Sego Lily
Newsletter of the Utah Native Plant Society
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Horseshoe Milkvetch Hides Out in Colorado

By Tony Frates

As a result of field work over the past three years, Colorado botanists have found the globally rare Horseshoe milkvech in the Gateway area of Mesa County, Colorado, near the Utah-Colorado border east of Moab. Utah taxonomists have confirmed the identity of these recent finds.

The milkvetch, first discovered by Drs. Elizabeth Neese and Stanley Welsh in May of 1979 (and given the name *Astragalus equisolensis* by Welsh and Neese in 1981), was initially thought to be a Uinta Basin endemic found in a 12 square mile area around Horseshoe Bend on the east side of the Green River south of Vernal, in Uintah County, Utah. There it is restricted to soils derived from the Duchesne River formation on river terraces and gravel in mixed desert shrub communities. The single known population in Utah is limited to elevations between 4700 to 5200 feet.

The genus *Astragalus* is an extremely large and diverse group of plants in the Pea or Bean family (i.e Fabaceae or Leguminosae). *Astragali* occur over much of the Northern Hemisphere (including places like Spain, Iran, and central Asia) and conservatively number over 1,600 species (more than 2,000 if one includes varieties). Over 375 species (over 550 counting varieties) occur in North America, mostly in the western [continued on page 6]

Horseshoe milkvetch (Astragalus equisolensis *or* A. desperatus *var.* neeseae *depending on one's taxonomy of choice). Photo by Ellen Mayo, 27 April 2006, inset photo of fruits by Peggy Lyon, 21 May 2008.*

In this issue:

Utah Native Plant Society

Website: For late-breaking news, the UNPS store, the Sego Lily archives, Chapter events, links to other websites (including sources of native plants and the digital Utah Rare Plant Field Guide), and more, go to unps.org. **Many thanks to Xmission for sponsoring our website.**

For more information on UNPS: Contact Bill King (582-0432) or Susan Garvin (356-5108), or write to UNPS, PO Box 520041, Salt Lake City, UT, 84152-0041 or email unps@unps.org

Sego Lily Editor: Walter Fertig (walt@kanab.net). News items, articles, photos, and illustrations from members make the editor very happy. The deadline for the November 2008 *Sego Lily* is 25 October 2008.

UNPS News

UNPS Annual Members Meeting, Friday, November 7, 2008: Each year UNPS holds an annual members meeting which has traditionally included three main elements: a "New World Potluck" lunch or supper featuring foods native to the Americas (classics include turkey, potatoes, tomatoes, yams, blueberries); a featured speaker who has something important to say about native plants and UNPS; and a brief business meeting at which the members elect a Board of Directors for the following year.

In recent years we have cycled among the three population centers of Utah Valley, Salt Lake, and Cache Valley, and it is the Salt Lake Chapter's turn to host the 2008 meeting. This being our 30th anniversary we hope that as many people as possible will make a special effort to attend: we will do our best to arrange "home stay" accommodations for anyone traveling from out of the area.

Our venue is the Sugarhouse Garden Center, 1602 East 2100 South, Salt Lake City which has good meeting rooms and a large kitchen for heating and preparing food. Arrive any time from 5:30 PM to socialize and help get things set up. We expect to start eating between 6:15 and 6:30.

Our speaker for this special occasion will be Dr. Duane Atwood. Duane was one of the founding members of UNPS and its first President. Over the years he has made many contributions to our understanding of Utah's plants and worked on their behalf. Earlier this year he gave a retrospective talk on the early years of UNPS at the annual Utah Rare Plant Conference and was presented with the Society's Lifetime Achievement Award for his outstanding work (see May issue of *Sego Lily* or http://www. unps.org /PAGES/news#atwood)

To reach Sugarhouse Park from north or south, take the eastbound I-80 exit from I-15, and exit again at 1300 East (about 2 miles). Proceed north by Sugarhouse Park, turn right on 2100 South. The Garden Center is located in the extreme northeast corner of the park with its own parking lot (not accessible from Sugarhouse Park). For more details or questions, please email or call Bill Gray (cyberflora@xmission.com, 801-532-3486). - *Dave Wallace*

30th Anniversary Issue—Coming in November: Getting a newsletter together every two months can be difficult under ordinary circumstances, but is especially challenging during the midst of summer field work and vacation time. So—the 30th Anniversary special issue of the *Sego Lily*, commemorating the history of the Utah Native Plant Society, is being postponed to our November issue.

UNPS Events Calendar

September 6, 2008: **Utah Green Festival.** Over the last decade the Jordan Valley Water Conservancy District has taken an active role in water conservation through the development of educational programs and other efforts designed to reduce water use, including development of the Conservation Garden Park. The Conservancy will hold a public event centered around resource conservation (including water, energy, air, and fuel) and sustainability, at the Conservation Garden Park, located at 8215 South 1300 West in West Jordan on Saturday, Sept 6, from 8 AM-5 PM.

September 13, 2008: The **Manzanita (Kane Co.) Chapter's**, Fall Plant Sale featuring Janett Warner of Wildland Nursery and Merrill Johnson of Great Basin Natives will be held during the Kanab Farmers Market from 9 AM until noon on the lawn of the Kanab Chamber of Commerce.

October 4, 2008: Celebrate the Wild with the **Fremont Chapter**,on Saturday, Oct 4 from 1-5 PM, at Sam Stowe Group Area, Fremont Indian State Park. Enjoy hikes, nature walks, a tour of the native garden at the Sam Stowe Campground, workshops, presentations, and a plant sale. Free to the public. For more information, contact Janett Warner (janett@wildlandnursery.com)

October 6, 2008: **Southern Chapter** Monthly Meeting, 7 PM at the Canyon Community Center, 126 Lion Blvd., Springdale. Call 772-0525 for information. **Peter Stempel** will present "**Natural Site Planning**". Taking a natural approach to site design can have critical benefits both to the natural and constructed worlds. Rather than treating drainage like plumbing, the natural site planner uses a combination of natural drainage strategies, native plants, and common sense, to preserve the natural world, while enhancing the safety and value of the constructed one. Peter Stempel, currently practicing in Virgin UT, is certified in the USGBC's LEED program, and a member of the American Institute of Architects.

