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- Flint Island -
A Natural Resources Inventory

Nature Conservancy
Philip W. Conkling

Nature Conservancy

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FLINT ISLAND- A NATURAL RESOURCES INVENTORY

Conducted for the Nature Conservancy

by Philip W. Conkling

I. General

Location: Pleasant Bay, Harrington, Washington County, Maine

44° 28' 30" N. Latitude

67° 47' 30" W. Longitude

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Area: 170 acres

Relief: 75 ft.

Date surveyed: 6/21/75, 6/22/75, 6/23/75

II. Description

Flint Island lies approximately 5 miles south of Harrington in Pleasant Bay. Dyer Island is directly to the north and Shipstern Island lies to the west. The coast is rocky, interspersed with cobble beaches. A relatively high bluff isolated on the northwest side of the island near the most convenient landing beach makes an attractive place to camp. The relief is generally gentle on the north shore and steep on the south and east. Flint is mostly spruce-fir forest interspersed with old fields.

III. Land Use History

The relative distance of Flint from the mainland and the few landing sites make this island more remote than all but a few in Pleasant Bay. The only discernable path on the island travels

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from the above-mentioned cobble beach to the old field bluff. The size of Flint, the dense forest and steep shores reinforce its inaccessibility.

According to J.C. Strout a boatsman from Milbridge, Flint was used for grazing sheep up until 15 years ago. Signs of grazing are still evident (see vegetation). Most islands in this area were used for grazing since island weather was less severe; there was less snow and sheep didn't need to be fed even during the winter. They are able to forage along the shore to maintain themselves. In addition to grazing, lobstermen used islands for storing nets, buoys, and other gear in rough structures. On Flint, in the grove of spruce near the north head shore there is a store of weir stakes once used to hold nets for herring fishing. With the decline of the sardine industry in Maine, weir fishing for herring has also declined and few weir traps are actively tended.

In 1972, George Milmine a summer resident of Harrington donated the island to the Nature Conservancy. A small plaque in memory of his mother has been placed on a rock near the landing beach.

Though picnickers are not the rule on Flint,

Outward Bound School at Hurricane Island visits the island on expedition stop-overs. Two 12-man boats generally make up an expedition. They bring their own food, collect any trash left from other visitors, and remain on the island overnight except in weather. According to Outward Bound Director, Peter Willauer, Flint Island is used on two or sometimes three occasions between March and October.

IV. Geology

The bedrock geology of Flint Island is strikingly different from any other island in Pleasant Bay and has geological features which taken together may make it unique to the entire coast of eastern Maine. The following description of the bedrock of Flint is heavily dependent on the interpretation of William J. Metzger from the Department of Geology, State University College, Fredonia, New York who visited the island with this writer and who is in the process of publishing an article on the geology of Flint Island. William Metzger is a former student of Carleton Chapman, the foremost bedrock geologist of the Mount Desert area and author of The Geology of Acadia National Park (1962).

The geological history of the island is best

viewed by a walk along the northern shore of Flint. Beginning at the landing beach on the north side, one sees beautiful lavendar-grey-blue cliffs flanking the beach on both sides. These rocks, for quite some distance along the northern shore, consist mainly of fine-grained siltstones with thin, discontinuous lenses of limestone. Interbedded in these water-laid rocks are various volcanic ashes and tuffs. These whitish cliffs, striking in the summer sun, include beds so fine-grained that they appear "cherty" or "flinty", from whence comes the name Flint Island. Along the north shore for some distance these rocks dip to the south and are split by largely vertical northeast-southwest trending fractures. The latter, where concentrated, are partially responsible for the formation of Flint's numerous, deeply-incised thunderholes. The easily-eroded fracture system also has helped form lovely, isolated tide pools and a host of other marine environments discussed in a later section (see Marine Environments).

This entire series of rocks is cut by dark gray basalt and lighter granitic (acidic porphyry) dikes. These dikes follow the direction of the fracture system. Mr. Metzger feels that if these

latter rocks can be dated by potassium-argon methods in the labortory to be Middle Silurian in age, as he thinks likely from other evidence, they then indicate that igneous activity in the northern Appalachians occurred much earlier than had been supposed. This latter hypothesis is of considerable scientific and academic importance, making the Flint Island white cliffs to be of prime scientific as well as scenic value. Mr. Metzger believes this series on Flint to be correlative if not coeval with the Bar Harbor series on Mount Desert Island. If so, it is the first continuity of this series recognized this far east of Mount Desert.

