



Invasive and Exotic Plant Species Management in Sitka National Historical Park

2012 Summary Report

Natural Resource Data Series NPS/SITK/NRDS—2013/432



ON THE COVER

Beach wildrye frames the view of Sitka Sound from the coast of Sitka National Historical Park
Photograph by: Gina Bono, Sitka National Historical Park

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All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner.

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Abstract

This year marks the ninth consecutive year that the Alaska Exotic Plant Management Team (EPMT) has been represented in Sitka National Historical Park. The EPMT consisted of one seasonal Biological Science Technician from May 21 through September 28, 2012. Field work included surveying for, locating, mapping, and manually controlling plants exotic to the regions flora. Many non-native species were located within park boundaries, and the surrounding urban environment of Sitka. Control work for the season was supplemented with the addition of a Southeast Alaska Guidance Association (SAGA) crew during July 16-27, 2012. Data was collected using a GeoExplorer 6000 series portable Trimble unit, edited with GPS Pathfinder office, and analyzed at the regional office with ArcGIS. Most notable species found within the park were creeping buttercup (*Ranunculus repens*), European mountain-ash (*Sorbus aucuparia*), and common dandelion (*Taraxacum officinale*). New species detected this year were common groundsel (*Senecio vulgaris*), reed canary grass (*Phalaris arundinacea*), and thyme leaf speedwell (*Veronica serpyllifolia*) (Identifications pending). A total 7 acres of infested area was found within the park. Additional focus was placed on the location, measuring, and mapping of European mountain-ash (*Sorbus aucuparia*) in an attempt to lay the groundwork for a long term management plan for this non-native tree.

Acknowledgments

The Sitka National Historical Park Exotic Plant Management Team would like to thank Craig Smith for his GPS assistance, and troubleshooting advice; Tim Federal for editing and exporting data as well as providing a GIS map of the European mountain-ash infestation; the AmeriCorps SAGA crew for their hard work in controlling exotic plants; Bob Geiger for helping to maintain the parks ethnobotanical garden; Mike Johnson for disposing of invasive plant materials; and Bob Gorman and the UAF extension service for donating native plants for the ethnobotanical garden.

Introduction

Exotic Plant Management Teams (EPMT) are part of a nationwide National Park Service (NPS) program that includes 16 teams covering over 225 parks. The role of these teams is to reduce the spread non-native plants in order to fulfill the agency's mission of "the preservation of native habitats for the enjoyment of future generations" (NPS). Monitoring the land is arguably the most important step in exotic plant management (Maxwell 2009). Since 2001, the Alaska national parks have been collecting data on exotic plants. These efforts follow the Early Detection and Rapid Response methodology instilled into the NPS protocol regarding exotic species management.

There are a variety of ways in which exotic plants pose a threat to our public lands. The structure of the native plant community becomes vulnerable by reducing species richness and diversity, changing pollinator relationships, and displacing available resources such as light, water and nutrients. This culminates into altered ecosystems by changing fire regimes, nutrient cycling, and hydrology (Levine 2003). Left unchecked, invasive plants can have untold effects upon highly balanced systems. Humans play an important role in the global spread of non-native species, as well as provide disturbance areas where invasive species can infiltrate and thrive (Vitousek 1997).

Sitka National Historical Park (SITK) is a 107-acre park located on the western coast of Baranof Island within the Alexander Archipelago of southeast Alaska. Established in 1910, SITK is managed primarily for its historical significance as the site of the battle of 1804 between the invading Russians and the native Tlingit population, and for its totem pole collection. The maritime climate at SITK is temperate with a high annual rainfall. Most of the park is second growth Sitka spruce and western hemlock forest, but also contains the riparian ecosystem of the Indian River, a sedge and grass estuary meadow at the mouth of the river, as well as coastal shore and intertidal habitats. The area is frequented by nesting bald eagles, occasional brown bears, and spawning salmon.

