevation Model

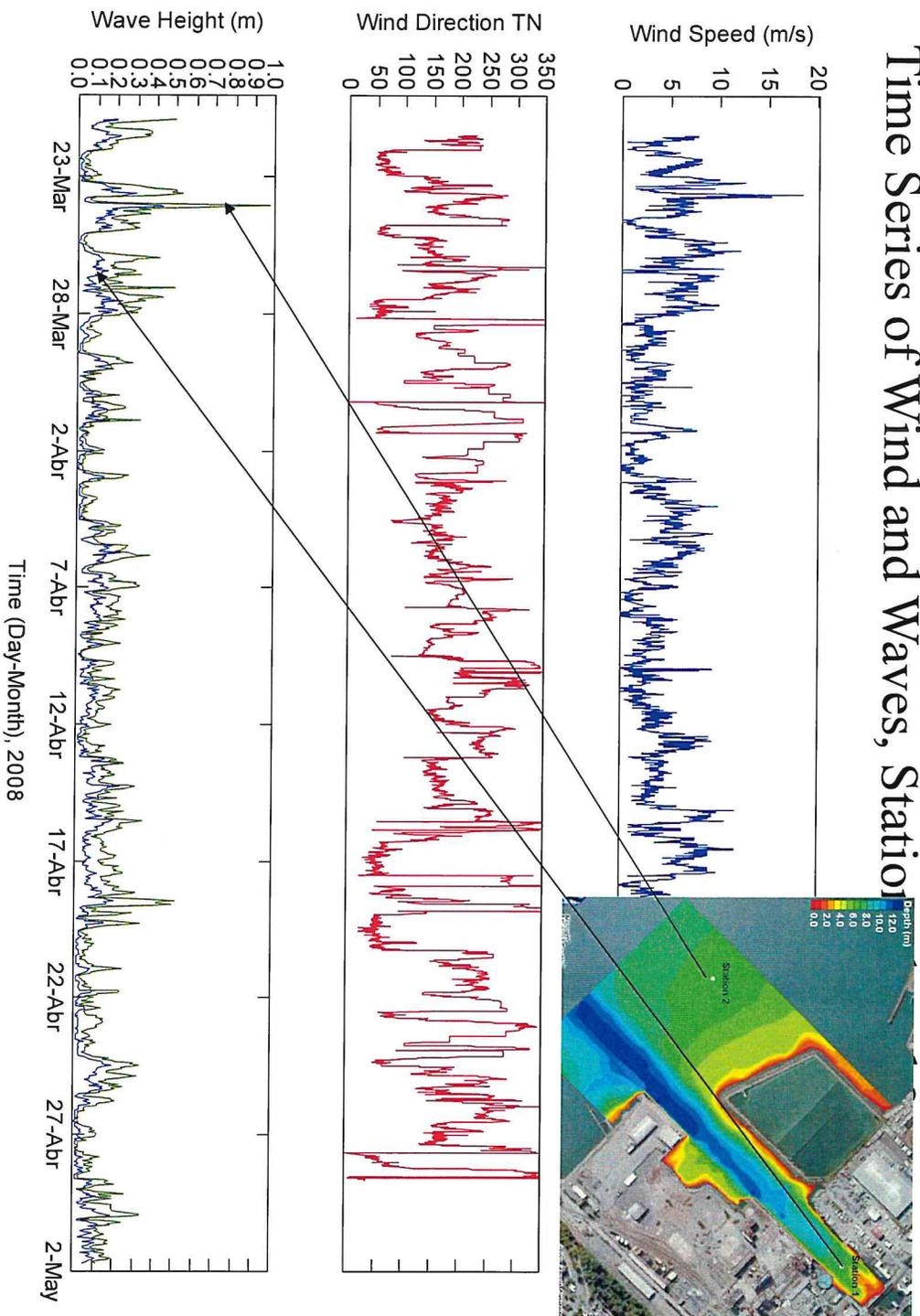
# Project Site







# Time Series of Wind and Waves, Station



## Comparison between Modeling Results and Measurements

	Model Input		Model Output			Measured Waves		
	Wind Speed (m/s)	Wind Dir (TN)	Hs (m)	Peak Period (s)	Peak Dir (TN)	Hs (m)	Peak Period (s)	Peak Dir (TN)
STATION 1	15.2	258.5	0.41	3.98	223	0.41	3.71	222
STATION 2	15.2	258.5	0.94	3.41	253	0.97	3.60	255

