

Date: 8-17-98
From: Monica Hansen, 1998 Intern
To: Resource Management, Petrified Forest
Subject: PEFO Exotics

Introduction:

In the thirteen week time period I had as a botany intern, I acquired information in regards to the distribution and dispersion of exotics within the park. This project was in collaboration with the USGS Southwest Exotic Mapping Program (SWEMP). The project headquarters is at the Colorado Plateau Field Station in Flagstaff, AZ. They can be contacted at (520) 526-7466 ext. 225 or 516. The distribution of most exotics is concentrated mainly along roadways, riparian areas, and sensitive recreation sites. I focused my study by mapping the exotics first along the trails and at the lookout points. I then proceeded to map along the riparian areas. The mapping was comprised of filling out the USGS exotics data sheets, which includes mapping the GPS coordinates. I only conducted a basic overview survey; a more extensive survey must be done to have a complete survey. Management procedures and preventative measures must be taken to determine newly found noxious weeds, and to stop the threat of exponential growth into sensitive native habitats.

Results:

Table 1.1

Introduced and native invasive species that encompass Petrified Forest National Park, and a listing of species of special concern that are included in the USGS Southwest Exotic Plant Mapping Program (SWEMP).

Table 1.2

Location and UTM's of easily eradicated species if contained with immediate action.

Table 1.3

Listing of the least controllable invasive species due to the high density and extensive area of distribution, and the possibility of eradication.

Table 1.4

The noxious weeds that are the most threatening to the Park's ecosystem, that can be contained with immediate action and little monetary funding.

Recommendation Attachments:

- Arizona Noxious Weeds list
- Weed Management plans for Coconino, Kaibab, and Prescott National Forests
- Overview of Sample Weed Management Plan from Nature Conservancy
- Brochure on why noxious weed control is imperative

Table 1.1

Introduced and native invasive species that encompass Petrified Forest National Park, and a listing of species of special concern that are included in the USGS Southwest mapping program.

Scientific Name	Common Name	Introduced Species (Y/N) 1*	Exotics Mapped by USGS (Y/N) 2*	Weed Status
<i>Acrotilon repens</i>	Russian knapweed	Y	Y	
<i>Agropyron cristatum</i>	crested wheatgrass	Y	N	
<i>Ailanthus altissima</i>	tree-of-heaven	Y	N	
<i>Alhagi maurorum</i>	camelthorn	Y	Y	
<i>Atriplex rosea</i>	tumbling saltweed	Y	N	
<i>Bromus didandrus</i>	ripgut brome	Y	N	
<i>Bromus hordeaceus</i> ssp.				
<i>hordeaceus</i>	soft brome	Y	N	
<i>Bromus rubens</i>	red brome	Y	Y	
<i>Bromus tectorum</i>	cheatgrass	Y	Y	
<i>Cardaria chalapensis</i>	lens-podded whitetop	Y	Y	
<i>Ceratocephala testiculata</i>	curvseed buttercup	Y	N	
<i>Cirsium vulgare</i>	bull thistle	Y	Y	
<i>Convolvulus arvensis</i>	field bindweed	Y	Y	
<i>Corispermum hyssopifolium</i>	common bugseed	Y	N	
<i>Cynodom dactylon</i>	bermudagrass	Y	Y	
<i>Eleagnus angustifolia</i>	Russian olive	Y	Y	
<i>Eltrigia elongata</i>	tall wheatgrass	Y	N	
<i>Eragrostis barrieri</i>	Mediterranean lovegrass	Y	N	
<i>Erodium cicutarium</i>	redstem stork's bill	Y	N	Debatable species according to Seed Plants of Northern Arizona and is extensively naturalized
<i>Helianthus annuus</i>	common sunflower	N	Y	Debatable may be an invasive native species
<i>Helianthus ciliaris</i>	Texas blueweed	Y	Y	

1* Source- USDA Plants database, <http://plants.usda.gov/plants/>

2* Source-Southwest Exotics Mapping Program,
<http://www.usgs.nau.edu/swemp>

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Introduced and native invasive species that encompass Petrified Forest National Park, and a listing of species of special concern that are included in the USGS Southwest mapping program.

Kochia scoparia	kochia	Y	Y	
Lactuca serriola	prickly lettuce	Y	N	
Lappula occidentalis var. cupulata	flatspine stickweed	N	N	Debatable as to country of origin
Lolium perenne	perennial ryegrass	Y	N	
Lolium pratensis	ryegrass	Y	N	
Marrubium vulgare	horehound	Y	Y	
Medicago sativa	alfalfa	Y	N	
Melilotus alba	clover	Y	Y	
Melilotus officinalis	yellow sweet clover	Y	Y	
Plantago lanceolata	narrowleaf plaintain	Y	N	
Plantago major	common plaintain	Y	N	
Polygonum lapathifolium	curlytop knotweed	Y	N	
Polypogon monspeliensis	annual rabbitsfoot grass	Y	N	
Polypogon viridis	beardless rabbitsfoot grass	Y	N	
Polyponum aviculare var. salicifolium	prostrate buckwheat	Y	N	
Portulaca oleracea	common purslane	N	Y	Legally regulated noxious weed in Arizona
Puccinellia distans	weeping alkaligrass	Y	N	
Salsola kali	Russian thistle	Y	Y	
Setaria viridis	green bristlegrass	Y	N	
Sisymbrium altissimum	tall tumbled mustard	Y	N	
Solanum elaeagnifolium	silverleaf nightshade	N	Y	Legally considered as a new and invading potential noxious weed in Utah
Sonchus asper	spiny sowthistle	Y	N	
Sorghum halipense	Johnsongrass	Y	Y	

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Tamarix chinensis	five-stamen tamarix	Y	Y	
Tragopogon dubius/ I.D. not certain	yellow salsify	Y	N	
Tragopogon pratensis	meadow salsify	Y	N	
Tribulus terrestris	puncturevine	Y	Y	
Ulmus pumila	Siberian elm	Y	N	
Verbascum blattaria	moth mullein	Y	N	
Verbascum thapsus	mullein	Y	Y	
Xanthium strumarium	common cocklebur	N	Y	

1* Source- USDA Plants database, <http://plants.usda.gov/plants/>

2* Source-Southwest Exotics Mapping Program,
<http://www.usgs.nau.edu/swemp>

Table 1.2

Location and UTM's of easily eradicated exotic/invasive species if contained with immediate action.

