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Botany Bill on the Hill

By Wayne Padgett

There's a Botany Bill on the Hill! And, that has never happened before! H.R. 1572, the Botanical Sciences and Native Plant Materials Research, Restoration, and Promotion Act was introduced by Rep. Mike Quigley of the Illinois 5th congressional district on March 6, 2019. On 18 July 2019 I testified in support of this bill in front of the House Subcommittee on National Parks, Forests, and Public Lands.

As the bill name indicates, a primary focus of H.R. 1572 is on native plants, but what does that mean? In general, this bill covers three distinct, but related areas.

1. Title I -Promoting Botanical Research and Botanical Science Capacity
2. Title II – Generating Demand for Native Plant Materials
3. Title III – Authorization of Federal Native Plant Materials Related Activities

Title I - Promoting Botanical Research and Botanical Science Capacity

Section 101 – Department of the Interior Botanical Research

The need for a robust native plant materials research program is immense. H.R. 1572 identifies five areas of emphasis regarding research: 1) Effective approaches to restoring habitat damaged by wildfires that incorporate the use of appropriate plant materials; 2) Effective methods for developing and using locally adapted native plant materials in land management activities; 3) Effective mitigation strategies for combating invasive plant species; 4) Mitigation strategies related to the impacts of long- and medium-term environmental changes such as changes in moisture levels, temperature, landscape fragmentation, nonnative animal and plant species, and human activity; and 5) Methods to promote the recovery of threatened and endangered species.

The Forest Service Rocky Mountain Research Station has built a strong program for the Great Basin, and the US Geological Survey has been involved with the development of the research program for the Colorado Plateau. In addition, the University of Nevada, Reno and the Chicago Botanical Garden are but two universities that have provided support to this effort. But the need goes well beyond what has been, and what is being done.

More and more acres are burning every year; invasive plant materials have taken over much of the western United States; climate change is having an ever-increasing effect on our ecosystems as temperatures continue to rise and precipitation becomes even more unpredictable; and the challenges to protecting Threatened and Endangered (T&E) species are at the same time becoming more and more difficult.

And simply using “Native” species is becoming better understood. While in the past, one was lucky if you could find seed of a species that was native in name. But now, we understand that these plant materials are best if they are locally adapted. So, what does “*locally adapted*” mean? Locally adapted plant materials are native plant materials environmentally adapted to a restoration site that are likely to establish, persist and promote community and ecological relationships.

As a simple example, bluebunch wheatgrass, occurs from Alaska to western Texas; it is a common native species in the mountain big sagebrush plant communities of Utah. But, can we expect seed from eastern Washington, for example, to establish as well in the hills of southern Utah as seed from environments that more closely align with those of the area where they are being used? The answer is a resounding “No”! Research is needed to both identify how far seed from one area can be transferred and successfully establish (i.e. its *Seed Transfer Zone*), and how is that seed and the sites on which it is being used best be prepared before it is used?

So now we come to “promoting the recovery” of threatened and endangered (T&E) plants. As we all know, plants have always played second fiddle to animals when it comes to funding and protection. From 1999-2012 Federal and State expenditures on T&E animals and plants in the United States was not even close to equal (Table 1). In 2012 there were 872 plants and 648 animals Federally listed as Threatened and Endangered. While plants made up 57.4 percent of the total number of species, they received 3.7 percent of the total funding; animals, which made up 42.6 percent of the total, received 96.3 percent. Not even close to adequate funds have ever been made available to adequately address this issue.

To carry out all the purposes of this section, the bill

Table 1. 1999-2012 Federal and State Expenditures on Threatened & Endangered Animals and Plants

Group	Number of Species	Percent of Species	Total Funds Spent 1999-2012*	Percent of Total
Fishes	153	10.1%	\$7,453,983,093	59.4%
Birds	96	6.3%	\$1,648,113,804	13.1%
Clams	88	5.8%	\$110,504,990	0.88%
Mammals	88	5.8%	\$1,750,092,647	14.0%
Insects	71	4.7%	\$124,452,369	1.0%
Snails	46	3.0%	\$44,452,369	0.35%
Reptiles	39	2.6%	\$730,841,787	5.8%
Amphibians	29	1.9%	\$130,807,596	1.0%
Crustaceans	24	1.6%	\$67,418,881	0.54%
Arachnids	12	0.8%	\$6,083,853	0.0%
Corals	2	0.1%	\$12,374,252	0.10%
Animal Subtotal	648	42.6%	\$12,079,125,641	96.3%
Flowering Plants	837	55.1%	\$450,387,861	3.6%
Ferns & Allies	30	2.0%	\$7,760,503	0.06%
Conifers & Cycads	3	0.2%	\$1,077,071	0.01%
Lichens	2	0.1%	\$983,531	0.01%
Plant Subtotal	872	57.4%	\$460,208,966	3.7%
Grand Total	1520	100.0%	\$12,539,334,607	100.0%

*Combined Federal & State Spending.

authorizes \$10,000,000 for fiscal year 2020, *and such sums as may be necessary for subsequent fiscal years.* Given this tremendous discrepancy in funding provided to plants, it seems that this bill would provide an important, although minor, contribution toward the recovery of T&E plants. And, when you add all the other research needs, it is only a start. But it *IS* a start. And we will hold on to that, at least for the time being.

