Data-Driven Decision Support for Improved Water Security in East Africa

LASER PULSE EAST AFRICA WATER SECURITY (LPEAWS) PROJECT OVERVIEW

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PURDUE UNIVERSITY
MAKERERE UNIVERSITY We Build for the Future
USDA ARS United States Department of Agriculture Agricultural Research Service
aidenvironment
Global Water Partnership Southern Africa
Tanzania Water Partnership
Productivity

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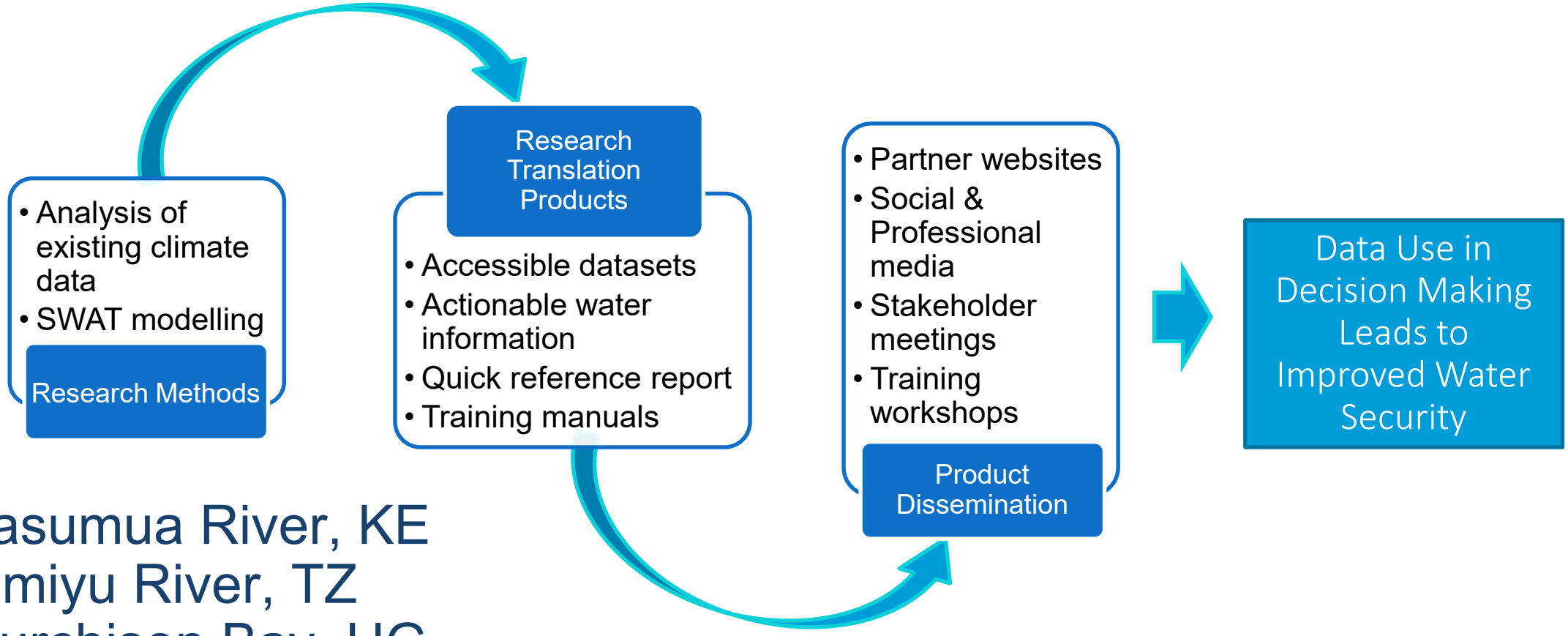
Research Question: What are the current, and potential future states of water resources in the study areas?



- Sasumua River, KE
- Simiyu River, TZ
- Murchison Bay, UG

LASER PULSE East Africa Water Security Project Highlights

Stakeholder Meeting
-
Gained insights into common challenges and opportunities surrounding data, access, and use; Differences among countries, sectors, and genders.

