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Vegetation of Stockport Forest, Wayne County, Pennsylvania

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Prepared for the Norcross Wildlife Foundation, Inc.

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Report on the

Vegetation of Stockport Forest, Wayne County, Pennsylvania

prepared for the

Norcross Wildlife Foundation, Inc.
Caller Box 611, PO Box 0414
Planetarium Station, New York, NY 10024-0414

by
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Site Description

Stockport Forest is a 1,937 acre property located in Buckingham Township, Wayne County, Pennsylvania. The tract includes frontage along the Delaware River, Route 191, and Stockport Road. Elevation varies from just under 900 feet at the river to 1662 feet above mean sea level at the highest point. Very steep slopes rise 400-500 feet from the Delaware River and the valley of Stockport Creek.

The site is entirely within the Hancock PA/NY USGS 7.5 minute quad. Two named streams traverse the site, Stockport Creek flows from just above the Beaver Pond to Route 191. Shingle Hollow Creek, with the exception of the headwaters of the right branch and the portion below Route 191, is entirely within the tract. South of Stockport Road the tract includes portions of tributaries of Stockport Creek and Nabbys Lake.

Bedrock geology is Devonian age Catskill Formation consisting of shales, siltstones, sandstone and conglomerate (DER 1980; Geyer and Wilhusen 1982). The surface is overlain by glacial deposits of the Wisconsinan Glaciation (Crowl and Sevon 1980).

More than half of the property lies north of Stockport Road and forms an unbroken block of forested land more than 1000 acres in extent, interrupted only by narrow woods roads and old quarries.

Evidence of past land use includes at least four abandoned bluestone quarries, each an acre or two in extent, numerous woods roads used for timber and stone removal, and a stone dam and dike on the Stockport Creek built in 1845. Other than the dam and another bridge across the Stockport Creek, there are no structures on the property. Timber harvesting has taken place fairly recently in some areas.

The property includes approximately 1 mile of Delaware River frontage consisting of steep slopes dropping down to the river from Route 191 in the northern portion of the eastern boundary.

Vegetation Survey

This survey was carried out by Drs. Ann F. Rhoads and Timothy A. Block of the Morris Arboretum of the University of Pennsylvania during three days of site visits in June and July 2000. Locations of endangered and threatened plants were recorded using a hand held GPS receiver CMT MC-GPS made by Corvallis Microtechnology, Corvallis, OR.

Upper Slopes and Ridges - The forest type on upper slopes and ridges consists of a dry oak-heath type (Fike 1999). The canopy is dominated by red oak (Quercus rubra), white oak (Q. alba), and red maple (Acer rubrum) with occasional chestnut oak (Q. montana) and chestnut (Castanea dentata). The understory contains mountain laurel (Kalmia latifolia), lowbush blueberry (Vaccinium angustifolium and V. pallidum), and black huckleberry (Gaylussacia baccata). On the ridge tops the shrub understory is dense and continuous, but lower down the slope the shrub layer has been severely impacted by deer browsing and is often reduced to a few suppressed shoots. Mountain laurel, because it is evergreen, is especially vulnerable to
browsing in the wintertime. Herbaceous species include bracken fern (*Pteridium aquilinum*), sarsaparilla (*Aralia nudicaulis*), common hairgrass (*Deschampsia flexuosa*), and cow-wheat (*Melampyrum lineare*).

**Lower Slopes and Ravines** - The lower slopes, north-facing slopes, and ravines are characterized by a hemlock-northern hardwood forest type (Fike 1999). Typical species include hemlock (*Tsuga canadensis*), American beech (*Fagus grandifolia*), yellow birch (*Betula allegheniensis*), sugar maple (*Acer saccharum*) with witch-hazel (*Hamamelis virginiana*) and occasionally striped maple (*Acer pensylvanica*) in the understory. In the steep ravine of Stockport Creek where access by deer is limited by the terrain, remnant populations of additional understory tree and shrub species can be found including mountain maple (*Acer spicatum*), rosebay rhododendron (*Rhododendron maximum*), hobblebush (*Viburnum lantanoides*), flowering raspberry (*Rubus odoratus*), bush-honeysuckle (*Diervilla lonicera*), red elderberry (*Sambucus pubens*), and round-leaved gooseberry (*Ribes rotundifolium*). In more accessible areas of gentler slopes the understory is almost exclusively heavily browsed beech shoots. Herbaceous species diversity is low except where the slopes are very steep or rocky or in wet areas along the streams. In many areas common wood-sorrel (*Oxalis acerosa*), hayscented fern (*Dennstaedtia punctilobula*), starflower (*Trientalis borealis*), and Canada mayflower (*Maianthemum canadense*) are the only herbaceous species present and much of the ground surface is bare. A more diverse herbaceous flora is present in the ravines and stream valleys, however, even in those more protected locations deer browse has reduced many species to small residual populations.

