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NORMANDEAU ASSOCIATES, INC.

ENVIRONMENTAL SCIENTISTS,
ENGINEERS & PLANNERS

PHASE 2 REPORT
VOLUME II
APPENDIX 5 & 6

# THE COASTAL WETLANDS MAPPING PROGRAM, NEW HAMPSHIRE

Prepared for

The New Hampshire Coastal Program
Office of State Planning, NH

Prepared by

Martin C. Michener
Gretchen Stevens
Michael H. Simpson

Normandeau Associates, Inc.
25 Nashua Road,
Bedford, NH 03102

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## 5.0 APPENDIX: SALT MARSHES, DETAILED RESULTS

### 5.1 HOW TO USE THE RESULTS

Assessment of the tidal marsh systems was based on infra-red photo interpretation and field surveys. This report presents a broad overview of conditions. More detailed work is necessary to document the more highly impacted tidal systems and to monitor changes that will occur if efforts are made to restore their hydrology.

To assess the general health of a tidal marsh system, the following factors were considered:

1. Extent of panne and/or rotten spots present on the high marsh surface.

2. Presence of species indicative of high saline conditions, such as *Salicornia* sp. and the short form of *Spartina alterniflora* on the high marsh.

3. Presence of species, such as *Lythrum salicaria, Phragmites* sp. and *Typha* sp. which indicate progression of the high marsh toward a freshwater tidal system. Also, species such as *Phragmites*, and to a lesser extent *Typha*, which often point to a man-made disturbance.

4. Presence of man-made restrictions, such as culverts, road and railroad beds, extensive mosquito ditching, stream blockages due to riprap and/or fell.

5. Presence of bedrock and/or glacial till islands in the high marsh, or other unique geological or topographical features. These areas provide an ecotonal situation which contributes to the diversity of wildlife on the marsh.

6. Presence of open areas of freshwater, adjacent to tidal marsh systems. These sites provide a diversity in habitat which increases the biological diversity of flora and fauna in the area.

7. Integrity of the border zone around the tidal marsh system. The border zone not only buffers the high marsh from human activities, but also provides a biologically rich habitat, due to its ecotonal nature.

8. Relative size of the tidal marsh and its proximity to other similar systems.

9. Development of salt marsh peat, which includes depth of soil, stage of decomposition, texture of underlying mineral soil materials and total salts in surface soil materials. For a description of salt marsh soils, see Section 3.2.3.

Though a quantitive model was not used in the assessment of these tidal systems, each of the criteria above were assigned a value of high, medium or low for each marsh, from which were calculated a rating for the marsh's overall health. Section 5.2 presents these results, along with brief comments for each marsh.

## 5.2 RESULTS TABLES

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM001
LOCATION: (Photo 2-26) North Shore, NC

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & 997 (1) | ? |

General Health Index ($\bar{X}$): 2.2

COMMENTS:

Culvert into this marsh may need to be cleaned out.

(A) Intertidal patch of marsh with a small strip of *Spartina patens*

(B) *Spartina alterniflora* all the way up drainage ditch until point *Typha* enters the marsh from the east. Majority of marsh supports *Spartina patens, Juncus gerardi*, and *Distichlis spicata*. On the eastern border switch grass and *Juncus* (*balticus* possibly).

(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM002
LOCATION: (Photo 2-26) East of Boatswain Hill, NC

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 2.1

COMMENTS:

This is a unique isolated system, which is hard to approach without crossing private property. Even though the houses are very close to the marsh on the western boundary, the main channel of the tidal creek prevents easy access to the high marsh.

The upper part of this system (A) is primarily forb pannes dominated by arrow-grass, black grass and some golden rod around the border zone. (B) There are two major restrictions to flushing in the high marsh:

(SM002 Cont.)

a stone wall and a berm. Behind the berm is a *Typha* stand. This area could be classified as tidal-fresh water. (C) A small stand of *Phragmites* is growing on an area where a tree fell into the marsh. (D) From photo interpretation (only) there appears to be an obstruction (possibly stones) at the mouth of the system.

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(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM003
LOCATION: (Photo 1-24) Little Harbor, NC

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) * | Low(1) | 1.5 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & 997 (1) | ? |

General Health Index ($\bar{X}$): 2.4

COMMENTS:

This site is mostly intertidal. It is an important marsh due to the lack of similar systems in this area. There is potential for impact to the system if boat traffic into and out of Little Harbor increases and/or if the docking facilities to the west are enlarged.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM005, SM006, SM007
LOCATION: (Photo 2-24) Point West of Wentworth Hotel, NC

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) * | Med.(2) | Com.(1) | 2.5 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 2.5

COMMENTS:

Both intertidal and high marsh exist at these sites.

SM005 - narrow band of intertidal marsh with healthy high marsh; *Spartina patens* and blackgrass present.

SM006 - mostly intertidal with a small strip of high marsh.

SM007 - (photo interpretation only) appears to have a thin stand of *Spartina alterniflora*; 80% of area high marsh.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM008
LOCATION: (Photo 2-24) Leach's Island, NC

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Buffer/Borderzone | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & 997 (1) | ? |

General Health Index ($\bar{X}$): 2.8

COMMENTS:

(photo interpretation only) Unique well-protected system. Undoubtedly provides good wildlife/waterfowl/shore bird feeding habitat.

Very few large irregular pannes. Many small circular to oval pannes. indicating deeper standing water which aids survival of fish and invertebrates brought in on the higher tides.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM009
LOCATION: (Photo 2-26) Goat Island and nearby islands, NC

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & 997 (1) | ? |

General Health Index ($\bar{X}$): 2.6

COMMENTS:

These are small islands of mostly intertidal marsh. The rarity of salt marsh in the region makes these quite important despite their small size.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM010
LOCATION: (Photo 2-22, 2-24) Witch Creek, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.6

COMMENTS:

(A) At western end, large areas of black grass (*Juncus gerardi*) *Spartina patens*, silver weed (*Potentilla anserina*) and, to a lesser extent, seaside plantain (*Plantago juncoides*) and arrow-grass. *Spartina alterniflora* grows nearly to tree line along stream channel. Channel contains numerous rocks.

(SM010 Cont.)

(B) Island where marsh widens still has a good deal of black grass. Stones in creeks not evident downstream of island.

(C) Small stand of *Typha* near golf course to the north.

(D) Small stand of *Scirpus* along edge of marsh on southern border. Stone wall extends into marsh just east of narrows and island.

---

(A), (B), etc. refer to locations on wetland maps.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM011
LOCATION: (Photo 2-22) Berry's Brook, West of Brackett Road, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) * | Med.(2) | Low(3) | 1.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) * | Low(1) | 1.5 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.9

COMMENTS:

(A) A combination of stone walls, mosquito ditch levees and vehicle tracks on the high marsh inhibits drainage at this site. Undoubtedly an excellent birding location. Many pannes are deep enough to support *Ruppia maritima* and will probably contain water through the summer.

(SM011 Cont.)

(B) Forb pannes in evidence; area dominated by short *Spartina alterniflora*, arrow-grass, *Salicornia*, silver weed.

(A), (B), etc. refer to locations on wetland maps.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM012
LOCATION: (Photos 1-22, 2-24) Mouth of Berry's Brook, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) * | Low(1) | 1.5 |
| (+) | Buffer/Borderzone | High(3) * | Med.(2) | Low(1) | 2.5 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) * | Com.(1) | 1.5 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 2.2

COMMENTS:

Egrets and herons sighted.

(A) Four stone walls not only restrict tidal flooding, but also trap water in this area. Between 2nd and 3rd stone wall there are numerous pannes with scattered stands of short *Spartina alterniflora*.

(SM012 Cont.)

