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I. INTRODUCTION

A. Background

This project was funded by the United States Forest Service (USFS) through the Resource Advisory Council for the communities of Wrangell, Petersburg and Kake. The purpose of this project is to provide private and local government landowners the information to manage invasive plants for the protection of Alaska ecosystems. The USFS is actively working to control invasive plants on National Forest System lands but is limited in the complete eradication of these plants without their neighboring land owners also controlling them. With participation in integrated weed management from all land owners, the USFS is hopeful that the National Forest's ecological integrity will be maintained for the benefit of all, since the natural resources derived from federal lands has direct impacts on the livelihoods of communities, such as Kake. This plan provides information to the people, organizations, and the city of Kake on the type of weeds that occur within and around their community and the opportunities for managing them. A community-wide strategy for this plan is also suggested by providing a prioritization ranking for the invasive plants found within the Kake area.

B. Summary

Kake's isolation from Alaska's road system helps to shield it from the importation and establishment of many harmful invasive plants. However, construction projects, road maintenance, ferry traffic, and home gardeners are among potential vectors for introduction of invasive plants. Kake has many small infestations of highly invasive plants and their eradication should be the community's highest priority. Establishing best management practices in construction and maintenance projects will go a long way toward controlling invasive plants in Kake. Community outreach and education will give residents tools to identify and control harmful weeds, and can reduce the strain on agency or corporation budgets. This document outlines the effects of invasive plants, control methods, and includes a prioritized list of invasive plants of concern in Kake.



Figure 1 Map of approximate study area

C. Study Area

This management plan covers non-federal lands on the northwest corner of Kupreanof Island in Southeast Alaska. The majority of the land in this area is forestry land owned by either the Kake Tribal Corporation or the Sealaska Corporation. The City of Kake and private ownership make up less than 5% of this land, with most of this land along the shoreline. The map shown in Figure 1 includes the management area covered by this Plan.

II. INVASIVE PLANT MANAGEMENT

A. What Plants are Considered to be Invasive?

Non-native (or “exotic”) plants are plants that do not naturally occur in an ecosystem. Not all non-native plants are considered invasive (consider, for example, broccoli planted in a garden). An invasive plant is a non-native species that was intentionally or inadvertently introduced into an area where it did not evolve and thus has no natural enemies to reduce its spread. Invasive plants reproduce in large numbers and have the potential to establish and spread into natural areas. Invasive plants are serious and pervasive threats to native species and ecosystems of Alaska. The greatest negative impact of invasive plants is the invasion of undisturbed native ecosystems.

B. What are the Effects of Invasive Plants?

Invasive species have been shown to dominate entire ecosystems, cause economic losses in locations all over the world and push rare species to the brink of extinction. Millions of acres of land in the coterminous United States and Hawaii have been irreparably altered or harmed by invasive plants. In most cases, once an invasive organism becomes widespread, reversal of its spread is nearly impossible. In the United States, economic losses caused by invasive species have been estimated to exceed \$120 billion each year. In terms of ecological losses, 400 of the 958 species that are listed as threatened or endangered under the Endangered Species Act are considered to be at risk primarily because of competition with non-indigenous species (Pimentel 2004). Second only to direct loss of habitat, invasion of non-native species into intact ecosystems is the primary cause of biodiversity loss (Carlson et.al.).

Direct impacts of invasive plants include competition for space, soil, light, or water with native plants, which can lead to reductions in populations of native species or even elimination of entire populations of rare plants. In addition to displacing native plants and wildlife, weeds disrupt ecosystem patterns and processes, such as hydrology, nutrient cycling, natural succession, and soil erosion. Displacement of native plant communities can lead to loss of food sources and habitat for wildlife. Other impacts include pollination competition, loss of stream bank stabilization, changes in nitrogen input from nitrogen fixing native species, and a reservoir for plant disease and alternative hosts for insects (Carlson et.al.).

Some invasive plants produce copious amounts of nectar and can be more desirable to native pollinators, resulting in a disruption of native plant/pollinator relationships.

Plants that flourish in wet environments can have extensive roots system that hold sediment in place and can change the characteristics of the stream. This could affect salmon spawning beds.

C. Steps for Effective Invasive Plant Management

The threat of invasive plants can be reduced significantly with quick action against the most potentially detrimental species. There are proven steps for effective invasive plant management. In other areas of Alaska, various groups, individuals and agencies have joined together to fight the threat of invasive plants.

Cooperative weed management areas (CWMAs) are an effective way for agencies, organizations, and individuals who are concerned with invasive plant management to work together for a more effective approach on a regional level. A CWMA creates a basis for participants to cooperate, coordinate activities, and share resources necessary for public education and for the prevention, and control of invasive plants on public, private, and tribal lands across ownership or management boundaries. A CWMA establishes a framework that promotes cooperation among participants to accomplish mutually beneficial projects and activities. Each participant will benefit from a unified strategy, combined expertise, shared resources, consistency of methods, and collective results.

There are many resources available about invasive plants in Alaska. Refer to Appendix B for a list of organizations concerned with invasives plant in Alaska.

There are four steps for any community to follow to fight invasive plants:

- Inventory
- Prevention
- Early Detection and Rapid Response (EDRR)
- Control
 - Manual (hand pulling, digging)
 - Barrier (tarps, mulching)
 - Mechanical (mowing, tilling)
 - Cultural (burning, flooding, fertilizing)
 - Biological
 - Chemical (herbicides)

1. Inventory

It is first necessary to know which invasive plants are in the region. Invasive plant infestations must be positively identified to the species level, and data must be collected on the location and size of the infestation. If the plant cannot be positively identified by persons on the ground, samples can be sent to the Alaska Natural Heritage Program (AKNHP) of the University of Alaska Anchorage, or to a regional office of the University of Alaska Fairbanks Cooperative Extension Service for positive identification. Local USFS offices may also have the necessary expertise to accurately identify unknown plants.

The Alaska Natural Heritage Program collects, synthesizes and validates information on Alaska's invasive animal and plant species of concern and their habitats. The information in their database is a result of ongoing cooperation among many federal and state agencies in support of the Alaska Committee for Noxious and Invasive Plants Management (CNIPM) as well as contributions from individuals and organizations concerned about invasive plants in Alaska. The information collected and validated by AKNHP is entered into the Alaska Exotic Plants Information Clearinghouse (AKEPIC). AKEPIC is a database and mapping application that provides geospatial information for non-native plant species in Alaska and neighboring Canadian Territories

(<http://aknhp.uaa.alaska.edu/botany/akepic>). This database ranks non-native plants by their invasiveness, using the Invasiveness Ranking System for Non-Native Plants of Alaska.

The Invasiveness Ranking System for Non-Native Plants of Alaska was developed by experts from state and federal agencies to evaluate the potential impacts of non-native plants to natural areas in Alaska so that the limited resources available for managing invasive species may be directed towards the most threatening species. This system ranks species using a series of questions in four broad categories: ecosystem impacts, biological attributes, distribution, and control. In addition, species that are not known to occur in Alaska undergo a climate screening procedure, which evaluates the potential for species



Figure 2 Image from AKEPIC database showing all invasive plants records for Kake Study area

to establish in the three ecogeographic regions of Alaska: Arctic-alpine, Interior boreal and Pacific maritime. Species are then assigned a rank between 0 and 100, where the rank of 100 indicates an extremely invasive species. AKEPIC collects information for the entire state of Alaska. Some plants may be more of a problem in certain regions of the state.

There are many books and reference materials to help identify invasive plants and many useful websites concerning invasive plants. Appendix A provides a list of useful resources concerning invasive plants.

Some scouting has been done within the city of Kake and most invasive plant populations in town are documented in the AKEPIC database. Additional surveys are needed, in particular along logging roads of Native corporation lands. Monitoring efforts are also needed to continue to update the database and to track changes in invasive plant infestations.

2. Prevention of Invasive Plants

Preventing unwanted plants from establishing can be accomplished through public awareness and by developing practices that minimize the introduction and spread of non-native plants, particularly through construction and maintenance practices by private and public entities, and transportation of invasive plants by vehicles, animals, and people.

Public outreach brings awareness to the community about invasive plants and their ecological and economic impacts on the community. The USFS and other groups have produced many pamphlets and field guides to educate the public. Displays in public areas help to spread the word. Boot washing stations and signs at trailheads will help both publicize the issue and have a physical effect to stop the spread of invasive plants. For example, the community of Metlakatla has installed a vehicle washing system at their ferry terminal to prevent vehicles entering by ferry from bringing invasive plants onto their island.

