

Range Trend Monitoring in Southern Arizona

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Pace Frequency monitoring has been used in southern Arizona for over a decade. It permits range managers to look at the response of upland and riparian plant communities to grazing management. It is also used to evaluate the effectiveness of vegetative manipulation, such as prescribed burning and range seeding. A range conservationist and rancher can easily read two transects per day. Analysis of the results is fast and simple.

Selecting and Establishing the Key Area

The selection of the Key Area for monitoring is important in order to make effective management decisions. It should have the following characteristics:

- 1) It should represent the major range site within the management unit or pasture.
- 2) The entire transect should be located on 1 range site.
- 3) The key area should be located on a site which has the potential to improve under management.
- 4) There should be an adequate representation of key species found on or near the site. Characteristics of a key species include being relatively common on the site, consistent with management objectives, and palatable to the class of animal managed.

When establishing the transect, a starting point is marked with a T-post or pile of rocks. An easily seen marker helps in relocating the site. Select a distinguishable landmark or use a compass to determine the direction in which to run the transect. Try to select a site and direction where you can see the majority of the area from

the starting point, so that most of the site can be seen in a photograph. Take a picture from the starting point in the established direction. It helps to make a sign to put in the foreground which gives information about the location and date.

Method

Four lines with 50 plots in each line are read using a 40 × 40-cm frame. Each frame is 1 pace (2 steps) apart. Transects are read following the growing season to aid in species identification. Data are collected for 3 components:

- 1) Cover—Point cover is recorded for each frame. The cover categories are bare ground, gravel, rock, litter, or live vegetation (basal).

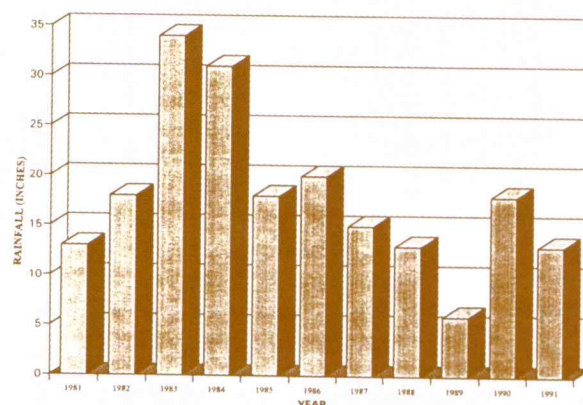


Fig. 1. Total annual rainfall since 1981.

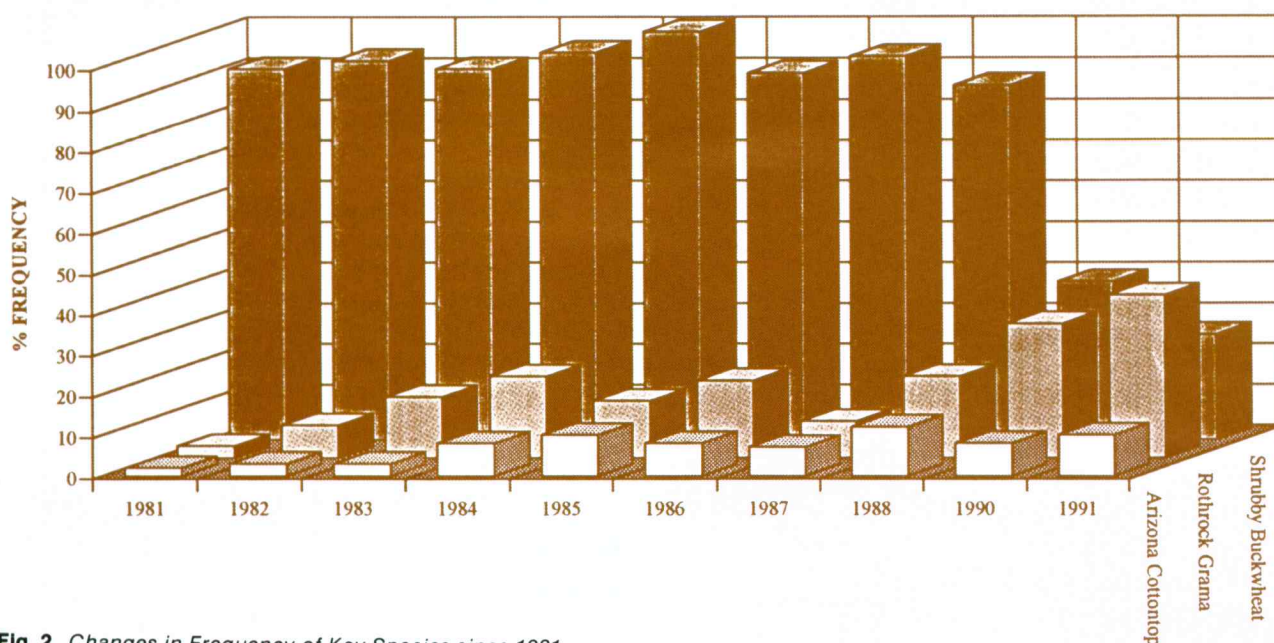


Fig. 2. Changes in Frequency of Key Species since 1981.

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Table 1. Typical summary sheet showing the kind of data collected using pace frequency monitoring.

