COASTAL ACT INTERAGENCY DATA COLLECTION PROTOCOL

Purpose

This annex supplements the National Plan for Disaster Impact Assessments (NPDIA) to outline inter-agency protocol for responding to storms that could invoke the Consumer Option for an Alternative System to Allocate Losses (COASTAL) Act of 2012. It describes the plan for capturing the data needed for post-storm assessments, assembling those data for the NOAA's Coastal Weather and Water Event Database (CWWED), for assimilation into NOAA's Named Storm Event Model (NSEM), and making those data available to FEMA, other Federal, State, and Local governmental agencies, private insurance adjusters, and the general public for use in the evaluation of indeterminate loss causes and insurance coverage responsibilities.

Requirement, Directives, and References

COASTAL Act Section 12312 paragraph (c) requires the establishment of a "protocol" for the collection of covered data. Paraphrased, it says: Not later than 540 days [December 28, 2013] after the date of the enactment of the COASTAL Act of 2012, the (NOAA) Administrator shall establish a protocol, based on the data collection plan submitted to Congress (the CACDP) to collect and assemble all covered data required by the NOAA Administrator to produce post-storm assessments required by subsection (b), including assembling data collected by participants and stored in the database established under subsection (f) and from such other sources as the Administrator considers appropriate.

This annex addresses those requirements and will be maintained as part of the National Plan for Disaster Impact and Assessments: Weather and Water Data, the COASTAL Act Capabilities Development Plan (CACDP), NOAA/NWS policy directives and technical references, and other national plan participant agency policy directives addressing COASTAL Act Data collection.

Related legislation, directives/references:

a. COASTAL Act legislation
b. COASTAL Act Capabilities Development Plan (CACDP)
c. Terms of Reference, Working Group for Disaster Impact Assessments and Plans: Weather and Water Data (WG/DIAP)
d. National Plan for Disaster Impact Assessments: Weather and Water Data (NPDIA)
e. National Hurricane Operations Plan (NHOP)
f. NWS Policy Directives (NWSPD) referenced in this document http://www.nws.noaa.gov/directives/

Participating Federal Agency Priorities

Reference NPDIA paragraph 1.2.1: The role each Federal entity assumes during a storm event period is determined by the individual agency's authority and mission requirements. Any response by a Federal entity to an event deemed to be covered by this plan and its annexed Data Collection Protocols shall be at the discretion and within the mission authority and resources of that entity.

Definitions

The following definitions that shall be used exclusively for this protocol:

Airborne sensor: Data collection sensor onboard aircraft.

Affiliate Members: A non-federal entity that directly supports the COASTAL Act data collection effort and has entered a data sharing agreement with the NWS.

Collection Team: The COASTAL Act Data Collection Team described in Phase I, Paragraph 2 of this protocol.

Covered data: Data useful for COASTAL Act purposes, as defined by the COASTAL Act of 2012, Section 12312(a) [126 Stat. 970; to be codified at 33 U.S.C. § 3611].

Data Collection Phase (or Phase I): The period during which NWS formally prepares for the collection of covered data and collects covered data in anticipation of a possible post-storm assessment.

Deployment deadline: The time by which NWS must authorize deployment of a pre-arranged contract with a Collection Team member with mobile sensor capabilities if said mobile sensors are to be deployed at the locations in the expected impact zone desired by NWS. This deadline will vary for each Collection Team member, based on the origin of the mobile sensors and location of the deployment zone. Deployment deadlines are outlined in Section 3.

Member: A federal agency or auxiliary partner that is part of the Collection Team.

Mobile sensor: Non-permanent data collection sensor that can be repositioned before, during or after a storm's landfall. Only those mobile sensors that are being deployed in accordance with a pre-arranged contract with NWS are subject to this protocol.

NWS Assessment Lead: The program office within the NWS that the NOAA Assistant Administrator for Weather Services designates as the lead on coordinating the Post-storm Assessment Phase, as will be determined by NWSPD XXXX.