Alaskans value the natural beauty of our state. Many are willing participants in efforts to keep their community free of weeds that out-compete native plants. Presentations in local schools or to service organizations or having a booth with information and handouts at community events are easy, low-cost methods of disseminating information. Encourage volunteer activities such as community weed pulls. Work with local gardening groups to discourage growing invasive plants, and offer alternatives that do not have invasive characteristics. Agree on a local coordinator to take calls when people spot new infestations of invasive plants, and establish a method for reporting to the AKEPIC database. The opportunities for enlisting the community are endless and limited only by imagination. The Southeast Alaska Soil and Water Conservation District can assist, as can Cooperative Extension, Alaska Association of Conservation Districts, and many federal agencies.

The State Department of Transportation and Public Facilities have been working with the University of Alaska Fairbanks Cooperative Extension Service to develop “best management practices” to prevent the importation or spread of weeds in State rights-of-way. Some public contracts include provisions establishing procedures to minimize weed importation (power-washing heavy equipment before bringing it into a community, for example). Gravel pits can be certified as weed-free, and many contracts require the use of certified weed-free seeds and straw (used in waddles for erosion control). The USFS has also instituted similar weed best management practices and is actively using them on federal lands.

Best Management Practices can be established requiring that any project includes the following:

- Minimize soil disturbance
- Stabilize soil and re-vegetate with non-invasive and preferably native plants
- Assure that fill, topsoil, riprap, and gravel are free of weeds
- Clean equipment
- Assure that staging areas are free of weeds

The first step in any construction project is to scout for any invasive plants. If the project is to take place in the winter or early spring, inspection of the site should happen the summer before activity begins. If a high ranking invasive plant is identified, steps should be taken to minimize the chance of spread.

Prior to activities, scout for invasive plants and document species infestations. If an invasive plant is found, first consider the need for action based on: 1) the degree of invasiveness; 2) the severity of the infestation; 3) habitat at risk; and 4) feasibility of control.

Stabilize disturbed soils as soon as possible. Revegetate the area as soon as possible with non-invasive, weed-free seed--preferably native seed mix.

Establish procedures that prevent the spread of weeds by ensuring that invasive plants are mowed when the plant is in or nearing flowering to prevent seeds from being dispersed and set before construction activity. This is also effective in slowing the spread of weeds due to roadside mowing by ensuring that roadsides are mown before seed has set.

If soil is removed that is known to contain an invasive weed, those soils should be separated from other piles to assure that it is not moved to contaminate other areas.

Assure that all equipment and materials that are involved in a project do not contain weed seeds or other propagules (root, stem or other). Prior to moving equipment into an uninfested area, assure the equipment is clean and there are no plant parts or seeds on tires and exterior surfaces. Use only soil, gravel, fill, and hay bales/waddles that are weed-free. If the soil or gravel comes from a local source, encourage or require the pit to be inspected to assure that products are weed free. If a local certified inspector is not available, another approach is to treat the pit with herbicides twice a year, killing all non-native plants.

With any weed control treatment disposal of pulled plant material is essential. Many plants can flower and go to seed after being pulled or cut. Always place weeds in garbage bags if disposed of in a land fill. Burying the plant material two feet underground or burning the plants in a contained area are also effective measures to assure the plant does not spread.

3. Early Detection and Rapid Response

As the name implies, early detection and rapid response (EDRR) is a method proven successful in identifying and then containing or eradicating new populations of invasive plants. Scouting regularly often results in an infestation being found quickly while it is still eradicable. With public outreach, many people become aware of what plants to watch for that could harm the local ecosystem. Having many eyes looking for these plants increases the opportunities for rapid control measures. By finding an infestation early, the plant can be more easily and quickly eradicated or controlled, while the infestation is still small and control methods with less impact can be performed.

4. Control

The control method used on an infestation depends on the plant species, size of the infestation and location. The physical characteristics of the plant are very important to the choice of control. Many of Alaska's highest ranking invasives have large, extensive roots systems and many are able to propagate from the smallest of root fragments, requiring that all roots pieces be removed from site in order to prevent spread or re-infestation. The size of the infestation also comes into play.

Some methods, such as hand digging or tarping, may not be economically feasible if an infestation is a half acre or larger. Another factor is the location of an infestation. For example, an infestation located on a highly erodible slope may prohibit hand pulling if the removal of the plant causes soil instability. A location near water may prohibit or complicate the use of an herbicide, although there are herbicides formulated for use in aquatic habitats

Methods of control include:

- **Manual** (hand pulling, digging). Manual controls can be effective on small infestations (< 0.1 acre) and on some annual plants with small root systems. Some plants can re-sprout from root fragments, so it is very important to remove all root pieces. Dispose of roots and cut material to ensure that they do not re-infest the area or infest a new area. In addition the flowers of some plants can produce seeds after they have been cut from the plant. Some methods to assure removed plant material does not infest new areas are: double-bag weeds and place in refuse transfer station, burn plant material or bury in ground at least two feet.
- **Barrier** (tarping, mulching). Using a landscape fabric or natural mulch can often be the only alternative when herbicides cannot be used and hand pulling is not feasible. The goal of this technique is to exclude sunlight and increase soil temperature to kill the plants. Many locations are not suitable for the use of tarps. The area needs to be relatively level and located where high winds cannot disturb the tarp. For most plants the tarp must be left in place for at least three years and some hardier plants will take over five years. The tarp must extend 3 to 5 feet beyond the boundary of the infestation and the site must be monitored to assure that no shoots emerge from edge of tarp. A drawback to this treatment is that all vegetation under the tarp is killed and the site must be re-planted with desired plants.
- **Mechanical** (mowing, tilling). Mowing can be useful in three ways. First, if the plant is an annual and will not resprout, this method can be used to kill the plants. Second, if a plant cannot be removed that season, mowing can be used to prevent flowering and eliminate seed production. Finally, mowing can be used in combination with another control effort to make the control more effective. For example, mowing before an herbicide application will weaken the plant, making the herbicide application more effective. Tilling is usually not a feasible method with invasive plants outside of agricultural settings
- **Cultural** (burning, flooding, fertilizing). Burning with a brush burner has the same effect as mowing, and has the benefit of destroying any flowers so they cannot go to seed after treatment. Another cultural method is fertilizing. In lawns and some fields, an invasive plant can thrive with low nutrient levels that many other plants cannot. With correct fertilizing, a lawn can out-compete an invasive plant, and if the lawn or grass field is healthy, it will inhibit the invasion of another plant. Flooding will work to control some plants, but at this time, there are no sites in Kake where this is feasible.
- **Biological**. Classic biological control of weeds is achieved by the introduction of a natural enemy of the invasive plant to suppress its population. Most invasive plants in our region arrived without the organisms that keep their populations in check in their native region. For biological control to work the natural enemies must be very specific to that plant and the

infestation must be large enough to sustain the population of enemies. Use of biological controls must undergo a rigorous regulatory process by APHIS (Animal and Plant Health Inspection Service). At this time, there are not any good candidates for this control method in the state of Alaska.

- **Chemical** (herbicides). For many infestations, chemical control is the most appropriate method. Like all control methods, there is a time and place for the use of an herbicide. With an annual plant, hand pulling or mowing is almost always the best method. For larger infestations of a plant with an extensive root system, herbicides may be the only effective method.

Herbicides vary in their mode of action and target species. There are selective and non-selective herbicides. Selective herbicides will affect either grasses (monocots) or broadleaf plants (dicots). Selective herbicides can be very useful when controlling a broadleaf weed because they will not kill grasses, thus allowing the grasses to quickly establish in the treated area. Non-selective herbicides kill all plants.

Herbicides can be applied using different methods; the most common is spraying with a backpack sprayer. Wiping is an application method where the herbicide is applied with a sponge or brush. This method limits the chance of damage to non-target plants and greatly reduces drift. Stem injection is another method which limits drift and will be explained better in the section on knotweeds (Section III, page 24).

Timing is very important with an herbicide application. Some plants are more susceptible to herbicides during certain times of the growth stage, and less or not at all susceptible during others. Many herbicides and sites require application by a certified pesticide applicator. Some herbicides cannot be used near water while other herbicides are formulated specifically for applying to water or wet conditions. Weather conditions affect the safety and effectiveness of herbicides. University of Alaska Fairbanks Cooperative Extension Agents can provide information on herbicides and timing of application for the control of an invasive species. The USFS is also a good source of information for effective use of herbicides. Always follow the label and use required safety equipment.

