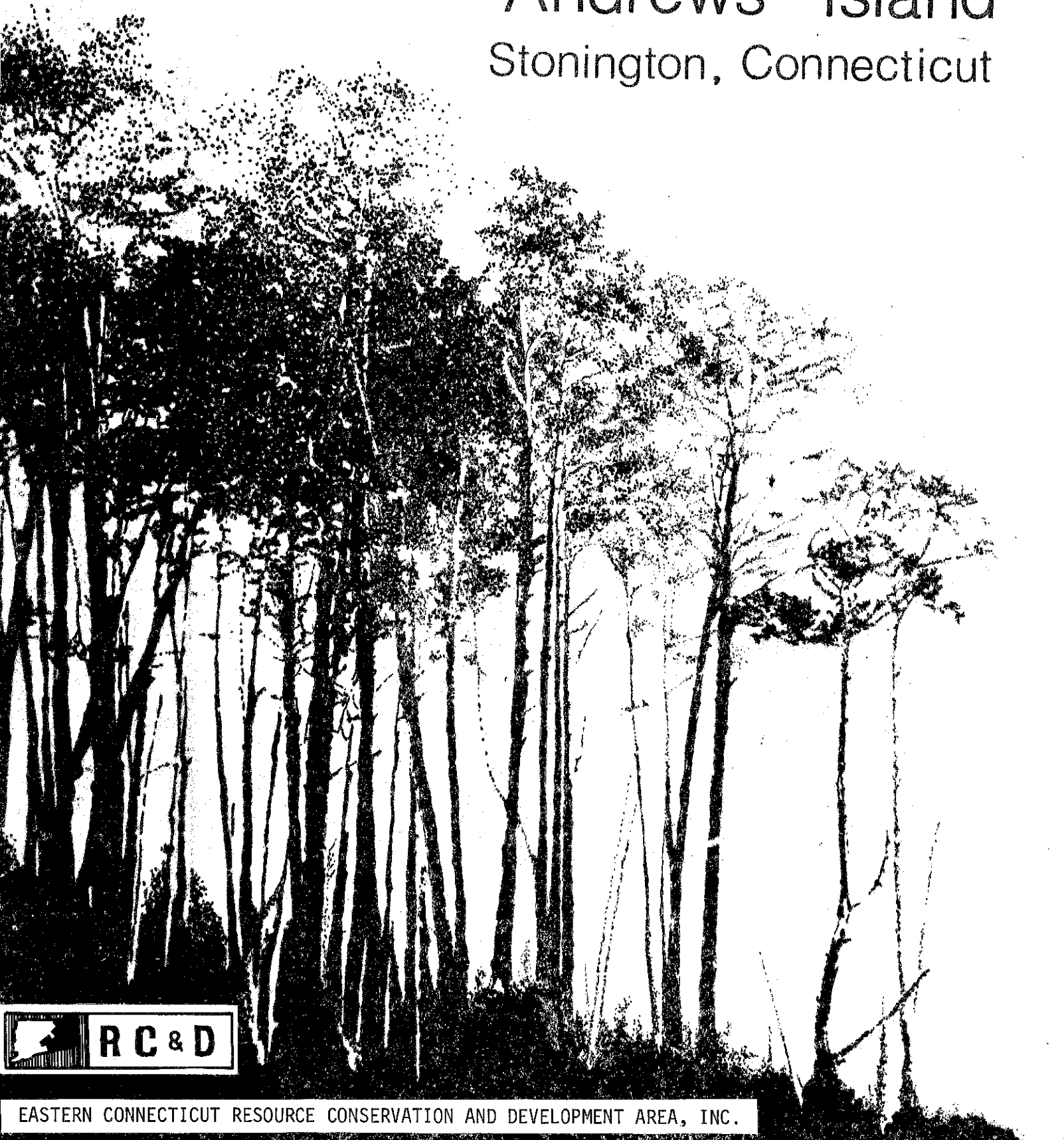


Environmental Review Team Report

Andrews Island

Stonington, Connecticut

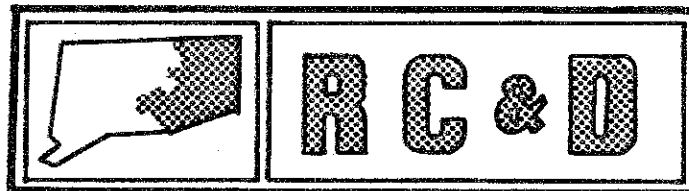


EASTERN CONNECTICUT RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

Environmental Review Team
Report
on

Andrews Island
Stonington, Connecticut

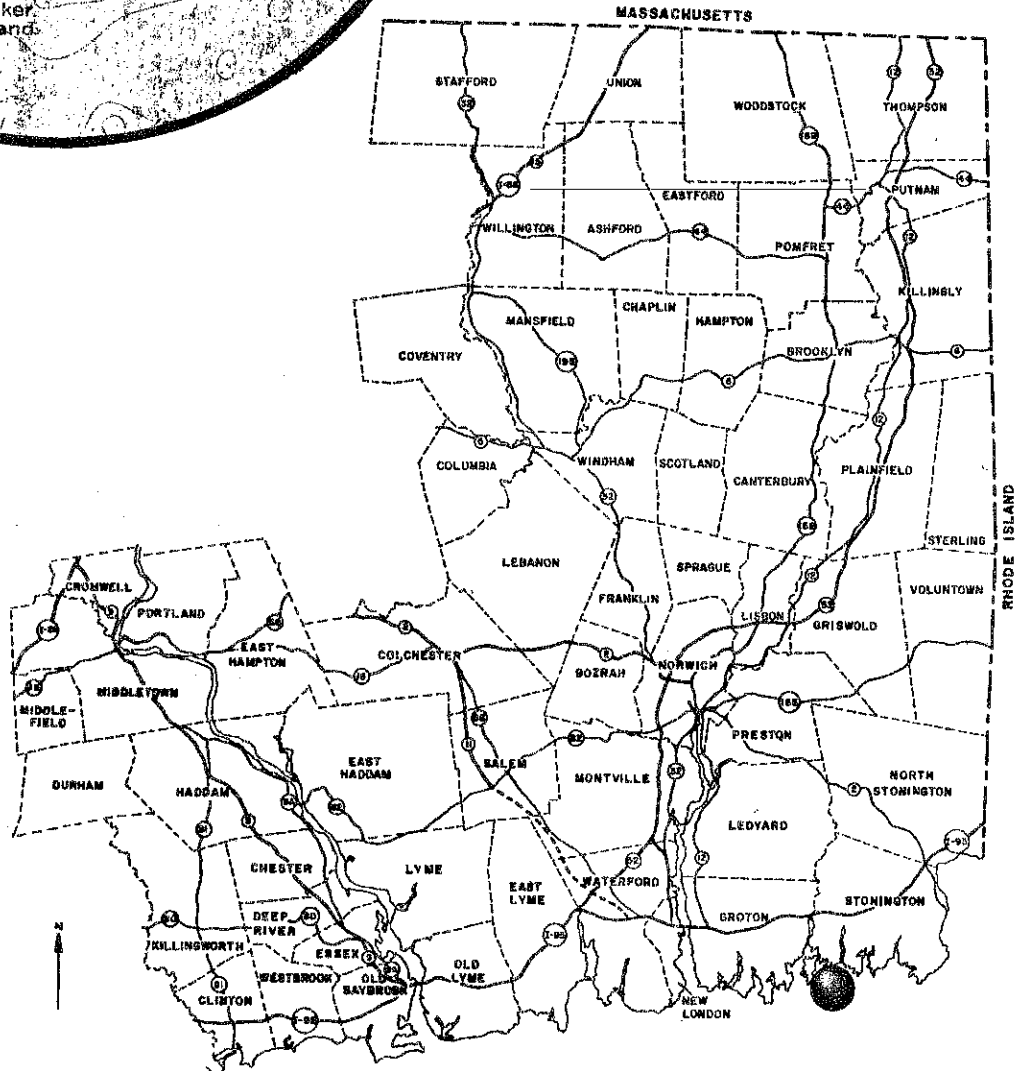
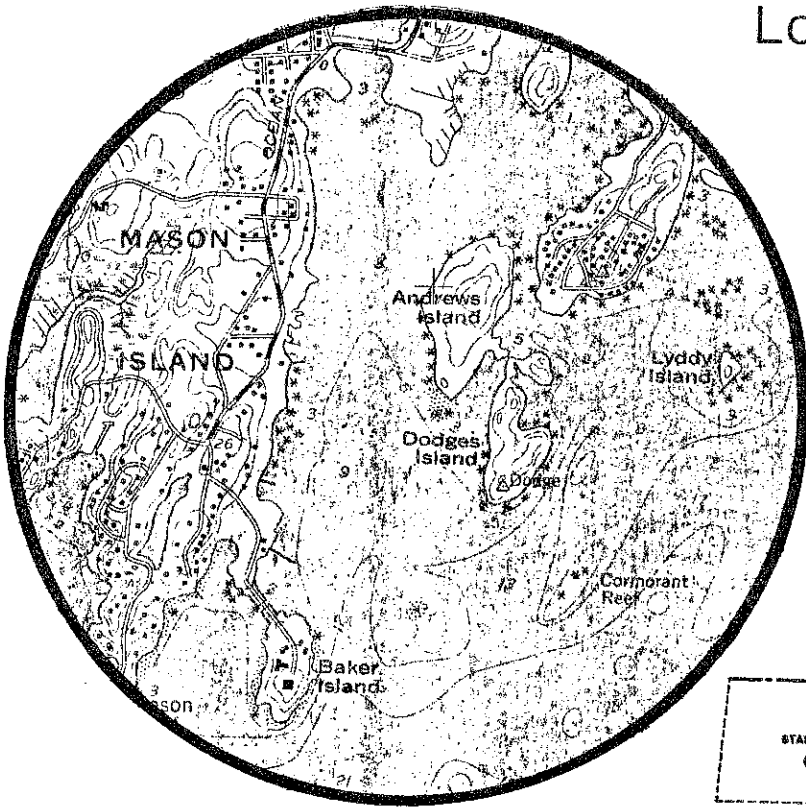
May 1979