NWS Deployment Lead: The program office within the NWS that the NOAA Assistant Administrator for Weather Services designates as the lead on coordinating the Data Collection Phase, as will be determined by NWSPD XXXX.

Post-storm assessment: A post-storm assessment implemented for COASTAL Act purposes, as defined by COASTAL Act of 2012, Section 12312(a) [126 Stat. 970; to be codified at 33 U.S.C. § 3611].

Post-storm Assessment Phase (or Phase II): The period during which NWS implements a post-storm assessment.

Stationary sensor: Non-mobile data collection sensor that is positioned at a fixed location unrelated to a specific storm landfall.

Storm: A tropical cyclone, as defined by NWS Instructions 10-604 under NWSPD 10-6.

Team assets: Stationary sensors, mobile sensors and airborne sensors that are operated by Collection Team members and whose data are available for connection to the CWWED and assimilation into the NSEM.

PHASE I – DATA COLLECTION AND DISSEMINATION

1. Activation Criteria

The Data Collection Phase will be activated by NWS following the criteria and procedures established in NWSPD ####. Pre-activation preparation activities by the Collection Team can occur prior to the activation of this phase, but any costs resulting from pre-activation efforts will not be covered by NWS.

2. COASTAL Act Data Collection Team

The NWS will be the lead member of the Collection Team. In this capacity, it has responsibility for activating this protocol in response to a storm, confirming the deployment zone of mobile sensors, directing the deployment of mobile sensors, and formally requesting the participation of Collection Team members. Active participation on the Collection Team requires each member to have a valid data agreement with NWS that adheres to NWSPD 1-12 and NWS Instructions 1-1201.

The Collection Team membership currently includes the following federal agencies and affiliate members:

NOAA/National Weather Service (NWS) – Lead Agency

NOAA/Office of Oceanic and Atmospheric Research (OAR)

NOAA/National Ocean Service (NOS)

NOAA/National Environmental Satellite Data and Information Service (NESDIS)

NOAA/Aircraft Operations Center (AOC)

USGS/Office of Surface Water (OSW)

USGS/Natural Hazards Mission Area (NHMA)

DHS/Federal Emergency Management Agency (FEMA)

DOD/U.S. Army Corps of Engineers (USACE)

DOD/Air Force Reserve Command/53d Weather Reconnaissance Squadron (53d WRS)

DOT/Federal Highway Administration (FHWA)

U.S. Department of Agriculture (USDA)

Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM)

Digital Hurricane Consortium (DHC) – Affiliate Member

- University of Colorado
- Center for Severe Weather Research
- Louisiana State University
- University of Notre Dame
- Oklahoma University
- Texas Tech University
- University of Alabama-Huntsville
- University of Florida
- University of South Alabama

3. Operations and Procedures

3.1 Collection Team Notification and Coordination

a. Notification. To initiate the data collection phase, the NWS Deployment Lead alerts the rest of the Collection Team by the WG/DIAP group email list: diap.alerts@noaa.gov (this email list includes all WG/DIAP members). The initial email should contain: a brief description of the event; the source of the event information; any preliminary data collection plans and timelines; and a date/time for the first response coordination teleconference. Depending on the urgency and lead time, the NWS Deployment Lead may need to follow up with phone calls to key members. The addressee list with contact information is located on the WG/DIAP web site http://www.ofcm.gov/wg-diap/index.htm and is maintained by OFCM. Email replies may be sent by any member. ***(Important Note:*** *to reply to all members, the group email address must be added as an addressee*).

b. Coordination Conference Calls. Collection coordination conference calls will be initiated by OFCM or the NWS Deployment Lead. Conference calls will be convened as needed prior to, during, and after collection activities to discuss and coordinate activities. These may be supplemented by web-based capabilities such as GoToMeeting and Chat services. Conference Calls, GoToMeeting, and Chat services may be initiated by OFCM or any member having these or similar capabilities. Standard conference call agendas include the following:

