



Marc Coles-Ritchie

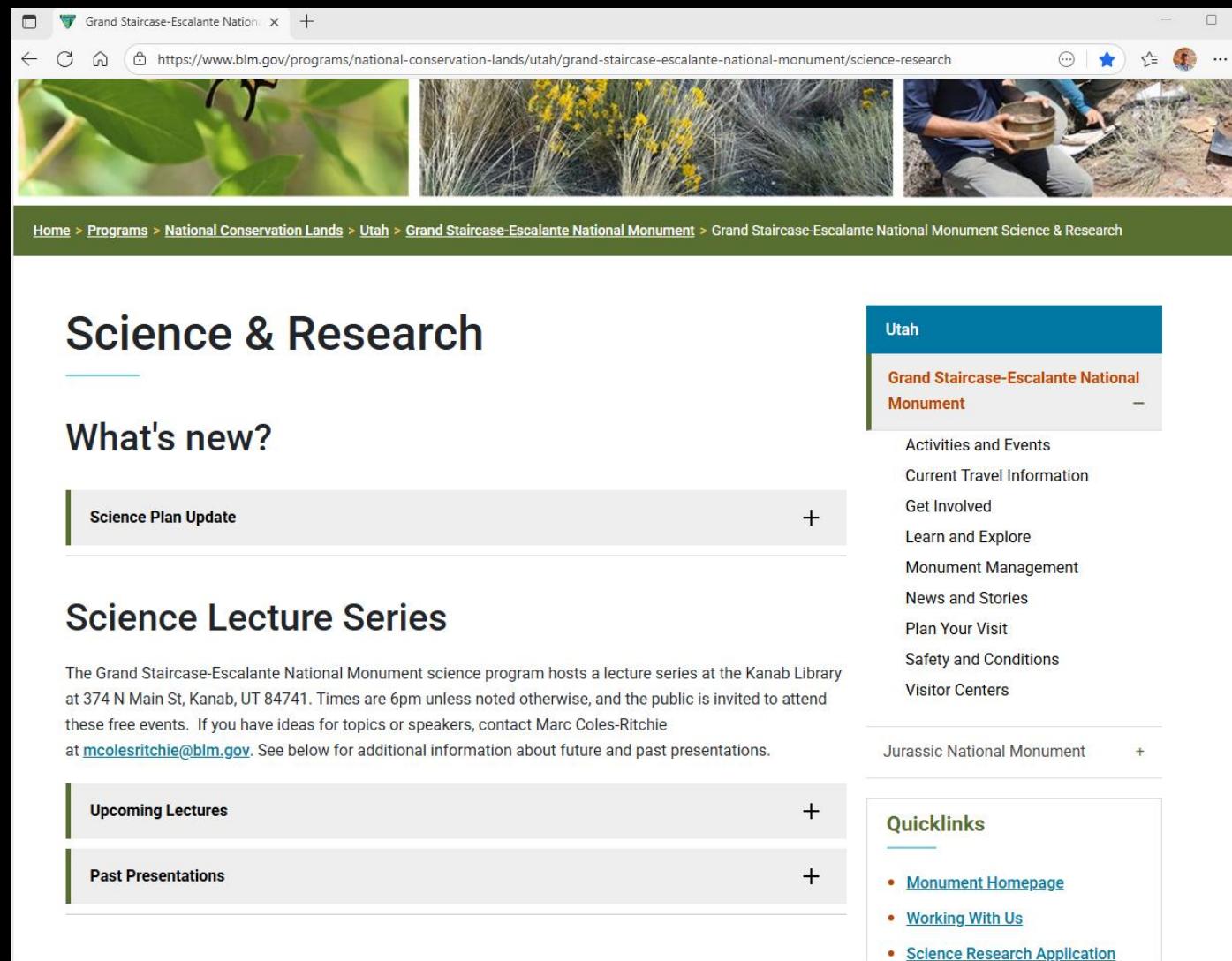
BLM Ecologist and Science
Coordinator at Grand Staircase-
Escalante National Monument

Kanab Public Library Presentation
November 19, 2025

Recognizing Indigenous People and Knowledge

- Tribes connected to this land include Southern Paiute, Hopi, Zuni, Pueblo, Dine' (Navajo), Ute and others.
- Indigenous people lived off this land.
- Indigenous knowledge holders knew and know how to use trees.

GSENM Science webpage



The screenshot shows a webpage from the Bureau of Land Management (BLM) titled "Grand Staircase-Escalante National Monument Science & Research". The page features a header with three images: a close-up of green leaves, a field of yellow wildflowers, and a person in a blue shirt holding a small container in a field. Below the header is a breadcrumb navigation: Home > Programs > National Conservation Lands > Utah > Grand Staircase-Escalante National Monument > Grand Staircase-Escalante National Monument Science & Research. The main content area has a section titled "Science & Research" with a "What's new?" section containing a "Science Plan Update" item. Below this is a "Science Lecture Series" section with text about the program and links for "Upcoming Lectures" and "Past Presentations". To the right is a sidebar titled "Utah" which includes a "Grand Staircase-Escalante National Monument" section with links to Activities and Events, Current Travel Information, Get Involved, Learn and Explore, Monument Management, News and Stories, Plan Your Visit, Safety and Conditions, and Visitor Centers. There is also a "Jurassic National Monument" section and a "Quicklinks" section with links to the Monument Homepage, Working With Us, and Science Research Application.