eastern connecticut resource conservation & development area
environmental review team
139 boswell avenue
norwich, connecticut 06360

Location of Study Site

ANDREWS ISLAND
STONINGTON, CONNECTICUT



EASTERN CONNECTICUT
RESOURCE CONSERVATION AND DEVELOPMENT PROJECT

ENVIRONMENTAL REVIEW TEAM REPORT
ON
ANDREWS ISLAND
STONINGTON, CONNECTICUT

This report is an outgrowth of a request from the Stonington Planning Commission to the New London County Soil and Water Conservation District (S&WCD). The S&WCD referred this request to the Eastern Connecticut Resource Conservation and Development (RC&D) Area Executive Committee for their consideration and approval as a project measure. The request was approved and the measure reviewed by the Eastern Connecticut Environmental Review Team (ERT).

The soils of the site were mapped by a soil scientist of the United States Department of Agriculture (USDA), Soil Conservation Service (SCS). Reproductions of the soil survey map as well as a topographic map of the site were distributed to all ERT participants prior to their field review of the site.

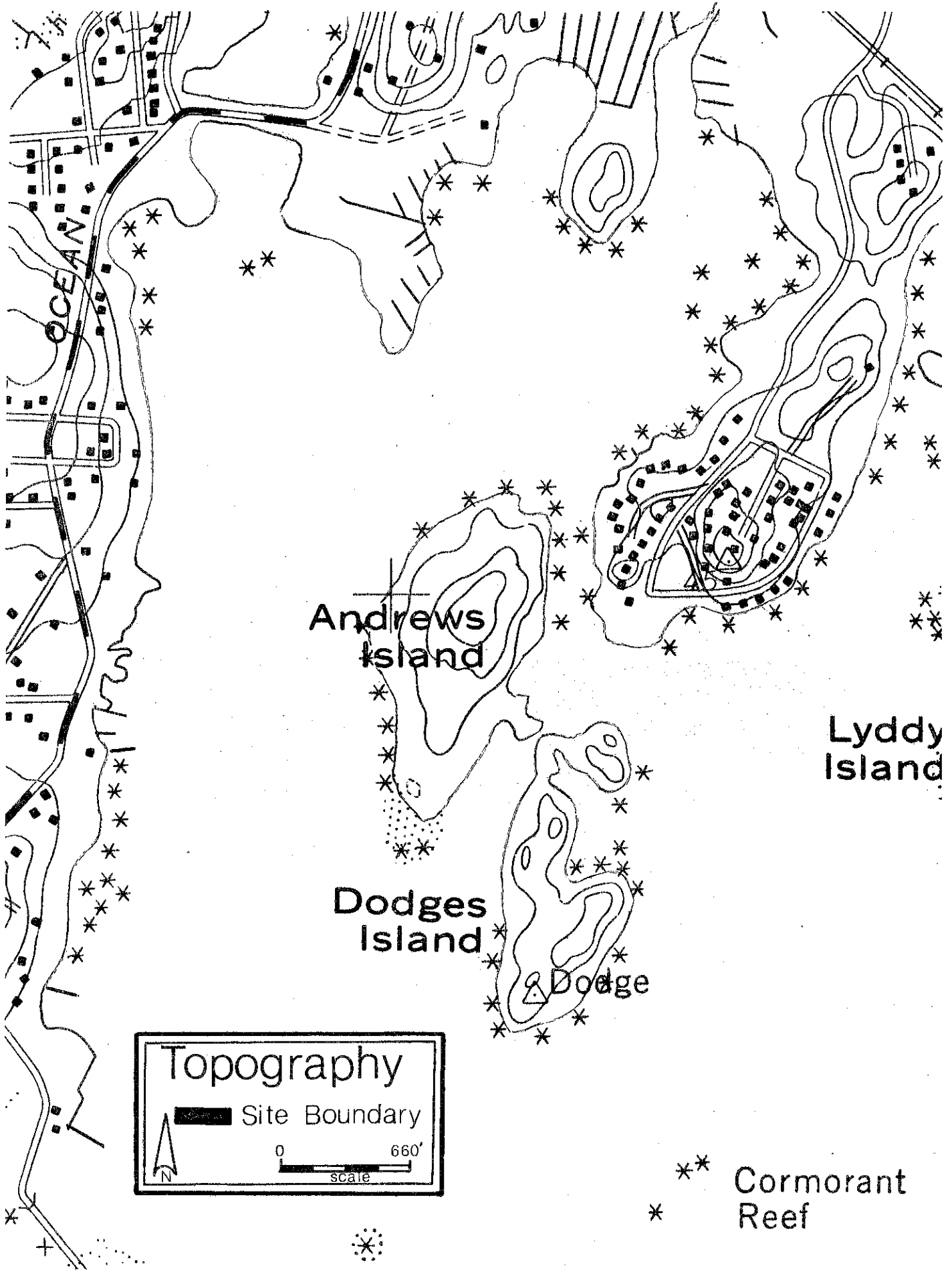
The ERT that field checked the site consisted of the following personnel: Gary Parker, District Conservationist, Soil Conservation Service (SCS); Mark Traceski, Soil Conservationist, (SCS); Mike Zizka, Geologist, Department of Environmental Protection (DEP); Tim Hawley, Forester, (DEP); Ernest Beckwith, Marine Biologist, (DEP); Charles Newling, Ecologist, Army Corps of Engineers; David Poirier, Archeologist, Connecticut Historical Commission; Gerhard Amt, Regional Planner, Southeastern Connecticut Regional Planning Agency; and Jeanne Shelburn, ERT Coordinator, Eastern Connecticut RC&D Area.

