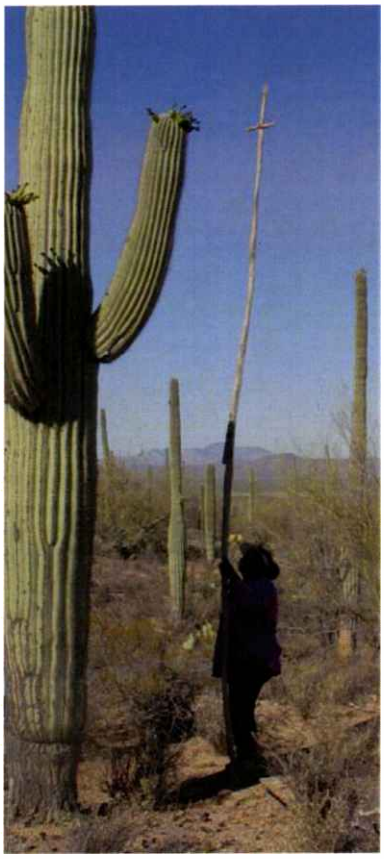
TRADITIONAL SAGUARO HARVEST IN THE TUCSON MOUNTAIN DISTRICT, SAGUARO NATIONAL PARK

FINAL REPORT



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December 15, 2006

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Table of Contents

List of Tables

List of Figures

Forward

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John Sullivan
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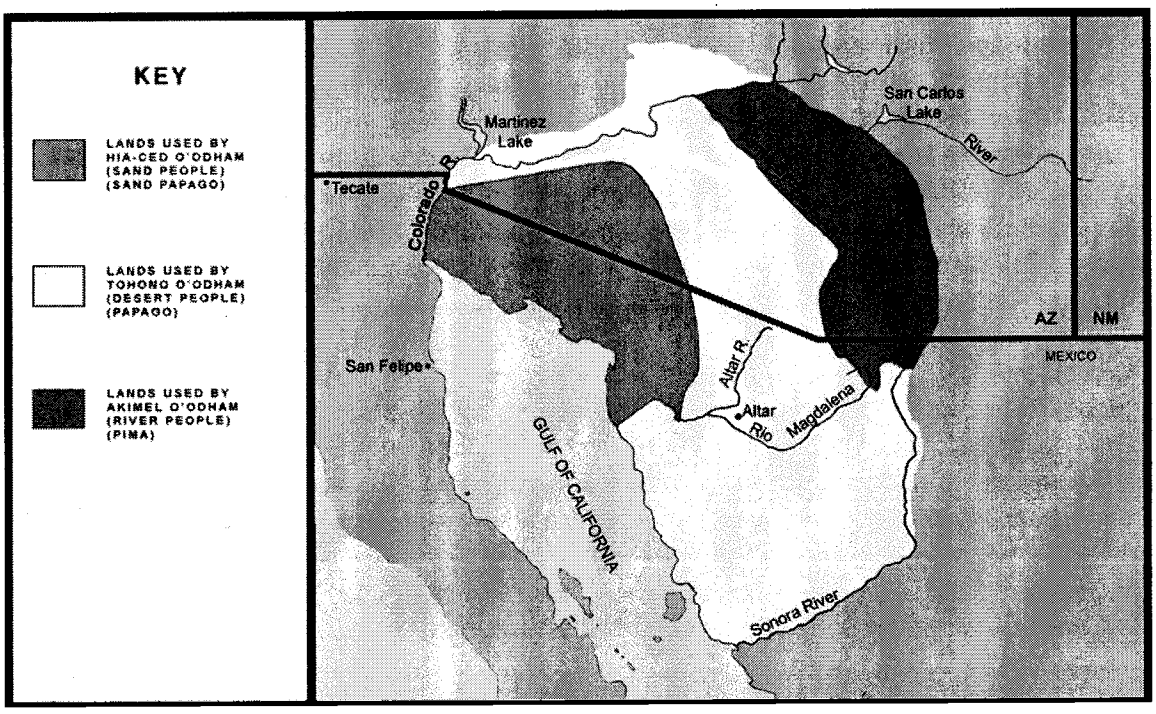
About the O'odham

Tribal name	Meaning	Old name	Reservations
Tohono O'odham	Desert People	Papago	Tohono O'odham, San Xavier, and Florence Community
A'kimel O'odham	River People	Pima Kokololoti Tautaukwani Kohatk	Gila River, Salt River, and Ak-chin Reservation/Community
Hia-ced O'odham	Sand People	Sand Papago	



The Papaguería
Traditional O'odham lands (*O'odham Jewed*)

Traditional Saguaro Harvest in the Tucson Mountain District, Saguaro National Park
Executive Summary

The Tucson Mountain District (TMD) of Saguaro National Park (SAGU), also known as Saguaro West, was established by Presidential Proclamation 3439 on November 17, 1961 to protect the saguaro and associated vegetation in the area. Saguaro National Park encompasses two units approximately 30 miles apart and separated by the city of Tucson, Arizona. The two park units comprise 91,400 acres, of which 71,400 acres are designated wilderness.

The management of SAGU is carried out with consideration of several acts including the National Environmental Policy Act of 1969, the National Historic Preservation Act of 1966 (as amended), the American Indian Religious Freedom Act of 1978, the Native American Graves Protection and Repatriation Act of 1990, and various statutes, executive orders, and National Park Service (NPS) policies and guidelines. The NPS, consequently, strives to be responsive to the concerns of contemporary traditionally associated people. In SAGU's case, this predominantly refers to the Tohono O'odham Nation whose people have harvested a variety of wild food and medicinal plants from the region including the TMD. This report on the traditional saguaro fruit harvest in the TMD uses previously documented sources and contemporary ethnography to provide the agency with an ethnohistoric and ethnobotanic understanding of the Tohono O'odham and the saguaro harvest.

Research Summary

The overall objective for this report is to examine the Tohono O'odham people's traditional gathering and use of saguaro fruit in the TMD. It is intended to aid park planning and environmental assessment work, as well as other related management decisions. Potential use of this report includes updating and informing the park's cultural and natural resource programs, and public education programs.

This report is based on an extensive literature review, meetings with the Tohono O'odham Legislative Council, and Natural Resource and Cultural Affairs committees, and ethnographic data from multi-generational saguaro fruit harvesters. A tribal election shortly after the project began altered the planned methodology of an extensive ethnography. UA and SAGU personnel worked together to explain the study to the new tribal councils and committees, some of whose members had reservations about the project, specifically referencing past abuses of cultural knowledge, and violations of intellectual property rights and copyright infringement of traditional symbols. These issues were not directed at the park but stemmed from problems with the general public.

Based on tribal concerns, the focus of the study shifted to the existing harvest camps in TMD, an ethnohistory of harvest in TMD, and an ethnobotany of the saguaro. The 2004 harvest season provided our only access to field interactions with harvesters, however, it was

a year of poor production and only a handful of people came to the camp in TMD. The ethnography, consequently, was limited to two individuals, one of whom wrote her account privately. Both women came from families with an unbroken saguaro harvest tradition and have continued the practice with their immediate families.

The report includes an ecological overview of the saguaro, an ethnohistory of the saguaro harvest and harvest camp in the TMD, and an ethnobotany of the saguaro. A final management discussion includes impacts, traditional knowledge, and suggestions from the study participants.

Summary of Findings

The results of this study address saguaro ecology, a history of saguaro harvest in the TMD, saguaro ethnobotany, and impact issues. The main result of this work is the conclusion that the traditional saguaro harvest does not harm the saguaro or associated plant community, and provides a moment in the annual cycle during which some direct care is given the plants.

Ecology

The saguaro is a slow-growing, long-lived cactus. It produces upwards of 250,000 seeds per plant per year, however, only about one percent of these germinate. Those that germinate under a nurse tree have the best chance for survival. Biotic and climatic factors put the saguaro seedlings at risk, particularly predators such as rodents and insects, as well as frost and drought. Biotic factors - insects, rodents, foraging birds, and other mammals - have the greatest impact during the summer and fall months immediately following germination. Climatic factors - erosion, drought, and winter freezing - present the next greatest threat to first-year saguaro survival.

The second year of growth is when the young saguaros most need adequate moisture for survival. At this stage, saguaro mortality begins to diminish, however, and continues to do so as the plants successively outgrow the individual consumptive capacity of insect and rodent predators. As the saguaro matures, freezing becomes more of a concern to survival. Fire is another potential problem for mature saguaro survival, although if the plant has enough reserves, it can continue to reproduce for up to six years after fire damage. The growth rate of the saguaros in the TMD is slower than those in the east unit of SAGU.

Seed dispersal is aided by several species of birds and one reptile. These include the verdin (*Auriparus flaviceps*), ash-throated flycatcher (*Myiarchus cinerascens*), curved-bill thrasher (*Toxostoma curvirostri*), cactus wren (*Campylorynchus brunneicapillus*), northern cardinal (*Cardinalis cardinalis*), and bushtit (*Psaltriparus minimus*), and the desert iguana (*Dipsosaurus dorsalis*). Pollination is aided predominantly by the white-winged dove (*Zenaida asiatica mearnsii*), the Mexican long-tongued (*Choeronycteris mexicana*) and the lesser long-nosed bats (*Leptonycteris yerbabuenae* and *L. curasoae*), and honey bees (*Apis mellifera*).

Many wildlife species make use of the saguaro's flowers, fruits, and seeds including the collared peccary (*Tayassu tajacu*), bats, rodents, birds, moths, and honey bees. Mule deer (*Odocoileus hemionus*) and desert bighorn sheep (*Ovis canadensis nelsoni*) also eat the fruits.

Numerous bird species make nests in the saguaro. In addition to the white-winged doves, elf owls (*Micrathene whitneyi*), western screech-owls (*Otus kennicottii*), Purple Martins (*Progne subis hesperia*), mourning doves (*Zenaida macroura*), Inca doves (*Columbina inca*), Northern flickers (*Colaptes auratus*), gilded flickers (*Colaptes chrysoides* [Malherbe]), and Gila woodpeckers (*Melanerpes uropygialis* syn. *Centurus uropygialis* [Baird]) nest in cavities in the saguaro. Harris hawks (*Parabuteo unicinctus*), Redtail hawks (*Buteo jamaicensis*), and Great-horned owls (*Bubo virginianus*) make nests among the branches of mature saguaro.

Ethnohistory

The saguaro has been a dominant figure in the Sonoran Desert for millenia. The Tohono O'odham people have lived in the Sonoran Desert for thousands of years, and harvested the saguaro fruit during much of that time. When the TMD unit was established, no mention was made of the traditional harvesting that occurred there. When the harvesters showed up the June after establishment, park staff allowed them to harvest but were looking for a way to end the activity. When made aware of the situation, Secretary of the Interior Stewart Udall was glad the park had not stopped the harvest, and went so far as to amend the regulations concerning resource protection to allow the Tohono O'odham to harvest the fruits of the saguaro and other cacti.

When the regulations were next amended, Udall's amendment was left out inadvertently. An opinion provided later by a solicitor indicated that the regulations were worded such that the harvest could continue. Annual permits signed by SAGU and the Tohono O'odham Nation have since guided the annual event. Harvesters have welcomed visitors and given demonstrations on harvesting and processing the fruit and seeds. They take care of the plants around the camp by watering some and cleaning mistletoe out of others. The study participants expressed appreciation for the opportunity to continue the harvest in the TMD not only for themselves and their families, but for all Tohono O'odham people.

It would appear based on newspaper accounts and park records, that protection of the saguaro in the TMD was necessary from a development and mining standpoint. Nowhere does anyone raise the traditional harvest as detrimental, and in one park memo, it was heralded as an ideal example of a man-desert association that would help the general public feel more comfortable in the desert environment.

Ethnobotany

The Tohono O'odham people have a complex, interdependent relationship with the saguaro. It has a cosmological foundation that includes the saguaro once being human, a feature which the Tohono O'odham still recognize today. Their calendar is based on the saguaro's flowering and fruiting cycle, which represents the New Year for them.

The saguaro harvest was a village-oriented activity traditionally but as cultural changes occurred over the last 500 years, it became family-based. Where villages once had saguaro groves recognized as theirs, families came to be associated with specific groves. Trespass was frowned upon but 'ownership' was not enforced. On the Tohono O'odham Reservation, the family-based groves and camps are veiled in privacy, an aspect which complicates efforts at cultural revitalization. The TMD harvest camp is seen as operating under different cultural rules and an opportunity for Tohono O'odham youth and adults denied their culture while growing up to learn the traditions surrounding the saguaro and harvest.

The earliest documented use of the saguaro was in 1540 when Pedro de Castañeda witnessed an O'odham group involved in the *Navai't*, known as the wine or rain ceremony, in Mexico. As a cultural feature, ceremonies develop over many generations so it is reasonable to assume that the 1540 event was well-established by then. The Tohono O'odham relationship with the saguaro then has an aboriginal basis, surviving many cultural changes when other aboriginal traditions did not. Such resilience consequently, suggests that the saguaro remains central to O'odham culture and identity.

Castetter and Underhill (1935) estimated some six hundred families gathered about 100,000 pounds of saguaro fruit each year, although some estimated the saguaro harvests in the 1920s and 1930s at about 450,000 pounds of fruit annually (Fontana 1989). The Tohono O'odham people used the flowers, fruit, seeds, thorns, burls or boots, and ribs of the saguaro for food, ceremony, fiber, manufacture, trade, and unspecified needs. The Tohono O'odham people used the fruit and seeds to make a variety of food products including ceremonial wine that was used in the *Navai't*, and the *Vikita*, or harvest ceremony. After a saguaro died, the Tohono O'odham people used the ribs and 'boots' that were once nest holes for a variety of structures, tools, instruments, and other useful objects. They also used the fruit and seed products as trade items with the neighboring Pima tribes.

Other people and tribes have been documented as using the saguaro including the Hohokam, Western Apache bands, the Hualapai, Yavapai, Maricopa, Pima, Seri, and Yuman speakers and southwest tribes in general. These groups used the fruit, seeds, thorns, burls or boots, and ribs of the saguaro for food, medicine, ceremony, fiber, manufacture, trade, and unspecified needs.

Impact Issues and Management Comments

The slow growth rate of the saguaro complicates determinations of harvest impacts. Various aspects of saguaro growth further illustrate other factors are more critical to saguaro reproduction and survival. Studies have shown that fruit production is dependent on branching, which in turn is dependent on winter precipitation (Drezner 2001). The saguaro is capable of relying on its stored reserves to reproduce for several years after fire damage (Thomas 1991). The mature saguaro can produce approximately 250,000 seeds annually yet only one percent of these is expected to germinate (Niering, Whittaker, and Lowe 1963; Steenbergh and Lowe 1977). Finally, seedling survival is enhanced greatly when growing

under the canopy of a nurse tree (Franco and Nobel 1989; Hutto, McAuliffe, and Hogan 1986; Sherbrooke 1989).

Since the Tohono O'odham have preferred historically to harvest from mature saguaros (Raab 1976), there would seem to be little overlap in factors most affecting saguaro survival. Nabhan et al. (1982) support the assertion of a lack of negative impact because while humans compete with birds for saguaro fruits, they have done so for millennia. Since only a small percentage of the seeds produced naturally germinate in favorable sites, it is unlikely that wild fruit gathering reduces plant population sizes.

Ethnographic accounts and archaeological records, previously discussed in Chapter Three, indirectly suggest no negative impact from harvest. These accounts have shown that traditionally, villages and later families returned to the same saguaro groves each year, although within their grove, they might shift their camp site (Lewis 1988; Underhill 1939). They also spend very little time at each saguaro, consequently, offering little disturbance to wildlife occupants. Once the harvesters have cleaned the pulp from the fruit body, they leave it red-side to bring rain and to share with the wildlife.

As these were multi-generational groves, one would expect that there were plenty of mature saguaros and adequate saguaro harvests year after year, implying a lack of negative impact to the plant's survival. Culturally, the Tohono O'odham believe it is their responsibility to care for the saguaro, and that to not harvest its fruit is to not take care of it, and that is a sure way to cause the plant's decline.

The contemplation of whether and how to accommodate the saguaro fruit harvest tradition must include potential impacts from disallowing its continuation in the TMD. First and foremost is the loss of an important opportunity for cultural preservation. As noted by the numerous newspaper accounts, the harvest has included an extensive educational component. First led by Juanita Ahil, and now Stella Tucker, many Tohono O'odham youth and adults, and non-Indian people have learned about the harvest, processing, and cultural importance of the saguaro in O'odham life.

The existence of the harvest camp in the TMD provides an almost unique opportunity for the Tohono O'odham, particularly the youth. While it might seem that without this camp, they would go elsewhere to collect fruit, two things impeded them doing so. One is the lack of suitable and accessible public land, particularly for the San Xavier community. The other difficulty lies in the cultural rules of harvest groves. As family-based places today, even tribal members living on the Sells reservation do not have open access to the saguaro fruit. On the Sells reservation, of course, this challenge can be overcome more easily than off the reservation. The San Xavier community, however, is a considerable distance from those saguaro groves and few if any tribal members can make such a trip.

The second potential impact from no TMD camp has to do with cultural identity. As Helen Ramon (1980) explained the importance of the saguaro fruit harvest, it was when and how she learned to be O'odham.

The saguaro harvest has persisted through a variety of cultural changes much better than other O'odham traditions, indicating a strong bond or relationship between the Tohono O'odham and the saguaro. The giant cactus is a human being, a giver of life, a figure in their legends and religious beliefs, and a direct connection to their homelands. Simply put, the saguaro is a major part of their identity (Nabhan et al. 1982:26).

Management and Suggestions

The study participants shared traditional management concepts about the saguaro. One was the desire to see the saguaro protected from vandals, from people hitting them with sticks or stones, and from putting bullet holes in them. One possible response would be increased law enforcement, possibly Tohono O'odham officers/rangers. Additional emphasis in interpretive programs, visitor center displays, and brochures could be helpful.

Another comment by participants addressed the management of nurse trees, many of which have a mistletoe problem. One way of addressing this concern would be to work with the Tohono O'odham Nation, possibly the San Xavier District specifically, to have knowledgeable elders go out with Tohono O'odham youth to address the problem while passing on their traditions to the youth.

The participants explained that the Tohono O'odham clean the pulp and seeds from the fruit body where they harvest the fruit. They do not bring the entire fruit back to camp but instead leave the pods face up to bring the rain and so wildlife can access them for food.

The primary management comment from the study participants was gratitude to the park for access to the saguaro and the harvest camp. They also shared a "wish list" for the park's consideration:

- A winter story-telling camp.
- If the permit could include cholla harvesting, and collecting ironwood seeds and Morman tea.
- Getting the land back or leasing it.

Future Research

Historic documentation suggests that while the saguaro may benefit from the traditional harvest, there are no negative impacts as a result of the harvest. Additional research is needed, however, to clarify the effects of harvesting. Such investigation could include quantification of harvest areas, saguaros, and fruit collected. Development of a study design in consultation with the Tohono O'odham Nation should enhance data collection and project completion.

Given the data collection difficulties that arose following tribal elections, there remains a need for more ethnographic accounts of the cultural significance of the saguaro,

and the history of the harvest camp in the TMD. Ideally, another study for this purpose would coincide with a non-election year, and good fruit production so that more of the harvesters would use the harvest camp.

The "wish list" provided by study participants suggests potential for a Tohono O'odham ethnobotany of park species. A winter story-telling camp might offer opportunity to record Tohono O'odham history of the Tucson Mountains and surrounding landscape. As with additional data collection concerning the saguaro, these ideas would need approval of the Tohono O'odham Nation. It may be possible to work through the Chairperson and the San Xavier District, the one closest to the park, thereby minimizing on-reservation sensitivities.

Chapter One
Study Overview

As part of its management considerations, the National Park Service (NPS) identified a need to examine the impacts of the gathering and processing saguaro fruit within Saguaro National Park (SAGU) by contemporary members of the Tohono O'odham Nation. Contracting with the Bureau of Applied Research in Anthropology (BARA) at the University of Arizona, NPS requested an ethnographic study of the practice in the west unit of SAGU known as the Tucson Mountain District (TMD).

Saguaro National Monument was established March 1, 1933 by President Hoover's Proclamation No. 2032 (Appendix A). Located east of Tucson running into the Rincon Mountains, the park unit comprised 63,360 acres. On November 15, 1961, President Kennedy issued Proclamation No. 3439 adding 15,360 acres to the park on the west side of the Tucson Mountains, west of Tucson (Appendix B). A wilderness designation in 1976 (P.L. 94-567), and expansions in 1991 (P.L. 102-61) and 1994 (P.L. 103-364) resulted in today's total of 91,445 acres of which 71,400 acres are wilderness. The 1994 legislation also changed the park unit to Saguaro National Park.

The reasons given for the establishment and expansion of SAGU focus on the plant communities. Proclamation No. 2032 cites "outstanding scientific interest of the exceptional growth ... of various species of cacti, including the so-called giant cactus" while Proclamation No. 3439 cites "a remarkable display of relatively undisturbed lower Sonoran desert vegetation, including a saguaro stand which equals or surpasses saguaro stands elsewhere in the Nation." While the collection of natural resources generally is prohibited in national park units, the authorizing legislation of some park units, such as Organ Pipe Cactus National Monument, have included a traditional harvesting provision. The legislation for SAGU, however, did not include harvesting by the Tohono O'odham people, possibly because proponents were not aware of the activity did not considered it an issue to establishment.

Personnel at SAGU, however, have recognized the cultural significance of saguaro fruit harvesting to the Tohono O'odham since TMD's establishment. Beginning with the first harvest following establishment, SAGU officials have worked with the tribe to allow tribal members to continue this traditional practice. The purpose of this traditional use study is to gather ethnohistoric and ethnobotanic information with existing scientific data to provide a better understanding of any impacts that traditional harvesting might have on the saguaro plant community. Intents of the research include the development of a scientific basis for the park's decisions regarding the traditional harvest, and additional information for park cultural and natural resource programs, and public education programs.

Project Scope and Methodology

This report is based on an extensive literature review, meetings with the Tohono O'odham Legislative Council, and Natural Resource and Cultural Affairs committees, and

ethnographic data from multi-generational saguaro fruit harvesters. A tribal election shortly after the project began altered the planned methodology of an extensive ethnography. UA and SAGU personnel worked together to explain the study to the new tribal councils and committees, some of whose members had reservations about the project. Based on tribal concerns, the focus of the study shifted to the existing harvest camps in TMD, an ethnohistory of harvest in TMD, and an ethnobotany of the saguaro (Table 1). The 2004 harvest season provided our only access to field interactions with harvesters, however, it was a year of poor production and only a handful of people came to the camp in TMD. The ethnography, consequently, was limited to two individuals, one of whom wrote her account privately.

Date	Meeting
Winter 2003	The UofA team met with the Natural Resources Committee and Cultural Affairs Committee of the Tohono O'odham Nation (TON) to discuss the project. Both committees expressed interest as well as a desire to participate including contributing writings to the report.
Spring 2003	Tribal elections resulted in a new administration and new committee members.
Nov. 25, 2003	The UofA team met with Theresa Throssell, Executive Assistant to Chairwoman Saunders to explain the project, the team's interactions with the tribe prior to taking the contract and to the elections. UofA team asked to meet with Chairwoman Saunders as part of the tribal interaction protocol before meeting with the new committees.
February 13, 2004	Chairwoman Saunders directed Peter Steere, TON archaeologist, to arrange meetings for UofA with the Natural Resources Committee and Cultural Affairs Committee.
March 17, 2004	The UofA team and SAGU personnel met with the Cultural Committee, which was mostly supportive, and wanted to contribute to the report.
March 29, 2004	The UofA team and SAGU personnel met with the Natural Resource Committee, which raised the issues of intellectual property rights, and cultural methods and symbols being copyrighted or patented by non-Indians as concerns. Committee Chairman Mike Flores reserved support but asked UofA team and SAGU personnel to meet with the TON Legislative Council.
April 14, 2004	The UofA team and SAGU personnel met with the TON Legislative Council to discuss the project. UofA team and SAGU personnel agreed to an alternative plan for the report depending on the outcome of tribal meetings. The alternative plan would focus field visits on the history and importance of the SAGU camp, and a literature review on traditional use of the saguaro fruit.
May 6, 2004	The UofA team and SAGU personnel met with the TON Legislative Council to get feedback on the draft field questions.
June 17, 2004	Having addressed Legislative Council members' concerns with the study's field questions, the UofA team collected ethnographic data from a harvester at the SAGU camp. UofA team received self-administered set of questions from a Legislative Council member. This was a bad harvest year, so no additional field data was collected.
May 2005	The UofA team attempted additional fieldwork, however, Cultural Affairs Chairwoman Frances Conde recommended that the UofA team get a supporting resolution from the TON Legislative Council. She later said that she would pursue the matter but it was never resolved. The UofA team and SAGU personnel agreed to pursue the alternative plan for the report (above), and include the two ethnographic accounts obtained.

Table 1. Chronology of interactions with the Tohono O'odham Nation regarding the project and tribal participation.

Research Team

The Principal Investigators in the study were Dr. Richard W. Stoffle and Dr. Rebecca S. Toupal. The field work and meeting interactions were conducted by professionally trained ethnographers from the UofA who include Dr. Stoffle, Dr. Toupal, and Nathan O'Meara.

Dr. Richard W. Stoffle is a senior cultural anthropologist at BARA and has more than 25 years of experience with American Indian environmental issues. He has worked successfully with more than 80 American Indian tribes and many federal agencies to address American Indian environmental concerns in land management decisions. His more recent publications include American Indian histories with the Nevada Test Site and with Nellis Air Force Base, and articles on traditional environmental knowledge in Human Organization, American Indian Quarterly, and Current Anthropology.

Dr. Rebecca S. Toupal is an assistant research scientist with over seven years of research experience with BARA including work with Scandinavian fishermen, and 21 American Indian tribes in the southwest, Midwest, and Great Plains. She has a B.S. in Forestry/Range Management from the University of Montana, a Master of Landscape Architecture (MLA) from the University of Arizona (UA), and a Ph.D. in Renewable Natural Resource Studies from UA. She investigated successful conservation partnerships in the western U.S. for her MLA thesis. Her Ph.D. dissertation was an investigation of four cultural landscapes centered on a wilderness area in southern Arizona.

Nathan O'Meara has a B.A.in Anthropology from. His research interests center on native ethnobotany and he has participated in ethnobotanical work with local fishermen in the Bahamas, and American Indians in the southwest and Midwest.

Organization of Report

This report begins with an ecological overview of the saguaro. It examines aspects of saguaro growth and mortality, and the extensive wildlife relationships with which the giant cactus is involved. An ethnohistory of the saguaro harvest follows that includes a land use history of the Tohono O'odham, cultural changes, contemporary land use, and the harvest camp in the Tucson Mountain District. The latter section includes previously documented sources and contemporary ethnography. The next discussion involves the cultural role of the saguaro including cosmology, the calendar, the saguaro, and ethnobotany of the saguaro. The report concludes with a discussion of management aspects of the saguaro harvest. This section includes ecological impacts of the harvest and cultural impacts of no harvest. Contemporary accounts of traditional knowledge and management, as well as comments and suggestions for management follow the impact section. The chapter concludes with a discussion of future research.

Chapter Two
An Ecology of the Saguaro

The saguaro (*Carnegiea gigantea* syn. *Cereus giganteus* [Engelm.] Britt. and Rose, N.Y. Bot. Gard. Jour. 9:188) (Figure 1) is a member of the *Cactaceae* family. Known also as sahuaro, giant cactus, and pitahaya, it is of a monotypic genus meaning there are no subspecies, varieties, or forms (Table 2). The saguaro grows throughout much of the Sonoran Desert (Figure 2) but its largest populations are found in Sonora, Mexico (Shreve and Wiggins 1964; Steenbergh and Lowe 1977). It is a dominant or co-dominant member of paloverde (*Cercidium* spp.)-saguaro (Figure 3) and paloverde-bursage (*Ambrosia* spp.) (Figures 4, 5) desertscrub communities on bajadas (Lowe and Holm 1991; Niering and Lowe 1984; Tomoff 1974; Turner 1982; Turner and Brown 1982), and has been found in creosotebush (*Larrea tridentata*) (Figure 6) communities as a xero-riparian species in arroyos and washes on the southwestern edge of its range (Asplund and Gooch 1988; Bennett, Kunzmann, and Johnson 1989; Brown, Lowe, and Hausler 1977; Niering and Lowe 1984).

Figure 1. Mature saguaro.

Kingdom	*Plantae*	Plants
Subkingdom	*Tracheobionta*	Vascular plants
Superdivision	*Spermatophyta*	Seed plants
Division	*Magnoliophyta*	Flowering plants
Class	*Magnoliopsida*	Dicotyledons
Subclass	*Caryophyllidae*	
Order	*Caryophyllales**	
Family	Cactaceae	Cactus family
Genus**	*Carnegiea* Britt. & Rose	saguaro
Species	*Carnegiea gigantea* (Engelm.) Britt. & Rose	saguaro

* *Iincludes cacti, carnations, beet, spinach, rhubarb, sundews, and bougainvillea*
** *Contains 1 Species and 1 accepted taxa overall*

Table 2. Classification of the saguaro.

The saguaro is an arborescent[1], stem succulent that can reach heights of over 50 feet (15 m) and a diameter of 30 inches (76 cm) (Benson 1982; Britton and Rose 1920). The largest of the columnar cacti growing in the United States (Young and Young 1986), its taproot can be over three feet deep (one meter) and have lateral roots up to 98 feet (30 m) long (Cannon 1911; Shreve and Wiggins 1964). The main stem is simple with several lateral, erect branches (Benson 1982; Britton and Rose 1920), many prominent ribs, and clusters of stout spines up to three inches (7.5 cm) long. Large saguaros are believed to be 150 to 200 years of age. Its great capacity for storing water, along with its slow rate of growth, allows the plant to fruit annually more or less irrespective of drought (Kearney and Peebles 1942).

[1] Treelike in size and form.

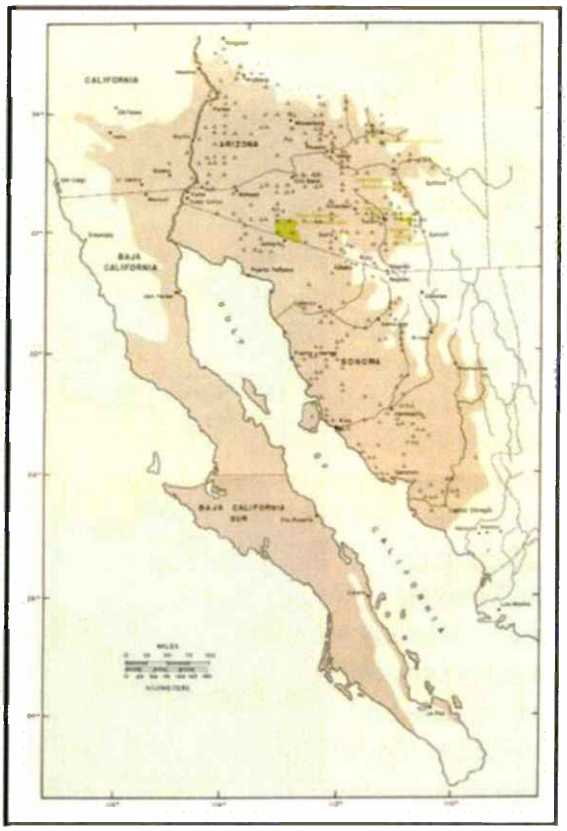


Figure 2. Geographic distribution of the saguaro in the Sonoran Desert region (Steenbergh and Lowe 1977).

Figure 3. Palo verde/saguaro desertscrub community (Nate O'Meara)

Figure 4. Palo verde/bursage desertscrub community (Hank Jorgensen, Cabeza Prieta Natural History Association)

Figure 5. Triangle bursage (Hank Jorgensen, Cabeza Prieta Natural History Association)

Figure 6. Creosotebush (Hank Jorgensen, Cabeza Prieta Natural History Association)

Growth

The saguaro blooms from late April to June (Alcorn and Martin 1974; Kearney and Peebles 1960), and the fruits mature in June and July before the summer rains (Benson 1982; Shreve and Wiggins 1964). While the saguaro reproduces sexually, it is incapable of self-fertilization (Alcorn, McGregor, and Olin 1961) and flowers are cross-compatible only with flowers on other branches (Alcorn et al. 1959); it does not begin to reproduce until it is over seven feet (2.2 m) tall (Hutto, McAuliffe, and Hogan 1986; Steenbergh and Lowe 1977). The saguaro's flowers are approximately three to five inches (7.5 to 12.5 cm) long and generally bloom on the ends of the branches (Benson 1982; Kearney and Peebles 1960). The more branches, the greater the reproductive potential of a plant (McAuliffe and Janzen 1986). Each plant averages four open flowers per day for about 30 days (McGregor et al. 1959), the flowers staying open for less than 24 hours (Alcorn, McGregor, and Olin 1961). The fertilized flowers develop into oblong fruits each of which can contain up to 2,500 seeds (Alcorn and Martin 1974; Britton and Rose 1920). Over the course of the bloom period, the saguaro often produces more than 100 fruits resulting in dispersal of as many as 250,000 seeds per plant (Niering, Whittaker, and Lowe 1963; Steenbergh and Lowe 1977).

While the saguaro's seeds germinate readily (Britton and Rose 1920), these are short-lived so seed reserves are not maintained in the soil (Rogers 1985; Turner 1990). Less than one percent of the annual seed production[2] germinates as a result of predation or lack of moisture (Castellanos and Molina 1990; Nobel 1988). Optimal germination conditions for saguaro seeds are extended periods of daylight at 77°F (Alcorn and Kurtz 1959) after the start of summer rains in July and continues into August and September. Establishment of seedlings is limited primarily by frost, drought, rodents, and insects (Steenbergh and Lowe 1969).

