

To the Rocks the Trees were Just Passing Through

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ABSTRACT I compile information on five rare conifer species in the White Mountains: *Pinus albicaulis*, *P. contorta*, *P. ponderosa*, *P. jeffreyi*, and *Juniperus grandis*.

Decades ago I attended a talk in Berkeley by American poet, Gary Snyder. He related a story that I mistily remember: “A young boy said to his elder, ‘Grandpa, if trees and rocks could talk, what would they say to each other?’ ‘My son,’ replied his Grandfather, ‘They would have nothing to say, as to the rocks the trees are just passing through.’”

Since childhood I have been fascinated by unusual occurrences of trees, wondering where they came from and why they are there. Like many Great Basin mountain ranges, the White Mountains (WMs) are rich in mysteries of isolated and “unexpected” tree species occurrences (Charlet, 1996). Some of those in the WMs have been known to western science for decades (Griffin and Critchfield, 1972; Lloyd and Mitchell, 1973), no doubt millennia by Indigenous residents. Here I compile information on rare conifers of the WMs and share a few thoughts on their passing-through stories. Many locations derive from herbarium records, others are credible unvouchered observations; the list is no doubt incomplete. My hope is to encourage continuing exploration of rare trees species in the WMs, and to inspire research on decoding their biogeographic histories.

The rare conifers of the WMs occur within a matrix of widespread and well-known conifers: venerated bristlecone pine (*Pinus longaeva*), its subalpine friend, limber pine (*P. flexilis*), and fragrant, lower-slope singleleaf pinyon (*P. monophylla*) and Utah juniper (*Juniperus osteosperma*). Against this backdrop, rare conifers make cameo appearances, sometimes on their own, other times peeking out amidst woodlands of the matrix species, or even showing off as a substantial population.

My inspiration to write this essay comes from a promise I made to botanist-*par-excellence*, Dean Taylor, before he passed in 2020. This pertains to a stand of ~30 whitebark pines (WBP, *Pinus albicaulis*) in the southeasternmost cirque of Middle Creek, CA that Dean vouchered in 1986 (Fig. 1a, b). WBP has not been documented elsewhere in the range. My conifer-biogeographer friend, David Charlet, first told me about this and I was instantly hooked on re-finding it, an effort I began in 2015. Spoiler alert: I didn’t find it in 2015 and still haven’t (despite that I’m not giving up), nor has anyone else to my knowledge.

