

Integrated Weed Management Strategy Focusing on Early Detection/Rapid Response for the Kenai Peninsula - Cooperative Weed Management Area¹

December, 2007²

I. INTRODUCTION:

A common operating approach to the management of noxious weeds and other invasive plants is to focus strictly on specific sites. Infestations may be treated, but the relationship of the treatment to the entire problem in an area is not addressed. In addition, individual landowners and managers in a given area attempt to manage invasive plant species based on narrowly defined objectives, independent of each other.

Treatment of specific invasive plants and sites remains a critical component of an effective strategy. However, successful long-term solutions to the problem of invasive plants and noxious weeds must include a broad-scale approach to weed management. A cooperative weed management area is a broad-scale, landscape approach that places specific species and treatment sites in context with geographic distribution of invasive plants, susceptible habitats and feasibility of management. The focus of the weed management area is to find solutions to invasive plant problems across a landscape, rather than strictly focusing on treatments within specific land ownerships.

The Kenai Peninsula - Cooperative Weed Management Area (KP-CWMA) was convened in 2003 by Soil and Water Conservation Districts on the Peninsula in partnership with US Forest Service – State and Private Forestry. The CWMA is composed of all relevant and interested agencies, organizations, tribal landowners and other groups throughout the Peninsula through a signed cooperative agreement, referred to as the Memorandum of Understanding (MOU), which formally recognizes the organization and intent of the group. The following plan further outlines the strategic, landscape approach with an emphasis on early detection and rapid response to specific invasive plant species on the Kenai Peninsula in Southcentral Alaska.

¹ Plan developed by: Caleb Slemmons
Natural Resource Specialist
Homer Soil and Water Conservation District
4014 Lake St, Ste 201
Homer, AK 99603

² Plan updated April 2010 and April 2013.

II. PURPOSE:

The KP-CWMA is intended to bring together those responsible for invasive plant management within the region, to develop common management objectives, set realistic management priorities, facilitate effective treatment, and coordinate efforts along logical geographic boundaries with similar land types, use patterns and problem species.

III. COOPERATIVE WEED MANAGEMENT AREA GOALS:

The following are the four primary goals of the CWMA:

1. Prevent the introduction, reproduction and spread of designated noxious weeds³ and other invasive⁴ plants into and within the KP-CWMA.
2. Reduce the extent and density of newly established invasive plants to minimize spread and damage to natural resources.
3. Implement the most economic, effective and safe control methods for priority species.
4. Facilitate cooperation among those working to manage invasive plants on the Kenai Peninsula.

IV. TECHNICAL ADVISORY COMMITTEE:

Cooperators of the weed management area currently include agencies, non-profit organizations, tribal entities and other interested and concerned groups. An advisory committee has been organized from interested cooperators to jointly accomplish the following:

- Develop and maintain an up to date, comprehensive inventory of invasive plant species recorded on the Peninsula;
- Establish control priorities and develop specific management objectives;
- Develop priorities for area-wide informational, educational, and public awareness material;
- Coordinate the efficient use of resources and personnel to treat designated infestations; and
- Ensure science-based management of designated invasive plants utilizing an integrated approach.

V. COOPERATIVE WEED MANAGEMENT AREA BOUNDARIES:

The initial group involved in development of the CWMA agreed that it should include the entire contiguous Kenai Peninsula. Although a large area, the Peninsula is a discrete region, bounded by natural barriers to weed invasion on nearly all sides by the Cook Inlet, Turnagain Arm, Blying Sound and Prince William Sound. Consequently, including

³ Noxious weeds are problematic species listed by various US states and by the Federal Noxious Weed Act of 1974.

⁴ Invasive species are defined by Executive Order 13112.

the entire Peninsula in the CWMA encompasses all areas of immediate concern, allowing for maximum impact of time invested in planning and helping to prioritize limited resources. To facilitate the management of information and cooperation among landowners the CWMA is divided into logical management units based on Federal land management boundaries and Soil and Water Conservation District boundaries which include Borough, State, tribal and private lands.

These units are:

Chugach National Forest

Kenai National Wildlife Refuge

Kenai Fjords National Park

Homer Soil and Water Conservation District

Kenai Soil and Water Conservation District

Alaska Soil and Water Conservation District

Recognizing that different regions within the Peninsula may have different specific invasive plant problems and slightly different scopes of interest, regional units within the CWMA will provide localized support and coordination in order to maintain long-term stewardship for a particular area. A map of the CWMA and associated management units is included in Appendix A.

VI. INVASIVE PLANTS CURRENTLY RECORDED WITHIN THE KENAI PENINSULA – COOPERATIVE WEED MANAGEMENT AREA

A number of non-native plant surveys have been completed within the KP-CWMA, focusing primarily on disturbed habitats along roadways and trails where exotic species are likely to establish (Duffy, 2003; DeVelice, 2004; Kreideman, 2004; Chumley & Klausner, 2005; Barnett and Simonson, 2007). A few efforts have also been made to sample backcountry sites on the Peninsula and to extract records from existing vegetation datasets (US Fish and Wildlife Service, 2006). Although most current survey data are somewhat biased towards areas of likely establishment and have been completed using both systematic and non-systematic methods - they provide a reasonable baseline on which to prioritize regional management activities. Survey results and other non-native plant records are currently available through the Alaska Exotic Plant Inventory Clearinghouse database at <http://aknhp.uaa.alaska.edu/botany/akepic/>.

