Drought & Water Update for the AA Climate Goal Board July 24th meeting

Chet Koblinsky & Roger Pulwarty

OAR/Climate Program Office

Existing Activities
Cross-NOAA Examples

Monitoring and Forecasting

- **Applied research**: Evaluation of Long-Term Retrospective Forecasts with NCEP Climate Forecast System: Predictability of ENSO and Drought
- **Transition**: Improved water supply forecasts in support of the CO and SE NIDIS pilots
- **Delivery:** RCCs: Monitor and verify state climate extremes, Collect and distribute climate network information etc.

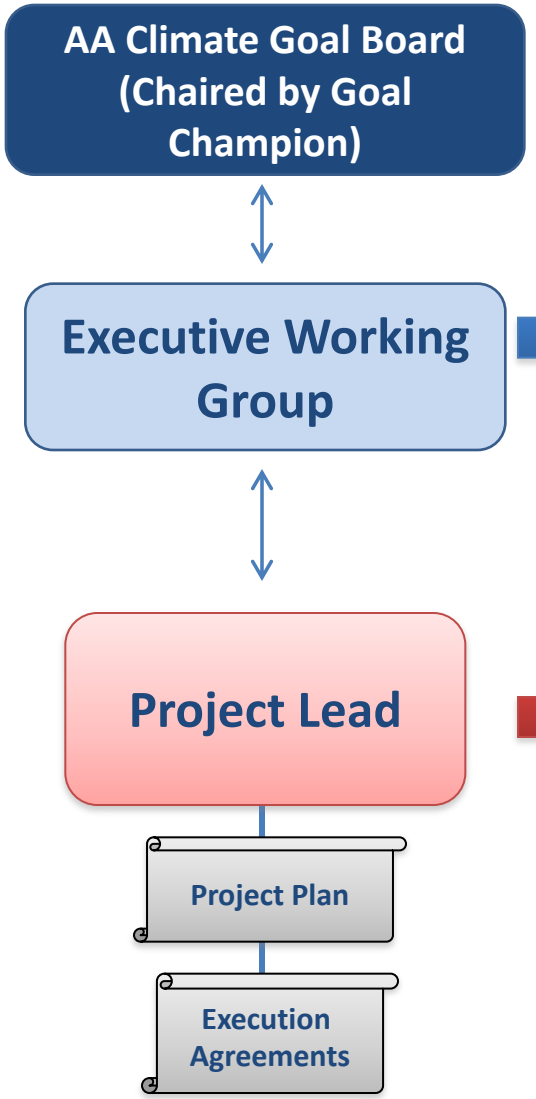
Impacts and Risk Assessment

- **Applied research**: Reconciling future streamflow projections in the Upper Colorado River Basin
- **Transition**: RCCs and State Climatologists as transition endpoints; Building partnerships with extension agencies to transition decision-support tools
- **Delivery**: Provide information regarding impacts and risks associated with water resource reliability

Informing Adaptation

- **Decision support research**: Evaluation of Paleoclimatic Data in Drought Planning for California
- **Transition**: Drought-Ready Communities
- **Delivery**: Regional climate outlook forums

