

Botanical Survey
North Truro Air Force Station
Cape Cod
Barnstable County, Massachusetts

22-24 August 1990

For the Cape Cod National Seashore

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ABSTRACT

A botanical survey of the North Truro Air Force Station [NTAFS], Cape Cod, Massachusetts, conducted on 22-24 August 1990 resulted in the discovery of 4 additional sites [totalling 60 plants] of *Spiranthes tuberosa* var. *grayii* (little ladies' tresses), a species on the Watch List. An additional 19 patches of *Corema conradii* (broom crowberry), a species of Special Concern, were also found on the site, along with a very large patch of *C. conradii* immediately west of the site. A large proportion of the vegetation inside the inner fence of the NTAFS is reflective of its urban/suburban disturbed land uses. Between the inner fence and the outer fence are extensive areas of less disturbed vegetation dominated by species typical of upland coastal forests and coastal dune/bluffs. No wetlands were found on the site.

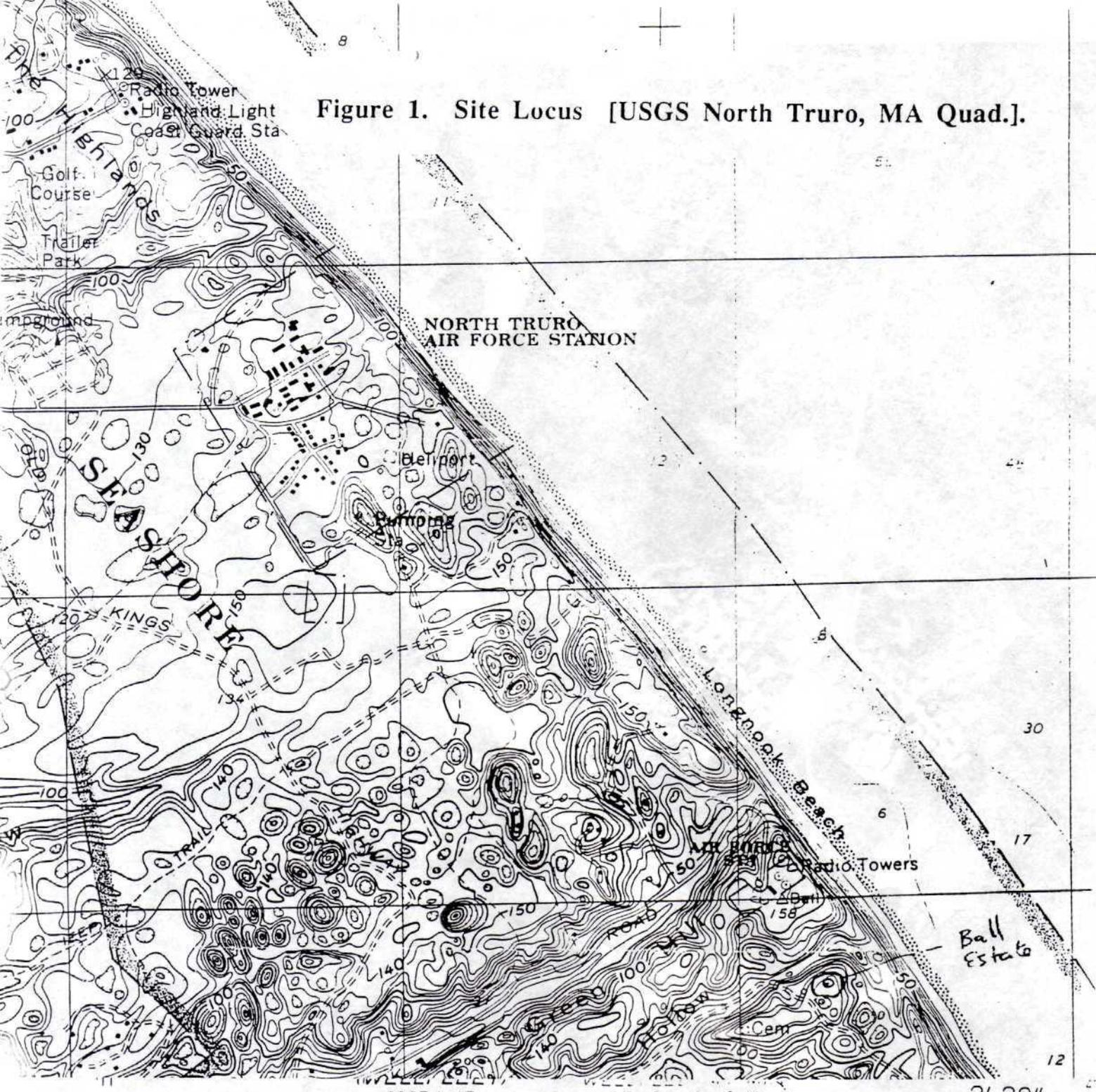
THE SITE

The North Truro Air Force Station [NTAFS] is located on the Outer Cape Cod about 4 miles northeast of Truro and 9 miles southeast of Provincetown (42° 2' N, 70° 3' W; U.S.G.S. 7.5 minute series, North Truro, MA [Figure 1]). The