

# Snapshot Wisconsin: A citizen-based trail camera project to monitor wildlife



Jennifer Stenglein, Research Scientist  
Wisconsin Department of Natural Resources

Lakes Convention and Citizen-based  
monitoring conference  
April 1, 2016



# ACKNOWLEDGEMENTS



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Dougal Walker  
Mitch Liddecoat  
Dan Storm  
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Christina Locke  
Susan Frett  
Scott Hull

Ho Chunk Nation DNR  
Jackson County Forest and Parks  
US Forest Service  
WM staff helping with camera set up and check  
SS staff helping with photo classification



Phil Townsend  
Ben Zuckerberg  
Tim Van Deelen  
Christine Anhalt-Depies  
John Clare  
Aditya Singh  
Mark Rickenbach  
Adena Rissman  
Jamie Nack

ZOONIVERSE  
REAL SCIENCE ONLINE

Laura Trouille  
Ali Swanson  
Sarah Allen



Karl Martin  
Becky Sapper



# PITTMAN-ROBERTSON ACT



Federal Aid in Wildlife Restoration Act, 1937

Use excise tax on guns and ammunition to fund wildlife restoration projects



*Senator Key Pittman*



*Senator A. Willis Robertson*

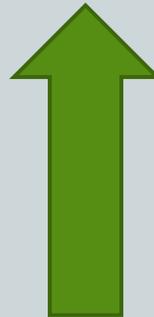


*President Franklin D. Roosevelt*

# PITTMAN-ROBERTSON "BUMP" MONEY



Cabelas



Getty images



**75 Years of the Federal Aid in Wildlife Restoration Act (P-R)-1937-2012**

"What began as a federal-state partnership to conserve game species has evolved into a highly sophisticated, science-based program to keep American wildlife populations of all kinds in healthy balance."  
-Steve W. Miller, former director, Bureau of Wildlife Management, DNR

**Wildlife Funding**

- 1936 - Wisconsin's first appropriation was \$20,000.
- Total to date has been in excess of \$157.2 billion for habitat development, land acquisition, research, hunter education, restoration, wildlife health and many more benefits to all Wisconsin citizens.

**Wildlife Habitat**

- Scattered around Wisconsin are more than 137 Wildlife Areas that cover approximately 620,000 acres of land. All Wildlife Areas are managed to sustain the wildlife and natural communities based on the program and to provide a full range of traditional outdoor recreational uses. The Pittman-Robertson act has played a direct role in acquiring half of those acres and plays a pivotal role in their continued management.

**Wildlife Restoration**

<p><b>Wild Turkey:</b></p> <ul style="list-style-type: none"> <li>• 1937 - Last native wild turkey reported killed.</li> <li>• 1979 - WSA tagged turkey reintroduced.</li> <li>• 2011 - 45,000 turkeys harvested.</li> </ul> <p><b>Elk:</b></p> <ul style="list-style-type: none"> <li>• 1986 - Last native elk reported killed.</li> <li>• 1989 - WSA tagged elk (25) reintroduced.</li> <li>• 2011 - Elk herd consisted of 161 animals.</li> </ul>	<p><b>Pronghorn:</b></p> <ul style="list-style-type: none"> <li>• 1927 - Declared extirpated.</li> <li>• 1959 - 1967 - WSA tagged Pronghorn (120) reintroduced.</li> <li>• 2011 - Current population estimate 1,500.</li> </ul> <p><b>White-tailed Deer:</b></p> <ul style="list-style-type: none"> <li>• 1957 - Game in the public predicted their would meet game with the buffalo and passenger pigeon.</li> <li>• 2011 - Deer harvests harvested = 548,000 deer.</li> </ul>
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**Wildlife Research**

- Approximately 200 wildlife research projects have been funded.
- Over 70 years of their research, approximately 60 studies on habitat, populations and CWD.
- Developed models to identify potential wolf den, reintroduction sites and crossing sites in future highway projects.
- Over 10 annual wildlife and hunter surveys to estimate size and abundance of wildlife populations and harvest.
- Supplemental tracking and monitoring of American beaver.
- Establishing a long-term recovery monitoring and ecological risk assessment program in the Great Lakes.
- Estimating productivity of chicks in relation to wetland and grassland habitat restoration.

**Hunter Education**

- 1967 - Voluntary hunter education program begins.
- 1971 - Reauthorized first Pittman-Robertson allocation of \$140,000.
- 1985 - Hunter education required for hunters born on/after January 1, 1975.
- 2011 - One millionth hunter education student certified in Wisconsin.
- 2012 - P-R funding exceeds \$1 billion in allocation, passage and run the statewide hunter education program, and to manage hunting and shooting sports recreational and restoration efforts.

**Endangered Resources**

<p><b>Gray Wolf:</b></p> <ul style="list-style-type: none"> <li>• 1980 - Declared extirpated.</li> <li>• 1973 - Began to reevaluate, listed as a state endangered species.</li> <li>• 2011 - Population recorded at 700-824 wolves in Wisconsin.</li> </ul> <p><b>Bald Eagle:</b></p> <ul style="list-style-type: none"> <li>• 1973 - Listed as a state endangered species.</li> <li>• 1989 - Reclassified to state threatened species.</li> <li>• 1987 - Removed from state endangered species list.</li> </ul>	<p><b>Trumpeter Swan:</b></p> <ul style="list-style-type: none"> <li>• 1967 - Recovery program initiated.</li> <li>• 2011 - Population recorded at 201 nesting pairs.</li> </ul> <p><b>Whooping Crane:</b></p> <ul style="list-style-type: none"> <li>• 2001 - First flock of reintroduced whooping cranes trained to follow an overnight aircraft on migration to a wetland ground in Florida.</li> <li>• 2011 - Population recorded at 103 birds in Wisconsin.</li> </ul>
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**Wildlife Health**

- Developed a wildlife health database to capture and analyze wildlife health data.
- Developed an education and outreach plan to reduce the impact of lead ammunition and fishing tackle released into the environment.
- Developed a beach cleanup surveillance program to monitor pollution-related mortality in waterbirds.
- Monitored the impacts of lead exposure on the wildlife of Wisconsin.
- Evaluated environmental contaminants in Wisconsin waterfowl and heronidae of consumption risk.
- Administered CWD eradication and control program.



# DEER TRUSTEE



Dr. James Kroll, Deer Trustee  
Conducted an independent review of  
Wisconsin's deer management  
practices.

## FINAL REPORT AND RECOMMENDATIONS

BY,

WISCONSIN WHITE-TAILED DEER TRUSTEE AND REVIEW COMMITTEE

JUNE, 2012

Dr. James C. Kroll (Trustee), David C. Gaynn, Jr. (Committee Member), and Gary L. AR  
(Committee Member)

Presented to,

Wisconsin Department of Administration

Madison, Wisconsin

### PREAMBLE

In the history of North American wildlife management few issues have been more contentious and challenging than the management of white-tailed deer. The root of this problem has been in defining a clear answer from society for the basic question "How many deer should there be?" The answer, of course, depends on who you ask and what their relationships have been with deer. Predictably, one portion of society will demand more deer to hunt, photograph, or just view, while another portion of society will demand fewer deer to reduce conflicts such as damage to crops, gardens, or forest ecosystems, or to reduce deer-vehicle collisions out of concern for public safety.

Managing deer is fundamentally different than managing most other species of game animals, leading to greater consequences both economically and ecologically. Aside from enormous economic impacts, both positive and negative, deer management has cascading long-term effects on forest ecosystems. Unlike managing bears, turkeys, rabbits, squirrels, upland wildlife or waterfowl, white-tailed deer, if allowed to become overly abundant for extended periods of time, can and will destroy their own habitat, as well as that of other species. This is why they often are referred to as a "Keystone Species." When this happens it is not in the best interest of the health and long-term sustainability of the forest, and most of the other plants and animals that live there—it is also not in the long-term best interest of the deer, the hunters or the future of hunting.

The reestablishment and recovery of the whitetail to its historic range has been celebrated as one of the great success stories of wildlife management in the 20<sup>th</sup> century, but attempting to balance those recovered populations with their habitat, and simultaneously maintaining numbers acceptable to sport hunters, is proving to be one of the greatest challenges for wildlife management in the 21<sup>st</sup> century. We strongly believe the decisions and associated impacts of deer management in Wisconsin should not be made in isolation as a single species, but rather need to be congruent with and guided by the state's (DNR's) greater responsibility for the management of all their natural resources, and for all the people of Wisconsin in current and future generations.

# DEER TRUSTEE REPORT

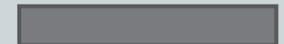
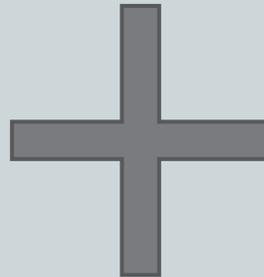


- Produced the Deer Trustee Report
- >60 recommendations
- Implementation began 2014

Among the recommendations:

1. Increasing citizen involvement in wildlife monitoring,
2. Creating better relationships and trust between the Department and citizens,
3. Assessing the statewide distribution and abundance of carnivores in Wisconsin,
4. Developing new methods to monitor deer populations, and
5. Moving the Department research program to be more proactive, innovative, and leading edge.

