

# THE BEAVER RESTORATION ASSESSMENT TOOL (BRAT)

## Case Study: Escalante River Watershed



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## Overarching Goal

- Expand use of beaver as a watershed restoration agent and ecosystem engineer throughout the Escalante and the western U.S.



## Presentation Overview:

### Phase 1 of BRAT:

*What is the capacity of a given landscape to support dam building beaver?*

- Case study: Escalante Watershed
- Validation: Logan & Blacksmith Watersheds



### Step 1: Identify historic, current and potential distribution/abundance

We used a multi-scalar approach that included:

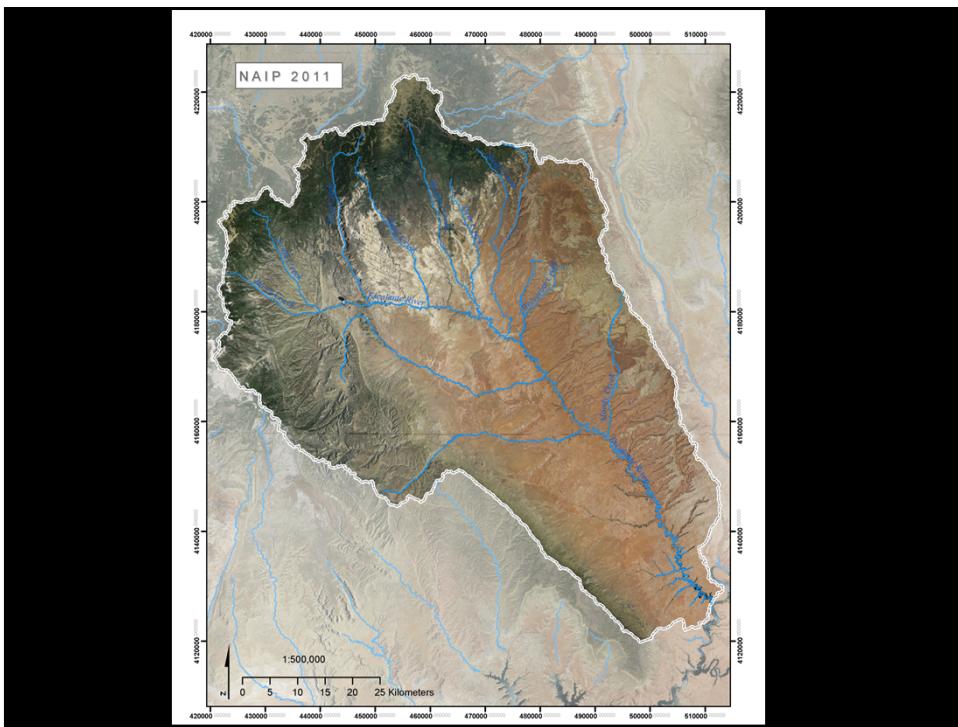
- Historic records
- Local knowledge
- Beaver surveys
- Map analysis
- Cessna aircraft overflights (EcoFlight)
- Detailed ground-based surveys