facility is roughly 125 acres, situated on a relatively flat glacial outwash surface varying from 83 feet (near Pump Station, Bldg. 58) to 178 feet above mean sea level on bluffs adjacent to the Atlantic Ocean [see Figures 1,2]. An inner security fence surrounds approximately 25 acres of highly urbanized, developed land that has been devoted to the Ground to Air Transmitter Radio [GATR] facility, consisting of two radar domes and many buildings [see 1":100' Rare Plant Survey Map].

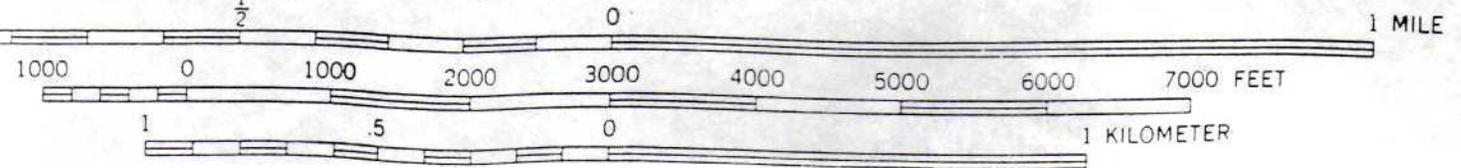
A 27-unit suburban housing facility is situated on 20 acres south of the GATR facility. Other service facilities including a sewage treatment plant, helicopter landing area, pumping station, athletic field, commissary, TROPD/Scatter site, etc. occupy approximately 50 additional acres.

Relatively undisturbed vegetation is found in a 300-foot wide strip from the eastern side of the security fence on the cliffs, to the beach on the Atlantic Ocean below. This vegetation is largely typical of dunes and coastal cliffs. Upland coastal woodland and forest vegetation is found south and west of the housing facility, and east of the commissary building (Bldg. 45), along the trail leading to the tower just north of the boundary fence.

Figure 1. Site Locus [USGS North Truro, MA Quad.]