(B) Beyond restriction: a few forb pannes dominated by arrow-grass and some *Salicornia*. Evidence of a good deal of *Salicornia* at this site last year; at present *Spartina alterniflora* and black grass dominate.

---

(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM013
LOCATION: (Photo 1-24) Mouth of Berry's Brook, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 2.2

COMMENTS:

Very healthy system. *Spartina alterniflora* borders outer edge; forb pannes in center.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM014
LOCATION: (Photo 1-24) Odiorne Point, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Buffer/Borderzone | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 2.6

COMMENTS:

This is a tiny but healthy saltmarsh with approximately 50% intertidal and 50% high marsh. Being so close to the influence of ocean tides and storm surges, it is remarkable that this marsh is doing so well.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM016
LOCATION: (Photo 1-22) Fairhill Swamp, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) * | Med.(2) | Low(1) | 2.5 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) * | 497,597, & 697 (2) | 797 & 997 (1) | 2.75 |

General Health Index ($\bar{X}$): 2.3

COMMENTS:

An important marsh due to the high number of marsh islands and the visible presence of 3000-year-old cedar stumps. This is the largest contiguous marsh area north of Hampton-Seabrook in New Hampshire.

(A) Has been highly impacted by all terrain vehicles. Already water is being trapped in depressions caused by the wheels, leading to expansion of rotten spots/panne areas. *Ruppia maritima* is present in pond holes. This area is a rich wildlife/birding area.

(SM016 Cont.)

(B) More all-terrain vehicle tracks. This area is exceptionally thick with mosquitoes. A number of short *Spartina alterniflora* pannes.

(C) Area rich in wildlife. Raccoon, fox and deer sign. 20+ mallards and a number of egrets sighted feeding in these large pannes.

Much of the drainage problems can be attributed to mosquito ditch levees.

(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM018
LOCATION: (Photo 1-20) Wallis Sands, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 1.9

COMMENTS:

This area is becoming a freshwater/tidal system. It has a large deep pond hole which allows for survival of fauna brought in by the highest spring tides. Potential for restoration is high. Must alter culverts running under Route 1A to provide better communication with SM023. Also must direct parking lot (Wallis Sands State Beach) runoff away from SM018.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM019
LOCATION: (Photo 1-22) Marsh Road Pond, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | Low(3) | N/A |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | Low(3) | N/A |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 1.5 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Buffer/Borderzone | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |
| | | | General Health Index ($\bar{X}$): | | 2.2 |

COMMENTS:

East Rye pond is essentially a freshwater system. The major restriction to flow is the culvert going under Parsons Road. However, in this case the restriction is helping maintain the freshwater habitat in the pond. Excellent bordering area. Though soils classified as Terric Sulfihemists, may be closer to a Sulfihemist; surface soil materials low in salt.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM020
LOCATION: (Photo 1-22) East of Marsh Road Pond, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | *797 & 997 (1) | 1 |

General Health Index ($\bar{X}$): 1.1

COMMENTS:

Highly impacted system. Culvert under Marsh Road is blocked leaving little, if any, communication with main marsh system (SM023). *Typha* over-running site creating a stagnant system. High mosquito breeding potential. This roadway has been known to flood (1978).

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM021
LOCATION: (Photo 2-24) Sheafe's Point, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) * | Com.(1) | 1.5 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.3

COMMENTS:

This is a narrow band of healthy high marsh at the mouth of Witch's Creek, dominated by *Spartina patens* and *Juncus gerardi*, both interspersed and in pure stands. Other common species: *Distichlis spicata, Puccinellia maritima, Plantago juncoides* and *oliganthos, Solidago sempervirens.*

Presence of golf course provides some buffer from disturbance, but may be contributing to encroachment of freshwater herbaceous species.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM022
LOCATION: (Photo 1-22) North West end of Parsons Creek Marsh, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.7

COMMENTS:

This section of the Parsons Creek Marsh is showing definite signs of impact, caused by a series of tidal restrictions along the drainage. The area is changing toward a freshwater tidal system with stands of *Typha* evident. Though loosestrife is not present at this site, it is found in SM023 and if the species migrates into MS022, it will quickly take over.

For further discussion, see Appendix Section 5.3.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM023
LOCATION: (Photo 1-20) Parsons Creek Marsh, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 1.4

COMMENTS:

This marsh is showing definite signs of impact from tidal restrictions along the creek drainage. Large areas of pannes/rotten spots and the proliferation of *Salicornia* and short forms of *Spartina alterniflora* indicate inadequate flushing and poor drainage. Construction along Route 1A and Wallis Road has contributed to the marsh's condition.

For further discussion, see Appendix Section 5.3.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM024
LOCATION: (Photo 1-20) West of Brackett Road at Massacre Marsh, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.1

COMMENTS:

Culvert under Brackett Road is restricting tidal flow and spring runoff to some extent. Soil is classified 397; however from soundings taken, it appears that SM024 is approaching the upland edge of the Massacre Marsh tidal system. This site has good potential for restoration if culvert is enlarged and if obstructions at Concord Point are removed.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM025
LOCATION: (Photo 1-20) Massacre Marsh, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.3

COMMENTS:

Area (A) in western section of SM025 is showing signs of impact. It appears that water during the higher spring tides is trapped behind the levees of the mosquito ditching. The lower part of this drainage is known as "Stinky Creek". The causes for the odor are localized at Concord point.

For further discussion, see Appendix Section 5.3.

(A), (B), (C), etc. refer to locations on wetland maps.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM026
LOCATION: (Photo 1-20) South of Massacre Marsh, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.6

COMMENTS:

(Photo interpretation only)

There appears to be a blockage or constriction between SM025 and SM026. Mosquito ditching and soil type indicate an impacted salt marsh. The area has changed towards a shrub-marsh with what appears to be *Typha* and/or *Phragmites* stands. The hydrology is well on its way to a freshwater-tidal system.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM027
LOCATION: (Photo 1-18) Dredge spoils site West of Rye Harbor, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | Low(3) | N/A |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | Low(3) | N/A |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | Low(1) | N/A |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | Low(1) | N/A |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | Com.(1) | N/A |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 0 (dredge spoils) |

General Health Index ($\bar{X}$): .75

COMMENTS:

*Zero chance of restoration*

This area can no longer be considered a salt marsh system. Dredge spoils deposited at this site have killed all high marsh vegetation and compressed the peat. A *Phragmites* - *Typha* - sedge system has replaced the once viable sedge tidal system. The area is surrounded with a berm to contain runoff of leachate from dredge spoils. The berm acts to trap freshwater and restrict tidal flow into this site.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM028
LOCATION: (Photo 1-18) South of Rye Harbor, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) * | Low(3) | 2.5 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 1.9

COMMENTS:

High tides normally saturate most of this system, but drainage is inhibited around the perimeter and water is trapped by mosquito levees.

Marsh shore birds (egrets, herons, plovers, ducks and an Ibis) seen in vicinity of pannes/sandholes, indicating these provide a good food source - at least during the spring and early summer.

For further discussion, see Appendix Section 5.3.

(SM028 Cont.)

(A) Fill may have been placed in marsh in the southwest corner Deep panne present enclosed by levees.
(B) Many small shallow pannes. Seems to be most impacted section of this marsh.

(A), (B), (C), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM029
LOCATION: (Photo 1-18) Awcomin Marsh, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) * | 497,597, & 697 (2) | 797 & 997 (1) | 2.5 |

General Health Index ($\bar{X}$): 2.6

COMMENTS:

A number of bedrock and/or till islands associated with this system provide good protective habitat for animal and bird species. This marsh has a variety of peat types.

Due to work done to contain the dredge spoil runoff, the area behind SM027 has been cut off from the tidal ebb and flow. *Phragmites* has invaded this site creating a stagnant area that may contribute to the local mosquito problem.

(SM029 Cont.)