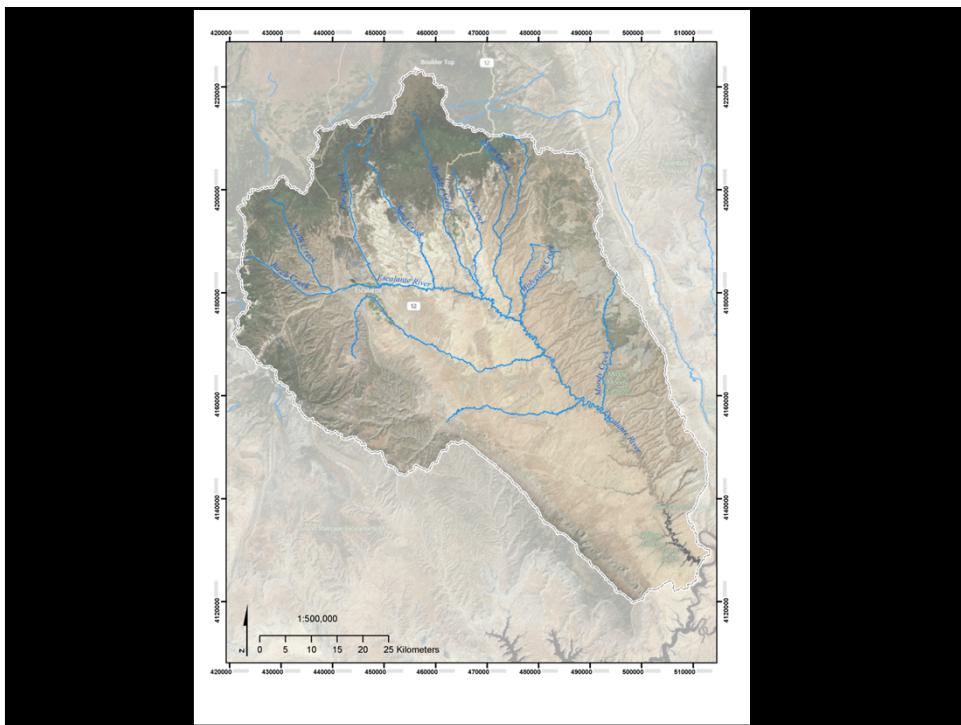
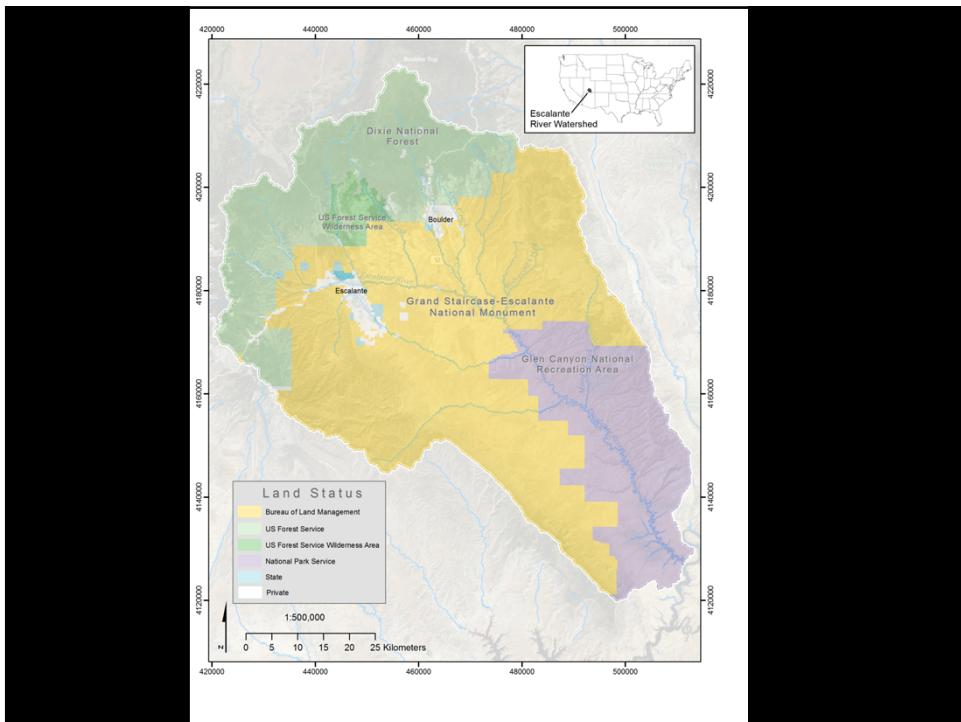


