BEAVERS IN OUR LANDSCAPE

BEAVER OREGON WORKS
A program of THINK WILD

INTRODUCTIONS

*Supporting beaver and native wildlife habitat on our Oregon high desert landscapes through **Habitat. Support. Awareness**.*

BEAVER OREGON WORKS

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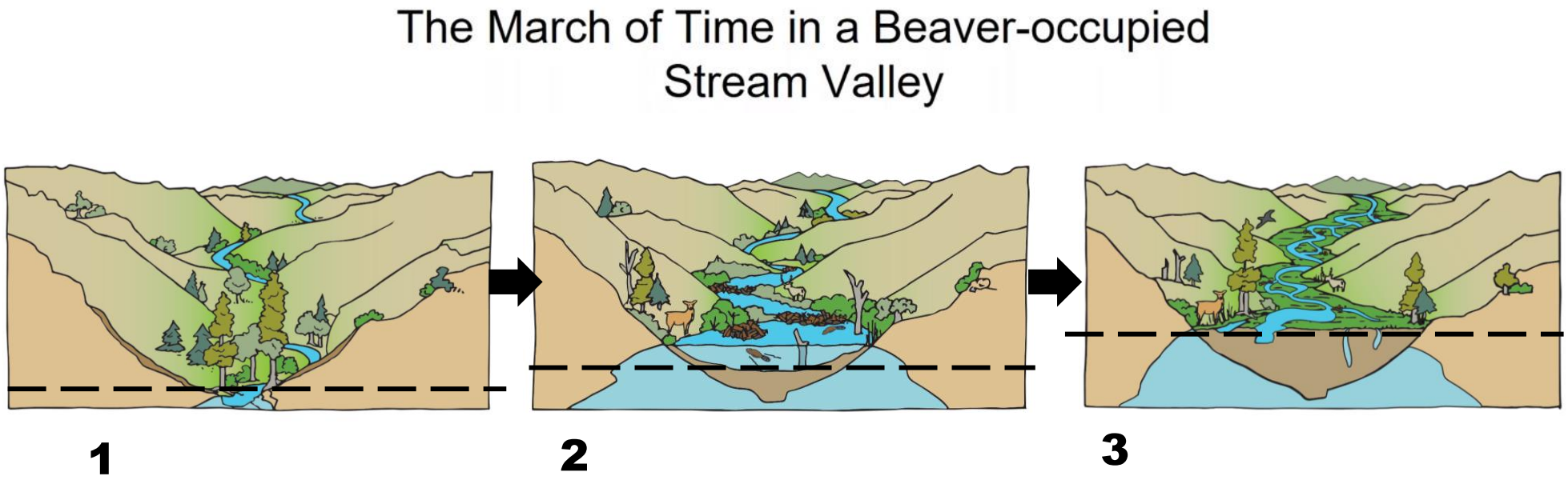
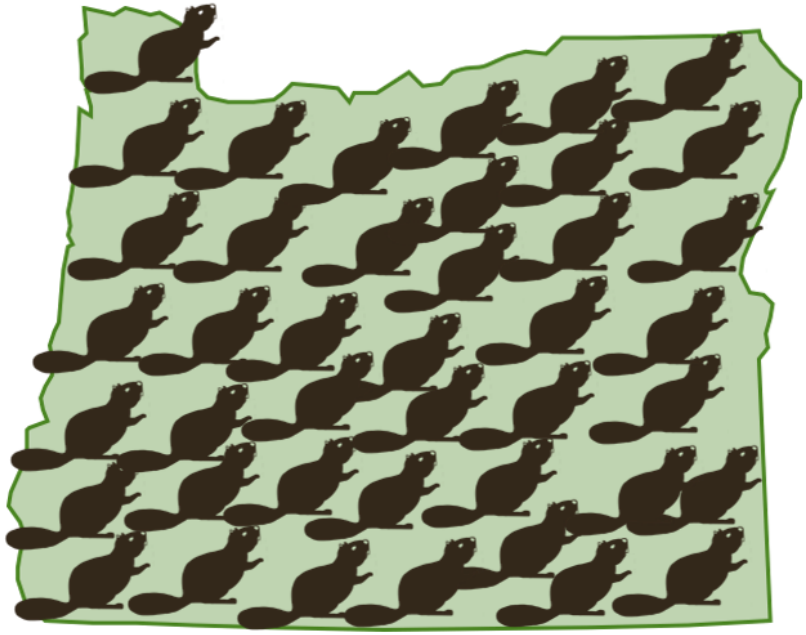
RIPARIAN FOUNDATIONS

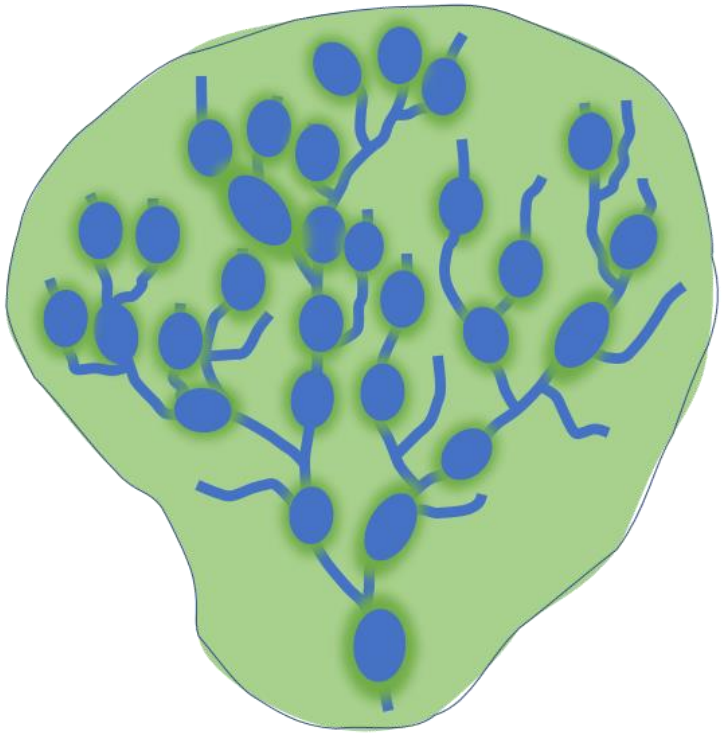
BEAVER MEADOWS



A NETWORK OF MEADOWS



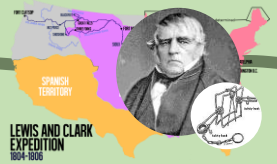
Estimated pop. 1,000,000
Pre-Euro-American Settlement

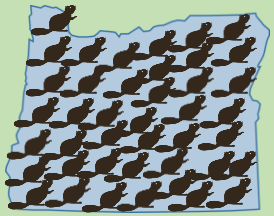


Water “catchment”?
(vs. “shed”)