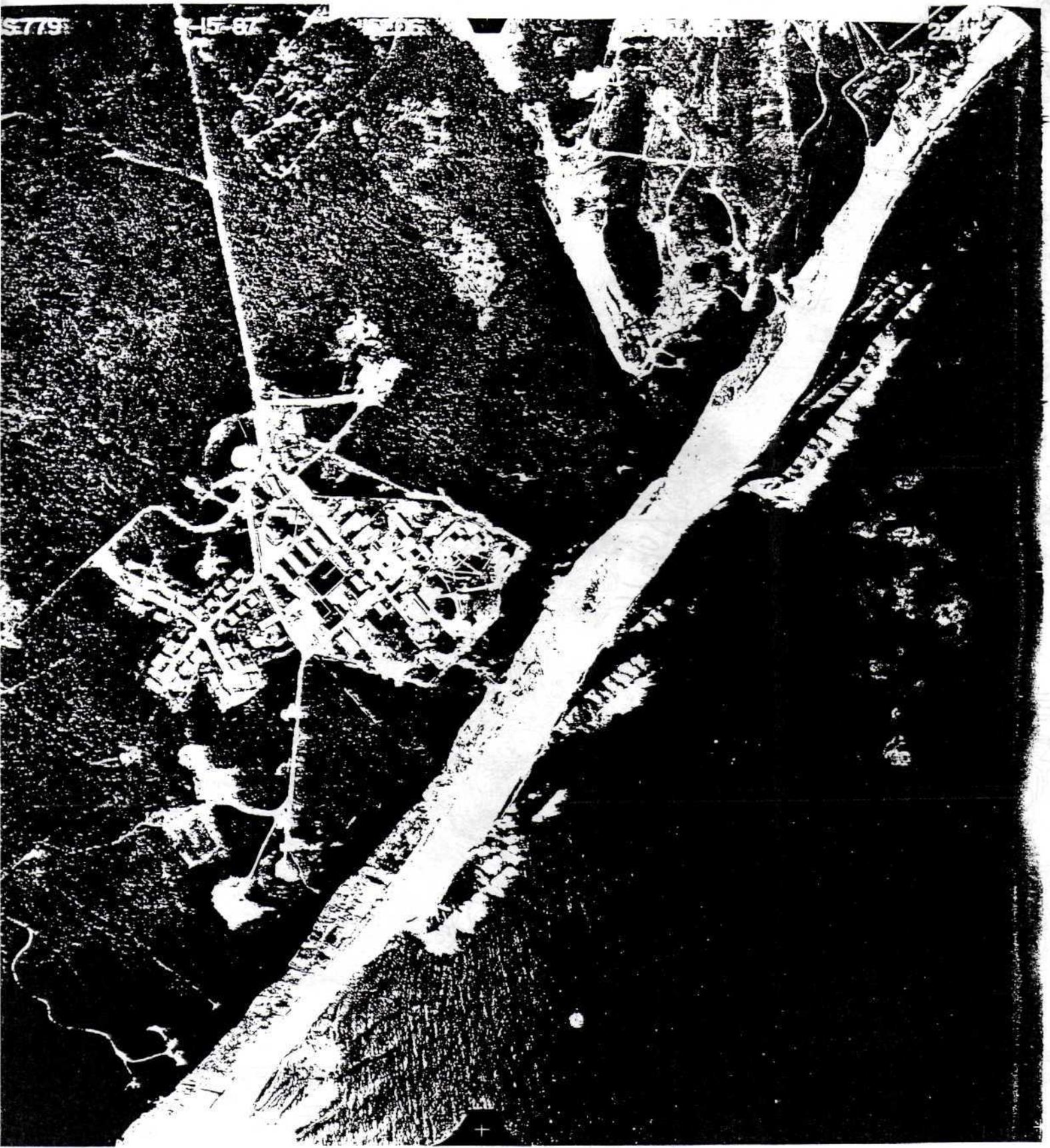
SCALE 1:25 000



CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL



Figure 2. Aerial Photo [15 Sept 1987].



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METHODS

Prior to visiting the site, previous studies of the general area Richard LeBlond, Swansboro Institute of Herbal Studies, Swansboro, NC, was contacted regarding his report, *Rare Vascular Plants of Cape Cod National Seashore* (LeBlond, 1990), to determine the likelihood of encountering species of botanical interest or ecological concern on the NTAFS site and the best time to visit the site. Bruce Sorrie of the Massachusetts Natural Heritage and Endangered Species Program, Boston, MA, was also consulted regarding species of special concern listed by the Natural Heritage Program that might be found on the site. The following list of potential species of special concern was developed from these sources:

BOTANICAL NAME	COMMON NAME	STATUS
<i>Angelica lucida</i>	Seaside angelica	Watch list
<i>Aristida purpurascens</i>	Purple needlegrass	Threatened
<i>Asclepias tuberosa</i>	Butterfly-weed	Watch list
<i>Botrychium matricaraefolium</i>	Daisy-leaf grapefern	Watch list
<i>Carex oligosperma</i>	Few-flowered sedge	Threatened
<i>C. striata</i> var. <i>brevis</i>	Walter's sedge	Endangered
<i>Corema conradii</i>	Broom crowberry	Special concern
<i>Dichanthelium commonsianum</i>	Commons' panicgrass	Special concern
<i>Helianthemum dumosum</i>	Bushy rockrose	Special concern
<i>Lupinus perennis</i>	Wild lupine	Watch list
<i>Mertensia maritima</i>	Oysterleaf	Endangered
<i>Opuntia humisifusa</i>	Prickly-pear cactus	Threatened
<i>Spiranthes tuberosa</i>	Little ladies' tresses	
var. <i>grayii</i>		Watch list
<i>Stipa avenacea</i>	Black oatgrass	Watch list
<i>Suaeda richii</i>	Rich's sea-blight	Watch list

The site was visited during the period 22-24 August 1990, because it was expected that species such as *Spiranthes tuberosa* would be most apparent at that time. It is possible that spring ephemeral perennials would have been missed because they would not have been visible during a late August visit. The field survey was accomplished by walking about the site during the three day period, sometimes alone, and once in the accompaniment of Dave Crary, Fire Management Officer, CCNS. No systematic collection of herbarium specimens was undertaken, and no samples of plants of special botanical concern were taken. However some limited samples of abundant plant species were collected for taxonomical determination using Fernald (1950), Hinds & Hathaway (1968), and through consulting the Herbarium of the Cape Cod National Seashore at the Salt Pond Visitor's Center.

Field notes were used to compile the list of species found on the site (Table 1), to indicate on LeBlond's (1990) maps showing the locations of rare vascular species (Figures 3,4), and on the large scale [1":100'] Rare Plant Species Map.

FINDINGS

A through exploration of NTAFS found no wetlands, as defined by the Massachusetts Wetland Protection Act, were found on the site. The closest approximation to wetland vegetation is a stand of *Phragmites communis* growing in the sewage treatment drainage facility.

Relatively undisturbed vegetation is found in a 300-foot wide strip from the eastern side of the security fence on the cliffs, to the beach on the Atlantic Ocean below. This vegetation is dominated by species such as *Arctostaphylos uva-ursi* (bear berry), *Hudsonia tomentosa* (beach heather), *Hudsonia ericoides* (golden heather), *Ammophila breviligulata* (beachgrass), *Chrysopsis falcata* (golden aster), *Cakile edentula* (sea-rocket), and *Lathyrus japonicus* (beach pea) that are largely typical of dunes and coastal cliffs.

Upland coastal oak-pitch pine woodland vegetation is commonly found south and west of the housing facility, and east of the commissary building (Bldg. 45), along the trail leading to the Tower just north of the boundary fence. This vegetation is dominated by species such as *Quercus velutina* (black oak), *Q. prinoides* (dwarf chestnut oak), *Q. ilicifolia* (scrub oak), *Pinus rigida* (pitch pine), *Vaccinium vacillans* (low-bush blueberry), *Gaylussacia baccata* (black huckleberry), and *Pteridium aquilium* bracken.

Several oak individuals were found south of the housing site that appear to resemble *Quercus rubra* (red oak) more than *Q. velutina* in that they lacked pubescence on the twigs and on the underside of the leaves. The color of the inner bark was ambiguous, being intermediate between yellow and pink, and perhaps these individuals represent some introgression between red and black oaks. Svenson and Pyle (1979) state that red oak is found only locally in rich woods in Mashpee, Barnstable, and

Brewster; as well as on clay soil in Wellfleet.

The vegetation in the vicinity of buildings and NTAFS facilities is typical of urban/suburban disturbed sites, dominated by alien species and cultivated plants indicated on Table 1, as well as other native species such as *Solidago* spp. (goldenrods), *Asclepias syriaca* common milkweed, *Vitis* spp. (grapes), *Hypericum perforatum* (common St. Johnswort), *Lactuca* spp. (lettuce), *Rubus* spp. (blackberry, dewberries), *Rhus radicans* (poison ivy), etc.

