NWS Constituent Briefing
FY2017 President's Budget Request

Dr. Louis W. Uccellini
Director, National Weather Service
NOAA Assistant Administrator for
Weather Services

March 23, 2016

Baseline: 2012 - 2013

- Operational computer – under resourced; model upgrades and implementation – lagging
- Dissemination systems– not sustainable during November 17, 2013, severe weather outbreak and December 2013 storm event
- Travel – slashed, including local travel for operational support
- Training – slashed
- Conference attendance – minimized
- Facilities in disrepair
- CSTAR on life support
- Vacancies worsened by sequestration threat
- Components of NWS field structure not working well together – inconsistent products and services

NWS Strategic Outcome: A Weather Ready Nation

Becoming a Weather-Ready Nation is about building community resiliency in the face of increasing vulnerability to extreme weather, water & climate events

"Ready, Responsive, Resilient"

- **Requires NWS to produce:**
  - *Better forecasts and warnings*
  - *Consistent products and services*
  - *Actionable environmental intelligence*
- **NWS needs to address the "last mile" that connects forecast to critical national, state and location decisions**
  - *Provide Impact-based Decision Support Services (IDSS)*
  - *Deliver through multiple and reliable dissemination pathways*
  - *Work with partners , including embedding NWS in Emergency Operations Centers and incorporating Social Sciences, to gain public's needed response*

Involves entire US Weather, Water and Climate Enterprise WORKING TOGETHER to achieve national preparedness for weather, climate and water events

Becoming a Weather-Ready Nation is about building community resiliency in the face of increasing vulnerability to extreme weather, water and climate events

Generating forecasts and warnings + Connecting those forecasts/warnings with partner decision-making process = **IDSS**

Impact-based Decision Support Services

Trust

The best hydrometeorological forecasting in the world

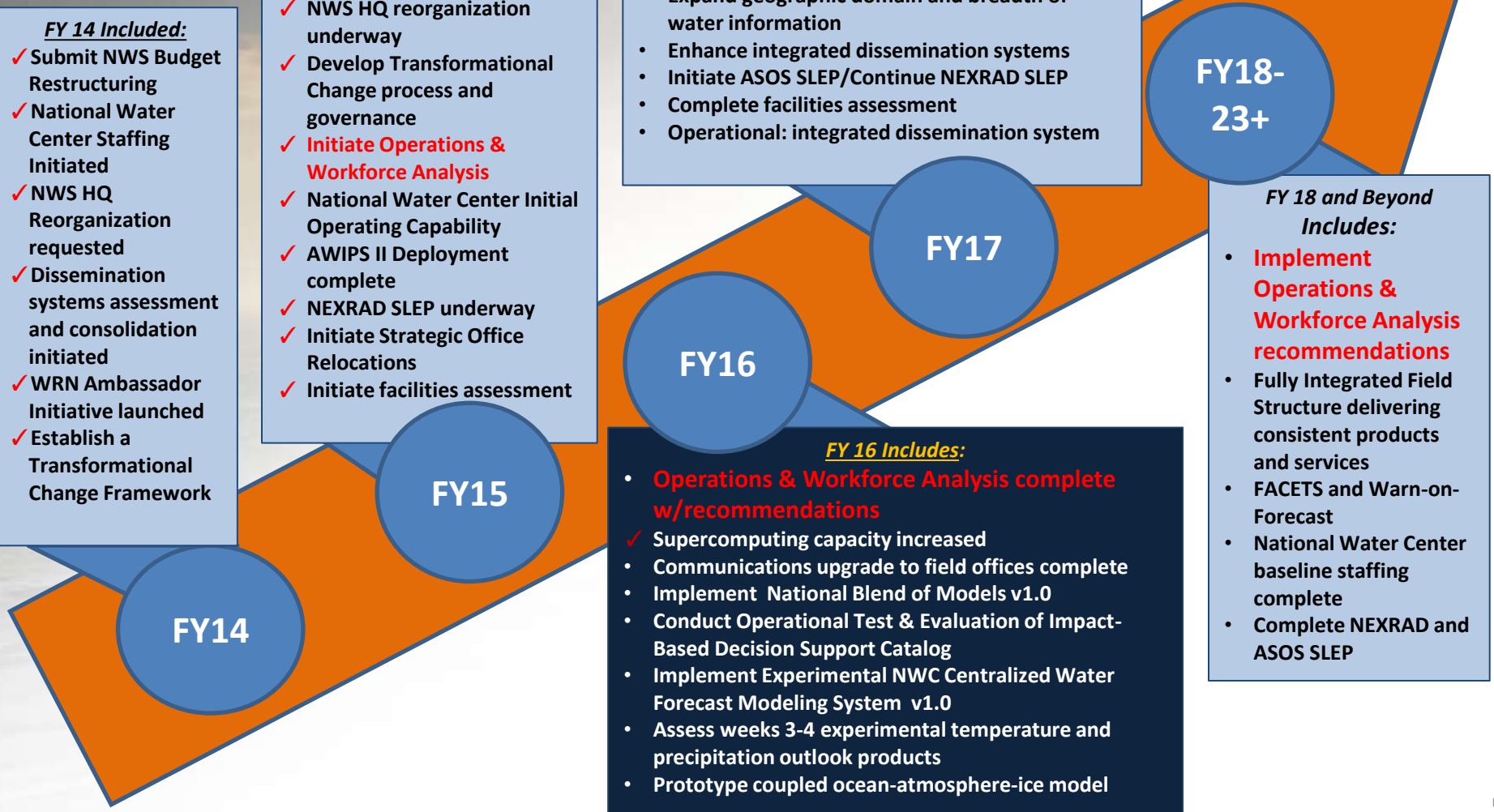
Practice, practice, practice!

