

Invasive Plant Management Recommendations for the Tanana Lakes Recreation Area



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I. Executive Summary

The recommendations in this plan are meant to provide the Fairbanks North Star Borough Department (FNSB) Parks and Recreation Department with the guidance needed to take early management action against invasive plant establishment and spread in the Tanana Lakes Recreation Area (TLRA). Invasive plants are plant species that are non-native, do not respond readily to control efforts, and may cause harm to the environment, economy, or human health.¹ The TLRA is a 750-acre multi-use recreation area that is being developed by the FNSB. When completed, the TLRA will be a valuable community asset with opportunities for bird watching, jet skiing, hiking, boating, swimming, disc golf, and more. Plans also include gravel extraction with gravel to be used at the nearby landfill.

Over the past several years this area has been largely neglected and used for illegal dumping, recreational shooting, and bird watching. Fortunately, despite these disturbances, the area has remained relatively free of invasive plants with a few dense infestations found along roadsides and areas of former gravel extraction. As development of the TLRA continues there will be many soil disturbances and a greater influx of people to the area, which could lead to increasing infestations and spread of invasive plants. The TLRA contains sensitive migratory bird habitat and access to the Tanana River floodplain that are worthy of being protected.

The primary recommendations are focused on low-cost measures that can be easily incorporated within the project development and operational stages. The project development phase recommendations focus on integrating best management practices (BMPs) into all construction and development activities to prevent further spread of invasive plants. Additionally, during this phase the FNSB should consider working closely with volunteers and partners to provide direct management of invasive plants at TLRA. During the operational phase, when personnel and funds may be more available, invasive plant management should be included in daily operations with continuing support from volunteers and partners. Visitors should be educated about invasive plants and invited to join management efforts through volunteer opportunities and encouragement to follow BMPs for their preferred recreational activities.

This plan also suggests high priority area and species management recommendations to help guide invasive plant control efforts in the TLRA. These areas include the natural preserve, Tanana River access, motorized areas, and the gravel extraction areas. High priority species include those that were found at TLRA during a preliminary survey and are considered high priority because of their high invasiveness ranking.² Maps are provided in Appendix A with the locations of these high priority invasive species at TLRA.

Finally, this plan recognizes that the areas surrounding the TLRA are highly infested with invasive plants; ideally, invasive plant management will occur in the entire greater Fairbanks area. Recommendations are given to the FNSB, as a whole, to work with local agencies and organizations to provide invasive plant management throughout our community.

II. TLRA Area Map



Proposed site concept for summer use at the TLRA. This map provides an image of the future layout of TLRA and shows the locations of the high priority areas included in this plan, which include: gravel extraction areas, Tanana River access, preserved area, and motorized recreational areas (ORV park).

Map provided by FNSB Parks and Recreation Department.

III. TLRA Project Development Phase Recommendations

The TLRA project development phase is projected to span 15-20 years³ with efforts being led by FNSB, Parks and Recreation Department Project Coordinator, Steve Taylor. Gravel extraction activities will continue throughout this process along with other development activities. Initial activities will include revegetation efforts and development of a boat launch and access to the Tanana River, picnic areas, and a swim beach. Many of the development activities will lead to soil disturbance that could exacerbate existing invasive plant infestations or provide avenues for new introductions. This project development phase is an ideal time to begin invasive plant management and prevention activities.

Funding for the TLRA is largely allocated to project development activities with multiple shortfalls that still need to be accounted for. Invasive plant management is most effective, both in terms of cost and efficacy, when action is taken when populations are small. While this is the most cost-effective time to manage invasive plants, some funding is still necessary. Fortunately, there are some low-cost actions that can be taken at this time. Grant funds may also be an option.

1. Implement Best Management Practices (BMPs) for Construction and Development Activities

The following BMPs are adapted from Appendix 4 of the Municipality of Anchorage Invasive Plant Management Plan.⁴ This more complete and detailed list of BMPs is included in full in Appendix B of this plan.

- During project design and planning, survey the immediate area for high priority invasive plants and plan activities to limit the potential for invasive plant spread and introduction. Plan to enter highly infested locations last and/or when plants are not seeding. Also, plan ahead for revegetation needs so that disturbed soil will not remain for long periods of time.
- For revegetation and landscaping activities, always use native or non-invasive plant species and weed-free landscape materials, such as soil and mulch. Do not plant Siberian pea shrub or European bird cherry. These plants have been used widely in the Fairbanks area for landscaping purposes, but their invasive tendencies have recently become apparent, as they have spread into natural ecosystems in the area. Monitor areas where new materials have been brought in and remove any plants that were not intentionally planted. Avoid unnecessary soil disturbance; if needed, annual rye or oats can be used to temporarily stabilize soil and discourage invasive plant establishment. For information on native and appropriate non-native plant species and sources refer to The Revegetation Manual for Alaska⁵ or contact the Plant Materials Center.
- Some general measures to follow during construction and development activities include: clean vehicles and equipment of vegetation and soil clumps before entering sensitive areas and before leaving infested areas, minimize soil disturbance by using established roads and access points, and attempt to stabilize disturbed soils with mulch or vegetation as quickly as possible. Additionally, any invasive plant parts or infested landscaping material should be bagged and taken to the landfill to prevent propagule spread.

2. Form a Network of Invasive Plant Management Partners and Volunteers

- Coordinate with local agencies and organizations involved with invasive plant management, particularly with the Fairbanks Cooperative Weed Management Area (CWMA). Having a representative from FNSB attend monthly CWMA meetings would be an effective way to network with local agencies. Fairbanks CWMA contact: 907-479-1213, FCWMA.tech@gmail.com
- Collaborate with the U.S. Army to manage invasive plants on adjacently owned land. An invasive plant survey was recently completed for the Bonnifield trail (located southeast of the TLRA). The lead contact for this project is Josh Buzby, Range and Training Land Assessment (RTLTA) Coordinator; Center for Environmental Management of Military Lands (CEMML), US Army, Ft. Wainwright. Contact: 907-353-3016, Joshua.buzby@us.army.mil
- Form a 'Friends of TLRA' group to be involved in invasive plant management, trash clean up, and other beautification projects.
- Continue to organize and promote an annual 'Weed Smackdown' event to target highest priority species and areas for mechanical weed control.
- Provide small incentives, such as t-shirts, to volunteers that aid in weed management activities.



The Fairbanks Roller Girls team posing in front of the bags of invasive plants they pulled at the First Annual Weed Smackdown; June 2010. This was a volunteer, competitive weed pull event that, if continued can be used to help manage invasive plants within the TLRA. Photo by Laurel Devaney, USFWS

IV. TLRA Operational Phase Recommendations

The TLRA operational phase is anticipated to begin in three to five years, overlapping with the project development phase.⁶ The hiring of personnel assigned to the area will mark the beginning of the operational phase. This will provide the opportunity for invasive plant management to be integrated into daily operations. The recommendations listed above should continue to be utilized throughout the development and operational phase overlap time.

TLRA can provide multiple opportunities to both engage and educate park visitors in invasive plant management related activities. Many visitors will come to enjoy the natural resources of the park and will be interested in hearing how the FNSB Parks and Recreation Department is working to protect these resources. Kiosks at high-density visitor access points can help to educate visitors about invasive plants and how FNSB is involved. Information can also be provided for those wanting to be more directly engaged through volunteer activities at TLRA.

