

NOAA Coastal Storms Initiative

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**NOAA National Ocean Service
Coastal Services Center**



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



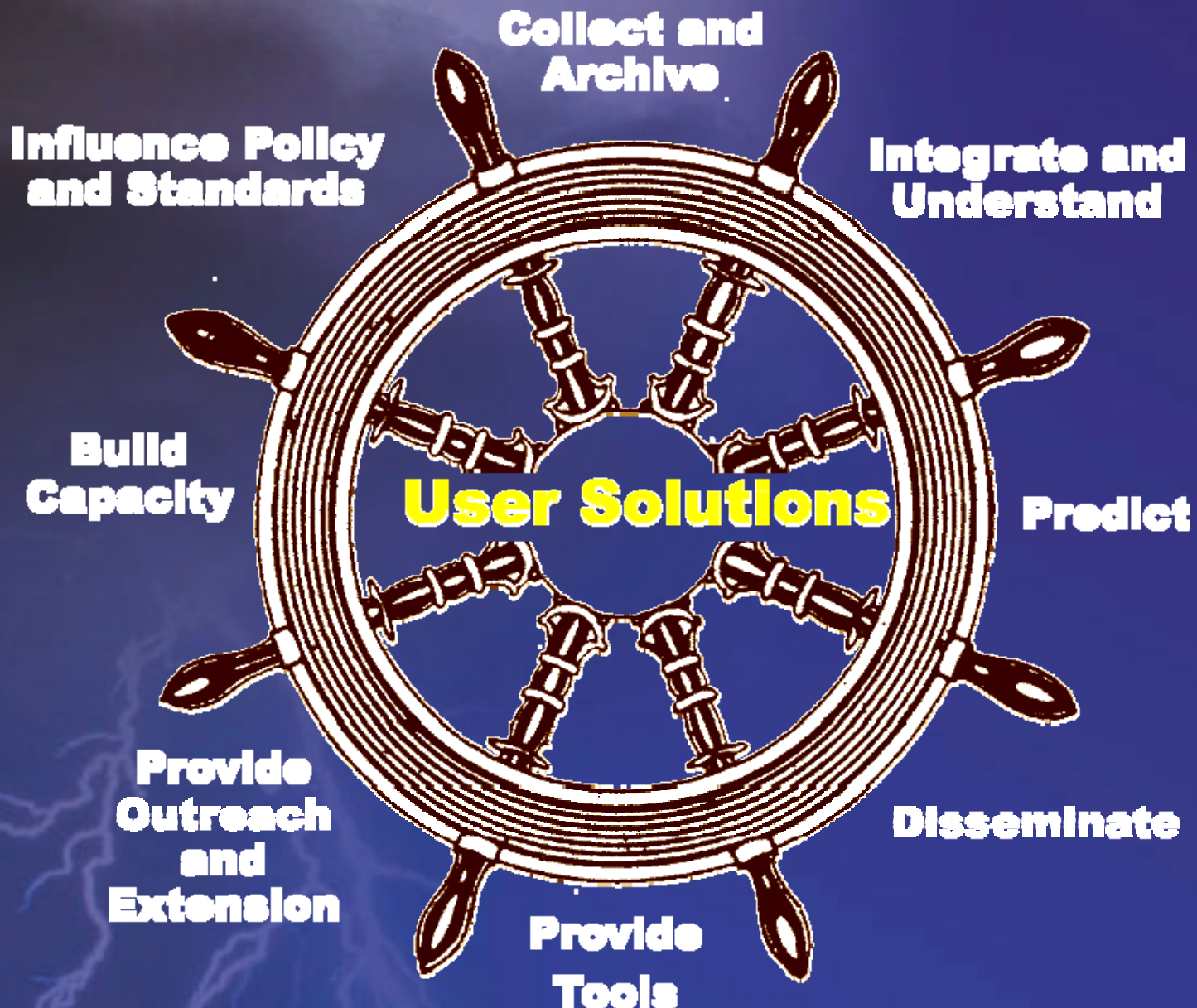
Primary Goals

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





The Sum is Greater than the Parts.



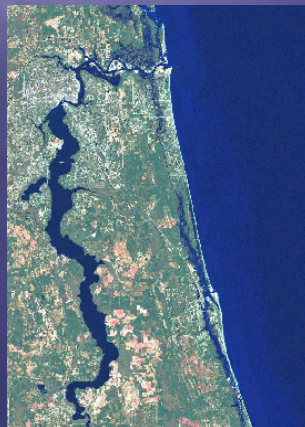
Coastal Storms Initiative



Coastal Storms Initiative

3 Pilot Regions

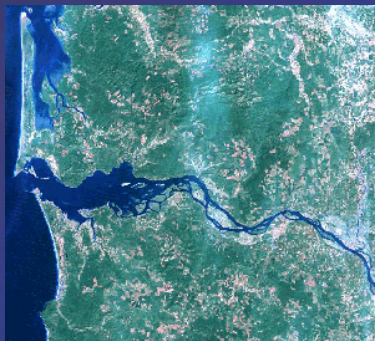
1) St. Johns River, FL
(Jacksonville)



