



Integrated Water Resources Science and Services (IWRSS) Stakeholder Forum

with the

Interstate Commission on the Potomac River Basin

February 6, 2013

Outline

- **Integrated Water Resources Science and Services (IWRSS)**
- **Grand Challenges**
- **Forum Objectives**



Growing Water Challenges Impetus for IWRSS

- *Population growth and economic development are stressing water supplies and increasing vulnerability*
- *A changing climate is impacting water availability and quality, increasing uncertainty*
- *An aging water infrastructure is forcing critical, expensive decisions*
- *Socio-economic risks of floods and droughts are escalating*



Blue Gold, "The New Oil"

IWRSS Partners and Missions



- ***Water Science*** - to collect and disseminate reliable, impartial, and timely information needed to understand the Nation's water resources in order to minimize loss of life and property from natural disasters



**US Army Corps
of Engineers®**

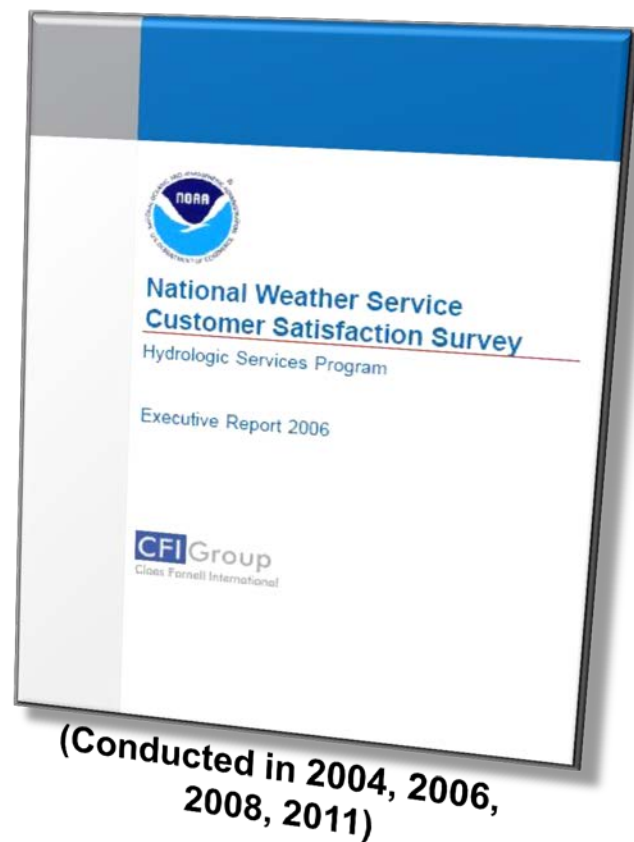
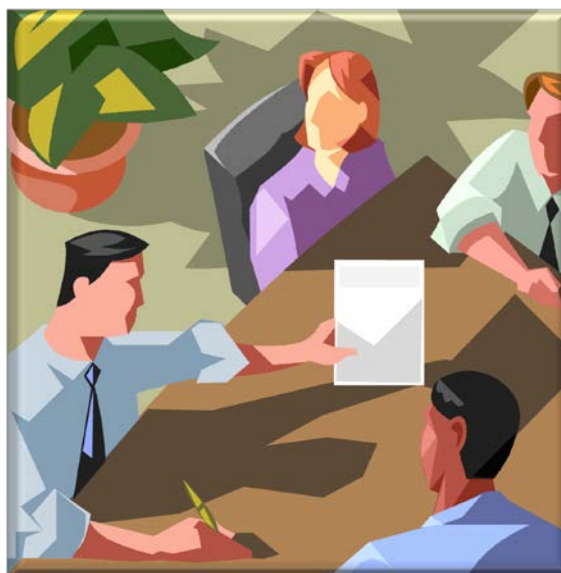
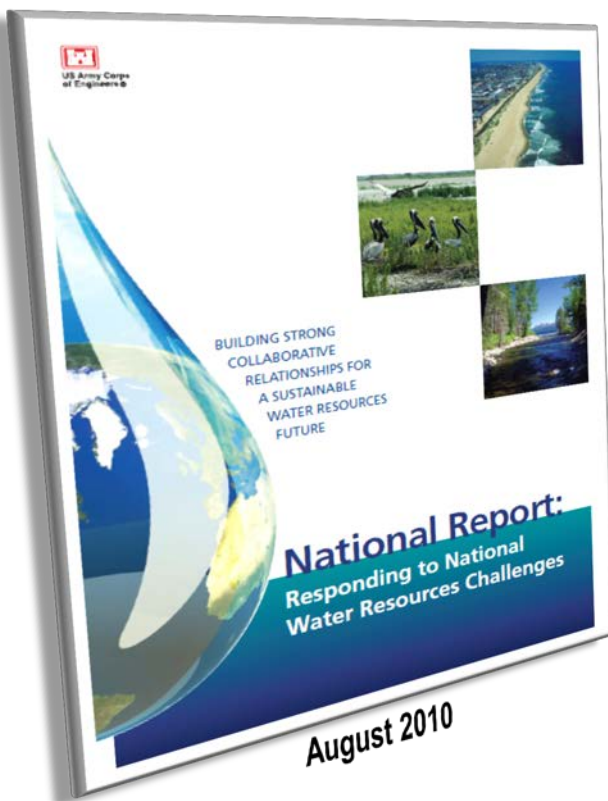
- ***Water Management*** - to strengthen our Nation's security, energize the economy, and reduce risks from disasters