Science & Research

What's new?

Science Plan Update

Science Lecture Series

The Grand Staircase-Escalante National Monument science program hosts a lecture series at the Kanab Library at 374 N Main St, Kanab, UT 84741. Times are 6pm unless noted otherwise, and the public is invited to attend these free events. If you have ideas for topics or speakers, contact Marc Coles-Ritchie at mcolesritchie@blm.gov. See below for additional information about future and past presentations.

Upcoming Lectures

Past Presentations

Utah

Grand Staircase-Escalante National Monument

- Activities and Events
- Current Travel Information
- Get Involved
- Learn and Explore
- Monument Management
- News and Stories
- Plan Your Visit
- Safety and Conditions
- Visitor Centers

Jurassic National Monument

Quicklinks

- Monument Homepage
- Working With Us
- Science Research Application

GSENM Science Lecture Series

Science Lecture Series

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Upcoming Lectures

- December 10: Native buckwheat plants of GSENM (Web Staley & Marc Coles-Ritchie)
- January 14, 2026: Geology and Plant Road Guide to Cottonwood Canyon (Janice Gillespie)
- February 11, 2026: Utah Prairie dog impacts from new plague (Barbara Sugarman)
- March 11, 2026: Wildlife (Joel Berger)
- April 8, 2026: River restoration (Mark Briggs)
- May, 2026: Amazing Earthfest has many science and nature talks and walks
- June 10, 2026
- July 8, 2026
- August 12, 2026
- September 9, 2026
- October 14, 2026: How to photograph in the desert responsibly (Andrew Napier)
- November 11, 2026
- December 9, 2026

Past Presentations

News and Stories

Plan Your Visit

Safety and Conditions

Visitor Centers

Jurassic National Monument

+

Quicklinks

- [Monument Homepage](#)
- [Working With Us](#)
- [Science Research Application](#)

Science Compilations

- [Deep Roots: A 10,000-year Indigenous History of GSENM \(2021\)](#)
- [Digital Collection at SUU Library](#)
- [Science Symposium Proceedings 2016](#)
- [Science Symposium Proceedings 2006](#)
- [Science Symposium Proceedings 1997](#)

Science Lecture Series

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Upcoming Lectures

Past Presentations

Did you miss a science presentation of ours or just wanted the slides from one? No problem! You can find them below.

Plants

+

Animals

+

Archaeology & History

+

Soils, Biocrust & Lichens

+

News and Stories

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Quicklinks

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PDFs

Past Presentations

Did you miss a science presentation of ours or just wanted the slides from one? No problem! You can find them below.

Plants



Animals



[Utah's Amazing Bees and How We Can Help Them](#)

Amy Dolan, Xerces Society
Conservation Biologist Mountain States BBA Coordinator

[Wildlife in a challenged world](#)

Joel Berger

[Bats of GSENM](#)

Jackie Grant

Archaeology & History



[Utah Cultural Site Stewardship](#)

Lexi Little, Operations Coordinator for the Utah Cultural Site Stewardship Program
Caitlyn McAllister Grand Staircase-Escalante National Monument Archaeologist

[Enigmatic Traces of Sacred Water: Cup and Channel Petroglyphs of the Far West](#)

Michael L. Terlep, Archaeologist, North Kaibab Ranger District, Kaibab National Forest

Soils, Biocrust & Lichens



- [Monument Homepage](#)

- [Working With Us](#)

- [Science Research Application](#)

Science Compilations

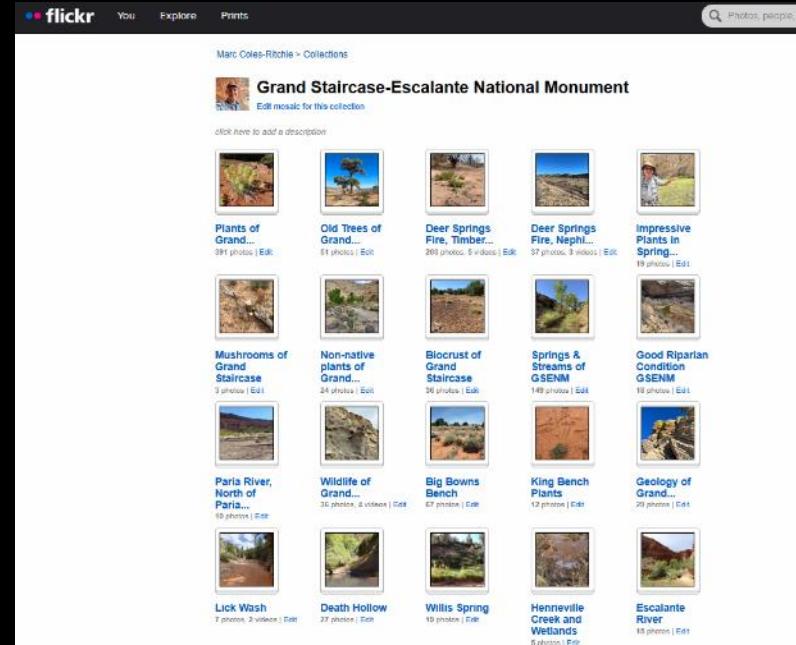
- [Deep Roots: A 10,000-year Indigenous History of GSENM](#)
(2021)
- [Digital Collection at SUU Library](#)
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Partners