The 12 to 14 months following germination is critical for seedlings; this period is when they most need adequate moisture for survival (Nobel 1988; Steenbergh and Lowe 1976; Turner et al. 1966). Seedling establishment and survival are enhanced greatly by nurse plants such as the foothills paloverde (*Cercidium microphyllum*) (Figure 7) (Franco and Nobel 1989; Hutto, McAuliffe, and Hogan 1986; Sherbrooke 1989). Sosa-Fernández (1997) found the most important nurse plants to be ironwood (*Olneya tesota*), elephant tree (*Bursera microphylla*), creosote bush, burro bush (*Hymenoclea monogyra*), saltbushes (*Atriplex* spp.), limberbush (*Jatropha cuneata*) and lomboy (*J. cinerea*) (Figures 8 - 13). The importance of nurse trees to saguaro survival is significant enough to include them in saguaro management since factors affecting these populations consequently become important to saguaro survival (Turner et al. 1966).

Figure 7. Palo verde nurse tree
(© Paul Berquist)

[2] Approximately equivalent to that of a single fruit.

SOME SAGUARO NURSE PLANT SPECIES

Figure 8. Ironwood (© Thomas

Figure 9. Elephant tree (© Hank Jorgensen)

Figure 10. Burro bush
(© Saguaro Juniper Corporation)

Figure 11. Saltbush (© Hank Jorgensen)

Figure 12. Limberbush (© Hank Jorgensen)

Figure 13. Lomboy
(© Hank Jorgensen)

The majority of seed dispersal beneath shrub canopies is attributable to frugivorous[3] birds (McAuliffe 1988). Sosa-Fernández (1997) found six species of birds - verdin (*Auriparus flaviceps*), ash-throated flycatcher (*Myiarchus cinerascens*), curved-bill thrasher (*Toxostoma curvirostri*), cactus wren (*Campylorynchus brunneicapillus*), northern cardinal (*Cardinalis cardinalis*), and bushtit (*Psaltriparus minimus*) - and one reptile, the desert iguana (*Dipsosaurus dorsalis*) (Figures 14 – 20) were the most effective dispersers. While freezing temperatures limit the saguaro's northern range, nurse plants can extend that range by providing appropriate microclimates. Where nurse plants provide this opportunity, saguaros tend to establish on the south side of the canopy, a pattern which differs from establishment in warmer areas (Drezner and Garrity 2003). This finding clarifies Kearney and Peebles' (1951:569) description of elevation limitations in which they place the upper limit of the saguaro's range at 3500 feet "or exceptionally 4500 feet, [in] warm situations in well-drained soil."

Figure 14. Verdin (© Kent

Figure 15. Ash-throated flycatcher (© Ashok Khosla)

Figure 16. Curved-bill thrasher (© Don Dirks, NPS-ORPI)

Figure 17. Cactus wren (© Don Dirks, NPS-ORPI)

[3] Fruit-eating.

Figure 18. Northern cardinal
(© Michael Woodruff)

Figure 19. Bushtit (© Lee Karney, USFWS)

Figure 20. Desert iguana
(© John Sullivan/Ribbit Photography)

Most saguaro seedlings struggle to establish, and mortality is high during the first year of life. At this stage of development, the seedlings are tiny succulents, weakly rooted and subject to a variety of destructive factors (Steenbergh and Lowe 1969, 1976, 1977). Biotic factors - insects, rodents (Figure 21), foraging birds, and other mammals - have the greatest impact during the summer and fall months immediately following germination. Climatic factors - erosion, drought, and winter freezing - present the next greatest threat to first-year saguaro survival. In the second year, saguaro mortality begins to diminish and continues to do so as the plants successively outgrow the individual consumptive capacity of insect and rodent predators (Steenbergh and Lowe 1969, 1977). As the saguaro matures, freezing becomes more of a concern to survival (Lowe 1966; Steenbergh and Lowe 1976).

Figure 21. Kangaroo rat
(Glenn and Martha Vargas © California Academy of Sciences)

The saguaro develops quite slowly and its age can be difficult to determine with any certainty. Drezner (2003b) developed a general growth curve of age-height relationships using data from both SAGU units that presents an interesting trend (Figure 22) - the saguaros in the east unit grow more rapidly than saguaros in the west unit. Since saguaro growth is strongly linked to summer rainfall (Drezner 2005), one would expect a precipitation difference to explain this trend. Historic precipitation data for sites in the immediate vicinity of the two units, however, are quite similar indicating other factors contribute to the difference in growth rates (Table 3).

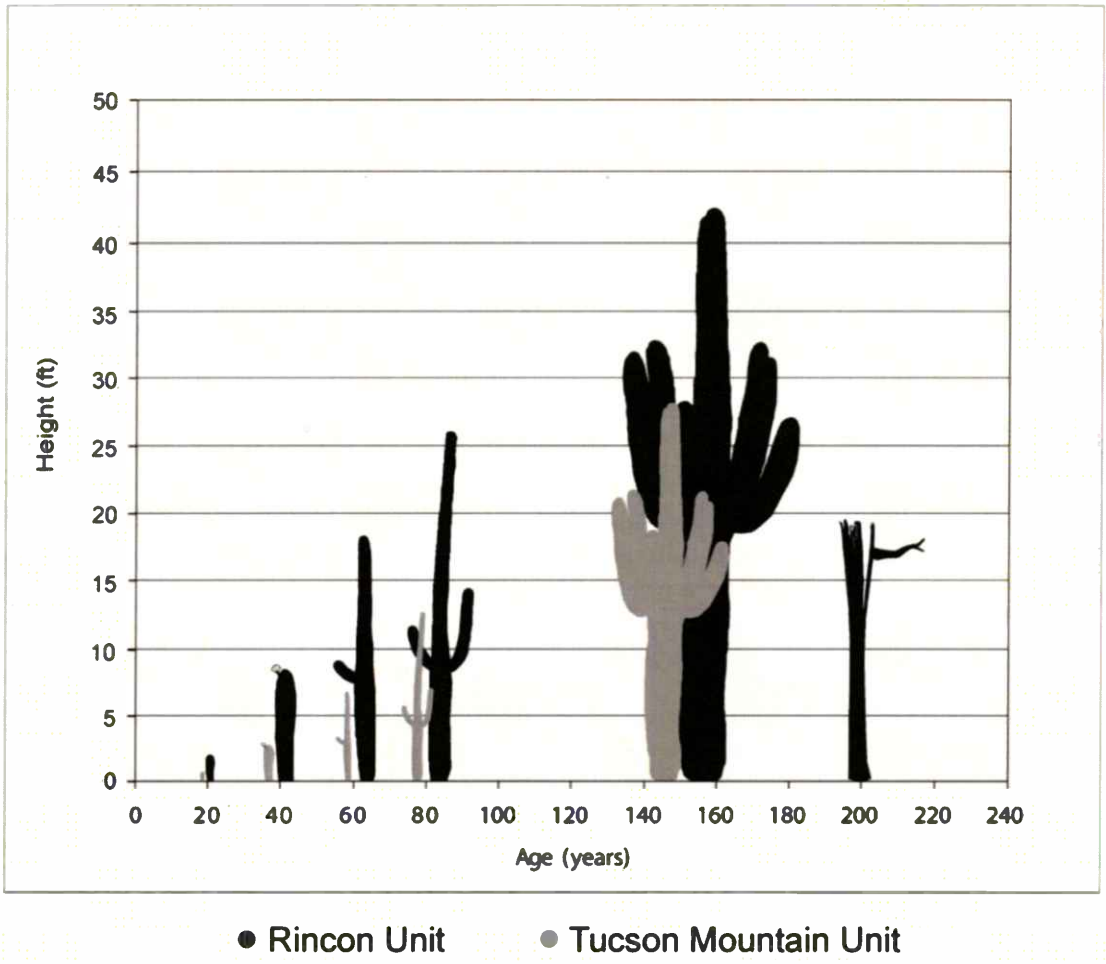


Figure 22. Age-height relationships of saguaros in Saguaro National Park (based on Drezner 2003b)

1961-1990 Monthly Climate Summary			
	Annual	**Winter** (Dec-Feb)	**Summer** (Jul-Sep)
TMD Unit **Tucson 17 NW, AZ (028795)**	14.77	3.29	7.23
Rincon Unit **N Lazy H Ranch, AZ (025908)**	14.03	3.78	6.52

Table 3. Average Total Precipitation (in.) for Saguaro National Park (http://www.wrcc.dri.edu/)

Many saguaro studies were conducted at SAGU and Organ Pipe Cactus National Monument, so Drezner (2001) examined saguaro populations across Arizona to identify those variables that control saguaro populations, and those that are coincidental to the location where they were studied. She found that in the central and eastern part of the saguaro's range where ample moisture is available, higher populations of juvenile saguaro were influenced more by lower maximum summer temperatures than by summer precipitation. She found that branching, which directly controls reproductive output, is controlled more by winter than summer rains, a result contrary to Steenbergh and Lowe (1977). Drezner (2003c) later concluded that any relationship of stem diameter with temperatures was coincidental, and that winter precipitation again was the better predictor of stem growth.

Once saguaros receive enough summer moisture (i.e. a population exists), the maximum July temperature is the variable that best predicts survival. While saguaro regeneration appears to be influenced by maximum summer temperatures more than by precipitation (Drezner 2004), relative growth throughout the saguaro's range is linked strongly to summer precipitation (Drezner 2005).

As the saguaro matures, biotic factors are not eliminated entirely as potential threats to survival. A relatively insignificant number of adult saguaro, however, die as an indirect result of consumption by jackrabbits, woodrats (Figures 23 - 24), and bighorn sheep, particularly in the more arid western range of the species (Simmons 1969). This type of damage seldom kills the plant outright, but weakens it structurally consequently increasing its vulnerability to freezing or wind breakage.

Figure 23. Jackrabbit (Rebecca S. Toupal)

Figure 24. Desert woodrat (Dr. Lloyd Glenn Ingles © California Academy of Sciences)

Another biotic factor that may contribute indirectly to saguaro decline is nesting holes. When woodpeckers (Figures 25 – 26) drill in healthy saguaros, the exposed tissue is sealed off rapidly and completely by callus tissue formation so the plant is not killed or seriously injured. Woodpecker holes in larger, re-excavated saguaros, however, increase the

saguaro's vulnerability to freezing or wind breakage. This biotic factor is not of particular concern since old giant saguaros of 100 to 150 years or older may have 40 to 50 woodpecker holes.

Figure 25. Gila woodpecker (© Paul Berquist)

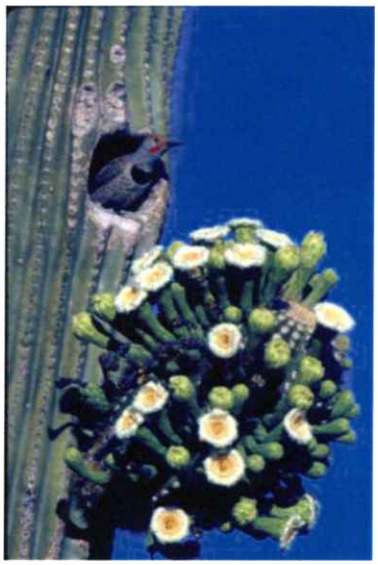


Figure 26. Northern flicker (© Paul Berquist)

Insects also have little impact on healthy saguaros. Insects, such as noctuid moth larvae (*Cactobrosis fernaldialis* [Hulst]), tunneling in the soft tissues of both healthy and aging saguaros cause little damage as the tunnels are rapidly sealed off by the formation of callus tissue (Figure 27) (Steenbergh and Lowe 1983).

Figure 27. Callused galleries created by *Cactoborsis* larvae (©Michael J. Plagens)

One factor of particular threat to the saguaro is fire to which the species is not adapted (Figure 28) (Alford 2001). Not surprisingly, younger or smaller saguaros are more susceptible to fire mortality than older, larger plants (Cave 1982; McLaughlin and Bowers 1982). The mature plant does have some morphological characteristics, however, that can aid survival following a burn. Tissue folds and spines provide some protection to the apex while a thick cortex protects the vascular tissue. In older saguaros, the ribs at the base of a plant may develop a woody bark that offers some resistance to burning. If a saguaro has enough reserves, it can even flower for several years before dying (Thomas 1991). Natural environmental extremes in temperature and drought, however, are more of a threat to the survival of this species (McAuliffe and Janzen 1986).

Figure 28. Wildfire in saguaro habitat (© Paul Berquist)

Wildlife Use

Many wildlife species make use of the saguaro's flowers, fruits, and seeds including the collared peccary (*Tayassu tajacu*) (Figure 29), bats, heteromyid[4] rodents, birds, and insects such as moths and honey bees (*Apis mellifera*) (Figure 30) (Alcorn, McGregor, and Olin 1961; Eddy 1961; McGregor, Alcorn, and Olin 1962; McGregor et al. 1959; Parker 1986; Reichman 1975). The fruits are utilized also but to a lesser degree by mule deer (*Odocoileus hemionus*) (McCulloch 1973; Short 1979), desert bighorn sheep (*Ovis canadensis nelsoni*) (Miller and Gaud 1989; Wallmo 1975), and mourning doves (*Zenaida macroura*) (Figures 31 - 33) (Wolf, Martinez del Rio, and Babson 2002).

Figure 29. Collared peccary (© 2006 John White)

Figure 30. Bee pollinating saguaro (© 2006 Paul

[4] Small native rodents adapted to desert conditions. They have fur-lined cheek pouches and hind limbs and tail adapted to leaping. They have complex burrows and are adapted to desert conditions. Examples include pocket mice (*Chaetodipus* spp.), kangaroo mice (*Microdipodops* spp.), and kangaroo rats (*Dipodomys* spp.).

Figure 31. Mule deer (©Steve Maniscalco)

Figure 32. Desert bighorn sheep (© Glenn and Martha Vargas © California Academy of Sciences)

Figure 33. Mourning dove (© Paul Berquist)

Several species serve as pollinators for the saguaro. Bats are particularly efficient in contributing to the saguaro's production of fertile fruit (Kartheiser 2004), however, white-winged doves and bees have been found to be equally-effective pollinators. Their activities produce little difference in seed production and viability, indicating that pollination is not a limiting factor in saguaro repopulation (Alcorn, McGregor, and Olin 1961).

The Mexican long-tongued (*Choeronycteris mexicana*) (Figure 34) and the lesser long-nosed bats (*Leptonycteris yerbabuenae* and *L. curasoae*) (Figure 35) are two bat species that play a vital role in the pollination of saguaro and other cacti. The most prevalent daytime pollinator is the western white-winged dove (*Zenaida asiatica mearnsii*) (Figure 36) (McGregor, Alcorn, and Olin 1962), which uses both saguaro pollen and nectar (Wolf and Martinez del Rio 1999). Other bird species observed feeding in the saguaro flower include the thrasher (*Toxostoma* spp.) (Figure 37), cactus wren (*Campylorhynchus brunneicapillum couesi* [Sharpe]), gilded flicker (*Colaptes chrysoides* [Malherbe]) (Figure 38), and Gila woodpecker (*Melanerpes uropygialis* syn. *Centurus uropygialis* [Baird]) (McGregor, Alcorn, and Olin 1962), and Scott's Oriole (*Icterus parisorum*) (Figure 39).

In addition to subsistence needs, the saguaro provides important nesting habitat for birds and small mammals (Olsen 1973) including large predators such as the Harris hawk (*Parabuteo unicinctus*) (Figure 40) and Redtail hawk (*Buteo jamaicensis*) (Figure 41). Some bird species rely on it for cover and nesting, and consequently are affected negatively by high saguaro mortality (Bock and Bock 1990).

Figure 34. Mexican long-tongued bat
(© Roger W. Barbour)

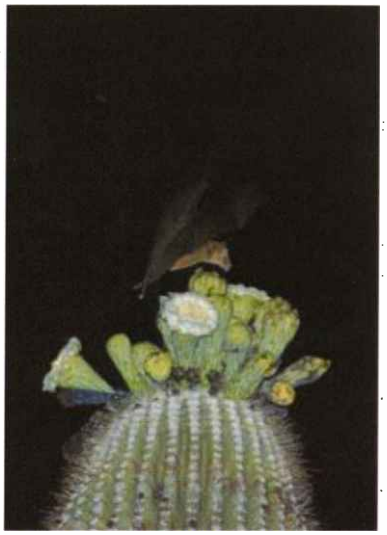


Figure 35. Lesser long-nosed bat
(© NPS-ORPI)

Figure 36. Western white-winged dove
(© Paul Berquist)

Figure 37. Curved-bill thrasher
(© Don Dirks, NPS-ORPI)

Figure 38. Gilded flicker
(©Herbert Clarke)

Figure 39. Scott's Oriole
(© Paul Berquist)

Figure 40. Harris hawk
(© Paul Berquist)

Figure 41. Redtail hawk (© Paul Berquist)

Gila woodpeckers (Figure 42) seem to prefer saguaro in arroyos over those on hillsides, ridgetops, or desert flats. They also prefer taller, branched saguaros for excavating nest holes (Korol and Hutto 1984), which tend to have a northerly orientation (Inouye, Huntly, and Inouye 1981). Male Gila woodpeckers spent much of their time guarding the nest, while the females primarily foraged (Martindale 1983).

Purple Martins (*Progne subis hesperia*) (Figure 43) use saguaros for nest holes and while they do not form dense colonies like eastern martins (*Progne subis subis*), they do group their nests geographically. Up to 10 birds will respond to a threat in such a nest area (Stutchbury 1991).

Elf owls (*Micrathene whitneyi*) (Figure 44) prefer areas with high densities of mature saguaros and saguaro cavities. Below 4100', most of cavities occupied by elf owls are in saguaro and cardon (*Cereus pringlei*) cacti (Goad and Mannan 1987). These owls nest only in cavities that have been excavated by Gila woodpeckers or Northern flickers (*Colaptes auratus*). Hardy (1997) found that western screech-owls (*Otus kennicottii*) (Figure 45), which use both saguaro and mesquite cavities, nested nearly exclusively in gilded flicker cavities when they used saguaros.

The saguaro has been a dominant presence in the Sonoran Desert for millions of years (Steenbergh and Lowe 1977). During that time it has provided subsistence to a variety wildlife species who share it as a home and food source (Figures 46 – 49). The indigenous peoples of the Sonoran Desert, particularly the Tohono O'odham, have made extensive use of the saguaro as well, sharing its rich resources with the wildlife for thousands of years. These interactions are the subject of the next chapter.

Figure 42. Gila woodpecker (© Boris Krylov)

Figure 43. Desert Purple Martin (© James R. Hill, III)

Figure 44. Elf owl nesting in saguaro (© Paul Berquist)

Figure 45. Western screech owl nesting in saguaro (© Paul Berquist)

Figure 46. Great Horned owl nesting in saguaro (© Paul Berquist)

Figure 47. Inca dove (*Columbina inca*) nesting in saguaro (© Paul Berquist)

Figure 48. Ringtail cat (*Bassariscus astutus*) in saguaro (© Paul Berquist)

Figure 49. Nesting white-wing dove and Gila woodpecker in saguaro (© Paul Berquist)

Chapter Three
An Ethnohistory of the Saguaro Fruit Harvest

The harvesting of saguaro fruit by the Tohono O'odham people is a centuries-old practice of subsistence, religion, and reaffirmation of their relationship with their traditional environment. Often viewed by non-Indian people as quaint or a necessity of an impoverished people, the saguaro fruit harvest has become a pivotal management issue. Legislation and regulations over the years have ignored and supported the activity, but on the ground National Park personnel have tried to accommodate what they viewed as a long-standing, harmless cultural tradition. This chapter provides an ethnohistoric view of the saguaro fruit harvest as a traditional practice, and includes a focus on a specific location – the Tucson Mountain District (TMD) or west unit of Saguaro National Park.

Land Use History

A vast region encompassing southern Arizona and northwestern Mexico has been home always to the O'odham people (Figure 50) (Papago Tribe 1985). Referred to by non-Indians over the years as Papagos, Pimas, Sobas, and Gileños, this ethnic group shares language, culture, and history. Today, they are known as the Tohono O'odham, Akimel O'odham, and Hia-Ced O'odham.

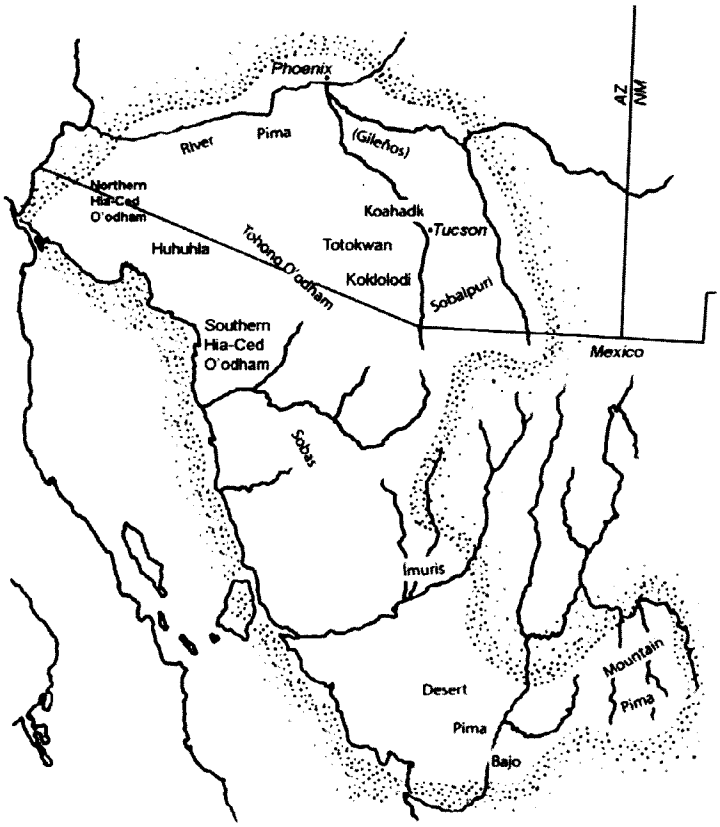


Figure 50. O'odham groups of the Pimería Alta

The Tohono O'odham people describe their relationship with their homelands in the Sonoran Desert since "time immemorial." While anthropologists debate what this means, at least one noted archaeologist has documented detailed evidence of cultural remains in the Pinacate area that date back more than 40,000 years (Hayden 1989). Other archaeologists also support the Tohono O'odham claim of longevity, pointing to evidence that the O'odham people occupied the Sonoran Desert long before the rise of the Hohokam about AD 200 (Zedeño and Stoffle 1995). Shelton (1972), for example, notes carbon-14 dating at Ventana Cave places humans in the region 12,500 years ago. Archaeologists also contend that Mesoamerican influences in the Southwest were adopted and spread by the lower Akimel (Pima) O'odham and the Tepehuanes who are also O'odham (Sheridan and Parezo 1996).

Linguistically, the O'odham belong to the Piman-speaking communities that stretch from the Salt River Valley near Phoenix to the mountains of northern Jalisco, Mexico (Shaul and Hill 1998). The traditional lands of the O'odham ethnic-linguistic group are commonly defined as ending at the middle of major rivers (Figure 51), but evidence shows that their lands extended beyond these to the tops of adjacent mountains (Figure 52). From this perspective, their traditional lands in Mexico included the Sonoran desert north of Yaqui territory, north and east of Seri territory near the Altar and Sonora rivers and along the eastern side of the Gulf of California. In the United States, their lands extended from east of the lower Colorado River northeastwardly to the first range of mountains north of the lower Gila River and lower Salt River, and eastwardly to the crest of the mountains east of the San Pedro River (BARA 2000).

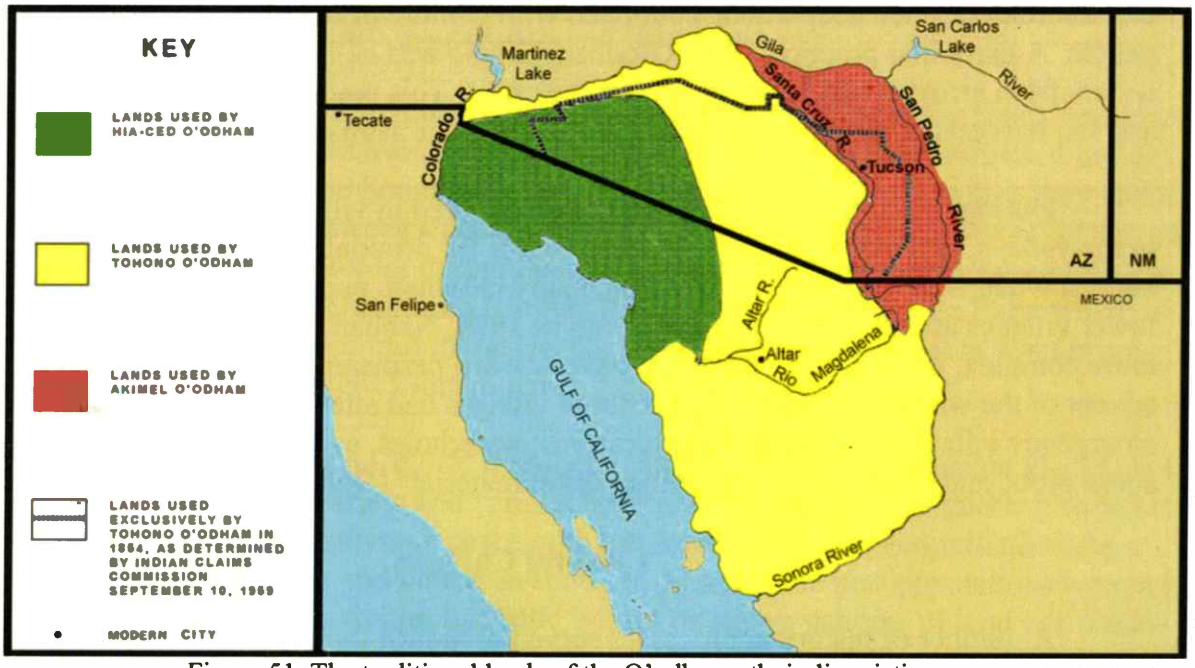


Figure 51. The traditional lands of the O'odham ethnic-linguistic group.

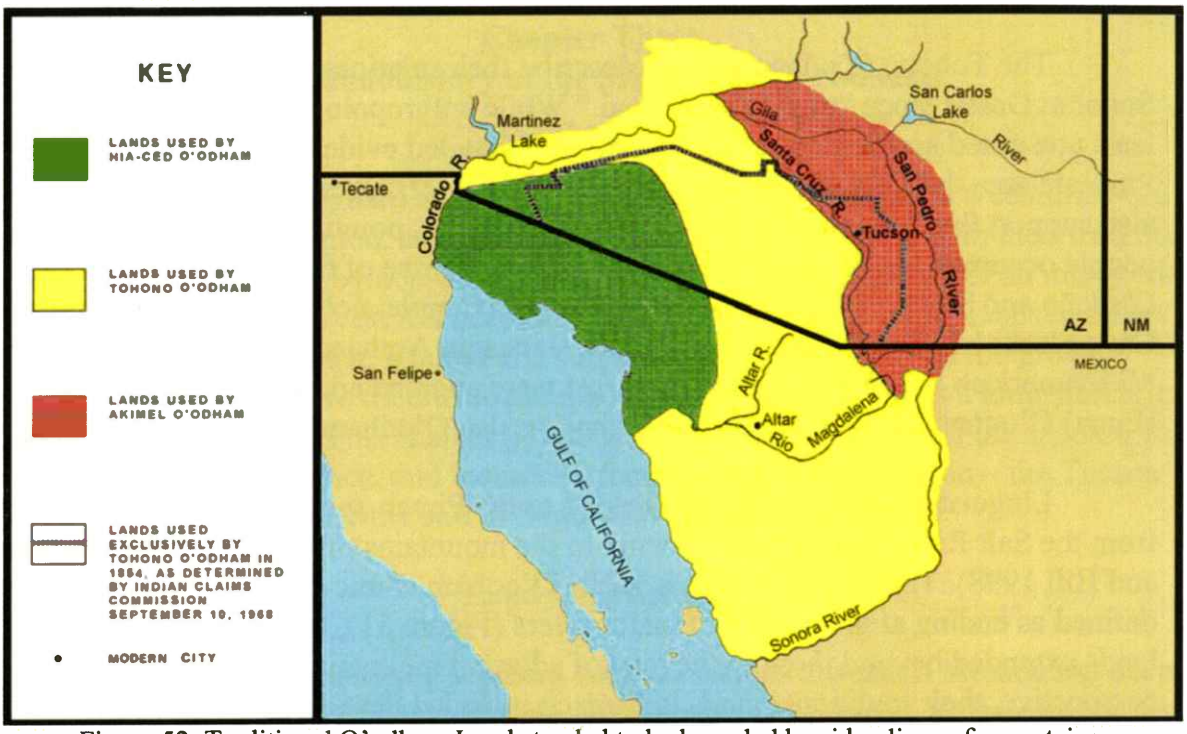


Figure 52. Traditional O'odham Lands tended to be bounded by ridge lines of mountains.

Life in the Papaguería required hard work and wise, sustainable use of desert resources. The O'odham people cultivated crops, gathered wild plants, and hunted game utilizing social mechanisms of communal living, cooperation, sharing, and trading. When the Spaniards came, they incorporated animals, plants, tools, and other technologies brought by the newcomers; such adaptations continued with coming of the Mexican and American people. A particular practice of the O'odham people was *ak-chiñ* farming in which flood waters from arroyos were used to irrigate the crops. This practice supplemented the spring and fall harvests of desert foods such as fruits from the saguaro, prickly pear, and cholla.

During the summer months, the O'odham lived in villages at lower elevations, farmed in the valleys, and built *charcos* to harvest runoff for drinking and washing. After the fall harvest when water became scarce again, many O'odham people commuted between the lower villages and mountain villages (Dobyns 1974; Nabhan 1986). Life in the desert was more complex, however. "The Papago have lived in permanent villages since before the advent of the white men. Every one of these villages had attached to it what we might call emergency villages embracing field locations, waterholes, cactus groves, mesquite forests, acorn plots, and localities for gathering basket material" (Oblasser 1936:3-4).

Cultural Changes

A number of historical processes served to reduce the O'odham populations, their traditional lands, and the dominance they held against other tribes and ethnic groups. All the O'odham groups were impacted by European diseases. The groups along rivers were immediately impacted but diseases ran through rather dense populations so many survived. The Hia-Ced O'odham, Tohono O'odham, and other people from drier areas were affected more severely since their populations were considerably smaller.

O'odham social organization changed in response to wars stimulated in part by European encroachment on other tribes and in part by the desire to defend their homelands. Many O'odham people died at the hands of Mexicans and Anglo-Americans who sought O'odham lands and resources during the 18th and 19th centuries. As they lost river resources to the Europeans, many of them relocated to other rivers. They also moved to mining areas and non-Indian settlements in southern Arizona and northern Sonora to find new ways to make a living, but held on to traditional activities whenever possible (Fontana 1983; Papago Tribe 1985). These social and cultural changes are described further for two periods in order to show the complexities of change through which traditional ways were lost or survived.

Spanish-Mexican Period

The first non-Indian visitors to the contemporary Southwest were Alvar Núñez Cabeza de Vaca and three companions, including a North African named Estevanico. Three years later, in 1539, Estevanico and Friar Marcos de Niza led the first expedition into what is today Arizona and New Mexico. de Niza's report prompted Francisco Vazques de Coronado to launch another expedition in 1540, which de Niza participated in as their guide.

Spanish penetration of the western Papaguería and the Colorado Plateau continued with colonial expeditions to Pueblo territory in 1581-1583; colonization began in earnest on the upper Rio Grande in 1598. Missionization of the Hopi people in northern Arizona began in 1629. The mission frontier reach northern O'odham country in 1687, joining the fate and history of the Papaguería with the histories of Spain, Mexico, and the United States (Officer 1987; Spicer 1962). Father Eusebio Kino explored portions of the Papaguería during the 1690s, as well as the San Pedro, Santa Cruz, and Gila rivers.

At the end of the 17th century, the conquistadors were followed by Jesuit, and later Franciscan, missionaries, and eventually miners and ranchers. The Spaniards used Indian trails to travel throughout the Sonoran Desert. One of these Indian trails, which they called El Camino del Diablo, runs between Caborca and Yuma. An aboriginal Hia-Ced O'odham trail, this route was used by all peoples during Spanish colonial, the Mexican, and the U.S. periods. A second major trail ran from Rio San Ignacio-Magdalena to Gila Bend where it connected with another major trail to the Hal Chedom[1] villages northwest in what is now Blythe Valley along the lower Colorado River.

The introduction of Old World livestock (cattle, horses, sheep, chicken, ducks, and rabbits) and crops (wheat, barley, and various fruit trees) to western Papaguería also followed Father Kino's excursions. Although peace with the Apaches encouraged settlement by a number of Spanish ranchers and miners in southern Arizona, the new populations were not very large and their initial activities had little impact on native patterns of land use. Small-scale mining, farming, and ranching began along the Santa Cruz Valley and in the

[1] Hal Chedom (Dobyns and Euler 1999). Halchidhoma (Braatz 1999; Stewart 1969) is a more common spelling. Other spellings include: Halchadhoma (Kroeber 1925), Halchedoma (Oñate in Bolton 1916), Halchidhom (Ezell 1961), Jalchedun (pl. Jalchedunes) (most historic Hispanic documents including Garcés 1776) (Dobyns, Ezell, and Ezell 1963), Alebdoma (Oñate in Hammond and Rey 1953), and Xalcadom (Spier 1933).

surrounding mountain ranges. Between 1691 and 1821, a number of settlements, including missions, visitas, and presidios, some of which flourished, were established in southern Arizona and along the Lower Colorado River (Bahr et al. 1994; Officer 1987).

Establishment of southern Arizona settlements during colonial times was not always successful. When the Spaniards were unable to maintain a military post at the aboriginal village of Quiburi on the upper San Pedro River in the late 1690s, the garrison relocated to Fronteras in present-day Sonora. The presidio founded at the O'odham community of Tubac in 1752 persisted until the garrison was ordered downstream to Tucson in 1755, where it survived until the Gadsden Purchase. The Spaniards relocated the garrison across the river from a major native settlement that was founded in prehistoric times as *Stjuk shon* (later Blackwater, then Tucson) on the Santa Cruz River. They began to settle peaceful Apaches downstream from the garrison in 1793.

Other difficulties occurred with the Quechan who wiped out semi-mission and semi-presidio colonies at the Yuma Crossing of the lower Colorado River in 1781. Northern O'odham settlements persisted at Calabasas until early nineteenth century, and at Tucson, Va:k[2], and Tumacacori until the mid-nineteenth century.

