

# POTENTIAL NATIONAL NATURAL LANDMARKS OF THE COLORADO PLATEAU



WARNER COLLEGE OF  
Natural Resources



Colorado State University

# Potential National Natural Landmarks of the Colorado Plateau

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Cover Photo by John Fowler. Badlands near Old Paria, Utah. This site was originally recommended by Welsh et al. 1981 as a potential National Natural Landmark (NNL). Decades later, it is within a BLM Wilderness Study Area, and is still worthy of the NNL designation due to its beautiful exposures of the Meonkopi, Shinarump, Chinle, and Wingate sandstones.

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## EXECUTIVE SUMMARY

The Colorado Plateau, an area covering approximately 130,000 square miles in Arizona, Colorado, New Mexico, and Utah, contains some of the most inspiring and remote landscapes in the United States. Red sandstone towers, desert shrublands, pinyon juniper woodlands, and dramatic canyons and rapids carved by the Colorado River make this area unique and ecologically valuable. This report provides descriptions of potential areas of the Colorado Plateau that contain geologic or ecologic features worthy of a National Natural Landmarks (NNL) designation. To date, only four NNLs have been designated within the Colorado Plateau. The list of potential NNL sites recommended in this report serves as an update to previous documents (Welsh et al. 1980, Goldberg et al. 1981, Riech and Breed 1981). Using these documents as a foundation, we examined each site and determined current viability using landowner and ecological intactness geospatial layers. The final list of sites contains 23 potential NNLs, and detailed maps and short descriptions.

## INTRODUCTION

This report contains a list of sites recommended for potential National Natural Landmark designation. The sites are located within the Colorado Plateau in Arizona, Colorado, and Utah. No sites have been identified in New Mexico. This report serves as an update to previous documents that explored potential NNL sites (Welsh et al. 1980, Goldberg et al. 1981, Riech and Breed 1981). Below is a summary of the methods used to identify sites, followed by a list of potential sites and accompanying site maps.

## BROAD-SCALE ASSESSMENT FRAMEWORK AND METHODS

Our analysis examined sites located within the Colorado Plateau as defined by the National Park Service (NPS) (1972) based on a modification of Fenneman's 1928 physiographic divisions. The Colorado Plateau consists of approximately 130,000 square miles in Arizona, Colorado, New Mexico, and Utah. It is centered on the Four Corners region, and falls primarily within the Colorado River watershed (Figure 1). The Plateau is characterized by an arid climate with desert shrublands, grasslands, and woodlands. Three reports produced in the 1980s identified potential National Natural Landmarks across the Colorado Plateau based on ecological and geological features (Welsh et al. 1980, Goldberg et al. 1981, Riech and Breed 1981). We examined each site recommended in these reports and determined if these were still viable, given that land ownership may have changed since the 1980s, and that the quality of the site may have changed over time. To determine land ownership, we used GIS layers from PADUS [Protected Areas Database of the U.S.] and CoMAP [Colorado Ownership, Management, and Protection] (Colorado Natural Heritage Program and the Geospatial Centroid 2016). We also used land cover layers (Landfire and Southwest ReGAP), surface geology layers, and Colorado Natural Heritage Program Potential Conservation Area layers. Using CNHP data and reports from the Colorado Plateau, along with existing reports and GIS layers, we focused on identifying sites that represent 15 primary ecological or geological themes (as defined by the NNL program) that are most characteristic of the Colorado Plateau (Table 1). Only seven NNLs have been designated within the Colorado Plateau: Barringer Meteor Crater

(AZ), Cleveland-Lloyd Dinosaur Quarry (UT), Comb Ridge (AZ), Grants Lava Flow (NM), Kaibab Squirrel Area (AZ), Little Rockies (UT), and Ship Rock (NM).

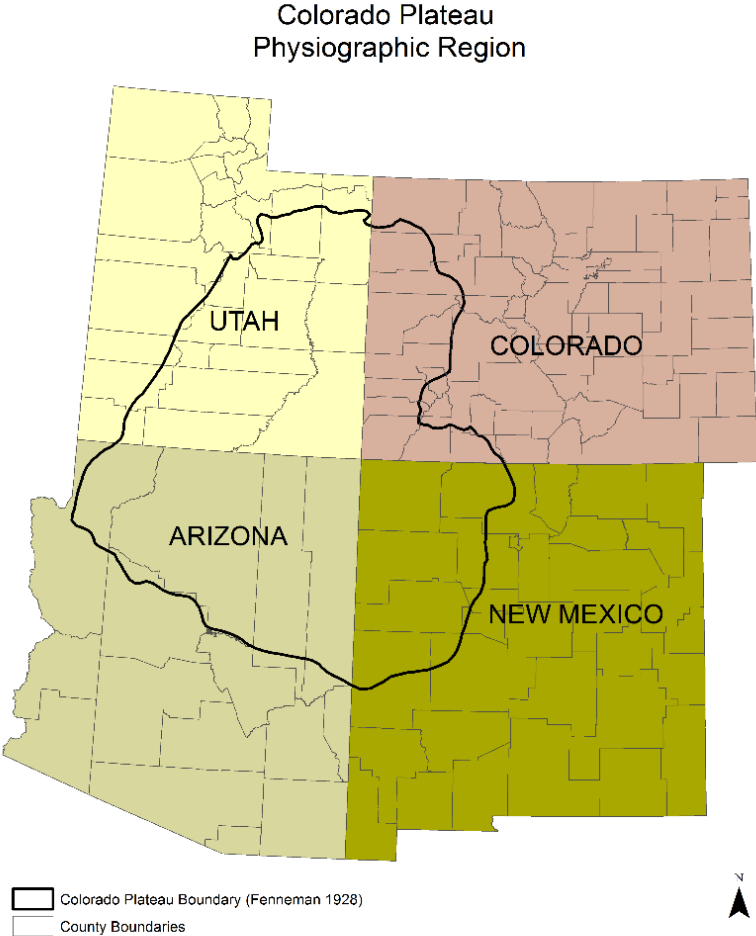


Figure 1. Map of Colorado Plateau Physiographic Region as defined by Fenneman 1928.

Table 1. Known representation of NNL Natural History Themes within the Colorado Plateau region.

Themes	Representation in CO Plateau	Sub-themes present	Represented by Existing NNL
<b>Group 1: Land Forms of the Present</b>			
1. Plains, Plateaus, and Mesas	Characteristic	b. Plateaus c. Mesas	
2. Cuestas and Hogbacks	Characteristic	a. Cuestas b. Hogbacks	
3. Mountain Systems	Present	a. Folded b. Fault block c. Dome d. Volcanic	Little Rockies
4. Works of Volcanism	Characteristic	a. Extrusive b. Intrusive	Grants Lava Flow, Shiprock, Little Rockies
5. Hot Water Phenomena	Present	b. Hot springs e. Hydrothermally altered or colored terrain	
6. Sculpture of the Land	Characteristic	a. Eroded landforms b. Superposition of drainage systems c. Badland topography d. Mass wasting	Barringer Meteor Crater, Shiprock
7. Eolian Landforms	Present	a. Sand dunes c. Other wind-shaped landforms	
8. River Systems and Lakes	Present	a. Mountain streams b. Valley streams and rivers c. Lakes	
9. Works of Glaciers	Very Limited	b. Glacial erosion	
10. Sheashores, Lakeshores, and Islands	No		
11. Coral Islands, Reefs and Atolls	No		
12. Caves and Springs	Present	b. Lava caves e. Springs f. Karst topography (very limited)	Grants Lava Flow
<b>Group 2: Geologic History</b>			
13. Precambrian	Very Limited		
14. Cambrian-Early Silurian	Very Limited		
15. Late Silurian-Devonian	Very Limited		
16. Mississippian-Permian	Very Limited		
17. Triassic-Cretaceous	Characteristic		Comb Ridge, Cleveland-Lloyd Quarry
18. Paleocene-Eocene	Present		
19. Oligocene-Recent	Present		
<b>Group 3: Land Ecosystems</b>			
20. Tundra	Very Limited	e. Alpine tundra	
21. Boreal Forest	Limited	d. Rockies	
22. Pacific Forest	No		
23. Dry Coniferous Forest	Characteristic	a. Douglas fir forest b. Ponderosa pine forest	Grants Lava Flow, Kaibab Squirrel Area

Themes	Representation in CO Plateau	Sub-themes present	Represented by Existing NNL
		c. Mixed conifer forest d. Oak-pine forest e. Pinyon-juniper woodland f. Oak woodland g. Savanna	
24. Eastern Deciduous Forest	No		
25. Grassland (steppe)	Limited	e. Desert grassland f. Montane grassland	
26. Chaparral	Present	e. Interior	
27. Deserts	Present	a. Great Basin Desert	Grants Lava Flow
28. Tropical Ecosystems	No		
<b>Group 4: Aquatic Ecosystems</b>			
29. Marine Environments	No		
30. Estuaries	No		
31. Underground Systems	Unknown		
32. Lakes, Ponds and Wetlands	Present	a. Lakes g. Saline lakes n. Marshes q. Wet meadows r. Springs	Grants Lava Flow
33. Streams	Present	a. Rapidly flowing streams b. Slow meandering streams e. Spring fed streams	



## RESULTS

We identified a total of 23 sites representing 16 NPS Natural History Themes as either primary or secondary themes (Table 2). Multiple primary themes are listed in many instances, since the most important theme would be determined during the evaluation process. Surface ownership is federal or state at all sites. Site size varies from 80 to 200,000 acres. The majority of the sites are located in Arizona and Utah on federal lands. Many of these sites occur on existing protected lands. Although previous reports from Goldberg et al. (1981) and Riech and Breed (1981) identify potential NNLs in New Mexico, none were included here due to their low priority status by the authors, or because they occur on tribal lands where a designation may be difficult to obtain.

An approximate ranking was made by scoring each site from 1-3 for the first three factors, and by a yes/no (0-1) score for the remaining two factors:

**Original Priority:** an approximate High, Medium, or Low rank derived from the original inventory

**Primary Gap:** To what extent is the primary theme already represented by a Colorado Plateau NNL

**Secondary Gap:** To what extent is the secondary theme already represented by a Colorado Plateau NNL

**Important habitat:** Special plant or animal area

**Potential connectivity:** Is the area of sufficient size (>20,000 acres) to form a significant local connection in natural lands

Table 1. List of Potential National Natural Landmarks identified through existing reports and GIS layers. Sites are sorted alphabetically by site name within priority rank.

