

Ecological site R040XA131AZ Granitic Hills 10"-13" p.z.

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

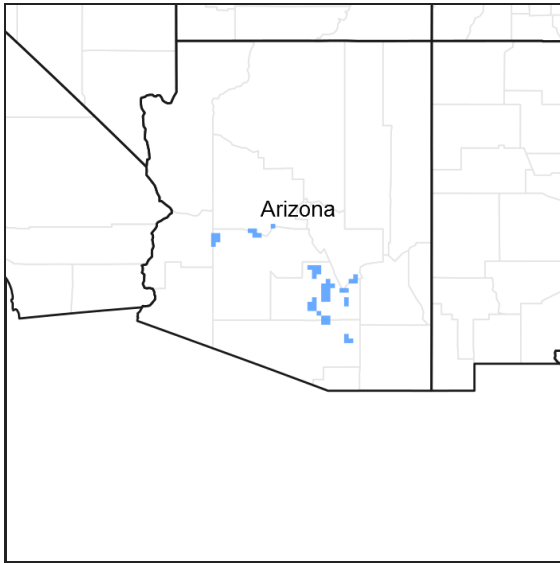


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 040X–Sonoran Basin and Range

AZ 40.1 – Upper Sonoran Desert

Elevations range from 2000 to 3200 feet and precipitation averages 10 to 13 inches per year. Vegetation includes saguaro, palo verde, mesquite, creosotebush, triangle bursage, prickly pear, cholla, limberbush, wolfberry, bush muhly, threeawns, ocotillo, and globe mallow. The soil temperature regime is thermic and the soil moisture regime is typic aridic. This unit occurs within the Basin and Range Physiographic Province and is characterized by numerous mountain ranges that rise abruptly from broad, plain-like valleys and basins. Igneous and metamorphic rock classes dominate the mountain ranges and sediments filling the basins represent combinations of fluvial, lacustrine, colluvial and alluvial deposits.

Table 1. Dominant plant species

Tree	(1) <i>Parkinsonia microphylla</i>
Shrub	(1) <i>Eriogonum fasciculatum</i> (2) <i>Ephedra nevadensis</i>
Herbaceous	(1) <i>Muhlenbergia porteri</i> (2) <i>Tridens muticus</i>

Physiographic features

This site occurs as rough hills and low mountains. In areas, rock outcrop and granite boulders tend to hide the site. Numerous canyons and natural drainages occur within the site.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	610–1,219 m
Slope	15–80%
Aspect	Aspect is not a significant factor

Climatic features

Precipitation in the sub resource area ranges from 10 to 13 inches in the southern part, along the Mexican border with elevations from about 1900 to 3200 feet. Precipitation in the northern part of the resource area ranges from 11 to 14 inches with elevations from about 1700 to 3500 feet. Winter-summer rainfall ratios range from 40%-60% in the southern portions of the land resource unit, to 50%-50% in the central portions, to 60%-40% in the northern part of the land resource unit. As one moves from east to west in this resource area rains become slightly more unpredictable and variable with Coefficients of Variation of annual rainfall equal to 29% at Tucson and 36% at Carefree. Summer rains fall July through Sept., originate in the Gulf of Mexico, and are convective, usually brief, intense thunderstorms. Cool season moisture tends to be frontal, originating in the Pacific and Gulf of California. This winter precipitation falls in widespread storms with long duration and low intensity. Snow is rare and seldom lasts more than an hour or two. May and June are the driest months of the year. Humidity is generally very low.

Winter temperatures are mild, with very few days recording freezing temperatures in the morning. Summer temperatures are warm to hot, with several days in June and July exceeding 105 degrees F.

Both the spring and the summer growing seasons are equally important for perennial grass, forb and shrub growth. Cool and warm season annual forbs and grasses can be common in their respective seasons with above average rainfall. Perennial forage species can remain green throughout the year with available moisture.

Table 3. Representative climatic features

Frost-free period (average)	265 days
Freeze-free period (average)	0 days
Precipitation total (average)	330 mm

Influencing water features

Soil features

These soils are shallow to moderately deep over highly weathered granitic and diabase bedrock. They take rainfall well but available water capacity is limited by depth. Plant-soil relationships are fair. Soils are gravelly and/or cobbly on the surface. The fractured bedrock offers good opportunity for plant root penetration. Rock outcrop will make up from 5-25% of the area.

