

Appendix C: Spring Inventory and Assessment Reports for Springs Surveyed for Fire Effects

Springs outside of the Upper Santa Cruz River Basin used in Fire Effects and Fuels Analysis

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Catalina Mountains

Bug Spring

Survey Summary Report, Site ID 12828

Location: The Bug Spring ecosystem is located in Pima County in the Rillito Arizona 15050302 HUC, managed by the US Forest Service. The spring is located in the Sierra Vista RD, Coronado NF at 32 21' 1.648", -110 42' 26.68" in the Agua Caliente Hill USGS Quad, measured using a GPS (NAD 83). The elevation is approximately 1570 meters. Bill Beaver, Paul Condon, Graciela Robinson, Karen Lowery, and Randy Serraglia surveyed the site on 4/22/12 for 02:00 hours, beginning at 15:00, and collected data in 4 of 12 categories.

Physical Description: Bug Spring is a rheocrene spring

The distance to the nearest spring is 1949 meters.

Survey Notes: This survey was part of a training session early on in the process. There is a pool formed from boulders in the channel that is 3m deep. The trees have some damage due to fire. There is algae covering the top pool, but the bottom pool had none. The channel has a sandy bottom. There is some piping down below the source that are not being used.

Flora: Surveyors identified 59 plant species at the site. These included 49 native and 4 nonnative species; the native status of 6 species remains unknown.

Table 1 Bug Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	33	7
Shrub	14	4
Mid-canopy	4	3
Tall canopy	2	0
Basal	0	0
Aquatic	2	2
Non-vascular	1	0

Table 2 Bug Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Agave palmeri	GC	N	U
Agrostis	GC	I	W
algae	AQ	N	
Amorpha fruticosa	SC	N	F
Arctostaphylos pungens	SC	N	U
Astragalus nothoxys	GC	N	
Astrolepis sinuata	GC	N	
Berberis wilcoxii		N	
Bouteloua hirsuta	GC	N	U
Carex	GC	N	
Carex	GC	N	
Castilleja integra	GC	N	
Cercocarpus montanus	SC	N	U
Dasyilirion wheeleri		N	
Dasyilirion wheeleri	SC	N	
Echinocereus	SC		U
Elymus elymoides	GC	N	F
Erigeron	GC	N	F
Garrya	GC	N	U
Garrya wrightii	SC	N	F
Glandularia bipinnatifida	GC	N	U
Juncus	GC	N	
Juncus	GC	N	
Juniperus deppeana	MC	N	U
Lactuca	GC	I	WR
Lonicera albiflora	SC	N	U
Mimosa	GC	N	
Mimulus	GC	N	W
Mimulus guttatus	GC	N	W
Monarda citriodora	GC	N	
moss	NV	N	F
Muhlenbergia emersleyi	GC	N	
Nasturtium officinale	AQ	I	W
Nolina microcarpa	SC	N	U
Packera neomexicana	GC	N	U
Penstemon stenophyllus	GC	N	
Pinus discolor	TC	N	
Piptochaetium fimbriatum	GC	N	
Platanus wrightii	MC	N	R
Populus fremontii	MC	N	R
Prosopis velutina	SC	N	F
Pseudognaphalium	GC	N	W
Pseudognaphalium leucocephalum	GC	N	
Quercus arizonica	MC	N	R
Quercus toumeyii		N	
Quercus turbinella	SC	N	F
Rhamnus betulifolia	SC	N	WR

Rhus virens var. choriophylla		N	
Rubus	SC		R
Salix	SC	N	WR
Salix bonplandiana	TC	N	
Taraxacum officinale	GC	I	F
Thalictrum fendleri	GC	N	F
Toxicodendron radicans	GC	N	WR
Tragia nepetifolia	GC	N	F
Typha	GC		A
unknown grass	GC		
unknown grass	GC		
Verbena	GC		F
Vitis arizonica	SC	N	R

Fauna: Surveyors collected or observed 1 aquatic and 9 terrestrial invertebrates and 2 vertebrate specimens.

Table 3 Bug Spring Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Aranea		T	Spot		more than 1
Coleoptera Dytiscidae	Ad		Spot	1	
Diptera	Ad	T	Spot		"gnat-like bugs"
Diptera	Ad	T	Spot		more than 1
Diptera Asilidae Efferia	Ad	T	Spot	1	female
Diptera Culicidae	Ad	T	Spot		more than 1
Hemiptera Belostomatidae	Ad	T	Spot	1	
Hymenoptera	Ad	T	Spot	1	
Lepidoptera Lycaenidae	Ad	T	Spot		more than 1
Odonata	Ad	T	Spot	1	damselfly

Table 4 Bug Spring Vertebrates.

Species Common Name	Count	Detection
tree lizard	1	obs
hummingbird	1	obs

Assessment: Assessment scores were compiled in 5 categories and 27 subcategories, with 15 null condition scores, and 16 null risk scores. Aquifer functionality and water quality are moderate with some restoration potential and there is moderate risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is moderate risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is moderate with some restoration potential and there is moderate risk.

Table 5 Bug Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	3.2	3.4
Geomorphology	3.6	3.8
Habitat	4	2.5
Biota	4.2	2.6
Human Influence	4	3.33
Administrative Context	0	0
Overall Ecological Score	3.75	3.08

Chiricahua Mountains

Anita Spring

Survey Summary Report, Site ID 17176

Location: The Anita Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.85190, -109.28532 in the Chiricahua Peak USGS Quad, measured using a GPS (NAD83, estimated position error 3 meters). The elevation is approximately 2837 meters. Louise Misztal, Randy Seraglio, Glenn Furnier, Aida Castillo-Flores, Matt Minjeres surveyed the site on 5/30/15 for 01:00 hours, beginning at 14:00, and collected data in 9 of 12 categories.



Fig 1 Anita Spring.

Physical Description: Anita Spring is a hillslope spring. The site has 2 microhabitats, including A -- a 1 sqm pool, B -- a 12 sqm channel.

Anita Spring emerges as a seepage or filtration spring from a igneous rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 847 meters.

Survey Notes: The area has burned recently. The site is surrounded by erosion gullies and standing dead burned trees.

Table 1 Anita Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value	Comments
pH (field)	8	
Specific conductance (field) (uS/cm)	30	
Temperature, air C	22.8	
Temperature, water C	9.2	

Flora: Plant list is for the site as a whole. Surveyors identified 4 plant species at the site, with 0.3137 species/sqm. These included 3 native and 1 nonnative species.

Table 2 Anita Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	3	1
Shrub	1	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Anita Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Ribes	SC	N	F
Rubus idaeus	GC	NI	F
Sambucus	GC		F
Veratrum	GC	N	WR

Fauna: Surveyors collected or observed 1 aquatic invertebrates and 10 vertebrate specimens.

Table 4 Anita Spring Invertebrates.

Species	Lifestage	Habitat	Method	Rep#	Count	Species detail
Turbellaria Planariidae		A	Spot		1	

Table 5 Anita Spring Vertebrates.

Species Common Name	Count	Detection
yellow-rumped warbler	1	obs
Broad-tailed hummingbird	2	call
yellow-eyed junco	10	obs
Steller's jay	2	obs
hairy woodpecker	1	obs
house wren	1	obs
cordilleran flycatcher	1	
American robin	1	
western bluebird	1	
American black bear	1	obs

Assessment: Assessment scores were compiled in 5 categories and 31 subcategories, with 11 null condition scores, and 11 null risk scores. Aquifer functionality and water quality are moderate with some restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 6 Anita Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	3.8	2.4
Geomorphology	3.2	3
Habitat	4.4	2.4
Biota	4.9	2.1
Human Influence	4	2.2
Administrative Context	0	0
Overall Ecological Score	4.1	2.4

Management Recommendations: This spring is in the Chiricahua Wilderness on a side trail to the main Chiricahua Ridge trail. It is used by hikers/backpackers as well as local bears as a water source. The site has suffered some erosion, especially in the runout channel due to fire in the surrounding hillslopes and unstable soil. The trail leading to the site is in poor shape and suffering from erosion and user created spurs. Overall the site could benefit from some erosion stabilization and possibly restoration of the diversity of plants expected to be at this type of site (assuming some plant diversity has been lost due to fire and seed bank loss.)

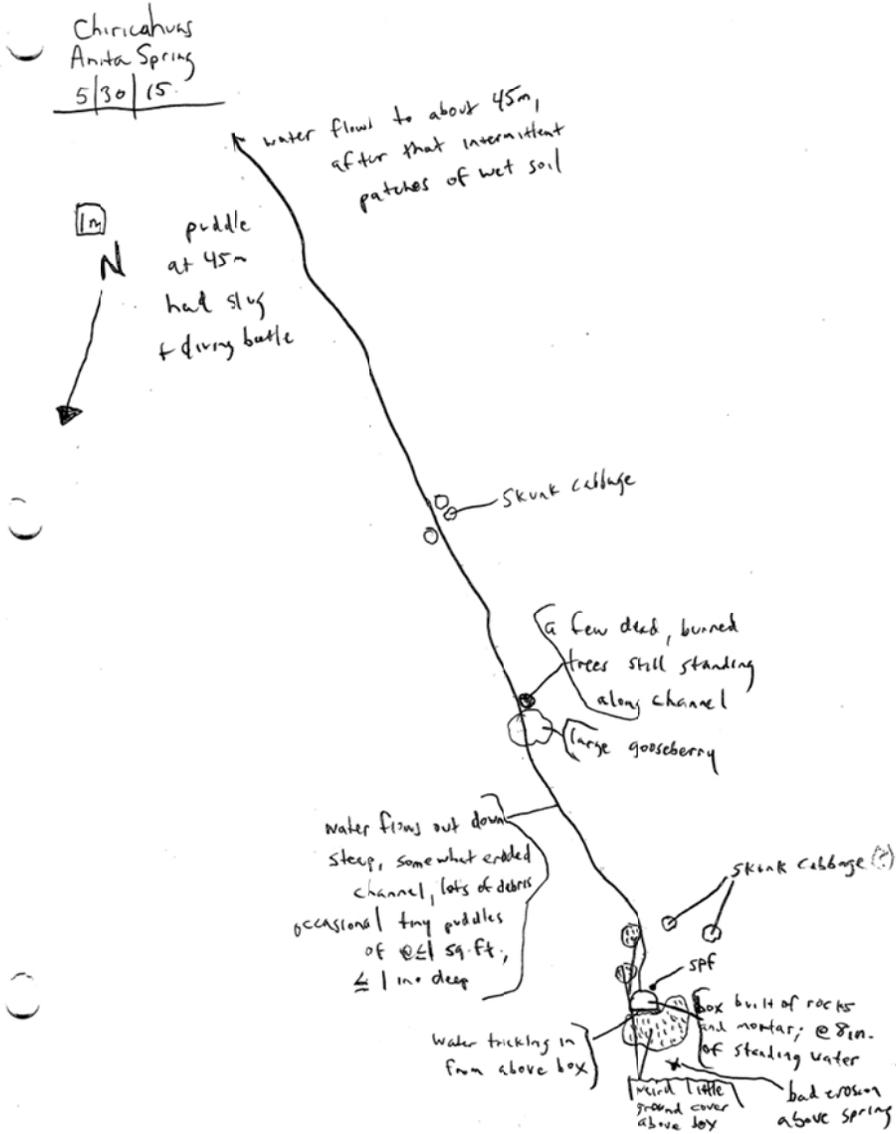


Fig 2 Anita Spring Sketchmap.

Ash Spring Survey Summary Report, Site ID 17194

Location: The Ash Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Sierra Vista RD, Coronado NF at 31.87153, -109.24512 in the Portal Peak USGS Quad, measured using a GPS. The elevation is approximately 2150 meters. Louise Misztal, Randy Serraglio, Carianne Campbell, and other volunteers surveyed the site on 7/20/14 for 02:15 hours, beginning at 10:45, and collected data in 7 of 12 categories.



Fig 1 Ash Spring: View looking downchannel at upper, middle, and lower ponds.

Physical Description: Ash Spring is a hillslope spring. The spring emerges from 10 degree slope in a pine oak habitat. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

Ash Spring emerges as a seepage or filtration spring from a rock layer in an unknown unit. The emergence environment is subaerial, with an artesian flow force mechanism. The distance to the nearest spring is 3678 meters.

Survey Notes: At the time of the visit the spring is boxed, surrounded by a fence in disrepair. The spring is flowing and in decent shape.

Flora: Surveyors identified 69 plant species at the site, with 0.1816 species/sqm. These included 57 native and 6 nonnative species; the native status of 6 species remains unknown.

Table 1 Ash Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	36	11
Shrub	14	1
Mid-canopy	8	3
Tall canopy	3	3
Basal	0	0
Aquatic	1	1
Non-vascular	0	0

Table 2 Ash Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Acer negundo</i>	TC	N	R
Agastache			
<i>Agrostis exarata</i>	GC	N	W
<i>Agrostis stolonifera</i>	GC	I	W
<i>Amauriopsis dissecta</i>	GC	N	
Asteraceae fam	GC	N	F
<i>Baccharis pteronioides</i>	SC	N	
<i>Berberis wilcoxii</i>	SC	N	
<i>Bothriochloa barbinodis</i>	GC	N	F
<i>Bouteloua curtipendula</i>	GC	N	U
<i>Bouvardia glaberrima</i>	SC	N	
<i>Brickellia betonicifolia</i>	GC	N	
<i>Brickellia grandiflora</i>	SC	N	F
<i>Bromus anomalus</i> var. <i>lanatipes</i>	GC	N	
<i>Callitriche heterophylla</i>	GC	N	W
<i>Carex praegracilis</i>	GC	N	W
<i>Carex senta</i>		N	W
<i>Cirsium ochrocentrum</i>	GC	N	
<i>Conyza canadensis</i>	GC	N	R
<i>Cynodon dactylon</i>	GC	I	WR
Cyperaceae			
Cyperaceae			
Desmodium			
<i>Equisetum hyemale</i>	GC	N	WR
<i>Eragrostis intermedia</i>	GC	N	
<i>Erigeron flagellaris</i>	GC	N	U
<i>Erigeron neomexicanus</i>	GC	N	U
<i>Frangula californica</i>	SC	N	U
<i>Fraxinus velutina</i>	TC	N	R
Galium	GC	I	F
<i>Glandularia bipinnatifida</i>	GC	N	U
<i>Gymnosperma glutinosum</i>	SC	N	
<i>Juglans major</i>	TC	N	R
<i>Juncus marginatus</i>	GC	N	F
<i>Juncus saximontanus</i>	GC	N	W

<i>Juniperus deppeana</i>	MC	N	U
<i>Lactuca graminifolia</i>	GC	N	F
<i>Leptochloa dubia</i>	GC	N	
<i>Lonicera albiflora</i>	SC	N	U
Malvaceae			
<i>Marrubium vulgare</i>	GC	I	F
<i>Maurandya antirrhiniflora</i>	GC	N	R
<i>Morus</i>	MC	I	R
<i>Muhlenbergia asperifolia</i>	GC	N	WR
<i>Muhlenbergia emersleyi</i>	GC	N	
<i>Muhlenbergia rigens</i>	GC	N	U
<i>Panicum obtusum</i>	GC	N	WR
<i>Parthenocissus quinquefolia</i>	SC	N	F
<i>Pennellia</i>	GC		F
<i>Pinus engelmannii</i>	MC	N	
<i>Pinus leiophylla</i>	MC	N	
<i>Pinus ponderosa</i>	SC	N	F
<i>Piptochaetium fimbriatum</i>	GC	N	
<i>Platanus wrightii</i>	MC	N	R
<i>Poa pratensis</i>	GC	I	F
<i>Prunus serotina</i>	SC	N	
<i>Pseudotsuga menziesii</i>	MC	N	U
<i>Pteridium aquilinum</i>	GC	N	U
<i>Quercus arizonica</i>	MC	N	R
<i>Quercus grisea</i>	SC	N	F
<i>Quercus hypoleucoides</i>		N	
<i>Rhus trilobata</i>	SC	N	F
<i>Robinia neomexicana</i>	MC	N	F
<i>Samolus vagans</i>	GC	N	W
<i>Schoenocrambe linearifolia</i>	GC	N	U
<i>Toxicodendron rydbergii</i>	SC	N	F
<i>Vitis arizonica</i>	SC	N	R
<i>Yucca madrensis</i>	GC	N	
<i>Zannichellia palustris</i>	AQ	N	A

Fauna: Surveyors collected or observed 9 terrestrial invertebrates and 7 vertebrate specimens.

Table 3 Ash Spring Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Diptera Bombyliidae	Ad	T	Spot		Many observed.
Ephemeroptera	Ad	T	Spot		Unknown mayfly. No quantity information entered on datasheet
Hemiptera Belostomatidae	Ad	T	Spot	2	Unknown waterbug.
Hymenoptera	Ad	T	Spot		Unknown wasp. No quantity information entered on datasheet
Hymenoptera Formicidae	Ad	T	Spot		Unknown ant. No quantity information entered on datasheet
Lepidoptera	Ad	T	Spot		Unknown butterfly. No quantity information entered on datasheet.
Lepidoptera Papilionidae Papilio multicaudata	Ad	T	Spot	1	The datasheet says giant swallowtail, but photos are of two-tailed swallowtails.
Lepidoptera Sphingidae Manduca	Ad	T	Spot	1	
Odonata Anisoptera	Ad	T	Spot		Unknown dragonfly. No quantity information entered on datasheet

Table 4 Ash Spring Vertebrates.

Species Common Name	Count	Detection
black-throated gray warbler	1	call
rufus hummingbird	1	obs
blue-throated hummingbird		obs
western kingbird	2	obs
brown-crested flycatcher	1	
hermit thrush		call
Cordilleran Flycatcher	1	call

Assessment: Assessment scores were compiled in 5 categories and 24 subcategories, with 18 null condition scores, and 18 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is good with significant restoration potential and there is low risk. Habitat condition is good with significant restoration potential and there is moderate risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Barfoot Spring Survey 1 Survey Summary Report, Site ID 13097

Location: The Barfoot Spring ecosystem is located in Cochise County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Sierra Vista RD, Coronado NF at 31.91536, -109.27813 in the Rustler Park USGS Quad, measured using a GPS (NAD83). The elevation is approximately 2409 meters. Louise Misztal and Max Licher surveyed the site on 8/09/14 for 01:00 hours, beginning at 10:48, and collected data in 3 of 12 categories.



Fig 1 Barfoot Spring.

Physical Description: This high-elevation boxed spring emerges at the toe of a slope and flows through diverse wet meadow habitat in a clearing of ponderosa pine woodland. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

The distance to the nearest spring is 1435 meters.

Survey Notes: The site is relatively wet and lush.

Table 1 Barfoot Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	7.68
Specific conductance (field) (uS/cm)	90
Temperature, water C	8.6

Flora: Surveyors identified 45 plant species at the site. These included 30 native and 4 nonnative species; the native status of 11 species remains unknown.

Table 2 Barfoot Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	26	13
Shrub	0	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Barfoot Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Achillea millefolium</i>	GC	N	U
<i>Agrostis gigantea</i>		I	F
Amaranthaceae			
Asteraceae			
<i>Bromus</i>	GC		F
<i>Bromus inermis</i>	GC	I	F
<i>Cacalia decomposita</i>			
<i>Carex kelloggii</i>			
<i>Carex microptera</i>	GC	N	W
<i>Carex occidentalis</i>	GC	N	W
<i>Carex wootonii</i>	GC	N	W
Caryophyllaceae fam	GC		WR
<i>Castilleja</i>	GC	N	U
Chenopodiaceae			
Cyperaceae			
<i>Cyperus fendlerianus</i>	GC	N	W
<i>Delphinium andesicola</i>		N	
<i>Glandularia bipinnatifida</i>	GC	N	U
<i>Hymenoxys</i>			
<i>Hypericum scouleri</i>	GC	N	WR
<i>Iris missouriensis</i>	GC	N	F
<i>Juncus saximontanus</i>	GC	N	W
<i>Lithospermum cobrense</i>		N	
<i>Mimulus cardinalis</i>	GC	N	W
<i>Mimulus guttatus</i>	GC	N	W
<i>Monarda citriodora</i> ssp. <i>austromontana</i>		N	
<i>Oenothera laciniata</i>		N	
Oxalidaceae			
<i>Pennellia micrantha</i>		N	
<i>Penstemon barbatus</i>	GC	N	U
<i>Piptochaetium pringlei</i>		N	
<i>Poa palustris</i>	GC	N	
<i>Polemonium foliosissimum</i>	GC	N	U
<i>Polygonum convolvulus</i>	GC	I	F
<i>Pseudognaphalium</i>	GC		W
<i>Rumex orthoneurus</i>		N	
<i>Scirpus microcarpus</i>	GC	N	W
<i>Senecio wootonii</i>		N	
<i>Sisyrinchium longipes</i>		N	
<i>Solanum fendleri</i>		N	
<i>Thalictrum fendleri</i>	GC	N	F
<i>Trifolium pinetorum</i>	GC	N	WR
<i>Valeriana edulis</i>	GC	N	WR
<i>Verbascum thapsus</i>	GC	I	F
<i>Vicia americana</i>	GC	N	F

Assessment: Assessment scores were compiled in 5 categories and 25 subcategories, with 17 null condition scores, and 17 null risk scores. Aquifer functionality and water quality are very good with excellent restoration potential and there is negligible risk. Geomorphology condition is good with significant restoration potential and there is low risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 4 Barfoot Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	5.3	1.3
Geomorphology	4.2	2.2
Habitat	4.3	2.3
Biota	5.4	2
Human Influence	4.6	2.2
Administrative Context	0	0
Overall Ecological Score	4.7	2.1

Management Recommendations: Continue to monitor the perimeter fencing to keep cows out. If possible, monitoring water flow would help understand the response surrounding habitat to fire and to climate change.

