

Highway 31 Fire

April 22-May 20, 2009



After Action Report

South Carolina Forestry Commission



February 2010

Acknowledgements

The following individuals were the primary contributors to this report: Many other Forestry Commission personnel and partners also provided assistance. Your input into this process is greatly appreciated.

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State Forester's Foreword

The Highway 31 Fire far exceeded the impact of the other 2,001 wildfires the Forestry Commission responded to during the 2009 wildfire season and was easily the largest wildfire since 1976. The \$50 million in damage was the greatest of any past wildfire. Its impact was only surpassed by past wildfires that claimed the lives of firefighters and citizens. The fire response involved agency personnel from every part of the state, either on the fireline or providing valuable support to the firefighting effort. The extreme fire behavior, inaccessibility, and complexity of the Highway 31 Fire made it very difficult to control and put the lives of citizens, firefighters, and other first responders in great jeopardy.

Within a few hours, what started as a small woods fire became the worst wildfire in South Carolina's history. Highly volatile, continuous fuels, dry weather, strong winds, and unusual weather events combined to create a powerful force of nature that was unpredictable, resulting in 76 homes destroyed, 97 homes damaged, destruction of many other structures and vehicles, plus much business lost by the surrounding community. The home owners lost heirlooms, important documents, family photos, and other belongings, but thankfully, no loss of life or serious injuries occurred.

During the initial attack, the unusually rapid growth and spread of the fire made it difficult for agencies to stay in contact and share information. While emergency coordination involving multiple agencies, jurisdictions, and disciplines was very difficult, Horry County, the City of North Myrtle Beach, and the Forestry Commission worked together to ramp up operations quickly and ultimately establish unified command on April 23. This process allowed the responding agencies to coordinate communications and operations during the rapidly growing event.

No single agency can adequately handle a wildfire or any other natural disaster of this magnitude. The Highway 31 Fire response was indeed a cooperative effort, involving more than 700 individuals from more than 20 different agencies. Many of these agencies had never responded to a large wildfire, but they effectively brought their experience in dealing with other natural disasters to bear during this event. Some agencies were not familiar at all with the Forestry Commission, its responsibilities, or wildfires in general, but during the course of the fire, working relationships were developed. The Commission will continue to build on these experiences and relationships to improve coordination, communication, and response capabilities.

As a result of this incident, the Forestry Commission has reviewed its policies, procedures, and staffing levels to assess its ability to respond to such catastrophic events and to help prevent their occurrence. Strengths and weaknesses have been identified and will be reported to the agency's Board of Commissioners and state leaders. Several legislators and others asked what could be done to prevent and respond to such incidents. The answer to this question is to maintain an intensive communications and outreach program for the public and decision makers on wildfire hazards and prevention, and to ensure that the Commission and its partners are properly staffed and equipped for normal emergency response conditions while also having the buffer capacity needed to handle unusual conditions like that encountered with the Hwy 31 Fire.

The Forestry Commission's mission is defined by State law and can be summarized as being required to protect and develop the state's forest resources. The Commission supports the forest industry, which is the state's largest business manufacturing segment with regard to both number of jobs and wages paid. Forestry is also the largest industry segment regarding overall economic impact with an average wage that is 35% higher than the state's average, propping up per capita income. Given these facts, the Commission and the state's forests are critical strategic resources to South Carolina's economic health and well being.

Our state's forest resource is at record levels of timber volume and growth offering a unique opportunity to grow its economic impacts and number of well paying jobs. With adequate funding, the Forestry Commission will lead in seizing this growth opportunity while protecting the forests, property, and lives from catastrophic events like the Hwy 31 Fire.

Best regards,



Gene Kodama
State Forester

Table of Contents

Acknowledgements	ii
State Forester's Foreword	iii
Table of Contents	iv
Executive Summary	1
Introduction	3
Significant Events	5
Wildfire History In The Area	6
Summary of Findings	7
Command Staff and Incident Management	8
Public Information	12
Safety	14
Operations	17
Plans	20
Finance	22
Logistics	24
State Headquarters and Fire Staff Support	26
Interagency Communications	28
Training Opportunities	31
Conclusion	32
Appendices	33
A. List of Acronyms	34
B. Highway 31 Fire Progression Map	35

Executive Summary

Prior to April 22, the 2009 wildfire season in South Carolina was very mild. Between July 1, 2008 and April 21, 2009, the Forestry Commission responded to 1,796 wildfires statewide that burned 9,792 acres, significantly lower than the five-year average. Fire occurrence in the days leading up to the Highway 31 Fire was low across the state, and the Keetch-Byram Drought Index, an index used to determine forest fire potential, [ranging from 0 (no moisture deficit) to 800 (absolutely dry)] was 93.

The Forestry Commission was requested by Horry County Fire-Rescue to respond to a small wildfire just after noon on April 22, 2009. The fire grew rapidly over the next 36 hours, and ultimately burned 19,130 acres, destroyed 76 homes, damaged 97 additional homes, and caused two firefighters to deploy fire shelters and three firefighters to retreat to a safety zone to avoid serious injuries. The extreme behavior led to the evacuation of more than 2,500 residents before it was declared controlled on May 20. Agency expenditures related to the Highway 31 Fire totaled approximately \$1.5 million. Estimated losses to insured property exceeded \$25 million, and damage to timber is estimated at approximately \$17 million.

The Highway 31 Fire was the worst wildland-urban interface fire in the history of the state, and represents the largest mobilization of SCFC resources to a wildfire on record. The rapid rate of spread and extreme fire behavior of this fire presented many challenges to the agency, and this review has identified 63 issues and 76 recommendations to address them. The key findings of this report include:

- Interoperable communication with other responding agencies is crucial. The SCFC should ensure that agency firefighters have direct communication with fire departments, law enforcement agencies, military assets, and other public safety agencies that may respond to wildfires.
- Annual exercises should be conducted in Horry County and other counties in the state where the potential for large fires exists. These exercises should test the interoperability of communications equipment, establishment of unified command, information sharing, and public notification of threats from rapidly moving wildfires.
- The Forestry Commission should continue the development of qualified incident management teams. Additional training and experience are needed in many functional areas, including operations, plans, finance, logistics, public information, and safety.
- Scarcity of personnel or firefighting equipment did not directly impede the Forestry Commission's response to the Highway 31 Fire, because it was the only large wildfire occurring near populated areas at the time. In the future, a lack of equipment replacement funding, the loss of experienced personnel due to budget reductions, and the difficulties in recruiting and retaining qualified personnel could have serious impacts on the agency's response capability. The occurrence of multiple large fires will easily exceed Forestry Commission response capacity and likely result in major loss of homes, forest assets, and possibly lives.

The extreme fire behavior, rapid spread, and unpredictability of the Highway 31 Fire resulted in catastrophic losses of timber, homes and belongings, and it is miraculous that no citizens, firefighters, or public safety officers were killed or seriously injured during this massive mobilization of resources. The Forestry Commission has already implemented many of the recommendations identified in this report, and will continue to learn from this event and improve the ability of the agency to fulfill its wildfire control mission.



Introduction

The Forestry Commission was requested by Horry County Fire-Rescue to respond to a two acre wildfire on Woodlawn Drive off of Hwy 90 in Horry County at 12:22 pm on April 22, 2009. Within 36 hours, this fire would burn 19,130 acres, destroy 76 homes, damage an additional 97 homes, and become the worst wildland-urban interface fire in South Carolina's history.