Multi-Line Execution Model for Drought & Water



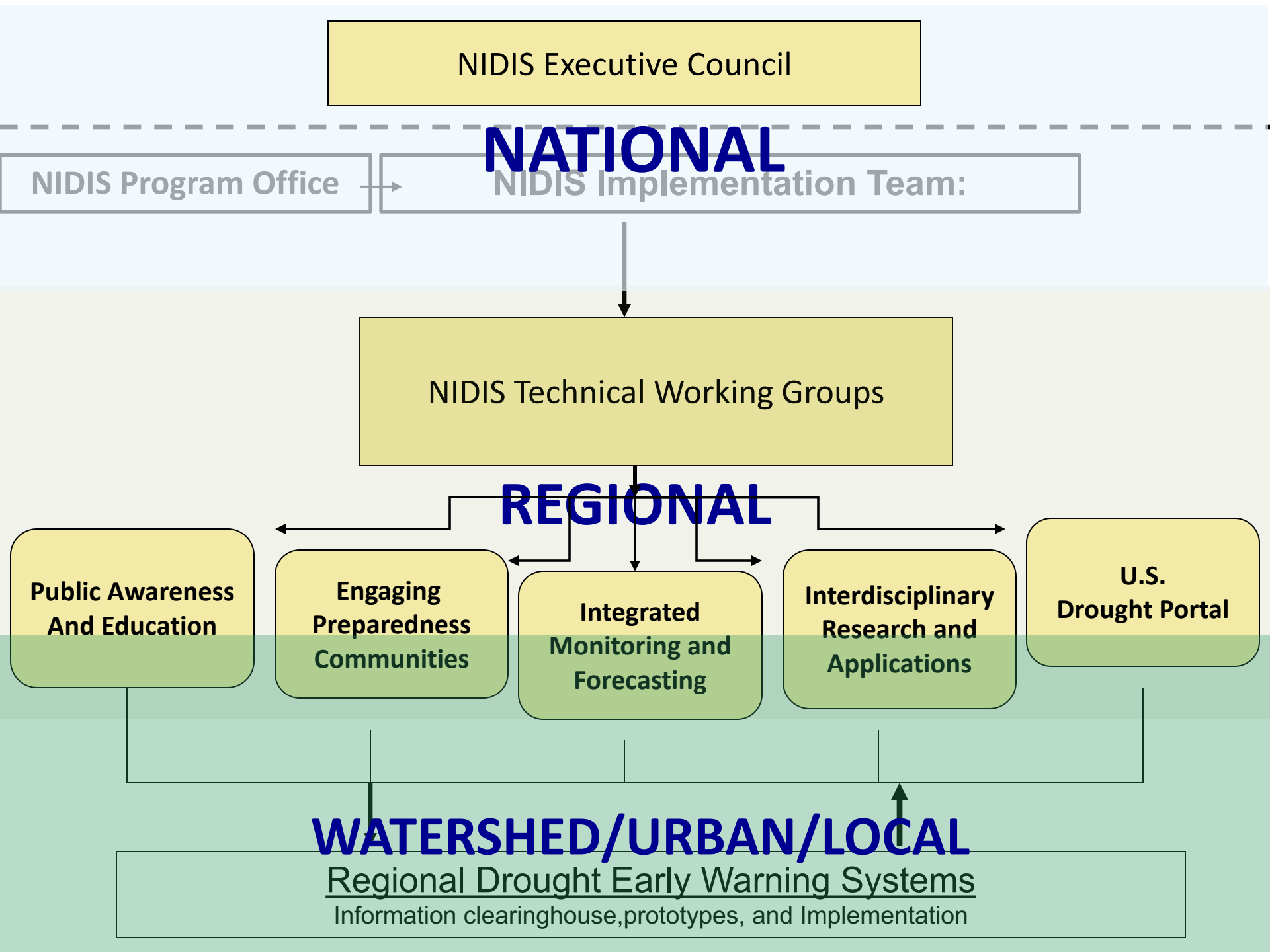
Proposed NOAA Executive Working Group members*

- Physical Sciences Division
- Coastal Services Center
- Office of Hydrology/RFCs
- NCDC
- CPC

Advisors: Executive Council-Exists for NIDIS

LO Sponsor = OAR

Project Lead = Roger Pulwarty


NIDIS Executive Council
NATIONAL
NIDIS Program Office
NIDIS Implementation Team:
NIDIS Technical Working Groups
REGIONAL
Public Awareness And Education
Engaging Preparedness Communities
Integrated Monitoring and Forecasting
Interdisciplinary Research and Applications
U.S. Drought Portal
WATERSHED/URBAN/LOCAL
Regional Drought Early Warning Systems
Information clearinghouse,prototypes, and Implementation

Drought-A continuum and a deficit

Heat Waves

Storm Track Variations

Madden-Julian Oscillation

El Niño-Southern Oscillation

Decadal Variability

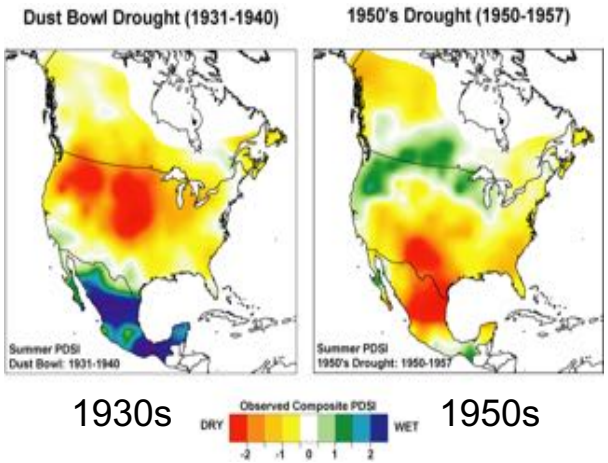
Solar Variability

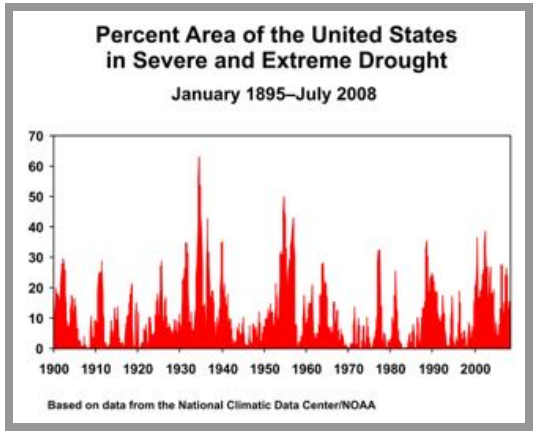
Deep Ocean Circulation

Greenhouse Gases

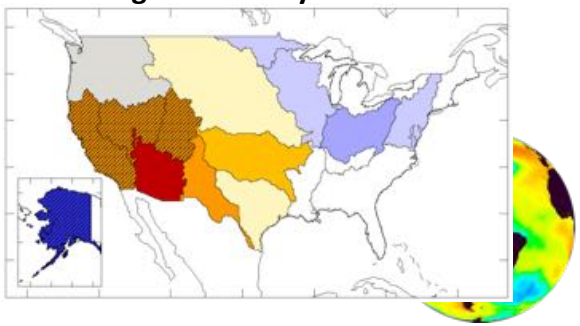
30 DAYS | 1 SEASON | 3 YEARS | 10 YEARS | 30 YEARS | 100 YEARS

