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Agriculture-Migratory Bird Conflicts

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Agriculture Wildlife Conflict Working Group – September 28, 2018



Overview

- Guiding Principles
- Damage or Danger Permits and Conflict Mitigation
- Conflicts with Canada geese
- Conflicts with Sandhill Cranes
- Updates on Recent Sandhill Crane Work
- Key Findings so Far...
- Next Steps
- Potential Research to Inform Policy
- Opportunities for Collaboration



Guiding Principles

Select guiding principles from “Strategy for preventing and managing human wildlife conflicts in Ontario” that are relevant to our discussion today:

- All residents of the province share responsibility for preventing and managing human-wildlife conflicts
- Effectiveness is dependent on implementation of practical solutions through collaboration and discussion among stakeholders
- Actions to address human-wildlife conflicts must be ecologically sound.
- Sound scientific and applied technical knowledge can enhance human-wildlife conflict prevention efforts.
- Prevention is achieved through proactive efforts and an adaptive management approach.



Damage or Danger Permits

- Migratory Birds are protected by the *Migratory Birds Convention Act, 1994* and its *Regulations*.
- However, the *Migratory Bird Regulations* provide options to address conflicts with migratory birds, including Damage or Danger Permits.
- Permits are available for free and applicants in good standing can receive a 3-year permit.
- **Possession of an EC permit does not exempt permit holders from other federal, provincial or municipal laws and regulations.**

For more information on permits and the application process see:

<https://www.canada.ca/en/environment-climate-change/services/migratory-bird-permits/application-forms.html>



Damage Mitigation

Techniques **requiring** a federal permit:

- Use of a Firearm
- Use of an Aircraft (including remote control)
- Use of Raptors (falcons, eagles, etc.).



Common techniques **not requiring** a federal permit:

- Remote Scaring
 - Propane cannons
 - Strobes lights and lasers
 - Motion-activated sprinklers
- Active Scaring
 - Dogs
 - Pen-style “Bear Bangers”
- Habitat modification
 - Lure crops
 - Remove/limit attractants
 - Barriers to attractants

Agricultural Conflicts with Migratory Birds



- Canada Geese (#1) and Sandhill Cranes (#2) account for the majority of Migratory Bird – Agriculture conflicts in Ontario.
- Gulls (mostly ring-billed) are a distant third.
- Various other species can be involved in agricultural conflicts
 - Snow geese – E. Ontario
 - Robins, other passerines – Orchards
 - Herons - Aquaculture



Agricultural Conflicts with Migratory Birds

Canada geese

- Spring planted crops.
- Pastures and hay (primarily wet areas).
- Freshly planted winter wheat (fall).
- Some standing soybean and cereal crops during brood rearing (local).

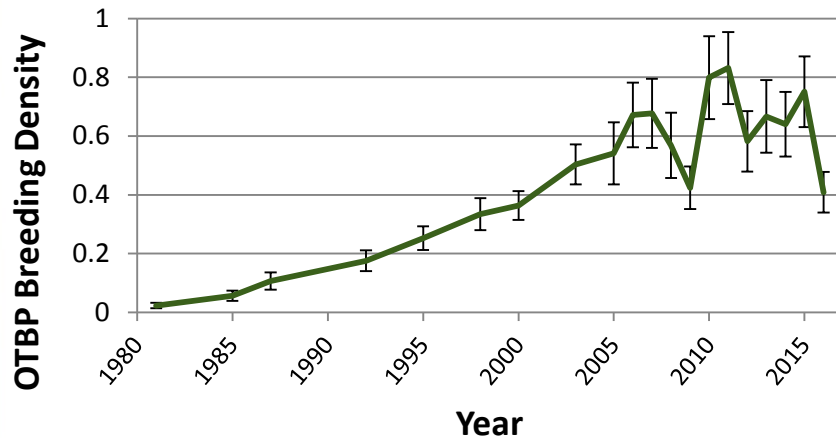


Sandhill cranes

- Germinated/sprouting corn.
- Standing cereal crops.
- Pre-harvest potatoes.
- Trampling of standing cereal crops allows access for other species (geese/ducks).