1. Integrate Invasive Plant Management and Monitoring into Daily Operations.

- Provide brief invasive plant education as part of the annual training to aid park staff in understanding the purpose for managing invasive plants and being able to identify the highest priority invasive plants. Contact the Fairbanks CWMA for local workshops being offered or for support developing training material.
- Incorporate invasive plant management into regular maintenance operations. See sections V and VI for high priority areas and species and methods of control.
- Perform regular monitoring of high priority areas for evidence of invasive plant spread or new introductions. Park personnel should prioritize areas for volunteers to target to get the best use out of limited resources.

2. Utilize Best Management Practices as Applicable to Specific User Groups

- Develop BMP brochures for specific user groups and make them available at the ranger station or in the specific area of use.
- Install a wheel wash station for off-road vehicle (ORV) users to help reduce the introduction of invasive plant propagules into areas where soil disturbance is inherent. Seek grant funding for this project with the perspective of reducing invasive plant spread and providing an educational demonstration opportunity.

3. Provide Education and Awareness Opportunities

- Install at least two educational kiosks to promote invasive plant awareness to park visitors. Work with the CWMA and local agencies to develop the content.
- At the kiosks, provide information for those who may want to assist in volunteer invasive plant management activities. Keep weed bags and instructional flyers at the ranger station for this purpose. Provide small incentives, such as t-shirts or admission passes, to those who participate.
- Promote current projects as demonstration sites with signs that describe control methods being used and anticipated completion dates.

4. Continue to Develop Network of Partners and Volunteers

- Continue to implement all recommendations listed under objective 3 of TLRA Project Development Phase Recommendations (Page 5)

V. Select Areas of High Priority

1. River Access/Crossing

The TLRA will provide boaters with access to the Tanana River. This will be a valuable asset to the community, but may also open avenues for invasive plant spread into remote natural areas of the state. Invasive plants found near river crossings and boat launches should receive higher priority for control efforts and resources. The boat launch area will be an ideal place for one of the educational kiosks.

White sweetclover is of particular concern. The seeds can float and remain viable in water. White sweetclover has been documented spreading into river floodplains and displacing native vegetation.⁷ White sweetclover is found in the TLRA in fairly dense infestations and near the Tanana River. Pull or trim this plant before seeding to prevent seeds spreading into the river system; see section VI, page 15 for additional control recommendations.

2. Natural Preserve

The eastern portion of TLRA will be preserved as a natural area providing wetland habitat for migratory birds with limited gravel extraction and low-impact recreational opportunities. This area is intended to be a natural preserve, making this a high priority place to manage invasive plants and prevent new infestations. Native plants, particularly wetland plant species, are vital to migratory bird habitat.

This area should be monitored annually for new and existing invasive plant infestations. All infestations in the natural preserve area should be targeted for eradication using the least toxic methods available. If herbicides are to be used, select those that are safe for use in and around water and take care to not impact native vegetation. However, during the scoping process many people indicated that they would not like to see herbicides used in this area. This would be a good area to focus volunteer resources.

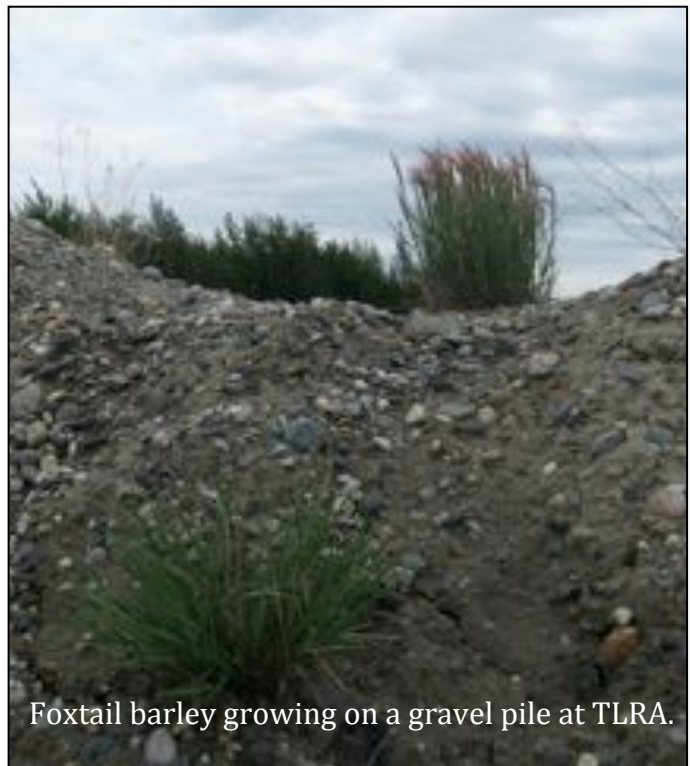
3. Motorized Recreational Areas

Motorized areas, particularly ORV locations, will be particularly vulnerable to invasive plant establishment due to high soil and vegetation disturbance. This area is not being maintained as a natural preserve, so invasive plants may not pose direct harm to the immediate area. However, this area can provide an avenue for introductions that once established can easily spread to nearby natural preserves and river crossings. For this reason, it will be worthwhile to monitor the area for high priority invasive plant species and provide control efforts as needed. Herbicides would be an effective tool in this area as it is a less sensitive area than the natural preserve. Preventative measures should also be utilized with a focus on cleaning vehicles before entering un-infested areas and after leaving any infested areas. The addition of a wheel wash station targeted to ORV users would prove a valuable tool in preventing the introduction of new invasive plant infestations.

4. Gravel Extraction Areas

Gravel extraction will occur within the TLRA for the next 20-25 years.⁶ Resource extraction and movement is a major pathway contributing to the spread of invasive plants. The gravel extracted from the Tanana Lakes Recreation Area will be used at the local landfill and multiple trips will be made between the landfill and TLRA on a daily basis. Unfortunately, the landfill is highly infested with invasive plants; vehicles coming from the landfill to TLRA may be introducing invasive plant propagules into the area. The utilization of a wheel wash station for trucks entering TLRA would be an effective tool to reduce the introduction of invasive plant propagules, however, it is unclear whether this would be a realistic obligation due to the number of trips that are made in a single day. A wheel wash station placed in a convenient location may help to alleviate the time investment needed. If this is not possible, then it will be important for all gravel moving equipment to remain on established roads and access points and remain clear of the natural preserve and other sensitive areas. Additionally, drivers should try to avoid driving through large infestations of invasive plants.

If invasive plants can be effectively managed to meet the North American Weed Management Association (NAWMA) weed-free gravel standards (Website: <http://www.nawma.org/>) there may be opportunities for the FNSB to gain additional income through the sale of weed-free gravel. Weed-free gravel is increasingly in demand for sensitive projects such as those near river crossings, wetlands, or recreational areas. Using weed-free gravel throughout the TLRA would also prevent future invasive plant infestations in a cost effective manner.



Foxtail barley growing on a gravel pile at TLRA.