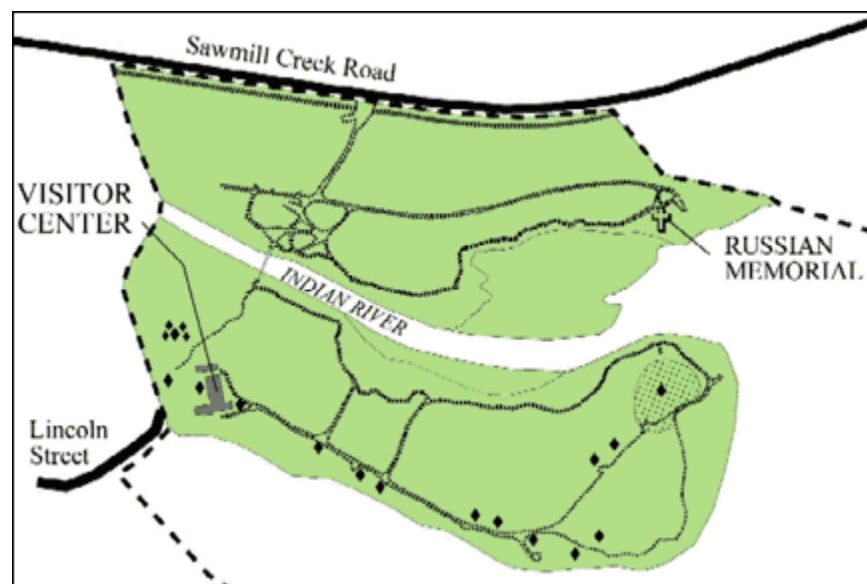


Fig. 1: Map of Sitka National Historical Park

Most national parks in Alaska are still relatively unaffected by exotic species when compared to those of the lower 48. This is due to remoteness, extreme boreal climates requiring strict adaptations, as well as less frequent anthropogenic disturbances (McKee 2005). However, SITK is unique among the Alaska park service units in that it is a small park surrounded by the urban environment of Sitka, has a mild climate, and was historically logged. The park is frequented heavily in the summer from cruise ship tourists, and offers recreation opportunities for locals. Also, given that SITK is located on an island, there is an added susceptibility of non-native species invasions (Vitousek 1997). These factors provide many opportunities for exotic plants to infiltrate park boundaries, and if management efforts are to be effective, then SITK must work cooperatively with the surrounding federal, state, and private land owners.

The 2012 season marked the ninth year of having an EPMT presence in SITK. Many of the same species encountered over the years have persisted in the park. The most commonly encountered exotics were creeping buttercup (*Ranunculus repens*) and European mountain-ash (*Sorbus aucuparia*). Many areas in the park, such as the fort site, around the totem poles, the Russian memorial, and smaller sitting areas, have established a lawn-type habitat with a high density of non-native plants. Additionally, the largely unmaintained ethno-botanical gardens planted near the visitor center continue to harbor many common garden weeds. Given the persistence of some exotic species and the constant discovery of new species at SITK, there remains sufficient need for continuing the EPMT presence in the park.

Methods

All work took place between May 28-September 28, 2012 and was conducted primarily by one seasonal Biological Science Technician. Training was provided at the Alaska NPS regional office in Anchorage, AK during the week of May 21-25, 2012 and covered topics in data collection, plant identification, and program expectations. Methods used were based on the Alaska Exotic Plant Management Team 2012 field protocol (Million 2012).

Inventories focused on high disturbance areas such as trails and park boundaries, while a comprehensive inventory on European mountain-ash spanned the entire park. Mapping was conducted using a Trimble GeoExplorer 6000 series handheld GPS. The data dictionary fields were based on the standardized Alaska EPMT data fields (Million 2012). The mapping of European mountain-ash included the measured circumference of trees encountered. This data was uploaded and differentially corrected using GPS Pathfinder Office version 5.3 and primarily corrected with the Biorka Island base station. Files were sent bi-weekly to the Alaska regional office as both uncorrected shape files and corrected and edited files to be analyzed with ArcGIS. A log was also kept of all data files sent to the regional office.



Fig 2: Collection bags of weed materials

Control efforts for the 2012 season focused on species controlled in previous years. During July 16-27, 2012 SITK received additional support from an AmeriCorps SAGA crew. Most person hours were dedicated to the removal of creeping buttercup along the shoreline, near the visitor center, and along the trails near the Russian memorial. This was done with hand tools, and plant materials were bagged and later sent to the local dump. The other focus was on European mountain-ash, and this was the first year that weed wrenches were used at the park in order to pull the saplings. This occurred along the western mouth of the Indian river and also near the southern tip of the western peninsula at the park. Once pulled, these saplings were taken to Granite Creek overburden disposal site.

Special attention was given to the parks ethno-botanical gardens that were planted in the summer of 2007, and located sporadically around the visitor center. The gardens are unmaintained and provide a consistent source for non-native plants to establish. Although the garden contains a beautiful array of native species, many are being overgrown by aggressive competitors. Weeds were manually removed here and, where possible, re-planted with native plants donated locally from the University of Alaska (UAF) Extension Service native plant garden.