SHORT-TERM **INTERANNUAL** **DECADE-TO-CENTURY**



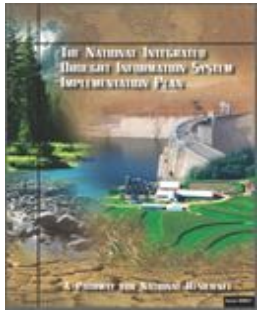


The future (2041-2060): where do the projections agree and why?



The NIDIS Way: Developing Information Systems

- The NIDIS governance structure promotes cross-NOAA and multi-agency development and implementation of information systems to support adaptation decisions across climate timescales (weather extremes, variability and change)



Identify and characterize impacts, observations and forecasts of climate across timescales ***(Identifying and Assessing Risks and Impacts)***

Assess & Improve the accessibility and utility of information to meet user needs ***(Informing Decisions-Products, Prototyping, and Delivery)***

Engage federal and non-federal partners to align research and practice to inform decision making ***(Building Coordination & Capacity)***

NIDIS

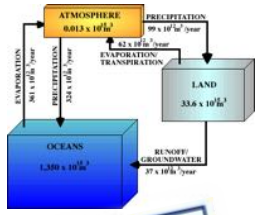
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

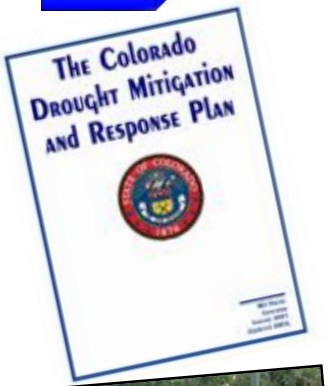
Regional Drought Early Warning Information Systems

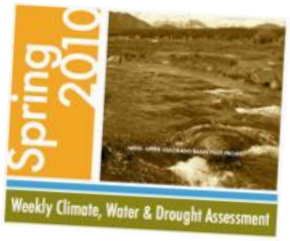
NIDIS Implementation

Over 50 Federal, state, tribal and private sector representatives nationally

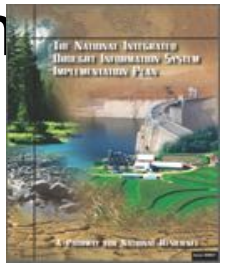
Integrated Monitoring and Forecasting	NRCS, USGS River Forecast Center, BoR Climate *Prediction* Center USDA
Interdisciplinary Needs Assess., Research, Applications	Regional Integrated Sciences and Assessments Regional Climate Centers NCAR
U.S. Drought Portal	NCDC NDMC-NOAA,USGS, USDA, USBoR
Public Awareness And Education	State Climatologists, NWS-CSD USDA Extension
Engaging Preparedness Communities	NDMC State and Tribal Offices, RISAs US BoR, USACE, Counties

