

**SUPPORTING THE DATA NEEDS OF THE COASTAL COMMUNITY  
II - HURRICANE FLOYD POST-EVENT**

Sharon K. LeDuc<sup>\*†</sup>  
Air Resources Laboratory  
National Oceanic and Atmospheric Administration  
Research Triangle Park, NC 27711

## 1. INTRODUCTION

The Environmental Protection Agency (EPA) is cooperating with federal, state and local organizations in developing tools necessary to predict the effects on water quality of various events. The most dramatic of these events in recent years was the extensive damage to fragile coastal environments in the State of North Carolina as a result of Hurricane Floyd. This event and the runoff from this event had major impacts on the water quality. Pollutants on the earth's surface can be transported into surface water bodies inland and in coastal areas. Hurricane flooding, like that associated with Hurricane Floyd, can transport tremendous amounts of animal waste and pesticides from agricultural lands into a river. Pollutants can also enter the surface water bodies via groundwater recharge during such storm events. This event serves as a dramatic example of the data needs for analyzing impacts. The data acquired and presented were all available for internet access and tools were developed to process and present data in an interpretive form. This capability is indicative of the potential use and interest EPA has in the National Coastal Data Development Center (NCDDC).

## 2. DEMONSTRATED USES

The NCDDC capability will provide strong support for many offices in EPA. Four geographic regions are: west coast; north east; south Atlantic; and Gulf of Mexico. The south Atlantic includes the Hurricane Floyd area. The Albermarle/Pamlico Sound selection links to EPA's Office of Water website which describes EPA's programs there. Visual impacts of the environmental concerns associated with the event were found at multiple internet sites and provide vivid images indicating the extent of the damage.

The details associated with the Hurricane itself are of interest in analyzing the event. An overview was available along with a tracking capability (National Weather Service). The tracking capability was linked to visual images of other impacts of damage beyond water quality (North Carolina Department of Agriculture). Also remote sensing images indicate the extent of the turbulence and runoff in the coastal area (National Aeronautics and Space Administration SeaWiFS). The time series showing the extent of flooding was also available for the coastal areas. The aftermath shows additional capability found on the web, the ability for a viewer to navigate a scene and change the view point. Thirty other images are identified as depicting the aftermath of Hurricane Floyd.

Tools were developed to make further contributions to the ability to analyze and assess the impact in coastal areas. This capability is what is being planned for NCDDC. The process uses the internet for communication, accesses primary data providers to collect and process the data. Multiple users can be serviced. Three users are identified in this presentation; Facility for Ocean/Atmospheric Modeling and Visualization; the North Carolina Department of Environment and Natural Resources; and the Multimedia Integrated Modeling System (MIMS) research project of EPA's Office of Research and Development (Johnson, *et al.*, 2000). The goal is to create a problem solving software framework to support ecosystem modeling and environmental health assessment. The modeling will require data both for input and evaluation. NCDDC will support the MIMS needs. The development of MIMS can be obtained from:

<http://www.epa.gov/asmdnerl/mims/description.html>

## 3. SAMPLE DATA PROVIDERS

The National Centers for Environmental Prediction (NCEP), in cooperation with the Office of Hydrology (OH), have developed the multi-sensor National Precipitation Analysis (NPA) which provides an analysis of hourly digital precipitation radar estimates obtained from the WSR-88D Radar Product Generator and from raingages. These data are being evaluated for

---

\* On assignment to the National Exposure Research Laboratory, U. S. Environmental Protection Agency, RTP, NC 27711

† Corresponding author address: MD-80, AMD, NERL, RTP, NC 27711; email: leduc@hpcc.epa.gov

use with MIMS (Eder, *et al.*, 2001). Many other providers of data have been identified for internet access: political boundaries, hydrologic units, rivers, digital elevation model, meteorological observations, dissolved oxygen, stream-gaging, and hydrography comparisons. There are others not shown.

