

# Sea Level Affecting Marshes Model (SLAMM) Maps

## *Middletown*

Middletown Map Panels		
71	86	100
76	92	
81	93	
85	99	

The Rhode Island Coastal Resources Management Council (CRMC) and its partners have developed Sea Level Affecting Marshes Model (SLAMM) Maps for the coastal wetlands of all 21 Rhode Island coastal communities. The purpose of these SLAMM maps is to show how coastal wetlands will likely transition and migrate onto adjacent upland areas under projected sea level rise scenarios of 1, 3 and 5 feet in the coming decades. These maps are intended to support state and local community planning efforts and to help decision makers prepare for and adapt to future coastal wetland conditions despite the inherent uncertainties associated with future rates of sea level rise.

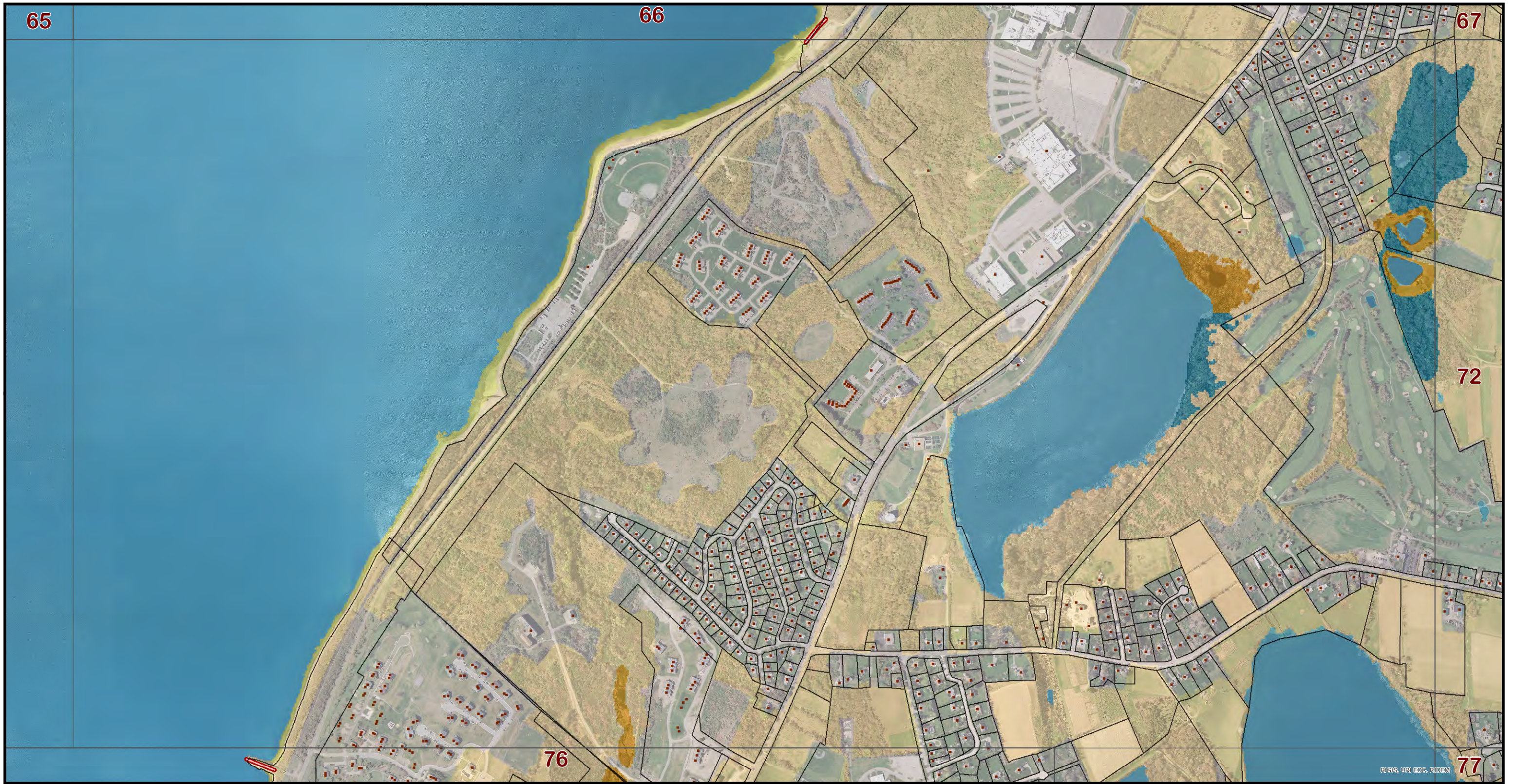
The SLAMM maps were developed using a digital wetlands coverage derived from the 2010 National Wetlands Inventory for Rhode Island. The elevation data used in the model was developed from the 2011 USGS LIDAR elevation dataset. These maps were developed using the “protection off” mode for the model simulations, thereby depicting the highest potential for marsh migration despite current limitations such as parking lots, roads or other development. In this way the maps illustrate opportunities for conservation and potential land modification to enhance wetland migration and restoration. The SLAMM data do not consider natural processes such as coastal erosion or the impacts of coastal storms that can have significant influence on shoreline location and sediment dynamics. Despite these limitations the data still provide a valuable tool to identify those places that provide the best opportunity for future saltmarsh habitat and conservation priorities, and provide valuable information to help plan for new development and infrastructure. Additional map parameters, data sources and caveats can also be found at [www.crmc.ri.gov](http://www.crmc.ri.gov)

These SLAMM maps are Geographic Information System (GIS)-based map images exported as PDF files to reduce file size and ease of access. In total there are 149 map panels that cover the entire Rhode Island shoreline and each panel has four maps showing the initial (current) wetland condition followed by 1, 3, and 5-feet of sea level rise scenarios.

No warranty is expressed or implied by the CRMC and its SLAMM project partners related to the spatial accuracy of these maps and promote no other use of these maps and data other than as a planning tool. These maps should not be used for, and are not intended for, survey and engineering purposes. The data do not take the place of a legal survey or other primary source documentation. They were created for general reference, informational, planning, and guidance use. They are not a legally authoritative source as to the exact location of natural or manmade features.

These maps can be examined at the Council’s office in Wakefield, at the Secretary of State’s office, and on-line at the Council’s website: [www.crmc.ri.gov](http://www.crmc.ri.gov).





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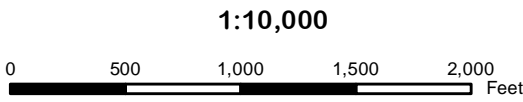
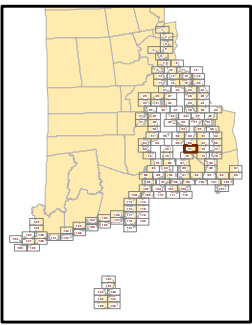
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REIS, URI EDC, RIDEM

Map  
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- Developed Upland
- Undeveloped Upland
- Rocky Intertidal
- Beach
- Tidal Flat
- Open Water
- Swamp
- Tidal Creek
- Salt Marsh
- Brackish Marsh
- Scrub/Shrub Transitional Marsh
- Fresh Marsh
- Hardened Shores
- Buildings
- Parcel Boundaries

## Tidal Marsh Vulnerability Analysis: Current Condition



Map produced by Kevin Ruddock. 4/2/2014



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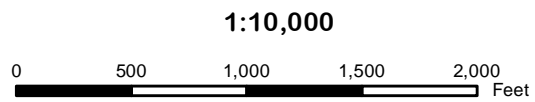
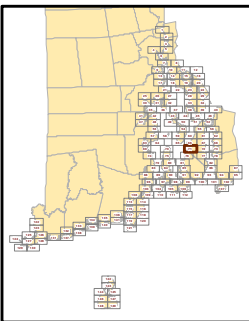
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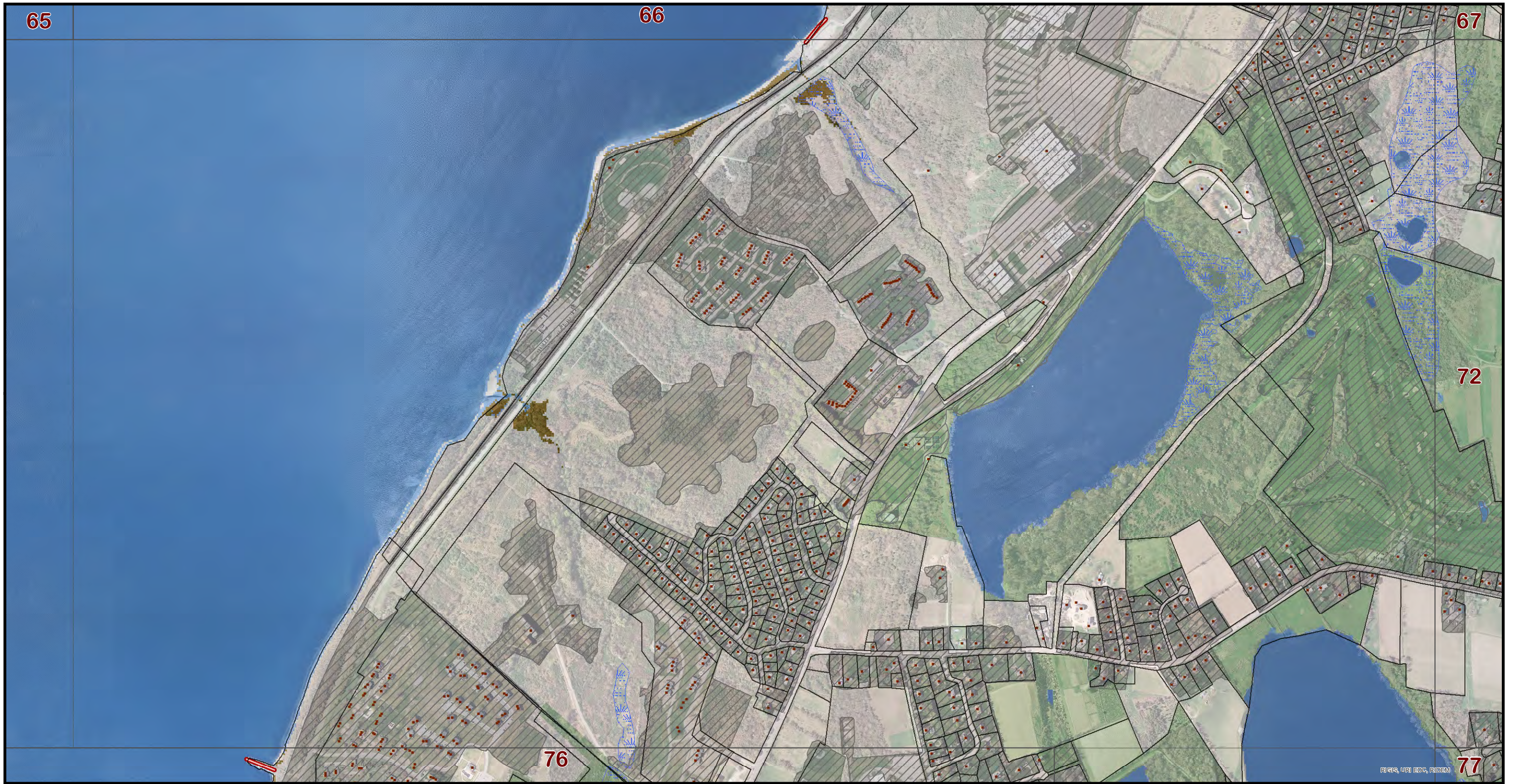
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model



NOAA grant award #: NA120AR4310108

Map produced by Kevin Ruddock. 4/1/2014



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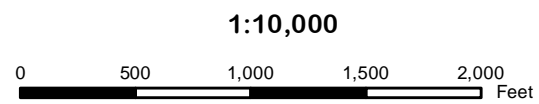
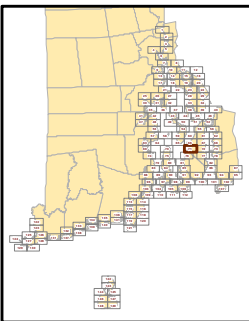
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## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model





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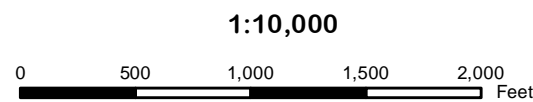
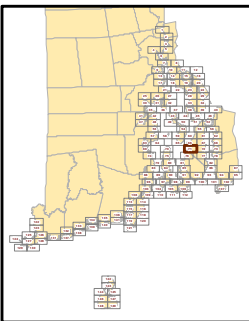
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REIS, URI EDC, RIDEM

