

**SITKA NATIONAL HISTORICAL PARK
VASCULAR PLANT INVENTORY
FINAL REPORT**



Robert Lipkin
Alaska Natural Heritage Program
Environment and Natural Resources Institute
University of Alaska Anchorage
707 "A" Street
Anchorage, Alaska 99501

National Park Service Alaska Region
Inventory & Monitoring Program
NPS Report

January 2005

Cooperative Agreement No. 1443CA991000013

Funding Source: Southeast Alaska Park Network Inventory & Monitoring Program,
Alaska Region, National Park Service

ABSTRACT

In 2002, the Alaska Natural Heritage Program (AKNHP) inventoried the vascular flora of Sitka National Historical Park in accordance with a cooperative agreement with the National Park Service. The primary goal was to document $\geq 90\%$ of the vascular plant species expected to occur within the park. We visited the park for three days at the end of July in order to briefly survey all areas of the park and to review and verify the collections in the park herbarium. We collected five species new to the park and an additional 14 species which had not previously been collected. After revising the lists of known and expected species, the percentage of vouchered taxa increased from 63 to 68%. When all reliably observed but non-vouchered taxa are included, 93% of the expected flora are documented.

Key Words: Sitka National Historical Park, inventory, vascular plants

INTRODUCTION

A nationwide Inventory and Monitoring (I & M) Program for the National Park Service (NPS) was established by the US Congress in 1992. Thirty two networks of natural resource parks were created, and funded incrementally. The Southeast Alaska Park Network (SEAN) was funded in 2000 to begin the biological inventory component of the program. The goal of NPS and the I & M program is to establish baseline information and long-term trends of natural resources in the parks. To help meet this goal, biological inventories were conducted to gather data for use in future monitoring programs, inform management decisions, help direct research, and educate the public. To meet these objectives, NPS established three program goals:

- Document at least 90 percent of the species of vertebrates and vascular plants expected to occur in the park (the “expected” list);
- Describe the distribution and abundance of species of special concern (e.g., rare or exotic species); and
- Provide information necessary to establish a monitoring strategy, with special reference to special threats and resource issues within each park.

The Alaska Natural Heritage Program (AKNHP) was contracted to conduct the vascular plant inventory component of the SEAN I & M program. In 2002, one AKNHP botanist and a small NPS crew inventoried the vascular flora of Klondike Gold Rush National Historical Park, and one to three AKNHP botanists, accompanied by NPS ecologists, inventoried the floras of Sitka and Glacier Bay National Parks. In 2003, one to two AKNHP botanists visited additional, representative, regions of Glacier Bay and Klondike Gold Rush National Parks in order to complete the vascular plant inventories. The present report details the methods and results of the vascular plant inventory in Sitka National Historical Park.

Sitka National Historical Park (SITK) was established in 1910 to preserve historically and culturally significant sites and artifacts related to the 1804 Battle of Sitka between the Tlingit Indians and the Russians, the Russian-American period in Alaska, and the Native people of southeastern Alaska. The park is located on the western coast of mountainous Baranof Island at the mouth of the Indian River, an important regional salmon stream. The Indian River drains a narrow post-glacial valley delineated by rugged coastal peaks. Sitka has a maritime climate characterized by relatively heavy precipitation with moderate temperatures ranging from an average daily low of 31 degrees Fahrenheit in January to an average daily height of 55 degrees in July and August.

Though relatively small (107 acres), SITK contains a variety of habitat types including temperate rainforest, open meadow, estuary, the mouth of an anadromous river, and semi-temperate rainforest typical of southeastern Alaska and is characterized by the Sitka spruce/western hemlock closed-canopy forest type. The northeastern corner of the park exhibits old-growth characteristics such as multiple canopy layers, trees of varying diameters, snags (dead standing trees), and downed woody debris. Non-forested areas in the park include the Indian River estuary and associated wetlands, the beach fringe (a

forb-graminoid-shrub zone between the intertidal zone and forest edge) and the historic Tlingit fort site, which is a maintained grassy opening enclosed by the surrounding forest. The marine intertidal area is unusually diverse and productive. Descriptions of the landforms, plant associations and communities can be found in Steveler 1969 and U.S. Forest Service 1993, 1994.

