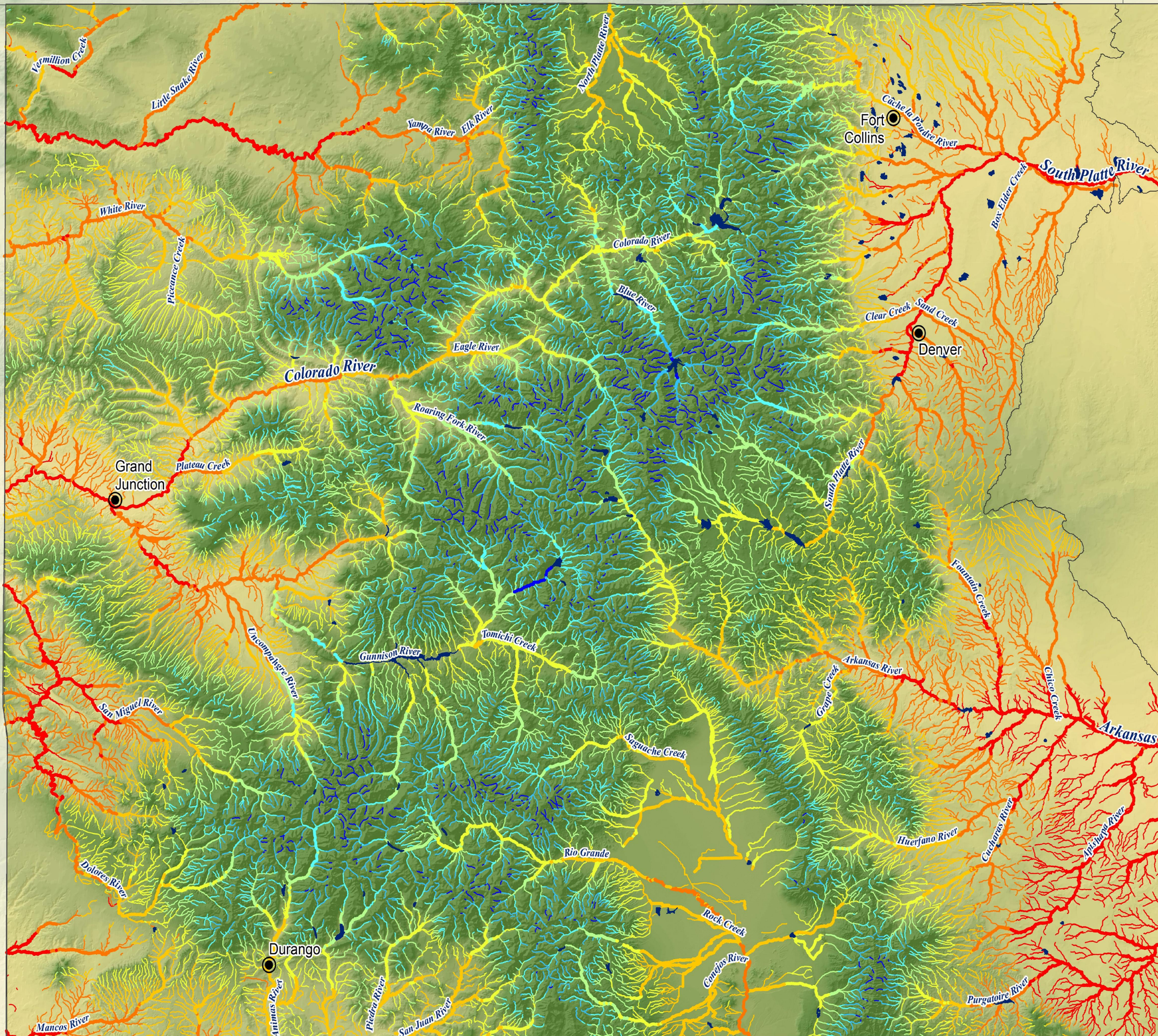
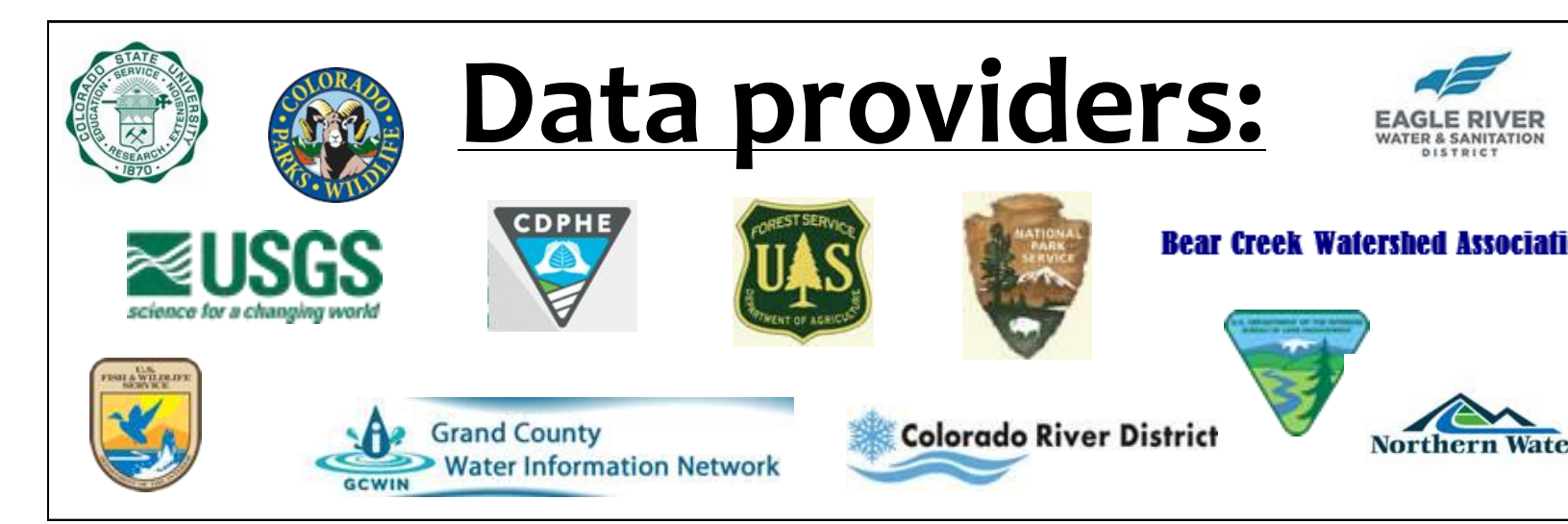