Barfoot Spring Survey 2 Survey Summary Report, Site ID 13097

Location: The Barfoot Spring ecosystem is located in Cochise County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Sierra Vista RD, Coronado NF at 31.91536, -109.27813 in the Rustler Park USGS Quad, measured using a GPS (NAD83). The elevation is approximately 2409 meters. Louise Misztal, Carianne Campbell, Karen Lowery, Brit Oleson, Tim Cook, and Nick Pacini surveyed the site on 7/21/13 for 02:00 hours, beginning at 15:00, and collected data in 6 of 12 categories.



Fig 1 Barfoot Spring: Looking down to the open meadow

Physical Description: This high-elevation boxed spring emerges at the toe of a slope and flows through diverse wet meadow habitat in a clearing of ponderosa pine woodland. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

The distance to the nearest spring is 1435 meters.

Survey Notes: At the time of the visit, vegetation was very lush and the site was relatively undisturbed though there are signs of drying. There appears to be a dry channel/ditch dug originating at the spring box traveling downslope to the road. There is a flammable materials storage facility constructed of brick above the spring box.

Table 1.1 Barfoot Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) (mg/L)	96.6
pH (field)	5.75
Specific conductance (field) (uS/cm)	41.7
Temperature, water C	7.8

Flora: Surveyors identified 19 plant species at the site, with 0.0089 species/sqm. These included 9 native and 1 nonnative species; the native status of 9 species remains unknown.

Table 2 Barfoot Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	12	3
Shrub	0	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Barfoot Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Achillea millefolium	GC	N	U
Amaranthus	GC		F
Asteraceae fam	GC	N	F
Cacalia decomposita			
Carex			
Delphinium andesicola		N	
Glandularia	GC		U
Iris missouriensis	GC	N	F
Lithospermum cobrense		N	
Mimulus cardinalis	GC	N	W
Mimulus guttatus	GC	N	W
Penstemon barbatus	GC	N	U
Piptochaetium			
Poaceae fam	GC		
Polemonium			U
Rumex	GC		WR
Thalictrum fendleri	GC	N	F
Verbascum thapsus	GC	I	F
Vicia			WR

Fauna: Surveyors collected or observed 3 terrestrial invertebrates and 6 vertebrate specimens.

Table 4 Barfoot Spring Invertebrates.

Species	Lifestage	Habitat	Species detail
Coleoptera Coccinellidae	Ad	T	ladybug
Diptera Tipulidae	Ad	T	crane fly
Trichoptera	Ad	T	caddisfly

Table 5 Barfoot Spring Vertebrates.

Species Common Name	Detection
northern flicker	obs
yellow-eyed junco	obs
western tanager	obs
American black bear	sign
mule deer	obs
Mexican Jay	obs

Assessment: Assessment scores were compiled in 5 categories and 25 subcategories, with 17 null condition scores, and 17 null risk scores. Aquifer functionality and water quality are very good with excellent restoration potential and there is negligible risk. Geomorphology condition is good with significant restoration potential and there is low risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 1.6 Barfoot Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	5.3	1.5
Geomorphology	4.2	2.4
Habitat	4.3	2.3
Biota	5.4	2
Human Influence	4.3	2.3
Administrative Context	0	0
Overall Ecological Score	4.6	2.1

Management Recommendations: Some of the fencing around the site is in disrepair. It's highly recommended that the perimeter fence be adequately maintained to preclude access to cows. The site has been modified via digging pools to allow bats access to water. We recommend that this practice be discontinued unless the wet meadow habitat can be left undisturbed.

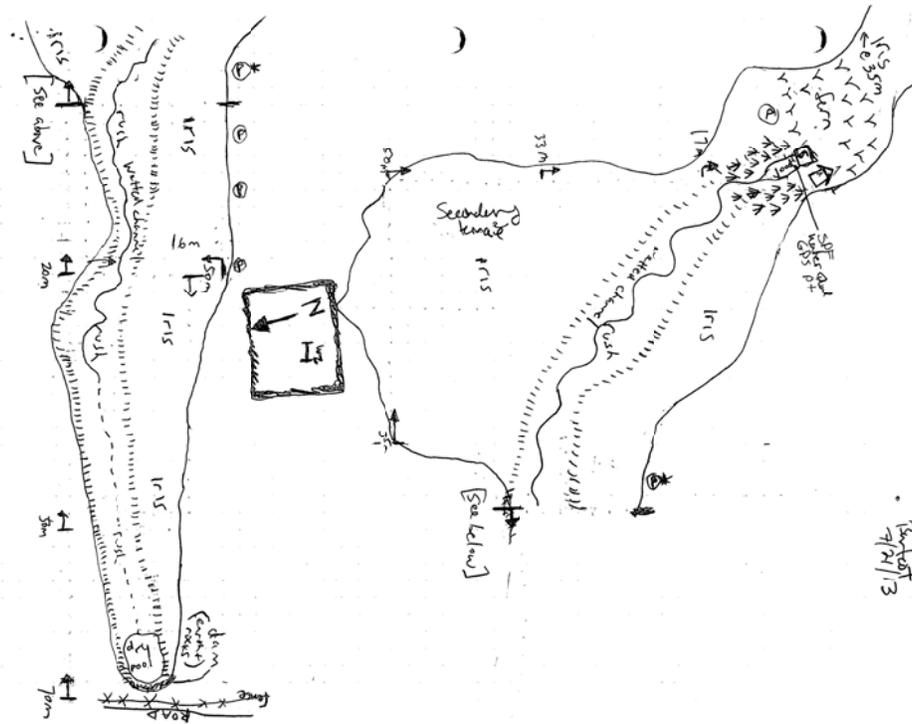


Fig 2 Barfoot Spring Sketchmap.



Fig 3 Barfoot Spring: View of flammable material storage facility above spring box.

Booger Spring Survey Summary Report, Site ID 17178

Location: The Booger Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.86659, -109.28209 in the Chiricahua Peak USGS Quad, measured using a GPS (NAD83, estimated position error 3 meters). The elevation is approximately 2936 meters. Louise Misztal, Randy Seraglio, Glenn Furnier, Aida Castillo-Flores surveyed the site on 5/31/15 for 00:47 hours, beginning at 10:13, and collected data in 7 of 12 categories.

Physical Description: Booger Spring is a hillslope/rheocrene spring. The microhabitats associated with the spring cover 60 sqm. The site has 2 microhabitats, including A -- a 20 sqm channel, B -- a 40 sqm wet hillslope. The geomorphic diversity is 0.28, based on the Shannon-Weiner diversity index.

Booger Spring emerges as a fracture spring from a rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 725 meters.

Survey Notes: A hillslope spring in a moderately burned area, downed trees and erosion apparent with lots of aspen regrowth and some standing pines.

Table 1 Booger Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	8.5
Specific conductance (field) (uS/cm)	110
Temperature, air C	20
Temperature, water C	8.2

Flora: Surveyors identified 8 plant species at the site, with 0.1333 species/sqm. These included 4 native and 4 nonnative species.

Table 2 Booger Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	3	1
Shrub	2	1
Mid-canopy	0	0
Tall canopy	2	1
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Booger Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Acer negundo	TC	N	R
Juncus			
Populus tremuloides	TC	N	U
Pteridium	GC		U
Ribes	SC	N	F
Rubus	SC		R
Sambucus	GC		F
Veratrum californicum	GC	N	W

Fauna: Surveyors collected or observed 1 terrestrial invertebrates and 3 vertebrate specimens.

Table 4 Booger Spring Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Coleoptera Coccinellidae	Ad	T	Spot	1	

Table 5 Booger Spring Vertebrates.

Species Common Name	Count	Detection
hermit thrush	3	call
American black bear	1	sign
yellow-eyed junco	1	obs

Assessment: Assessment scores were compiled in 5 categories and 24 subcategories, with 18 null condition scores, and 19 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is moderate with some restoration potential and there is moderate risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 6 Booger Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.5	2.5
Geomorphology	3.5	3
Habitat	3.5	3
Biota	5	2.7
Human Influence	4	2.3
Administrative Context	0	0
Overall Ecological Score	4	2.6

Management Recommendations: This is a boxed spring that flows out into a runoff channel. There is no real channel above the box so believe it is a hillslope spring. This spring

is impacted by fire-effects from the surrounding landscape as well as human use. It is located off a short side-trail from a main trail that traverses the Chiricahua Wilderness and is an important source of water for hikers. There are numerous trails leading to the spring and erosion surrounding the spring both from human use and from fire effects. There is some lush riparian habitat persisting at the spring site. The site could benefit from thoughtful placement and signing of a clear trail for hikers to access the water as well as erosion control and other upland restoration efforts to address post-fire effects.

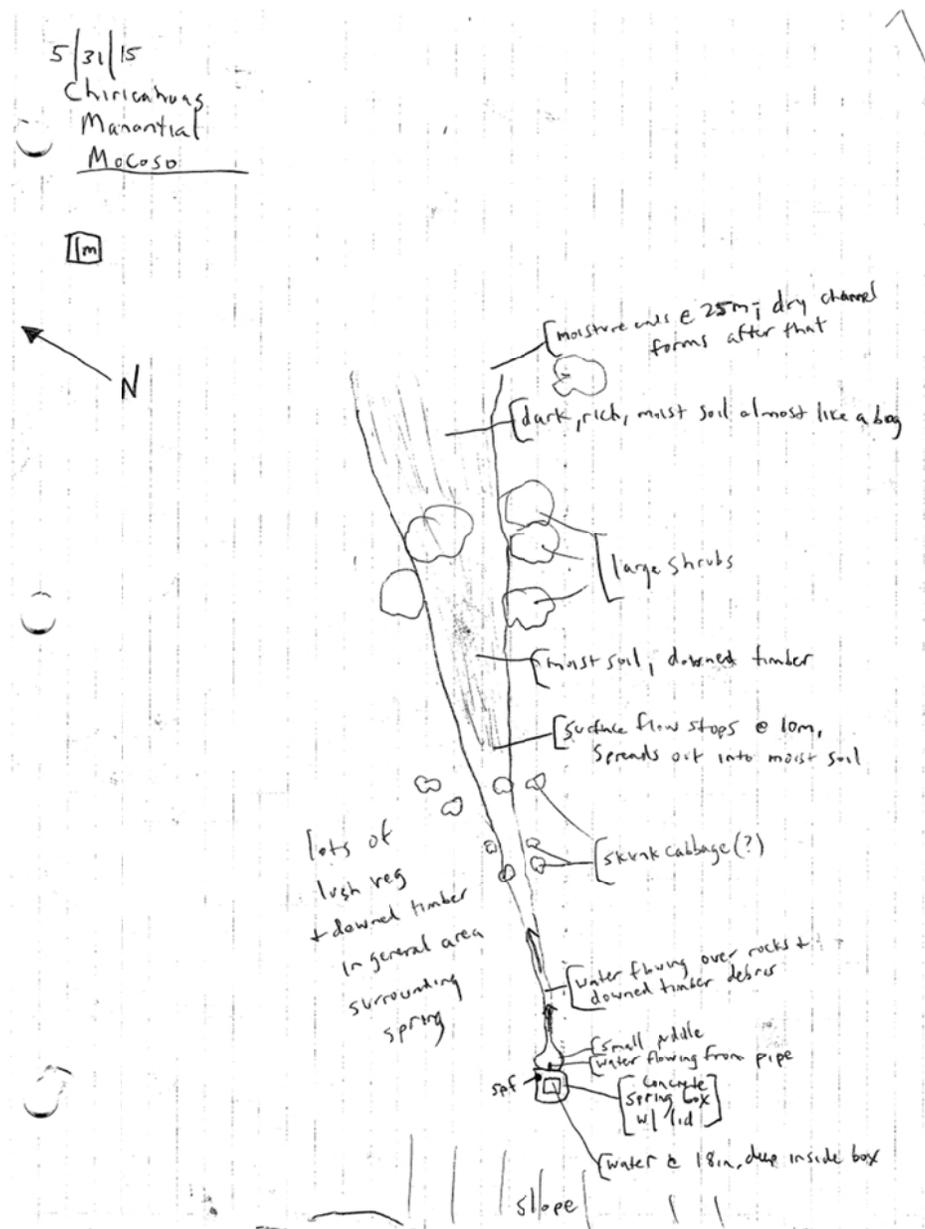


Fig 1 Booger Spring Sketchmap.

Deer Spring

Survey Summary Report, Site ID 17173

Location: The Deer Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.83589, -109.27041 in the Chiricahua Peak USGS Quad, measured using a GPS (NAD83, estimated position error 4 meters). The elevation is approximately 2761 meters. Louise Misztal, Randy Seraglio, Glenn Furnier, Aida Castillo-Flores, Matt Minjeres surveyed the site on 5/30/15 for 09:34 hours, beginning at 9:45, and collected data in 8 of 12 categories.



Fig 1 Deer Spring: best available image of spring

Physical Description: Deer Spring is a hillslope spring. A hillslope spring in steep terrain on a south-facing slope. The site has 3 microhabitats, including A -- a 3 sqm pool, B -- a 20 sqm channel, C -- a 48 sqm wet hillslope.

Deer Spring emerges as a seepage or filtration spring from an igneous rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 806 meters.

Survey Notes: The site is on a severely burned steep slope. It is barely flowing. There is some aspen regeneration happening right above the spring.

Table 1 Deer Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	7.9
Specific conductance (field) (uS/cm)	45
Temperature, air C	23.9
Temperature, water C	11.8

Flora: Plant list is for the site as a whole. Surveyors identified 4 plant species at the site, with 0.0567 species/sqm. These included 3 native and 0 nonnative species; the native status of 1 species remains unknown.

Table 2 Deer Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	1	0
Shrub	2	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	1	0

Table 3 Deer Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
moss	NV	N	F
Populus tremuloides	SC	N	U
Pteridium	GC		U
Ribes	SC	N	F

Fauna: Surveyors collected or observed 8 vertebrate specimens.

Table 4 Deer Spring Vertebrates.

Species Common Name	Count	Detection
western tanager	3	obs
yellow-eyed junco	1	obs
American black bear	1	obs
spotted towhee	1	call
deer	1	sign
western bluebird	2	obs
house wren	1	obs
woodpecker	1	sign

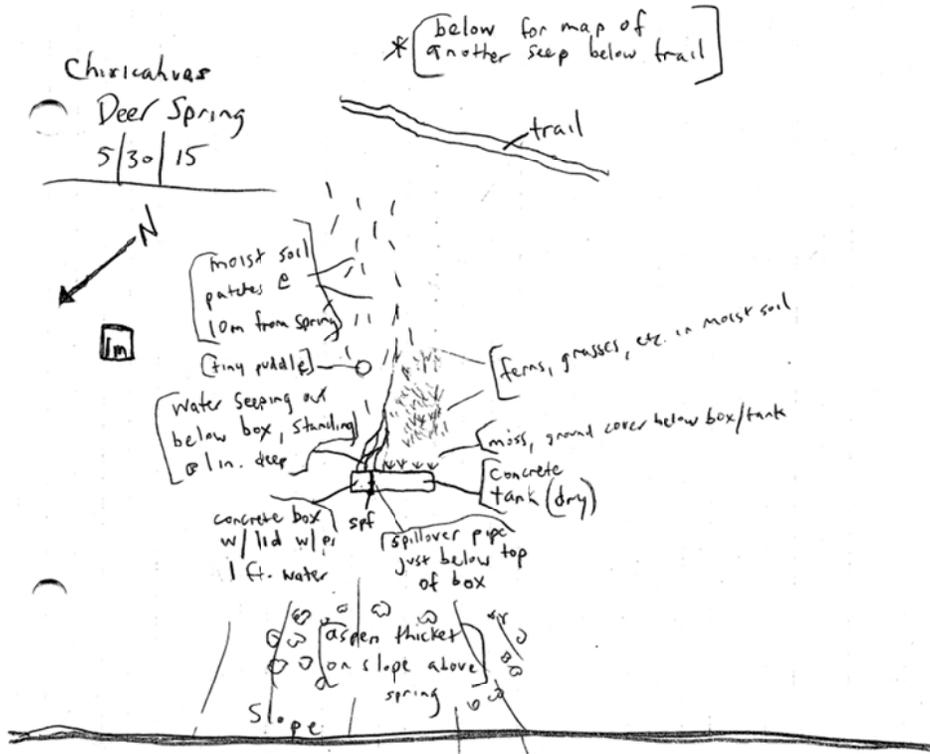
Assessment: Assessment scores were compiled in 5 categories and 31 subcategories, with 11 null condition scores, and 11 null risk scores. Aquifer functionality and water quality are moderate with some restoration potential and there is moderate risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is moderate with some restoration potential and there is moderate risk. Biotic

integrity is good with significant restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is moderate with some restoration potential and there is low risk.

Table 5 Deer Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	3.4	3.4
Geomorphology	3.2	3.2
Habitat	3.8	3
Biota	4	2.5
Human Influence	4	2.4
Administrative Context	0	0
Overall Ecological Score	3.7	2.8

Management Recommendations: Site is on very steep slopes in an area that burned severely. It is being effected by erosion, is developed for human use and continues to be used by backpackers in the wilderness. Site is suffering erosion due to the surrounding land condition and is believed to be significantly dewatered due to the loss of canopy cover and other alterations post fire. The site could benefit from upslope erosion control, a trail to send backpackers to the box in the least erosive way, and possibly from restoration of the diversity of plant species you might expect at this type of site. It has lost much of its function as a microhabitat



same orientation & scale as above

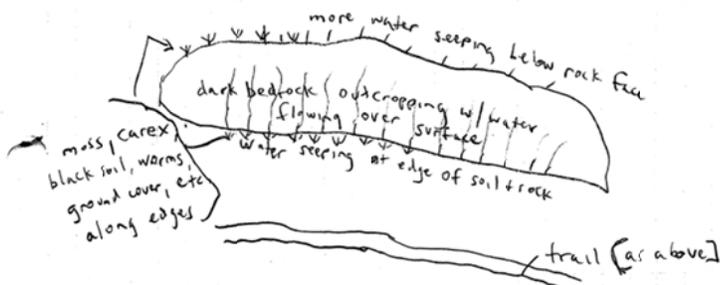


Fig 2 Deer Spring Sketchmap.

Eagle Spring Survey Summary Report, Site ID 13108

Location: The Eagle Spring ecosystem is located in Cochise County in the Whitewater Draw Arizona 15080301 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.83602, -109.27927 in the Chiricahua Peak USGS Quad, measured using a GPS (NAD83, estimated position error 4 meters). The elevation is approximately 2845 meters. Sami Hammer, Brian DeArmon, Brian Jones, Marisa Rice surveyed the site on 5/30/15 for 01:15 hours, beginning at 13:15, and collected data in 9 of 12 categories.



Fig 1 Eagle Spring: view with northern seep in foreground, springbox farther away

Physical Description: Eagle Spring is a hillslope spring. It is a boxed spring on a steep southwest-facing slope with a spur trail to it. There is a covered spring box with an openable cover, which has a hole in the side from which water flows into the trough. Water then overflows the trough and continues down the steep hillside in a bit of a channel. There is an undeveloped seep 6m away from the box. The site has 3 microhabitats, including A -- a 1 sqm pool, B -- a 5 sqm channel, C -- a 3 sqm wet hillslope.

Eagle Spring emerges as a seepage or filtration spring from an igneous rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 458 meters.

Survey Notes: The site looks nice - the trough is full. The sedges are grazed, most likely by deer.

Table 1 Eagle Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	8.71
Specific conductance (field) (uS/cm)	49
Temperature, air C	20
Temperature, water C	11.2

Flora: Plant list is for the site as a whole. Surveyors identified 3 plant species at the site, with 0.3191 species/sqm. These included 2 native and 1 nonnative species.

Table 2 Eagle Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	1	0
Shrub	0	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	1	1
Non-vascular	0	0

Table 3 Eagle Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
algae	AQ	N	A
Carex			
Geranium	GC	N	F

Fauna: Surveyors collected or observed 1 aquatic invertebrates and 8 vertebrate specimens.

Table 4 Eagle Spring Invertebrates.

Species	Lifestage	Habitat	Method	Count
Diptera Culicidae	L	A	Spot	100

Table 5 Eagle Spring Vertebrates.

Species Common Name	Count	Detection
broad-billed Hummingbird	1	obs
northern flicker	1	obs
Common raven	2	obs
yellow-eyed junco	2	obs
deer	1	sign
spotted towhee	1	obs
house wren	1	obs
mountain spiny lizard	1	obs

Assessment: Assessment scores were compiled in 5 categories and 30 subcategories, with 12 null condition scores, and 12 null risk scores. Aquifer functionality and water quality are good

with significant restoration potential and there is negligible risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is moderate with some restoration potential and there is low risk. Biotic integrity is moderate with some restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 6 Eagle Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.4	1.6
Geomorphology	3.6	3
Habitat	3	2.4
Biota	3.7	2.7
Human Influence	4.3	2.3
Administrative Context	0	0
Overall Ecological Score	3.9	2.4

Management Recommendations: The source is boxed, destroying the original emergence microhabitat (but creating a new one). The area is heavily burned around and above the site - there is some potential for slope failure or erosion to damage or destroy the site. It may be a good idea to protect the site from this in some way.