- ***Water Prediction*** - to provide weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy

Emerging Stakeholder Needs

- *Provide high spatial and temporal resolution “summit to sea” analyses and forecasts for full spectrum of water budget parameters*
- *Expand the temporal range, improve the accuracy, and quantify the certainty of river stage and volume forecasts*
- *Provide static flood inundation map libraries and real-time flood forecast inundation mapping services*
- *Link river forecasts and associated flood inundation to potential socioeconomic impacts*
- *Integrate access to the geospatial water resource information from multiple federal agencies through a single portal*



IWRSS Five Point Strategy

IWRSS: Innovative Partnership

- New business model for interagency collaboration
- Share technology, information, models, best practices
- Address complex, multidisciplinary issues collaboratively
- Leverage Investments through joint planning and development
- Common Operating Picture

Enriched Stakeholder Participation

- Strengthen participatory processes
- Understand and document growing information needs
- Quantify value of new/improved services and develop social capital
- Inform design, development and implementation activities

New Digital Information Products

- Summit to Sea
- Floods to Droughts
- Coherent Past, Present and Future information
- Extend forecast range, improve accuracy, quantify uncertainty
- Enhanced mapping capabilities linked to impact information

Improved Supply and Distribution

- Interoperable Systems
- Data Synchronization
- Enterprise Geo-Intelligence
- Single Portal for Water Information

National Water Center

- New bricks and mortar facility
- Catalyst for synthesis and integration
- Proving Ground for accelerated R2O
- National water forecasting operations center
- Multi-agency staffing

IWRSS Roadmap and MOU

Integrated Water Resources Science and Services (IWRSS)

*An Integrated and Adaptive Roadmap for
Operational Implementation*

Don Cline, NOAA (Compilation)

IWRSS Workshop Participants (NOAA, USACE, USGS)

Cross-cutting Theme Teams for Human Dimensions and
Technical Information Services

Regional Case Study Contributors



US Army Corps
of Engineers



February 2009

DRAFT v1.1
February, 2009

MOU Signed May 11, 2011

*“Collaborative Science, Services and Tools to
Support Integrated and Adaptive Water Resources
Management”*

Signatories



Dr. Jane
Lubchenco,
NOAA
Administrator

Terrance “Rock” Salt
for Jo-Ellen Darcy,
Assistant Secretary
of the Army for Civil
Works