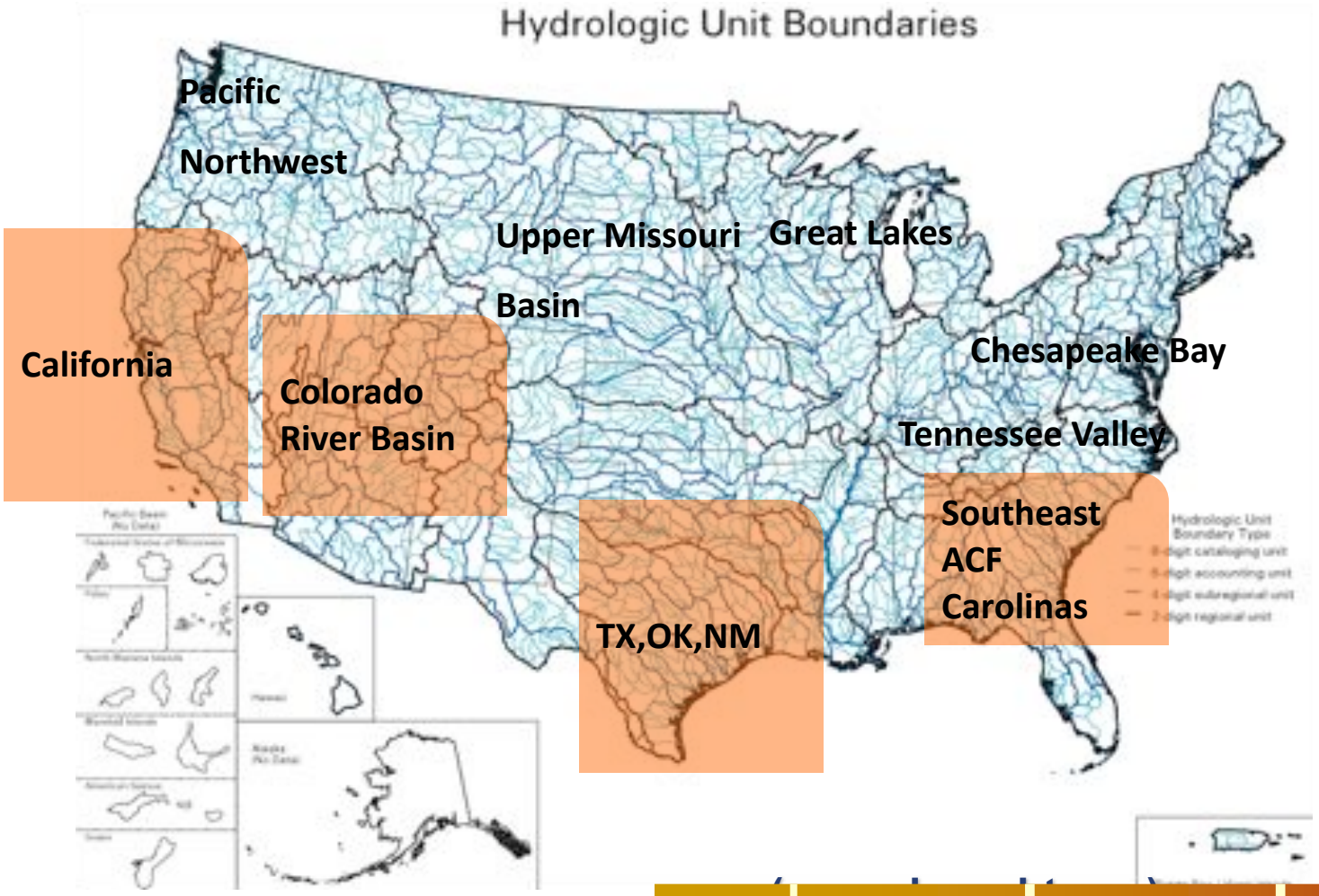


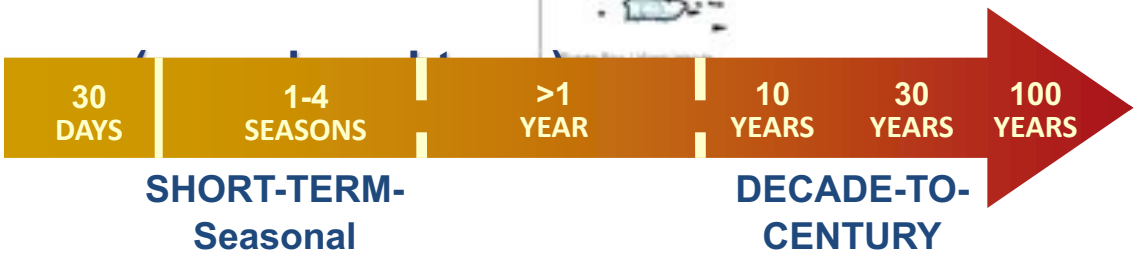




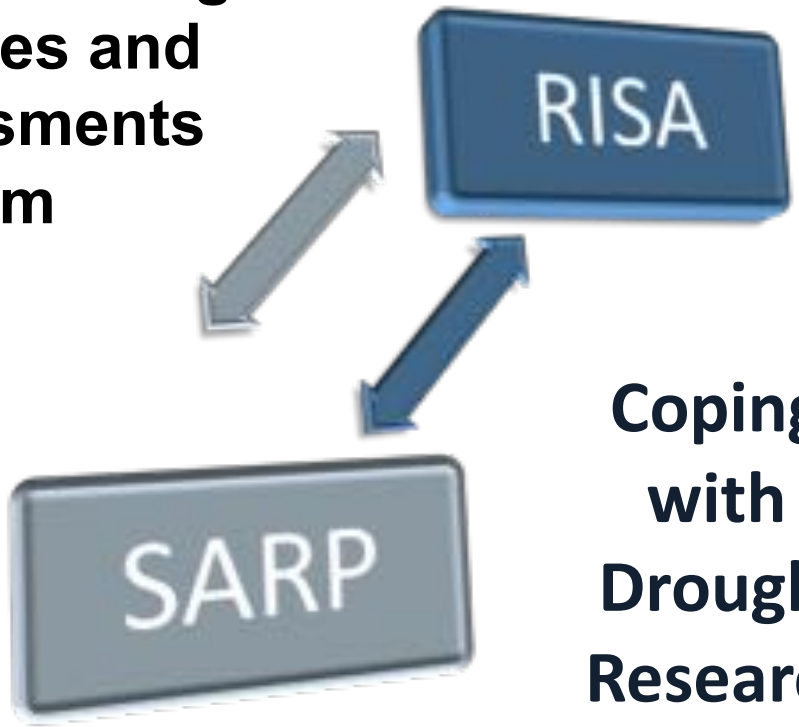
NIDIS-Developing Regional Early Warning Systen







