

Designation Study and Recommendation for Inclusion of West Branch Wading River in the Natural Areas System

August 9, 2017

Name of Site: West Branch Wading River Natural Area

Name of Natural Areas Register Site: West Branch Wading River

Percentage of Register Site: 37 %

Acreage: 1,367 acres

Location: Washington Township, Burlington County

I. MANAGEMENT OBJECTIVE

Protection and management of globally rare pine barrens riverside savanna community, and large occurrences of the globally rare and state endangered plant bog asphodel, as well as other rare plant and animal species.

II. EVALUATION OF SIGNIFICANCE AND PROTECTABILITY

A. Quality – overall quality of the site including:

1. Inherent ability to perpetuate features of concern:

The features of concern, most notably pine barrens riverside savannas and bog asphodel (*Narthecium americanum*) populations, are often associated with more stable floodplain habitats of old abandoned stream channels which are filled with sediment or organic matter and continually saturated by ground water seepage (Walz et. al., 2006). If present in the natural area, this more stable habitat type may provide some inherent ability to perpetuate the features of concern, provided hydrologic processes are not disrupted by local water uses. The role of sporadic wildfire or disturbance in maintaining savanna and bog asphodel in continuous seepage habitats is not well understood, but may be a secondary factor in their establishment or long term persistence. The savanna community and associated rare species are also associated with less stable habitats which lack continuous seepage, primarily created by severe disturbance events which removed competing woody species, such as severe turf-consuming wildfire, prolonged flooding by beaver, mechanical turfing, or bog iron mining (Walz et. al., 2006). In the absence of fire or disturbance to check

succession, these less stable habitats supporting savannas may revert to cedar swamps or other woody communities.

2. Size of site sufficient to perpetuate features of concern:

The size of the natural area provides immediate protection to the features of concern, and surrounding parts of Wharton State Forest provide additional buffering and watershed protection. However, the size of the natural area may still not be sufficient to perpetuate all the features of concern, due to potential hydrologic and water quality impacts from privately owned cranberry agricultural lands nearby and upstream.

3. Size of populations sufficient to assure perpetuation of biotic features:

Most populations of rare plant and animal elements that occur in pine barren riverside savannas and associated habitats appear to be of sufficient size to be self-perpetuating for the near future, although management may be needed to assure their long term survival. Management to reverse woody succession or create new habitats, and to reduce several ongoing and potential threats, may be needed.

4. Integrity of site sufficient to illustrate features of concern:

The integrity of the pine barren riverside savannas and rare species habitats are currently sufficient to illustrate these features of concern, since all are still dominated by the natural communities, rare species and natural hydrologic processes characteristic of these habitats. However, some signs of hydrologic alteration, off-highway vehicle (OHV) impacts, and human trampling impacts are apparent in other parts of Wharton State Forest in the vicinity.

B. Diversity – significant diversity of biotic features and number of plant and/or animal species per community:

Several examples of the rare pine barrens riverside savanna are found along the rivers within this proposed natural area. This Pinelands community type is considered globally imperiled and endemic to New Jersey (Table 1) and provides habitat for numerous rare plant species. This herbaceous wetland community is restricted worldwide to the New Jersey Pinelands and occurs among a diverse mosaic of stream-floodplain habitats, generally within old abandoned stream channels which are filled with sediment or organic matter and are often saturated. Occurrences are usually separated from the river proper by a well-developed levee. Sparsely vegetated areas of bog iron are present in some occurrences, often in the bed of the old stream channels. Areas within some occurrences are influenced by ground water seepage, usually adjacent to an Atlantic white cedar swamp. Flooding from the adjacent river occurs periodically, generally first at the

