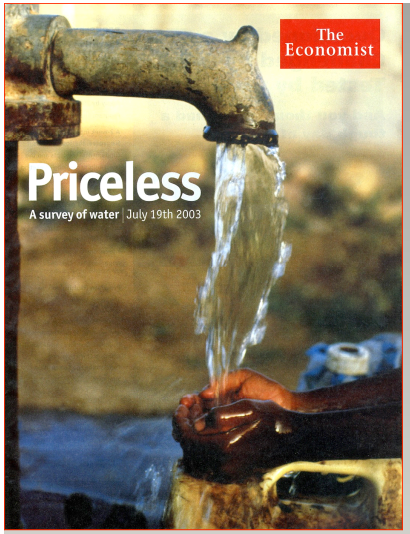
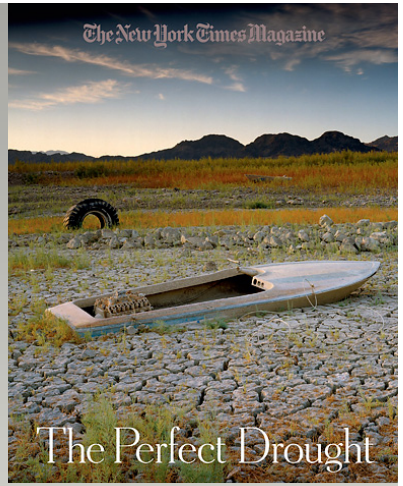


NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM



A National Integrated Drought Information System (NIDIS) Pilot in California

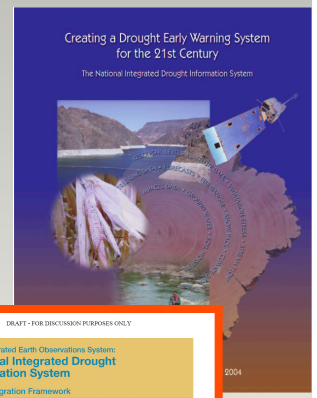
Robert S. Webb

R. Pulwarty, J. Verdin, C. McNutt, L. Darby

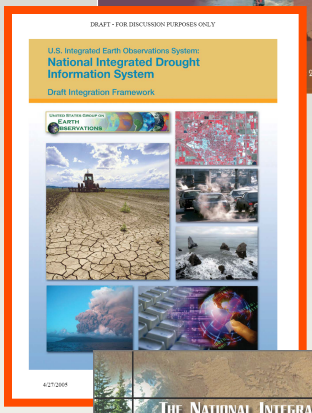
and the NIDIS Implementation Team

National Integrated Drought Information System

"No systematic collection and analysis of social, environmental, and economic data focused on the impacts of drought within the United States exists today" **Western Governors Association 2004**

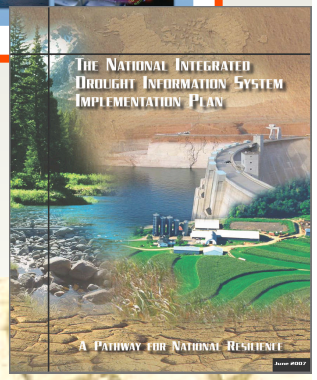


Public Law 109-430 (The NIDIS Act 2006)