For the purposes of this plan, a current list of exotic plant species recorded on the Peninsula was prepared from the database source listed above. A final list of invasive plants for the KP-CWMA (listed in Table 1) was created from those exotic plant species listed to be “of the greatest concern for Alaska” (AKEPIC, 2005). A few species were also included because of their particular biology, status as a noxious weed elsewhere or the potential for spread in habitats common to the Peninsula. The purpose of the list below, and the intent of this plan, is to narrow the list of species for coordinated management to those that are considered highly invasive (Table 1) and of limited distribution (“new invaders” listed in Table 2).

TABLE 1: NON-NATIVE PLANT SPECIES RECORDED ON THE KENAI PENINSULA WITH ALASKA NATURAL HERITAGE PROGRAM INVASIVENESS RANKING (UPDATED MAY, 2013)

USDA CODE	Latin Name	Noxious Weeds ¹	AK Noxious Weed ²	Common Name	AKNHP RANKING ³
ACPT	<i>Achillea ptarmica</i>			Sneezeweed	46
ANCO2	<i>Anthemis cotula</i>			stinking chamomile	41
BRINI	<i>Bromus inermis ssp. inermis</i>			smooth brome	62
BRTE	<i>Bromus tectorum</i> **	✓		Cheatgrass	78
CABU2	<i>Capsella bursa-pastoris</i>			sheperd's purse	40
CAAR18	<i>Caragana arborescens</i>			Siberian peashrub	74
CEBI2	<i>Centaurea stoebe ssp. micranthos</i>	✓		spotted knapweed	86
CEFOV2	<i>Cerastium fontanum ssp. vulgare</i>			big chickweed	36
CHALA	<i>Chenopodium album var. album</i>			lamb's quarters	37
CIAR4	<i>Cirsium arvense</i>	✓	✓	Canada thistle	76
CIVU	<i>Cirsium vulgare</i>	✓		bull thistle	61
CRETE3	<i>Crepis tectorum</i>			narrowleaf hawkweed	56
CYSC4	<i>Cytisus scoparius</i>	✓		scotch broom	69
DAGL	<i>Dactylis glomerata</i>			orchard grass	53
ELRE4	<i>Elymus repens</i>	✓	✓	Quackgrass	59
GABI3	<i>Galeopsis bifida</i>			splitlip hempnettle	50
GATE2	<i>Galeopsis tetrahit</i>		✓	brittlestem hempnettle	50
HIAU	<i>Hieracium aurantiacum</i>	✓		orange hawkweed	79
HICA10	<i>Hieracium caespitosum</i>	✓		meadow hawkweed	79
HIUM	<i>Hieracium umbellatum</i>			narrowleaf hawkweed	51
HOJU	<i>Hordeum jubatum</i>			foxtail barley	63
IMGL	<i>Impatiens glandulifera</i>	✓		ornamental jewelweed	82
LEDE	<i>Lepidium densiflorum</i>			common pepperweed	25
LEVU	<i>Leucanthemum vulgare</i>	✓		oxeye daisy	61
LIVU2	<i>Linaria vulgaris</i>	✓	✓	butter and eggs	69
LOPEM2	<i>Lolium perenne spp. multiflorum</i>			Italian rye grass	52
MADI6	<i>Matricaria discoidea</i>			pineapple weed	32
MEOF	<i>Melilotus officinalis & alba</i>			sweetclover	69
PHAR3	<i>Phalaris arundinacea</i>			reed canarygrass	83
PHPR3	<i>Phleum pratense</i>			timothy	54
PLMA2	<i>Plantago major</i>		✓	common plantain	44
POAN	<i>Poa annua</i>		✓	annual bluegrass	46
POCO	<i>Poa compressa</i>			Canada bluegrass	39
POPRI2	<i>Poa prantensis ssp. irrigata</i>			spreading bluegrass	52

USDA CODE	Latin Name	Noxious Weeds ¹	AK Noxious Weed ²	Common Name	AKNHP RANKING ³
POPRP2	<i>Poa pratensis ssp. pratensis</i>			Kentucky bluegrass	52
POAV	<i>Polygonum aviculare</i>			prostrate knotweed	45
PRPA5	<i>Prunus padus</i>			European bird cherry	74
RAACA3	<i>Ranunculus acris var. acris</i>			showy buttercup	54
RARE3	<i>Ranunculus repens</i>	✓		creeping buttercup	54
RUAC3	<i>Rumex acetosella</i>	✓		sheep sorrel	51
RUCR	<i>Rumex crispus</i>	✓		curly dock	48
RULO2	<i>Rumex longifolius</i>			dooryard dock	48
SEVU	<i>Senecio vulgaris</i>	✓		common groundsel	36
SILAA3	<i>Silene latifolia ssp. alba</i>	✓		bladder campion	42
SINO	<i>Silene noctiflora</i>			nightflowering silene	42
SOAR2	<i>Sonchus arvensis</i>	✓	✓	perennial sowthistle	73
SOAU	<i>Sorbus aucuparia</i>			European mountain ash	59
SPAR	<i>Spergula arvensis</i>			corn sandspurry	32
STME2	<i>Stellaria media</i>			common chickweed	42
TAVU	<i>Tanacetum vulgare</i>	✓		common tansy	60
TAOFO	<i>Taraxacum officinale ssp. officinale</i>			common dandelion	58
TRHY	<i>Trifolium hybridum</i>			alsike clover	57
TRPR2	<i>Trifolium pratense</i>			red clover	53
TRRE3	<i>Trifolium repens</i>			white clover	59
TRPE21	<i>Tripleurospermum perforata</i>	✓		scentless false mayweed	48
VICR	<i>Vicia cracca</i>		✓	bird vetch (tufted vetch)	73

¹ **Noxious Weeds** – Species currently listed as noxious weeds by one or more states in the US (outside of Alaska) according to the USDA Plants Database at <http://plants.usda.gov>

² **AK Noxious Weeds** – Also currently listed as a noxious weed by Alaska State Statute (11 AAC 34.020)

³ **AKNHP Ranking** is an Alaska-specific invasiveness ranking (a high rank indicates greater invasiveness) provided by the Alaska Natural Heritage Program. Current ranking and methodology available at: <http://aknhp.uaa.alaska.edu/botany/akepic/non-native-plant-species-list/#content> .

