



Chapter 8



*H*erbaceous Wetlands



*H*erbaceous wetland - Herbaceous vernal pond,
Pepper Run sedge pool, Clinton County.
Photograph by Jeff Wagner



PERSISTENT EMERGENT WETLANDS

Bluejoint - reed canary grass marsh

These marshes occur in a variety of landscape settings, from river backwaters to upland depressions. The most typical species are *Calamagrostis canadensis* (bluejoint) and *Phalaris arundinacea*⁽¹⁾ (reed canary grass). Associates vary widely, but commonly include *Glyceria* spp. (mannagrass), *Leersia oryzoides* (rice cutgrass), *Dulichium arundinaceum* (three-way sedge), *Eupatorium* spp. (joe-pye weed), *Typha* spp. (cat-tail), *Rubus hispidus* (swamp dewberry), *Scirpus cyperinus* (wool grass) and other *Scirpus* spp. The invasive species *Phragmites australis*⁽¹⁾ (common reed) and *Lythrum salicaria*⁽¹⁾ (purple loosestrife) are frequently a major problem in these systems.

Related types: This type may contain *Carex stricta* (tussock sedge), but it is not dominant. The "Tussock sedge marsh" type may contain *Phalaris arundinacea*⁽¹⁾ (reed canary grass) and/or *Calamagrostis canadensis* (bluejoint) but is strongly dominated by *Carex stricta*.

Range: Entire state.

Selected references: Sneddon, Anderson, and Metzler 1996, Reschke 1990, Golet and Larson 1974.

[Crosswalk: Smith's "Graminoid Marsh" (in part). TNC's *Calamagrostis canadensis* - *Phalaris arundinacea* Herbaceous Alliance.]

Cat-tail marsh

These are robust emergent marshes dominated by *Typha latifolia* (common cat-tail), or less commonly, *T. angustifolia* (narrow-leaved cat-tail). This type can occur in a variety of landscape positions including river backwaters, protected pond and lakeshores, and upland depressions. The substrate may be muck or mineral soil. The surface is usually flooded for most of the year. Associated species include *Scirpus* spp. (bulrush), *Peltandra virginica* (arrow-arum), *Sparganium americanum* (bur-reed), *Onoclea sensibilis* (sensitive fern), *Impatiens* spp. (jewelweed), *Pontederia cordata* (pickerel-weed), *Sagittaria latifolia* (arrowhead), *Bidens* spp. (beggar-ticks), *Polygonum* spp. (smartweeds), *Lemna* spp. (duckweed), and *Carex* spp. (sedges)—especially *C. stricta* (tussock sedge). The invasive species *Phragmites australis*⁽¹⁾ (common reed) and *Lythrum salicaria*⁽¹⁾ (purple loosestrife) are frequently a major problem in these systems.

Related types: Clear dominance by *Typha* spp. (cat-tail) distinguishes this type from the other marsh/palustrine herbaceous types that occur in similar settings.

Range: Entire state.

Selected references: Golet and Larson 1974, Reschke 1990, Sneddon, Anderson, and Metzler 1996.

[Crosswalk: Smith's "Robust Emergent Marsh" (in part), TNC's *Typha (angustifolia, latifolia)* - *Scirpus* spp. Semi-permanently Flooded Herbaceous Alliance.]

Tussock sedge marsh

These are *Carex stricta* (tussock sedge)-dominated marshes. The majority of these systems are influenced by past impoundment. The substrate may be peat, muck or mineral soil. There is generally standing water between the tussocks for much of the year. Associated species include other sedges (e.g. *Carex lurida*, *C. canescens*, *C. stipata*, *C. tribuloides*), rushes (*Juncus* spp.), *Calamagrostis canadensis* (bluejoint), *Thalictrum pubescens* (tall meadow-rue), *Agrostis scabra* (hairgrass), *Eupatorium* spp. (joe-pye weed), *Scirpus cyperinus* (wool grass), *Sium suave* (water parsnip), *Triadenum virginicum* (marsh St.-John's-wort), scattered *Typha latifolia* (common cat-tail) and small *Acer rubrum* (red maple). The invasive species *Phragmites australis*⁽¹⁾ (common reed) and *Lythrum salicaria*⁽¹⁾ (purple loosestrife) are frequently a major problem in these systems.

Related types: The "Bluejoint - reed canary grass marsh" may contain *Carex stricta* (tussock sedge), but it is not dominant. This type may contain *Phalaris arundinacea*⁽¹⁾ (reed canary grass) and/or *Calamagrostis canadensis* (bluejoint), but is strongly dominated by *Carex stricta*.

Range: Entire state.

Selected references: Sneddon, Anderson, and Metzler 1996, Reschke 1990, Golet and Larson 1974.

[Crosswalk: Smith's "Graminoid Marsh" (in part), TNC's *Carex stricta* Herbaceous Alliance.]