Nov 7, 2008: UNPS Annual Membership— see page 2 or the UNPS website (www.unps.org) for more details.

March 16-20, 2009: **Southwest Rare Plant Conference**, **Salt Lake City, U**T. The Utah Native Plant Society will be hosting the next Southwest Rare Plant Conference (which will incorporate the annual Utah Rare Plant Task Force Conference). The event, entitled *Changing Landscapes in the Southwest,* will be held in Salt Lake City, Utah on the University of Utah campus from March 16 through 20, 2009. Topics will include rare plant biology and biogeography (in the Southwest region as well as Utah), plant community and ecological restoration, climate change issues, and others. Format will include posters, oral presentations, and special topic breakout sessions.

Dr. Noel Holmgren of the New York Botanical Garden and co-author of the *Intermountain Flora* will be the conference keynote speaker. His topic will be "Plant Geography of the Intermountain Region and Connections with the Southwest".

UNPS is currently soliciting abstracts for oral or poster presentations for the conference. To submit an abstract, register, or learn more about the conference, go to the conference website at http://webmail.xpressweb.com/horde3/services/go.php?url=http%3A%2F%2Fguest.cvent.com%2Fi.aspx%3F5S%2CM3%2C549fa0a2-ee97-4fab-81b4-288ff73aac78, or follow the link on the UNPS home page (with the much shorter URL www.unps.org).

Please consider attending the conference, submitting an abstract, or passing word along to friends, students, and colleagues.

Bulletin Board

UNPS Society Page: The UNPS Board of Directors is pleased to announce the marriage of two of our favorite board members: former UNPS President and Board chair Susan Garvin and Robert Fitts of the Utah Conservation Data Center on August 29th, 2008. Congratulations to the happy couple, who we believe are registered at the UNPS store (www.unps.org).

UNPS Life Membership Update: Jared Fuller of Provo, Utah and Carol Baker of Logan, Utah are our newest lifetime members (#s 31 and 32). Thank you for supporting UNPS!

From the Office of the Co-President: Salt Lake City gets it right. In among all the bad news we tend to forget that some government agencies do a great job. One of these is the Salt Lake City department of public utilities. Over the years their watershed program has been a leader in protecting areas of significant environmental value – good both for the land and its plants and for the city water supply. This year they purchased an area at the head of Lamb's Canyon drainage where development of summer homes is threatening to increase its impact.

Part of the purchase includes Lake Salamander. The lake itself is not too impressive, but where a series of small streams enter the lake is one of the finest populations of Wasatch Fitweed (*Corydalis caseana* ssp. *brachycarpa*) in the world. Downstream are several small populations scattered in minor drainages. Hats off to the long-sighted members of the watershed department who got it right! - *Bill Gray*

Print Subscribers: Tired of seeing the Sego Lily in black and white or suffering a paper cut opening up your issue in the mail? Consider an email subscription—see the issue in color, save a tree, and email it to a friend when you are done!

Will Plants Run Your Car?

By Peter Lesica

Adapted from the Winter 2008 issue of *Kelseya*, newsletter of the Montana Native Plant Society

There is debate in the scientific community about the role of biofuels in mankind's future energy supplies. At first glance biofuels might seem like a good idea for solving dependence on foreign oil, while producing lower net greenhouse gases than petroleum. Further, large-scale biofuel production promises guaranteed domestic agricultural markets. However, there are several reasons to be skeptical about biofuels as an answer to the energy needs of our country and planet.

Current and future energy demands are great, but the efficiency of biofuel energy production is not. It is estimated that biofuels produce between 1.3 and 3.2 units of energy for every unit used. This low efficiency means that there will be little net gain for the effort expended and little reduction in the production of greenhouse gases. Recent research suggests that nitrous oxide entering the atmosphere as a result of using nitrogen fertilizer to produce biofuel crops will contribute more to global warming than the amount saved by using less fossil fuel. Furthermore, the most efficient crops are those that require the best agricultural land and the most fertilizer. Large-scale biofuel production will also likely result in an increase in water pollution due to increased use of fertilizer and pesticides for raising crops such as corn and soybeans. They also require significant water to produce the fuel, frequently six gallons of water for each gallon of biofuel produced. Biofuel proponents argue that residues from biofuel production, such as distilled grain and soybean meal, can be used for livestock feed. However, producing even 10% of current energy demand in the U.S. would generate almost 40 times the livestock feed currently used. Clearly the byproducts of large-scale biofuel production must be considered a serious waste disposal problem rather than a benefit at this time.

The biggest issue with large-scale biofuel production revolves around land. Large tracts of land will have to be diverted from other beneficial uses. Producing fuel from crops such as corn, sunflowers, and soybeans will divert land from food crops with a resulting reduction in food security. Some estimates suggest that providing fuel for one average U.S. automobile for one year would require three tons of grain.

*Above: Switchgrass (*Panicum virgatum*) is a native prairie grass often mentioned as a potential biofuel crop. In Utah, this perennial species occurs primarily in the Colorado River drainage in the southeastern corner of the state. Insets: two views of the spikelet of* Panicum virgatum *with two glumes and a single glume-like lemma. Illustration by W. Fertig.*

Latin America, particularly Brazil, Bolivia, Argentina, and Colombia, has potential to greatly expand its agricultural frontier, but unfortunately this would come at the expense of native forests and grasslands, including some of the world's biodiversity hotspots. A recent report by the United Nations Food and Agriculture Organization (FAO) indicates that biofuel could provide economic opportunities in developing countries if it resulted in an increase of small producers. However, the FAO notes that expansion in biofuel production will most likely result in an increase in local crop prices and a transfer of income from poor urban people to wealthy large-scale farmers.

