



# The Beach Water Quality NowCast Project Update and Discussion

CWQWG – February 2019

# State of the NowCast System



# NowCast is a Comprehensive Program

## 1. Modeling Pipeline

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2. Technical Oversight

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3. Public Notification and Education

# NowCast is a Comprehensive Program

1. Modeling Pipeline
2. Technical Oversight
3. Public Notification and Education
4. Beach Manager Communication

# NowCast Model Performance

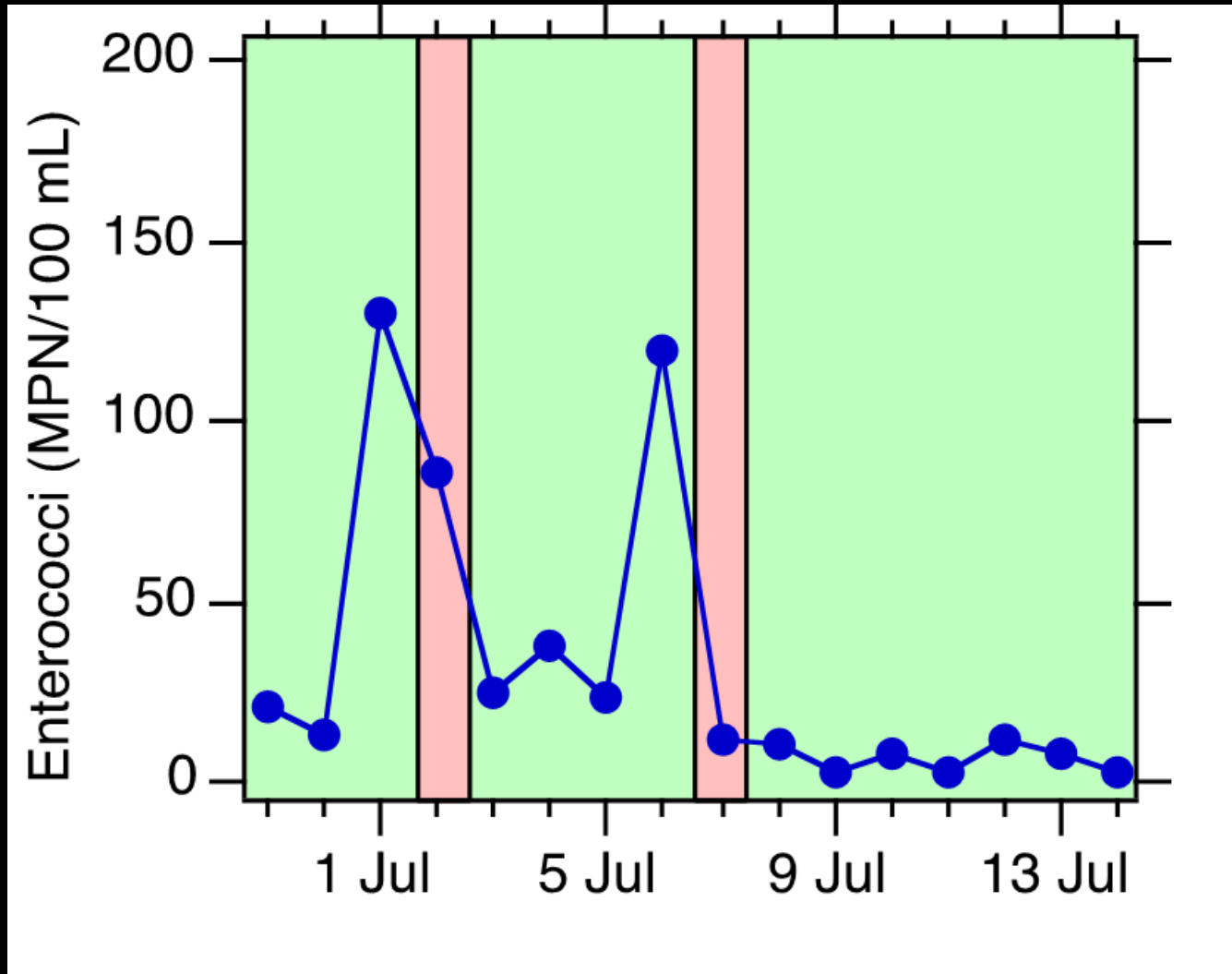


# Why predictions don't always match observations

- Variability that comes with using a model
- Variability of sample results



# What is the Current Method

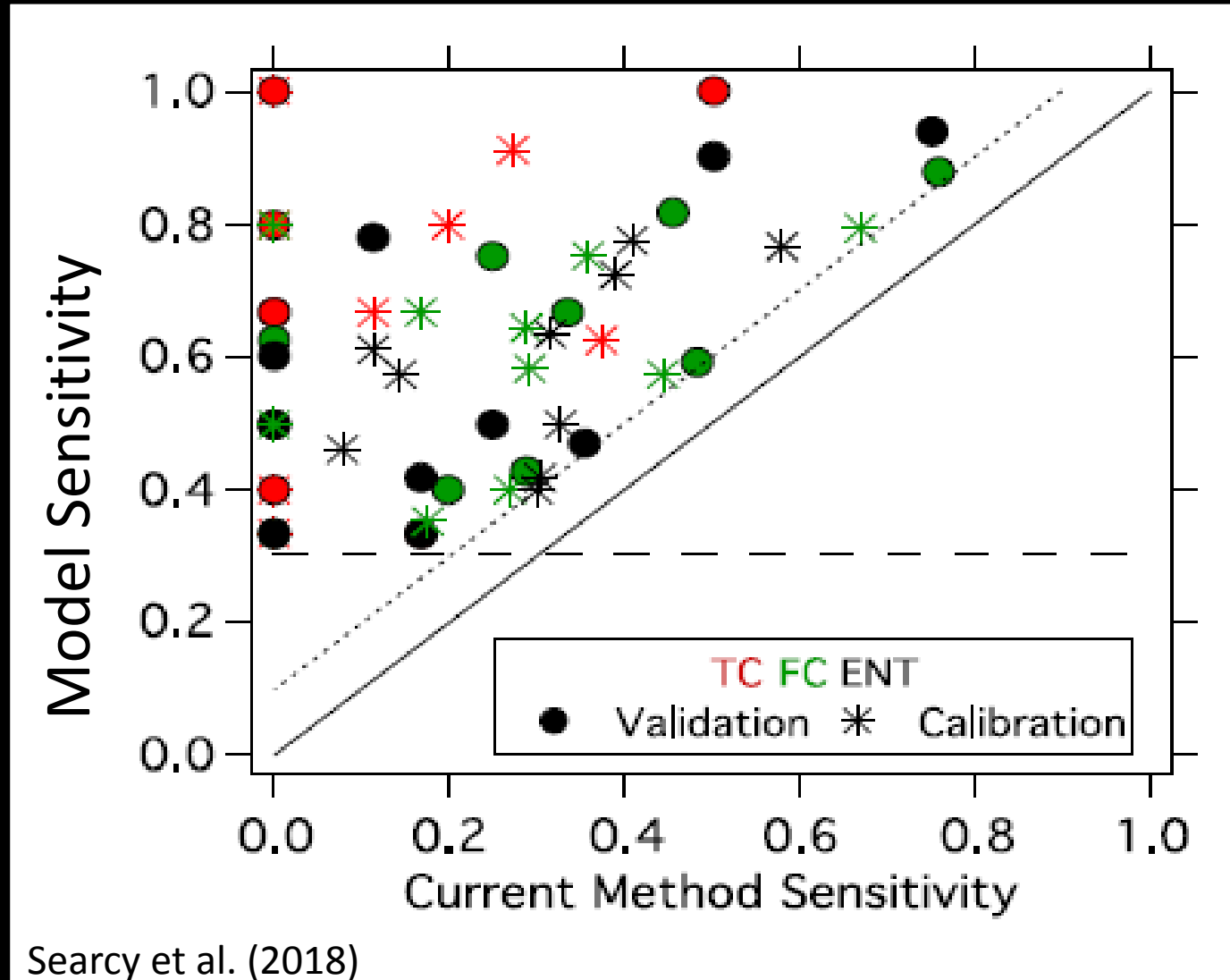


Current Method (Model)

$FIB_{pred} = FIB$  (most recent)

\*Also known as the 'persistence model'

# How the Current Method performs



Searcy et al. (2018)

