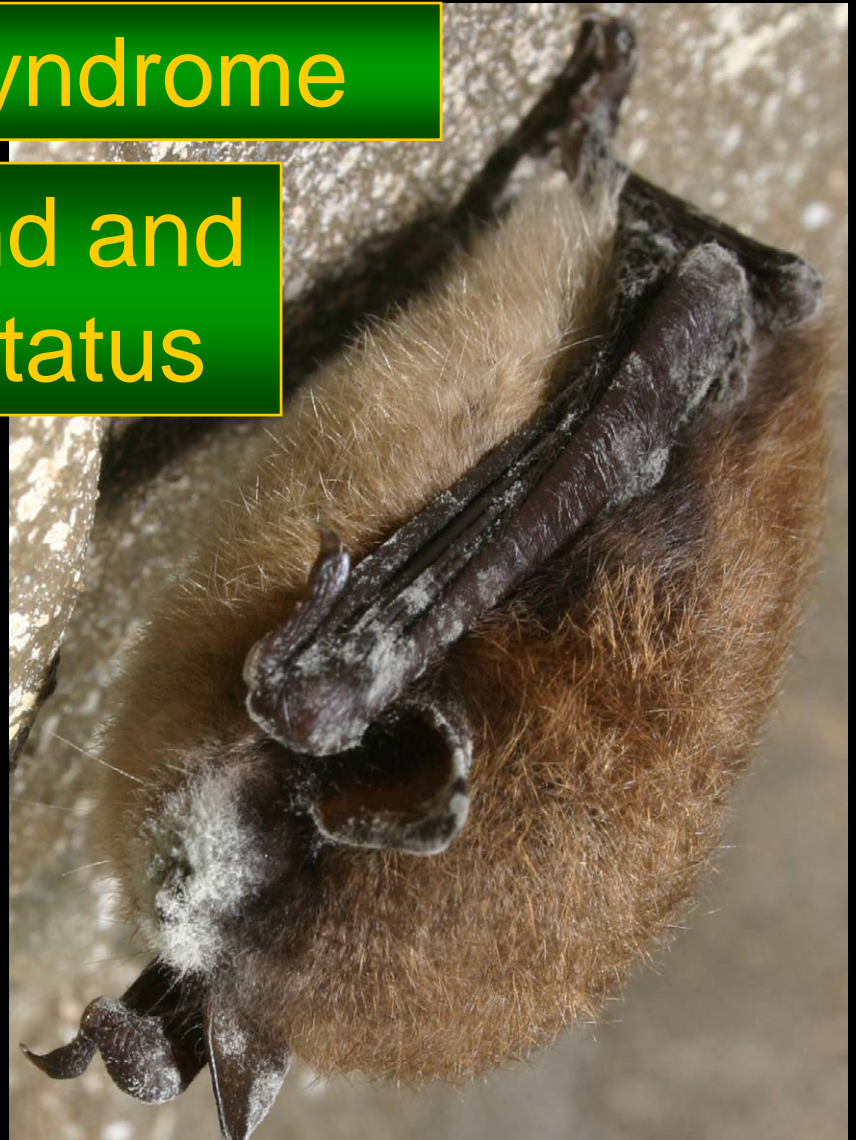


White Nose Syndrome

Background and Current Status



By Alan Hicks

New York State Department Of Environmental Conservation, Albany, NY 12233-4754

3/30/08 Update

What is White Nose Syndrome?



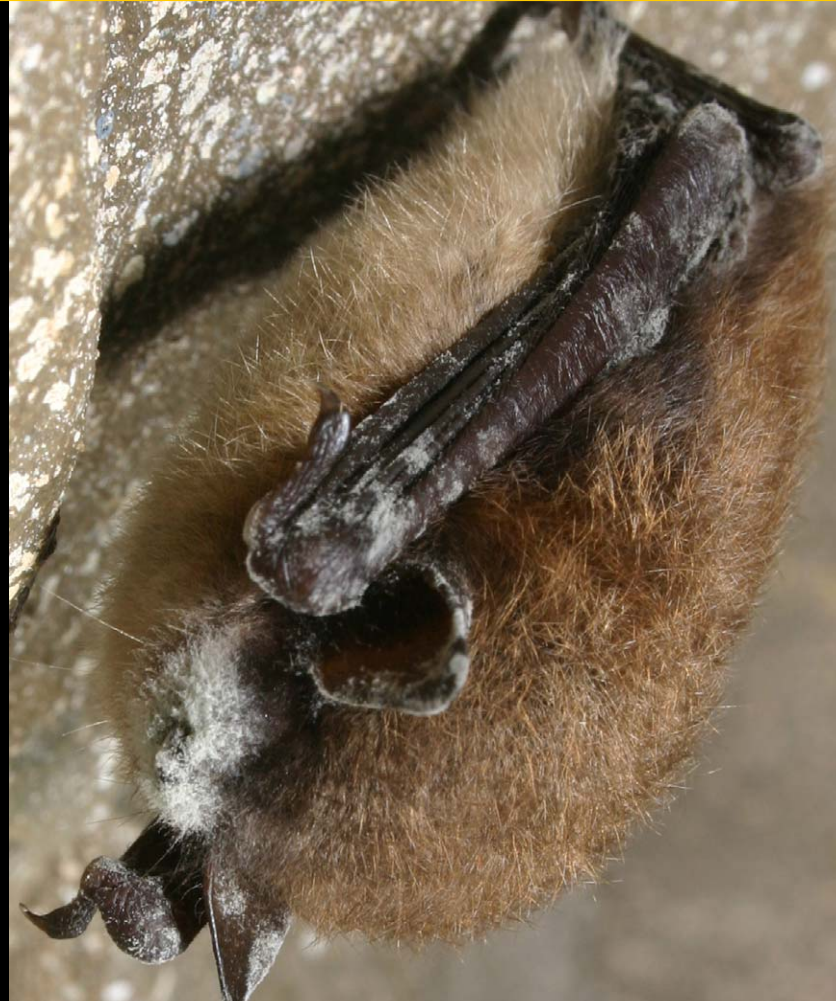
White Nose Syndrome or simply “White Nose” is a name we have given to an as yet unidentified agent or agents that is causing mass mortalities at a growing number of bat hibernacula in and around NY.

What is White Nose Syndrome?

- Symptoms:
 - Bats found in roosts in colder regions of the caves or mines and/or concentrated in unusually high numbers near the entrances, often within the zone of light penetration.
 - Bats near affected sites are also observed flying during daylight hours, and dying on the landscape, under a range of temperature conditions.

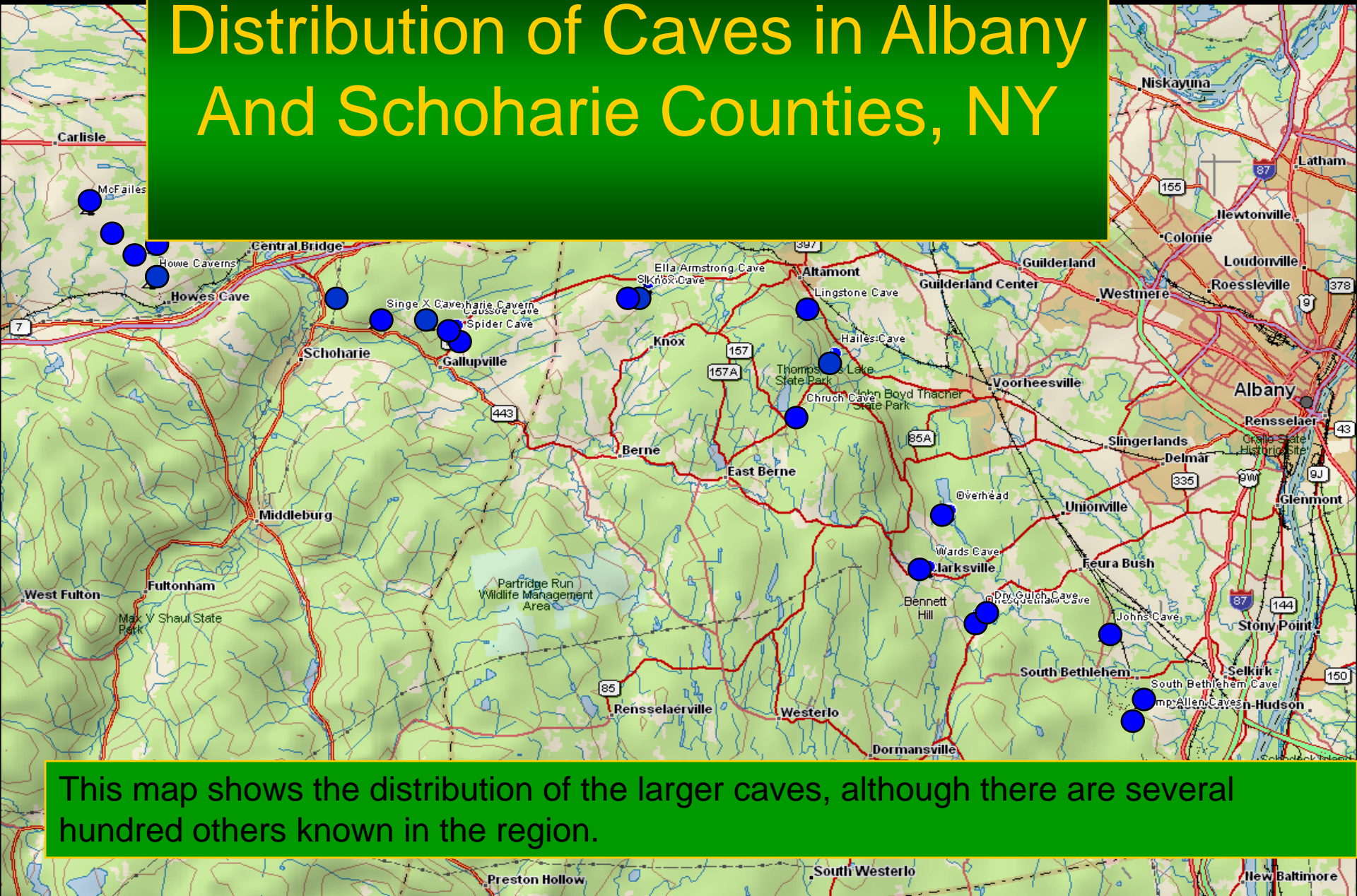


What is White Nose Syndrome?