Site Name	State	Primary Themes Represented	Secondary theme(s)	Original Priority	1° GAP	2° GAP	Important habitat	Potential connectivity	Total score
Douglas Pass Green River Fossil Locality	CO	Paleocene-Eocene Epoch	Boreal forest	H	3	3			9
Fisher Towers-Onion Creek Gorge	UT	Mountain Systems, Sculpture of the Land	Special plant area	H	3	1	1	1	9
Gilson Buttes Sand Dunes	UT	Eolian Landforms	Sculpture of the Land, special plant area	H	3	2	1		9
Kodachrome Flat and Little Creek-Wood Bench Escarpment	UT	Plains, Plateaus and Mesas, Triassic-Cretaceous Periods	Dry Coniferous Forest, special plant area	H	3	2	1		9
Paria Plateau/Vermillion Cliffs	AZ/UT	Plains, Plateaus, and Mesas, Sculpture of the land	Special animal area	H	3	1	1	1	9
San Francisco Peaks (Humphrey's Peak)	AZ	Works of Volcanism, Sculpture of the Land	Tundra, special plant area	H	2	3	1		9
Escudilla Mountain	AZ	Works of Volcanism	Boreal forest, Dry Coniferous Forest	H	1	3		1	8
North Caineville Mesa-Factory Butte, Blue Valley	UT	Triassic-Cretaceous Periods, Sculpture of the Land	Dry Coniferous Forest, special plant area	H	1	2	1	1	8
Red Canyon-Sevier Fault Area	UT	Works of Volcanism, Mountain Systems	Dry Coniferous Forest, special plant area	H	2	2	1		8
Arizona Cypress Woodland	AZ	Dry Coniferous Forest	Chaparral, Desert	H	1	3			7
Manti Canyon Slide Area	UT	Sculpture of the Land	Boreal forest	H	1	3			7
Pigeon Creek	AZ	Deserts	Special animal area	M	3	1	1		7
The Jewel Box	UT	Cuestas and Hogbacks, Sculpture of the land	Dry Coniferous Forest, Triassic-Cretaceous Periods	H	3	1			7
Frank's Lake	AZ	Caves and Springs	River systems and lakes	L	2	3			6
Mormon Lake	AZ	Lakes and Ponds	Dry Coniferous Forest, Special animal area	M	2	2			6
Westwater Plant Locality	UT	Triassic-Cretaceous Periods	Deserts	H	1	2			6
Beckwith Plateau	UT	Triassic-Cretaceous Periods, Dry Coniferous Forest	Sculpture of the Land	M	1	1		1	5
Gateway	CO	Dry Coniferous Forest, Sculpture of the Land, Triassic-Cretaceous Periods	Special plant area	L	1	1	1	1	5

Site Name	State	Primary Themes Represented	Secondary theme(s)	Original Priority	1° GAP	2° GAP	Important habitat	Potential connectivity	Total score
Lemon's Dinosaur Footprints	UT	Triassic-Cretaceous Periods	Dry Coniferous Forest	H	1	1			5
Mogollon Rim	AZ	Plains, Plateaus, and Mesas, Mississippian-Permian Periods	Dry Coniferous Forest	L	3	1			5
Mount Trumbull	AZ	Works of Volcanism, Dry Coniferous Forest and Woodland	Dry Coniferous Forest	H	1	1			5
Old Paria	UT	Triassic-Cretaceous Periods	Dry Coniferous Forest	H	1	1			5
Williams Bottom	UT	Triassic-Cretaceous Periods	River systems and lakes	L	1	3			5



## SITE DESCRIPTIONS

Brief site descriptions with area maps for the identified potential NNL sites are provided below. Specific boundaries are not being proposed for each potential NNL site, rather an area surrounding the primary feature that could be considered the study area is shown. During a more complete site evaluation process, a proposed boundary would be developed, in consultation with the land owner/manager. Typically the NNL boundary would be within the indicated study area.

# Arizona Cypress Woodland

**Primary Natural History Theme:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland)

**Secondary Theme or Features:** 26. Chaparral (e. Interior) and 27. Deserts (a. Great Basin Desert)

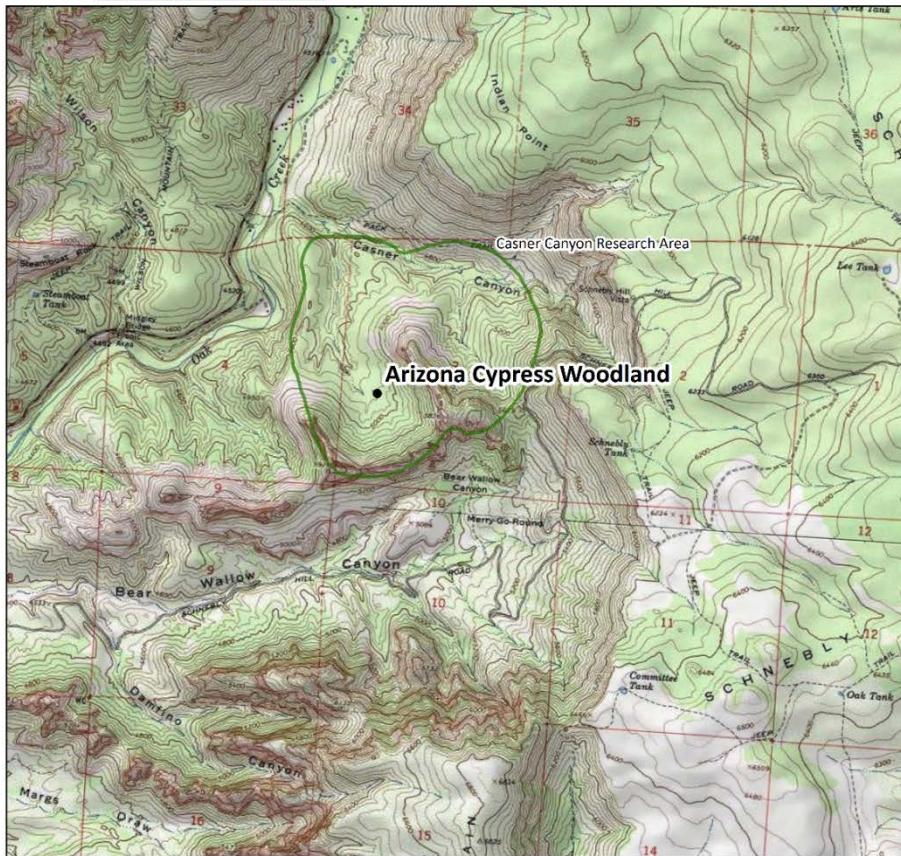
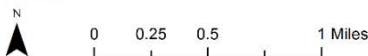
The area encompasses 565 acres and is within a USFS Research Natural Area near Sedona, Arizona. It is one of the few remaining sizable stands of both smooth and rough bark Arizona cypress. Only a few small stands of the smooth bark species remain.

## Potential National Natural Landmark Arizona Cypress Woodland

USFS Research Natural Area near Sedona.  
One of the few remaining sizable stands of both smooth and rough bark Arizona cypress. Arizona cypress is rare in Arizona.

### Land Ownership

 Forest Service



## Beckwith Plateau

**Primary Natural History Theme:** 17. Triassic-Cretaceous Periods, 23. Dry Coniferous Forest (e. Pinyon-juniper woodland)



**Secondary Theme or Features:** 6. Sculpture of the Land (a. Eroded landforms)

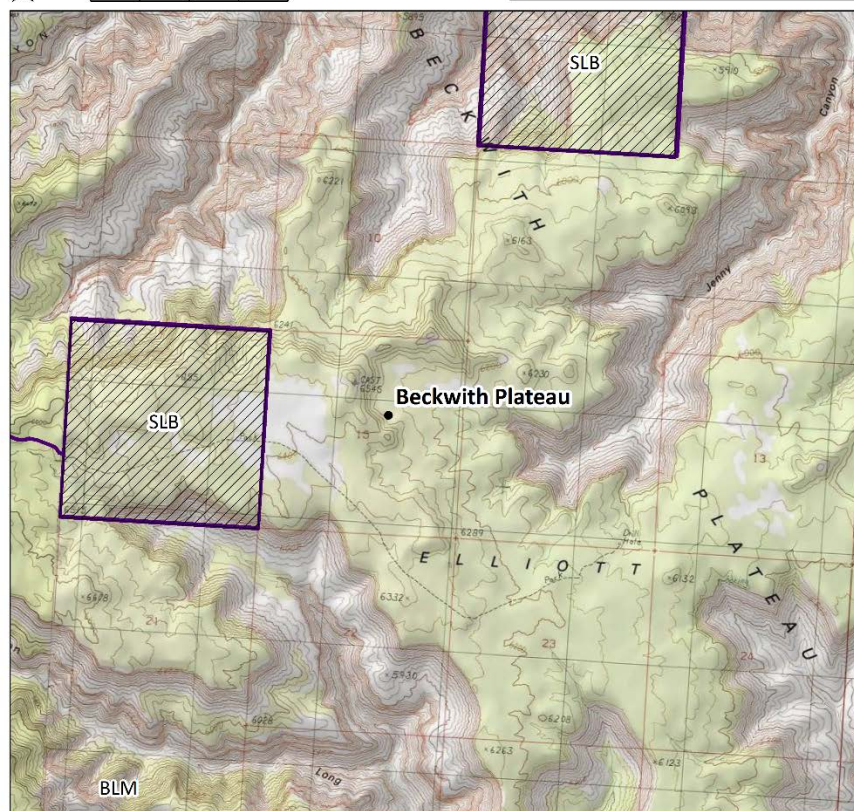
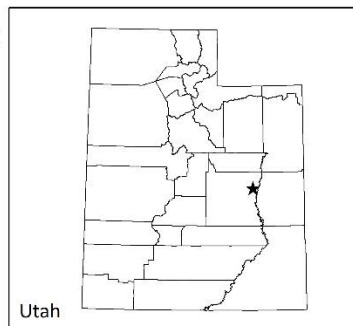
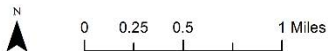
The area falls within the Desolation Canyon BLM Wilderness Study Area. It is an ecologically intact example of a pinyon-juniper woodland, and also contains a desert shrub plant community (Bryce et al. 2012). Thick coal beds are also present at this 37,760 acre site. Due to its large size, we recommend refining the potential NNL boundaries to include a smaller portion of the site that is most representative of the high quality pinyon-juniper woodland.

### Potential National Natural Landmark Beckwith Plateau

BLM Wilderness Study Area (Desolation Canyon). Very intact example of pinyon-juniper woodland, also contains salt desert shrub communities. Has thick coal beds.

