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Summary Report: Monitoring Elf Owls In and Near Saguaro National Park, 2000-2002

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Assessing trends through time in characteristics of natural populations of plants and wildlife can help inform decisions made by land managers, such as the National Park Service. Consistent trends—where the characteristics are found to be increasing, decreasing, or remaining stable—may indicate that the ecosystem inhabited by the population studied is changing due to natural or other causes. A classic example is the precipitous declines observed in many populations of birds of prey in the 1950's and 1960's. Biologists observing these declines initiated a spate of research to establish the cause, which was eventually linked to the use of pesticides such as DDT that remained stable in the environment. Detecting trends in characteristics of natural resources is called "monitoring".

No matter what resource is being monitored, the ability of the monitoring program to detect trends and the ultimate utility of this information to managers depends critically on the way in which the information is collected. Any future insights gained will depend on the characteristics being measured in a scientifically valid, consistent way.

Species that are relatively abundant and easily surveyed make good candidates for monitoring because collecting high quality information from these species is usually comparatively easy. In some cases, species that occupy higher levels in ecological food webs may be more likely to reflect changes to their local environment, triggering appropriate management actions.

Consequently, elf owls (*Micrathene whitneyi*) are likely a good candidate for monitoring upland deserts of Arizona and Sonora, Mexico, including the Sonoran Desert. They are the most abundant bird of prey in these deserts and they are very vocal during the breeding season, making them relatively easy to survey. Because they are high trophic-level predators—that is,

high on the food chain—they may reflect the conditions of the ecosystems they inhabit, especially the wide variety of insect prey they consume. Lastly, in some regions of their range they are classified as endangered, so monitoring their status may prove crucial to their continued persistence throughout their range.

My objective was to establish survey methods and to collect baseline data for long-term monitoring of elf owls in and adjacent to Saguaro National Park. Collected over a long time period, this information could allow Park biologists to reliably assess the status and trends of elf owls in these locations. Because several areas adjoining the Park are threatened by development pressures, monitoring will provide an opportunity to understand the effects of these impacts on owls and to provide an opportunity to educate Park visitors on the far-reaching effects of land-management decisions.

To achieve this objective, I installed four transects each of which was 4.5 km long on which I established 18 survey points spaced at 250 m intervals. From 2000 to 2002, I surveyed each transect two or three times between May and July.

Beginning 30 minutes after sunset, I traversed each transect stopping at each station for approximately 10 minutes. During the first 1-2 minutes, I counted the number of owls vocalizing, then I played a tape-recorded vocalization of elf owls for the next 45 seconds, then listened for the next 5-8 minutes counting the number of additional individuals responding.

I counted an average of 2.5 owls per station surveyed between April and June. The number of owls counted was similar for all years (Table 1) and varied somewhat depending on the location of each transect. This suggests that estimating abundance based on vocalizations is consistent from year to year, making it a good characteristic for monitoring.

Counts during these surveys were similar to counts of 2.2 pairs/ km^2 recorded previously in Saguaro Park as well as those reported from other areas of southern Arizona, which ranged from 2.4 pairs/ km^2 to 2.7 pairs/ km^2. Interestingly, the numbers of elf owls in Saguaro Park were nearly four times that recorded in western Arizona, which averaged about 0.7 per station

suggesting that habitat for elf owls in Saguaro Park is more abundant or of higher quality than in western Arizona.

The number of owls counted per station varied seasonally. Counts in April and May averaged about 1 owl per station more than those in June and July, which likely reflects that owls are most vocal when establishing territories and less vocal after young have hatched. This suggests that surveys for owls are most effective early in the owl's nesting season (April and May) when owls are most vocal.

The number of owls counted per station also averaged about 0.8 higher along two transects in the northern section of the Park compared to two transects in and near the southern section of the Park, considering only surveys done in April and May. This suggests that even in an area of overall high owl density, habitat quality varies somewhat, supporting more owls in some areas compared to others. Recognizing existing differences among areas is important for monitoring because each area will serve as its own baseline for assessing future trends in owl numbers in these areas.

The information I have collected should provide a reliable baseline from which to assess future changes to the elf owl population. Periodic surveys, repeated perhaps every 4-5 years, should be sufficient to indicate changes in abundance of elf owls in and near the Park that may reflect the state of the ecosystem they inhabit.

Table 1. Mean number of elf owls counted per survey point by year, for areas and months combined, 2000-2002.

Year	No. Points Surveyed	Mean	SE
2000	128	2.70	0.11
2001	108	2.60	0.09
2002	144	3.00	0.11