Section 102 – Staff enhancement

H.R. 1572 states:

Subject to the availability of appropriations for such purpose, by not later than September 30, 2020, the Secretary shall hire not more than 20 full-time Botanical Science Personnel to support the Department's land management responsibilities... The Secretary may waive any limitation on the number of full-time equivalent personnel assigned to the Department and its constituent agencies in order to carry out the purposes of this section

In 2009, Drs. Kayri Havens, Andrea Kramer, and Barbara Zorn-Arnold, Chicago Botanic Garden lead an assessment of botanical capacity within government, academic, and private agencies within the United States. In their 2010 report they found that government agencies were losing botanical capacities, as staff botanists retired and positions were not being refilled, either because positions are eliminated, replaced by individuals without equivalent botanical training, or because there is an inability to find appropriately qualified new candidates to fill them.

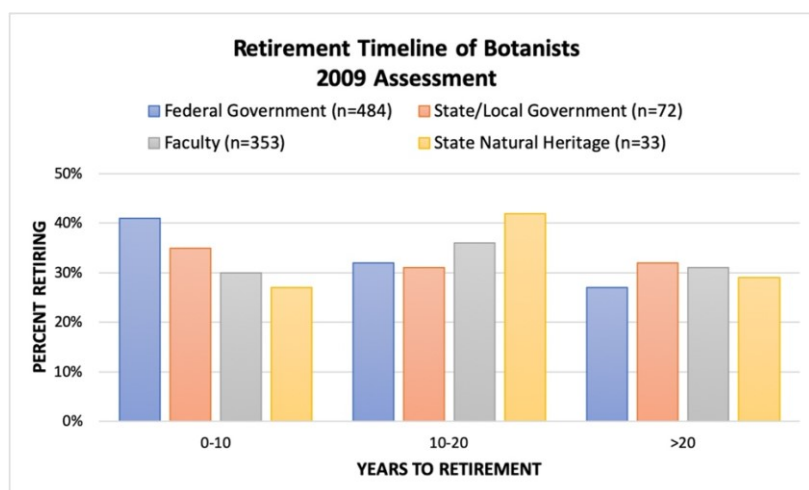


Figure 1 – Retirement timeline of survey respondents from academic and government sectors illustrates the need for education and training.

Figure 1 illustrates the number of respondents in this assessment who indicated that they would be retired by now (0-10 Years to Retirement). In fact, while we have no follow-up numbers on how many individuals have actually retired since that assessment was done ten years ago, those numbers do seem to be close based on anecdotal knowledge of the people we all know who have retired since 2009. We do know that, for whatever reason, there were 68 full-time botanists working for the Bureau of Land Management in 2000; today that number has fallen to 46.

As it stands, adding even 20 new full-time botanists to the agency's staffing would not bring it up to the number in 2000, but again, it is a start. H.R. 1572 authorizes \$3 million to fund these positions for fiscal year 2020 and would continue funding this program as needed into the future.

A second, and equally important portion of Section 102 is the student loan forgiveness program for student who would qualify as botanists. Qualifying individuals who agree to a term of employment with the Department of the Interior would have their student loads repaid. This could encourage new students to complete their degrees in botanical sciences and would, at the same time, bring new employees and new energy to the BLM. H.R. 1572 authorizes \$1 million to fund this program for fiscal year 2020 and would continue funding this program as needed into the future.

Title II – Generating Demand for Native Plant Materials

Section 201 of Title II establishes a policy for the use of locally adapted native plant materials. Through this policy, the demand for native plant materials should be greatly increased across agencies. Since 2008 the U.S. Forest Service has had a policy in place for the use of native plant materials in Forest Service Manual (FSM) 2070.

Key elements of the Forest Service policy include:

- ◆ Native plants are defined as all indigenous terrestrial and aquatic plant species that evolved naturally in a defined native ecosystem.
- ◆ Native plant materials will be the first choice in revegetation for restoration and rehabilitation of native ecosystems where timely natural regeneration of the native plant community will not occur.
- ◆ Non-native, non-invasive plant species may be used when:
 - ◇ Needed in emergency conditions to protect basic resource values,

- ◇ As an interim, non-persistent measure designed to aid in the re-establishment of native plants,
- ◇ When native plant materials are not available, and
- ◇ In permanently altered plant communities.
- ◆ Under no circumstances will non-native invasive plant species be used as plant materials for restoration, rehabilitation, or reconstruction of native ecosystems.
- ◆ The best information available should be used to choose genetically appropriate native plant materials for the site to be restored.
- ◆ A reliable source of native plant materials, either as seed or other vegetative propagules is essential for the successful implementation of the native plant materials program.

While somewhat less restrictive, H.R. 1572 establishes similar policy for agencies within the Department of Interior. These differences were of concern to staff members from the Forest Service I spoke with, but I believe these differences could easily be worked out before this bill heads out of the Subcommittee and into the House Natural Resources Committee.

