

THE USE OF RADAR TO AUGMENT VISUAL OBSERVATIONS IN WILDLIFE HAZARD ASSESSMENTS



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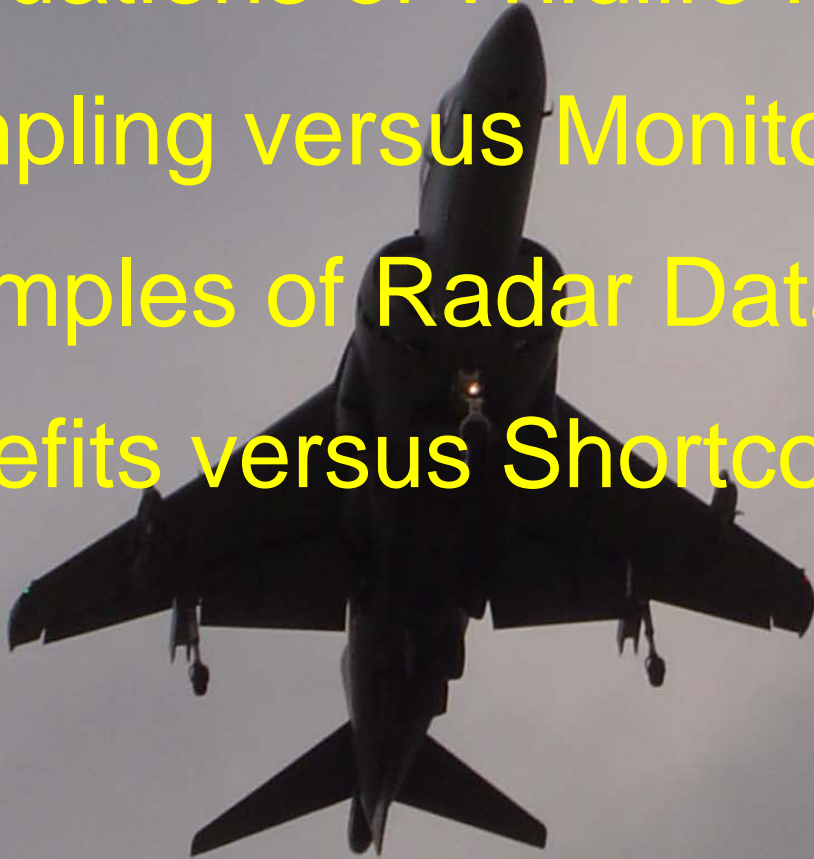
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Outline

- Evaluations of Wildlife Hazards
- Sampling versus Monitoring
- Examples of Radar Data
- Benefits versus Shortcomings



Airfield Evaluation

- Wildlife hazards on the airfield
- Wildlife attractants within 5 miles of the airfield
- Movements of wildlife, especially birds, over the airfield without landing.