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





Florida Pilot Projects

Shallow Water Bathymetry St. Johns River

Ensures navigation safety by

- updating critical chart areas
- providing emergency response information

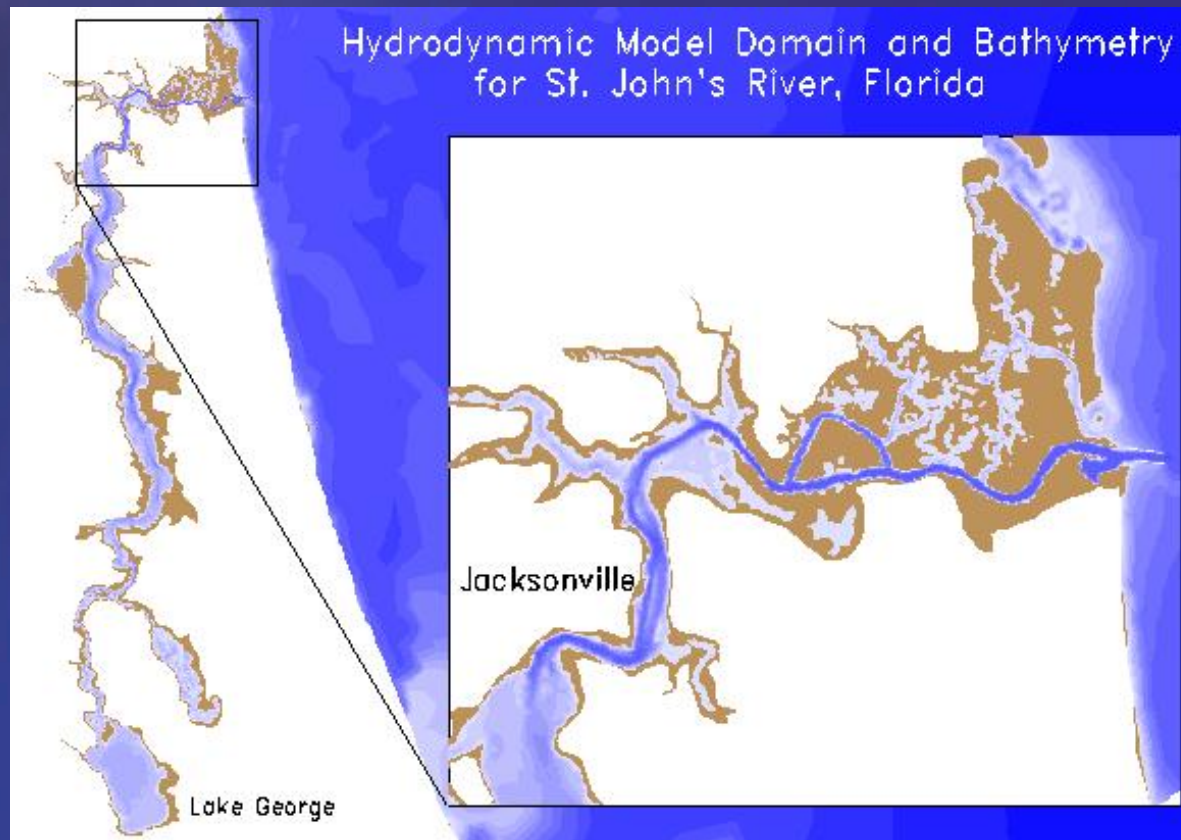




Florida Pilot Projects St. Johns River Circulation Model

Promoting public safety by

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



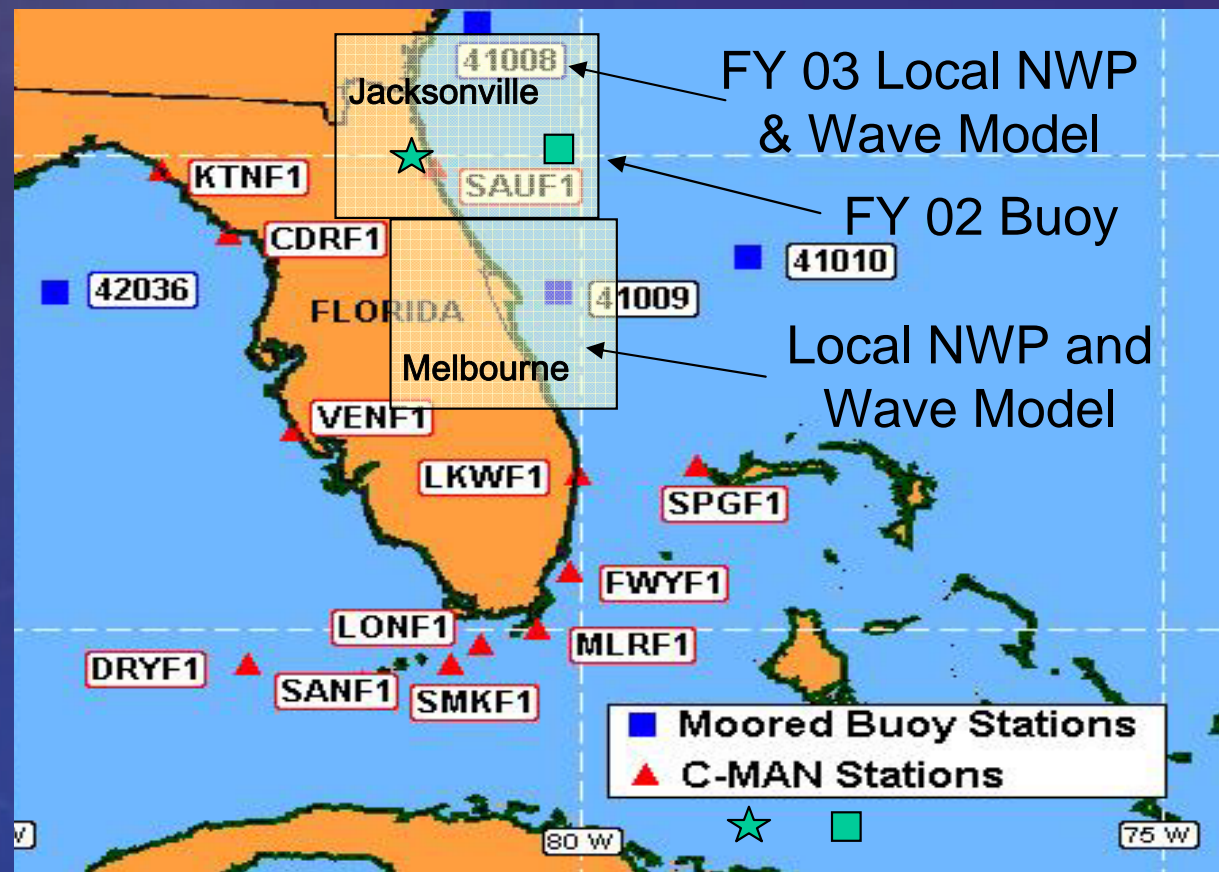


Florida Pilot Projects

Improved Ocean and Observations

Provides user-friendly observations by

- updating existing networks
- standardizing sensors and systems



Coastal Storms Initiative



Florida Pilot Projects

Ecological Forecasting

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

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**



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Florida Pilot Projects

Risk and Vulnerability Assessment Tool

Advancing hazard planning by

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



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

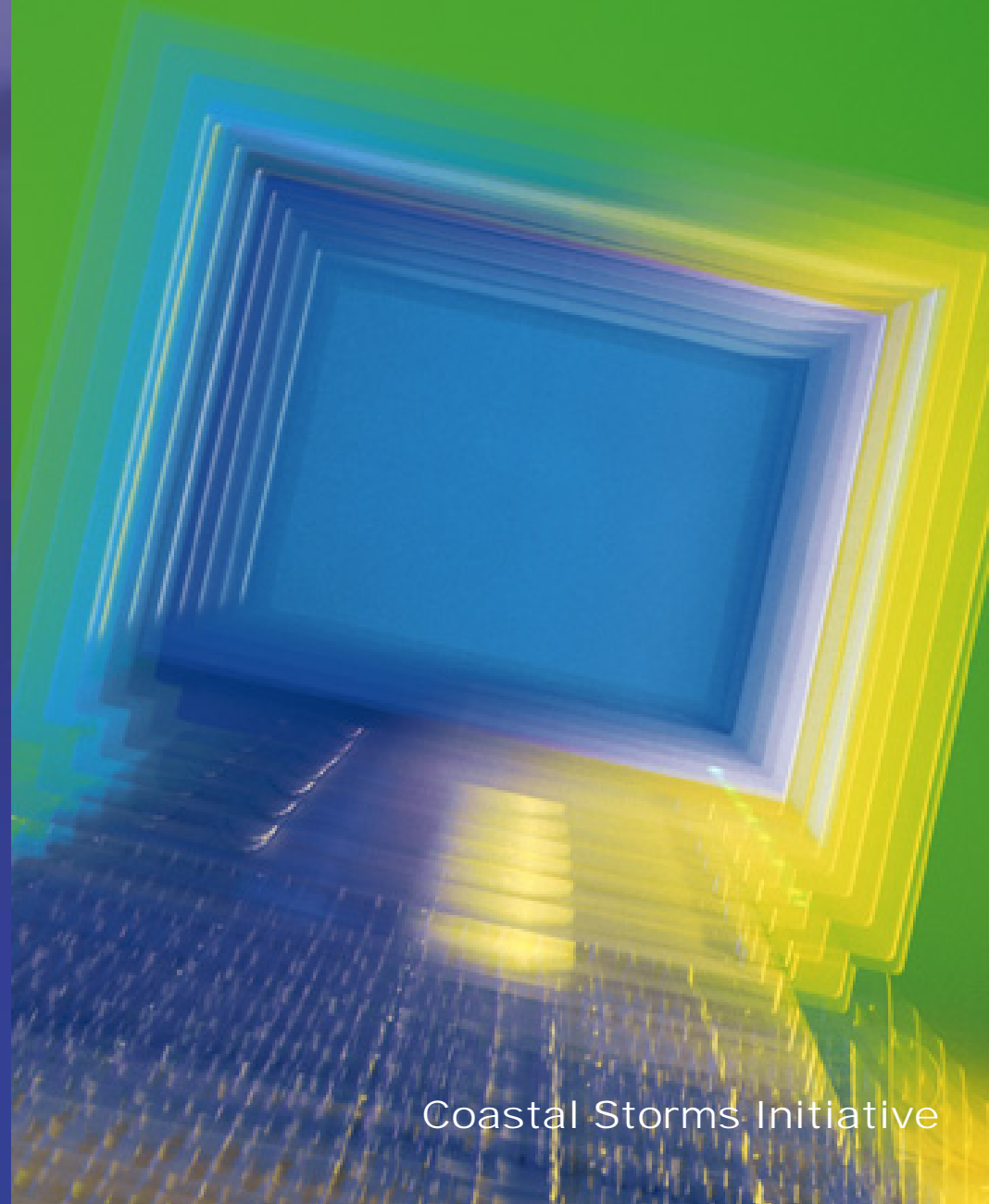


Florida Pilot Projects

Data Access and Standards

Ensuring data
reliability by

- **collecting coastal data**
- **converting data into user-friendly formats**



Coastal Storms Initiative



Data Access and Standards

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

Coastal Storms Initiative



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

Coastal Storms Initiative

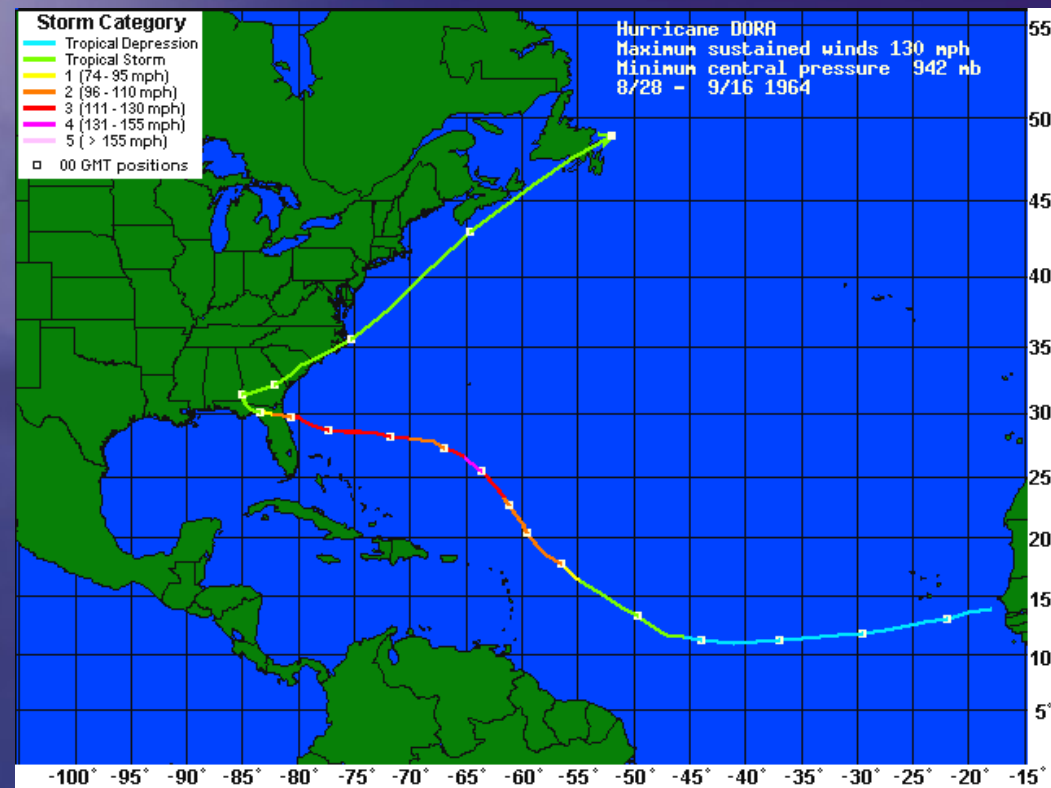


- ✓ New Experimental River Forecast System
 - ✓ Improved Flood Warnings
 - ✓ Improved Weather Prediction
 - ✓ New Wave Forecasts for the Coasts



Why Mitigate Impacts of Coastal Storms

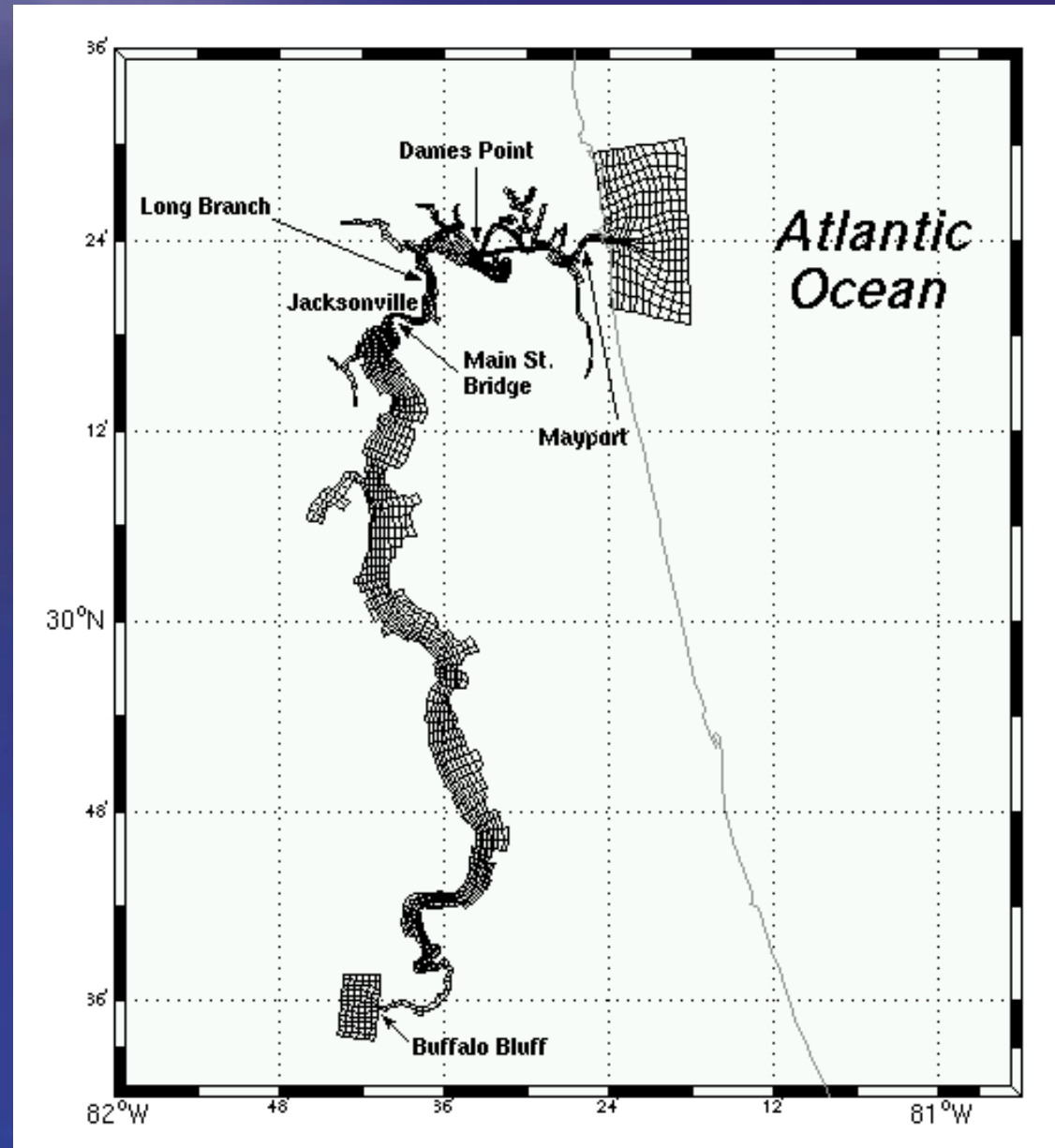
- Flooding due to Storm Surge
- Wave Action on the Coast
- Adverse Weather
 - Wind
 - Precipitation
 - Thunderstorms
 - Marine Visibility
- Navigation Hazards
 - Water Levels and Under Keel Clearance
 - Currents for HAZMAT, Search and Rescue, Homeland Security
- Resource Management





St. Johns River Circulation Model: Nowcast/Forecast System

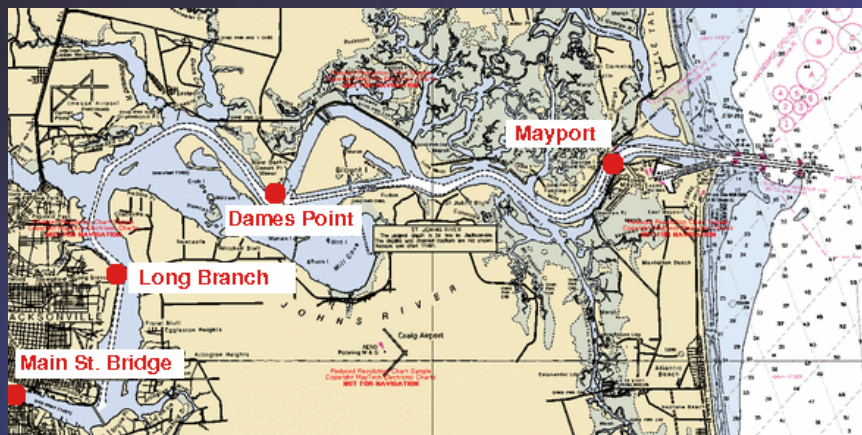
- EFDC (Environmental Fluid Dynamics Code) application developed by the St. Johns River Water Management District.
- NOS implemented a real-time experimental version:
 - hourly nowcasts
 - 36-hour forecasts four times a day
- Webpage with water levels, currents, salinity and temperature from both model and data.