Dr. Marcia McNutt,
Director of the
U.S. Geological
Survey

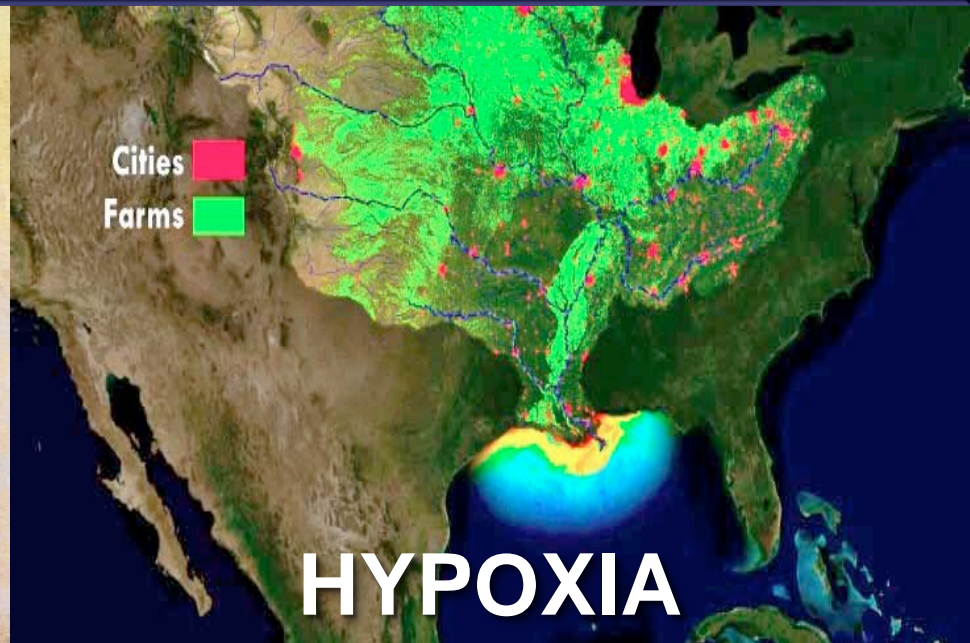
Initial Focus Areas

- High-Resolution Water Resource Forecasts
- Flood Inundation Mapping
- System Interoperability and Data Synchronization

Grand Challenges



WATER SECURITY



HYPOXIA



HYDROLOGIC EXTREMES



Grand Challenge #1

Ensure water security by:

- a) Predicting surface and groundwater availability in all watersheds to enable water users to determine the least-cost source and plan for droughts,**
- b) Predicting water flow and depth in all rivers to permit optimal operation of multiple-use reservoirs, facilitate navigation and fully inform flood fighting efforts on levees, and**
- c) Tracking and predicting movement of hazardous contaminants accidentally or deliberately released into the water supply to enable effective operation of control structures and issuance of notifications.**

WATER SECURITY

Grand Challenge #2

Understand and seamlessly predict the full range of hydrologic extremes, from floods to droughts and from short-term to long-term, and their relationships to large-scale climate, land and water management practices and other drivers.

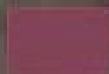
HYDROLOGIC EXTREMES

Grand Challenge #3

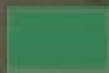
Reduce the occurrence of estuarine hypoxia everywhere along our coastline by:

- a) Tracking nutrient and sediment movement throughout watersheds nationwide, and**
- b) Providing actionable predictive information that allows managers to effectively and efficiently control sources and enables more effective legislation**