VII. INTEGRATED MANAGEMENT SYSTEM FOCUSING ON EARLY DETECTION AND RAPID RESPONSE:

Integrated weed management "... is a system for the planning and implementation of selected methods of management for preventing, containing, or controlling undesirable plant species or group of species using all available strategies and techniques," (Federal Noxious Weed Act, 1974.)

Together these strategies and techniques are economically and environmentally more effective than any single option. Control methods are available and prescribed on a species/infestation specific basis. Elements of integrated management included in this plan are: prevention and education/awareness, early detection and rapid response, inventory, treatment and monitoring.

A. Prevention and Education/Awareness

Prevention measures are practices that reduce the potential for the introduction, establishment and spread of weeds. Because prevention is the most cost effective and successful way to manage noxious weeds. It is considered a high priority for strategic planning. The following list of land management activities are key areas to implement prevention methods, including, but not limited to:

- Timber management
- Road and railroad construction/reconstruction and maintenance
- Construction and use of sand and gravel extraction sites
- Range management activities
- Recreational activities (including construction and maintenance of recreational sites, and areas of concentrated use such as campsites, trailheads and trails, and off-road vehicle use)
- Mining activities
- Wildlife management and enhancement projects
- Fire suppression and rehabilitation
- Farm management

Education and awareness programs foster public understanding of the threat invasive, exotic plants can pose to the diverse natural resources of the Kenai Peninsula. Education can also help describe the techniques used to manage weeds and the role humans can play in the dispersal and establishment of invasive weeds. Education also includes the training of district and agency personnel, private landowners and the general public in weed identification, management techniques, monitoring protocols and other skills needed for the management of noxious and invasive weeds. Awareness provides an important first step in the detection of new invaders. Education efforts for the KP-CWMA will focus on new and potential invaders (Table 2) to improve awareness of these species and

facilitate public reporting of early infestations as part of an early detection network.

B. Early Detection/Rapid Response

After prevention activities, early detection and rapid response is considered the next highest priority to mitigate the introduction and spread of invasive weeds. The goal for early detection and rapid response is to find incipient populations of invasive plants and eradicate them before they begin to spread. This approach, as defined by the National Invasive Species Council (2003), is the most effective means for eradicating invasive species and is intended to be the keystone of invasive plant management within the KP-CWMA. Many of the necessary elements of an early detection and rapid response system currently exist for the Peninsula. This includes several baseline inventories for non-native plants within the KP-CWMA and tools for assessing current and future weed infestations such as species-specific invasiveness rankings.

C. Inventory

The collection, documentation, and storage of information (i.e. inventory) of the extent and location of invasive weeds within the KP-CWMA are a critical part of integrated management. A current inventory of weed species provides necessary information for establishing site-specific and regional priorities, management objectives, and for prescribing treatment methods.

D. Treatment Methods

Under the integrated approach, all control methods are considered. It is typically the use of all appropriate options, with respect to a particular species, in combination that results in the most successful control program. Specific treatment prescriptions are determined by the biology of the particular plant species, site characteristics and management objectives. Successful management and eradication of invasive plant infestations typically require several years of treatment and follow-up monitoring. The following management techniques of noxious weed control will be considered on a site-specific and plant species basis:

Physical/Mechanical: The use of physical or mechanical methods for weed control can be effective on small infestations of annual or biennial species. Hand grubbing, mowing, tilling, and burning are commonly used to physically destroy weeds or interfere with their reproduction. To be effective, treatment must typically take place before seed production. Plants that have flowered must be removed from the site and destroyed. Repeated mowing or tilling during the growing season is required with most weed species. Generally this approach is not recommended as a sole method for control of species that spread vegetatively.

Chemical: Herbicides are an effective and efficient tool for the control of noxious weeds. Chemical control methods, along with appropriate cultural practices, are likely to be the best option for larger infestations and for tough to control perennial species. Herbicide application and rates are dependent on specific site characteristics, target plant, location, non-target vegetation and land use. Herbicides are a particularly important method of treatment when complete eradication of a plant population is the management objective. Treatment at the earliest stage of invasion will greatly reduce the future need for additional herbicide applications. It is critical to follow all label instructions, site-specific directions and safety precautions when using any herbicide.

Cultural/Land Use: Cultural practices are activities that purposefully enhance and maintain the growth of desired vegetation. Practices that retain, enhance, or introduce desirable plant species that out-compete exotic plant species can serve as important prevention and control measures. Examples that are applicable include seeding, planting, fertilizing and retaining brush and tree canopy cover where appropriate. Grazing prescriptions that are designed to maintain or enhance perennial vegetation in a healthy state or maintain soil cover is an important practice in slowing the spread of invasive plants. Minimizing the extent and duration of exposed soil during management actions can also reduce the risk of weed establishment.

