# D. WHERE DO BEAVER MAKE SENSE? - BRAT

Nate Hough-Snee
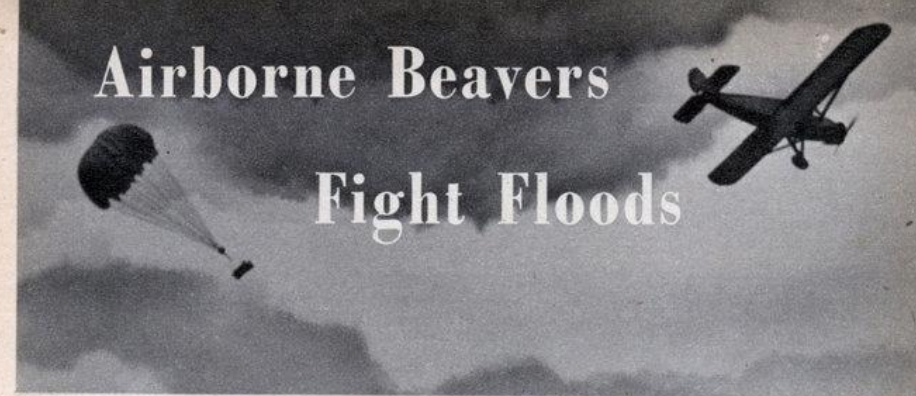
Wally MacFarlane

Joe Wheaton

**NRCS Workshop**

# PURPOSE OF TALK

Share some of work we've been doing on beaver..

- Too easy to get people excited about beaver as a restoration tool… so need **expectation management:**

1. Where could beaver work?
2. Where are they a problem?
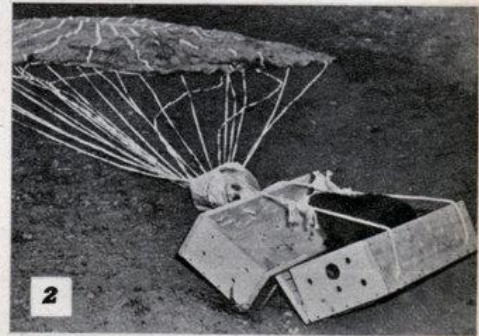3. What do we do where beaver alone are not enough?



Airborne Beavers Fight Floods

OUT in Idaho, the Department of Fish and Game is teaching eager beavers to yell "Geronimo!" These busy little creatures are being dropped by parachute to terrain where they can do their bit in the conservation battle.

Idaho state caretakers trap unwanted beavers which may be a nuisance in certain areas, round them up at central points and pack them in pairs in specially constructed wooden crates. After they are dropped, the boxes remain closed as long as there's some tension on the parachute shrouds but pull open as soon as the chute collapses on the ground. Then, out crawl Mama and Papa beaver, ready to start work.

After they're settled, the 40-pound, web-footed rodents multiply and become outpost agents of flood control and soil conservation. Fur supervisor John Smith reports that in carefully observed early operations, the beavers headed straight for water and started building a new dam within a couple of days.

