

# Design and Development of a Prototype Tool for Integrated Climate Downscaling and Streamflow Prediction using Open Source GIS Software

Reclamation Science & Technology Program  
Research Project x9449

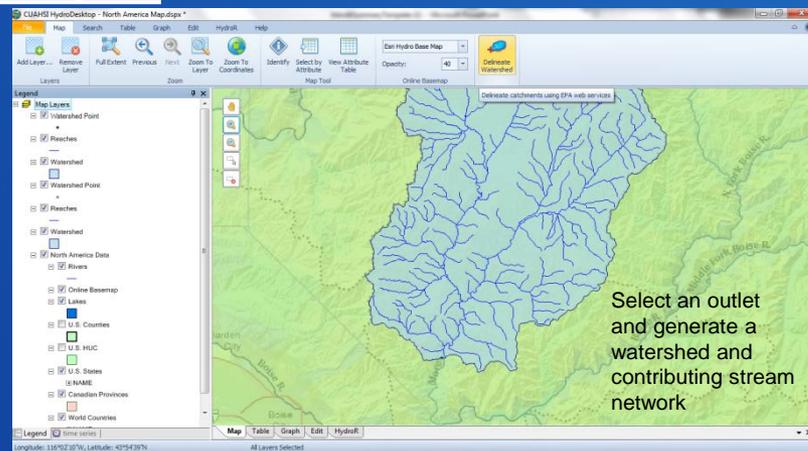
RECLAMATION

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## Gap(s) Addressed

- Enhance and streamline access to GCM and RCM projection data using a geographic approach
- Improve climate data workflows and integration with hydrologic data for use in streamflow prediction modeling

## Graphic



## Research Question(s)

- Can an existing open source GIS application platform be extended to integrate downscaled GCM and RCM projection data?
- Can observed hydrologic times series data be adjusted to predict future streamflow conditions?

