# RESOURCE MANAGEMENT TRACKS

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## Big Bend…Parks *and* People

***by Superintendent Frank J. Deckert***

Many people view national parks as pristine, undisturbed wilderness areas. In most cases, however, human activity is an integral part of a park's history. This is certainly the case in Big Bend National Park. From early farming to current scientific study, humans have a continuing impact on the resources of the park. This issue of *Resource Management Tracks* examines some of these human impacts – historic mining and ranching, modern air pollution, and the spread of exotic plants and animals, to name a few. Also highlighted are the modern technologies that help us study and understand park resources.

The knowledge gathered from these ongoing research projects helps the park fulfill its mission to preserve and protect this most special place for future generations.

### *Inside This Issue…*



## Assessing the Effects of Historic Mining in the Rio Grande Watershed

***by John Forsythe***

Several large centers of former mining activity are located within and immediately adjacent to Big Bend National Park, on both sides of the Rio Grande. In some locations ore and finely-ground tailings rise in heaps which measure over 200 feet high, covering hundreds of square yards and emitting a powerful sulphurous odor. Because the processing of ore required large amounts of water, these tailings piles are typically adjacent to or in major drainages leading into the river. Tailings piles near abandoned mines in the Study Butte and Terlingua areas are excellent examples of potential sources of toxic metals located near a large tributary, Rough Run, which empties into Terlingua Creek a short distance above its confluence with the Rio Grande.


***Equipment sampling for water-borne metals on Terlingua Creek***

A new study will determine the amount of metals that may be introduced into the watershed from residue left from mining activity. The study is jointly funded by the U.S. Geological Survey (USGS)-National Park Service (NPS) Mexican

Affairs program and the USGS National Stream Quality Accounting Network (NASQAN).

Study personnel have installed a specially-designed water sampler within the park at Terlingua Abaja, and another sampler at the Terlingua Creek bridge in Study Butte. The solar-powered instruments are designed to operate only when the creek is running bank to bank after substantial rains, affording the best opportunity to capture metals-laden sediment which may wash into the stream.

Although the samples will be tested for a variety of metals, the focus of this project will be the determination of the levels of mercury that may be entering the river. Mercury, among the most lethal substances known to man, was the principal metal obtained from the local mines.

## Water Quality at the Gravel Pit in Big Bend National Park

***by Presidio High School River Rangers***

The *Presidio High School River Rangers* are students who meet after school once a week to enhance their science and language skills. Since 1991, they have been sampling water quality of the Rio Grande in the Presidio Valley in Presidio County, Texas. Their usual testing sites are more than 100 kilometers upstream from where National Park Service staff monitor the Rio Grande.

In April 2002, the River Rangers monitored the Rio Grande in Big Bend National Park at the Gravel Pit (N 29° 9.130', W 103° 0.104', 508 meters elevation) for a 24 hour period. They tested dissolved oxygen, total phosphates, total nitrates, alkalinity, temperature (both air and water) and pH every hour for 24 hours beginning at 11:00 AM on the 12th and ending at 10:00 AM on the 13th.

Students collected, and then analyzed, the data. After the initial analysis students were to compare that data with other data collected under similar circumstances upstream in the Presidio Valley. At least that was the plan. Something very unusual happened to the students during their research in the park, however - it rained.

"We are used to the wind and the dust that preceded the rain," according to one student, "but we have never had rain when we've monitored up in the Presidio area." The rain, although not heavy at any time, blew in at about sunset and continued off and on throughout the night. "It gives us some interesting data to study but, unfortunately, we can't compare it to similar conditions upstream," according to one of the four faculty sponsors. Although the students couldn't compare the information collected in the park with data collected upriver, they felt the trip was very worthwhile. One team of students, when analyzing the data stated, "It is interesting because you can clearly tell when the storm blew in and when the sun set."

***Presidio River Rangers Sample Water in the Rio Grande, Big Bend National Park***

## Big Bend Amphibian Conservation and Ecology

***by Gage Dayton***

Beginning in 1998, the Big Bend Amphibian Conservation and Ecology project has established the most intensive distribution and baseline survey of amphibians in Big Bend National Park's history.