Following these cliffs further east, which previously have been exposed only to rather low-grade metamorphism, the rocks begin to show signs of cross bedding. Then, instead of gently dipping to the south, folds and twists became noticeable and the series becomes more shattered and distorted. Concretions, or extraneous mineral masses, become larger and more frequent. Toward the northeast tip of Flint, the rocks undergo a radical change. Large, angular highly metamorphosed, recrystallized rocks are intruded into a rude shatter zone. Further on, blocks with these

blocks surrounded in turn by magonatic granitic can be discerned. The flow patterns within these latter angular, whitish blocks are multi-directional indicating violent, extrusive volcanic activity. Mr. Metzger concludes that these rocks once formed an ancient volcano; were located in the neck or vent and were torn from the sides of the volcano during the violent eruptions of Paleozoic times. Again another rock formation on Flint is of unique scientific and educational value.

Located at several points along this northern shore between the whitish-lavender flinty cliffs and the highly metamorphosed section is a third unique geological resourse. In a dark gray fine grained series is a fossil bearing rock, at least 420 million years old. The tiny marine fossils are crinoids, an echinoderm still preserving its stacked, saucer-like structure when viewed in cross section. In these gray, pitted rocks on several beaches one can also find brachiopod, tetracoral, and trilobite fossils. These fossils identified as Silurian marine invertebrates, support Metzger's hypothesis of an early Paleozoic intrusive history of eastern Maine coastal plutons.

The surficial deposits on Flint Island are less

dramatic; blue-gray marine clays, deposited during a coastal submergence, underlie the alder swamps and bog. The remainder of the island is topped with a shallow ground moraine, except on the high parts of Flint where the soil has been scraped away by glacial action. The glacier is also partially responsible for the steep-sloped southern face of Flint. The glacier "plucked" volcanic boulders from this lee side and has formed not only steep cliffs, but also a giant step-like descent to the shore composed of large boulders "quarried" from the cliff behind.

V. Vegetation

1. Spruce-fir.

On the shallow sandy loam tills the spruce and fir do not grow to anymore than 50 or 60 feet in height. White spruce, more salt tolerant than red spruce, rings the shore line while red spruce dominates the inland areas. The forest is distinctly two-aged. The oldest red spruce scattered throughout the areas of lower elevation were obviously field grown, developing as "wolf" trees at a time when much of the vegetation was cropped back by grazing sheep. These are approximately 115 years old. The rest of the pole-sized spruce (12-14 DBH) on the inner part of Flint are

some 20 years younger than those with thick low lying branches. One of the dead white spruce provides a nesting site for a pair of osprey. The herbaceous cover is typical;dominated by jewel weed, bunch berry, lycopodium and wood sorrel in the cool moist woods. Blueberry, grey birch and creeping juniper are found on the sandy topped bedrock outcrops. One white pine is found growing near one of these outcrops.

2. Alder Swamp

There are at least 4 different alder swamps where impermeable layers beneath the vegetation trap ground water run off. One of these is large enough and persistent enough to have created a small fresh water acidic bog with white and black spruce and tamarack in it. The other alder swamps are smaller and are most likely maintained by the spring and early summer rains. Whereas speckled alder and gray birch interspersed with various ferns are the only species found in the latter areas, a more complex and interesting flora exists in and around the fresh water bog. The ground cover is sphagnum and cotton grass. Black grass grows near where run off empties on to the beach. Marsh St. Johnswort, labrador tea, and rhodora grow in patches in association with the stunted

spruce and tamarack. This fresh water bog is fast being reclaimed. A peaty soil exists in places where smooth gooseberry, beach flag iris and raspberries have gained a hold. The fresh water bog was almost certainly a tidal marsh at one point in the long history of Flint Island. Underlying the dark fresh water peat one would expect to find a lighter colored salt water peat with flecks of salt marsh grass (Spartina) in it. As indicated earlier, the bog is underlain partly by marine clays, though there may be evidence of a sandy-gravel beach formed before the present cobble beach closed the tidal inlet off.

3. Old Field

On Flint, in addition to the numerous areas showing evidence of having been in field at one time, there are two green old fields typically covered with rose, raspberry and a great diversity of flowering herbaceous plants. The latter include pearly everlasting, blue-eyed grass, mullein, sandworts and stitchworts. Mats of ericaceous plants grow over exposures of ledge at the peripheries of both fields. Crowberry, cranberry, and blueberry make up these maps.