Climate and Water Data Policy Study
-
Survey of 50+ official legislation, documents and websites in East Africa and beyond to observe common elements leading to or hindering free and effective access to data.

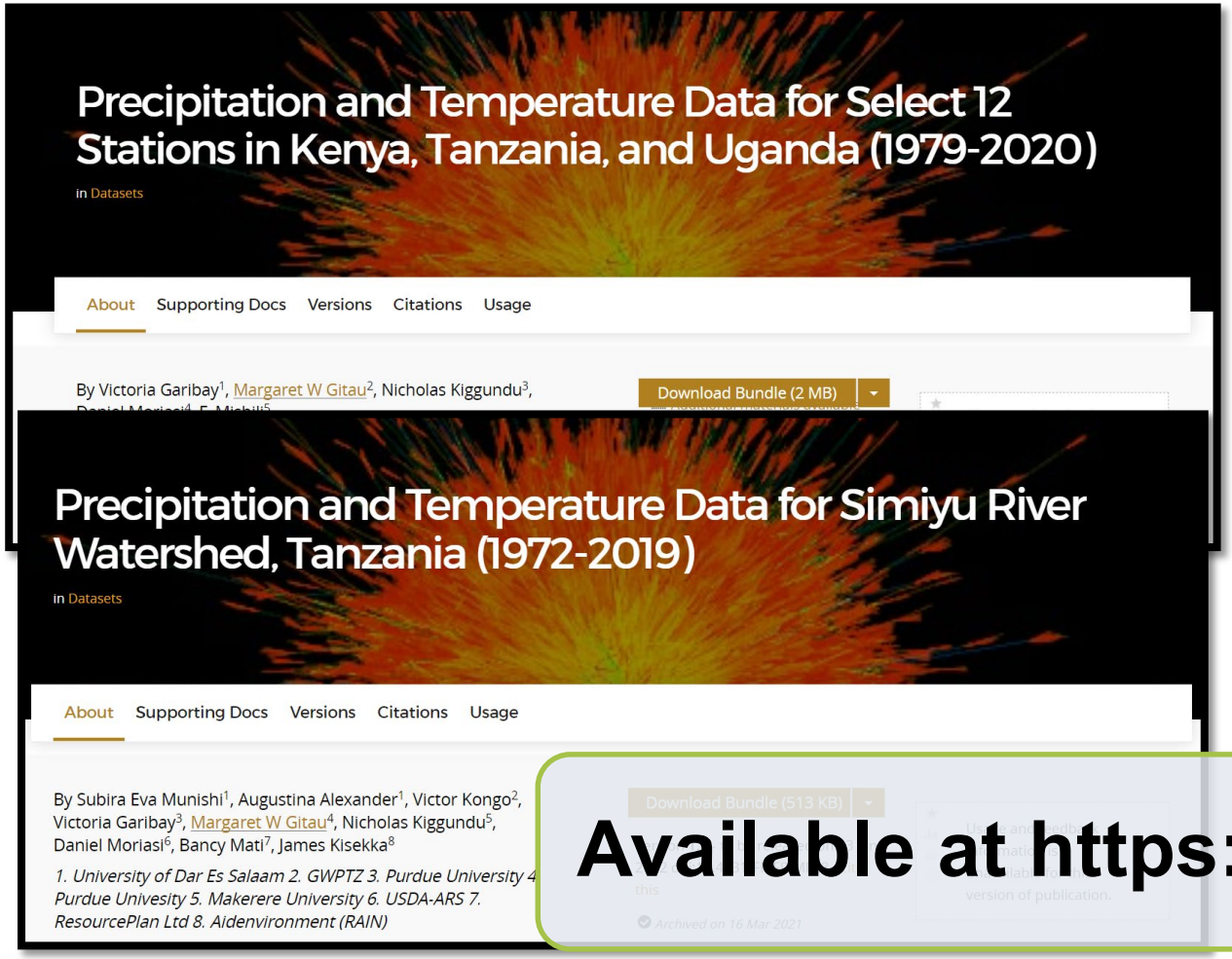
Watershed Case Studies
Construct hydrologic models and apply to water resources decision making; Highlight data types warranting further attention.

