Coastal Storms Initiative

Key Components

- National partnership effort
- Will address specific local needs
- Local leadership working with NOAA resources
- First pilot project is in Florida
Primary Goals

- Prevent loss of life and property
- Lessen economic impacts on communities and business
- Sustain the natural environment

Coastal Storms Initiative
The Sum is Greater than the Parts.

Coastal Storms Initiative

- Collect and Archive
- Integrate and Understand
- User Solutions
- Predict
- Disseminate
- Provide Tools
- Provide Outreach and Extension
- Build Capacity
- Influence Policy and Standards
Coastal Storms Initiative

3 Pilot Regions

1) St. Johns River, FL (Jacksonville)
   - Why?
     - Hurricanes
     - Flooding/winds
     - Ecological impacts

2) Pacific Northwest (Columbia River)
   - Why?
     - Pacific Storms
     - Flooding and erosion
     - Fish habitat impacts

3) Southern California (Bight Region)
   - Why?
     - Pacific Storms
     - Flooding and runoff
     - Pollution
Florida Pilot Focus

- Easier data access
- New models and tools
- Improved forecasting
- Increased coordination
- Enhanced local decision making

Coastal Storms Initiative
Florida Pilot Projects

Shallow Water Bathymetry

St. Johns River

Ensures navigation safety by

- updating critical chart areas
- providing emergency response information
Promoting public safety by

- providing real-time river conditions and forecasts
- supporting hazardous spill tracking
- planning for coastal flooding response and evacuation
Florida Pilot Projects

Improved Ocean and Observations

Provides user-friendly observations by

- updating existing networks
- standardizing sensors and systems

Coastal Storms Initiative
Protects public health by

- identifying causes of beach and shellfish bed closures
- developing a model to track and predict contaminant flow
- determining appropriate mitigation strategies

Florida Pilot Projects
Ecological Forecasting
Coastal Storms Initiative
Florida Pilot Projects

Improved Prediction of Coastal Wind, Waves, and Flooding

Enhancing storm watches and warnings by:

- Improving forecasts of winds, precipitation, thunderstorms, and marine visibility
- Providing new wave forecasts for shoreline and offshore areas
- Improved forecasts of ocean water levels and potential flooding
Advancing hazard planning by

- developing a tool to visually illustrate risks
- empowering communities with knowledge

Florida Pilot Projects
Risk and Vulnerability Assessment Tool

Coastal Storms Initiative
Florida Pilot Projects

Outreach and Extension

Promoting community efforts by:

- facilitating public meetings
- helping to build capabilities through training, workshops, and outreach

Coastal Storms Initiative
Florida Pilot Projects

Data Access and Standards

Ensuring data reliability by

• collecting coastal data

• converting data into user-friendly formats
Ensures data availability by

• making data more widely available on-line

• providing free, one-stop shopping

• providing a Metadata catalog
Expected Benefits

- More accurate storm warnings
- Greater evacuation time for populations
- Better planning and mitigation strategies
- Prevention of property loss or damage
- Lives saved
Florida Pilot Projects 2 and 6

Prediction of River and Marine Conditions in the St. Johns River Watershed

Ed Myers and Frank Aikman
NOAA Office of Coast Survey
Real-Time Prediction of River and Marine Conditions in the St. Johns River Watershed

Coastal Storms Initiative

- New Experimental River Forecast System
- Improved Flood Warnings
- Improved Weather Prediction
- New Wave Forecasts for the Coasts
Why Mitigate Impacts of Coastal Storms

- Flooding due to Storm Surge
- Wave Action on the Coast
- Adverse Weather
  - Wind
  - Precipitation
  - Thunderstorms
  - Marine Visibility
- Navigation Hazards
  - Water Levels and Under Keel Clearance
  - Currents for HAZMAT, Search and Rescue, Homeland Security
- Resource Management
St. Johns River Circulation Model: Nowcast/Forecast System

• EFDC (Environmental Fluid Dynamics Code) application developed by the St. Johns River Water Management District.