4. Sea Strand

The flora of this community is also discussed

in the Marine Environments section of this report. Depending on the exposures and surficial deposits, sea plantain, mertensia, sea rocket, milkwort, beach pea and angelica are common. Ground cherry and strawberry are found near shore where shallow soils have developed between rock outcrops. Boreal forbs, notable seaside plantain, iris and bog aster occur especially where seaward exposures are wet by frequent coastal fogs. Growing on top of ledge exposures on the steep north and east faces of Flint are particularly beautiful mats of ericaceous shrubs, which when in flower and fruit strike a stunning contrast with the whitened rocks of the Bar Harbor Series. Red-fruited mountain cranberry, black fruited crowberry crowd under and around the pink flowered small cranberry. From grassy areas above these mats, the fragile boreal perrenial artic beach flag grows. According to Paul Favor, retired chief Naturalist of Acadia Park, this arctic beach flag grows only on a few islands in Penobscot and Frenchman's Bays.

VI. Wildlife

A nesting osprey is the most visible member of the wildlife community of Flint. Since Flint is remote the pair of osprey were distinctly less used to human disturbance than other osprey

nesting closer to shore. Two nestlings were observed from the vantage of a nearby tree. Other large birds were seen continuously off shore including guillemot, black-backed and herring gulls, and eiders. On the southeastern tip of Flint Island there is good evidence of nesting Leach's Petrel. The large drooping mats of crowberry and cranberry have formed a shallow loose soil where digging is easy and protection is improved by burrows dug back into the unincorporated organic matter.

Less visible, but perhaps more significant fauna associated with Flint Island are the harbor seals observed playing and feeding off the ledges on the north side. Other ledges are found off the southeastern side of Flint but cormorants and gulls were the only animal life observed. It is not known whether these ledges are used by harbor or grey seals as whelping sites, but given the current extention of both species range and numbers, these ledges should be regarded as potential areas for pups to be born.

VII. Marine Environments

Partially as a result of Flint's unique geologic history and partially as a result of its geographic location in southernmost Pleasant Bay, Flint Island's shore environments are very diverse.

Four such beaches are found on the island:

1. Gravel beach

Wave-accumulated gravel particles have been deposited in the intertidal zone from storm high tide to mean low tide. Mostly boulder and cobble sized particles. These beaches are well-sorted as they are inundated twice daily by tides. The beach to the south, exposed to high wave energy, storm winds and storm tides has formed a double-decked seawall. During severe storms the cobbles may be hurled shoreward and tossed over its crest. The landing shore on the north side is a beautiful cobble beach formed from the same rocks as the nearby outcrop of Bar Harbor Series. The laminated nature of these when rounded and weathered are all of interesting texture and composition. Vegetation at the heads of these beaches includes beach pea, vetch, sea rocket, scotch lovage, willow herb and sea blite. Particularly large and pretty mats of oyster leaf, when in flower in early August, offer soft lavendar blue hue as contrast to the nearby rocks.

2. Lowtide terrace

Lowtide terrace is a flat platform of mixed sand and pebble-sized gravel just seaward of gravel beaches where it is found. These terraces are often the longshore current deposits which have

passed over cobble beaches and carried off the smaller particles. Subsequently transport is both onshore and alongshore. Such areas are exposed only at low tide, are permanently water saturated , and support no vegetation.

3. Tidal channel

This environment is described as an elongate intertidal or subtidal channel composed of either coarse sand, shell, gravel or exposed ledge. On Flint the channel is formed in the area between the above-mentioned northern ledges and the rocky shore. Its bottom is muddy and supports an extensive mussel bed of potential commercial value. Algal vegetation includes wrack, rockweed, and Irish sea moss. Marine invertebrates in this environment are barnacles, periwinkles, green crabs, rock crab and sea urchins. This tidal channel is an important feeding ground for eiders and gulls. On two of the three visits to Flint the bald eagles which nest on Shipstern were seen flying over the ledges and probably use them for their shellfish and scavenge at low tide. On one occasion, a young eagle was chased off by the osprey, a resident on the opposite side of the island.

4. Ledge

The intertidal and subtidal bedrock outcrops are exposed to a high wave energy climate. On certain exposed ledges, particularly those of the eastern side of Flint, one sees good examples of intidal zonation of algae. Green algae occupy the small niches nearest mean high tide level in tide pools of the Bar Harbor Series. Brown wrack and rockweed are found underneath, and occupying niches under them are the red dulse and kelps. As mentioned above, these ledges, both off the northeastern and southeastern faces of Flint, are important habitat for seal.