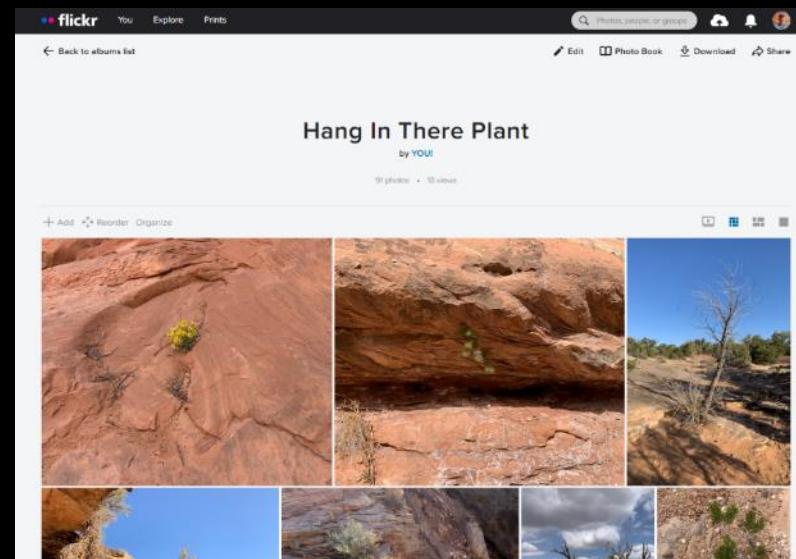
- [ARS - SW Watershed Research Center](#)
- [Denver Museum of Nature and Science](#)
- [Glen Canyon Conservancy](#)
- [Southern Utah University IIC](#)

Photos

- Photos are by me (unless noted) in GSENM or nearby, and in [flickr albums](#).



- “Hang in There Plant” [flickr album](#)



What is a tree?

	Tree	Shrub	Herbaceous (grass & wildflower)
Woody	Yes	Yes	No
Stems	1 trunk (or a few), erect & elongate	Multiple, shorter, bending; emerge near ground	
Sprout	No	Yes	
Height	Taller (over 15 feet)	Shorter (under 10 feet)	
Shape	Narrower, pointed top	Wide, rounded crown	
Branches	Lateral, some distance from ground, and can be large	Branch size similar to main stem, closer to ground	
Age	Can live very long; growth rings of main stem indicate plant age	Plant can live long but stems not so much	

Sit under a tree for lunch



Ponderosa pine

Not under a shrub



Serviceberry



Large shrubs not in this presentation

- Utah serviceberry
- Cliffrose
- Oaks, some
- Willow
- Maple
- Tamarisk

Trees of GSENM

Conifers

- Pine
 - Pinyon pine
 - Ponderosa pine
 - Limber pine (near)
 - Bristlecone pine (near)
- Fir & Spruce
 - Douglas-fir
 - White fir
- Juniper
 - Utah juniper
 - Rocky Mountain juniper



Deciduous

- Water birch
- Russian olive (not native)
- Silver buffaloberry
- Single-leaf ash
- Gambel oak
- Cottonwood (Fremont & narrowleaf)
- Aspen
- Box-elder
- Hackberry
- Siberian elm



Pine Family (*Pinaceae*)

- Pine
- Fir
- Spruce

Pinyon (left) and
Ponderosa (right)



Two-needle pinyon (*Pinus edulis*)



Pinyon Pine



Pinyon pine



Pinyon aging



322 growth rings

Ponderosa pine (*Pinus ponderosa*)



600-year old tree near Coral Pink Dunes.
Inner ring was the year 1386.