• NOS implemented a real-time experimental version:
  ° hourly nowcasts
  ° 36-hour forecasts four times a day

• Webpage with water levels, currents, salinity and temperature from both model and data.
Real-Time Water Levels

- For the nowcasts, the model uses water levels from Mayport as an open ocean boundary condition.
- For the forecasts, tide predictions from Mayport are added to forecasts of nontidal water levels made by NWS’ Extratropical Storm Surge model.
Real-Time Currents

Along-Channel currents are compared with tidal predictions computed from historical current meter measurements.

New current measurements will enable updated model evaluations and comparisons.
Real-Time Salinity

- Salinity is imposed along the ocean boundary as a 35-36 PSU profile.
- At the upstream boundary, salinity (< 1PSU) is imposed with data from a real-time USGS gauge. Tributary freshwater input from an additional five USGS gauges are also input to the model.
- NOS and FDEP are upgrading instruments to make real-time salinity data available for comparison with the model.
Flood Forecasting

- National Weather Service (NWS) working with National Ocean Service (NOS) to:
  - Create 6 new forecast points on the St. Johns
    - Part of NWS Advanced Hydrologic Prediction Service (AHPS)
    - Will provide inputs to NOS estuary model
  - Develop real-time flood mapping capability
  - Integrate output from NOS estuary model with NWS models (inland river, storm surge) into a single product.

Currently no river forecast points
Weather Forecasting

• NWS implemented Weather Research and Forecast (WRF) model at office in Jacksonville

• Provides highly detailed forecasts (5 km res) for 24 hours, 4 times a day
  • Wind forecasts as input to NOS estuary model
  • Improved forecasts of coastal winds, such as sea breezes
  • Improved forecasts of temperature, visibility, thunderstorm activity

• Formal evaluation began June 2
Wave Forecasting

NWS collaborating with Naval Research Lab to develop:

- High resolution nearshore wave model
  - Model guidance currently lacking for NWS forecasters
- Focus on northern Florida and Pacific Northwest regions initially
- Better planning and safer navigation near bars along west coast
- Improved forecasts of other hazards (High surf, rip currents)
Real-Time Prediction of River and Marine Conditions

Integrated Products to Improve Predictions and Real-Time Information on:

- River conditions: water levels, currents, temperature and salinity
- Improving forecasts of water levels and potential flooding
- Improving forecasts of winds, precipitation, thunderstorms, and marine visibility
- Providing new wave forecasts for shoreline and offshore areas
Florida Pilot Project 7
Risk and Vulnerability Assessment Tool

Russell Jackson
NOAA National Ocean Service
Coastal Services Center
Need for …

• The counties had developed a hazard mitigation plan in paper format (just sat around) – they needed a more interactive way to visualize risk and vulnerabilities.

• Assisting the counties with their Disaster Mitigation Act of 2000 requirements.

• Internet access to the tools, especially mapping applications, increase the use of the data.

• Smaller towns without GIS capability or risk and vulnerability assessment expertise now have the resources to conduct them.

• Provide more access and utility for some of the data and information provided by other CSI projects.
Community based process

• Working directly with Brevard and Volusia Counties, FL
  - Local Emergency Management Office – lead
  - Hazard Mitigation Committee

• Partner interaction and feedback led to other products/tools
  - Identified a need for tools specifically for public outreach and awareness
    - Hazards Locator Tool
    - 3D storm surge visualizations
  - Floodplain Management Tool – lower rates
  - Parcel Analysis Tool
Technology

Internet - to maximize usage (especially smaller communities without GIS and risk and vulnerability assessment capabilities)

• Web based tutorials

• 3D visualizations and images

• Internet Mapping Applications

  - Hyperlinks to other data, products, services
Risk and Vulnerability Assessment Tool (RVAT)

Using geographic information system (GIS) to analyze coastal hazard vulnerability to develop loss reduction strategies

Mapping Hazards and Identifying Vulnerability

- Perform analyses on data to determine the locations of vulnerable people, property and natural resources
- Use analysis results to prioritize hazard mitigation measures
- View the status of the Community Rating System by municipality and county
- Analyze parcel data and information

Not Sure What Hazards May Impact You?

