

CHAPTER 3

SIGNIFICANCE OF INVASIVE PLANTS

Impacts of Weeds

Invasive plants negatively impact millions of acres of land nationwide. In the western United States alone, invasive weeds have infested more than 890 million acres. However, this problem is caused by a relatively small number of species in comparison with the total number of non-native plants growing in the US or being introduced each year. Few introduced plants actually cause a problem at all (Nevada's Coordinated Invasive Weed Strategy, 2002).

For example, out of 1,500 plant species in the Great Smoky Mountain National Park, 400 species are non-native but only 10 of those appear to pose a threat to park resources (Hiebert, 1997).



Figure 7. Tamarisk species were first introduced as windbreak and ornamental plants.

Plants are intentionally introduced with many aesthetic and functional values including flowers, fruit, windbreak protection and bank stabilization (Figure 7). Non-native plants are also introduced unintentionally as contaminants in seed grain, packaging material, bilge or ballast water, attached to vehicle and tires, or carried by natural means (such as water), NWAC, 2002. The process of invasion is difficult and the possibility of a species to becoming invasive in a new environment is unlikely.

The process of invasion is as follows. If a new species is introduced it must first become established in the new environment which is dependant upon both survivability and its ability to reproduce. It must become naturalized that is, adapted to the local conditions, which may require a long period of selection and hybridization with native species. This step may also result in a lag period before rapid expansion. The final step in the invasion process is dispersal throughout the new environment.

Though a relatively small percentage of introduced plants overcome these obstacles and become invasive, those few plants can cause a tremendous amount of economic and ecological damage (Holt, 2002). Most invasives in the United States have been traced back to Europe or Asia. In their native ecosystem, these plants were in balance with the system, controlled by competing plants, plant pathogens and predatory insects. Without these controls the plant has the opportunity to spread, unchecked, often until it is a monumental problem (Nevada's Coordinated Invasive Weed Strategy, 2002).

Classifications of Weeds and Nevada Weed Law

A plant is considered a *weed* if it is located where it is not wanted. Where this designation is somewhat subjective, it can be site specific and may not be

**A noxious weed is “any species of plant which is, or likely to be, detrimental or destructive and difficult to control or eradicate.”
– U.S. Department of Agriculture**

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based on whether the plant is native or not. The term *invasive* refers to a plant's ability to rapidly reproduce and spread. These plants ultimately out-compete all other vegetation in an area to form dense stands composed almost entirely of this single unwanted species (Nevada's Coordinated Invasive Weed Strategy). The United States Department of Agriculture, defines a *noxious weed* as a "species of plant that causes disease or is injurious to crops, livestock or land, and thus is detrimental to agriculture, commerce or public health". Once an invasive plant is designated as noxious, it is elevated to a status that carries regulatory authority.

Like many other states, Nevada regulates the control of noxious weeds. As part of the Nevada Revised Statutes (NRS), Nevada has developed a State Noxious Weed List (Table 1). The State of Nevada's noxious weed law places the responsibility for noxious weed control on all landowner-occupiers. According to NRS Chapter 555.160-180, every landowner or occupier, whether private, city, county, or federal, shall cut, destroy, or eradicate all noxious weeds. The NDOA can serve notice to owners-occupiers of the action they must take to address their noxious weed problems. If the owner-occupier refuses to comply, NDOA will notify the County Commissioners who must then perform the required control actions, paying for them out of county funds. The county then bills the owner-occupier for the cost of performing the work. In turn, the owner-occupier can file an objection with the county. The County Commissioners may determine that some or all costs are to be borne by the owner-occupier and may, as a last resort, collect the cost of control through a tax lien on the land. However, this mechanism is rarely used. Most

