MONTANA STREAM GAGE NETWORK

Black Eagle Falls
at Great Falls

2-15-3308, MCA DWSAC'S STREAM GAGE OVERSIGHT

(h) coordinate oversight of the statewide stream gage network identified by the department of natural resources and conservation, including:

(i) an early notification process for the discontinuation of any network gage;

(ii) an annual review of the funding status and potential alterations to the network; and

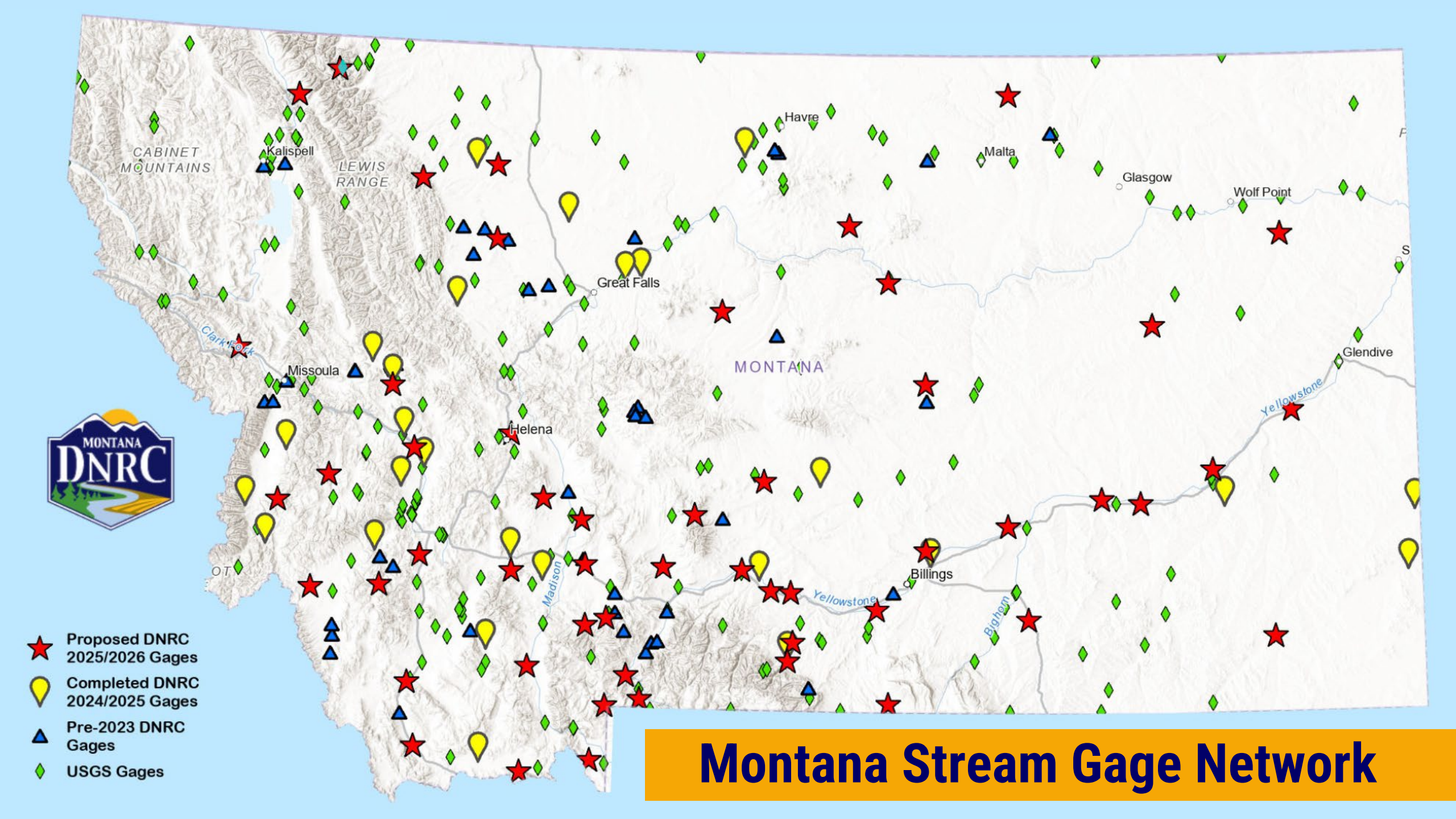
(iii) an annual report to the water policy interim committee, in accordance with **5-11-210**, on the drought and water supply advisory committee's network oversight activities.

