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# EC76-1739 Bug Bombers Battle Range Fires

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E.C. 76-1739

# Bug Bombers

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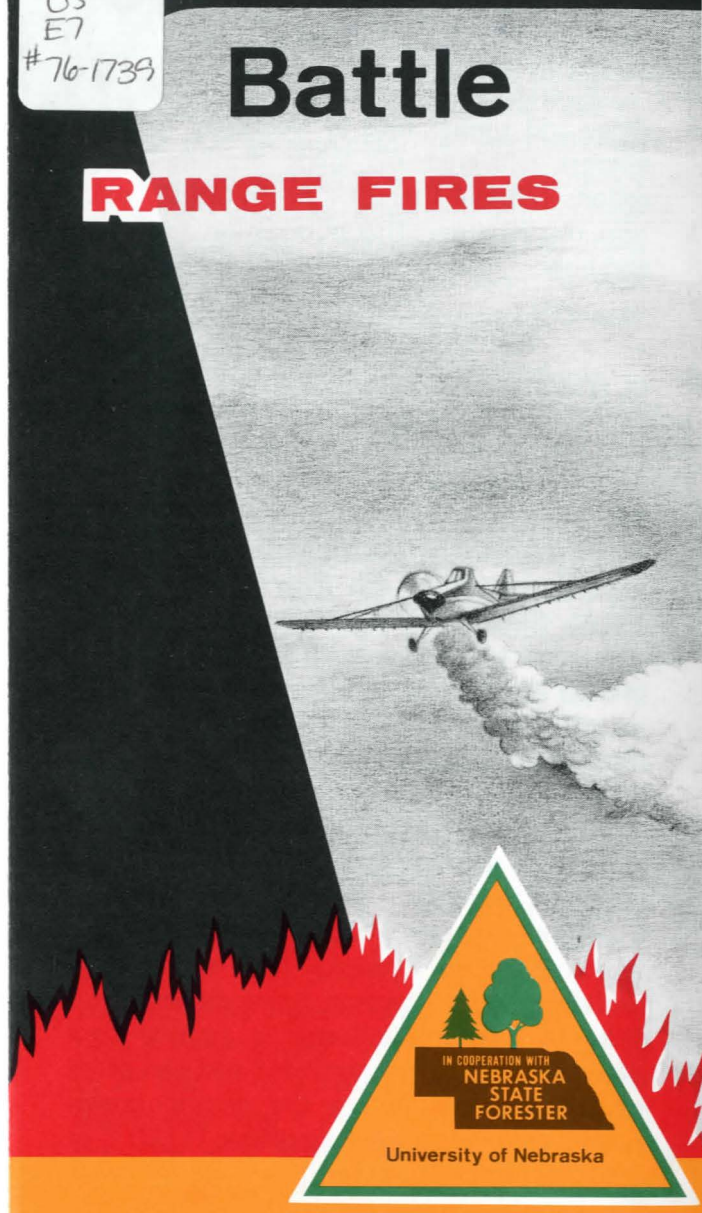
# Battle

## RANGE FIRES



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Leo E. Lucas, Director

# FIRE CONTROL FROM THE AIR

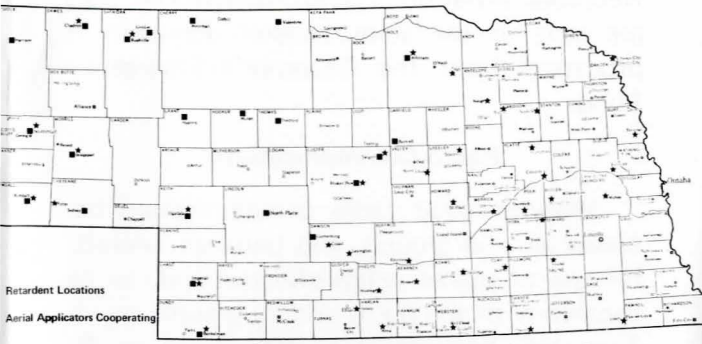
**Joseph E. Range, Extension Forester and Assistant State Forester (Fire Control)**

Aircraft used for crop spraying also fight range and timber fires in Nebraska. In 1975 aircraft delivered 47 loads, hauling 7,000 gallons (26,497 liters) of fire retardant solution on 10 fires. This publication tells why and how.

## Situation

Range fires greater than 1,000 acres (400 hectares) are common in Nebraska. Range fires in Nebraska often start in isolated areas where men and ground equipment have great distances to go. Because of weather conditions, primarily low humidities and high winds, range fires can have a high rate of spread. Some have been known to burn over five miles (8+ kilometers) in one hour. One burned 30 miles (48.3 kilometers) in 6 hours in 1972. There often are few natural barriers like green hills, roads or streams to slow or stop fire spread. When the water supply is limited to what is carried on the trucks, to refill fire trucks can take long travel and extended time.