Intensive surveys of Big Bend, combined with searches of historical databases throughout the United States, have revealed that two of Big Bend's eleven amphibian species have not been located in the park for several years. The southwestern toad (last recorded in 1975) and western spadefoot toad (last recorded in 1996) may have been extirpated from the park.

Reasons for their absence are unknown; however, habitat alteration is a likely cause. Preliminary studies conducted on a few species, in which we examined the affects of UV-B radiation on egg hatching and tadpole survival,

indicate that UV-B does not negatively affect survival of these species. Current distributions of the seven extant species seem to have shown little reduction or change during the past 100 years.

Our research has resulted in the development of several survey and monitoring techniques, such as canoe surveys on the Rio Grande, night driving after rain events, and mark recapture studies on tadpoles. These methods seem to be effective for abundant species in which detection rates are relatively high. We are currently developing predictive Geographic Information System (GIS) habitat suitability models in order to help predict areas of high amphibian diversity within the park boundaries. We have also been working collaboratively with protected area managers and private landholders in the Sierra Del Carmen and Santa Elena Protected Areas to establish baseline amphibian surveys in these areas as well.

In order for conservation efforts to be effective it is essential that we first have a basic understanding of the natural factors that regulate species persistence across the landscape. Conservation efforts must be based on a foundation of basic science and knowledge of specific life histories of the species that we are trying to conserve. It is one thing to monitor amphibian declines but it is another to be able to determine whether the declines are due to natural or anthropogenic factors. Thus, we are also focussing our efforts on studying ecological factors such as predation, competition, habitat associations, and water chemistry that ultimately play a role in determining amphibian species persistence and distribution in Big Bend National Park.

Preliminary results indicate that amphibians occur throughout the park in a non-random manner and that specific habitat requirements and abilities to cope with natural predators play a role in determining where species occur.

## Improvements Sought for Big Bend Mosquitofish Habitat

***by Raymond Skiles***

***Endangered Big Bend Mosquitofish***

Solutions are being sought to two issues that threaten endangered Big Bend mosquitofish habitat. A pond berm containing many of the fish is at risk of failure, and humans use much of the spring water upon which the fish depend.

The world's population of endangered Big Bend mosquitofish live in only three ponds, all near Rio Grande Village (RGV), and depend upon only two warm springs. The largest of the springs, Spring 4, flows into Spring 4 Pond, then into the Beaver Pond, thus providing water for two of the three fish habitats.

Spring 4 Pond is located just east of the Beaver Pond. The Spring 4 Pond berm, originally constructed in 1954 to create a stocked fishing pond for park visitors, was later converted to Big Bend mosquitofish habitat.

For several years, park staff have observed the berm develop leaks. The leaks have now worsened to the point that the berm is in danger of failure, with potentially severe consequences for a large part of the mosquitofish population.

In 2002, the park convened a group to evaluate the problem. The team included an earthen dam expert from the NPS Water Resources Division (WRD), the U.S. Fish and Wildlife Service Recovery Team coordinator for Big Bend mosquitofish, and Big Bend Facility Management and Resource Management staff.

The resulting recommendation calls for removing and reconstructing much of the Spring 4 Pond berm, and reconfiguring it into a smaller pond. One important result would be improvement of Beaver Pond habitat by allowing more water of better thermal quality to flow into the Beaver Pond.

Another issue recognizes competition for endangered fish habitat by humans. Spring 4 is also the sole source of "domestic" water for human consumption in the RGV visitor use and residential development. During times of drought-induced low spring flow, little water remains for natural purposes such as fish habitat.

In another WRD-assisted project, an alternative domestic water supply is being sought. Test wells will be drilled in the area during the coming year, with the hope of locating a separate water source of adequate quantity and quality to provide for human needs.

With luck and yet-unidentified funding to implement improvements, Big Bend's most endangered animal will become a little more secure.

