



# North-South River Reopening Plan


Commonwealth of Massachusetts  
Division of Marine Fisheries  
Tuesday December 13, 2022

# *Outline*

- Study Review
  - Sampling Results
  - Dilution from Model
  - MSC Analysis
  - New Area Boundaries and Seasons
  - Performance Criteria
  - Notification/Patrol
- Questions/Discussion







# Current Area Classification & Status

Conditionally Approved  
MB5.1, North River East  
MB6.1, South River North  
Current Status - Closed

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Seasonally  
Closed  
June 1 to October 31  
Open  
November 1 to May 31

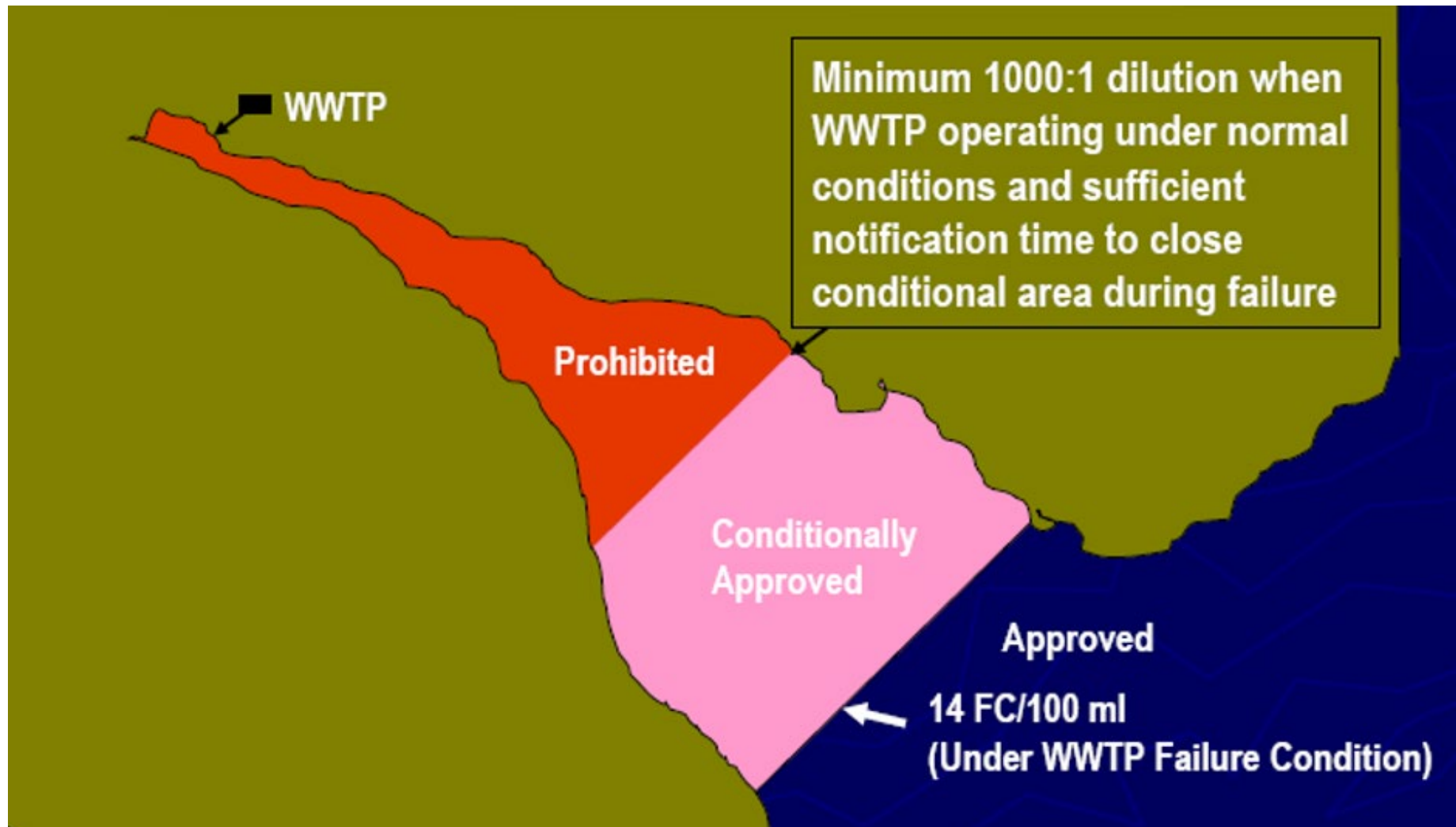


# Classifications

- **Approved** Open to shellfish harvesting for direct human consumption subject to local rules and regulations. Closed only during major coast-wide events (e.g., hurricane, oil spill, red tide event).
- **Conditionally Approved** Closed some of the time due to rainfall or seasonally poor water quality or other predictable events. When open, it is treated as an Approved area.
- **Restricted** Contains a limited degree of contamination at all times. When open, shellfish can be relayed to a less contaminated area or harvested for depuration.
- **Conditionally Restricted** Contains a limited degree of contamination at all times, subject to intermittent pollution events and may be closed some of the time due to rainfall or seasonally poor water quality.
- **Prohibited** Closed to the harvest of shellfish under all conditions, except the gathering of seed for municipal propagation programs under a DMF permit.