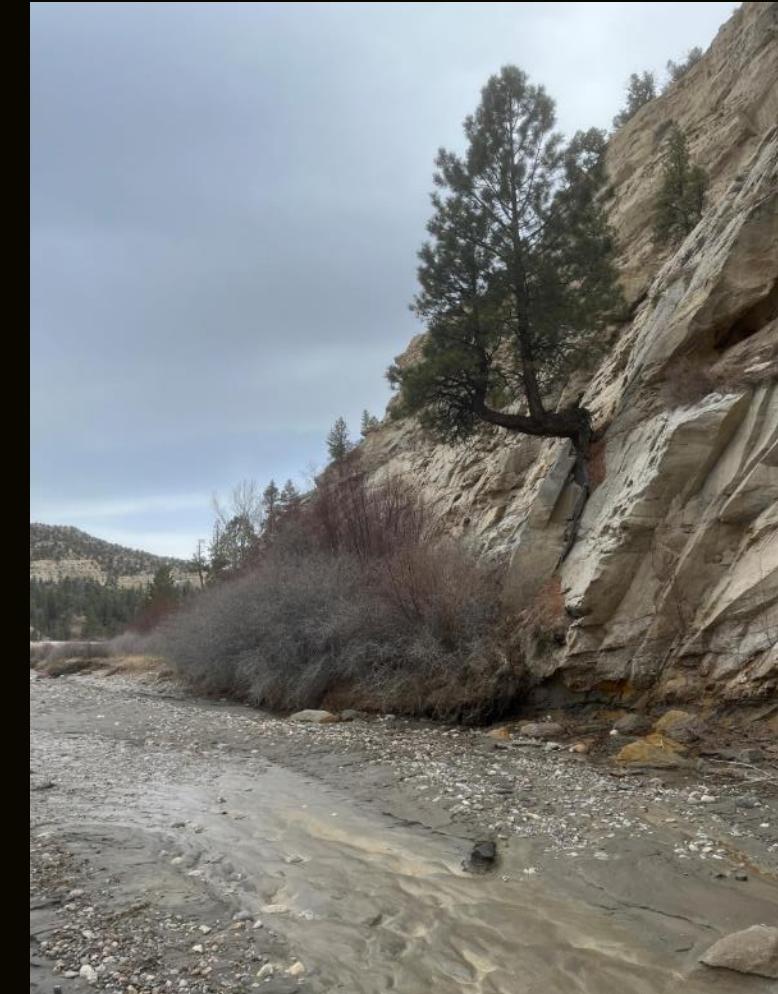




Ponderosa research by UNLV's Dr. Drew Peltier and students; this tree is 560 years old



Ponderosa in precarious places



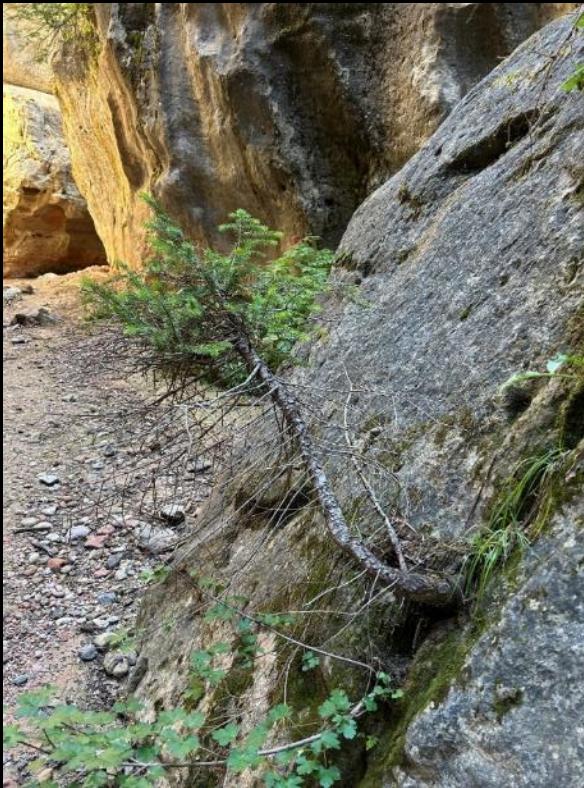
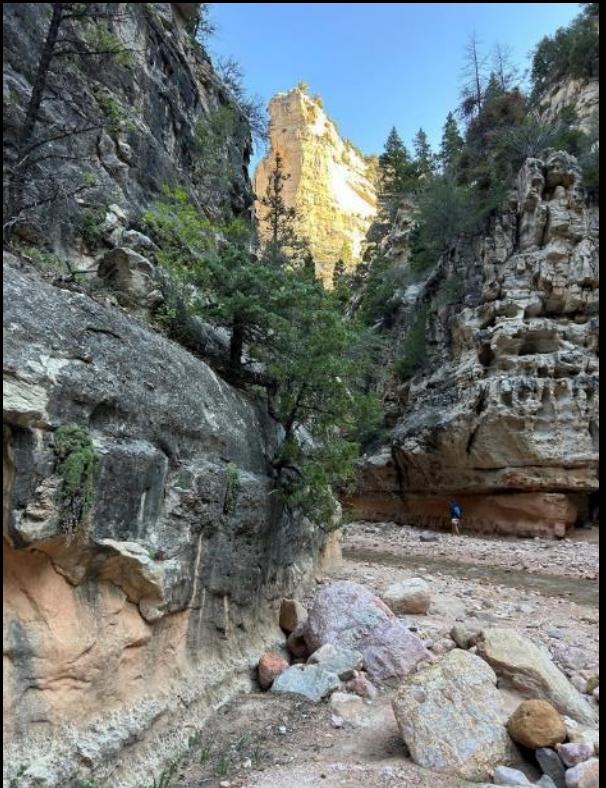
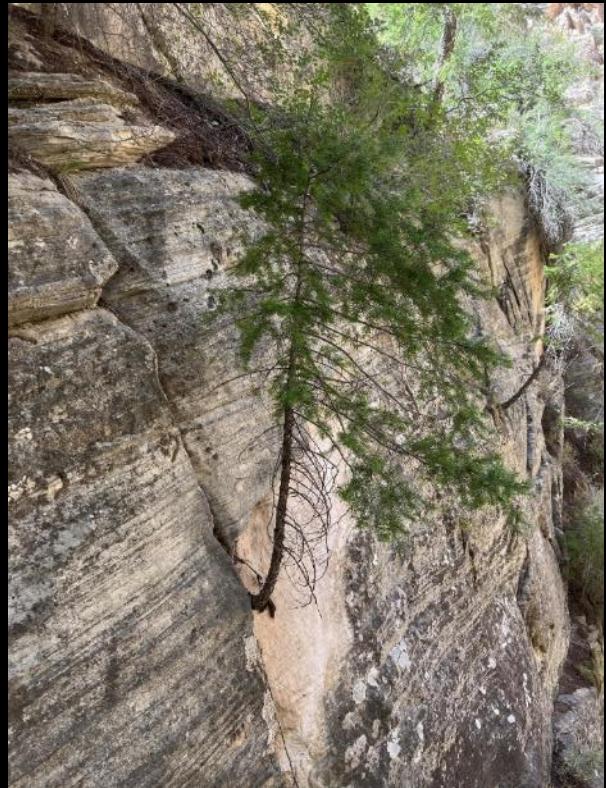
Ponderosa at Zion National Park



