Grand Canyon Trust

Springs Assessments of Bears Ears National Monument 2018

by Marc Coles-Ritchie

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SURVEY

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Acknowledgments

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COVER PHOTO BY LISA WINTERS

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Introduction

Where water emerges from the ground onto the dry, red, and brown Colorado Plateau, remarkable patches of green appear. Springs in the desert Southwest are critical for many plants and animals. President Obama's proclamation[1] establishing Bears Ears National Monument states, "Numerous seeps provide year-round water and support delicate hanging gardens, [and] moisture-loving plants." These springs also provide water, food, and habitat for many animals, particularly birds, mammals, invertebrates (e.g., springsnails), and amphibians.

People have long used springs as water sources for themselves and domestic animals. Native communities treated springs as a type of garden, managing plants in and around them. Colorado Plateau springs often retain evidence of the long presence of Native Americans, including signs such as rock art, structures, and plants that have traditional uses by tribes.

We visited springs in Bears Ears National Monument, as designated by President Obama in December 2016, in order to document the condition of these important places. Our objectives were to highlight the following: impairment to springs caused by people, animals, or vehicles; reference sites, which are examples of healthy and functioning springs that can show the potential of currently impaired springs; springs in the area removed from Bears Ears National Monument by President Trump in December 2017; and differences between springs in areas grazed and not grazed by cattle.

Cultural resources were sometimes observed around springs but we did not characterize those because tribal members and other experts in archaeology are better able to do such assessments.

Sites

Spring sites in Bears Ears National Monument were identified in three ways: springs listed in databases, including the National Hydrography Dataset[2], Springs Stewardship Institute[3], U.S. Forest Service data, and Geographic Names Information System (GNIS) from the U.S. Geological Survey (USGS); springs shown in hiking guidebook maps; and springs we encountered while hiking to assess springs in the databases. The databases provided a list of 177 known springs and we visited 25 of those sites (Figure 1); therefore, in 2018 we assessed 14 percent of the listed springs. In 2017, the Grand Canyon Trust surveyed 18 springs from the list of 177 springs (report available here).[4] Therefore, during 2017-18, we surveyed 24 percent of the springs that are in the databases. There are certainly many more springs than the 177 we compiled from databases, and indeed we came across 16 additional springs while doing fieldwork. The springs that we encountered were generally small areas that had some wetland vegetation, such as hanging gardens where water seeps from a rock wall, but they usually had minimal, if any, standing water.

The geographic areas of the springs we assessed were Elk Ridge and Cedar Mesa. We intentionally included many sites in the White Mesa Cultural and Conservation Area (aka Gooseberry Allotment on north Elk Ridge), where the Grand Canyon Trust has a cooperative agreement with the Ute Mountain Ute Tribe and the Forest Service (Manti-La Sal National Forest), to monitor conditions in an area where cattle are not authorized (described here).[5] The sites surveyed on Cedar Mesa included 11 springs in Grand Gulch, which is not authorized for cattle grazing.

Of the 41 springs we assessed, 21 are in areas not currently authorized for cattle use. These include areas where livestock have been excluded in the canyons of Cedar Mesa, such as Grand Gulch, Arch Canyon, and Mule Canyon, in order to protect the archaeological and natural resources, and an area on Elk Ridge—the White Mesa Cultural and Conservation Area[6] or Gooseberry Allotment, outlined in Figure 1—where cattle have not been authorized since 2002, although trespass cattle have been observed on numerous occasions.

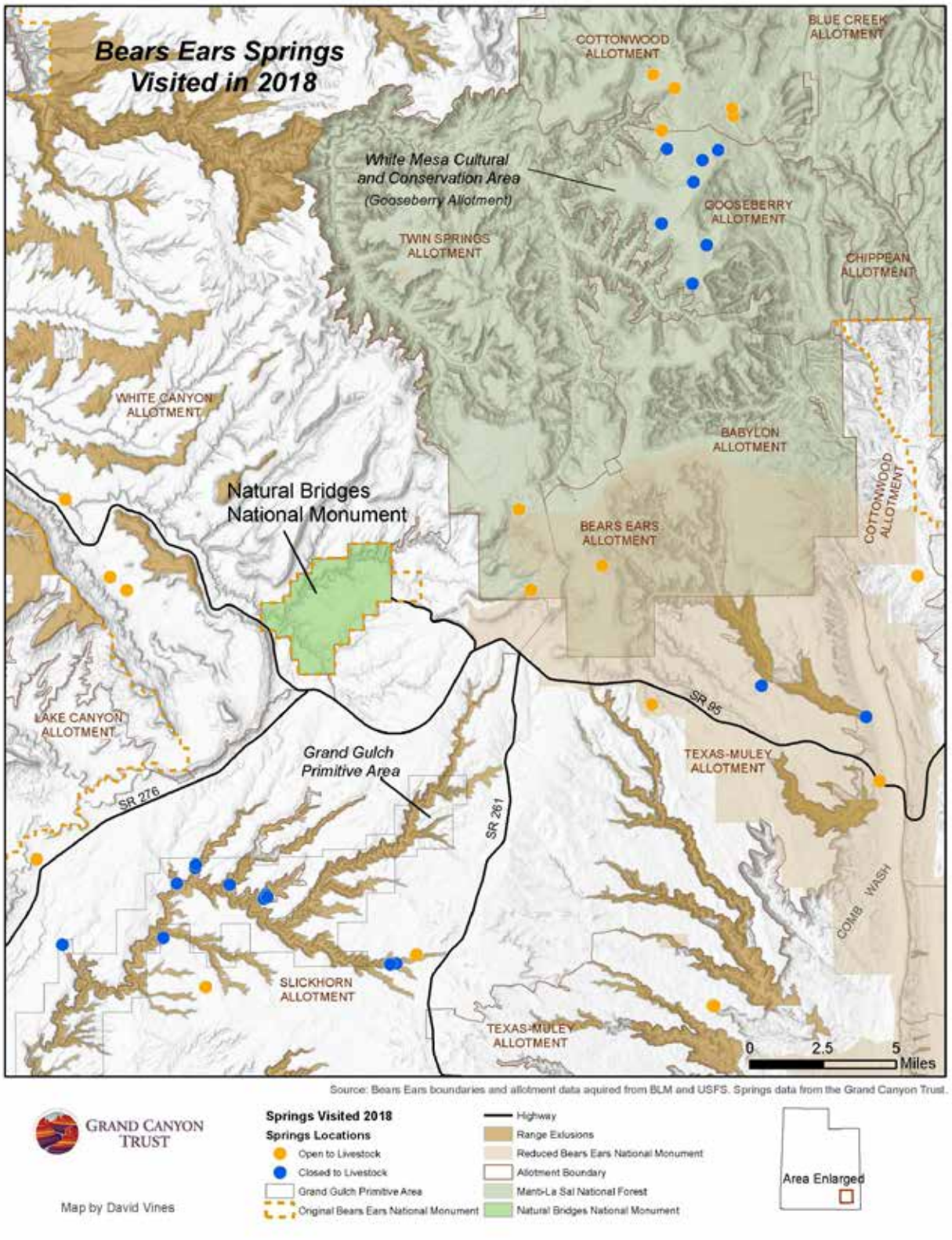

Fig. 1. Locations of springs assessed in Bears Ears National Monument in 2018.

Livestock grazing was discontinued in Grand Gulch in 1970 according to the Lake Canyon Allotment Management Plan (San Juan Resource Area). Grand Gulch Primitive Area (Figure 1) was established in 1974 to protect the archaeological resources of the area. In some Comb Wash side canyons, including Arch and Mule canyons, livestock grazing was discontinued in 1994 by court order.[7]

Thirty-five of 41 that we assessed have been removed from Bears Ears National Monument by President Trump's December 2017 proclamation.[8]

Methods

The Grand Canyon Trust conducted two surveys of spring conditions in Bears Ears National Monument during the summer of 2018. A backpacking trip to the Grand Gulch region was conducted May 26–28 with Grand Canyon Trust staff and volunteers, and field visits were made in Cedar Mesa and Elk Ridge areas of Bears Ears during June 20–22 with staff and volunteers.

Data were collected using field sheets that the Grand Canyon Trust adapted from those used by the Springs Stewardship Institute.[9] The methods provide a relatively quick and simple assessment or characterization of the following:

- Location
- Water abundance
- Disturbances observed
- Wildlife water accessibility
- Condition and whether a reference site, followed by restoration recommendations
- Site description, including photos

The following optional categories were assessed or recorded if the observers had the necessary skills:

- Vegetation
- Wildlife, particularly birds
- Invertebrates
- Hydrology—flow and water quality

Much of the data were collected by experts in botany and bird identification. Some data were collected by volunteers with less familiarity with individual species.

The determination of whether a site was considered reference was a qualitative judgement made by the crew in the field and upon report review. The intent was to identify sites that were in very good condition, i.e., sites with abundant native wetland vegetation and an apparently unaltered flow regime. In other words, sites identified as reference had minimal disturbance to vegetation, soil, and hydrology from human activities, including livestock.

All photos in this report are by staff and volunteers of the Grand Canyon Trust.

Results

A range of types and conditions of springs were assessed, and are summarized in Table 1. Detailed information about each spring is provided in the individual spring reports that follow.

Water

Groundwater discharge or other evidence of water was observed at 38 sites; two sites had no evidence of water and one site was not accessible due to private property. Only 10 of the 41 sites had steady flow or a pool of water (Table 1). Springs with any significant amount of water in Bears Ears National Monument have typically been modified to provide water for cattle, although some of those systems are no longer functional. Twelve sites had water diversion infrastructure (such as pipes leading to water troughs), but water wasn't always present in the pipes or troughs. Of the 29 sites without water diversion infrastructure, 13 were hanging gardens that have minimal water flow, and therefore little potential for water diversion.