Biological: Biological weed control involves the deliberate introduction and establishment of natural enemies to reduce the target plant's competitive or reproductive capacities. Insects are the most common agent released against noxious weeds. Plant pathogens, such as fungi, are increasing in use. Sheep and goats have also been effective in reducing densities and limiting spread of specific weed species. Biological control can be a slow process, often requiring 10 to 20 years to be effective. Its purpose is not eradication but a reduction in densities and rate of weed spread to an acceptable level. It is most effective on dense weed infestations over large areas. As such, this is not expected to be a treatment option in the near future for the KP-CWMA.

E. Monitoring

Monitoring is the collection of information to determine the effectiveness of management actions in meeting the prescribed objectives. Noxious weed management focuses upon density and rate of spread of invasive exotic plant species and the effect these aggressive plants have on natural resources. If eradication is a management goal, monitoring of the site for several years following treatment is essential. A species is considered to be locally eradicated when the seed bank, based on persistence reported in scientific literature, has been

extinguished. Persistent species will likely take five or more years of follow-up control and monitoring.

Cooperators are also interested in the effectiveness of prescribed actions on the target plant and the response of desirable vegetation. Monitoring will help determine if treatments and management activities are accomplishing the goals and objectives established by KP-CWMA partners.

VIII. SPECIES CLASSIFICATION, PRIORITIZATION AND MANAGEMENT OBJECTIVES:

The following species classifications are based on current inventory data collected within the KP-CWMA. This list will be updated as needed with approval of the KP-CWMA Technical Advisory Committee and revised no later than January, 2012.

A. Invasive and Noxious Weed Classification:

- **Established Invaders:** Invasive plant species firmly established and somewhat wide spread throughout the KP-CWMA.
- **New Invaders:** Invasive plants found to occur in the KP-CWMA with very limited distribution and density. For these species, eradication is currently considered a feasible goal for certain management units.
- **Potential Invaders:** Invasive plants not known to be located within the KP-CWMA but occurring in other regions of Alaska or considered to have imminent potential for introduction and pose a future threat to resources.

**Table 2: INVASIVE AND NOXIOUS WEED SPECIES CLASSIFICATION
(UPDATED January, 2017)**

Low Priority	High Priority	Potential Invaders to the KP-CWMA
Orange hawkweed* <i>Hieracium auranticum</i>	Cheat grass** <i>Bromus tectorum</i>	Purple loosestrife* <i>Lythrum salicaria</i>
Quackgrass* <i>Elymus repens</i>	Canada thistle* <i>Cirsium arvensis</i>	Garlic mustard <i>Alliaria petiolata</i>
Hempnettle* <i>Galeopsis spp.</i>	Perennial sowthistle* <i>Sonchus arvensis</i>	Tansy ragwort <i>Senecio jacobaea</i>
Butter and Eggs* <i>Linaria vulgaris</i>	Scentless false mayweed <i>Tripleurospermum perforate</i>	Winter vetch <i>Vicia villosa</i>
Reed Canary grass <i>Phalaris aurundinacea</i>	Common tansy <i>Tanacetum vulgare</i>	Japanese knotweed <i>Polygonum cuspidatum</i>
Oxeye daisy <i>Leucanthemum vulgare</i>	Sweetclover <i>Melilotus alba & officinalis</i>	Giant knotweed <i>Polygonum sachalinense</i>
Meadow hawkweed <i>Hieracium caespitosum</i>	Creeping buttercup <i>Ranunculus repens</i>	Bohemian knotweed <i>Polygonum x bohemicum</i>
Mouse ear hawkweed <i>Hieracium pilosella</i>	Tall buttercup <i>Ranunculus acris</i>	Himalayan blackberry <i>Rubus discolor</i>
Narrowleaf hawkweed <i>Hieracium umbellatum</i>	Wild Buckwheat* <i>Polygonum convolvulus</i>	Western salsify <i>Tragopogon dubious</i>
Narrowleaf hawksbeard <i>Crepis tectorum</i>	Bird Vetch* <i>Vicia cracca</i>	Spotted knapweed <i>Centaurea stoebe ssp. micranthos</i>
Fall Dandelion <i>Leontodon autumnalis</i>		Scotchbroom <i>Cystis scoparius</i>
Birdsfoot trefoil <i>Lotus corniculatus</i>		Ornamental jewelweed <i>Impatiens glandulifera</i>
Bird cherry <i>Prunus padus</i>		Bull thistle <i>Cirsium vulgare</i>
		Elodea spp. <i>cnadensis, nuttallii</i>

*Currently listed as a prohibited or restricted noxious weed by Alaska State Statute (11AAC 34.020)

** Historical record from Kenai National Wildlife Refuge herbarium, 1958

Currently, Federal land management agencies within the KP-CWMA are at various stages in the process of planning invasive plant management efforts. The US Forest Service has developed an Invasive Plant Management Plan that identifies the overall goals of management within the Chugach National Forest (DeVelice et al., 2005). Although management objectives and specific priorities are not identified in the Plan, the Seward Ranger District has developed a list of species for potential eradication (E. Bella, pers. comm.).

The Kenai National Wildlife Refuge has been applying herbicide (Roundup®, Milestone®) since 2008. The goal of this plan is to protect the interior of the refuge by keeping trail heads, public boat launches, heavy equipment yard, airport hangar, and the float plane launch on Headquarters Lake free of invasive plants. New regulations are being considered to mandate certified weed-free forage for horse packers. Additionally, the refuge continues to work with the industrial operators of the Swanson and Beaver Creek oil and gas units to contain and, in some cases, eradicate invasive plant species (J. Morton, pers. comm.).