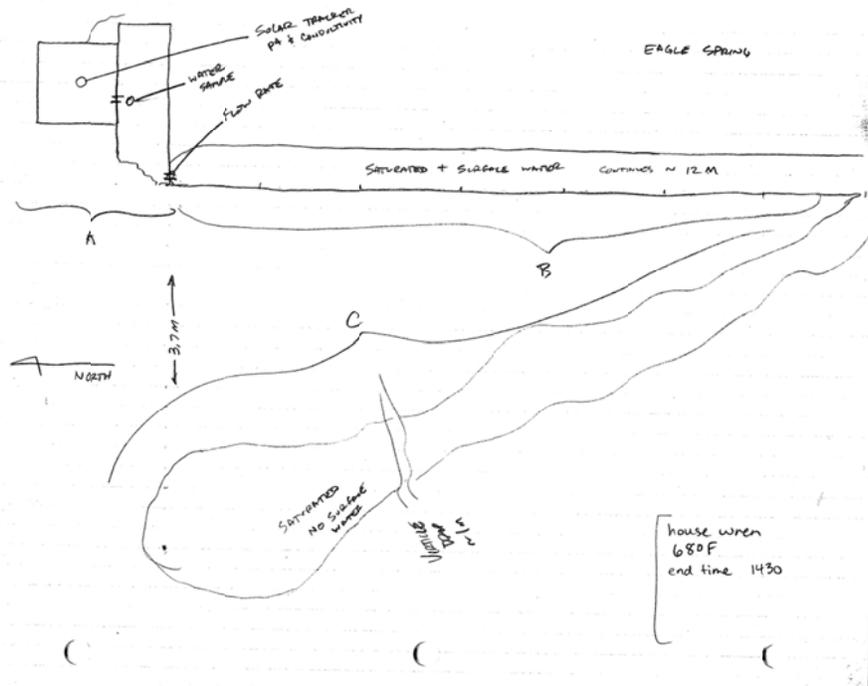


Fig 2 Eagle Spring Sketchmap

Headquarters Spring Survey Summary Report, Site ID 17175

Location: The Headquarters Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.84521, -109.28465 in the Chiricahua Peak USGS Quad, measured using a GPS (NAD83, estimated position error 5 meters). The elevation is approximately 2818 meters. Sami Hammer, Brian DeArmon, Brian Jones, Marisa Rice surveyed the site on 5/29/15 for 01:30 hours, beginning at 14:15, and collected data in 9 of 12 categories.



Fig 1 Headquarters Spring.

Physical Description: Headquarters Spring is a hillslope spring on a north-facing slope among aspens and conifers, flowing freely from its source into a tank, and overflowing from the other end of the tank. The site has 3 microhabitats, including A -- a 1 sqm wet hillslope, B -- a 2 sqm pool, C -- a 1 sqm wet hillslope.

Headquarters Spring emerges as a seepage or filtration spring from an igneous rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 559 meters.

Survey Notes: Flow was slow, and there were cobbles placed in polygon C (the runout channel) for the trail to cross it.

Table 1 Headquarters Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	7.4
Specific conductance (field) (uS/cm)	60
Temperature, air C	22.2
Temperature, water C	16.8

Flora: Surveyors identified 5 plant species at the site, with 1.2821 species/sqm. These included 5 native and 0 nonnative species.

Table 2 Headquarters Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	2	2
Shrub	0	0
Mid-canopy	0	0
Tall canopy	1	0
Basal	0	0
Aquatic	1	1
Non-vascular	1	0

Table 3 Headquarters Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
algae	AQ	N	A
Aquilegia chrysantha	GC	N	W
moss	NV	N	F
Populus tremuloides	TC	N	U
Veratrum	GC	N	WR

Fauna: Surveyors collected or observed 1 aquatic and 1 terrestrial invertebrates and 15 vertebrate specimens.

Table 4 Headquarters Spring Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Lepidoptera Papilionidae Papilio	Ad	T	Spot	1	probably rutilus or multicaudata
Trichoptera	L	A	Spot	100	photo taken

Table 5 Headquarters Spring Vertebrates.

Species Common Name	Count	Detection
Steller's jay	1	call
American black bear	1	sign
hairy woodpecker	2	obs
house wren	2	obs
yellow-eyed junco	5	obs
northern flicker	1	call
Common raven	2	call
yellow-rumped warbler	1	obs
White-breasted nuthatch	2	call
Red-faced Warbler	1	obs
hermit thrush	1	call
American robin	1	obs
Broad-tailed hummingbird	1	call
western bluebird	3	obs
western tanager	2	obs

Assessment: Assessment scores were compiled in 5 categories and 30 subcategories, with 12 null condition scores, and 12 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is negligible risk. Geomorphology condition is good with significant restoration potential and there is low risk. Habitat condition is moderate with some restoration potential and there is low risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is very good with excellent restoration potential and there is negligible risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is negligible risk.

Table 6 Headquarters Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.2	1.6
Geomorphology	4.4	2
Habitat	3.4	2
Biota	4.7	2
Human Influence	4.9	1.6
Administrative Context	0	0
Overall Ecological Score	4.4	1.8

1 m

Headquarters Spring
5/29/15
Chiricahua Mtns

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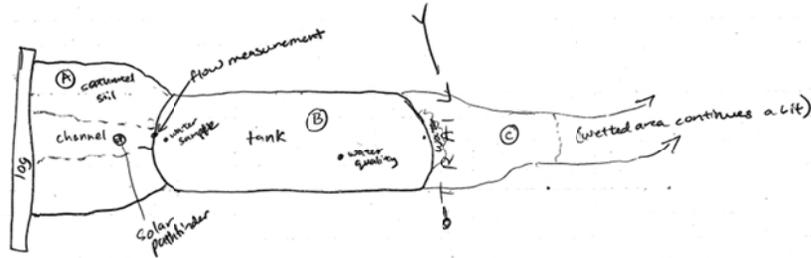


Fig 2 Headquarters Spring Sketchmap.

Juniper Spring Survey Summary Report, Site ID 17185

Location: The Juniper Spring ecosystem is located in Cochise County in the Whitewater Draw Arizona 15080301 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.83363, -109.27664 in the Chiricahua Peak USGS Quad, measured using a GPS (NAD83, estimated position error 4 meters). The elevation is approximately 2796 meters. Sami Hammer, Brian DeArmon, Brian Jones, Marisa Rice surveyed the site on 5/30/15 for 01:15 hours, beginning at 11:45, and collected data in 8 of 12 categories.



Fig 1 Juniper Spring.

Physical Description: Juniper Spring is a hillslope spring on a south-facing slope at the edge of open pine woodland, with several generations of concrete boxes and some unboxed seeps. The site has 3 microhabitats, including A -- a 1 sqm pool, B -- a 10 sqm wet hillslope, C -- a 4 sqm wet hillslope.

Juniper Spring emerges as a seepage or filtration spring from a igneous rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 458 meters.

Survey Notes: The site is on the edge of a burn area. The southern-most spring box is dry and disconnected (pipe broken).

Table 1 Juniper Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	7.5
Specific conductance (field) (uS/cm)	50
Temperature, air C	18.9
Temperature, water C	13

Flora: Plant list is for the site as a whole. Surveyors identified 8 plant species at the site, with 0.5674 species/sqm. These included 7 native and 1 nonnative species.

Table 2 Juniper Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	2	0
Shrub	1	0
Mid-canopy	0	0
Tall canopy	2	0
Basal	0	0
Aquatic	1	1
Non-vascular	2	0

Table 3 Juniper Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
algae	AQ	N	A
Geranium	GC	N	F
Holodiscus dumosus	SC	N	F
moss	NV	N	F
Pinus ponderosa	TC	N	F
Pseudotsuga menziesii	TC	N	U
Pteridium	GC		U
unknown Lichen	NV	N	

Fauna: Surveyors collected or observed 6 vertebrate specimens.

Table 4 Juniper Spring Vertebrates.

Species Common Name	Count	Detection
yellow-eyed junco	1	obs
turkey vulture	1	obs
Steller's jay	1	obs
Broad-tailed hummingbird	1	obs
northern flicker	1	obs
Common raven	1	obs

Assessment: Assessment scores were compiled in 5 categories and 30 subcategories, with 12 null condition scores, and 12 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is negligible risk. Geomorphology condition is good with significant restoration potential and there is low risk. Habitat condition is moderate with some restoration potential and there is low risk. Biotic integrity is moderate with some restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 5 Juniper Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.4	1.6
Geomorphology	4.2	2
Habitat	3	2
Biota	3.7	2.7
Human Influence	4.1	2
Administrative Context	0	0
Overall Ecological Score	3.9	2.1

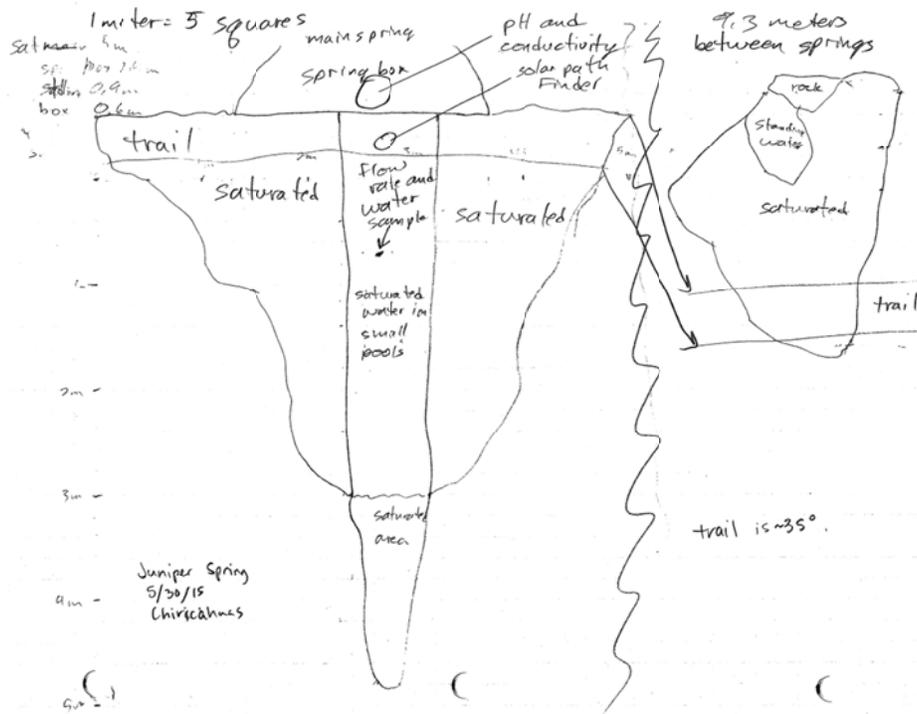


Fig 2 Juniper Spring Sketchmap.



Fig 3 Juniper Spring: upper seep close up

Lone Juniper Spring Survey Summary Report, Site ID 13107

Location: The Lone Juniper Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.82760, -109.27254 in the Chiricahua Peak USGS Quad (NAD 83). The elevation is approximately 2738 meters. Sami Hammer, Brian DeArmon, Brian Jones, Marisa Rice surveyed the site on 5/30/15 for 01:00 hours, beginning at 9:20, and collected data in 1 of 12 categories.



Fig 1 Lone Juniper Spring. Spring coordinates fall on distant slope at top of aspens

Physical Description: A potential hillslope spring - there is currently no lone juniper and no spring, but a stand of regenerating aspens begins right at the coordinates.

The distance to the nearest spring is 928 meters.

Survey Notes: The surveyors spent searched the hillside in the vicinity of the coordinates thoroughly and found no spring. The area was burned quite badly in 2011. However, there is a dense stand of aspen regenerating at the site, and the center top of the stand begins exactly at the coordinates, where the soil is also slightly damp - it is possible there was once an emergent spring here, and there is still a hypocrene spring at this location. Zac Ribbing (USFS) has also searched for this spring and found nothing.

Lower Rustler Spring Survey Summary Report, Site ID 17149

Location: The Lower Rustler Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.90608, -109.27786 in the Rustler Park USGS Quad, measured using a GPS (NAD83, estimated position error 8 meters). The elevation is approximately 2549 meters. Louise Misztal, Karen Lowery, Carianne Campbell, Randy Seraglio, Brit Oleson, Tim Cook surveyed the site on 7/22/13 for 01:20 hours, beginning at 9:30, and collected data in 8 of 12 categories.



Fig 1 Lower Rustler Spring: spring origin

Physical Description: Lower Rustler Spring is a hillslope spring in a high elevation conifer forest that feeds directly into a channel located in a developed campground. It emerges from a steep hillock. The site has 2 microhabitats, including A -- a 80 sqm channel.

Lower Rustler Spring emerges from an igneous rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 477 meters.

Survey Notes: At the time of the visit, the site is heavily disrupted from fire in 2011 and the USFS is actively cutting down burned trees - the vegetation is trampled from lots of (foot traffic?) crossings. At the time of the visit, burned trees were actually down and being cut across the spring run.

Table 1 Lower Rustler Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) % saturation	94.5
pH (field)	6.08
Specific conductance (field) (uS/cm)	52.3
Temperature, air C	16
Temperature, water C	9.8

Flora: Surveyors identified 19 plant species at the site, with 0.0396 species/sqm. These included 13 native and 6 nonnative species.

Table 2 Lower Rustler Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	15	5
Shrub	0	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Lower Rustler Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Achillea millefolium</i>	GC	NI	U
Asteraceae		N	
<i>Bromus carinatus</i>	GC	N	WR
<i>Cerastium nutans</i>	GC	N	F
Cyperaceae			
<i>Delphinium andesicola</i>	GC	N	
<i>Eragrostis</i>	GC	I	WR
<i>Galium aparine</i>	GC	N	WR
<i>Geranium richardsonii</i>	GC	N	F
<i>Glandularia</i>	GC		U
<i>Iris missouriensis</i>	GC	N	F
<i>Mimulus cardinalis</i>	GC	N	W
<i>Monarda citriodora</i>		N	
<i>Penstemon barbatus</i>	GC	N	U
<i>Polemonium foliosissimum</i>	GC	N	U
Rumex	GC		WR
<i>Sporobolus</i>			F
<i>Thalictrum fendleri</i>	GC	N	F
<i>Verbascum thapsus</i>	GC	I	F

Fauna: Surveyors collected or observed 3 vertebrate specimens.

Table 4 Lower Rustler Spring Vertebrates.

Species Common Name	Count	Detection
yellow-eyed junco	10	obs
dark-eyed junco		obs
house wren		call

Assessment: Assessment scores were compiled in 5 categories and 28 subcategories, with 14 null condition scores, and 15 null risk scores. Aquifer functionality and water quality are very good with excellent restoration potential and there is negligible risk. Geomorphology condition is good with significant restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 5 Lower Rustler Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	5.3	1
Geomorphology	4.6	3
Habitat	4.2	2.8
Biota	4.4	2
Human Influence	4.8	2.4
Administrative Context	0	0
Overall Ecological Score	4.6	2.3

Management Recommendations: The spring is in an area that burned severely. The USFS is actively cutting down burned trees all around the site. At the time of the visit, burned trees were actually down and being cut across the spring run. Also within a popular developed campground near the road in. The springs is the source of a stream that continues down the mountain. Although the forest is burned all around the spring emmersion, there are areas upslope that have not burned.

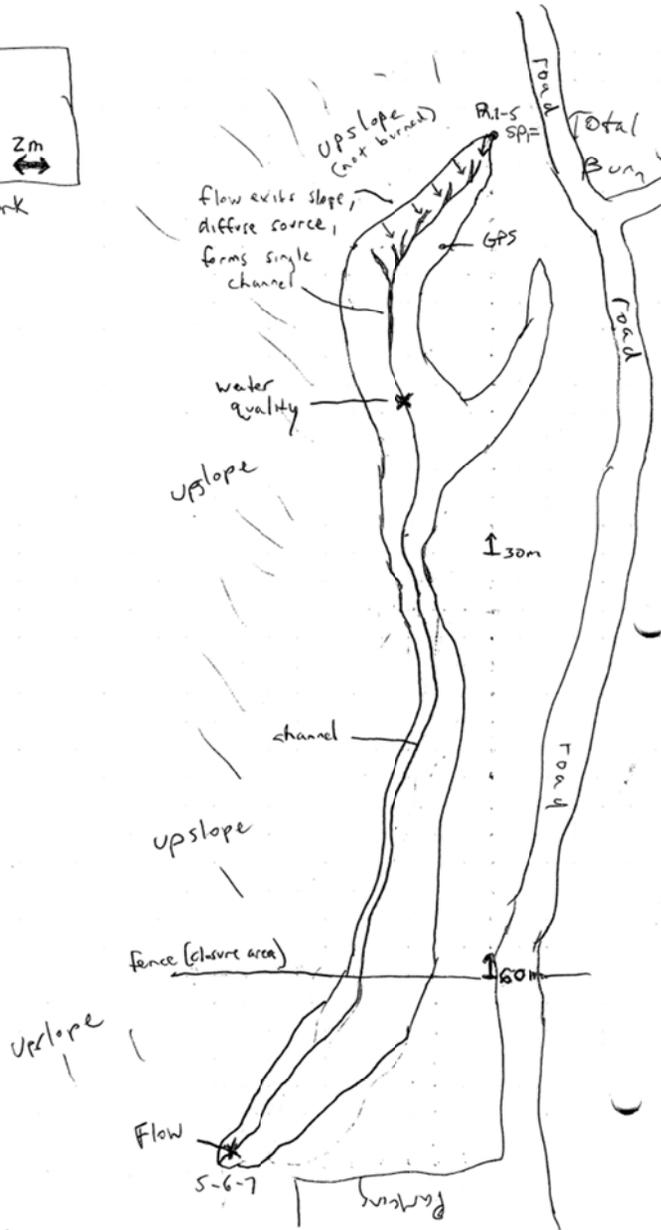
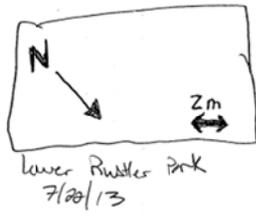


Fig 2 Lower Rustler Spring Sketchmap.



Fig 3 Lower Rustler Spring: At spring origin, looking upstream at fire damage

Ojo Agua Fria

Survey Summary Report, Site ID 17174

Location: The Ojo Agua Fria ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.84327, -109.27989 in the Chiricahua Peak USGS Quad, measured using a GPS (NAD83, estimated position error 3 meters). The elevation is approximately 2722 meters. Louise Misztal, Randy Seraglio, Glenn Furnier, Aida Castillo-Flores, Matt Minjeres surveyed the site on 5/29/15 for 00:45 hours, beginning at 14:45, and collected data in 8 of 12 categories.



Fig 1 Ojo Agua Fria.

Physical Description: Ojo Agua Fria is a hillslope spring in a steep area just above a small drainage. Spring emerges from hillslope where it is boxed then flows into a channel. The site has 2 microhabitats, including A -- a 2 sqm pool, B -- a 52 sqm channel.

Ojo Agua Fria emerges as a seepage or filtration spring from a rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 559 meters.

Survey Notes: The site is severely eroded due to fire effects - the channel below the spring is severely eroded. There is really no spring habitat because the spring is boxed and piped to an open tank.

Table 1 Ojo Agua Fria Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	8.12
Specific conductance (field) (uS/cm)	33
Temperature, water C	9.9

Flora: Plant list is for the site as a whole. Surveyors identified 4 plant species at the site, with 0.0741 species/sqm. These included 3 native and 1 nonnative species.

Table 2 Ojo Agua Fria Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	1	1
Shrub	3	1
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Ojo Agua Fria Vegetation.

Species	Cover Code	Native Status	Wetland Status
Populus tremuloides	SC	N	U
Ribes	SC	N	F
Rubus	SC		R
Veratrum	GC	N	WR

Fauna: Surveyors collected or observed 1 aquatic invertebrates and 3 vertebrate specimens.

Table 4 Ojo Agua Fria Invertebrates.

Species	Lifestage	Habitat	Method	Count
Hemiptera Gerridae	Ad	A	Spot	1

Table 5 Ojo Agua Fria Vertebrates.

Species Common Name	Count	Detection
hairy woodpecker	1	obs
house wren	1	obs
yellow-eyed junco	1	obs

Assessment: Assessment scores were compiled in 5 categories and 29 subcategories, with 13 null condition scores, and 13 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is

undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 6 Ojo Agua Fria Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.4	2.2
Geomorphology	3.8	3
Habitat	4.7	2
Biota	5	2
Human Influence	4.6	1.9
Administrative Context	0	0
Overall Ecological Score	4.5	2.2

Management Recommendations: Spring is located in Chiricahua Wilderness in an area that has burned severely in the last few years. Slopes above the spring are primarily aspen regrowth. Mature pine/conifer canopy cover at the site has been lost due to fire. The site is developed and appears to be maintained. There were some erosion control measures taken near the spring box. Spring is used by hikers/backpackers. There is a sign and trail leading to the spring. Upslope instability and channel down cutting near the spring will continue to be a problem. The spring may have previously supported more robust in-channel riparian/aquatic habitat and may still be able to do that while providing water for hikers if the structure is modified.

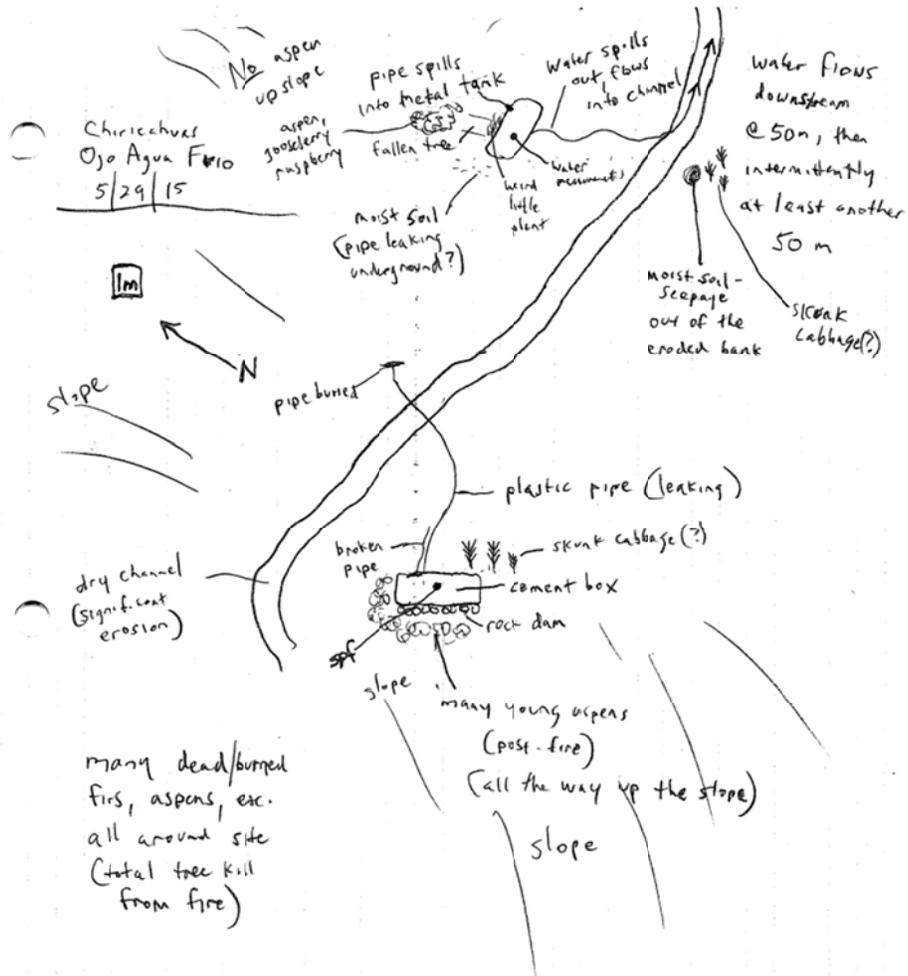


Fig 2 Ojo Agua Fria Sketchmap.