***Table 1**. Water observed at spring sites, with categories listed from wettest to dry.*

Water Observed	Number of Sites
Steady flow (creates small stream and pond/wetland)	3
Pool	7
Trough full of water (fed by pipe)	5
Puddles	4
Dripping water from wet wall	8
Moist soil	6
Dry, but evidence of water in past	5
No evidence of a spring	2
Inaccessible (appeared to be private property)	1
TOTAL	**41**

Condition & Disturbance

The most common disturbance at the spring sites was by cattle, including impacts from grazing and trampling, and the related impacts from water diversion, fencing, and impoundment—including excavation to make ponds. Other disturbances observed were from wildlife, particularly elk, vehicles, and campers and hikers. Table 2 presents a summary of site condition, based on a qualitative assessment of the springs.

***Table 2**. General condition (qualitative assessment) of springs sites, listed from excellent to impacted condition.*

Condition	Number of Sites	Comment
Reference (excellent condition)	14	Six were hanging gardens in Grand Gulch, where livestock grazing is not authorized.
Moderate or good condition	9	
Heavily impacted	10	
Dry spring (and impacted)	5	
No spring found	2	
Inaccessible	1	Appeared to be private property
TOTAL	**41**	

About half (55%) of springs in areas closed to livestock were categorized as reference condition sites. Only three of 18 springs (17%) in areas open to livestock were categorized as reference sites (Table 3 and Figure 2) and two of those, Snow Flat 1 and Snow Flat 2, were hanging gardens, which are not very vulnerable to livestock impacts.

***Table 3**. Number of sites considered to be in reference condition (out of total visited) based on a qualitative assessment, grouped by sites in areas closed and open to cattle.*

Land Manager	Reference Condition Sites in Area CLOSED to Cattle	Reference Condition Sites in Area OPEN to Cattle	No spring found
U.S. Forest Service	3 (of 6)	0 (of 7)	2
Bureau of Land Management	8 (of 14)	3 (of 11)	1
TOTAL	**11 (of 20)**	**3 (of 18)**	**3**

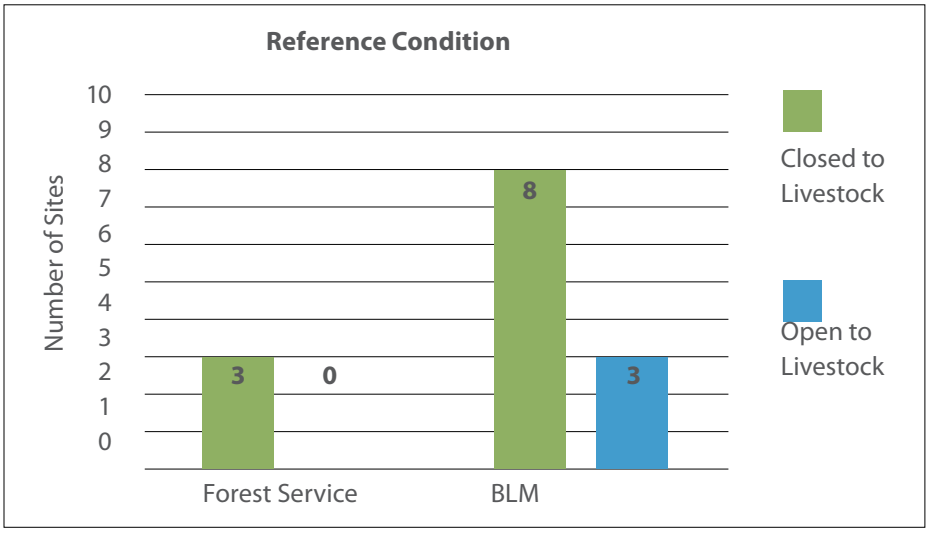

***Figure 2**. Number of reference condition springs in areas closed to livestock versus areas open to livestock.*

Wildlife

Wildlife presence or evidence was observed at 74% of spring sites surveyed, although we did not search for invertebrates. At sites where wildlife data were not recorded, either the crew was not able to identify species, or no animals were observed. The most commonly recorded animals were violet-green swallows, lizards of various species, black-throated and chipping sparrows, elk or deer evidence such as tracks or scat, black-chinned and other hummingbirds, yellow warblers, and flycatchers. See Appendix A for a complete list of observed wildlife.

Water troughs for livestock were present at 12 sites, two of which were filled with dirt. Escape ramps for wildlife were lacking at eight of the 10 troughs that were functional or potentially functional. Lack of a wildlife escape ramp means small animals and invertebrates are likely unable to exit if they enter the water. Dead animals were observed floating in the water trough at one site (Figure 3).

***Figure 3**. Dead animals (small mammal and bird) in the water trough at Sego Spring, in Cottonwood Allotment, observed June 20, 2018.*

Vegetation

The plant species most frequently observed are listed below in alphabetical order. See Appendix B for a complete list of observed plants. Throughout this report, non-native plants are noted with an asterisk (*).

- Arctic rush (aka Baltic rush)
- Cheatgrass*
- Common dandelion*
- Coyote willow
- Fremont cottonwood
- Goldenrod
- Kentucky bluegrass*
- Mountain snowberry
- Orchardgrass*
- Tamarisk*
- Woods' rose

*not native

The vegetation associations we observed are listed in Table 4. These associations are from the U.S. National Vegetation Classification http://usnvc.org/explore-classification.[10]

***Table 4**. Vegetation associations (from USNVC) observed and species commonly observed, listed alphabetically, at the sites with that vegetation association.*

Vegetation Association	Species We Commonly Observed	Sites
Baltic Rush Wet Meadow	Arctic rush, common dandelion*, Kentucky bluegrass*, smooth brome*, spikerush, Woods' rose	Duck Lake, Spring 29, Government Trailhead, Maverick
Bebb's Willow / Mesic Graminoids Wet Shrubland	American speedwell, Arctic rush, Bebb's willow, feathery false lily of the valley, goldenrod, Kentucky bluegrass*, orchardgrass*, quaking aspen, smallwing sedge, smooth brome*, Woods' rose	Birch, North Notch, Pine, Posey, Spring 11
Colorado Plateau Seep Hanging Garden	Alderleaf buckthorn, Arctic rush, cheatgrass*, common maidenhair, coyote willow, ditch reedgrass, Fremont cottonwood, golden sedge, goldenrod, Mancos columbine, saltgrass, singleleaf ash, skunkbush sumac, tamarisk*, Utah serviceberry	Arch Canyon, Bullet 1, Bullet 2, Bullet 3, Collins, Columbine Cove, Dripping Canyon Upper, Fry (113), Green House Canyon Salted Rainbow, Green House Canyon South Side Canyon, Green House Canyon Upper South Side Canyon, Hwy 95 Spring, Snow Flat 1, Snow Flat 2, Snow Flat 3
Fremont Cottonwood / Narrowleaf Willow Riparian Forest	Artic rush, coyote (aka narrowleaf) willow, Fremont cottonwood, sweetclover*	Dog Tanks, Dripping Canyon Lower, Spring 125
Quaking Aspen - White Fir / Mountain Snowberry Forest (surrounding a patch of wetland shrubs and herbaceous vegetation at the spring source)	American speedwell, common dandelion*, common yarrow, fowl mannagrass, Franciscan bluebells, Kentucky bluegrass*, longstalk clover, mountain snowberry, orchardgrass*, quaking aspen, Richardson's geranium, smallwing sedge, white fir, Woods' rose	FS 5094, FS 5145, FS 5160, Poso, Sego
Tamarisk species Ruderal Riparian Shrubland	Cheatgrass*, scratchgrass, tamarisk*, thistle (native)	Cow Tank, Green House Canyon Main Canyon, Red House, Rock

Spring Reports

The following pages present summaries of each of the spring sites we visited. General location information is provided, but exact coordinates are not included in order to help prevent excessive visitation and disturbance to these fragile springs ecosystems.

Notes About the Data

- "GCT Site ID" is a number generated by the Grand Canyon Trust for our database.
- "Removed from Monument" indicates the site is in the area excised from Bears Ears National Monument by President Trump in December 2017 (described here).[11]


Arch Canyon hanging garden (left) and overview of site and stream channel at base of wet wall (right).

Spring Name: Arch Canyon Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: No
Elevation (ft): 5,008
Grazing Allotment: Comb Wash (closed to livestock)
Survey Date: June 21, 2018
General Location: Comb Wash, north of Highway 95

Site Description: Hanging garden under an overhang on the south side of Arch Canyon, next to the stream.

Hydrology: Water drips off the wall into small pools a few inches deep in the stream channel of Arch Canyon.

Wildlife Water Access: There is a small pool at the bottom of the overhang which provides easy animal access. Tracks were observed.

Reference Site: Yes, for the hanging garden; the wash is somewhat trampled by hikers.

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Bear (scat), beaver (cut stems), black-throated sparrow, lesser goldfinch, deer (tracks), spotted towhee, turkey (feather), violet-green swallow, western wood peewee, yellow warbler.

Plants: Alderleaf buckthorn, arctic rush, buffaloberry, cheatgrass*, columbine, common reed, field horsetail, Fremont cottonwood, golden sedge, goldenrod, mountain snowberry, mountain tansymustard, New Mexico thistle, orchardgrass*, scouringrush horsetail, skunkbush sumac, sparse-flowered bog orchid, squirreltail, sweetclover*, tamarisk*, two-needle piñon, Utah serviceberry, western white clematis, willow.

