

**THE VASCULAR FLORA OF
PETIT MANAN NATIONAL WILDLIFE REFUGE
UPPER FLAG ISLAND, MAINE**



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INTRODUCTION

Biological inventories of protected areas are essential for assessing a reserve's conservation value, developing long-term monitoring and stewardship strategies, and for protecting rare or unique habitats (Johnson et al. 1984, Likens 1989, Goldsmith 1991). Species lists of distinct areas compiled at regular intervals can also provide valuable data on changes in the presence of native and introduced species and can contribute to our knowledge of biogeography, dispersal, and speciation (Wielgolaski 1975, Treshow 1984).

Plants and animals living on islands in the Gulf of Maine are influenced by cold water currents, the prevalence of fog in summer, and strong cold winds that typically occur off the coast of Maine (Conkling 1999). Along the outer islands, this results in harsh environmental conditions similar to those in more arctic regions (Hill 1919). These conditions, although too extreme for some plant species found on the mainland, give rise to a group of Arctic species of plants that typically exist much farther north such as Seaside Lungwort (*Mertensia maritima*), Marsh Felwort (*Lomatogonium rotatum*), and Roseroot Stonecrop (*Sedum rosea*). Because of their unique physiography and habitats, numerous rare plant taxa are confined to or exist primarily on these offshore islands.

Upper Flag Island (Maine Coastal Island Registry Number 55-415) is a small (13.8 ha) island under the jurisdiction of Petit Manan National Wildlife Refuge and is located approximately 1.3 km southwest of Potts Point in South Harpswell (Figure 1). No botanical field work has been conducted on Upper Flag Island. Counts of breeding seabirds have occasionally been conducted (L. Tudor, Maine Department of Inland Fisheries and Wildlife, pers. comm.). The primary objective of this study was to inventory the vascular plants of Upper Flag Island. Secondary

Figure 1. Upper Flag Island, Maine.



objectives were to document any observations of nesting seabirds, herptiles, and mammals on the island.

METHODS

During botanical field work, we conducted non-systematic searches for vascular plants in all habitats. We surveyed the perimeter of the island on foot, surveyed the steep shoreline cliffs from shore and by kayak at high tide, and searched portions of each habitat in the interior of the island. Special attention was given to unusual habitats as sources of additional species.

Standard regional manuals were used for identification of specimens, particularly Haines and Vinning (1998), Fernald (1950), Hinds (2000), and Gleason and Cronquist (1991). Identification of species were made primarily in the field, however, some specimens were collected for identification back in the lab. Identification of difficult taxa were verified by Dr. C. Greene, professor of botany at College of the Atlantic.

All nomenclature follows that of Haines and Vinning (1998). Voucher specimens were mounted on acid-free paper and are deposited in the herbarium at Petit Manan National Wildlife Refuge headquarters in Milbridge, Maine. Vouchers were collected for approximately 25% of the species observed.

Observations and evidence of breeding seabirds, mammals, and herptiles were documented during field work. Snap traps (4 x 8 cm) non-systematically placed on various portions of the island were used to determine if small mammals were present on the island. Snap traps baited with cheese were set only during daylight hours during our visits to the island. All traps were checked at the end of the day and removed. Small mammals were identified in the lab using

regional field guides (Burt and Grossenheider 1976, Franq 1981).

RESULTS AND DISCUSSION

HABITAT DESCRIPTION

Upper Flag Island is a 13.8 ha island located within Casco Bay in Cumberland County, 1.3 km southwest of Potts Point in South Harpswell (Figure 1). The nearest islands are Horse Island at 0.6 km to the north, Little Birch Island at 0.8 km to the northwest, and Haskell Island at 0.9 km to the east. A boat ramp where a skiff can be launched at all but the lowest tides is 1.9 km to the northeast on the east side of Potts Harbor off the southern end of Route 123. Because of the close proximity to the mainland, we used sea kayaks to access the island. The best location to land on the island is along the sandy beach at the northern tip of the island (Figure 1). A cobble beach on the southern end of the island is also suitable for landing if the seas will permit.

The island is generally flat on the northern side (Plate 1) with tall cliffs with a vertical relief up to 10 meters on the southern and western shorelines (Plates 9-12). Sandy beaches are present around the northern tip of the island (Plates 7-8) and a small cobble beach is on the southern end of the island (Plates 2-6). Wetlands on the northern (Plates 16-17) and western sides (Figure 1) are seasonally flooded, although portions were extremely dry during 2001, an unusually dry summer. Rolling hills are present on the southern end of the island with dry rocky ridges of exposed ledge along the western side and in scattered pockets on the southern end of the island (Plates 13-15). We found the remains of a stone foundation and a stone-lined dug well in the interior of the island (Figure 1).