Regional Integrated Sciences and Assessments Program



Support cross-regional efforts to assess user needs, test drought-focused decision support tools

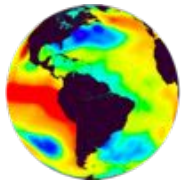
Coping with Drought Research

Sectoral Applications Research Program

Identify *socio-economic effects of drought and *data and info needs of resource managers and policy/decision makers

Evaluate and transition drought information products to operations

Regional Climate Centers
State Climatologists
RCSDs

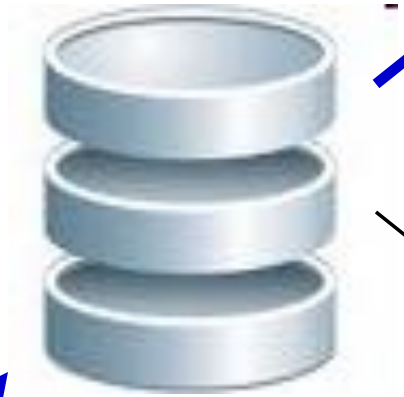


Ensemble evaporation estimates

6 Western River Forecast Centers (RFC)

RFC Website

Water Supply Forecasts



NIDIS Web Services

Ensemble Streamflow Forecasts

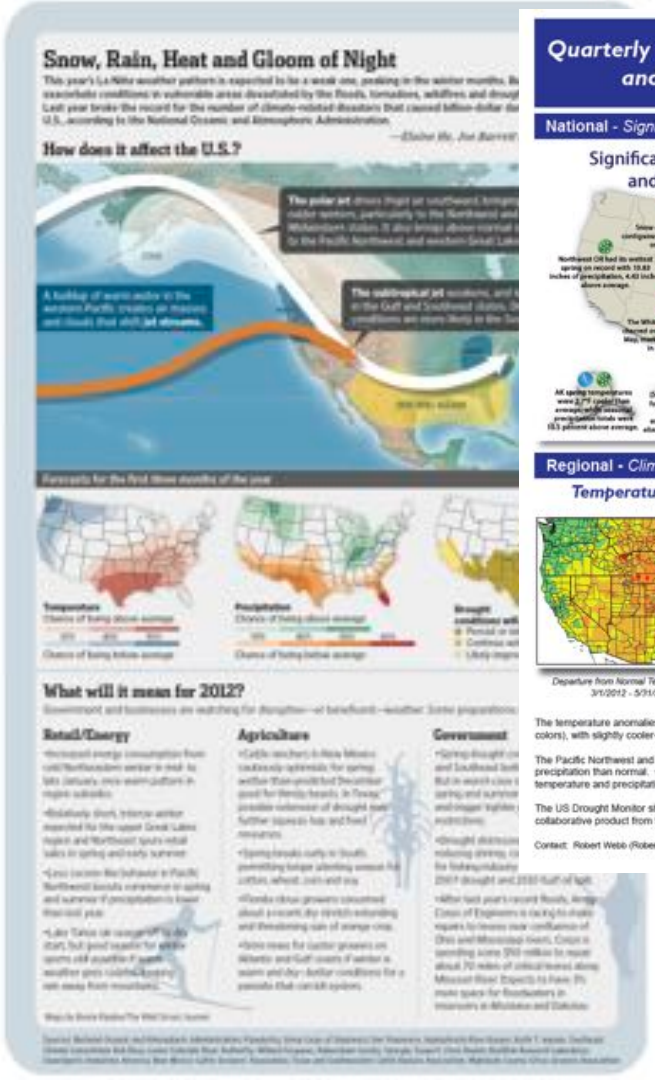
Historical Streamflow

Metadata

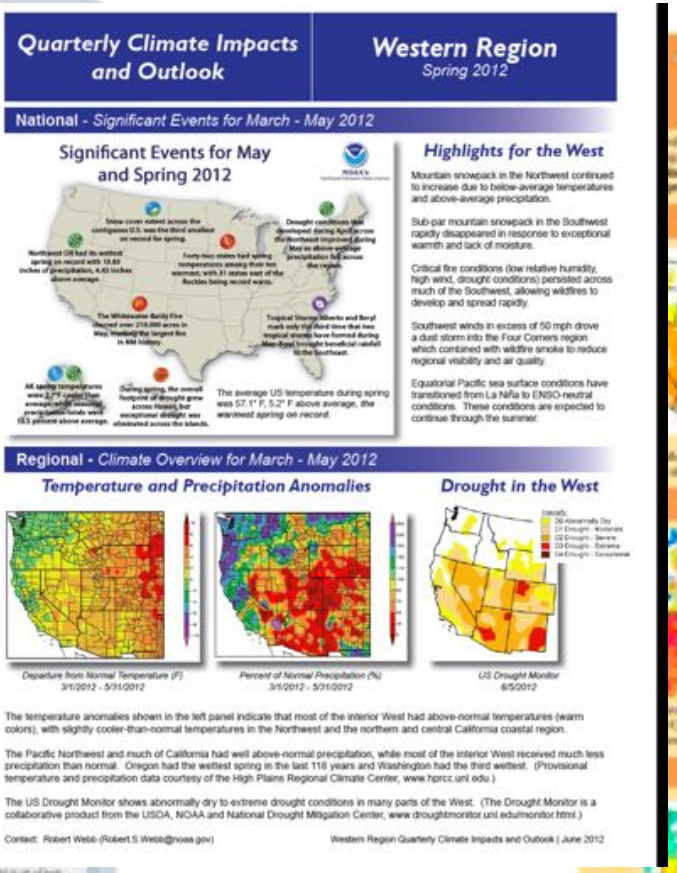
Central Database

NIDIS (RFC/CPC, BoR)

