

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Flood Frequency Variability on Seasonal to Multi-Decadal Times Scales in the Western US and Implications for Infrastructure Planning

Discipline: Natural
Type of Project: Research
Funding Agency: Bureau of Reclamation
Other Partners/Cooperators: University of Colorado, Boulder
Effective Dates: 4/1/2013 - 9/30/2015
Funding Amount: \$54,322

Investigators and Agency Representative:

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Project Abstract: Methods of Non-stationary extreme value space-time analysis and availability of tools to apply EVA (extreme value analysis) methods efficiently is relatively new. Availability of such EVA tools makes it feasible to analyze climate projections of extreme events (floods) probabilistically. Reclamation is being asked in several of its basin studies (WaterSMART Basin Studies Program) questions on flood risk to existing infrastructure from a changing climate. For example, will floods become more severe and threaten flood protection infrastructure under climate change? Are dams sufficiently sized for the 200 year storm or does the risk level increase under climate change?

This research is aimed to develop an approach to respond to questions above and meets the needs identified in Climate Change Research Needs for Long-Term Water Resources Planning and Management (<http://www.usbr.gov/climate>) gap 4.03 - method and basis for estimating extreme hydrologic event possibilities in a challenging climate. Implicit in this gap is the need for developing a long-lead forecasting tool that can be used to predict extreme events such as floods under a changing climate. This project will accomplish this first by understanding the space-time manifestation of extreme flooding events, and subsequently apply non-stationary flood-frequency analysis in a forecasting context with large-scale climate drivers to model flood frequency in space and time:

This research will help develop:

- Methods to perform non-stationary space-time flood frequency analysis.
- Understanding of flood frequency under a changing climate.
- Forecasting tool to predict flood events under climate change.
- Characterization of infrastructure risk from floods under climate change.

Outcomes with Completion Dates: September 30, 2015

Keywords: Bureau of Reclamation, University of Colorado Boulder, Western US, flood frequency, variability, climate change