

NATIONAL PARK SERVICE
U.S. DEPARTMENT OF THE INTERIOR

GRAND CANYON NATIONAL PARK
ARIZONA



Invasive Plant Species Observation

Y*ou can make a difference!* Of the more than 170 exotic plant species found in Grand Canyon National Park, about 60 are “target” species because of the threats they pose to native plants, animals, and ecosystems. You can help the National Park Service control these invaders by documenting how many invasive plants you see and exactly where they are located. With help from you we can compile information and quickly respond to sites infested with these plants. Please contact the park’s Backcountry Vegetation Program Manager for additional paperwork and training if you are willing to help manually remove these plants. Even skilled botanists can confuse these exotic plants with some of our well-loved, native species, so we want to make sure you have the necessary information to help us with this battle.

Early identification is one of our strongest tools in fighting the invasion! Visitors to Grand Canyon play an integral role in protecting our national park from invasive species. The National Park Service thanks you for your voluntary participation in this program and your interest in protecting native plants and animals. Please use the format below when gathering information. If you are not sure of a plant’s name or status, take a picture and send it along with your collected data.

Send your postcard and any pictures to:

Grand Canyon National Park / Backcountry Vegetation Program Manager
823 North San Francisco, Suite B / Flagstaff, AZ 86001-3265
phone (928) 226-0165 fax (928) 226-0170 / email: Lori_Makarick@nps.gov

SAMPLE REPLY POSTCARD

Please note the following when you see an invasive plant species.

Date of observation _____
Name of plant species _____ # of individuals at the site _____
Location (the more precise you can be, the easier it will be for us to find the site)
River mile _____ River right or left _____ Name of camp or side canyon _____
Descriptive place name along a trail? _____ GPS coordinates and datum _____
Did you take any action? Yes No
If yes, did you pull the plants? Yes No How many did you pull? _____
Was the plant flowering? Yes No
If there was more than one plant of the same species, what percent were flowering? _____ %
Were there ripe seeds on the plant? Yes No
Did it appear that some of the seeds had already dropped? Yes No
Comments _____

Camelthorn (*Alhagi maurorum*)

Camelthorn, a member of the pea family, is native to the Mediterranean and Asia. It was accidentally introduced into the United States in 1915 via contaminated alfalfa seed, but is now found throughout Arizona and in 34 other states.

Identifying characteristics

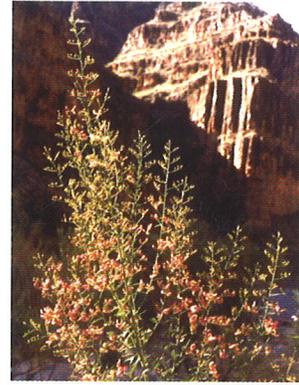
- Shrub, 1-4 feet tall, intricately branched, with yellow-tipped spines
- Leaves small, alternate, wedge-shaped, with hairy undersides
- Flowers pink to magenta, on upper part of branches
- Seedpods slender, spine-tipped, brown to maroon

Why is this plant a threat?

Camelthorn is notorious for taking over Grand Canyon's already limited beaches. Its hardy roots and stems can reach a depth of 45 feet and extend more than 24 feet from the plant, giving it plenty of reserves to survive during hard times. The extensive underground system allows it to spread rapidly, tap into the groundwater, and steal nutrients and moisture from native vegetation.

Management of camelthorn

Currently, the only tributary camelthorn grows in is the Little Colorado River (LCR), but it thrives along the main river corridor from the confluence downstream. In order to curtail the empire it is creating, park biologists need to know immediately if this species is found in other side canyons or anywhere upstream of the LCR. Due to its widespread distribution in the river corridor, current control efforts focus on just a few sites, including Unkar Delta and Crystal Camp. Park staff and volunteers pull camelthorn from these sites several times a year, keeping count of the number of plants pulled each time to see if this method will control this species. If you are interested in pulling camelthorn at these sites, please contact the park's Backcountry Vegetation Program Manager before heading into the field to get the latest information on the project.



Top: mature plant; bottom: flowers.