At its peak, the fire was consuming 1,100 acres per hour, spreading at more than 2.4 miles an hour, and had flame lengths of approximately 270 feet. More than 150 SCFC personnel were involved in the response, including 47 tractor plow units, 3 aircraft, 4 firetracks, the Type 2 Incident Management Team, staff from headquarters, dispatch, and staff from all three regions. The Highway 31 Fire represents the largest mobilization of SCFC resources to a wildfire on record.

In addition to the SCFC response, more than 579 other individuals responded, including personnel and apparatus from Horry County Fire Rescue, North Myrtle Beach Fire and Rescue, and 203 firefighters from 33 other departments across the state that were requested to assist Horry County Fire Rescue through the South Carolina Firefighter Mobilization Plan. The Forestry Commission requested aerial suppression assets from the SC Army National Guard, and 5 UH-60 Black Hawk helicopters with bambi buckets were deployed, including 4 from the NC Army National Guard. The US Forest Service provided a P3 Orion air tanker to conduct retardant drops.

Many other agencies provided valuable support to the incident, including Horry County Emergency Management Department, Horry County Police Department, SC Department of Transportation, SC Emergency Management Division, SC Department of Natural Resources, and the SC Department of Public Safety. The American Red Cross coordinated with other volunteer organizations to provide food and water to firefighters and evacuees.

Agency expenditures related to the Highway 31 Fire totaled approximately \$1.5 million. Estimated losses to insured property exceeded \$25 million, and damage to timber is estimated at approximately \$17 million. The fire was contained on April 28, and was declared controlled on May 20, 2009.

In order to present the pertinent issues in a single document, after action issues were obtained from the following sources:

- SCFC large fire review, as required by agency policy
- SCFC Incident Management Team After Action Review Report
- Highway 31 Shelter Deployment Report
- After Action Review report for the Highway 31 Fire, conducted by the Lowcountry Incident Management Team
- Atlanta NIMO Team report: Support To The Highway 31 Fire

- Notes and input provided by the following cooperating agencies:
 - o Horry County Fire-Rescue
 - o North Myrtle Beach Fire and Rescue
 - o North Myrtle Beach Public Safety Division
 - o Horry County Emergency Management
 - o SC Army National Guard
 - o SC Department of Natural Resources
 - o SC Department of Transportation
 - o SC Department of Public Safety
 - o SC Emergency Management Division
 - o Horry County Police
 - o USDA Forest Service/SC Coordination Center
 - o SC Department of Labor, Licensing, & Regulation (Firefighter Mobilization)



Significant Events

- Initial dispatch:** Horry County dispatch contacted SCFC dispatch at 12:22 pm on April 22, requesting assistance with a 2 acre woods fire on Woodlawn Drive. Two tractor plow units and a forester were dispatched.
- Initial size-up:** The first SCFC aircraft arrived over the fire at approximately 1 pm. Size-up provided by the pilot indicated that the fire was approximately 150 acres, running east along Hwy 90, and spotting 3-400 yards ahead of the main fire. The pilot also indicated that unbroken fuel was present ahead of the fire for 5-6 miles.
- Fire weather:** Afternoon fire weather readings, from the SCFC weather station at Marion on 4/22: Temperature 64, relative humidity 26%, winds NW at 17 mph, 1 hour fuel moisture 11, KBDI (drought index) 93, burning index 14.
- Shelter deployments:** During the evening hours on 4/22, active fire behavior was observed. The spot weather forecast (obtained at 8 pm) predicted favorable conditions to support direct attack with tractor plows overnight. At approximately 9 pm, a wind shift occurred and the fire made an intense run to the north. As a result, two firefighters deployed their fire shelters in a power line right of way, and three other firefighters remained in a safety zone while the fire burned around them. After this short-lived run, fire behavior moderated somewhat.
- Fire blow-up:** During the late evening hours, the fire was burning intensely but well away from populated areas, and an attempt was made to install firebreaks to stop the forward spread of the fire. At approximately 1:47 am on 4/23, an unpredicted weather event occurred that caused the fire to intensify and blow up, sending firebrands more than a mile ahead of the main fire into the Barefoot Community. As a result, 76 homes were destroyed, 97 additional homes were damaged, and numerous outbuildings and vehicles were destroyed.
- Burning Ban:** Because so many SCFC resources (experienced personnel and the most reliable equipment items) were committed to the Highway 31 Fire, a statewide burning ban was issued at 10 am on April 23. The ban was lifted on 4/27.
- Fire Contained:** April 28, 2009
- Fire Controlled:** May 20, 2009

Wildfire History of the Area

The area burned in the Highway 31 Fire, generally known as the Buist Tract, has a long history of large wildfires. The Buist Tract is a largely undeveloped area located between Hwy 544, Hwy 90, and the Intracoastal Waterway. In the interior of the tract, there is little or no infrastructure. The terrain consists largely of Carolina Bays with peat soils that contain highly flammable vegetation, including wax myrtle, bay trees, and other species. While several roads have been constructed in the area, much of the tract is still difficult to access. Most of the acreage is managed for timber and wildlife management, including over 8,700 acres in the Lewis Ocean Bay Heritage Preserve, owned by the SC Department of Natural Resources.

The lack of roads, deep, mucky peat soils, and thick vegetation make it difficult for firefighting equipment to operate safely and efficiently in the area. The fuels present in the area (primarily evergreen shrubs with pine overstory) are known to burn very intensely and support rapid fire spread. Torching, crown fires, and long-range spotting are common in this fuel type.

Since the 1970s, rapid development has occurred around this tract, creating what firefighters call the Wildland-Urban Interface (WUI). This area, where homes, businesses, or other developments are constructed adjacent to forests that are prone to wildfires is particularly dangerous for firefighters and those living and working there. Numerous large wildfires have occurred in this area, including the largest wildfire in South Carolina's history, the 1976 Clear Pond Fire.

Large Wildfire History - Buist Tract

<u>Year</u>	<u>Fire Name</u>	<u>Acres Burned</u>
• 1954	Bombing Range Fire	10,162
• 1966	Rambi Raceway Fire	625
• 1967	Longs Crossroads Fire	1,200
• 1967	Socastee Plantation Fire	6,005
• 1976	Clear Pond Fire	30,000
• 1981	Cotton Patch Bay Fire	2,500
• 1996	Forestbrook Fire	844
• 2001	Long Bay Fire	1,911
• 2002	Legends Fire	1,658

Table 1: Large wildfire history of the Buist tract in Horry County. While many of these fires burned large areas of forestland, it should be noted that no homes were lost in any of these wildfires. Development in and around the Buist Tract has continued to increase, placing more homes and lives in the line of fire.

SUMMARY OF FINDINGS

Command Staff and Incident Management

The initial response to the Hwy 31 Fire consisted of two tractor plow units and one forester. The forester was the initial Incident Commander (IC), followed by a supervisor from Horry County. The Unit Forester arrived on scene and notified dispatch that he had assumed IC role, which he retained during the afternoon and evening of April 22. The Hwy 31 Fire was developing rapidly during the initial hours of the response, presenting incredible challenges for the IC. The initial actions consisted of structure protection efforts, with SCFC personnel working collaboratively with responders from Horry County Fire & Rescue. While line level personnel worked together effectively, true unified command was not in place during the initial attack phase of this incident, due to rapid fire spread and a lack of available personnel.