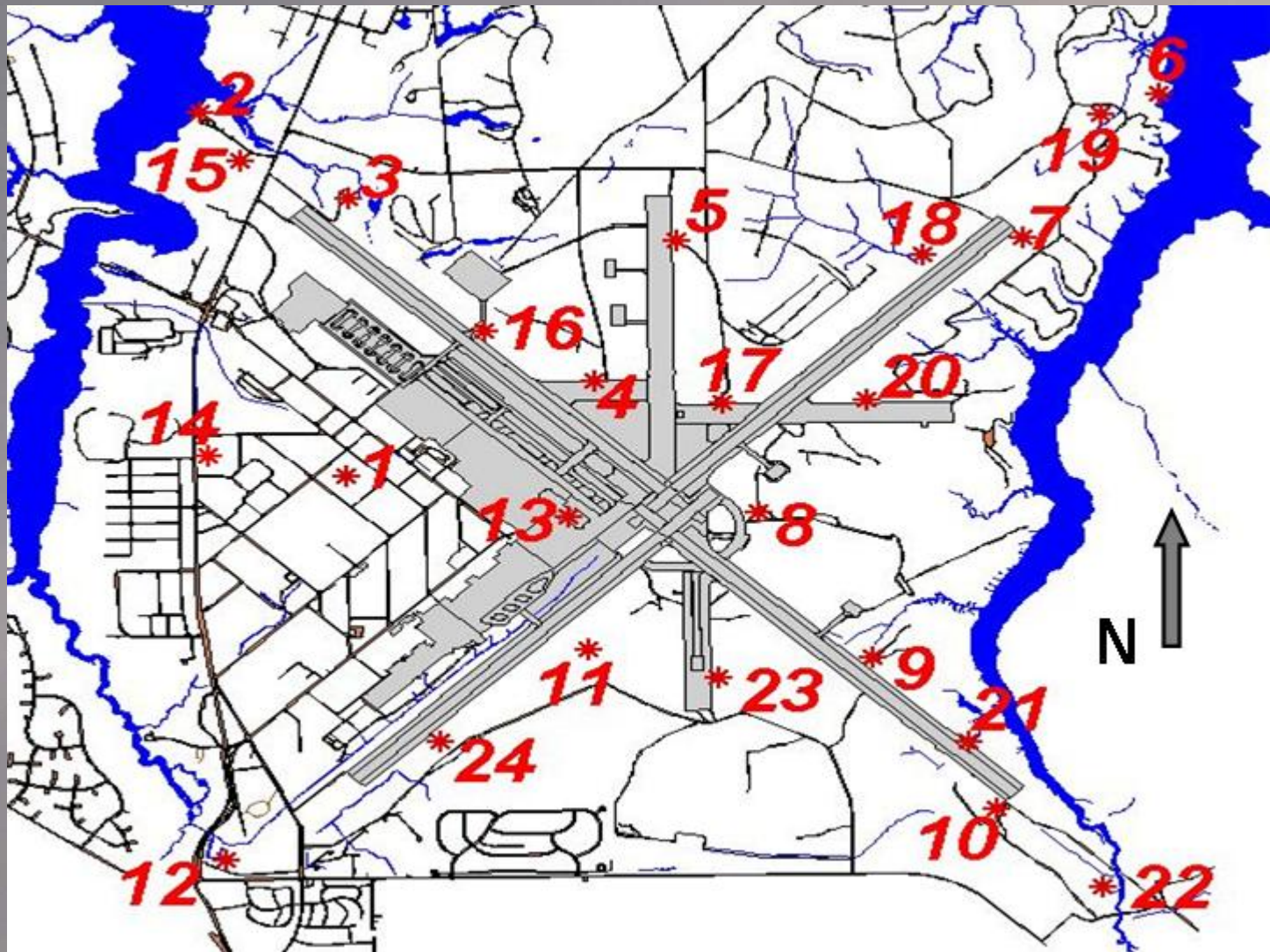
On-Airfield Environment



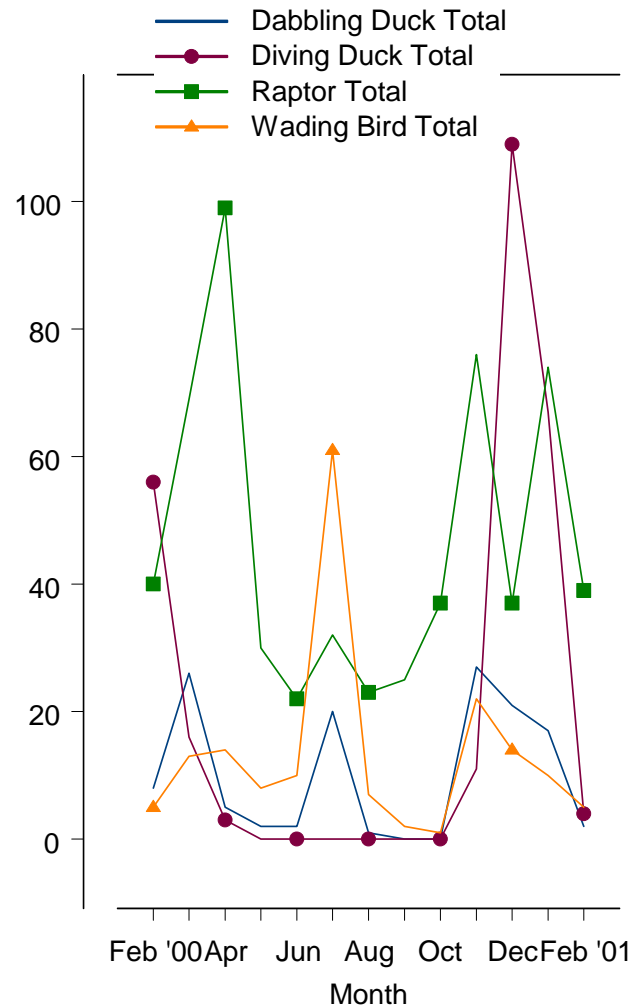