NowCast models are designed to be more health protective than the Current Method

*NowCast Model Performance Criteria*

- Sensitivity shall be greater than or equal to 0.30

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*NowCast Model Performance Criteria*

- Sensitivity shall be greater than or equal to 0.30
- Sensitivity shall be greater than or equal to 0.10 greater than the sensitivity of the Current Method
- Specificity shall be greater than or equal to the lesser of 0.85 and the specificity of the Current Method

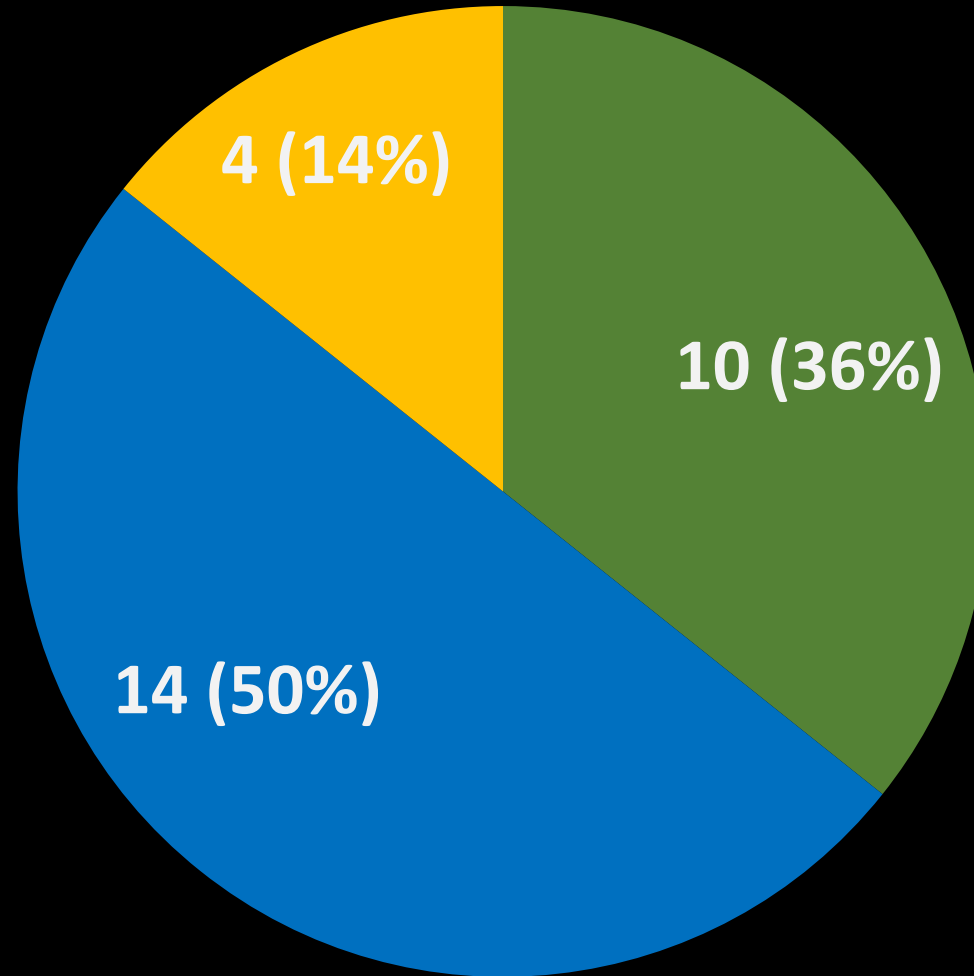
# Model Performance

Performance		Mean Sensitivity		Mean Specificity	
NowCast Season	# Beaches	NowCast	Current Method	NowCast	Current Method
Summer 2017	10	0.46	0.10	0.86	0.95
Winter 2017/2018 (Pilot)	5	0.51	0.28	0.88	0.91
Summer 2018	19	0.19	0.12	0.90	0.95
Present (Winter 18/19)	5	0.40	0.10	0.88	0.91

