



# **N.C. DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES**

## **NORTH CAROLINA FOREST SERVICE**



## **ANNUAL LEGISLATIVE REPORT ON WILDFIRES**

October 1, 2019

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Pursuant to G.S. 106-911, the North Carolina Forest Service, North Carolina Department of Agriculture and Consumer Services, respectfully submits this annual report on wildfire in North Carolina for Fiscal Year 2019.

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## **STATUTORY REQUIREMENT**

### **§ 106-911. Annual report on wildfires**

No later than October 1 of each year, beginning October 1, 2012, the Commissioner shall submit a written report on wildfires in the State to the Chairs of the House Appropriations Subcommittee on Natural and Economic Resources and the Senate Appropriations Committee on Natural and Economic Resources, the Joint Legislative Commission on Governmental Operations, and the Fiscal Research Division of the General Assembly. The report shall include the following information for all major or project wildfires during the prior fiscal year:

- (1) The date, location and impacts (property damage and any casualties) from the wildfire.
- (2) The following data for firefighters and related support personnel involved in fighting the wildfire:
  - a. Total overtime hours worked.
  - b. Total compensation paid for overtime.
  - c. The portion of compensation paid that was reimbursed to the State.
- (3) The fiscal impact of the wildfire, including total costs, reimbursable costs and costs incurred by the State.

## **OVERVIEW OF FIRE CONTROL**

North Carolina has 18.8 million acres of forestland. Wildfire is one of the greatest threats to this important and valuable natural resource. The North Carolina Forest Service (NCFS) is responsible for protecting state and privately-owned forestland from forest fires. The NCFS forest fire protection program is managed on a cooperative basis with each of the 100 North Carolina counties. Emphasis in the fire program includes fire prevention efforts, pre-suppression activities (including extensive training of personnel and cooperators), aggressive suppression efforts on all wildfires and law enforcement follow-up.

NCFS, local fire departments and communities across the state are working together to prevent, prepare for and lessen the impact of wildfires. Maintaining a well-trained, proficient forest fire control organization is very similar to maintaining a well-trained army. Fire training occurs year-round. New personnel are constantly being trained to maintain capabilities. Veteran firefighters regularly undergo refresher training in suppression tactics, strategy, organization and management.

A study conducted by the U.S. Forest Service and the University of Wisconsin-Madison indicated that North Carolina leads the nation in the amount of area classified as wildland-urban interface (WUI). The WUI is the area where structures and other human development meet or intermingle with undeveloped wildland, forest or vegetative fuels. While North Carolina has the most WUI acres, it also ranks fifth in most housing units within the WUI. The interface creates great challenges for fire

managers, as nearly every wildfire or its associated smoke may impact homes, roads, farms or other developments.

Table 1 illustrates the need to keep wildfires as small as possible through early detection and rapid response, which are critical to reducing fire size, protecting property and minimizing overall loss.

**Table 1. Historical wildfire activity in North Carolina, FY 2010-2019**

Fiscal Year	Wildfires	Acres	100+ Acre Wildfires	100+ Acres Burned	Percent of Total Wildfires	Percent of Acreage Burned on 100+ Ac. Wildfires
<b>2010</b>	3,023	10,904	16	3,347	0.5%	30.7%
<b>2011</b>	5,701	85,857	36	70,166	0.6%	81.7%
<b>2012</b>	3,259	11,958	14	2,779	0.4%	23.2%
<b>2013</b>	3,542	11,026	14	3,647	0.4%	33.1%
<b>2014</b>	4,624	13,358	14	4,448	0.3%	33.3%
<b>2015</b>	3,991	9,903	9	2,647	0.2%	26.7%
<b>2016</b>	3,210	18,808	12	11,992	0.4%	63.8%
<b>2017</b>	5,541	79,674	38	69,389	0.7%	87.1%
<b>2018</b>	4,553	13,647	14	5,575	0.3%	40.9%
<b>2019</b>	2,823	6,786	8	1,846	0.3%	27.2%
<b>Total</b>	40,267	261,921	175	175,836	0.4%	67.1%
<b>Average</b>	4,027	26,192	18	17,584	0.4%	41.8%

From fiscal year 2010-2019, 261,921 acres of woodland burned in North Carolina wildfires. Of these wildfires, 175,836 acres, or 67 percent of the total area burned, were burned in fires larger than 100 acres. However, 100+ acre fires only made up 0.4 percent of the total number of fires for this 10-year period.