Soils mapped on this site include: in

SSA-627 Southern Mohave county MU's Cellar-26, Akela-62 & Quilotosa-90 and in

SSA-645 Aguila-Carefree area MU's Cellar-17, Gran-64 & Wickenburg-64.

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam (2) Very gravelly loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	25–102 cm
Surface fragment cover <=3"	35–60%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	0–12.7 cm
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4

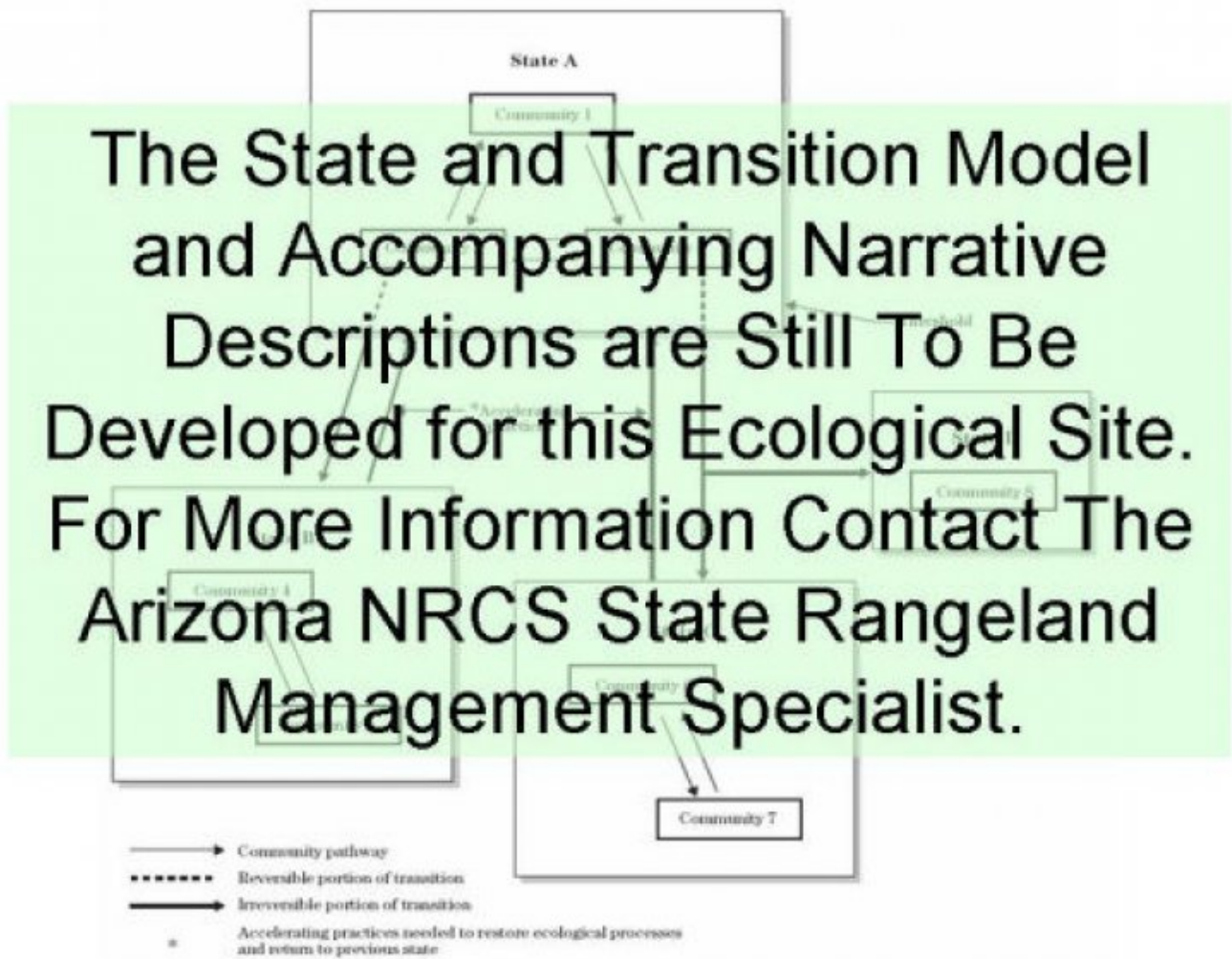
Ecological dynamics

The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as grazing, fire, or drought.