The O'odham armies who had successfully defended their traditional territory and the Mexican settlements within it from Apaches, could no longer do so in their ancestral valley along the San Pedro River after 1762. They moved their line of territorial defense from the mountains east of the river to the mountains west of the river along the crests of the Santa Catalina, Rincon, Whetstone, and Santa Rita Mountains. After Mexico gained independence from Spain in 1821, Apache people returned to the raiding that they had ceased decades earlier because supplies quit coming to the frontier military posts where they had been living peacefully. Once again the O'odham had to defend their eastern boundary from Apache raids. The people defending this boundary came to be known as Tohono O'odham by colonists in the 19th century, but some were Kokololoti continuing to defend Imuris tribal resources, some were Tautaukwani, and some were Kohatk, all with a united purpose of defending their lands.

Despite the Apache hostilities, a number of large stock-raising ranches were established in and around the present international borderline. These ranches were O'odham lands that were purchased at auction by the highest bidder in the 1820s. The ranches were sold by the Mexican state governments of Occidental and then Sonora and not the Mexican government itself.

The ranches depended on natural surface water for their livestock, mainly along the major rivers. Many of these early private ranches were located in the San Pedro River valley on lands that were available for sale due to the forced removal of the O'odham irrigated farmers and their fellow villagers in 1762. The two largest ranches acquired miles of narrow strips of San Pedro River valley bottomlands on both sides of the river.

[2] San Xavier del Bac.

Abandoned in the 1830s and 1840s due to Apache attacks, the ranches represented some of the largest non-Indian holdings in Arizona and involved, at the peak of activity, thousands of horses, cattle, and sheep. According to Barlett (Bahr et al. 1994:237), "there were 140,000 cattle on the Baboquivari and San Bernardino grants alone." Most land grants filed in Papaguería were in the well-watered eastern valleys. The Mexican government made eighteen land grants between 1821 and 1851 that covered more than 800,000 acres of the eastern Papaguería.

Anglo-American Period

With the Gadsden Purchase of 1853-1854, the United States government inherited the challenges of controlling the western Papaguería and of containing the Apaches who raided O'odham settlements, however, the government was slow to act upon either. The O'odham people were left out of the 1853 negotiations even though the transaction placed the northern Papaguería under the control of the U.S., which also obtained the sovereignty Mexico had wielded over the area.

The Gadsden Purchase reaffirmed provisions in the 1848 Treaty of Guadalupe Hidalgo, which guaranteed the property rights and freedom of conscience of Mexican citizens who elected to remain in the ceded territory. The O'odham were technically citizens of Mexico, but the U.S. classified them as Indians who, at that time, were not citizens of the United States. The O'odham lands within the Gadsden Purchase, consequently, became part of the national public domain administered by the General Land Office. It was 20 years later that President Ulysses S. Grant initiated the process of reserving aboriginal lands for O'odham people at Va:k.

Another provision in the 1848 Treaty of Guadalupe Hidalgo required the U.S. government to prevent raiding by hostile Indians from north of the new international boundary. The U.S. government, however, found this to be more difficult than anticipated. Over a year after the U.S. Senate ratified the Gadsden Purchase at the end of June in 1854, the U.S. Army was still unable to put Dragoons on the ground in the new territory. U.S. Boundary Commissioner William H. Emory asked Pima-Maricopa General Antonio Azul and village captains who met with him at Los Nogales on the new boundary to continue cooperating with Mexican forces against the Apaches.

In November of 1856, a handful of Dragoons had arrived in the new territory, however, it was all they could do to defend their own post from Apache raiders. The following year, U. S. mail service was instituted between San Antonio and San Diego. In the fall of 1857, the Pima-Maricopa Confederation offered to defend the mail service from Apache raids in return for muskets. While the Dragoon commander recommended the deal, his superiors failed to follow through and the U.S. government continued to depend on O'odham warriors to protect its citizens from Apaches, Yavapais, and Quechans. The military role of the Tohono O'odham was almost invisible given their dispersed settlement pattern. In 1858, however, a special inspector for the Commissioner of Indian Affairs characterized the Pima-Maricopa Confederation army as a frontier militia that constituted the only military barrier that kept the Apaches from sweeping southern Arizona clean.

American colonization of the lower Colorado River Valley commenced in the 1850s at Fort Yuma and Fort Mohave. Colonization of the middle Gila and lower Salt River Valleys commenced in the 1860s under the protective military umbrella of the Pima-Maricopa Confederation's army. The smaller Anglo settlements in the Papaguería focused on ranching, mining, and farming.

Anglo-Americans quickly migrated to Tucson following the Gadsden Purchase, and its population numbered in the thousands by 1870. Most major Anglo settlements of southern Arizona and the Lower Colorado River, however, did not start until the 1870s. Theses settlements increased dramatically over the next two decades largely as a result of four crucial events: (1) the containment of the Apaches; (2) the completion of the Southern Pacific Railroad from El Paso through Tucson and Yuma to Los Angeles; (3) the development of mining in southern Arizona and along the Lower Colorado River; and (4) the boom in cattle ranching and mining.

In the 1890s, the United States gave title to non-Indians for 100,000 private ranch acres in the Papaguería without consulting the O'odham, which created the first serious ownership fragmentation of the O'odham traditional lands (Papago Tribe 1985). In the early twentieth century, capital-intensive development plans for the entire Sonoran Desert began to emerge. These plans, with the involvement of federal agencies, centered on harnessing water resources, and by doing so, shifted traditional water uses from the O'odham and the desert they inhabited to non-Indian farmers, ranchers, and communities.

The eastern boundary of O'odham lands was pushed further west until 1916 when President Woodrow Wilson established the Papago Reservation. The boundary was to experience one more adjustment in 1917 when local ranchers and miners pushed for it to be relocated from the eastern base of the Baboquivari Mountains to its ridgeline. Even with the establishment of the reservation, encroachment on O'odham lands did not end. The Indian Reorganization Act of 1934 (48 Stat. 984) authorized residents of Indian reservations to govern themselves according to constitutions and bylaws approved by the Secretary of the Interior. This act resulted in numerous impacts on reservation resources management by American Indians and on relations between reservation and off-reservation populations (Dobyns 1948, 1965) including encroachments on O'odham land and water by outsiders. In response, the O'odham prepared a constitution and established the Papago Indian Tribe in 1937.

Today, there are four O'odham reservations (Figure 53)[3]. The largest, the Tohono O'odham reservation, is structured legislatively with eleven districts, each district having its own council as well as two delegates in the Tribal Legislative Council. The tribal constitution

[3] The main reservation lies in portions of three counties: south-central Pima, southwestern Pinal, and southern Maricopa. It comprises 11,243.098 km² (4,340.984 mi²), which is approximately 97.5% of the O'odham reservations. The San Xavier Reservation is in Pima County, in the southwestern part of Tucson. It comprises 288.895 km² (111.543 mi²). The San Lucy District includes seven small non-contiguous parcels of land in and northwest of Gila Bend in southwestern Maricopa County. These comprise 1.915 km² (473.2 acres). The Florence Village District is just southwest of Florence in central Pinal County. It is a single parcel of 0.1045 km² (25.83 acres).

calls for elections of a chairperson and the vice-chairperson at large by eligible tribal members.

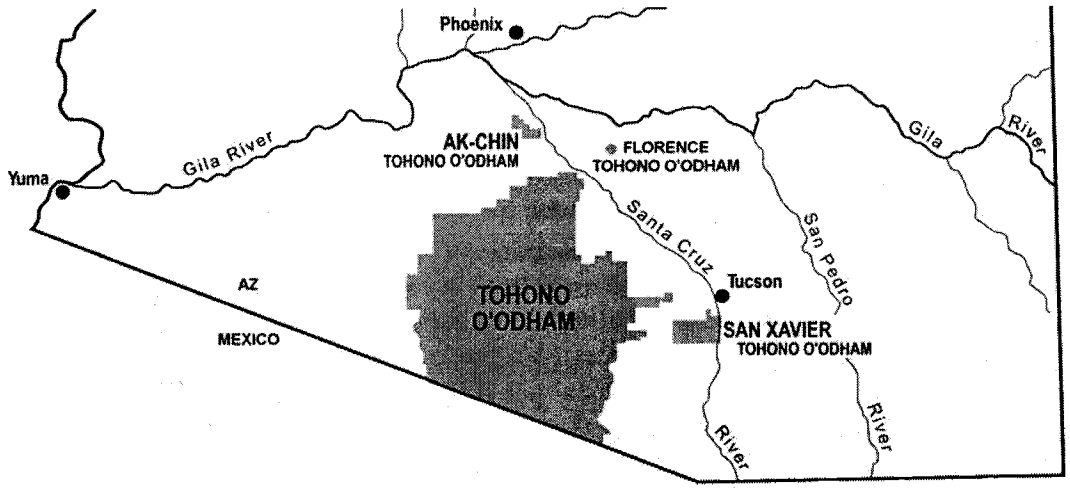


Figure 53. Tohono O'odham reservations.

The U.S. government continued to have interest in O'odham lands. Approximately 1.1 million acres of traditional lands south and west of Gila Bend were converted for military purposes into the Luke Air Force Range[4] in 1941. This area included traditional lands of the Hia-Ced O'odham who were not consulted about the actions despite their living in many parts of the area at the time of acquisition. Eventually, the western portion of this area was converted to the Yuma Aerial and Gunnery and Bombing Range, while the eastern portion became the Gila Bend Gunnery Range, later known as the Ajo-Gila Bend Gunnery Ranges.

The Cabeza Prieta National Wildlife Refuge, established in 1939 as the Cabeza Prieta Game Range, was affected also by the establishment of the military lands. As the United States became more involved in World War II, part of the Game Range was withdrawn for military use. By 1943, approximately 80% of the Game Range served as both wildlife refuge and military range. By 1962, the Goldwater Range had been expanded to approximately 2,664,423 acres (U.S. Air Force 1995).

Contemporary Tohono O'odham Land Use

The Tohono O'odham society was created over thousands of years of adaptations to the changing opportunities and constraints of the Sonoran Desert (Bahr et al. 1994). As Spicer (1957:216) explains it:

> They [Indians] do not see men as engaged in struggle and conflict, nor do they set the ideal of achievement through the spiritual conquest of the flesh or the human conquest of the physical world – [but] as a harmony to be maintained – harmony in human relations as a product of existing harmony in the natural world.

[4] The name was changed to Barry M. Goldwater Range in 1986.

The Tohono O'odham people are grounded in harmony with the natural world. Their association of identity, ethics, work, and sacredness of place plays a crucial role in the development of sustainable resource management strategies. Loyalty to place, responsibility for resources, local knowledge, and an abiding respect for the land constitute the main ingredients of the Tohono O'odhams' strategy for sustainability. To develop harmonious land and resource use strategies framed within consumptive and contemplative uses of the environment requires a tradition of respect, labor, and, worship. The Constitution of the Tohono O'odham Nation provides guidance toward such strategies in Article XVIII, Section 1 – Environmental Policy:

> It shall be the policy of the Tohono O'odham Nation to encourage productive and enjoyable harmony between members of the Nation and their environment; to promote efforts which will preserve and protect the natural and cultural environment of the Tohono O'odham Nation, including its lands, air, water, flora and fauna, its ecological systems, and natural resources, and its historic and cultural artifacts and archaeological sites; and to create and maintain conditions under which members of the Nation and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of members of the Tohono O'odham Nation.

The Tohono O'odham people have expressed repeatedly their concern for the land and their hopes for future land relationships. The Tohono O'odham Nation produced a public video entitled *Sic Has Elid g Jewed (Respect the Land)* that was intended to explain to other people, with contributions by tribal members, what the land means today. It was intended also as a message from Tohono O'odham elders to their youth. The main theme of the video is summed up in its subtitle:

> *We used to depend on the land to live, Now we need to help the land survive.*

Both Tohono O'odham elders and young people speak in the video about the land and its resources, including the saguaro. Their words reflect life lessons passed down through the generations:

> *We should respect all the plants that kept us as persons. I don't remember if it is a boy or girl that sunk into the ground and came up as a cactus. Truthfully, I'll say that I was one person of them too. I got cactus ribs.* – O'odham Elder

> *I guess I am lucky. My parents make me go out and walk the land and learn my culture. And I hope it is still there when I have my children.* – O'odham Youth

> *I really love the trees, the plants, the cactus, and I want them to be here forever.* – O'odham Youth

Our ancestors really respected the land; they depended on it for survival. They built their houses from it. The cactus ribs, the ocotillo, the mud, and the everyday things they used around the house, baskets, the pottery, and all the games they played, toca, shangu, guins. All materials came from the land. So you see, they took care of the land, because it took care of them. – O'odham Elder

The Tohono O'odham regard the Sonoran Desert as their homeland, a sacred place of songs and stories blessed by storm clouds, rain, sunlight, and mythological creatures such as Turtle, Rattlesnake, and the Trickster Coyote. It is a native Holy Land where I'itoi created the O'odham and the earth, where he taught Indian people where and when to look for life and how to protect life. When the Tohono O'odham describe natural resource conservation, they discuss the management of resources while stressing the harmonious relationship between people and resources.

There are difficulties in passing on traditional knowledge and conservation ethics such as those expressed above. One difficulty has to do with privilege; not every Tohono O'odham person can know all the traditional O'odham knowledge. Some knowledge must be earned through hardship while other knowledge is reserved for those who show the proper respect and propensity for whatever service is associated with that knowledge.

Another difficulty lies with the impacts of past U.S. Indian policies, particularly the assimilation policies, and the availability of foods from grocery stores and through federal commodity programs. As part of an effort to overcome these challenges, the Tohono O'odham Community Action organization (TOCA) has been working diligently to promote education and use of native foods. TOCA sees the lack of use of traditional foods as the most recent cause of ceremonial decline. Such a view brings us back to the Tohono O'odham belief in harmony with place (Lopez 2002).

TOCA has organized dozens of trips to collect wild desert foods such as desert acorns, saguaro fruit, cholla cactus buds, and mesquite beans. In addition to providing families with healthy foods, these trips provided an opportunity for young people to learn the cultural importance and health benefits of these foods, as well as the practical skills necessary for collecting, preserving and preparing these foods (Lopez 2002). The saguaro fruit harvest camp at TMD offers another opportunity for cultural education and revitalization. Being off-reservation, the opportunities at this camp are more readily available to urban O'odham youth but important to all tribal members. Living in a more supportive environment relative to both the government and public sectors, the O'odham people today are increasingly motivated to reestablish cultural patterns and pass on traditional knowledge to their children. Toward that end, the harvest camp at TMD has become significant to their efforts.

The TMD Saguaro Fruit Harvest Camp

The Tohono O'odham people have harvested saguaro fruit from the groves of the Tucson Mountains for as long as the O'odham have lived in the Sonoran Desert. While

archaeologists have not found permanent settlements within the TMD, we know a major settlement existed across the mountains in an area now occupied by part of Tucson. Desert travel was an everyday affair for the Tohono O'odham and a trek to the west side of the Tucson Mountains would have posed little hardship. This section addresses use of the saguaros in the TMD chronologically and from contemporary Tohono O'odham perspectives.

Historic Perspective of Saguaro Use

The earliest non-Indian documentation of saguaro use by O'odham people comes from Pedro de Castañeda who traveled with the Coronado expedition of 1540. While his notes pertain to O'odham in Mexico and do not mention harvesting, the temporal aspects of ceremonial development and relationships between O'odham groups suggest that Castañeda indirectly documented a well-established tradition of saguaro harvesting. His notes also reflect the beginnings of cultural change so the event is discussed in its historic context.

The O'odham ethnic group possesses its own cosmology which accounts for its creation within its historic Holy Land, and the supernatural origin of Sonoran Desert plants useful to it, including the giant cactus.[5] European and later Euroamerican invaders of O'odham territory arrived with a very different cosmology. That Christian cosmology has historically served a multiplicity of ethnic groups converted to Christianity, although its key events occurred in a Middle Eastern Holy Land and its neighbors such as Egypt. Euroamerican scholars, consequently, have studied the O'odham and their environment from numerous Christian and secular perspectives.

Edward H. Spicer wrote a landmark analysis of the impact of Spain, Mexico, and the United States on peoples native to southwestern North America. In it, he compared O'odham historic cultural changes to those among other Native American ethnic groups subjected to the same Eurocentric influences.[6] One difficulty with this magisterial work is defining aboriginal cultural patterns of each native ethnic group before historic changes began.

Surviving chronicles of Spanish colonial exploration sometimes help to identify native aboriginal cultural patterns and traits relatively early during the Columbian Exchange process.[7] In the O'odham instance, a chronicler of the 1540-1542 Francisco Vazquez de Coronado expedition to the Pueblos and across the Great Plains recorded in passing several O'odham cultural traits. Pedro de Castañeda from Náxera, Spain, wrote his reminiscences of the expedition several years afterward (1596). His memory appears to have been good. His laconic description of O'odham behavior may well be a product of Castañeda's writing style rather than loss of detail in his memory. Don Pedro and other members of the Vazquez de Coronado expedition were, moreover, not all focused upon ethnic O'odham. They passed through O'odham territory bound elsewhere. To them, O'odham were merely trailside scenery as the Spaniards rode or trudged by.

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[5] For example, Bahr et al. 1994:125-36. The translated stories also account for the origin of vital irrigation canals in the Gila-Salt River basin.
[6] Spicer 1962.
[7] Crosby 1972.

Yet Castañeda penned two priceless sentences concerning the 1540 O'odham giant cactus fruit harvest and subsequent New Year ritual imbibing of fermented juice of the giant cactus fruit.[8] "They drink the juice of the pitahaya, a fruit of Cardon cacti which opens like the pomegranate. They become stupefied with this drink."[9]

Laconic though it be, that passage plainly indicates that Don Pedro witnessed the 1540 O'odham giant cactus fruit jack[10] drinking ceremony. He saw at least some drinking ritual participants become intoxicated by gorging on enormous quantities of the only slightly alcoholic beverage. "They drank themselves silly."

Pedro de Castañeda observed a 1540 O'odham *navaita*[11] ceremony in Ures. That southern Piman-speaking settlement was located on the Sonora River on the coastal plain immediately downstream from a twisting gorge. General Francisco Vazquez de Coronado reached Ures with his expeditionary force on 26 May.[12] He remained at Ures but four days. Then Vazquez rode north with a picked complement of the best mounted soldiers, leaving most of his men in Ures.

Pedro de Castañeda was one of the men left at Ures. The body of the expeditionary force waited out the summer rainy season there, so it did not join up with Vazquez at Hawikuh Pueblo until well into the fall season, We cannot tell from surviving documents, therefore, the date of the *navaita* ritual Don Pedro witnessed. It was after 26 May, most likely after 30 May and Vazquez's departure.[13] If the Ures *navaita* ceremony leaders were like their later O'odham counterparts, they held the ceremony at the peak of giant cactus fruit harvesting season, usually just before the summer monsoon started.[14]

Later documentation of the saguaro harvest includes anthropological and archaeological sources, several specific to the TMD camp. Many anthropologists have documented the saguaro harvest, processing, and related ceremonies.[15] Since their works

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[8] Winship (1896:449) published his transcription of Castañeda's Spanish text: "Beben bino de pitahayas que es fruta de cardones que se abre como granadas, Hacen se con el bino tontos." Spaniards such as Castañeda learned the term pitahaya to identify the fruit of columnar cactus of the *Cereus* genus long before they reached the Sonoran Desert. Organ Pipe National Monument on the Arizona-Sonora international boundary lies virtually at the northern limit of the distribution of cacti with this shape. They range southward to the Southern Andes in South America.

[9] Castañeda 1940:251, Dobyns' translation. Hammond and Rey followed Winship, who did not understand that cardon is the name of a giant cactus even larger than the saguaro. The pomegranate fruit simile is apt, but pomegranate seeds are much larger than are giant cactus seeds.

[10] Castañeda was the first European who referred to fermented giant cactus fruit as wine. Dobyns considers "jack" to be more accurate, the analog being farmed "apple jack."

[11] O'odham term for the New Year ritual, after *návait*, the name of fermented giant cactus fruit juice (Lumholtz 1912:48).

[12] Coronado 1940:164.

[13] Coronado 1940:164 ["on the 26th of May, I reached the valley of Corazones, and rested there for several days."]; 165 ["I stayed there four days"]. Winship (1896:553) translated this passage differently. "I reached the valley of Hearts at last, on the 26th day of the month of May, and rested there a number of days."

[14] Lumholtz 1912:47-60.

[15] Allen 2001; Bahr 1983a; Bolton 1930; Bowen 1939; Bruder 1982; Castetter 1935; Castetter and Underhill 1935; Castetter and Bell 1937, 1942; Chesky 1943; Crosswhite 1980; Curtin 1984; Davis 1920; Densmore

speak more directly to O'odham ethnobotany, these are discussed in that chapter. Discussion of archaeological work relative to saguaro use and camps are included here.

Archaeological Perspectives of Saguaro Use

Records at the Western Archaeological Conservation Center (WACC) contain evidence of saguaro harvesting as far back as the Chiricahua phase of the Cochise culture, 3500-1500 BC. The WACC records also document saguaro use in Colonial phases, AD 500-700 and AD 700-900, the Rincon phase, AD 900-1200, and the Classic phase, AD 1200-1300. The strongest archaeological evidence for occupation within park boundaries begins with the Hohokam and includes the whole historical sequence from Early Papago through Anglo-American use and occupation, a date range of AD 700-1300 (Stacy and Hayden 1975). We know from the presence of carbonized seeds that saguaro fruit was collected aboriginally (Haury 1976:318).

One challenge to documenting saguaro use archaeologically is the inclusive nature of the evidence. Many artifacts associated with saguaro harvesting were used for many other purposes. Bruder (1977) found the remains to be expected in association with cactus camps include ramadas, saguaro collecting implements, hearths, grinding stones, a large proportion of jars, and signs of repeated use. He built on his earlier findings by adding stone basket rings, ramadas for shade, firepits, cooking jars, water ollas, jars for produce, and grinding tools (manos and metates) to his list of archaeological expectations at past fruit camps (Bruder 1982). Rosenthal (1977) found evidence in the Quijotoa Valley of roasting pits where no agave grew; he presumed the pits were used for cactus products, including saguaro.

Another archaeological challenge is the seasonal aspect of harvest camps. Goodyear (1975) identified evidence of crude shelters or ramadas, grinding implements in association with ceramics, and ceramic assemblages dominated by jar forms as indicating seasonal harvest camps. He determined that the perishable nature of the shelters contributed to a lack of such evidence and that the other types of evidence had better potential for identifying harvest camps. Of that evidence, he identified grinding implements with seed processing, and jars with cooking, storage, and transportation. Goodyear's analysis led to the conclusion that sites having manos and metates with ceramics indicated prehistoric saguaro harvest camps.

Goodyear also examined Raab's (1972) theory that 12" to 16" rock rings with no other artifacts, nor signs of use as a hearth (charcoal or reddened earth) indicated support facilities for saguaro fruit baskets. The size of the rock rings was similar to the harvest baskets photographed by Thackery and Leding (1929). While Raab had only nine rock rings with which to work, Goodyear had 33 rock rings to analyze. His findings supported and elaborated Raab's theory, consequently, adding the rings to his list of archaeological indicators. He found that the density of rock rings increased as the ocotillo population decreased. Since the

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1929; Diaz 1930; Doelle 1976; Felix 2004; Fisher 1977; Fontana 1960, 1989; Gaillard 1896; Galinier 1991; Gasser 1982; Hackenberg 1964; Haury 1976; Hayden 1987; Hazen-Hammond 1996; Hrdlička 1906, 1908; Hughes 1996; Jones 1969; Joseph, Spicer, and Chesky 1949; Keasey 1975, 1980; Kino [1698, 1919] 1949; Kozak 1992; La Barre 1938; Lewis 1988; Lopez, Reader, and Buseck 2002; Lumholtz 1912; Mason 1920; McGee 1894; Nabhan 1982; Niethammer 1999; Raab 1973; Ramon 1980; Seivertson 1999; Stone 1943; Tessandori 2000; Thackery and Leding 1929; Underhill 1919, 1940, 1946.

ocotillo was used to prop up the harvest basket, it would make sense that the harvesters would find other support for the basket as the ocotillo thinned. Goodyear also found that rock ring clustering occurred in zones heavy with cholla and prickly pear suggesting the rings served a similar purpose for harvesting of those plants.

Simpson and Wells (1983) surmised that protohistoric and historic Indian use (basically since European contact) of the saguaro groves in the Rincon Mountain Unit of SAGU was minimal since they found little archaeological evidence. Given the nature of such evidence, saguaro use in the Rincon Mountains since European contact could have been much greater. The lack of evidence may be due to the previously noted shift of the Tohono O'odhams' eastern boundary to the Rincon ridgeline. If this were an area in close proximity to Apache conflicts, harvesters may have been reluctant to leave jars and other tools behind as they did at other camp sites.

Stacy and Hayden (1975) found five to ten active Tohono O'odham saguaro harvesting camps near the monument boundary, west of Sandario Road during their archaeological survey (Figure 54). They concluded that evidence in the TMD suggested that both the San Dieguito Phase I people and the Amargosans, the latter from about 1300 BC to the present day occupied the bajadas and lower ridges and terraces, like the Tohono O'odham fruit gatherers. They found Amargosan tools to be quite common on the bajadas, where they presume hunting and saguaro fruit gathering have taken place for millenia. Some of the artifacts they found dated to the mid-1800s implying an unbroken tradition of harvesting.

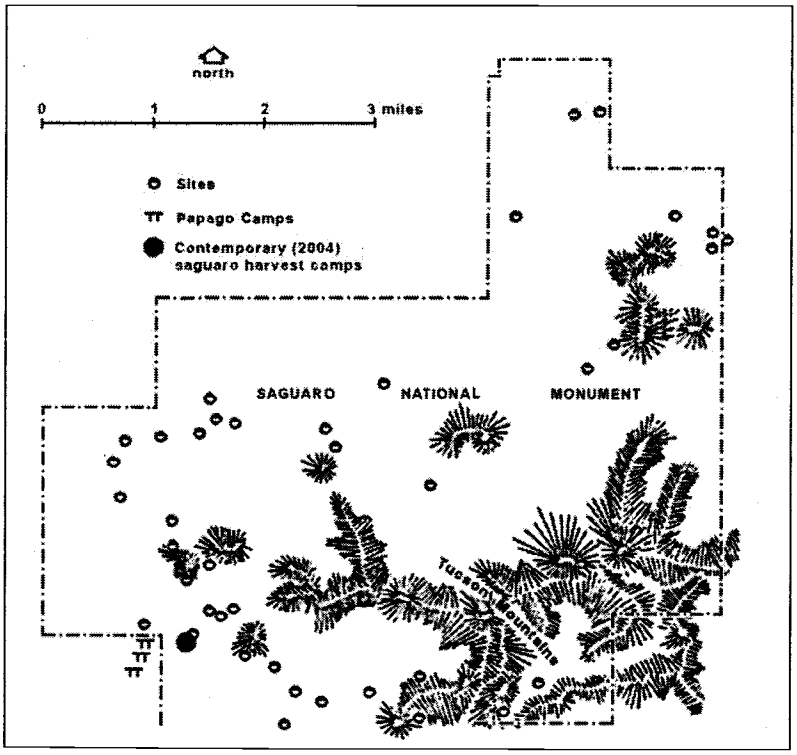

Figure 54. Archaeological sites and Tohono O'odham saguaro harvesting camps in TMD (Stacy and Hayden 1975:25)

In his archaeological investigations, Raab (1976) developed a three-component model of prehistoric settlement based on settlement-environment correlates: floodplain village, mountain seasonal, and floodplain agriculture. He found that both modern and prehistoric Tohono O'odham saguaro fruit harvesting camps tend to cluster in areas of mature saguaro, those having the most branches and, consequently, being the most productive. Raab found such sites near the Santa Rosa Wash on the Tohono O'odham reservation that support the contention of a very real historical tradition of saguaro exploitation that extends back in time to the prehistoric era.

Archaeologically, saguaro fruit harvest camps are evidenced by a variety of features that are associated with other traditional activities. The most obvious artifact specific to saguaro fruit harvesting is the *kuipad*, or harvesting pole, which is too long to be used for any other purpose. A lack of archaeological evidence does not rule out past saguaro use. Wherever saguaro groves existed, harvest camps would have been present. Areas where saguaros were 40 to 80 years old would have been used but lightly; heavier use and potentially more archaeological evidence would occur where saguaros were over 80 years old as these would be the more productive plants (Raab 1976). This pattern would suggest that where archaeological evidence of saguaro harvesting exists in contemporary groves of young saguaro, there were mature saguaro groves. If found to be the case, this would reflect a cyclic aspect of saguaro growth.

NPS Records of the Saguaro Fruit Harvest at TMD

The west unit of Saguaro National Park, TMD, was established by Presidential Proclamation 3439 on November 17, 1961. As with the east unit, the authorizing legislation emphasized the protection of vegetation, particularly the saguaro. Since this mandate is contradictory to traditional plant use, which has occurred in the TMD for thousands of years, and SAGU personnel must consider traditional use and cultural resource management, this section presents a history of saguaro harvesting in the TMD based on available NPS records.

In January 1962, TMD Interpretive Services noted a new exhibit on "Uses of the Saguaro." The exhibit showed uses by early Indians, presumably at the east unit.[16] From July 1962 through June 1963, several memos and letters were written concerning the saguaro fruit harvest of 1962. In one of these, Park Ranger Montford advised Superintendent Fitch that Indians came to TMD to harvest from June 17 to July 10. He estimated a total of 225 harvesters (figures in later correspondence were 245 to 255), many of whom were children. He stated that most people took "a bucket or so apiece" but that some filled 55 gallon drums. He also noted problems of unofficial campsites, driving off-road, and littering. While the superintendent recognized the centuries-old tradition of the fruit harvest, federal regulations at the time[17] did not allow continuation of the fruit harvest. He wrote to Superintendent St.

[16] Historic files (1940-1983), Box 9 of 12 N-2615, Monthly Reports, WACC Accession #946, SAGU Accession #275.

[17] 36CFR1.2(c) Visitors may pick and eat, but not carry out of the parks or monuments, such native fruits and berries as the superintendent may designate. Fruits and berries shall be picked by hand. The use of rakes or mechanical pickers is prohibited. 36CFR1.3 prohibited camping in parks and monuments outside designated campsites.

Clair of the Papago Agency and corresponded with Papago Chairman Francisco who protested an end to the harvest in TMD. Overall, the tone of the correspondence was one of trying to resolve the matter with education rather than law enforcement.

Mrs. James Estrada (Elizabeth), who was not a member of the tribe, also wrote letters of protest to Superintendent Fitch and Secretary of the Interior Stewart Udall. She made reference to the public's expectation to see traditional harvesters. Secretary Udall was pleased that the harvest had not been prohibited and successfully pressed for an amendment to the regulations, which read:

> 36CFR2.1(c) Visitors may pick and eat, but not carry out of the parks or monuments, such native fruits and berries as the superintendent may designate. Fruits and berries shall be picked by hand. The use of rakes or mechanical pickers is prohibited. *The regulations in this paragraph shall not apply to the Indians of the Papago Reservation in Arizona, who are permitted to pick and remove from the Tucson Mountain District of Saguaro National Monument the fruits of the Saguaro Cactus and other cacti; however, all such harvesting operations shall be done in a manner which will be in accord with other regulations applicable to the administration of the monument and pursuant to a written agreement between the superintendent of the monument and the Chairman of the Papago Tribal Council which will specify routes and methods of travel in the monument, camping places to be used, types of camps to be erected, condition in which campsites are to be left and the sanitary conditions to be maintained. Any such agreement shall be subject to review annually prior to the harvest season. August 28, 1962 [F.R. Doc. 63-6240* Filed Sept. 4, 1962 8:48 am] (*unclear type) (in 27 FR 6830? 9/5/62)*

In June of 1963, a Memorandum of Understanding outlining the terms of saguaro fruit harvest was signed by the park superintendent and the Tohono O'odham chairman. The following month saw traditional harvesting of saguaro fruit from the 2nd to the 14th.[18] No other records concerning the fruit harvest were found for the rest of 1963, however, Earl Jackson, a naturalist, wrote to David Jones at SAGU about the decline of young saguaros, which he attributed to grazing prior to 1938 and predator control in the 1930s. The latter action led to a increase in rabbit and rodent populations that consumed the young saguaros.[19]

The next record concerning the saguaro fruit harvest came in 1965 with a monthly report dated July 6th, which noted that the saguaro reached peak bloom in June.[20] Another note showed that the Tohono O'odham finished their annual fruit harvest in July.[21]

A monthly report in July 1966 seems to document an extended bloom and fruit season: "May 31, saguaro bloom maxed at the end of the month. July 6, saguaro blooming

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[18] Historic files (1940-1983), Box 2 of 12 NC-827, WACC Accession #946, SAGU Accession #275.
[19] Historic files (1940-1983), WACC Accession #946, SAGU Accession #275.
[20] Historic files (1940-1983), Box 9 of 12 N-2615, Monthly Reports, WACC Accession #946, SAGU Accession #275.
[21] Historic files (1940-1983), Box 2 of 12 NC-827, WACC Accession #946, SAGU Accession #275.

tapered off in June, fruits began to ripen nearing a peak by the end of the month."[22] A potential problem appeared in this year that did not involved the Tohono O'odham. In a letter to Superintendent Robert L. Giles, W. H. Earle, Director of the Desert Botanical Garden wrote that he with some others had been gathering saguaro fruit from the ground in TMD and that they had done so for the past five years with the permission of former Superintendent Justice. He added that they anticipated gathering again the following year and would contact Mr. Giles before doing so.[23] It is unknown how this issue of non-traditional gathering was resolved as no additional records were found.