The most obvious symptom of the problem is the presence of a white fungus around the nose of some, **but clearly not all** affected animals. The fungus can also be present on the wing or tail membrane.

Distribution of Caves in Albany And Schoharie Counties, NY



This map shows the distribution of the larger caves, although there are several hundred others known in the region.

It is important to remember that we are aware of only a portion of the caves occupied by bats, and thus, only an unknown percentage of our hibernating populations.



9-7-06

For example, this site was discovered by staff that repeatedly observed fall concentrations of animals at this location as they traveled home.

Entrance "B"

As many as 6 animals at a time
were seen on the ground



9-7-06

2006

2-16-06
First Observation
Howe Cave

White Nose
photographed. Up to
18 dead bats per trip
were observed.
(reported Feb. 08)

● Caves not searched
● Contaminated Caves 2006

2007

1-18-07
First Observation
Schoharie Caverns

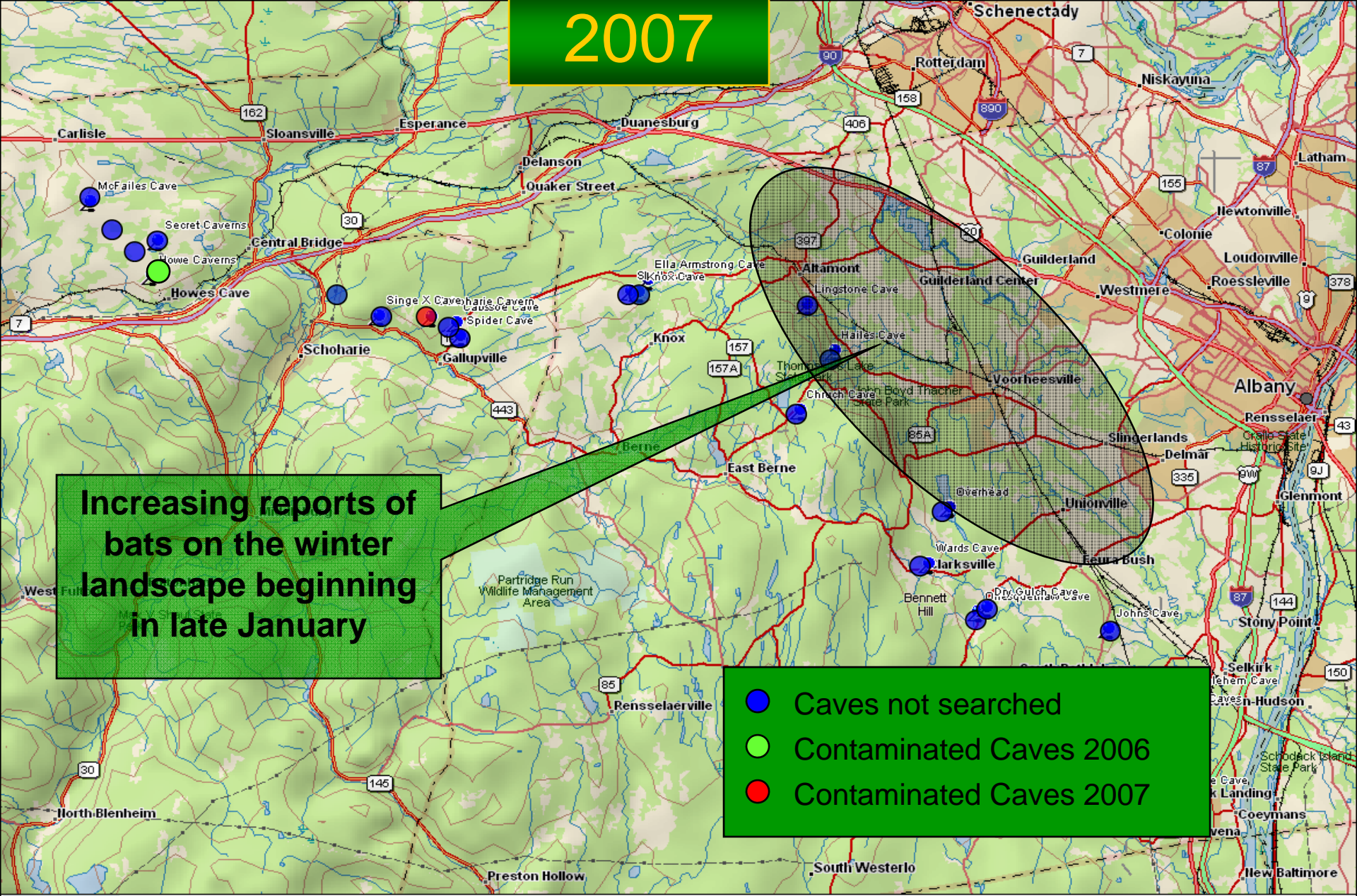
Many bats unusually
close to the entrance

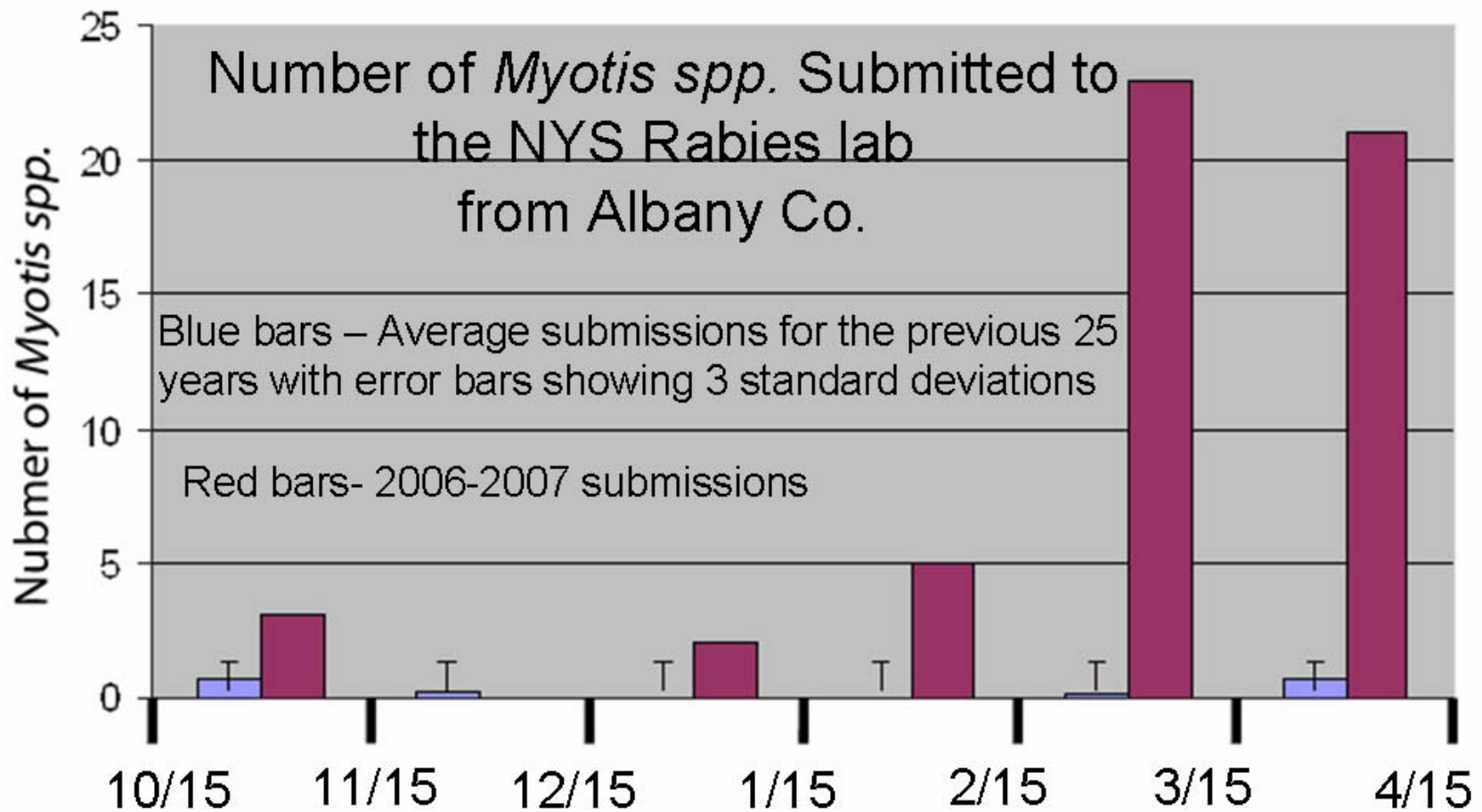
- Caves not searched
- Contaminated Caves 2006
- Contaminated Caves 2007

2007

Increasing reports of bats on the winter landscape beginning in late January

- Caves not searched
- Contaminated Caves 2006
- Contaminated Caves 2007





During 2007 there were a record number of winter submissions of *Myotis sp.* to the NYS rabies lab from the region described in the earlier slide.