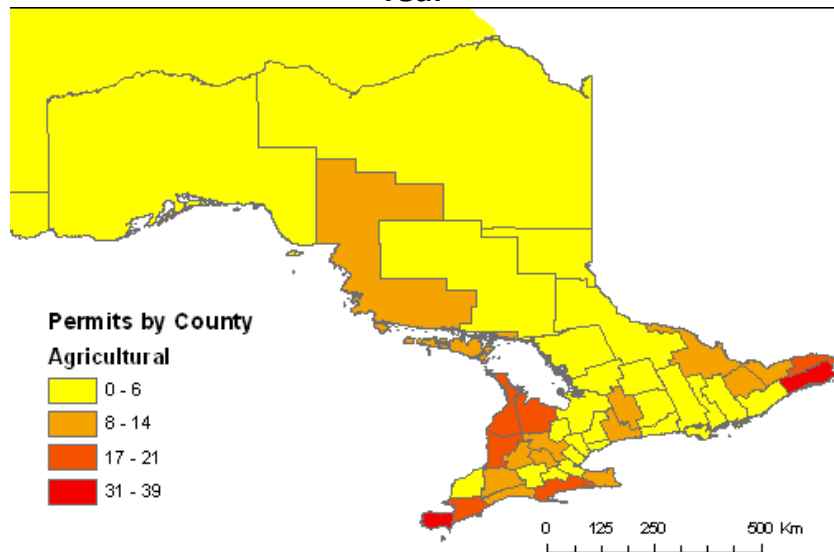


Conflicts with Canada geese



Canada goose populations in Ontario

- Ontario Temperate-breeding Population (OTBP; Urban & Agricultural)
- Southern Hudson Bay Population (Agricultural – SW ON)
- Atlantic Population (Agricultural – Eastern ON)
- Moulting Migrants (Urban & Agricultural)



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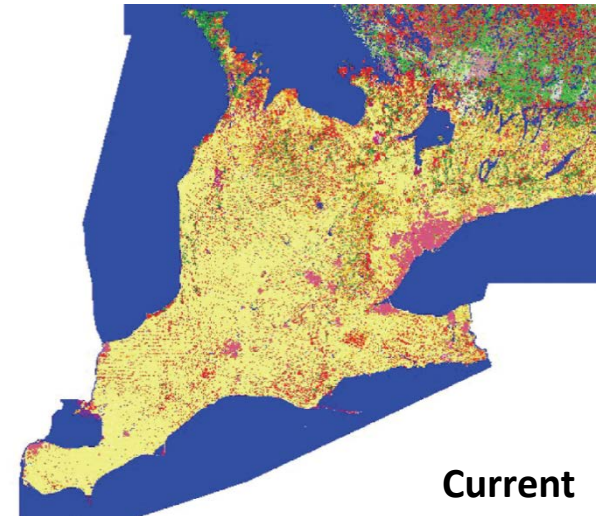
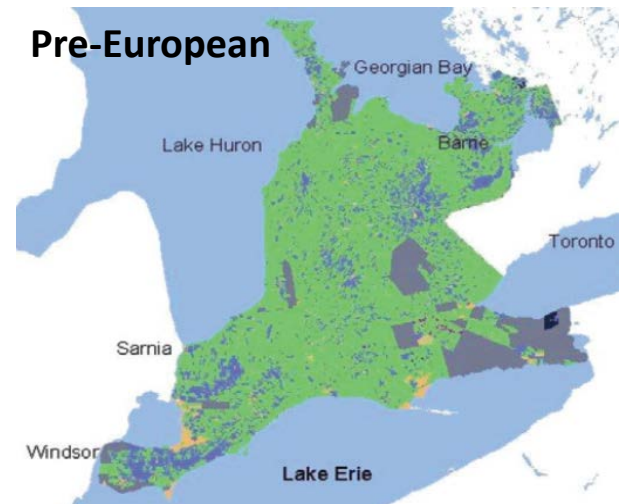
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Conflicts with Canada Geese

Why so many Canada Geese and conflicts?

- Dramatic population increase
 - Changes to landscape – Shift from forest to agricultural landscape; manicured waterfronts
 - Current agricultural practices provide an abundance of food throughout annual cycle.
- Large interface for conflict
 - “Urban Refuge” provides suitable habitat for entire annual cycle in close proximity to people.