Production data provided in this site description is standardized to air-dry weight at the end of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity Index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine Similarity Index, compare the production (air-dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

State and transition model



**State 1
Historic Climax Plant Community**

**Community 1.1
Historic Climax Plant Community**

The native, potential community on this site is a mixture of perennial grasses, forbs and desert shrub species. As the site deteriorates from improper use or the lack of natural fires, desert shrub species and cacti increase to dominate it.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	308	340	370
Shrub/Vine	216	231	247
Forb	62	77	93
Tree	6	9	11
Total	592	657	721

Figure 5. Plant community growth curve (percent production by month). AZ4011, 40.1 10-13" p.z. hill sites. Growth begins in the late winter, goes semi-dormant in the drought period of late May through early July, growth continues in the summer through early fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	5	15	20	5	5	10	15	15	5	5	0

Figure 6. Plant community growth curve (percent production by month). AZ4032, 40-3AZ 10-12" p.z. all sites. Growth begins in the spring, most growth occurs during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	10	15	20	30	20	5	0	0	0

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
0	Dominant Perennial Grasses			157–280	
	tobosagrass	PLMU3	<i>Pleuraphis mutica</i>	93–123	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	31–93	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	31–62	–
1	Other Perennial Grasses			62–123	
	bush muhly	MUPO2	<i>Muhlenbergia porteri</i>	17–34	–
	slim tridens	TRMU	<i>Tridens muticus</i>	17–34	–
	black grama	BOER4	<i>Bouteloua eriopoda</i>	11–28	–
	Arizona cottontop	DICA8	<i>Digitaria californica</i>	17–28	–
2	Misc Perennial Grasses			62–93	
	cane bluestem	BOBA3	<i>Bothriochloa barbinodis</i>	11–17	–
	nineawn pappusgrass	ENDE	<i>Enneapogon desvauxii</i>	11–17	–
	tanglehead	HECO10	<i>Heteropogon contortus</i>	11–17	–
	curly-mesquite	HIBE	<i>Hilaria belangeri</i>	6–11	–
	large-spike bristlegrass	SEMA5	<i>Setaria macrostachya</i>	6–11	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	6–11	–
	squirreltail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	6–11	–
	threeawn	ARIST	<i>Aristida</i>	6–11	–
3	Annual Grasses			7–31	
	Bigelow's bluegrass	POBI	<i>Poa bigelovii</i>	1–6	–
	Arizona signalgrass	URAR	<i>Urochloa arizonica</i>	1–6	–
	Arizona brome	BRAR4	<i>Bromus arizonicus</i>	2–4	–
	mucronate sprangeltop	LEPAB	<i>Leptochloa panicea ssp. brachiata</i>	2–4	–
	Hall's panicgrass	PAHA	<i>Panicum hallii</i>	1–3	–
	low woollygrass	DAPU7	<i>Dasyochloa pulchella</i>	1–3	–
	Pacific fescue	VUMIP	<i>Vulpia microstachys var. pauciflora</i>	0–3	–
	sixweeks threeawn	ARAD	<i>Aristida adscensionis</i>	0–3	–
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	1–3	–
	needle grama	BOAR	<i>Bouteloua aristidoides</i>	0–2	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	0–2	–
Forb					