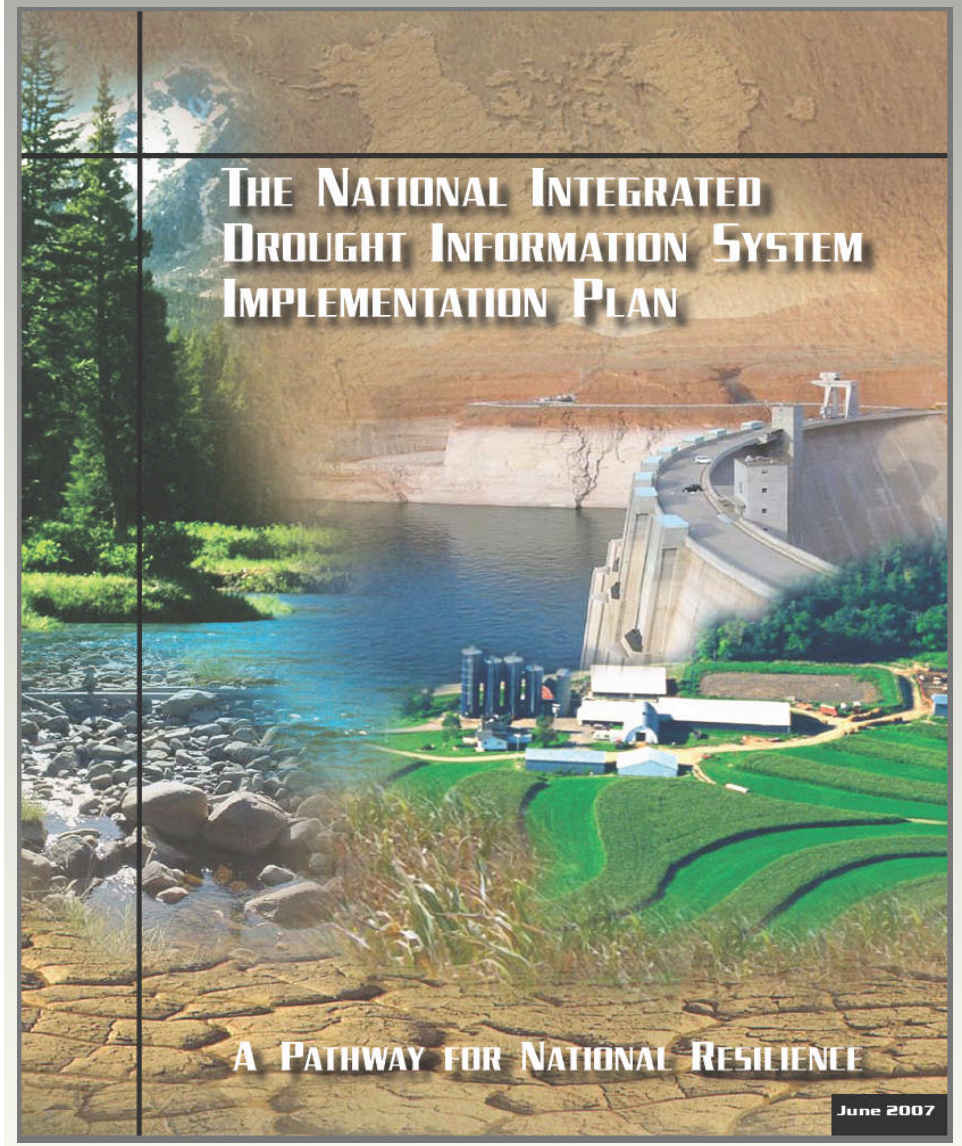
"Enable the Nation to move from a reactive to a more proactive approach to managing drought risks and impacts"

"better informed and more timely drought-related decisions leading to reduced impacts and costs"



(www.drought.gov)

NIDIS Components



1. **NIDIS Office** (PSD/CPO..)
2. **U.S. Drought Portal**
   (NCDC, NDMC, RCCs..)
3. **Climate Test Beds/Drought**
   - Integrating data and forecasts *(CPC..)*
4. **Coping with Drought**
   - Applications and Decision support Research *(RISAs, SARP, TRACS..)*
