2018

Aviation Annual Report

Aviation Aircraft Use Summary

U.S. Forest Service

2018

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Executive Summary

This document provides a comprehensive picture of the U.S. Forest Service Aviation use and costs for contract and agency-owned aircraft reporting into the IT system of record. This report is dynamic and subject to change. Fire and Aviation Management provides updates at least annually.

Information sources include the FAMWEB Data Warehouse containing data from Aviation Business System (ABS) and Aviation Management Information System (AMIS), Forest Service aviation program specialists, contract specialists, and Regional Aviation Officers.

The report lists data using Calendar Year (January 1 – December 31) to provide an overall summary reflective of the fire season and contracting cycles. In 2018, the Forest Service agency-owned and contracted aircraft flew a total of roughly 76,230 hours, which is nine thousand hours above the 10-year average of 67,064 flight hours.

Table 1 represents the number of aircraft awarded a contract line item or available to the agency for use. These numbers are not reflective of the actual number of aircraft utilized because a Call When Needed (CWN) aircraft may not have been available at the time of a resource order and some Exclusive Use aircraft are also awarded CWN contracts.

Report Disclaimer

Aircraft use, cost, and other data is queried from the Aviation Business System (ABS) and Aviation Management Information System (AMIS) stored in the FAMWEB Data Warehouse. This dataset is only as accurate as the information entered. Totals represent both fire and non-fire missions (wildlife, resource, and point-to-point missions).

Not all aircraft utilized by the agency are reported or billed through ABS (i.e. MAFFS). Data fields do not have limitations to prevent erroneous data (i.e. 93 million gallons of retardant delivered on one flight). Not all data fields are required in ABS. For example, cargo weight is not a required field when cargo transport is selected as the mission code; 5% of cargo flights does not have a transported weight.

ABS is an invoicing tool and not designed for reporting. The Forest Service updates ABS data as payments are processed. Inconsistences in some datasets are noted. Trends are accurate.

Table 1 – 2018 Forest Service Total Aircraft Available

Aircraft	Number of Aircraft
Helicopters	
Helicopters – Exclusive Use (EXU)	115
Helicopters – Call When Needed (CWN)	310
Airtankers	
Next Gen Airtankers – EXU	13
Next Gen Airtankers – CWN	8
Forest Service Owned[1]	2[2]
MAFFS	8
SEAT (EXU)	1
Water Scoopers	
Water Scooper – CL-415 (CWN)	4
Fixed-Wing Aircraft	
Aerial Supervision Module/LP – Lease	15
Light Fixed-Wing ATGS (EXU)	16
Light Fixed-Wing ATGS (CWN)	75
Smokejumper Aircraft (EU)	6
Smokejumper Aircraft (CWN)	2
Large Transport (EU)	1
Other Light-Fixed Wing Aircraft	61
Agency-Owned and Operated (WCF) Aircraft	
Working Capital Fund Fleet - Total **Fixed-Wing 20** **Rotor Wing 3**	23

[1] The 2014 National Defense Authorization Act stated the aircraft ownership would transfer to the Forest Service upon completion of maintenance and installation of a retardant tank by the U.S. Air Force. With the required maintenance and retardant tank installation not completed, the U.S. Coast Guard bailed the aircraft to the Forest Service. Throughout this report, the HC-130H aircraft bailed to the Forest Service from the U.S. Coast Guard will be referred to as Forest Service "Owned."

[2] Only one of the HC-130H aircraft bailed to the Forest Service from the U.S. Coast Guard was operated as an Airtanker in 2018. The second aircraft flew training missions only.

Introduction: The Forest Service Aviation Program

The Forest Service is responsible for managing 193 million acres of National Forests and Grasslands. The agency's top priority is to maintain and improve the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of current and future generations. Aviation plays a key role in managing the National Forests and Grasslands by supporting natural resource management missions and wildland fire missions. The primary mission of Forest Service Aviation is to support firefighters and natural resource programs through a variety of means, including, but not limited to:

- Aerial delivery of firefighters by parachute, rappel rope, or on-site landing;
- Air tactical command and control;
- Surveillance, reconnaissance, and intelligence gathering;
- Infrared detection and mapping;
- Aerial delivery of fire retardant and water;
- Passenger transport for firefighting and resource missions;
- Administrative flights;
- Research;
- Forest rehabilitation;
- Forest health protection (aerial surveys, application and photography);
- Law enforcement; and
- Aerial photography.

Approximately 300 personnel at the Washington, Regional, and Forest level offices administer the aviation program. The national staff is located in Washington, D.C. and at the National Interagency Fire Center (NIFC) in Boise, Idaho. The vast majority of aviation personnel are located throughout the forests with local forest and regional office staff providing day-to-day operational oversight and program guidance.

The Forest Service Aviation Program is one of the largest amongst the Federal aviation community (Non-DoD) in the United States Government and is the leading user of commercial aircraft services. The agency owns and operates less than thirty aircraft and contracts for hundreds of aircraft annually from commercial vendors.

The Forest Service also receives aviation support from numerous partners (the Department of the Interior), cooperators, such as State, County, and international municipalities, and the Department of Defense. Statistics from these aircraft, Forest Service owned aircraft under the Federal Excess Personal Property (FEPP) program, and any aircraft not billed through Aviation Business System (ABS) are not included in this report, unless otherwise noted.

The Forest Service bases its Aviation Risk Management program on the philosophy that all aircraft mishaps are preventable and that mishap prevention is an inherent function of management. The "Aviation Safety Summary FY2018" states the Forest Service had three aviation accidents and three incidents in 2018. The full report is available online at https://www.fs.fed.us/sites/default/files/2019-05/fy18_us_forest_service_aviation_safety_report_final.pdf.