As the early center of Russian Alaska, Sitka has a long history of botanical collecting. Collections from the general Sitka vicinity date back at least to Georg von Langsdorff and Wilhelm Tilesius's work during the Russian von Krusenstern expedition in 1806. The first extensive collections were made by the German naturalist Carl Mertens in 1827 when he visited Sitka with Lütke's Russian expedition (Hultén 1941 1950). Many of these early collections, however, contain only general information about location, making it impossible to determine if they were made within the park. Observations and collections that can reliably be assigned to the park date back to the 1950's. In 1962 Decker listed his observations on the "Alaskan Plants Native to Sitka National Monument". He apparently made no vouchers and some of the species listed are clearly mis-identifications. In 1969 Strevler made the first detailed observations on the flora and vegetation of the Park and made a number of collections that form a large part of the SITK herbarium.

Extensive ecological inventories of Sitka National Historical Park were prepared by the U. S. Forest Service (USFS 1993, 1994), including descriptions of soils, plant associations and communities as well as a vascular plant species list with habitat notes for each species. Other significant collections were made in SITK by L. Smith (1933-1959) and S. Jones (1985) and are archived in the herbarium of SITK.

METHODS AND MATERIALS

SITK is a relatively small park (approximately 107 acres) that has been well studied botanically; consequently, few additions to the known flora were expected. To gauge progress toward achieving 90% documentation of the expected flora, we needed an informed list of known and probable taxa. A database was compiled of plant collections from the Herbarium of the University of Alaska Museum (ALA) and the SITK herbarium, as well as observations and floristic lists from published and unpublished literature. Collections from ALA were verified for both taxonomic identification and geographic location. Records from the Automated National Catalog System of the National Park Service (ANCS+) were largely unverified for both taxon and geographic location. The records were used by AKNHP to develop lists of taxa known from, or expected to occur in, the park units. Taxa that were only known from unverified collections or from observations or literature citations were recorded as "Unconfirmed."

Determining the expected species for an areainvolves extrapolation and interpretation of the known flora of the area and the adjacent areas.. Our initial method included documented taxa occurring within 50 km of the park units. This is a very rough approximation at best. Even after revisions were made (based on likely habitats and geography) the list undoubtedly included taxa that are not present in the park and most likely also omitted taxa that will later be found in the park. Taxa known from within 50

km of the park boundary, or that were otherwise felt likely to occur in the park, were recorded as "Probably Present." Using these definitions we initially determined that the percentage of the total expected flora known to be present in SITK was 44% (140 taxa documented as Present out of 318 Expected).

The relatively small size of SITK and its well known flora, however, suggested that we should compile the lists of Expected and Present differently than we did for the other National Parks in Alaska. The small size and limited habitats of the Park renders the 50 km buffer unrealistic and resulted in the inclusion of many taxa that are not likely to occur in the park. Consequently, we only included taxa as Probably Present if they were from an immediately adjacent area (< 500 meters) with comparable habitat, or were easily overlooked taxa with known from habitats similar to the park. We also removed taxonomic and nomenclatural synonyms that artificially inflated the number of expected species [].

Since so few collections from SITK were represented in the collections of ALA, one of our main tasks while in Sitka was to verify the identifications and collecting locales of specimens at the SITK herbarium in order to refine the list of known and likely species. After removal of unlikely species and synonyms, the number of taxa expected to occur in Sitka National Historical Park dropped to 169. Of these, 107 (or 63%) were listed as "Present," 46 were listed as "Unconfirmed," and 16 were listed as "Probably Present." (Many of the "Unconfirmed" were based on reliable observations of distinctive species by several experienced botanists, and could well have been considered "Present".)