TABLE 1. NEVADA STATE NOXIOUS WEED LIST

Common Name	Scientific Name
African rue	<i>Peganum harmala</i>
Austrian fieldcress	<i>Rorippa austriaca</i>
Austrian peaweed	<i>Sphaerophysa salsula/ Swainsona salsula</i>
Black henbane	<i>Hyoscyamus niger</i>
Camelthorn	<i>Alhagi pseudalhagi</i>
Canada thistle	<i>Cirsium arvense</i>
Carolina horse-nettle	<i>Solanum carolinense</i>
Common crupina	<i>Crupina vulgaris</i>
Dalmation toadflax	<i>Linaria dalmatica</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Dyer's woad	<i>Isatis tinctoria</i>
Eurasian water-milfoil	<i>Myriophyllum spicatum</i>
Giant salvinia	<i>Salvinia molesta</i>
Goats rue	<i>Galega officinalis</i>
Green fountain grass	<i>Pennisetum setaceum</i>
Hoary cress	<i>Cardaria draba</i>
Houndstongue	<i>Cynoglossum officinale</i>
Hydrilla	<i>Hydrilla verticillata</i>
Iberian starthistle	<i>Centaurea iberica</i>
Klamath weed	<i>Hypericum perforatum</i>
Leafy spurge	<i>Euphorbia esula</i>
Malta starthistle	<i>Centaurea melitensis</i>
Mayweed chamomile	<i>Anthemis cotula</i>
Mediterranean sage	<i>Salvia aethiopsis</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Musk thistle	<i>Carduus nutans</i>
Poison hemlock	<i>Conium maculatum</i>
Puncture vine	<i>Tribulus terrestris</i>
Purple loosestrife	<i>Lythrum salicaria,</i>
Purple starthistle	<i>Centaurea calcitrapa</i>
Rush skeletonweed	<i>Chondrilla juncea</i>
Russian knapweed	<i>Acroptilon repens</i>
Saltcedar (Tamarisk)	<i>Tamarix ramosissima</i>
Scotch thistle	<i>Onopordum acanthium</i>
Sorghum species, perennial, including, but not limited to: (a) Johnson grass; (b) Sorghum alum; and (c) Perennial sweet sudan	
Sow thistle	<i>Sonchus arvensis</i>
Spotted knapweed	<i>Centaurea biebersteinii</i>
Squarrose knapweed	<i>Centaurea triumfettii</i>
Sulphur cinquefoil	<i>Potentilla recta</i>
Syrian bean caper	<i>Zygophyllum fabago</i>
Tall whitetop (Perennial pepperweed)	<i>Lepidium latifolium</i>
Water hemlock	<i>Cicuta maculata</i>
Silver leaf nightshade	<i>Solanum elaeagnifolium</i>
Yellow starthistle	<i>Centaurea solstitialis</i>
Yellow toadflax	<i>Linaria vulgaris</i>

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landowners-occupiers comply with the laws when notified and advised of the problem.

Some of the listed species are ubiquitous throughout the state, such as tamarisk, and some species such as Eurasian water milfoil, have yet to be found in southern Nevada. In addition to the species on the Nevada Weed List, other plants may be of concern in the Wash. Giant reed is a serious problem along riparian corridors in Arizona and southern California and is listed on the California Noxious Weed list. Giant reed is present in the Wash, and may pose a problem in the future, though it is not currently listed on the Nevada Weed List. To address species such as giant reed, considerations should be made on a case-by-case basis to determine when management actions are necessary and for which species regardless of the state's designation for a particular plant.

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CHAPTER 4

WEED MANAGEMENT PRIORITIES

Weed management priorities are based on the actual or potential threat that weeds pose to the management goals for a project area. Considerations are given to weed species and location of weed infestations when setting priorities. Weed species vary considerably in the threat they pose to resource values and vary greatly in their susceptibility to control measures. Weed species that pose the highest risk toward achieving the management goals for the project area need to be controlled immediately and should be the highest priorities for management. However, if the location of an infestation is especially vulnerable or has other important values that are at risk, the infestation at a particular location may be rated high even if it is not a high priority weed (Gershman & Lane, 2000).

Priority Weeds

The Partnership has identified three priority weeds of concern for the Wash: tall whitetop, giant reed and tamarisk (Table 2). The ranking was based on threat to the ecosystem, size of infestation, potential for control, and established control programs.