Develop relationships / know partner needs

Embed

"Ready, Responsive, Resilient"

Key Milestones



FY 14 Included:

- ✓ Submit NWS Budget Restructuring
- ✓ National Water Center Staffing Initiated
- ✓ NWS HQ Reorganization requested
- ✓ Dissemination systems assessment and consolidation initiated
- ✓ WRN Ambassador Initiative launched
- ✓ Establish a Transformational Change Framework

FY14

FY 15 Includes:

- ✓ New budget structure implemented
- ✓ NWS HQ reorganization underway
- ✓ Develop Transformational Change process and governance
- ✓ Initiate Operations & Workforce Analysis
- ✓ National Water Center Initial Operating Capability
- ✓ AWIPS II Deployment complete
- ✓ NEXRAD SLEP underway
- ✓ Initiate Strategic Office Relocations
- ✓ Initiate facilities assessment

FY15

FY 16 Includes:

- Operations & Workforce Analysis complete w/recommendations
- ✓ Supercomputing capacity increased
- Communications upgrade to field offices complete
- Implement National Blend of Models v1.0
- Conduct Operational Test & Evaluation of Impact-Based Decision Support Catalog
- Implement Experimental NWC Centralized Water Forecast Modeling System v1.0
- Assess weeks 3-4 experimental temperature and precipitation outlook products
- Prototype coupled ocean-atmosphere-ice model

FY16

FY 17 Includes:

- Test & evaluate recommendations from Operations & Workforce Analysis
- Continue National Water Center baseline staffing
- Expand geographic domain and breadth of water information
- Enhance integrated dissemination systems
- Initiate ASOS SLEP/Continue NEXRAD SLEP
- Complete facilities assessment
- Operational: integrated dissemination system

FY17

FY18-23+

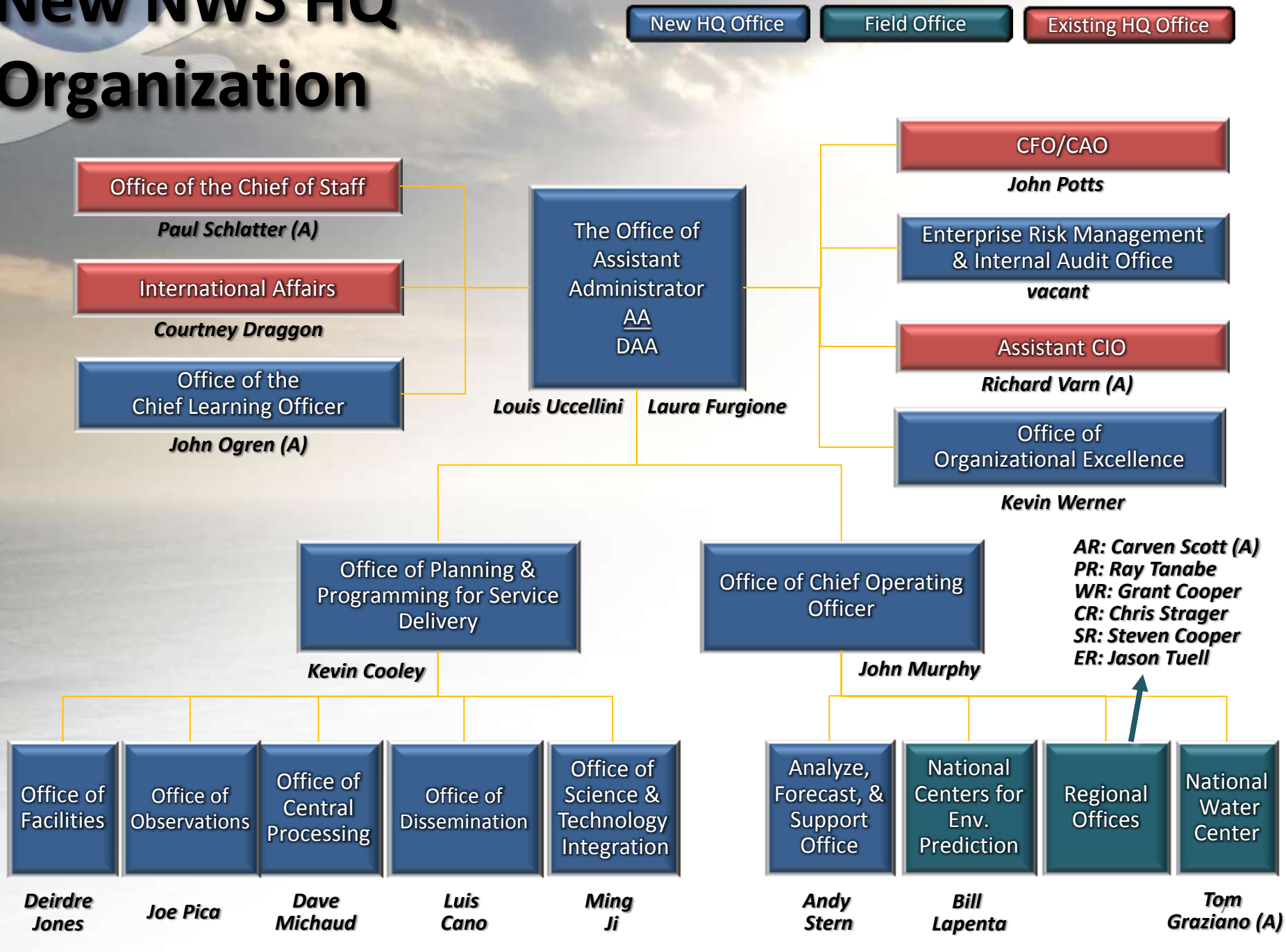
FY 18 and Beyond Includes:

- Implement Operations & Workforce Analysis recommendations
- Fully Integrated Field Structure delivering consistent products and services
- FACETS and Warn-on-Forecast
- National Water Center baseline staffing complete
- Complete NEXRAD and ASOS SLEP

New Planning & Budget Structure Increases Transparency and Enhances Service Delivery

Observations Joe Pica	A focused effort on sustaining & integrating all observations supporting the NWS mission and ensuring continuous situational awareness.
Central Processing David Michaud	Fully integrating the central and distributed computing system from central computer to AWIPS/AHPS
AFS Andrew Stern	Includes all NWS forecast offices: - Working toward "fully integrated field structure" providing consistent products & services - Supports IDSS, outreach, social science integration *(nature of work will change)*
Dissemination Luis Cano	Better managed, reliable, centralized, and more responsive network, especially during high impact events.
STI Ming Ji	Accelerates numerical model advances, supports forecaster training/development Provides a centralized development environment to enable Research to Operations (R2O) & a visible "catcher's mitt" for the rest of the community interested in R2O process
Facilities Deirdre Jones	Make sustaining all of the NWS facilities a fundamental part of the NWS mission execution

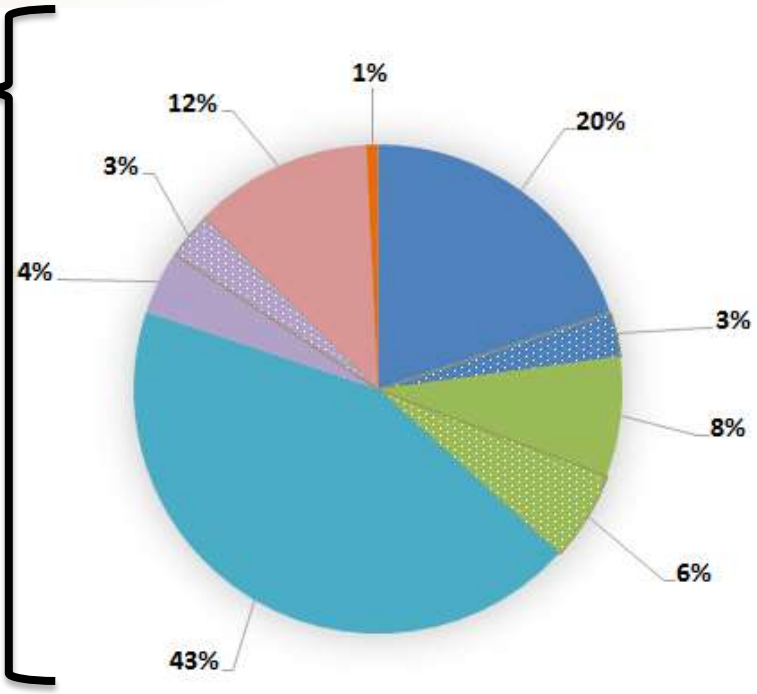
New NWS HQ Organization



FY2017 NWS President's Budget Request Composition by Portfolio

Funds Breakdown

Programs, Projects and Activities	$ thousands	FTE
Observations ORF	222,996	933
Observations PAC	32,755	0
Central Processing ORF	88,388	134
Central Processing PAC	66,761	22
Analyze, Forecast and Support ORF	485,931	2,908
Dissemination ORF	47,236	82
Dissemination PAC	34,619	0
Science and Technology Integration ORF	131,956	470
Facilities PAC	8,650	0
Total	**1,119,292**	**4,549**



High Priority Activities (FY2016-7017)

Science & Technology Integration

- Model upgrades: GEFS, HWRF, NWPS, HRRR, NWM
- HEFS implementation in RFCs
- Exp. Winter Wx days 4-7 outlook
- Exp. Arctic Sea Ice Outlooks,
- Grants: CSTAR/NGGPS/HFIP/Testbeds ($4.7M FY16)
- National Blend of Models V1/Virtual Lab
- Exp. Week 3-4 Temp and Precip
- Geospace Model Transitioned

Observations

- JPSS/GOES-R Readiness
- NEXRAD Service Extension
- Autosonde testing
- Buoys sustained
- ASOS SLEP

Facilities

- Relocation with partners, if possible
- Second one-third Facility Condition Assessments
- WFO Relocations: Phoenix & Cleveland

Central Processing

- Central Computer Upgrade
- AHPS locations added
- AWIPS/NAWIPS Merger

Dissemination

- "One NWS Network"
- NOMADS, MAG, MADIS, MRMS, nowCOAST, FTPPRD, www.weather.gov