III. PRIORITY SPECIES FOR KAKE

The criteria used to develop this prioritization were: the AKEPIC ranking, the size of the infestation, and the difficulty of control of the species. In this report a 'High' AKEPIC ranking is 70-100, 'Medium' is 40-70 and 'Low' is below 40. The plants are divided into four categories:

Category A:

This category includes invasive plants that have very small infestations of less than .1 acre. The goal in this category is to eradicate the plant from Kake. The invasive plants within this category should be prioritized by their AKEPIC Ranking.

Common Name	Scientific Name	AKEPIC Ranking	Page #
Giant hogweed	<i>Heracleum mantegazzianum</i>	81	11
Orange hawkweed	<i>Hieracium aurantiacum</i>	79	12
Canada thistle	<i>Cirsium arvense</i>	76	13
Tansy ragwort	<i>Senecio jacobea</i>	63	14
Bull thistle	<i>Cirsium vulgare</i>	61	15
Common tansy	<i>Tanacetum vulgare</i>	60	16
Common hawkweed	<i>Hieracium lachenalli</i>	57	17
Narrowleaf hawksbeard	<i>Crepis tectorum</i>	56	18
Common St. Johnswort	<i>Hypericum perforatum</i>	52	19
Splitlip hempnettle	<i>Galeopsis bifida</i>	50	20
Hairy cat's ear	<i>Hypochaeris radicata</i>	44	21
Nipplewort	<i>Lapsana communis</i>	33	22
Wall lettuce	<i>Mycelis muralis</i>	31	23

Category B:

Invasive plants with a Medium to High AKEPIC ranking and a population level of less than 5 acres. The ultimate goal for this group is eradication but it will take time. This first step is to control the spread of these plants.

Common Name	Scientific Name	AKEPIC Ranking	Page #
Bohemian knotweed	<i>Fallopia xbohemica</i>	84	24
Spiny and annual sowthistle	<i>Sonchus asper</i> and <i>S. oleraceus</i>	46	25

Category C:

Invasive plants that have a high to medium AKEPIC ranking, are difficult to control, and are prevalent in Kake. Measures must be taken to keep them out of areas where they do not exist. Further monitoring and scouting must be done to find zones free of these plants.

Common Name	Scientific Name	AKEPIC Ranking	Page
Reed canarygrass	<i>Phalaris arundinacea</i>	83	26
Oxeye daisy	<i>Leucanthemum vulgare</i>	61	27
European mountain ash	<i>Sorbus aucuparia</i>	59	28

Category D:

These are plants that have not been found in Kake. Many of these plants are found in other Southeast Alaskan communities and have a good probability of arriving in Kake. These are EDRR candidates.

Common Name	Scientific Name	AKEPIC ranking	Page #
Spotted knapweed	<i>Centaurea stoebe</i>	86	29
White sweetclover	<i>Melilotus alba</i>	81	30
Himalayan blackberry	<i>Rubus discolor</i>	77	31
Herb Robert	<i>Geranium robertianum</i>	67	32

For a list of all other documented invasive plants in Kake not covered in this plan please refer to Appendix C.

Giant Hogweed, *Heracleum mantegazzianum*

AKEPIC Invasiveness Ranking: 81, Category: A

Description - Giant hogweed is a biennial or perennial plant that looks similar to the Alaska native plant cow parsnip but is much larger, growing 9 to 15 feet tall. Stems are hollow and are 2 to 4 inches in diameter. They have reddish-purple spots and are covered in bristles. Leaves are compound and 3 to 5 feet in width. Inflorescences have many individual flowers that form a broad flat-topped inflorescence as large as 2.5 feet in diameter. Individual flowers are small and white. Most plants die after flowering but some may flower for several years. Each plant can produce 25,000 to 50,000 seeds that can remain viable for more than seven years (ANHP 2011, KCNW 2013).



Giant hogweed in bloom
Photo by Dana White

Impacts – Giant hogweed establishes along rivers and streams as well as many other disturbed areas. It forms thick canopies that enable it to outcompete and displace native vegetation. Infestations of this plant are known to increase soil erosion along stream banks in winter. This plant produces a sap which contains toxins that can cause severe dermatitis. Dermal injuries to birds and animals have been reported (AKNP 2011).



Giant hogweed leaf with glove for scale
Photo by Dana White

Management Recommendations - Hand digging is effective if the root is cut at least 5 inches below ground level. The small infestation in Kake is on private property along Keku Road. This is the only known occurrence of this plant in Alaska (See Appendix D). There have been intense efforts to eradicate this plant for the last few years and, as of the summer 2012, the infestation had been greatly decreased. Efforts should continue to hand pull this plant. Eradication should be achieved within a few years. Use protective gear to avoid contact with plant sap.

Orange Hawkweed, *Hieracium aurantiacum*

AKEPIC Invasiveness Ranking: 79, Category A.

Description - Orange hawkweed is a perennial herb that has shallow, fibrous roots, and stolons (above ground trailing stems). Stems arise from a basal rosette of leaves, grow to a height of one foot, and bear up to 30 flower heads. Stems and leaves exude milky latex when cut or broken. Leaves are oblong and lance shaped. They grow up to 5 inches long, are very hairy, and exclusively basal. Flowers are deep orange to red and are ½ inch in diameter. This plant is recognizable as being the only orange flower of its type in Alaska (AKNP 2011).

Impacts - Orange hawkweed is allelopathic, meaning it exudes a chemical from its roots that suppresses the growth of neighboring plants. Because of this, orange hawkweed can outcompete and crowd out native plants, many of which can be much larger than the hawkweed. This can result in dense monocultures of orange hawkweed (AKNP 2011).

This plant can reproduce sexually through seeds or vegetatively from stolons, rhizomes, and root fragments. Each plant can produce 50 to 600 seeds that remain viable in the soil up to seven years. In addition each plant sends out 4 to 8 stolons every year. Plants can sprout from any fragment left in the soil. This large reproductive potential and allelopathic ability make this plant very aggressive and a threat to undisturbed ecosystems (AKNP 2011).



Orange Hawkweed
Photo by Brian Maupin



Orange hawkweed Infestation
Photo by Dana White

Management recommendations - This plant is very hard to control. Mowing promotes more root growth and hand pulling is difficult in that any small root fragment left in the soil can produce a new plant. Tarping is very effective if care is taken to cover the entire infestation and extend tarp well beyond infestation for a period of no less than 3 years.

In Kake the only known infestation is in a grassy strip along Totem Way across the street from the totem poles (See Appendix D). Tarping this infestation would be the most effective and easiest way to eradicate this plant. The tarp should overlap 3 feet beyond plants and should be in place for at least 3 years. This infestation could also be dug up, making sure all roots fragments are removed and disposed of properly to assure this plant does not spread.

Canada Thistle, *Cirsium arvense*

AKEPIC Invasiveness Rank: 76, Category A.

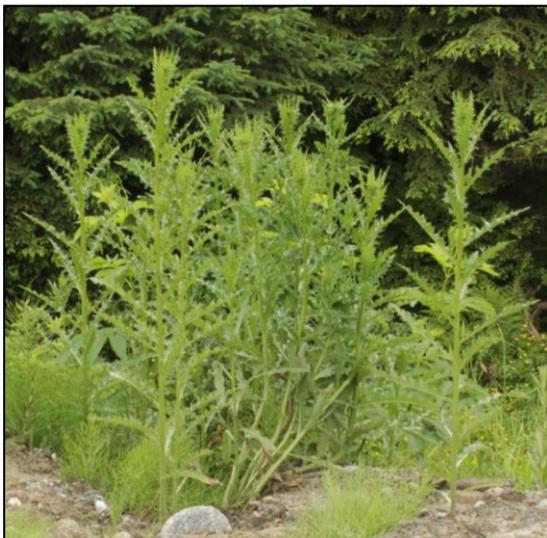
Description - Canada thistle is a perennial plant with a deep and extensive horizontal root system that can form new shoots. Stems usually grow to 1 to 4 feet tall and branch on the upper portion. The leaves are arranged alternately and are shallowly lobed with sharp spines at the margins. The flowers measure ½ to ¾ inches and are light purple. Seeds are brownish with a tuft of short white hairs (AKNP 2011).

Impacts - Canada thistle can displace native vegetation by competing for water and nutrients, resulting in a decrease of species diversity. Canada thistles perform allelopathy, a process in which the plants roots release toxic chemicals into the soil that inhibit growth of other plants. The sharp spines on the leaves make it a nuisance (AKNP 2011).