downstream end. The physiognomy is somewhat variable, but is generally characterized by coarse mid-height grasses, sedges, and herbs. Some areas, generally those of slightly higher elevations, also support a sparse tree or shrub cover, which grades into pitch pine - heath lowland vegetation types. At the wetter end of the hydrologic gradient, this vegetation becomes predominantly hydrophytic, dominated by rushes, sedges, and aquatic herbs. Characteristic species include bog asphodel, gold crest (*Lophiola aurea*), downy oatgrass (*Danthonia sericea*), and pine barrens smokegrass (*Muhlenbergia torreyana*). Associates are varied among occurrences but often include golden club (*Orontium aquaticum*), pipewort (*Eriocaulon decangulare*), Nuttall's reedgrass (*Calamagrostis coarctata* = *Calamagrostis cinnoides*), India lovegrass (*Eragrostis pilosa*), three-way sedge (*Dulichium arundinaceum*), clustered beaked rush (*Rhynchospora glomerata*), beaked rush (*Rhynchospora gracilentia*), rush (*Juncus acuminatus*), false asphodel (*Tofieldia racemosa*), pitcher plant (*Sarracenia purpurea*), slender blue flag (*Iris prismatica*), swamp azalea (*Rhododendron viscosum*), panic grass (*Dichanthelium dichotomum*), cranberry (*Vaccinium macrocarpon*), rose pogonia (*Pogonia ophioglossoides*) and grass pink (*Calopogon tuberosus*) (Breden et al., 2001). The site also includes high quality examples of Atlantic white cedar swamp and pitch pine lowland vegetative community types (Table 1).

Table 1: Rare and common ecological communities in the proposed West Branch Wading River Natural Area. Community classification includes state common names and National Vegetation Classification names in parentheses, preliminary ranks from NatureServe/NJ Natural Heritage Program for global (G) and state (S) ranks from Breden et al. (2001), Walz et. al. (2006), NJDEP (2017) and Windisch (2017).

Rare Community Types	Rank
Pine Barrens riverside savanna (multiple types) – includes two alliances and six types present at WBWR per K. Walz; NJNHP Database entry pending	
Pine Barrens riverside bog asphodel savanna (RS2) (<i>Chamaecyparis thyoides</i> / <i>Nartheceum americanum</i> - <i>Sarracenia purpurea</i> - <i>Drosera filiformis</i> / <i>Sphagnum pulchrum</i> Saturated Woodland)	G2S2
Pine Barrens riverside shrub savanna (RS1) (<i>Chamaecyparis thyoides</i> / <i>Gaylussacia dumosa</i> / <i>Andropogon glomeratus</i> var. <i>glomeratus</i> Woodland)	G2G3S2
Pine Barrens riverside twig-rush savanna (RS4) (<i>Cladium mariscoides</i> - <i>Panicum rigidulum</i> var. <i>pubescens</i> Herbaceous Vegetation)	G3S2S3
Pine Barrens riverside sedge savanna (RS5) (<i>Rhynchospora (alba, cephalantha)</i> - <i>Muhlenbergia uniflora</i> - <i>Lophiola aurea</i> Herbaceous Vegetation)	G2S2
Pine Barrens riverside muhly savanna (RS6) (<i>Muhlenbergia torreyana</i> - <i>Lobelia canbyi</i> - <i>Rhynchospora alba</i> Herbaceous Vegetation)	G2S2
Seven-angle pipewort – brown-fruit rush riverside savanna (RS3) (<i>Eriocaulon aquaticum</i> - <i>Juncus pelocarpus</i> – <i>Drosera intermedia</i> Herbaceous Vegetation)	G3G4 S2S3

Rare and Common Community Types	Rank
Atlantic white cedar swamp (<i>Chamaecyparis thyoides</i> / <i>Ilex glabra</i> - <i>Rhododendron viscosum</i> Forest)	G3S3
red maple – black gum swamp (<i>Acer rubrum</i> - <i>Nyssa sylvatica</i> - <i>Magnolia virginiana</i> / <i>Vaccinium corymbosum</i> - <i>Leucothoe racemosa</i> Forest)	G3G4? S3S4?
pitch pine-red maple swamp (<i>Pinus rigida</i> - <i>Acer rubrum</i> / <i>Vaccinium corymbosum</i> - <i>Clethra alnifolia</i> - <i>Leucothoe racemosa</i> Forest)	G3S3
pitch pine lowland (<i>Pinus rigida</i> Saturated Woodland Alliance)	G3S3
Pinelands highbush blueberry bog (<i>Vaccinium corymbosum</i> - <i>Rhododendron viscosum</i> - <i>Clethra alnifolia</i> Shrubland)	G3G4S3
Central Pinelands oak-pine forest (<i>Quercus coccinea</i> - <i>Quercus velutina</i> / <i>Sassafras albidum</i> / <i>Vaccinium pallidum</i> Forest)	G4G5? S4S5?

