



USGS Activities in and near the Missouri Headwaters Basin

For the

Missouri Headwaters Basin Study and Impacts
Assessment Stakeholder Meeting

12/1/2016

National Water Balance Model Portal

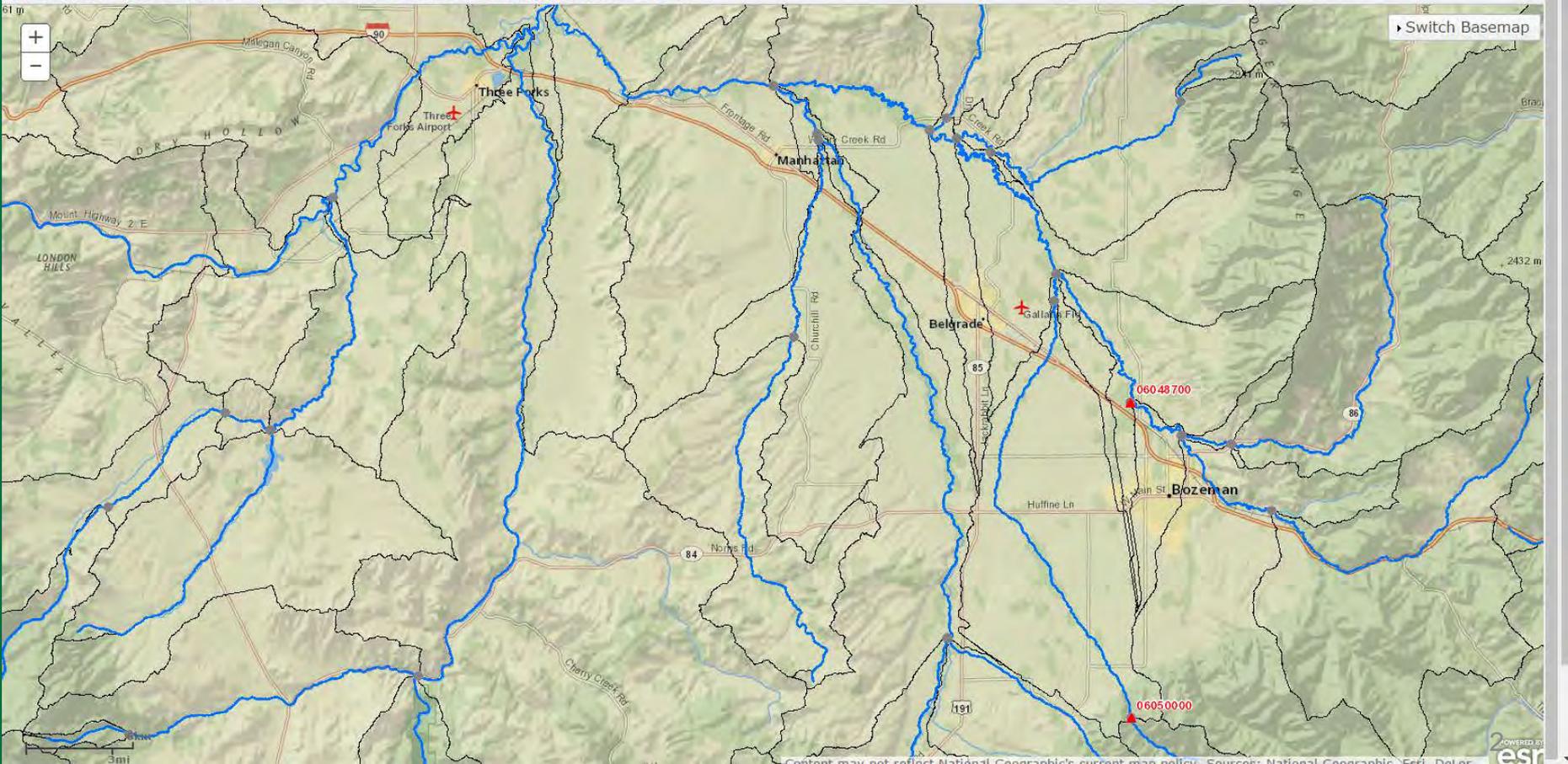


