Exotic Plant Surveys at Sitka National Historical Park, Alaska
Summer 2004 Field Season Report

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Introduction

Summer 2004 marked the fourth year that baseline surveys for non-native plant species were carried out on National Park Service (NPS) lands in Alaska. These surveys serve as the first source of data to be used in formulating a long-term monitoring and control plan for these plant species in Alaska's NPS units. Exotic plant species are a concern to resource managers because they threaten the genetic integrity of native flora through hybridization (D'Antonio et. al 2001), can out compete resident plant species for limited resources, and can change the structure and function of ecosystems through alterations of geochemical and geophysical processes (Ruesnik et. al 1995, Gordon 1998). By 1996, exotic plant species had infested an estimated 7 million acres of NPS lands, with 4600 acres of new infestations occurring daily (NPS 1996).

In Alaska, NPS lands have been rather immune to the establishment of many pernicious exotic species found in the lower 48 states (Westbrooks 1998). Several factors have contributed to this immunity. The first is climate. Circumboreal flora are adapted to a wide range of climatic conditions that exotic plants cannot tolerate. In addition many parklands in Alaska have remained relatively free of man-made disturbances such as livestock grazing, wildfire suppression, and altered hydrological regimes that encourage the introduction of exotic species, and the remote wilderness parks in Alaska still have all of the major floral and faunal ecosystem components (Densmore et. al 2001). Despite these protective factors, the threat of exotic plant invasion is increasing due to global warming and increases in disturbance related construction, among others. Fortunately, the NPS has the opportunity to get a head start on exotic plant introduction in Alaska before it becomes a problem, but research and active management must begin now (Spencer 2001).

Sitka National Historical Park (SITK) is unique among Alaska NPS units in its very small size and urban setting, being surrounded by the town of Sitka. The threat of exotic plant introduction is encouraged by the influx of summer visitors, the escape of planted ornamentals from Sitka gardens, and ongoing maintenance activities which create new areas of disturbances that can facilitate the establishment of exotic species. Fortunately, the parks small size makes it relatively easy to monitor and control incoming plant species, but park managers must remain vigilant. The purpose of surveys in SITK during the 2004 field season was to more accurately map out disturbed areas of the park and to update any new exotic plant introductions to the park since the original surveys in 2000. Information on the status and number of exotic plant species in SITK will be used to help prioritize areas in the state and park for long-term monitoring and control of these species on Alaska NPS lands.

Methods

The 2004 summer field season marked the first year that extensive surveys for exotic plants were conducted using highly accurate Trimble Geo XT GPS units. These units can

achieve sub-meter accuracy and can be downloaded with data dictionaries that can be tailored to the unique needs of a research or monitoring effort. The units were used to map both infested areas and areas without exotic plants with spatial detail sufficient for year-to-year monitoring of spread. Within the framework of a nationwide database for exotic plants on NPS lands, a data dictionary was customized for Alaska with multiple fields used to describe the composition, size and severity of exotic plant infestations in a given area (Table 1). A digital photo of each site and species was recorded in addition to a qualitative description of the area. If exotic species were found in sufficiently low numbers, they were removed by hand.

In SITK, an opportunistic survey of all park trails was conducted as well as surveys in other areas of anthropogenic disturbance such as picnic areas, parking lot edges and the developed area around the park visitor center. Particular attention was paid to the presence of Japanese knotweed (*Polygonum cuspidatum*), which was originally documented in 2000 and is a species of concern due to its ability to spread along riparian corridors via fragments of stem and rhizome that can rapidly colonize stream sides and islands (Shaw and Seiger 2002). ArcGIS (ESRI 2002) software was used to generate a shapefile that includes all records from the GPS unit, from which a map of surveyed areas was generated.

Results

A total of 9 exotic plant species were documented in the park. This is the same number found in the original surveys of 2000 (Densmore et. al 2001). By far the most common species were common dandelion, plantain and white clover (Table 2). These species were most prevalent around the visitor center area of the park and at rest areas and picnic sites. Creeping buttercup (*Ranunculus repens*) was common at the old fort site and the trails leading to the old battle site area. Only 9 individual plants of *Polygonum cuspidatum* were found on the east side of the bridge over Indian River. These specimens were removed by myself and by the park biologist Geoff Smith. On a short (150 meter) section of trail near the old battle site, several possible specimens of European mountain ash (*Sorbus aucuparia*) were identified. Most specimens were restricted to an area immediately adjacent to the park trail system. Only two specimens of foxglove (*Digitalis purpurea*) were found within the park, one on the edge of the upper parking lot, and one in a small clearing behind the visitor center, which also contained a small number of ox-eye daisies (*Leucanthemum vulgare*).