The total number of wildfires per fiscal year is shown in Figure 1 while Figure 2 shows the total number acres burned in wildfires per fiscal year from 2010-2019.

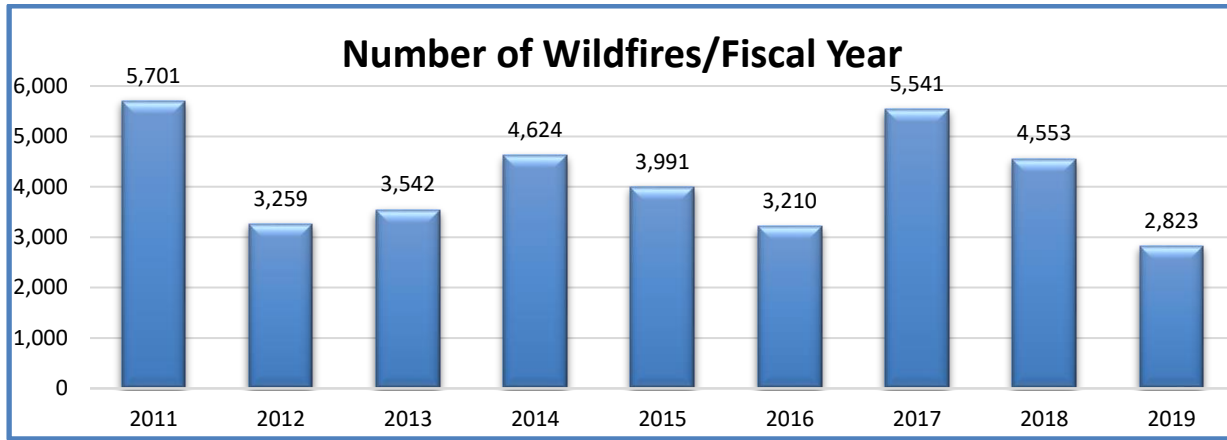


Figure 1. Wildfire activity per fiscal year in North Carolina, FY 2010-2019

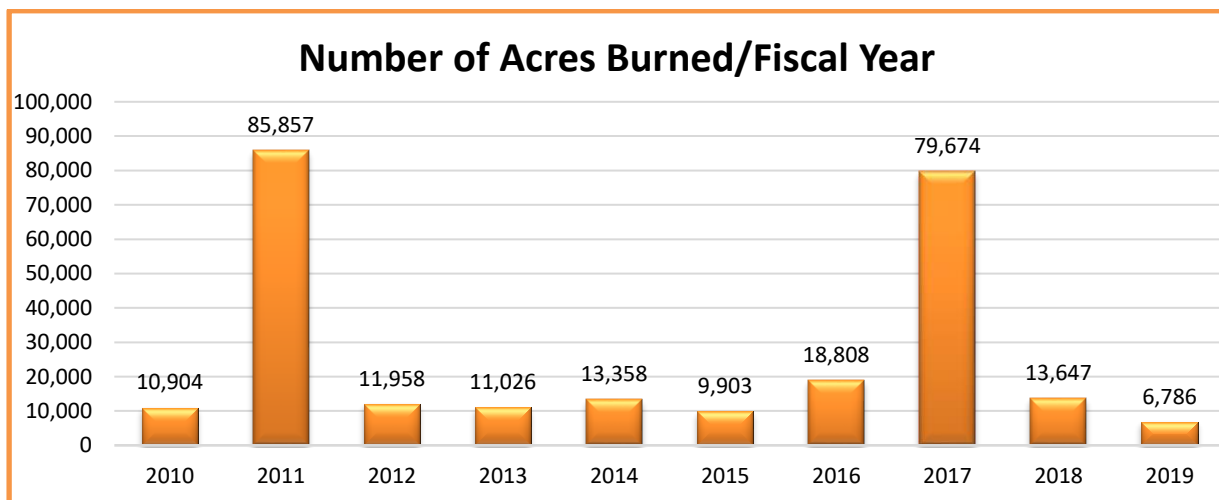


Figure 2. Wildfire acres burned per fiscal year in North Carolina, FY 2010-2019

## SUMMARY OF ALL WILDFIRE DATA FOR FISCAL YEAR 2019

From July 1, 2018, through June 30, 2019, 2,823 wildfires<sup>1</sup> burned on 6,786 acres in North Carolina. The average fire size was 3 acres with the largest wildfire being 387.5 acres. Of these 2,823 wildfires, only two percent could be directly linked to a natural ignition source (lightning). That means 98 percent of the wildfires started in fiscal year 2019 were directly related to human activity. As the population of the state increases, the number of wildfires per year are expected to also increase.

