NATIONAL PARK SERVICE
RESEARCH OPPORTUNITIES

in

GUADALUPE MOUNTAINS NATIONAL PARK

COOPERATIVE PARK STUDIES UNIT
DEPARTMENT OF RECREATION AND PARKS
TEXAS A&M UNIVERSITY
COLLEGE STATION, TEXAS 77843-2261
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January 26, 1987

Introduction

The National Park Service is seeking highly qualified and interested scientists who desire the opportunity to conduct important management oriented research in Guadalupe Mountain National Park (GUMO). These projects are requested by park management to provide the specific resource information necessary to protect and interpret the natural resources of this complex and ecologically important area.

Funding Assistance

Unfortunately, there is very little direct Federal funding available at the present time. However, the National Park Service is prepared to support researchers working on these projects in a variety of ways. First, the Director of the Cooperative Park Studies Unit (CPSU) at Texas A&M University is willing to assist researchers in their pursuit of corporate or foundation research funding. Second, GUMO has a limited number of temporary housing units that can be made available to approved researchers during field work in the Park. Third, some limited travel support may be available from the CPSU Director to get researchers to the Park. Fourth, the CPSU will provide some assistance with the printing of research results. Fifth, the park staff will provide all necessary permits for conduct of the research and are available for consultation on access and logistics in GUMO.

How To Get Started

If any of the projects listed herein are of interest to you, or you desire further information, please contact the CPSU Director, Dr. Dennis B. Fenn, Department of Recreation and Parks, Texas A&M University, College Station, TX 77843-2261. The CPSU telephone number if 409-845-5369.

PRESERVATION OF MCKITTRICK CANYON

The most heavily visited and popular area of GUMO is the McKittrick Canyon day use area. This area of the park is famous for its scenic beauty, cool streams, riparian vegetation, water falls and brilliant fall color display. It is an ecologically sensitive zone and concern has been expressed about the level of visitation to the area. McKittrick Canyon has been designed for day use only in an effect to minimize visitor impacts to the degree possible. Much more information is needed on a variety of subjects in order to ensure that adequate management of the area is accomplished over the long term.

The specific research questions needing answered by this study are as follows:

-- What effects are current visitation levels having on the vegetation of McKittrick Canyon.

-- What effects are current visitation levels having on the water quality of McKittrick Canyon.

-- What visitor use levels can be tolerated in McKittrick Canyon before unacceptable damage is done to the ecosystem, i.e. What is the recommended ecological carrying capacity of the day use area?

-- What is the status of the fishery in the stream? Is the small trout population introduced or native? What have the trout done to other species in the streams, or vice versa?

-- What would you propose as a fisheries management plan for McKittrick Canyon?

BLACK BEAR SURVEY

Black bears, once numerous throughout many areas of Texas, are now a relatively rare sight in the state. One area known to still have a small residual population is GUMO. Some scientists say that the Guadalupe Mountains may harbor the last gene pool of native Texas black bear. Four bears, were killed by a rancher near GUMO in 1986 during a mountain lion trapping operation. The presumably small population of black bears in the area cannot support its numbers for long with that level of human caused mortality. Scientific information on the GUMO black bear population is urgently needed.

The research questions needing to be answered by this study are as follows:

-- What is the estimated population of black bears in GUMO and adjacent Lincoln National Forest lands?

-- Where in the study area do black bears reside?

-- What are the home ranges of resident black bears in Guadalupe Mountains?

-- What is the population trend of black bears in the study area?

-- What is the status of the habitat health in the study area? Is the habitat a serious limiting factor in the black bear population level or are other factors limiting the numbers?

-- What management actions are needed to ensure the population of a viable black bear population in GUMO?

Threatened and Endangered Species

America's National Parks have become very important refuges for many endangered species, both plant and animal. Some ecologists see a park's most important function being that of gene-pool conservation. This responsibility to protect specific endangered species, as well as naturally functioning ecosystems, is taken very seriously by GUMO. Information on the location, population and current status of the several species in GUMO currently proposed for endangered designation is badly needed. At the current time, no federal officially listed species are known to occur in GUMO. However, up to 15 proposed species do occur in the park. The Texas state list also contains several species found in GUMO. Field work is needed to locate and map these occurrences.

The specific research questions needing answered by this study is as follows:

-- What listed or proposed endangered or threatened plant species occur in GUMO?

