UDECIDE

Understanding Decision-Climate Interactions on Decadal Scales

Oct 1, 2014 – Sept 30 2019
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To understand the role of decadal climate information for water management decisions.

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Meeting Goals

- Project status update

- Discuss how the pieces are fitting together

- Discuss high-level research plan for the next 12-18 months

Project Overview

Part 1: Understand current information needs and use.

Part 2: Build predictive capacity for the needed information.

Test prototype presentations of decadal climate information with stakeholders and iterate between the information needs and predictive capacity.
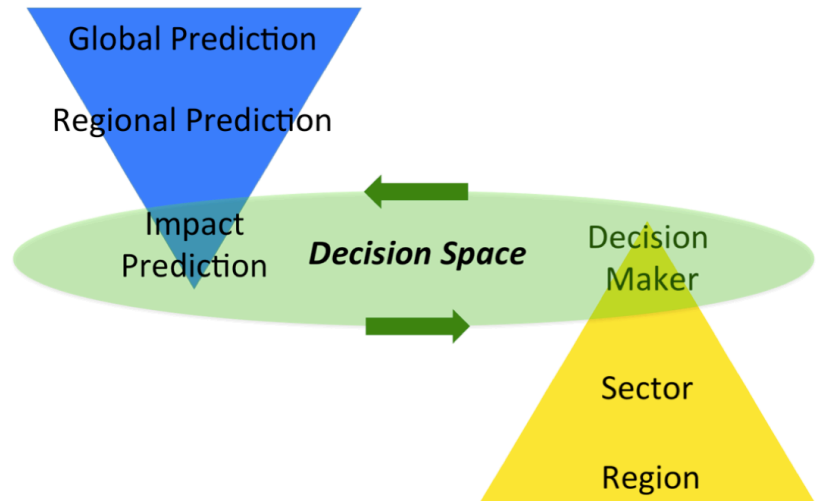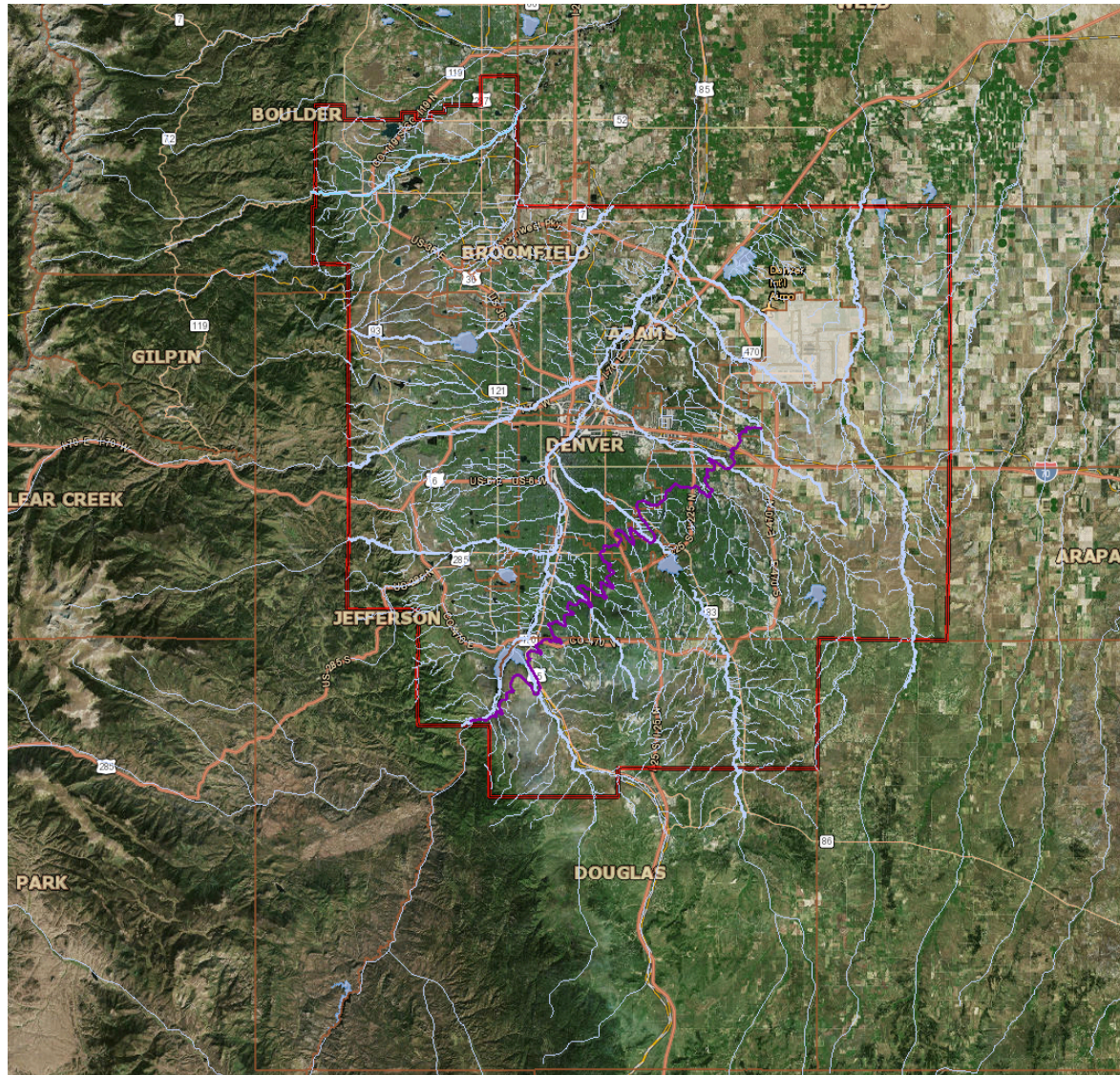
Flood Case Study