- Target deployment zone and timeline for pre-positioning of mobile sensors
- Positioning/tracking of both mobile and stationary sensors
    - The positioning and tracking of sensors is expected to be accomplished by leveraging existing mapping capabilities available within the WG/DIAP.
- Deployment issues that may arise (e.g. mobile sensor positioning clearance/authorization, transportation, sensor recovery)

3.2 Timeline and Decisions

The coordination of data collection activities is desired to most effectively deploy and position mobile sensors. Specific Collection Team member actions in response to a storm will depend to some extent on the forecast track, intensity, and characteristics of the storm. Threatened or affected zones may change with time as the storm progresses or additional storms pose a threat.

The Director of the NWS National Centers of Environmental Prediction (NCEP), in consultation with the NWS National Hurricane Center (NHC), the NWS Deployment Lead, and the NWS Assessment Lead, determines that a storm could pose a surge and/or wind threat to a U.S. state or territory, using the criteria and processes established in NWSPD XXXX. Upon this determination, the NWS Deployment Lead activates the Data Collection Phase via a deployment execution notice. The NWS Deployment Lead and OFCM coordinate the deployment of mobile sensors operated by Collection Team members to the state/territory under threat. NWS reimburses Collection Team members that deployed mobile sensor capabilities as part of a pre-arranged contract, in accordance with the funding guidance set in NWSPD XXXX.

An NWS-directed deployment of mobile sensors is contingent upon the availability of dedicated funding and the ability to contract with mobile sensor operators prior to their respective deployment deadlines. If funding is not available or deployment deadlines are not met, then NWS will have to rely on mobile sensor data collected at the prerogative of the mobile sensor operators, as well as data collected by stationary and airborne sensors. The execution of this protocol will continue, regardless of whether a NWS-controlled mobile sensor deployment occurs.

The deployment of airborne sensors will be governed by NWSPD XXXX. The directive will ensure that forecasting operations are not negatively impacted by flights conducted for COASTAL Act purposes.

Timeline:

-7 to -5 days prior to forecast onset of damaging wind and water conditions in the expected impact zone

- NWS Deployment Lead and NWS Assessment Lead consult the NHC on the probability of a specific tropical disturbance or tropical cyclone meeting the Data Collection Phase activation criteria set in NWSPD XXXX, and the possible impact zones.
- NWS Deployment Lead and NWS Assessment Lead brief the NCEP Director on the state of COASTAL Act-related assets/resources and the possible need for a post-storm assessment.
- Collection Team members responsible for deploying mobile assets will have begun tropical activity evaluations and pre-planning.
- NWS Deployment Lead will confirm the availability of funding for mobile sensors deployment.
- Collection Team members will notify NWS Deployment Lead and OFCM as to the availability of their mobile sensors and the deadline for deployment execution notice in order to deploy under contract with NWS.

- 5 day to -3 days prior to forecast onset of damaging wind and water conditions in the expected impact zone

NWS Deployment Lead sends a diap.alerts@noaa.gov email to alert Collection Team members of a potential storm, announce the date/time of the first conference call, describe possible deployment zones.

First conference call:

- NHC presents a synopsis of pending landfall
- NWS Deployment lead facilitates discussion with Collection Team members to share common situational picture and discuss deployment plans.

Subsequent conference calls and actions:

- NWS Deployment Lead issues "pending notice" (or "Pre Execution" phase) notice.
- NCEP Director, in consultation with NHC, NWS Deployment Lead, and NWS Assessment Lead determines that an oncoming storm meets the criteria for activating the Data Collection Phase.
- NWS Deployment Lead formally activates the Data Collection Phase.
- NWS Deployment Lead consults NHC on changes to possible impact zones.
- NWS Deployment Lead confirms, by conference call, plans to deploy/preposition mobile sensors.
- NWS Deployment Lead issues deployment execution notice.

Collection Team members confirm their plans with the NWS Deployment Lead and OFCM.

Members with mobile sensors begin to transport their mobile sensors to expected impact zones.