Cities

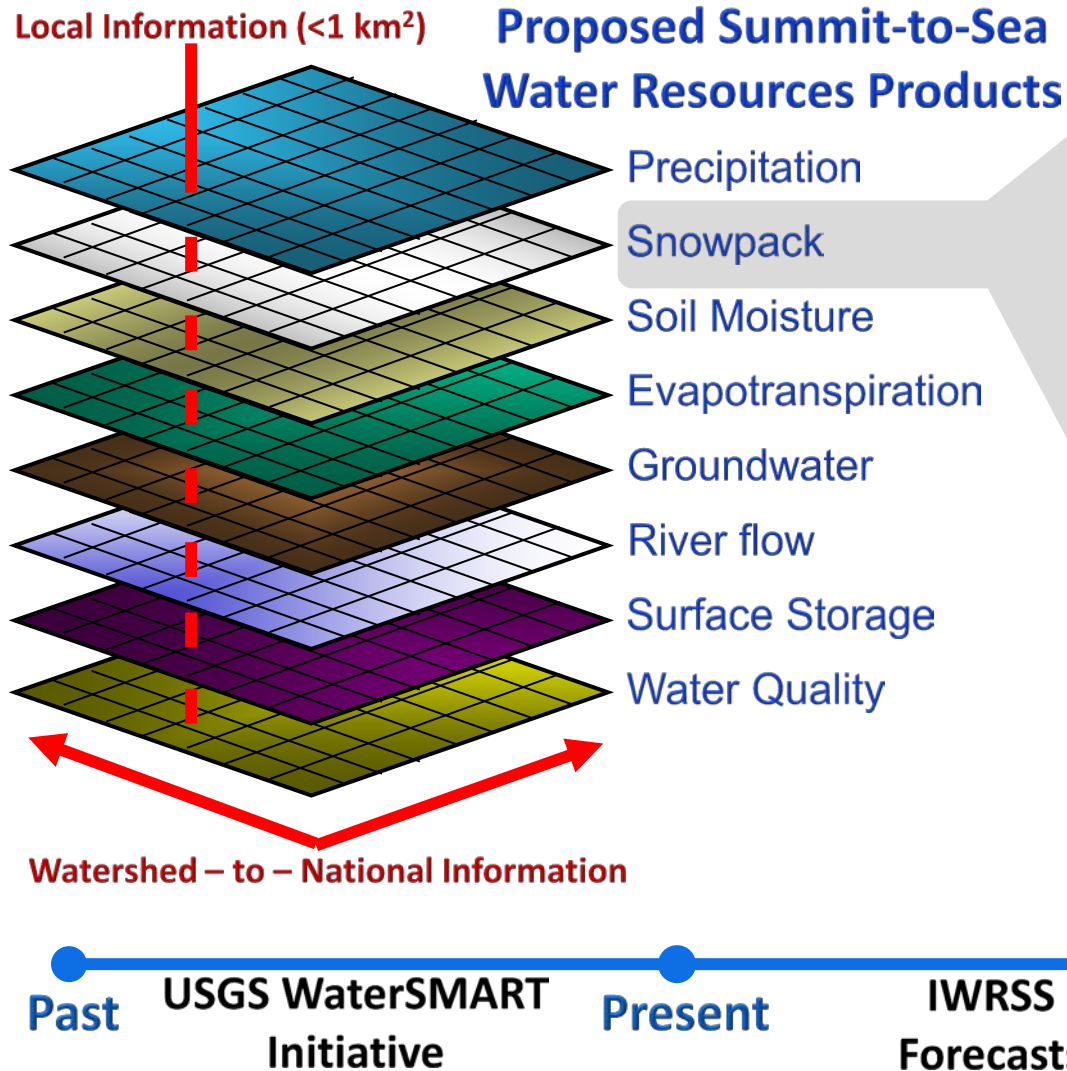


Farms

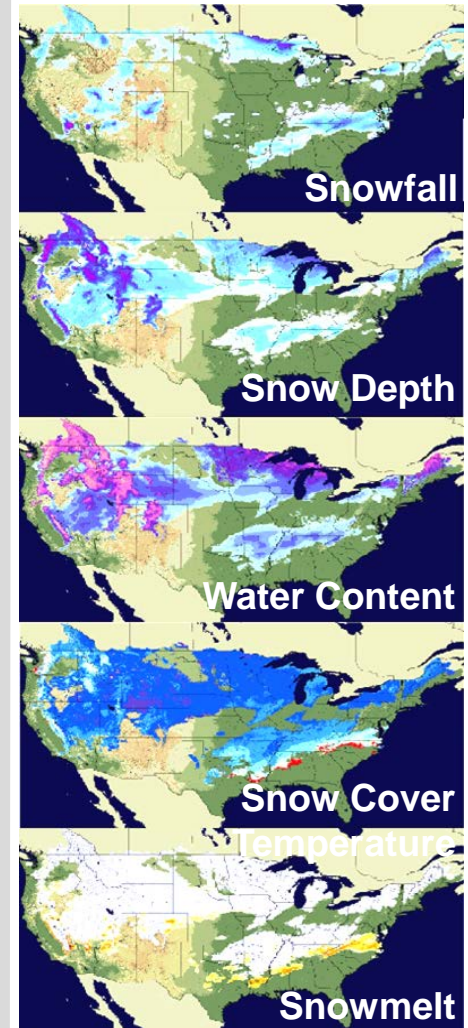


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New Digital Information Products