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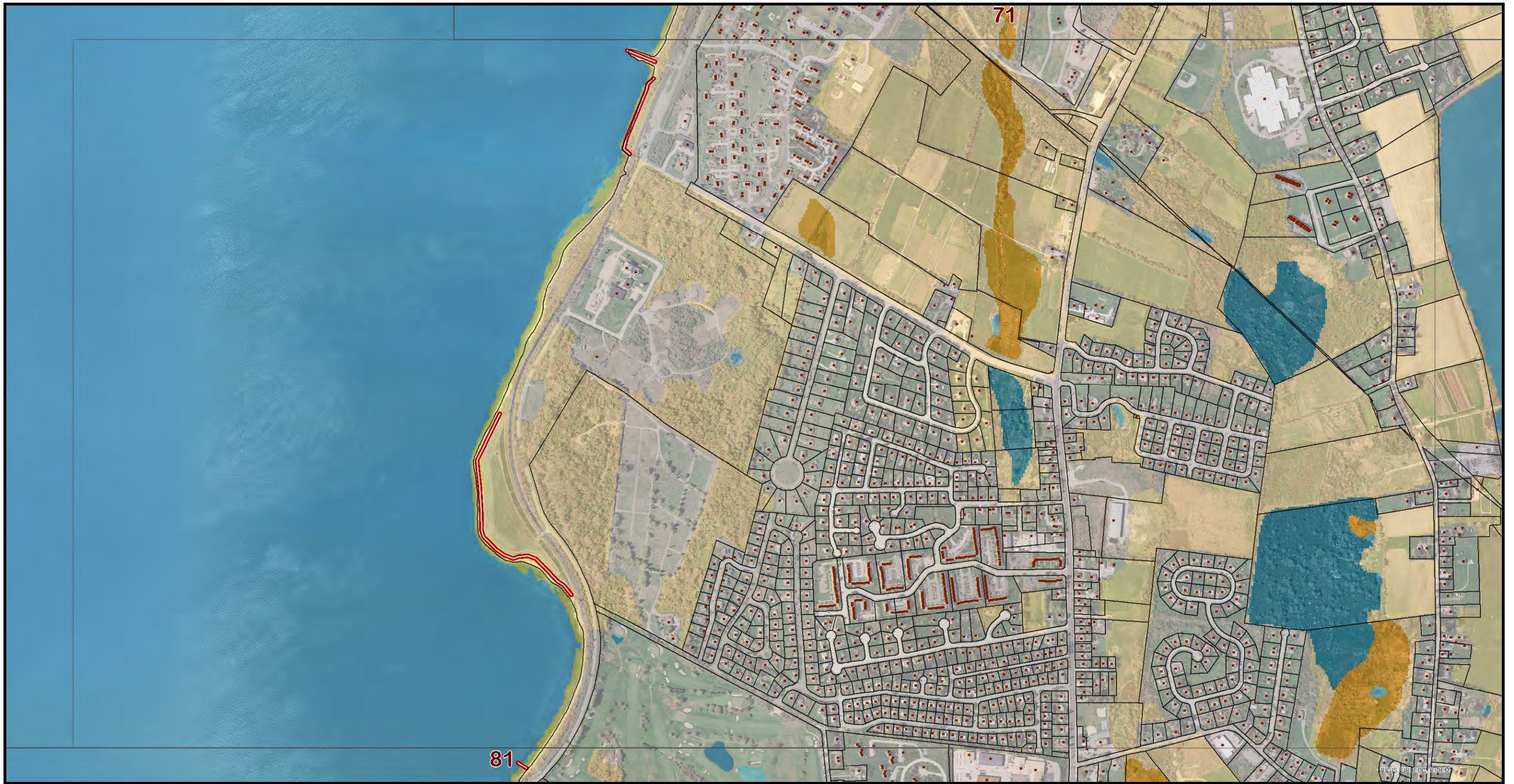
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## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model

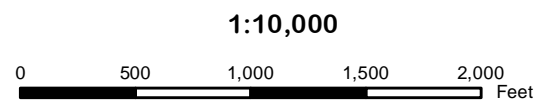
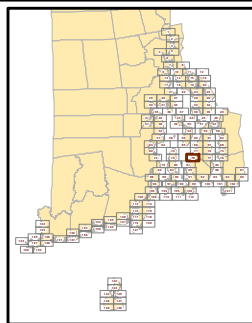


NOAA grant award #: NA120AR4310108

Map produced by Kevin Ruddock. 4/1/2014



Map  
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- |                    |                                |
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| Tidal Flat         | Hardened Shores                |
| Open Water         | Buildings                      |
| Swamp              | Parcel Boundaries              |
| Tidal Creek        |                                |

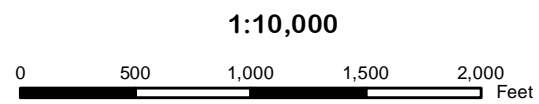
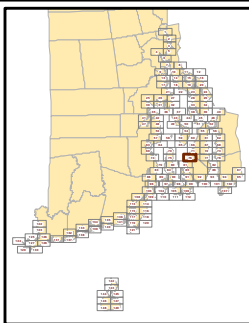
## Tidal Marsh Vulnerability Analysis: Current Condition














NOAA grant award #: NA12GAR4310108



Map  
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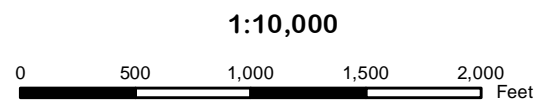
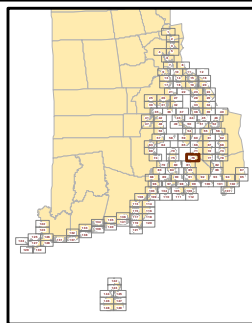
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-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model
















Map  
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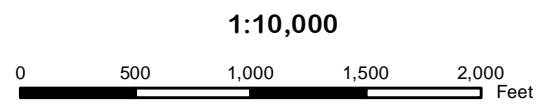
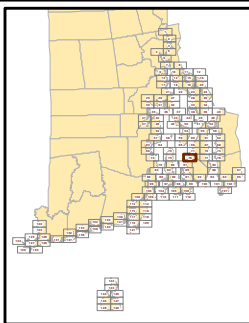
## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model







Map  
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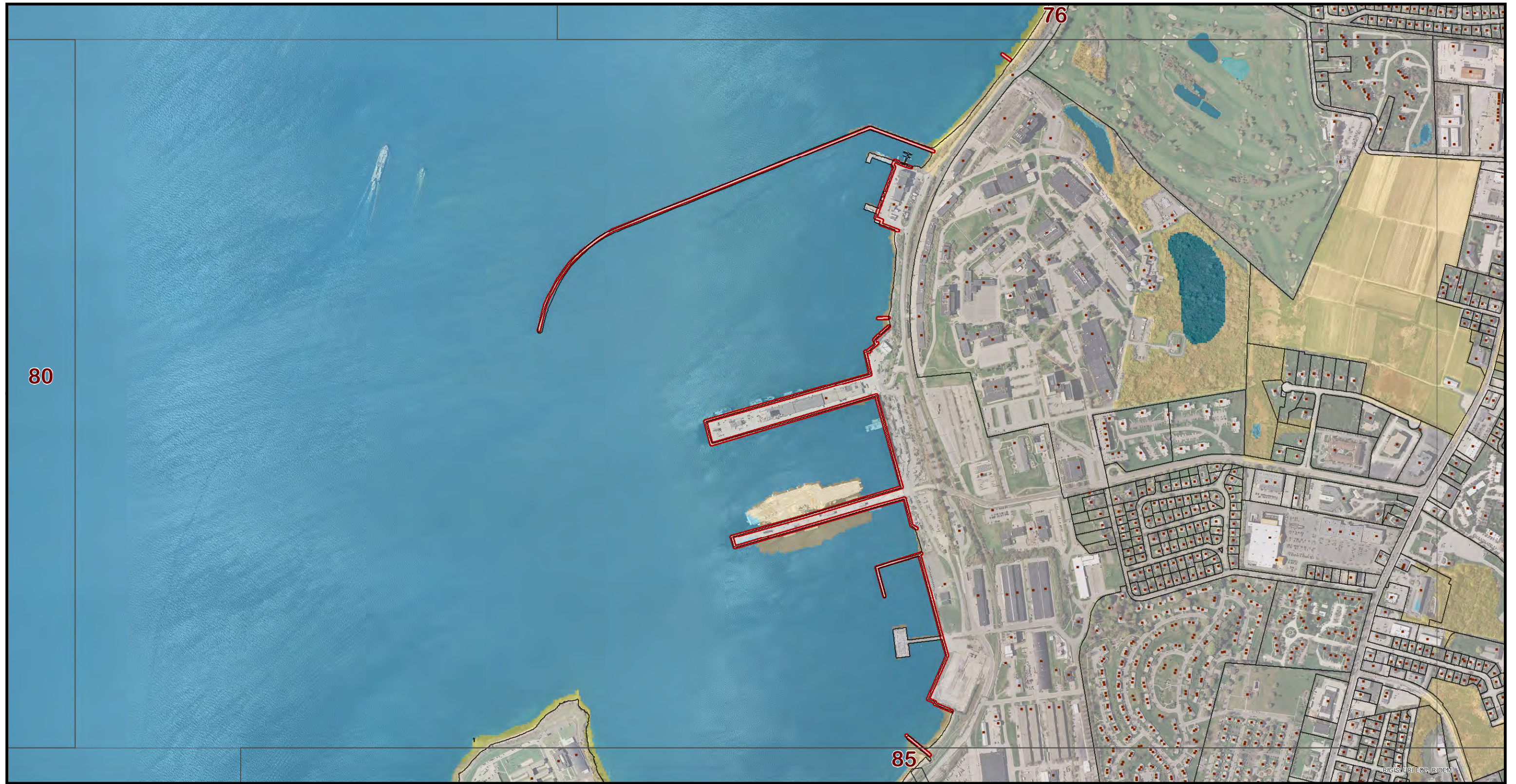


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## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model



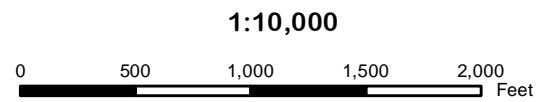
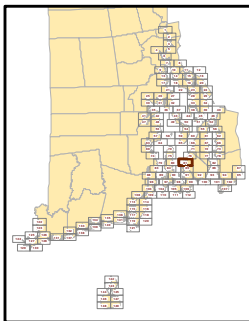


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Map  
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- |                    |                                |
|--------------------|--------------------------------|
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| Rocky Intertidal   | Scrub/Shrub Transitional Marsh |
| Beach              | Fresh Marsh                    |
| Tidal Flat         | Hardened Shores                |
| Open Water         | Buildings                      |
| Swamp              | Parcel Boundaries              |
| Tidal Creek        |                                |

## Tidal Marsh Vulnerability Analysis: Current Condition



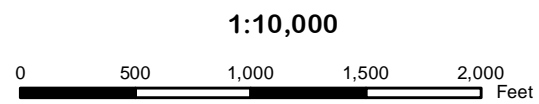
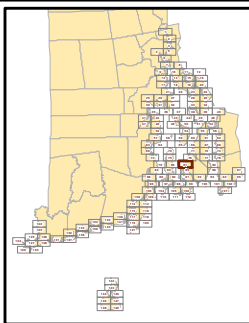


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Map  
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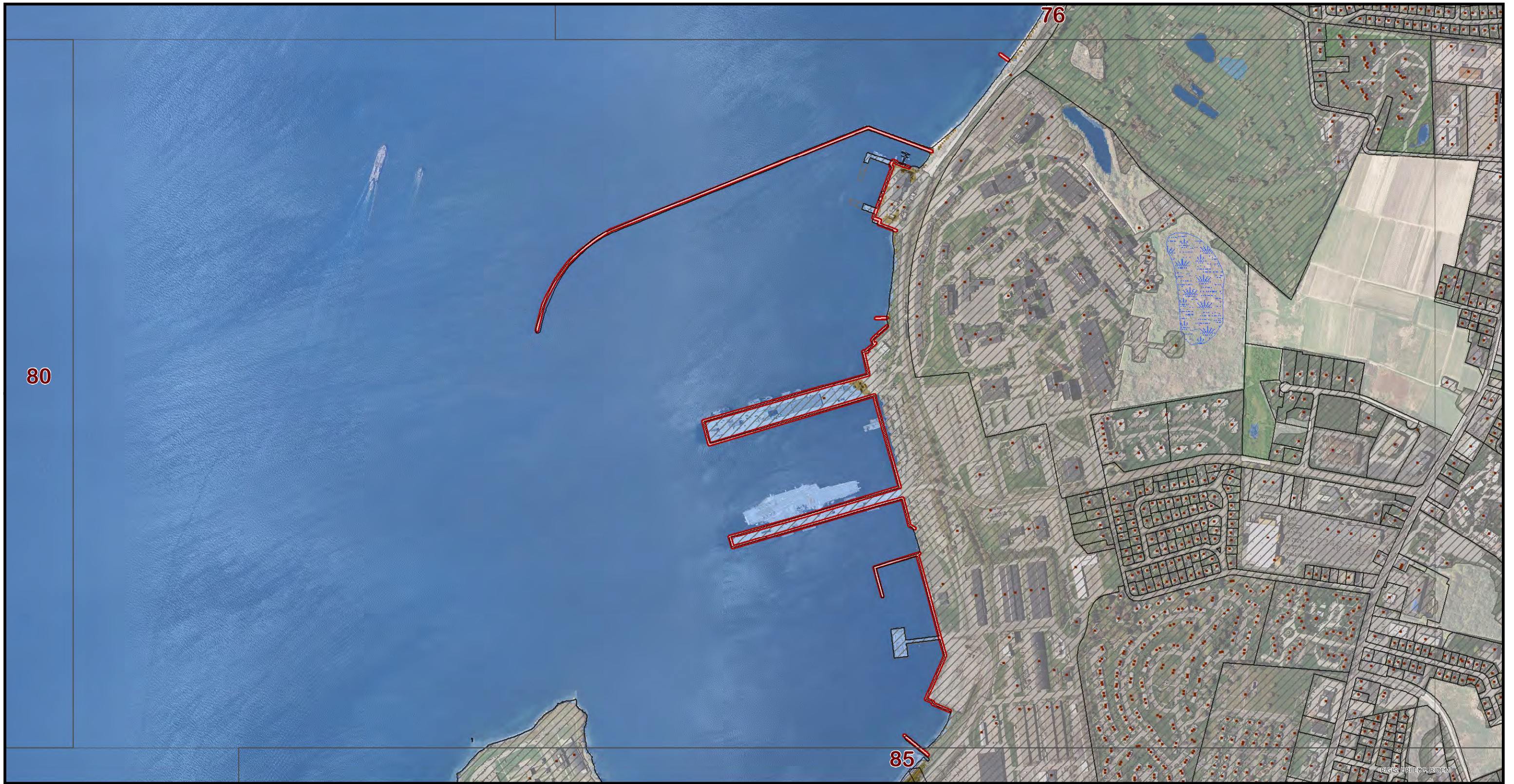


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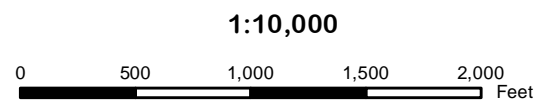
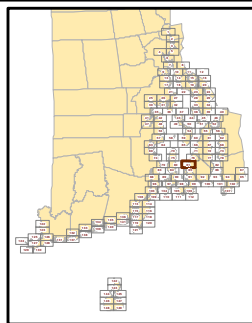
-  Potential Marsh Zone
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-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model
