Mixed forb marsh

This is a highly variable type dominated by broad-leaved plants. This community type occurs in a variety of landscape settings, from freshwater tidal systems to inland wet meadows. Characteristic species include *Dulichium arundinaceum* (three-way sedge), *Polygonum arifolium* (halberd-leaved tearthumb), *P. sagittatum* (arrow-leaved tearthumb), *Rumex* spp., (dock), *Juncus acuminatus* (sharp-fruited rush), *Bidens* spp. (beggar-ticks), *Impatiens capensis* (jewelweed), *Onoclea sensibilis* (sensitive fern), *Sagittaria latifolia* (arrowhead), *Carex stricta* (tussock sedge), *Acorus calamus*⁽¹⁾, and *Leersia oryzoides* (rice cutgrass). The invasive species *Phragmites australis*⁽¹⁾



(common reed) and *Lythrum salicaria* (purple loose-strife) are frequently a major problem in these systems.

Related types: This type is distinguished from the various graminoid-dominated marsh types by its broad-leaf dominants. The "Herbaceous vernal pond" community is related to this, but occurs exclusively in upland depressions that dry out substantially to completely in the dry season. There is also a difference in species composition.

Range: Entire state.

Selected references: Schuyler, Anderson, and Kolaga 1993.

[Crosswalk: Smith's "Freshwater Intertidal Marsh Community" (although here not restricted to tidal areas), TNC—includes several alliances.]

Herbaceous vernal pond

This community type is characterized by seasonally fluctuating water levels; it may dry out completely in the summer. The substrate is mineral soil with or without a layer of muck. The species composition is variable between sites, as well as annually and seasonally. Larger examples of this community type may exhibit strong zonation. Many smaller, shaded vernal ponds are unvegetated, their bottoms covered by dead leaves and algae. Cover may be sparse, species composition is extremely variable, some typical representatives include (although only a few are likely to be found on any one site) *Dulichium arundinaceum* (three-way sedge), *Glyceria acutiflora* (mannagrass), *Leersia oryzoides* (rice cut-grass), *Scirpus cyperinus* (wool-grass), *S. ancistrochaetus*^s (northeastern bulrush), *Lycopus uniflorus* (bugleweed), *Torreyochloa pallida* (pale meadow grass), *Polygonum* spp. (smartweeds), *Thelypteris palustris* (marsh fern), *Carex gynandra* (a sedge), *C. crinita* var. *crinita*^s (short hair sedge), *C. leptonevia* (a sedge), *C. stipata* (a sedge), *C. canescens* (a sedge), *C. vesicaria* (a sedge), *Juncus effusus* (soft rush), *Woodwardia virginica* (Virginia chain fern), *Bidens* spp. (beggar-ticks), *Hypericum mutilum* (dwarf St.-John's-wort), *Osmunda cinnamomea* (cinnamon fern), *O. regalis* (royal fern), *H. canadense* (Canadian St.-John's-wort), *Agrostis scabra* (hairgrass), *Utricularia geminiscapa* (bladderwort), *Triadenum virginicum* (marsh St.-John's-wort), *Sagittaria rigida* (arrowhead), *S. latifolia* (arrowhead), and *Eleocharis* spp (spike-rushes). Although this community type is dominantly herbaceous, shrubs and small trees may be present. Typical woody species include *Vaccinium corymbosum* (highbush blueberry), *Lyonia ligustrina* (maleberry), *Quercus palustris* (pin oak), *Nyssa sylvatica* (black-gum), *Acer rubrum* (red maple), *Salix* spp. (wil-

lows), *Cephalanthus occidentalis* (buttonbush), and *Ilex verticillata* (winterberry). These ponds lack mature fish populations and therefore can provide critical breeding habitat for several species of amphibians. They are also an important habitat resource for many species of birds, mammals, reptiles, amphibians, and invertebrates.

Related types: This community often occurs in association with shrub and woodland community types such as the "Buttonbush wetland" or "Red maple - mixed shrub palustrine woodland" community types. On some sites, the distinction becomes a matter of scale, as small herbaceous openings often occur on shrub-dominated sites.

Range: Entire state.

Selected references: PNDI field surveys.

[Crosswalk: Smith's "Ephemeral / Fluctuating Natural Pool," TNC—no direct crosswalk.]

Wet meadow

These are open, usually graminoid-dominated meadows. They are typically flooded early in the growing season, and may be saturated to near the surface for some of the growing season, but are generally dry for much of the year. The substrate is typically mineral soil with a layer of muck at the surface. Although flooding may help to keep these systems open, most are also grazed or mowed.

