United States Department of Agriculture
Forest Service

Rocky Mountain Research Station

Air, Water, and Aquatic Environments Program

Providing scientific knowledge and technology to sustain our nation's forests, rangelands, and grasslands

Science Briefing

THE NORWEST INTERAGENCY STREAM TEMPERATURE DATABASE AND CLIMATE SCENARIOS

Funded by:

Great Northern Landscape Conservation Cooperative

North Pacific Landscape Conservation Cooperative

Lead agencies:

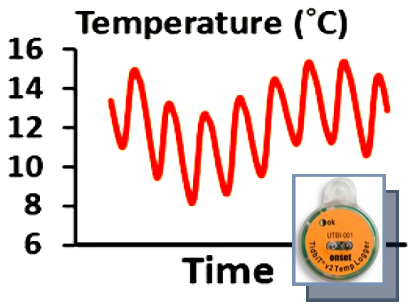
USDA Forest Service, NOAA, Trout Unlimited, CSIRO, USGS science for a changing world

ISSUE

Climate change is warming aquatic ecosystems and will have profound consequences this century. Effective conservation and management of aquatic resources will require unprecedented levels of interagency coordination. Development of shared databases and common sets of high-resolution climate scenarios are a cost-effective means of developing interagency partnerships and the information required to understand local climate effects so that conservation efforts can be prioritized accordingly.

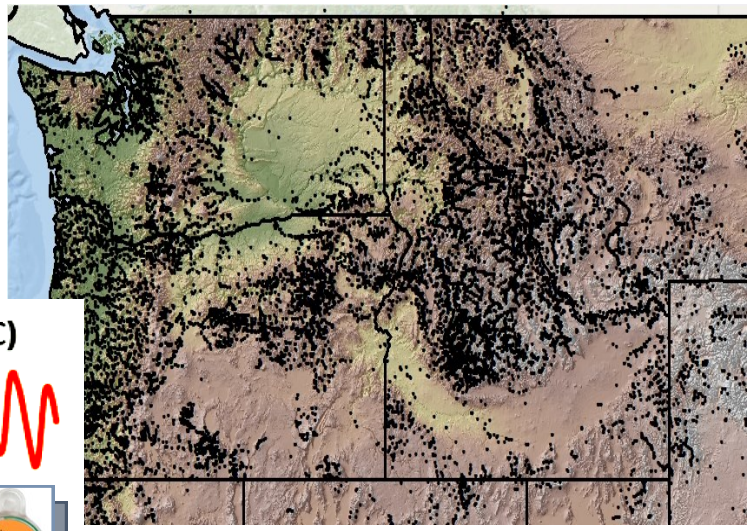
INFORMATION CREATION

Through generous funding by the Great Northern and North Pacific Landscape Conservation Cooperatives, the NorWeST project and database team has developed a comprehensive, interagency stream temperature database for the northwestern U.S. Those data were used to develop accurate (R^2 = 90%; RMSE <1.0˚C), high-resolution (1 kilometer) stream temperature scenarios for 500,000 kilometers of streams and rivers.