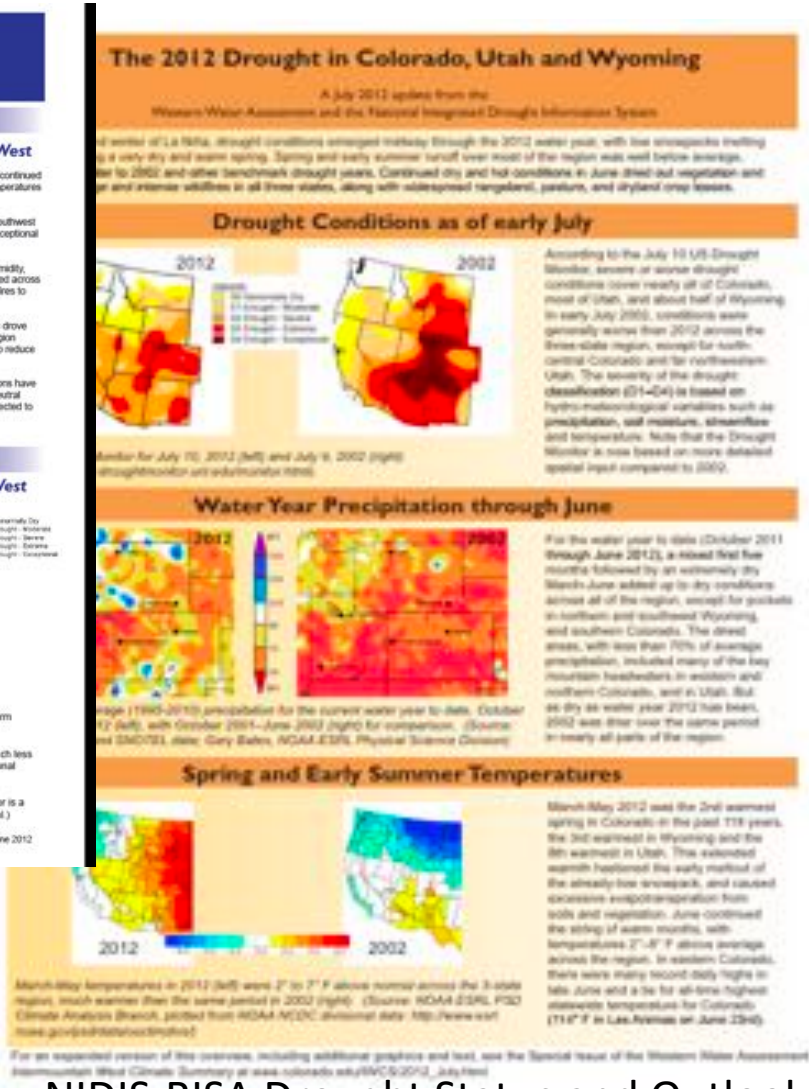
Regional Outlooks



2 Jan 2012 Wall Street Journal



NOAA-WGA
Regional Outlook



NIDIS-RISA Drought Status and Outlook

Next Steps

- Understand the role of precipitation events in reducing the severity or ending drought conditions and the influence of temperature in exacerbating (or reducing) drought severity and duration
- Develop new regions for early warning systems: Pacific Northwest, Chesapeake Bay, Great Plains (transferring approaches from earlier pilots)
- Initiate a network of Regional Drought Information Coordinators for existing EWS

Next Steps-Help needed Drought-Water EWG

- Developing partnerships with extramural groups- state, tribal, private, and local agencies, organizations, and other stakeholders on developing and implementing early warning information that include impacts assessments
- Improving the understanding of climate variability and forecast reliability across a variety of timescales (influence of decadal scale forcings and land surface feedbacks on seasonal forecast reliability);

- Assessing current understanding of climate processes, model and observational capabilities for accurately representing watershed scales and budgets
- Characterizing and communicate relevant uncertainties
- Developing and delivering skillful drought and flood outlooks that integrate antecedent, existing and predicted conditions