Douglas fir (*Pseudotsuga menziesii*)



Douglas fir (*Pseudotsuga menziesii*)



White fir (*Abies concolor*)



White fir (*Abies concolor*)

Upright cones
at top of tree



Photo by Andrey Zharkikh



Blue spruce (*Picea pungens*)



Photos by Andrey Zharkikh



Limber (left) and Bristlecone (right) pines
at Bryce Canyon National Park

Limber pine (*Pinus flexilis*)

May not be in GSENM but is close



Photo by Matt Lavin



Bristlecone pine (*Pinus longaeva*)
May not be in GSENM but is close



Bryce Canyon N.P.



Cedar Breaks National Monument

Cypress or Juniper Family (*Cupressaceae*)

- Junipers
 - Utah juniper (*Juniperus osteosperma*)
 - Branchlets are coarse, thick (1-2 mm) and stiffer and so tips are more erect
 - Leaf (scale-like) margins denticulate
 - Cones (round “juniper berries”) dry (not juicy), brown to purple when mature
 - Rocky Mountain juniper (*Juniperus scopulorum*)
 - Branchlets slender (less than 1 mm thick) and so branches bend or droop
 - Mature scale leaves rarely overlapping those directly above
 - Wood below bark is reddish

Junipers (*Juniperus*) of GSENM

	Utah juniper <i>(Juniperus osteosperma)</i>	Rocky Mountain juniper <i>(Juniperus scopulorum)</i>
Form	Broad, rounded crown	Conical, narrow crown
Branchlets	Thick (1-2 mm) and stiffer and so tips are more erect	Slender (less than 1 mm thick) and less stiff, so branch tips bend or droop
Leaves (scale-like)	Margins denticulate (toothed). Yellow-green	Margins entire. Leaves rarely overlapping those directly above. Blue-green
Cones (berries)	Larger; 0.31 to 0.51 inches	Smaller; 0.24 to 0.35 inches
Bark	Gray Fibrous and sheds in long strips	Reddish-brown (often visible under bark)
Setting	Dry	Dry to moist (such as canyons)

Rocky Mountain juniper
(*Juniperus scopulorum*)
on left



Utah juniper (*Juniperus
osteosperma*) on right

Utah juniper (*Juniperus osteosperma*)



Utah juniper (*Juniperus osteosperma*)



Utah juniper (*Juniperus osteosperma*)



Utah Juniper Cones





Cones (juniper berries)

Rocky Mountain Juniper

(Juniperus scopulorum)



Rocky Mountain Juniper aging by
UNLV's Dr. Drew Peltier and
students; over 500 years old