-- Where are populations of each of these species found within the park? Conduct field surveys to plot site locations on the park base map. Provide b/w and color photos of the plants for GUMO staff orientation.

-- What listed or proposed endangered or threatened animal species occur in GUMO?

-- Where are populations of each of these species found within the park? Do field surveys or habitat evaluations to plot locations on the park base map.

IMPACTS OF OIL AND GAS DEVELOPMENT

Oil and gas development is not allowed within GUMO. However, such exploration and development is underway on lands adjacent to the park. A recent opening of exploration and development of a field in the Wilderness ridge area of the Lincoln National Forest has created concern about threats to the McKittrick Canyon day use area. the wilderness Ridge area is up drainage from McKittrick Canyon and occupies the same watershed. Concern has also been expressed about the visual impacts of the field on the viewscope of McKittrick Canyon. A thorough evaluation of the potential impacts of Wilderness Ridge oil and gas development on the visitor experience in and ecological health of McKittrick Canyon.

The specific research questions needing answered by this study are as follows:

-- How serious an oil spill threat does the Wilderness Ridge oil and gas development pose to the McKittrick Canyon day use area to other areas of the park?

-- Do conditions warrant the preparation of a comprehensive oil spill recovery plan for McKittrick Canyon? What should such a plan contain?

-- What visual impacts is the Wilderness Ridge oil and gas development likely to have on the McKittrick Canyon viewscope?

-- What other impacts is the Wilderness Ridge oil and gas development likely to have on the park visitor?

SURFACE WATER MONITORING

Water, the central character in the drama of life in the southwest, is naturally a subject of great interest to GUMO. The two primary concerns of this study are surface water quality and surface water quantity. It is important that the park monitor water quality in order to ensure visitor safety and to quickly locate potential problems that might have ecological impacts within GUMO. Water quantity is a primary park resource that is as much a part of the ecosystem as are ponderosa pine communities on Guadalupe peak. The park has a responsibility to monitor water quantity as a part of the baseline information system upon which resource management decisions are based. Some early work by Dr. Ernest B. Fish and colleagues at Texas Tech University needs to be extended and carried forward.

The specific research products needed from this study are as follows:

-- A baseline data set on surface water quality throughout GUMO.

-- A Water resource management plan for GUMO.

-- A Water quality monitoring program for GUMO.

-- A baseline data set on surface water quantity throughout GUMO.

-- A water quantity monitoring program specifically developed for GUMO.

INVERTIBRATE SURVEY

GUMO is similar to most National Park areas in that relatively little is known about the invertibrate populations in the park. A few general surveys have been conducted in the past and a small insect collection is available in the park archives. This early survey work needs to be expanded to cover the park in greater detail. Invertibrates play an important role in the functioning of most ecosystems and GUMO needs to know more about the what, where and why of its invertibrate population. This project could be undertaken in individual geographic units of the park or the entire park could be surveyed in a more ambitious effort.

The following products are needed from this research effort:

-- Terrestrial invertibrate inventory for each of the numerous canyons of the park.

-- Terrestrial invertibrate inventory of the foothill zone of the park.

-- Terrestrial invertibrate inventory of Guadalupe and other peaks in the park.

-- Terrestrial invertibrate inventory of the land base above the escarpment but not on peaks or in the canyons of the park.

-- Aquatic invertibrate inventory in McKittrick Canyon.

VISITOR MARKET SEGMENTATION STUDY

Approximately 150,000 people visit GUMO each year. Of these, 30,000 stop at the Frijole Visitor Center and 7,000 visit McKittrick Canyon day use area. The balance are day users in Dog Canyon, the Patterson Hills and other parts of the park, as well 1500 back country campers who hike into the wilderness areas of the GUMO Mountains. The park does not currently have a good demographic description of its visitors, nor do we know their motives or expectations from a visit to GUMO. The interpretive staff could better serve the needs of the public if they had definitive information on the above topics and could target their programs accordingly.

The specific research questions needing to be answered by this research are as follows:

-- What is the geographic distribution of GUMO visitors by season and annually?

-- What is the park visitation by age, group affiliation, special population membership, and point of origin?

-- What is the percent breakdown for-destination/duration of stay, activity and area/facilities used, interpretive program use, and special activity/occurrence?

-- What interpretive activities do visitors expect to find in GUMO?

-- How do visitors rate the quality and content current park interpretive offerings?