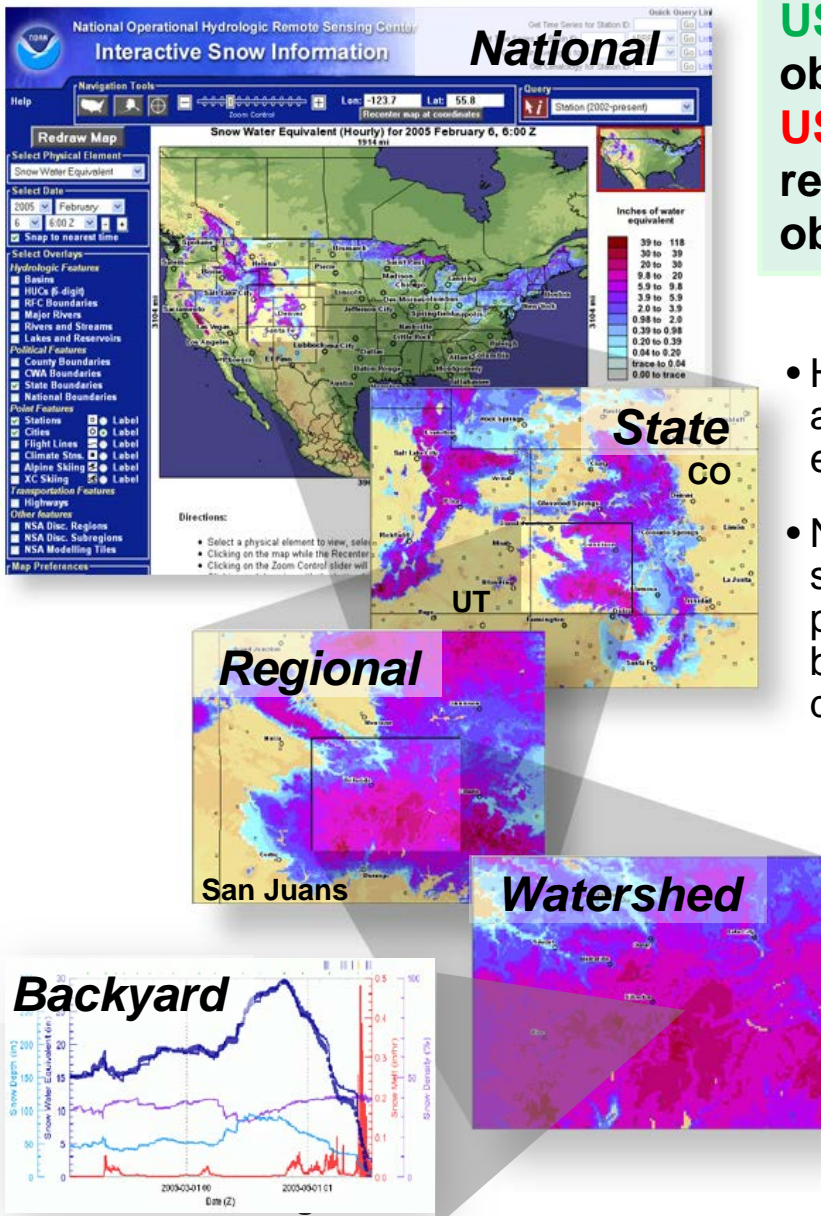
Pilot Snowpack Products



www.nohrsc.noaa.gov

High-Resolution Water Budget Information

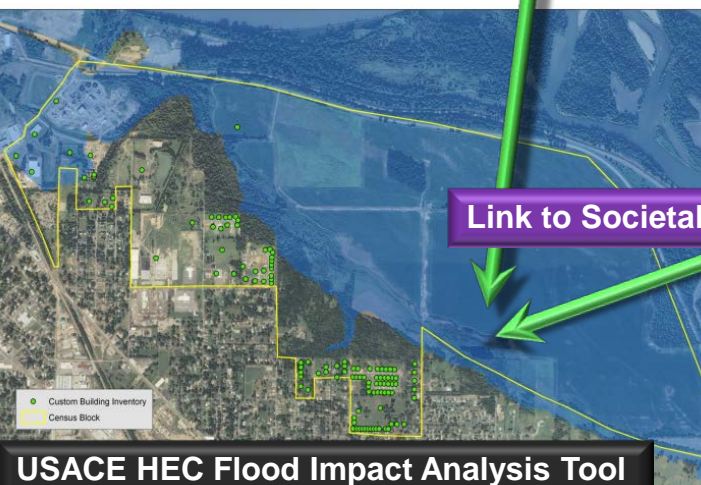
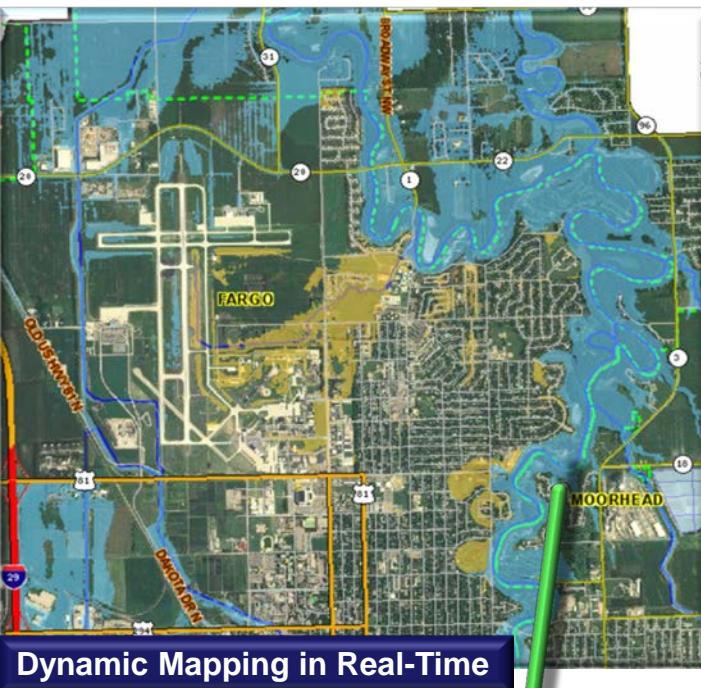
Enhancing services through improved data integration and modeling