## Classification adjacent to a Wastewater Treatment Plant





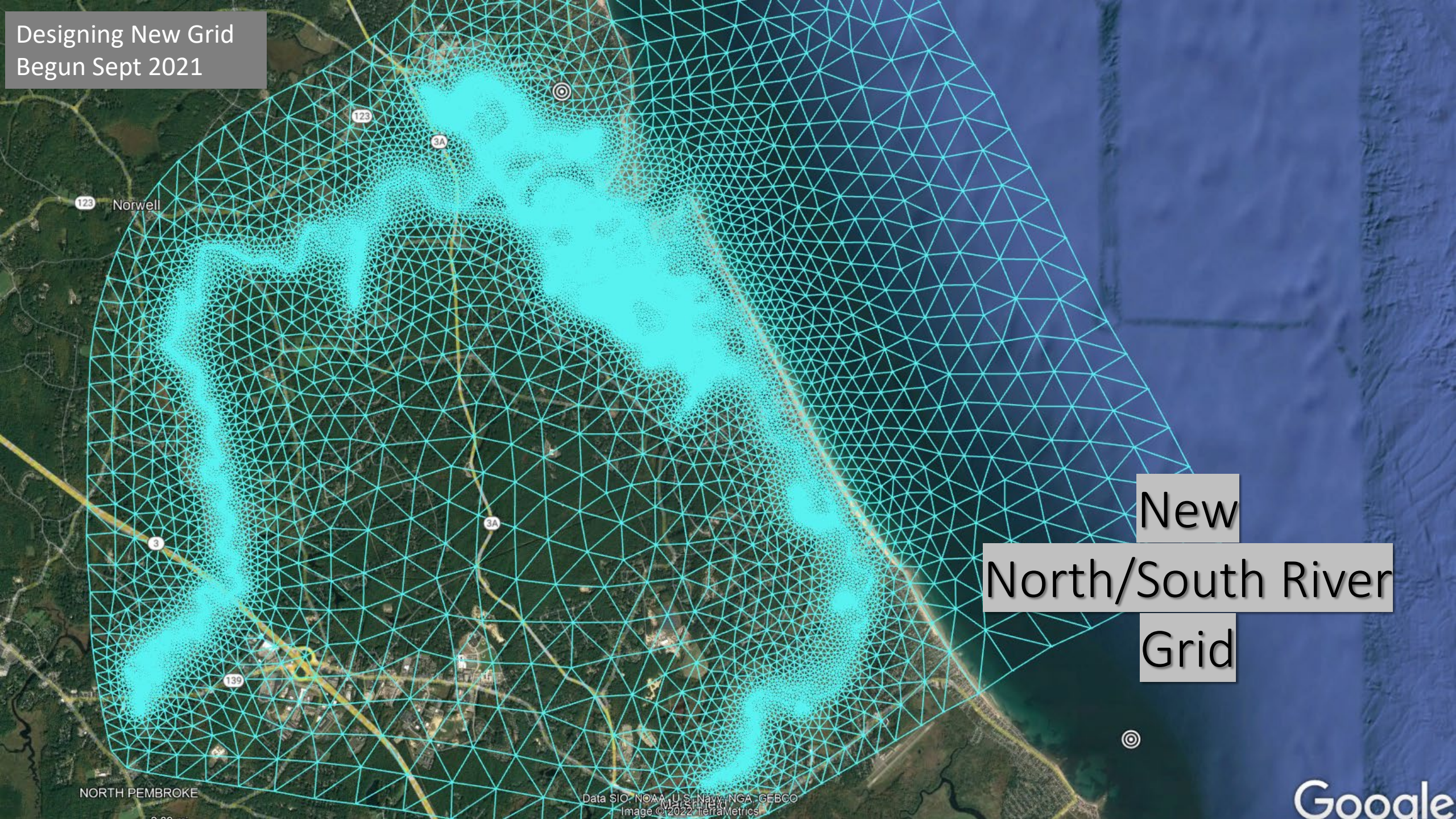
# Data Collection Approach

- DMF contracted with SMAST @Umass Dartmouth for modeling
  - *FVCOM (finite-volume coastal ocean model)*
- Scituate WWTP sampling
  - *Samples collected @Influent, Pre-disinfection, Effluent*
  - *Fecal Coliform (bacterial indicator) and Male Specific Coliphage (viral indicator)*
- Routine Water Quality Monitoring
  - *Fecal Coliform Classification Station Sampling*
- WWTP Re-evaluation