Plants of Special Concern. Seventeen patches of *Corema conradii* (broom crowberry), a species categorized as "Special Concern" by the Massachusetts Natural Heritage Program, were also found on the NTAFS site, along with a very large patch of *C. conradii* immediately west of the site [1:100 scale map]. These patches are found in 4 clusters marked as sites A-D on Figure 3, the map from LeBlond (1990).

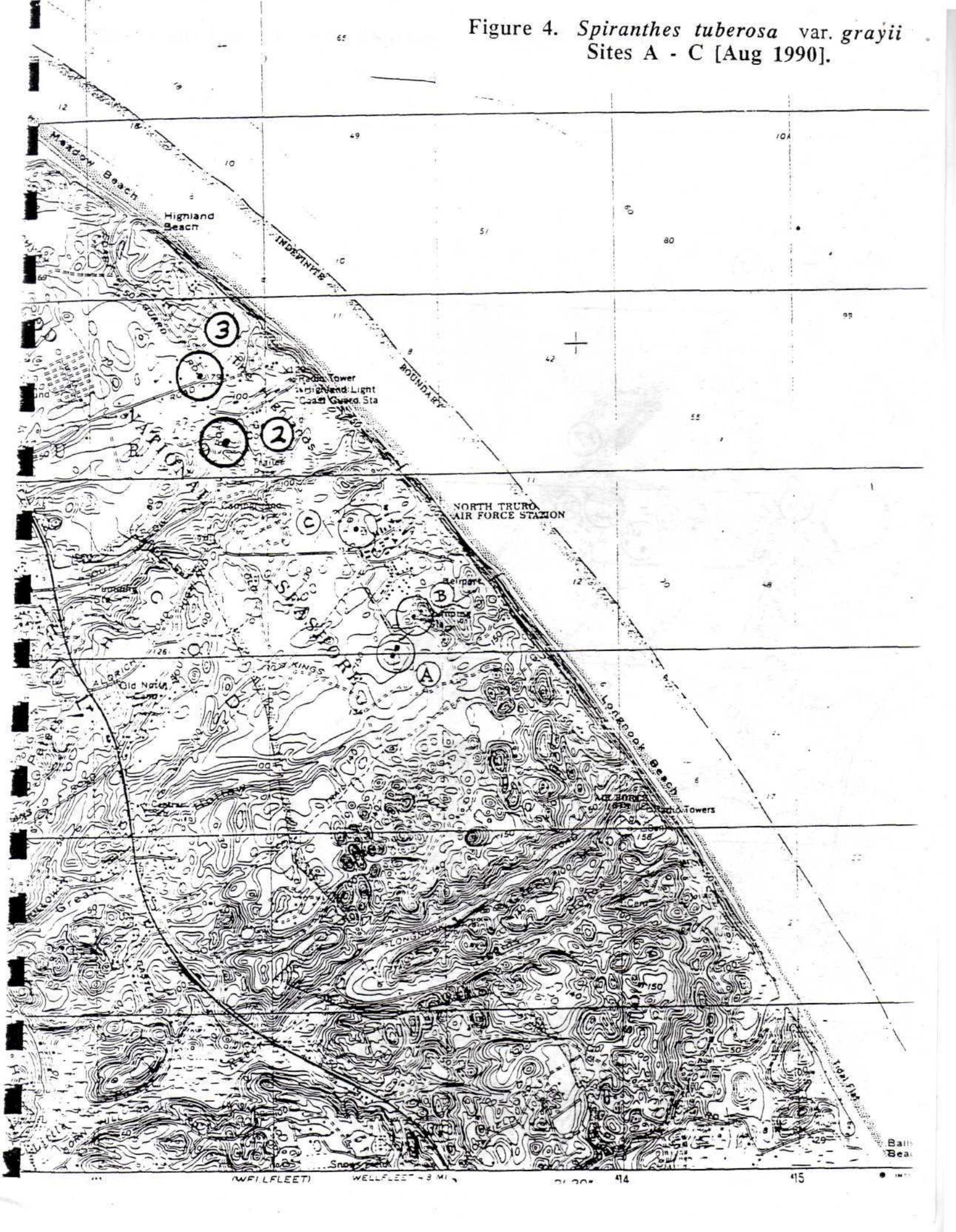
Site A: One small clump of *C. conradii* between the old parking area at the TROPO/Scatter Site and the sand road. **Site B:** A very luxuriant grove located 90' east of the northeast corner of the helicopter landing site, with stems that are an inch in diameter at the base and branches that extend as much as 18" high. A smaller patch on the east side of the road. **Site C:** Four spotty but vigorous clumps of *C. conradii* located in the western corner of the site, in the general vicinity of the Commissary (Bldg. 45). In addition there is a very expansive

