Beaver Strongholds

as building blocks to prioritize beaver-based restoration planning at scale.

REESE MERCER

- Beaver based restoration practitioner
- Beaver Corps Wetlands Professional
- Beaver Institute Board Director
- 5000+ hours in field research

WESTERN BEAVERS COOPERATIVE

Beaver INSTITUTE

Today's Talk

- BBR - State of Practice
- Aligning *our Goals* with Beaver Goals
- A Beaver Strongholds Approach – from the Pond View
- Watershed Inventory
- Building the Workplan
- Working the Plan

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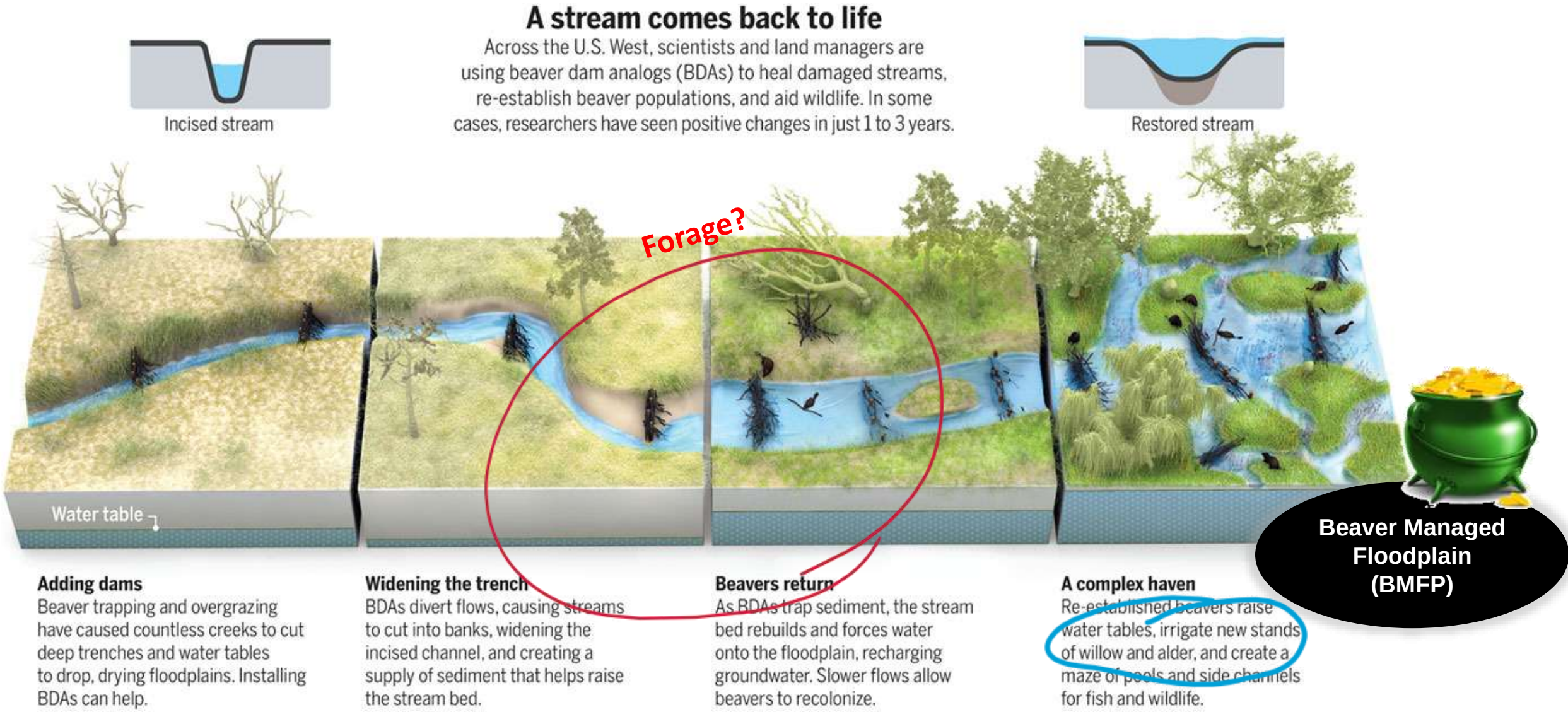
BEAVER BASED RESTORATION – STATE OF PRACTICE



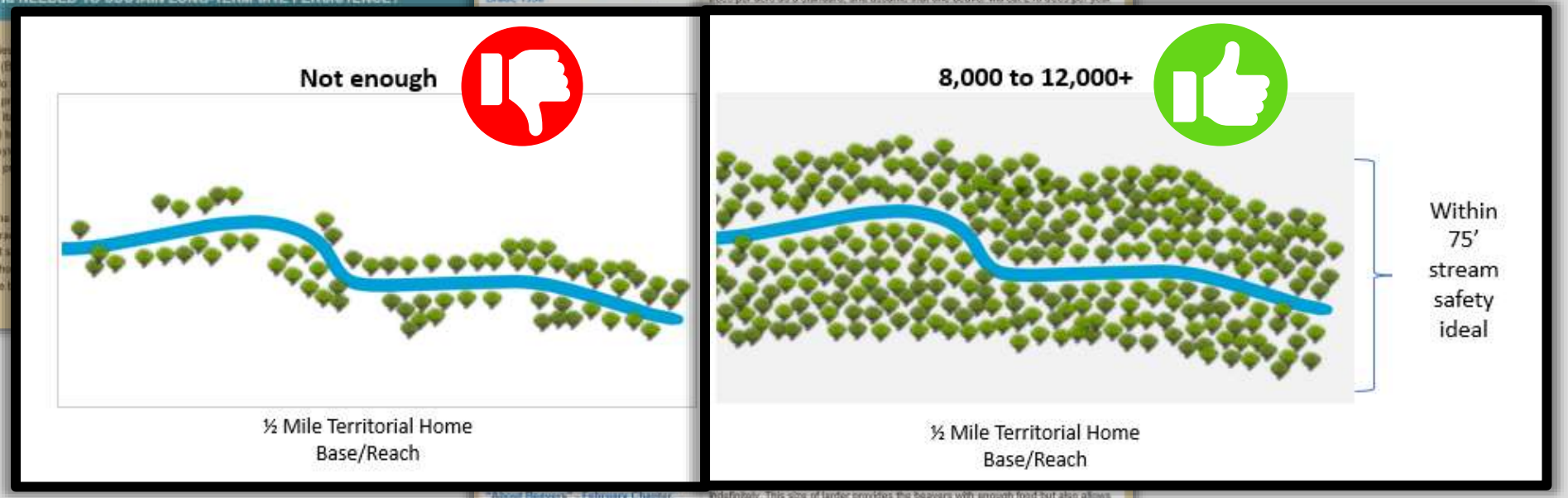
Source: Science Magazine 2018

(p.s. HOW MUCH FORAGE?)

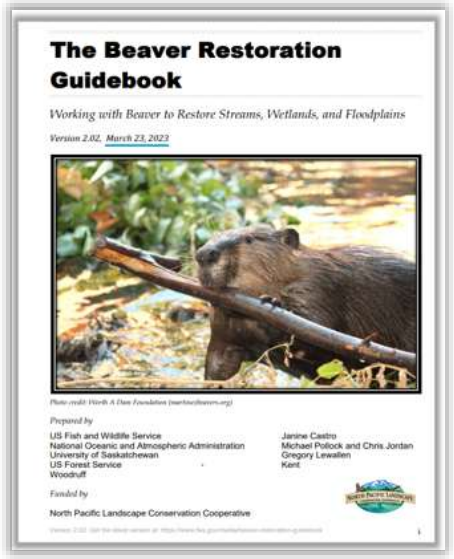
WHERE THRIVING BEAVER FAMILIES AND BEAVER MANAGED FLOODPLAINS IS A GOAL, HOW MU
BEAVER FOOD IS NEEDED TO SUSTAIN LONG-TERM SITE PERSISTENCE?

BEAVER FOOD AND FORAGE REQUIREMENTS - READING AND RESEARCH REPORTS

ARTICLE (Click to view)	CITATION
1. A study of beaver colonies in Michigan. Journal of Mammalogy, Glenn Bradt, 1938	"It's estimated that one acre of poplar will support an average colony of 5 animals for 1 to 2.5 years, depending on the stand of poplar and other factors." "If we use 1500 trees per acre as a standard, and assume that one beaver will cut 216 trees per year
"About Beavers" – February Chapter, pages 26-27, Dr. Ellen Wohl, CSU, 2019 (See also bibliography reading p. 152 related to that chapter.)	indefinitely. This size of larder provides the beavers with enough food but also allows the willows to regenerate between beaver harvests
9. Beaver Carrying Capacity of Certain Streams in North Park, Colorado, Duncan MacDonald, 1956	Thesis paper with helpful references to research on beaver forage needs (captive and wild), and measurements around how much ingestible food exists on Aspen of different stem sizes



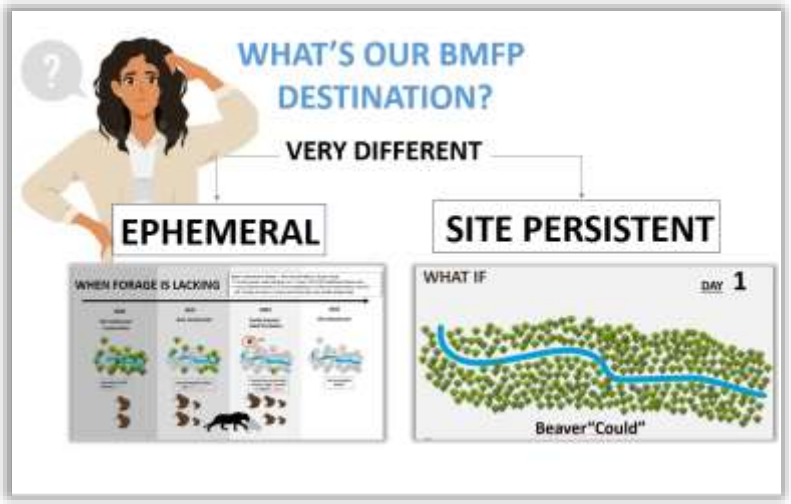
BEAVER BASED RESTORATION – STATE OF PRACTICE



- Best available guidance (v. 2023) is still ***structure forward*** and ***beaver relocation*** heavy.

CONTENTS:
* 36 pages on BDAs and Relocation
* 2 pages on beaver habitat

- Planning is **top down**, **opportunistic** and "Command and Control" mindset.