Canada thistle flowers and buds
Photo by Brian Maupin

Control recommendations - Canada thistle is very difficult to control once it has established. A combination of mechanical, cultural, and chemical control methods are more effective than any single control method alone. Hand pulling is ineffective because it fails to remove the deep lateral roots. Mowing can be effective only when repeated multiple times per season for several years.



Canada thistle plants pre-bloom
Photo by Brian Maupin

The only known infestation in Kake is on the Kake Tribal Corporation Land. In the summer of 2012, less than 20 plants were found among a pile of old tires in a storage area (See Appendix E). These plants should be pulled, mowed or burned repeatedly throughout the summer season for possibly several years. There is a bit of a difficulty with the fact that the plants are growing among tires and the tires may have to be moved to effectively treat this infestation.

Tansy Ragwort, *Senecio jacobea*

AKEPIC Invasiveness Rank: 63, Category A.

Description - Tansy ragwort is a biennial or short lived perennial plant with one to several stems that grows from 1 to 4 feet tall. The stout stems are unbranched to the flower heads. The leaves are 2 to 8 inches long, alternate, with deeply cut, blunt-toothed lobes and a ragged/ruffled appearance. Clusters of bright yellow flower heads develop on ends of the long leafy stems. The flower heads are composed of disc and ray florets with 10 to 13 ray florets (petals). Its seeds have white hairy tufts that allow them to be wind-carried. Seeds usually germinate in fall or early winter, live through the next year as a rosette of leaves, then flower and die the next year. A single plant can produce up to 150,000 seeds that lie dormant up to 20 years (ANHP 2011).



Tansy ragwort
Photo by Brian Maupin

Impacts - Tansy ragwort contains an alkaloid that is highly toxic to animals including humans and can cause irritation if plant sap comes in contact with skin. Tansy ragwort can easily outcompete native grasses and forbs and hinder the colonization of disturbed areas by native plants (ANHP 2011).



Tansy ragwort flowers
Photo by Brian Maupin

Management recommendations- Hand pulling is most effective for small to medium sized infestations. Make sure to remove as much of the roots as possible. If plants are in flower when pulled, bag plants because flowers can go to seed after being pulled. Mowing is not recommended because it encourages the plant's fibrous root system to produce adventitious roots and may not die as biennial, but may survive multiple years. Wear gloves and use caution to avoid contact with plant sap.

The infestation in Kake is concentrated around the ferry dock and the AML yard and does not extend much further than ½ mile each way, with a few outliers (See Appendix D). Continue hand pulling before flowering to eliminate seed production. As much root must be removed as possible and care should be used not to come in contact with plant sap; wear gloves.

Bull Thistle, *Cirsium vulgare*

AKEPIC Invasiveness Rank: 61, Category A.

Description - Bull thistle is a biennial plant with hairy leaves that are deeply lobed with prickles at the leaf margins. The plant lives the first year as a short, ground-hugging cluster of leaves with virtually no stem. The second year, the plant bolts to 2 to 5 feet tall and flowers. The stems are conspicuously winged, many-branched, and sparsely hairy. Leaf blades extend down and along the stem, forming long, prickly wings. Flower heads are 1 to 2 inches wide and are deep purple in color. Individual plants can produce up to 4,000 short-lived seeds (ANHP 2011).

Impacts – Bull thistle competes with native species for soil moisture and nutrients. Not a lot is known about this plant’s impact on ecosystem processes. The prickles of the plant are very sharp.

Management recommendations -

Bull thistle plants are easily pulled up by hand and can be killed by cutting at the soil surface. Any program must be maintained for at least 4 years (KCNW 2013).

In Kake there is one known infestation near the giant hogweed infestation. During the summer of 2012, less than 10 plants were found and pulled along the road. Efforts should continue to eradicate this plant and the site must be monitored for the next couple of years.



Bull Thistle
Photo by Dana White



Bull thistle flower
Photo by L. Kok

Common tansy, *Tanacetum vulgare*

AKEPIC Invasiveness Ranking: 60, Category A.

Description - Common tansy is a perennial plant that grows to a height of 15 inches to 5 feet. Stems are erect, branching at the top, often grow in clusters and are reddish-brown. The leaves are alternately arranged on the stem and are heavily lobed with toothed margins, giving the leaves a feathery appearance. The flower heads are yellow and button-like and are borne in compact clusters of 20 to 200 at the ends of the stems. The flower heads are less than a ½ inch in diameter (ANHP 2011, KCBW 2013).

Impacts - Common tansy can establish in existing herbaceous layer and form dense stands that can displace native plant species. This species is mildly poisonous. Each plant can produce 50,000 seeds but they are viable for only a few years (ANHP, 2011).

Management recommendations - Small infestations such as the one in Kake can be controlled by manually pulling the plants, being sure to remove as much root as possible. Wear gloves to avoid coming in contact with plant sap, which can cause skin irritation. It is also effective to mow this multiple times a year before seeding, repeating for 2 to 3 years.

Although this is not a very aggressive plant, the infestation in Kake at the fork of Silver Spike Road and 2nd Avenue is small and contained, and efforts should be made to eradicate it from the community before it spreads out of town (See Appendix D).



Mature common tansy plants
Photo by Dana White



Flower close-up
Photo by Dana White

Common hawkweed, *Hieracium lachenalii*

AKEPIC Invasiveness Ranking: 57, Category A.

Description - Common hawkweed is a fibrous-rooted perennial with small dandelion-like flower heads in grouped in loose clusters. Leaves at base of plant are hairy and broadly elliptical or lance shaped. The stems are upright, contain milky sap, and have 4 to 7 leaves. Stem leaves are smaller than basal leave, lack a stalk, and become progressively smaller as they move up the stem. Flower heads are arranged in groups at the ends of stems. The florets are yellow, strap-shaped and 14 to 18 mm long. Seeds are cylindrical, 2.5 to 3.5 mm long, and have a pappus with 30 to 40 short bristles (ANHP 2011).

Note: There are other species of yellow hawkweeds found in Petersburg and Wrangell and there is the potential for them to arrive in Kake. If found their management strategy would be the same as orange hawkweed.

Impacts - Although this plant has not been studied in depth, it is known to invade many habitats such as, open fields undisturbed natural meadow roadsides and many other disturbed areas. Seeds remain viable in the soil for over 5 years (ANHP 2011).



Common Hawkweed
Photo by Brian Maupin



Flower Close-up Photo by Brian
Maupin

Management recommendations - This plant can be difficult to control once established and must be controlled as soon as it found to be present. Digging is effective on small patches if all roots are removed. Tarping small areas is also effective, but the tarp must be left in place for at least 2 full growing seasons. If found in pastures or lawns, added fertilizer will greatly help native and lawn grasses out compete this plant (KCNW 2012).

The infestation at the airport in Kake is in a gravelly area and could be controlled using a brush burner to burn off all above-ground plant matter and possibly kill some of the root system. This would have to be done 4 to 5 times a year and before the plant has a chance to flower. Hand pulling or tarping this infestation would also be effective (See Appendix D).

Narrowleaf Hawksbeard, *Crepis tectorum*

AKEPIC Invasiveness Ranks: 56, Category A.

Description – Narrowleaf hawksbeard is an annual that grows 4 to 40 inches tall. Stems are solid, erect, branched, and leafy. The basal leaves are lance-shaped, slightly toothed, and 2 to 6 inches long by 0.25 to 1.5 inches wide. Leaves on the stem are smaller, arranged alternately on stem, and are not toothed. Flower heads are arranged in groups of 5 to 20 and are similar to but smaller than common dandelion. Seeds are spindle-shaped with a pappus composed of numerous white bristles (ANHP 2011).

Impacts – Narrowleaf hawksbeard has established along many rivers throughout Alaska. It creates dense stands that can displace native colonizers. It quickly invades burn areas and may delay establishment of native species. It is likely this plant reduces the availability of soil moisture. The seeds are light and can be carried long distances by wind (ANHP 2011).

Management recommendations – There is one known infestation in Kake located in an old gravel pit on Sealaska land (See Appendix E). It is remote and undisturbed and does not seem to have moved out of the pit, but once on the logging road system it has the potential to spread rapidly. Plants can be easily hand pulled, but when the plant is small and in its rosette stage, it is hard to locate. This infestation could be burned using a brush burner. Either of these treatments needs to be done multiple times each year, as these plants emerge throughout the summer. Hand pulling must take place before plants go to seed and, if in flower, the plants must be bagged because they can go to seed after being pulled.