5. **NIDIS Early Warning Information Systems**
   - Design, Prototyping, Implementation *(multi-agency, multi-state)*

NIDIS Governance: Executive Council

NIDIS Program Office

NIDIS Implementation Team: Over 50 Federal, state, local and private sector representatives

NATIONAL

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

Integrated Drought Information Systems

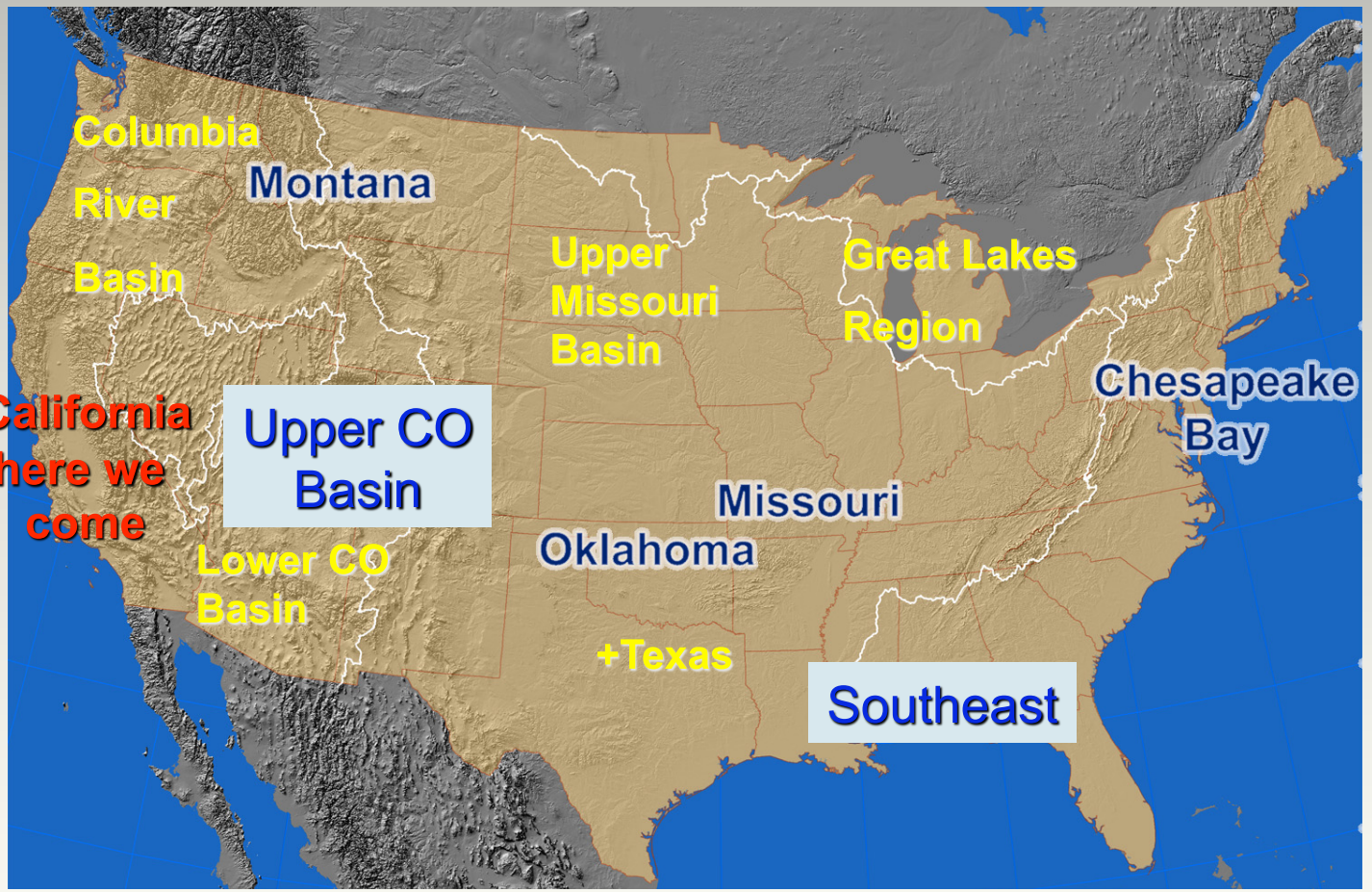
Drought Early Warning System Design-Information clearinghouse, Pilots, and Implementation