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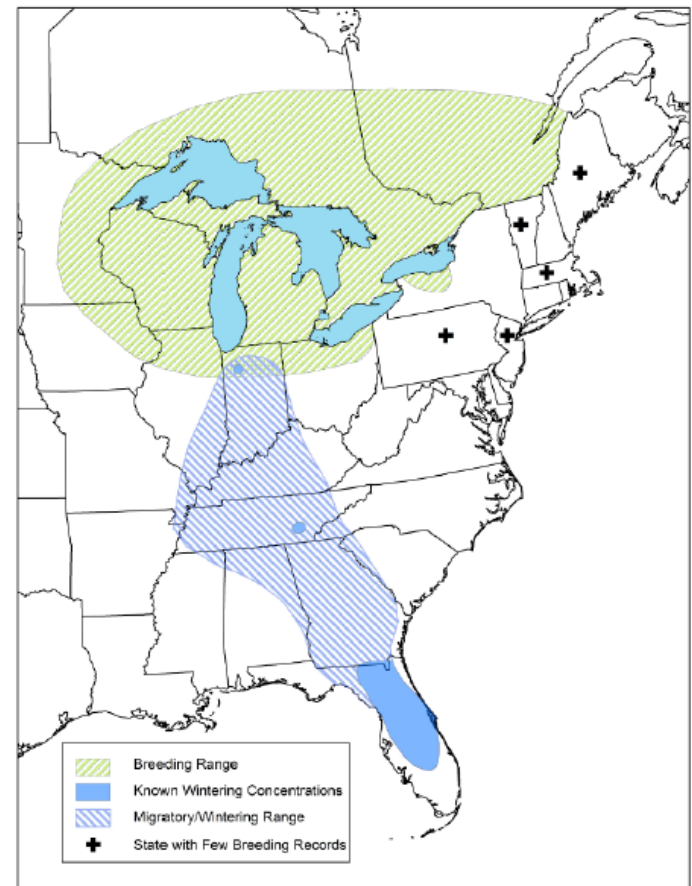
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Sandhill Crane Populations in Ontario

Two Sandhill Crane populations in Ontario:

- Midcontinent Population - 700 000 cranes
- Eastern Population - 80 000-90 000 cranes



Sandhill Crane Ecology

- Opportunistic, omnivorous foragers that consume a variety of plant materials, small vertebrates, and invertebrates
- Crane diet has likely changed substantially in the last century with the loss of natural prairie systems, substantial wetland drainage, and the development of large-scale agriculture.
- Waste grains from agricultural crops, such as corn, barley, and wheat are the most important source of energy during migration and wintering



Sandhill Crane Ecology

- Adults are socially monogamous, often with multi-year pair bonds.
- Age of first reproduction is generally 4+ years old (Eastern Population)
- Both parents incubate (Female $\approx 70\%$), and both are involved in parental care post-hatch.
- In boreal forest, nest in larger wetlands dominated by grass/sedge.
- Nest on floating mat adjacent to water, generally lay two eggs.
- Will remain as a family group through to the following spring and sometimes will be joined by offspring from previous seasons.



John M. Kowarski



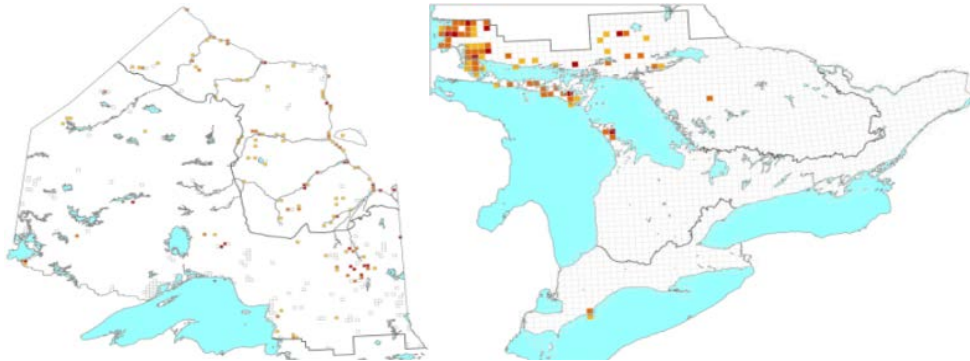
Conflicts with Sandhill Cranes

- Increasing population size → growth rate = 4.4% per year.
- Expanding breeding distribution → dramatic expansion in Eastern Canada from 1980s to 2000s .

