CHAPTER 3. LANDSCAPE DISTURBANCES

Invasive Plant Species – Uncompahgre Plateau

Invasive plant species have been identified as one of the great issues facing the Forest Service today (USDA Forest Service 2003). Invasive plant species are both native and non-native species that can cause economic or environmental harm, or harm to human health. Many species are also considered to be noxious weeds. The State of Colorado (Colorado Revised Statutes 35: Article 5.5, Section 35-5.5-103. (16)) defines noxious weeds as: an alien plant or parts of an alien plant that have been designated as being noxious by a local advisory board, and meets one or more of the following criteria:

(a) aggressively invades or is detrimental to economic crops or native plant communities;
(b) is poisonous to livestock;
(c) is a carrier of detrimental insects, diseases or parasites;
(d) the direct or indirect effect of the presence of this plant is detrimental to the environmentally sound management of natural or agricultural ecosystems.

Invasive plant species generally are species that have been introduced into ecosystems in which they did not evolve, and consequently, tend to have no natural enemies to limit their reproduction and expansion. They also tend to be more vigorous, taller, and more productive than native species (Mitchell 2000). As a result they can out-compete and displace native plant species, often completely taking over a site.

Invasive plant species have the potential to cause serious ecological and economic harm. Natural plant community composition can be altered, greatly reducing biodiversity and eliminating habitat and forage for wildlife and livestock. Ecosystem functions such as nutrient cycling and energy flow can be altered. Invasive plants can change soil textures by reducing soil moisture holding capacity or lowering water tables. Soils can become more unstable and surface runoff and sediment yield can be increased (Miller 2000). The presence of invasive plant species can also alter fire regimes.

Human activities that disturb native plant communities can create suitable habitat for invasive plant species. Invasive plant species can be spread or introduced into unoccupied areas by vehicles, humans, and animals along travel routes and waterways.

Invasive plant species infestations are increasing exponentially through the western United States, and this trend is also occurring within the Uncompahgre Plateau Geographic Area. The Forest Plan Revision process must evaluate any risks to ecological sustainability and provide direction to reduce the threats of invasive species.

Known Occurrences of Invasive Plant Species

The State of Colorado, local counties (Delta, Mesa, Montrose, Ouray, San Miguel), and the GMUG National Forest have all identified invasive plant species (noxious weeds) of concern. Thirty-nine (39) species occur or potentially occur in the Uncompahgre Plateau Geographic Area. (Complete list is in administrative record.)

Efforts to map and monitor known infestations of invasive plant species are ongoing. Data is available through a state-wide effort to map invasive plants by the quarters of 7.5 min topographic quadrangles (2002 State Quarter Quad Mapping). Invasive species mapping on NFS lands identify more precise locations. Current inventories do not include all known infestations.

Twenty-seven species have been inventoried on the Uncompahgre Plateau Geographic Area. Table 1 lists these species and the affected acres for the entire Geographic Area and just the NFS lands. These acreage figures do not reflect the density of plant infestations at any given site, due to the different data sources. Infestation densities vary from less than 10 percent to 100 percent cover within the affected acres.

Table 1. Gross Acres Affected by Invasive Plant Species, Uncompahgre Plateau Geographic Area

Species	Acres on Geographic Area	Acres on NFS
Jointed goatgrass (*Aegilops cylindrica*)	710	0
Scentless Chamomile (*Anthemis arvensis*)	1	1
Mayweed Chamomile (*Anthemis cotula)*	1	1
Common burdock (*Arctium minus)*	250	0
Cheat Grass (Downy Brome) (*Bromus tectorum)*	4,709	1,059
Plumeless thistle (*Carduus acanthoides)*	5	4
Hoary cress (Whitetop) (*Cardaria draba)*	1,176	67
Musk thistle (*Carduus nutans L.)*	192	123
Spotted knapweed (*Centaurea maculosa*)	104	100
Russian knapweed (*Centaurea repens)*	3,127	227
Yellow starthistle (*Centaurea solstitialis)*	25	0
Oxeye daisy (*Chrysanthemum leucanthemum)*	78	47
Chicory (*Cichorium intybus)*	42	0
Canada thistle (*Cirsium arvense)*	1,493	1,485
Bull thistle (*Cirsium vulgare)*	333	276
Field bindweed (*Convolvulus arvensis)*	2,387	0
Poison hemlock (*Conium maculatum)*	17	0
Houndstongue (*Cynoglossum officinale)*	12,923	12,901
Russian olive (*Elaeagnus angustifolia)*	466	2
Leafy spurge (*Euphorbia esula)*	404	2
Dame's rocket (*Hesperis matronalis)*	5	0
Perennial pepperweed (*Lepidium latifolium)*	112	68
Yellow toadflax (*Linaria vulgaris)*	132	127
Purple loosestrife (*Lythrum salicaria)*	47	0
Scotch thistle((*Onopordum acanthium)*	8	4
Saltcedar (Tamarisk) (*Tamarix ramosissima)*	1,506	54
Common Mullein (*Verbascum thapsus*)	1	1