(A) *Salicornia*, short form of *Spartina alterniflora* and *Distichlis* were present, evidence that recent high tide inundated and flooded pannes in this area.

(B) Large pond progressing toward freshwater tidal system. *Phragmites* and *Typha* around ponds.

(C) Slumping of creek banks; stones in stream restricting tidal ebb and flow.

(D) Very large area of shallow pannes with the short form of *Spartina alterniflora* in evidence. Many of the mosquito ditches are blocked due to slumping.

List of wildlife or wildlife sign seen:

Egret
Kingfisher
Bittern
Hawk
Crows
Ducks (mallards and black)
Fox
Raccoon

(A), (B), (C), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM031
LOCATION: (Photo 1-18) Between Rye Harbor and Route 1, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 0 (dredge spoils) |

General Health Index ($\bar{X}$): 1.1

COMMENTS:

This is an isolated pocket of marsh >80% impacted. Soil soundings indicate dredge spoils in northwest with increasing peat layer toward the southeast. Dr. Richardson (NHSWB) states that dredge spoils were deposited here, thus explaining the berm surrounding this area. There is no visible means for tidal inundation, though the presence of *Spartina patens* would indicate there must be. The only culvert discovered was a rusted pipe in the southeast corner. The pipe appears

(SM031 Cont.)

to have been installed to allow the dredge spoils leachate to drain back into the harbor. On investigation no outlet end of the pipe could be found on the harbor side.

This small ecotone supports a great diversity of wildlife.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM032
LOCATION: (Photo 1-18) West of Rye Harbor, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) * | 497,597, & 697 (2) | 797 & 997 (1) | 2.5 |
| | | General Health Index ($\bar{X}$): | | | 1.7 |

COMMENTS:

This area is suffering from inadequate drainage.

The culvert under Route 1-A was recently replaced by the highway department. During site visit, waters were reaching the upper portions of this system. However, water backed up at the culvert on the ebbtide.

(A) Freshwater is trapped during spring runoff and salt water after the higher spring tides. The integrity of the high marsh peat has

(SM032 Cont.)

degraded to the point that slumping is quite evident. Such slumping is exacerbating the blockages, thus increasing the trapping of waters.

(B) This area supports a large shallow panne; field evidence suggests that it partially dried up the previous summer. The primary drainage ditch for the panne has filled in at its western end. Birds were observed feeding on the this panne.

For further discussion, see Appendix Section 5.3.

(A), (B), (C), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM033
LOCATION: (Photo 1-18) West of Locke Road, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.6

COMMENTS:

A large encroachment of border zone species in southwest corner of this system, primarily *Typha* and *Phragmites*. Extensive "rotten spots" bordering private drive crossing marsh. There is evidence that a recent high spring tide has inundated this system.

This area receives inadequate tidal flushing for much of the year. The stream entering from the southwest floods the area with freshwater. The tidal energy coming up the drainage is not great enough to offset this freshwater inundation from the upland.

(SM033 Cont.)

Tidal restrictions along the creek drainage have contributed to the restricted tidal ebb and flow. The building of the Pilot House Restaurant and its adjoining parking lot may be a causal factor.

For further discussion, see Appendix Section 5.3.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM034
LOCATION: (Photos 1-16, 1-18) West of Locke Road, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.6

COMMENTS:

Private road crossing the marsh has led to the deterioration of this system by cutting off communication between SM033 and SM034. The culvert constructed is inadequate to allow proper flushing of the high marsh. Consequently, border zone species have encroached to within 50 feet of the tidal channel at the eastern end of this wetland. There are rotten spots present east of the drive, trapping runoff from the road.

For further discussion, see Appendix Section 5.3.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM036
LOCATION: (Photo 1-16) East of Route 1 at Straw Point, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |
| | | | General Health Index ($\bar{X}$): | | 1.6 |

COMMENTS:

Sounding showed 6 feet of Terric Sulfihemists peat. The flood tides are not getting into this area because the culvert into SM036 and SM034 is inadequate and there are other obstructions along the drainage. Division of the main channel (parallelling Route 1A) also has reduced the amount of tidal waters reaching this system.

This is a highly impacted system with over 85% of the original high marsh occupied by *Typha*. One panne in the southwest corner shows

(SM036 Cont.)

that the highest of spring tides will make it into this marsh. Surrounding the panne were small patches of *Spartina patens* and larger areas of *Distichlis spicata*. The panne and connecting mosquito ditch are experiencing the onset of anaerobic conditions. This area has a very high odor and mosquito potential.

For further discussion, see Appendix Section 5.3.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM038
LOCATION: (Photo 1-14) North of Philbrick Pond, RY

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) * | Med.(2) | Low(3) | 1.5 |
| (-) | Obstruct./Restrict. | High(1) * | Med.(2) | Low(3) | 1.5 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.3

COMMENTS:

Evidence of recent tidal inundation. Encroaching stands of *Lythrum, Phragmites* and *Typha* around the perimeter.

Area (A) is devoid of *Spartina patens* and is covered with *Salicornia*. This area appears to trap saline waters during the higher spring tides. As the water evaporates, it creates hyper-saline conditions, killing off the high marsh vegetation, permitting only *Salicornia* to survive.

(SM038 Cont.)

Area (B) is cut off from tidal flooding by an old trolley bed that traverses the marsh from north to south. There is very little evidence of high marsh vegetation. There is *Typha* and some *Lythrum* and an extensive area of panne formation. This area floods from runoff coming down the stream and from adjacent developed areas. This influx of fresh water, without the mitigating effect of daily tidal flooding, has caused area B to change toward a freshwater system.

For further discussion, see Appendix Section 5.3.

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(A), (B), (C), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM039
LOCATION: (Photo 1-14) Philbrick Pond, NH

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) * | Low(1) | 1.5 |
| (+) | Relative Size | Large(3) | Med.(2) * | Sma.(1) | 1.5 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) * | Com.(1) | 1.5 |
| (+) | Soil Type | 397(3) * | 497,597, & 697 (2) | 797 & 997 (1) | 2.5 |
| | | | General Health Index ($\bar{X}$): | | 1.5 |

COMMENTS:

This area is greater than 90% impacted. The system is suffering from lack of proper drainage. The mosquito ditch levees are trapping water during the higher spring tides. Standing water has led to rotting and subsidence of the marsh peat. These panne areas support bluegreen algae, mosquitoes, and other insects. Small fish and crustaceans can be observed in the deeper pannes. Many shore birds and waterfowl were seen frequenting this area. This marsh is definitely changing to a highly unproductive system.

For further discussion, see Appendix Section 5.3.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM041
LOCATION: (Photo 1-12) Little River Swamp, NH

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) * | Low(1) | 1.5 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) * | Com.(1) | 1.5 |
| (+) | Soil Type | 397(3) * | 497,597, & 697 (2) | 797 & 997 (1) | 2.5 |
| | | | General Health Index ($\bar{X}$): | | 1.8 |

COMMENTS:

More than 80% of the original tidal marsh has been severely impacted. Restrictions have reduced tidal flushing dramatically, and rerouting of the main channel from its original egress in the south (A) to a dug ditch in the north (B), has shifted the ecology of the system. The original mouth of the tidal system has now become isolated above the reach of the tidal influence. Border zone species are prevalent, with *Lythrum salicaria* in large abundance.

(SM041 Cont.)

The section south of Huckleberry Lane (C) is divided by an east-west dike, south of which grows a mixture of loosestrife, cattails and sedges, and north of which is a dense stand of loosestrife.

The section north of Huckleberry Lane (D) contains a small, viable but isolated high marsh (*Spartina patens*) in center and a small patch of *Spartina patens* and *Distichlis spicata* surrounded by *Phragmites* near Route 1A. Cattails are present in the southern part of this section and loosestrife is scattered throughout. The area will soon be taken over by loosestrife if nothing is done to improve the drainage.