Map  
81

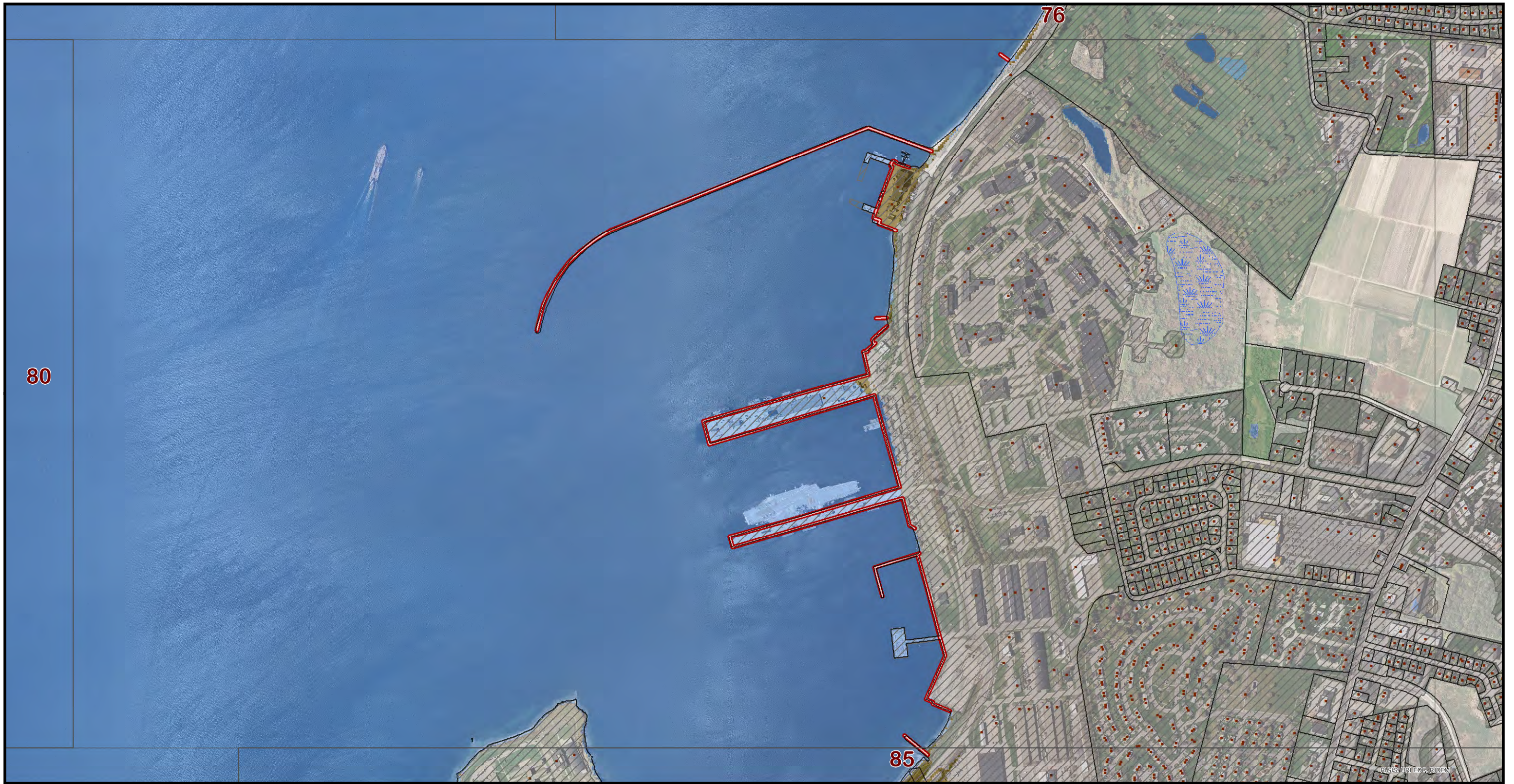


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## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model



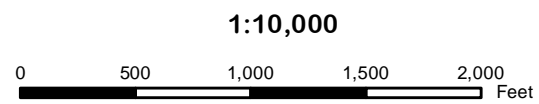
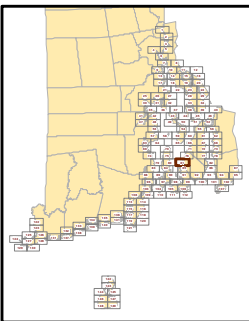


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Map  
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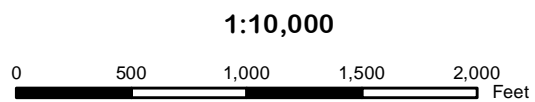
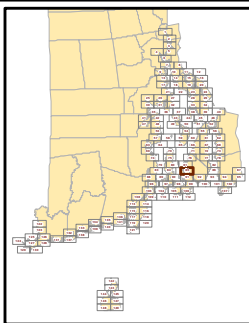
-  Potential Marsh Zone
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## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model





Map 85



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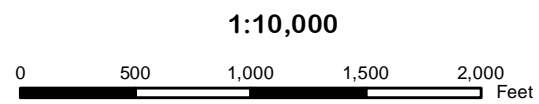
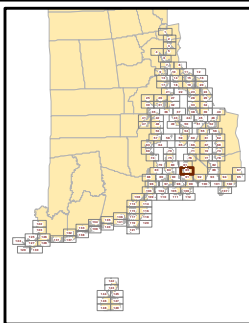
- |                    |                                |
|--------------------|--------------------------------|
| Developed Upland   | Salt Marsh                     |
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| Beach              | Fresh Marsh                    |
| Tidal Flat         | Hardened Shores                |
| Open Water         | Buildings                      |
| Swamp              | Parcel Boundaries              |
| Tidal Creek        |                                |

## Tidal Marsh Vulnerability Analysis: Current Condition





Map  
85

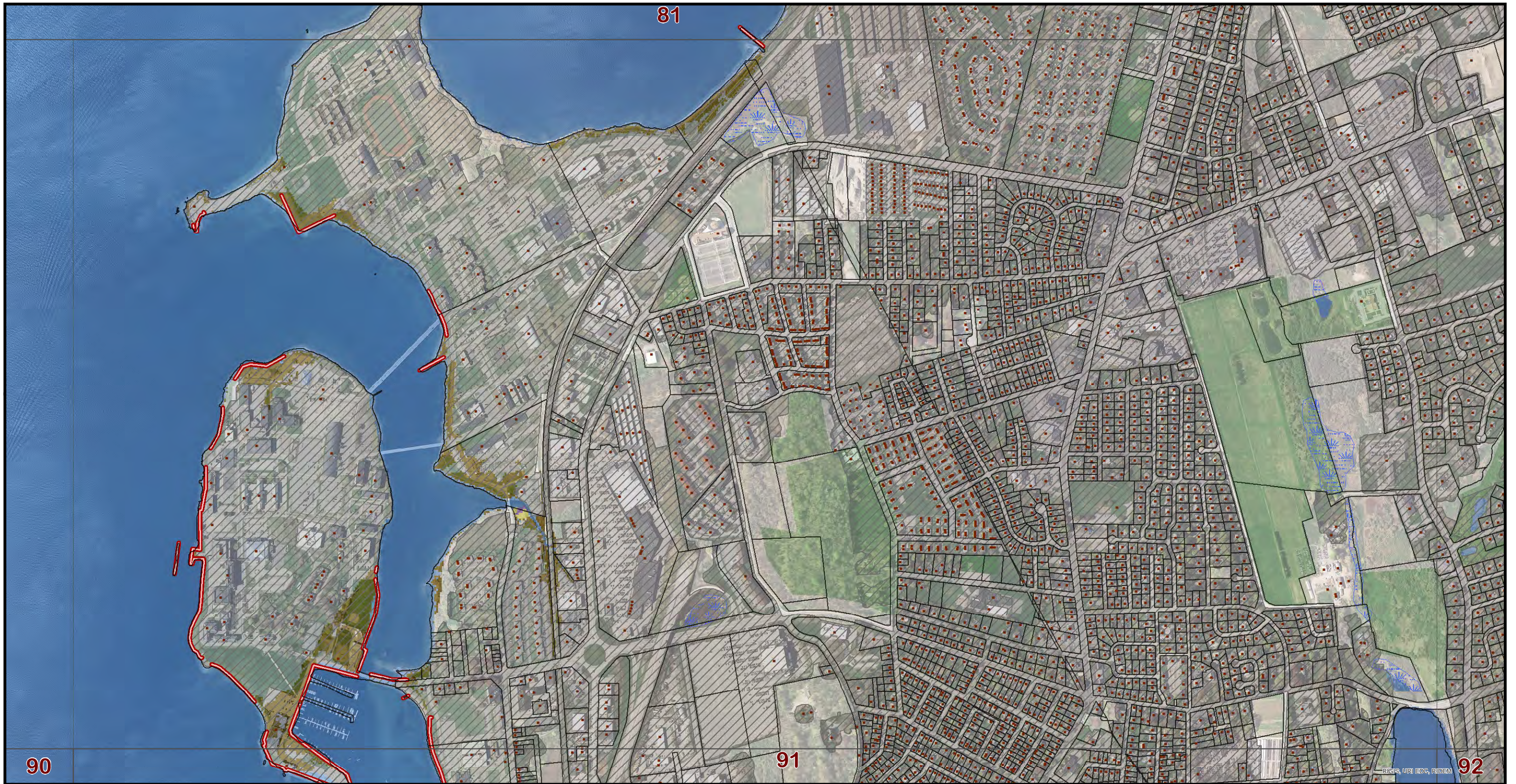


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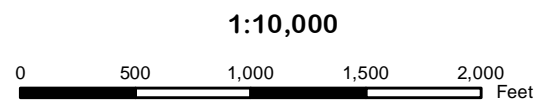
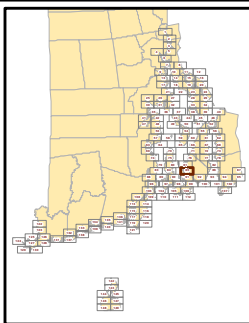
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- Developed Land
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## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model
















Map  
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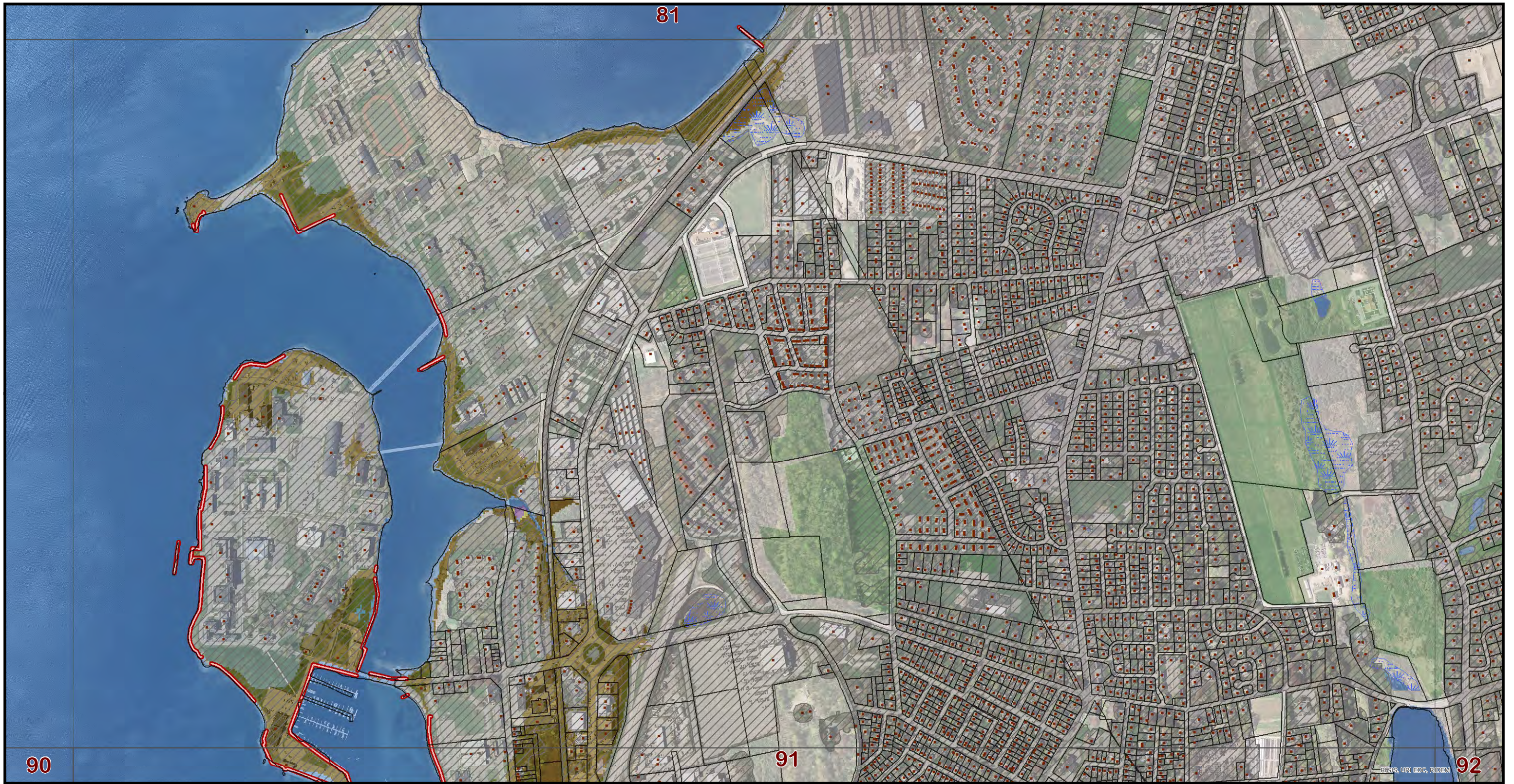
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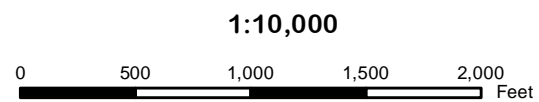
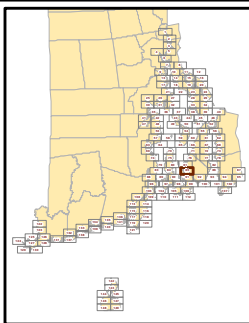
## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model


