WRN Ambassador Initiative
2600+ Ambassadors

Analyze, Forecast & Support

- Impact-based Decision Support
- Hazard Simplification
- National Impacts Catalog
- Enable Ecological Forecasting
- Impact-based Warning Demo expanding nationally
- Weather/Climate linkage (e.g., week 3-4 outlooks)
- Storm Surge Watch/Warnings
- Probabilistic Winter Outlooks and snowfall predictions
- National Water Model Exp. products

Computer Status/Model Implementation

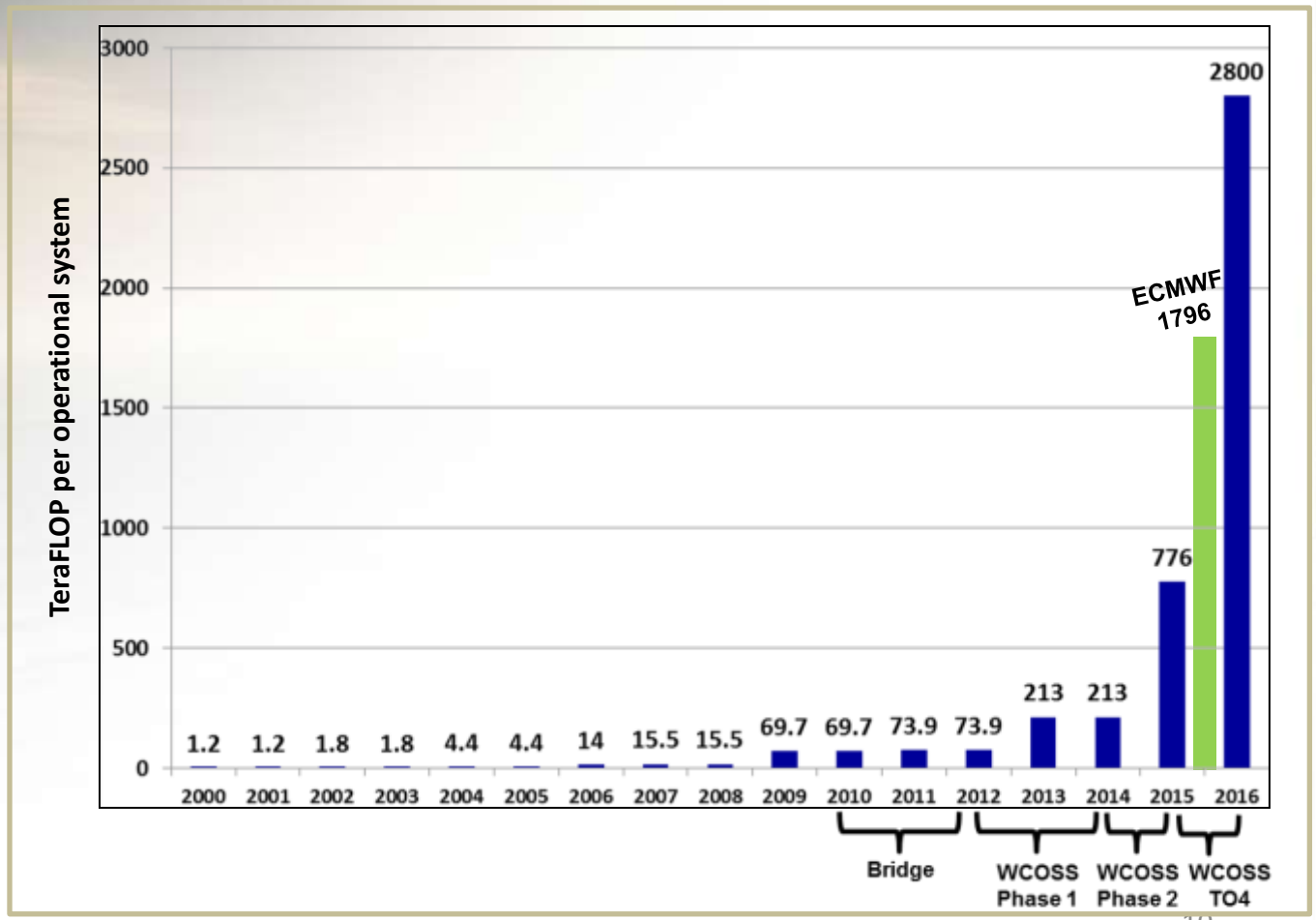
Supported Thru HFIP and Sandy Supplemental

Key Atmospheric Model Upgrades Complete:

- Sept 2014: High-Resolution Rapid Refresh (HRRR) operational – 3km every hr.
- Jan 2015: Global Forecast System (GFS) upgraded – 13km out to 10d.
- June 9, 2015: 2km HWRF
- September 2015: SREF, GEFS