Aviation Utilization and Cost Information

The U.S. Forest Service requires aircraft services for both fire and non-fire missions. Although the Forest Service owns a limited number of aircraft, the agency contracts the majority of the aviation assets available for mission-related work. Regardless of the type of contract, the numbers below do not "double count" aircraft unless otherwise noted. In 2018, 455 contracted aircraft, twenty-three agency-owned aircraft, and two agency operated Airtankers bailed from the U.S. Coast Guard were utilized to fulfill the overall mission of the agency. These contracted aircraft represent the actual number of aircraft that operated and do not include any duplicate aircraft awarded multiple contracts.

This report categorizes aircraft into four groups: fixed wing, helicopter, Airtanker, and water scoopers. The data presented below includes both agency owned and contracted aircraft, unless it is otherwise noted where contract and agency-owned aircraft are presented separately. The fixed-wing category includes the large NIFC transport jet, smokejumper aircraft, leadplanes, air attack, and all other fixed-wing aircraft not operating for the sole purpose of delivering a fire suppressant. Unless otherwise noted, the Airtanker category includes any fixed-wing aircraft delivering a fire chemical suppressant to a fire (i.e. Single Engine Airtanker (SEAT), Large Airtanker (LAT), and Very Large Airtanker (VLAT)).

2018 At-A-Glance

Aviation Use

Calendar year 2018 was an above average compared to the previous 4 years for aviation utilization. Contract and agency-owned aircraft flew 76,230 flight hours with peak activity in July and August. These two months alone accounted for more than half of the total flight hours. Contract aircraft flew approximately 95 percent of the total flight hours with agency-owned covering the remaining 5 percent. Based on flight hours, the aircraft were used 68 percent of the time to support Forest Service missions, 21 percent for States and Local cooperators, and 11 percent to support the Department of the Interior federal agencies.

Table 2 and Figure 1 – Aircraft Total Use CY 2014-2018

Total Use by Year	Number of Hours
CY 2014	57,660
CY 2015	68,137
CY 2016	67,702
CY 2017	83,184
CY 2018	76,230
5-Year Average	**70,583**

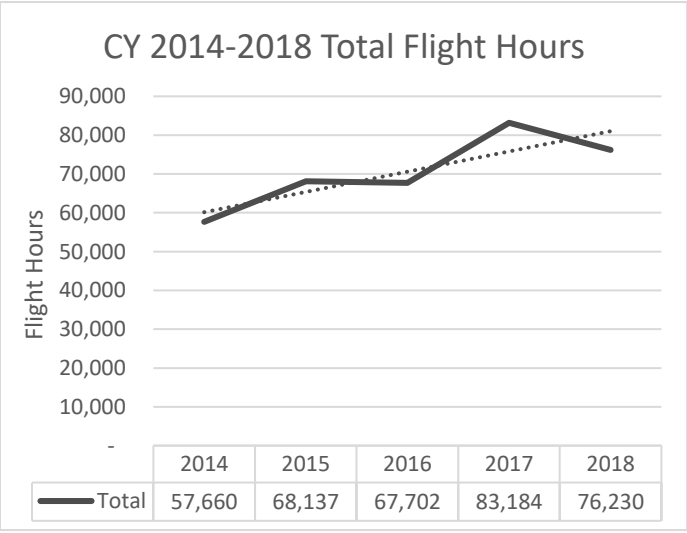


Figure 2 – CY 2018 Flight Hours by Month

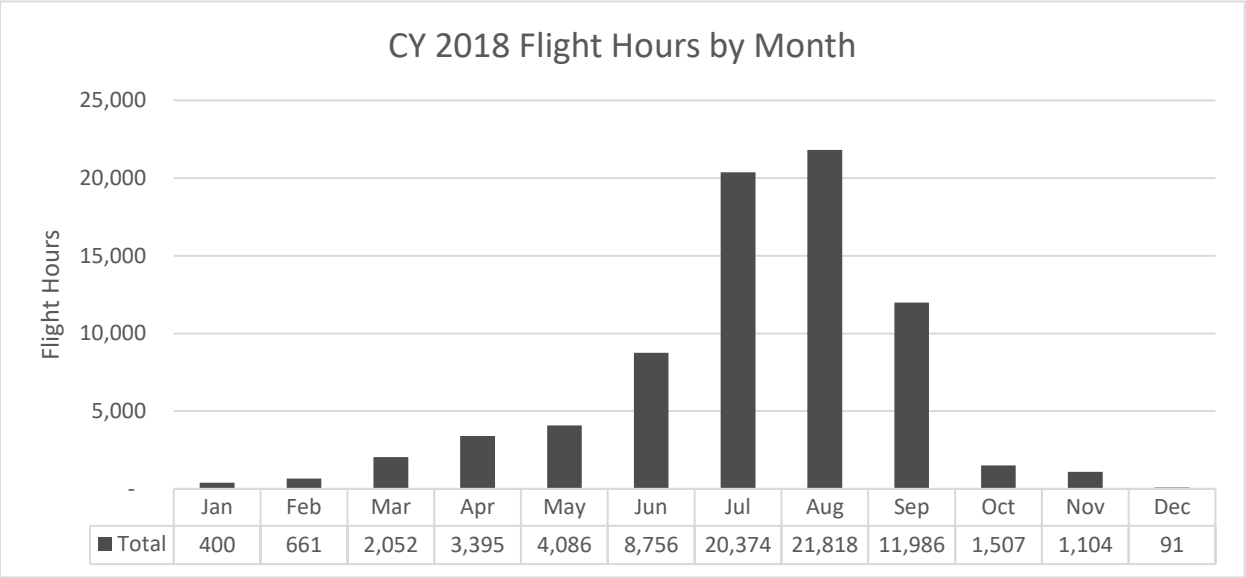


Table 3 and Figure 3 – Percent of CY 2018 Flight Time by Aircraft Type

Aircraft Type	Number of Hours	Percent of Total
Contract Rotor-Wing	39,892	52%
Contract Fixed-Wing	24,522	32%
Contract Airtankers	6,082	8%
Contract Scoopers	1,609	2%
Agency Owned Rotor-Wing	698	1%
Agency Owned Fixed-Wing	3,246	4%
Agency Owned Airtankers	182	0%
Totals	**76,230**	**100%**