**Transition Areas** - A transition forest occurs between these two dominant types that is characterized by red maple, sugar maple, white oak, and beech. The understory in these mid-slope areas is very sparse with beech shoots and scattered American chestnut shoots that continue to sprout from old stumps. While seedlings of oaks and other tree species can be found, no sapling size trees are present, even where extensive tree harvesting has occurred. The seedlings present can be seen upon close inspection to have been browsed back repeatedly. Thickets of mountain laurel with only a few live shoots remaining are also evident. The herbaceous layer is dominated by sarsaparilla (*Aralia nudicaulis*) and hayscented fern, species that are not highly preferred by deer. A sedge (*Carex debilis*), a grass (*Brachyelytrum erectum*) and occasional pink lady's-slipper (*Cypripedium acaule*) and round-leaved orchid (*Platanthera orbiculata*) can also be found among the dense ground-cover of sarsaparilla.

**Headwaters Wetlands** - Headwaters of tributaries of Stockport Creek and other creeks consist of hummocky expanses of wetland dominated by cinnamon fern (*Osmunda cinnamomea*), interrupted fern (*O. claytoniana*), and royal fern (*O. regalis*) surrounded by hemlock groves. Sphagnum moss hummocks bristling with sedges (*Carex bromoides, C. gynandra, C. prasina, and C. scoparia*) border the areas of springs and seeps that gradually coalesce to form small rivuletts and eventually more pronounced stream channels. Other species found in these areas include goldthread (*Coptis trifoliata*), blue flag (*Iris versicolor*), bunchberry (*Cornus canadensis*), gaywings (*Polygala paucifolia*), and a few well chewed shrubs including mountain holly (*Ilex montana*), winterberry holly (*I. verticillata*) and spicebush (*Lindera benzoin*).

**Quarries** - Abandoned bluestone quarries constitute areas where the soil and rocks have been
excavated and disturbed. Piles of discarded rock fragments are present as well as excavations and exposed rock faces. Several of these old quarries appear to have been graded recently and are completely lacking plant cover. In others the natural process of revegetation has produced stands of trembling aspen (Populus tremuloides), gray birch (Betula populifolia), staghorn sumac (Rhus typhina) and the shrubs sweetfern (Comptonia peregrina), round-leaved gooseberry (Ribes rotundifolium), red raspberry (Rubus idaeus), black raspberry (R. occidentalis) and an occasional multiflora rose (Rosa multiflora). Native herbaceous species are also present including poverty grass (Dianthus spicata), deer tongue grass (Panicum clandestinum), several panic grasses (Panicum dichotomum, P. linearifolium), early goldenrod (Solidago juncea), whorled loosestrife (Lythrum salicaria), and several non-native species including red and yellow clovers (Trifolium pratense, T. aureum), goat's-beard (Tragopogon dubius), common mullein (Verbascum thapsus), slender vetch (Vicia tetrasperma), English plantain (Plantago lanceolata) and oxeye daisy (Chrysanthemum leucanthemum).

Beaver Pond - The beaver pond is an impoundment on Stockport Creek above the manmade stone dam. The pond is surrounded by a 50-100 foot wide zone of shrubby growth perhaps representing an area where beaver consistently remove larger woody stems or perhaps a zone that was under water at some previous time, or both. The margin of the pond contains stands of emergent plants such as three-way sedge (Dulichium arundinaceum), arrowhead (Sagittaria latifolia), blue flag (Iris versicolor), soft rush (Juncus effusus), and the state endangered northern manna-grass (Glyceria borealis). Several patches of yellow pond lily (Nuphar lutea) and ribbonleaf pondweed (Potamogeton ephippus) are also present in the pond.

The open area around the pond is dominated by gray birch (Betula populifolia), highbush blueberry (Vaccinium corymbosum), and meadow-sweet (Spiraea latifolia) which constitutes a highbush blueberry-meadow sweet wetland. In the wetter areas, especially at the west end where Stockport Creek enters the pond basin, there are thickets of northern arrowwood (Viburnum recognitum), pussy willow (Salix discolor), silky willow (Salix sericea), and winterberry holly, and large stands of several sedges (Carex utriculata and C. scabrata). Beaver are clearly active at the site.