Figure 3. *Corema conradii* Sites A - D [Aug 1990].



Balt
Bea

Figure 4. *Spiranthes tuberosa* var. *grayii*
Sites A - C [Aug 1990].



(>10,000 ft²) patch of *C. conradii* just west of the NTAFS site.

Site D: Twelve clumps of *C. conradii* along the trail running north and east from the Commissary toward the Tower north of the NTAFS. These clumps are generally small, have low density of shoots, and are scattered among the gaps in the coastal upland woodlands.

Spiranthes tuberosa var. *grayii* (little ladies' tresses), a species on the Watch List was found in 4 groups in the 3 areas indicated as sites A-C on Figure 4, the map for the species from LeBlond (1990).

Site A: A single individual found just west of the sand road running south along the parking area for the TROPO/Scatter site. A larger group of 38 plants are found just north of the parking area; 3 of these individuals are growing among the pipes just east of the road way as it enters TROPO/Scatter Site (Bldg. 30). Extreme care should be exercised when the area is cleaned up and pipes removed, preferably in winter or early spring, being careful not to disturb these plants or to compact the soil with heavy machinery.

Site B: A group of 20 *S. tuberosa* var. *grayii* was found growing at the base of a hillside, 40' up the power line from the pumping station (Bldg. 58). **Site C:** A single *S. tuberosa* var. *grayii* growing at the edge of an open field near low shrubs, 225' northwest of the main entrance road Security Fence gate.

Additional comments: The herbarium collections of the CCNS

are varied and should prove to be an increasingly valuable resource in the future. They consist of several different systematic, thematic collections that have been made in the past and could be made more useful to resource managers and scientists alike if they were better indexed and housed in an area that permitted inspection of the sheets with adequate work space and illumination. It might also be useful in the long-term to also compile a listing of plants in the collections of other herbaria (such as the Herbaria of Harvard University) that have their provenance in land now part of CCNS.

Table 1. Species List - North Truro Air Force Station

22-24 August 1990

* <i>Achillea millefolium</i>	Yarrow
* <i>Ambrosia artemisiifolia</i>	Common ragweed
<i>Amelanchier canadensis</i>	Shadbush
<i>Amelanchier laevis</i>	Shadbush
<i>Ammophila breviligulata</i>	Beachgrass
<i>Anaphalis margaritacea</i>	Pearly everlasting
<i>Andropogon scoparius</i> [<i>Schizachyrium scoparium</i>]	Little Bluestem
<i>Apocynum androsaemifolium</i>	Spreading dogbane
<i>Aralia nudicaulis</i>	Wild sarsaparilla
<i>Arctostaphylos uva-ursi</i>	Bearberry
* <i>Artemisia stelleriana</i>	Dusty miller
<i>Asclepias syriaca</i>	Common milkweed
<i>Aster eriocides</i>	Heath aster
<i>Aster linariifolius</i>	Stiff aster
<i>Aster novo-belgii</i>	New York aster
<i>Baptisia tinctoria</i>	Wild indigo
<i>Cakile edentula</i>	Sea rocket
<i>Carex pensylvanica</i>	Sedge
* <i>Chenopodium album</i>	Pigweed
<i>Chrysopsis falcata</i>	Golden aster
* <i>Chrysanthemum leucanthemum</i>	Ox-eye daisy
* <i>Chicorium intybus</i>	Chicory
* <i>Cirsium arvense</i>	Canada thistle

