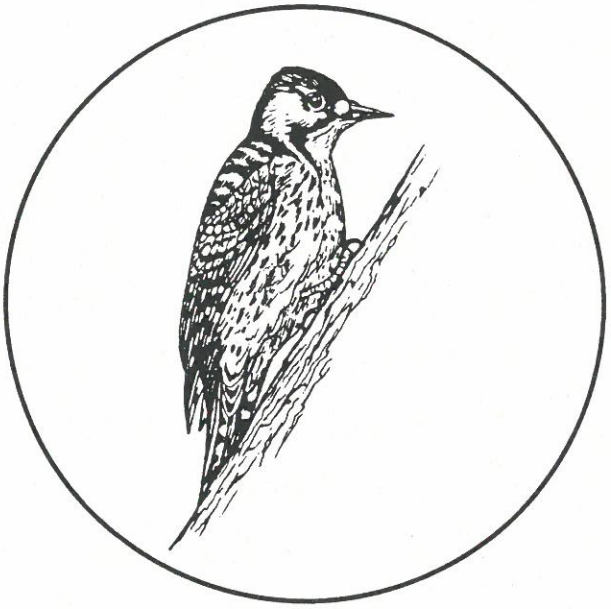
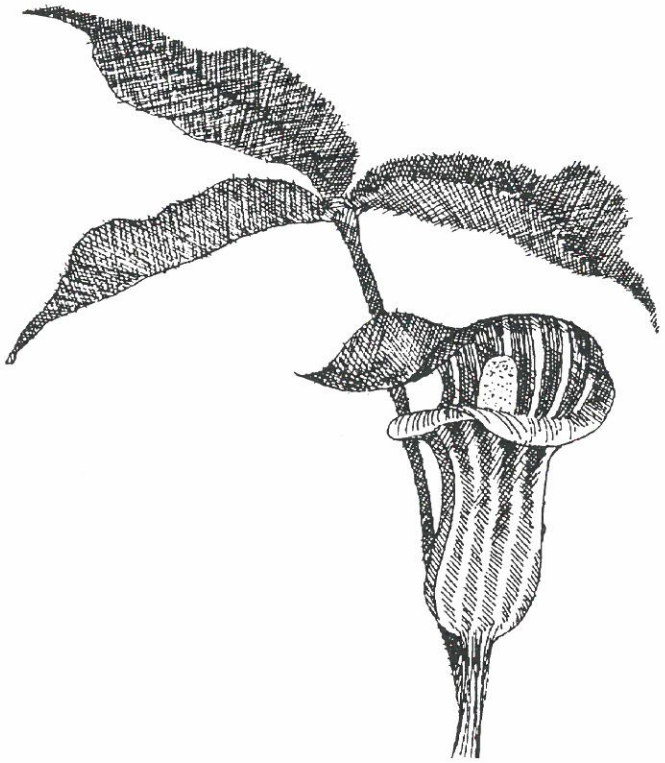
NORTHWEST CORNER CONSERVATION PLAN



The Nature Conservancy
Rhode Island Field Office
45 South Angell Street
Providence, Rhode Island 02906

October 1997

NORTHWEST CORNER CONSERVATION PLAN



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I. SITE INFORMATION AND ANALYSIS

A. SITE DESCRIPTION & REGIONAL CONTEXT

The Northwest Corner of Rhode Island (Map 1) is notable for its altitude - it is the highest region of the state - and for its large patches of relatively unfragmented forest. This forest harbors a few high-quality examples of rare natural communities and many species threatened because of their need for sizable patches of undisturbed forest. A number of these forest interior species are at the southern/eastern periphery of their range in northwestern Rhode Island and are not found elsewhere in the state (Appendix A).

Among the forests of western Rhode Island, three areas in particular stand out for their ecological significance: (1) Arcadia-Nicholas Farm, (2) Scituate Reservoir, and the (3) Northwest Corner (Map 2; Sutton and Enser 1996). Both the Arcadia/Nicholas Farm region and the Northwest Corner are of great conservation concern due to their intact condition and preponderance of globally and state-imperiled species and natural communities. The Scituate Reservoir lands, while of great biodiversity conservation value, lack the concentration of imperiled species and communities found in the other two areas, and are more intensively managed for timber production.