## Exotic Animal Management Plan Underway

***By Raymond Skiles***

In a multi-year collaborative process supported by the NPS Natural Resource Preservation Program, resource managers are charting the course toward understanding and managing exotic animals that threaten Big Bend National Park's natural and cultural resources.

Components of the process that began in 2002 include: 1) holding species-specific conferences of scientists and staff from a variety of universities, agencies and non-governmental organizations to share knowledge and make recommendations; 2) performing scientific studies needed to fill information gaps; 3) developing environmental impact and cost-benefit models for key species; and 4) meeting the legal requirement to generate an Environmental Assessment on actions proposed for implementation.

Feral hogs, nutria, aoudad (Barbary sheep), bullfrogs and elegant (red-eared) sliders have been identified as the exotic species that pose the greatest threat to Big Bend resources. Other exotic animals exist in the park. The planning process will also identify them and evaluate their potential for harm.

***Exotic nutria feeding on wetland vegetation***

The first conference of specialists was held in Odessa, Texas in early January and addressed exotic amphibians and reptiles. Aoudad will be the subject of a meeting scheduled for late March at Sul Ross State University. Similar gatherings in early summer will focus on feral hogs and nutria. In addition to numerous university specialists, the primary participants in species forums are Texas Parks and Wildlife Department, U.S. Department of Agriculture, Texas Department of Agriculture, Texas Animal Damage Management Service, and the Texas Agricultural Extension Service. Private landowner and international representation will be sought for consultation on feral hogs and nutria, species of significant trans-boundary concern.

Three universities have been contracted for scientific studies to inform the effort. Southwest Texas State University is studying nutria ecology and impact in the wetlands and river near Rio Grande Village. Texas A&M University and the Texas Agricultural Extension Service are implementing a social science analysis of landowner and land managers' perspectives toward feral hogs in Trans-Pecos Texas. New Mexico State University is working with Big Bend staff to develop the plan, perform environmental and economic impact models, and draft the required Environmental Assessment for the plan.

Additionally, a partnership between the NPS, Texas Agricultural Extension Service, and the Texas Farm Bureau will result in a professional training videotape, "Management of Feral Hogs" for landowners and land managers in West Texas.

The plan is scheduled for completion in 2004, after which the park will assume responsibility for taking actions necessary to protect native resources threatened by exotic animals.

## Alamosaurus Fossil Update

***by Anthony R. Fiorillo***

In 2001, the Dallas Museum of Natural History (DMNH), in partnership with Big Bend National Park and the University of Texas – Dallas, (UTD) successfully removed approximately 23 feet of fossilized neck from a large dinosaur known as Alamosaurus. The specimen was removed from the park and has been housed at the Dallas Museum of Natural History where preparation of the bones has since taken place.

The bones are encased in a hard rock matrix. It has been the job of the preparation staff at DMNH to remove the surrounding rock with air-powered hand tools. At this point two of the neck vertebrae have been partially prepared. The lab at DMNH has a public viewing area such that museum visitors can watch the preparation of the fossil material. Interpretative panels highlighting the history of the specimen, its collection, and what it means scientifically assist visitors in understanding the activity in the lab.

***Preparation of fossilized Alamosaurus bones at the Dallas Museum of Natural History***

The original site where the neck was retrieved showed additional bone fragments on the ground. A joint DMNH/UTD field crew initiated a survey of the area using ground-penetrating radar. The results of the survey showed numerous anomalies in the subsurface. One of the larger anomalies, when excavated proved to be a limb bone of Alamosaurus. We therefore think that the site contains several more bones, which will be retrieved as resources permit.

## BRAVO Study Update

***by Vidal Davila***

The Big Bend Regional Aerosol and Visibility Observational (BRAVO) Study is a multiyear monitoring and assessment of the causes of haze in the vicinity of Big Bend National Park, Texas. The goal of the BRAVO Study is identify, and if possible quantify, contributions to haze at Big Bend National Park from the source regions and source types that could be contributors to the haze.

The BRAVO Study included an extensive four-month monitoring program from July through October 1999. State-of-the-art scientific techniques were used to measure air quality, meteorology and haze at locations throughout Texas. Although officially invited, Mexico declined to participate in, or provide information to, the study.