This community type on some sites may be dominated by one or two species, but is typically mixed. Representative species include *Leersia oryzoides* (rice cut-grass), *Scirpus cyperinus* (wool-grass), *Lycopus uniflorus* (bugleweed), *Torreyochloa pallida* var. *pallida* (pale meadow grass), *Polygonum* spp. (smartweeds), *Dulichium arundinaceum* (three-way sedge), *Thelypteris palustris* (marsh fern), *C. stipata* var. *stipata* (a sedge), *C. canescens* (a sedge), *C. lurida* (a sedge), *C. cristatella* (a sedge), *C. tribuloides* (a sedge), *C. stricta* (tussock sedge), *C. vesicaria* (a sedge), *Juncus effusus* (soft rush), *Woodwardia virginica* (Virginia chain fern), *Bidens* spp. (beggar-ticks), *Hypericum mutilum* (dwarf St.-John's-wort), *Eupatorium* spp. (Joepye-weed), *E. perfoliatum* (boneset), *Osmunda cinnamomea* (cinnamon fern), *O. regalis* (royal fern), *H. canadense* (Canadian St.-John's-wort), *Calamagrostis canadensis* (bluejoint), *Vernonia noveboracensis* (New York ironweed), *Triadenum virginicum* (marsh St.-John's-wort), *Sagittaria rigida* (arrowhead), *S. latifolia* (arrowhead), *Phalaris arundinacea* (reed canary-grass), *Glyceria canadensis* (rattlesnake grass), *Scirpus atrovirens* (black bulrush), *S. pendulus* (a bulrush), and *Eleocharis* spp (spike-rushes). Scattered shrubs may be present, representative species include *S. tomentosa* (hardhack), *Cephalanthus occidentalis* (buttonbush), *Cornus amomum* (red-willow), *C. racemosa* (swamp dogwood), *C. sericea* (red-osier dogwood), and *Viburnum*



recognitum (arrow-wood). Exotic species such as *Lythrum salicaria*^d (purple loosestrife), and a variety of exotic grasses are frequently found in these meadows.

Related types: Although *Phalaris arundinacea* (reed canary-grass) *Calamagrostis canadensis* (bluejoint) may occur in this community type, they are not dominant. If one of these species or a combination of the two dominates the community, see the description of the "Bluejoint - reed canary grass marsh." If *Carex stricta* (tussock sedge) dominates the community, see the description of the "Tussock sedge marsh." If the community is a seasonally flooded basin, also read the description for "Herbaceous vernal pond."

Range: Entire state.

Selected references: Golet and Larson 1974.

[No crosswalk.]

Bulrush marsh

These are communities dominated by *Schoenoplectus tabernaemontani* (soft-stem bulrush), and/or *S. acutus* (hard-stemmed bulrush), or less commonly *S. pungens* (chairmaker's rush), *S. purshianus* (a bulrush), *S. fluviatilis*^s (river bulrush), or *S. torreyi*^s (Torrey's bulrush). This community type occurs along lake and pond margins, on mudflats, and in shallow water—both tidal and non-tidal.

Related types: This community type is easily distinguished by its clear dominance of *Schoenoplectus* spp. (bulrushes). It may occur in combination with virtually any community type that approaches a water body having the appropriate substrate.

Range: Entire state.

Selected references: Sneddon, Anderson, and Metzler 1996.

[Crosswalk: Smith's "Robust Emergent Marsh" (in part), TNC's *Scirpus* spp. Herbaceous Alliance.]

Great Lakes Region palustrine sandplain

In Pennsylvania, this community type occurs only on Presque Isle. This is a graminoid-dominated, sparsely vegetated herbaceous community that occurs on moist sandy flats. Water levels vary seasonally from standing water at times in the spring, to below the surface for drier portions of the year. Characteristic species include *Juncus articulatus* (jointed rush), *J. articus*^s (Baltic rush), *J. alpinoarticulatus* (alpine rush), *Cyperus bipartitus* (an umbrella-sedge), *C. flavescens* (an umbrella-sedge),

Agalinis paupercula^s (small-flowered false-foxglove), *Carex viridula*^s (green sedge), *C. garberi*^s (elk sedge), and *Hypericum majus*^s (Canadian St.-John's-wort). This community type is part of the "Great Lakes Region beach -dune - sandplain complex."

Related types: The "Great Lakes Region dry sandplain" is associated with this type, but is drier and less sparse, and has a different suite of species, including at times scattered trees and shrubs. Because of the sandy soils on which both types occur, the wetter type may appear dry for much of the year. It is the difference in species composition that distinguishes the two.

Range: Great Lakes Region.

Selected references: Bissell and Bier 1987.

[Crosswalk: Smith's "Eastern Great Lakes Sand Plains," TNC - no crosswalk.]

Prairie sedge - spotted joe-pye-weed marsh

This community type is dominated by graminoids with a mixture of forbs and shrubs. It occurs in areas influenced by calcareous waters. The substrate is mineral soil, often with a thin layer of muck over a restrictive layer of clay or clay-loam soils.

