

Planting the Seed for BEAVER Success

The Oregon Natural Desert Association (ONDA) has been utilizing volunteer labor to implement riparian planting projects on wadeable streams in eastern Oregon's high desert for nearly two decades. Over the past decade, ONDA's riparian restoration strategy has developed to focus specifically on beaver as an "umbrella species"; addressing the factors limiting beavers' management of floodplains, by utilizing an in-house conceptual model referred to as "BeaverHOODS". This beaver-based prioritization strategy was adopted because of the inherent ecological resilience and productivity achievable only from self-sustaining nature-based solutions: as opposed to relying on anthropogenic controls, or on actions that treat symptoms rather than root causes. Because of its unique destination, this route to restoration is deliberately unique.

BeaverHOODS helps a practitioner look at a riverscape "through a beaver's eyes": at the site's 1) hydrology, 2) vegetation, 3) morphology/topography and 4) cultural landscape. Associated rules of thumb and guidance then help congeal these observations into a restoration design and set of expectations in an intentional and strategic way. The goal is to establish a "Beaverhood": a 0.5 to 0.75-mile long reach where all four categories of the BeaverHOOD Strategy are addressed and beavers can therefore take over management. A lack of suitable woody riparian vegetation (size, species, location, density) is a frequently overlooked category limiting factor preventing beaver long-term occupancy, and their ability to manage floodplains. Viewing beavers as sentient creatures with their own agency, social structures, learned skills and preferences is critical.

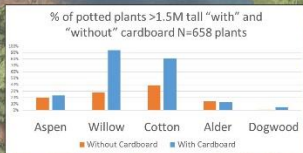
The BeaverHOOD Strategy encourages the establishment of 18,000 mature stems of suitable riparian plant species per "half-mile reach": typically diverse willow species, aspen and cottonwood. To achieve this, ONDA needed to evolve planting techniques into an intentional and repeatable suite of approaches which could meet these goals over short timelines; all while utilizing volunteer labor, and low budget/tech tools. This poster represents an overview of "prompts" for deeper discussions with restoration practitioners regarding just the vegetation portion of the BeaverHOOD Strategy: from "initial site assessments" to "post-implementation care". For more detailed information on the rest of the BeaverHOODS model components and its implementation use the two QR codes at the bottom of the poster.

Step 1: Start pre-planning for planting at least a year in advance!

- Potted plants often need to be ordered a year in advance
- "Sticks" are often harvested months before they can be planted
- So need to work through steps 2-4 to have idea of how, what species, and where you will plant; informing the number and type of plants (potted/sticks) to order or harvest.

Step 5: Planting, Finally

Timing: Potted plants after senescence in fall, sticks as early in spring as possible. Don't store sticks in a cooler >2 months. It is possible to soak sticks for too long.
Densities 1 plant per <2.5 feet: Shades *Phalaris*. Discourages deer from jumping into enclosures.
Cardboard weed-mat for potted plants going into weedy areas, after weed whacking.
Cluster augered sticks: 4 to 6 sticks per 6-inch diameter hole won't compete if they are deep into moist soil.
Exclusion fence with skirt all the way around to exclude beaver, and discourage deer. Inexpensive 60"x2"x4" welded-wire fence balances effective with affordable and easy to handle.
Tips for planning the logistics: Soaking, staging, materials, order of operations, mental walk-through.

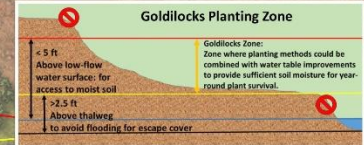


Step 6: The job's not over until the beaver move in!

Maintain fences and BDAs: All that work is wasted if the plants get killed off before they can handle the stress of browsing and of fluctuating water levels.
Track what worked, and what didn't (and why) to better inform your next effort. Fail forward. If this is your first project, start small and learn from your mistakes. Everyone makes mistakes: They just don't publish them.
Remove exclusion fences 5 years after the last enclosure in the whole Beaverhood was planted. Removing individual enclosure fences "piecemeal" will result in overbrowsing of each one in turn. Established plants have more resilience to browsing and higher structural diversity and volume.

Step 2: Find the Goldilocks Planting Zone:

>2.5ft above thalweg Likely permanently flooded by beavers creating escape cover for their own safety.
<5ft above surface of water at lowest flows represents the practical upper limit where plants can be installed with low budget, low-tech techniques and still reach suitable soil moisture.
100ft from the creek's current location means food closer to escape cover where beavers feel safer.
But what about... Planting further away from the creek? Flooding?



Step 3: Existing suitable vegetation can count towards your initial 18,000 stem goal:

Map existing suitable beaver food in the Goldilocks zone. Suppressed vegetation might recover and spread on its own with the removal of browse pressure. Just make sure it is actually "beaver food" and don't assume it actually exists. **Learn the significance of beaver sign:** Beavers will maintain their teeth on, cut down, and build with, materials they don't actually eat. They will also "survive" on sub-optimal food sources. Understand what your beavers prefer to eat based on consumption vs. availability, (including aquatic vegetation like cattails) and what is not being eaten.

Step 4: Map Soil Moisture and "Diggability" in the Goldilocks Zone.

Spoiler: Plants need water year round, and you need to be able to make holes to plant them. Planting during the wet spring or fall seasons makes everywhere look suitable for planting; you need to plan your planting locations for the dry season conditions those plants will have to survive. **What and how you will be planting** determines how near to the surface you need suitable soil moisture at the driest time of the year. **Accessibility, planting objectives and soil moisture and diggability** will also determine what and how you hope to plant and where.

- Deep planting "sticks" with a mounted auger vs. Hand-planting "sticks" vs. potted plants

Map Soil Moisture and "Diggability" at the driest time of year using the "deepest" planting methods suitable at any given location (i.e. dig, auger or "pike" actual test holes throughout all potential planting sites).

- **Suitable moisture rules of thumb:** Holes need the lower 75% to have soil moist enough to make a "snowball" in fine grains, or to be "visibly wet" in coarser grains. A hole with more than 75% (for sticks) or 30% (for potted plants) filled with standing water can drown out plants.
- **Diggability:** Gravel holes collapse, but have good water infiltration. Bedrock or embedded cobble may be undiggable, and prevent hyporheic benefits. Fine, uniform soil may be hydrophobic and prevent infiltration. *Phalaris* root masses means needing soil from elsewhere for backfilling around plants.

But what about...

- **Beaver Dam Analogues (BDAs)?** A means to an end, not an end to themselves. Temporary tool to address stream power or improve soil moisture, but thoroughly resurvey soil moisture months after install.
- **Mesic and riparian vegetation present on your restoration reach:** Mature plants can persist in conditions where establishment would be too tough.

