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


C-IACP

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

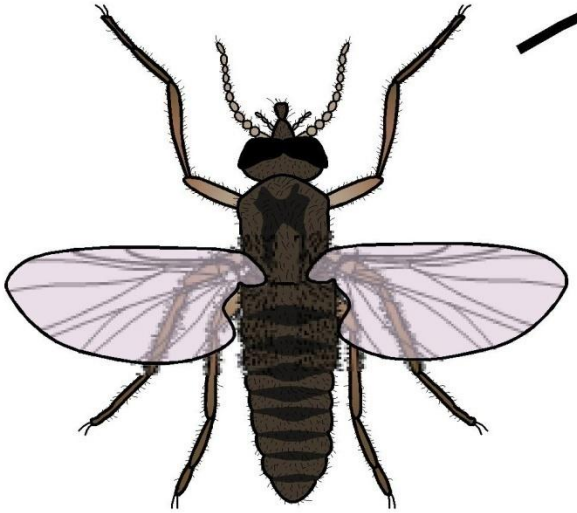
Desertion Trends

- 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

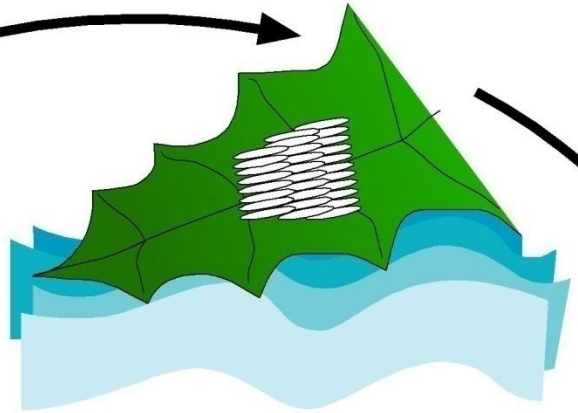
Are Black Flies Involved?

- 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

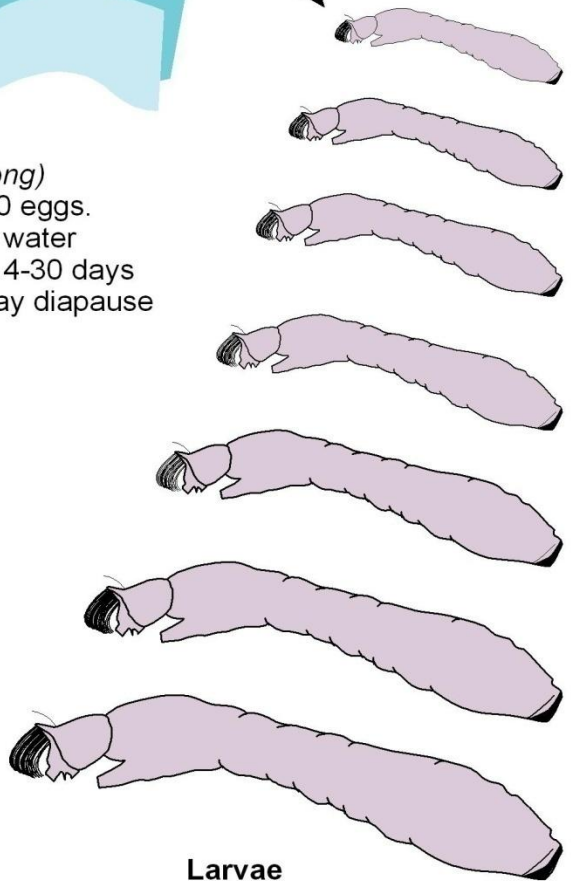
General Life Cycle of Black Flies
(see text for details)



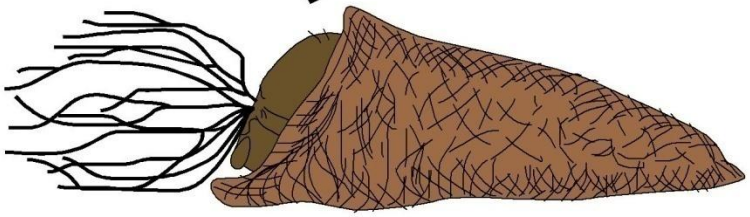
Adult
(5-15 mm long)
Males and females emerge in late spring-early summer
Males and females feed on nectar and mate; males die
Females feed on blood and develop an egg mass