Characteristic species include *Carex prairea* (prairie sedge), *Eupatorium maculatum* (spotted joe-pye-weed), *C. tetanica* (wood's sedge), *C. schweinitzii* (Schweinitz's sedge), *C. interior* (a sedge), *Juncus articus* var. *littoralis* (Baltic rush), *J. nodosus* (knotted rush), *Vernonia noveboracensis* (New York ironweed), *Glyceria* spp. (mannagrass), *Galium* spp. (cleavers), and *Eleocharis intermedia*^s (matted spike-rush). The overall aspect is often that of a mosaic, with the wettest areas containing species like *Equisetum fluviatile* (water horsetail), *Potamogeton crispus*^d (curly pondweed), and *Typha latifolia* (common cat-tail). Shrubs, especially *Ribes hirtellum* (northern wild-gooseberry), may occur scattered throughout, especially in drier areas.

Related types: This type is distinguished from the other marsh types by the presence of calciphilic species.

Range: Entire state (?)

Selected references: Golet and Larson 1974, Smith 1991.

[Crosswalk: Smith's "Calcareous Marsh," TNC's (?).]

Open sedge (Carex stricta, C. prairea, C. lacustris) fen

These are open sedge-dominated wetlands, which usually occur on organic soil (sedge peat) saturated through-



out most of the year by base-rich groundwater. These sites usually lack the distinct seepage areas associated with other fen types. Surface water pH is generally between 6.9 and 7.9 during the growing season. Sedges dominate, usually by some combination of *Carex prairea*^s (prairie sedge), *C. stricta* (tussock sedge), *C. sterilise* (Atlantic sedge), *C. lacustris* (a sedge), *C. aquatilis*^s (water sedge), *C. leptalea* (a sedge), *C. lasiocarpa*^s (many-fruited sedge), and *C. tetanica*^s (Wood's sedge). Additional characteristic herbaceous species include *Pycnanthemum virginianum* (mountain-mint), *Verbena hastata* (blue vervain), *Smilacina stellata* (starflower), *Eupatorium maculatum* (spotted joe-pye-weed), *Typha latifolia* (common cat-tail), *Epilobium leptophyllum* (willow-herb), *Callum tinctorium* (cleavers), *Onoclea sensibilis* (sensitive fern), *Cirsium muticum* (swamp thistle), *Impatiens capensis* (jewelweed), *Juncus articus*' (Baltic rush), *Aster puniceus* ssp. *firmus* (purple-stemmed aster), and *Polemonium reptans* (spreading Jacob's-ladder). Typical bryophytes include *Sphagnum teres*, *Campylium stellatum*, and *Thuidium delicatulum*. These fens typically lack a substantial shrub layer. This may be due to excessive moisture, but in many cases disturbance—including cattle grazing, or more rarely, repeated fire—keeps these sites open.

Related types: Ecologically, this type resembles the herbaceous patches within the two shrub fen types: "Poison sumac - red-cedar - bayberry fen" and "Buckthorn - sedge fen." All three descriptions should be read carefully before classifying a site.

Range: Ridge and Valley, Piedmont.

Selected references: Wagner and Bier 1995.

[Crosswalk: Smith's "Hillside Graminoid-Forb Fen," TNC's (proposed) *Carex stricta*-*Carex prairea* Herbaceous Alliance.]

Golden saxifrage - sedge rich seep

These are typically small (less than 0.1 hectare) wetlands that occur where base-rich groundwater (alkaline to circumneutral) saturates the surface for most of the growing season in most years. There may be an accumulation of organic matter (peat or muck), but it is seldom more than 50 cm deep. The species composition is highly variable, and includes common species with a wide range of pH tolerance, as well as calciphilic, typically rarer species. Species composition also varies according to light availability. Sites that occur in completely open areas are usually characterized by dense graminoid cover, while those that receive some shading from surrounding vegetation typically have more forbs. The species composition is variable, but usually includes several of the following: *Carex leptalea* (a sedge), *C. granularis* (a sedge), *C. flava*^s

(yellow sedge), *C. sterilis*^s (Atlantic sedge), *C. atlantica* (a sedge), *Poa palustris* (fowl bluegrass), *Cardamine pensylvanica* (Pennsylvania bitter cress), *Senecio aureus* (golden ragwort), *Eupatorium* spp. (boneset), *Impatiens* spp. (jewelweed), *Symplocarpus foetidus* (skunk cabbage), *Chrysosplenium americanum* (golden saxifrage), *Vernonia noveboracensis* (New York ironweed), *Equisetum arvense* (common horse-tail), *E. fluviatile* (water horsetail), *Chara* spp. (stoneworts), *Rhynchospora capillacea*^s (capillary beak-rush), *R. alba* (white beak-rush), *Thelypteris palustris* (marsh fern), *Pam assia glauca*^s (grass-of-Parnassus), *Lobelia kalmii*^s (brook lobelia), *Saxifraga pensylvanica*, (swamp saxifrage), and *Chelone glabra* (turtlehead). There may be open seepage areas dominated by *Chara* spp. (stoneworts).