Map 85



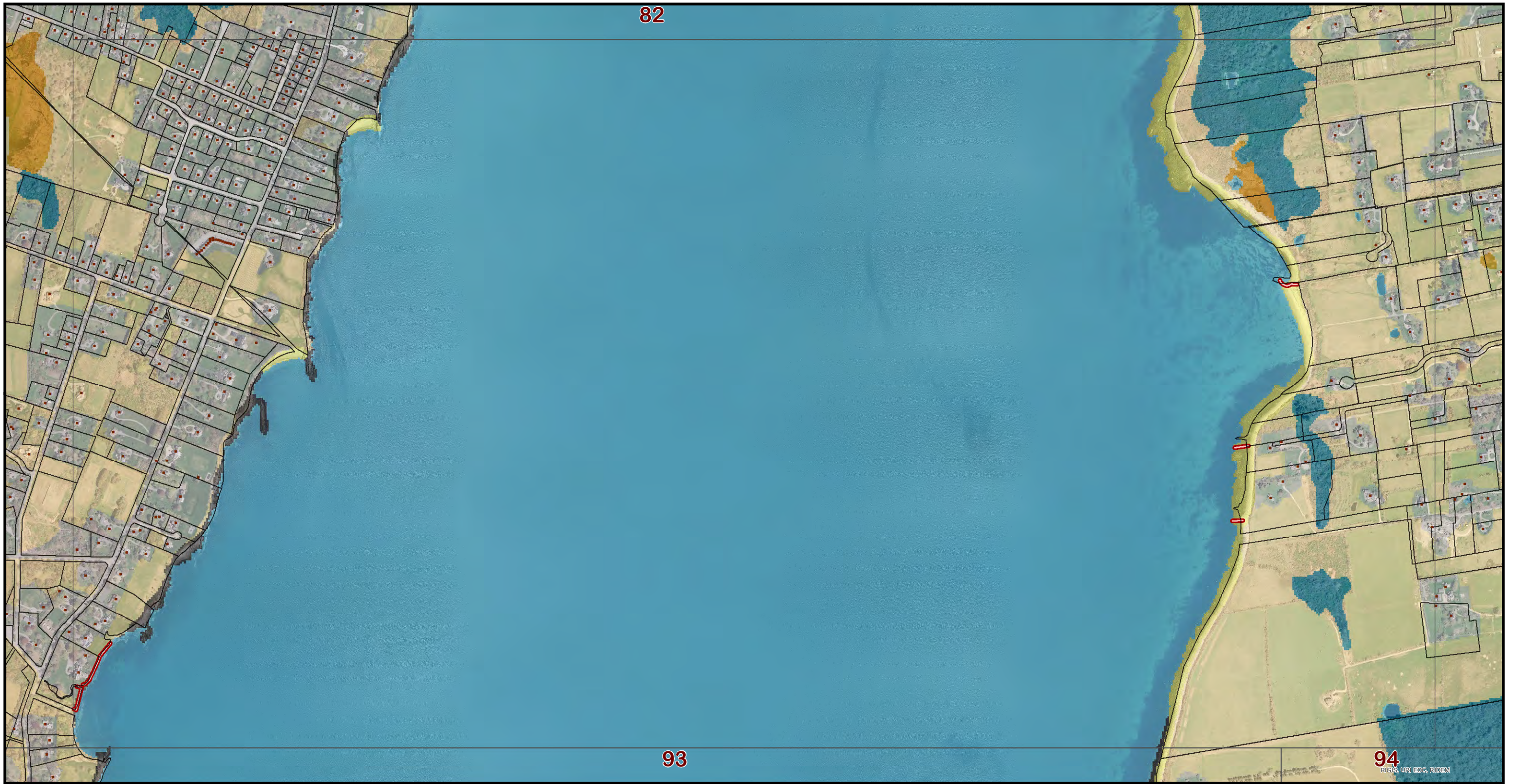
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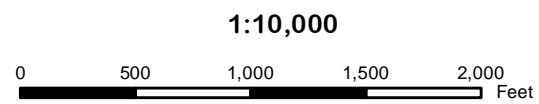
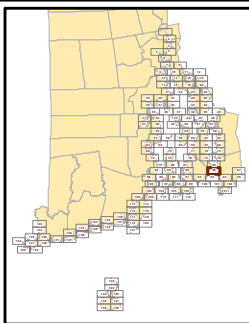
## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model



NOAA grant award #: NA120AR4310108



Map  
86

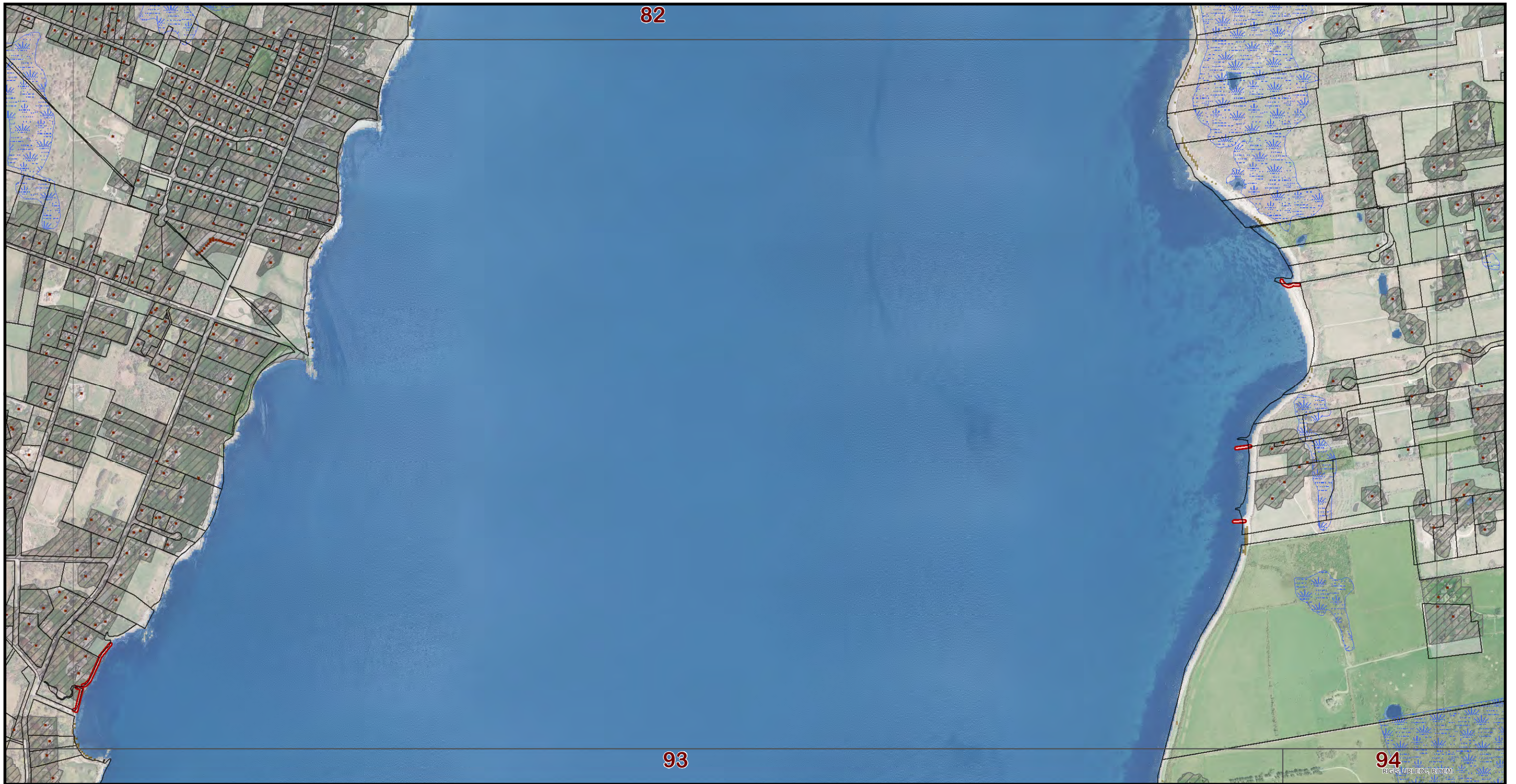


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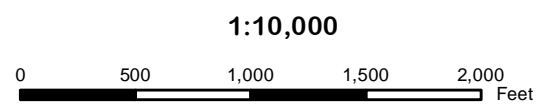
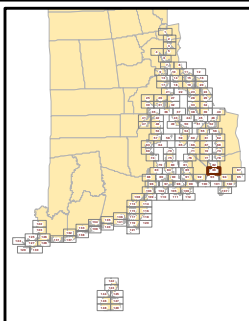
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## Tidal Marsh Vulnerability Analysis: Current Condition
















Map  
86

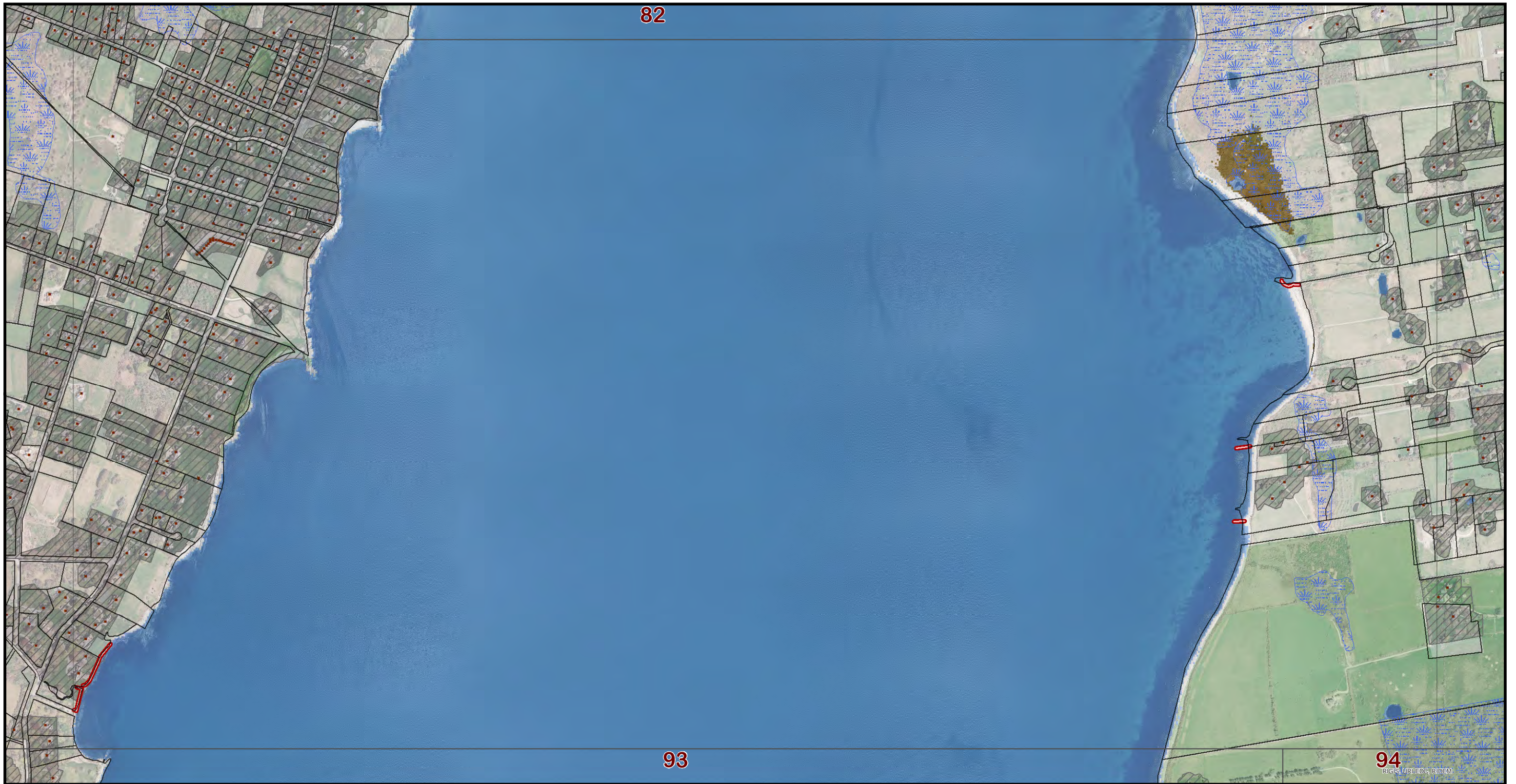


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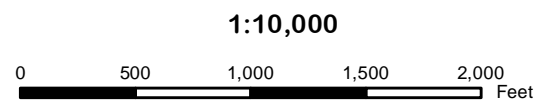
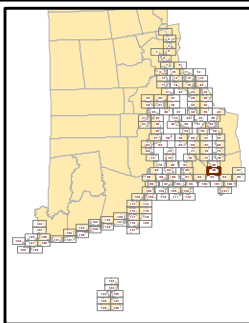
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model
















Map  
86



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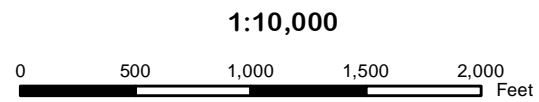
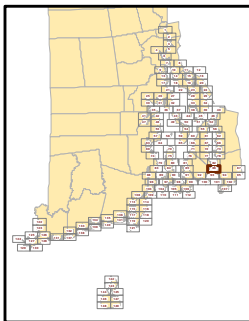
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model
