National Park Service is currently preparing an invasive plant management plan and environmental assessment for all Alaska National Parks which will provide guidance for management of invasive plants within Kenai Fjords National Park. The Park is currently managing butter and eggs and oxeye daisy for eradication (J. Heys, pers. comm.).

The management goals in Table 3 have been proposed based on current survey data and are intended to guide management activities within the CWMA. It is recognized that land management agencies will independently develop future plans for management. This Plan does not directly affect the development of agency management objectives and priorities.

However, the intention of the CWMA and this plan is that proposed priorities and objectives will be adopted by land management agencies and other partners for coordinated management across the peninsula. This will help focus resources where they are the most effective and to manage the following species and other future incipient invaders for Peninsula-wide eradication. With the exception of meadow hawkweed, which is currently known (in 2012) to occur on only two sites on the Kenai Peninsula, the characteristic that the other 27 species in this table have in common is that they are NOT wind dispersed. The 14 species identified for peninsula-wide eradication are either thought to have been recently eradicated or are currently so restricted in distribution that eradication is considered a viable goal. The four species identified for containment are not dispersed by wind and are primarily restricted to developed areas (butter and eggs, oxeye daisy, quackgrass) or to specific watersheds (reed canarygrass; see RCG strategic plan). In addition to these 28 species, the default management goal for any exotic plants new (or newly-reintroduced) to the Kenai Peninsula is assumed to be eradication by the most appropriate method.

B. General Management Priorities for the Kenai Peninsula Cooperative Weed Management Area:

1. Prevent the establishment of potential invaders (refer to Table 2 for classification of species as established, new and as potential invaders).
2. Eradicate new invaders and any species subsequently introduced from the list of potential invaders (early detection/rapid response).
3. Treat transportation corridors and areas of concentrated activities, such as roads, trails, campgrounds, trailheads parking lots and gravel pits and/or treat satellite infestations.
4. Reduce the density or slow the spread of widespread established invaders.

C. Management Objective Definitions:

- **Eradicate.** The noxious or invasive weed species is eliminated from the KP-CWMA, including all viable seeds and/or vegetative propagules.
- **Control.** Seed production is prevented throughout the target patch, and the area coverage of the weed is decreased over time. Prevent the weed species from dominating the vegetation of the area but accept low levels of the weed.
- **Contain.** Weeds are geographically contained and are not increasing beyond the perimeter of the infestation. Treatment within established infestations may be limited, but populations are controlled or eradicated outside those areas.

TABLE 3: MANGEMENT OBJECTIVES FOR INVASIVE PLANTS ON THE KENAI PENINSULA (UPDATED APRIL, 2013)

KP-CWMA management goals for invasive plant species that are known to occur on the Kenai Peninsula but either sparsely or with restricted distribution (see text for rationale). In addition to the species listed below, the default management goal for any exotic plants new (or newly re-introduced) to the Kenai Peninsula is eradication by the most appropriate method.

Common name plants	Scientific name plants	ERADICATE	CONTAIN
Bird Vetch	<i>Vicia cracca</i>		X
Butter and Eggs	<i>Linaria vulgaris</i>		X
Cattail	<i>Typha latifolia</i>	X	
Cheatgrass	<i>Bromus tectorum</i>	X	
Common Tansy	<i>Tanacetum vulgare</i>	X	
Creeping thistle	<i>Cirsium arvense</i>	X	
Meadow hawkweed	<i>Hieracium caespitosum</i>		X
Ornamental jewelweed	<i>Impatiens glandulifera</i>	X	
Oxeye daisy	<i>Leucanthemum vulgare</i>		X
Perennial Sowthistle	<i>Sonchus arvensis</i>	X	
Quackgrass	<i>Elymus repens</i>		X
Reed canarygrass	<i>Phalaris arundinacea</i>		X
Scentless false mayweed	<i>Tripleurospermum inodorum</i>	X	
Yellow/White sweetclover	<i>Melilotus officinalis</i>	X	

Refer to Page 12 for management definitions. Within any Containment Area, if satellite infestations appear beyond the containment line, the management objective for that outbreak is to eradicate. Species currently recommended for Peninsula-wide eradication are: bull thistle, Canada thistle, mouseear hawkweed, ornamental jewelweed, perennial sowthistle, scotchbroom and spotted knapweed.

IX. SPECIFIC MANAGEMENT RECOMMENDATIONS:

A. Education/Awareness

Creating awareness of the threat to Kenai Peninsula resources and the need to manage weeds will provide the foundation for active treatments, early alert programs, and prevention practices. Continued education of practitioners may ensure that effective strategies and new technologies will be incorporated into management actions. Efforts should generally focus on those species that are new or potential invaders to increase the likelihood of identifying and eradicating infestations early in their establishment. The following Education/Awareness focus will be incorporated into the KP-CWMA strategy for managing noxious weeds:

1. Conduct annual invasive weed workshop and tours.
2. Develop and maintain a weed management display for public gatherings such as fairs, expos, conventions, and shows. Current focus includes Kenai Peninsula State Fair, Kenai River Festival and various garden and home shows.
3. Develop interpretive signs to alert the general public of the threat of weeds and the efforts in the CWMA.
4. Post weed identification signs and other outreach materials at trailheads, road turnouts, and other public places.
5. Conduct periodic weed pull events that include groups such as garden clubs, Boy Scouts, and recreation clubs.
6. Provide presentations to classrooms and special interest groups such as horse council, Off Highway Vehicles (OHV) groups, fishing groups etc.
7. Develop brochures and pamphlets specific to the CWMA. Examples include weed-free feeds, early alert posters, and local overview of existing weeds.
8. Facilitate communication and coordination of cooperators and partners in the CWMA.
9. Develop demonstration plots for treatment and management techniques.
10. Develop annual accomplishment briefs for the KP-CWMA Technical Advisory Committee about current projects and programs.