Related types: This community type may occur in combination with either of the fen types ("Buckthorn - sedge (*Carex interior*) - golden ragwort fen", or "Open sedge (*Carex stricta*, *C. prairea*, *C. lacustris*) fen").

Range: Glaciated NE, Glaciated NW, Pittsburgh Plateau, Ridge and Valley, Piedmont, Great Lakes Region.

Selected references: PNDI field surveys, WPC and TNC 1998.

[Crosswalk: Smith's "Northern Appalachian Calcareous Seep," TNC's *Carex* (*flava*, *hystericina*, *interior*, *sterilis*) -*Campylium stellatum* Herbaceous Alliance (?).]

Skunk cabbage - golden saxifrage forest seep

These are small communities (usually less than 0.1 hectare) that occur where groundwater comes to the surface in a diffuse flow, saturating the soil for most of the growing season. The water chemistry ranges from acidic to strongly calcareous, with only minor accompanying shifts in species composition. Where waters are moderately to strongly calcareous, any of a variety of calciphiles may be present. This case is described as the "Calcareous subtype" below. These seeps most often occur in a forested context. Canopy cover ranges widely, and may be contributed by woody plants rooted within the seep, or by overhanging foliage from those in the surrounding uplands. The species composition is highly variable. Species include *Symplocarpus foetidus* (skunk cabbage), *Chrysosplenium americanum* (golden saxifrage), *Osmunda cinnamomea* (cinnamon fern), *Carex folliculata* (a sedge), *Coptis trifolia* (goldthread), *Mitchella repens* (partridge-berry), *Impatiens capensis* (jewelweed), *Dryopteris carthusiana* (fancy fern), *Cardamine pensylvanica* (Pennsylvania bitter-cress), *Pilea pumila* (clearweed), *Galium triflorum* (sweet-scented bedstraw), *Glyceria melicaria* (slender mannagrass), *Saxifraga pensylvanica* (swamp saxifrage), *Thelypteris*



novaboracensis (New York fern), *Aster radula* (swamp aster), and *Onoclea sensibilis* (sensitive fern). Bryophytes include *Brachythecium rivulare*, *Bryhnia novae-angliae*, *Rhynchostegium serrulatum*, *Rhizomnium punctatum*, *Sphagnum* spp., and *Thuidium delicatulum*. Shrubs may be present, common representatives include *Alnus* spp. (alders), *Lindera benzoin* (spicebush), *Viburnum* spp. (viburnums), and *Cornus* spp. (dogwoods).

Calcareous subtype: These sites are influenced by moderately to strongly calcareous groundwater ([Ca²⁺] >15mg/l). They may contain any of the species above, but usually with the additional presence of one to several calciphilic species. The species of calciphile present varies; typical representatives include *Trollius laxus*^s (spreading globeflower), *Conioselinum chinense*^s (hemlock parsley), and *Parnassia glauca*^s (grass-of-Parnassus). These species also have higher light requirements, so sites or portions of sites on which they occur tend to be somewhat open.

Related types: The "Golden ragwort - sedge rich seep" receives more light than does this type. The greater light availability is reflected in the species composition. The "Water cress - golden saxifrage spring run" community is also groundwater fed, but in the case of a spring, water comes to the surface in a concentrated rather than diffuse flow.

Range: Entire state.

Selected references: PNDI field surveys, WPC and TNC 1998.

[Crosswalk: Smith's "Northern Appalachian Acidic Seep," no direct crosswalk to TNC, in part resembles openings in *Acer rubrum* - *Fraxinus nigra* Saturated Forest Alliance.]

Serpentine seepage wetland

This community type is restricted to areas underlain by serpentinite bedrock. Seeps occur on gentle slopes at the base of low hills and adjacent to streams. Groundwater saturates the surface for a substantial portion of the growing season. Graminoids dominate; *Deschampsia cespitosa* (tufted hairgrass), *Leersia oryzoides* (rice cut-grass), *Eleocharis tennis*' (slender spike-rush), and *Panicum clandestinum* (deer-tongue grass) are common. Other species that are characteristic of these seeps include *Cerastium arvense* var. *uillosum*^s (barrens chickweed), *Cyperus strigosus* (false nutsedge), *Muhlenbergia mexicana* (satin grass), *Cirsium muticum* (swamp thistle), *Polygonum* spp. (smartweeds), *Lycopus uniflorus* (bugleweed), *Philonotis capillaris* (a moss), *Sorghastrum nutans* (Indian grass), *Scleria trglomerata*

(whip-grass), *Agalinis purpurea* (false-foxglove), *Sanguisorba canadensis* (American burnet), and *Eupatorium perfoliatum* (spotted joe-pye weed). This community type is part of the "Serpentine barrens complex."