Results

The persistence of many exotic plants within SITK demonstrates the need for the continued presence of Alaska's EPMT within the park. Although much focus has been placed on the manual removal of creeping buttercup throughout the years, this plant remains common along trails, coastlines, and other disturbed habitats. Species such as mouse ear chickweed (*Cerastium fontanum*), annual bluegrass (*Poa annua*), and white clover (*Trifolium repens*) are also staples in the disturbed sites of the park. Within the heavily forested areas the main exotic plant concern is European mountain-ash, which is so well-established that ecological considerations must be addressed with its removal.

Many of the same species encountered during past monitoring events still exist, yet this year additional species were encountered that were previously undocumented. This included reed canary grass (*Phalaris arundinacea*)(PENDING), thyme-leaf speedwell (*Veronica serpyllifolia*, pending), common groundsel (*Senecio vulgaris*), and sweet vernal grass (*Anthoxanthum odoratum*) growing just outside of park boundaries. The dynamic nature of the parks vegetation provides clear support toward monitoring, documenting, and removing unwanted species within the area. Invasiveness rankings are based on Alaska Exotic Plant Information Clearinghouse ranking system (AKEPIC 2012). Many highly ranked species are also found within the surrounding city of Sitka and so there is a constant potential threat for future invasions into the park.

Species Summaries:

Sweet Vernal Grass (*Anthoxanthum odoratum*) **Invasiveness Rank: NA**



Identified from a collection along Sawmill Creek Road near the Indian River bridge, sweet vernal grass has yet to be found within the park boundaries. This was the first year that it was documented and a herbarium collection was made for future identifications. It is very commonly found growing along the roadside near park boundaries as well as the surrounding town and should be one to look for in the future.

Fig. 3: Herbarium collection of sweet vernal grass

Snow-in-Summer (Cerastium tomentosum)**Invasiveness Rank: NA**

Snow-in-summer was first located along Lincoln Street in 2006, and was again located this year. Only about five plants were present, and were easily removed. The home across the street has a large population which is probably where it is coming from. This site should be checked next year since it seems to be getting smaller, but is still persistent.

Purple Foxglove (Digitalis purpurea)**Invasiveness Rank: 51**

Foxglove is a very showy and easily detectible plant and was found both in the ethnobotanical gardens and at a former picnic area that has been closed off east of the footbridge near the pit toilets. All plants were manually removed when encountered and sites should continue to be monitored, especially in the former picnic area since this site was also controlled in previous years. This is a common garden ornamental around town and a species likely to re-occur.

Japanese Knotweed (Fallopia japonica)**Invasiveness Rank: 87**

Japanese knotweed was again not detected near the footbridge where a population was discovered and pulled in 2001. This is the third year in a row in which the plant has not been found and so diligence toward eradication has been successful. There are many places in town where Japanese knotweed continues to thrive, and one example is a nearby population that spans two lawns on Lincoln Street just near the park entrance. It was observed that one homeowner pulled their population, and contact and permission to pull the other was given to the EPMT this year. However, the plant has already come back rigorously within the growing season, displaying its hardiness and ability to re-sprout. Although unable to completely eradicate the population, this at least kept the plants from flowering and eventually being able to spread their seed. It is suggested that SITK maintains a relationship with the homeowners and treats their knotweed patches each year.

Oxeye Daisy (Leucanthemum vulgare)**Invasiveness Rank: 61**

Oxeye daisy is a very common weed along roadsides and in gardens in Sitka and so it is no surprise that it is found in the park. It was found growing sporadically in the ethnobotanical gardens and near the snow-in-summer along Lincoln Street. Both populations were controlled and additional monitoring around disturbed, high light areas in the park should continue for this species. It hasn't become a huge problem yet but given how vigorous and common it is around town it should be a priority species for detecting and pulling. It pulls up easily, but should be removed before seed set since plants in the Asteraceae have large seed sets adapted for widespread wind dispersal.



Fig. 4: Oxeye daisy growing along shore near Lincoln Street

Apple (Malus pumila)

Invasiveness Rank: NA

A single apple tree is growing on the southern coast of the west side of the park. It does not seem to be spreading and no attempts to eradicate have been suggested since its initial documentation. It is thought to be an early planting and so represents a historical aspect of the park. For this reason, and since it doesn't seem to be spreading beyond the one tree it does not pose a huge threat at SITK

Pineapple Weed (Matricaria discoidea)

Invasiveness Rank: 32

Pineapple weed is a small annual that was found intermixed with the planted lawns around the Visitor Center. It was found in previous years near the Russian Memorial but this population went undetected this year. Its low invasiveness ranking and limitation to lawns makes it less of an overall threat to the flora of SITK. It is a plant that rarely grows to form dense populations.

European Forget-Me-Not (Myosotis scorpioides)

Invasiveness Rank: 54

European forget-me-not was found in 2010 near Merrill Rock but went undetected in both the 2011 and 2012 seasons (Wolfe, 2011). A small patch was located and removed from the ethnobotanical gardens this year. It is a common early spring flower that is planted throughout Sitka as an ornamental, so potential for subsequent infestations is likely.