#### Land Ownership

-  Bureau of Land Management
-  Other or Unknown State Land

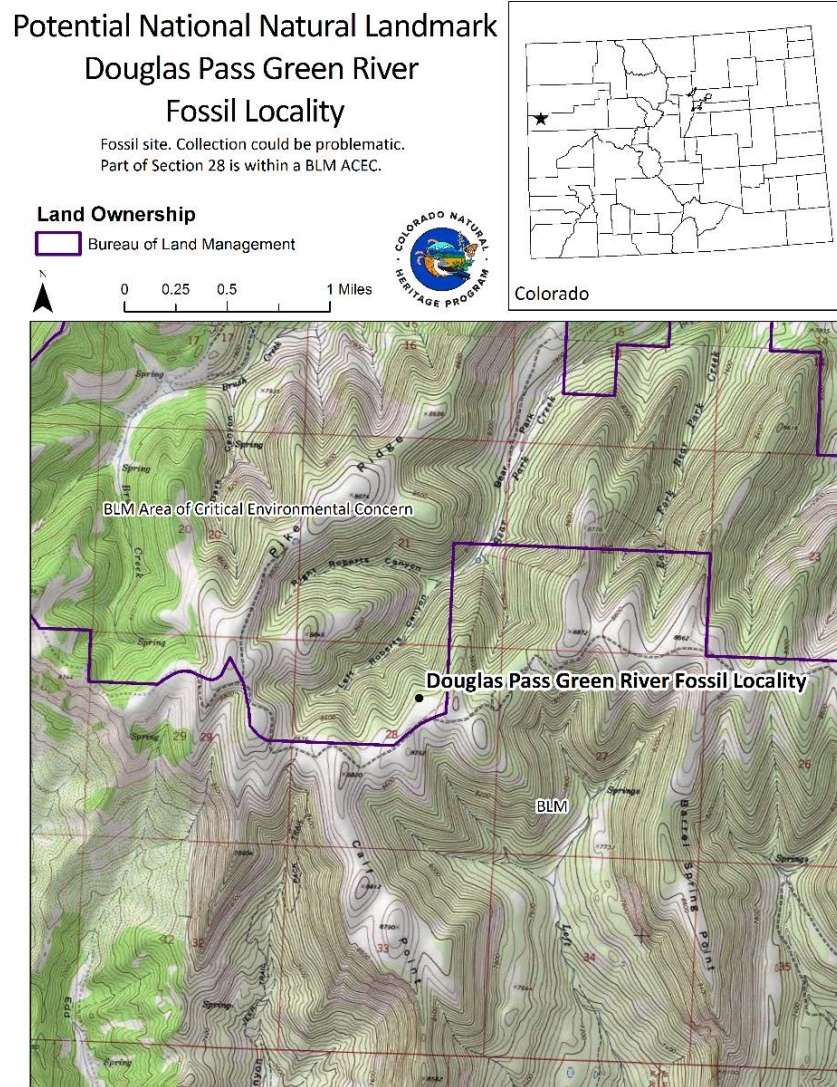


## Douglas Pass Green River Fossil Locality

**Primary Natural History Theme:** 18. Paleocene-Eocene

**Secondary Theme or Features:** 21. Boreal forest (d. Rockies)

This fossil site covers 1,062 acres and is located on BLM land within an Area of Critical Environmental Concern. The site is rich in insect and fossil plants that are preserved in tuffaceous calcareous siltstones of the Green River Formation (Welsh et al. 1980).





## Escudilla Mountain

**Primary Natural History Theme:** 4. Works of Volcanism (a. Extrusive)

**Secondary Theme or Features:** 21. Boreal forest (d. Rockies), 23. Dry Coniferous Forest (b. Ponderosa pine forest, c. Mixed conifer forest)

Escudilla Mountain is the third highest peak in Arizona (10,912 ft), and is volcanic in origin. Ancient Cenozoic desert sands are preserved here by being covered with ash and lava from volcanism that occurred during Oligocene times (25 mya). Located in the White Mountains in eastern Arizona, it is located in a USFS Wilderness area. The Wallow Fire of 2011, to date the largest fire in Arizona history, burned areas of Escudilla Mountain. However, intact spruce-fir forests, aspen stands, and ponderosa pine forests still remain on the mountain. The area encompasses 22,400 acres.

### Potential National Natural Landmark Escudilla Mountain

Third highest peak in Arizona. Volcanic origin.  
Spruce-fir forests, aspens, ponderosa pine forests  
at lower elevations.

#### Land Ownership

 Forest Service

 0 0.25 0.5 1 Miles



## Fisher Towers-Onion Creek Gorge

**Primary Natural History Theme:** 3. Mountain Systems (c. Dome) 6. Sculpture of the Land (a. Eroded landforms)



**Secondary Theme or Features:** Special plant area

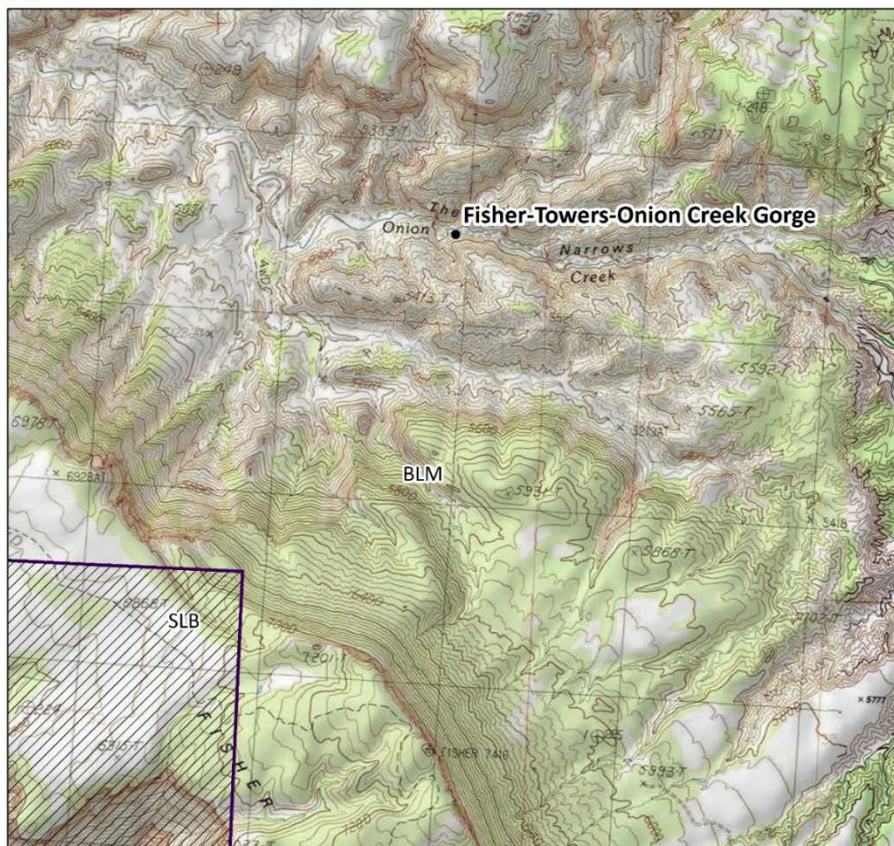
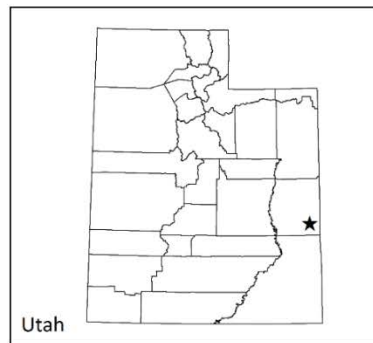
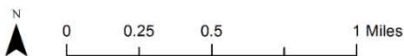
The area contains the most spectacular examples of the interior of a salt dome (Welsh et al. 1980). The lower part of Onion Creek Gorge cuts through red beds of the Cutler sequence. Site is within a proposed Area of Critical Environmental Concern on BLM lands. The 22,400 acre area also has enormous ecological value, and contains rare plant species such as the Fisher Towers milkvetch (*Astragalus piscator*). This area has very high visitation rates by recreationists and rock climbers.

### Potential National Natural Landmark Fisher Towers - Onion Creek Gorge

Paradox Formation is Pennsylvanian age.  
Busy climbing and recreation area.

#### Land Ownership

-  Bureau of Land Management
-  Other or Unknown State Land



## Frank's Lake

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**Primary Natural History Theme:** 12. Caves and Springs (f. Karst topography),

**Secondary Theme or Features:** 8. River Systems and Lakes

Frank's Lake is a permanent pond at the bottom of an outstanding karst sinkhole that is 1500 feet in diameter and 200 feet deep (Rieck and Breed 1981). The site encompasses 80 acres and is located on USFS lands. Karst topography is very rare on the Colorado Plateau. No caves and caverns are located on the site because the gypsum of the Toroweap Formation is not strong enough to support their formation.

## Gateway

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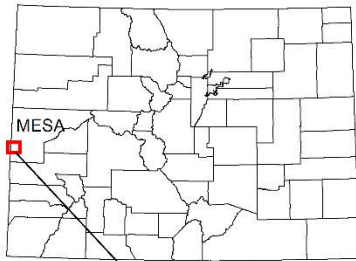
**Primary Natural History Theme:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland), 6. Sculpture of the Land (a. Eroded landforms), 17. Triassic-Cretaceous Periods

**Secondary Theme or Features:** Special plant area

The highly continuous, relatively intact pinyon-juniper woodlands at the Gateway site are worthy of an NNL designation. These woodlands, which become highly fragmented to the north, south and east of the site in Colorado, are ranked with the highest score of ecological integrity (Bryce et al. 2012, CNHP 2011). This site encompasses 34,556 acres, but could be refined to a smaller area. Rare plants occur at the site, such as *Astragalus piscator*, *Astragalus equisolensis*, *Eriogonum palmerianum*, and *Penstemon utahensis* (Lyon 2007). Towering red rock buttresses, such as the Palisade (pictured below), represent erosional landforms of the Triassic-Cretaceous Periods. The site is on BLM lands, and a portion of the site falls within an existing BLM Area of Critical Environmental Concern. Portions of the site have also been designated as a Colorado Natural Area.

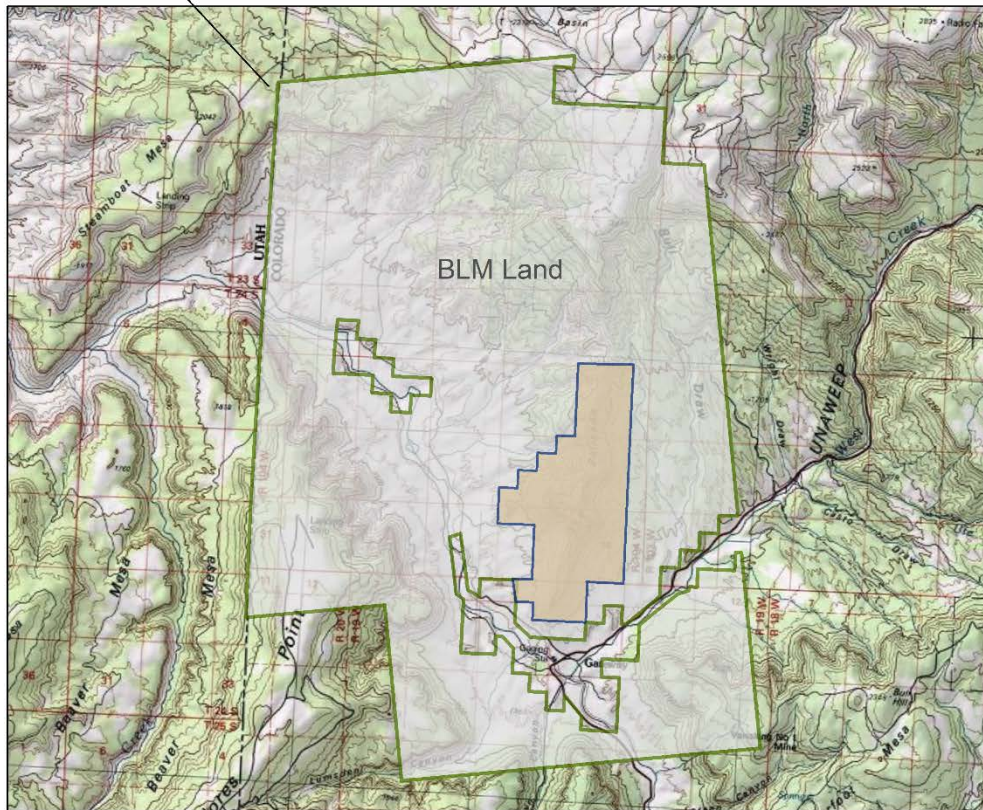


## Gateway Study Area Potential National Natural Landmark Large Boundary



The PNNL area below was identified due to its overlap with highly continuous, relatively intact expanses of Colorado Plateau Pinyon Juniper Woodlands.

