NATURAL AND CULTURAL RESOURCES MANAGEMENT PLAN

and environmental assessment

TUZIGOOT

NATIONAL MONUMENT ● ARIZONA

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ARIZONA

Prepared by

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TABLE OF CONTENTS

ABSTRACT

In the natural and cultural resources management plan for Tuzigoot National Monument a variety of actions are proposed to perpetuate the area's natural and cultural resources for the enjoyment of present and future generations. Cultural resource proposals include: archeological research, including surveying the monument and surrounding areas and developing a current archeological base map; selective excavation and stabilization of prehistoric ruins; and the installation of a deep rainwater drainage system under the ruins. Natural resource proposals include: reestablishing and interpreting native vegetation in areas disturbed by construction, visitor use, or maintenance activities; elimination of the equipment access road into the ruins; bat management and studies; and water resources monitoring.

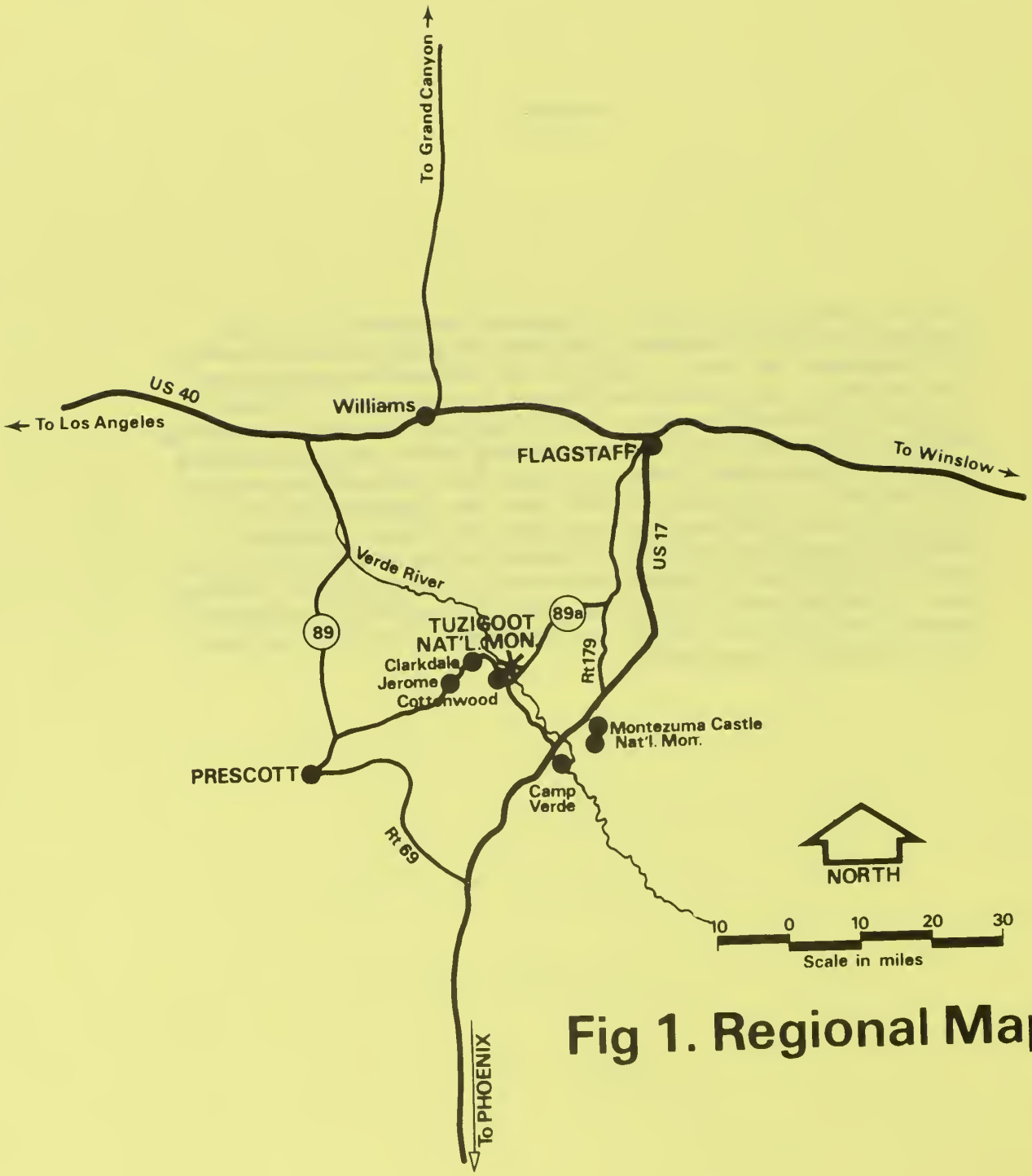

Fig 1. Regional Map

RESOURCES MANAGEMENT PLAN

Introduction

This resources management plan presents a method for the Park Service to manage the cultural and natural resources of Tuzigoot National Monument. The plan identifies resources management objectives and problems, and presents an action program to correct the problems.

Tuzigoot National Monument lies at the upper end of the Verde Valley in Yavapai County, Arizona (figure 1). The monument was established in 1939 on 43 acres situated on a limestone ridge rising 100 feet above the Verde River floodplain (figure 2). An additional 15 acres were added in 1966 as right-of-way for the construction of a new approach road. The monument contains the ruins for one of the largest known pueblos (110 rooms) built by the Sinagua Indians during the period 1100-1450 A.D. The entire monument has been designated a National Historic Landmark and is included on the National Register of Historic Places. Within sight of the monument are other evidences of man's occupation of the Verde Valley, including several prehistoric pueblos, the relics of the coppermining town of Jerome, and modern farms and towns (see page 11 for additional description of the monument).

MANAGEMENT OBJECTIVES

Management objectives for the area's natural and cultural resources include the following:

Acquire approximately 500 additional acres of adjacent lands as a buffer against residential and commercial development; for protection of endangered marsh and desert ecosystems; and to acquire prehistoric Sinagua Indian farmlands.

Preserve the area's prehistoric Indian ruins as they now exist.

Reduce or eliminate landscape scars from previous construction activities

Establish native trees and shrubs where necessary within the area.

Recreate where feasible the monument's prehistoric scene.