In August 1966, Charles H. Lowe presented a paper on "Life and Death of a Saguaro" at the annual meeting of the American Institute of Biological Sciences at the University of Maryland. He cited the causes of death of large saguaros as including (1) weather elements, primarily temperature, (2) native animals, primarily rodents, and (3) historic overgrazing. He emphasized that bacterial necrosis was not a primary controlling factor in saguaro death. He made no mention of impacts from traditional harvesting.[24]

The end of 1966 saw another change in the regulations concerning harvesting. Unfortunately, the exception for the Tohono O'odham was removed, apparently unintentionally, but the net effect of the regulations still permitted saguaro harvesting: *(2) The gathering or possession for personal consumption or use, of only such fruits and berries as the Superintendent may designate is permitted. All such fruits and berries shall be picked only by hand. The gathering or collecting of subject objects for the purpose of sale is prohibited.*[25]

Records for 1967 only address the saguaro bloom period. In early May, Warren Steenbergh anticipated a late bloom in both park units, however, the June monthly report noted that saguaro blooming peaked during the 4th week of May.[26]

In August 1969, a hand-written note by H. Coss stated, without additional documentation, that the Tohono O'odham stopped harvesting fruit in the area in 1922.[27] That same month, a lengthy park memo outlined problems with the year's saguaro harvest. It documented that a camp was set up off Sandario Road from June 5th to July 27th. Adverse actions included driving off established roads, littering, indiscriminate camping, gathering fire wood, and destruction of vegetation. District Ranger Schneider estimated 10 Indians were gathering each day with each taking 40 to 60 gallons of fruit each day. He noted the peak season ran from June 29th to July 20th and that "most of the Indians were driving up from the reservation" and were 40 years or older; only a few young Indians were seen in the camps. Schneider listed suggestions for managing future harvests "Until the practice of

[22] Historic files (1940-1983), Box 9 of 12 N-2615, Monthly Reports, WACC Accession #946, SAGU Accession #275.
[23] Historic files (1940-1983), WACC Accession #946, SAGU Accession #275.
[24] Historic files (1940-1983), WACC Accession #946, SAGU Accession #275.
[25] December 29, 1966, CFR amended (FR, Vol. 31, No. 251, page 16651, et seq.)
[26] Historic files (1940-1983), Box 9 of 12 N-2615, Monthly Reports, WACC Accession #946, SAGU Accession #275.
[27] File Box 11-13, SAGU 257, SAGU 2636, Box 11 of 11.

allowing the Indians to gather fruit can be eliminated...." adding that the harvest "has little value other than to allow continuation of an age-old tradition."

In an attachment to Schneider's letter titled "Papago Fruit Harvest," the practice was described as "a modern-day remnant of a Prehistoric subsistence pattern of the Desert People of southern Arizona, and Sonora of Northern Mexico." The attachment also outlined the park's interpretive approach: "To respect the Papago people in this family event, the Monument will interpret this prime cultural resource in a vicarious manner for the park visitor. This will be done through exhibits and talks by the Park Staff. Material for this interpretation will be developed through contacts between the Park staff and individual Papago families, as well as material developed by researchers in the areas of the culture and archeology of the Desert People."

A park memo in July 1970 noted that the first camp was set up June 21st and that the last one left July 21st. It documented four to five camps each with five to ten occupants in section 33 just south of Sandario Road. The Indians had stated that it was a bad year for fruit, and the District Ranger estimated the number of harvesters at half of those the previous year. Problems were noted as being less but park personnel still found littering, and signs of driving off roads and gathering wood, but no one tried to camp in the monument. Also in the 1970s, letters to the Pima County Board of Supervisors and the Planning and Zoning Commission documented concerns about rezoning and development in the TMD.[28]

A September 1971 park memo documented saguaro harvest activities for that year. The first camp was set up June 21st and the last one left July 21st. There was a total of five camps with an average of 10 occupants each in section 33. Once again the Indians stated that it was a bad year for fruit. The District Ranger noted that problems were less but littering, parking off roads, and gathering wood still occurred; no one tried to camp in the monument. Another 1971 memo regarding interpretation stated that "Relating other humans to the desert environment will also help to make the visitor feel more at home. The present day Papago Indians of the region and their saguaro fruit harvest activities provide an ideal example of a man-desert association."[29]

The next saguaro harvest related document was dated 1973. An April park report stated that on March 5th glass was placed over the Saguaro Fruit Harvest exhibit to protect it from visitor handling and possible defacement by dissident Indian groups.[30]

In June 1974, the Unit Manager wrote a memo about Juanita Ahill arriving. She told him the rest of the families would be arriving during the week. They stayed on land near Sandario Road and Mile Wide. An August report documented a visit to Mr. Lopez's saguaro fruit harvest camp on July 12th by Hal Coss and Dick Boyer but stated no purpose.[31] In

[28] File A3815 in Historic files (1940-1983), Box 1 of 12, NC-827, Archival Collections WACC Accession #946, SAGU Accession #275.
[29] File Box 11-8, Master Plan 1971, Page 18 of draft, SAGU 257, SAGU 2636, Box 11 of 11.
[30] Historic files (1940-1983), Box 9 of 12 N-2615, Monthly Reports, WACC Accession #946, SAGU Accession #275.
[31] Historic files (1940-1983), Box 9 of 12 N-2615, Monthly Reports, WACC Accession #946, SAGU Accession #275.

another document, someone named Richards wrote that "Remains of early hunting and fruit gathering camps can be found in the Tucson Mountain Unit of the Monument in the form of fragments of pottery, tools, petroglyphs, and sleeping circles." He noted that the Papago "still gather saguaro fruit in the western section of the Monument and their early camps can still be found. Recent discoveries indicate that humans may have inhabited southern Arizona and northern Mexico 25,000 to 30,000 years ago."[32]

District Ranger Martin wrote to Mr. Augustine Lopez of Sells, Arizona in April 1975 to inform him that vandals had caused considerable damage to two camps. Juanita Ahill's camp was destroyed as was one between Juanita's and Sandario Road. He asked Mr. Lopez to inform the other families. In a June memo to park staff, District Ranger Martin stated that the "Papagos found a new camp to replace the traditional ones that were destroyed. It was a picnic area in the County Park." In a Daily Log, note was made of the former camps being removed and the area being fenced off. An entry on June 7th noted that an old CCC camp on BLM land along Rudasill Road would be used, as would the right-of-way between fence lines on Sandario would be used. In July, nonspecific special use permits and cooperative agreements were made.[33] Also in June, Carol Farris finished the Papago Fruit Harvest Exhibit and installed it at TMD.[34] The two units now comprised 83,576 acres.[35]

The following year, 1976, saw much correspondence relative to the saguaro harvest camps. The January log noted that Juanita Ahill of Sells, Arizona said they [the other Indians] did not want to camp in the federal or county parks because there were so many restrictions. In the March log, Sally Estrada and Charles Salio of Sells reported that their ramadas had been vandalized, but these were out of NPS jurisdiction. That same month, Merv Larson, Director of Arizona-Sonora Desert Museum (ASDM) told park staff that he burned the ramadas because he told the Papagos last year that they would not be able to camp in the right-of-way this year. He proposed that two or three of the older groups may be able to camp on 20 acres of ASDM land in the area but they would be subject to ASDM's rules and regulations, and the other families would have to go somewhere else.[36]

Another March entry noted that the traditional camps, which were on or adjacent to private land, were lost because the land values had increased. Also, the previous year, there had been problems with "some young Papagos camping to harvest; they did some drinking and caused some problems." The entry noted park concern that if the situation was not resolved to the Papagos' satisfaction, it was possible AIM (American Indian Movement) could get involved. The author noted that the harvesting was in violation of the CFR because permission was inadvertently left out when the CFR was reprinted. Another note of the same day indicated that Ron Ayers of the Community Relations office of the Pima County

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[32] File Box 11-15c, Draft history materials by Richards, SAGU 257, SAGU 2636, Box 11 of 11.
[33] Historic files (1940-1983), Box 1 of 12, NC-827, Archival Collections WACC Accession #946, SAGU Accession #275.
[34] Historic files (1940-1983), Box 9 of 12 N-2615, Monthly Reports, WACC Accession #946, SAGU Accession #275.
[35] L14 Acquisitions of Lands 1975-1984, Historic files (1940-1983), Box 2 of 12, WACC Accession #946, SAGU Accession #275.
[36] File Box 11-3, A2636 Admin. & Mgt. Briefing Statements, 1976-1978, SAGU 257, SAGU 2636, Box 11 of 11.

Highway Department mistakenly thought the Papagos had previous permission to camp in the right-of-ways and that doing so again would not be a problem. After looking in to the matter, he found that permission had not and would not be given.

On March 15th, a meeting was held to discuss the problem of finding harvest camps. The situation in Avra Valley had progressed to where it would be necessary to allow camping in the park, and an old borrow pit on Sandario Road in section 34 was proposed. A few days later, Superintendent Luken, Unit Manager Guraedy and Sally Estrada visited the borrow pit and determined it would be a suitable camp site.

June 1976 saw an increasing interest in saguaro harvesting and use of the camp by teachers of Papago students. A tribal request to harvest fruit for sale was denied, and the question of whether other Native Americans should be allowed to harvest was answered with an emphatic "No." A third issue was raised by Lorna Patricio, Director of the Papago Nutrition Improvement Program. She expressed concern to Superintendent Lukens about having to submit a proposal to harvest when they had not had to do so for the previous three or four years. Her group's harvesting was part of the Desert Foods Project, originally funded by the Office of Economic Opportunity. It was set up as an educational project intended to become self-supporting from the sales of the food items gathered from the desert. She submitted a proposal and copy of the original application for the project.[37] In November, park personnel sought a solicitor's opinion regarding the harvest and traditional Indian rights:

> "Harvesting of saguaro fruit by members of the Papago Indian Tribe has historical precedence. Shortly after the Tucson Mountain Unit was added to Saguaro national monument the issue of traditional Rights was reached by a Cooperative Agreement with the Papago Tribal Council and the National Park Service. This agreement recognized the Traditional Rights and established guidelines which minimized adverse impacts on the monument. Regulations permitting the traditional gathering of saguaro fruit were published in the CFR Title 36. Since that time the Cooperative Agreement has more or less dropped by the wayside. During revisions to CFR Title 36, the regulation permitting traditional gathering was inadvertently dropped. In 1976 members of the tribe became quite vocal when they found out they would no longer be allowed to camp on private land and public rights of way. Their camps were also destroyed. NPS provided a camping area as agreed to in the Cooperative Agreement. A request was submitted through channels to the Solicitor's Office for an opinion on the Traditional Rights concept and any restrictions which management might place. Recommended solutions: (1) request action on the request for a Solicitor's opinion; (2) renegotiate the Cooperative Agreement in conformance with the opinion; (3) request Special Regulation covering Traditional Rights in Title 36 CFR based on Solicitor's opinion."[38]

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[37] File Box 11-3, A2636 Admin. & Mgt. Briefing Statements, 1976-1978, SAGU 257, SAGU 2636, Box 11 of 11.

[38] File Box 11-3, A2636 Admin. & Mgt. Briefing Statements, 1976-1978, SAGU 257, SAGU 2636, Box 11 of 11.

In September 1977, the park received the Solicitor's opinion of saguaro harvesting and traditional Indian rights. He felt that sufficient authority existed in Title 36 CFR 2.20 to grant permits to members of the Papago Tribe. An update in response noted that procedure was being followed.[39] Additional support came in a March letter from the Field Solicitor to the Superintendent of Southern Arizona Group. It stated that while the Papago exception was removed from 36CFR2.20, the net effect of the regulations allowed the harvesting to continue. He recommended issuing annual family permits that referenced the regulations as well as previous items such as routes, camps, etc. In a hand-written note at the bottom of the letter, Unit Manager Guraedy indicated that this would be difficult and chose to allow harvesting under the regulations only, and assume the original agreement with the tribe was still in effect. In June, Guraedy wrote to Stanley Pancho of the Desert Foods Project to clarify that the program could not harvest in the park because one of the purposes was the sale to make the program self-sufficient, and the regulations prohibited sale.

Special Directive 78-1 was issued in 1978 (Appendix C). In part, it stated that "In carrying out its mandate for the conservation and public enjoyment of park lands and their resources, the Service, consistent with each park's legislative history, purpose and management objectives, will develop and execute its programs in a manner that reflects informed awareness, sensitivity, and serious concern for the traditions, cultural values and religious beliefs of Native Americans who have ancestral ties to such lands."[40]

A June 1978 update to a traditional Indian rights briefing noted that family groups returned to the camping area that month and there were no problems. It also stated that tribal members were giving harvesting demonstrations at the Arizona-Sonora Desert Museum.[41]

In 1979, Superintendent Lukens wrote to the Regional Director of the Western Region. He had "consulted with Juanita Ahill, her son Warren and sister Isabel. Juanita 70-plus years old, has been coming to the Tucson Mountains since she was a little girl, her family has come for generations; they collected prickly pear, saguaro, and cholla fruits from Tucson Mountains, beargrass from Oracle, and acorns from Tumacacori National Monument. The only religious requirement is to collect saguaro fruit for wine-making ceremony; all other activities strictly cultural, not religious." His letter left the door open to consider any new information the Papago might bring forward.[42]

A preliminary Environmental Assessment for a realignment of Sandario Road was written in 1984. It described the west slopes of the Tucson Mountains and east Avra Valley as not as settled historically as the Tucson Basin, but a mining boom in the late 19th century resulted in many small mining sites. Two archaeological sites in the project area included a possible plant procurement site (AA:12:476) and a food processing station (AA:12:70). The

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[39] File Box 11-3, A2636 Admin. & Mgt. Briefing Statements, 1976-1978, SAGU 257, SAGU 2636, Box 11 of 11.

[40] Acting Director to All Regional Directors, February 6, 1978, file code A5623 (560), RMR-AC, Library.

[41] File Box 11-3, A2636 Admin. & Mgt. Briefing Statements, 1976-1978, SAGU 257, SAGU 2636, Box 11 of 11.

[42] A64 AIRFA of 1979, second label 10-285 Record of Property Transaction, letter/memo of 6/20/79 from Wm. M. Lukens, SAGU Superintendent to Regional Director, Western Region, in Historic files (1940-1983), Box 1 of 12, NC-827, Archival Collections WACC Accession #946, SAGU Accession #275.

dating was uncertain but thought to signify prehistoric Hohokam to historic Papago exploitation of resources.[43]

No records were found for the next 20 years but, as noted in many newspaper accounts, the annual harvest continued. The activity continued with Special Use Permits similar to what was issued in 2003 and the contemporary regulations in 36CFR2.1(c)(1 & 2)[44] (Appendix D). By 2003, the permit included attachments that outlined the conditions of the permit and showed the requirement of a pre-event inspection report. To date, "As a matter of policy, the Service generally supports the limited and controlled consumption of natural resources for traditional religious and ceremonial purposes and is moving toward a goal of greater access and accommodation. ...The general regulations at 36 CFR 2.1 allow superintendents to designate certain fruits, berries, nuts, or unoccupied seashells that may be gathered by hand for personal use or consumption if it will not adversely affect park wildlife, the reproductive potential of a plant species, or otherwise adversely affect park resources."[45]

Other Records of the Saguaro Fruit Harvest at TMD

Most of the non-governmental accounts of the saguaro fruit harvest in the TMD come from newspaper accounts. Most of these describe the harvest and mention the families who come year after year to harvest the fruit, but each one provides at least one new contribution to the story. As with the park records, these accounts are presented chronologically.

Only five families came to the TMD harvest camps in 1972. They included Madeline Seriestawa and Juanita Ahil both of whom had children with them to learn the traditional ways (Tortorell 1972).

There were several small camps just outside the monument in 1974. Eleven families occupied the camps where only six families stayed the previous year. Juanita Ahil attributed the increased number of families participating to the "sharp increase in the price of food in stores" (Niethammer 1974; Sortore 1974).

Visiting the TMD camps in 1975, Keasey noted technological changes in the traditional harvest. The Tohono O'odham had replaced ollas with galvanized tubs and enameled pans for the fruit, and with steel drums or aluminum kegs for water; woven basket strainers were replaced with screen wire. He noted that the age-old feeling of the camp remained, and that many of the traditional harvest and preparation methods and implements

[43] Historic files (1940-1983), Box 8 of 12, Archival Collections WACC Accession #946, SAGU Accession #275.

[44] 36CFR2.1(c)(1)The superintendent may designate certain fruits, berries, nuts, or unoccupied seashells which may be gathered by hand for personal use or consumption upon a written determination that the gathering or consumption will not adversely affect park wildlife, the reproductive potential of a plant species, or otherwise adversely affect park resources.
(2) The superintendent may:
(i) Limit the size and quantity of the natural products that may be gathered or possessed for this purpose; or
(ii) Limit the location where natural products may be gathered; or
(iii) Restrict the possession and consumption of natural products to the park area.

[45] Management Policies: The Guide to Managing the National Park System. Washington, DC: U.S. Department of the Interior, National Park Service. Pg. 193.

were unchanged. The ramadas, for example, were made with paloverde poles and a roof of ocotillo branches, saguaro ribs, palm fronds, and tar paper. They still used saguaro ribs for stirring sticks, the framework for strainers, and the *kuibit* or gathering pole. He was told that the cross-pieces of the *kuibit* are called *matsuguen*. Juanita Ahil told him that her camp was located in the same spot each year, just outside the TMD. She remembered her first trip to the camp with her mother when she was a very young girl and pointed out a ten-foot-high saguaro next to her ramada saying she and it were about the same height then (Keasey 1975).

Six families came to the TMD harvest camps in 1976. Some people felt the decline in harvesting was due to youths who had begun to use the unoccupied ramadas for beer trysts, vandals who burned the structures after the families left for the season, and some of the private land where most of the ramadas stood was sold to people who were not sympathetic to the O'odhams' needs. The park, consequently, opened a small area on monument land to accommodate three ramadas but the area was too confined and three families built ramadas between the county road and fenced private land. Sally Estrada and her grandchildren occupied one of the roadside ramadas. Juanita Ahil and her son Warren came out and shared their camp with Laura Martinez (Tortorell 1976).

Juanita Ahil, who had come to the TMD camp to harvest saguaro for about 70 years, passed away in January of 1994. Her granddaughter, Stella Tucker, took over her camp and continued her legacy of educating Tohono O'odham and non-Indian people about the saguaro, its uses and preparations, and its cultural significance to the Tohono O'odham people (Innes 1997).

Seventeen year old Jessica Estrada returned to her grandmother's TMD harvest camp in 1995 for about the eleventh time. The previous year she had made a photographic record of the family tradition. Her grandmother Sally taught her and her cousins how to harvest and process the fruit. Sally also taught them traditional respect for the saguaro, how the first time a fruit is opened, they should stop for a blessing to thank the fruit for its existence and to ask it for another year of harvest. She also taught the children never to poke or throw rocks at the saguaros, not even to knock off the fruit (Dahl 1995).

The 1997 harvest at TMD saw an additional tradition when Helen Ramon baptized her 4-month-old granddaughter, Helena, with a cross-shaped smudge of saguaro fruit over the infant's heart. Helen performed the ceremony in the harvest camp that her family had used for the past 21 years (Innes 1997).

In 1998, Stella Tucker, Cipriano Pedro, and Justin Manuel made up the core group of harvesters. Stella's 17-year-old daughter had returned as well explaining that she considered the harvest to be a spiritual activity; she learned her peoples' traditions surrounding the saguaro and the harvest at the TMD camp (Innes 1998).

Allen (2004) described traditional harvest and preparation activities at the TMD camp and noted that this year included a significant educational element. He met with O'odham tribal member Stella Tucker who, following in the footsteps of her grandmother the late Juanita Ahil, has harvested saguaro fruit at her family's camp in the TMD for many years. As

tribal members have done for centuries, she, family members, and friends harvested the fruit with the traditional *ku'ipaD*. She cut the fruit open with the sharp edge of its stem and scooped out the pulp. Back at camp, Stella cooked the pulp before straining it to remove the fiber and seeds. She then cooked the juice until it thicken into a syrup that could be eaten as is, or made into jams, jellies or wine. She dried the fiber and seeds, which are used to thicken jams, and to thicken gravies and other foods, respectively. She always keeps some of the saguaro syrup for herself and relatives and distributes some to tribal elders no longer able to participate in the harvest.

Stella showed this entire process to about 80 native people from around the world who came to learn the ancient method of harvesting and cooking saguaro fruit. Some were educators from the University of Arizona's American Indian Language Development Institute who work with American Indian children. Other participants included an Apache man from Dulce, New Mexico, a man from Japan, and another man from Laguna, New Mexico. Allen noted that Stella was one of the few O'odham who continued the tradition, spending about six weeks a year at the harvest camp (Allen 2004).

Beal (2005) also wrote about Stella's annual harvest. He described how she started harvesting about the age four at her grandparents' camp near Topawa, Arizona which is south of Sells. For most of her adult life, however, she has come to the harvest camp in the TMD. According to Stella, many family camps can be found in the 4,600 square miles of the Tohono O'odham Nation, although the days when entire villages relocated for the harvest are gone. Another change she noted was her use of plastic buckets instead of baskets like those her grandmother Juanita Ahil made for collecting the fruit. Stella also explained how she saves some of the syrup for the saguaro ceremony at *Gu Oidak* (Big Field). This is the ceremony at which they call the rain and the syrup is fermented into wine as part of the ritual. Stella shared significant insight into the O'odham relationship with the saguaro when she described how "We see them as people. I talk to them. You see a family sitting there as a group [saguaro cluster]. Or you see an old couple holding each other up."

Contemporary Ethnographic Accounts of the Saguaro Fruit Harvest in TMD

The following accounts, collected in 2004, are based on questions that addressed traditional use, traditional ecological knowledge, and conservation (Appendix E). As previously mentioned in the first chapter, only two individuals provided information. Their statements are separated by a dashed line. The first account of each section comes from the same individual and the second account of each section comes from the other individual. Both women come from families with an unbroken saguaro harvest tradition and have continued the practice with their immediate families. Their stories[46] provide past, present, and future perspectives of the harvest and the harvest camps in the TMD.

The Past

> My grandparents camps were in the Hickiwan District between the villages of South Kickiwan and Vaya Chin. These were traditionally

[46] Some portions are paraphrased. Verbatim statements are in quotation marks.

important and they went there every year. They enjoyed picking the fruit because they liked it. My parents inherited and used the camps because it was important to do so.

Between Topowa and Sells is where my great-grandparents had our camp. "For my Great Grandparents, I think it was more work for them because they had to supply everything on their own like their own water. They had to haul their own water and they didn't have cars so they went by wagon. Probably the area too wasn't such a secure area. It was rocky. I remember they cleared it out so that we had a flat area there so that we can camp there and not so much rocks. It was still kind of a hilly...almost to the hill...to the top of a mountain. So we had to go up there and that's about all I can remember."

"I used to go with my great-grandfather and my great-grandmother when they used to go pick fruit and my grandmother would go. Well, sometimes my grandmother...well, my grandfather was very ill...I also remember him to be ill and she would stay home most of the time caring for him. He had TB. He died when I was about 7 or 8 years old."

"Then when my grandmother Juana...now this...I am talking about is my grandparents in Topowa, that is my grandmother's Juana's brother. She camped out here. She had been camping out here. Her family were campers out here. Then she met up with different people like these people right here from Big Fields, the Pedros, and she told them 'Why don't you come camp out there with me. There's more saguaros out there and the area's better you know to walk around and pick.' So she called them over and they came one year and they started camping and then her brother, another Grandpa, Louie, he came down here. He just thought 'Well, this is the place to pick all the fruit.' So he came out here and camped out here so the whole family."

"Then later...I don't remember if I told you that they were camping on the side of the road and she met a lady at home who worked for the church, Jeanne Marsteller. Jeanne used to come out here and visit her while she was camping out here, and then the Desert Museum recognized her and saw her out here. They became interested in what she was doing and there was a lady there that worked there Muffin...what was her real name...we called her Muffin... Anyway, she worked at the Desert Museum and her and Jeanne became very good friends with my Grandmother Juana and that's when the road was not paved and it was dusty over there where they were picking. So Jeanne and Muffin helped my Grandmother Juana write up this form...letter to the Saguaro National Monument. You know why couldn't she come here and stay and pick in this area. So she could be away from the road and there won't be not so much dust. Because all the other property was private property. So they wrote a letter and Saguaro National Monument had to send it to Washington DC. So from there everything was approved. And so they

assigned us the land here for her and any Tohono O'Odham that wants to come out here and do their harvest and they are allowed to pick in Saguaro National Monument. Anywhere. Anywhere in Saguaro National Monument. The whole area. So this is how she got this little area here. They were allowed to build the ramadas and so she invited the other people from Big Fields...the Pedros and they built their camp here. And then later, her sister in-law... my grandma Juana's sister-in-law, Mrs. Francisco....what was her name...invited her to come over and camp. And she camped over here...her family. Then later, my father and my grandmother on my dad's side...my grandmother's side...her family they came out and camped over here. My aunt. So it was a whole family of campers. There were five camps here. But Grandpa Louie didn't wanna come over here. He wanted to stay over there in that area. So Bobby Jack who owns that property over there gave them that little space over there where they were camping. It's just by the side of the road. On Fort Lowell. Fort Lowell is the next street."

"So they were on private property. They camped right here where they can pick right in this area across. They picked all through here. They picked here too but this was their picking area. This was their camp right there. He gave them this little space right here. The ramada is still there and one of the daughters is talking about taking it over but she so far really hasn't done much over there. So I don't know if it is going to happen."

"And then there was another camper from San Xavier [about 35 years ago], Sally Estrada. She wanted to come out here and so Grandpa Louie told her 'Why don't you camp? We got a lot of space here.' So she came over and she started camping next to him over there, so they had two campers over there. She would use the same areas or they would drive down here and pick in Golden Gate area or down Sandario. We would just go all over the place. They stayed in Saguaro National Monument because...all [the rest was] private land."

Speaking of the other families here, "Ciprano Pedro lives in Big Field. He runs the first ramada in Saguaro National Monument. Teresa Francisco lives in Little Tucson. She ran the camp on Fort Lowell Road, on private land. Stella referred to her as her grandmother. The ramada is still there but no one has come out for three years. The families have talked about coming out again but no one has shown up. Sally Estrada from San Xavier, she is in her 90s now. She came out to the park in the old days."

Prior to park establishment, the TMD area was used but not as much as in the past because of Anglo settlement. Children on the reservation were told never to cross the boundary line in the Baboquivari Mountains because the ranchers would shoot them. Whether true or not, the Tohono O'odham believed it and that belief may have been responsible for the decline of use of the TMD harvest area. "You know I think they collected in the area. But you

know how Saguaro National Monument they need like special permission or at the time who ever was in charge was a pretty nice guy that he let them pick it. He allowed them to pick in this area. But they had to get something legal that's when everything was written. It became legal and so that's when it happened. The tribe has a copy of the letter I'm sure. One of the lawyers who comes out here to help with me to get the permit together. We all meet together. I was going to ask him to check into it and see if he can get a copy for us. I think on the gate there is a number on there. You might find it on that letter because there's a permit sign on the gate and there's a number on it."

Prior to park establishment and private property development, they harvested a lot of the area west and south of the park but now people own that area. "They own it and I've never seem any people. In fact, there is a house there that I never see anybody there. I don't know if it's a summer...a snowbird's that go away during the summer and then come back during the winter. I've never seem anybody over there."

They collected all around here. "They would walk all the way up to the mountain. I know a couple who use to live...they would walk all the way and pick all the way up to the mountain. They would go all the way out in this area. And a lot of them didn't have cars. They walked. They didn't have cars. Until somebody came with a car here. Like I use to come on weekends and take them down to Sandario where there is a lot...that hadn't been picked there. So we picked there. That's when I use to come out on weekends. When I had a full time all year round job."

These camps in the TMD were important to her parents. They did not have saguaro camps anywhere outside this immediate area. "Well it was very important because the harvest had to be...I mean this harvest only happens once a year and it's part of our harvest for hundreds of years. It was something for them to do, to come out and harvest and collect the fruit and make syrup and jam and it's important to the wine feast that we have every year at the end of our harvest."

The Present

The TMD camps are important to me because other Tohono O'odham who live in that area do use them. It is part of their livelihood and it has been a traditional practice for many years. The fruit is important to the Tohono O'odham people as a food and for use in many traditional events. Fruit collecting and preparation techniques today are the same as what my grandparents did. The fruit is used in the same ways today as in my grandparents time.

This camp been used for over 35 years. [She has] been coming to the camp for 17 to 18 years but before than [she] came for five years only on weekends. [She] will stay for four to six weeks depending on the weather and the fruit. [She] went to the Topowa camp when [she] was young. "I work for the school so I have two and half months vacation during the summer. From June to the middle of August. That works for me because the harvest happens right in June so I'm here."

When it comes to how they select the saguaros to harvest, they start with "the same area. It's always the same plants." They know that they picked in that area and then maybe the next day or in the evening they will go to a different area. And then the next day they will go to another area and just rotate. "We go from day to day to different areas and then by the time [they have visited all their areas] there's more fruit where we started out. We'll go back and start there again." In the past when people were on foot, they might only use two or three areas but today with her truck, she has six areas she visits. Some of her fruit still goes to the wine feast.

This saguaro camp is very important to her. "It's important to me because no one is doing it anymore. It's dying. The culture is dying and a lot of people don't know how to make the syrup and the jam. A lot of my own people, and they want to learn...they say they are going to come and watch so they can learn how to do it. And I'm here to teach them. I'm here to teach them how to do the saguaro harvest, how to make the syrup, how the fruit is made into syrup and jam. Kids come out and groups of kids come out and even groups of adults come out. And people that are just interested and don't...probably [are] never going to do what I'm doing. You know, like your people, Anglo people. They come here and they want to see how it's done but it's not something that they will probably ever do, you know, on a yearly thing when the harvest comes. They're just curious of how... because a lot of people don't know that there are even fruits on the saguaros. They had no idea and went they see the end product when it is made, 'Wow!' - you know. They are amazed at the saguaros' fruits."

"You know the media like the newspaper and the TV people that have been out here to film and write stories and make it known and that's how it spreads too through the media that I'm here and that when they read about this, 'Wow, we never know that. That's something new.'" And like a lot of people that, when we did that summer solstice at the university, a lot of people didn't know. They had a lot of questions."

She also teaches her children and adults from the Nation. "You know I tried to get a group from the school [on the Nation] but you know my principle just didn't want to go through all the permission slips and because it was through the school. Like I told her we should bring some kids out here for the summer. You know maybe kids that um... we could pick a child from

each class room and we could do this every year. Because now that teaching the culture and the language in our schools is priority, I think that it should be part of your culture teaching. I mentioned it to her and she didn't seem very interested in it. So I didn't want to push the issue. Because I know that you probably have to get permission slips from the parents and then you got to be responsible for them. If a child gets hurt out here we're liable. The school is probably liable. So she didn't really...we didn't talk about it anymore after that. I think that if the parents themselves wanted to bring the children out here, which I have mentioned to the parents and they say they are going to bring them out here, but they never do."

Whole classes have come and stayed overnight. "This group from San Xavier had, I don't how many, about forty kids out here. They were up all night. That was last year and I thought that maybe this year they will come out again but I didn't hear anything from them but a course there's no fruit so they wouldn't have much to pick." When this group came they brought tents.

She does not teach the Desert Museum kids. "No, they don't come out. They [DM] do their own teaching. I've taught them everything they know, so now their teaching their own." It is mostly kids and adults from the Nation who visit the camp these days in addition to a few curious Anglos or her close Anglo friends. "I don't like to have more than fifteen. Fifteen is a good number of people. But if it's more than that it gets to over powering."

"I give them a demonstration on how to collect the fruit and how to knock them off the saguaro and then they go out." She has had any problems with the groups hurting things. "Oh no. Everybody's been good. Because I tell them that they are visitors here and they come out here... this is Saguaro National Monument property and they got to respect the saguaros. Not only that but because we respect them in a way just like we respect our own people. The O'odham people. And they are here to just collect the fruit and not damage the plants."

"Maybe...well, San Juan will have mass. That's a group that comes out. We have mass, maybe about 20 or 30 people. And groups maybe about 15 to 20 people at a time. We have a mass in honor of my grandmother and all the harvesters that have harvested here that passed on. And it was my grandma's Juana's birthday so we celebrated her birthday every year when she was here and then when she passed on I started having a mass out here for her. And then all the other harvesters that were here. There's a whole list of them that we say mass for and then we just have a potluck breakfast. Then if anybody wants to go out and pick, they can go out and pick. A lot of them don't stay very long because especially it's during the weekday and everybody goes back to work or has to work."

As far as public access to San Juan Day, "I mainly invite the family. It's not announced. People that are family members just know that I have it every year. So usually it's the same people that come every year. And the campers, they invite their families and they come and friends. I know that during the year, it's probably another reason why they want to get a longer permit, you know people like to come out here and do like...um. We had like ceremonials out here, not ceremonials but memorial services. I know that there had been certain groups before I guess that really didn't do the paper work or anything with Saguaro National Monument. I know there's been services here. They got permission from my grandmother's friends that have died and they wanted services here. They come out and I guess they talk to the monument and they give them permission to come out here. That's ok with me." These things happen outside the harvest season.

"If people from the Nation want to use the area, they have to build their own ramada. I always tell them that, 'If you want to come out and pick, there's space here for you to put your ramada. But nobody ever shows up. [But] it's important because it is a dying culture. It's dying. It's being forgotten. And so I am kind of a resource person they come to when they want to see how the process is done. So they come to me here and this is where they learn. And I think it's important that they don't forget it."

"[The fruit] is important because that's what nature, Creator gave us. That's why we were put here. Our people were put here because of a reason and we are here to do that. We are here to take care of the plants and the plants in return give us food. So I can relate to them putting us here, that we belong here. Because we know how to use the plants in the desert and the different kinds of plant that we use for medicine and food. This is what we use to live on before stores came so much closer to the reservation. This was our diets, this is what we lived on, like the saguaros. When we make the syrup and jam, we never had desserts, [now] we [go] out to the store to get a cake or ice cream, [but then] this was our dessert. That's why we jarred them and took it home and they last. We store it and use it throughout the year." The fruit can be stored up to two years or maybe even longer. She mentioned that the University has large balls of dried fruit that are 30 to 50 years old.