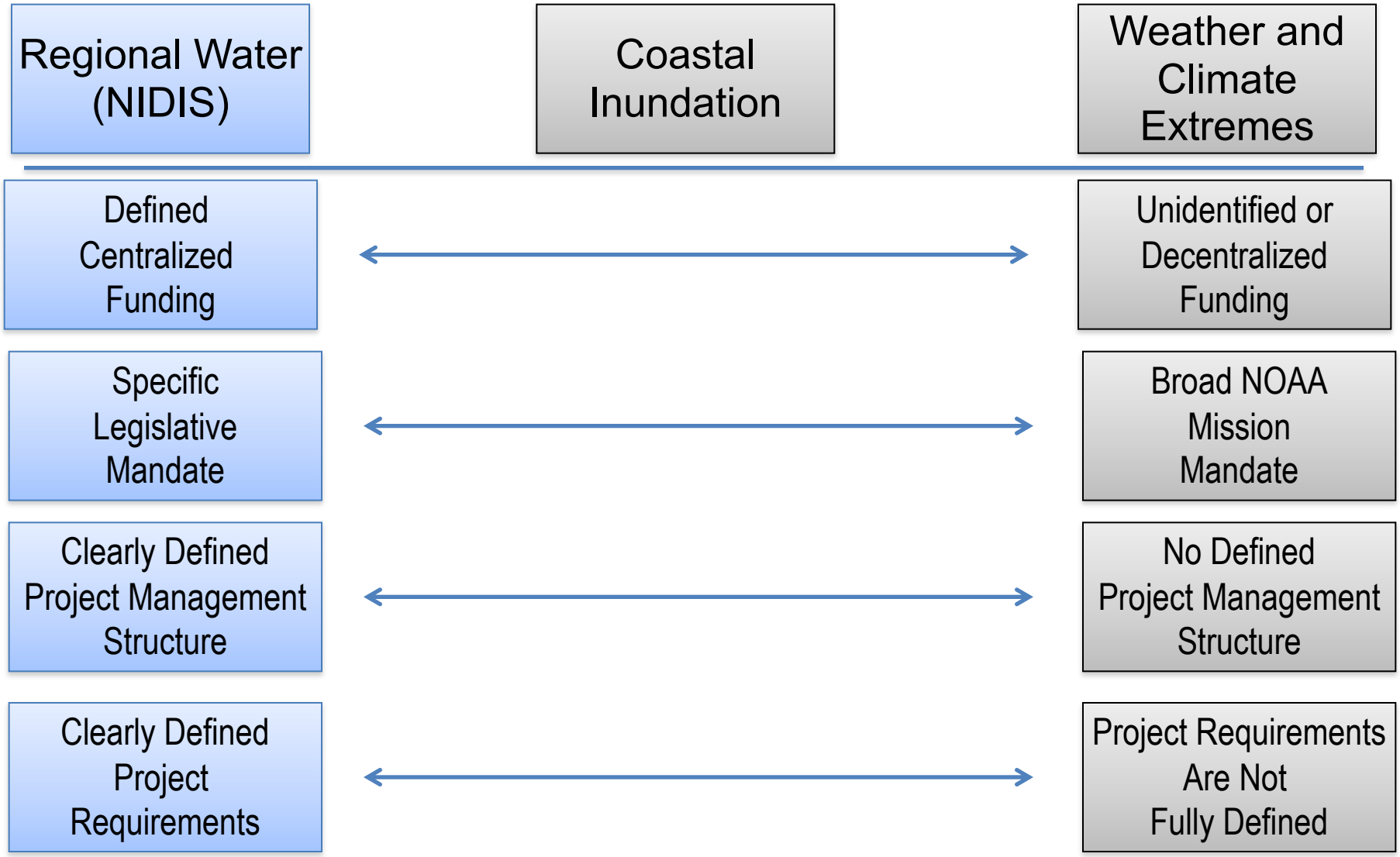
- Work across the Climate Goal Societal Challenges team on cross-scale water-related issues e.g. coastal/nearshore impacts

Backup Slides

NIDIS Requirements

- **Public Law (109-430, 2006)** *better informed and more timely drought-related decisions leading to reduced impacts and costs*
- Specific Tasks
  - Provide an effective drought early warning system:
    - collect and integrate key indicators of drought severity and impacts; and (b) produce timely information that reflect local, regional, and State differences;
  - Coordinate and integrate as practicable Federal research in support of a drought early warning system
  - Build upon existing forecasting and assessment programs and partnerships

Current Status

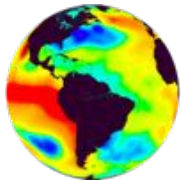


What does the NIDIS prototype allow–

- **Developing an Information Pedigree-Relevant, authoritative, accessible, compatible/usable**
  - Downscaling is valuable but not a substitute for monitoring and understanding local climates

- **Overcoming impediments to information flow**
  - Existing barriers to cross-agency collaboration to be addressed or least be made explicit
  - Innovations and new information to be introduced and tested, and
  - The benefits of participation in design, implementation and maintenance to be clarified

Mature prototypes become the regional early warning system and are More likely to be viewed as transferable



Coping with Drought: Examples

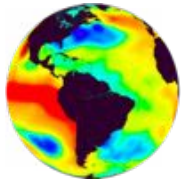
Drought decision support portal for the Republican River Basin (NE,KS)

Reconciling projections of CO Basin streamflow (multiple)