Site Condition: Excellent. There is a diversity of and dominance by native plants. However some non-native plants are present including cheatgrass*, sweetclover* and orchardgrass*. Evidence of visitation by animals and people was observed.


Birch Spring with trampling and pedestals near one of the groundwater discharge points (left) and a trough and pond (right).

Spring Name: Birch Spring
GCT Site ID: Spring 20
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,154
Grazing Allotment: Twin Springs (open to livestock)
Survey Date: June 22, 2018
General Location: Elk Ridge, south end

Site Description: Hillslope spring complex along a road with at least four spring sources and a large pond.

Hydrology: A steady flow from multiple sources. Measured 10.5 liters per minute from one source and 2.7 liters per minute at another source. Pipes go from two spring boxes to a human-made pond that is approximately 200 feet by 100 feet and approximately 3 feet deep. A natural source also feeds the pond.

Wildlife Water Access: Extensive water in the cattle trough and large pond provides easy access to water. The trough has a wildlife escape ramp.

Reference Site: No

Restoration Recommendations: Fence off the source that is heavily trampled on the north side of pond. Fence around the pond to exclude cattle; trough can provide water away from tank and pond.

Evidence of Wildlife: American robin, dark-eyed junco, elk tracks and scat, leopard frog, snake (unknown species), violet-green swallow.

Plants: Alkali buttercup, American speedwell, arctic rush, Bebb's willow, elkweed, feathery false lily of the valley, fowl mannagrass, quaking aspen, Rocky Mountain rush, smallwing sedge, spikerush, violet, Woods' rose.

Site Condition: Springs are heavily developed and impacted by humans, cattle, and wild ungulates. Severe trampling, pedestals, and hummocks are present at the second natural source and near the northern shoreline of the pond. Water is being pumped out of the pond and over the hill by a generator. A road goes in and around the site.


Bullet 1 Spring where groundwater emerges (left), and overview showing cottonwood and willows (right).

Spring Name: Bullet 1 Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 6,362
Grazing Allotment: Slickhorn (open to livestock)
Survey Date: June 22, 2018
General Location: Bullet Canyon, a side canyon of Grand Gulch

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Site Description: Hanging garden on south-facing canyon wall along the Bullet Canyon Trail. There is a small cottonwood and willow patch at the base of the wall. The surrounding vegetation is piñon-juniper.

Hydrology: There is no surface water, but there is moist soil, wetland plants, and precipitate, which indicate groundwater discharge. About 70 feet away, there is a very small patch of water that comes off the cliff wall.

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: None recorded

Evidence of Wildlife: None recorded

Plants: Arctic rush, cheatgrass*, Fremont cottonwood, goldenrod, Kentucky bluegrass*, saltgrass, tamarisk*, yellow willow.

Site Condition: Hiker disturbance includes trampling, soil erosion, and pedestals because the trail into Bullet Canyon goes through this spring.


Bullet 2 hanging garden vegetation (left), and overview of site (right).

Spring Name: Bullet 2 Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 6,161
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: June 22, 2018
General Location: Bullet Canyon, a side canyon of Grand Gulch

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Site Description: Hanging garden under a large, south-facing overhang along the dry wash of Bullet Canyon. Water seeps from a linear feature along the wall for about 150 feet.

Hydrology: There are saturated spots along the wall as well as a small amount of seepage.

Wildlife Water Access: Birds can access water on the wall.

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Chipping sparrow, finch, ground squirrel, hummingbird, swallow, Townsend's solitaire.

Plants: Arizona thistle, bluegrass, cheatgrass*, common maidenhair, crested wheatgrass*, Fremont cottonwood, goldenrod, Mancos columbine, sagebrush, saltgrass, two-needle piñon, Utah serviceberry, yellow willow.

Site Condition: Good condition with a lot of wetland vegetation on the wet wall. At the base of the wall and in the nearby wash there are some willow and cottonwoods as well as some trampling and cheatgrass*. Evidence of grazing by wild ungulates is present.


Bullet 3 groundwater emergence that supports hanging garden vegetation (left), and site overview (right).

Spring Name: Bullet 3 Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 6,156
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: June 22, 2018
General Location: Bullet Canyon, a side canyon of Grand Gulch

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Site Description: Hanging garden along a 150-foot wall , under a south-facing overhang. Vegetation hangs at multiple levels of the wall. A large rose patch is nearby, along the dry wash of Bullet Canyon. The surrounding vegetation is piñon-juniper.

Hydrology: Water drips at about 1 drop per second from multiple points along horizontal seams in the wall.

Wildlife Water Access: Birds can access water on the wall.

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: None recorded

Plants: Alcove bog orchid, Arizona thistle, golden sedge, goldenrod, Mancos columbine, saltgrass, sedge, tansyaster, tapered rosette grass, two-needle piñon.

Site Condition: Very good condition with wetland vegetation on the wall and at the base for about 2 feet. There are human tracks at the base of the wall.


Collins Spring source and wooden catchment (left), and site overview with cottonwood tree (right).

Spring Name: Collins Spring
GCT Site ID: Spring 144
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,017
Grazing Allotment: Lake Canyon (closed to livestock)
Survey Date: June 22, 2018
General Location: Cedar Mesa, near Highway 276

Site Description: Water drips along a contact line that supports some hanging garden vegetation. A wooden catchment collects drips from the rock face. Two small pipes have been drilled into the wall. A pipe coming out from the catchment leads down to two sand-filled metal troughs. The spring system is located at the head of a small canyon. An inscription at the source says June 1937. Nearby vegetation includes broom snakeweed, mountain mahogany, rabbitbrush, sagebrush, serviceberry, and snowberry.

Hydrology: Water drips from the rock face and along the mossy surface. Less water drips out of the pipe and into the catchment. Water is minimal — just a wet, mossy surface.

Wildlife Water Access: Birds can access water on the wall.

Reference Site: No

Restoration Recommendations: None recorded

Evidence of Wildlife: Ash-throated kingbird, black-throated sparrow, blue gray gnatcatcher, chipmunk, plateau fence lizard, gray flycatcher, hummingbird, juniper titmouse, long-nosed leopard lizard, squirrel.

Plants: Fremont cottonwood, Mancos columbine, single-leaf ash, two-needle piñon, Utah juniper, white sagebrush.

Site Condition: The spring looks heavily used. Water development infrastructure, including fencing, pipes, and a trough, is present but not operational. Trails and trampling by people and cattle are present. The canyon appears to be eroding from flooding and periodic flow.


Columbine Cove hanging garden where groundwater emerges (left), and site overview (right).

Spring Name: Columbine Cove Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,334
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 26, 2018
General Location: Where Government Trail enters Grand Gulch

Site Description: Hanging garden on rock wall just below the mesa where Government Trail starts to descend into Grand Gulch. The wet wall is about 40 feet long with small patches of columbine and precipitate. The columbine continues another 50 feet along the wall with no visible water. The vertical extent of the hanging garden vegetation is generally a few feet. The surrounding vegetation is gambel oak, two-needle piñon, and snowberry.

Hydrology: Water drips slowly from several layers along the wall. The drips flow through plant roots before emerging. There is much precipitate. We collected 20 milliliters in three minutes.

Wildlife Water Access: Good access for birds who were visiting the wall.

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Black-throated sparrow.

Plants: Bluegrass, common maidenhair, goldenrod, Mancos columbine, Rydberg's thistle, single-leaf ash, and woolly sedge.

Site Condition: Good. Seems undisturbed by humans with possibly a bit of trampling by hikers and wildlife.


Cow Tank rock spillover (left), and site overview (right).

Spring Name: Cow Tank Spring
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,223
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 27, 2018
General Location: Cow Tank Canyon; side canyon of Grand Gulch

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Site Description: Dry plunge pool at the base of a 12 foot drop, close to the head of Cow Tank Canyon. It may have water during wetter periods. It does not appear to be a spring.

Hydrology: A dry pool with a 7-foot-deep depression but no water and not much vegetation.

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: None recorded

Plants: Beardtongue, catnip*, cheatgrass*, Fremont cottonwood, Indian ricegrass, mountain pepperweed, old-man-in-the-Spring*, pale evening primrose, rubber rabbitbrush, sacred thorn-apple, scarlet globemallow, singleleaf ash, squirreltail, sugarberry, thistle, Utah bladderpod. These plants are in the general vicinity.

Site Condition: A dry site that has a small amount of vegetation. Dramatic fluctuation in water and pulse flows likely make it difficult for riparian vegetation to establish and persist.


Dog Tanks spring-fed pool (left), and site overview (right).

Spring Name: Dog Tanks Spring
GCT Site ID: Spring 127
Land Manager: Bureau of Land Management
Removed from Monument: No
Elevation (ft): 6,129
Grazing Allotment: Texas-Muley (closed to livestock)
Survey Date: June 22, 2018
General Location: Cedar Mesa, just north of Mule Canyon

Site Description: A pond with mature cottonwoods. An established campsite accessible by road is adjacent to the spring. The surrounding vegetation is buffaloberry, hairy false goldenaster, ponderosa pine, skunkbush sumac, two-needle piñon, Utah juniper, and Utah serviceberry.

Hydrology: A pond that is about 15 feet by 15 feet.

Wildlife Water Access: Good

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Ash-throated flycatcher, bushtit, Cooper's hawk, black-chinned hummingbird, juniper titmouse, plumbeous vireo, spotted towhee, violet-green swallow.