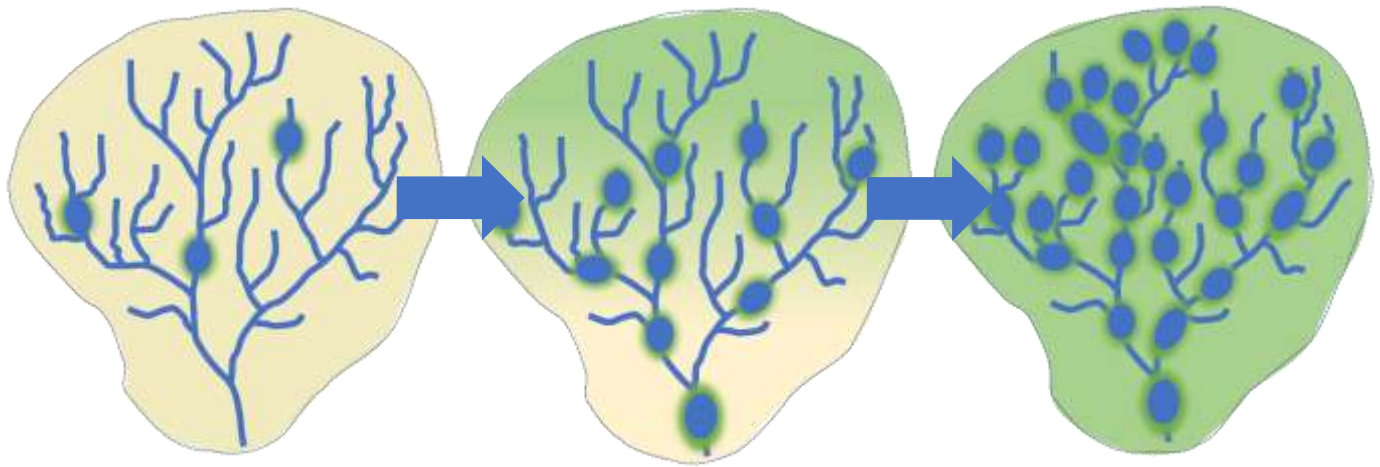


- Lack a clear Destination or Goal for what **quality, thriving beaver occupancy** (***Persistent*** **BMFPs**) should look like.

LIMITS OUR PERSPECTIVES AND APPROACH TO BEAVER BASED RESTORATION,

and…

LIMITS THE POTENTIAL FOR BEAVER RECOLONIZATION OUTCOMES



GOALS ALIGNMENT

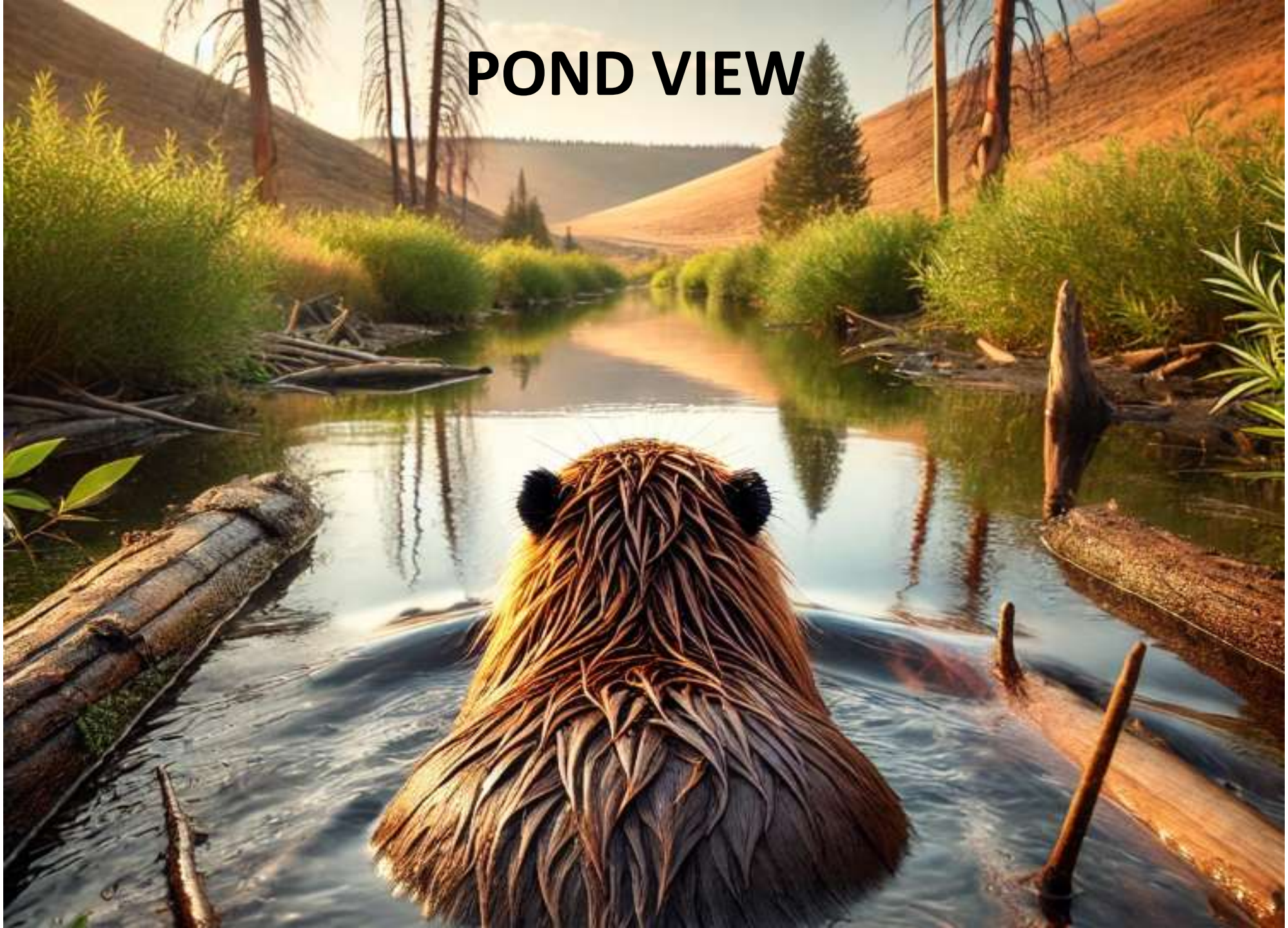
BMFP: Persistent occupancy of thriving beaver with multigenerational residency managing riverscapes for the long term.

~

Individual Fitness with capacity to reproduce and successfully pass on genes.

ULTIMATELY: BEAVERS ARE IN THE DRIVER'S SEAT

POND VIEW



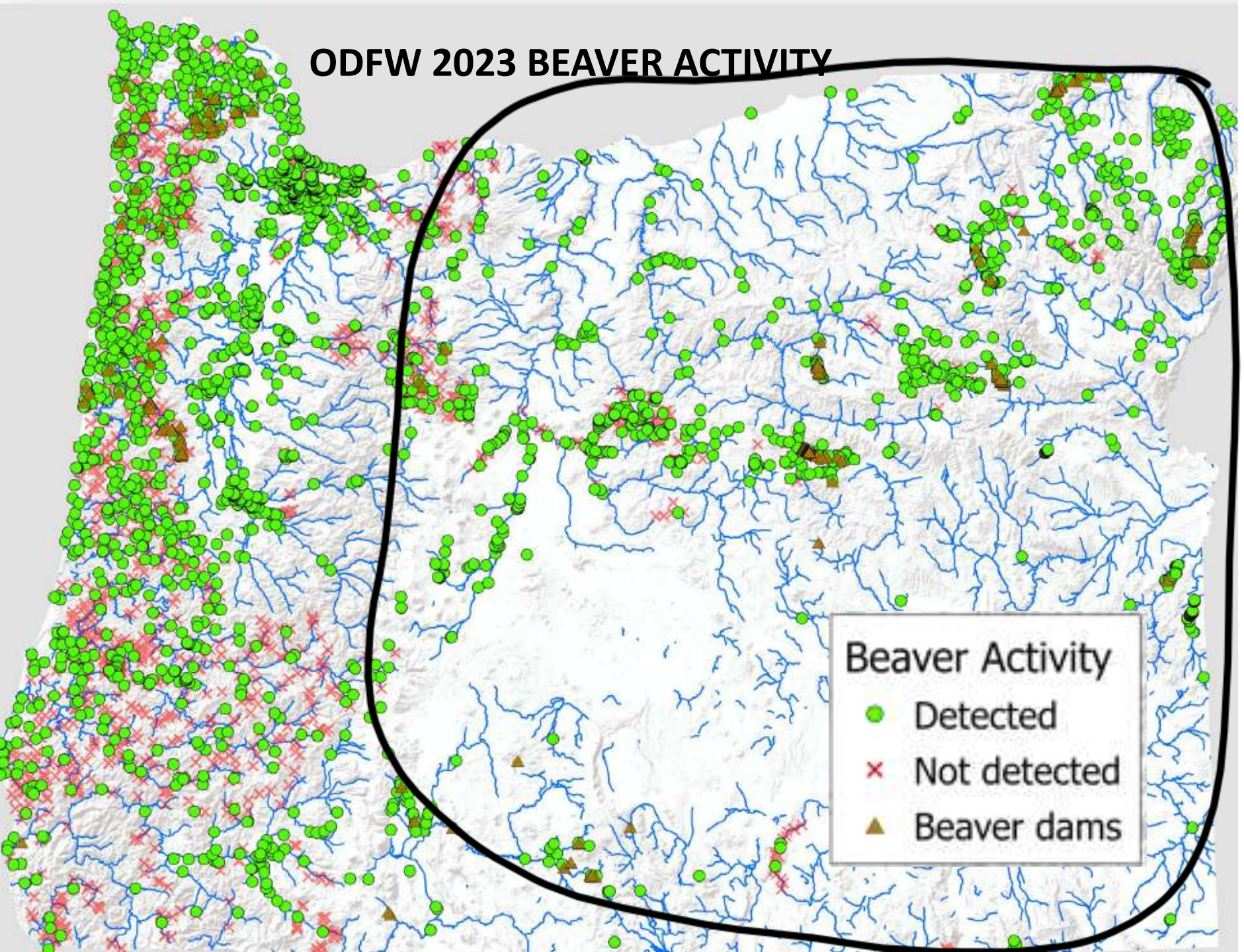
“From the Pond View”

Assessment and Action Plan

2025-26

With existing beaver populations ❤ as the foundation for planning.