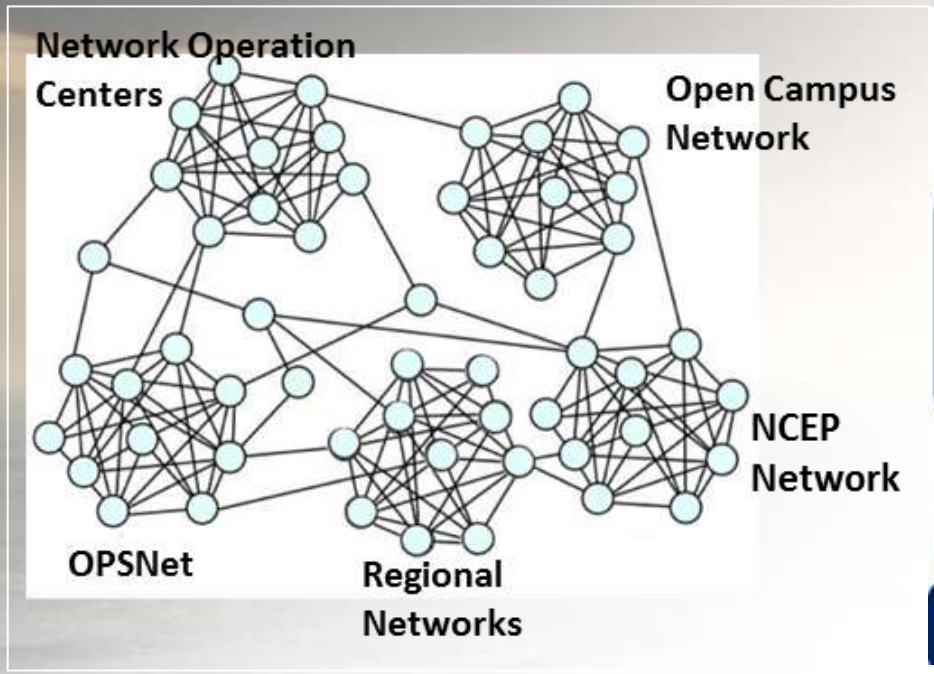
- Upcoming Model Upgrades:
  - **GFS/4D ENKF**
  - **HRRR v2.0 (HRRRe)**
  - **HWRF – Storm Surge**
- HPC-Based Water Modeling:
  - **Deploy National Water Model v1.0 on WCOSS (FY16)**

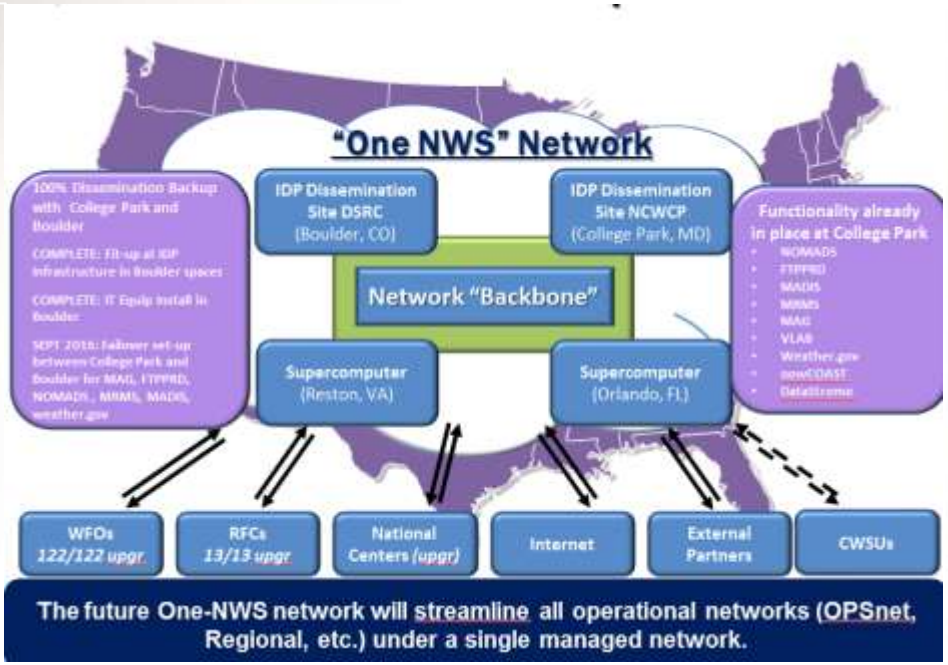
Increased HPC capacity to 2.8 petaFLOPs
***(for primary and backup, respectively–for a total of 5.6 PF)* - Implemented**