Narrowleaf hawksbeard
Photo by Caleb Stemmons

Common St. Johnswort, *Hypericum perforatum*

AKEPIC Invasiveness Ranking: 52, Category A.

Description - Common St. Johnswort is a perennial herb that grows from 1 to 3 feet tall. Stems are smooth, rust colored, and somewhat two-sided. The stems are woody at the base, with numerous branches above. The leaves are arranged oppositely, borne directly to stem without a stalk. They are oblong or oval, less than an inch long and are smooth. The leaves have transparent spots throughout and black dots along margin. The flowers are $\frac{3}{4}$ inch in diameter, bright yellow and numerous. Each flower has five petals and numerous stamens. This plant reproduces by short rhizomatous roots and prolifically by seed. Each plant can produce 15,000 to 30,000 seeds per year and these seeds can remain viable in the soil for 6 to 10 years. Seeds also have gelatinous seed coats that stick to moving objects or animals facilitating dispersal (ANHP 2010).

Impacts - Although this plant is not overly aggressive, it can establish in disturbed areas and slow the transition to native plant communities. This plant is toxic to animals if consumed (ANHP 2011, KCNW 2013).

Management recommendation – Once established this plant is very difficult to control. Hand pulling can be effective if done multiple times throughout the season and care is taken to remove as much roots as possible. Mowing is also effective if performed a few times per season and before the plant has gone to seed (KCNW 2013).



Common St. Johnswort
Photo by Brian Maupin

In Kake there is a very small infestation on the gravel road to Point Macartney, in the same area as the hairy cat's ear (See Appendix E). In 2012 there were 3 large plants and less than 10 small ones. These plants need to be removed as this is the only known infestation of this plant in Kake.

Splitlip hempnettle, *Galeopsis bifida*

AKEPIC Invasiveness Ranking: 50, Category A.

Description - Splitlip hempnettle is a member of the mint family and is similar in appearance to many mint species. It is an annual plant that grows 8 to 30 inches from a taproot. Stems are square, erect, hairy, and often swollen below the nodes. Leaves are arranged opposite on the stems, and are sparsely hairy on both sides. They are lance to oval shaped, with long pointed tips and coarsely toothed margins. They are 1 to 4 inches long and ½ to 2 inches wide. Leaf stems (Petioles) are hairy and ⅓ to 1 inch long. Flowers are arranged in dense clusters in leaf axils near the top of the plant. Flower bracts are linear with bristly margins. The calyx forms a green cup that is fringed with rigid spines. The corolla is purple to white and consists of 5 fused petals. The seeds are black, hard, and arranged in clusters of four. Each plant averages around 400 seeds. Seeds can remain viable in the soil for several years (ANHP 2011).

Impacts - Hempnettle establish in disturbed areas and create a dense layer. It can thrive in low light, developing large leaves that can shade out underlying vegetation. These dense populations likely inhibit the establishment of native grasses and forbs (ANHP 2011).

Management recommendations - Not a lot is known about the control of this plant outside of agricultural environments, but with continued hand pulling and eliminating seed production, this plant can be eradicated from Kake.

Although this plant is not overly aggressive, the documented infestation in Kake is very small and warrants control efforts. Located at the intersection of Totem Way and Silver Spike Road this small infestation should be mowed or hand pulled multiple times a year (See Appendix D).



Hempnettle
Photo by Dana White

Hairy Cat's Ear, *Hypochaeris radicata*

AKEPIC Invasiveness Ranking: 44, Category A.

Description - Hairy cat's ear is a perennial plant that somewhat resembles common dandelion. Each plant produces one to fifteen erect, leafless, stems. Leaves are basal, coarsely toothed, and wider at the end than the base. They are 2 to 12 inches long and ¼ to 1 inches wide, and are coarsely hairy. Yellow flowers are very similar to common dandelion. Florets are strap-shaped, yellow and are ¼ to ¾ inches long. This plant spreads by seed and each plant can produce up 6,000 seeds. Multiple rosettes can be produced from a single taproot (ANHP 2010).

Impacts - Hairy cat's ear usually only invades disturbed area and can outcompete native plants for water and nutrients. This plant can become a pest in lawns and is difficult to get rid of once established (ANHP 2010).

Control recommendation - This plant can be easily controlled by hand pulling the woody crown. Small root fragments do not re-grow.

Although this plant has a low invasive ranking, in Kake the population is very small and can be easily controlled with digging. The infestation in Kake is on road to Point Macartney and during the 2012 field season less than 12 plants were found (See Appendix E).



Basal rosette
Photo by R. Old

Nipplewort, *Lapsana communis*

AKEPIC Invasiveness Rank: 31, Category A.

Description – Nipplewort is an annual plant that grows 8 to 40 inches tall. All parts of the plants exude a milky juice when broken. Stems are erect, hollow, and branched. Leaves are oval or circular shaped, thin, and arranged alternately. They are up to 6 inches long and 3 inches wide and coarsely toothed at the margins. Flower heads are arranged in groups of 5 to 25. Ray florets or “petals” are yellow, approximately $\frac{1}{4}$ long and have five teeth at tips (ANHP 2011).

Impacts – This is not a particularly invasive species but it has been known to invade natural disturbances on beach fringes.

Management recommendation – There is one small infestation in Kake on the corner of C Street and Keku Road. Although this is not a very aggressive plant, the infestation is small and the plant is easily hand pulled. It also can be mowed multiple times a year before flowering (See Appendix D).



Nipplewort plants
Photo by Brian Maupin



Flower close-up
Photo by Brian Maupin

Wall Lettuce, *Mycelis muralis*

AKEPIC Invasiveness Rank: 31, Category B.

Description - Wall lettuce is a slender herb that behaves as an annual or biennial. Multiple, slender, 2 to 3 foot tall stems rise from a fibrous root system. Stems branch towards the top to end in many small flowers and exude milky juice when broken. Basal and lower leaves are two to seven inches long and one to three inches wide, smooth and pinnately lobed. Lobes have broad, terminal segments and earlike, clasping flanges at the leaf base. Middle and upper leaves are fewer and reduced in size and structure. Flower heads are composed of five strap-shaped, yellow ray flowers. There are many small flowers and the plant can have a slight purple tinge. A single plant can produce 500 to over 10,000 small black seeds with a white tuft that can disperse long distances by wind (ANHP 2011).

Impacts - Wall lettuce is not an extremely aggressive plant but can grow in shade and is an early successional species that is likely to have minimal impact on ecosystem processes (ANHP 2011). It appears to be spreading relatively quickly in Kake. It is the opinion of this author that this plant needs a higher AKEPIC ranking.



Wall lettuce leaf close-up
Photo by Brian Maupin



Flowers of wall lettuce
Photo by Brian Maupin

Management recommendation - There has been little investigation into controlling this plant. Hand pulling is relatively easy and repeated mowing should kill this plant in a short time. In Kake there is a small infestation in town on the Macartney Road just north of Creek Street. More scouting is needed to determine the extent of this plant in Kake.

Bohemian Knotweed, *Fallopia x bohemica*

AKEPIC Invasiveness Ranking: 87, Category B.

Description - Bohemian knotweed is a large perennial plant that has stems similar to those of bamboo and large, elephant ear-shaped leaves. This plant has thick, extensive rhizomes that can grow up to 20 ft long. Stems are stout, hollow and can be reddish-brown in color. They are swollen at the nodes giving a bamboo-like appearance, and are 4 to 9 feet tall. Stems branch many times and have a zigzag appearance. Leaves are arranged alternately on stems and are 2 to 6 inches long. They are oval shaped with a pointed tip and a flat base with a very short leaf stem. The inflorescence is composed of many small white flowers (AKEPIC 2011, KCNW 2008). **Note:** this plant is identified as Japanese knotweed, *F. japonica* in the AKEPIC database.



Young knotweed shoots and old dried stems
Photo by Dana White

Impacts - Bohemian knotweed can establish in natural areas with little or no disturbance. Once established, knotweeds form dense monocultures that reduce plant diversity by shading native vegetation. It colonizes stream banks and can clog waterways, and lowers the quality of habitat for wildlife and fish. Knotweeds increase the risk of soil erosion. Dead stem and leaf litter decompose very slowly and form a deep organic layer that prevents native seeds from germinating (AKEPIC 2011).