# In-Season Performance Monitoring Categories

<b>Good</b>	Model performance meets or exceeds the NowCast Model Performance Criteria
<b>Acceptable</b>	Sensitivity: <ul style="list-style-type: none"><li>- If at least 2 exceedances have been measured, sensitivity is greater than or equal to the sensitivity of the Current Method (CM)</li></ul> Specificity: <ul style="list-style-type: none"><li>- Greater than or equal to the lesser of 0.80 and the specificity of the CM</li></ul>
<b>Under Notification</b>	Sensitivity: <ul style="list-style-type: none"><li>- If at least 2 exceedances have been measured, sensitivity is less than, but no less than 1/2, the sensitivity of the CM</li></ul> Specificity: <ul style="list-style-type: none"><li>- No less than 0.15 below the lesser of 0.80 and the specificity of the CM</li></ul>
<b>Poor</b>	Sensitivity: <ul style="list-style-type: none"><li>- If at least 2 exceedances have been measured, sensitivity is less than 1/2 the sensitivity of the CM</li></ul> Specificity: <ul style="list-style-type: none"><li>- Less than 0.15 below the lesser of 0.80 and the specificity of the CM</li></ul>
<b>Unknown</b>	Model performance cannot be evaluated due to unavailability of sample data

# Summer 2017 – Model Performance

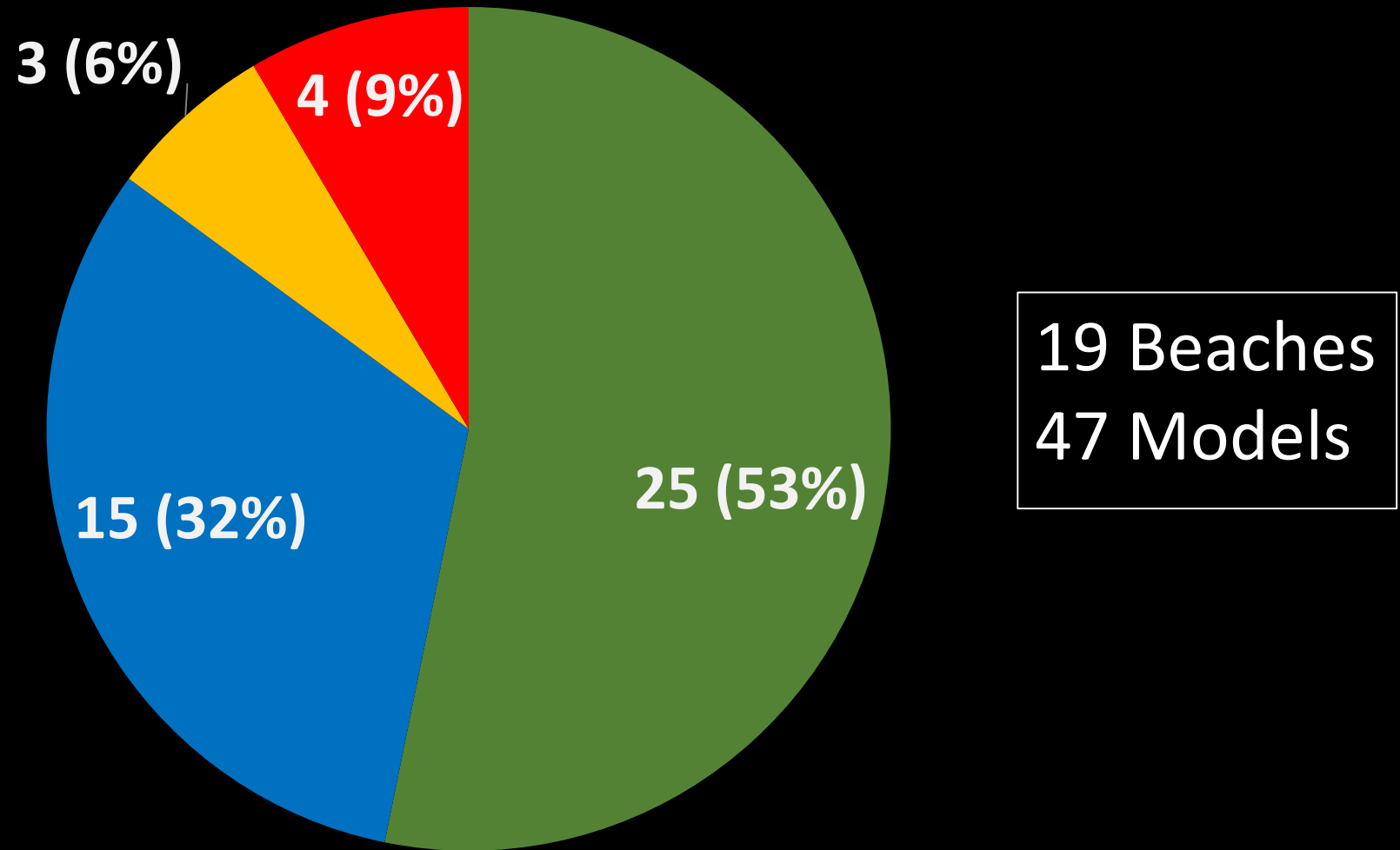


10 Beaches  
28 Models

■ Good ■ Acceptable ■ Under Notification ■ Poor



# Summer 2018 – Model Performance



■ Good ■ Acceptable ■ Under Notification ■ Poor

# Current Method vs. NowCast Predictions

## Current Method

1. Low availability