B. Recommended Prevention Strategies

Cooperators will strive to integrate appropriate prevention measures into management activities and promote the use of practices that reduce rates of weed spread throughout the KP-CWMA. Cooperators will work with agencies, organizations, and individuals in the development and implementation of prevention practices that could be effective in reducing dispersal and establishment. The following measures are provided as examples. Adopted practices need not be limited to those listed below.

1. Minimize disturbance in areas or habitats highly susceptible to weed invasion.
2. Use native plant species when practicable and when conditions are not favorable for natural succession to a vigorous native plant community following disturbance.
3. Encourage the use of high quality seed that is free of noxious weeds. Consider having the seed tested for “all state noxious weeds”, prior to planting.
4. Promote and support the use of “certified noxious weed free”, and/or other weed free feeds.
5. Keep gravel pits free of weeds. Noxious weed risks should be considered during new pit and/or road construction. The placement of gravel from infested pits should be mitigated through early monitoring and necessary treatment.
6. Clean equipment and vehicles, by washing or the use of compressed air, when transporting between sites (including logging equipment if the equipment is to be used off road).
7. Manage high human use areas, such as campgrounds, trailheads, turnouts, parking lots, equipment yards, scaling sites, in a weed-free state.
8. Maintain existing weed free areas.
9. Maintain rangeland and open forest sites in healthy condition.
10. Maintain existing tree and brush cover, where practicable and appropriate.
11. Limit access through heavily infested areas, where feasible.

12. Maintain road shoulders or drainage ditches that are covered by desirable herbaceous cover. If disturbed, they should immediately be reseeded with an appropriate, weed-free seed mix.
13. Provide guidance for road maintenance practices, such as mowing prior to seed set to prevent the spread of noxious weeds.
14. Avoid use of sites infested with invasive weeds as staging areas for large projects such as fires, construction, landings, gravel stockpiles, etc.
15. Provide invasive and noxious weed identification training and discuss the connection between weed spread and human activities.
16. Reduce risk of transporting invasive and noxious weed seed via livestock by:
 - Placing livestock in a transition pasture free of designated weeds for at least 14-20 days prior to moving animals to non-infested areas. Maintain the transition pasture in a weed free state.
 - Moving animals to weed free areas after the animal has shed.
 - Hosing down the legs of livestock as they move through a handling corral.
 - Avoid moving livestock through infested areas.
 - Grazing livestock in weed infested areas when weeds are not flowering or producing seeds.
17. Reduce risk of spreading weeds by pack and saddle stock.
 - Feeding pack and saddle stock “certified noxious weed free” feed for at least two to three days prior to traveling in the backcountry.
 - Brushing stock to remove any weed seed.
 - Excluding stock from dense weed sites, where the risks are high that the animals will spread the weeds off site.
18. Maintain an early alert program where cooperators and interested public communicate the location of potential invasive plants or locations of new invasive plant infestations.
19. Develop and maintain an inter-agency team that can appropriately respond to incipient infestations from the list of new and potential invaders.

C. Inventory

A coordinated weed inventory should be maintained for the entire management area as funding and personnel allow. At a minimum, the inventory will include

information required to meet standards of the Alaska Exotic Plant Information Clearinghouse (AKEPIC Collaborators Manual, 2005). The agencies involved will be responsible for furnishing necessary maps for the lands under their jurisdiction. All cooperators will offer input into the location and types of infestation.

A statewide database, the Alaska Exotic Plant Information Clearinghouse, will house geospatial data of invasive and noxious weeds recorded within the KP-CWMA. Cooperators should include their inventory and treatment efforts to this resource to facilitate sharing of information among those working to identify and manage infestations within the KP-CWMA.

Table 1 summarizes the current list of invasive and noxious weeds recorded by inventories by a variety of agencies throughout the CWMA since 2003. The information can also be accessed at <http://akweeds.uaa.alaska.edu>. The summary provides an initial assessment of the extent and distribution of problem weeds within the management area. This inventory will be continually updated with new reports of weed infestations, inventories and management efforts.

D. Species Management Objectives

It is assumed that the elements of education, prevention, early detection, and inventory will be integrated concurrently with specific control actions. Management objectives are listed for each weed species in Table 3. The objectives are developed in context with the geographic distribution, habitat relationships, invasiveness, relative abundance and treatment feasibility of specific weeds.

Established and widespread weed species within the management area may be stratified into management zones. Zones with low population levels of the target plant would be managed for eradication. Those with moderate to high population levels of target plants would focus on containment and other sites maintained as weed free.

1. Long-Term Spread of Weeds:

Monitoring of weed spread and/or suppression will be accomplished through existing database tools and GIS layer through the Alaska Exotic Plant Information Clearinghouse. Inventory to re-map infestations should be completed in five years to compare with previous surveys. Yearly treatment summaries will also be used to assess weed spread. All management activities should be included in the Alaska Exotic Plant Information Clearinghouse under the “control” attribute, listing the type of control as: manual, mechanical; broadcast, spot or aerial herbicide or other (see AKEPIC Collaborators Manual, 2005).

