

Macfarlane's four o'clock (*Mirabilis macfarlanei*)



ENDANGERED



Flowers (left), habit (center), and habitat (right) of Macfarlane's four o'clock. Photos by Thomas Kaye. If downloading images from this website, please credit the photographer.

Family

Nyctaginaceae

Plant description

Macfarlane's four o'clock is a stout perennial that forms hemispheric clumps 0.6-1.2 m in diameter, with several freely branched decumbent or ascending stems that are glabrous to sparsely puberulent. The leaves are opposite and fleshy, the lower blades orbicular to ovate-deltoid, the upper narrowly ovate. The petioles of lower leaves are 1-2.5 cm long; upper leaves are nearly sessile. Flowers are clustered (4-7) in involucre borne on stalks about 1 cm long in the upper axils and on shoot apices. The conspicuous involucre is green to purplish, 1.3-2.5 cm long. The showy perianth is magenta, broadly funnelform, and 1.5-2.5 cm long, the limb slightly longer than the tube. The ellipsoid fruits are light brown to grayish, with 10 slender ribs visible when wet, 6-9 mm long, tuberculate, glabrous or very sparsely puberulent.

Distinguishing characteristics

No other *Mirabilis* species occur within the range of Macfarlane's four o'clock. *Mirabilis laevis* var. *retrorsa* has shorter involucre (0.5-0.7 cm long), a white to pale pink perianth, and ranges from Malheur and Harney Counties in Oregon southward. Macfarlane's four o'clock is most closely related to *M. multiflora* var. *glandulosa* and *M. greenei*, which occur in Nevada and California, respectively, and have longer involucre and larger perianths.

When to survey

Surveys should be completed when Macfarlane's four o'clock is flowering, from the beginning of May through June.

Habitat

Macfarlane's four o'clock occurs in canyon grasslands on gravelly to loamy and sandy substrates. It prefers steep, sunny slopes ranging from 300-900 m (1,000-3,000 feet) in elevation.

Associated species include *Balsamorhiza sagittata*, *Celtis reticulata*, *Cryptantha humilis*, *Lomatium dissectum*, *Penstemon eriantherus*, *Phacelia heterophylla*, *P. linearis*, *Pseudoroegneria spicata*, and *Sporobolus cryptandrus*. Non-native associates that occur at many Macfarlane's four o'clock sites include *Bromus tectorum*, *Hypericum perforatum*, *Convolvulus arvensis*, *Linaria genistifolia* ssp. *dalmatica*, and *Centaurea solstitialis*.

Range

Macfarlane's four o'clock is restricted to the Salmon, Snake, and Imnaha river canyons in northeastern Oregon and adjacent Idaho. There are four known occurrences of this species in Oregon and nine in Idaho.

Oregon counties

Wallowa

Federal status

Threatened

Threats

Non-native weed invasions are a major threat to this species, resulting in the competitive exclusion of Macfarlane's four o'clock and other natives and an increase in the amount and continuity of combustible biomass throughout the landscape. This leads to increased frequency and intensity of wildfires within Macfarlane's four o'clock habitat, resulting in further loss of suitable habitat for this endangered plant. Grazing by livestock and native and introduced ungulates, including Rocky Mountain bighorn sheep, elk, mule deer, and mountain goats, can negatively impact Macfarlane's four o'clock by direct trampling or consumption of the species, and can lead to decreased reproduction and reduced plant height. Of greater concern, however, are the long-term indirect impacts of livestock and other ungulates, which often include decreased species diversity and proliferation of weedy, non-native plant species within affected habitats. Insect herbivory, particularly by spittle bug nymphs (*Aphrophora* sp. and *Philaenus* sp.), has caused significant reductions in plant height as well as shoot death and floral abortion within some Macfarlane's four o'clock populations. Additional threats include recreation and off-road vehicle use, habitat fragmentation and small population sizes, low seed viability, landslides, and herbicide drift from highway maintenance activities.

Conservation planning

A U.S. Fish and Wildlife Service [Revised Recovery Plan](#) (pdf document, 3.04 MB) was released for Macfarlane's four o'clock in 2000.

A U.S. Fish and Wildlife Service [5-Year Review](#) (pdf document, 1.72 MB) addressing updated conservation needs for Macfarlane's four o'clock was released in 2009.

Did you know?

Macfarlane's four o'clock can reproduce both sexually from seed and clonally from thick woody tubers which can send out many genetically identical shoots called ramets. The species has an extensive underground lateral root system, with tubers usually 4-8 cm in diameter by 25-35 cm long, and roots typically shorter than 2 meters in length, but which can reach up to 10 meters. Clones can thus vary greatly in size and number of ramets. Clumps of stems are sometimes comprised of multiple clones growing together, and the number of ramets produced by an individual varies from year to year, likely depending upon environmental conditions, making it difficult to determine the number of genetically distinct individuals within a population.

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