Black Flies and the Critically Endangered Whooping Crane: Is There a Link?
Whooping Cranes - *Grus americana*

- CRITICALLY ENDANGERED SPECIES
- Formerly found from Canada to Mexico and from Utah to the Atlantic Coast
- As few as 16 in 1941-42, under 35 for the next two decades
- Today there are ~530 in 4 populations
  - Aransas-Wood Buffalo ~250
  - Captivity ~150
  - Eastern Migratory ~100
  - Florida Non-migratory ~30
Biological Facts

- Tallest, flying bird in North America at ~5 feet
- Wingspan of ~7-8 feet
- Weigh ~ 14-17 pounds
- Fossils date back several million years
- Omnivorous – mollusks, crustaceans, insects, minnows, frogs, snakes, acorns, grains, rodents
- Affected by habitat loss and conversion and unregulated harvest for food, sport and specimen collection
Whooping Crane Eastern Partnership – Est. 1999

• U.S. Fish and Wildlife Service
• International Crane Foundation
• International Whooping Crane Recovery Team
• US Geological Survey’s Patuxent Wildlife Research Center
• Operation Migration Inc.
• Natural Resources Foundation of WI
• Peter Adler – Clemson University
Eastern Migratory Whooping Crane Reintroduction Project: Survival Parameters

• First year survival acceptable
• Migration aided by ultra-light
• Human avoidance adequate
• Reproductive behavior progressing
• Nest desertion became an unanticipated threat to the success of reintroduction
Nest Desertion

- Nesting began in 2005
- No successful first nest attempts from 2005-2010 (0/43)
- Birds would demonstrate “vigilant nest attentiveness” until near or at the time of desertion
- Patterns of desertion were evident
Desertion Trends

- Urbanek *et al.* - 17 nests studied
- Nest failure not associated with stage of incubation
- Dates of desertion related to degree days above 0° C
- Desertions would occur in groups, no predators or obvious disturbances
- Seemed to occur on relatively warm, sunny days
Are Black Flies Involved?

- Desertion precipitated by "an environmental factor which is temperature related and affects numerous nesting pairs at about the same time"
- Black flies observed in large numbers on deserted nests and eggs and feeding on cranes
- Implicated in nest desertion w/other birds
**General Life Cycle of Black Flies** (see text for details)

**Eggs**
- (0.20-0.50 mm long)
- Laid in a mass of 200-500 eggs.
- Laid in or on with flowing water.
- Direct hatching occurs in 4-30 days.
- Eggs of some species may diapause.

**Adult**
- (5-15 mm long)
- Males and females emerge in late spring-early summer.
- Males and females feed on nectar and mate; males die.
- Females feed on blood and develop an egg mass.

**Pupa**
- (5-15 mm long)
- Pupal stage completed in 4-7 days.

**Larvae**
- (Last stage is 5-15 mm long)
- Develop in flowing water.
- 4-9 larval stages, usually 7.
- Larval period 1 month to 6 months.
Surveillance = Maps

Evaluated any possible waterway within 8 – 10 miles of nesting area

2009 – Sampled on Necedah Refuge

2010 – We sampled around refuge and around the Horicon National Wildlife Refuge, pilot larvicide application conducted

2011 – Suppression program initiated and evaluated
Initial Focus - *Simulium annulus*

- Found on eggs and birds
- Documented in literature having caused avian mortality
- Recorded feeding on loons and the common crane
- Implicated in loon nest abandonment in Wisconsin and Michigan
2011: Black fly suppression as a research parameter

- WCEP Goal: To evaluate the effect of eliminating 95% of the black flies on nest desertion
- Record snow pack in upper watershed
- Late spring melt, delayed in stages
- Flows ~ 4X more than in 2010
- Insufficient volume of larvicide, despite having 2X more than projected
Treatment Process

• Confirm sites for pest species
• Target closest, most productive sites
• Use maps, flow readings and experience to develop initial plan
• Conducted initial series of ground based treatments, followed by canoe based
• Evaluated mortality where we could and began locating additional access points
Treatment Parameters - 2011

- Water Temperatures: 1-2°C
- Flow Rates: 9.9-27.2 m³/sec
- Treatment Rates: 4-25 ppm
- Product: Vectobac® 12AS
- Species Present: Late instar *Simulium annulus* and early instar *S. johannseni*
## Yellow River, Babcock to Necedah, WI
### March 31- April 3, 2011

<table>
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<th>Miles Downstream</th>
<th># Alive</th>
<th># Dead</th>
<th>% Mortality</th>
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<tr>
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<td>100’s dead</td>
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<tr>
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</table>
2011 Results

• First time black fly suppression conducted to protect an endangered species
• Eliminated ~85% of pest species from ~32 miles of river
• Previous 6 years, 0 of 43
• 6 of 20 first nests were successful!