VASCULAR FLORA

We conducted five days of field work on Upper Flag Island: June 23, July 20, August 3, August 24, and September 6, 2001. During our field work, we identified 161 species of vascular plants in 49 families and 125 genera (Table 1). Thirty-nine vouchers were deposited at the herbarium at Petit Manan National Wildlife Refuge. One species that we collected from Upper Flag Island, Pitseed Goosefoot (*Chenopodium berlandieri* var. *macrocalycium*), is listed as a species of 'Special Concern' in Maine. This species is currently considered rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered. We found this species growing scattered along the sandy beaches at the northern tip of the island.

Non-native plants accounted for 32% of the total number of species observed on Upper Flag Island. This included Oriental Bittersweet (*Celastrus orbiculata*), an invasive species in Maine that potentially poses a serious threat to native species and habitats. We found a single small clump of this species only on the northern-most tip of the island.

The vegetation of Upper Flag Island is composed primarily of dense low woody shrubs with scattered patches of trees and low vegetation (Plate 1). Shrubs over 1 m tall are dense over much of the northern half of the island (Plate 16) and include Northern Bayberry (*Myrica pensylvanica*; Plate 21), Winterberry (*Ilex verticillata*), Purple Chokeberry (*Photinia x floribunda*), and patches of Choke-cherry (*Prunus virginiana*) near the western side of the island. Other shrubs present on the island but more patchily distributed included Common Juniper (*Juniperus communis*), Arrowwood (*Viburnum dentatum* var. *lucidum*), Bristly Gooseberry (*Ribes hirtellum*), and Highbush Blueberry (*Vaccinium corymbosum*). Trees are scattered over portions of the interior of the island, especially the northern and western sides, and include Red

Table 1. Vascular plants of Upper Flag Island, Cumberland County, Maine based on field work conducted during 2001. Species arranged systematically by family name (in bold) as in Haines and Vining (1998); Genera and species within families are alphabetical. Collection numbers are given in parentheses for species where we deposited vouchers in the herbarium at Petit Manan National Wildlife Refuge.

LYCOPODIACEAE

Lycopodium dendroideum Michx. [Prickly Tree Clubmoss]: Growing at the southwest portion of the island (GHM 724).

OSMUNDACEAE

Osmunda cinnamomea L. [Cinnamon Fern]: Small patches in the vicinity of the southern wetland; also dense patches on the northern portion of the island.

POLYPODIACEAE

Athyrium filix-femina (L.) Roth ex Mertens var. *angustum* (Willd.) Lawson [Lady Fern]: Growing on the inland portion of the northern end of the island.

Dennstaedtia punctilobula (Michx.) T. Moore [Hay-scented Fern]: Very dense carpets covering large portions of the southern quarter of the island.

Onoclea sensibilis L. [Sensitive Fern]: A large patch near the old stone foundation in the middle of the island. Also present in other locations including the northern end of the island.

Thelypteris palustris Schott var. *pubescens* (Lawson) Fern. [Marsh Fern]: Growing in the northern-most wetland.

Thelypteris simulata (Davenport) Nieuwl. [Massachusetts Fern]: Locally common in the northern-most wetland (GHM 774).

PINACEAE

Picea rubens Sarg. [Red Spruce]: A few scattered trees on the north end of the island.

Pinus resinosa Ait. [Red Pine]: A single tree on the northeast end of the island.

Pinus strobus L. [Eastern White Pine]: A few scattered trees on the north end of the island.

CUPRESSACEAE

Juniperus communis L. var. *depressa* Pursh [Common Juniper]: Scattered patches throughout island. One patch is near the old foundation.

ALISMATACEAE

Sagittaria latifolia Willd. [Common Arrowhead]: Locally common in patches of the northern-most wetland.

ZOSTERACEAE

Zostera marina L. var. *stenophylla* Aschers. & Graebn. [Eelgrass]: Growing in small patches in the subtidal zone along portions of the northeast side of the island.

CONVALLARIACEAE

Maianthemum canadense Desf. [Canada Mayflower]: Scattered patches throughout island, especially near the middle of the eastern shore in small patches of open field.

IRIDACEAE

Iris versicolor L. [Northern Blue Flag]: Present in scattered locations in the northern-most wetland.

Sisyrinchium montanum Greene var. *crebrum* Fern. [Blue-eyed Grass]: A few stems near the sand beach on the northern end.

TYPHACEAE

Typha latifolia L. [Common Cat-tail]: Growing in the northern wetland.

JUNCACEAE

Juncus arcticus Willd. var. *balticus* (Willd.) Trautv. [Wire Rush]: Dense in portions of the northern-most wetland (GHM 734).

Juncus bufonius L. [Toad Rush]: Growing in patches around the perimeter of the island.

Juncus effusus L. [Soft Rush]: Growing in the northern-most wetland (GHM 773).

Juncus tenuis Willd. [Path Rush]: Growing at the beach on the northern end of the island and on east side of island on a cliff (GHM 736).