Economic Benefits

An expected outcome of this increased demand is the economic benefit to local communities where native plant materials can and will be produced by private native seed growers and native seed collectors. It is also expected that, over time, the cost of native plant materials will be more economical to land management agencies. While the cost of native plant materials has been a factor in the decision-making process as to whether or not these or nonnative plant materials are used, the reduced cost will make this a moot point. Industry benefits. Agencies benefit. Pollinators benefit. Wildlife benefit. And ecosystem resiliency benefits!

Title III – Authorization of Federal Native Plant Materials Related Activities

Section 302. Bureau of Land Management Plant Conservation Program

This section authorizes the Bureau of Land Management to undertake activities to develop and use native plant materials. It provides funding for the agency's Plant Conservation Program to implement all of the activities above, and more. For this, H.R. 1572 appropriates \$35 million in fiscal year 2020, and "such sums as may be necessary" for each fiscal year after fiscal year that.

So, in adding up all the numbers, that comes to \$49 million. Never before has a bill been submitted that does anything close to that for native plants. And, as a retired

ecologist who spent 30 years combined working for the Forest Service and the Bureau of Land Management, I can only imagine what this level of funding would have been able to do to support my efforts is using native plant materials to fight the ongoing battle against past, present, and future threats on our native ecosystems.

There is more to H.R. 1572 than these benefits described above, but as you can see if this bill is able to make it through the various stages from House to Senate to Presidential signature, we all benefit. I testified in front of the House Subcommittee, which is an important first step, but it's only a first step. And, while I also met with Senator Romney's staff while in DC, much more support is needed. We will need Republican support in the Senate for a Democratic House bill. I will try to set up a meeting with the Senator Romney's local staff regarding this bill and, if I'm successful at doing that, I would encourage everyone reading this today to also give a call to his office. We will post a notice on our Facebook page with some guidance on how you can help move this forward.

In the meantime, here are a few links that might be of interest to you.

To download a pdf of H.R. 1572, click on this link:
<https://www.govinfo.gov/content/pkg/BILLS-116hr1572ih/pdf/BILLS-116hr1572ih.pdf>

To download a copy of my testimony in favor of H.R. 1572:
<http://naturalresources.house.gov/download/padgett-wayne-testimony>

For access to all those that testified on H.R. 1572 (as well as to other bills on July 18, 2019):
<https://naturalresources.house.gov/hearings/npfpl-legislative-hearing3>

To watch the entire hearing on YouTube:
<https://www.youtube.com/watch?v=S2o0xIdFr6k>

To follow this bills progress, click on this link:
<https://www.govtrack.us/congress/bills/116/hr1572>

Plant Blindness: Why Scientists Who Know Nature Are Becoming an Endangered Species



POSTED ON SEPTEMBER 5, 2018 BY MARTIN COTHRAN

"The U.S. is running short of people who can tell the forest from the trees." So says a recent *Wall Street Journal* article that is at least partly indicative of the fate of science education in the U.S. in recent years. It tells of the growing problem of "plant blindness," the term used among botanists to indicate the inability of many people, even those in the scientific community, to identify plants.

As the *Journal's* Douglas Belkin warns: Organizations such as the National Park Service and Bureau of Land Management can't find enough scientists to deal with

invasive plants, wildfire reforestation, and basic land-management issues.

... The issue has prompted botanical gardens around the nation to raise the alarm. Colleges are beefing up plant identification coursework for a generation of botanists more focused on their microscopes than studying leaf patterns. Bills introduced in the U.S. Senate in July and the U.S. House last year are aimed at promoting botany education.

As Belkin relates:

Not only are there fewer university botany programs, but those who graduate from them may not be well versed in plant identification. The cutting edge of plant science, which has commercial applications, is molecular. Students and universities are following the significant money.

You are invited to continue reading this article online at Memoria Press:

<https://www.memoriapress.com/articles/plant-blindness-why-scientists-who-know-nature-are-becoming-an-endangered-species/>

Two Small Leguminous Tree Species that Should Be Considered as Invasive In Utah

by Tony Frates

In a family as large and richly diverse as the pea family (Fabaceae) that includes small flowering annuals to enormous trees, we might expect to encounter some species that started out as something that seemed helpful and instead turned out to be harmful (as with so many of our invasive species). Sometimes introductions are unintentional, or are introduced as something innocuous having some perceived value, but then at some point reaches a critical mass and escapes into open spaces and creates ecological imbalance and increasingly dysfunctional ecosystems ultimately resulting in lowered biodiversity.

Of those plants that are members of the family that are woody trees or shrubs, most of the Utah native examples are found only in the half of the state with many of those only occurring in Washington County.

Some non-native pea family trees are planted as shade trees or as ornamentals.

Non-tree members of the family have been often used in well-intentioned, but typically flawed, revegetation efforts involving disturbed sites with attempts to also try to also include forage for grazing animals.

Of the many examples that could be discussed, the focus here will turn to two recently observed off-the-radar species that should be of high concern in our area.

***Amorpha fruticosa* (False IndigoBush)**

The genus *Amorpha* consists of some 15 species solely found in North American, Canada and Mexico but which has become naturalized in other parts of the world. The genus is unusual for the Fabaceae in that its small flowers have only one petal. The meaning of the genus name refers to this amorphous (without form, also highly variable) characteristic. Their leaves (and fruits, although also somewhat unusual) are characteristic of the pea family.