-3 to -1 day (72-24 hrs.) prior to forecast onset of damaging wind and water conditions in the expected impact zone

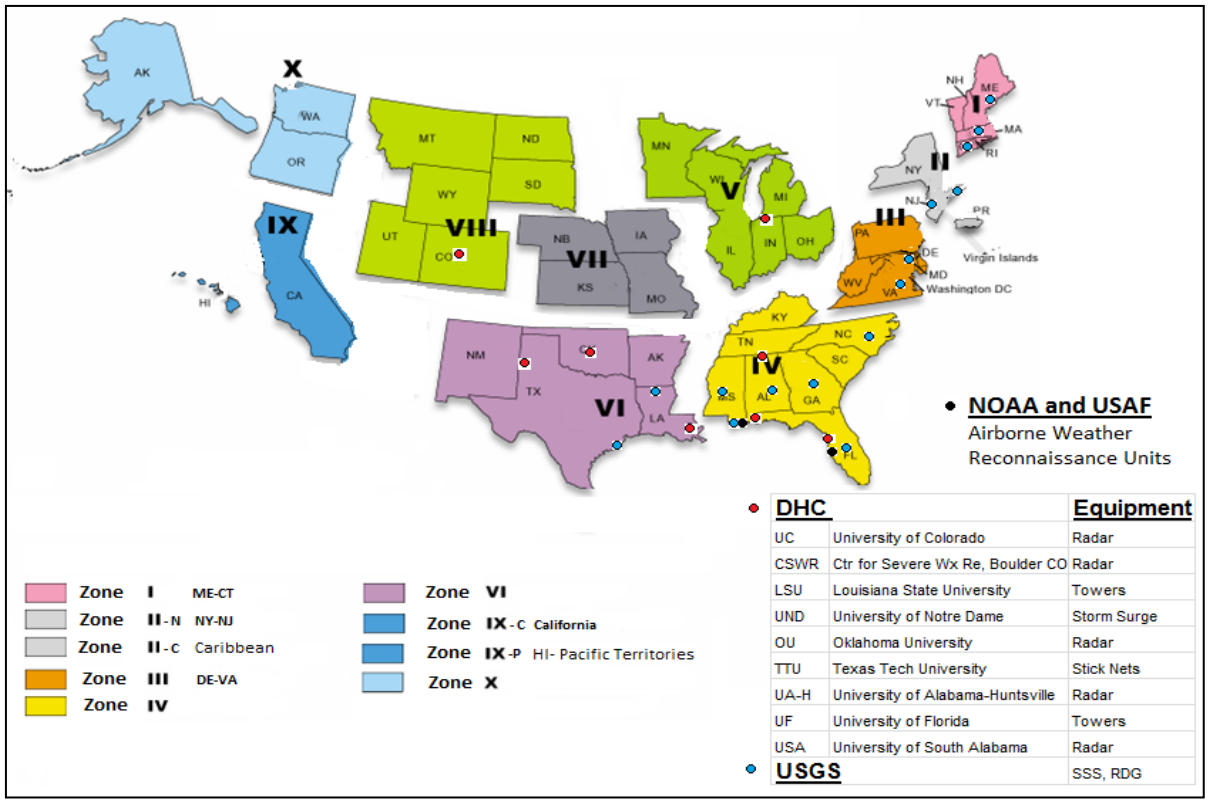
- Mobile sensors deployed by Collection Team members.
- Members confirm deployment and deployment locations.

+ 1 to + 10 days following onset of damaging wind and water conditions in the impact zone

- Mobile sensors retrieved by deployment teams.
- Mobile sensor deployment teams travel back to their respective home bases.
- Data relevant to the storm collected by team assets will be uploaded to members' online databases. Links to the databases will be provided to the NESDIS National Climatic Data Center for connection to the CWWED.

3.3 Mobile and Airborne Sensor Deployment Zones

Deployment Zones are consistent with established FEMA Regions. FEMA Regions V, VII, VIII are included in order to display origin of mobile sensors.