USGS Home
Contact USGS
Search USGS

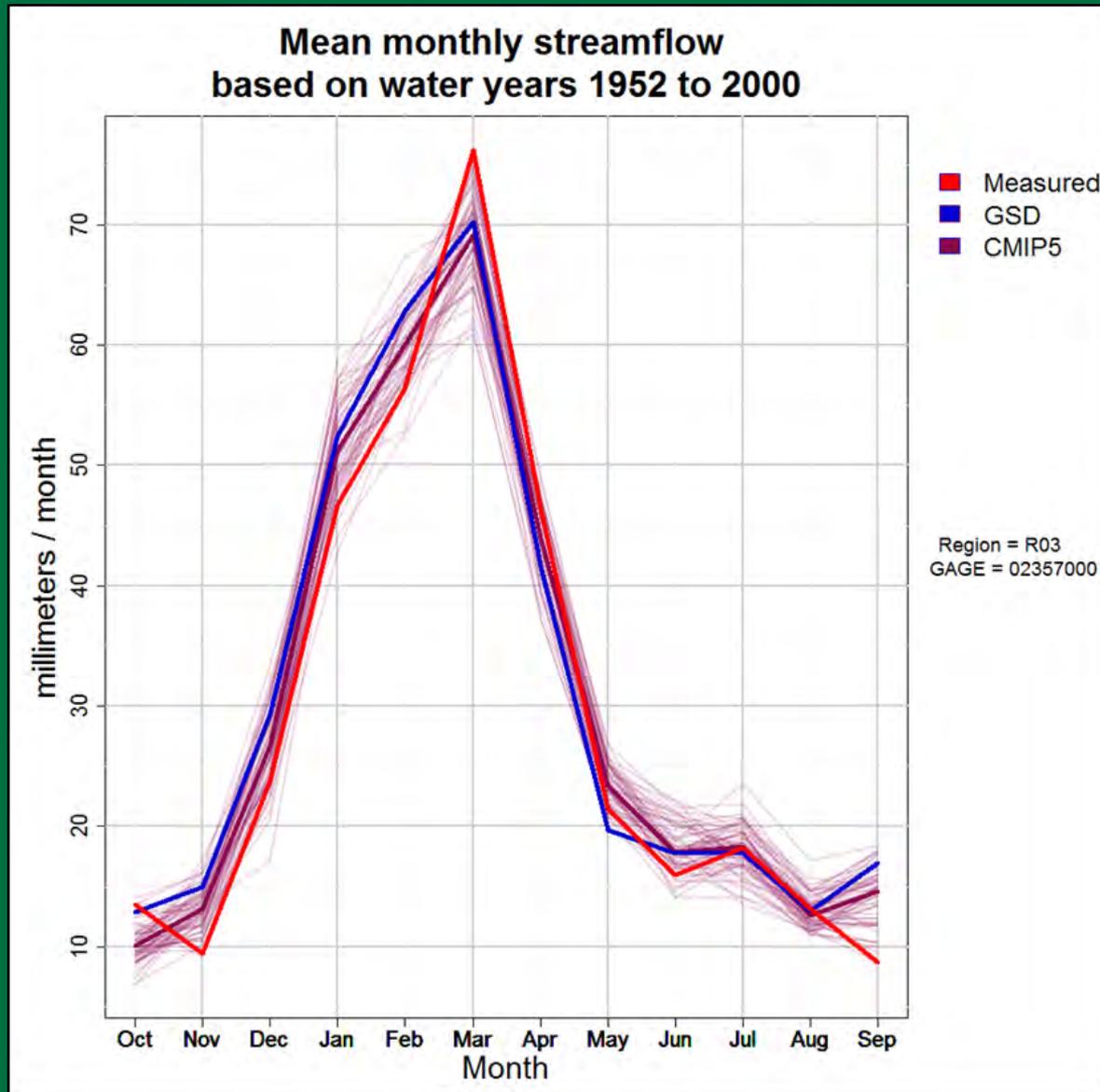
MoWS - Hydrology Futures Portal

kchase@usgs.gov Log Out

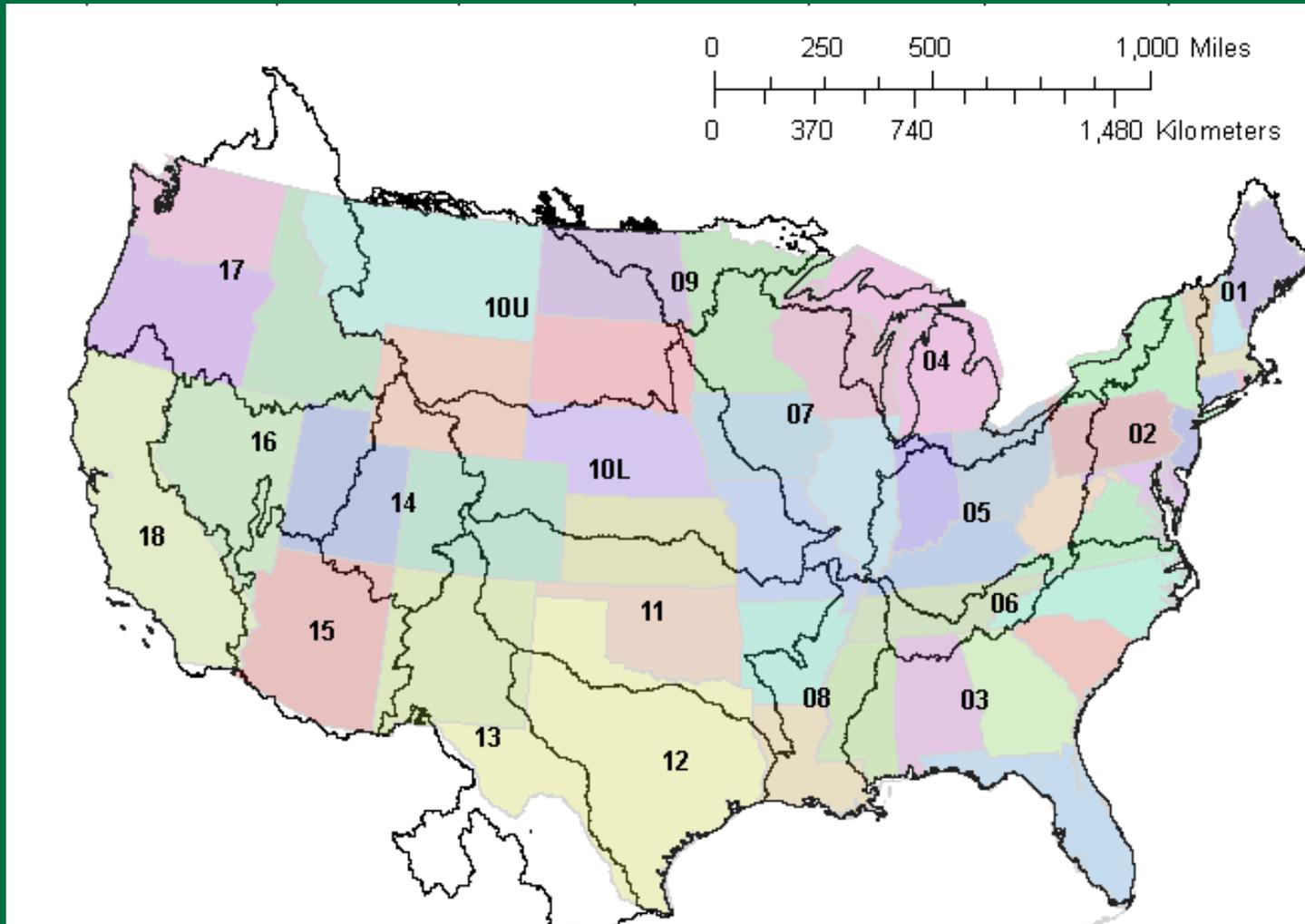
Full Extent Prev Extent Next Extent Measure Legend Plots FAQ