PHOTOS: GLENN RINK

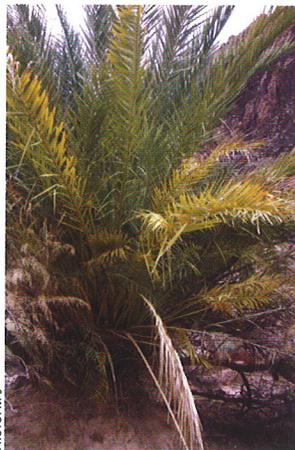


PHOTO: NPS

Mature plant.

Date palm (*Phoenix dactylifera*)

Originally from North Africa and the Middle East, date palms were first brought to the United States in the mid-18th century by Jesuit and Franciscan missionaries. Today most date palms in Arizona, California and Nevada grow in landscaped settings, with some renegades escaping into the wild.

Identifying characteristics

- Medium-sized tree, 10-40 feet tall, with woody sheaths on trunk
- Leaves to 20 feet long, blue-green, clustered, leaflets folded lengthwise
- Flowers white, clustered, fragrant
- Fruits known as dates, dark-brown to yellowish-brown when they are ripe

Why is this plant a threat?

The easily identified date palm reproduces from seeds and roots, tending to form dense stands. This invader uses vast quantities of water. Date palms have been known to dry up precious desert springs relied on by wildlife, native plants, and humans.

Management of date palm

Before 2004, only a small number of date palms grew in Grand Canyon. Recently, vegetation managers noticed the number of palm trees increasing and even found trees with fruit and viable seed near Phantom Ranch. Knowing that humans and animals could potentially spread the seed far and wide, park biologists took action. Crews labored to remove the trees with shovels and small saws and then meticulously re-contoured the sites to minimize the ground disturbance. Any new date palms will be removed from the park, so please let us know if you see these trees.



PHOTO: ©BARRY RICE/THE NATURE CONSERVANCY PHOTO: NPS



Top: mature plants; bottom: leaves.

Perennial pepperweed

(*Lepidium latifolium*)

Originally from Eurasia, perennial pepperweed may have been accidentally introduced to North America via contaminated sugar beet seed at the turn of the 20th century. It is now found throughout coastal New England and in all states west of the Rocky Mountains.

Identifying characteristics

- Perennial herb, 3-8 feet tall, forming dense stands
- Leaves alternate around stem, green to gray-green, waxy, with toothed edges
- Flowers white, with 4 petals, clustered at the branch tips
- Plants appear as a rosette for the first few weeks in early spring

There are 2 native pepperweeds in the Inner Canyon: mountain pepperweed (*L. montanum*) and bush pepperweed (*L. fremontii*). Bush pepperweed is more common at higher elevations, while mountain pepperweed grows in abundance in the river corridor. Look for toothed margins on broad leaves of perennial pepperweed and its more showy and open flowering stalk.

Why is this plant a threat?

Once established, perennial pepperweed forms dense stands that make it difficult for native plants to survive. Its ability to bring salts from deep in the soil to the surface and the copious litter it produces further limits native plant germination and survival. Each perennial pepperweed plant can produce thousands of seeds. New plants can also grow from small pieces of broken rootstock. It flourishes in a wide variety of habitats, even on relatively dry sites, making it suitable to creep into the park's side canyons.

Management of perennial pepperweed

This plant is only known to occur in the river corridor, but the number of populations is increasing every year. At this time, park biologists are mapping populations and determining the best strategy for control. Please record any sites in the Inner Canyon where you see this species.

Ravenna grass (*Saccharum ravennae*) Pampus grass (*Cortaderia* spp.)

Ravenna grass is a large bunchgrass from Eurasia and pampus grass is an even larger bunchgrass from South America. Both were originally imported as ornamentals, but have escaped into natural areas, thriving and adapting to the arid Southwest.