Juniper core with over 500 rings



Juniper aging by Utah Valley University's Dr. Tara Bishop & students; 77 rings



Juniper aging by Utah Valley University's
Dr. Tara Bishop & students; 97 rings



Juniper aging by Utah Valley University's
Dr. Tara Bishop & students; 245 rings



Old Utah Junipers at Tilted Mesa



537 growth rings



623 growth rings

Very old juniper; 726 rings



Small but old Utah juniper



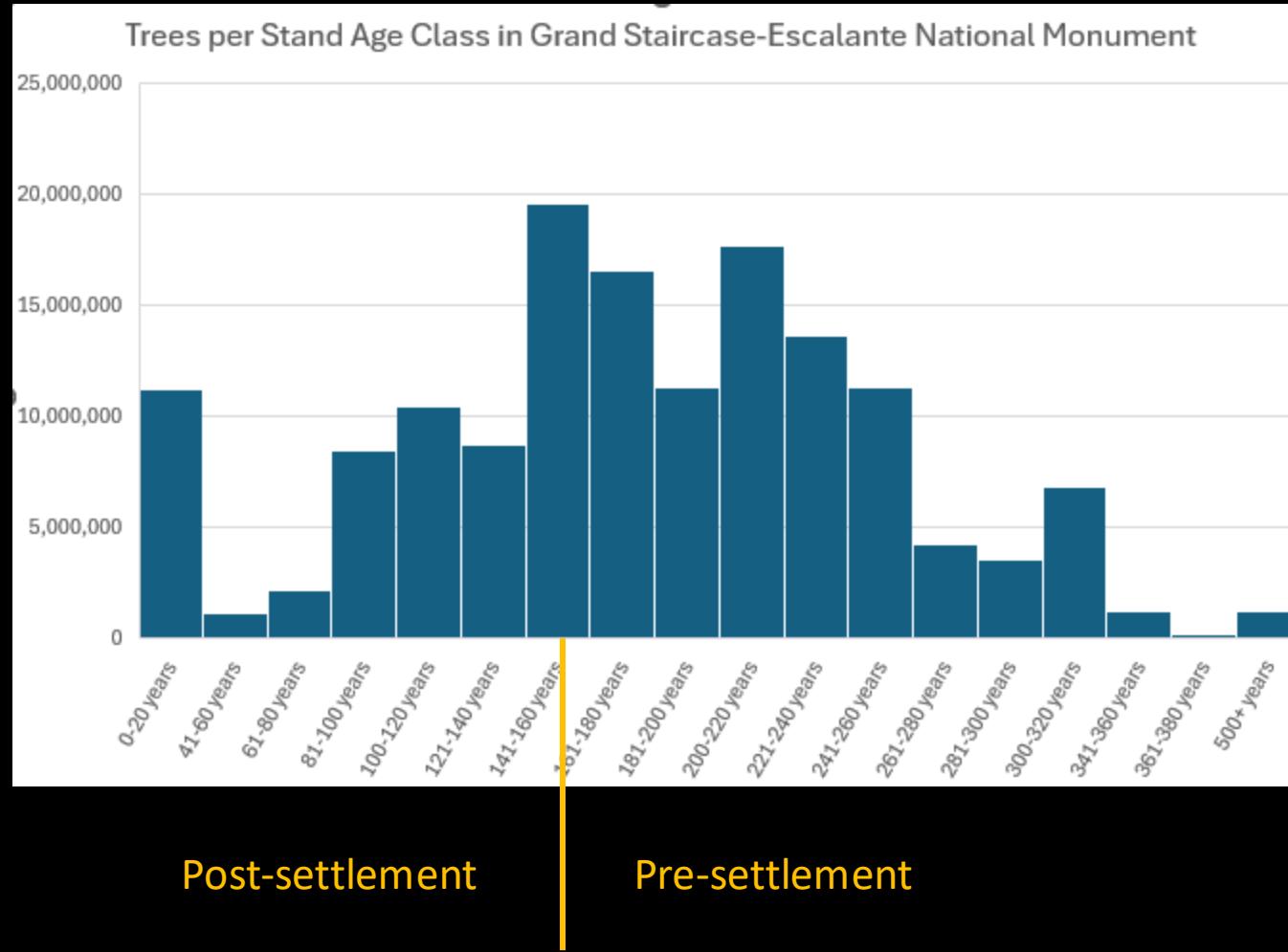
How many
growth rings?



