



A mysterious phenomenon that needs conservation attention: *Swallow Roosts* along the lower Great Lakes

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Nature Canada

# Ontario's six species of swallow



**Purple Martin**  
*Progne subis*



**Barn Swallow**  
*Hirundo rustica*



**Tree Swallow**  
*Tachycineta bicolor*



**Cliff Swallow**  
*Petrochelidon pyrrhonota*



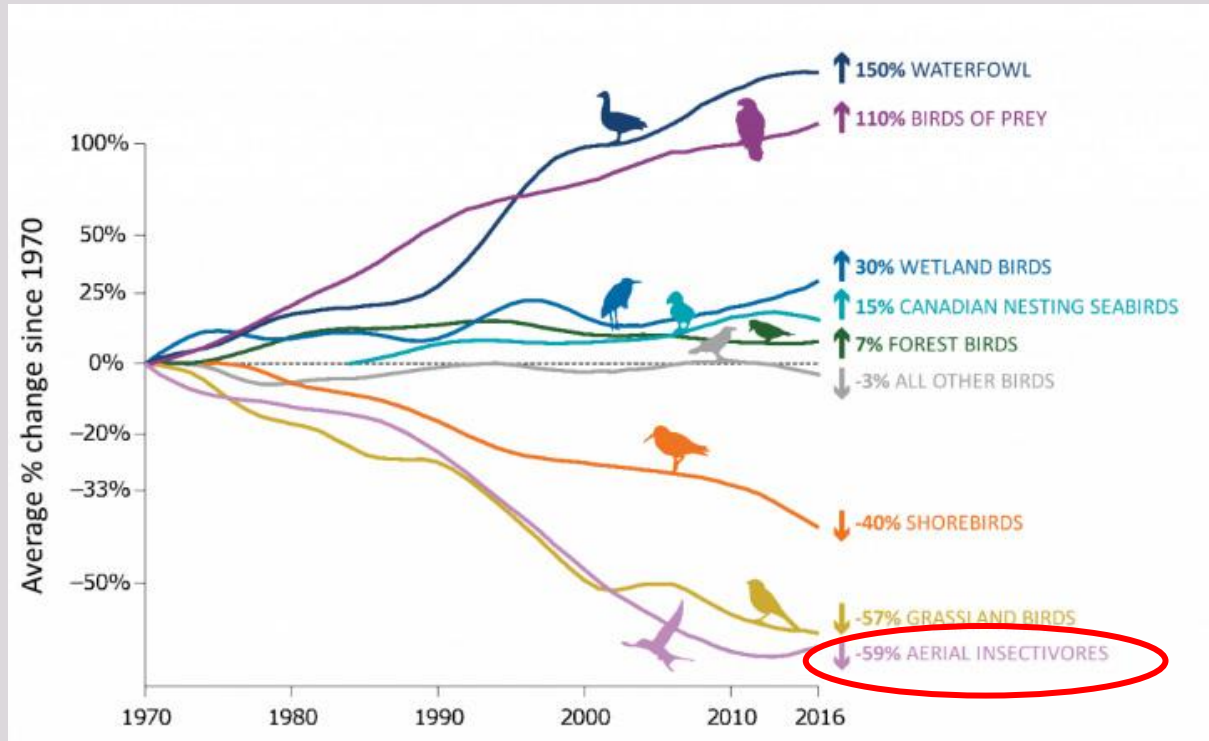
**Bank Swallow**  
*Riparia riparia*



**Northern Rough-winged Swallow**  
*Stelgidopteryx serripennis*



# State of Aerial Insectivores and Swallows



Ontario BBS for Swallows	% loss 1970-2018	% loss 2007-2018
Bank Swallow	95.7	45.5
Barn Swallow	70.9	23.9
Cliff Swallow	92.7	34
N. R-w Swallow	64.4	11.5
Purple Martin	90.2	39.2
Tree Swallow	81.5	15.2
Aggregate loss	82.6	28.2