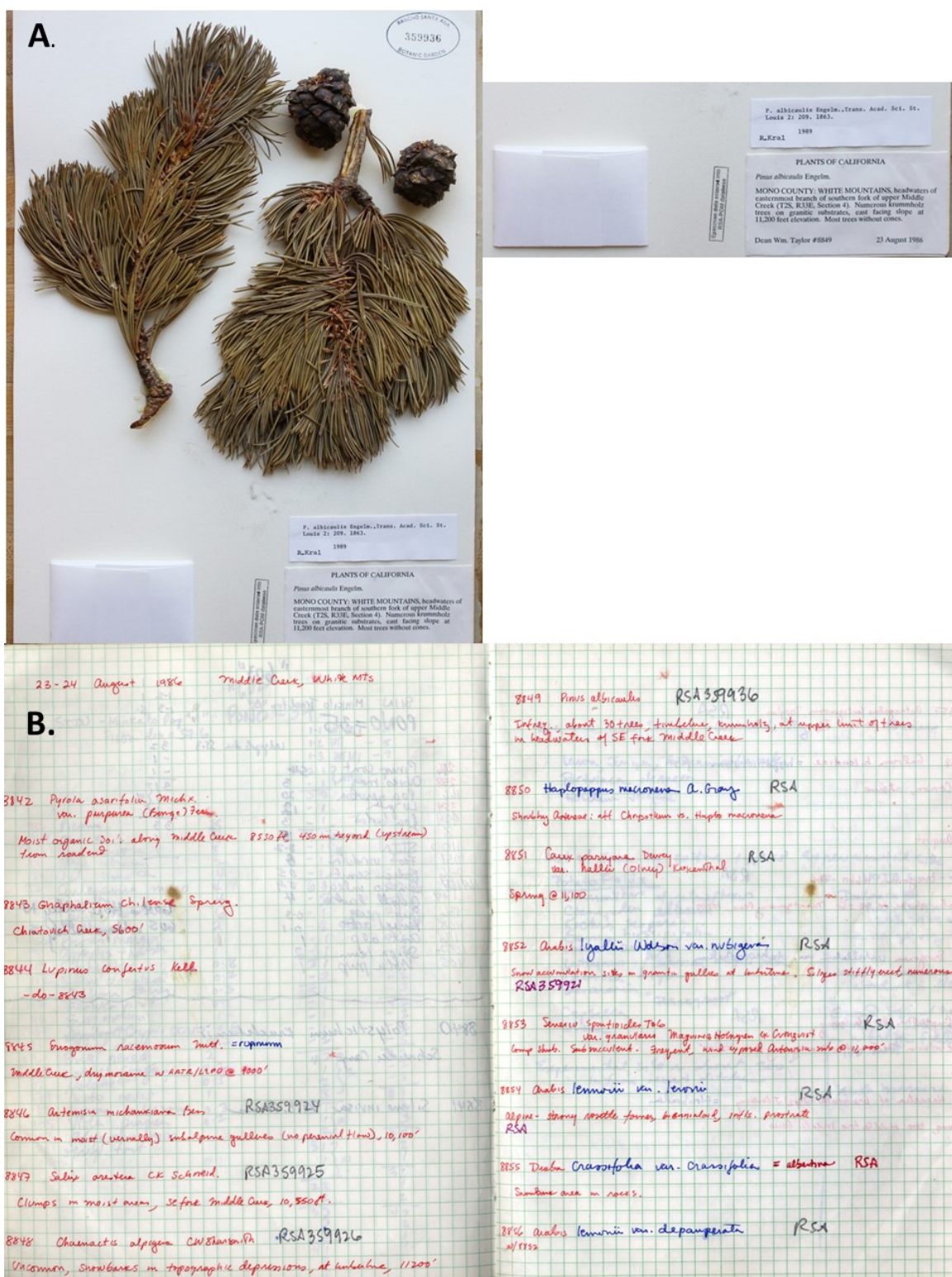


Fig. 1. A) Middle Creek whitebark pine, RSA 3599636 herbarium sheet, B) Dean Taylor's fieldbook entry, 8/23/1986.

My initial lack of success prompted me to correspond with Dean, who was forthcoming with information, although much of it was conflicting. My last conversation with him was in 2018. He told me in no uncertain terms that I should publish his WBP occurrence whether anyone found it or not. I share these notes from my explorations and conversations with Dean (and others) to motivate all of us to keep looking.

I started my search with coordinates given by CalFlora (calflora.org) for Dean's voucher (one record as of 2015; Table 1). This led to a point high in the southeast part of the cirque (Fig. 2) at the uppermost limit of bristlecone and limber pines, which grow scattered on the cirque floor, blanket the south and northwest slopes of the cirque, and grow through the uplands of Middle Creek Canyon. I searched the CalFlora-record area thoroughly and spent the rest of the day surveying the cirque floor and west-facing slopes of the cirque.

Back home, I went back to basics, engaging Dean: the most trustworthy information comes from his field notebook entry for his August 23, 1986 collection day (Fig. 1b). Dean reminded me that he had no GPS device then, that he was on a CNPS reconnaissance trip headed to The Jumpoff (Fig. 2), had rapidly bagged samples of many species during that trip, and only sometime later entered notes in his field book. The order of appearances for other samples collected that day was, he explained, unrelated to his collection order in the field.