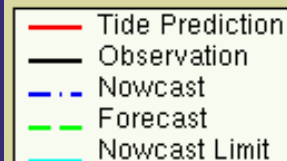


Real-Time Water Levels

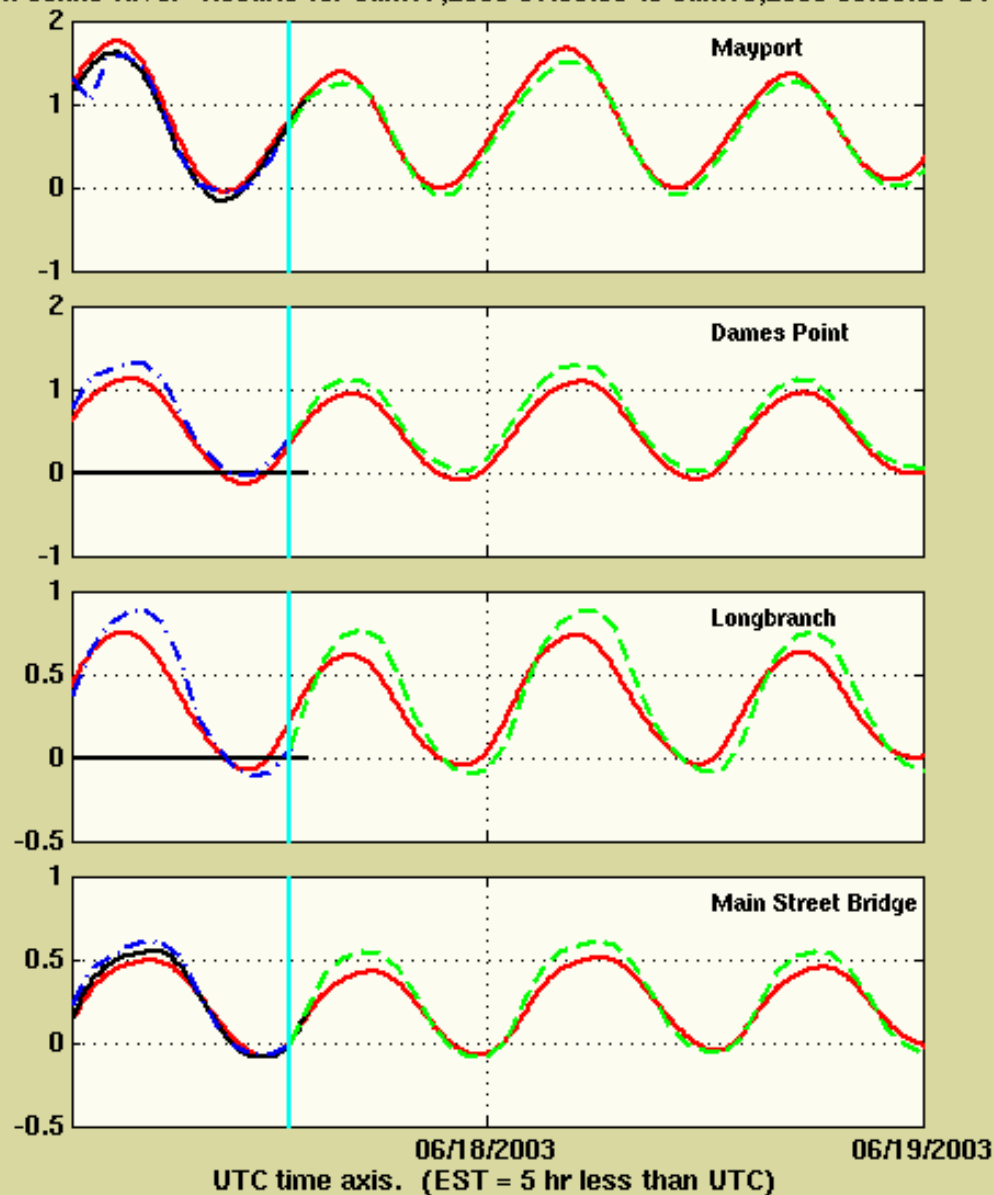
- For the nowcasts, the model uses water levels from Mayport as an open ocean boundary condition.



- For the forecasts, tide predictions from Mayport are added to forecasts of nontidal water levels made by NWS' Extratropical Storm Surge model.



St. Johns River Results for Jun.17,2003 01:00:00 to Jun.19,2003 00:00:00 UTC

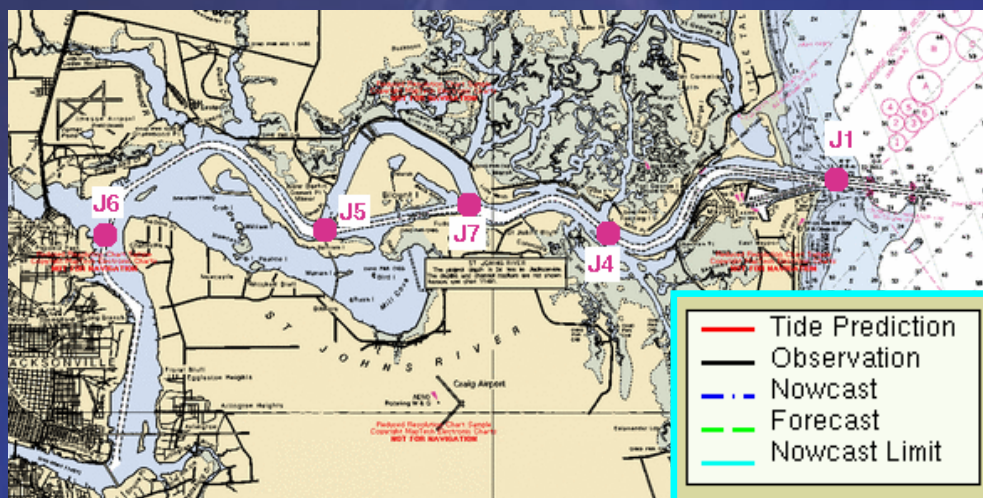




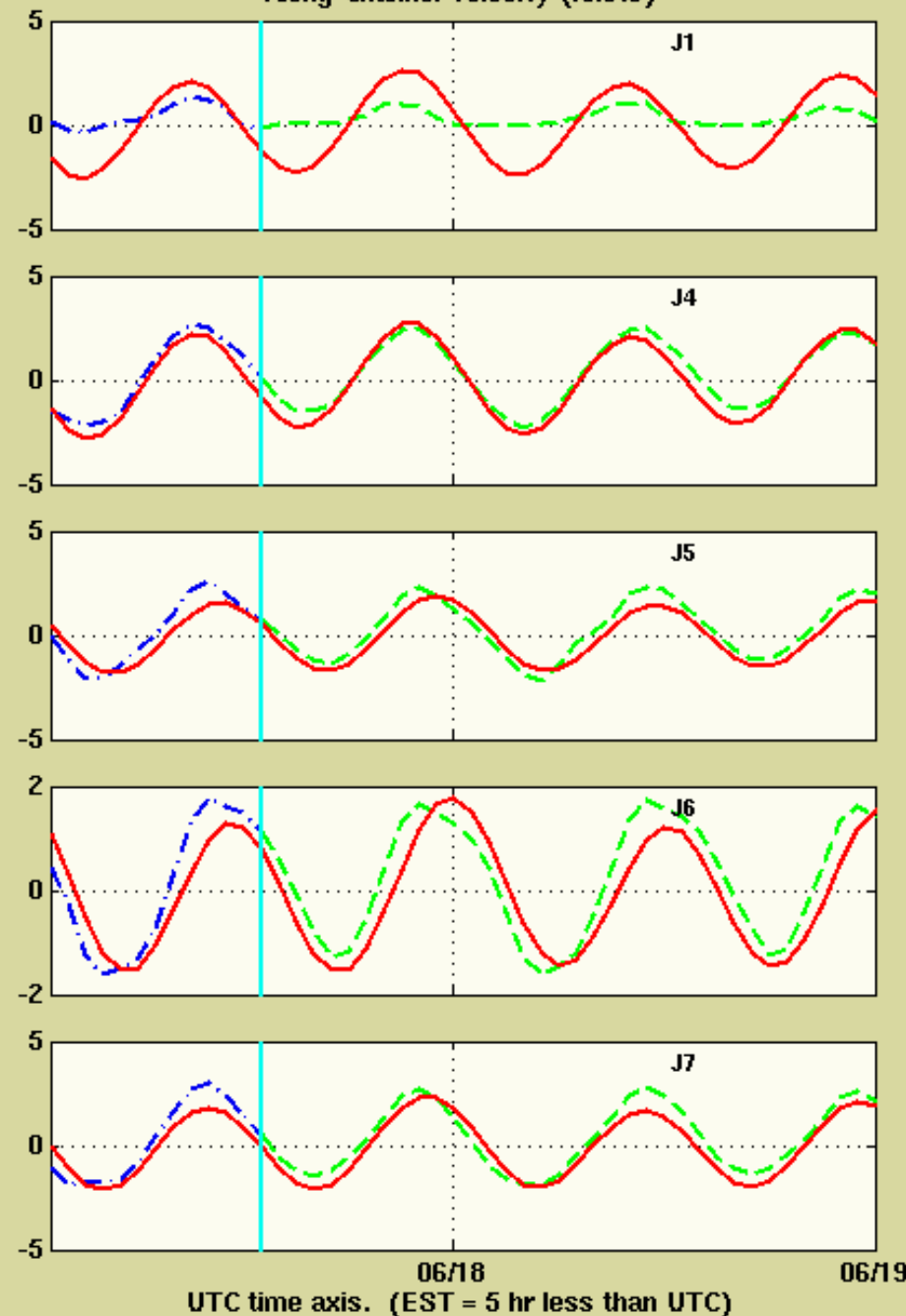
Real-Time Currents

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

New current measurements will enable updated model evaluations and comparisons.



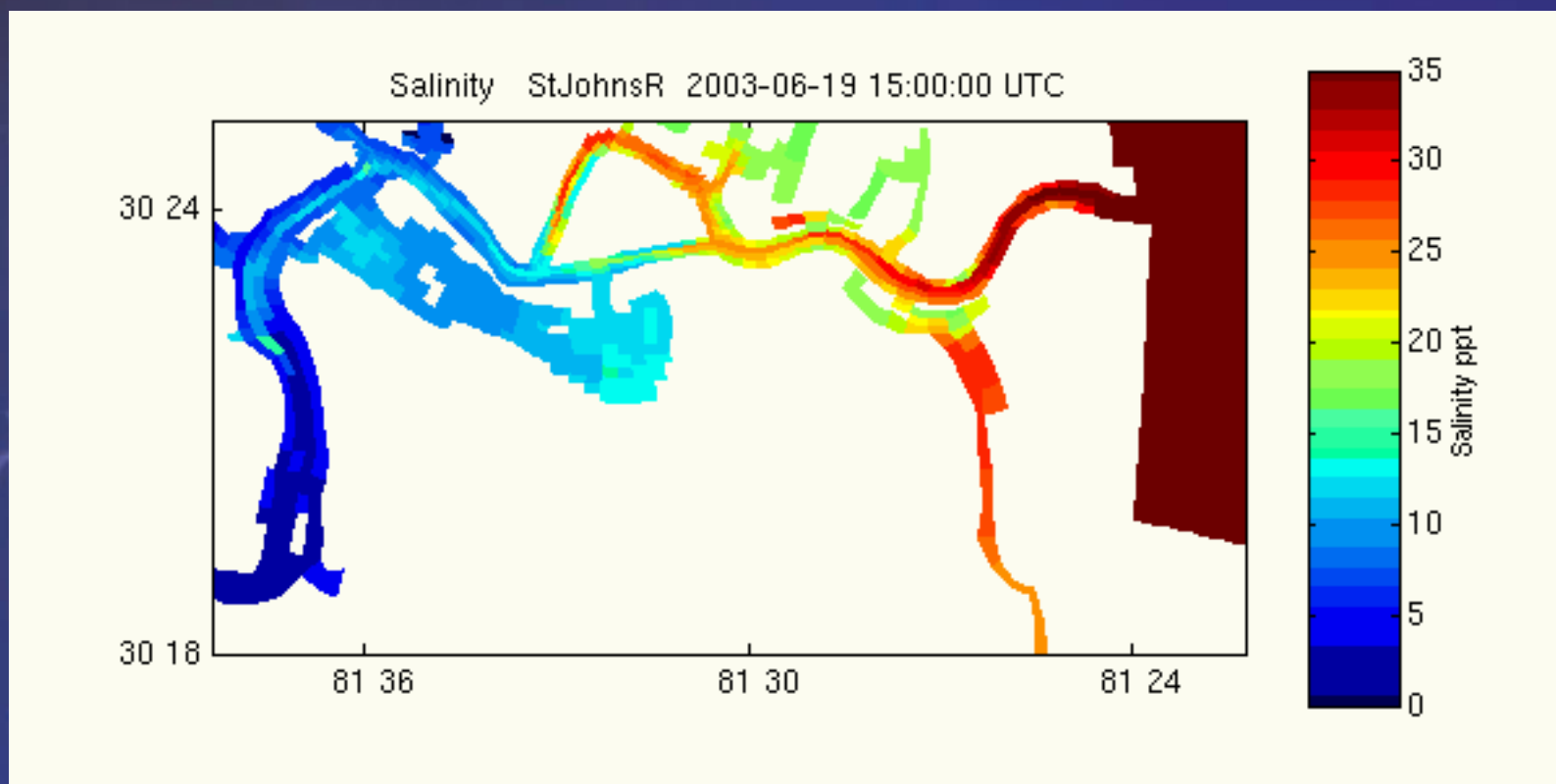
St. Johns River Results for Jun.17,2003 01:00:00 to Jun.19,2003 00:00:00 UTC