For further discussion, see Appendix Section 5.3.

(A), (B), (C), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM044
LOCATION: (Photo 1-10) Meadow Pond, HA

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & *997 (1) | 1 |

General Health Index ($\bar{X}$): 1.4

COMMENTS:

(At low tide, waters exiting Meadow Pond were at 4% salinity (15°C); at the north end salinity was 0% (16°C)).

Meadow Pond is an excellent example of a transition from tidal marsh in the south to a freshwater-tidal system in the north, though the saltmarsh has been impacted along the border zone which is under

(SM044 Cont.)

development pressure. *Phragmites* dominates the northern border. Cranberry can be found in the wetter areas. This ecotonal area is excellent bird/wildlife habitat and should have a greater diversity of species then the tidal marsh proper.

(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM046
LOCATION: (Photos 1-8, 2-8) Tide Mill Creek, North of Route 51, HA

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.1

COMMENTS:

This is generally a healthy marsh. There are a number of deeper pond holes without rotten spots. Unfortunately, the border zone continues to suffer from development, particularly along Eel Creek.

For further discussion, see Appendix Section 5.3.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM047
LOCATION: (Photo 1-8) Isolated marshes South of Great Boar's Head, HA

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) * | Med.(2) | Low(3) | 1.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | *Med.(2) | Com.(1) | 2 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | 797 & 997 (1) | ? |

General Health Index ($\bar{X}$): 1.6

COMMENTS:

Even though these systems are highly impacted, they serve as "natural areas" in this highly developed location. Also, they help mitigate flooding and storm drainage.

(A) seems the healthiest of the 3 sites.

(B) is being heavily impacted by surrounding residential area. *Phragmites* is well established in the eastern section of this marsh.

(SM047 Cont.)

(C) has encroachment of border zone species, but a small healthy section of high marsh.

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(A), (B), etc. refer to locations on wetland maps.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM051
LOCATION: (Photo 3-8) North of Route 51, East and West of Landing Road, HA

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.8

COMMENTS:

(A) Approximately 50% is occupied by border zone species including *Typha, Phragmites, and Juncus*. Center of area a mixture of *Spartina patens*, black grass, arrow-grass and *Distichlis spicata*. Western end of high marsh area has a short *Spartina alterniflora* panne.

(B) Similar to (A) but encroachment of border zone species is not as pronounced.

(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM054
LOCATION: (Photo 3-8) Junction Route 1 and Route 51, HA

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | *497,597, & 697 (2) | 797 & 997 (1) | 2 |

General Health Index ($\bar{X}$): 1.4

COMMENTS:

This area has been highly impacted and isolated from the main marsh, primarily because of road construction.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM056
LOCATION: (Photo 3-8) South of Route 51, East of Landing Road, HA

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) * | Med.(2) | Low(3) | 1.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) * | Med.(2) | Low(3) | 1.5 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) * | 497,597, & 697 (2) | 797 & 997 (1) | 2.5 |

General Health Index ($\bar{X}$): 1.5

COMMENTS:

Large open-water pannes, noted by Richardson (1982) as good birding area. No wildlife in evidence during site visit. These pannes are surrounded by a number of short *Spartina alterniflora* panne areas - a typical "rotten spot" formation. Drainage is restricted apparently because of a combination of mosquito ditch levees, two roads, and old fences. There is a small stand of *Phragmites* in the northeast corner of the area; *Typha* is bordering the eastern edge.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM057
LOCATION: (Photo 3-10) Drakes River between Drakeside Road and Route 51, HA

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.1

COMMENTS:

This is a healthy piece of marsh though there is evidence of *Phragmites* and *Typha* encroachment. A tide gate is on one of the two culverts passing under Drakeside Road; it serves no useful function. The topography does not suggest a flooding problem, nor is this close to being a fresh water system. The tide gate is just inhibiting the flow and contributing to the encroachment of the border zone species.

# TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM058
LOCATION: (Photos 3-8, 4-8) Taylor River and Drakes River between Route 1 and I95, HA HF

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) * | Low(1) | 1.5 |
| (+) | Buffer/Borderzone | High(3) * | Med.(2) | Low(1) | 2.5 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.1

COMMENTS:

Restrictions at the railroad bed and Route 1 have contributed to the lack of tidal flushing of these upper reaches of the marsh. Also the extensive mosquito ditch levees have inhibited adequate drainage. Borderzone species such as *Phragmites* and *Typha* have entered the marsh near the extremities. This area is rich in wildlife sign and birds.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM059
LOCATION: (Photo 3-8) Taylor River between RR tracks and Route 1, HA HF

| | SUBJECT | | SCORE | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2

COMMENTS:

Area behind railroad bed not draining adequately. Opening to south inadequate. As tidal water floods this area, tidal energy is lost at Route 1, causing ponding. On ebb tide, the force of outgoing water is less than the tidal energy coming in, so drainage takes a longer period of time.

- Mosquitoes seemed to be bad compared to other similar areas.
- Vegetation primarily short *Spartina alterniflora, Salicornia*

(SM059 cont.)

intermixed with *Spartina patens*. There were a number of "rafted" pieces of marsh peat deposited in this area. The peat was undoubtedly broken off or slumped further down the drainage. As the high tide came in the peat was moved upstream until it reached the Route 1 barrier where it was deposited.

It has been noted by F. Richardson, that this type of area is good for birding. This seems to be correct, based on large concentration of egrets and herons.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM061
LOCATION: (Photo 3-6) Hampton Falls River, HF

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.3

COMMENTS:

A relatively healthy system; culvert under railroad tracks is adequate in size.

(A) Spike grass and short *Spartina alterniflora* with patches of black grass and arrow-grass. Predominant vegetation *Spartina patens*. Old mosquito ditch levees along with some slumping has contributed to capturing some water; however, this is not very extensive. Hawk, heron(s), egrets, deer sign.

(SM061 Cont.)

(B) Dam at pond west of 1A. Some tidal restrictions in creek before dam. Borderzones have stands of *Typha* and *Lythrum*.

(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM062
LOCATION: (Photo 3-6) Browns River, HF SE

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) * | Med.(2) | Low(3) | 1.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) * | Med.(2) | Low(3) | 1.5 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) * | Low(3) | 2.5 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 1.9

COMMENTS:

Culvert under railroad trestle seems undersized; drainage inadequate. Some circular deep pond holes. Extensive areas of large irregular-shaped pannes surrounded primarily by short *Spartina alterniflora*. Deer sign at edge of marsh.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM063
LOCATION: (Photo 2-4) Cains Brook, West of Causeway Road, SE

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | *797 & 997 (1) | 1 |

General Health Index ($\bar{X}$): 1.4

COMMENTS:

Major restriction is under private road. Damming caused by stones, logs and stumps, causing ponding of water to west.

(A) *Spartina patens* with seaside goldenrod and sedges near channel. Sparse stand of short *Spartina alterniflora*. The area is changing toward a freshwater tidal regime. Also present was silver weed and *Typha* (on the border).

(SM063 Cont.)

(B) Large areas of *Juncus*. Limit of salt marsh vegetation.

(C) Tidal to freshwater.

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(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM064
LOCATION: (Photo 2-4) Cains Brook, East of Causeway Road, SE

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | Large(3) | *Med.(2) | Sma.(1) | 2 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.3

COMMENTS:

(A) Forb pannes dominated by arrow-grass. Some recently dried out pannes with short form of *Spartina alterniflora* with some *Salicornia*. Slumped mosquito ditches seem the main reason for trapped waters in these panne areas. Remainder of marsh mostly *Spartina patens* interspersed with stands of blackgrass.