However, one problem still remains to be solved—a question of ethics more than conservation. *Are these eager beavers bona fide members of the Caterpillar Club?* •
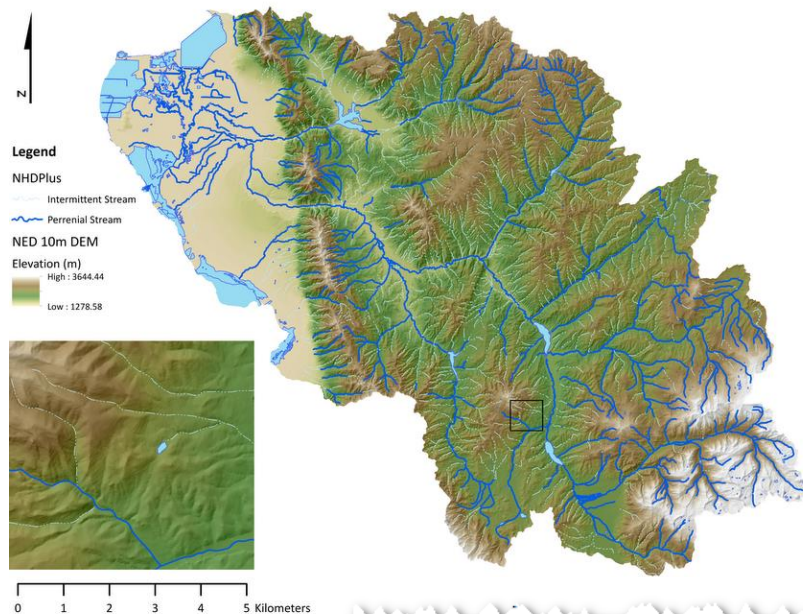
1. Boxed for travel, this beaver is placed in a crate designed by Scotty Heter, left.
2. Rubber bands pull the box apart when the chute hits the ground, freeing the animals.
3. Heading for water, the airborne beavers start working like beavers on their new dam.
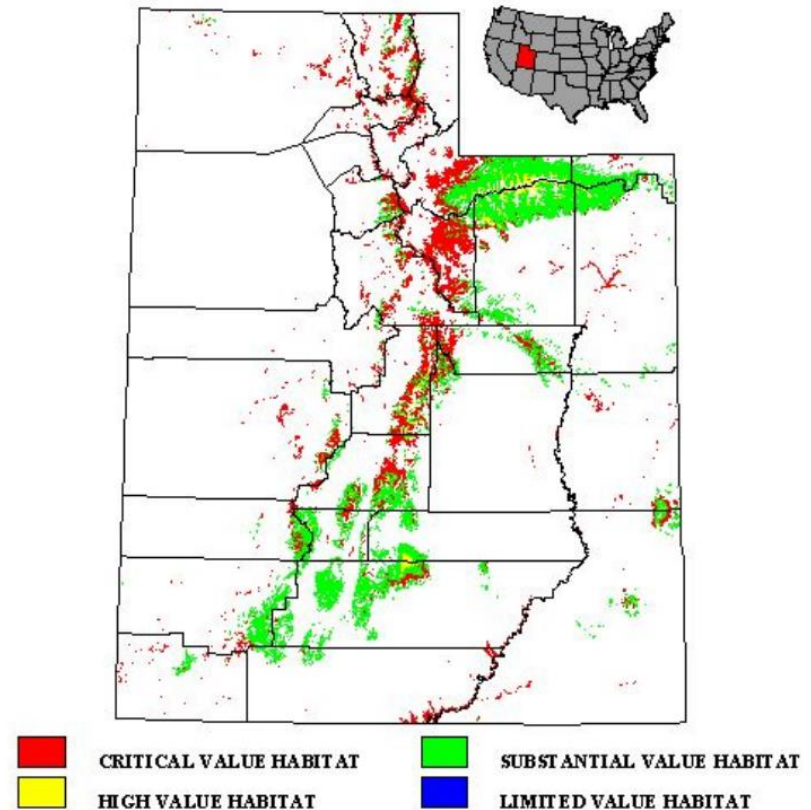
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# WHERE COULD WE USE BEAVER?

- This is not a very useful map...

- What about in my watershed, on my stream?



**Legend**

NHDPlus
- Intermittent Stream
- Perrenial Stream

NED 10m DEM
Elevation (m)
- High : 3644.44
- Low : 1278.58

0  1  2  3  4  5 Kilometers



UTAH GAP ANALYSIS - PREDICTED HABITAT
American Beaver

| | |
|---|---|
| ▮ CRITICAL VALUE HABITAT | ▮ SUBSTANTIAL VALUE HABITAT |
| ▮ HIGH VALUE HABITAT | ▮ LIMITED VALUE HABITAT |

beavers in excess of estimated carrying capacity (Blackwell and Pederson 1993). The predicted beaver habitat in Utah was mapped as part of the 1995 Utah GAP Analysis (Figure 1). Current beaver distribution and abundance is not fully understood, however they are considered common and most of the suitable habitat believed to be occupied.

# BUT ITS WHERE THEY BUILD DAMS, THAT WE REALLY CARE ABOUT...

- The dams provide the ecosystem services we're primarily interested in

- So knowing where beaver are is less important then knowing where they can and are building dams that last!



Beaver and Climate Change Adaptation in North America
A Simple, Cost-Effective Strategy
WildEarth Guardians | Grand Canyon Trust | The Lands Council