#### **4. NCDDC**

The NCDDC will provide for the archive of, and access to, long-term coastal data records. They will provide a catalog and ensure its quality. The activities at NCDDC will include retrospective studies and environmental predictions. The data which will be delivered will meet the standards set by the Federal Geospatial Data Committee and other applicable standards. This cooperation and adherence to standards will support EPA in its MIMS research and in its coastal programs.

File conversion will be needed for much of the data being supplied by NCDDC. This may be done by NCDDC or by the user, but is an important link in the process. The user interface is another important feature NCDDC will provide to users for access to retrieval and visualization capability. One possible visualization tool is IBM Data Explorer. A sample is shown displaying salinity measurements taken from midstream gaging stations in the Neuse River in North Carolina.

#### **5. SUMMARY**

The EPA hopes to cooperate with the NCDDC to promote the tools, data model, user interface, visualizations and data quality that will be most useful to the EPA and its needs. The MIMS and other programs of the Office of Water will benefit from the NCDDC. The Hurricane Floyd post-event is used to indicate the needs and concerns of EPA.

#### **6. REFERENCES**

- Eder, B.K., S.K. LeDuc, A.B. Gilliland, and P.L. Finkelstein, 2001: On the use of NEXRAD Stage IV data in the multimedia modeling of pollutant transport. Preprints of the Symposium on Precipitation Extremes: Prediction, Impacts, and Responses, American Meteorological Society.
- Johnston, J.M., J.H. Novak, and S.R. Kraemer, 2000: Multimedia integrated modeling for environmental protection: Introduction to a collaborative framework. *Environ. Monitor. And Assess.*, **63**, 253-263

*Disclaimer.* This document has been reviewed and approved by the U.S. Environmental Protection Agency for publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

1. REPORT NO. <b>EPA/600/A-00/113</b>	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Supporting the Data Needs of the Coastal Community II: Hurricane Floyd Post-Event	5. REPORT DATE	
	6. PERFORMING ORGANIZATION CODE	
7. AUTHOR(S) LeDuc, Sharon K.	8. PERFORMING ORGANIZATION REPORT NO.	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Same as Block 12	10. PROGRAM ELEMENT NO.	
	11. CONTRACT/GRANT NO.	
12. SPONSORING AGENCY NAME AND ADDRESS National Exposure Research Laboratory Office of Research and Development U.S. Environmental Protection Agency Research Triangle Park, NC 27711	13. TYPE OF REPORT AND PERIOD COVERED	
	14. SPONSORING AGENCY CODE EPA/600/9	
15. SUPPLEMENTARY NOTES		
16. ABSTRACT <p>The Environmental Protection Agency (EPA) is cooperating with federal, state, and local organizations in developing tools necessary to predict the effects on water quality of various events. The most dramatic of these events in recent years was the extensive damage to fragile coastal environments in the State of North Carolina as a result of Hurricane Floyd. This event and the runoff from this event had major impacts on the water quality. Pollutants on the earth's surface can be transported into surface water bodies inland and in coastal areas. Hurricane flooding, like that associated with Hurricane Floyd, can transport tremendous amounts of animal waste and pesticides from agricultural lands into a river. Pollutants can also enter the surface water bodies via groundwater recharge during such storm events. This event serves as a dramatic example of the data needs for analyzing impacts. The data acquired and presented were all available for internet access and tools were developed to process and present data in an interpretive form. This capability is indicative of the potential use and interest EPA has in the National Coastal Data Development Center (NCDDC).</p>		
17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/ OPEN ENDED TERMS	c. COSATI
18. DISTRIBUTION STATEMENT <u>RELEASE TO PUBLIC</u>	19. SECURITY CLASS ( <i>This Report</i> ) UNCLASSIFIED	21. NO. OF PAGES <b>2</b>
	20. SECURITY CLASS ( <i>This Page</i> ) UNCLASSIFIED	22. PRICE