Large-scale biofuel production will likely also have significant ramifications for the northern Great Plains of the U.S. and Canada, even though this region does not have either the climate or irrigation to raise corn, soybeans, or other highly productive biofuel crops. Much of this cropland is also considered highly erodable by the Natural Resources Conservation Service due to low annual precipitation and potential for wind erosion. A great deal of highly erodible land was plowed up nearly 100 years ago and then abandoned during the dust bowl years when the climate became hotter and drier. Since then, farmers have continued to sodbust native rangeland whenever markets allowed for a profit on dryland crops. These profits were always short-lived however, because the topsoil was thin, and wheat markets are cyclical. The Government Accounting Office reports that 25 million acres of grassland were converted to other uses, primarily cropland, between 1985 and 2003. Conversion continues unabated across the northern plains according to the Farm Service Agency, with over 100,000 acres of grassland converted to cropland in North Dakota since 2003, and over 26,000 acres converted in Montana the past three years.

Increased demand for biofuel crops and the concomitant higher prices will spark an increased demand for wheat and other dryland crops (such as *Camelina sativa* for biodiesel) to replace them in human and domestic livestock diets. As a result, biofuels are being touted as an economic boon for the northern Great Plains farming sector, and they might be in the short-term. However, it should be remembered that the sodbusting of the early 20th Century was also a short-term boom that resulted in a long-term loss due to soil erosion and the cost of reclaiming the land to perennial grass. Biofuels may seem like a good idea right now, but the greenhouse gas emissions, fertilizer use, waste disposal, and food security problems make large-scale biofuel production unsustainable. Humans already appropriate 40% of the earth's biological productivity. Further agricultural disturbance is untenable because natural ecosystems provide critical support for all life on the planet. Because of these problems, a short period of biofuel glory will likely be followed by a decline in demand and production as better, non-polluting energy sources come on line. Marginal cropland will again become idle and in need of restoration. We could be at the beginning of another round of sodbusting and loss of one of the country's most precious resources, native prairie.

It is possible that native grasslands could be used for biofuel production. David Tilman at the University of Minnesota proposes that biofuels derived from native grassland hay could provide more energy and greater CO_2 reductions than corn-based ethanol or soybean-derived biodiesel without fertilizer or significant changes in food security. His predictions are based on studies showing that high diversity grasslands sequester more energy per acre than grasslands with one or two species. Furthermore, native grasslands store more carbon in the soil than crops that require annual tillage. If the technology can be developed to extract the energy from native hay we can produce biofuels with little loss of native habitat and the services it provides.

Most ecologists familiar with the issue agree that biofuels can never be expected to supply more than a small part of our energy. Long-term solutions to humanity's future energy needs must be based on two strategies: non-polluting sources of energy such as solar and wind, and conservation. We will have to live in smaller houses and drive smaller, more fuel-efficient vehicles. We may have to drive less, and we may have to turn down the thermostat and put on a sweater. Native prairie is one of the most endangered ecosystems in North America. Numerous plants and animals depend on this habitat to persist. It is important that any legislation promoting biofuel production also carry provisions to protect native prairie from sodbusting. Whatever role biofuels play in our energy future, it is not worth trading the loss of native prairie ecosystems for a short-term economic surge.

Further reading:

Crutzen, P.J. A.R. Mosier, K.A. Smith, and W. Winiwarter. 2007. N2O release from agro-biofuel production negates global warming reduction by replacing fossil fuels. Atmospheric Chemistry and Physics Discussion 7:11191-11205. www.atmos-chem-phys-discuss.net.

Economic Commission for Latin America and the Caribbean and Food and Agriculture Organization of the United Nations. 2007. Opportunities and risks arising from the use of bio-energy for food security in Latin America. New York.

Giampietro, M., S. Uligiati, and D. Pimentel. 1997. Feasibility of large-scale biofuel production. *Bioscience* 47:587-600.

Government Accounting Office. 2007. Farm program payments are an important factor in landowners' decisions to convert grassland to cropland. GAO-07-1054.

Koh, L.P. 2007. Potential habitat and biodiversity losses from intensified biodiesel feedstock production. *Conservation Biology* 21:1373-1375.

Tilman, D., J. Hill, and C. Lehman. 2006. Carbon-negative biofuels from low-input high diversity grassland biomass. *Science* 314:1598-1600.

Horseshoe Milkvetch Hides Out in Colorado (continued from page 1)

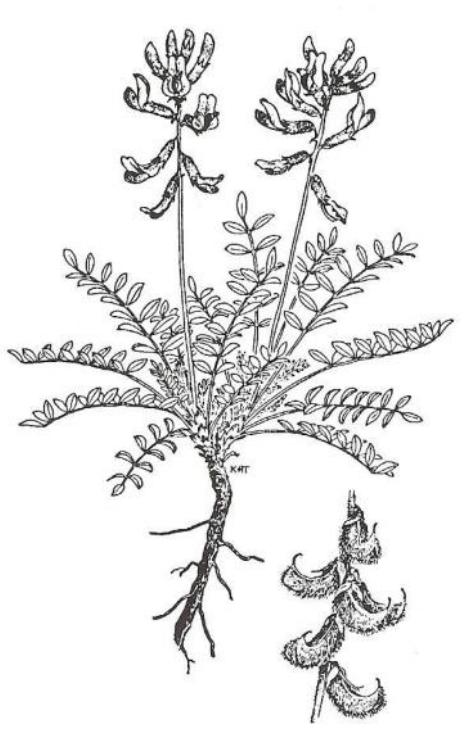
portion of the United States. Utah has 168 species and varieties of *Astragalus,* making it our largest genus of flowering plants. Typically they are found in harsh, arid environments and often on unusual geologic formations. As a result of Utah's stunning diversity of harsh, arid environments and vast array of geological formations, we have many endemic and rare *Astragali*.