"They [the park] are very supportive because they know it's apart of our culture. They know that it shouldn't be forgotten. And it's also a very religious thing for us and how we respect the saguaros. And that's one thing about the Nation that they are very supportive of in education, culture, cultural teachings, learnings. I don't know if it is written down but I don't know if they have like...they should be like educational. In education, I know that they were starting to do a film so that the kids can watch it, watch a film about the saguaro harvest. But nobody ever came back and we never finished it. I know one lady from the education came over, and recorded it and said that she wanted to maybe some day do a film of the whole process so that they could

show it in their classrooms. In their high school and all also down to elementary. Great idea but they never happened or I don't know maybe they did it some where else. But I work at a school and I haven't seen anything on it. I'm sure that we would have it at our school. It's important. I think we should get this on film for those of them that don't know about it. It's a good learning thing to know about their own culture."

She said the fruit collecting techniques had changed some since her grandparents' time. "As we started getting more modern you know, I should say when the stores started coming to us. That's when we made changes. They used to use, instead of buckets, they used baskets to collect. They used to use baskets to strain their fruit. And they cooked in pottery instead of modern aluminum pans or enamel pans and pots that we use now. And then during that time, during the older, as far as back as I can remember, my great grandparents we didn't have beds to sleep on like we do here. We slept on the ground. Of course, we hauled our own water. We didn't have vehicles. We used wagons, horse and wagon. And the facilities, you know, the bathroom facilities were not there like we have here now. We have the Porty-Johns." The actual collecting and processing techniques are "pretty much the same. And fruit uses are the same."

The Future

"It's important that future generations of Tohono O'odham people know about the saguaro, and about traditional harvesting. It's important to their survival and should be passed on. The camp in Saguaro West is important and access to it is needed so that the tradition can continue. This camp has become a teaching camp, one where the traditions concerning the saguaro can be accessed somewhat freely. Many family camps on the reservation are very private and the passing on of the tradition is dependent on the interest of the children in the family. What happens to the tradition when the children whose families have camps aren't interested in learning, but the children whose families don't have camps are interested in learning the tradition?

It is important for future generations of Tohono O'odham people to know about saguaro plants and harvest. "Very much so. It's important because it is apart of their culture. They should know this. And it shouldn't be forgotten. I'm sure their parents, their grandparents, somebody in their family had to have done it and it should have been continued to go on. I know, like I said, going back to when we had our own camp in Topowa, we all went out to do the harvest. Each family had their camps. Their sites to go to. So we all would pack up and leave. And do our harvest. Everybody use to do it. Everybody would go out and do it. But now nobody does it any more. The villages they don't do it anymore. There are a few families in um...I bet there

there's like maybe one or two people in each village that might go out. I know of three families that do go out and still do it. You know go out and camp. And stay until they have made their syrup and jam out there."

It is important for future generations of Tohono O'odham people to continue to have access to the TMD saguaro camps "...because it's been here. And it's here for them to do their harvest. This is where all the saguaros are at. This is a forest of saguaros. There is so much. And the area is a large area to pick from. And if the Saguaro National Monument gives us the privilege to go into their area, into the whole area that they have here. This is the area where they should do it." This is a special stand of saguaros. There are areas on the reservation but not as dense as Saguaro National Monument. "There are saguaros up in the Covered Wells area but not as much as you see here. This is really the area. This is the best spot. Thanks to my grandmother who picked out in this area. She came a long ways from home to find this area. I'm glad that my grandmother found this place."

Chapter Four
The Cultural Role of the Saguaro

This chapter deals with various aspects of the relationship that the Tohono O'odham people have with their brother, the saguaro. Their relationship is most noticeable in the ethnobotanical uses, such as the fruit harvest, but it is much more complex than it might seem. Their relationship is expressed through legends, language, and ceremonies, all cultural aspects that developed over the tens of thousands of years that the Tohono O'odham have lived in the Sonoran Desert (Hayden 1989; Richards[1]).

Many cultural changes have been imposed on the people of the Papaguería, however, as Bruder (1977) noted, while wild resource gathering steadily declined in response to various assimilative pressures, saguaro collection decreased more slowly. While it is easy for him to attribute this resistance to decline to the productivity and dependability of the saguaro as a food resource, and the lack of conflict between the saguaro harvest season and seasonal wage work, the more likely reason is cultural. The features Bruder mentions simply eased the struggle to retain a tradition that may been considered a keystone to Tohono O'odham survival.

The Saguaro in Tohono O'odham Culture

One of the most spectacular plants endemic to the Sonoran Desert is the saguaro or giant cactus (*Carnegiea giganteus*[2] syn. *Cereus giganteus*[3]). Higher than the xerophytic, leafy trees that also grow in this desert, the saguaro stores large quantities of water within its trunk and limbs. That stored water enables this cactus to fruit annually, more or less regardless of secular variations in local precipitation. The giant cactus fruit borne at the tips of trunk and limbs bursts open when ripe to expose a scarlet saccharine juicy pulp relished by desert mourning and white-wing doves and the Native Peoples inhabiting the Desert. This essay explores some of the human relationships with the saguaro.

Cosmology

The foremost fact about the relationship between the saguaro and the Desert People is its cosmological foundation. A number of Euroamericans have elicited differing Tohono O'odham versions of the origin of the saguaro.

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[1] File Box 11-15c, Draft history materials by Richards, SAGU 257, SAGU 2636, Box 11 of 11.

[2] Early in the twentieth century, specialists at the New York Botanical Garden concluded that the saguaro was fairly unique compared to other *Cereus*, so they proposed a new genus, *Carnegiea*. Botanists' gossip characterized the new generic name as a bid for financing from Andrew Carnegie (Crosswhite 1980:6, following Britton and Rose 1908).

[3] The U. S. Army of the West reported encountering saguaros on the upper Gila River in 1846, and trading for molasses, dried pulp, and seeds among the Akimel O'odham. Lieut. W. H. Emory sent seeds to botanist G. Engleman in St. Louis. On 13 February 1848, the latter reported to Emory. "The small black shining seed sent me, belongs to a true *Cereus*" (Engleman, ["Report"] Pp. 155-59 in Emory 1848. Engleman wrote: "In your letter you figure and describe a cactus plant, of which you have sent me the seeds, ... I propose for it the name *Cereus giganteus*." (158).

Scandinavian ethnographer Carl Lumholtz reported in 1912 that I'itoi (Elder Brother) created the giant cactus by placing beads of his perspiration in the ground[4]. "He walked in ceremonial circuits around it for four days, and the plant began to give fruit." I'itoi also made a jar in which to place the juice of the fruit. Mixing it with water, I'itoi made cactus jack "and it began to rain, as he thought it would." Therefore the Desert People made cactus jack and celebrated according to Elder Brother's commandments. The cactus jack would make the people drunk, "and then rain would follow." Lumholtz reported that the strength of belief carried through to his day because the Tohono O'odham viewed the saguaro "invaluable, and by tacit understanding they considered it a crime to cut one down."[5]

Collecting Tohono O'odham music early in the twentieth century, Frances Densmore recorded two other versions of the origin of the giant cactus plant. She published them in 1929. "Long ago, when the Papago first came to this region, there was no water and the medicine men brought rain. The custom began at Casa Grande. A medicine man living there made a long cactus, but he did not like it." Cactus maker picked the fruit when it was so dry that the seeds were ready to fall. He handed it to one of his men, who met Coyote. The latter wanted the seeds. The man handed Coyote the seeds, then wanted them back. "Coyote instead of giving them back held his hand high, and scattered them broadcast. The wind was blowing toward the north, therefore the giant cactus is everywhere growing on the south slope of the mountains and in low places."

Later the rain-bringing ceremony began. Some of the cactus seed came up on *Kihau toak* ("Carrying Basket Mountain"). A bird flying over that range saw the cacti, picked some of the fruit and "took it back to the village, and the people made it into wine[6]. They put the wine in ollas, and the second morning it was ready to drink." Then it was that medicine men worked to gain knowledge of rain. "If their report was favorable, the people planted their crops in a few days."[7] The wise medicine man times his rain-seeking with the beginning of the summer monsoon on the Sonoran Desert. The date can vary over a month from late June to late July, so experience aided a medicine man in recognizing reliable climatological indications that the monsoon would soon begin.

A second saguaro origin legend, recorded by Densmore (1929), began when there were already People who already played *thaka* (a two-team contest resembling women's field hockey). A particular woman wanted to go to another village to play *thaka*. She put her son to bed, set food and water beside him, and went to play. The little boy awakened, ate the food, and followed his mother. He found her *thaka* game in progress, and sat down to watch. The women playing noticed him, commented, and his mother claimed him. After the *thaka*

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[4] Crosswhite 1980:7, over-condensing Lumholtz 1912:48 [following quotes].
[5] Lumholtz 1912:47.
[6] Fermented saguaro fruit juice is actually cactus jack, analogous to applejack. Spaniards reached the Papaguería with their fermented grape juice, wine, long before Anglo-Americans arrived with their apple jack. Apples, moreover, do not flourish in the Sonoran Desert, although they do so in some mountain valleys on the eastern edge of the Desert. Consequently, Spanish terminology and categories influenced the Northern Piman language and interpreters' concepts long before the English language did so.
[7] Densmore 1929:161-62. Densmore's desert collaborators considered this a riverine O'odham version of the origin of the saguaro.

game, she tied a cloth around his head, and stuck a feather in it. The boy played with the other children until they teased him for being too proud of his feather (O'odham greatly value social conformity). When he could stand the teasing no longer, the boy said that perhaps he had something in his mind of which he could be prouder than the feather. "He made a circle on the ground, stood inside it and began to sink into the ground."

Some of the children ran to tell his mother. Except for the feather, the boy had sunk out of sight when his mother reached the circle. She grabbed the feather, then summoned Badger and ordered him to dig the boy up. Badger dug as hard as he could but failed to overtake the boy. The boy's mother then asked the birds to search for the boy. Crow found him in the Kiyota Mountains. The people went to the mountains and found the boy there. He refused to go home with his mother, saying, "I want to stay in the hills, but I will be of use to my people." He slowly turned himself into a saguaro.

The boy-cum-saguaro gave the People directions for *navait* (saguaro fruit jack) making. They were to take the giant cactus fruit to a house, mash it, boil it for about an hour and a half, strain it through grass matting, and seal it in an olla. The boy taught the People a hundred songs or more to sing during a ceremony to bring rain. He warned that if the Tohono O'odham stopped the rain-bringing ceremony, "there would be no more rain." Moreover, he said "that the people must eat wild vegetables and that if they ever stopped eating wild food they would lose their vitality and not be able to stand exposure."[8] The warning has been verified; as the O'odham have decreased or abandoned their traditional diet including numerous wild foods like cactus fruits, they have come to suffer from the highest incidence of Type II Diabetes Mellitus known in the world.[9]

Also in 1929, popular novelist Harold Bell Wright published a book of English versions of Tohono O'odham legends and tales. His version of the saguaro origin has the first plant resurrected from a child's bones.[10]

During the early 1930s, ethnographer Ruth M. Underhill recorded a slightly different version of Densmore's second origin legend but did not publish it until 1946. In this account, the mother was so enthusiastic about playing "double ball" that she deserted her infant son before she even nursed him. He followed her in vain, and sank into the earth, coming up as a giant cactus on a mountain slope. Crow found it, nibbled the fruit, and vomited red pulp into a basket. Putting this into a jar, the people said to it "You know what to do." The fermenting pulp sang its song. When the *navai't* had fermented all the birds and animals (who were then human) painted themselves and congregated to drink.

There was so much intoxication that the people sent Badger to throw the seeds into the ocean. Badger met Coyote, who talked Badger into opening his hand to exhibit the seeds. Coyote struck Badger's hand, scattering the seeds. The wind blowing from the south blew the

[8] Densmore 1929:149-50.
[9] Bennett, Burch, and Miller 1971:125.
[10] Wright 1929:109-22.

seeds against the southern slopes of the mountains. I'itoi then gave women the long stick for gathering the fruit, and the head-ring of *Agave* fiber on which to balance baskets.[11]

Susie Enos, a Tohono O'odham woman, published a similar version a year before Underhill's book appeared. In her account, Sugu-ik Oof's is a 10-year old girl who is transformed into a saguaro cactus. This version of the legend describing the creation of the saguaro ends with a traditional conservation ethic that the fruit should be shared with all birds and animals.[12]

Frank Thackery, former Bureau of Indian Affairs superintendent of both the Gila River Indian Agency and the Sells Indian Agency, published with A. R. Leding in 1929, an outstanding study of Tohono O'odham saguaro use. They reported Tohono O'odham behavior that reflected the sacredness of the saguaro to the Desert People. Papagos "when clearing away brush for the construction of roads . . . . frequently curve the road for the sole purpose of saving one or more of the Saguaros.[13]

Saxton and Saxton (1973) recounted a version similar to Densmore's, "Coyote Scatters Saguaro Seeds," in which Coyote was sent to trick Turtle out of the saguaro seeds he was to give humans to plant. Pilcher (1967) and later Beal (2004b) cited Densmore's version in which a boy sank into the ground to become the saguaro.

It is worth noting that some Euroamerican observers witnessed more secular interactions with the saguaro. Writing about the Maricopa and Akimel O'odham whom he visited on the middle Gila River in the summer of 1852, U. S. Boundary Commissioner John R. Bartlett observed archery practice. "It is a favorite amusement with both men and boys to try their skill at hitting the *petahaya*, which presents a fine object on the plain. Numbers often collect for this purpose; and in crossing the great plateau, where these plants abound, it is common to see them pierced with arrows." Bartlett published a sketch of "Indian Amusements. Shooting at the Petahaya." This shows ten men, two loosing arrows at a tall saguaro, seven holding arrows.[14]

Reluctant to believe such disrespect, Crosswhite questioned whether the archers were Desert or River O'odham, whether only certain plants designated Apaches became targets, or whether Bartlett merely saw arrows in saguaros and assumed that Pimans had loosed them.[15] Bartlett's sketch conclusively rules out the last hypothesis, suggesting another interpretation. The ten archers Bartlett showed had circular tattoos covering the entire body. Such tattooing was a riverine Yuman trait, so it is likely that the archers were Maricopas. Their original lower Colorado River homeland lacked saguaros, and as they migrated up the Gila River they relied more on fishing, hunting, and horticulture than saguaro fruit gathering. The saguaro was not sacred to the Maricopa.

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[11] Underhill 1946:42, Crosswhite 1980:23 quoted much of Underhill's text on this version.
[12] Enos 1945:64-69.
[13] Thackery and Leding 1929:407, Crosswhite 1980:7 quoted Thackery and Leding under the heading "Papago Respect for the Saguaro," evidently not relating respect to sacredness.
[14] Bartlett 1854: 237-238 and plate between 238 and 239.
[15] Crosswhite 1980:7.

Norrell (2004) included the Tohono O'odham relationship with the saguaro in a summary of their worldview. "The O'odham *Himida'g*, sacred lifeways, includes clans such as Coyote, Buzzard and Bear and the annual saguaro harvest to call the rain. There are songs about wind and rain, about Baboquivari and other sacred mountains and I'itoi." This contemporary account illustrates a persistent cosmology, a rich tapestry of living culture and tradition that sustains the Tohono O'odham people today.

Calendar

The fundamental importance of the saguaro and its fruit in O'odham life is reflected in the O'odham calendar. The O'odham divided the year into 13 lunar "months," starting with *Hashañi Mashad*, or Saguaro [harvest] month.[16] The cactus jack imbibing ceremony to bring the summer monsoon doubled as the O'odham New Year's celebration. The temporal regularity of the saguaro fruit harvest made syrup for cactus jack making available during the latter half of June. Because the O'odham processed ripe fruits into thickened syrup which could be stored for a while before fermentation, the actual date of the New Year could vary during the first half of July, depending on the end of the harvest and the beginning of the monsoon.

Other O'odham month names indicate the long Sonoran Desert residence of this ethnic group. *Jukiabig Mashad* or "rainy moon" applies to the monsoon. *Shopol Eshabig Mashad* or "short planting moon" reflects long experience with *ak chiñ*[17] horticulture on the Sonoran Desert, planting during the monsoon, rapidly growing crops that will mature before first frost. *Washai Gak Mashad* or "dry grass moon" refers to the cessation of the monsoon. *Wi'ihanig Mashad* or "persisting vegetation moon" was when women harvested cholla buds and prickly pear cactus fruits. First frost can occur during this period, corresponding to late October. Cultivated foods had to be harvested, dried, and stored for the winter.

Unpleasant, relatively inactive months followed. *Kehg S-hehpijig Mashad* or "really getting nice and cold" is November-December. *EDa Wa'ugad Mashad* or "inner bone moon" is a metaphor for backbone of winter, the English "dead of winter." *Gi'ithodag Mashad* is when animals have used up their stored fat, in January-February. *Uhwalig Mashad*, or "odor moon" when deer mate follows. Then comes *Kohmagi Mashad* or "gray moon" at the end of which cottonwood trees flower, early March.

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[16] Crosswhite 1980:14; more or less following Lumholtz 1912:76, who spelled "moon" *mashat*, and Russell 1908:36, and Underhill 1939:124-25, and Saxton and Saxton 1969:178-80. Crosswhite listed only 12 "months" instead of the actual 13 lunar "moons" the O'odham recognized.

[17] *Ak chiñ* translates as "arroyo mouth" and refers to the Tohono O'odhams' traditional irrigation method of diverting floodwaters from the mountains to their fields (Nabhan 1986). Bryan (1929:449) clarifies the different uses of the term as place name and adjective: *In the Papago country of southern Arizona the flood run-off of the mountain areas is gathered in streams with well defined channels which on reaching the great undissected alluvial basins spread out in sheets. The place where this spreading occurs is called by the Papago Indians Ak-Chin, 'arroyo mouth'. These are favorite situations for flood-water fields, and more than six villages or localities once inhabited in Arizona and Sonora are called Ak-Chin or a corrupted form of the same name.* It should be noted that not all O'odham floodwater farming is *ak chiñ* farming. The term was prominent enough in historic times to be used in the naming of the Ak-Chin Reservation in 1912.

Chehdagi Mashad or "green moon" is when cottonwood trees and mesquite trees leaf out, grass grows, and early fobs grow. Early in the twentieth century, at Noria, Lumholtz learned that "about the time of the equinox, a ceremony, accompanied by singing, is performed to insure a good saguaro harvest. Seeds of the fruit are ground and put in a basket into which also four sticks, taken from the dried plant, are placed, one at each cardinal point." Those participating in the rite sit around the basket and sing all night, finally consuming the seeds. Four individuals receive the four sticks, "who later, when the season comes around, leave them at the foot of a saguaro."[18]

The next moon is *Oam Mashad* or "yellow-orange month" from palo verde, greasewood, cacti, desert marigold, brittlebush, desert poppy and other wildflowers, is another reflection of Sonoran Desert influence on the Piman language. *Kai Chukalig Mashad* or saguaro "seeds are turning black" in late May and early June. After the River People began growing Old World wheat in mid-eighteenth century, many of the Desert People traveled north to help hand-harvest the cereal grain in return for a share of the crop. People innovated; hence, *Hihkugiabig mashad* or "grain cutting moon." Then the giant cactus fruit ripened and a new year started.

Saguaro Camp

For centuries, the Tohono O'odham raised part of their food on valley fields (*ak chiñ*) naturally flooded by monsoon runoff from the desert mountains. While residing near their valley fields, the Desert People obtained water from shallow reservoirs, which caught and stored ephemeral arroyo runoff during the monsoon. Such domestic water was scant and increasingly unpalatable as it diminished from bank seepage, evaporation, and consumption. The Desert People, consequently, resided near their valley fields only as long as necessary. They wintered at springs in the desert mountains, or along the perennial Santa Cruz River to the east, Gila River to the north, or the San Ygnacio or Altar-Concepción Rivers to the south. Oblasser's (1936) description of the Tohono O'odham lifestyle reflected a bit more permanency. He wrote of them living in permanent villages since before the advent of the whitemen, each village having attached to it what he called emergency villages that embraced field locations, waterholes, cactus groves, mesquite forests, acorn plots, localities for gathering basket material, and other such places.

As the O'odham New Year approached, the Desert People left their villages to camp within their traditional giant cactus groves, which were scattered over the southern slopes of Sonoran Desert mountains. As Underhill (1938:22) noted, "The giant cactus clusters on the southern hillsides away from the villages."

The time fruit harvesters spent in saguaro camp varied according to several circumstances. Waddell placed the beginning of saguaro camp four weeks prior to the New

[18] Lumholtz 1912:60-61; Crosswhite 1980:15 quoted this report, and speculated that "the sacrificial offering of consecrated Saguaro ribs, could tie in with a Papago resurrection legend involving life after death." Referring to Wright's (1929) version of the cosmological creation of the saguaro from the bones of a child.

Year's cactus jack drinking ceremony. Underhill put the ripe fruit season at three weeks.[19] With the advent of motor vehicles and wage labor, saguaro camp time shrank to a weekend or ended entirely. On the other hand, tourism in the world economy enabled one O'odham lady to demonstrate to classes and "serious onlookers" saguaro fruit gathering and processing for no less than six weeks[20] Botanists have reported that a few saguaros ripen fruit the last week of May or the first during June. More and more fruits ripen until the season peaks during the final week of June into the second week of July, depending upon the year.[21] Imprecise ethnographic research and reporting, as well as cultural and economic changes, have clouded O'odham identity and life.

Arrival at saguaro harvesting camp triggered a ritual recognition of the ties between plant and people. "Each person is supposed to take the first ripe fruit that he encounters, open it, extract some of its juicy, red pulp, and apply it to his heart, and say a prayer of thanks for having lived another year.[22] Then harvesting and processing begin.

During pre-horse times, transporting the very large ollas used to boil saguaro juice into syrup was an onerous task. Once ollas were at camp, consequently, their owners carefully hid them "in pits and covered them with branches of mesquite and greasewood, before the hole was covered with dirt. And there they would remain until the next season."[23] Densmore observed this strategy while working with the Desert People during a saguaro harvest. "The work of gathering the fruit and making the sirup was done in places called cactus camps, several families combining in the work. The equipment of such a camp consisted of a thatch in a tree, on which the cactus fruit was spread to dry, and a covered fireplace. A few ollas were usually left in the camp and were not disturbed by travelers."[24] Underhill also noted the permanency of saguaro fruit harvesting camps. "[T]here were ... migrations to food gathering grounds, where families kept permanent camps. In late June and early July, every family went for three or four weeks to the foothills to gather the fruit of the giant cactus whose juice was fermented for the liquor ceremony."[25]

Underhill stressed that saguaro fruit harvesting was womens' work. "Every day the women go out at sunrise, for cactus picking is women's work. Each carries a long rod, slender as a fishing pole, with little transverse sticks tied along it with cactus fibers, and with this she hooks the fruit down from the thorny shafts, twenty-five feet high." If a fruit does not break when it strikes the ground, the woman splits it with a fingernail, "throws the pulp into her basket, and leaves the halves of the shell lying on the ground" with the red inner rind uppermost to summon rain.[26] The harvesting pole is called *kuipaD*. Made from two or three components, it may be from 15 to 30 feet long, with cross pieces at the end and lower to drag

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[19] Crosswhite 1980:20; Waddell 1973:217; Underhill 1946:41; after Castetter and Underhill 1935:20 wrote that harvesting lasted for two weeks.
[20] Crosswhite 1980:20, following Keasey 1975:29; Fisher 1977:2.
[21] Crosswhite 1980:20, following Steenburgh and Lowe 1977:34.
[22] Crosswhite 1980:18, quoting Underhill et al. 1979:21.
[23] Crosswhite 1980:18, Fisher 1977:2
[24] Densmore 1929:151.
[25] Underhill 1939:97
[26] Underhill 1938:22-23.

fruit from lower branches. These may be catclaw (*Acacia greggii*), creosote bush (*Larrea tridentata*), or saguaro skeletal rib.[27]

Wielding her *kuipaD*, an O'odham woman stands to the side of a saguaro, holding "her hands well apart on the stick like a girl with a baseball bat, for control. She plants her feet, keeps her eyes on the fruit, and hooks with a slow rhythm."[28] Some women harvest alone; others work in pairs, one hooking and one picking up fruit. "[A]ll the ripe fruits on a number of adjacent plants are knocked to the ground before any are picked up." Hard, dried fruits are put in a separate container for later use.[29]

At mid-morning, women lugged their harvested fruits to the extra-large ceramic cooking jar in the saguaro camp. Lumholtz explained why juice boiling began soon after harvesting. The collection basket [now metal bucket] "presented an appetizing mass of crimson fruit pulp as well as a great amount of similarly colored juice, which would keep for a few hours only."[30] Boiling time has been reported as from 20 minutes to two hours. For centuries, Tohono O'odham women strained the heated mixture through a special straining basket fashioned from leaves of sotol or desert spoon (*Dasylirion wheeleri*). They set the straining basket on top of a large olla, supporting it on two sticks. By 1929, some people strained with screen wire. Flour sacks and burlap bags have also been pressed into duty as strainers.[31] Women spread pulp and seeds on a canvas to dry in the sun, returning the liquid to the fire.[32] It cooked until juice became sugary syrup that would keep.

Processing saguaro fruit juice and pulp recovered diverse products. "It is not juice alone that the cactus provides. When the juice is boiled, and strained through a basket, there is still a pulp, one of the few sweets known to the Papagos, and there are the oily seeds which supply both grease and flour."[33] At the end of the 1920s, a decade prosperous in cities but depressed in rural agricultural regions, Thackery and Leding estimated total saguaro fruit harvest by Tohono O'odham. They assumed that at least half of the 1,200 families collected

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[27] Crosswhite 1980:21; following Thackery and Leding 1929:412; Herbert 1955:16; Herbert 1969:4.
[28] Crosswhite 1980:22, quoting Wickham 1971:7.
[29] Herbert 1969:5; Niethammer 1974:25;Thackery and Leding 1929:412 [quote]. See Crosswhite 1980:23, Fig. 10 "Laura Williams shaking dried Saguaro fruits to remove dirt and pebbles. West of the western unit of Saguaro National Monument. 7-7-70."
[30] Crosswhite 1980:24; quoting Lumholtz 1912:77, emphasis added. For metal buckets, see Crosswhite 21, Fig. 8; 23, Fig. 9; 26, Fig. 11; 27, Fig. 12; 28, Fig. 13; 35, Fig. 21.
[31] Crosswhite 1980:27-28, and 29, Fig. 15 for view of bag strainer suspended from two Y-shaped tree limbs driven into the ground; 31, Fig. 16 "Cooked Saguaro pulp slowly draining on a burlap bag tied to four upright sticks in the ground." 32, Fig. 18 "Juanita Ahill straining Saguaro fruit juice. . . screen wire attached to Saguaro rigs in a manner to fit perfectly over a shiny new wash tub." 33, Fig. 19, "Two Papago ladies straining fruit pulp west of the western unit of Saguaro National Monument." Following Thackery and Leding 1929:412; Herbert 1955:14, Herbert 1969:6
[32] Crosswhite 1980:28, and 35, Fig. 21, 'Juanita Ahill separating dried Saguaro seeds from the fruit pulp" [spread on a cloth on the ground]. Also 37, Fig. 22 "Laura Williams rotating a basket to separate remaining pulp from dried Saguaro seeds."
[33] Underhill 1938:23.

giant cactus fruit, processing 100,000 pounds. The average family produced three to 10 gallons of syrup, plus less preserves. They evidently did not estimate dried fruits collected.[34]

Tohono O'odham techniques for making saguaro fruit preserves, or "jam" apparently varied somewhat. The essential ingredient was sun-dried fruit pulp with seeds removed. One recipe called for mixing dried pulp with water, which was added to an olla of boiling syrup. "When it swelled, forming a gelatin-like mass, it was transferred to a large mixing olla and beaten vigorously for half an hour."[35] Such processing would certainly aid crystallization and concentration of the fructose in the fruit.

Crosswhite, following Castetter and Underhill, emphasized that the weeks the O'odham spent in saguaro harvesting camp were a season for jollity and enjoyment.[36] Saguaro fruit was the first fresh food people tasted after the winter existing on stored foods. Campers who arrived before the fruit ripened visited one another, exchanging news and gossip.[37] Cactus camp allowed people to sing songs previously forbidden.

Autobiographical comments by participant observers catch something of the joy of the saguaro fruit harvest. "Being pleasant to the taste and much superior to molasses, I found this sirup excellent as part of my provisions. I also relished the fresh juice of the fruit when brought in cool in the morning."[38] Six decades later, Wickham described good camp manners and sensuous pleasure. "You eat the perfect ones on the spot, turning your back to the other harvesters. You chew the oily seeds into a thick syrup before you swallow. It feels luscious and wicked, but no one says anything back in camp. Everyone's mouth is pink and sticky."[39]

Villagers tended to harvest fruit from saguaro groves nearest to their homes. The Tohono O'odham respected village and familial property rights in giant cactus groves. "Nearly related families placed their camps together with a picking grove around them a half mile or more square, or such that the women of the combined families could just manage to keep the groves picked clean as the fruit ripened. The next campers settled far enough away so as to give themselves room and not interfere." Underhill added that no one unrelated to people using a camp would settle nearby, and a relative would only after asking and receiving permission. The People knew better than to seek saguaro fruit from plants growing on hills already claimed by other villagers.[40]

By the early 1930s, centuries old respect for saguaro grove property rights was weakening. The Tohono O'odham by then were "less willing to camp in the waterless groves where water has to be transported a long distance and they are beginning to encroach on the

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[34] Crosswhite 1980:24 calculated a total harvest of 450,000 pounds by 600 families with two women each (or a woman and children helpers) collecting two 15-20 pound baskets daily for three weeks; Thackery and Leding 1929:410-11.
[35] Crosswhite 1980:30, quoting Herbert 1969:6.
[36] Crosswhite 1980:18, Castetter and Underhill 1935:20 ["the first taste of anything sweet"].
[37] Crosswhite 1980:19; Herbert 1969:4.
[38] Lumholtz 1912:77.
[39] Crosswhite 1980:19-20, quoting Wickham 1971:6.
[40] Underhill 1939:98.

groves of people camped in the more accessible places." This trespass stressed traditionally proper non-aggressiveness, but most people "would say nothing."[41]

Ethnobotanist Gary P. Nabhan elicited an account of saguaro camp and fruit harvesting and processing from a woman who collected ripe fruit around a camp in the west unit of Saguaro National Monument for 60 years. She was harvesting fruit from said camp long before the monument was set aside, having started when her grandfather hauled her to the camp by horse and wagon.[42]

Tohono O'odham acquisition of the four-wheeled [motorized] wagon altered numerous dimensions of life.[43] Not least important, wagons were used to haul barrels filled with water to summer field camps and to saguaro harvest camps. Wooden barrels were not accident proof, but as the Desert People became motorized, they also acquired steel drums for water containers.[44]

Despite the great economic depression, Tohono O'odham of Tucson and Wa:k owned motor vehicles by the end of the 1930s. They drove to saguaro stands, harvested what fruit they could in a few hours, and carted it home for processing. People on the large reservation still spent the harvest period in camps.[45] Those Tohono O'odham with most access to wage labor led the conversion from horse-drawn wagons to horsepower under a metal hood.

Traditionally, people packed jackrabbit jerky and beans to saguaro camp for food, counting on consuming great quantities of ripe cactus fruit. As early as 1920, Lumholtz reported lunching on some canned goods, puffed wheat with evaporated milk, and coffee during a trip from saguaro camp back to the village.[46]

By the 1970s, spaghetti and cold cuts from the nearest trading post provisioned cactus camp. Camp equipment included blanket rolls, pots, water jugs, and groceries stacked under a convenient palo verde tree. Flashlights furnished illumination after dark on Saguaro National Monument where campfires were prohibited save in recreation areas. Saguaro camp was only a weekend affair, inasmuch as the husband had to return to work on Monday morning. Deciding whether to take home dried fruits, this party took into account that the Desert People by that time really preferred soda pop.[47] Because of the metabolic difference between fructose and sucrose, this dietary shift is one of the factors contributing to the high O'odham incidence of Diabetes Mellitus II.

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[41] Underhill 1939:98.
[42] Crosswhite 1980:8, anticipating Nabhan 1982:30 ["It is one of the most productive stands of saguaros anywhere (30-31)"].
[43] Bliss 1952:28 "The Papagos turned then to metal barrels, which were unbreakable and unaffected by the dryness. These steadily replaced ollas both for hauling water and for storing it in the houses."
[44] Crosswhite 1980:17 Figure 6 photograph of cactus camp equipment including two steel drums, two garbage cans, a metal wash tub converted into a camp stove.
[45] Crosswhite 1980:18, quoting Bowen 1939:4.
[46] Lumholtz 1912:78.
[47] Crosswhite 1980:18, following Wickham 1971:3, 6, 11.

Early in the twentieth century, a *wa:to*, or flat roof supported by four to eight posts, was the most conspicuous structure in a saguaro fruit harvesting camp. Equipment included saguaro rib harvesting poles, and ceramic vessels for boiling juice. A *wa:to* appears in two of three general photographic views of camps Crosswhite published.[48] Saguaro camp property rights were traditionally no problem among the Tohono O'odham. The *wa:to* and fireplace "are somebody's place just as surely as a house is."[49]

Traditional Economic Importance

Ethnographer Ruth M. Underhill characterized the traditional Tohono O'odham economy as one of abundance.[50] That people exploiting the seemingly scant natural resources of one of the world's great deserts could create an economy of abundance seems a paradox. Underhill carefully stated that Tohono O'odham material expectations were relatively low, so that they could perceive their economy as yielding them an abundance of material goods. Ever since the Desert People went through their revolution of rising expectations, they have perceived their economy as one of poverty and shortages.

