Vegetation Need for Change Report

Noxious or Invasive Plants (Weeds)[1]

The Kaibab NF has experienced an expansion of weeds from a few isolated populations along roads to about 55,165 acres today. These plants are now widely dispersed over the project area. The forest started to inventory for weeds in 1997 and has conducted surveys each year that are documented in the NRIS. Inventories were concentrated at first along major travel corridors (e.g., Interstate 40) and forest roads, campgrounds, and other areas where disturbances occur. Since 1997 more general surveys have been conducted for projects on grazing allotments, timber sales, and inventories associated with the National Fire Plan and forest health. In addition, trained volunteers have provided information. The acreages for all species except bull thistle and Dalmatian toadflax are considered accurate estimates. The acreages for bull thistle and Dalmatian toadflax are estimates based on observations and projections. Eighty percent of the total occurrences of weeds are 5 acres or less, with many less than 1 acre. The remaining 20 percent are over 5 acres in size and are associated with cheatgrass, Dalmatian toadflax, and tamarisk.

Of particular concern due to their invasiveness are leafy spurge and knapweed species (Russian, diffuse, spotted, and squarrose). These plants tend to form dense infestations that eventually eliminate all native species. Two patches of leafy spurge occur on the Kaibab National Forest within the Colorado-Grand Canyon Watershed.

Verde Watershed: Bull thistle, Dalmatian toadflax and non-native annual grasses, including red brome and cheatgrass, are the most prominent invasive plants in this watershed on the Kaibab NF. Diffuse and spotted knapweeds are known from small populations (Johnson 2006).

Little Colorado-San Juan Watershed: Approximately 176 acres are infested with invasive plants in the Kaibab portion of this watershed. Most of those acres are associated with Dalmatian toadflax and bull thistle, although leafy spurge, Mediterranean sage and tamarisk have also been inventoried. (p. 50 EIS)

Colorado-Grand Canyon or Lower Colorado Watershed. Invasive weeds impact 33,370 acres or 12% of this basin. Some species found include tamarisk, leafy spurge, Scotch thistle, Dalmatian toadflax, bull thistle, camelthorn, Mediterranean sage, Russian knapweed, and

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[1] **Weed Definitions and Regulations**:
Noxious weed is a legal term applied to plants regulated by Federal and State laws.
Arizona Administrative Codes R3-4-244, R3-4-245 (Arizona Department of Agriculture 1999) regulate certain invasive species in the state: "A noxious weed is defined as any species of plant that is detrimental or destructive and difficult to control or eradicate and includes plant organisms found injurious to any domesticated, cultivated, native or wild plant." The director of Arizona's noxious weed program uses five biological criteria to describe noxious weeds: (1) exotic, (2) invasive, (3) competitive, (4) persistent, and (5) aggressive. "Biological invaders, environmental pollutants, plant plagues, botanical monsters or ecological time bombs, aptly describe the nature of noxious weeds" (Northam, 2001).

Noxious Weed Coordination and Plant Protection Act 2000 (Public Law 106-224)
"NOXIOUS WEED - The term 'noxious weed' means a plant or plant product that has the potential to directly or indirectly injure or cause damage to a plant or plant product through injury or damage to a crop (including nursery stock or a plant product), livestock, poultry, or other interest of agriculture (including irrigation), navigation, natural resources of the United States, public health, or the environment."

The National Invasive Species Council defines "invasive species" as a species that is:
(1) nonnative (or alien) to the ecosystem under consideration; and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112).

cheatgrass. The knapweed species have 5 acres identified for the Colorado-Grand Canyon Watershed. (p. 61 EIS)

Watershed Name	Total Acres	Strata Definition	Total Weed Species	Acres Infested	Percent of Strata Infested
Verde	272,000	Riparian	6	100	Less than 1%
		Chaparral and Woodland/Chaparral	3	0	0
		Grasslands-Low Elevation	3	16	Less than 1%
		PJ Woodlands	8	159	Less than 1%
		Ponderosa Pine	7	21,148	15%
		Grasslands-High Elevation	2	187	1%
		Mixed Conifer	2	9	Less than 1%
		Totals		**21,619**	**8%**
Little Colorado	130,600	Riparian	1	9	Less than 1%
		Shrublands and Shrub/Grassland	2	9	0
		PJ Woodlands	2	26	Less than 1%
		Ponderosa Pine	4	132	Less than 1%
		Grasslands-High Elevation	0	0	0
		Mixed Conifer	0	0	0
		Totals		**176**	**Less than 1%**
Colorado-Grand Canyon	267,500	Riparian	1	440	37%
		Shrublands and Shrub/Grasslands	3	12,390	6%
		PJ Woodlands	3	11,500	4%
		Ponderosa Pine	5	160	Less than 1%
		Grassland-High Elevation	3	25	Less than 1%
		Mixed Conifer	-0-	0	NA
		Totals		**33,370**	**12%**

Brief descriptions of the noxious or invasive plants in the potential natural vegetation types (PNVT)on the Kaibab Nation Forest follow.