2. Post-treatment Monitoring:

Treatments will be monitored and assessed following two general intensity levels as permitted by funding and personnel.

a. Visual: Personnel will conduct visual reconnaissance of the treated area after chemical application to determine the presence or absence of target plants, and/or desirable vegetation.

b. Systematic: Within selected infestations sample plots will be established to document changes in target plant densities, and species composition and cover of desirable vegetation.

3. Biocontrol Agents:

Biocontrol agents are generally considered only for very large and densely infested areas. The release of a biocontrol agent is a complex and laborious process requiring extensive review and is very difficult to accomplish successfully. It is not expected for biocontrol to be part of management activities in the KP-CWMA in the near future.

X. REFERENCES:

AKEPIC – Alaska Exotic Plant Information Clearinghouse. 2005. Invasive plants of Alaska. Alaska Association of Conservation Districts Publication. Anchorage, Alaska.

AKEPIC (Alaska Exotic Plant Information Clearinghouse) Collaborator's Manual –. 2005. Mapping Project Collaborator's Manual, 2005 (<http://akweeds.uaa.alaska.edu/>) accessed May 2007.

Barnett, D. and S. Simonson. 2007. A vegetation survey of disturbed areas on the Kenai National Wildlife Refuge. Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO. 33p.

Chumley, J and H. Klausner. 2005. Non-native Plants of the Kenai Peninsula: Summary of a Two-Year Roadside Inventory. Final Report for USDA Forest Service, State and Private Forestry by Representatives of the Kenai Peninsula Cooperative Weed Management Area. 39p.

DeVelice, R.L. 2004. Non-native plant inventory: Kenai Trails. USDA Forest Service, Chugach National Forest, Alaska Region Technical Publication R10-TP-124. Anchorage, Alaska.

DeVelice, R.L., BH. Charnon, EM. Bella and M. Shephard. 2005. Chugach National Forest Invasive Plant Management Plan. 28p.

Duffy, M. 2003. Non-native plants of the Chugach National Forest: a preliminary inventory. USDA Forest Service, Chugach National Forest, Alaska Region Technical Publication R10-TP-111. Anchorage, Alaska.

Federal Noxious Weed Act of 1974. Pub. L. 93-629, Jan. 3, 1975, 88 Stat. 2148 (7 U.S.C. 2801 et seq.)

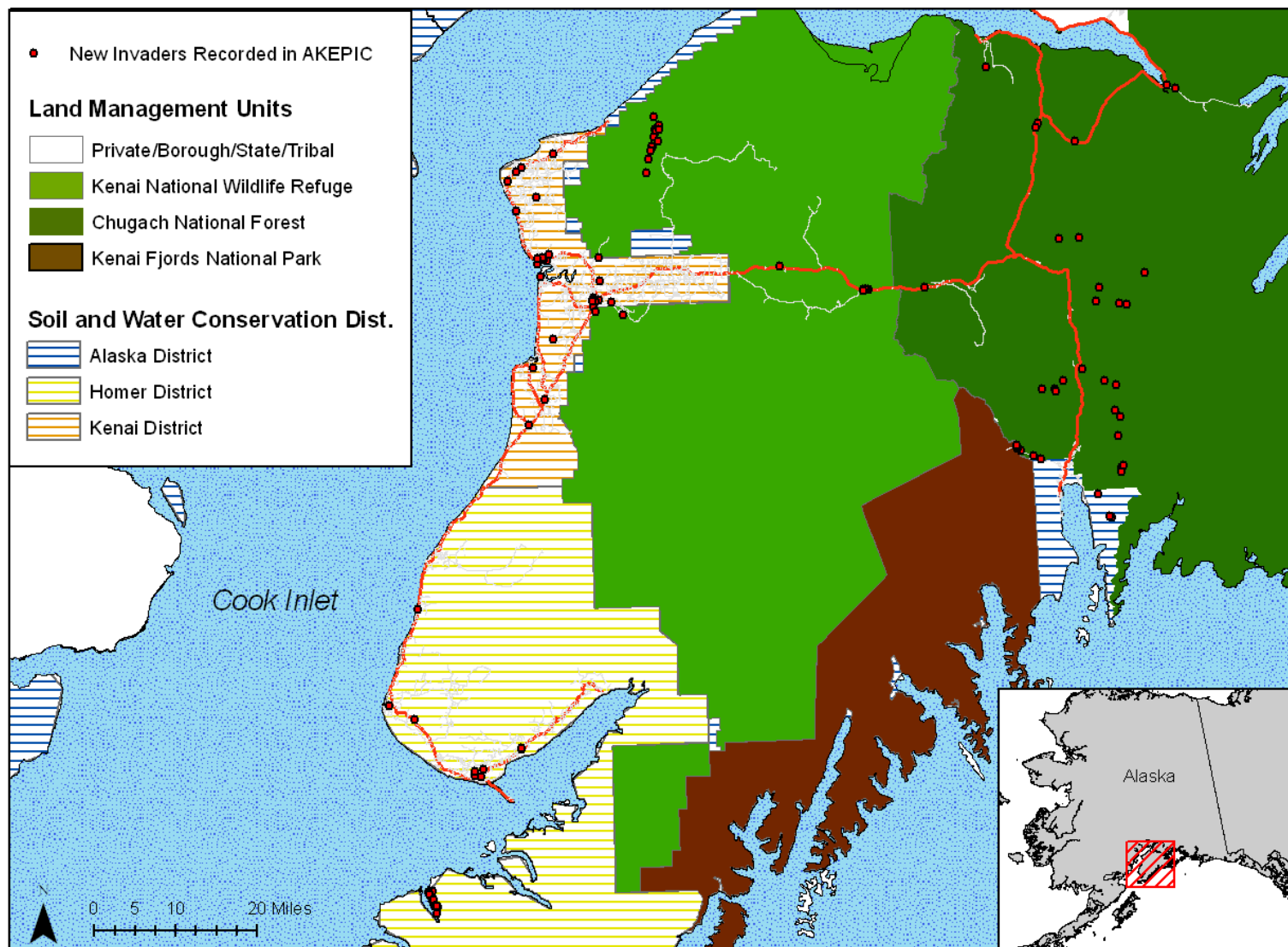
Kriedeman, C. 2004. Final report: exotic plant management team. National Parks Service. Kenai Fjords National Park Seward, AK. Unpublished report.

