

SOUTH RIVER RESOURCES REPORT

NATURAL RESOURCES OF WEYMOUTH TOWNSHIP

STUDY PURPOSE

Weymouth Township's political boundaries surround a large segment of the South River watershed. This includes open land north of Eleventh Avenue and east of Route 50. Weymouth Township recognizes the open area supports native forests, wildlife and water resources. Acting upon this recognition, the Township's Environmental Commission funded a biological investigation to define the resources. Ted Gordon and Joe Arsenault were selected to provide field investigation and produce a report from field study on the peninsula's vegetation, important flora and fauna as well as any other identified resource.

METHOD OF STUDY

The investigators made three site visits to the peninsula and adjoining South River corridor lands. Visits were made in the spring, summer and fall of 1999 (April 29, July 7, September 30, 1999). The site was walked or driven where access existed to insure coverage of portions of the land identified by the Township Environmental Commission (Figure 1: Study Area). All existing vegetation types were noted and the important characters of the flora and fauna were recorded. The landscape and soils are characterized as well.

DESCRIPTION OF THE STUDY AREA

GEOLOGY & PHYSIOGRAPHY

Weymouth Township's portion of South River is situated on an Outer Coastal Plain lowland terrace. This terrain formed on a Cohansey Formation outcrop capped with a veneer of Cape May Gravel that has been weathered and eroded by time, wind and water. The South River valley is a wide, gentle depression formed by thousands of years of run off and seeps. At the western end of the study area, near the headwaters, the stream is narrow (<7' wide) and shallow (<3' deep). Near the terminus, the South River joins an ancient oxbow of the Egg Harbor River and triples in size and volume.

SOILS

The soils formed from the Cohansey and Cape May formations are fine to medium sand and gravel. The Atlantic County Soil Survey, Sheets 30, 31 and 38, has classified the soils. The uplands east of Route 50 support Lakehurst Sand (LaA) and Lakewood Sand (LeA). West of Route 50, the landscape changes slightly. The terrain begins to rise in elevation toward the South River headwaters. On this landscape, Lakehurst and Lakewood give way to Evesboro, Aura and Matawan Sand on the higher topographies and slopes.

VEGETATION

Today's landscape resembles the regionally distinct Pine Barrens, with a slight coastal influence. Situated southwest of the county seat. Mays Landing, the South River peninsula is relatively undeveloped. Residential dwellings cluster around the little village of Belcoville, as well as along the township and State roads such as Route 50, Lowell Street and West Riverside Drive. The study area encompasses a portion of land abutting the Egg Harbor River as well as the headwaters of the South River. Each provides distinct environmental conditions, producing subtle changes to the natural vegetation. The western end of the study area surrounds the non-tidal watershed of the South River. The landscape's hydric soils support an oak-pine forest characteristic of Atlantic County's Bridgeton Cap uplands. Deciduous hardwoods, primarily oaks, with a small component of pitch pine and short leaf pine, dominate the forest. The forests do not show signs of repeated fire, but do show signs of repeated logging. The forest, for the most part, is composed of multi-aged stands of re-sprouting oak forest. Multiple stemmed trees predominate and provide a clear indication of timber harvesting. Scarlet, white, black, southern red, chestnut oaks provide a 40 to 60% canopy closure. The forest is stratified with few sub-canopy trees and shrubs. Black huckleberry, inkberry, lowbush blueberry, and teaberry dominate the forest floor. Dangleberry, scrub oak and staggerbush are less pronounced members of this dense understory. The wetland end of this non-tidal continuum is dominated by red maple. Hardwoods such as black gum, gray birch, and sweet-bay magnolia are the other dominant trees. Atlantic white cedar and pitch pine are also present to a lesser degree, but do form pure stands where disturbance removed the hardwoods, providing space for the evergreen trees. A dense, multi-layered thicket of shrubs and vines entangles most of the understory in the wetland corridor. This thicket includes many ericaceous and related species such as sweet pepperbush, fetterbush, high-bush blueberry, swamp azalea, and other plants like nannyberry, winterberry, and greenbrier.