  - Samples taken typically once weekly
2. Public notification/management action based only on a single sample
  - Retroactive
3. Generally low sensitivity

## NowCast

1. Available 7 days/week
2. Predictions are based on the most up to date environmental data
  - Come from models based on years of environmental data
3. Models are tuned to achieve performance levels desired by beach managers

# DISCUSSION

## NowCast Model Performance



# Messaging NowCast Predictions



# Public Notification Protocol

- Goal: To notify the public of water quality in a timely and easily accessible manner
- NowCast is designed to provide additional information to sampling, not to replace it
- Clarification on when to post the beach
- Forms of public notification




Wed 1/23/2019 6:30 AM



NowCast

NowCast Predictions - 01/23/2019

To NowCast

Cc calimodel@lists.stanford.edu

 If there are problems with how this message is displayed, click here to view it in a web browser.

 Message  NowCast\_Predictions\_01232019.csv (594 B)

Good morning,

Here are the **NowCast Predictions for 01/23/2019**:

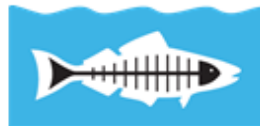
Beach	County	Prediction	Comments
Venice Breakwater	LA	Post	Triggered by ENT
Manhattan (28th St.)	LA	No Post	
Redondo Breakwater (Herondo St.)	LA	No Post	
Huntington City Beach (Beach Blvd.)	OC	No Post	
Santa Ana Rivermouth	OC	No Post	

Please contact us with any questions or comments.

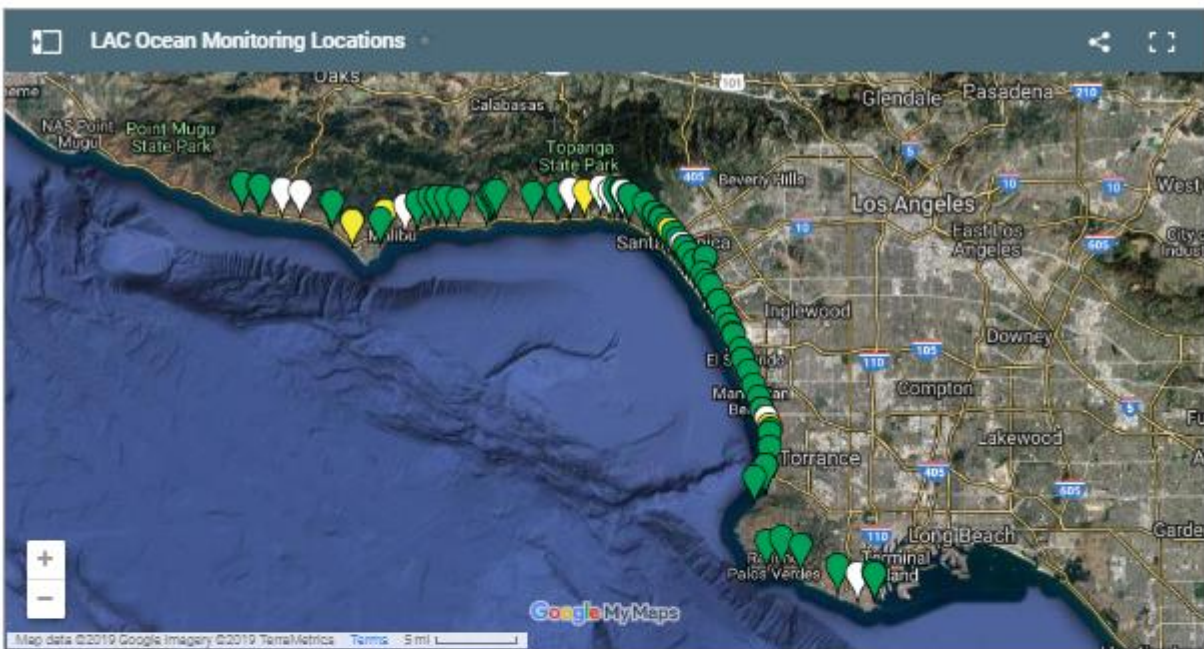
*NowCast predictions may also be accessed on Heal the Bay's [Beach Report Card website](#).*