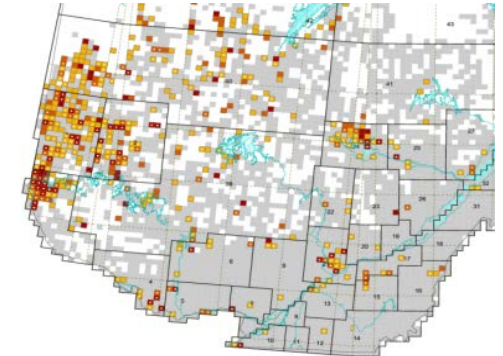
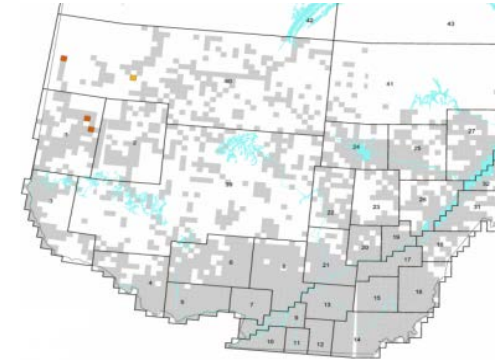
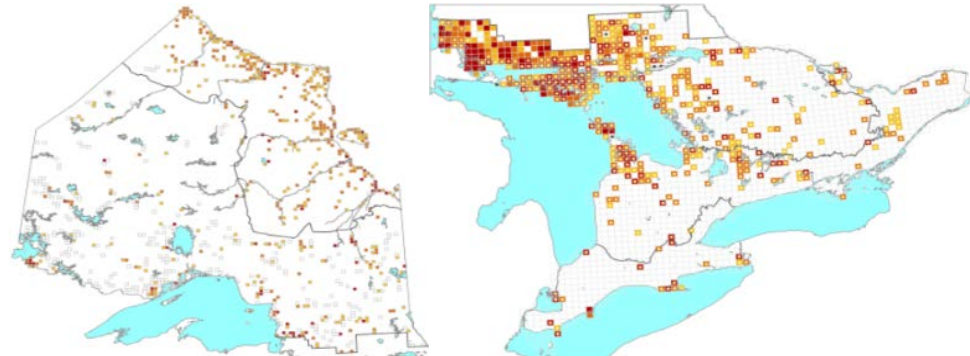
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Québec