Identifying characteristics of Ravenna grass:

- Perennial bunchgrass, to more than 6 feet tall and wide
- Leaves have the following characteristics:
 - very fine, short hairs along blade with long, dense visible hairs clustered at the base
 - v-shaped when viewed in cross-section, white vein running along the underside from tip to base
 - edges have serrated teeth that will grab the skin if rubbed from tip to base
 - turn tan-brown, often with red streaks, curl as they dry

• Flower stalks to 12 feet, with silvery, plume-like seed clusters
Pampus grass is even larger than Ravenna grass—up to 9 feet tall with very long leaf blades. The flowering stalk appears more feathery, delicate, and white, up to 15 feet tall.



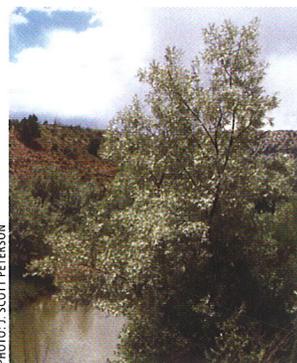
Top: Ravenna grass with seedhead;
bottom: pampus grass seedhead.

Why are these plants a threat?

Highly competitive with the ability to produce large numbers of wind-dispersed seeds, both bunchgrasses rapidly colonize riparian habitats, displacing native plants. Both currently occur only in the Colorado River corridor, with pampus grass found only at a few locations. Ravenna grass has been found on upper, drier terraces, indicating that it could be expanding its range within the park.

Management of ravenna and pampus grasses

Ravenna grass has been the target of an ongoing control program since the early 1990s, with volunteers removing more than 20,000 individual plants between Lees Ferry and Diamond Creek. Only a few pampus grass plants have been found in the park, and those were immediately removed. Annual surveys locate any new plants, which are removed prior to seed set. It is critical to the program's success for more people to be able to identify these plants! We need to know where these plants are so we can focus our control efforts each fall. Please send in your information!



Mature Russian olive tree.

Russian olive (*Elaeagnus angustifolia*)

Originally from Eurasia, Russian olive was brought to North America during colonial times as a much-loved ornamental tree. Used for erosion control and as a windbreak, it is still sold today in many nurseries. If you have traveled in the Southwest, you have seen this tree.

Identifying characteristics

- Tree to 45 feet tall, with a dark brown, deeply furrowed trunk
- Branches smooth, reddish brown, with long thorns
- Leaves narrow, 2-3 inches long, silvery-green
- Flowers creamy yellow, in clusters, highly aromatic

Why is this plant a threat?

Russian olive aggressively invades riparian habitats and, once established, provides inferior wildlife habitat compared to native trees. Like other invasive species, Russian olive uses copious amounts of water. Its thorny thickets can make camping and hiking along waterways a challenge.

Management of Russian olive

Only a limited number of Russian olive trees have been found within the park. Park biologists have removed them due to their aggressive nature; however, more may be out there. The earlier we locate these trees, the easier they will be to control. Please scan the shorelines as you are floating down the river—look for the silvery hue. From a distance, buffalo berry (*Sheperdia rotundifolia*) and young netleaf hackberry (*Celtis laevigata* var. *reticulata*) resemble Russian olive trees, so get closer and look at the leaves before filling out the site description postcard!



Russian olive flowers and leaves.

PHOTO: PAUL WRAY

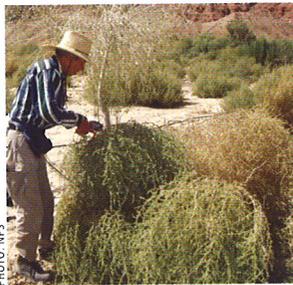


PHOTO: WPE



PHOTO: MARY ELLEN HARTÉ

Top: mature plant; bottom: seedling.

Russian thistle (*Salsola tragus*)

Russian thistle first arrived in North America from Eurasia in 1873 through contaminated flaxseed. Commonly known as “tumbleweed,” mature plants pull free from the soil and blow away, spreading their seeds across the land.

Identifying characteristics

- Shrub, 1-4 feet tall, very branched and round
- Stems with distinct reddish stripes when young
- Leaves alternate, linear, fleshy when young
- Flowers small, papery, without petals with 5 pink to greenish white sepals

Why is this plant a threat?