VIII. Critical Areas

From both scenic and scientific points of view the various geological features on Flint Island are of a degree of significance to establish them as critical areas according to the States definition contained in the Critical Area Act. These geological features include the whitish-lavendar cliffs of the north edge of Flint, the fossiliferous sequence along the same edge and the evidences for the presence of an ancient volcanic neck on the northeast tip of Flint.

The osprey nest annually supports a pair of these hawks and their young. Osprey nests are

generally included on critical areas registers.

If Leach's petrels are found to be nesting along the eastern and southern edges of Flint, these places should be placed under the classification of a critical area.

In summary, the critical areas or features of Flint Island are:

(1) the northern shore cliffs

(2) the marine fossils in shore rocks

(3) the volcanic neck

(4) the osprey nest

(5) possible nesting Leach's petrel

IX. Management Recommendations

With the exception of the possibility of nesting petrels, none of the critical features on Flint Island are easily disturbed by moderate use of the island. Some of the fossils could be taken from Flint, but since they are tiny and require identification by one with substantial geologic knowledge, this problem is not likely to arise.

There is no reason, in the writer's opinion, to prohibit all camping on Flint. Since it is remote, access difficult, and the forest dense and swampy in many spots, overuse of Flint Island's resources has not occurred. As long as this con-

dition prevails, occasional visits by Hurricane Island Outward Bound expeditions should pose no serious problem.

X. Species List by Vegetational Community

A. Spruce-Fir

scientific name	common name
Abies balsamea	balsam fir
Betula papyrifera	white birch
B. pupulifolia	grey birch
Clintonia borealis	blue bead lily
Cornus canadensis	bunchberry
Equisetum arvense	horsetail
Impatiens capensis	jewel weed
Lycopodium obscurum	lycopodium
Mianthemum canadensis	Canada mayflower
Monotropa uniflora	indian pipe
Osmunda cinnamomea	cinnamon fern
Oxalis montana	wood sorrel
Picea glanca	white spruce
P. rubens	red spruce
Pinus strobus	white pine
Sorbus americana	mountain ash
Trientalis borealis	twin flower

B. Alder Swamp and Bog

Alnus crispa	common alder
Aster nemoralis	bog aster
Betula populifolia	grey birch
Cotton grass	cotton grass
Dryopteris theypteris	marsh fern
Hypericum virginicum	marsh St. Johnswort
Juncus voemarianas	black rush grass
Larix laricina	eastern larch
Ledum groenlandicum	labrador tea
Picea mariana	black spruce
Ribes hirtellum	smooth gooseberry
Sphagnum sp.	sphagnum
Viola sp.	violets