Use the Hazards Locator to see if floods, hurricanes, or erosion could impact your family

Interested in Reducing Flood Risk and Insurance Premiums?

Find out how the Community Rating System activities can reduce flood risk and increase flood protection.

Need to Conduct a Risk and Vulnerability Assessment?

The risk and vulnerability analysis outlines the steps, provides examples, gives data locations, and contact information for performing a risk and vulnerability assessment.

The Coastal Storms Initiative project was piloted in Brevard and Volusia Counties, Florida, but is adaptable to other areas.
Coastal Storms Initiative

Web site – Assessment Discussions

- Brief overview
- Expanded discussion, including methodology
### Risk and Vulnerability Assessment Tool (RVAT)

Using geographic information system (GIS) to analyze coastal hazard vulnerability to develop loss reduction strategies.

#### Data Dictionary

These data sets were used to create the interactive maps. Browse through the table below to find specific data layers, links to the data source, and text explaining the relevance of the data to a risk and vulnerability assessment.

<table>
<thead>
<tr>
<th>Data Name</th>
<th>URL or Contact Information</th>
<th>Relevance to Vulnerability Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>County Overview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beach Access Point</td>
<td>[Volusia County Government GIS](direct request only)</td>
<td>Useful for assessing minimal requirements for federal beach nourishment activities; useful for post-storm damage assessment</td>
</tr>
<tr>
<td>Evacuation Route</td>
<td>[Florida Division of Emergency Management GIS (direct request only)]</td>
<td>Evacuation Planning</td>
</tr>
<tr>
<td>Evacuation Zones</td>
<td>[Florida Division of Emergency Management GIS (direct request only)]</td>
<td>Evacuation Planning</td>
</tr>
<tr>
<td>Railroad</td>
<td>[Florida Geographic Data Library]</td>
<td>Response and recovery supply transportation route; helps to identify private sector responsibilities for maintenance and debris removal</td>
</tr>
<tr>
<td>Rivers</td>
<td>[Florida Geographic Data Library]</td>
<td>Response and recovery supply transportation route; helps to identify essential routes for debris removal</td>
</tr>
</tbody>
</table>

- Link to source
- Relevance to assessment
ArcIMS – Imagery Sample, NOAA Nautical Chart

1. Click and hold down your left mouse button.
2. Drag a box over a location of interest on the map.
3. Release the left mouse button.
Information about hazardous location
ArcIMS – Repetitive Loss Structures
ArcIMS - Hotlinks

Coastal Storms Initiative: Risk and Vulnerability Assessment Tool, Brevard and Volusia Counties, FL (Overview)

NOAA CSC > SWAT Home

NDBC - Station 41009 - Microsoft Internet Explorer

National Data Buoy Center
Center of Excellence in Marine Technology

A new buoy, Station 14027, Junesport, was deployed on May 20, 2003. A new C-MAN station, Station FILA2, Flat Island Light, AK, was placed into service on May 23, 2003. The NDNC 2002 Annual Report is now available.

Station 41009 - CANAVERAL 20 NM East of Cape Canaveral, FL

Owned and maintained by National Data Buoy Center
6-meter NOMAD buoy
VEEP payload
28.50 N 80.18 W (28°30'0"N 80°10'03"W)

Site elevation: sea level
Air temp height: 4 m above site elevation
Anemometer height: 5 m above site elevation
Barometer elevation: sea level
Sea temp: depth 1 m below site elevation
Water depth: 42.0 m

Latest NWS Marine Forecast
Important Notice to Mariners

Observations from Nearby Stations and Ships
ArcIMS – “Hazard Locator”

Address locator tool
Benefits

Local officials, emergency managers, coastal zone managers, and the general public can use the tools to identify potential risks and vulnerabilities to coastal storm impacts.