Thus, in the statewide and regional contexts, the Northwest Corner is an ecologically distinct, biologically significant region in Rhode Island, worthy of conservation concern. Protection of the forested ecosystem of the Northwest Corner is a vital component of the Conservancy's efforts to protect the diversity of species and ecosystems found in Rhode Island and New England as a whole. As a result, the Five-Year Strategic Plan of the Conservancy's Rhode Island Field Office (1995) identifies the Northwest Corner as one of a handful of focus areas for its protection efforts.

B. HUMAN CONTEXT

Zoning - With a few small exceptions, the Towns of Burrillville and Glocester have zoned this region for agricultural or residential use, with 4-5 acre minimum lot sizes.

Ownership overview - State, municipal, and private actions have preserved a significant amount of land in the Northwest Corner. The State owns four major holdings: Buck Hill (2049 Ac), Pulaski/George Washington (3489 Ac), Durfee Hill (1176 Ac), and Killingly Pond (366 Ac). The Glocester Land Trust also holds a number of properties, including a significant block (609 Ac) at the Sprague Hill Natural Heritage site.

Much of this region, including a great deal of the Sprague Hill area, consists of relatively large private landholdings of 50-200 acres. There are four particularly large private and corporate holdings of 750-1600 acrea[1], each of which, in its current open state, contributes significantly to the unfragmented nature of the landscape. The combination of relatively large ownerships and low land prices, provide for real conservation opportunities in the Northwest Corner.

Growth pressure - The towns of Burrillville and Glocester have grown significantly in recent years. Population increased 23.3% in Burrillville and 22.2% in Glocester from 1980 to 1990. The total number of housing units increased 25.0% and 22.3%, respectively, in this period, closely mirroring the population growth. Population growth has slowed since the boom of the 1980s,

[1] Boy Scouts of America, 1600 Ac, Burrillville, Algonquin Gas Transmission Co., 756 Ac, Burrillville, Barbara Bates, 791 Ac, Glocester, and Factory Mutual Engineering, Inc., 945 Ac, Glocester and Putnam, CT.

but population projections predict an increase of 19.0% in Burrillville and 24.4% in Glocester from 1990 to 2010.[2] In Burrillville, much of the development pressure in coming decades will likely occur in the historical villages; those areas have access to public water and sewers (Donnelly pers. comm). Unless any part of Glocester receives similar municipal services, development in Glocester is likely to be far less concentrated (Caldow pers. comm.).

C. CONSERVATION GOALS

1. Enhance protection of this forested landscape.
2. Protect key habitats for vulnerable species and natural communities including:
   a) Area-sensitive forest bird species such as the Black-throated Blue Warbler, Pileated Woodpecker, and Northern Goshawk (Appendix A).
   b) Disturbance sensitive reptiles and amphibians such as the Wood Turtle and Northern Spring Salamander, (Appendix A)
   c) State imperiled plant species, many of which are northern species on the periphery of their range in the Northwest Corner (Appendix A)

D. SPECIES AND NATURAL COMMUNITIES OF SPECIAL CONSERVATION CONCERN IN THE NORTHWEST CORNER

Natural Communities

- *New England Coastal Plain Pondshore* and *New England Acid Level Bog* - Coastal plain pondshores occur, with decreasing frequency, from southeastern Massachusetts to New Jersey. Water levels in coastal plain ponds significantly fluctuate both seasonally and annually. Many rare plants germinate only in dry years when sections of previously submerged pondshore dry up and become available. Cedar Swamp Pond is an excellent example of a coastal plain pondshore. New England acid level bogs are much like coastal plain pondshores, but more peaty and bog-like. Floating mats of sphagnum moss provide habitat for a variety of rare plants. Croff Farm Brook and the floating bog islands at Bowdish Reservoir are excellent examples of New England acid level bogs.

Species

- *Area sensitive forest bird species* - the Northwest corner is one of the most significant breeding areas for forest interior birds in Rhode Island (Map 2). These species require large blocks of unfragmented forest, an increasingly rare commodity in the state. Of particular concern may be those species that migrate to the neotropics (Appendix A, Robbins et al. 1989). Particularly noteworthy breeding birds of the Northwest Corner include the Black-throated Blue Warbler, Northern Goshawk, and Pileated Woodpecker.

- *Fisher and Bobcat* - Fishers inhabit Canada and the northern United States, and have been reintroduced to this region in northern Connecticut (Enser pers. comm.). Fishers tolerate human activity, but not extensive development or large open spaces. In Rhode Island, Fishers are known only from the Northwest Corner. Bobcats inhabit much of North America. No one has seen a bobcat in the Northwest Corner in some time, but this area would be their most likely habitat in Rhode Island (Enser pers. comm.).