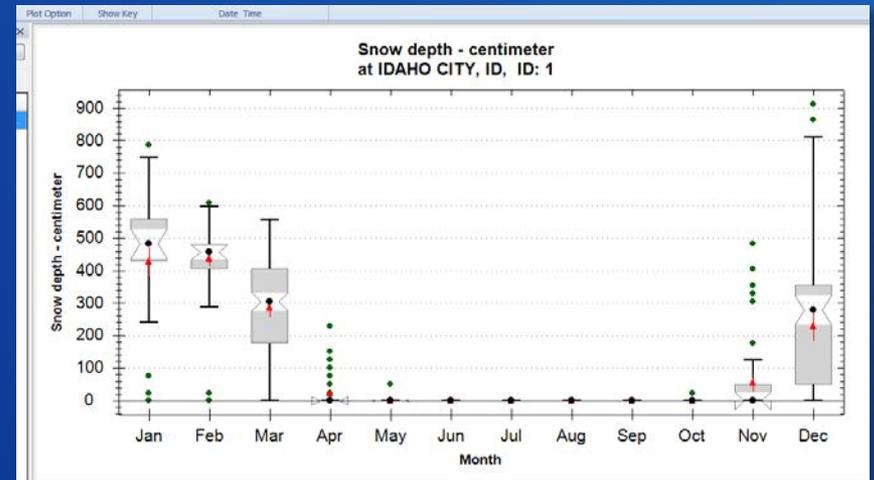
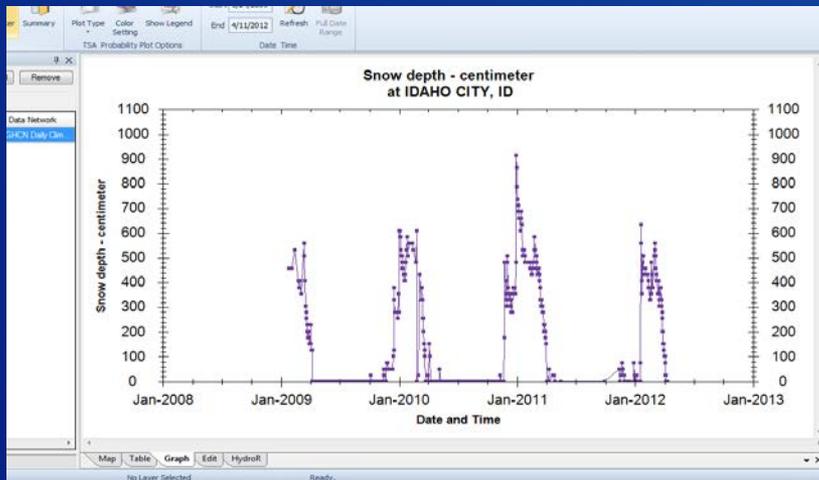
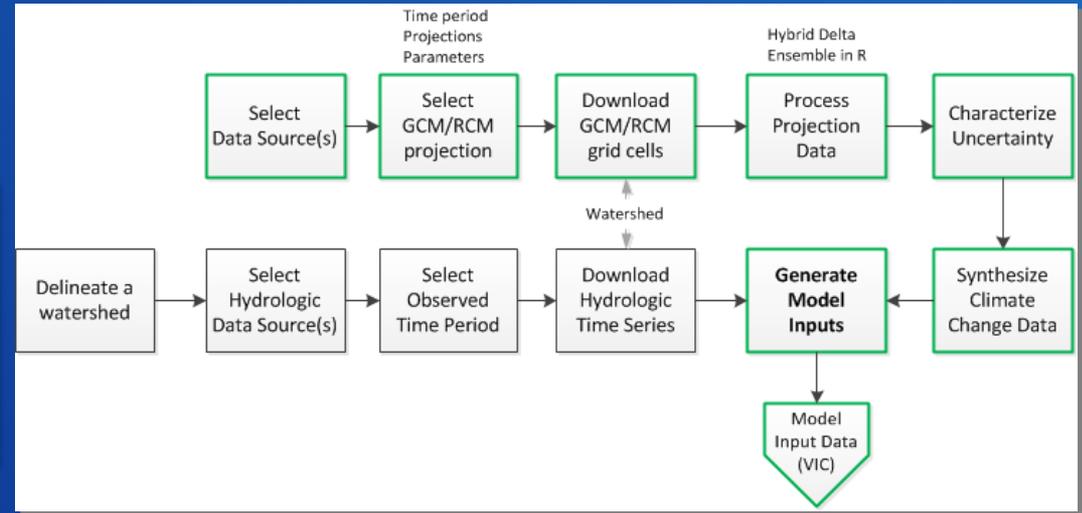
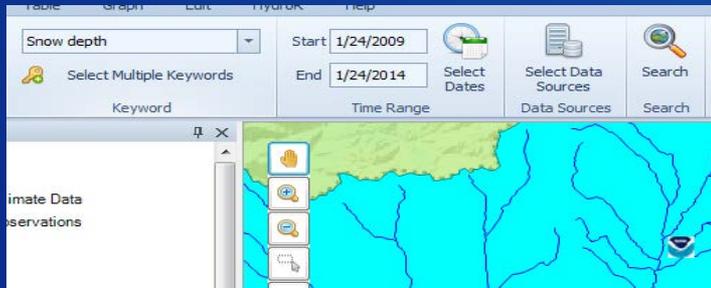
## Collaborators/Schedule/Source of Support

- Reclamation S&T Program, PN Region GIS Group, Brigham Young University (CESU agreement), Idaho Water Resources Research Institute
- Delayed for most of FY13, majority of work to be conducted FY14 extending into FY15
- Reclamation S&T Program, Idaho Water Resources Research Institute

RECLAMATION

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Leverage time series data visualization and analysis tools to analyze climate change data