Despite multiple species in this genus having broad distributions in the United States, no species of this genus are known to natively occur in the Intermountain West, nor in the Pacific Northwest (Barneby 1989).

This species along with *A. nana* was collected on the Lewis and Clark expedition. They likely also observed *A. canescens*. All three species are widely distributed in the Great Plains. In fact, *A. fruticosa* was likely originally restricted to the Great Plains. Yet Linneaus knew about



Amorpha fruticosa leaves and flowers.



the plant when he named it in 1753 because it was already apparently being grown in Europe (Reveal 2003).

Howard Stansbury (1852) refers to *Amorpha* on four different pages of his historic report involving his 1849 to 1850 investigation of the Great Salt Lake and surrounding areas. Stansbury at one point enthusiastically indicates that, "The *Amorpha* is beginning to bloom. The vetch, with its purple clusters, is met with, but seems of a different species from that seen heretofore, and has not so much foliage" (p. 34, June 26, 1849). He reports seeing *Amorpha* some two weeks earlier growing with a yellow flowered *Oenothera* (probably instead a *Camissonia*) and *Artemisia* as well as others on several different consecutive days along with other species including a blue lupine and a white mallow. But in the included botany

report by John Torrey, there is no mention of *Amorpha*. Corresponding specimens may not have been taken since Stansbury refers to other plants such as two species of cactus that were apparently not collected. Stansbury also refers to *Tradescantia* as co-occurring with *Amorpha*, but our only species of *Tradescantia* occurs in southern Utah and is also not included as such in Torrey's report and was no doubt some other species. Stansbury would have been familiar with several species of *Amorpha* in crossing the Plains and that may have been the source of his confusion. Perhaps the *Amorpha* referenced by Stansbury was, at least in part, *Hedysarum boreale*.

From the Great Plains including southeastern Wyoming where it sparingly occurs as part of the natural landscape and from eastern Colorado, *A. fruticosa* appears to have spread from the Plains into New Mexico, Arizona and southwestern California, all presumably naturally. But its introduction into Washington, Oregon and Idaho has created havoc. In 1993, Judith Glad and Richard Halse reported the spread of this species along the Snake and Columbia Rivers indicating that it was "firmly established" there and also referencing Barneby who had indicated that it was a "fully established riparian weed along the Boise and Payette rivers" in southwestern Idaho (Glad 1993, Barneby 1989). Glad and Halse could not pinpoint the source of the invasion but suspected that the seed source may have been along the Boise River in Idaho where the species was known to have been planted in the 1930's by the CCC (and that it may have been introduced more than once), and they believed that the plant was spreading from east to west. Their final thought was that perhaps river edge habitats would support "a dense thicket of shrubs all the way to the Pacific Ocean" (Glad 1993).

A. fruticosa has accordingly been classified as a Class B noxious weed in Washington state since 1988 and is also on that state's quarantine list (Washington 2015). It is also listed as a noxious weed in Connecticut and is on the radar of various organizations in New Jersey, New Hampshire, Michigan, Oregon, and Rhode Island as a potential invasive of concern (EDDMapS 2019). It should also be getting attention in Idaho.

Despite having medicinal qualities, in Europe the species is referred to as being highly aggressive and "registered amongst the most noxious invasive species in Europe" (Kozuharova et al 2017).

In Utah since Stansbury, the species has been only occasionally reported from plantings around buildings in Uintah (Vernal) and Utah (Provo area, and also a ranch in Hobbie Creek Canyon) counties since the early 1980's. At one point it was thought there might be a western form of this species referred to as var. *occidentalis* including a collection made by Clyde Gillette on May 15, 2002 at the

entrance to a ranch in Professor Valley in Grand County. There have also been purported sightings along the Colorado River southwest of Moab (Welsh 2015). The Gillette collection was taken however at a location adjoining a cement reservoir near the entrance to the ranch at an elevation of 4,320 ft. (1316 m) and appears to have been planted. This location is however only about 2.3 miles south of the Colorado River. A significant concern would be whether plants have spread from that ranch planting. It would be highly unfortunate if this species were to spread along the Colorado River given its proclivity to spread along riparian systems. A western form of this species is no longer recognized taxonomically as any perceived differences were likely due to its highly variable nature. Should this plant be found at locations along river systems in Grand or San Juan Cos., it should be considered as invasive and eradicated.

In late July of 2009, the species was collected by Michael and Mary Vincent (affiliated with the Department of Botany at the Miami University in Oxford, Ohio, their specimen #14526) near the Great Salt Lake in Salt Lake County in an abandoned parking lot on the frontage road near the pavilion at an elevation of 4,200 ft (1,280 m). They reported the plant as a shrub, four feet tall, with an indication that it was planted. This appears to be the first report of the species just barely occurring within Salt Lake County. If it was planted there, then perhaps we do not have to worry that the species has spread from southern Idaho into Utah. The species has persisted at the Saltair area location as evidenced by photographs taken by Andrey Zharkikh on May 18, 2018 at the exact same location. He reports however that there are no signs so far that it has spread from that location to surrounding areas.