The Team met and field checked the site on Thursday, July 20, 1978. Reports from each Team member were sent to the ERT Coordinator for review and summarization for the final report.

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the developer and the Town of Stonington. The results of this Team action are oriented toward the development of a better environmental quality and the long-term economics of the land use.

The Eastern Connecticut RC&D Project Committee hopes you will find this report of value and assistance in making your decisions on this particular site.

If you require any additional information, please contact: Ms. Jeanne Shelburn, Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360, 889-2324.



Andrews
Island

Dodges
Island

Lyddy
Island

Dodge

Topography

— Site Boundary

0 660'
scale

**
* Cormorant
Reef

INTRODUCTION

The Eastern Connecticut Environmental Review Team was asked to prepare a natural resource inventory of Andrews Island in the Town of Stonington. The 17 acre island is currently owned by Dixon Downey, a town resident. The island is located in Mystic Harbor approximately 2000 feet to the east of Mason's Island and approximately 500 feet west of the mainland at Latimer's Point.

The island is a bedrock knob which was no doubt cut off from the mainland by the rise in sea level which accompanied deglaciation. Soils in most areas of island are shallow to bedrock. Marsh areas fringe the southwestern and eastern sides of the island and are flooded twice daily. Vegetation on the upland is scrubby in nature; many vines (notably poison ivy) cover the trees.

Mr. Downey intends to construct a small summer cottage of the southern portion of the island and a permanent docking location. The remainder of the island would be left in its natural state; the only disturbance being several trails cut through for access and establishment of general wildlife management techniques. He hopes to attract migrant wildlife to the island by providing areas of grain crops for their feeding. Lack of evident fresh water supplies, however, may restrict wildlife use of the site. Mr. Downey intends to develop the island as a wildlife preserve and a teaching tool. The Team was called in to provide a resource inventory of the island and its surrounding marine environment, which would help Mr. Downey achieve his objective.

TERRESTRIAL ENVIRONMENT

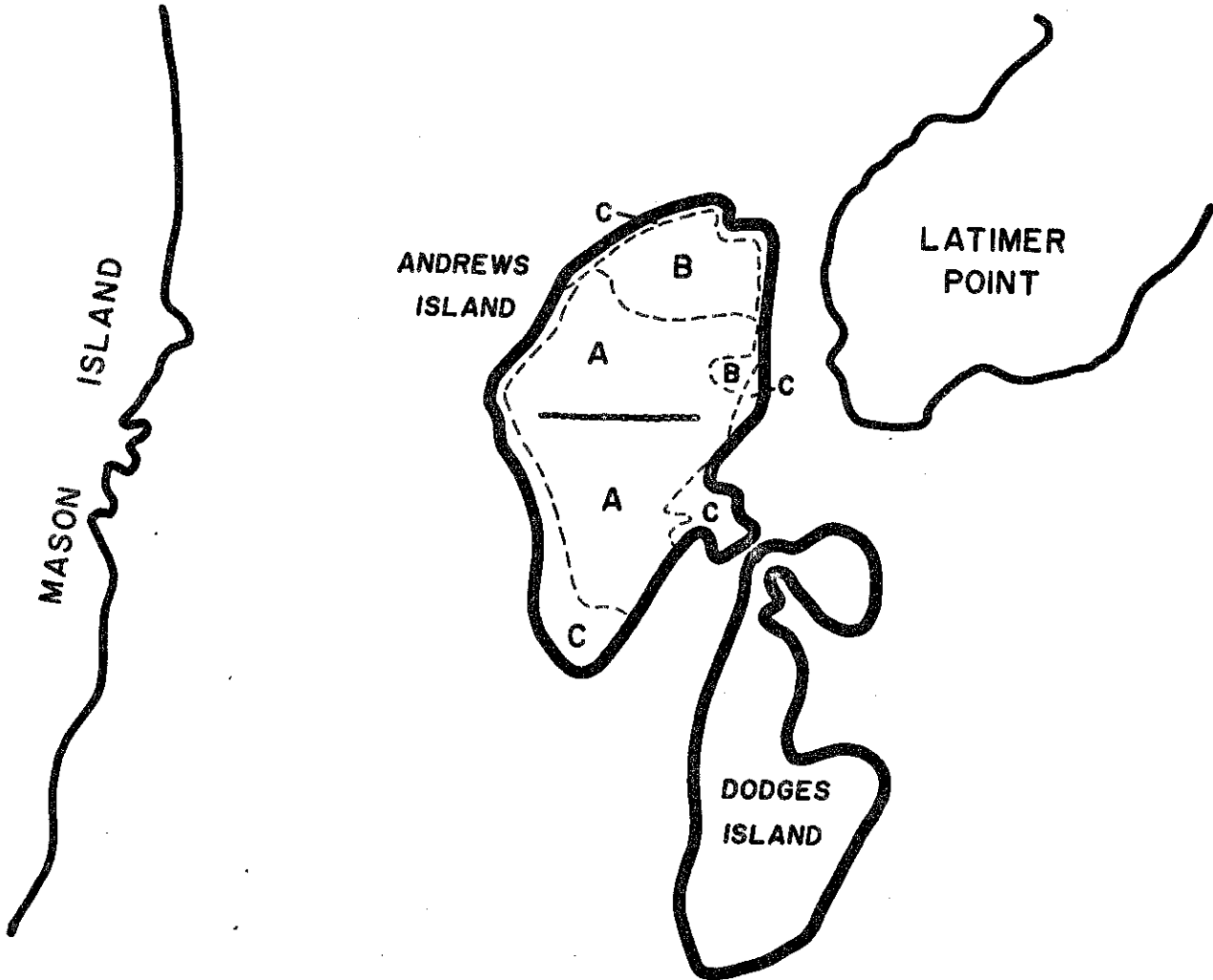
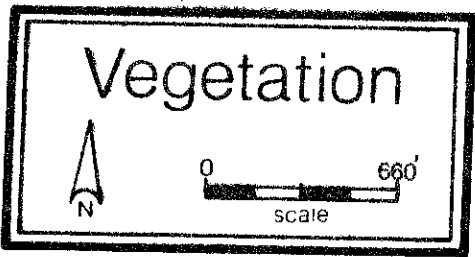
GEOLOGY

Andrews Island is basically a bedrock knob that is covered and fringed with a relatively thin layer of glacial and postglacial sediments. The island represents a topographic high which was formerly connected to the mainland, but which became isolated with the rise in sea level that followed deglaciation.

Bedrock exposures are scarce: the largest, which is approximately 150 feet long and 2 to 25 feet wide, is located just above the inland edge of a salt marsh near the southern tip of the island. Most of the bedrock observed was granitic gneiss. In Explanatory Text for Preliminary Geological Map of Connecticut, 1956*, the local bedrock is described as gray or occasionally pink gneiss whose mineral constituents are oligoclase, quartz, microcline, and biotite, with minor hornblends, magnetite, and local garnet. Inclusions of biotite and hornblende gneiss and schist are reportedly common. Large crystals of pink microcline and grayish quartz were noticed on several boulders on the island.