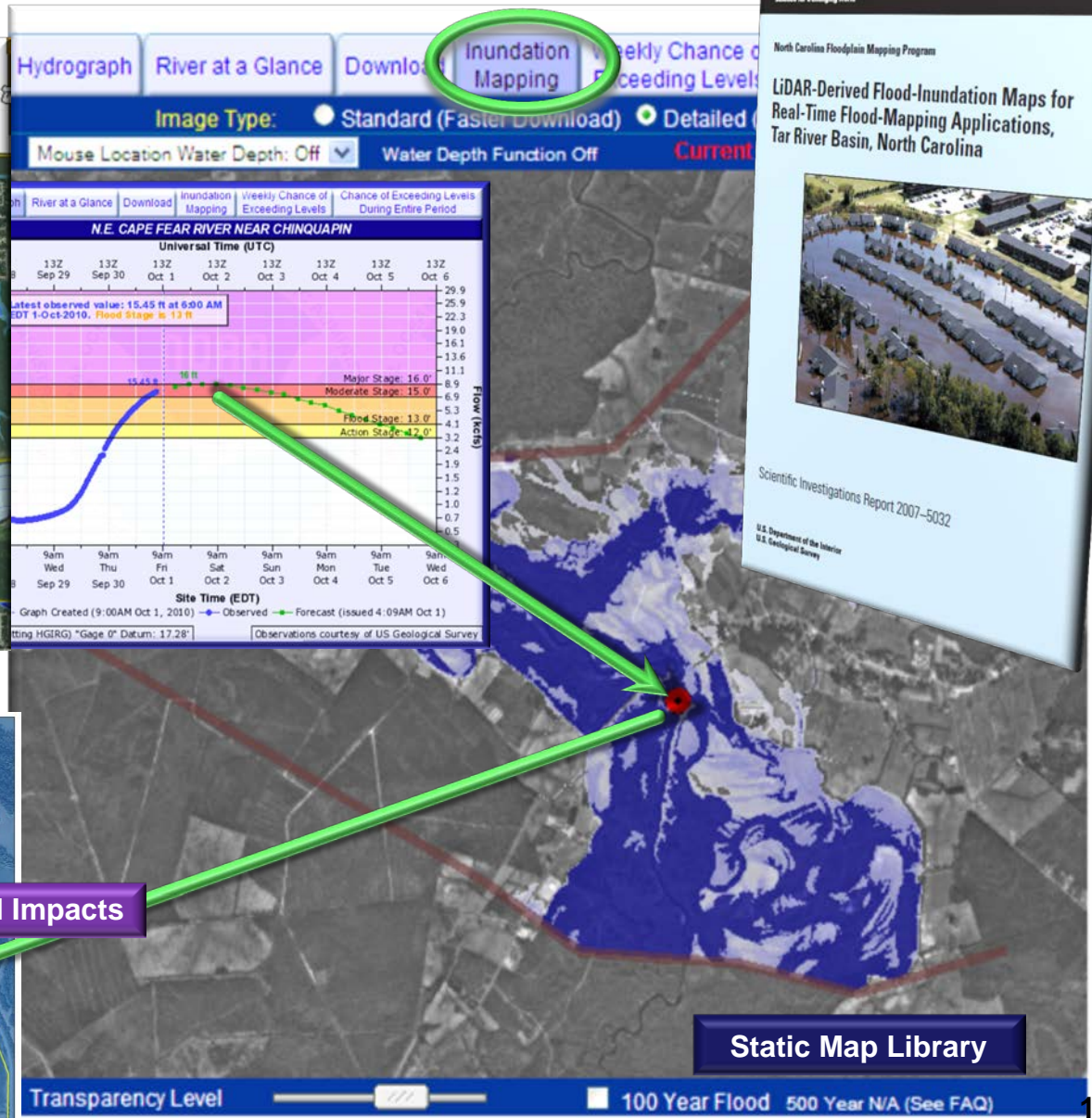
USGS provides climatological and real-time observations of surface water and groundwater, **USACE** manages flood control and water supply reservoirs, and **NOAA** provides environmental observations and forecasts