4	Forbs			31–93	
	pelotazo	ABIN	<i>Abutilon incanum</i>	3–9	–
	dwarf Indian mallow	ABPA3	<i>Abutilon parvulum</i>	3–9	–
	trailing windmills	ALIN	<i>Allionia incarnata</i>	3–9	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	3–9	–
	New Mexico silverbush	ARNE2	<i>Argythamnia neomexicana</i>	3–9	–
	desert trumpet	ERIN4	<i>Eriogonum inflatum</i>	3–9	–
	shrubby deervetch	LORI3	<i>Lotus rigidus</i>	3–9	–
	Parry's false prairie-clover	MAPA7	<i>Marina parryi</i>	3–9	–
	wishbone-bush	MILAV	<i>Mirabilis laevis var. villosa</i>	3–9	–
	Colorado four o'clock	MIMU	<i>Mirabilis multiflora</i>	3–9	–
	Coues' cassia	SECO10	<i>Senna covesii</i>	3–9	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	3–9	–
5	Annual Forbs			7–31	
	brownfoot	ACWR5	<i>Acourtia wrightii</i>	1–3	–
	fiddleneck	AMSIN	<i>Amsinckia</i>	1–3	–
	American wild carrot	DAPU3	<i>Daucus pusillus</i>	1–3	–
	hoary bowlesia	BOIN3	<i>Bowlesia incana</i>	0–3	–
	California suncup	CACA32	<i>Camissonia californica</i>	0–3	–
	phacelia	PHACE	<i>Phacelia</i>	0–3	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	1–3	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–2	–
	woolly tidestromia	TILA2	<i>Tidestromia lanuginosa</i>	0–2	–
	pepperweed	LEPID	<i>Lepidium</i>	1–2	–
	coastal bird's-foot trefoil	LOSAB	<i>Lotus salsuginosus var. brevivexillus</i>	0–2	–
	Coulter's lupine	LUSP2	<i>Lupinus sparsiflorus</i>	1–2	–
	combseed	PECTO	<i>Pectocarya</i>	0–2	–
	desert larkspur	DEPA	<i>Delphinium parishii</i>	0–2	–
	tall mountain larkspur	DESC	<i>Delphinium scaposum</i>	0–2	–
	bluedicks	DICAC5	<i>Dichelostemma capitatum ssp. capitatum</i>	0–2	–
	buckwheat	ERIOG	<i>Eriogonum</i>	1–2	–
	California poppy	ESCAM	<i>Eschscholzia californica ssp. mexicana</i>	0–2	–
	spurge	EUPHO	<i>Euphorbia</i>	1–2	–
	spiderling	BOERH2	<i>Boerhavia</i>	1–2	–
	oakfern	GYMNO	<i>Gymnocarpium</i>	0–1	–
	mariposa lily	CALOC	<i>Calochortus</i>	0–1	–
	clubmoss	LYCOP2	<i>Lycopodium</i>	0–1	–
Shrub/Vine					
6	Dominant Shrubs			93–123	
	Mexican bladdersage	SAME	<i>Salazaria mexicana</i>	11–22	–
	Eastern Mojave buckwheat	ERFA2	<i>Eriogonum fasciculatum</i>	11–22	–
	bastardsage	ERWR	<i>Eriogonum wrightii</i>	11–22	–

	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	9–17	–
	Wright's beebrush	ALWR	<i>Aloysia wrightii</i>	11–17	–
	brickellbush	BRICK	<i>Brickellia</i>	6–11	–
	fairyduster	CAER	<i>Calliandra eriophylla</i>	6–11	–
	slender janusia	JAGR	<i>Janusia gracilis</i>	2–9	–
7	Other Shrubs			62–93	
	littleleaf ratany	KRER	<i>Krameria erecta</i>	9–17	–
	plains blackfoot	MELE2	<i>Melampodium leucanthum</i>	6–11	–
	Mojave sage	SAMO3	<i>Salvia mohavensis</i>	6–11	–
	rock sage	SAPI2	<i>Salvia pinguifolia</i>	6–11	–
	toothleaf goldeneye	VIDE3	<i>Viguiera dentata</i>	6–11	–
	Arizona wrightwort	CAAR7	<i>Carlwrightia arizonica</i>	6–11	–
	California fagonbush	FALA	<i>Fagonia laevis</i>	6–11	–
	Newberry's velvetmallow	HONE	<i>Horsfordia newberryi</i>	6–11	–
	narrowleaf silverbush	ARLA12	<i>Argythamnia lanceolata</i>	7–10	–
	desert rosemallow	HICO	<i>Hibiscus coulteri</i>	3–9	–
	desert lavender	HYEM	<i>Hyptis emoryi</i>	3–9	–
	buckwheat	ERIOG	<i>Eriogonum</i>	3–9	–
	San Felipe dogweed	ADPO	<i>Adenophyllum porophylloides</i>	3–9	–
	bedstraw	GALIU	<i>Galium</i>	2–6	–
8	Misc. Shrubs			31–62	
	alderleaf mountain mahogany	CEMO2	<i>Cercocarpus montanus</i>	2–11	–
	Sonoran scrub oak	QUTU2	<i>Quercus turbinella</i>	6–11	–
	sugar sumac	RHOV	<i>Rhus ovata</i>	3–9	–
	whitethorn acacia	ACCO2	<i>Acacia constricta</i>	2–9	–
	catclaw acacia	ACGR	<i>Acacia greggii</i>	3–6	–
	rayless goldenhead	ACSP	<i>Acamptopappus sphaerocephalus</i>	1–6	–
	yerba de pasmo	BAPT	<i>Baccharis pteronioides</i>	1–6	–
	crucifixion thorn	CAHO3	<i>Canotia holacantha</i>	1–6	–
	Indian mallow	ABUT1	<i>Abutilon</i>	1–6	–
	snakeweed	GUTIE	<i>Gutierrezia</i>	1–6	–
	desert-thorn	LYCIU	<i>Lycium</i>	3–6	–
	American threefold	TRCA8	<i>Trixis californica</i>	1–6	–
	Schott's pygmycedar	PESC4	<i>Peucephyllum schottii</i>	2–6	–
	slender poreleaf	POGR5	<i>Porophyllum gracile</i>	1–6	–
	jojoba	SICH	<i>Simmondsia chinensis</i>	3–6	–
	turpentinebroom	THMO	<i>Thamnosma montana</i>	1–6	–
	whitestem paperflower	PSCO2	<i>Psilostrophe cooperi</i>	2–4	–
	Lemmon's ragwort	SELE8	<i>Senecio lemmonii</i>	2–4	–
	woody crinklemat	TICAC	<i>Tiquilia canescens</i> var. <i>canescens</i>	1–3	–
	lacy tansyaster	MAPIP4	<i>Machaeranthera pinnatifida</i> ssp. <i>pinnatifida</i> var. <i>pinnatifida</i>	1–3	–
	snapdragon penstemon	KEANM	<i>Keckiella antirrhinoides</i> ssp. <i>microphylla</i>	1–3	–