A glacial deposit known as till covers bedrock on most of the island. Till is predominantly a collection of rock particles that were removed from preexisting outcrops and overburden by glacier ice. The particles include all variations of

* Connecticut Geological and Natural History Survey Bulletin No. 84.



LEGEND

- Type Boundary
- Stone Wall
- A** Black Cherry Type
- B** Huckleberry-Bracken Fern Type
- C** Tidal Marsh

size and shape. Numerous, very large boulders with dimensions up to 15 feet were observed on the island. The bulk of the till, however, consists of sand, silt, and pebbles. The thickness of the till is not known, but it is believed to be less than 10 feet in most places.

Salt marshes fringe much of the island. These deposits consist of partly decomposed organic material that is mixed or interbedded with silt and sand. Other parts of the shoreline contain stony beaches at which wave or current energy has concentrated many large boulders.

WATER SUPPLY

If a potable water supply on the property is desired, a well would have to be drilled into bedrock, as no other suitable aquifer exists on the island. Crystalline bedrock in Connecticut generally provides small but reliable groundwater yields. According to Connecticut Water Resources Bulletin No. 15, a U.S. Geological Survey publication (1968), nine out of ten wells drilled into bedrock in southeastern Connecticut's coastal river basins yielded 3 gallons per minute or more of groundwater. Such quantities would seem to be more than adequate for the uses suggested for the island.

Because Andrews Island is marine, a possibility exists for salt-water encroachment into any bedrock well on the property. The possibility increases with any of the following: proximity of the well to the shoreline, depth of the well, rate and duration of pumping. If the well is located near the summit of the island, and if it is not pumped for any purposes other than drinking supplies or occasional domestic chores, the potential for salt-water encroachment probably would be very small.

FOREST RESOURCES

Andrews Island is a remarkable example of insular colonization and succession. In order to preserve the educational and scientific values of this successional pattern, cultural practices such as thinning and planting should be minimized or restricted to one portion of the island. A heavily wooded, "climax" forest typical of inland southern New England is not likely to develop here. Sensitivity to salt spray from Long Island Sound will continue to influence the success of species which become established. Only trees of at least moderate salt-spray tolerance will thrive in the overstory. The forest will remain small-statured due to the frequent severe storms along the Connecticut coastline. As the existing trees become taller, there will be an increasing probability of their being blown over and the successional cycle beginning again.

The dense understory vegetation and absence of steep slopes will prevent erosion when trees are uprooted. Therefore, although windthrows are probable, the site will not deteriorate as a result of them. The dense brushy character of the present forest provides food and cover for deer and songbirds. Development of a drinking water source would be helpful to wildlife, but not in keeping with the concept of a natural area.

Marine salt spray and seed sources have strongly influenced the pattern of old pasture succession on the island. Overstory species of moderate salt spray tolerance dominate the site. Most of these species bear seed which is dispersed by wind or birds. Protection afforded by the overstory allows less salt-tolerant species to grow beneath them.

Two upland vegetation types can be differentiated, as indicated on the vegetation map. Sapling-size black cherry is the principal species on approximately 75% of the island. Evidence of ice, wind, and/or salt damage is indicated by the poor form of the stems. A variety of shrub and tree species occur in mixture with, and occasionally in pure clusters among, the black cherry.

The northern 25% of the island is principally huckleberry and bracken fern with isolated clumps of grey birch and red maple. Poison ivy, sumac, shadbush, and Japanese honeysuckle are locally abundant in both vegetation regions and along the transition zone between them. A list of representative species is included in the Appendix to this report.

Health and vigor of the vegetation is good for a site which is exposed to such severe weather conditions. No serious hazards are present. The aspen and black cherry could be thinned to provide growing space for the healthiest trees. Since ice damage to forked and leaning trees is especially prevalent in black cherry; such poor form trees should be cut out to favor trees with the tallest live crowns (a private forester should be consulted in this regard). Thinning is not necessary to protect the site. Rather, it would function in concentrating growth on the trees most likely to survive storm damage and possibly increasing their lifespan. These effects may have aesthetic value, but there is little ecological justification for it.

Several pole-sized pignut hickory and one black oak are outstanding features on the island. These trees rise above the general forest canopy and show little sign of salt spray damage. If these trees continue to thrive, they may give rise to an oak-hickory forest type as their seedlings come up through the black cherry.

Tolerance to salt spray varies considerably among different species. Some are quite intolerant and exhibit foliage burning and die back almost immediately. Other species show immediate but superficial symptoms, and still others do not show immediate signs but later die back. Finally, some are resistant to salt spray and exhibit little burning. (*, **)

Highly susceptible species include royal fern and cinnamon fern, white pine, hemlock, sugar maple, tulip tree, and black gum.

Those which showed delayed symptoms include pokeweed, winged sumac, highbush blueberry, Virginia creeper, greenbrier, red maple, oaks, and beach plum. It is noteworthy that although many of these occur on the island, they are typically in the understory or on the western (storm lee) side.

Poison ivy, sassafras, and black locust exhibit superficial burning on the leaves, but they usually recover. Shadbush, sheep laurel, and black cherry are moderately tolerant, although prolonged or repeated exposure (as in a tropical storm) will cause heavy defoliation.

Pitch pine, red cedar, groundsel-tree, American holly, and inkberry are all considered salt-tolerant. These show no more than 25% defoliation even after repeated exposure, unless wind or insects have caused previous physical injury.

* Martin, W.E., 1959, "The Vegetation of Island Beach State Park", Ecological Monographs, 29:1-46.

** Moss, A.E., 1940, "Effect on Trees of Wind-Driven Salt Water", Journal of Forestry, 38:421-425.

WILDLIFE

The size of the island and lack of fresh water sources limits upland wildlife potential. The proximity of nearby urban areas and boat traffic, and the narrowness of beach and marsh areas limits wildlife to the more common and less shy coastal species. Vegetation control and plantings can increase their numbers. Only a few species of wildlife such as rodents, would be year-round residents. Winter storms and summer droughts will be real hazards even if the island is protected as a wildlife sanctuary.

The salt marsh and tidal flat areas of the island are the most important ecological habitats. They are extremely rich environments playing host to the basic ocean food chains. Salt marsh snails, amphipods, and small fishes are evident examples. (See section on Marine Environment.) The island probably plays host to a wide variety of transient species as seasons and conditions vary. At the time of the review the following species were seen and identified: herring gull, mallard (nesting), green heron, double-crested cormorant (rocky shore), common flicker, robin, catbird, Brewer's blackbird, and white tail deer.

Wildlife Management Potential

The island presently has a fair diversity of plant species. There is a good fruit supply for song birds. The island does, however, lack any appreciable grass and forb habitat. A program of brush control to provide more open areas will increase wildlife populations. Grain or corn crops could be planted in some such openings. Since this coastal area plays host to a variety of waterfowl, food plots could attract large numbers of migrants, resulting in habitat destruction for resident wildlife. Keeping food plots and openings smaller than 1 acre will help to prevent this. Although poison ivy, Japanese honey suckle, and greenbrier are all favored wildlife food and cover plants, they exist on the island in excessive amounts. Control, but not eradication, will improve wildlife value. The white tail deer are browsing heavily on the existing greenbrier. It is a favored food. Cutting trees and brush in the greenbrier area will thicken it up and cause more abundant sprouting and fruiting for song birds. Ten to twenty percent shading is recommended. At least 38 species of non-game birds are known to eat greenbrier berries. Greenbrier is also important to ruffed grouse. The leaves, berries, and stems are a valuable protein source for all browsing wildlife species including rabbits. Present deer browsing has kept the vines from spreading. Thinning the overstory will increase the food supply. Areas of old tough vines can be rejuvenated by cutting and dicing. Greenbrier is well adapted to withstand browsing. Undesired stands of common greenbrier can be controlled by proper herbicides or mowing.