Map  
86



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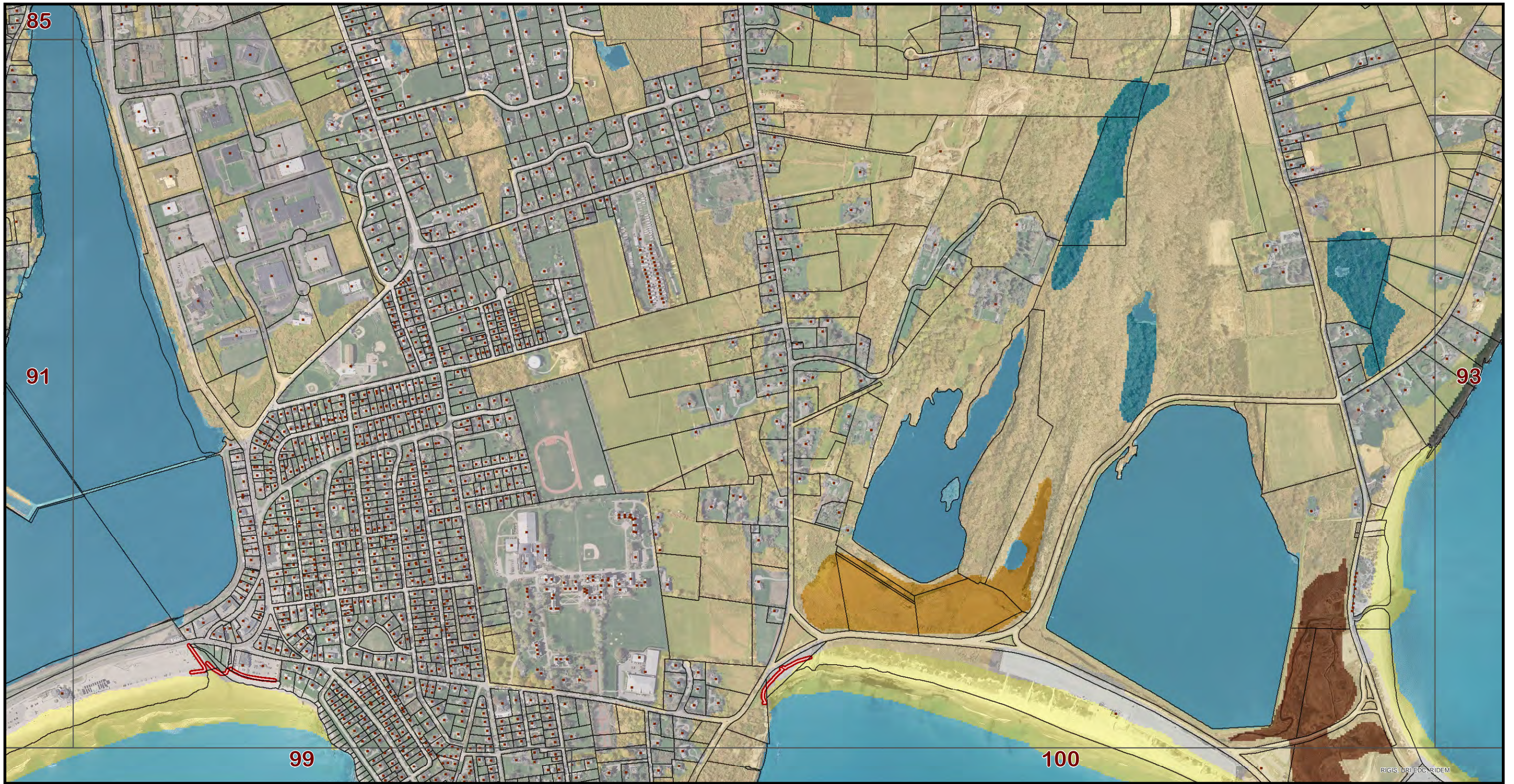
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model

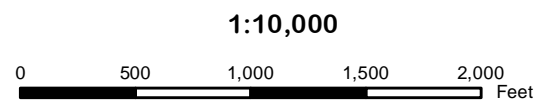
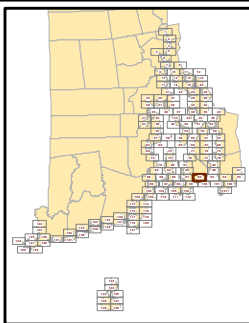


NOAA grant award #:  
NA120AR4310108

Map produced by Kevin Ruddock. 4/1/2014



Map  
92

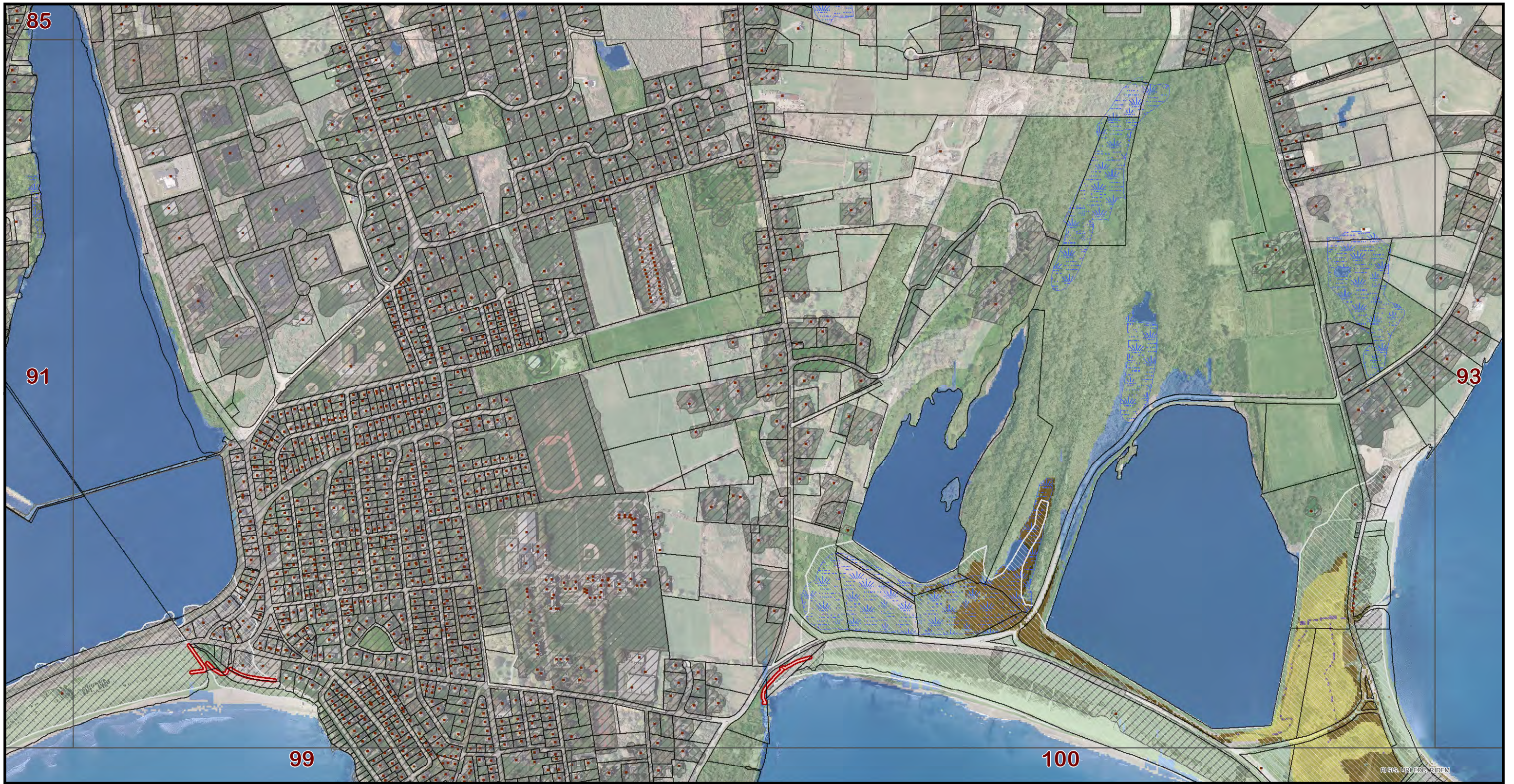


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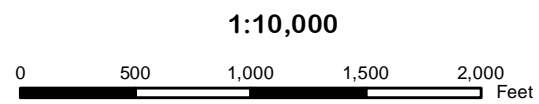
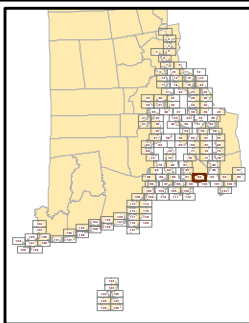
- |                    |                                |
|--------------------|--------------------------------|
| Developed Upland   | Salt Marsh                     |
| Undeveloped Upland | Brackish Marsh                 |
| Rocky Intertidal   | Scrub/Shrub Transitional Marsh |
| Beach              | Fresh Marsh                    |
| Tidal Flat         | Hardened Shores                |
| Open Water         | Buildings                      |
| Swamp              | Parcel Boundaries              |
| Tidal Creek        |                                |

## Tidal Marsh Vulnerability Analysis: Current Condition
















Map  
92



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-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

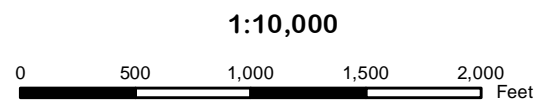
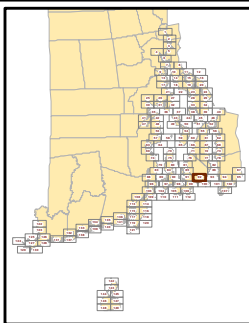
## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model



NOAA grant award #:  
NA120AR4310108



Map  
92



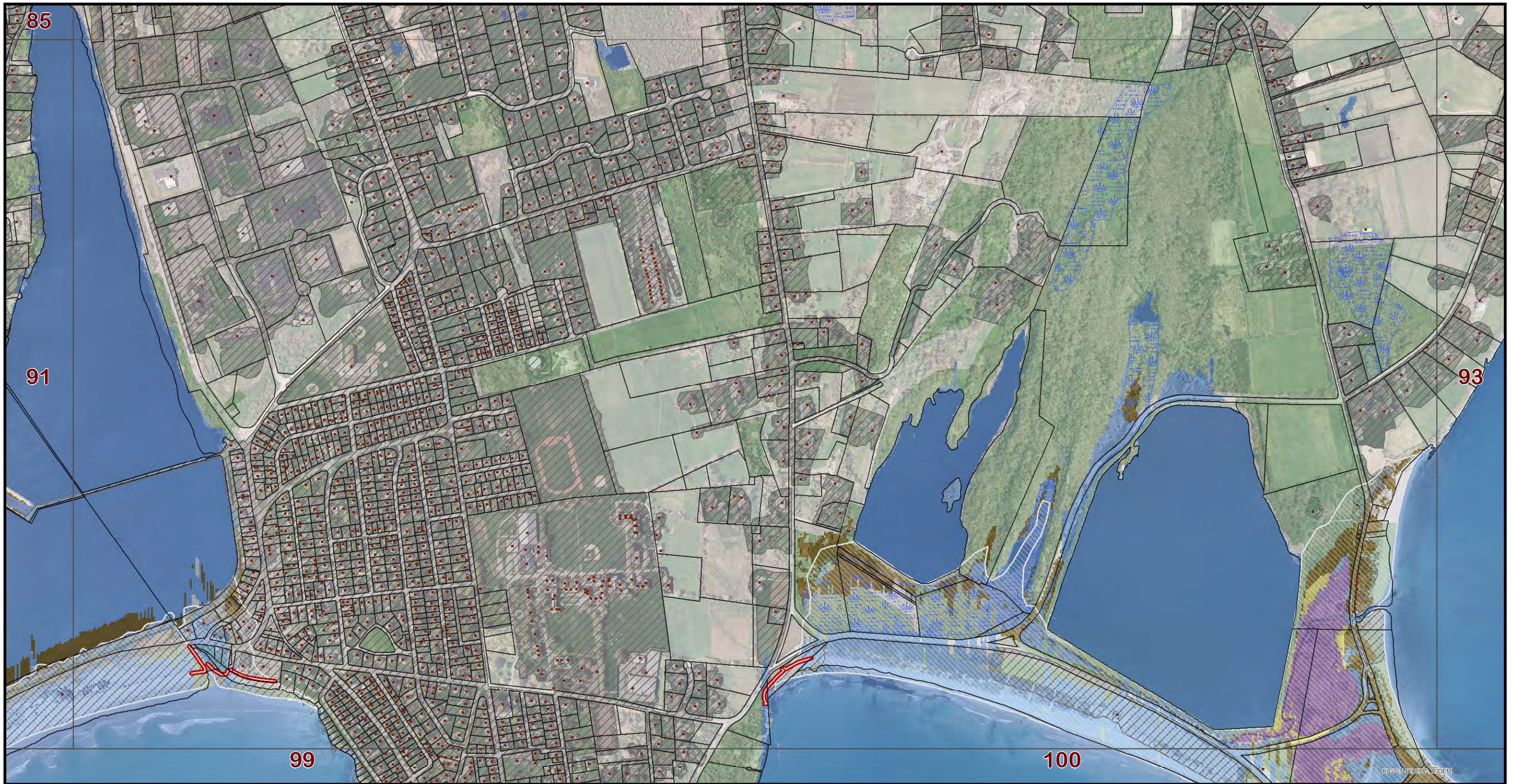
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- Potential Marsh Zone
- Persistent Marsh Zone
- Potential Marsh Loss
- Open Water and Tidal Flat
- Current Fresh Wetlands
- Protected Open Space
- Hardened Shores
- Buildings
- Parcel Boundaries
- Developed Land
- CRMC Coastal Barriers

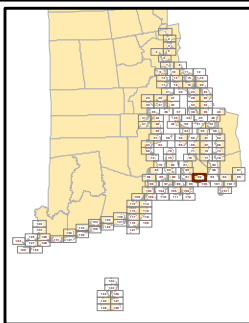
## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model