The entire study area falls within lands owned by the BLM. It also overlaps with an area of Critical Biological Concern as identified by the Colorado Natural Heritage Program. The boundary encompasses 34,566 acres, and is meant to serve as a very broad area for further refinement for a PNNL, based on input from BLM, NPS, and others.



- Potential NNL Large Boundary
- Gateway Palisade Natural Area



Jan 21, 2016  
B. Kuhn

## Gilson Buttes Sand Dunes

**Primary Natural History Theme:** 7. Eolian Landforms (a. Sand dunes)



**Secondary Theme or Features:** 6. Sculpture of the Land (a. Eroded landforms), Special plant area

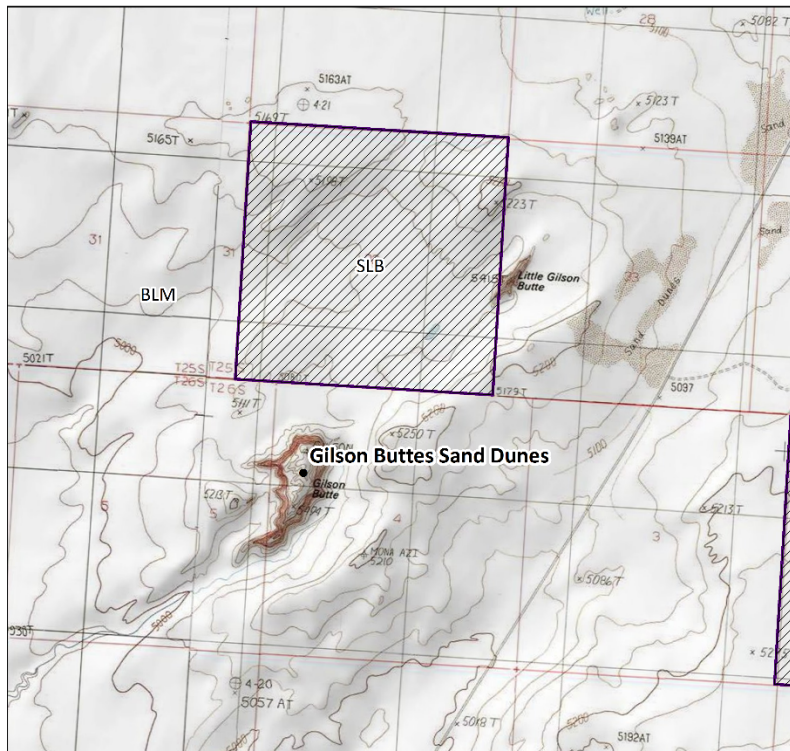
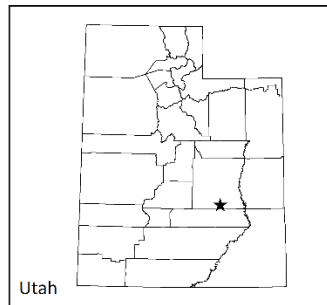
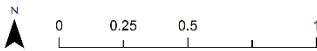
This site encompasses 12,160 acres, and contains pink sand from eroding Summerville and Entrada beds. It is one of the finest examples of sand dunes in the Colorado Plateau (Welsh et al. 1980). Shrub steppe is a secondary feature of the site. A narrow endemic plant, *Astragalus rafaensis*, occurs on the Entrada sandstone at the site. Shrub steppe could be considered as a secondary theme for this site in the Grassland (Steppe) category of NNL designation. Surface ownership is BLM and State Land Board (Utah).

### Potential National Natural Landmark Gilson Buttes Sand Dunes

One of the nicest patches of sand dunes in the Colorado Plateau. Dominated by shrub steppe Entrada and Curtis sandstones. Pink sand is from erosion of Summerville and Entrada beds.

#### Land Ownership

-  Bureau of Land Management
-  Other or Unknown State Land



## Kodachrome Flat and Little Creek-Wood Bench Escarpment

**Primary Natural History Theme:** 1. Plains, Plateaus, and Mesas, 17. Triassic-Cretaceous Periods,


**Secondary Theme or Features:** 23. Dry Coniferous Forest, special plant area

This site is located along the headwaters of the Paria River southeast of Tropic, Utah. It encompasses 3,200 acres, and is located primarily on BLM lands with some scattered Utah State Park land. Jurassic Age deposits are exposed as the Entrada Formation and younger rocks are eroded along an escarpment. Rare plants also occur at the site in white shale outcrops, including the Kodachrome bladderpod (*Lesquerella tumulosa*), which is listed as Endangered by the U.S. Fish and Wildlife Service. The bladderpod grows on soils derived from the Carmel Formation and is globally known only from 4 km area of the Paria River drainage in Kane County, Utah. The site showcases classic plateau, mesa, and butte topography that is characteristic of the Colorado Plateau (Welsh et al. 1980).

### Potential National Natural Landmark Kodachrome Flat and Little Creek

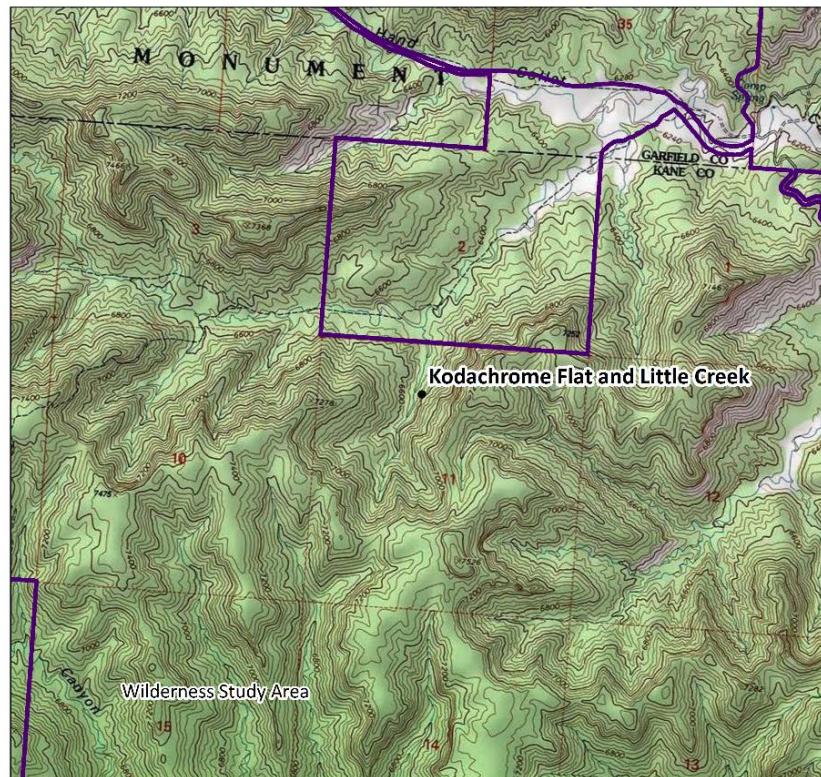
Jurassic Age deposits are exposed as the Entrada Formation and younger rocks are eroded along the escarpment. White shale outcrops have rare plants.

#### Land Ownership

 Bureau of Land Management



0 0.25 0.5 1 Miles



# Lemon's Dinosaur Footprints

**Primary Natural History Theme:** 17. Triassic-Cretaceous Periods


**Secondary Theme or Features:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland)


This site encompasses 960 acres, and contains a dinosaur trackway in the Entrada Formation. This is one of the best and most unusual trackways on the Colorado Plateau, and contains individual tracks of varying sizes. The site is located on BLM land.


## Potential National Natural Landmark Lemon's Dinosaur Footprints

Dinosaur trackway in Entrada Formation. Individual tracks up to 20 inches and as small as 8 in occur in the sandstone. Without question one of the best and most unusual trackways in the Colorado Plateau, according to Welsh et al. 1980.

### Land Ownership

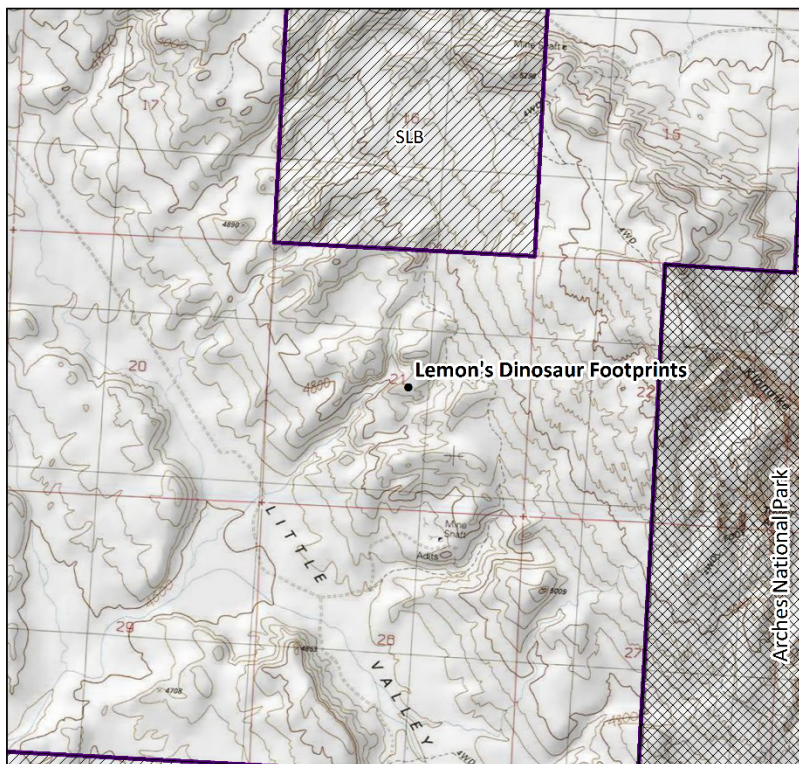
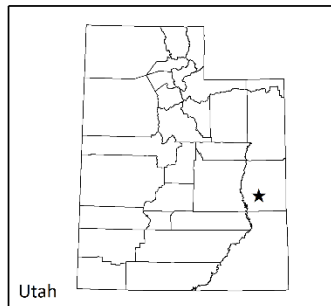
 Bureau of Land Management