ODFW 2023 BEAVER ACTIVITY



Very widely distributed

Vast majority of observations not associated with dams

Data gaps = future survey opportunities

EASTERN OREGON

Site occupancy is mostly ephemeral, not persistent.

Beavers pass through but often don’t stick.

THE APPROACH

"From the Pond View" Assessment and Action Plan

With current beaver populations and habitat needs as the foundation for planning.

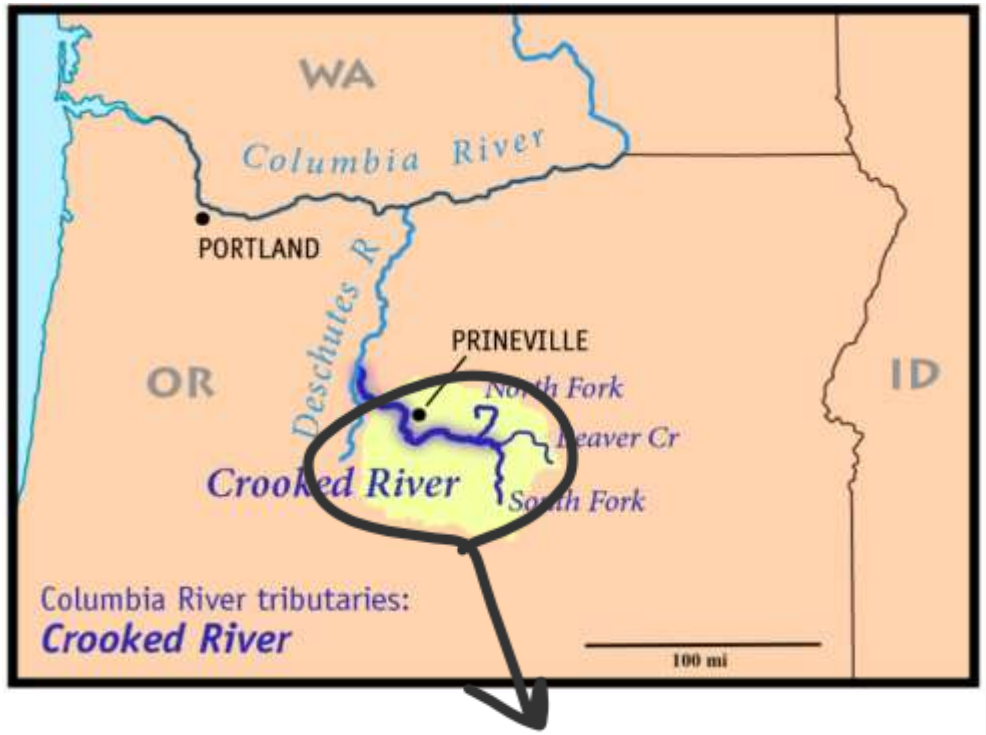
=

Existing, *Persistent* Beaver Occupancy (with "Dispersers")

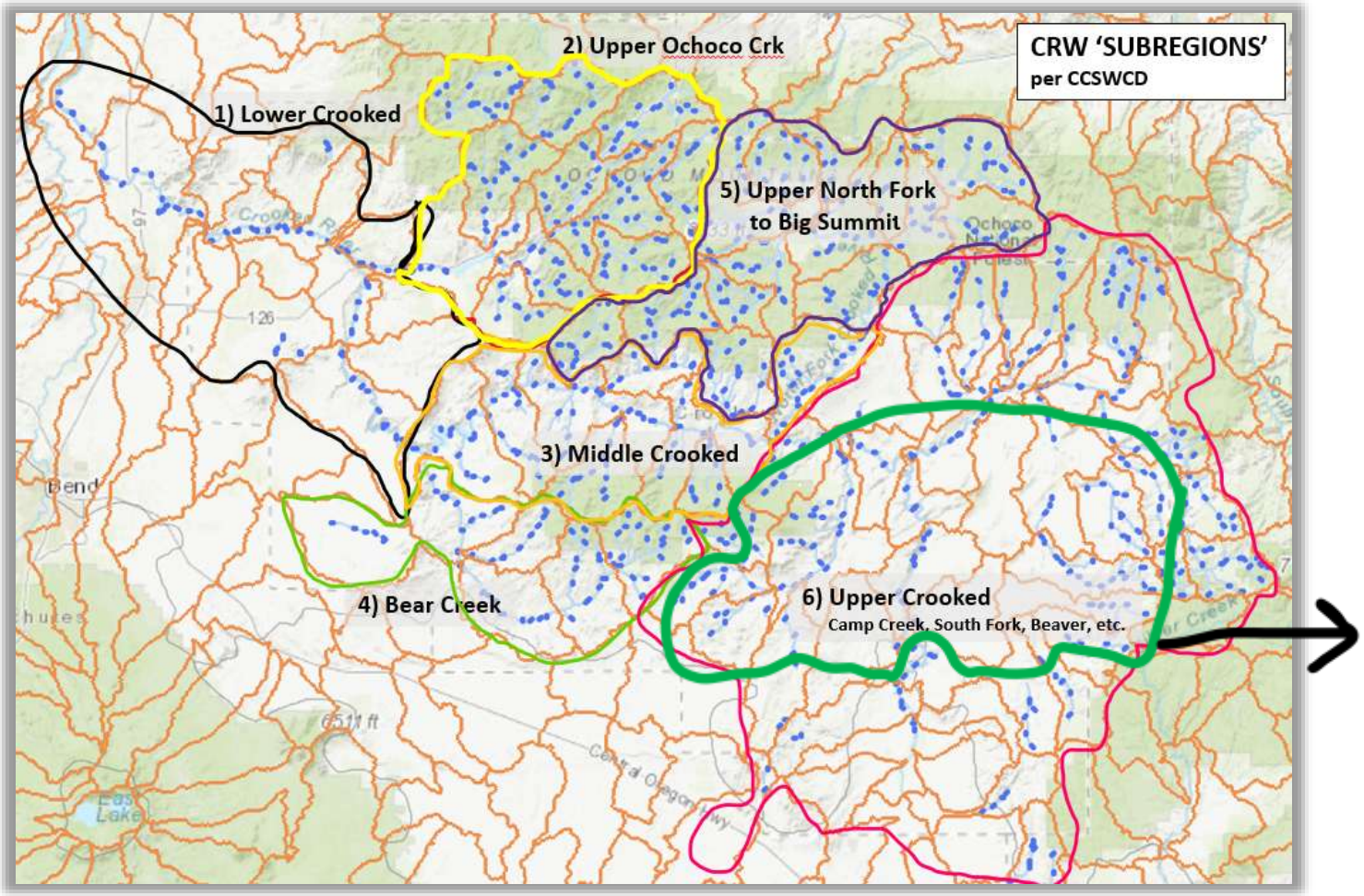
+

Habitat Connectivity

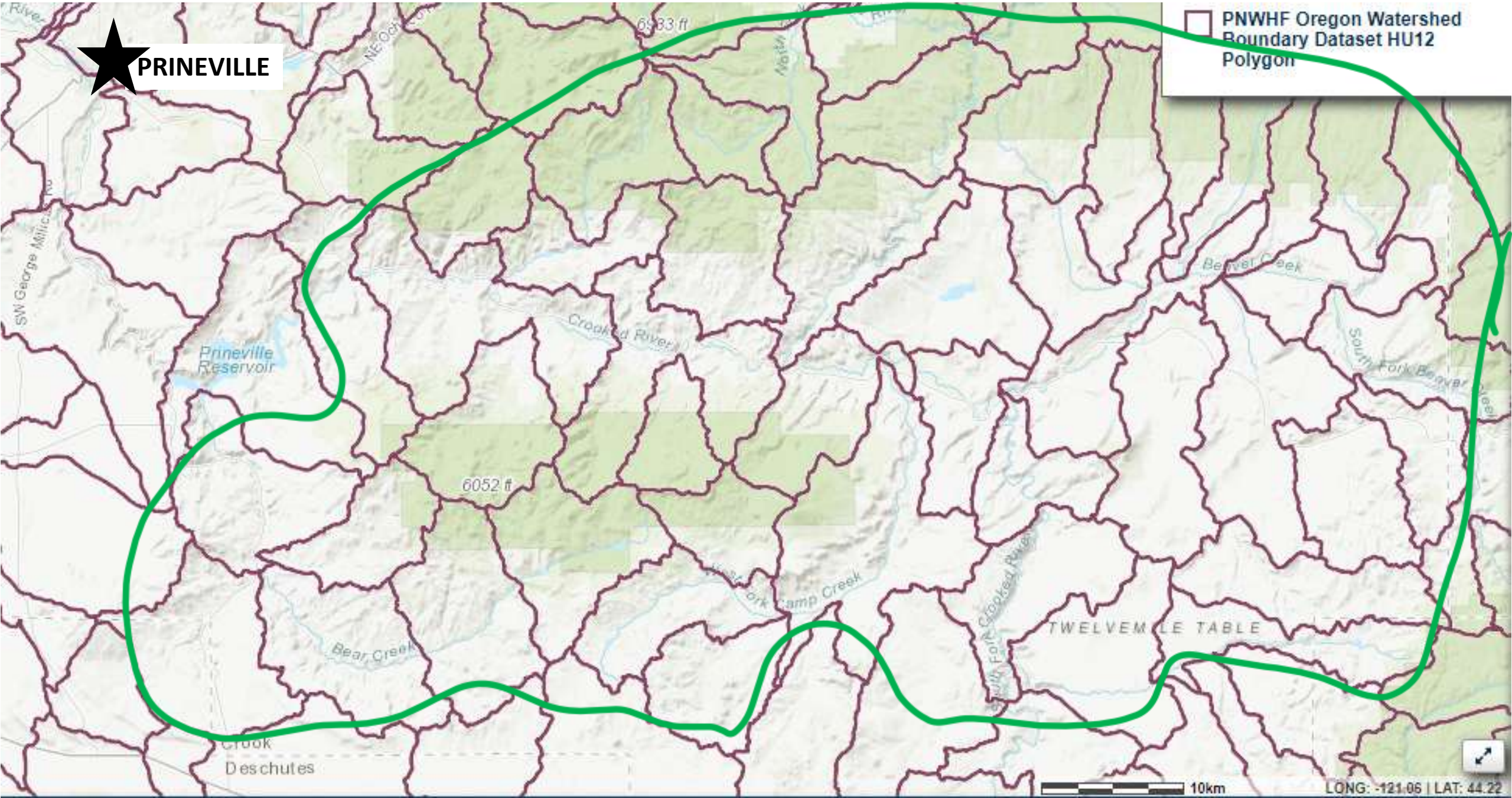
APPLIED IN THE CROOKED RIVER WATERSHED



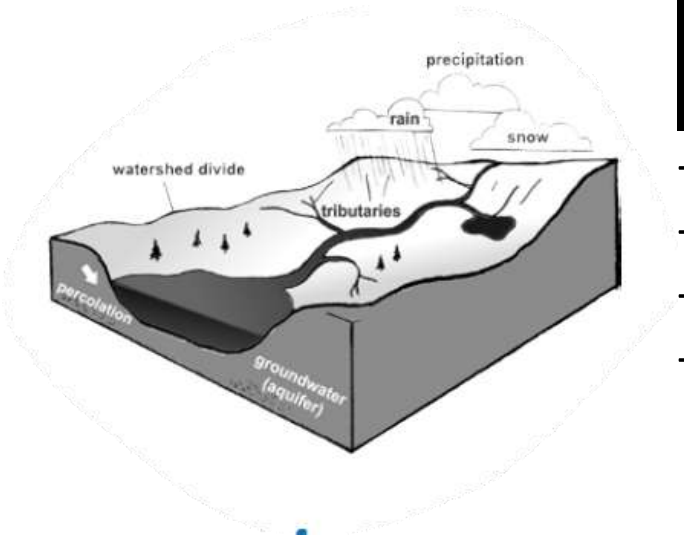
Crooked River Watershed:
- **3 HUC8s**
- **4,500 Sq Miles (3 Million Acres)**
- **10,000+ Stream Miles**