The Japanese honeysuckle present is not a dependable fruit producer but does provide escape cover for small mammals and birds. It is browsed by deer but is less preferred than greenbrier. Only a few nibblings were seen on the date of the field review. Although sporadic, fruit production is heavy and widely used by wildlife; use is primarily as an emergency winter food. Fruiting is heavier in the full sunlight. Although some Japanese honeysuckle is desirable, control of the present rampant growth is recommended.

Some evergreen vegetation on the island would be desirable for storm protection in winter. Two salt tolerant evergreens are Japanese black pine and spreading juniper. White spruce, Colorado spruce, Austrian pine, and Japanese yew are

tolerent of salt spray but sensitive to salt in the root zone. Some additional salt-tolerant trees and shrubs are: Pfitzer juniper, Tatarian honey suckle, buffaloberry, Adam's needle, honey locust, white poplar, white oak, red oak, Burr oak, Russian olive, mulberry, black locust, Siberian elm, and weeping willow. The above are more salt-tolerant than most species but not guaranteed to thrive on this harsh island environment.

When developing a maintenance and planting program to encourage wildlife use of the island, it would be wise to identify the types of animal communities which are desired on the site. Open-land, forest, and marine wildlife communities have differing needs. Providing cover near food sources should be a major concern. Paths extending through the natural area should be 1 1/2 times the desired width; this will encourage weedy annual growth along the edges which will provide some food sources for wildlife. Fruit producers should be encouraged, especially those species such as blueberry or honey-suckle that will provide food into the winter. Vegetation thinning on the site should occur in clumps to form continuous corridors. It is recommended that the services of a wildlife biologist with coastal management expertise be secured to assist in developing a specific management plan and implementing it.

SOILS

A detailed soils map of this site is included in the Appendix to this report, accompanied by a chart which indicates soil limitations for various urban uses. As the soil map is an enlargement from the original 1,320'/inch scale to 660'/inch, the soil boundary lines should not be viewed as absolute boundaries, but as guidelines to the distribution of soil types on the site. The soil limitation chart indicates the probable limitations of each of the soils for on-site sewage disposal, buildings with basements, streets and parking, and landscaping. However, limitations, even though severe, do not preclude the use of the land for development. If economics permit large expenditures for land development and the intended objective is consistent with the objectives of local and regional development, many soils and sites with difficult problems can be used. The soils map, with the publication, New London County Interim Soil Survey Report, can aid in the identification and interpretation of soils and their uses on this site. "Know Your Land: Natural Soil Groups for Connecticut" can also give insight to the development potentials of the soils and their relationship to the surficial geology of the site.

Andrews Island is a typical coastal island. Although the preliminary soil survey maps most of the island as 173 M/BC - Hollis-Rock outcrop complex, 3-15% slopes, it appears that there are a number of inclusions of Canton and Charlton soils, 3 to 8% slopes predominate. Bedrock is evident on the southern portion of the island. The shoreline areas are typical of the Connecticut shoreline with two small but rich tidal marshes.

Soils most typical of Andrews Island include the Hollis series and the Pawcatuck series. The Pawcatuck series (TM-1) is a regulated wetland soil as designated by Public Act 155. These soils limit development due to their depth to bedrock, wetness, flooding, and excess humus.

The Hollis series (^{173-M}_{BC}) consists of gently sloping, sloping, moderately steep, and steep, shallow well-drained soils on uplands where relief is influenced by the underlying bedrock. They formed in glacial till less than 20 inches deep

over granite, gneiss, and schist bedrock. Hollis soils have moderate permeability. Major limitations are related to depth to bedrock, rockiness, and slope.

The Pawcatuck mucky peat series (TM-1) consists of nearly level, very poorly drained soils on tidal flats. They formed in partially decomposed organic material, 16 to 51 inches thick, over sandy mineral deposits. Pawcatuck soils are subject to twice-daily inundations of salt water. Major limitations are related to low strength, wetness, and flooding.

Due to the nature of the soils on this site and their proximity to tidal wetlands, a sediment and erosion control plan should accompany any proposed development. Connecticut's Sediment and Erosion Control Handbook can aid both the developer and the town in preparing such a plan. Technical expertise for developing both mechanical and vegetative means of erosion control is available from the Soil Conservation Service field office in Norwich.

SITE PLANNING CONSIDERATIONS

The exact elevation of the site of the proposed dwelling is not available, but would appear from the topography map to be somewhere between 10 and 20 feet above mean sea level (m.s.l.). Studies of potential flood conditions in this area indicate the following:

"The storm-tide potential for Mystic Harbor under design hurricane conditions is estimated at 12.5 feet. This design storm tide of 12.5 feet is over 30 percent greater than the 1938 storm surge which is the greatest experienced during the past 50- to 60-year period of reliable records. The addition of a 12.5-foot surge on top of a spring tide of 2.4 feet gives a design tidal-flood level of 14.9 feet, m.s.l., or 4.5 feet higher than the level of flooding experienced in 1938."*

The same report notes that wave heights ranging from 3.3 to 5.4 feet could be expected over and above the design tidal flood level in this area.

There is an above average chance of flood waters reaching the proposed house site. The Team recommends that the proposed house be moved to a higher elevation, perhaps just south of the wall, which is above the 20-foot contour. This would not only lessen the chances of periodic flooding of the water supply and septic system, but also locate the house closer to the proposed landing on the western edge of the island.

Since there is no road or utility connection between the island and the mainland, providing police and fire protection or other emergency services becomes complicated. Therefore, development on the island for occupancy or use of more than a very modest nature should be discouraged. Indeed, the most appropriate use of this island and neighboring Dodge Island would be continued sanctuary for wild-life.

* Mystic, Connecticut. U.S. Army Corps of Engineers Report. May, 1962.

MARINE ENVIRONMENT

A survey of the marine flora and fauna surrounding Andrews Island was performed August 1, 1978. Underwater observation techniques (snorkeling) were utilized. The two potential landing and docking sites, one on the eastern shore and the other on the western shore, served as focal points for the survey. An area approximately 50 meters (m) north and south of the potential dock areas to approximately 50m offshore were surveyed by three divers.