The New Jersey Natural Heritage Database contains documented records for 19 rare plant species and two rare animal species in West Branch Wading River (Table 2). Based on the locational precision of the record and the observation date, all of these species are believed to be extant in the proposed natural area. Among these are several high quality occurrences of the globally rare and state endangered species bog asphodel found worldwide only in association with the globally rare and New Jersey endemic pine barren riverside savannas and other habitats of the New Jersey Pine Barrens (Breden et al., 1998).

Table 2: Rare plants and animals documented in the Natural Heritage Database within the proposed West Branch Wading River Natural Area, or which are probable based on documentation in similar adjacent habitats within the West Branch Wading River Register Site (*).

Scientific Name	Common Name	Rank / NJ Status
Plants		
<i>Calamagrotis pickeringii</i>	Pickering's reedgrass	G4S1 / SE, LP
<i>Calamovilfa brevipilis</i> *	pine barrens reedgrass	G4S4 / LP
<i>Carex barrattii</i> *	Barratt's sedge	G4S4 / LP
<i>Cleisthes divaricata</i> *	spreading pogonia	G4S1 / SE, LP
<i>Gentiana autumnalis</i>	pine barrens gentian	G3S3 / LP
<i>Juncus caesariensis</i>	New Jersey rush	G2G3S2 / SE, LP
<i>Lobelia canbyi</i>	Canby's lobelia	G4S3 / LP
<i>Muhlenbergia torreyana</i>	pine barrens smokegrass	G3S3 / LP
<i>Nartheccium americanum</i>	bog asphodel	G2S2 / SE, LP
<i>Panicum scabriusculum</i>	sheathed panic grass	G4S3
<i>Potamogeton confervoides</i>	algae-like pondweed	G4S2
<i>Rhynchospora cephalantha</i>	large-headed beaked rush	G5S3 / LP
<i>Rhynchospora inundata</i> *	horned beaked rush	G3G4S2 / LP

<i>Rhynchospora knieskernii</i>	Knieskern's beaked-rush	G2S2 / SE, LP, LT
<i>Rhynchospora oligantha</i>	few-flowered beaked rush	G4S2
<i>Rhynchospora pallida</i>	pale beaked-rush	G3S3
<i>Schizaea pusilla</i>	curly grass fern	G3G4S3 / LP
<i>Scirpus longii</i> *	Long's bullrush	G2S2 / SE, LP
<i>Sphagnum cyclophyllum</i> *	a peat moss	G3S2
<i>Smilax pseudochina</i>	bamboo vine	G4G5S3
<i>Tofieldia racemosa</i>	false asphodel	G5S1 / SE, LP
<i>Xyris caroliniana</i>	sand yellow-eyed grass	G4G5S1 / SE, LP

Explanation of NJ Status

Codes for Plants:

SE - Listed as State Endangered

LP - Listed by Pinelands Commission as endangered or threatened

LT - Federally Listed as threatened

Animals		
<i>Accipiter cooperii</i>	Cooper's Hawk	G5S3B,S4N / SC
<i>Anaxyrus fowleri</i>	Fowler's Toad	G5S3 / SC
<i>Buteo platypterus</i>	Broad-winged Hawk	G5S3B,S4N / SC
<i>Caprimulgus vociferus</i>	Whip-poor-will	G5S3B,SUN / SC
<i>Celithemis martha</i> *	Martha's Pennant (a dragonfly)	G4S3S4 / SC
<i>Clemmys guttata</i>	Spotted Turtle	G5S3 / SC
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	G5S3B,S4N / SC
<i>Crotalus h. horridus</i>	Timber Rattlesnake	G4T4S1 / SE
<i>Dendroica virens</i>	Black-throated Green Warbler	G5S3B,S4N / SC
<i>Haliaeetus leucocephalus</i>	Bald Eagle	G5S1B,S2N / SE
<i>Helmitheros vermivorum</i>	Worm-eating Warbler	G5S3B,S4N / SC
<i>Hyla andersonii</i>	pine barrens treefrog	G4S2 / ST
<i>Hylocichla mustelina</i>	Wood Thrush	G4S3B,S4N / SC
<i>Lampropeltis getula getula</i>	Eastern Kingsnake	G5T5S3 / SC
<i>Lithobates virgatipes</i>	Carpenter Frog	G4S3 / SC
<i>Lynx rufus</i>	Bobcat	G5S2 / SE
<i>Macromia alleghaniensis</i>	Allegheny River Cruiser (a dragonfly)	G4S3 / SC
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	G5S2B,S2N / ST
<i>Myotis septentrionalis</i>	Northern Myotis	G1G2S1 / FT
<i>Neonympha helicta</i>	Georgia Satyr (a butterfly)	G3G4S3 / SC
<i>Pantherophis guttatus</i>	Corn Snake	G5S1 / SE
<i>Parula americana</i>	Northern Parula	G5S3B,S4N / SC
<i>Pituophis m. melanoleucus</i>	Northern Pine Snake	G4T4S2 / ST
<i>Strix varia</i>	Barred Owl	G5S2B,S2N / ST
<i>Terrapene carolina carolina</i>	Eastern Box Turtle	G5T5S3 / SC
<i>Toxostoma rufum</i>	Brown Thrasher	G5S3B,S4N / SC
<i>Wilsonia citrina</i>	Hooded Warbler	G5S3B,S4N / SC

Explanation of NJ Status

Codes for Animals:

SE - Listed as State Endangered

ST - Listed as State Threatened

SD - Listed as State Declining

SC - Species of Concern in New Jersey

FT - Federally Listed Threatened

C. Scarcity - relative scarcity or uniqueness of plant and animal species, community types and/or wildlife habitats:

The pine barren riverside savanna community and bog asphodel are restricted to very limited floodplain habitats of the New Jersey Pinelands. Some percentage of these savannas and habitats have been destroyed by cranberry bogs or altered by woody succession. Therefore, these habitats are quite scarce within the Pinelands region, and they are found nowhere else in the world.

D. Buffers – presence and quality of surrounding buffer areas to provide protection and insure integrity of site:

The buffers to the natural area include large areas of Wharton State Forest, which provide watershed protection and a physical buffer to most development pressure. However, natural area features may be partially unbuffered from the effects of cranberry agriculture on nearby private lands, which can have potential hydrologic and water quality impacts.

E. Threats – direct and indirect factors which currently or potentially threaten natural area resources:

Potential threats to natural area resources include human trampling, illegal OHV use, overbrowsing by deer and Canada geese, flooding by beaver, alterations to hydrology and water quality by nearby and upstream cranberry agriculture and natural succession to forest. Sedimentation from the roads and state campgrounds near Hawkins Bridge and Godfrey Bridge may pose some limited threat as well.

Traits typical of riverside savannas, including saturated muck soils and scarcity of woody species, make these habitats extremely sensitive to trampling or OHV use. Human footsteps or OHVs will often have enough weight to break through the thin sod of fine herbaceous roots and sink into the viscous saturated muck, destroying the plants at each point of contact and leaving a mucky scar which often floods. These scars can sometimes persist for years due to the altered microtopography and microhydrology.

The natural succession of native woody species may also pose a long term threat to some rare savanna communities and species if fire or other disturbance events do not reverse woody succession or create new savanna habitats. Atlantic white cedar, a characteristic and highly desirable species in most muck soil floodplain habitats, is probably the strongest competitor with riverside savannas and creates the greatest threat from woody succession. Other woody species such as red maple, black gum and heath shrubs also eventually crowd out savannas in the absence of severe fire or disturbance. With fewer wildfires burning into floodplain swamps due to fire suppression, there may be fewer opportunities for wildfires to create and maintain savanna habitats, perhaps threatening their long term existence on the Pinelands landscape. Also, with less anthropogenic activity

in floodplain swamps due to land use regulations, there may be fewer opportunities to apply severe disturbances to create and maintain early successional savanna habitats.

- F. Manageability – the ability of the administering agency to adequately manage the site or enter into a management agreement with others to preserve the integrity of the natural features:

Most of the management recommendations noted below (see Preliminary Management Techniques) should be within the ability of staff at the Office of Natural Lands Management, its management partners at NJ Forest Service, or their contractors to achieve. Most recommendations will not significantly interfere with the passive recreational activities allowed throughout the natural area, including canoeing, hunting and hiking.