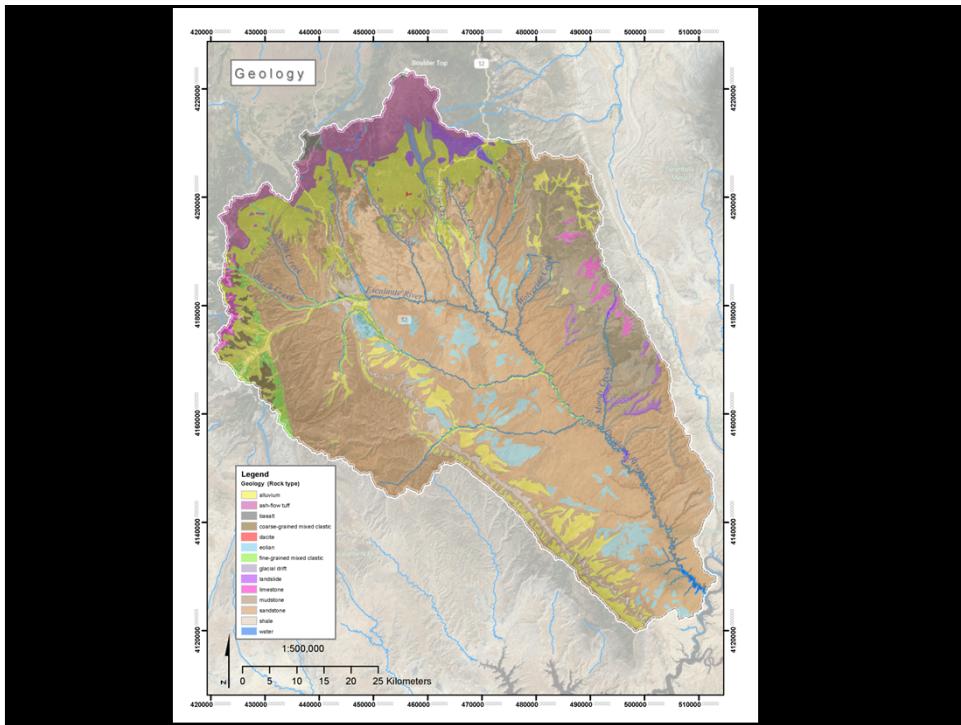
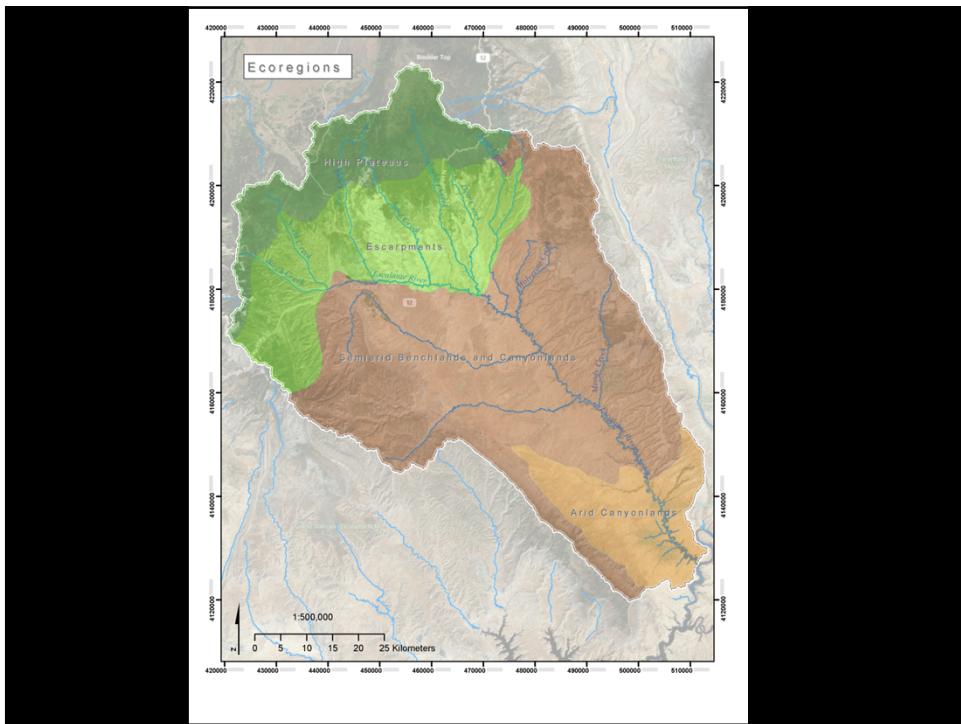
*"If you want to get to know a place  
make a map of it."* Jack Schmidt