# Alarming news of biodiversity loss



NEWS LIFE

## We've lost 3 billion birds since 1970 in North America

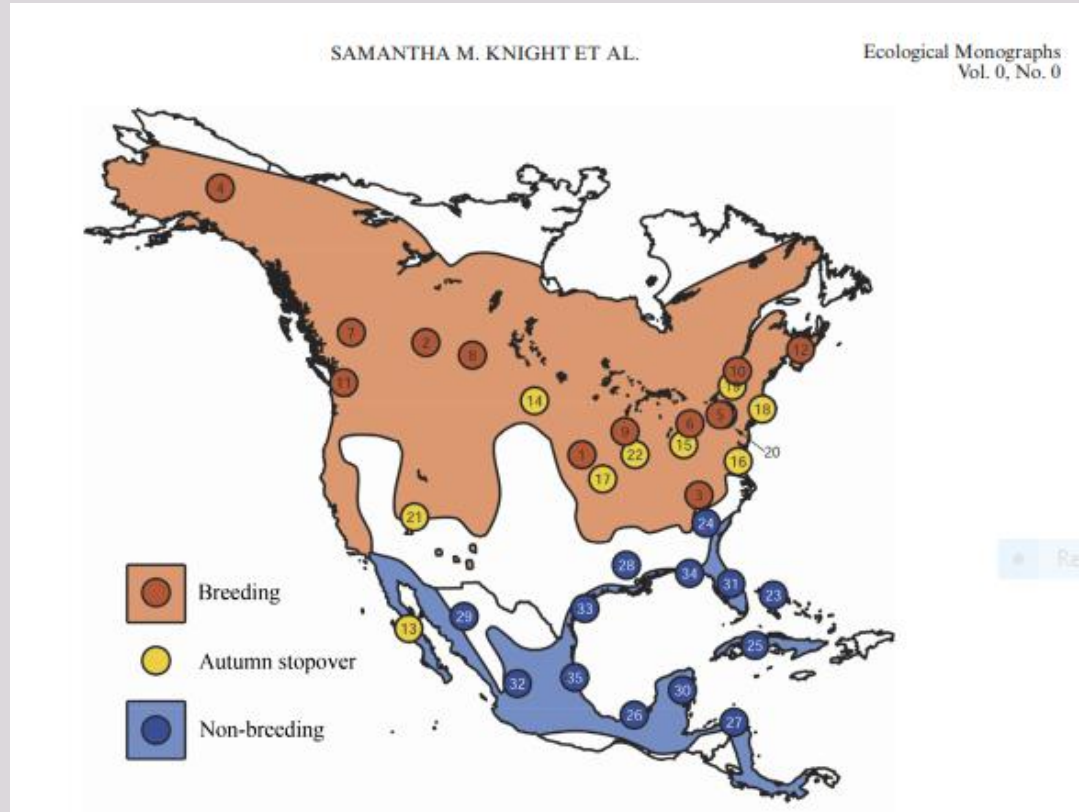
Scientists found profound losses among both rare and common birds



Populations of rare and common birds alike are decreasing across North America, including (clockwise from top left) snowy owls, sanderlings, cactus wrens and Western meadowlarks.

**160 million  
fewer aerial  
insectivores**

# Annual life cycle of swallows



From 2018 paper on the Tree Swallow



Purple Martin range - PMCA

# Functions and Features of Roosts



- Nocturnal safe place
- Close to food sources
- Provide social interactions and learning



- Formed during nesting cycle for Bank Swallow, or after leaving nesting area and prior to long-distance migration for other sp. (late July to early Sept)
- Birds assemble in roosts at dusk and leave prior to sunrise (10 to 30 minutes) (hence poorly studied)
- Some birds move between roosts. Juvenile birds tend to move more than adults. (U of Man study)
- Some of the large roosts are predominantly Phragmites
- Roost sites should be protected from disturbance.
- Wind turbines operating in August near roost sites may pose a threat to some of the birds when they are leaving or arriving at the roosts.