Luzula multiflora (Ehrh.) Lej. ssp. *multiflora* [Common Woodrush]: Growing on the northeastern side of the island.

CYPERACEAE

Carex canescens L. ssp. *disjuncta* (Fern.) Toivonen [Silvery Sedge]: Growing in the small bog at the western portion of the island.

Carex novae-angliae Schwein. [New England Sedge]: Scattered stems on the southern portion of the island.

Carex scoparia Schkuhr ex Willd. var. *scoparia* [Pointed Broom Sedge]: Near northern beach and southern cobble beach.

Carex utriculata Boott [Beaked Sedge]: Adjacent to northern wetland (GHM 746).

Schoenoplectus tabernaemontani (Gmel.) Palla [Softstem Bulrush]: Very abundant in the wetland on the northern tip of the island. Also growing in the smaller bog on the western portion of the island (GHM 754).

Scirpus cyperinus (L.) Kunth [Wool-grass]: Growing at the northern tip of the island adjacent to and within the wetland.

POACEAE

Agrostis capillaris L. [Rhode Island Bentgrass]: Non-native. Growing on the eastern and southern portions of the island in the vicinity of the cliffs (GHM 740).

Agrostis scabra Willd. [Ticklegrass]: Growing on the eastern and northern portions of the island (GHM 728).

Agrostis stolonifera L. [Creeping Bentgrass]: Non-native. Growing on the northern portion of the island (EWM 07200103).

Anthoxanthum odoratum L. [Sweet Vernal Grass]: Non-native. Growing near beach at northern end of island.

Deschampsia flexuosa (L.) Trin. [Common Hairgrass]: Very common on the cliffs on the west side of the island (GHM 742).

Elymus pycnanthus (Godr.) Melderis [Saltmarsh Wheatgrass]: Growing adjacent to the beach on the northwest portion of the island (EWM 07200108).

Elymus repens (L.) Gould. [Witch Grass]: Non-native. Growing on the north end of the island about 10 feet from the beach (GHM 725).

Elymus virginicus L. var. *halophilus* (Bickn.) Wieg. [Virginia Wild Rye]: Growing on the northern portion of the island (GHM 768).

Glyceria canadensis (Michx.) Trin. [Rattlesnake Mannagrass]: Growing in the wetland on the northern portion of the island (GHM 771).

Leymus mollis (Trin.) Hara [Sea Lyme-grass]: Common along the shoreline on the northern tip of the island.

Panicum acuminatum Sw. ssp. *implicatum* (Scribn.) Freckmann & Lelong [Woolly Panic Grass]: Scattered clumps along the eastern shoreline (GHM 737).

Phleum pratense L. [Timothy]: Non-native. Occasional on the island; large patch on the northwest end of the island.

Poa annua L. [Speargrass]: Non-native. Growing on the cliffs on the west side of the island and on the northwestern portion of the island (EWM 07200109).

Poa compressa L. [Canada Bluegrass]: Non-native. Growing on the western portion of the island.

Poa palustris L. [Fowl Meadowgrass]: Growing on the northern portion of the island.

Spartina alterniflora Loisel. [Smooth Cordgrass]: Large patches adjacent to the northern portion of the island.

GROSSULARIACEAE

Ribes hirtellum Michx. [Bristly Gooseberry]: Scattered but common throughout the island.

DROSERACEAE

Drosera rotundifolia L. var. *rotundifolia* [Round-leaved Sundew]: Growing in the wettest portion of the bog on the northern end of the island.

PLUMBAGINACEAE

Limonium carolinianum (Walt.) Britt. [Sea Lavender]: Scattered stems are located in the *Spartina* patch on the northeast corner of the island.

POLYGONACEAE

Persicaria hydropiper (L.) Opiz [Common Smartweed]: Non-native. Found both at the northern (southwestern side of northern-most wetland) and southern ends of the island.

Polygonum arenastrum Bor. [Dooryard Knotweed]: Non-native. One stem was observed growing on a ridge on the southeast quarter of the island (not collected). The species was very prostrate with small elliptic leaves

of similar size and tepals under 2 mm long. Also growing in patches near the wetland on the north end of the island.

Polygonum aviculare L. [Prostrate Knotweed]: Non-native. Growing on the south end of the island in shallow soils (GHM 760).

Rumex acetosella L. [Sheep Sorrel]: Non-native. Scattered patches mostly on the eastern side.

Rumex crispus L. [Curly Dock]: Non-native. Most abundant on the northern end of the island, adjacent to the shore (GHM 731).

PORTULACACEAE

Portulaca oleracea L. [Common Purslane]: Non-native. Common on the interior rocky areas especially along the southern half of the island. Also occasionally found adjacent to high ledge shores (GHM 753).

AMARANTHACEAE

Atriplex glabriuscula Edmondston [Edmondston's Atriplex]: Scattered along the shoreline on the north end of the island (GHM 766).