- G. Public welfare - The degree of threat to the public health, safety and welfare which may be encountered as a result of terminating existing uses or activities:

With the exception of greater restrictions and/or enforcement of illegal OHVs, no significant changes to existing public uses within Wharton State Forest are recommended. These restrictions will not create threats to the public health, safety and welfare.

- H. Preliminary boundaries – The preliminary boundaries of the natural area (See attached map) will be refined upon adoption of a management plan.

III. INTERIM CLASSIFICATION – Conservation Preserve

IV. PRELIMINARY MANAGEMENT TECHNIQUES

Designation of the West Branch Wading River to the Natural Areas System will require the development of a management plan. N.J.A.C. 7:5A-1.8, Natural area management plans, indicates that the Department, with the cooperation of the administering agency, shall prepare a management plan for each natural area in the System. The primary purpose of a management plan is to describe the natural features of the area and prescribe management practices and public uses to ensure preservation in accordance with the management objective of the natural area.

Management is recommended to control human trampling impacts by nature enthusiasts and canoeists. This may include posting signs at access points to savannas to educate the public on the trampling issue. Sections of the Wading River which pass through savannas should be posted as a "no canoe take-out area." Creating a viewing boardwalk in some of the more accessible, frequently visited savannas might be considered to provide interpretive opportunities for the public and to help prevent trampling impacts. Those who seek foot access should be educated on the trampling issues in savannas and on the state requirements to minimize impacts (e.g., limits on the number of people

accessing a savanna, use of snowshoes, "mudders" or other devices to distribute weight and avoid breaking through the sod, limiting access to winter when soils are frozen and firm, etc.). Strict enforcement of regulations prohibiting illegal OHV use on all state lands is recommended, particularly in natural areas.

Monitoring for excessive browsing by deer and Canada geese may be recommended, and reduction in local deer populations may be advisable through increasing hunting permits, in coordination with the Division of Fish and Wildlife. Monitoring should be conducted sporadically for flooding of savannas due to beaver activity. When beaver ponds threaten to flood a savanna, the use of trapping, relocation of beaver or other methods should be coordinated with the Division of Fish and Wildlife. Hunters should also be educated on the trampling issues in savannas, and access techniques which minimize impacts should be required.

Alterations to hydrology and water quality due to nearby cranberry agriculture should be evaluated and monitored for long term changes, in coordination with state and federal regulatory agencies. Sites should be identified where erosion and sedimentation may potentially threaten savanna and rare species habitats, such as from the roads and state campgrounds near Hawkins Bridge and Godfrey Bridge. If problem areas are identified, stabilization needs should be identified using native vegetation plantings and temporary or permanent erosion control structures, depending on the settings and causes.

Management to maintain or restore riverside savanna community and associated rare species is recommended as the primary goal. A secondary goal to maintain or restore Atlantic white cedar swamps may also be recommended where it does not conflict with the primary goal. A detailed species and habitat inventory is needed to identify all existing occurrences of riverside savanna and rare species present within the proposed natural area, and all potential habitats with favorable geomorphology and hydrology where these rare elements could be restored through management. A detailed forest inventory may be needed to identify existing forest cover types and conditions, and help develop criteria for selecting the best management sites for maintaining or restoring riverside savannas and bog asphodel, other rare species, Atlantic white cedar swamps, or other wetland types.

Monitoring woody species succession and rare plant populations in riverside savanna habitats is recommended to determine the rate of succession and the potential loss of rare species and community habitats. Spot removal of Atlantic white cedar and other woody species may provide a limited tool in slowing the successional process in some savanna habitats.

There is a need for basic research on the fire and disturbance history of known riverside savannas and bog asphodel populations throughout the Pinelands, and on the effects of recent and future fires in and near these habitats. Such research may provide a better understanding of the natural processes and regimes needed to create and maintain riverside savanna habitats, and perhaps some measure of the loss of natural processes. A better understanding is needed on the historic role of human disturbances in creating

riverside savannas, such as clear-cutting in cedar swamps, or more severe disturbances such as turfing and bog iron mining. This research may provide clues on the best management practices to recreate and maintain riverside savanna and bog asphodel habitats.