Basic goals to be met by the cultural resource projects are: to preserve intact the maximum possible amount of historical and archeological resources; to complete a cultural resource inventory in compliance with Executive Order 11593; and to conduct professional

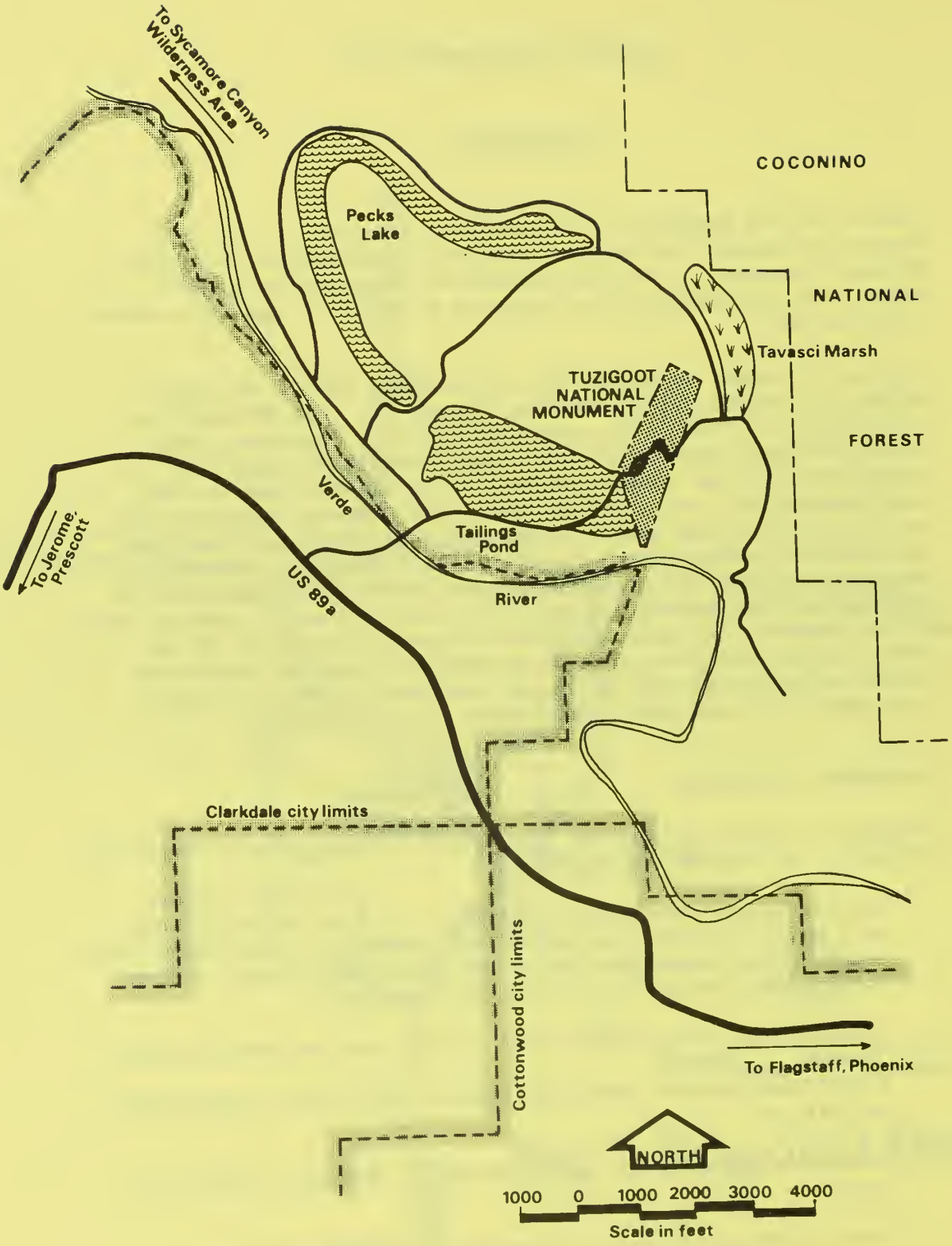

Fig 2. Vicinity Map

resource studies. Information obtained from the suggested studies will be used to plan monument development in a manner compatible with preservation of the cultural resources. The information will also contribute to a basic theme of area interpretation--the development of prehistoric farming communities in the Verde Valley.

Proposals for biological research and inventories of indigenous plants and animals are limited in scope because of the current small size of the monument and the legislative and interpretive emphasis on prehistoric resources. If and when the proposed land acquisition occurs, natural resource programs, including basic inventories and the identification of problem areas requiring further action, will be developed as appropriate.

CULTURAL RESOURCES RESEARCH AND MANAGEMENT ACTIONS

Inventory and Mapping of Archeological Resources. The present archeological base map will be updated by accurately inventorying and mapping all surface and sub-surface features of Tuzigoot, including walls, joints, trenches and burials. It will establish documentary and illustrative data on the history of construction and use of the site. A restudy of past archeological field notes will give further details on architectural and use features as well as pinpoint selected areas of the site which require further study. Acquired information will be used to check the original notes and the new site map. The map will provide direction for future excavation at the site and surrounding sites and will form a basic reference for stabilization of the pueblo.

Human Sustaining Area Survey. A survey will be conducted of the area that was required to support the populations of prehistoric peoples at Tuzigoot. The study will investigate the ecological and economic relationships between Tuzigoot pueblo and the immediate environment. This is an intensive cultural and natural study of the lands within a nominal walking and working distance (about two miles). Such research will include the entire monument, proposed additions and other areas most probably used for farming, gathering and hunting. The survey will aid in the development of research priorities inside and outside the monument and will be of both interpretive and scientific importance.

This survey will produce a set of master topographical maps. Each will illustrate the use of the areas by each succeeding phase of the Tuzigoot culture. It will identify the reliable farmlands that could have been irrigated by the Tuzigoot dwellers and the areas of exploitation of mineral, plant and animal resources. These maps should include a reconstructed vegetation zone overlay that includes the limits of modern agricultural use and irrigation. The density and settlement patterns of contemporaneous sites in the area should be recorded. On the basis of limited highway route surveys to the north of Tuzigoot in the Duff Flat area, there is some evidence for small, contemporaneous pueblos along the river bottomlands.

The survey will include some major sites in the immediate area of Tuzigoot. The Tuzigoot extension and the pueblo of Hatalacva undoubtedly had considerable interaction with Tuzigoot and investigation of these areas can contribute information to the monument's interpretive programs. The Tuzigoot extension is on private land but is included as part of the proposed land addition to Tuzigoot. The site of Hatalacva is on land owned by Phelps-Dodge Corporation, and has been 50 to 75 percent destroyed by pothunters. A systematic survey of the area and assessment of sites would contribute to a research design for gathering data pertinent to Tuzigoot before such data is destroyed by further pothunting. The survey would also place the site of Tuzigoot in its proper perspective as the final link in a chain of population adaptation to the Verde Valley. Research into the population aggregates of contemporaneous pueblos in the area and into the irrigation farming areas surrounding Tuzigoot will form the core data for interpreting the causes of changing adaptations and the abandonment of the valley. The late period of history that the site of Tuzigoot spans (A.D. 1000 to 1400) is also the period of considerable change in settlement patterns and social organizations in the valley. The site spans the transition from riverine pithouse villages to masonry pueblos. The site also extends into the "abandonment" period of the Verde. It is doubtful that the remaining sub-floor fill at Tuzigoot will contribute significantly to questions generated by these changes. Sites located on the survey, however, have the potential for comprehensive research into these areas. The survey will yield:

1. Settlement pattern data for each phase of occupation and data necessary to correct deficiencies in knowledge of these patterns.

2. Man-land variables that bear on man's adaptation to ecological zones and the causes of change.

3. Population sizes and aggregates and local population changes through phases and how they relate to changes in man's adaptations.

4. Trends in economic, social and cultural change during the Tuzigoot pueblo occupation, and the causes of change that produced the puebloid adaptation.

5. A priority listing of research inside and outside the monument which can be coordinated with research done by other institutions in the area to augment the interpretive program at the monument.

Inventory and Identification of Archeological Collections. The collections from excavations are of limited use for reference and comparative studies; one collection consists of 48 boxes of sherds, which is a source of type specimens. It could profitably be re-studied using current type identifications. A number of restorable vessels are included in the lot. The stone collection is a source of good exhibit items.