Common names of the genus include milkvetch and locoweed. *Astragalus* plants typically are low growing and have dry pods. Some species are toxic at varying levels to grazing animals; some have known medicinal benefits to humans.

A Utah Endemic in Colorado?

On June 5, 1985, renowned legume expert Rupert C. Barneby (who at that time was about 74 years old) located an *Astragalus* "along the left bank of the Dolores" approximately four miles "upstream" from Gateway (this would mean to the south or below the town) growing on "red gravelly banks." In May of 1986 on yet another annual trek from his home in New York City, Barneby collected it again "immediately downstream from Gateway" in gravel-clay soils under sandstone cliffs at about 4430 feet. This would place the location just above or north of Gateway (the Dolores River heads in a northwesterly direction for roughly six miles from the Gateway area until it enters Utah and ultimately flows into the Colorado River near Fisher Towers). The following month botanist Betsy Neely found the same plant south of Gateway (likely near Barneby's 1985 collection site), on the Cutler formation in dry washes with occasional junipers at 4650 feet.

In 1989, Barneby published the name *Astragalus desperatus* var. *neeseae* in volume 3B of the *Intermountain Flora* series, naming it in honor of Elizabeth Neese (hence the plant is sometimes referred to as Elizabeth's milkvetch). Barneby included the Gateway area plants from Colorado with those from Horseshoe Bend in Utah published previously under the name of



*Above: Horseshoe milkvetch (*Astragalus equisolensis*). Illustration by Kaye Thorne from* Utah Endangered, Threatened, and Sensitive Plant Field Guide.

of *Astragalus equisolensis**. It was not until the 3rd edition of *A Utah Flora* (published in 2003) that Welsh recognized the Colorado distribution ("disjunct and below Gateway, Mesa Co., Colo."). Each expert had thus recognized the other's name as a synonym, and both provided a somewhat similar argument in their respective publications as to why it had received the different treatment. (This disagreement however was no doubt of an academic nature as Welsh had great respect for Barneby; some 17 years younger than Barneby, he had initially contacted him in 1958 while still a graduate student, and the two became good friends. Barneby died in New York in 2000.)

In view of how messy different taxonomic treatments can become, this example is relatively cut and dry in that both experts ultimately agreed that the exact same specimens and populations represent the exact same "something." From a conservation standpoint this is very important, since taxonomic questions often thwart effective conservation actions. Taxonomic rank is important, since agencies make a distinction in the assessment of rank and status based on accepted taxonomic treatments. Thus a variety receives less priority than if treated at the full rank of a species, species in a large genus receive less attention than those from a monotypic (one species) genus, and so forth. The error in this approach is that frequently varieties are raised to the level of a species (and genera are moved back and forth between families) in a never ending quest to organize our knowledge and understanding of something that is complex in an imperfect system and the result is that important ecotypes could be lost forever.

*The name Rimrock milkvetch is typically used in conjunction with the full species *A. desperatus,* named by early Utah botanical explorer Marcus Jones who was "desperate" to find an available name in the crowded genus.

It is unclear what specimens Welsh based his Colorado locality information on in the 2003 flora. On February 24, 2006, Stan Welsh determined that three out of four specimens sent to him for review by the herbarium at the University of Colorado at Boulder earlier that year were *Astragalus equisolensis*. The three specimens were the same two Barneby collections taken from Gateway in 1985 and 1986, and the Neely collection from Gateway in 1986. The fourth specimen was a 1921 George Osterhout collection which remains labeled *A. desperatus* and which appears to have come from the vicinity of Colorado National Monument and Grand Junction and not specifically the Gateway area.

Under either name the plant was thought to be rare and was ranked by NatureServe (The nationwide umbrella organization of state natural heritage programs) as critically imperiled (T1), as it remains to this day. Welsh's confirmation of the Gateway specimens in early 2006 led to renewed efforts to relocate it in Colorado. In late April 2006, Ellen Mayo, botanist/plant ecologist with the U.S. Fish & Wildlife Service (FWS) in Grand Junction, photographed and collected an *Astragalus* south of Gateway which in August of 2008 was confirmed by Drs. Stan Welsh and Duane Atwood to be *Astragalus equisolensis*. After waiting for some 20 years in relative obscurity, the plant had been re-discovered in Colorado, apparently alive and well.

Encouraged by the Mayo find, botanist Peggy Lyon of the Colorado Natural Heritage Program took up the search for the Horseshoe milkvetch in 2007 and discovered a new location east of The Palisade (which is north of Gateway) at 5,150 feet in an open pinyon-juniper blackbrush community on May 20*. In 2008, Lyon located plants along the west side of the Dolores River for about 15 miles (south of Gateway and north/northwest to the Utah border). She estimates that overall there are six occurrences and about 3,000 plants but expects there may be more. Plants were found in blackbrush communities, often growing up through shrubs but also out in the open. The southernmost plants were growing with *Artemisia nova*, typically on rocky convex slopes with reddish soils.

The habitat description and locality of the plants noted by Lyon in 2008 is remarkably consistent with the mid-1980's specimens of Barneby and Neely with an extension of the known habitat both below and above Gateway. (There is some natural confusion in that "up river" is to the south and "down river" is to the north of Gateway.) It is of interest that Ben Franklin noted the association of *Artemisia nova* growing with the Horsehoe milkvetch in Utah in a 1991 collection.