Atriplex prostrata Boucher ex DC. [Hastate Orache]: Non-native. Growing along shore on northern end of island and adjacent to the beach at the south end of the island (GHM 767).

Chenopodium berlandieri Moq. var. *macrocalycium* (Aellen) Cronq. [Pitseed Goosefoot]: Growing scattered along the beaches at the northern end of the island (GHM 765A; GHM 765B). This species is considered rare in Maine (species of special concern) based on available information.

Salicornia depressa Standl. [Samphire]: Growing in patches of *Spartina* on the northern shoreline (GHM 780A).

Salsola kali L. ssp. *kali* [Common Saltwort]: Observed growing low on the cobble beach on the southern end of the island.

Suaeda maritima (L.) Dumort. ssp. *maritima* [White Sea-blite]: Non-native. Stems mixed with the *Spartina* on the northern end of the island.

CARYOPHYLLACEAE

Cerastium fontanum Baumg. ssp. *vulgare* (Hartman) Greuter & Burdet [Common Mouse-ear Chickweed]: Non-native. Common in patches on portions of the island.

Moehringia lateriflora (L.) Fenzl [Grove Sandwort]: Common in patches scattered on the island.

Sagina procumbens L. [Birdseye]: Locally common on ledges adjacent to the shoreline.

Spergularia salina J. & K. Presl [Salt-marsh Sand Spurrey]: Non-native. Locally common on the eastern shoreline.

Stellaria graminea L. [Lesser Stitchwort]: Non-native. Patchily distributed throughout.

OXALIDACEAE

Oxalis stricta L. [Common Yellow Wood-sorrel]: A few stems at the edge of the beach on the northwest corner of the island.

CELASTRACEAE

Celastrus orbiculata Thunb. [Oriental Bittersweet]: Non-native. One patch at the northern tip of the island.

Oriental Bittersweet is considered a threat to other species because of its aggressive habit of twining around and growing over other vegetation.

MYRICACEAE

Myrica pensylvanica Loisel. [Northern Bayberry]: Very common throughout.

BETULACEAE

Alnus incana (L.) Moench ssp. *rugosa* (Du Roi) Clausen [Speckled Alder]: Scattered patches especially on the eastern side.

Betula populifolia Marsh. [Gray Birch]: A few trees in the interior and along the eastern shore.

ROSACEAE

Amelanchier canadensis (L.) Medik. [Eastern Serviceberry]: Scattered trees on the eastern and southern portions of the island.

Fragaria virginiana Duchesne ssp. *virginiana* [Wild Strawberry]: Scattered along the perimeter of the island.

Geum aleppicum Jacq. [Yellow Avens]: Scattered stems on the northern tip of the island.

Malus sylvestris P. Mill. [Apple]: Non-native. A single tree in the interior of the island.

Photinia x floribunda (Lindl.) Robertson & Phipps [Purple Chokeberry]: Locally common on the southern and eastern portions of the island (GHM 751).

Potentilla argentea L. [Silvery Cinquefoil]: Non-native. Growing on the northern portion of the island.

Potentilla norvegica L. [Rough Cinquefoil]: Common along rocky ridges on the southern portion of the island. Also present along the shoreline on the north end of the island.

Prunus pensylvanica L. f. [Pin Cherry]: Common in patches along the western half of the island.

Rosa rugosa Thunb. [Salt Spray Rose]: Non-native. Large patches on the northern and western sides of the island.

Rosa virginiana P.Mill. var. *virginiana* [Virginia Rose]: Growing adjacent to the beach on the northwestern corner of the island.

Rubus hispidus L. [Swamp Dewberry]: Growing in portions of the wetland on the northern tip of the island.

Rubus idaeus L. ssp. *idaeus* [Wild Red Raspberry]: Non-native. Common throughout the island.

Rubus pensilvanicus Poir. [Pennsylvania Blackberry]: Growing along the eastern side of the island (GHM 752).

Sibbaldiopsis tridentata (Ait.) Rydb. [Three-toothed Cinquefoil]: Patches located above the cliffs along the western side of the island.

Sorbus decora (Sarg.) Schneid. [Showy Mountain-ash]: Scattered stems above cliffs on western side.

Spiraea alba Du Roi var. *latifolia* (Ait.) Dippel [Meadowsweet]: Dense patches throughout the southern half of the island.

Spiraea tomentosa L. [Steeple-bush]: Near the small bog on the western portion of the island.

URTICACEAE

Urtica dioica L. ssp. *gracilis* (Ait.) Seland. [Stinging Nettle]: Non-native. Scattered in small patches along the perimeter of the island, more common along the eastern side.

FABACEAE

Lathyrus japonicus Willd. var. *pellitus* Fern. [Beach Pea]: Non-native. Adjacent to beaches on the northern and southern ends.

Trifolium arvense L. [Rabbit-foot Clover]: Non-native. Adjacent to beach on north end above rocky ledges.

