PIEDMONT/MOUNTAIN SEMIPERMANENT IMPOUNDMENT (SHRUB SUBTYPE)

Concept: Type covers portions of Piedmont and Mountain floodplains affected by impoundment by beaver dams, along with the rare small man-made ponds that resemble them. This includes drained impoundments that are still distinguishable from pre-impoundment conditions.

Subtype covers all Piedmont and Mountain examples with substantial shrub and young tree vegetation, including shallow water zones of mature ponds and natural successional vegetation of abandoned ponds.

Sites: Floodplains of streams or rivers. On larger river floodplains, beavers dam sloughs or tributary creeks. Beavers generally prefer second order streams (Snodgrass 1997), but can use smaller or larger. Beavers strongly prefer low gradient streams; some Piedmont and most Mountain streams are probably too swift for them. Within beaver ponds, the Shrub Subtype typically occurs as a zone on the edges, at the upper end, or fills the bed of drained ponds.

Soils: Can occur on any floodplain or valley bottom soil, though impoundment presumably modifies the preexisting soil if the pond lasts very long. Besides saturation, depletion of oxygen, and reduction, the still water of ponds traps sediment; this may allow deposition of relatively pure clay over sizeable areas. In at least one example in South Carolina, a floating mat is present with the shrubs rooted in it. Kroes and Bason (2015) noted that ponds could be significant repositories for carbon storage, and that, though sediments in channels tend to wash out quickly if the dam is breached, sediment stored in floodplains might remain in place for centuries.

Hydrology: Permanently or seasonally flooded with shallow water, or unflooded but saturated on edges and in drained ponds.

Vegetation: Vegetation is dominated by woody species, which may range from dense to fairly open. Most frequently dominant is Alnus serrulata, and Salix nigra and Cephalanthus occidentalis are also often dominant. Water tolerant species of trees, such as Acer rubrum and Fraxinus pennsylvanica, may also be abundant. Herbaceous plants may be present, beneath the shrubs or on stumps and tree bases. Any of the species listed for the Piedmont Marsh Subtype or Montane Marsh Subtype may occur.

Dynamics: See the more extensive discussion of general beaver pond dynamics under the Open Water Subtype.

The Shrub Subtype, as defined, has variable dynamics, with some being fairly stable zones and others being short-lived natural successional communities. The Shrub Subtype generally develops from one of the marsh subtypes. This may occur simply because it takes longer for the woody plants to establish and grow to dominance, when a pond forms or is drained. It may also occur slowly, as sediment gradually fills in parts of a long-lasting pond and creates shallower water. Within the Shrub Subtype, shrubs may quickly give way to young trees in drained ponds.
**Range and Abundance:** Ranked G4. This subtype may occur throughout the Piedmont and Mountains. It likely occurs in all adjacent states and probably ranges farther. The characteristic species are wide-ranging, so this community could potentially be recognized over a very large range. However, the associated herbaceous species, though not well known, would potentially distinguish more narrowly defined floristic types.

**Associations and Patterns:** This subtype may be either a zone within a complex of other subtypes, or may be the only subtype present in drained ponds. This subtype likely borders some other floodplain community, or an upland, on one side.

**Distinguishing Features:** Semipermanent Impoundment communities are distinguished by vegetation and hydrology affected by impoundment by beavers. Small manmade impoundments are included if they produce a similar environment and vegetation, but most reservoirs in the Piedmont and Mountains bear little resemblance to natural beaver ponds and should not be treated as natural communities.

The Shrub Subtype is distinguished by the dominance of shrubs or small trees, most often *Alnus serrulata*, *Salix* spp., or *Acer rubrum*, but potentially *Viburnum*, *Cephalanthus*, *Fraxinus*, or other species. It is distinguished from floodplain communities that would otherwise occupy the site by having different vegetation, usually more uniform and wetter, with a more depauperate herb layer or an herb layer composed of shade-intolerant species remaining from the pond rather than typical floodplain forest species.

**Variation:**
Though not well described, two axes of variation can readily be defined in this subtype. Some examples are successional, occurring in drained ponds, with invading trees and expected short life-span, while others area long-term zonal communities dominated by open wetland shrubs and expected to last as long as the pond lasts. The differences between Piedmont and Mountain biogeography, enough to define separate subtypes for the marsh communities, are less well marked but presumably can be recognized as variants. Thus, we can define four variants that should prove useful:
1. Montane Shrub Zone Variant;
2. Montane Successional Variant;
3. Piedmont Shrub Zone Variant;
4. Piedmont Successional Variant.

**Comments:**
This subtype as defined covers both Piedmont and Mountain examples. The lower diversity among the woody species (and poorly known herbaceous component) suggests less variation than among the marshes.

The NVC association synonymized with this subtype is problematic, in that it is very broadly defined and covers natural and artificial vegetation. *Cephalanthus occidentalis* / *Carex* spp. - *Lemna* spp. Southern Shrubland (CEGL002191) could potentially apply to some examples in North Carolina, but none are known.
**Synonyms:** *Alnus serrulata* Southeastern Seasonally Flooded Shrubland (CEGL008474).

**Rare species:**

**References:**
