Spotted knapweed infestations lower the number and diversity of native plants with the potential to create large-scale and long-term ecosystem-level effects including reduced wildlife habitat and increased surface water runoff and subsequent erosion (Duncan et al. 2001).

Spotted knapweed is well adapted to a wide range of habitats including, but not limited to, open, forest, urban interfaces, and range lands. Although not well suited to riparian areas, it has been noted to invade stream banks and nearby meadows, where disturbance occurs or people visit. Though most common in disturbed sites, disturbance is not necessary for knapweed to establish itself. In Alaska, likely plant communities at risk are open riparian forests, bluffs along river systems, open spruce-birch forests, or sites with frequent natural disturbances. Sites such as steep slopes or recently burned areas with exposed mineral soil would be especially at risk.

Guidelines for Control Options

Management of spotted knapweed, as with other exotic weeds, will maintain healthy land-use objectives such as improving livestock forage, wildlife habitat, or quality recreational opportunities. Once spotted knapweed becomes established, it has proven quite difficult to manage. For that reason, by far the most desirable and cost effective control method that disturbs the soil surface may increase the potential for knapweed to thrive. If spotted knapweed, or any of the related species mentioned are found, please notify your local extension office immediately.

Figure 3: Spotted knapweed infestation near Missoula, Montana.

If populations are found early (i.e. patch size less than 1/10th acre) hand-pulling is a viable option for control. It is important to note that pulling knapweed plants can be difficult and must be timed so that seeds are not spread in the process. Pulled plants should be incinerated or bagged and taken to a waste collection facility. Gloves are recommended, as some people have been known to develop a reaction to the plant stems.

Chemical herbicides are recommended for the eradication of new infestations too large or difficult to pull. Although herbicides can be an effective, most are relatively broad spectrum in their effects, often removing many desirable native plants along with the target weeds. If knapweed has a spotty distribution, small spot treatments are a good strategy to limit the loss of native vegetation. Spotted knapweed does not flower in early spring, while the plant is still in the rosette stage. Due to long-lived seed, herbicides must be reapplied periodically. Herbicide treatments on large-scale infestations are most effective when combined with other control methods that enhance the competitive ability of desired plant species. Materials often ineffective because the plants will adapt a horizontal growth form and flowers will remain below the level of the soil, thus avoiding the herbicide. Grazing big game and goats has had limited success in states such as Montana and Idaho. However, any control method that disturbs the soil surface may enhance the competitive ability of desired plants to outcompete spotted knapweed.

Caution: Herbicides can be dangerous to the user and environment under and according to the label directions. Federal laws require that the user read, understand, and follow all label directions. Consult with a UAF Cooperative Extension Service office near you for more information on use of herbicides. Mention of a proprietary product does not constitute an endorsement by the USDA, nor a recommendation for use by the USDA, nor an endorsement by the user read, understand, and follow all label directions.

Photoshot Graphics

Cover photo: Sheep, Shepherd, USDA Forest Service, Alaska Region, State and Private Forestry.

Figure 1: Close-up, from the Burned Network, www.bugwood.org, The University of Georgia Cooperative Extension Service, Tifton, GA.

Figure 2: Story, from the Burned Network, www.bugwood.org, The University of Georgia Cooperative Extension Service, Tifton, GA.

Figure 3: Shephard, Ecologist, USDA Forest Service, Alaska Region, State and Private Forestry.

Figure 4: Box, from the Burned Network, www.bugwood.org, The University of Georgia Cooperative Extension Service, Tifton, GA.