A different set of habitats exists further down stream, close to the tidal water. A subtle yet gradual change is visible the closer one gets to the distinct open waters of the confluence of the two regional waterways. The dense canopy of the wetlands in the headwater corridor gives way to a leading edge of tidal inundation. Here trees die and remain standing as the gradual sea-level rise covers the non-tidal landscape. Further downstream, most tree snags have collapsed and the river edge opens up to a freshwater marsh. The marsh gradually dominates the landscape and eventually becomes the dominant vegetation at the confluence of the Great Egg and South rivers. The leading edge of the freshwater marsh is dominated by tussock sedge, golden club, spatterdock and arrowhead. Dodder and other vines are interlaced into the fabric of the mixed shrub and herbaceous dominated vegetation. Further down, near the confluence, the marsh vegetation become more complex. Species such as wild rice, tall cord grass, sweet flag and broad-leaf cattail become major components, nearly displacing the marsh species encountered upstream. The soils and micro-topography of the uplands also changes, reflecting the lowland

position within the corridor. The upland is a series of dunes comprised of materials re-deposited from the Bridgeton Formation found in the headwaters. Coarse sand deposited in long narrow ridges show signs of water deposition and Aeolian reworking. Upon these dunes are typical pine barren forests. Pitch pine and short needle pine are dominating primarily due to the coarse xeric soil but also due to the intensive disturbances created by the historic Belcoville complex. Black jack, post, black, southern red and scrub oaks also exist on this droughty soil.

SPECIAL FEATURES OF THE STUDY AREA

The South River Study Area provides a large setting with many possible species groupings. The site inspection found numerous items of interest, which are described in the following category assessments.

NATURAL LANDSCAPES

The study area stretches between the Bridgeton Formation and the Cohansey Formation. Both are common southern New Jersey unconsolidated geologies. Their location, however, in close proximity, provides an interesting series of topographies.

1. The Upland Cape May Formation Cap: This is the origin for the South River. This upland landscape is dominant across southern New Jersey Upland Interior, and this forms an eastern leading edge. This upland landscape dominates the Pleistocene deposit from New Jersey's cuesta to the headwaters of the major regional rivers. This setting provides a relatively steep gradient between the finer Cape May sediments to the more coarse Cohansey deposits. A drop of approximately 50' occurs from the headwaters of the South River to the confluence with the Egg Harbor River. This area is important for its upland ecosystem continuity as well as its water recharging resources.

2. The Riverine Dune Complex: This landscape exists between the South River and the Great Egg Harbor River, south of Belcoville. Dunes are normally associated with oceanic beaches and dry arid landscapes. Here, in Weymouth Township, dunes are the relic evidence of a once active flooding regime. The parallel ridges and orientation indicate that the origin of the dune system is periodic, severe river flooding. Subsequent actions of the wind reshaped the sandy deposits into the features we see today. These are a very unusual landscape features in New Jersey. They have importance because they are visual remnants of an ancient landscape that has otherwise been muted and smoothed by the eastern North American climate and vegetation.

3. Freshwater Tidal Flats: Open mud and freshwater marshes are dynamic. The conditions that surround the tidal river deposits are very fine silts, clays and organic fragments from the South River and Great Egg Harbor watersheds. This accumulation will eventually erode and be replaced with a

more saline environment and quite possibly open water as regional sea level rises. Freshwater marshes are important for their varied vegetative covers, wildlife habitats and the positive impacts to regional water quality.

VEGETATION

The South River Study Area supports vegetation types common to southern New Jersey's Southern Pine Barrens. The following are among the more noteworthy vegetation habitats.

Atlantic white cedar swamps: This vegetation type is a limited forest type throughout New Jersey. The South River Study Area supports small concentrations of Atlantic white cedar throughout the corridor. Most exist as small stands within the larger red maple hardwood swamp complex. This tree is a critical and characteristic component of southern New Jersey's coastal plain wetlands. Atlantic white cedar forests support a wide array of typical pine barren species, some of which are protected by statute.

Non-tidal Freshwater Marshes: Marsh habitats are confined to the stream corridor in the headwaters of the South River, as well as the fringed edges of the river within the tidal portion of the river. This wetland type is non-tidal and maintained by persistent disturbance and inundation. One small marsh exists under the PSE&G power line. This is maintained by mowing within the right-of-way. A second open marsh is present upstream of Eleventh Avenue. A constriction in the stream flow caused by the Eleventh Avenue causeway dams water that allows for a small non-tidal marsh to exist. These habitats are limited in size and dependent on human intervention to persist.