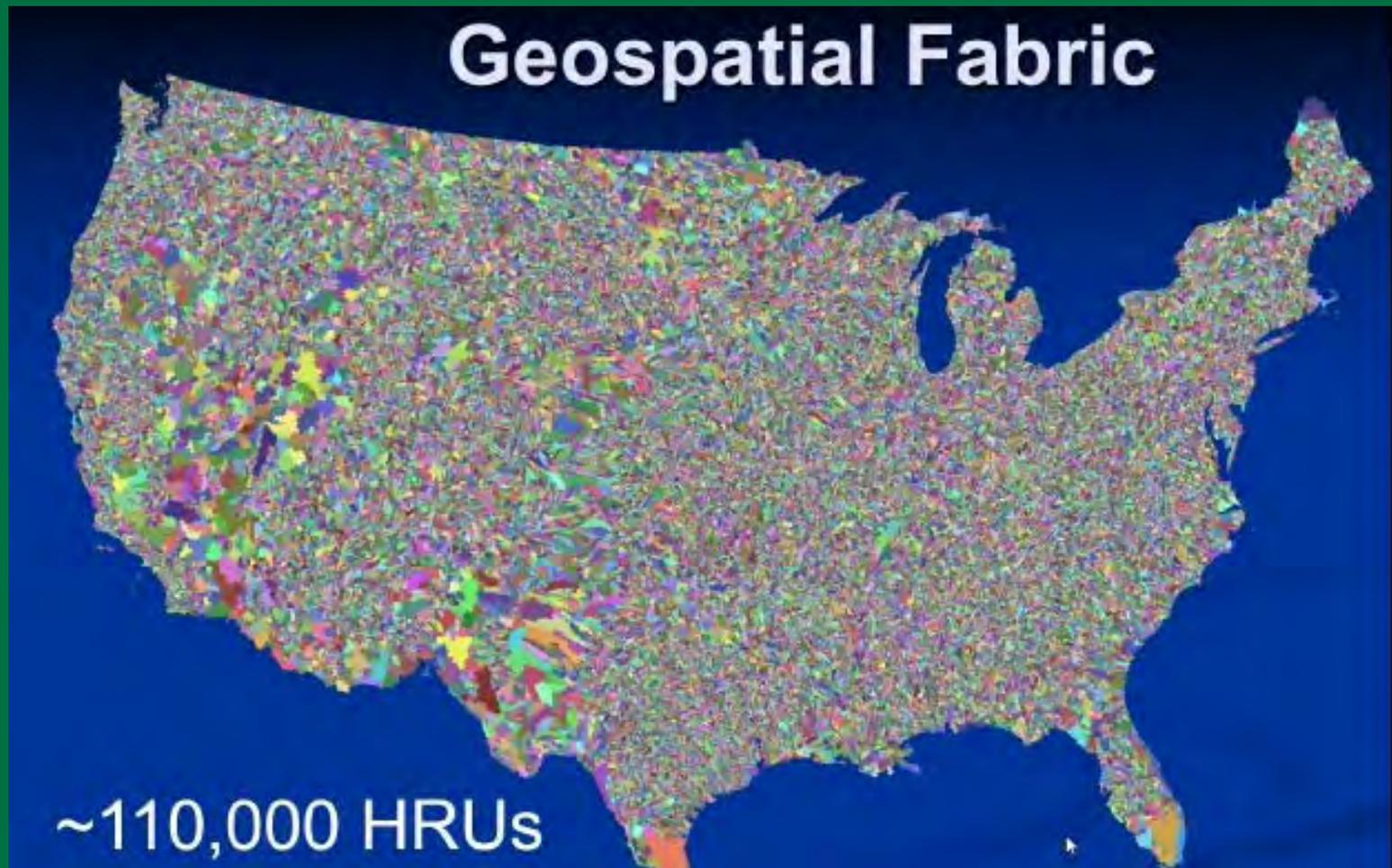
National Water Balance Model Portal



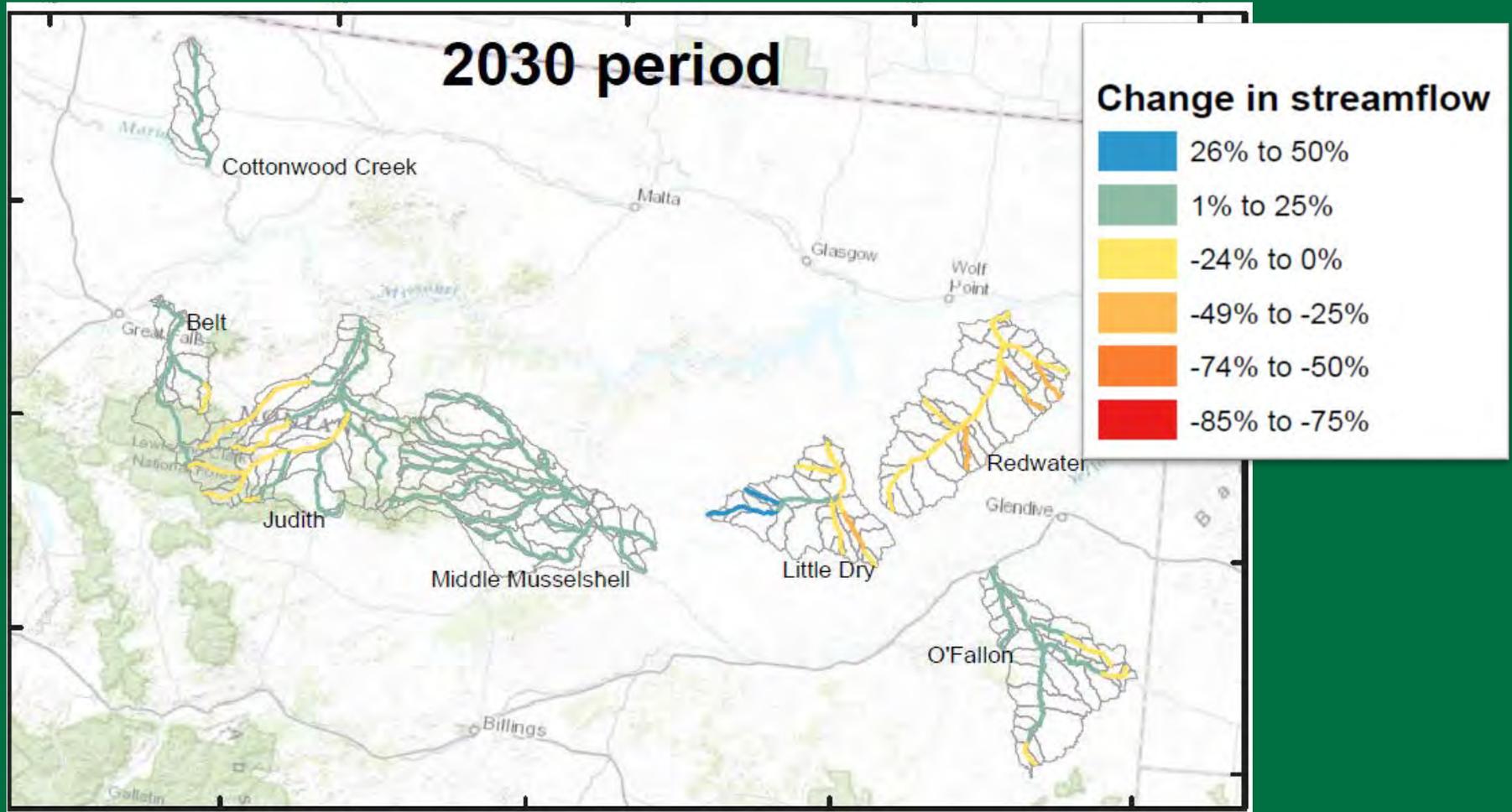
National Hydrologic Model



National Hydrologic Model



Potential Effects of Climate Change on Streamflow and Fisheries





Contents lists available at ScienceDirect

Journal of Hydrology: Regional Studies

Journal homepage: www.elsevier.com/locate/ejrh



Potential effects of climate change on streamflow for seven watersheds in eastern and central Montana



Katherine J. Chase^{a,*}, Adel E. Haj^b, R. Steven Regan^c, Roland J. Viger^c

^a U.S. Geological Survey Wyoming-Montana Water Science Center, 3162 Bozeman Avenue, Helena, MT 59601, USA

^b U.S. Geological Survey Iowa Water Science Center, 400 S. Clinton Street, Iowa City, IA 52240, USA

^c U.S. Geological Survey National Research Program, P.O. Box 25046, MS 413 Bldg 53, Denver Federal Center, Lakewood, CO 80225-0046, USA

ARTICLE INFO

Article history:

Received 10 August 2015

Received in revised form 3 June 2016

Accepted 9 June 2016

Keywords:

Streamflow

Precipitation-runoff model

Hydrology

Climate

Change

Eastern Montana

Central Montana

Regional climate model

ABSTRACT

Study region: Eastern and central Montana.

Study focus: Fish in Northern Great Plains streams tolerate heat, cold, floods, and drought; however changes in stream climate change may render some prairie streams uninhabitable. To better understand future hydrology of these prairie streams, the Precipitation-Runoff Modeling System (PRMS) model and output from the RegCM3 Regional Climate Model were used to simulate streamflow for seven watersheds in eastern