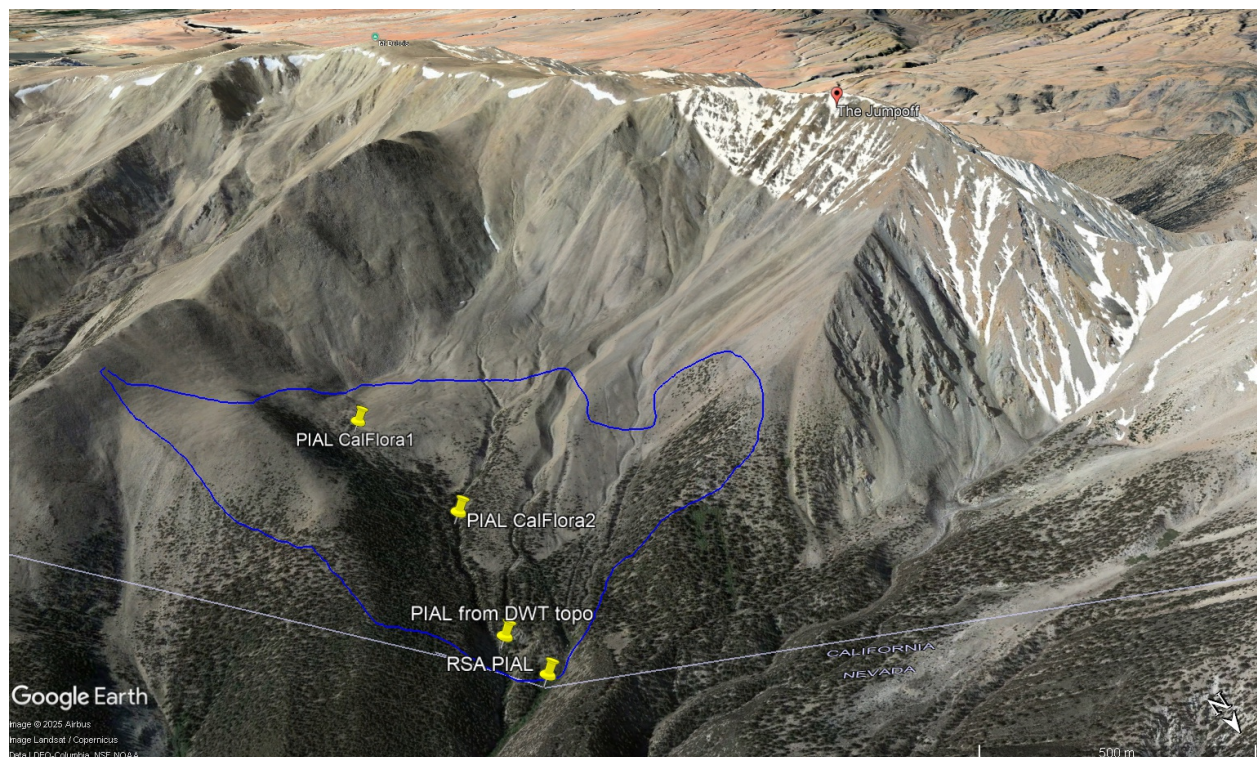


Fig. 2. Google Earth image of Middle Creek cirque showing interpreted locations for Taylor's whitebark pine. RSA accession record; Taylor's point on the topo (extrapolated by CIM); CalFlora2 entry from Taylor's 2018 spreadsheet, obtained posthumously in 2020; CalFlora1 entry before 2015. Blue polygon marks an area within which I've searched.

Here is where conflicting information began (Table 1). Dean's notebook indicated "krummholz" at "upper limit of timberline." Dean insisted, however, that the WBPs were *not* krummholz ("I slept under them and had to climb to get a cone"), and that by "timberline" he meant the upper limit of tall pines ("treeline"), not the uppermost limit of pines ("species line"). He marked a location (then 30-years later) on a topographic map giving his best estimate (Fig. 3). This maps ~1 km downhill from the CalFlora point. The location Dean marked also does not correspond to the herbarium accession record, which gives an elevation of 3415 m and coordinates that map to a low elevation outside the cirque. Given the 1550 m error on the location, however, this could be anywhere in the vegetated cirque. The accession also describes, "...numerous krummholz trees on granitic substrates, E facing slope." Dean did not mention an east-facing aspect, and, as above, he was adamant the trees were not krummholz.

As preparation for this essay, I checked the key herbaria databases and asked White Mountain botanists for updates and insights. In doing this, I found a new WBP record had been added to CalFlora. This also referenced Dean's 1986 observation and gave yet another set of coordinates (Table 1, Fig. 2). The entry attributed the update to California botanist, Julie Kierstead. I wrote Julie and found that after Dean passed, she ended up with his voluminous spreadsheets and took on the job of transferring the information to database managers. It appears that Dean must have come up with those coordinates, no doubt much later than when he and I were corresponding, as they are not near the spot he marked on the topographic map.