# THE *SNAPSHOT WISCONSIN* FORMULA

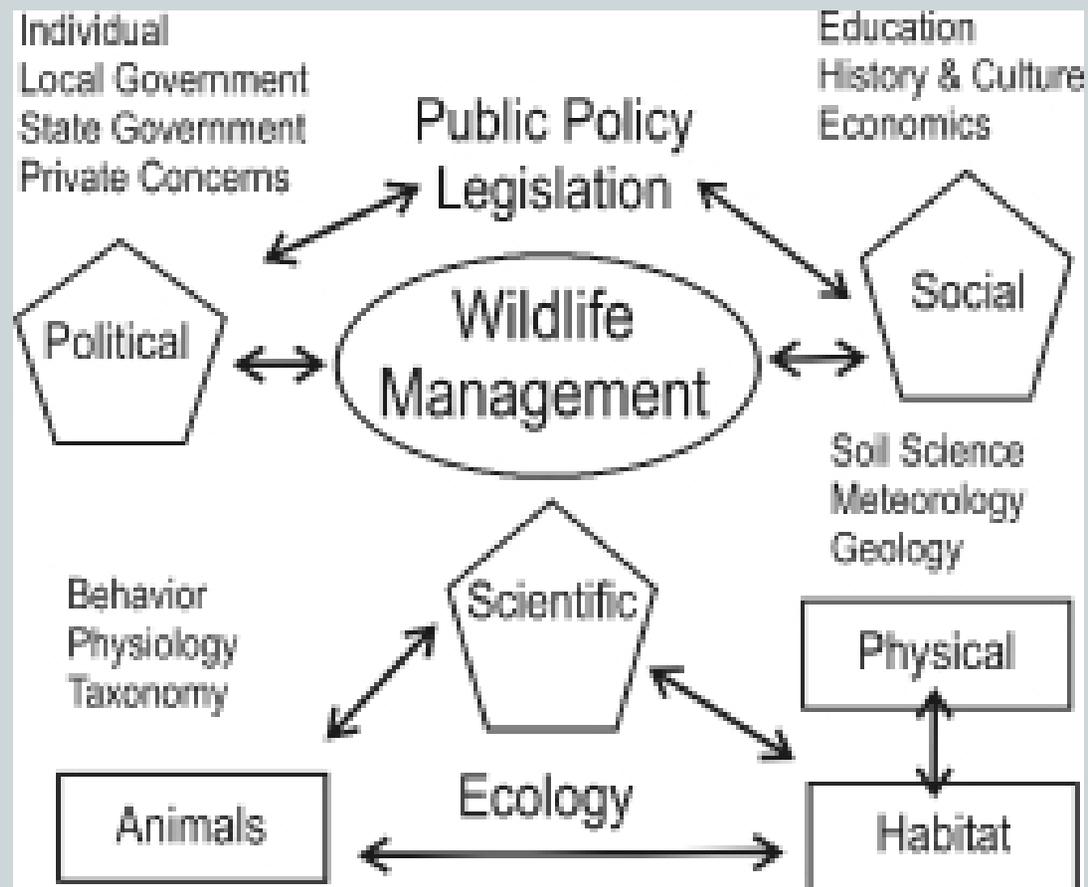




***SNAPSHOT***

**W I S C O N S I N**

# WILDLIFE MANAGEMENT



# WILDLIFE MANAGEMENT



## Determine population goal

- Research and science
- Public input

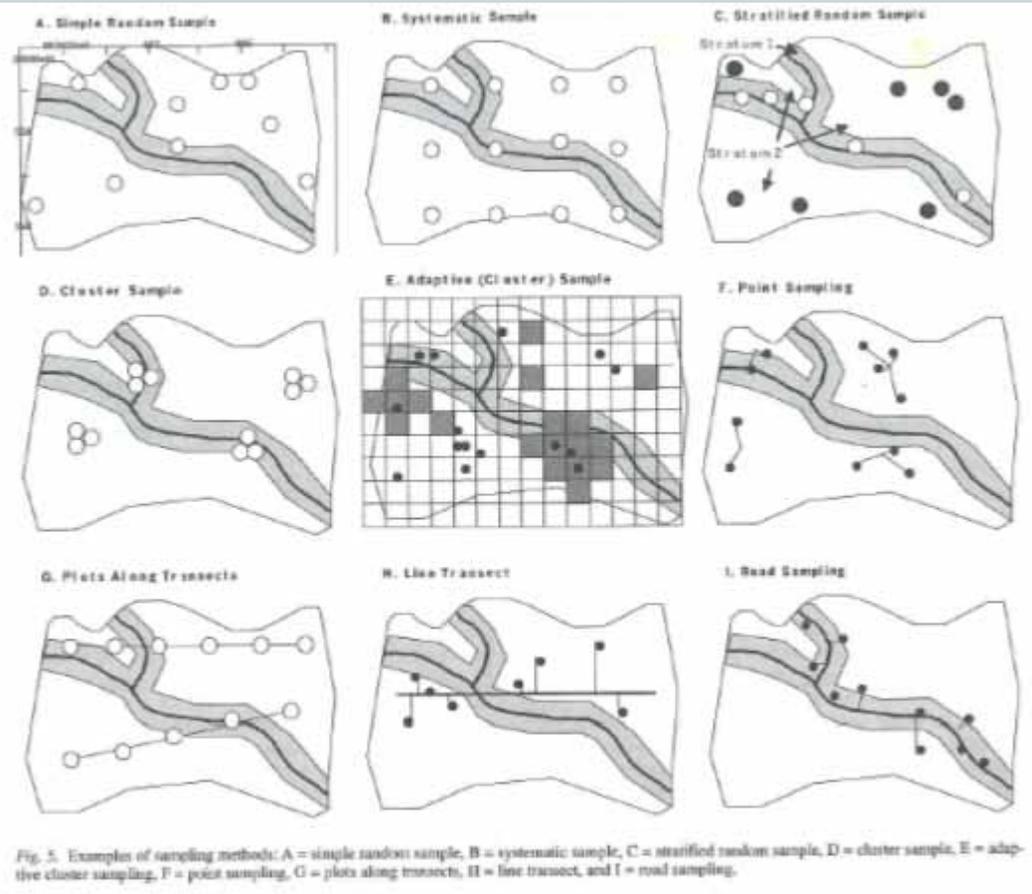
## Estimate population size

- Distribution and numbers
- Projected growth

## Establish population manipulation

- Hunting quota
- Conservation target

# ESTIMATE POPULATION SIZE



# TOOLS OF WILDLIFE MONITORING



Photos from WDNR  
and USFWS

# TOOLS OF WILDLIFE MONITORING

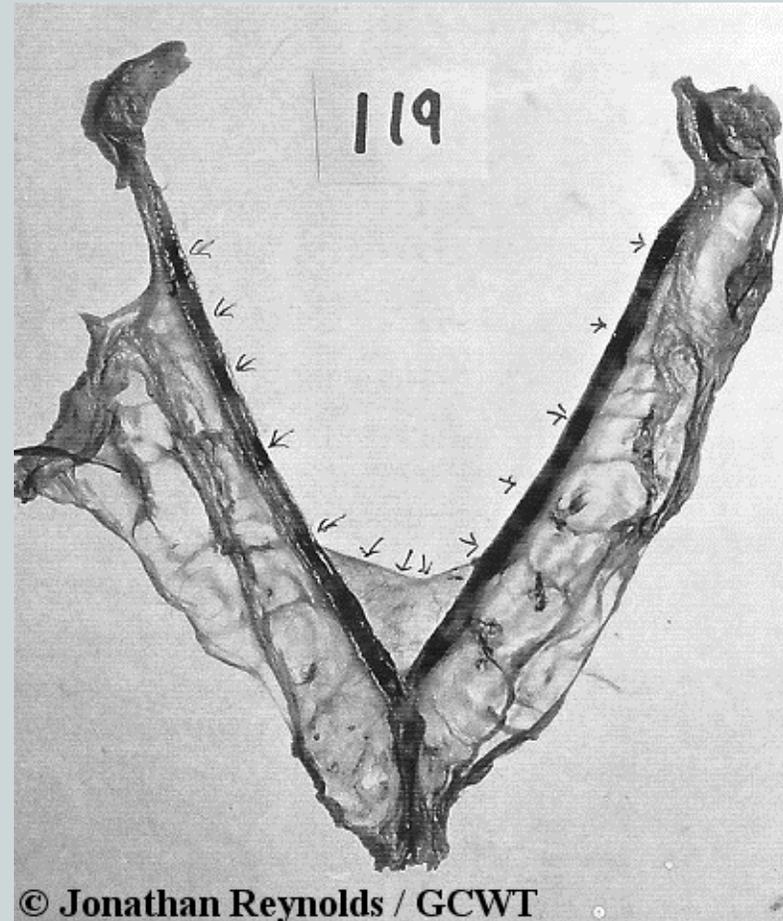
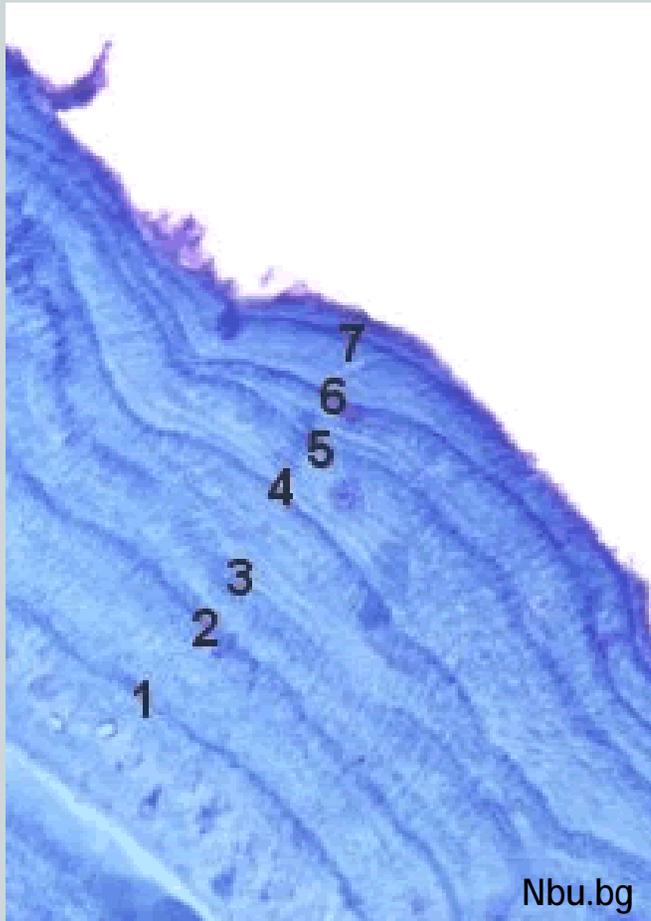