On June 14, 2019 I came across a tree previously unknown to me along the Midvale Jordan Parkway (8500 South 700 West) in Salt Lake County. It was a woody shrub to small tree, unarmed, with entire pinnate leaves (about 5 to 6 pairs) that were mucronate with terminal leaflets. The plant was in flower with the numerous tiny flowers in clustered racemes. The tiny flowers seemed to have a single fused purplish petal-like cup that was enclosed by a 5-lobed calyx, and yellow stamens that were somewhat exserted. I had difficulty counting the stamens (with magnification and dissecting tools) and was coming up initially with a variable number from 6 to 9 per flower, but they are described as having 10. The plant was fairly robust and in the vicinity of 3 to 4 meters tall with additional growth at the base. It was located less than 25 meters north of the Jordan River. It wasn't growing in the best of habitats. Associated species were *Elaeagnus angustifolia*, *Tragopogon dubius*, *Melilotus* sp., *Salix exigua* (the only native species), and what appeared to be some extensively row planted non-locally native *Festuca ovina*.



Amorpha fruticosa as a tree.

A thick and largely impenetrable stand of the Jordan River's ubiquitous invasive *Phragmites australis* subsp. *australis* was nearby.

I did not observe additional plants of this species on this visit. This location is 17.5 aerial miles southeast of the Vincent specimen. Whether this indicates that the plant is spreading along the Jordan River or was accidentally introduced somehow in the soil is unknown. (This is a serious potential danger when plants are purchased from out-of-state.) The nearest residences and commercial structures are mostly 0.25 miles away. This species could have also spread to this location from a planting somewhere in the area (seems unlikely, but possible). Plant growth of this species can be aggressive and can form dense thickets.

This species should not be planted outside of its natural range. It should most certainly not be planted in Utah nor used in any revegetation or other projects nor planted as an ornamental. To the extent that extant plants exist anywhere close to a riparian area, they should be removed and replaced with something more appropriate. This is a species that needs to be on the radar of Utah botanists, ecologists and naturalists as well as government agencies, especially in Salt Lake County, the Wasatch Front, and in Grand County. It would be tragic to see a species like this spread along the Jordan River to Utah Lake and potentially also into lower elevation canyon river/drainage systems connecting with the Jordan River, not to mention anywhere along the Colorado River.

This species also represents an important reminder: just because something is native somewhere in the continental United States does **not** mean it is something appropriate to plant in Utah. This isn't the Great Plains.

Amorpha does not belong here, especially not *A. fruticosa*.

Similarly, just because a species occurs in the southern half of Utah doesn't mean it is necessarily okay to plant it in the northern half either (especially in agency directed revegetation projects). In other words, just because a species occurs somewhere in Utah does not mean that it is appropriate to plant it anywhere in Utah. And even for locally occurring species, consideration of elevation and habitat are also often overlooked factors that also should be carefully taken into account in determining whether something should be planted at a particular location.

***Colutea arborescens* (Bladder-senna)**

Unlike *Amorpha*, this species is not native to the Western Hemisphere and was introduced from Europe and North Africa and then widely planted elsewhere. It was introduced to our area as an ornamental, and for erosion control and was thought to be weakly-propagating (Barneby 1989). It grows to a similar height as *Amorpha* depending on conditions, it also has moderate to fast growth rate and can also form dense thickets. It has more typical pea flowers that are yellow with bladdery-inflated, translucent, indeshiscent pods, and has been heavily planted along road-cuts in the southern two-thirds of the state (Welsh 2015).

Omitted from treatments in floras restricted to northern Utah, I initially thought that this was *Caragana aborescens*, which has a similar stature and somewhat similar flowers until the intrepid Vincent Tepedino corrected that identification, and our ever roaming colleague Walter Fertig confirmed it. Like *Caragana aborescens*, *Colutea aborescens* is also drought tolerant and can grow in a variety of soils but also prefers direct sun. Tepedino had grown both inasmuch as *Bombus* are highly attracted to both species (as are carpenter bees). He notes that the plant escaped from a planting in Green Canyon north of Logan and that he has seen the plant growing adjacent to the USU parking lot and along the canal in the Island area of Logan. Fertig adds that the species is becoming a problem in southern Utah and has escaped into the Kolob Canyons extension of of Zion National Park.

In Salt Lake County, the species has been obscurely known from open spaces. In 1998, Robert Haynes and John Thieret (#9780a) collected it near Saltair at the Great Salt Lake. Then Michael and Mary Vincent, on the same date (July 26, 2009) and at same general location as the *A. fruticosa* specimen discussed previously also collected it (#14525), and reported that while originally planted around the parking lot, there were many escapees.

While typically reported from lower elevations, Mont E. Lewis reported it (#6953) from Fairview Canyon in



Colutea arborescens, flowers, fruits and form.

Sanpete County growing at an elevation of 7500 ft. in 1981.

Clearly this species has the propensity to not only persist where planted but to also easily spread and it seems to be able to grow in at a wide elevation range in many different soil types. And like *Amorpha fruticosa*, it is apparently long-lived.

This is also a species that is tracked on EDDMapS and is on the “monitor list” in Washington state where it is also noted to be invasive in some upper Midwest states. As an invasive that is spreading, its use in Utah cannot be recommended.