A Report from
WildEarth Guardians
SEPTEMBER 2011

ICRRR

UtahState University
DEPARTMENT OF WATERSHED SCIENCES
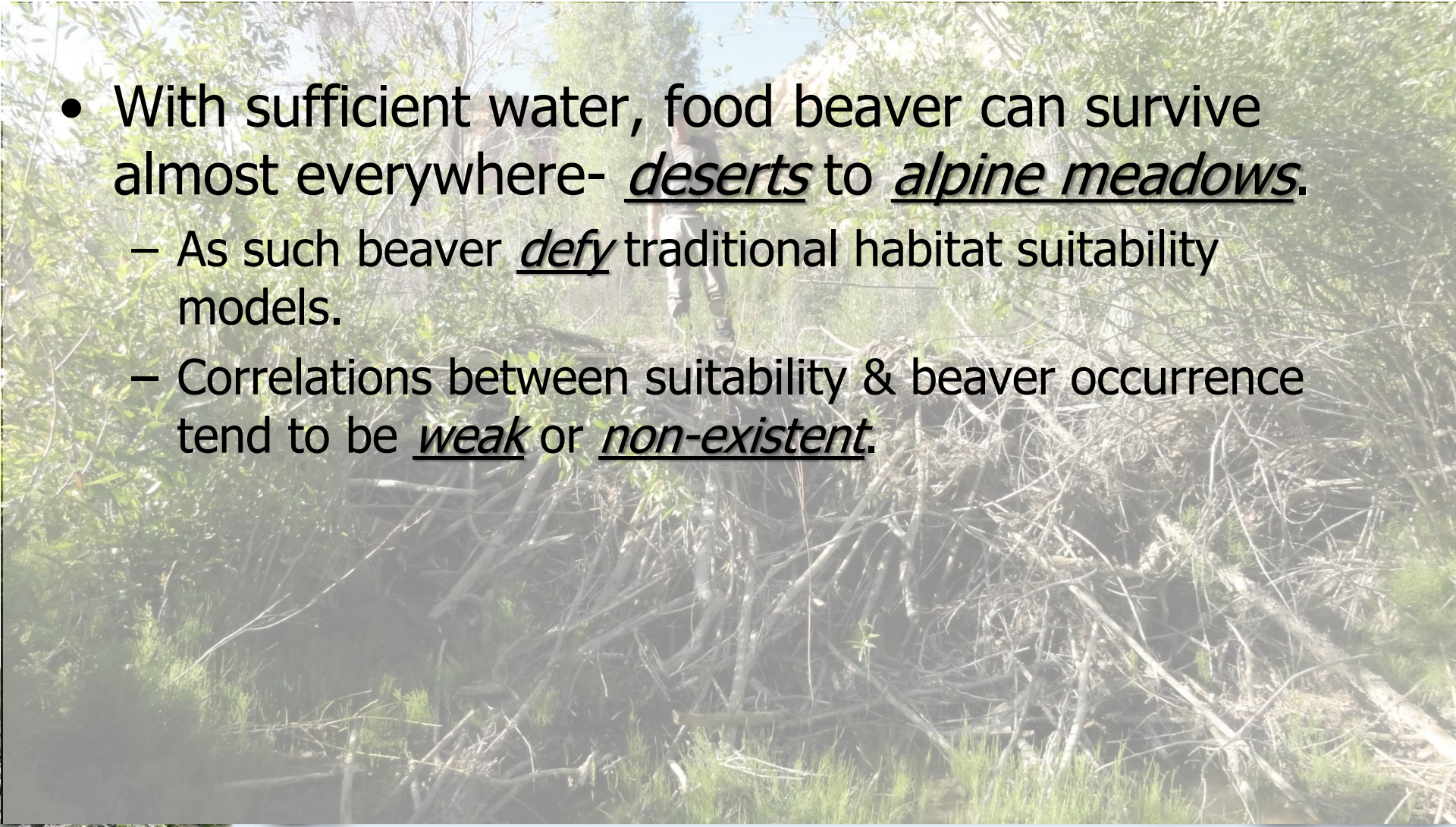
# BRAT — BEAVER RESTORATION ASSESSMENT TOOL

# TRADITIONAL HABITAT SUITABILITY MODELS DON'T WORK FOR BEAVER

- With sufficient water, food beaver can survive almost everywhere- *deserts* to *alpine meadows*.
  - As such beaver *defy* traditional habitat suitability models.
  - Correlations between suitability & beaver occurrence tend to be *weak* or *non-existent*.
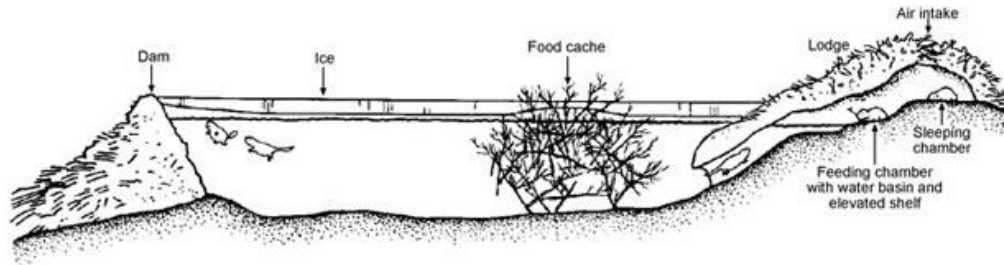
# AN UNDISCRIMINATING RODENT...