<sup>1</sup> NCFS has the statutory (G.S. 106-895) requirement of prevention and control of forest fires in any and all parts of this state with the exception of Federal Government owned property. Through administrative decision, areas within municipal limits are considered beyond the jurisdiction of the N.C. Forest Service.

## Effects of weather on the North Carolina wildfire season

Weather plays a very important role in determining wildfire activity and severity in North Carolina. Historically, North Carolina has two distinct wildfire seasons that occur in the fall and in the spring. During these two times of the year, weather and vegetation conditions on the landscape increases the potential for wildfires.

Figure 3 below provides a visualization of the general trend for wildfires throughout the year. Wildfire occurrence was generally low at the beginning of fiscal year 2019. Typically, fuels of concern are at full greenness during the summer months, which reduces the danger of having a wildfire. Moving into the fall of the year, fuels of concern start to become more available with the physiological changes in vegetation as moisture content decreases. Wildfire occurrence in North Carolina normally starts to pick up in October coinciding with leaf shed.

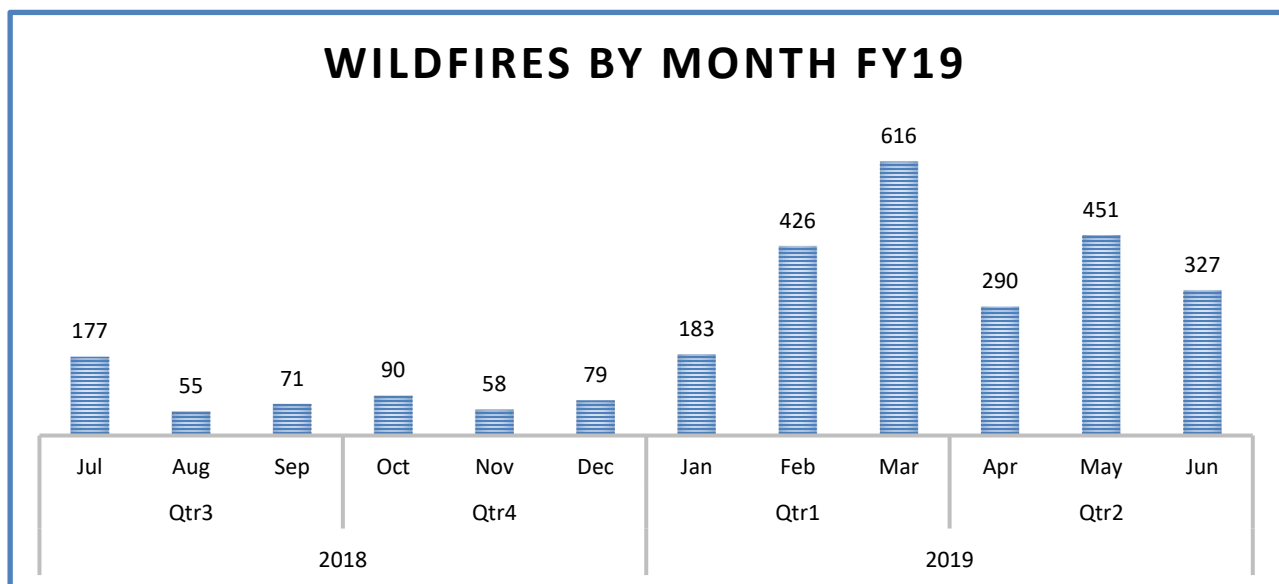


Figure 3. Wildfires in North Carolina by month during FY19

This trend of increasing available fuels continues through the winter months into spring. During winter and spring, it is very common for North Carolina to have periods of weather with low relative humidity and strong wind events. These weather events, along with receptive fuels, combine to create high fire danger that correlates to the increase in the number of wildfires during this period.

Wildfire occurrence normally starts to decrease as vegetation starts new growth in late spring. The wildcard in these trends is drought. North Carolina can experience severe droughts and during these events the wildfire seasons can extend beyond the historical wildfire season. Some of the largest fires that have occurred in the state have been during the summer months as shown in Table 2.