Figure 1 displays the current inventory of invasive plant species locations on the NFS portion of the geographic area. Figures 2 through 7 display the current inventory of invasive plant species locations in the Geographic Area from the State quarter quad inventory data (2002). Invasive plant species shown on these figures are grouped by knapweeds, thistles, ornamentals, agricultural weeds, riparian species and particularly noxious species. Invasive plant species shown on these figures are grouped by knapweeds, thistles, ornamentals, agricultural weeds, riparian species and other noxious species. Acres of infestations associated with quarter quads that overlap NFS land are included in the NFS acres totals, above.

Extensive inventories for invasive plant species were conducted in the Burn Canyon fire area (burned in 2002) during 2003, which accounts for the high density of point locations on the Naturita Division on Figure 1. Bull thistle was the most common species inventoried (infesting 150 acres), followed by Canada thistle (50 acres) and musk thistle (50 acres). Most invasive plant species were concentrated in areas that were intensively burned and all vegetation was eliminated. The next area of concentration was in ponderosa pine stands where the understory vegetation had been burned.

On the Uncompahgre Plateau proper, houndstongue is found on the southern one-third of the Plateau, with most occurrences in aspen, grass/forb and ponderosa pine cover types. Canada thistle is scattered throughout the Plateau, with concentrations in grass/forb, aspen and shrub cover types. Musk thistle is also scattered across the Uncompahgre Plateau, with infestations mainly occurring in aspen and ponderosa pine. Oxeye daisy occurs in three widely scattered sites, in aspen dominated sites. Yellow toadflax is currently only found in two areas clustered around private land near 25 Mesa and the Dave Wood roads in the oak and ponderosa pine cover types. Russian knapweed is found at lower elevations on both the east and west sides of the Uncompahgre Plateau. The largest concentration occurs in Roubideau Canyon, an area managed as Wilderness. The largest amount of acres infested by invasive plant species on the Plateau are in aspen (3900 acres), ponderosa pine (3800 acres), oak (2800 acres), grass/forb (1500 acres) and pinyon-juniper (1000 acres) cover types.

No weed infestations are shown for the Fruita Division. This is a function of lack of survey data for this area.

The majority of inventoried infestations shown on Figure 1 occur along roads. Roads are one of the major pathways upon which invasive plant species are transported; however, roads also serve as the primary survey routes. Additional concentrations shown on Figure 1 are within specific project areas (i.e., Last Chance timber sale). As mentioned above, not all parts of the Uncompahgre Plateau Geographic area have been inventoried for invasive plant species.

Roads are also the primary survey routes for inventories included in the State's quarter quad inventory. Infestations indicated by a shaded quarter quad on Figures 2 through 7 are likely located along roads or trails within that shaded area.

Figure 1. Forest Service Inventory of Invasive Plant Species, Uncompahgre Plateau Geographic Area