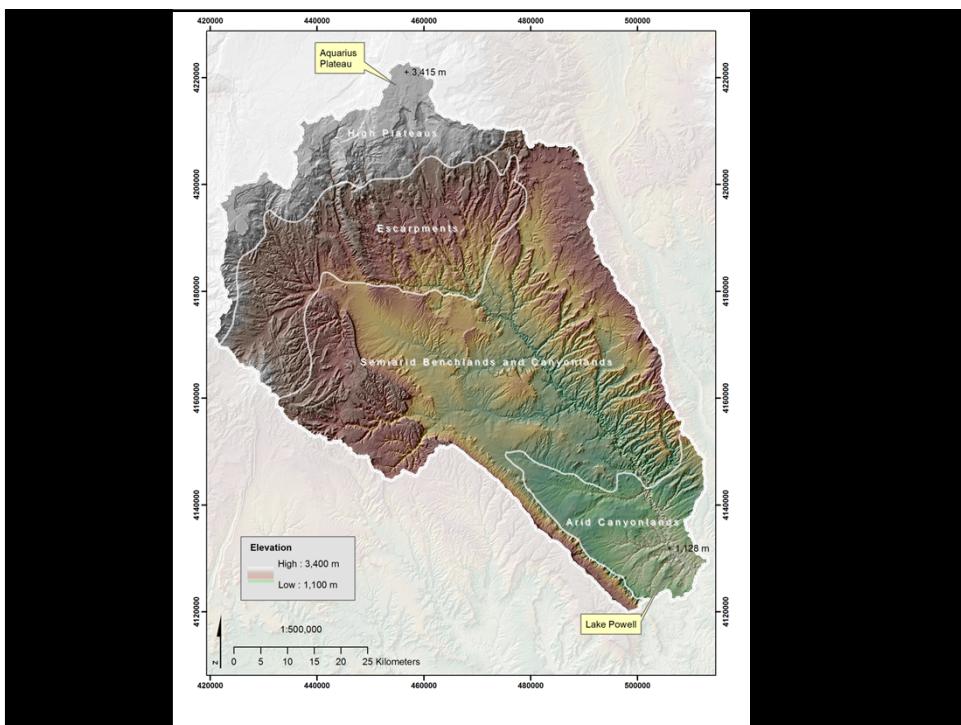
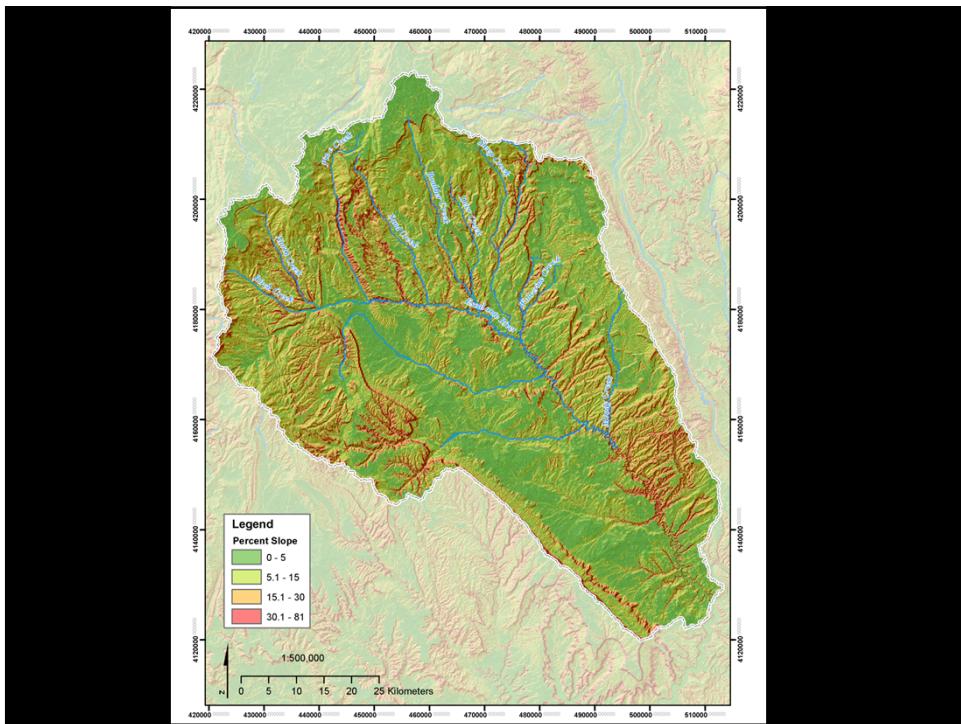