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



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



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

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

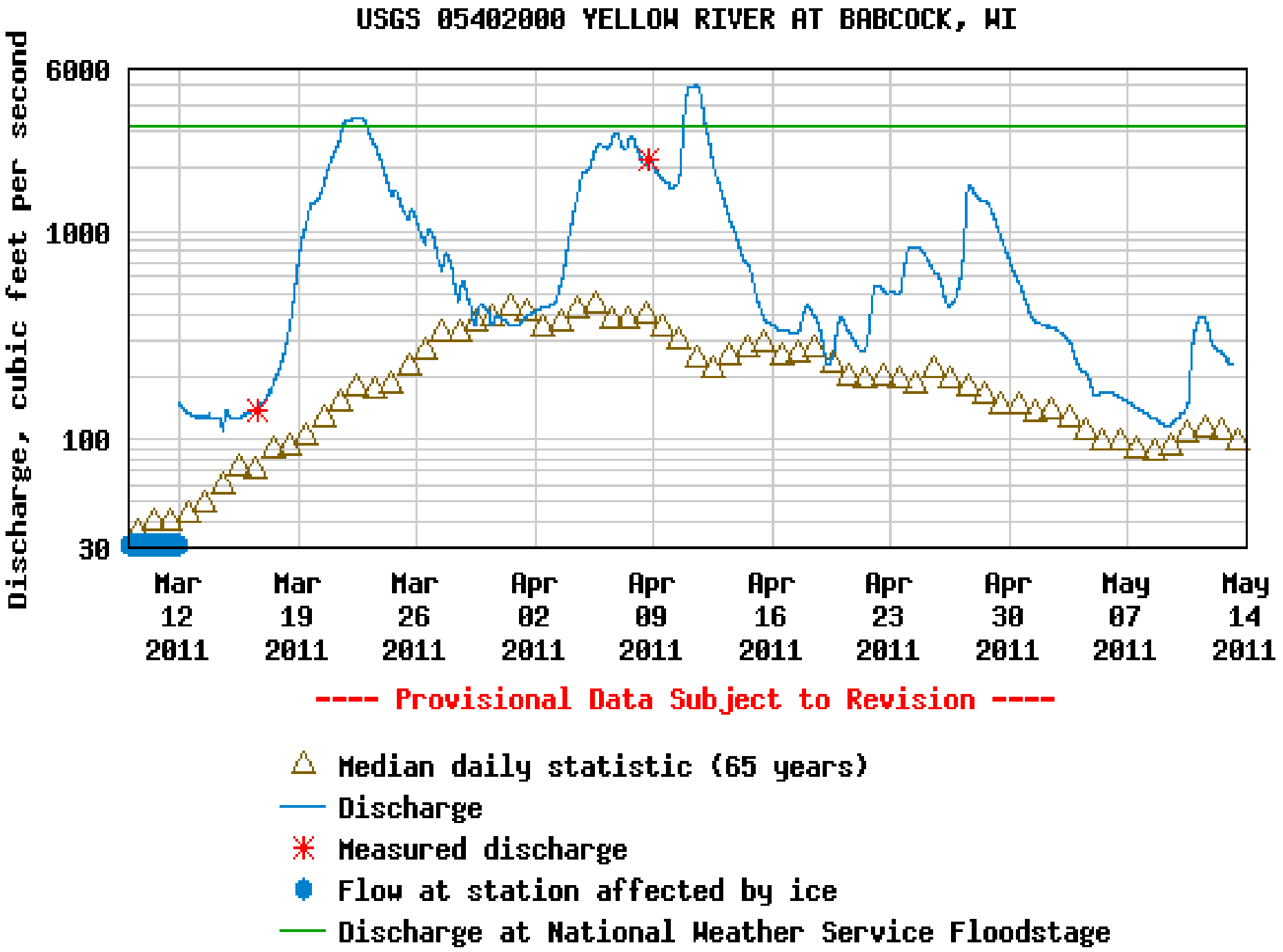
2011 – Suppression program initiated and evaluated

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


USGS 05402000 YELLOW RIVER AT BABCOCK, WI
Discharge, cubic feet per second
6000
1000
100
30
Mar 12 2011
Mar 19 2011
Mar 26 2011
Apr 02 2011
Apr 09 2011
Apr 16 2011
Apr 23 2011
Apr 30 2011
May 07 2011
May 14 2011
---- Provisional Data Subject to Revision ----
Median daily statistic (65 years)
Discharge
Measured discharge
Flow at station affected by ice
Discharge at National Weather Service Floodstage

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


CAMPER
Old Town

Treatment Parameters - 2011

- Water Temperatures: 1-2°C
- Flow Rates: 9.9-27.2 m^3/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

Miles Downstream	# Alive	# Dead	% Mortality
UTC	232	2	0.9
UTC	98	4	3.9
0.25	0	249	100.0
2.7	6	195	97.0
2.8	1	235	99.6
3.4	100's dead		99.0
4.9	67	321	66.0
5.3	60	371	46.0

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!**

International Crane Foundation
www.savingcranes.org