Upper Rustler Spring Survey Summary Report, Site ID 13094

Location: The Upper Rustler Spring ecosystem is located in Cochise County in the San Simon Arizona, New Mexico 15040006 HUC, managed by the US Forest Service. The spring is located in the Douglas RD, Coronado NF at 31.90303, -109.28075 in the Rustler Park USGS Quad, measured using a GPS (NAD83, estimated position error 8 meters). The elevation is approximately 2578 meters. Louise Misztal, Karen Lowery, Carianne Campbell, Randy Seraglio, Brit Oleson, Tim Cook, Nick Pacini surveyed the site on 7/22/13 for 01:30 hours, beginning at 11:30, and collected data in 8 of 12 categories.



Fig 1 Upper Rustler Spring: source

Physical Description: Upper Rustler Spring is a hillslope spring that emerges on a steep slope above a mountain meadow in coniferous forest. The spring is boxed with a pipe emerging. The site has 2 microhabitats.

Upper Rustler Spring emerges from an igneous rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 477 meters.

Survey Notes: The area around the site was recently (2011) severely burned. Trees at the site are marked with flagging - for FS removal? The spring is within the campground area where the FS is actively removing burned trees post-fire.

Table 1 Upper Rustler Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) (mg/L)	103.2
pH (field)	5.92
Specific conductance (field) (uS/cm)	37.1
Temperature, air C	16
Temperature, water C	8.3

Flora: Surveyors identified 20 plant species at the site, with 0.0156 species/sqm. These included 8 native and 12 nonnative species.

Table 2 Upper Rustler Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	11	2
Shrub	3	1
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Upper Rustler Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Androsace septentrionalis</i>	GC	N	U
Asteraceae			
Boraginaceae			
<i>Cacalia decomposita</i>			
Campanulaceae			
<i>Cerastium nutans</i>	GC	N	F
<i>Chenopodium</i>	GC		F
Cyperaceae			
<i>Delphinium andesicola</i>	GC	N	
<i>Galium</i>	GC	I	F
<i>Glandularia</i>	GC		U
<i>Hackelia pinetorum</i>		N	
<i>Iris missouriensis</i>	GC	N	F
<i>Mimulus cardinalis</i>	GC	N	W
<i>Ribes</i>	SC	N	F
<i>Rubus</i>	SC		R
<i>Rumex</i>	GC		WR
<i>Sambucus nigra</i>	SC	NI	
<i>Tragopogon dubius</i>	GC	I	F
<i>Verbascum thapsus</i>	GC	I	F

Fauna: Surveyors collected or observed 2 vertebrate specimens.

Table 4 Upper Rustler Spring Vertebrates.

Species Common Name
yellow-eyed junco
Broad-tailed hummingbird

Assessment: Assessment scores were compiled in 5 categories and 27 subcategories, with 15 null condition scores, and 15 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 5 Upper Rustler Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.2	2.6
Geomorphology	3.8	3
Habitat	4.5	2.3
Biota	5	2
Human Influence	4.4	2.6
Administrative Context	0	0
Overall Ecological Score	4.4	2.5

Management Recommendations: Trees at the site are marked with flagging - for FS removal? The spring is within the campground area where the FS is actively removing burned trees post-fire. There has been loss of canopy cover around the site due to fire and most of the trees surrounding and upslope of the site are dead. This may affect the spring over the long term including microhabitats and flow.

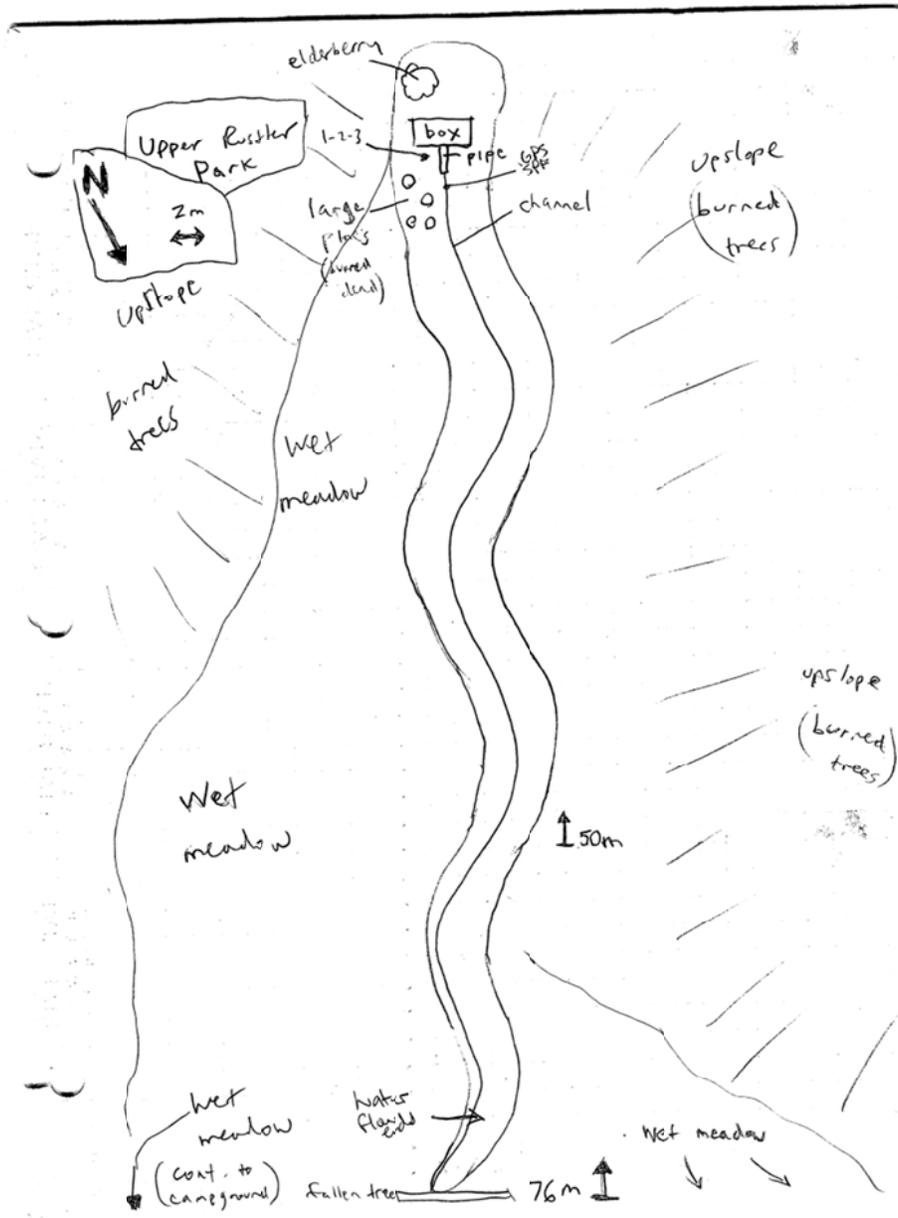


Fig 2 Upper Rustler Spring Sketchmap.

Pinaleño Mountains

Bearwallow Spring Survey Summary Report, Site ID 13240

Location: The Bearwallow Spring ecosystem is located in Graham County in the Upper Gila-San Carlos Reservoir Arizona 15040005 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.70122, -109.87722 in the Webb Peak USGS Quad. The elevation is approximately 3175 meters. Louise Misztal, Max Licher, Steve Buckley, Molly McCormick, Craig Willcox, Nick Pacini surveyed the site on 8/09/13 for 00:50 hours, beginning at 12:40, and collected data in 7 of 12 categories.



Fig 1 Bearwallow Spring.

Physical Description: Bearwallow Spring is a rheocrene spring emerging at the start of a channel in a high elevation meadow. The site has 2 microhabitats, including A -- a 150 sqm channel, B -- a 800 sqm low gradient cienega.

Bearwallow Spring emerges from a metamorphic rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 74 meters.

Survey Notes: The site is in good condition with no sign of direct human impacts. The spring is surrounded by severe burn/beetle kill that was stand replacing - there is no longer forest surrounding the spring. The area around this spring has experienced stand replacing fire. It is the only location in the surrounding landscape where fir and spruce are regenerating.

Table 1 Bearwallow Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	7.28
Specific conductance (field) (uS/cm)	48
Temperature, air C	26
Temperature, water C	6.5

Flora: Surveyors identified 35 plant species at the site, with 0.0368 species/sqm. These included 32 native and 0 nonnative species; the native status of 3 species remains unknown.

Table 2 Bearwallow Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	27	12
Shrub	1	0
Mid-canopy	0	0
Tall canopy	1	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Bearwallow Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Actaea rubra	GC	N	F
Agrostis scabra	GC	N	W
Allium geeyeri	GC	N	
Bromus ciliatus	GC	N	F
Bromus marginatus	GC	N	W
Carex bella	GC	N	
Carex kelloggii			
Carex microptera	GC	N	W
Carex microptera	GC	N	W
Carex siccata	GC	N	W
Cirsium parryi	GC	N	F
Conioselinum scopulorum	GC	N	F
Deschampsia caespitosa		N	
Dryopteris filix-mas	GC	N	R
Epilobium	GC		WR
Festuca sororia		N	
Fragaria virginiana	GC	N	U
Geranium richardsonii	GC	N	F
Juncus saximontanus	GC	N	W
Laennecia schiedeana		N	
Luzula parviflora	GC	N	F
Maianthemum stellatum	GC	N	U
Mertensia franciscana	GC	N	F
Mimulus guttatus	GC	N	W
Oreochrysum parryi		N	
Paxistima myrsinites	SC	N	U
Picea engelmannii	TC	N	U
Ribes montigenum	GC	N	F
Rubus idaeus	GC	NI	F
Senecio bigelovii	GC	N	F
Trisetum montanum			
Urtica dioica	GC	NI	WR
Veratrum californicum	GC	N	W
Vicia americana	GC	N	F
Viola nephrophylla	GC	N	WR

Fauna: Surveyors collected or observed 6 vertebrate specimens.

Table 4 Bearwallow Spring Vertebrates.

Species Common Name	Count	Detection
yellow-rumped warbler	1	
chickadee	3	call
yellow-eyed junco		
lesser goldfinch	7	
red-breasted nuthatch		
white-tailed Deer		

Assessment: Assessment scores were compiled in 5 categories and 30 subcategories, with 12 null condition scores, and 12 null risk scores. Aquifer functionality and water quality are excellent with no need for restoration and there is negligible risk. Geomorphology condition is very good with excellent restoration potential and there is negligible risk. Habitat condition is very good with excellent restoration potential and there is negligible risk. Biotic integrity is excellent with no need for restoration and there is negligible risk. Human influence of site is very good with excellent restoration potential and there is negligible risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is very good with excellent restoration potential and there is negligible risk.

Table 5 Bearwallow Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	6	1.2
Geomorphology	5.6	1
Habitat	5.3	1
Biota	5.9	1
Human Influence	5.4	1.2
Administrative Context	0	0
Overall Ecological Score	5.7	1.1

Management Recommendations: This is an excellent reference site for a high elevation rheocrene spring.

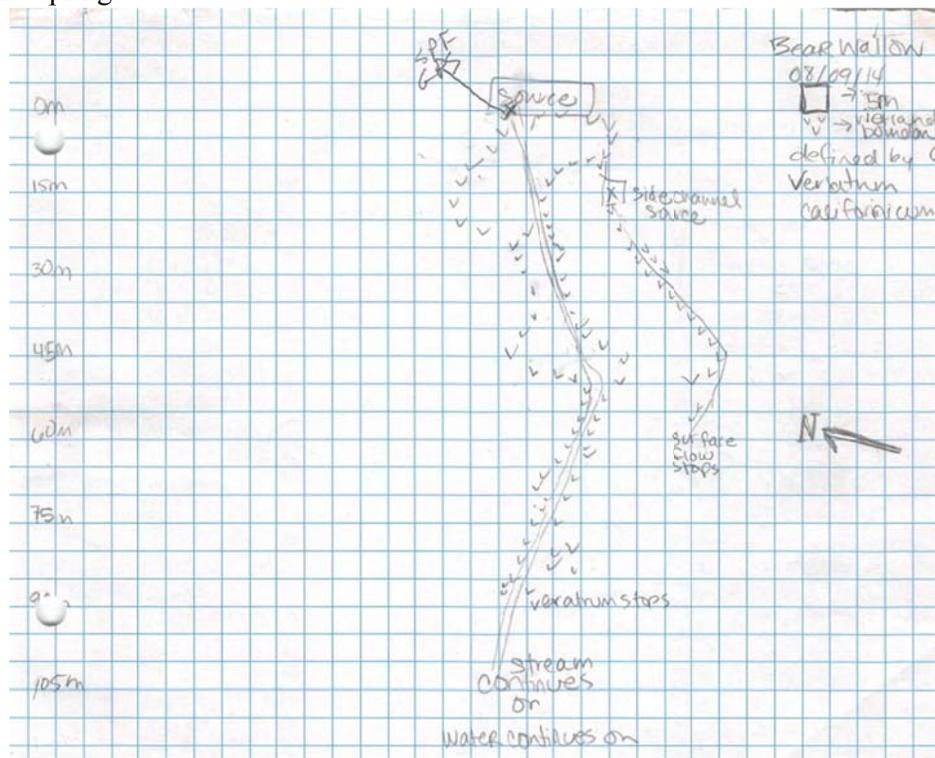


Fig 1.2 Bearwallow Spring Sketchmap.

Emerald Spring Survey Summary Report, Site ID 13241

Location: The Emerald Spring ecosystem is located in Graham County in the Upper Gila-San Carlos Reservoir Arizona 15040005 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.70208, -109.88617 in the Webb Peak USGS Quad, measured using a GPS (NAD83, estimated position error 4 meters). The elevation is approximately 3153 meters. Louise Misztal, Max Licher, Steve Buckley, Molly McCormick, Craig Willcox, Nick Pacini surveyed the site on 8/09/13 for 01:45 hours, beginning at 14:15, and collected data in 7 of 12 categories.



Fig 1 Emerald Spring.

Physical Description: Emerald Spring is a helocrene spring. There is a wet meadow in a burned area (2004) with scattered spruce/fir, but primarily open. The site has 2 microhabitats, including A -- a 2050 sqm high gradient cienega, B -- a 700 sqm channel.

Emerald Spring emerges as a seepage or filtration spring from a rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 902 meters.

Survey Notes: The spring is in the middle of a large burned area, although it appears the wet meadow area of the spring has always been tree-free. This site appears to be the only source of natural regeneration of spruce and fir in the surrounding landscape. The cienega has young spruce and fir around the edges of the wet meadow and along the runout channel. The site is 500m from the telescope and a road. No springsnail search was conducted.

Table 1 Emerald Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	6.63
Specific conductance (field) (uS/cm)	24
Temperature, air C	15
Temperature, water C	11.7

Flora: Surveyors identified 19 plant species at the site, with 0.0069 species/sqm. These included 17 native and 1 nonnative species; the native status of 1 species remains unknown.

Table 2 Emerald Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	16	7
Shrub	0	0
Mid-canopy	0	0
Tall canopy	1	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Emerald Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Achillea millefolium</i>	GC	NI	U
<i>Agrostis exarata</i>	GC	N	W
<i>Agrostis scabra</i>	GC	N	W
<i>Carex bella</i>	GC	N	
<i>Carex microptera</i>	GC	N	W
<i>Carex occidentalis</i>	GC	N	W
<i>Carex siccata</i>	GC	N	W
<i>Deschampsia caespitosa</i>		N	
<i>Dodecatheon</i>	GC		W
<i>Geranium richardsonii</i>	GC	N	F
<i>Hymenoxys hoopesii</i>	GC	N	F
<i>Laennecia schiedeana</i>		N	
<i>Mertensia franciscana</i>	GC	N	F
<i>Picea engelmannii</i>	TC	N	U
<i>Poa pratensis</i>	GC	NI	F
Poaceae	GC		
<i>Ribes montigenum</i>	GC	N	F
<i>Rubus idaeus</i>	GC	NI	F
<i>Viola nephrophylla</i>	GC	N	WR

Fauna: Surveyors collected or observed 2 vertebrate specimens.

Table 4 Emerald Spring Vertebrates.

Species Common Name	Count	Detection
yellow-eyed junco		
mountain spiny lizard		

Assessment: Assessment scores were compiled in 5 categories and 24 subcategories, with 18 null condition scores, and 18 null risk scores. Aquifer functionality and water quality are very good with excellent restoration potential and there is low risk. Geomorphology condition is good with significant restoration potential and there is negligible risk. Habitat condition is excellent with no need for restoration and there is low risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is very good with excellent restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is very good with excellent restoration potential and there is low risk.

Table 5 Emerald Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	5.3	2.8
Geomorphology	4.6	1.8
Habitat	6	2
Biota	4.8	2
Human Influence	5.4	2.3
Administrative Context	0	0
Overall Ecological Score	5.2	2.2

Management Recommendations: Work with Tom VanDevender to locate field records from previous visits to the site both pre-burn and pre-beetle kill. Look at squirrel BO and Scoping EIS for any further information about flow and species presence before the fire. Talk with San Carlos and White Mountain Apache to understand the history and importance of the site to the tribes - they are known to be sacred sites as is the whole top of the mountain.

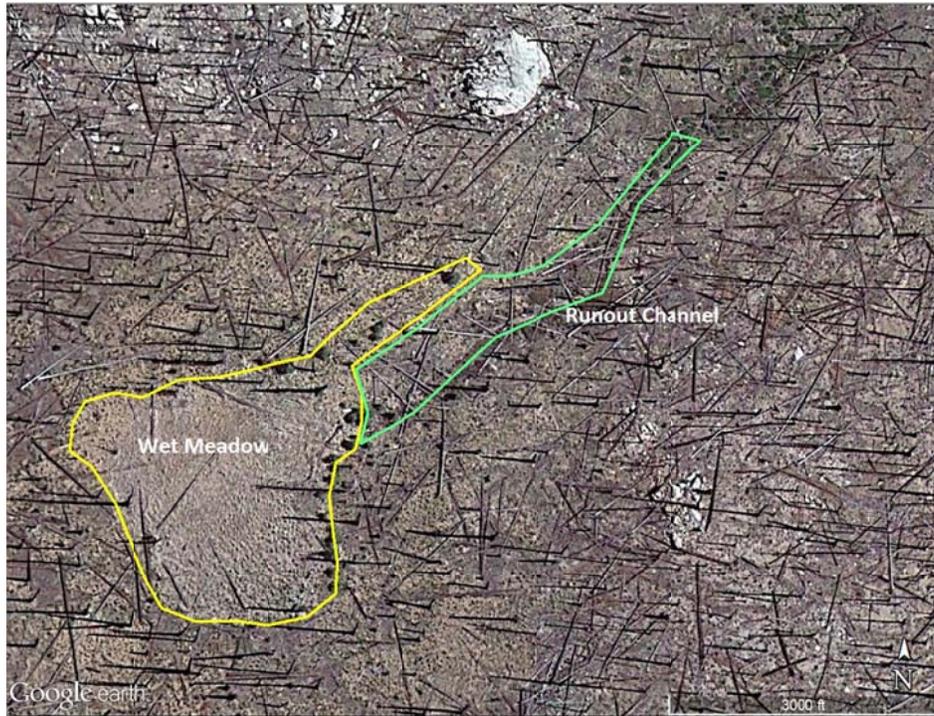


Fig 2 Emerald Spring Sketchmap.



Fig 3 Emerald Spring.

Hairpin Spring Unnamed Survey Summary Report, Site ID 13255

Location: The Hairpin Spring Unnamed ecosystem is located in Graham County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.66130, -109.86431 in the Mount Graham USGS Quad, measured using a GPS (NAD83, estimated position error 10 meters). The elevation is approximately 2816 meters. Nick Deyo, Bill Beaves, Karen Lowery, Don Davis, Diana Wheeler surveyed the site on 8/03/13 for 01:30 hours, beginning at 15:00, and collected data in 7 of 12 categories.



Fig 1 Hairpin Spring Unnamed.

Physical Description: Hairpin Spring Unnamed is a rheocrene spring. It is a small spring emerging in a steep, heavily wooded channel. The site has 1 microhabitat, A -- a 38 sqm channel.

Hairpin Spring Unnamed emerges as a seepage or filtration spring from an igneous, granite rock layer in an unknown unit. The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 727 meters.

Survey Notes: The spring is covered by logging or thinning debris - lots of downed wood. The road above the spring has likely altered its natural condition. The culvert above the spring is clogged and almost buried, which may cause the road to fail and destroy the spring.

Table 1 Hairpin Spring Unnamed Water Quality with multiple readings averaged.

Characteristic Measured	Average Value	Comments
Dissolved oxygen (field) % saturation	59.2	average of 4 measurements
Dissolved oxygen (field) (mg/L)	4.59	average of 4 measurements
pH (field)	5.92	average of 4 measurements
Specific conductance (field) (uS/cm)	27.5	average of 4 measurements
Temperature, air C	15.6	
Temperature, water C	11.3	1 measurement

Flora: Plant list is for the site as a whole. Surveyors identified 12 plant species at the site, with 0.3158 species/sqm. These included 7 native and 0 nonnative species; the native status of 5 species remains unknown.