To understand the role of decadal flood information for water management.

Primary Partner: Urban Drainage and Flood Control District

- **Decision Types:** 30-yr storm water management master plan updated every 10 years that considers infrastructure maintenance, drainage stabilization and drainage capacity.
- **Design Event**: 1-hour peak rainfall.

∪DECIDE Drought Case Study

To understand the role of decadal drought information for water management.

**Primary Partner:** Denver Water

- **Decision Types:** Operational water management planning, maintenance planning during drought, investments in a drought fund, communication campaigns to manage demand expectations.

- **Design Event:** 3-year drought

Part 1: Interviews

First round conducted Spring 2016 for both case studies:

- Flood/drought characteristics of key concern.

- How timescale and geography is considered in decisions.

- What effective management looks like.

- A scenario type question. Story telling.

- Questions exploring what comprises effective decadal climate information.

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New statistical spatial model of winter rainfall using local and remote predictors.
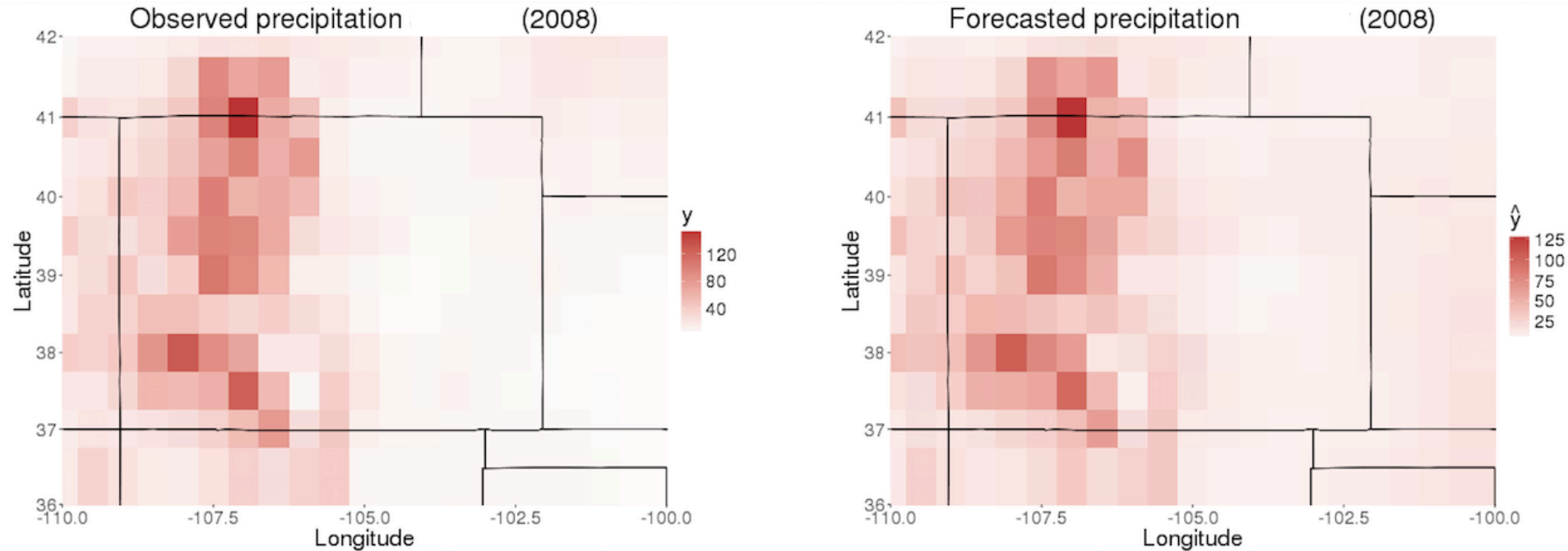

