



Swamp Milkweed (*Asclepias incarnata*). Photo by L. Cairo.

The Botanical Legacy of Beaver Engineering

By CRISTINA NICIPORCIUKAS

Beavers leave a distinctive botanical legacy wherever they work, reshaping Maryland's landscapes in ways few other animals can. Their steady chewing of trees and shrubs opens the canopy, which allows sunlight in, stimulates vigorous coppice regrowth, and keeps riparian vegetation in young stages. Just as vital for supporting diverse plant communities, their engineering slows streamflow, elevates groundwater, and brings back the wet soils that native wetland plants depend on. All of these beaver-driven changes create diverse microhabitats and abundant edge communities, resulting in far more living space for far more species.

When beavers cut shrubs and small trees, they interrupt the march toward mature forest and maintain a perpetual early-successional mosaic along streambanks and pond edges (Rosell et al. 2005). Maryland's riparian edges commonly feature Red Maple (*Acer rubrum*), River Birch (*Betula nigra*), Box Elder (*Acer negundo*), and Sycamore (*Platanus occidentalis*), all capable of vigorous resprouting after beaver cutting. In addition, this bushy regrowth creates dense

wildlife structures which serve as nesting cover for songbirds, shaded microhabitats for amphibians, and browse for deer and small mammals (Baker & Hill 2003). High stem density

also slows water and traps sediment, helping build wetland soils and expand shallow-water habitat (Naiman et al. 1988).

Pollock et al. (2014) describe how beaver disturbance promotes a further habitat type: the shrub swamp, a shrub-dominated floodplain vegetation. In Maryland, this zone often includes Buttonbush (*Cephalanthus occidentalis*), Silky Dogwood (*Cornus amomum*), Winterberry (*Ilex verticillata*), Wax Myrtles

(*Morella cerifera*, *M. pensylvanica*), and Willows (*Salix* spp.), forming dense thickets along pond margins.

Beaver pruning also opens sunny littoral zones that favor emergent macrophytes such as Pickerelweed (*Pontederia cordata*), Arrow Arum (*Peltandra virginica*), and Broadleaf Cattail (*Typha latifolia*) (Naiman et al. 1988). As ponds age or water levels shift,



Pickerelweed (*Pontederia cordata*). Photo by C. Niciporciukas.

continued



An impounded beaver pond in Baltimore County, MD. Newly elevated water tables cause mortality in flood-intolerant upland trees, converting closed-canopy riparian forest into open wetlands. The standing deadwood provides nesting, cavity, and perching structure for wildlife while the impounded water supports wetland plants species, including submerged aquatic vegetation. Photo by S. McGill.

Botanical Legacy continued

flooded margins often transition into saturated meadows. Hood & Larson (2014) found that these beaver-created wetlands support significantly higher plant diversity than adjacent non-beaver sites. In Maryland, wet meadows commonly include Swamp Milkweed (*Asclepias incarnata*), Virginia Iris (*Iris virginica*), Golden Ragwort (*Packera aurea*), Jewelweed (*Impatiens capensis*), and Sensitive Fern (*Onoclea sensibilis*). The emergent vegetation stabilizes sediments, oxygenates water, and provides dense habitat for macroinvertebrates, amphibians, and nesting waterfowl (Naiman et al. 1988). The resulting plant diversity attracts birds, butterflies, amphibians, and other wildlife (Naiman

et al. 1988; Rosell et al. 2005), while woody debris adds further structure for fish and invertebrates (Baker & Hill 2003; Naiman et al. 1988).

And perhaps most well-known of the habitats created by beavers are beaver impoundments, more commonly known as beaver ponds. Here, deep, slow-moving water allows fine sediments and organic matter to accumulate, producing the soft substrates typical of open-water interiors in the Coastal Plain (Correll et al. 2000). These conditions support submerged and floating native aquatics such as Spatterdock (*Nuphar advena*), American White Water Lily (*Nymphaea odorata*), and Pondweeds (*Potamogeton* sp.), all well adapted to nutrient-rich, low-velocity

environments (Naiman et al. 1988).

The result is a biologically rich, structurally complex habitat that simply would not exist without beaver engineering. Beavers are more than builders. They are ecological catalysts. Healthy wetlands depend on the quiet persistence of nature's own engineers.



Table of Maryland Native Plants Across Beaver-created Habitat Zones.

REFERENCES

- Baker B.W. & E.P. Hill. 2003. Beaver (*Castor canadensis*). In: Feldhamer GA, Thompson BC, Chapman JA, editors. Wild mammals of North America: biology, management, and conservation. 2nd ed. Baltimore (MD): Johns Hopkins University Press. pp. 288–310.
- Correll D.L., T.E. Jordan & D.E. Weller. 2000. Beaver pond biogeochemical effects in the Maryland Coastal Plain. *Biogeochemistry*. 49:217–239.
- Hood G.A. & D.G. Larson. 2014. Ecological engineering and aquatic connectivity: a new perspective on beaver ponds. *Freshwater Biology*. 59:198–208.
- Naiman R.J., C.A. Johnston & J.C. Kelley. 1988. Alteration of North American streams by beaver. *BioScience*. 38:753–762.
- Pollock, M.M., T.J. Beechie, J.M. Wheaton, C.E. Jordan, N. Bouwes, N. Weber & C. Volk. 2014. Using beaver dams to restore incised streams: a natural process-based approach. *BioScience*. 64:279–290.
- Rosell, F., O. Bozser, P. Collen & H. Parker. 2005. Ecological impact of beavers (*Castor fiber* and *Castor canadensis*) and their ability to modify ecosystems. *Mammal Review*. 35:248–276.