Table 2 Hairpin Spring Unnamed Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	9	4
Shrub	0	0
Mid-canopy	1	0
Tall canopy	2	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Hairpin Spring Unnamed Vegetation.

Species	Cover Code	Native Status	Wetland Status
Adiantum	GC	N	
Arenaria	GC		
Carex wootonii	GC	N	W
Fragaria virginiana	GC	N	F
Glyceria	GC		W
Heracleum	GC		W
Pinus contorta	TC	N	U
Pinus strobiformis	TC	N	
Pseudotsuga menziesii	MC	N	U
Pyrola	GC		U
Senecio	GC		F
Veratrum	GC	N	WR

Fauna: Surveyors collected or observed 2 vertebrate specimens.

Table 4 Hairpin Spring Unnamed Vertebrates.

Species Common Name	Count
red-breasted nuthatch	1
dark-eyed junco	1

Assessment: Assessment scores were compiled in 5 categories and 29 subcategories, with 13 null condition scores, and 13 null risk scores. Aquifer functionality and water quality are moderate with some restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is low risk. Habitat condition is moderate with some restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is negligible risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 5 Hairpin Spring Unnamed Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	3.3	2.7
Geomorphology	3.6	2.6
Habitat	3.7	2.3
Biota	5.3	2
Human Influence	4.8	1.7
Administrative Context	0	0
Overall Ecological Score	4.3	2.2

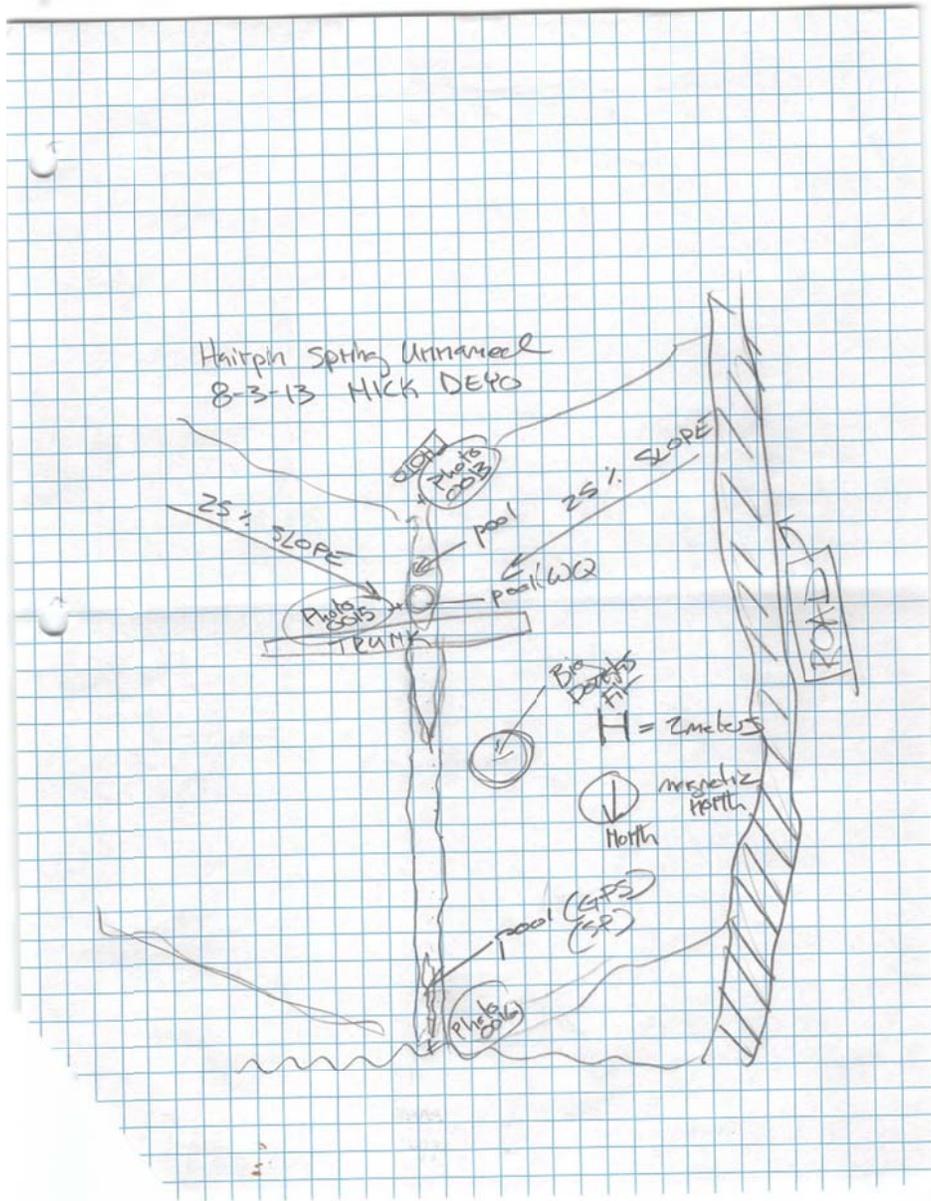


Fig 2 Hairpin Spring Unnamed Sketchmap.



Fig 3 Hairpin Spring Unnamed.

Heliograph Spring Survey Summary Report, Site ID 13249

Location: The Heliograph Spring ecosystem is located in Graham County in the Upper Gila-San Carlos Reservoir Arizona 15040005 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.65145, -109.85026 in the Mount Graham USGS Quad, measured using a GPS (NAD27, estimated position error 9 meters). The elevation is approximately 2843 meters. Randy Seraglio, Ries L., Annamarie Schaecher, Christopher Morris, Katy Brown, Maya K., Allie L., Rick M. surveyed the site on 8/03/13 for 02:10 hours, beginning at 10:59, and collected data in 8 of 12 categories.



Fig 1.1 Heliograph Spring. Best available photo

Physical Description: Heliograph Spring is a hillslope spring. The site has a lidded/boxed hillside spring protected by several stone enclosures.

Heliograph Spring emerges from a metamorphic rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 321 meters.

Survey Notes: The spring is heavily developed and piped until it is allowed to flow freely again once it passes through the culvert under the road.

Table 1 Heliograph Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) % saturation	99.5
Dissolved oxygen (field) (mg/L)	8.86
pH (field)	6.27
Specific conductance (field) (uS/cm)	39.9
Temperature, air C	26.5
Temperature, water C	6.7

Flora: Surveyors identified 26 plant species at the site, with 0.26 species/sqm. These included 20 native and 3 nonnative species; the native status of 3 species remains unknown.

Table 2 Heliograph Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	15	4
Shrub	1	1
Mid-canopy	1	0
Tall canopy	6	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Heliograph Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Abies concolor</i>	TC	N	U
<i>Acer glabrum</i>	TC	N	F
<i>Achillea lanulosa</i>	GC	N	
<i>Actaea rubra</i>	GC	N	F
<i>Carex</i>			
<i>Cirsium parryi</i>	GC	N	F
<i>Geranium</i>	GC	N	F
<i>Glyceria</i>	GC		W
<i>Heracleum maximum</i>	GC	N	W
<i>Hymenoxys hoopesii</i>	GC	N	F
<i>Maianthemum</i>	GC		U
<i>Mertensia</i>	GC	N	U
<i>Oxalis alpina</i>		N	
<i>Picea engelmannii</i>	TC	N	U
<i>Picea pungens</i>	TC	N	U
<i>Pinus</i>	TC		U
<i>Populus tremuloides</i>	TC	N	U
<i>Pseudotsuga menziesii</i>	MC	N	U
<i>Pteridium aquilinum</i>	GC	N	U
<i>Rubus</i>	SC		R
<i>Rubus idaeus</i>	GC	NI	F
<i>Scirpus</i>	GC	N	W
<i>Solanaceae</i>			
<i>Thalictrum</i>	GC	N	U
<i>Veratrum californicum</i>	GC	N	W
<i>Viola</i>	GC	N	F

Fauna: Surveyors collected or observed 18 vertebrate specimens.

Table 4 Heliograph Spring Vertebrates.

Species Common Name	Count	Detection
Common raven	1	sign
Steller's jay	1	sign
house wren		
hairy woodpecker		
yellow-eyed junco		
cooper's hawk		
red-breasted nuthatch		
mountain chickadee		
common bushtit		
hermit thrush		
Broad-tailed hummingbird		call
red-tailed hawk		call
White-breasted nuthatch		call
Yarrows spiny lizard	1	obs
deer		sign
vole	1	obs
tadpole	1	obs
squirrels, marmots, chipmunks		sign

Assessment: Assessment scores were compiled in 5 categories and 32 subcategories, with 10 null condition scores, and 10 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is low risk. Habitat condition is moderate with some restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is moderate risk. Human influence of site is very good with excellent restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 5 Heliograph Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.5	2.3
Geomorphology	3.4	2.8
Habitat	3.5	2.5
Biota	5.5	2.9
Human Influence	4.9	2.2
Administrative Context	0	0
Overall Ecological Score	4.6	2.5

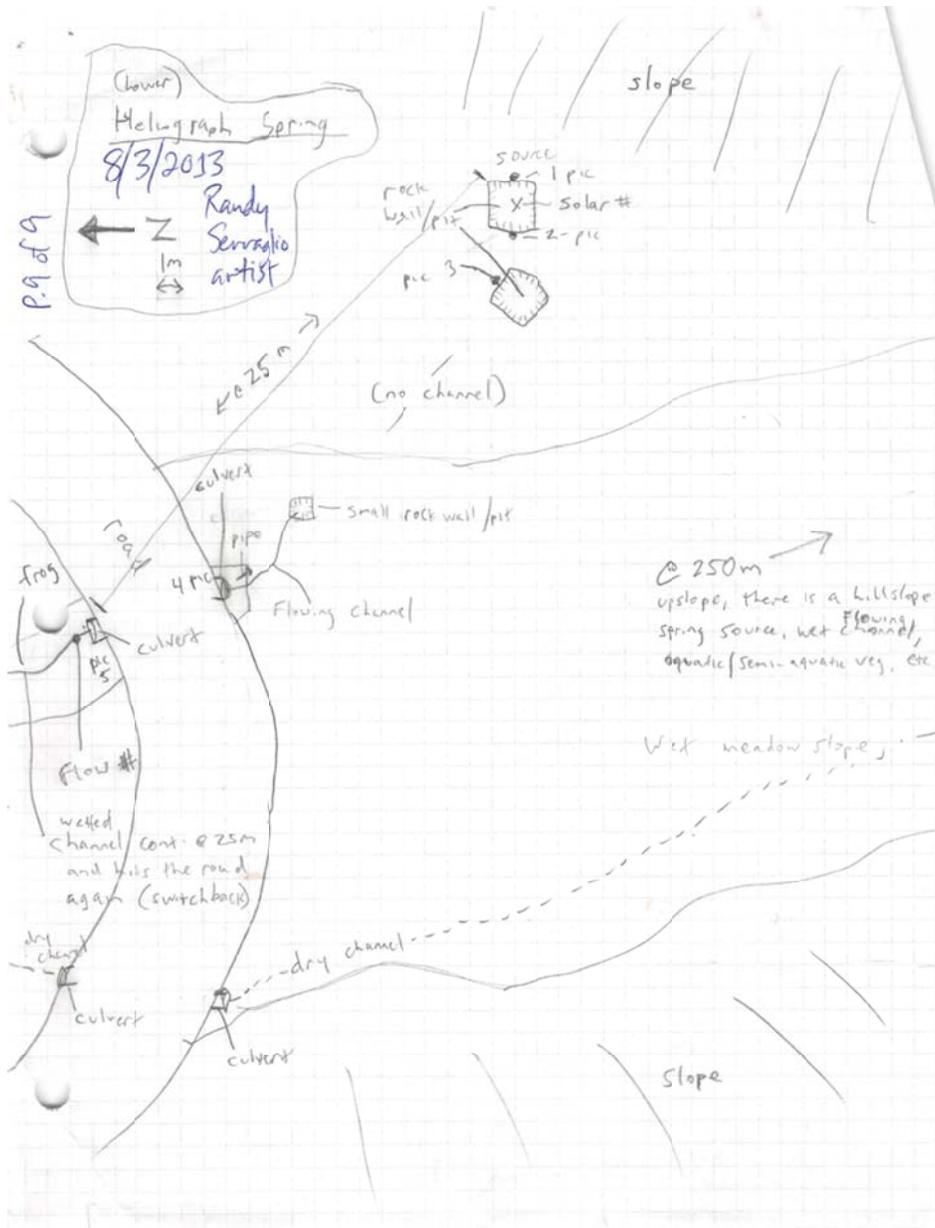


Fig 2 Heliograph Spring Sketchmap.

High Peak Cienega

Survey Summary Report, Site ID 17339

Location: The High Peak Cienega ecosystem is located in Graham County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.69385, -109.86762 in the Mount Graham USGS Quad, measured using a GPS (NAD83, estimated position error 5 meters). The elevation is approximately 3124 meters. Louise Misztal, Max Licher, Steve Buckley, Molly McCormick, Craig Willcox, Nick Pacini surveyed the site on 8/09/13 for 01:46 hours, beginning at 9:54, and collected data in 8 of 12 categories.



Fig 1 High Peak Cienega.

Physical Description: High Peak Cienega is a hillslope spring. The spring emerges from a hillside in a flat open meadow at the start of a drainage. The microhabitats associated with the spring cover 430 sqm. The site has 2 microhabitats, including A -- a 36 sqm channel, B -- a 394 sqm low gradient cienega. The geomorphic diversity is 0.12, based on the Shannon-Weiner diversity index.

High Peak Cienega emerges from a metamorphic rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 1457 meters.

Survey Notes: The site is in good condition. A large fire burned here in 2004 and the spring is the only site of regeneration of spruce and fir. The spring appears to be the only source of natural spruce/fir regeneration - all of the surrounding landscape burned in 2004, with no

signs of regeneration. No spring snails were detected but there were a variety of other insects present - worms, leeches, etc.

Table 1 High Peak Cienega Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	7.05
Specific conductance (field) (uS/cm)	75
Temperature, air C	18.5
Temperature, water C	8.2

Flora: Surveyors identified 41 plant species at the site, with 0.0953 species/sqm. These included 38 native and 1 nonnative species; the native status of 2 species remains unknown.

Table 2 High Peak Cienega Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	34	12
Shrub	0	0
Mid-canopy	0	0
Tall canopy	1	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 High Peak Cienega Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Abies concolor</i>	TC	N	U
<i>Achillea millefolium</i>	GC	NI	U
<i>Agrostis scabra</i>	GC	N	W
<i>Agrostis stolonifera</i>	GC	I	W
<i>Allium geberi</i>	GC	N	
<i>Arenaria lanuginosa</i>	GC	N	U
<i>Bromus ciliatus</i>	GC	N	F
<i>Bromus marginatus</i>	GC	N	W
<i>Campanula parryi</i>	GC	N	U
<i>Carex bella</i>	GC	N	
<i>Carex kelloggii</i>			
<i>Carex microptera</i>	GC	N	W
<i>Carex occidentalis</i>	GC	N	W
<i>Carex siccata</i>	GC	N	W
<i>Conioselinum scopulorum</i>	GC	N	F
<i>Deschampsia caespitosa</i>		N	
<i>Dodecatheon dentatum</i>	GC	N	
<i>Dryopteris filix-mas</i>	GC	N	R
<i>Elymus trachycaulus</i>	GC	N	F
<i>Festuca sororia</i>		N	
<i>Fragaria virginiana</i>	GC	N	U
<i>Geranium richardsonii</i>	GC	N	F
<i>Helianthella quinquenervis</i>	GC	N	
<i>Heracleum maximum</i>	GC	N	W
<i>Hymenoxys hoopesii</i>	GC	N	F
<i>Juncus saximontanus</i>	GC	N	W
<i>Laennecia schiedeana</i>		N	
<i>Luzula parviflora</i>	GC	N	F
<i>Mertensia franciscana</i>	GC	N	F
<i>Mimulus guttatus</i>	GC	N	W
<i>Oreochrysum parryi</i>		N	
<i>Poa pratensis</i>	GC	NI	F
<i>Potentilla albiflora</i>	GC	N	
<i>Ribes montigenum</i>	GC	N	F
<i>Rubus idaeus</i>	GC	NI	F
<i>Senecio bigelovii</i>	GC	N	F
<i>Sisyrinchium longipes</i>	GC	N	
<i>Trisetum montanum</i>			
<i>Veratrum californicum</i>	GC	N	W
<i>Vicia americana</i>	GC	N	F
<i>Viola nephrophylla</i>	GC	N	WR

Fauna: Surveyors collected or observed 1 aquatic invertebrates and 9 vertebrate specimens.

Table 4 High Peak Cienega Invertebrates.

Species	Lifestage	Habitat	Method
Hirudinea		A	Spot

Table 5 High Peak Cienega Vertebrates.

Species Common Name
pine siskin
yellow-eyed junco
western bluebird
northern flicker
house wren
White-breasted nuthatch
Annas hummingbird
yellow-rumped warbler
pygmy nuthatch

Assessment: Assessment scores were compiled in 5 categories and 25 subcategories, with 17 null condition scores, and 17 null risk scores. Aquifer functionality and water quality are very good with excellent restoration potential and there is low risk. Geomorphology condition is very good with excellent restoration potential and there is negligible risk. Habitat condition is excellent with no need for restoration and there is low risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is very good with excellent restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is very good with excellent restoration potential and there is low risk.

Table 6 High Peak Cienega Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	5.3	2.8
Geomorphology	5.2	1.8
Habitat	6	2
Biota	4.8	2
Human Influence	5.2	2.2
Administrative Context	0	0
Overall Ecological Score	5.2	2.2

Management Recommendations: Work with Tom VanDevender to find previous survey information from before 2004 fire, possibly from before beetle kill. Consult BO and telescope EIS for any previous flow information. Talk with San Carlos and White Mountain Apache about the cultural significance of the site.

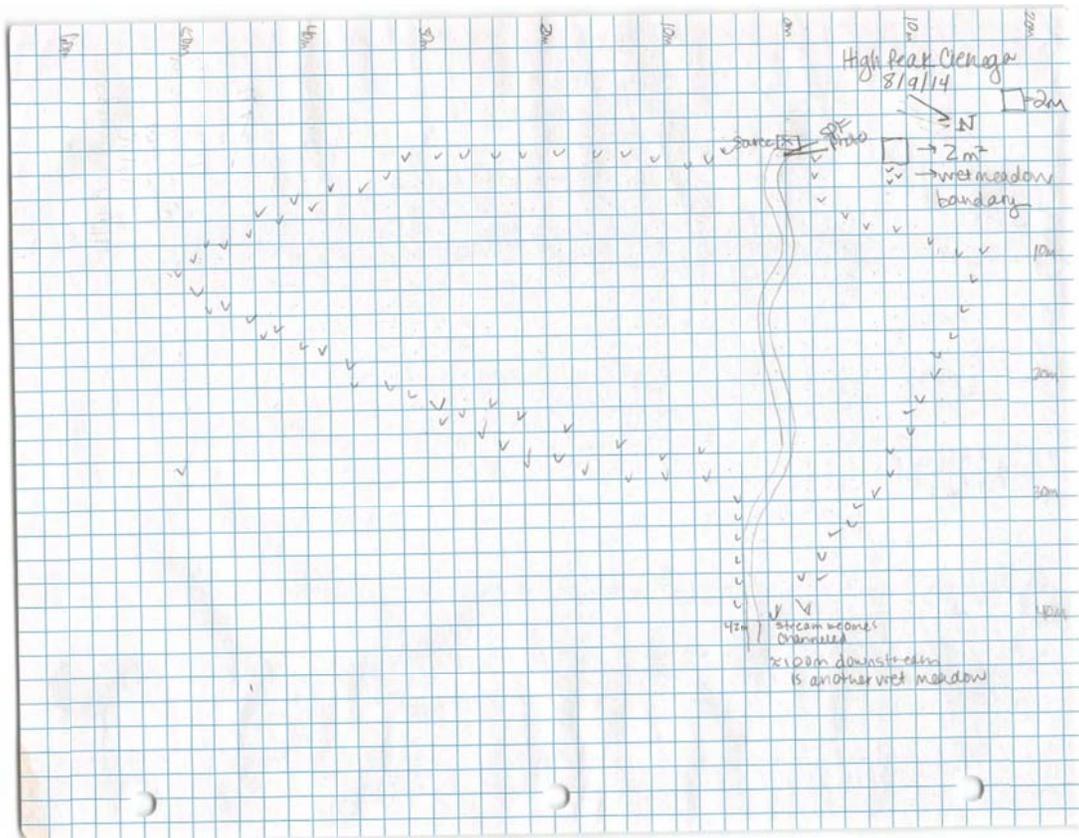


Fig 2 High Peak Cienega Sketchmap.



Fig 3 High Peak Cienega.



Fig 4 High Peak Cienega.

Unnamed (Middle Treasure Park Spring)
Survey Summary Report, Site ID 17336

Location: The Unnamed ecosystem is located in Graham County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.66153, -109.87185 in the Mount Graham USGS Quad, measured using a GPS (NAD83, estimated position error 4 meters). The elevation is approximately 2733 meters. Nick Deyo, Bill Beaver, Karen Lowrey, Diana Wheeler, Don Davis surveyed the site on 8/04/13 for 02:30 hours, beginning at 9:00, and collected data in 7 of 12 categories.



Fig 1 Unnamed.

Physical Description: Unnamed is a helocrene spring. The spring emerges from a large open meadow denoted by alder trees and a small channel. There is no open water. The site has 2 microhabitats, including A -- a 375 sqm channel, B -- a 1000 sqm low gradient cienega.

Unnamed emerges from an igneous, granite rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 137 meters.

Survey Notes: The site is heavily used for recreation with signs of people driving through the meadow. This site is part of a larger helocrene complex with high quality wetland habitat - passed camping and driving - Road engineering has degraded the adjacent habitat (recent?).