Since many artifacts were apparently loaned or taken prior to establishment of the monument, a curatorial inventory will be conducted to reconcile catalog records and collections.

Stabilization. Stabilization needs are immediate, but site map and field note research are needed first to give additional information for decisions on stabilization. Selected excavation throughout the pueblo, based on these archeological surveys and research, will accompany establishment of a deep drainage system for rainwater. This should greatly minimize water retention in the prehistoric wall system and subsequent need for frequent repair to crumbling and eroding rock and mortar. Such excavation will also answer and verify specific problems and conclusions concerning the history and use of specific rooms.

NATURAL RESOURCES RESEARCH AND MANAGEMENT ACTIONS

Landscaping. Soils in areas disturbed by visitor use, maintenance or construction activities will be stabilized by the planting of native vegetation. These areas include road scars and barren areas adjacent to the parking lot. The unpaved equipment access road into the ruins area for example, is unsightly, creates erosional problems and invites vehicle and foot traffic directly from the parking area. To eliminate these problems the equipment access road will be erased (fig. 3) and native shrubs, grasses and cacti will be planted. Future equipment access to the ruins will be transferred to existing trails into the area.

Native plants will also be used to screen residential and utility areas and to discourage off-trail visitor use of some areas.

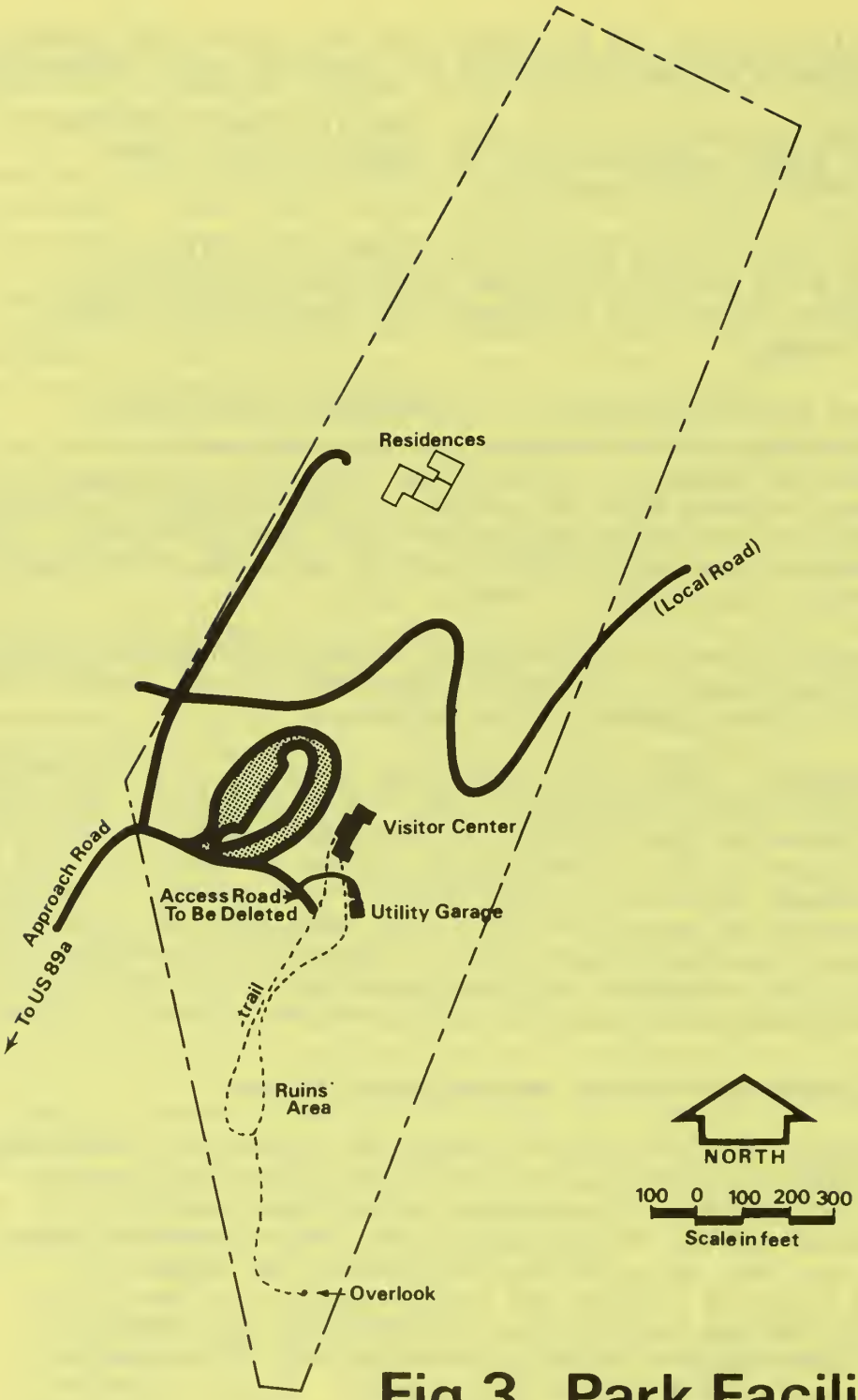

Fig 3. Park Facilities

In connection with the landscaping program, selected native plants will be labeled with interpretive signs. They will explain plant use by prehistoric and/or modern indians, especially those groups which inhabited the Verde Valley.

Wildlife. The problem of bats roosting among the roof logs of the restored room in the ruins will be minimized by spraying pine oil in the roosting area weekly in summer, when the colony is in residence. The room area will be cleaned daily to remove bat droppings which are definitely an esthetic problem and a potential health hazard to visitors. Previous attempts at complete closure of this room to bats only transferred the problem to the front porch or restroom breezeway where it created more of a mess and health hazard. Enclosure of the large open spaces of the restroom breezeway is impractical since it would involve major construction and funding, plus adding to the modern appearance of the present building.

Future funding requests will include one for consultative services with bat control experts. More efficient bat control methods based on existing literature and, possibly, on an onsite study will be developed.

Water Resources. Numerous domestic and irrigation wells, located in the vicinity, draw upon the same ground water sources as the monument. The impact of current and past withdrawals on the monument's water supply is unknown. To obtain information on local water table fluctuations and assess the ability of the monument's water supply to meet future needs, water levels in the monument's well will be monitored.

INTERRELATIONSHIPS WITH OTHER PROJECTS

The monument's preliminary master plan proposes the acquistion of approximately 500 acres of private lands now surrounding the area. The proposed acquisition includes a marsh area used for irrigation water and hunting by the area's prehistoric inhabitants, prehistoric farmlands, a mine tailings pond, a riverine area and semidesert grasslands. Acquisition of these private lands--particularly the marshlands and adjacent grasslands--is deemed essential for the preservation of the historical and interpretive integrity of the monument. The entire acquisition will serve as a buffer zone against future development.

The town of Clarkdale has expressed some interest in using the mine tailings area for secondary water sewage treatment.

The utility building now blocking maintenance equipment access on the adjacent wheel chair access trail to the ruins will be razed and the area will be planted with native vegetation. Subsequently, all equipment access to the ruins will be via this trail.