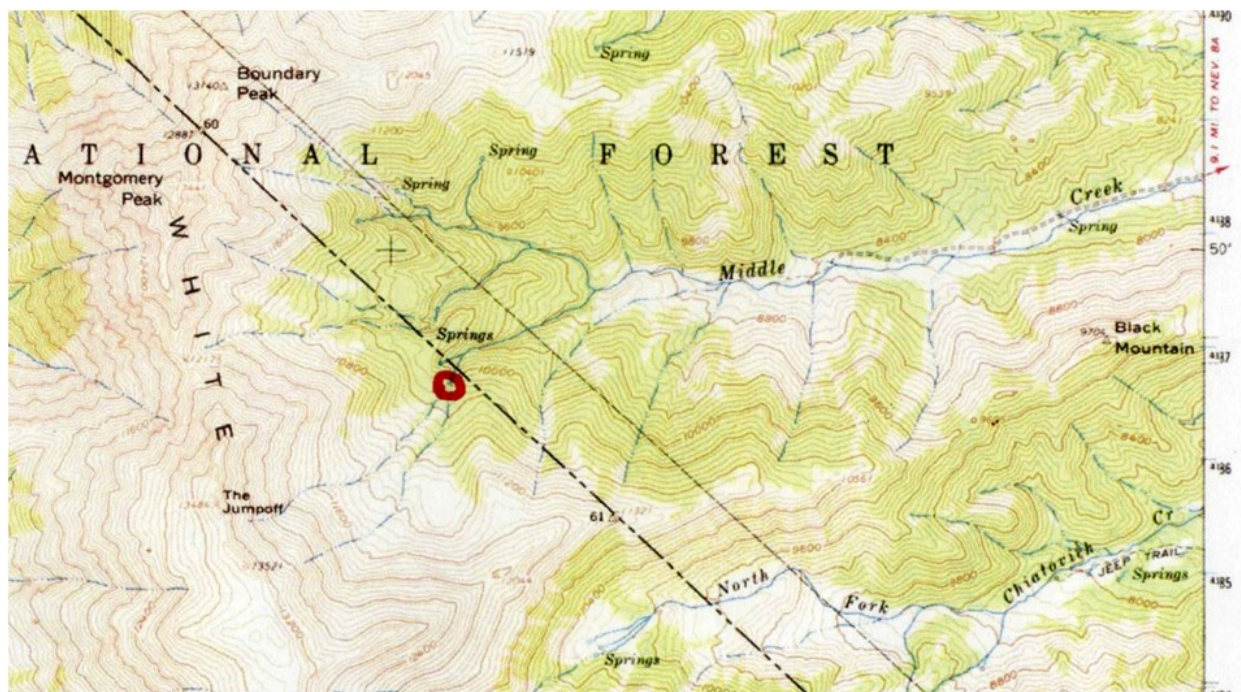


Fig. 3. Map marked by Taylor in 2015; circle was his estimate for location of the trees. Benton USGS 15' topographic map includes this area.

So, we end up with four interpretations of the location for WBP in the cirque and considerable conflicting notes. Hearing from colleagues that Dean occasionally mixed numbers and recognizing that we are trying to piece together events almost forty years ago, the strategy I have taken in recent years is to “search everywhere” in the cirque. By now I have walked within a large perimeter of the cirque (Fig. 2), but this is one pair of eyes in an aging body, leaving a lot of trees uninspected! Importantly, to distinguish WBP from the other pines (particularly limber), seed cones are essential, either on the tree or cones/scales on the ground. Visiting in late summer/fall and in heavy cone-crop years is best. I consider comments from Dean that he camped under the pines to suggest flattish ground, near water (there is little by late summer these years), and that he was on a route to The Jumpoff. I have hiked up from the bottom of Middle Canyon by various routes, looking for WBP elsewhere. An important update is that a large avalanche occurred in what appears to be spring 2023. This felled all trees in a large swath from the SE slopes of the cirque across the floor to the east ridge (Fig. 4); did we lose Dean’s WBPs in this event? Another concern I have is that Dean might have mistaken which cirque he was in. Recently, Julie Kierstead noted that 10 collections in Dean’s 2018 spreadsheet for August 23, 1986, including the WBP, had the same coordinates (the list can be traced through CCH2: <https://cch2.org/portal/>). One species, *Carex norvegica*, was published as a noteworthy collection in *Madroño*, giving the location as “head of E branch of S Fork of upper Middle Cr” (Phillips et al., 1990, p. 64). The question of which cirque, however, could still remain...