# Roosts – essential stop over habitat

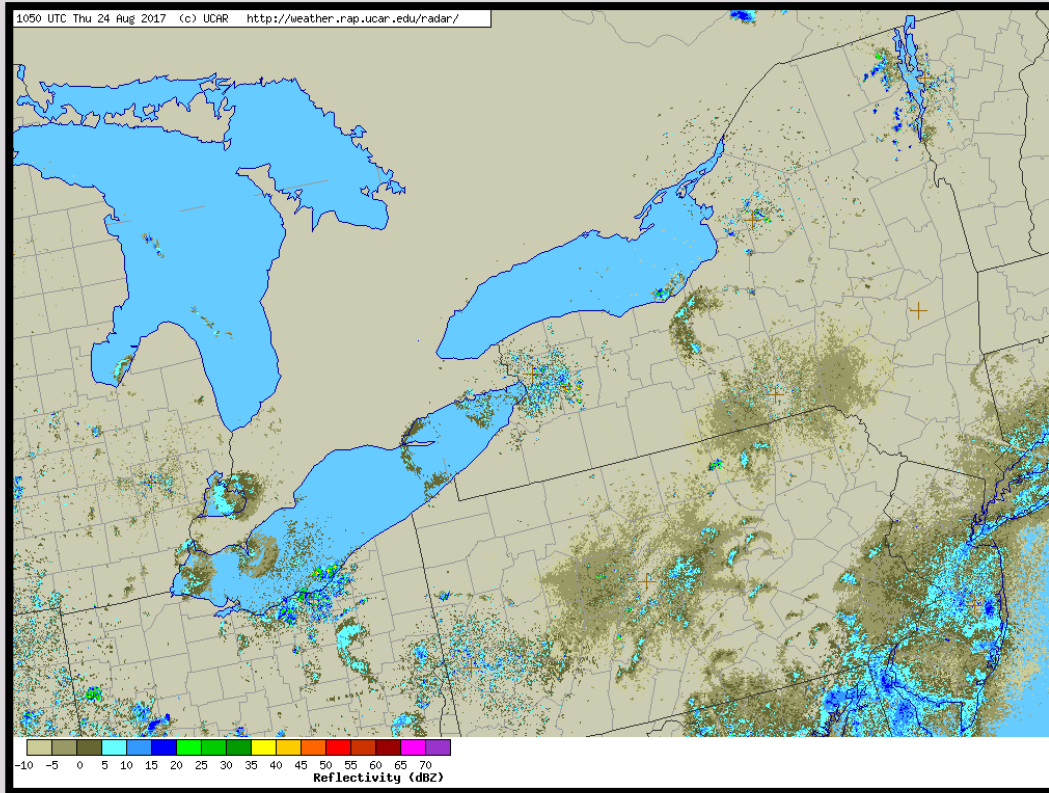
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Videos – Estimating numbers uses two methods – samples timed counts of streaming birds and sample extrapolations of large flocks. Here is a video of streaming birds entering a roost site near Dunnville, Ontario.

<https://youtu.be/DFOk-Ai3rLo>

# Some roosts are visible on weather radar



But radar images don't tell us what the species are. . . .

# Roost Monitoring Strategy

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- Use Radar and local knowledge to detect roosts
- Develop standardized methods for monitoring
- Recruit and train volunteer monitors
- Monitor roosts
- Compile data
- Compliment with eBird observations



Boots on the ground/ paddles in the water to determine composition and numbers

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# Roost Monitoring protocols



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**CONTACT INFORMATION - Please send completed forms to:**

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## INSTRUCTIONS

Please fill out this monitoring form to the best of your ability. **We suggest recording data in a field notebook and transferring information to this form afterwards. Please complete a separate 'Visit Details' page (see pgs. 3-4) for repeat visits to the same roost location.**