**1st Atlas
(1980s)**

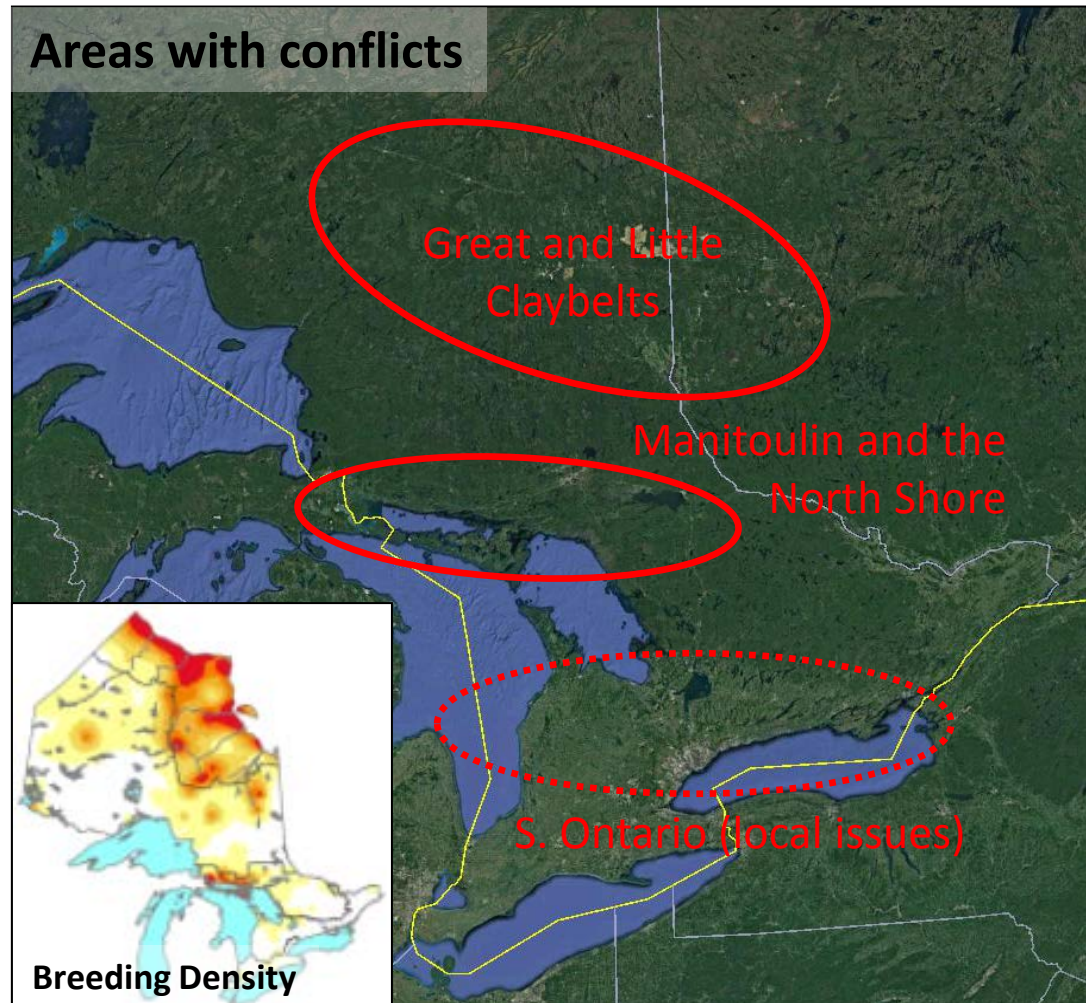


**2nd Atlas
(2000s)**



Conflicts with Sandhill Cranes

- Damage mostly limited to agricultural areas on the fringe of the boreal forest.
- ≈50 DorD permits annually.
- Often impact the same farms each year.



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Sandhill Crane Conflicts in Ontario

Why are SACR increasing and “expanding”?

- Simply rebounding from near extinction, not a “non-native”/invasive species
 - Dramatic population declines due to habitat loss, human disturbance, and over-hunting (1800s-1916).
 - Low annual recruitment = vulnerable to over-harvest and slow recovery.
 - Closure of hunting in North America from 1916 to 1959; 1916-2011 for Eastern Population.
- Factors linked to population increase/expansion.
 - “Expansion” represents infilling of region that were historically occupied (pre-1900’s).
 - Shift from forested to agricultural landscape in Eastern Canada/US.
 - Current agricultural practices provide an abundant and reliable food source more most of annual cycle.
 - Harvest is limited and closely monitored to ensure the sustainability of the population.



Updates on Recent Sandhill Crane Work

- Eastern Waterfowl Survey Analysis
- Staging Sandhill Crane Survey
- Damage or Danger Permit Questionnaire
- Mitigation Review – Annotated Bibliography