A Thermal Map for Colorado Streams

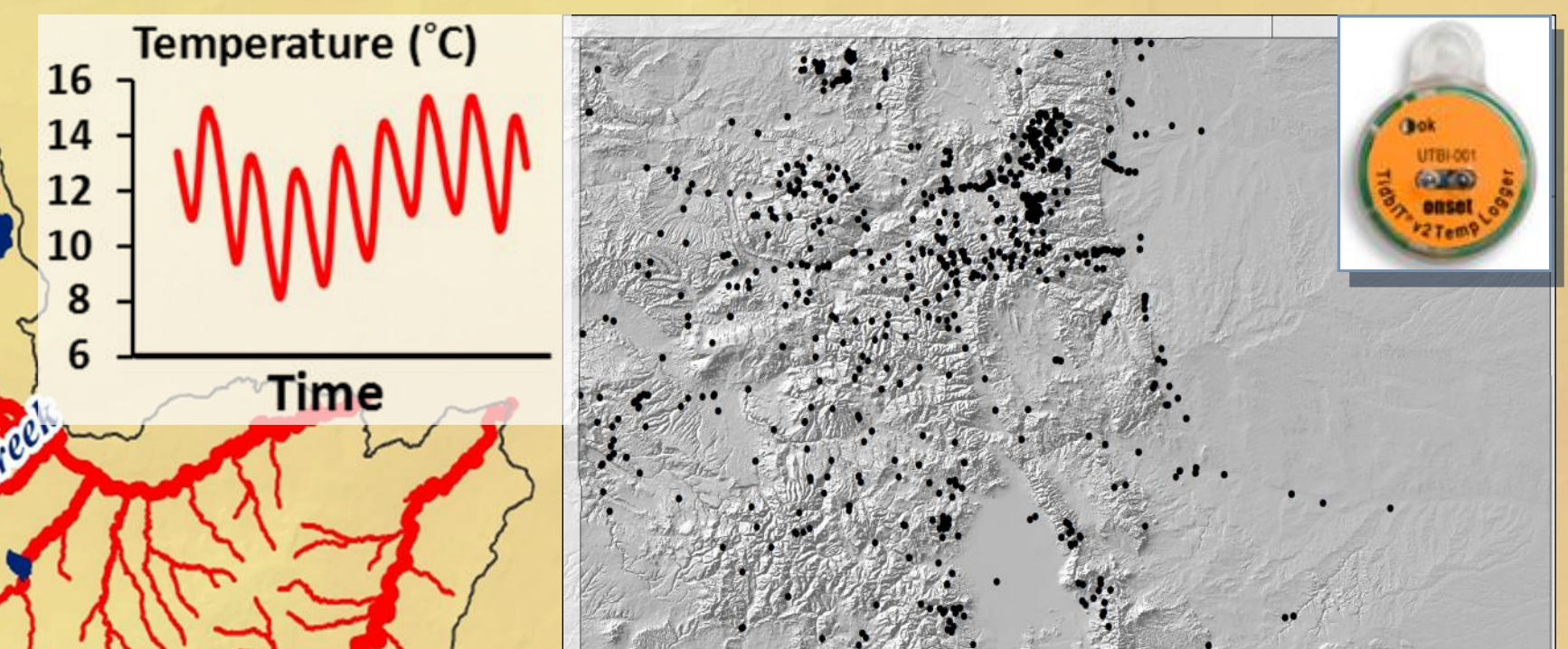