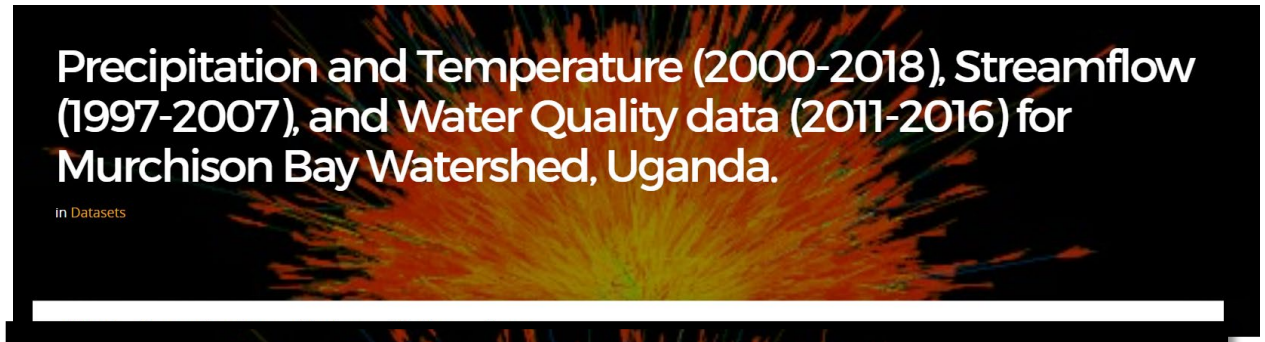
Rainfall Data Bias Correction
-
Determined the best-performing bias correction method for CFSR precipitation data from 12 Cities in the study region.

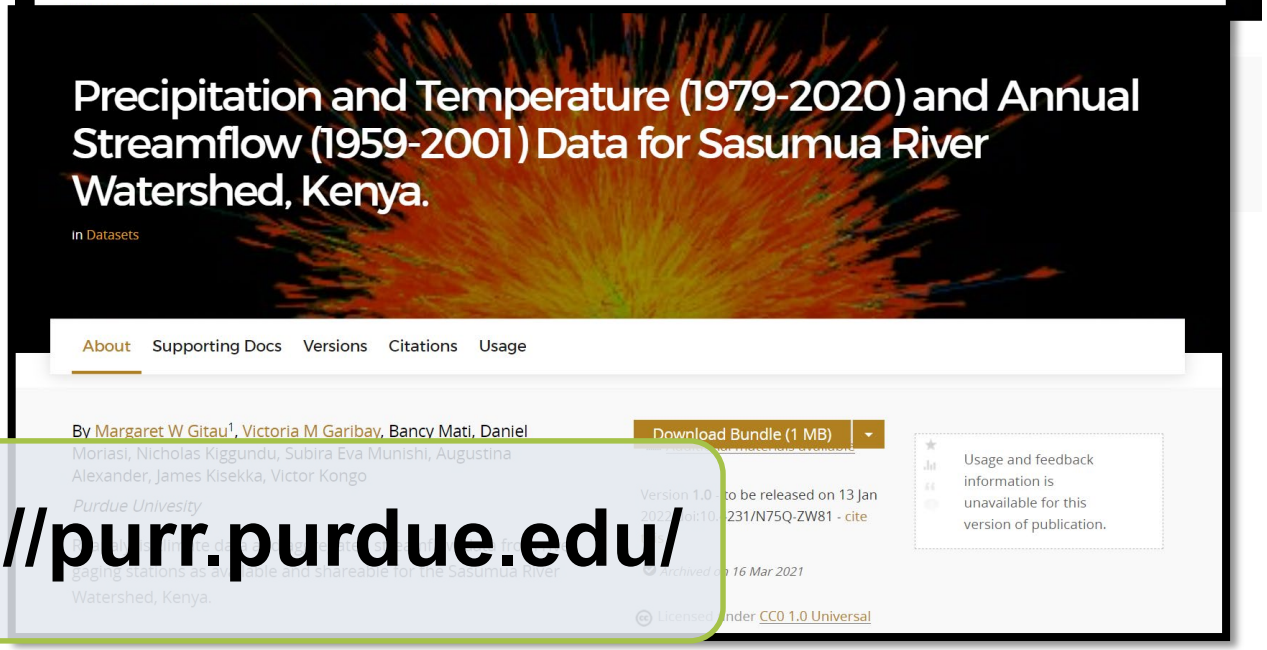
Targeted Meetings
-
*USDA-ARS National Program Leader
*IGAD /ICPAC Director
*Tanzania Director of Water and Direct Reports
*Lake Victoria Basin