Beaver Habitat Requirements
- Water, Trees

# A BETTER APPROACH: DAM-BUILDING CAPACITY MODELING

- _Beaver dams_ not beaver themselves provide the restoration outcomes.
- While beaver can survive in wide range of conditions, where they _build dams_ is more _limited_.
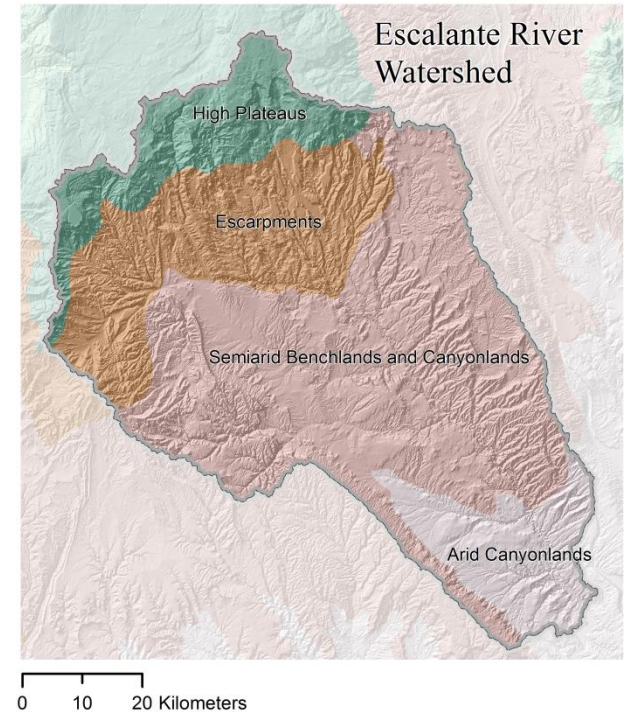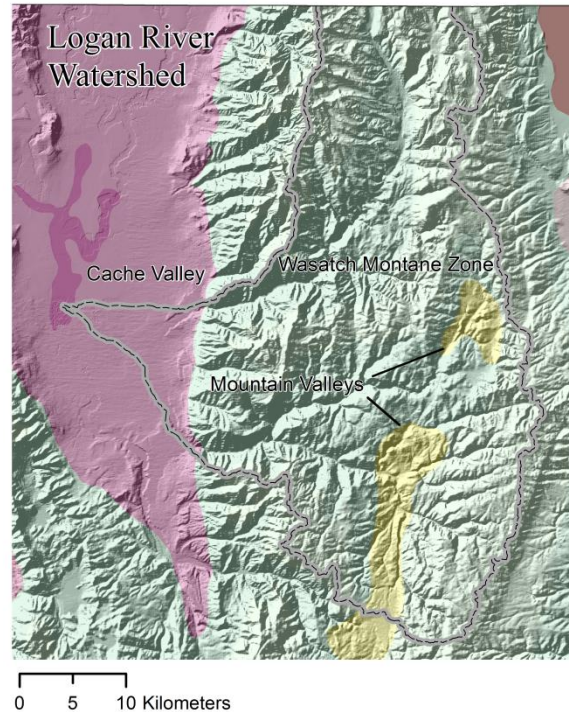- Dam building activity varies dramatically according to _flow regime_ & availability of _dam building materials_.