Tidal Freshwater Marshes: This wetland cover type is an important yet limited habitat on New Jersey's Atlantic Ocean drainage systems. Most coastal freshwater marshes are small, found as a narrow fringe associated with a small segment of the tidal watercourse. The South River and the tidal edge of the Great Egg Harbor River, however, support extensive freshwater tidal marshes. These are some of the largest freshwater marshes associated with the Atlantic drainage in New Jersey. Nowhere else in Atlantic County are freshwater marshes so extensive and relatively free of modern disturbances. This vegetation type is also known to support very rare plants such as Parker's Pipewort and sensitive joint vetch. Important as a food source, wild rice and other large seed producing plants exist and provide seasonal calories to migrating ducks and perching birds.

Pitch Pine Lowlands: This characteristic pine barren habitat is found within the intra-dune swales on the peninsula between the South and Egg Harbor rivers. This habitat supports characteristic pine barren flora and is an archetype of pine barren vegetation.

Open Water-Aquatic Bed: The extent of this habitat is not known, but constitutes an important habitat for marine fisheries and migrating waterfowl. Wild celery, sago, clasping-leaf, small and ribbon-leaf pondweeds & swaying bulrush are species expected to occupy this limited

habitat. The vegetation type is elevated to a stature of notoriety because the river has an exceptional inter-tidal habitat without extensive modern pollution or dredging impacts.

FLORA

The plant life in the South River corridor is composed of a flora reflecting pine barren affinities, yet with indications of different nutrient inputs. Many characteristic pine barren plants abound within the study area. The upland oak-pine and pine-oak woodlands support the typical array of species. The same is true for the wetland areas. A few, however, stand out because of their rarity or status within our local flora.

At the close of the field investigations, three characteristic pine barren plants were verified in their appropriate habitats. Sand myrtle, turkey beard and pyxie moss are found in pitch pine lowland conditions on the intra-dune landscape of the peninsula between the Egg Harbor and South rivers. These plants are found nowhere else in New Jersey but the Pine Barrens. Their presence within the study area provides an important link between the local South River plant community and the surrounding, greater Pine Barrens region.

Although suitable rare species habitat exists within the study area, only one State Natural Heritage Program tracked species was identified during the study. The plant, wild lupine, (*Lupinus pennnis*) is a S-3 (25-100 colonies) species with a declining population in New Jersey. Wild lupine is a member of the pea family. It produces a beautiful blue- purple flower in May. This species is found along the abandoned railroad bed, near its intersection with the high power line. Its characteristic leaf is visible in widely scattered clumps on the north and south side of the old railroad.

FAUNAL RESOURCES

No systematic faunal investigation was undertaken in this study. It is assumed all common mammals and avian faunal species characteristic of the various vegetation types exist. Common upland mammals such as gray and red squirrel, white-tailed deer, pine vole, white foot mouse raccoon, opossum, and cottontail rabbit are ubiquitous throughout the state, and are assumed to have the same population dynamics within the study area. Reptiles such as the black rat snake banded water snake, garter snake, box turtle, snapping turtle, mud turtle, red-bellied turtle and eastern fence swift are common and assumed present throughout the study site. The study site's proximity to large open water of the South River and the Great Egg Harbor River provides habitat to unusual species such as river otter, mink and the wide variety of birds adapted to the inter-tidal flats. Herons, egrets and other wading birds have ample habitat at low tide to forage for freshwater invertebrates. Notable species observed include the osprey and bald eagle, both seen in the vicinity of the tidal rivers confluence.

CULTURAL RESOURCES

Man has always been a critical part of the South River-Great Egg Harbor River ecosystem. From the earliest periods of human existence in North America to the present day, man has been a part of this system. The work provided for this biological survey also discovered many sites

distinguished by their cultural affinities. "The items found put the South River area in an important position as a focal point of regional cultural heritage.