(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM065
LOCATION: (Photos 1-4, 1-6, 1-8; 2-4, 2-6, 2-8; 3-6, 3-8) Hampton/ Seabrook Estuary, East of RR tracks, HA HF SE

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | High(1) | Med.(2) | *Low(3) | 3 |
| (+) | Unique Geological/ Topographical Formations | *High(3) | Med.(2) | Low(1) | 3 |
| (+) | Buffer/Borderzone | High(3) | *Med.(2) | Low(1) | 2 |
| (+) | Relative Size | *Large(3) | Med.(2) | Sma.(1) | 3 |
| (+) | Relative Uniqueness | *Rare(3) | Med.(2) | Com.(1) | 3 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 2.9

COMMENTS:

This system is New Hampshire's best example of a large productive salt marsh. Saltmarshes SM044-SM067 are all part of this tidal system, totalling about 3,500 acres.

Area along Hampton River behind Hampton Beach is experiencing high impact both from development and all-terrain vehicles along the edge of marsh.

(SM065 Cont.)

- Development of Mills Point and Riverside have adversely affected the marsh in the immediate vicinity.

  For further discussion see Appendix Section 5.3.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM066
LOCATION: (Photo 1-2) Between South Main Street and Route 86, SE

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | High(1) * | Med.(2) | Low(3) | 1.5 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Obstruct./Restrict. | High(1) | *Med.(2) | Low(3) | 2 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | *397(3) | 497,597, & 697 (2) | 797 & 997 (1) | 3 |

General Health Index ($\bar{X}$): 1.6

COMMENTS:

Tidal restriction at point where stream passes under Route 86C.

(A) Western 25% covered with *Phragmites* and *Typha*. High marsh primarily rotten spots with short form of *Spartina alterniflora*. Fill from recently excavated mosquito ditch has been placed on high marsh. Will act to inhibit tidal flow across surface of marsh, leading to eventual death of *Spartina patens* and further degradation of marsh.

(SM066 Cont.)

(B) Healthy high marsh with small amounts of short form of *Spartina alterniflora*. Stones in creek create obstruction at culvert under South Main St.

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(A), (B), etc. refer to locations on wetland maps.

TIDAL MARSH SITE EVALUATION

WETLAND CODE: SM067
LOCATION: (Photo 1-2) South of South Main Street, SE

| | SUBJECT | SCORE | | | TOTAL |
|---|---|---|---|---|---|
| (-) | Pannes/Rotten Spots | *High(1) | Med.(2) | Low(3) | 1 |
| (-) | Indicator Species Re: High Saline Conditions | High(1) | *Med.(2) | Low(3) | 2 |
| (-) | Borderzone/Freshwater Species Encroachment | High(1) | Med.(2) | *Low(3) | 3 |
| (-) | Obstruct./Restrict. | *High(1) | Med.(2) | Low(3) | 1 |
| (+) | Unique Geological/ Topographical Formations | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Buffer/Borderzone | High(3) | Med.(2) | *Low(1) | 1 |
| (+) | Relative Size | Large(3) | Med.(2) | *Sma.(1) | 1 |
| (+) | Relative Uniqueness | Rare(3) | Med.(2) | *Com.(1) | 1 |
| (+) | Soil Type | 397(3) | 497,597, & 697 (2) | *797 & 997 (1) | 1 |

General Health Index ($\bar{X}$): 1.3

COMMENTS:

This marsh has little communication with SM066 or SM065.The large ditch surrounding it was full of standing water at low tide. Even though the marsh itself is highly impacted with extensive rotten spots this may be a good habitat for waterfowl and shorebirds. Dominant species is short form of *Spartina alterniflora*.

## 5.3 IMPACT ANALYSIS OF SELECTED SALT MARSHES

### Concord Point Drainage, Rye

This drainage includes not only Parsons (SM022, SM023) and Massacre Marsh (SM025) Creeks, but also a number of small isolated pockets of marsh (SM018, SM019, SM020) that communicate via culverts with the main tidal creeks. Table 9 summarizes some of the impacts that have contributed to the marsh's degradation. In 1985, the Town of Rye obtained Coastal Zone Management monies to remove obstructions and restrictions along the course of Parsons Creek. The objective was to increase tidal ebb and flow into the upper reaches of the marsh. In the spring of 1985, work was carried out to: (1) straighten the channel at Concord Point, (2) remove the obstructions in the creek at the site of the old Wallis Road bed and (3) dredge the channel of the creek at the point it passes under Wallis Road.

After this work was completed, field investigations confirmed that tidal innundation had increased in the upper reaches of the marsh, but further analysis is needed to determine the long-term benefit of these actions. Restrictions along the creek remain, and further actions should be taken to continue the removal of these materials (Simpson, 1986). Increased tidal flooding into the higher reaches of the system (including the small isolated pockets) would stem the advancement of the invasive species *Phragmites, Typha, Lythrum, Scirpus*, etc. These border zone plants would gradually die back and the restoration of high marsh species could proceed.

### Philbrick Brook Drainage, Rye

The situation in this series of marshes (SM028, SM032, SM033, SM034, SM036) is similar to that described for the Concord Point drainage. Through the years construction of a number of roads has inadvertently choked off the upper reaches of this salt marsh. Each time a road was

TABLE 9. Summary Of Impacts At Parsons Creek Marsh

| SITE NAME | LOCATION DESCRIPTION | COMMENTS |
|---|---|---|
| Concord Point | East of Route 1-A where "Stinky Creek" empties into the ocean | Grounded barge has shifted stream channel and reduced flow. |
| Old Wallis Road | South of Wallis Road; looks like a stone wall running through the marsh | Old bridge abutments have fallen into creek restricting ebb and flow of the tide. |
| Wallis Road | Road running east-west through center of marsh. | Stones, sand, and debris accumulate under and on either side of bridge, impeding ebb and flow of tide. |
| Red Roof Market Area ("Trash Corner") | Corner of Route 1-A and Wallis Road; also residence to north of Market | Loss of marsh due to placement of gravel-fill over marsh. Fill is being undercut by creek; debris is being used to stabilize bank. |
| Horse Paddock | North of Red Roof Market, built in major ox-bow of creek | Encroachment onto marsh; organics, nitrogen, etc. finding way into creek waters. |
| Wallis Sands/ Route 1A | Northern end of marsh before junction of 1-A and Parsons Road | Rerouting of 1-A isolated segment of marsh from main drainage system; changing to brackish conditions |

added, the movement of salt water through the peat was inhibited. The road beds either replaced the peat or compressed the peat so that subsurface tidal waters could not pass underneath these barriers. Thus, areas of salt marsh that hydrologically communicated with each other are now isolated except for the tidal waters that can move through the culverts under these roadways. A good example is the private drive that was built across the marsh, cutting off SM033 from SM034. The construction of Ocean Boulevard early in this century created a smiliar effect.

In addition to road construction, other activities, such as the development of Rye Harbor and the riprapping of the major creek channels, helped to cut off infiltration of tidal waters into the creek bank peat. Also, near the Pilot House Restaurant, rocks from riprap appear to have fallen into the creek, blocking tidal flow into SM032, SM033, etc. and ultimately reducing the distance the tidal bore can move through the tidal creeks.

Little can be done about the roads already built across the tidal marsh, except to insure that culverts are large enough to allow adequate ebb and flow of the tidal waters. A culvert of adequate size will not cause damming of waters on the ebb tide. The overall health of the system can be improved by removing all rocks and stones along the drainage that either inhibit tidal inundation on the flood tide or restrict draining of the marsh on the ebb tide. Such mitigation activities might precede work on culverts discussed above. In addition, a maintenance schedule should be established for all culverts to insure clear passage of tidal waters.