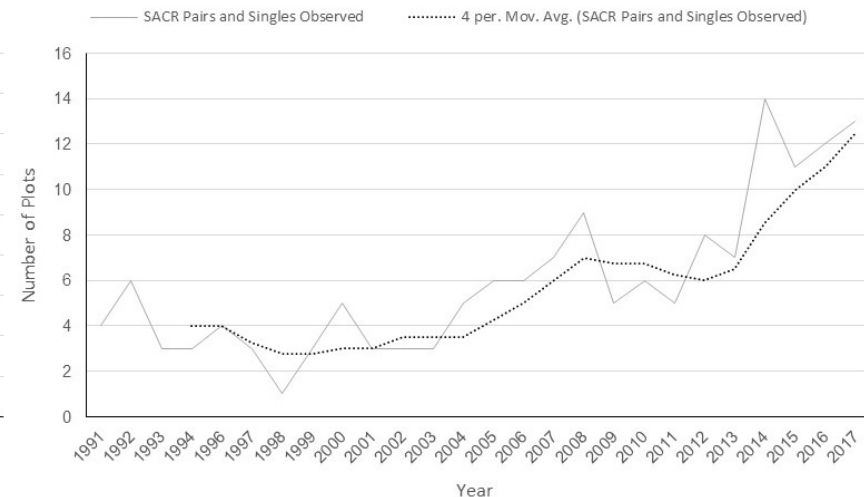
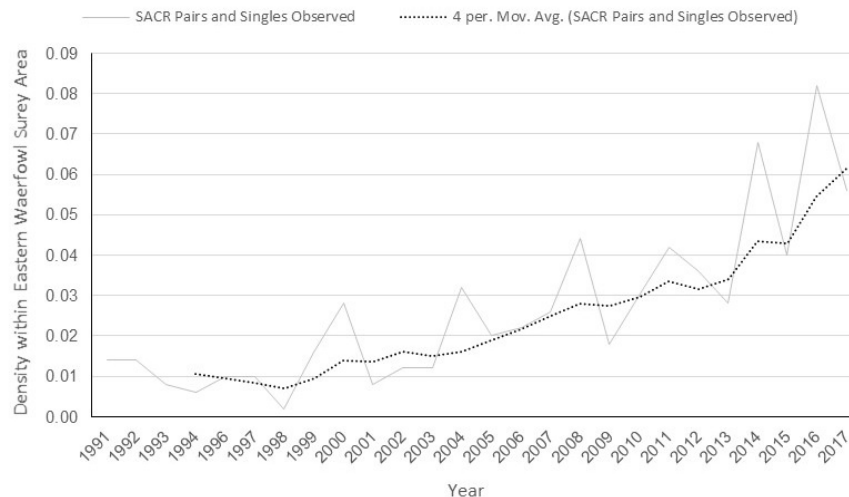
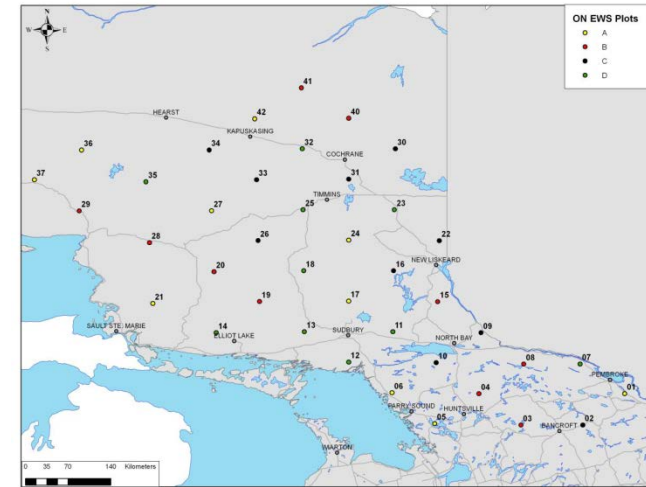
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Update on Sandhill Crane work

- Helicopter-based plot survey in the boreal forest, primarily focused on counting breeding waterfowl.
- SACR breeding abundance and range increasing in both Ontario and Quebec.