 National Park Service

 Other or Unknown State Land



0 0.25 0.5 1 Miles





## Manti Canyon Slide Area

**Primary Natural History Theme:** 6. Sculpture of the Land (d. Mass wasting)

**Secondary Theme or Features:** 21. Boreal forest (d. Rockies)

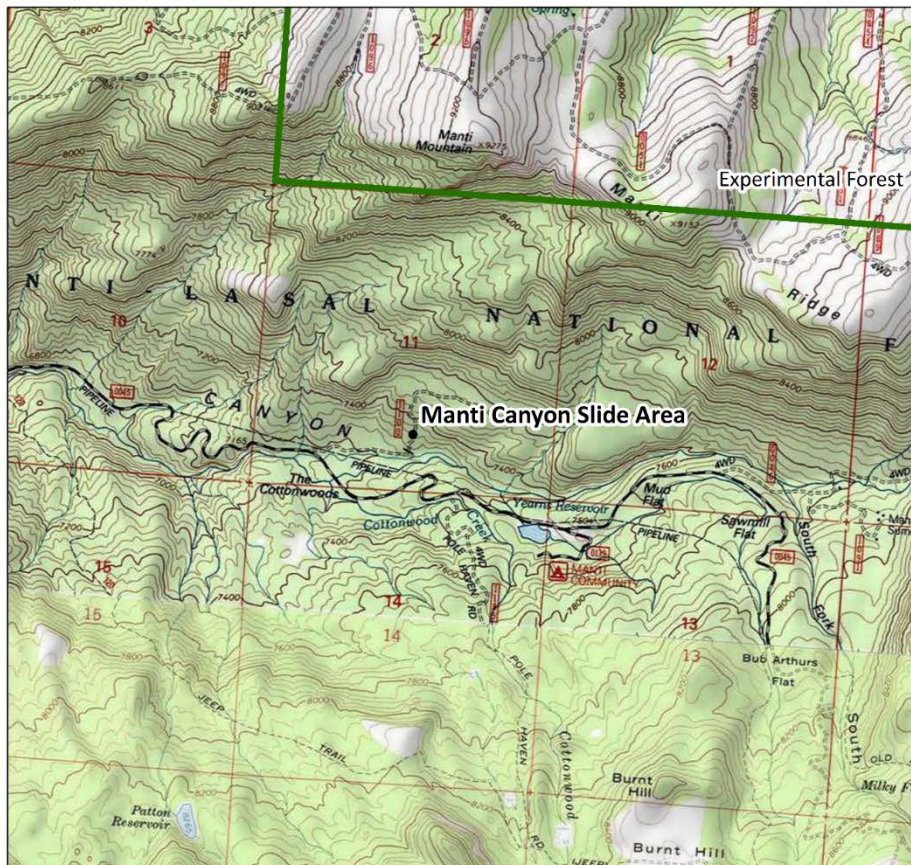
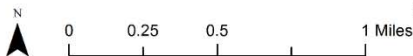
This 2,800 acre site contains an active landslide area. Exposures of the North Horn Formation are visible here, and are overlain by Quaternary glacial morainal material (Welsh et al. 1980). Both of these units are sliding into the canyon bottom, sometime at a very rapid rate of 10 feet per day (Welsh et al. 1980). The site is located on USFS lands in the Manti-La Sal National Forest. Aspen, spruce, and fir are present in the upper elevations of the site, and lower elevations contain Rocky Mountain juniper and gambel oak (Welsh et al. 1980), and could be considered secondary features of the site.

### Potential National Natural Landmark Manti Canyon Slide Area

Active landslide area. Exposures of North Horn Formation overlain by Quaternary glacial morainal material.

#### Land Ownership

 Forest Service



## Mogollon Rim

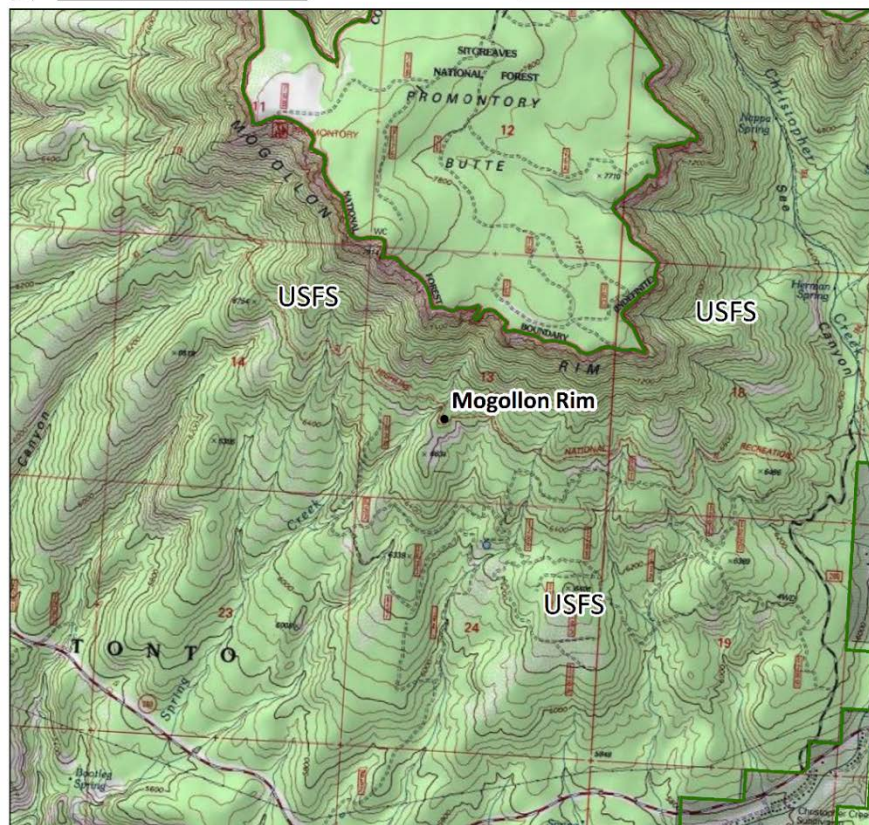
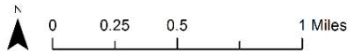
**Primary Natural History Theme:** 1. Plains, Plateaus, and Mesas, Mississippian-Permian Periods (b. Pennsylvanian)

**Secondary Theme or Features:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland)

The Mogollon Rim forms the southern boundary of the Colorado Plateau. It stretches for 300 miles, and creates a strikingly beautiful topographic feature (Rieck and Breed 1981). One of the most dramatic sections of the Rim is near Payson, Arizona where the vertical relief from the top to bottom is approximately 2,000 feet. For an overview of the faulting processes that formed the Rim, see Rieck and Breed 1981. The site also contains abundant fossils in the Paleozoic sequence, particularly the Naco Formation.

### Potential National Natural Landmark Mogollon Rim

The Mogollon Rim marks the southern boundary of the Colorado Plateau. This site near Payson, AZ showcases a dramatic vertical drop of 2,500 feet from the top of the rim to the Tonto Basin below. Site is on USFS lands.



# Mormon Lake

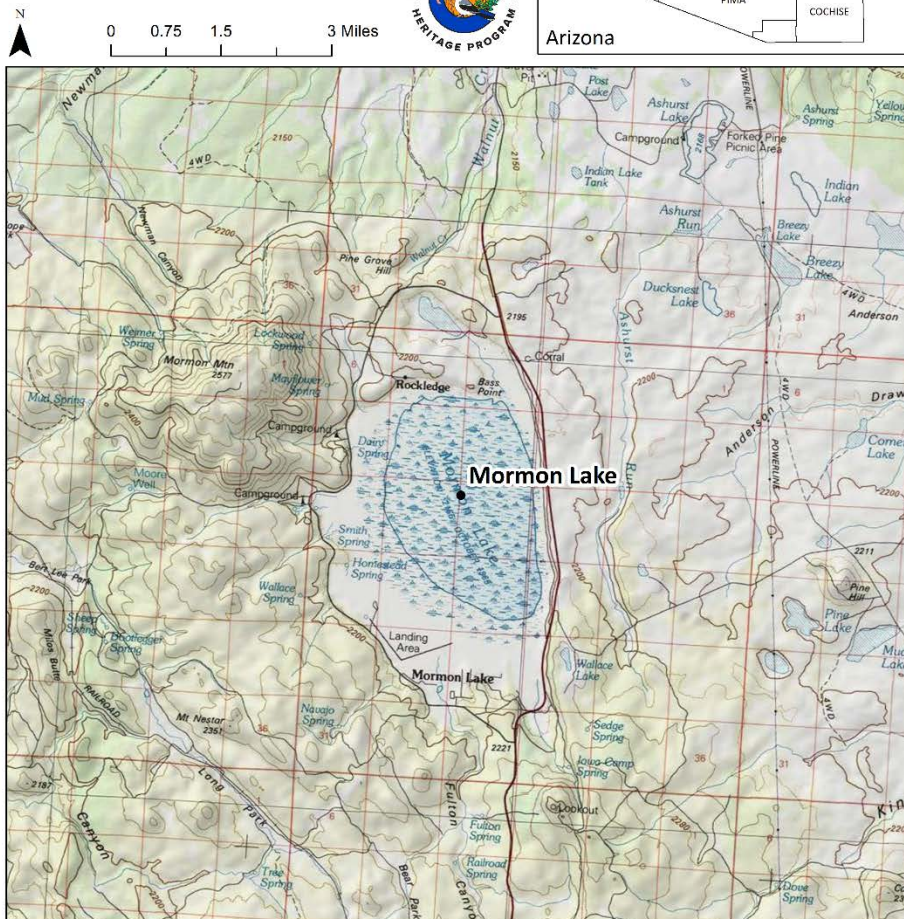
**Primary Natural History Theme:** 32. Lakes, Ponds and Wetlands (a. Lakes)

**Secondary Theme or Features:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland), Special animal area.

Mormon Lake is Arizona's largest natural lake. The site boundaries proposed by Goldberg et al. 1981 encompass 9,600 acres, all owned by the U.S. Forest Service. The lake contains dense growth of emergent wetland plants, and supports high bird diversity and an endemic caddisfly (*Apatania arizona* sp. nov) (Goldberg et al. 1981). The site is included within a designated Important Bird Area called Anderson Mesa.

## Potential National Natural Landmark Mormon Lake

Arizona's largest natural lake. Contains large wetland and is a biodiversity hotspot. Land owned by USFS.