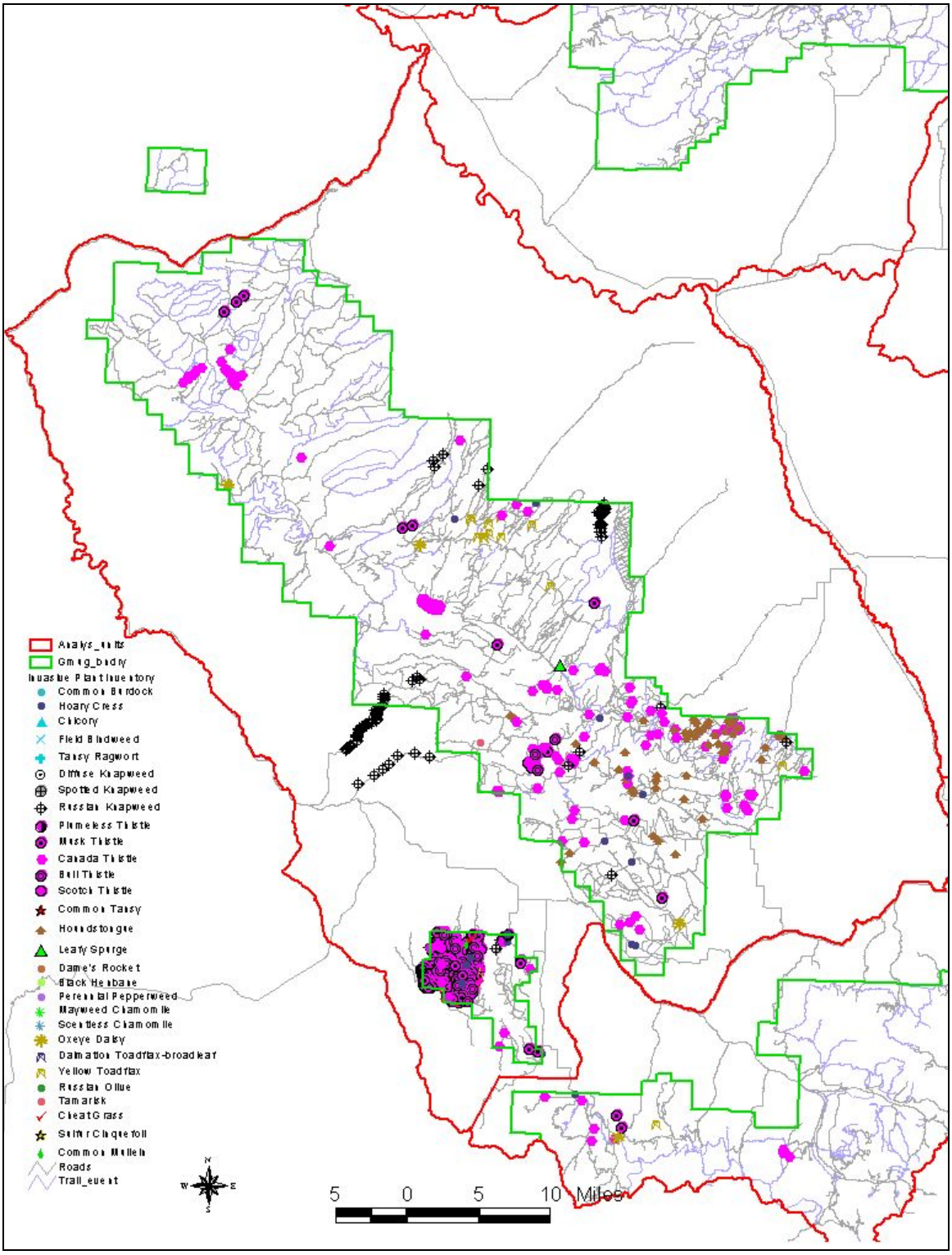


Figure 2. Knapweed Species

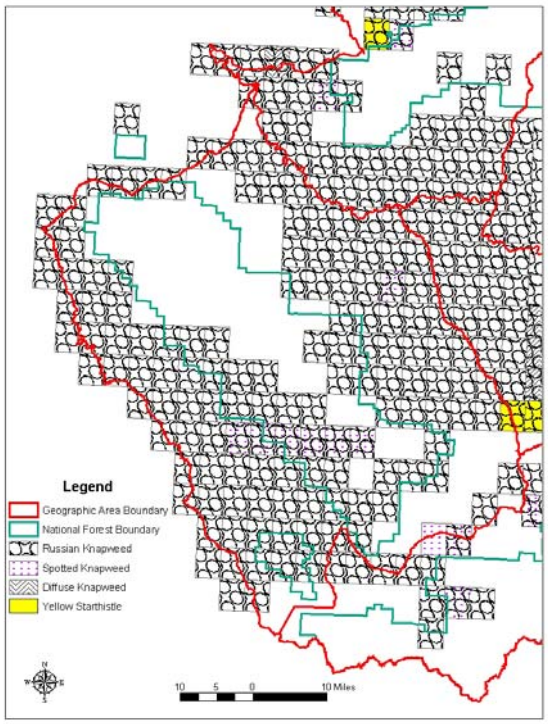


Figure 3. Thistle Species

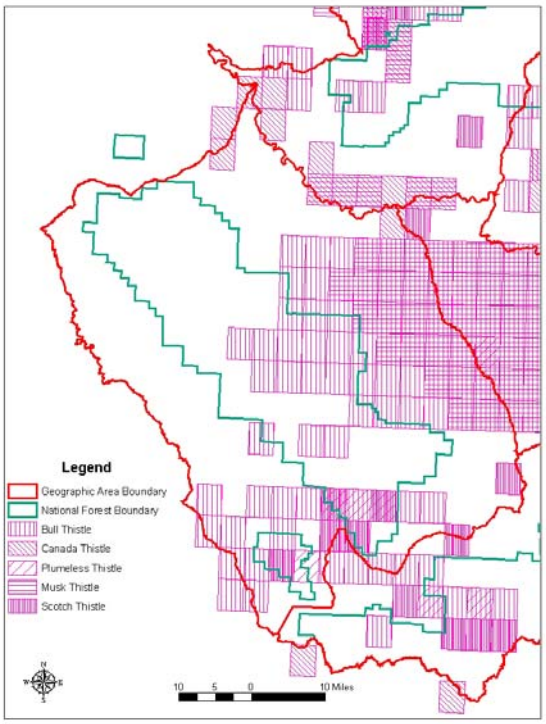


Figure 4. Ornamental Species

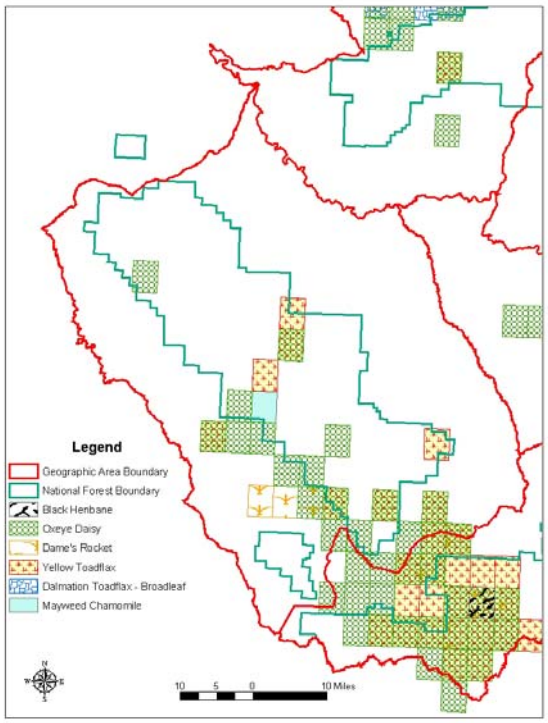


Figure 5. Agricultural Species

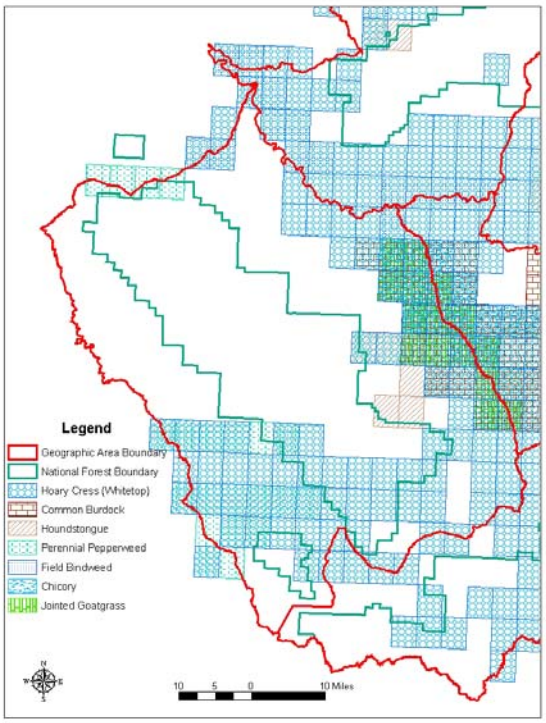


Figure 6. Riparian Species

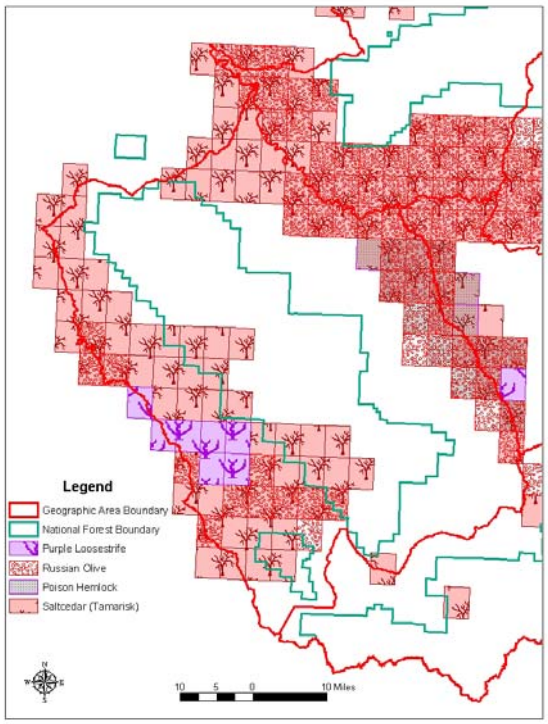
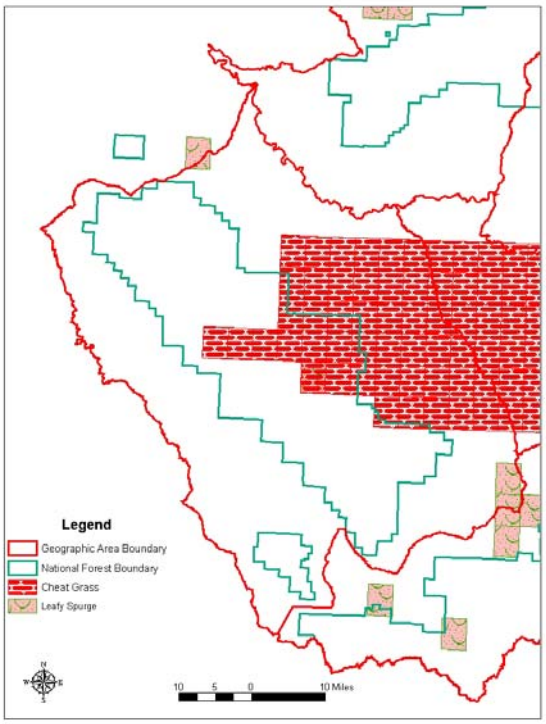


Figure 7. Other Noxious Species



Invasibility Risk

Areas where vegetative cover is disturbed and bare soil becomes exposed are most susceptible to noxious weed invasions. Land areas can be disturbed as a result of human land uses/management (i.e., roads, trails, ditches, agriculture, livestock grazing, timber harvest, prescribed burning, and land clearance) or natural disturbances (i.e., wildfires, wildlife concentration areas).

Physical factors of a site, such as available moisture, sunlight and warm temperatures (Stohlgren as cited in Regan et al. 2003), also influence the potential for invasive species to become established. Most invasive plant species require large amounts of sunlight, warm temperatures and relatively long growing seasons. In arid western environments like the Uncompahgre Plateau, riparian and wetland areas are susceptible because of the available water.