Management Recommendations - Non-chemical control of this plant is expensive and time consuming. Hand pulling or digging can be effective for small populations if care is taken to remove all rhizomes. USE CAUTION WHEN MOVING ROOT FRAGMENTS as very small pieces can germinate and infest new areas. Covering the plants with tarp is also effective for smaller populations. The plants should be mowed first to facilitate placement of tarp and the tarp should extend at least 6 feet from plants. This tarp will have to be left in place for at least 5 years. Mowing is also effective; plants should be mowed twice a month, being sure to cut as low as possible. Rake and pile up cut stem where they will dry out



Knotweed in Bloom
Photo by Dana White

because stem fragments can sprout and reinfest the area. Make sure fragments are not moved from the infested area, as they may establish in new areas.

The infestation in Kake is of medium size and is spreading out of town (See Appendix F). Efforts should be made to stop the spread of this plant. Smaller patches outside of town should be controlled by hand digging, tarping or mowing. With concerted efforts the plant could be eradicated from Kake.

Spiny sowthistle, *Sonchus asper* and Annual Sowthistle, *Sonchus oleraceus*

AKEPIC Invasiveness Ranks: 46, Category B.

Description - Spiny sowthistle and annual sowthistle are annuals or biennials that grow up to 4 feet tall from a short taproot. All above-ground plant parts are smooth, lack hairs, and excrete a milky juice when broken. Both these plants have single, erect stems that branch at the top, and are thick and hollow at the base. Leaves are oblong to lance shaped, lack stalks and strongly curve down at the base. The leaves clasp or wrap around stem and are 2.5 to 12 inches long and ½ to 5 inches wide, tough and alternate. Spiny sowthistle has very prickly leaf margins, while annual sowthistle leaves are less prickly and softer to the touch. The flowers of both plants are very similar, having a somewhat teardrop shape before opening and yellow dandelion-like flowers that are approximately ½ inch in diameter (ANHP 2011).

Impacts - Sowthistle are invaders of disturbed areas and can impede natural succession of native plants. These plants are able to grow in riparian and coastal habitats. Each plant can produce 5,000 seeds (ANHP 2011).

Management a recommendation - The sowthistle infestation in Kake is large and is centered at the ferry and AML docks, and spreads out from there. In 2012 a few plants were found in a meadow at Point Macartney. The priority should be to first control the infestation a Point Macartney. Efforts should continue to hand pull the infestation near docks, before they flower or go to seed. This plant may not be feasible to attempt eradication but its spread should be controlled.



Annual sowthistle
Photo by Brianne Blackburn

Reed Canarygrass, *Phalaris arundinacea*

AKEPIC Invasiveness Ranking: 83, Category C.

Description - Reed canarygrass is a robust, sod-forming perennial grass that can grow over 5 feet tall and has a stout creeping root system that produces new plants. Leaf blades are flat, long, and broad; 6 inches long by ¼ to ½ inches wide. Flowers are arranged in dense, branched panicles. Immature panicles are compact and spike shaped, then opens and become slightly spreading when mature. Reed canarygrass may be confused with some native grasses but can be distinguished from other grasses by its robust height. It is one of the last green grasses (ANHP 2011).

Impacts - Reed canarygrass reproduces sexually by seeds and vegetatively from creeping rhizomes, forming dense, persistent, stands in wetlands and on stream banks. These dense single species stands exclude and displace other plant species, and it can promote silt deposition and the consequent constriction of rivers, streams, and ditches. This may result in slowing stream flow, eliminating the scouring action needed to maintain the gravel river bottoms essential for salmon reproduction. When in flower, it can cause hay fever and allergies (ANHP 2011).



Open reed canarygrass flower head Photo by Brian Maupin

Management Recommendations - Once established reed canarygrass is very difficult to control. Mechanical control methods are feasible but are labor intensive and require a long-term investment.



Reed canarygrass with closed flower heads Photo by Dana White

The root system is very robust and takes a lot of digging and care to remove all rhizomes. Mowing is not effective by itself, but can enhance other methods and when timed properly, can eliminate seed set for that year. For small monocultures, tarping can eradicate reed canarygrass. The tarp must remain in place for at least three years. Mowing before placing the tarp will help. Plants reestablish quickly from seeds after control methods are used, so the area must be monitored for several years (ANHP 2001).

Reed canarygrass is very common in Kake and found virtually everywhere. It is very thick on logging roads close to town. It becomes less common further down logging roads and very few patches are present near the town's water source. Further monitoring is needed on native corporation land to determine the full extent of the plant's range and to keep it from infesting stream banks (See Appendix G).

Oxeye Daisy, *Leucanthemum vulgare*

AKEPIC Invasiveness Ranking: 61, Category C.

Description - Oxeye daisy is a perennial plant with numerous stems that grow from 1 to 3 feet tall. The basal leaves are spoon-shaped, broadly toothed, have a long stalk and are 2 to 5 inches long and 2 inches wide. Stem leaves are arranged alternately and have short leaf stalk. The flower heads are composed of white ray flowerets surrounding yellow disc florets. They are 1 to 2 inches in diameter and are solitary at the ends of stems (ANHP 2011).

Impacts – Oxeye daisy can form dense populations that decrease plant species diversity. It can rapidly replace native grasses in pastures and along roadsides. Because of its shallow root system, large infestations can increase the potential for soil erosion (ANHP 2011).

Control methods – Small infestations can be easily hand pulled, making sure to remove all the larger root fragments. Repeated mowing over multiple years is also effective, although this will cause more shoot growth. Mowing must take place before flowering to assure that no seed is produced. It has been found, in some regions of the Pacific Northwest, that an application of Nitrogen fertilizer can reduce canopy cover in mountain meadows (ANHP 2011).

Recommendations – This plant is common in Kake but precautions should be taken not to spread this plant. If found out of town plants can be hand pulled or mowed. Further scouting is needed on logging roads to determine the extent of this plant in the Kake area.



Oxeye daisy flowers
Photo by Dana White

European Mountain Ash, *Sorbus aucuparia*

AKEPIC ranking: 59, Category C.

Description – European mountain ash is an upright tree that grows from 20 to 40 feet tall. The bark is grey to yellow-green and smooth. The leaves are alternate, pinnately compound and 5 to 8 inches long, with 11 to 15 leaflets per leaf. Flowers bloom in May and are borne in clusters that are 3 to 5 inches across. Flowers are small and white. The fruits are bright orange, small and remain on the tree for some time. Note: there are several native mountain ashes but they can easily be distinguished from European mountain ash because the natives are shrubs, usually less than 20 feet tall, and the fruit clusters on the natives have far fewer berries (>25) (ANHP 2011).

Impacts - This plant's seeds can be transported long distances by birds and establish in undisturbed wilderness. It integrates into and eventually dominates coastal rainforest plant communities. The fruits are highly desirable to birds and may alter their feeding behaviors (ANHP 2011).

Management recommendation – This is a popular landscape tree in Kake, and any eradication plan would be unfavorable to the public; but if young seedlings are found in remote areas, they should be hand pulled.



European mountain ash with berries
Photo by Boris Hrasovec

Spotted Knapweed, *Centaurea stoebe ssp. micranthos*

AKEPIC ranking: 86, Category D.

Description – Spotted knapweed is a biennial or short-lived perennial plant that grows to a height of 1 to 3 feet tall. Basal leaves have several irregularly-lobed segments. Stem leaves are alternate, mildly hairy, and 2 to 6 inches long. Lower stem leaves are narrowly divided, while upper stem leaves are undivided. The flower heads are 1 inch wide and are composed of bluish-purple disc florets (ANHP 2011).



Spotted knapweed flowers
Photo by Brian Maupin

Impacts – Spotted knapweed can form dense monocultures that reduce the vigor of native plants and decrease the diversity of native plant communities. Knapweeds are allelopathic, suppressing the growth and establishment of surrounding vegetation. Large infestations have been shown to increase erosion of topsoil. This plant has been found in a few areas in Southeast Alaska and near ferry docks.

Control Methods – This plant is easily hand pulled and is susceptible to multiple mowings per year.



Spotted knapweed along Haines Highway
Photo by Brian Maupin

White Sweetclover, *Melilotus alba*
Yellow Sweetclover, *Melilotus officinalis*

AKEPIC Invasiveness Ranking: 81, Category D.

Description: White sweetclover is a biennial plant (lives for 2 years) that grows from 2 to 5 feet tall. Stems are erect and branched. Leaves are trifoliate, alternate, and .5 to 2.5 inches long. The flowers are white, fragrant and very small. They are spread out and arranged all around the stem. Plants flower from June to October during their second year of growth and then die. Pods are black to grey with a single seed each (ANHP 2011). There is a yellow-flowered species of this plant (*M. officinalis*) that is identical to white sweetclover except the flowers are yellow and it is thought to be a less aggressive plant.