TABLE 2. PRIORITY WEEDS

<u>Common name</u>	<u>Scientific name</u>	<u>Ranking</u>
Tall whitetop	<i>Lepidium latifolium</i>	1
Giant reed	<i>Arundo donax</i>	2
Tamarisk	<i>Tamarix ramosissima</i>	3

Tall Whitetop (Lepidium latifolium)



Figure 8. Tall whitetop

Tall whitetop, Perennial pepperweed, (Figure 8) was first identified in the Wash by Clark County Public Works – Vector Control (Vector Control), near Vegas Valley Drive in 1995. In March 2001, it was found farther downstream in LVWCC mitigation sites. At that time, tall whitetop had a wide distribution but was generally found at low densities. It was estimated to total less than two acres throughout the Wash. In 2002, visual estimates were made and tall whitetop was found in patches throughout the entire length of the Wash. The fact that tall whitetop has only recently invaded this area means that there still may be an opportunity to control this noxious weed. Registered on the Nevada Weed List and regulated by law, tall whitetop ranked as the first priority species for the Partnership because of the pernicious nature of the weed, the potential for control early in the Wash and the threat to Lake Mead and the lower Colorado River system. Control of this plant is anticipated to take three to five years, with the first year of on-the-ground control activities completed in fall 2002 to spring 2003, (Figure 9). The goal of tall whitetop in the Wash system is suppression.