When I first saw this species in June of 2009 growing with what turned out to be UDOT planted *Purshia stansburyana* (in median strip between I-215 and Wasatch Blvd. at about 4980 ft. in elevation), it was also near an occasionally moist drainage with an odd assortment of plants, and I didn't realize then that it was a drought resistant shrub/small-tree. That occurrence also involved some fairly tall, lush plants but seemed to be somewhat confined and not spreading. I didn't give it another thought until more recently I saw a high number of plants in a vegetative state in a different location about 0.75 miles south of where I saw it in 2009 and this time to the east and well above Wasatch Blvd. I was somewhat puzzled by it and so then returned to that location on July 7, 2019. This location is somewhat off the beaten path along a deer trail and growing near the base of Tolcat Canyon on the western flank of Mt. Olympus (Wasatch mountains) in Salt Lake County. The area is largely undisturbed (although with some prior disturbance: there are dirt road switchbacks just below that was either providing off-road access to the area at one time or where perhaps someone was contemplating building homes). The plants here are growing on a fairly steep slope with a full southwestern exposure in an elevation range from about 4,980 ft to 5,020 ft. Perhaps they were placed there for erosion control in light of homes below on the west side of Wasatch Blvd. or they have moved into this area on their own.

I don't recall any fire activity in this particular area over say the last 25 years. The plants are growing at an elevation over 150 ft. higher than Wasatch Blvd. which is, along with the nearest homes below, about 0.10 miles away.

The invading nature of these plants based on the mixture of ages of both mature and young adults that were flowering/fruitlet and the fact that they were overtaking habitat of native plants was clear. I counted at least 30 sprawling adult plants in the 2 to 3 meter tall range (and much wider) plus younger plants around the periphery. In one area they formed a dense thicket. Younger plants have clearly spread both uphill to the east as well as to the north.

Native associated species growing near/with this *Colutea* location included:

Ambrosia psilostachya
Artemisia ludoviciana
Asclepias asperula
Celtis reticulata



Gutierrezia sarothrae
Heterotheca villosa
Opuntia macrorhiza
Quercus gambelii

Non-native associated species included the Utah Class II weed, *Linaria dalmatica*, and of course, *Bromus tectorum*.

Celtis reticulata (Netleaf hackberry) is most typically represented in Wasatch Front foothill habitats as straggly, solitary, short trees growing almost always from a nurse rock. In this area near the base of Tolcat Canyon, there is a more dense occurrence of *C. reticulata*. One of those occurrences however involved *C. arborescens* moving into even rock crevices and directly competing with *C. reticulata*.

This general area is also being invaded to the north by *Euphorbia myrsinites*, a Utah Class IV noxious weed, and there is a disturbing amount of robust *Prunus mahaleb* trees scattered everywhere (spread no doubt by birds) that have escaped into foothill habitats all along the Wasatch Front, and which should also be treated as highly invasive.

The use of *Colutea arborescens* (including the somewhat look-alike species *Caragana arborescens*) should not be

encouraged nor used by agencies or others for erosion control and it would be best not to plant it as an ornamental particularly given the significant number of much better options that are available and that would be more appropriate (such as *Cercocarpus ledifolius*, *Rhus aromatica* var. *trilobata*, *Rhus glabra* and so many others that would have been vastly more appropriate for this area).

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Native Plant Conservation Campaign

Save Plants, Save The Planet, Save Ourselves – Native Plants and Nature Based Solutions to Climate Change And Other Threats to Humanity

by Emily B. Roberson and Doug Tallamy
June 14, 2019

Sea level rise, record breaking heat waves, floods, pollution, mass extinction – 2019 is frightening! What if there were one simple thing individuals, businesses and communities could do to address these problems? There is! Plant native plants!

Native wildflowers and trees are beautiful. They remind us of what is special, even unique about the places we live. However, as ecological threats to people and the planet intensify, we must recognize another characteristic of native plants. They support our ecosystems and the essential ecosystem services they deliver in ways introduced plants cannot. Why is this so?

Ecosystems are run by plants and animals. The key is that, through eons of coevolution, only native plants can sustain the abundance and diversity of the animals we need to run our ecosystems: the 4000 species of native bees in North America, the hundreds of species of insectivorous birds, bats, lizards, bears, and foxes. Above all, only natives can support the insects that provide essential protein for these creatures. Those birds whose morning songs brighten your day rear their young on insects. A world without native plants and insects is a world without biological diversity, and a world without biological diversity is a world without humans!

The good news is that by saving wildlife with native plants, we also battle climate change and other environmental woes. Let's compare native grasses with lawn grass. Our native grasses have deep roots that make them drought resistant, reduce soil erosion and flooding, filter pollutants from ground water and increase rainwater infiltration. Best of all, these plants remove tons of carbon from the atmosphere and pump it into the soil and out of harm's way. Lawn grass, in

contrast, increases storm water runoff, and adds countless tons of polluting chemicals to our watersheds, and is the worst plant choice for carbon sequestration.