References:

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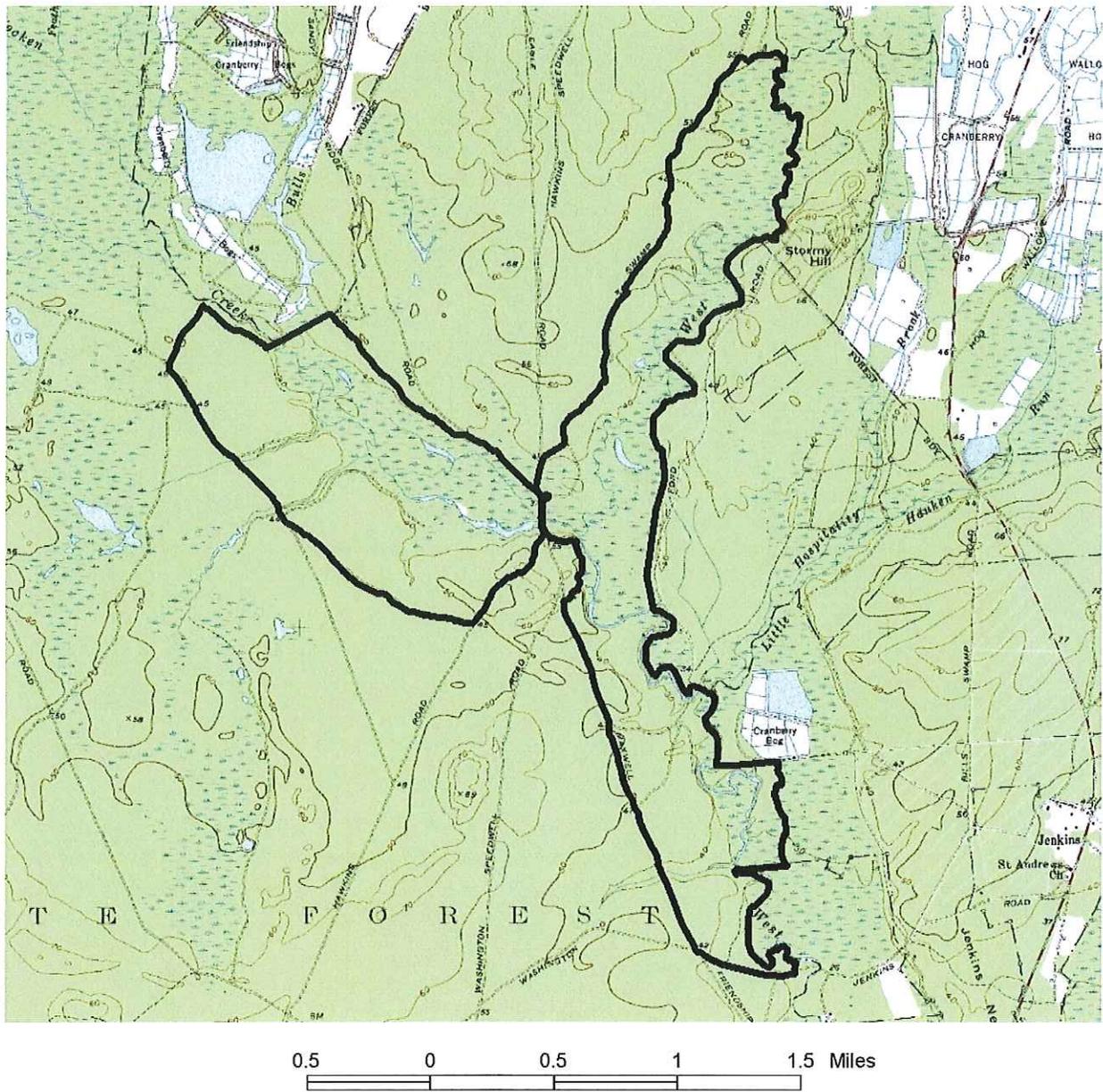


Figure 1: Proposed West Branch Wading River Natural Area, with about 1,367 acres, located in Wharton State Forest, Burlington County, NJ.