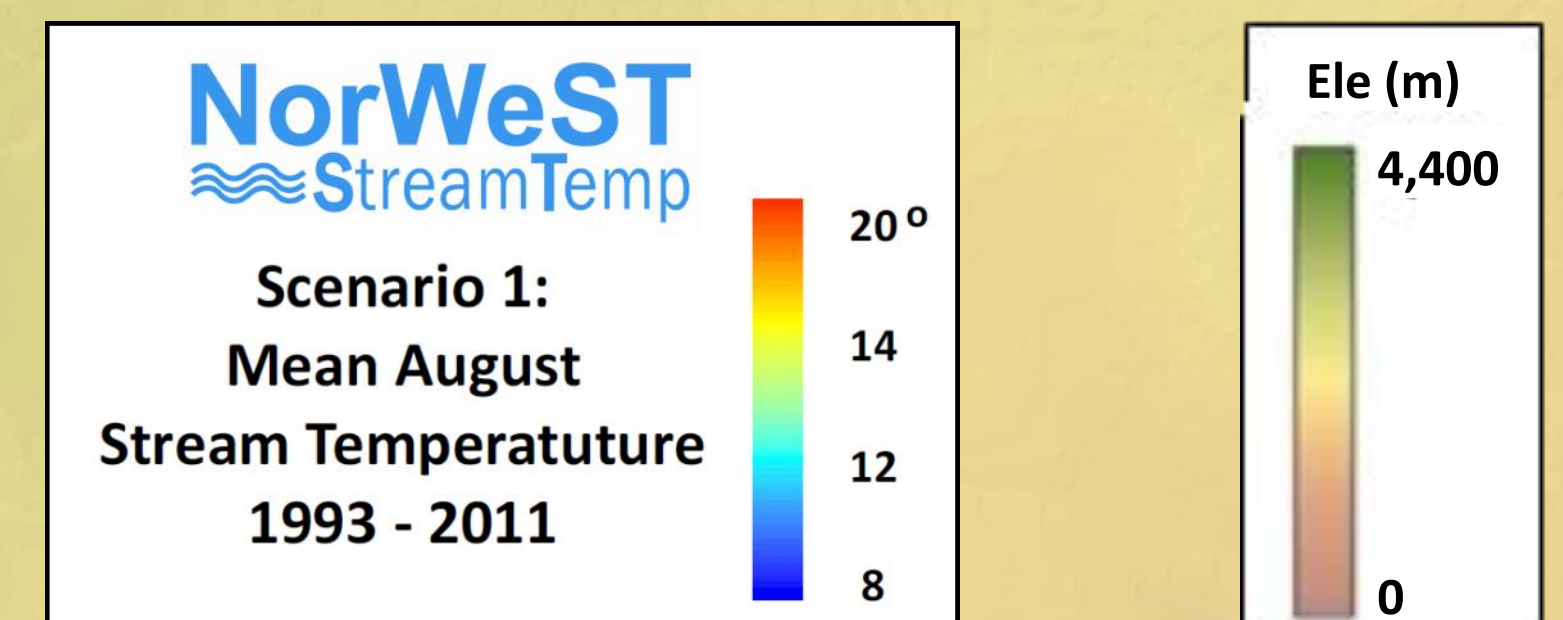