Reed Canary Grass (Phalaris arundinacea)
Invasiveness Rank: 83

Previous sightings of reed canary grass by SITK EPMT have noted its presence outside of park boundaries along Sawmill Creek Road. This was the first year that this species has been documented within the park, and it was found in three distinct locations. These include just over the park boundary near the Sawmill Creek Road bridge, at the forest boundary of the upper parking lot, and at the forest edge along the northeast side of the meadow that surrounds the mouth of the Indian River.

The populations next to the bridge and upper parking lot were controlled manually, while the meadow population is pending an identification confirmation. This high priority species is found very densely along roadsides in Sitka and should be a top concern for future EPMT. Sights that were pulled this year should be re-checked since this species readily grows back from rhizomes. Possible other control measures include covering with plastic to kill off the plants, and then re-planting with native plants.

Common Plantain (Plantago major)
Invasiveness Rank: 44

Common plantain is a plant that does well in disturbed habitats around SITK. This plant was found growing at the Sawmill Creek road entrance parking lot, in the lawns outside of the visitors center and other lawn type settings within the park, and on the east side of the sedge and grass meadow. Given its low invasiveness ranking and sporadic occurrence this species was not controlled this year.

Annual Bluegrass (Poa annua)
Invasiveness Rank: 46

Annual bluegrass is established at disturbed lawn type settings within the park, at the visitor center, and in open viewing areas along the southern coast. This small grass was not controlled since it seemed to be restricted to these disturbed, high light areas and is mostly part of lawn settings. It should be monitored for its potential to spread beyond these areas.

Kentucky Bluegrass (Poa pratensis)
Invasiveness Rank: 52

Kentucky bluegrass is another common site at lawns, roadsides, and other highly disturbed areas. It was not targeted for removal since it seems that the park desires lawns at certain open areas throughout the boundaries. It should be monitored for in high light environments such as coastlines and the meadow so that it is not able to take over these types of habitats.

Cherry (*Prunus* sp.)
Invasiveness Rank: NA

A single cherry tree is located on the southern tip of the western part of the park. It has been documented since initial surveys and appears to not be spreading beyond this one tree and so poses little threat to the native plant community. It should continue to be monitored in case it does establish more seedlings.

Creeping Buttercup (*Ranunculus repens*)
Invasiveness Rank: 54

Creeping buttercup is one of SITK's most common non-native species and can be found along trails, in the forest, along shorelines, and in garden and lawn sites. As with previous years this species was a high priority for control, and much of the SAGA crew person hours were dedicated to removing creeping buttercup. This was done manually and sites included near the shore side of the Visitor Center, along the southern shore, the trail near the battle site, the trail near the fort site, near the Sawmill Creek Road bridge, and at the Russian memorial and surrounding areas.

This species threatens a variety of native plants given its ability to grow in such variable habitats. It also doesn't seem to be responding well to pulling since sites where it was removed already have grown back just within this growing season. There also was question regarding the presence of native look-alike species which could be found in SITK's herbarium. *Ranunculus pacificus* and *R. macounii* have both been historically collected and some species originally targeted as *R. repens* seem difficult to distinguish from these other buttercups. A very extensive population is located on the southern shoreline between the forest edge and coast. It appears that historical logging is responsible for this disturbance.



Fig. 5: Creeping buttercup re-growth during the same growing season after manual control

Rugosa Rose (Rosa rugosa)
Invasiveness Rank: NA

This species was planted historically at the park and is an established part of a hedge near the Visitor Center. Given its historical significance and enjoyment by visitors it has not been targeted for removal. Small seedlings were found only within the ethnobotanical gardens this year and were removed manually. This displays Rugosa rose's ability to spread and so should continue to be monitored in future years.

Common Sheep Sorrel (Rumex acetosella)
Invasiveness Rank: 51

Common sheep sorrel went undetected where it was found in 2005 near the eastern boundary with the trailer park. It was located, as in 2011, in the upper parking lot ethnobotanical garden near the Visitor Center (Wolfe, 2011). It was manually removed and this site should continue to be checked annually. It doesn't seem to pose a huge threat and is able to be removed quite readily.

Curly Dock (Rumex crispus)
Invasiveness Rank: 48

Curly dock was found in most of the Visitor Center ethnobotanical gardens and also near the forest boundary near the visitor center. This species has a very deep taproot and must be pulled up carefully upon removal. It is likely that it will return in subsequent years given the depth of growth. Native docks do occur here so emphasis on identification of this species needs to take place.