Since the late 1800s botanists have been concerned with the ability of Russian thistle to dominate disturbed soil in drought conditions. One plant can produce up to 250,000 seeds, increasing this species' ability to spread and dominate. It can cause allergies in humans. This plant can crowd out native plants and also impact recreation, overgrowing beaches prized for camping.

Management of Russian thistle

Until very recently, Russian thistle was relatively uncommon in the park's Inner Canyon. However, this plant can now be seen on virtually every beach and in many side canyons. Volunteers and biologists manually remove the young plants before they produce seed. The plants are left on site to dry. Each site requires several visits since the seed can remain viable for several years. This is a plant we could use help pulling, so please contact the park's Backcountry Vegetation Program Manager if you are interested in lending a hand.



Sahara mustard basal rosette.

Sahara mustard (*Brassica tournefortii*)

Sahara mustard is native to Mediterranean areas, thriving in the broad desert belt from northwestern Africa to the Saudi Arabian peninsula, preferring sandy and gravelly soils. Fully adapted to arid regions, the southwestern U.S. reminds this plant of home, allowing it to settle in and feel very comfortable. It spread exponentially during the moist spring of 2005—earning it the nickname “tsunami mustard.”

Identifying characteristics

- Annual or biennial herb, to 4 feet tall and 3 feet wide
- Basal leaves deeply lobed, with rounded tips
- Stem leaves small, linear, with stiff hairs
- Flowers dull yellow with 4 petals

Two other similar mustards occur in Grand Canyon: London rocket (*Sisymbrium irio*) and tumble mustard (*S. altissimum*). London rocket usually only grows to 2 feet tall, with more slender, curved upright seedpods than Sahara mustard. Tumble mustard is common throughout the U.S., growing to about 3 feet tall. Its leaves are reduced and more linear toward the top of the plant, but the seed pod can grow to 5 inches long, even longer than that of Sahara mustard.

Why is this plant a threat?

Sahara mustard sprouts earlier than most native plants and its enormous basal leaves can smother surrounding plants and rob them of early spring moisture. It also coats its seeds with a sticky gel, helping them to cling to animals and catch a ride. As these giants die back in early spring, their large, dry bodies act like tumbleweeds, acrobatically rolling across the landscape, spreading seed far and wide and providing tinder for future fires.

Management of Sahara mustard

Sahara mustard is found in great numbers in both Glen Canyon and Lake Mead National Recreation Areas, surrounding Grand Canyon and poisoning itself for an advance. Park biologists and volunteers began an aggressive control program in the spring of 2004, with a primary focus on the Lees Ferry area. We now need all the help we can get to start searching for this plant in the river corridor and side canyons.



PHOTO: MARY ELLEN HARTE

Tumble mustard.

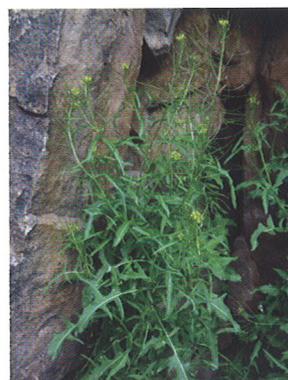


PHOTO: NPS

London rocket.

Sowthistles (*Sonchus* spp.)

Originally from Europe and Asia, sowthistles are now widely distributed throughout the United States. Three species of sowthistles grow in Grand Canyon: common sowthistle (*Sonchus oleraceus*), spiny sowthistle (*Sonchus asper*), and perennial sowthistle (*Sonchus arvensis*). These species prosper in moist soils along rivers and springs. Flowerheads appear very similar to common dandelion.



PHOTO: JAMES H. MILLER

Perennial sowthistle flower/seedhead.



PHOTO: CHRIS EVANS

Common sowthistle.

Identifying characteristics for all 3 species:

- Plants about 1-6 feet tall but begin life as a small rosette
- Stems and leaves exude a milky sap when broken
- Yellow flowers mature into fluffy, dandelion-like seed heads

Common and spiny sowthistle characteristics:

- An erect and unbranched stem
- Alternately-arranged, bluish-green, hairless, toothed leaves

Spiny sowthistle characteristics:

- Leaves are much more prickly than those of common sowthistle

Perennial sowthistle characteristics:

- A smooth, unbranched lower stem, but a branched upper stem
- Alternately-arranged, shiny, green leaves
- Upper leaves smaller and fewer than lower leaves

Why are these plants a threat?