Trifolium hybridum L. [Alsike Clover]: Non-native. Adjacent to beach on north end.

Trifolium repens L. [White Clover]: Non-native. Adjacent to beach on north end.

Vicia cracca L. [Cow Vetch]: Non-native. Small patch on the northern tip of the island.

SALICACEAE

Populus tremuloides Michx. [Quaking Aspen]: Scattered patches of trees especially on the northern half of island.

VIOLACEAE

Viola macloskeyi Lloyd ssp. *pallens* (Banks ex DC.) M.S. Baker [Wild White Violet]: Few stems growing on the northern tip of the island.

Viola sororia Willd. [Dooryard Violet]: Few small patches especially on the middle of the eastern side (GHM 748).

CLUSIACEAE

Hypericum canadense L. [Canada St. Johnswort]: Growing near the small bog on the western portion of the island.

Hypericum perforatum L. [Common St. Johnswort]: Non-native. Very common throughout most of the island.

Triadenum virginicum (L.) Raf. [Marsh St. Johnswort]: In the small bog on the western portion of the island (GHM 755).

ONAGRACEAE

Epilobium ciliatum Raf. ssp. *glandulosum* (Lehm.) Hoch & Raven [Northern Willow Herb]: In scattered locations along the perimeter of the island.

Oenothera biennis L. [Common evening-primrose]: Scattered among the grassy areas on the northern end of the island.

BRASSICACEAE

Barbarea vulgaris Ait. f. [Yellow Rocket]: Non-native. Most abundant inland of the northern beach (EWM 07200102).

Brassica nigra (L.) W.D.J. Koch [Black Mustard]: Non-native. Common along the shore, especially along the beaches at the northern end of the island (EWM 07200101).

Cakile edentula (Bigelow) Hook. [Sea Rocket]: Most abundant along cobble beach along southern end of island.

Capsella bursa-pastoris (L.) Medik. [Shepherd's Purse]: Non-native. Scattered stems, especially along southern half of island. Common on the dry rocky ridges on the southern portion of the island.

Lepidium densiflorum Schrad. [Prairie Pepperweed]: Growing on northern portion of the island (EWM 08030104).

Raphanus raphanistrum L. [Wild Radish]: Non-native. Common, especially along southern and northern beaches.
Rorippa palustris (L.) Bess. ssp. *fernaldiana* (Butters & Abbe) Jonsell [Common Yellow Cress]: Growing in portions of the northern end of the island.

ANACARDIACEAE

Rhus hirta (L.) Sudworth [Staghorn Sumac]: A single patch on the northeast corner of the island.
Toxicodendron radicans (L.) Kuntze [Poison-ivy]: Scattered patches, especially on the northern third of island.

SAPINDACEAE

Acer rubrum L. [Red Maple]: Trees and seedlings scattered on the northern portion of the island.

PRIMULACEAE

Lysimachia terrestris (L.) B.S.P. [Swamp Candles]: Growing in the east portion of the northern-most wetland.

BALSAMINACEAE

Impatiens capensis Meerb. [Spotted Touch-me-not]: Adjacent to beach on the northwestern end of the island.

ERICACEAE

Kalmia angustifolia L. [Sheep Laurel]: Southern bog.
Lyonia ligustrina (L.) DC. [Maleberry]: Small patch along eastern half of island; also present in wetland on the northern portion of the island (GHM 776).
Rhododendron canadense (L.) Torr. [Rhodora]: Scattered, especially on northern half of island
Vaccinium angustifolium Ait. [Low Sweet Blueberry]: Scattered, especially on dry ridges on southern half of island.
Vaccinium corymbosum L. [Highbush Blueberry]: Few clumps near the middle of the western side and near the southern portion of the island.
Vaccinium macrocarpon Ait. [Large Cranberry]: Occasional in wetlands on the island.
Vaccinium oxycoccos L. [Small Cranberry]: Occasional patches growing in the bog on the northern portion of the island.

CONVOLVULACEAE

Calystegia sepium (L.) R.Br. [Hedge-bindweed]: Scattered stems on the northern end of the island.
Cuscuta gronovii Willd. ex J.A. Schultes [Common Dodder]: Locally common in small scattered patches on the island, especially toward the southern third of the island.

SOLANACEAE

Solanum dulcamara L. var. *villosissimum* Desv. [Bittersweet Nightshade]: Non-native. Occasional scattered stems on the berm at the northern end of the island.

LAMIACEAE

Galeopsis bifida Boenn. [Hemp Nettle]: Non-native. Northeast shore.
Lycopus americanus Muhl. ex W.Bart. [American Water-horehound]: Clumps both on northern and southern portions of island.
Lycopus uniflorus Michx. [Northern Water-horehound]: Growing near the south end of the island.
Nepeta cataria L. [Catnip]: Non-native. Common near shore on the Northeast side of island
Scutellaria galericulata L. [Marsh Skullcap]: Adjacent to northern bog.