PLANNING BLOCKS AT HUC12 SUBWATERSHED UNIT SCALE



TAKE INVENTORY

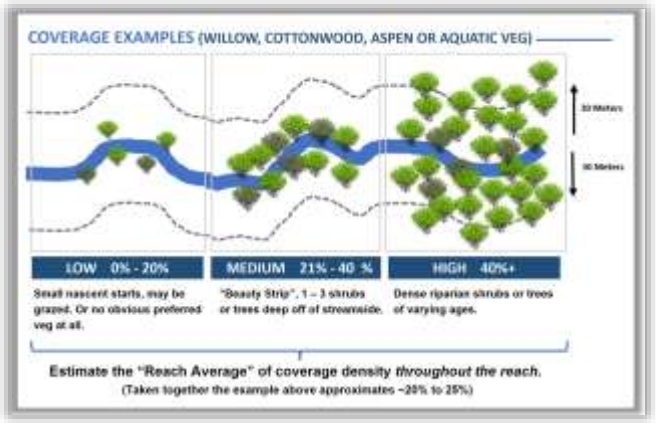


1. **Riverscape shape, geology, hydrology** and infrastructure

- Geomorphology/hydrology
- Stream power
- Infrastructure conflict potential
- Availability of dam building materials

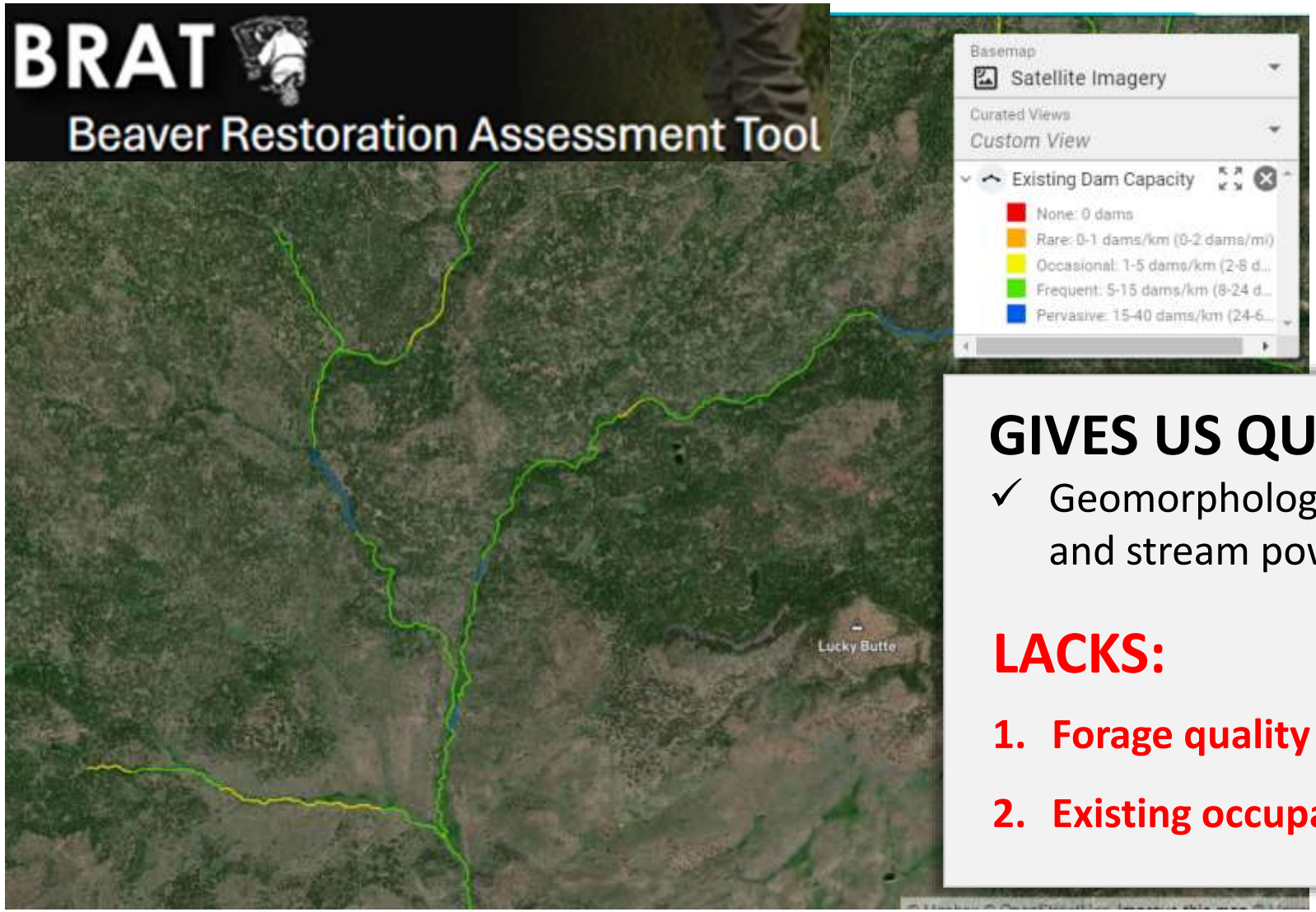
2. Assess the **quality** and **intent** of **existing beaver occupancy**.

(Just presence/absence isn't enough.)



3. Chart **existing forage availability ('coverage' of preferred vegetation)**.

1. Riverscape shape, geology, hydrology and infrastructure



GIVES US QUICK:

- ✓ Geomorphology, infrastructure pinch points and stream power

LACKS:

1. **Forage quality and abundance**
2. **Existing occupancy: *Distribution and Intent***

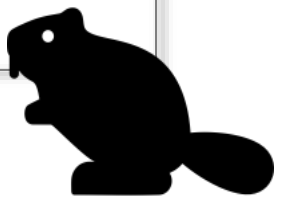
2. Assess Quality and Occupancy of Existing Beaver Occupancy

QUALITY AND INTENSITY OF <u>THESE 6 KEY ACTIVITIES</u>

1. Den/Lodge building
2. Quantity of felled trees/harvest branches
3. Food caching (Fall mostly)
4. Scent Mounds
5. Feeding benches
6. Dam building and maintenance

WHAT IS SITE 'OCCUPANCY INTENT'? AND WHY DO WE CARE?

That **beavers themselves consider** the site worthwhile to 'invest in' settlement, long term occupancy with dam building, den expansion, and family building.

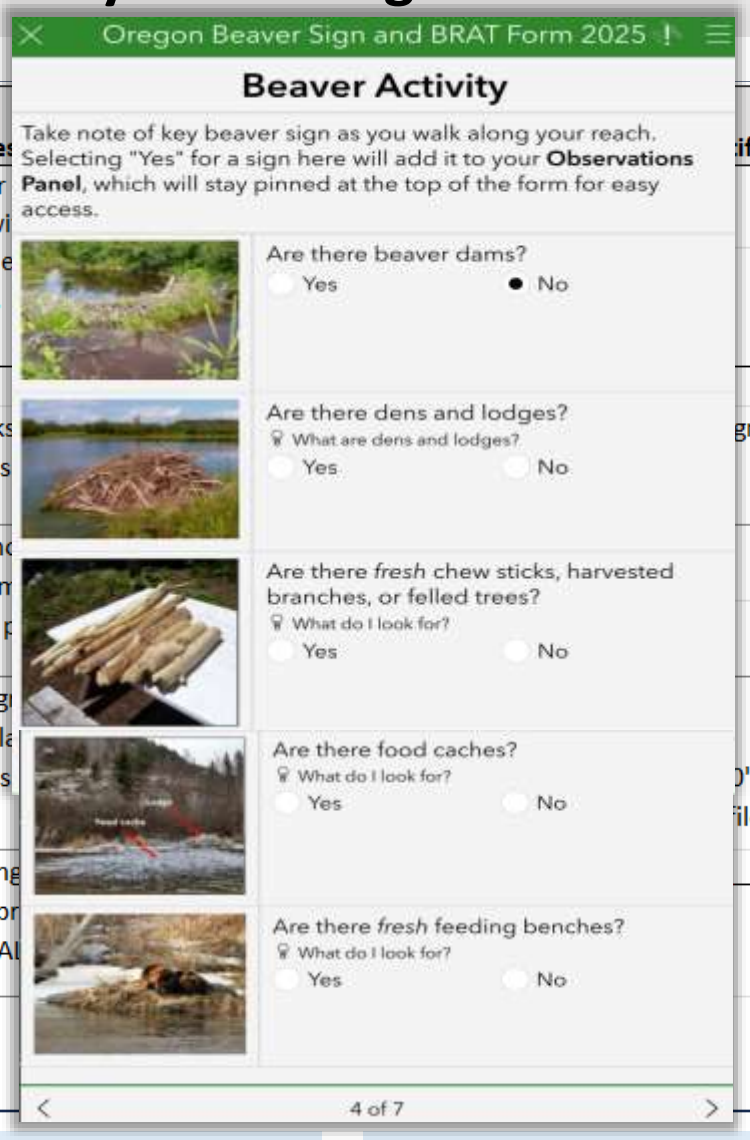


CLOSER LOOK →

* Use for Fall surveying
* Outcome/scoring provides an idea of occupancy robustness, but NOT a conclusion. Higher Scores suggest more permanent occupancy intention, and warrant/trigger further on-site NonInvasive study over time with habitat observations and trail cams.