The aquatic community within Colorado has amassed significant amounts of stream temperature data through their collective monitoring efforts in previous decades. As part of a broader West-wide effort, the NorWeST project has developed a comprehensive interagency stream temperature database for the state that consists of >2,850 summers of monitoring effort at 851 unique sites (map inset lower right). Those data were used with spatial-statistical network models (details at the SSN/STARS website:

www.fs.fed.us/rm/boise/AWAE/projects/SpatialStreamNetworks.shtml) to develop an accurate stream temperature model ($r^2 = 95\%$; $\text{RMSPe} = 1.0^\circ\text{C}$; $\text{MAE} = 0.65^\circ\text{C}$), which was then used to predict 30 high-resolution (1 kilometer) historical and future climate scenarios for streams in western Colorado. This poster depicts a historical scenario of the mean August temperature from 1993-2011 for 99,000 kilometers of stream mapped to the 1:100,000-scale NHDPlus hydrography layer trimmed to exclude intermittent reaches and those >15% slope. NorWeST stream temperature scenarios and state temperature maps are available in user-friendly digital formats (e.g., ArcGIS shapefiles and .pdf files) from the project website (www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html) and can also be viewed dynamically online using this webtool (www.sciencebase.gov/gisviewer/NorWeST/).

Daily summaries (min/max/mean) of the temperature data used to develop the temperature model are also available through the website if permission was given for their distribution. All data are attributed to the original source agency and contributing biologists or hydrologists in metadata files. By providing open access to stream temperature information in user-friendly formats, the NorWeST project is facilitating coordination of monitoring activities among organizations, better conservation planning, and new research on temperature dynamics and thermal ecology.

The analytical infrastructure used to develop the Colorado stream temperature model consists of a new class of spatial-statistical model for data on stream networks that many groups are beginning to use with water chemistry attributes (e.g., pH, alkalinity, conductivity, etc.), biological datasets (species occurrence, abundance, genetic attributes), and habitat surveys to provide a wealth of new information about streams. More details regarding those applications are provided at the National Stream Internet Project website (www.fs.fed.us/rm/boise/AWAE/projects/NationalStreamInternet.html).



Stream sites with temperature data used to develop the thermal map for western Colorado. Data consist of 2,850 summers of monitoring effort from 851 sites.

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