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[2] Rhode Island Economic Development Corporation, Research Division, Rhode Island City and Town Monographs.

- *Area Sensitive Reptile and Amphibian Species* - Many reptile and amphibian species are very sensitive to forest fragmentation, particularly road construction and destruction or isolation of breeding pools. Of particular note in the Northwest corner are the Northern Spring Salamander and Wood Turtle. Other noteworthy species of conservation concern are listed in Appendix A.
- *Imperiled Plant Species* - Appendix A lists threatened plant species of the Northwest Corner. As indicated in the table, many of these species reach the limits of their range in this area. Such peripheral populations may be of particular conservation significance from an ecological and evolutionary perspective (Lesica and Allendorf 1995).

E. STRESSES TO PLANTS AND ANIMALS OF THE NORTHWEST CORNER

The major source of stress to ecosystem function in the Northwest Corner is forest fragmentation. Forest fragmentation reduces the amount of available habitat, and the populations that inhabit the remaining forest face new stresses. Fragmentation hampers the ability of organisms to disperse to fulfill life-cycle or territorial needs. Increased amounts of sunlight and wind and higher temperatures alter the new forest edge environment. Wildlife suited to this habitat interface utilize the forest edge, thus diminishing the core of interior forest unaffected by these changes. The smaller populations of wildlife supported by the smaller forest "cores" are more vulnerable to random and rare events such as hurricane damage, increasing the probability of extinction (National Research Council 1986).

Residential and Commercial development, as well as road construction, can lead to habitat fragmentation. Roads increase surface runoff and can adversely affect water quality. They prohibit the dispersal of wildlife, or act as population sinks by causing the death of a significant number of organisms that attempt to cross them. And like all types of fragmentation, roads attract many edge species, including many exotic species that compete with native species. Road corridors may facilitate the dispersal of mammalian nest predators and Cowbirds, which detrimentally impact forest bird populations. Residential development, in addition to producing similar fragmentation effects, may have negative effects on ground and surface water quality. In addition, residential development may increase the volume of direct human disturbance in the nearby forest.

While home construction is not booming in Burrillville and Glocester to the same extent that it has in some South County towns, these towns did experience about a 25% increase in housing units during the 1980's. Population projections indicate that population will increase another 19-25% in Burrillville and Glocester from 1990 to 2010 (RI Economic Dev. Corp 1995). Sprawling development threatens to continue to fragment the region's forests, harming area-sensitive wildlife species, and forever changing the character of these rural communities.

F. SITE DESIGN

The Northwest Corner focus area (30,725 acres) contains three protection zones, designed to address the threats listed above (Map 1). Cedar Swamp Pond (B3) and Croff Farm Brook (B3) are excellent examples of unique communities, and both harbor numerous examples of state rare plants and animals. A primary protection zone (Zone 1a, 425 acres) is delineated around the watersheds of these sites, where the goal is to maintain as much forest land and natural vegetation as possible.

Zone 1b (Map 1, 18,204 acres) includes a relatively intact core of contiguous forested habitat incorporating and providing connectivity between the following five natural heritage sites: Buck Hill Macrosite (B3, including Cedar Swamp Pond and Croff Farm Brook), Pulaski/Washington SF (B4), Bowdish (B4), and Sprague Hill (B4). Also included are extensive areas of protected forest land including RI DEM-owned Durfee Hill, and George Washington Management Areas, and the Glocestor Land Trust-owned Sprague Farm. Maintaining connectivity of forest habitat and limiting fragmentation here will help insure that the full set of plants and animals found in these forests today, will continue to be able to thrive here.

The outer boundary of the focus area (Zone 2, 12,096 acres) encompasses an area of "unfragmented natural land" (low population density, high percentage of natural land) delineated by the Environmental Protection Agency and the Rhode Island Resource Protection Project.[3] This landscape, consisting of relatively unfragmented forest, is part of a larger forested landscape including Douglas State Forest in Massachusetts (5400 acres) and Quaddick State Forest in Connecticut (560 acres). Those forested lands surrounding protection Zones 1 and 1a provide important habitat for some species, as well as bufferage to key sites in Zones 1 and 1a. There are a few rather large (>250 acre) private landholdings in this zone which are of particular conservation interest. In addition, efforts of local governments and the land trust, may help to control development density within this zone.