Cottonwood Willow Riparian Forest– This is normally associated with perennial streams although it is also found along intermittent systems. The highest percentage (37 percent) recorded for weed species within a riparian corridor is in the Colorado/Grand Canyon Watershed, all of it tied to the species tamarisk. Other weeds found in this ecosystem include Himalayan blackberry near old homesteads, Scotch thistle and bull thistle.

Sagebrush Shrubland This PNVT is represented by the blackbrush, big sagebrush, and four-wing saltbush communities within the Colorado/Grand Canyon Watershed. Noxious or invasive weeds are estimated to occupy 12,390 acres, consisting mostly of cheatgrass

and other exotic annual grasses, though camelthorn, Scotch thistle, musk thistle, Dalmatian toadflax, and bull thistle have established populations.

Semi-desert Grasslands – This represents the semi-desert grasslands in the pinyon-juniper ecosystem and semi-desert grasslands. This ecosystem has not been well inventoried for the total number of weeds or population sizes. Current estimates indicate less than 1 percent of this ecosystem is infested with weeds.

Chaparral –This terrestrial ecosystem is mostly in the Verde River basin. Infestations of weeds are also minimal in this ecosystem. The most dominant species are tamarisk and annual grasses such as red brome.

Pinyon-Juniper Woodlands – This is one of the largest vegetation types found on the Forest. Infestations of about 11,500 acres occur in the Colorado/Grand Canyon Watershed (Burger 2007). The most common weed is cheatgrass, although other species including Scotch thistle, Dalmatian toadflax, diffuse knapweed, yellow starthistle, Malta starthistle, bull thistle, and Russian knapweed have also been noted. The list of weeds found in this ecosystem represents some of the most aggressive taxa and current populations are estimated at 4 percent of the acres.

Ponderosa Pine– This PNVT represents the second largest type on the Forest. Dominant weed species include bull thistle and Dalmatian toadflax. Diffuse knapweed, spotted knapweed, Scotch thistle, and cheatgrass are also present. Leafy spurge is present in two populations.

Montane/Subalpine Grasslands – This PNVT is confined to the Coconino and North Kaibab Plateaus. Government Prairie, Garland Prairie, Davenport Lake, Little Pleasant Valley, De Motte Park, and numerous small grasslands interspersed within the ponderosa pine or mixed conifer ecosystems make up this type. Infestations range from 25 acres within the Colorado/Grand Canyon Watershed to 187 acres in the grasslands around Williams. The 300 acre Garland Prairie Proposed Research Natural Area and adjacent grasslands has infestations of Dalmatian toadflax and cheatgrass.

Dry Mixed Conifer and Spruce Fir Forest – Found on 10 percent of Forest, substantial areas of mixed conifer occur on the North Kaibab Ranger District, and the isolated volcanic peaks such as Kendrick, Bill Williams, and Sitgreaves mountains. The high levels of canopy cover ultimately restrict the production of grass and forbs plants. Less than one-tenth of 1 percent of this ecosystem has weeds established. Dalmatian toadflax and bull thistle are the most common species.

Great Basin Grassland

Weeds in relationship to roads and recreation sites.

Federal and State routes and forest roads and trails serve as conduits for the dispersal of many weed species (Roche & Roche 1999). Weed seeds and plant parts are moved along road systems by vehicles and people, allowing the establishment of plants into previously uninfested areas (Gelbard and Belnap 2003, USDA Forest Service, Sandpoint Ranger District, 1998c). Interstate 40, US 180 and State Route 64 are the main Level 4 and Level 5 roads on the Kaibab NF with numerous weed infestations. A very few acres occur along State Route 67 and the Perkinsville Road. Current infestations along forest roads also pose an opportunity for the spread of weeds as

traffic moves on and off the forests. On the Kaibab National Forest these include Forest Roads (FRs) 90, 100, 108, 129, 139, 171, 194, 747, and 786 where populations of Dalmatian toadflax, biennial thistles and cheatgrass have been found.

Recreation use at campgrounds, trailheads, and scenic overlooks also create a potential avenue for the spread of weeds. One-third of 90 recreation sites on the Kaibab NF have weeds within 1 mile of the facility. Dalmatian toadflax occupies 352 acres and bull thistle 176acres. The potential for visitors to spread these plants through use of all-terrain vehicles, domestic autos, and getting seeds stuck on their clothing or pets is high.