We visited the Park and conducted fieldwork between July 30 and August 1, 2002. Our primary objective was to locate and collect species not previously documented for SITK. A secondary objective included vetting the collections at the SITK herbarium.

Based on conversations with previous collectors (Shephard, Stensvold and Streveler, pers. comm.) we focused our very limited time on coastal beach meadows, estuarine areas, riparian understory and the new addition at the north end of the Park. Voucher specimens were collected for those species that were new to the park, species of concern (rare, endemic, exotic), geographic or ecological range extensions and specimens not identifiable in the field. The following data were collected for each vouchered specimen: date, unique collection number, latitude and longitude (NAD27, decimal degrees); slope, aspect, elevation, topographic position, associated landforms, associated species, vegetation class, substrate, soil moisture, soil type, drainage, parent material, cover class and frequency class, notes on characters not preserved well, phenology and ecological observations.

Collections were made only if the population was large enough to support removal of individuals and followed the collecting protocol of Murray and Parker (1990). Duplicate collections were made when possible, allowing the first set to be archived at the Herbarium of the University of Alaska Museum (ALA) and the second set to be sent to the park.

RESULTS

We made twenty seven collections of species that were either new to the park, without an existing voucher, or that were not readily identified in the field. Survey routes and collecting sites are shown below in Figure 1 and a list of collections is in Appendix 1.

Figure 1. Map of Sitka National Historic Park showing survey routes (blue), collecting sites for 2002 floristic inventory (green) and *Polystichum setigerum* site (red).



Five collections were made of taxa new to the park, and an additional fourteen collections were made of taxa that had been previously reported for the park but which lacked vouchers confirming their presence. The taxa new to the park included:

Adiantum aleuticum

Agrostis stolonifera

Atriplex gmelinii

Cerastium fontanum

Poa annua

These new taxa are all common in Southeast Alaska, and do not represent range extensions. *Agrostis stolonifera*, *Cerastium fontanum*, and *Poa annua* are non-native invasive species common to disturbed areas.

We also reviewed and vetted collections at the SITK herbarium as well as collections at the U.S. Forest Service herbarium in Sitka. Corrections to identifications in the SITK herbarium were made and additions to the known flora were noted. Many of the collections, although listed as being from the park, were actually collected outside of the park boundaries. A new list of expected taxa for the park was generated, reflecting these corrections and eliminating synonyms present in the previous NPSpecies lists. Using this revised list, the total number of vascular plant species listed as Expected in SITK is 169, of which 156 (93%) are now either verified by a voucher (114) or by reliable reports of experienced botanists (42).

DISCUSSION

The purpose of this vascular plant inventory was to document at least 90 % of the vascular plant taxa expected to occur in Sitka National Historic Park. We documented 93% of the species on the expected list.

Within the three days available for the inventory we were able to review the existing collections at the park herbarium and to briefly survey the full extent of the park, adding five new species and documenting 14 other species that previously lacked a voucher. Although SITK is a relatively small park with a small flora, the vascular plant inventory posed several problems in defining a realistic expected species list. Many of the collections in the park herbarium were made outside of the park boundaries and a number of them were incorrectly determined. The park habitats may well have changed since early observations and some species may no longer be rightly considered “expected”. We feel a conservative approach to defining the “expected” flora is realistic, especially given how well botanized the park is. Similarly, we feel that although all of the species in the park should be represented by a voucher, 42 of the 45 “observed” species (those still lacking a voucher) are based on reliable observations, and should be given considerable

weight in assessing the known flora. Given these adjustments, 93% of the expected flora can be considered documented. If we do not include the 42 species lacking vouchers, then only 68 % if the flora is documented as Present. Future surveys are likely to turn up additional species, but these will be few, and it is difficult to predict which they are likely to be.