II. PROTECTION PLAN

Land Protection - The Northwest Corner of Rhode Island has significant biodiversity value. In general, the Conservancy's conservation strategy will consist of working with RIDEM and local conservation organizations such as the Glocestor Land Trust to establish contact with key landowners and track the status of key parcels which are identified as conservation priorities. This approach will help to generate projects over the long term, which we will pursue as opportunities arise. Zones 1a and 1b on Map 1 delineate the areas that are the highest priority for for acquisition of key tracts or the purchase of development rights. Partnership with the Glocester Land Trust will be especially critical to generating more land conservation activity here.

Forest Management - Due to a history of clearing and timber harvest (see Human Context, above), today's forests of the Northwest Corner are relatively young. There are few stands with trees over 100 years old ("mature forest"). At the same time, the abandonment of agricultural lands, and economic conditions which have not favored extensive timber harvest, have led to at least a short term decline in early successional habitats in recent years. Current forestry practices consist for the most part of the selective harvest of individual trees, creating a more open canopy. The Rhode Island Department of Environmental Management is the largest manager of forest lands in the focus area. While there are a handful of other landowners with substantial forest holdings (>500 acres), most land is held in smaller (<100 acre) blocks, making concerted management difficult. Timber is generally of low quality and does not command a high price. Therefore, we are not currently seeing extensive cutting. At the same time, though, the forest is maturing, and standing wood/acre and tree sizes are increasing (Dickson and McAfee 1988).

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[3] The Rhode Island Resource Protection Workgroup is an interagency, inter-organizational group convened by the US Environmental Protection Agency and the New England Interstate Water Pollution Control Commission in 1995. The Workgroup is composed of representatives from both public and private organizations.

These trends may lead to increased economic incentives for more extensive timber harvests on both state and private lands in the next century.

Specific recommendations:

1. Maintenance of forest lands, whatever the management regime, is the top short-term priority. Management practices can be changed, but conversions of forest land for development are practically irreversible. Economic incentives and other approaches which promote sustainable forestry are critical.

2. Encourage managers and landowners to attempt to measure any potential action against Leopold's (1953) precautionary principle of "preserving every cog in the wheel." In making decisions about what uses and management strategies are acceptable, "clear yes-no answers are rarely available and decisions must be made in the face of uncertainty. There are costs in assuming an effect of human activity on ecosystem integrity when there actually is none, but the consequence of assuming no effect when there really is one is often far greater" (De Leo and Levin 1997).

3. Seek to minimize known or suspected detrimental impacts of timber harvest. Landowners are required to follow water quality protection best management practices as outlined in Best Management Practices in Rhode Island (Cassidy and Aron 1996). Work with RIDEM and other partners to encourage landowners to go beyond the minimums required in the guide, for example more extensive buffers around and connectors between vernal pools.

4. Over the millennia, natural disturbances (such as severe storms, fire, and falling dead and diseased trees) have maintained a mosaic of young and old forest stands distributed across the landscape. If forests of the Northwest Corner are to be managed for timber production, management regimes should seek to mimic natural patterns of disturbance at a landscape scale. Today we have almost a complete lack of mature stands supporting trees more than 100 years old. Given what we know about the frequency of fires and storms in the region, such "mature" stands were likely widespread 300 years ago. Unless areas are set aside, economic incentives to harvest timber may preclude the re-establishment of "mature" forest stands.

5. While we may not have clear answers, we do have stakeholders who will be continuing to implement a variety of management practices over the coming years. Each management activity should be viewed as an experiment and an opportunity for learning. For example, do 50 foot buffers provide adequate protection for vernal pool species? What happens to forests adjacent to clear cuts vs. selective cuts. What are the impacts of selective cutting on breeding birds? Do older forests support different species than younger ones? This kind of concerted, multi-agency effort to monitor managed systems, and use lessons learned to change management protocols is the centerpiece of the "adaptive management" approach designed for decision making in the face of uncertainty (Holling 1978, Hillborn 1987).

Education

Many of the residents of the region may be unaware of the unique and threatened wildlife that inhabits their environs. Glocester Land Trust, Audubon Society of Rhode Island, and The Nature Conservancy volunteers and staff could prepare various educational materials to raise awareness. Existing school environmental programs could be modified to incorporate more locally relevant information; meetings, slide shows and guided nature walks could be provided for all ages;

presentations could be made to specific landowners. These actions could help to stimulate more interst in local conservation action.

III. CONSERVATION SCIENCE PLAN

Our primary goal is the protection of the Northwest Corner ecosystem and the globally and state imperiled species and natural communities contained therein. Therefore, success is perhaps best measured in terms of the extent to which this ecosystem maintains its functional and compositional integrity over time. The use of a variety of monitoring measures may be warranted.

