THE TOWN OF VAIL WEED MANAGEMENT PLAN

The Town of Vail in accordance with "Colorado Weed Management Act", Title 35, Article 5.5-107, and through Eagle County Resolution No. 2000-45, will through it's own Title 5, Public Health & Safety, Chapter 1 Public Nuisances, 5-1-6: Undesirable Plants (1997 Code: Ord. 19 (1993)§ 1) will also designate the following plants as Noxious Weeds and/or Undesirable Plants.

	Common Name:	Scientific Name:
1.	Leafy Spurge	(Euphorbia esula L.)
2.	Russian Knapweed	(Centaurea repens L.)
3.	Diffuse Knapweed	(Centaurea diffusa Lam.)
4.	Spotted Knapweed	(Centaurea maculosa L.)
5.	Canada Thistle	(Cirsium arvense)
6.	Musk Thistle	(Carduus nutans L.)
7.	Plumeless Thistle	(Carduus acanthoids L.)
8.	Scotch Thistle	(Onopordum acanthium L.)
9.	Houndstongue	(Cynoglossum officianle L.)
10.	Whitetop/Hoary Cress	(Cardaria draba L.)
11.	Yellow Toadflax	(Lindaria vulgaris P.)
12.	Oxeye Daisy	(Chrysanthemum leucanthemum)
13.	Dalmatian Toadflax	(Lindaria damatica)
14.	Common Tansy	(Tanacetum vulgare)
15.	Scentless Chamomile	(Anthemis arvensis L.)
16.	Salt Cedar	(Tmarix chinensis)

The purpose of this weed management plan is to update the Town of Vail's undesirable plants list as set forth in "Colorado Weed Management Act", Title 35, Article 5.5-107, and through Eagle County Resolution No. 2000-45. The Town of Vail will annually will review and update our list of undesirable plants along with the Colorado Title 35, Article 5.5-107, and Eagle County Resolution No. 2000-45 or sooner if needed.

2004

I. Introduction:

The undesirable plants that have currently invaded our community have be come a threat to the economic and environmental value of land in Eagle County. These undesirable plants are not indigenous to this county and have no natural predators or diseases to keep them in check. They are rapidly displacing desirable vegetation causing a loss of productive wildlife grazing and recreational resources.

Our mission as stewards of our environment shall be to place our focus and purpose toward public and private partnerships, which we can use to build and implement an integrated weed management plan. As such, it

must provide for safe, cost effective and cause the least harm to people and the environment.
An integrated noxious weed management plan must include best practice strategies along with the Federal, State of Colorado, Eagle County, Town of Vail and Private land owners, working together to meet the challenges we now face in our state.

II. Goals of this plan:

- Adopting and Implementing "*Title 35 Article 5.5-107 The Colorado Weed Management Act"* and *Eagle County Resolution No. 2000-45* as it applies to Vail. The Town of Vail Code Title 5, Public Health & Safety, Chapter 1 Public Nuisances, 5-1-6: Undesirable Plants will automatically update along with all future revisions and amendments to *Title 35 Article 5.5-107 and Eagle County Resolution No.2000-45.*

- Education of the public and private landowners concerning weed management issues facing our community.

- Work with the Federal, State, County, Private landowners, and I-70 Corridor Communities within our Eagle County. Working together to implement *"Best Management Practices"*

- Identify, Inventory, and Map out undesirable plants currently in our community and use as a means to monitor our effectiveness and as a tool for future work plans.

III. Weed Management Methods:

The Colorado Weed Management Act (C.R.S. 35-5.5) states that integrated methods must be utilized in the management of weeds. Integrated methods include but are not limited to: Cultural, Chemical, Biological and Mechanical management.

Please understand that many or all of these methods may be inadequate for control as a stand alone solution. Particularly cultural, mechanical and biological methods will need support from one or more methods mentioned.