MONTANA STREAM GAGE NETWORK

USGS – 232 real-time gages, both seasonal and year-round

MT DNRC – 100 real-time gages

Tribal Nation Networks



Montana Stream Gage Network

USGS GAGES

232 Total Stations

Federal Priority Gages
41

4 sites will be discontinued July 1, 2025
5 sites were discontinued in 2024/25

Cooperatively Funded Gages
191

2 sites discontinued in 2024/25
10 sites added in 2024/25

USGS STREAM GAGES
FEDERALLY FUNDED AND COOPERATIVELY FUNDED

- 41 Sites are Federally funded
  - 5 sites were discontinued due to lack of federal funding in 2024. DNRC took over operations of 3 of the 5. 2 were rescued.
  - 4 sites will be discontinued on July 1, 2025 due to lack of federal funding
- Sites are important to federal agencies, but many other entities rely on this data
- Sites are generally on large rivers and very important to multiple agencies

Canyon Ferry Reservoir

USGS STREAM GAGES
FEDERALLY FUNDED AND COOPERATIVELY FUNDED

- 191 Sites are **cooperatively funded**. Costs vary by site, but are split at about $7,960 federal + $12,740 to partner
  - Total cost to operate each site is about $20,700
  - Costs increase between 5-10% annually and entirely fall to partner
- Site data primarily used by sponsor, but many are also important to numerous other entities
- Funding partners are State Agencies (DNRC, FWP, MDT), Local Governments, Municipalities, Conservation Districts, Tribal Governments, Private Businesses

USGS STREAM GAGES
FEDERALLY FUNDED AND COOPERATIVELY FUNDED

State FY2025 Summary

- Loss of 5 FPS gages – all continue to operate in some respect
  - 4 additional may be decommissioned on July 1, 2025
- Loss of 2 Coop gages
- Addition of 10 Coop gages

Looking forward to FY2026

- No planned changes to FPS network through FY28. Funding is subject to federal appropriations which are uncertain.
- Possible additions of water quality monitoring/stream gaging in Madison River basin, Big Hole River, and Muddy Creek near Vaughn
- Possible additional temperature monitoring on Powder R near Locate, MF Flathead R near West Glacier, and SF Flathead R ab Twin C near Hungry Horse

DNRC STREAM GAGES

- Montana started the state-based network in 2015, under recommendation of 2015 State Water Plan
- By 2023, network was built out to 40 sites
- 60 additional sites funded in the last 3 years
- Sites cost about $10,000 to operate annually
- Sites are mainly funded through state general funds, but a few are partner funded

DNRC STREAM GAGE PROGRAM

Total Real-time Sites: 100

Total Staff: 7

Annual Program Budget: $961,511

As of June 4, 2025

- Network built out to 74 stations
- Additional stations are scheduled; Goal for 100 is end of 2027

DNRC STREAM GAGES

- Sites are prioritized for multi-user benefits with the following considerations:
  - DNRC administrative need;
  - Tribal and Federal compact need;
  - Water distribution projects;
  - Municipal, and conservation district need;
  - Watershed and Conservation group resource management
  - Multi-agency overlapping benefit;
  - Recreation, and education;
  - Support for academic studies