Decker's (1962) notes on the plants of SITK is a curious document riddled with misapplied names and obvious errors in identification. Still, some of his entries raise the possibility that some habitats and associated species may have changed over the last 40 years. While his entry for "*Convolvus soldanella*" may actually refer to *Lathyrus maritimus*, and his mention of *Spiraea* likely is a mistake for *Aruncus*, other entries are harder to explain. He notes "Blue-eyed grass, *Sisyrinchium sarmentosum*", is abundant in the Monument, covering open gravelly areas with its "small, purplish-blue, yellow-centered blossoms". Neither *Sisyrinchium* nor *Iris* is now known from the park and it is hard to think of what other plant he could be mistaking it for. It is possible that portions of the Park may have changed sufficiently (either through rebound or succession) that the flora has changed.

No species of conservation concern were seen or collected during our inventory in 2002. Subsequent to our visit, Mary Stensvold, USFS, collected the shield fern *Polystichum setigerum*, another species new to the park, but which had previously been collected from the greater Sitka area. This species is only known from Southeast Alaska and British Columbia, with a disjunct population in the western Aleutian Islands. Although it is not common (it is ranked G3 S3 by the AKNHP), it has been found at an increasing number of sites in Southeast Alaska (US Forest Service Herbarium, Sitka). Decker (1962) noted the presence of *P. munitum* in SITK and seemed to suggest it was common there. Given his frequent misidentifications, this might be an earlier reference to *P. setigerum*.

Notes were also made on weedy and non-native plant taxa. The developed trails, lawns, and historical sites are corridors for these species and although most appear to be restricted to the disturbed areas, several may be spreading into less disturbed forested habitats. These include *Polygonum convolvulus*, *Poa palustris*, *Ranunculus repens*, and *Taraxacum officinalis*. Non-native mountain-ash (*Sorbus aucuparia*) and Japanese knotweed (*Polygonum cuspidatum*) are also established in the park. *Polygonum cuspidatum* is of particular concern as it can be very aggressive and the NPS has been trying to eradicate it within the park.. Only a few small plants were seen southeast of the visitor center, off the trail. Non-native plants included:

Capsella bursa-pastoris
Cerastium fontanum
Chenopodium album
Chrysanthemum leucanthemum
Digitalis purpurea
Matricaria matricarioides
Phleum pratense
Plantago major
Poa annua

Poa pratensis
Polygonum convolvulus
Polygonum cuspidatum
Ranunculus repens
Sorbus aucuparia
Taraxacum officinale
Trifolium pratense

Recommendations

The species list for SITK may be considered reasonably complete, but it would be worthwhile to collect vouchers for the remaining 42 species on the list. This could be a good student project for a local science class. Although we would not expect to see many new species for the Park, it is likely that new additions can be made of less conspicuous species, such as graminoids, if an effort is made to collect them throughout the season.

ACKNOWLEDGEMENTS

The AKNHP is grateful for the logistical and financial support of the NPS, particularly the Regional and SEAN I & M coordinators, Sara Wesser, Lewis Sharman, and Chiska Derr. Geoff Smith of SITK provided help and insights during the inventory.

LITERATURE CITED

- Decker, A. N. 1962. Alaskan Plants Native to Sitka National Monument. Unpublished report on file with National Park Service, Sitka, Alaska. 61 pp.
- Hultén, E. 1940. History of botanical exploration in Alaska and Yukon territories from the time of discovery to 1940. *Bot. Not.* 289-346.
- Hultén, E. 1941-50. Flora of Alaska and Yukon , 1-10/ Lunds Universitets Arsskrift N.F., Aud. 2. Vols. 37-46. 1902 pp.
- Shephard, M. 2002 Personal communication. US Forest Service, Anchorage, AK.
- Stensvold, M. 2002 Personal communication. US Forest Service, Sitka, AK.
- Streveler, G. 1969. Comments on the Natural History of Sitka National Monument. Unpublished memorandum on file with National Park Service, Sitka, Alaska. 11 pp.
- _____. 2002 Personal communication. Icy Strait Environmental Services, Gustavus, AK
- U.S. Forest Service. 1993. Ecological inventory: Sitka National Historic Park. U.S. Forest Service. Tongass National Forest, Chatham Area. Interagency Agreement No. IA 97070-2-9017. 79.
- . 1994. Vegetation inventory and forest health assessment Sitka National Historic Park. Prepared by U.S.D.A. Forest Service, Tongass National Forest, Chatham area, for U.S.D.I. National Park Service, Alaska Regional Office. 187 pp.