Related types: This community is distinguished from other types of seeps primarily by its landscape context. This type occurs exclusively in areas underlain by serpentinite bedrock and influenced by groundwater rich in magnesium and iron.

Range: Piedmont.

Selected references: PNDI field surveys, WPC and TNC 1998.

[Crosswalk: Smith's "Eastern Serpentine Barrens" (in part), TNC's *Deschampsia cespitosa* Herbaceous Alliance.]

Golden saxifrage - Pennsylvania bitter-cress spring run

This community type occurs in and immediately adjacent to springs. Springs are points of concentrated groundwater flow reaching the surface. Water flow is relatively constant, and temperatures at the source are generally between 9 and 15 degrees C; pH varies between 6.0 and 8.0 at the ground surface. *Chrysosplenium americanum* (golden saxifrage), *Cardamine pennsylvanica* (Pennsylvania bitter cress), and the introduced *Nasturtium officinale* (watercress) are by far the most characteristic species. Other species include *Saxifraga micranthidifolia*^s (lettuce saxifrage), *C. rotundifolia* (mountain watercress), *C. bulbosa* (bitter cress), and *Equisetum* spp. (horsetails). Bryophytes are an especially important element of this community type; more species information is needed.

Related types: A spring run is characterized by a concentrated flow of groundwater reaching the surface. Seeps are also groundwater-fed, but are characterized by diffuse flow.

Range: Entire state (?).

Selected references: PNDI field surveys.

[Crosswalk: Smith's "Spring Community" and "Spring Run Community," TNC's *Chrysosplenium americanum* - *Nasturtium officinale* Herbaceous Alliance.]

Sphagnum - beaked rush peatland

This type occurs in the open areas of many acidic peatlands. The substrate is sphagnum peat, often a floating mat. Typical species include *Rhynchospora alba*



(white beaked-rush), *Sarracenia purpurea* (pitcher-plant), *Drosera intermedia* (spatulate-leaved sundew), *D. rotundifolia* (round-leaved sundew), *Xyris montana*^s (yellow-eyed grass), *Juncus pelocarpus* (brown-fruited rush), *Carex trisperma* (a sedge), *Platanthera blephariglottis* (white-fringed orchid), *Utricularia cornuta*^s (horned bladderwort), *Eriophorum vaginatum* (cotton-grass), and *E. virginicum* (tawny cotton-grass). *Vaccinium macrocarpon* (large cranberry), and *V. oxycoccos* (small cranberry) are abundant in some areas. Shrubs, such as *Chamaedaphne calyculata* (leatherleaf), *Kalmia polifolia* (bog laurel), and *Andromeda polifolia*^s (bog-rosemary), may also occur but do not dominate the community. This community usually occupies one of the interior zones of a larger peatland complex that may also include shrub, woodland, and forest physiognomies. In this case it may occur as part of the "Acidic glacial peatland complex."

Related types: The "Many fruited sedge - bladderwort peatland" type has a very similar structure and setting, but occurs under the influence of groundwater that raises the pH to at least 5. There is a corresponding difference in species composition. As the shrub cover increases, this type usually grades into one of the associated shrub peatland types. Pennsylvania's acidic peatlands usually represent a mosaic of floristically and physiognomically distinct patches or zones. For a description of this pattern and a list of associated community types, see the "Acidic peatland complex" description.

Range: Glaciated NE, Glaciated NW, Pocono Plateau, Unglaciated Allegheny Plateau.

Selected references: Crum 1992, PNDI field surveys.

[Crosswalk: Smith's "Oligotrophic Kettlehole Bog" (in part), "Nonglacial Bog" (in part), TNC's *Chamaedaphne calyculata* - *Carex* spp. Saturated Shrub Herbaceous Alliance.]

Many fruited sedge - bladderwort peatland

These are peatland influenced by some degree of groundwater enrichment (pH 5-5.5). They are dominated by sedges, of which *Carex lasiocarpa*^s (many-fruited sedge) is the most characteristic. Bladderworts, usually *Utricularia intermedia* (flat-leaved bladderwort), are also characteristically present. Other species commonly found in these systems include *Carex lacustris* (a sedge), *Potentilla palustris* (marsh cinquefoil), *Menyanthes trifoliata* (bogbean), *Triadenum virginicum* (marsh St.-John's-wort), *C. stricta* (tussock sedge), *Spiraea latifolia* (meadow-sweet), *Typha latifolia* (common cat-tail), *Thelypteris palustris* (marsh fern), and *Vaccinium macrocarpon* (cranberry).

Related types: The "Sphagnum - beaked rush

peatland" type is structurally similar, but lacks the groundwater enrichment that characterizes this type. This type lacks the heavy sphagnum layer that characterizes the previous type. The broad-ranging associate species here are replaced by peatland specialists in the lower-pH type.