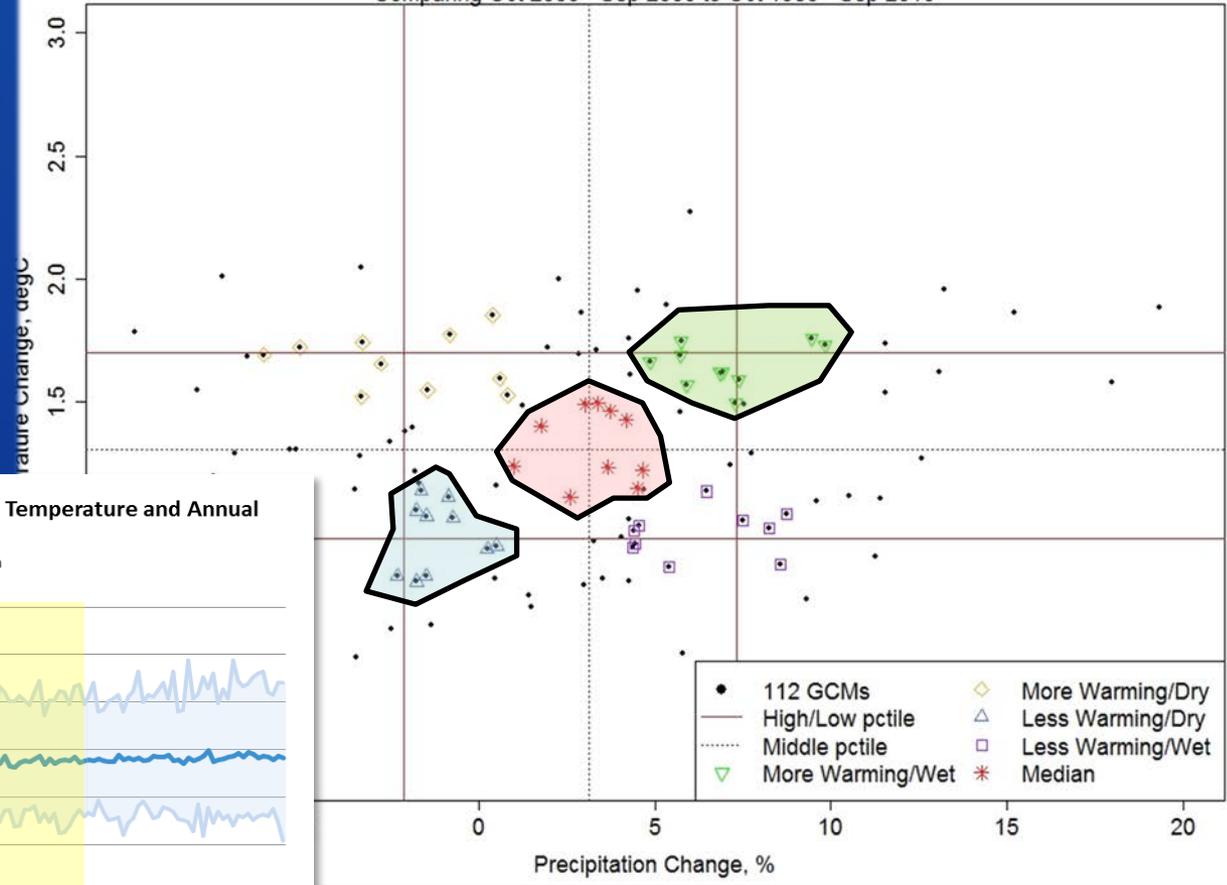
# RECLAMATION

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Integrate statistical tool to determine adjustment factors using Hybrid Delta Ensembles

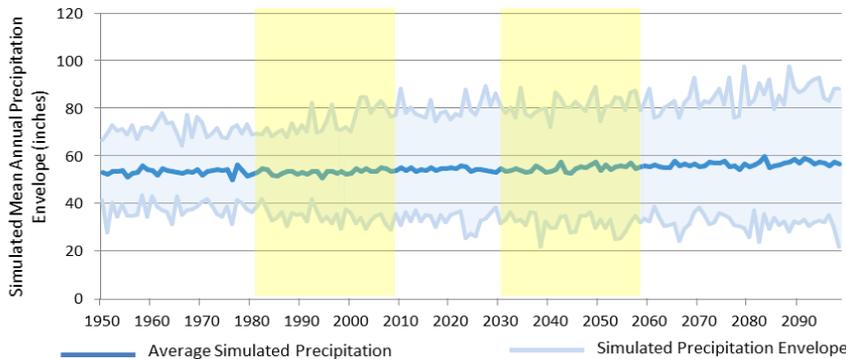
### Changes in Mean Annual Temp & Precip