Plants: Arctic rush, common dandelion*, coyote willow, Fremont cottonwood, horsetail, redosier dogwood, sweetclover*, thistle, two-needle piñon, willow, Woods' rose, Wyoming Indian paintbrush.

Site Condition: Good. A pool at the base of a sandstone pourover is surrounded by large cottonwoods, willows, and overhanging vegetation. The wetted reach extends about 60 feet downstream to the campsite and dirt road. Some ungulate grazing and browsing is evident. Disturbance seems minimal.


Dripping Canyon Lower pool (left), and site overview (right).

Spring Name: Dripping Canyon Lower Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,179
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 27, 2018
General Location: Dripping Canyon, a side canyon of Grand Gulch

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Site Description: Pool in channel that is otherwise dry. There may have been downcutting in the past due to disturbance. Some robust riparian vegetation is present.

Hydrology: A pool about 5 feet wide, 30 feet long, and 2 feet deep with somewhat turbid water. The water surface has leaf litter and twigs.

Wildlife Water Access: Good wildlife access, with animal tracks to indicate that.

Reference Site: No

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Lizard, deer tracks, red-spotted toad, yellow warbler.

Plants: Annual rabbitsfoot grass*, arctic rush, cheatgrass*, coyote willow, Fremont cottonwood, Kentucky bluegrass*, squirreltail, sweetclover*.

Site Condition: Moderate, with some trampling from wildlife and hikers who access water here. There may be historical channel incision.


Dripping Canyon Upper Spring, where water drips from rock wall (left), and site overview (right).

Spring Name: Dripping Canyon Upper Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,272
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 27, 2018
General Location: Dripping Canyon, a side canyon of Grand Gulch

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Site Description: Water drips from exposed rock layers beside a channel that forms small pools. Precipitate is abundant. Surprisingly little riparian vegetation is present considering the availability of water. There is a small seep about 70 feet to the northeast, on the opposite slope, where water also drips.

Hydrology: Water drips from the walls into pools of water in the channel. The pool area is approximately 30 feet long, 2 feet wide and 1 foot deep. About 14 milliliters per minute were captured from the largest dripping area.

Wildlife Water Access: Good. Birds can access water on the wall.

Reference Site: No

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Hummingbirds, rabbit, rodent trails, swallow, and yellow warbler.

Plants: Cheatgrass*, coyote willow, curlycup gumweed, Fremont cottonwood, mountain snowberry, singleleaf ash, tamarisk*, thistle (native).

Site Condition: Moderate. Spring is impacted by trampling or disturbance from native ungulates, people, and high flows. Vegetation is sparse, considering the water availability.


Duck Lake spring site (left), and nearby Bebb's willow that is dramatically overbrowsed (right).

Spring Name: Duck Lake Spring
GCT Site ID: Spring 66
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,698
Grazing Allotment: Gooseberry (currently closed to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: This is a mesic meadow that was a shallow lake in the past. Photos from 2012 show the area with water. The margin of the lake bed has a ring of scattered, old Bebb's willows, which are heavily browsed as high as ungulates can reach. The surrounding area has aspen, currant, gambel oak, ponderosa pine, and snowberry.

Hydrology: Dry with some wetland plants, such as Nebraska sedge.

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: Restoration of additional Bebb's willow would require additional fencing. Retain livestock-free status of the allotment.

Evidence of Wildlife: American robin, chipping sparrow, elk tracks and scat, flycatcher, house wren, lesser goldfinch, plumbeous vireo, violet-green swallow, warbler, western bluebird, western kingbird, western wood peewee.

Plants: Arctic rush, Bebb's willow, bull thistle*, common dandelion*, Kentucky bluegrass*, Nebraska sedge, owl's-claws, tufted hairgrass.

Site Condition: Heavily grazed by elk. The lake seems to have dried up, presumably due to drought. Soil compaction is evident. In the general area, there are two exclosures to protect young Bebb's willow plants and two to protect young aspen. While Gooseberry Allotment has not been authorized for grazing for 18 years, trespass cattle from the Cottonwood Allotment have often gathered in the Duck Lake meadow area through unmaintained boundary fences. The boundary fence was reconstructed in 2014 but breaks in the fence (due to fallen trees or other disturbances) make occasional cattle entry possible.


Fry (113) groundwater emergence (left) and site overview (right).

Spring Name: Fry (113) Spring
GCT Site ID: Spring 113
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,369
Grazing Allotment: White Canyon (open to livestock)
Survey Date: June 21, 2018
General Location: Cedar Mesa, Fry Canyon area

Site Description: Three seeps emerge from the base of a sandstone wall into a wash with intermittent flow. Piñon, juniper, and tamarisk* are on the bank. The soil appears alkaline. Other nearby vegetation includes big sagebrush and Fremont's mahonia.

Hydrology: Puddles with aquatic invertebrates (tadpoles) are present. A bermed pond with extensive standing water is downstream of the seeps. It was likely excavated down to the water table.

Wildlife Water Access: Accessible to all wildlife

Reference Site: No

Restoration Recommendations: Fence the area to exclude cattle and allow the vegetation to recover.

Evidence of Wildlife: Ash-throated flycatcher, black-throated sparrow, coyote scat, house finch, kingbird, mourning dove, red-spotted toad, Scott's oriole, jay, summer tanager, tadpoles, violet-green swallow.

Plants: Arctic rush, burningbush*, cattail, cheatgrass*, coyote willow, Fremont's mahonia, greasewood, Parry's rabbitbrush, tamarisk*, and Utah serviceberry.

Site Condition: Heavily used by cattle, with evidence of soil erosion, compaction, excavation, grazed cattails, and browsed willows.


Spring U.S. Forest Service 5094 where groundwater emerges from pipe (left), and site overview (right).

Spring Name: U.S. Forest Service 5094
GCT Site ID: Spring 56
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,378
Grazing Allotment: Gooseberry (currently closed to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: A steady flow of water emerges from a pipe into the channel. The stream has abundant riparian vegetation. This seems to be part of a springs complex. A pond, likely human-made, is about 150 feet downslope. The surrounding vegetation is made up of aspen, chokecherry, blue spruce, and lots of bracken fern in the understory.

Hydrology: Approximately 30 liters per minute flows from the pipe into the stream. The pipe comes from upslope, but the source location is unclear.

Wildlife Water Access: The stream below the pipe has flowing water that is accessible to wildlife. The pond downstream also provides water access.

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status of the allotment.

Evidence of Wildlife: Deer tracks and scat, elk tracks and scat, house wren, violet-green swallow, yellow warbler, yellow-rumped warbler.

Plants: Bigtooth maple, bull thistle*, chokecherry, Columbian monkshood, common dandelion*, common yarrow, Douglas fir, fowl mannagrass, heartleaf bittercress, Kentucky bluegrass*, largeleaf avens, mountain snowberry, orchardgrass*, quaking aspen, Richardson's geranium, sedge, sweetcicely, vetch, western brackenfern, Woods' rose.

Site Condition: This site has healthy and abundant riparian vegetation. It seems undisturbed except right around pipe and the excavated pond, which is downstream a few hundred feet. There is a road close to the spring outflow pipe. A wildlife camera was near the site.


Spring U.S. Forest Service 5145 source surrounded by log exclosure fence (left), and site overview including pipes on ground leading to trough (right).

Spring Name: U.S. Forest Service 5145
GCT Site ID: Spring 36
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,558
Grazing Allotment: Cottonwood (open to livestock)
Survey Date: June 21, 2018
General Location: Elk Ridge, north area

Site Description: The spring source is surrounded by a relatively new log fence about 12 feet by 12 feet. Herbaceous wetland vegetation is growing inside the fenced area, which has what looks like a covered well. A pipe from the source goes to a trough with animal access on either side of a fence that crosses the trough. The surrounding area is aspen forest.

Hydrology: Wetland grasses at the source suggest some groundwater. There is constant dripping over the rim of the full trough in three or four places.

Wildlife Water Access: Access on both sides of the fence that goes across the trough.
Needs wildlife escape ramp.

Reference Site: No

Restoration Recommendations: Improve fence for the larger area. Current fence is not fully functional and the area is trampled, weedy, and bare. The log fence around spring is very effective, with much wetland vegetation, but it is only about 150 square feet.

Evidence of Wildlife: Clark's nutcracker, robin, unidentified bird, western tanager, woodpecker.

Plants: American speedwell, chokecherry, common yarrow, fowl mannagrass, Kentucky bluegrass*, mountain snowberry, orchardgrass*, quaking aspen, sedge, seep monkeyflower, shepherd's purse*, smooth brome*, sweetclover*, timothy*, Woods' rose.

Site Condition: The source is somewhat protected by the log fence exclosure, but that is a relatively small area. The site is heavily grazed outside of that exclosure, where weeds are abundant. The soil is compacted, eroded, and pedestaled. Water is diverted to the trough. The surrounding area is a relatively healthy aspen forest that includes young and old trees.


Spring U.S. Forest Service 5160 source location (left), and site overview (right).

Spring Name: U.S. Forest Service 5160
GCT Site ID: Spring 55
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,435
Grazing Allotment: Gooseberry (currently closed to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: Hillslope spring flowing from under a large rock. Sections of wooden fence are present above the spring source, with piping to a trough. The surrounding forest vegetation consists of Douglas fir, gambel oak, ponderosa pine, Rocky Mountain juniper, and white fir.

Hydrology: Pipes from underground carry water to a trough that it is overflowing with water. Minimal water is flowing above the trough; the water is mostly standing.

Wildlife Water Access: Wildlife can access the flow and trough which is full and overflowing. A wildlife escape ramp is needed.

