

INTRODUCTION

1.1 General

Disasters can be informative. When powerful storms and major floods damage or destroy our communities and infrastructure we can learn from the experience. That learning can lead to more accurate forecasts; better designed building, transportation, and communication systems; more robust response and recovery mechanisms; and more effective land use planning. But a key piece of such learning involves close technical observation and measurement of the factors that characterize the event and its impacts on communities, infrastructure, and environment. Making those observations and measurements during the event requires a timely and well-coordinated deployment of engineers, scientists, technicians, and equipment into affected areas. The *National Plan for Disaster Impact Assessments and Plans: Weather and Water Data (NPDIA)* establishes a procedural template that addresses this need.

The motivation for development of a national plan is threefold. The first motive is to minimize or eliminate the duplication of effort by agencies performing post-event data acquisition, thereby making the best use of the limited resources available to perform these surveys. The second is to assure these highly perishable data are indeed collected and that they are collected in conformance with the requirements (e.g., degree of accuracy) of all participating data users. It is generally acknowledged that the acquisition of these data is urgent; the physical effects that fully characterize a storm event are transient and can begin to change or be obliterated immediately after the event. The third motive is to define the coordination procedures of the agencies participating in the acquisition of storm event environmental data and to collaborate on data sharing and on ensuring that means for data archival and future retrieval are established.

1.2 Scope

The procedures outlined herein apply to the conterminous 48 states, Alaska, Hawaii, the Commonwealth of Puerto Rico, and the Virgin Islands, Guam, American Samoa, and the Confederation of Northern Mariana Islands. This plan defines the roles and coordinating procedures of the agencies participating in the acquisition of storm event environmental data. When only a single agency is involved in a storm event response, that agency should follow procedures specified in its internal documents, but those practices should be consistent with those contained herein. It is recognized that many Federal missions are undertaken in the overall response and recovery process that follows a significant storm event. The intent of this plan is to address an important, though limited, aspect of this response process.

Environmental events addressed in this plan include land-falling tropical cyclones (hurricanes/typhoons and tropical storms), dangerous coastal extra-tropical storms, severe convective outbreaks (tornadoes and windstorms), riverine and flash flooding, and tsunamis. The plan includes data requirements and acquisition capabilities of the participating agencies, event

response initiation criteria, coordination procedures, agency points of contact, and data deposition procedures.

While the 2003 *National Post-Storm Data Acquisition Plan*, which the NPDIA supersedes, addressed post-storm activities, new technologies have ushered in opportunities to pre-deploy, increase the density of, and harden observation systems, thereby providing the capability to collect and disseminate real-time data of relevance to those who forecast the events and manage Federal, State, and local response and recovery. These data support those agencies that characterize the actual event to improve scientific understanding and modeling capabilities. With the addition of real-time data, this new NPDIA supports nearly all of the Emergency Support Functions (ESFs) in the National Response Framework in either a real-time or long-term application. ESFs and descriptions of the support provided to the ESFs by the NPDIA are listed in Appendix A.

1.3 Goals

The following goals of the NPDIA expand upon the objectives contained in the Terms of Reference for the Working Group for Disaster Impact Assessments and Plans: Weather and Water Data (WG/DIAP):

- Identifying the requirements, resources, and capabilities of the participating agencies
- Developing procedures for coordinating agency activities during and following storm events
- Developing mechanisms for aggregating and sharing resources among the participating agencies
- Preparing summaries of event documentation and data acquired under this national plan

As experience is gained in responding to events and procedures become more refined and efficient, resources available outside the participating agencies should be identified and arrangements made to access these resources. Examples of such resources include aircraft for transport of personnel and for aerial photoreconnaissance, expertise residing in academic institutions for field assessment and interpretation of storm effects and damage, and data acquired during scientific field experiments involving the same or similar storm events.

1.4 Participating Federal Agencies

The Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM). The OFCM facilitates Federal agency coordination for storm event assessments and plans and assumes overall responsibility for the preparation and maintenance of the NPDIA. The role each agency assumes during a storm event period is determined by the individual agency's authority and mission requirements. Appendix B contains authority and mission statements of individual agencies and entities referenced in the NPDIA.

1.4.1 Department of Agriculture (USDA)

Natural Resources Conservation Service (NRCS). The NRCS leads the Federal commitment to the conservation of all natural resources by ensuring private lands are conserved, restored, and more resilient to environmental challenges, including climate change. The NRCS works with landowners through conservation planning and assistance designed to benefit the soil, water, air, plants, and animals that result in productive lands and healthy ecosystems. The NRCS provides technical and financial assistance through local conservation districts to land users, communities, watershed groups, Federal and State agencies, American Indian tribes, and others at their request. At the local level, the NRCS staff works alongside State and local conservation staff and volunteers in a partnership to care for natural resources on private lands. The NRCS develops comprehensive technical guidance for conservation planning and assistance.