Table 2. Recent examples of large summer wildfires in North Carolina

Fire Name	County	Acres Burned	Start Date
<b>Pains Bay</b>	Dare	45,294	5/5/11
<b>Juniper Road</b>	Pender	31,140	6/19/11
<b>Simmons Road</b>	Cumberland/Bladen	5,438	6/20/11
<b>Evans Road</b>	Hyde/Washington/Tyrrell	41,534	6/1/08

Figures 4 and 5 plus Tables 3-7 outline all FY19 wildfires occurring by region, including estimated damages and causes.

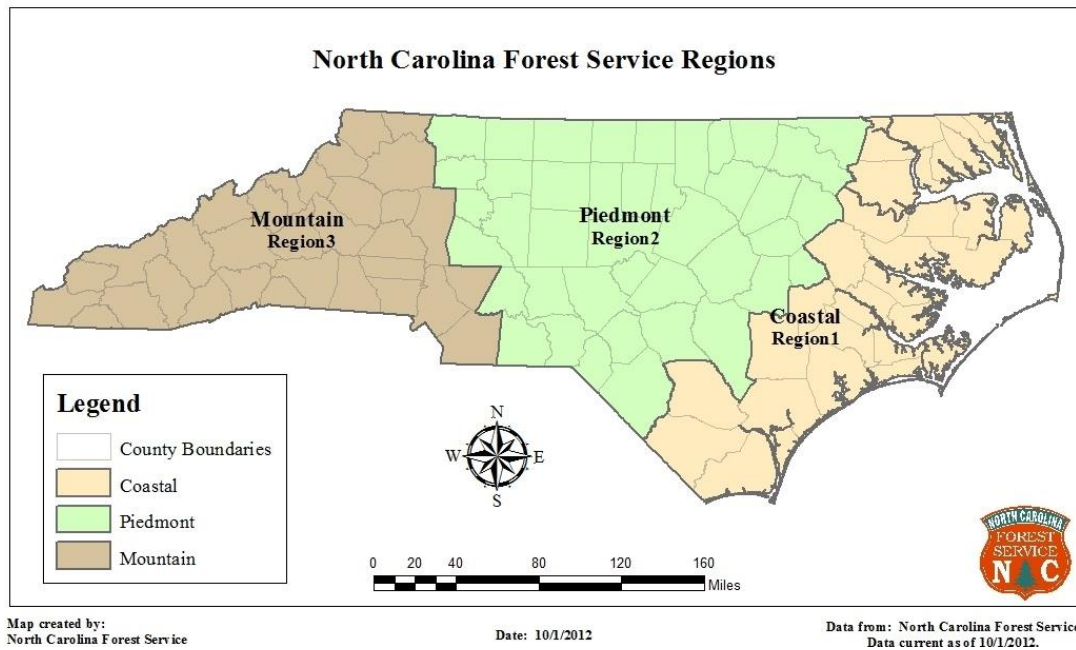


Figure 4. Map of North Carolina Forest Service regions

Table 3. Wildfires by North Carolina Forest Service Region in FY19

NCFS Region	# of Wildfires	% of Wildfires	Wildfire Acres
Coastal	737	26%	2481
Piedmont	1,439	51%	3706
Mountain	647	23%	599
Total	2,823	100%	6,786



Table 4. Estimated values of property impacted by wildfires per geographic area in North Carolina during FY19

N.C. Forest Service Region	Homes and Structures Protected by NCFS Fire Protection	Est. Value of Homes and Structures Protected	Homes and Structures Damaged or Destroyed by Wildfires	Est. Value of Homes and Structures Damaged or Destroyed	Est. Value of Other Property Damaged (Timber, Livestock, Crops, Vehicles)
Coastal	907	\$74,814,049	53	\$335,050	\$776,289
Piedmont	2,034	\$173,517,564	112	\$996,551	\$272,352
Mountains	741	\$241,587,238	30	\$529,350	\$279,375
Total	3,682	\$489,918,851	195	\$1,860,951	\$1,328,016

Table 5. Causes of wildfires in North Carolina during FY19

Wildfire Cause	#of Wildfires	Wildfire Acres
Camping	25	145
Children	82	89
Debris Burning	1,295	2,623
Incendiary	21	637
Lightning	186	967
Machine Use	49	156
Miscellaneous	381	535
Fireworks	389	305
Railroad	26	32
Smoking	22	19
Undetermined	347	1,278
Total	2,823	6,786