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status of the allotment. Remove the piping and trough.

Evidence of Wildlife: Elk tracks and scat, hairy woodpecker, raven.

Plants: American speedwell, Colorado blue columbine, Columbian monkshood, common dandelion*, feathery false lily of the valley, fowl mannagrass, Franciscan bluebells, Kentucky bluegrass*, mountain goldenbanner, mountain snowberry, redosier dogwood, Richardson's geranium, smallwing sedge, Woods' rose, woolly sedge.

Site Condition: Riparian vegetation is abundant. The nearby trail does not seem to be impacting the spring. Good flow into the trough and much overflowing water. Some grazing, trails, and soil trampling by wild ungulates.


Gooseberry Guard Station spring site (left), and dry water trough (right).

Spring Name: Gooseberry Guard Station Spring
GCT Site ID: Spring 51
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,534
Grazing Allotment: Gooseberry (currently closed to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: Dry. There are two long-unused troughs and pipes, but no water. There is a fenced meadow with shrubby cinquefoil, which indicates some soil moisture. There is a small corral.

Hydrology: Dry

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: Retain livestock-free status of the allotment.

Evidence of Wildlife: None recorded

Plants: Mesic graminoids, shrubby cinquefoil nearby.

Site Condition: The site looks like it has been disturbed by livestock and human activities associated with the Guard Station, including the fence, road, which is about 30 feet from the trough, and water diversion infrastructure.


Government Trailhead Spring source (left) and site overview (right).

Spring Name: Government Trailhead Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,600
Grazing Allotment: Slickhorn (open to livestock)
Survey Date: May 26, 2018
General Location: Trail leading into Grand Gulch

Site Description: A moist meadow with wetland graminoids and patches of willow and cottonwood. A berm probably helps sustain this wetland in wetter periods, and may have been created to provide water to livestock. There are four old cottonwood trees.

Hydrology: No surface water, but wetland vegetation and a small channel at the upper end of the meadow indicate past flows.

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: Fence this spring-wetland.

Evidence of Wildlife: None recorded

Plants: Cheatgrass*, coyote willow, foxtail barley, Fremont cottonwood, spikerush, tamarisk*, western tansymustard.

Site Condition: Wetland vegetation is abundant but no surface water was observed. The dense vegetation stands out in this dry setting. Some impacts from grazing, such as trails and trampling, are present but they seem to be old. Government Trailhead is a few hundred feet away.


Green House Canyon Main Spring source (left) and site overview (right).

Spring Name: Green House Canyon, Main Spring
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,372
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 28, 2018
General Location: Green House Canyon, off Grand Gulch

Site Description: Channel pool that seems to be fed by groundwater. A large, car-sized boulder is next to the pool, as is some riparian vegetation, but it is not very dense.

Hydrology: There is a pool of standing water, about 3 feet wide, 10 feet long and 6 inches deep.

Wildlife Water Access: Good

Reference Site: No

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Deer tracks

Plants: Arctic rush, buckwheat, Canada wildrye, cheatgrass*, Indian hemp, Kentucky bluegrass*, mule-fat, ripgut brome*.

Site Condition: Moderately good condition although there are some human impacts from hikers accessing water. High flows create disturbance. Some tamarisk* are nearby.


Green House Canyon, Salted Rainbow Spring source (left) and site overview (right).

Spring Name: Green House Canyon, Salted Rainbow Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,348
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 28, 2018
General Location: Green House Canyon, off Grand Gulch

Site Description: Hanging garden where water seeps out along a cliff wall for a few hundred feet. There is somewhat dense vegetation, particularly reedgrass, at the base. Much precipitate is on the wall. Nearby vegetation is sparse but includes Fremont cottonwood, cheatgrass,* and tamarisk.*

Hydrology: A small amount of water seeps out along the wall, creating wet spots with wetland vegetation on the wall and at the base.

Wildlife Water Access: Good

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Hummingbird

Plants: Arctic rush, buckwheat, cheatgrass*, curl-leaf mountain mahogany, ditch reedgrass, golden sedge, Mancos columbine, mule-fat, rubber rabbitbrush, singleleaf ash, stream orchid, white sagebrush.

Site Condition: Good condition hanging garden with robust wetland vegetation.


Green House Canyon, South Side Canyon spring source (left) and site overview (right).

Spring Name: Green House Canyon, South Side Canyon Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,343
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 28, 2018
General Location: Green House Canyon, off Grand Gulch

Site Description: Hanging garden on tall wall at the head of a small side canyon of Green House Canyon. Water seeps from the wall and sustains a dense patch of grass at the base of the wall. Small patches of hanging garden plants are on the wall. Nearby vegetation includes buffaloberry, juniper, piñon pine, serviceberry, single-leaf ash, sumac, and snowberry.

Hydrology: Water drips and oozes down the wall.

Wildlife Water Access: Good

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: None recorded

Plants: Ditch reedgrass, Fremont cottonwood, rockspirea, tamarisk*, thistle (native).

Site Condition: Very good. There is minor nearby evidence of trails by animals or people.


Green House Canyon, Upper South Side Canyon wet well with precipitate and hanging garden plants (left) and site overview (right).

Spring Name: Green House Canyon, Upper South Side Canyon Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,381
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 28, 2018
General Location: Green House Canyon, off Grand Gulch

Site Description: Hanging garden in a steep side canyon of Green House Canyon, with water dripping from the wall and supporting wetland plants and moss.

Hydrology: Water drips and oozes along approximately 250 feet of wet wall, creating a hanging garden. Flow seeps to the base of the wall where there is much vegetation. The flow from the wall was estimated to be hundreds of milliliters per minute.

Wildlife Water Access: Good

Reference Site: Yes

Restoration Recommendations: Retain livestock-free status.

Evidence of Wildlife: Hummingbird, deer tracks, small mammal tracks.

Plants: Alderleaf buckthorn, buckwheat, ditch reedgrass, Eastwood's monkeyflower, Mancos columbine, mat rockspirea, singleleaf ash, skunkbush sumac, stream orchid.

Site Condition: Great. Vegetation present on the wet wall.


Hwy 95 Spring wet wall (left) and site overview (right).

Spring Name: Highway 95 Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: No
Elevation (ft): 5,110
Grazing Allotment: Comb Wash (open to livestock)
Survey Date: June 21, 2018
General Location: Comb Wash, north of Highway 95

Site Description: Hanging garden in an east-facing alcove. There is evidence of water seeping from the ledge for about 100 feet. Goldenrod plants are on a small flat area at the lowest seep. The surrounding vegetation is piñon-juniper woodland and includes roundleaf buffaloberry.

Hydrology: There is no surface water, but there are patches of damp and/or saturated soil and wetland plants such as common maidenhair (fern).

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: None recorded

Evidence of Wildlife: None recorded

Plants: Alderleaf buckthorn, brickellbush, butterfly milkweed, common maidenhair, coyote willow, curl-leaf mountain mahogany, desert needlegrass, ditch reedgrass, Fremont cottonwood, goldenrod, hairy false goldenaster, Rocky Mountain rush, sideoats grama, snowberry, tapered rosette grass, Torrey's jointfir.

Site Condition: Very little water seeps from the wall, but maidenhair fern is present. Trails were observed, but no other disturbances were observed.


Maverick Spring with pipe coming from ground (left) leading to trough that overflows to hillslope wetland (right).

Spring Name: Maverick Spring
GCT Site ID: Spring 1
Land Manager: U.S. Forest Service
Removed from Monument: No
Elevation (ft): 7,847
Grazing Allotment: Twin Springs (open to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, south end

Site Description: Hillslope spring with a water trough filled by a pipe that comes from upslope. A fenced area, measuring about 25 feet by 75 feet, surrounds a hillslope wetland with dense wetland graminoids. Outside the exclosure there is less vegetation and more upland species, but some wetland species are also outside the fence. The surrounding vegetation is piñon-juniper woodland.

Hydrology: The trough is full of water, which drips in from a pipe. Water overflows the trough and flows down to the fenced wetland.

Wildlife Water Access: Water access is good, but the trough lacks an escape ramp for small mammals.

Reference Site: No

Restoration Recommendations: None recorded

Evidence of Wildlife: Ash-throated flycatcher, bear scat, coyote tracks, mountain chickadee, spotted towhee, turkey feather, violet-green swallow.

Plants: Alderleaf mountain mahogany, alkali buttercup, arctic rush, bulrush, common dandelion*, Gambel oak, goldenrod, Kentucky bluegrass*, roundleaf buffaloberry, rubber rabbitbrush, rush, saltgrass, smooth brome*, speedwell, spikerush, toad rush, two-needle piñon, Utah juniper, Utah serviceberry, Woods' rose.

Site Condition: Good condition in the exclosure with dense wetland graminoid vegetation. The tall fence works well to protect the wetland. Area outside the exclosure is highly impacted, with signs of trampling, trails, and grazing. It looks like there was an older fence that used to be a larger exclosure. An old road goes through the upper edge of the spring area where the trough and pipes are located. An old outhouse remains below the site. Grazing around the exclosure has caused soil erosion, compaction, and some pedestaling.


North Notch Spring source (left) and site overview (right).

Spring Name: North Notch Spring
GCT Site ID: Spring 54
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,565
Grazing Allotment: Gooseberry (currently closed to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: Hillslope spring emerges from a large boulder. It is 50 yards from the source to the lower fence boundary where the spring drops off a steep cliff. About 150 yards downhill is a small cienega with wetland plants. The surrounding vegetation is ponderosa pine, Gambel oak, juniper, and aspen.