<i>Cirsium pumilum</i>	Pasture thistle
<i>Comptonia peregrina</i>	Sweet fern
# <i>Corema conradii</i>	Broom crowberry
~ <i>Coreopsis lanceolata</i>	Lance-leaved coreopsis
<i>Corylus americana</i>	American hazelnut
* <i>Cyperus esculentus</i>	Yellow nutgrass
* <i>Cytisus scoparius</i>	Scotch broom
* <i>Daucus carota</i>	Queen Anne's lace
* <i>Deschampsia flexuosa</i>	Common hairgrass
* <i>Dianthus armeria</i>	Deptford pink
* <i>Digitaria</i> spp.	Crabgrass
* <i>Echium vulgare</i>	Viper's bugloss
<i>Epigea repens</i>	Mayflower
<i>Erechtites heiracifolia</i>	Pilewort
<i>Eupatorium hyssopifolium</i>	Hyssop-leaved thoroughwort
<i>Euphorbia maculata</i>	Eyebane
<i>Euphorbia polygonifolia</i>	Seaside spurge
* <i>Forsythia</i> sp.	Forsythia
<i>Fragaria virginiana</i>	Strawberry
~ <i>Fraxinus pennsylvanica</i>	Red ash
~ <i>Fraxinus pennsylvanica</i> var. <i>subintegerrima</i>	Green ash
<i>Gaultheria procumbens</i>	Wintergreen
<i>Gaylussacia baccata</i>	Black huckleberry
<i>Helianthemum bicknellii</i>	Frostweed
* <i>Hieracium florentinum</i>	King devil

<i>Hieracium venosum</i>	Rattlesnake weed
<i>Hudsonia ericoides</i>	Golden heather
<i>Hudsonia tomentosa</i>	Beach heather
<i>Hydrangea paniculata</i>	Hydrangea
<i>Hypericum gentianoides</i>	Orange grass
* <i>Hypericum perforatum</i>	Common St. John's wort
* <i>Ilex aquifolium</i>	English holly
<i>Ilex verticillata</i>	Winterberry
~ <i>Iris</i> X spp.	Garden iris
<i>Juniperus virginiana</i>	Red cedar
<i>Juncus gerardi</i>	Black rush
<i>Lactuca biennis</i>	Lettuce
<i>Lactuca canadensis</i>	Lettuce
<i>Lathyrus japonicus</i>	Beach pea
<i>Lechea maritima</i>	Pinweed
* <i>Leontodon autumnalis</i>	Fall dandelion
* <i>Leontodon hastilis</i> var. <i>vulgaris</i>	Fall dandelion
* <i>Lepidium virginicum</i>	Poor-man's pepper
<i>Lespedeza capitata</i>	Bush clover
* <i>Ligustrum vulgare</i>	Privet
* <i>Linaria vulgaris</i>	Butter-and-eggs
* <i>Lonicera morrowi</i>	Morrow's honeysuckle
* <i>Lonicera xylostemon</i>	Fly honeysuckle
<i>Lysimachia quadrifolia</i>	Whorled loosestrife
<i>Maianthemum canadense</i>	Wild lily-of-the-valley
* <i>Melilotus alba</i>	Sweet white clover