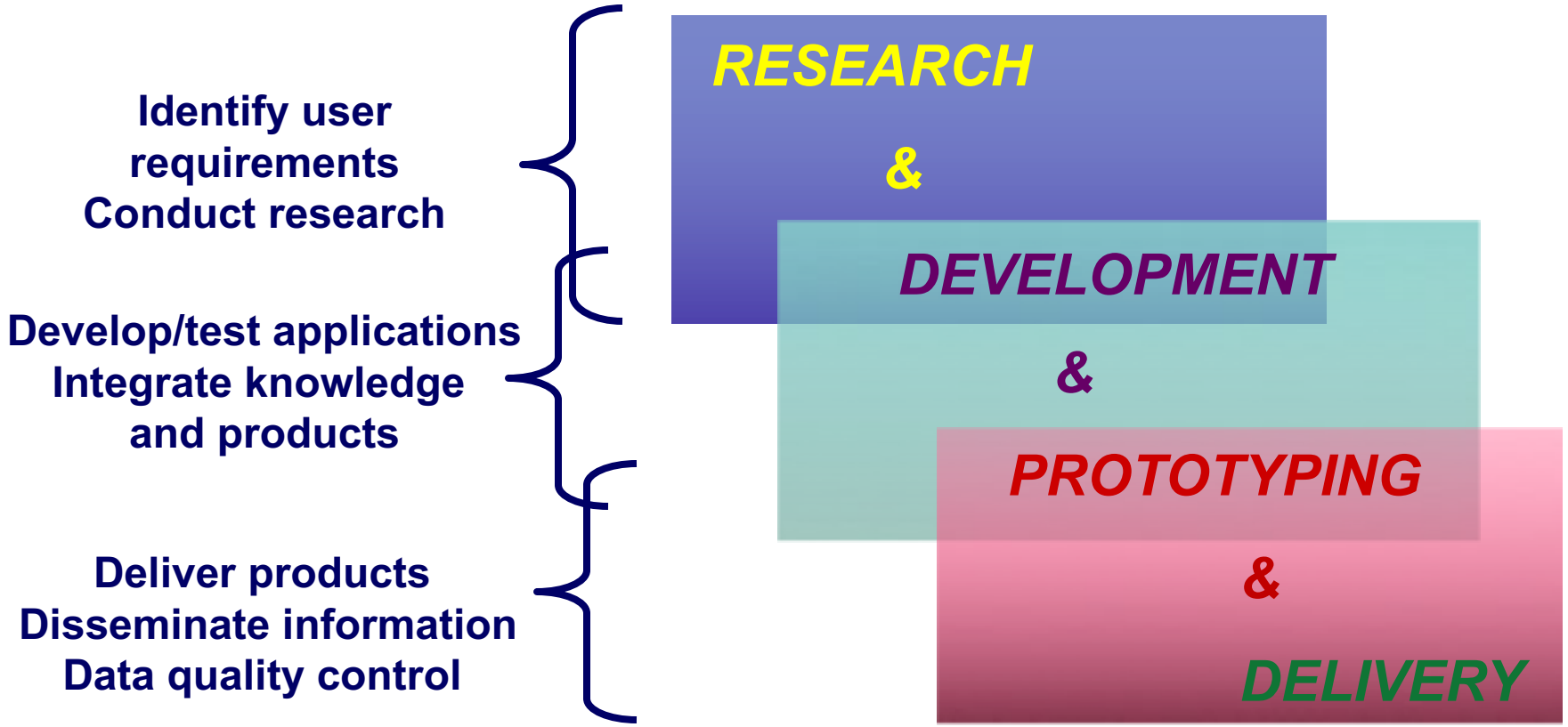
Develop climate training workshops targeting Extension Agents/Farm Bureaus (OK,TX)

Paleoclimatic Information for Drought Planning and Decision Making (AZ,CA)

Link NOAA climate forecasts to dynamic vegetation models to produce seasonal predictions for fire management (NV)



Framework for Drought & Water



Measures

- The number of states and institutions with improved capacity to inform risk management and reduce exposure to drought and flood risks
- The number of staff in or working with those institutions trained to develop and communicate local drought information and help reduce impacts
- The number of research projects that conduct and update drought impacts and user needs assessments in drought-sensitive parts of the US and
- The percentage of the U.S. population covered by adequate drought risk and early warning information systems

National Weather Center

- **NOAA is constructing the IWRSS National Water Center (NWC) at the University of Alabama, Tuscaloosa.**
  - 60,000 SF facility (full occupancy = 200)
  - groundbreaking was February 21, 2012
  - completion in Summer 2013
- **Key Components & Capabilities**
  - operations center for water analysis, forecasting and decision support
  - applied water resources research and development center
  - geo-intelligence laboratory
  - distance-learning center
  - Joint agency coordination and collaboration; common operating picture
  - multi-agency interoperability

National Water Center Grand Opening
~June, 2013

Initial Operating Capability (IOC)
October, 2013

Baseline Operating Capability
~5 Years

Full Operating Capability
~10 Years