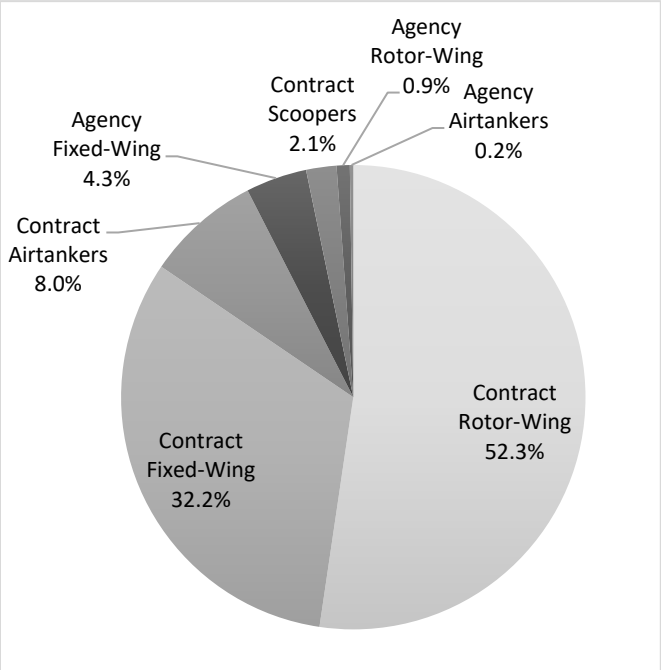


Table 4 – CY 2018 Aircraft Use by Region/Agency[3]

Region/Agency	Flight Hours	Percent of Total Flight Hours
FS: Region 1	6,593	8.6%
FS: Region 2	3,614	4.7%
FS: Region 3	3,457	4.5%
FS: Region 4	10,255	13.5%
FS: Region 5	12,697	16.7%
FS: Region 6	7,871	10.3%
FS: Region 8	2,370	3.1%
FS: Region 9	1,405	1.8%
FS: Region 10	1,253	1.6%
FS: Region 13 (WO)	1,768	2.3%
FS: Region Other (Northeastern Area, Research Stations, CIO)	576	0.8%
FS Total	**51,859**	**68.0%**
BIA	1,551	2.0%
BLM	5,205	6.8%
FWS	92	0.1%
NPS	1,396	1.8%
DOI Total	**8,244**	**10.8%**
Non-Fed Fire (State)	**15,646**	**20.5%**
Non-Wildland Fed Fire (DoD)	**34**	**0.0%**
NICC	**385**	**0.5%**
Unknown	**62**	**0.1%**
Grand Total	**76,230**	**100%**

[3] Incident Finance Job Codes with ABS data were used to determine Region/Agency.

Aviation Cost

The Forest Service expended approximately $607 million on contract aircraft in 2018 with 57 percent on Availability and 38 percent on flight time. Helicopters accounted for more than half of the total cost at 56 percent and Airtankers were almost a quarter of total at 24 percent.

Table 5 and Figure 4 – CY 2018 Aviation Contract Cost by Pay Code

Pay Code	Total Cost
Availability	$344,846,561
Flight Time	$229,417,496
Standby/Extended Standby	$18,179,090
Other	$14,528,355
Total	**$606,971,502**

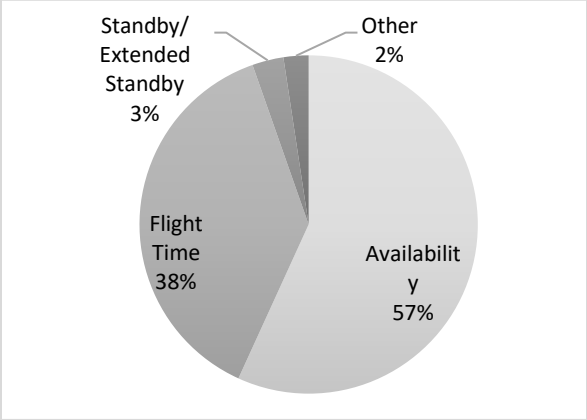
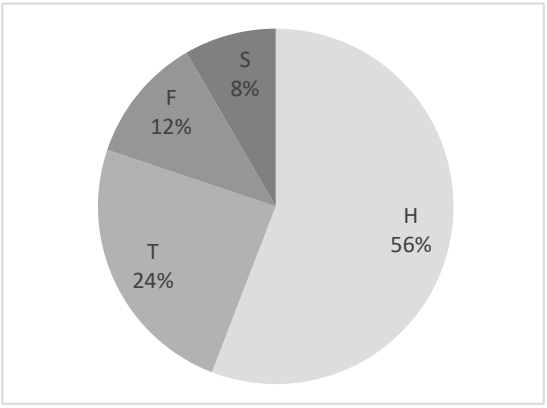


Table 6 and Figure 5 – CY 2018 Aviation Contract Cost by Aircraft Type

Aircraft Type	Total Cost
Helicopter (H)	$338,995,891
Airtanker (T)	$147,520,797
Fixed-Wing (F)	$69,622,279
Scooper (S)	$50,832,534
Total	**$606,971,502**



Fixed-Winged Aircraft

In 2018, the Forest Service issued Exclusive Use contracts for 38 fixed-wing aircraft to support missions for smokejumper, leadplane, air attack, and transportation of firefighters. The 15 aircraft contracted for aerial supervision are a capital lease where the agency provides the pilot and fuel while the vendor provides the aircraft and maintenance. One of the 16 light fixed-wing aircraft for air tactical supervision is equipped with infrared and color video, providing night air tactical supervision and fire intelligence.