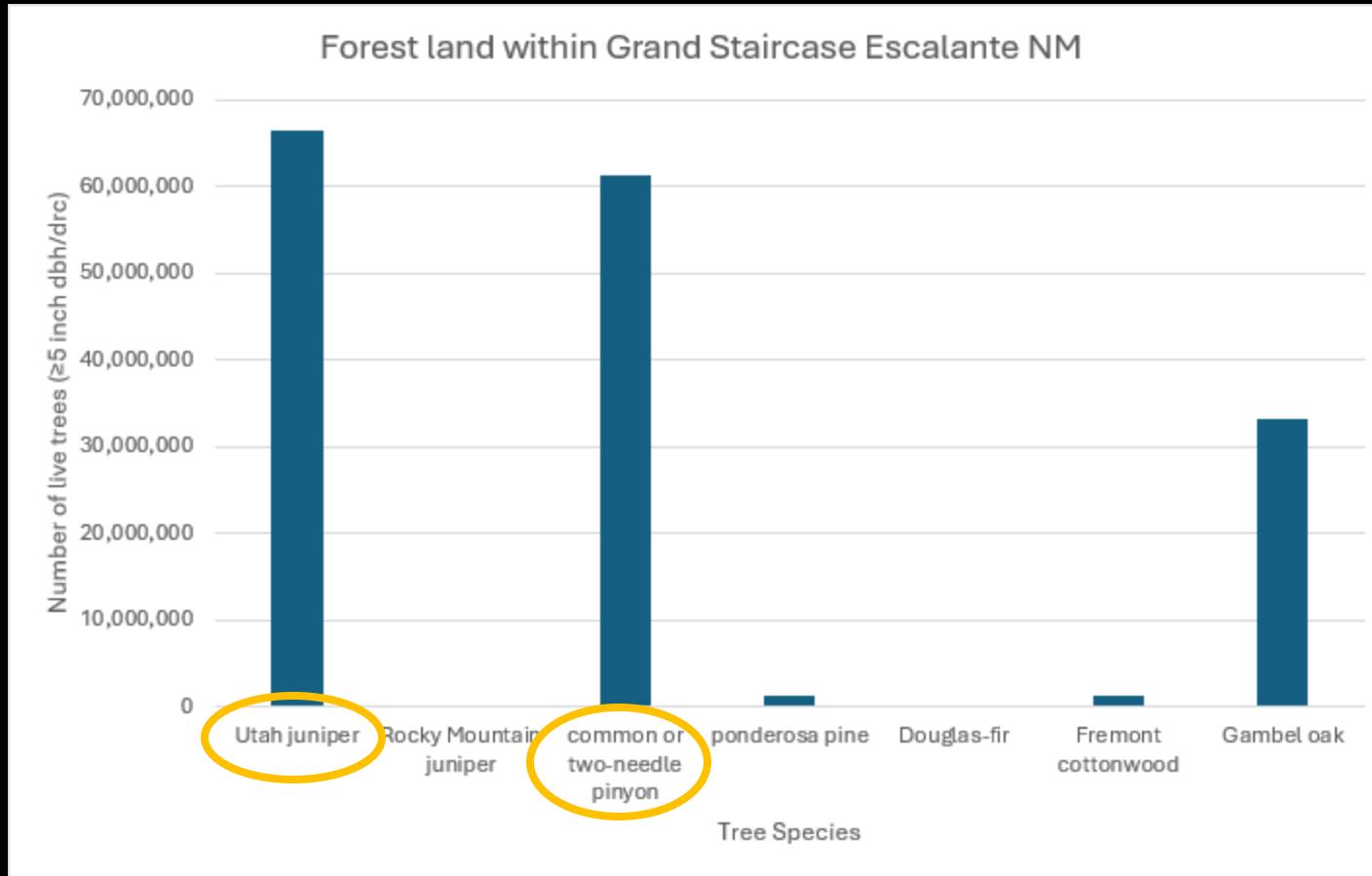
75 growth rings!

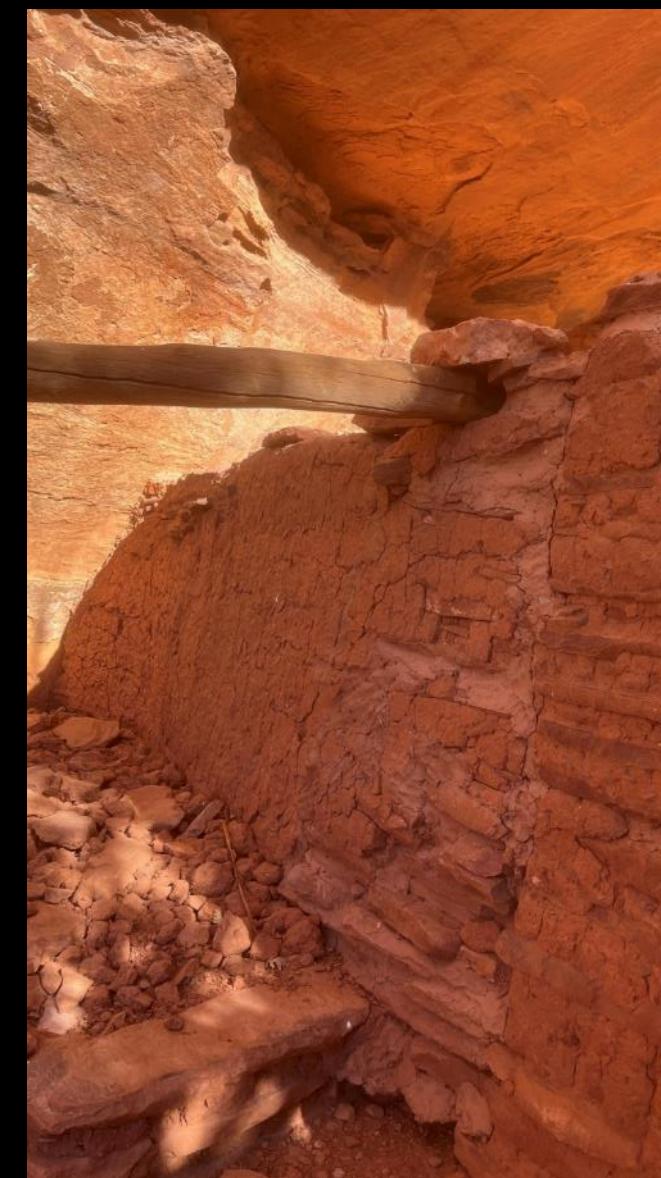


Tree age distribution from Forest Service FIA (Forest Inventory and Analysis)