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ENVIRONMENTAL REVIEW

The Natural and Cultural Resources Management Plan for Tuzigoot National Monument presents a long-term action program for managing the area's resources. Its accompanying environmental assessment analyzes and documents the environmental impacts of the proposed actions.

The research proposed will provide the monument with the kind of information necessary for the efficient management of the area. Excavation and stabilization will permanently remove the archeological record in some affected areas. Excavation, when necessary, will prevent the unnecessary loss of archeological evidence. Stabilization and the installation of a deep drainage system will aid in preserving the ruins. Reestablishing native vegetation in disturbed areas will minimize soil erosion on these sites. Elimination of the equipment access road to the ruins will enable the monument staff to control visitor use more efficiently and remove a modern intrusion on the prehistoric scene. The proposed bat management activities will decrease the safety hazards to visitors and staff presented by bats roosting in the ruins and visitor center.

For each proposal the "no action" alternative was considered. More limited studies were considered as alternatives to the research proposals. Alternatives to the proposed stabilization and installation of a deep drainage system include roofing the ruins and continuing maintenance of existing pliofilm sheeting under the ruins floor. An alternative to the proposed program of establishing native plants is to use exotics to stabilize soils. The equipment access road to the ruins could be paved. Alternatives to bat management include closing off the ruins and visitor center to bat entry, installing sonic disruptors and destroying the bats.

Because none of the proposed actions entail significant environmental impacts, it is recommended that the Tuzigoot Natural and Cultural Resources Management Plan be assigned a negative declaration. Unless significant controversy develops during public review, a full environmental statement will not be prepared.

The resources management planning effort at Tuzigoot National Monument will be translated into an action program when the 30-day public review period has expired.

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ENVIRONMENTAL ASSESSMENT

The environmental assessment for the Tuzigoot resources management plan consists of the preceding description of the proposal and the following sections.

Description of the Environment

The area known as Tuzigoot National Monument, established in 1939 on 43 acres, is reserved from all forms of appropriation under the public land laws to preserve historic and prehistoric structures and/or other objects of historic or scientific interest. No other legislative policies specific to the area exist at this time.

In 1966, 15 acres of land were donated as right-of-way for the construction of a new approach road. This right-of-way reverts to the original owners should it cease to be used for this purpose. Congressional authority to expand the boundaries to include approximately 500 more acres of surrounding land is currently being sought.

Tuzigoot is located at the upper end of the Verde Valley in Central Arizona (Fig. 1). It is almost equidistant from the small towns of Cottonwood and Clarkdale, and one mile east of Highway 89A (Fig. 2).

NATURAL ENVIRONMENT

Climate. In general, the climate is semi-arid with mild winters and hot summers. Summer highs average 110° F., winter lows about 20° F. Average yearly rainfall is 11 inches, the majority of which occurs during the months of July, August and September. Snow may fall during winter months, but seldom stays on the ground more than a day or two, except in the mountains surrounding the valley. The air is normally clean with good visibility. Prevailing wind direction is from the south-southwest, and velocities average 5 knots. Humidity is generally low.

Geology. The Verde River Valley is primarily a long depression, sunk below the level of the Coconino Plateau due to earthquake action along the Verde Fault and other lesser faults on the west side of the valley. The upper Verde River, beginning in Chino Valley, flows through narrow canyons with precipitous cliffs. The middle Verde, where Tuzigoot is located, flows through a broad valley approximately 35 miles long. From here the river enters a narrow canyon at the Mazatzal Mountains and flows into the Salt and Gila Basin.

About 10 million years ago, during the late Cenozoic Era, large-scale volcanic activity blocked the river's outlet from the Verde Valley and formed a large lake. At the time of eruption, the valley consisted of a broad, red Supai sandstone plain with gravel slopes along the base of the Black Hills to the west and lava cliffs along the Mongollon Rim to the north and east.

Deposition of sandstone and limestone on the lake bottom continued for thousands of years, until the river cut a new outlet, exposing the broad middle Verde Valley. The deposited sediments, now known as the Verde Formation, consist of materials eroded from the surrounding Yavapai Group, Kaibab Limestone, Coconino Sandstone, Supai Formation, Redwall Limestone and lava. The Verde Formation covers an area of approximately 300 square miles and is up to 15 miles wide and 40 miles long. Corings have shown the maximum thickness to be approximately 1,500 feet. The formation contains a great network of channels, many of which are bordered by rock shelters, and is pocked with caves.

Topography. Topographically, this region is diverse with terrain including gentle slopes, mesas, canyons, plateaus and peaks. Within the area's boundaries, elevations range from 3,620 feet to 3,720 feet. Most of the monument is situated on a ridgetop which drops off steeply eastward to the Verde River floodplain and Pecks Lake outflow. The west side slopes more gradually into level desert lands.

Soils. Within the monument, shallow rocky soils supporting sparse vegetation overlay horizontal lake deposits of impure white limestone and reddish sandstone.

Water Resources. Less than one-quarter mile to the west of the present monument is the perennially flowing Verde River. The approach road to the monument bridges this river about one-half mile west of the visitor center. Upstream about seven river miles from the bridge, the U.S. Geological Survey has a gauging station.

Peck's Lake, an ancient oxbow of the Verde River, lies about one mile northwest of the monument. Drainage from the lake, and Tavasci Marsh northeast of the monument ridge, re-enters the Verde River to the east of the area (Fig. 2). There are no other surface water channels in or near the monument. However, numerous domestic and irrigation wells are located in the vicinity. Located on an ancient oxbow of the Verde River, Tavasci Marsh occupies an area of about 66 acres and is watered by several springs and drainage from Peck's Lake. Tavasci Marsh not only represents a unique ecotype within the Verde Valley but also represents one of the few marsh habitats within the State of Arizona. The marsh is being proposed as a unique natural area by the State of Arizona, Department of Economic Planning and Development, to be set aside for management by a conservation agency as a wildlife refuge and scenic research preserve. Water supply for the monument comes from groundwater pumped from the Verde Formation. Further details on the geohydrology of the area can be obtained from U.S.G.S. Bulletin 1177, 1963.

Vegetation. The natural semidesert shrub grassland of the Verde Valley contrasts sharply with riparian vegetation of the Verde River and its principal tributaries, Oak Creek and Beaver Creek.

The natural upland vegetation of the Verde Valley can be classed as an upper Sonoran desert transition zone of semidesert bunch grasses, primarily black grama and burrograss, dominated by mesquite, creosote bush, false paloverde, saltbush, and yucca. The ecotone with the riparian environment is sharp. The outstanding features of the river bottoms are the tree species, principally cottonwood, seep willow, and desert willow.

Wildlife. The mammalian diversity typically reflects the semi-desert conditions. Small rodents such as rock squirrel, antelope squirrel, kangaroo rat, pocket gopher, cottontail and jackrabbit predominate. Important carnivores include the coyote and bobcat. Raccoon, fox, badger and Mexican free-tail bat also occur.

Since the valley is in the transition zone between the Upper Sonoran life zone of the Kaibab Plateau and the true Sonoran desert, many species of migrant birds pass through the area. Only 23% of the 180 species noted in the area are classified as year-round residents.