• The information can be used to make informed decisions to lessen disaster impacts – hazard mitigation.

• Develop effective response & recovery plans – debris management plans, temporary housing plans, etc.

• Use information in real-time to enhance response and recovery activities – target search and rescue efforts, enhanced evacuations, etc.
Florida Pilot Project 4
Ecological Forecasting of Coastal Storm Impacts on Marine Resources

Erica Boyce and Tom Siewicki
NOAA National Ocean Service
Center for Coastal Environmental Health and Biomolecular Research

Coastal Storms Initiative
Project Purposes

- Identify species at risk
- Identify geographic locations at risk
- Focus post-storm ecological assessments
- Assist mitigation planning
- Provide access to available pesticide information
- Promote responsible pesticide use
Project Components

Risk Assessment
- Landuses
- Toxicology
- Database

Modeling
- Transport and Fate
- Volusia and Brevard Counties

Toxicology
- Indigenous Species
- Developmental Model

Fact Sheets

Source: www.sjrwmd.org
Pesticide Database

Crop Information
- Acreage of Each Crop per County
- Pounds of Active Ingredient per Crop Year Applied to Each Crop

Pesticide Information
- Chemistry
- Toxicity
- Allowable Land Cover for Application

Web Accessibility
Transport and Fate Modeling

- Atrazine, Fipronil and Imidacloprid
- PRZM-3 (Pesticide Root Zone Model)
  - EPA Tier 2
  - Groundwater
  - Effects of Rain, Application, Transpiration, etc.
  - Hydrology and Chemical Transport
Transport and Fate Modeling

EXAMS-II (Exposure Analysis Modeling System)

- EPA Tier 2
- Surface Water
- Effects of Sorption, Biodegradation, Photolysis, etc.
- Uses Output of PRZM
- Predicted Concentrations Compared to Aquatic Animal and Human Health Levels of Concern
Atrazine is an herbicide commonly used in the control of broadleaf and grassy weeds in corn, sorghum, rangeland, sugarcane, macadamia orchards, pineapple, and turf grass sod. Atrazine can be used as a non-selective herbicide for vegetation control on non-crop land. Other facts about atrazine are listed below.

- It is the most heavily used pesticide in the United States.
- Atrazine frequently contaminates both surface and ground water.
- It is highly mobile during storms.
- Atrazine resists degradation.
- It disrupts primary productivity and aquatic insects.
- Atrazine has secondary effects on fish and shellfish.

Chemistry of Atrazine

- CAS Number: 1912-24-9
- Chemical Formula: C\text{1}H\text{14}N\text{3}
- Molecular Weight: 215.6851
- Melting Point: 171-174 °C
- Density: 1.187g/cm\text{3} at 20 °C
- Log Kow:
- Koc:

Solubility: In water, 33 ppm at 25 °C

Toxicology of Atrazine

- Half Life:
  - Atrazine is moderately to highly mobile in soils, especially where soils have low clay or organic matter content. Because it does not absorb strongly to soil particles and it has a lengthy soil half-life, it is expected to have a high potential for groundwater contamination, even though it is only moderately soluble in water.

- Data has suggested atrazine is an endocrine disruptor for some amphibians and crustaceans at environmentally possible levels.
Coastal Storms Initiative

Technical Fact Sheet

**District Information**

- Acreage Calculations
- Common products with that pesticide
- Links for more information

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**SJRWMD Information**

The following is some information on how atrazine impacts the St. Johns River Water Management District specifically.

- Atrazine can be used on 925,816 acres (3,747 km²) of land in the SJRWMD.
- Atrazine is used in the SJRWMD on land classes that include golf courses, residential, and row crops (Table 1).
- Areas within the SJRWMD that may be at particular risk from atrazine contamination after a storm are:
  - Town A
  - River B
  - Stream C
- Adverse effects on phytoplankton may be observed at a concentration of more than 1 part per billion. Some species may become more sensitive to atrazine contamination after a prior exposure.