- **Cultural** – those methodologies or practices conducted to favor the growth of desirable plants over undesirable plants. Including but not limited to: maintaining an optimum fertility and plant moisture status in an area, and planting species most suited to an area. *(Grazing, Revegetation for wildlife)*

- **Erosion Control –** Healthy plant revegetation of all disturbed sites, with a 2 year warranty and extensive weed control during the re-growth period

- **Chemical** – the use of herbicides or plant growth regulators to disrupt the growth of undesirable plants. *(Herbicides)*

- **Biological** – the use of organisms to disrupt the growth of undesirable plants. *(Insects, Bacteria, Pathogens, Goats)*

- **Mechanical** – practices that physically disrupt plant growth including but not limited to: *(tilling, mowing, burning, mulching, hand pulling, and hoeing)*

1. **Leafy spurge** - (Euphorbia esula) a perennial that spreads by seed and creeping rootstocks. An extensive root system with vast nutrient reserves makes this plant extremely difficult to control.

   Management Methods:

a) Cultural: seeding perennial grasses can be an effective management tool. Early emerging plant species that utilize early season moisture such as smooth brone (bromus inermis) or crested wheat grass have reduced leafy spurge density and limited the spead and establishment of new infestations. Alfalfa can also be a good competitor with leafly spurge.[1]

b) Chemical: Contact an licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: grazing[2] with sheep or goats can stress leafly spurge making it more susceptible to other control methods. Apthona flava and Apthona nigriscutis are two species of flea beetles that have been introduced to attack leafly spurge. Adults feed on foliage during summer and lay eggs at the base of spruge plants. The larvae tunnel the soil and mine the roots as well as the fine root hairs. These insects along will not control leafly spurge but they can weaken the plant making it more susceptible to herbicde treatments or other control methods.

d) Mechanical: mechanical methods have not been proven to be an effective management tool on this plant.

   Comments: A complex of insects, grazing, plant disease and chemical methods will be necessary to stress the plant sufficiently to attain acceptable control.

2. **Russian Knapweed** - (Centaurea repens) A creeping perennial weed which once established, becomes extremely difficult to control. In heavy infestations few plants can grow in competition.

   Management Methods:

a) Cultural: dry range seeded with Crested wheatgrass can cause stress in knapweed by using up moisture for spring growth.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: a leaf & stem gall-forming nematode (Subanguina peridus) has been released in the U.S. This nematode had shown limited success in controlling Russian knapweed
d) Mechanical: due to the extensive energy reserves in the root system, removal of top growth alone will not provide adequate control of Russian knapweed. In fact recent studies have shown mowing to increase Russian knapweed density and stimulates growth.

3. **Diffuse Knapweed** - (Centaurea diffusa Lam.) is a biennial or short lived perennial which has become one of the most damaging rangland weeds in the Northwest inter-mountain area.

Management Methods:

a) Cultural: Seeding of Crested wheatgrass can inhibit the spread of Diffuse knapweed in dry climates

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: Two kinds of seed head gall flies (Uphora affins and Uphora quadrifaciata) attack the seed heads of Spotted knapweed. The larvae of the files induce galls in immature flower heads thus directing nutrients away from seed production. These flies will reduce seed production of the plant but not sufficiently to stop its spread.

d) Mechanical: Deep plowing can reduce the stand density.

4. **Spotted Knapweed** - (Centaurea maculosa) is a biennial or short lived perennial that greatly reduces the range's carrying capacity for both livestock and wildlife.

Management Methods:

a) Cultural: Good grazing management is one of the best defenses against the spread of knapweeds on the range and pasture lands. Proper stocking rates, good livestock distribution and correct timing and deferment of grazing are essential to the maintenance of a healthy range or pasture environment.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: Two kinds of seed head gall flies (Uphora affins and Uphora quadrifaciata) attack the seed heads of Spotted knapweed. The larvae of the files induce galls in immature flower heads thus directing nutrients away from seed production. These flies will reduce seed production of the plant but not sufficiently to stop its spread.

d) Mechanical: Deep plowing can reduce the stand density.