ACTIONS

Vegetation monitoring

1. Develop more complete list of natural communities (including descriptions) occurring in NW corner and adjacent areas in Connecticut and Massachusetts.
2. As data becomes available, use GIS to measure changes in extent of habitat fragmentation across the landscape/perform more sophisticated analysis to identify "unfragmented lands." Consider modeling impacts of different patterns of fragmentation on species for whom dispersal distances can be estimated.
3. Work with the RI Natural Heritage Program and landowners to assure systematic monitoring of imperiled natural communities at Cedar Swamp Pond and Croff Farm Brook.
4. Monitor populations of individual rare plant species on an as needed basis. Develop strategy with Natural Heritage.
5. Conduct exhaustive plant species inventories at selected sites to serve as baseline information and to track changes in vegetation over time. Consider establishment of permanent transect system.

Vertebrate monitoring

A number of vertebrate species are currently thought to be imperiled (see above). Further, a number of vertebrate species may serve as "umbrella species" or good overall indicators of ecosystem integrity. Thus, measures of species richness and density for certain groups such as forest interior birds, amphibians, and reptiles may be particularly useful.

1. Working with Natural Heritage, consider establishment of additional Breeding Bird Survey Routes in this area, or the establishment of another volunteer-dependent breeding bird monitoring protocol.
2. Collect currently available data on reptile, amphibian, and mammal densities and distributions, and consider the usefulness and practicality of undertaking additional monitoring efforts.

IV. ACKNOWLEDGMENTS

This plan was prepared by James Scott with assistance from Jon Regosin. We thank the many people who gave their time and provided the valuable information that made preparation of this plan possible: J. Benedict, P. Bissell, G. Caldow, V. Carpenter, B. Payton, E. Donnelly, P. Dolan, T. Dupree, W. Eccleston, R. Enser, G. Johnson, R. Huckins, G. Leslie, D. Parker, L. Pointek, C. Raithel, P. Ricard, M. Voccio.

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Appendix A: Species of Special Conservation Concern

Table I. Neotropical Migrant Birds - Forest Interior and Interior-edge Specialists

Scientific Name	Common Name	G-rank	S-rank
Forest Interior Species			
Buteo platypterus	Broad-winged Hawk		
Catharus fuscescens	Veery		
Dendroica caerulescens	Black-throated Blue Warb.	G5	S1BS3N
Dendroica cerulea	Black-throated Green Warb.		
Dendroica fusca	Blackburnian Warbler	G5	S1BS1N
Empidonax virescens	Acadian Flycatcher	G5	S1BS1N
Helmitheros vermivorus	Worm-eating Warbler	G5	S2BSZN
Mniotilta varia	Black and White Warbler		
Piranga olivacea	Scarlet Tanager		
Seiurus aurocapillus	Ovenbird		
Seiurus motacilla	Louisiana Waterthrush		
Seiurus noveboracensis	Northern Waterthrush		
Vireo solitarius	Solitary Vireo		
Wilsonia canadensis	Canada Warbler		
Wilsonia citrina	Hooded Warbler		
Interior-edge Species			
Caprimulgus vociferus	Whip-poor-will		
Coccyrus americanus	Yellow-billed cuckoo		
Coccyrus erythropthalmus	Black-billed cuckoo		
Contopus virens	Eastern Wood Pewee		
Dendroica magnolia	Magnolia Warbler		
Empidonax minimus	Least Flycatcher		
Hylocichla mustelina	Wood Thrush		
Parula americana	Northern Parula	G5	S1BS1N
Pheuticus ludovicanus	Rose-breasted Grosbeak		
Polioptila caerulea	Blue-gray Gnatcatcher		
Vermivora ruficapilla	Nashville Warbler		
Vireo flavifrons	Yellow-throated Vireo		
Vireo olivacens	Red-eyed Vireo		

Table II. Area-sensitive Amphibians and Reptiles

Scientific Name	Common Name	G-rank	S-rank
Desmognathus f. fuscus	N. Dusky Salamander		
Notophthalmus v. viridescens	Red-spotted Newt		
Hyla versicolor	Gray Treefrog		
Carphopis amoenus	Eastern Worm Snake	G5	S1
Heterodon platyrhinos	Eastern Hognose Snake	G5	S2
Thamnophis sauritus	Eastern Ribbon Snake	G5	S3
Clemmys insculpta	Wood Turtle	G4	S2