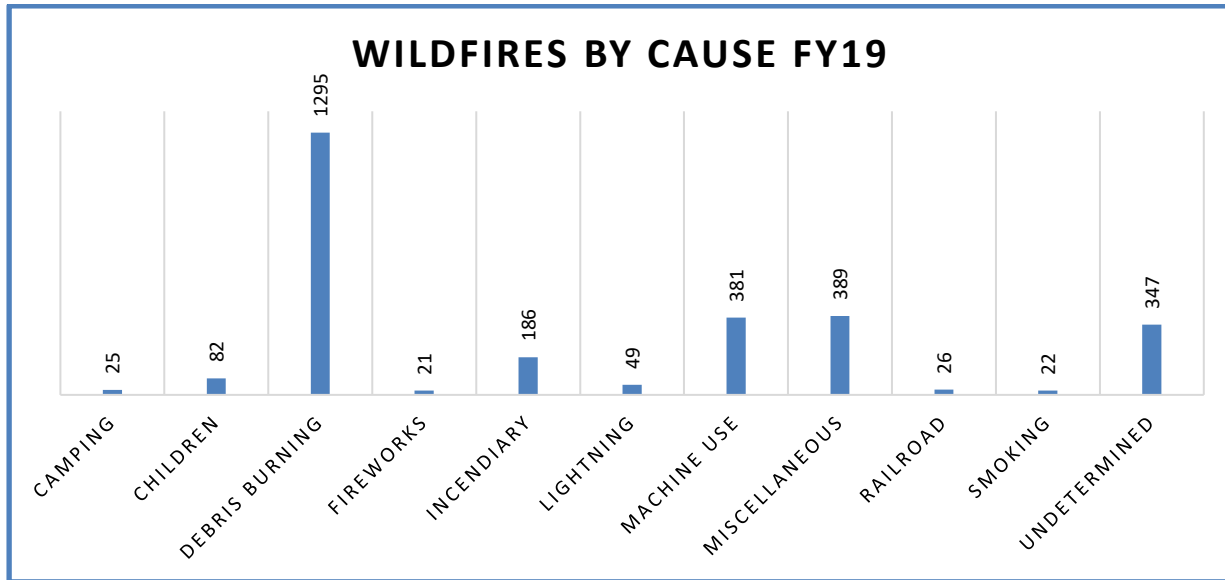


Figure 5. Leading causes of wildfires in North Carolina during FY19

Table 6. Top five counties with the most fire response in North Carolina during FY19

County	NCFS Region	# of Wildfires	Wildfire Acres	Suppression Cost
Richmond	Piedmont	108	220	\$41,357
Robeson	Piedmont	106	602	\$62,783
Harnett	Piedmont	103	232	\$77,763
Moore	Piedmont	77	278	\$31,017
Brunswick	Coastal	72	600	\$148,232
Total for the 5 counties		466	1,933	\$361,152
% of annual total		17%	28%	16%

Table 7. Top five counties with most acres burned by wildfire in North Carolina during FY19

County	NCFS Region	# of Wildfires	Wildfire Acres	Suppression Cost
Scotland	Piedmont	58	1,123	\$30,600
Robeson	Piedmont	106	602	\$62,783
Brunswick	Coastal	72	600	\$148,232
Carteret	Coastal	42	388	\$65,720
Moore	Piedmont	77	278	\$31,017
Total for the 5 counties		355	2,992	\$338,351
% of annual total		13%	44%	15%

## MAJOR WILDFIRE DATA FOR FISCAL YEAR 2019

North Carolina had 22 major wildfires with a start date between July 1, 2018, and June 30, 2019. NCFS classifies a major wildfire when any of the following occurs:

- A wildfire is 100 acres or more in size.
- Any inhabited or inhabitable dwelling has been destroyed regardless of value.
- Structure(s) destroyed with a value greater than \$50,000 (ex. commercial building, detached garage, farm shop).
- A firefighter fatality.
- Any significant firefighter injury that requires an emergency room visit or hospitalization.
- An Incident Management Team (Type 1, 2 or 3) is assigned to the incident.
- Central Office funding is requested.<sup>2</sup>