Designing New Grid  
Begun Sept 2021



New  
North/South River  
Grid

Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
Image © 2022 TerraMetrics



focus on Winter and Spring  
typical open season Nov1-May31

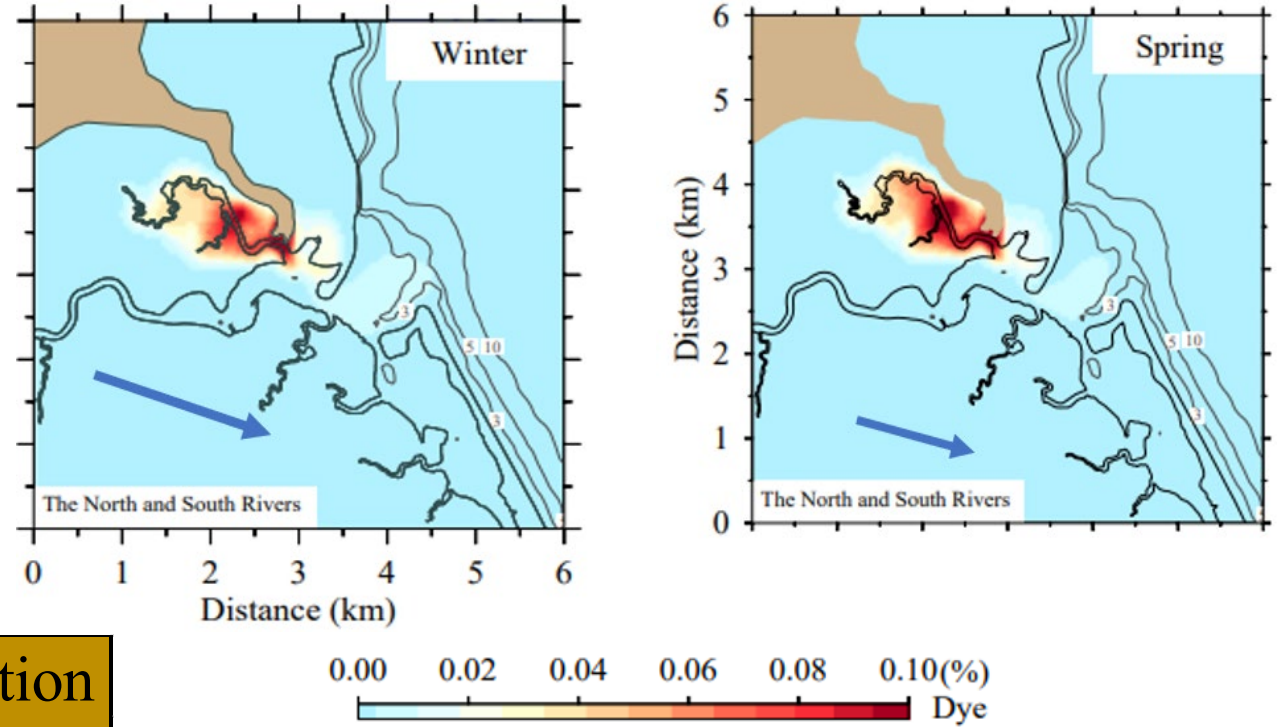
**Preliminary results**

Model forced with climatology condition

Average data from 2013 to 2021

Season	river (m <sup>3</sup> /s)	treated water (m <sup>3</sup> /s)	wind (m/s)	direction (degree)
Spring	92.22	0.0795	4.85	-14.40
Summer	31.67	0.0650	3.79	60.11
Fall	39.99	0.0720	5.01	-37.11
Winter	81.61	0.0761	5.41	-28.65

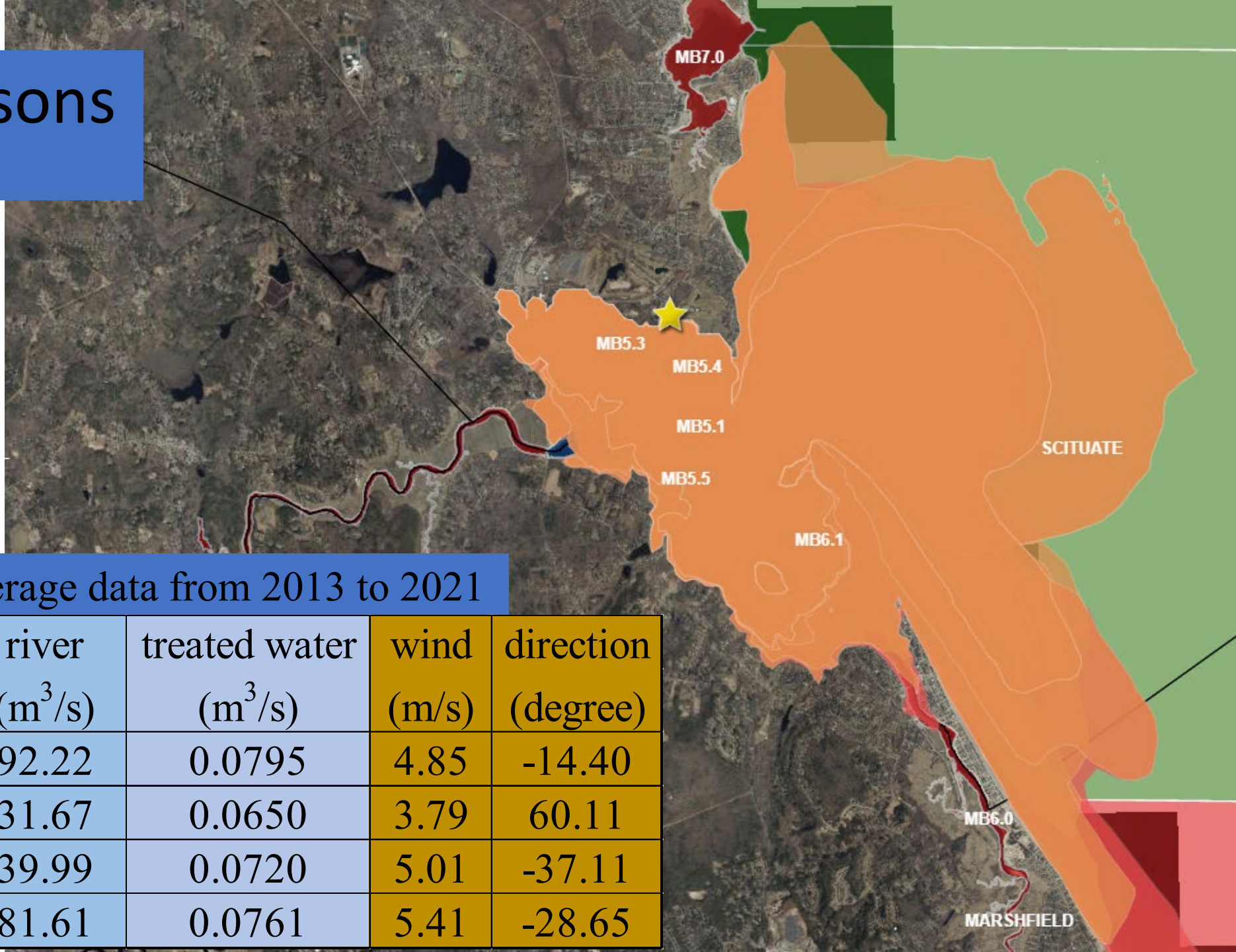
Treated water distribution in steady state  
(result is one tidal cycle average)





# 4 Seasons

1000:1



Display of the maximum coverage of the WWTP contaminant with a concentration of 1000:1 or higher under the seasonal-mean wind conditions for each season. Each treatment uses the seasonal-mean WWTP discharge. The simulations includes the spring and neap tidal cycles.