StAGE Platform

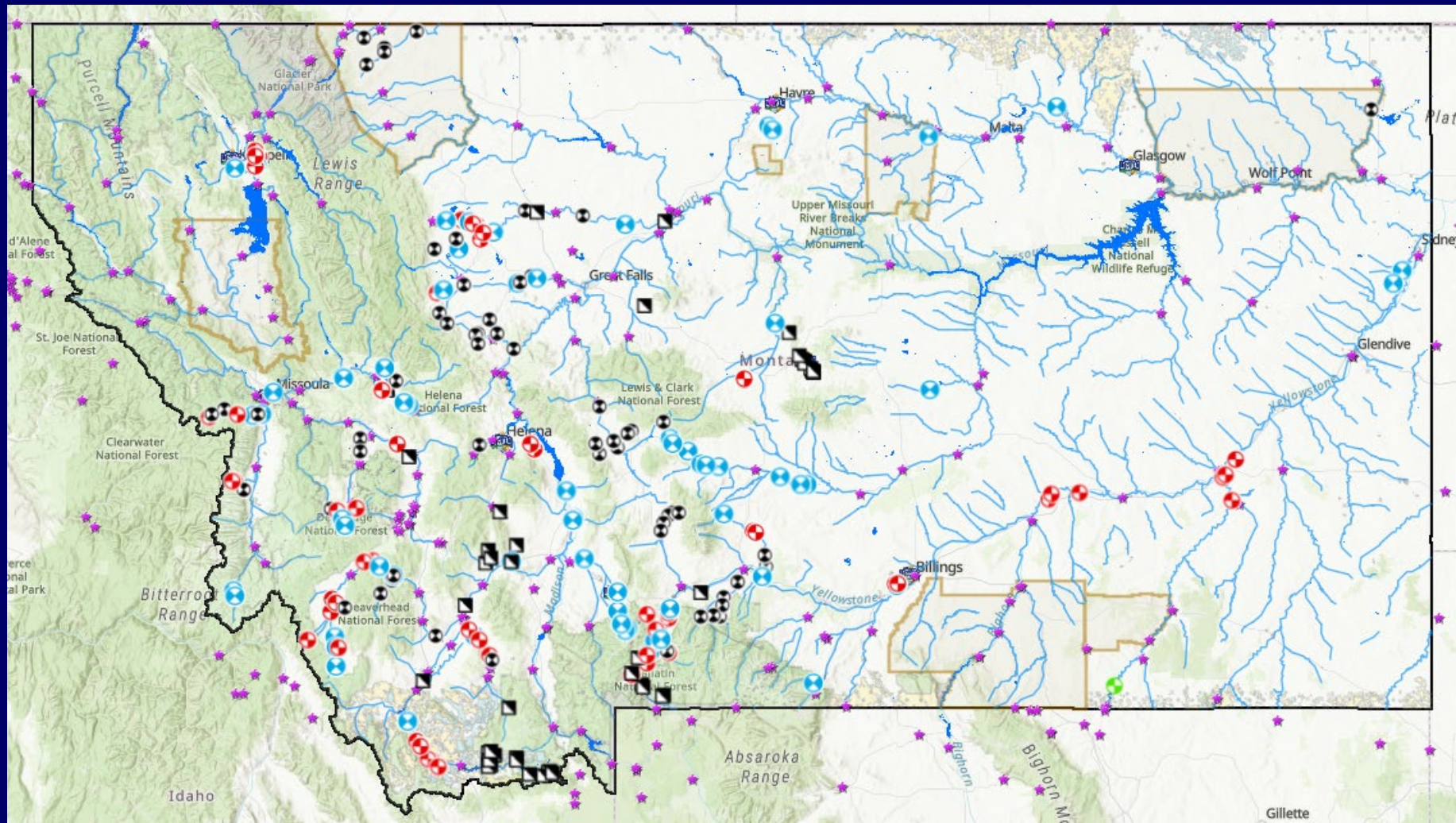
-Data for both USGS & DNRC gages is publicly available

-Currently working on numerous enhancements

-State reservoirs

-Hydrologic modeling and forecasting

-Early flood awareness



LEGISLATIVE SUPPORT

- 2023: $1.4M One-time-only funding was approved to install 32 new state gages
- 2025: $1.8M base budget funding was approved to install 24 more gages and maintain network
- 2025: $942k base budget funding to fund USGS Coop cost increases for next 2 years

Questions ?

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Water Sciences Bureau Chief
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WHAT IS A STREAM GAGE AND HOW DOES IT WORK?

A Stream Gage is a structure that measures, records and transmits the height, or stage, of water in a stream

WHAT IS A STREAM GAGE AND HOW DOES IT WORK?

- Manual stream flow measurements are taken at a variety of stage height to create a graph of the stage vs flow rate, or the “**rating curve**”
- Using the rating curve, stage height is converted to **flow rate**