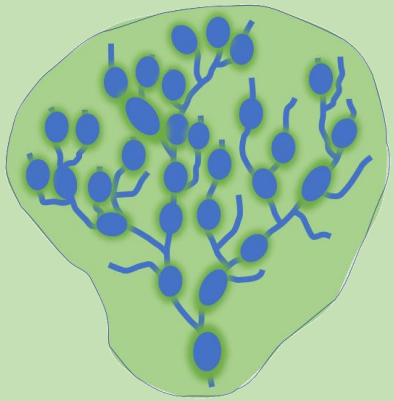
UNRAVELING

1800's

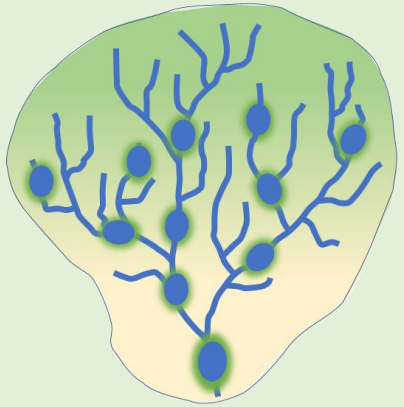




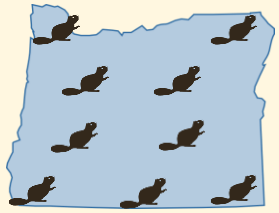
p. 1,000,000



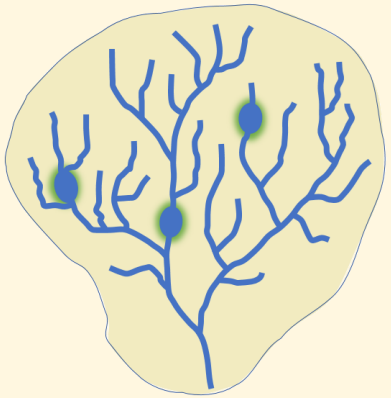
1900's



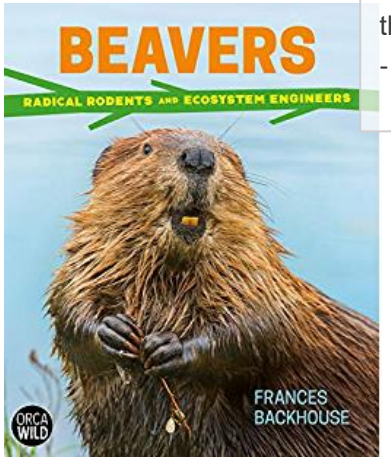
2000's



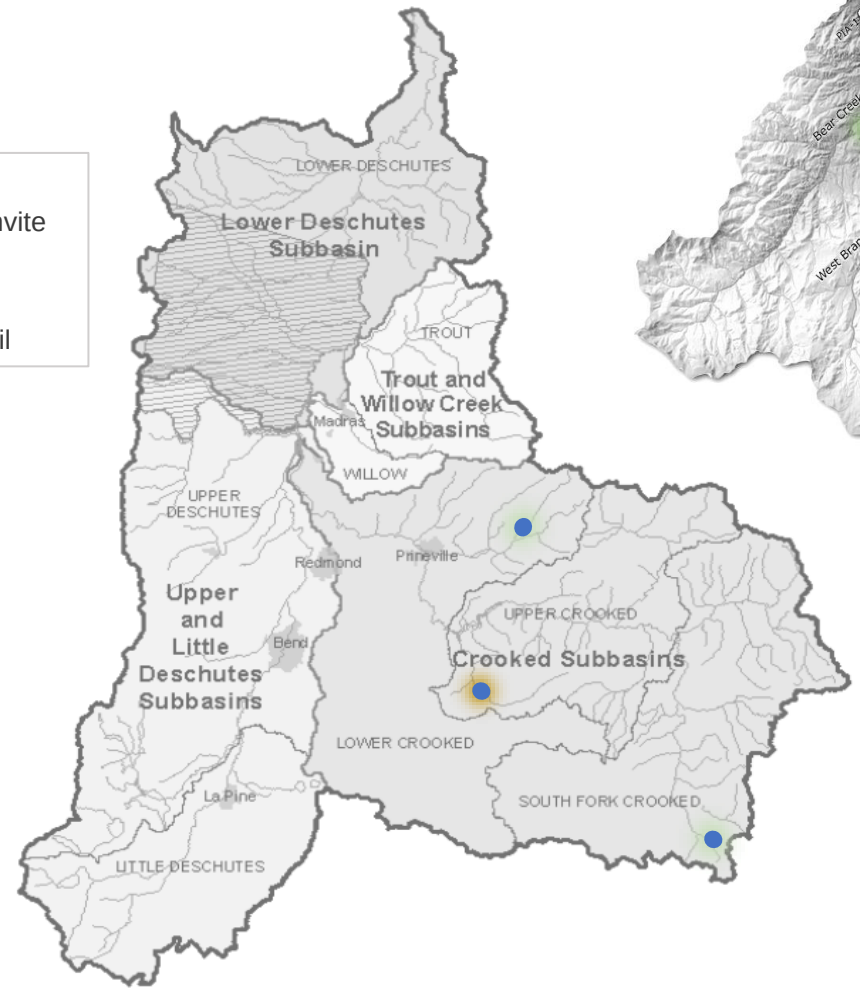
p. 50,000 (5%)

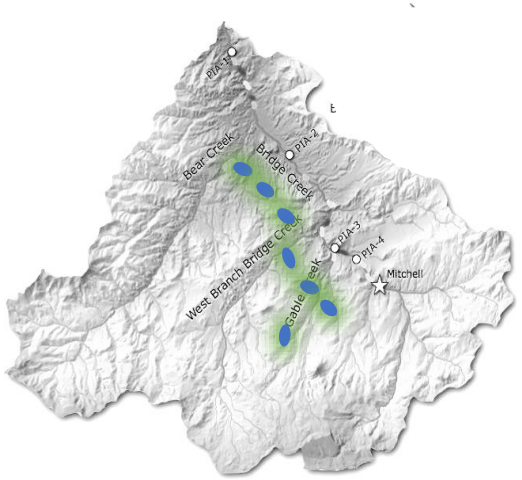


IN RESPONSE - RIPARIAN RESTORATION



"Beavers are the cheapest way to restore streams, but you have to invite them into good habitat first."
- Mark Peterson
Crooked River Watershed Council





BEAVER BASICS

Biology

- "Semi-aquatic rodents". Conformationally 'challenged', designed for water not land.
- Hard wired response to flowing water - the sound and feel
- Average family/colony size ranges 4 to 6 (2 adult, 2 juvenile, 2 kits)
- New kits born around April, can swim within first 24 hours.
- Very family-oriented: 2nd year "juveniles" participate in kit raising and family chores like dam / den building.

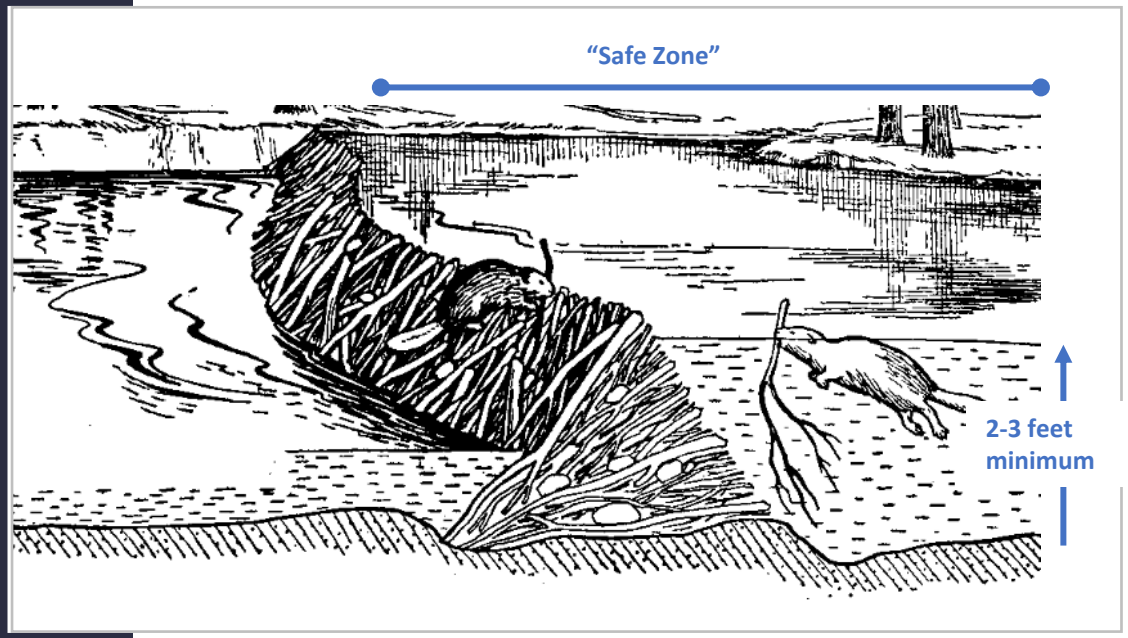
On Land

In Water

BEAVER BASICS

Engineering

- Dams
  Act as “moats” of water depth / safety from predators
- Often multiple successive dams, primary and secondary structures
- Often blowout during spring flows, beavers will repair / rebuild if conditions are right
- Create “bank dens” under trees/root
  structure (if available)
- Often more than one den