Dataset Products and Publications
-
Bias corrected CFSR data for 12 stations is available for 1979-2019 and CMIP6 model comparisons.
Published article “Evaluation of Reanalysis Precipitation Data and Potential Bias Correction Methods for use in Water Resources Applications in Data-Scarce Areas” in Water Resources Management.
Water data policy article in progress.

Data Products







Available at https://purr.purdue.edu/

Stakeholder Meeting: Key Sentiments

Status of Water Quality

- Water quality perceptions vary widely based on specific location.
- Sampling is not conducted systematically, with exceptions in areas where special conservation efforts are being made or where economic activities drive interest.

Status of Data Usage for Decision Making

- Data is being used for allocation, planning, drought/flood forecasting, GIS analyses across sectors.
- There are gaps caused by lack of equipment and equipment maintenance.

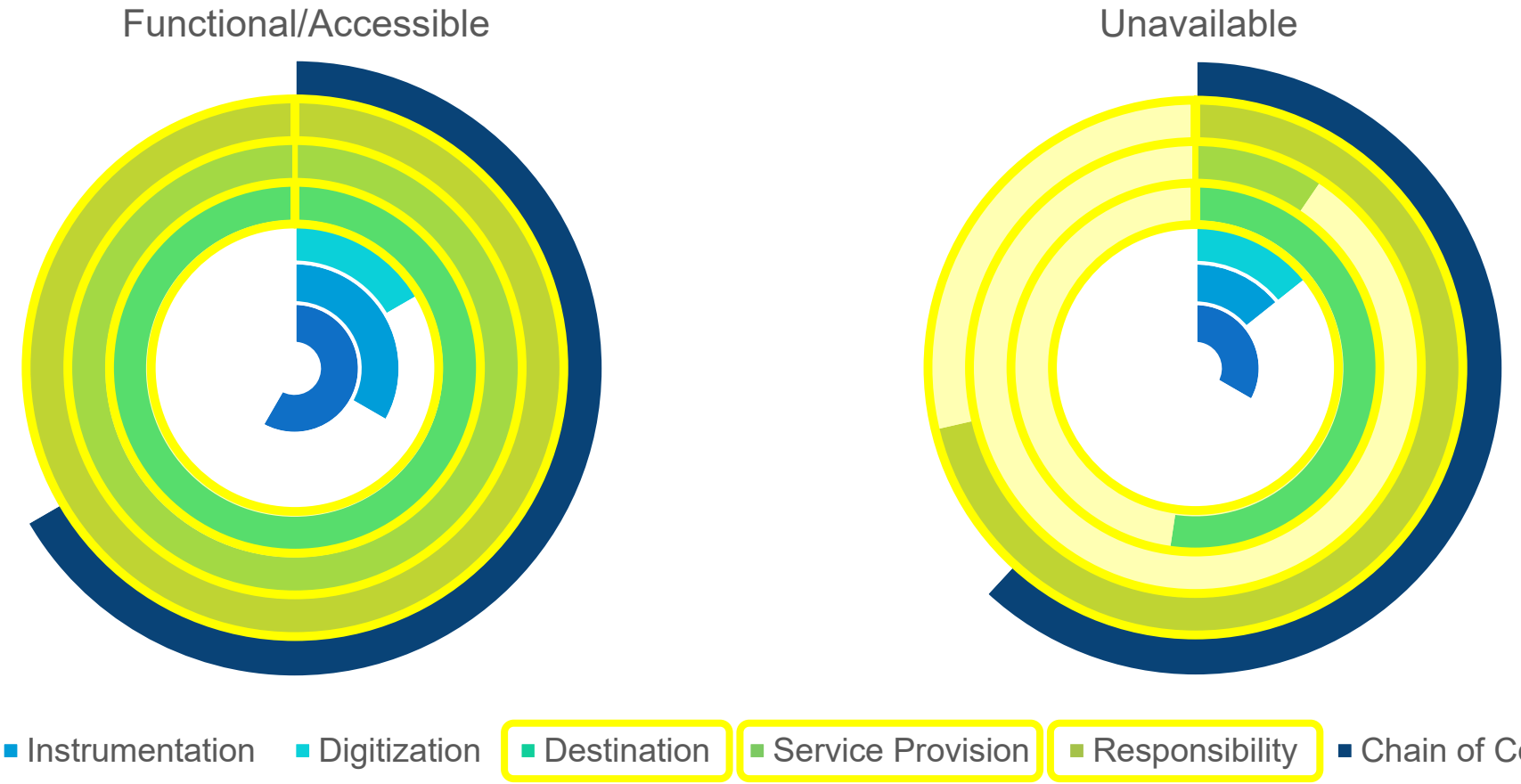
Status of Data Quality

- Quality of data ranges from high to low, and frequently has gaps.
- Funding for data collection is insufficient.
- There is an interest in modernizing, and applying remote sensing.
- Human resources are too few or insufficiently skilled.

Intersection of Data Collection and Policy

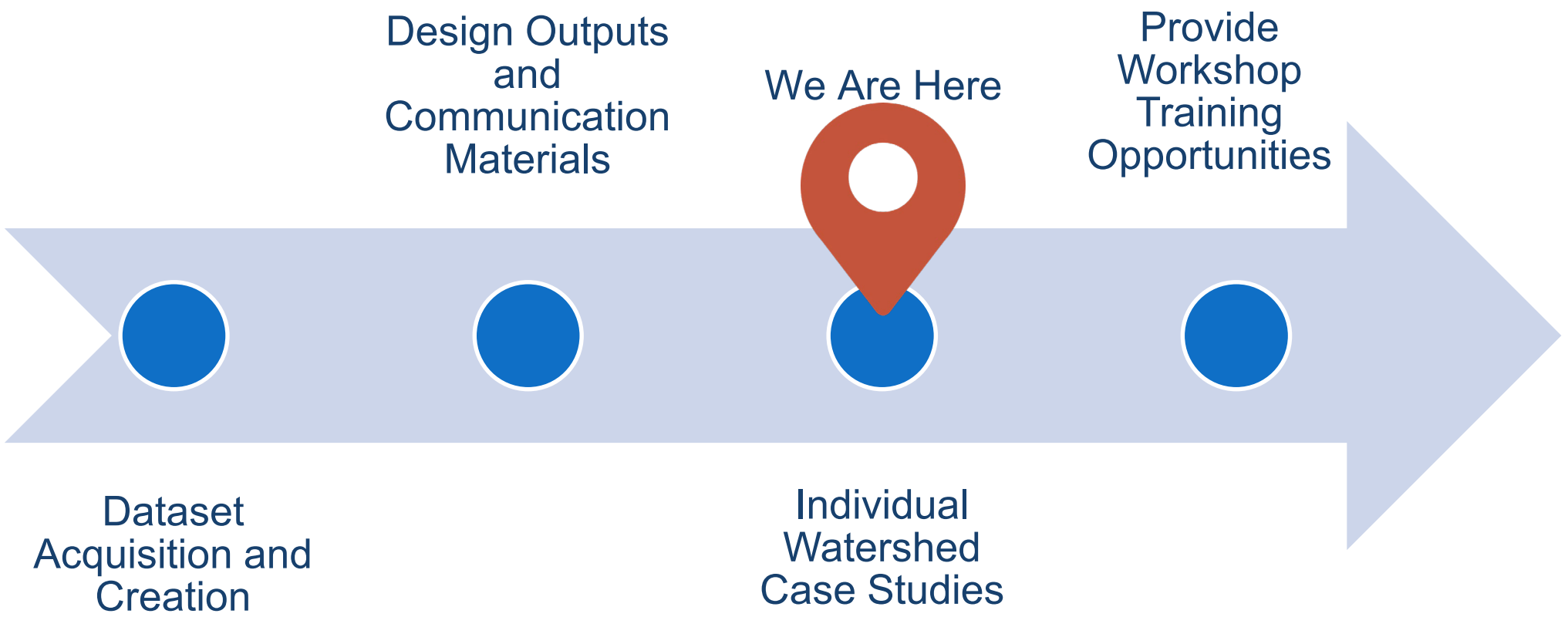
- Policies are useful in setting a data quality standard but can also negatively affect data sharing abilities.

