

Plant Assessment Form

For use with the “Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands”
by the California Exotic Pest Plant Council and the Southwest Vegetation Management Association
(Warner et al. 2003)

Printable version, February 28, 2003
(Modified for use in Arizona, 07/02/04)

Table 1. Species and Evaluator Information

Species name (Latin binomial):	<i>Ulmus pumila</i> L. (USDA 2005)
Synonyms:	None listed in USDA (2005).
Common names:	Siberian elm (sometimes erroneously identified as Chinese elm [<i>Ulmus parvifolia</i>])
Evaluation date (mm/dd/yy):	08/06/04
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List committee members:	08/06/04: W. Albrecht, W. Austin, D. Backer, J. Hall, L. Moser, F. Northam, B. Phillips, J. Schalau, K. Watters 10/22/04: W. Albrecht, D. Backer, L. Moser, B. Phillips, J. Schalau
Committee review date:	08/06/04 and 10/22/04
List date:	10/22/04
Re-evaluation date(s):	

Table 2. Scores, Designations, and Documentation Levels

Question		Score	Documentation Level	Section Scores	Overall Score & Designations
1.1	Impact on abiotic ecosystem processes	C	Observational	“Impact” Section 1 Score: B	“Plant Score” Overall Score: Medium Alert Status: None
1.2	Impact on plant community	B	Other published material		
1.3	Impact on higher trophic levels	C	Observational		
1.4	Impact on genetic integrity	D	Other published material		
				“Invasiveness” <i>For questions at left, an A gets 3 points, a B gets 2, a C gets 1, and a D or U gets=0. Sum total of all points for Q2.1-2.7:</i> 11 pts Section 2 Score: B	 Something you should know.
2.1	Role of anthropogenic and natural disturbance	B	Observational		
2.2	Local rate of spread with no management	B	Observational		
2.3	Recent trend in total area infested within state	U	Observational		
2.4	Innate reproductive potential	A	Other published material		
2.5	Potential for human-caused dispersal	B	Other published material		
2.6	Potential for natural long-distance dispersal	C	Observational		
2.7	Other regions invaded	C	Other published material		
				“Distribution” Section 3 Score: B	
3.1	Ecological amplitude	A	Observational		
3.2	Distribution	C	Observational		

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>Score: C Doc'n Level: Obs.</p>
<p>Identify ecosystem processes impacted: <i>Ulmus pumila</i> has the potential to utilize soil moisture, capture light, and utilize moisture that would otherwise be available to native species.</p>	
<p>Rationale: Research and subsequent publications are focused on areas outside of Arizona. <i>Ulmus pumila</i> germinates and grows rapidly in disturbed areas with available soil moisture. It is a deciduous tree with a dense canopy that will capture available light between spring and fall. This could reduce temperatures in the understory and alter site microclimate. Although little information is available on this species, it is invading native plant communities in Arizona and New Mexico. <i>Ulmus pumila</i> also has the capacity to store quantities of water in its trunk. Significant amounts of xylem fluid was observed leaking from a cut stump in New Mexico (A. Fletcher, personal communication, 2004).</p>	
<p>Sources of information: Personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004) and personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004).</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>Score: B Doc'n</p>
<p>Level: Other pub.</p>	
<p>Identify type of impact or alteration: <i>Ulmus pumila</i> has the potential to displace all native vegetation when density is high. Species displaced in riparian communities would primarily be cottonwoods and willows. Once established in riparian areas, seedlings can become established on adjacent uplands. <i>Ulmus pumila</i> can impact grasses and forbs when growing in very dense, multi-aged concentrations. It can virtually preclude other vegetation from growing, leading to increased erosion in some areas (A. Fletcher, personal communication, 2004). The effects on other plant communities (meadows and upland areas) are unknown.</p>	
<p>Rationale: <i>Ulmus pumila</i> is an aggressive competitor once established. Densities of 2,100 seedlings on one-half acre have been documented in New Mexico (USDA 2004). Fast growing seedlings quickly overtake native vegetation, especially shade-intolerant species (Wieseler 2004). In Illinois <i>U. pumila</i> has invaded and, after a few years, dominated prairie areas particularly where disturbance has occurred (Illinois Natural History Survey 1990).</p>	
<p>Sources of information: See cited literature. Also considered personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004) and personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004).</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>Score: C Doc'n Level: Obs.</p>
<p>Identify type of impact or alteration: Bird populations in riparian areas may be reduced after invasion by <i>U. pumila</i>. It has displaced cottonwoods and willow used for nesting sites by native birds (A. Fletcher, personal communication, 2004).</p>	
<p>Rationale: <i>Ulmus pumila</i> may affect higher trophic levels indirectly through displacement of native vegetation. Birds seem avoid nesting in <i>U. pumila</i>, although they may eat the seeds. <i>Ulmus pumila</i> also has an associated insect: the elm leaf beetle (<i>Pyrrhalta luteola</i>). This insect is native to southern Europe and is widely established in North America. Adults and larvae feed on the leaves during the growing season and the insect has no known affect on other trophic levels.</p>	
<p>Sources of information: Personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004).</p>	