- High impact and routine high value planning and mitigation activities informed by past, current, and predicted environmental information
- New joint national water model (e.g., coupled atmospheric, surface water, groundwater, coastal estuary model) will provide enhanced water quantity and quality forecasts to better account for, predict the effects of, and/or support decisions related to:
 - natural changes in recharge
 - a changing climate (e.g., sea level rise/salt water intrusion)
 - water supply, water use/competing demands (e.g., agriculture, hydropower, municipal water supply, recreation, river commerce)
 - extreme events (e.g., floods and droughts)
 - ecosystem management, species/habitat protection
 - point/non-point pollution/contamination

New Digital Information Products



Link to Societal Impacts



Static and Dynamic Flood Inundation Mapping

Created using a common approach among NOAA, USGS and the USACE

Flood Inundation maps enhance the conveyance of risk and build community resiliency

Static:

- Linked to socioeconomic impacts, used by emergency managers to develop emergency action plans and prioritize responses.
- Used by planners to inform land use and development decisions in the floodplain, plan for levee construction, identify and protect wetlands and associated native species, or other mitigation techniques.

Dynamic:

- Produced in near-real time in high flow scenarios
- Enhanced modeling and predictions of timing and uncertainty of the flood peak
- More effective and safe response in emergency situations
- Changes in levees by USACE during the flood fight can be used to update dynamic maps and better reflect flooding conditions.

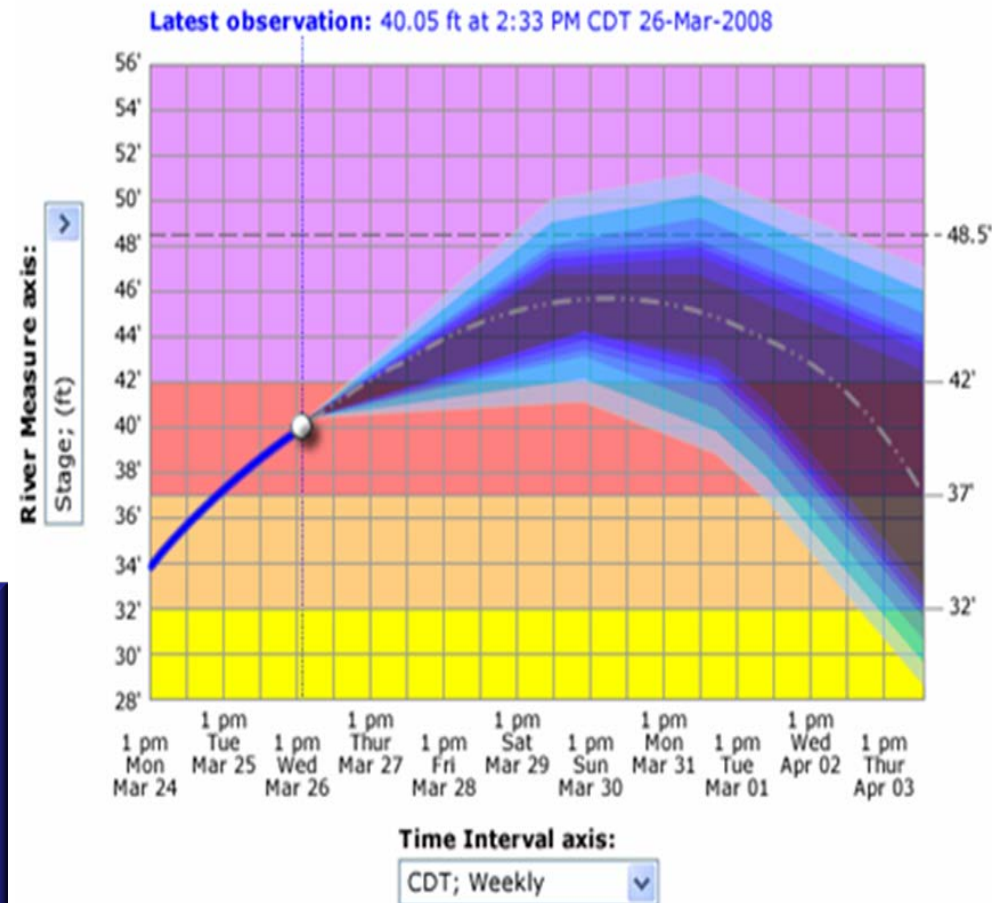


Forecast point is at gauge 1.7 miles upstream

New Digital Information Products

Hydrologic Ensemble Forecast System (HEFS)