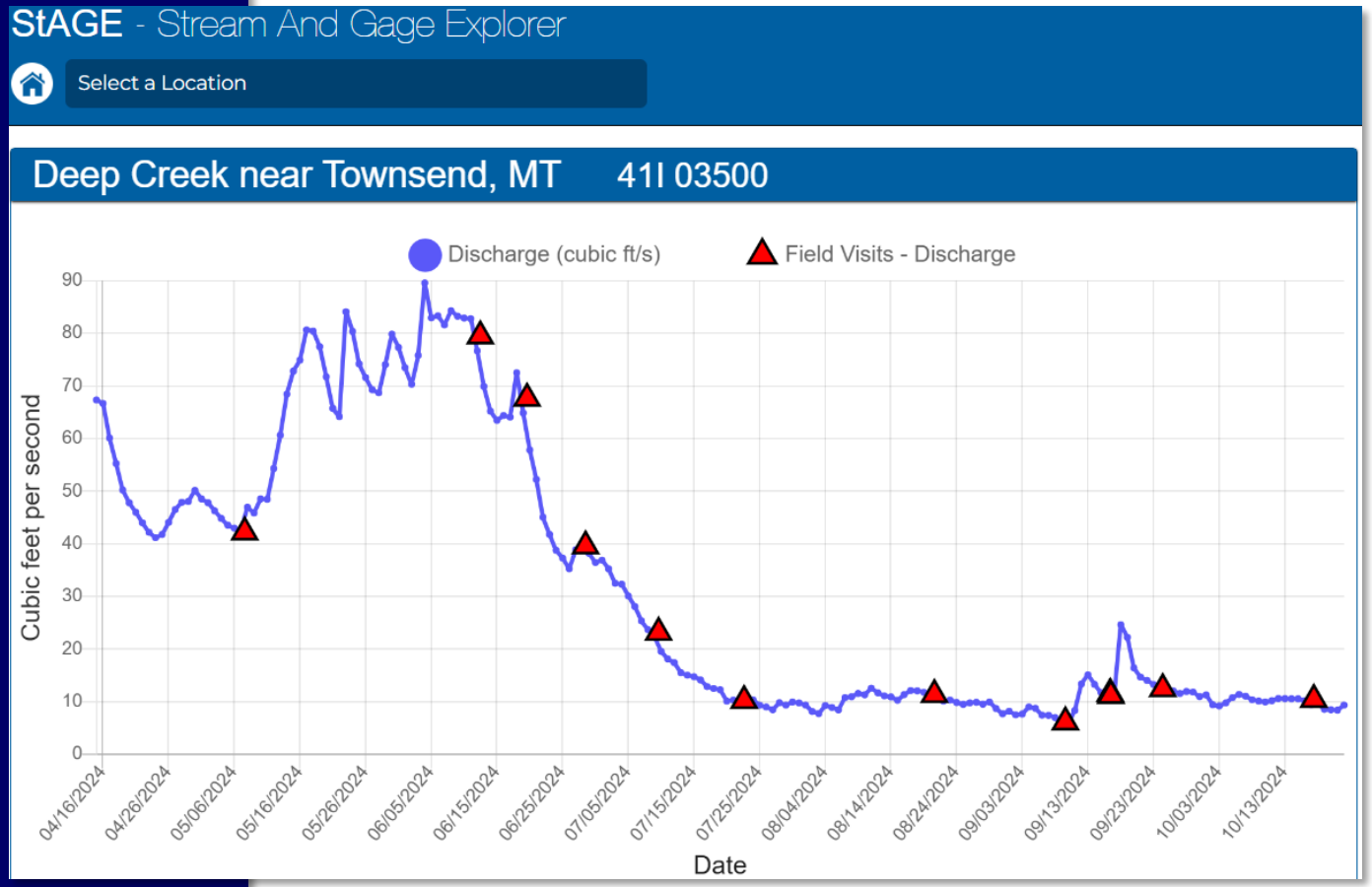
WHAT IS A STREAM GAGE AND HOW DOES IT WORK?

In addition to “flow rate”, many other data sets can be collected

- Air and Water Temperature
- Water Quality
- Meteorological sensors (precipitation, wind speed, etc.)

WHAT IS A STREAM GAGE AND HOW DOES IT WORK?

Data are transmitted back to DNRC, where they are validated and made available for public use on the StAGE platform