Because of the fire history in the area, familiarity with the fuel type, and the difficult operating conditions present in the fire area, the IC requested the SCFC type 2 Incident Management Team (IMT) to manage this fire. The IMT was en route from the SCFC headquarters before 8 pm. Pee Dee Regional personnel secured space at the Horry County Solid Waste Authority headquarters and established an incident command post (ICP) in the late evening of 4/22, and the SCFC IMT arrived at 10:30 pm for a briefing. Based on the predicted weather for the following day and anticipated fire behavior overnight, the IMT was scheduled to assume control of the fire at the beginning of day shift operations on April 23.



As additional SCFC resources arrived on-scene, the incident command structure began to develop. Foresters and supervisors were assigned to various roles, including strike team leader, public information officer, logistics, and plans. By 7 pm on 4/22, sixteen agency tractor plow units were engaged in the firefight. Horry County Fire-Rescue (HCFR) established a command post at station #5, but initial attack SCFC resources were deployed on the fireline, and no SCFC personnel were present in the HCFR command post. Around 11 pm, command of the incident was turned over to two experienced supervisors for the night shift operations. All other resources (tractor-plow units, firefighters, and supervisory personnel) remained on scene throughout the night.

The initial objectives, developed during day shift operations on 4/22 were:

- Conduct structure protection in cooperation with HCFR
- Conduct backfiring operations to shift the fire spread into undeveloped areas and away from residences
- Conduct safe night operations and take advantage of the predicted favorable weather conditions to make significant progress on fireline construction
- Transition control of the fire to the SCFC type 2 IMT was scheduled at the beginning of day shift operations on 4/23.

What Worked Well

1. There were no deaths or serious injuries to civilians or firefighters. Firefighters were able to fight fire aggressively, but provided for safety first. During the evacuation, more than 2,500 residents were successfully evacuated. Approximately 733 firefighters and support personnel responded to this incident. The safety success during this incident can be attributed to the leadership and initiative of firefighters in their effort to protect lives and property in a safe manner. Firefighters took appropriate independent action where possible to assist in the evacuation of the Barefoot Community and to minimize structure loss.
2. The initial attack IC was very familiar with the area, the fuel types, and the past history of large fires. This knowledge, combined with his experience, allowed the IC to make excellent decisions during the first few hours of this incident. Backfires were used effectively to reduce the threat to homes along Highway 90 and to turn the head of the fire into undeveloped areas. Several hours later, a backfire was effectively used to reduce the threat to homes along Highway 31.
3. During the initial hours of the fire, Pee Dee Region personnel performed support roles (Public Information Officer, Logistics, Plans) and established an ICP.
4. The Duty Officer at SCFC headquarters and the Incident Commander for the IMT worked to contact team members and coordinate the IMT deployment.
5. Liaison officers (LOFR) were placed in both the Horry County Emergency Operations Center (EOC) and the North Myrtle Beach EOC by 9:30 am on 4/23. This aided in communications, information sharing, and interagency cooperation. The Liaison Officers were particularly effective sharing information regarding the fire status, road closures, and air operations.
6. Incident Command System (ICS) structure was increased in scale as the incident developed. The on-scene IC recognized the potential for an extended, multi-day incident and ordered the type 2 IMT. The type 2 IMT scaled up according to the needs of the incident, and reduced staffing as the incident decreased in complexity.
7. The Atlanta National Incident Management Organization (NIMO) offered assistance to the SCFC IMT and three NIMO members arrived on 4/24. The NIMO staff brought valuable expertise to the Safety, Logistics, and Finance areas, providing coaching & training.
8. Command of the incident was transferred from the Type 2 IMT back to the Pee Dee Region on 4/29/09.

Command Staff Issues

1. A lack of available personnel in the vicinity of the Hwy 31 Fire, combined with additional wildfires in the area (1,087 acre fire in Georgetown County, 325 acre fire in Williamsburg County) increased the amount of time necessary for additional resources to arrive. Some tractor plow operators were on mandatory furlough (unpaid leave) as a result of severe agency budget cuts and were not immediately available for dispatch, and others were on regular days off. Additional support was requested from other counties, but travel time increased as a result.
2. During initial attack, there were insufficient personnel available to fill all of the ICS roles. Safety officers were not identified, and an ad hoc team was formed to fill other roles (information, logistics, plans, etc). The initial attack IC also performed operations functions

and did not designate an operations chief.

3. Coordination was not maintained between the incident and SCFC dispatch, leading to confusion over what resources were assigned to the Hwy 31 Fire and which were available for dispatch to other incidents.
4. Status/check-in was understaffed initially and I-Suite (resource and cost tracking software) was not working, leading to difficulties in resource tracking.
5. Expertise was not available in several key areas, including field observer, documentation unit leader, and demobilization unit leader, computer technical specialist, etc.
6. Liaison Officers were deployed to the emergency operations centers for Horry County and the City of N. Myrtle Beach. However, the Liaison Officers were not equipped with adequate communication equipment (800 mhz radios, etc).
7. Unified command was not established until the late afternoon of 4/23. During the initial response, HCFR had many more personnel on scene than the SCFC due to resource availability, travel time, etc. HCFR established a command post, but during the initial hours, SCFC had no personnel available to locate at the HCFR command post. After the type 2 IMT responded and assumed command of the incident, the SCFC established an ICP at a separate location, and HCFR maintained a separate ICP. In addition, N. Myrtle Beach established an ICP at station #5 in the Barefoot Community and had no representation at either of the other ICPs during the first day. A consolidated incident action plan was not produced until day shift on 4/24, after unified command between the SCFC, HCFR, and NMBFR was established.
8. Because of a lack of capability to reproduce large quantities of the Incident Action Plan (IAP), some line supervisors and agencies did not receive copies or have immediate access to this vital document.
9. The SCFC Type 2 IMT did not immediately incorporate the Lowcountry type 3 IMT into their organization.



Command Staff Lessons Learned

1. Request IMT and other additional support as soon as possible. Recognizing incident potential can help reinforce the strength of the command structure. When a high potential incident is recognized, fire managers must be proactive in establishing a complete command structure. Failure to recognize the potential of a incident to overcome resources available locally can lead to reduced command and control.
2. The Incident Commander for the IMT should make sure team members are clear on their position and assignments.
3. The training and experience acquired as the SCFC has established the type 2 team proved invaluable during the Hwy 31 Fire. The agency needs to continue the IMT development process.
4. SCFC IMT should participate in exercises to practice incorporating other IMTs into the command

structure. There should be a coordinated effort to merge resources into a unified command as soon as possible during an incident.

5. During the initial hours of a wildfire, SCFC overhead resources (Liaison Officer, Public Information Officer, etc) are not normally available to place at the fire department incident command post, and the SCFC incident commander is handling operations functions on the fireline from a mobile command post (type 6 engine). To enhance communication between responding agencies and speed up the formation of unified command, the SCFC IC should request that a representative from the county fire department ride in the command vehicle. As additional overhead personnel arrive, the SCFC and fire department will establish a joint incident command post to ensure that unified command is possible.