2. Assess Quality and Occupancy of Existing Beaver Occupancy

	PRIMARY ACTIVITIES	Description/Quick Notes	ify/ Qualify		
1	Den/Lodge 1	A primary living space for more than one present wi is actively maintained, the needed, and rotationally.		Size 10'-15'	Size 16'-20'+
	Den/Lodge 2			Size 10'-15'	Size 16'-20'+
2	Fresh Chew Sticks/ Harvested Branches / Felled trees	Fresh sign of naked sticks branches. Count FRESH s within 10M streamside.	gns	Quantity 15-30 signs	Quantity 30+ signs
3	Fresh Food Cache 1	Appearance of 'clean' (nc stick/cuttings secured en and usually close to the p		Med (30-75 cuttings)	Large (75+ cuttings)
	Fresh Food Cache 2			Med (30-75 cuttings)	Large (75+ cuttings)
4	Scent Mounts	Mudded, and debrised (gu can range small to very la visible sheen or distinct s and note the size.	0" ile)	- Medium (11"-15" wide, 2"-5" height)	- Large (15"+ wide, 5"+ height)
5	Fresh Feeding Benches	Favorite spots for feeding many of these close to pr residence/pond. Count Al			
6	+ Dam Count and current Maintenance				



Low Activity Site ~ 10 minutes

High Activity Site ~ 30 minutes

KEY BEAVER SIGNS > DEN PRESENCE, FREQUENCY AND SIZE

Source: Gilliam SWCD

Look for a mass of sticks and mud, often constructed nestled within the root system of a large shrub or tree.

KEY BEAVER SIGNS > FORAGING AND FEEDING DEBRIS

KEY BEAVER SIGNS > SCENT MOUNDS

Look for a mass of mud and sticks, adjacent to stream. Look for oils and sometimes a strong odor.

KEY BEAVER SIGNS > FOOD CACHE/S

Look for a mass of young, and still barked and leafed sticks instream just outside of living quarters.

KEY BEAVER SIGNS > FEEDING & GROOMING BENCH/ES

Look for fresh forage debris (sticks, grasses)

KEY BEAVER SIGNS > DAM REPAIR / MAINTENANCE

Look for mudding, grasses and bright sticks at crest of the dam, upstream side.

SCORING BEAVER SIGNS

OCCUPANCY INTENT: Net New to BRAT Survey form (vs. already existing)

		FIELD VALUES		** SCORING ** LOW	MED	HIGH
1	**Den site/s**	A) Yes, but there's no current activity	|	5	5	5
	(lodge or bank den)	activity.	OR			
		Score for each Den.	|	10	10	10
		If current activity, Size Small		5		
		If current activity, Size Med			10	
		If current activity, Size Large				15
2	**Fresh chewed sticks/trees/aqua**	Yes, low amounts (Quantity < 15 in reach)		5		
	(nearby sticks, grasses, aquatic ve	Yes, med amounts (15-30 floating sticks, grasses, etc)			10	
	yes/no	Yes, high amounts (30+ floating sticks, grasses, etc)				15
3	**Food cache/s (award pts for eac**	Small, <30 cuttings		5		
	yes/no	Med, 30-75 cuttings			10	
		Large, 75+ cuttings				15
	IMPT: If strong aquatic veg source in pond (ex. cattails), how to adapt this?					
4	**Scent mounds, if so, average siz**	Small		5		
	yes/no	Med			10	
		Large				15
5	**Fresh feeding benches**	Quantity 1-2		5		
	yes/no	Quantity 2-4			10	
		Quantity 5+				15
6	**Dam Count (Breached or intact)**	Quantity 1-2		10		
	(Do not count dams older than 2 y	Quantity 3-5			15	
		Quantity 6+				20
	+ FOR DAM/S CURRENTLY MAINTAINED - 5 ADDITIONAL POINTS FOR EACH DAM (U			10	20	20
		BEAVER OCCUPANCY INTENT/SCORE		55	95	125

2. Assess Quality and Occupancy of Existing Beaver Occupancy

SCORING THE 6 SIGNS FOR OCCUPANCY INTENT

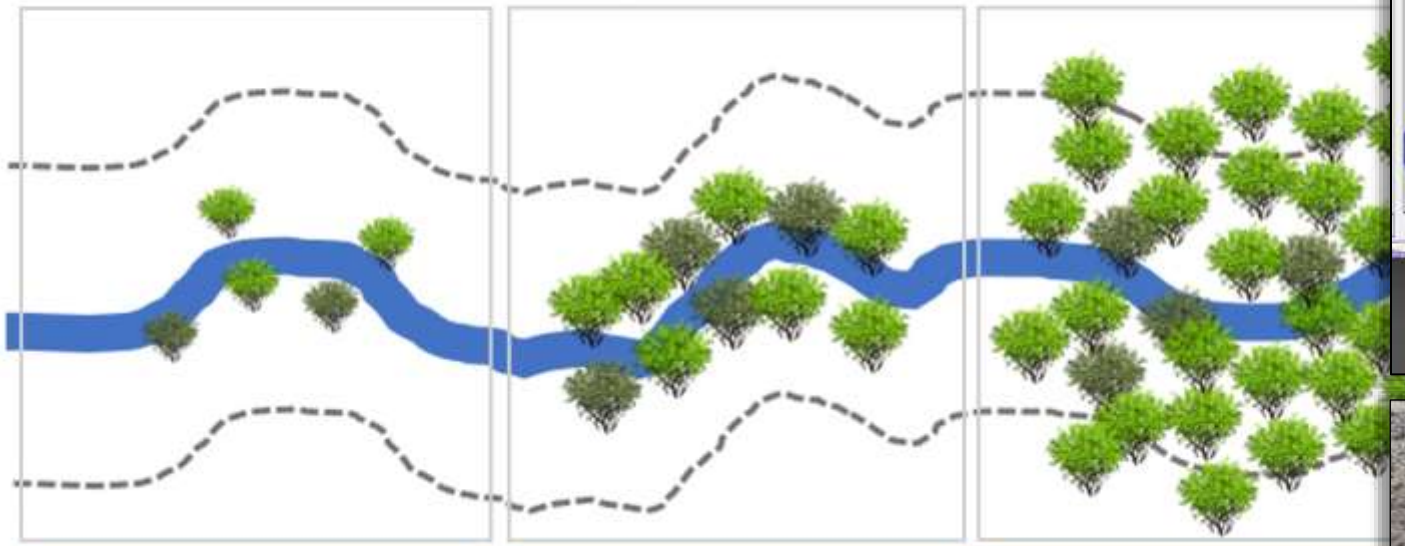
Low, ephemeral, transitory. Beavers may be present for a matter of days to 1-2 weeks during exploration and dispersal, but haven't show interest to adapt the site into a more permanent residence.

More 'robust' occupancy, possible solo beaver or a new pair. Site Occupancy where one or possibly two paired Beavers are considering more permanent occupancy and family building in the season ahead, but not there yet. There may be a handful of smaller "scout dams" present, along with refuge holes and the beginnings of a den/lodge.

Definitely settled and Thriving. With young or in planning. Beavers are clearly settled in with much fresh harvesting and feeding benches, adding dams or expanding existing dams, and enlarging resident den/lodge(s).

3. Forage Quality and Abundance/Coverage

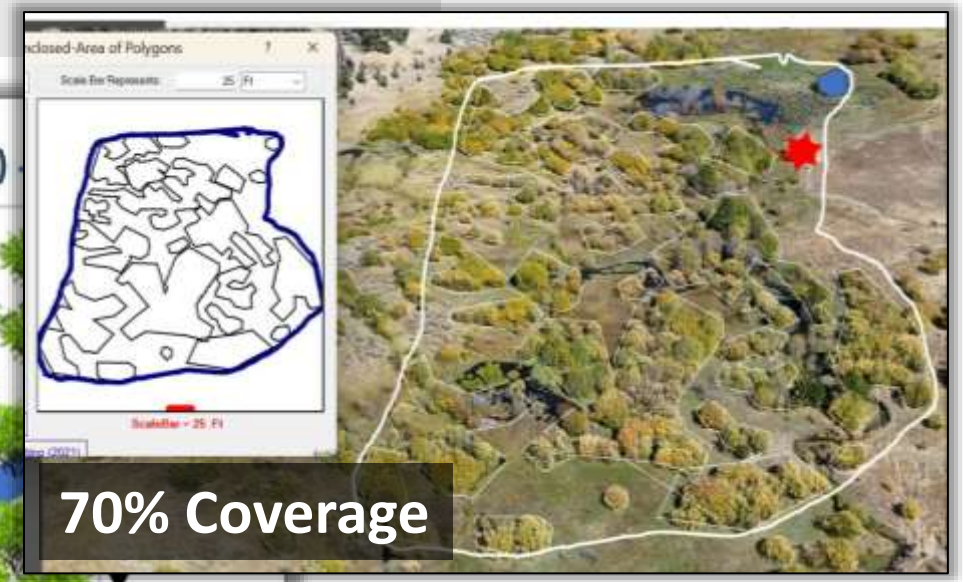
COVERAGE EXAMPLES (WILLOW, COTTONWOOD, ASPEN OR AQUATIC VEG)



LOW 0% - 20%	MEDIUM 21% - 40 %	HIGH 40%+
Small nascent starts, may be grazed. Or no obvious preferred veg at all.	"Beauty Strip", 1 – 3 shrubs or trees deep off of streamside.	Dense riparian shrubs or tr of varying ages.