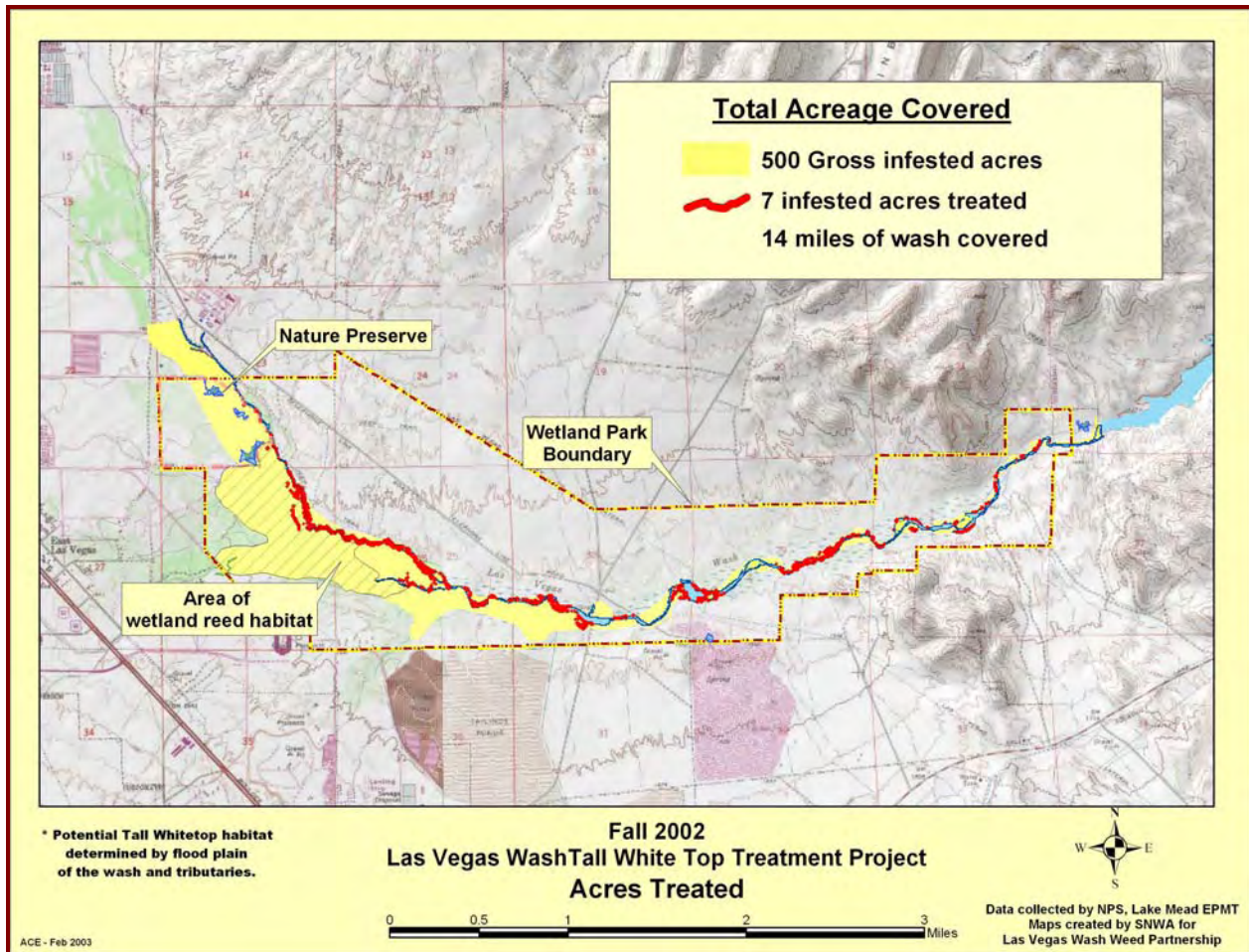


Figure 9. Total acreage covered in the fall of 2002 by the National Park Service Exotic Plant Management Team (NPS EPMT) for the tall whitetop project.

Giant Reed (Arundo donax)



Figure 10. Giant Reed

Giant reed (Figure 10) is in the early stages of infestation in the Wash. Currently exists in isolated stands, to date 38 stands have been identified and mapped in the Wash (Figure 11). Though not listed on the Nevada’s Noxious Weed List, it is listed in the State of California and has caused significant problems in riparian areas throughout the state. As such, giant reed has the potential to become a noxious weed in southern Nevada and should be controlled in the Wash system before it becomes a problem. The Partnership ranked this weed as its second priority.

To date, the Vector Control has treated the majority of stands of giant reed in the Wash. The National Park Service (NPS) has been contracted to treat the remaining stands as part of their treatment activities. The goal for giant reed is eradication.

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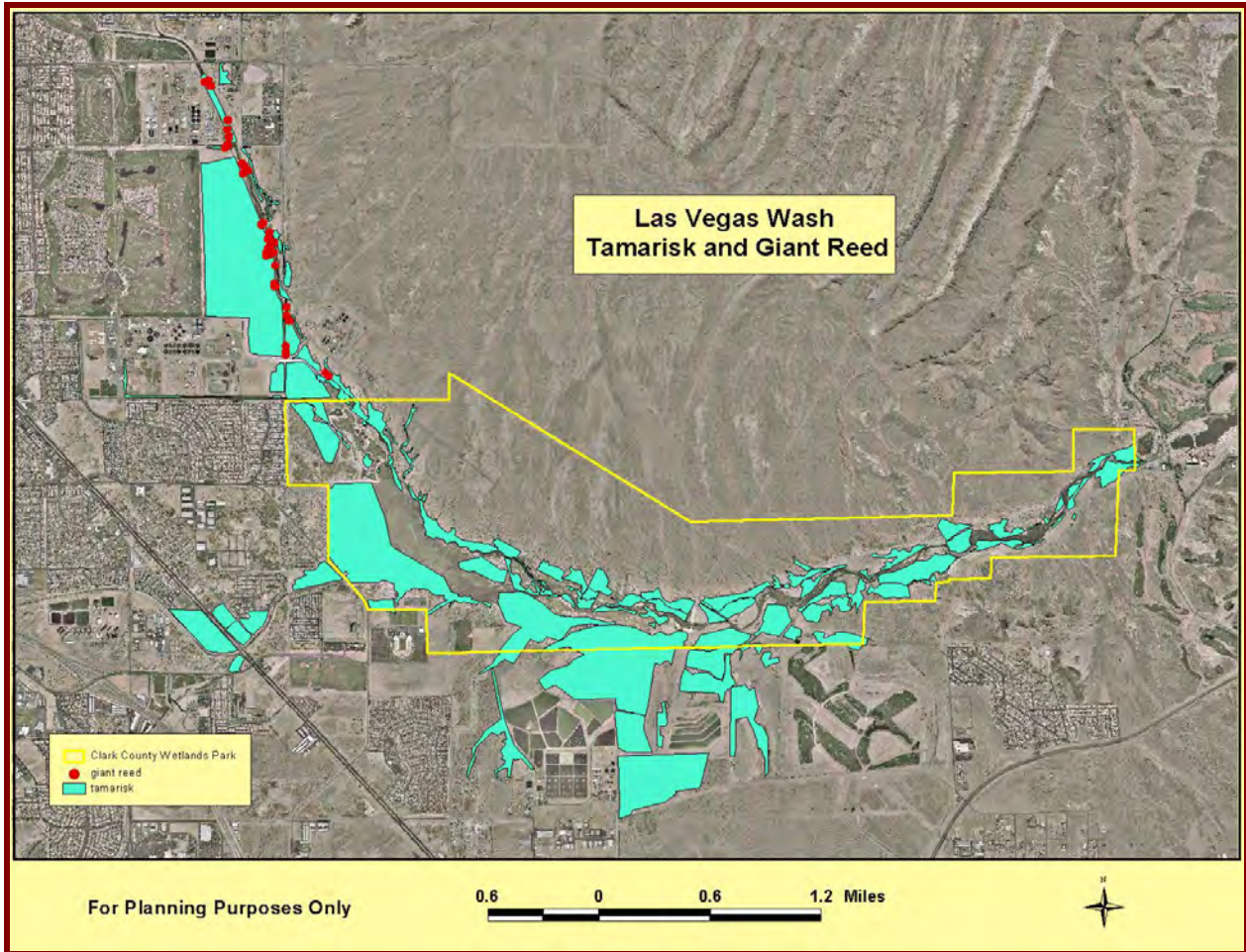