Command Staff Recommendations

1. On future incidents, the resource unit leader should coordinate with dispatch daily to keep them informed regarding personnel and equipment assigned to an incident.
2. Additional personnel should be identified and trained to assist with status/check-in. These resources should be dispatched early in the incident to ensure that all personnel and equipment assigned to the incident are documented.
3. Fire staff and incident commanders should identify key positions that the SCFC needs to develop expertise in, including demobilization, documentation unit leader, computer technical specialist, field observer, and other positions. Personnel should be recruited and trained to perform these roles.
4. Additional personnel need to receive training for liaison officer position, and equipment needs should be identified. Liaison officers should work to develop & maintain contact lists for each county in the state, and be prepared to dispatch to county or city emergency operations centers during a large incident.
5. Initial attack incident commanders need additional training to help them recognize the potential of wildfires, and to become more proactive in establishing a complete command structure early on in the incident.
6. Establishing unified command with other responding agencies should always be considered an immediate, high priority task.
7. A contract should be developed to supply a high-capacity copier to the incident command post whenever an IMT is dispatched. The IAP should be made available to all responding agencies, and should be provided to all single resource bosses on the incident.
8. Through exercises and training, the SCFC IMT should practice transitioning from the initial attack to extended attack, and incorporating other IMTs into their organization.
9. IMT should meet at a central location and travel to the incident as a group if possible.
10. IMT should receive a thorough briefing from the Initial Attack IC and the Regional Forester before departing for the assignment. This will allow the IMT to conduct some planning while en route.
11. Duty Officer and dispatch should contact team members not deployed with the initial IMT to make them aware of the situation and determine their availability.
12. IC should designate a point of contact to provide information to the SCFC Duty Officer.

Public Information

During the first 48 hours of this incident, there were significant challenges in getting timely information regarding the SCFC firefighting efforts to the public via traditional media. In the initial response, there was a lack of personnel available, and the Public Information Officer (PIO) role was not filled. This was overcome when a forester was designated to be the initial PIO. When the IMT arrived, additional resources were ordered to help handle the large volume of requests for information from the media.

What Worked Well

1. Those tasked with PIO responsibilities possessed innate talent for relaying complicated fire information to the public. PIO staff consisted of an excellent combination of local knowledge, media knowledge, and overall wildfire and forestry education experience.
2. Once the IMT was in place, information flow to the public occurred regularly, and updated information was provided to local, state, and national media outlets.
3. This incident attracted tremendous local and national media attention. Public information staff handled numerous requests, ranging from national news outlets to local print media. As fire activity decreased, PIO staff took advantage of “teachable moments”, stressing the importance of defensible space and the Firewise program.
4. Media tours of fire activities were well-received.
5. This assignment provided an excellent training and learning experience for agency PIOs.

Public Information Issues

1. There is an inherent lag time between the arrival of the IMT and its ability to get accurate and helpful information out to a worried public.
2. The volume of requests for information and media assistance was overwhelming during the first 48 hours of the incident.
3. While the focus on information flow was on traditional media outlets, opportunities exist to better utilize web-based information sharing (YouTube, social networking sites, etc) more effectively.
4. Command & General Staff need to acknowledge the importance of providing updated information to PIO staff so the flow of information can be maintained.
5. The agency webmaster was deployed to the incident in a finance section position. As a result, the agency web page was not kept current during the initial days of the incident.
6. Inciweb was not utilized during the Hwy 31 Fire. This important tool can help disseminate information to other state, local, and national response agencies, in addition to providing



updated information to the media.

7. The IMT deployed with only one PIO. The most experienced PIO was not dispatched, and the PIO with less fire experience was quickly overwhelmed.
8. No Joint Information Center (JIC) was established with Horry County and N. Myrtle Beach. This led to confusion among the media and inconsistent messages in news releases.

Public Information Lessons Learned

1. In exercises and training, Command & General Staff need to exercise the transfer of information to the PIO to facilitate frequent, accurate updates to the media as an incident unfolds.
2. Multiple PIOs need to deploy when the SCFC IMT is dispatched. If the incident does not require multiple PIOs, they can be released.
3. On large incidents, a JIC should be established, especially when multiple agencies and jurisdictions are involved. This will result in a more consistent message to the media.



Public Information Recommendations

1. Designated SCFC personnel across the state should receive some level of PIO training so they can assist with media relations until an IMT arrives.
2. A need was identified to train more personnel to update the agency web page to keep it current during deployments, since many media sources check the SCFC web page for information, graphics, and images
3. PIOs need to receive training and experience using web-based information sharing outlets more effectively.
4. IMT members need training and experience utilizing Inciweb to publish current incident information

Safety

There was no designated safety officer on April 22. This can be attributed to a lack of personnel available to fill this role at this time. With limited overhead resources available locally, strike team leaders, division supervisors, and the incident commander assumed the role and responsibility of the safety officer position.

What Worked Well

1. The Hwy 31 Fire was a remarkably safe operation, resulting in no significant injuries to firefighters, other responders, or the public.
2. Over 2,500 residents were evacuated safely from the Barefoot community.
3. More than 150 SCFC personnel responded to this incident, with no significant injuries reported.
4. Air operations included SCFC aircraft, five Army National Guard Blackhawks, and a USFS air tanker. Air space was managed effectively and safely using a designated air operations manager.
5. Firefighters responded and fought fire aggressively, but provided for safety first.
6. There was good communication of safety hazards to all incident personnel.
7. Line Safety Officers were beneficial and provided excellent information to the Safety Officer.
8. The Atlanta NIMO Team Safety Officer provided valuable coaching and assistance, particularly with the review of the fire shelter deployments.
9. After the initial period, enough additional resources were available to allow for adequate work/rest cycles.



Safety Issues

1. The first two tractor plow units to arrive on the scene conducted size up then attempted to conduct a burnout operation to protect a structure. As one firefighter left his unit to begin the burnout, firebrands ignited vegetative material inside the cab of the tractor plow unit, resulting in significant damage to the tractor. No injuries resulted.
2. During the afternoon of 4/22, civilian aircraft interfered with air operations. A temporary flight restriction was requested, but was not in effect until after dark.
3. During the initial operational period, fire weather predictions proved to be inaccurate.
4. During the late evening hours of 4/22, 5 tractor plow units were directed to begin a firebreak on the left flank of the fire in thick bay vegetation. After a wind shift, two of the tractor plow operators were overrun by fire and deployed their fire shelters. The other three operators constructed a safety zone, where they remained until the fire passed around them.

5. Smoke created traffic hazards on Hwy 90, Hwy 31, Hwy 22, and several other local roads throughout the incident.
6. In the initial attack period, SCFC resources did not have direct communications with Horry County resources.
7. There were limited personnel available to staff dedicated Safety Officer positions until the SCFC type 2 IMT assumed command of the fire.
8. Span of control was difficult to maintain during the initial attack period due to a lack of available overhead personnel.