Hydrology: Groundwater emerges and forms a channel about 1 foot across and 1 inch deep. There are cattails to the right side of the stream, but no visible water.

Wildlife Water Access: There is good access to water in the channel but no access at the source. The trough is not currently connected to the water source. There is a small amount of standing water in the trough. A wildlife escape spot is present.

Reference Site: Yes

Restoration Recommendations: Improve fencing by road; retain livestock-free status of the allotment.

Evidence of Wildlife: Deer, elk tracks and scat, hermit thrush, brown snake.

Plants: Alkali buttercup, American speedwell, arctic rush, Bebb's willow, common dandelion*, common mullein*, feathery false lily of the valley, fowl mannagrass, goldenrod, Kentucky bluegrass*, longstalk clover, meadow fescue*, muttongrass, New Mexico thistle, orchardgrass*, quaking aspen, Rocky Mountain juniper, Rocky Mountain rush, Scouler's St. Johnswort, smallwing sedge, smooth brome*, southern cattail, Woods' rose, yellow salsify*.

Site Condition: There is a steady flow and prevalent riparian vegetation. Past diversion of water led to a trough. There is log fencing on two sides but that does not exclude ungulates. Fencing continues down slope in a lower cienega. Some soil erosion and compaction was observed. A road leads to the edge of the spring fencing.


Pine Spring source (left) and site overview (right).

Spring Name: Pine Spring
GCT Site ID: Spring 128
Land Manager: Bureau of Land Management
Removed from Monument: No
Elevation (ft): 6,614
Grazing Allotment: Texas-Muley (open to livestock)
Survey Date: June 22, 2018
General Location: Cedar Mesa, just south of Highway 95

Site Description: A seep at the head of a drainage, which emerges between soil and underlying bedrock. Water forms pools that eventually become Picket Creek. The surrounding vegetation includes curl-leaf mountain mahogany, greenleaf manzanita, ponderosa pine, prickly pear, two-needle piñon, Utah juniper, and Utah serviceberry.

Hydrology: Water seeps between soil and bedrock into a channel with pools and a bedrock bottom. The pools are 25 feet long, 3 feet wide, and 2 feet deep.

Wildlife Water Access: Water is accessible to wildlife. A trough that is filled with soil and is half-fenced is about 400 yards away.

Reference Site: Yes

Restoration Recommendations: Remove non-native plants.

Evidence of Wildlife: Ash-throated flycatcher, black-chinned hummingbird, blue-gray gnatcatcher, bobcat tracks and scat, deer tracks and scat, house finch, peregrine falcon, plateau fence lizard.

Plants: Arctic rush, Cainville thistle, ditch rabbitsfoot grass, ditch reedgrass, feathery false lily of the valley, golden sedge, goldenrod, hairy false goldenaster, orchardgrass*, ravennagrass*, redosier dogwood, smooth brome*, smooth horsetail, sweetclover*, western white clematis, yellow willow.

Site Condition: Appears relatively untouched. Native wetland vegetation is dominant, although there are also some non-native plant species (noted above).


Posey Spring source (left) and site overview (right).

Spring Name: Posey Spring
GCT Site ID: Spring 65
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,196
Grazing Allotment: Bears Ears (open to livestock)
Survey Date: June 21, 2018
General Location: Elk Ridge, south end

Site Description: Hillslope spring emerges from steep, rocky slope. There is a metal catchment at the bottom of the slope with two pipes leading to two troughs; one is metal, one is wood. A pipe exits a trough and goes underground. There is an excavated tank about 50 feet southeast of the trough. The surrounding vegetation is gambel oak, Rocky Mountain juniper, Rocky Mountain maple, timothy grass,* and Woods' rose.

Hydrology: Site is dry, but willows indicate some groundwater.

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: Fence the area to allow vegetation to recover.

Evidence of Wildlife: Blue-gray gnatcatcher, hermit thrush, house finch, violet-green swallow.

Plants: Bebb's willow, common dandelion,* common yarrow, Fendler's meadow-rue, goldenrod, Kentucky bluegrass,* longstyle rush, mountain snowberry, Richardson's geranium, smallwing sedge, smooth brome.*

Site Condition: Impacts from cattle and wild ungulates include grazed plants, trampling, and soil compaction. An all-terrain vehicle trail is nearby. Pipes are broken. Excavation may have been done in the past.


Poso Spring source (left) and site overview (right).

Spring Name: Poso Spring
GCT Site ID: Spring 58
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,563
Grazing Allotment: Gooseberry (currently closed to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: Hillslope spring emerges from rock and leads down a steep drainage to stagnant pools. Wetland graminoids are at the spring source. The surrounding vegetation is ponderosa pine, Douglas fir, white fir, and aspen.

Hydrology: Patches of water that are almost connected. Slight flow is present in some places.

Wildlife Water Access: Water is accessible to wildlife.

Reference Site: No

Restoration Recommendations: Retain livestock-free status of the allotment.

Evidence of Wildlife: Elk tracks and scat.

Plants: American speedwell, common dandelion*, common yarrow, fowl mannagrass, Franciscan bluebells, Kentucky bluegrass*, longstalk clover, smallwing sedge, snowberry, sweetcicely, white fir.

Site Condition: The slopes along the channel are highly eroded. Species richness seems low; only one veronica and some grasses. Mannagrass is abundant and sedges are common. Significant tree cutting, particularly ponderosa pine and white fir has occurred recently, apparently as a thinning effort. Some cut trees are still green. Fallen trees are in the wash. Trails, soil compaction, and erosion from animals and/or people are present.


Red House site overview with evidence of old berm (both photos) which may have impounded water in the past.

Spring Name: Red House Spring
GCT Site ID: Spring 145
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,165
Grazing Allotment: Lake Canyon (open to livestock)
Survey Date: June 22, 2018
General Location: Cedar Mesa, near Highway 276

Site Description: Dry site that includes old stone house ruins, perhaps from the early 1900s, old tin cans, and assorted trash. Open depressions with an L-shaped berm are near the road with U.S. Geological Survey marker. Depression vegetation includes tamarisk* and greasewood. Soil is alkaline. Nearby vegetation is blackbrush, milkvetch, Navajo yucca, and prickly pear.

Hydrology: Dry

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: None recorded

Evidence of Wildlife: Desert spiny lizard, black-throated sparrow, bobcat tracks and scat, deer skeleton, whiptail lizard, kingbird, piñon jay.

Plants: Greasewood, scratchgrass, shadscale saltbush, tamarisk*, Utah juniper.

Site Condition: The site is dry and there is evidence of grazing and trampling by ungulates as well as excavation by people.


Rock Spring apparent source (left) and site overview (right).

Spring Name: Rock Spring
GCT Site ID: Spring 112
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,257
Grazing Allotment: White Canyon (open to livestock)
Survey Date: June 21, 2018
General Location: Cedar Mesa, Fry Canyon area, along Highway 95

Site Description: A dry site with 3-inch diameter black plastic piping buried at the apparent source. Bricks are present. A pipe runs for about 100 feet to a small catchment pond. Cattle trails, a salt block, and unknown farm equipment were observed. A major highway culvert drains parallel to the spring channel, which is highly eroded. The surrounding vegetation is Utah juniper, piñon pine, cliffrose, Fremont barberry, Navajo yucca, and single leaf ash. There is also biocrust.

Hydrology: Dry, with alkaline soil

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: None recorded

Evidence of Wildlife: Blue-gray gnatcatcher, sharp-shinned hawk, whiptail lizard, western fence lizard.

Plants: Annual rabbitsfoot grass,* broom snakeweed, cheatgrass*, goldenrod, mountain snowberry, scratchgrass, thistle, tamarisk*, two-needle piñon, Utah serviceberry.

Site Condition: There is no surface water, but there is evidence of past water presence. Tamarisk* is present near the source. A small channel with piping leads to a dried pool with cattle tracks. Two T-posts are near the pipe outlet. There is trash at the site, and salt blocks are nearby. A road is above the spring source. Evidence of channel erosion, general erosion, and soil compaction by cattle and people is present.


Sego Spring source surrounded by log fence (left) and site overview (right).

Spring Name: Sego Spring
GCT Site ID: Spring 59
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,737
Grazing Allotment: Cottonwood (open to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: The spring source is fenced with logs that form an approximately 20 foot by 20 foot exclosure. Inside the exclosure there is much herbaceous vegetation and what looks like an old well. The area outside the exclosure is highly grazed and trampled. Pipes go from the source to a trough that has stagnant water. The surrounding vegetation is aspen forest and gambel oak.

Hydrology: There is water in the trough, but minimal flow, approximately 0.1 liters per minute, coming in. The only evidence of water are some patches of slightly damp soil.

Wildlife Water Access: Needs wildlife escape ramp. Small dead animals were floating in trough (Figure 3).

Reference Site: No

Restoration Recommendations: Fence a larger area of the spring and wetland area with better fence; current fence is made of old logs. Remove old infrastructure.

Evidence of Wildlife: Elk tracks and scat.

Plants: Alkali buttercup, American speedwell, American vetch, Bebb's willow, Columbia needlegrass, common dandelion*, common yarrow, Franciscan bluebells, gambel oak, Kentucky bluegrass*, lambsquarters*, longstalk clover, longstalk clover, meadow fescue*, mountain snowberry, orchardgrass*, prostrate knotweed*, quaking aspen, Richardson's geranium, shepherd's purse*, smallwing sedge, smooth brome*, timothy*, trailing fleabane, tuber starwort, Woods' rose.