Estimate the "Reach Average" of coverage density *throughout the reach*

(Taken together the example above approximates ~20% to 25%)



+SCORING VEG COVERAGE

OCCUPANCY INTENT: Net New to BRAT Survey form (vs. already existing)

		FIELD VALUES		** SCORING ** LOW	MED	HIGH
1	**Den site/s** (lodge or bank den)	A) Yes, but there's no current activity activity. Score for each Den.	OR	5	5	5
				10	10	10
		If current activity, Size Small		5		
		If current activity, Size Med			10	
		If current activity, Size Large				15
2	**Fresh chewed sticks/trees/aqua** (nearby sticks, grasses, aquatic ve yes/no	Yes, low amounts (Quantity < 15 in reach)		5		
		Yes, med amounts (15-30 floating sticks, grasses, etc)			10	
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3	**Food cache/s (award pts for eac** yes/no	Small, <30 cuttings		5		
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	IMPT: If strong aquatic veg source in pond (ex. cattails), how to adapt this?					
4	**Scent mounds, if so, average siz** yes/no	Small		5		
		Med			10	
		Large				15
5	**Fresh feeding benches** yes/no	Quantity 1-2		5		
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		Quantity 5+				15
6	**Dam Count (Breached or intact)** (Do not count dams older than 2 y	Quantity 1-2		10		
		Quantity 3-5			15	
		Quantity 6+				20
	+ FOR DAM/S CURRENTLY MAINTAINED - 5 ADDITIONAL POINTS FOR EACH DAM (U			10	20	20
		BEAVER OCCUPANCY INTENT/SCORE		55	95	125
7	**+ Coverage - Forage availability** (of ***preferred veg species*** , or abundant aquatic [ex cattails, see Hay Creek])	Low (0% to 20%)		-20		
		Med (Beauty Strip 21% to 50%)			0	
		High (coverage 50%+)				30
		PERSISTENCE POTENTIAL *		**35**	**95**	**155**

2 & 3 Equals: The “Persistence Potential” of a Beaver Occupied Site

Low, ephemeral, transitory. Beavers may be present for a matter of days to 1-2 weeks during exploration and dispersal, but haven't show interest to adapt the site into a more permanent residence.

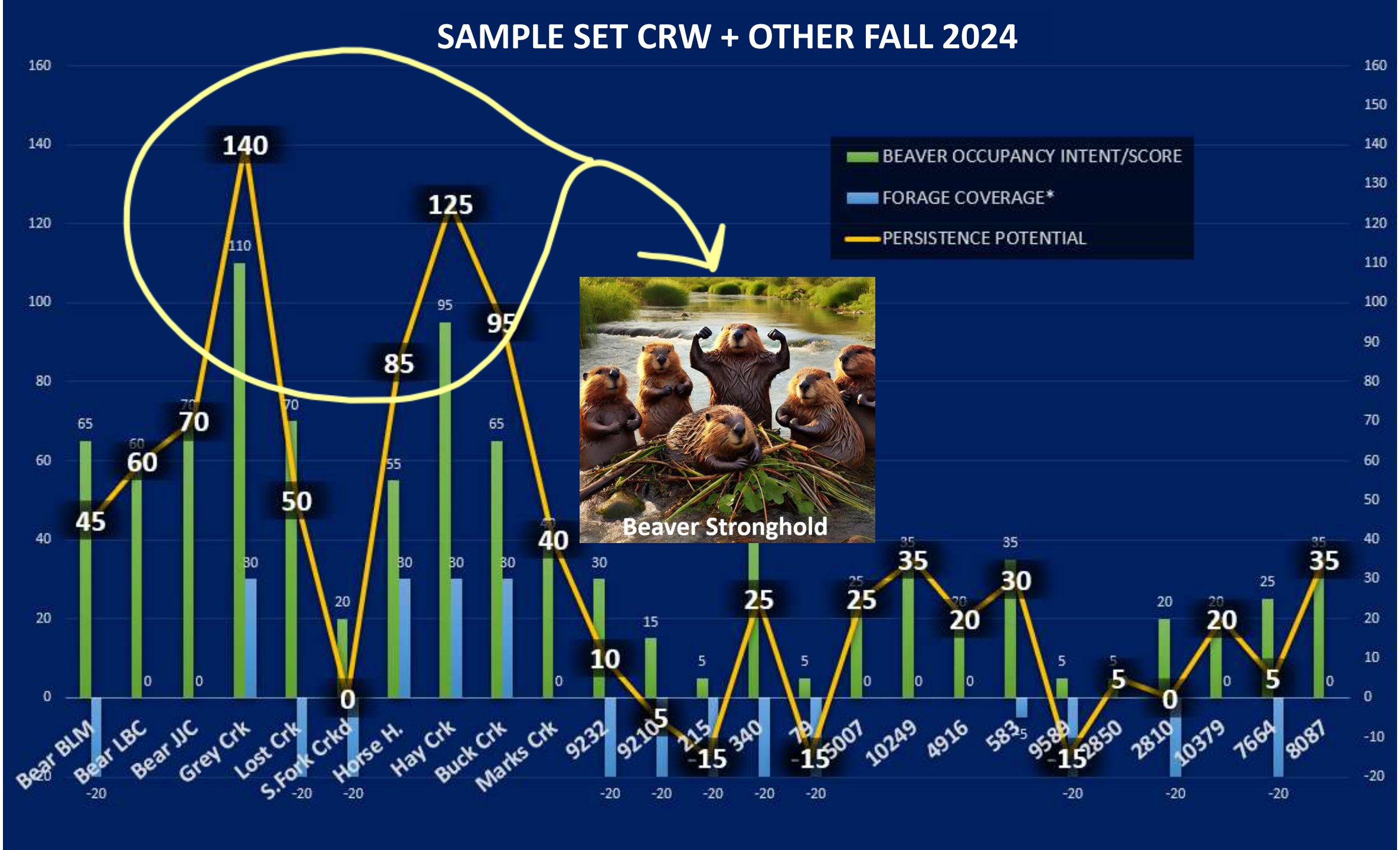
More 'robust' occupancy, possible solo beaver or a new pair. Site Occupan where one or possibly two paired Beavers are considering more permanen occupancy and family building in the season ahead, but not there yet. There may be a handful of smaller "scout dams" present, along with refuge holes and the beginnings of a den/lodge.

HIGH OCCUPANCY INTENTION

Definitely settled and Thriving. With young or i eavers are clearly settled in with much fr and feeding benches, adding dams or expandin dams, and enlarging resident den/lodge(s).

+ HIGH FORAGE COVERAGE (50+%)

SAMPLE SET CRW + OTHER FALL 2024



BUILDING THE WORKPLAN

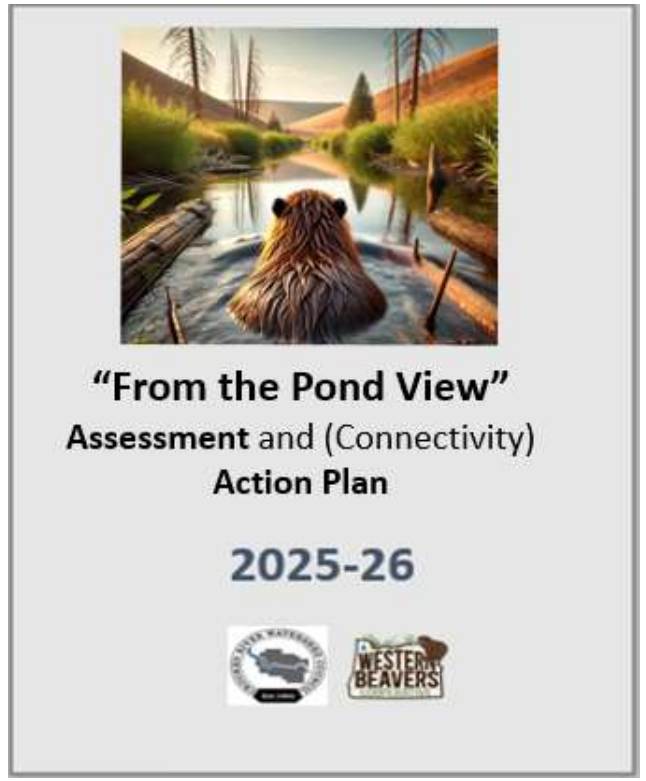
STACKING THE LAYERS

- ✓ Geomorphology and stream power
- ✓ Infrastructure: culverts, roads, irrigation infrastructure) and support

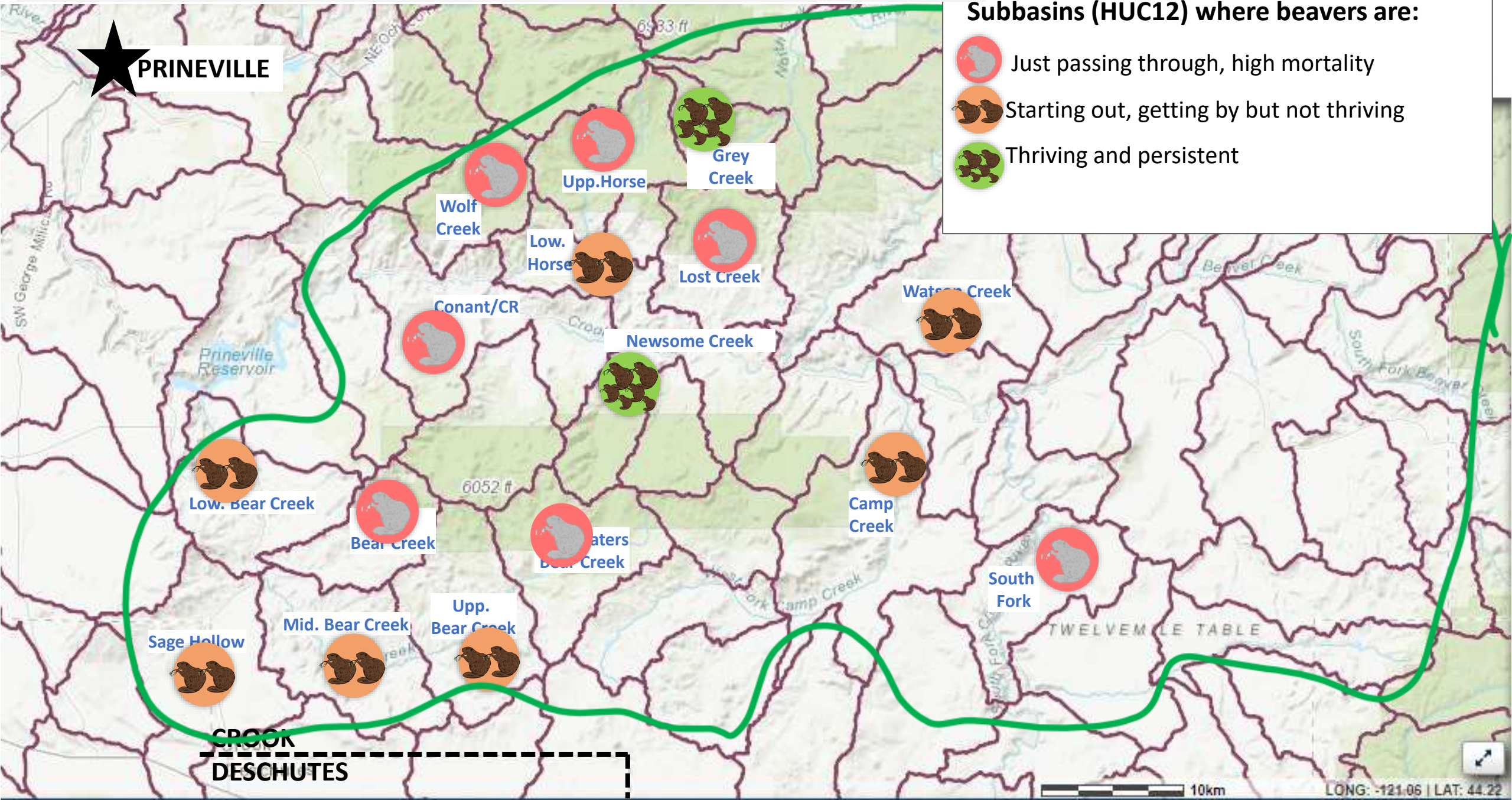
- ✓ Existing Site Occupancy Intent (Beaver Activity / Occupancy Assessment) Cross-reference datasets with:
  a) Most Current ODFW Activity data (ABAS Protocol)
  b) Remote satellite imagery, and
  c) Conversations with the locals.