Table III. Threatened plants of the Northwest Corner

Scientific Name	Common Name	G-Rank	S-Rank
Rhyncospora inundata	Inundated Horned-rush	G4	S1
Isoetes ripara (var)	River Quillwort	G4T	S1
Xyris montana[N]	N. Yellow-eyed Grass	G4	S1
Lonicera dioila	Mountain Honeysuckle	G4?	S1
Eleocharis equisetoides[S]	Horntail Spike-rush	G4	S2
Acer pensylvanicum[N]	Striped Maple	G5	S1
Andromeda glaucophylla[N]	Bog Rosemary	G5T5	S1
Arceuthobium pusillum[N]	Dwarf Mistletoe	G5	S1
Asclepias exactata	Poke Milkweed	G5	S1
Asplenium montanum[S]	Mountain Spleenwort	G5	S1
Carex albicans	Covered Sedge	G5	S1
Carex artitecta	Covered Sedge	G5	S1
Carex exilis[N]	Bog Sedge	G5	S1
Corallorhiza trifida	Early Coralroot	G5	S1
Dalibarda repens[N]	Dewdrop	G5	S1
Desmodium ciliare	Small Leaved Tick-trefoil	G5	S1
Gaultheria hispidula[N]	Creeping Snowberry	T4T5	S1
Gaylussacia dumosa(var)	Dwarf Huckleberry	G5	S1
Gymnocarpium dryopteris	Oak Fern	G5	S1
Kalmia Polifolia[N]	Pine Laurel	G5	S1
Larix laricina[N]	American Larch	G5	S1
Lycopodium annotinum[N]	Stiff Clubmoss	G5	S1
Moneses uniflora[N]	One-flowered Wintergreen	G5	S1
Plantanthera orbiculata	Round Leaved Orchid	G5	S1
Pyrola secunda	One-sided Pyrola	G5	S1
Saxifraga pensylvanica	Swamp Saxifrage	G5	S1
Streptocus roseus[N]	Rose Twisted-stalk	G5	S1
Taxus canadensis[N]	Ground Hemlock	G5	S1
Viburnum arnifolium[N]	Hobblebush	G5	S2
Aletris farinosa	Colicroot	G5	S2
Picea mariana[N]	Black Spruce		

[N] Northern/Appalachian species near periphery of range in NW Corner

[S] Southern/Coastal species near periphery of range in NW Corner

Appendix B: Contacts

Department of Environmental Management
- Division of Planning and Development
  - Rick Enser - Natural Heritage Program 222-2776 x4308
  - Lisa Pointek - Land Conservation and Acquisition Program 222-2776 x4307
  - Ginny Leslie - North-South Trail info 222-4700 x4309
- Division of Forestry
  - Paul Dolan - George Washington State Mgmnt. Area
  - Pete Bissell - Enforcement
  - Paul Ricard - Forest Legacy Program 222-1414
  - Bruce Payton - (also on Glocester Cons. Comm.) 647-3367
- Division of Administration
  - George Johnson - State planner
- Division of Fish and Wildlife
  - Chris Raithel - Non-game biologist 789-0281
- Division of Agriculture
  - Eugene Pepper - Landowner at Sprague Hill