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# Winter Season

1000:1

Average data from 2013 to 2021

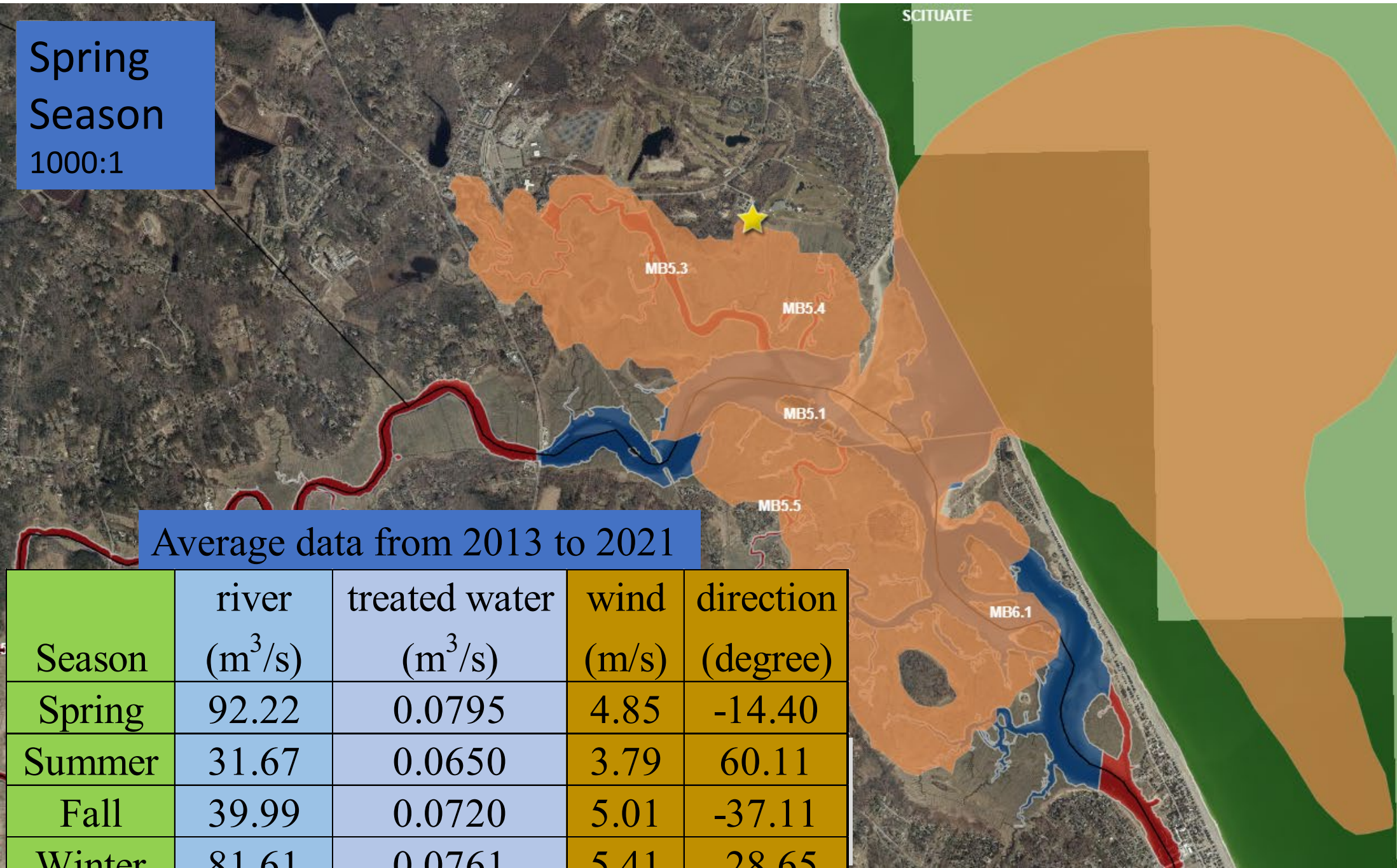
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Spring  
Season  
1000:1

SCITUATE



Display of the maximum coverage of the WWTP contaminant with a concentration of 1000:1 or higher under the seasonal-mean wind conditions for each season. Each treatment uses the seasonal-mean WWTP discharge. The simulations includes the spring and neap tidal cycles.

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Effluent		
	Male Specific Coliphage (PFU/100ml)	Fecal Coliform (CFU/100ml)
number ( $\eta$ )	22	26
Min	5	1
Max	40	40
Geometric Mean	9	4
Median	10	5
90th Percentile	19	28
95th Percentile	30	36
Ave Log Reduction	4.34	5.73