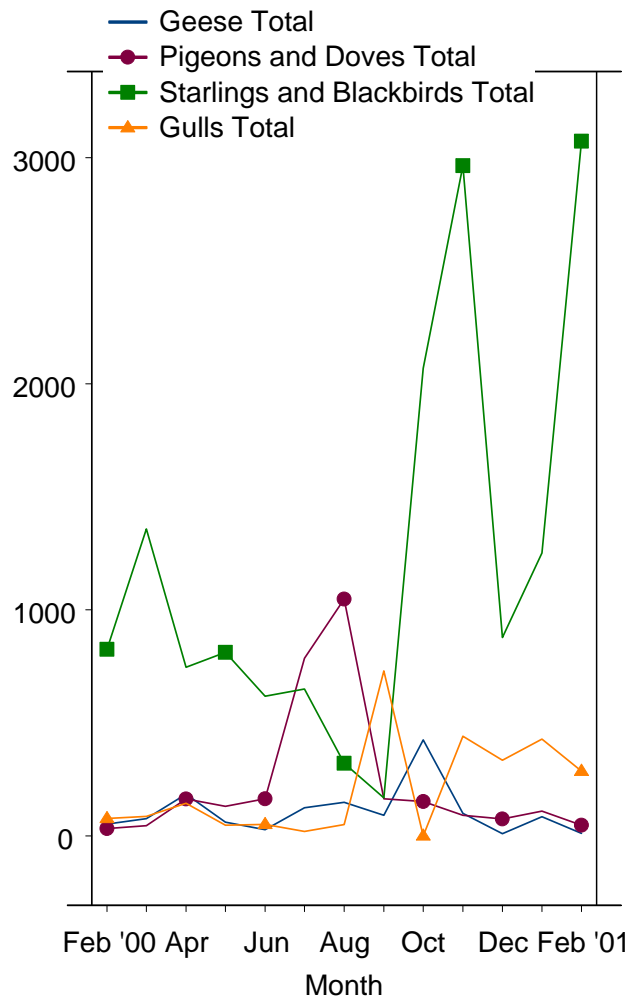
Off-Airfield Environment