For the purpose of the study, “success” of a data stream is determined by proven free accessibility to the associated data resources.

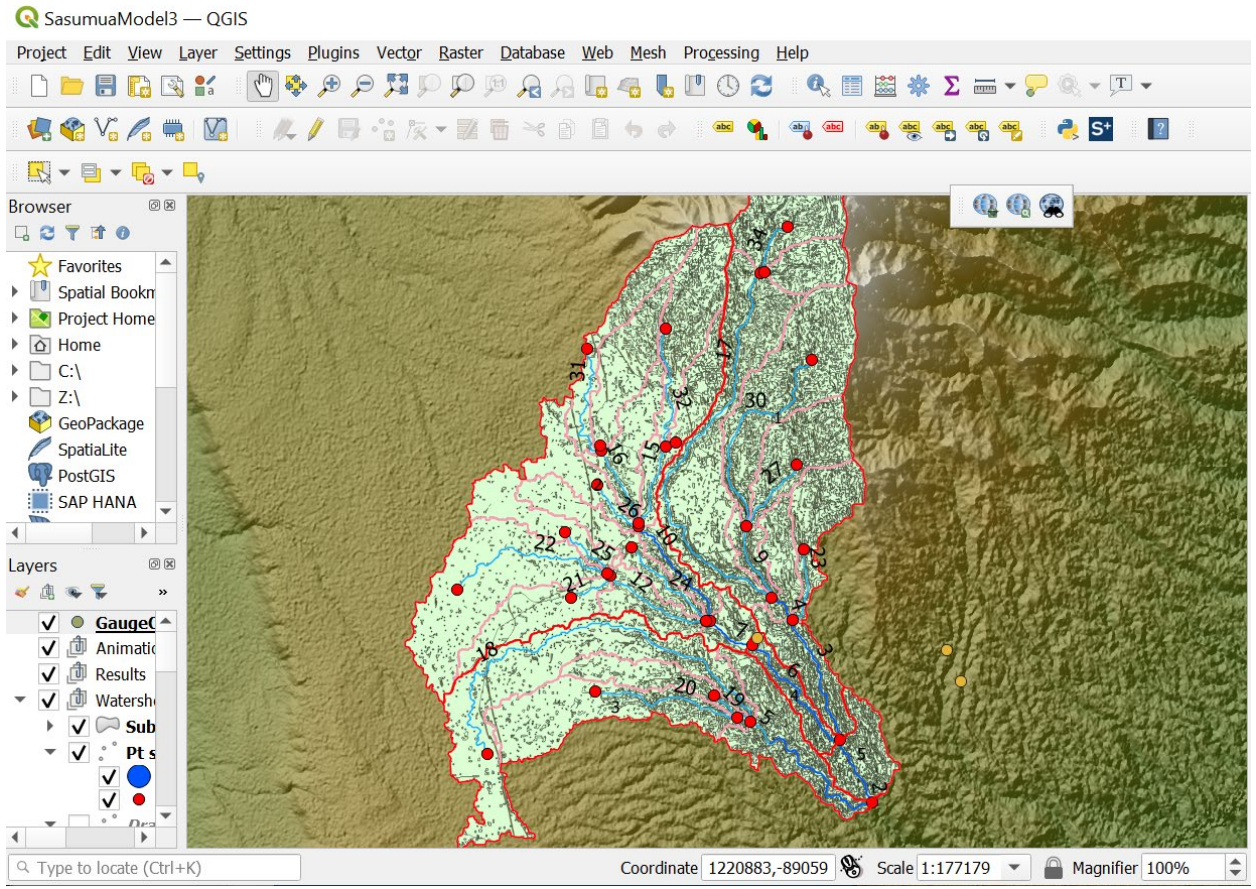


(Garibay, et al., 2021b) [In Prep]

