Aerial Wildland Firefighting Resources in Fire Suppression Activities: an example USDA Forest Service

Armando González-Cabán, Ph.D
USDA Forest Service
Pacific Southwest Research Station
4955 Canyon Crest Drive, Riverside, California 92507
Ph: 951.680.1525; Fax: 951.680.1501
E-mail: agonzalezcaban@fs.fed.us
Aerial Wildland Firefighting Resources

Wildfires are a significant social problem affecting millions of people worldwide and causing major economic impacts at all levels. Global estimates of the area affected by wildfires range anywhere from 3 to 6 million square kilometers annually.
Aerial Wildland Firefighting Resources

• Significant events in wildfire management
  – In the USA
    • Western fires of 1910
    • Fire exclusion policies
    • Change in fire exclusion policies
    • Advent of aerial firefighting
    • Wildland-urban interface (WUI)
    • Catastrophic fires of 1990s and of 2000s
Aerial Wildland Firefighting Resources

• Significant events in wildfire management
  – Other parts of the world
    • Large fires
      – 1998 in Mexico
      – 2003 in Portugal
      – 2007 in Greece
      – 2009 Australia
      – 2010 Russia
    • Wildland-Urban Interface (WUI)
    • Abandonment of rural areas
Aerial Wildland Firefighting Resources

- Wildland fire management programs in US
  - Five principal components
    - prevention
    - detection
    - presuppression
    - fuels management
    - suppression
Aerial Wildland Firefighting Resources

• Suppression firefighting resources
  – Ground forces
  – Mechanized forces
  – Aerial delivered crews
  – Aerial resources
Aerial Wildland Firefighting Resources

• Aerial resources
  – Fixed-wing
    • Transportation planes
    • Lead planes
    • Air tankers
  – Rotary-wing
    • Helicopters
Aerial Wildland Firefighting Resources

• Aerial resources
  – Fixed-wings
    • Airtankers
      fixed-wing aircraft fitted with tanks that can be filled on the ground at airtanker bases or, by skimming water from lakes, reservoirs, or large rivers as in the case of flying boats and amphibious aircraft
Aerial Wildland Firefighting Resources

• Aerial resources
  – Fixed-wing
    • Airtankers
      – First mission flown 1930
      – WWII surplus aircraft: first free-flowing water drop 1955
      – First retardants: sodium calcium borate 1956
      – Small capacity of aircraft
      – Multiengine surplus aircraft: first aircraft fully dedicated to aerial suppression 1960s
Aerial Wildland Firefighting Resources

• Aerial resources
  – Fixed-wing
    • Airtankers
      – Single Engine Air Tankers (SEAT): ≤ 3,024 liters
      – Medium aircraft: ≥ 4,536 and ≤ 27,126 liters
      – Heavy aircraft: ≥ 43,092 and ≤ 46,116 liters
      – Super heavy aircraft: ≥ 75,000 liters
Aerial Wildland Firefighting Resources

Airtankers

Air Tractor 802F

Martin Mars Bomber
Aerial Wildland Firefighting Resources

Canadair CL-415

PBY Catalina flying boat
Aerial Wildland Firefighting Resources

Evergreen Super Tanker
Aerial Wildland Firefighting Resources

- Aerial resources
  - Fixed-wing
    - Lead Planes
      Direct the activities of airtankers by both verbal target descriptions and by physically leading them on the drop run.
Aerial Wildland Firefighting Resources

- Lead Planes

0-2 Skymaster  V-10 Bronco
Aerial Wildland Firefighting Resources

Now decommissioned USDAFS’ Beachcraft Baron Lead Planes leading an Airtanker
Aerial Wildland Firefighting Resources

New USDAFS Beechcraft King Air 100

American Champion Scouts 8GCBC
Aerial Wildland Firefighting Resources

• Aerial resources
  – Rotary-wing
    • Helicopters
      May be fitted with tanks, called helitankers, or may carry buckets.
      May also be fitted with front-mounted foam cannon
      Most common bucket: the flexible bucket
      Bambi bucket in the US
Aerial Wildland Firefighting Resources

Bell 205

S-64 Erickson Air-Crane
Aerial Wildland Firefighting Resources

Helicopter dipping bucket into river
Aerial Wildland Firefighting Resources

- Fire retardants

  Designed to suppress and decrease the intensity of wildland fires, and to protect property when wild fires threaten.

  Decreases risks to firefighters, enabling them to construct fireline safely.
Aerial Wildland Firefighting Resources

- Fire retardants
  - Three types
    - Long-term
      - Applied using fixed or rotary-wing aircraft
      - 85% water, 10% fertilizer and 5% other minor ingredients
      - Found to be toxic
      - Court mandate to set new guidelines
Aerial Wildland Firefighting Resources

Fire retardant drop over a wildfire
Aerial Wildland Firefighting Resources

• Foams and Gels
  – Mostly applied from ground equipment
  – Foams are basically concentrated dish detergents
  – Gels are basically water enhancers
¡Muito Obrigado!