**Atrazine Products**

Atrazine can be found in products like those listed below. The names in parenthesis indicate the manufacturers of the product.

- Aatrex 4L (Syngenta)
- Aatrex None-O (Syngenta)
- Atra 5 (Drexel)
- Atrazine 0.92% 20-0-20 (Lesco)
- Atrazine 4L (UHS, Agrilliance, Helena, UAP, Universal Cooperatives)
- Atrazine 90 DF (Agrilliance)

**Atrazine Links**

This is a list of links that lead to additional information about atrazine or the water management district itself.

- Attrazine Information
  - [www.beyondpesticides.org](http://www.beyondpesticides.org)
  - [www.scorecard.org/chemical-profiles](http://www.scorecard.org/chemical-profiles)
  - [www.spectracompany.com/compsais/cf912249.htm](http://www.spectracompany.com/compsais/cf912249.htm)

- District Information
  - [www.sjrwmd.org](http://www.sjrwmd.org)
Coastal Storms Initiative

Layperson Fact Sheet

- General information about pesticides
- Information about the specific pesticide
- Map of potential application sites
- District Information

PESTICIDE FACT SHEET
ST. JOHNS RIVER

ATRAZINE
What is a Pesticide?

The Environmental Protection Agency defines a pesticide as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. This does not refer just to insect pests but to plants, fungi, microorganisms such as bacteria and viruses as well as mice and other animals. Many household products that people commonly use from flea and tick sprays to kitchen disinfectants to swimming pool chemicals are considered pesticides.

What Kind of Pesticide is Atrazine?

Atrazine is an herbicide commonly used in the control of broadleaf and grassy weeds. Other facts about atrazine are listed below.

- It is the most heavily used pesticide in the United States.
- Atrazine frequently contaminates both surface and ground water.
- It is highly mobile during storms.
- Atrazine takes a long time to break down.
- It disrupts primary productivity and aquatic insects.
- Atrazine has secondary effects on fish and shellfish.

Where is Atrazine Used in the SJRWMD?

- Atrazine can be used on 952,268 acres (3,854 km²) of land in the SJRWMD.
- Atrazine is used in the SJRWMD on land that include golf courses, residential lawns, other turf areas, and corn crops (Figure 1).
- Areas within the SJRWMD that may be at particular risk from atrazine contamination after a storm are:
  - Town A
  - River B
  - Stream C
Layperson Fact Sheet

Why should I care?

- The presence of high levels of atrazine in ground and surface water can lead to the following effects in the surrounding ecosystem.
  - The algae and aquatic insects that are harmed by the atrazine serve as the food for larger organisms such as shellfish and fish. If their food is gone, they too may die.
  - Because I said so?

What can I do to help?

- Only use a product for its intended purpose. Just because it eliminated one pest does not mean it remove another.
- Always use the amount recommended on the label. More does not mean better.
- Manufacturer labels advise users not to apply atrazine to sand and loamy sand soils where the water table (ground water) is close to the surface and where these soils are well-drained. Your local agriculture agencies can provide further information on the type of soil in your area and the location of ground water.
- Atrazine should not be mixed, loaded, or used within 50 feet of wells, including abandoned wells, drainage wells, and sink holes.
- Atrazine may not be applied aerially within 200 feet of natural or impounded lakes and reservoirs.
- Do not use outdoor pesticides near sources of water. Allow for a XX feet between your application and the water.
- Unless instructed to by the label, do not apply the pesticide before a predicted rainstorm. The rain washes the chemicals into nearby creeks and rivers.