In addition to WBP, I summarize information for other rare conifers in the WMs, including new and previously known locations, vouchered or not (Tables 1, 2). Three-needled yellow pines are documented from only one-two locations. Jeffrey pine (*Pinus jeffreyi*) has long been known from westside Jeffrey Mine Canyon, where it forms a large, open, old-growth population on hydrothermally altered metamorphic substrates, which provide some benefits for growth of the species (Billings, 1950). I visited the population again in January 2025 and was glad to find considerable reproduction in many age classes and healthy trees. White Mountain botanist, Jim Morefield, considers some trees to be ponderosa pine (*P. ponderosa*, Table 1) as did Elliott-Fisk and Peterson (1991); I have not seen trees that suggest this. In the next canyon to the north, Lone Tree Creek, ponderosa pine grows as a small population on very steep walls of the narrow gorge, also on altered substrates.



Fig. 4. A large avalanche occurred in 2023 (apparently in late winter-spring) in the south fork Middle Creek cirque. View N-NE.

Sierra lodgepole pine (*Pinus contorta* ssp. *murrayana*; Table 2) has been long known from several widely separated locations in the WMs, including the large, old-growth population along Cabin Creek on Chiatovich Flats (Elliott-Fisk and Peterson, 1991). I have visited this population several times, observing large, old trees; fire scars on downed stems that suggest stand-level event(s) and longevity of the population; many age classes and abundant reproduction in a very healthy forest. Jim Morefield documented a lodgepole pine grove in the North Fork Perry Aiken Creek in 1987. A small population on the westside in steep, rugged Milner Creek Canyon was documented in 1988 (Glenn Clifton) and in 1989 (Morefield; Table 2). More recently (2014), Michele Slaton mapped a population > 4 ha in North Fork McAfee Creek Canyon, and another in a tributary 800 m north. I have observed single young trees along Leidy Creek, and cones in the Indian Creek drainage bottom. Lloyd and Mitchell (1973) mention lodgepole pine in Montgomery Creek, to my knowledge not confirmed. Notable for lodgepole pines in the WMs is their co-occurrence with bristlecone pine (*P. longaeva*) in the Cabin Creek and N Fk Perry Aiken (and maybe other) populations. To my knowledge these two species do not grow together elsewhere in their native ranges.

The last rare conifer is western/Sierra juniper (*Juniperus occidentalis* var. *australis*/*J. grandis*; Table 2). Most observations have been of single trees scattered on the central WM plateau near or above 3000 m. I observed two valley locations ~2070 m, a single young tree along Indian Creek, and a large old-growth population on east-facing slopes of Wyman Canyon. While the latter has been assumed to be *J. osteosperma*, I identified it as Sierra juniper, as did David Charlet, who curates my collections and has experience identifying *Juniperus* species.

In regard to passing-through stories of these species, we can say little confidently about their histories until/unless genetic studies are conducted. I won't hesitate, however, to offer a few "Just-So" thoughts. Several scholars have suggested that the WM rare conifers are relictual from long-past widespread forests, with habitat reducing as climates changed (Vasek, 1966; Elliott-Fisk and Peterson, 1991). Elliott-Fisk and Peterson (1991) go so far as to suggest origins of these populations in the "Tertiary," with persistence since then. I don't think the intervening climates, given Paleogene-Neogene variability and even greater Pleistocene fluctuations, would have allowed persistence of habitat for the species above the lowest valley slopes, except perhaps for the rare species that currently find haven on scattered patches of altered substrates (Billings, 1950).