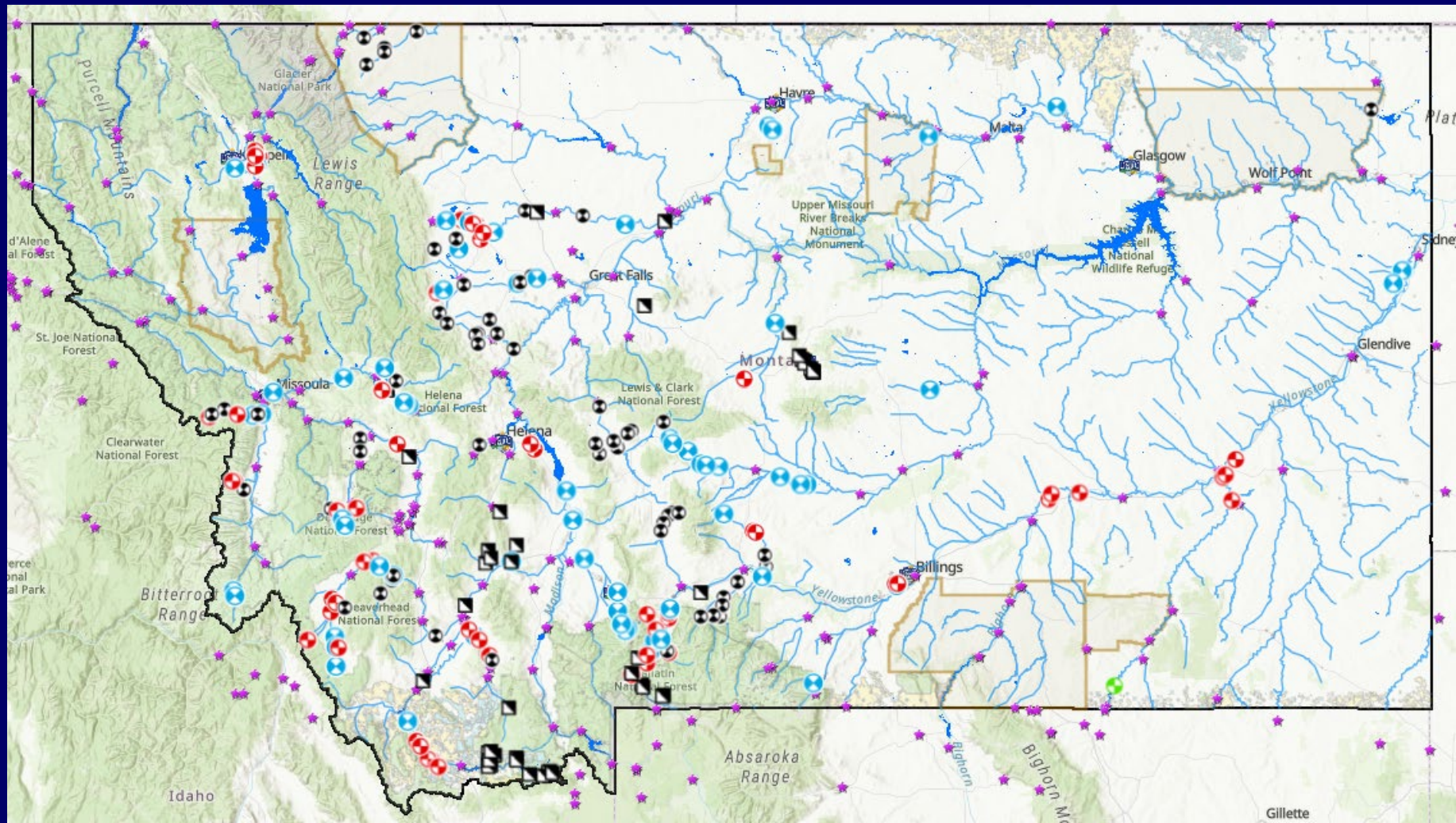


https://gis.dnrc.mt.gov/apps/StAGE/

StAGE Platform

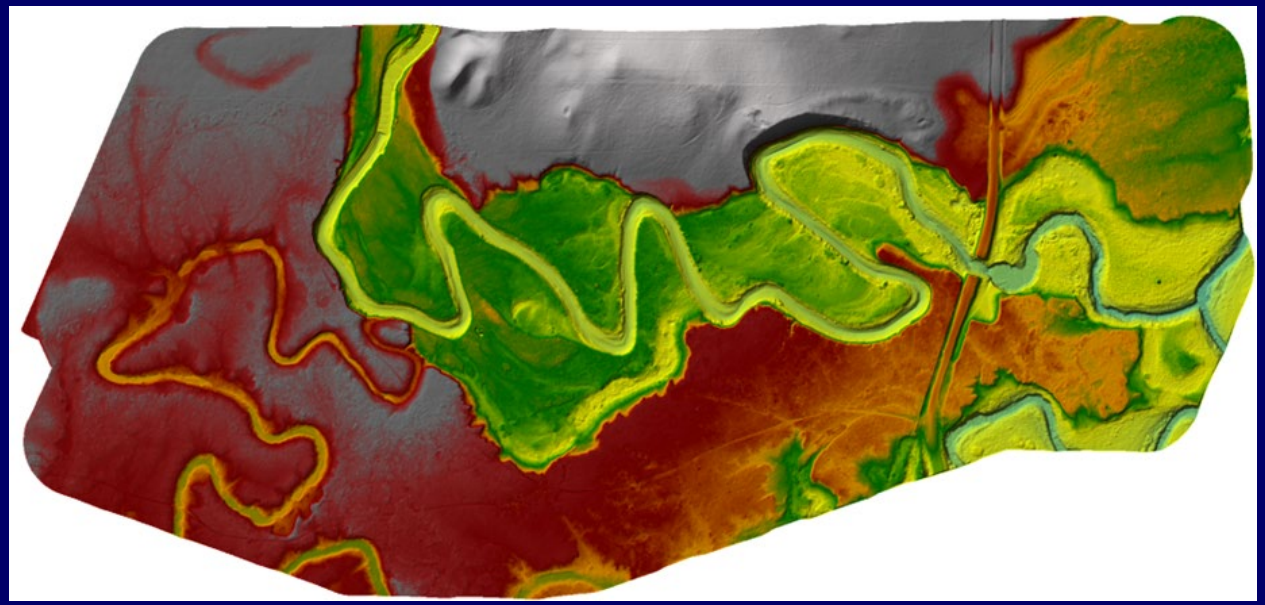
-Aquarious time series software is back end

