Where can you find the Tidal Marsh Inventories?

The final Tidal Marsh Inventory maps, reports, and GIS data will be made available at the CCRM web site (ccrm.vims.edu) as they are completed. The TMI data will also be incorporated into locality-based Comprehensive Coastal Resource Management Plans (CCRMPs). Each CCRMP draws information, strategies, and recommendations from a variety of resource management tools, including the Tidal Marsh Inventory.

The original Tidal Marsh Inventories from the 1970’s are currently available for viewing or downloading, including the final reports (http://ccrm.vims.edu/publications/tidal_marsh_inventories.html) and the GIS data (http://ccrm.vims.edu/gis_data_maps/staticMaps/gis/mml.html).

For more information or assistance locating a Tidal Marsh Inventory, contact Karen Duhring karend@vims.edu, 804-684-7159.

Tidal Marsh Inventories

Wetland scientists at the VIMS Center for Coastal Resources Management (CCRM) spent the last three summers conducting Tidal Marsh Inventories or TMIs. This issue of the Virginia Wetlands Report highlights this research by describing the process and why these inventories are important for management and sustainability of the Commonwealth’s tidal wetland resources.

What are they?

Tidal Marsh Inventories contain maps and information about the size and location of vegetated tidal wetlands. A Tidal Marsh Inventory is completed for each coastal locality. Each Tidal Marsh Inventory has information about total marsh area, different marsh shapes, and various marsh plant communities within the locality.

Why are we doing them?

The Virginia Institute of Marine Science (VIMS) is obligated to continuously maintain and update an inventory of vegetated tidal wetlands in the Commonwealth (Section 28.2-1301, Code of Virginia). The VIMS Wetlands Advisory Program surveyed tidal wetlands in all coastal localities in the 1970’s. In 1990, the tidal marshes in this original map series were converted to a digital format.

The VIMS Center for Coastal Resources Management began updating the Tidal Marsh Inventories in 2010. The main objective is to map the current locations and plant community types of tidal marshes throughout the Tidewater region. The TMI project is part of CCRM’s ongoing shoreline inventory program that provides maps of several coastal features. In addition to tidal marshes, these features include riparian land uses, bank erosion conditions, shoreline defense structures such as bulkheads and revetments, and access structures such as piers and boat ramps. A shoreline management model also imports data from the TMIs to highlight sites where preferred living shoreline alternatives for erosion protection may be suitable.

How are we doing them?

The process for generating Tidal Marsh Inventories is a CCRM team effort that combines remote sensing with field surveys to collect tidal marsh information. Visible tidal marsh boundaries are first traced or “digitized” onto high resolution infra-red aerial photographs using GIS software. Then field surveys are performed in shallow draft boats during the summer growing season. Map corrections are made and plant community attributes are coded after the field surveys. Quality assurance checks are completed to check for human and processing errors prior to publishing the final inventory maps.
Tidal Marsh Inventory Process

1 Remote Sensing
- Digitize visible tidal marshes on high-resolution aerial photographs
- Code each marsh for general shape

Fringe Embayed Extensive Marsh Island

Digitized tidal marshes outlined in black on infra-red aerial photo.

2 Field Surveys
- Ground-truth mapped marshes
- Add new marsh areas not visible in aerial photographs
- Record visible plant species at each marsh

Karen Duhring ground-truthing maps in VA Beach
Julie Bradshaw identifying wetland plants on the York River

3 Map Corrections
- Digitize new marshes observed in field
- Delete areas that are not tidal marsh
- Merge plant species & community types into marsh attributes
- Quality assurance checks

Christine Tombleson making map corrections

What can be done with TMI information?

Different analyses can be performed once the inventory maps are completed, especially when they are combined with other shoreline inventory data. Changes to the dominant plant species and marsh community types over time indicate trends in surrounding conditions. For example, tidal marshes previously characterized by high marsh or freshwater plant species that are now dominated by low marsh or brackish plants may indicate changes in sea level and salinity. By making the GIS data available, other researchers can apply the TMI information to their own investigations.