In addition to the contract aircraft, the Forest owns and operates twenty light-fixed-wing aircraft utilized for smokejumper, leadplane, and other natural resource management missions, such as Forest Health Protection. The flight hour totals below represent both contract and agency-owned aircraft.

Fixed-wing aircraft flew 27,768 flight hours, or roughly 36% of the total hours in 2018. The majority of the flights were to support the Air Attack mission. CWN aircraft accounted for 48 percent of the flight hours, EXU flew 40 percent of the flight hours, and Agency-Owned aircraft (WCF) had 12 percent of the 27,768 hours flown by fixed-wing aircraft.

Table 7 – Contract Fixed-Wing Aircraft Available

Program	Number of EXU	Number of CWN
Smokejumper Aircraft	6	2
Aerial Supervision Modules/Leadplanes	15	0
Light Fixed-Wing ATGS	16	75
Transport Jet	1	1
Other Regional LFW		61
Total	**38**	**140**

Table 8 and Figure 6– CY 2018 Fixed-Wing Flight Hours by Aircraft Type

Fixed-Wing Type	Flight Hours
CWN	13,281
EXU	11,241
WCF	3,246
Total	**27,768**

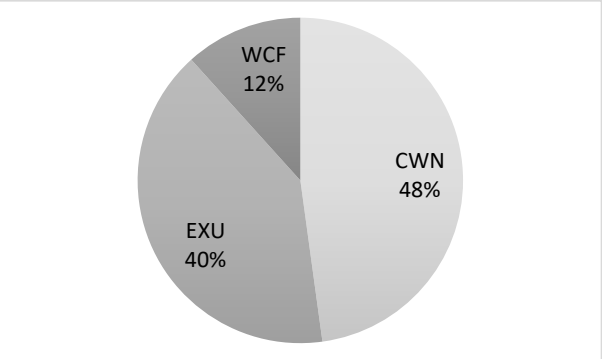


Table 9 – CY 2018 Total Contract and Agency Owned Fixed-Wing Flight Hours by Mission Code

Mission Code	Flight Hours	Percent
Air Attack	14,535	52%
Leadplane	3,508	13%
Detection (Flights for detecting wildfires)	1,884	7%
Smokejumper Transport	1,446	5%
Survey/Observation	1,421	5%
Ferry	1,127	4%
Infrared Imagery, Fire Suppression	1,063	4%
Personnel Transport, Normal Activities	924	3%
Other	1,861	7%
Total	**27,768**	**100%**

Table 10 – Total Contract Fixed-Wing Costs in $millions (FY2014-2018)

Fiscal Year	Flight Hours	Total	Availability	Flight and Miscellaneous
2014	21,410	$52.0	$18.2	$33.8
2015	25,339	$60.1	$18.3	$41.9
2016	22,774	$60.3	$20.1	$40.2
2017	27,078	$67.7	$21.2	$46.3
2018	24,522	$69.6	$24.0	$45.6

Smokejumper Program

The Smokejumper Program has seven Forest Service bases in four Regions (Region 1, Region 4, Region 5, and Region 6). In 2018, contract and agency-owned smokejumper aircraft flew 1,758 total flight hours, or 6 percent of the total fixed-wing flight hours, with 1,446 hours in the smokejumper mission.

Table 11 – CY 2018 Smokejumper Program

Smokejumper Base	Region	Aircraft	# of Smokejumpers	Fires	Fires Jumped
Grangeville	R1	(1) DHC-6 Twin Otter/Leading Edge	27	15	114
Missoula	R1	(1) Sherpa A Model/USFS (1) DHC-6 Twin Otter/Leading Edge (1) CASA 212/Bighorn CWN	77	53	194
West Yellowstone	R1	(1) Dornier 228/Bighorn	23	13	76
McCall	R4	(2) DHC-6 Twin Otter/USFS (1) DHC-6 Twin Otter/Leading Edge	56	46	255
Redding	R5	(1) Sherpa A Model/USFS (1) Dornier 228/Bighorn (1) CASA 212/Bighorn CWN	35	17	106
North Cascades	R6	(1) CASA 212/Bighorn	27	29	149
Redmond	R6	(2) Sherpa A Model/USFS	53	38	172
7 Bases	**4 Regions**	**14 Aircraft**	**298**	**211**	**1,066**

Helicopters

In 2018, the Forest Service utilized more than 249 contracted helicopters on fire and natural resource management missions, including two for night air operations in southern California.

The agency awarded 115 Exclusive-Use contracts and 310 line items on Call When Needed contracts as depicted in the table below. The values in this table represent the number of contract items awarded. The actual number of aircraft inspected and operated will differ as some helicopters are awarded line items on both EXU and CWN contracts, the companies may substitute aircraft (aka swap equipment), or a CWN aircraft may not be available for a resource order. In 2018, there were numerous CWN aircraft awarded and activated on contracts issued by states making them unavailable for Forest Service resource orders.

Overall, helicopters flew 40,589 hours in 2018 and with relatively even distribution across Type 1, Type 2, and Type 3 helicopters. Type 1 helicopters accounted for 39 percent of the total hours, 27 percent for Type 2, and 34 percent for Type 3.