**The ideal time to look for roosts is at sunset.** It is always best to have multiple people monitoring a roost at the same time. Station yourself at a safe and strategic location with good visibility. Position yourself such that the sunset is on the far side of the roost if possible. This way, the sky will silhouette the birds, making them easier to see and count. **Always make sure you secure permission from the appropriate landowner before accessing a roost site.**

## WHAT TO BRING

- Field notebook and/or copy of roost monitoring form
- Time of sunset/sunrise (available online)
- Pen/pencil
- Appropriate clothing (& usually bug spray)
- Binoculars

### Optional:

- Spotting scope
- Stopwatch/cell phone (for timed counts)
- Chair/mat/blankets to sit on
- Photo/video equipment for recording

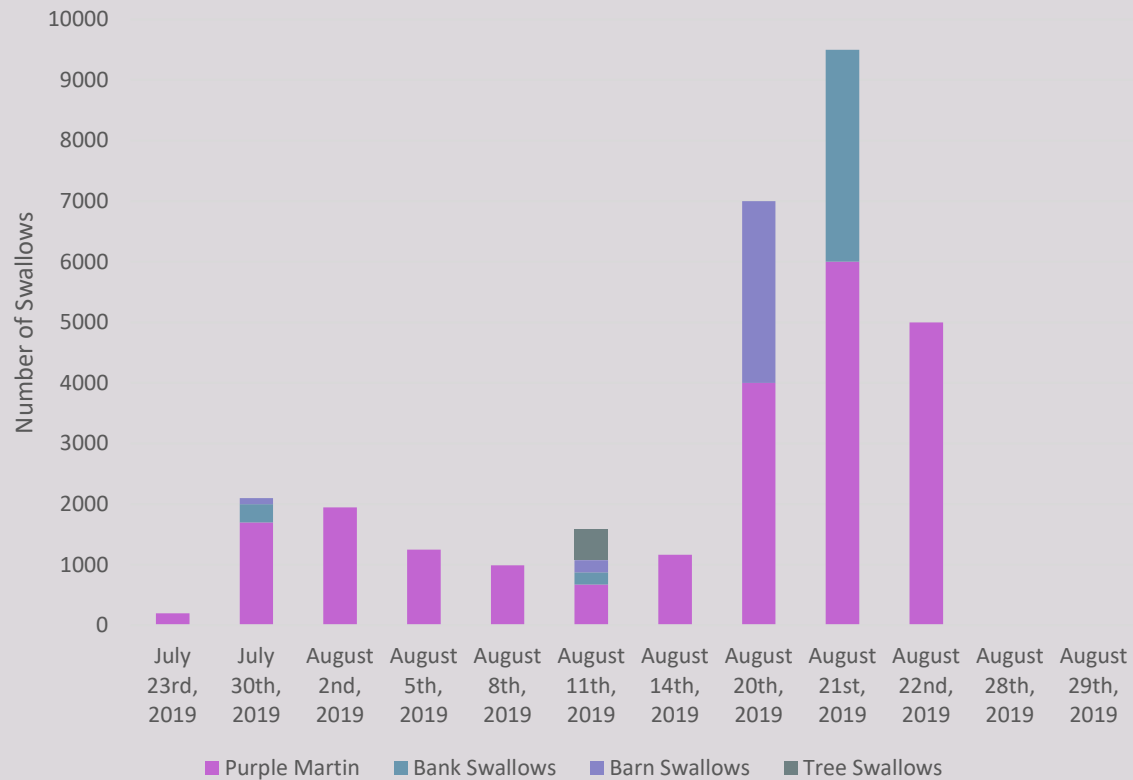
**Any photos or video documentation of your roost monitoring would be greatly appreciated!**