and central Montana for a baseline period (water years 1982–1999) and three future periods: 2046–2063 (2055 period), and 2071–2088 (2080 period). New hydrological insights for the region: Projected changes in monthly streamflow vary by the RegCM3 model selected period. Mean annual streamflows for all future periods are projected to increase slightly (2–15%) for the 2030 period and decrease (–24 to –75%) for Redwater River watershed in eastern Montana for the 2080 period for the four remaining watersheds. Mean annual streamflows for all future periods are projected to increase slightly (2–15%) for the 2030 period and decrease (–44%) for the 2080 period for the four remaining watersheds in central Montana.

Published by Elsevier B.V. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).



science for a changing world

ScienceBase Catalog Comments Help

ScienceBase Catalog - USGS Data Release Products - Potential Effects of Climate Change

Potential Effects of Climate Change on Streamflow in Eastern and Central Montana (2013-2014 Analyses) - PRMS Model Input and Output

These PRMS model input and output data are provided to accompany the journal article "Potential Effects of Climate Change on Streamflow for Seven Watersheds in Eastern and Central Montana".

Dates

Publication Date: 2016
Start Date: 1981-10-01
End Date: 2088-09-30

Citation

Chase, K.J., Haj, A.E., Regan, R.S., and Viger, R.J., 2016. Potential Effects of Climate Change on Streamflow in Eastern and Central Montana (2013-2014 Analyses) - PRMS Input and Output Data. U.S. Geological Survey data release. <http://dx.doi.org/10.5066/977020V55>.