Site Condition: Site is heavily impacted by cattle, elk, and deer. There is much bare ground, soil compaction, and erosion. A small area around the source is somewhat protected by a log fence. The site is adjacent to the allotment boundary fence, which is intended to keep cattle outside the White Mesa Cultural and Conservation Area (Gooseberry Allotment). The fence and proximity to the ungrazed allotment probably increases animal visitation to this spring. A large, old Bebb's willow is heavily browsed on the lower part of the plant. A game camera and salt lick were observed.


Snow Flat 1 Spring source (left) and site overview (right).

Spring Name: Snow Flat 1 Spring
GCT Site ID: Spring 149
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,555
Grazing Allotment: Comb Wash (open to livestock)
Survey Date: June 20, 2018
General Location: Between Comb Ridge and Highway 261

Site Description: Hanging garden that is approximately 75 feet across, and sits between Navajo sandstone and Kayenta shale layers. The site is at the top of an alcove on the north side. Three hanging gardens, Snowflakes 1, 2, and 3, are in the area. The surrounding vegetation is piñon-juniper woodland.

Hydrology: A pool approximately 6 feet by 6 feet is at the source. Just downslope, water seeps off a ledge, supporting a large stand of coyote willow.

Wildlife Water Access: Surface water is present and is easily accessible.

Reference Site: Yes

Restoration Recommendations: None

Evidence of Wildlife: Black-throated sparrow, canyon wren, great horned owl, hummingbird, jay, lizard, turkey vulture, violet-green swallow.

Plants: Arctic rush, columbine, coyote willow, desert needlegrass, ditch reedgrass, Fremont cottonwood, goldenrod, sedge, southern cattail, toad rush, two-needle piñon, Utah juniper.

Site Condition: Excellent. The only disturbance is a small earthen water impoundment on the west side of the spring. No invasive plants were observed.


Snow Flat 2 Spring source (left) and site overview (right).

Spring Name: Snow Flat 2 Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,540
Grazing Allotment: Comb Wash (open to livestock)
Survey Date: June 20, 2018
General Location: Between Comb Ridge and Highway 261

Site Description: Hanging garden that is nearly dry on an east-facing wall that is about 100 square feet. This spring is approximately 150 feet downstream of Snow Flat 1 Spring.

Hydrology: There is damp soil under vegetation, but no surface water.

Wildlife Water Access: No surface water

Reference Site: Yes

Restoration Recommendations: None

Evidence of Wildlife: Swallow

Plants: Columbine, common dandelion*, coyote willow, desert princesplume, ditch reedgrass, Fremont cottonwood, goldenrod, Kentucky bluegrass*, roundleaf buffaloberry, Rydberg's thistle, sedge, skunkbush sumac, Utah serviceberry.

Site Condition: There is wetland vegetation, but no surface water was observed. No significant disturbances were observed.


Snow Flat 3 wet wall close-up (left) and site overview (right).

Spring Name: Snow Flat 3 Spring (name created in the field)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,542
Grazing Allotment: Comb Wash (open to livestock)
Survey Date: June 20, 2018
General Location: Between Comb Ridge and Highway 261

Site Description: Hanging garden that is relatively small, approximately 500 feet downstream of Snow Flat 2 Spring, across alcove, facing south.

Hydrology: Small, less than 4-inch patches of standing water.

Wildlife Water Access: Minimal surface water, but good for birds and insects.

Reference Site: No

Restoration Recommendations: None

Evidence of Wildlife: None recorded

Plants: Arctic rush, ditch reedgrass, longstyle rush, scarlet monkeyflower.

Site Condition: The condition is good, but the spring appears to have dried up substantially. Evidence of recreational visitation.


Spring 11 source (left) and site overview (right).

Spring Name: unknown
GCT Site ID: Spring 11
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 8,507
Grazing Allotment: Cottonwood (open to livestock)
Survey Date: June 21, 2018
General Location: Elk Ridge, north area

Site Description: Hillslope spring with a distinct groundwater emergence spot which supports a wet grassland. The surrounding vegetation is aspen-oak forest.

Hydrology: A small, steady flow of water runs down a channel and forms a wetland. An old pipe leads to a trough in the lower part of the spring-wetland area, but it has no flow.

Wildlife Water Access: Good water access at source and outflow stream. A pipe leads to trough but it is dry. A wildlife escape ramp is needed.

Reference Site: No

Restoration Recommendations: Fence the area to allow for recovery of the wetland vegetation in the lower section that is trampled by elk.

Evidence of Wildlife: Elk tracks and flicker.

Plants: American speedwell, arctic rush, Bebb's willow, clover, gooseberry currant, Kentucky bluegrass*, longstyle rush, mountain snowberry, orchardgrass*, quaking aspen, smallwing sedge, timothy grass*, toad rush, Woods' rose.

Site Condition: Relatively good condition. There is a small, but steady, discharge of water which supports a graminoid wetland with riparian shrubs and trees further down. There is water development infrastructure, including pipes, fences, and a trough, that only partially function, if at all. There is a bit of channel erosion and pedestals but the wetland vegetation is abundant. The lower wetland area is heavily grazed and trampled by deer and/or elk.


Spring 125 possible spring sources (both photos).

Spring Name: unknown
GCT Site ID: Spring 125
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,550
Grazing Allotment: Cottonwood (open to livestock)
Survey Date: June 21, 2018
General Location: East of Comb Ridge, north of Hwy 95

Site Description: No surface water was present. This may be or have been a spring that emerges in the channel. There is vegetation on the terrace that is indicative of water.

Hydrology: Patches of damp soil

Wildlife Water Access: No surface water

Reference Site: No

Restoration Recommendations: None recorded

Evidence of Wildlife: None recorded

Plants: Arctic rush, common reed, coyote willow, Fremont cottonwood, hairy false goldenaster, scarlet gilia, smooth brome*, sweetclover*, western white clematis.

Site Condition: No surface water is present. The exact location of the spring is unclear. The terrace is about 3 feet high and has seen severe downcutting and erosion, which has likely affected the spring.


Spring 29 source (left) and water trough (right).

Spring Name: unknown
GCT Site ID: Spring 29
Land Manager: U.S. Forest Service
Removed from Monument: Yes
Elevation (ft): 7,893
Grazing Allotment: Cottonwood (open to livestock)
Survey Date: June 20, 2018
General Location: Elk Ridge, north area

Site Description: Hillslope spring in dry meadow, which historically has been wet. The spring water is piped to a cattle trough about 250 feet downhill. A pipe from the trough leads to a dry pond approximately 150 feet away.

Hydrology: Dry at spring source. Flow from the pipe was measured as 4.2 liters per minute. Overflow from the trough flows into small wet meadow and down a channel created to transport water from the dam of a small pond.

Wildlife Water Access: Yes, the two full troughs are easily accessible. It needs a wildlife escape ramp.

Reference Site: No

Restoration Recommendations: Fence the area to exclude cattle and allow vegetation to recover.

Evidence of Wildlife: Elk scat.

Plants: Antelope bitterbrush, arctic rush, broom snakeweed, common dandelion*, common yarrow, curlycup gumweed, gambel oak, hairy false goldenaster, herb sophia*, intermediate wheatgrass*, Kentucky bluegrass*, mountain snowberry, orchardgrass*, quaking aspen, rock goldenrod, smooth brome*, sweetclover*, timothy*, western wheatgrass, Woods' rose, woolly cinquefoil.

Site Condition: All the water is piped from the spring source to two cattle troughs which overflow and create a 12 foot by 100 foot wetland leading to a diversion. The pond is fenced from cattle, protecting some of the wet meadow, but not all of it. Elk trampling and heavy cattle trampling were evident from the source to the trough. Soil erosion and pedestals were observed.


Step Canyon Blackwater Pool (left) and site overview (right).

Spring Name: Step Canyon Blackwater Pool (name created in the field)
GCT Site ID: Spring 133 (near)
Land Manager: Bureau of Land Management
Removed from Monument: Yes
Elevation (ft): 5,263
Grazing Allotment: Slickhorn (closed to livestock)
Survey Date: May 27, 2018
General Location: Step Canyon, a side canyon of Grand Gulch

Site Description: This pool was in an otherwise dry channel. A spring is listed for Step Canyon, but it was not found at the location of the coordinates. This pool was about a quarter mile downstream of the listed coordinates, and it was the only significant water observed in the canyon. It was not clear if it was fed by groundwater and hence a spring.

Hydrology: Standing water in a pool.

Wildlife Water Access: The open pool is accessible to animals.

Reference Site: No

Restoration Recommendations: Retain livestock-free status

Evidence of Wildlife: None recorded

Plants: None around the pool

Site Condition: Barren

Table 5. *Historic spring locations for which no spring was found during the field visits of June 20-22, 2018.*

Spring Name	GCT Site ID	Source of Site Coordinates	Land Manager and Allotment	Comment
U.S. Forest Service 5149	Spring 57	Database of U.S. Forest Service (an undated note in the database said "Location may be off")	U.S. Forest Service; Gooseberry	No spring found.
Round Mountain Flowing Well	Spring 37	Database	U.S. Forest Service; Cottonwood	No spring found. One report says an underground pipe accesses groundwater.

Table 6. *Spring sites that were not accessible during the field visits we did June 20-22, 2018.*

Spring Name	GCT Site ID	Source of Site Coordinates	Land Manager and Allotment	Comment
Fry (114)	Spring 114	Geographic Names Information System (GNIS) developed by USGS	U.S. Forest Service; White Canyon	No trespassing signs. Other sign says "Closed for bighorn sheep lambing and rutting. Apr 15-July 15, Oct 15-Dec 31." In the distance, green vegetation was visible at the bottom of a small canyon.