[Ontariowildflower.com](http://Ontariowildflower.com)



[Imgarcade.com](http://Imgarcade.com)

# TOOLS OF WILDLIFE MONITORING



# TOOLS OF WILDLIFE MONITORING



Citizen Science!



**MassWildlife Pocket Guide to MA Animal Tracks**


**Tracks Not To Scale**

Tracks will show considerable variation depending upon conditions of ground.  
 (L) = Left, (R) = Right, (H) = Hind, (F) = Fore, (T) = Tail.  
 H = Hind Track, F = Fore Track, T = Tail mark may be present.

**Protect wildlife and its habitat. Support the Wildlands Fund.**  
 Division of Fisheries & Wildlife Field HQ  
 1 Rabbit Hill Rd., Westford, MA 01581  
 303.791.7270 • www.state.ma.us/fieldoffice

# DNR.WI.GOV KEYWORD "REPORTS"



Business Licenses & Regulations Recreation Education Topics Contact Join DNR Search of keywords

## Wisconsin wildlife reports

Wildlife reports are divided into surveys addressing five species groups: small game, big game, waterfowl, furbearers and nongame. Interpretations to data in these reports are subject to change as a result of data verification and more extensive data analysis.

Please [contact](#) the appropriate author for additional clarification or further interpretation of survey results. These reports were made possible by Pittman-Robertson funding.

*Semi-annual reports are distributed in April and August.*

Small game Big game Waterfowl **Furbearers** Nongame

Report title	Previous	Current
Beaver population analyses	2008 [PDF]	2011 [PDF]
Beaver trapping questionnaire	2013 [PDF]	2014 [PDF]
Bobcat harvest	2012 [PDF]	2013 [PDF]
Bobcat hunter/trapper survey	2012 [PDF]	2013 [PDF]
Bobcat population analyses	2013 [PDF]	2014 [PDF]
Fisher harvest	2012 [PDF]	2013 [PDF]
Fisher population analyses	2013 [PDF]	2014 [PDF]
Fur trapper survey	2013 [PDF]	2014 [PDF]
Otter harvest	2013 [PDF]	2014 [PDF]
Otter population analyses	2013 [PDF]	2014 [PDF]
Winter track counts	2013 [PDF]	2014 [PDF]
Wisconsin fur buyers report	2013 [PDF]	2014 [PDF]



Wisconsin fur buyers are asked to report the number of otter and other furs purchased from Wisconsin harvesters. This helps to document harvest totals.

to receive report updates

### Wildlife and habitat

**Find**  
ways to reduce wildlife-human conflict and avoid wildlife damage.

**Explore**  
Wisconsin's rare plants, animals and natural communities.

**Discover**  
tips to manage your land for wildlife.

**Learn**  
about wildlife health and rehabilitation.

### Related links

- Online wildlife surveys
- Volunteer opportunities
- Hunting in Wisconsin
- Trapping in Wisconsin
- Wisconsin's endangered resources

### Contact information

For information on wildlife survey reports, contact:

[Brian Oboya](#)  
Survey analyst/database manager  
Bureau of Science Services  
608-221-6342

# DEER POPULATION SIZE

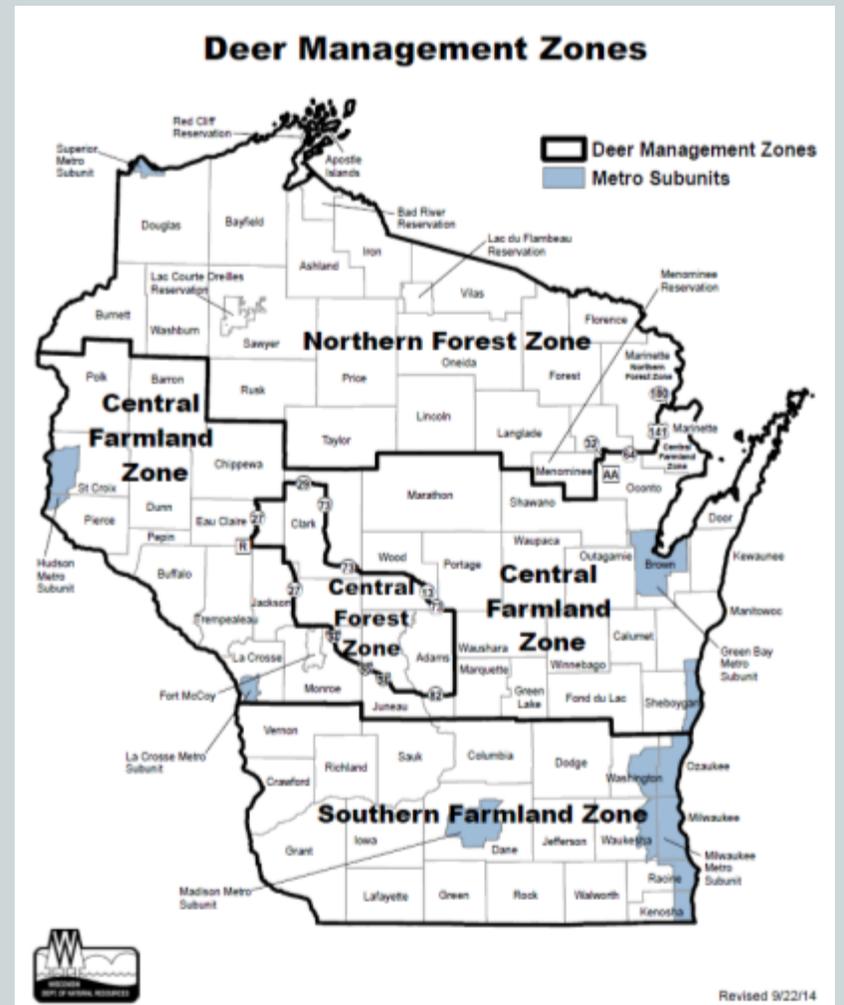


2013 statewide, post-hunt population:  
1,182,200 deer

Sex-Age-Kill model with data from harvest



DNR deer study



# BOBCAT POPULATION SIZE



~2,200 bobcats in Northern Zone  
Data from harvested bobcats and tracking  
Minnesota Furbearer Population Model



Figure 1. Prehunt bobcat population estimates from the Minnesota Furbearer Population Model and 3-year mean numbers of bobcat tracks observed per transect in winter track surveys, 1978-2013.

