

Providing Science for Climate Change Preparedness & Resilience

At the U.S. Geological Survey

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Climate Science to Engineering Operations for Watershed
Management: CCAWWG Workshop
August 25-27, 2015



USGS National Climate Change & Wildlife Science Center and the DOI Climate Science Centers

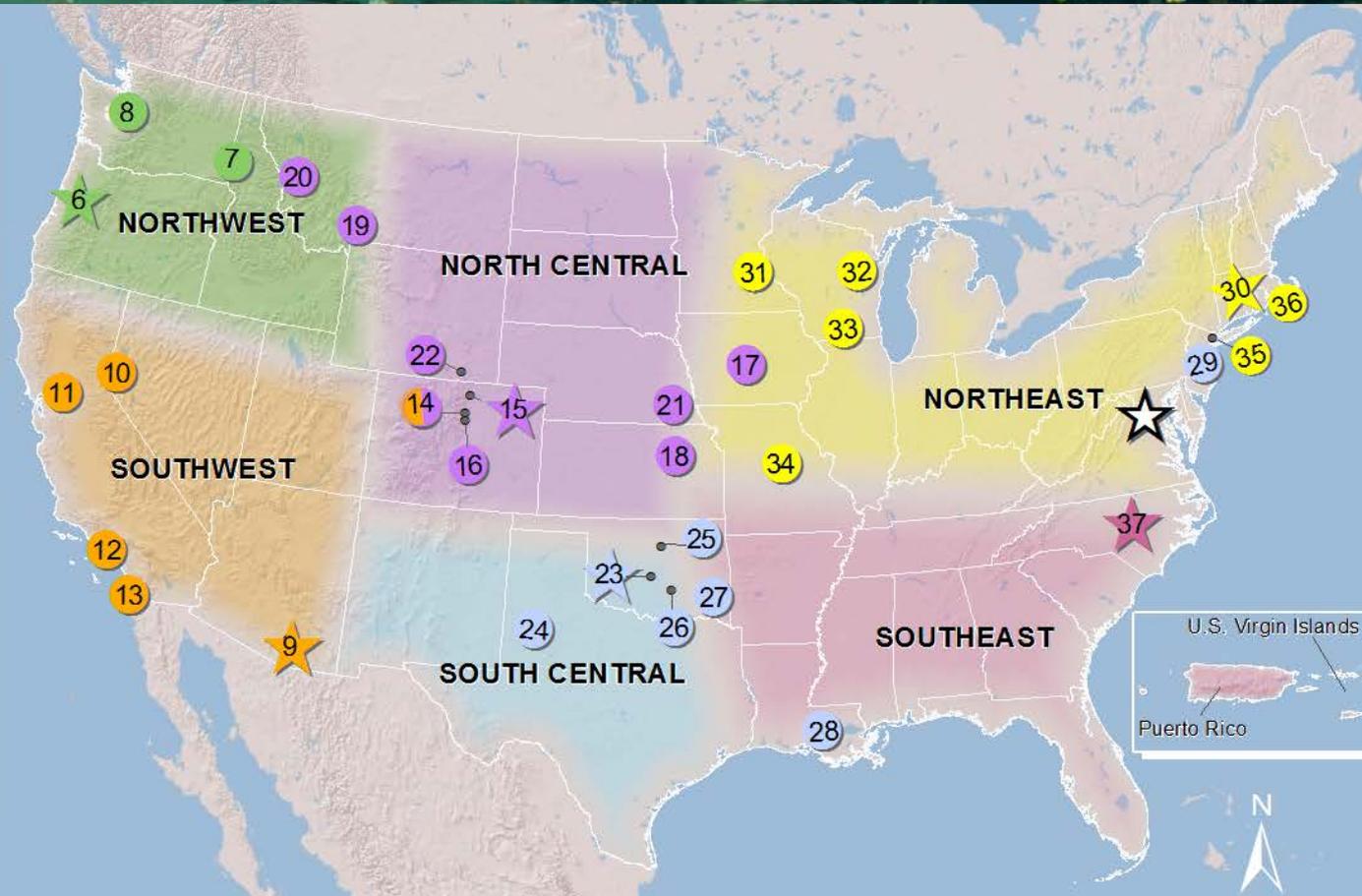
Providing science and tools for natural and cultural resource managers to help fish, wildlife, ecosystems, & the communities they support adapt to climate change.

