

Wildland Fire Management at Carlsbad Caverns NP

By Tim Stubbs

Carlsbad Caverns NP in the Guadalupe Mountains of Southeast New Mexico is widely known for its ornate caves, but not for its 47,000 acres of nearly pristine wilderness. The vegetation is mostly representative of the Chihuahuan Desert biome. It can be characterized as a plant community normally dominated by grasslands and interspersed with areas of shrubs and agavaceous succulents and cacti.

Surface water is scarce; riparian areas are limited to a few places along normally dry washes. Both pinon-juniper (*Pinus edulis* and *Juniperus scopulorum*) and forested areas are found in the park's higher elevations (generally above 6000'). The latter are found only on the extreme west end of the park and are composed of disjunct timber species such as ponderosa pine (*Pinus ponderosa*), douglas fir (*Pseudotsuga mensiesii*), and white pine (*Pinus strobiformis*), more widely found to the north in the Southern Rocky Mountains.

Periodic and sometimes large prairie and timber fires are well documented in both written and verbal records from the 19th and the early part of the 20th centuries. Considerable evidence, both in historical accounts and in tree ring studies, indicates that most of what now is Guadalupe Mountains NP to the west of Carlsbad Caverns burned in one large fire around the turn of the century. A few large (around 10-33 thousand acres) wildfires also occurred in this century, most caused by summer lightning.

Prevention and suppression of vegetation fires has taken place throughout most of this century; the great majority of detected natural lightning ignitions have been quickly suppressed. Heavy grazing of the herbaceous vegetation by cattle, sheep, and goats has taken place concurrently. This substitution of sustained unnatural disturbance (grazing) for the periodic natural disturbance (fire) has allowed the colonization of many areas with various fire sensitive and unpalatable shrubs such as spreading juniper (*Juniper pinchotti*), catclaw (*Mimosa biuncifera*), and creosote (*Larrea tridentata*), and the unpalatable succulents lechuguilla (*Agave lechuguilla*), sotol (*Dasylirion leiophyllum*), and prickly pear (*Opuntia* spp.).

Beginning several years ago, park managers endeavored to exclude trespass livestock that was migrating into the park from adjacent private and federal lands by fencing the perimeters of both parks. This sudden cessation of heavy grazing, coupled with abnormally wet years, produced a bumper crop of grass and other herbaceous vegetation intermingled with the aforementioned shrub and

succulent vegetation. The resulting fuel situation has been shown by several recent fires in and around to readily sustain almost any ignition not immediately rained out or suppressed. Successful suppression in these fuel conditions has been shown by woeful experience to be unlikely in view of the hot, dry, and windy weather typical of spring and early summer months. Fuel reduction is clearly called for in many areas if any subsequent suppression efforts are to be successful.

The park also contains a substantial wilderness area within its boundaries. The mandates of the Wilderness Act of 1964 and of NPS policies governing management of wilderness areas have dictated that we consider reintroduction of naturally ignited vegetation fires as a natural resource management tool.

The Park Fire Management Program

A Fire Management Plan has been drafted and approved for Carlsbad Caverns that includes both "prescribed natural fire" and "management ignited prescribed fire" as tools for achieving certain natural resource management and fuels management goals.

A prescribed natural fire (PNF) is defined as a wildland fire ignited by natural means (usually lightning), which is permitted to burn under specific prescribed conditions, in a preplanned location, and with adequate fire management personnel and equipment available to achieve certain defined resource management objectives. A management ignited prescribed fire (MIPF) is similarly defined except that MIPF is intentionally ignited by park management, where specific prescribed conditions and fire location usually are more precisely defined.

The introduction of this program to park neighbors and neighbor agencies has not been without substantial resistance. Land adjacent to the park is sparsely populated but contains valuable gas and oil facilities and ranchlands, and memories are still fresh of the Cottonwood Fire (1974, 16,000 acres) and the Big Fire (1990, 33,000 acres). Neither of these wildfires had regard for park boundaries and both presented major threats to outlying ranches and gas/oil facilities. The specter of prescribed natural fires becoming similar raging wildfires is unacceptable, and every attempt has been made to coordinate park planning with that of all adjacent property owners and jurisdictional agencies around these relatively small tracts of NPS land.

