Graham's Beardtongue Fact Sheet
(*Penstemon grahamii*)

Habitat Description

Graham's beardtongue grows directly on the weathered exposures of oil-shale strata associated with the Parachute Creek Member and Evacuation Creek Member of the Green River Formation. More specifically, most known populations are associated with surficial exposures of the Mahogany Bed, a mostly discontinuous series of raw semi-barren knolls, ridges and slopes rich in oil shale (Franklin, 1995). Soil surface in habitat consists of white or whitish-tan shale channer, 5 cm across on the surface, 5 to 10 cm across below. Freshly broken channers exhibit a very dark brown interior due to the high organic content of the kerogen in the oil shale; the nearby beds of raw, unbroken oil shale itself may exhibit an even darker, almost black interior, on a hot day redolent of an auto garage. The underlying soil itself is usually silty clay derived from thinly bedded shale; the soil chemistry is usually alkaline and calcareous. Elevational amplitude is from 4600 to 6700 ft amsl.

Species Description

Graham's beardtongue is a perennial herb, consisting of one to several shoots per plant, growing 0.5 to 2 dm tall from a sparingly branched tap-rooted caudex. The shoot is ascending to erect, the herbage is puberulent. The phyllotaxis is opposite. The leaves are deep green, 1.5-5 cm long × 3-8 mm wide, thick, leathery, with entire (or rarely inconspicuously toothed) margins; the basal and cauline leaves are ovate, spatulate or broadly oblanceolate, narrowed to a petiolar base, sometimes sparsely pubescent; the upper cauline leaves are oblong to oblanceolate, sessile and clasping, becoming glandular-pubescent in the inflorescence. The inflorescence is cymose and consists of 1 to 5 crowded axillary verticillasters, each with 1 to 3 flowers—totaling 3 to 20 flowers per inflorescence. The calyx is 5 to 9 mm long, glandular-pubescent, with lanceolate pubescent lobes. The corolla is bilaterally symmetrical with petals fused into a floral tube. The floral tube is large, 27 to 35 mm long, glandular-pubescent, abruptly and conspicuously ampliate, conspicuously bilabiate, the upper lobes projecting, the lower reflexed, pinkish or light to deep lavender, with dark violet lines in the corolla tube throat. The stamens are exserted, the anthers are glabrous, peltate-explanate, the anther sacs 1 to 4 mm long; the staminode is conspicuously exserted and downward-curving, evenly bearded on all sides with short golden-orange hairs. The ovary is superior, the stigma globose, the capsule bivalvate, the dehiscence septicidal and the seeds black, few to numerous (Welsh *et al.,* 1993).

Associated species can include

Amelanchier utahesis, Artemisia pygmaea, Atriplex confertifolia, Cercocarpus montanus, Chamaechaenactis scaposa, Cirsium pulchellum, Elymus salina, Ephedra torreyana, Eriogomum corymbosum, Glossopetalon spinescens, Juniperus osteosperma, Parthenium (Bolophytum) ligulatum, Pinus edulis, Tetradymia nuttallii, Tetraneuris acaulis, Yucca harrimaniae.

In addition, Graham's beardtongue can be associated with other oil shale endemics such as: *Astragalus lutosus, Aquilegia barnebyi, Cryptantha barnebyi, Cryptantha rollinsii, Eriogonum ephedroides, Penstemon scariosus* var. *albifluvis.* The plant community associated with Graham's beardtongue forms a distinct assemblage of species dominated by low shrubs and mound-forming perennial herbs (Shultz & Mutz, 1979).

Phenology and Reproductive Biology

Graham's beardtongue appears to be long-lived (10 years) with low fecundity. Anthesis is in mid-May to mid-June. Pollination is by the bees *Anthophora lesquerellae* and *Osmia sanrafaelae*; the sweat bees *Dialictus* sp. and *Lasioglossum sisymbrii*; the masarid wasp *Pseudomasaris vespoides*; the bumblebee *Bombus huntii*; and even occasional hummingbirds *Archilochus alexandri* and *Selasphorus platycercus*. The most consistent of all these pollinators is probably *Pseudomasaris vespoides*, a beardtongue specialist of the Subfamily Masarinae, the so-called "pollen wasps." Fruit maturation can be recognized by the browning of the exocarp, usually by mid-summer. No specialized seed dispersal vectors are known. Seeds are thought to disperse by random tumbling of dehisced fruits—i.e., snapped off by wind or kicked about by animal hooves, and tumbling over the soil surface. Recruitment is believed to be fairly low.

Current Distribution

Graham's beardtongue occurs only in the Uinta Basin of northeastern Utah and adjacent western Colorado. Known species occurrences extend from the vicinity of the confluence of the Green River, Sand Wash and Nine Mile Creek (near the shared convergence of Carbon, Duchesne and Uintah Counties); then east across southern Uintah County towards Dragon; then north towards the White River and Cowboy Canyon and then north-northeast across the Colorado line into Raven Ridge, the eastern terminus of the species' range (USFWS, 2008).