Bank of the Delaware River - The Stockport Forest tract includes approximately 1 mile of riverbank at the base of a steep forested slope along Route 191. The slope is a continuation of the forested slopes on the west side of the road that rise steeply for 400-500 feet. The forest extends down the bank below the road to a narrow riverside ice-scour community (Fike 1999) adjacent to the river. Large boulders and rock outcrops are present along the lower edge. Near the northern end of the tract there is a section of riverbank about 175 feet long where water flowing out of the lower slope trickles down over the riverbank. These seeps provide habitat for the state endangered Chamisso's miners lettuce (Montia chamissonii) which grows with forget-me-not (Myosotis scorpioides), monkey flower (Mimulus moschatus), creeping buttercup (Ranunculus repens), bog chickweed (Stellaria alpina), and several mints (Mentha x gentilis and M. x verticillata).

Endangered Species - Two plants classified as species of special concern in Pennsylvania were
found during this survey; northern manna grass (*Glyceria borealis*), which grows in shallow water along the edge of the beaver pond, and Chamisso's miners lettuce (*Montia chamissoi*) which occurs along the riverbank are classified as endangered in Pennsylvania (DCNR 1993). Locations where these two species were found are shown in figure 1. Checkered rattlesnake plantain (*Goodyera tesselata*), which was found on the site in 1984, was not relocated, however it may well still exist somewhere on the property. This plant has been recommended for threatened status in the state.

Northern manna grass occurs from Newfoundland to Alaska and reaches its southern limit of range in New Jersey, Pennsylvania, Indiana, Iowa, and California (Fernald 1950, Gleason and Cronquist 1991). It is a perennial grass that grows in shallow water and wet shores of lakes, streams, and ponds. It is known from fewer than 20 locations in Pennsylvania, most of them in the northeastern counties of Wayne, Susquehanna, Pike, Lackawanna and Monroe (Rhoads and Block 2000; Rhoads and Klein 1993).

Chamisso's miners lettuce is one of the rarest plants in Pennsylvania (Wherry 1964, Rhoads et al. 1985). It occurs at several sites along the Upper Delaware River in Wayne County and at a single site in Minnesota but its main range lies in the western mountains from Alaska to California and Arizona (Fernald 1950, Gleason and Cronquist 1991; Rhoads and Klein 1993). The eastern plants are believed to represent relic populations from the glacial era. The plant, a member of the Portulacaceae Family, is a delicate perennial with opposite leaves, small 5-parted white or pinkish flowers and slender bulblet-bearing rhizomes (Rhoads and Block 2000). It grows on dripping sandstone ledges and seeps on the riverbank.

Checkered rattlesnake-plantain, is a native orchid known from fewer than 10 sites in northern Pennsylvania where it is at or near the southern limit of its range (Rhoads and Klein 1993). It grows in moist coniferous or deciduous forests from Newfoundland to eastern Manitoba and south to New York and northern Pennsylvania (Fernald 1950; Gleason and Cronquist 1991). Like other members of the genus, it is a perennial with distinctive evergreen leaves marked with light vein patterns.

**Impacts**

**Timber harvest** - Timber harvests conducted over the past 10-20 years appear to have removed most of the high quality timber with little regard for sustainability. This high grading has left the canopy in many areas dominated by red maple and beech. In some areas little or no regeneration is occurring and the understory contains little other than beech shoots.

**Deer Overabundance** - The diversity and future health of this forest are seriously threatened by excessive numbers of deer. The condition of the forest, including lack of tree regeneration, browsed shrubs, and depleted understory and ground layers clearly indicate that there are too many deer present. Canopy trees are not regenerating in many areas where the older trees were harvested. Diversity of species is greatly reduced, with steep areas in the ravine of Stockport Creek serving as a refugium where species such as hobblebush, mountain maple, and alternate-leaved dogwood that should be common throughout are barely maintaining a presence. Many wildflowers and other herbaceous species are similarly restricted.
Steep Slopes - Timber removal on steep slopes and creek banks has increased erosion on the site. There is evidence of three recent landslides on the north side of Stockport Creek. These are visible from Stockport Road.

Invasive Exotic Species - The Stockport Forest tract has not been seriously impacted by invasive exotic species, however there are initial incursions by several potentially serious weeds including multiflora rose which is scattered along the woods roads and in several of the quarries. Patches of Japanese knotweed (Polygonum cuspidatum) and purple loosestrife (Lythrum salicaria) along the riverbank could pose a serious threat to the Chaminosso's miners lettuce.