# LINES OF EVIDENCE TO ESTIMATE BEAVER DAM DENSITIES AT FULL CAPACITY

- Evidence of a perennial water source
- Evidence of riparian vegetation to support dam building activity
- Evidence of adjacent vegetation (on riparian/upland fringe) that could support expansion and establishment of larger colonies
- Evidence that a beaver dam could physically be built across the channel during low flows
- Evidence that a beaver dam is likely to withstand typical floods
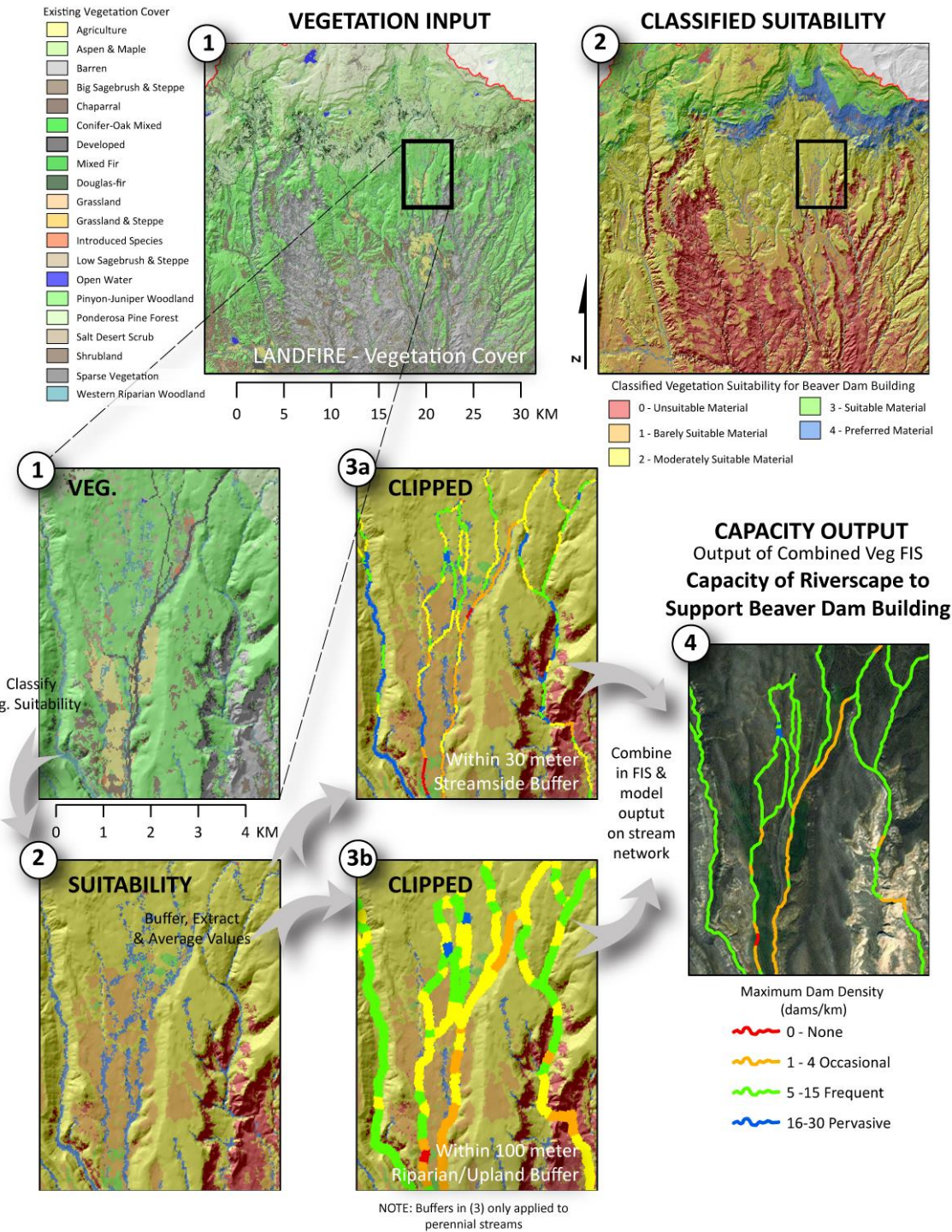
# TEST-BEDS