Cheers,

The NowCast Team  
(310) 451-1500  
[nowcast@healthebay.org](mailto:nowcast@healthebay.org)



Heal the Bay



-  Ocean water bacteria level **meets State Standards**
-  **Advisory;** Ocean water bacteria level **exceeds State standards** and may cause illness. Also used for all beaches during an ocean water quality rain advisory
-  **Closed;** Ocean water **closed** to water contact due to sewage contaminated water or other health hazard
-  No recent sample results available

**NOWCAST**  
 Predicted to exceed State standards for bacteria level in ocean water



Today's NOWCAST  
 50 feet upcoast of the Santa Ana River Mouth at Huntington State Beach



**GOOD**

Ocean water bacterial levels predicted to meet state health standards at the location above.

Today's NOWCAST  
 Surf at the projection of Beach Boulevard at Huntington City Beach




**GOOD**

Ocean water bacterial levels are predicted to meet state health standards at the location above.





Search For Your Favorite Beach   

# Welcome Beach Lover.

We believe that no one should get sick from a day at the beach, and that's why we've created a simple, yet comprehensive tool that lets you search for the latest water quality information at your favorite beach.

To get started, enter the location of a beach in the search bar or play around with the map to find water quality information for beaches near you.

**NowCast Predictions**      **Beach Report Card Grades**

 Good     
  A     
  B     
  C     
  D     
  F

 Poor







Search For Your Favorite Beach

All NowCast Grades



**Manhattan Beach**  
projection of 28th

NowCast: **Good**  
10 hours ago



**Hermosa Beach**  
Herondo

NowCast: **Good**  
10 hours ago



**Venice City Beach**  
projection of Windward Ave.

NowCast: **Good**  
10 hours ago





# Venice City Beach

projection of Windward Ave.