## Golf Course Drainage, (Bass Beach) Rye

This marsh (SM038) is the southern-most saltmarsh in the Town of Rye. The upland stream feeding this area flows from a golf course west of Causeway Road and exits through a culvert under Route 1A into the ocean. Short (1985) states that at one time this drainage entered the Bass Beach Marsh (Philbrick Pond) to the south. An old trolley bed traverses the marsh from north to south approximately 650 feet west of Route 1A. During the site visits there was ample evidence that the tide had entered and inundated the marsh. *Spartina alterniflora* is present for about 150 feet upstream of the Route 1A culvert. *Spartina patens* is prevalent up to 600 feet west of Route 1A. At about 600 feet there is a *Spartina/Typha* interface. *Typha* as well as *Phragmites* and *Lythrum salicaria* are prevalent along the northern and western borders of the marsh. Of particular note is an area in the eastern section of the marsh, close to Route 1A, where a large area is devoid of *Spartina patens*, and is dominated by *Salicornia*.

The area immediately west of the trolley bed is a highly impacted high marsh, with sparse stands of *Spartina*, a great deal of *Typha* and some *Lythrum*. It appears to be flooded by the highest of the yearly tides, but seems quite stagnant most of the year making it prime mosquito breeding habitat. The upland stream has a very organic substrate until approximately 200 feet east of Causeway Road where the bottom substrate is primarily sand and small stones. If the opening through the trolley bed were enlarged and the stream cleared of obstructions, the increased ebb and flow of the tide into this isolated area would not only alleviate the stagnation, but help restore the high marsh vegetation.

A flapper valve, which was presumably attached to the ocean end of the culvert running under Route 1A, now lies (unattached) on the rocks to the south of the pipe opening. Its function was to keep the tidal waters from flooding the marsh; its earlier operation contributed to the marsh's present condition.

The presence of the large area dominated by *Salicornia* indicates that this part of the marsh (closest to Route 1A) is being inundated by saline waters during the higher spring tides. During the summer, tides are not high enough to periodically soak this area; the saltwater that was trapped on the marsh evaporates and creates a hypersaline condition in this section of the marsh. *Spartina* is unable to grow, but the more salt tolerant *Salicornia* appears to thrive.

In order to increase tidal flushing and restore the high marsh vegetation, the pipe now running under Route 1A must be redesigned or enlarged. A second, and more costly, alternative is to install another pipe to the north, running under Route 1A, which would allow greater amounts of salt water to inundate the marsh during a flood tide. The benefits would be both the reestablishment of the high marsh plants and the decline of the border zone species which are now invading the system.

Philbrick Pond, North Hampton

This small tidal system (SM039) is an excellent birding location, partly because of the confluence of a number of small drainages entering the southwest end of Philbrick Pond. The pond's outlet flows under an old trolley bed, and travels by culvert under Route 1A to the ocean.

*Spartina alterniflora* (tall form) is found along the channel and at the upper end of the pond. The short form of *Spartina alterniflora*, along with *Salicornia*, is found in the rotten spot/panne areas which have dried out. Stands of *Phragmites* are present along the western border of this area. Some loosestrife (*Lythrum salicaria*) appears just upland from the marsh (Short, 1985).

The main problem at Philbrick Pond is a lack of adequate drainage. The levees along the numerous mosquito ditches have created a patchwork of enclosed areas. These areas trap saline water during the higher spring tides. The standing salt water inhibits the growth of *Spartina patens*. As the water evaporates, these pannes are invaded by species of *Salicornia* and the short from of *Spartina alterniflora*, two plants that can withstand high saline conditions.

This is not a stable ecosystem. The size and extent of the pannes have increased rapidly over the last ten years, and could continue to expand (Short, 1985). To restore this area the outflow channel from Philbrick Pond should be enlarged, and the pannes should be drained through ditching. Material excavated from such a ditching operation should be removed from the marsh. Moreover, some of the shallower pannes should be deepened so as to insure survival of fauna brought in on the high tides. If more water is allowed to enter the marsh during the tidal cycles and the drainage restrictions are removed, the outgoing water will flush the channels and re-establish adequate communication with the ocean.

## Little River Marsh, North Hampton and Hampton

Before 1950, Little River Marsh (SM041) had access to the ocean through a channel that flowed under Route 1A at the town line of North Hampton and Hampton. This channel has since been blocked, reducing the marsh's communication with the ocean to one man-made channel to the north, a culvert that runs under Route 1A near the junction with Sea Road.

*Spartina patens* is in evidence in this marsh, and can be seen as far upstream as Fifield Road. There is one stand of *Spartina alterniflora*. In addition there are stands of *Typha* and *Phragmites* which border this area.

*Lythrum salicaria* has invaded this system and now covers 60% of the former marsh area (Short, 1985). This invasion of loosestrife occurred after the old channel had been blocked. The prevalence of loosestrife indicates that much of this marsh does not have an adequate flow of tidal waters. The culverts at 1A and under Fifield Road may contribute to the tidal restriction. If these restrictions were reduced and/or if additional ocean access could be secured, tidal flushing would be enhanced. The flushing would curtail the invasion of the loosestrife and encourage the re-establishment of high marsh vegetation, rendering the area a productive tidal marsh.

Hampton-Seabrook Marsh System, Hampton, Hampton Falls and Seabrook

The six to seven thousand acres of tidal wetlands along the coast represent only a small percentage of the total wetlands in the State. It is because of this limited acreage that these systems should be protected as unique and valuable State resources. The Hampton-Seabrook Estuary is the largest contiguous tidal marsh system in New Hampshire, comprising about 3500 acres. Most of these associated tidal wetlands are in good condition though there are outlying areas and isolated pockets that are suffering from developmental pressures and/or manmade constrictions.

A train track on a raised bed traverses the western side of the Hampton-Seabrook marsh. This, together with Route 1 to the west, has resulted in the restriction of tidal ebb and flow. There are a number of areas beyond these restrictions that have extensive panne/ rotten spots due to a lack of proper drainage.

The areas bordering the Hampton Beach development (SM065) are showing signs of severe impact. This is due not only to the continued encroachment by construction activities, but also to the fact that the

marsh is so accessible at this location. The high concentration of people during the summer months results in the marsh being trampled.

The Hampton-Seabrook system, overall, should be considered a prime tidal wetland and accorded all appropriate relief from current impacts and protection from further disturbance. For further discussion of Prime Wetland status of this tidal system, see Richardson's (1982) Identification, Documentation and Mapping of Prime Tidal Wetlands In The Town of Hampton, New Hampshire.

# 6.0 APPENDIX: SAND DUNES, DETAILED RESULTS

## 6.1 HOW TO USE THE RESULTS

The twelve sand dune areas evaluated in the study area were sampled only for plant species. The plants were listed in the same manner as for wetlands. The computer was used to produce ecological summaries, despite the inappropriateness of wetland data computations for these sandy upland communities. Refer to Section 3.3 for a more complete description of dune ecology, impacts and management.

The following results are useful as representative lists of the plant species occurring at the sites sampled. At the end of each species list is a number between 0 and 1.0 following the label "DUNE: ". This is the computed fraction of the plant abundances from the site which are considered to be dune indicator species (Table 8, section 3.3). This number is 1.000 for a community comprised of only dune species, and 0.000 for a community with no dune species. This fraction gives the user a rough idea of how pure the community is for foredune species (1.00) or how many upland sandy species have taken over for the pioneer dune species (less than 1.00). Numbers less than 1.00 do not imply lower value to the dune ecology. For example, poison ivy, common throughout the inland parts of the state, cannot be considered to be a dune indicator, so its presence lowers the "DUNE" fraction. But it is one of the most useful dune species, according to Dr. Lazell (1976):

"Resplendent in lovely purples, scarlets, russets, ochres, and greens, growing first as a ground trailing vine, then low herbage, then as dense shrubbery, and someday even attaining the character of a small tree, poison ivy is the finest and most wonderful of all our plants. Poison ivy holds the shifting sands; it shades and shelters the birds and animals; its berries richly augment the complex ecological chain; best of all, poison ivy keeps people off the land. It is the trouncing, trampling feet of man that crush and kill the fragile plants of the dunes, and set the sand to blowing mercilessly inland."