Water Resources
Drought
Sea-level Rise
Forests
Wildfire
Rivers & Streams

Glacier Change
Inland Fisheries
Migratory Birds
Mammals
Downscaled Data
Ecosystem Modeling

Climate Projections
Tribal Communities
Decision Frameworks
Connectivity
Extreme Events
And much more...

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Drought, Water & Climate Change in the South Central U.S.

South Central Climate Science Center

Assessment of Water Availability Under Climate Change Scenarios – Online Web Portal	1.01, 3.03 (access to information; guidance on climate projections)
Establishing a foundation for evaluating the ecological implications of climate change along a gradient in macroclimatic drivers of coastal wetland ecosystems	4.06 (climate change impacts on coastal fish)
Two-basin Project – Bringing together stakeholders to guide climate science for the Rio Grande and Red River & development of decision support tools	4.07 (climate change impacts on riparian ecosystems)



Drought Monitoring & Water Use in the North Central U.S.

North Central Climate Science Center

Understanding **Water Use & Availability** in the Missouri River Basin

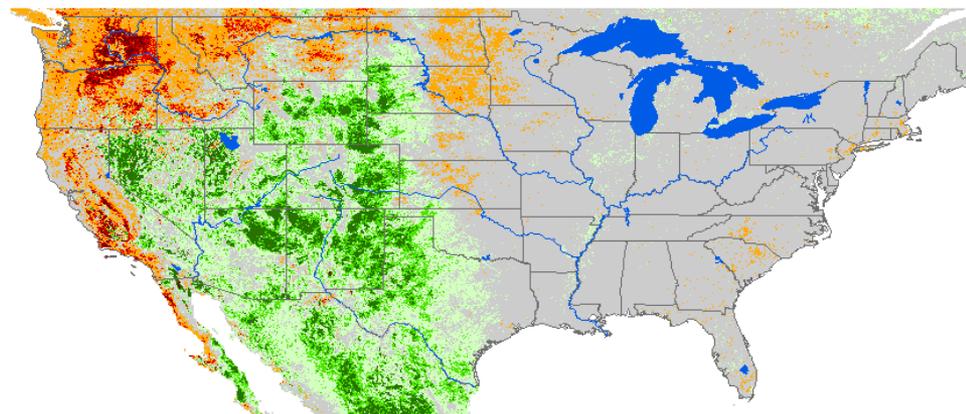
4.05, 4.07
(climate change & water supplies; riparian water budgets)

Remote Sensing for **Drought Monitoring**

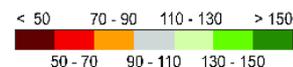
2.01, 4.09
(improved simulations; climate change and land cover)



8-day Cumulative ETa Anomaly
01 Apr - 04 Aug 2015



ETa Anomaly (%)



— Rivers ■ Lakes □ State Boundaries

Map produced by USGS/EROS



Precipitation & Hydrology In the Salt and Verde River Basins

Southwest Climate Science Center

Hydrologic response of atmospheric river events in the Salt and Verde river basins: climatology and possible future changes

4.07

(climate change impacts to riparian ecosystems)

Project Goals:

- Evaluate the impact of changing Atmospheric Rivers (intensity & frequency) on the basins' water resources using state of the art hydrologic and atmospheric modeling
- Engage with natural resources managers, water managers, and Native American tribes to better address their most pressing needs