Nothing sequesters carbon and manages watersheds as well as native forests. New York City's celebrated tap water quality does not depend on expensive filtration. Instead, the city invests in conserving and restoring watersheds in the Catskills to purify water for its 9 million residents. Philadelphia is creating a "green mosaic" of gardens, green roofs and wetlands that reduces flooding, water pollution and sewage spills during severe storms. These cities save taxpayers at least \$15 billion that would otherwise be spent to update grey infrastructure (storm drains, filtration plants, etc.) to address these problems. Other cities are adopting parallel strategies.

Leaves and shoots act similarly, absorbing air pollutants, including greenhouse gases, while simultaneously releasing the oxygen we breathe. According to the U.S. Forest Service, urban trees in the United States remove 784,000 tons of air pollution annually. Planting more native trees, shrubs, perennials and annuals would provide even more pollution control. Restoring native plant communities could absorb enough carbon to compensate for more than 20% of U.S. greenhouse emissions.

Native plants also moderate local climates. The water that a single tree releases daily into its surroundings has a cooling effect equivalent to two domestic air conditioners. Trees also create shade, lowering local temperatures and reducing energy use and emissions from building cooling.

Naturally dense native plant communities can also buffer severe storms. Roots and shoots absorb energy from wind and water, lessening storm strength and damage. Salt marshes, wetlands and other native plant communities prevented more than \$600 million in property damage during Hurricane Sandy. Native plants can provide coastal storm protection at substantially lower cost than concrete breakwaters and flood barriers.

Collectively these processes are called Nature-Based Solutions. The United Nations, World Bank, and European Union are among those promoting Nature

The mission of the Native Plant Conversation Campaign is to promote the conservation of native plants and their habitats through collaboration, research, education, and advocacy.

Based Solutions to confront climate change, natural disasters and other perils. Nature-Based Solutions protect us at a lower cost, and require fewer chemicals, less water, and less maintenance than nonnative plants or grey infrastructure.

So let's fill our parks, gardens, roadsides and open spaces with natives, and then sit back, count our savings and enjoy the rewards. You can do it in your garden or on your farm. Cities can do it along roadways, in parks

and public spaces. Our gardens and communities will become more ecologically resilient, comfortable, safe, and low maintenance.

Plant natives to help save people and the planet. Do it for the wildflowers, birds and butterflies; do it for your children; do it for fun. Do it for cleaner air and water. Do it to lower your taxes and cut your power and water bills. Contact your local native plant society or botanic garden to find out more and get started!

For more information on Nature Based Solutions, see the Ecosystem Services section of our website.

PMB 151 * 1459 18th St. * San Francisco, CA 94107

<https://plantsocieties.cnps.org/index.php>

Native Plant Conservation Campaign Affiliate Organizations

Alabama Wildflower Society * Albuquerque Bio Park * Arizona Native Plant Society * Arizona-Sonora Desert Museum * Arkansas Native Plant Society * Botanic Gardens Conservation International * Botanical Society of Washington (DC) * California Native Plant Society * Colorado Native Plant Society * Florida Native Plant Society * Georgia Native Plant Society * Grand Prairie Friends of Illinois * Herb Society of America * Idaho Native Plant Society * Illinois Native Plant Society * Indiana Native Plant Society * Institute of Applied Ecology * Iowa Native Plant Society * Kansas Native Plant Society * Kauai Native Plant Society * Kentucky Native Plant Society * Kinnikinnick Native Plant Society (N IDAHO) * Lady Bird Johnson Wildflower Center * Laukahi (Hawaii) * Louisiana Native Plant Society * Maryland Native Plant Society * Minnesota Native Plant Society * Missouri Native Plant Society * Montana Native Plant Society * Native Plant Society of New Jersey * Native Plant Society of New Mexico * Native Plant Society of Northeastern Ohio * Native Plant Society of Oregon * Native Plant Society of Staten Island * Native Plant Society of Texas * Native Prairies Association of Texas * Nevada Native Plant Society * Plant Trust/New England Wild Flower Society * New Mexico Rare Plant Technical Council * New York Botanic Garden * North Carolina Botanical Garden * North Carolina Native Plant Society * Oklahoma Native Plant Society * Pinelands Preservation Alliance (NJ) * Rhode Island Wild Plant Society * Santa Barbara Botanic Garden * South Carolina Native Plant Society * Utah Native Plant Society * Virginia Native Plant Society * Washington Native Plant Society * West Virginia Native Plant Society * Wild Ones * Wyoming Native Plant Society



Bill King providing scale for a magnificent specimen of *Echinocereus mojavensis* in western Utah

UNPS Salt Lake Chapter Meeting

The usual first Wednesday of the month
September 4th at 7:00 p.m.

REI Community Room
3285 East 3300 South SLC

- Chapter Elections
- Speaker: Wayne Padgett "Botany Bill on the Hill"

Join us and bring a friend!



Utah Juniper Not a Discontented Tree

Tyler Wilson

D. Gary Young Research Institute

Over the years I have spent seemingly countless hours walking through pinyon-juniper forests. Juniper trees in Utah, particularly *Juniperus osteosperma*, have become my friends. I agree with John Muir in that I too have never seen a discontented tree. That's not to say that Utah juniper trees have not been through a lot. Their habitat has little water for most of the year, high winds, intense sunlight, and the threat of summer fire.

