

The PNWER Forestry Working Group Presents

FIGHTING FIRES: INNOVATIVE TECHNOLOGY FOR WILDFIRE MANAGEMENT

THURSDAY, SEPTEMBER 17TH | 1PM-2PM PT

More info at www.pnwer.org/webinars



*Pacific NorthWest
Economic Region*

Fighting Fires: Innovative Technology for Wildfire Management

SPEAKERS

Moderated by:



Travis Joseph,
President/CEO,
American Forest
Resource Council,
PNWER Forestry Co-Chair



Robert Atwood,
CEO & Co-Founder,
Hummingbird Drones



Dan Snyder,
Sr. Vice President,
Neptune Aviation



Ann Walker,
Principal Consultant,
Ann Walker Consulting

Fighting Fires: Innovative Technology for Wildfire Management

AGENDA

Welcome & Introductions- Travis Joseph, American Forest Resource Council & Forestry Co-Chair

Presentations:

- *Detection- Robert Atwood, Hummingbird Drones*
- *Suppression- Dan Snyder, Neptune Aviation*
- *Policy/Information/Education- Ann Walker, Ann Walker Consulting*

Q & A- Moderated by Travis Joseph

Fighting Fires: Innovative Technology for Wildfire Management

HUMMINGBIRD DRONES



Robert Atwood
CEO & Co-Founder

Fighting Fires: Innovative Technology for Wildfire Management

NEPTUNE AVIATION



Dan Snyder
Sr. Vice President



September 2020

NEPTUNE

AVIATION SERVICES

Neptune's Core Values:

Embracing Family Firm Handshake Resilient Spirit



Neptune Aviation

- 27 years of aerial firefighting experience operating Large Air Tankers (LAT).
 - 51,775 flight hours
 - 62,654 successful fire support missions
 - 138,126,635 gallons of retardant delivered
- Contracts with federal and state agencies along with several international organizations supporting wildfire suppression efforts, including: US Forest Service, State of Minnesota, Cal Fire, State of Montana, Bureau of Land Management (BLM), Providence of Alberta and, Chile
- Operating from Alaska to Florida and the Carolinas to California. Having supported fire suppression efforts in all the western US states, over half of the United States and South America.



Neptune Aviation

- Operate 9 BAe-146 Airtankers modified exclusively in-house using company maintenance and engineering personnel
- 130 Maintenance Personnel
 - 900 years of airtanker experience
 - 2100 years of aviation maintenance experience
- 35 Flight Personnel
 - Train to high standards (averages 4 years to become a captain)
 - 35,000 hrs airtanker firefighting operations experience
 - 211,000 hrs of combined aircraft flight time
- Hold multiple FAA operating certificates: FAR 135, 137, and 145



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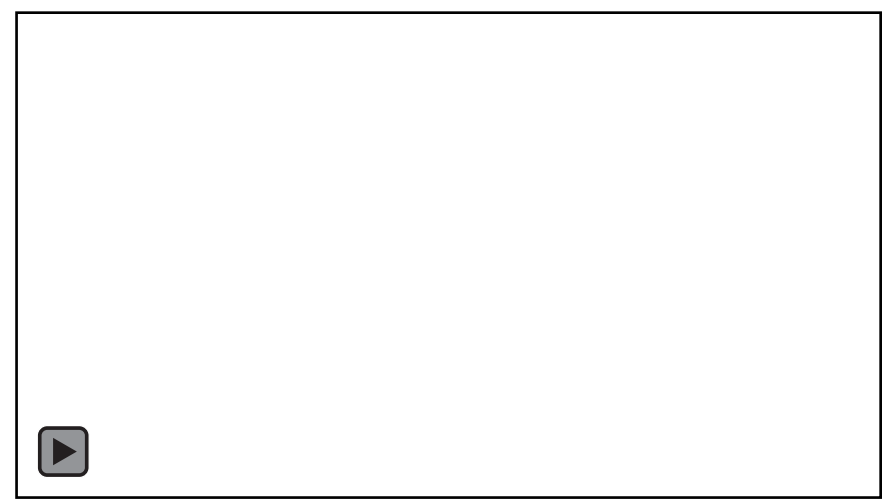
Neptune Aviation

- BAe-146-200A Airtanker
 - Original Equipment Manufacturer (OEM) Support
 - Compatible with current firefighting infrastructure
 - Rapid response times, 12 mins from “cold” aircraft to airborne
 - Standard Airworthiness Certification
 - Robust design, reliable systems and airframe
 - Excellent slow speed characteristics
 - Self-contained systems, no ground support required
 - Able to operate in all terrain types, excellent maneuverability
 - Able to carry the mission load of at least 32,000 lbs