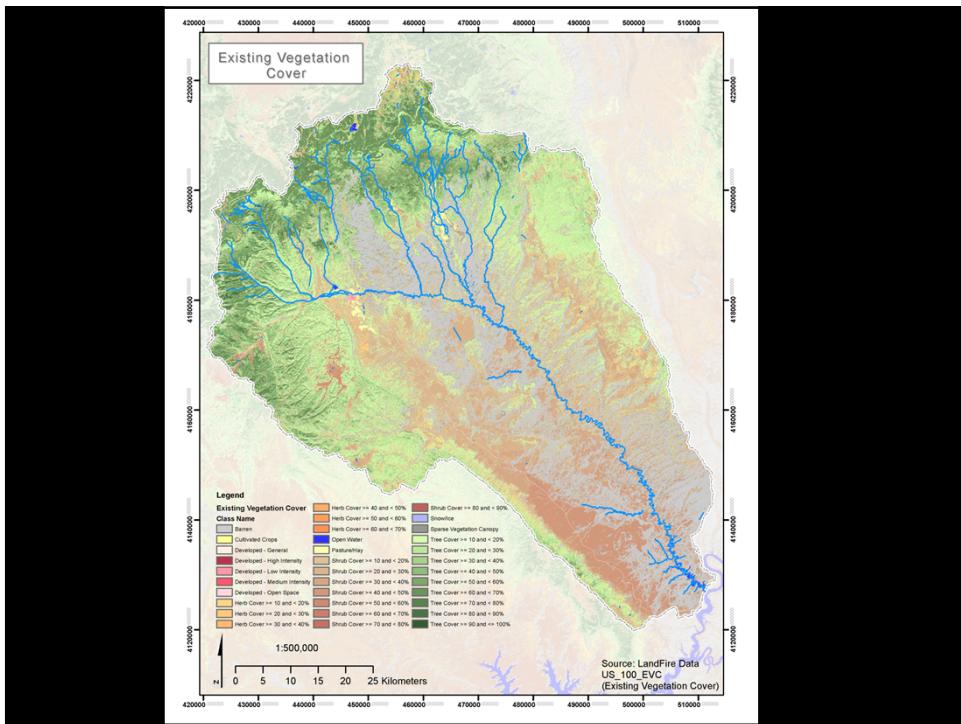
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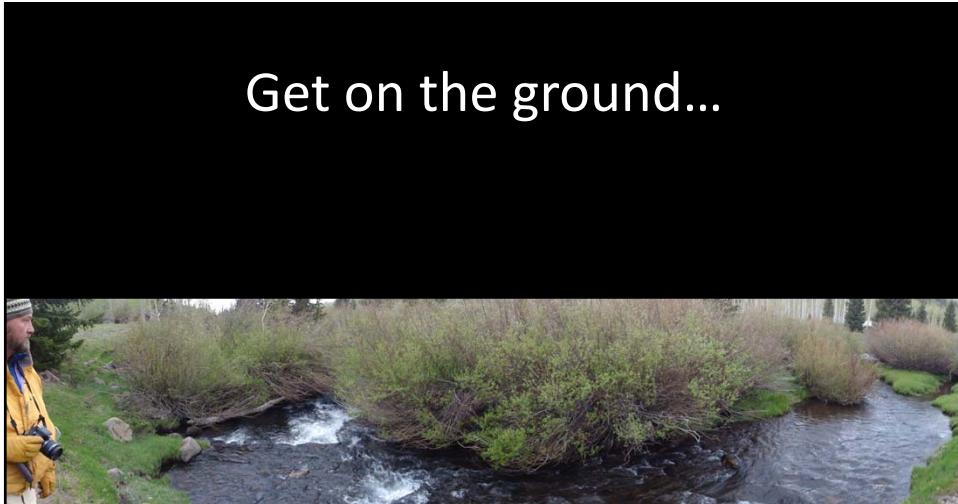


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Get on the ground...