Real-Time Salinity

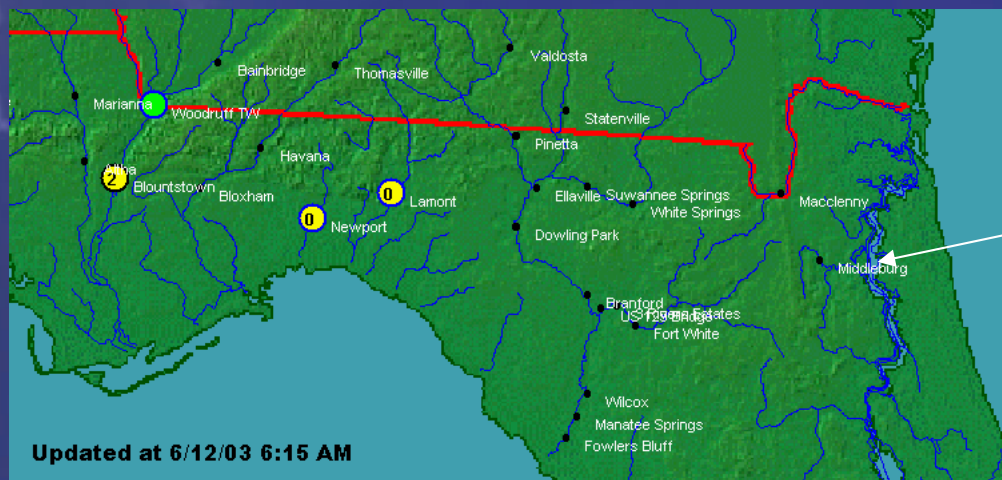
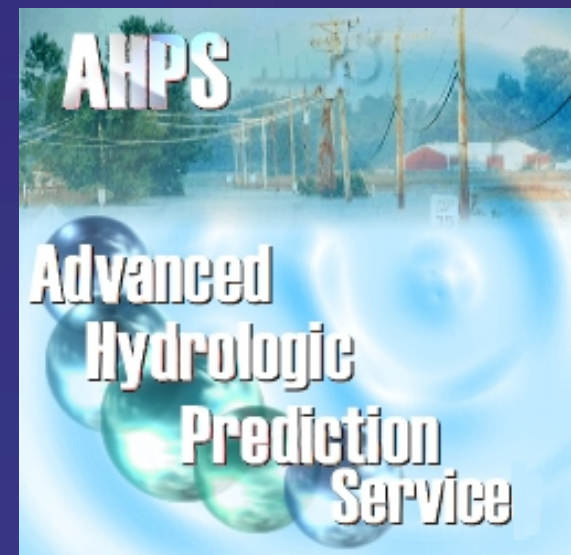
- Salinity is imposed along the ocean boundary as a 35-36 PSU profile.
- At the upstream boundary, salinity (< 1 PSU) is imposed with data from a real-time USGS gauge. Tributary freshwater input from an additional five USGS gauges are also input to the model.
- NOS and FDEP are upgrading instruments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

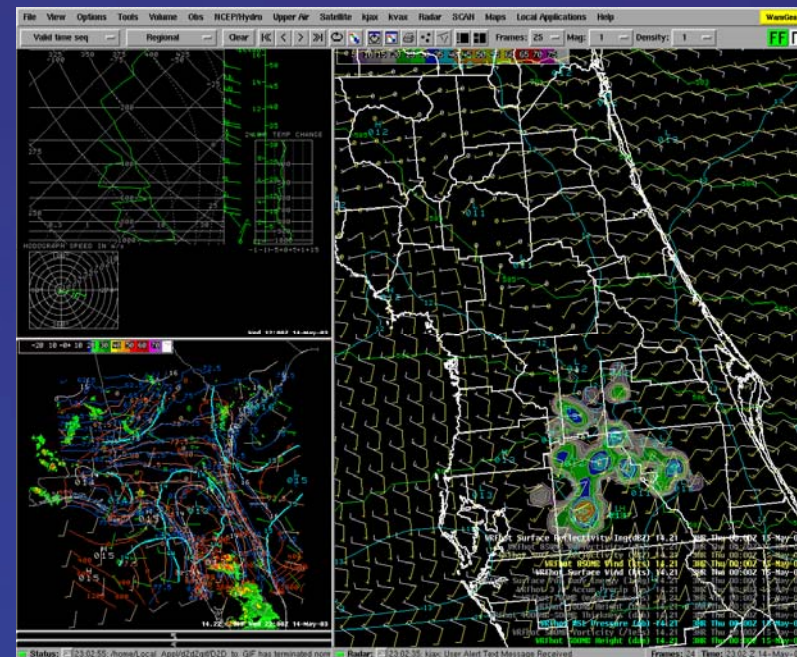


Currently no river
forecast points



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

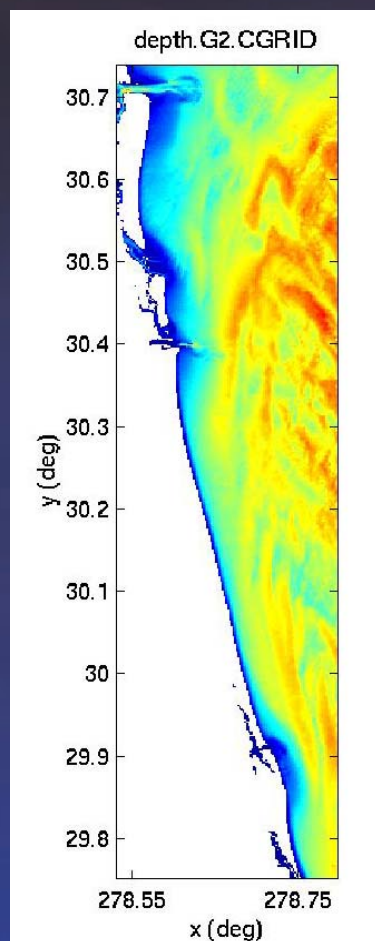




Wave Forecasting

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)**

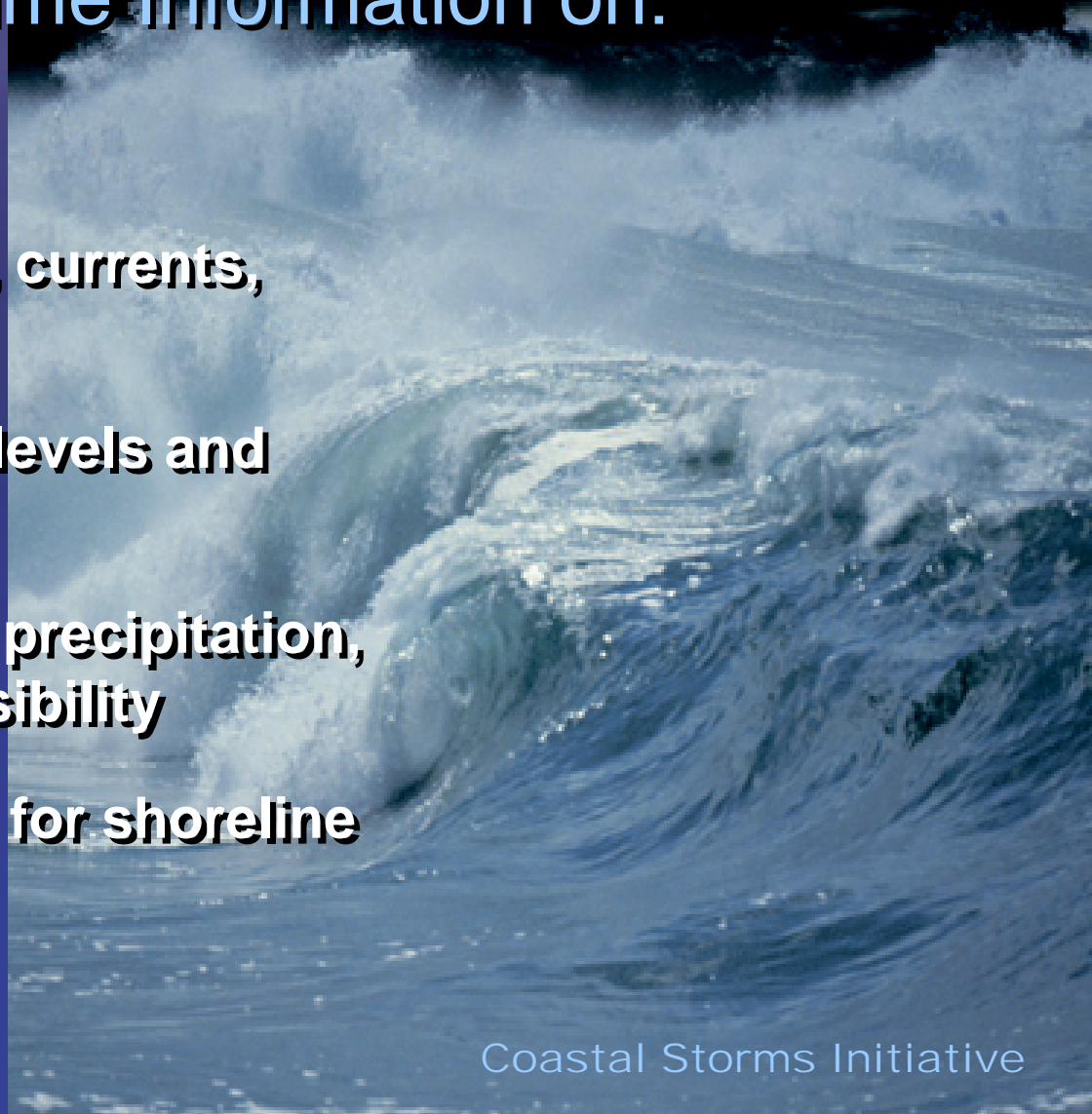




Real-Time Prediction of River and Marine Conditions

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

Coastal Storms Initiative



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




Web site – Homepage

Assessing the Risk and Vulnerability of Brevard and Volusia Counties, Florida to Coastal Storms - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print Mail

Address <I:\ID\4tashya\hazards\csi\website\index.html> Go

**NOAA Coastal Services Center**
LINKING PEOPLE, INFORMATION, AND TECHNOLOGY

Site Search: Go

Risk and Vulnerability Assessment Tool (RVAT)

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

Center Home
[On-line Mapping](#)

RVAT Home

Risk & Vulnerability Assessment
[Overview](#)
[Identifying Hazards](#)
[Critical Facilities](#)
[Societal](#)
[Economic](#)
[Environmental](#)

Interactive Mapping
[Risk & Vulnerability](#)
[Parcel Analyzer](#)
[Community Ratings](#)
[Hazards Locator Tool](#)

Mitigation
[Mitigation Opportunities](#)
[Community Rating Overview](#)


Storm Surge Visualization

Resources
[Glossary](#)
[Links](#)
[Data Dictionary](#)
[Disclaimer](#)

Mapping Hazards and Identifying Vulnerability

Use the Interactive Mapping to:

- 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



The map displays a coastal area with yellow and orange shaded regions indicating different levels of hazard vulnerability. A red location pin is visible on the map.