Appendix A

Wildlife Observations at Springs in Bears Ears National Monument

Birds

American robin
ash-throated flycatcher
black-chinned hummingbird
black-throated sparrow
blue gray gnatcatcher
bushtit
canyon wren
chipping sparrow
Clarks nutcracker
Cooper's hawk
dark-eyed junco
flicker
gray flycatcher
great horned owl
hairy woodpecker
hermit thrush
house finch
house wren
juniper titmouse
kingbird
lesser goldfinch
mountain chickadee
mourning dove
peregrine falcon
piñon jay
plumbeous vireo
raven
Scott's oriole
sharp shinned hawk
spotted towhee
summer tanager
Townsend's solitaire
turkey
turkey vulture
violet-green swallow
western bluebird
western kingbird
western tanager
western wood peewee
yellow warbler

Amphibians

frog and tadpoles (unknown species)
leopard frog
red-spotted toad

Mammals

bear (evidence)
beaver (evidence)
bobcat (evidence)
chipmunk
coyote (evidence)
deer (evidence)
elk (evidence)
ground squirrel
rabbit
rodent (unknown species)

Reptiles

desert spiny lizard
lizards (unknown species)
long-nosed leopard lizard
plateau fence lizard
snake (unknown species)
whiptail lizard

Appendix B

Plants Observed at Springs in Bears Ears National Monument

Common Name	Species
alcove bog orchid	*Platanthera zothecina*
alderleaf buckthorn	*Rhamnus alnifolia*
alderleaf mountain mahogany	*Cercocarpus montanus*
alkali buttercup	*Ranunculus cymbalaria*
American speedwell	*Veronica Americana*
American vetch	*Vicia americana*
annual rabbitsfoot grass*	*Polypogon monspeliensis**
antelope bitterbrush	*Purshia tridentata*
arctic rush	*Juncus arcticus*
Arizona thistle	*Cirsium arizonicum*
beardtongue	*Penstemon* sp.
Bebb's willow	*Salix bebbiana*
big sagebrush	*Artemisia tridentata*
bigtooth maple	*Acer grandidentatum*
brickellbush	*Brickellia* sp.
broom snakeweed	*Gutierrezia sarothrae*
buckwheat	*Eriogonum* sp.
bull thistle*	*Cirsium vulgare**
bulrush	*Scirpus* sp.
burningbush*	*Bassia scoparia**
butterfly milkweed	*Asclepias tuberosa*
Cainville thistle	*Cirsium calcareum*
Canada wildrye	*Elymus canadensis*
catnip*	*Nepeta cataria**
cattail	*Typha* sp.
cheatgrass*	*Bromus tectorum**
chokecherry	*Prunus virginiana*
clover	*Trifolium* sp.
Colorado blue columbine	*Aquilegia coerulea*
Columbia needlegrass	*Achnatherum nelsonii*
Columbian monkshood	*Aconitum columbianum*
common dandelion*	*Taraxacum officinale**
common maidenhair	*Adiantum capillus-veneris*
common mullein*	*Verbascum thapsus**
common reed	*Phragmites australis*
common yarrow	*Achillea millefolium*
coyote willow	*Salix exigua*
crested wheatgrass*	*Agropyron cristatum**

Common Name	Species
curl-leaf mountain mahogany	*Cercocarpus ledifolius*
curlycup gumweed	*Grindelia squarrosa*
desert needlegrass	*Achnatherum speciosum*
desert princesplume	*Stanleya pinnata*
ditch rabbitsfoot grass	*Polypogon interruptus*
ditch reedgrass	*Calamagrostis scopulorum*
Douglas-fir	*Pseudotsuga menziesii*
Eastwood's monkeyflower	*Mimulus eastwoodiae*
elkweed	*Frasera speciosa*
feathery false lily of the valley	*Maianthemum racemosum*
Fendler's meadow-rue	*Thalictrum fendleri*
field horsetail	*Equisetum arvense*
fowl mannagrass	*Glyceria striata*
foxtail barley	*Hordeum jubatum*
Franciscan bluebells	*Mertensia franciscana*
Fremont cottonwood	*Populus fremontii*
Fremont's mahonia	*Mahonia fremontii*
Gambel oak	*Quercus gambelii*
golden sedge	*Carex aurea*
goldenrod	*Solidago* sp.
gooseberry currant	*Ribes montigenum*
greasewood	*Sarcobatus vermiculatus*
hairy false goldenaster	*Heterotheca villosa*
heartleaf bittercress	*Cardamine cordifolia*
Heller's rosette grass	*Dichanthelium oligosanthes*
herb sophia*	*Descurainia sophia**
Indian ricegrass	*Achnatherum hymenoides*
Indianhemp	*Apocynum cannabinum*
intermediate wheatgrass*	*Thinopyrum intermedium**
Kentucky bluegrass*	*Poa pratensis**
lambsquarters*	*Chenopodium album**
largeleaf avens	*Geum macrophyllum*
longstalk clover	*Trifolium longipes*
longstyle rush	*Juncus longistylis*
Mancos columbine	*Aquilegia micrantha*
mat rockspirea	*Petrophytum caespitosum*
meadow fescue*	*Schedonorus pratensis**
mountain goldenbanner	*Thermopsis montana*

Common Name	Species
mountain pepperweed	*Lepidium montanum*
mountain snowberry	*Symphoricarpos oreophilus*
mountain tansymustard	*Descurainia incana*
mule-fat	*Baccharis salicifolia*
muttongrass	*Poa fendleriana*
Nebraska sedge	*Carex nebrascensis*
New Mexico thistle	*Cirsium neomexicanum*
old-man-in-the-Spring*	*Senecio vulgaris**
orchardgrass*	*Dactylis glomerata**
owl's-claws	*Hymenoxys hoopesii*
pale evening primrose	*Oenothera pallida*
Parry's rabbitbrush	*Ericameria parryi*
ponderosa pine	*Pinus ponderosa*
prostrate knotweed*	*Polygonum aviculare**
quaking aspen	*Populus tremuloides*
Ravennagrass*	*Saccharum ravennae**
redosier dogwood	*Cornus sericea*
Richardson's geranium	*Geranium richardsonii*
ripgut brome*	*Bromus diandrus**
rock goldenrod	*Petradoria pumila*
rockspirea	*Holodiscus dumosus*
Rocky Mountain juniper	*Juniperus scopulorum*
Rocky Mountain rush	*Juncus saximontanus*
roundleaf buffaloberry	*Shepherdia rotundifolia*
rubber rabbitbrush	*Ericameria nauseosa*
russet buffaloberry	*Shepherdia canadensis*
Rydberg's thistle	*Cirsium rydbergii*
sacred thorn-apple	*Datura wrightii*
saltgrass	*Distichlis spicata*
scarlet gilia	*Ipomopsis aggregata*
scarlet globemallow	*Sphaeralcea coccinea*
scarlet monkeyflower	*Mimulus cardinalis*
Scouler's St. Johnswort	*Hypericum scouleri*
scouringrush horsetail	*Equisetum hyemale*
scratchgrass	*Muhlenbergia asperifolia*
seep monkeyflower	*Mimulus guttatus*
shadscale saltbush	*Atriplex confertifolia*
shepherd's purse*	*Capsella bursa-pastoris**
sideoats grama	*Bouteloua curtipendula*
singleleaf ash	*Fraxinus anomala*

Common Name	Species
skunkbush sumac	*Rhus trilobata*
smallwing sedge	*Carex microptera*
smooth brome*	*Bromus inermis**
smooth horsetail	*Equisetum laevigatum*
snowberry	*Symphoricarpos*
southern cattail	*Typha domingensis*
sparse-flowered bog orchid	*Platanthera sparsiflora*
spikerush	*Eleocharis* sp.
squirreltail	*Elymus elymoides*
stream orchid	*Epipactis gigantea*
sugarberry	*Celtis laevigata*
sweetcicely	*Osmorhiza berteroi*
sweetclover*	*Melilotus officinalis**
tamarisk*	*Tamarix chinensis**
tansyaster	*Machaeranthera*
tapered rosette grass	*Dichanthelium acuminatum*
timothy*	*Phleum pratense**
toad rush	*Juncus bufonius*
Torrey's jointfir	*Ephedra torreyana*
trailing fleabane	*Erigeron flagellaris*
tuber starwort	*Pseudostellaria jamesiana*
tufted hairgrass	*Deschampsia cespitosa*
two-needle piñon	*Pinus edulis*
Utah bladderpod	*Lesquerella utahensis*
Utah juniper	*Juniperus osteosperma*
Utah serviceberry	*Amelanchier utahensis*
vetch	*Vicia* sp.
violet	*Viola* sp.
western brackenfern	*Pteridium aquilinum*
western tansymustard	*Descurainia pinnata*
western wheatgrass	*Pascopyrum smithii*
western white clematis	*Clematis ligusticifolia*
white fir	*Abies concolor*
white sagebrush	*Artemisia ludoviciana*
Woods' rose	*Rosa woodsii*
woolly cinquefoil	*Potentilla hippiana*
woolly sedge	*Carex pellita*
Wyoming Indian paintbrush	*Castilleja linariifolia*
yellow salsify*	*Tragopogon dubius**
yellow willow	*Salix lutea*

Endnotes

[1] "Presidential Proclamation—Establishment of the Bears Ears National Monument." December 26, 2016. https://obamawhitehouse.archives.gov/the-press-office/2016/12/28/proclamation-establishment-bears-ears-national-monument. Accessed March 11, 2019.

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[9] Springs Stewardship Institute. http://springstewardshipinstitute.org/. Accessed March 11, 2019.

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