The park's fire management plan describes strict prescription limits for prescribed natural fire behavior. Since the park is surrounded on most of its boundary by Bureau of

Land Management (BLM) and U.S. Forest Service (USFS) lands, the park's plan delineates a conditional suppression strategy zone for its boundary area. The strategy for this buffer zone is identical to that specified by neighbor agency fire management planning documents. Any ignition in the boundary areas of the park/BLM/USFS (or any PNF that approaches this area from the interior of the park) will be managed in an appropriate suppression strategy (confine, contain, or control) as determined by a unified command of all involved/concerned agencies. MIPF is proposed for natural resource management purposes in lieu of PNF in the proximity of park boundaries and around high visitor use areas of the park. In these areas an increased degree of control is necessary and the uncertainties of PNF (i.e. the timing of the treatment vs. the availability of control forces) are unacceptable. MIPF in these areas also will create "defensible space" of reduced fuels in the likely event of a PNF or wildfire in these areas.

Wildland Fire Research Needs

Research in the form of intensive fire effects monitoring must be involved in every step of the implementation of this program. Some examples of current research needs are:

- The effects of fire in the park on flora and fauna have been qualitatively researched only cursorily; there is scant information as to the effects of fire on hydrology, cultural resources, etc. Quantitative baseline data on species composition and density need to be established and monitored through several burn/recover cycles under the strictly controlled and monitored conditions of MIPF. With this data we can ascertain the effects of fire on the park's natural and cultural environment in general and on affected flora, fauna, and watershed in particular.
- Current theories concerning fire frequency for the park are based largely on incomplete historical records or on suppression-era ignition data. Tree ring, charcoal deposit, or similar studies could ascertain more correctly the fire frequency in the Guadalupe Mountains, particularly in the Carlsbad Caverns area.
- The current vegetation composition is almost certainly unnatural, as complete fire suppression and heavy grazing have been the rule throughout most of this century. Photographic reviews, pollen and opal phytolith, or similar studies would help park managers ascertain the "natural" vegetation composition of the park.



Resource Management SCA student Amy Rusk monitors fire behavior during a Management Ignited Prescribed Fire in the park. Vegetation transects were laid out prior to the burn and monitored during the burn and will be monitored in the years to come.

- All known colonies of the nationally listed cacti Lee's Pincushion (*Corypanthus sneedi* var. *leei*) in Carlsbad Caverns NP are currently protected in full suppression zones because the effects of fire on this species are largely unknown. The USFS and USFWS have conducted recent studies adjacent to the park to determine the effects of wildfire on this species. Preliminary reports are that intense broadcast fire not only seems to have little long-term effect on individual specimens but may

even aid in the plant's propagation. Several of our known populations are in easily accessed areas in which it would be relatively easy to execute MIPFs. We should establish interagency ties to study the effects of fire of various intensities on this federally protected plant.

Fire Management's Future at Carlsbad

Prescribed natural fires will be allowed to burn, with extreme sensitivity to the concerns of neighboring agencies, park visitors, and park neighbors. These fires will be

carefully monitored to learn the effects of fire on natural resources and to ascertain and certify the capabilities of park management at deploying this inexpensive but powerful natural resource management tool.

Management ignited prescribed burns will be conducted to ascertain both the direct and the indirect effects of fire on all aspects of the park's natural environment. Various academic institutions will be encouraged to address the park's fire research needs, possibly through subsidized research funds currently available through FIREPRO (NPS wildland fire management funding) sources. Through MIPS we will continue to establish research-based goals and objectives derived from properly conducted research, which will include documentation of fire effects in various intensities, and the validation of prescriptions necessary for achieving these goals/objectives.

Suppression of all fires that do not qualify as PNFs (including all non-MIPF human-caused fires) will continue. The park will maintain a cadre of highly trained wildland fire personnel to properly monitor prescribed fires and to professionally supervise wildfire suppression efforts when these become necessary.

Stubbs is Fire Management Officer at Carlsbad Caverns NP.