VI. High Priority Species Recommendations

A preliminary invasive plant survey was done for portions of the TLRA. A more complete survey would aid invasive plant management and prioritization within the TLRA and should be done as resources allow. Eight high priority invasive plant species were found during the preliminary survey. Infestations are of varying severity from few individual stems to dense patches. Following is a brief description of each plant with recommendations for control. Appendix A includes maps showing species locations as documented during the preliminary survey.

Invasive plants, by definition, are difficult to control and often require an integrated weed management (IWM) approach where multiple tactics are combined for the most effective and

sustainable control. There are three primary methods of control: mechanical, cultural and chemical. Mechanical control methods are those that are done by hand or with machinery, such as hand pulling, weed trimming, mowing, or digging. Cultural control methods focus on providing water, fertilizer, shade or other resources to help desired species thrive while making conditions less favorable for undesired species. Chemical control methods involve the use of herbicides to kill an undesired plant. Herbicides can be used that are targeted very specifically to one or a few plants or those that are targeted to a broad group of plants. By law, herbicides must be used according to the label and only herbicides registered with the Alaska Department of Environmental Conservation (ADEC) may be used. To find herbicides registered by ADEC visit: <http://www.dec.state.ak.us/eh/pest/index.htm>. All control recommendations are adapted from Invasive Plant Inventory and Bird Cherry Control Trials (Phases I and II)^{9 & 12} and the UAF Campus Invasive Plant Management Plan.¹³

Species listed in alphabetical order by common name



Bird vetch, *Vicia cracca*, is a perennial legume plant that has weak stems with tendrils, purple flowers, and seedpods. This plant can climb and cover trees, vegetation, and fences. Dense growth of bird vetch over trees and shrubs can result in reduced photosynthesis and dieback of these plants. Bird vetch has been documented growing into undisturbed natural areas. Bird vetch reproduces by abundant seed production and vegetative spread. Relatively heavy seeds shoot out from seedpods and can easily get caught up in tangled vegetation attached to maintenance equipment. The seeds are thought to be viable for five to seven years.⁸

Status: While dense infestations of bird vetch can be found throughout Fairbanks, the TLRA is fortunate to have only a few isolated patches. These patches should be a high priority because this species is very difficult to control once populations are large. It should be noted that there are native legumes at TLRA including *Astragalus alpinus* and *Hedysarum alpium*. To distinguish bird vetch from native legumes look for the tendrils at the end of the bird vetch stems.



Bird Vetch, *Vicia cracca*

Control: A combination of mechanical and chemical methods should be used to control bird vetch. Before flowering the plants should be hand-pulled or mown/trimmed near the base of the stem. If time permits roots should be removed; bird vetch may reproduce from rhizome fragments Repeat this every six weeks until the end of the growing season. Survey the surrounding area for new plants. Monitor and continue treatment, as needed, until the seed bank is depleted, or at least five years. If plants remain after five years, herbicides should be used to control the existing infestation. Herbicides can also be used earlier in the process to potentially eradicate an infestation within a shorter time frame and with fewer control treatments per season.⁹

Distinguishing tendrils found on bird vetch and not on native legumes in the area.

Description: European bird cherry, *Prunus padus*, is a deciduous tree with dark green leaves, white flowers, and black cherry fruit. It reproduces by seed and bare root. The main method of seed dispersal is by birds that eat the fruit and spread the seeds through their droppings.⁸ European bird cherry has become established in south central Alaska and has caused displacement of native species in several Anchorage streams. Research is currently underway to determine whether there are ecosystem effects beyond displacement.¹⁰ In the Fairbanks area, European bird cherry is established along the Chena River and in the Creamer's Field area.¹¹

Status: Several bird cherry seedlings and small plants were found at TLRA during the preliminary survey. A few were larger, approaching six feet (see photo below). There are no known bird cherry trees planted in this area, so it is likely that those present are the result of birds spreading the seeds through their droppings. Bird cherry should be a high priority for control so that it does not become established within the TLRA or along the Tanana River.

Control: For small seedlings, hand pulling can be an effective method, however beyond the seedling stage roots are well established and difficult to remove. For small and large established bird cherry plants, cut to the base of the trunk and apply an approved herbicide. If herbicide is not an option then continually monitor the cut stump and trim any shoots that resprout. Creating a depression in the stump and covering with soil would allow rainwater and organic matter to contribute to an anoxic environment that would speed decay of the tree stump.¹²



European bird cherry, *Prunus padus* (photo by Tricia Wurtz, USFS FHP)

Bird cherry growing at the TLRA. Picture on right shows well-established roots on a relatively small plant.



Foxtail barley, *Hordeum jubatum*
(Photo by Darcy Etcheverry, AACD)



Foxtail barley infestation at TLRA.

Foxtail barley, *Hordeum jubatum*, is a perennial grass that produces a pale green to purple bristly spike that fades in color with maturity. This plant reproduces primarily by seed. The seeds are easily dispersed by wind and by attaching to animal fur and hooves. If swallowed the seeds can pose a significant health concern to livestock, dogs, and wildlife.⁸

Status: Foxtail barley is found throughout the TLRA, sometimes in large and dense patches. Fortunately the natural preserve areas are less infested, although foxtail barley is present throughout. It may not be possible to eradicate this plant from the TLRA so priority should be given to the natural preserve areas and, perhaps due to health hazards, areas where dog walkers and/or horse riders may frequent.

Control: Foxtail barley can be very difficult to eradicate once established. Plowing and herbicides can be effective in the short term, but are unlikely to provide long-term control unless combined with other strategies. Weed pulls may be an effective form of control for small patches and can be used for education. Digging up the plant and roots can also be effective. For all control methods a follow up planting should be prepared because if bare ground remains foxtail barley will quickly colonize disturbed sites. Mowing, trimming, and plowing can be used to reduce seed set.¹³



Narrowleaf hawksbeard, *Crepis tectorum*



Narrowleaf hawksbeard grows in dense infestations of single stems mixed in with other vegetation.

Narrowleaf hawksbeard, *Crepis tectorum*, is an annual plant with yellow ray flowers. A single, sometimes branched, stem grows from a deep taproot. Reproduction is solely through abundant seed production. Seeds are easily dispersed by wind.⁸

Status: Narrowleaf hawksbeard can be found throughout the TLRA. It is particularly dense along roadsides. Because of its prevalence, priority should be given to those infestations within the natural preserve areas.

Control: For small infestations in undisturbed natural areas, repeated hand pulling or herbicide should be used. Hand pulling must be done before seed set and the entire root should be removed; all material should be bagged as plants in the asteraceae family can produce viable seed even after being pulled. Mowing or trimming can also be used if the plant can be identified before flowers are open. Repeat efforts after a few weeks to control seedlings that may have been overlooked. Monitor annually until no hawksbeard has been found at the site for at least one year.⁹

These same methods can be used for larger infestations or long continuous populations, but they are likely to prove too time and cost intensive. For these areas a focus on best management practices to prevent spread should be used. For example, park vehicles and equipment should be cleaned before entering non-infested locations.⁹

Perennial sowthistle, *Sonchus arvensis*, is a perennial plant that belongs to the asteraceae family. This plant is closely related and bears resemblance to the dandelion including having a milky sap. However, this species can grow 2-4 feet tall and the leaves have prickly margins. Sowthistle can reproduce by seed and by aggressive vegetative growth. One plant can produce 4,000 to 13,000 seeds, which may remain dormant up to six years. Wind, animals, vehicles, equipment, and contaminated seed or hay can disperse seeds. This plant cannot be controlled through most mechanical means because the root breaks off easily and rhizome fragments can re-sprout, thus exacerbating an infestation.⁸

Status: Perennial sowthistle was found at four separate locations during the preliminary survey. The industrial area surrounding the TLRA is heavily infested with sowthistle, so there are likely more infestations in the TLRA that have not yet been bound. The infestations present are relatively small and priority should be given to eradication before the populations become larger and more difficult to control.