Adding remote SST increasing spatial correlation and reduces RMSE.

Possible next steps:

- Evaluate against dynamically downscaled rainfall.

- Explore physical mechanisms.

- Shift from seasonal rainfall towards the needed information.

- Explore potential to develop a similar model for drought.

- Consider using the CESM-Large ensemble data.

Collaboration with NCAR/RAL

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Plug decadal hindcasts through Water Evaluation and Planning (WEAP) model for Denver Water system.
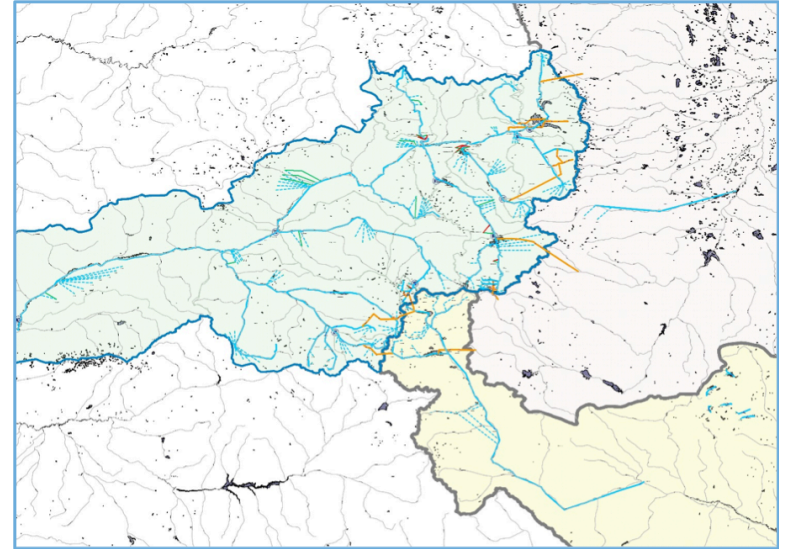
- How does decadal information intersect with outlooks on seasonal and centennial scales?
- Iterate with Denver Water on what is an effective presentation.
- Explore how these presentations affect decisions and/or perceptions of decadal climate information.

Does temporal clustering drive impacts?

- Does clustering make events high-impact?
- Can the skillful components of decadal predictions describe temporal clustering of rainfall events?

Approach:

- Characterize clustering of rainfall (incl. design storms) in CA and CO.

- Test covariates on the rate of occurrence:

    - remote modes (PNA, ENSO, AMO)

    - local environment (SMOIS, T2, TCWV, Weather Type)

    - rainfall characteristics (seasonality, intensity, duration, total)

- Explore clustering case studies obtained through second round of interviews(?).