Birdseye Pearlwort (Sagina procumbens)
Invasiveness Rank: 39

This species was very common as a groundcover within the ethnobotanical gardens, but was not found within the main part of the park. Where encountered in the gardens it was manually removed with little effort. It is expected to continue to have a presence within the gardens and should be pulled where encountered to keep it from spreading into the disturbed and open areas within the park.

Common Groundsel (Senecio vulgaris)
Invasiveness Rank: 36

This annual species was found within the ethnobotanical gardens located in front of the park visitor center as well as near the shore on the coast side of the visitor center. It had yet to be documented at SITK until this year. It was encountered during numerous occasions throughout the season, but in only small quantities. Manual removal was easy and implemented whenever the plant was encountered. It is also found commonly throughout town and should continue to be monitored in coming seasons.

European Mountain-Ash (*Sorbus aucuparia*)
Invasiveness Rank: 59

European mountain-ash is a commonly planted ornamental tree within Sitka. It has spread throughout the park over the years and now inhabits riparian, coastal, and forest habitats within SITK. This year the EPMT continued an intensive inventory that spanned the entire park to map and measure each tree found (Figure 6). Questions arose as to the correct identification of the species, as Sitka mountain-ash (*Sorbus sitchensis*) overlaps in range and may hybridize with European mountain-ash (Mackinnon 1994). Though it appears that there is no Sitka mountain-ash in the park, there is the possibility that this is incorrect.