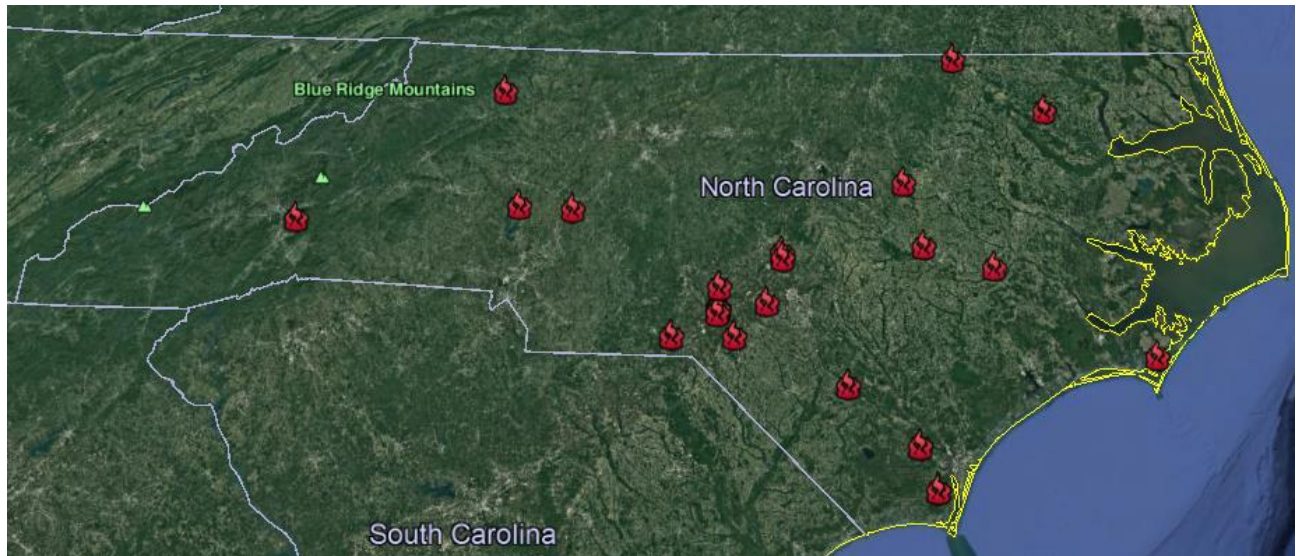


Figure 6. Locations of major wildfires in North Carolina during FY19

Table 8 shows the dates, locations and impacts for each of the 22 major wildfires in fiscal year 2019. It is important to note that while Table 8 shows approximately \$2,228,014 in property damage/loss to homes and structures, 84 homes and structures with an estimated value of \$19,020,000 were protected on those same wildfires. Of the 22 fires, 8 were considered major wildfires due to the fire size and 14 were considered major due to the value of structures lost or damaged.

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<sup>2</sup> When the cost of responding to an incident is projected to be more than the field unit can afford, financial support from the NCFS Raleigh Headquarters (Central Office) budget can be requested. Recently, the NCFS Central Office "fire contingency budget" has been limited to \$200,000. This has proven to be insufficient for multiple major fires, as shown in fiscal year 2019.