NowCast 10 hours ago

 **Good**

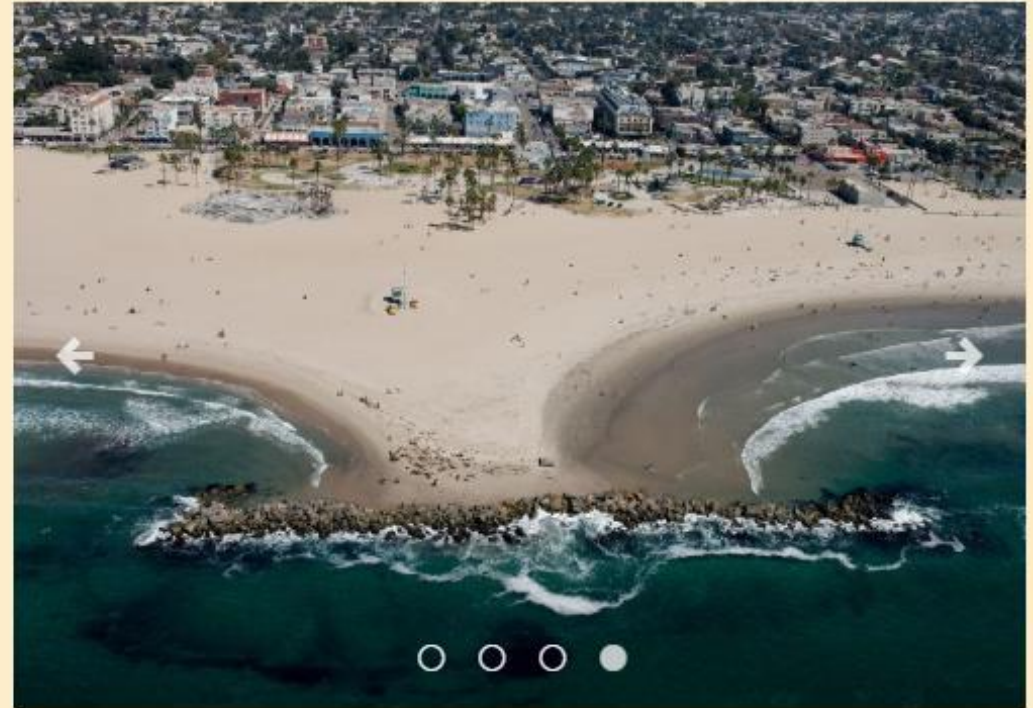
Dry Grade 8 days ago

 **B**

Wet Grade 8 days ago

 **F**

This site is situated at the wave wash of the Windward Avenue storm drain. Monitored by The City of Los Angeles Environmental Monitoring Division.



## Monitoring Agency Contact Info

**Contact**  
LA City  
1-800-773-2489  
[Website](#)

# WARNING

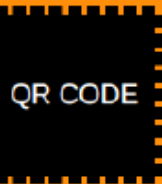
Bacteria levels predicted to exceed  
health standards today  
Ocean water contact may cause illness



## AVISO

Los niveles de bacterias pronosticados hoy  
superaron los estándares de salud  
El contacto con el agua puede causar enfermedades

For more information on the California NowCast system:  
Para más información sobre el sistema NowCast de California:



Temporary

# Catch a wave, NOT A COLD

BEACH  
REPORT  
CARD  
WITH  
NOWCAST

Water quality can change every day. That is why  
your local beach managers and Heal the Bay  
have partnered to provide you daily NowCast  
predictions at this beach. Know before you go,  
and check the latest NowCast prediction on the  
Beach Report Card app



beachreportcard.org

Fixed

# What does a 'Good' or 'Poor' prediction mean?





- 'Good' or 'No Post' - FIB predicted to be below SSS
- 'Poor' or 'Post' - FIB predicted to exceed SSS
- Binary predictions vs. FIB concentration
  - How beaches are currently managed (post/no post)
  - Easy for the public to understand
  - Do not indicate how close to the threshold water quality is predicted to be