NIDIS Early Warning Systems Pilots

Blue - first round prototypes

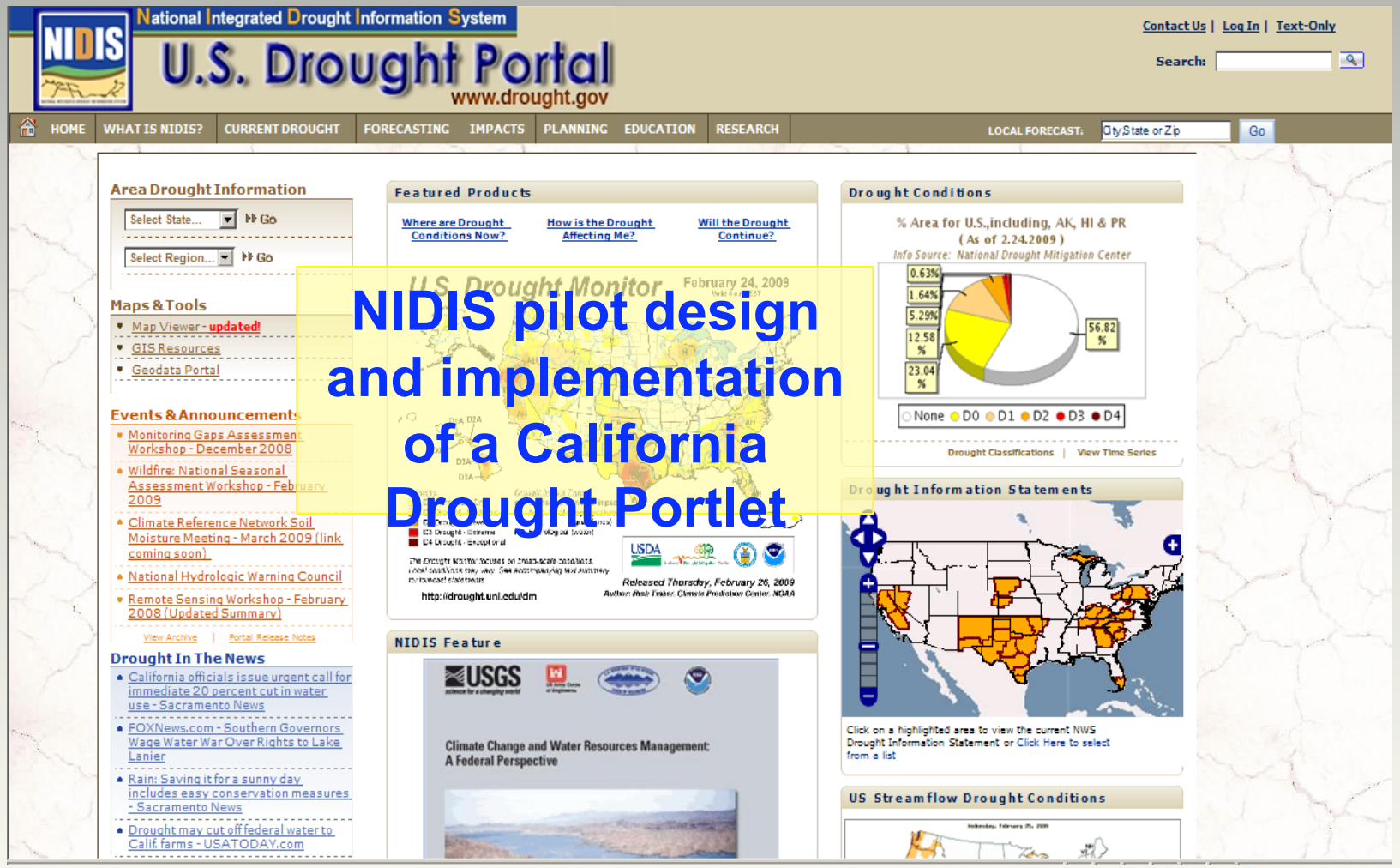
Red - first round prototype part II

Yellow - second round transferability



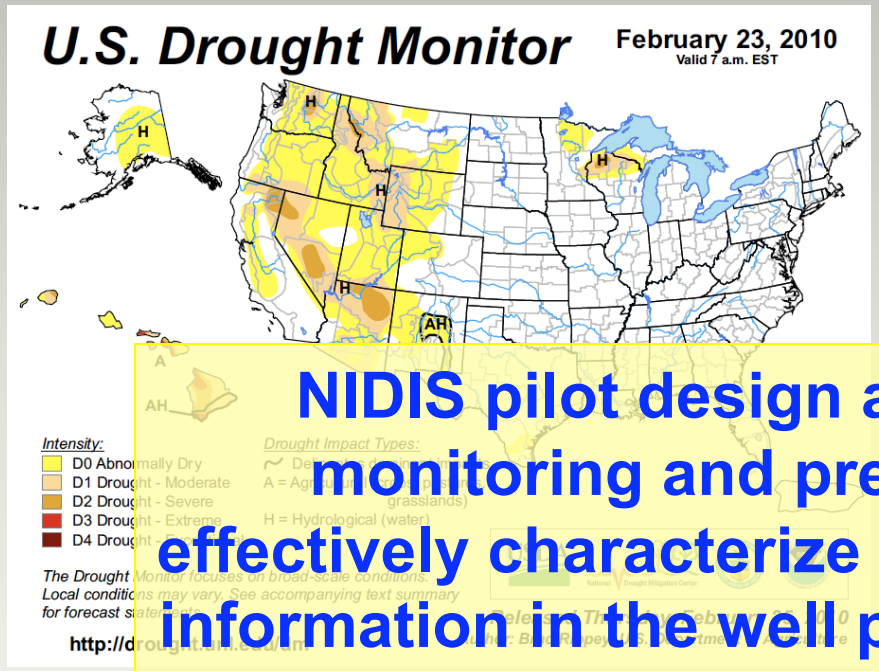
So what might a NIDIS Pilot in California Look Like?

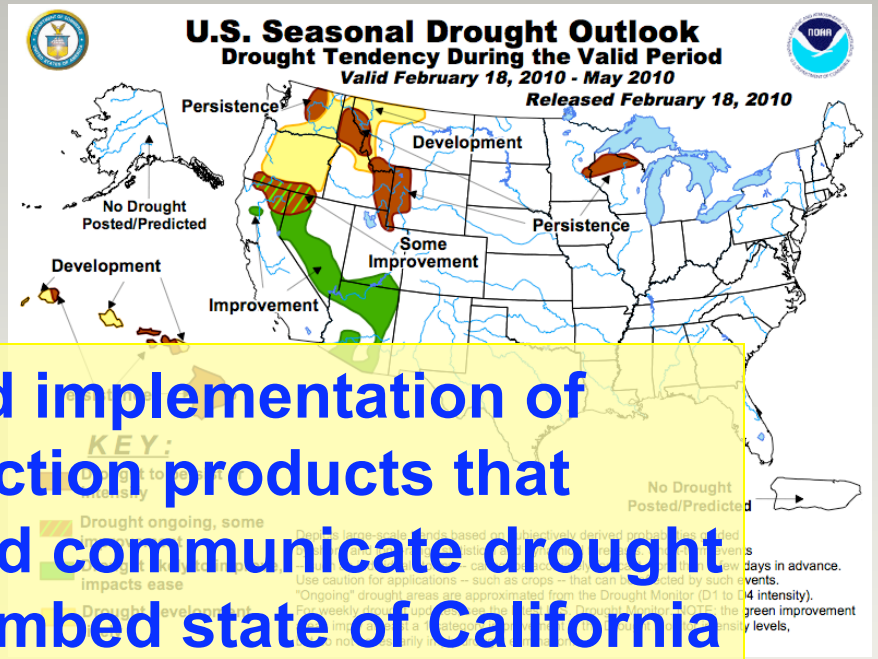
Regionally tailored U.S. Drought Portal (www.drought.gov)



NIDIS pilot design and implementation of a California Drought Portlet

Regionally Tailored Drought Monitor and Outlook





NIDIS pilot design and implementation of monitoring and prediction products that effectively characterize and communicate drought information in the well plumbed state of California

So what might a NIDIS Pilot in California focus on?