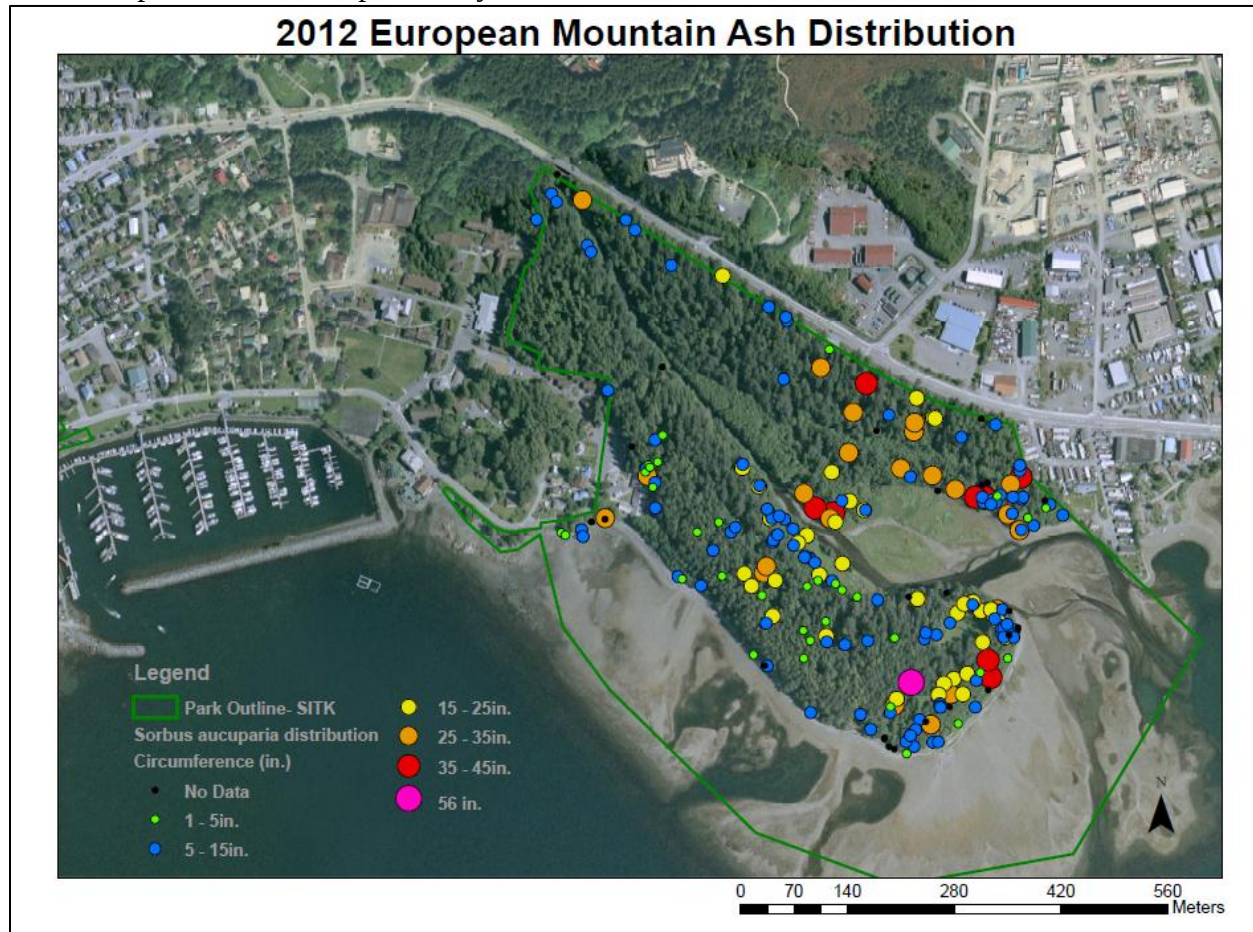


Fig. 6: Distribution of European mountain-ash by tree size

This species was a high priority for control this year. Small seedlings were hand pulled where encountered. With the acquisition of weed wrench tools SITK EPMT and the SAGA crew were able to remove saplings up to 4 inches in diameter. Removal occurred along the western bank of the Indian River meadow just off of the small fishing trail, and near the southern tip of the park. With the aid of these tools, trees with intact root structures could be successfully Removed. However, this technique created large disturbance zones that should be monitored in coming years to note how succession takes place. A long-term management plan was completed during this season by the EPMT which further details the European mountain-ash situation at SITK.

Common Dandelion (Taraxacum officinale ssp. officinale)

Invasiveness Rank: 58

Common dandelion is a pervasive non-native species at SITK. It was found in high sunlight areas, disturbed and lawn sites, and in the ethnobotanical garden. Dandelion was controlled within the sedge/grass meadow at the mouth of the Indian River, at one site along the southern coast, and within the ethnobotanical gardens. Its strong competitive nature, proliferation of seeds, and density throughout Sitka make it a species to be expected continually in the park. Even where control efforts occurred it should grow back rigorously given its long taproots which are difficult to completely remove and ability to re-sprout from only the tiniest piece. Places where dandelion were pulled early in the season already show signs of regrowth.

White Clover (Trifolium repens)

Invasiveness Rank: 59

White clover is a ubiquitous groundcover within the open lawns and disturbed sites at the park. A large population is located just off the trail near the Raven Memorial Pole on the southwestern part of the Totem Loop. This species spreads through creeping rhizomes and forms thick patches where allowed. No effort was focused on removal of this plant since it would leave large patches of bare ground where removed, and is typically found in established lawns. It is restricted to the open and highly disturbed habitats and so is suspected to pose little threat to the closed canopy woodlands. It was not observed in the open meadows or shoreline as well, except at those areas where disturbance for viewing sites took place.

Thyme-Leaf Speedwell (Veronica serpyllifolia)

Invasiveness Rank: 36

A small population was found growing next to the pit toilets on the east side of the river near the footbridge. This was the first time that this species has been documented at SITK, and it was vouchered for the park herbarium and the specimen sent to the regional office to confirm identification. If it is indeed thyme-leaf speedwell it could be controlled in the future quite easily since the population is contained to just one area. No control took place this year since identification is still pending.

Discussion

Restoration

It has come to the attention of the EPMT that removal efforts would be more effective if coupled with restoring the disturbance afterwards. Because this year was the first season that European mountain-ash saplings were removed with weed wrenches, it provided a learning experience for future projects. When taking saplings out of the ground there is significant disturbance. At one site, the trail had to be reconstructed because a tree root that had been removed was growing under the trail. Removing weeds is only the first step since this essentially creates a prime disturbance site for re-establishment from competitive invaders.

Looking at these sites after the trees were removed presented the question of how succession will take place. Large patches of disturbed ground were left, and it would be beneficial to plan to re-plant after such large removal efforts take place to prevent erosion and establishment of invasive species. A good working relationship with the people at the UAF native plant garden may help in obtaining native plants for restoration. Another option is to conduct seed collections within the park which could then be spread where removal takes place. Collections would target native, competitive, fast growing species that are adapted to the micro-habitat where restoration takes place.

Potential Threats

There are ongoing projects at SITK that threaten the native plant community and provide disturbance areas for invasive species to gain a foothold. Already completed is the erection of a new totem pole in front of the Visitor Center which took place in the spring of 2011. To erect this pole, a large patch of forest was cut down and replaced with more lawns. Now this area hosts creeping buttercup, that had been removed manually but has already begun to re-sprout. Also, a



new trail was constructed along the upper west side of the Indian River. No invasive species have been documented along the trail, but there is the potential for invasions to occur here and the trail should be monitored in the future.