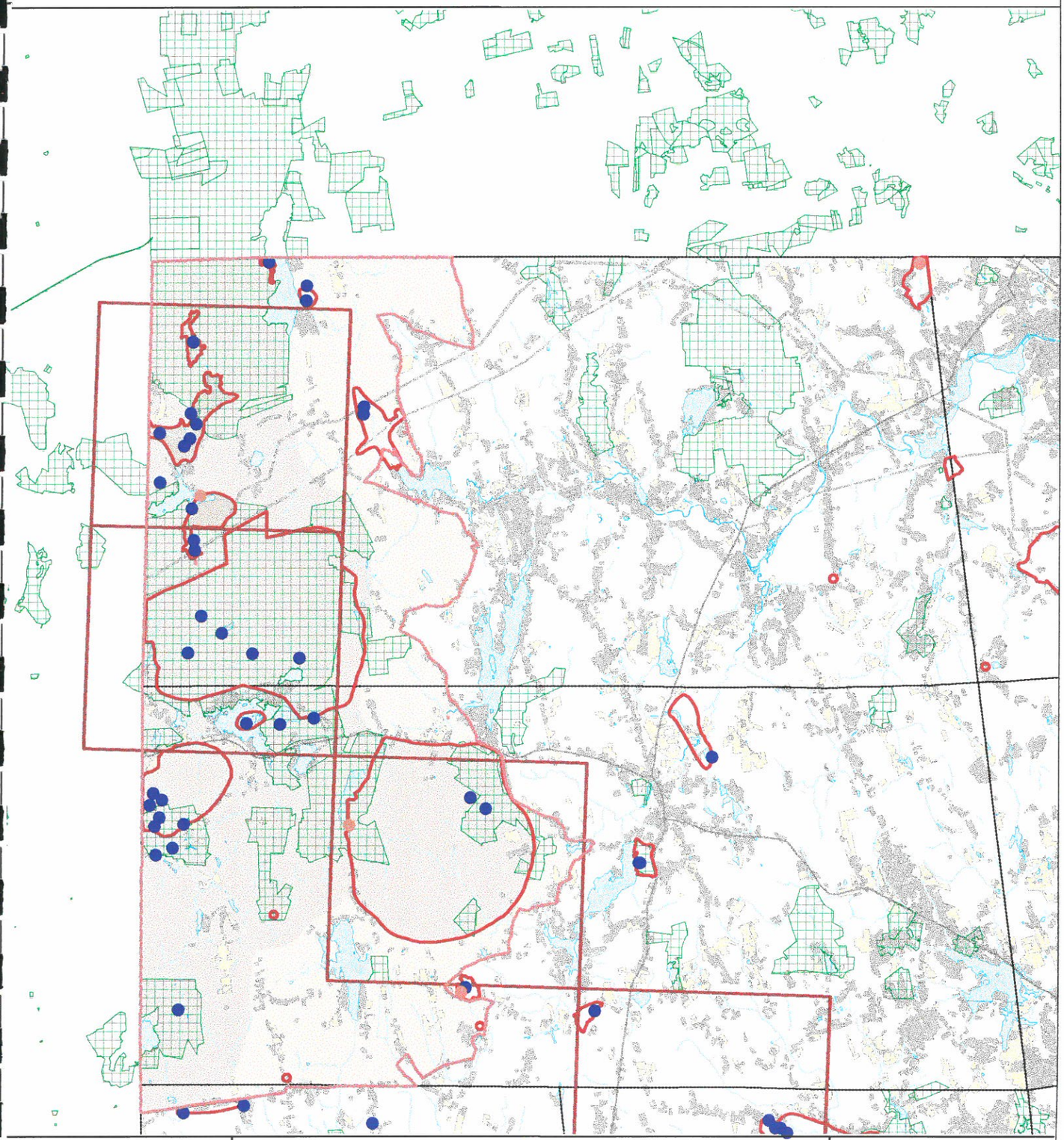
Town of Glocester -
- George Caldow - Town Planner 568-9578
- Vivian Valentine - Tax Assessor 568-3329
- Bob Hawksley - Glocester Land Trust 568-8611
- Bruce Payton - Conservation Commission (see DEM above)

Town of Burrillville
- Ed Donnelly - Town Planner 568-9453
- Shelby Jackson - Tax Assessor 568-6245
- Bill Eccleston - former co-chair of Comp. Plan Committee, former Open Space and Rec. Rep. 568-9934

Map 1

Northwest Corner

Focus Area - Protection Zones



LEGEND

- Northwest Corner Focus Area
- Globally Imperiled (G1-G3) Species/Nat. Communities*
- State Imperiled (S1) Species*
- Neotropical Migrant Forest Interior Bird "Hotspots"**
- Natural Heritage Sites*
- Towns
- Protected Open Space
- Major Roads
- Ponds

Land Use
- Developed
- Agriculture

Protection Zones
- 1a
- 1b
- 2

N

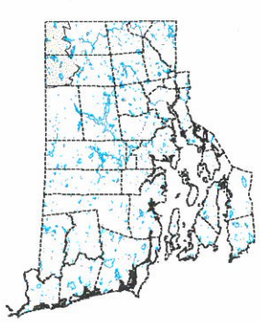
1 0 1 2 3 4 Kilometers

1:107325

*Biological data on imperiled species from **Rhode Island Natural Heritage Program.** Occurrence points were located in the field, mapped at 1:24,000 scale and entered into the Biological and Conservation Database (BCD). These data do not represent an exhaustive survey, but rather a current snapshot of the BCD which is updated on a regular basis.