Discussion

The numbers and distribution of exotic plant species within SITK appear to be stable. No new species were identified since the original surveys in 2000. Those species present at that time have not appeared to have expanded or increased greatly in numbers since the original survey. As before, the most numerous species within the park were found in clearings, such as at the old fort site or some of the picnic or trailside rest areas where there is little native plant canopy cover. Sufficient repeated disturbances and incoming solar radiation are present to permit large numbers of individual species to persist. These

areas were usually populated by common dandelion, plantain and white clover. These species are innocuous and their numbers can be controlled by hand pulling or mowing.

It was encouraging to see that Japanese knotweed had not multiplied in the park since the initial surveys. Park staff have done a good job of monitoring and controlling the populations of this species within the park. Care should be taken, however, to remove all of the plant parts, particularly the extensive rhizomes that this species can develop. In addition, this species can be difficult to distinguish from surrounding native vegetation when not in flower and can easily be missed. Particular attention should be paid to the Indian River area within the park as any establishment of Japanese knotweed here could lead to the rapid spread of the species along the riparian corridor of the park. The use of herbicides should also be considered for this species given its small area of infestation and the high potential for eradication.

One of the more confusing areas related to exotic plant species within SITK is associated with the numbers of European mountain ash (*Sorbus aucuparia*) within the park. During a brief examination of this species by myself, the park biologist and the parks chief of resources, it was discovered that many of the individual plants examined had botanical characteristics of the exotic species or a combination of characters of both the exotic and the native species of the area, *Sorbus sitchensis*. It is possible that some hybridization has occurred between the native and exotic species. This creates a potentially confusing situation with respect to control and or eradication of the exotic species. The removal of hybrid varieties is an uncertain prospect. Since the exotic species appears to be confined to a small section of trail along the coast line, it might be acceptable to merely monitor the growth and spread of this species over the short term (5 to 10 years) before deciding upon any potential removal efforts. Removal efforts might not be in the best interest of park resources if they created new areas of disturbance that other exotic species already present could use to expand into new areas of the park.

By far the biggest potential for the expansion of existing exotic species and the establishment of new species within SITK lies in ongoing maintenance. Several new areas of disturbed ground were evident near some park trails and by the newly paved upper park lot. Many of these new disturbances are under the extensive old growth forest canopy and therefore the establishment of exotic plant species is unlikely in these areas. However, care should be taken to minimize the amount of bare ground exposed and repetitive disturbance to topsoil in any areas of the park should be avoided. In addition, the use of broadcast fertilizers in areas of revegetation should be discouraged. These types of fertilizers make nutrients available for relatively short periods of time and native species cannot respond as quickly to short term increases in soil nutrients as exotic species can.

Since SITK is a small park, is easily accessible by people, and is surrounded by an urban area, it will most likely be a priority in terms of active and long term monitoring. There are too many potential avenues for the introduction of exotic plant species to justify anything less than vigilant monitoring of this park. Fortunately, the small size of the park allows for relatively easy surveying. Control of exotic species in the visitor center area

and elimination of Japanese knotweed along the Indian River corridor should be the biggest areas of concern in the short term.

Table 1. Selective fields used in GPS data dictionary and GIS analysis for surveys of exotic plant species within Sitka National Historical Park, Alaska, Summer 2004.

Location ID	Location ID
Dstrbncs	Disturbance Type (trampling or mowing)
LctnDscrpt	Location Description (sitka park = inside park boundary)
Taxon	Dominant exotic species
Phenology	Phenology of dominant exotic species (no flower or full flower)
CvrClssPer	Cover class percentage of dominant exotic species (1, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90, 95, 100)
CntrlEffrt	Control effort (low, medium, high)
Action	Inventory or Treatment
Undetermined	Stem count of dominant exotic species
Remarks	Remarks
AssocPark	Associated park (SITK)
Recorder	Recorder (CPM = Chris McKee)
Taxon2, Taxon3…	Additional 8 fields for 8 other exotic taxa for each unique site
Treatment	Treatment (only PULL/DIG-MANUAL this year)

Table 2. Exotic Plant Species found within Sitka National Historical Park, Alaska, Summer 2004.

Species	Common Name	Location Description
Digitalis purpurea	Foxglove	Upper parking lot and small clearing behind park visitor center
Leucanthemum vulgare	Oxe-Eye Daisy	In small clearing behind park visitor center
Matricaria discoidea	Pineapple Weed	In lawn in front of park visitor center
Plantago major	Common Plantain	Extensive in lawn in front of park visitor center and at rest area facing ocean near old battle site
Polygonum cuspidatum	Japanese Knotweed	In small patches next to Indian River footbridge
Ranunculus repens	Creeping Buttercup	Extensive at old fort site and sporadic along some park trails
Sorbus aucuparia	European Mountain Ash	Possible hybrid varieties growing on coastal trailside section
Taraxacum officinale	Common Dandelion	Abundant in lawn in front of park visitor center and rest areas along park trails
Trifolium repens	White Clover	Common in lawn in front of visitor center, rest areas along park trails and at old fort site

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