2007

3/14/07
Standard winter
survey of Hailes Cave

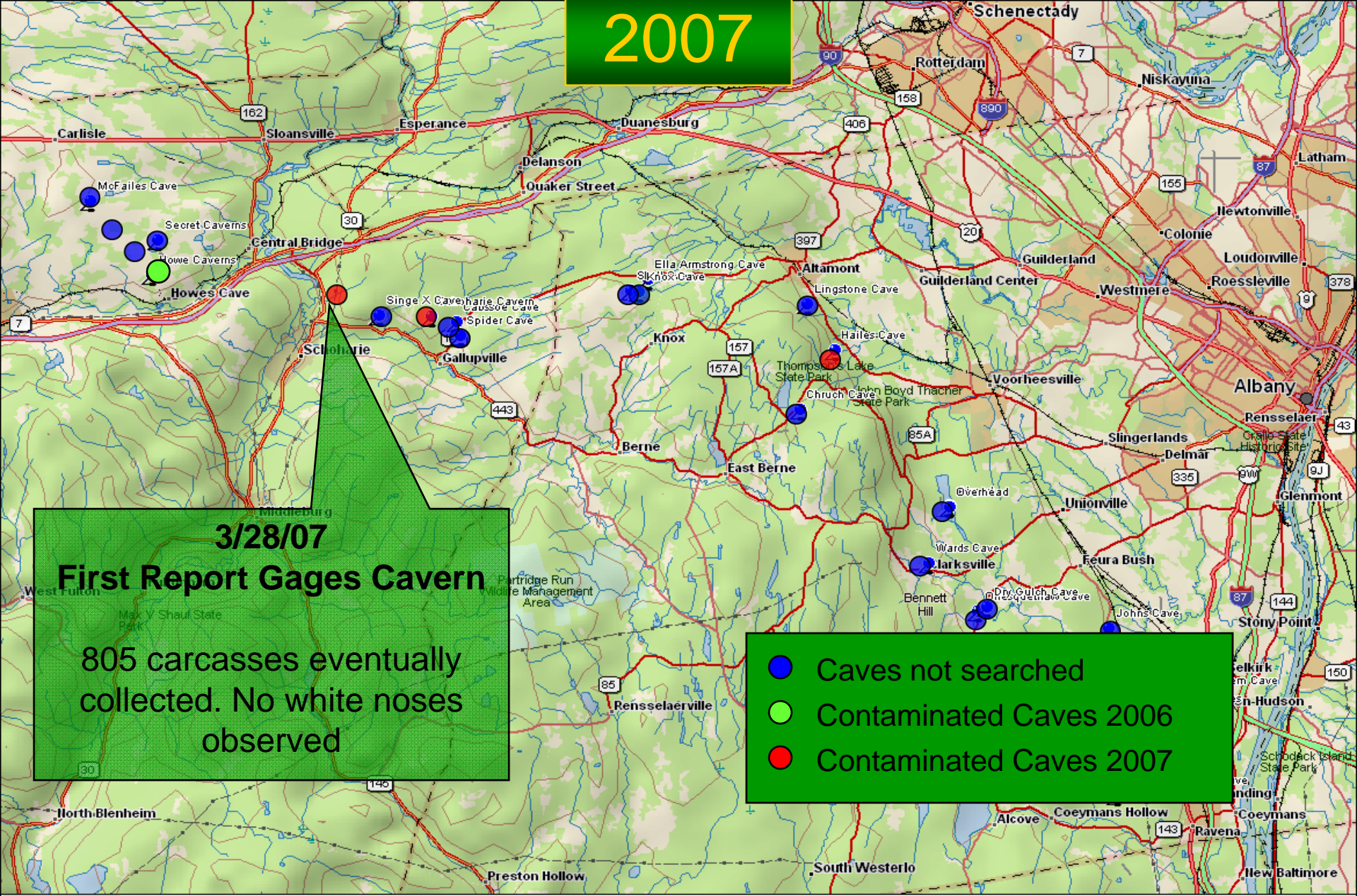
Thousands seen dead.
White Nose on half of
the survivors

- Caves not searched
- Contaminated Caves 2006
- Contaminated Caves 2007

2007

3/28/07
First Report Gages Cavern
805 carcasses eventually collected. No white noses observed

- Caves not searched
- Contaminated Caves 2006
- Contaminated Caves 2007



2007

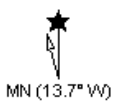
4/25/07
Knox Cave

350 carcasses
collected
White Nose observed

- Caves not searched
- Contaminated Caves 2006
- Contaminated Caves 2007



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2007 Surveys for Bat Mortalities

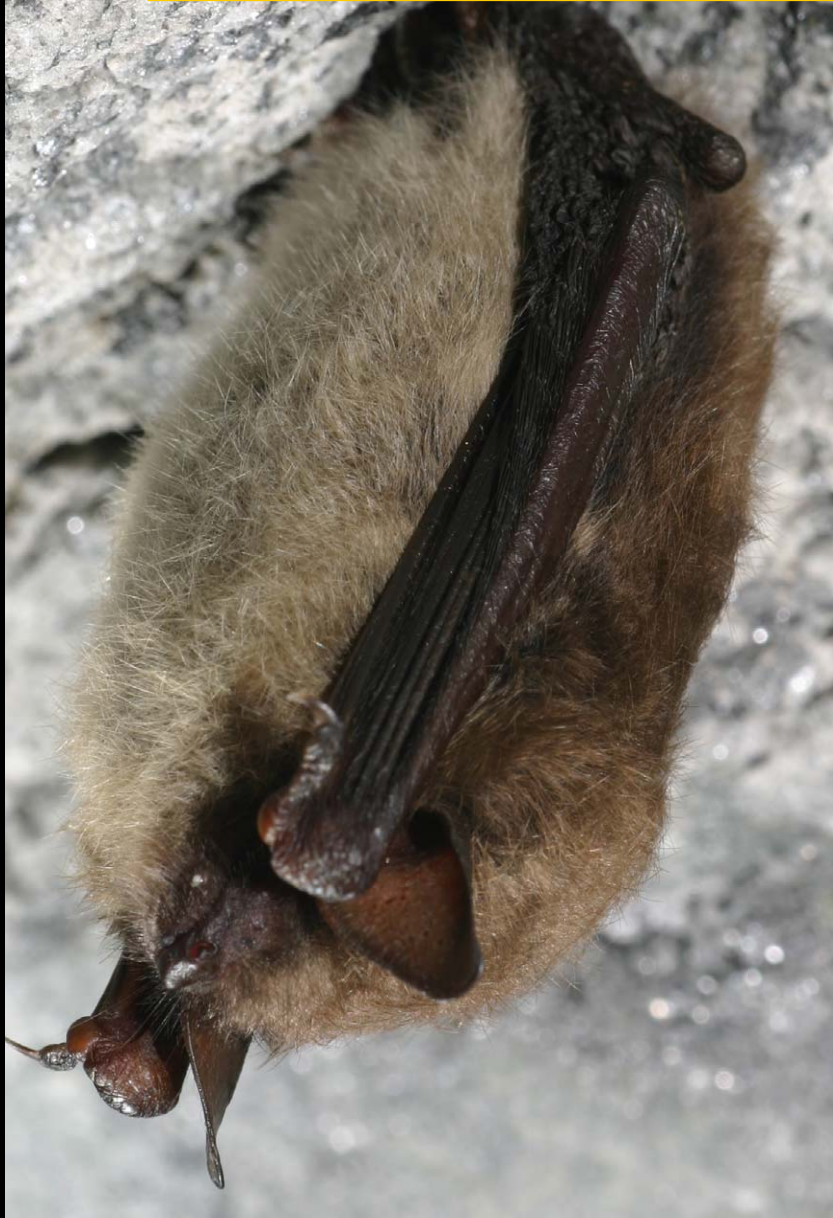
- Not Surveyed
- No mortalities
- Large scale mortalities
- Small scale mortalities

Surveys of other sites demonstrated that the problem was limited in distribution. Pink sites had evidence of mortalities.

100 km

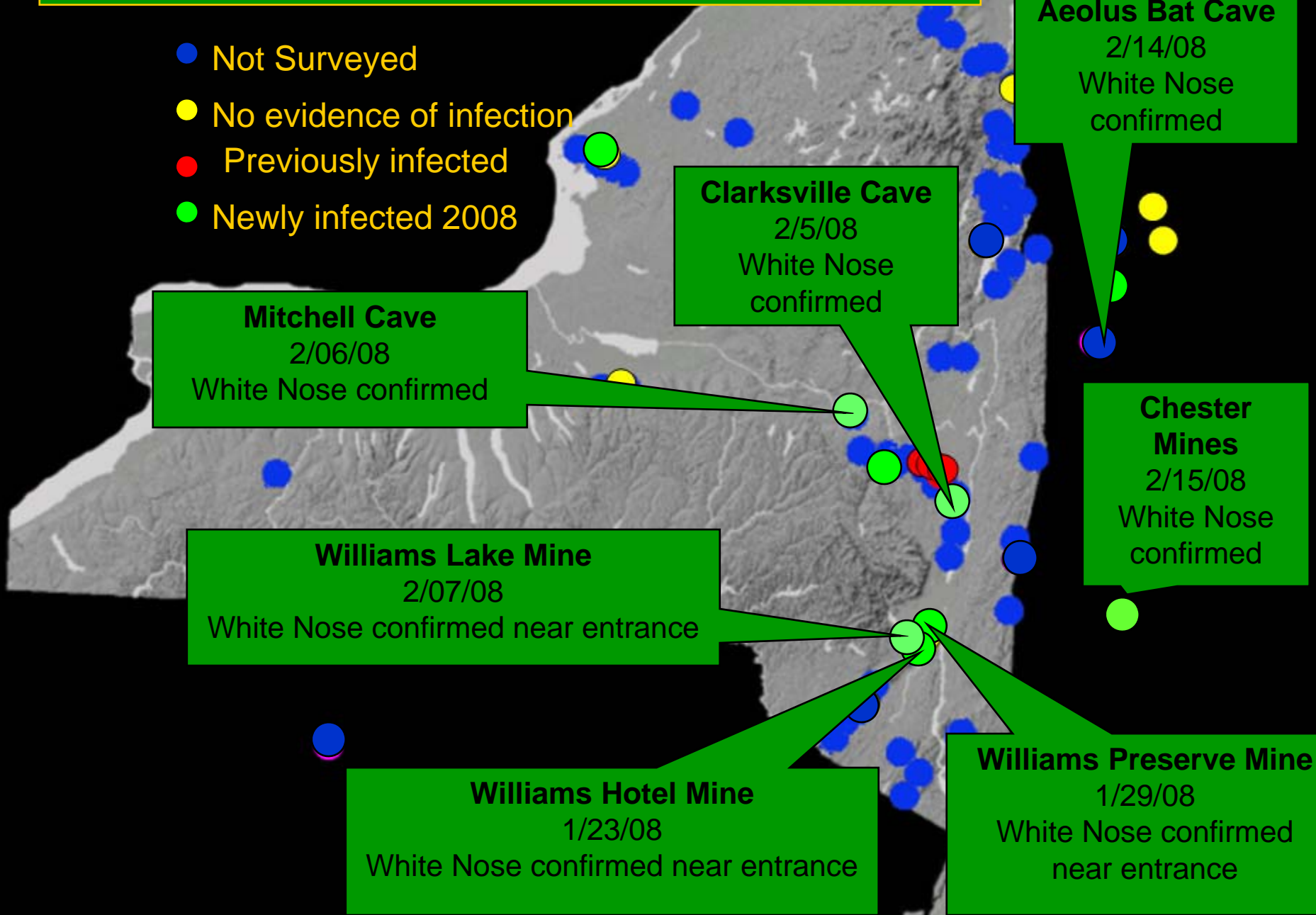


2008 Surveys for Newly Affected Sites



2008 Surveys for Infected Sites

- Not Surveyed
- No evidence of infection
- Previously infected
- Newly infected 2008