The area's most common birds include the redwing blackbird, robin, Western meadowlark, desert sparrow, green-tailed towhee, gray headed junco, house finch, Oregon junco, Cooper's hawk, sharp-shinned hawk, belted kingfisher, horned lark, Western mockingbird, marsh hawk, California gull, common flicker, yellow warbler, mourning dove, killdeer, bank swallow, rock wren and red-tailed hawk.

Reptiles, including the diamondback rattlesnake, king snake, Arizona bull snake, red racer, banded sand snake, banded gecko, Clark's swift and others, occupy an important part of the fauna.

Anthropods are also numerous, especially during the warm months of April through October. Poisonous varieties include the scorpion and the tarantula.

Paleontological Resources. Fossil mammoth bones are occasionally reported by quarry workers for the cement plant near Clarkdale. Specimens are listed as poor and have been destroyed by mining operations. There are no reports of fossil finds within the present monument boundaries.

CULTURAL ENVIRONMENT

Archeological Resources. Man has occupied the Verde Valley for thousands of years. Fragments and chips of stone, bone and other discarded arti-

facts have enabled archeologists to piece together the outlines of prehistoric human occupation in the area, divided roughly into seven phases.

The foraging-hunting population adaptation in the Verde is represented by the Dry Creek phase (2000 B.C. - A.D. 1). The type-site, NA 5005, the Dry Creek site, was excavated in the 1940's by Richard Shutler. It was an early campsite on a creek drainage and Shutler felt the artifacts were similar to Chiricahua Cochise implements. Several other lithic campsites have been noted in the Coffee and Spring Creek areas.

The Squaw Peak phase (A.D. 1 to 700) relates typologically and, in part, temporally to the San Pedro stage of the Cochise culture and the Basketmaker II period; like them, this phase lacks pottery. Dwellings were small and ill-defined round surface structures or shallow pithouses with large bell-shaped cache pits. Contemporary Basketmaker II groups grew corn, beans and squash; presumably this was true in the Verde.

The Hackberry phase (A.D. 700 to 800) marks the introduction of pottery to the Verde. Trade relationships extended into the Gila-Salt Basin, and some archeologists consider the entry of Hohokam culture into the Middle Verde as the result of intrusive populations. An alternative explanation is an indigenous population that traded downriver into the Hohokam area.

The Cloverleaf phase (A.D. 800 to 900) is generally interpreted as a Hohokam intrusion during the Colonial period. This is a phase of established Hohokam-like villages along the Verde drainages. The population lived in pithouse villages near riverine fields and grew a variety of domestic plants. Trade relationships were along the rivers and into the Gila-Salt Basin.

In the Camp Verde phase (A.D. 900 to 1100 or 1125) there is a wider range of house types. Two and four-post pithouses and "communal" houses have been found by excavation. Trade was still primarily to the south, but there was an increasing percentage of northeastern artifacts. Casa Grande type ballcourts occur in the Verde in this phase. The first pueblo of Tuzigoot was under construction at this time.

The Honanki phase (A.D. 1125 to 1300) is the period of "Southern Sinagua" intrusion. In this period there is a shift from riverine pithouse villages to hilltop or cliff masonry pueblos. Schroeder and Colton have inferred that the "Northern Sinagua" intruded into the valley and moved south to form the classic Hohokam. The Northern Sinagua were dry-farmers while the Verde Sinagua were irrigation farmers.

The Tuzigoot phase (A.D. 1300 to 1400 or 1420) is typified by large masonry hilltop pueblos. The largest sites are concentrated at the confluence of tributaries with the Verde and in areas of trade. The Tuzigoot

cluster is near the Jerome copper fields; Montezuma Castle and Well are near the Camp Verde salt mines and on the old Hopi trail. Corresponding to the development of large masonry pueblos is the development of many defensive architectural traits. By 1425, the valley was abandoned.

The Tuzigoot pueblo proper was first occupied about A.D. 1000. The pueblo grew to be one of the largest known hamlets on the Verde River by A.D. 1350. The site was occupied during the last three phases of the Verde farming cultures: the Camp Verde, Honanki and Tuzigoot phases.

The architectural history at Tuzigoot is somewhat conjectural, but indicates continued growth:

1. Prior to A.D. 1000, there was some trash on the ridge representing limited occupation;

2. In about A.D. 1000, during the Camp Verde phase, masonry rooms were constructed on the refuse in the following sequence:

   a. Four rooms were constructed, and possibly three more added;
   b. Four rooms were added on the west slope.

3. At about A.D. 1100, one large room and two small rooms were abandoned on the west slope.

4. At about A.D. 1200, in the Honanki phase, eight rooms were added on the summit, partially covering the abandoned rooms on the slope. Rooms were then periodically added on the south slope.

5. Around A.D. 1300, in the Tuzigoot phase, whole new complexes of rooms were added on the south and east slopes and on the north ridge. Second story rooms were integral to the additions.

Prior to abandonment, Tuzigoot pueblo contained between 90 and 100 contemporaneous rooms. Perhaps 225 people were living in the pueblo at that time. Just across the river, the 20-room Tuzigoot extension was occupied by perhaps another 45 people. At this same time, Hatalacva near Pecks Lake had about 100 rooms. These three sites alone perhaps totaled 600 people. Evidence indicates that the region near Clarkdale was one of the most densely settled areas in the latter period of prehistoric farming occupation of the Middle Verde. In addition to the Tuzigoot extension, Hatalacva and Tuzigoot itself, several pueblos of 35 rooms have been located at the confluence of each tributary north of the monument. Two other fairly large downstream sites are known within three miles of Tuzigoot. The sites close to the copper outcroppings appear to be the only other major cluster of sites along the Verde not associated with the confluence of a tributary.

The sustaining area of Tuzigoot, the geographical area from which the prehistoric population drew the greatest percentage of its subsistence, was particularly rich in wild foods and useful plants and animals. The ancient pueblo inhabitants were farmers who supplemented their crops with localized hunting, gathering and specialized mining.

The local bottomland environment of the pueblo was prime farmland and the water table lay close to the surface. The lake and marsh in the northern part of the oxbow could be drained by shallow ditches through the bottomlands and into the Verde below the pueblo. At least 160 acres east of the monument fit into the bottomland category. Perhaps another 160 acres of similar land lies across the Verde to the south. Another 1200 acres of prime bottomlands are near the monument.

Pecks Lake, in the oxbow, would have been a good hunting and gathering area. Tavasci Marsh contained a multitude of wild foods and construction resources. Most of the marsh plants are useful and the marsh and lake are attractive to many birds. The seasonal lack of water at many elevations would make this oasis attractive to many valuable meat animals. This small region was probably intensively used and exploited by the prehistoric population cluster near Clarkdale.

In addition to the floral and faunal resources already outlined, there are large deposits of copper ores only six miles west at Jerome. These ores were well known ethnographically as far away as the Hopi mesa. However, disturbance by recent mining has probably destroyed all prehistoric traces.

Shortly after abandonment of the Verde Valley by the Sinagua, groups of foragers and hunters reappeared in the Verde. Around A.D. 1500 the Yavapai occupied the valley and the Apache occupied the mountains to the east. These peoples practiced essentially the same kind of economy as the earliest phase groups in the valley and provide ethnographic parallels of foraging adaptations.