Question 1.4 Impact on genetic integrity	Score: D Doc'n Level: Other pub.
Identify impacts: No known hybridization.	
Rationale: No native species of <i>Ulmus</i> occur in Arizona (Kearny and Peebles 1960). No literature sources found related to the ability of <i>U. pumila</i> to hybridize. <i>Ulmus pumila</i> does not appear to hybridize with any other plants in Arizona.	
Sources of information: See cited literature.	

Question 2.1 Role of anthropogenic and natural disturbance in establishment	Score : B Doc'n Level: Obs.
Describe role of disturbance: Disturbed soils due to construction impacts, land management activities, vehicles, and recreational impacts are primary anthropogenic disturbances that promote <i>U. pumila</i> establishment. Flooding, wind erosion, fire, and wildlife impacts are primary natural disturbance factors that promote <i>U. pumila</i> establishment.	
Rationale: Motor vehicles, grazing animals, and recreational enthusiasts are all potential contributors to anthropogenic disturbance factors that lead to invasion by <i>U. pumila</i> . In riparian areas, periodic flooding and subsequent soil disturbance creates niches for <i>U. pumila</i> establishment. Thickets of seedlings can be found where <i>U. pumila</i> has been planted or naturalized individuals are well-established. A major means of movement and establishment is road construction and widening, and roadside maintenance at time trees are seeding. It has also been observed spreading into edges of undisturbed grasslands, uplands adjacent to riparian areas, forested lands, and along irrigation ditches (A. Fletcher, personal communication, 2004).	
Sources of information: Personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004) and personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004).	

Question 2.2 Local rate of spread with no management	Score: B Doc'n Level: Obs.
Describe rate of spread: <i>Ulmus pumila</i> increases rapidly spreads quickly once established in an area, but does not double in 10 years. Many mature trees grow in areas where they were not planted.	
Rationale: <i>Ulmus pumila</i> has been and continues to be planted as a shade tree in Arizona and New Mexico. From these areas, it has spread into riparian areas, along roadsides, and into disturbed waste areas. Where this has occurred, trees of all ages are present indicating successful colonization and continuous spread. April Fletcher (personal communication, 2004) has observed that as soon as at least one tree matures and begins to produce seed, successive spread can be very rapid. Where establishment occurs, there may be 6 to 10 seedlings the first year, and every year subsequently. The seedlings and young trees frequently grow between three and five feet per year even when moisture levels are below normal.	
Sources of information: Personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004) and personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004).	