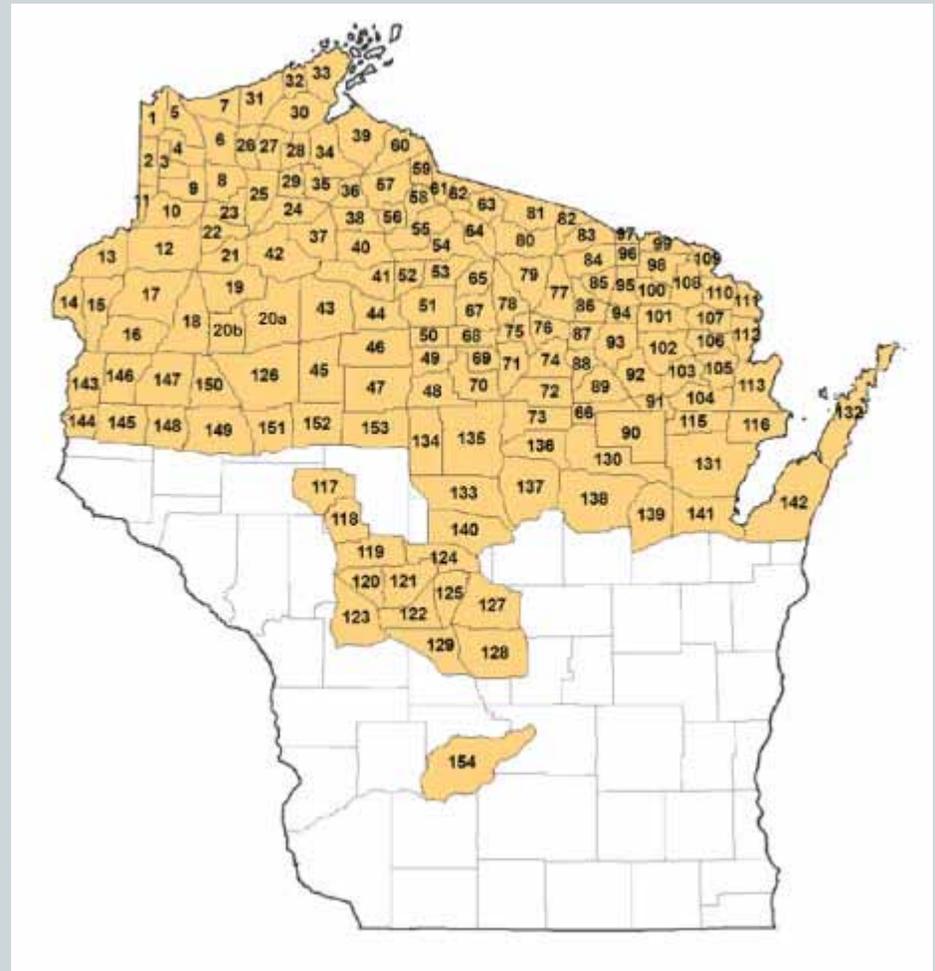


# WINTER CARNIVORE TRACKING



Dnr.wi.gov

Keyword "Carnivore Tracking"



# BEAVER POPULATION SIZE



~54,700 beavers in 2011  
Helicopter survey every 3 years



USFWS

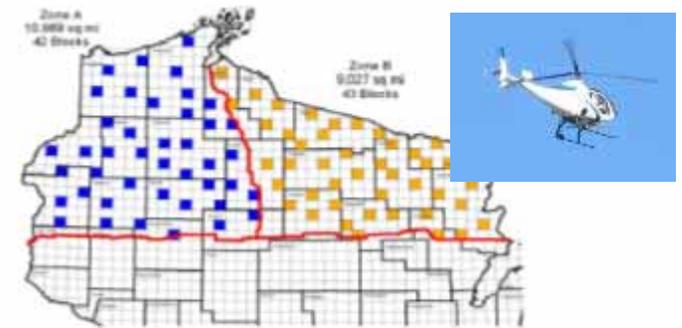


Figure 1. Wisconsin's Beaver Management Zones A and B and general locations of blocks surveyed.

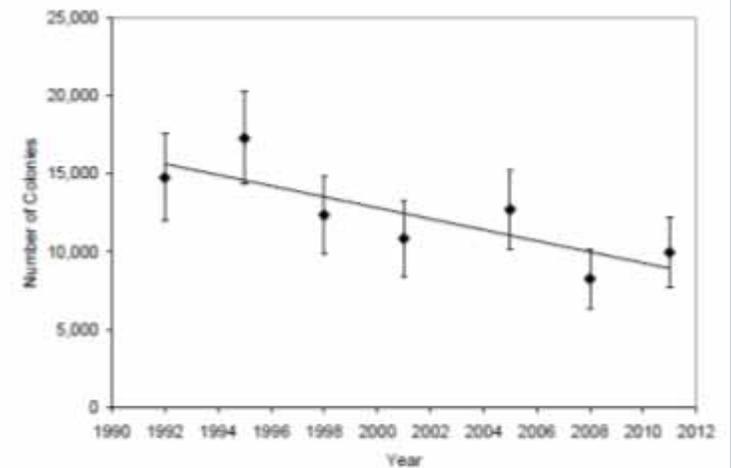
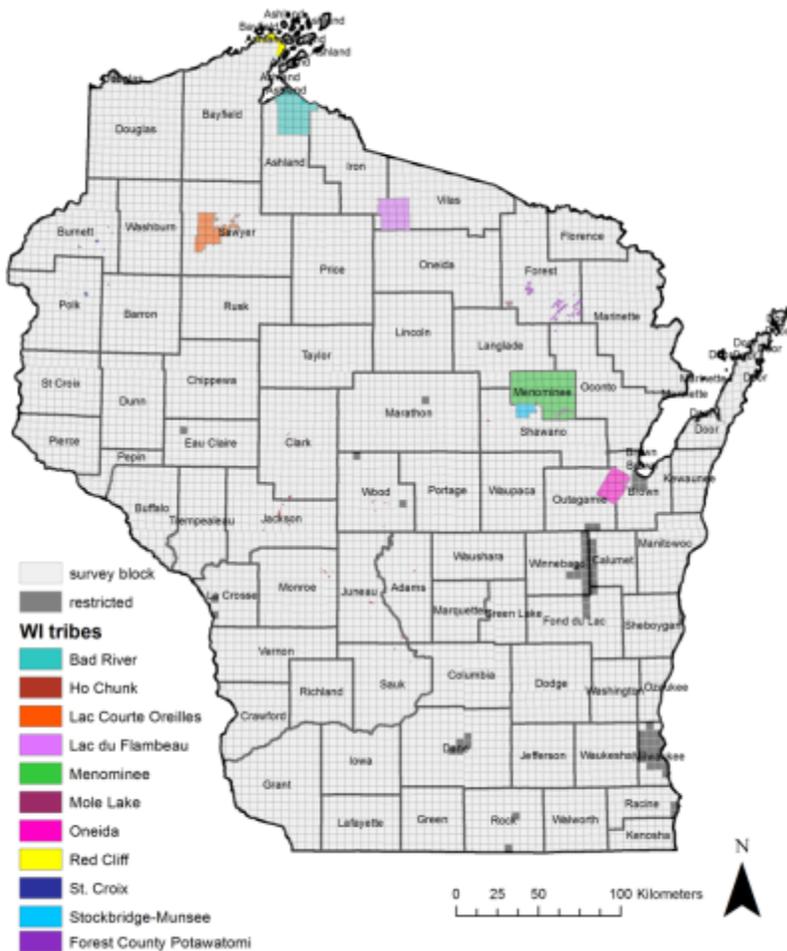
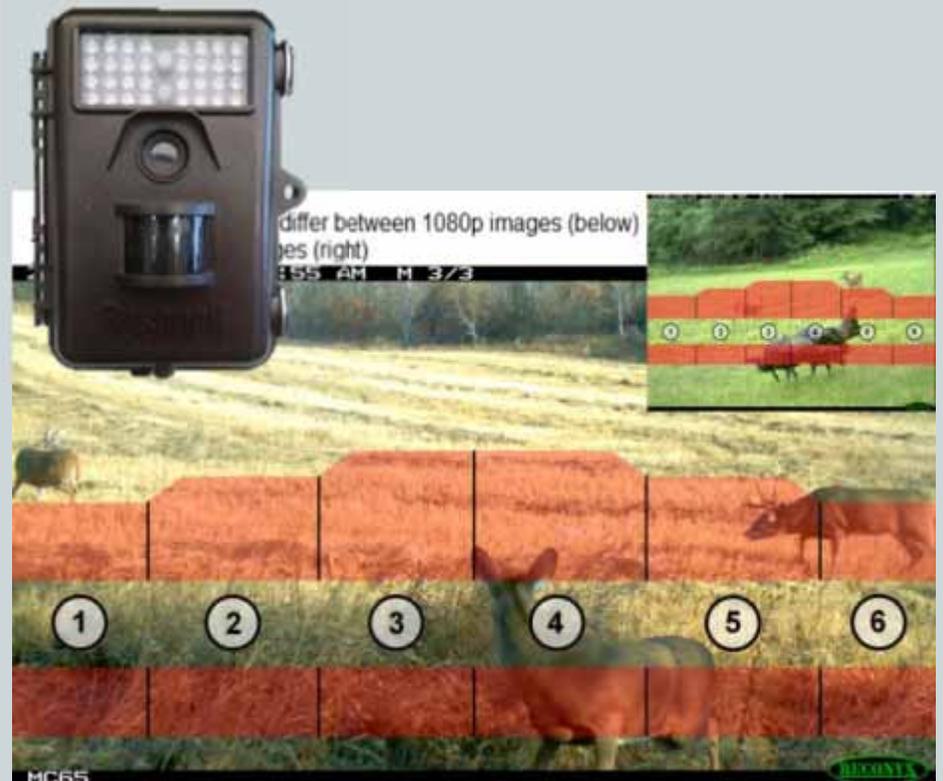


Figure 2. Estimated number of beaver colonies ( $\pm 95\%CI$ ) in northern Wisconsin, 1992-2011.