The BRAVO Study results are still not final. A number of analytic techniques are being employed to ensure scientifically supportable conclusions. Preliminary results indicate that most of the haze was caused by sulfate aerosol with much less from the other aerosol species. On an average, the majority of sulfate particles at Big Bend National Park are from distance sources. The highest sulfate levels at Big Bend National Park are associated with sources along the U.S./Mexico Border and to the north and east of Big Bend, including those in Texas and the Eastern U.S.

A final report for public distribution is expected in June 2003. For background information, and details of preliminary analysis, go to http://www2.nature.nps.gov/ard/bravo

## Glenn Springs GPS Mapping Demonstration Project

***by Tom Alex***

Global Positioning System (GPS) technology was developed in the 1970s by the U.S. Department of Defense to provide continuous, worldwide positioning and navigation for U.S. military forces around the globe. Today, GPS technology has matured into a resource that goes far beyond its original goals, and is used extensively by scientists, dispatchers, fire fighters and many others.

In January 2003, Big Bend National Park conducted a GPS mapping demonstration project at the Glenn Springs historic site. The objective of the project was to evaluate the potential of advanced GPS technology for use in mapping important historic sites.

The equipment used for the demonstration project was the Trimble Pathfinder System, purchased with funds graciously donated by the Friends of Big Bend National Park. This system features an improved positioning capability (known as differentially corrected GPS) that corrects inaccuracies transmitted by the GPS satellites. The result is a dramatically improved accuracy. Uncorrected GPS signals can be inaccurate by up to 300 meters. Differentially corrected GPS signals are accurate to one meter – and perhaps to as little as 40 centimeters.

The Glenn Springs field project was done in three phases. First, the GPS receiver was mounted on a range pole and extended outside the driver's side window of a vehicle. The vehicle was driven down each side of the Glenn Springs Road, and along the Black Gap Road to the entrance to the Glenn Springs Cemetery road. The receiver was then carried on foot along the edges of the cemetery road. The second phase was done by mounting the receiver on its built-in staff on a backpack (both the staff and backpack were supplied as part of the system). Mapping of all other features was done by walking the perimeter of rock alignments, earth dams, rock piles, graves, and so forth. Finally, the GPS data was plotted onto a series of maps using both the Trimble Pathfinder software and park-specific GIS applications.

One person completed the three phases of the demonstration project in a total of 5 hours. Using traditional transit mapping techniques, the same work would have taken four people a total of 185 hours over 7 days. The total savings in personnel cost for the demonstration project was over $3,100 (not including transportation or other associated logistical costs).

The use of appropriate technology allows us to do more with less; that is, the lack of a field crew can be offset by this technology that allows one person to do the work previously done by a crew of four. Archeological site mapping projects that have been deferred for years due to a shortage of staff can be scheduled for completion by the park archeologist who will now be able do the field work without assistance.

## GIS Update

***by Betty Alex***

Big Bend National Park is receiving assistance from the National Biological Inventory Infrastructure (NBII), a branch of U.S. Geological Survey (USGS), to compile existing biological data and capture all new biological data in digitally mapped format. The park has received eight hand-held computers (Compaq iPAQs), with ArcPad software and Global Positioning System (GPS) units attached. The GPS units allow quick mapping, data entry in the field, and instantaneous downloading of data into the park's Geographic Information System (GIS). The GIS can then be used for printing maps, tracking changes in biological systems, and advanced modeling to derive information such as plant habitat requirements and changes in human impacts at campsites or along trails and roads.

This summer the park will receive funding from NBII to compile all paper records of sensitive plant species and to field-check all existing sensitive plant location maps. The "sensitive plants" are those that are listed as *Threatened, Endangered* or *Species of Concern* by the U.S. Fish and Wildlife Service; plants about which so little is known that their status cannot be determined; or plants that are subject to illegal commercial collecting. The iPAQs will be used for mapping and data entry.