Legal Status of Horseshoe Milkvetch

Complicating the picture is the fact that the Horseshoe milkvetch was a federal candidate species from September 27, 1985 until September 12, 2006, a period of almost 21 years. A candidate is a plant or animal species that the FWS has sufficient information to propose as Threatened or Endangered under the Endangered Species Act (ESA). To be considered a candidate, an extensive amount of information and documentation of threats has to be compiled similar to a listing proposal or petition and published in the *Federal Register*.

The goals and purpose of the candidate species program are laudable and include the potential for cooperative actions and landowner incentives to reverse the decline of a species and avoid the need for listing. While individuals or organizations may provide input to the FWS on species that might be considered as candidates, ultimately it is solely up to the agency to make the recommendation. With respect to candidate plant species across the U.S., the candidate species program for plants has for many years become, lamentably, dormant.

Candidate status confers no actual legal protection, but by past policy (and because the BLM has an obligation generally to help ensure that their actions do not cause a species to need to be listed under the ESA), the Utah BLM has automatically treated candidate species as though they were included within their otherwise separately maintained sensitive species list. Such species have sometimes been treated almost as if they were formally listed.

The Horseshoe milkvetch was dropped as a candidate in 2006 for reasons that are controversial. The last and only survey for the Utah population was in 1991 by Ben Franklin (published in 1992). The population was then estimated at 10,000. Neither a comprehensive survey nor monitoring took place before or after that time. In the Candidate Notice of Review of 9/12/06 removing the milkvetch, it was indicated that "there is no recent information indicating it has declined," that "the Colorado population is a recent discovery" and that the "only potential threat of substance is from future energy development, but that does not threaten the species through most of its range."

While it is true that the FWS would not have possessed any information about the status of the Colorado plants in 2006 and that energy development might not obliterate the species from every last acre that it occupies, the timing of removing Horseshoe milkvetch from the candidate list was unfortunate. Without any ongoing monitoring/surveying efforts, the FWS was relying on 15 year old information and was only assuming that the population in Utah had not declined based on anecdotal evidence. Even though *Astragali* are thought to be evolutionarily capable of seeking out and adapting to harsh habitats, the ongoing drought in the Uinta Basin has likely added sudden and significant stresses on the plants and animals in the region and this may very well have included the Horseshoe milk-

*see *Rare Plant Survey of BLM Lands, Gateway, Colorado* at http://www.cnhp.colostate.edu/documents/2007/Gateway%20final%20report%20with%20edits.pdf

Above: The Palisade habitat of Horseshoe milkvetch, north of Gateway, Colorado. Photo by Peggy Lyon, spring 2007.

vetch and perhaps even more importantly, its pollinators. And, while in 2007 there was a discovery of a new occurrence in Colorado, the existence of plants from Colorado had been well known since at least 1989.

Worst of all, the decision occurred at a time when the Uinta Basin is under siege from massive energy development plans and actions. Impacts from oil and natural gas development "have and continue to occur in its habitat, and both sheep and cattle grazing are present" per a comprehensive Ben Franklin report released in 2005. Current impacts to the species have been mentioned on several occasions during the ongoing Uinta Basin Rare Plant forum discussions hosted by The Nature Conservancy.

The most extensive recent impact relates to Questar's Greater Deadman Bench Oil and Gas Producing Region project. A BLM Record of Decision (ROD) signed in March of 2008 refers to the fact that oil and gas development has been "ongoing within the project area for over 50 years" and allows for up to 1,020 natural gas wells and 348 oil wells, 169 miles of new roads, and 193 miles of natural gas pipelines with a total surface disturbance of 4,561 acres (over a project size of some 98,785 acres!). Also impacted by the project are the federally listed *Sclerocactus brevisipinus* and *Sclerocactus wetlandicus* (federal analyses still fail to uniformly treat these as two separate species and instead lump them together under the name *Sclerocactus glaucus* which is now recognized as only occurring in Colorado). SITLA (School Institution and Trust Lands Assoc.), a quasi-state agency and the largest state lands manager, has reportedly leased all of its holdings in the area for oil and gas development. While some conditions of approval were included for the rare *Sclerocacti* in the ROD, no conditions were issued relative to *Astragalus equisolensis*, despite the fact that some 1600+ acres of known habitat for the Horseshoe milkvetch occurs in the project area.

Conservation Needs

Currently *A. equisolensis* remains without any special status in Utah as the current political climate (which likely is not limited to the national level) is preventing it from being added to the Utah BLM sensitive species list. And Utah

Elizabeth Neese (1934-2008)

Elizabeth Neese, a founder of the Utah Native Plant Society and longtime Utah botanist with an interest in rare plants and floristics, died in her California home in El Cerrito on August 9, 2008 at the age of 74.

Neese received a doctorate from Brigham Young University in 1981 based on her study of the vascular flora of the Henry Mountains of southeastern Utah. She worked for several years as a botanical consultant in Utah and other western states. Her studies in the Uinta Basin and Dinosaur National Monument led to the discovery of several new narrowly endemic species, including Rock hymenoxys (*Hymenoxys lapidicola*), Blue Mountain penstemon (*Penstemon scariosus* var. *cyanomontanus*, Flowers' penstemon (*P. flowersii*), Uinta yucca (*Yucca harrimaniae* var. *sterilis*), and Horseshoe milkvetch (*Astragalus equisolensis*). In 1986, Sherel Goodrich and Neese co-authored the *Uinta Basin Flora*, a wonderful regional flora published jointly by the US Forest Service and BLM which is now, sadly, out of print.