<i>Myrica pensylvanica</i>	Bayberry
<i>Oenothera biennis</i>	Biennial evening primrose
<i>Panicum capillare</i>	Old witch grass
<i>Panicum lanuginosum</i>	Wolly panic grass
<i>Parthenocissus quinquefolia</i>	Virginia creeper
* <i>Phleum pratense</i>	Timothy
* <i>Phragmites communis</i>	Reed
<i>Phytolacca americana</i>	Pokeweed
<i>Pinus rigida</i>	Pitch pine
<i>Plantago aristata</i>	Bracted plantain
* <i>Plantago lanceolata</i>	English plantain
* <i>Plantago major</i>	Common plantain
<i>Polygalya polygama</i>	Milkwort
<i>Polygonella articulata</i>	Jointweed
<i>Polygonum scandens</i>	Climbing false-buckwheat
<i>Populus tremuloides</i>	Quaking aspen
* <i>Potentilla argentea</i>	Silver cinquefolia
<i>Potentilla canadensis</i>	Canada cinquefolia
<i>Potentilla simplex</i>	Old field cinquefolia
<i>Prunus maritima</i>	Beach plum
<i>Prunus serotina</i>	Black cherry
<i>Pteridium aquilinum</i>	Bracken
<i>Pyrus melanocarpa</i>	Black chokeberry
<i>Quercus alba</i>	White oak
<i>Quercus ilicifolia</i>	Scrub oak
<i>Quercus prinoides</i>	Dwarf chestnut oak

<i>Quercus rubra</i>	Red oak
<i>Quercus velutina</i>	Black oak
* <i>Raphanus raphanistrum</i>	Wild radish
<i>Rhus copallina</i>	Winged sumac
<i>Rhus radicans</i>	Poison ivy
<i>Ribes hirtellum</i>	Gooseberry
~ <i>Robinia pseudo-acacia</i>	Black locust
<i>Rosa carolina</i>	Salt-spray rose
* <i>Rosa rugosa</i>	Rugose rose
<i>Rubus allegheniensis</i>	Blackberry
<i>Rubus flagellaris</i>	Dewberry
<i>Rubus hispidus</i>	Bristly dewberry
* <i>Rumex acetosella</i>	Sheep sorrel
<i>Salix discolor</i>	Large pussy-willow
* <i>Saponaria officinalis</i>	Bouncing-bet
<i>Sassafras albidum</i>	Sassafras
<i>Sericarpus asteriodes</i>	White-topped aster
<i>Smilacina stellata</i>	Starry false Solomon's-seal
<i>Smilax rotundifolia</i>	Common cat brier
<i>Smilax glauca</i>	Saw brier
* <i>Solanum dulcamara</i>	Nightshade
<i>Solidago odora</i>	Sweet goldenrod
<i>Solidago rigida</i>	Stiff goldenrod
<i>Solidago rugosa</i>	Rugose goldenrod
<i>Solidago semervirens</i>	Sea-side goldenrod

<i>Solidago tenuifolia</i>	Slender-leaved goldenrod
# <i>Spiranthes tuberosa</i> var <i>grayi</i>	Little ladies-tresses
* <i>Syringa vulgaris</i>	Lilac
* <i>Taraxacum officinale</i>	Common dandelion
~ <i>Taxus canadensis</i>	American yew
<i>Trientalis borealis</i>	Star-flower
* <i>Trifolium arvense</i>	Rabbit-foot clover
* <i>Trifolium pratense</i>	Red clover
* <i>Trifolium procumbens</i>	Low hop-clover
* <i>Trifolium repens</i>	White clover
<i>Vaccinium angustifolium</i>	Low sweet blueberry
<i>Vaccinium vacillans</i>	Low-bush blueberry
* <i>Verbascum thapsus</i>	Common mullein
<i>Viburnum dentatum</i>	Southern arrowwood
<i>Viburnum cassinoides</i>	Witherod
<i>Viburnum recognitum</i>	Arrowwood
* <i>Vicia</i> sp.	Vetch
<i>Vitis labrusca</i>	Fox grape
<i>Xanthium echinatum</i>	Sea-burdock

1. Nomenclature follows Fernald, M.L., 1950, *Gray's Manual of Botany*, 8th Ed., Corrected Printing, 1970. D. Van Nostrand Co., N.Y., 1632 pp.

*= Alien

#= Plant of special concern

~= Escapee, native out of place

%= Probable hybrid between *Q. rubra* and *Q. velutina*

Acknowledgements

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