Range: Glaciated NE, Glaciated NW, Pocono Plateau, Unglaciated Allegheny Plateau.

Selected references: PNDI field surveys, Sneddon, Anderson, and Metzler 1996, Reschke 1990.

[Crosswalk: Smith's "Poor Fen," TNC's *Carex lasiocarpa* - *Myrica gale* - *Campyllum stellatum* Herbaceous Alliance.]

Water-willow (*Justicia americana*) - smart-weed riverbed community

This community type occurs on major rivers in areas of inundated alluvium, mud or on riverbed rock where soil accumulates in crevices. These areas are flooded for most of the year, but may become exposed during dry periods. The species composition varies; *Justicia americana* (water-willow) is often dominant. Other species that may occur include *Polygonum amphibium* var. *emersum* (water smartweed), *Polygonum punctatum* (dotted smartweed), *Sagittaria* spp. (arrowhead), *Rotala ramosior*^s (tooth-cup), *Schoenoplectus pungens* (chairmaker's rush), *Eleocharis compressa*^s (flat-stemmed spike-rush), *E. acicularis* (needle spike-rush), and *E. erythropoda* (a spike-rush). In more protected, backwater areas, *Saururus cernuus* (lizard's tail) is often the dominant species. This community type is part of the "River bed - bank - floodplain complex."

Related types: This community type differs from the other two herbaceous river-associated types in flooding regime and species composition. This community is flooded for most of the year, the other two types are dry for most of the year. See the description of the "River bed - bank - floodplain complex" for more information.

Range: Entire state except South Mountain.

Selected references: PNDI field surveys.

[Crosswalk: Smith - no crosswalk, TNC's *Justicia americana* Temporarily Flooded (sic.) Herbaceous Alliance.]

Riverside ice scour community

This community type occurs along the banks of major rivers where rock outcrops are subject to winter ice scour and periodic flooding. Plants grow in soil that accumulates in cracks in the rock. Several rare species are found in this habitat in different parts of the state.



These include *Marshallia grandiflora*^s (large-flowered marshallia), *Boltonia asteroides*^s (aster-like boltonia), *Trautvetteria caroliniensis*^s (Carolina tassel-rue), *Hypericum densiflorum*^s (bushy St.-John's-wort), *Prunus pumila* var. *depressa*^s (prostrate sand cherry), *Aristida purpurascens*' (arrow-feather), *Hibiscus laevis* (halberd-leaved rose-mallow), *Montia chamissoi*^s (Chamisso's miners-lettuce), and *Sida hermaphrodite*^s (Virginia mallow). More common species include *H. pyramidatum* (great St.-John's-wort), *H. ellipticum* (pale St.-John's-wort), *Amorpha fruticosa* (false-indigo), *Toxicodendron radicans* (poison ivy), *Vitis* spp. (grapes), *Osmunda regalis* (royal fern), *Rhododendron arborescens* (smooth azalea), *R. maximum* (rosebay), *Spartina pectinata* (freshwater cordgrass), *Eupatorium* spp. (joe-pye weed), *Phalaris arundinacea*⁽¹⁾ (reed canary-grass), *Senecio* spp. (groundsel), *H. mutilum* (dwarf St.-John's-wort), *Physocarpus opulifolius* (ninebark), *Hydrangea arborescens* (wild hydrangea), *Zizia aurea* (golden-Alexander), *Salix* spp. (willows), and *Betula nigra* (river birch). This community type is part of the "River bed - bank - floodplain complex."

Related types: Although *Betula nigra* (river birch) may occur in this community as scattered individuals or in small clumps, it does not dominate the community as in the "River birch sycamore floodplain scrub" type. Substrate and hydrology (temporarily flooded rock outcrops) distinguish this type from the other riverside herbaceous types.

Range: Piedmont, Pittsburgh Plateau, Glaciated Northeast, Glaciated Northwest, Ridge and Valley.

Selected references: PNDI field surveys.

[Crosswalk: Smith's "Riverside Outcrop / Cliff Community," TNC—no direct crosswalk.]

Big bluestem - Indian grass river grassland

This community type occurs on sand/gravel deposits or rock outcrops along riverbanks and on river islands. These sites are subject to flooding and ice scour. The typical aspect is that of a tall grassland. The most characteristic herbaceous species are *Andropogon gerardii* (big bluestem), *Sorghastrum nutans* (Indian grass), and *Panicum virgatum* (switch grass). Other herbaceous species include *Phalaris arundinacea*⁽¹⁾ (reed canary-grass), *Spartina pectinata* (freshwater cordgrass), *Sporobolus asper* (dropseed), *Schizachyrium scoparium* (little bluestem), *Lespedeza violacea* (bush-clover), *Apocynum cannabinum* (Indian hemp), and, in western Pennsylvania, *Baptisia australis* (blue false-indigo). In some places, woody species may become established for a time. Common species include *Salix* spp. (willows), *Platanus occidentalis* (sycamore), *Fraxinus* spp. (ash),

Acer negundo (box-elder), and, in the eastern drainages, *Betula nigra* (river birch) and *Prunus pumila* var. *depressa*^s (prostrate sand cherry). Vines may also be present; common species include *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (poison ivy), *Vitis labrusca* (fox grape), and *V. riparia* (frost grape). This community type is part of the "River bed - bank - floodplain complex."