The Tanking System

- First of its Kind Tanking System
 - FAA Approved STC
 - Retains the aircraft's original certification basis (Standard Transport)
 - U.S. Interagency Airtanker Board Approved
 - Internal 3080 U.S. gallon capacity (11,660 litres)
 - Gravity Active Flow control system
 - Completely new gating system with the ability to “start and stop”
 - Able to deliver foam, retardant and water
 - Effective in all terrain types
 - Consistent drops patterns in all environments



Asset Utilization

Main uses for Large Air tankers

- Initial Attack (IA)
 - Most effective use of LAT aircraft
 - Most cost effective
- Extended Attack
 - Line building
 - Support Incident Commands objectives
- Direct Attack
 - Flame suppression efforts
 - Structure and personnel protection



Cost Benefit

Credit: Joel Lane

La Brea Fire (1 of 2)

The La Brea fire is an example of a wildland fire incident where due to lack of committed aviation-based resources, a small fire expands to a multiday event



- **Name:** La Brea Fire
- **Cause:** Human-caused incident
- **Location:** Los Padres National Forest in Southern California
- **Start Date:** August 8th, 2009
- **Initial Response:** 1st alarm with 8 additional air tankers ordered. Only 2 air tankers were received in the 1st hour

“ ...Fires are easier and less expensive to suppress when they are small... ”
- Redbook 2019

Cost Benefit

Credit: Joel Lane

La Brea Fire (2 of 2)

The La Brea fire is an example of a wildland fire incident where due to lack of committed aviation-based resources, a small fire expands to a multiday event



- Within 90 minutes, the La Brea fire grew to a 500-acre incident
- **Total duration:** 44 days
- **Assigned firefighters:** 2,152
- **Total Size:** 89,489 Acres
- **Retardant Cost:** \$4,800,000
- **Total Cost:** \$34,888,910

Fire growth and fire suppression costs have a common trait in that they both grow exponentially over time

Cost Benefit

Credit: Joel Lane

The Unknown Fire

When initial response has the necessary aviation-based resources, fires that have the potential to scale can be swiftly resolved, minimizing costs and danger to life and property



- Airtankers can quickly contain a fire utilizing one payload that can be divided into multiple drops
- **Name:** N/A
- **Start Date:**
- **Total Size:** 3 Acres
- **Initial Response:** 1st alarm brush with 2 air tankers ordered and received
- **Retardant Cost:** ~\$3,000
- **Total Cost:** ~\$18,000

It's impossible to spend too much on fire suppression costs on day 1 if you spend \$0 on day 2

Cost Benefit

Credit: Joel Lane

Costs of Large Fires in the U.S.

Large Fires are responsible for most fire suppression costs, despite representing only 1.5% of the total count of all wildfires that occur*

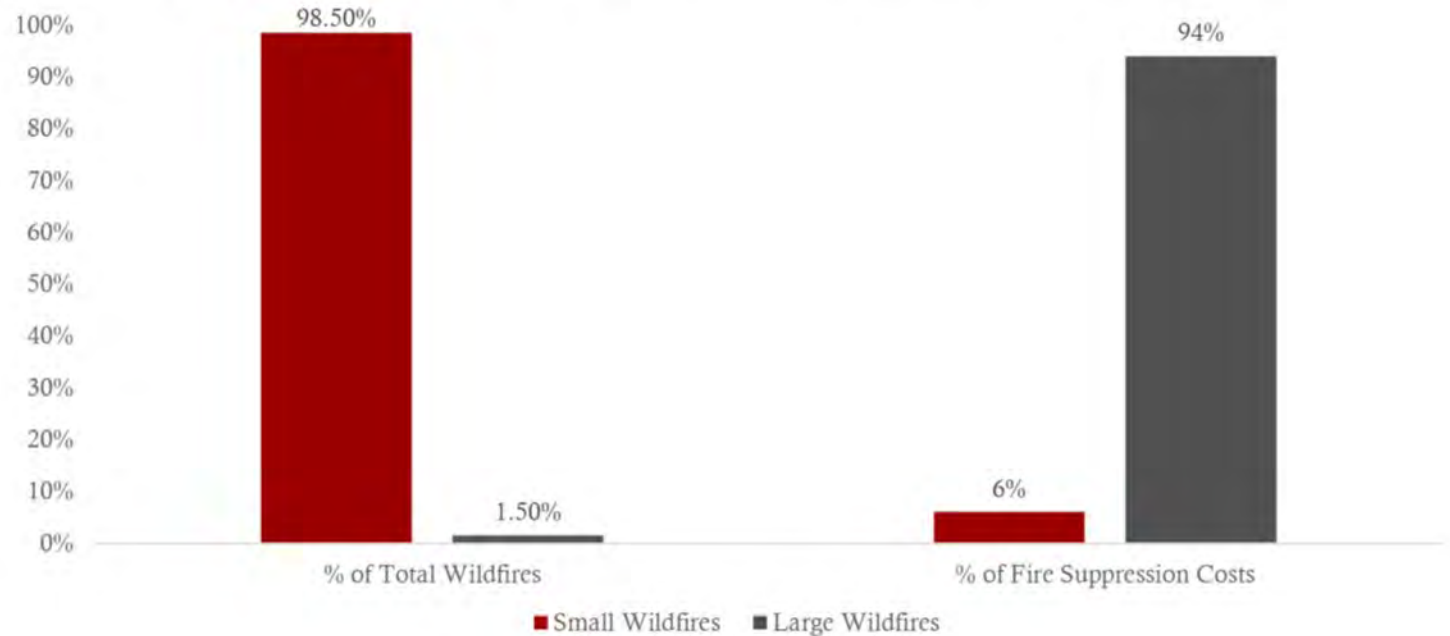
Although large fires represent only ~1.5% of US Wildland Fires...