10

Dissemination
NWS Network Updates

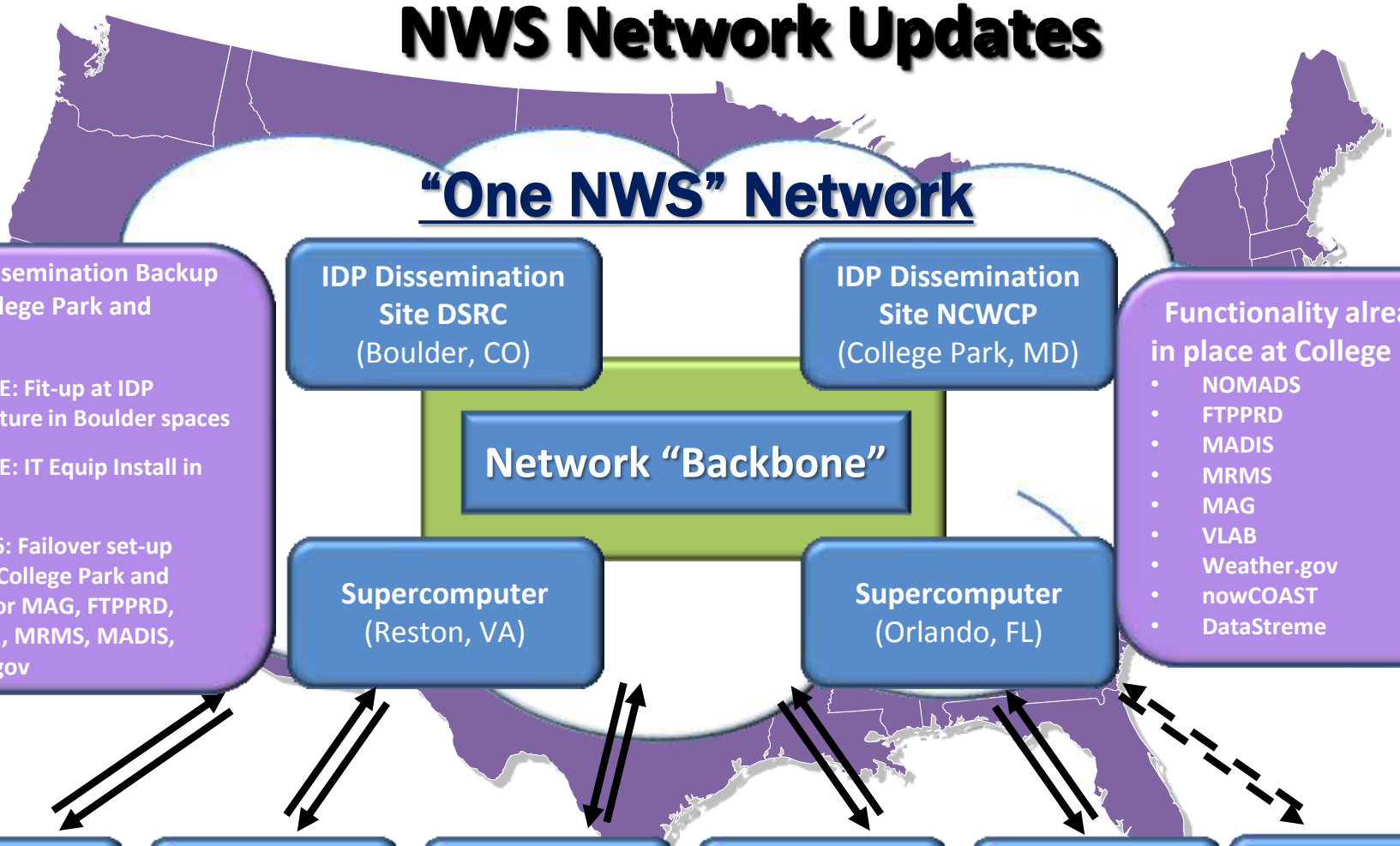




From this → **To this**

Dissemination

NWS Network Updates



The future One-NWS network will streamline all operational networks (OPSnet, Regional, etc.) under a single managed network.

National Water Center

Initial Operating Capability: May 26, 2015

VISION: **Scientific excellence and innovation driving water prediction to support decisions for a water resilient nation.**

BENEFITS:

- **State-of-the science modeling for global to street level predictions *(from 6,000 forecast locations to 2.7 million stream reaches)***
- **Operations Center to establish common operating picture within NOAA and among water agencies; decision support for floods to droughts *(flood mapping to street level)***
- **Proving ground to accelerate research to operations; partnerships with research communities *(e.g. CHUASI, National Flash Flood Interoperability Experiment)***
- **Data integration and service backup**

FY 2017 PAC Budget Highlights

Total PAC Budget = $142,785,000

Reflects Net Increase of $7,470,000 in FY 2017 Program Changes

Summary of PAC Program Changes: Observations Portfolio

Project	What	Change	FY17 Submit
NEXRAD SLEP	• Continue implementation of NEXRAD SLEPT to Extend useful life by ~15 years • Four components: receiver/signal processor, transmitter, pedestal, shelter	$8.5	$25.3
ASOS SLEP	• With FAA, maintain required observations and advance dissemination	$7.5	$7.5

Summary of PAC Program Changes: Central Processing Portfolio

Project	What	Change	FY17 Submit
Integrated Water Prediction	• Provide HPC capacity to support Nation's first Integrated Water Prediction capability	$4.5	$66.8
R&D HPC	• Reduce future R&D High Performance Computing capacity in support of HFIP • Maintain at current capacity	($2.0)	$2.0

Summary of PAC Program Changes: Dissemination Portfolio

Project	What	Change	Total Budget
Complete NWSTG	• Planned reduction reflects completion in FY17 of the 4-year project to modernize and re-architect the NWS Telecommunications Gateway	($7.6)	$10.9
Ground Readiness Project	• Reflects completion of 3-year GRP that prepared NOAA for 3x increase in data from satellites, models and radar	($3.5)	$16.1

FY 2017 ORF Budget Highlights

Total ORF Budget = $976,507,000

Reflects Net Decrease of $26,021,000
in FY2017 Program Changes

Summary of ORF Program Changes: Dissemination Portfolio

Project	What	Change	Total Budget
NOAA Weather Radio	• Provide for O&M of NWR network at current levels. • FY16 levels not sufficient to maintain NWR program at necessary levels	$2.0	$47.2

Summary of ORF Program Changes: Central Processing Portfolio

Project	What	Change	FY17 Submit
AWIPS Refresh	• Minimal funding level required for AWIPS cyclical replacement • Basis for "Fully Integrated Field Structure" • Maintain Industry Standard 5-year replacement cycle	$5.1	$98.5
READI Teams	• Provide cost-effective, consistent IT support for the field through investments in open source software and implementation of IT best practices • READI teams will be located in each of the six NWS regions and HQ.	($10.1)	$2.5