Control: Spot spray herbicide applications are the preferred management action because of the difficulty in controlling this plant mechanically. If mechanical methods must be used it will be important to dig up the entire plant, including roots and soil, and incinerate or bag all removed material. For large infestations where this is not possible, repeatedly mow and trim before flowers bloom to prevent seed set. This will not eliminate the existing infestations, but may prevent seeding that can contribute to new infestations.¹³



Perennial sowthistle grows in clumps with all stems connected by underground rhizomes. Mechanical methods of control that break rhizomes may exacerbate infestations.



Perennial sowthistle, *Sonchus arvensis*



Quackgrass, *Elymus repens*, is a rhizomatous perennial grass with broad flat leaves and solitary spikelets. This plant can easily be confused with *Lolium*, *Agropyron*, and other *Elymus* grasses; identification should be certain before management actions are implemented. Quackgrass is a successful competitor of crops and native forbs and grasses. It may be a successful invader following fire disturbances. This plant spreads by seeds and aggressive vegetative growth. Small fragments of root will resprout. Seed production can reach 400 seeds per stem and vegetative spread can be up to 3 m per year with the potential to produce up to 200 new shoots.⁸

Status: Two isolated patches of quackgrass were found at the TLRA on the west side of the park, just north of the lake. These patches should be a high priority for eradication.

Control: Herbicides are most effective because of this plant's potential for aggressive vegetative spread. For small infestations digging up the plant with complete removal of roots may be effective. All plant material should be incinerated or bagged.¹³

Upper Left: **Quackgrass, *Elymus repens***

Lower Left: Thick and sharp rhizomes
(Photos by Darcy Etcheverry, AACD)

White sweetclover, *Melilotus albus*, is a biennial legume. The second-year plants have branching stems, vertical spikes of white flowers, and grow 2 to 6 feet tall. This species reproduces primarily by seed. One plant can produce up to 350,000 seeds that may remain viable for 80 years and are easily distributed by wind, water and vehicle tires. This plant resprouts when cut. White sweet clover is a dominant species along many roadsides. It can invade undisturbed habitats and is of particular concern along waterways.⁸ **Yellow sweetclover (*Melilotus officinalis*)** may also be found at TLRA. This plant is very similar to white sweetclover in its biology and effective control methods. The following recommendations apply to yellow sweetclover as well.

Status: White sweetclover is found throughout the TLRA with the densest infestations found along roadsides. There are also abundant infestations found within the gravel extraction areas. Priority should be given to those infestations found near the Tanana River (within 500 feet) and within the natural preserve areas.

Control: Hand pulling can be an effective form of control for second year plants if done before the plant is flowering and care is taken to remove all roots. For large plants it may be difficult to remove the well-established root. If the root is not removed the plant will resprout. It is best to revisit the site every few weeks to check for missed plants. In the fall it may be possible to hand pull first year plants. For large infestations trimming can be used, but the plant will regenerate so this control will need to be repeated every 1-2 weeks throughout the season. Herbicides can be used for a less energy intensive method of control. Only herbicides approved for use near water bodies should be used near the Tanana River and wetland areas. Control sites should be visited annually and re-treated as needed.⁹ **(See photos, next page)**



White sweetclover, *Melilotus albus*
(Photo by Darcy Etcheverry, AACD)



Roots of white sweetclover can grow very large, making pulling difficult.



Yellow toadflax, *Linaria vulgaris*
(Photo by Darcy Etcheverry, AACD)

Yellow toadflax, *Linaria vulgaris*, is a perennial plant that grows in clumps connected by rhizomes. It has thin green leaves and, arranged in a vertical cluster, are yellow to orange flowers with a one-inch throat at the base. Clumps of toadflax can be very successful at crowding out other species through vegetative spread. Root fragments as small as ½ inch can regenerate. Seed production is very high and seeds remain viable for up to 10 years. Wind, water, vehicles, equipment, and animals can disperse seeds. This species needs disturbed area to become established, but once established it can spread into undisturbed areas.⁸

Status: One small population was found on the west side of TLRA, north of the lake that will provide access to the Tanana River. This infestation should be a high priority for control.

Control: This plant can be difficult to manage through mechanical methods; however, since there is only one patch it may be possible. Beginning one month after snowmelt identify the stems and dig up stems and rhizomes. Scout the area for new plants and revisit the area once a month to provide ongoing control. If this does not work after one to two years of effort, herbicides may be required.⁹

VII. Potential Invaders

Prevention is the most cost effective method of invasive plant control. There are multiple invasive plants that are found in other parts of Alaska but that are not currently found in the TLRA. Taking basic prevention measures as described above should help to prevent the introduction of new invasive plants. Still, it is wise to monitor for select potential invaders that may cause the most harm so that, if found, Early Response/Rapid Detection (EDRR) measures can be taken. Listed here are some invasive plants that are more likely to cause problems in wetland environments, as well as a few others that can be particularly difficult to control once established.



Photo by Tricia Wurtz, USFS FHP

Canada thistle, *Cirsium arvense*, is a perennial plant with spine-tipped, lobed leaves and purple flowers. Canada thistle reproduces by seed and aggressive vegetative growth. Seeds are a common contaminant in crop seed and hay and are easily spread by vehicles. This plant was successfully eradicated in Delta Junction following a multi-year herbicide control effort and is currently widespread in Anchorage. If found, a combination of herbicides and digging up the entire plant will be most effective. Incinerate all removed material.⁸



(Photo by Darcy Etcheverry, AACD)

Ornamental jewelweed, *Impatiens glandulifera*, is an annual plant that grows 3-5 feet tall and has irregular white to pinkish-red flowers. Reddish stems are hollow, smooth, and hairless with oppositely arranged leaves. This plant reproduces entirely by seed. Seeds explode from a capsule fruit when ripe and can eject up to 20 feet. Seeds can remain viable in water and this plant is an invader of wetland and stream habitats.⁸ This plant has been found in the Fairbanks area.

Hand pulling or digging is effective for small populations and mowing is effective for larger populations. All removed plant material should be bagged or incinerated because cut plants can resprout. The seed bank can be very large and sites should be monitored for seedlings for 1-2 years.



(Photo by Steve Dewey, Utah State University, Bugwood.org)

Purple loosestrife, *Lythrum salicaria*, is a perennial plant that grows in a bush-like clump with multiple stems growing from a single rootstock. The flowers are rose-purple and arranged in vertical raceme. Purple loosestrife reproduces by seed and vegetatively. One plant is capable of producing more than two million viable seeds. This species is a successful invader of wetland habitats.⁸

Mechanical and chemical control methods are largely ineffective for established populations so prevention and early detection is vital. For small populations dig up entire plant, including roots, and bag up or incinerate all removed material.⁸



(Photo by Darcy Etcheverry, AACD)

Reed canarygrass, *Phalaris arundinacea*, is a perennial grass with flat leaf blades and flowers arranged in dense, branched panicles. Two identifying characteristics are a single flower per spikelet and an open, branched inflorescence. Reed canarygrass reproduces from seed and vegetatively. Vegetative growth is by creeping rhizomes and can be very aggressive. This plant is a successful invader of wetlands and is very difficult to control once established.⁸ This plant has been found in the Fairbanks area.