ANDREWS ISLAND EAST

Andrews Island is separated from the mainland on the east by a narrow shallow channel that opens to Fisher's Island Sound. The channel and subtidal areas contiguous to the island are dominated by eel grass (Zostera marina). Small open areas devoid of eel grass do exist in the center of the channel and adjacent to the potential docking site. Intertidal areas are also devoid of eel grass. Organic detritus appears to concentrate in the sheltered open areas. Numerous large rocks present in the intertidal and shallow subtidal areas are profusely covered with the alga, Ascophyllum nodosum. The red algae Ceramium rubrum is quite common in the open areas. Other species of macroalgae observed include:

<u>Fucus vesiculosus</u>	Rock weed
<u>Cladophora spp.</u>	
<u>Chondrus crispus</u>	Irish moss
<u>Codium fragalis</u>	
<u>Agardhiella spp.</u>	
<u>Gigartina sp.</u>	

The most common macroinvertebrates observed were crustaceans. Several sub-legal lobsters (Homaris americanus) were observed in burrows under the subtidal rocks along the shoreline in water as shallow as 0.8 to 1m. The green crab (Carcinus maenas) was quite common all along the shoreline especially between and under rocks, and in the silt-sand open areas. Large numbers of hermit crabs (Pagurus longicarpus) were found in open areas between the rocks and at the potential dock site. Other crustaceans observed include:

<u>Libinia emarginata</u>	spider crab
<u>Neopanope texana sayi</u>	mud crab
<u>Cancer irroratus</u>	rock crab
<u>Palaemonetes spp.</u>	grass shrimp
<u>Crangon septemspinosa</u>	sand shrimp

The periwinkle (Littorina littorea) was quite common on rocks as was the mud snail (Ilyanassa obsoleta) on the silt-sand substrate. Other gastropods observed were:

<u>Crepidula fornicata</u>	Atlantic slipper shell
<u>Urosalpinx cinereus</u>	Oyster drill

Observations of bivalve mollusks were limited to shallow burrowers, surface dwellers, and shells. The hard-shelled clam (Mercenaria mercenaria) appears to be quite common. Numerous shells of this species concentrate in the open channel areas subject to stronger tidal currents. Several hard-clams were observed

partially exposed, particularly in the open areas. One live bay scallop (Aequipecten irradians) was spotted in the eel grass, and numerous shells were scattered across the bottom.

The Atlantic ribbed mussel (Modiolus demissus), a salt marsh species, was quite numerous in the Spartina spp. south of the potential docking site. Spat of the blue mussel (Mytilus edulis) was observed on hard substrates. Shells of the Atlantic jingle (Anomia simplex) and false angel wing (Petricola pholadi-formis) were also encountered.

The most numerous fish species observed were juvenile winter flounder (Pseudopleuronectes americanus), stickleback (Gasterosteus spp.), striped killifish (Fundulus majalis), and American eel (Anguilla rostrata). Winter flounder were very abundant in the near shore open sand-silt areas. These areas obviously serve as a nursery for this species. Sticklebacks were abundant among eel grass; killifish were most numerous among the rocks and nearshore. Other fish species observed included:

<u>Sygnathus fucus</u>	northern pipefish
<u>Tautoglabrus adspersus</u>	cunner
<u>Menidia menidia</u>	Atlantic silverside
<u>Opanus tau</u>	oyster toadfish

ANDREWS ISLAND WEST

Mason's Island lies to the west of Andrews Island across a bay. Eel grass dominates the bay and subtidal areas contiguous to Andrews Island; the numerous rocks along the shoreline are covered with A. nodosum. Shallow areas devoid of eel grass adjacent to the shore are more extensive than on the eastern side of the island. The algae Cladophora spp. and Ceramium rubrum are much more abundant than on the eastern side, perhaps due to the more extensive open shallow areas. Similar algal species described for the eastern shore were also present.

As observed off the eastern shore, crustaceans were the most common macro-invertebrates. Lobsters were observed in burrows under rocks. Green crabs were very common, but hermit crabs were not as abundant as off the eastern shore. Crustacean species previously described, were also present or can be expected to occur.

The periwinkle (on rocks) was the most abundant gastropod and was commonly found on rocks in shallow intertidal areas. The gastropod species described for the eastern shore were also observed.

The occurrence of bivalve mollusks was similar to that found off the eastern shore, but bay scallops were more abundant. Scallops were observed among eel grass from approximately 20-30m offshore.

Juvenile winter flounder were the most abundant fish species observed. They were very numerous in the near shore sand-silt areas and appeared more abundant than off the eastern shore. This may be attributed to the more extensive shallow open sand-silt areas. Other species of fish observed were similar to those off the eastern shore, but with two additions: summer flounder or fluke (Paralichthys dentatus), and Atlantic tomcod (Microgadus tomcod).

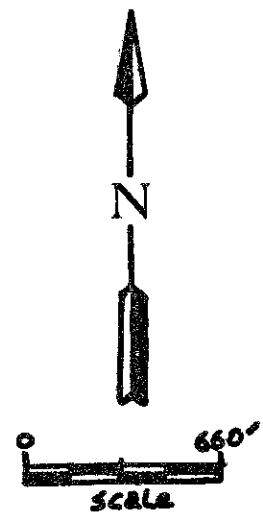
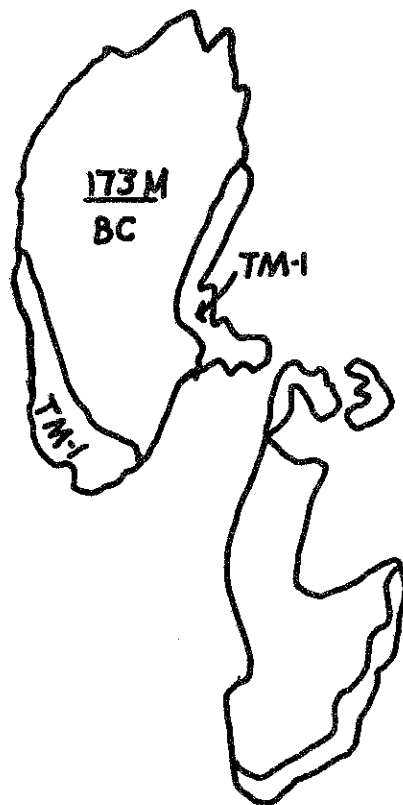
Over 100 species of fish have been reported from Long Island Sound. The majority of these species can occur in the Andrews Island area at various times of the year. Some of the more common and abundant species that were not observed and can be expected to be present are listed below.

Menhaden	<u>Brevoortia tyrannus</u>
bluefish	<u>Pomatomus saltatrix</u>
alewife	<u>Alosa pseudoharengus</u>
smelt	<u>Osmerus mordax</u>
scup	<u>Stenopus chrysops</u>
windowpane flounder	<u>Scopthalmus aquosus</u>
grubby	<u>Myoxocephalus aeneus</u>
searobin	<u>Prionotus spp.</u>
striped bass	<u>Morone saxatilis</u>
little skate	<u>Raja erinacea</u>
Atlantic mackerel	<u>Scomber scombrus</u>

Appendix

SOILS

ANDREWS ISLAND
STONINGTON, CONNECTICUT



This map is an enlargement from the original 1,320'/inch scale to 660'/inch.

Information taken from: Interim Soil Report, New London County, Connecticut, 1978;
Soil survey sheet #401, prepared by the United States Department of Agriculture,
Soil Conservation Service. Advance copy, subject to change.

ANDREWS ISLAND
STONINGTON, CONNECTICUT

PROPORTIONAL EXTENT OF SOILS AND THEIR LIMITATIONS FOR CERTAIN LAND USES

Soil Series	Natural Soil Group	Soil Symbol	Approx. Acres	Percent of Acres	Principal Limiting Factor	Urban Use Limitations*			
						On-Site Sewage	Buildings with Basements	Streets & Parking	Land-Scaping
Hollis		173M BC	16.4	78%	Depth to rock, slope	3	3	3	3
Pawcatuck		TM-1	4.7	22%	Wetness, flooding, excess humus	3	3	3	3
			<u>20.9</u>	<u>100%</u>					

Limitations: 1 = slight, 2 = moderate, 3 = severe

SOIL INTERPRETATIONS FOR URBAN USES

The ratings of the soils for elements of community and recreational development uses consist of three degrees of "limitations:" slight or no limitations; moderate limitations; and severe limitations. In the interpretive scheme various physical properties are weighed before judging their relative severity of limitations.