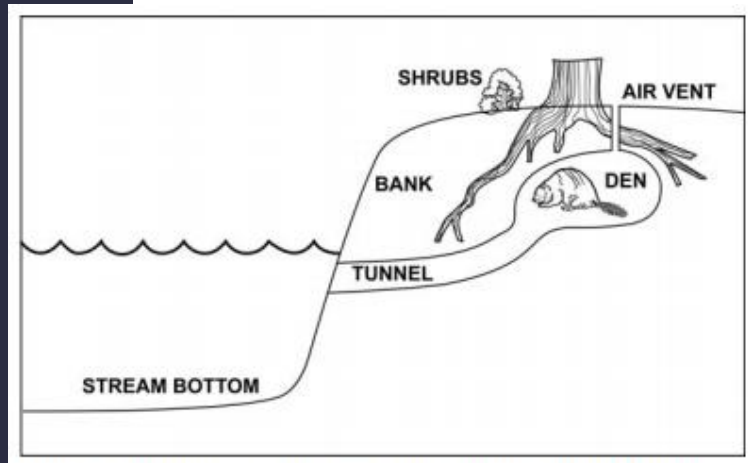


Figure 1. Like many rodents, beavers construct nesting dens for shelter and for protection against predators.

BEAVER BASICS

Food

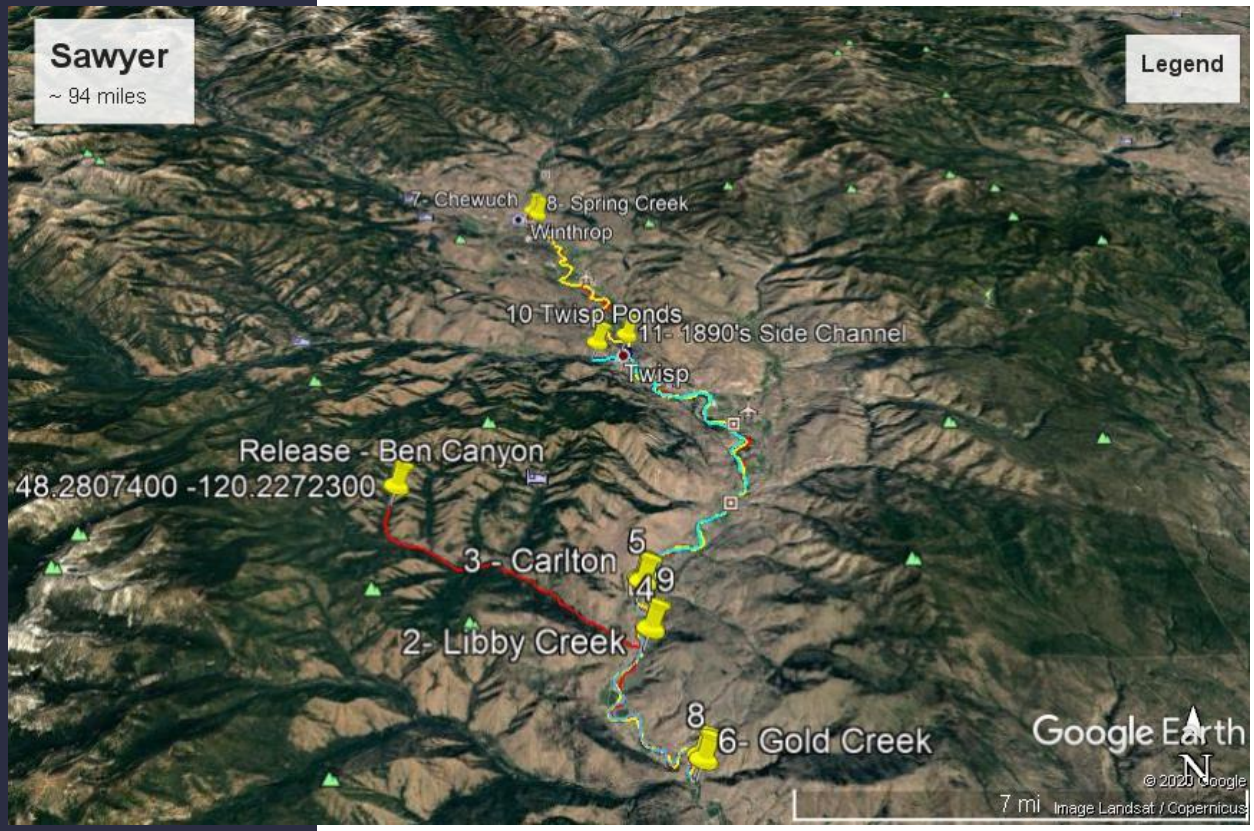
- A family/colony requires 3 - 5 acres to successfully establish
- Can eat anything, preferences tend to be willow, aspen, cottonwood, sometimes alder. Vegetarian.
- Also eat less preferred juniper, sage, pine, etc.
- Food competition with browsers (deer, elk, livestock, etc.)
- Food within 100 ft ideal, may dig channels to access more safely
- Without proximate food source (water for cover), tend to be ephemeral – predated by lions, coyotes, other.
- “Desert Beavers” are highly adaptable

BEAVER ON THE MOVE

- New activity usually dispersing youngsters leaving home in Spring (2-3 years old).
- Prefer settlement sites close to family, but may travel further to lower quality habitat depending on competition.
- Territorial. Home ranges 0.5 to 0.75 miles in healthy system.
- Dam site selection at pinch points like culverts, PODs, ditches, bridges, etc.
- Will travel many miles to find conditions to settle into. Including land travel.

LONG DISTANCE TRAVEL

- Long distance travel not uncommon, often prefer river stems where water availability is more certain.
- But territorial and habitat pressures force travel to upper reaches and sometimes even other subbasins.