OROBANCHACEAE

Rhinanthus minor L. [Yellow Rattle]: Growing on the northern tip of the island.

SCROPHULARIACEAE

Verbascum thapsus L. [Common Mullein]: Non-native. Scattered stems, especially on the southern third and eastern side of the island.

PLANTAGINACEAE

Nuttallanthus canadensis (L.) D.A. Sutton [Old-field Toadflax]: Few stems on the middle of the eastern shoreline.
Plantago major L. var. *intermedia* (DC.) Pilger [Common Plantain]: Non-native. Growing adjacent to beach on the northwest corner of the island (GHM 769).
Plantago maritima L. var. *juncoides* (Lam.) Gray [Seaside Plantain]: Common along ledge shores, especially along southern end.
Veronica arvensis L. [Corn Speedwell]: Non-native. Small patch along southwestern portion of island (GHM 722).

APOCYNACEAE

Asclepias syriaca L. [Common Milkweed]: Present in scattered locations, especially along northern tip and southeastern side.

RUBIACEAE

Galium aparine L. [Spring Cleavers]: Growing in portions of the northern half of the island.

Galium mollugo L. [White Bedstraw]: Non-native. Growing on the dry ridges and open fields on the southern portion of the island.

Galium palustre L. [Marsh Bedstraw]: Present along the banks of the northern wetland, especially toward the western side.

ADOXACEAE

Viburnum dentatum L. var. *lucidum* Ait. [Arrowwood]: Few stems on the eastern portion of the island.

AQUIFOLIACEAE

Ilex verticillata (L.) Gray [Winterberry]: A common scattered bush especially towards the southern half of the island.

APIACEAE

Angelica lucida L. [Sea Beach Angelica]: Growing along portions of the shoreline.

Daucus carota L. [Queen Anne's Lace]: Non-native. A patch growing adjacent to the shore on the north end of the island.

Ligusticum scoticum L. [Scotch Lovage]: Growing along portions of the shoreline.

ASTERACEAE

Achillea millefolium L. var. *millefolium* [Common Yarrow]: Non-native. Common in scattered locations along perimeter.

Ambrosia artemisiifolia L. var. *elator* (L.) Descourtils [Common Ragweed]: Abundant in small patches at the edge of the beach at the northern end of the island.

Anaphalis margaritacea (L.) Benth. & Hook. f. [Pearly Everlasting]: Small patch next to a grassy clearing on middle of eastern portion of island.

Arctium minus Bernh. [Common Burdock]: Non-native. Southern beach.

Cirsium arvense (L.) Scop. [Canada Thistle]: Non-native. Scattered, but especially abundant along north tip.

Cirsium vulgare (Savi) Ten. [Bull Thistle]: Non-native. Scattered, but especially abundant along north tip.

Conyza canadensis (L.) Cronq. [Horseweed]: Many scattered stems were found near the cobble beach on the southern end of the island.

Euthamia graminifolia (L.) Nutt. var. *nuttallii* (Greene) W. Stone [Grass-leaved Goldenrod]: Small patches near the southern half of the eastern side.

Gnaphalium uliginosum L. [Low Cudweed]: A few stems adjacent to the beach along the north end of the island.

Hieracium piloselloides Vill. [Glaucous King Devil]: Non-native. Growing along portions of the northern half of the island (GHM 716).

Leucanthemum vulgare Lam. [Ox-eye Daisy]: Non-native. Growing near the northern tip of the island.

Senecio sylvaticus L. [Woodland Groundsel]: Non-native. Scattered stems on the south end of the island and adjacent to the eastern shore (EWM 07200107).

Solidago juncea Ait. [Early Goldenrod]: Growing in the fields on the northeast side of the island (GHM 750).

Solidago rugosa P. Mill. ssp. *aspera* (Ait.) Cronq. [Rough-stemmed Goldenrod]: Very common throughout island in dense patches.

Solidago sempervirens L. [Seaside Goldenrod]: Most common along the southern shoreline; small patches are scattered along all shorelines.

Sonchus arvensis L. ssp. *arvensis* [Field Sow Thistle]: Non-native. Scattered along the berm on the western end of the island. Some stems still flowering in September (GHM 733).

Symphotrichum novi-belgii (L.) Nesom. var. *elodes* (Torr. & Gray) [New York Aster]: Common in patches over island.

Taraxacum officinale Wiggers ssp. *officinale* [Common Dandelion]: Non-native. At scattered locations throughout the island.

Xanthium strumarium L. var. *strumarium* [Common Cocklebur]: Non-native. Growing adjacent to the wetland on the northern portion of the island (EWM 08240104).

Pine (*Pinus resinosa*), Eastern White Pine (*Pinus strobus*), Red Spruce (*Picea rubens*), Quaking Aspen (*Populus tremuloides*), Red Maple (*Acer rubrum*), Eastern Serviceberry (*Amelanchier canadensis*), and Apple (*Malus sylvestris*).