In 1582, Antonio de Espejo left the Hopi mesas on the trail to the copper mines. The expedition found,near the Jerome mines, a cluster of Yavapai who mined and traded the green and blue pigments. In 1658, Farfan also visited the area and described the "Cruzados" or Yavapai. In 1704, Zarate described the Cruzado economic system. In 1776, Garces, a Franciscan padre, passed through and described the "Yabipais" people and the Verde area.

The earliest Western explorers and trappers used the Verde as a trail stop for many years, but it was not until the 1850s and 1860s that settlers began to remain in the valley. The Yavapai were placed under military control in 1875 and moved to the San Carlos reservation. In 1900 they were returned to the Verde at the Camp Verde reservation.

Past and Current Archeological Research. The data base for cultural history in the Verde is based on reconnaissance surface surveys and limited site testing and excavation. The chronologies and culture history are not clear, since early excavation was incomplete and does not include sites representative of important transitional periods.

The site of Tuzigoot was first explored during the extensive 1932-33 survey of the Middle Verde by Earl Jackson. In 1933, the Archeological Committee of the Yavapai County Chamber of Commerce, Prescott, began excavations under the direction of Caywood and Spicer. The excavation occurred in two phases: (1) the trenching of lower slopes to get burials; (2) excavation of the rooms. Over 400 burials were recovered and 86 rooms were excavated to the ground floor. Five distinct architectural units and a patio were uncovered, but these units did not correspond to the arbitrary groupings used in excavation.

Caywood and Spicer, using room abandonment sequences, found that the pueblo was constructed in several increments. Their report is an artifact inventory, standard for that period, with no reference to artifact provenience and no systematic description of internal features. The research aim of gathering museum specimens was fulfilled, but a full report on the excavation will require restudy. This report should document artifact provenience and room features. There is no accurate site map of architectural details, internal features, or the locations of trenches and burials. An accurate site map is needed before any further work on the pueblo is done.

In 1958, Fred Peck, park archeologist at Tuzigoot, excavated a stratigraphic test trench down the east slope of the ridge. This was the same area trenched by Caywood and Spicer and later used for backdirt from the room excavations. Peck's excavations reached a maximum depth of three feet. The trench was on the southeast corner of the ridge and was excavated in horizontal levels. There is a profile of the trench, but there is no formal report on the excavations.

In 1964, park archeologist Calvin Cummings surveyed the construction sites for employee residences, water tank, access road, and utilities system and found no evidence of prehistoric occupation. After the contractor cleared the land, Cummings resurveyed all sites and again found no evidence of prehistoric occupation. In 1966, Cummings surveyed the proposed borrow pit for the access road and found no cultural material within the pit limits. There is a Yavapai camp just outside the limits of the pit, but it was not disturbed by the project.

In 1972, George Gumerman surveyed the Phelps Dodge proposed land exchange area surrounding the monument. He found two badly vandalized five to six room masonry pueblos.

Fig 4. Archeology Map

In 1973, Sam Henderson, Dave Forgang, Tony Razo, and Leonard Ontiveros excavated five test trenches along a buried telephone cable route. There were no significant remains along the surveyed and tested route. Henderson also tested an irrigation ditch near the route and found two superimposed ditches.

Figure 4 shows the areas of survey and excavation. The basic survey work inside the monument was done in the 1930s during the Spicer and Caywood research. Surface finds by park personnel indicate there may be other sites inside the monument. Survey and excavation within the boundaries are virtually limited to the Tuzigoot pueblo and various developed sites.

Research Collections. The Arizona Archeological Center of the National Park Service holds approximately one-fourth of the Tuzigoot collection, or about 450 catalogued specimens, most of which came from the 1933 excavation of the Tuzigoot site. The remainder is at the monument. About half the catalog entries at the center are stone objects, which include a variety of artifacts. Few wood or plant items are preserved. A relatively small number of items comes from other sites and areas: Tuzigoot Extension, Hatalacva, Hidden House, Sycamore Canyon, and the general Verde Valley area. The materials present a good representation of late Sinagua culture. The collections are most useful for reference and comparative studies, but also provide a resource for exhibits in the monument museum in order to relate prehistoric culture to that of modern man.

Library Collection. Tuzigoot has a catalogued and accessioned library of approximately 800 volumes, which is kept up-to-date and is quite comprehensive in areas related to the particular emphases of the monument. This collection consists primarily of research material and reflects a broad cross section of anthropology, archeology and ethnology.

Both published and unpublished documented materials on the natural history of the monument and surrounding area are incorporated into the library, serving research, resource management and interpretive purposes.

Because of the visible impact of past mining activities in the valley, documents on the geology of the area and history of the mines, land, and people are available.

All manuscripts and documents are cross-referenced with existing photo and slide files for staff use in developing interpretive programs. A small herbarium and insect collection is also used for interpretive and research purposes.

Collections at Other Institutions. Some display quality items are on loan to the Smoki Museum and the State Archives in Phoenix. Other artifacts are at the University of Arizona, University of Missouri and the Western Museum of Texas.

Historical Resources. The old copper mining town of Jerome, 7 miles distant, is a designated National Historic Landmark and also a designated Bicentennial site for the state of Arizona. As a historic area of the National Park Service, and being of national historical significance, Tuzigoot National Monument in its entirety was automatically listed on the National Register of Historic Places. There are no features or structures within the monument property that have been individually nominated.

Developments. On-site developments include a museum-visitor center constructed in 1936 to house the artifacts excavated earlier from the ruins, and a modern triplex residence built in 1965. The ruins and museum are reached over 1.2 miles of paved road from Highway 89a between the towns of Cottonwood and Clarkdale. Another .3 mile of graded dirt road crosses the monument ridge between the visitor center and the residences, providing access to adjacent ranches and a newly established state park. This latter road is not a Service road, but was put through in 1941 by the county and is sporadically maintained by same (figure 3).

Visitor Use. Visitation to the monument consists mainly of family groups arriving in private vehicles. Peak usage occurs during June, July and August, with moderately heavy periods occurring during April-May and September-October. Visitation statistics for the past five years are present in table 1.

Table 1. Visitation

	Museum	Overall
1969	49,039	103,576
1970	53,603	119,345
1971	63,693	104,909
1972	62,221	88,741
1973	62,230	85,215

Population. The monument is two miles east of Clarkdale, built originally as a service town for the mining area of Jerome. Two miles further east is Cottonwood, trade center for the surrounding areas, with a population of about 3,500.

Ethnic groups include a small group of Yavapai-Apache Indians whose ancestors entered the valley between A.D. 1500 and 1700. About 10 percent of the population consists of Spanish-speaking descendants of mine workers at Jerome. Around the turn of the century, Slavic and Italian farmers were attracted to the fertile farm lands. The modern influx is predominantly northern European.

The entire Verde Valley is in the midst of a real estate and residential boom. Speculation in land has escalated prices dramatically in the past four to five years.

Table 2., taken from a 1972 community profile, illustrates the dynamics of the area.

Table 2. Population

	1960	1970	% of Change
Cottonwood	2,120	2,815	+32.8%
Clarkdale	1,095	892	-18.5
35-mile radius	20,000	21,600	+ 8.0
Yavapai County	28,912	36,837	+27.4

Age structure is similar to state and national averages; 32 percent under 18, 50 percent between 18 and 65, 18 percent over 65. Since the 1970 census, population has taken a tremendous surge and probably has increased as much in the past three years as during the previous ten.