Summary

Fish in Northern Great Plains streams evolved to survive heat, cold, floods and drought, however changes in streamflow associated with long-term climate change may render some prairie streams uninhabitable for current fish species. To better understand future hydrology of these prairie streams, the Precipitation-Runoff Modeling System (PRMS) model and output from the RegCM3 Regional Climate Model were used to simulate streamflow for seven watersheds in eastern and central Montana for a baseline period (water years 1982–1999) and three future periods: water years 2021–2038, 2046–2063, and 2071–2088. These PRMS model input and output data are intended to accompany a journal article (Chase et al., 2016); they include 2 appendices:
1. Appendix 1 - ranges for PRMS parameters for each PRMS model (excel file)
2. Appendix 2 - tables 2.1-2.7 containing simulated monthly streamflows, PRMS output (csv file)

Chase, K.J., Haj, A.E., Regan, R.S., and Viger, R.J., 2016. Potential effects of climate change on streamflow for seven watersheds in eastern and central Montana. *Journal of Hydrology: Regional Studies*, Volume 7, Pages 69-81. <http://dx.doi.org/10.1016/j.ejrh.2016.06.001>

Child Items (4)

- Appendix 1: Sources, values, and ranges for selected Precipitation-Runoff Modeling System parameters for the seven study watersheds in eastern and central Montana.
- Appendix 2: Simulated monthly mean streamflows for the seven study watersheds in eastern and central Montana for the baseline period (WY 1982–1999) and future periods (WYs 2021–2038, 2046–2063, and 2071–2088) for the three General Circulation Models used in the regional climate model.
- Selected Stream Segments (Subset F10L) from "Geospatial Fabric for National Hydrological Modeling" - Web



Map »



