

RUSSIAN OLIVE
Elaeagnus angustifolia

Life History/Identification:

Russian olive is a small, thorny shrub or small tree that can grow up to 30 feet in height. Its stems, buds, and leaves have a dense covering of silvery to rusty scales. The leaves of Russian olive are egg-shaped, smooth-margined, and alternate along the stem. Russian olive begins flowering when the plant is between 3 to 5 years old. Flowering occurs from May through June, and the flowers are highly aromatic and a creamy yellow color. From August to October, clusters of abundant silvery fruits, remain on the plant throughout the winter. Seeds are dispersed by birds and are commonly deposited along river courses where shrubs and trees are localized. The seeds of Russian olive are viable for up to three years.

Germination is promoted by the natural cold treatment that seeds receive over the winter or they can also be artificially enhanced by stratification in moist sand. In addition to sexual reproduction and the setting of abundant seeds, Russian olive also propagates itself vegetatively by sprouts from adventitious buds. Once established, the plant can thrive over a broad range of soils textures and moisture levels, from heavy clay soils with groundwater to light, sandy, well-drained soils. Russian olive can withstand flooding and silting and is also drought resistant. This exotic grows rapidly and readily competes with other species, especially in riparian environments. Russian olive is shade tolerant, persistent, and can easily become the dominant species, replacing native cottonwoods and willows in western drainage systems.



Northern Arizona Localities:

Russian olive can be found in many areas of Northern Arizona. In the past it has been promoted for use as windbreaks and erosion control. Rows of Russian olive can be seen in areas such as Doney Park. Scattered populations can be found in the National Forest. These are probably the result of animal dispersal but might have also been deliberately planted. This species can become very invasive when introduced into a wild land setting. For example, in 1964, Russian olive was planted in Canyon De Chelly in northeastern Arizona and ten years later it was one of the dominant trees of the canyon bottom. Control efforts must be initiated to stop the spread of these invasive trees into the canyons and waterways of northern Arizona.

Origin and Impacts:

Russian olive was first cultivated in Germany in 1736, and was introduced into the United States in the late 1800's as an ornamental tree. Until recently, the Soil Conservation Service (SCS) recommended Russian olive for windbreaks and erosion control. It is increasingly being recognized, however, for its invasiveness in natural areas, particularly in arid riparian ecosystems. The plants rapidly colonize lowland fields and choke irrigation ditches in the western United States. Russian olive woodlands have replaced many marshlands in South Dakota and riparian areas in New Mexico. Communities that are dominated by Russian olive are generally considered to be inferior wildlife habitats to those consisting of primarily native vegetation. In fact, the ecosystem that the tree creates is thought to strain some federally threatened and endangered birds, such as piping plovers, least terns, and whooping cranes. Bald eagles may also be impacted by the reduction or elimination of cottonwood trees that they use for nesting and roosting. These plants could also impact threatened, endangered, or rare fish. Russian olive consumes water at a higher rate than native trees, thus

lowering the water table. The lowered water table could make spring-fed desert lakes unsuitable for the rare fishes inhabiting them. There is also no commercial value for the wood of Russian olive.

Control:

Prevention is the most effective and least expensive method of control. Once Russian olive is established in unwanted areas, it is difficult to control and almost impossible to eradicate because of its ability to form root shoots and suckers. The dispersal of seeds over a large area by birds and wildlife, and the long viability of its seed, also makes control an arduous task.

Cultural Control:

Cultural control must be used in conjunction with other control techniques in order to contain and eradicate Russian olive. When restoring or treating an area infested with the plant, use shrub and tree species that are native to the particular region and ecosystem. In Arizona, cottonwood and willow species are competitive with Russian olive, but are not capable of eradicating invasive species on their own. Do not use Russian olive as an ornamental or for erosion control. They easily escape into the wild and begin new infestations.