2008 Surveys for Affected Sites

- Not Surveyed
- No evidence of infection
- Previously infected
- Newly infected 2008

Glen Park Caves

1/24/08

4 of 50 bats in 45 ft level
with white nose

Jamesville Quarry Cave

1/23/08

No evidence of infection

Barton Hill Mine

2/04/08

Possible White Nose observed in
photographs but not confirmed

Morris Cave

1/21/08

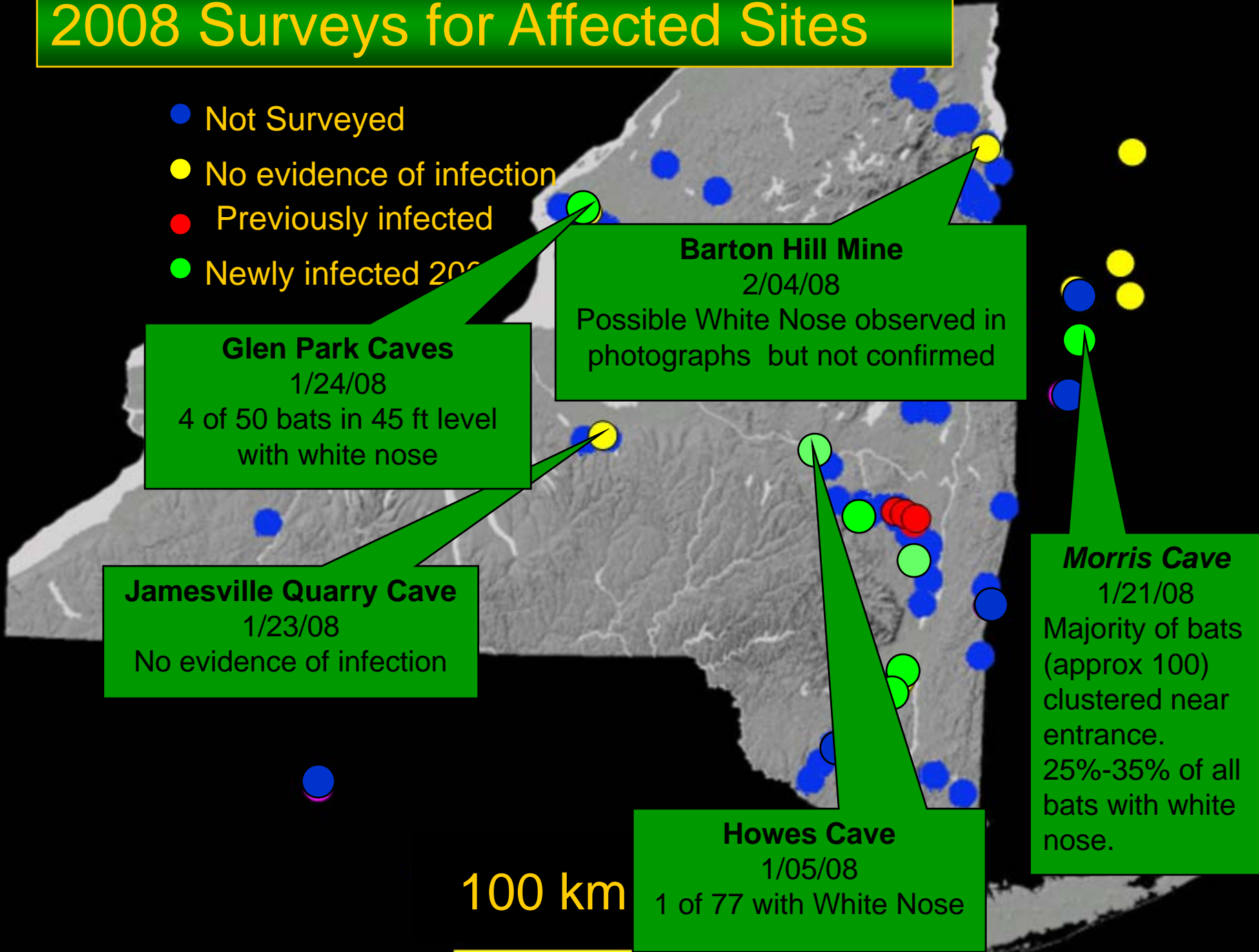
Majority of bats
(approx 100)
clustered near
entrance.
25%-35% of all bats with white
nose.

Howes Cave

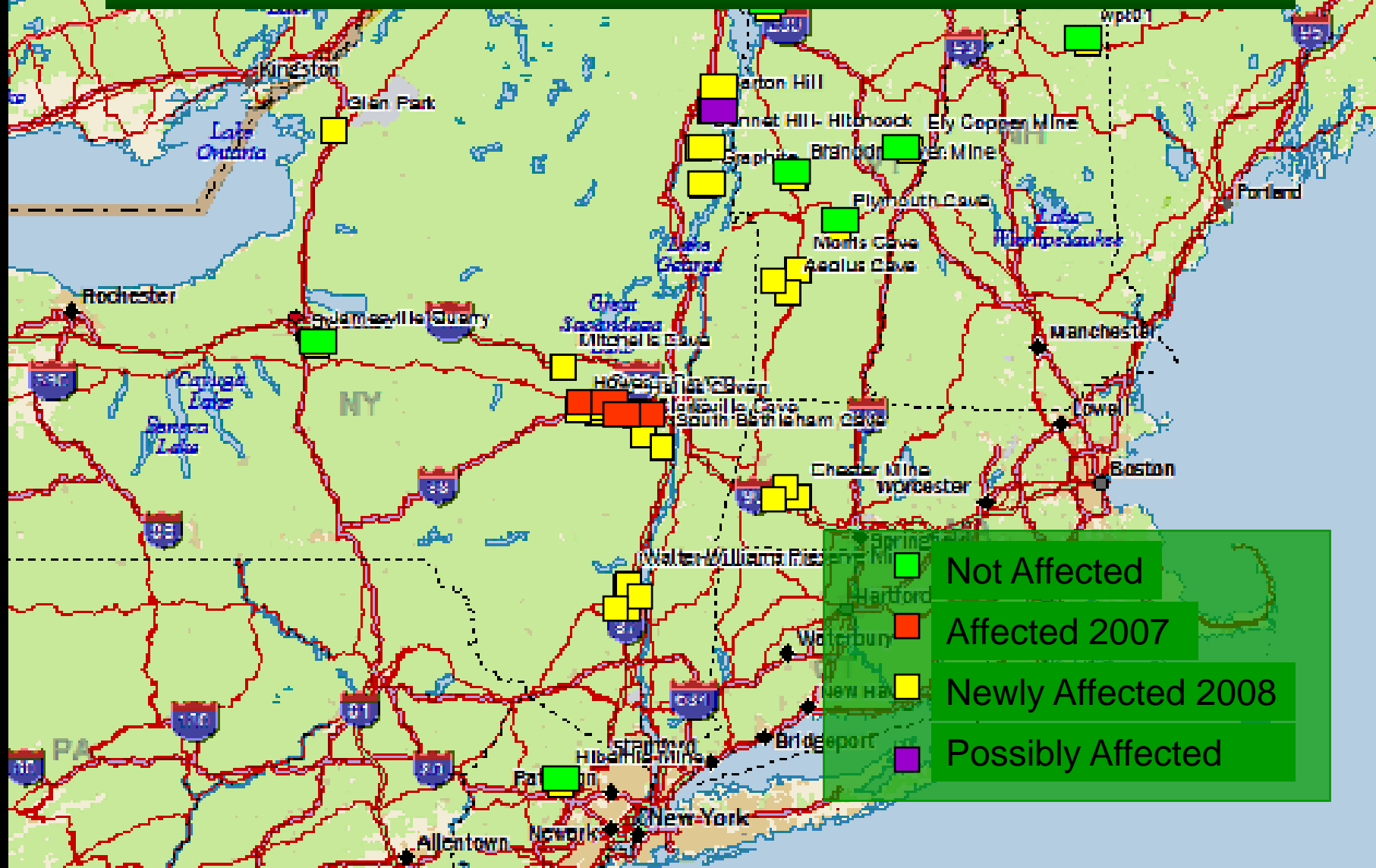
1/05/08

1 of 77 with White Nose

100 km

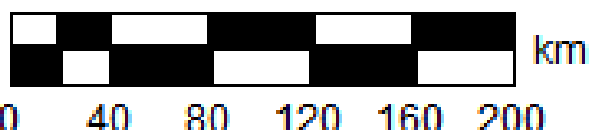


White Nose Distribution As Of 3-10-08



Legend:

- Not Affected
- Affected 2007
- Newly Affected 2008
- Possibly Affected



Almost all sites checked to date within
80 miles of the 2007 caves are affected



Currently Involves 400,000 to 500,000 Animals





Jamesville Quarry- Clean as of 3-10-08

Barton Hill Mine – Potentially Clean



Hailes Cave 2007; a case study

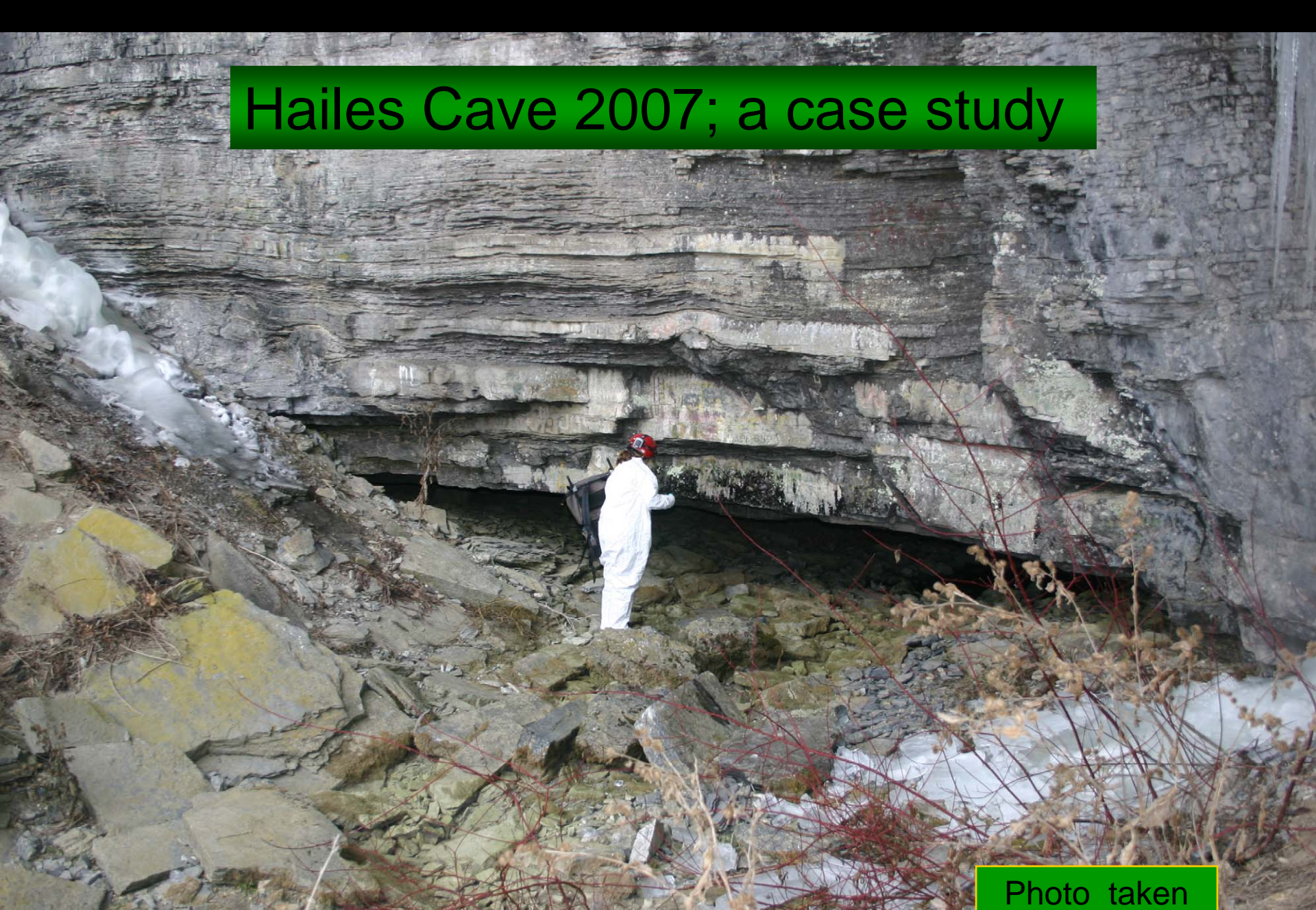


Photo taken
1/29/08

3/14/07 Hailes Cave Survey



Among the missing were all 685 Indiana bats (*Myotis sodalis*). Since the discovery of this species at Hailes Cave By Donald Griffin during the 1930's, this was the first winter survey that we are aware of where they were not observed.

M. sodalis have been absent during all three visits since.

3/14/07 Hailes Cave Survey



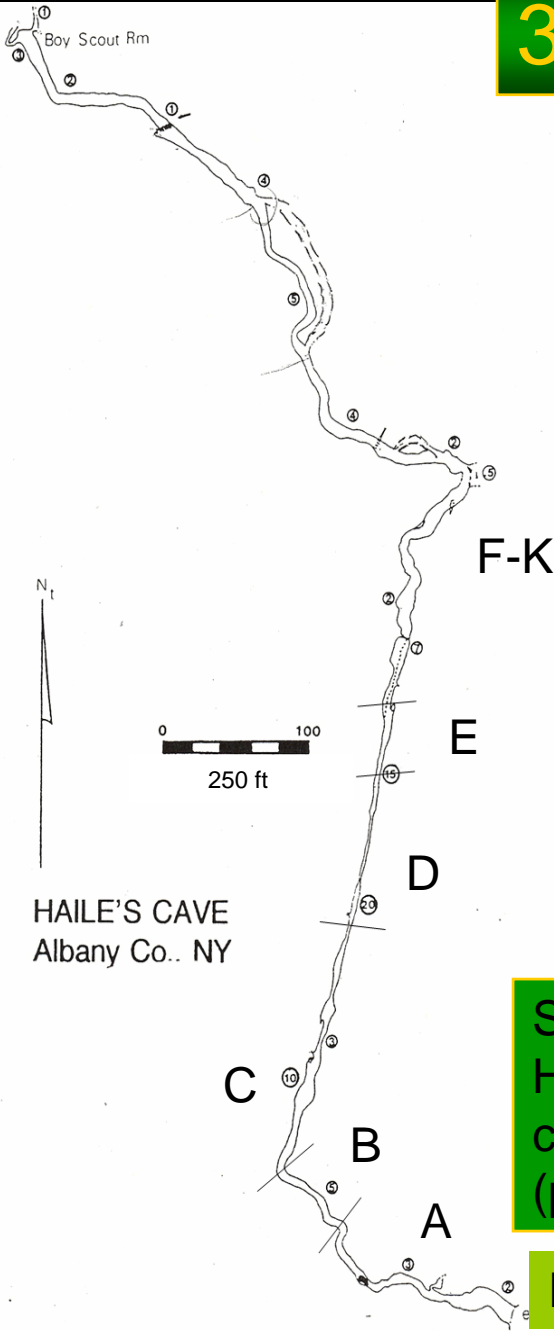
Roughly half the bats observed had a white fungus around the muzzle, It had not been noticed at either Schoharie Cavern, or Gages Cavern, although it was seen on animals at Knox.

3/14/07 Hailes Cave Survey

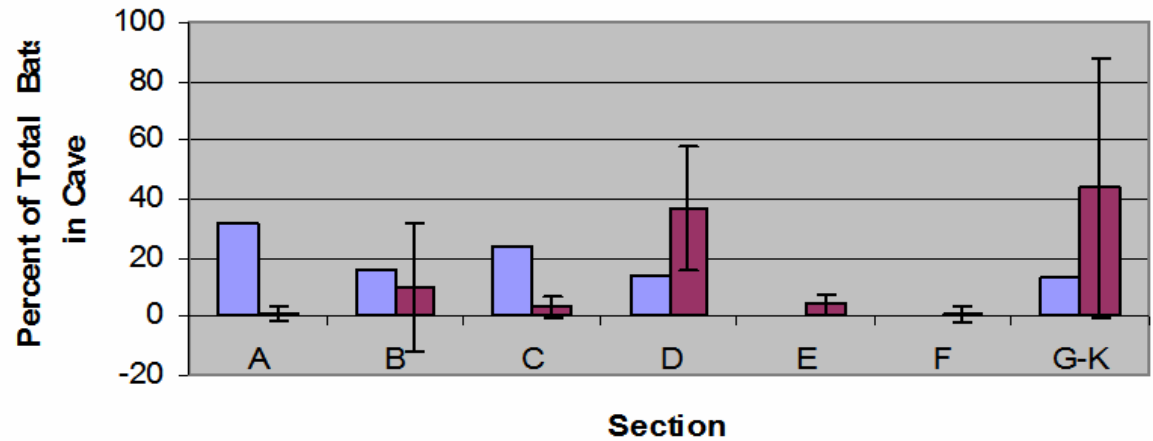


Carcasses, or parts of carcasses, were found on most rocks emerging from the resurgent stream. Examinations to date (not yet complete) indicated that body parts represent at least 600 animals.

3/14/07 Hailes Cave Survey



Distribution of Bats in Hailes Cave By Section



Similar to Schoharie, the distribution of bats during the 2007 Hailes survey (blue) has shifted to the front of the cave compared to the average from the previous 5 surveys (purple). Error bars indicate 3 standard deviations.