# Mount Trumbull

**Primary Natural History Theme:** 4. Works of Volcanism (a. Extrusive)

**Secondary Theme or Features:** 23. Dry Coniferous Forest (b. Ponderosa pine forest, e. Pinyon-juniper woodland)

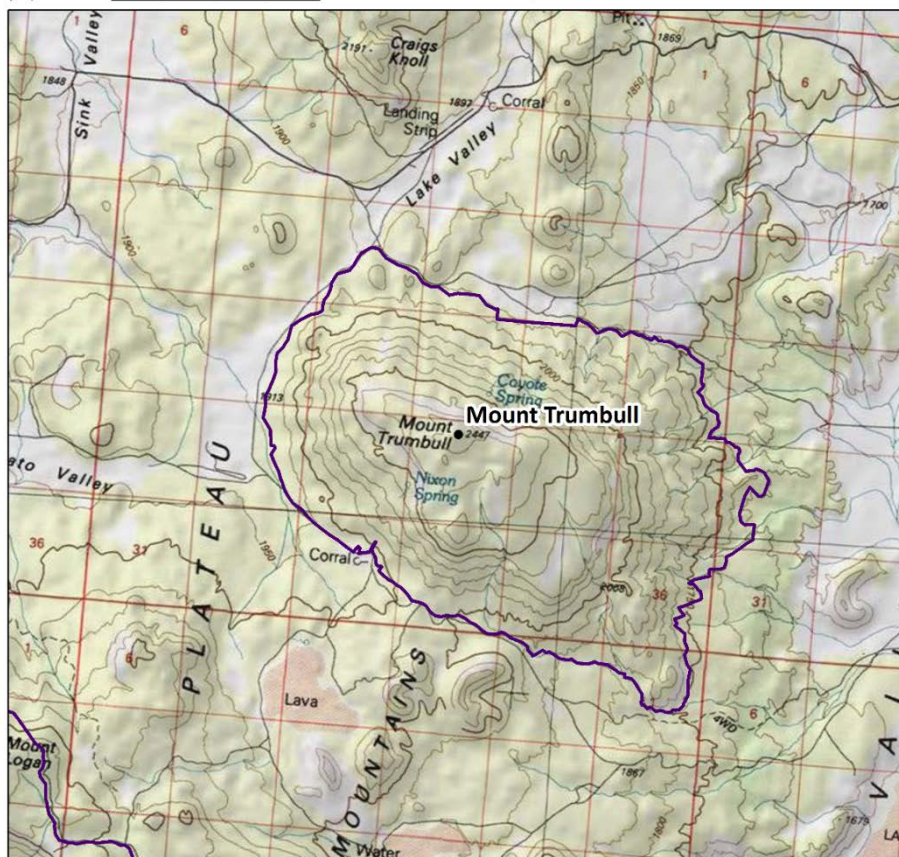
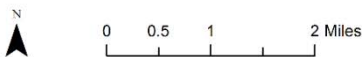
Mount Trumbull is a very remote site within the Grand Canyon National Monument owned by the BLM. It contains the oldest basalt flow in the Tuweep (also known as Toroweap) Valley. This basalt flow caps Mount Trumbull and is dated 3.67 +/- 0.07 million years. Highly intact ponderosa pine and pinyon-juniper forests are also found at Mount Trumbull. The site boundaries encompass 2,840 acres in Mohave County, Arizona (Ried and Breed 1981).

## Potential National Natural Landmark Mount Trumbull

Highly intact ponderosa pine forests and pinyon-juniper forests. Very remote area. Part of BLM National Monument for the Grand Canyon. Oldest basalt flow in the Tuweep Valley is the basaltflow capping Mt. Trumbull, dated 3.67 +/- 0.07 million years.

### Land Ownership

 Bureau of Land Management

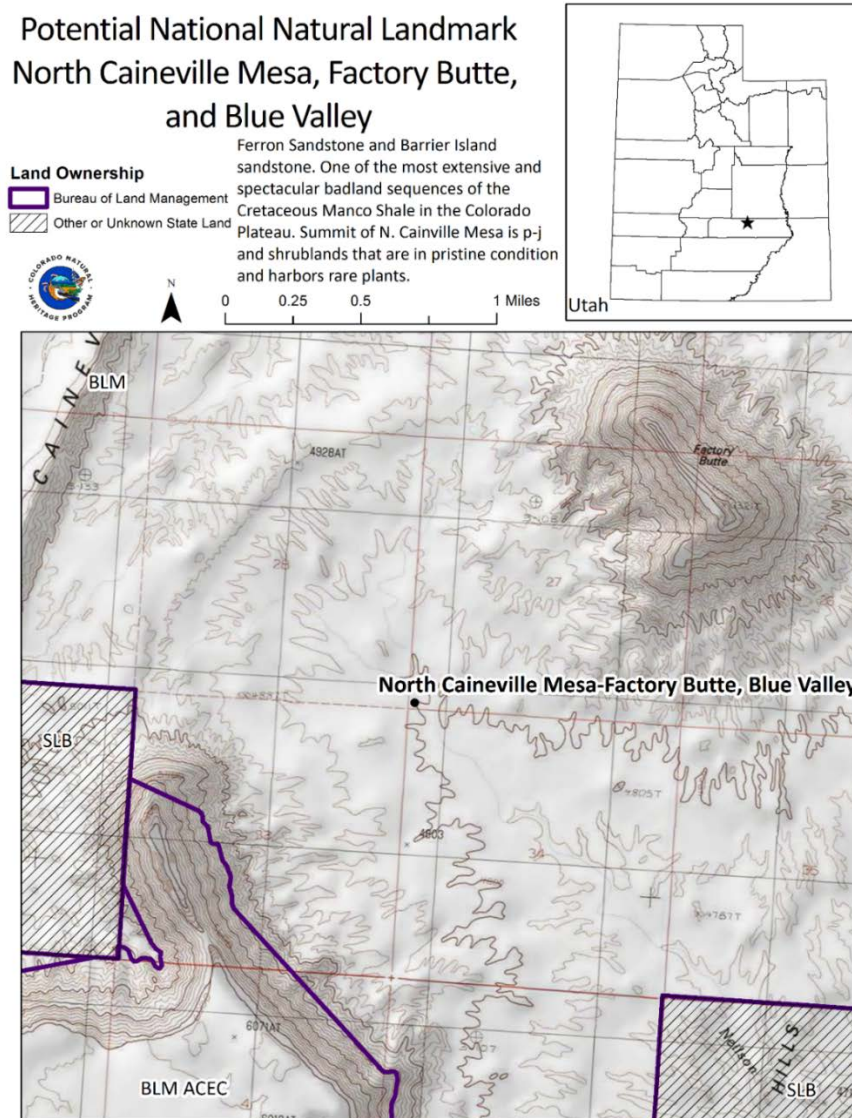


## North Caineville Mesa-Factory Butte, Blue Valley

**Primary Natural History Theme:** 6. Sculpture of the Land (c. Badland topography), 17. Triassic-Cretaceous Periods

**Secondary Theme or Features:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland), Special plant area.

This large site encompasses 25,600 acres as indicated by Welsh et al. (1980). It is within a designated BLM Area of Critical Environmental Concern (ACEC), and contains some of the most spectacular and extensive badland sequences of the Cretaceous Mancos Shale in the Colorado Plateau. Ferron and Barrier Island sandstone are exposed at the site. The summit of North Caineville Mesa contains relatively pristine pinyon-juniper woodlands and shrublands that support rare plant populations (Welsh et al. 1980, Bryce et al. 2012).

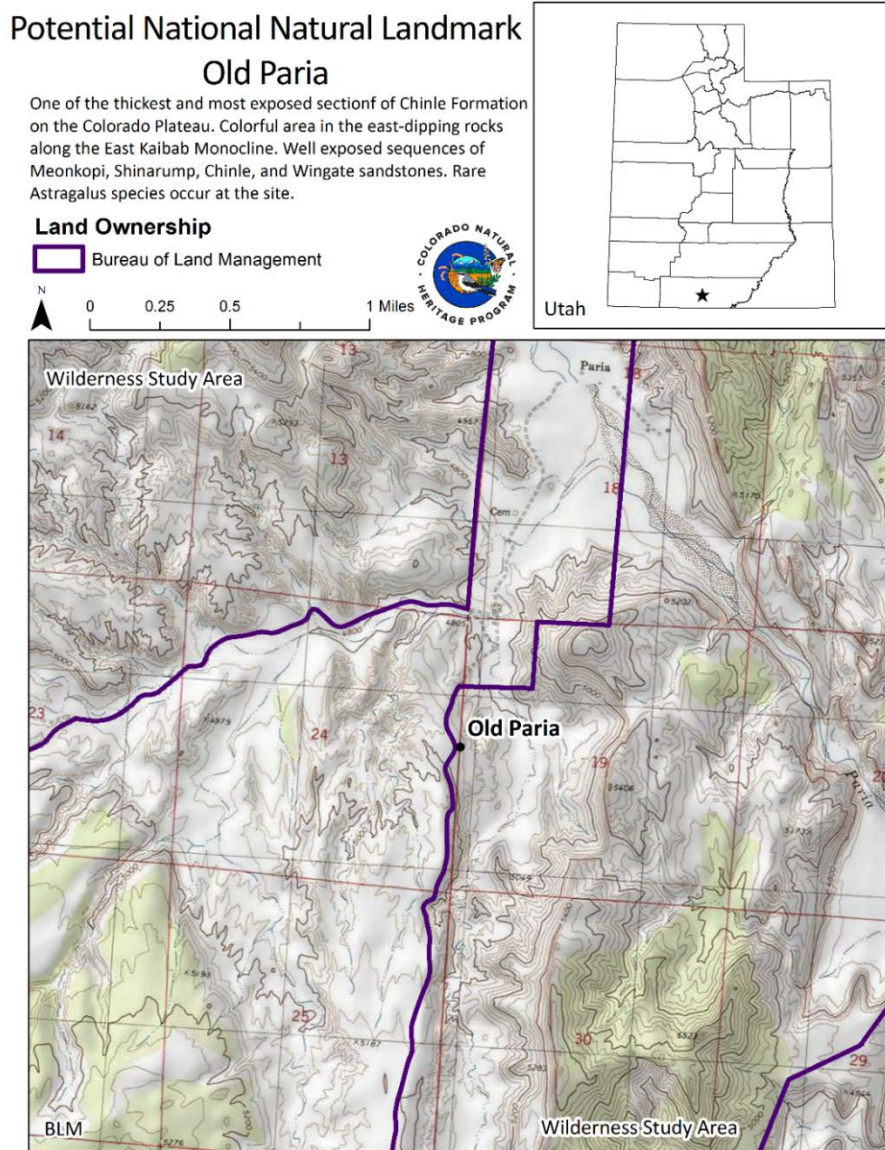


## Old Paria

**Primary Natural History Theme:** 17. Triassic-Cretaceous Periods (a. Triassic)

**Secondary Theme or Features:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland)

This site is located on BLM lands, and is comprised of 3,840 acres of striking badlands, with some areas located within a BLM Wilderness Study Area. This colorful area is located in the east-dipping rocks along the East Kaibab Monocline. It was originally recognized by Welsh et al. (1980) as a potential NNL due to the presence of the thickest and most exposed section of the Chinle Formation on the Colorado Plateau. There are well exposed sequences of Meonkopi, Shinarump, Chinle, and Wingate sandstones. Pinyon-juniper woodlands are present at the site, as well as salt desert shrublands, and these could be considered as secondary features, although further investigation into their condition is recommended.