1. Prehistoric Aboriginal Loci: Early man is known from numerous sites throughout southern New Jersey. Early collectors discovered tools and other evidence between the South and Egg Harbor rivers. While conducting the botanical phase of this investigation the survey team also found lithic evidence left on the landscape by these people. At least five separate encampments are currently exposed within the study area. (Refer to the Cultural Resource Map found in the Appendix of this report.) Stone tools, flakes and bits of ancient pottery abound where the camps once flourished. There are, no doubt, more prehistoric human sites within the study area. Many aboriginal sites were occupied as late as the time of the first arrival by Europeans, but many were long lost to even the native memory by that time. The sites span a period from the middle Archaic Period (5,000-1,500 B.C.) up to the most recent Late Woodland Period (1,000-1,500 A.D.), is well represented in the debris (see photocopy in appendix). The sites discovered during this survey are located in logical situations, along the river's upland terraces. These are areas where sandy soil conditions and close proximity to water exist. Lithic scatters have been identified throughout the watershed, from the South River headwaters to the last spit of accessible upland at the southern edge of the study area.

2. Colonial Occupation: Mays Landing and the surrounding environments have been important to American history. The riverine corridors carried timber, grain, ore and finished products to Europe during the colonial occupation by Great Britain. The region was important during the revolutionary war and was part of the early industrial might of the young United States. Shipping, shipbuilding, iron manufacturing, glass and collection of raw materials were once the backbone of the regional economies. Sites such as Walkers Forge, today a place name on the upper South River, were an important local source for employment and supplied materials throughout the region. Other activities, such as charcoal making and forest harvesting have left subtler, though ever present, ecological scars on the reforested landscape.

3. Belcoville and Related Industries:

Belcoville was a World War I munitions plant operated to produce explosives. Manufacturing occurred in isolated bunkers scattered throughout the land located east and south of the named village. A rail line passed through the plant and carried raw products to this and other destinations within Weymouth Township. Today, all that remains are eroded revetments, derelict concrete ruins, abandoned railroad beds and dirt

roads. These are the remnants and the sole identifiers of this once bustling community. These ruins, as degraded as they are, provide a link to the earliest parts of the 20th century and together with the two or three other pine barren munitions plants attest to the importance of New Jersey's products to the health and wealth of the nation.

CONCLUSION

The South River study area is a unique and interesting natural site. The study area supports typical southeastern New Jersey biotic resources and as well as unusual landscapes. Our study found few living resources with limited distributions (protected species), but it did find a healthy, vibrant ecosystem that is unique by virtue of its location and type. Modern landscape interpretations focus on physical features that define a landform. Watersheds have become the current model or unit of landscape subdivision that is readily definable and self-contained.

The South River watershed supports a wetland corridor that is a small, confined coastal drainage. The compact nature of the system provides headwater, mid-channel and lower tidal habitats that exist in a relatively short distance. From headwaters on gravel outcrops to coastal marshes on muck and peat, this drainage corridor is a good representation of New Jersey's important coastal environments. Weymouth Township's natural and man-made resources are also well represented within the study site. Oak-pine and pine-oak uplands, old-fields, hardwood and evergreen wetland forests, shrub thickets and freshwater tidal marshes are all represented, each providing an important component to the sustenance and maintenance of the natural communities.

The presence of many habitats compressed into a short distance and their proximity to navigable waters has provided motivation for human use and occupation for many years. The evidence of a continued use from the early prehistoric time to the present indicates how important the area is to human needs. Our presence in the region, studying the natural communities, also attests to modern culture's interest in the resources it continues to support.

The information presented in this document should act as a starting point for future investigations into the watershed's natural resources. There will, no doubt, be new finds and discoveries that will add to this interpretation. With that in mind, the following recommendations are made:

1. Current GIS information for soils, wetland cover and land use is available as digital data. It is recommended the township obtain or produce annotated maps from the available digital data as supplements to this report
2. Any new flora or fauna records should be kept in an easily accessible file, or on a list that is easily updated. Encourage regular inspections and updates by township residents and regional professionals.

3. As with every landscape, the South River study area will change. Incorporate long-term updates into a periodic summary that will provide information on the dynamic nature of the upper extreme of this coastal ecosystem.