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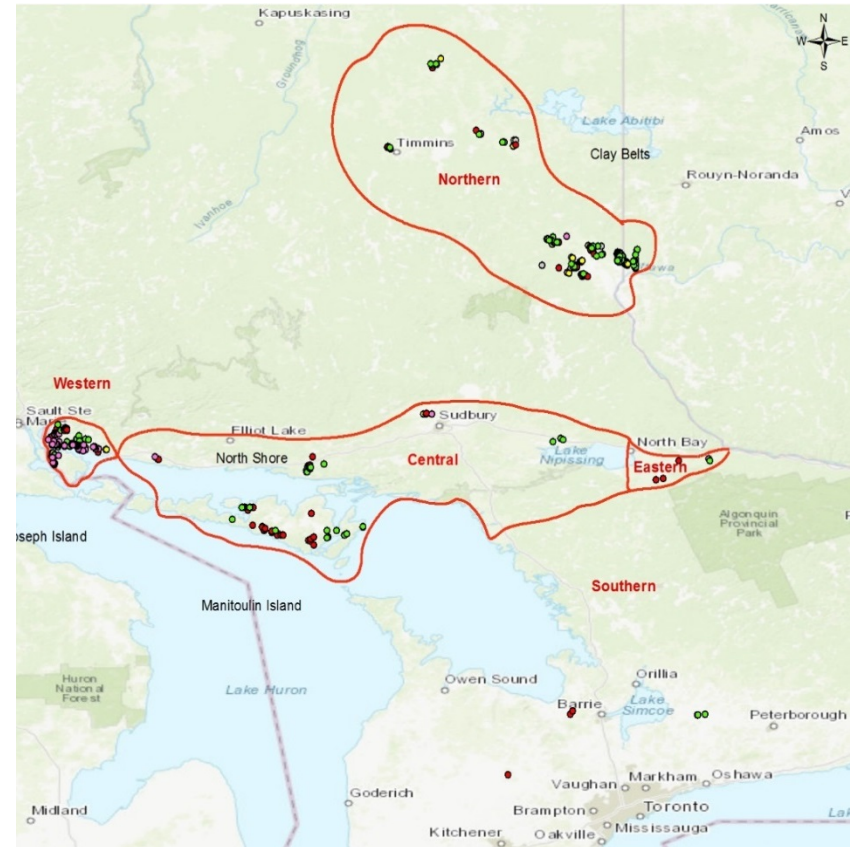
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Staging Sandhill Crane Survey

Objectives

- *Survey Development:*
 - Minimum population estimate for SACR in Ontario
 - Identify information needs supporting survey development.
 - Inform and advance the development of a population model for EP cranes in Ontario.
- *Agricultural Use and Damage*
 - Document agricultural field use by fall staging cranes in Ontario;
 - Determine information required to address agricultural damage



Staging Sandhill Crane Survey

Survey Areas	2013	2014	2015	2016	2017
Northern	2,816	4,117	4,575	7,230	7,779
Western	-	2,971	504	1,560	1,777
Central	610	327	800	1,945	3,921
Eastern	-	7	0	6	11
Southern	-	27	10	343	611
All Ontario	3,426	7,449	5,889	11,084	14,099
Western Quebec	-	6	4,149	2,181	2,833
Survey Total	3,426	7,455	10,038	13,265	16,932

“Peak” count of SACR in Ontario ≈ 14,000 individuals



Staging Sandhill Crane Survey

Field use

- Typically used agricultural fields close to roosts locations.
- Smaller groups tend to use “green” field proportionately more than larger groups (↑ % young).
- Appear to prefer harvested fields when available.
- Select harvested corn in fall when available.

Table 6. Percent of flocks observed in each field type during 2016 fall staging Eastern Population Sandhill Crane surveys in Ontario.

Field Type ¹	Flocks ≤ 50 (n)	Flocks > 50 (n)	All Flocks (n)
Grain Fields			
Harvested Cereal ²	40.5%(n=98)	51.5% (n=17)	41.5% (n=115)
Standing Cereal ²	1.7%(n=4)	9.1% (n=3)	2.5% (n=7)
Harvested Corn	14.5%(n=35)	18.2% (n=6)	14.8% (n=41)
Green Fields			
Hay	25.6%(n=62)	12.1% (n=4)	23.8% (n=66)
Winter Wheat	0.4%(n=1)	3.0% (n=1)	0.7% (n=2)
Grass/Pasture	11.2%(n=27)	6.1% (n=2)	10.5% (n=29)
Fallow-Reclaimed	1.2%(n=0)	0% (n=0)	1.8% (n=5)
Harvested Soy	4.1%(n=10)	0% (n=0)	3.6% (n=10)
Other	0.8%(n=2)	0% (n=0)	0.7% (n=2)

¹Plowed fields were included with the respective harvested crop, if known.

²Cereal crops include: grain, oats, wheat, barley



Damage or Danger Permit Questionnaire

Objectives

- Collect preliminary information on:
 - Timing of damage from SACR and CAGO
 - Crops involved
 - Estimates of costs and losses resulting from conflicts with SACR and CAGO.
 - Insights from permit holders regarding options for mitigating conflicts with migratory birds

Methods

- Attempted to contact 32 permit holders in Ontario with an authorization for SACR to conduct a telephone questionnaire. Successfully completed 22 questionnaires.
- Additional 20 permit holders without any contact information (mostly in Desbarats and Bruce Mines).