1.4.2 Department of Commerce (DOC)

National Oceanic and Atmospheric Administration (NOAA)

Within the DOC, NOAA is the principal meteorological agency of the Federal government. By law, NOAA is responsible for reporting the weather of the United States, providing weather and flood warnings and forecasts to the general public, developing and furnishing applied weather services, and recording the climate of the United States. This mission is carried out within NOAA by the National Weather Service (NWS); National Environmental Satellite, Data, and Information Service (NESDIS); Office of Oceanic and Atmospheric Research (OAR); National Ocean Service (NOS); and NOAA Marine and Aviation Operations (NMAO).



NWS. The NWS consists of a national headquarters in Silver Spring, Maryland; 6 regional headquarters across the continental United States, Alaska, and the Pacific; 122 Weather Forecast Offices (WFOs); and 13 River Forecast Centers. The River Forecast Centers provide basin-specific forecast guidance on riverine and flash flooding. The NWS has two Tsunami Warning Centers that provide reliable tsunami detection, forecasts, and warnings in the United States. In addition, the NWS's National Centers for Environmental Prediction (NCEP) include the following service centers: Environmental Modeling Center, Storm Prediction Center (SPC), NCEP Central Operations, Hydrometeorological Prediction Center, Ocean Prediction Center, Tropical Prediction Center, Climate Prediction Center, Aviation Weather Center, and Space Environment Center. These service centers provide the expertise to produce focused guidance, modeling, and numerical weather prediction for severe local storms, marine weather, tropical weather, climatic trends, aviation weather, and the space environment. This support provides basic information for both the NWS WFOs and external users, including other Federal agencies and Federal, State, and local emergency management officials. Respondents in the event of tornadoes and other severe convective storms, flooding, and other weather-related natural disasters, represent all strata of the NWS, depending on the type of event. Warning Coordination Meteorologists (WCM) at each of the WFOs are often the initial NWS responders to all major

weather events, documenting apparent damage and causal effects, as well as gathering commentary from witnesses.

NOS. The NOS provides science-based solutions through collaborative partnerships to address evolving economic, environmental, and social pressures on our oceans and coasts. This effort includes protecting coastal communities; monitoring our oceans and coasts; promoting safe, efficient and environmentally sound marine transportation; reducing ocean and coastal health risks; and protecting coastal and marine places. The NOS has eight program offices and two staff offices that manage and preserve the Nation's ocean and coasts.

Coastal Services Center (CSC). The CSC supports the environmental, social, and economic well being of the coast by linking people, information, and technology. It helps communities prepare for and respond to coastal hazards. The Center's coastal hazards toolkit of services for State and local organizations allows users to quickly find the hazard-related information they need, effectively apply it, and visually showcase the results to their constituents and other end users. The coastal hazards toolkit of services provides data and information, data analysis, and visualization tools. These products and services help coastal regions prepare for and react to both chronic episodic events and longer-term climate change issues such as sea-level rise.

Center for Operational Oceanographic Products and Services (CO-OPS). The CO-OPS collects and distributes observations and predictions of water levels and currents to ensure safe, efficient, and environmentally sound maritime commerce. It provides the set of water level and coastal current products required to support NOS's Strategic Plan mission requirements and to assist in providing operational oceanographic data and products required by NOAA's other Strategic Plan themes. The CO-OPS manages the National Water Level Observation Network (NWLON), and a national network of Physical Oceanographic Real-Time Systems (PORTS) in major U.S. harbors. It establishes standards for the collection and processing of water level and current data, collects and documents user requirements that serve as the foundation for all resulting program activities, designs new and/or improved oceanographic observing systems, designs software to improve its data processing capabilities, maintains and operates oceanographic observing systems, performs operational data analysis and quality control, and produces and disseminates oceanographic products.

Office of Response and Restoration (OR&R). The OR&R protects coastal and marine resources, mitigates threats, reduces harm, and restores ecological function. It provides comprehensive solutions to environmental hazards caused by oil, chemicals, and marine debris. To fulfill its mission of protecting and restoring NOAA trust resources, the OR&R provides scientific and technical support to prepare for and respond to oil and chemical releases, determines damage to natural resources from these releases, protects and restores marine and coastal ecosystems including coral reefs, and works with communities to address critical local and regional coastal challenges

National Geodetic Survey (NGS). The NGS and its predecessor agencies have been world leaders in geodesy and cartography, with a focus on enabling safe and efficient transportation. For decades the NGS has collected remotely sensed aerial data to support two primary programs:

the Coastal Mapping Program (CMP) and Aeronautical Survey Program (ASP). The CMP delivers accurate and up-to-date National Shoreline maps. In addition to promoting safe marine navigation, the National Shoreline provides the basis for a multitude of legal boundaries. The ASP delivers airport obstruction charts and other products used to design and validate the instrument approaches required for aircraft to land at U.S. airports during inclement weather. Through the capability to execute these programs, NGS provides emergency response imagery in the wake of national disasters.

National Institute of Standards and Technology (NIST)

NIST promotes U.S. innovation and competitiveness by anticipating and meeting the measurement science, standards, and technology needs of the U.S. building and fire safety industries in ways that enhance economic security and improve the quality of life. Through its Materials and Construction Research Division, NIST conducts laboratory, field, and analytical research in structural engineering, including the investigation of important structural failures, the characterization of building loads during construction and during their service life, and structural response analyses. Extreme events, such as hurricanes and tornadoes, are viewed as opportunities to evaluate the performance of structures subjected to wind loads that may approach or exceed the ultimate limit states of the structure. Beginning with Hurricane Camille in 1969, the Structures Division has conducted post-storm assessments on its own or in collaboration with other Federal agencies, universities, and building research centers.