Safety Lessons Learned

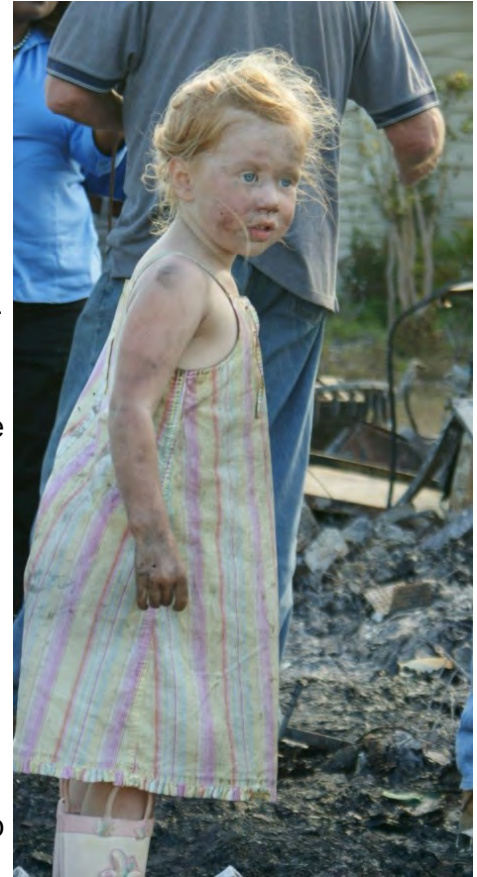
1. The need for air space restrictions occurs infrequently in South Carolina. Additional clarification of the temporary flight restriction process is needed to ensure they can be requested and enacted without delay.
2. All personnel involved in the shelter deployment and retreat to the safety zone were wearing all appropriate PPE. Several of these operators indicated that fire shelter training contributed to a calm deployment.
3. Personnel involved in the shelter deployment and retreat to the safety zone maintained their situational awareness, allowing them to foresee potential fire conditions, take time to construct safety zones, locate the best deployment location, and maintain constant communication during the event.
4. A new employee involved in the deployment stated that being around experienced personnel who stayed calm allowed him to stay calm as well.
5. The SCFC has been fortunate and has not had serious injuries or fire shelter deployments in many years. The training and mentoring provided by the NIMO Team Safety Officer on NWCG turnover and entrapment protocols, interview techniques, and report development were very beneficial.
6. Weather updates should be provided periodically and shared with all firefighting resources
7. During erratic fire behavior, the affected employees stayed in groups and maintained communication with their supervisor and other employees.



Safety Recommendations

1. Maintain equipment properly to ensure that vegetative material is not allowed to accumulate in the cab or pan. This increases the safety of the operator and reduces the chance that firebrands will cause equipment fires. Firefighting equipment should be parked or staged in safe areas, away from firebrands.

2. Work with the FAA and SCFC pilots to clarify and document the process for requesting temporary flight restrictions. Ensure that SCFC duty officers are aware of the process.
3. Ensure all SCFC employees complete annual fireline safety refresher training that includes information regarding safety zones, escape routes, and fire shelter deployment practice. Ensure all personnel use appropriate PPE, including new generation fire shelters
4. All supervisors should review Operational Leadership responsibilities (in NWCG Incident Response Pocket Guide) on an annual basis
5. Establish a standard procedure to ensure that all resources are given a briefing upon arrival at a fire, using the IRPG
6. Establish a routine or automatic transmission of weather conditions/predictions on extended attack incidents
7. Ensure initial attack resources give accurate size up to SCFC dispatch upon arrival at a fire using the SCFC size up report form.
8. SCFC supervisory personnel should review the Tactical Watch Outs (p. 5 in the IRPG) annually
9. Safety Officers and SCFC Duty Officers should receive training and become familiar with accessing/activating Critical Incident Stress Teams for use when fatalities and/or serious injuries occur.
10. Safety Officers and SCFC Duty Officers should become familiar with protocols for securing and inspecting the scene of deployments, serious injuries, or fatalities, and proper procedures for transferring evidence (shelters) to the USFS Missoula Technology Development Center.
11. Fund and develop staffing to ensure the availability and timely implementation of an incident safety officer.
12. Safety Officers should be supplied with a cache of safety items for the line (hard hats, gloves, earplugs, etc).
13. A review of safety procedures should be conducted to address fighting fires in the wildland/urban interface
14. Safety Officers should take additional classes (Food Unit Leader, Medical Unit Leader, Helibase Manager, Base Camp Manager, etc) if possible to facilitate safety inspections.



Operations

On 4/22, the Incident Commander (IC) filled the role of the Operations Section Chief (OSC). After the transition to night shift, a Deputy OSC position was filled. When the type 2 IMT assumed command of the fire, an OSC was deployed and a Deputy OSC position was filled on 4/24. SCFC and fire service personnel filled operational positions, including division supervisors, strike team leaders, engine bosses, and other positions.

What Worked Well

1. The Initial Attack IC recognized the extreme fire behavior and potential for fire growth and ordered additional resources quickly, including additional tractor plow units, supervisors, and the IMT.
2. Backfires were used effectively during the initial attack to protect structures along Hwy 90, and to reduce the intensity of the fire as it approached Hwy 31.
3. Burnouts were successfully conducted to remove unburned fuel inside containment lines.
4. Spot weather forecasts were requested several times during this incident. These forecasts helped determine appropriate fire suppression strategies and tactics.
5. As fire activity moderated, demobilization was initiated for unneeded resources.
6. Resources were used and allocated efficiently. Tractors and firetracks were assigned to areas where the equipment would be most effective.
7. Inexperienced firefighters were paired with experienced firefighters to gain valuable hands-on knowledge. Taskbooks were initiated where appropriate.



Operations Section Issues

1. The Operations Section Chief (field ops on this incident) and the Deputy Operations Section Chief (planning ops on this incident) had some difficulty in sharing information gathered during visits to the fireline in time to have that information gathered for use in developing the IAP. This was overcome by having “tailgate” meetings between the OSC and Deputy OSC.
2. Night operations on 4/22 were based on information provided in the spot weather forecast obtained from the National Weather Service (NWS) around 8 pm. This spot weather forecast did not predict the unusual weather event that occurred during the overnight hours.
3. During the initial days of the incident, the OSC had some difficulty getting an aerial view of the fire. After more air resources arrived, observation flights helped gather information used to develop tactics for the IAP.

4. Some incoming resources indicated that they did not get a briefing upon arrival.
5. The protocol for requesting road closures should be clarified. While local law enforcement agencies can close roads for short periods, long-term road closures must be enacted by the SC Department of Transportation.
6. SCFC tractor plow units encountered heavy traffic and had difficulty getting to the fire, particularly in areas where road closures were in effect.

Operations Section Lessons Learned

1. On large incidents, it is extremely important to have a field ops and planning ops, with one functioning as the Operations Section Chief, and one as Deputy Operations Chief. This enables them to make sound decisions based on field observations.
2. During extended attack incidents, the field ops and planning ops should take turns filling each role. This will improve their understanding of field conditions and the planning process.
3. Road closure decisions were made jointly by all agencies involved, based on progress by firefighters and a discussion about which roads would likely be affected by smoke overnight. The presence of a Liaison Officer in the Horry County EOC was essential to this process.
4. Air support should be requested as early in the incident as possible. SC Army National Guard aircraft should be requested in pairs to accommodate pilot work/rest schedules and ensure aircraft availability during the entire operational period.
5. Operations Section should look forward and set trigger points to request additional air support. This will allow SCANG time to plan for additional air assets and move them to staging areas sooner.
6. Some resources were unfamiliar with the area; transportation maps would be helpful to assist these resources.



Operations Section Recommendations

1. On large wildland fires, an Operations Section Chief and Deputy OSC need to be deployed with the IMT.
2. On future incidents, the SCFC needs to work with SC Department of Public Safety and local law enforcement agencies to develop an escort system to guide responding units through congested areas.
3. The SCFC should work with SC DPS and SCDOT to clarify and exercise the protocol for requesting road closures. Both of these agencies indicated a lack of understanding of the SCFC role/mission, and therefore were not sure how to provide the best assistance during the Hwy 31 Fire.

4. Ensure that all resources are given a briefing upon arrival and at each shift change.
5. Initial attack incident Commanders should receive training and begin to use the ICS 201 form. This will improve the transition from initial attack to extended attack.
6. SCFC should work with the NWS to identify opportunities to improve the communication between agencies, so that NWS can provide the best possible forecasts.
7. Operations Section Chiefs should request aerial observation flights to enable them to get a better overall understanding of the incident.