Table 8. Dates, locations and impacts of major wildfires in North Carolina FY19

County	Wildfire Name	Start Date	Days to Control	Acres Burned	Homes and Structures Damaged or Destroyed	Estimated Value of Homes and Structures Damaged or Destroyed	Estimated Value of Other Property Damaged (Timber, Livestock, Crops, Vehicles)
Bladen	701 S / Harris Rd	2/26/2019	1	3.2	1	\$50,000	\$0
Brunswick	Andover Rd.	4/28/2019	1	118.6	0	\$0	\$23,314
Scotland	Blakley Road #2	10/9/2018	1	0.0	1	\$50,000	\$100,000
Carteret	Browns Island	5/23/2019	5	303.4	1	\$4,500	\$0
Iredell	Catalina	3/29/2019	1	0.5	2	\$155,000	\$1,000
Brunswick	Craven Street	7/3/2018	3	154.9	0	\$0	\$0
Harnett	Deerview	3/23/2019	1	2.6	6	\$1,200,000	\$0
Halifax	Everette's School	3/24/2019	1	121.9	1	\$10,000	\$2,000
Hoke	Hidden Acres	3/13/2019	1	1.0	2	\$140,000	\$0
Henderson	Huntley Road	4/4/2019	3	130.1	1	\$1,000	\$2,500
Moore	Jeans Loop	6/30/2019	1	0.0	1	\$35,000	\$0
Wilkes	Mallard Way	3/24/2019	1	0.0	2	\$74,000	\$0
Johnston	Old Bailey road	2/5/2019	1	1.2	2	\$10,700	\$0
Richmond	Osborne Rd 2019	2/7/2019	1	2.3	1	\$60,000	\$0
Bertie	Pine St. trailer	3/28/2019	1	2.0	2	\$30,000	\$0
Wayne	Pleasant Pines	5/19/2019	1	0.5	3	\$112,000	\$0
Scotland	Riflerange Road	1/28/2019	1	387.5	0	\$0	\$0
Harnett	Robin Hill	6/30/2019	1	0.6	1	\$80,000	\$0
Scotland	Tiner Lane	4/28/2019	1	369.1	0	\$0	\$0
Rowan	Trex RD	11/28/2018	2	0.2	1	\$75,000	\$0
Scotland	Whiskey Still Lane	5/16/2019	1	260.3	0	\$0	\$0
Lenoir	Will Baker Road	5/21/2019	2	0.4	2	\$12,000	\$0
<b>Totals</b>			<b>32</b>	<b>1,860.1</b>	<b>30</b>	<b>\$2,099,200</b>	<b>\$128,814</b>

## Overtime data

Employees record time worked on an incident with timesheet charge objects. Charge objects are assigned for major fires. In fiscal year 2019, NCFS permanent employees earned 44,911 hours of compensatory time related to wildfire suppression in the state.

Table 9. Overtime/compensatory time for major wildfires in North Carolina during FY19

County	Wildfire Name	Acres Burned	Overtime Hours Worked	Reimbursement	Hours of Earned Comp. Time
Bladen	701 S / Harris Rd	3.2	2.00	N/A	3.00
Brunswick	Andover Rd.	118.6	57.50	N/A	83.25
Scotland	Blakley Road #2	0.0	0.00	N/A	0.00
Carteret	Browns Island	303.4	70.25	N/A	101.00
Iredell	Catalina	0.5	0.00	N/A	0.00
Brunswick	Craven Street	154.9	148.30	N/A	215.95
Harnett	Deerview	2.6	9.25	N/A	12.63
Halifax	Everette's School	121.9	74.50	N/A	102.25
Hoke	Hidden Acres	1.0	4.00	N/A	5.50
Henderson	Huntley Road	130.1	182.15	N/A	264.53
Moore	Jeans Loop	0.0	0.00	N/A	0.00
Wilkes	Mallard Way	0.0	0.00	N/A	0.00
Johnston	Old Bailey road	1.2	0.00	N/A	0.00
Richmond	Osborne Rd 2019	2.3	62.00	N/A	93.00
Bertie	Pine St. trailer	2.0	5.25	N/A	7.88
Wayne	Pleasant Pines	0.5	6.00	N/A	7.50
Scotland	Riflerange Road	387.5	0.00	N/A	0.00
Harnett	Robin Hill	0.6	0.00	N/A	0.00
Scotland	Tiner Lane	369.1	24.00	N/A	32.50
Rowan	Trex RD	0.2	0.00	N/A	0.00
Scotland	Whiskey Still Lane	260.3	6.00	N/A	9.00
Lenoir	Will Baker Road	0.4	7.60	N/A	11.10
<b>Totals</b>		<b>1,8601.1</b>	<b>658.80</b>	<b>N/A</b>	<b>949.08</b>

## Fiscal impacts

NCFS tracks cost information for reimbursable<sup>3</sup> and billable<sup>4</sup> wildfires. The NCFS Fire Reporting System tracks estimated costs. These estimated costs include employee salary (based on an average salary of the position) and standard equipment use rates. Table 10 shows the estimated costs of each of the 22 major fires that started July 1, 2018 through June 30, 2019. The total estimated suppression cost for all wildfires in fiscal year 2019 was \$2,189,224.26.