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?

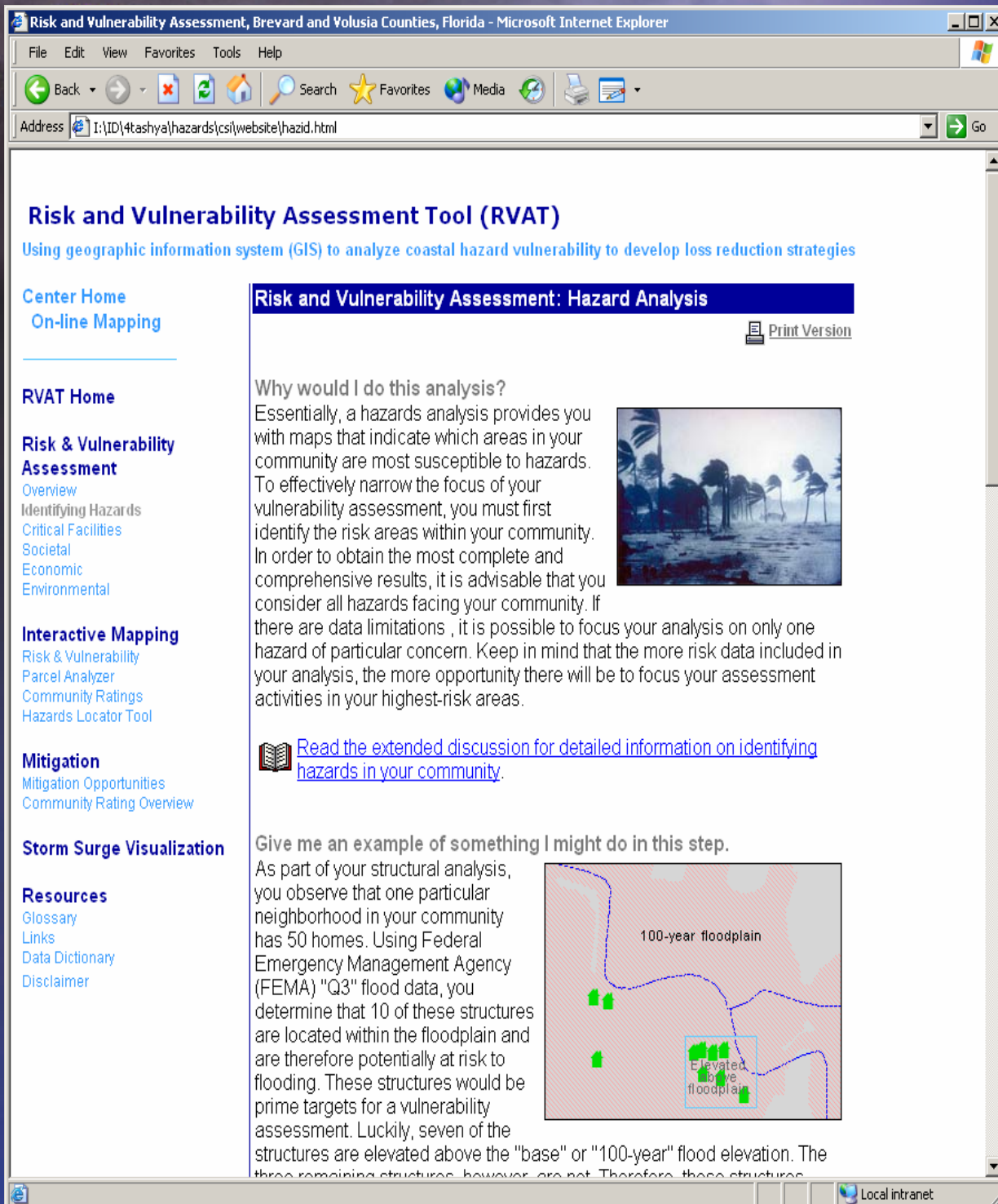
Find out how [Community Rating System activities](#) can reduce flood risk and increase flood protection.

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.

Local intranet



Web site – Assessment Discussions

- Brief overview
- Expanded discussion, including methodology



Web site – Data Dictionary

- Link to source
- Relevance to assessment

Risk and Vulnerability Assessment, Brevard and Volusia Counties, Florida - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print

Address <I:\ID\4tashya\hazards\csi\website\data.html> Go

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

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[Mitigation Opportunities](#)
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Storm Surge Visualization

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[Data Dictionary](#)
[Disclaimer](#)

Data Dictionary

[Print Version](#)

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 relevancy of the data to a risk and vulnerability assessment.

| County | | Economic | Environmental | Hazard Analysis | Societal |
Critical Facilities | Mitigation | CRS | Base Layers |

Data Name	URL or Contact Information	Relevance to Vulnerability Assessment
County Overview		
Beach Access Point	Volusia County Government GIS	Useful for assessing minimal requirements for federal beach nourishment activities; useful for post-storm damage assessment
Evacuation Route	Florida Division of Emergency Management GIS (direct request only)	Evacuation Planning
Evacuation Zones	Florida Division of Emergency Management GIS (direct request only)	Evacuation Planning
Railroad	Florida Geographic Data Library	Response and recovery supply transportation route; helps to identify private sector responsibilities for maintenance and debris removal
Rivers	Florida Geographic Data Library	Response and recovery supply transportation route
	Brevard County Property Appraiser's Office Data (contact directly)	Response and recovery supply transportation route; helps to identify essential routes for debris removal

Local intranet



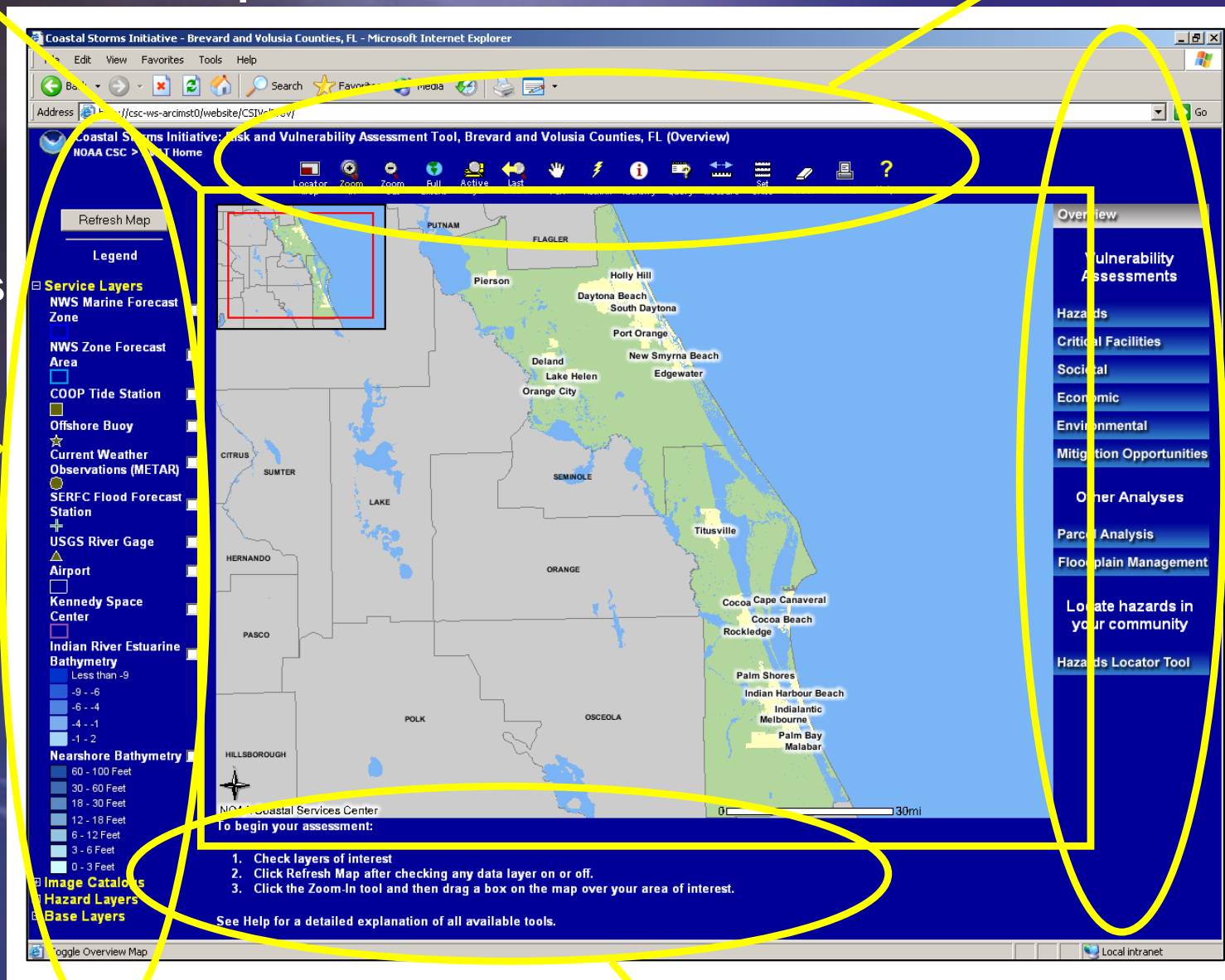
ArcIMS - Overview

Interactive Map

Interactive Tools

Data Layers

Mapping Services



Instructions



ArcIMS – Imagery Sample, 1m 1999-2000 DOQQs

Coastal Storms Initiative - Brevard and Volusia Counties, FL - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://csc-ws-arcimst0/website/CSIVolBrev/>

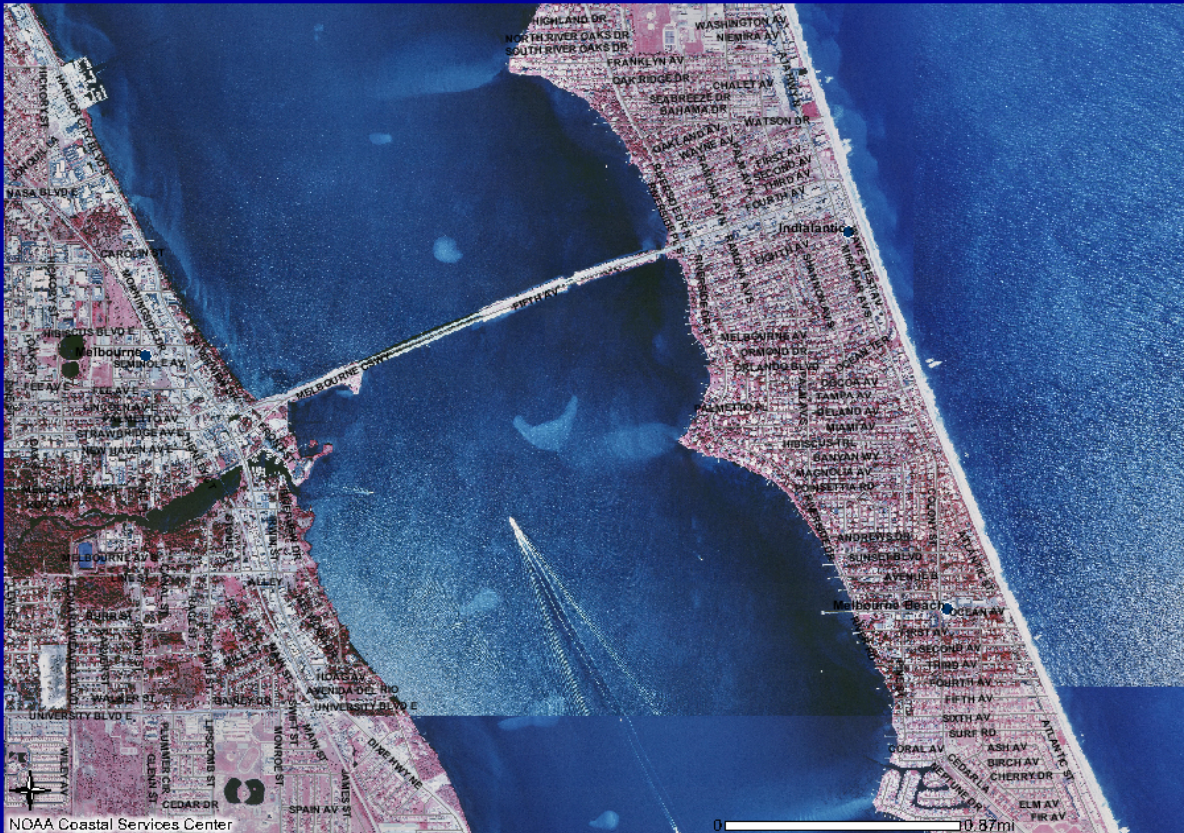
Coastal Storms Initiative: Risk and Vulnerability Assessment Tool, Brevard and Volusia Counties, FL (Overview)
NOAA CSC > RVAT Home

Locator Map Zoom In Zoom Out Full Extent Active Layer Last Extent Pan Hotlink Identify Query Measure Units Clear Print Help

Refresh Map

Legend

- Service Layers
- Image Catalogs
 - Southern Volusia Images
 - Northern Volusia Images
 - Southern Brevard Images
 - Northern Brevard Images
 - Nautical Chart North
 - Nautical Chart Central
 - Nautical Chart South
 - Volusia Digital Raster Graphic
 - Brevard Digital Raster Graphic
- Hazard Layers
- Base Layers



NOAA Coastal Services Center
This tool allows you to re-center the current map.