Damage or Danger Permit Questionnaire

Results

- 50% of respondents indicated that caused the majority of damage, while 32% indicated SACR and CAGO were equally responsible. Remaining 18% indicated CAGO were primarily responsible for damage.
- 73% of reported damage occurs before September 1st.
 - Dominant damage occurs in the spring either at seeding or sprouting of the crops. Second highest damage occurrence is around the time of pre-harvest.
- Conflicts occurring around (9%) or after Sept 1st (9%) are :
 - Pre-harvest cereals in the clay belt, primarily in years with delayed harvest (severity/timing of damage is variable).
 - Potatoes immediately pre-harvest –always after September 1st.
- SACR appear to prefer harvested fields in fall once available, decreasing the likelihood of conflicts once crops begin to be harvested.

Average Annual Loses			
\$		%	
\$0-\$500	0	0-5%	0
\$500-\$1,000	2	5-10%	3
\$1,000-\$5,000	3	10-15%	2
\$5,000-\$10,000	5	>15%	3
>\$10,0000	1		



Alternative Mitigation Strategies for Sandhill Cranes

- Modify/enhance farm practices to reduce exposure/severity of conflicts
- Use of lure crops/supplemental feeding.
- Remove/limit attractants or reduce access to attractants.
- Non-lethal seed treatment – ex: biopesticide 9,10-anthraquinone (AQ) treatment for corn (Avipel). USDA approved.



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Key Findings so Far....

- Counts vary with effort and seasonality, but >10,000 sandhill cranes migrating through agricultural areas of northern and central Ontario each year.
- Majority of damage in agricultural areas that on the fringe of the boreal forest.
- Manitoulin/North Shore - corn is most vulnerable post seeding and early emergence. Claybelt - most damage is pre-harvest cereals, mainly barley and oats.
- Potato crops are also very vulnerable immediately pre-harvest, can result in significant economic losses.
- Majority of damage occurs before September 1st.
- Alternative mitigation options can be effective and are being applied elsewhere

Given the timing of conflicts and the very small size of any potential harvest, instating a hunting season will not help mitigate conflicts involving SACR in Ontario in any meaningful way.



Next steps....

- **Further assessment of agricultural conflicts involving SACR.**
 - Factors influencing risk of damage (location, crop type, weather/seasonality, etc).
 - Spatial and temporal extent of conflict and populations involved.
 - Economic losses attributable to SACR
 - Effectiveness of mitigation tools for SACR (direct vs indirect vs farm practices)
- **Engage with other stakeholders to inform science and policy regarding SACR and conflict mitigation**
 - Foster relationships to improve collaboration with CWS-QC and other partners to have a combined approach to monitoring/managing EP SACR.
 - Inform policy regarding conflict mitigation.
- **Continue to collect baseline species information for SACR**
 - Population Size/Distribution/Genetics
 - Migration phenology and habitat use.



Potential Research to Inform Policy

Conflict Mitigation Strategies - Partner with agricultural community?

- Build on preliminary permittee surveys to improve understanding of conflicts.
- Explore/trial alternative mitigation techniques that could be useful in managing.

Transmitter Study – Funding partners will be needed.

- Multi-year transmitters study examine large and small scale movements and relate to habitat availability and human land use.

Genetics Work

- Genetics of birds causing damage as well as explore if there is a shift in the genetics during migration.

Possible PhD student at Université du Québec en Abitibi-Témiscamingue – CWS ON and QC regions



Opportunities for Collaboration

For CWS, this working group provide the potential for:

- Knowledge/experiences to inform/support effective conflict mitigation.
- Robust survey/questionnaire design targeting the agricultural community.
- Access to relevant agricultural data.
- Potential funding opportunities through partnerships.

CWS is looking to collaborate with agricultural partners to leverage limited resources to meet common objectives regarding Sandhill Cranes.



Opportunities for Collaboration

Questions for AWCWG:

- Initial thoughts on information presented here?
- Key information required to improve guidance and mitigation techniques for the agricultural sector?
- Resources and expertise to bring to the table?
- Other opportunities/means to communicate with individuals experiencing conflicts.
- Thoughts on alternative techniques?



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