5. **Canada Thistle** – (Cirsium arvense) A perennial weed with an extensive root system, Canada Thistle reproduces both by seed and by vegetation buds on the roots. This requires a much more extensive management plan than the biennial thistles.

   Management Methods:

a) Cultural: Cultivation may increase the number of plants by spreading the roots to new areas where they may become established. Competitive crops, especially alfalfa and forage grasses may be used to control Canada thistle infestations. Choose aggressive grass with early season vigor to plant in areas where Canada thistle is present.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: Ceutorhynchus litura is a stem weevil whose larvae mine tissues of the leaf, root crown and root. Outward signs of damage by this larvae is not readily apparent but secondary damage is caused by other organisms which enter the plants through exit holes made by the larvae. Urophora cardui is a stem gall fly whose larvae cause galls to form on the stem of Canada thistle plants. The galls reduce the plant's vigor making it less able to compete with other plants or to resist pathogens or attacks by other insects. It is essential that both of these insects be combined with other methods of control for adequate management of Canada thistle.

d) Mechanical: Mowing can be an effective tool when combined with herbicide treatment. Mowing alone is not effective unless conducted at two week intervals over several growing seasons. Mowing should always be combined with cultural and chemical control.

6. **Musk, Plumeless, & Scotch Thistles** – are all biennial weeds, which require the same management methods. Biennial weeds are best controlled in their first year of growth. This group of thistle is the most commonly found noxious weed in Eagle County.

   Management Methods:

a) Cultural: The best way to prevent or duce the amount of biennial thistle is to manage areas that are susceptible to invasion

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: Rhinocyllus conicus is a flower head weevil which is widely distributed in Eagle County. This weevil consumes most of the seeds in the terminal flower heads, but has no effect on buds which form later in the season. The conicus weevil can be an effective control method only if it is combined with chemical mechanical controls. Trichosirocalus horridus is a crown weevil which feeds on the growing tip of the thistle rosette. This weevil has been released on numerous occasions in Eagle County but has not yet become established. Due to

the very nature of the predator prey cycle the bio control listed above will not completely eliminate the thistle.

d) Mechanical: Since these thistles are biennials and do not resprout, they are easily killed by tillage or any method that severs the taproot below the crown of the plant. If dug or cut after seed heads have formed the plants should be burned or otherwise destroyed so the seeds will not mature. Mowing is effective only if done when flowers first open.
A second mowing may be necessary because the plants may recover and produce viable seed later in the growing season.

7. **Houndstongue** – (Cynoglossum officianle L.) is a biennial weed which is toxic to horses and cattle. The seed is contained in pods, which are covered with barbs enabling them to stick to clothing or animal hair, and thus readily transported.

Management Methods:

a) Cultural: Maintain range and pasture in good condition through proper irrigation and fertilization.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: No biological controls are available at the this time.

d) Mechanical: Severing the taproot below the crown will control Houndstongue. After cutting, the plants should be burned or removed if they are in bloom to prevent seed formation.

8. **Hoary Cress Whitetop** – (Cardaria draba L.) is a perennial plant, which is vary competitive with native vegetation. Its early seeding habits make it difficult to effect control in a timely manner.

Management Methods:

a) Cultural: The effectiveness of mowing or cultivation will be increased if perennial grasses or alfalfa are seeded as competitor species. Promote healthy grass in rangeland or pastures by using proper irrigation and fertilization techniques.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: No insects are known to be effective for controlling this weed.

d) Mechanical: No scientific data is available on mechanical control for this species. Mowing just prior to seed set may reduce overall seed production, but must repeated several times during the growing season.

9. **Yellow Toadflax -** (Lindaria vulgaris P.) This deep-rooted perennial plant is an aggressive invader of rangeland, pasture and waste areas. Once established on a site it is one of the most difficult noxious weeds to control.