- ✓ Forage Quality and Abundance Coverage

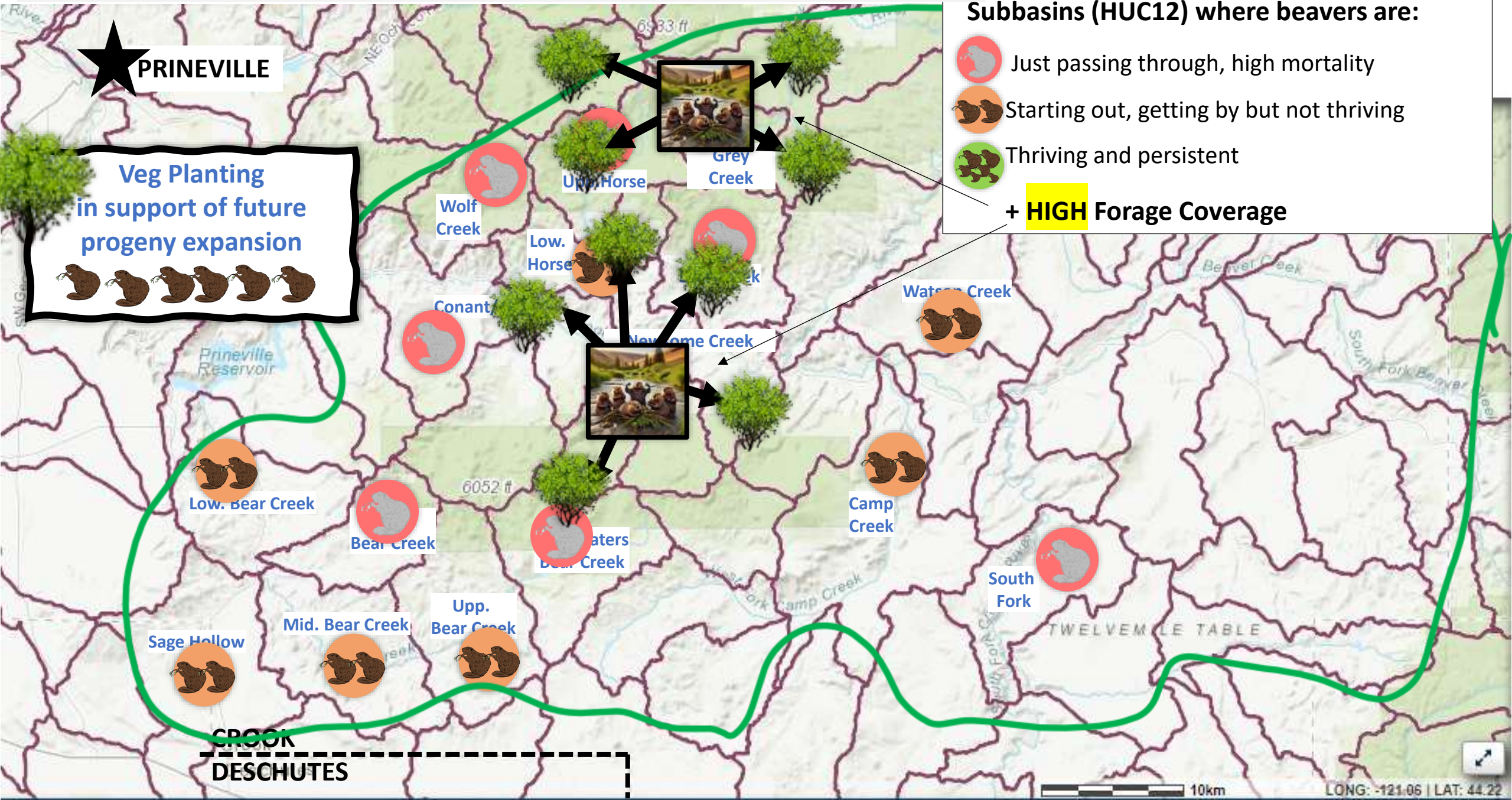
- ➢ Prioritize landowner interest in beavers and restoration