Mechanical Control:

Mowing hedges with a brush-type mower, followed by the removal of cut material is an effective method of control. Large machines, however, are costly and they are not selective in avoiding damage to native vegetation. The use of a chainsaw, used by trained personnel, is effective if the tree is cut just above the ground and then followed by an herbicide application.

Chemical Control *(Noted here are chemical control techniques that have been used in other areas. Always check with weed specialists or chemical suppliers before treatment to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council or The Nature Conservancy.):*

- 1) One part Remedy™ (chemical name: triclopyr) added to three parts vegetable oil can be sprayed evenly but lightly from the base of the stem up to 12 inches above the ground. It is important to cover the entire circumference of the tree, but not to cause runoff or puddling.
- 2) If the tree is cut just above the ground, Garlon 3A™ (triethylamine salt of triclopyr) can be sprayed on the entire perimeter of the stump for effective control. It is important to have an equal mixture of Garlon 3A™ and water, and to thoroughly clean the stump of any dirt or sawdust.
- 3) Repeated application of 2,4-D has been used in Nebraska as a means of controlling large trees. This method requires at least two-years of multiple applications.

Biological Control *(No exotic species should be introduced into an ecosystem without extensive research into the long-term effects. Mention of the species below does not imply appropriateness for use in Northern Arizona.):*

Verticillium wilt and phomopsis canker are two natural disease agents that are already present in North America that harm Russian olive. The disease is manifested as reddish brown to black areas of canker on smaller branches, often with small, dark structures of the fungus on the diseased bark. The cankers restrict water, which results in the death of leaves and branches.

Note: No single control method, or any one-year treatment program, will ever achieve effective control of an area contaminated with Russian olive. The fast growth, high seed viability, fast rate of spread, and aggressive vegetative growth of this plant require long-term cooperative integrated management programs and planning to prevent, contain, and reduce Russian olive infestations.

Species Management Plan
Russian Olive
Elaeagnus angustifolia L.

Life History/Identification: Russian olive is a large deciduous shrub or small tree. Individual plants can reach a height of about 45 feet. The plant has alternate, lanceolate (oblong) leaves with smooth leaf margins. The leaves are dull gray-green on the upper sides and are covered with silver-whitish scales below and are arranged oppositely on the stems. The plant has thorny stems. The flowers are yellowish, four parted and are scattered along the stem in clusters of one to three. Blooming is in June or July. After blooming the plant forms "olives", which are drupes with an exterior somewhat fleshy covering. The drupes remain on the plant throughout the winter and can provide a source of winter food for a variety of animals. Small mammals and birds can disperse the seeds in their feces to new locations. The seeds of Russian olive are viable for up to three years. Germination is promoted by the natural cold treatment that seeds receive over the winter. Russian olive has been widely used in shelterbelts, ornamental planting, beautification projects, and wildlife habitat plantings for many years. It is still available through many garden shops and until recently through conservation service programs such as the Soil Conservation Service and the Arizona State Land Department. Russian olive has the ability to fix nitrogen in the soil. In some areas it has been planted with other species such as black alder to increase the growth and yield of the other species.

Status: Russian olive is included in the Noxious Weed List for the Coconino, Kaibab and Prescott National Forests. It is a Class B Weed. The classification recognizes that there may be some small groups that can be effectively controlled, but larger groups may be present in some areas where control would be difficult. These include riparian areas and around residential areas where the species was widely planted. Russian olive is not included on the Arizona State List or on the Federal Noxious Weed List.

Impacts: Russian olive grows rapidly and can out compete other species, especially in riparian ecosystems. Russian olive is shade tolerant, persistent, and can easily become the dominant species, replacing native species such as cottonwoods and willows. The species can easily spread by seeds dispersed by animals or by sprouting by adventitious buds, which occur on the roots. In riparian areas where Russian olive becomes the dominant species, the quality of wildlife habitat is inferior to habitat provided by native plant species. Russian olive sprouts from adventitious root sprouts after disturbance. After the occurrence of fire, burned plants can resprout from the root crowns. Russian olive can also become established after a fire through off-site seed sources from nearby plants or from seeds transported by animals. The pollen of Russian olive can be a source of allergies for some people.