Atrazine Products

- Atrazine can be found in products like those listed below. The names in parenthesis indicate the manufacturers of the product.
  - Aatrex 4L (Syngenta)
  - Aatrex Nine-O (Syngenta)
  - Atra-5 (Drexel)
  - Atrazine 0.93% 20-0-20 (Lesco)
  - Atrazine 4L (UHS, Agrilincce, Helena, UAP, Universal Cooperatives)
  - Atrazine 90 DF (Agrilincce)
  - Atrazine 90 (Universal Cooperatives)
  - Atrazine 90 WDG Southern Turf (UHS)
  - Atrazine 90DF (Drexel)

Atrazine Links

- This is a list links that lead to additional information about atrazine or the water management district itself.
  - Pesticide Information
    - www.epa.gov/pesticides/about/
  - Atrazine Information
    - www.beyondpesticides.org
    - www.scorecard.org/chemical-profiles
    - www.speclab.com/compound/c1912249.htm
  - District Information
    - www.sjrwmd.org
Project Progress

Risk Assessment and Toxicology
° Bulk of data collection completed Fall 2002
° Online database construction began Spring 2003
° Acute toxicity tests are ongoing

Modeling
° Preliminary results achieved Spring 2003
° Further development is currently ongoing

Fact Sheets
° Preliminary template created Winter 2003
° Feedback evaluation is currently ongoing

Total Project
° Proposed date of completion is Summer 2004
Second Pilot Region
Pacific Northwest
and Beyond

Keelin Kuipers
NOAA Office of Ocean & Coastal Resource Management /
Coastal Services Center

Coastal Storms Initiative
Coastal Storms Initiative

Next Steps

• Pacific Northwest pilot underway
• Southern California pilot anticipated in FY05
• Expansion within pilot regions planned
Pacific Northwest Pilot

NOTE 3
NATIONAL MARINE SANCTUARIES
National Marine Sanctuaries are protected areas,administered
which contain abundant and diverse natural resources such
mammals, seabirds, fishes, and tidepool invertebrates. They
are particularly sensitive to environmental damages such as oil
and hazardous materials, discharges, and groundings. Exercise
and follow applicable Sanctuary regulations when transiting to
avoid environmental impacts. A full description of Sanctuary
requirements can be found in 15 CFR Part 922 and in the Coast Pilot.
Coastal Storms in the PNW

- Navigation Safety
- Coastal Erosion
- Flooding
- Aquaculture
- Salmon & Watersheds
Pacific Northwest Pilot Issues

Navigation Safety

- Port of Portland and 14 small ports in the pilot area
- Fishing and commercial shipping important
- Accurate storm forecasting needed
- Treacherous bar conditions a hazard

Coastal Storms Initiative
Coastal Erosion

- Coastal storms a major factor
- Erosion hotspots
- El Nino impact
- Storm wave height is increasing
Can be a major storm issue
Impacts to lives, property, & businesses
Tillamook County, Oregon particularly vulnerable
Pacific Northwest Pilot Issues

Aquaculture

- Major industry in Washington and Oregon
- Stormwater runoff impacts
- Wind, wave & sediment impacts
Storms a double-edged sword

Storms critical for recharging coastal rivers, but...

runoff, sediment and contaminant impacts can harm salmon
Status of Pacific Northwest Pilot

- Currently working closely with federal, state and local partners
- Fall Roundtable Meeting - October 2003
- Pilot will be fully implemented in FY 2004
Pacific Northwest Partners

- National Oceanic and Atmospheric Administration
- Oregon Sea Grant
- Washington Sea Grant
- Oregon Coastal Management Program
- Washington Coastal Management Program
- Currently identifying other partners
Next Steps...

Southern California Pilot
- Early planning in FY 2004
- Implementation anticipated in FY 2005

Regional Expansion
- Exploring opportunities to expand within pilot regions
For more information on the Coastal Storms Initiative and for contact information check your packet.

You may also visit our web site at www.csc.noaa.gov/csi
The NOAA Coastal Storms Initiative

Sheltering Communities from Coastal Storms