The upper Verde Valley has two elementary school systems and a union high school. The nearest colleges are at Prescott and Flagstaff. 1970 figures showed 48 percent of the working population had less than a high school education, 35 percent had completed high school, nine percent had some college and eight percent a college degree.

Churches include most denominations. The local Indian culture is Yavapai-Apache, with some Pueblo or Navajo due to intermarriage.

Economic Activity and Land Use. Only one large industry exists, the Phoenix Cement plant in Clarkdale. A small garment factory is located in Cottonwood. Ranching and farming are active, but not dominant as in previous years. Construction, with the attendant retail and professional services, seems to provide much of the present employment. Tourism has great potential within the area.

Local interests are urging a main highway to connect the Verde Valley with Interstate 40 at Williams, opening the area to more competitive markets. The project is delayed for further environmental studies of the proposed routes. A recently established Resource Conservation and Development program of action proposes expansion of economic opportunity through increases in tourism, recreational opportunities, specialty crop agriculture, and attraction of carefully selected industries (type not specified).

PROBABLE FUTURE ENVIRONMENT WITHOUT THE PLAN

Without the proposed archeological research, future efforts to properly manage and interpret the area's archeological resources will suffer from lack of information. Available information on the area's archeological resources will remain fragmentary and, in some instances, of questionable accuracy.

If the ruins stabilization and drainage proposals are not implemented, water retention in the ruin's walls will remain a problem and the ruins will continue to rapidly deteriorate. In the long run, the ruins may be lost.

Without the proposed landscaping projects, unsightly conditions and soil erosion will continue in areas disturbed by visitor use, maintenance, or construction activities.

Without the proposed bat control measures the human health hazards presented by bats in the ruins area will remain greater than necessary. Without the proposed studies more efficient bat control measures will not be developed.

Environmental Impact of the Proposed Plan

All proposals are dealing with an archeological area where manmade alterations to the natural environment have been occurring for nearly 1,000 years and have themselves become a prime resource. With most projects, the aim is to lessen or eliminate modern intrusions in sections of the monument where a completely natural environment no longer exists and restoration of such an environment is not desirable. The intended impact of the cultural portion of the plan is to prevent or minimize loss of archeological and historical resources. By following a professionally prepared research design employing current scientific procedures, a better data base can be established upon which to sample known non-renewable resources.

Detailed descriptions of sites within the monument will provide reference information for future research, stabilization, planning and interpretation. Such information can be used to reduce any adverse impacts associated with excavation and stabilization.

Surveying the geographic area within a two-mile radius of Tuzigoot will minimize loss of interpretive and scientific data due to modern development and heavy vandalism of unprotected archeological sites. The survey will establish a priority listing of research proposals both inside and outside of Tuzigoot. Impacts will be minimal except where excavation is considered critical for research.

Establishment of a deep drainage system for the ruins will alleviate constant deterioration of the walls and reduce periodic maintenance costs. Excavation will permanently remove archeological evidence. The disruption of established drainage patterns and the possibility for heavier erosion will occur during construction. Equipment noise and dust will be intrusion to visitors during construction. The visual intrustion of mechanical drainage aids or surface barriers will be eliminated. Interpretive possibilities will be enhanced for explaining to visitors what is involved in maintaining an archeological site and allowing them to see work in progress.

The introduction of native plants into those areas where soils and vegetation have been disturbed by visitor use, maintenance, or construction activities will reduce soil erosion and restore native plant cover to these sites. Established plants will serve to screen utility and residential areas and limit the spread of exotic plants in the area. The plants will also contribute to resource protection by discouraging off-trail use in some areas. Labeled plants will aid in providing visitors with information on those plants used by prehistoric and/or modern Indians. Irrigation water and energy (to run the well pump) will be required during the early stages of plant establishment. Once established the plants should not require artificial irrigation.

Erasure of the equipment access road, highly visible from the monument parking lot, will remove a visual intrusion and the temptation for unauthorized, non-fee access. This action will also lessen erosion along the dirt ruts made by equipment wheels. Erasure of the road will require that future equipment access to the ruins be via one of the two existing trails into the area. This should not inconvenience or disturb visitors as equipment use will be infrequent and confined to the less used trail.

The proposed bat management measures will partially deodorize and disinfect the treated area. Since bats are often attracted to roosting sites by the odor of their droppings any reduction in odor may result in decreased use of the site. Any decline in the resident bat population may result in reduced predatory pressure on specific insect populations in the area. Some insect species may become more abundant while others may decrease in numbers. Scrubbing the ruins floors to remove bat droppings and disinfecting the area will minimize the potential for humans contracting diseases, including rabies, from association with bats and bat feces. The proposed consultations with bat experts and possible onsite studies will aid the monument in developing the most efficient means for controlling bat use of the area.

Monitoring water levels in the area's well will provide information on the present water supplies' ability to meet future demands. The monitoring will provide a necessary corrective action to be taken as soon as possible.

Mitigating Measures Included in the Proposed Action

To offer those archeological sites located during the mapping and surveying projects some protection from pot hunting and vandalism, the sites will not be made public knowledge.

Cultural resource management projects will be limited to nondisruptive professional surveys and studies, except where other overriding management needs may require professionally adequate excavation to recover threatened data. This will occur only if stabilization and drainage cannot be designed to avoid destruction of cultural resources, after professional archeological examination and evaluation.

Research and drainage needs will be coordinated before the excavation project is begun. Selected sites within the ruins will be as few as possible and destruction of the archeological record minimized. Remapping of the ruins and updating the area's archeological base map prior to any excavation will aid in insuring that portions of the ruins remain intact for future development of better archeological research techniques.

Hand tools in preference to heavy equipment will be used whenever feasible during installation of the ruins drainage system, to avoid damage to the prehistoric walls.

Maintenance of prehistoric ruins will be done with the use of local limestone and sandstone and soil-colored cement so as to approximate as closely as possible the original appearance of the walls.

Project planning has been and will continue to be in compliance with Section 106 of the National Historic Preservation Act of 1966 and Executive Order 11593, Protection and Enhancement of Cultural Resources. Before any work that could have an effect on cultural resources begins, consultation with the Procedures of the Advisory Council on Historic Preservation will be completed. A professional archeological examination and evaluation will be part of these proposals.

Research will provide continuous feedback to modify resource management efforts that are ineffective or destructive of other values and to identify new and better approaches to achieve management goals.

To minimize the need for watering and other care, only native plants, adapted to the local soils and climate, will be used for the proposed landscaping. Prior to the initiation of those landscaping actions which may require ground disturbance, an adequate archeological survey of the area will be sought. Identified material of archeological significance will not be disturbed by the landscaping actions. If materials not identified by the survey are located subsequent to the survey, all work will cease until a professional archeologist can assess the situation.

Adverse Effects Which Cannot Be Avoided Should the Proposal be Implemented

The proposed stabilization project will cause unavoidable disturbance of the cultural deposits in the pueblo. Any excavation will permanently remove archeological evidence.

There will be some disruption of visitor services, equipment noise, and dust during construction of the ruins drainage system.