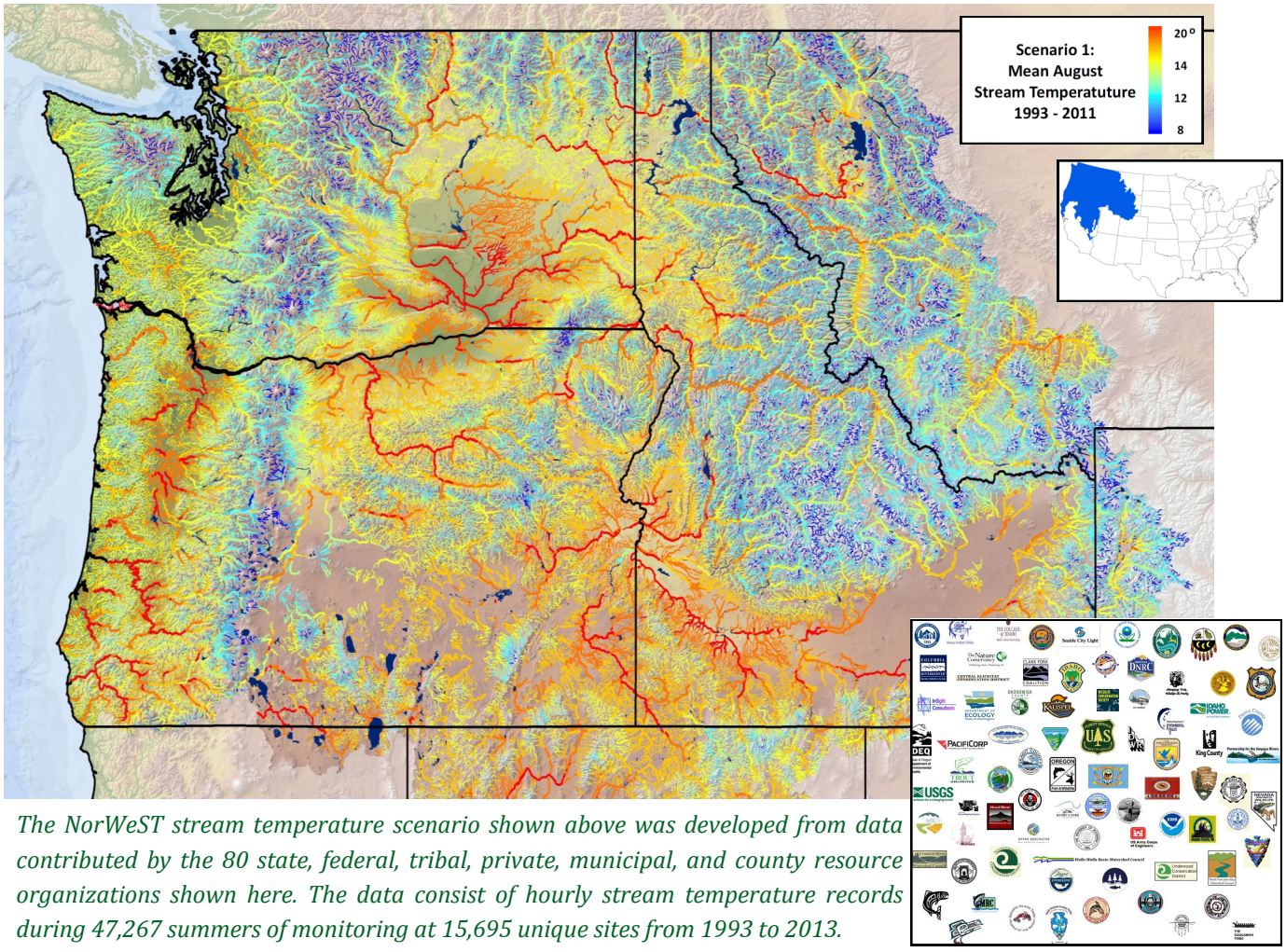
KEY POINTS

- The NorWeST stream temperature database is the world's largest and was developed by contributions from >80 state, federal, tribal, private, municipal, and county resource agencies across the western U.S.
- The data contained in NorWeST would require $10,000,000 to replicate, but the information these data yield for decision making and prioritizing future investments has much greater value.
- Stream temperature data and high-resolution climate scenarios are available in user-friendly digital formats through the NorWeST website.



Locations of stream temperature data contributed to NorWeST across Washington, Oregon, Idaho, and Montana..

THE NORWEST INTERAGENCY STREAM TEMPERATURE DATABASE AND CLIMATE SCENARIOS



The NorWeST stream temperature scenario shown above was developed from data contributed by the 80 state, federal, tribal, private, municipal, and county resource organizations shown here. The data consist of hourly stream temperature records during 47,267 summers of monitoring at 15,695 unique sites from 1993 to 2013.

SIGNIFICANCE

By providing open access to stream temperature information in user-friendly digital formats, the NorWeST project is facilitating interagency coordination of monitoring activities, better conservation planning, and new research on temperature dynamics and thermal ecology of stream organisms. Moreover, because the data to develop NorWeST were collected by dozens of resource agencies, the information is being rapidly adopted and used in local and regional decision making.

NorWeST StreamTemp

KEY REFERENCES

Original Grant Proposal

- Isaak, D.J., S.J. Wenger, E.E. Peterson, J. M. Ver Hoef, S. Hostetler, C.H. Luce, J.B. Dunham, J. Kershner, B.B. Roper, D. Nagel, D. Horan, G. Chandler, S. Parkes, and S. Wollrab. 2011. NorWeST: An interagency stream temperature database and model for the Northwest United States. U.S. Fish and Wildlife Service, Great Northern and North Pacific Landscape Conservation Cooperative grants.

Stream Temperature Model

- Isaak, D.J., C.H. Luce, B.E. Rieman, D.E. Nagel, E.E. Peterson, D.L. Horan, S. Parkes, G. Chandler. 2010. Effects of climate change and wildfire on stream temperatures and salmonid thermal habitat in a mountain river network. *Ecological Applications* **20**: 1350-1371.

MORE INFORMATION

Temperature data and stream climate scenarios are available for download at the NorWeST website (www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html). For more information, please contact **Dan Isaak**, USFS Research Fishery Biologist, (208)373-4385 or disaak@fs.fed.us.