Table 12 – Contract Helicopters by Type

Program	Number of EXU	Number of CWN[4]	Total Number of Contract Aircraft by Type
Type 1 (Helicopters)	28	34	62
Type 2 (Helicopters)	32	22	54
Type 3 (Helicopters)	53	254[5]	307
Type 2 Std. (Night Flying)	2[6]	0	2
Total Helicopters	**115**	**310**	**425**

[4] These totals represent the number of aircraft awarded a line item on the CWN contract and is not representative of the number of aircraft that had orders for operational missions. Some of the T3 helicopters are double-counted since they are awarded both an EXU and CWN contract.

[5] This number represents the total number of aircraft awarded a line item. Ninety-five T3 CWN helicopters operated for the FS in 2018.

[6] In 2018, the program began contracting for two helicopters for day and night coverage.

Table 13 – Exclusive Use Helicopters by Region

Region	Type 1 LFS	Percentage	Type 2 IA	Percentage	Type 3[7]
Region 1	4	14%	3	9%	3[8]
Region 2	2	7%	1	3%	2
Region 3	2	7%	1	3%	8
Region 4	5	18%	6	18%	10[9]
Region 5	11	39%	17[10]	50%	3
Region 6	4	14%	6	18%	2[11]
Region 8	0	0%	0	0%	19[12]
Region 9	0	0%	0	0%	4
Region 10	0	0%	0	0%	0

[7] Eight Type 3 helicopters share contracts between regions. A helicopter is counted in the Region where the aircraft initially starts its MAP. The percentage by Region for Type 3 helicopters is not provided since the shared contracts skew the data.
[8] Region 1 has shared contracts on five helicopters.
[9] Region 4 has one shared contract.
[10] Includes the two night flying helicopters.
[11] Region 6 has two shared contracts
[12] Includes Exclusive Use contracted helicopters for prescribed fires.

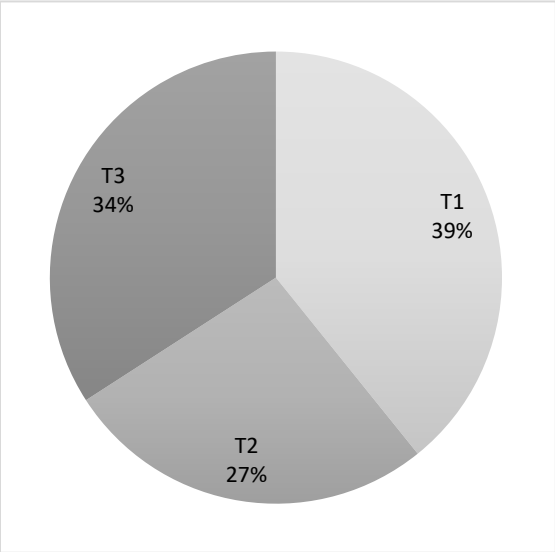
Table 14 – CY 2018 Contracted and Forest Service Owned Helicopter Use

Helicopter Type	Flight Hours	Gallons of Water Enhancers (i.e. Gel and Foam)	Gallons of Water	Gallons of Retardant
Exclusive Use Helicopters				
Type 1	10,340	74,514	70,684,486	1,868,594
Type 2	8,423	27,724	10,786,442	87,794
Type 3	10,235	3,960	3,166,616	2,628
EXU Subtotal	**28,998**	**106,198**	**84,637,544**	**1,959,016**
Call When Needed Helicopters				
Type 1	5,574	735,481	30,458,653	1,086,676
Type 2	1,775	46,175	2,807,443	13,068
Type 3	3,545	3,018	583,039	
CWN Subtotal	**10,894**	**784,674**	**33,849,135**	**1,099,744**
Agency Owned Helicopters				
Type 2 (Firewatch[13])	629			
Type 3 (N106Z)[14]	69			
Agency Owned Subtotal	**698**			
Total Helicopter Use	**40,589**	**890,872**	**118,486,680**	**3,058,760**

[13] The agency-owned Firewatch helicopters have infrared equipment used to find hotspots. These aircraft do not fill the role of the usual type designation.

[14] N106Z does not meet the current Type 3 specifications as defined in the Interagency Helicopter Operations Guide (IHOG).

Figure 7 and Figure 8 – Percentage of Helicopter Flight Hours by Type and Contract Type



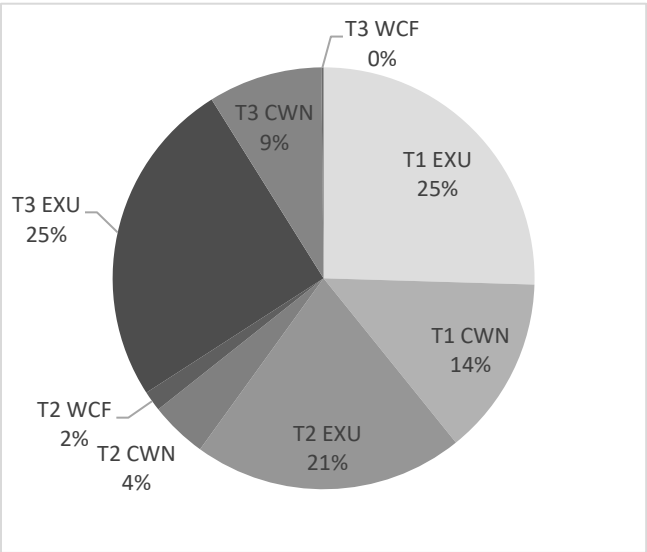


Table 15 – Contract Helicopter Availability and Flight Costs in $ millions (CY 2014-2018)