## 6.2 RESULTS TABLES FOR STUDY AREA

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-20) Wallis Sands State Beach, jct with Marsh Rd, RY
DU001 Field Date: 06/04/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Rosa rugosa | Salt-spray rose | 8 | 0.00 | S | 1 |
| Rhus typhina | Staghorn sumac | 2 | 0.00 | T | 2 |
| Prunus maritima | Beach plum | 1 | 0.00 | S | 3 |
| Crataegus sp. | Hawthorn | 3 | 0.00 | T | 1 |
| Rhus radicans | Poison ivy | 1 | 0.82 | S | 2 |
| Solanum dulcamara | Bittersweet | 2 | 0.50 | H | 0 |
| Euphorbia cyparissias | Cypress spurge | 8 | 0.00 | H | 0 |
| Juncus tenuis | Path rush | 1 | 0.50 | H | 0 |
| Agrostis alba | Redtop grass | 2 | 0.82 | H | 0 |
| Asclepias syriaca | Common milkweed | 2 | 0.50 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 2 | 0.82 | H | 0 |
| Oenothera biennis | Evening primrose | 5 | 0.18 | H | 0 |
| Senecio sp. | Ragwort | 1 | | H | 0 |
| Ammophila breviligulata | Dune grass | 50 | 0.00 | H | 0 |
| Lathyrus japonicus | Beach pea | 12 | 0.00 | H | 0 |
| Taraxacum officinale | Dandelion | 1 | 0.50 | H | 1 |
| Artemisia stelleriana | Dusty miller | 6 | 0.18 | H | 0 |
| Cakile edentula | Searocket | 6 | 0.18 | H | 0 |
| Agropyron repens | Quack grass | 1 | 0.00 | H | 1 |

WSI: 0.089 WFV: 0.048 BOG: 0.000 SALT: 0.070 DUNE: 0.570
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.07 COMPACT: 0.00
MARSH SBCL: ROBUST: 0.00 BROADL: 0.07 NARROW: 0.47 FLOATING: 0.00
SUBTYPES:NUVW
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-16) Jenness Beach, RY
DU002 Field Date: 06/04/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Rosa rugosa | Salt-spray rose | 3 | 0.00 | S | 1 |
| Lathyrus japonicus | Beach pea | 5 | 0.00 | H | 0 |
| Ammophila breviligulata | Dune grass | 70 | 0.00 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 5 | 0.82 | H | 0 |
| Bromus tectorum | Cheat grass | 25 | 0.00 | H | 0 |
| Cakile edentula | Searocket | 2 | 0.18 | H | 0 |
| Euphorbia cyparissias | Cypress spurge | 2 | 0.00 | H | 0 |

WSI: 0.039 WFV: 0.006 BOG: 0.000 SALT: 0.062 DUNE: 0.687
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.02 COMPACT: 0.00
MARSH SBCL: ROBUST: 0.00 BROADL: 0.01 NARROW: 0.84 FLOATING: 0.00
SUBTYPES:NUV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-12) Plaice Cove, E of Rt1, HA
DU003 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Pinus rigida | Pitch pine | 3 | 0.18 | T | 3 |
| Lathyrus japonicus | Beach pea | 2 | 0.00 | H | 0 |
| Rosa rugosa | Salt-spray rose | 3 | 0.00 | S | 1 |
| Ammophila breviligulata | Dune grass | 40 | 0.00 | H | 0 |
| Myrica pensylvanica | Bayberry | 1 | 0.50 | S | 2 |
| Artemisia stelleriana | Dusty miller | 1 | 0.18 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 2 | 0.82 | H | 0 |

WSI: 0.055 WFV: 0.067 BOG: 0.000 SALT: 0.038 DUNE: 0.903
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.05 COMPACT: 0.01
MARSH SBCL: ROBUST: 0.00 BROADL: 0.00 NARROW: 0.76 FLOATING: 0.00
SUBTYPES:NUV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-12) N of Plaice Cove, W of Rt1A, HA
DU004 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abundance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Myrica pensylvanica | Bayberry | 2 | 0.50 | S | 2 |
| Quercus ilicifolia | Bear (scrub) oak | 3 | 0.00 | S | 4 |
| Prunus maritima | Beach plum | 1 | 0.00 | S | 3 |
| Pinus rigida | Pitch pine | 2 | 0.18 | T | 3 |
| Ammophila breviligulata | Dune grass | 30 | 0.00 | H | 0 |
| Hudsonia tomentosa | Poverty-grass | 5 | 0.00 | S | 0 |
| Poaceae | Grasses | 10 | | H | 1 |

WSI: 0.031 WFV: 0.165 BOG: 0.000 SALT: 0.000 DUNE: 0.811
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.01 BUSHY: 0.05 COMPACT: 0.13
MARSH SBCL: ROBUST: 0.00 BROADL: 0.00 NARROW: 0.75 FLOATING: 0.00
SUBTYPES:CNU
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-6) Hampton Beach State Park, HA
DU005 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Lathyrus japonicus | Beach pea | 12 | 0.00 | H | 0 |
| Ammophila breviligulata | Dune grass | 70 | 0.00 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 2 | 0.82 | H | 0 |
| Trifolium repens | White clover | 2 | 0.00 | H | 2 |

WSI: 0.019 WFV: 0.011 BOG: 0.000 SALT: 0.023 DUNE: 0.837
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.00 COMPACT: 0.00
MARSH SBCL: ROBUST: 0.00 BROADL: 0.00 NARROW: 0.81 FLOATING: 0.00
SUBTYPES:NV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-6) S of HA Harbor inlet, W of Rt1A, HA SE
DU006 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Lathyrus japonicus | Beach pea | 10 | 0.00 | H | 0 |
| Ammophila breviligulata | Dune grass | 40 | 0.00 | H | 0 |
| Euphorbia cyparissias | Cypress spurge | 1 | 0.00 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 3 | 0.82 | H | 0 |

WSI: 0.045 WFV: 0.000 BOG: 0.000 SALT: 0.055 DUNE: 0.796
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.00 COMPACT: 0.00
MARSH SBCL: ROBUST: 0.00 BROADL: 0.01 NARROW: 0.74 FLOATING: 0.00
SUBTYPES: NV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-6) Beckmans Point, E of Rt1A, SE
DU007 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Lathyrus japonicus | Beach pea | 5 | 0.00 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 2 | 0.82 | H | 0 |
| Ammophila breviligulata | Dune grass | 50 | 0.00 | H | 0 |

WSI: 0.028 WFV: 0.000 BOG: 0.000 SALT: 0.035 DUNE: 0.912
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.00 COMPACT: 0.00
MARSH SBCL: ROBUST: 0.00 BROADL: 0.00 NARROW: 0.87 FLOATING: 0.00
SUBTYPES:NV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-6) S of HA Harbor inlet, W of Rt1A, SE
DU008 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abundance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Solidago sempervirens | Seaside goldenrod | 2 | 0.82 | H | 0 |
| Ammophila breviligulata | Dune grass | 50 | 0.00 | H | 0 |