Wilderness, Wild and Scenic Rivers, Research Natural Areas, and Special Management Areas

Weeds are now a common occurrence in our wilderness, wild and scenic rivers and research natural areas, although invasive plant populations are typically less than 10 percent of any wilderness, and frequently less than 1 percent. Table 2 summarizes by noxious weed species and the extent of known infestations within wilderness, wild and scenic river corridors, and research natural areas. While the known infestations are small, they are growing. The natural integrity and apparent naturalness of some wilderness areas are beginning to be compromised. As the infestations expand in size and number, the complexity of the logistics of treatment will increase.

Table 2. Designated wilderness, wild and scenic river corridors, and research natural areas and estimates of weed populations

Forest	Area Designation	Acres	Noxious Weed Species
Kaibab	Kendrick Mountain Wilderness	6,651	Bull thistle: common Dalmatian toadflax: abundant
	Kanab Creek Wilderness	68,340	Tamarisk: 440 acres Cheatgrass: present
	Saddle Mountain Wilderness	40,610	None observed
	Sycamore Canyon Wilderness (Kaibab portion)	7,600	None observed
	Garland Prairie Proposed Research Natural Area	300	Dalmatian toadflax: common Cheatgrass: present

Current weed surveys have documented few weed infestations on the Tusayan portion of the Grand Canyon Game Preserve (GCGP). These acres are not accessible by vehicular traffic due to broken and steep topography. There are numerous, mostly small weed infestations in the GCGP north of the Grand Canyon on the North Kaibab Ranger District. The largest is an approximate 440 acres infestation of tamarisk within Kanab Creek Wilderness.

In late 2000, “Inventoried Roadless Areas” (IRAs) were designated. This included 53,000 acres on the Kaibab NF. Throughout these areas there are currently scattered but unknown quantities of weed infestations. Due to the limited access within the areas, they are generally more difficult to survey for infestations and will be comparably more difficult to control infestations.

A total of 19.7 miles of Kanab Creek from the forest boundary with BLM on the north to the Kaibab NF boundary with Grand Canyon National Park on the south have been evaluated for

potential eligibility for a Wild/Scenic/Recreational River designation (USDA Forest Service 1993c). This segment lies entirely within Kanab Creek Wilderness, Kaibab National Forest. This segment was determined to be potentially eligible with a "wild" classification. Five outstandingly remarkable values were identified: fish species habitat, scenic, wildlife habitat, geology and recreation.

Desired Conditions

Control of noxious or invasive plants will promote the ecosystem health of forested and rangeland habitats by maintaining or improving native forbs and grass species, increasing the regeneration of cottonwood and willow trees in riparian corridors, and ultimately preventing the loss of wildlife habitat and overall species diversity.

This action is needed because existing conditions within the Kaibab NF indicate that weed populations have expanded from a few, small infestations to over 55,165 acres. Experience in other parts of the country demonstrates that many invasive plants have the ability to eliminate all native plants within a given area and over 3 to 10 years (Sheley & Petroff 1999, Lessica & Shelly 1996, Tyser & Key 1988, Rikard & Cline 1980). These species pose a serious threat to ecosystem diversity and have a high potential to harm native plants and wildlife, especially threatened, endangered and sensitive species. Bull thistle and Dalmatian toadflax have made significant increases in their overall population size on the Forest over 10 years. Cheatgrass, leafy spurge, and the knapweeds (Russian, diffuse, and spotted) are of particular concern due to their invasiveness. These plants tend to form monocultures (become the only plants found within a site) and eventually eliminate all other native plants. These plants often alter physical conditions or disturbance regimes that allow the invasive species to spread further and form monocultures. Invasive weeds have been documented to alter soil temperature, soil salinity, water availability, nutrient cycles and availability, native seed germination, infiltration and runoff of precipitation, fire severity and frequency (Brooks et al. 2004, DiTomaso 2000, Sheley & Petroff 1999, Lacey et al. 1989).

In addition, leafy spurge, Russian knapweed and other species produce toxic substances that can pose threats to humans, livestock, and wildlife. The effects of weed population growth on native plants include a decline in ecosystem diversity and health, increases in bare soil resulting in declines in watershed condition, a decrease in the overall capacity of the land to support wild and domestic ungulates, and a reduction in the quality of habitat for many wildlife species that require native plants for either cover or food (Rice et al. 1997, Thompson 1996, Trammell & Butler 1995, Hein and Miller 1992, Kelsey & Mihalovich 1987, Lym & Kirby 1987).

Another concern is the current infestation in and along riparian corridors. Roughly 440 acres, along Kanab Creek are infested with tamarisk and other species. These plants will limit and eventually cause a decline in quality of wildlife habitat by reducing native cottonwood and willow regeneration potential. Instream flows can be reduced since these nonnative, woody plants draw more water out of the water table in their life processes than native trees (Hart 1999, DiTomaso 1998, Zimmerman 1997, DiTomaso 1996, Tesky 1992).