- Escalante Watershed, Utah*
- Logan River Watershed, Utah*
- Greater Yellowstone Ecosystem, Wyoming
- Lower John Day Watershed, Oregon
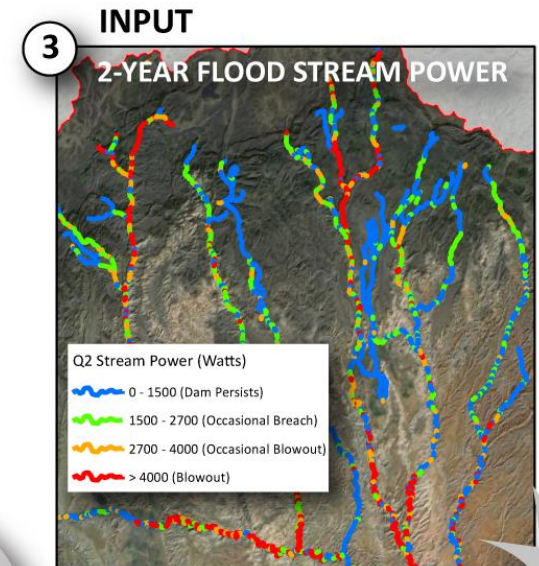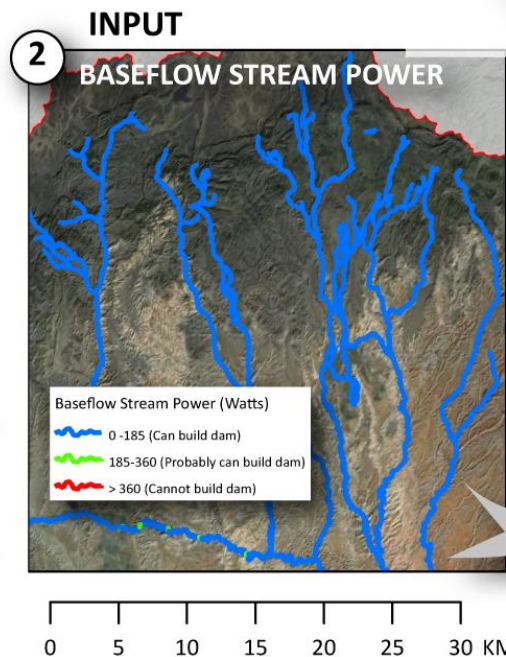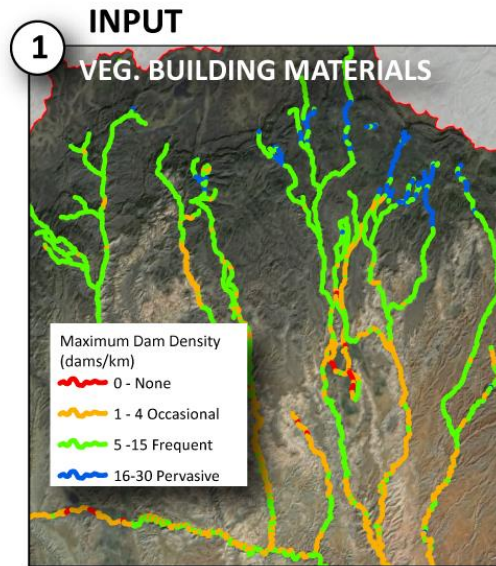- Deschutes Watershed, Oregon

# WORKFLOW

- Get LANDFIRE
- Classify it
- Clip it to streamside and riparian/upland buffers
- Run it through fuzzy inference system
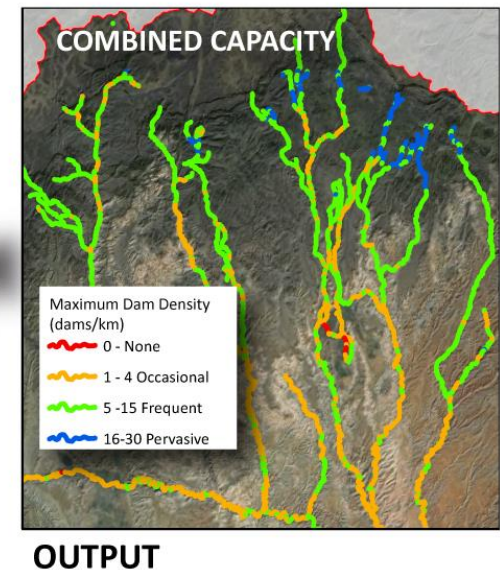  - Takes inputs and estimates the maximum dam density that can be supported based on this