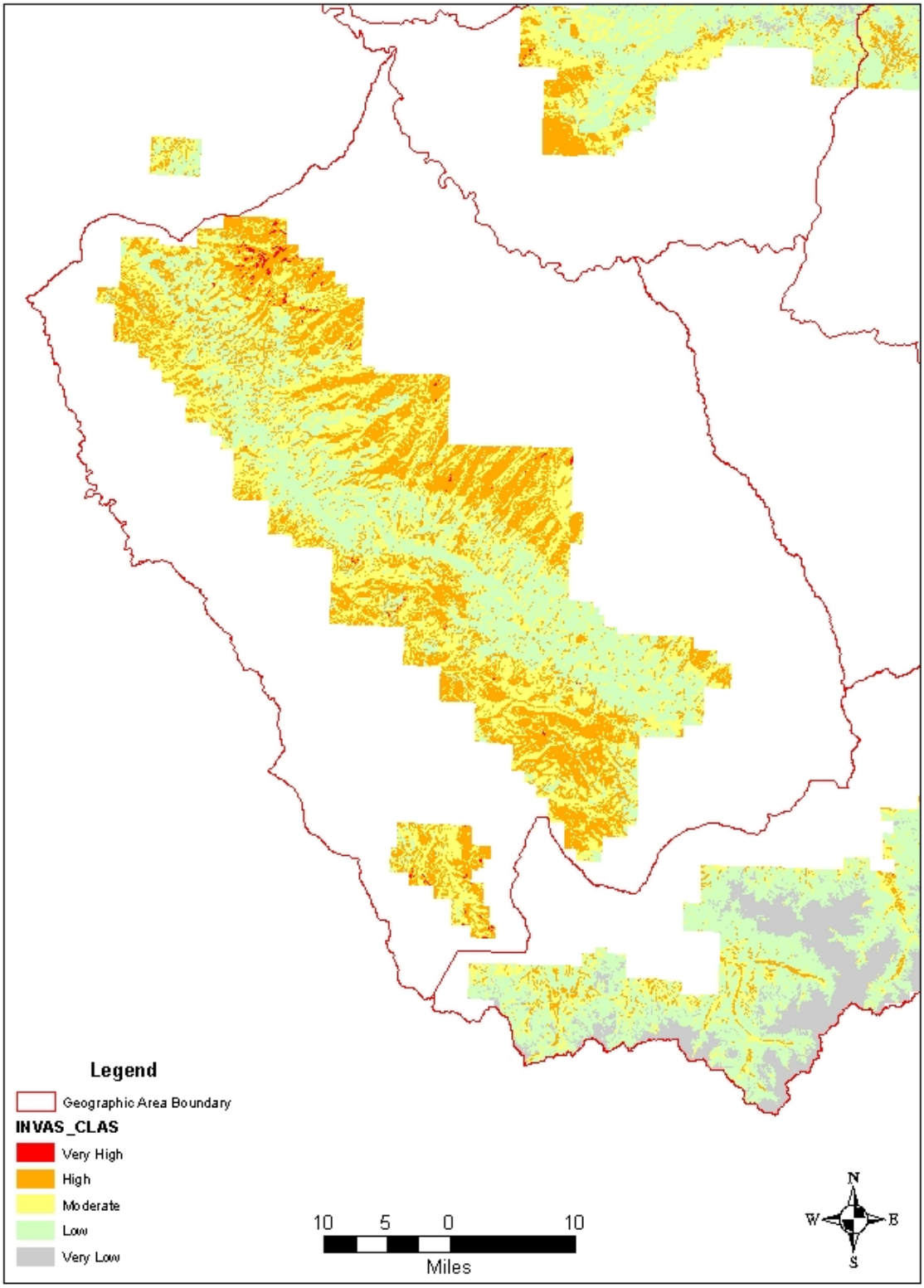
A GIS based modeling effort was used to identify those areas that have the highest risk for invasive plant species. Slope, aspect, elevation and canopy cover were used to assign invasibility risk. For example; areas of highest risk are below 8,500 feet in elevation, in areas with canopy closure less than 20 percent and in riparian or valley bottom locations. The results of this invasibility risk modeling for the Uncompahgre Plateau are summarized in Table 2, and displayed in Figure 8.

Table 2. Acres of Invasibility Risk Ratings, NFS Portion of Uncompahgre Plateau Geographic Area

Invasibility Risk Rating	Acres	Percent	Dominant Cover Type
Very High	2,400	<1	Grass-forb
High	216,000	35	Oak-Mtn. shrub, ponderosa pine
Moderate	229,000	37	Oak-Mtn. shrub, pinyon-juniper, aspen
Low	167,300	27	Aspen, oak-mtn. shrub
Very Low	0	0	None

Approximately three-quarters of the Uncompahgre Plateau Geographic Area have moderate or higher invisibility risk. This is because of lower elevations (approximately 6,500 – 9,700 feet) and the dominance of more open cover types on this Geographic Area.

Figure 8. Invasibility Risk Ratings, Uncompahgre Plateau Geographic Area



Invasive Plant Species Management

Numerous federal and State laws, as well as Forest Service policy and direction guide management of invasive species. The current Forest Plan has very limited direction related to invasive plant species. To address these limitations the Grand Mesa, Uncompahgre and Gunnison National Forests Noxious Weeds Strategy was prepared in 1994. Since 1994 additional federal and State laws and strategies have been developed. Management efforts have been modified as new direction was enacted. The revised Forest Plan needs to incorporate the latest direction concerning invasive plant species management.