-Data for both USGS & DNRC gages is available



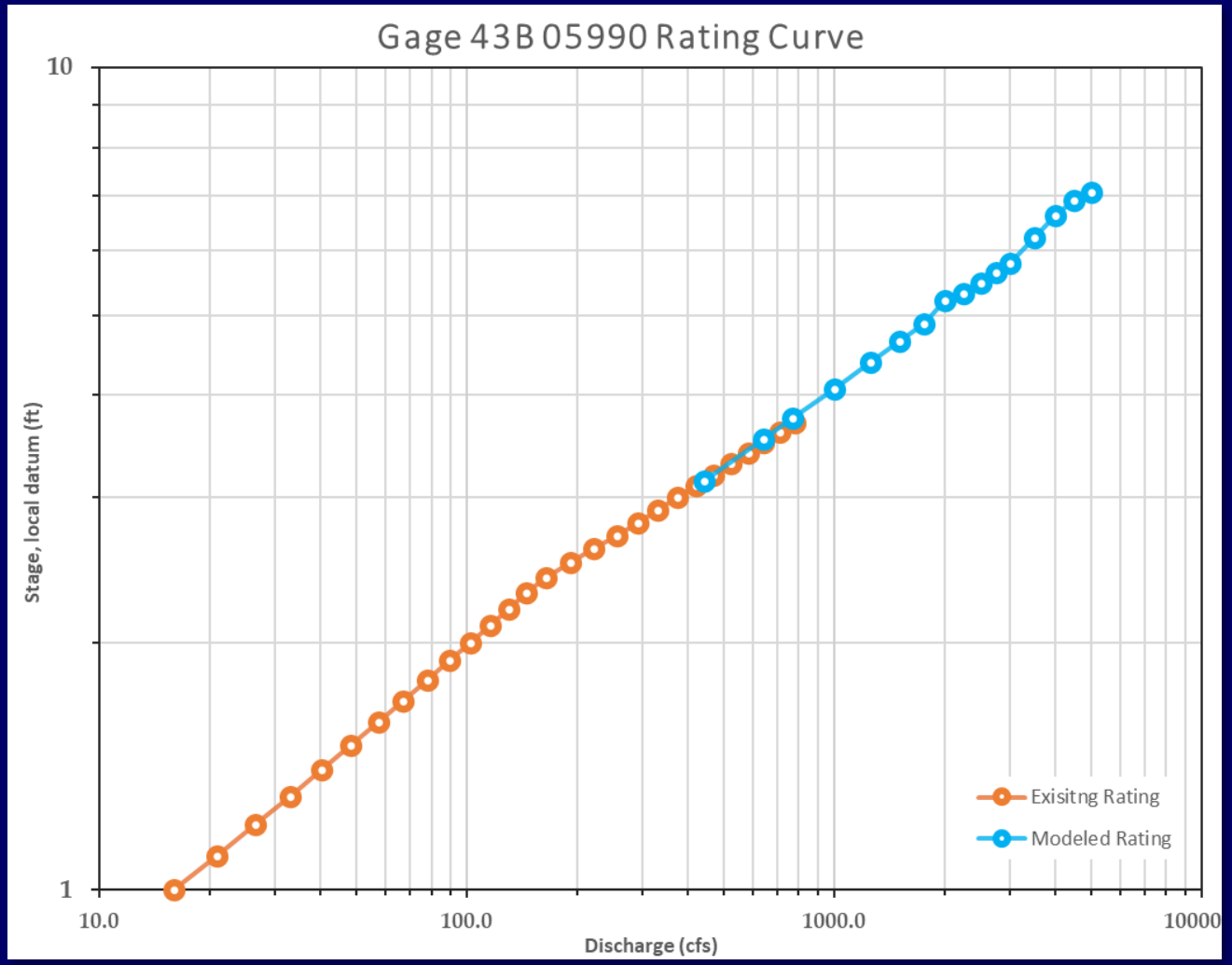
NOVEL APPROACHES

The DNRC Stream Gage Program for the past year has been using drone based-lidar to create 3D hydraulic models of DNRC Stream Gage sites