In all, Dr. Neese authored or co-authored descriptions of at least 18 different plant species from Utah and Nevada. Her fieldwork led to the rediscovery of the Deseret milkvetch (*Astragalus desereticus*) near Birdseye in 1981, after it had not been seen for nearly seven decades and was presumed extinct. This species is now listed as Threatened under the Endangered Species Act.

Neese gave a presentation on Utah wildflowers at the inaugural meeting of the Utah Native Plant Society in September 1978. She served for several years as an officer of UNPS (including President in 1983) and was co-editor of the Society newsletter in 1981 (before it became known as the *Sego Lily*). Members of the Salt Lake Chapter recall the many field trips she led.

Elizabeth Neese is commemorated by several plant names, including a variety of *Lepidium montanum,* two varieties of *Astragalus*, and most recently, a new *Physaria* named by Stan Welsh in 2008. - *W. Fertig*

has no state laws that offer any relief to actions on state lands.

We may never know how or why the Horseshoe milkvetch came to exist in two separate, very isolated areas some 115 air miles apart. But there is action that needs to be taken and information that needs to be obtained to ensure that these rare and unique plants and the ecosystems that support them continue to survive. These actions at a minimum include:

1. The Utah BLM State Office needs to add the species to its sensitive species list as soon as possible and should consider new procedures to avoid having to add back a species that suffers an ESA status change (that is, removal or de-listing should result in an automatic addition to the BLM sensitive species list until such time as a separate review is made on the merits);

2. The FWS should in due course re-consider placing the species back on the candidate list since significant information about the Colorado occurrences is now known, and there are real and existing threats particularly to the Utah population but also to the Colorado locations that may still indicate that this is a threatened species;

3. A comprehensive survey of the Utah population should be conducted on a priority basis, and at least partially paid for by industry (and should occur over a period of more than just a single year);

4. Permanent monitoring plots should be established in Utah and Colorado;

5. Pollination studies need to be conducted, particularly at the Utah site, which industry should help pay for;

6. Further surveys by both the Colorado and Utah natural heritage programs including searching the Dolores River drainage between the UT-CO border and Fisher Towers need to be encouraged (perhaps the species occurs in Grand County, Utah?);

7. A soil analysis of the Utah and Colorado sites needs to be conducted (do the plants grow on the same or different geologic formations?);

8. Last but not least, a DNA analysis comparing the Utah and Colorado plants should be conducted and also at least partially paid for by industry (how closely related are the Utah and Colorado populations?).

Author's end notes:

Space constraints prohibit the inclusion of numerous references upon which this article was based; these are available by sending an e-mail to unps@unps.org.

Photographs by Ellen Mayo and Peggy Lyon are used by permission and remain their respective property.

Special thanks to the numerous individuals who provided technical assistance and general information, and particularly to Ellen Mayo, Peggy Lyon and Ben Franklin.

The comments, opinions and errors in this article should solely be attributed to its author.

Further Weakening of the Endangered Species Act

On 11 August, 2008, Interior Secretary Dirk Kempthorne announced administrative changes in how the federal government will respond to potential conflicts between development projects and endangered species.

For the past 35 years, Section 7 of the act has established the ground rules by which federal agencies are regulated by the US Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). Under Section 7, federal agencies proposing projects that might impact listed species on public or private lands are required to consult with scientists from USFWS and NMFS. Nearly 90% of consultations are "informal" in which agencies and USFWS/NMFS typically find few impacts from a proposal or agree on minor modifications. Where conflicts are more significant, "formal" consultations take place, in which USFWS/NMFS scientists develop comprehensive Biological Assessments of the proposal, its probable effects on listed species, and potential alternatives.

The new rules announced by the government now make the initiation of consultation voluntary on the part of the proponent agency. Federal agencies can thus decide for themselves that their projects have no effect or only marginal impacts (cumulative effects need not be taken into account) without input or oversight from professional biologists without a stake in the outcome. Should consultation be sought by a proponent, USFWS and NFMS now have only 60 days to respond. If the deadline is missed, the project is automatically approved (not unlike the claim of a national pizza chain a few years ago that if not delivered in 30 minutes your pizza was free).

The new rules are subject to a 30 day comment period before they will be finalized in mid-September. (As of press time, however, there is no formal announcement of the rule change on the USFWS Endangered Species program website, and no contact information is provided to direct comments.) According to the government, these new changes do not require approval by Congress. From 1995-2006, similar changes were proposed in legislation introduced by former California Congressman Richard Pombo, but routinely defeated.

In 2003 the government developed similar rules allowing agencies to approve new pesticides and projects to reduce the risk of wildfire without requiring consultation with government scientists about possible impacts to Threatened or Endangered species. The pesticide rule was later found to be illegal and overturned, while litigation is on-going on whether wildfire prevention rules can circumvent the Endangered Species Act.

As with all administrative rules, the proposed changes can be overturned as easily as they are implemented (they lack the same weight as law). With a new administration taking power in January 2009, these rule changes may not survive. In the meantime, it is up to diligent citizens to watch how agencies meet their obligations under the Endangered Species Act and to demand that scientific rigor and objectivity be restored to their rightful place in the execution of government. - *W. Fertig*

Botanist's Bookshelf: *A Utah Flora, Fourth Edition, Revised*

Anyone who has ever written a piece of technical non-fiction knows only too well that such works become outdated about as soon as the ink is dry. This is especially true for those who attempt to write keys and descriptions of the flora of a state or region. Keeping up with a constant flow of taxonomic name changes, newly described species, and the discovery of new distribution records that arise with each field season can be enough to drive even the sanest systematist mad.