# WHAT CAN *SNAPSHOT WISCONSIN* CONTRIBUTE TO CURRENT WILDLIFE MONITORING?



- Spatial extent
- Temporal extent
- Consistency and rigor



# LONG-TERM MONITORING



# PHENOLOGY



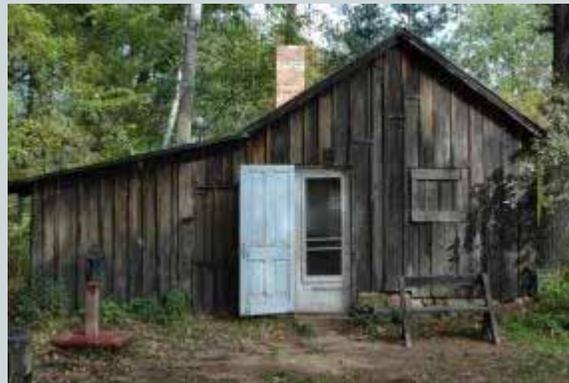
Wisconsintrails.com

# PHENOLOGY



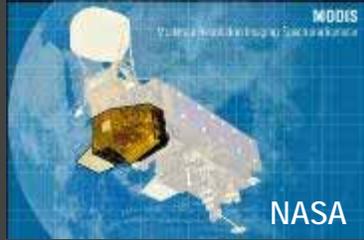
*“Many of the events of the annual cycle recur year after year in a regular order. A year-to-year record of this order is a record of the rates at which solar energy flows to and through living things. They are the arteries of the land. By tracing their response to the sun, phenology may eventually shed some light on that ultimate enigma, the land’s inner workings.”*

–Aldo Leopold, *A Phenological Record for Sauk and Dane Counties, Wisconsin, 1935-1945*



# GREEN UP



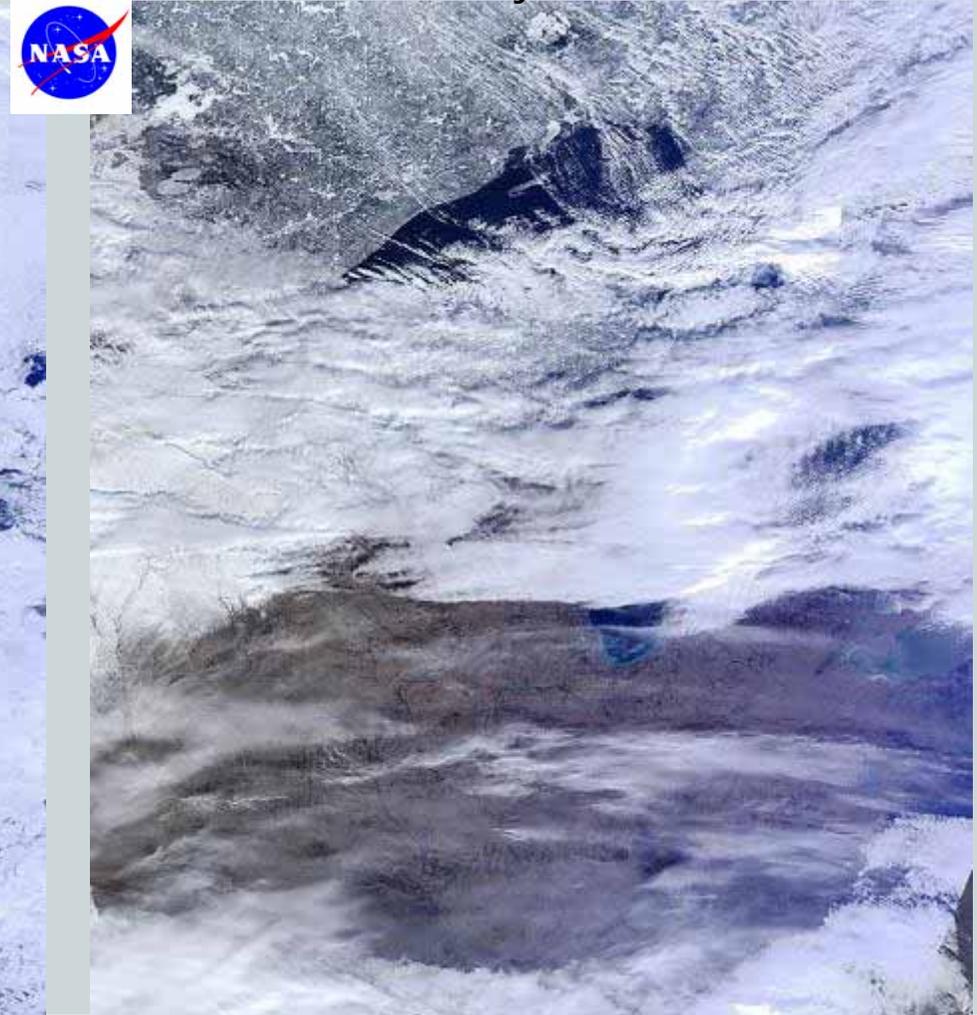
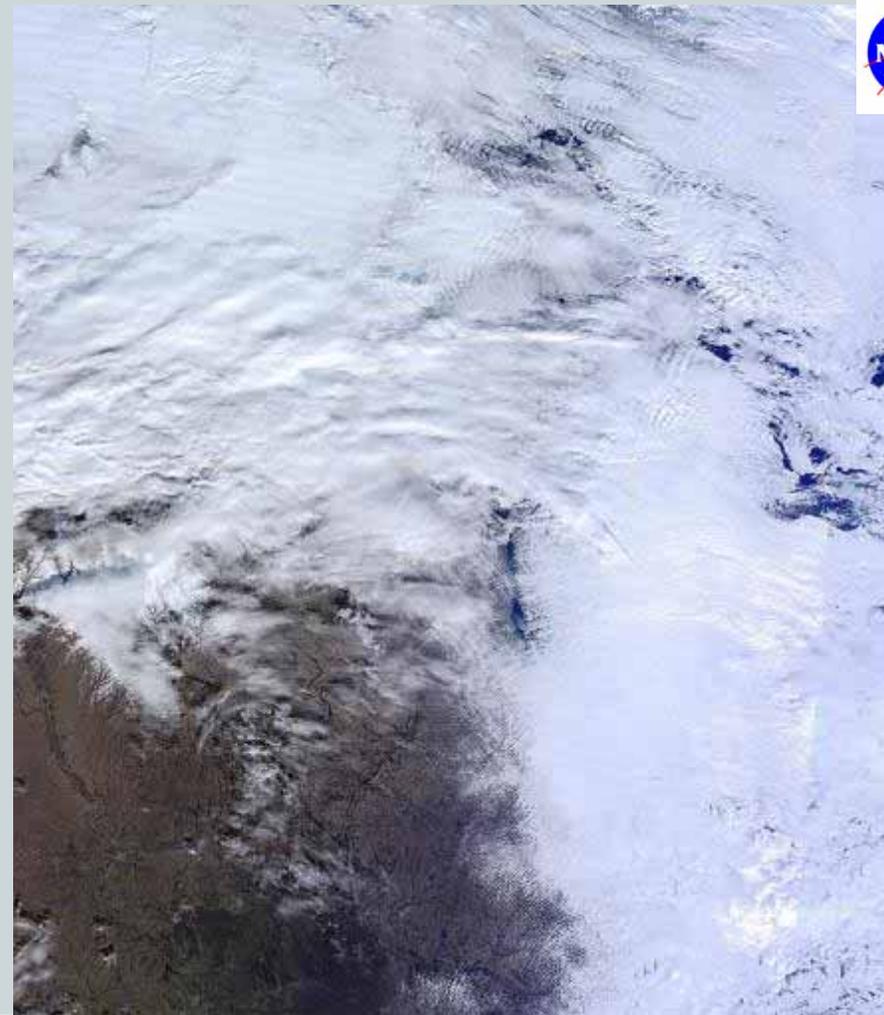