There were few locations in the interior of the island with large expanses of grasses. Common Hairgrass (*Deschampsia flexuosa*) was very common in a narrow band on the summit of the cliffs on the western side of the island, where Rhode Island Bentgrass (*Agrostis capillaris*) was a common associate (Plates 11-12). Timothy (*Phleum pratense*) was present on the island but did not dominate large expanses of the vegetation as is commonly present on other islands. The rolling hills on the southern end of the island were instead dominated by Hay-scented Fern (*Dennstaedtia punctilobula*; Plate 25), Wild Red Raspberry (*Rubus idaeus*), and patches of Rough-stemmed Goldenrod (*Solidago rugosa* ssp. *aspera*), Meadowsweet (*Spiraea alba* var. *latifolia*), and Purple Chokeberry (*Photinia x floribunda*). Dry rocky ridges of exposed ledge on the southern and western sides (Plate 15) contained Three-toothed Cinquefoil (*Sibbaldiopsis tridentata*), Shepard's Purse (*Capsella bursa-pastoris*), and Common Purslane (*Portulaca oleracea*; Plate 19).

A narrow band of salt tolerant species skirts the shoreline above the intertidal zone and contain many plants not located elsewhere on the island. Some dominant species in this narrow band include Common Yarrow (*Achillea millefolium*), Common Ragweed (*Ambrosia artemisiifolia* var. *elatiior*), Edmondston's Atriplex (*Atriplex glabriuscula*), Sea Rocket (*Cakile edentula*), Toad Rush (*Juncus bufonius*), Beach Pea (*Lathyrus japonicus* var. *pellitus*), Sea Lyme grass (*Leymus mollis*), Seaside Plantain (*Plantago maritima* var. *juncooides*), and Seaside Goldenrod (*Solidago sempervirens*). The northern sandy beaches (Plates 7-8) were sparsely

populated with Sea Rocket, Beach Pea, Common Ragweed, Pitseed Goosefoot (*Chenopodium berlandieri* var. *macrocalycium*), and Black Mustard (*Brassica nigra*). Lower down on the beaches on the northern end of the island were small pockets of salt marsh (Plate 8) dominated by Smooth Cordgrass (*Spartina alterniflora*). Common associates in these small pockets of Smooth Cordgrass included Samphire (*Salicornia depressa*), Sea Lavender (*Limonium carolinianum* var. *rotundifolia*), Hastate Orache (*Atriplex prostrata*), and White Sea-blite (*Suaeda maritima*). Eelgrass (*Zostera marina* var. *stenophylla*) was also present further out in the intertidal and subtidal zones. On the southern cobble beach (Plates 3-5), Hastate Orache was common along with a few stems of Common Saltwort (*Salsola kali*; Plate 18).

The wetland on the northern tip of the island (Plate 16) contains dense stands of Softstem Bulrush (*Schoenoplectus tabernaemontanii*). In the wettest areas of this wetland, species diversity increased and included Round-leaved Sundew (*Drosera rotundifolia*), Small Cranberry (*Vaccinium oxycoccos*), Large Cranberry (*Vaccinium macrocarpon*), Common Arrowhead (*Sagittaria latifolia*), and Swamp Dewberry (*Rubus hispidus*). Common Cat-tail (*Typha latifolia*; Plate 17), Rattlesnake Mannagrass (*Glyceria canadensis*), Beaked Sedge (*Carex utriculata*), Massachusetts Fern (*Thelypteris simulata*), Wire Rush (*Juncus arcticus* var. *balticus*), Poison-ivy (*Toxicodendron radicans*), and Northern Blue Flag (*Iris versicolor*) were also common in portions of the wetland and along the margins of the wetland grew Common Smartweed (*Persicaria hydropiper*), Marsh Skullcap (*Scutellaria galericulata*) and many other species (Table 1). Many of the same species were also found in the much smaller wetland on the western part of the island along with one small patch of Silvery Sedge (*Carex canescens*).

BREEDING SEABIRDS

Since the 1960s, three species of seabirds including Common Eider (*Somateria mollissima*), Herring Gulls (*Larus argentatus*), and Great Black-backed Gulls (*Larus marinus*) have been reported as nesting on Upper Flag Island (Korschgen 1979, Andrews 1990, L. Tudor, Maine Department of Inland Fisheries and Wildlife, pers. comm.). During our field work on the island, we observed little evidence of breeding seabirds. On June 23, 2001, we counted about 100 female Common Eiders with 10 chicks of the year on the water around the perimeter of the island. On the island, however, we did not observe any nesting bowls of Common Eider. The only evidence that we observed suggesting that Common Eider nested on the island during the spring was the remains of Eider eggs in two locations on the southern end of the island. We also found the remains of what appeared to be a single gull nest out in the open on the southern portion of the island. Because our field work was not timed to detect breeding seabirds (typically surveys occur in early May in southern Maine), evidence of breeding may have been difficult to detect.

