

# Differential vulnerability of Bald and Golden Eagles to wind turbine collision on breeding grounds in Québec

Charles Maisonneuve<sup>1</sup>, Tricia Miller<sup>2,3</sup>, Junior A. Tremblay<sup>1</sup>, Todd Katzner<sup>3,4</sup>, Mike Lanzone<sup>5</sup>, and Dave Brandes<sup>6</sup>

<sup>1</sup>Ministère des Ressources naturelles et de la Faune, Canada, <sup>2</sup>The Pennsylvania State University, U.S.A., <sup>3</sup>West Virginia University, U.S.A., <sup>4</sup>USDA Forest Service, Timberland Watershed Laboratory, USA, <sup>5</sup>Cellular Tracking Technologies, <sup>6</sup>Lafayette College, U.S.A.

## Introduction

- Important wind energy development in eastern North America
- Wind facilities planned near nests of designated species of birds of prey: Golden eagles (GOEAs) and Bald eagles (BAEAs)
- GOEAs reported more often than BAEAs among fatalities at existing wind facilities

## Objectives

- Adequate sighting of wind facilities to reduce collision risk
- Examine if differential flight behaviour between the two species may lead to differential collision risk

## Methods

Adult birds captured with baited bow-net traps

- GOEAs in eastern USA and in southern Québec
- BAEAs in southern Québec

Tracked with Argos/GPS transmitters

- Hourly locations
- Altitude
- Flight activity (flying or not)

Breeding home ranges determined

- using fixed kernel density estimate
- complete breeding seasons only

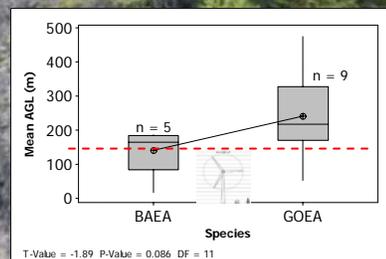
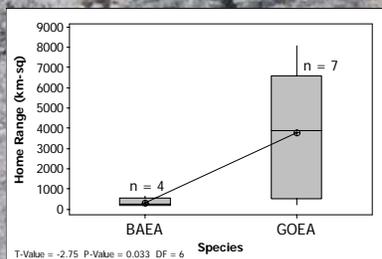
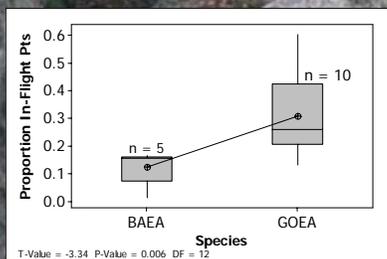
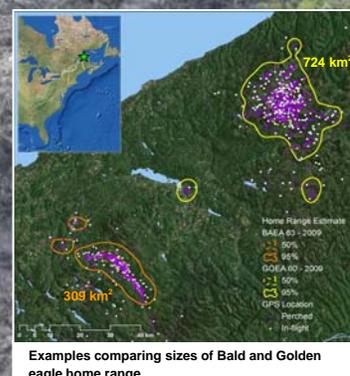
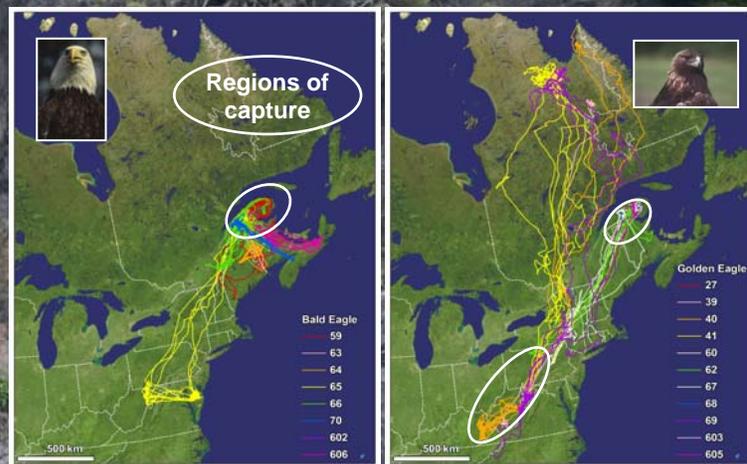
Flight altitudes estimated by

- subtracting GPS altitude from underlying elevation of each point using SRTM 90-m elevation grid

## Results

Evident interspecific differences in flight behaviour

- GOEAs spend about twice as much time in active flight than BAEAs
- Mean home range areas of GOEAs considerably greater
- On average, BAEAs are flying ~ 100 m lower than GOEAs
- BAEA home ranges closely tied to water bodies



## Conclusions

Variation in flight behaviour and space use may lead to differential vulnerability to wind energy development

**Golden eagles**

Greater home range areas and proportion of time spent in active flight may contribute to generally higher collision risk

**Bald eagles**

Because of relatively low flight altitude within smaller home ranges, and because of fish eating habits during the breeding season, collision risk is probably greater when siting of wind facility is close to main water bodies used within home ranges