Calendar Year	Flight Hours	Total	Availability	Flight and Miscellaneous
2014	28,440	$227.3	$137.8	$89.4
2015	32,946	$264.7	$162.7	$102.1
2016	34,371	$382.0	$173.6	$208.4
2017	43,981	$344.7	$200.2	$144.5
2018	39,892	$339.0	$198.0	$141.0

Table 16 – Contract Type 1 Helicopter Availability and Flight Costs in $millions (CY 2014-2018)

Calendar Year	Flight Hours	Total	Availability	Flight and Miscellaneous
2014	8,623	$128.2	$78.9	$49.3
2015	10,698	$164.0	$101.1	$62.9
2016	13,168	$178.2	$107.5	$70.6
2017	15,981	$217.7	$126.7	$90.9
2018	15,914	$225.6	$131.9	$93.8

Table 17 – Contract Type 2 Helicopter Availability and Flight Costs in $millions (CY2014-2018)

Calendar Year	Flight Hours	Total	Availability	Flight and Miscellaneous
2014	8,060	$49.9	$31.5	$18.5
2015	9,913	$59.9	$38.1	$12.9
2016	10,061	$165.6	$44.5	$121.1
2017	13,429	$77.4	$46.0	$31.3
2018	10,198	$64.8	$39.5	$25.3

Table 18 – Contract Type 3 Helicopter Availability and Costs in $millions (CY2014-2018)

Calendar Year	Flight Hours	Total	Availability	Flight and Miscellaneous
2014	11,198	$48.9	$27.5	$21.4
2015	11,749	$40.6	$23.5	$17.1
2016	11,142	$38.2	$21.5	$16.7
2017	14,572	$49.2	$27.0	$22.2
2018	13,780	$48.5	$26.7	$21.9

Rappel Program

The Rappel Program for the Forest Service has fifteen aircraft across twelve bases in four Forest Service Regions. These aircraft flew 3,593 flight hours in 2018.

Table 19 – CY 2018 Rappel Program

Base	Region	Aircraft	Rappellers	Fires (Rappel)	Fires (Helitack)	Large Fires Supported	Flight Time
Gallatin	R1	33HX	15	2	14	29	209.9
Libby	R1	37HX	16	13	10	16	155
Lucky Peak	R4	316LH	16	0	9	11	269
Salmon 1	R4	933CH	21	6	19	9	172.7
Salmon 2	R4	205LM	22	4	8	15	303
Price Valley 1	R4	669H	15	2	5	8	315
Price Valley 2	R4	679H	15	1	12	11	262.4
Scott Valley	R5	502HQ	16	6	21	8	254
Trimmer	R5	C-FHQB	17	2	6	6	421
La Grande 1	R6	223HT	18	10	9	19	218.4
La Grande 2	R6	404HA	18	9	11	9	193.4
Wenatchee	R6	205RH	23	9	11	7	178.2
John Day	R6	689H	24	12	10	17	264.4
Siskiyou	R6	28HX	19	22	6	13	180.1
Central OR	R6	205DY	16	10	38	11	196.1
Total: 12 Bases	**4 Regions**	**15 Aircraft**	**271**	**108**	**189**	**189**	**3,592.6**

Airtankers

In 2018, the Forest Service had twenty-six Airtankers across a combination of Exclusive Use and Call When Needed contracts as well as agency-owned available for use with only twenty-five Airtankers operational for fire suppression missions. This includes two agency-owned Large Airtankers with one available for fire missions and the other used only for training, one single engine Airtanker (SEAT) on a Regional exclusive use contract, three Very Large Airtankers (VLAT), and twenty Large Airtankers (LAT). The agency also received additional Airtanker support from State and Canadian cooperators as well as support from activating the Modular Airborne Fire Fighting System (MAFFS) with the Department of Defense.

Contract and Agency-Owned Airtankers accumulated 6,264 flights hours in 2018, or approximately 8 percent of the total flight hours. About 60 percent of Airtanker use in 2018 was in support of non-Forest Service fires with 39 percent of use by State and Local Cooperators and 21 percent by the Department of the Interior agencies. Contract Airtanker costs totaled $147.5 million with 64 percent paid to Availability and 38 percent Flight Time. Airtankers account for 24 percent of the total aviation contract costs in 2018.

Table 20 – Number of Airtankers Available by Type

Program	Agency Owned	Number of EXU	Number of CWN
Next Generation Airtankers		13	8
Single-Engine Airtankers (SEATs)		1	
MAFFS	2[15]		8
Cooperator Large Airtankers			Up to 8

[15] Only one of the agency's HC-130H aircraft was available and configured as MAFFS for fire missions. The second aircraft flew only training missions.

Table 21 – CY 2018 Airtanker Flight Hours and Gallons Delivered Summary

Airtanker Type	Flight Hours	Gallons of Retardant
Exclusive Use		
LAT	3,856	12,529,634
VLAT	678	5,178,692
SEAT	61	36,170
EXU Subtotal	**4,595**	**17,744,496**
Call When Needed		
LAT	1,196	4,194,568
VLAT	291	1,970,183
CWN Subtotal	**1,486**	**6,164,751**
Agency Owned		
LAT	182	446,730
Total Airtanker Use	**6,264**	**24,355,977**

Table 22 – CY 2018 LAT/VLAT Use by Aircraft Model on Exclusive Use Contracts (in millions for cost and gallons)

Aircraft Model	Flight Hours	Availability Cost	Retardant Gallons
BAE 146	1,479	$22.8	4.74
C-130	276	$4.2	1.14
DC-10	678	$10.1	5.18
MD-87	631	$9.8	2.26
RJ-85	1,451	$17.4	4.38
Totals	**4,516**	**$64.4**	**17.7**

Table 23 – CY 2014-2018 EXU and Forest Service Owned Large Airtanker Use[16]

Calendar Year	Flight Hours	Gallons of Retardant
2014	2,814	7,993,527
2015	2,960	8,505,338
2016	3,842	13,413,889
2017	6,156	25,711,954
2018	4,021	12,976,364

[16] Does not include Very Large Airtankers (VLAT), Modular Airborne Fire Fighting Systems (MAFFS) or Cooperator Airtankers.