# Estimating Viral Load in Shellfish

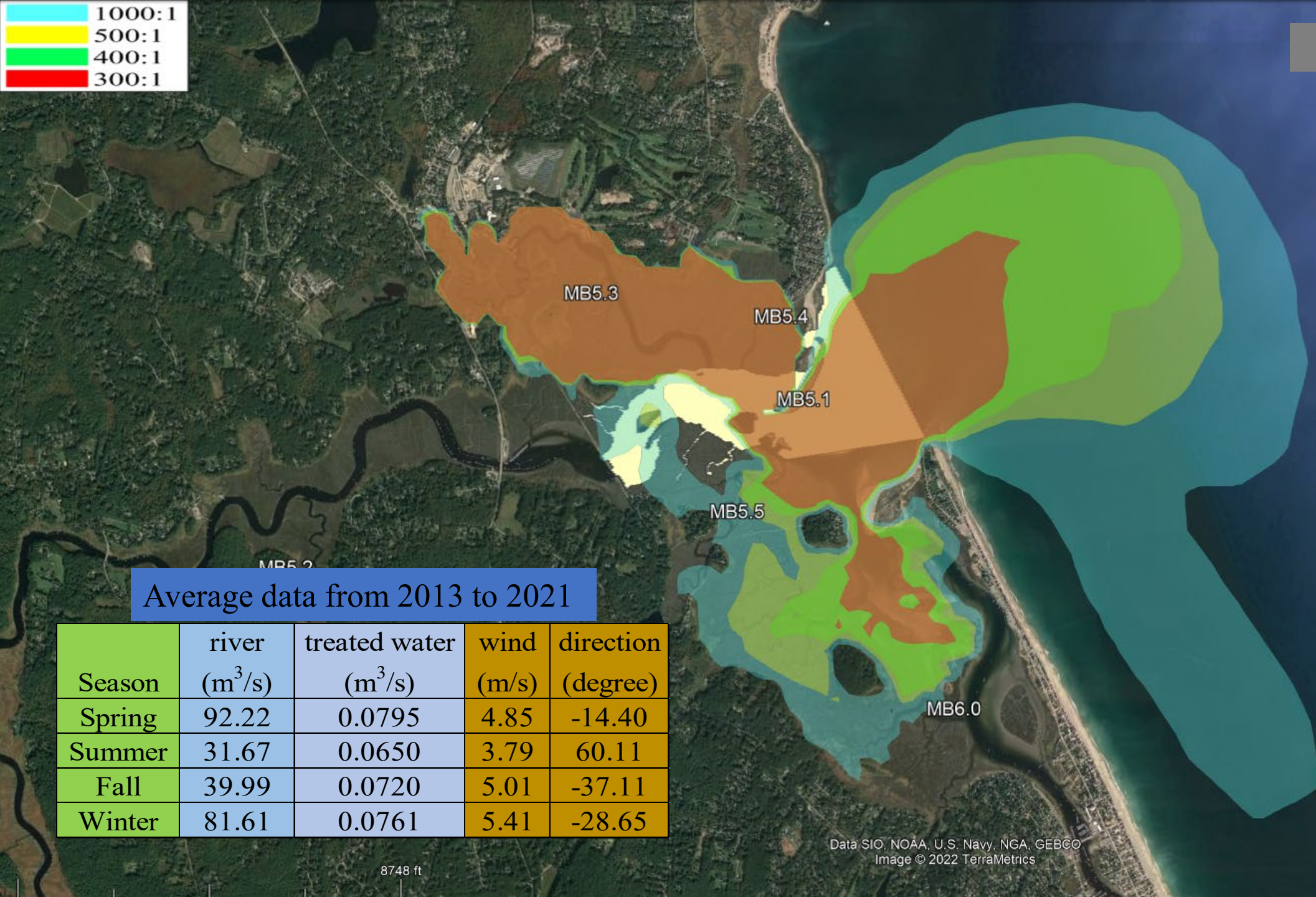
Scituate WWTP	Influent	MSC in Influent (PFUs/100ml)	Log Reduction	Estimated MSC in Effluent (PFUs/100ml)	Minimum Dilution Growing Area	Estimated MSC in Growing Area (PFUs/100ml)	Estimated MSC in Shellfish (PFUs/100g)
Influent/raw	Median	312,000					
Influent/raw	90% Tile	662,000					
Partially Treated	Median	312,000					
Partially Treated	90% Tile	662,000					
UV	Median	312,000	4.6	8	300	0.027	3
UV	90% Tile	662,000	5.8	1	300	0.003	0.3

*Chart based on TABLE A10.1.1 RECOMMENDED MINIMUM BUFFER ZONE DILUTION from the WHO publication, TECHNICAL GUIDANCE FOR THE DEVELOPMENT OF THE GROWING AREA ASPECTS OF BIVALVE MOLLUSC SANITATION PROGRAMMES*





Winter



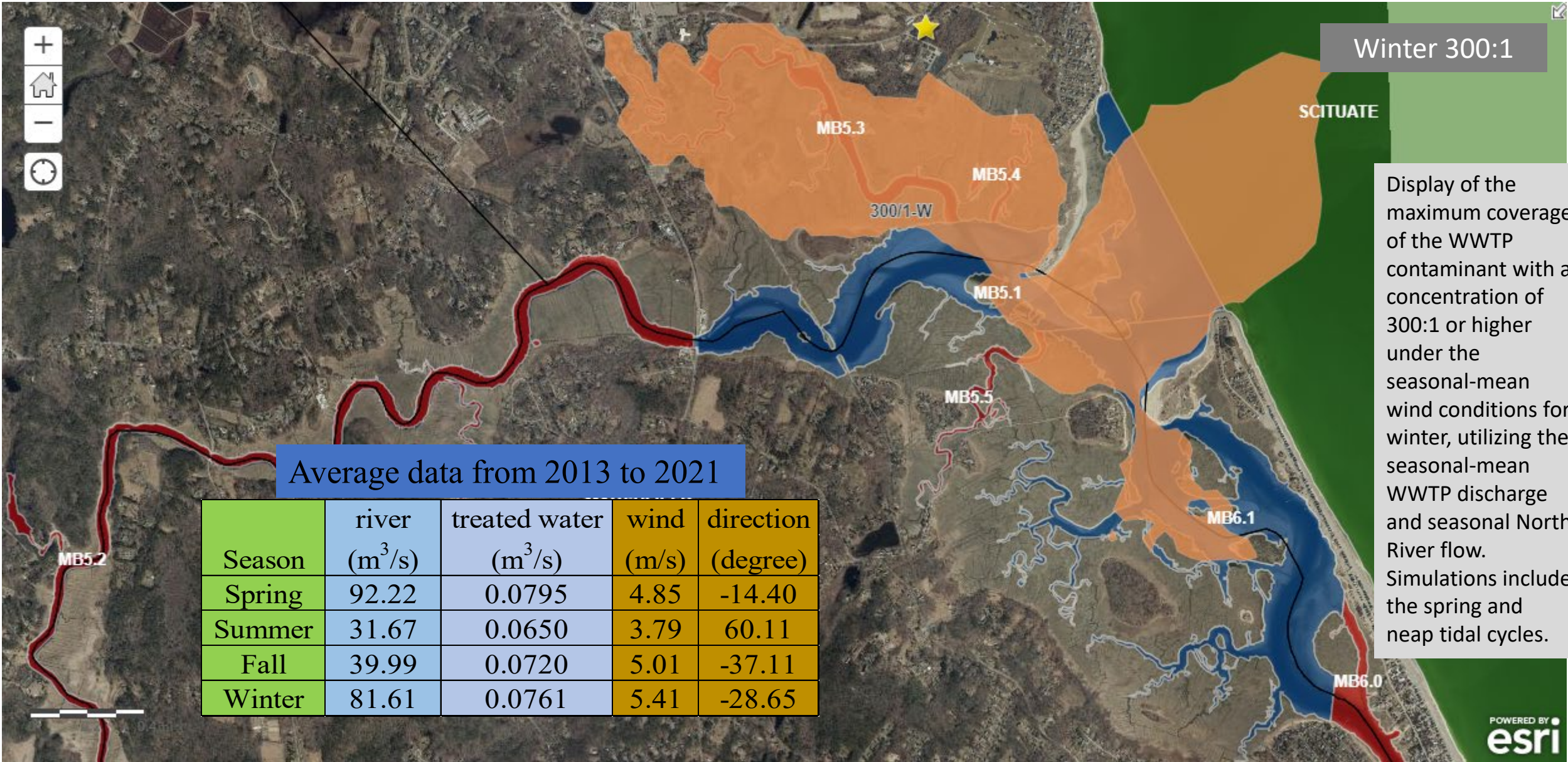
Display of the maximum coverage of the WWTP contaminant with a concentrations of 300, 400, 500, and 1000:1 under mean wind conditions for each season. Each treatment uses the seasonal-mean WWTP discharge and seasonal North River flow. Simulations include the spring and neap tidal cycles.