## Paria Plateau/Vermillion Cliffs

**Primary Natural History Theme:** 1. Plains, Plateaus, and Mesas, 6. Sculpture of the Land (a. Eroded landforms)

**Secondary Theme or Features:** Special animal area

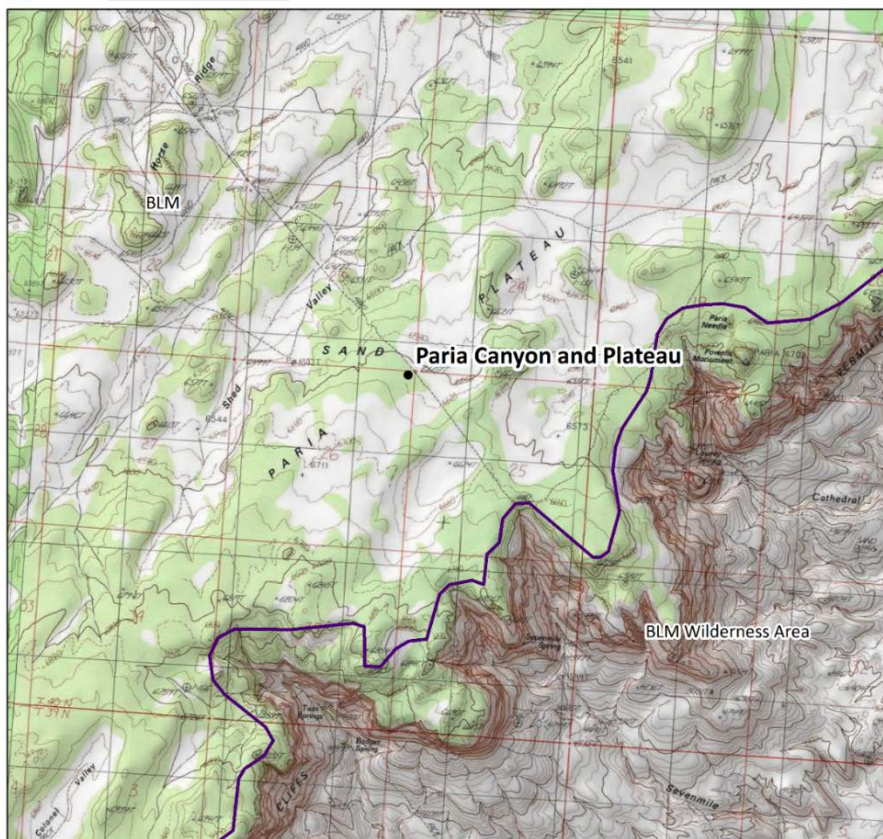
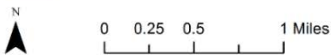
This is a very large area that encompasses 320,000 acres across Coconino County, Arizona and Kane, County, Utah (Goldberg et al. 1981). Parts of this site are located in a designated BLM Wilderness Area. The site contains broad plateaus, tall escarpments, and rugged canyons. The site is remote, and contains large expanses of high quality habitat for wildlife species such as native fish like the bluehead sucker, bighorn sheep, and peregrine falcons. The boundaries of this site should be refined to encompass the most ecological intact areas of the Plateau or Cliffs.

### Potential National Natural Landmark Paria Canyon and Plateau

This is a huge site. Encompasses parts of Arizona and Utah near Page, Arizona.

#### Land Ownership

 Bureau of Land Management



## Pigeon Creek Canyon

**Primary Natural History Theme:** 27. Deserts

**Secondary Theme or Features:** Special animal area

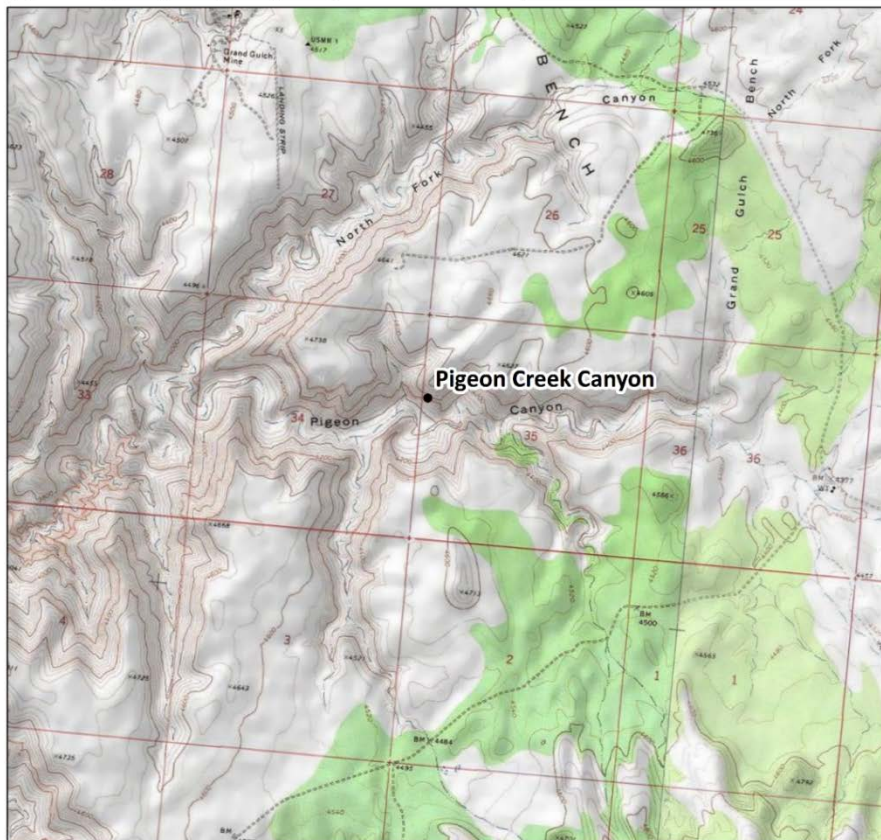
This site is located in the Grand Wash Cliffs Wilderness Area managed by the BLM in Mohave County, Arizona. It encompasses 5,000 acres and contains a unique mix of desert shrublands and sagebrush shrublands. The area is very remote. Pigeon Canyon cuts into the Grand Wash Cliffs which mark the southwestern escarpment of the Colorado Plateau. The site contains an unusual plant community dominated by Gambel oak (*Quercus gambellii*) and sagebrush (*Artemisia tridentata*). This area is managed for desert tortoise recovery.

### Potential National Natural Landmark Pigeon Creek Canyon

BLM Wilderness Area (Grand Wash Cliffs).  
Unique mix of desert shrublands and sagebrush.  
Remote area part of BLM National Monument.



0 0.25 0.5 1 Miles





## Red Canyon-Sevier Fault Area

**Primary Natural History Theme:** 3. Mountain Systems (b. Fault block), 4. Works of Volcanism

**Secondary Theme or Features:** 23. Dry Coniferous Forest (b. Ponderosa pine forest, e. Pinyon-juniper woodland), Special plant area



This site is located within USFS owned lands primarily, and portions are located in a designated USFS Research National Area. The 1,760 acre site shows an example of the Sevier Fault where colors of volcanic rocks and basalt flows contrast with the sedimentary strata of the Wasatch Formation. This site is located in Garfield County, Utah and contains four rare plant species: *Lesquerella rubincundula*, *Silene petersonii* var. *minor*, *Cryptantha ochroleuca*, and *Oxytropis jonesii*. Several plant communities are present at the site, including sagebrush, pinyon-juniper, ponderosa pine, and aspen-mixed conifer (Welsh et al. 1980).

### Potential National Natural Landmark

#### Red Canyon-Sevier Fault Area

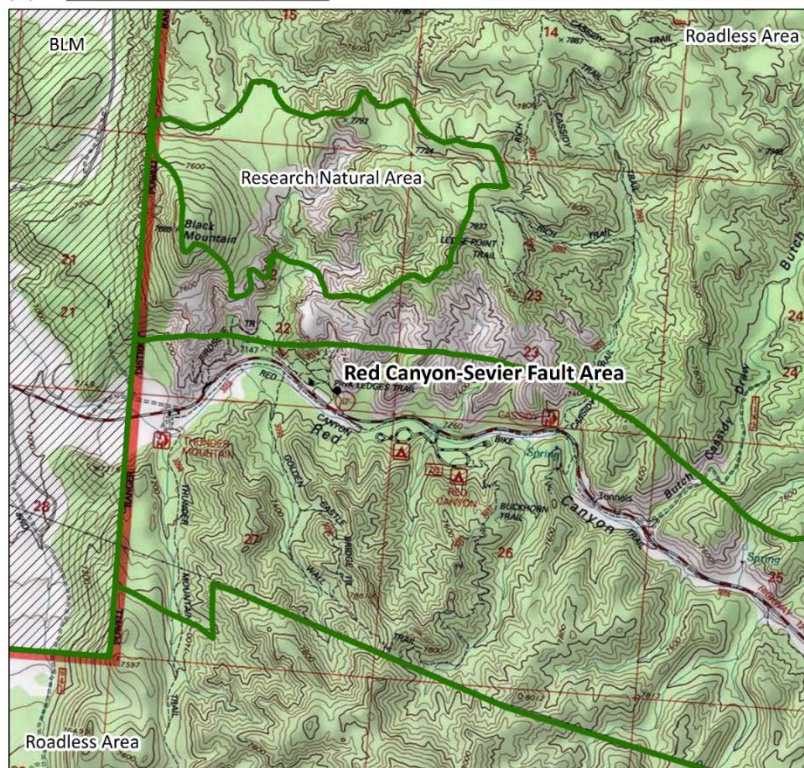
USFS Dixie National Forest Roadless Area in part. Site shows a displacement along the Sevier Fault which clearly shows the contrast between volcanic rocks and basalt flows against the sedimentary strata of the Wasatch Formation. Site has four rare plants that are very narrowly restricted to the area.