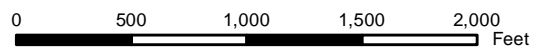















Map  
92



1:10,000



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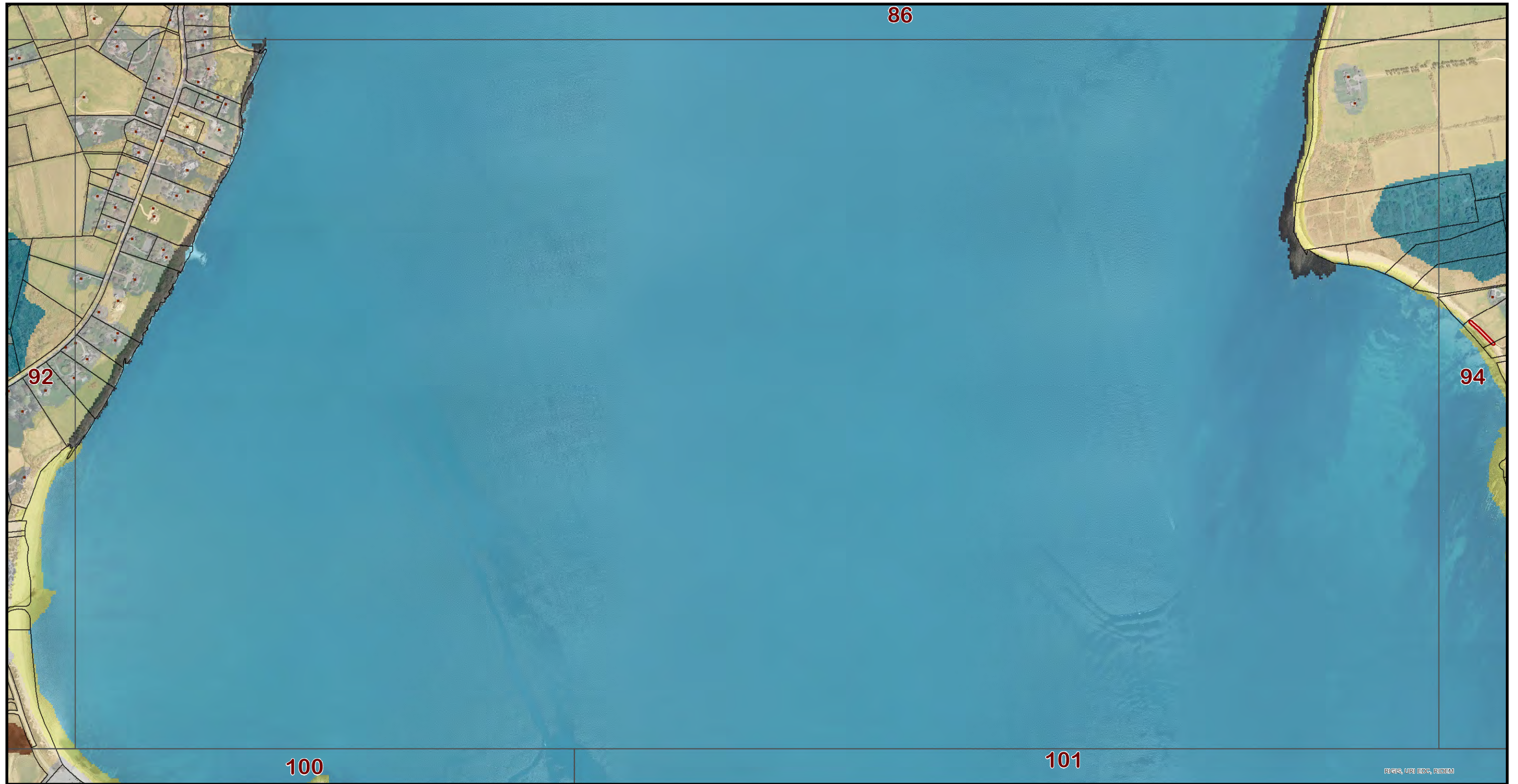
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model



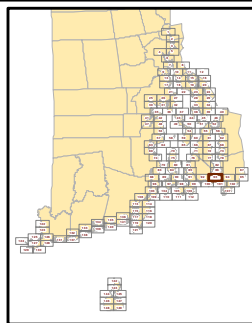
NOAA grant award #:  
NA120AR4310108



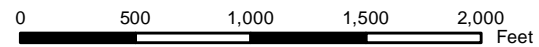


RGIS, URI EDG, RIDEM

Map  
93



1:10,000



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- |                    |                                |
|--------------------|--------------------------------|
| Developed Upland   | Salt Marsh                     |
| Undeveloped Upland | Brackish Marsh                 |
| Rocky Intertidal   | Scrub/Shrub Transitional Marsh |
| Beach              | Fresh Marsh                    |
| Tidal Flat         | Hardened Shores                |
| Open Water         | Buildings                      |
| Swamp              | Parcel Boundaries              |
| Tidal Creek        |                                |

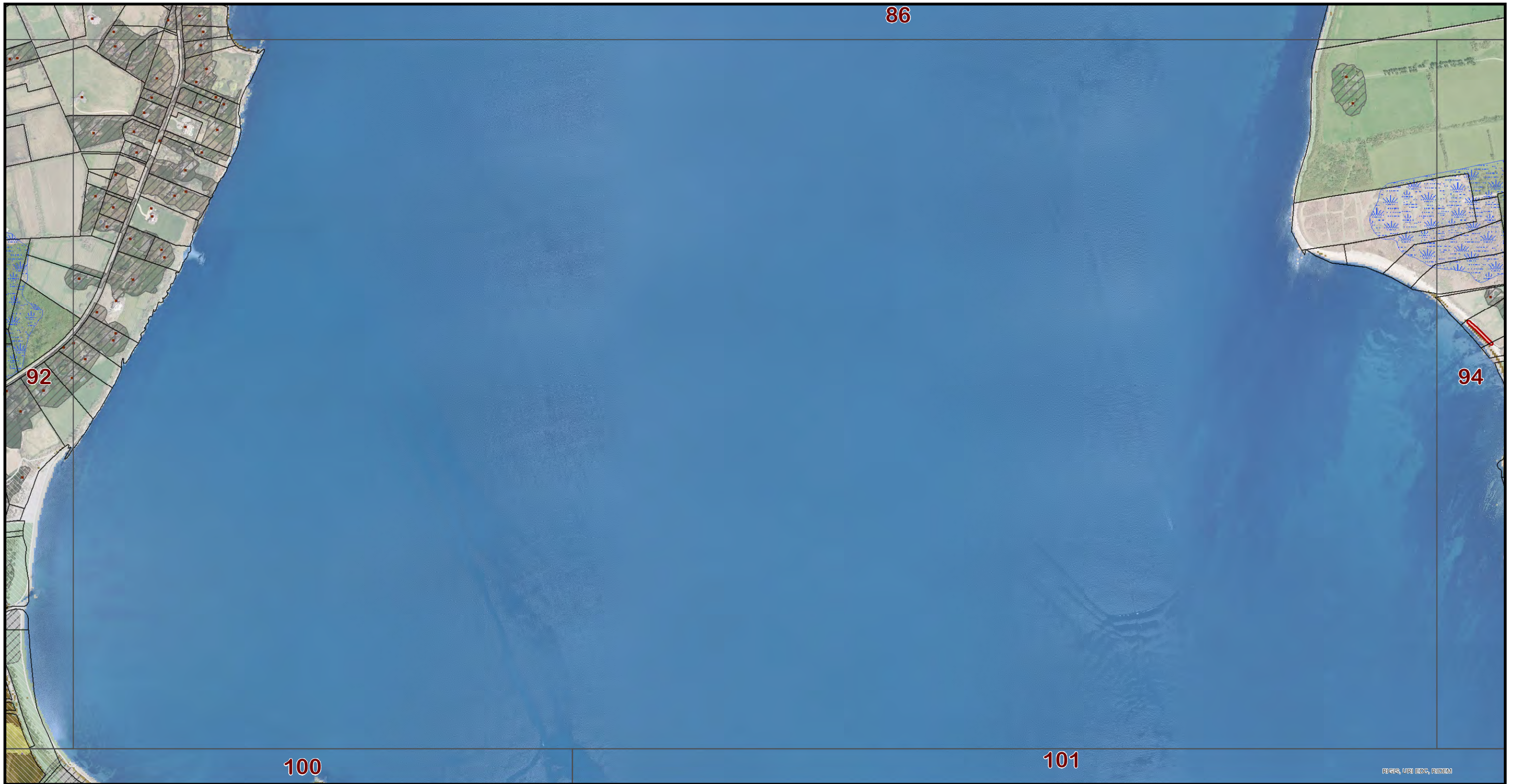
## Tidal Marsh Vulnerability Analysis: Current Condition



NOAA grant award #: NA12GAR4310108

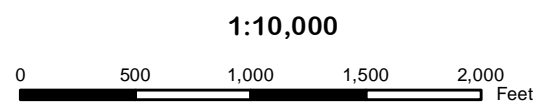
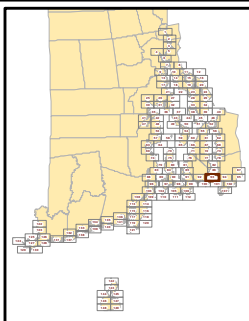


Map produced by Kevin Ruddock. 4/2/2014














REIS, URI EDG, RIDEM

Map  
93



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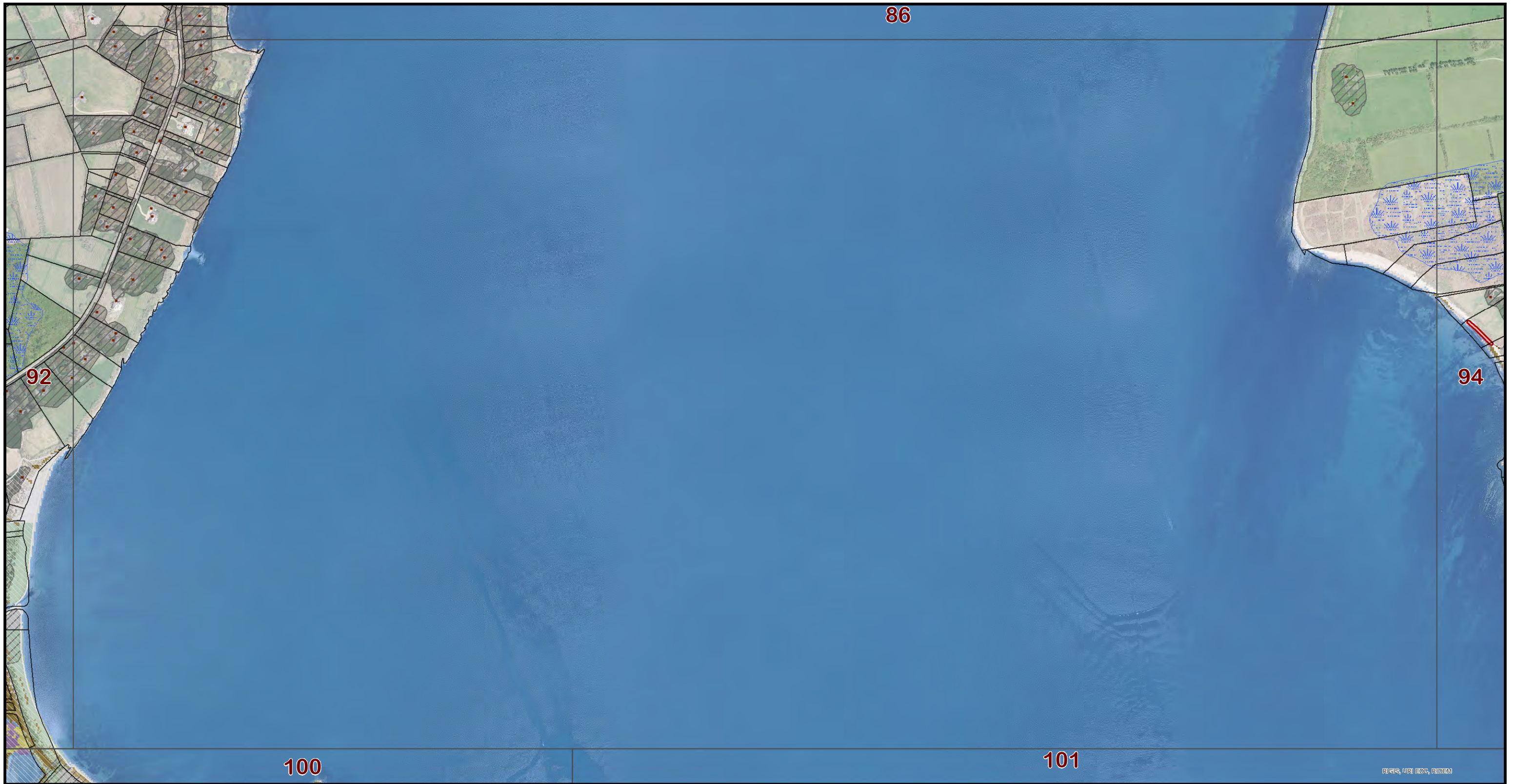
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model

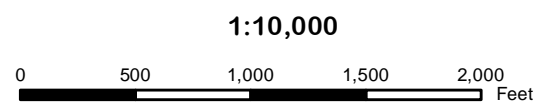
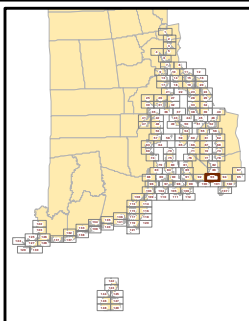