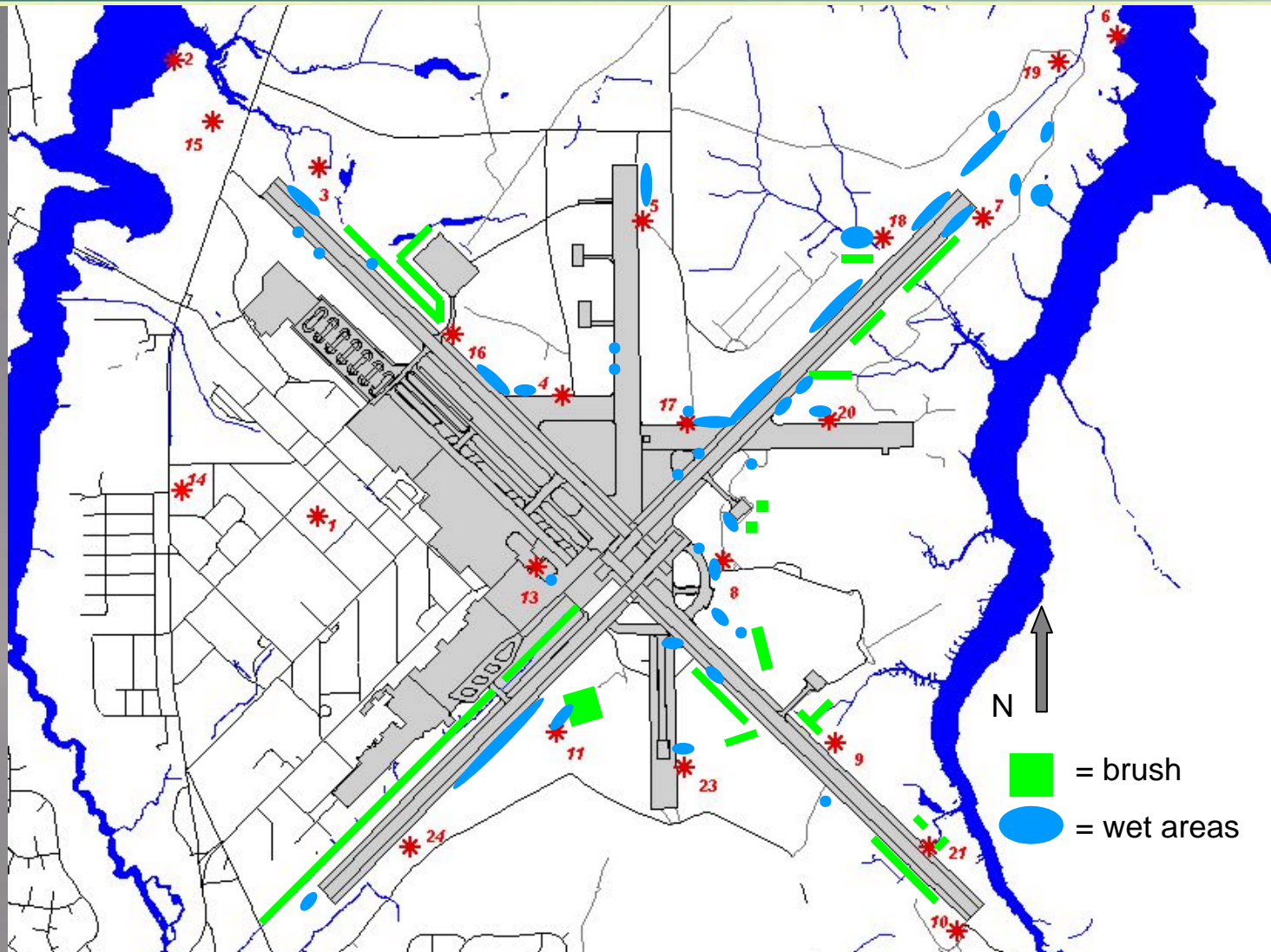
Sampling Protocol



Seasonal Variation



On-Airfield Wildlife Attractants



What Radar Provides

- Continuous coverage
- Night-time observations
- Observations beyond visual range