Table 24 – CY 2014-2018 CWN LAT Use

Calendar Year	Flight Hours	Gallons of Retardant
2014	0	0
2015	890	3,129,859
2016	414	1,662,021
2017	395	1,658,126
2018	1,196	4,194,568

Table 25 – CY 2014-2018 EXU VLAT Use

Calendar Year	Flight Hours	Gallons of Retardant
2014	390	3,664,909
2015	243	2,206,558
2016	484	4,698,349
2017	673	6,670,145
2018	678	5,178,692

Table 26 – CY 2014-2018 CWN VLAT Use

Calendar Year	Flight Hours	Gallons of Retardant
2014	4	0
2015	273	2,517,189
2016	52	595,995
2017	199	1,991,424
2018	291	1,970,183

Table 27 – CY 2016-2018 Forest Service Owned HC-130H

Calendar Year	Flight Hours	Gallons of Retardant
2016	29.6[17]	0
2017	313[18]	768,344
2018	182[19]	446,730

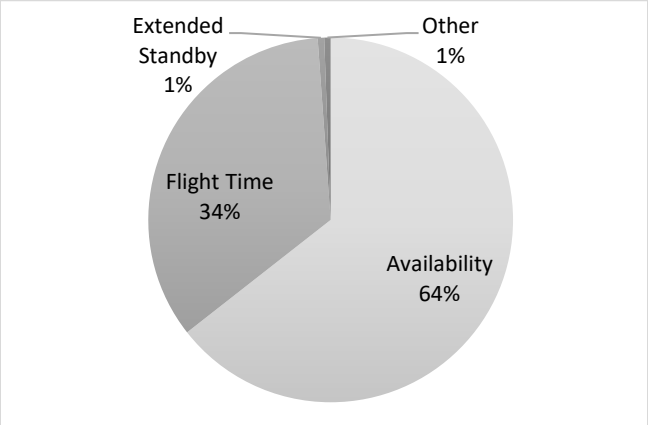
[17] Due to a late start date, the aircraft did not fly any fire missions. Flight hours represented are all training flights.
[18] The aircraft flew 233 hours of operational fire missions configured with a MAFFS. The remaining flight hours were ferry and training flights.
[19] The aircraft flew 152 hours of operational fire missions configured with a MAFFS. The remaining flight hours were ferry and training flights.

Table 28 – CY 2018 Airtanker Flight Hours by Agency/Fire Ownership[20]

Region/Agency	Flight Hours	Percent of Flight Hours
FS: Region 1	192.5	3.1%
FS: Region 2	247.3	3.9%
FS: Region 3	152.8	2.4%
FS: Region 4	819.4	13.1%
FS: Region 5	691.0	11.0%
FS: Region 6	343.1	5.5%
FS: Region 8	5.3	0.1%
FS: Region 9	12.0	0.2%
FS: Region 10	0.0	0.0%
FS: Washington Office	45.9	0.7%
FS Total	**2,509.3**	**40.1%**
BIA	247.7	4.0%
BLM	891.3	14.2%
FWS	14.8	0.2%
NPS	149.4	2.4%
DOI Total	**1,303.1**	**20.8%**
Non-Fed Fire (State)	**2,437.2**	**38.9%**
Non-Wildland Fed Fire (DoD)	**6.0**	**0.1%**
NICC	**8.6**	**0.1%**
Grand Total	**6,264.1**	**100%**

Table 29 and Figure 9 – CY2018 Contract Airtanker Cost by Pay Code (in $ millions)

Pay Code	Total
Availability	$95.0
Flight Time	$50.8
Extended Standby	$0.9
Other	$0.8
Total	$147.5



[20] Incident Finance Job Codes with ABS data were used to determine Region/Agency.

Table 30 – Contract Airtanker Availability and Flight Costs in $ millions (CY 2014 -2018)

Calendar Year	Flight Hours	Total	Availability	Flight and Miscellaneous
2014	2,814	$87.3	$58.2	$29.0
2015	2,960	$122.8	$85.9	$36.9
2016	6,277	$121.9	$82.2	$39.7
2017	6,437	$153.8	$97.3	$56.4
2018	6,082	$147.5	$95.0	$52.5

MAFFS

The Forest Service also utilizes military C-130 aircraft with a Modular Airborne Fire Fighting System (MAFFS) to support the Airtanker mission needs. The totals represented in the tables below are not included elsewhere in this report as the MAFFS do not report their flight hours into ABS for payment.

Table 31 – CY 2014-2018 MAFFS Activation on Fires

Calendar Year	Flight Hours	Gallons of Retardant	Total Cost
2014	111	244,406	$2,027,934
2015	424	980,246	$4,916,994
2016	144	411,774	$2,416,374
2017	95	Unknown	$4,031,517
2018	Unknown	Unknown	$2,034,281
5-Year Average			**$3,085,420**

Table 32 – CY 2014-2018 MAFFS Total Use including Certification and Activation on Fires

Calendar Year	Flight Hours	Total Cost
2014	262	$4,093,668
2015	454	$6,740,844
2016	216	$5,661,562
2017	252	$6,373,360
2018	Unknown	$3,971,495
5-Year Average		**$5,368,186**

Table 33 – MAFFS Costs in $ millions (CY 2014 – 2018)

Calendar Year	Certification	Fire Activation	Total Cost
2014	$2.1	$2.0	$4.1
2015	$1.8	$4.9	$6.7
2016	$3.2	$2.4	$5.7
2017	$2.3	$4.0	$6.4
2018	$1.9	$2.0	$3.9

Water Scoopers

The Forest Service contracted four Water Scoopers on a Call When Needed contract. The Scoopers flew 1,609 hours, about 2 percent of the total flight hours in 2018.