Let the brainstorming begin

- **Public Awareness And Education**
- **Engaging Preparedness Communities**
- **Integrated Monitoring and Forecasting**
- **Interdisciplinary Research and Applications**
- **Regional Drought Portlet**

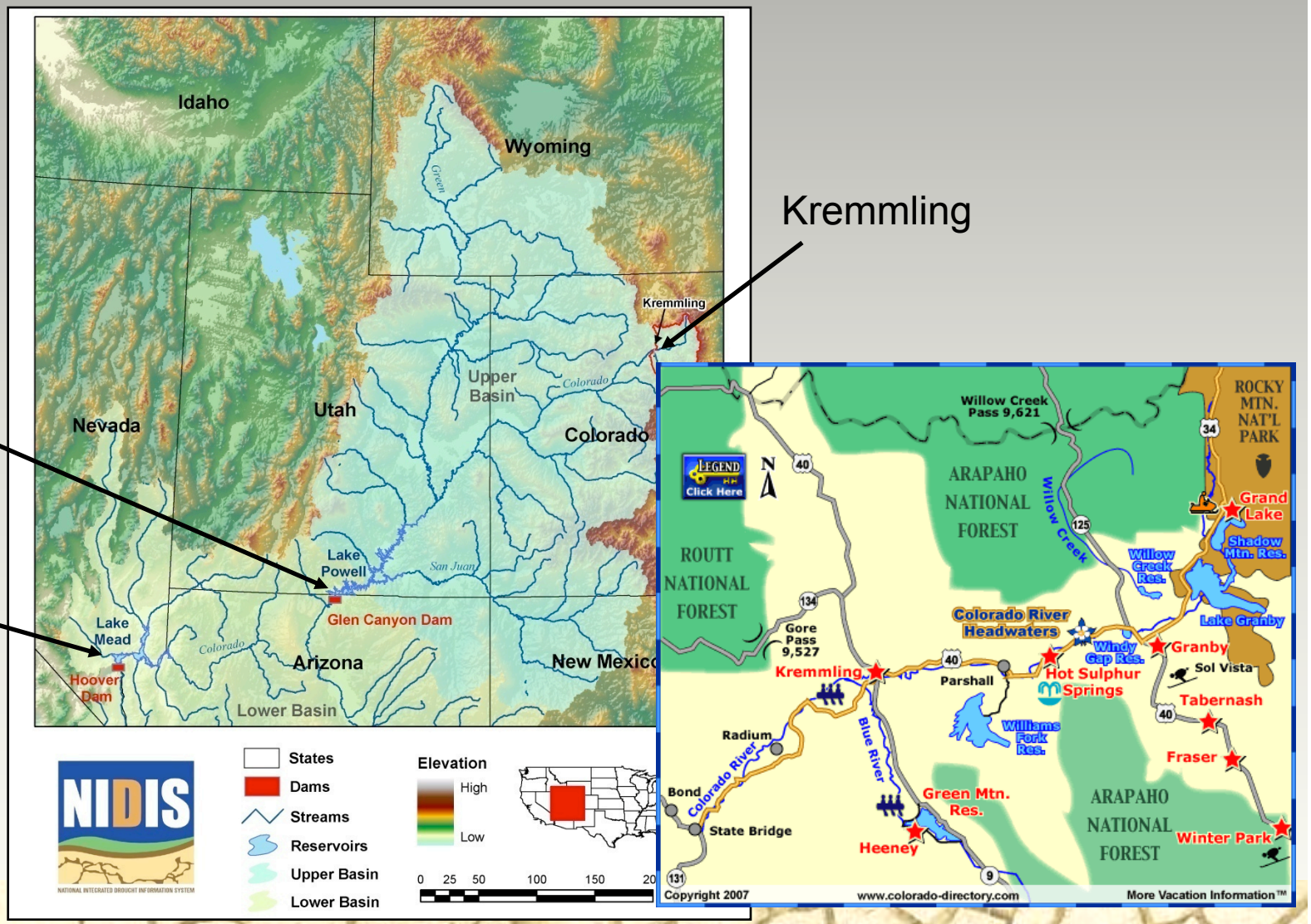
Include components of an early warning information system
Learn from successes of ongoing NIDIS pilots

Pilot Implementation
Upper Colorado River Basin:
Small Planning Meeting: Salt Lake City UT, May 2008

- **Federal Participants**
  - NOAA, NWS, WR, ESRL; USGS GCMRC & WY WSC; USBR; USACE; NPS; USFS

- **Three categories of drought information users**
- **Two scales of analysis**
  - Large reservoir operations and triggers (full basin scale)
  - Water supply managers with a stake in trans-basin diversions (sub-basin scale, Colorado River above Kremmling CO)
  - Ecosystem health and services, including recreation and tourism (sub-basin scale, Colorado River above Kremmling CO)

Pilot Implementation
Upper Colorado River Basin:



Pilot Implementation
Upper Colorado River Basin:

Scoping Workshop for the Upper Colorado River Basin Pilot, NIDIS, Boulder CO, October 2008

Explore existing mandates, decision cycles, and organizational capacities to guide implementation of the pilot

OUTCOMES

Initiate discussion of types of observations, model output, remote sensing data, climate data, reservoir levels, and many more that are needed to support decision making