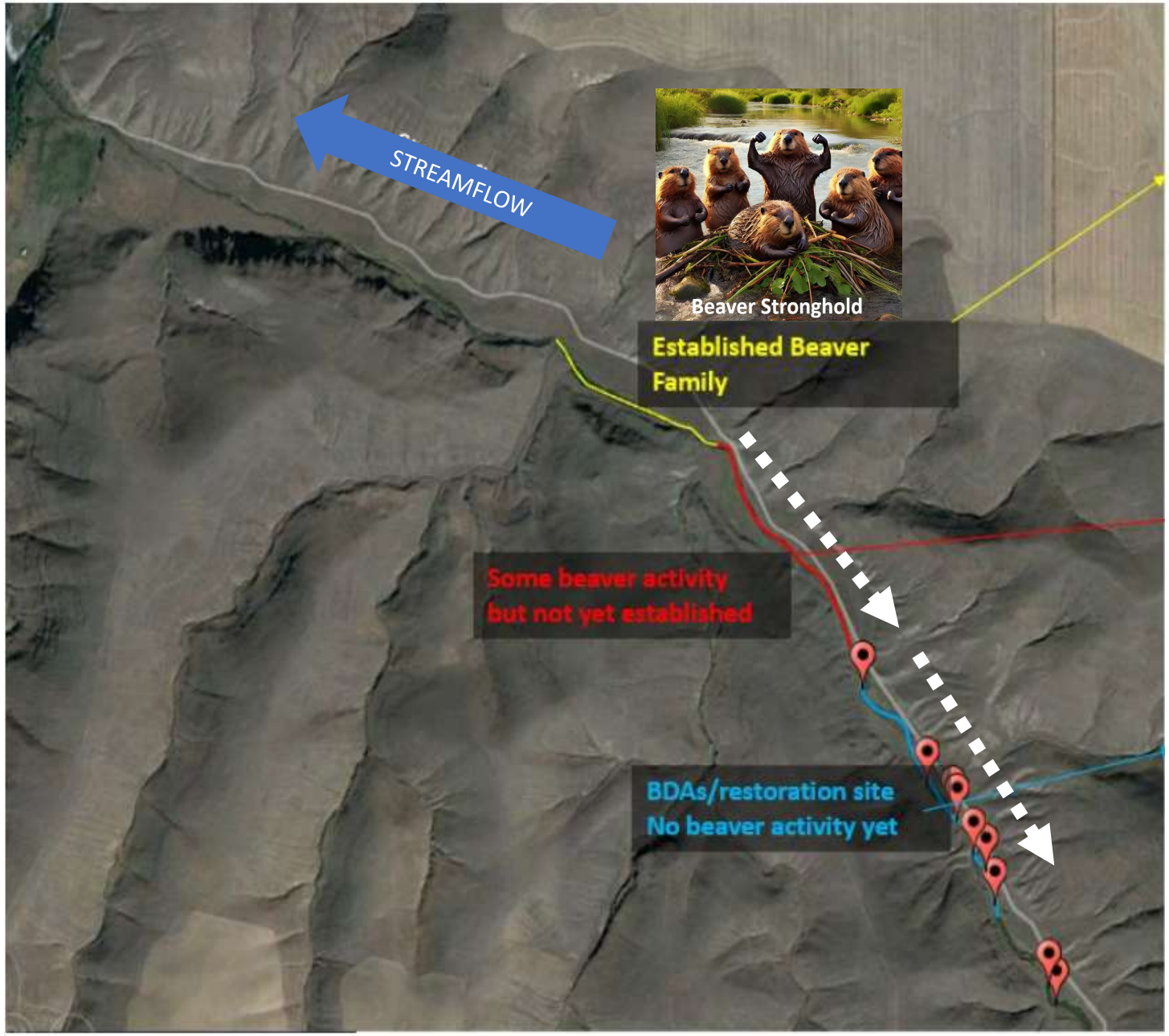


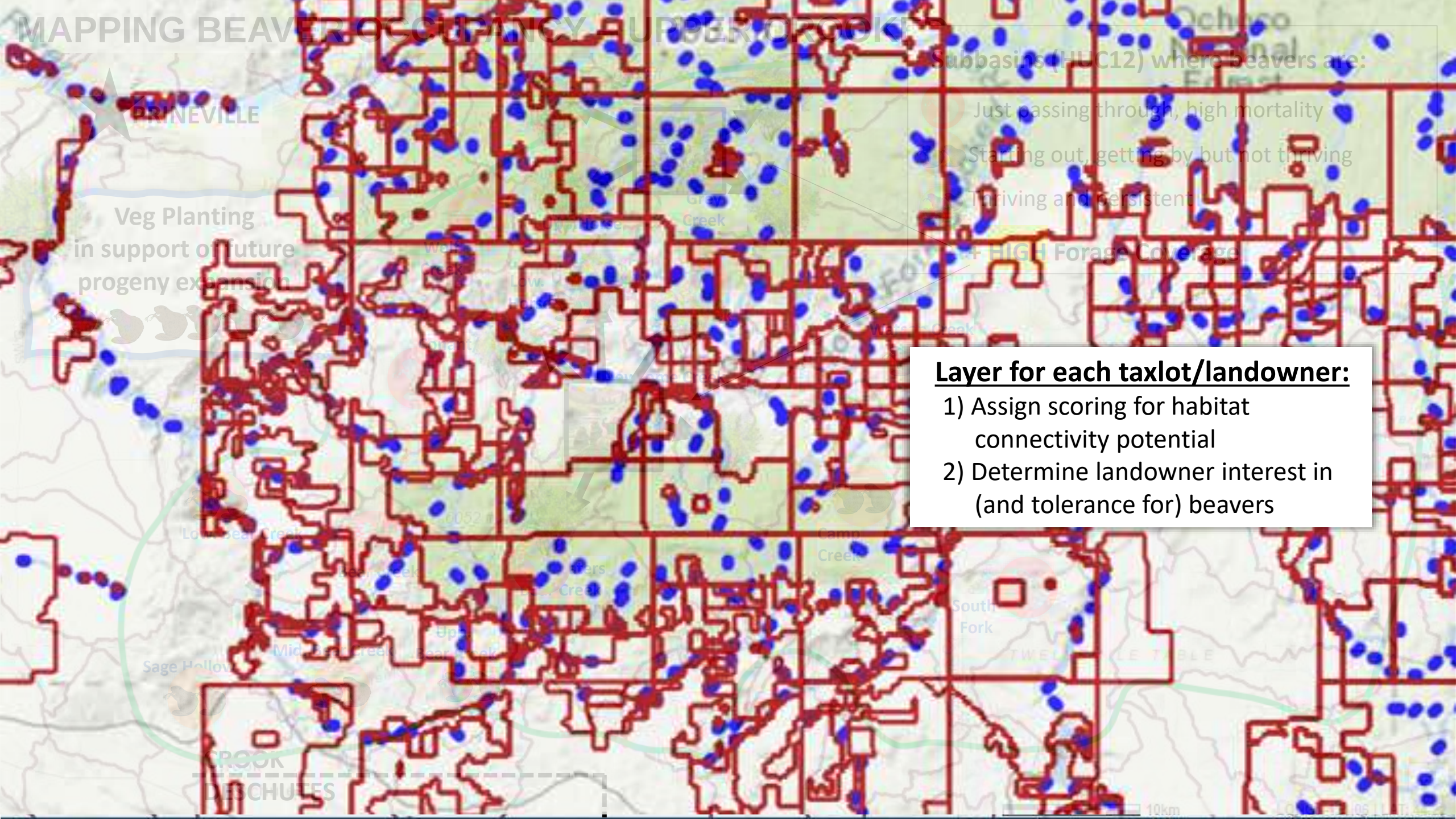
MAPPING BEAVER OCCUPANCY – UPPER CROOKED



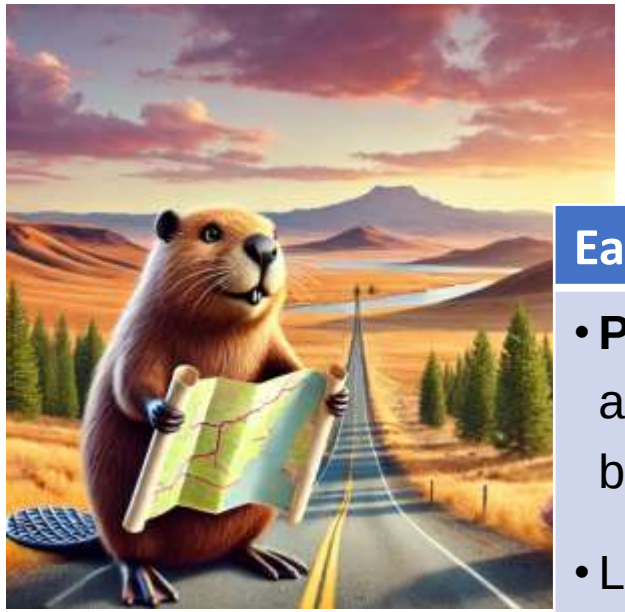
MAPPING BEAVER OCCUPANCY – UPPER CROOKED




STREAMFLOW
Beaver Stronghold
Established Beaver Family
Some beaver activity but not yet established
BDAs/restoration site
No beaver activity yet

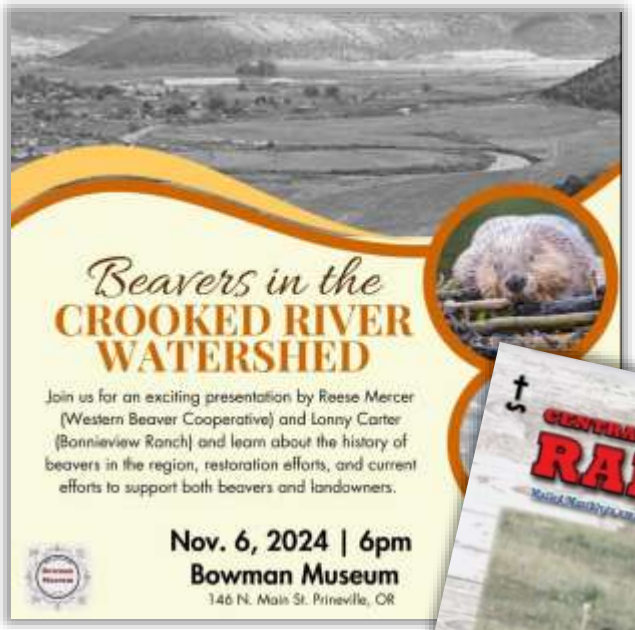

MAPPING BEAVER CONGRUENCY AUDIT TOOLKIT
Subbasins (HUC12) where beavers are:
Just passing through, high mortality
Starting out, getting by but not thriving
Thriving and persistent
+ HIGH Forage Coverage
Veg Planting
in support of future
progeny expansion
Layer for each taxlot/landowner:
1) Assign scoring for habitat connectivity potential
2) Determine landowner interest in (and tolerance for) beavers
PRINEVILLE
Sage Hollow
CROOK
DESCHUTES
10km

WORKING THE PLAN



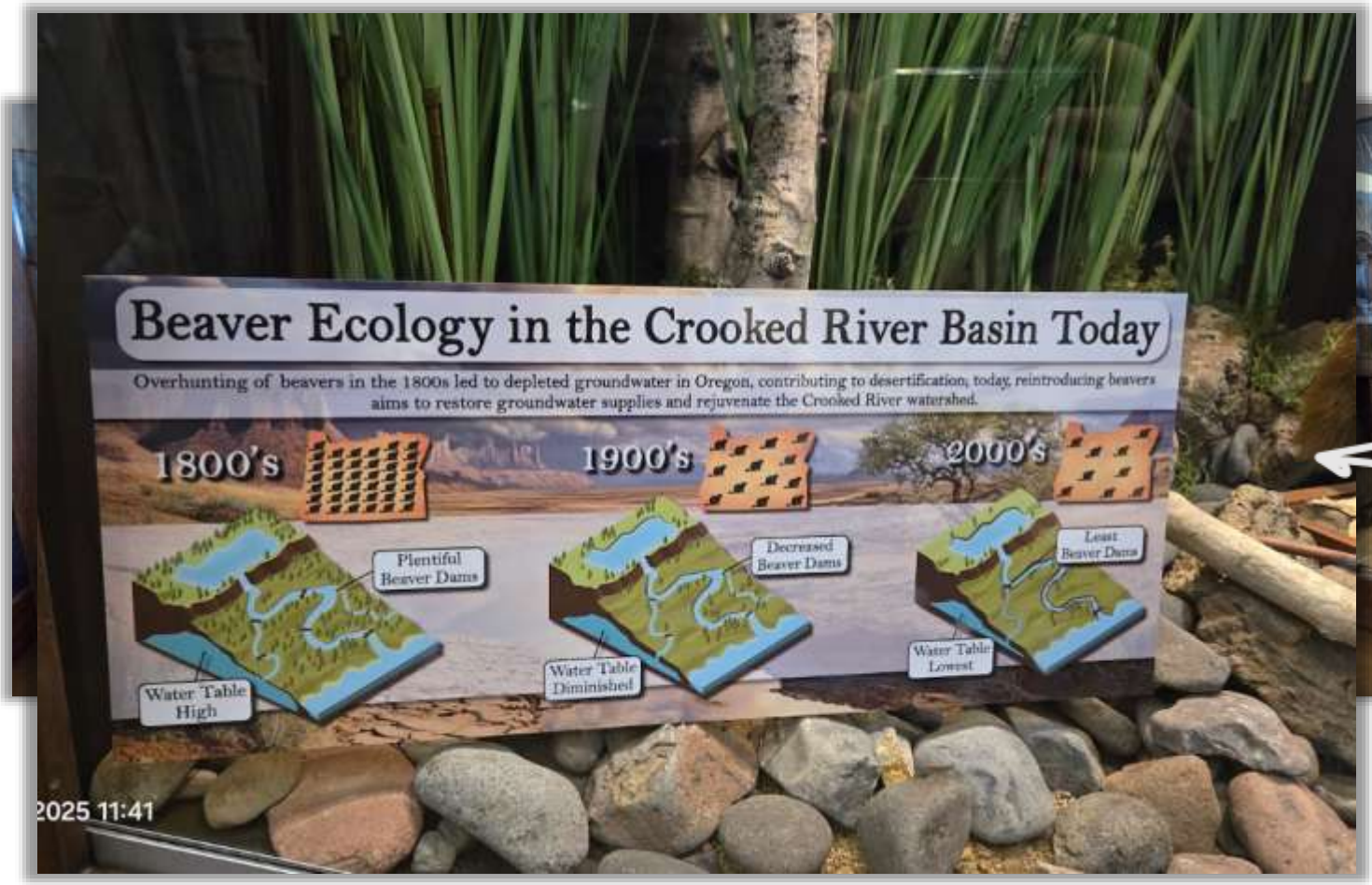
Early	Ongoing
• **Partner** and **community outreach** around the Action Plan, with vision boards and interactive mapping • Landowner outreach **according to *highest connectivity* potential** • As needed, address beaver conflicts with mitigation services.	• **Fund and implement** according to strengthen Strongholds and dispersing progeny success. • **Annual BS monitoring** with ABAS protocol, remote sensing/drone, on-site visits, and noninvasive camera trapping • **Regularly Update and Adapt** the Workplan (as a living document)

WORKING THE PLAN



WORKING THE PLAN

COMMUNITY ENGAGEMENT
CROOK COUNTY, OREGON (BOWMAN MUSEUM NEW EXHIBIT)



WORKING THE PLAN

Get to know local beaver families: size, habits, food source, kits/ juveniles, etc.

TAKEAWAYS

- Consider ‘the pond view’ in your planning with Beaver Strongholds as a foundation
- *Our job* is to defend and support these Strongholds connecting habitat for progeny expansion
- Get to know better your local beavers

THANK YOU

Contact:
reese@westernbeavers.org

More at:
www.westernbeavers.org/connect2025