Can Weather Types Predict Flood Damage?
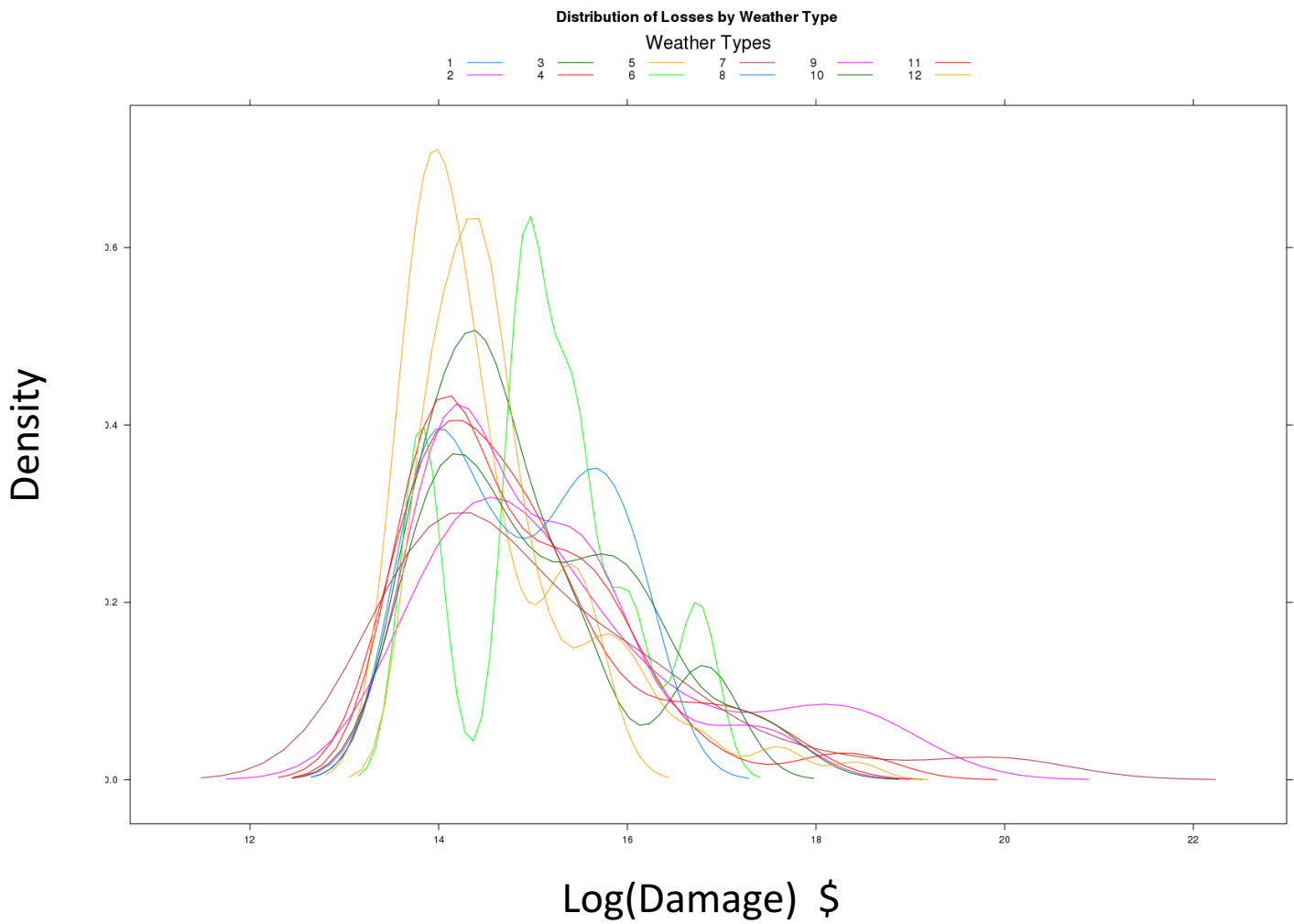
Distribution of Losses by Weather Type

2016-2017 Research Milestones

Fall/Winter 2016

- Analyze first round of interviews

Winter 2016/2017

- Shift focus of statistical and physical modeling towards the needed information.

- Consider a second round of interviews.

Staring Summer 2017

- Collect data on experience with prototype presentations of the predictions, using CH2M projects.

- Explore where decisions may be supported by skillful information.

- Identify entry points to explore how results extend to CA partners.

We have travel funds

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AGU (12-16 Dec, 2016) Abstracts due Aug 3:

PA028. Making an Impact: Stories, Tips, and **Lessons Learned from Collaborating with Communities.**

PA024: **Improving the Usability of Climate**, Extreme Event, and Hazard Data and Information Products for Community Decision.

PA040: Towards more **effective decision maker-scientist engagement**

PA001: Applying climate expertise: **Training a new cadre of climate scientists** to improve decision-making and societal outcomes

A053: Grand Challenges in Earth System Modeling: **Decadal Climate Variability and Change, Prediction and its Applications**

Reminders

Acknowledge grant on papers, posters, talks.

Next UDECIDE Meeting: Thursday Aug 18, 10am MDT.

Speaker: David Hollingsworth, Senior Civil Engineer with the City of Longmont, CO.

Extra Slides

What are the physical mechanisms between drought and other decision-relevant climate events (e.g., floods, wild fires, heat waves), and to what extent can decadal climate predictions provide information on sequences of events?

How do other climate events (e.g., floods) intersect with droughts (e.g., co-occurrence, sequences of events) in ways that affect decisions, and how might that change on decadal scales due to changes in climate, management strategies, or other factors?