C. Old Field

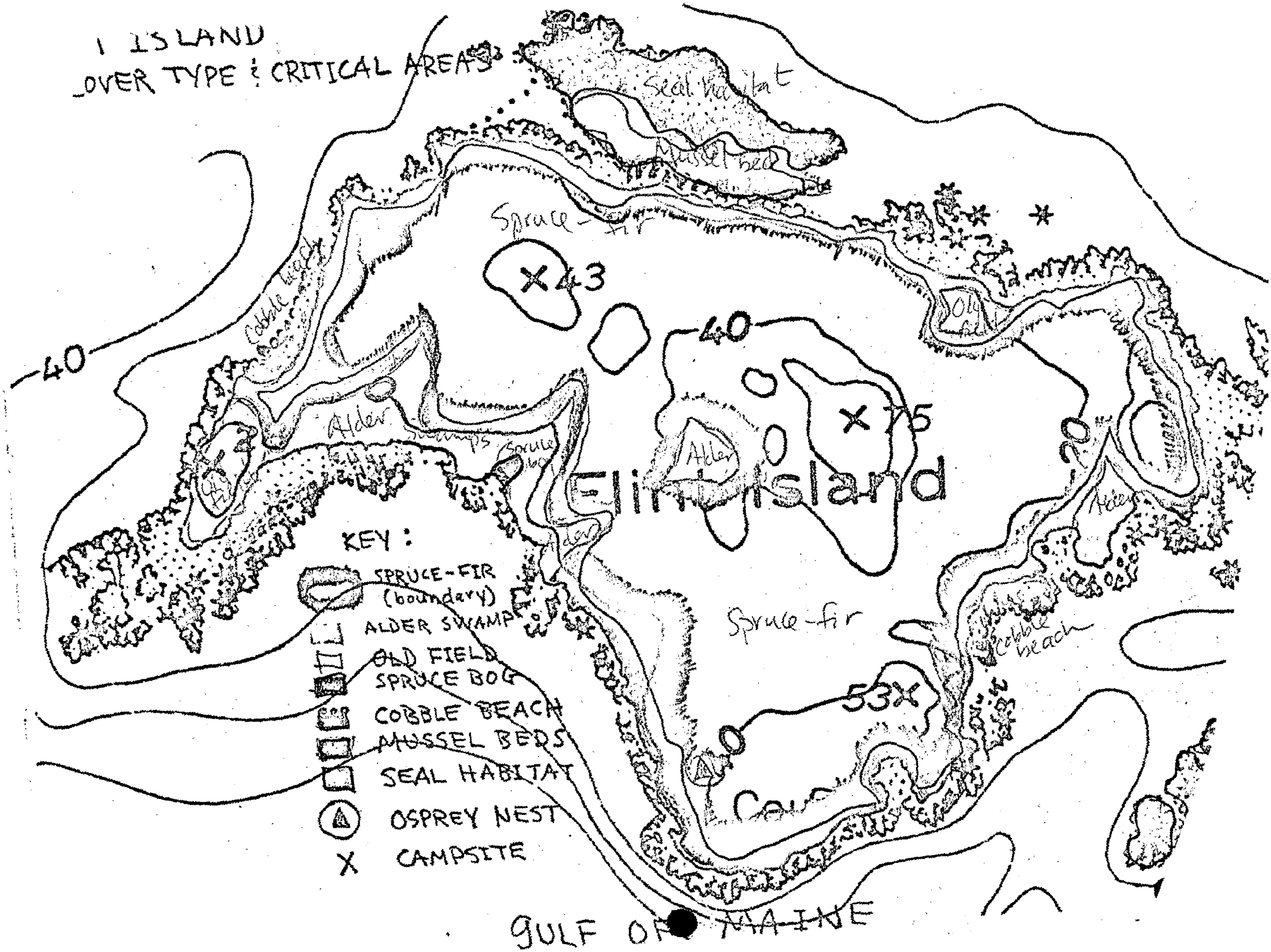
Achillea millefolium	yarrow
Arenaria laterflora	grove sandwort
Aster spp.	aster

(Old Field, cont.)

Circeum arvense	sow thistle
Euphrasia americana	eyebright
Fragaris virginiana	strawberry
Hieracium pratense	king devil
H. spp.	hawkweed
Iris versicolor	blue flag iris
Juncus spp.	grasses
Juniperus communis	juniper
J. horizontalis	juniper
Oenothera biennis	evening primrose
Prunella vulgaris	seal-heal
Prunus maritimus	ground cherry
Rhinanthus crista-galli	yellow rattle
Rosa rugosa	rugose rose
Rubus allegheniensis	blackberry
R. flagellaris	dewberry
R. strigosus	red raspberry
Rumex acetosella	field sorrel
Sisyrinchium mucronatum	blue-eyed grass
Solidago spp.	goldenrods
Sonchus spp.	thistles
Spirea latifolia	meadowsweet
Stellaria graminea	grove sandwort
S. sp.	chickweed
Vaccinium angustifolia	low blueberry
Verbascum thapsus	mullein
Viola spp.	violets

D. Sea Strand

Angelica atropurpurea	Alexander's angelica
Atriplex patula	orach
Cakile endulata	sea rocket
Empetrum nigrum	crowberry
Epilobium leptophyllum	narrow willow herb
Glaux maritima	sea milkwort
Iris sp.	arctic beach flag iris
Juncus voemarianus	black rush grass
Lathyrus maritima	beach pea
Ligusticum scothium	scotch lovage
Mertensia maritima	oysterleaf
M. virginica	blue bells
Plantago oliganthos	sea plantain
Pramanthes sp.	licus foot
Scutellaria epilobiifolia	marsh skullcap
Suaeda maritima	sea blite
Vaccinium oxycoccus	small cranberry
V. vitus-idaea	mountain cranberry
Vicia cracca	cow vetch


I ISLAND
OVER TYPE & CRITICAL AREAS
KEY:
SPRUCE-FIR (boundary)
ALDER SWAMP
OLD FIELD
SPRUCE BOG
COBBLE BEACH
MUSSEL BEDS
SEAL HABITAT
OSPREY NEST
CAMPSITE
Seal habitat
Mussel bed
Spruce-fir
Cobble beach
Alder swamps
Old field
Alder
Spruce-fir
cobble beach
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