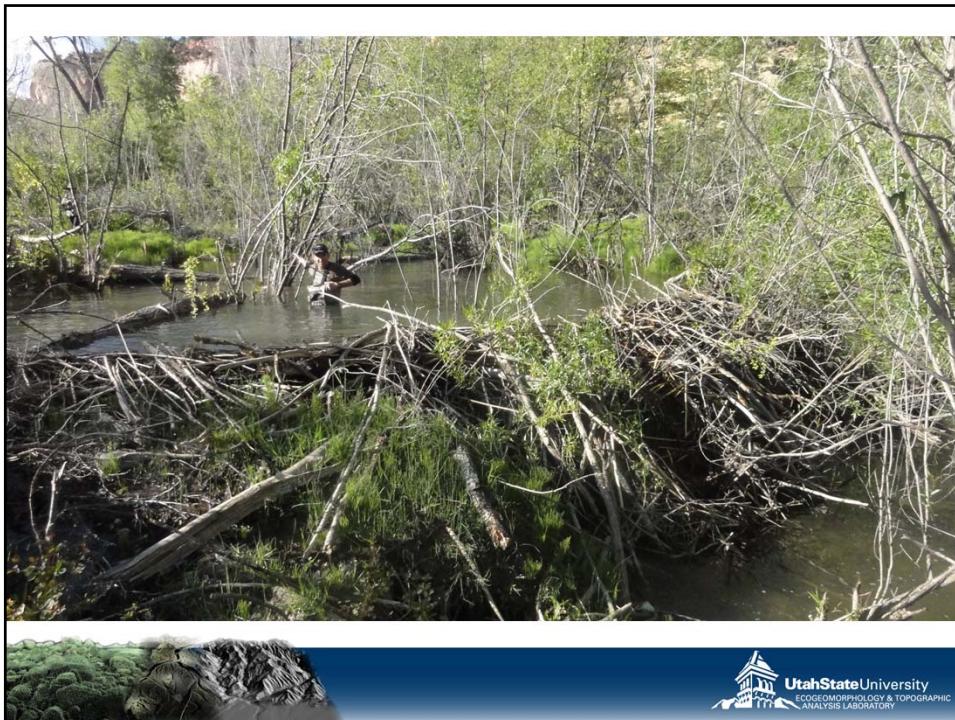
Get a closer look





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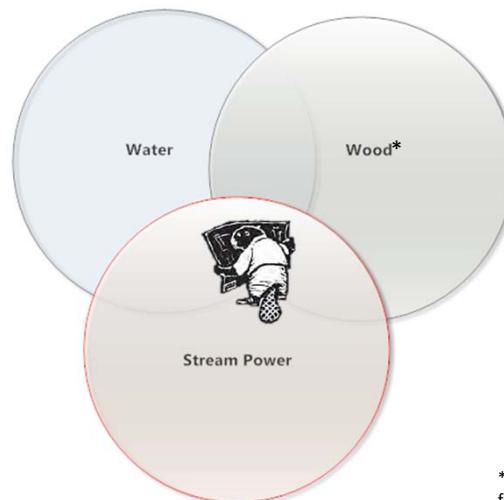
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## Step 2: Model Development

- A. *Model Inputs & GIS Geoprocessing*
- B. *Fuzzy Inference System*
- C. *Model outputs (Maps)*
- D. *Validation*



## Model Inputs



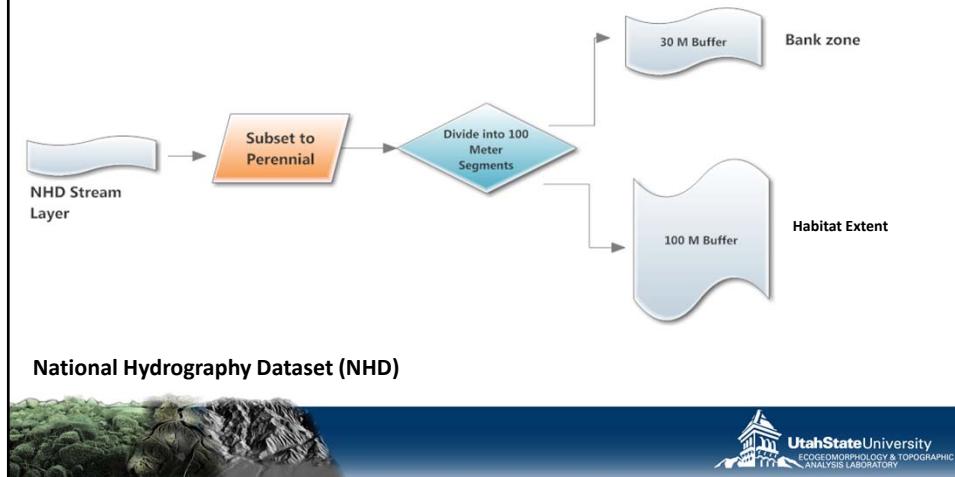
\*Distribution of preferred food/building materials