Exotic/ Invasive species	Location	UTM coordinates: Easting(E)/ Northing (N)	Percent Cover	Area Estimate
Acroptilon repens	Puerco River area, S. side of River	E: 0610451 N: 3871236	26-100%	0.1-1acre
Ailanthus altissima	East of Park road North of I-40 bridge	E: 0609729 N: 3872091	1-5%	0.1-1 acre
Alhagi maurorum	Along Old 180 ~1 mile from Park road	E: 0603152 N: 3852863	less than 1percent	0.1-1 acre
Cardaria chalepensis	~1/2 mile South of Nizhoni point, East side of Park road	E: 0609905 N: 3880976	6-25%	0.1-1 acre
Cardaria chalepensis	East side of Lacey point along East side of Park road	E: 0609241 N: 3880449	1-5%	0.1-1 acre
Cirsium vulgare	West end of maintenance yard, on the South side of the Northern Visitor center	E: 0611083 N: 3880675	6-25%	o.1-1 acre
Convolvulus arvensis	South of mile marker 24 along Park road	E: 0607295 N: 3854493	1-5%	less than 1%
Convolvulus arvensis	Old Route 66 past weather station	E: 0612879 N: 3882513	1-5%	0.1-1 acre
Marrubium vulgare	Near Tiponi point, South side of Park road	E: 0611047 N: 3882048	1-5%	~300 ft. along roadside
Marrubium vulgare	South of Tiponi point near roadside	E: 0611079 N: 3881414	1-5%	~0.1-1 acre
Marrubium vulgare	lookoff point on North side of Park road before Tawa point	E: 0611087 N: 3882116	less than 1 %	less than 0.1 acres
Verbascum thapsus	North of I-40 overpass along West side of Park road	E: 0609063 N: 3879106	less than 1%	0.1-1 acre
Ulmus sp.	Old 180 ~1/4 mile from old West entrance	E: 0601434 N: 3853793	less than 1%	0.1-1 acre

Table 1.3

Listing of the least controllable invasive species due to the high density and extensive area of distribution, and the possibility of eradication.

Species That Invade Wide Areas	Eradication Possibilities
<i>Bromus tectorum</i>	Almost impossible due to extensive range throughout entire Park.
<i>Bromus rubens</i>	Almost impossible due to extensive range throughout entire Park.
<i>Tamarix chinensis</i>	Difficult, but may be manageable though the use of herbicide in combination with mechanical control. Extensive range in the Puerco River, however most of the Park's washes have minimal numbers that could be eradicated easily.
<i>Eleagnus angustifolia</i>	Possible to eradicate due to mainly in the Puerco River, however the population range may increase.
<i>Salsola kali</i>	Extensive range in both the disturbed and natural areas, will require much time and intensive removal.
<i>Melilotus alba</i>	Extensive along roadside and other disturbed areas, seldom in naturalized habitats. Could possibly be eradicated with time.
<i>Tragopogon pratensis</i>	Mostly in disturbed areas, may be eradicated with time.
<i>Sisymbrium altissimum</i>	Mostly in disturbed areas, may be eradicated with time.

Table 1.4

The noxious weeds that are the most threatening to the Park's ecosystem, that can be contained with immediate action and little monetary funding.

Scientific Name	Method of Invading Native Habitat
Acroptilon repens	long lived perennial that produces copious amounts of seeds, has extensive root system, and creates a large monoculture
Alhagi maurorum	thorny plant that is not edible by most animals, strong roots with underground stems that are capable of breaking roadways
Cardaria chalapensis *1	perennial that contains a strong rhizomatous stem that eliminates native habitat
Cirsium vulgare	numerous seeds for reproduction, extremely spiny leaves and flowers prohibiting animals to feed on them creating thickets, long lived perennial or biennial

***1**

Identification in question, being sent to Missouri Botanical Garden, if confirmed first I.D. in state

Recommendations:

Petrified Forest National Park has 53 exotic or invasive species, as seen in Table 1.1. The main distribution of exotic species in the park is located along roadsides and in riparian areas. A few species that have overcome these limitations are located in Table 1.3. The exotics that are dispersed through riparian areas cause alarming threats due to their ability to take over native habitat. This leads to a decrease in animal and plant diversity and an eventual drop in the water table. The main threat to the riparian areas is the tamarisk, and with a well-planned multi year program the use of both a mechanical control and herbicide may effectively limit the distribution. A good preventative measure would be to start to work on the least invaded areas first to stop further distribution of the tamarisk. The most limited exotic species distributions are described in Table 1.2. These species could be eradicated easily by taking simple mechanical measures to continually uproot or apply herbicide to larger trees. Areas along recreation sites will be easy to eradicate by simply controlling where people walk at lookout points and to revegetate the area, whereas it is difficult to control the spread of exotics on the roadways due to its constant disruption. I suggest that the park work on the controllable species and areas first by removal and extensive revegetation projects. A listing is also provided of the most threatening plant species at the park in Table 1.4. These species could potentially cost the park thousands of dollars if not treated immediately. A management plan must be made by the park to control the furthering of exotic species. This needs to include the prioritizing of species of special concern.