VISIT DETAILS (PLEASE USE A NEW SHEET WITH EACH VISIT)									Site: _____ Monitoring Location Number: _____	
Visit #	Date (dd/mm/yyyy)	Start Time	End Time	Sunrise/ Sunset Time	Wind strength (see pg. 4)	Wind direction	Cloud cover (10ths)	Precipitation	Temp. (°C)	
							____ / 10			
SPECIES OBSERVATIONS										
Total estimated number of roosting birds observed:					How did you arrive at this number? (i.e. survey method)					
Species name	Present? (✓)	% of total estimated	Estimated count	Notes						
Unidentified swallow species										
Bank Swallow										
Barn Swallow										
Cliff Swallow										
Northern Rough-winged Swallow										
Purple Martin										
Tree Swallow										
European Starling										
Red-winged Blackbird										
Common Grackle										
Other species observed (and counts):					Additional notes:					

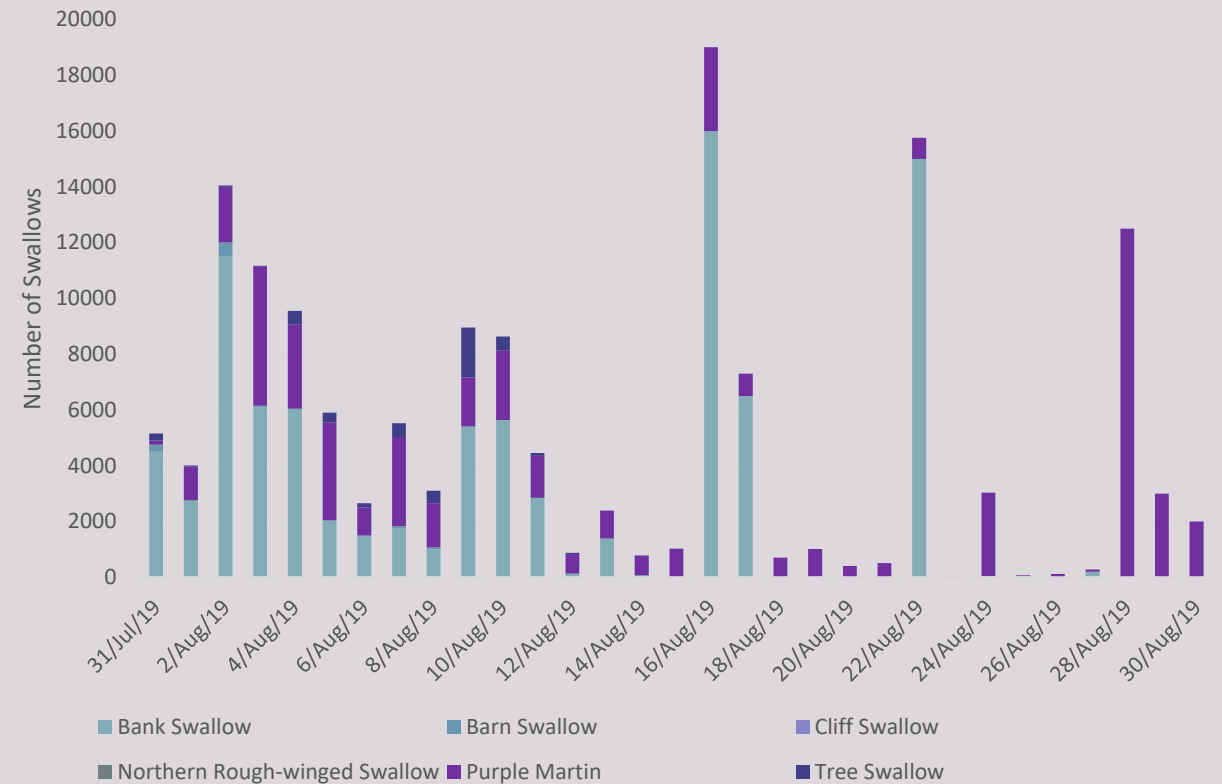