Range Site	Granitic Hills									
Major Land Resource Area	D41-3, Chihuahuan Semidesert Grassland									
Condition Score	29							34		57
Number of Plots	200	200	200	200	200	200	200	200	200	200
Transect Data	Freq	Freq	Freq	Freq	Freq	Freq	Freq	Freq	Freq	Freq
	1981	1982	1983	1984	1985	1986	1987	1988	1990	1991
COVER										
Bare Ground	49	47	48	26	27	28	25	27	28	21
Gravel	13	11	12	21	12	13	18	15	13	14
Rock	20	22	23	21	24	20	20	21	19	17
Litter	15	17	14	23	29	34	32	32	32	41
Live Vegetation (Basal)	3	3	3	9	8	6	6	7	8	9
SHRUBS AND TREES										
Shrubby Buckwheat	91	93	91	95	100	90	94	87	39	26
Catclaw Acacia	3	2	3	3	5	2	2	2	5	4
False Mesquite	44	34	39	41	46	39	49	43	49	41
Snakeweed	4	4	4	2	6	5	10	8	2	8
Turpentine Bush	22	21	27	33	34	32	34	41	30	32
PERENNIAL GRASSES										
Arizona Cottontop	2	3	3	8	10	8	7	12	8	10
Black Grama	2	1		1	4	8	6	3	6	7
Hairy Grama	3	2	2	3	4	4	3	4	3	5
Rothrock Grama	3	8	15	20	14	19	9	20	33	40
Sideoats Grama	8	3	9	4	14	9	6	5	8	6
Slender Grama	2	3	4	9	7	10	10	11	10	6
Plains Lovegrass	1			3	6	7	3	3	2	7
Red Threeawn	3	2	1	2	14	3	7	5	1	5
Wrights Threeawn	2	5	1	3		2	1	3	1	1
Spike Pappusgrass		1		1	1	6	1	3	6	
Blue Threeawn	1		20	3	5	1	3	3	4	2
Mesa Threeawn		2	1	6	4	7	9	8	5	10
Spidergrass Threeawn			1	7	12	13	5	6	13	8
PERENNIAL FORBS										
Deer Vetch	41	40	34	40	37	27	27	5	8	14
Ragweed	2	1	6	2	3	6	5	9	10	16
Perennial Spurge	24	16	24	19	10	15	9	19	11	24
Spiny Haplopappus				1	1	3	2	1		14

* Shows only species which have been found in 5% or more plots in any year.

- 2) Trees & Shrubs—A tally is kept of the tree and shrub species found in each frame. Trees and shrubs are considered to be in the frame if they are rooted in the frame or live branches overhang the frame. Seedlings are not included.
- 3) Grasses & Forbs—A tally is also kept for the grass and forb species found in each frame. Grasses and forbs must be rooted in the frame to be counted. Annual plants may be recorded by species or may be pooled together as annual grasses or annual forbs.

Results

The data are tabulated to show the percent of frames in which any given species was found. The data are compared with information from previous years to evaluate range trend. Other information that should be collected includes range condition ratings, numbers of animals, season of use in the pasture, utilization, production, and precipitation. This information is reviewed with the rancher to determine the effects of rainfall, grazing systems, and vegetative treatments.

Permanent frequency transects are an effective way for range conservationists with the Soil Conservation Service in southern Arizona to work with cooperating ranchers. Their use provides sound data to devise and adjust successful management plans. When the site is established, key species are typically found in a low percent of the frames and the range condition is high poor to fair. With the application of grazing management key species should increase on the site. Through pace frequency monitoring the rancher is able to see the impacts of management.

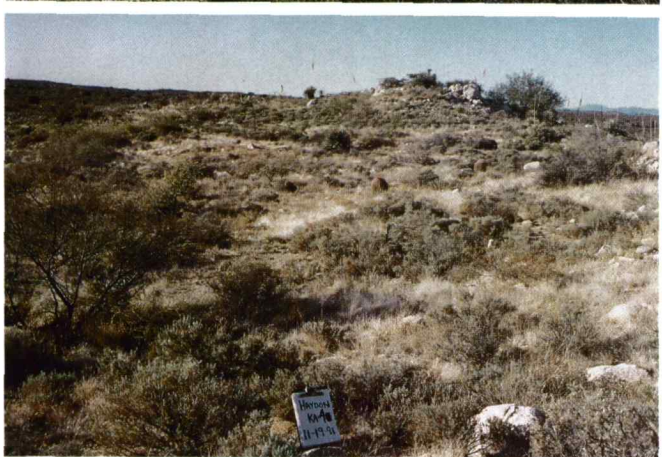
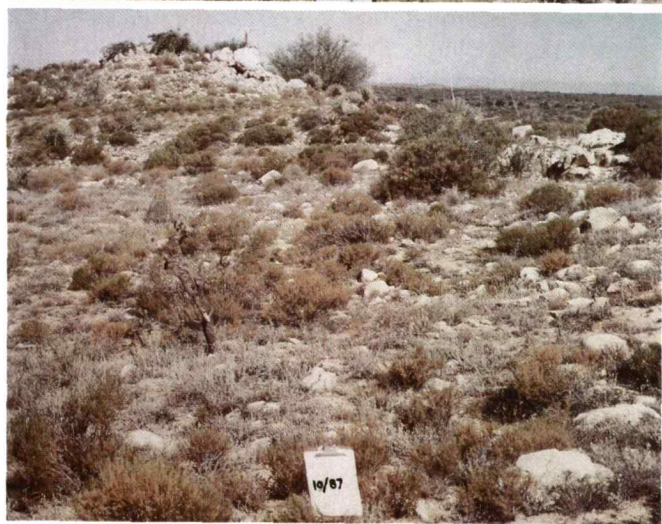


Photo record of changes on the granitic hills site, 1981 through 1991.