Average data from 2013 to 2021

Season	river (m <sup>3</sup> /s)	treated water (m <sup>3</sup> /s)	wind (m/s)	direction (degree)
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8748 ft





Winter 300:1

Display of the maximum coverage of the WWTP contaminant with a concentration of 300:1 or higher under the seasonal-mean wind conditions for winter, utilizing the seasonal-mean WWTP discharge and seasonal North River flow. Simulations include the spring and neap tidal cycles.

Average data from 2013 to 2021

Season	river (m <sup>3</sup> /s)	treated water (m <sup>3</sup> /s)	wind (m/s)	direction (degree)
Spring	92.22	0.0795	4.85	-14.40
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Spring

Scituate WWTP Outfall

Display of the maximum coverage of the WWTP contaminant with a concentrations of 300, 400, 500, and 1000:1 under mean wind conditions for each season. Each treatment uses the seasonal-mean WWTP discharge and seasonal North River flow. Simulations include the spring and neap tidal cycles.

Average data from 2013 to 2021

	river	treated water	wind	direction
Season	(m <sup>3</sup> /s)	(m <sup>3</sup> /s)	(m/s)	(degree)
Spring	92.22	0.0795	4.85	-14.40
Summer	31.67	0.0650	3.79	60.11
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Winter	81.61	0.0761	5.41	-28.65



Spring 300:1

SCITUATE

Display of the maximum coverage of the WWTP contaminant with a concentration of 300:1 or higher under the seasonal-mean wind conditions for spring, utilizing the seasonal-mean WWTP discharge and seasonal North River flow. Simulations include the spring and neap tidal cycles.

Average data from 2013 to 2021

Season	river (m <sup>3</sup> /s)	treated water (m <sup>3</sup> /s)	wind (m/s)	direction (degree)
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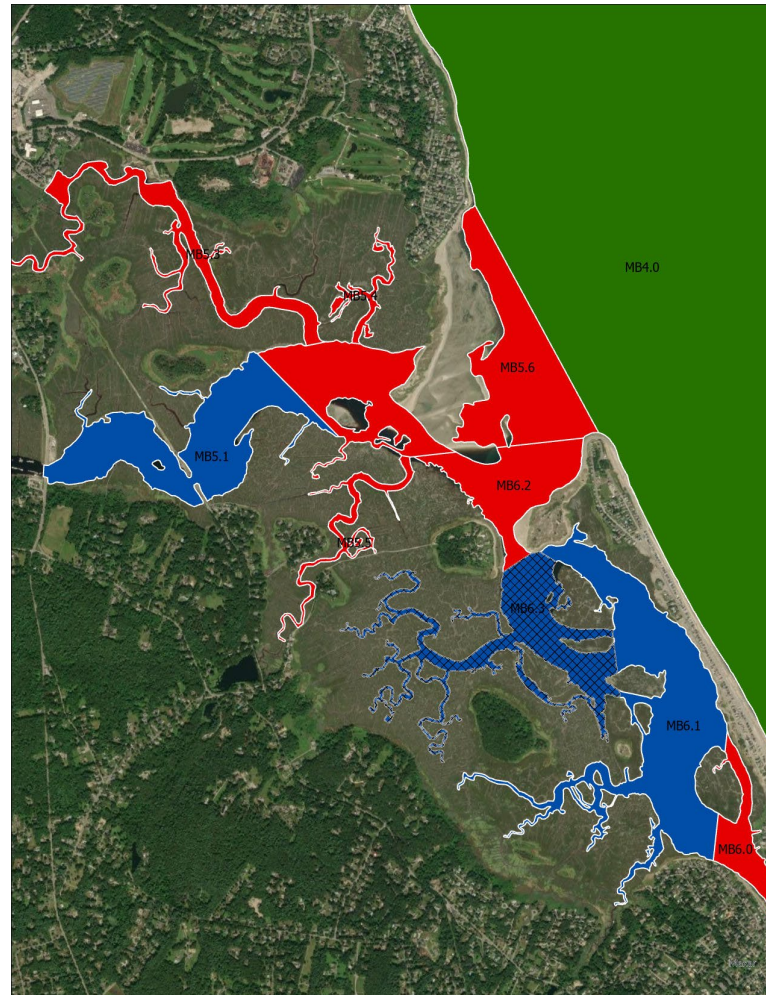
# Changes