# REMOTE SENSING

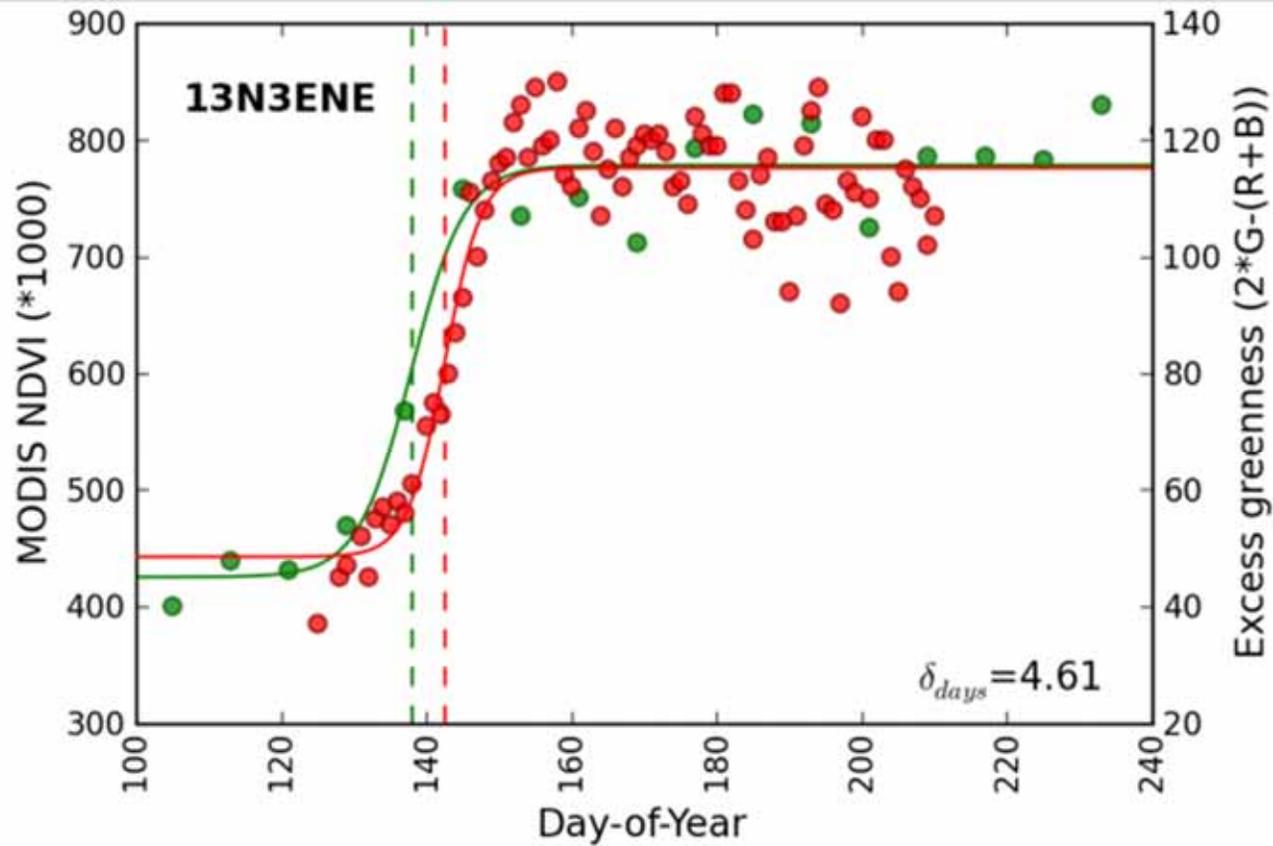


December 25, 2014

January 1, 2015



# GREEN UP



# ELK IN WISCONSIN



# ELK MONITORING WITH TRAIL CAMERAS



- 2 camera grids
- 362 trail cameras
- July 2015 – current
- >2.5 million photos!

