Developing a Framework for the National Coordinated Soil Moisture Monitoring Network: A Discussion at the 2018 MOISST Workshop

Photo Credit: Arizona State Climate Office

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National Integrated Drought Information System (NIDIS)

NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM ACT OF 2006 (PUBLIC LAW 109-430). REAUTHORIZED IN 2014 (PUBLIC LAW 113-86).

NIDIS Mandate

To “develop and provide a national drought early warning system”

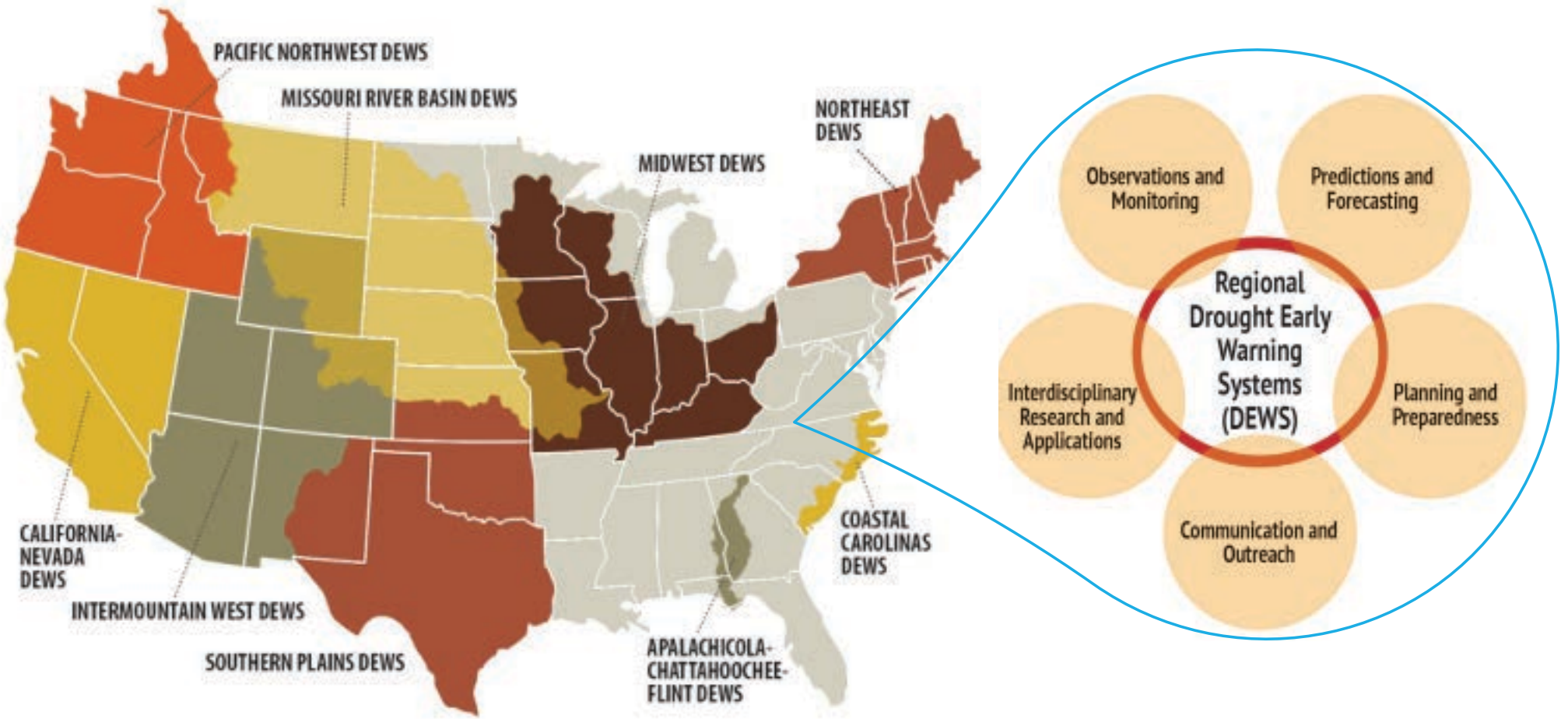
in order to:

“better inform and provide for more timely decision-making to reduce drought-related impacts and costs”

NIDIS – 2006 Public Law

- comprehensive system that collects and integrates information on the key indicators of drought
- includes timely (where possible real-time) data, information, and products that reflect local, regional, and State differences in drought conditions
- coordinate, and integrate as practicable, Federal research in support of a drought early warning system

NIDIS: 9 Regional Drought Early Warning Systems (DEWS)



S.2200 - National Integrated Drought Information System Reauthorization Act of 2018

- utilize and support, as appropriate, monitoring by citizen scientists, including by developing best practices to facilitate maximum data integration.