Some of the current applications underway at CCRM are listed below with possible future studies.

CURRENT
- Locate & map tidal marsh areas for general interest
- Highlight potential living shoreline sites through a shoreline management model
- Evaluate trends in marsh area and types since 1970s
- Assess relationships with other sensitive habitats, e.g. forested riparian buffers, submerged aquatic vegetation (SAV), shellfish areas

FUTURE
- Compare baseline TMI with future surveys
- Track changing marsh landscape positions and loss due to sea level rise
- Target potential wetland restoration sites, Monitor marsh-dependent fish and wildlife population trends
- Track effectiveness of wetlands management efforts

Where have TMI field surveys been completed?

<table>
<thead>
<tr>
<th>Locality</th>
<th>Field Survey Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Virginia Beach</td>
<td>2012</td>
</tr>
<tr>
<td>Westmoreland County</td>
<td>2012</td>
</tr>
<tr>
<td>Henrico County</td>
<td>2012</td>
</tr>
<tr>
<td>Fairfax County</td>
<td>2012</td>
</tr>
<tr>
<td>City of Alexandria</td>
<td>2012</td>
</tr>
<tr>
<td>Prince William County</td>
<td>2012</td>
</tr>
<tr>
<td>Mathews County</td>
<td>2012</td>
</tr>
<tr>
<td>Northampton County</td>
<td>2011</td>
</tr>
<tr>
<td>City of Hampton</td>
<td>2010</td>
</tr>
<tr>
<td>York – Pamunkey – Mattaponi Rivers</td>
<td>2010</td>
</tr>
</tbody>
</table>

(continued on page 4)
Tidal Marsh Inventory Process

1 Remote Sensing
   • Digitize visible tidal marshes on high-resolution aerial photographs
   • Code each marsh for general shape

   Fringe  Embayed  Extensive  Marsh Island

   Digitized tidal marshes outlined in black on infra-red aerial photo.

2 Field Surveys
   • Ground-truth mapped marshes
   • Add new marsh areas not visible in aerial photographs
   • Record visible plant species at each marsh

   Karen Duhring ground-truthing maps in VA Beach
   Julie Bradshaw identifying wetland plants on the York River

3 Map Corrections
   • Digitize new marshes observed in field
   • Delete areas that are not tidal marsh
   • Merge plant species & community types into marsh attributes
   • Quality assurance checks

   Christine Tombleson making map corrections

What can be done with TMI information?

Different analyses can be performed once the inventory maps are completed, especially when they are combined with other shoreline inventory data. Changes to the dominant plant species and marsh community types over time indicate trends in surrounding conditions. For example, tidal marshes previously characterized by high marsh or freshwater plant species that are now dominated by low marsh or brackish plants may indicate changes in sea level and salinity. By making the GIS data available, other researchers can apply the TMI information to their own investigations.

Some of the current applications underway at CCRM are listed below with possible future studies.

CURRENT
   Locate & map tidal marsh areas for general interest
   Highlight potential living shoreline sites through a shoreline management model
   Evaluate trends in marsh area and types since 1970s
   Assess relationships with other sensitive habitats, e.g. forested riparian buffers, submerged aquatic vegetation (SAV), shellfish areas

FUTURE
   Compare baseline TMI with future surveys
   Track changing marsh landscape positions and loss due to sea level rise
   Target potential wetland restoration sites, Monitor marsh-dependent fish and wildlife population trends
   Track effectiveness of wetlands management efforts

Where have TMI field surveys been completed?