Comparing Oct 2030 - Sep 2060 to Oct 1980 - Sep 2010



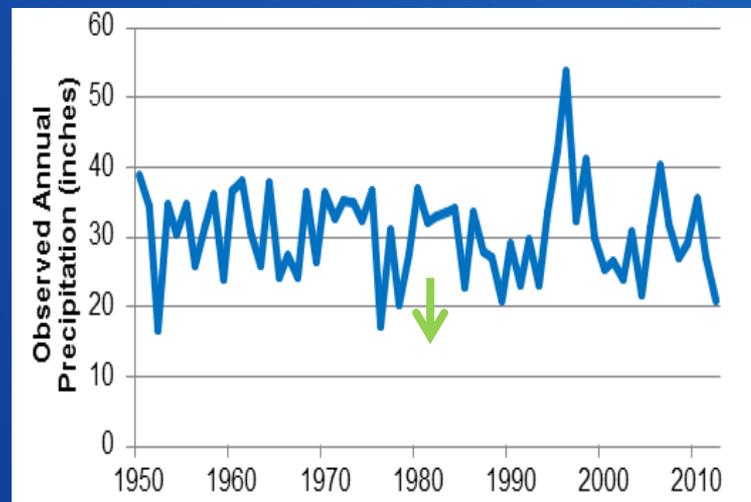
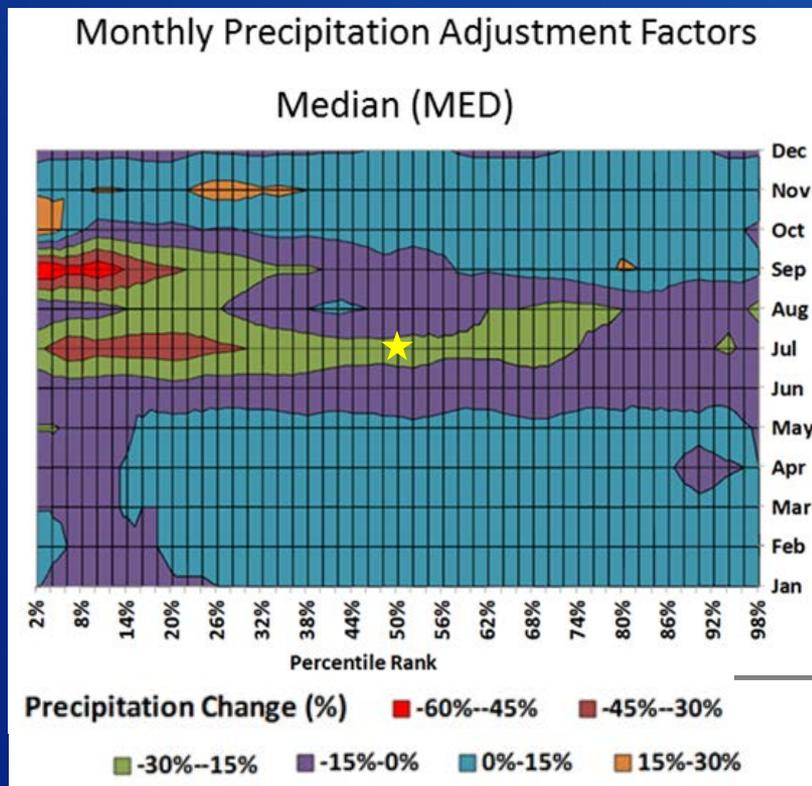
### 112 Member Ensembles Envelopes of Mean Annual Temperature and Annual Precipitation, 1950 – 2099

Climate over the Hood River basin



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Apply adjustment factors to observed hydrologic time series to generate input for streamflow prediction models



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## Summary

HydroDesktop is a robust open source GIS software platform that will be extended to integrate climate change data

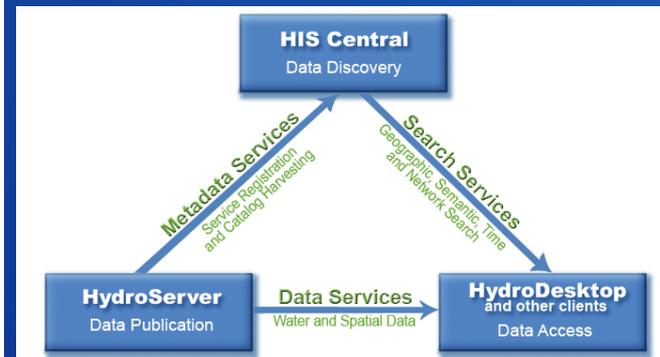
Existing data discovery, retrieval and analysis workflows will be extended to support climate change data

## Key Lessons Learned

- Climate research community has a need for data management and workflows to simplify working with GCM/RCM data
- CUAHSI's catalog of hydrologic data sources is a model to explore for publishing climate data

## Next Steps/Future Work

- Complete user requirements analysis and develop software specification for a climate tools extension
- Integrate existing in-house prototype software components and new tools into extension for HydroDesktop platform
- Leverage or mimic HIS data discovery and access protocols for GCM and RCM data repositories



A web services architecture supports standard data discovery and access for hydrologic data



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## More Information

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CUAHSI - Consortium of Universities for the Advancement of Hydrologic Science  
<http://www.cuahsi.org/>

HydroDesktop  
<http://his.cuahsi.org/hydrodesktop.html>  
<http://hydrodesktop.codeplex.com/>

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