Flora: Surveyors identified 24 plant species at the site, with 0.0175 species/sqm. These included 18 native and 0 nonnative species; the native status of 6 species remains unknown.

Table 1 Unnamed Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	18	9
Shrub	0	0
Mid-canopy	1	1
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 2 Unnamed Vegetation.

Species	Cover Code	Native Status	Wetland Status
<i>Achillea millefolium</i>	GC	NI	U
<i>Agrimonia</i>			
<i>Alnus incana</i>	MC	N	WR
<i>Carex lenticularis</i>	GC	N	W
<i>Carex pellita</i>	GC	N	W
<i>Carex stipata</i>	GC	N	W
<i>Carex utriculata</i>	GC	N	W
<i>Carex wootonii</i>	GC	N	W
<i>Cerastium</i>			WR
<i>Cirsium parryi</i>	GC	N	F
<i>Festuca arizonica</i>	GC	N	U
<i>Glyceria elata</i>		N	W
<i>Heracleum</i>	GC		W
<i>Hymenoxys hoopesii</i>	GC	N	F
<i>Hypericum scouleri</i>	GC	N	WR
<i>Muhlenbergia montana</i>	GC	N	U
<i>Oxalis alpina</i>		N	
<i>Poa pratensis</i>	GC	NI	F
<i>Rorippa</i>			A
<i>Rudbeckia</i>	GC		F
<i>Scirpus microcarpus</i>	GC	N	W
<i>Senecio</i>	GC		F
<i>Senecio bigelovii</i>	GC	N	F
<i>Veratrum</i>	GC	N	WR

Fauna: Surveyors collected or observed 3 terrestrial invertebrates and 1 vertebrate specimens.

Table 3 Unnamed Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Hymenoptera Apidae	Ad	T	Spot	1	"flower bee"
Hymenoptera Apidae Bombus	Ad	T	Spot	1	
Hymenoptera Formicidae Formica	Ad	T	Spot		

Table 4 Unnamed Vertebrates.

Species Common Name	Count
dark-eyed junco	1

Assessment: Assessment scores were compiled in 5 categories and 25 subcategories, with 17 null condition scores, and 17 null risk scores. Aquifer functionality and water quality are moderate with some restoration potential and there is low risk. Geomorphology condition is good with significant restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is moderate risk. Biotic integrity is very good with excellent restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is moderate risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is moderate risk.

Table 5 Unnamed Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	3.5	2.5
Geomorphology	4	3.2
Habitat	4.3	3
Biota	5	2.5
Human Influence	4.3	3
Administrative Context	0	0
Overall Ecological Score	4.2	2.9

Management Recommendations: This site is part of a larger helocrene complex with high quality wetland habitat - passed camping and driving - Road engineering has degraded the adjacent habitat (recent?). The site could benefit from restoration and engineering.

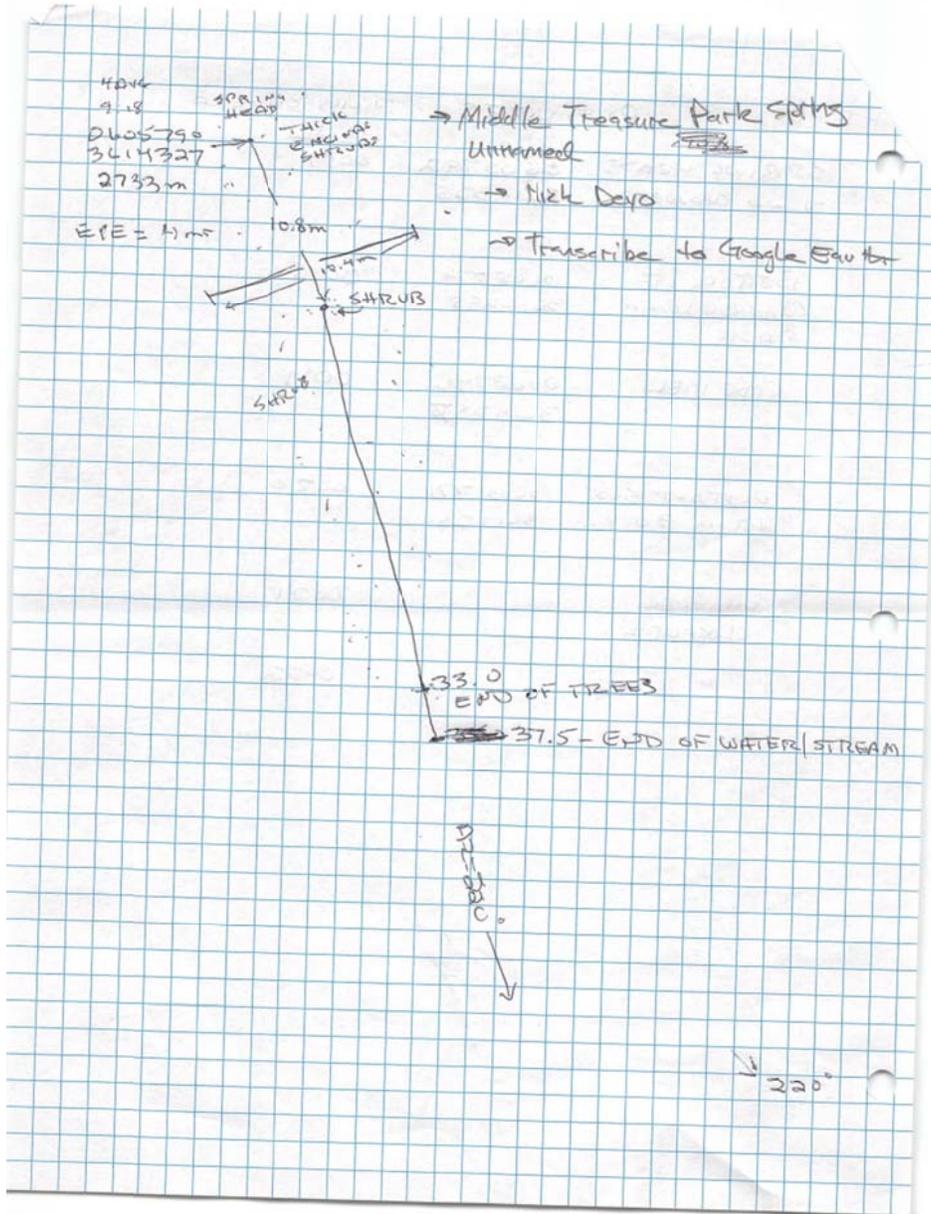


Fig 2 Unnamed Sketchmap.



Fig 3 Unnamed.

Shannon Campground Unnamed Survey Summary Report, Site ID 17329

Location: The Shannon Campground Unnamed ecosystem is located in Graham County in the Upper Gila-San Carlos Reservoir Arizona 15040005 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.65606, -109.85732 in the Mount Graham USGS Quad, measured using a GPS (WGS84, estimated position error 8 meters). The elevation is approximately 2793 meters. Randy Seraglio, Ries L., Christopher Morris, Katy Brown, Maya K., Allie L., Rick M., Ries L. surveyed the site on 8/03/13 for 01:4 hours, beginning at 14:40, and collected data in 9 of 12 categories.



Fig 1 Shannon Campground Unnamed.

Physical Description: Shannon Campground Unnamed is a rheocrene/helocrene spring. This site is nearly pristine. It has a faint channel, so is likely a rheocrene site.

The emergence environment is subaerial. The distance to the nearest spring is 321 meters.

Survey Notes: The site was overgrown to the point that the surveyors had to part back the sedges to access the origin point. The spring is quite natural and has good vegetative cover and normal flow. An abandoned (logging) road leads out to the spring area. No more vehicles area accessing the area above the spring, allowing the road to revegetate. From the looks of it, it doesn't get a lot of foot traffic either.

Table 1 Shannon Campground Unnamed Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) % saturation	93.9
Dissolved oxygen (field) (mg/L)	8.04
pH (field)	5.88
Specific conductance (field) (uS/cm)	42.9
Temperature, air C	29
Temperature, water C	8.6

Flora: Surveyors identified 30 plant species at the site, with 0.06 species/sqm. These included 21 native and 0 nonnative species; the native status of 9 species remains unknown.

Table 2 Shannon Campground Unnamed Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	20	6
Shrub	3	0
Mid-canopy	1	0
Tall canopy	3	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Shannon Campground Unnamed Vegetation.

Species	Cover Code	Native Status	Wetland Status
Abies	TC		U
Acer glabrum	TC	N	F
Actaea rubra	GC	N	F
Aquilegia chrysantha	GC	N	W
Artemisia	SC	N	F
Bouteloua curtipendula	GC	N	U
Bromus	GC		F
Carex	GC		
Cerastium			WR
Cirsium	GC		F
Fragaria	GC	N	U
Geranium caespitosum	GC	N	F
Heracleum maximum	GC	N	W
Hymenoxys hoopesii	GC	N	F
Jamesia americana	SC	N	
Mertensia	GC	N	U
Mimulus guttatus	GC	N	W
Oxalis	GC	N	WR
Picea	SC		U
Poaceae fam	GC		
Populus tremuloides	TC	N	U
Pseudotsuga menziesii	MC	N	U
Pteridium aquilinum	GC	N	U
Ribes pinetorum		N	
Rubus idaeus	GC	NI	F
Sambucus	GC		F
Scirpus	GC	N	W
Thalictrum	GC	N	U
unknown Fungus, fleshy (mushroom)			
Veratrum californicum	GC	N	W

Fauna: Surveyors collected or observed 1 terrestrial invertebrates and 5 vertebrate specimens.

Table 4 Shannon Campground Unnamed Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Lepidoptera Arctiidae Gnophaela vermiculata	Ad	T	Spot	1	photos

Table 5 Shannon Campground Unnamed Vertebrates.

Species Common Name	Count	Detection
hermit thrush	3	obs
house wren		
mountain chickadee		
red-breasted nuthatch		
deer	1	sign

Assessment: Assessment scores were compiled in 5 categories and 32 subcategories, with 10 null condition scores, and 10 null risk scores. Aquifer functionality and water quality are very good with excellent restoration potential and there is negligible risk. Geomorphology condition is very good with excellent restoration potential and there is negligible risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is very good with excellent restoration potential and there is moderate risk. Human influence of site is very good with excellent restoration potential and there is negligible risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is very good with excellent restoration potential and there is low risk.

Table 6 Shannon Campground Unnamed Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	5	1.5
Geomorphology	5.8	1.2
Habitat	4.5	2
Biota	5.5	2.9
Human Influence	5.7	1.6
Administrative Context	0	0
Overall Ecological Score	5.4	1.9

Management Recommendations: The spring is quite natural and has good vegetative cover and normal flow. An abandoned (logging) road leads out to the spring area. No more vehicles area accessing the area above the spring, allowing the road to revegetate. From the looks of it, it doesn't get a lot of foot traffic either.

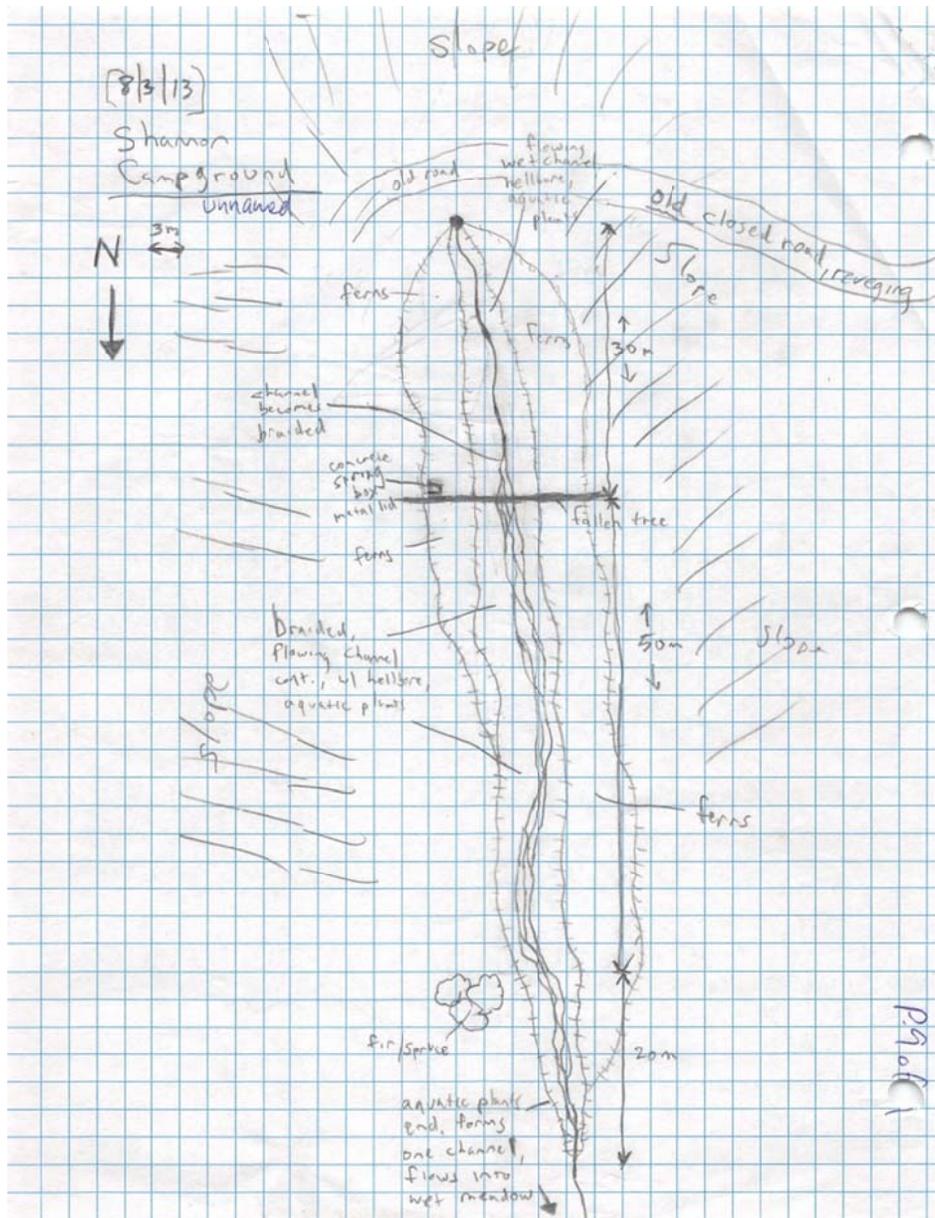


Fig 2 Shannon Campground Unnamed Sketchmap.



Fig 3 Shannon Campground Unnamed: spring in its surroundings - spring is where people are standing

Snow Flat Unnamed Survey Summary Report, Site ID 17337

Location: The Snow Flat Unnamed ecosystem is located in Graham County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.65319, -109.86487 in the Mount Graham USGS Quad, measured using a GPS (NAD83, estimated position error 5 meters). The elevation is approximately 2692 meters. Nick Deyo, Bill Beaver, Karen Lowrey, Diana Wheeler, Don Davis surveyed the site on 8/03/13 for 03:00 hours, beginning at 10:30, and collected data in 7 of 12 categories.



Fig 1 Snow Flat Unnamed.

Physical Description: Snow Flat Unnamed is a helocene/anthropogenic spring. There is a wet meadow which drains to a small dammed pool. The site has 5 microhabitats. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

Snow Flat Unnamed emerges from a combination rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 890 meters.

Survey Notes: The site is heavily impacted by recreation. It has been dammed for many years; the spillway is causing erosion in the downstream channel.

Table 1 Snow Flat Unnamed Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) % saturation	22
Dissolved oxygen (field) (mg/L)	1.54
pH (field)	5.86
Specific conductance (field) (uS/cm)	32
Temperature, air C	21
Temperature, water C	14.3

Flora: Surveyors identified 11 plant species at the site. These included 6 native and 5 nonnative species.

Table 2 Snow Flat Unnamed Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	9	2
Shrub	0	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Snow Flat Unnamed Vegetation.

Species	Cover Code	Native Status	Wetland Status
Agoseris	GC		U
Carex microptera	GC	N	W
Carex utriculata	GC	N	W
Epilobium exaltatum			
Geranium	GC	N	F
Glandularia	GC		U
Houstonia wrightii	GC	N	F
Hypericum	GC		F
Luzula multiflora	GC	N	
Poa pratensis	GC	NI	F
unknown Moss			

Fauna: Surveyors collected or observed 14 terrestrial invertebrates and 3 vertebrate specimens.

Table 4 Snow Flat Unnamed Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
arachnid	Ad	T	Spot	2	2 spp of crab spiders
Coleoptera Cerambycidae	Ad	T	Spot		longhorn beetle
Coleoptera Coccinellidae	Ad	T	Spot		ladybug
Diptera Syrphidae			Spot		
Hymenoptera Apidae Bombus	Ad	T	Spot		
Hymenoptera Pompilidae		T	Spot		
Hymenoptera Pompilidae Pepsis	Ad	T	Spot		
Lepidoptera Lycaenidae	Ad	T	Spot		blue (Polyommatainae)
Lepidoptera Nymphalidae	Ad	T	Spot		checkerspot butterfly
Lepidoptera Nymphalidae Adelpha eulalia	Ad	T	Spot		
Lepidoptera Pieridae Phoebis sennae	Ad	T	Spot		
Odonata Aeshnidae	Ad	T	Spot		blue darner
Odonata Anisoptera	Ad	T	Spot		multiple spp
Odonata Libellulidae Libellula saturata	Ad	T	Spot		
Orthoptera Acrididae		T	Spot		multiple spp

Table 5 Snow Flat Unnamed Vertebrates.

Species Common Name
yellow-eyed junco
pocket gopher
fish

Assessment: Assessment scores were compiled in 5 categories and 29 subcategories, with 13 null condition scores, and 13 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is moderate risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is moderate with some restoration potential and there is moderate risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is moderate risk.

Table 6 Snow Flat Unnamed Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.2	2.2
Geomorphology	3.4	3.2
Habitat	4.3	3.3
Biota	4.8	2.5
Human Influence	3.7	3.2
Administrative Context	0	0
Overall Ecological Score	4	2.9

Management Recommendations: The dam is creating an unnatural pond. A spillway is causing erosion in the runout channel. There are extensive road and trail impacts around the spring that could be mitigated. Dispersed recreation is heavily impacting the spring and

surrounding areas. A better designed campground and restoration of impacted areas would be beneficial.

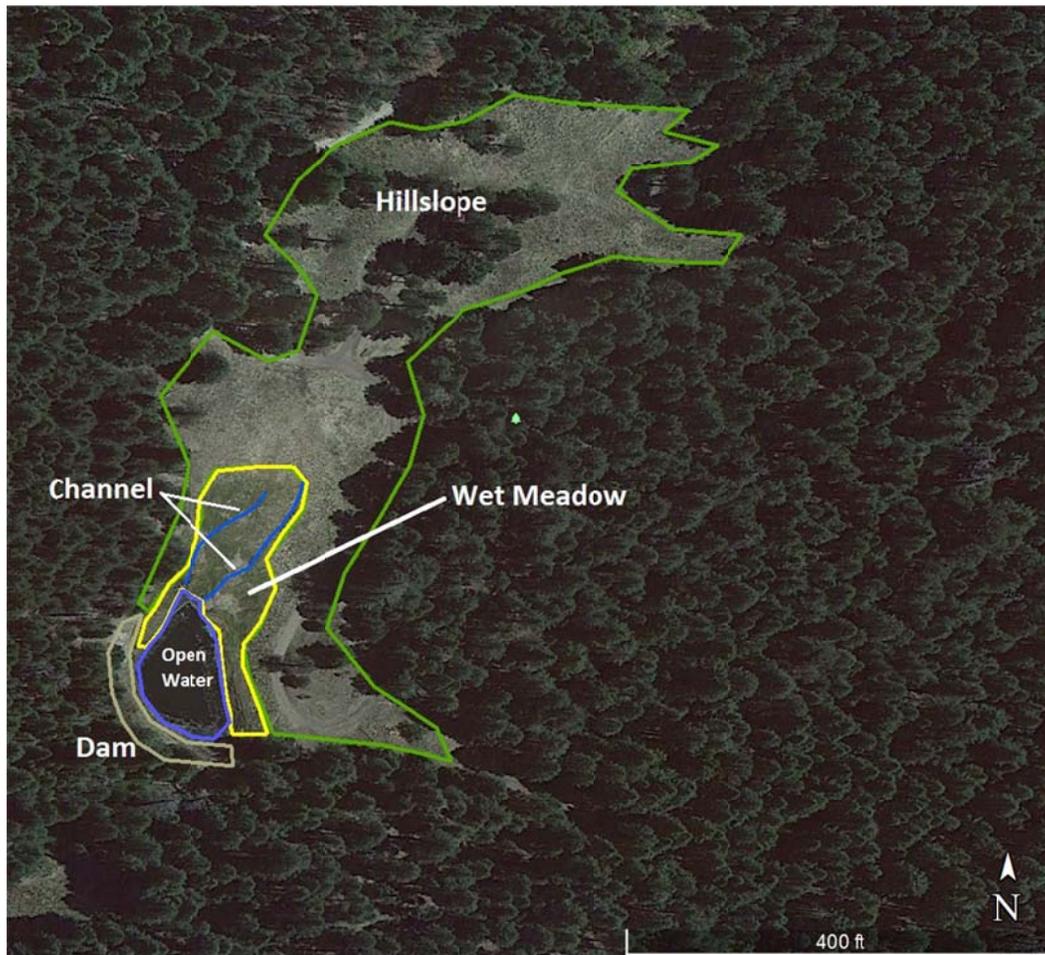


Fig 2 Snow Flat Unnamed Sketchmap.



Fig 3 Snow Flat Unnamed.



Fig 4 Snow Flat Unnamed.

Unnamed (Treasure Park Campground)
Survey Summary Report, Site ID 17334

Location: The Unnamed ecosystem is located in Graham County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.66417, -109.87004 in the Mount Graham USGS Quad, measured using a GPS (NAD83, estimated position error 9 meters). The elevation is approximately 2785 meters. Nick Deyo, Bill Beaver, Karen Lowrey, Diana Wheeler, Don Davis surveyed the site on 8/04/13 for 01:00 hours, beginning at 11:20, and collected data in 8 of 12 categories.