# COMBINED

1. Veg FIS
2. Baseflow (can they build a dam?)
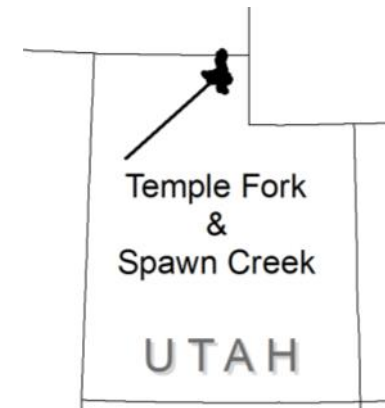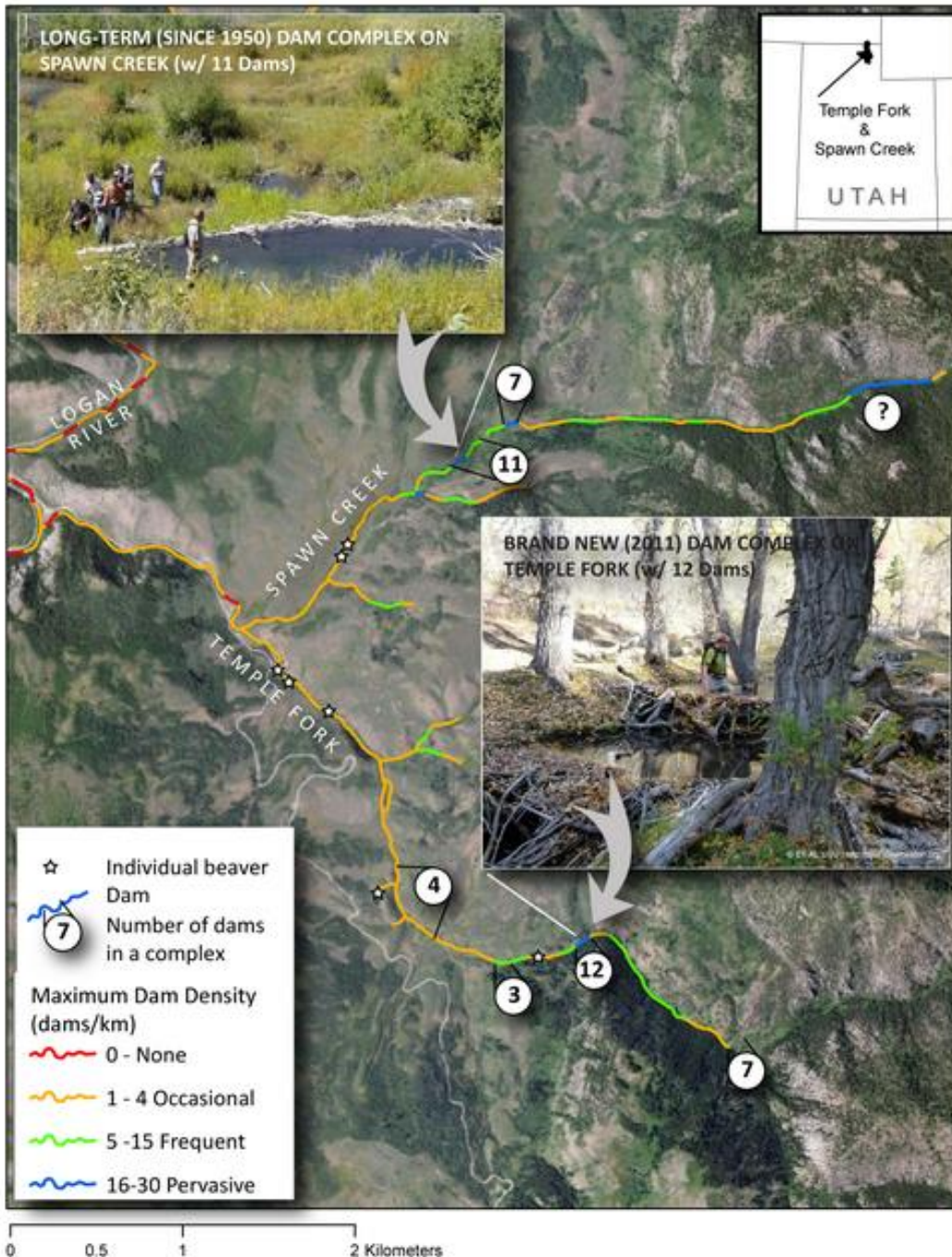3. 2 Year Flood (does dam blow out)

= Resulting Capacity

# VERIFICATION
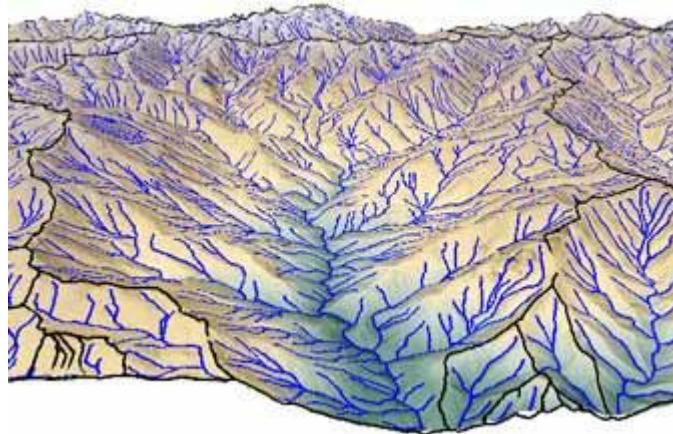
# WHAT BRAT WILL DO...

- Classify the drainage network in terms of 'where could they be':
  - Low-hanging fruit streams
  - Quick return streams
  - Long-term possibility streams
  - Unsuitable, Naturally Limited Streams
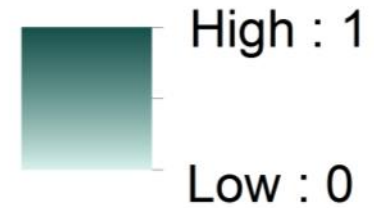  - Unsuitable, Anthropogenically Limited Streams