3.5 Mobile and Airborne Deployment Travel Timelines

Agency/Entity		System	Deployment Timetable								
			Zone 10	Zone 9-C	Zone 9-P	Zone 6	Zone 4	Zone 3	Zone 2-N	Zone 2-C	Zone 1
Surface			WA-OR (AK)	CA	HI-Pacific	TX-LA	MS-WFL	VA-NY	NJ-NY	Caribbean	CT-ME
DHC											
UC	University of Colorado	Radar	48	48	--	48	72	96	96	--	108
CSWR	Center for Severe Weather Research, Boulder CO	Radar	44	44	--	46	58	50	50	--	58
LSU	Louisiana State University	Towers	72	60	--	24	48	60	60	--	72
UND	University of Notre Dame	Storm Surge	120	120	--	96	96	96	96	--	96
OU	Oklahoma University	Radar	84	60	--	24	72	84	84	--	108
TTU	Texas Tech University	Stick Nets*	72	48	--	36	60	84	84	--	96
UA-H	University of Alabama-Huntsville	Radar	104	104	--	64	56	56	60	--	72
UF	University of Florida	Towers*	104	96	--	36	48	60	60	--	84
USA	University of South Alabama	Radar	104	96	--	36	48	60	60	--	84
USGS											
USGS	Instruments distributed among state offices	40 SSSs	72	120	--	48	48	96	96	--	96
USGS	Secondary Instruments cached in LA, GA, FL	120 SSSs	144	144	--	72	72	144	144	--	144
USGS	Cached in TX, MS, and GA	10 RDGs*	72	96	--	72	72	96	96	--	96
		* (Real Time)									
Airborne											
NOAA AOC	MacDill AFB FL	Dropsondes									
		SFMR									
		Doppler			(variable timeline dependent on NHC needs/NHOP priorities)						
		WSRA									
		AXBTs									
AFRC/53d WRS	Keesler AFB MS	Dropsondes									
		Buoys:									
		ADOS Drifter			(variable timeline dependent on NHC needs/NHOP priorities)						
		SVP/MINIMET									
		ARGO SOLO									
		SFMR									
		Radar									
NOAA/USGS/USACE		Lidar									
		Hi Res Imagery			(variable timeframes depending on funding/airborne assets available)						
			Note 1: Deployment Timetable/surface assets, time/hours from execution order/go until operational at furthest extent of each zone								
SSS	Storm Surge Sensors										
RDG	Rapidly Deployable Gages										
Dropsondes	GPS Dropsondes	AXBTs	Aircraft Expendable BathyThermographs								
SFMR	Stepped Frequency Microwave Radiometer	Buoys:									
Doppler	Airborne Doppler Radar	ADOS Drifter	Autonomous Drifting Observing System Drifter								
WSRA	Wide Swath Radar Altimeter	ARGO SOLO	Argo Sounding Oceanographic Lagrangian Observer Float								
Lidar	Light Detection and Ranging	SVP/MINIMET	Surface Velocity Program Mini Meteorological Drifter								

Note: *For areas outside CONUS (zone 9-P and 2-C), the existence of and leveraging possibilities of mobile resources at those locations is yet to be determined.*

3.6 Data Collection

This section describes currently known, resource dependent, potential surface and airborne covered data sources. Note: Covered data are described and defined in the COASTAL Act Capabilities Development Plan (CACDP) section 4 and appendices C and E.