Mowing, burning, herbicide, and tarping can all be effective methods of control. Control efforts will be most effective if done in late spring after the plant has achieved some growth, but before it has set seed. Control work should continue for 4-5 years.⁹

VIII. FNSB-Wide Recommendations

The TLRA is an important place to begin invasive plant management because of its migratory bird habitat and the access it provides to the Tanana River floodplain, however, it is a small part of a much larger community. The Greater Fairbanks area is fortunate to have fewer invasive plant infestations than the lower 48 states and even than other large cities in Alaska, but there are still some invasive plant infestations in our area. To be successful, invasive plant management needs to occur on a larger scale with consideration given to the surrounding areas. These recommendations are targeted to the FNSB as a whole, with encouragement that FNSB work with the City of Fairbanks and other partners to manage invasive plants in the greater Fairbanks area.

1. Develop Roadside Mowing Schedules Designed to Reduce Invasive Plant Propagules

The FNSB, City of Fairbanks, and Alaska Department of Transportation and Public Facilities (DOT&PF) should work together to develop and utilize a mowing plan for the greater Fairbanks area to determine high priority areas and appropriate timing for mowing invasive plant infestations to prevent further seed spread. The FNSB should present the research and coordinate with road service areas to encourage the mowing plans be adopted in each district.

2. Hire a Weed Management Coordinator

The FNSB would benefit from having a seasonal weed management coordinator to provide organization, hands-on work, regulation, and prioritization for invasive plant management on FNSB-owned lands. Several federal and state agencies employ persons that are responsible for invasive plant management under their land jurisdiction; it would be beneficial to model these established positions when developing a similar job within the borough.

3. Participate in the Fairbanks Cooperative Weed Management Area (CWMA)

The Fairbanks CWMA provides a forum for members from local agencies and organizations involved in weed management to collaborate on local weed management

issues. Having a member from FNSB attend these meetings would allow the FNSB to participate in weed management efforts, prioritization, and resource coordination.

4. Work with Local Agencies and Other Partners for Community-Wide Invasive Plant Management

The FNSB should coordinate with local agencies and organizations that are involved in invasive plant management. These agencies include, but may not be limited to:

- **City of Fairbanks**
- **Fairbanks Cooperative Weed Management Area (CWMA)**
- **US Fish and Wildlife Service (USFWS)**
- **US Forest Service, Forest Health Protection (USFS, FHP)**
- **UAF Cooperative Extension Service (CES)**
- **Fairbanks Soil and Water Conservation District (FSWCD)**
- **U.S. Army**
- **Alaska Department of Transportation and Public Facilities (DOT&PF)**

IX. Conclusion

The TLRA will be a unique and valuable resource to FNSB residents providing multiple recreation opportunities in one easily accessible location. This area is worth protecting as a natural area with native plant and animal species. However, with increased soil disturbance from development activities and a greater influx of people to the area, active invasive plant management will be required to maintain this natural state. Fortunately, there are several organizations and agencies in the greater Fairbanks area that are involved in invasive plant issues and can help support invasive plant management activities at TLRA and in other areas of the FNSB. By following the simple recommendations listed in this plan, the FNSB can help protect the TLRA and be a model of invasive plant management to our community.



Native sedge growing in the TLRA wetlands area

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All photos by Marie Heidemann unless otherwise cited.

Appendix A: Preliminary Survey Maps

During the month of June, Darcy Etcheverry (AACD) and Marie Heidemann (UAF) performed a preliminary invasive plant survey of the TLRA. For each high priority invasive plant found a GPS point was taken and data recorded in accordance with the Alaska Exotic Plant Information Clearinghouse (AKEPIC, Website: <http://www.eddmaps.org/alaska/report/report.cfm>) methods. Plants were considered high priority based on their high invasiveness ranking as determined by the Alaska Natural Heritage Program (ANHP, Website: http://akweeds.uaa.alaska.edu/akweeds_ranking_page.htm). This was not a complete survey; the map below shows the areas, outlined in red, that were not surveyed. The following maps provide species location information for each of the eight species found at the TLRA. The numbers correspond to the TLRA Preliminary Invasive Plant Survey excel sheet, which provides more information about the infestation. These maps and the corresponding excel sheet should prove useful for future survey and control efforts.



Number of species per site and areas that were not surveyed.



Bird vetch (*Vicia cracca*) and European bird cherry (*Prunus padus*) locations at TLRA; preliminary survey by Darcy Etcheverry and Marie Heidemann.



Foxtail barley (*Hordeum jubatum*) and Narrowleaf hawksbeard (*Crepis tectorum*) locations at TLRA; preliminary survey by Darcy Etcheverry and Marie Heidemann.



Perennial sowthistle (*Sonchus arvensis*) and Quackgrass (*Elymus repens*) locations at TLRA; preliminary survey by Darcy Etcheverry and Marie Heidemann.



White sweetclover (*Melilotus albus*) and Yellow toadflax (*Linaria vulgaris*) locations at TLRA; preliminary survey by Darcy Etcheverry and Marie Heidemann.

APPENDIX 3

BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are a series of guidelines or minimum standards of practical methods designed to prevent or reduce the introduction, establishment, and spread of weeds. This Plan does not suggest that BMPs are mandatory for owners or managers of private land, but landowners and managers that choose to follow BMPs will minimize the introduction and impact of invasive plants on their land. These practices must be effective and feasible while avoiding or minimizing adverse impacts to natural and cultural resources and maintaining ecological integrity. BMPs should achieve a balance between preventing and controlling weeds and the maintenance and development of land and road systems.

A thorough understanding of BMPs and the flexibility in their application are of vital importance in selecting which practices to use. BMPs offer site specific prevention or control and there may be more than one correct BMP to utilize at any give site. Therefore, BMPs may be different for the Department of Transportation (DOT), MOA maintenance department, construction crews, recreationists, and land owners. The intent of this guide is to promote better weed management on both public and private lands in the MOA. This appendix outlines environmentally responsible weed management methods which, when applied properly, minimize adverse impacts on ecosystems. Unusual situations may arise or strategies other than those recommended here may be more appropriate. In most cases, common sense is most often the best guide. BMPs are intended as concepts to be tailored by individuals or user groups.

The document is structured as in the following example, adapted from the Wisconsin Council on Forestry Forest Invasives document entitled: Best Management Practices for Preventing the Spread of Invasive Species by Outdoor Recreation Activities in Wisconsin:

Section Number: Example

BMP E-1: Weed BMPs are in bold and underlined with a number indicating the section and the BMP. These statements describe voluntary practices that reduce the impact of invasive species.

Suggestions:

- BMP Suggestions are listed below the BMP Statement.
- BMP Suggestions give more information about why the BMP is important.
- BMP Suggestions introduce items that could be used to address the BMP; they will not apply to every species or situation, and the user does not *necessarily* have to follow them to address the BMP (i.e., they are optional).