# Examples of data from selected roosts



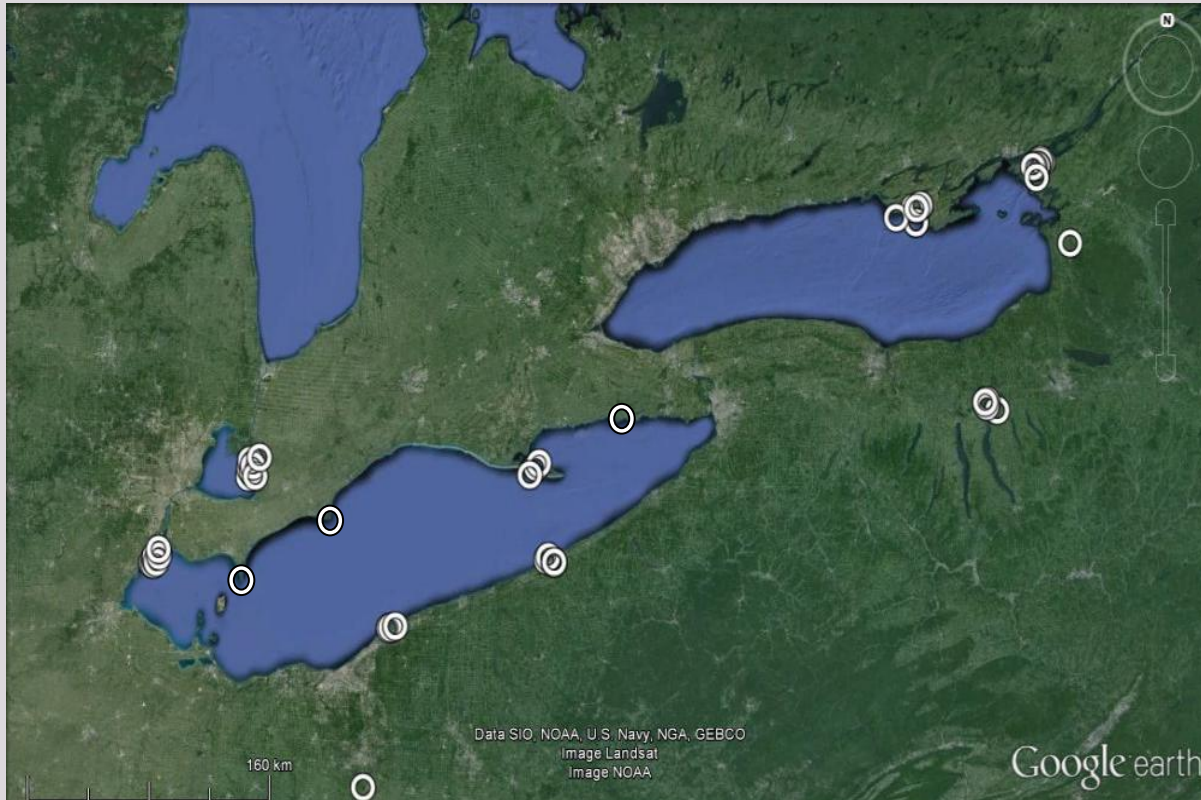
Roost Monitoring Point Pelee 2019



Roost Monitoring Long Point - Breakwater 2019

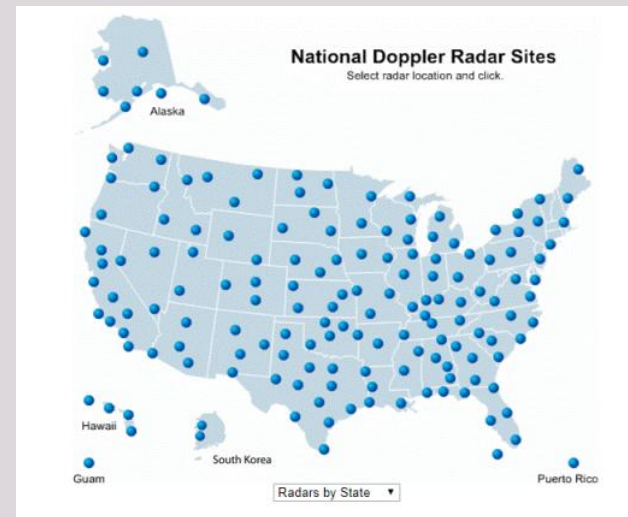


# Roosts along the lower Great Lakes detected by Radar

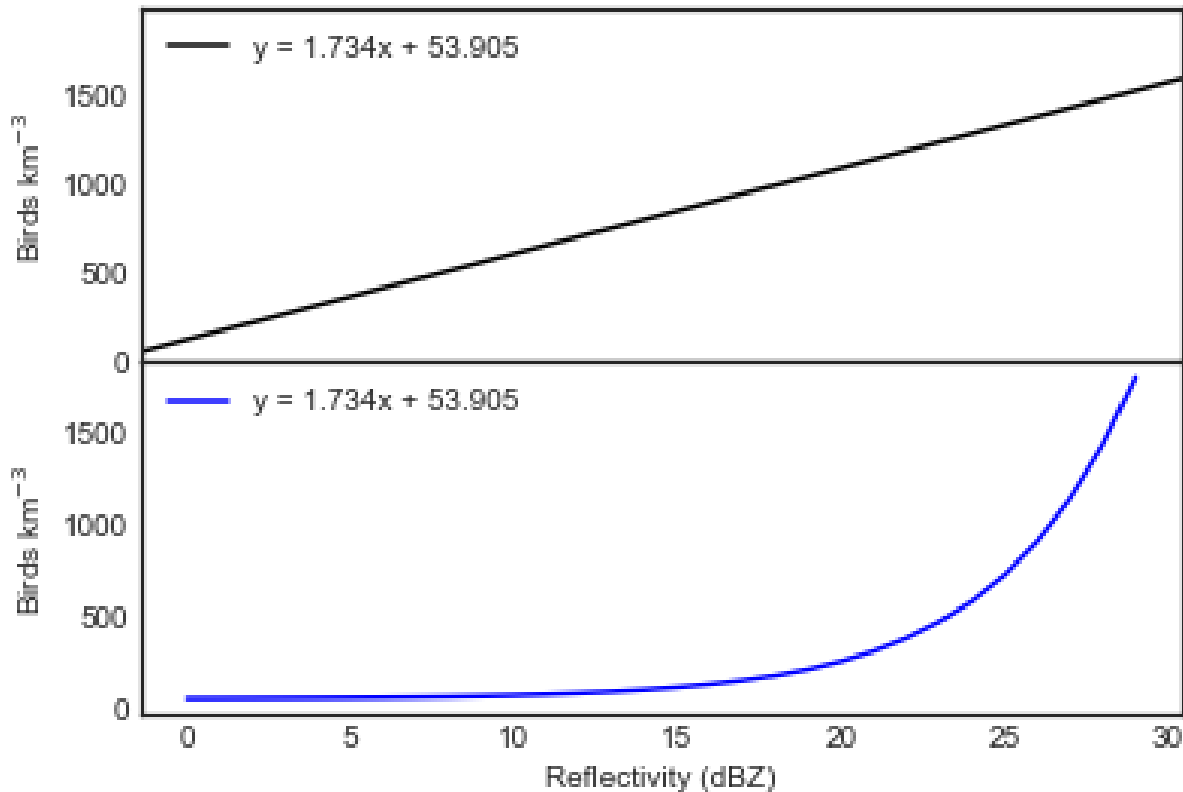


NOAA Weather Surveillance Radar 1998  
Doppler (WSR-88D)

Many different data sets available (different  
ranges, reflectivities, elevation angles, etc.)