Recommendations

Reduce Deer Density - Deer density should be reduced throughout the site in order to prevent further losses of biological diversity and allow the forest to regenerate. Deer density should be brought down to the point where forest understory and herbaceous layers can recover. In all probability suppressed fragments of many species would recover if the browsing pressure were reduced. But it will take many years for this site to recover the species and structural diversity that it should have throughout.

A new program recently adopted by the Pennsylvania Game Commission allows owners of tracts of 1000 acres or more to prepare a deer management plan for submission to the Game Commission, excess doe licenses will be made available for use on lands with an approved deer management plan. This program has just been adopted and will be initiated beginning in 2001 (see attached information).

Avoid Fragmentation - Stockport Forest represents a largely unbroken expanse of forest that should be protected from fragmentation so it can continue to provide habitat for area sensitive species of mammals and birds. It is important to maintain the continuous forested slopes along the Delaware River to continue to provide habitat for bald eagles that are moving south along the river. A pair has nested in the river valley just north of the tract for the past few years. Coyote, bear, and bobcat are also present in the area. Fragmentation also facilitates invasion by non-native exotic plants. If residences are to be located within the Stockport Forest property we strongly recommend that they be sited along Route 191 or Stockport Road or in other peripheral areas.

Protect Steep Slopes - Steep slopes along the Delaware River and Stockport Creek should be protected from deforestation to reduce erosion and maintain the hydrological basis for the riverbank seeps that provide habitat for Chaminosso's miners lettuce.

Protect Headwaters Wetlands - Headwaters wetlands at the upper ends of tributary streams are important to maintaining steady flow in streams. These wetlands and adjacent areas should remain forested to preserve their hydrological function.

Control Exotic Invasive Plants - The scattered plants of multiflora rose that are present along woods roads and in several of the abandoned quarries should be removed as should the clumps of Japanese knotweed and purple loosestrife on the riverbank.
Revegetate Quarries - The old quarries should be allowed to revegetate with trembling aspen and other native species suited to the dry, open conditions. These naturally occurring early successional species will gradually be replaced by other forest species as the soil layer is rebuilt.

References Cited


Species Lists
(species marked with an asterisk are not native to Pennsylvania)

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<th>Scientific Name</th>
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common yellow wood-sorrel
cow-wheat
creeping buttercup
creeping spike-rush
daisy fleabane
dandelion
deer tongue grass
deerberry
diamond willow
dog violet
dogbane
doll's-eyes
drooping bluegrass
dwarf ginseng
dwarf raspberry
dwarf St. John's-wort
enchanter's nightshade
enchanter's-nightshade
English plantain
evening-primrose
evergreen wood fern
false hellebore
false Solomon's-seal
feverfew
field horsetail
flat-branched ground-pine
fly-honeysuckle
foamflower
forget-me-not
fowl mannagrass
fragile fern
fringed bindweed
fringed loosestrife
gaywings
goat's-beard
golden saxifrage
goldthread
gray birch
hardhack
hawthorn
hay-scented fern
heal-all
hemlock
hickory
Veronica officinalis*
Oxalis stricta
Melampyrum lineare
Ranunculus repens
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Taraxacum officinale
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Rubus pubescens
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Glyceria striata
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Polygala paucifolia
Tragopogon dubius*
Chrysosplenium americanum
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Betula populifolia
Spiraea tomentosa
Crataegus sp.
Dennstaedtia punctilobula
Prunella vulgaris*
Tsuga canadensis
Carya (seedlings)
hobblebush
hog- peanut
hooked crowfoot
horse-balm
hybrid oak
Indian cucumber-root
Indian pipes
interrupted fern
ironwood
jack-in-the-pulpit
Japanese knotweed
jewelweed
Juneberry
Kentucky bluegrass
lady fern
large yellow hop-clover
late goldenrod
leatherwood
long-leaved stitchwort
low cudweed
low smartweed
lowbush blueberry
lowbush blueberry
maidenhair fern
maidenhair spleenwort
maple-leaved viburnum
marsh bedstraw
marsh pennywort
meadow-sweet
mint
mountain holly
mountain laurel
mountain maple
mouse-eared hawkweed
muskflower
New York fern
nodding fescue
northern arrow-wood
northern beech fern
northern manna grass
northern wood-sorrel
oak fern
old-pasture grass
orange hawkweed
oxeye daisy
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Amphicarpa bracteata
Ranunculus recurvatus
Collinsonia canadensis
Quercus saulii
Medeola virginiana
Monotropa uniflora
Osmunda claytoniana
Carpinus caroliniana
Arisaema triphyllum
Polygonum cuspidatum*
Impatiens capensis
Amelanchier arborea
Poa pratensis*
Athyrium felix-femina
Trifolium aureum*
Solidago altissima
Dirca palustris
Stellaria longifolia
Gnaphalium uliginosum
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Adiantum pedatum
Asplenium trichomanes
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Galium obtusum
Hydrocotyle americana
Spiraea latifolia
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Ilex montana
Kalmia latifolia
Acer spicatum
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Festuca obtusa
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Glyceria borealis
Oxalis acetosella
Gymnocarpium dryopteris
Poa saltuensis
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Chrysanthemum leucanthemum*
painted trillium  
panic grass  
panic grass  
panic-grass  
pineberry  
pine rush  
peary everlasting  
Pennsylvania bittercress  
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pink lady's-slipper  
pinxtre-flower  
poison ivy  
poverty grass  
purple flowering raspberry  
purple loosestrife  
purple trillium  
pussy willow  
rattlesnake fern  
rattlesnake root  
red clover  
red elderberry  
red maple  
red mint  
red oak  
red raspberry  
reed canary grass  
Rhode Island bent  
ribbonleaf pondweed  
rock-cap fern  
rose mandarin  
rosebay rhododendron  
rough bluegrass  
round-leaved gooseberry  
round-leaved hepatica  
round-leaved orchid  
round-leaved violet  
royal fern  
running pine  
ryegrass  
sarsaparilla  
sedge  
sedge  
sedge  
sedge  
sedge