The user is cautioned that the suitability ratings, degree of limitations and other interpretations are based on the typical soil in each mapping unit. At any given point the actual conditions may differ from the information presented here because of the inclusion of other soils which were impractical to map separately at the scale of mapping used. On-site investigations are suggested where the proposed soil use involves heavy loads, deep excavations, or high cost. Limitations, even though severe, do not always preclude the use of land for development. If economics permit greater expenditures for land development and the intended land use is consistent with the objectives of local or regional development, many soils and sites with difficult problems can be used.

Slight Limitations

Areas rated as slight have relatively few limitations in terms of soil suitability for a particular use. The degree of suitability is such that a minimum of time or cost would be needed to overcome relatively minor soil limitations.

Moderate Limitations

In areas rated moderate, it is relatively more difficult and more costly to correct the natural limitations of the soil for certain uses than for soils rated as having slight limitations.

Severe Limitations

Areas designated as having severe limitations would require more extensive and more costly measures than soils rated with moderate limitations in order to overcome natural soil limitations. The soil may have more than one limiting characteristic causing it to be rated severe.

Vegetation Species List (non-exhaustive)

Trees

arrowwood
 quaking aspen
 black birch
 gray birch
 paper birch
 black cherry
 pignut hickory
 red maple
 black oak
 red oak
 white oak
 red cedar
 sassafras
 shadbush
 tree-of-heaven
 groundsel tree

Shrubs and Vines

Japanese barberry
 bayberry
 oriental bittersweet
 highbush blueberry
 greenbrier
 Japanese honeysuckle
 Tatarian honeysuckle
 huckleberry
 marsh elder
 poison ivy
 multiflora rose
 steeplebush
 staghorn sumac
 winged sumac (dwarf)
 Virginia creeper

Herbs

Adam's needle
 aster
 buffalo berry
 blackberry
 deer tongue
 cattail
 common mullein
 bracken fern
 hayscented fern
 red fescue
 figwort
 goldenrod
 grasses
 indian pipe

mint
 nettle
 Phragmites
 raspberry
 salt marsh fleabone
 sea beach dock
 salt meadow grass
 saltwater cord grass
 smartweed
 strawberry
 spirea
 thistle
 yarrow

COTTONTAILS

Planning Considerations

The New England cottontail occupies the more northerly areas of Maine, New Hampshire, and Vermont. In Connecticut and southern New England both the Eastern and New England cottontail may occur in brushy areas and tracts of sapling growth. The New England cottontail prefers more wooded areas than the Eastern and seldom ventures into the more open areas where the latter may be common. Conifer woodlands appear to be somewhat more used by the New England cottontail. It invades to some extent the habitat of the snowshoe hare.

Cottontails eat a great variety of plant foods. Buds, soft twigs, and bark are the principal winter foods. Food shortages are most likely to occur in woods that have a poor understory of shrubs and saplings at "rabbit height." With heavy snowfall, cottontails can feed progressively higher. The cottontails probably have home ranges of about 5 to 10 acres per male and 3 to 4 for females. Nesting is usually on well drained, brushy, weed, or grassy areas.

Predators exert a fairly constant pressure, which does not appear to affect either rabbit decreases or increases. Most studies show a "crash" decline at intervals, followed by a gradual rebuilding of numbers.

SPECIFICATIONS

The following vegetative types must be established or maintained per each 5 acres of habitat under management:

1. Grasses and Legumes (alfalfa, birdsfoot, trefoil, bluegrass, clover, crownvetch, redtop, reed canarygrass, smooth brome, timothy)

a. Establishment

- (1) Plant at least 1 acre per 5 acres of habitat within 100 feet of hardwood trees, shrubs, vines, etc.
- (2) Allow growth to reach a minimum height of 6 inches on at least 1/4 acre.
- (3) Protect from fire and grazing as necessary to obtain minimum height.

b. Maintenance

- (1) Maintain at least 1 acre per each 5 acres of habitat under management by fertilizing, mowing, etc.

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- (2) Allow growth to reach a minimum height of 6 inches on at least 1/4 acre.

2. Wild Herbaceous Plants (buttercup, panic grass, ragweed, milkweed, sedges, sweet clover, and goldenrod)

a. Establishment

- (1) Disturb at least 1/4 acre per each 5 acres of habitat under management by discing, controlled fire, or other means that will retard natural plant succession.
- (2) Control grazing and fire as necessary.

b. Maintenance

Maintain at least 1/4 acre by discing, controlled fire, or other means often enough to retain desired vegetation.

3. Hardwood Trees (Trees - apple, cherry, gray birch, oaks, poplar, and red maple. Shrubs and Vines - alder, barberry, blackberry, blueberry, dogwood, hawthorn, hazelnut, rose, sumac, and willow)

a. Establishment

- (1) Plant or establish through natural plant succession at least 1 acre per 5 acres of habitat under management.
- (2) At least 1/2 acre must be in shrubs and vines.

b. Maintenance

- (1) Maintain at least 1 acre of each 5 acres under management by release cutting, thinning, or other means to maintain desirable species.
- (2) Prevent fire and/or harmful grazing.
- (3) Cut, prune, or thin when canopy becomes so dense that desirable plants become unthrifty or are shaded out of habitat.

WOODCOCK

Planning Considerations

Woodcocks are migratory and in the Northeast they appear in early spring and mostly have left by late November. No overwintering habitats need be considered. They generally can be considered birds of overgrown land ranging from mainly perennial weed stages of plant succession to sapling stages of woodland. They may, however, be found elsewhere as in pole-stage woods, pastures, and occasionally on lawns or in crop fields. They can be correlated mainly with soil conditions favorable to earthworm abundance. These generally are moist soils having fairly high fertility and considerable organic matter. Woodcock also feed on ants, beetles, various insect larvae, and some weeds.

Adequate courtship grounds apparently have high significance in maintaining good woodcock populations. Openings of a few hundred square feet to an acre or more are needed for this purpose. These, typically, have brushy cover not more than 2 feet tall with flat, open grassy spots and no trees over 30 feet in height within 15 yards of the smaller openings. Nesting ordinarily is done within 350 feet of a courtship spot. The nests usually are within 50 feet of a woods edge and may be in sapling stage mixed hardwoods (birch, aspen, pine), brushy areas (gray-stemmed dogwood, common juniper, spirea, blueberry), alder thickets, weedy overgrown land, or young conifer plantations. Woodcock production areas usually are abandoned when woody cover 10 to 15 feet tall covers 60 percent or more of the area.

SPECIFICATIONS

To create, improve, or maintain woodcock habitat, the following vegetative types must be established or maintained:

1. Wild Herbaceous Plants (most all locally adapted grasses and weeds are desirable)
 - a. Keep at least 500 square feet free of brush and trees; and keep brush no taller than 2 feet for an additional 50 or more feet around opening and trees no taller than 30 feet for another 50 feet. (These make good feeding and courtship areas.)
 - b. Create openings at a rate of at least one per acre of brushy or shrubby areas occurring on poorly or very poorly drained soils having fairly high fertility and considerable organic matter.
2. Hardwood Trees
 - a. Shrubby Evergreens (common juniper, rhododendrons, and privets)

Several small clumps of evergreen shrubs near grassy areas or

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brushy thickets provide nesting and brood rearing sites. A dozen or so plants per clump are sufficient. When planted, they should be fairly closely spaced - 6' x 6', for example. Where such evergreens occur naturally, maintain by release cutting or control of overtopping trees and shrubs. Young conifer trees can be used for woodcock cover by topping to prevent excessive height growth.

b. Brushy Thickets

(Shrubby areas most commonly frequently contain one or several of the following species: alder, blueberry, pussywillow, basket willow, redosier, silky and gray-stemmed dogwoods, and saplings of gray birch, aspen, red maple, and willows.)