Tohono O'odham utilization of saguaro fruits stands out in the old Northwest of Indoamerica culture area. "The Papagos depend upon this fruit to a much greater extent than do any other Indian people of the Southwest, and some six hundred families gather about 100,000 pounds each year."[51]

The Tohono O'odham apparently have since their earliest differentiation from the Akimel O'odham lived in a symbiotic relationship with the River People. The Desert People labor intensified a number of natural products of the Sonoran Desert which they then exchanged with the River People for the latter's surplus irrigated horticultural products. Akimel O'odham imports from the Desert People attest the pattern. Akimel O'odham began growing Old World wheat immediately before 1750. A winter crop on the Sonoran Desert, wheat ripened in late May and June on the middle Gila River. That agricultural innovation affected the annual round of the Tohono O'odham; they traveled to the Gila River in June to help hand harvest wheat in return for a share of the grain. They carried with them labor-intensified Desert products to exchange for additional wheat and other Akimel O'odham exports. Tohono O'odham hunters and their families brought the River People "dried meat of the mountain sheep, deer meat, deer tallow in small ollas, buckskins, dried beef, tallow, cheese, and cords of human hair." Saguaro products headed the list of vegetable products the Tohono O'odham packed to the River People: "saguaro seeds, the dried fruit and sirup, *tci'aldi*, a small hard cactus fruit, agave fruit in flat roasted cakes, agave sirup ... prickly pear sirup" etc."[52]

The Tohono O'odham spent markedly different lengths of time harvesting and processing the true desert products they carried north to the Akimel O'odham. As already

[48] Lumholtz 1912:77; Crosswhite 1980:16 Fig. 5, 17 Fig. 6, 18 Fig. 7.
[49] Crosswhite 1980:20, quoting Underhill et al. 1979:19.
[50] Underhill 1939:90.
[51] Castetter and Underhill 1935:20.
[52] Russell 1908:93. The O'odham acquired cattle, like wheat, from Spanish colonists during colonial times, thus augmenting the diversity of food production on the Sonoran Desert.

mentioned, Underhill described saguaro camps as lasting three to four weeks in June and July. Immediately after the *navait* ritual, summer crops of maize, beans, pumpkins, *eohuk* (Devil's Claw) and minor crops such as *tchuhukia* (*Amaranthus palmeri*), *hiwitcuis* (*Chenopodium murale*), *mo'otari* (*Franseria tenuifolia*), were planted in *ak chiñ* fields as soon as the monsoon began and mountain run-off moistened the soil. The growing season lasted into some time during October, so Tohono O'odham crops grew and matured in three months, and the people spent that time at their "field" camps.

The other Tohono O'odham vegetative exports to the River People rested upon a much shorter harvesting and processing period. "The cholla and the prickly pear grew in the same general locations as the giant cactus and when they were in season the women of the family went back to the cactus camp for two or three days, drying and eating the prickly pear and pit-baking the cholla on the spot."[53] In other words, harvesting-processing time indicates that saguaro seed-syrup-dried pulp seemingly contributed at least seven times as much to the Tohono O'odham economy as did prickly pear dried fruits-syrup and at least seven times as much as cholla buds. On the other hand, women processing cholla buds "continue to go out for other batches until a large area surrounding the village has been picked over." The cholla "buds which develop at the tips of the branches are gathered as they come out in May. Whole cholla joints, as well as the buds, are pit-baked and dried."[54] Prickly pear (*Opuntia engelmannii*) fruit ripens in October; cholla (*O.fulgida* and *O. echinocarpa*) fruit ripens earlier during August and is processed much like prickly pear fruit.[55]

In order to winter at mountain springs or peripheral perennial streams, garden in flood water fields during the summer, harvest and process several Sonoran Desert plant fruits or buds, the Desert People necessarily walked a great deal (prior to the acquisition of Spanish horses). "There was, in fact, a constant going to and fro over all Papagueria."[56]

Tohono O'odham harvested *Agave* plants to roast from the summits of the Table Top, Quijotoa, Santa Rosa, and Baboquivari Mountains in the Sonoran Desert. Those *Agave* stands grew little farther from the villages than did saguaro and prickly pear cacti, but at higher elevations. Some Tohono O'odham went on *Agave* harvesting-processing expeditions to the Santa Rita and Santa Catalina Mountains at the Desert's edge east of the Santa Cruz River. "The prepared product was kept in jars to be eaten a little at a time, or traded as a delicacy."[57] Information seems not to be available concerning how long such long distance *Agave* expeditions lasted. Those trips into the Santa Catalina and Santa Rita Mountains necessarily took longer than cholla bud or prickly-pear fruit harvesting-processing expeditions to nearby mountain slopes. In terms of Tohono O'odham exports to the Akimel O'odham, however, internal Desert People demand for processed *Agave* among those not undertaking expeditions diminished the amount available for export.

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[53] Underhill 1939:98.
[54] Castetter and Underhill 1935:15-16.
[55] Castetter and Underhill 1935:19, 23.
[56] Castetter and Underhill 1935:5.
[57] Castetter, Bell and Grove 1938:48-49.

Saguaro Harvest

Descriptions of the saguaro fruit harvest are many. Some of the older references are indirect such as Castañeda's 1540 account of saguaro wine drinking, Garcés' 1776 record of the use of saguaro wine by the Pimas during a September ceremony to welcome him, Pfefferkorn's 1794 account of Sonoran Indians making saguaro syrup, and the United States-Mexican Boundary Commission's documentation of it in 1898.

Other references speak more directly of the harvest including Father Kino's (1919 [1698], Vol. 1:291) early account of receiving fruit from the Tohono O'odham in 1698, and noting a problem between April 1700 and April 1701 when many cattle strayed from San Xavier "on account of the neglect of the few cowboys, especially when they had gone to eat pitajayas." Major W. H.Emory noted as his party left the Gila River in November 1846, that they soon encountered the saguaro, the fruit of which was highly prized by the Indians. Hardy (1829) traveled through Mexico extensively in the late 1820s and documented account of saguaro fruit being harvested from 1825 to 1828.

Detailed accounts of the harvest have been recorded by many anthropologists.[58] Lumholtz (1912:77) provided one of the earliest descriptions of the harvest.

> Early in the morning all the female members of the household could be seen proceeding on their fruit-gathering expedition, each armed with a large basket and the usual pole, about twenty feet long and made from two pieces of sahuaro rib. At the top of the pole, as well as lower down, there is a kind of hook made by tying crosswise in these two places a small piece of greasewood [creosotebush] by the aid of which the spiny fruit is broken off. Two or three hours later they returned, each carrying on her head her share of a heavy harvest. The skin with its spines had been removed in the field, so the inside of the huge water-tight basket presented an appetizing mass of crimson fruit pulp, as well as a great amount of similarly colored juice, which would keep for a few hours only. Most of the contents of the baskets was immediately emptied into large jars, to be boiled for about two hours, when the mass is strained in order to separate the numerous small black seeds. The juice is boiled for hours longer until it becomes sirup (*sítoli*), which is kept for future use in small earthen-ware jars, each neatly sealed with a piece of broken pottery and sticky mud.

The fruiting characteristics of the saguaro provide definite harvesting parameters (Goodyear 1975). The fruits of a given plant do not ripen together making several visits necessary for an intensive harvest. The fruit is available for a limited time further intensifying harvest activities. A combination of small quantities of ripe fruit at a given point in time and the scattered growth pattern of the saguaro with small groups of gatherers meant several hours must be spent to harvest a large basketful, approximately 14 quarts. The small

[58] For example, Austin (1924), Bahr (1983a), Castetter and Underhill (1935), Crosswhite (1980), Fontana (1959), Hackenberg (1964), Jones (1969), Joseph et al. (1949), Nabhan et al. (1982), Russell (1908), Seivertson (1999), Thackery and Leding (1929), Underhill (1940)

harvest groups maximized their efforts by concentrating on an area approximately one half mile square. Within that space, they would harvest the ripe fruits from several adjacent plants by knocking them all to the ground before picking them up and moving on to the next set of plants. Baskets were critical to such efforts and a large basket was placed centrally to the group of plants being harvested, often propped on an ocotillo plant.

The Tohono O'odham people used different magical practices and rituals to insure good harvests of wild food plants[59]. They commonly planted effigies, for example, of the desired fruits in their gathering grounds after a night of ritual singing (Lewis 1988).

There was no individual ownership of gathering grounds or collectible resources, however, villages claimed non-exclusive use rights to certain gathering areas (Lewis 1988). Wild plant resources, especially the fruit of saguaro, were considered free, although each household had its customary gathering grounds. Permission was asked of a household when another household wanted to harvest in their grounds. Everyone knew his neighbor's footprints, and later in the twentieth century, their wagon tracks and tire marks. While the wild resources were not defended, pathways to them were studied regularly to see who was using the routes (Bahr 1983b). The rules and relationships of the saguaro camps, however, were more complex (Lewis 1988:98):

> As a rule, each village located a good grove in the foothills nearest it and the families chose their camping sites there. Nearly related families placed their camps together with a picking grove around them a half mile or more square, or such that the women of the combined families could just manage to keep the groves picked clean as the fruit ripened. The next campers settled far enough away so as to give themselves room and not interfere. No one would settle near an established camp unless he was a relative and then only after asking permission and no one, looking for a new camp, would go to the hills already pre-empted by a village not his own.
> However, residents of one village often asked their relatives from another village to make cactus camp with them; married daughters came back to camp with their families and people who had formed new Field villages used the old cactus camp. Since the cholla and prickly pear grew in the same general area, the cactus camps were used by the families for gathering those fruits but they only stayed for two or three days.

This pattern continued well into the 20th century. Chesky (1943) noted that most families still gathered saguaro, and many families still returned their camps to harvest areas they had reused annually for generations. She noted that in 1943 the saguaro harvests lasted three to four weeks.

In her family's story of traditional saguaro harvesting, Helen Ramon (1980) recorded some technological changes. She harvested with her great-grandparents and grandparents, and credited their teachings of the traditions as how she learned to be O'odham. Just as other families did who used the same camp year after year, her grandparents and great-

[59] These practices and rituals generally are privileged information.

grandparents would bury supplies for the next year, including the pot used to cook the syrup. The one her family used had been passed down over many generations. It was so old and had been used over so many fires that she could hardly see the designs on it. "The same pot had been used for syrup when my mother was a little girl like me and when my grandmother was a little girl too. Maybe that's why the syrup and jelly and candy tasted so good (7)."

> Every year in June when the saguaro fruit was ripe, we hitched the horses to the wagon, packed in it everything we would need for a week and went to our family's saguaro camp between Topawa and Sells. We had to take our food and water and cooking pots as well as the things needed to fix the fruit. And, of course, we had to take our eating bowls and sleeping mats. Some things stayed at the camp all year like the *ku'pad*, the sticks for picking the fruit from the tops of the tall cactus, and the grinding stone, and other big or heavy things (5).

As traditional farming practices decreased after reservation establishment and eventually ended, part of the spiritual connection between the O'odham and their land also declined. With no crops, the saguaro ceremony became less important since there was no need to call the summer rains (Seivertson 1999).

But the ceremony and the importance of the saguaro were not forgotten. Estimates from the 1920s and 1930s put the Tohono O'odham saguaro harvest at about 450,000 pounds of fruit annually (Fontana 1989). Thackery and Leding (1929:401), however, marveled at the persistence of the cultural centrality of the saguaro. "The fact that the Indians and particularly the Papagos, cling to the use of these fruits is especially significant in view of the ready availability and easy use of many modern manufactured food products." Jones (1969) found that even though it was a considerable distance (over 60 miles), families from the village of Vamori would go to the Tucson Mountains to harvest saguaro fruit in the 1960s.

Many Tohono O'odham remember and value the traditions while others wish to regain knowledge of their culture. Plans were made for a renewal of the saguaro ceremony and the planting of a few fields in the ancestral manner during the summer of 1999 (Seivertson 1999), and the Tohono O'odham Community Action group continues to work toward this and other cultural revitalization of traditional food uses (Lopez et al. 2002).

As tribal elder Edward Encinas explained, it is a Tohono O'odham tradition to celebrate the coming of the summer rains by harvesting the saguaro. "The desert comes back to life with the arrival of water," he told Allen (2001). "We gather the fruit, process some of it into wine and hold a rain feast ceremony to thank our creator for nature's bounty." A more detailed contemporary account illustrates that some families continue to use some of the traditional technology as well (Felix 2004).

> When we bring the fruit home, we prepare it over an open fire of mesquite wood. First we boil the fruit in water, then we strain it and cook it some more until it is a thick syrup. We seal the red, sweet syrup in ollas, which are large jars we have made of the red desert clay. Then we place the ollas in our

> village roundhouse, which we also know as the rainhouse, for a few days. While the ollas are in the rainhouse, our community medicine man or woman performs secret prayers, allowing the winemaker to transform the juice into wine. When it is ready, the village gathers outside the rainhouse for the rainmaking ceremony. Ritual wine is presented to the elders, then to all of us who stand encircling them. Our songs asking for the blessing of rain for the desert earth bring in the new rains.

As Stella Tucker explained to Allen (2001), "Saguaros have been a part of our people forever. As long as there have been human beings and cactus in the desert, the annual gathering of cactus fruit has been part of the Tohono culture."

Saguaro Wine (Cactus Jack)

The making of saguaro wine, or cactus jack, is a centuries-old practice of unique qualities, and the saguaro wine ceremony, *navaita*, is perhaps the most persistent of aboriginal Indoamerican ceremonies. These cultural aspects are presented along with discussions of two ceremonies that involve saguaro wine – the *navaita* and the *vikita* (or *wiigita*, *wigita*).

Ritual Alcohol Drinking

Fundamental aspects of O'odham imbibing fermented saguaro cactus fruit juice during ceremonies have cultural and historical dimensions. That is to say that the O'odham constituted the northwestern-most Indoamerican ethnic group fermenting for ritual purposes. "[T]his is the sole appearance of an aboriginal alcoholic drink north of Mexico."[60]

Most peoples in Indoamerica fermented maize kernels to make *chicha* (the Andean Quechua term). Andeans drank fresh *chicha* in secular contexts as a refreshing and nourishing beverage. They also offered it to various supernatural beings, including the *auquin* which resided within mountains.

In Northern Indoamerica, the Nahuatl-speaking peoples fermented the sap of the cultivated *Agave* plant to produce *pulque*. Consumption of *pulque* for other than ritual purposes was strictly regulated by the Aztec state. Only older men who were more or less retired were allowed to consume all the *pulque* they wanted.

Mayan speaking peoples fermented tropical barks to make what they called *balche*, offered to the gods at the rain ceremony. [61] At the northwestern tip of Indoamerica, the O'odham also fermented an exotic fruit, that of the subtropical saguaro. Maize fermentation extended north to the Tarahumara on the Mexican Central Plateau, but apparently not to the O'odham. Maguey or *Agave* sap fermentation extended to the Sinaloan tribes, the Acaxee, the Laguneros, Tepehuanes, Cora, etc.[62] The O'odham shared the ceremonial drinking of

[60] Spencer 1976.
[61] Redfield 1941:121.
[62] Beals 1932:169-70.

fermented beverage trait with the Tarahumara, Yaqui, Sinaloan tribes, Acaxee, Huichol, Tarascan, and the Nahuas.[63]

Aboriginal Ceremonies

Twentieth century ethnographic research discovered for newcomers the O'odham purpose for the *navaita* ceremony - bringing rain. Castañeda's brief record of a 1540 *navaita* ceremony makes quite clear that said ceremony was an aboriginal O'odham cultural practice. After all, 1540 was only a score of years after the Cortesian invasion of the Aztec Empire. Initial contact between Europeans (plus a North African[64]) and the Ures O'odham had occurred but four years earlier in 1536. Consequently, the Spaniards had not had time to initiate what Spicer called their program of directed native cultural change[65]. That would occur later, and it would alter much of aboriginal O'odham religious practice and belief, although not the *navaita* ceremony. The Sonoran Desert always needs summer rains so the O'odham can irrigate and raise summer crops on riverine and desert *akchiñ* fields alike.

Not all aboriginal O'odham religious ceremonies have persisted like the *navaita* ceremony has. The chronicler Pedro de Castañeda, castaway Alvar Núñez Cabeza de Vaca, and historian Bartolomé de las Casas reported 1536-40 O'odham religious behaviors which certainly did not survive O'odham conversion to Christianity, and may not have persisted until missionization began in the seventeenth century.

Anglo-American newcomers to O'odham country and later ethnographers were struck by the 16-day long ritual cleansing O'odham enemy slayers endured.[66] In 1540, a ritual building peppered with arrows in preparation for going to war impressed Castañeda. "They have their temples in small houses, into which they drive numerous arrows, making them look like porcupines on the outside, They do this when war is about to break out."[67] Dobyns translates the Spanish text somewhat differently. "They have some little houses by way of chapels into which they shoot so many arrows that they look from the outside like a porcupine. They do this when they expect to go to war."[68] To repeat, such a structure is unknown among the O'odham at later dates.

The Ures O'odham also employed special arrows in another ceremony mentioned so briefly by Núñez Cabeza de Vaca that its purpose remains unknown. The O'odham hosts presented Castañeda and his companions with coral beads and other gifts. To Dorantes, they presented five arrow points made of "emerald" - probably blue beryl from the Rio Grande

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[63] Beals 1932:218.
[64] This was Estevan the Moor, a Spanish slave of African descent who traveled with Cabeza de Vaca.
[65] The Spanish came with an expectation to encounter "barbarians" or "savages" and an intent to "civilize" these people with appropriate dress, town life, legal marriages, Christianity, and Spanish regal authority and law.
[66] Underhill 1938:93-103; 1939:137-38.
[67] Castañeda 1940:250.
[68] Winship (1896:449) published his transcription: "Tiene(n) unas casillas pequeñas de adoratorios en que hincan muchas flechas que las ponen por de fuera como un eriso y esto hacen quando asperan [*sic*, esperan] tener guerra."

Valley. Said arrows they used in their *areitos*[69] and dances, wrote Núñez.[70] *Areitos* is a Taino word the Spaniards learned in the islands. It referred to ritual dancing performed to oral song accompaniment - evidently outside previous European experience else the Spaniards would not have borrowed the Taino label. Consequently, Núñez's use of the loan word indicates that he perceived the musically accompanied dancing as ceremonial, although he wrote no clue concerning the purpose of the rare arrow point performance.[71] No nineteenth or twentieth century record of such an O'odham arrow point ritual is known.

Castañeda and Vazquez applied the place name Corazones[72] to the O'odham settlement[73] at the upper edge of the coastal plain where the Sonora River leaves its intermontane long cañon. Corazones is obviously Spanish; it translates into English as "Hearts." The four survivors from the disastrous Pánfilo de Narváez expedition to Florida used this label in 1536 because one O'odham ritual behavior greatly impressed them. Local ceremonialists - almost certainly native priests rather than shamans - presented to one of the fugitive quartet 600-plus split, dried deer hearts.[74] That was what the fugitives wrote or reported to colonial officials, leaving readers or auditors to draw their own conclusions concerning the O'odham rituals involving that huge number of animal hearts. That they formed part of a rite aimed toward keeping living deer amenable to being killed for their venison seems quite possible.

The Gila River Akimel O'odham engaged in a similar ritualized behavior until at least the end of the seventeenth century. During the final decade of that century, Eusebio F. Kino, S.J., and Captain Juan M. Manje reported finding a horse-high stack of mountain sheep racks outside one Akimel O'odham village.[75] Neither reported the O'odham motivation for accumulating the spectacular stack of horns. In 1774, Hi'a Ced told Captain Juan B. Anza that horns stacked in the Cabeza Prieta mountains were placed there to "keep the wind from leaving the country."[76] Animal horns are, however, not deer hearts, so O'odham beliefs concerning the supernatural functions of horns most likely differed from their beliefs concerning the supernatural functions of deer hearts.

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[69] In Tainos culture, *areitos* were ceremonial and social dances, during which they recited their creation stories and other cosmologies. Thanksgivings were made for various natural and plant spirits, and the ancient stories were told. There were areitos for the season of Huracan, singings for the four beings, for the origin of the sun and moon, the ocean and fishes, the snake and jutia, for the guayaba, the ceiba, the corn, the name and the yucca (José Barreiro 1990).

[70] Núñez 1944:62.

[71] Bandolier's (in Núñez 1905:156) translation of *areitos* as "feasts" is positively misleading.

[72] Corazones is opposite Ures on the Sonora River.

[73] Hrdlička (1906) places the Lower Pima or Pima Bajos (Nevome) around Ures. He also stated that they did not have communications with the Gila River Pima and only a few of them knew of the Gila River Pima. Hrdlička (1904) identified the Nevome as a separate band of Pima or Yaqui. He refers to the Ures Pima, and places the Papago mostly in Arizona but also in the vicinity of Hermasillo, implying that at one time they occupied more of Sonora than in his day. He describes the Papago as living "in their own villages or rancherias about the frontier, and [preserving] their customs and traditions in almost aboriginal purity"(p.57). Undreiner (1947) also refers to the Ures as a branch of the Lower Pimas. He places Ures a few miles west of Corazones.

[74] Núñez 1944:63; Fernández de Oviedo y Valdés 1974:63 [English], 146 [Spanish: "les dieron mas de 600 corazones de venado escaladas e secos"].

[75] Manje 1954:87; Kino 1919, reprint 1948, 1:128.

[76] Anza in Bolton 1930:29-30; quotation from Ezell 1961:76.

While the four Narvaez Expedition fugitives were circumspect in what they wrote and said about O'odham ceremonialism, someone talked to the great Dominican reformer and historian, Bartolomé de las Casas. Likely it was a soldier in Vazquez's army who spent the monsoon season of 1540 at Corazones as did Castañeda.[77] Whoever Fray Bartolomé's source may have been, he claimed that the Ures O'odham used at least one "very tall temple made of stone and tamped earth" housing a stone image before which deer, rabbits and fowl were sacrificed. That is, sacrificed by having hearts cut out of carcasses and blood poured over the stone image.[78] All of the Spanish sources agreed that this was animal sacrifice, not the abominable and intolerable to Spaniards Mesoamerican human sacrifice which extended northward as far as the mountain dwelling ethnic Acaxee living immediately southeast of the ethnic Mayo.[79]

Whatever the precise practice of O'odham ritual animal heart sacrifice, it did not survive Christian missionization and conversion. Venison was a treat. In later times, Gila River Akimel O'odham imported jerked venison and mountain sheep meat, plus deer tallow from Tohono O'odham hunting specialists.[80] Maize, tepary beans, and pumpkins were, on the other hand, dietary necessities. Dried stewed pumpkin tasted appealing sweet, but maize and beans satisfied hunger and maintained active bodies. The irrigated fields or *oidak*, consequently, required water at the proper crop growing times. That meant being able to depend year after year on the summer monsoon precipitation. In O'odham conception, the giant cactus fruit jack drinking ritual brought the rain clouds, or, in the case of extended drought periods, encouraged their return. So the *navaita* ceremony continues despite the determined opposition of Christian missionaries and government officials of colonial New Spain, independent Mexico, and the United States. That the *navaita* ceremony has endured so long, outlasting several more spectacular rituals concerned with hunting and warfare attests its centrality in O'odham cosmology and technical (sustainable) and psychological adjustment to the Sonoran Desert landscape of the O'odham Holy Land.

Navai't Ritual

Ceramic vessels were once vital to dietary and ceremonial use of giant cactus fruit juice. "The cactus fruit was boiled in water, strained through a mat of grass or branches to remove seeds, etc., the juice was then boiled down to a sirup and placed in ollas, and sealed with a bit of broken pottery covered with mud." When the rain-bringer ("He Who Desires Liquor") decided to hold the rain-bringing ceremony, his assistants opened the sealed ollas and the syrup mixed with water and set to ferment.[81]

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[77] Wagner (1967:202) decided "Doubtless his informant was a Franciscan who had made the journey to Quivira and managed to return" but admitted such a person could not be identified from published sources.
[78] Casas 1958:106, 127. This imposing temple also served as the preservation chamber for the eviscerated, desiccated cadavers of persons the Spaniards identified as deceased rulers.
[79] Casas wrote about a dynastic minded Maya ruler recently converted to Christianity who forebore the traditional sacrifice of birds and other animals at his brother's marriage festival (Wagner 1967:91).
[80] Russell 1908:92. The priests at Corazones probably employed (one way or another) hunting specialists to accumulate sacrificial hearts.
[81] Densmore 1929:151.

such as creosote bush (*Covillea glutinosa*). A four-strand rope made with the rope twister is the usual one used for halters and bridles (p. 62)."

In the construction of traditional brush houses, saguaro ribs formed the roof, while a large needle made from saguaro ribs were used to thread bundles of grass to serve as the outer house thatching (p. 66-67).

In the construction of scarping sticks, a musical instrument: "A series of minor songs concerned an imaginary being, *pihuri*, who caused and cured sore eyes. These required a straight stock of sahuaro rib with shallow, close-spaced notches, giving a much softer sound." (p. 68)

Coarse, strong slats [ribs] were bound together and used for house frames, shelves, doors, cradleboards, traps, and bird-cages. Slats were joined with one or two rows of deer hide thong and used to make screen doors. Ribs made into a drying rack for datil fruit (*Yucca baccata*). Ribs split, made into rough cages and used to trap gambel's quail (*Callipepla gambelii*) and mourning doves (*Zenaida macroura*). Giant ribs split in two and used as wooden tongs for gathering cholla joints and buds. The ribs were a chief warp material that were used to form an upright bundle of long slats when the fleshy portion had rotted away, and were ready for immediate use. Ribs used for roofing, to make several kinds of light tools, and for the handles of skin scrapers. "The scraper used for this purpose was a slightly curved rod of catclaw (*Acacia greggii*) about a foot long, set at each end in a short handle of split cactus rib (p. 69)."

In the construction of bowstring, perforations were bored in sticks and used to smooth rough cords, "This hard rough cord was made rather smooth by running it through a small perforation bored in a stick of sahuaro wood (p. 70)."

Saguaro wood and sawdust was used to make fire "with palm drill; the heart of a cactus rib was held with the feet while the drill of creosote bush wood or arrow bush was revolved between the palms. A little sawdust from dry sahuaro rib caught the spark which was transferred to a pile of dry grass and manure (p. 73)."

Saguaro 'boots' were used extensively for items such as dishes or tobacco pouches. "These dishes are eagerly collected and most households have an assortment of them (p. 74)." (Castetter and Underhill 1935).

Trunks used to make cactus fruit picking poles (Castetter and Bell 1937).

Minor uses of the seeds were as a source of oil and as a tanning medium for skin dressing (Bruhn 1971).

Saguaro ribs are used in the roof of the ramadas, for stirring sticks, the framework for strainers, and in the construction of the "kuibit," or gathering pole" (Keasey 1975).

Saguaro ribs used to make saguaro harvesting pole, *ku'ipaḍ*, and to make tongs, *wa'o*, to pick prickly pear fruit (Keasey 1980:13).

Even in the 1980s at Quitovac, Sonora, the traditional houses of adobe bricks had some walls made of ocotillo with saguaro-rib stringers (Galinier 1991).

[In the late 1990s] saguaro ribs were being used for fence material and ramada roofs around homes as well as for a ramada roof over a shrine (Seivertson 1999).

Related plants:

Catclaw acacia (*Acacia greggii*) - Short transverse sticks affixed to poles and used to dislodge saguaro fruits from the shafts (Castetter and Underhill 1935).

Creosotebush (*Larrea tridentata*) - Piled on top of saguaro ribs to strengthen house roofs. Short transverse sticks affixed to poles and used to dislodge saguaro fruits from the shafts (Castetter and Underhill 1935).

Small soapweed (*Yucca glauca*) - Fiber used to tie saguaro needles together (Castetter and Underhill 1935).

During World War II, when families had returned to Topawa with their processed saguaro fruit syrup, "each family donates syrup for ceremonial use, probably about four quarts." Villagers gathered to sing and dance all night to foster syrup fermentation. "Only the Presbyterians refuse to attend." The *navai't* ritual had lapsed in the two western districts of the Papago Reservation - Hickiwan and Gu Vo - two decades previously.[82]

The fructose-rich syrup had to be diluted with water before fermentation. Lumholtz (1912: 32) was told of a place at Baboquivari Peak where a "pond is found which is called by the Indians *Viikan Shootak* , 'Lasting Water' (*shootak*, water), and which in the belief of the Indians was left by the sea after the deluge. At the time of the making of sahuaro wine for their great feasts of the summer, people go up there to get some of this water, after having first sung to it, to use in the wine making." Lumholtz described the hands-in procedure at Santa Rosa.

> Two young men seated on the ground under the *jacal* in front of Juan's hut and facing the east began these operations. The sweet stuff was first poured into a large and deep water-tight basket, with symbolic [sic] designed in the weaving, one placed before each young man. Water was poured into this, in the proportion of two-thirds to a third part; sometimes half and half is used. The operators, who had their shirt sleeves turned up to the elbow, mixed according to rules and regulations. Slowly stretching their hands, palm down and forward, over the fluid, they would immerse them and draw them along the bottom toward themselves, then rubbing the hands twice against each other over the fluid. This was repeated several times. As a change they sometimes dipped them into the liquid, lifted up what the two hollows of the hand would hold, and rubbed it into foam, continuing rubbing until the foam disappeared. An elderly man then tasted the mixture, carried the basket into the house, and emptied it into one of the big jars. This procedure of mixing lasted nearly four hours.[83]

The syrup-water mixture was fermented in a special structure, the *va:ki*. This was round, walled with a framework covered with grass and a layer of ocotillo and tree branches on the exterior. The flat roof was supported by internal stout posts.

Within the *va:ki*, ceremonialists dug shallow holes at the cardinal points, cushioned them with straw to hold the ollas containing fermenting cactus fruit juice mixed with water.[84] One leader conducted the entire ceremony, assisted by mixers, a taster, and four men to watch the ollas during the fermentation process, and four rain bringing medicine men, plus usually 16 singers. A fire burning near the single door of the *va:ki* furnished mesquite and ironwood coals taken into the *va:ki* and placed in its center "to supply an even heat and induce the desired fermentation."

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[82] Crosswhite 1980:36, following somewhat inaccurately Joseph, Spicer, and Cheskey 1949:74, 76 [Presbyterians quote].

[83] Lumholtz 1912:120, quoted in part by Crosswhite 1980:38.

[84] See Crosswhite 1980:41, Fig. 25 "Interior of ceremonial round house at Santa Rosa showing a depression in the floor for a wine olla." 42, Fig. 26, 'The plant material in the depression is creosote bush (*Larrea tridentata*) just as described by Carl Lumholtz in 1912."

Traditional songs fostered cactus juice fermentation, as well as the even warmth. "The old men must sit beside it to sing, lest any magic influence it, and outside the people must sing it into fermentation. Two nights of song is the regular measure."[85] Lewis (1988), however, noticed that O'odham hunters kept deer tails as a magical fetish, and used these to aid in the fermentation. Men and women joined in a circle dance - women chose their partners in the circle.[86] As Austin (1924:152) described it, "The Papago are the only Indians of my acquaintance who hold one another's hands as they dance, and their ceremonial circle is against the sun."

When the *navai't* was nearly ready, the People assembled to drink it. Traditionally, they painted themselves with a special paint made of white clay and black mud ground together. People sat in a circle east of the *va:ki* doorway. Four men served *navai't* from baskets. "Many songs were sung during the distribution of the wine." In addition, a man dressed as if old and poor delivered a memorized speech--an admonition speech or sermon. "Let us all join in our feeling to have the rain." Rejoice to see water in the little arroyos leading to the flood fields. Think of the white winds and clouds to the east, the black winds and clouds to the west, the green winds and clouds to the north, the yellow flowers and clouds to the south.[87]

Once a village's *navai't* had fermented, if the supply were sufficient, it would invite neighboring villagers to come share in the ritual bounty. Messengers invited the neighboring villagers by reciting the traditional Mocking Bird speech "because the mockingbird is the most eloquent of birds."[88] In pre-horse times, the *navai't* ceremony leader selected a special runner to run to the neighboring villages with the invitation. Alert to the season, an important man in the village expecting the invitation was in front of its ceremonial structure awaiting the runner. After the O'odham acquired horses, the runner became a rider. Analysts regard the memorized speeches recited by the runner as very old, transmitted from generation to generation.[89]

Invitees from neighboring villages arrived at the host village, or *vahki*, either in mid-morning or around midday for the sit-and-drink ceremony. The same man who had previously recited the running speech, recited a seating speech. The invited guests then ran to their places and sat in a circle outside for the "Sit-and-drink" ritual. Then "before the baskets of liquor go round, are recited some of the most beautiful of the descriptions of rain and fruitfulness."[90] Color symbolism went on display during this ceremony. Traditionally, there

> ...was a special paint for use at this festival, made of white clay and a soft black mud ground together...Those who were seated at the cardinal points were the leaders and had their faces painted half white and half red. They were painted in pairs, the man at the north having the left half of his face

[85] Underhill 1938:24.
[86] Underhill 1938:24.
[87] Densmore 1929:152-58.
[88] Underhill 1938:31.
[89] Crosswhite 1980:44, following Underhill 1946:52-53; Underhill et al. 1979:25-26.
[90] Underhill 1938:32.

painted white, and the man at the south having the right side of his face white, while the man at the east had his left cheek and the man at the west had his right cheek white.[91]

Historic access to Old World wines and distilled alcoholic beverages apparently changed O'odham attitudes toward *navai't* consumption. "Tradition says that, in the old days, all juice was fermented in the council house with none kept for private consumption." In 1909 at La Noria, however, Lumholtz reported that as soon as the sit-and-drink supply of *navai't* was consumed," people repaired to the houses, where the sahuaro wine flowed through the evening and night"[92]

Ritual and related conduct had changed by the early 1930s. "At present a great deal of the liquor is used for home consumption and people want more of it."[93] People in the central Reservation told Underhill that they drank until the supply of *navai't* was entirely exhausted. Men on horseback galloped "from house to house, wherever there was a supply"[94] because no family could drink its own liquor for fear their house would burn down. They would drink at other houses, vomit, and go on to visit others and sing songs (Underhill 1936).

A challenge to the cultural role of the saguaro occurred in 1883 when the U.S. government passed the Religious Crimes Code of 1883 in an attempted to ban Indian dances and ceremonies. While the law was formulated based on problems with the Plains tribes and with encouragement from the Protestant missionary establishment, all tribes were affected by it to varying degrees. While some Bureau of Indian Affairs (BIA) personnel tried to discourage the Indian dances, others viewed them as harmless social gatherings and even participated in organizing them (Lewis 1988).

The issue of Indian dances reached a critical point in 1923 when BIA commissioner Burke issued a circular prohibiting traditional dances. The struggle continued until 1934 when John Collier, the new BIA commissioner, distributed to reservation superintendents BIA Circular 2940. Concerned with Indian religious freedom and Indian culture, this statement made it clear that "no interference with Indian religious life or ceremonial expression will hereafter be tolerated."