Impacts: Each plant is capable of producing up to 350,000 seeds that can remain viable in the soil for up to 80 years. White sweetclover readily invades open areas, and has established extensively along early succession river bars on a number of river systems in Alaska.



White sweetclover flowers
photo by Dana White



White sweetclover
Photo by Dana White

This plant degrades natural plant communities by overgrowing and shading native species. The flowers are very desirable to native pollinators and may affect the pollination of native plants. It also could alter soil conditions by fixing nitrogen (ANHP 2011).

Control recommendations: This plant is relatively easy to hand pull. Pulling should be done before the plant goes to seed. Very small seedlings can be burned with a brush burner. Since the seed viability can be over 50 years, treated sites must be monitored for many years.

This plant has been found on Kupreanof Island, less than ten miles from Kake.

Himalayan Blackberry, *Rubus discolor*

AKEPIC ranking: 77, Category D.

Description - Himalayan blackberry is a robust perennial bramble with palatable berries and large, sharp spines. Stems have a reddish tinge, large curved spines, grow up to 30 feet long and can root at the tips. The stems live for 2 to 3 years, and dead stems persist for a couple years. Leaves are made up of five leaflets (sometimes three) that are palmately compound. Leaflets are 2.5 to 5 inches long, somewhat round in shape, and sharply toothed. They are bright green and smooth on top and hairy and gray on underside. Flowers are white to light red in color and up to one inch in diameter. Flowers and fruit are arranged in loose clusters of five to twenty. Fruits turn red to shiny black as they ripen (ANHP 2011, KCNW 2013).



Himalayan blackberry flowers
Photo by John Randall

Flowers and fruit are arranged in loose clusters of five to twenty. Fruits turn red to shiny black as they ripen (ANHP 2011, KCNW 2013).

Impacts – Himalayan blackberry forms large, impenetrable thickets in a few years. It can grow to densities as high as 150 stems per square foot and grow tangled upon itself to over 6 feet tall. It blocks out all light and forms a large layer of organic matter, eliminating the growth of almost all other plants. Once established it will grow over the top of native plants, including small trees. The fruits are eaten by birds and animals and are then spread to other locations. Its dense growth and numerous thorns limit movement by animals and humans. In the Pacific Northwest, this plant is very common in riparian areas, along roadsides and pastures (ANHP 2011, KCNW 2013). This plant has not been found in Kake.



Himalayan blackberries
Photo by John Randall

Controls Methods– This plant is very difficult to control once established. It spreads rapidly through its root system and through stems rooting, and berries can be carried great distances by birds and animals. If found when small, it can be hand-dug, making sure to remove root ball and major side roots. Mowing 4 to 5 times a year will deplete the root system, killing the plant.



Himalayan Blackberry Stem
Photo by John Randall

Herb Robert, *geranium robertianum*

AKEPIC Invasiveness Ranking: 67, Category A.

Description - Herb Robert is an annual to short-lived perennial herb. It grows 4 to 20 inches tall from a many-branched taproot. Stems are red and branch at base and have long spreading hairs on the lower portions. Branches lay flat on the ground at their base and grow upright further from the base. Leaves are heavily divided and have 3 to 5 heavily lobed leaflets. Stem leaves are arranged oppositely, are 0.5 to 3.5 inches long, and are sparsely hairy. Flowers are borne in pairs from the leaf axils. Flower petals are 1/8 to 1/2 inch long and pink or purple with white stripes, rounded tips, and soft hairs on the lower portions. Fruits are 5-segmented with a long erect beak on top (AKEPIC 2010).

Impacts- In forests in the Pacific Northwest, this plant can grow at densities of up to 75 plants per square foot, creating dense monocultures. This plant can spread in undisturbed woodlands and can flourish in shady areas, and has the potential to change the understory diversity of Alaskan forests. Herb Robert is not palatable to wildlife and has been documented to alter native plant-pollinator relationships. This species has been documented producing up to 1,550 seeds per plant that are forcibly ejected from the capsules, landing up to 20 feet away. In addition, each seed has a sticky, thread-like fiber that can attach to insects or passing mammals. Seeds can remain viable in soil for up to 6 years (AKEPIC 2010).

Control Recommendation - Small populations can be controlled with hand-pulling. The root system is shallow and can easily be pulled before it has gone to seed. Herb Robert can also be mowed several times a season before they flower. This plant has been found on Kupreanof Island.



Herb Robert - flowers and "beaked seed"
Photo by John Randall

IV. CONCLUSION

Kake's isolation creates a unique position to prevent introduction of invasive plants, and the opportunity to eradicate those that exist. To reach this goal, residents need to vigilantly survey for weeds, through both individual and organized efforts.

Public outreach will bring community awareness of the detrimental effects of invasive plants, and bring many new trained spotters into the effort.

Agencies and organizations concerned with invasive plants should incorporate regular survey and treatment into their environmental plans.

Local government should consider methods that will help to prevent introduction of new weeds, such as requiring that heavy equipment transported into the community be power-washed to remove weed seeds and fragments, or installing an undercarriage wash at the ferry station, or requiring or offering a bidder's preference to pits or quarries that are free of invasive plants.

Priority should be given to eradicating new, small populations of invasive plants before they can become established and spread. Staff training and community outreach will help to ensure that appropriate control methods are used to avoid weeds being spread by eradication efforts.

Establishment of a Cooperative Weed Management Area (CWMA) will help to coordinate weed prevention and treatment in Kake and surrounding areas. This would be made easier if an agency or organization will step forward to take responsibility for coordinating efforts toward establishing the CWMA. Through the CWMA, community outreach, community weed pulls, fun events (such as a Weed Smackdown), and education efforts will reach more people and have greater effect. Prevention and control efforts are more likely to continue into the future with a CWMA, rather than relying on the interest and energy of a few concerned individuals.

Initial control efforts should focus on the Category A and B plants identified in this document, as the populations are small enough to achieve eradication and thus prevent future ecological and economic consequences of these weeds.

Support for local efforts is available through University of Alaska Fairbanks Cooperative Extension Service, the Southeast Soil and Water Conservation District, the State of Alaska's Division of Agriculture, and many federal agency staff assigned to monitor and control invasive species. More information about individual species is available through the Alaska Natural Heritage Program of the University of Alaska.

V. REFERENCES CITED

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VI. APPENDICES

A. Reference Materials

Websites –

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University of Alaska Fairbanks, Cooperative Extension Service
www.alaskainvasives.org/

Juneau Cooperative Weed Management Area
<http://www.juneauinvasives.org/>

King County Washington Noxious weeds
<http://www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds.aspx>.

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<http://www.fs.fed.us/invasivespecies/documents/cookbook.pdf>

Books –

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B. Contacts of Interested Parties

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Email: invasiveplants@seswcd.org
Website: <http://www.seswcd.org>