OTHER INVENTORY EFFORTS

Small mammals were observed scurrying through the grass on the north end of the island on June 23, 2001. Six snap traps were set on the northern and southern ends of the island on 20 July, 3 August, and 6 September, for a total of 18 trap days. Three Meadow Voles (*Microtus pennsylvanicus*) were captured, two on 3 August on the northern tip of the island and one on 6 September also on the northern tip of the island. These specimens were frozen and are stored in freezers at the Petit Manan National Wildlife Refuge Headquarters in Milbridge. Although we did not capture any small mammals on the southern end of the island, two traps here were sprung on 6 September. There were abundant signs of a large herbivore on the island, possibly White-tailed

Deer (*Odocoileus virginianus*) or Snowshoe Hare (*Lepus americanus*). Despite these abundant signs, no large animals were observed during field work. No reptiles or amphibians were observed during field work on Upper Flag Island.

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Plate 1: View of Upper Flag Island from Potts Harbor,
July 20, 2001.



Plate 2: Cobble beaches at the southern end of island,
August 24, 2001.



Plate 3: View from southern-most cobble beach looking
west, August 24, 2001.



Plate 4: Cobble beach at the southern end of island
looking southeast, August 24, 2001.



Plate 5: Cobble beach at the southern end of the island
looking northwest, August 24, 2001.



Plate 6: View from southern-most cobble beach looking
north, August 24, 2001.



Plate 7: Beaches on the northern tip of the island, September 6, 2001.



Plate 8: Beaches on the northern tip of the island, September 6, 2001.



Plate 9: Cliffs on southeast tip of island, July 20, 2001.



Plate 10: View of eastern side of island looking south, July 20, 2001.



Plate 11: View of west side of the island looking north, July 20, 2001.



Plate 12: Cliffs on the western side of the island, July 20, 2001.



Plate 13: View from southwest portion of island looking north, August 24, 2001.



Plate 14: View from southern cobble beach looking west, August 24, 2001.



Plate 15: View from southern side of island looking west, August 24, 2001.



Plate 16: Wetland on the northern tip of island, July 20, 2001.



Plate 17: Wetland on the northern tip of island, September 6, 2001.



Plate 18: Common Saltwort (*Salsola kali*), southern-most cobble beach, August 24, 2001.



Plate 19: Common Purslane (*Portulaca oleracea*) common on the dry ridges, September 6, 2001.



Plate 20: Common St. Johnswort (*Hypericum perforatum*), July 20, 2001.



Plate 21: Northern Bayberry (*Myrica pensylvanica*), western side, August 24, 2001.



Plate 22: Rough-stemmed Goldenrod (*Solidago rugosa* ssp. *aspera*), August 24, 2001.



Plate 23: Bull Thistle (*Cirsium vulgare*), August 24, 2001.



Plate 24: Canada Thistle (*Cirsium arvense*), July 20, 2001.

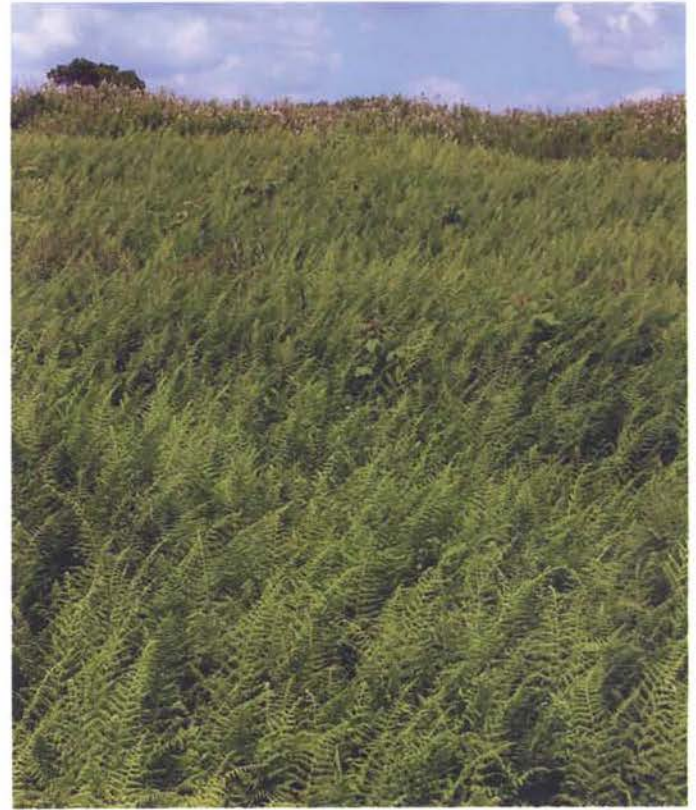


Plate 25: Hay-scented Fern (*Dennstaedtia punctilobula*), July 20, 2001.