WSI: 0.031 WFV: 0.000 BOG: 0.000 SALT: 0.038 DUNE: 1.000
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.00 COMPACT: 0.00
MARSH SBCL: ROBUST: 0.00 BROADL: 0.00 NARROW: 0.96 FLOATING: 0.00
SUBTYPES:N
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-4) The Sands, W of Rt1A, SE
DU009 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Amelanchier canadensis | Canada serviceberry | 10 | 0.50 | T | 1 |
| Prunus maritima | Beach plum | 10 | 0.00 | S | 3 |
| Pinus rigida | Pitch pine | 10 | 0.18 | T | 3 |
| Crataegus sp. | Hawthorn | 2 | 0.00 | T | 1 |
| Myrica pensylvanica | Bayberry | 15 | 0.50 | S | 2 |
| Rhus radicans | Poison ivy | 8 | 0.82 | S | 2 |
| Rosa virginiana | Virginia rose | 9 | 0.50 | S | 1 |
| Rhus typhina | Staghorn sumac | 6 | 0.00 | T | 2 |
| Prunus serotina | Black cherry | 5 | 0.18 | T | 3 |
| Populus tremuloides | Quaking aspen | 2 | 0.00 | T | 2 |
| Lonicera morrowi | Morrow's honeysuckle | 12 | 0.00 | S | 1 |
| Ammophila breviligulata | Dune grass | 60 | 0.00 | H | 0 |
| Hudsonia tomentosa | Poverty-grass | 4 | 0.00 | S | 0 |
| Oenothera parviflora | Evening primrose | 3 | | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 3 | 0.82 | H | 0 |
| Danthonia spicata | Poverty grass | 12 | 0.00 | H | 0 |
| Lathyrus japonicus | Beach pea | 3 | 0.00 | H | 0 |
| Artemisia caudata | Wormwood | 1 | 0.00 | H | 0 |
| Puccinellia maritima | Alkali grass | 1 | 1.00 | H | 0 |
| Puccinellia paupercula | Alkali grass | 1 | 0.82 | H | 0 |
| Lechea maritima | Pinweed | 1 | 0.00 | H | 0 |
| Limonium carolinianum | Sea lavender | 1 | 1.00 | H | 0 |
| Parthenocissus quinquefolia | Virginia creeper | 2 | 0.00 | S | 1 |
| Andropogon scoparius | Broom beardgrass | 15 | 0.00 | H | 0 |
| Aristida tuberculosa | Seabeach needle grass | 1 | | H | 0 |
| Cakile edentula | Searocket | 1 | 0.18 | H | 0 |
| Cyperus grayii | Gray's sedge | 1 | | H | 0 |
| Euphorbia polygonifolia | Seaside spurge | 1 | 0.00 | H | 0 |
| Solidago rugosa | Rough-leaved goldenrod | 1 | 0.50 | H | 0 |

WSI: 0.164 WFV: 0.213 BOG: 0.000 SALT: 0.034 DUNE: 0.527
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.04 BUSHY: 0.05 COMPACT: 0.13
MARSH SBCL: ROBUST: 0.00 BROADL: 0.00 NARROW: 0.45 FLOATING: 0.00
SUBTYPES: CNPUV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-4) Seabrook beach, E of Rt1A, SE
DU010 Field Date: 06/05/86 Report Date: 06/30/86

| Scientific name | Common name | Abundance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Rosa rugosa | Salt-spray rose | 8 | 0.00 | S | 1 |
| Myrica pensylvanica | Bayberry | 2 | 0.50 | S | 2 |
| Prunus maritima | Beach plum | 1 | 0.00 | S | 3 |
| Cakile edentula | Searocket | 1 | 0.18 | H | 0 |
| Artemisia stelleriana | Dusty miller | 1 | 0.18 | H | 0 |
| Solanum dulcamara | Bittersweet | 2 | 0.50 | H | 0 |
| Euphorbia cyparissias | Cypress spurge | 2 | 0.00 | H | 0 |
| Lathyrus japonicus | Beach pea | 5 | 0.00 | H | 0 |
| Ammophila breviligulata | Dune grass | 50 | 0.00 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 2 | 0.82 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 2 | 0.82 | H | 0 |

WSI: 0.074 WFV: 0.049 BOG: 0.000 SALT: 0.065 DUNE: 0.776
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.01 BUSHY: 0.10 COMPACT: 0.02
MARSH SBCL: ROBUST: 0.00 BROADL: 0.02 NARROW: 0.65 FLOATING: 0.00
SUBTYPES:CNUVW
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-26) New Castle Beach, NC
DU012 Field Date: 06/17/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Pinus rigida | Pitch pine | 2 | 0.18 | T | 3 |
| Pinus rigida | Pitch pine | 1 | 0.18 | S | 3 |
| Rosa rugosa | Salt-spray rose | 8 | 0.00 | S | 1 |
| Rhus radicans | Poison ivy | 2 | 0.82 | S | 2 |
| Spiraea latifolia | Meadowsweet | 4 | 0.50 | S | 0 |
| Juniperus communis | Juniper | 1 | 0.00 | S | 1 |
| Rumex crispus | Curled dock | 1 | 0.82 | H | 0 |
| Ambrosia artemesiifolia | Common ragweed | 1 | 0.00 | H | 4 |
| Oenothera biennis | Evening primrose | 1 | 0.18 | H | 0 |
| Artemisia stelleriana | Dusty miller | 3 | 0.18 | H | 0 |
| Artemisea vulgaris | Common mugwort | 2 | 0.00 | H | 0 |
| Polygonum cuspidatum | Japanese knotweed | 1 | 0.00 | H | 3 |
| Taraxacum officinale | Dandelion | 1 | 0.50 | H | 1 |
| Lathyrus japonicus | Beach pea | 2 | 0.00 | H | 0 |
| Daucus carota | Queen anne's lace | 2 | 0.00 | H | 0 |
| Ammophila breviligulata | Dune grass | 90 | 0.00 | H | 0 |
| Tanacetum vulgare | Common tansy | 2 | 0.00 | H | 0 |
| Agropyron repens | Quack grass | 5 | 0.00 | H | 1 |
| Brassica sp. | Mustard | 1 | 0.00 | H | 0 |
| Lepidium campestre | Cow-cress | 3 | 0.00 | H | 1 |
| Solidago sempervirens | Seaside goldenrod | 1 | 0.82 | H | 0 |

WSI: 0.052 WFV: 0.070 BOG: 0.000 SALT: 0.007 DUNE: 0.723
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.05 COMPACT: 0.03
MARSH SBCL: ROBUST: 0.00 BROADL: 0.00 NARROW: 0.73 FLOATING: 0.00
SUBTYPES: CNUV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

Normandeau Assoc. Inc: E C O L O G I C A L  S U M M A R Y

Location: (Photo 1-12) Plaice Cove, HA NH
DU013 Field Date: 06/30/86 Report Date: 06/30/86

| Scientific name | Common name | Abun-dance | Wetl Freq | Type | Food Value |
|---|---|---|---|---|---|
| Rosa rugosa | Salt-spray rose | 4 | 0.00 | S | 1 |
| Rhus radicans | Poison ivy | 2 | 0.82 | S | 2 |
| Ammophila breviligulata | Dune grass | 60 | 0.00 | H | 0 |
| Lathyrus japonicus | Beach pea | 10 | 0.00 | H | 0 |
| Artemisia stelleriana | Dusty miller | 2 | 0.18 | H | 0 |
| Solidago sempervirens | Seaside goldenrod | 3 | 0.82 | H | 0 |
| Oenothera biennis | Evening primrose | 3 | 0.18 | H | 0 |
| Phragmites communis | Reed | 3 | 0.82 | H | 0 |

WSI: 0.085 WFV: 0.022 BOG: 0.000 SALT: 0.034 DUNE: 0.747
SHRUB SBCL: AQUATIC: 0.00 SAPLINGS: 0.00 BUSHY: 0.04 COMPACT: 0.00
MARSH SBCL: ROBUST: 0.03 BROADL: 0.00 NARROW: 0.68 FLOATING: 0.00
SUBTYPES:NRUV
WATERSHED: Beach Dunes TYPE: Sand Dune Community

## DATE DUE

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