Although provided for biological survey, the new GPS systems also support many other park projects. GPS units have been used for such diverse activities as mapping fossil outcroppings, locating sampling pits for soil taxonomic studies, identifying areas of cactus poaching, and documenting invasion of non-native species.

The National Park Service mandate "to conserve and protect" park natural resources has been greatly furthered by the use of this hardware and software from NBII. Some of these projects would not have been possible without this technology and all are requiring less time, money and manpower due to the efficiency of data collection and compilation. Many more projects involving the hand-held computers are planned in the near future.

## Big Bend Does the "Buffel Shuffle"

***by J. Sirotnak and F. Daniels***

The "Buffel Shuffle" is a new dance that is sweeping south Brewster County! To do the Shuffle, you need to grab a shovel, find a patch of invasive exotic grass, and start digging. Confused? Maybe we should explain a little.

Buffelgrass (*Pennisetum ciliare*), a native of Sub-Saharan Africa, was brought to North America in the 1950s by the Agricultural Research Service. For several years under cultivation in laboratory gardens in Arizona, it was selected for productivity and drought tolerance in hyper arid climates. By the time it was released for general ranching use, it had been deemed the "wonder grass" of the southwest because of its ability to establish and flourish under the harsh environmental conditions in the desert Southwest. Although this grass was never cultivated in the park during the ranching era, it has spread here – probably arriving in tires and on the undercarriages of vehicles from south Texas and the Sonoran Desert – and is taking over native Chihuahuan Desert habitats. This grass easily establishes anywhere there is a slight depression for rain encatchment; it also does well in washes and along roadsides. It chokes out native vegetation and causes dramatic declines in biodiversity. Several core habitats for threatened cactus species are being invaded by buffelgrass.

In recent months we have begun the project of ridding the national park of buffelgrass. The most effective way of removing established patches is to dig up the bunchgrass by the roots, making sure to get all of the active meristems located in the root crown. Using the grass' natural intolerance to cold we have begun to push the invasion back - starting at its highest point, the Basin, and working downward in elevation. We are also actively protecting core habitat of the rare Chisos hedgehog cactus. In order to raise the community's awareness and encourage involvement on this issue, Botanist Joe Sirotnak has given several community talks on exotic plants in the park. Thanks to the energy and efforts of biological science technician Fern Daniels, volunteers and park employees have removed tons of buffelgrass in the last 4 months, and we are currently building long-term partnerships to work with local communities and organizations in protecting our desert from exotic plants.

Compared to the scale of the problem, our successes have been modest to date. A large and increasing buffelgrass population in the Basin has now been removed, as well as six patches in Panther Junction, one site in Pine Canyon, and countless other roadside sites. With additional volunteer support and funding we may just be able to push the growing populations out of the Chisos and surrounding areas for good. This is not to say it will happen without a fight.

***Park Botanist Joe Sirotnak in a sea of bufflegrass***

Buffelgrass may be the single largest threat to the Chihuahuan Desert Ecosystem. We will continue to support our native ecosystems through the eradication of this exotic.

## Grasslands not Badlands – Phase 2

***by Cat Crumpton***

The "Nine Point Draw" restoration project is entering Phase 2 of multi-year research effort to restore degraded park grasslands beyond the North Rosillos Mountains. The original emphasis was placed on the northern section of the Park because it was acquired more recently and was used for ranching until that time.

During the first phase of the project, stock ponds and water diversions were inventoried and revegetation plots were identified. Gullies and areas of sheet erosion were mapped using GPS. The resulting data was used to quantify the amount of erosion, to assess erosion severity, and to determine appropriate sites for grassland restoration and erosion remediation and abatement.

There are two objectives for Phase 2 of the "Nine Point Draw" restoration project. The first, and most important, is to learn what techniques will instigate a return to natural processes and functions in soils that were formerly grasslands. The second is to assess the degraded park lands beyond the North Rosillos.