Entrance

2008 Surveys of Previously Affected Sites



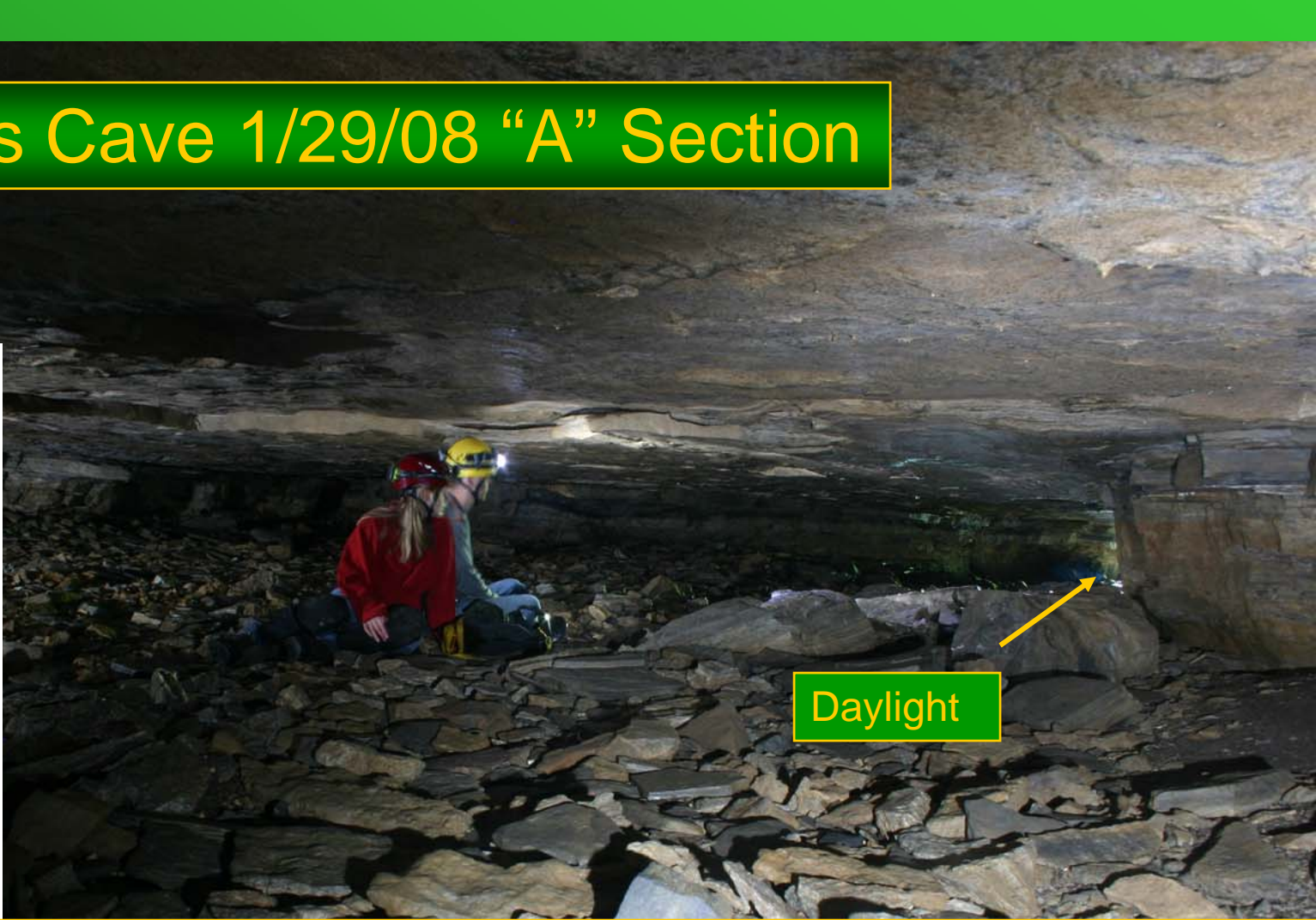
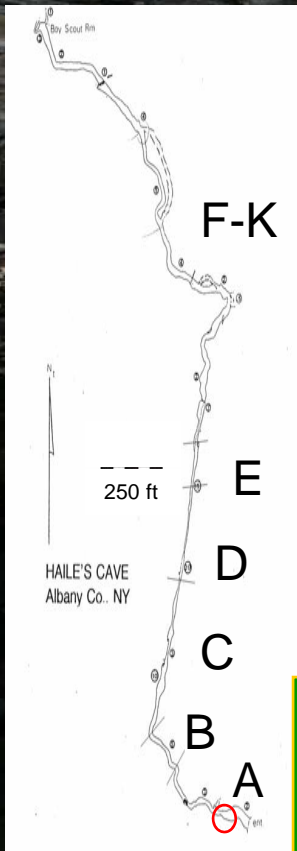
Hailes Cave and Schoharie Caverns

Hailes Cave 1/29/08



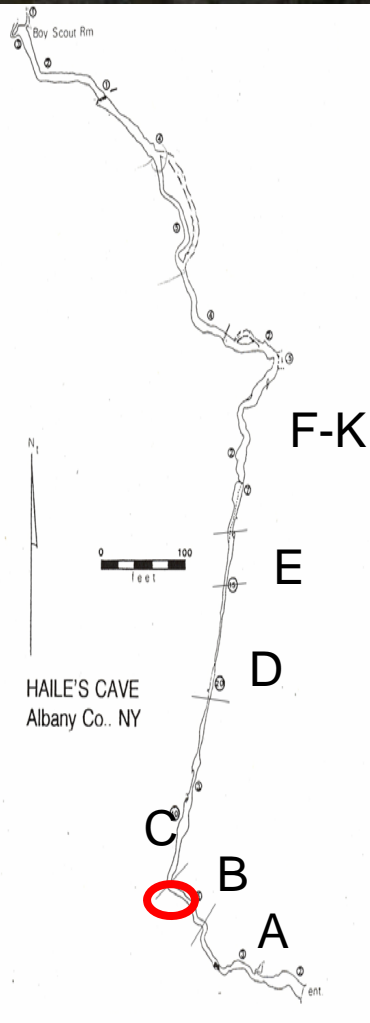
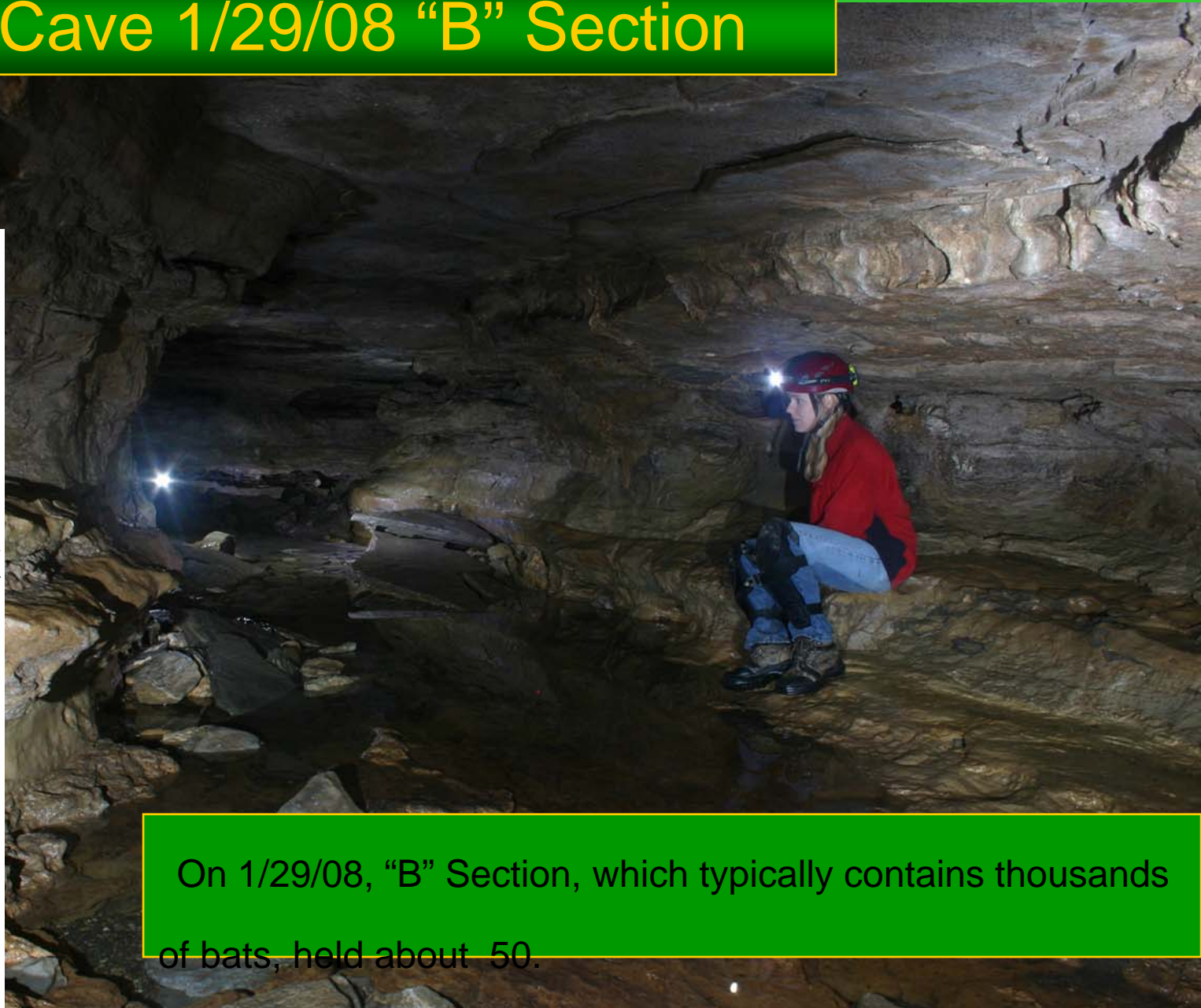
We saw no white on the noses of any of the 1,500 bats we observed. However, distribution within the cave and unresponsiveness to our presence indicate most were affected