Fig 1 Unnamed.

Physical Description: Unnamed is a hillslope spring. It is a developed spring in a small drainage near the Treasure Park campground. It is the water source for the campground. The site has 2 microhabitats, including A -- a 1120 sqm channel, B -- a 1200 sqm adjacent uplands.

Unnamed emerges from an igneous, granite rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 255 meters.

Survey Notes: The spring is completely developed with no water flowing to the historic channel. It is the water source for the campground. It was recently developed or renovated. Due to the presence of overflow, it may be possible to rewater the historic wetlands at the site.

Table 1 Unnamed Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	7.14
Specific conductance (field) (uS/cm)	203.2
Temperature, air C	19
Temperature, water C	15.2

Flora: Surveyors identified 29 plant species at the site, with 0.0125 species/sqm. These included 18 native and 1 nonnative species; the native status of 10 species remains unknown.

Table 2 Unnamed Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	17	3
Shrub	0	0
Mid-canopy	2	1
Tall canopy	5	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Unnamed Vegetation.

Species	Cover Code	Native Status	Wetland Status
Abies			U
Achillea millefolium	GC	NI	U
Alnus incana	MC	N	WR
Bromus	GC		F
Carex	GC		
Carex wootonii	GC	N	W
Cerastium			WR
Cirsium parryi	GC	N	F
Deschampsia caespitosa		N	
Erysimum			
Galium	GC	I	F
Geranium	GC	N	F
Glandularia	GC		U
Heracleum	GC		W
Hymenoxys hoopesii	GC	N	F
Mertensia	GC	N	U
Monarda	GC		F
Oxalis alpina	GC	N	
Picea engelmannii	TC	N	U
Picea pungens	TC	N	U
Pinus ponderosa	TC	N	F
Pinus strobiformis	TC	N	
Poa pratensis	GC	NI	F
Populus tremuloides	TC	N	U
Pseudotsuga menziesii	MC	N	U
Pteridium	GC	N	U
Rorippa			A
Rudbeckia	GC		F
Veratrum	GC	N	WR

Fauna: Surveyors collected or observed 1 terrestrial invertebrates and 2 vertebrate specimens.

Table 4 Unnamed Invertebrates.

Species	Lifestage	Habitat	Method
Coleoptera Erotylidae Megalodacne heros	Ad	T	Spot

Table 5 Unnamed Vertebrates.

Species Common Name	Count	Detection
pocket gopher		
red-breasted nuthatch		

Assessment: Assessment scores were compiled in 5 categories and 26 subcategories, with 16 null condition scores, and 16 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is moderate risk. Geomorphology condition is poor with limited restoration potential and there is high risk. Habitat condition is poor with

limited restoration potential and there is high risk. Biotic integrity is poor with limited restoration potential and there is moderate risk. Human influence of site is moderate with some restoration potential and there is moderate risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is moderate with some restoration potential and there is moderate risk.

Table 6 Unnamed Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.6	3.8
Geomorphology	2.5	4.5
Habitat	2.5	4
Biota	2.5	3.8
Human Influence	3.8	3
Administrative Context	0	0
Overall Ecological Score	3.3	3.7

Management Recommendations: Due to the presence of overflow from the storage tank, it may be possible to rewater the historic wetlands at the site.

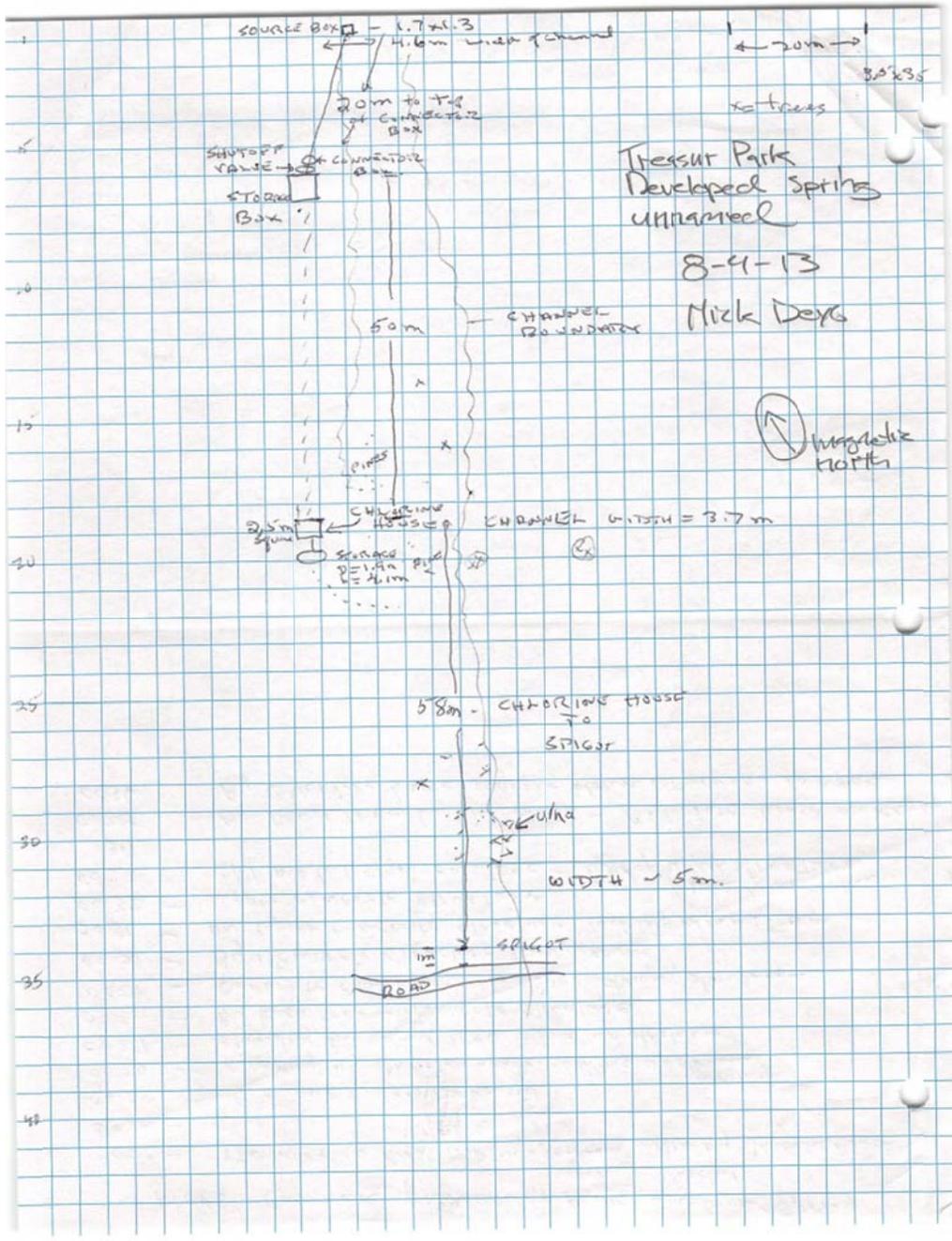


Fig 2 Unnamed Sketchmap.



Fig 3 Unnamed.



Fig 4 Unnamed.



Fig 5 Unnamed.

Unnamed (Upper Treasure Park Spring)
Survey Summary Report, Site ID 17335

Location: The Unnamed ecosystem is located in Graham County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.66236, -109.87203 in the Mount Graham USGS Quad, measured using a GPS (WGS84, estimated position error 8 meters). The elevation is approximately 2738 meters. Louise Misztal, Randy Seraglio, Ries L., Rudy L., Annamarie Schaecher, Christopher Morris surveyed the site on 8/04/13 for 01:11 hours, beginning at 9:19, and collected data in 8 of 12 categories.



Fig 1 Unnamed.

Physical Description: Unnamed is a helocrene spring that is part of a larger complex. It is located in an open meadow in an undeveloped campground area. The microhabitat associated with the spring covers 1300 sqm. The site has 1 microhabitat, A -- a 1300 sqm high gradient cienega. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

Unnamed emerges from an igneous, granite rock layer in an unknown unit. The emergence environment is subaerial. The distance to the nearest spring is 137 meters.

Survey Notes: The emergence point has been downcut 5-6' from the rest of the cienega due to a modified (?) channel above. Fortunately, aquatic vegetation has grown in to anchor the spring run. Flow increases as you descend the meadow. The FS road nearby massive ditch digging above spring dug out channel. The piled up rock at spring source may be to prevent a head cut? The site could use fencing to keep yahoos out - there are lots of motorized traffic

(quads, etc.) tire tracks through meadow. There is an old campground in the middle of the meadow.

Table 1 Unnamed Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) % saturation	52
pH (field)	6.16
Specific conductance (field) (uS/cm)	54
Temperature, air C	24.4
Temperature, water C	11.3

Flora: Surveyors identified 30 plant species at the site, with 0.0231 species/sqm. These included 17 native and 4 nonnative species; the native status of 9 species remains unknown.

Table 2 Unnamed Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	24	7
Shrub	1	0
Mid-canopy	1	1
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 3 Unnamed Vegetation.

Species	Cover Code	Native Status	Wetland Status
Achillea lanulosa	GC	N	
Agoseris aurantiaca	GC	N	U
Alnus incana	MC	N	WR
Artemisia	SC	N	F
Brassicaceae			
Brassicaceae			
Bromus	GC		F
Campanula rotundifolia	GC	N	U
Carex			
Centaurea solstitialis	GC	I	WR
Cerastium fontanum	GC	I	WR
Cirsium	GC		F
Conioselinum scopulorum	GC	N	F
Geranium richardsonii	GC	N	F
Glyceria	GC		W
Heracleum maximum	GC	N	W
Hymenoxys hoopesii	GC	N	F
Hypericum frondosum	GC	N	F
Linum lewisii	GC	N	
Monarda	GC		F
Oxalis	GC	N	WR
Poa pratensis	GC	NI	F
Poaceae			
Prunella vulgaris	GC	N	F
Rudbeckia laciniata	GC	N	F
Rumex acetosella	GC	I	W
Senecio	GC		F
Taraxacum officinale	GC	NI	F
Tragopogon dubius	GC	I	F
Veratrum viride	GC	N	WR

Fauna: Surveyors collected or observed 2 terrestrial invertebrates and 5 vertebrate specimens.

Table 4 Unnamed Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Lepidoptera	Ad	T	Spot	1	small white moth with small darker patch at wing base
Orthoptera Acrididae		T	Spot	1	photo

Table 5 Unnamed Vertebrates.

Species Common Name	Count	Detection
terrestrial gartersnake	1	obs
Broad-tailed hummingbird		
house wren		
pine siskin		
yellow-eyed junco		

Assessment: Assessment scores were compiled in 5 categories and 23 subcategories, with 19 null condition scores, and 20 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is moderate risk. Habitat condition is good with significant restoration potential and there is low risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is moderate risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 6 Unnamed Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.5	2.8
Geomorphology	3.8	3
Habitat	4.5	2.5
Biota	4.3	2.7
Human Influence	4	2.9
Administrative Context	0	0
Overall Ecological Score	4.1	2.8

Management Recommendations: The FS road nearby massive ditch digging above spring dug out channel. The piled up rock at spring source may be to prevent a head cut? The site could use fencing to keep motorized users out - there are lots of motorized traffic (quads, etc.) tire tracks through meadow. There is an old campground in the middle of the meadow.

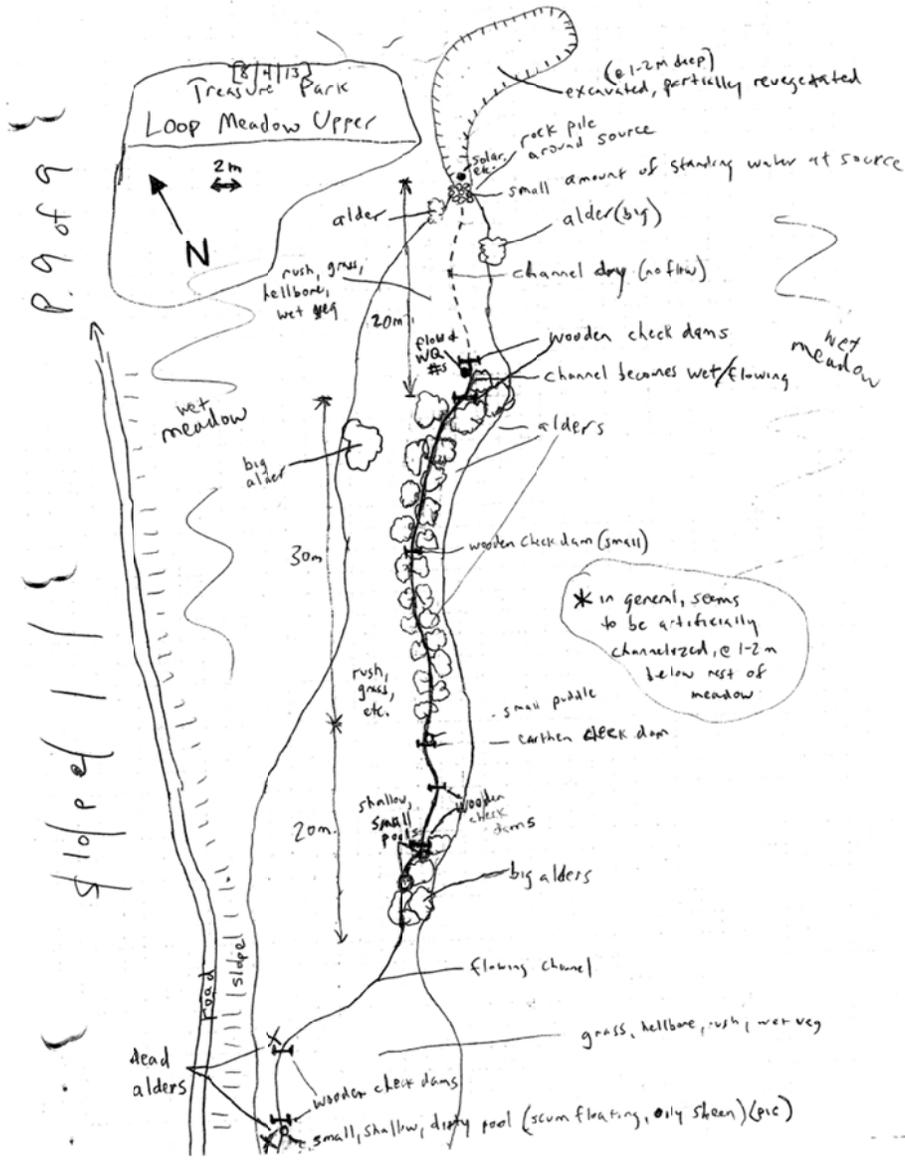


Fig 2 Unnamed Sketchmap.

Western Hospital Flat Unnamed Survey Summary Report, Site ID 179832

Location: The Western Hospital Flat Unnamed ecosystem is located in Graham County in the Willcox Playa Arizona 15050201 HUC, managed by the US Forest Service. The spring is located in the Safford RD, Coronado NF at 32.66831, -109.87738 in the Mount Graham USGS Quad, measured using a GPS (NAD83, estimated position error 5 meters). The elevation is approximately 2750 meters. Louise Misztal, Randy Seraglio, Ries L., Rudy L., Annamarie Schaecher, Christopher Morris surveyed the site on 8/04/13 for 01:30 hours, beginning at 11:30, and collected data in 8 of 12 categories.



Fig 1 Western Hospital Flat Unnamed: middle section of meadow, from upper

Physical Description: Western Hospital Flat Unnamed is a helocrene spring. It is a large high elevation wet meadow with braided channels. The site has 3 microhabitats, including A -- a 160 sqm channel, B -- a 0 sqm low gradient cienega.

Western Hospital Flat Unnamed emerges as a seepage or filtration spring from a rock layer in an unknown unit. The emergence environment is subaerial.

Survey Notes: A good reference site! It has a high diversity of plants, as well as wetted and secondary terrace habitat.

Table 1 Western Hospital Flat Unnamed Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Dissolved oxygen (field) % saturation	67.1
Dissolved oxygen (field) (mg/L)	503
pH (field)	6.06
Specific conductance (field) (uS/cm)	31.2
Temperature, water C	15.4

Flora: Surveyors identified 31 plant species at the site, with 0.1938 species/sqm. These included 28 native and 0 nonnative species; the native status of 3 species remains unknown.

Table 2 Western Hospital Flat Unnamed Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	27	13
Shrub	1	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	1	0

Table 3 Western Hospital Flat Unnamed Vegetation.

Species	Cover Code	Native Status	Wetland Status
Achillea millefolium	GC	NI	U
Agrostis scabra	GC	N	W
Bistorta bistortoides		N	F
Caltha leptosepala	GC	N	
Carex buxbaumii	GC	N	
Carex interior	GC	N	W
Carex lenticularis	GC	N	W
Carex microptera	GC	N	W
Carex stipata	GC	N	W
Carex wootonii	GC	N	W
Danthonia			U
Deschampsia caespitosa	GC	N	
Dodecatheon pulchellum	GC	N	W
Erysimum capitatum	SC	N	U
Festuca arizonica	GC	N	U
Glandularia	GC		U
Hymenoxys hoopesii	GC	N	F
Hypericum frondosum	GC	N	F
Juncus interior	GC	N	U
Juncus longistylis	GC	N	W
Juncus saximontanus	GC	N	W
Luzula multiflora	GC	N	
Mimulus guttatus	GC	N	W
moss	NV	N	F
Poa pratensis	GC	NI	F
Prunella vulgaris	GC	N	F
Pteridium	GC		U
Scirpus microcarpus	GC	N	W
Senecio bigelovii	GC	N	F
Sisyrinchium demissum	GC	N	W
Veratrum californicum	GC	N	W

Fauna: Surveyors collected or observed 2 aquatic and 2 terrestrial invertebrates and 6 vertebrate specimens.

Table 4 Western Hospital Flat Unnamed Invertebrates.

Species	Lifestage	Habitat	Method	Count	Species detail
Hemiptera Gerridae Gerris	Ad	A	Spot	1	
Hemiptera Notonectidae Notonecta	Ad	A	Spot	50	collected
Lepidoptera Nymphalidae Speyeria hesperis	Ad	T	Spot	1	nausicaa, maybe
Lepidoptera Sphingidae	Ad	T	Spot	1	Sphinx sp.

Table 5 Western Hospital Flat Unnamed Vertebrates.

Species Common Name
mule deer
mountain chickadee
chipmunk
house wren
red-tailed hawk
gopher

Assessment: Assessment scores were compiled in 5 categories and 30 subcategories, with 12 null condition scores, and 14 null risk scores. Aquifer functionality and water quality are very good with excellent restoration potential and there is low risk. Geomorphology condition is very good with excellent restoration potential and there is negligible risk. Habitat condition is very good with excellent restoration potential and there is negligible risk. Biotic integrity is excellent with no need for restoration and there is negligible risk. Human influence of site is very good with excellent restoration potential and there is negligible risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is very good with excellent restoration potential and there is negligible risk.

Table 6 Western Hospital Flat Unnamed Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	5.3	2
Geomorphology	5.6	1.2
Habitat	5.5	1.8
Biota	6	1.5
Human Influence	5.2	1.7
Administrative Context	0	0
Overall Ecological Score	5.5	1.6

Management Recommendations: There is a campground just downhill and a road nearby (including one that crosses the meadow above the spring). There is an erosion ditch forming from the road. There is road sand and gravel build-up on the upper terrace.

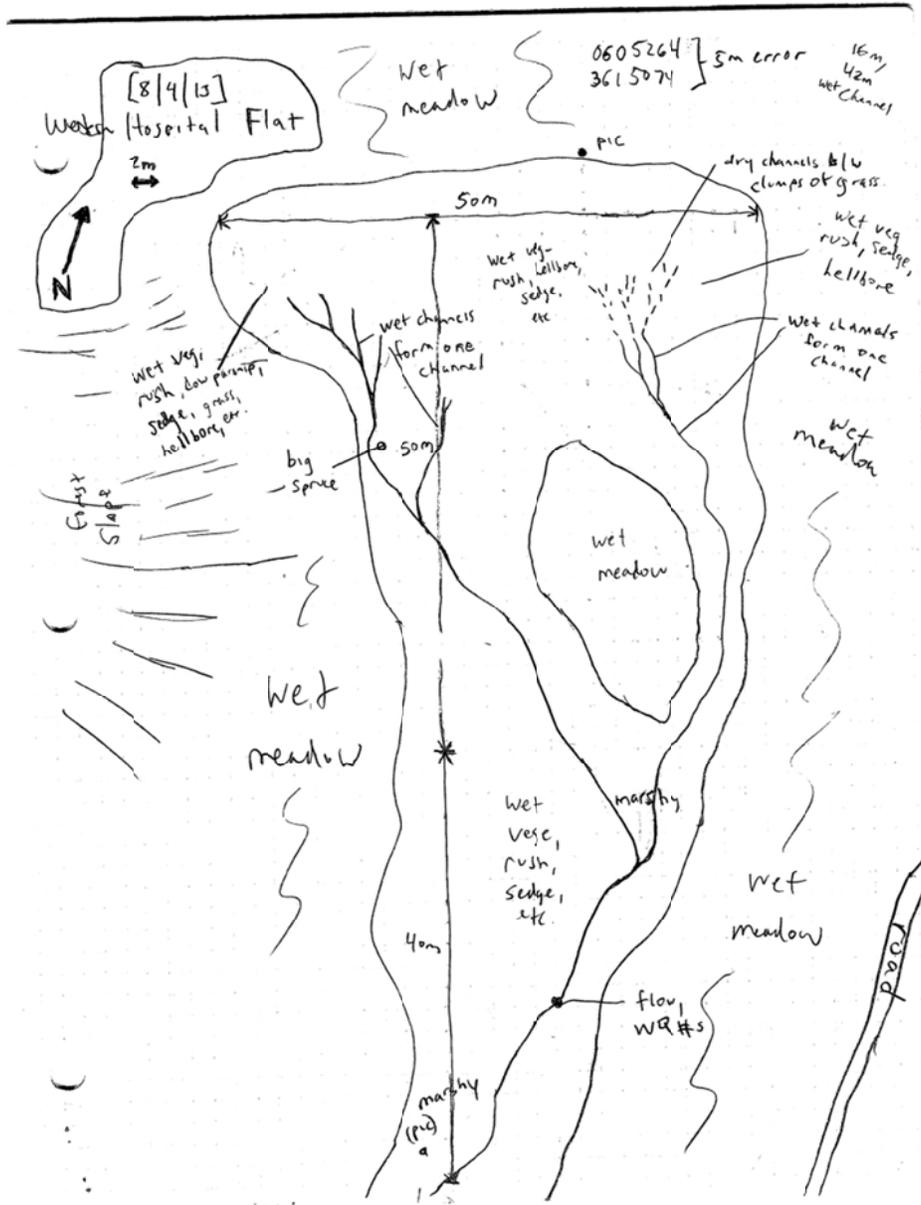


Fig 2 Western Hospital Flat Unnamed Sketchmap.