Figure 11. Tamarisk and giant reed distribution in the Las Vegas Wash.

Tamarisk (Tamarix ramosissima)



Figure 12. Tamarisk.

Tamarisk (Figure 12) also known as saltcedar, has been ranked third in the Partnership’s priority list. Aerial photography, mapping have been completed for tamarisk in the Wash. There are currently 1,500 acres of tamarisk infesting the Wash (Figure 11). Because tamarisk serves as potential habitat to the Southwestern willow flycatcher, as well as providing structure for all species, tamarisk is removed only in specific areas based on the Wash’s revegetation program. At this time, the goal for the tamarisk management program is containment of the existing stands where feasible and control tamarisk growth in the revegetation sites.

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Watch Weeds

In addition to the Nevada Weed List, consideration must also be given to other southwestern riparian weeds of concern. A list of Watch Weeds has been developed to include plants that have the potential to infest southern Nevada from neighboring states or other habitats. The following table (Table 3) lists the additional weed species that were identified as Watch Weeds based on their known distribution, potential for invasion and/or nuisance. Additional species will be added to this list as they are identified.

TABLE 3. WATCH WEEDS

Common name	Scientific name	Status
Russian knapweed	<i>Acroptilon repens</i>	present
Johnson grass	<i>Sorghum spp.</i>	present
Fountain grass	<i>Pennisetum setaceum</i>	potential
Camelthorn	<i>Alhagi pseudalhagi</i>	potential
Fivehook bassia	<i>Bassia hyssopifolia</i>	present
Kochia	<i>Kochia scoparia</i>	present
Fan palm	<i>Washingtonia filifera</i>	present
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>	present
Tree tobacco	<i>Nicotiana glauca</i>	present

Another tool that may be helpful in ranking weeds in the future is the Noxious Weed List Tiering Structure that the NDOA is currently drafting. This system provides a strategy for prioritizing weeds for management. The NDOA will conduct abatement procedures on those species placed in Categories A & B. Abatement is at the discretion of NDOA on those species in Category C, but they are still subject to NRS 555.

The categories are defined as follows:

CATEGORY A: These noxious weeds have not been detected in the state or are found in small, scattered localized infestations. Many of these weed species are found in neighboring states and may cause serious degradation to lands in Nevada. Management actions should focus on immediate treatment for eradication.

CATEGORY B: These noxious weeds have recently been introduced into the state or are rapidly spreading from their current infestation sites. Many of these species are found throughout Nevada or may not pose as serious a threat as Category A species. Management actions should focus on treatment to control existing infestations and prevent new infestation sites.

CATEGORY C: These noxious weeds are weeds that are currently established and generally widespread in many counties of the state. These species are found in large infestations and management actions should be taken to control where possible and prevent new infestation sites.

