3A.3 FIRE MANAGEMENT IN THE INTER-GALACTIC INTERFACE
OR THIRTY YEARS OF FIRE MANAGEMENT ON MERRITT ISLAND NATIONAL WILDLIFE REFUGE

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1. ABSTRACT

Merritt Island National Wildlife Refuge is located on the John F. Kennedy Space Center (KSC) on the central east coast of Florida. Most of the fuels found on the refuge burn with high intensity, and many are important habitat for threatened and endangered species. Little fire management occurred until 1981. That year a severe fire season resulted in two fatalities when over 17,000 acres burned in wildfires. An intensive prescribed burning program was initiated after this with the primary objective being the reduction of hazardous fuels. Large tracts, containing several vegetative types were commonly burned during this period. In 1993, more emphasis was placed on using fire to restore and maintain wildlife habitat. Many of the constraints to prescribed burning on the Refuge are similar to those one encounters elsewhere; increasing urbanization in the vicinity, threatened and endangered species concerns, and impacts on visitors and the general public, for example. However, the biggest challenge has proven to be conducting a prescribed burning program in and around a space port. Launches at both the Kennedy Space Center and the adjacent Cape Canaveral Air Force Station and landings of the Space Shuttle are sensitive to smoke impacts. Smoke can also impact many of the payloads while they are in processing facilities. As one would expect, both NASA and the Air Force have put restrictions on burning operations. When first put forth, these restrictions would have eliminated effective prescribed burning.

Reducing the limitations to prescribed burning took a combination of education, negotiation, external pressure and a bad fire season to accomplish. Key KSC personnel were briefed on the need for fuels reduction prescribed burning in order to minimize potential wildfire impacts on space operations. Mid level managers were taken out on prescribed burns to observe operations. With the support of these managers, a new notification/approval process was developed. This limited the number of KSC personnel with “no-go” authority from almost anyone with a phone, to seven. KSC dispatch also agreed to field most of the casual questions and only forward significant inquires to fire managers at the refuge. Negotiations with Hubble Space Telescope personnel reduced the original limit of prohibiting fires within 25 miles of processing areas to a more reasonable six mile zone. Lines of communication were set up so refuge fire personnel could capitalize on any windows during the payload processing time where burning might be possible inside the 6 mile radius. These precedents were followed for other sensitive payloads. The 1998 fire season, during which clean rooms were smoked in for a week underscored the need for fuels management prescribed burning. The coordination between fire managers on space operation managers is a continuing process. The effort required is great, but it allows the refuge to maintain an active prescribed fire program.

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2. INTRODUCTION

Merritt Island National Wildlife Refuge is located on the east central coast of Florida approximately fifty miles east of Orlando. Most of the Refuge’s lands are on NASA’s John F. Kennedy Space Center (KSC). These lands are administered by the U.S. Fish and Wildlife Service under an interagency agreement which gives the responsibility for land management activities on non-operational lands to the Service. Included in these management responsibilities are wildland fire suppression and prescribed burning. The Refuge also has an agreement with Canaveral National Seashore (CNS) to assist with both prescribed burning and wildand fire suppression. It also has an agreement with Cape Canaveral Air Force Station (CCAFS) to assist in prescribed burning. These three agencies oversee almost 181,498 acres (7,3450 hectares) of relatively undeveloped land along the east coast of Florida.

These lands provide habitat for a number of State and Federally listed species. The refuge itself provides habitat for sixteen Federally listed species of animals (EG&G, 1994) and seventy three taxa of plants that are on Federal or State lists as being endangered, threatened or of special concern (Schmalzer and Hinkle, 1990). Many of these species occur in fire maintained vegetative communities such as oak scrub, flatwoods and marshes. All of these vegetative types can produce very intense fire behavior. Removing fire from these systems not only increases fuel loadings to dangerous levels, but also lowers the quality of the habitat.

2. EARLY FIRE MANAGEMENT

Fire management on the refuge has changed considerably over the past three decades. Between the time the refuge was created in 1963 and 1981 little active fire management was done. A review of the somewhat

sketchy early Refuge records shows a few small prescribed burns, and occasional suppression activities. During this time, the responsibility for suppression of wildfires was confused with refuge resources taking action on some fires, and KSC Fire (primarily a structural fire organization) suppressing others. Training of Refuge personnel was minimal and equipment was typically converted military vehicles and other used equipment.

3. FUELS MANAGEMENT PRESCRIBED BURNING

With little fire activity in the ecosystem, fuel accumulated to a point where it was only a matter of time before severe fires would occur. This happened in the summer of 1981 when 46 wildfires burned over 17,000 acres and two fire fighters were killed. This calamity initiated the second phase of fire management on the Refuge. Training of fire fighters was increased, new equipment was purchased, and a contract helicopter was acquired for both fire suppression and prescribed burning.