-- What interpretive offerings should be added or deleted to meet visitor demand and needs?

-- What are the activity-interest segments into which the GUMO visitor pool may be divided for interpretive targeting?

-- What other kinds of visitor segmentation would be most useful to park management?

ETHNOHISTORY OF MESCALERO APACHE IN GUMO

Settlement of this area of west Texas was a dangerous and uncertain proposition in the early days. The Mescalero Apache were very effective in their defense of their homelands. This tribe was war-like and determined to hold on to their lands. Their arrival in the GUMO area preceded the white man only by a short period. Their study is one of the most interesting parts of the history of the GUMO story for most visitors. The interpretive staff would like to have a carefully prepared ethnohistory of this tribe that relates to the GUMO area. This information will be integrated into the interpretive offerings in the park.

What follows below is a list of specific questions that the GUMO staff would like to have answered. In addition however, should you express an interest in this study, the Park Service has detailed instructions concerning the standards to which such research should be conducted. These instructions are contained in the National Park Service handbook entitled "Cultural Resources Management, NPS-28." Copies of the instructions will be provided to you during your discussion of this project with GUMO staff or the CPSU Unit Leader at Texas A&M University.

This ethnohistory of the Mescalero Apache in the GUMO area should answer the following questions:

-- When did the Mescalero Apache arrive in the GUMO area?

-- Where did they come from?

-- What tribes did they displace from the area?

-- How do the Mescalero Apache relate to the Chirichahua, Jicarilla and other Apache peoples?

-- What was the nature of the Mescalero Apache way of life?

-- What was the form of government used by the tribe?

-- What land area was controlled by the Mescalero Apache when European men arrived in west Texas?

-- What military system and warfare tactics did the Mescalero Apache use to first win control of the area and then later to defend this control against white men?

-- What population level did the Mescalero Apache reach before non-Indian contact?

-- What cultural factors were unique to the Mescalero Apache?

HISTORY OF MILITARY IN GUMO AREA

The Guadalupe Mountains area of west Texas has a rich military history that stretches from the frontier indian wars era through World War II. Military activities in what is now GUMO has left behind artifacts, structures, trails and, more recently, plane crash sites, that are of immense interest to many park visitors. This study is needed in order to document this military history and to put the information in a concise form that the park can use to present an accurate and interesting story to the visitors at GUMO.

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The specific research questions needing answered by this study are as follows:

-- What was the relationship of the GUMO area to the plains indian wars?

-- How significant was GUMO to the overall indian operations of the U.S. cavalry?

-- What information can be documented on the several military plane crashes in GUMO during World War II training exercises? Things such as plane type, mission at time of crash, names of and information on people killed or injured in the crashes and locations of the crash sites are desired.

HISTORY OF RANCHING IN GUMO

West Texas was cattle and sheep ranching country long before oil and gas discoveries entered the picture. The role of ranching in opening up the area to post-european contact settlement cannot be over estimated. Still today, ranching is synonymous with life in the arid hills and open valleys of west Texas. Much of the area that comprises present day GUMO was ranchland before the park was established. The park is surrounded on all sides by ranching activity to the present day. The historical role of ranching, and the hardy people who made it their way of life, is an important and fascinating story that most park visitors want to learn about. Specific historical documentation and elaboration about past ranching in GUMO is sorely lacking. This research project is needed in order to fill those gaps and to help the park do a better job of interpreting the area for the public.

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The specific research questions needed answered by this project area follows:

-- When did ranching first get started in the general area and also specifically on lands within GUMO?

-- What effect did the Homestead Act have on settlement of the area?

-- Who were the early settlers in GUMO, and who followed them down to the 1972 establishment of the park?

-- What kind of ranching operations occurred in the area, i.e., large or small, cattle and/or sheep, farming, numbers of livestock?

-- What old photographs and news articles can be found to supplement the historic record and provide interpretive exhibits?

HISTORY OF MINING IN GUMO

The geologic history of the area encompassing GUMO was largely sedimentary, and more specifically marine sedimentary in origin. Therefore, there are not a lot of exploitable mineral deposits. However, certain sections of the Guadalupe Mountains were dissected by later igneous activity and mineral deposits are found at some of the discontinuities in geologic origin of the bedrock. Therefore, Dog Canyon and a few other isolated areas of the park have received some mineral exploration and extraction in the past. These mine shafts and surface scars can still be seen on the landscape. Many visitors are keenly interested in the mining history of GUMO. This study is needed to provide the park interpretive staff with accurate and documentable information on this aspect of GUMO's past.