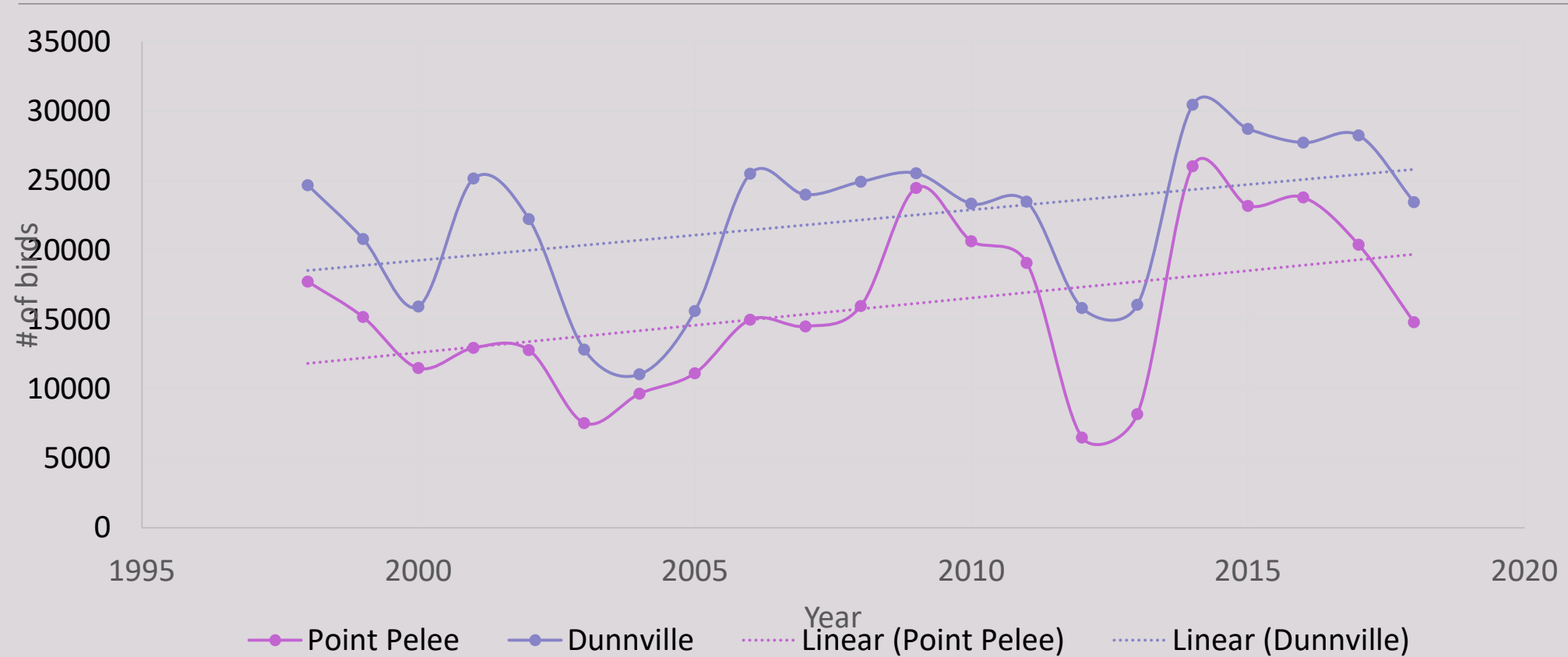
# Converting a roost signature to a number



- Annual image files for Aug 1 to 20 from 1998 to present were downloaded from NOAA through WCT and converted to shapefiles.
- These shapefiles were imported into ArcMap, where a Python script was created that applies the linear equation proposed by Gauthreaux and Belser (1999) to quantify the radar values.
- Dates with precipitation events or no data were excluded.

Relationship between dbZ values and the density of migrating birds aloft

# Apply formula to determine max. annual value in Point Pelee and Dunnville roosts 1998 to 2018



# What's needed next?

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- Research questions from radar analysis
  - Detection value
  - Changes over time
- Citizen science need for roost validation
- Conservation need to protect roost and reduce proximate risks
- Funding

# We are continuing work to identify, monitor and protect roost sites