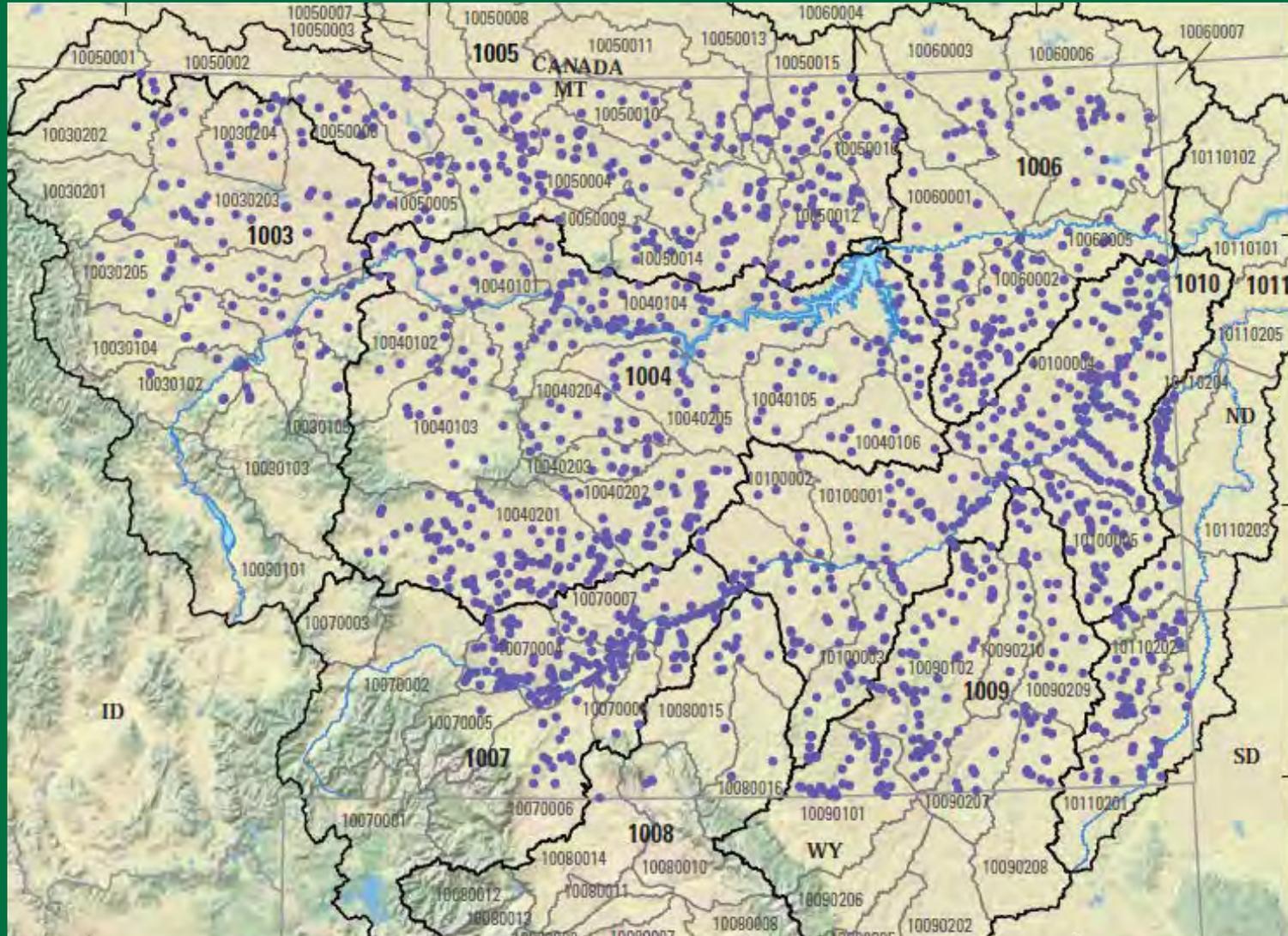
Spatial Services

ScienceBase WMS:
<http://www.sciencebase.gov/catalog>

Communities



Potential Effects of Climate Change on Streamflow and Fisheries



StreamStats

USGS StreamStats Version 3.0 : MT

Select on a tool on the toolbar. If the icon remains depressed, click on the map to perform the desired action.

Map Layers

- Streamgages
- Regional Studies
- Availability
- State Applications
- Study Area Bndys

Base Layers

- Imagery
- Street Map
- World Topo
- USA Topo
- Canadian Topo
- TNM Topo

0 1.5 3mi
Scale: 1 : 288,895
Latitude: 45.91845
Longitude: -111.07482 MT

USGS The National Map, National Boundaries Dataset, National Elevation Dataset, Geographic Names Info...

[Streamstats Status](#) [News](#) [Introduction](#) [Application Information](#)