And yet, many persevere. Just five years after the last edition hit the presses, Drs. Stanley Welsh, Duane Atwood, Sherel Goodrich, and Larry Higgins have released *A Utah Flora, Fourth Edition, Revised* in the summer of 2008 (Print Services, Brigham Young University, Provo, UT. $150.00 hardbound). While it may seem unnecessary to reissue a flora so soon, new information on the composition and distribution of the plants of Utah have already made the 2003 edition out of date. By my count, 17 species or varieties of vascular plants new to science have been described from Utah since 2003, and over 40 new native or weedy species have been documented or reported for the state. Dozens of name changes, many arising from the ongoing publication of the Intermountain Flora and Flora of North America series, have also been made in the past few years.

Some readers may wince at the seemingly constant changes in nomenclature, especially when it involves beloved, familiar names. Fortunately, most of the revisions in the Fourth edition are fairly minor. Few will probably be troubled by changing the name of *Alyssum minus* to *A. parviflorum, Delphinium andersonii* to *D. scaposum* (correcting a problem in which name has priority), *Malvastrum exile* to *Eremalche exile,* or the 30 or so similar changes. Perhaps the biggest change comes to some of the common varieties of *Chrysothamnus nauseosus*, with vars. *consimilis* and *gnaphalodes* now var. *oreophilus* and var. *hololeucus*, respectively. Nomenclatural changes have claimed two genera of umbels, as *Aletes* and *Oreoxis* are now subsumed under *Cymopterus*.

Overall, the taxonomic philosophy of the *Flora* remains fairly conservative. From the use of older family names (such as Compositae and Cruciferae over Asteraceae and Brassicaceae) to maintenance of traditional generic concepts of *Aster, Chrysothamnus,* or *Arabis*, the authors of *A Utah Flora* have resisted some of the major revisions seen in other recent floras. In many cases the conservative approach is justifiable until conflicting lines of evidence are resolved through additional research. For those unsatisfied with the traditional approach, the authors have done a good job of combing the newer literature and including relevant synonymy. Welsh and colleagues frequently include brief (and often entertaining) commentary on taxonomic and other issues in a short paragraph at the end of each species account.

In the course of revising the *Flora*, Welsh and his co-authors re-examined tens of thousands of herbarium specimens from the collections at Brigham Young University (the largest in the state). Based on this review, a few taxa from previous editions were found to be misidentified or no longer sufficiently distinct to warrant taxonomic recognition. Among the newly departed are *Mollugo verticillata* (still to be expected, but no longer confirmed for the state), *Erigeron awapensis* (synonymized under *E. abajoensis*), *Haplopappus acaulis* var. *atwoodii* (synonymized), *Matricaria recutita* (misidentified), *Physaria reediana* (UT material lumped with *P. subumbellata*), *Physaria wardii* (combined with *P. kingii,* as also proposed in Vol 2B of the *Intermountain Flora*), *Collomia tinctoria* (misidentified), and a half dozen others, mostly cultivated species.

One of the biggest changes in the Fourth edition is the addition of nearly 100 new cultivated species. Of the 4025 species addressed in the book, just over 500 are non-native and non-naturalized plant taxa of farm and garden environments. Inclusion of cultivated species can be useful, especially if one is faced with identifying unfamiliar ornamentals, but their presence increases the heft of an already large book. A separate book, addressing all of the cultivated species of Utah, might be useful in the future.

It should be noted that *A Utah Flora* is a technical manual, replete with botanical jargon and lacking a single illustration (save for the cover). The book is intended for professionals or advanced amateurs. It is an important resource for anyone studying the state's native or introduced plants. We are extremely fortunate to have a manual that is so thorough and up to date.—*Walter Fertig*

Noteworthy Discoveries from *A Utah Flora, Fourth Edition* (2008)

The following is an annotated list of newly described species (indicated by *) or new state records for the flora of Utah that were not previously included in the 3rd edition of *A Utah Flora* published in 2003. Cultivated (but not naturalized) species are excluded.

Amaranthaceae
Alternanthera caracasana, exotic, Washington Co., *Higgins 27020.*

Campanulaceae
Nemacladus longiflorus var. *breviflorus,* native, Kane Co., *Fertig & Kneller 20412.*

Caryophyllaceae
Silene nachlingerae, native, Beaver Co., *Goodrich 19803.*

Chenopodiaceae
Chenopodium chenopodioides, native, Davis, Garfield, Iron, San Pete, & Sevier Cos, formerly included in *C. capitatum.*

Compositae (Asteraceae)
Artemisia tridentata var. *parishii,* native, cited for southern UT in *Flora of North America* Vol 19, 2006 by Leila Shultz.
Bahia absinthifolia, native, Washington Co., *Higgins 25056*.
Coreopsis tinctoria, exotic, Kane Co., *Fertig 22861*.
**Crepis runcinata* var. *aculeolata*, native, Kane Co., *Ward 606* (holotype), *Welsh, Atwood, & Higgins 27523*.
**Erigeron vagus* var. *madsenii,* native, Garfield, Iron, and Kane Cos., *Madsen 1025* (holotype)
Erigeron watsonii, native, cited for Utah in *Flora of North America* Vol 20 by Guy Nesom.
Gaillardia pulchella, native to SW USA, but apparently introduced in Emery, Grand, San Pete, Summit, Tooele, Utah, & Washington Cos., previously included in *G. aristata*.
Haplopappus racemosus var. *sessiliflorus,* native, Millard Co., *Welsh, Taylor, & Thorne 14514*, previously included in var. *paniculatus*.
Helianthus pumilus, native to WY & CO, apparently exotic in Kane Co, UT, *Fertig 20563*.
Leontodon nudicaulis, exotic, Washington Co., *Higgins 25874*.
**Senecio bairdii*, native, Box Elder Co., *Baird 3411* (holotype).
**Thelesperma subnudum* var. *maliterrimum*, native, Duchesne & Uintah Cos., *Goodrich & Huber 25174* (holotype)
**Townsendia goodrichii*, native, Duchesne & Uintah Cos., *Goodrich 26977* (holotype).