1. Click and hold down your left mouse button.
2. Drag the image in the direction you want to go.
3. Release the left mouse button when finished to view the newly re-centered location.

Map: 733402.66 , 456462.15 -- Image: 207 , 432 -- ScaleFactor: 7.793262361519088

Local intranet

Overview

- Vulnerability Assessments
 - Hazards
 - Critical Facilities
 - Societal
 - Economic
 - Environmental
 - Mitigation Opportunities
- Other Analyses
 - Parcel Analysis
 - Floodplain Management
- Locate hazards in your community
- Hazards Locator Tool



ArcIMS – Imagery Sample, NOAA Nautical Chart

Coastal Storms Initiative - Brevard and Volusia Counties, FL - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media Print

Address http://csc-ws-arcimst0/website/CSIVolBrev/ Go

Coastal Storms Initiative: Risk and Vulnerability Assessment Tool, Brevard and Volusia Counties, FL (Overview)
NOAA CSC > RVAT Home

Locator Map Zoom In Zoom Out Full Extent Active Layer Last Extent Pan Hotlink Identify Query Measure Set Units Clear Print Help

Refresh Map

Legend

- Service Layers
- Image Catalogs
 - Nautical Chart North
 - Nautical Chart Central
 - Nautical Chart South
 - Volusia Digital Raster Graphic
 - Brevard Digital Raster Graphic
- Hazard Layers
- Base Layers

NOAA Coastal Services Center
This tool allows you to view a larger area in less detail.

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.

Map: 732857.14 , 460880.93 -- Image: 188 , 72 -- ScaleFactor: 15.586524723039085

Local intranet

Overview

Vulnerability Assessments

- Hazards
- Critical Facilities
- Societal
- Economic
- Environmental
- Mitigation Opportunities

Other Analyses

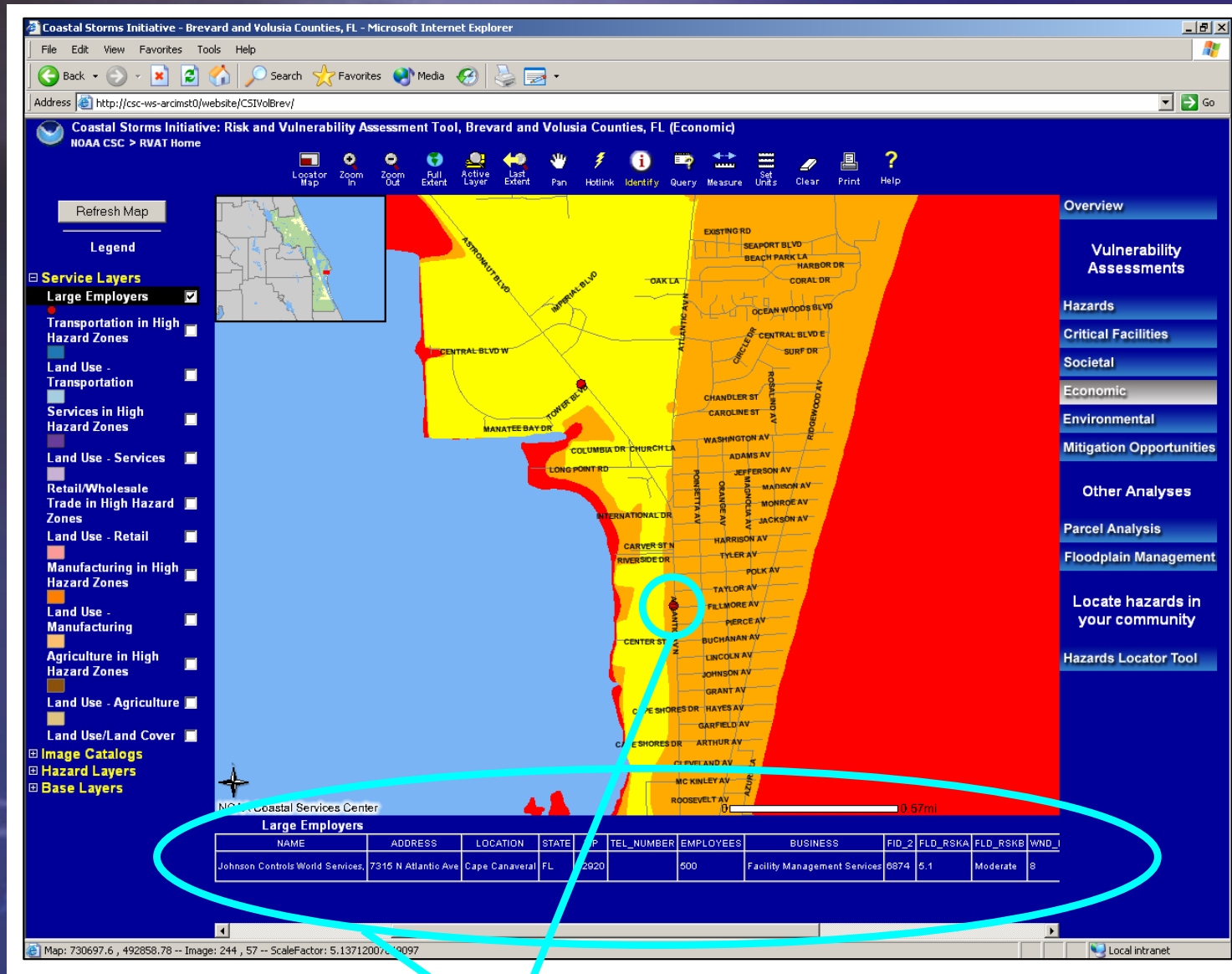
- Parcel Analysis
- Floodplain Management

Locate hazards in your community

Hazards Locator Tool



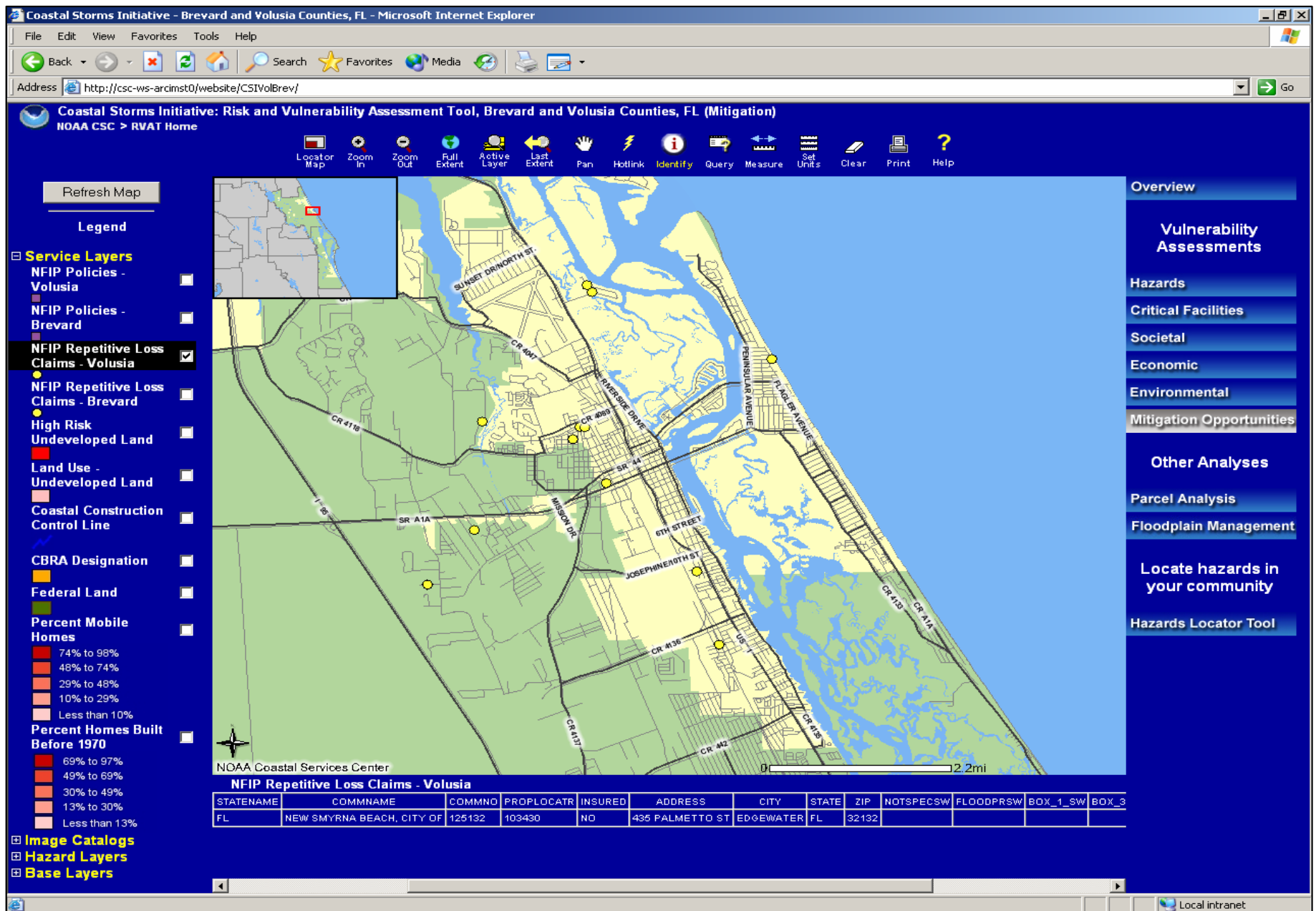
ArcIMS – Economic Vulnerability Assessment



Information about hazardous location



ArcIMS – Repetitive Loss Structures





ArcIMS - Hotlinks

Coastal Storms Initiative - Brevard and Volusia Counties, FL - Microsoft Internet Explorer

Address: <http://csc-ws-arcimst01/website/CSIVolBrev/>

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

NOAA CSC > RVAT Home

Locator Map, Zoom In, Zoom Out, Full Extent, Active Layer, Last Extent, **Hotlink**, Identify, Query, Measure, Set Units, Clear, Print, Help

Refresh Map

Legend

- Service Layers
 - NWS Marine Forecast Zone
 - NWS Zone Forecast Area
 - COOP Tide Station
 - Offshore Buoy ☒
 - Current Weather Observations (METAR)
 - SERFC Flood Forecast Station
 - USGS River Gage
 - Airport
 - Kennedy Space Center
 - Indian River Estuarine Bathymetry
 - Less than -9
 - 9 - -6
 - 6 - -4
 - 4 - -1
 - 1 - 2
 - Nearshore Bathymetry ☒
 - 60 - 100 Feet
 - 30 - 60 Feet
 - 18 - 30 Feet
 - 12 - 18 Feet
 - 6 - 12 Feet
 - 3 - 6 Feet
 - 0 - 3 Feet
 - Image Catalogs
 - Hazard Layers
 - Base Layers

Zoom to Active Layer

NDBC - Station 41009 - Microsoft Internet Explorer

National Data Buoy Center
Center of Excellence in Marine Technology

Home FAQ Links What's New? Contact Us Search Go

A new buoy, [Station 44027](#), Jonesport, was deployed on May 20, 2003.
A new C-MAN station, [Station FLA2](#), Flat Island Light, AK, was placed into service on May 23, 2003.
The [NDBC 2002 Annual Report](#) is now available.