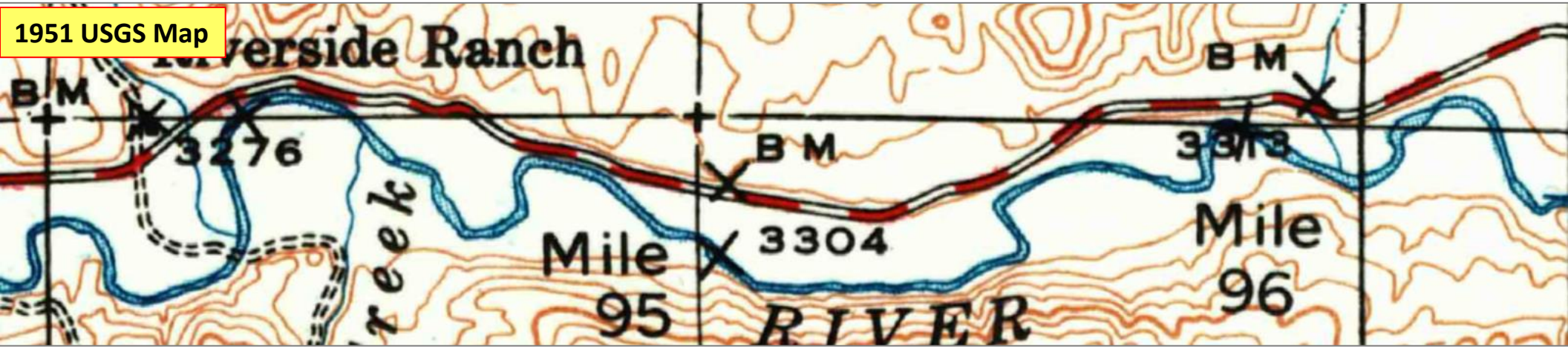
Source: Methow Beaver Project

LIMITING FACTORS

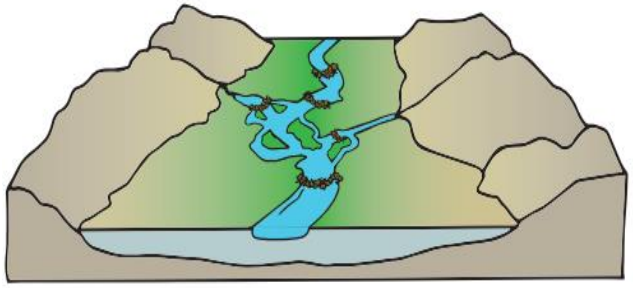
- **Habitat / Lack of Food**
  ~1000 lbs/year per beaver
  3 – 6 acres for establishment
- **Lack of Structure (“Large Woody Debris”)**
  for dam resilience
  for sediment aggradation
- **Drought**
  forces land travel / predation
- **Humans**
  when conflicts

BEAVERS AND WATER

Straightening of the Crooked River



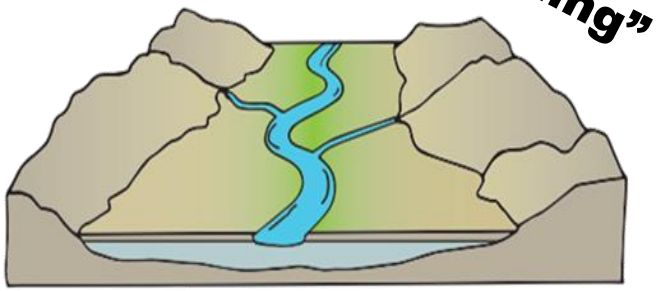
BEAVERS AND WATER



1800
System balanced and resilient

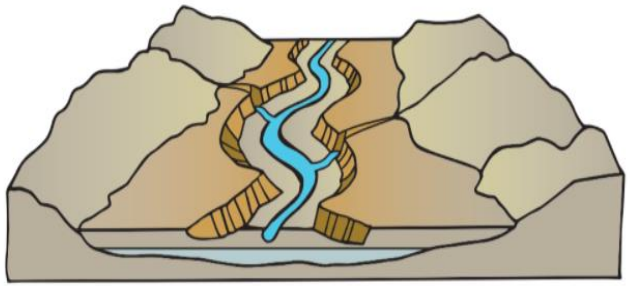
Slow it, spread it!

"Unraveling"



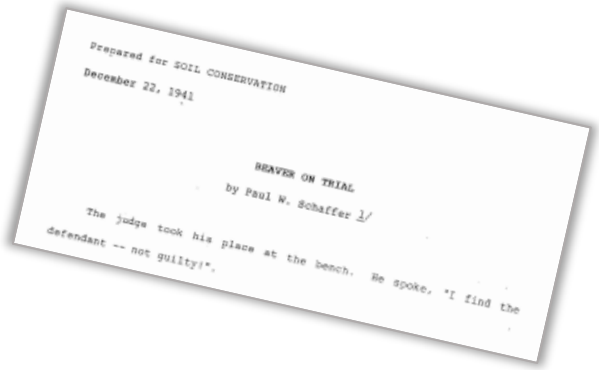
1900
Beaver absent: a ticking time bomb

Drought, overgrazing, and
increased browsing



2000
Channelized from erosion and
straightening

BEAVERS AND WATER

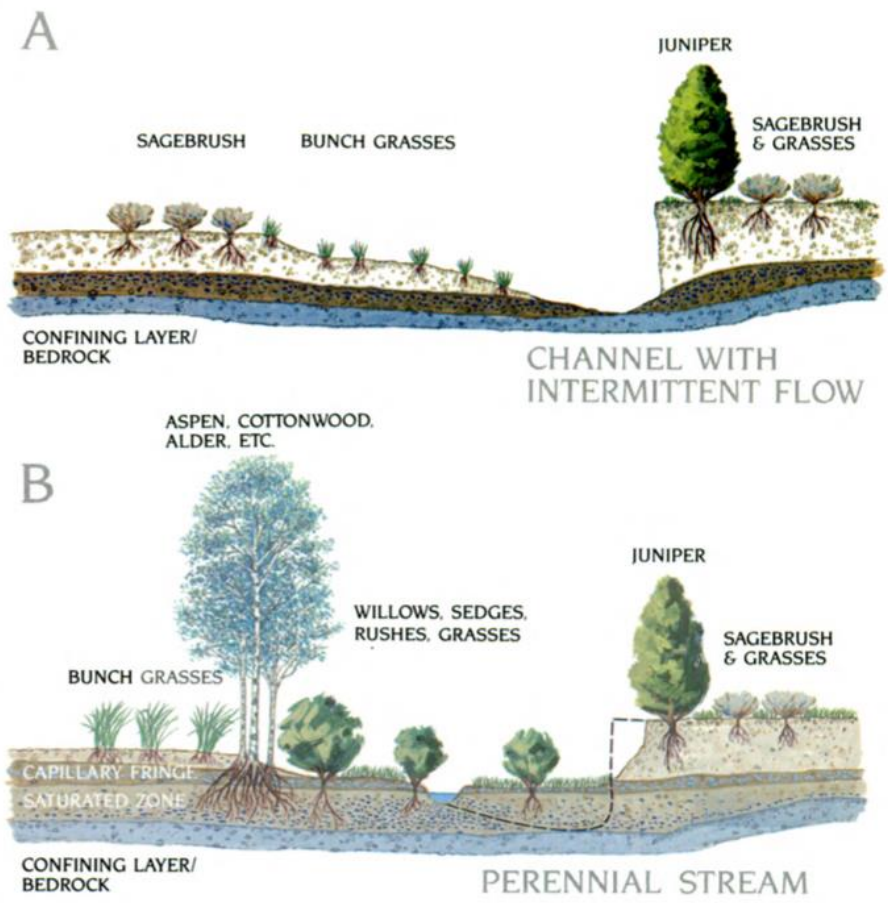

Prepared for SOIL CONSERVATION
December 22, 1941

BEAVER ON TRIAL
by Paul W. Schaffer 1/

The judge took his place at the bench. He spoke, "I find the defendant -- not guilty!".

Crane Creek (Harney County near Lakeview, OR) from Schaffer 1941.

Period	Status
1884 - 1923	“Stirrup-high” native grasses sub-irrigated by beaver dams on Crane Cr.
1924	Poachers trap all beavers; beaver dams washed out.
1925	Floods run unchecked, incise streambed.
1930	10 feet of channel incision; sloughing banks reduce acreage.
1935	15 feet of channel incision; drained groundwater table and dry well.
1936	“Yawning canyon”; 20 feet of incision. Meadow lands replaced by sage.
1936-1938	Beavers reintroduced: dams built, sediment captured, hydrograph began to rebalance and hay yields began recovering with sub-irrigation.



BEAVERS AND WATER

A stream comes back to life

Across the U.S. West, scientists and land managers are using beaver dam analogs (BDAs) to heal damaged streams, re-establish beaver populations, and aid wildlife. In some cases, researchers have seen positive changes in just 1 to 3 years.

Adding dams
Beaver trapping and overgrazing have caused countless creeks to cut deep trenches and water tables to drop, drying floodplains. Installing BDAs can help.

Widening the trench
BDAs divert flows, causing streams to cut into banks, widening the incised channel, and creating a supply of sediment that helps raise the stream bed.