Blue = Open Nov-May

Blue crosshatch = Open Mar-May

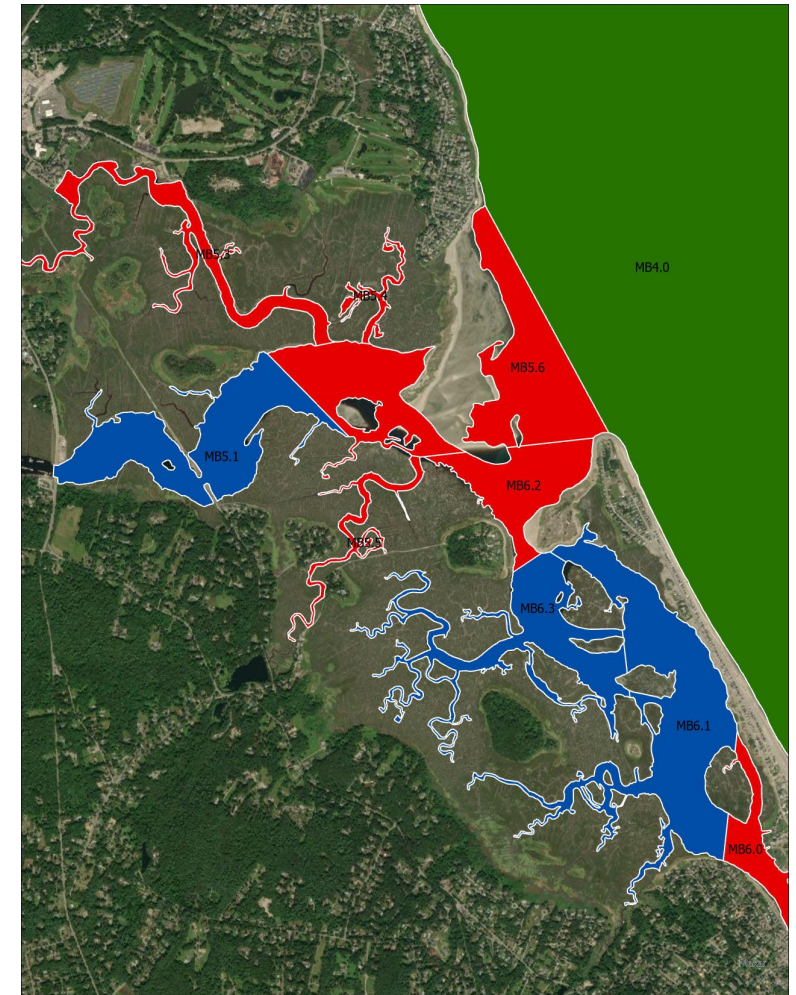
Red = Prohibited/Closed

## New Winter Classification



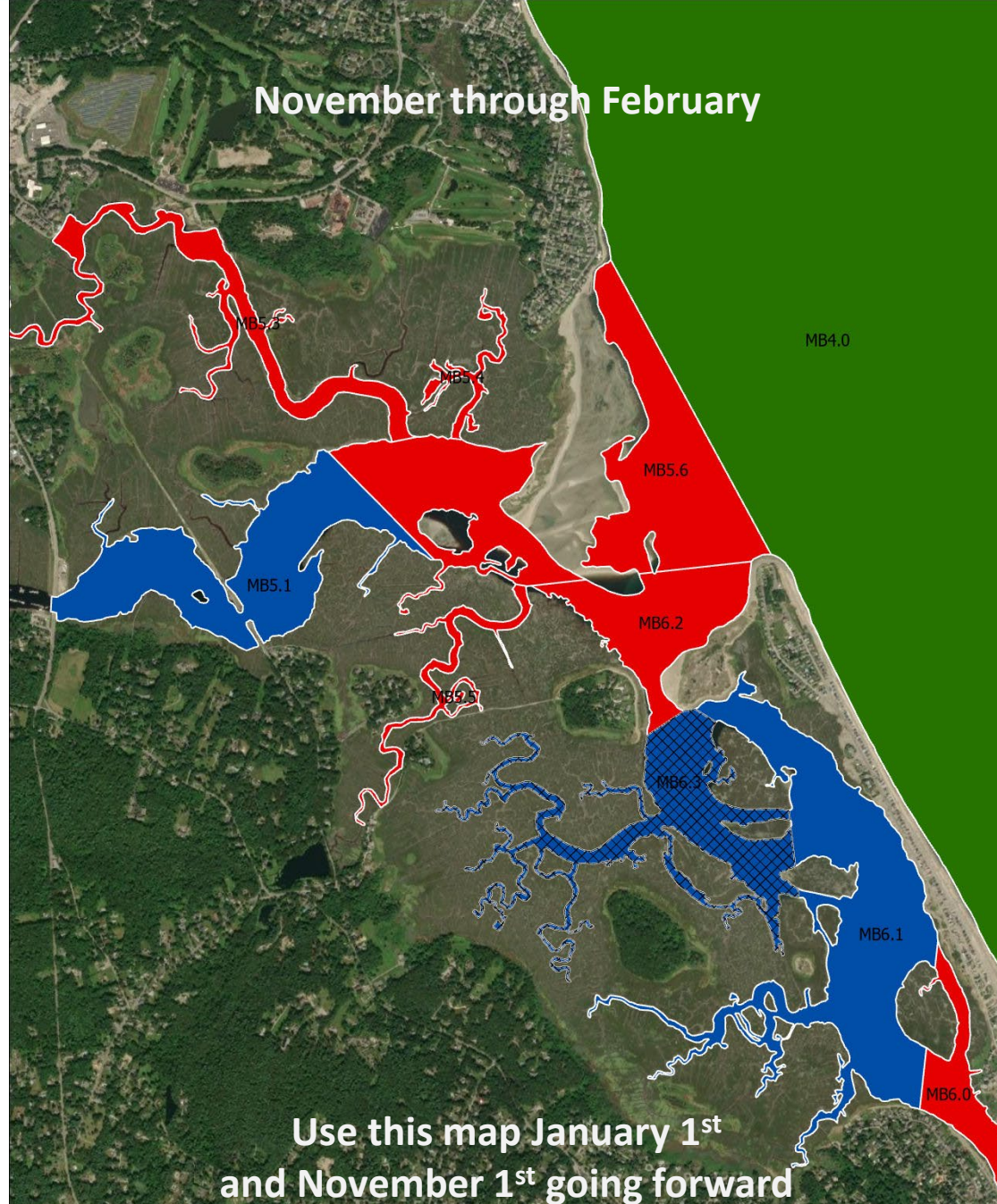
November through February

## New Spring Classification



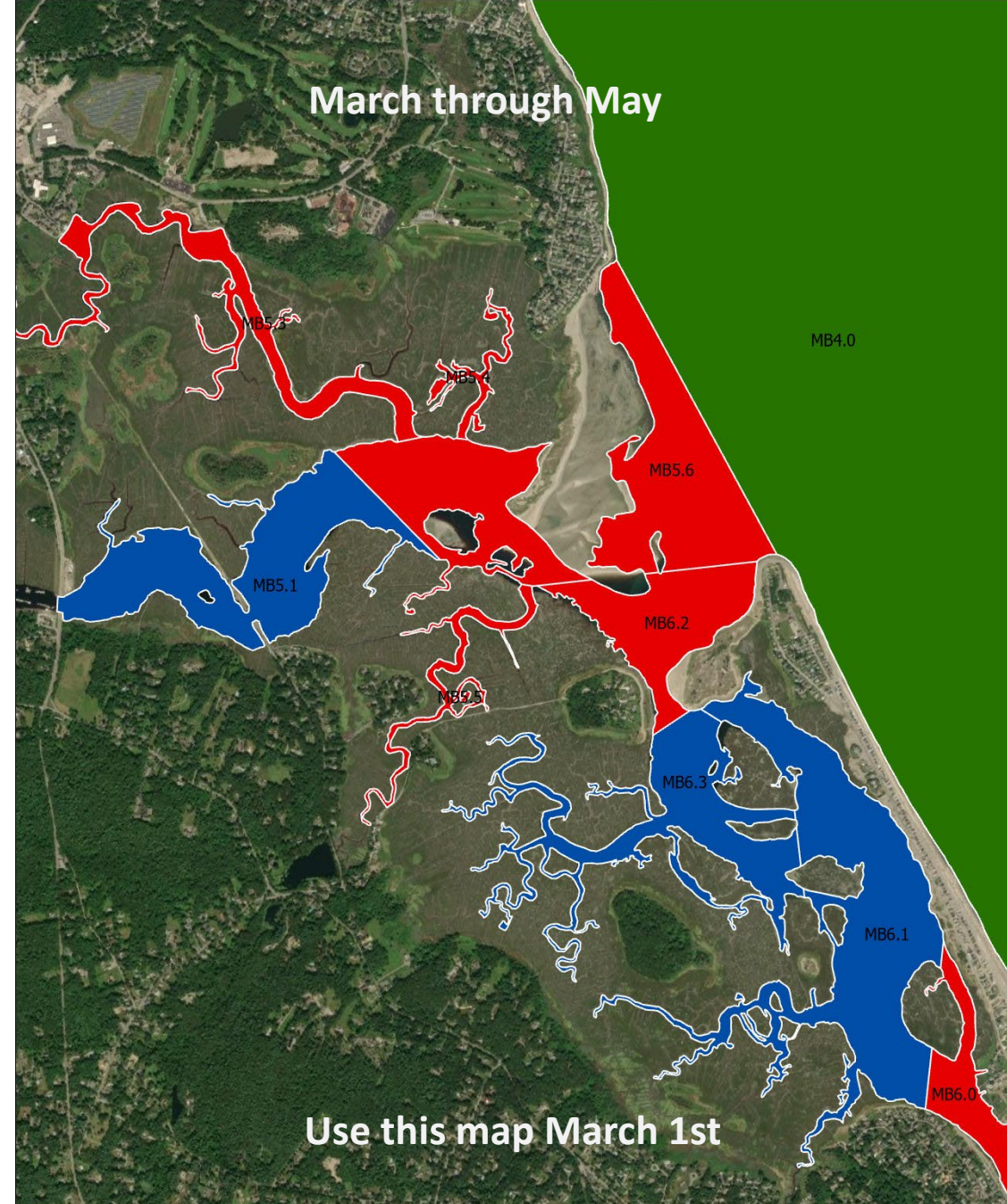
March through May

November through February



Use this map January 1<sup>st</sup>  
and November 1<sup>st</sup> going forward

March through May



Use this map March 1<sup>st</sup>



<b>Acreage Comparisons**</b>							
Area	Classification - Status		Acres		New Winter		New Spring
		Historic					
MB5.1	CA Open	293	CA Open		115	Prohibited Closed	179
MB6.1	CA Open	314	CA Open		162	CA Open	115
MB5.6			Prohibited Closed		179	CA Open	162
MB6.2			Prohibited Closed		59	Prohibited Closed	59
MB6.3			CA Closed		92	CA Open	92
Prohibited or Closed*		0			330		238
Conditionally Approved/Open		607			277		369
					46%		61%
*does not include Prohibited areas MB5.2, MB5.3, MB5.4, MB5.5, or MB6.0							
**Acreage totals include intertidal and subtidal waters							



# Conditional Area Management Plan (CAMP)

## WWTP Performance Standards

- Notification to DMF
  - Release from damaged infrastructure (i.e., surcharging manhole)
  - Violation of fecal coliform standards as outlined in NPDES permit