Throughout this fifty year period, however, the saguaro wine ceremony continued even during the most turbulent times. After the Papago Reservation was established in 1917, government officials began to crack down on native ceremonies, especially those connected with the consumption of intoxicants like *tiswin*. Special agents even raided villages and smashed ollas believed to be used in making tiswin, but found no wine. As Lewis (1988:461) noted

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[91] Crosswhite 1980:44, quoting Densmore 1929:156. Underhill (1946:66-67) reported that "dandies were said to prepare for the drinking by reddening the soles of their feet so that when they fell over drunk "the pretty color would show"."

[92] Crosswhite 1980:46, quoting Lumholtz 1912:60.

[93] Underhill 1939:98.

[94] Crosswhite 1980:48, quoting Underhill 1946:66-67.

> [In the 1920s] Papagos in the northern districts of the Papagueria responded to the drought in very traditional ways -- by moving to their Well Villages, gathering traditional desert foods, and by increasing traditional rain-making ceremonies, particularly the Náwai't ceremony where the people gathered to consume tiswin (saguaro wine) and listen to ritual mockingbird speeches which "brought down the clouds."

During the 1922 drought at Big Fields, a tribal leader was arrested for making *tiswin* to bring rain. Agents dispersed the crowd of 200 to 300 villagers, and proceeded to Santa Rosa to arrest the leaders there as well. But the reservation superintendent recognized that arresting the tribal leaders would not stop the practice for the people firmly believed that, "If they gave up the making of 'tiswin', it would mean starvation for their wives and children, as it would never rain again." Despite warnings and more arrests in 1924 and 1925, the Tohono O'odham people continued to hold their ceremonies in secret (Lewis 1988:461-462).

During the Indian Reorganization Act period of the 1930s, traditional Tohono O'odham leaders openly renewed the Náwai't ceremony. Ruth Underhill, an anthropologist working with the Papago, assured John Collier that the consumption of *tiswin* was harmless, and that, "The ceremony is dearer to the Papago heart than any other; they still feel that, without it, there would be no rain and an attempt to interfere with it would bring profound resentment" (Lewis 1988:481). Throughout the 1930s, it was estimated that the Tohono O'odham people harvested 450,000 pounds of saguaro fruit each year and turned most of it into *tiswin* (Fontana 1989).

Vikita (Wiigita, Wi:gida, Wigita)

The purpose of the *vikita* is to keep the world in balance (Lewis 1988), or as Kozak (1992) describes, it is a world renewal ceremony. Underhill (1939) refers to it as the prayerstick ceremony, and Mason (1920) calls it the harvest festival. The saguaro is used in the *vikita* in a variety of ways. The ribs are used in the bull-roarer, a tool used to call people together at various times during the ten-day ceremony, and *tiswin* is consumed. Hayden (1987) described ceremonial objects of clay models resembling saguaros and ripe saguaro fruit, painted red and green, being carried by the singers. Mason (1920:18) described abstract representations of the saguaro during a *vikita* that he attended.

> One body of men are the *nanawitcu* (singular *nawitcu*) or clowns who represent saguaros and wear turkey feathers on their heads to represent the fruit. They carry long poles that represent the *kui'pad* and hold representations of clouds made of cloth at the celebration. They also carry four ridiculous-looking arrows that are made from saguaro ribs, and a saguaro pole with small greasewood sticks tied to it at right angles to serve as hooks. On the tenth day, a main enclosure is built for the *vikita* that includes saguaro ribs. The men from the villages make objects from twigs and colored cotton to carry to the ceremony that represent sahuaros, *tiorimus* (choyas), mezquite beans, *parmitas* (a small seed), clouds, deer, or some other object of ceremonial

importance. At noon, the *nanawitcu* pretend to make *tiswin*, and bring great ollas pretending to be drunk.

Lumholtz (1912:95) also observed more abstract representations of the saguaro during a *vikita*. He also provided some insight as the relationship of the saguaro to the *vikita*.

> An important part of the singer's outfit is the bull-roarer, consisting of two flat pieces made of sahuaro rib, the smaller one being held by the hand when in use. The connecting string should be twine of native cotton, which still may be found in use. They are decorated with symbolic designs, such as those standing for lightning, clouds, turtles, grains of corn, expressing their desire for rain. The buzzing sound produced should be deep, in imitation of the thunder, which brings rain; if the sound is shrill, lightning only will follow.

Davis (1920:174-176) estimated that 120 gallons of saguaro wine was consumed at a 1920 *vikita*. He noted some interactions during the drinking that involved the saguaro.

> The night following the ceremony was given over entirely to unrestricted drinking, indulged in by the entire male population. A peculiar custom is that some of the young men, still able to walk, went around to every Indian house and touched every man on the shoulder with a stick of saguaro wood - a summons to go to the tizwin house and get drunk. This could not be disregarded. The summons was always accompanied with the ceremonial phrase, "You are a good man when you are drunk." Any man so summoned arose immediately, found his way to the place of debauchery, and drank. Often the men would vomit, then proceed to drink again and this might happen several times during the night (174-175).

> The old keeper doled the liquor in small, two-quart ollas, from which the Indians drank, passing them from mouth to mouth until all was consumed, and the ollas ready to be refilled. The Indians claim that the liquor is good for them, as it cleanses the system either as an emetic or as a cathartic. It was given to them by "Montezuma," together with the saguaro and other desert products. During the drinking there was neither quarreling nor fighting (176).

Galinier (1991:519) was told of the traditional *wi:gita* ritual in Quitovac, Sonora during which "a ritual consumption of saguaro cactus wine occurred ten days after the beginning of the notched-stick day count." The wine was called *tepache* in Quitovac Spanish. It no longer occurs but was similar to the *wi:gita* in Sells, Arizona. The people of Quitovac also used saguaro wine during the ritual of the mule deer, which was performed before a deer hunt held ten days before the *wi:gita*.

The extent and complexity of the saguaro in O'odham life surpasses that of other plant species. Despite the changes in and challenges to their traditional ways, the Tohono O'odham people retain a strong sense of place and identity. Through their language (Table 4), traditional stories, crafts, and ceremonial life, they continue to celebrate their connection

with the land and each other. Some people still plant small gardens and *ak-chiñ* fields in the traditional ways. Many of them continue to gather wild fruits from the desert, particularly the saguaro, to use in ceremonies or as a subsistence supplement (Lewis 1988; Lopez et al. 2002).

	O'odham	Source
Saguaro	hacani, hahshani	Fowler 1983
	háašañ	Mathiot 1962
	ha:sani	Shaul and Hill 1998
	há:ṣañ	Pilcher 1967
	ha:ṣañ	Keasey 1980
Harvesting pole	kuibit	Keasey 1975
	kuipaD	Dobyns
	kui'ipad	Papago Tribe 1984
Saguaro syrup	bahidaj sitol	Keasey 1980
	tci'aldi	Russell 1908
	sítoli	Lumholtz 1912
Saguaro fruit	bahidaj	Keasey 1980
Saguaro seeds	kaij	Keasey 1980
Saguaro fruit jam	hihij kuʂul	Keasey 1980
Dried fruit seed	do'ig kajj	Keasey 1980
Roasted fruit seed	s-bahi kaij	Keasey 1980
Dried fruit	juñ	Keasey 1980
Cross pieces of the harvest pole	matsuguen	Keasey 1975
Saguaro rib tongs for harvesting prickly pear fruit	wa'o	Keasey 1980
Saguaro moon or Month to gather saguaro fruit (June)	Ha:san Bak Masad	Heard Museum 2003
July, the rain moon	tcuuki(macat)	Underhill 1939
Giant cactus ripe	haacainyi pa'k	Underhill 1939
The Dipper	Kiupat (cactus stick)	Underhill 1939
The Saguaro Harvest	Ha:sañ Bak	

Table 4. O'odham saguaro terms.

Ethnobotany

The saguaro provided materials for a variety of subsistence needs in aboriginal life. While extensive use by the Tohono O'odham people has been documented, other tribes made some use of the great cactus. Use categories include food, medicine, ceremonial, fiber, manufacture, trade, other, and unspecified.

The saguaro was an important food supplement throughout the American Southwest in both prehistoric and historic times. Procurement of saguaro fruit normally took place on the bajadas of near-by mountains, where the saguaro found the preferred rocky, well-drained soils on south-facing slopes (Gasser 1982).

There are several early accounts of saguaro use. In the fall of 1698, Tohono O'odham people living near Caborca, Sonora presented Father Kino with saguaro fruit. Almost one

hundred years later, Garces (1776) documented the use of saguaro wine by the Pimas during a September ceremony to welcome him, and Pfefferkorn (1794) wrote of Sonoran Indians making saguaro syrup. Hardy (1829) observed saguaro fruit harvests in 1825-28. As his party left the Gila River in November 1846, Major W. H. Emory soon encountered the saguaro, the fruit of which he noted was highly prized by the Indians. Castetter and Bell (1937) found that the United States-Mexican boundary Commission in 1898 recorded the use of saguaro wine by the Tohono O'odham. These historic accounts simply document what the Tohono O'odham people have known all along. "Saguaros have been a part of our people forever. As long as there have been human beings and cactus in the desert, the annual gathering of cactus fruit has been part of the Tohono culture" (Tucker in Allen 2001).

All fresh cactus fruits are an excellent source of ascorbic acids (Greenhouse, Gasser and Gish, 1981). The fruit and seeds are high in calories and good sources of protein, fat, and carbohydrate (Table 5). Saguaro seeds can be eaten along with fresh fruit, or extracted from the pulp, parched, and ground into a multi-purpose flour. The fruit was eaten in quantity by recent Indians when available, the surplus gathered and dried or boiled to make syrup, candy, preserves, or wine (Castetter 1935; Castetter and Bell 1937; Castetter and Underhill 1935; Crosswhite 1980; Russell 1975).

	Protein	Fat	Carbohydrates	Calorie	Ash	Calcium
Saguaro fruit	10.3%	15.0%	70%	499 gm	3.3%	0.032%
Saguaro seed	16.3%	30.6%	54%	609 gm	3.3%	0.100%

Table 5. Saguaro nutritional values (Ross 1941).

Tohono O'odham Uses of Saguaro

The Tohono O'odham people used the flowers, fruit, seeds, thorns, burls or boots, and ribs of the saguaro. The majority of uses were for food, ceremony, and various types of manufacture. Uses are presented by category of use and sources.

Food
Saguaro as a food item (Diary of Father Fray Juan Diaz, Feb. 7, 1774, in Bolton 1930).
"On its fruit the Papago Indian lives for weeks at a time, and from it makes a syrup and a fermented drink. What he cannot use when fresh he dries and preserves for the future (Gaillard 1896:600)."
"The only native alcoholic drinks among the Papago are the sawado, saguaro, or haren, made by fermenting the molasses of the pitahay-like fruit of the saguaro, and mescal. The haren takes two days to make, and it lasts in good condition one day and one night. The first day it is not very intoxicating and is said to leave few or no bad effects; after that it grows more alcoholic, and its effects are more unpleasant. To make it strong without so much of the bad taste the Indians cover with blanket the jar in which it ferments (Hrdlička 1908:28)."
In addition to making wine, they boil down the juice to a thick syrup, sealing it hermetically in native jars, with fresh clay. They make a kind of meal cake of the pounded seeds (Austin 1924).
Fruits used as an important article of diet. Made into a conserve, and boiled to make a syrup. Seeds ground into flour. Oil extracted from the seeds (Castetter 1935).

Fruits used as a staple food, also dried and stored in jars, used as sweets, made into jam or syrup. Pulp eaten fresh, and boiled to a sweet, sticky mass and used like raspberry jam. Juice made into cactus jam and used as the most important sweet in the diet. "The sweets, highly prized, were dried fruits, fruit jam, fruit syrup, and honey. Sahuaro, pitahaya (*Stenocereus thurberi* syn. *Lemaireocereus thurberi*), and prickly pear (*Opuntia* spp.) fruits could be dried and stored in jars, but not for long because they became wormy. Syrup and jam from all these fruits were made when they were picked (p. 46)."
Seeds made into flour and used for food. Saguaro seed flour mixed with cornmeal was a favorite food having a "slightly oily and sweet" taste (p. 45). Seeds parched, stored and used to make meal cakes. Also parched, ground, mixed with water and oil extracted. Seeds parched and used as a chicken feed (Castetter and Underhill 1935).
Fruit used for food, and boiled, without sugar, to make preserves. Fruit used to make syrup and candy (Castetter and Bell 1937).
Fruits and seeds used for food (Castetter and Bell 1942).
The fruit is boiled down to syrup and sealed in jars at the end of each day. The syrup is used as is or made into wine (Chesky 1943).
San Xavier families gather saguaro fruit to get the saguaro seed for meal and to make syrup rather than to make ceremonial wine (Fontana 1960).
The Papago were primarily interested in the saguaro with its large juicy sweet fruit that can be eaten raw or reduced to a very palatable syrup or jelly. The saguaro seeds are also a source of oil. ...Saguaro seeds, although they were eaten in considerable numbers, are extremely small (Hackenberg 1964).
Uses of the fresh fruit include syrup and jam. Uses of the pulp and seeds include dried and powdered for gravy, made into candy, and fed to chickens. Saguaro ribs are used in the roof of the ramadas, for stirring sticks, the framework for strainers, and most notably, in the construction of the "kuibit," or gathering pole" (Keasey 1975).
Seeds ground into a rich, buttery paste, which was pressed into cakes for home storage (Goodyear 1975).
Fruit still collected and used for food (Haury 1976).
Flowers used to make a gruel. Juice boiled to make syrup, some of which is used to make wine for the rain ceremony. Pulp used to make jam or dried, ground and mixed with wheat to make bread. The ground seeds can be used as a substitute for grease, or eaten with syrup, jerky or pinoli. The seeds are used to make a gruel or porridge. The dried fruit that falls to the ground can be stored for winter use (Keasey 1980:15).
Fruit boiled in large ollas for conserves or to make wine. Seeds and pulp ground to make cakes. Any of this processing might occur at the habitation site depending on distances (Bruder 1982).
Fruit and seeds used in many recipes (Niethammer 1999).
Related plants:
Malvaceae* - Seed flour mixed with saguaro seed flour, baked on sand and eaten as browned cakes (Castetter and Underhill 1935).
Velvet Mesquite (*Prosopis velutina*) - "The lumps of clear white gum-like secretion found on the branches of the mesquite bush were gathered by the basketful, and might be chewed just as they were found, or they might be dried and then ground on the metate. The dried granules could be mixed with sahuaro syrup and eaten like jam, or be ground up again with any of several species of cactus seed, then boiled in sweet, thick gruel which hardened like candy when it cooled" (Castetter and Underhill 1935:28).

* May include Indian mallows (*Abutilon* spp.), anoda (*Anoda* spp.), poppymallows (*Callirhoe* spp.), mallows (*Eremalche* spp.), Thurber's cotton (*Gossypium thurberi*), bladdermallow (*Herissantia crispa*), rosemallows (*Hibiscus* spp.), velvetmallows (*Horsfordia* spp.), largeflower wild hollyhock (*Iliamna grandiflora*), mallows (*Malva & Malvella* spp.), shrubby false mallow (*Malvastrum bicuspidatum*), Carolina bristlemallow (*Modiola caroliniana*), buffpetal (*Rhynchosida physocalyx*), fanpetals (*Sida* spp.), checkerblooms (*Sidalcea* spp.), and globemallows (*Sphaeralcea* spp.).

Ceremonial

"[The ribs] form a covering for their graves when they die. So in death, as in life, the Papago is near his beloved "Saguaro" (Gaillard 1896:600)."

As part of the vikita, two booths were made of saguaro ribs, semicircular in form and about 100 feet apart (Davis 1920).

Saguaro wine used in viikita and rain ceremonies (Densmore 1929).

Pulp boiled with water, strained, boiled again and used as a ceremonial drink. Juice mixed with water, fermented and used as an intoxicating drink in ceremonies to bring rain.

Ribs with shallow, close-spaced notches used as soft rattles for certain songs. In the construction of scarping sticks, a musical instrument, "A series of minor songs concerned an imaginary being, *pihuri*, who caused and cured sore eyes. These required a straight stock of sahuaro rib with shallow, close-spaced notches, giving a much softer sound (68)." Coarse strong slats [ribs] were bound together and used for a number of ceremonial objects.

Fetishes made for the Vikita ceremony were mounted on a wicker frame of saguaro ribs. In the Vikita ceremony "the effigies used for the wild crops represented sahuaro and prickly pear fruit and might be of red clay or of red ocotillo blossoms (p. 76)."

"Women were tattooed with vertical lines on the chin, a woman specialist doing the work for which she was paid a necklace or a basket of corn. Her piercing instrument was four sahuaro needles tied in a row with a shred of yucca fiber (*Yucca glauca*) (p. 51)." (Castetter and Underhill 1935).

Saguaro harvest marked the beginning of the new year (Castetter and Bell 1942).

Saguaro juice is stored in jars to ferment, making an intoxicating beverage called *tis-win*, which is used in the rain-making ceremonies that follow the harvest (Keasey 1975).

Juice boiled to make syrup, some of which is used to make wine for the rain ceremony. Children were taught to place the cleaned skins of the fruit on the ground red side up to bring rain (Keasey 1980:14-15).

According to a Pima informant, the preparation and drinking of an intoxicating beverage (*ha-ashan navait*) made from sahuaro is a religious ceremony of the Papago (Curtin 1984).

Fiber

Ribs used as one of the chief warp materials, and for roofing. Slats joined with one or two rows of deer hide thong and used to make screen doors (Castetter and Underhill 1935).

Related plants:

Creosotebush (*Larrea tridentata*) - Piled on top of saguaro ribs to strengthen house roofs (Castetter and Underhill 1935).

Manufacture

"When dead this cactus is almost as useful as when living, for its long, tough ribs, disposed beneath the outer skin, like staves of a barrel, furnish the Papagoes with a foundation on which to form their mud roofs and with material out of which to make their chicken coops, traps, and similar articles of household furniture (Gaillard 1896:600)."

Ribs were used to make cotton spindles. "The cotton was spun on a spindle of arrow weed (*Pluchea sericea*) eighteen inches high, with a whorl made of a section of sahuaro rib two inches wide and three or four long (p. 59-60)" and to weave horsehair ropes: "This twister consisted of two pieces, the larger made of giant cactus rib, the other of some hard wood

Trade

Saguaro syrup was traded and gifted to neighbors. They would trade giant cactus seeds to the Pima (Underhill 1939).

Other

The O'odham name for the Big Dipper is "Cactus Hook" because of its resemblance to the saguaro harvesting pole and hook.

"The 'stick game' (*ginskut*) is played every afternoon at San Xavier, a set of sticks being concealed under a cactus ready for use. This is a dice game, the sticks being dice. Songs...are commonly sung to bring success in the game. The four gaming sticks (Figure 55) are made of the rib of the saguaro cactus, which is smooth and hard." (Densmore 1929:80)

Saguaro ribs were used in a game known as *kinyiskuht*. "Each move was decided by a throw of four dice. These were sections of giant cactus rib about eight inches long with patterns marked with red clay and blue soot of creosote bush" (Castetter and Underhill 1935:77).

The 'ball' [in the game *tohka* or double ball] was usually two bits of cactus rib, three inches long and an inch and a half in diameter, tied together with maguey cord so that they were about three inches apart. If there were no trees at either end to mark it [the playing ground], sticks of cactus ribs would be set up [about "one hundred steps" long] (Underhill 1939).

Tobacco was stored in cavities created by red-shafted flickers in saguaros (Castetter and Bell 1942).

Calendar sticks were made of ironwood or saguaro ribs (Lewis 1988).

Unspecified

(Underhill 1946)

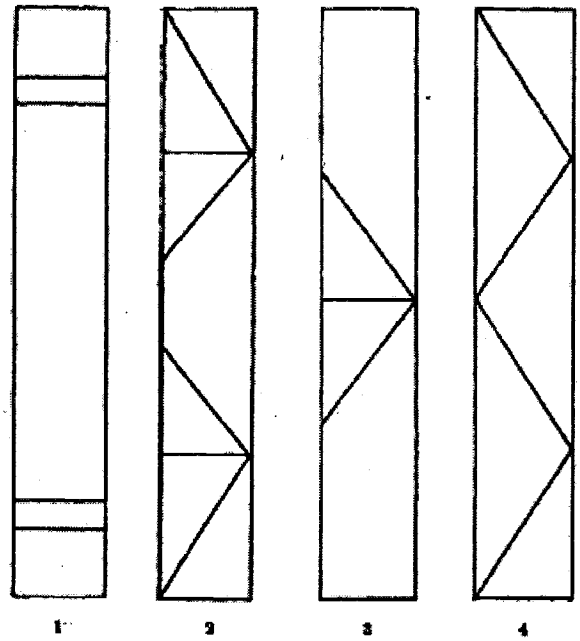

Figure 55. Patterns of stick game 'dice.' The lines on No. 1 indicate the four days' fasting of a warrior on his return from a victory, on No. 2 they represent bird's claws, on No. 3 they represent the rays of the sun, and on No. 4 they represent the lines of paint on the face of the warrior (Densmore 1929:80).

Other Tribes Uses of Saguaro

Native people of the southwest, including the Apache, Hohokam[95], Hualapai, Maricopa, Pai, Pima, Seri, Yavapai, Yuman speakers, used the fruit, seeds, thorns, burls or boots, and ribs of the saguaro. The majority of uses were for food and various types of manufacture. Uses are presented by category of use, tribe, and sources.

Food
Apache
The Apache Indians would come down from the mountains to gather the saguaro fruit and at the same time wage war on the Pima and Papago Indians (Bourke 1895).
The Apaches depended to a lesser degree on saguaro although they liked it, but were in an area where it was possible to gather acorns and piñon nuts instead (Hackenberg 1964).
Fruit eaten. Syrup used in the absence of sugar to sweeten an intoxicating drink (*Chiricahua & Mescalero*) (Castetter and Opler 1936).
Fruits eaten raw, and sun dried to make into large cakes and used for food (*San Carlos*) (Hrdlička 1908).
Fruit eaten raw, or squeezed to separate juice and pulp. Juice used as a drink. Pulp dried and made into cakes. Seeds washed and dried; ground with corn into a pudding, or roasted, ground and mixed with water to make a mush (*Western*) (Buskirk 1986).
Fruit eaten, and used to make a kind of butter (*White Mountain*) (Reagan 1929).
Hohokam
Sahuaro fruit was a staple. Sahuaro and mesquite seeds supplemented agricultural products especially when crops failed (Bohrer 1970).
Saguaro used for food and wine (Haury 1976).
Unspecified food use (Gasser 1982).
Hualapai
Fruit used for food (Watahomigie 1982).
Maricopa
Juice fermented to make an intoxicating drink (Castetter and Bell 1951).
Pai
The saguaro fruit was an important food for the Pai; it was edible in June (Martin 1985).
Pima
"They drink wine made of the *pitahaya*, which is the fruit of a great thistle which opens like the pomegranate. The wine makes them stupid" (Winship 1896).
"The only native drink, now rarely made, is a wine manufactured from the juice of the saguaro, or giant cactus" (Hrdlička 1906:45).
Ripe fruits eaten raw or dried in balls and used for food. Fresh or dried fruits boiled and used as a syrup, or boiled and the residue ground into an oily paste and eaten. Fruits boiled, fermented and used as an intoxicating liquor.

[95] The Hohokam are listed here rather than with the Tohono O'odham given the ongoing debate about their relationship.

Seeds eaten raw or ground, put into water and eaten as pinole or combined with other meal and baked to make bread (Russell 1908).

Ripe fruits eaten fresh or made into balls and dried for future use. Fresh or dried fruits boiled to make a syrup (Castetter 1935).

Used to make candy. Fruit eaten, used to make syrup, and boiled, without sugar, to make preserves (Castetter and Bell 1937).

The ripe fruit is picked with a long forked stick and the skin removed and discarded. A little water is added to the pulp, which is boiled until it becomes light in color; it is then drained and spread to dry. Next the seeds are removed by stirring the pulp around in a basket, then they are ground on a metate and mixed with an equal quantity of whole wheat. Boiling water is now added, and the whole cooked until it resembles a thin porridge, which is seasoned with salt. The red fruit is picked, split into halves, the skins discarded, and the pulp eaten as dessert. The pulp may also be boiled into a syrup with a little water, the seeds are strained off, and the juice again boiled. The liquid is then sealed in glass jars, and the longer it is kept the more it thickens-like honey. The seeds are dried, and when needed they are roasted and ground on a metate to make a mush, which is moist and sticky. As a substitute for lard, which is used with beans and corn, the ground seeds are either passed through a sieve or left mixed with husks. When the fruit ripens, it dries, and the wind blows it down; then it is gathered and pressed into a ball five or six inches in diameter, the sugar content making it adhere. These balls are stored in large earthenware ollas, the mouths of which are covered with pieces of cloth tied over the rim and sealed with mud. This conserve is removed as needed and boiled in water to make syrup or wine; in the latter case, it is allowed to ferment for twenty-four hours, then strained. If bottled and sealed, the wine will keep a long time. Sahuaro seeds, which are known to contain vitamin C, are fed to chickens (Curtin 1949).

The Pima were primarily interested in the saguaro with its large juicy sweet fruit that can be eaten raw or reduced to a very palatable syrup or jelly. The saguaro seeds are also a source of oil. ...Saguaro seeds, although they were eaten in considerable numbers, are extremely small (Hackenberg 1964).

Saguaro seeds can be eaten along with fresh fruit, or extracted from the pulp, parched, and ground into a multi-purpose flour. The fruit was eaten in quantity by recent Indians when available, the surplus gathered and dried or boiled to make syrup, candy, preserves, or wine (Russell 1975).

Fruits used as a staple food and as sweets. Ripe fruit used to make a cold drink. Pulp used to make jam, or dried whole for future use. Pulp made into a syrup and fermented for the annual wine feast. Seeds ground, mixed with grains and used to make a porridge, or a paste resembling peanut butter (Rea 1991).

Pima, Gila River

Fruits used as a staple food and as sweets. Ripe fruit used to make a cold drink. Pulp dried whole for future use, or made into jam and syrup. Some syrup fermented for the annual wine feast.

Seeds ground, mixed with grains and used to make a porridge, or a paste resembling peanut butter (Rea 1991).

Seri

Fruits eaten for food.

Seeds ground to a powder and made into a meal or paste (Dawson 1944).

Southwest Indians

Fruit used for food (Bell and Castetter 1941).

Yavapai

Fruit used for food, or mixed with water and liquid scooped with hand. Dried fruit smeared with fresh fruit juice, made into slabs and dried for later use. Dried fruit pressed into bricks and kept for later use, pieces broken off and stirred in water.

Dried, parched, seeds ground to consistency of peanut butter and squeezed into cakes. Parched, ground seeds of honey mesquite (*Prosopis glandulosa* var. *torreyana*) sometimes dampened and mixed with ground saguaro seed and used for food (Gifford 1936).

Unspecified people

"In addition, at least some humans were cactus seed predators. When available, quantities of fruit of a large cactus known as *pitahaya dulce* were eaten by the natives. During that harvest period, the Indians all defecated in one chosen location. Several weeks later, they collected their dried feces, ground them up, and winnowed out the undigested seeds. These were toasted, ground and eaten ... (Janzen 1986:606)"

Medicine

Pima

"To keep the stomach warm" and to make the milk flow after childbirth, a gruel is made from sahuaro. Dead sahuaro ribs, which were used as splints for broken bones, were bound to the injured limb with a rope of human hair, or by twisted cotton (Curtin 1949:53).

Ceremonial

Apache

Whole fruit mashed, water added and mixture drunk after a two day burial in a dry place (*Western*) (Buskirk 1986).

Pima

Pima calendar stick contained record of a large quantity of saguaro wine (Russell 1903).

Saguaro harvest marked the beginning of the new year (Castetter and Bell 1942).

Unspecified people

"Each of the pilgrims from San Miguel threw a prayer-stick into the breakers. This was a flat stick, about two feet in length, made from the rib of a sajuaro cactus. It was painted with red and black designs, and an eagle or hawk feather was attached to the pointed end. The prayer-stick was thrown straight, like an arrow (Stewart 1965:89)."

Fiber

Seri

Dried plant skeletons and sea lion oil used as a caulking compound (Dawson 1944).

Manufacture

Apache

Burls used as containers, and vessels or cups (*Western*) (Buskirk 1986).

Hohokam

An acid derived from the saguaro wine making process was used to etch shells (Figure 56). The seeds used in tanning hides, ribs in structure building (Haury 1976).

Hualapai

Velvet ash (*Prosopis velutinus*) was used to make long prongs to pick the fruit from the saguaro (Watahomigie 1982).

Pima

"The ceilings of the flat-roofed houses, including the adobe dwellings, are usually made of the flat ribs of the saguaro, or giant cactus" (Hrdlička 1906:42).

Trunks used to make cactus fruit picking poles (Castetter and Bell 1937).

Sahuaro seeds were used as a medium for tanning, and were available at any time, as they were always kept in storage as an article of food. Dry ribs of dead sahuaro are collected and used to form the framework of a house; dry sahuaro ribs were bound together with rawhide or wire, and suspended from the ceiling as shelves; dead sahuaro ribs were sometimes used as cross-pieces for cradle frames; saguaro ribs were used to make carrying baskets (Curtin 1949).

Seri

Dried plant skeletons and sea lion oil used as a caulking compound. Dried plant skeletons used as a straight, slender pole for knocking off ripe fruit. (Dawson 1944).

Southwest Indians

Seeds spread on saguaro ribs to dry (Bell and Castetter 1941).

Trade

Pima

"Sahuaro seeds, dried fruit, and syrup were often obtained by the Pima from the Papago through barter" (Russell 1908:93).

Unspecified

Apache (*Western*) (Buskirk 1949; Hrdlička 1908)

Maricopa (Hrdlička 1908)

Pima (Bahr et al. 1974; Castetter and Bell 1942; Fontana 1974; Hrdlička 1908)

Yuman speakers (Spier 1933)

Seri (Rea 1981)

Figure 56. Shells (*Laevicardium elatum*) etched with saguaro fruit acid. Hohokam Rincon-Sacaton phases, ca. 850-1200 (http://www.statemuseum.arizona.edu/coll/smart3.shtml).

Chapter Five
Management Aspects of the Saguaro Fruit Harvest

Without the saguaro the story of survival in the desert might be written differently....The probable integration of the saguaro and mesquite harvesting periods with double annual planting by the Hohokam, as proposed by Bohrer (1970:424) may have been unique in the Southwest as a regimen of food acquisition. ...In review, a case can be made for maize and beans as having had the highest priority as produced foods in the minds of the Hohokam and the saguaro-mesquite combination as holding the top spot among collected foods. This pattern appears not to have changed for more than two millennia. Stable environmental conditions favorable to the production of foodstuffs by man and nature appear to have prevailed although nominal fluctuations, whether man or nature induced, are suggested by the profile developed from pollen taken from refuse (Bohrer 1970:426-428) (Haury 1976:113-114).

Saguaro National Park is faced with the challenge, as are many parks are in the west, of protecting its natural resources while addressing cultural needs. What makes their situation different is the access to the saguaro fruit harvest tradition that has taken place in the Tucson Mountains for thousand of years[1]. This tradition declined during the late 19th and 20th centuries as a result of various federal Indian policies, modern stores and foods, and private landownership. The last few decades of the 20th century, however, saw a resurgence of traditions and cultural knowledge among the Tohono O'odham people, including the saguaro fruit traditions.

In this chapter, the impacts of the harvest are discussed along with the potential impacts of no harvest in the TMD. Contemporary accounts of traditional management and ecological knowledge provide the basis for a conservation ethic almost as old as the Tohono O'odham culture. Comments and management suggestions shared by tribal members in 2004 provide additional considerations for the future of the Tohono O'odham in the Tucson Mountain District of Saguaro National Park.

Impacts of the Harvest

This assessment of fruit harvest impacts, both beneficial and adverse, on the saguaro cactus plant community is focused on the saguaro itself. It is based on ecological and cultural documentation of different aspects of the saguaro and the harvest, and includes potential impacts from ending the harvest in the park.

Ecological Impacts

Early protection problems in the Rincon unit included cactus thieves, wood cutters, and poachers – all forces that removed the entire plant from its habitat and consequently, its

[1] The Tohono O'odham perspective, which is based on oral history and a worldview that includes living in the Sonoran Desert since time immemorial.

seed source. The primary motivations for protection of what became the TMD, however, were concerns over homestead development and mining (Clemensen 1988). Park records at WACC repeatedly point to rodent damage, disease, freezing temperatures, and grazing as the primary causes of saguaro decline. No where in these records does any agency person or researcher suggest traditional harvesting as detrimental to saguaros, nor have past management recommendations within the records addressed the harvest. This lack of documentation suggests the harvest has not been perceived harmful and consequently, as an issue of concern. Park perception of the harvest has gone so far as to view it as a beneficial interpretive topic as noted in a 1971 memo, which stated that "Relating other humans to the desert environment will also help to make the visitor feel more at home. The present day Papago Indians of the region and their saguaro fruit harvest activities provide an ideal example of a man-desert association."[2]

The slow growth rate of the saguaro complicates determinations of harvest impacts. Various aspects of saguaro growth further illustrate other factors are more critical to saguaro reproduction and survival. Studies have shown that fruit production is dependent on branching, which in turn is dependent on winter precipitation (Drezner 2001). The saguaro is capable of relying on its stored reserves to reproduce for several years after fire damage (Thomas 1991). The mature saguaro can produce approximately 250,000 seeds annually yet only one percent of these is expected to germinate (Niering, Whittaker, and Lowe 1963; Steenbergh and Lowe 1977). Finally, seedling survival is enhanced greatly when growing under the canopy of a nurse tree (Franco and Nobel 1989; Hutto, McAuliffe, and Hogan 1986; Sherbrooke 1989).

Since the Tohono O'odham have preferred historically to harvest from mature saguaros (Raab 1976), there would seem to be little overlap in factors most affecting saguaro survival. Nabhan et al. (1982) support the assertion of a lack of negative impact because while humans compete with birds for saguaro fruits, they have done so for millennia. Since only a small percentage of the seeds produced naturally germinate in favorable sites, it is unlikely that wild fruit gathering reduces plant population sizes.