Management Methods:

a) Cultural: No data is currently available for the control of Yellow toadflax.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: The Calophasia lunula moth larvae can reduce the root reserves and general vigor of Yellow toadflax by defoliating new growth and eating buds and flowers. Gymnetron antirrhini is a capsule weevil which can reduce the amount of seed produced but has little if any effect on stand density. Combine the use of either of these insects with chemical or mechanical control for best results.

d) Mechanical: Mowing at bud stage two or three times per year will reduce seed production but will not effect stand density or duration. Repeated cultivation twice a year for two years should slow the spread and reduce seed population. This should be followed by seeding of competitive grasses.

10. **Dalmation Toadflax** – (Lindaria damatica) An introduced perennial with a creeping root system. This plant may suppress desirable grasses even in well managed rangeland or pastures.

Management Methods:

a) Cultural: No data is currently available for the control of Yellow toadflax.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: The Calophasia lunula moth larvae can reduce the root reserves and general vigor of Yellow toadflax by defoliating new growth and eating buds and flowers. Gymnetron antirrhini is a capsule weevil which can reduce the amount of seed produced but has little if any effect on stand density. Combine the use of either of these insects with chemical or mechanical control for best results.

d) Mechanical: Mowing at bud stage two or three times per year will reduce seed production but will not effect stand density or duration. Repeated cultivation twice a year for two years should slow the spread and reduce seed population. This should be followed by seeding of competitive grasses.

11. **Oxeye Daisy** – (Chrysanthemum leucanthemum) A member of the sunflower family is an erect perennial plant with white ray and yellow disk flowers which bloom from June through August. A native of Eurasia, this aggressive plant has escaped cultivation and become a troublesome weed in the Intermountain West.

Management Methods:

a) Cultural: Maintain range and pasture in good condition through proper irrigation and fertilization.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: None known

d) Mechanical: Hand pulling or digging before seed head production can used to effectively control small infestations. However, for this method to be successful it is important to remove as much of the underground part as possible.

12. **Scentless Chamomile** – (Anthemis arvensis L.) An escaped ornamental plant, this annual has become widely established in the eastern part of Eagle County and is a threat to native plant communities.

Management Methods:

a) Cultural: Learn to identify the plant and physically remove them when they first appear. Seed competitive cool season grasses that out compete this plant at its early stage of growth.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: No known biological controls

d) Mechanical: Since it is an annual plant, chamomile can be controlled by hand pulling, cultivation, or any type of physical disturbance.

13. **Common Tansy** - (Tanacetum vulgare L) An escaped ornamental, is a perennial plant, from 1 ½ feet to 6 feet tall with showy button-like flowers. Tansy is a member of the sunflower family and has become widely established on the western slope of Colorado. Flowering typically occurs from July to September. Tansy reproduces by both seed and creeping rootstock.

Management Methods:

a) Cultural: Prevent the establishment of new infestations by minimizing disturbance and seed dispersal, eliminating seed production and maintaining healthy native communities.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: None known

d) Mechanical: can be mowed before flowering and seed set to eliminate seed production. This method may have to be repeated to eliminate regrowth from the rootstock

14. **Salt Cedar:** - (Tamarix Ramosissima Ledeb) also called tamarisk, was introduced from Eurasia and is now widespread in the United States. Salt Cedar, a member of the tamarisk family, is a deciduous or evergreen shrub or small tree that grows from 5 to 20 feet tall. The bark on saplings and stems is reddish-brown. Leaves are small and scale-like and the flowers are pink to white and 5-petalled.

    Small flower tamarisk (T. Parviflora DC) is similar in appearance, but has 4-petalled flowers and the bark is brown to deep purple.

    Both species are used as ornamentals, but have escaped and can be found growing along streams, canals, and reservoirs in much of the western United states.

    Management Methods:

a) Cultural: Learn to identify the plant and physically remove them when they first appear. Seed competitive cool season grasses that out compete this plant at its early stage of growth.

b) Chemical: Contact licensed commercial applicator for specific recommendations for herbicide use.

c) Biological: The USDA has permitted the release of two species of insects for saltceder biocontorl.

d) Mechanical: Cut, dig, pull and/or burn stems close to the ground by mechanical means followed by herbicide