Distribution: Russian olive is a widely distributed species throughout the Northern Arizona area. There are many populations around places of human inhabitation throughout the area. Groups of trees can be seen along US Highway 89N in the Fernwood area. These plants were a part of a windbreak planted in the area several years ago. Trees are sometimes found singly or in small groups in the wildland areas throughout Northern Arizona. Scattered trees can be seen along Interstate 40 in the Kaibab and Coconino National Forests. At least one population of Russian olive trees can be found in the A-1 Burn, an old wildfire that occurred in the 1950's just west of Flagstaff. A group of Russian olive trees is growing in perfectly arranged rows in part of a ponderosa pine plantation. It is unclear if these trees were intentionally planted or if they may have been accidentally included in contaminated

nursery stock. Russian olive trees may occur along stream edges and drainages in several areas of the forest.

Control:

1. Cultural Control:

Prevention of more introductions of this species into native ecosystems will help control it. This species has been used in the past as a nitrogen-fixing agent and in wildlife improvement projects. Future use of this species for these purposes should be discouraged. Managers are encouraged to consider native species for use in these projects. **Information** on the invasive nature of this species should be shared with local citizens. With the species apparently widespread, local citizens may be digging up trees from one place and transporting them to another. This practice should be discouraged. Some populations of Russian olive may exist in areas of former human habitation on formerly private land inholdings. Future acquisitions or land exchanges should include **surveys** to assess the impacts of non-native plants on future management of the acquired parcel.

2. Mechanical Control of this species would be labor intensive.

Cutting the stem of an established tree may result in formation of many more stems. Sprouting may occur from adventitious buds on the stump. Other mechanical controls such as **mowing** of seedlings, **girdling** or **bulldozing** have been used with limited results.

Fire may kill the above ground portions of Russian olive trees. However, trees can resprout from the root crowns after a fire or new plants may become established through off-site seed sources.

3. Chemical Control: *Noted here are chemical control techniques in use in other areas. Always check with weed specialists or chemical suppliers to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council, San Francisco Peaks Weed Management Area, the USDA Forest Service, nor the Nature Conservancy. Currently the use of herbicides is not allowed on lands administered by the Coconino, Kaibab and Prescott National Forests. Always check with your local land manager before using herbicides on public lands.*

Basal treatment of trees with stems **less than two inches in diameter** is one method of herbicide treatment. In this treatment triclopyr is mixed with vegetable oil in a ratio of 1 part herbicide to 3 parts vegetable oil to make a 25 percent solution. The solution is then sprayed on the base of the stem to a height of 12 inches. This method is effective only on small stems with smooth bark. The solution does not penetrate the roughened bark of larger stems enough to be effective.

Herbicide treatment can also be used on recently cut **stumps**. To be effective, the trees must be cut horizontally just above the ground and all sawdust and debris removed. The cut area is treated with a 50 percent solution of triclopyr and water. A similar solution of vegetable oil and herbicide could be used but this increases the cost and is not necessarily more effective.

4. Biological Control:

There are currently no biological control agents approved by APHIS for use on Russian olive. Some natural diseases such as Verticillium wilt and phomopsis canker may cause some leaf and stem mortality but apparently do not cause widespread mortality to the plants.

5. Integrated Control

Cutting trees and **treatment** of the stump with **herbicide** as proposed by Parker and Williamson is an example of the use of Integrated Control on this species. Other techniques include **cutting, herbicide treatment** of the stump and then **burning** to prevent resprouting after fires in infested areas (Fire Effects Database). **Cutting the trees followed by burning** has been successful in some areas.

For all of treatments mentioned above repeated treatments are needed to assure full control of the infestation.

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