A conference with experts in soil science, biology, and arid land restoration was held in April 2002. With their advice and suggestions, as well as those from park personnel, a variety of procedures were designed and are being implemented to determine which have the most potential for bringing back the native grasses and decreasing the extensive erosion in the park. Treatments include: mulch, mesh, Polyacrylamide (PAM), excelsior, seeding and seedballs, small obstructions to flow, microcatchments, and several methods of transplanting native grasses and shrubs that succeed in the alkaline soils of the arid southwest.

Each treatment is carefully monitored to determine its efficacy in increasing soil moisture retention, increasing infiltration, creating biotic crusts, and decreasing erosion. Phase 2 is scheduled to end in September 2004. Phase 3 – large-scale restoration – has been proposed. If approved, it will follow using the most practical and productive methods of Phase 2.

## Tamarisk Removal and Spring Restoration Continue

***by J. Sirotnak***

The year 2002 saw initial and follow-up tamarisk removal treatments at several dozen upland water sources in the park. Both the Exotic Plant Management Team, based in Carlsbad, and Big Bend park staff and volunteers worked on tamarisk projects. The Smoky Creek and nearby drainages were cleared from the Dodson Trail to the Mule Ears Trail. Much of the beautiful and rarely visited no-man's-land between the Sierra Quemada and Glenn Springs was treated for tamarisk as well. A new spring was found in this area that harbored a good population of satintop, a rare native grass. Finally, dozens of cottonwoods, willows and tornillo (screwbean mesquite) were planted at backcountry sites where tamarisk had been removed, such as Upper Tornillo Spring and Banta Shut-in.

In addition, the year 2002 saw the initial stages of what is hoped to be a major research effort aimed at riparian restoration in the Rio Grande corridor. Park staff worked with a variety of partners, including the U.S. Bureau of Reclamation and the World Wildlife Fund, to put together a proposal to install pilot riparian restoration projects near Castolon.

## Historic Research at Terlingua Abajo

***by Scarlett Wirt***

Big Bend National Park is conducting an oral history project to learn more about Terlingua Abajo, a large village whose ruins are contained within the park. The majority of research conducted to date has been directed toward documentation of existing conditions. Architectural surveys and studies were conducted in 1981 (Davila), 1988 (Alex), 1992 (de la Palma and Rugiero) and 1992 (Lyons). Consequently, the park has a variety of architectural drawings, sketches, maps and photographs of the ruins at Terlingua Abajo. However, no systematic or significant site history research has been performed.

The oral history work is one component of an ongoing Cultural Landscape Study (CLS) of Terlingua Abajo. For the purposes of the CLS,

Terlingua Abajo is defined as a historic vernacular landscape: "... a landscape whose physical biological, and cultural features reflect the customs and everyday lives of people." It is important to document not only the landscape characteristics, but also those characteristics associated with social and cultural history of the site.

Oral history is particularly appropriate for this type of research. In general, oral history serves as a primary source, identifying changes to the landscape over time and providing important historical context. For Terlingua Abajo, oral history is doubly important, as it gives voice to a population that is under-represented in traditional forms of written primary source material. Examples of topics to be explored include the representation and interaction of Hispanic, Anglo and Indigenous cultures; U.S./Mexican relationships (to include border issues) the local mining economy; and establishment of the park.

The Terlingua Abajo work is only one component of the park's oral history program, but it is an important one. Insights gained through oral history can help focus subsequent research into land records, census data and other primary and secondary sources. When complete, the Terlingua Abajo CLS will serve as a basis for preservation planning efforts.

## Landscape of Ghosts, River of Dreams – BBNP Administrative History Completed

The Big Bend Administrative History, titled ***Landscape of Ghosts, River of Dreams: A History of Big Bend National Park,*** was completed recently by historian Michael Welsh.

According to Welsh, "Six decades of NPS operations along the Rio Grande reveal much about Big Bend, Texas, Mexico, and the American ideal of preserving what is best about the land and the people who made it their home."

The book details the rich history of Big Bend National Park, from its first proponents in the 1920s to the management issues of the 21st Century. Copies are available in the park libraries.

## The Many Faces of Resource Management

***by Vidal Davila***

What exactly is resource management? What does the staff of the Division of Science and Resource Management (ScRM) at Big Bend National Park do anyway? This is the question that many newcomers to the park ask.