Initiate discussion of relevant triggers for decision making

Initiate discussion of current capacity to monitor triggers

Initiate discussion of predictability of triggers

Pilot Implementation
Upper Colorado River Basin:

Actions from the Scoping Workshop

- Inventory and assessment of drought indicators and triggers presently used in the UCRB
- Build a UCRB community on the NIDIS Drought Portal (www.drought.gov)
- Facilitate access to indicator and trigger observational data and information products via the UCRB community
- Develop an Upper Colorado basin-specific drought monitor
- Perform a monitoring networks gap analysis for the UCRB

Colorado Climate Center Interviews and Focus Groups

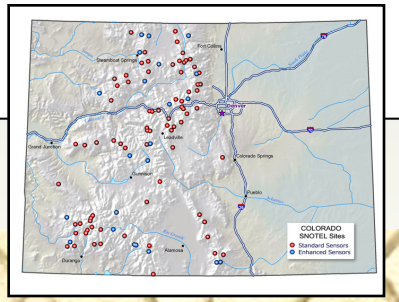
between May and December 2009 exploring drought indicators, triggers and data needs by sector

Some of Nolan's general findings

- Results vary by sector and by individual user based on "exposure to drought risk"
- Most (not all) users systematically track available hydro-climatic data and projections from existing sources, at least at critical times of year
- State Water Law, water rights and the prior appropriate doctrine dictates "exposure and potential risk and impacts" for pretty much all surface water users. River "calls" are the ultimate triggers and indicators
- Operators of the major reservoirs systematically said "our jobs are easiest during drought but our critical decisions and errors are made during high flows – which affect our capabilities to deal with future drought"

Pilot Implementation
Upper Colorado River Basin:
Monitoring Gaps Analysis

- Existing drought monitoring practices: Where are we today?
  - Indicators & Triggers for decision makers
- Gaps in our understanding of drought: Past, present and future
  - Are we making good use of what measurements we already have?
- Gaps in current observational networks (e.g., stream gaging, wx obs, SNOTEL, soil moisture, reservoir levels)
  - What is the status of these networks?
  - What are the measurement gaps?
- Gaps in analytical products and tools
  - "Where does the snow go?" → Evapotranspiration, sublimation & soil moisture products
- Gaps in knowledge of water use
  - Water demand and use



NRCS Revised Surface Water Supply Index (SWSI) for Colorado

- Will replace the original 1981 Colorado SWSI
- Transition from 4 digit to 8 digit HUCs
- Methodology:
  - For Jan-Jun: SWSI = Streamflow Forecast + Reservoir Storage
  - For Jul-Sept: SWSI = Reservoir Storage + Obs. Streamflow
  - For Oct-Dec: SWSI = Reservoir Storage

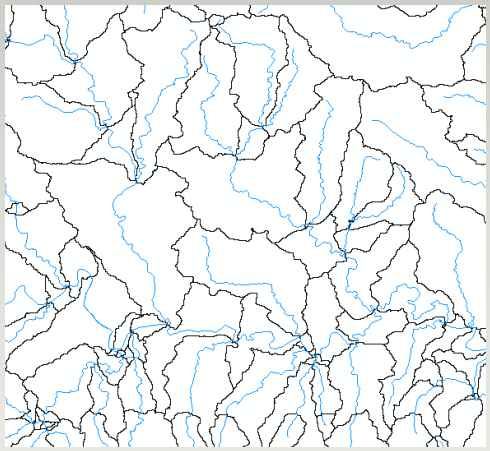
UCRB Tailored Drought Monitor

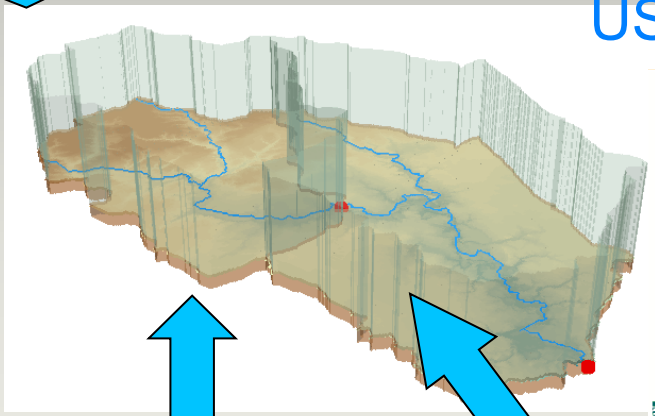
- Not a downscaling of the U.S. Drought Monitor, but a bottom-up consultative process
- Weekly drought briefing webinar series with a summary recommendation to USDM lead author

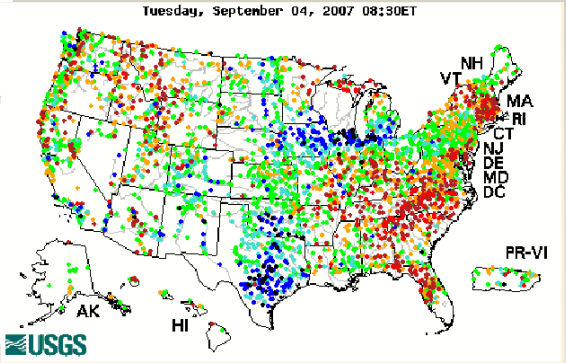
Connecting geospatial and temporal water resources data