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CATEGORY Q: Weeds rated in this category would indicate that a State or Federal quarantine exists for the weed and action would have to be taken immediately to control and eradicate the weed.

Weed Infestations

Prioritizing weed infestations is an important component of the weed management strategy. It allows for selecting weed control activities that will yield the greatest effect in meeting land management goals and objectives. Among other factors, limited resources may sometimes not allow all the priority weeds to be addressed at a given time (Gershman & Lane). Such is for tamarisk in the Wash. With 1,500 acres, complete treatment is not feasible and not desirable, as tamarisk does provide structure and cover for some wildlife and serves as potential habitat. Thus, after prioritizing the weed, each infestation should also be ranked individually. Management actions should be based on factors such as location and extent of the infestation. According to Neill (1997), priority should be given to "...isolated patches of the highest priority weed species first. Two reasons to adopt this strategy: 1) to increase the efficiency of control efforts, and 2) the psychological reward. Weeds spread from existing infestations. To reduce the spread of weeds, it makes sense to limit the number of new infestations. Such infestations are typically small and easily controlled because they have less well developed root systems, less stored food reserves in roots and rhizomes, and smaller seed banks in the soil. Controlling isolated patches also gives a landowner or manager a sense of accomplishment, providing the motivation to persist in weed control efforts. High efficiency means gaining control of a weed species problem with a minimum of effort". High priority infestations are characterized as: 1) small, isolated infestations, 2) patches of high priority weeds, and 3) areas of frequent



Tall whitetop infestation at the Wash.

disturbance, such as streams and roadsides. Low-priority weed infestations include large infestations of low-priority weed species, especially species that are easy to control even if left unmanaged. Large infestations of high-priority weed species may be low-priority for control if they present an exceptionally large weed management challenge (Gershman & Lane).

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LAND MANAGEMENT GOALS AND OBJECTIVES

Given the known conditions for the Wash, current management programs and planned management actions based on the CAMP document, the Partnership developed specific goals and objectives for the boundary of influence to serve as the foundation for weed priorities and the selection of weed management actions. These goals and objectives are beneficial because they help make more efficient use of limited resources, focus time and money on important natural resources, enable selection of the most important weed species and infestations to control and provide specific criteria for evaluating the effectiveness of control actions. Additionally by identifying goals and objectives the focus is placed on weed management goals (where people are more likely to find a common ground) rather than solely on control actions (where people are less likely to agree), and thereby increase accountability. Management goals identified are brief statements that describe the desired conditions within the management area. The focus includes human values, natural resources and/or financial resources (Gershman & Lane).

The Partnership developed the following goals:

- 1. Contribute to the protection of the watershed.**
- 2. Promote native plant communities.**
- 3. Identify new invasive weed species invasions early.**
- 4. Improve the upland, riparian, and wetland areas within the Las Vegas Wash boundaries.**
- 5. Complete a plant inventory of the Las Vegas Wash.**
- 6. Create a strategy to address wildfire rehabilitation.**

Weed management objectives are achievable, specific, measurable statements with deadlines and apply to a specific location. The objectives are tied to the very general goals and specific action steps. The objectives are consistent with state regulations, but additional weed species may be selected for management actions that are not listed on the State Noxious Weed List if identified as a nuisance for the project boundary (Gershman & Lane).

The Partnership developed the following weed management objectives:

- 1. Maintain less than 20 percent invasive species cover in restoration sites.**
- 2. Treat and control existing stands of giant reed (*Arundo donax*) from the Wash and Wetlands Park over the next year (June 2003- May 2004).**
- 3. Continue treatment and monitoring for significant control of tall whitetop aka perennial pepperweed (*Lepidium latifolium*) in the Wash and Wetlands Park over the next year (June 2003- May 2004).**
- 4. Control tamarisk (*Tamarix ramosissima*) associated with erosion control and bank stabilization improvements.**
- 5. Identify desirable native plant species of the Colorado River drainage for a revegetation program.**

The goals and objectives defined above are designed to be a tool in the establishment of a strategy for weed management. As management actions are implemented, the goals will be revisited, adjusted as necessary. The objectives will help guide the annual work plan and will be reviewed each year.

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