Plans

Until the IMT arrived, plans functions were conducted by the incident commander and SCFC dispatch. After the IMT assumed control of the fire, the plans section included a plans section chief, resources unit leader, situation unit leader, documentation unit leader, demobilization unit leader, status check-in, GIS specialists, and field observers.

What Worked Well

1. Resources were ordered early in the incident and enabled the plans section to complete the necessary reports and documents on time.
2. A documentation unit leader (DOCL) was ordered early in the incident through the Southeastern Forest Fire Protection Compact. This proved to be a critical position to ensure that incident documentation was prepared appropriately.
3. Resources in the plans section were increased and decreased according to the incident complexity.
4. Horry County provided GIS staff and equipment to assist with mapping during the incident. County GIS staff provided mapping capability, large map printing, and access to property records.
5. The Low Country IMT provided valuable assistance establishing unified command and producing the first incident action plan.
6. During tactics meetings, representatives from the SCFC, HCFR, and NMBFD worked together to ensure that operations were unified.

Plans Section Issues

1. Developing an IAP for both day and night shift was a challenge.
2. I-Suite did not work correctly when the team established the command post. This hampered data entry, information sharing, and development of the initial incident action plan. A computer should be obtained and dedicated to serve as an I-Suite server.
3. Status Check-in and the Resources Unit Leader had to share one computer I-Suite. This slowed down both functions.
4. Some trainees did not have task books when they arrived at the incident.
5. On this incident, the Horry County EOC and the N. Myrtle Beach EOC were in operation. It was difficult for representatives from these organizations to be present at all briefings provided by the IMT.
6. SC Army National Guard has helicopters that are equipped with forward-looking infrared (FLIR) capability. This technology could assist in locating hot spots, but the SCFC was unfamiliar with the use and application of FLIR technology at the time of this incident.
7. IMT mobilization status was not clearly communicated to all IMT members (including alternates) early in the deployment.
8. A high-speed copier was not available at the incident command post. This slowed the process of reproducing and distributing the incident action plan.
9. A public address system is necessary to conduct briefings for an incident of this size.

Plans Section Lessons Learned

1. During the build up phase of an incident, additional Status Check-in personnel are necessary to keep up with incoming resources.

2. Some resources were ordered and placed in staging or at other locations (airport). Remote check-in would be helpful to accommodate these alternate locations.
3. The IMT needs to develop more expertise in demobilization (DMOB) and documentation (DOCL).
4. On incidents where unified command is established and SC Firefighter Mobilization is used to supply resources, it may be helpful to access Firefighter Mobilization records for resource tracking.

Plans Section Recommendations

1. Include multiple Status Check-in personnel with the initial IMT. The additional personnel can speed up check-in at the ICP and at remote locations (staging or airport, etc).
2. Develop expertise in I-Suite support and consider deploying a computer technical specialist with the IMT.
3. Acquire additional IMT computers with I-Suite installed.
4. Acquire a computer to serve as a dedicated I-Suite server (since this incident, a server has been purchased for the IMT).
5. Ensure that trainees are issued task books before deploying to an incident.
6. Utilize SCFC dispatch to notify all IMT members (including alternates) when a deployment occurs.
7. Utilize conference and/or video conferencing to offer some briefings to HQ staff, county & city EOCs, and other interested parties.
8. Plans Section should review and refine the demobilization process.
9. Conduct exercises with SC Army National Guard to develop process for utilizing FLIR technology to identify hot spots.
10. Work with SC Department of Labor, Licensing, and Regulation (Firefighter Mobilization) to gain access to Firefighter Mobilization resource information. This information would be very helpful for resource tracking and input into the IAP.
11. Contract for or purchase a high-speed, high-volume copier for the IMT.
12. Acquire a public address system for briefing(since the incident, this item has been purchased).



Finance

Prior to the arrival of the IMT, finances were handled by local personnel. When the IMT assumed control of the incident, Finance staff began tracking costs, time, and acquiring necessary items. This information is essential to ensure compliance with FEMA guidelines under the Fire Management Assistance Grant program.

What Worked Well

1. This was the first assignment to an actual incident for most of the Finance Section. It provided an excellent learning opportunity.
2. Assistance from the Atlanta NIMO Team was invaluable to the Finance Section.
3. Records and documentation were successfully completed; this provided valuable information to the agency.

Finance Section Issues

1. I-Suite was not set up properly at the beginning of the incident. This slowed down data entry and complicated cost-tracking.
2. Finance needs access to a fast printer/copier to ensure proper documentation is produced.
3. SCFC personnel are not used to using crew time reports and shift tickets.
4. Finance staff did not have time during the incident to audit crew time reports or shift tickets for accuracy.
5. Division Supervisors (and other supervisors) allowed some resources to demobilize without completing all of the necessary documentation (crew time reports, shift tickets, etc). This made it difficult to complete this important documentation.
6. Space in the ICP was limited; Finance and Check-in were set up on one table.



Finance Lessons Learned

1. SCFC needs to maintain a sufficient supply of crew time report and shift ticket forms.
2. Supplies, including dry erase boards, flip charts, and bulletin boards should be carried to incidents.

3. An example crew time report and shift ticket should be included in the IAP to help responders that are not familiar with these documents.
4. Finance staff needs additional assignments to become fully qualified. Until full qualifications are met, having more experienced personnel on our incidents (NIMO Team) will help ensure that essential records and documentation are created.
5. All requests for resources, supplies, and equipment should be documented on the general message form (ICS form 213).

Finance Recommendations

1. Identify and train a computer technical specialist to ensure I-Suite works properly.
2. Provide training to SCFC personnel for using crew time reports, shift tickets, and the demobilization process. Begin to use these forms and processes during training and on extended attack incidents so personnel will be familiar with them.
3. Contract for or purchase a high-speed, high-volume copier for the IMT.
4. Provide training to IMT members, line supervisors, and mechanics on the use of General Message forms (ICS 213).
5. Supervisors should require all resources to complete all crew time reports, shift tickets, and other documentation at the end of every shift and ensure all documentation is submitted before demobilizing from an incident.
6. The Finance Section Chief should order and maintain a sufficient supply of crew time reports and shift tickets. These items should be deployed with the IMT.



Logistics

Early during the incident, logistics was handled by regional staff, including providing food and water to firefighters. Resources from within the Pee Dee Region were ordered through SCFC dispatch. The SCFC Type 2 IMT was ordered by the Incident Commander through the Regional Forester and the Duty Officer.

When the IMT assumed control of the incident, resource ordering was conducted by the Logistics Section Chief. Orders for additional resources were communicated to the SCFC duty officer.

What Worked Well

1. During the initial attack, logistics support was limited to providing food & water to firefighters on the line. The initial Logistics officer arrived on scene quickly and made adequate plans to support firefighters.
2. The Regional Forester and Logistics officer made arrangements with the Horry County Solid Waste Authority to locate the Incident Command Post at their facility prior to the arrival of the IMT.
3. This was the first deployment to a large wildfire for the members of the Logistics Section. Once the IMT was in place, Logistics staff made sure that firefighters were fed, provided lodging, and had adequate supplies, equipment and other support.
4. Liaison Officers provided valuable assistance to the Logistics Section.