	Florida hopbush	DOVI	<i>Dodonaea viscosa</i>	1-3	-
	brittlebush	ENFA	<i>Encelia farinosa</i>	1-3	-
	desert yellow fleabane	ERLI	<i>Erigeron linearis</i>	1-3	-
9	Succulents			7-31	
	desert agave	AGDE	<i>Agave deserti</i>	1-2	-
	saguaro	CAGI10	<i>Carnegiea gigantea</i>	1-2	-
	buckhorn cholla	CYACA2	<i>Cylindropuntia acanthocarpa</i> var. <i>acanthocarpa</i>	1-2	-
	teddybear cholla	CYBI9	<i>Cylindropuntia bigelovii</i>	1-2	-
	Gila County liveforever	DUCO	<i>Dudleya collomiae</i>	1-2	-
	Engelmann's hedgehog cactus	ECEN	<i>Echinocereus engelmannii</i>	1-2	-
	hedgehog cactus	ECHIN3	<i>Echinocereus</i>	1-2	-
	candy barrelcactus	FEWI	<i>Ferocactus wislizeni</i>	1-2	-
	ocotillo	FOSP2	<i>Fouquieria splendens</i>	1-2	-
	globe cactus	MAMMI	<i>Mammillaria</i>	1-2	-
	beargrass	NOLIN	<i>Nolina</i>	1-2	-
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	1-2	-
	dollarjoint pricklypear	OPCH	<i>Opuntia chlorotica</i>	1-2	-
	cactus apple	OPEN3	<i>Opuntia engelmannii</i>	1-2	-
	banana yucca	YUBA	<i>Yucca baccata</i>	1-2	-
Tree					
10	Tree			6-11	
	yellow paloverde	PAMI5	<i>Parkinsonia microphylla</i>	6-11	-

Animal community

This site is suitable for yearlong grazing by all classes of livestock. Yearlong stocking results in overuse of canyon bottoms, ridgetops and saddles with moany other areas deteriorating from little or no use. Fencing, to control use of the site, along with water developments and stock trails may all be needed to improve grazing distribution and facilitate management.

The site has good cover and a wide diversty of forage plants with variable green seasons. Natural water is lacking and stockwater developments are important to wildlife in these areas.

Recreational uses

The landscape quality consists of grassy slopes interrupted by bouldery rock-outcrop areas. In good winter rainfall years, desert wildflowers lend much color to the site.

Very few days in the fall, winter and spring restrict outdoor activities. Afternoon temperatures in June, July and August make such activities less enjoyable.

Activities include hunting, prospecting, hiking, horseback riding and photography.

Wood products

None.

Other products

Mining occurs in places on this site.

Type locality

Location 1: Yavapai County, AZ	
Township/Range/Section	T10N R7W S9
General legal description	Phoenix F.O. Section 17, T7N, R6W Vulture Mountains, Echeverria Ranch. Prescott F.O. Section 9, T10N, R7W Date Creek Mountains, Knight Ranch. Prescott F.O. Section 3, T9N, R4W Stanton Hills, JJ Coughlin Ranch.

Contributors

Larry D. Ellicott
Unknown

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**