Approximately 100 aerial applicators are scattered across Nebraska. One or more aircraft are within practical flying distance of a fire. The aerial applicator is another tool available to a fire department and can often get to the fire before the ground crews. Liquid ammonium polyphosphate (11-37-0 or 10-34-0) agricultural fertilizers are excellent fire retardants and suppressants and are readily available from fertilizer dealers across Nebraska. The fertilizer is mixed with water




to make a fire retardant solution. Spray planes can deliver from 70 to 400 gallons (265 to 1,514 liters) of solution on the fire per trip.

## Aircraft Benefits

1. Aircraft can apply retardant solution early. The fire can be slowed to buy time for ground crews and equipment.

2. Aerial applications can knock down hot spots to enable firemen to get closer to the fire and to make time on the fire line.

3. Aircraft can apply solution in front of or on the head of the fire without endangering firemen and equipment.

4. Aircraft can apply solution as a barrier from which to backfire or to hold the backfire while burning out.

5. Aerial applicators can apply a fire retardant barrier around high value areas such as hay yards or improvements in the path of the fire.

6. Aerial applicators can see and extinguish spot fires.

7. Aircraft can be used to see the whole fire and the fire chief can be advised about terrain, roads, water, and the fire's progress. An observer can help direct people and equipment into the fire. The plane used for reconnaissance and direction should be separ-

ate from the one used to deliver fire retardant.

### The Retardant

A fire retardant should:

1. Control the fire
2. Be long lasting
3. Minimize rekindling of the fire
4. Be easy to handle
5. Be non-corrosive
6. Not be harmful to plants or animals
7. Be economical
8. Fertilize

The fertilizers, 11-37-0 and 10-34-0, satisfactorily meet these requirements. Aircraft should be hosed down and tanks flushed after use. One pound (.45 kilogram) of sodium dicromate in 125 gallons (473 liters) of solution (0.1 weight percent) is recommended to prevent corrosion when using fire retardant liquid fertilizer. Neither 10-34-0 nor 11-37-0 are excessively corrosive to mild steel nor to aluminum alloys at temperatures of 80 degrees Fahrenheit (27 degrees Celcius) but at 120 degrees Fahrenheit (49 degrees Celcius) aluminum alloys would corrode excessively. Brass is satisfactorily resistent. Magnesium would corrode even with sodium dicromate inhibitor present.

### Operational Guidelines

1. Aerial applicators must be certified by Nebraska Department of Aeronautics.

2. We have placed 200 gallons (757 liters) of 11-37-0 or 10-34-0 at each of 20 airports near areas where large fires commonly occur. The state forester purchased the tanks and retardant concentrate.

3. The fire department should request the

dispatch of aircraft early on days of high fire danger. Aircraft can be most effective before a fire becomes large.

4. Fire chiefs are authorized to solicit aerial applicators for fire suppression. A local fire chief representative radios the local law enforcement officer, generally the sheriff, advising that an applicator has been solicited and requesting that the State Emergency Operating Center be informed. For application of more than 1,000 gallons (3,785 liters) of solution per fire, additional approval must be received from the State Emergency Operating Center.

5. The fire department should arrange to have water and men available for loading aircraft with retardant solution at the airport or temporary landing facilities near the fire.

6. Aircraft deliver to the fire a solution of fire retardant consisting of 11-37-0 or 10-34-0 liquid fertilizer and water. The solution is mixed four gallons (15.1 liters) water to one gallon (3.8 liters) liquid fertilizer. The fertilizer concentrate goes readily in solution in water.

7. Application: On or just ahead of the fire line, ½ gallon (1.9 liters) of solution is applied per 100 square feet (9.29 square meters). Twenty-five gallons (94.6 liters) of the liquid fertilizer into 100 gallons (378.5 liters) of water gives 125 gallons (473 liters) of solution. This should be applied in a strip 25 feet (7.62 meters) wide and 1,000 feet (304.8 meters) long. Flying at a height of 20 to 30 feet (6 to 9 meters) should give proper distribution and a 25 foot (7.6 meter) width using the quick dump method.

8. Cost of aircraft use is established in cooperation with the board of directors of the

Nebraska Aviation Trades Association. Bills are sent to the state forester. Payment is processed from the Governor's Emergency Fund.

## Radio Communications

Without good radio communication between air and ground, and between aircraft, the use of planes is less effective and can be dangerous to the pilots and to ground crews. The state forester is providing up to 50 percent of the cost for portable radios for use in aircraft. Approved applications are made by rural fire districts, which are cooperating members of a mutual aid district. The radio must have at least two approved frequencies and be equipped with aircraft type head sets.

## Coordination

The pilots participate in training programs with the fire department and the mutual aid district. Mutual aid districts agree on a system of identifying departments and vehicles by large numbers or letters painted on the tops of vehicles. The larger the lettering the easier for the pilot to identify.

Light and dark contrasting coloring is best.

It is important that the fire chief and a mutual aid district consider the aerial applicator as another member of the fire suppression team, and that the aircraft be used as another specialized piece of equipment like other equipment stationed within the district.

Aircraft are not expected to completely control a fire. Ground crews stop the fire, extinguish the fire, and mop up after the aircraft has slowed its progress.

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