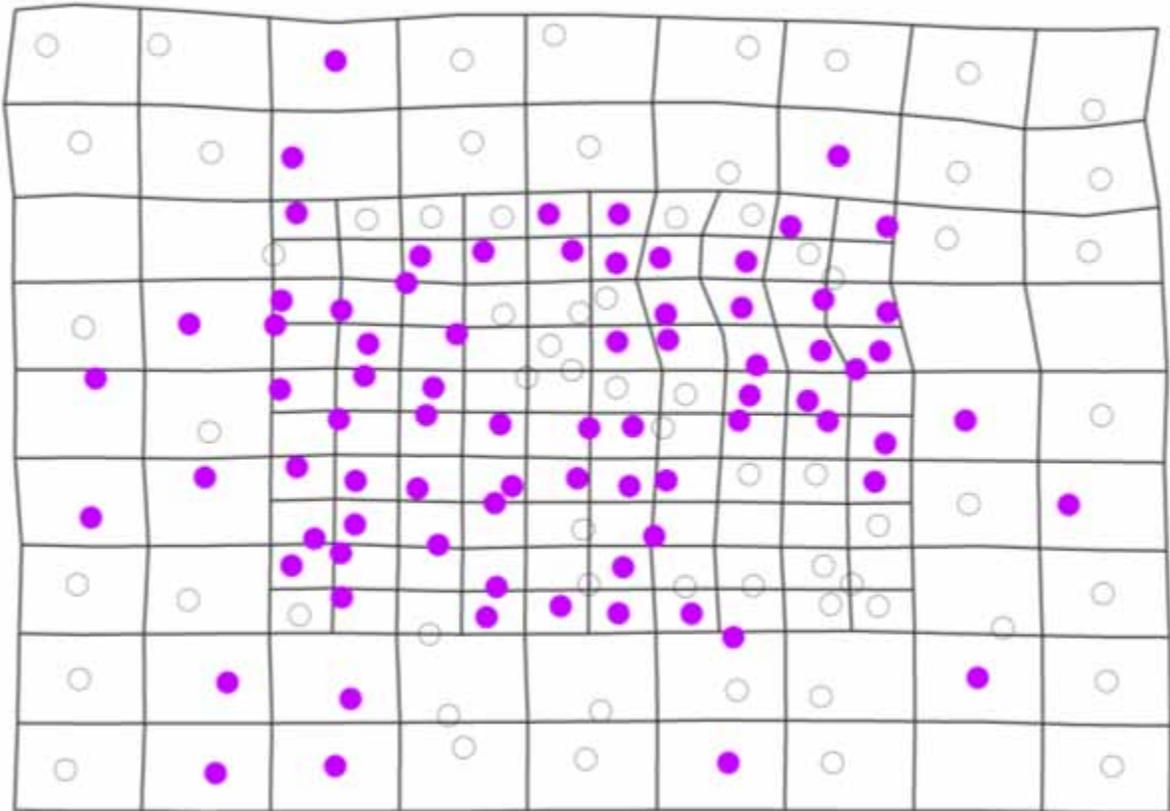
# CAMERA SITES WITH ELK



## Distribution Maps

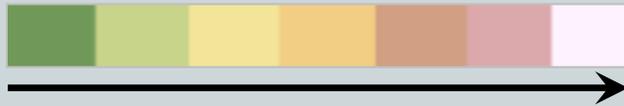
- Seen
- Not seen

at 144 cameras  
active 10 – 206 days  
between Jan 2015  
and Feb 2016





# SIGHTING DENSITY OF ELK



Low to high relative sighting density



Bulls



Cows



Calves

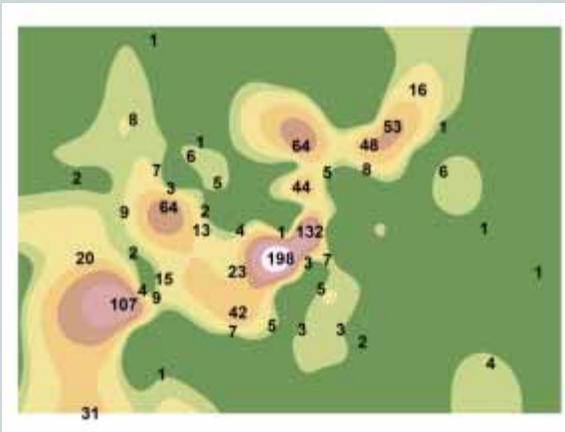


# SIGHTING DENSITY OF OTHER ANIMALS



Low to high relative sighting density

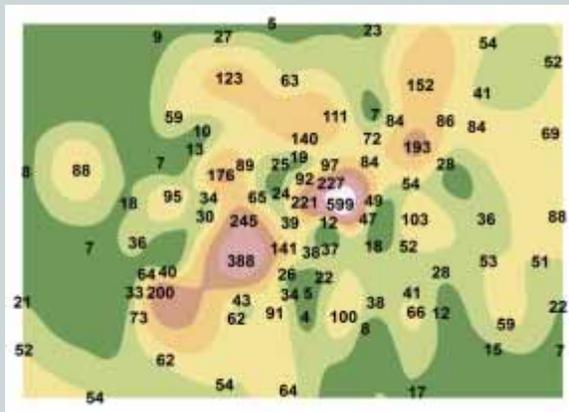
Elk



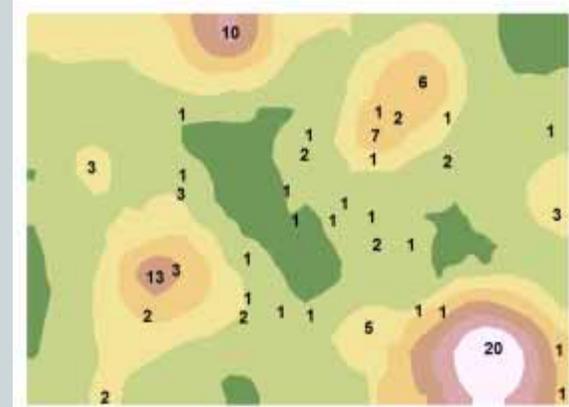
Bears



Deer



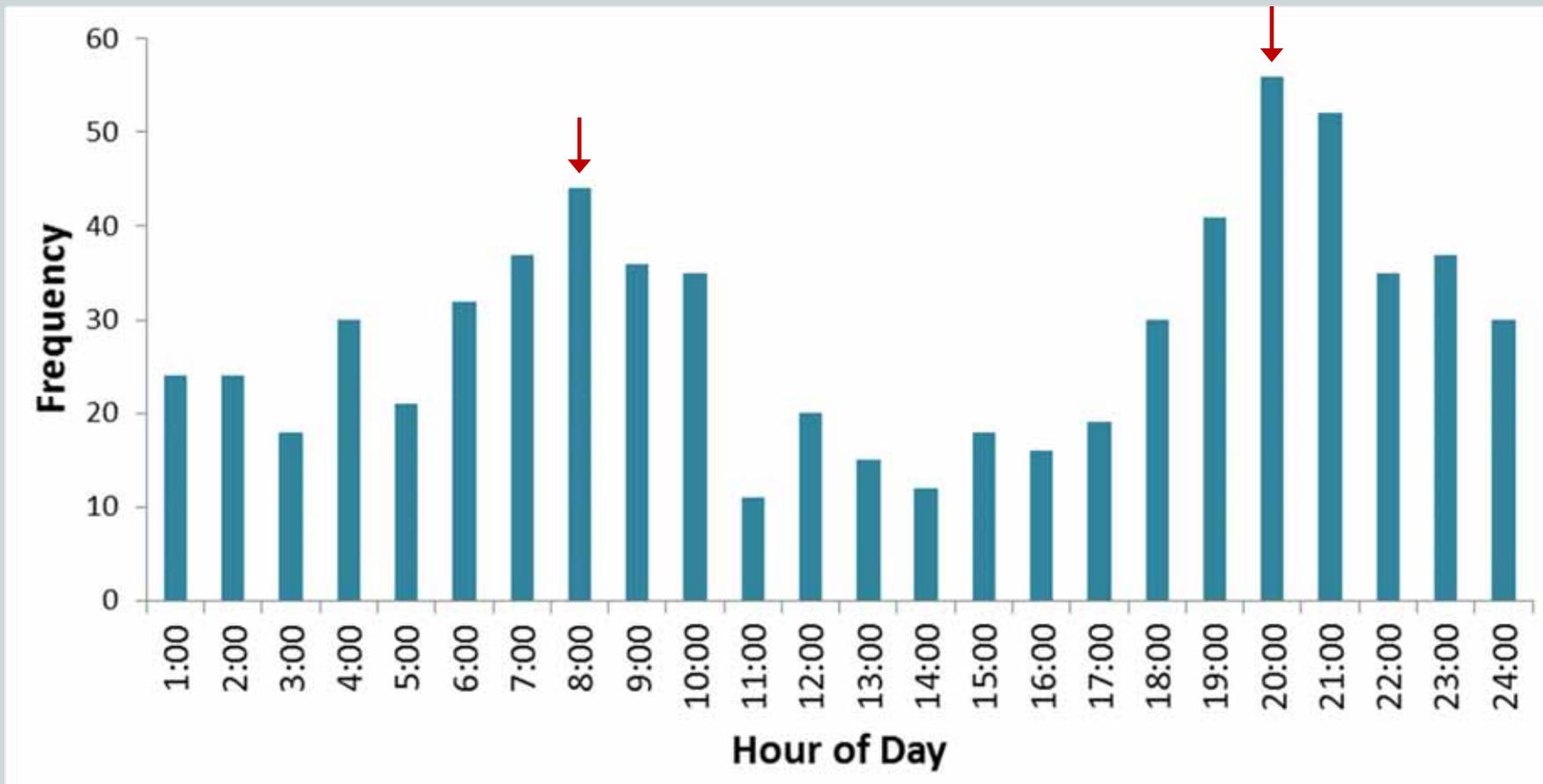
Coyotes and wolves



# ELK ACTIVITY THROUGHOUT THE DAY



Elk activity peaks between 7:00 and 8:00, AM and PM

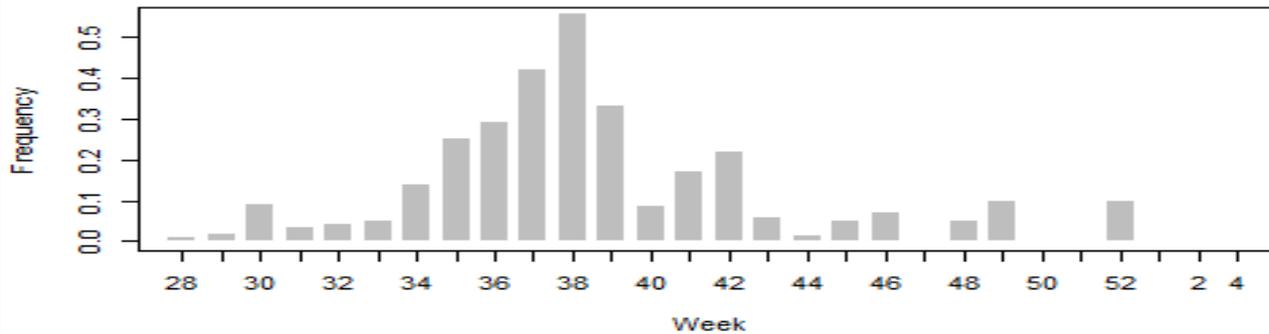


# ELK ACTIVITY THROUGHOUT THE YEAR

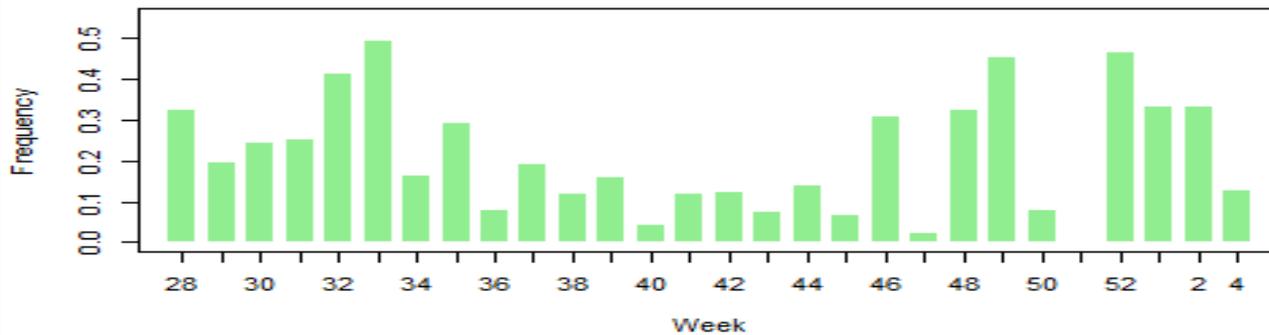


Bull elk are more active during the rut

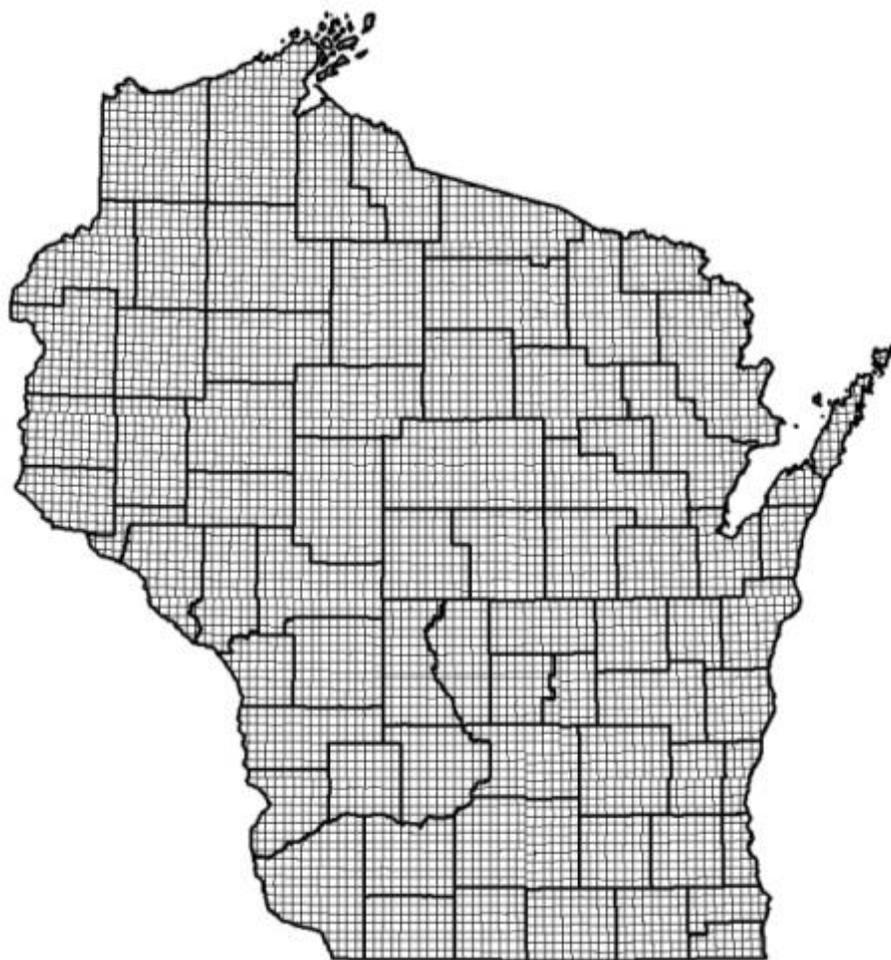
Corrected number of photos of bulls



Corrected number of photos of cows

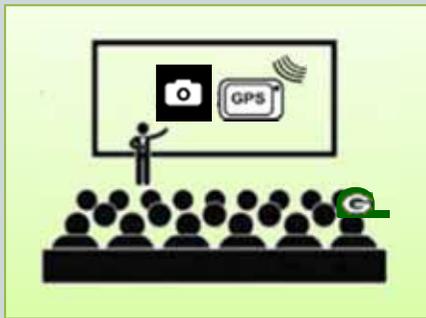


# *SNAPSHOT WISCONSIN STATEWIDE*



# TWO WAYS TO PARTICIPATE

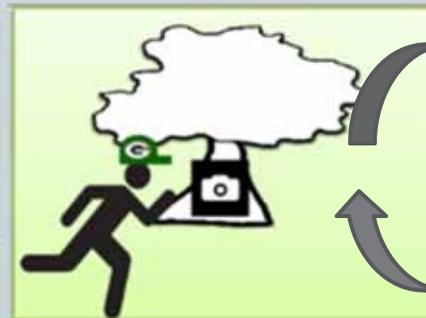
## 1. Host a trail camera within a survey block



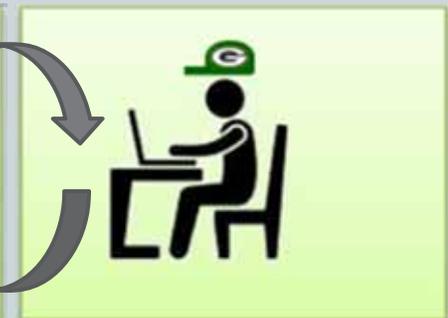
Attend training



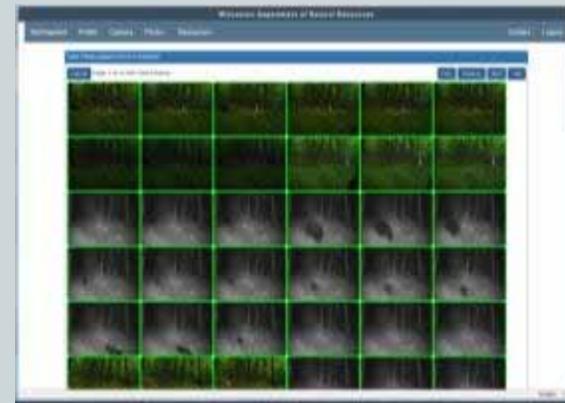
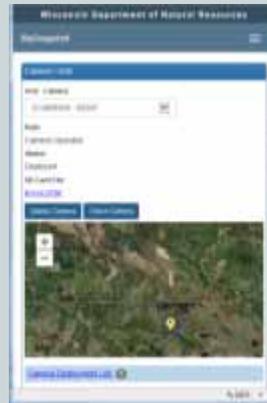
Set up a camera



Retrieve photos

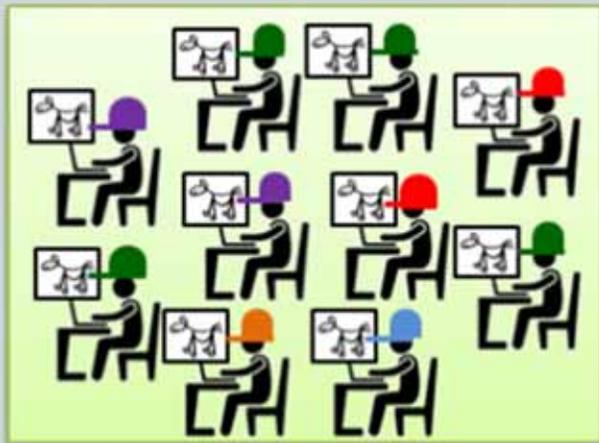


Upload & check photos



# TWO WAYS TO PARTICIPATE

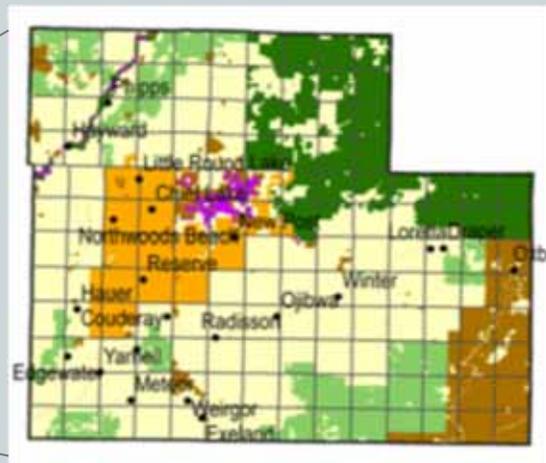
## 2. Classify animals in photos



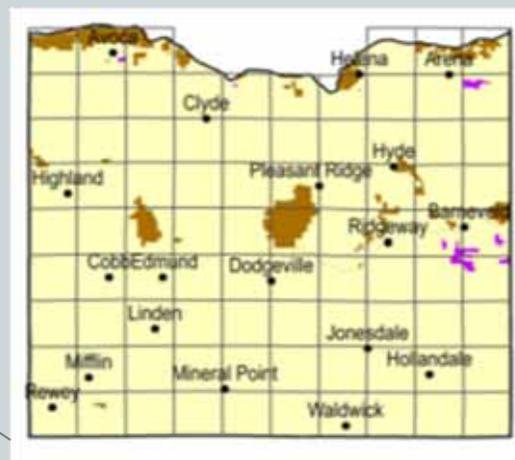
Search

Coat	Tail	Built
Amphibians and Reptiles	Dog, Domestic	Opposum, Virginia
Badger, American	Elk	Other Domestic
Beaver, Black	Fisher	Otter
Beaver, American	Fox, Gray	Pheasant
Bird	Fox, Red	Pig, Feral
Bobcat	Grouse	Pomarine
Cal, Domestic	Hare, Snowshoe	Raccoon
Chipmunks and Squirrels	Human	Skunk, Striped
Cottontail, Eastern	Jackrabbit, White Tailed	Skunk, Spotted
Cougar	Lynx	Turkey
Coyote	Marten, American	Weasel
Crane, Sandhill	Mink, American	Wolf, Gray
Crane, Whooping	Moose	Wolverine
Deer	Muskrat	Woodchuck

# ENROLLING VOLUNTEERS BY COUNTY



Sawyer County  
152 survey blocks



Iowa County  
86 survey blocks