## Water: NHD Stream Network

readily available nation-wide GIS datasets

### Geoprocessing



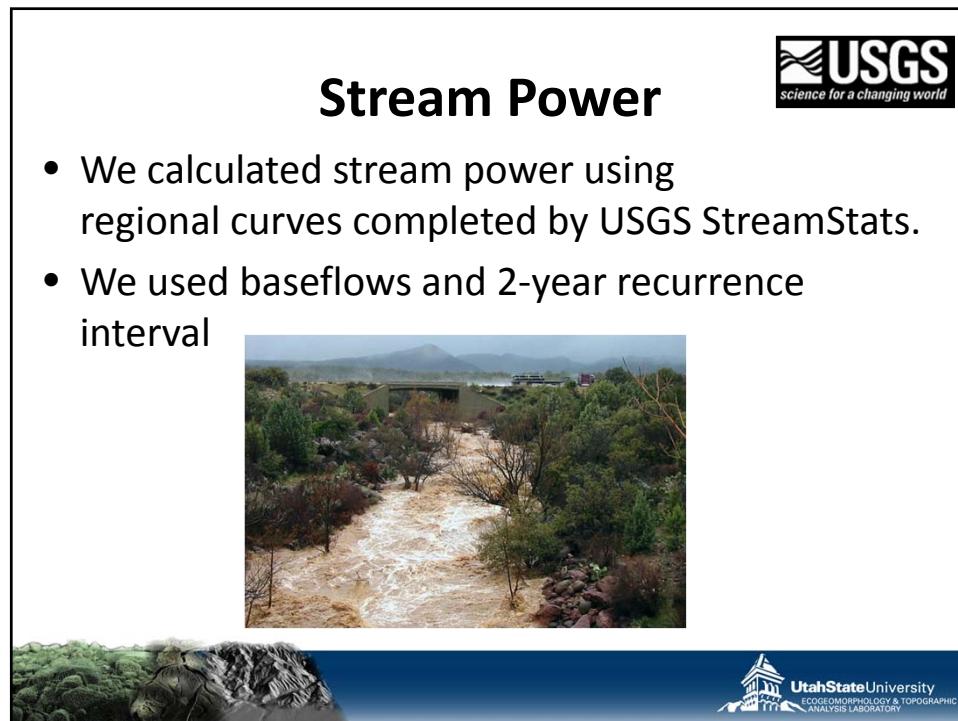
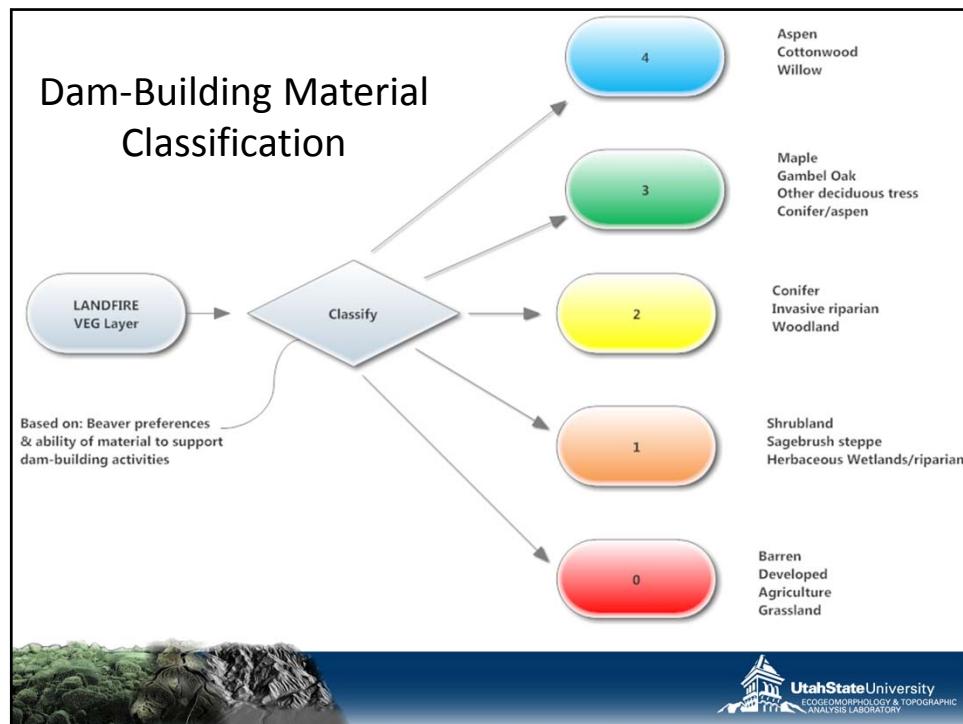
## Dam-building Material



- 2008 nation-wide geospatial vegetation data (30-meter resolution)
- Vegetation layers: Existing/potential\*, type/cover/height

\* “best guess” pre-settlement condition based on predictive landscape models and extensive field-referenced data