Section 1: Project Design and Planning

BMP P-1: Survey for weeds during the design phase of the project. The survey should be consistent with the extent and intensity of planned operations. Knowing which weeds are present, and where, is necessary to calculate risks and plan for appropriate management.

Suggestions:

- Integrate surveys into normal environmental assessments.

- The extent and intensity of the survey should reflect the potential threat posed by weeds that are in or are likely to occur in the area.
- The survey should include areas within and around the project vicinity, and at likely introduction sites such as access points, parking lots, and staging areas.
- The survey should include a buffer in accordance with disposal mechanisms of weeds present, accounting for wind, water, etc.
- Coordinate among multi-use entities for the same project area.

BMP P-2: Assess the threat of each weed infestation and plan for management accordingly.

Suggestions:

- Whenever possible, operations should be modified to avoid the further spread of weeds.
- Allocate time and resources for post-treatment follow-up control measures.
- Plan for management actions based on:
 1. Invasiveness of the weed species¹;
 2. Severity of the current infestation
 - a. Modify project plans to limit movement of soil and equipment from infested project areas to non-infested areas;
 3. Additional habitat at risk for invasion;
 4. Economic and environmental impacts of the infestation and control actions.

BMP P-3: Prior to construction, plan activities to limit the potential for introduction and spread of weeds.

Suggestions:

- Planning includes developing budgets, schedules, and management options.
- Consider the likely response of weedy species when prescribing activities that result in soil disturbance or increased sunlight.
- Time construction activities for optimum weed control
 1. Should control efforts occur prior to, after or concurrent with the activity?
 2. Can the activity be postponed until an infestation can be treated?
*Note that effective pre-treatments may need to occur one or more years prior to the activity.
 3. What time of the season will minimize introduction and movement weeds?
- Plan for appropriate cleaning of equipment. Make prior arrangements for cleaning in conjunction with construction activities.
- Exclude weed infestations from activity boundaries.
- Plan to enter areas with weed infestations last.
- Avoid creating soil and site conditions that promote invasive plant germination and establishment. Minimize soil disturbance to no more than needed to meet project objectives.
 1. Consider the impacts of different types of equipment.
 2. Plan to retain soil and native vegetation in and around the activity area to the greatest extent possible.
- Whenever possible, plan to work under conditions that minimize the risk of spread, e.g., frozen ground, snow cover, absence of seeds/propagules, etc.

BMP P-4: Select appropriate species for revegetation and landscaping activities. DO NOT plant species known or suspected to be invasive in Alaska.

Suggestions:

¹ Alaska Natural Heritage Program weed ranking project: http://akweeds.uaa.alaska.edu/akweeds_ranking_page.htm

- **Do not sell, purchase, or plant weeds or their propagules.** Table BMP1 is a list of species that are invasive in Alaska and should never be planted in the MOA. The table consists of species in the “A-list” and “B-list” of the ABC-U prioritized management list of non-native plants in the Municipality of Anchorage. This is not an all inclusive list. *Questions regarding specific species should be directed to the University of Alaska Cooperative Extension Services at (907) 786-6300.*

Table BMP1

Species	Common name
<i>Campanula rapunculoides</i>	creeping bellflower
<i>Centaurea stoebe</i>	spotted knapweed
<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Hieracium aurantiacum</i>	orange hawkweed
<i>Hieracium umbellatum</i>	narrowleaf hawkweed
<i>Hypericum perforatum</i>	common St. Johnswort
<i>Impatiens glandulifera</i>	ornamental jewelweed
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Linaria vulgaris</i>	butter and eggs
<i>Lupinus polyphyllus</i>	large-leaf lupine
<i>Lythrum salicaria</i>	purple loosestrife
<i>Medicago sativa</i> ssp. <i>falcata</i>	yellow alfalfa
<i>Melilotus alba</i>	white sweet clover
<i>Melilotus officinalis</i>	yellow sweet clover
<i>Myosotis scorpioides</i>	marsh forget-me-not
<i>Phalaris arundinacea</i>	reed canarygrass
<i>Polygonum cuspidatum</i>	Japanese knotweed
<i>Polygonum x bohemicum</i>	bohemian knotweed
<i>Prunus padus</i>	European birdcherry
<i>Prunus virginiana</i>	choke cherry
<i>Ranunculus acris</i>	tall buttercup
<i>Ranunculus repens</i>	creeping buttercup
<i>Senecio jacobea</i>	tansy ragwort, stinky Willie
<i>Silene latifolia</i> ssp. <i>alba</i>	bladder campion
<i>Sonchus arvensis</i>	perennial sowthistle
<i>Tanacetum vulgare</i>	common tansy
<i>Thlaspi arvense</i>	pennycress
<i>Tragopogon dubius</i>	yellow salsify, goatsbeard
<i>Vicia cracca</i>	bird vetch, dog pea

- Identify sources of native and appropriate nonnative materials. Contact the Alaska Plant Materials Center at 907-745-4496 or visit <http://dnr.alaska.gov/ag/NEWintroduction.htm> for more information and an up-to-date Directory of Alaska Native Plant Sources
- When seeding and/or planting, use native species or non-native species that are not invasive.

BMP P-5: Do not purchase or sell plant or landscape material that suspected to be *infested* with weeds or their propagules.

Section 2: Soil Disturbance and Stabilization

BMP S-1: Minimize or avoid unnecessary soil disturbance. Use existing roads, access points, staging areas and alternative construction. Ground disturbance may uproot existing vegetation and expose soil, creating a seedbed for weeds that overwhelm desirable vegetation.

Suggestions:

- After a soil disturbance, encourage prompt regeneration of desirable vegetation or cover exposed soil with a layer of mulch to reduce germination or introduction of weeds.
- Monitor work sites for weeds for a minimum of two years after project completion. Always treat new infestations.

BMP S-2: Minimize the introduction and spread of weeds during soil disturbance activities.

Suggestions:

- Excavated material from weed infested areas may be reused within the exact limits of the infestation.
- Excavated material that contains weedy plant material and is not reused within the limits of the infestation should be stockpiled until the remaining weedy material is destroyed.
- Store topsoil along the perimeter of the project for later use within the project site. If the stored topsoil will sit for longer than one growing season, seed it a native or non-invasive seed mix.

BMP S-3: Stabilize disturbed soils as soon as possible.

Suggestions:

- Materials such as fill, loam, mulch, hay, rip-rap, and gravel should ***not*** be brought into project areas from sites where weeds are known to occur. If the absence of weedy plant parts in these materials cannot be guaranteed, work sites should be monitored for the emergence of weeds for a minimum of two years after project completion.
- Use weed-free mulch, sand, and gravel. Weed free materials may not be necessary for buried layers

BMP S-4: Use non-invasive or native seeds and plants for revegetation. DO NOT plant species known or suspected to be invasive in Alaska.