NOVEL APPROACHES

- Using the 3D models, we have developed a new method to calculate high stream-flow
- The high stream-flow calculation builds the top of the rating curves



NOVEL APPROACHES

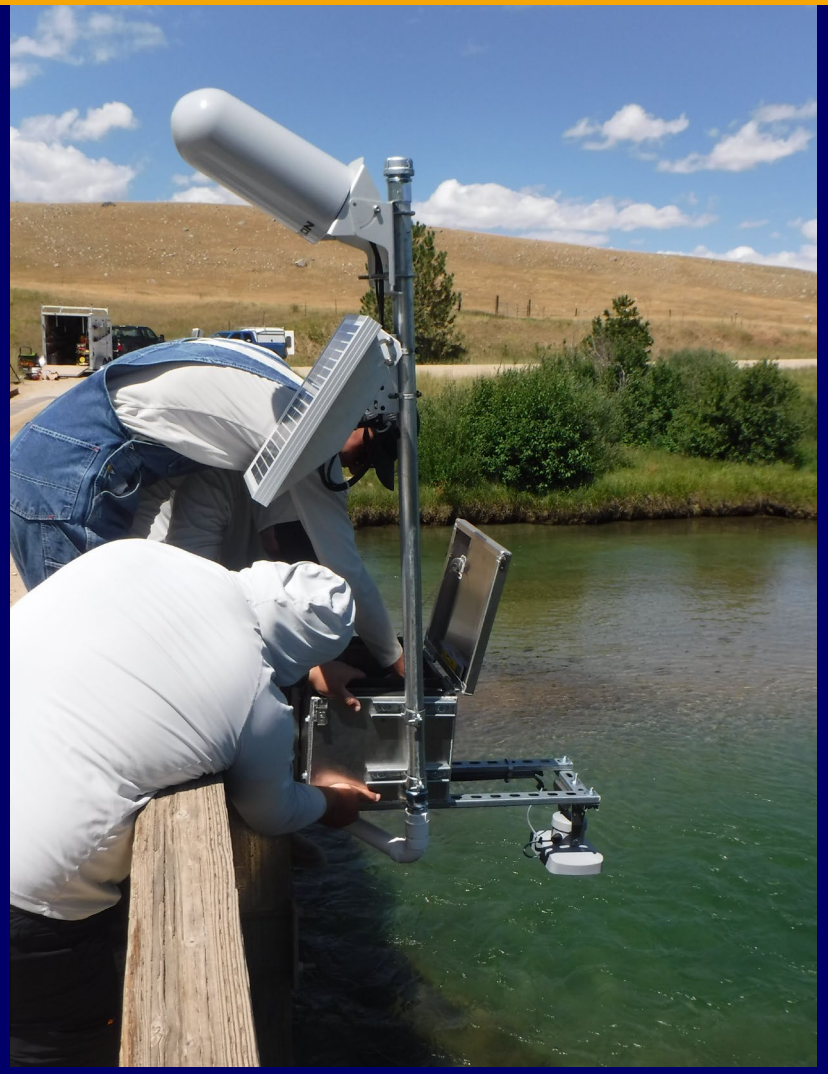
We are using this technology to develop flood warning systems, and to help calibrate statewide water availability models used for water rights permitting

KEEPING THE NETWORK RUNNING

- After a site is selected, access and permits are secured, and all equipment is installed, a technician visits each site monthly to take a manual measurement and make any necessary adjustments to the equipment.
- Data is uploaded to servers and reviewed by hydrologists. Shifts and corrections are applied, and data is released for public use.