Mobile Sensors

Observing System	Primary Platform Type	System Description	Variable(s) Collected	Agency/ Entity
Radar	Truck mounted	Portable Doppler	Wind speed, Rain Rate	Digital Hurricane Consortium
Towers	Trailer mounted	Vertical towers with prop and UVW anemometer that are erected on site	Wind speed	Digital Hurricane Consortium
Sticknet	Tripod mounted	Anemometers	Wind speed	Digital Hurricane Consortium
Storm Surge Sensor	Surge Sensors	Near shore wave and surge, some deployed by helicopter into surf zones	Wave and Surge	Digital Hurricane Consortium
Disdrometer	Portable	Images ambient raindrops	Rain rate, droplet size distribution	Digital Hurricane Consortium
Storm Tide Sensors	Pressure sensors	mobile storm-surge network for water-level and barometric-pressure monitoring	Water level, and in some cases wave height	USGS
Streamgage	Streamgage	Rapidly Deployable Gages that provide real time water level data	Water levels	USGS

Airborne Sensors

Observing System	Primary Platform Type	System Description	Variable(s) Collected	Agency/ Entity
GPS Dropwindsonde	Aircraft WP-3D, G-IVor WC-130J	GPS Dropwindsonde	Temp, RH, Pressure, Wind speed/dir	NOAA/AOC USAFR/53d WRS
Radiometer	Aircraft WP-3D or WC-130J	Stepped Frequency Microwave Radiometer (SFMR)	Sfc Wind Speed, rainfall rate	NOAA/AOC USAFR/53d WRS
In-Situ Sensors	Aircraft WP-3D, G-IV, WC-130J	State perameters	Temp,Pres, RH, Wind speed/dir	NOAA/AOC USAFR 53d WRS

Observing System	Primary Platform Type	System Description	Variable(s) Collected	Agency/ Entity
Radar	Aircraft WP-3D, G-IV	Tail Doppler Radar (TDR)	Wind speed/dir	NOAA/AOC
Radar	Aircraft WP-3D	W-band Doppler	Sea spray backscatter, Sfc Winds	NOAA/AOC
Radar Altimeter	Aircraft WP-3D	Wide Swath Radar Altimeter (WSRA), digital beamforming	Wave spectra, Wave heights, Rain rate	NOAA/AOC
Profiler	Aircraft WP-3D	Integrated Wind and Rain Profiler (IWRAP)	Wind speed/dir, Rain rate	NOAA/AOC
AXBT AXCP AXCTD	Aircraft WP-3D, G-IV	Aircraft Expendable BathyThermographs (AXBT) Aircraft Expendable Current Probes (AXCP) Aircraft Expendable Conductivity Temperature Depth (AXCTD)	Sea Sfc Temp/depth Ocean current velocity Ocean salinity, temp	NOAA/AOC
Buoys/Floats	WC-130J	Autonomous Drifting Observing System Drifter (ADOS Drifter) Surface Velocity Program Mini Meteorological Drifter (SVP/MINIMET Drifter) Argo Sounding Oceanographic Lagrangian Observer Float (ARGO SOLO Float)	Ocean Data	USAFR/53d WRS
Topographic lidar	Aircraft	Measurements of coastal topography at ~1 meter horizontal resolution	Elevation	NOAA, USGS, DOD, FEMA
Bathymetric lidar	Aircraft	Measurements of pre- and post-event coastal bathymetry at ~5 meter horizontal resolution	Elevation	NOAA, USGS, DOD
High Resolution Imagery	Aircraft and commercial satellite procurement	Aerial photography (= .35cm) for orthoimagery of shoreline/topo; also commercial high res satellite imagery (<= 1 meter)	Elevation	NOAA, USACE, USGS; DOD/NGA
JALBTCX bathymetric and topographic LiDAR	Aircraft	Measurements of seamless nearshore bathymetry and coastal topography at ~1 meter horizontal resolution	Elevation	USACE (lead), NOAA, Navy

3.7 Deployment Funding by Pre-arranged Data Collection Contracts.

Prior to the onset of a storm, NWS may enter into contracts with Collection Team members with mobile sensor capabilities. The terms and limitations of these contracts, and the processes by which these contracts will be crafted and executed, will be governed by NWSPD XXXX.