PRELIMINARY LIST OF PLANTS OBSERVED

Taxonomy follows Gleason, H.A. & A. Cronquist. 1991. Manual of Vascular Plants of the Northeastern United States and Adjacent Canada, 2nd ed. New York Botanical Garden, Bronx, NY

FERNS/MOSSES

Asplenium platyneuron - ebony spleenwort
Osmunda cinnamomea - cinnamon fern
O. regalis - royal fern
Thelypteris palustris - marsh fern
Pteridium aquilinum - bracken fern
Woodwardia areolata - netted chain fern
W. virginica - Virginia chain fern
Sphagnum tenerum - a peat moss
S. compactum - a peat moss
Sphagnum spp. - peat mosses (2)

SHRUBS & SUB-SHRUBS

Ainus serrulata - common alder
Viburnum dentatum - arrowwood
V. cassinoides - witherod
V. nudum - naked witherod
Rhododendron viscosum - swamp azalea
Myrica pensylvanica - common bayberry
M. cerifera - wax myrtle
Rubus allegheniensis - common blackberry
Vaccinium corymbosum - highbush blueberry
V. pallidum - lowbush blueberry
Cephalanthus occidentalis - buttonbush
Aronia arbutifolia - red chokeberry
Leucothoe racemosa - fetterbush
Smilax rotundifolia - common greenbrier
Corylus americana - American hazelnut
Gaylussacia baccata - black huckleberry
G. frondosa - dangleberry
G. dumosa - dwarf huckleberry
Hudsonia ericoides - heath-like hudsonia
Ilex glabra - inkberry
I. verticillata - common winterberry
Kalmia angustifolia - sheep laurel
K. latifolia - mountain laurel
Chamaedaphne calyculata - leatherleaf
Decodon verticillatus - swamp loosestrife
Lyonia ligustrina - maleberry

L. mar i ana - staggerbush
Toxicodendron radicans - poison ivy
T. vernix - poison sumac
Opuntia humifusa - prickly-pear
Pyxidantha barbula - pyxie
Hypericum densiflorum - shrubby St. John's-wort
Leiophyllum buxifolium - sand myrtle
Elaeagnus umbellata - autumn olive
Amelanchier canadensis - swamp shadbush
Rhus copallinum - dwarf sumac
Comptonia peregrina - sweetfern
Clethra alnifolia - sweet pepperbush
Crataegus uniflora - dwarf thorn
Epigaea repens - trailing arbutus
Campsis radicans - trumpet-creeper
Gaultheria procumbens - wintergreen or teaberry
Chimaphila maculata - spotted wintergreen

TREES

Ailanthus altissima - tree of heaven
Betula populifolia - gray birch
Catalpa bignonioides - southern catalpa
Prunus serotina - wild black cherry
Chamaecyparis thyoides - Atlantic white cedar
Juniperus virginiana - red cedar
Cornus florida - dogwood
Nyssa sylvatica - sour or black gum
Liquidambar styraciflua - sweet gum
Celtis occidentalis - hackberry
Carya pallida - sand (pale) hickory

Ilex opaca - American holly
Magnolia virginiana - swamp magnolia
Acer rubrum - red maple
Morus rubra - red mulberry
Quercus velutina - black oak
Q. marilandica - blackjack oak
Q. ilicifolia - bear or scrub oak
Q. prinus - chestnut oak
Q. stellata - post oak
Q. coccinea - scarlet oak
Q. falcata - southern red oak or Spanish oak
Q. alba - white oak
Diospyros virginiana - persimmon
Pinus taeda - loblolly pine (planted)
P. rigida - pitch pine
P. sylvestris - scotch pine (planted)
P. echinata - shortleaf pine
P. virginiana - Virginia pine
Sassafras albidum - sassafras
Juglans nigra - black walnut