Relationship Between Short-Term Uses and Long-Term Productivity

The proposed ruins stabilization project will involve minor, short-term inconvenience to visitors. The long-term result will be the preservation of the resource for future visitors, while increasing visitor enjoyment and enhancing the established interpretive theme.

Research projects are intended to identify specific long-term goals of cultural resource management and to give these precedence over short-term management goals. Since cultural resources are fragile and non-renewable, their preservation under current laws, policies and standards for historic preservation is a primary goal of park management. These resources outside the monument are subject to continuing destruction by land development and vandalism.

The proposed sustaining area survey has the long-term goal of maintaining the surrounding resources and environment to insure the historical context of the pueblo.

The monument's maximum long-term productivity can be realized through the above program providing for appropriate research and the restoration, preservation, and visitor enjoyment of the area's cultural and natural resources. No short-term uses which will interfere with this long-term productivity are proposed. The proposals limit short-term uses in order to enhance long-term productivity.

Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action

The proposed stabilization project will permanently alter and replace historic fabric. Any excavation of archeological or historical sites permanently commits and disrupts the context of these remains. The proposed studies will aid in minimizing excavation within the monument and insure optimum data recovery from those excavations deemed necessary. Ruins stabilization will require the irreversible commitment of energy necessary to operate power equipment used on the project.

The landscaping project will require the irreversible commitment of some water and the energy required to pump the water.

Alternatives to the Proposed Action

Alternatives to the proposed archeological base mapping of Tuzigoot include no action, development of a map based on more limited studies than proposed and mapping based only on aerial photographs. If no action were taken, an adequate archeological base map of the area would not be available for future planning efforts. Future excavation and stabilization programs would be based on the existing inadequate map of the area. This would lead to the unnecessary loss or destruction of cultural evidence. If sites within the Tuzigoot sustaining area yet outside the monument are not studied soon, the information they contain may be permanently lost for the Park Service cannot insure the preservation of sites external to the monument. Any mapping of the ruins based on more limited studies than those proposed could also lead to the unnecessary loss of cultural materials. In order to insure that such losses are minimized, the proposed set of studies is needed prior to construction of the map. A rough map of the ruins could be constructed from aerial photographs of the area, but again this would not result in development of an adequate map.

Alternatives to the proposed archeological survey of Tuzigoot's sustaining area include no action and surveying a more limited area than that proposed. If no survey were conducted, continued development and vandalism on non-protected archeological sites in the proposed survey area would lead to the permanent loss of interpretive and scientific data. Without the survey, available information on the ecological and

economic relationships between Tuzigoot's inhabitants and the immediate environment will remain inadequate for the proper interpretation and management of the monument. Any survey of less than the proposed area would not provide adequate protection against future losses due to development and vandalism. An incomplete survey would not accumulate the data necessary for adequately interpreting the site.

No action, roofing the site, and the continued maintenance of existing pliofilm under the ruins floors were considered as alternatives to the stabilization proposal. If no action is taken the prehistoric wall system will continue to deteriorate due to improper drainage. Roofing the pueblo would eliminate the drainage problem but would be very expensive and present a visual intrusion on the site. Maintenance of the existing pliofilm sheeting would not prevent continued deterioration. of the ruin walls.

A variety of alternatives to the proposed landscaping is available. If no action is taken disturbed sites may, in time, be revegetated through natural processes, but this could take many years. In the mean time erosion would continue. Exotic plants could be used in the landscaping program but these would present an intrusion on the local, prehistoric scene. If the established native plants are not interpreted the visitor will not have ready access to information on early plant uses. The monument would be overlooking an opportunity to provide an interpretive exhibit which can add to the quality of the visitor experience. If the equipment access road to the ruins is paved or if no action is taken the road will remain as an intrusion on the prehistoric scene. Direct visitor access from the parking lot to the ruins would also remain a problem.

Alternatives to the proposed bat management actions include no action, closing off the ruins and visitor center to bat entry, installation of sonic disruptors, and destroying the bats. If no action were taken the possibility of visitors encountering rabid bats or contracting diseases from close association with their roosting sites would remain greater than necessary. The odors of the roosting site will be offensive to some visitors. Closing off the visitor center to bats is not feasible since it would involve major construction and funding and would add to the modern appearance of the building. Closing off the ruins is feasible but this would only shift all bat activity to the visitor center. Sufficient information is not currently available to assess the effectiveness and impacts of sonic disruptors. These devices will continue to receive consideration in the future. Destroying the bats could disrupt ecological balances in the area.

The only alternative to the proposed water resources project is no action. If water levels in the area's well are not monitored the monument will continue to lack information on local water table fluctuation and the ability of the monument's water supply to meet future needs. Under this alternative the area may not receive adequate warnings before a critical water shortage occurs.

Consultation and Coordination

During preparation of the resources management plan, the following persons were consulted for their knowledge and recommendations regarding the bat problem.

Mr. Nelson B. Kverno,
Coordinator AID Programs
Denver Research Center
U.S. Fish and Wildlife Service

Mr. Ed Smith, Regional Refuge Supervisor
U.S. Fish and Wildlife Service
Portland, Oregon

Informational copies of the plan and environmental assessment will be sent to the following organizations and individuals and their comments will be solicited. All letters of comment received will be reviewed for implementation by the Superintendent. Copies of the assessment and public comments will be available at Tuzigoot National Monument and the National Park Service's Western Regional Office.

Arizona State Historic Preservation Officer
Arizona State Department of Fish and Game
Coconino National Forest
Prescott National Forest
Museum of Northern Arizona
Sierra Club

The following letter of comment was received from the Arizona State Historic Preservation Officer.

ARIZONA
STATE
PARKS

1688 West Adams
Phoenix, Arizona 85007
Telephone 271 – 4174
DENNIS Mc CARTHY, Director
WALLACE VEGORS, Assistant Director

Dennis McCarthy, State Historic Preservation Officer
State and National Registers of Historic Places

January 2, 1975

Mr. John H. Davis
Acting Regional Director
Western Region
U.S. Department of the Interior
National Park Service
450 Golden Gate Avenue
San Francisco, California 94102

Re: Resources Management Plan
Tuzigoot National Monument

Dear Mr. Davis:

The draft environmental statement for the natural and cultural resources management plan has been reviewed. The State Historic Preservation Officer has applied the Criteria of Adverse Effect, 800.9 and determined that the project will not have an adverse effect.

Nearby Hatalacva Ruin was entered into the National Register of Historic Places on July 9, 1974. It is gratifying to note that a systematic survey of the area will include this site. It is of great concern that the site is being demolished and destroyed by pot hunting activities.

Sincerely,

DENNIS McCARTHY
State Parks Director

Dorothy H. Hall

Dorothy H. Hall
Historic Sites
Preservation Officer

DHH:oml
cc: Mike Bureman

Department of the Interior

National Park Service

NEGATIVE DECLARATION

TUZIGOOT NATIONAL MONUMENT, ARIZONA

Western Region

In compliance with the National Environmental Policy Act of 1969, the National Park Service has prepared an environmental assessment on the following proposed project:

Natural and Cultural
Resources Management Plan
Tuzigoot National Monument

The assessment process did not indicate a significant environmental impact from the proposed action. Consequently, an environmental statement will not be prepared.

4/3/75
Date

Glen E. Henderson
Superintendent

4/14/75
Date

Howard H. Chapman
Regional Director, Western Region