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Cover photo: Spotted knapweed plant found along Saganagam Arm at Rainbows.
have significant economic and aesthetic impacts to both agriculture and wildlands. Spotted knapweed was first found in Alaska in Skagway in 1994. National Park Service employees immediately began a hand-pulling operation and due to their diligent control efforts, knapweed has not been found there since 1997 (Claudia Rector pers. comm.). A patch found in Valdez by the University of Alaska Herbarium staff in 2002 was pulled (Carolyn Parker pers. comm.), and approximately 100 new plants were again pulled at that location in 2003 (Jeff Conn pers. comm.). Also in 2003, a new location of three plants was found and pulled by forest employees south of Anchorage along Turnagain Arm and another single plant was found and pulled on Prince of Wales Island (Calle Mayn pers. comm.). In Skagway in 1994. National Park Service employees immediately began a hand-pulling operation and due to their diligent control efforts, knapweed has not been found there since 1997 (Claudia Rector pers. comm.). A patch found in Valdez by the University of Alaska Herbarium staff in 2002 was pulled (Carolyn Parker pers. comm.), and approximately 100 new plants were again pulled at that location in 2003 (Jeff Conn pers. comm.). Also in 2003, a new location of three plants was found and pulled by forest employees south of Anchorage along Turnagain Arm and another single plant was found and pulled on Prince of Wales Island (Calle Mayn pers. comm.).

**Spotted knapweed, *Centaurea biebersteinii* (alt. C. maritima, alt. C. stoebe ssp. micranthos (Asteraceae)), is one of the most pervasive weeds in western North America, originating from the grasslands of central Siberia. Several species within the genus originating from the grasslands of central Siberia, including *C. solstitialis* (star-thistle), *Acroptilon repens* (yellow star-thistle), and *Centaurea frigida* (Russian knapweed) have significant economic and aesthetic impacts to both agriculture and wildlands. Spotted knapweed was first found in Alaska in Skagway in 1994. National Park Service employees immediately began a hand-pulling operation and due to their diligent control efforts, knapweed has not been found there since 1997 (Claudia Rector pers. comm.). A patch found in Valdez by the University of Alaska Herbarium staff in 2002 was pulled (Carolyn Parker pers. comm.), and approximately 100 new plants were again pulled at that location in 2003 (Jeff Conn pers. comm.). Also in 2003, a new location of three plants was found and pulled by forest employees south of Anchorage along Turnagain Arm and another single plant was found and pulled on Prince of Wales Island (Calle Mayn pers. comm.).

**Spotted knapweed** is a concern for several reasons. Most notably, it is capable of growing in a wide range of conditions from highly disturbed roadsides to intact forest openings, often replacing the native vegetation and creating large monotypic stands (Figure 5).

**Life History**

Spotted knapweed reproduces solely by seed, with plants typically producing up to 1,000 seeds per year. Three species within the genus, *Centaurea maculosa* var. *lancifolia*, *C. solstitialis*, and *C. rhodanica*, are capable of growing long-lived and are able to remain stable in soil for eight or more years. The seeds are viable of germinating in both early spring and fall, and seedlings become established wherever adequate space and moisture are available. *C. maculosa* overwinters as a rosette and resumes growth in early spring. *C. solstitialis* produces new flower stalks each year and older stalks remain a green crust to the landscape. Flowers bloom from late August to late September. Individual flowers bloom for 2 to 6 days. *C. rhodanica* produces new stalks 8 to 10 days after blooming; seeds are rarely dispersed by birds and local wildlife, and rarely disperse by the wind.

**Description**

Spotted knapweed is a deeply tap-rooted perennial of the aster family. In the first year of growth, each plant produces a rosette of basal leaves (Figure 3). These deeply lobed leaves radulate from a common point and measure up to 6 inches long with leaf margins undulate about halfway to the midrib. In the following and subsequent years, new plants produce a rosette, one to ten multiply branched stems. Individual stems are generally 1 to 3 feet long, with stem height varying from 1 to 2 feet on dry upland sites to over 4 feet on sites receiving additional moisture. Each stem culminates in a single pinkish-purple flower, similar to that of the cultivated bachelor’s button, at the tip of each branch (Figure 2). Each flower has dark-colored hairs at the tips of the bracts, beneath the flower petals creating a spotted appearance that gives the plant its name. Finely divided stem leaves of mature plants arise from several points along the stem, with stems and foliage a distinctive gray-green color.

Diffuse and Russian knapweed share many common characteristics and both have the potential to infest agricultural areas, roadsides, and disturbed sites such as roadsides, fallow fields, and waste areas.

**Impacts**

Spotted knapweed is a concern for several reasons. Most notably, it is capable of growing in a wide range of conditions from highly disturbed roadsides to intact forest openings, often replacing the native vegetation and creating large monotypic stands (Figure 5).