... they were responsible for 94% of Fire Suppression costs from 1980 – 2002

Comparison of large fires to total fire count and expenditures (1980 – 2002)

Percentage of total fires and percentage of total costs



Cost Benefit

Credit: Joel Lane

Wildland Fire Cost Categories

Total costs associated with a wildfire incident can be categorized into Direct, Indirect, Rehabilitation, and Special Costs. Often only Direct Costs are taken into consideration

Direct Costs

- Aviation
- Engines
- Crews
- Overhead
- Private Property Loss
- Utility
- Recreational Facilities
- Timber
- Aid to Public

Indirect Costs

- Real Estate
- County Tax Revenue
- Business Revenue
- Property Losses

Rehabilitation Costs

- Burned Area Emergency Rehabilitation
- Post Fire Flooding
- Watershed Damage
- Invasive Species

Special Costs

- Human Life
- Health Problems
- Long Term
- Short Term
- Young /Old
- Ecosystem
- Intrinsic Costs
- Aesthetics
- Scenery
- Wildlife

Case Studies Summary

Suppression and other direct costs account for only a fraction of the total cost of large fires. Total costs must be considered when analyzing the cost-value of suppression resources

Incident	Suppression	Other Direct	Rehab.	Indirect	Special	Total	Suppression / Total
Canyon Ferry	\$9.5m	\$0.4m	\$8.1m	\$55.3m	-	\$18.1m	53%
Cerro Grande	\$33.5m	\$864.5m	\$72.4m	-	-	\$970.4	3%
Hayman	\$42.3m	\$93.3m	\$39.9m	\$2.7m	\$29.5m	\$207.7m	20%
Missionary Ridge	\$37.7m	\$52.6m	\$8.6m	\$50.5m	\$3.4m	\$152.8m	25%
Rodeo-Chediski	\$46.5m	\$122.5m	\$139.0m	\$0.4m	-	\$308.4m	15%
Old, Grand Prix, Padua	\$61.3m	-	\$534.6m	\$681.0m	-	\$1.3b	5%
Total	\$230.9m	\$1.1B	\$802.6m	\$734.7m	\$32.9m	\$2.9b	5 – 53%

We will use 2 examples of a Suppression / Total Cost ratio (5% and 53%) in an illustrative example of the potential cost savings evaluation for aviation-based fire suppression resources

Technology in Aerial Firefighting

New and Emerging Tech

- Night operations
- Low visibility operations
- Real-time data gathering and sharing
- Thermal Imaging
- More accurate delivery of retardant and water
- Rapid delivery and high response to resource request

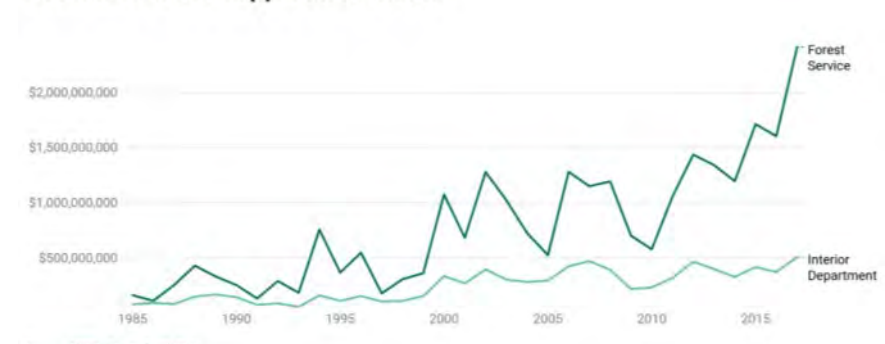


Challenges for Aerial Firefighting

- Governmental pressures on firefighting agency's budgets yet fire needs continue to increase each year.
 - Almost every year the USFS alone exceeds its annual firefighting budget. In 2016 the agency's firefighting expenses broke \$2.0 billion for the first time.
- Contracting issues continue to create uncertainty
- Growing year round demand for aerial firefighting support
- Continued vigilance in safety and operational readiness as new aircraft and operators enter into operation.



Federal Wildfire Suppression Costs






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ANN WALKER CONSULTING



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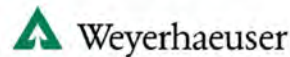


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