In these often-extreme conditions, juniper trees are not left defenseless. Among other characteristics that make them hardy, they produce a volatile oil. Volatile oils, primarily composed of terpenoids, have been attributed to plant defense against herbivory and microbial growth. The composition and quantity of the volatile oil in Utah juniper changes under different biotic and abiotic stresses. Interestingly, different portions of the tree contain a drastically different profile of volatile oil. The leaf material (image 1) primarily contains light aromatic fractions, prominent in camphor and bornyl acetate. This provides a medicinal, light aroma that most people familiar with Utah juniper associate with the tree. Moving towards the center of the tree, the limbs and trunk (image 2) primarily contain alpha-pinene, cis-thujopsene and cedrol. The latter two compounds are 'heavy' aromatic notes. In fact, dead Utah juniper trees will often hold onto these heavy compounds for years.

Last month I cut down a dead Utah juniper tree in the mountains near Eureka. This particular hillside had been through a fire several years ago. Hundreds of dead Utah juniper trees, and some pinyon pine, fill the mountainside. The tree was cut down at the base and

had an intense aroma. I chipped up a small section of the trunk and extracted the volatile oil by steam distillation. The volatile oil had a deep amber color and rich aroma, prominent in heavy compounds. Dead Utah juniper trees have great utility. Thousands of miles of fence posts are made from the wood. There are really two reasons for this: the first is that the tree is common at lower elevations near range land, and the second being that the volatile oil delays wood rot.

This is an amazing tree that is found in every county in the state of Utah and has been here for thousands of years. These ancient juniper forests aren't discontented, they have a story to tell.

[A portion of this research will be published in the September 2019 Phytologia release. Research on dying and dead Utah juniper trees is ongoing.]



2nd Annual Weed Day (Logan)

by David Wallace, UNPS Invasive Species Committee



Weed orientation at the Canyon Entrance (First Dam Park pavilion



Digging burdock along the River Trail

people brought their own.

There was plenty of woad and thistle on the nearby slopes and burdock along the shore, so we didn't have to go far to get started. The rain-softened ground made for relatively easy digging and soon the weeds were piling up. By about 11:00 the nearby slope was pretty much weeded. One person went north on the Bonneville Shoreline Trail, three others went up to the River Trail and others kept working on the burdock.

The weeding project ended at 1:00, as planned, just as the rain started pouring down (we probably would have canceled the event if it had been raining like this at the beginning). We had removed dyers woad and Scotch thistle from about 1/2 acre on the slope between Canyon Road and US-89, burdock from about 200 feet of shoreline and burdock and houndstongue from 1/3 mile of the River Trail between Second Dam to the switchbacks. The burdock was bagged and put in park dumpsters while the dyers woad and Scotch thistle was placed by the side of the road where Logan City could pick up the piles.

This was a successful effort and we hope to do it again next year. If more people get involved it should only take a few years before we could see significant weed reductions on the City property at the mouth of Logan Canyon and Forest Service land along the River Trail (and then we could move on to other areas).



Digging dyers woad and Scotch thistle from the slope between US-89 and Canyon Road

Ten people braved wet weather to participate in Logan's 2nd Annual Weed Day, May 18, 2019. It had rained earlier that morning and the forecast called for more rain, but these hearty souls were not deterred. Sponsored by the US Forest Service, Utah Native Plant Society, Bridgerland Audubon and Logan City, the event began at 9:00 at Logan's Canyon Entrance ("First Dam") Park. Two USFS employees joined us there for a safety meeting and orientation, where we learned how to identify and manually weed the four plants of concern for the day; dyers woad, Scotch thistle, burdock and houndstongue. Weeding tools were provided although most



Before and After

Your Membership

Your membership is vital to the Utah Native Plant Society. It is important that your information is correct and up to date for notifications and the delivery of The Segoe Lily newsletter.

Susan Sims is our UNPS Membership Committee. You may direct any questions about and updates to your information to Susan at: membership@unps.org

WANTED: Membership Person

UNPS is looking for a **volunteer membership assistant** to keep membership records. Some data-base entry helpful, but will train. Contact Susan Sims, shsims@mac.com

New lifetime members August 2019

Franci deLong
Anthony Vellinga



Utah Native
Plant Society

Utah Native Plant Society
PO Box 520041
Salt Lake City, UT, 84152-0041.

To contact an officer or committee chair write to

Webmaster: unps@unps.org

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Website: For late-breaking news, the UNPS store (posters, etc.), the *Sego Lily* archives, Chapter events, sources of native plants, the digital Utah Rare Plant Field Guide at unps.org.

Webmaster inquiries at
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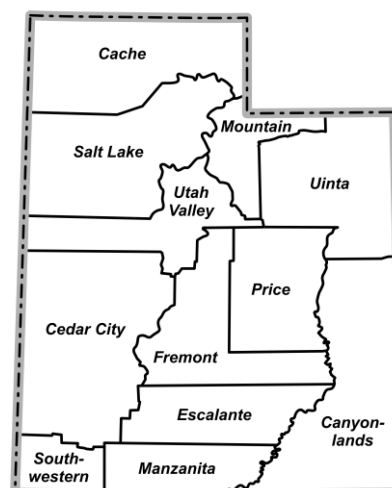
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UNPS Chapter Map



Utah Native Plant Society



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