# LIMITING FACTORS AFFECTING CAPACITY

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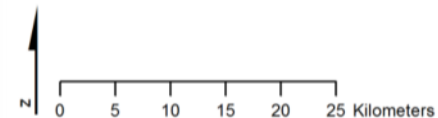- Timber harvesting
- Natural disturbance (flooding, fire)



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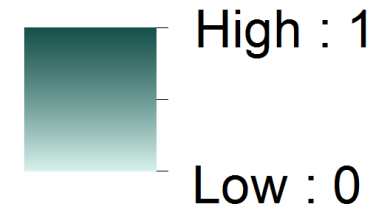
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## Probability of Ungulate Utilization

High : 1

Low : 0

## What goes in?
- Slope
- Distance from Water
- Vegetation

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**Probability of Ungulate Utilization**

High : 1

Low : 0

**Existing Combined FIS Dams per KM**

0 - None

1 - 4 Occasional

5 - 15 Frequent

16 - 30 Pervasive

0   0.5   1 Kilometers
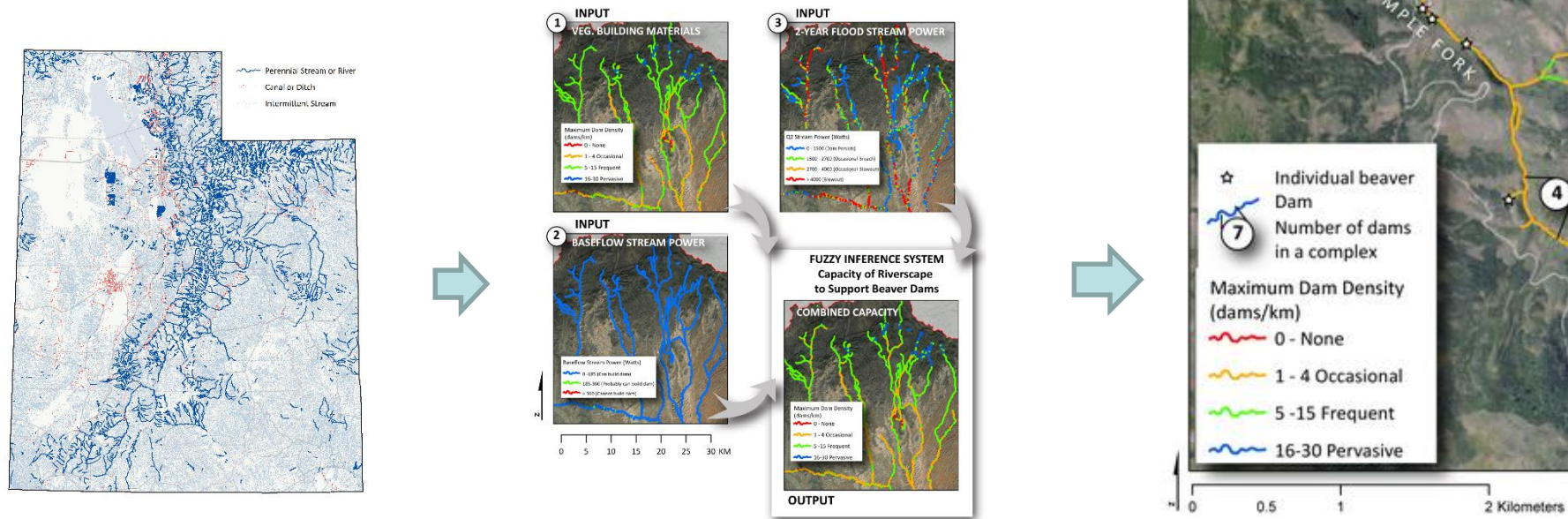
0   5   10   15   20   25 Kilometers

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# WHAT JOHN & I WANT TO DO…

- Finish decision support elements of BRAT in bespoke manner for UDWR
- Take whole state & run BRAT



2. Identify zones on the map to illustrate appropriate beaver management strategies for given geographic areas, i.e. existing populations (including source populations), unoccupied historical range and areas where the potential for conflict is high.

# BEAVER MONITORING APP!

- Simple enough 2ⁿᵈ graders can use it
- Sophisticated enough that researchers get useful data streams
- Going to launch statewide monitoring campaign with USU Extension & DWR

# EVEN SECOND GRADERS GET IT

- They use the App
- They build their own dams in beaver side channels
- They learn how beaver modify the landscape