Hailes Cave 1/29/08 "A" Section



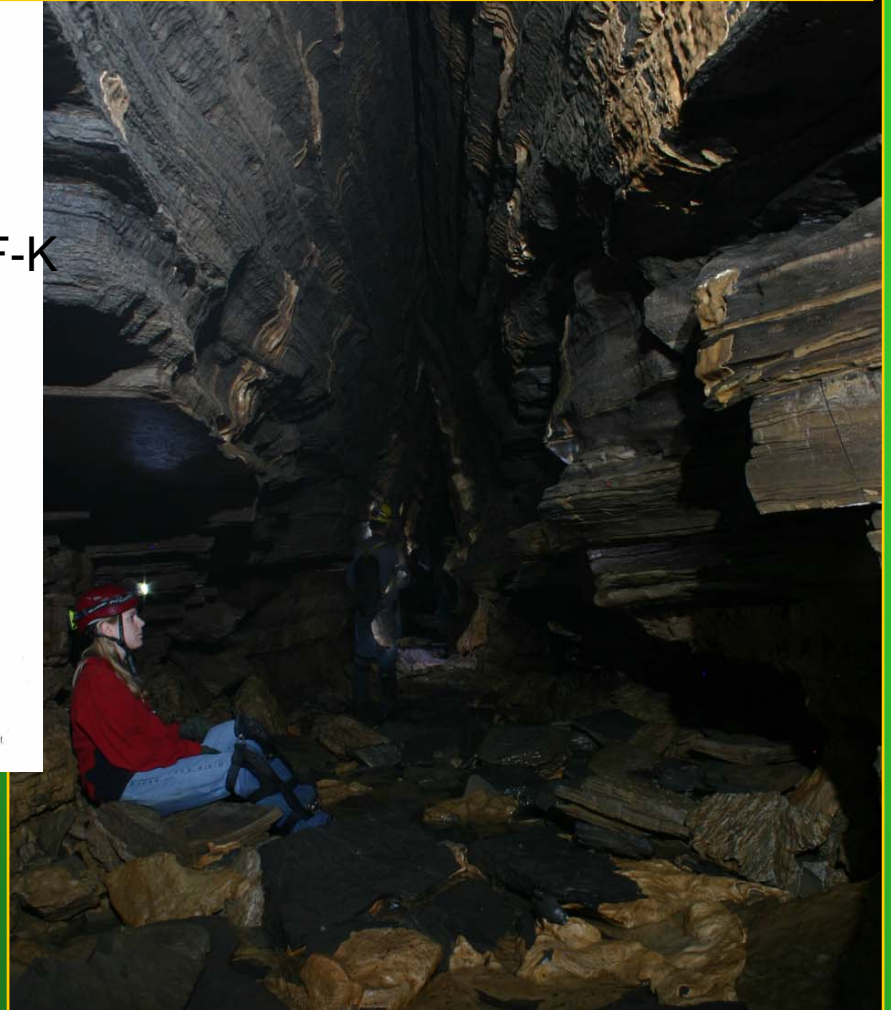
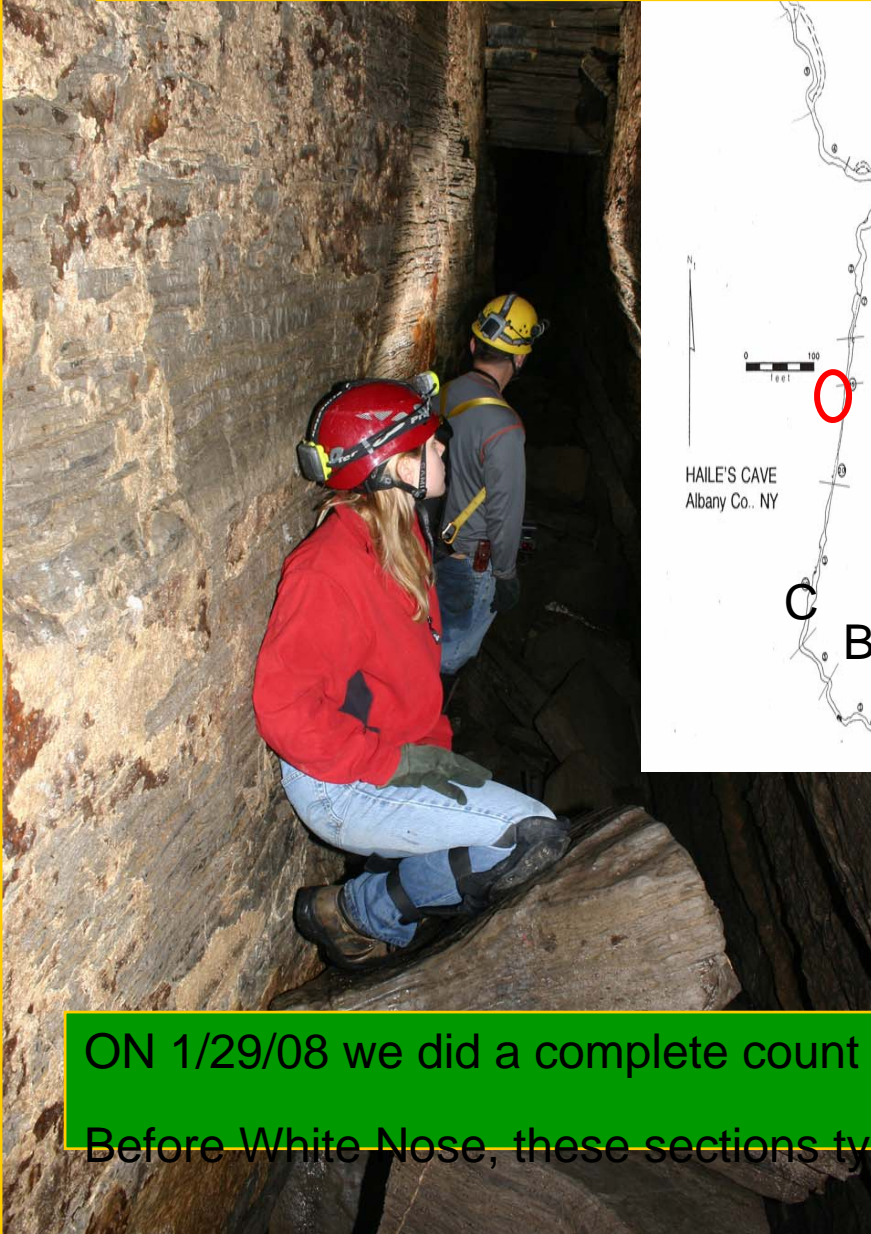
"A" section typically contains very few wintering bats, with most of those in the distal third. On 1/29/08 about two thirds of the roughly 1,500 seen in sections "A" through "E" were located within this circle.

Hailes Cave 1/29/08 "B" Section



On 1/29/08, "B" Section, which typically contains thousands of bats, held about 50.

Hailes Cave 1/29/08 "D" and "E" Sections



ON 1/29/08 we did a complete count in these sections and saw 129 animals.

Before White Nose, these sections typically contained several thousand.

2007-2008 Mortality Event

Percent Decline Based on Winter Survey Counts

Site	Pre mortality survey (year)	2007 Survey	2008 survey	% Decline
Hailes	15,584 (2005)	6,735	1,400	91%
Gages Cavern	968 (1985)	NA	88	91%
Schoharie Caverns	1,329 (2006)	478	38	97%
Knox Cave	1,948 (2001)	N/A	361	81%

2007-2008 Mortality Event

Percent Decline Based on Winter Survey Counts

Site	Pre mortality survey (year)	2007 Survey	2008 survey	% Decline
Barytes	1,521 (2005)	NA	1	100%
Hell's Well	394 (2005)	NA	2	99.5%
Clarksville	89 (2006)	NA	18	80%
Bensons	189 (2006)	N/A	4	95%

2007 Mortality Event

Recovered Carcasses as a Percent of the Most Recent Survey Total

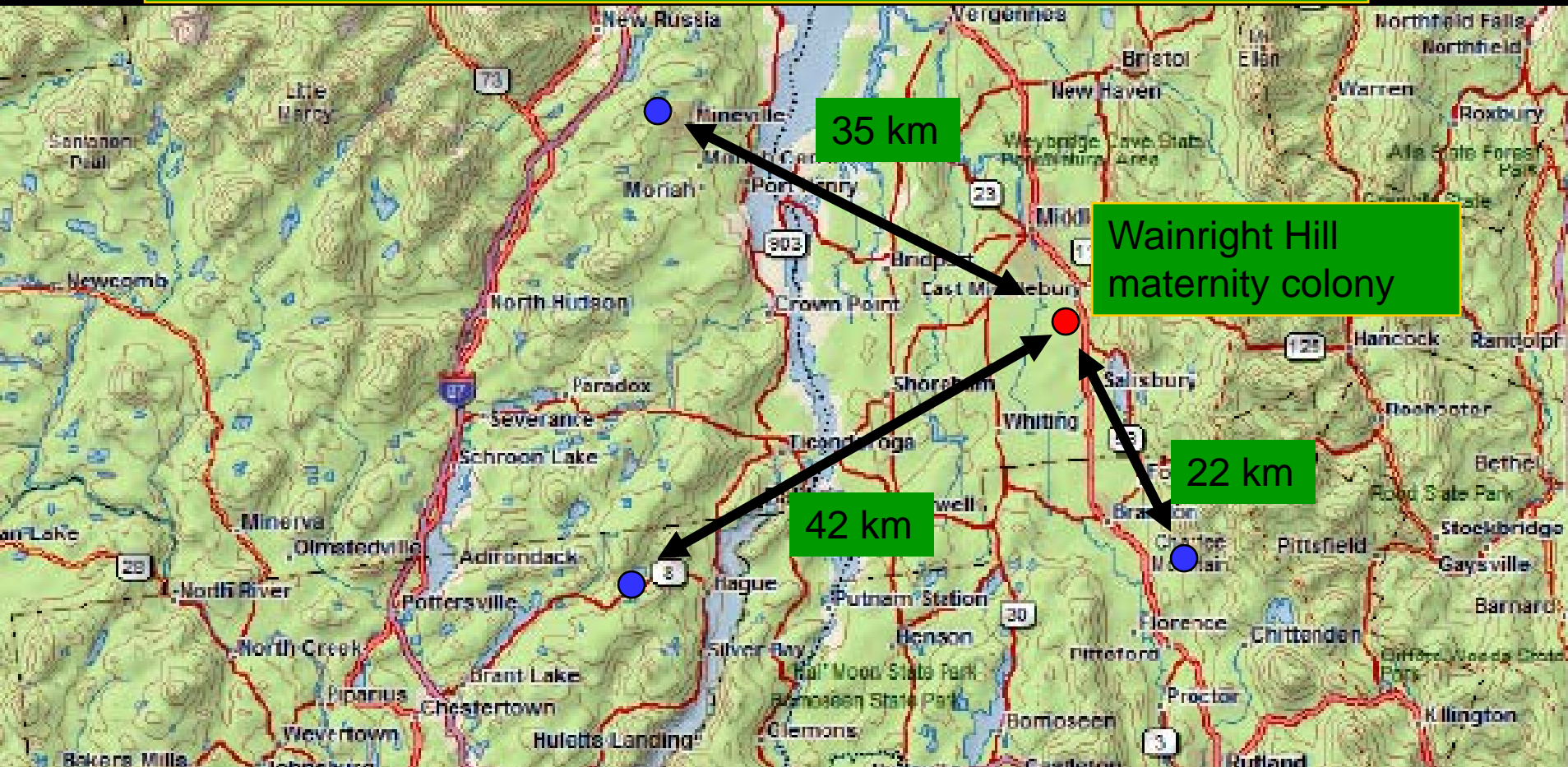
Site	# of Carcasses Recovered	# of Live Bats Seen During the Most Recent Survey (<i>year</i>)	% Mortality
Hailes	count not yet complete	15,584 (2005)	NA
Gages	805	968 (1985)	83%
Knox	350	1,948 (2001)	18%
Schoharie Caverns	125	1,329 (2006)	8%

How Might White Nose be Spread?