Project Progress



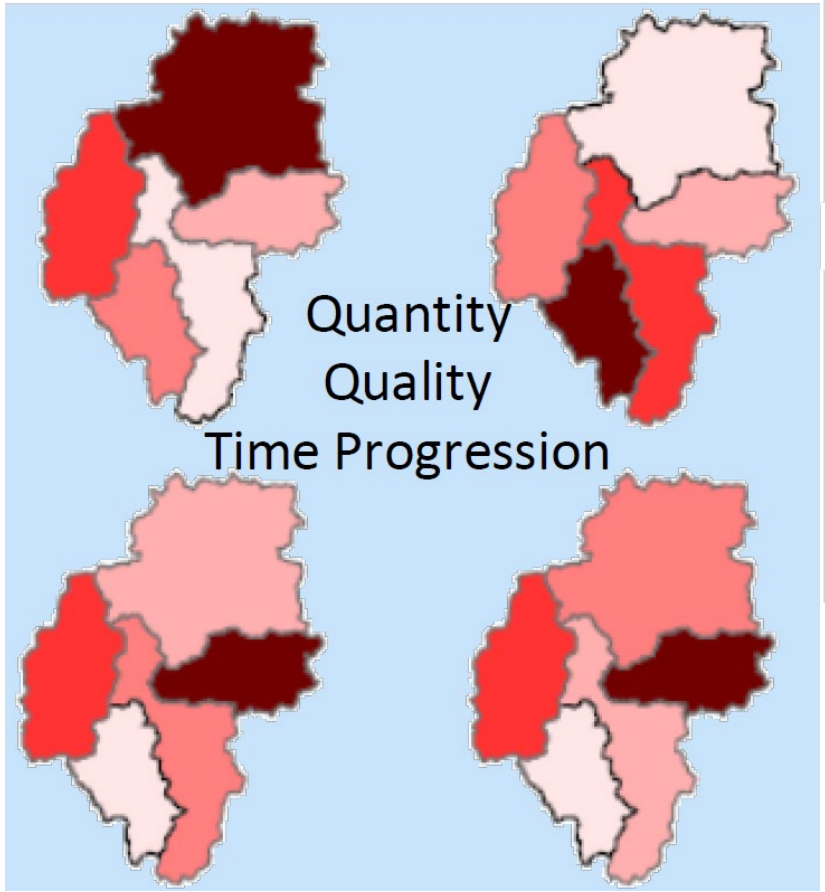
Watershed SWAT Models

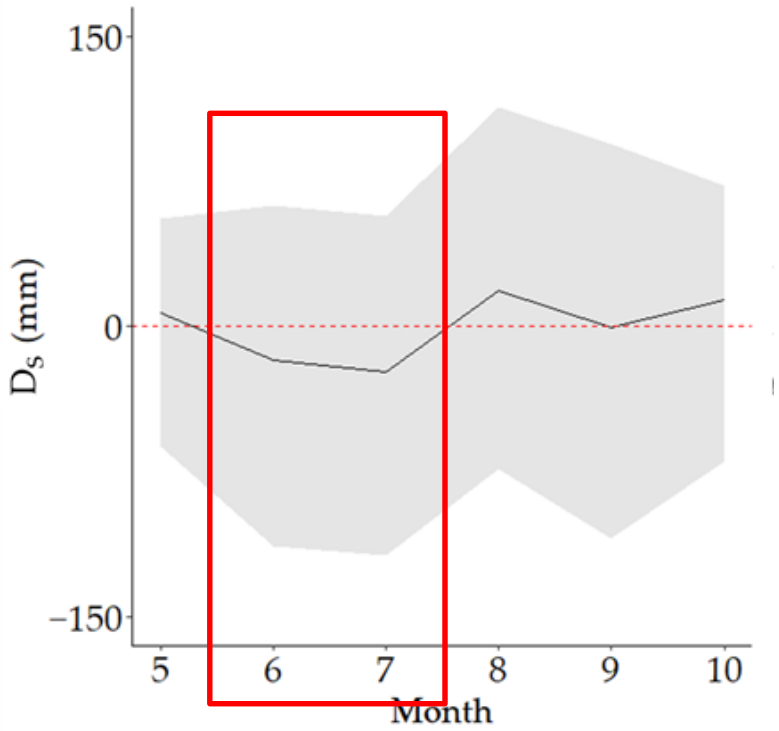


- Gathered data from different sources, favoring openly available software and data
- Models will be calibrated using daily streamflow data
- Calibration based on NSE and PBIAS