Ethnographic accounts and archaeological records, previously discussed in Chapter Three and in Haury's quote above, indirectly suggest no negative impact from harvest. These accounts have shown that traditionally, villages and later families returned to the same saguaro groves each year, although within their grove, they might shift their camp site (Lewis 1988; Underhill 1939). They also spend very little time at each saguaro, consequently, offering little disturbance to wildlife occupants. Once the harvesters have cleaned the pulp from the fruit body, they leave it red-side to bring rain and to share with the wildlife.

As these were multi-generational groves, one would expect that there were plenty of mature saguaros and adequate saguaro harvests year after year, implying a lack of negative impact to the plant's survival. Culturally, the Tohono O'odham believe it is their responsibility to care for the saguaro, and that to not harvest its fruit is to not take care of it, and that is a sure way to cause the plant's decline. As an unanswered research question,

[2] File Box 11-8, Master Plan 1971, Page 18 of draft, SAGU 257, SAGU 2636, Box 11 of 11.

understanding the effects of harvesting saguaro fruit might be best addressed with long-term research that uses Tohono O'odham traditional ecological knowledge.

Cultural Impacts

The contemplation of whether and how to accommodate the saguaro fruit harvest tradition must include potential impacts from disallowing its continuation in the TMD. First and foremost is the loss of an important opportunity for cultural preservation. As noted by the numerous newspaper accounts in Chapter Three, the harvest has included an extensive educational component. First led by Juanita Ahil, and now Stella Tucker, many Tohono O'odham youth and adults, and non-Indian people have learned about the harvest, processing, and cultural importance of the saguaro in O'odham life.

The existence of the harvest camp in the TMD provides an almost unique opportunity for the Tohono O'odham, particularly the youth. While it might seem that without this camp, they would go elsewhere to collect fruit, two things impeded them doing so. One is the lack of suitable and accessible public land, particularly for the San Xavier community. The other difficulty lies in the cultural rules of harvest groves. As family-based places today, even tribal members living on the Sells reservation do not have open access to the saguaro fruit. On the Sells reservation, of course, this challenge can be overcome more easily than off the reservation. The San Xavier community, however, is a considerable distance from those saguaro groves and few if any tribal members can make such a trip.

Another challenge of the family-based camps was expressed by a member of the Tohono O'odham Cultural Affairs Committee in 2003. He explained that saguaro camps are family- and/or individual-specific. The location and use of these sites is considered private and those who have camps do not know about or ask about others camps. Variations in saguaro fruit practices may exist and what occurs at reservation-based camps will be different from what occurs at more public camps such as those at Saguaro National Park. Research of contemporary on-reservation camps would not be supported due to the sensitive and private nature of camp activities. These statements suggest that unless a tribal member was a family member as well, on-reservation camps would be closed to them and so too the opportunity to learn the saguaro traditions.

The second potential impact from no TMD camp has to do with cultural identity. As Helen Ramon (1980) explained the importance of the saguaro fruit harvest, it was when and how she learned to be O'odham. We know from historic records that the wine ceremony was observed as early as 1540 (Winship 1896). The saguaro harvest would have occurred for many generations before that in order for a ceremony to have developed. The saguaro harvest has persisted as well through a variety of cultural changes much better than other O'odham traditions. These aspects of longevity indicate a strong bond or relationship between the Tohono O'odham and the saguaro. The giant cactus is a human being, a giver of life, a figure in their legends and religious beliefs, and a direct connection to their homelands. Simply put, the saguaro is a major part of their identity (Nabhan et al. 1982:26).

> For the Tohono O'odham, the saguaro is a plant that "is not seen as a 'separate' life form at all, not something of an 'other' outside world. Papago classify saguaros as part of humankind; a saguaro cactus is 'that which is human and habitually stands on earth.' ...It is not that saguaros are likened to humans because they often have 'arms' coming off their upright trunks. It [would seem] that the Papago liken saguaros to *Homo sapiens* because no matter how much they tend to dominate a landscape, they are still vulnerable...they are Indians."

Traditional Knowledge and Management

Castetter and Bell (1942:130) noted in the mid-19th century that a conservation ethic was in place. "There was no private ownership of wild plants on either cultivated or undeveloped land. In developing a new piece of ground, mesquite or sahuaro trees, because of their fruit, were never removed, but such trees were regarded as common property and any person might pick the fruit."

Contemporary accounts express similar sentiments. "We O'odham people treat our saguaros as people. We consider them as people. We consider them with respect" (Tucker in Hazen-Hammond 1996). "Don't pick an area clean because others need to eat, too" (Tucker in Allen 2001).

On the Tohono O'odham Reservation, the TOCA organization supports cultural revitalization of wild plant foods use. The staff takes tribal members on field trips to collect wild foods such as acorns, saguaro fruit, cholla cactus buds, and mesquite beans. Tribal members, young and old[3], learn the cultural importance and health benefits of these foods, as well as the skills necessary for collecting, preserving, and preparing them. TOCA's efforts are limited by a supply insufficient to meet the demand for traditional foods, however, this situation argues for the development and expansion of efforts to revitalize the wide scale harvest of traditional wild foods of the Sonoran Desert (Lopez et al. 2002).

One of the most sacred cultural practices is the saguaro wine ceremony. Designed to "sing down the rain" that makes agriculture possible in the desert, the saguaro harvest and the wine ceremony served as a cornerstone of O'odham ceremonial life, marking the beginning of the new year. The saguaro wine ceremony is but one of many examples of O'odham reliance upon and connection to the traditional food system. There is a great desire among tribal members to know how to grow, collect, cook and eat traditional foods including the saguaro (Lopez et al. 2002).

The following accounts, collected in 2004, are based on questions that addressed saguaro management (Appendix E). As previously mentioned in the first chapter, only two individuals provided information. Their statements are separated by a dashed line. The first account of each section comes from the same individual and the second account of each section comes from the other individual. Both women come from families with an unbroken

[3] Many adults who went through the Indian boarding school days lost or never gained cultural knowledge as children.

saguaro harvest tradition and have continued the practice with their immediate families. Their stories[4] illustrate traditional ecological knowledge related to the saguaro and a Tohono O'odham conservation ethic.

> My parents taught me about the uses and cultural significance of the saguaro, and I teach my children that it is a source of food and can stand for decades. "The saguaro is connected to other plants including the prickly pear, Organ Pipe cactus, cholla and others. These plants thrive on each other. The saguaro is connected to animals as well including the deer, rabbits, snakes, birds, and rodents. It is a source of food for them. The saguaro is not changed by people harvesting the fruit."
>
> I don't know whether others limit their harvest quantities but I don't. We harvest the same saguaros every year. Things that people do that help the saguaro include prayers to God for a good and fruitful harvest next year. The saguaro is help also by small animals that feed on the fruit left on the ground and distribute the seeds, and rainwater that carries the seeds to new locations where it grows.
>
> ---
>
> My great-grand parents, grandparents and parents taught me about the uses and cultural significance of the saguaro. I teach others about the uses and cultural significance of the saguaro. "I'm teaching anybody that wants to learn. My daughters have been out here. All three of my daughters have been out here and they've been taught. Especially my youngest one who just left home last year. She has been out here with me. I used to bring her out here since I started coming out here to live. Since I started coming out here to pick in this area. She's been coming out here with me. So she pretty much knows the whole process. She does. I think she will be able to teach somebody." She hopes her youngest daughter will take over the camp for her one day.
>
> "Saguaros are a different plant by itself. I don't think they are connected to any other plant, other than they give the fruit. We have prickly pear that gives fruit too. Ironwood seeds give us the seeds we eat too. Palo Verde. There is just all kinds of plants here. Medicinal plants. But they are all interrelated by their uses to people."
>
> "Saguaros are connected to the doves. The bats, of course, they are the ones that pollinate the saguaros. The coyotes enjoy it, and I'm sure the wild pigs, javelinas. The deer that are out here. I know the rattlesnakes like to hang around the saguaros. I don't know if it is a cool area to lay right by it, but sometimes they are right around the saguaros. All kinds of little creatures that live in the ground, prairie dogs or pack rats." I know that the dove is greedy and won't lot others eat the seeds.

[4] Some portions are paraphrased. Verbatim statements are in quotation marks.

"We pick as much as we can. This year they [the saguaros] are limiting us." But we selectively harvest by rotating areas. "We just look for the fruit. For the red. The ones that are ripe or the ones that we can get to." We use "The ribs when the saguaro dies; we collect the ribs for ramadas that we make for shading. We use it sometimes as a fire starter. We use it for our picking pole. There's many other things we can use it for. For housing."

"These saguaros are pretty healthy out here. It's just the ones that get old and die. Pretty much the saguaros depend on the rain. That's what keeps them alive. I mean they have been here hundreds and hundreds, some of them are hundreds and hundreds and hundreds years old. So if they have lived that long, they've lived a healthy life. We're not even going to live that long. I think that when you go out and you see these saguaros it just like amazing when you look at them their like people. You know there are families here, and their arms some of them are actually hugging each other. You see some really special ones out there and then some times they are like little baby saguaros they're like maybe like four feet tall. They're like coming out together all three, like a family. Three or four."

Management Comments and Suggestions

Study participants shared personal ideas about park management and for future management consideration. While the comments come from individuals, these were given in the spirit of benefit to the tribe, the saguaro, and the park.

The following accounts were collected in 2004. As previously mentioned in the first chapter, only two individuals provided information. Their statements are separated by a dashed line. The first account of each section comes from the same individual and the second account of each section comes from the other individual. Their stories[5] illustrate traditional ecological knowledge related to the saguaro and a Tohono O'odham conservation ethic.

"I'm not aware of anything affecting the condition of the saguaros in the park. I would like to see the saguaros protected from people hitting them with sticks or stones, and from putting bullet holes in them. I think it is a great thing you are doing to try to keep the saguaro camp open to all O'odham and especially to write a book or survey. Thank you!"

The saguaros are not changed by people gathering the fruit "They haven't changed they just get older. Get older and die." We help the saguaros with "TLC and a lot of rain. The rain helps the saguaros." When the fruit is scarce, I just make juice by mixing water and the pulp. It doesn't keep; the water makes it spoil because the saguaro fruit doesn't like water. That's why we collect it before the rains; the rains will destroy the fruit.

[5] Some portions are paraphrased. Verbatim statements are in quotation marks.

There are songs about the plants. "We always when we pick our first fruit we bless ourselves with it. We thank the saguaro for giving us all the fruit that we get from it. I always thank any kind of plant that gives me something that I appreciate especially food. Something you can eat." Other things we do as part of the saguaro harvesting that helps other plants or animals or the rain include "The wine ceremony that we have every year. That brings the rains. It makes the wine. The saguaro syrup makes the wine. And that's how they do their wine ceremonial. This is our ceremony that helps our harvest the harvest the following year because we call for rain. It's like a rain dance." By calling for rain it helps the saguaro, which in turn helps people.

We still leave the pods face up to bring the rain. "That's something that we were taught to do. We don't bring the pods home, although some people do. They don't want to dirty their hands. When we collect the fruit we leave all the pods out there by the saguaros. We don't bring it back to the camp. The coyotes, javelina, and deer eat them. I think it nourishes the grounds too, the pods."

As far as protecting the saguaros in the park, "You know that there [are] a lot of palo verde that are dying and it's because of the mistletoes that are in there. A lot of them are dying, and I know it's a large area, that if you sent one person out they would have a job. And even the ironwoods. The ironwood trees, they get the mistletoe in them too and they eventually fall and die. Like this one here [in the center of the camp]. This palo verde is so healthy looking because we water it when we are here during the time. And we try to get all the mistletoe. In fact, I meant to get those ones off right there, the ones over there in the corner. But this one, it had a lot of mistletoe. Every year we come, it had mistletoes in it. We'd take them down."

I let the rain take care of the plants except I do water the one by my ramada. "Like when we empty our ice chests, we water the plants. I water these little vines that grow. They call them limber brush. And they're turning green. They were all dried up when we came and now you can tell that they are getting watered and so they are coming out green. And the ones over there too."

"I really appreciate that I can be here. That I can be here and still continue to do the harvest. Even though I don't have a lot of people out here helping. I just like to make it understood to the Saguaro National Park that I'm here to do my harvest and not to damage any plants. We're here to appreciate the plants. The plants and all the desert plants that we have out here… the saguaros…mainly the saguaros."

The management discussions also resulted in a "wish list" for the park. Study participants are glad to have the saguaro harvest at the TMD but one offered the following items for future consideration.

- I'd like a winter story-telling camp.
- I would like the permit to include cholla harvesting. I still collect and roast ironwood seeds, and would like to collect them here too. I'd like to collect Morman tea; we use it to control diabetes.
- I would like to have the land back or at least lease it.

Future Research

Historic documentation suggests that while the saguaro may benefit from the traditional harvest, there are no negative impacts as a result of the harvest. Additional long-term research is needed, however, to clarify the effects of harvesting. Such investigation could include quantification of harvest areas, saguaros, and fruit collected. The study design should include traditional ecological knowledge and be developed in consultation with the Tohono O'odham Nation. These aspects should enhance park-tribal relations, data collection, and project completion.

Given the data collection difficulties that arose following tribal elections, there remains a need for more ethnographic accounts of the cultural significance of the saguaro, and the history of the harvest camp in the TMD. Ideally, another study for this purpose would coincide with a non-election year, and good fruit production so that more of the harvesters would use the harvest camp.

The "wish list" provided by study participants suggests potential for a Tohono O'odham ethnobotany of park species. A winter story-telling camp might offer opportunity to record Tohono O'odham history of the Tucson Mountains and surrounding landscape. As with additional data collection concerning the saguaro, these ideas would need approval of the Tohono O'odham Nation. It may be possible to work through the Chairperson and the San Xavier District, the one closest to the park, thereby minimizing on-reservation sensitivities.

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APPENDIX A

Presidential Proclamation #2032 Establishment of Saguaro National Monument (East)

66. Saguaro National Monument

By the President of the United States of America

A PROCLAMATION

(No. 2032--Mar. 1, 1933--47 Stat. 2557)

Whereas a certain area within the Catalina Division of the Coronado National Forest in the State of Arizona and certain adjacent lands are of outstanding scientific interest because of the exceptional growth thereon of various species of cacti, including the so-called giant cactus, it appears that the public interest will be promoted by reserving as much land as may be necessary for the proper protection thereof as a national monument.

Now, therefore, I, Herbert Hoover, President of the United States of America, by virtue of the power in me vested by section 2 of the act of Congress approved June 8, 1906 (34 Stat. 225), entitled "AN ACT For the preservation of American antiquities," do proclaim that there are hereby reserved from all forms of appropriation under the public land laws, subject to all valid existing rights, and the right of the State of Arizona to select for the use of the University of Arizona all or any portions of secs. 11, 14, 22, 28, and E.½ 21, T. 14 S., R. 16 E. of the Gila and Salt River meridian, and set apart as a national monument, the following-described tracts of lands in the State of Arizona:

Gila and Salt River Meridian

T. 14 S., R. 16 E., secs. 8 to 17 inclusive, secs. 20 to 29 inclusive, and secs. 32 to 36 inclusive.
T. 14 S., R. 17 E., secs. 7 to 36 inclusive.
T. 14S., R. 18 E., secs. 7, 8, 9, secs. 16 to 21 inclusive, and secs. 28 to 33 inclusive.
T. 15 S., R. 16 E., secs. 1 to 5 inclusive.
T. 15 S., R. 17 E., secs. 1 to 6 inclusive and secs. 11, 12, 13, 14, 23, and 24.
T. 15 S., R. 18 E., secs. 4 to 9 inclusive and secs. 16 to 21 inclusive.

The reservation made by this proclamation is not intended to prevent the use of the lands now within the Coronado National Forest for national-forest purposes under the proclamation establishing the Coronado National Forest, and the two reservations shall both be effective on the land withdrawn; but the national monument hereby established shall be the dominant reservation, and any use of the

land which interferes with the preservation of protection as a national monument is hereby forbidden.

Warning is hereby given to all unauthorized persons not to appropriate, injure, deface, remove, or destroy any feature of this national monument, or to locate or settle on any of the lands reserved by this proclamation.

In WITNESS WHEREOF, I have hereunto set my hand and caused the seal of the United States to be affixed.

DONE at the City of Washington this 1 day of March, in the year of our Lord nineteen hundred and thirty-three, and of the
(SEAL) Independence of the United States of America the one hundred and fifty-seventh.

Herbert Hoover.

By the President:
Henry L. Stimson,
Secretary of State.

C O P Y

APPENDIX B

Presidential Proclamation #3439 Establishment of Saguaro National Monument (West)

Presidential Documents

Title 3—THE PRESIDENT

Proclamation 3439

ENLARGING THE SAGUARO NATIONAL MONUMENT, ARIZONA

By the President of the United States of America

A Proclamation

WHEREAS an area in Arizona possessing outstanding scientific interest because of its exceptional growth of various species of cacti has been established as the Saguaro National Monument by Proclamation No. 2032 of March 1, 1933; and

WHEREAS it appears that it would be in the public interest to add to the Saguaro National Monument certain lands lying within what is known as the Tucson Mountain Park which contain a remarkable display of relatively undisturbed lower Sonoran desert vegetation, including a saguaro stand which equals or surpasses saguaro stands elsewhere in the Nation; and

WHEREAS the addition of these lands to the monument appears essential for their effective preservation and interpretation and for the implementation of the purposes of the Saguaro National Monument; and

WHEREAS the Advisory Board on National Parks, Historic Sites, Buildings and Monuments, established pursuant to the act of August 21, 1935, 49 Stat. 666 (16 U.S.C. 463), impressed by the remarkable diversity of desert vegetation of this area and its significant wildlife qualities, has recommended its preservation by adding it to the Saguaro National Monument:

NOW, THEREFORE, I, JOHN F. KENNEDY, President of the United States of America, by virtue of the authority vested in me by section 2 of the act of June 8, 1906, 34 Stat. 225 (16 U.S.C. 431), do proclaim as follows:

Subject to valid existing rights, the lands now owned by the United States within the exterior boundaries of the following-described tracts of land are hereby added to and reserved as a part of the Saguaro National Monument; and lands owned by the State of Arizona within such boundaries shall become and be reserved as a part of that monument upon acquisition of title thereto by the United States:

GILA AND SALT RIVER MERIDIAN, ARIZONA

T. 13 S., R. 11 E.,
Sections 13, 14, 15, 21, 22, 23, 24, 25, 26, 27, 28, 34, 35 and 36.
T. 13 S., R. 12 E.,
Sections 6, 7, 8, 17, 18, 19, 20, 29, 30 and 31;

comprising 15,360 acres, more or less.

The boundaries of the Saguaro National Monument are modified accordingly.

The lands reserved as a part of the Saguaro National Monument by or pursuant to this proclamation shall be administered pursuant to the act of August 25, 1916, 39 Stat. 535 (16 U.S.C. 1–3), and acts supplementary thereto and amendatory thereof and shall be subject to all the laws and regulations applicable to that monument.

Warning is hereby expressly given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature or object of this monument and not to locate or settle upon any of the lands thereof.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the Seal of the United States of America to be affixed.

DONE at the City of Washington this fifteenth day of November in the year of our Lord nineteen hundred
[SEAL] and sixty-one, and of the Independence of the United States of America the one hundred and eighty-sixth.

JOHN F. KENNEDY

By the President:
DEAN RUSK,
Secretary of State.

[F.R. Doc. 61–11127; Filed, Nov. 20, 1961; 12:57 p.m.]

Federal Register

Nov 22, 1961

APPENDIX C

Special Directive 78-1
Policy Guidelines for Native American Cultural Resources Management

ATTACHMENT A

United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
A5623-560

SEP 8 1978

SPECIAL DIRECTIVE 78-1 — Annual Review

Memorandum

To: Directorate and All Regional Directors

From: Acting Director

Subject: Policy Guidelines for Native American Cultural Resources Management

The revised Management Policies have gone to press but since there is an immediate need for a policy on Native American cultural resources management, the following will govern Service activities that involve Native Americans:

> In carrying out its mandate for the conservation and public enjoyment of park lands and their resources, the Service, consistent with each park's legislative history, purpose and management objectives, will develop and execute its programs in a manner that reflects informed awareness, sensitivity, and serious concern for the traditions, cultural values and religious beliefs of Native Americans who have ancestral ties to such lands. This policy includes developing means for reasonable access to and non-recreational use of sites with traditional, ceremonial or religious significance; the involvement of Native Americans in the decision making process where their traditions and cultural values will be affected by park programs; and providing technical assistance or participating in cooperative activities or programs related to Native American culture history, cultural traditions, or cultural resources.

Primary responsibility for dealing with Native American concerns rests with the Regional Director. In cases pertinent only to a local situation which are not expected to set precedent, escalate, or have effects beyond the area or issue in question, the Regional Director may delegate the responsibility to the area manager. Where a decision must be reached which may incur litigation, affect Service policy, provide

for long term use of park lands, impact policies or practices of other Federal land managing agencies, impact the conduct of professional research, touch on the obvious interests of Native Americans elsewhere, or reflect on the Service or Federal Government, the Regional Director shall retain full responsibility, keeping the Washington Office Directorate informed of developments as they occur. The Regional Director shall refer issues having a regionwide or Servicewide impact to the Washington Office for review and concurrence of the solution proposed.

For the purposes of these policies, the term Native American applies to: American Indians, Eskimos, and Aleuts in North America; Polynesians in Hawaii and American Samoa; Chamorros in Guam and the Northern Marianas Islands. The following guidelines should govern Service relationships with Native Americans:

1. Sites which are significant to a local or tribal entity may be used by them for non-destructive, ceremonial purposes. When appropriate, a public assembly permit, in accordance with 36 CFR 2.21, may be required. If necessary, Native Americans may enter and camp overnight for the duration of such ceremonies without entrance or camping fees, providing their use of the park is non-recreational. Prior arrangements with the park must be made, and assurances given, that no negative effects on the resources will occur. Where privacy is a factor it should be assured. If the resource is also traditionally available to the public at large, equitable arrangements must be negotiated by the park manager.

2. Participation of Native Americans in an advisory capacity for planning and review purposes, and as park interpreters, is encouraged. Consultation with appropriate persons or groups relative to emergency preservation of cultural materials is also encouraged. Appointments to boards and committees should be based on appropriate combinations of expertise and credibility as representatives of a Native American group. Where planning, development, or interpretation relate to Native American interests, consultation with Native Americans is very important. Expertise of the consultant can be established on the basis of "credentials of eminence" as well as formal training. Such credentials will be recognized on the same basis as by the United Nations to identify human custodians of ceremonial, artisan, and craft skills.

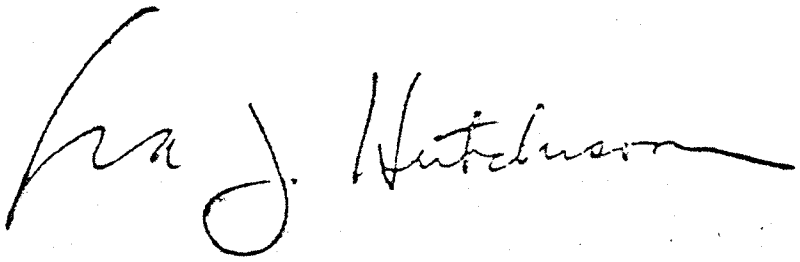
3. An informal listing of Native American cultural resources should be made for each park, categorized as to the nature of the resource (site, structure, object, other) and the type and degree of its historic,

cultural, and religious significance, with or without tangible physical evidence. These lists, for reasons of security, should not be formally filed pending further notice. Such lists should be compiled in cooperation with appropriate local Native American persons or groups.

4. Service collections of artifacts, objects of antiquity and cultural resources acquired in the course of professional research and which constitute an integral part of a systematic scientific collection will remain an individual part of the collection and will remain under the ownership and control of the Service.

In all matters other than those described above, Native American issues will be addressed on their merits by the park manager, with memoranda of explanation to the Regional Director, who shall be responsible for informing the Washington Office Directorate.

The Chief, Cultural Resources Management Division is assigned WASO program management responsibility for this activity.



APPENDIX D

36CFR2.1(c)(1)
Preservation of natural, cultural and archeological resources

[48 FR 30275, June 30, 1983, as amended at 61 FR 46556, Sept. 4, 1996]

PART 2—RESOURCE PROTECTION, PUBLIC USE AND RECREATION

Sec.

AUTHORITY: 16 U.S.C. 1, 3, 9a, 462(k).

SOURCE: 48 FR 30282, June 30, 1983, unless otherwise noted.

§ 2.1 Preservation of natural, cultural and archeological resources.

(a) Except as otherwise provided in this chapter, the following is prohibited:

(1) Possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state:

(i) Living or dead wildlife or fish, or the parts or products thereof, such as antlers or nests.

(ii) Plants or the parts or products thereof.

(iii) Nonfossilized and fossilized paleontological specimens, cultural or archeological resources, or the parts thereof.

(iv) A mineral resource or cave formation or the parts thereof.

(2) Introducing wildlife, fish or plants, including their reproductive bodies, into a park area ecosystem.

(3) Tossing, throwing or rolling rocks or other items inside caves or caverns, into valleys, canyons, or caverns, down hillsides or mountainsides, or into thermal features.

(4) Using or possessing wood gathered from within the park area: *Provided, however,* That the superintendent may designate areas where dead wood on the ground may be collected for use as fuel for campfires within the park area.

(5) Walking on, climbing, entering, ascending, descending, or traversing an archeological or cultural resource, monument, or statue, except in designated areas and under conditions established by the superintendent.

(6) Possessing, destroying, injuring, defacing, removing, digging, or disturbing a structure or its furnishing or fixtures, or other cultural or archeological resources.

(7) Possessing or using a mineral or metal detector, magnetometer, side scan sonar, other metal detecting device, or subbottom profiler.

This paragraph does not apply to:

(i) A device broken down and stored or packed to prevent its use while in park areas.

(ii) Electronic equipment used primarily for the navigation and safe operation of boats and aircraft.

(iii) Mineral or metal detectors, magnetometers, or subbottom profilers used for authorized scientific, mining, or administrative activities.

(b) The superintendent may restrict hiking or pedestrian use to a designated trail or walkway system pursuant to §§ 1.5 and 1.7. Leaving a trail or walkway to shortcut between portions of the same trail or walkway, or to shortcut to an adjacent trail or walkway in violation of designated restrictions is prohibited.

(c)(1) The superintendent may designate certain fruits, berries, nuts, or unoccupied seashells which may be gathered by hand for personal use or

consumption upon a written determination that the gathering or consumption will not adversely affect park wildlife, the reproductive potential of a plant species, or otherwise adversely affect park resources.

(2) The superintendent may:

(i) Limit the size and quantity of the natural products that may be gathered or possessed for this purpose; or

(ii) Limit the location where natural products may be gathered; or

(iii) Restrict the possession and consumption of natural products to the park area.

(3) The following are prohibited:

(i) Gathering or possessing undesignated natural products.

(ii) Gathering or possessing natural products in violation of the size or quantity limits designated by the superintendent.

(iii) Unauthorized removal of natural products from the park area.

(iv) Gathering natural products outside of designated areas.

(v) Sale or commercial use of natural products.

(d) This section shall not be construed as authorizing the taking, use or possession of fish, wildlife or plants for ceremonial or religious purposes, except where specifically authorized by Federal statutory law, treaty rights, or in accordance with § 2.2 or § 2.3.

NOTE: Regulations concerning archeological resources are found in 43 CFR part 3.

§ 2.2 Wildlife protection.

(a) The following are prohibited:

(1) The taking of wildlife, except by authorized hunting and trapping activities conducted in accordance with paragraph (b) of this section.

(2) The feeding, touching, teasing, frightening or intentional disturbing of wildlife nesting, breeding or other activities.

(3) Possessing unlawfully taken wildlife or portions thereof.

(b) *Hunting and trapping.* (1) Hunting shall be allowed in park areas where such activity is specifically mandated by Federal statutory law.

(2) Hunting may be allowed in park areas where such activity is specifically authorized as a discretionary activity under Federal statutory law if the superintendent determines that such activity is consistent with public safety and enjoyment, and sound resource management principles. Such hunting shall be allowed pursuant to special regulations.

(3) Trapping shall be allowed in park areas where such activity is specifically mandated by Federal statutory law.

(4) Where hunting or trapping or both are authorized, such activities shall be conducted in accordance with Federal law and the laws of the State within whose exterior boundaries a park area or a portion thereof is located. Nonconflicting State laws are adopted as a part of these regulations.

(c) Except in emergencies or in areas under the exclusive jurisdiction of the United States, the superintendent shall consult with appropriate State agencies before invoking the authority of § 1.5 for the purpose of restricting hunting and trapping or closing park areas to the taking of wildlife where such activities are mandated or authorized by Federal statutory law.

(d) The superintendent may establish conditions and procedures for transporting lawfully taken wildlife through the park area. Violation of these conditions and procedures is prohibited.

(e) The Superintendent may designate all or portions of a park area as closed to the viewing of wildlife with an artificial light. Use of an artificial light for purposes of viewing wildlife in closed areas is prohibited.

(f) Authorized persons may check hunting and trapping licenses and permits; inspect weapons, traps and hunting and trapping gear for compliance with equipment restrictions; and inspect wildlife that has been taken for compliance with species, size and other taking restrictions.

(g) The regulations contained in this section apply, regardless of land ownership, on all lands and waters within a park area that are under the legislative jurisdiction of the United States.

[48 FR 30282, June 30, 1983, as amended at 49 FR 18450, Apr. 30, 1984; 51 FR 33264, Sept. 19, 1986; 52 FR 35240, Sept. 18, 1987]

§ 2.3 Fishing.

(a) Except in designated areas or as provided in this section, fishing shall

APPENDIX E

Tohono O'odham Saguaro Fruit Gathering
University of Arizona Interview Form

Traditional Use Study of Saguaro National Monument
Tohono O'odham Saguaro Fruit Gathering
University of Arizona Interview Form

Interview Number _____ **Tape Number** _____

Date: _____ Respondent's Name: _____

Tribe/Organization: _____ Ethnic Group: _____

Gender: Male Female

Date of Birth: ___/___/___ Age _____

Place of Birth (town, reservation): _____ U.S. State of Birth _____

Study Area / place of interview (ethnographer fill this in):

Introduction

We would like to talk with you about the saguaro fruit harvest in Saguaro National Monument. We understand that this activity has persisted through time because of its cultural significance to individuals like yourself and the Tohono O'odham people. We also understand that that the importance and practices associated with saguaro harvesting can change over time. We would like to discuss these changes, as you see them occurring, over three time periods - the past, present and future. We would also like to talk about fruit gathering and protecting the saguaro. The following is a series of questions to help guide our conversation today. These discussions are an opportunity to convey your thoughts about this important activity as well as aid National Park Service personnel with their long-term management goals. However, given the sensitivity of some topics, we do not want you to share confidential information.

The Past

Did your grandparents have saguaro camps in this immediate area? Yes No Don't know No response

-If yes, can you tell me generally where these camps were?

-If yes, how would you describe the importance of these camps to your grandparents?

Did your grandparents have saguaro camps anywhere outside this immediate area? Yes No Don't know No response

-If yes, can you tell me generally where these camps were?

-If yes, how would you describe the importance of these camps to your grandparents?

Did your parents have saguaro camps in this immediate area? Yes No Don't know No response

-If yes, can you tell me generally where these camps were?

-If yes, how would you describe the importance of these camps to your parents?

Did your parents have saguaro camps anywhere outside this immediate area? Yes No Don't know No response

-If yes, can you tell me generally where these camps were?

How would you describe the importance of the saguaro fruit in your parent's lifetime? Yes No Don't know No response

The Present

How long has this camp been used?

Have you used this camp?

-If yes, for how long?

Is this saguaro camp important to you? Yes No Don't know No response

- If yes, can you tell me about its importance?

From your perspective, why is this saguaro camp important to the Tohono O'odham people?

Is the saguaro fruit important to you? Yes No Don't know No response

- If yes, can you tell me about its importance?

From your perspective, why is the saguaro fruit important to the Tohono O'odham people?

Have fruit collecting techniques changed since your grandparents' time? Yes No Don't know No response

-If yes, how have these changed?

-If yes, when did these changes occur?

Have fruit preparation techniques changed since your grandparents' time? Yes No Don't know No response

-If yes, how have these changed?

-If yes, when did these changes occur?

Have fruit uses changed since your grandparents' time? Yes No Don't know No response

-If yes, how have these changed?

-If yes, when did these changes occur?

The Future

Is it important for future generations of Tohono O'odham people to know about saguaro plants?
Yes No Don't know No response

-If yes, why is this so?

Is it important for future generations of Tohono O'odham people to collect saguaro fruit?
Yes No Don't know No response

-If yes, why is this so?

Is it important for future generations of Tohono O'odham people to continue to have access to this saguaro camp?

-If yes, why is this so?

Conservation, Ecology, Knowledge

Who taught you about the uses and cultural significance of the saguaro?

Are you teaching anyone about the uses and cultural significance of the saguaro? Yes No Don't know No response

-If yes, what are you teaching them?

From your perspective, is the saguaro connected to other plants? Yes No Don't know No response

-If yes, which plants?

-If yes, how is the saguaro connected to these plants?

From your perspective, is the saguaro connected to other animals? Yes No Don't know No response

-If yes, which animals?

-If yes, how is the saguaro connected to these animals?

From your perspective, are the saguaros changed by people gathering the fruit? Yes No Don't know No response

-If yes, how are they changed?

Do people place limits on the amount of fruit they collect? Yes No Don't know No response

-If yes, why do people restrict themselves?

Do people selectively harvest the saguaros or do they harvest the same saguaros every year?

-If selectively harvested, how are these individuals chosen?

Are there things people do that help the saguaros? Yes No Don't know No response

-If yes, what do they do?

Are there things associated with saguaro harvesting that help other elements in the environment such as plants, animals or the rain?
Yes No Don't know No response

-If yes, can you tell me something about these?

Is there anything affecting the condition of the saguaros here in the park? Yes No Don't know No response

-If yes, what is affecting their condition?

What would you recommend to protect the saguaros here in the park?

In closing, is there anything else you would like to add?