Direct cave to cave transmission by bats during fall swarm or pre-hibernation movements

How Might White Nose be Spread?



White nose could be transferred between bats while at summer colonies, then moved to clean hibernacula. Indiana bats banded at the Wainright Hill, VT summer colony have been found hibernating in three different mines.

What is being done?

To ID cause of mortality labs are analyzing:

Pathology, Viruses, Contaminants, Bacteria, Immune response or depression, Fungus, Environmental factors (humidity, temperature)

Surveying sites in affected and non-affected states:

PA, NJ, WV, VA, MD, NH, ME and selected hibernacula in IN, KY

What is being done?

Surveying affected NY sites for mortality,
shift in locations of known roosts,
investigating mortality at VT sites,
experimenting with body temperature radio
transmitters at VT site

Investigation of bat rehabilitation
(formulating proposal):

Should we do it? How do we do it? What species?
How many? Where?

To investigate if people are contributing
to the spread:

Mapping post-exposure dispersal of 2007 sites by cavers
and biologists

To investigate if bats are contributing to
the spread ?

Surveying sites within the “dead zone” that are not open to
cavers

Keeping people informed:

providing updated website (www.fws.gov/northeast/white_nose.html),
media contacts, coordination with stakeholders (Cavers groups, Conservation
organizations, state and federal agencies)

How Might White Nose be Spread?



Cavers and bat researchers could be moving the problem between sites on their gear. Most affected sites first found during 2008, had clearly been visited by people that had been in the original four sites during 2007.



Indiana bats, and to a lesser extent little brown bats typically hibernate in dense clusters. It is hard to imagine a condition more conducive to the spread of disease, if white nose is a disease.

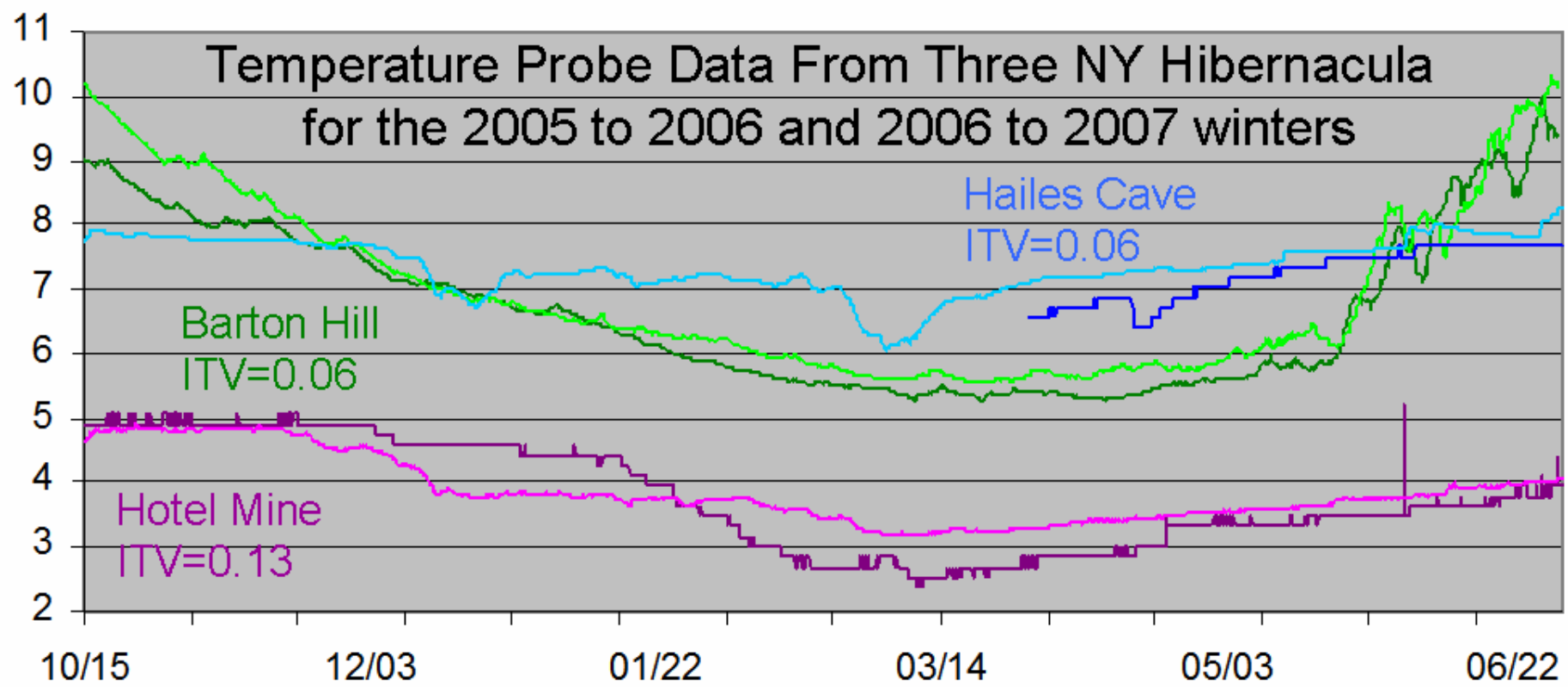


Every Indiana bat we know of in Jefferson county region of NY winters every winter on this same rock in the same cluster. It is now affected.



Roughly one third of the Indiana bats from Virginia to Maine winter in the area depicted by this image. This mine is now affected.

Temperature Probe Data From Three NY Hibernacula for the 2005 to 2006 and 2006 to 2007 winters



Darker shades are the 2006-2007 temps. with lighter shades being the 2005-2006 temps.

Summary

White Nose persists for at least two seasons

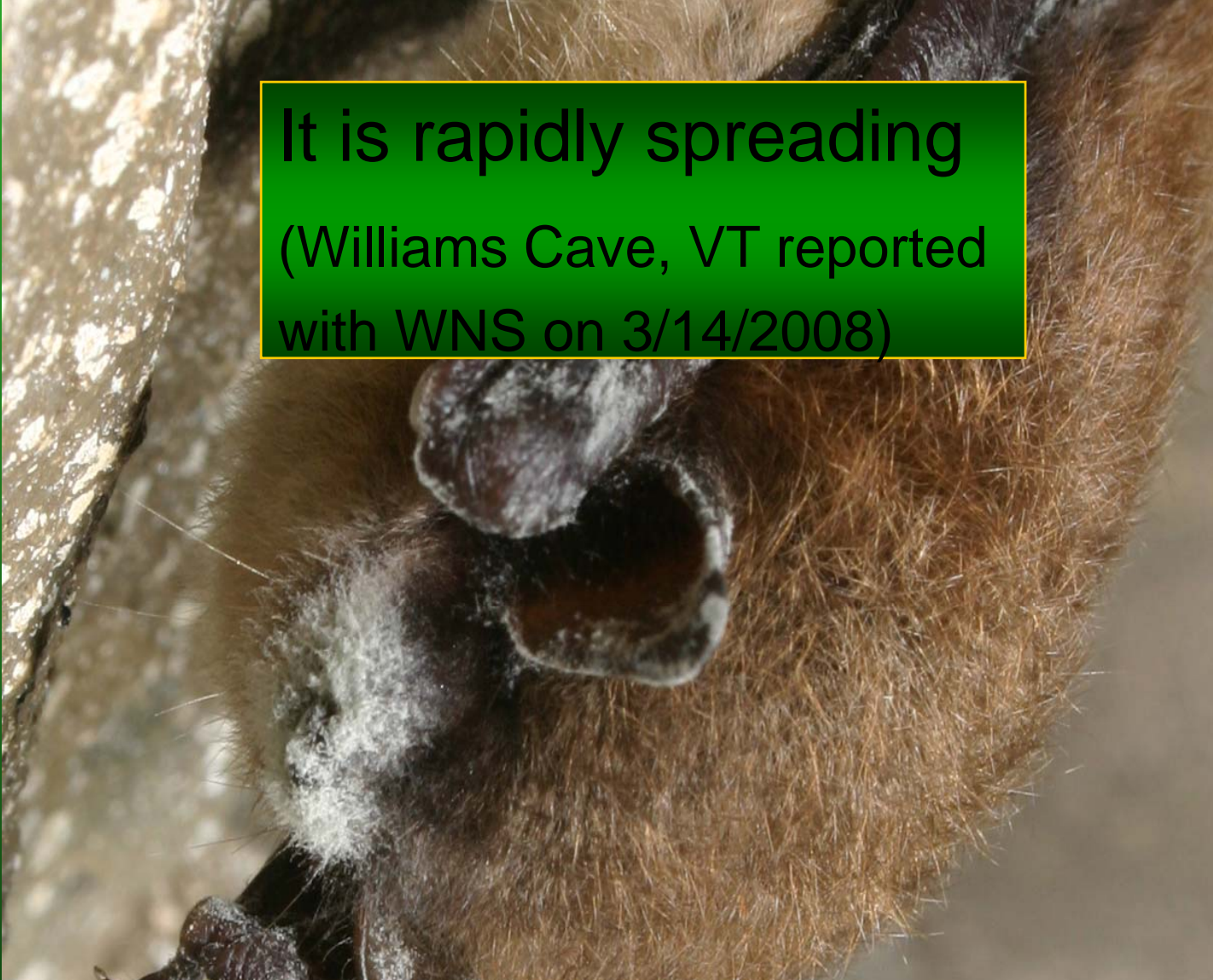


It is killing $>90\%$ of bats in affected sites within two years.

Vulnerability seems to vary between species



and between sites

A close-up photograph of a bat's face, showing its brown fur and dark eyes. There is a prominent white, fuzzy growth on the bridge of its nose and around its eyes, characteristic of White Nose Syndrome. The bat is positioned against a light-colored, textured rock surface.

It is rapidly spreading
(Williams Cave, VT reported
with WNS on 3/14/2008)

We do not know what it is, or how it is spread
Clearinghouse: WhiteNoseBats@FWS.GOV



Disney

APHIS

Boston University

USGS Wildlife Health Center

UC Davis

Participating Researchers /
Laboratories

CDC

Indiana State

NYS DEC Pathology

USGS Ft Collins

Columbia University

Colorado State

University of Colorado

Humboldt State

Cornell University

Bucknell

NYS Department of Health