<table>
<thead>
<tr>
<th>Locality</th>
<th>Field Survey Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Virginia Beach</td>
<td>2012</td>
</tr>
<tr>
<td>Westmoreland County</td>
<td>2012</td>
</tr>
<tr>
<td>Henrico County</td>
<td>2012</td>
</tr>
<tr>
<td>Fairfax County</td>
<td>2012</td>
</tr>
<tr>
<td>City of Alexandria</td>
<td>2012</td>
</tr>
<tr>
<td>Prince William County</td>
<td>2012</td>
</tr>
<tr>
<td>Mathews County</td>
<td>2012</td>
</tr>
<tr>
<td>Northampton County</td>
<td>2011</td>
</tr>
<tr>
<td>City of Hampton</td>
<td>2010</td>
</tr>
<tr>
<td>York – Pamunkey – Mattaponi Rivers</td>
<td>2010</td>
</tr>
</tbody>
</table>

(continued on page 4)
**Tidal Wetlands News & Events**

**Sign up for VIMS e-News to receive announcements about upcoming events & seminars. [www.vims.edu](http://www.vims.edu)**

**Restore America’s Estuaries annual conference.** October 21-25, 2012. Tampa, FL. [www.esteuaries.org](http://www.esteuaries.org) or TMIs. This issue of the Virginia Wetlands Report highlights this research by describing the process and why these inventories are important for management and sustainability of the Commonwealth’s tidal wetland resources.

**What are they?**

Tidal Marsh Inventories contain maps and information about the size and location of vegetated tidal wetlands. A Tidal Marsh Inventory is completed for each coastal locality. Each Tidal Marsh Inventory has information about total marsh area, different marsh shapes, and various marsh plant communities within the locality.

**Why are we doing them?**

The Virginia Institute of Marine Science (VIMS) is obligated to continuously maintain and update an inventory of vegetated tidal wetlands in the Commonwealth (Section 28.2-1301, Code of Virginia). The VIMS Wetlands Advisory Program surveyed tidal wetlands in all coastal localities in the 1970’s. In 1990, the tidal marshes in this original map series were converted to a digital format.

The VIMS Center for Coastal Resources Management began updating the Tidal Marsh Inventories in 2010. The main objective is to map the current locations and plant community types of tidal marshes throughout the Tidewater region. The TMI project is part of CCRM’s ongoing shoreline inventory program that provides maps of several coastal features. In addition to tidal marshes, these features include riparian land uses, bank erosion conditions, shoreline defense structures such as bulkheads and revetments, and access structures such as piers and boat ramps. A shoreline management model also imports data from the TMIs to highlight sites where preferred living shoreline alternatives for erosion protection may be suitable.

**How are we doing them?**

The process for generating Tidal Marsh Inventories is a CCRM team effort that combines remote sensing with field surveys to collect tidal marsh information. Visible tidal marsh boundaries are first traced or “digitized” onto high resolution infra-red aerial photographs using GIS software. Then field surveys are performed in shallow draft boats during the summer growing season. Map corrections are made and plant community attributes are coded after the field surveys. Quality assurance checks are completed to check for human and processing errors prior to publishing the final inventory maps.

**Where can you find the Tidal Marsh Inventories?**

The final Tidal Marsh Inventory reports, and GIS data will be made available at the CCRM web site (ccrm.vims.edu) as they are completed. The TMI data will also be incorporated into locality-based Comprehensive Coastal Resource Management Plans (CCRMPs). Each CCRMP draws information, strategies, and recommendations from a variety of resource management tools, including the Tidal Marsh Inventory.

The original Tidal Marsh Inventories from the 1970’s are currently available for viewing or downloading, including the final reports (http://ccrm.vims.edu/publications/tidal_marsh_inventories.html) and the GIS data (http://ccrm.vims.edu/gis_data_maps/static_maps/gis/cmi.html).

For more information or assistance locating a Tidal Marsh Inventory, contact Karen Duhring karend@vims.edu, 804-684-7159.

---

**Tidal Marsh Inventories**

Wetland scientists at the VIMS Center for Coastal Resources Management (CCRM) spent the last three summers conducting Tidal Marsh Inventories or TMIs. This issue of the Virginia Wetlands Report highlights this research by describing the process and why these inventories are important for management and sustainability of the Commonwealth’s tidal wetland resources.

---

**Virginia Wetlands Report**

Volume 27, Issue 2

A Biannual Publication Focused on Virginia Wetland Issues and Training

Fall 2012