APPENDIX I

Collections and collection sites from 2002 Vascular Plant Inventory of Sitka National Historic Park. Collections are archived at Sitka National Historic Park and the Herbarium of the University of Alaska Museum.

Family	IT IS name	Specific locality	Lat (decdeg)	Long (decdeg)	Habitat	Abundance	Coll. #	Collector	Coll. Date
Brassicaceae	CARDAMINE OLIGOSPERMA Nutt. subsp. KAMTSCHATICA (Regel) Cody	East side of Indian River, just south of park foot bridge	57.0497	135.3155	wet creek gravels	rare	004	Lipkin, R.	30-Jul-02
Caryophyllaceae	CERASTIUM FONTANUM Baumg.	Mouth of Indian River	57.0484	135.3124	in moss on old log by pond	rare	013	Lipkin, R.	31-Jul-02
Caryophyllaceae	CERASTIUM FONTANUM Baumg.	Old Fort site	57.0466	135.3116	open, disturbed meadow with introduced weeds	scattered-patchy	030	Lipkin, R.	1-Aug-02
Caryophyllaceae	SAGINA MAXIMA Gray. subsp. CRASSICAULIS (S. Wats.) Crow	Mouth of Indian River	57.0476	135.3127	seasonally flooded, sparsely vegetated, estuarine graminoid meadow	scattered-patchy	012	Lipkin, R.	31-Jul-02
Caryophyllaceae	SPERGULARIA CANADENSIS (Pers.) G. Don	Mouth of Indian River	57.0476	135.3127	seasonally flooded, sparsely vegetated, estuarine graminoid meadow	scattered-patchy	010	Lipkin, R.	31-Jul-02
Chenopodiaceae	ATRIPLEX GMELINII C.A. Mey. ex Bong.,.	Mouth of Indian River	57.0476	135.3127	seasonally flooded, sparsely vegetated, estuarine graminoid meadow	scattered-patchy	007	Lipkin, R.	31-Jul-02
Chenopodiaceae	ATRIPLEX GMELINII C.A. Mey. ex Bong., var. GMELINII	Beach gravels of SW coastline, 300m SE of visitor center	57.0456	135.3145	exposed gravels below high tide line with patchy cover of <i>Puccinellia</i> , <i>Honckenya</i> , <i>Plantago maritima</i> , <i>P. macrocarpa</i> , <i>Salicornia</i> and <i>Atriplex</i> .	scattered-patchy	023	Lipkin, R.	1-Aug-02
Cyperaceae	CAREX LYNGBYEI Hornem	Mouth of Indian River	57.0476	135.3127	seasonally flooded, sparsely vegetated, estuarine graminoid meadow	scattered-patchy	011	Lipkin, R.	31-Jul-02
Dryopteridaceae	CYSTOPTERIS FRAGILIS (L.) Bernh.	Southeast tip of park, south of mouth of Indian River	57.0461	135.3106	bank above rip rap and beach gravels	rare	028	Lipkin, R.	1-Aug-02