  - Any overflow or discharge of partially treated wastewater to any surface water
  - Use of the fourth secondary clarifier
  - Peak flow exceeds 3.3MG
- Automatic Closure – Notification to Shellfish Constable and DMF
  - Sand filters become clogged
  - Washout of the secondary clarifier
  - Storms with predicted coastal flooding
  - 24 Hr Rainfall >2 inches
  - Partial and Total Bypass or Blending
  - MGD Total exceeds 3.3MG



# Municipal Enforcement

- Vehicle Placard
- Area Boundary Signs
- New Regulations
  - Reciprocal Permits Marshfield ↔ Scituate
- Email Notifications (Scituate)
- Phone → Shellfish Constable offices
- Security Cameras



## Towns of Marshfield & Scituate Recreational Shellfishing Vehicular Placard



**Name:** \_\_\_\_\_

**Vehicle Plate Number:** \_\_\_\_\_

**Permit #:** \_\_\_\_\_ **Resident or Non-Resident (Circle one)**

**Issued by the: Town of Marshfield / Scituate (Circle one)**

\*Please place placard on dash in a visible location.

\*\* This placard is an added layer of safety while actively shellfishing, this will allow public safety to respond to potential overdue shell fishermen and the need of notification in the event of a shellfish closure while on the clam flats. Please do not display placard if not actively shellfishing.



# Questions