I propose two situations for the origins of the rare conifers in the WMs. For single trees, especially the junipers (seeds dispersed via birds' guts), I assume these to be recent colonists, arriving at however many years ago the trees' ages are. Sierra juniper grows in the eastern Glass Mountains and Sierra Nevada, distances from the WMs navigable by birds that eat juniper seeds. For Dean Taylor's whitebark pines, I assume these also established from a recent founder event, likely a single seed cache of a wandering Clark's Nutcracker (*Nucifraga columbiana*), the obligate dispersal vector. Notably, Middle Creek cirque lies ~25 km from WBP in the Glass Mountains, a distance within the documented range for nutcracker seed dispersal (Lorenz et al. 2011).

For stable, large, old-growth populations of the rare conifers, I propose that most of these were established during the Holocene (past 11,700 years), as available arboreal habitat seems unlikely to have persisted through the prior glacial period, especially the Last Glacial Maximum (~27-15 ka). The westside locations of Jeffrey and ponderosa pines and the Milner Creek lodgepole pine are natural targets for establishment from populations in the eastern Sierra or Benton Range

(Jeffrey), as altered substrates favor them. These might have persisted through glacial/interglacial periods, but unlikely pre-Mid-Pleistocene. Establishment of lodgepole pine populations high on the east slopes of the WMs would be supported by higher moisture from storms depositing snow on lee crests, larger drainage areas, more developed soils, and lower slope gradients than on the west. This is especially the case where the crest elevation dips down, allowing storms to pass through.

The future of these trees and populations is unknowable. I do not think, however, they are likely to wink out directly from changing climates anytime soon, given the current healthy condition of the trees/populations and the abundant reproduction. More likely, the stands will persist and expand. Solitary trees may live out their lives without reproducing, although self-pollination in pines can produce viable seeds, and pines and female junipers could pick up wind-dispersed pollen and reproduce. Fire and avalanche, as in Middle Creek, could eliminate canyon-slope populations if conditions were adequate. Finally, with more exploration, we may find many new occurrences of these species. As Jim Morefield asked about lodgepole pine: “Is it really even a ‘rare’ conifer in the Whites? Or maybe more likely just ‘rarely seen’ due to its remote and inaccessible habitat.” Let’s get out there and keep looking!

ACKNOWLEDGEMENTS

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Table 1. Rare Conifers of the White Mountains (Whitebark, Jeffrey, and Ponderosa pines). Continued next page.

Common name	Scientific name	Location	Herbarium- other record/ date	Coordinates Latitude Longitude +/- (m)	Eleva- tion (m)	Collector	Single tree (S) or Population (P)	Notes
Whitebark pine	<i>Pinus albicaulis</i>	Middle Cr./ SE Cirque*	RSA3599636/ 1986	37.82441 -118.32856 1550	3415 [†]	D. Taylor	P	RSA accession record; maps to Mineral Co., NV; “numerous krummholz”; herbarium sheet indicates T2S, R33E, Sec. 4
			CalFlora Sb2209-29002/ 1986	37.81893 -118.32889	3161	D. Taylor	P	Posthumously imported from Taylor’s 2018 database, shared by Julie Kierstead; “krummholz”
			CalFlora gr6684/ 1986	37.81444 -118.3275	3337	D. Taylor	P	“krummholz”
			--/ 1986	37.82300 -118.32804	3073	D. Taylor	P	Coordinates extrapolated by CIM from topo map marked by Taylor in 2015; “~30 trees, upper timberline, not upper treeline; not krummholz”; Taylor (2008) gives 3078 m
		Indian Cr.	--/ 2018	37.74510 -118.23304	2550	C. Millar	cones	Detached bird-chewed cones in drainage
Jeffrey pine	<i>Pinus jeffreyi</i>	Jeffrey Mine Cyn.	RENO:V11659/ 1950	37.61807 -118.31428	2438	G. Shreve	P	Additional record iNaturalist, (Morefield, 2019)
Ponderosa pine	<i>Pinus ponderosa</i>	Jeffrey Mine Cyn.	iNaturalist/ 2019			J. Morefield	P	

Table 1, continued. Rare Conifers of the White Mountains (Whitebark, Jeffrey, and Ponderosa pines).