Juncaginaceae	TRIGLOCHIN MARITIMA L.	Mouth of Indian River	57.0476	135.3127	seasonally flooded, sparsely vegetated, estuarine graminoid meadow	scattered-patchy	008	Lipkin, R.	31-Jul-02
Onagraceae	EPILOBIUM CILIATUM Raf.	North side of trail, approx. 300m SE of visitor center.	57.0463	135.315	disturbed meadow near totem and trailside	scattered	017	Lipkin, R.	1-Aug-02
Poaceae	AGROSTIS EXARATA Trin	East side of Indian River, just south of park foot bridge	57.0497	135.3155	wet creek gravels	rare	003	Lipkin, R.	30-Jul-02
Poaceae	AGROSTIS EXARATA Trin.	Southeast tip of park, south of mouth of Indian River	57.0461	135.3106	bank above rip rap and beach gravels	rare	027	Lipkin, R.	1-Aug-02
Poaceae	AGROSTIS STOLONIFERA L.	Mouth of Indian River	57.0478	135.3127	moist graminoid meadow, rarely flooded by brackish water	scattered-patchy	005	Lipkin, R.	31-Jul-02
Poaceae	CALAMAGROSTIS CANADENSIS (Michx.) Beauv. var. LANGSDORFII (Link) Inman	North side of trail, approx. 300m SE of visitor center.	57.0463	135.315	disturbed meadow near totem and trailside	scattered	020	Lipkin, R.	1-Aug-02
Poaceae	FESTUCA RUBRA L.	East side of Indian River, just south of park foot bridge	57.0497	135.3155	wet creek gravels	scattered-patchy	001	Lipkin, R.	30-Jul-02
Poaceae	FESTUCA RUBRA L.	Mouth of Indian River	57.0478	135.3127	moist graminoid meadow, rarely flooded by brackish water	scattered-patchy	006	Lipkin, R.	31-Jul-02
Poaceae	POA ANNUA L.	Old Fort site	57.0466	135.3116	open, disturbed meadow with introduced weeds	scattered-patchy	031	Lipkin, R.	1-Aug-02
Poaceae	POA PRATENSIS L. subsp. PRATENSIS	Southeast tip of park, south of mouth of Indian River	57.0461	135.3106	bank above rip rap and beach gravels	common	025	Lipkin, R.	1-Aug-02
Poaceae	PUCCINELLIA PUMILA (Vasey) A.S. Hitchc.	Mouth of Indian River	57.0476	135.3127	seasonally flooded, sparsely vegetated, estuarine graminoid meadow	scattered-patchy	009	Lipkin, R.	31-Jul-02

Poaceae	PUCCINELLIA PUMILA (Vasey) A.S. Hitchc..	Beach gravels of SW coastline, 300m SE of visitor center	57.0456	135.3145	exposed gravels below high tide line with patchy cover of Puccinellia, Honckenya, Plantago maritima, P. macrocarpa, Salicornia and Atriplex.	abundant	022	Lipkin, R.	1-Aug-02
Poaceae	TRisetum CANESCENS Buckl..	East side of Indian River, just south of park foot bridge	57.0497	135.3155	wet creek gravels	rare	002	Lipkin, R.	30-Jul-02
Poaceae	TRisetum CANESCENS Buckl..	Southeast tip of park, south of mouth of Indian River	57.0461	135.3106	bank above rip rap and beach gravels	scattered-patchy	026	Lipkin, R.	1-Aug-02
Polypodiaceae	POLYPODIUM GLYCYRRHIZA D.C. Eat.	North side of trail, approx. 300m SE of visitor center.	57.0463	135.3155	disturbed meadow near totem and trailside	rare	019	Lipkin, R.	1-Aug-02
Pteridaceae	ADIANTUM ALEUTICUM (Rupr.) Paris	Southeast tip of park, south of mouth of Indian River	57.0461	135.3106	bank above rip rap and beach gravels	rare	029	Lipkin, R.	1-Aug-02
Rosaceae	SORBUS AUCUPARIA L.	Southeast tip of park, south of mouth of Indian River	57.0461	135.3106	bank above rip rap and beach gravels	rare	024	Lipkin, R.	1-Aug-02