Digital Watershed

USGS NWIS Streamflow

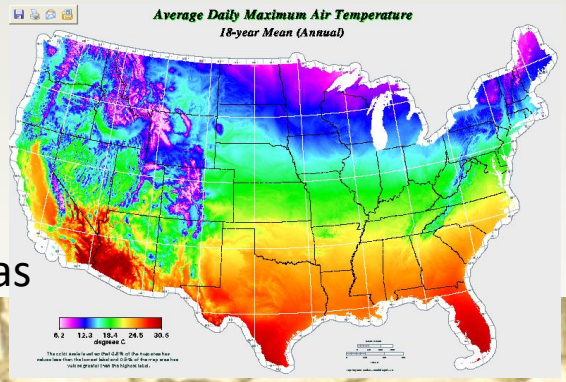




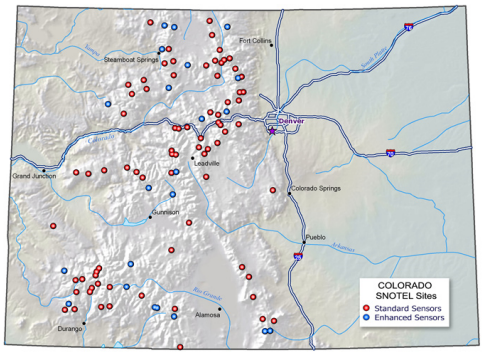


NHDPlus

NOAA NCDC and ASOS

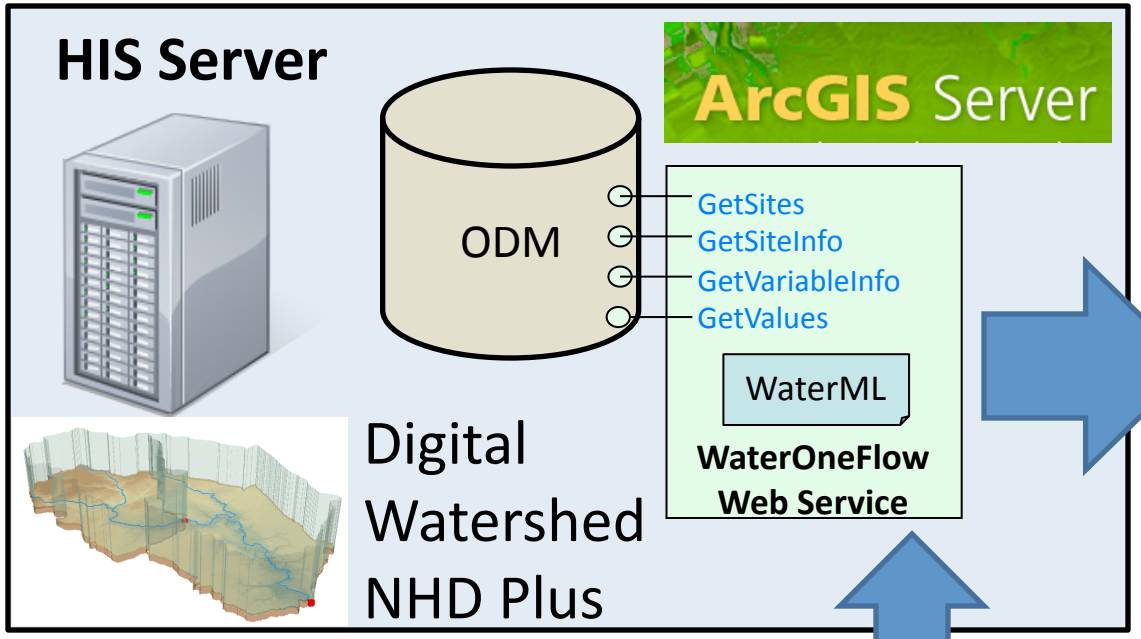


NRCS Snotel



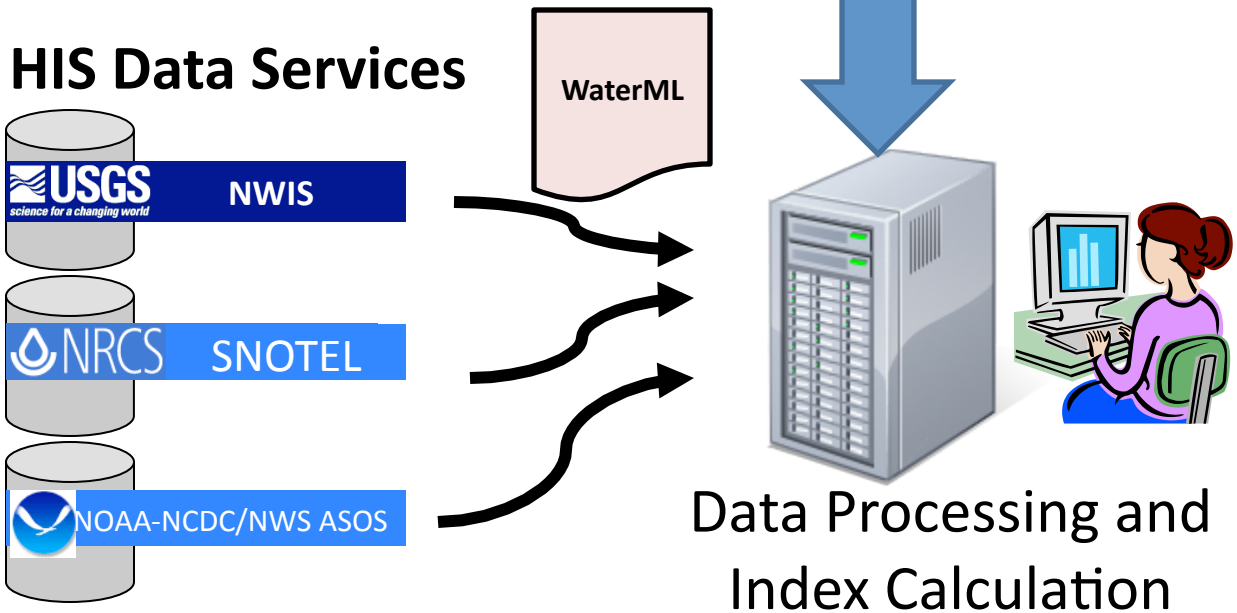
David Maidment, U Texas

Drought Index System Architecture



Data Products and Services

- Web Map Based Display of Index
- WaterOneFlow Web Service(s) for inputs and outputs
- GIS Data Services
  - WMS, WFS, WCS
  - Digital Watershed
  - Drought Index Results



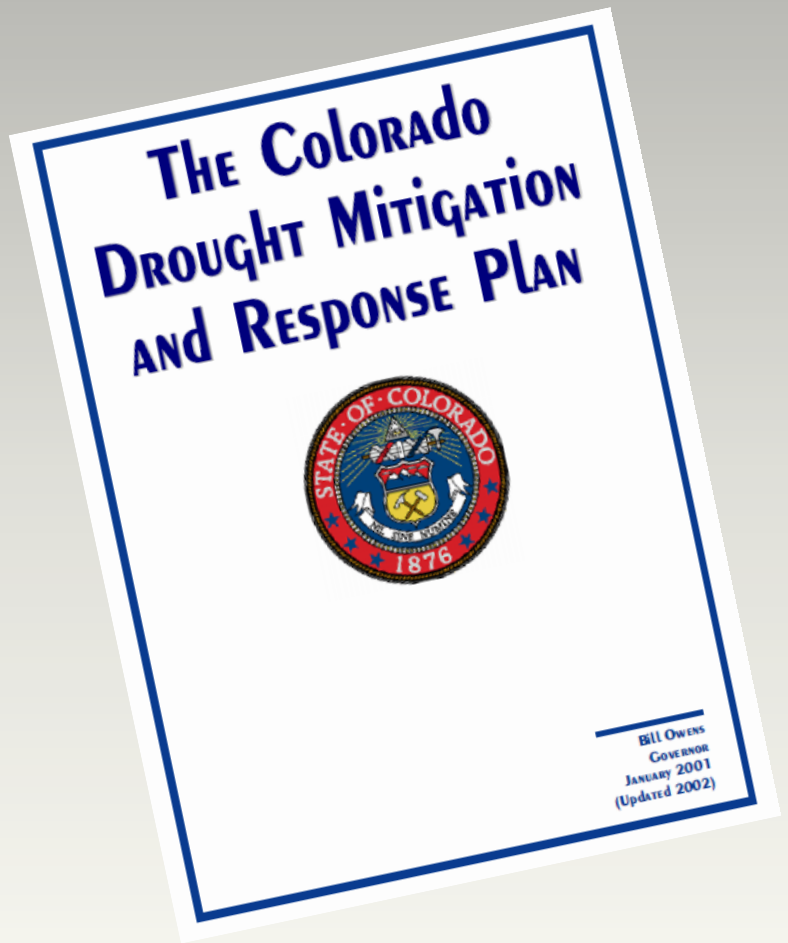
CUAHSI

D. Tarboton

J. Horsburgh

Utah State University

Coordination with State Plan



- Revision of the Plan to meet drought requirements of the State Natural Hazard Mitigation Plan, as well as FEMA and EMAP
- Development of indices that incorporate current surface water conditions and a forecast component
- Evaluate trigger points and the responses that they activate

If we don't get the NIDIS Pilot in California right, doubtful we will get NIDIS right

"If we don't get NIDIS right, we can't get a national climate service right"

Kelly Redmond, Western Regional Climate Center

6th Drought Monitor Forum
Austin, Tx Oct. 7-8, 2009

Lessons learned from NIDIS Pilots and NIDIS are informing the design and implementation of national climate services

Thank you