Question 2.3 Recent trend in total area infested within state	Score: U Doc'n Level: Obs.
Describe trend: <i>Ulmus pumila</i> is increasing in several locations within Arizona. However, the author is unaware of any new regions being colonized. No extensive management efforts are underway in Arizona. However, some landowners (mostly home gardeners) are working to control it on their land because of its invasiveness.	
Rationale: <i>Ulmus pumila</i> was widely introduced as a fast growing shade tree in many areas of Arizona in the late 1800s and early 1900s. It also happens to be drought-tolerant which increases its	

chance of survival in rural plantings. It is the author’s opinion that its range is not necessarily increasing.
Sources of information: Personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004).

Question 2.4 Innate reproductive potential	<i>Score: A Doc’n Level: Other pub.</i>
Describe key reproductive characteristics: <i>Ulmus pumila</i> is a fast growing tree that produces abundant seed crops in the spring of the year, germinates rapidly, and is not easily killed unless entire root crown is removed or herbicides are applied.	
Rationale: <i>Ulmus pumila</i> has a minimum seed-bearing age of eight years and produces many winged fruit, each of which contains a single seed. Where trees are abundant, hundreds of thousands of seeds blow in the wind and become piled in drifts. The seeds can remain viable for eight years and readily germinate and produce blankets of seedlings in areas void of other vegetation. The seedlings grow rapidly, putting down a deep taproot which allows it to successfully compete with native vegetation. Rapid and prolific resprouting can occur when the shoot is removed or disturbed.	
Sources of information: See USDA (1974, 2004). Also considered personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004) and personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004).	

Question 2.5 Potential for human-caused dispersal	<i>Score: B Doc’n Level: Other pub.</i>
Identify dispersal mechanisms: Human caused dispersal of <i>U. pumila</i> is ongoing: it is still being promoted and sold in nurseries for landscape use. It is planted as a shade tree in areas where irrigation water is limited and new plants are often allowed to grow or locally transplanted by landowners to more desirable locations. Seeds can also be inadvertently transported by vehicles (windshields, truck beds, vents, etc.) and introduced to new areas. <i>Ulmus pumila</i> was also widely planted because it less severely affected by Dutch Elm Disease: a disease caused by the fungus <i>Ophiostoma ulmi</i> (= <i>Ceratocystis ulmi</i>) that is transmitted by bark beetles or through root grafts (Stack et. al. 1996).	
Rationale: <i>Ulmus pumila</i> can be found in many public plantings (parks, landscapes, etc.). Sales of <i>Ulmus pumila</i> have decreased due to introductions of Dutch Elm Disease resistant cultivars of American elm (<i>Ulmus americana</i>).	
Sources of information: See cited literature.	

Question 2.6 Potential for natural long-distance dispersal	<i>Score: C Doc’n Level: Obs.</i>
Identify dispersal mechanisms: Wind is the natural dispersal mechanism for <i>Ulmus pumila</i> . Birds may transport <i>Ulmus pumila</i> seeds considerable distances to start new populations.	
Rationale: Although it is possible to transport <i>U. pumila</i> seed further than one kilometer, it is the author’s opinion that this is a rare occurrence. It would certainly have a greater potential to be transported long distances where vegetative cover is reduced (grazed grasslands or fallowed farmland) or on smooth paved surfaces. Some <i>U. pumila</i> populations in New Mexico appear to have been started by birds because no other logical mechanisms were apparent (A. Fletcher, personal communication, 2004).	
Sources of information: Personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004) and personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004).	