Table 10. Estimated fiscal impacts of wildfires in North Carolina during FY19

County	Wildfire Name	Days to Control	Acres Burned	Estimated Cost	Reimbursement	State Cost
Bladen	701 S / Harris Rd	1	3.2	\$416	\$0	\$416
Brunswick	Andover Rd.	1	118.6	\$7,142	\$0	\$7,142
Scotland	Blakley Road #2	1	0.0	\$911	\$0	\$911
Carteret	Browns Island	5	303.4	\$9,666	\$0	\$9,666
Iredell	Catalina	1	0.5	\$3,203	\$0	\$3,203
Brunswick	Craven Street	3	154.9	\$35,242	\$0	\$35,242
Harnett	Deerview	1	2.6	\$3,609	\$0	\$3,609
Halifax	Everettes School	1	121.9	\$11,814	\$0	\$11,814
Hoke	Hidden Acres	1	1.0	\$1,903	\$0	\$1,903
Henderson	Huntley Road	3	130.1	\$32,721	\$0	\$32,721
Moore	Jeans Loop	1	0.0	\$375	\$0	\$375
Wilkes	Mallard Way	1	0.0	\$930	\$0	\$930
Johnston	Old Bailey road	1	1.2	\$778	\$0	\$778
Richmond	Osborne Rd 2019	1	2.3	\$2,381	\$0	\$2,381
Bertie	Pine St. trailer	1	2.0	\$1,488	\$0	\$1,488
Wayne	Pleasant Pines	1	0.5	\$1,635	\$0	\$1,635
Scotland	Riflrange Road	1	387.5	\$470	\$0	\$470
Harnett	Robin Hill	1	0.6	\$1,595	\$0	\$1,595
Scotland	Tiner Lane	1	369.1	\$2,459	\$0	\$2,459
Rowan	Trex RD	2	0.2	\$1,558	\$0	\$1,558
Scotland	Whiskey Still Lane	1	260.3	\$385	\$0	\$385
Lenoir	Will Baker Road	2	0.4	\$1,923	\$0	\$1,923
<b>Totals</b>		<b>32</b>	<b>1,860.1</b>	<b>\$122,603</b>	<b>\$0</b>	<b>\$122,603</b>

<sup>3</sup> Reimbursable Fires – A wildfire where NCFS may obtain a reimbursement of funds from FEMA, U.S. Forest Service, or other agencies

<sup>4</sup> Billable Fires – Wildfires where NCFS has a cost share or cooperative agreement or provided suppression services to a federal agency

## Wildfire personnel and equipment

The NCFS could not perform its legislative mandate without trained personnel and specialized equipment. The agency puts a considerable emphasis on training our employees in wildfire and all-hazard emergency response. In fiscal year 2019, 43,847 hours were spent by NCFS employees in these trainings. Training for incident response is a career endeavor that is essential for safe incident response.

Along with training comes the need for specialized equipment necessary for wildfire response. This equipment ranges from simple tools like a fire rake to complex tools such as helicopters and single engine air tankers. Each tool has a specific use and it takes all of them for effective wildfire management across the state.

### Type 6 engine

The most visible tools include heavy equipment and aviation resources. The most commonly used of these resources is the Type 6 engine. These units are designed for maneuverability to allow for direct attack on wildfires to keep any acres burned as low as possible. Many of the wildfires in the state are controlled by these types of engines, equipped with 150-gallon water tanks, pump and hose along with an assortment of hand tools commonly used in wildland fire fighting.



Figure 7. Type 6 engine



## Wildland fire tractor plow units

When wildfires cannot be controlled with these engines, heavier equipment is needed. Wildland fire tractor plow units are the next line of defense (see Figure 8). These units range in size and configurations depending on the terrain in the portion of the state in which they are located. While configurations vary, the purpose of all these units is to quickly install fire breaks. All units are equipped with a plow pulled behind the tractor that allows for the quick construction of a fire break. Currently, the NCFS has 93 of these tractor plow units across the state that are designated for initial attack of wildland fires.



Figure 8. This John Deere 750K is one of the 93 wildland fire tractor plow units across the state.

## Aviation resources

Aviation is a critical tool used in the detection and control of wildfires. In North Carolina, the aviation fleet consists of 11 patrol aircraft, five helicopters and two single engine air tankers (SEATS) along with several support aircraft, as shown in Figures 9-13.



Figure 9. Patrol plane





Figure 10. Astar 350B3 helicopter



Figure 11. Air tractor (AT-802F)





Figure 12. Lead plane (T-34C)



Figure 13. SEAT (single engine air tanker) load crew plane

## CONTACT INFORMATION

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