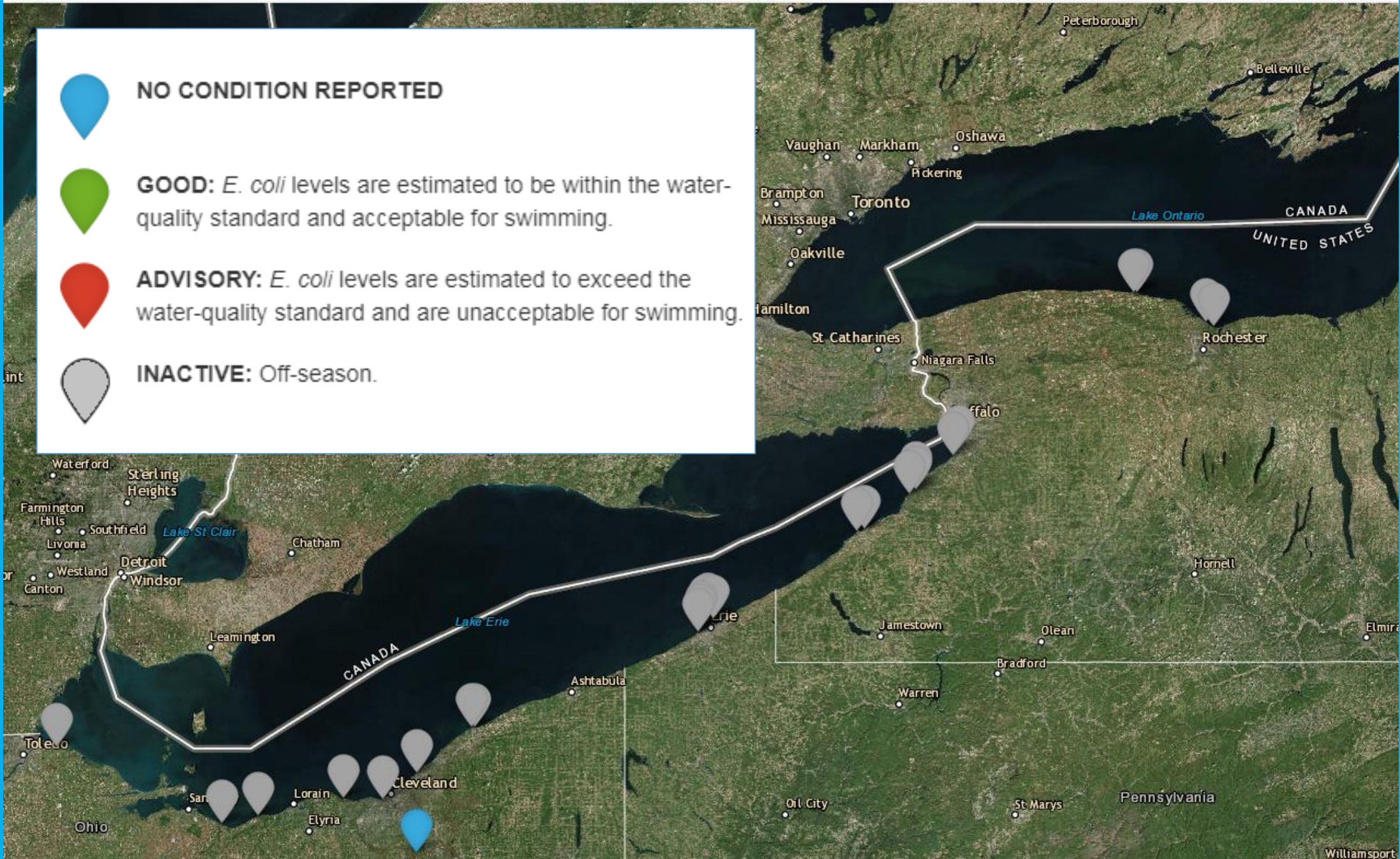
# Messaging 'Good' Predictions

- With a daily frequency, there is a lot of opportunity to celebrate 'Good' water quality predictions
  - 'Based on recent environmental conditions, NowCast models have predicted good water quality for today'
  - 'Get out to the beach!'
  - 'Low risk'
- For most beaches, models more often predict 'Good' water quality
  - Only 17% of the nearly 4000 NowCast predictions made in 2018 were for 'Poor' conditions
  - Note: The mean percentage of samples that exceeded SSS was also 17% for 2018 NowCast beaches

# Messaging 'Poor' Predictions

- Same as a posting, but not used for compliance purposes
- A 'Poor' prediction doesn't mean the beach is closed, but beachgoers should take caution
  - 'Based on recent environmental conditions, NowCast models have predicted poor water quality for today'
  - 'Higher risk'
  - 'Likely exceeds state health standards'
- Alternative language may be possible

-  **NO CONDITION REPORTED**
-  **GOOD:** *E. coli* levels are estimated to be within the water-quality standard and acceptable for swimming.
-  **ADVISORY:** *E. coli* levels are estimated to exceed the water-quality standard and are unacceptable for swimming.
-  **INACTIVE:** Off-season.



# Sydney ocean beaches

## Northern



Tuesday 15 January 2019

Issued at 7:10 AM



Beachwatch

Rainfall data has been used to predict the likelihood of bacterial contamination at Sydney's ocean beaches.

**Hover over maps** for council updates, the latest weekly star ratings and annual Beach Suitability Grades.

## Legend



Pollution is unlikely, enjoy your swim!



Pollution is possible, take care.



Pollution is likely, avoid swimming today.



Updated information available.



# DISCUSSION

## Messaging NowCast Predictions

# Future of NowCast



# Contact Info

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Modeler

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## *Acknowledgements:*

Dr. Mitzy Taggart

Dr. Mark Gold

Don Heim

Dr. Wai Thoe

Beach Agency Partners



## *Website:*

[beachreportcard.org](http://beachreportcard.org)

## *Mobile app:*

Available now on iOS  
and Android platforms