Fig. 7: A newly created lawn near the Visitor Center where creeping buttercup has already sprouted

SITK has other projects planned which may create areas of highly disturbed grounds. One such plan is the construction of the city Sea Walk, a new sidewalk that will link the downtown area to SITK. Plans are still underway for this project yet once construction occurs the site should be ripe for non-natives to get established. Another project is to cut down a piece of forest near the fort site on the southern tip of the park. This is to give visitors a view of the ocean from the fort site and will require significant vegetation removal and would provide an opportunity within the forest for non-native plants.

Maintenance of established trails requires new gravel to be brought in to keep them accessible after getting washed out. Special precautions should be taken to ensure gravel, and other materials have been certified weed free. A plan is being implemented to remove “hazard trees” from within the park. These are trees that pose a risk to humans when they eventually topple over. Removing these trees will cause a huge disturbance to the forest and these areas should also be monitored for the invasion of non-native species.

Cooperative Weed Management Areas

At the beginning of the season, the EPMT was contacted by Brian Maupin from Juneau, AK who has obtained funding to create a Sitka Cooperative Weed Management Area (CWMA). The purpose of CWMAs is to get land owners from different agencies and interests on the same page and working towards a common invasive plant management goal. This would be a great opportunity to collaborate with others in the area such as the Tongass National Forest, Sitka Trail Works, and Sitka Conservation Society. Given the small size of SITK it makes sense to have the support of other land owners that can help the park reach reasonable goals. This relationship should continue to be pursued by park management and the Superintendent.

Ethonobotanical Garden Management

In the summer of 2007, areas around the park’s Visitor Center were planted with native plants and interpretive signs displayed to inform people of their traditional uses. SITK is lucky to have such a landscaping effort, but over the years has neglected the maintenance of the area. Without diligent weed removal efforts the beds have become overgrown with non-native and highly competitive native species which detract attention away from the intended plants.

This year the EPMT removed weeds in the garden, obtained soil to add to the beds, and received native plants donated by the University of Alaska Extension Service native plant garden. Unfortunately there was not enough time to complete all desired tasks and some beds remain highly overgrown and untended. The future EPMT at SITK should continue this project and stay in communication with the generous donors at the UAF garden in town for help and support. Collaboration on this project with volunteers and Youth Conservation Corps employees would be helpful.



Fig. 8: A portion of the ethnobotanical

Plans for 2013

The first priority of the 2013 EPMT should be to get to know the region's flora. There are many available plant guide books and one comprehensive flora for Alaska available at SITK for use. There is also a dissecting scope for keying out unknown specimens, a plant press, and herbarium mounting supplies. Become familiar with the park herbarium and collect and mount species not currently represented.

Once one is comfortable identifying the common plants, surveying for non-native species should commence immediately. Important species to look for include reed canary grass, dandelion, creeping buttercup, foxglove, oxeye daisy, and knotweed. Note populations to return to with volunteer crews. Old reports may be useful for targeting historic areas where these plants occur. Surveys for European mountain-ash should continue and all plants small enough to pull with a weed wrench should be excavated. The 2012 European mountain ash plan (located on the park I drive) details this species' management more fully.

Outreach should also begin early on in the year. Make contact with local homeowners near the park who have invasive species in their yard, particularly two homes on Lincoln Street with knotweed populations. Community events may also be an outlet for informing the public about non-native plants. Working with the interpretation staff is another good way to communicate with the public.

Attention should be given to the park ethnobotanical gardens, which harbor many non-native species. Weeding the gardens throughout the growing season will help keep these invasives in check. Possibly work the University of Alaska extension service to obtain native plants for re-planting where large gaps occur in order to keep weeds out. The native plant garden is located just behind NPS housing near the USGS stations.

Conclusions

As exotic plant species continue to invade our National Parks lands, concern over the ecosystems we try to preserve remains. This season at SITK confirmed the known fact that non-native plants have established themselves within the park, and that there is ample opportunities for further infiltration. As long as disturbance and destruction occurs at SITK coupled with a readily available source of ornamental plants capable of escape then this battle will be one remaining for many years.

The city of Sitka is lucky to have access to the convenient and relatively intact ecosystem that SITK encompasses. It is surprising that there is not more of a weed problem here given the urban surroundings. As long as monitoring and controlling projects continue, under the guidance of Alaska's EPMT, the exotic plants infestations should be prevented from spreading. It is up to the seasonal staff to ensure that these projects continue to be such an important part of the weed management efforts at SITK. Diligence on locating new plants and populations should be a main concern with future EPMT employees. Continuing with past endeavors in non-native plant control will help in maintaining a natural public landscape for everyone to enjoy.