- Probabilistic information to support risk-based decisions
- Seamless short- to long-term ensemble forecasts within the Community Hydrologic Prediction System (CHPS)
- Incorporates both atmospheric and hydrologic uncertainties



Implementation Status

- ✓ *Demonstrating components of short-term capability at 6 RFCs*
- ✓ *Will deploy additional prototypes during the next 2 years*
- ✓ *Initial version of full capability in 2014*

Hydrologic Ensemble Forecast Service (HEFS)

NOAA predictions of streamflow and stage and associated uncertainty rely on reservoir release information from the USACE and observations and rating curves from the USGS.

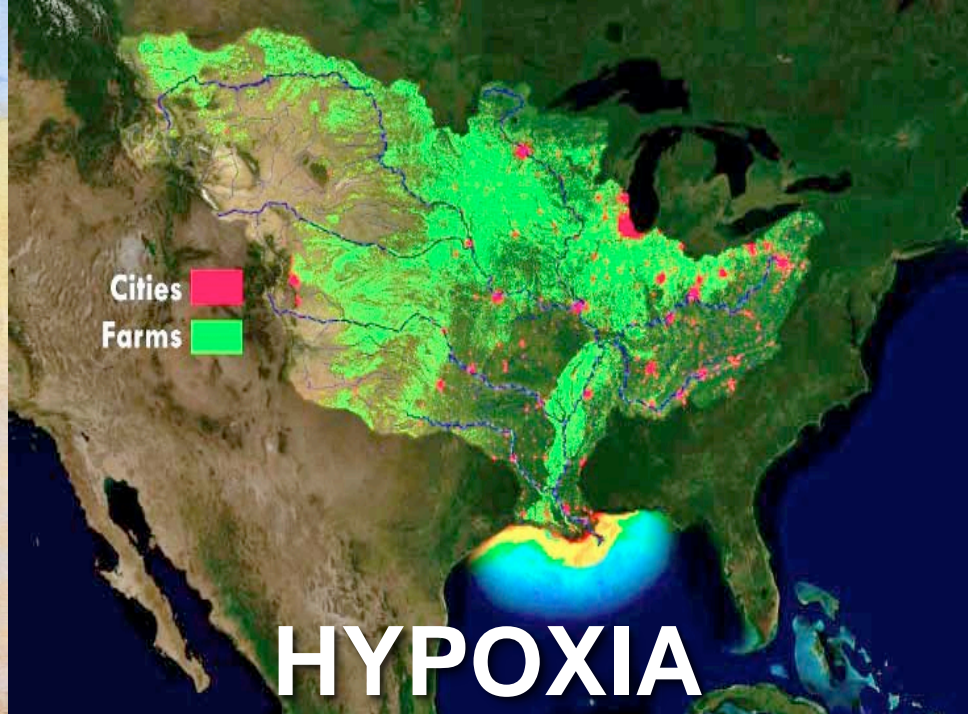
Better in-stream forecasts which quantify uncertainty in flow, stage, and volume will better inform/optimize decisions made by watershed managers, reservoir operators, energy producers, agribusiness, river commerce, industrial users, etc.



- Balance intake with requirements for consumptive use withdrawals, ecological releases, downstream flow targets, salt line, etc.
- NYC DEP uses in-stream forecasts with uncertainty information to make decisions about water releases to meet downstream low flow and water quality requirements
- Would inform the recreation sector when water level might interfere with activities (e.g., Boating/rafting, fishing can't operate under too low flows)
- More accurate forecasts help optimize river commerce decisions (e.g., barge traffic relies on very precise depths and velocities to optimize transport decisions)



WATER SECURITY



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Stakeholder Engagement Forum

Primary Objectives and Planned Outcomes:

- Listen, learn and use the information you provide to inform the design of IWRSS
- Understand and document the water resource decisions you make and document the information/services you need to enhance your decision making
- Integrate and prioritize your water resource information and service requirements, identify gaps, and quantify the socioeconomic benefit of addressing these gaps
- Develop a demonstration project plan which enables us to address your requirements/gaps through the provision of new information and services
- Develop business case to garner resources necessary to conduct demonstration projects with you