Massachusetts Fish & Wildlife Climate Action Tool

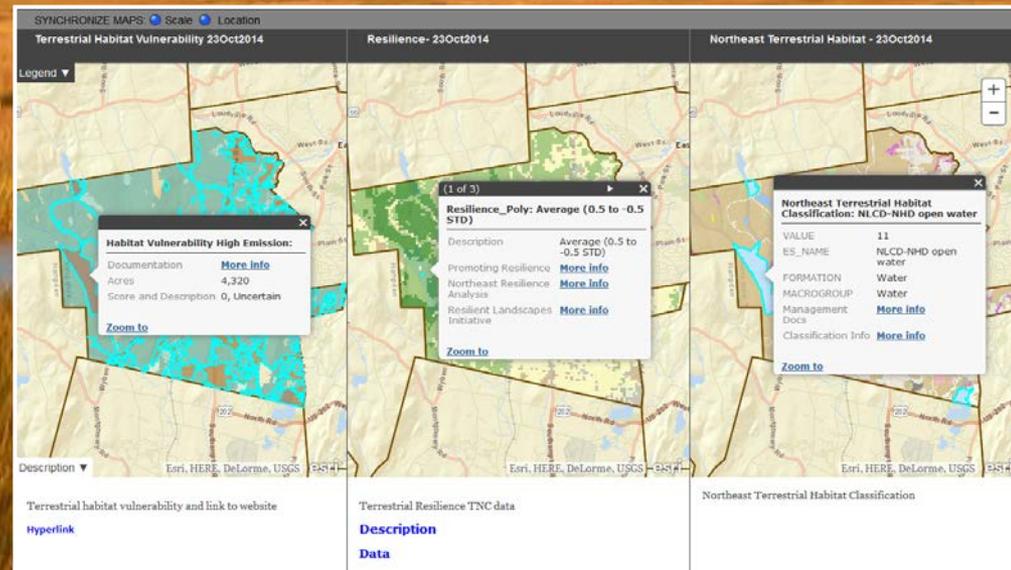
Northeast Climate Science Center

Development of a web-based **decision support tool** with information on **climate change impacts and vulnerability**, that identifies **potential adaptation strategies**

1.01, 4.06, 4.08, 8.02
(literature synthesis; climate impacts; decision support)

Initial Target Areas:

- Fish and wildlife species
- Forests and forestry
- Aquatic connectivity, roads, and culverts
- Land protection and planning



Water & Climate Change Research in the Pacific Islands

Pacific Islands Climate Science Center

Estimating Rainfall Changes on the major Hawaiian Islands in support of Hawaiian Ecosystem Management	2.02 (downscaled data)
21 st century high resolution climate projections for Guam and American Samoa	2.02, 3.06 (downscaled data; estimating extreme events)
Very fine resolution dynamical downscaling of past and future climates of Oahu and Kauai	2.02, 3.06 (downscaled data; estimating extreme events)
Empirical projection of future shoreline position and inundation due to sea level rise	2.05 (sea level projection info & synthesis)
Reconstruction of the West Pacific climate history (Utilizing geochemical data as proxy records of climate variability)	3.05 (longer-term climate variability)
Valuing climate change impacts on coral reef ecosystem services	4.01, 4.08, 4.12 (hydrologic models; climate change responses; sediment changes)

Water & Climate Change Research in the Pacific Islands

Pacific Islands Climate Science Center

Estimating low flows of ungaged streams in Hawaii for past and future rainfall conditions	4.07 (riparian ecosystems & water budgets)
Modeling climate-driven changes to dominant vegetation in the Hawaiian Islands	4.08 (modeling frameworks for climate change responses)
Understanding response of native and non-native forests to climate variability and change to support resource management in Hawaii	4.09 (land cover communities)
Vegetative guide & dashboard relating atoll agroforestry recommendations to predicted climate and sea level conditions in the Marshall Islands	4.11, 5.01, 5.02 (plants & irrigation; socioeconomic factors)
Climate Downscaling Workshop , September 2015	2.02, 2.03, 2.04 (downscaled data)

Water & Land Change Science

USGS Land Change Science Program

Aridland Water Harvesting Study (changes in surface flow, infiltration, sediment build-up at dams & detention features)	4.12 (sediment changes)
WaterSMART - Evapotranspiration Project (improving upon existing hydrologic models to estimate and validate ET)	4.02 (models & evapotranspiration)
Urban Green Infrastructure in Developing Landscapes (distributed green infrastructure vs. traditional centralized stormwater management)	4.05, 4.12 (groundwater & surface water supplies; sediment changes)
Mapping Irrigated and Rainfed Cropland Areas and Water productivity	4.11 (cropland changes)
Using high-quality elevation data to determine vulnerability to sea-level rise	2.05 (sea level rise information)

Thank you!

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