- Different scenarios will be applied to demonstrate how models can inform water resources management decisions.

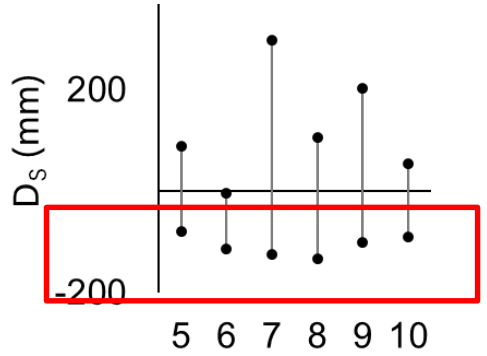
Example Results

1. Watershed Status



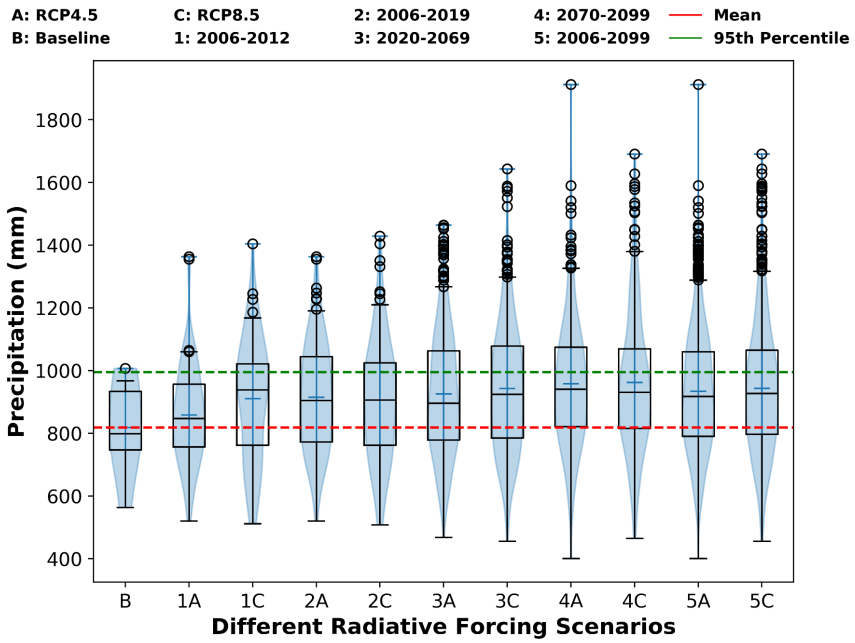


2. Deficits &Surpluses



3. Water Quality

4. Future Outlook



Thank you!

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