Logistics Section Issues

1. Food quality and quantity varied during the incident. In the early stages, food was provided by volunteer agencies. While this was helpful, some meals provided did not meet the nutritional standards for firefighters.
2. Until all responders were checked-in to the incident, it was difficult to ensure that enough meals were ordered.
3. There was a lack of documentation early in the incident. Requests for resources, supplies, and equipment were not adequately documented on general message forms (ICS 213), which led to some confusion.
4. No clear process exists for assigning overhead (O#) or equipment (E#) to resources.
5. Transportation of firefighters between accommodations, staging, and their assigned division was an issue. Most firefighters arrived on scene in heavy transports, with no other means of transportation.

- Both SCFC and Horry County Fire Rescue set up staging areas. Staging area managers were not identified. The Operations Section Chief was not always aware what resources were available in staging areas.

Logistics Section Lessons Learned

- Nutritional standards required for firefighters should be provided to food vendors.
- Sufficient status/check-in personnel should be deployed with the team to ensure that accurate information is available to logistics.
- Staging areas should be coordinated with other agencies; having multiple staging areas was confusing to some incoming resources.
- Documentation of all requests is essential. All requests for resources, supplies, and equipment must be documented on the general message form (ICS form 213).
- Interoperability issues were overcome when HCFR provided 800 mhz radios to the IMT. The IMT has a cache of 800 mhz radios that were not transported to the incident. The IMT should purchase a bank charger for the 800 mhz radios and an adequate supply of extra batteries.



Logistics Section Recommendations

- Provide training to IMT members and line supervisors on the use of General Message forms (ICS 213). All resource requests should be documented on these forms.
- Exercises should be conducted with volunteer agencies to clarify nutritional needs for firefighters.
- Need to clarify and document process for assigning overhead (O#) and equipment (E#) numbers to resources. This can be done at the incident or by headquarters staff.
- Orders for additional resources should be submitted to headquarters in writing.
- Dispatch several vans with the IMT when deployed to large wildfires. These vans, from the SCFC fleet, State Fleet Management, or rental agencies can provide transportation for firefighters to and from their accommodations.
- Additional training/positions would be beneficial in some areas, such as Food Unit Leader, Ordering Manager, etc.

State Headquarters & Fire Staff Support

The function of the State HQ and Fire Staff is to provide support prior to, during, and after the response phase of a major wildfire. The Duty Officer was notified about the Hwy 31 Fire by the Pee Dee Regional Forester at approximately 1:30 pm on April 22. The Incident Commander requested the Type 2 IMT, and fire staff subsequently began alerting team members.

Fire staff was in constant contact with region personnel and the IMT during the afternoon hours on 4/22. Initial actions consisted of filling requests for additional tractor plow units, spot weather forecasts, dispatching the IMT, and requesting a temporary flight restriction over the Hwy 31 Fire. Later actions included securing approval to use SC Army National Guard air assets and filling requests for resources submitted by the IMT.

What Worked Well

1. Orders from the incident were filled, using agency resources from other regions and the Southeastern Fire Compact.
2. The SCFC Type 2 IMT was requested during the early afternoon on 4/22. The IMT arrived on-scene at approximately 10:30 pm, with plans to assume control of the incident at the beginning of day shift operations on 4/23.
3. Aviation assets were requested from the SC Army National Guard, including 1 Blackhawk from SC and 4 from NC.
4. A US Forest Service air tanker was requested through the SC Coordination Center. The tanker arrived and began providing aerial retardant drops on 4/23/09.
5. Due to interference from civilian aircraft, a temporary flight restriction was requested in the fire area. The TFR was in place by approximately 10 pm on 4/22. The TFR was lifted late on 4/27.
6. The first spot weather forecast was obtained for the incident during the evening hours of 4/22. Additional spot weather forecasts were obtained in the following days.
7. SCFC provided a representative to staff the ESF 4 (Fire) desk at the State Emergency Operations Center beginning on 4/23.
8. Beginning on 4/23, interagency conference calls were held twice daily that included SC Emergency Management Division, Horry County EMD, the City of N. Myrtle Beach, SC Army National Guard, SC Department of Public Safety, SC Department of Transportation, and other agencies staffing the State Emergency Operations Center.
9. A statewide burning ban was implemented on April 23-27 due to the large amount of resources committed to the Hwy 31 Fire.
10. The Hwy 31 Fire was approved for a FEMA Fire Management Assistance Grant on 4/23.



State Headquarters & Fire Staff Support Issues

1. Beginning on 4/23, the volume of requests for additional resources increased dramatically. Initially, two employees from fire staff worked to locate and dispatch additional resources from other regions, and later other assistance was available. Fire staff was able to fill orders, but the process could be significantly improved.
2. No standard length of deployment has been established for SCFC personnel on in-state incidents. This led to some confusion and uncertainty for firefighters, and created some difficulties in finding replacement crews.
3. Better methods need to be established to track resource orders (assignment of O# and E#) during large incidents.

State Headquarters & Fire Staff Lessons Learned

1. An improved method for processing resource orders should be developed for use during large incidents. Personnel should be identified and trained to assist fire staff.
2. One individual should be designated as the primary contact for each large incident. During the Hwy 31 Fire, the Sandy Island Fire was also active. The Fire Chief was the primary contact for the Sandy Island Fire and the Protection Chief was the primary contact for the Hwy 31 Fire. This made it easier to track orders for each fire and consolidated information for each fire into one point of contact.
3. All IMT members, as well as regional foresters, unit foresters, project foresters, and supervisors should be notified when the SCFC IMT deploys.

State Headquarters & Fire Staff Recommendations

1. Identify and train non-fireline personnel to staff an expanded dispatch during large wildfires or other events.
2. Develop protocol for assigning overhead numbers (O#) and equipment numbers (E#) for resources ordered. This can be done by Logistics personnel at the incident or in expanded dispatch at State Headquarters, but a clear protocol should be developed.
3. Regular interagency conference calls, including the SCFC, SCEMD (and appropriate ESF representatives), and the county agencies involved in the response should be initiated as soon as possible during large incidents. These calls promote information sharing and can help resolve issues that arise between jurisdictions and response disciplines.
4. A standard length of deployment should be developed for in-state assignments of SCFC personnel, and included in agency procedures.

Interagency Communications

Due to the rapid spread of this fire, communication between responders and communication of fire size and spread information to agency administrators proved to be difficult.

This section will also address communication of fire intelligence among response agencies.

What Worked Well

1. During the initial hours of the fire, personnel from Horry County Fire-Rescue and the SCFC worked side by side to conduct structure protection along Hwy 90.
2. The placement of Liaison Officers in the Horry County EOC and the N. Myrtle Beach EOC was very successful. The Liaison Officers provided information to these agencies regarding fire spread, fire suppression strategies, and road closures, air operations, and other crucial items.
3. Once unified command was established, incident action plans were prepared for each operational period.



Interagency Communication Issues

1. The Hwy 31 Fire impacted multiple jurisdictions and involved several different agencies with different types of radio communication systems. Interoperability was a major issue, especially during the initial attack.
2. N. Myrtle Beach utilizes an 800 mhz radio system, and the SCFC does not have these frequencies.
3. Existing mutual aid radio channels were not appropriately utilized during this incident.
4. Some agencies had difficulty obtaining direct phone numbers to the SCFC Command Post.
5. Until Liaison Officers were placed in the Horry County EOC and N. Myrtle Beach EOC, there was sporadic information flow to these agencies.
6. There is no single method available to quickly communicate the threat of a wildfire to surrounding communities.
7. Some agencies did not receive incident action plans (IAP) in a timely manner, especially in the initial days of the incident.
8. Resources ordered by HCFR and NMBFR through the SC Firefighter Mobilization were tracked separately from other resources, making it difficult to incorporate them into the IAP.
9. SCFC normally establishes 12 hour operational periods and personnel work on 12 hour shifts. Fire service resources operated on shorter shifts. This resulted in a change of personnel on

the fireline during the middle of the operational period and uncertainty over call signs, resource status, etc.