Related types: This community's landscape setting and hydrology distinguishes it from related upland grassland types. Dominance by herbaceous plants (mainly grasses) distinguishes this type from the "River birch - sycamore floodplain scrub," which is dominated by stunted *Betula nigra* (river birch) and other woody species.

Range: Piedmont, Ridge and Valley, Pittsburgh Plateau, Glaciated NE.

Selected references: Jennings 1927, PNDI field surveys.

[Crosswalk: Smith's "River Gravel Community," TNC's *Andropogon gerardii* - *Sorghastrum nutans* Herbaceous Alliance.]

NON-PERSISTENT EMERGENT WETLANDS

Pickereel-weed - arrow-arum - arrowhead wetland

This community type is dominated by broad-leaved, emergent vegetation; it occurs in upland depressions and shallow ponds. The aspect of these systems changes seasonally from nearly unvegetated substrate in winter and early spring, to dense vegetation during the height of the growing season. The most characteristic species are *Pontederia cordata* (pickereel-weed), *Peltandra virginica* (arrow-arum), and *Sagittaria latifolia* (arrowhead). Other species commonly present include *Bidens laevis* (bur marigold), *Glyceria* spp. (mannagrass), *Orontium aquaticum* (golden-club), *Sparganium* spp. (bur-reed), *Sagittaria rigida* (arrowhead), *Schoenoplectus tabernaemontani* (soft-stem bulrush), *Eleocharis palustris* (creeping spike-rush), *Polygonum hydropiperoides* (water smartweed), *P. punctatum* (dotted smartweed), *Impatiens* spp. (jewelweed), and *Alisma plantagoaquatica* (water plantain). This type is restricted to small (less than 8 hectares), shallow (less than 2 meters at low water) bodies of water that usually support rooted vegetation across most of their surface. Examples of this vegetation that occur adjacent to the open water of lakes or rivers, are considered to be aquatic vegetation (Cowardin et al. 1979). Aquatic vegetation is beyond the scope of this classification.



Related types: Some examples of the "Herbaceous vernal pond" community type may resemble this floristically. The two differ in their hydrologic regime; the vernal pond type occurs in a small upland depressions that are seasonally flooded, but experience substantial or complete annual draw-down. The type described here is usually semi-permanently flooded.

Range: Glaciated NE, Glaciated NW, Ridge and Valley, Piedmont.

Selected references: Sneddon, Anderson, and Metzler 1994, Reschke 1990, Golet and Larson 1974.

[Crosswalk: Smith's "Natural Pond (in part), "Artificial Pond" (in part), "Stable Natural Pool" (in part), TNC's *Pontederia cordata* - *Peltandra virginica* Herbaceous Alliance.]

[Crosswalk: Smith's "Natural Pond (in part), "Artificial Pond" (in part), "Stable Natural Pool" (in part), TNC's *Nuphar lutea* Herbaceous Alliance, *Nymphaea odorata* - *Nymphoides cordata* Herbaceous Alliance.]

Spatterdock - water lily wetland

A combination of emergent and floating-leaved, rooted hydromorphic vegetation dominates this community type. This type occurs in upland depressions and shallow ponds. The substrate is mineral soil, muck, or peat. Water levels may fluctuate seasonally, but the substrate is seldom dry. The most typical species are *Nuphar lutea* (spatterdock) and *Nymphaea odorata* (fragrant water-lily). Other species include *Polygonum amphibium* (water smartweed), *Sparganium* spp. (bur-reed), *Sagittaria latifolia* (arrowhead), *Alisma plantago-aquatica* (water-plantain), *Schoenoplectus tabernaemontani* (soft-stem bulrush), and *Peltandra virginica* (arrow-arum). There may also be an admixture of submerged and free-floating aquatic species. This type is restricted to small (less than 8 hectares), shallow (less than 2 meters at low water) bodies of water that usually support rooted vegetation across most of their surface. Examples of this vegetation that occur adjacent to the open water of lakes or rivers, are considered to be aquatic vegetation (Cowardin et al. 1979). Aquatic vegetation is beyond the scope of this classification.

Related types: This type may occur intermingled with or surrounded by the "Pickerel-weed - arrow-arum - arrowhead wetland" type. The two types may intergrade.

Range: Entire state except Allegheny Mountain and South Mountain.

Selected references: Sneddon, Anderson, and Metzler 1994, Golet and Larson 1974, Reschke 1990.