Trillium undulatum  
Panicum latifolium  
Panicum dichotomum  
Panicum linearifolium  
Mitchella repens  
Juncus tenuis  
Anaphalis margaritacea  
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Danhonia spicata  
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Rhododendron maximum  
Poa trivialis*  
Ribes rotundifolium  

Hepatica nobilis var. obtusifolia  
Platanthera orbiculata  
Viola rotundifolia  
Osmunda regalis  
Lycopodium clavatum  
Lolium sp.  
Aralia nudicaulis  
Carex arctata  
Carex appalachica  
Carex bromoides  
Carex communis  
Carex debilis var. rudgei
Carex deweyana
Carex digitalis
Carex echinata
Carex glaucodea
Carex gracillima
Carex gynandra
Carex intumescens
Carex laxiculmis
Carex laxiflora
Carex lurida
Carex normalis
Carex prasina
Carex radiata
Carex scabrata
Carex scoparia
Carex stipata
Carex straminea
Carex swanii
Carex trisperma
Carex utriculata
Onoclea sensibilis
Carya ovata
Juncus acuminatus
Pyrola elliptica
Salix sericea
Potentilla argentea*
Departia acrostichoides
Vicia tetrasperma*
Ranunculus abortivus
Solidago gigantea
Juncus effusus
Polygonatum pubescens
Lindera benzoin
Aralia racemosa
Rhus typhina
Trientalis borealis
Acer pensylvanicum
Acer saccharum
Potentilla recta*
Lysimachia terrestris
Rubus hispidus
Anthoxanthum odoratum*
Osmorhiza claytonii
Comptonia peregrina
Thalictrum pubescens
teaberry
three-way sedge
toad rush
trembling aspen
tuliptree
turtlehead
two-leaved toothwort
virgin's bower
water speedwell
watercress
white oak
white pine
white snakeroot
white wood aster
whorled loosestrife
wild basil
wild black cherry
wild ginger
wild strawberry
winterberry holly
witch-hazel
wood anemone
wood aster
wood geranium
wood nettle
wood-rush
woodland bluegrass
woodland horsetail
wrinkle-leaf goldenrod
yellow birch
yellow pond lily
zigzag goldenrod

Gaultheria procumbens
Dulichium arundinaceum
Juncus bufonius
Populus tremuloides
Liriodendron tulipifera
Chelone glabra
Cardamine diphylla
Clematis sp.
Veronica anagallis-aquatica
Nasturtium officinale*
Quercus alba
Pinus strobus
Eupatorium rugosum
Aster divaricatus
Lysimachia quadrifolia
Clinopodium vulgare*
Prunus serotina
Asarum canadense
Fragaria virginica
Ilex verticillata
Hamamelis virginiana
Anemone quinquefolia
Aster acuminatus
Geranium maculatum
Laportea canadensis
Luzula multiflora
Poa alsodes
Equisetum sylvaticum
Solidago rugosa
Betula allegheniensis
Nuphar lutea
Solidago flexicaulis