Fig 3 Western Hospital Flat Unnamed: erosion from road going into meadow

Santa Rita Mountains

Aliso Spring Survey 1 Survey Summary Report, Site ID 17073

Location: The Aliso Spring ecosystem is located in Pima County in the Rillito Arizona 15050302 HUC, managed by the US Forest Service. The spring is located in the Sierra Vista RD, Coronado NF at 31 44' 7.494", -110 48' 9.05" in the Mount Wrightson USGS Quad, measured using a GPS (NAD 83, estimated position error 5 meters). The elevation is approximately 1780 meters. Julia Fonseca, John Stansberry, Dale Turner surveyed the site on 5/19/12 for 00:14 hours, beginning at 16:16, and collected data in 5 of 12 categories.



Fig 1.1 Aliso Spring.

Physical Description: Aliso Spring is a rheocrene spring. It is a partially boxed spring that is located at a well-used campsite. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

The distance to the nearest spring is 1068 meters.

Survey Notes: The surrounding campsite is heavily used and denuded and campers were present. Water is located in the a concrete tank with moist soil around it.

Flora: Surveyors identified 1 plant species at the site. These included 1 native and 0 nonnative species.

Table 1 Aliso Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	1	0
Shrub	0	0
Mid-canopy	0	0
Tall canopy	0	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 2 Aliso Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Carex	GC	N	

Assessment: Assessment scores were compiled in 5 categories and 32 subcategories, with 10 null condition scores, and 10 null risk scores. Aquifer functionality and water quality are moderate with some restoration potential and there is moderate risk. Geomorphology condition is very poor with very limited restoration potential and there is very high risk. Habitat condition is very poor with very limited restoration potential and there is very high risk. Biotic integrity is poor with limited restoration potential and there is extreme risk. Human influence of site is moderate with some restoration potential and there is very high risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is poor with limited restoration potential and there is very high risk.

Table 3 Aliso Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	3.4	3.2
Geomorphology	0.8	5.6
Habitat	1.8	5.6
Biota	2.38	6
Human Influence	3	5.71
Administrative Context	0	0
Overall Ecological Score	2.09	5.1

Management Recommendations: Steam is flowing nearby, but not next to site. There are interrupted segments of flow (ephemeral reaches in between). Unable to determine origin of flow coming out of pipe as there is no evidence of pipe in the stream.

Aliso Spring Survey 2 Survey Summary Report, Site ID 17073

Location: The Aliso Spring ecosystem is located in Pima County in the Rillito Arizona 15050302 HUC, managed by the US Forest Service. The spring is located in the Sierra Vista RD, Coronado NF at 31 44' 7.494", -110 48' 9.05" in the Mount Wrightson USGS Quad, measured using a GPS (NAD 83, estimated position error 5 meters). The elevation is approximately 1780 meters. Cory Jones, Christopher Morris, Willem Van Kempen, and Bryon Lichtenhan surveyed the site on 6/24/14 for 01:00 hours, beginning at 10:00, and collected data in 7 of 12 categories.

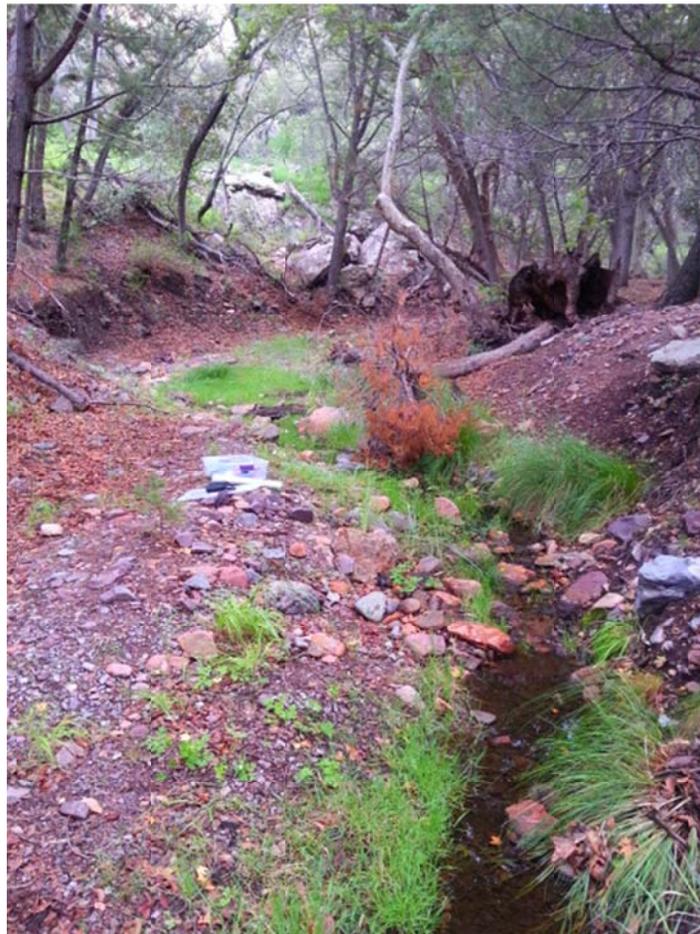


Fig 1 Aliso Spring

Physical Description: Aliso Spring is a rheocrene spring. It is a partially boxed spring that is located at a well-used campsite. The site has 1 microhabitat, A -- a 39 sqm channel. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

The distance to the nearest spring is 1068 meters.

Survey Notes: The site was very busy with wildlife activity and water was flowing nicely down the channel. The water was clear and teeming with lots of small invertebrates. Two hen

turkeys walked to within 10 meters of the surveyors during the visit on separate occasions. Damage from recreational shooting was evident on metal signage and on over 40 trees.

Table 1 Aliso Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
pH (field)	6.46
Specific conductance (field) (uS/cm)	447
Temperature, water C	18.4

Fauna: Surveyors collected or observed 1 aquatic and 1 terrestrial invertebrates and 23 vertebrate specimens.

Table 2 Aliso Spring Invertebrates.

Species	Lifestage	Habitat	Count	Species detail
Aranea Pisauridae Dolomedes	Ad	A	1	fishing spider
Lepidoptera Nymphalidae Adelpha eulalia	Ad	T	2	Arizona sister butterfly

Table 3 Aliso Spring Vertebrates.

Species Common Name	Count	Detection
Banded rock rattlesnake	1	obs
White-tailed Deer	1	obs
Gray fox	1	sign
common raven		obs
Blue Grosbeak		obs
hepatic tanager		obs
Bewick's wren		obs
painted redstart		obs
brown-crested flycatcher		obs
acorn woodpecker		obs
wild turkey	3	obs
Bridled Titmouse		obs
black-throated gray warbler		obs
plumbeous vireo		obs
black-headed grosbeak		obs
black-chinned hummingbird		obs
Broad-billed Hummingbird		obs
lesser goldfinch		obs
black-chinned sparrow		obs
white-breasted nuthatch		obs
ash-throated flycatcher		obs
turkey vulture		obs
Mexican Jay		obs

Baldy Spring Survey Summary Report, Site ID 12977

Location: The Baldy Spring ecosystem is located in Santa Cruz County in the Rillito Arizona 15050302 HUC, managed by the US Forest Service. The spring is located in the Nogales RD, Coronado NF at 31 41' 56.717", -110 50' 44.781" in the Mount Wrightson USGS Quad, measured using a GPS (NAD 83, estimated position error 5 meters). The elevation is approximately 2647 meters. Louise Misztal, Randy Serraglio, Aida Catillo-Flores, Gelnn Furnier surveyed the site on 5/19/12 for 02:00 hours, beginning at 14:30, and collected data in 7 of 12 categories.



Fig 1 Baldy Spring.

Physical Description: Baldy Spring is a helocrene spring. This spring is on a relatively steep north/northeast facing slope in close proximity to a mountain pass above the origin of Gardner Canyon drainage. The spring emergence is located under within what appears to be a spring box with concrete over it in designated Wilderness. The microhabitat associated with the spring covers 35 sqm. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 570 meters.

Survey Notes: This is a helocrene spring located in an area that was severely burned. There is a well-used hiking trail within 2 m of the spring site and the spring emergence is a small pool of water located under a concrete spring box structure. There is old piping infrastructure

going from the spring to a rusted out tank just across the hiking trail. The main microhabitat at this site is a small, very shallow pool of water located directly under the concrete.

Flora: Surveyors identified 6 plant species at the site. These included 5 native and 0 nonnative species; the native status of 1 species remains unknown.

Table 1 Baldy Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	2	1
Shrub	1	0
Mid-canopy	1	0
Tall canopy	2	0
Basal	0	0
Aquatic	0	0
Non-vascular	0	0

Table 2 Baldy Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Carex	GC	N	
Pinus ponderosa	SC	N	F
Plantago	GC		WR
Populus tremuloides	TC	N	U
Pseudotsuga menziesii	MC	N	U
Quercus gambelii	TC	N	F

Fauna: Surveyors collected or observed 1 terrestrial invertebrates and 7 vertebrate specimens.

Table 3 Baldy Spring Invertebrates.

Species	Lifestage	Habitat	Method
Coleoptera Coccinellidae		T	Spot

Table 4 Baldy Spring Vertebrates.

Species Common Name	Detection
yellow-eyed junco	obs
spotted towhee	obs
Grace's warbler	obs
house wren	obs
hepatic tanager	obs
Steller's jay	obs
Arizona gray squirrel	obs

Assessment: Assessment scores were compiled in 5 categories and 33 subcategories, with 9 null condition scores, and 9 null risk scores. Aquifer functionality and water quality are moderate with some restoration potential and there is low risk. Geomorphology condition is poor with limited restoration potential and there is moderate risk. Habitat condition is moderate with some restoration potential and there is low risk. Biotic integrity is moderate

with some restoration potential and there is low risk. Human influence of site is moderate with some restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is moderate with some restoration potential and there is low risk.

Table 5 Baldy Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	3.5	2.5
Geomorphology	2.4	3.2
Habitat	3.4	2.6
Biota	3.25	2.5
Human Influence	3.22	2
Administrative Context	0	0
Overall Ecological Score	3.14	2.7

Management Recommendations: Check for historic flow data to understand the effect the fire has had on the spring. The spring was signed by the FS so it was probably more productive at one time. This spring is of high value for recreation purposes - hikers in the Wilderness- so it would might be beneficial to look at the impact the trail and existing spring box structure is having on spring functionality. Perhaps it would benefit from cleaning the spring box. Due to the fire, the spring is very exposed and may benefit from native plant restoration to provid more shade and microhabitat shelter.

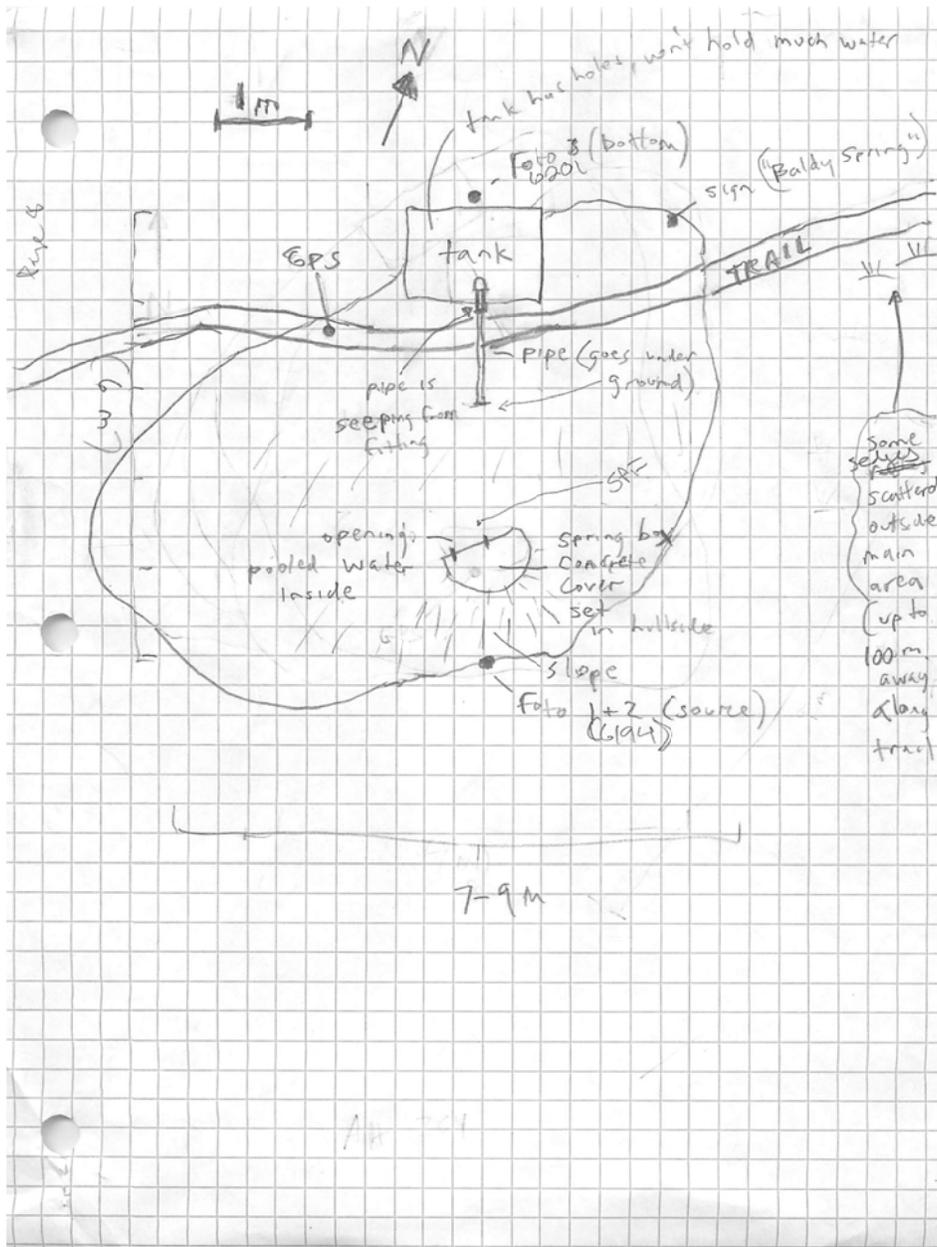


Fig 2 Baldy Spring Sketchmap.

Sawmill Spring Survey Summary Report, Site ID 17072

Location: The Sawmill Spring ecosystem is located in Santa Cruz County in the Rillito Arizona 15050302 HUC, managed by the US Forest Service. The spring is located in the Sierra Vista RD, Coronado NF at 31 43' 44.501", -110 49' 16.97" in the Mount Wrightson USGS Quad, measured using a GPS (NAD 83, estimated position error 4.5 meters). The elevation is approximately 2133 meters. Julia Fonseca, Karen Lowry, John Stansbury, Dale Turner surveyed the site on 5/19/12 for 01:50 hours, beginning at 12:50, and collected data in 7 of 12 categories.



Fig 1 Sawmill Spring.

Physical Description: Sawmill Spring is a hillslope spring. The microhabitat associated with the spring covers 336 sqm. The geomorphic diversity is 0.00, based on the Shannon-Weiner diversity index.

The emergence environment is subaerial, with a gravity flow force mechanism. The distance to the nearest spring is 262 meters.

Survey Notes: None recorded.

Table 1 Sawmill Spring Water Quality with multiple readings averaged.

Characteristic Measured	Average Value
Temperature, water C	14

Flora: Surveyors identified 13 plant species at the site. These included 11 native and 0 nonnative species; the native status of 2 species remains unknown.

Table 2 Sawmill Spring Cover Type.

Cover Type	Species Count	Wetland Species Count
Ground	6	3
Shrub	2	0
Mid-canopy	0	0
Tall canopy	4	2
Basal	0	0
Aquatic	0	0
Non-vascular	1	0

Table 3 Sawmill Spring Vegetation.

Species	Cover Code	Native Status	Wetland Status
Aquilegia	GC		W
Arbutus arizonica	TC	N	
Carex	GC	N	
Carex ultra	GC	N	
Eleocharis	GC	N	W
Fraxinus velutina	TC	N	R
Juglans major	TC	N	R
Juncus	GC	N	
Juniperus	SC	N	U
Mimulus	GC	N	W
moss	NV	N	F
Pinus strobiformis	TC	N	
Quercus	SC		U

Fauna: There was no fauna recorded at this site due to time constraints.

Assessment: Assessment scores were compiled in 5 categories and 31 subcategories, with 11 null condition scores, and 12 null risk scores. Aquifer functionality and water quality are good with significant restoration potential and there is low risk. Geomorphology condition is moderate with some restoration potential and there is low risk. Habitat condition is good with significant restoration potential and there is negligible risk. Biotic integrity is good with significant restoration potential and there is low risk. Human influence of site is good with significant restoration potential and there is low risk. Administrative context status is undetermined due to null scores and there is undetermined risk due to null scores. Overall, the site condition is good with significant restoration potential and there is low risk.

Table 4 Sawmill Spring Assessment Scores.

Category	Condition	Risk
Aquifer Functionality & Water Quality	4.17	2
Geomorphology	3.8	2
Habitat	4.4	1.8
Biota	4.5	2
Human Influence	4.56	1.88
Administrative Context	0	0
Overall Ecological Score	4.22	1.95

Management Recommendations: The spring is next to Sawmill Canyon trail and is at risk of trampling by people. The development at the spring may need maintenance to maintain flow. Fire in the area has reduced the canopy cover but that may allow other species to thrive. Monitor for health and continue to protect from grazing.

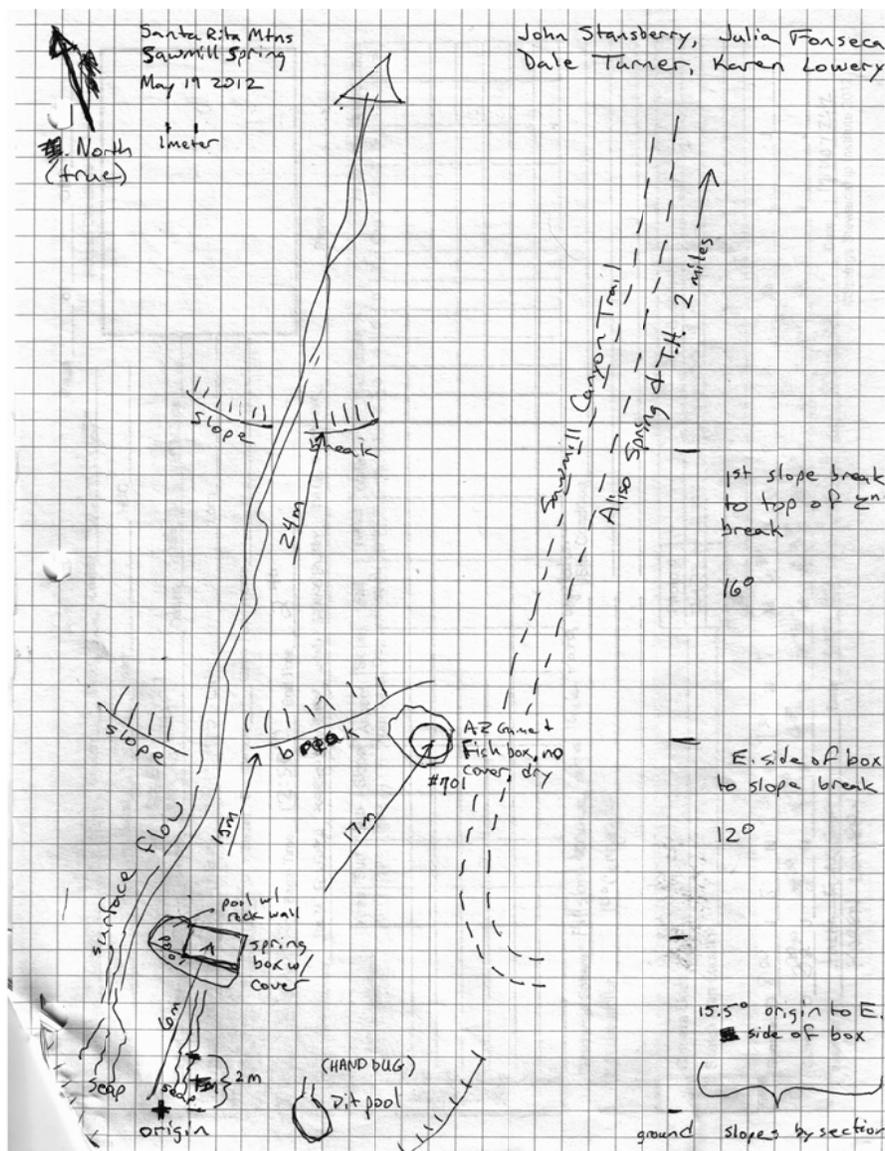


Fig 1.2 Sawmill Spring Sketchmap.