Beavers return
As BDAs trap sediment, the stream bed rebuilds and forces water onto the floodplain, recharging groundwater. Slower flows allow beavers to recolonize.

A complex haven
Re-established beavers raise water tables, irrigate new stands of willow and alder, and create a maze of pools and side channels for fish and wildlife.

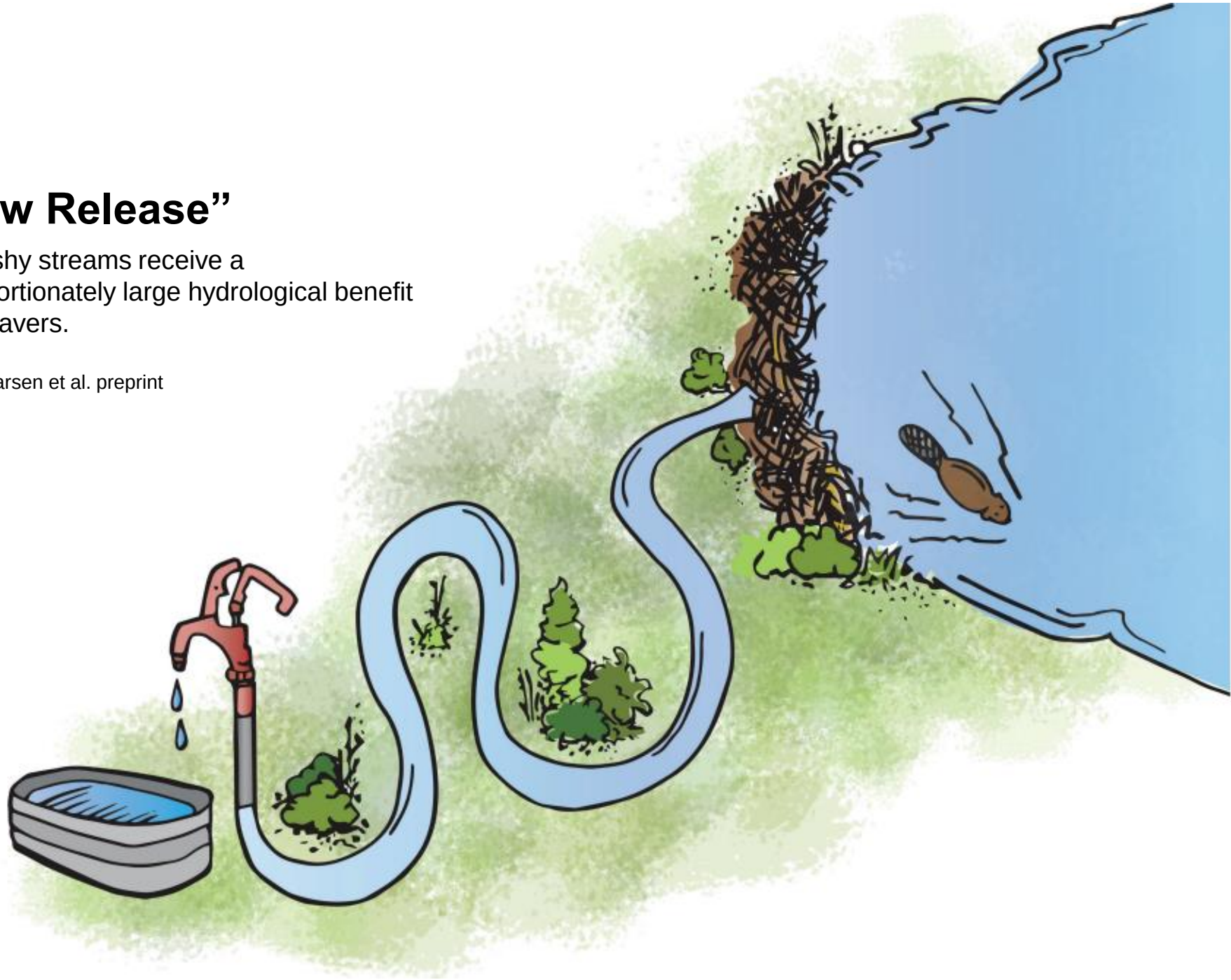
Utah State University: Process Based Restoration

BEAVERS AND WATER

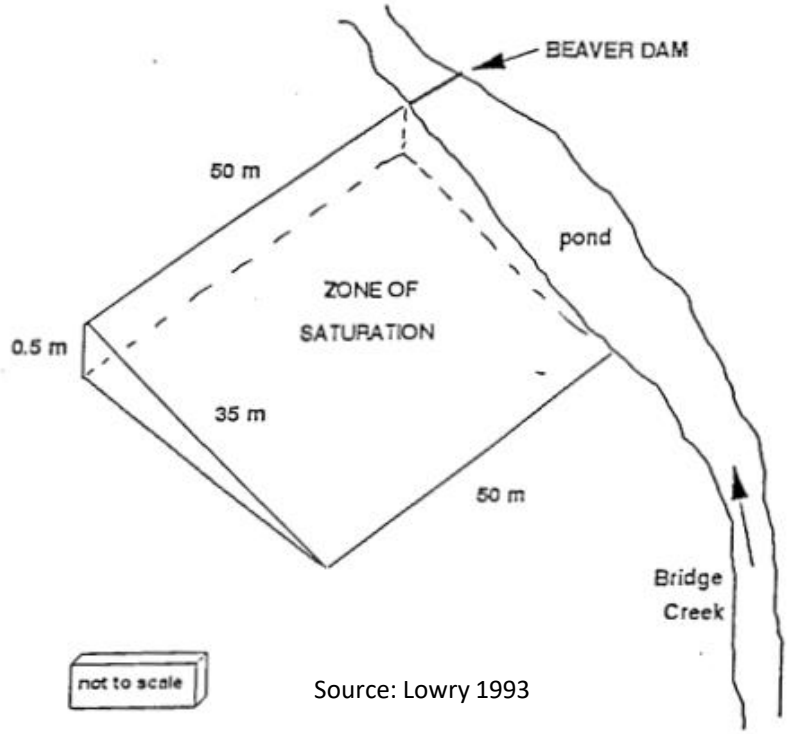
“Slow Release”

Dry, flashy streams receive a disproportionately large hydrological benefit from beavers.

Source: Larsen et al. preprint



BEAVERS AND WATER



Source: Lowry 1993

"More springs and watercourses existed in the basin because of higher water tables. Beaver dams were plentiful and instrumental in maintaining a high water table under most stream valleys. As a result, many streams that are now intermittent were perennial." – Deschutes Subbasin Plan (re: Crooked River)