NOAA grant award #:  
NA120AR4310108












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Map  
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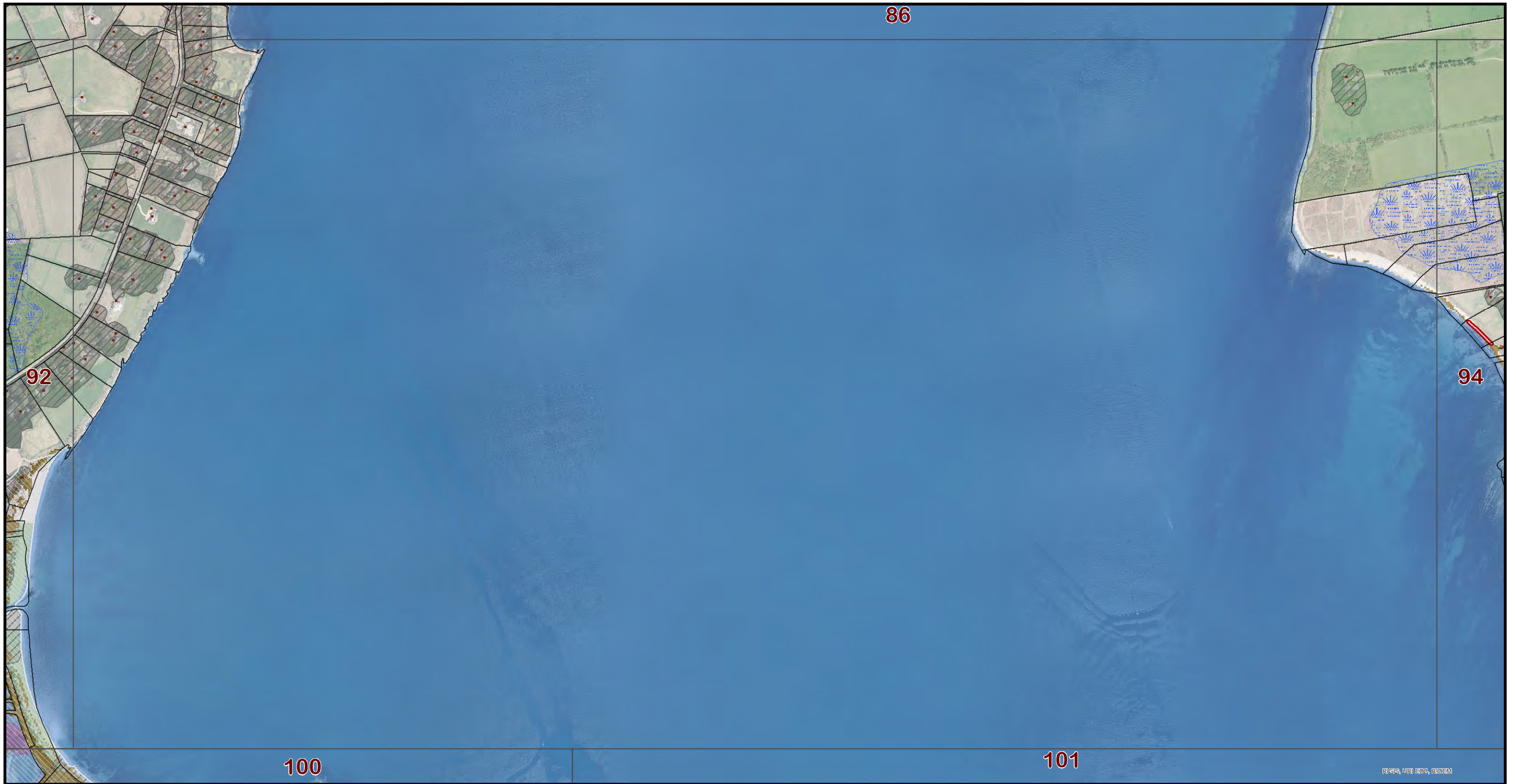
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model

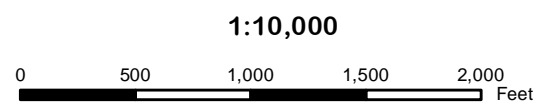
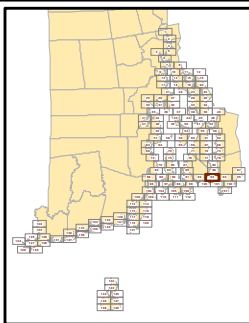


NOAA grant award #:  
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Map  
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-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

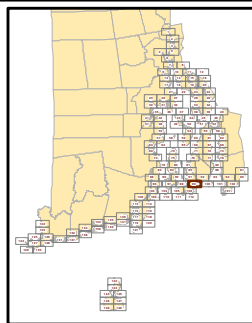
## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model





RCIS, URI EDG, RIDEM

Map  
99



1:10,000

0 500 1,000 1,500 2,000 Feet

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- |                    |                                |
|--------------------|--------------------------------|
| Developed Upland   | Salt Marsh                     |
| Undeveloped Upland | Brackish Marsh                 |
| Rocky Intertidal   | Scrub/Shrub Transitional Marsh |
| Beach              | Fresh Marsh                    |
| Tidal Flat         | Hardened Shores                |
| Open Water         | Buildings                      |
| Swamp              | Parcel Boundaries              |
| Tidal Creek        |                                |

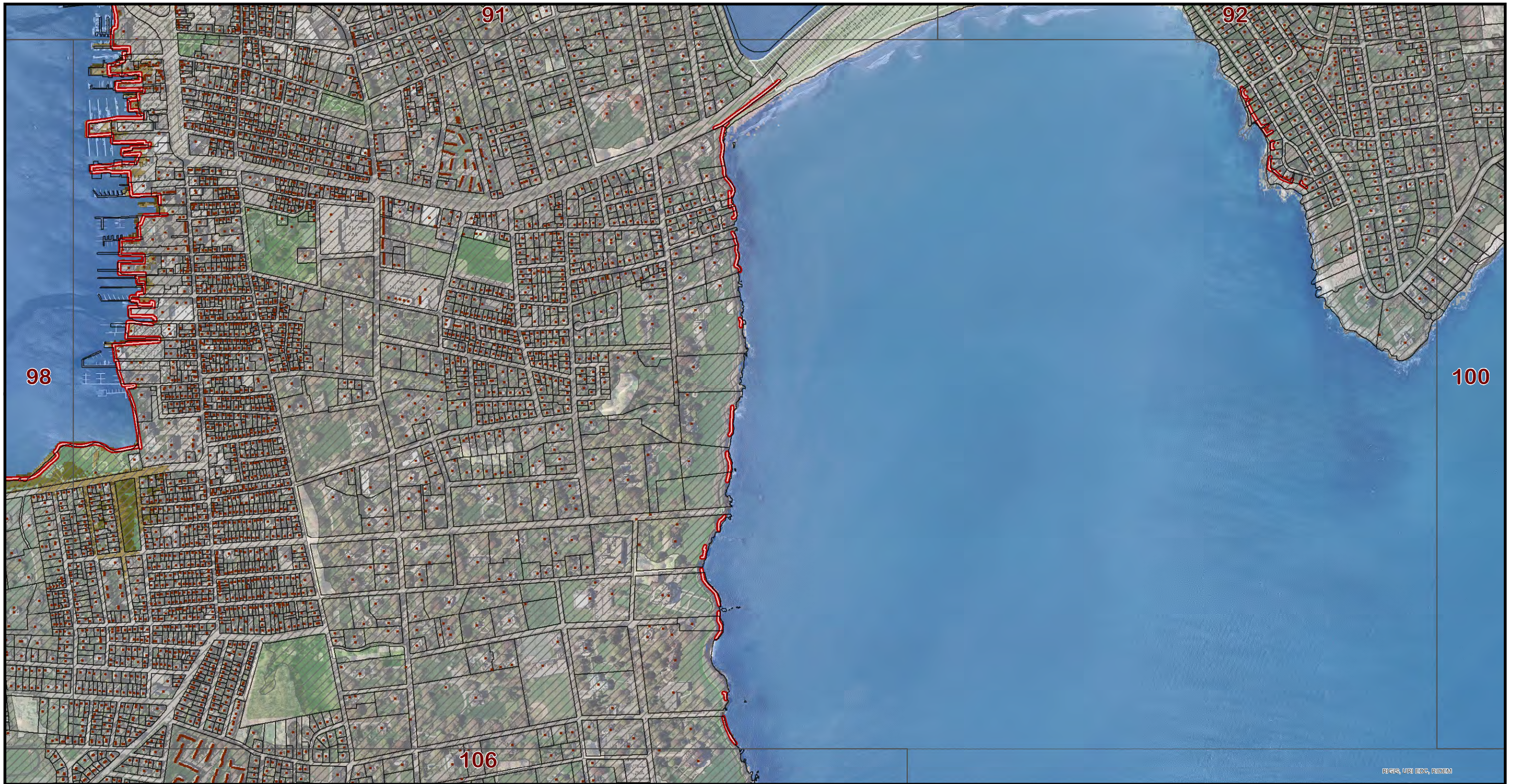
## Tidal Marsh Vulnerability Analysis: Current Condition



NOAA grant award #:  
NA12OAR4310108

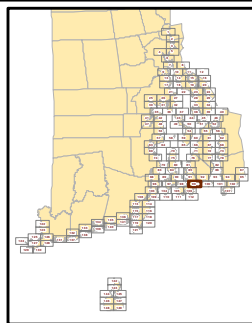


Map produced by Kevin Ruddock. 4/2/2014

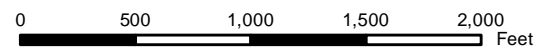


REIS, URI EDG, RIDEM












Map  
99



1:10,000



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-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model



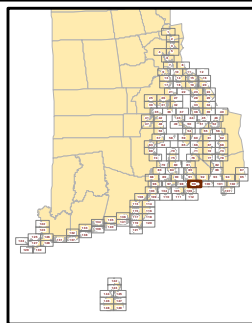
NOAA grant award #:  
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Map produced by Kevin Ruddock. 4/1/2014

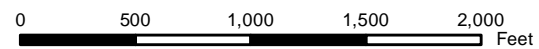


REIS, URI EDG, RIDEM












Map  
99



1:10,000



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-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model



NOAA grant award #:  
NA120AR4310108

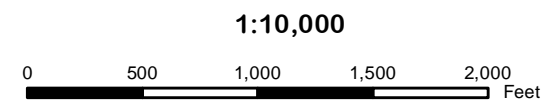
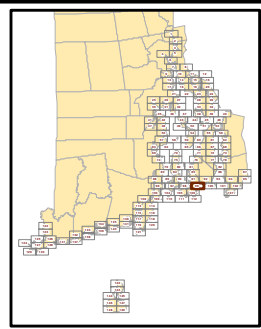
Map produced by Kevin Ruddock. 4/1/2014
















RTS, URI EDG, RIDEM

Map  
99



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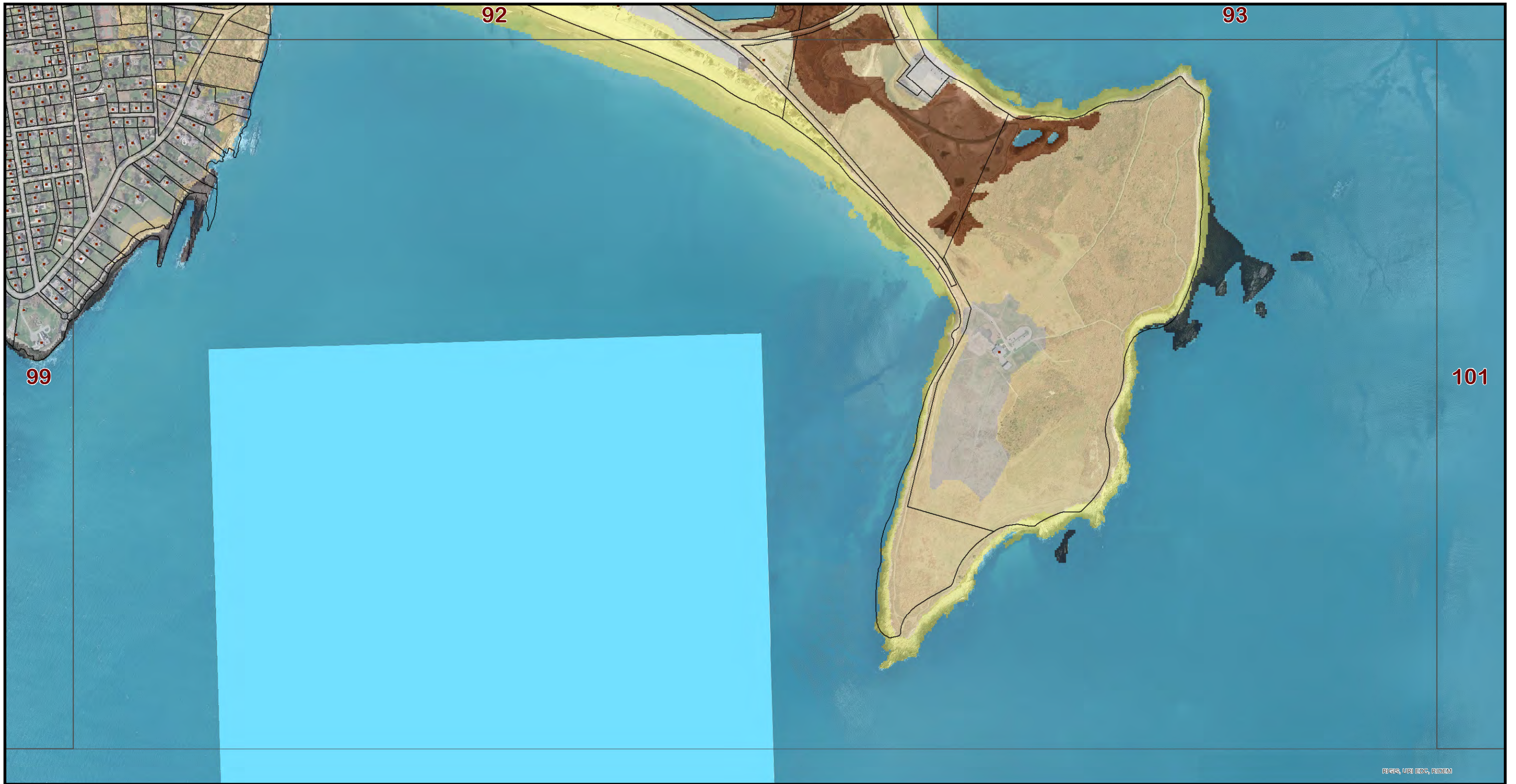
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model