Crassulaceae
Sedum sediforme, exotic, San Juan Co., *Tuhy 3834*.

Cruciferae (Brassicaceae)
Alyssum murale, exotic, cited for Weber Co. in *Intermountain Flora* Vol, 2B, 2005 by Noel Holmgren.
Descurainia pinnata var. *paradisa,* native, Box Elder Co., *Thorne 10587*.
Draba paysonii var. *treleasii*, native, cited for Tooele Co. in *Intermountain Flora* Vol, 2B, 2005 by Noel Holmgren.
Lepidium ramosissimum, native, Iron Co., *Goodding 1012*.
**Physaria neeseae*, native, Garfield & Washington Cos., *Neese 5127* (holotype).
Phoenocaulis cheiranthoides, native, cited for NW Utah in *Intermountain Flora* Vol, 2B, 2005 by Noel Holmgren.
Subularia aquatic, native, Duchesne Co., *Maguire et al. 4340*.
Thelypodium wrightii, native, Garfield, Kane, and Washington Cos., formerly included in *T. laxiflorum*.

Euphorbiaceae
Chamaesyce serpens, native to SE USA but exotic in Washington Co., UT, *Higgins 23347*.

Guttiferae (Hypericaceae or Clusiaceae)
Hypericum perforatum, exotic, Box Elder, Cache, Davis, and Juab Cos.

Fabaceae
Astragalus calycosus var. *monophyllidus*, native, Sevier Co., *Neese 15649*.
**Astragalus lentiginosus* var. *negundo*, native, Box Elder & Millard Cos., *Thorne 10584*.
Lotus tomentellus, native, Washington Co., *Neese 12992*.
**Trifolium andinum* var. *canone*, native, Millard Co., *Goodrich 15377* (holotype).
**Trifolium andinum* var. *navajoense*, native, San Juan Co., *Clifford 95-809* (holotype).
**Trifolium andinum* var. *wahwahensis*, native, Beaver Co., *Kass & Welsh 3627* (holotype).
**Vicia americana* var. *lathyroides*, native, Millard Co., *Tilley 339* (holotype).

Gramineae (Poaceae)
Eriochloa gracilis, exotic, Washington Co., *Higgins 26859*.

Hydrocharitaceae
Elodea densa, exotic, Sevier Co., *Thorne et al. 4158*.

Liliaceae
**Calochortus ciscoensis*, native, Duchesne, Grand, & Uintah Cos., *Welsh & Welsh 28943* (holotype).

Loasaceae
Mentzelia decapetala, native, Box Elder & Cache Cos., *Holmgren & Holmgren 15132*.

Malvaceae
Eremalche rotundifolia, native, Washington Co., *Atwood, Furniss, & Spencer* in 1997.
Sphaeralcea digitata, native, San Juan Co., *Rydberg & Garrett 9907*.

Nyctaginaceae
**Abronia fragrans* var. *harrisii*, native, Emery Co., *Harris 364*.
Boerhavia wrightii, native, cited for southern UT in *Flora of North America* Vol 4, 2003 by Richard Spellenberg.

Onagraceae
**Camissonia bolanderi*, native, Emery Co., *Atwood & Furniss 31354* (holotype).
Camissonia walkeri var. *tortilis*, native, Beaver, Box Elder, Juab, Millard, Sevier, Tooele, & Washington Cos., previously included in var. *walkeri*.
Oenothera pallida var. *latifolia*, native, cited for Cache, Salt Lake, Summit, and Tooele Cos in *Intermountain Flora* Vol, 3A, 1997 by Cronquist, Holmgren, & Holmgren.

Polemoniaceae
Phlox albomarginata, native, Rich Co., *Franklin* (# not cited)

Polygonaceae
Chorizanthe watsonii, native, Box Elder & Kane Cos., *Franklin 7495*.
Eriogonum acaule, native, Rich Co., *Moon & Moon 1620*.
Eriogonum brevicaule var. *bannockense*, native, Box Elder & Rich Cos.
Erigonum brevicaule var. *mitophyllum,* native, Sevier Co., *Reveal & Broome 8548* (holotype of *E. mitophyllum*, described by James Reveal in *Flora of North America* Vol. 5, 2005).
Eriogonum corymbosum var. *heilii*, native, Wayne Co., Reveal et al. 8543 (holotype, described by James Reveal in *Flora of North America* Vol. 5, 2005), previously included within var. *revealianum*.
Koenigia islandica, native, Duchesne Co., *Goodrich et al. 26308*.
Polygonum pensylvanicum, native?, Kane, Utah, and Washington Cos.

Ranunculaceae
**Aquilegia holmgrenii*, native, Garfield Co., *Cottam 4290* (holotype), formerly included within *A. elegantula*.

Rosaceae
**Potentilla diversifolia* var. *madsenii*, native, Kane Co., *Madsen 1230* (holotype).
**Potentilla gracilis* var. *hippianoides,* native, Beaver, Daggett, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane., Piute, San Juan, Summit, Uintah, & Wayne Cos., *Welsh 474* (holotype)
Potentilla recta, exotic, San Juan, Uintah, & Weber Cos.

Umbelliferae (Apiaceae)
Bupleurum americanum, native, Rich Co., *Moon & Moon* 468.
**Cymopterus crawfordensis*, native, Rich Co., Moon & Moon 703 (holotype).

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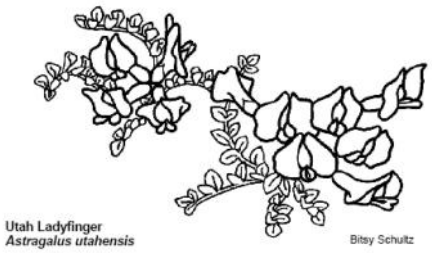

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