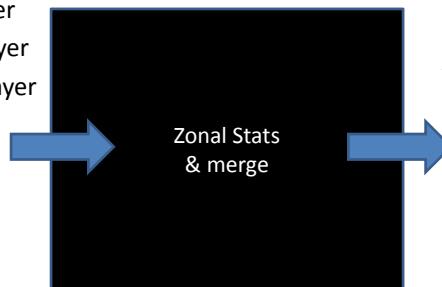
## Final GIS Black Box Analysis

**Processed Inputs:**

- NHD stream layer
- Classified veg layer
- Stream power layer

**Output:**

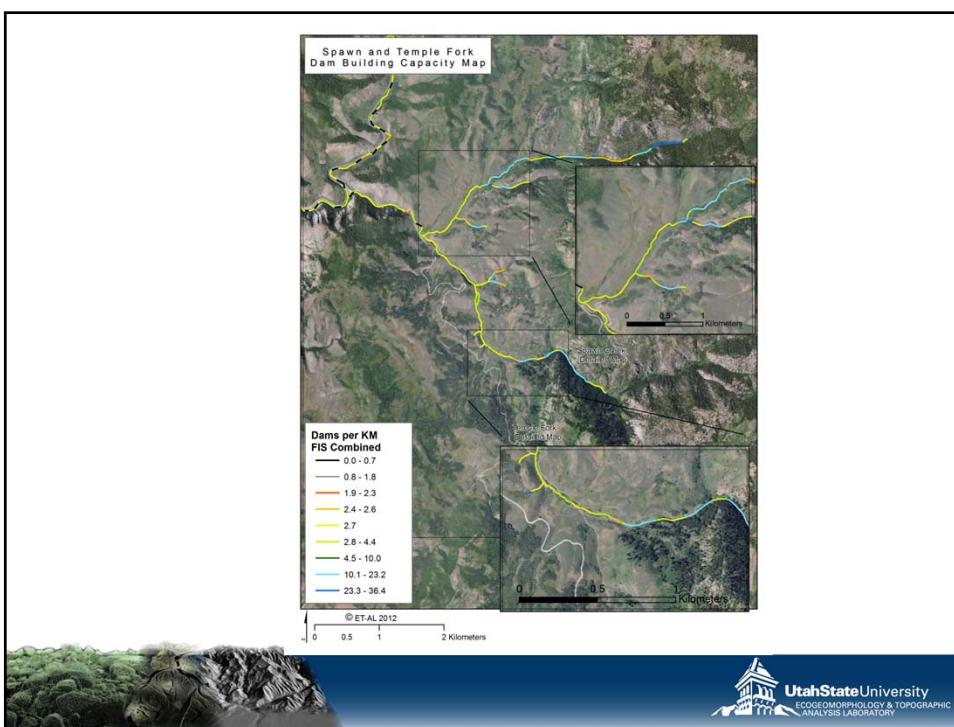
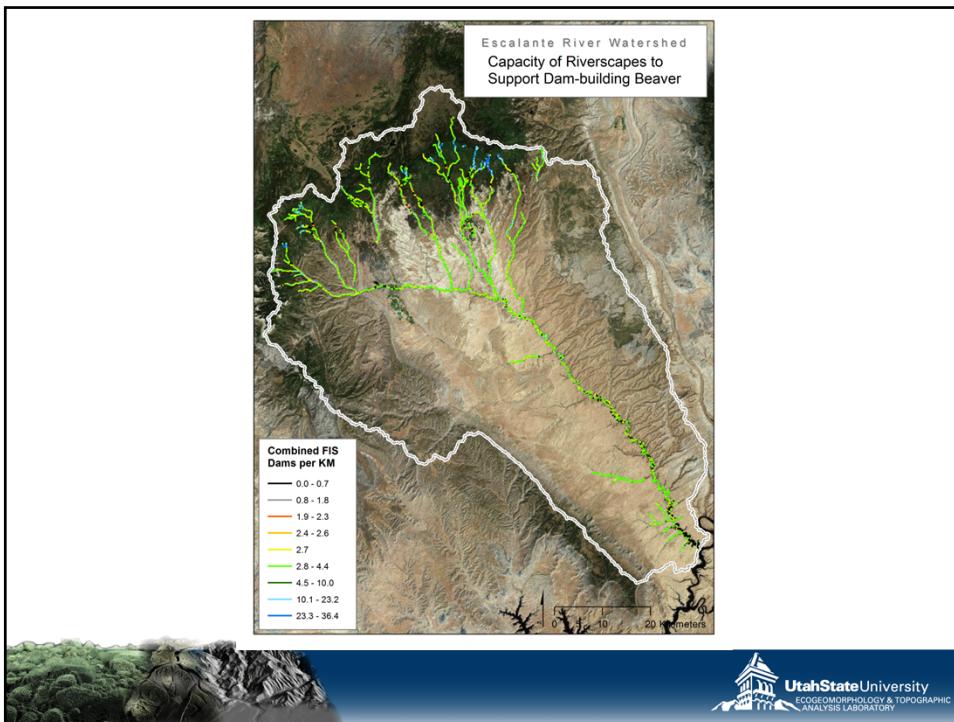
NHD stream layer with categorical ambiguity values  
(i.e., high, medium, low)



## Fuzzy Inference System (FIS)

- A fuzzy inference system was used to assess the relative importance of these inputs
- This allowed explicit incorporation of uncertainty resulting from categorical ambiguity of inputs





## What are some constraints to a site reaching its potential?

- Overgrazing of riparian zone
- Trapping or predation
- Roads /development
- Timber harvest
- Natural disturbance (flooding, fire)



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## Conclusion

- This is a work in progress... *beta version 0.0001*
- Our hope down the road is that BRAT will become a tool for resource managers to prioritize and optimize restoration projects using beaver.
- This afternoon you are going to have the opportunity to ground truth the model.



## Acknowledgements



Grand Canyon Trust has been working to protect and restore natural resources in southern Utah for many years. The Trust is engaging the Forest Service with numerous monitoring and restoration projects on the Dixie, Fish Lake, and Manti-La Sal National Forests.



The Walton Family Foundation's freshwater initiative focuses on sustaining healthy and resilient communities of both wildlife and people in the Colorado River Basin.



EcoFlight advocates for the protection of remaining wild lands and wildlife habitat through the use of small aircraft.