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Appendix A – List of known invasive plants within/near SITK

<i>Common Name</i>	<i>Taxon</i>	<i>Observed inside park?</i>	<i>Source of Observation(a)</i>	<i>AK Weeds Ranking(b)</i>
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>	No	11	not ranked
Shepherd's Purse	<i>Capsella bursa-pastoris</i>	Yes	2, 9	40
Perennial Cornflower	<i>Centurea montana</i>	Yes	4, 5, 6, 7, 8, 9, 10	46
Mouse-ear Chickweed	<i>Cerastium fontanum</i>	Yes	2, 4, 5, 6, 7, 8, 9, 10,11	36
Snow-in-summer	<i>Cerastium tomentosum</i>	Yes	5, 6, 7, 8, 9, 10,11	not ranked
Lambsquarters	<i>Chenopodium album</i>	Yes	2	37
Foxglove	<i>Digitalis purpurea</i>	Yes	1, 2, 3, 4, 5, 6, 9, 10,11	51
Oxeye Daisy	<i>Leucanthemum vulgare</i>	Yes	1, 2, 3, 4, 6, 7, 8, 9, 10,11	61
Yellow Toadflax	<i>Linaria vulgaris</i>	No	4	69
Campion	<i>Lychnis/Silene</i>	Yes	4	not ranked
Apple	<i>Malus pumila</i>	Yes	4, 5, 6, 7, 8, 9, 10,11	not ranked
Pineapple Weed	<i>Matricaria discoidea</i>	Yes	2, 3, 4, 6, 8, 9, 10,11	32
Forget-me-not	<i>Myosotis scorpiodes</i>	Yes	4, 5, 6, 7, 8, 9, 10,11	54
Reed Canarygrass	<i>Phalaris arundinacea</i>	No	4, 8, 9, 10,11	83
Common Timothy	<i>Phleum pretense</i>	Yes	2, 4, 8, 9, 10,11	56
Common Plantain	<i>Plantago major</i>	Yes	1, 2, 3, 4, 5, 6, 7, 8, 9, 10,11	44
Annual Bluegrass	<i>Poa annua</i>	Yes	2, 8,11	46
Kentucky Bluegrass	<i>Poa pratensis</i>	Yes	2, 8,11	52
Black Bindweed	<i>Polygonum convolvulus</i>	Yes	2, 8	50
Japanese Knotweed	<i>Polygonum cuspidatum</i>	Yes	1, 2, 3, 4, 5, 6, 7, 8, 9, 10,11	87
Sweet Cherry	<i>Prunus</i> sp.	Yes	4, 5, 6, 7, 8, 9, 10,11	not ranked
Tall buttercup	<i>Ranunculus acris</i>	Yes	10	54
Creeping Buttercup	<i>Ranunculus repens</i>	Yes	1, 2, 3, 4, 5, 6, 7, 8, 9, 10,11	54
Rugosa Rose	<i>Rosa rugosa</i>	Yes	5, 6, 7, 8, 9,	72

			10,11	
Common Sheep Sorrel	<i>Rumex acetosella</i>	Yes	1, 4, 5, 6, 7, 8, 10,11	51
Curly Dock	<i>Rumex crispus</i>	Yes	4, 8, 9, 10,11	48
Bitter Dock	<i>Rumex obtusifolius</i>	Yes	1, 10	48
Birdseye Pearlwort	<i>Sagina procumbens</i>	Yes	4, 8, 9, 10,11	39
Common Groundsel	<i>Senecio vulgaris</i>	Yes	11	36
European Mountain-ash	<i>Sorbus aucuparia</i>	Yes	2, 3, 4, 5, 6, 7, 8, 9, 10,11	59
Common Dandelion	<i>Taraxacum officinale</i> spp. <i>officinale</i>	Yes	1, 2, 3, 4, 5, 6, 7, 8, 9, 10,11	58
Red Clover	<i>Trifolium pratense</i>	Yes	2, 4, 8, 9, 10	53
White Clover	<i>Trifolium repens</i>	Yes	1, 3, 4, 5, 6, 7, 8, 10,11	59
Perennial Sow Thistle	<i>Sonchus arvensis</i>	No	4	73

- (a) 1 = 2000 Invasive Plant Inventory
2 = 2002 AKNHP Vascular Plant Survey
3 = 2004 Invasive Plant Inventory
4 = 2005 Invasive Plant Inventory
5 = 2006 Invasive Plant Inventory
6 = 2007 Invasive Plant Inventory
7 = 2008 Invasive Plant Inventory
8 = 2009 Invasive Plant Inventory
9 = 2010 Invasive Plant Inventory
10 = 2011 Invasive Plant Inventory
11 = 2012 Invasive Plant Inventory

(b) Alaska invasiveness ranking based on the threat to native ecosystems in Alaska from low (0) to high (100) (AK EPIC 2012).