Station ID Search Go

Station List

Observations

- Recent
- Historical
- Obs Search
- NOAA Obs
- APEX
- CSI
- DART

Station Status

- Maintenance
- Platform Status

Ship Observations

- VOS Program
- Ship Obs Report

About NDBC

Dial-A-Buoy

Publications

- Annual Report

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°30'01"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

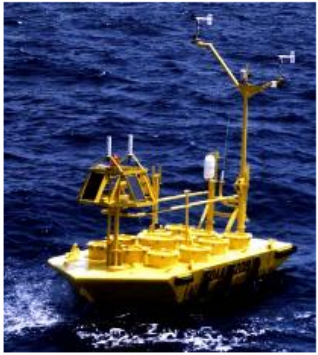
Water depth: 42.0 m

Watch circle radius: 164 yards

[Latest NWS Marine Forecast](#)

[Important Notice to Mariners](#)

[Observations from Nearby Stations and Ships](#)





ArcIMS – “Hazard Locator”

Address
locator tool

Coastal Storms Initiative - Brevard and Volusia Counties, FL - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://csc-ws-arcims01/website/CSIVolBrev/>

Hazards Locator: Risk and Vulnerability Assessment Tool, Brevard and Volusia Counties, FL
NOAA CSC > RVAT Home

Locator Map Zoom In Zoom Out Full Extent List Extent Hazards Address Print Help

Potential Risk Level

Storm Surge Moderate

Flood Moderate

Wind High

Erosion None

Check for Immediate Threats
Enter a ZIP Code OR a
ZIP Code

City, St. Go

About Hazards

Overview

Vulnerability

Hazard Analysis - Microsoft Internet Explorer

More Information

Storm Surge

Flooding

Wind

Erosion

Watch, Warning, What's the Difference?

Storm Surge

| [Storm Surge Main](#) | [Safety Actions](#) | [Saffir-Simpson Hurricane Scale](#)

Storm surge is simply water that is pushed toward the shore by the force of the winds swirling around a storm. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level 15 feet or more. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides. Because much of the United States' densely populated Atlantic and Gulf Coast coastlines lie less than 10 feet above mean sea level, the danger from storm tides is tremendous.

The level of surge in a particular area is also determined by the slope of the continental shelf. A shallow slope off the coast will allow a greater surge to inundate coastal communities. Communities with a steeper continental shelf will not see as much surge inundation, although large breaking waves can still pose a significant threat. Storm tides, waves, and currents in confined harbors can severely damage ships, marinas, and pleasure boats.

One tool used to evaluate the threat from storm surge is the SLOSH model. Emergency managers use this data from SLOSH to determine which areas must be evacuated for storm surge. Storm surge also affects rivers and inland lakes, potentially increasing the area that must be evacuated.

In general, the more intense the storm, and the closer a community is to the right-front quadrant, the larger the area that must be evacuated. The problem is always the uncertainty about how intense the storm will be when it finally makes landfall. Emergency managers and local officials balance that uncertainty with the human and economic risks to their community. This is why a rule of thumb for emergency managers is to plan for a storm one category higher than what is forecast. This is a reasonable precaution to help minimize the loss of life from hurricanes.

Wave and current action associated with the tide also causes extensive damage. Water weighs approximately 1,700 pounds per cubic yard; extended pounding by frequent waves can demolish any structure not specifically designed to withstand such forces.

The currents created by the tide combine with the action of the waves to severely erode beaches and coastal highways. Many buildings withstand hurricane force winds until their foundations, undermined by erosion, are weakened and fail.

Map: 730397.09, 465339.76 Image: 196, 320 -- ScaleFactor: 4.871187575409619

Local intranet



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



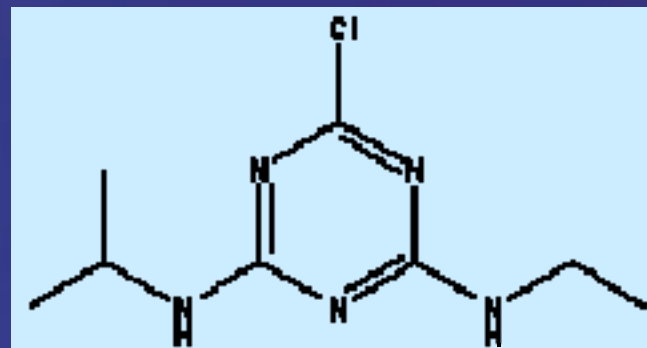
Pesticide Database

Crop Information

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

Pesticide Information

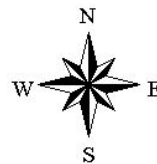
- Chemistry
- Toxicity
- Allowable Land Cover for Application



Web Accessibility

St Johns River Watershed Land Uses

- △ SJRWMD Boundary
- St Johns River
- Land Classifications**
- Abandoned Tree Crops
- Aquaculture
- Cattle Feeding Operations
- Cemeteries
- Citrus Groves
- Dairies
- Fallow Cropland
- Feeding Operations
- Field Crops
- Floriculture
- Golf Course
- Hammonck Ferns
- Horse Farms
- Improved Pastures
- Mixed Crops
- Nurseries and Vineyards
- Ornamentals
- Other Open Lands - Rural
- Parks and Zoos
- Potatoes and Cabbage
- Poultry Feeding Operations
- Recreational
- Residential High Density
- Residential Low Density
- Residential Medium Density
- Row Crops
- Shade Ferns
- Specialty Farms
- Stadiums not assoc. with schools
- Tree Crops
- Tree Nurseries
- Tree Plantations
- Unimproved Pastures



0 20 40 Miles

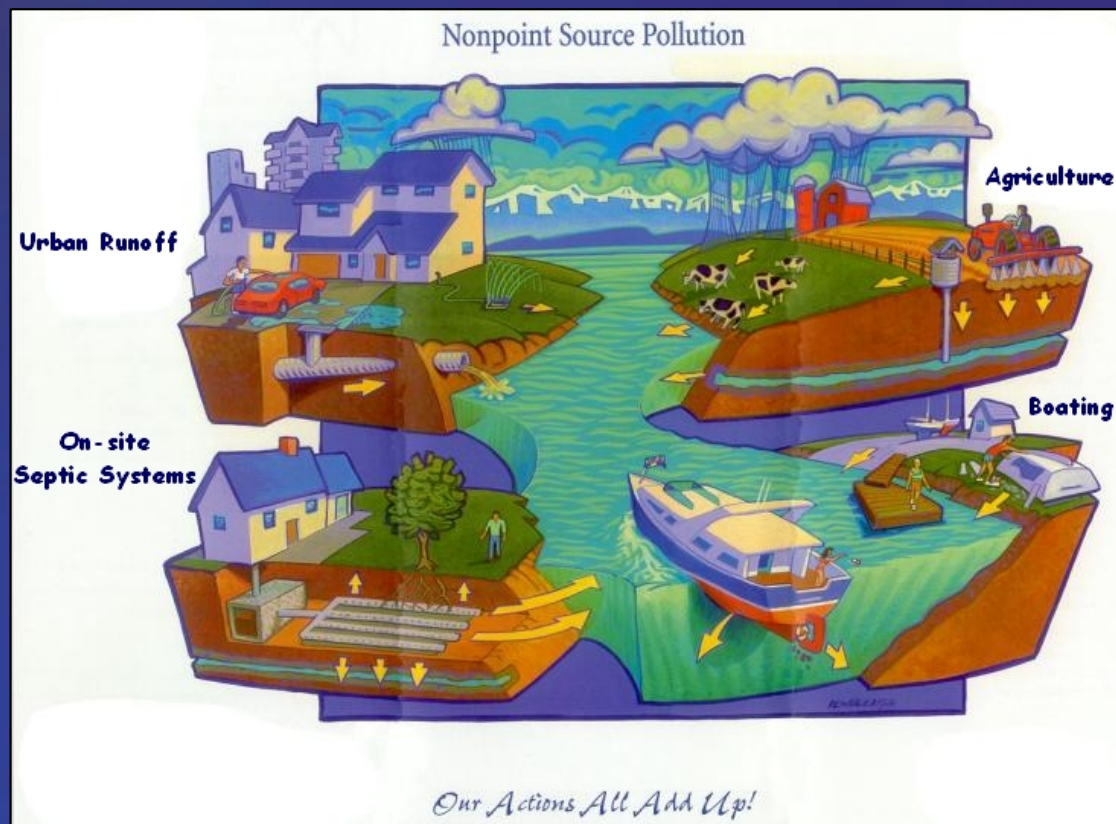
Land Cover Data

Coastal Storms Initiative



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)

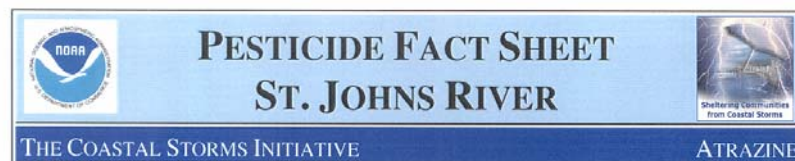
- EPA Tier 2
- Surface Water
- Effects of Sorption, Biodegradation, Photolysis, etc.
- Uses Output of PRZM
- Predicted Concentrations Compared to Aquatic Animal and Human Health Levels of Concern





Technical Fact Sheet

General information about the pesticide



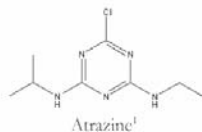
ATRAZINE

General Atrazine Information

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 land¹. 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 Number¹: 1912-24-9
- Chemical Formula¹: C₃H₃ClN₃
- Molecular Weight¹: 215.6851
- Melting Point¹: 171-174 °C
- Density²: 1.187g/cm³ at 20 °C
- Log Kow:
- Koc:
- Solubility²: In water, 33 ppm at 25 °C

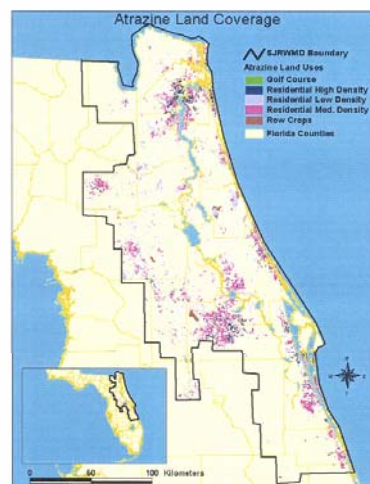


Figure 1 - Land Coverage of Potential Atrazine Use

- 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 water³.

Toxicology of Atrazine

- Data has suggested atrazine is an endocrine disruptor for some amphibians and crustaceans at environmentally possible levels⁵.

Map of potential application sites

Toxicology



Technical Fact Sheet

• District Information

• Common products with that pesticide

2 The Coastal Storms Initiative

- Because atrazine can be applied year round, toxic effects of atrazine would be most evident immediately after a rain storm.
- Toxic Sensitivity:
microalgae > macroalgae > macrophytes > invertebrates > vertebrates

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 exposure⁵.

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 0.92% 20-0-20 (Lesco)
- Atrazine 4L (UHS, Agrilience, Helena, UAP, Universal Cooperatives)
- Atrazine 90 DF (Agrilience)

Atrazine

- Atrazine 90 (Universal Cooperatives)
- Atrazine 90 WDG Sothern Turf (UHS)
- Atrazine 90DF (Drexel)

TABLE 1

Land Class	Acres	km ²
Golf Courses	27,644	112
High Density	115,121	466
Low Density Residential	392,935	1,590
Medium Density Residential	382,816	1,549
Row Crops*	7,300	30

* Area reported by Florida's Department of Agriculture and Consumer Services, primarily reflects corn acreage
Other areas calculated from GIS in Figure 1 provided by Florida's Department of Environmental Protection

Atrazine Links

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

Atrazine Information

www.beyondpesticides.org

www.scorecard.org/chemical-profiles

www.speclab.com/compound/c1912249.htm

District Information

www.sjrwmd.org

• Acreage Calculations

• Links for more information



Layperson Fact Sheet

- General information about pesticides

- Information about the specific pesticide

PESTICIDE FACT SHEET ST. JOHNS RIVER

THE COASTAL STORMS INITIATIVE

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 migrating 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.