# ENROLLING VOLUNTEERS BY COUNTY



SnapshotWisignup.org

The screenshot shows a web browser window displaying the Snapshot Wisconsin signup page. The browser's address bar shows the URL <http://www.snapshotwisignup.org>. The page features a large background image of a field at sunset. At the top center, there is a logo with the text "SNAPSHOT WISCONSIN" and the tagline "Let's discover our wildlife together!". Below the logo, a white box contains the following text:

**Welcome to Snapshot Wisconsin!**

Snapshot Wisconsin is a volunteer program to monitor wildlife using a statewide network of trail cameras. The project provides a unique opportunity for individuals, families and students to get involved in monitoring Wisconsin's wildlife and collect data to inform wildlife management decisions.

Equipment and training will be provided to volunteers, and ~~to host a trail camera.~~

General enrollment is now open in Iowee County and Sawyer County. We are also accepting applications from educators and tribal members statewide. Volunteers hosting trail cameras should have access to a property of at least 10 contiguous acres.

To apply to host a trail camera, please click "next" at the bottom of this screen.

General enrollment will open across the state over the next few years. To stay up to date with enrollment openings, please join our mailing list and visit [www.dnr.wis.gov](http://www.dnr.wis.gov) (beyond "Snapshot Wisconsin"). To reach project coordinators, email [Trish@snapshotwisconsin.org](mailto:Trish@snapshotwisconsin.org) or [www.wisconsin.gov](mailto:www.wisconsin.gov) or call 608-221-8334.

NOTE: Personal information collected on this form will be used in administration of the Snapshot Wisconsin Program, and may be provided to requestors to the extent required by Wisconsin's Open Records Law (see 19.31-19.39, Wis. Stats.)

At the bottom of the page, there is a green "Next" button and a row of logos for partner organizations: Wisconsin Department of Natural Resources, WISST, WISCONSIN, ADLER, and Extension.

# Questions?

More Info:

[dnr.wi.gov](http://dnr.wi.gov)

keyword "Snapshot Wisconsin"

[DNRSnapshotWisconsin@wisconsin.gov](mailto:DNRSnapshotWisconsin@wisconsin.gov)