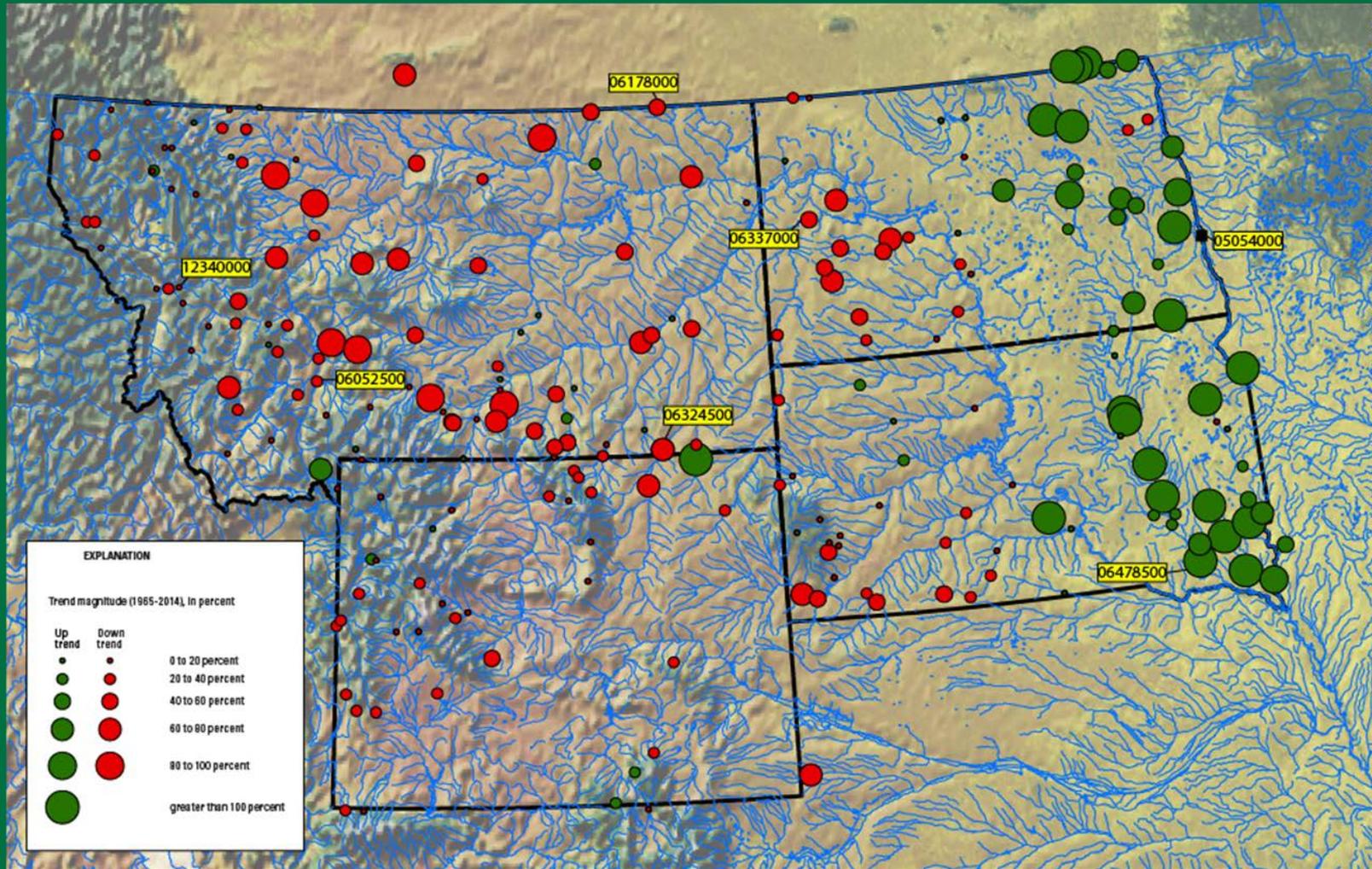
USA.gov



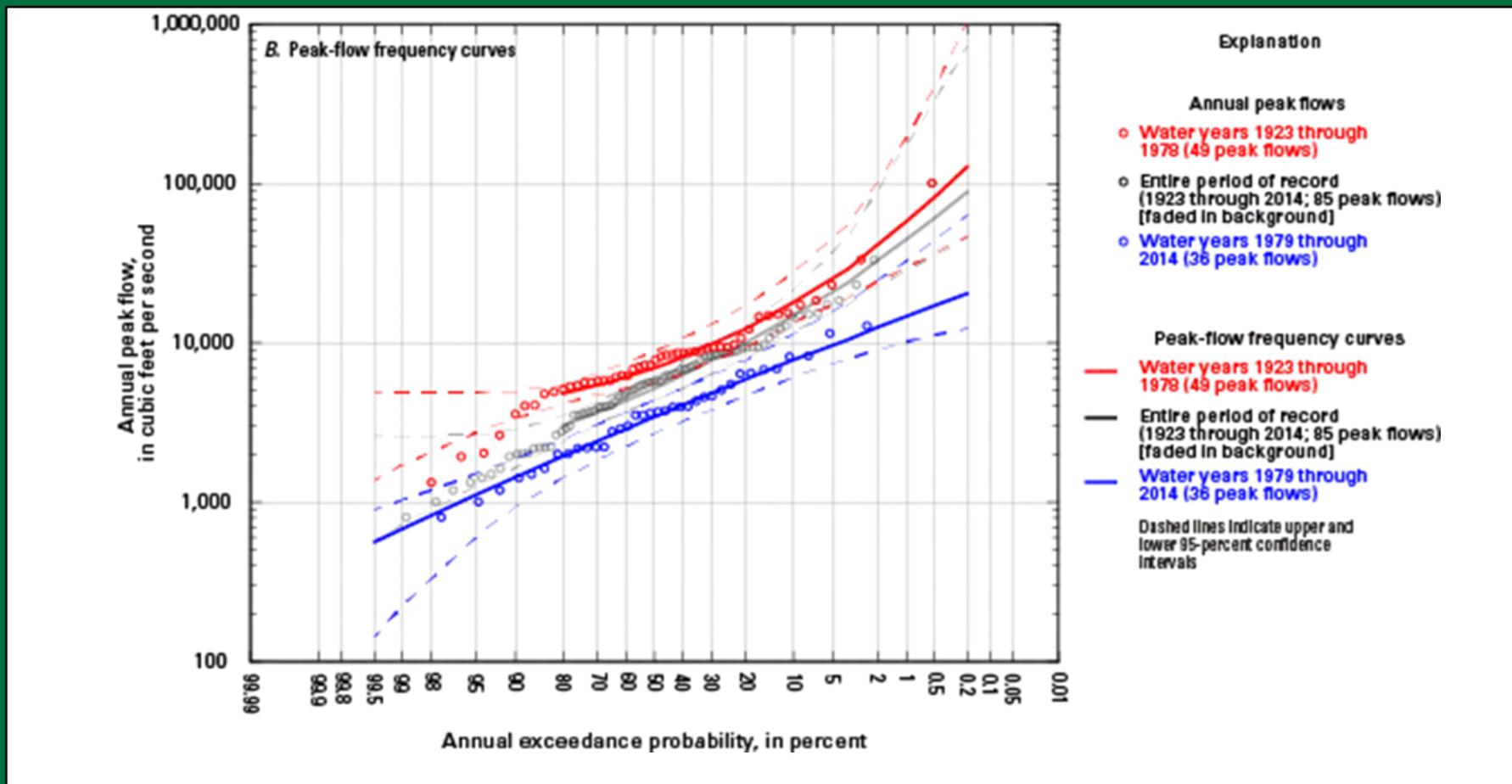
Identifying Drought-Resistant Headwater Streams in the Northwest



Proposal: Flood Frequency Non-Stationarity Montana, Wyoming, North Dakota and South Dakota



Proposal: Flood Frequency Non-Stationarity Montana, Wyoming, North Dakota and South Dakota



Proposal: Citizen Science Apps

- Low Flow /No Flow
- Flooding
- Ice Jams