Interagency Communication Lessons Learned

1. A true unified command was not achieved until late on 4/23. While line firefighters from both the SCFC and HCFR communicated face to face, there was no single set of strategies. Establishing a true unified command as early as possible in the incident would prevent many problems.
2. Liaison Officers placed in the Horry County EOC and N. Myrtle Beach EOC provided a critical link between the SCFC and these agencies.
3. Liaison Officers from the SC Army National Guard should be dispatched with 800 mhz radios on future incidents. At the time of this incident, SC Air National Guard Blackhawks did not have 800 mhz radios installed.



Interagency Communications Recommendations

1. Establish true unified command as soon as possible.
2. Utilize all available assets during future large wildfires, including the SC National Guard 43rd Civil Support Team and the SC Division of Information & Support Technology communications van to help overcome interoperability issues.
3. Create and distribute a phone list to all involved agencies, including direct phone numbers to the ICP.
4. Investigate alternative ways to communicate the threat of a large wildfire, smoke on roads, and other hazards to municipalities and citizens, including internet based methods and social networking.
5. SCFC should ensure that agency 800 mhz radios are programmed to allow communication between various agencies, including the use of existing mutual aid channels (800 mhz and VHF). The City of N. Myrtle Beach and SC Army National Guard are equipped with 800 mhz radios, and the SCFC should ensure that common channels are identified and programmed. Since this incident, HCFR has provided key SCFC personnel with 800 mhz radios programmed to work on their system.
6. Personnel should be designated to man radios in the ICP to ensure that incoming radio traffic is monitored.

7. Training should be conducted for SCFC employees to ensure that firefighters understand the capabilities and operation of their radios.
8. Conduct exercises to practice and improve interoperability between agencies, utilizing common channels that are clearly identified.
9. When structural fire resources are ordered to a wildfire through the SC Firefighter Mobilization Committee, a field representative from the SC Firefighter Mobilization Committee should be incorporated into the IMT.
10. SCFC and Firefighter Mobilization Committee should develop training to help fire service recognize the transition from initial attack to extended attack incidents.
11. Shift lengths for each operational period should be coordinated between the SCFC and fire service partners.
12. SCFC should dispatch personnel (Liaison Officers) to represent the agency as soon as fire service establishes an incident command post. This is especially important when fires occur in areas where terrain (mountains, boggy conditions), fuels (bays, swamps), or presence of high-value resources (homes, infrastructure) indicate that an extended attack is likely.
13. Liaison Officers should develop and maintain lists of contacts for other agencies (county fire departments, county emergency management, and local law enforcement agencies) in fire-prone areas.



Training Opportunities

The Highway 31 Fire response has helped identify areas where additional training or exercises is needed.

1. An annual table-top exercise should be conducted that involves the SCFC, Horry County Fire-Rescue, North Myrtle Beach Fire & Public Safety, Horry County Emergency Management, SC Department of Transportation, SC Department of Public Safety, Horry County Police, SC Emergency Management Division, the SC Army National Guard, and other emergency response agencies in the area. This exercise should test communication systems, interoperability, unified command, information sharing, public notification, and other areas. Every agency involved in the review of this incident indicated willingness to participate in an annual exercise.
2. SCFC should continue to conduct annual training with the SC Army National Guard.
3. SCFC personnel need additional training on the use of 800 mhz radios.
4. SCFC personnel need training on the use of crew time reports and shift tickets.
5. SCFC should examine the need for the development of expertise in several areas that may be helpful on future incidents. These include Documentation Unit Leader, Computer Technical Specialist for I-Suite, Situation Unit Leader, Field Observers, Air Attack Manager, and other positions.



Conclusion

The Highway 31 Fire was the most destructive wildfire in South Carolina's history and resulted in devastating losses of homes, vehicles, personal belongings, timber, wildlife habitat, and other assets. Fire behavior was extreme, placing hundreds of firefighters and thousands of residents in danger, either from direct flames, smoke on roads, breathing difficulties, falling trees, heat exhaustion, and fatigue. Throughout the incident, the safety of responders and the public was the highest priority, and no serious injuries occurred.

This large wildfire provided a valuable learning experience to the Forestry Commission and all other responding agencies. The incident tested the capability of the SCFC and identified areas for improvement at all levels of the organization. The lessons learned on the Highway 31 Fire, from those learned by the first resources dispatched through the completion of this AAR, will be used to help improve agency response for years to come.

Adequate Forestry Commission personnel and equipment were available for the Highway 31 Fire because fire activity at the time was at an historic low, the other two significant fires on April 22 and 23 were nearby, and only experienced personnel with the most reliable firefighting equipment were sent to this fire. The success in dealing with the fire masked the inadequacies in wildfire suppression capacity that currently exist and are worsening rapidly due to staffing cuts and very old equipment. Under severe fire conditions, the Commission's



capacity would not have been adequate, and many more homes and much more timber would have been lost, with a high probability of death or serious injury to citizens and firefighters. The lack of appreciation for the wildfire threat that exists in the state and long-term budget reductions have had a devastating effect on the agency's response capacity. In the future, insufficient equipment replacement funding, the loss of experienced firefighters, and difficulties in recruiting and retaining qualified personnel will have further serious impacts on the agency's response capability.

Forestry Commission leadership will continue to review the findings of this report and work to ensure that the necessary changes to policies, procedures, strategies, and tactics are implemented. The SCFC is committed to learning from the Highway 31 Fire and using the lessons learned to improve preparedness, planning, response, and recovery efforts in the future. The Commission and its allies will also continue to push for adequate staffing and equipment funding and seek alternative sources to be able to meet its firefighting mandate as stated in SC Code of Laws Section 48-33-40.

Appendices

Appendix A:

List of Acronyms

DOCL	Documentation Unit Leader
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
FLIR	Forward Looking Infrared
FOBS	Field Observer
FSC	Finance Section Chief
GIS	Geographic Information System
HCEM	Horry County Emergency Management
HCFR	Horry County Fire-Rescue
HCPD	Horry County Police
IAP	Incident Action Plan
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
IMT	Incident Management Team
IRPG	Interagency Response Pocket Guide
JIC	Joint Information Center
KBDI	Keetch-Byram Drought Index
LOFR	Liaison Officer
LSC	Logistics Section Chief
NIMO	National Incident Management Organization
NMBFR	North Myrtle Beach Fire and Rescue
OSC	Operations Section Chief
PSC	Plans Section Chief
SCANG	South Carolina Army National Guard
SCEMD	South Carolina Emergency Management Division
SCDOT	South Carolina Department of Transportation
SCDPS	South Carolina Department of Public Safety
SCFC	South Carolina Forestry Commission
SCLLR	South Carolina Department of Labor, Licensing, & Regulation (Firefighter Mobilization Committee)
SOFR	Safety Officer
TFR	Temporary Flight Restriction
USFS	United States Forest Service

Appendix B:

Highway 31 Fire Progression Map

Highway 31 Fire: Fire Progression Map