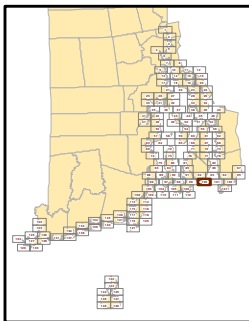
NOAA grant award #: NA120AR4310108

Map produced by Kevin Ruddock. 4/1/2014

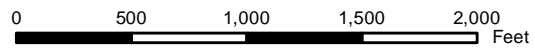


RTEIS, URI EDG, RIDEM

Map  
100



1:10,000



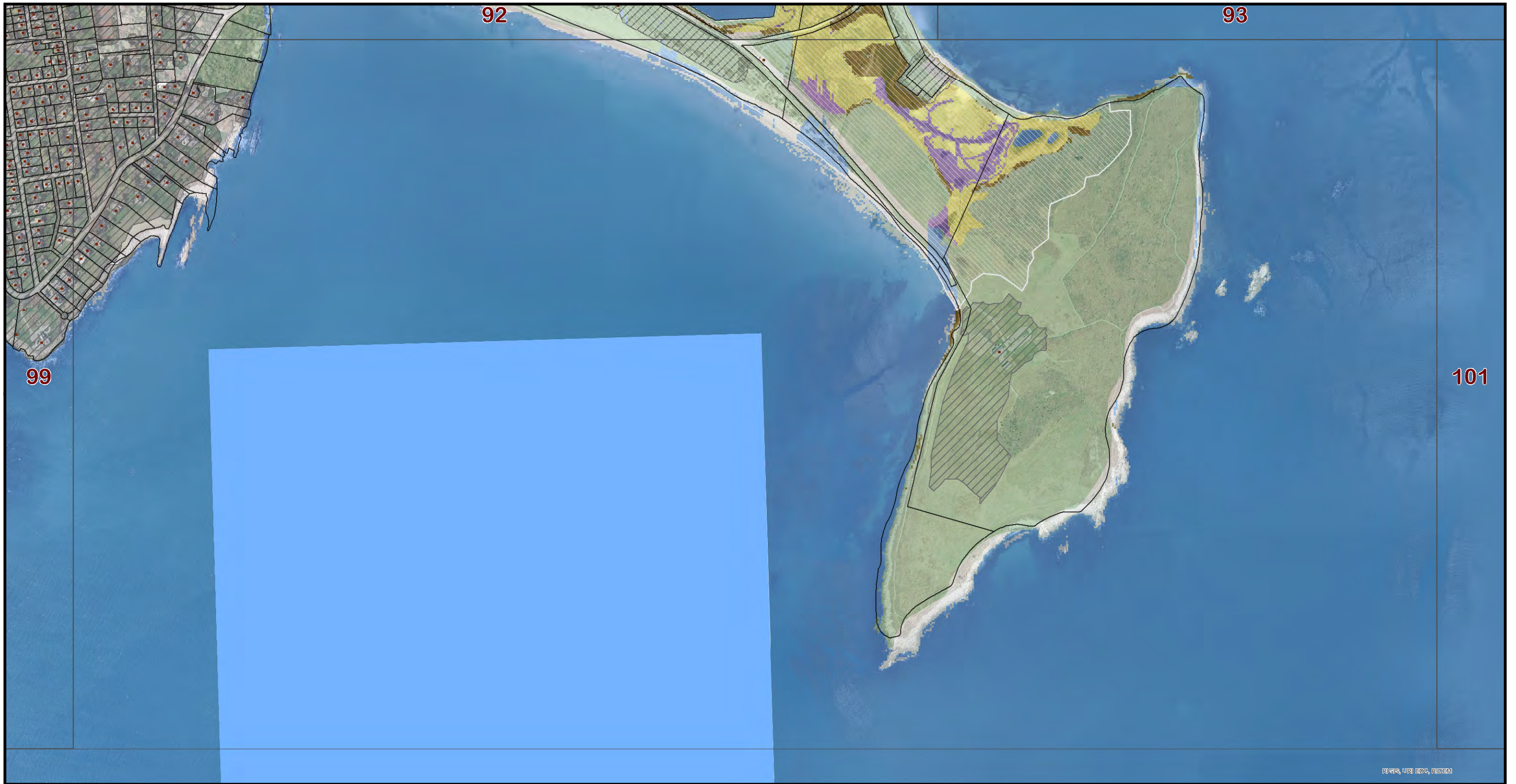
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- |                    |                                |
|--------------------|--------------------------------|
| Developed Upland   | Salt Marsh                     |
| Undeveloped Upland | Brackish Marsh                 |
| Rocky Intertidal   | Scrub/Shrub Transitional Marsh |
| Beach              | Fresh Marsh                    |
| Tidal Flat         | Hardened Shores                |
| Open Water         | Buildings                      |
| Swamp              | Parcel Boundaries              |
| Tidal Creek        |                                |

## Tidal Marsh Vulnerability Analysis: Current Condition

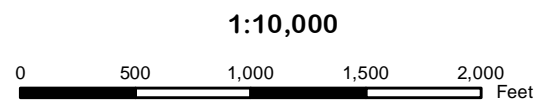
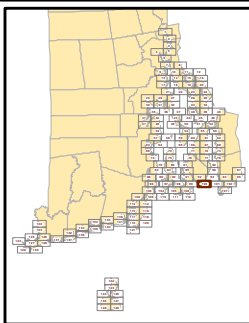


Map produced by Kevin Ruddock. 4/2/2014














RTS, URI EDG, RIDEM

Map  
100



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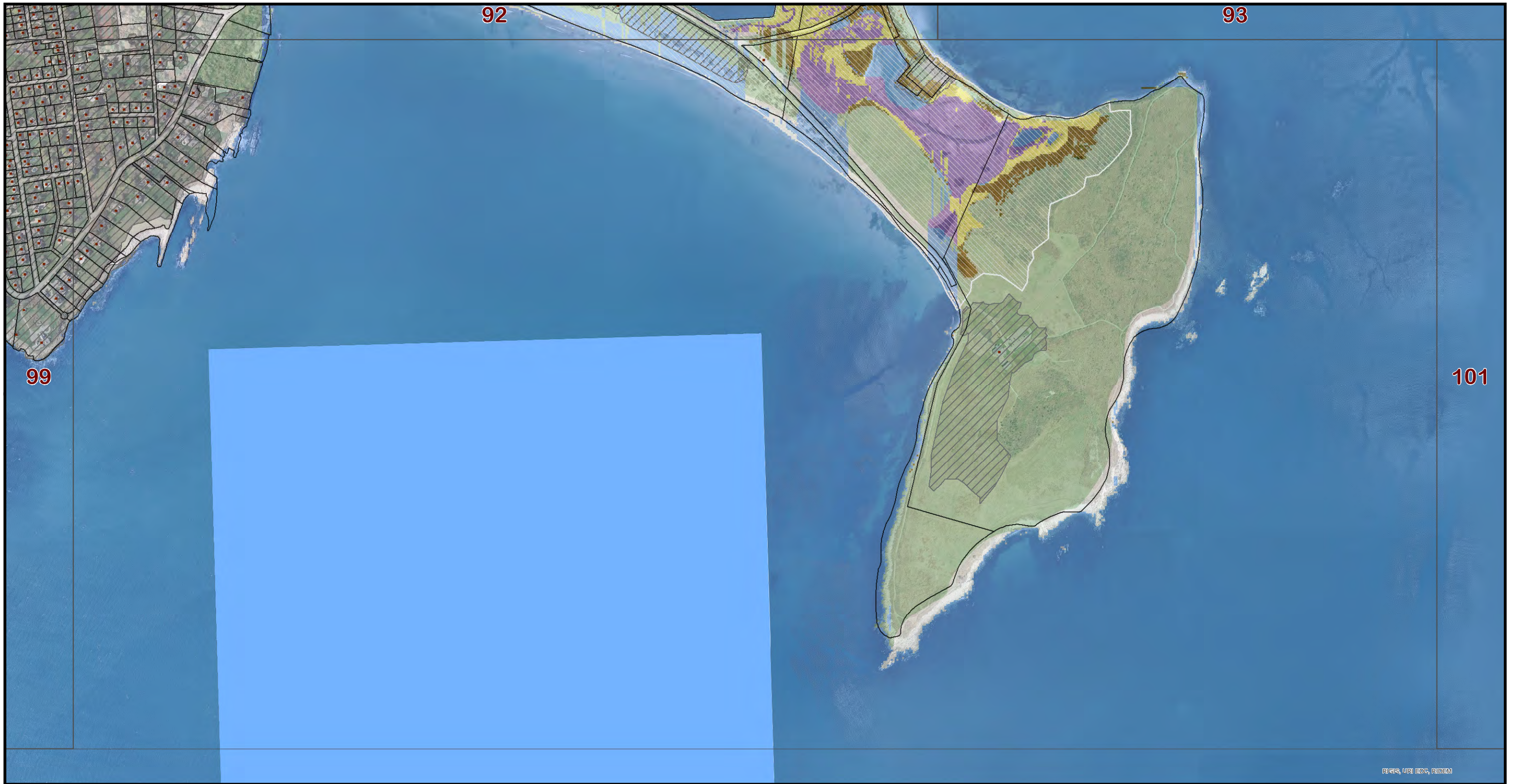
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: One Foot Sea Level Rise Model



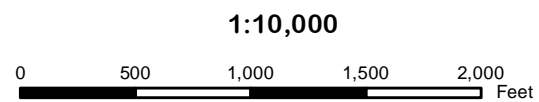
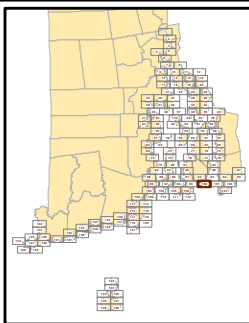
NOAA grant award #:  
NA120AR4310108

Map produced by Kevin Ruddock. 4/1/2014














RTS, URI EDG, RIDEM

Map  
100



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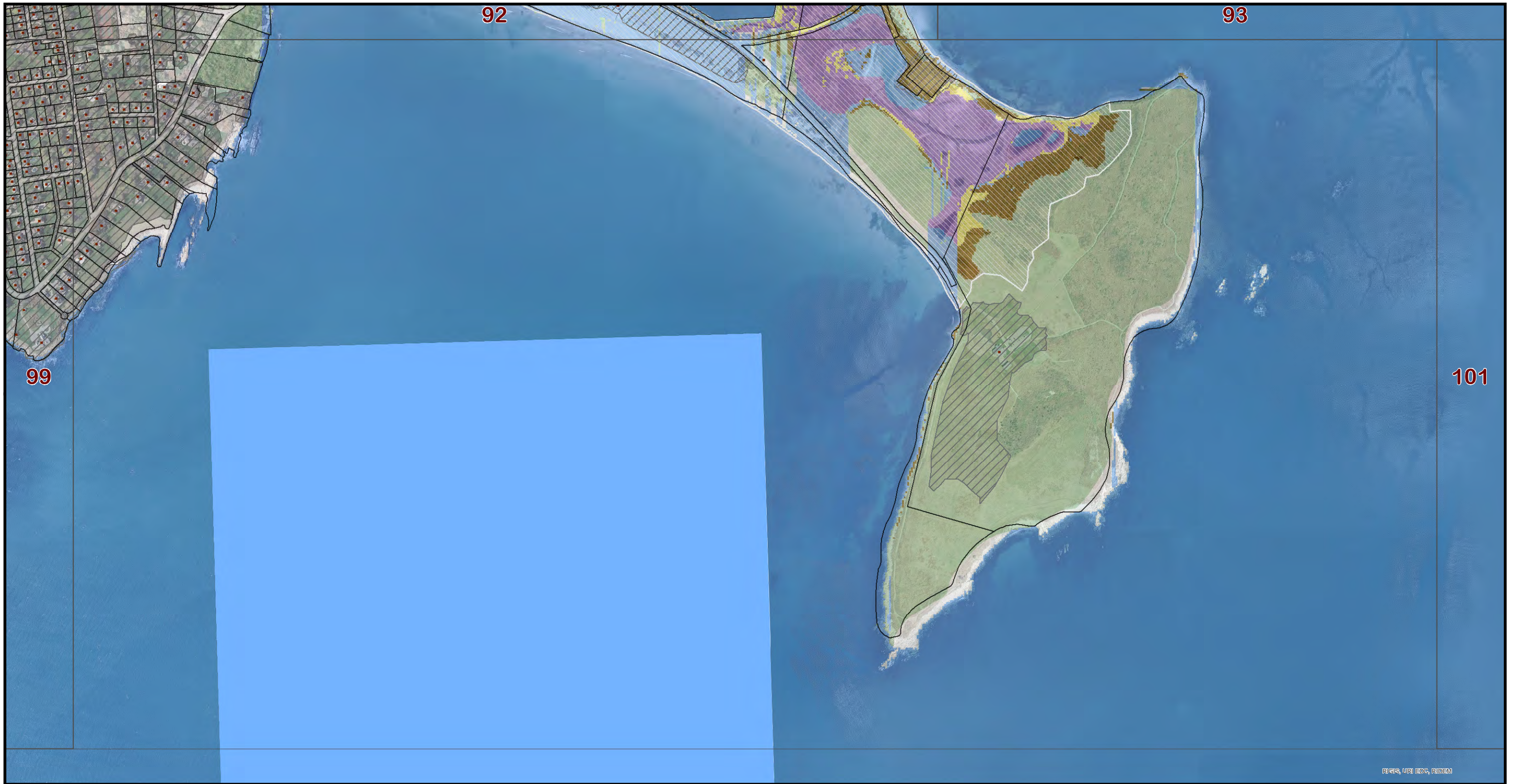
-  Potential Marsh Zone
-  Persistent Marsh Zone
-  Potential Marsh Loss
-  Open Water and Tidal Flat
-  Current Fresh Wetlands
-  Protected Open Space
-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Three Foot Sea Level Rise Model



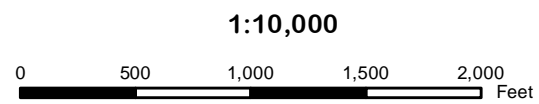
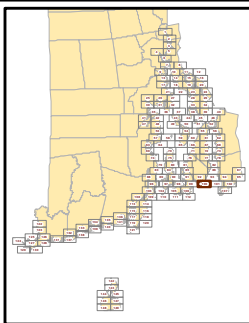
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Map  
100



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-  Potential Marsh Zone
-  Persistent Marsh Zone
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-  Open Water and Tidal Flat
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-  Hardened Shores
-  Buildings
-  Parcel Boundaries
-  Developed Land
-  CRMC Coastal Barriers

## Tidal Marsh Vulnerability Analysis: Five Foot Sea Level Rise Model



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