Common name	Scientific name	Location	Herbarium- other record/ date	Coordinates Latitude Longitude +/- (m)	Eleva- tion (m)	Collector	Single tree(S) or Population (P)	Notes
Ponderosa pine	<i>Pinus ponderosa</i>	Lone Tree Cr. Cyn.	UCSB021596/ 1966	37.6426 -118.3249 500		D. Powell	P	
			CAS79013/ 1972			E. Larsen, D. Guiliani	P	
			JEPS119375/ 2000	37.64 -118.3306	1825	D. York	P	

* All four entries for *P. albicaulis* in Middle Cr. are interpretations of Dean Taylor's single August 23, 1986 record.
†Coordinates map to 3028 m

Table 2. Rare Conifers of the White Mountains (Lodgepole pine and western Juniper). Continued next page.

Common name	Scientific name	Location	Herbarium-other record/ date	Coordinates Latitude Longitude +/- (m)	Elevation (m)	Collector	Single tree(S) or Population (P)	Notes
Lodgepole pine	<i>Pinus contorta</i> var. <i>murrayana</i>	Cabin Cr.	LA, <i>s.n.</i>		3048	Kleinforth	P	Lloyd and Mitchell, 1973; Taylor (2008) cites "Kleinforth (LA)"; LA has no record of this
			UNLVChia-1*/2022	37.71251 -118.25571	3162	C. Millar	P	
		Indian Cr.	--/ 2018	37.75367 -118.22883	2390	C. Millar	cones	Detached cones in drainage; NV
		Leidy Cr.	UNLVLeidy-5*/2018	37.70853 -118.20153	2222	C. Millar	S	Several young trees
		Milner Cr..	RENO:V111180/ 1989	37.60147 -118.22938 100	3030	J. Morefield	P	
			PUA:67905/ 1988	37.60128 -118.27044	2987	G. Clifton	P	
		N Fk Perry Aiken Cr.	RSA011910*/ 1987	37.64498 -118.2277 1200	3110	J. Morefield	P	
		N Fk Perry Aiken Cr.	RENO:V- 117196*/ 1987	37.64301 -118.2224 80	3109	J. Morefield	P	

Table 2, continued. Rare Conifers of the White Mountains (Lodgepole pine and western Juniper). Continued next page.

Common name	Scientific name	Location	Herbarium-other record/ date	Coordinates Latitude Longitude +/- (m)	Elevation (m)	Collector	Single tree(S) or Population (P)	Notes
Lodgepole pine	<i>Pinus contorta</i> var. <i>murrayana</i>	N Fk McAfee Cr. Montgomery Cr.	--/ 2014	37.61021 -118.19139	2965	M. Slaton	P	Stand > 4 ha; Another stand ~800 m north
Sierra juniper	<i>Juniperus grandis</i> / <i>J. occidentalis</i> var. <i>australis</i>	Indian Cr. Wyman Cyn. N Fk Crooked Cr.	UNLVIC-1*/ 2022 UNLVWYM-1*/ 2020 OBII64842/ 2018 RENO:V74465/ 2015	37.7778 -118.21083 37.43451 -118.11124 37.50536- 118.17471 2 37.50608 -118.16999 2	2075 2066 3189 3159	C. Millar C. Millar D. Neubauer D. Neubauer	S P S S	NV "krummholz"
		Poison Cr.	RENO:118122/ 2023	37.52528 -118.16526 5	2944	D. Neubauer	S	
		N Fk Cottonwood Cr.	RENO:V116480	37.53999 -118.1472 30	2804	J. Morefield	P	

Table 2, continued. Rare Conifers of the White Mountains (Lodgepole pine and western Juniper).

Common name	Scientific name	Location	Herbarium-other record/ date	Coordinates Latitude Longitude +/- (m)	Elevation (m)	Collector	Single tree(S) or Population (P)	Notes
Sierra juniper	<i>Juniperus grandis</i> / <i>J. occidentalis</i> var. <i>australis</i>	Crooked Cr.	UCR4253	37.49897 -118.17253	3201	H. Mooney	S	Vasek (1966) notes “wind-dwarfed mat”
		1.1 mile SE McCloud Camp	RENO:V100034	37.51934 -118.14542 3	3042	D. Neubauer	S	
		“North end. ... White Mtns.”	620928-3 620928-4				S	Two trees, (Vasek, 1966)

* These records await accession to UNLV.

† These records are different interpretations of a single collection from one location.