*Global ranks from **The Nature Conservancy** central database. G1-G3 Species and Natural Communities typically occur at fewer than 21-100 sites, worldwide, with total populations of no more than 3,000-10,000 individuals.

**NEOTROPICAL MIGRANT FOREST INTERIOR BIRD "HOTSPOTS" - Based on data from Enser (1992). Census blocks with at least 14 of the 30 migratory forest interior species breeding statewide (87th percentile or above) are shown.



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Data Sources: RIGIS, ASRI, RIDEM Natural Heritage, TNC RIFO/EPA, URI EDC
(c) The Nature Conservancy
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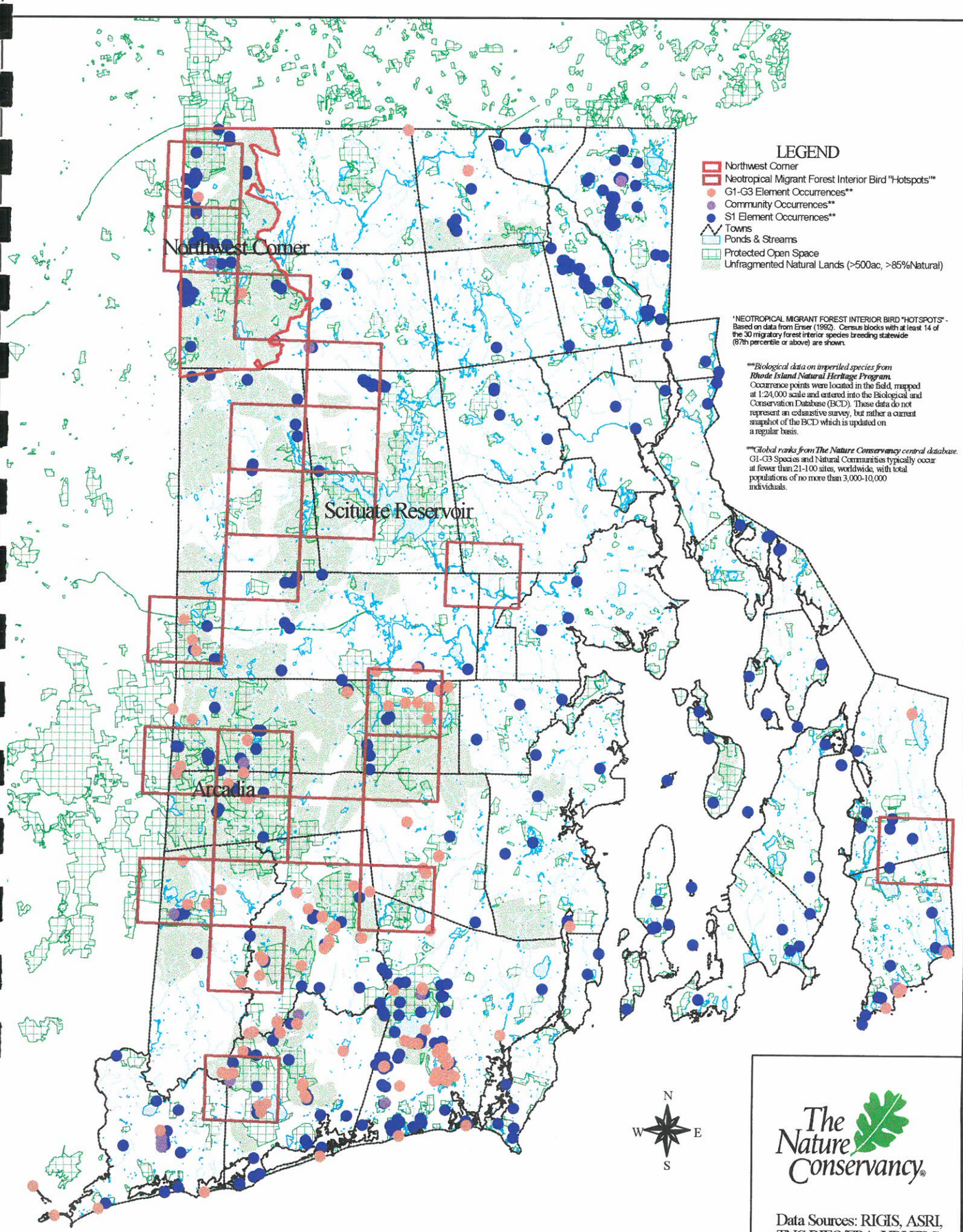
Map 2

Northwest Corner - Statewide Perspective



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