Sowthistles can displace native vegetation by invading disturbed and undisturbed sites. All species have seeds the wind can carry great distances, aiding their ability to spread. Usually you find hundreds of sowthistles growing at a site, not just a handful.

Management of sowthistles

Once you get a search image for these species, you start to see them everywhere. Current control focuses only at seeps, springs and side canyons in the Inner Canyon because these plants are so widespread in the river corridor. We need information about where they are in the side canyons. How widespread are they beyond the river corridor? How many plants are found in each location? You can help us get this information!



PHOTO: CHRIS EVANS

Spiny sowthistle.



PHOTOS: NPS

Top: mature tree; bottom: flowers.

Tamarisk (*Tamarix ramosissima*)

Originally from Eurasia, settlers introduced tamarisk into the western United States in the early 19th century. It was used as both an ornamental tree and for erosion control along riversides and in fields. It reached Grand Canyon during the early 1930s, but did not become a dominant plant along the Colorado River until after completion of Glen Canyon Dam in 1963.

Identifying characteristics

- Deciduous shrub or small tree, 12-15 feet tall, often forming dense thickets
- Leaves are alternate, gray-green, scaly
- Flowers are pink to white, appearing nearly year round
- Young branches and saplings have smooth, reddish-brown bark

Why is this plant a threat?

Tamarisk forms dense stands that usurp water and can quickly crowd out native vegetation such as willow and cottonwood trees. Once established, tamarisk trees create dense piles of leaf litter below their canopy, making it tough for native plant seedlings to establish. This litter also increases salt levels in the soils, making it difficult for native plants to survive.

Management of tamarisk

Although tamarisk is well-established along the Colorado River corridor, it is succumbing to efforts aimed at controlling its spread in Grand Canyon's side canyons. Through the Tamarisk Management and Tributary Restoration Program, staff and volunteers use herbicides and hand saws to fight this persistent invader. This ongoing project, which began in fall 2002, has resulted in a 99 percent reduction of tamarisk coverage in treated areas and native plants are returning and thriving. We need help mapping and pulling tamarisk seedlings in select side canyons, so please let us know if you are interested in joining the team.

Tree of heaven (*Ailanthus altissima*)

Native to China, tree of heaven was introduced to the United States in the late 18th century, moving west during the California gold rush. Today, it can be found in 42 states from Maine to Florida and west to California, often in dense patches with few other native plants.

Identifying characteristics

- Deciduous tree to 80 feet tall and 6 feet wide
- Bark light gray, cracked, and branches gray, smooth and glossy
- Leaves large, compound, 1-4 feet long, leaflets to 7 inches long
- Flowers small, greenish-yellow, with 5 petals, appearing from April to June
- All parts of the tree emit a strong, offensive odor
- Fruit flat, papery, wing-shaped, with twisted tips



PHOTO: NPS



PHOTO: JAMES H. MILLER

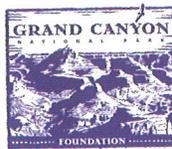
Top: mature plant; bottom: leaves.

Why is this plant a threat?

Tree of heaven spreads rapidly, often forming dense thickets and displacing native vegetation. It can grow from seed but most often spreads through its well-developed rhizomes and roots. It outcompetes native plants by releasing toxins that inhibit the growth of other plants.

Management of tree of heaven

This aggressive tree has only been found at one location within the park, less than a mile up Kanab Creek from the river. It was quickly removed the same year a boatman informed park biologists about it. It is very likely that there are more tree of heaven in the park, which is why your help is needed. Please learn to identify this tree and notify park biologists if and where you find one.



The Grand Canyon National Park Foundation works to build the ethic of stewardship for Grand Canyon through private philanthropy, volunteer leadership, and public outreach. Donations to the Foundation support projects that protect and preserve the Canyon's irreplaceable natural, cultural, and historic resources while enhancing the visitor experience.

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