Suggestions:

- **Do not sell, purchase, or plant weeds or their propagules.** Table BMP1 is a list of species that are invasive in Alaska and should never be planted in the MOA. The table consists of species in the "A-list" and "B-list" of the ABC-U prioritized management list of non-native plants in the Municipality of Anchorage. This is not an all inclusive list. *Questions regarding specific species should be directed to the University of Alaska Cooperative Extension Services at (907) 786-6300.*
- Identify sources of native and appropriate nonnative materials. *Contact the Alaska Plant Materials Center at 907-745-4496 or visit <http://dnr.alaska.gov/ag/NEWintroduction.htm> for more information and an up-to-date Directory of Alaska Native Plant Sources*
- When seeding and/or planting, use native species or non-native species that are not invasive. Use a non-persistent cover crop, such as annual rye or oats that can be used to temporarily stabilize the soil and discourage the establishment of invasive weeds.

Section 3: Movement and Maintenance of Equipment

BMP M-1: If work in areas containing weeds cannot be avoided, maintenance and construction equipment should be used in weed free areas first, then transported to infested areas whenever possible.

BMP M-2: Prior to moving equipment out of an infested area clean soils and propagules from exterior surfaces, to the extent practical.

Suggestions:

- All equipment, machinery, and hand tools should be cleaned of all visible soil and plant material before leaving the project site.
- Equipment should be cleaned at the sight of the infestation.
- Methods of cleaning include, but are not limited to (use most effective method that is practical):
 1. Brush, broom, or other hand tools (used without water);
 2. Car washes;
 3. High pressure air (diesel trucks may have air tank);
 4. Steam cleaning
- Do not clean equipment in or near water ways.

BMP M-3: Clean equipment during routine equipment maintenance activities.

BMP M-4: Use staging areas that are weed free to avoid spreading propagules.

Section 4: Revegetation and Landscaping BMP

BMP V-1 Use non-invasive or native seeds and plants for revegetation. DO NOT plant species known or suspected to be invasive in Alaska.

Suggestions:

- **Do not sell, purchase, or plant weeds or their propagules.** Table BMP1 is a list of species that are invasive in Alaska and should never be planted in the MOA. The table consists of species in the “A-list” and “B-list” of the ABC-U prioritized management list of non-native plants in the Municipality of Anchorage. This is not an all inclusive list. *Questions regarding specific species should be directed to the University of Alaska Cooperative Extension Services at (907) 786-6300.*
- Identify sources of native and appropriate nonnative materials. *Contact the Alaska Plant Materials Center at 907-745-4496 or visit <http://dnr.alaska.gov/ag/NEWintroduction.htm> for more information and an up-to-date Directory of Alaska Native Plant Sources*
- When seeding and/or planting, use native species or non-native species that are not invasive. Use a non-persistent cover crop, such as annual rye or oats that can be used to temporarily stabilize the soil and discourage the establishment of invasive weeds.

BMP V-2: Do not purchase, use, or sell plant or landscape material that are suspected to be infested with weeds or their propagules.

BMP V-3: Select plant materials that are site appropriate, healthy, and less susceptible to highly competitive weeds or other damaging pests and diseases. Diversify the planting material within the context of the project.

BMP V-4: Avoid unnecessary soil disturbance. See Section 2: Soil Disturbance and Stabilization.

BMP V-5: Inspect and clean clothing, footwear, and gear for soils and weed propagules before and after activities.

Suggestions:

- Carry appropriate cleaning equipment (i.e. wire brush, small screwdriver, boot brush) to help remove soil and plant propagules.
- Preferred locations for cleaning are those where weeds are already established and that are easily monitored for new infestations.
- Do not clean clothing, footwear, or gear in or near waterways.

BMP V-6: Prior to moving equipment out of an infested area clean soils and propagules from exterior surfaces, to the extent practical.

Suggestions:

- All equipment, machinery, and hand tools should be cleaned of all visible soil and plant material before leaving the project site.
- Equipment should be cleaned at the sight of the infestation.
- Methods of cleaning include, but are not limited to (use most effective method that is practical):
 1. Brush, broom, or other hand tools (used without water);
 2. Car washes;
 3. High pressure air (diesel trucks may have air tank);
 4. Steam cleaning
- Do not clean equipment in or near waterways.

BMP V-7: Revegetate disturbed soils as soon as feasible to minimize weed establishment.

Suggestions:

- Prior to revegetating, scout for and manage weeds that are germinating or resprouting within disturbed areas.
 1. Treatment options include herbicide use, tilling under, mowing, etc., and may be site or species specific.
- Mulching may aid revegetation. Use weed-free mulch.
- Utilize cover crops as temporary cover when there is a delay between disturbance and planting.

BMP V-8: Where site conditions permit, allow natural revegetation to occur.

Suggestions:

- Situations in which natural revegetation may occur include:
 1. The adjacent landscape contains no weeds.
 2. The adjacent landscape contains few weeds and the topsoil has been left intact.
 3. The adjacent landscape contains few weeds and the topsoil has been segregated and replaced during construction.
 4. The adjacent landscape is extensively infested by weeds and active revegetation will likely fail.
- While assessing the likelihood of natural revegetation, consider:
 1. Soil type
 2. Moisture levels
 3. Time of year

BMP V-9: Monitor and maintain revegetation sites.

Suggestions:

- Ensure that native or other non-invasive species have been used.

- Allow time and resources for post-activity follow-up control measures, due to persistent seed bank and resprouting.

BMP Section 5: Disposal of Vegetation and Infested Landscape Material

BMP D-1: Infested soils and weedy plant material must be covered for off site transportation.

BMP D-2: Avoid the use of wood chips, compost or other mulch that may contain weeds or their propagules.

BMP D-3: When weeds are cut or removed from a site, the spread of viable plant material must be avoided by rendering plant material nonviable.

The following methods can be used to destroy plant material:

- *Drying/Liquefying:* For large amounts of plant material or for plants with rigid stems, place the material on asphalt, tarps, or heavy plastic, and cover with tarps or heavy plastic to prevent the material from blowing away. For smaller amounts of plant material or for plants with pliable stems, bag the material in heavy-duty (3-mil or thicker) garbage bags. Keep plant material covered or bagged for at least one month. Material is nonviable when it is partially decomposed, very slimy, or brittle. Once material is nonviable, it can be disposed of in a landfill or brush pile.
- *Brush Piles:* Plant material from most invasive plants can be piled on site to dry out. Care must be taken to pile stems so that cut surfaces are not in contact with the soil. **NOT recommended for:** Any weed with seeds or fruit attached, unless plants can be piled within the limits of the infestation.
- *Burying:* Plant material from most weeds can be buried a minimum of three feet below grade. This method is best used on a site that already has disturbed soils.
- *Burning:* Plant material should be taken to a designated burn pile or incinerator. All necessary permits must be obtained before burning.
- *Herbicide:* Herbicide applications must be carried out by a licensed applicator with a permit from the Alaska Department of Environmental Conservation. Care must be taken to apply the proper herbicide of the most appropriate phenological stage.

Section 6: Excavated Material

BMP E-1: Excavated material taken from sites with weed infestations must not be used away from the site of the infestation until all viable plant material is destroyed. See Section 5: Disposal of Vegetation and Infested Landscape Material, BMP D-3.

Suggestions:

- Excavated material from areas containing invasive plants may be reused within the *exact* limits of the infestation.

BMP E-2: Any excavated material that contains viable plant material and is not reused within the limits of the infestation must be stockpiled on an impervious surface until all viable plant material is destroyed OR the material must be disposed of by burying a minimum of three feet below grade.