<p>Question 2.7 Other regions invaded</p>	<p>Score: C Doc'n Level: Other pub.</p>
<p>Identify other regions: <i>Ulmus pumila</i> has invaded similar areas in New Mexico as it has in Arizona. However, in New Mexico, it has been identified as a riparian invader and efforts are underway to aggressively control it. In Illinois, it has invaded dry and mesic prairies, including sand prairies (Illinois Natural History Survey 1990).</p>	
<p>Rationale: <i>Ulmus pumila</i> is listed as a noxious weed in New Mexico and is present in all other surrounding states. In New Mexico it is typically found in riparian areas, but has been observed to invade roadsides, meadows, pinyon/juniper woodlands, and upland areas. Infestations are present in the upper reaches of the Rio Grande, Pecos River, and other river systems, and are spreading into higher elevations (USDA 2004).</p>	
<p>Sources of information: See cited literature.</p>	
<p>Question 3.1 Ecological amplitude</p>	<p>Score: A Doc'n Level: Obs.</p>
<p>Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: <i>Ulmus pumila</i> was introduced to the United States in the 1860s as a landscape tree (USDA 1974). The oldest verified herbarium specimen was collected on April 22, 1962 in west Tempe (SEINet 2005). <i>Ulmus pumila</i> has been observed in riparian areas, roadsides, and waste areas at 3,500 to 8,000 foot elevations in northern Arizona and New Mexico. Some evidence exists that indicates <i>U. pumila</i> may spread to elevations higher than 8,000 feet in New Mexico.</p>	
<p>Rationale: Although riparian areas are the most prevalent ecosystem affected by <i>U. pumila</i>, it has observed it in grasslands, shrublands, and ponderosa pine forests of northern Arizona (J. Schalau, personal observations, 2004). It has also invaded pinyon-juniper woodlands in New Mexico (A. Fletcher, personal communication, 2004).</p>	
<p>Sources of information: Personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004), personal communication with A. Fletcher (Invasive Species Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 2004), and information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed May 2005).</p>	
<p>Question 3.2 Distribution</p>	<p>Score: C Doc'n Level: Obs.</p>
<p>Describe distribution: Occurrence within ecological type is at the highest between 5 to 20% (see Worksheet B).</p>	
<p>Rationale: See Worksheet B.</p>	
<p>Sources of information: Personal observations by J. Schalau (Associate Agent, Agriculture and Natural Resources, University of Arizona Cooperative Extension, Yavapai County, Prescott, Arizona, 2004).</p>	

Worksheet A. Reproductive Characteristics

Complete this worksheet to answer Question 2.4.

Reaches reproductive maturity in 2 years or less	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Dense infestations produce >1,000 viable seed per square meter	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	2 pt.
Populations of this species produce seeds every year.	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Seed production sustained for 3 or more months within a population annually	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Seeds remain viable in soil for three or more years	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	2 pt.
Viable seed produced with <i>both</i> self-pollination and cross-pollination	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	1 pt.
Fragments easily and fragments can become established elsewhere	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	2 pt.
Resprouts readily when cut, grazed, or burned	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	1 pt.
Total pts: 7			Total unknowns: 0
Score : A			

Note any related traits:

Worksheet B. Arizona Ecological Types

(*sensu* Brown 1994 and Brown et al. 1998)

Major Ecological Types	Minor Ecological Types	Code*
Dunes	dunes	
Scrublands	Great Basin montane scrub	
	southwestern interior chaparral scrub	
Desertlands	Great Basin desertscrub	
	Mohave desertscrub	
	Chihuahuan desertscrub	
	Sonoran desertscrub	
Grasslands	alpine and subalpine grassland	
	plains and Great Basin shrub-grassland	D
	semi-desert grassland	
Freshwater Systems	lakes, ponds, reservoirs	
	rivers, streams	
Non-Riparian Wetlands	Sonoran wetlands	
	southwestern interior wetlands	
	montane wetlands	
	playas	
Riparian	Sonoran riparian	
	southwestern interior riparian	C
	montane riparian	
Woodlands	Great Basin conifer woodland	D
	Madrean evergreen woodland	
Forests	Rocky Mountain and Great Basin subalpine conifer forest	
	montane conifer forest	D
Tundra (alpine)	tundra (alpine)	

*A means >50% of type occurrences are invaded; B means >20% to 50%; C means >5% to 20%; D means present but ≤5%; U means unknown (unable to estimate percentage of occurrences invaded).

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