HERBACEOUS PLANTS

Sagittaria latifolia - broad-leaved arrowhead
S. engelmanniana - Englemann ' s arrowhead
Peltandra virginica - arrow arum
Aster novi-belgii - New York aster
Galium palustre - marsh bedstraw
Bidens connata - purplestem beggar-ticks
B. laevis - showy bur-marigold
Uvularia sessilifolia - sessile-leaved bellwort
Rumex verticillatus - water-dock
Utricularia geminiscapa - hidden fruited bladderwort
Potentilla canadensis - Canada or running cinquefoil
Liatris graminifolia - hairy blazing star
Sparganium americanum - slender bur-reed
Lespedeza procumbens - downy trailing lespedeza
Lobelia cardinalis - cardinal flower
L. nuttallii - Nuttall's lobelia
Typha latifolia - broad-leaved cattail
Mikania scandens - climbing heropweed
Oxypolis rigidior - cowbane
Melampyrum lineare - cow-wheat
Cuscuta gronovii - common dodder
Erechtites hieracifolia - white fireweed
Helianthemum canadense - frostweed
Tephrosia virginiana - goat's-rue
Iris pseudacorus - yellow flag
Solidago canadensis var. scabra - common goldenrod
S. graminifolia - flat-topped or grass-leaved goldenrod
S. fistulosa - pine barren goldenrod
S. rugosa - wrinkled-leaved goldenrod
Vernonia noveboracensis - ironweed
Eupatorium dubiuro - Joe-pye-weed
E. rotundifolium var. ovatum - hairy thoroughwort
E. pilosum - rough thoroughwort or boneset
E. rugosum - white snakeroot
Polygonella articulata - coast jointweed
Spiranthes cernua - nodding ladies-tresses
Cypripedium acaule - lady's- slipper
Lupinus perennis - wild lupine
Polygala lutea - orange roilkwort
Habenaria (Platirthera) blephariglottis- white fringed orchid
Pontederia cordata - pickerel weed
Petrohagia prolifer - childing pink
Lechea racemulosa - oblong fruited pinweed
Sarracenia purpurea - pitcher plant
Spargula morisonii - spurrey
Acorus calamus - sweet flag
Triadenum virginicum - marsh St. John's-wort
Arenaria (Minuartia) caroliniana - pine barren sandwort
Ludwigia alternifolia - Seedbox
Scutellaria integrifolia - hyssop skullcap
Euphorbia epicacuanhae - ipecac spurge
Drosera intermedia - spatulate-leaved sundew
Polygonum sagittatum - arrow-leaved tearthumb

P. punctatum - dotted smartweed
P. arifolium - halberd-leaved tearthumb
Desmodium paniculatum - paniced tick-trefoil
Nuphar lutea spp. *advena* - spatterdock
Lilium superbum - turk's- cap lily
Linaria canadensis - blue toadflax
Xerophyllum asphodeloides - turkeybeard
Epilobium coloratum - purple-leaved willow-herb
Xyris difformis - yellow eyed grass

GRASSES

Spartina cynosuroides - big cord grass
Panicum clandestinum - deer's tongue
P. verrucosuro - warty panic grass
P. virgatuin - switch grass
P. dichotomum - forked panic grass
Phragmites australis - common reed
Andropogon glomeratus - bushy beardgrass
A. virginicus -broom-sedge or Virginia beardgrass
Chasmanthium laxurn - slender spike grass
Glyceria obtusa - blunt mannagrass
G. striata - fowl mannagrass
Phalaris arundinacea - reed canary grass
Stipa avenacea - black oat grass
Elymus virginicus - Virginia rye grass
Microstigium vimineus - stilt grass
Zizania aquatica - wild rice

SEDGES/RUSHES

Scirpus cyperinus - woolgrass
Eleocharis tenuis - slender spikerush
Scleria triglomerata - tall nut rush
Dulichium arundinaceuro - three-way sedge
Eriophorum virginicum - Virginia cotton grass
Rhynchospora alba - white beaked rush
R. capitellata - small-headed beaked rush
Carex foliculata - long sedge
C. striata - Walter's sedge
C. canescens v. *disjuncta* - silvery sedge
C. pensylvanica - Pennsylvania sedge
C. nigromarginata - black-edged sedge
C. bullata - button sedge
C. umbellata - umbel-like sedge
Juncus canadensis - Canada rush
J. effusus - soft rush

This report was prepared by Ted Gordon and Joseph Arsenault/Pine Barren Inventories, Southhampton NJ and the Weymouth Township Environmental Commission.