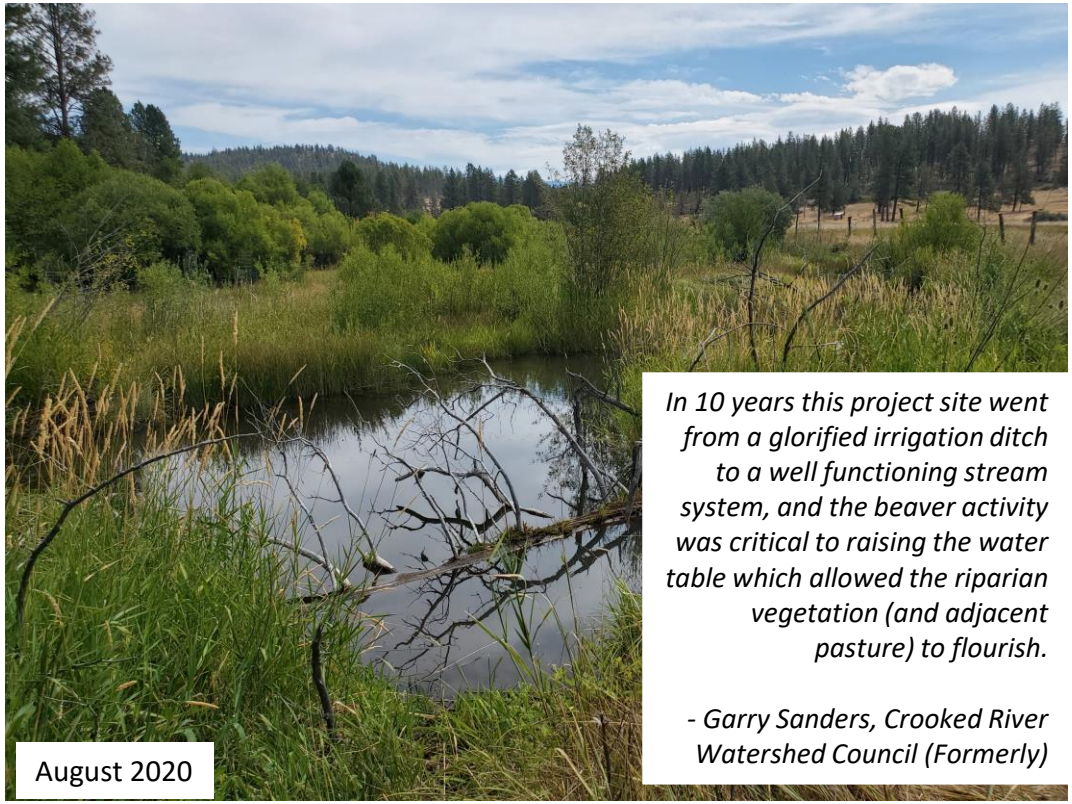
BEAVERS AND WATER

@ Marks Creek

Photos: Crooked River Watershed Council

BEAVERS AND WATER 💧

@ Marks Creek



August 2020

In 10 years this project site went from a glorified irrigation ditch to a well functioning stream system, and the beaver activity was critical to raising the water table which allowed the riparian vegetation (and adjacent pasture) to flourish.

- Garry Sanders, Crooked River Watershed Council (Formerly)

February 2021

BEAVERS AND WATER 💧

@ Marks Creek

BEAVERS AND WATER

@ Marks Creek

BEAVERS AND WATER

@ Marks Creek

BEAVERS AND WATER 💧

@ Bridge Creek

BEAVERS AND WATER

@ Bridge Creek

"This section of stream doesn't care whether it's a wet year or a dry year."

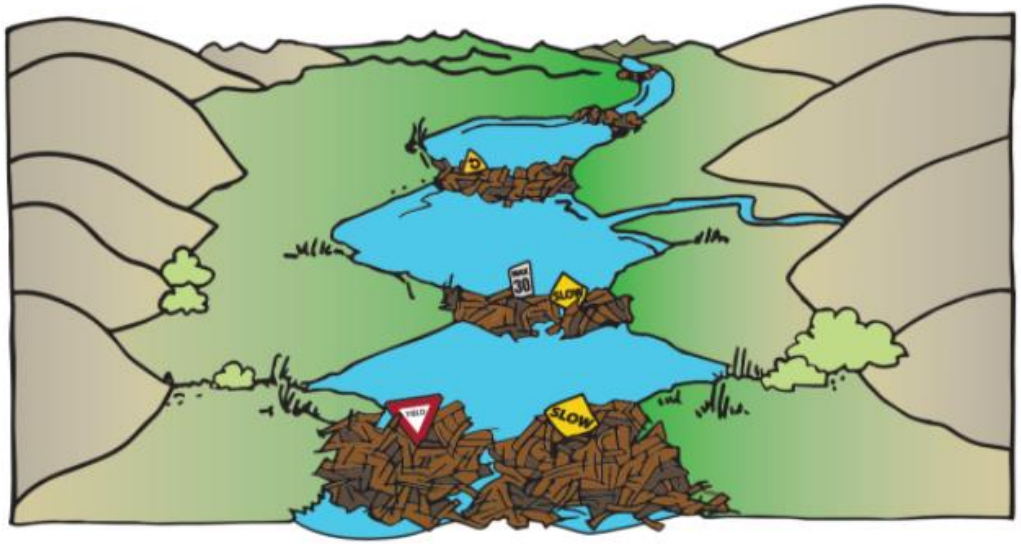
Nick Weber,
Anabranch Solutions

BEAVERS AND WATER

Susan Charnley, USDA – Working Lands interviews

Consequences of Beaver Colonization

Interviewees observed numerous hydrogeomorphic and ecological changes that they attributed to beaver colonization in Elko County during recent decades (table 3). The most commonly reported changes pertained to the spatial and temporal distribution of water, both of which have increased. More water in streams, available later into the dry season and during drought years, has been a noticeable change that all viewed as positive. As one rancher said, "…if you get water in this country you've got everything" (interview 12). Another echoed this sentiment: "In my vote, a beaver equals water storage, and water storage equals better everything. You can't argue water storage in the desert" (interview 16). Ecological changes associated with beavers and their dams observed by interviewees included the areal expansion of "green zones" around riparian areas, with increased wet meadows and riparian vegetation and decreased sagebrush. These increases, in turn, were observed to benefit wildlife and increase biodiversity.



BEAVERS AND WATER

Susan Charnley, USDA – Working Lands interviews

Table 3—Hydrogeomorphic and ecological consequences of beaver colonization reported during interviews for this study (n = 21)[a]

Outcome observed	Number of interviews
Hydrogeomorphic:	
Increased water availability in streams and beaver ponds, and longer duration of stream flows, during the hot season	16
Higher water tables and increased groundwater storage	14
Increased instream soil deposition behind beaver dams	6
Dams slow down and spread out stream flows/runoff during large storm events, reducing flooding	5
Some previously intermittent streams have become perennial	4
Reduced streambank incision and erosion	3
Ecological:	
Expansion of riparian areas and meadows (the "green zone"), and an increase in wet meadows over the longer term	10
Increased biodiversity in riparian areas, and wildlife benefits	8
Increased growth of riparian vegetation	5
Cut down trees	5
Improvements in instream fish habitat conditions, benefiting fish	4
Sagebrush die off in riparian areas	4
Increase in nesting and rearing habitat for sage grouse	2
Better watered streams and riparian areas serve as fuelbreaks during wildfire	2

[a] The one interview not reporting hydrogeomorphic or ecological outcomes from beaver colonization was one in which the respondent was not asked, owing to the interview's focus on water regulations.