Summary of ORF Program Changes: Science & Technology Integration Portfolio

Project	What	Change	Total Budget
Shift to Integrated R2O Approach	• Refocus R2O efforts on integrated modeling and forecast applications improvement approach • Reduce funds to regional models, specifically HFIP	($3.0)	$135.8
COASTAL Act	• Cease work specific to Consumer Option for an Alternative System to Allocate Losses (COASTAL) Act of 2012	($4.6)	0.0

Summary of ORF Program Changes: Analyze, Forecast & Support Portfolio

Project	What	Change	FY17 Submit
NTHMP Grants	• Eliminate grant funding to focus on critical tsunami warning activities	($6.0)	$8.7
Eliminate Telecom Circuits	• Eliminate redundant circuits resulting from implementation of Integrated Dissemination Program	($3.0)	$487.9

Evolving the National Weather Service

NWS OWA Phase 1 Summary

OWA External Survey sent to EMs (Summer 2015)

Analysis of surveys and interviews (Fall 2015)

OWA identified the need for service consistency and role clarity for both internal operations and external IDSS (Winter 2015)

OWA Operating Model Workstream will focus on Impact-Based Decision Support Services (IDSS):

NWS employees embrace IDSS, and EMs use IDSS with high customer satisfaction

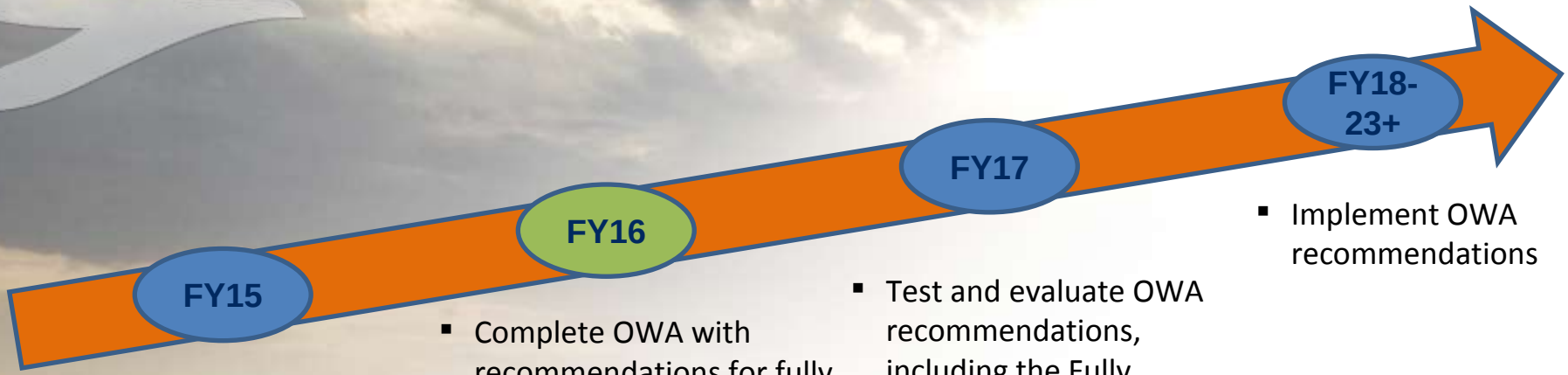
However, there are a number of definitions of IDSS, including in terms of what IDSS products are provided, how IDSS is delivered, when IDSS is delivered and to whom IDSS is being delivered

*"I trust my partners at NWS and **I know them** – the tone of their voice, the way they report out to us. And they know me."*

*"We have to know what the NWS can do for us, but **we also have to know what they can't do, or we'll ask them to do everything**, and, God help them, they'll try and give it to us"*

OWA Timeline

Where we are today



	FY15	FY16	FY17	FY18-23+
Overall	▪ OWA diagnostic on baseline and gaps to support WRN across org structure, workforce, and operating model	▪ Complete OWA with recommendations for fully integrated field and collaborative forecast process	▪ Test and evaluate OWA recommendations, including the Fully Integrated Field Structure (FIFS)	▪ Implement OWA recommendations
Details	▪ Clarify IDSS policy ▪ Conduct OHI survey ▪ Identify actionable ideas	▪ Rollout IDSS policy ▪ Evaluate and enhance forecasting process ▪ Give guidance on Fully Integrated Field Structure (FIFS) design ▪ Drive actionable ideas	▪ Test and evaluate FIFS organizational changes ▪ Refine IDSS approach ▪ Continue NBM[1] ▪ Reassess OHI ▪ Launch new actionable ideas	▪ Complete FIFS ▪ Ensure NBM in all regions ▪ Adjust roles and skills ▪ Assess and support actionable ideas

Engage and communicate with internal and external stakeholders

1 NBM refers to the National Blend of Models

Extraordinary Success in Predicting Extreme Events

- Post Christmas 2015
  - 6-8 day lead time for heavy rain, snow, severe weather
  - IDSS provided from national to local level
- January 2016 East Coast Blizzard
  - 8 day lead time drove IDSS at the state and local level
- March 2016 Texas and Louisiana Floods
  - 7 day lead time highlighting the flood potential
  - IDSS provided from national to local level