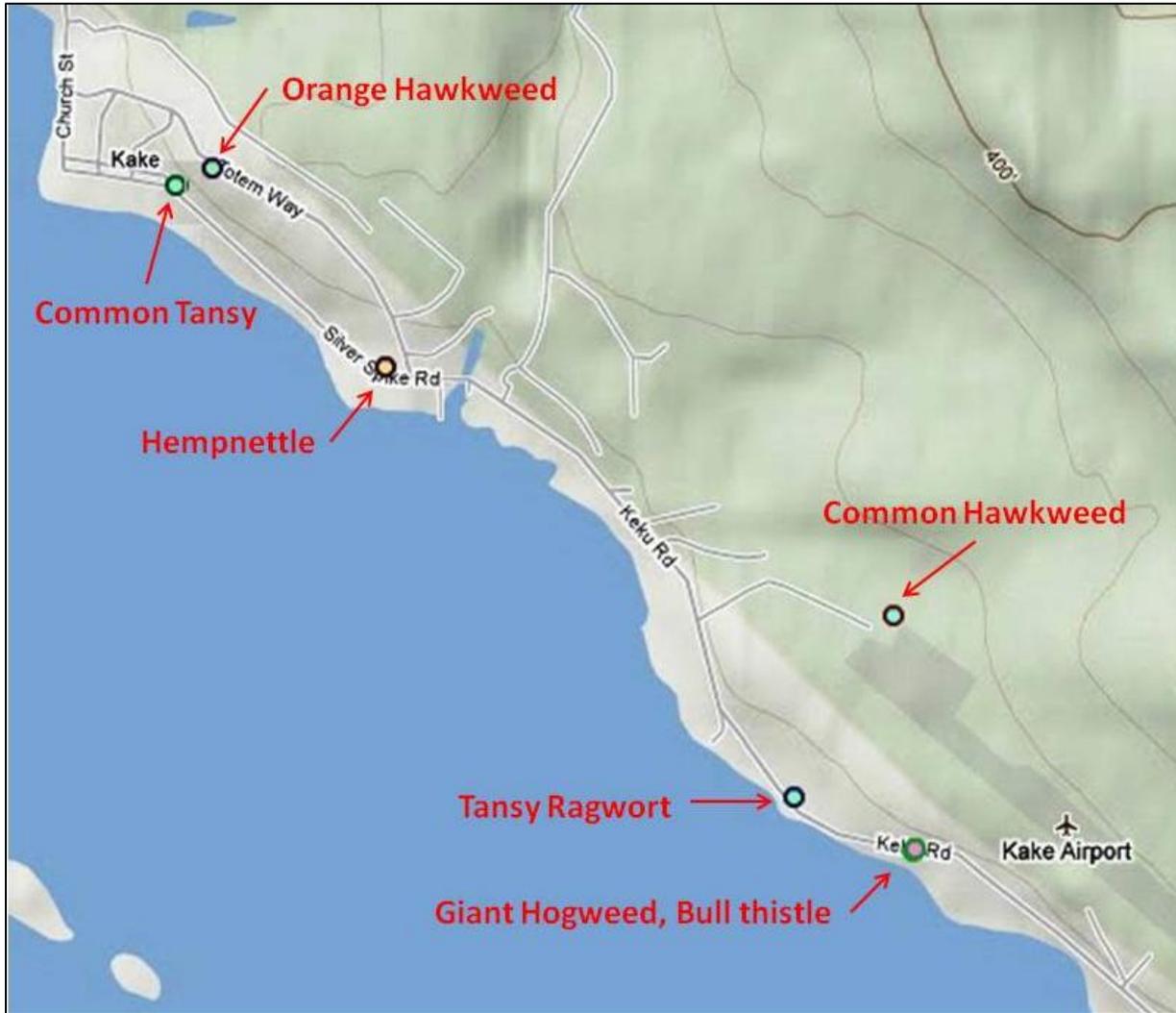
Juneau Cooperative Weed Management Area
Website: <http://www.juneauinvasives.org>

University of Alaska Fairbanks Cooperative Extension Service, Juneau
1108 F St., Suite 213,
Juneau, AK 99801-1844
Phone 907-796-6221

C. List of Invasive plants documented in AKEPIC in the study area that are not covered in Priority Species section.

Common Name	Scientific Name	AKEPIC Ranking
Alsike clover	<i>Trifolium hybridum</i>	57
Annual bluegrass	<i>Poa annua</i>	46
Big chickweed	<i>Cerastium fontanum ssp. vulgare</i>	36
Birdeye pearlwort	<i>Sagina procumbens</i>	39
Birds rape mustard	<i>Brassica rapa</i>	50
Bitter dock	<i>Rumex obtusifolius</i>	48
Calendula	<i>Calendula officinalis</i>	NR
Canada bluegrass	<i>Poa compressa</i>	39
Common chickweed	<i>Stellaria media</i>	42
Common dandelion	<i>Taraxacum officinale ssp. officinale</i>	58
Common groundsel	<i>Senecio vulgaris</i>	46
Common plantain	<i>Plantago major</i>	44
Creeping buttercup	<i>Ranunculus repens</i>	54
Curly dock	<i>Rumex crispus</i>	48
Field pennycress	<i>Thlaspi arvense</i>	42
Kentucky bluegrass	<i>Poa pratensis ssp. pratensis</i>	52
Low cudweed	<i>Gnaphalium palustre</i>	NR
Orchard grass	<i>Dactylis glomerata</i>	53
Perennial ryegrass	<i>Lolium perenne</i>	52
Pineapple weed	<i>Matricaria discoidea</i>	32
Red clover	<i>Trifolium pratense</i>	53
Rough bluegrass	<i>Poa trivialis</i>	52
Shepherd's purse	<i>Capsella bursa-pastoris</i>	40
Tall buttercup	<i>Ranunculus acris</i>	54
Tall fescue	<i>Schedonorus phoenix</i>	66
Timothy grass	<i>Phleum pratense</i>	54
White clover	<i>Trifolium repens</i>	59

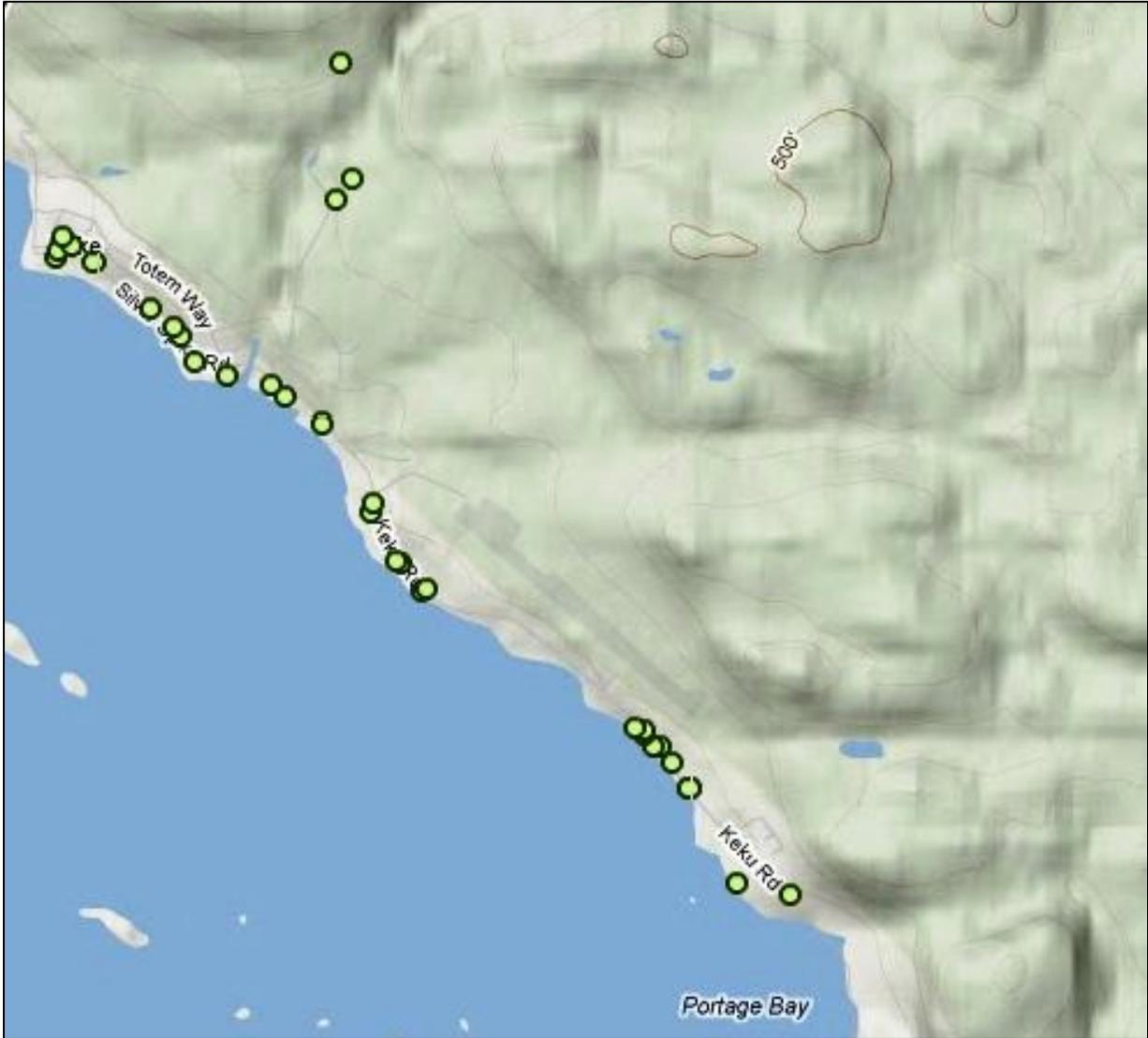
D. AKEPIC map of Category A invasive plants found in town



E. AKEPIC Map of category A. invasive plants found out of town



F. AKEPIC Map of Bohemian knotweed infestation in Kake



G. AKEPIC Map of documented reed canarygrass infestations in Kake