23

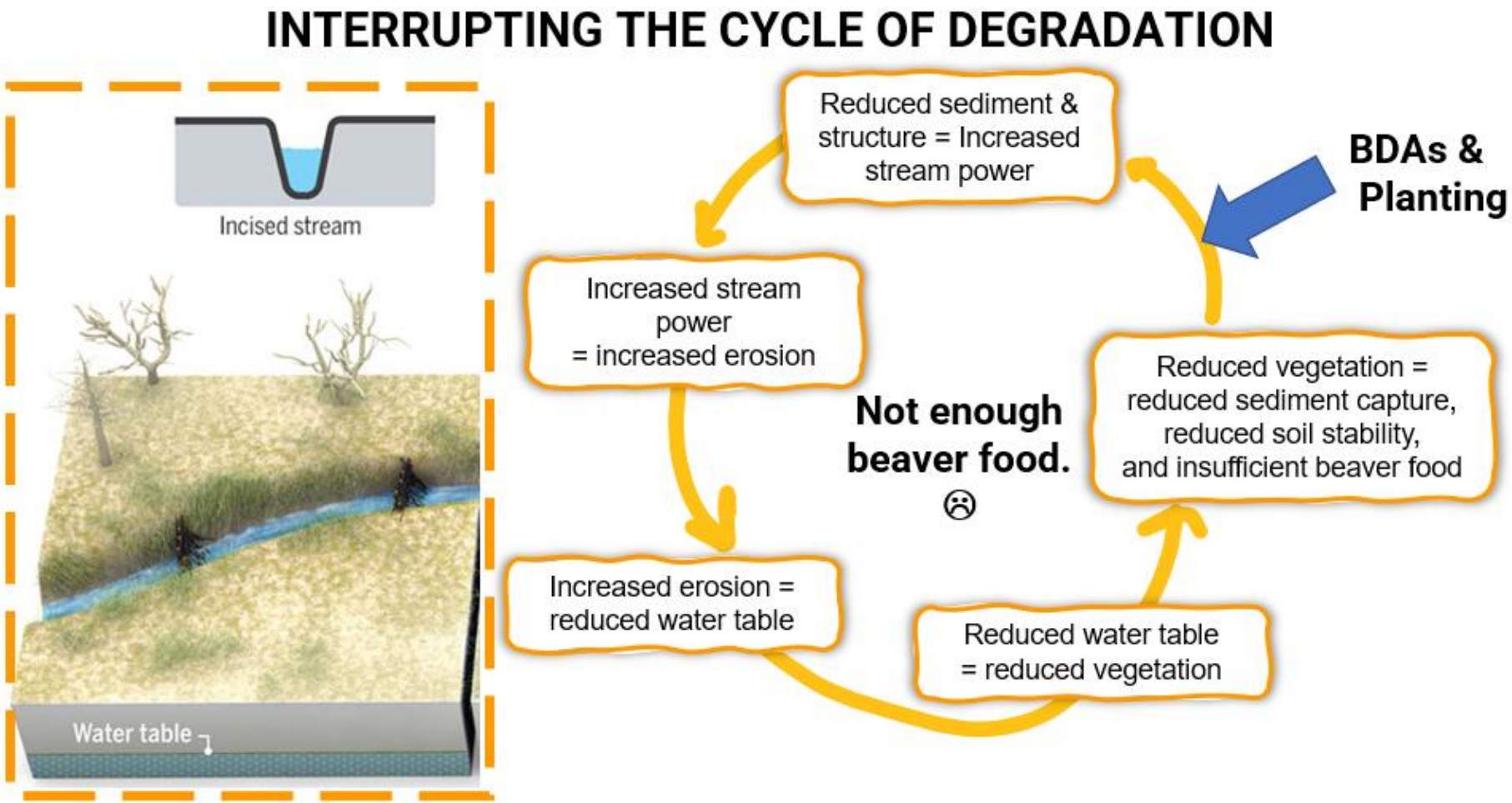
Observations (of 21 interviews):

- *16 described **increased water availability, longer flows**, during hot season*
- *2 in 3 observed **higher water tables** and **increased groundwater storage***
- *Half described **increase in wet meadows** over the long term*

BEAR CREEK JULY 2022

BEAVERS AND WATER

ARTIFICIAL BEAVER DAMS



WHAT IF BEAVERS MOVE IN?

BENEFITS

Susan Charnley, USDA – Working Lands interviews

Table 4—Impacts of beavers on livestock and ranchers described by interviewees

Impacts	Number of interviews
Positive:	
More water is available for livestock to drink later into the hot season and during drought years.	17
Meadows/riparian pastures have expanded and forage production there has increased; there is more green forage available later into the hot season; there is more green forage at higher elevations where cattle can graze later into the hot season; all of this improves livestock health.	12
Increased forage production means cattle have more feed, gain more weight, and eat less hay, creating financial benefits.	2
More water available later into dry season reduces the need for ranchers to haul water for livestock, creating financial benefits.	2
Increased water and forage availability make high-intensity, short-duration grazing practices more successful because grazing intensity can increase, and pastures can recover better.	2
When water backs up behind beaver dams and overflows onto hay fields, there is natural irrigation, reducing the need for intentional irrigating.	2
More water and forage mean one can run more cattle on private lands where animal unit months are not limited.	1
Beavers build and maintain water developments for cattle (i.e., beaver ponds), decreasing the workload for ranchers.	1
Increased water availability across the landscape creates more options for where to move livestock when, increasing flexibility of grazing management.	1
Soil deposition behind beaver dams means less sediment flows downstream to private lands and clogs irrigation infrastructure.	1
Beaver ponds provide a hot-season water source that enables firefighters to fight wildfire with helicopters using buckets.	1
Vegetation growth in riparian areas provides more shade for livestock.	1

Of 21 interviews:

- ***81% More water available*** *for drinking later in hot season and drought years*
- ***57%*** *Meadows have expanded,* ***increased forage*** *and availability later into hot season –* ***improving overall livestock health***

CHALLENGES

Susan Charnley, USDA – Working Lands interviews

Table 4—Impacts of beavers on livestock and ranchers described by interviewees

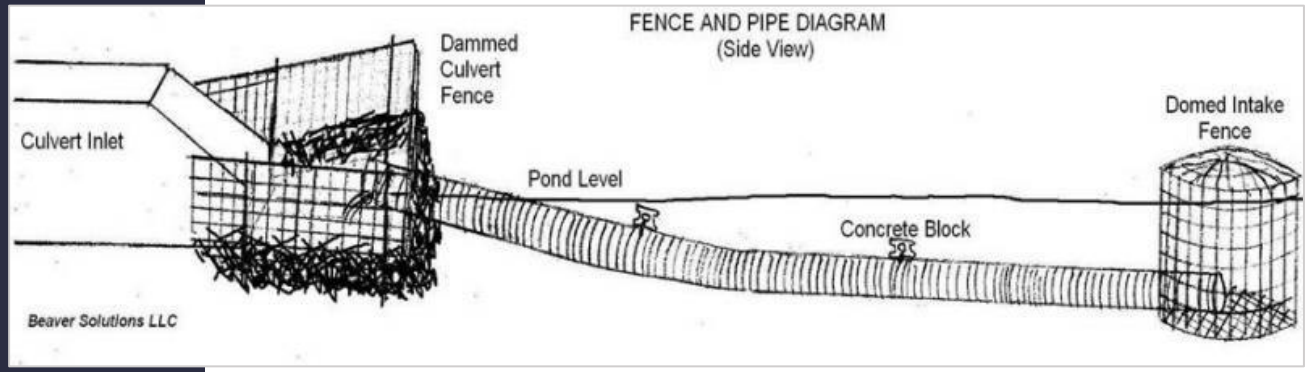
Impacts	Number of interviews
Negative:	
Beavers interfere with irrigation infrastructure and plug it up, impeding the flow of water.	11
When beaver dams back up water or beaver block culverts, roads and trails can flood and wash out.	6
Livestock cannot cross creeks where beaver dams are located, so must be driven further up or downstream, creating more work.	6
When beaver cause riparian pastures to become too wet and muddy, cattle may be unable to graze there. If cattle do graze there, it is hard to move them out because crossing wet meadows on horseback is difficult, and animals may get stuck in the mud.	6
When beaver dams promote growth of dense riparian vegetation such as willows, cattle can get lost and are more difficult to gather; vegetation may also become too thick for cattle to penetrate, and reduce available forage.	5
Beaver cut down trees such as quaking aspen and cottonwood, which people like for aesthetics and shade, and which reduces shade available to livestock.	5
Sometimes beaver eat themselves out of house and home, stripping riparian areas of vegetation, which can have negative ecological impacts, especially if livestock grazing is limiting regeneration.	2
Cows can get stuck in beaver ponds, or wallow in the mud around them, or fall into them when they ice over in winter, and become injured.	2
Beaver dams back up water and flood hayfields, which is bad for hay production if fields become too wet.	2
Beaver ponds cause water flows to slow down, meaning that in winter, beaver ponds and slow running creeks are more likely to ice over; this reduces open water for watering livestock.	1
It is harder to maintain riparian fencing when beavers make the ground more muddy and marshy.	1
Beaver dams can cause river water to flow around their sides, causing an increase in streambank erosion.	1

Of 21 interviews:

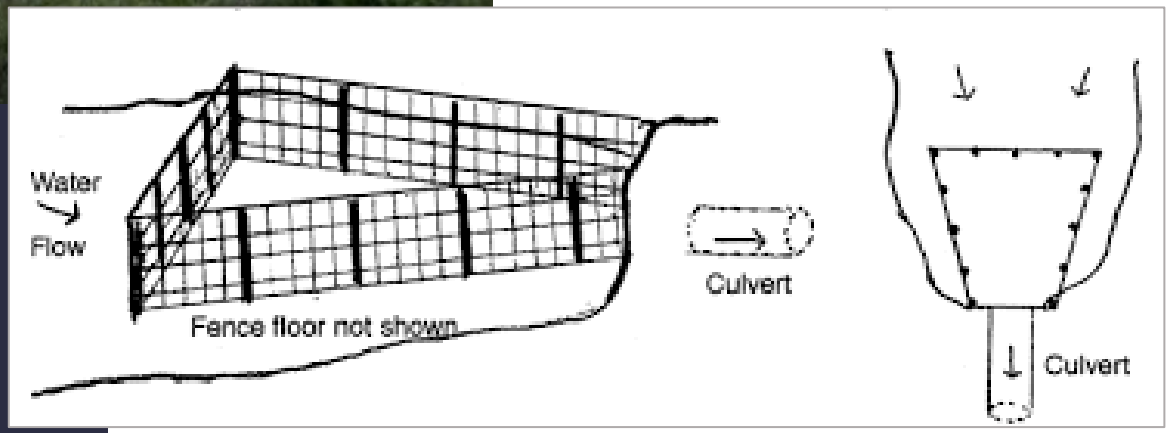
- *50% plugging up irrigation infrastructure*
- *28% livestock passage across beaver dammed creeks may take more work*
- *28% cattle unable to graze wetted, muddied meadows*
- *28% denser riparian vegetation (ex. willows) makes more difficult to gather and limits access to forage*

CULVERT PROTECTION

Photo: Susan Charnley, USFS



CULVERT PROTECTION

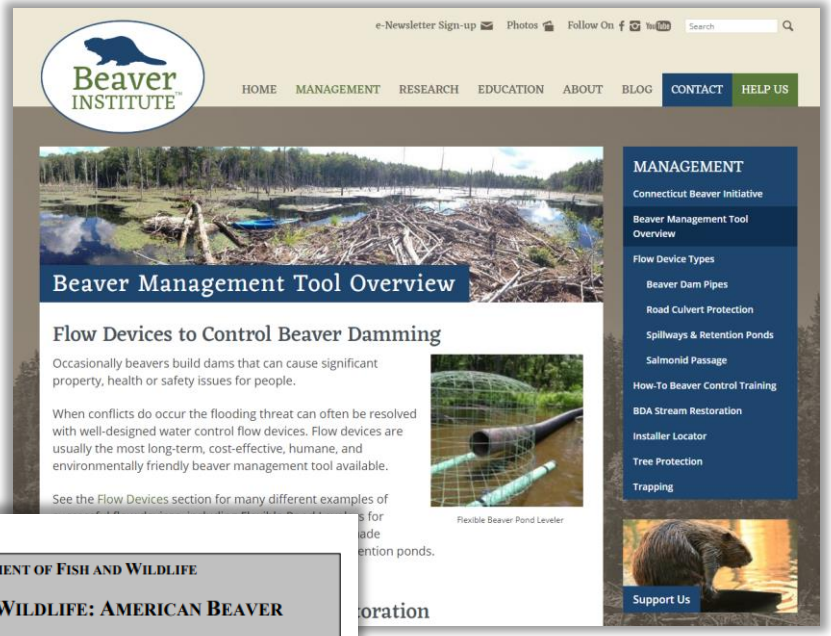


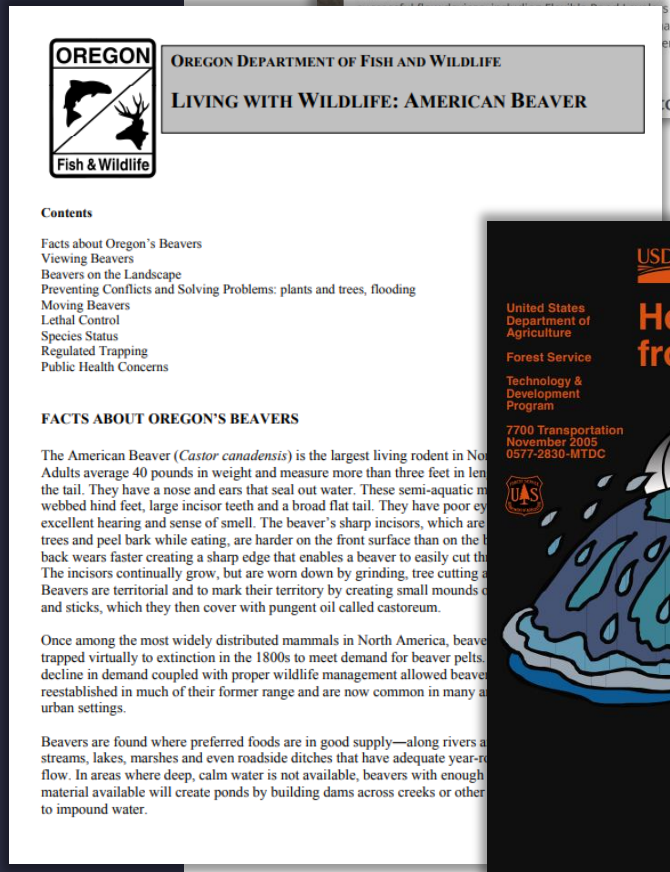
DAMS

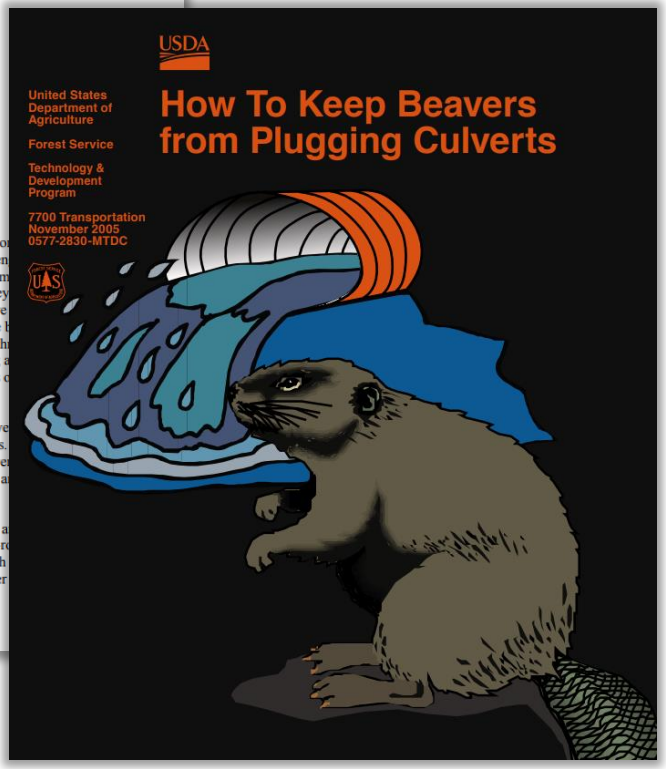
TREE PROTECTION

TOOLS & RESOURCES

- Beaver Works Videos and How To's
- Beaver Institute Tool Overview
- ODFW and USDA Booklets







WHERE TO START

- BDAs: Contact your local Watershed Council, Soil & Water Conservation District or NRCS
- Contact Beaver Works about an on-site Beaver Habitat Assessment and Plan
- Contact beavers@thinkwildco.org to request USDA reports
- Spread the word about technical support for bothersome beavers