1.4.3 Department of Defense (DOD)

U.S. Army Corps of Engineers (USACE) and U.S. Air Force (USAF), Civil Air Patrol (CAP)-USAF Auxiliary. The DOD is represented by elements of the U.S. Army and USAF, primarily by the USACE and the Civil Air Patrol (CAP), a civilian auxiliary of the USAF. The USACE has primary responsibility for construction and maintenance of marine navigation in public waterways and for coastal storm protection projects on public lands. USACE post-event activities are coordinated through the Office of Chief of Engineers, and the Engineer Research and Development Center (ERDC). The CAP and the Air Force Reserve Command's 53rd Weather Reconnaissance Squadron (53 WRS) serve principally in a supporting role to the other participating agencies.



1.4.4 Department of Homeland Security (DHS)

Federal Emergency Management Agency (FEMA). The DHS and FEMA within it are the Federal coordinating agencies that respond to major disasters or threats in the United States and its territories. FEMA provides response and recovery and hazard mitigation assistance, emergency management preparedness training, flood insurance, and funding for related studies and services. Headquartered in Washington, DC, FEMA has 10 regional offices, with field offices and special facilities located nationwide. The National Response Coordination Center (NRCC), located in Washington DC, assists in coordinating efforts among all Federal office. ESF Coordinator positions within the NRCC are activated for exercises and emergencies.



1.4.5 Department of the Interior (DOI)

U.S. Geological Survey (USGS). USGS is the principal Earth science agency responsible for collection, assessment, and dissemination of information regarding the geology, topography, mineral resources, hydrology, and biology of the United States. USGS is a nationally recognized provider of water data and information for use by others to design, operate, manage, and regulate water resources; establish floodplain boundaries; issue flood warnings and river forecasts; and manage emergency operations. Its real-time and long-term flow records and stage-discharge relationships (ratings) are key inputs for NWS forecast models. USGS peak-flow data are fundamental to flood-frequency analyses, on which the design of dams and the delineation of flood-insurance rate maps depend.



1.4.6 Department of Transportation (DOT)

Federal Highway Administration (FHWA). The FHWA, though not an active NPDIA participant, is expected to become more involved in the future. While the agency has no requirements to acquire environmental data following significant storm events, it works with State and local departments of transportation, which are building sites capable of acquiring and disseminating storm event data. These sites, which monitor the highway system, could eventually be used in the coordinated storm event data acquisition process under the NPDIA.



1.5 Affiliated Organizations

The following entities have participated in the WG/DIAP and are active partners in the acquisition and assessment of storm event environmental data under the NPDIA.

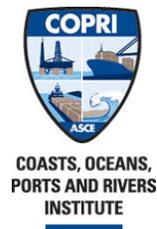
1.5.1 The American Association for Wind Engineering (AAWE)

The AAWE is a consortium of wind and surge experts affiliated with research universities, industry, and private consulting. These experts collaborate to collect field data before, during, and after U.S. land-falling hurricanes; promote and investigate effective mitigation; and contribute to the development of national codes and standards for wind resistant design. The AAWE is a national, nonprofit, technical society of engineers, meteorologists, architects, planners, public officials, social scientists, manufacturers and constructors. Included among AAWE members are researchers, practicing professionals, educators, government officials, and building code regulators.



1.5.2 Coasts, Oceans, Ports and Rivers Institute (COPRI)

COPRI is one of eight institutes under the American Society of Civil Engineering. It supports and advances specific civil engineering specialties focused on the technical, educational, scientific, and professional issues unique to coastal, ocean, port, waterway, wetland, and riverine environments. COPRI strives to advance and disseminate scientific and engineering knowledge relevant to its diverse



membership.

1.5.3 The Digital Hurricane Consortium (DHC)



The DHC consists of faculty from participating universities, the Center for Severe Weather Research (CSWR), and the Applied Technology Council (ATC). This consortium was formed to better respond to severe weather events, especially hurricanes, by mobilizing field deployed equipment to collect wind field and storm surge measurements that are extremely useful in determining not only the strength of the event but how the built environment responded to the event in terms of damage. Members of the consortium are also active in the AAWE. Participating faculty come from universities across the country, including Clemson University, Colorado University, Florida International University, Louisiana State University, Oklahoma University, Texas Tech University (TTU), University of Alabama at Huntsville, University of Florida, and University of Notre Dame.

1.6 The WG/DIAP

Appendix L lists, by name and organization, the WG/DIAP members from Federal agencies and the participants from affiliated organizations who collaborated on this edition of the NPDIA. Appendix C provides Internet links to participating agency/entity home pages (most of which contain organization charts). Contact information (telephone numbers and email addresses) for all members and participants is located on the WG/DIAP web page:

<http://www.ofcm.gov/wg-diap/index.htm>.