Number of trees in GSENM, from Forest Service FIA (Forest Inventory and Analysis)





Deciduous Trees of GSENM

Birch family (*Betulaceae*)

Water birch (*Betula occidentalis*)



Oleaster family (*Elaeagnaceae*)

- Russian olive (*Elaeagnus angustifolia*) – **not native**
- Silver buffaloberry (*Shepherdia argentea*)

Russian olive (left) & Silver buffaloberry (right)



Russian olive (*Elaeagnus angustifolia*) – not native



Russian olive removal, from Escalante Watershed



Hundreds of thousands of Russian olive removed by Escalante River Watershed Partnership, which includes BLM and Grand Staircase Escalante Partners

Silver buffaloberry (*Shepherdia argentea*)



Silver buffaloberry (*Shepherdia argentea*)



Olive or Lilac family (*Oleaceae*)

- Single-leaf ash (*Fraxinus anomala*)

Single-leaf ash (*Fraxinus anomala*)



Oak family (*Fagaceae*)

- Gambel oak (*Quercus gambelii*)

Gambel oak (*Quercus gambelii*)



Gambel oak (*Quercus gambelii*)



3 weeks after fire started



9 weeks after fire started

Willow family (*Salicaceae*)

- Cottonwood
 - Fremont's cottonwood (*Populus fremontii*)
 - Narrowleaf cottonwood (*Populus angustifolia*)
 - Quaking aspen (*Populus tremuloides*)

Cottonwoods

Fremont (left) and narrow-leaf (right)



Fremont Cottonwood (*Populus fremontii*)



Fremont Cottonwood (*Populus fremontii*)



Narrowleaf cottonwood (*Populus angustifolia*)



Quaking aspen (*Populus tremuloides*)





Quaking aspen
(*Populus tremuloides*)
Great Basin N.P.





Paria River tree research by Rebecca Senft

Preliminary Findings:

- Russian olive utilizes less water than Fremont cottonwood
- Fremont cottonwood is more sensitive to changes in climate
- Fremont cottonwood vulnerable to drought

Soapberry family (*Sapindaceae*)

(formerly in *Aceraceae*, the maple family)

- Boxelder (*Acer negundo*)

Boxelder (*Acer negundo*)



Elm family (*Ulmaceae*)

- Nettleleaf hackberry (*Celtis reticulata*)
- Siberian elm (*Ulmus pumila*) – **not native**

Netleaf hackberry (*Celtis reticulata*)



Photo by Matt Lavin



Photo by Andrey Zharkikh



Siberian elm (*Ulmus pumila*) – not native



Siberian elm (*Ulmus pumila*) – not native

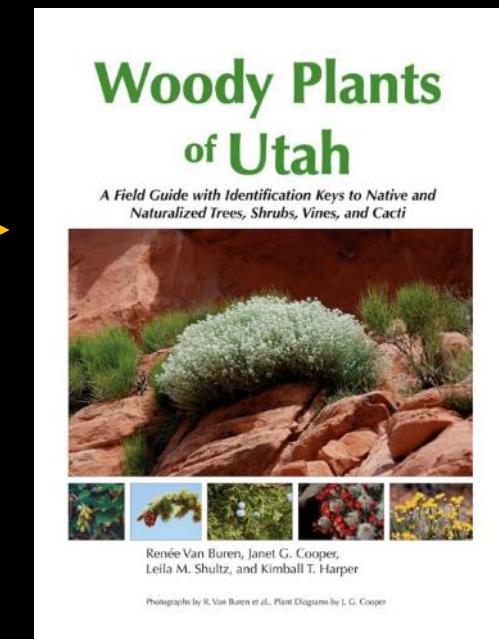
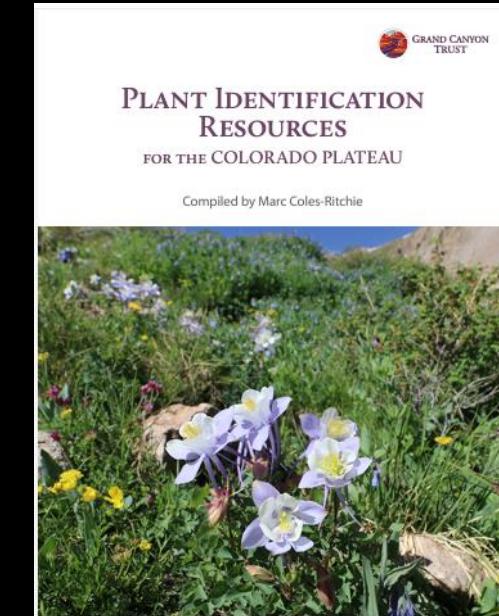


Siberian elm (*Ulmus pumila*) – not native



Plants Identification Tools

- iNaturalist – post and others will identify
- List of books, apps and websites:
<https://www.grandcanyontrust.org/plant-identification-resources>
- Download pdf free at:
https://digitalcommons.usu.edu/wild_facpub/1645/



End