3.8 Data Management

Each Collection Team member will store and manage covered data it collected. As of this writing, the CWWED will be a federated database system that will respond to individual data requests by dynamically accessing and obtaining requested covered data from the members' online databases, assembling the data, and providing it transparently to the requestor as though the covered data had been extracted directly from a central storage system within the CWWED. The federated database approach avoids allocating the significant resources necessary to redundantly store and maintain vast quantities of covered data and ensure 24-7 synchronization with the original data sets. A visitor to the CWWED website would not discern that the covered data they request are distributed across multiple servers. Data delivery would be initiated by an automated request from the CWWED to a data provider for specific data. Responsibility for maintaining access to the covered datasets by the CWWED, and assuring data quality and integrity, would rest with the member. This would also allow access to real and near-real-time data, if available. If the data that a member collects cannot be accessed by a federated database, that member will submit the data directly to NCDC for direct storage in the CWWED. Information (metadata) describing the covered data and methods of access will be supplied by members to the CWWED, which will develop a covered data index, compile a metadata library, and construct Application Programming Interfaces (APIs) to connect the datasets to the CWWED.

3.9 After-Action Review

Within 120 days following the activation of a Data Collection Phase, the NWS Deployment Lead will hold a teleconference with Collection Team members to evaluate the execution of the protocol and associated policies and discuss whether changes are necessary to enhance future executions. The NWS Assessment Lead will also participate, in order to help ensure this protocol is meeting the needs of the NSEM. Subsequent meetings may be necessary to develop a full evaluation. Within 30 days of this meeting, the NWS Deployment Lead will present a written report on the findings of these discussions and recommended changes to the OFCM Director, the NOAA Assistant Administrator for Weather Services, the NCEP Director and the Chair of the WG/DIAP.

PHASE II – STORM ASSESSMENTS

The bulk of this protocol pertains mainly to activities conducted during the Data Collection Phase. There will be some data-related activities that require participation by Collection Team members during the Post-storm Assessment Phase. However, most post-storm assessments procedures and rules will be established in NWSPD XXXX.

1. Activation Criteria

The activation of the Data Collection Phase will not indicate that a post-storm assessment will be conducted for every U.S. state/territory impacted by the storm. The Post-storm Assessment Phase will be activated by the NWS Assessment Lead following the criteria and procedures established in NWSPD XXXX.

2. Data Sources

Although this protocol primarily addresses the coordination of mobile sensors, all sources of data listed in the COASTAL Act Capabilities Development Plan (CACDP) will be considered for assimilation into the NSEM by the NWS Assessment Lead. A comprehensive list of covered data sources can be found in the CACDP. The listing of possible covered data sources in coastal areas will be maintained and updated by NOAA and OFCM.

3. Timeline and Decisions

As noted in Section 1 of Phase II, additional details regarding the Post-Storm Assessment Phase timeline and procedures will be established in NWSPD XXXX and other technical documents maintained by NOAA. The details described below pertain mainly to data collection-related activities that could assist the NWS Assessment Lead.

+ 1 to + 30 days following the onset of 34-knot winds.

- NWS will consult FEMA on the necessity of a post-storm assessment in an impacted U.S. state/territory.
- Upon meeting the activation criteria established in NWSPD XXXX, the NWS Assessment Lead will activate the Post-storm Assessment Phase for a specific state/territory.

+ 1 to + 3 days following an activation of the Post-storm Assessment Phase

- The NWS Assessment Lead will immediately notify NWS Deployment Lead and OFCM of an activation of the Post-storm Assessment Phase and the target state/territory. The NWS Assessment Lead should take this opportunity to communicate any known concerns or specific requests related to covered data in the said state/territory.
- The NWS Deployment Lead and OFCM will notify all members of the Collection Team of a pending post-storm assessment and solicit assistance or suggestions for answering the data concerns/requests expressed by the NWS Assessment Lead.

+ 10 to + 30 days following an activation of the Post-storm Assessment Phase

- If necessary, the NWS Assessment Lead will work with Collection Team members on resolving any data-related issues that arise.
- Anticipated NSEM run by NWS Assessment Lead.
- Data available through the CWWED will be considered for assimilation into the NSEM.