Table 34 – CY 2018 Scooper Flight Hours and Gallons Delivered Summary

Scooper	Flight Hours	Gallons of Water
Call When Needed		
Scooper	1,609	8,795,257

Table 35 – Total Contract Scooper Costs in $millions (FY2014-2018)

Fiscal Year	Flight Hours	Total Cost	Availability	Flight and Miscellaneous
2014	276	$13.4	$10.9	$2.5
2015	576	$22.4	$17.0	$5.4
2016	1,168	$41.4	$25.8	$15.6
2017	1,676	$53.8	$30.5	$23.3
2018	1,609	$50.8	$27.8	$23.0

Agency-Owned Aircraft Summary

The Forest Service owned and operated twenty-three aircraft and bailed two HC-130H aircraft from the U.S. Coast Guard in 2018. The agency purchased two new Quest Kodiak 100, N125Z and N160Z. These light fixed-wing aircraft are mainly supporting natural resource missions such as Forest Health Protection.

Agency-owned aircraft accounted for 4,126 of the 76,230 flight hours in 2018 or roughly 5 percent.

Table 36 – CY 2018 Agency-Owned Aircraft Use

Aircraft Registration #	Aircraft Make	Aircraft Model	Flight Hours
N106FS	DE HAVILLAND	DHC-2 BEAVER	94.1
N106Z	BELL	206B-III	69.2
N107Z	BELL AH-1	AH-1 COBRA	267.9
N109Z	BELL	AH-1 COBRA	360.6
N111Z	CESSNA	206 STATIONAIR-6	127.0
N116Z[21]	Lockheed	HC-130H	10.4
N118Z[22]	Lockheed	HC-130H	172.0
N125Z	Quest	Kodiak 100	183.0
N141Z	DE HAVILLAND	TWIN OTTER DHC-6	271.0
N142Z	SHORT	SD3-60 Sherpa	16.4
N143Z	DEHAVILLAND	TWIN OTTER DHC-6	6.4
N144Z	CESSNA	CITATION I 500	301.0
N149Z	BEECH	KING AIR 200	609.1
N160Z	Quest	Kodiak 100	218.8
N166Z	CESSNA	206 STATIONAIR-6	291.3
N173Z	SHORT	C-23A	170.7
N175Z	SHORT	C-23A	131.7
N178Z	SHORT	C-23A	135.0
N179Z	SHORT	C-23A	189.8
N182Z	BEECH	KING AIR 200	60.0
N191Z	DE HAVILLAND	DHC-2 BEAVER	26.4
N192Z	DE HAVILLAND	DHC-2 BEAVER	217.3
N193Z	DE HAVILLAND	DHC-2 BEAVER	125.5
N4340Z	PIPER	SUPER CUB PA-18	6.0
N4704A	CESSNA	185 SKYWAGON	65.5
TOTAL AGENCY-OWNED FLIGHT HOURS			**4,126.2**

[21] Aircraft owned by the U.S. Coast Guard and bailed to the Forest Service.
[22] Aircraft owned by the U.S. Coast Guard and bailed to the Forest Service.

Aviation Use and Cost Summary and Comparison CY 2014 to 2018

Table 37 – CY 2014-2018 Total Flight Hours by Aircraft Type

Calendar Year	Fixed-Wing	Rotor-Wing	Airtanker	Scooper	Total Hours
2014	21,410	28,017	3,208	276	57,660
2015	25,339	32,957	4,369	576	68,137
2016	22,774	34,416	5,110	1,168	67,702
2017	30,382	44,375	6,750	1,676	83,184
2018	27,768	40,589	6,264	1,609	76,230
Five-Year Average	**25,535**	**36,071**	**5,140**	**1,061**	**70,583**

Table 38 – CY 2014-2018 Contract and Agency-Owned Aircraft Use Information

Calendar Year	Flight Hours	# of Passengers	Cargo Weight (LBS)
2014	57,660	82,807	23,914,465
2015	68,137	93,630	16,294,902
2016	67,702	75,422	10,711,562
2017	83,184	86,175	12,707,407
2018	76,230	79,926	16,308,212
Five-Year Average	**70,227**	**83,592**	**15,987,310**

Table 39 – CY 2014-2018 Total Retardant Use for all Aircraft Types

Fiscal Year	Gallons
2014	13,628,338
2015	17,829,660
2016	23,554,633[23]
2017	33,515,515
2018	27,282,194[24]
Five-Year Average	**23,162,068**

Table 40 – Total Contract Aviation Cost in $ millions (CY 2014 – 2018)[25]

Calendar Year	Total Aviation Costs	Availability Cost	Flight and Miscellaneous
2014	$376.3	$222.3	$154.0
2015	$468.6	$283.5	$185.1
2016	$490.9	$293.8	$197.1
2017	$619.9	$349.2	$270.7
2018	$607.0	$344.9	$262.1
Five-Year Average	**$512.5**	**$298.7**	**$213.8**

[23] ABS data was edited to remove an erroneous 30 million gallon drop.
[24] ABS data was edited to remove an erroneous 93 million gallon drop.
[25] Total contract cost is derived from ABS. Total availability cost includes non-availability.