National Invasive Species Council. 2003. General guidelines for the establishment and evaluation of invasive species early detection and rapid response systems. Version 1. 16p.

US Fish and Wildlife Service. 2006. Exotic flora on Kenai National Wildlife Refuge at two spatial scales. Unpublished data.

This plan was developed using the Idaho State Department of Agriculture's Cost Share Handbook template for CWMA Strategic Plans (Exhibit 6) available at:
<http://www.idahoag.us/Categories/PlantsInsects/NoxiousWeeds/costshareapp.php>

APPENDIX A: MANAGEMENT UNITS WITHIN THE KENAI PENINSULA – COOPERATIVE WEED MANAGEMENT AREA



New Invaders in AKEPIC Database
Recorded on the Kenai Peninsula, Alaska 2007

Homer Soil & Water Conservation District
4014 Lake St., Suite 201
Homer, AK 99603



APPENDIX B. REVISIONS.

The following revisions to the strategic plan were made April 2010.

Updates to table 1 pages 4 and 5.

The following plant species were added to table:

<i>Achillea ptarmica</i>	<i>Polygonum aviculare</i>
<i>Anthemis cotula</i>	<i>Prunus padus</i>
<i>Bromus inermis ssp. inermis</i>	<i>Ranunculus acris var. acris</i>
<i>Capsella bursa-pastoris</i>	<i>Ranunculus repens</i>
<i>Caragana arborescens</i>	<i>Rumex acetosella</i>
<i>Cerastium fontanum spp. vulgare</i>	<i>Rumex crispus</i>
<i>Chenopodium album var. album</i>	<i>Rumex longifolius</i>
<i>Crepis tectorum</i>	<i>Senecio vulgaris</i>
<i>Dactylis glomerata</i>	<i>Silene latifolia ssp. alba</i>
<i>Hordeum jubatum</i>	<i>Silene noctiflora</i>
<i>Lepidium densiflorum</i>	<i>Sorbus aucuparia</i>
<i>Lolium perenne ssp. multiflorum</i>	<i>Spergula arvensis</i>
<i>Matricaria discoidea</i>	<i>Stellaria media</i>
<i>Phleum pratense</i>	<i>Taraxacum officinale ssp. officinale</i>
<i>Plantago major</i>	<i>Trifolium hybridum</i>
<i>Poa annua</i>	<i>Trifolium pratense</i>
<i>Poa compressa</i>	<i>Trifolium repens</i>
<i>Poa pratensis ssp. irrigata</i>	
<i>Poa pratensis ssp. pratensis</i>	

Centaurea biebersteinii was updated to *Centaurea stoebe spp. micranthos*. And its AKNHP Ranking was updated from 88 to 86.

Galeopsis bifida and *Galeopsis tetrahit* AKNHP Ranking was updated from 43 to 40.

Hieracium aurantiacum and *Hieracium caespitosum* ANKNP ranking was updated from 71 to 79.

Hieracium pilosella was removed from the table.

Melilotus officinalis and *alba* were combined into one row.

Table 2 page 9

Vicia cracca was updated from New Invader to Potential Invader.

Centaurea biebersteinii was updated to *Centaurea stoebe spp. micranthos* and from New Invader to Potential Invader.

Cytisus Scoparius was updated from New Invader to Potential Invader.

Table 3 pages 13 and 14.

Scientific names were added to all plants species.

Melilotus officinalis and *Melilotus alba* were combined into one row.

The following changes were made under the corresponding heading -

Chugach National Forest – *Vicia cracca* was updated from eradicate to contain.

Kenai Soil and Water Conservation District –

Tanacetum vulgare was updated from eradicate to control.

Tripleurospermum perforata, *Cytisus scoparius*, and *Centaurea stoebe ssp. micranthos* were removed, as they were eradicated from the management unit.

Melilotus officinalis was added as eradicate.

Alaska Soil and Water Conservation District –

Vicia cracca added as control.

Galeopsis spp. added as eradicated.

Leucanthemum vulgare added as control.

Elymus repens added as control

The following revisions to the strategic plan were made April & May 2013

Table 1 was updated to reflect the current noxious standing and AKNHP rankings of listed plants.

The original version of Table 3, which split the management area into six management units with different priorities and objectives, was replaced with a streamlined Table 3 that identifies the most important invasive plants to be addressed and how they will be managed across the entire management area. The heading for this table was changed and a brief description was inserted prior to the table.

Adjustments were made on pages 11& 12 regarding regional management units, as well as updated area practices, goals and activities. Adjustments were made to the first two paragraphs of section D. Species Management Objectives (p. 18) to reflect the change in Table 3 and corresponding area strategy.

Throughout the document, internet addresses were updated to reflect the current URL of those resources.

The following revisions were made in January and February 2017