An aggressive prescribed fire program was begun with fuels management as the primary objective. During this time period, burn units were large, some up to 4,000 acres. Between 1982 and 1992 the Refuge had 108 prescribed burns totaling 121,743 acres with an average size of 1,127 acres.

Most units were designated using existing natural and man made barriers. It was normal to find several different vegetation communities within a single burn unit. This meant that fire prescriptions could not be tailored to meet specific requirements for individual communities. This phase of the Refuge's prescribed burning did meet the overall objective of reducing the fire danger. In 1990, a year with similar weather conditions to 1981, the Refuge experienced 45 wildfires, but only 378 acres were burned and there were no injuries or fatalities.

4. HABITAT MANAGEMENT BURNING

In the early 1990's fire management objectives began changing from simply reducing fuel loads to meeting wildlife habitat management needs. Beginning in 1993 the Refuge began to subdivide the larger units in an attempt to focus more on the burning requirements of the individual vegetative communities and the wildlife species they supported. Of primary importance was the maintenance and restoration of oak scrub habitat for the threatened Florida scrub-jay. Also of great interest was maintaining nesting substrate for the bald eagle in the flatwoods, and habitat for black rails and other marsh birds in the grassy wetlands.

The size of the subdivided burn units was greatly reduced. Between 1993 and 2002 the refuge had 202 prescribed burns totaling 93,402 acres in the above habitats. The average burn size was 460 acres. Although some large burns are still done, especially in the marshes, it is expected that the trend for more burns covering smaller areas will continue. This is especially true as we continue to restore scrub habitat.

5. SPACE EXPLORATION ACTIVITIES AND ITS EFFECT ON PRESCRIBED BURNING

Many of the constraints and restrictions to prescribed burning on Merritt Island National Wildlife Refuge are common to other fire programs. Concerns such as safety of firefighters and the public, increasing urbanization, fickle weather, staffing and funding shortages that are encountered on other stations are likewise present here. In addition to these considerations, this Refuge must deal with an active space port. While the refuge fire program was evolving, the mission of the Space Center was changing. The Apollo and Saturn V programs were phased out in the late 1970's and the new Space Transportation System (STS) or Space Shuttle program was beginning.

At first, with limited launches and non-sensitive payloads, launches of Shuttle operations had little impact on fire management operations to. Burning was prohibited forty eight hours prior to launch and twenty four hours prior to landing. Pre-launch concerns included danger while fueling the spacecraft, exposure of the orbiter to the elements and increased ground and air traffic just prior to launch. Pre-landing concerns revolved around smoke causing visibility problems in the Orbiter's glide path and anomalies (mishaps) during the landing itself. This soon changed. When KSC was determined to be the primary emergency landing site, rather than Edwards Air Force Base in California, burning was severely curtailed the entire time the Shuttle was in orbit. The logic here was if there were concerns during a routine landing, the risks would be greatly magnified during an emergency situation. Although this was ten to fourteen days per space mission, with only two to three launches per year, sufficient burning could still be accomplished. However, as launches increased, lost burning opportunities became significant.

Additional constraints were established as plans progressed for the launch of the $2.2 billion Hubble Space Telescope (HST) in 1990. Original prescribed burning restrictions for the HTS called for no burning within twenty five miles of clean rooms where components of the telescope were being processed. This would shut down burning on the entire refuge for the six to nine months of the Hubble's residency on the Space Center. This situation did not bode well for the Refuge fire management program. Especially since the HST was the first in a series of space based observatories and other smoke sensitive space craft expected to be launched over the next fifteen years.

Along with restrictions on burning from space operations on KSC, the Refuge had to deal with Cape Canaveral Air Force Station. Here, each different type of launch vehicle, had it's own set of managers, payload processors, and bureaucracy. Additionally, some of the

payloads were military missions and much of the information about timing were secret. When it came to getting authorization to burn, almost anyone in either the KSC or CCAFS chain of command could trigger a no-go for the fire. Fire managers spent countless hours fielding phone calls, explaining the reasons for burning and begging to get permission to execute a burn.

The situation was quickly becoming untenable. There was a time when it appeared that all of the issues in force would reduce burning on the Refuge to a point where fire would no longer be a viable tool. It was obvious to all fire knowledgeable people that not burning would lead to a continued increase in the amount of very flammable vegetation. This would not only lead to a serious public safety problem from possible wildfires, but would also prevent effectively managing habitat management for the numerous wildlife species found on the refuge. Some way had to be found to provide for the integrity of both the space program's mission, and those of the Refuge.

6. CONFLICT RESOLUTION

The first step in the resolution process was to educate all of the concerned parties as to the reasons for burning. The best selling point was the possible impact of severe wildfires that would occur if the vegetation on the Refuge/Space Center was not burned on a regular basis. Here we had some help from Mother Nature. While the memory of the fires of 1981 were still vivid, burn approvals were relatively easy to obtain. As institutional memory faded, approval became more difficult. The bad fire season in 1998 refreshed NASA's collective memory when fires shut down operations for almost a week. This situation precipitated much discussion as to how find more windows of opportunity for burning.