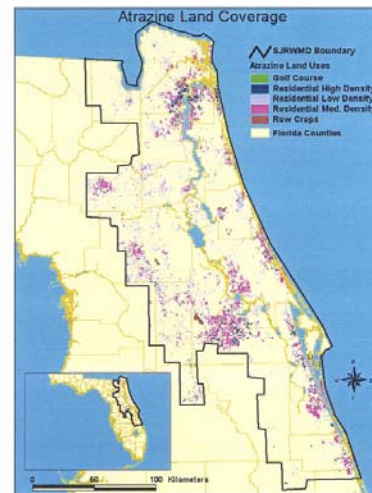


Figure 1 - Land Coverage of Potential Atrazine Use

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

- Map of potential application sites

- District Information



Layperson Fact Sheet

Why should I care?

What can I do to help?

2 The Coastal Storms Initiative

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?

Anytime you use pesticides, there are things you can do to minimize the harmful effects the pesticide may have on your household and the environment around you.

- 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 resevoirs.
- Do not use outdoor pesticides near sources of water. Allow for a XX feet between your application and the water.



Atrazine

- Unless instructed to by the label, do not apply the pesticide before a predicted rain storm. 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.

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- Aatrex Nine-O (Syngenta)
- Atra-5 (Drexel)
- Atrazine 0.92% 20-0-20 (Lesco)
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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

Common products with that pesticide

Links for more information



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

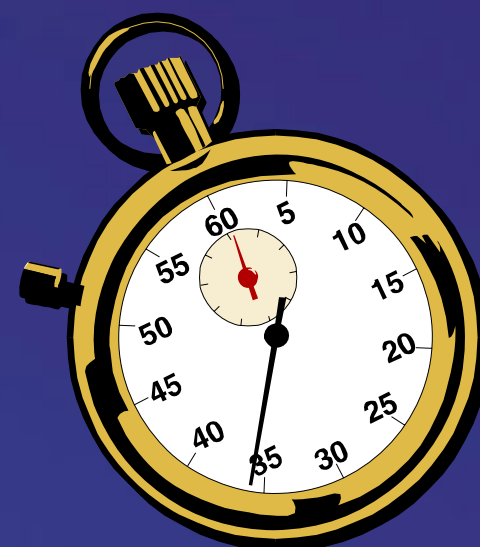
- Preliminary results achieved Spring 2003
- Further development is currently ongoing

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



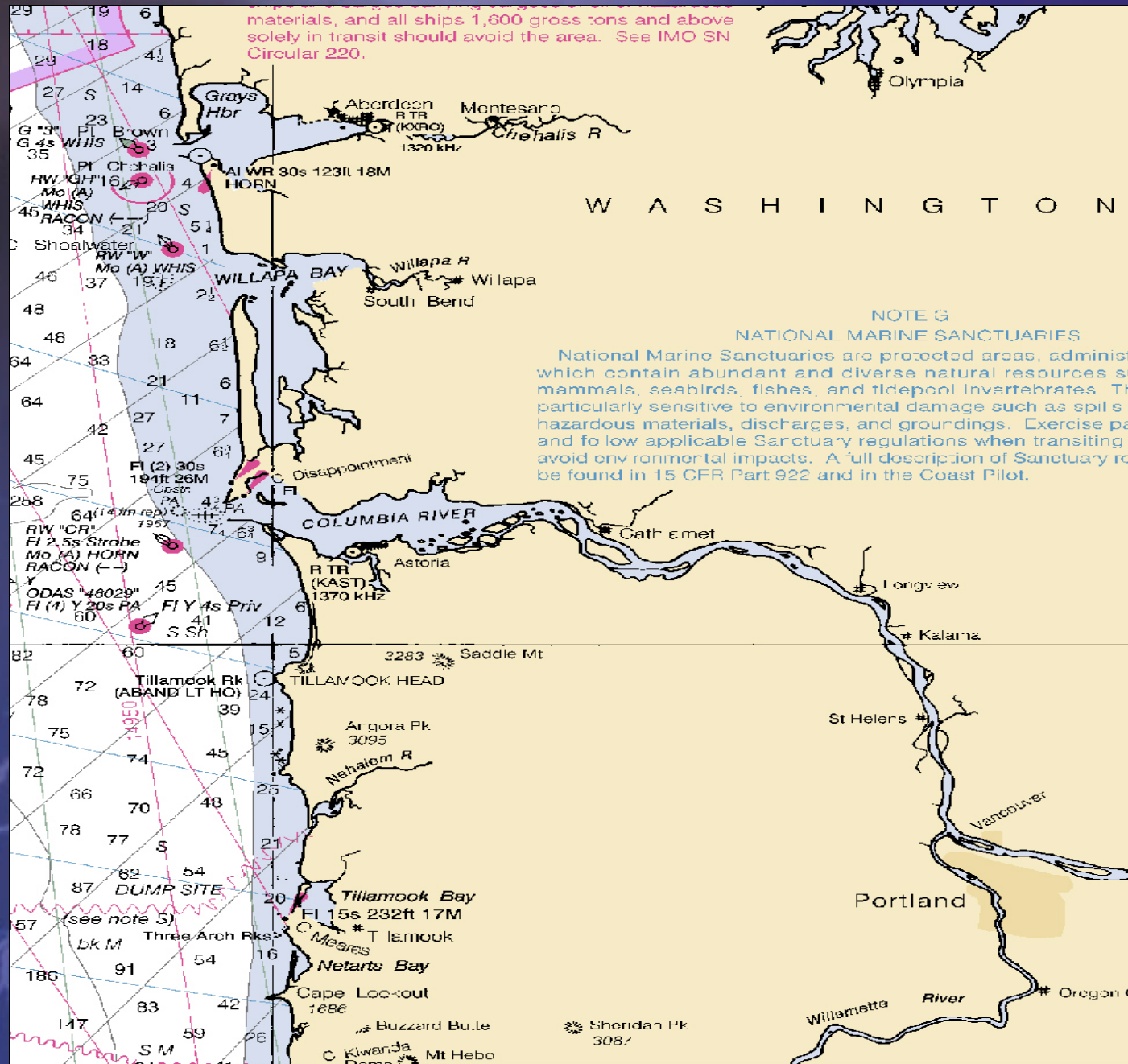
Coastal Storms Initiative

Next Steps

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



Pacific Northwest 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



Pacific Northwest Pilot Issues

Coastal Erosion

- Coastal storms a major factor
- Erosion hotspots
- El Nino impact
- Storm wave height is increasing





Pacific Northwest Pilot Issues

Flooding

- Can be a major storm issue
- Impacts to lives, property, & businesses
- Tillamook County, Oregon particularly vulnerable

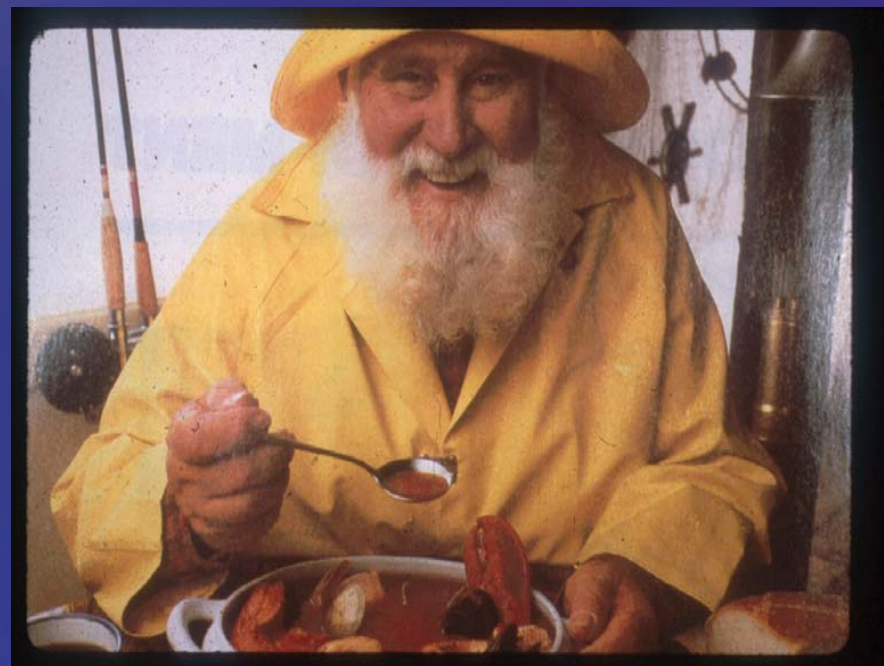




Pacific Northwest Pilot Issues

Aquaculture

- **Major industry in Washington and Oregon**
- **Stormwater runoff impacts**
- **Wind, wave & sediment impacts**



Salmon and Watersheds

- 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**

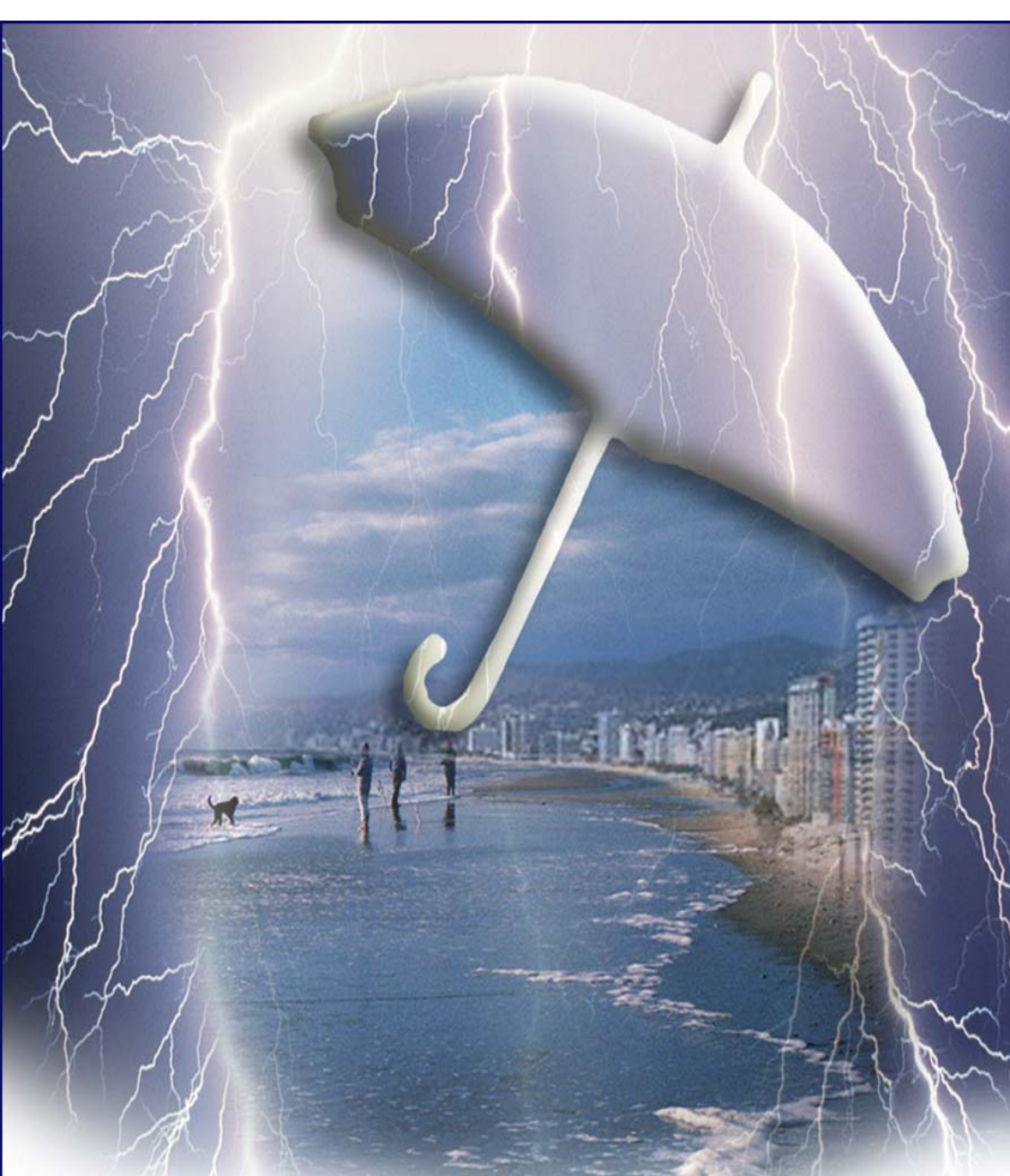
Regional Expansion

- **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**