Post Christmas Storm (Dec. 25-28, 2015): The Spectrum of IDSS

Preparedness

Federal and State Actions

- Maintained situational awareness through NWS and liaison briefings (as early as Dec 22)
- Alerted response teams and assets for possible activation or deployment (over holiday weekend)
- Increased level of coordination across federal, state and local jurisdictions

Weather Forecast for Sat, Dec 26, 2015, issued 4:29 PM EST
DOC/NOAA/NWS/NCEP/Weather Prediction Center
Prepared by Santorelli based on WPC, SPC and NHC forecasts

Immediate Response

Tornadoes

WFO Fort Worth created preliminary tornado tracks in collaboration with SR-ROC and liaisons; FEMA analyzed impacts to support activation and deployment decisions

Blizzard

State and local municipalities mobilized to address road conditions and open shelters

Flooding

- Emergency Response Specialist (ERS) deployed to FEMA VII Regional Response Coordination Center
- NOAA Liaison to FEMA and ERS highlighted greatest flood risk to support staging operations

States of Emergency Declared

Dec 27: TX/NM/MO; Dec 28: OK; Dec 29: IL; Dec 30: MS/LA

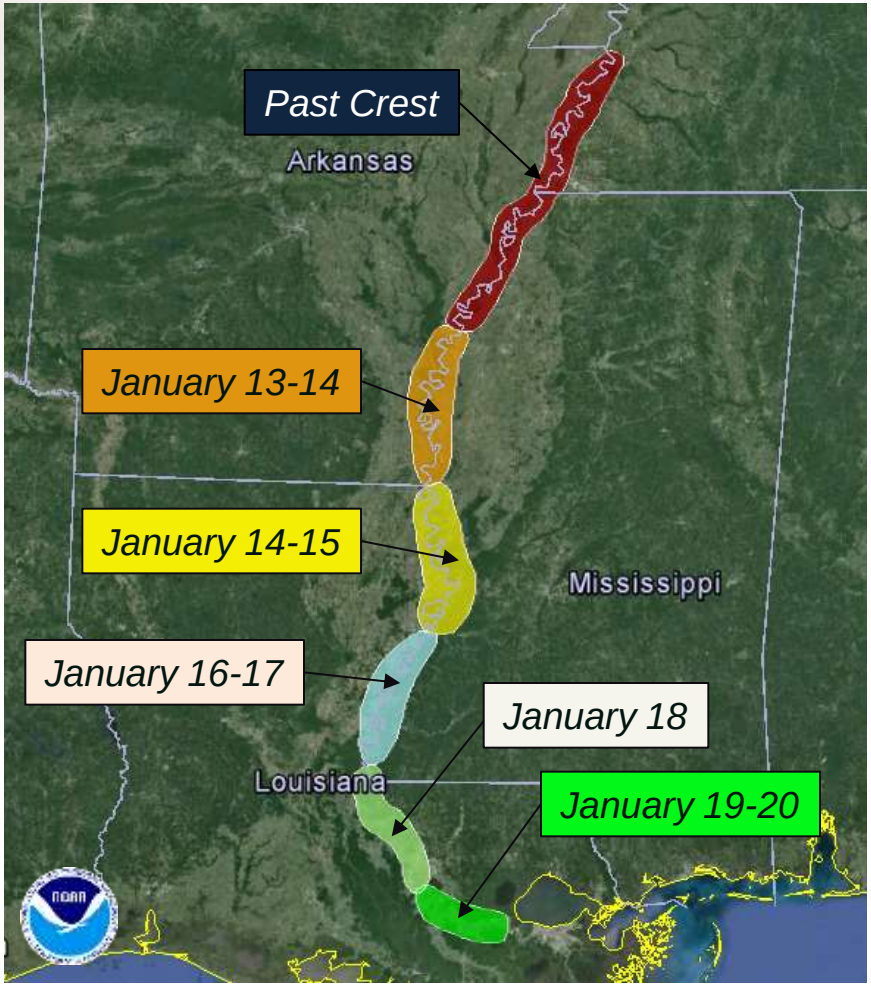
Post Christmas Storm (Dec. 25-28, 2015): The Spectrum of IDSS

Response and Recovery

Long-Duration River Flooding

- NOAA Liaison provided location and timing of peak crests along affected rivers:
  - to help FEMA define when NOAA and interagency remote sensing capabilities should be executed
  - imagery captured real-time visual impacts during worst conditions to support NWS RFC operations as well as inform disaster declaration (recovery) decisions
- NWS Central and Southern Regions worked closely with FEMA Regions and States to define the events for declaration requests
- Central Region ROC continues to provide IDSS for debris removal operations in southern Missouri

NOAA King Air Aircraft



FY 2017 NWS Summary

- **Progress toward a Weather-Ready Nation**
- **Continue to evolve NWS to be flexible, agile to adapt to change**
- **Maintain critical weather forecasts and warnings**
- **Sustain weather infrastructure and exploit technology.**
- **Enhance Integrated Water Prediction capabilities to effectively prepare for and respond to water-related events.**
- **Improve stakeholders' ability to make faster, smarter decisions that save lives and protect livelihoods.**
- **Good Budget – Ongoing great examples of improved forecasts and provision of IDSS through a fully integrated field structure and making great progress building a Weather Ready Nation and becoming 2nd to none!**