Resource management is a multidisciplinary career field that encompasses many different experts for the purpose of protecting cultural and natural resources in the park.

From a management point of view, the ScRM division is involved in many things in all aspects of park operations. On any given day, we are involved with making sure a scientific collecting permit is approved for a visiting researcher, there might be a housing request at the park's research housing units, keys must be checked out at headquarters and arrangements made to pickup the keys at the ScRM office because the researcher is arriving at 10:00 p.m. Saturday night.

We might also be involved in assessing vegetation damage along one of the main paved roads in the park where a vehicle accident occurred the night before. Mapping the affected area and then using a Global Positioning System (GPS) unit to input the data into a park database is another facet of the work.

A phone call has just come from the Chisos Mountains visitor center detailing a visitor's encounter with a mountain lion along one of the most used trails in the park. An immediate response is necessary in order to obtain the entire story behind the human/wildlife encounter. The park's wildlife biologist hurries up the mountain to interview the visitor still waiting at the visitor center in order to get all the details of the encounter.

The park's botanist travels with a group of Boy Scouts to one of the area springs to eradicate buffelgrass (a non-native grass from Africa). The Boy Scout troop is given a safety talk by the park botanist and then they work for several hours pulling buffelgrass and piling it away from the wash so it dries out and the seeds do not start fresh plants somewhere else. Later that day, the botanist takes a GPS unit and maps the work

area where the buffelgrass was eradicated for documentation purposes.

Several park employees are involved in reviewing a draft environmental assessment for a proposed prescribed fire and so an interdivisional team heads out into the field to look at the area and talk about the potential impacts that must be taken into consideration before the final environmental assessment goes out to the public.

The fire management officer comes in asking the GIS specialist for a map of the area where a wildland fire started as a result of a thunderstorm the night before. The GIS specialist quickly produces a map and together they pin point the exact location of the fire. The archeologist then joins in to assess the area for any cultural resources in the area. Maps are checked to determine if any sites occur in the area so that they can be avoided if possible before fire crews go in to fight the fire.

A hiker is reported overdue by a group and a search is initiated. The ScRM division chief is contacted for assistance. Three of the nine subject matter experts head out the door at a moments notice to gear up for a quick search of the area including the park's wildlife biologist, the geologist and the botanist. All work is set aside in order to search for the lost hiker and possibly save a life.

The maintenance supervisor calls the archeologist who goes out to look at a potential site where a telephone line will be installed underground. Park clearance forms are filled out before the project can begin, part of the many rules and regulations we all have to abide by and the form is later routed for park approval by the superintendent.

The division chief is dealing with a telephone call from a reporter who wants to know about the air quality problem in the park. At the same time, one employee comes into his office and informs him some volunteers have just arrived asking for a project to work on. Behind the scenes, the division's administrative assistant manages the budget, travel arrangements, correspondence and many other details that keep the division running smoothly.

The physical science technician collects water samples at one of the park's most popular areas, the Hot Springs, which tested high for harmful E. coli bacteria after the thunderstorms last week caused the river to rise four additional feet, flooding the spring. The geologist is dealing with a visitor who brought in a fossil he found on a nature trail because he thought it was the right thing to do. The museum curator is handling a request to look at an oral history tape for inclusion into the interpreter's evening program that will be presented at the park's amphitheater.

The division is involved with management of all cultural and natural resources. The employees are constantly working with the public, giving presentations in their own respective fields of expertise to the Sierra Club, an air quality group, school groups, local neighbors, etc.

They are busy reviewing environmental documents the National Park Service (NPS) has generated and sent in for review. They write articles for the park's newspaper; review NPS projects in the park including proposals; and interact with other divisions in the park and other entities such as the public schools, the U.S Border Patrol, US Fish and Wildlife Service, Texas Parks and Wildlife, and the Mexican Protected Area managers.

These are just a few of the things that go on during a not so typical day in the ScRM division.

***Big Bend National Park***
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