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The specific questions needing to be answered by this study are as follows:

-- When was mining underway in GUMO?

-- What minerals were mined in GUMO?

-- How much ore was extracted during mining operations in GUMO?

-- Where are evidences of mining found in GUMO? Plot those sites on the park base map.

-- Who were the people involved in mining in QUAD?

HISTORY OF TRANSPORTATION IN GUMO AREA

The history of the GUMO area is interesting because of the unique role the region played in various transportation systems developed over the years. The topographic lay of the land, certain important landmarks and water sources all influenced early settler's routes of travel through west Texas. GUMO was an important part of these travel routes. The Butterfield Stagecoach trail crossed the park in the Patterson Hills area. Numerous oil and gas pipelines now pass near the area. Early airline pilots used Guadalupe peak and El Capitan as geographic navigational aids. This history needs to be documented and this part of the GUMO human story told.

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The specific research questions needing to be answered by this study are as follows:

-- What is the history of the Butterfield Stagecoach Line's use of the GUMO area? Where was the road and where were the water and horse stops along the route? What accommodations were available?

-- What is the history of the ranch, county, state and federal highway system in the area? What influence did this factor have on settlement and use of GUMO?

-- What is the history of oil and gas pipeline activity in the GUMO area?

-- What is the history of commercial aviation traffic in the GUMO area? Why was the area important to development of the commercial airline industry?

HISTORIC STRUCTURES REPORTS

Even though GUMO wasn't established until 1972, the area is rich in southwestern history. Early ranching structures are common in the area. The Butterfield Stage Lines passed through the area, etc. Therefore, there are a number of historic structures in various states of repair that must be protected under various acts of Congress as well as National Park Service policy. One important step in protecting these historic structures is to prepare an Historic Structure Report for each that documents the historic significance and the architectural details of the structure. This project could be accompanied as a major park wide effort or could take one or more individual structures at a time.

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The desired content of each Historic Structure Report is as follows:

-- GUMO base map location of all GUMO structures.

-- Detailed condition report on the structure.

-- Detailed Photographic recording of the structure.

-- Evaluation and assessment of the historic significance of the structure.

COMPREHENSIVE LITERATURE SEARCH

GUMO is a relatively recent addition to the National Park System, having been established in 1972. The park currently does not have a complete listing of all published research that has been conducted in the Guadalupe Mountains. The Permain limestone reef that makes up the mountain range has been studied extensively by scientists from all over the world. Many aspects of the ecology, biology, geology and paleoecology of the region have been extensively researched. The park cannot insure that its management and interpretation of GUMO is as sound as current knowledge will allow. Without a comprehensive survey of the scientific literature to provide the park with a listing of this previous work. This project aims for a comprehensive literature survey. However, an individual researcher could undertake a thorough review of the literature in a given field, say geology for example, and the comprehensive survey could be built step by step. This would be an acceptable approach, if necessary.

The specific products desired from this research project are as follows:

-- An annotated bibliography of all research that has been published relative to the GUMO area. This could be accomplished a step at a time, by subject matter.

-- A reprint or photocopy of each paper for the GUMO library.

COMPUTERIZED DATA BASE MANAGEMENT SYSTEM

The information flow in today's world is accelerating and at a drizzling pace. A major National Park is no exception to this fact. The amount of data in park files that frequently needs manipulation is quite large. This includes administrative data like personal records, financial records, capitalized equipment lists, etc. It also includes the park annotated research bibliography mentioned earlier in the Comprehensive Literature Search project. It includes management data such as back country wilderness permits issued, visitor statistics, etc. the only way to effectively deal with this information flow is via a computerized data management system. Several data base management systems have been tried by the NPS over the years. The agency is currently implementing a resource management data base called COMMON to deal with resources management plans, budget priorities, etc. What is needed is a useful microcomputer based system that can draw all these systems together in easy to understand language to facilitate the utility of such automated manipulations. Word processing, spreadsheets and geographic based scientific data are all part of GUMO's need for a useful park data base system.

The products needed from this project are as follows:

-- The design and implementation of a user friendly system.

-- The entering of park data on the system.

-- The training of park staff to use the system.