#### Land Ownership

-  Bureau of Land Management
-  Forest Service



0 0.25 0.5 1 Miles



## San Francisco Peaks (Humphrey's Peak)

**Primary Natural History Theme:** 4. Works of Volcanism (b. Intrusive), 6. Sculpture of the Land (a. Eroded landforms)

**Secondary Theme or Features:** 20. Tundra (e. Alpine tundra), Special plant area

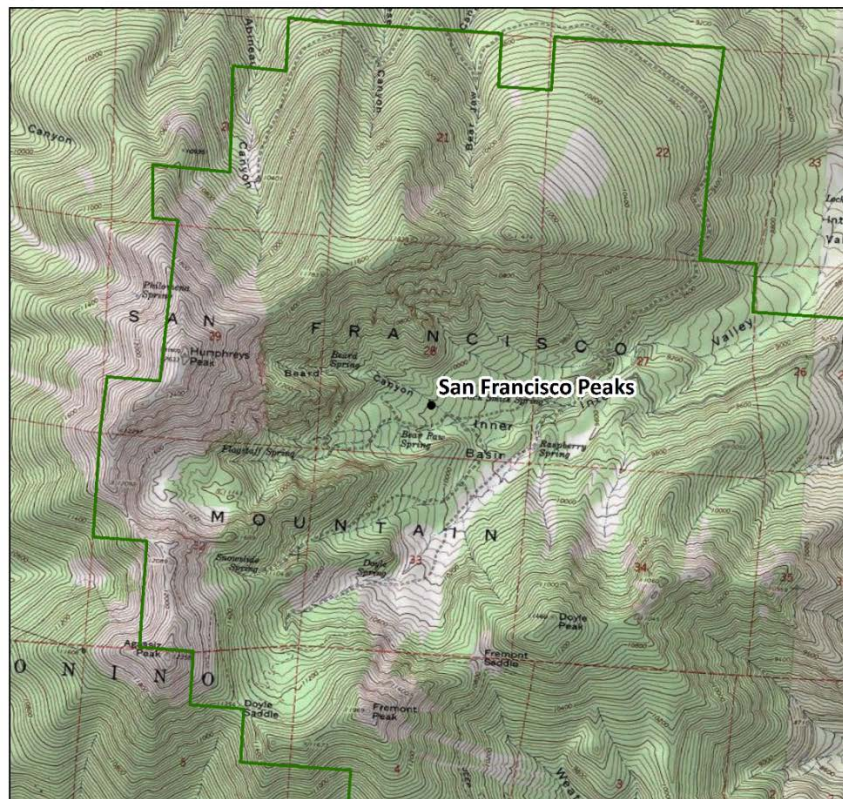
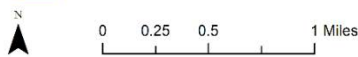
Humphrey's Peak is the highest peak in Arizona at 12,637 feet. It is an eroded stratovolcano. Very few areas in Arizona are located above treeline, so this area would be important to recognize for its ecological significance especially given the predicted hotter and drier temperatures due to climate change. Tundra is a secondary feature for this site. The alpine plant San Francisco Peaks groundsel (*Packera franciscana*), listed as Endangered by the U.S. Fish and Wildlife Service, occurs on Humphreys Peak and is known only from the San Francisco Peaks area. This plant may suffer from the effects of climate change because it cannot move upward in elevation if warming occurs.

### Potential National Natural Landmark San Francisco Peaks

Highest peak in Arizona. Eroded stratovolcano.  
This site would be important for recognizing the effects of climate change at high elevations.

#### Land Ownership

 Forest Service





## The Jewel Box along the Cockscomb

**Primary Natural History Theme:** 2. Cuestas and Hogbacks, 6. Sculpture of the Land (a. Eroded landforms)

**Secondary Theme or Features:** 23. Dry Coniferous Forest (e. Pinyon-juniper woodland), 17. Triassic-Cretaceous

This 640 acre site contains is within a Wilderness Study Area in the Grand Staircase-Escalante National Monument on BLM land. The site is very scenic and contains exposures of upper Jurassic rocks that are eroding to form colorful badlands (Welsh et al. 1980). The display of differential erosion of softer Jurassic beds below resistant overlying and underlying sandstone is well displayed here. The area supports pinyon-juniper woodlands interspersed with salt desert species.

### Potential National Natural Landmark The Jewel Box along The Cockscomb

Grand Staircase-Escalante National Monument. Part of Wilderness Study Area. Site is very scenic and contains exposures of upper Jurassic rocks that are eroding to form colorful badlands. Site is proposed bc of the display of differential erosion of softer Jurassic beds below the resistant overlying and underlying sandstone.



## Westwater Plant Locality

**Primary Natural History Theme:** 17. Triassic-Cretaceous Periods (c. Cretaceous)

**Secondary Theme or Features:** 27. Deserts


One of the most extensive and well preserved fossil plant locations in Dakota Sandstone in the Colorado Plateau, this is a 320 acre site on BLM lands with the highest level of ecological intactness. The fossil plants at the site are preserved three-dimensionally. The plant community at the site is a salt desert shrub community, which could represent a secondary feature.

### Potential National Natural Landmark

#### Westwater Fossil Plant Locality

One of the most extensive and well preserved fossil plant locations in Dakota Sandstone in the Colorado Plateau. Plants are preserved three dimensionally. Salt desert shrub community. BLM Rapid Ecol. Assessment layer indicates area has highest level of ecological intactness.

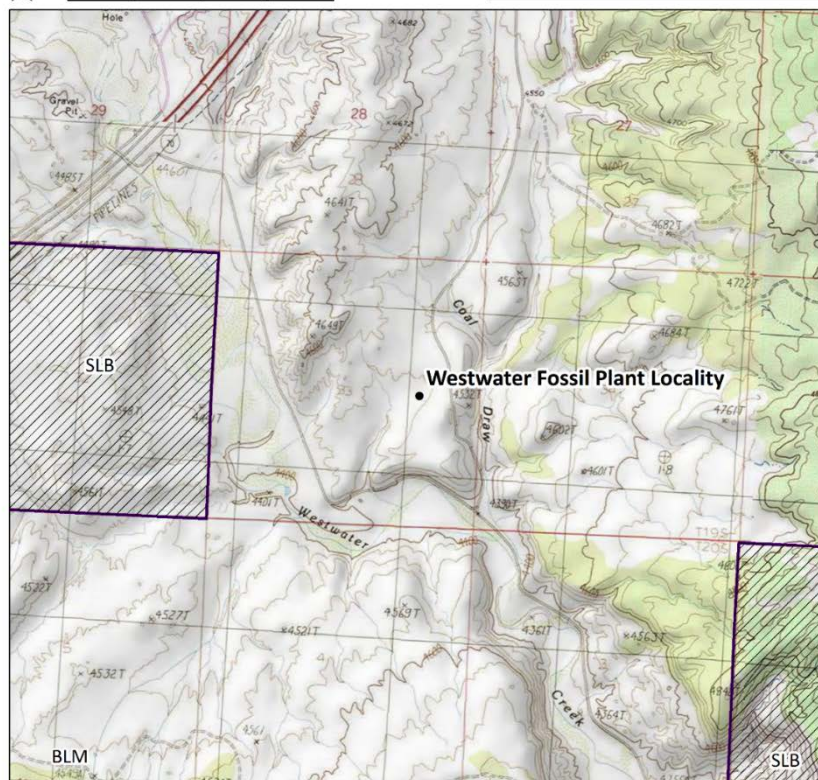
##### Land Ownership

 Bureau of Land Management

 Other or Unknown State Land



0 0.25 0.5 1 Miles



# Williams Bottom Playa Deposits

**Primary Natural History Theme:** 17. Triassic-Cretaceous Periods (b. Jurassic)

**Secondary Theme or Features:** 33. Streams

This site is 640 acres located on BLM lands. It is within the Long Canyon Area of Critical Environmental Concern near Moab, Utah. The site contains playa deposits that represent a unique type of lake sequence deposited in an oasis in the ancient Navajo Sandstone desert. The ecological intactness of the site received the highest ranking according to Bryce et al. (2012). Inclusion of part of the adjacent Colorado River corridor would be an excellent secondary feature of the site to highlight the ecological importance of the river in the otherwise arid landscape.

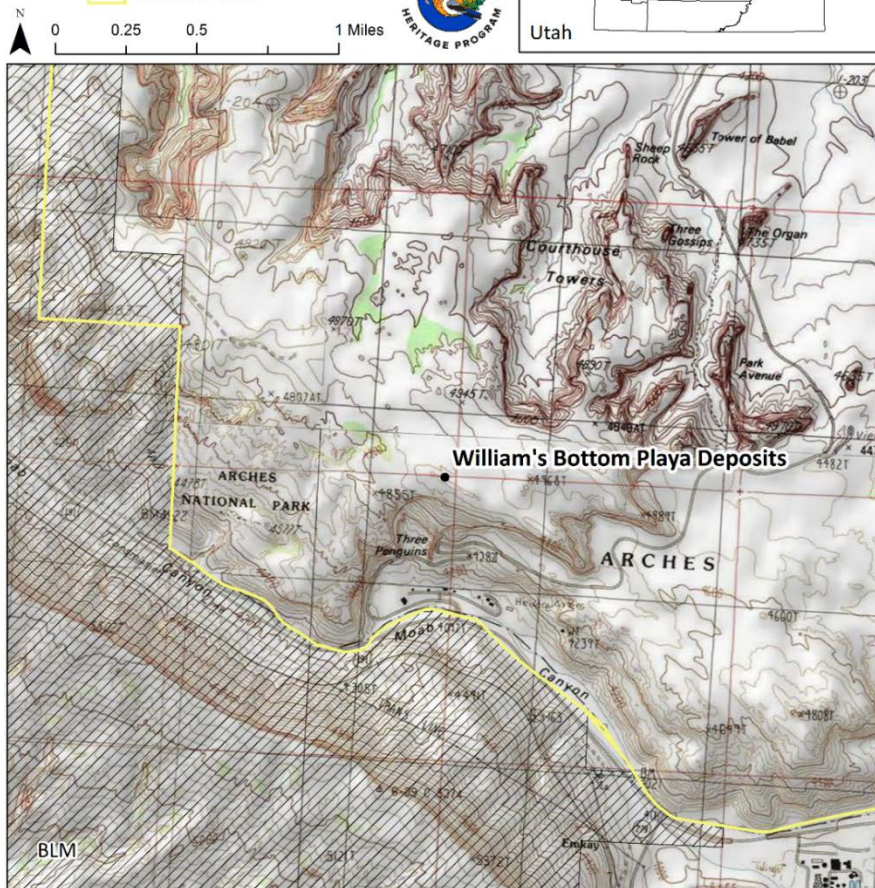
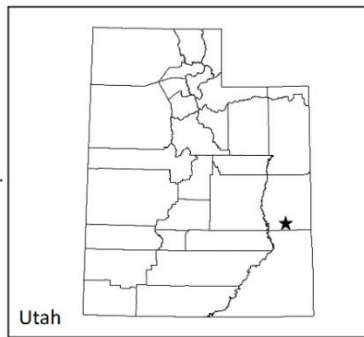
## Potential National Natural Landmark

### William's Bottom Playa Deposits

Long Canyon ACEC on BLM lands. Right along Colorado River near Moab. Highest level of ecological intactness according to BLM REA. Contains playa deposits that represent a unique type of lake sequence which was deposited in an oasis in the ancient Navajo Sandstone desert. Climbing area just north of site is called Wall Street.

**Land Ownership**

- Bureau of Land Management
- National Park Service



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