BMP E-3: Infested soils and weedy plant material must be covered for off site transportation.

Section 7: Mowing

BMP Mow-1: Some weeds such as purple loosestrife, oxeye daisy, Japanese knotweed, bird vetch, and European bird cherry, have the ability to sprout from stem and root fragments. For a complete list of species that can sprout from stem and roots fragments, contact *University of Alaska Cooperative Extension Services* at (907) 786-6300. **Mowing small populations of these plants should be avoided.** Other control options should be utilized.

Suggestions:

- Stake roadside infestations of these plants as “do not mow.”
- **Mowing large populations of these plants can be a viable management technique if it done before seed set and the plant material is bagged and disposed of after mowing.**
- All plant material must be rendered nonviable and extra care should be taken to avoid spreading plant fragments (Section 5: Disposal of Vegetation and Infested Landscape Material).

BMP Mow-2: Mowing weedy areas should occur prior to seed maturation.

BMP Mow-3: Mowing equipment should be cleaned daily and prior to transport to prevent the spread of propagules. This is particularly important if mowing occurs after seed maturation (See section 3: Movement and Maintenance of Equipment, BMP M-2).

Section 8: Private Land Owners

BMP L-1: Learn which plants are non-native and considered invasive in the Anchorage area and inventory your property for weed infestations. Refer to Table 1 in the Municipality of Anchorage Invasive Plant Management Plan, or online: <http://www.uaf.edu/ces/cnipm/plants.html> and <http://www.uaf.edu/ces/ipm/invasiveplants.html>.

BMP L-2: DO NOT plant species known or suspected to be invasive in Alaska.

Suggestions:

- **Do not sell, purchase, or plant weeds or their propagules.** Table BMP1 is a list of species that are invasive in Alaska and should never be planted in the MOA. The table consists of species in the “A-list” and “B-list” of the ABC-U prioritized management list of non-native plants in the Municipality of Anchorage. This is not an all inclusive list. *Questions regarding specific species should be directed to the University of Alaska Cooperative Extension Services at (907) 786-6300.*
- Identify sources of native and appropriate nonnative materials. *Contact the Alaska Plant Materials Center at 907-745-4496 or visit <http://dnr.alaska.gov/ag/NEWintroduction.htm> for more information and an up-to-date Directory of Alaska Native Plant Sources*

BMP L-3: Avoid creating conditions that promote weed germination and establishment.

Suggestions:

- Minimize soil disturbance.
- Retain shade to the extent possible to suppress weeds.
- Retain native vegetation and topsoil as much as possible.

BMP L-4: Require all equipment to be cleaned and inspected for weeds and their propagules before arriving on your property.

Suggestions:

- Mark off known infestations and request equipment operators to work in these areas last.

BMP L-5: Salvage weed-seed-free topsoil and replace it on disturbed areas.

BMP L-6: Do not purchase, sell, or use landscape material that is suspected to be infested with weeds or their propagules.

BMP L-7: Chip local, non-invasive brush for mulch.

Suggestions:

- Mature seeds in the brush can help restore localized vegetation on the site.

BMP L-8: Use certified weed-free hay or straw.

BMP L-9: Inspect all ground-disturbing projects for at least three growing seasons following completion of the project.

Suggestions:

- Weed seeds often last 5 to 50 years in the soil and pieces of root as small as ½ inch can start a new plant and a new infestation.
- Plan for follow-up treatments if weeds are detected.

BMP L-10: Educate neighbors about the impacts caused by weeds, including the effects on property values.

Section 9: Recreation

BMP R-1: Learn which plants are non-native and considered invasive in the Anchorage area.

Refer to Table 1 in the Municipality of Anchorage Invasive Plant Management Plan or online:

<http://www.uaf.edu/ces/cnipm/plants.html> and <http://www.uaf.edu/ces/ipm/invasiveplants.html>

BMP R-2: Wear outer layers of clothing and footwear that are not “weed seed-friendly.”

Suggestions:

- When appropriate (i.e. on dry, paved trails) wear low-tread footwear that does not hold soils, seeds, or other plant parts.
- Wear disposable shoe covers over footwear in infested areas or consider dedicating a pair of foot ware for use only on infested properties.
- Avoid exposing Velcro, bulky knits (*e.g.*, wool, fleece), pants with cuffs, and other fabrics or clothing styles that can carry seeds.

BMP R-3: Inspect and clean hair, clothing, footwear, and gear for soils, weeds and their propagules before and after recreating.

Suggestions:

- Use a stiff brush, stick, or small screwdriver to help remove soils, seeds, and plant parts.
- Cover or pull back long hair.
- Preferred locations for cleaning are those where:
 1. Invasive species are already established.
 2. Gear is unloaded and loaded
- Do not clean clothing, footwear, or gear in or near waterways.

BMP R-4: Prior to moving bicycles, equipment, vehicles, and trailers onto and off of an activity area, spray, scrape, or brush soils, seeds, and plant parts, from exterior surfaces.

Suggestions:

- Spray the undercarriage of all vehicles.
- Preferred locations for cleaning are those where:
 1. Invasive species are already established.
 2. Gear is unloaded and loaded
- Do not clean equipment, vehicles, or trailers in or near waterways.

BMP R-5: Inspect and remove soils, seeds, and plant parts from the coat and feet of animals and their clothing/gear before and after recreating.

Suggestions:

- Carry a grooming brush, shedding blade, small scissors, hoof knife, etc. to help remove soil and weed propagules from animals.
- Preferred locations for cleaning are those where:
 1. Invasive species are already established.
 2. Gear and animals are unloaded and loaded
- Do not clean animals in or near waterways.

BMP R-6: Properly dispose of soils, seeds, and plant parts found during inspection and cleaning. See Section 5: Disposal of Vegetation and Infested Landscape Material

BMP R-7: Stay on designated trails, roads, or other developed areas.

Suggestions:

- Minimize soil disturbance
- Destruction of native plants favors weeds.
- Avoid trails that are wet or muddy. If wet areas are encountered, go through them rather than around (if possible).

BMP R-8: When off trail, avoid areas that appear to be infested with weeds.

Suggestions:

- The chances of transporting soils, seeds, plant parts increase in heavily infested areas.
- Direct contact with some weeds can affect adversely human and animal health, including skin and eye irritation.

BMP R-9: Report weed infestations. To report weeds online: <http://akweeds.uaa.alaska.edu/> or <http://www.anchorageparkfoundation.org/projects/weedswarriors.htm>, or contact Alaska Cooperative Extension Services at (907) 786-6300.

BMP R-10: Properly dispose of all animal waste.

BMP R-11: Do not pick plants. Discarded flower or seed heads can spread weed seeds.

BMP R12: When using off-road vehicles, minimize soil displacement from the trail/roadway and soil degradation.

Suggestions:

- Avoid sudden stops and quick directional changes with acceleration or braking.
- Stay on the trail/roadway to not widen it so there is little or no compaction or impact outside the trail/roadway.
- In the winter, ride only when there is adequate snow cover and when the trail is firm or frozen.

REFERENCES

Perron, C. New Hampshire Department of Transportation. 2008. Best Management Practices for Roadside Invasive Plants. 33pp. <http://www.nh.gov/dot/bureaus/environment/documents.htm>

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