- (1) Brushy thicket growth, whether natural or planted, should not exceed 15 feet in height.
- (2) Must be maintained or established on poorly or very poorly drained soils with high organic matter.
- (3) Should occupy only 40 to 60 percent of area under management.

3. Habitat Maintenance

The principal maintenance measures include removal of trees (pole-size or bigger); sufficient brush control by mowing, tillage, cutting, grazing, or burning to maintain existing low cover, especially herbaceous and shrubby cover; and protection of wet areas from drainage.

WHITE-TAILED DEER

Planning Considerations

The white-tailed deer is an animal of forest lands broken by small clearings, lakes, small crop fields, cut-over areas, pastures, hay meadows, etc. which create edge or allow sunlight to reach the ground so that shrubs and bushes will grow. Deer do not prefer deep dense forest where the crowns of the trees produce virtually a closed canopy and little understory growth.

White-tailed deer movements are daily and seasonal. Winter climate is the principal factor causing seasonal movements. In areas with heavy snow and extremely low temperatures, movements from summer range to winter range occur and are usually pronounced. Summer movements seldom exceed 1/2 mile, while movements to winter range may be as far as 6 miles.

Studies indicate that deer need between 6 to 8 pounds of good browse per 100 weight per day in order to satisfy growth requirements and 4 to 6 pounds for maintenance. White-tailed deer eat a wide variety of forage foods; the leaves, succulent stems, fruits and acorns from trees, shrubs, forbs, and domestic crops and grasses.

Deer frequently drink water from ponds, springs, and streams, but also satisfy their moisture requirements from snow and succulent foods.

SPECIFICATIONS

Habitat planning and management for white-tailed deer requires two basic considerations:

1. Maintaining or creating a good quality vegetative habitat.
2. Protecting the health and vigor of the deer herd by intelligently planned hunting.

To maintain or create a good quality vegetative habitat, the following vegetative types must be established or maintained:

1. Hardwood Trees
 - a. Trees (apple, aspen, basswood, beech, birch, hazelnut, hemlock, maple, oak, willow, witch hazel, and yews)

Maintain extensive forested lands on at least 50 percent of each 200 acres under management.

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- b. Brushy Thickets (blackberry, blueberry, dogwoods, elderberry, hawthorns, honeysuckle, greenbrier, viburnums, and tree seedlings)

(1) Establishment

Create one 5 to 20-acre opening per 200 acres in hardwood forests to encourage these plants.

(2) Maintenance

Mow, cut, or thin as necessary to prevent shading or excessive competition.

2. Grasses and Legumes (oats, wheat, alfalfa, clover, trefoil, flatpea, and locally adapted grasses)

a. Establishment

Seed woods roads, small clearings, and other open areas to these plants; one 5-acre opening per 200 acres of hardwood forest under management or 4 miles of woods roads.

b. Maintenance

Maintain by fertilizing, mowing, etc. as needed.

3. Coniferous Trees

Any management of conifers should be limited to deer yard areas and planned with the Connecticut Department of Environmental Protection or the Rhode Island Department of Natural Resources on an individual unit basis.

NON-GAME LAND BIRDS

Planning Considerations

Non-game birds include a great variety of species which are found in nearly every kind of vegetative community. These species eat all kinds of foods, have many adaptations for nesting, feeding, escape, migration, etc. Therefore, a variety of habitats are advised for attracting a variety of many different species of birds. As a rule, the greater the variety of plant forms on a given tract of land the larger the number of bird species and the more the individuals. Birds can be attracted to farmstead or city residential lot. However, it is felt that a nearby area of vegetation indigenous to the immediate region or land resource area is a must for one's efforts to be most effective. This may not hold true for birds in migration.

The food preferences of non-game birds that are most easily attracted can be grouped as follows:

1. Dry seeds such as grains, grasses, and weeds (blackbirds, cardinals, finches, sparrows).
2. Berries and fruits (bluebirds, robins, starlings, thrushes, waxwings).
3. Flying insects caught on the wing (flycatchers, nighthawks, swallows).
4. Terrestrial insects and worms such as crickets, grasshoppers, and earthworms (robins, sparrows, thrushes).
5. Arboreal insects and their eggs (chicadees, nuthatches, warblers, woodpeckers).

Nesting sites are often rather specific and vary considerably, but in general may be grouped as follows:

1. On the ground - about 150 species.
2. Off the ground, in upland trees and shrubs, but not in holes - 100 species.
3. In wetland areas, off the ground, in marsh plants, shrubs, and trees - about 75 species.
4. In holes and cavities and in birdhouses - about 40 species.

Food and cover of proper amounts and kinds can be assured in three ways:

1. By maintaining non-deliberate sources of food and cover-producing plants.

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2. By planting and growing food and cover plants.
3. By placing food at feeding stations.

Non-deliberate sources of food and cover plants

These are grassy areas (dense, tall, mid-height, or low), grain and seed crops, weedy areas, viny areas, shrubby areas, and woodlands. They can be lawns, pastures, meadows, odd areas, fencerows, hardwood forests, coniferous forests, crop fields, and the like.

Planting and growing food and cover

These are mainly shrub plantings around ponds, homesites, or other buildings or across or within fields. Suggested plants are autumn olive, holly, dogwood, amur honeysuckle, crabapple, firethorn, highbush cranberry, sumac, cherry, mountain ash, red cedar, American cranberry bush, Tatarian honeysuckle, and bittersweet. Small food plots of seed-producing plants can also be established.

Feeding stations

Anyone interested in attracting birds can do so by using artificial feeding devices and providing the foods preferred by the species he wants to attract. Selective feeding can be used to deny food to unwelcome species. The art of feeding birds is the ability to feed them selectively. Applied only as a supplement to naturally occurring or domestically established vegetative sources of food and cover.

SPECIFICATIONS

1. Plan and apply specifications for cottontail rabbits for habitat management for openland non-game birds.
2. Plan and apply specifications for ruffed grouse for habitat management for woodland non-game birds.

About the Team

The Eastern Connecticut Environmental Review Team (ERT) is a group of professionals in environmental fields drawn together from a variety of federal, state, and regional agencies. Specialists on the Team include geologists, biologists, foresters, climatologists, soil scientists, landscape architects, archeologists, recreation specialists, engineers and planners. The ERT operates with state funding under the supervision of the Eastern Connecticut Resource Conservation and Development (RC&D) Area.

The Team is available as a public service at no cost to Connecticut towns.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in reviewing a wide range of projects including subdivisions, sanitary landfills, commercial and industrial developments, sand and gravel operations, elderly housing, recreation/open space projects, watershed studies and resource inventories.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision-making. This is done through identifying the natural resource base of the project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental reviews may be requested by the chief elected officials of a municipality or the chairman of town commissions such as planning and zoning, conservation, inland wetlands, parks and recreation or economic development. Requests should be directed to the Chairman of your local Soil and Water Conservation District. This request letter should include a summary of the proposed project, a location map of the project site, written permission from the landowner allowing the Team to enter the property for purposes of review, and a statement identifying the specific areas of concern the Team should address. When this request is approved by the local Soil and Water Conservation District and the Eastern Connecticut RC&D Executive Council, the Team will undertake the review on a priority basis.

For additional information regarding the Environmental Review Team, please contact Jeanne Shelburn (889-2324), Environmental Review Team Coordinator, Eastern Connecticut RC&D Area, 139 Boswell Avenue, Norwich, Connecticut 06360.