The second factor that helped sell the importance of burning was the Endangered Species Act. The Refuge has one of the three core populations of the threatened Florida scrub-jay (Breininger, 1989). In the early 1990's jays were discovered on the site where the Space Station Processing Facility was to be constructed. As part of mitigation for continued use of this and other areas in scrub-jay habitat, NASA agreed to assist the refuge in restoring overgrown scrub (Schmalzer et. al. 1994). Since burning is a critical component of scrub restoration, this compelled the Space Center to work more aggressively in finding windows for burning.

Along with establishing the need for burning, it was also necessary to demonstrate a level of competence in fire management activities. Although the vast majority of prescribed burns nationwide are executed with minimal impact to the surrounding areas, the small percentage of burns that do cause problems are well documented by the media. This situation can cause concern to our neighbors when we announce that a burn is forthcoming. We in the fire community are well aware of the amount of planning, training and skill required to carry out a successful prescribed burn. In many cases however, those we deal with outside our community are not. In most situations, knowledge helps combat the fear of the unknown. This proved to be the case when dealing with NASA managers.

The importance of good communication in solving the problems between space operations and refuge fire activities cannot be over emphasized. To ensure proper information flow, meetings were set up with all interested parties. In addition to stressing the needs for an active prescribed burning program, a presentation on the behind the scenes work that goes on was given. The extensive training given to burn bosses, firing specialists, air operations staff and other key fire personnel was detailed. The prescription development process, including smoke screening, environmental parameters, equipment and staffing needs were explained. It was also pointed out that the Fish and Wildlife Service requires that the prescription be reviewed by a qualified burn boss of appropriate skill level from outside the refuge. At the same time, NASA managers had a chance to express their concerns, ask specific questions concerning fire operations and, most importantly, meet us face to face.

To further establish our credentials, key NASA managers were invited to observe burns. They were given the whole burn day experience, from the crew briefing to the critique at the end of the day. The overall result of these discussions and observations was an improved level of confidence in our ability to do a successful burn. It was also important not to hide anything. All of us that have done any burns know that things can go wrong that are beyond our control. The most notable problem is fickle weather. NASA recognized the need for them to be able to initiate emergency protection measures for sensitive areas, such as clean rooms, should this occur.

Once the importance of burning was established, restrictions negotiated down to an agreeable level and comfort levels established, the final piece of the puzzle was to formulate a comprehensive burn notification process. The Space Center's dispatching office agreed to be the focal point for this endeavor through their Joint Base Operations Support Contract (JBOSC) Duty Office. In it's early stages the Duty Office received the Refuge's request to execute a burn, and then notified telephonically a long list of interested parties. Not only was this time consuming, but there was still the problem of almost anyone being able to trigger a no-go situation. Over the years this system was improved. Through negotiations with NASA Test Director (NTD), Payload Processing, The Center Director and the Commander of the Air Force Station, this list of people that could actually cancel a burn was reduced to under ten. All others on the notification list were information only. Any concerns had to be forwarded to one of the decision makers. The Duty Office also fielded most of the questions concerning the burn and only passed on to Refuge fire managers calls they could not handle. The final step was to send all correspondence electronically.

7. THE RESULTS

The process of education and confidence building resulted in a compromise that was acceptable to all parties. NASA managers recognized that burning is a essential part of managing the vegetation types that exist on the Refuge/Space Center. They also realized that no burning would eventually result in unacceptable impacts on both the space program and the environment. On the other side, Refuge fire managers became more aware of the sensitivity of space craft to smoke and the possible economic and scientific impacts should damage occur to these craft. The need for compromise and communication was recognized by both parties.

Through negotiation, the original twenty five mile radius burn prohibition when sensitive payload were present was reduced to a more manageable six miles. Burns were allowed while the Orbiter was in space so long as all its systems were “nominal” and Edwards AFB was available for emergency landings. Lines of communication helped find times in payload processing streams where burning could be done with minimum risk to space craft. Refuge and NASA managers meet several time a year to discuss upcoming operations on both sides that may come into conflict.

8. CONCLUSIONS

Although managing fire at Merritt Island National Wildlife Refuge has some unique aspects, many of the conflict resolution processes described here are applicable in other places. Certainly talking with neighbors and other concerned parties is necessary to sell a burning program. It is likewise important for fire managers to learn the specific concerns of those who live and work in the vicinity of burns. Establishment of communication channels through homeowner associations, the media and personal contact is essential to obtaining the support of the community for your burning program. Allow the public to see the degree of professionalism that is a part of your burning activities.

It is also important to be honest. No amount of planning, no amount of training nor the best forecast in the world can guarantee that nothing will go wrong. However, up front discussions of this possibility, and the presence of a good contingency plan can go far in mitigating a bad situation should it occur. Remember, use discretion and care. History has shown that one mishap can undo years of successful confidence building.

9. LITERATURE CITED

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