- Soil Moisture.—Not later than 1 year after the date of enactment, NIDIS shall develop a strategy for a national coordinated soil moisture monitoring network.

S. 2936: Improved Soil Moisture and Precipitation Monitoring Act of 2018

Not later than 1 year after the date of the enactment of this Act, the Secretary of Agriculture shall develop and implement a strategy to improve the accuracy of the United States Drought Monitor through increased geographic resolution of rural in-situ soil moisture profile observation or other soil moisture profile measuring devices, as the Secretary considers appropriate.

National Coordinated Soil Moisture Monitoring Network

- 2013 NOAA-NIDIS and the USDA partnered (under a 2012 MOU)

- Integrate the multitude of soil moisture data sources across federal and state in-situ monitoring networks, satellite remote sensing missions, and numerical modeling capabilities

- USDA Natural Resources Conservation Service's
- Soil Climate Analysis Network (SCAN) and Snow Telemetry (SNOTEL)
- State in-situ instrument networks/mesonets
- NOAA Climate Reference Network (USCRN)
- Remote sensing & modeling - NASA, NOAA, USDA
- Federal and state governments
- Academia

Priorities coming out of 2016 NCSMMN Meeting

- Inventory of available SM networks
- Standards and specifications
- Metadata for each site
- Probabilistic gridded product
- Soil temperature data
- Data search feature
- Funding Sources
- Data format
- Remote sensing platforms
- Incorporation into modeling efforts
- Users of data
- Hosting and operation of product
- Citizen science

Next Steps

- High-resolution gridded synthesized products
  - Variables: SM, ST, PAW, FAW, Soils, Veg data, model output
  - Metrics: VWC, weekly/daily change, percentiles, uncertainty
- Soil profile (site-specific) after sensor installation & soil analysis
- Testbed and sensor challenge
- Develop user community
  - ID people/groups developing products
  - ID users of those products
- Statistical methods to normalize across diverse networks
- Diversify station location (e.g. transition areas, irrigated lands)
- Public-private partnerships to facilitate standardization
- Involve citizen scientists
- Develop series of workshops with ender user groups
- MOUs or MTRAs for data sharing among the in-situ networks

Questions

Identifying Gaps and Needs

Discuss and identify gaps in available soil moisture data and information products, considering spatial coverage, temporal coverage and data availability.

Brainstorm how existing data sets could be leveraged or integrated to fill gaps and meet needs

Questions

Collaboration, Funding, & Data Integration

How can we engage soil moisture data holders to share their data in machine-readable ways?

Considering successes and lessons learned from other data sharing programs, how might we fund a National Soil Moisture Network?

Brainstorm strategies for data integration and list pros and cons for each. Consider both the data provider and the data user's perspective.

Questions

Gathering Requirements for the Network

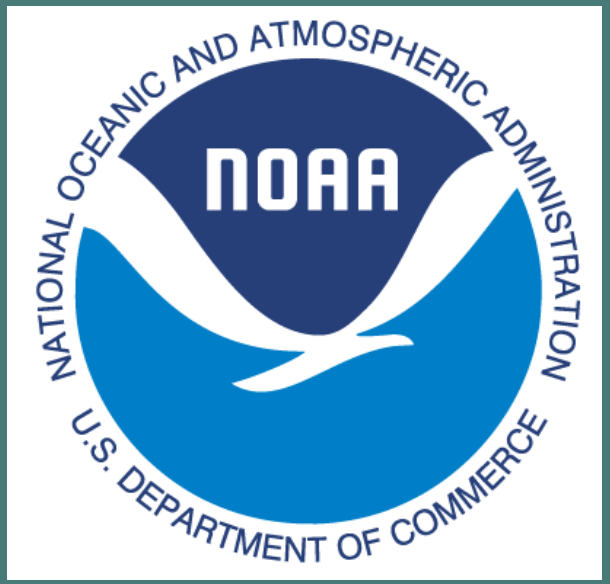
Brainstorm data products that you would expect would be available from a National Soil Moisture Network.

How would you expect you'd be able to find and view soil moisture data from a National Network?

Which methods would you anticipate that soil moisture data from a National Network be accessible by? (e.g. FTP, File download, Web service)

In which formats would you anticipate that soil moisture data from a National Network be accessible in? (e.g. CSV, NetCDF, GeoJSON, XML)

Thank you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