Management efforts for invasive plant species are done in close coordination with State and county weed management programs through cooperative agreements. Management efforts included prevention, detection, containment, suppression and eradication. Federal funds are diverted to counties to treat noxious weeds along roads during maintenance operations. State grant moneys have also been acquired to augmented federal dollars used to treat invasive plants species on both private and federal lands. Mitigation measures designed to prevent the risk of weed introduction and/or spread are included in project designs for any ground disturbing activities, such as timber sales, utility corridors, road and trail construction and maintenance. Funding levels from all sources have been limiting.

Key Findings

- Houndstongue, Canada thistle and yellow toadflax are almost exclusively found on NFS lands in this Uncompahgre Plateau Geographic Area.
- Houndstongue is inventoried on the most acres; however the density of these infestations is relatively light.
- After houndstongue, Canada thistle, cheat grass, and Russian knapweed affect the most acres on NFS lands.
- Invasive plant species are a much larger problem on private and BLM-managed lands below the Forest (see Figures 2 through 6). Cheat grass, Russian knapweed, field bindweed, tamarisk and whitetop account for most of the non-NFS acres affected in the Geographic Area.
- Russian knapweed occurs across the largest extent of the entire Geographic Area. This species can completely displace native vegetation and is extremely hard to control once it becomes established.
- Tamarisk is the most common invasive plant species that occurs in streamside riparian areas. This desert riparian weed species can completely replace cottonwood and other native riparian species.
- Current inventories do not include all known infestations. Inventories have occurred along transportation routes. Invasive plant species locations shown on maps are localized along transportation routes.

- Approximately ¾ of the Uncompahgre Plateau Geographic Area has a moderate or higher risk for the establishment and spread of invasive plant species.

Trends

- Invasive species infestations are rapidly increasing in the Geographic Area. The largest areas affected are off NFS lands. Activities in areas that have higher invasibility risks (elevations below 8,500 feet) are increasing in number and size (i.e., clearing and development on private land, road construction).

- The potential for additional ornamental plant species to become introduced onto NFS lands is increased with the development on private lands within and adjacent to public lands.

- Recent wildfires have burned with high intensities over large areas of the Uncompahgre Plateau Geographic Area (i.e., Burn Canyon, Bucktail, 47 fires). Surveys in these burned areas show invasive species populations have drastically increased in these disturbed sites. The potential for future fire disturbances is high (see Fire Management section). If additional areas are disturbed, the potential for invasive species to infest additional areas is also high.

- Inventory work to identify invasive species infestations has been elevated as a management emphasis. Coordinated efforts with county and other local partners have been increasing to treat new infestations as they are located.

Management Implications

- The revised Forest Plan needs to incorporate direction from local, state and national strategies to treat existing invasive plant infestations and prevent the spread or establishment of new infestations. All the ongoing coordination efforts need to be recognized in the revised Forest Plan. The revised Forest Plan also needs to put monitoring requirements in place that will track acres affected by invasive plant species, evaluate treatment success to reduce and/or eradicate invasive plant species infestations, evaluate effectiveness of standards and/or mitigation measures designed to prevent establishment or spread of invasive plant species, and track trends in acres at risk from invasive plant species.

- Projects designed to reduce fuels in wildland urban interface areas or in vegetation types that are more prone to frequent fires have also become management priorities, under the Healthy Forest Restoration Act and the regional Accelerated Watershed/Vegetation Restoration Program. Many of these projects have the potential to disturb areas, which would make them more suitable for invasive plant species. Projects must be carefully designed, implemented and monitored to ensure that fuels problems are not replaced with invasive plant species.

- Rehabilitation efforts following natural disturbances must include management efforts designed to prevent the introduction and spread of invasive plant species.

- Budget constraints for all cooperators involved in invasive species management will continue to limit the amount of work that can be done to control the spread of invasive plant species.

Reference

Colorado Weed Mapping Program. 2003. Colorado Department of Agriculture. 2002 QuarterQuad Survey. Available online at: www.ag.state.co.us/DPI/weeds/mapping/QuarterQuadSurvey.html. (accessed 7/8/2003).

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