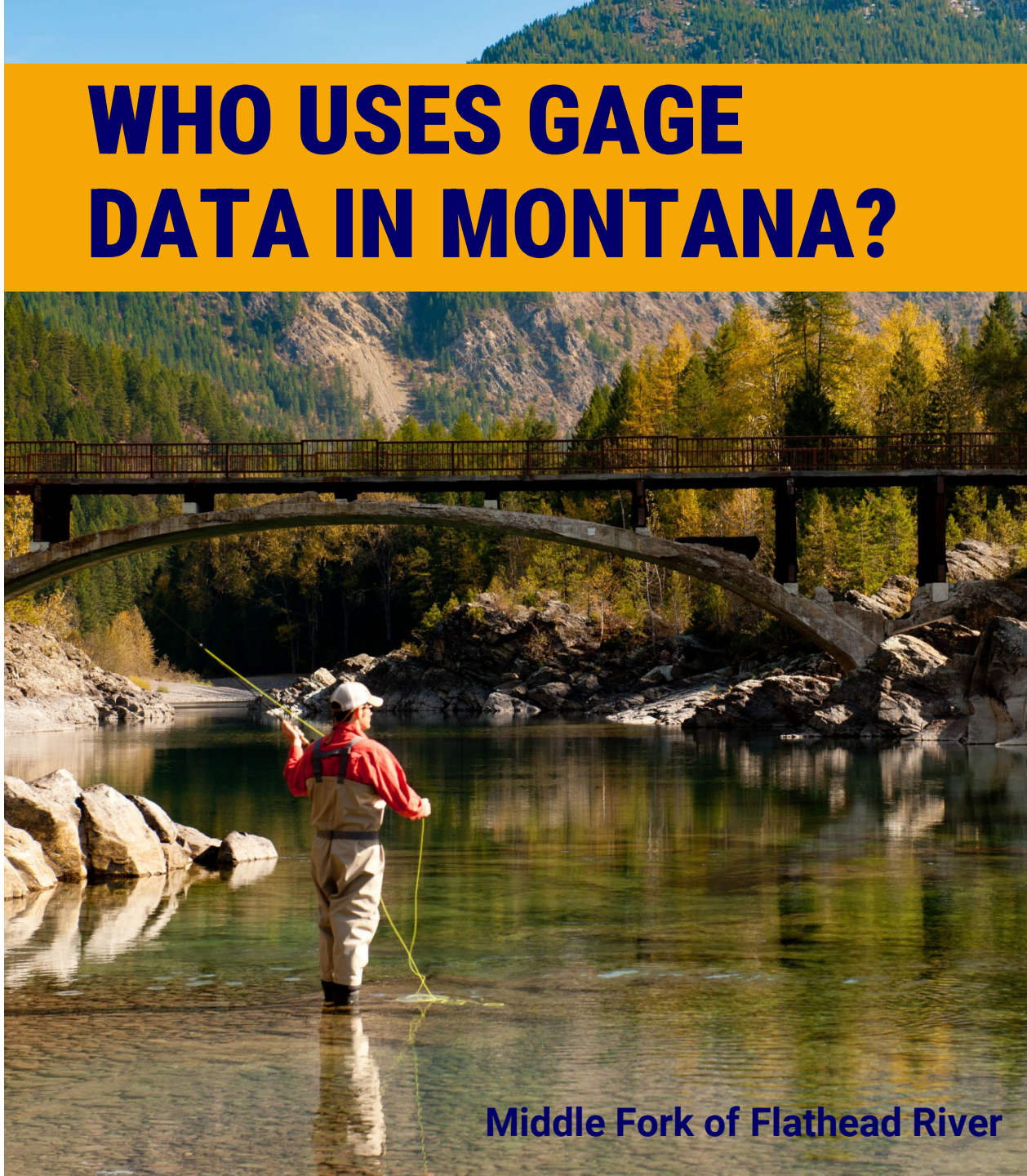
NEW GAGES FUNDED FROM 2023 SESSION

- 25 of 32 are installed and transmitting
- 7 are scheduled for early spring 2025
- All sites provide multi-user benefits
- Some of the biggest benefits are:
  - Water Rights Administration
  - Flood Management
  - Compacts Implementation
  - Fisheries Management
  - Drought Management



WHO USES GAGE DATA IN MONTANA?

- State Agencies: DNRC, FWP, DEQ, DOT, Dept of Agriculture, MBMG
- Water commissioners and water distribution projects
- Local governments: municipalities, conservation/irrigation districts, small water systems
- Floodplain and disaster management entities
- Watershed and conservation groups
- Montana University Systems
- Private companies, utilities, and industrial users
- Tribal, interstate, and international compacts
- Small businesses including fishing and floating guides and outfitters
- Recreationalists and Private Citizens



Middle Fork of Flathead River