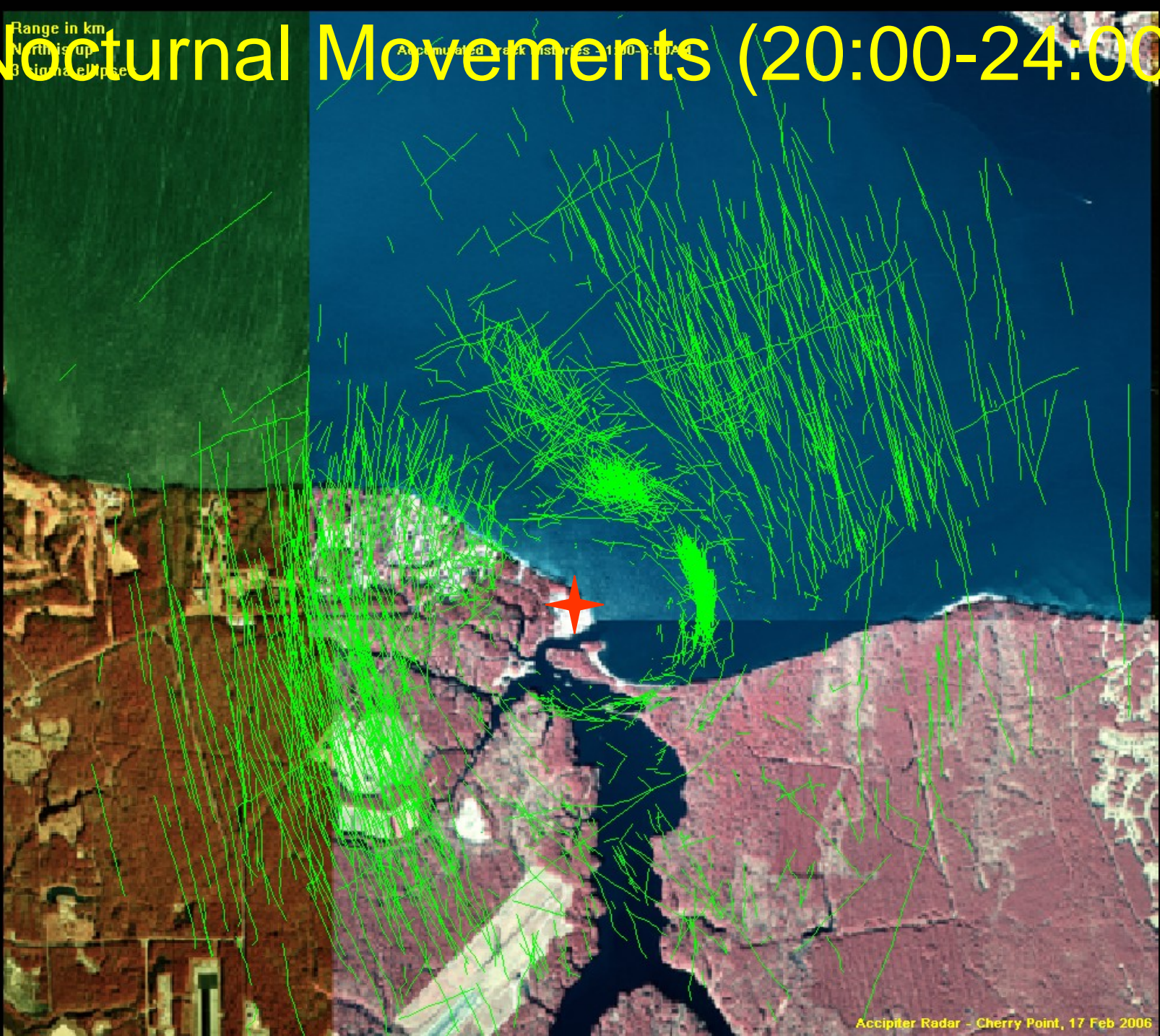
Data Available for Analyses from Radar

- Position
 - Movement (track)
 - Altitude
 - Numbers of targets
 - Pseudo 3-D representation of hazard
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- A silhouette of a fighter jet, likely an F-16, is shown from a low angle, flying towards the viewer. The jet is dark against a lighter, cloudy sky. The wings are spread, and the tail is visible. The overall image has a slightly grainy, high-contrast appearance.

Nocturnal Movements (20:00-24:00)

Range in km
North is up
6° signal ellipse

Accumulated track histories - 100-5000m

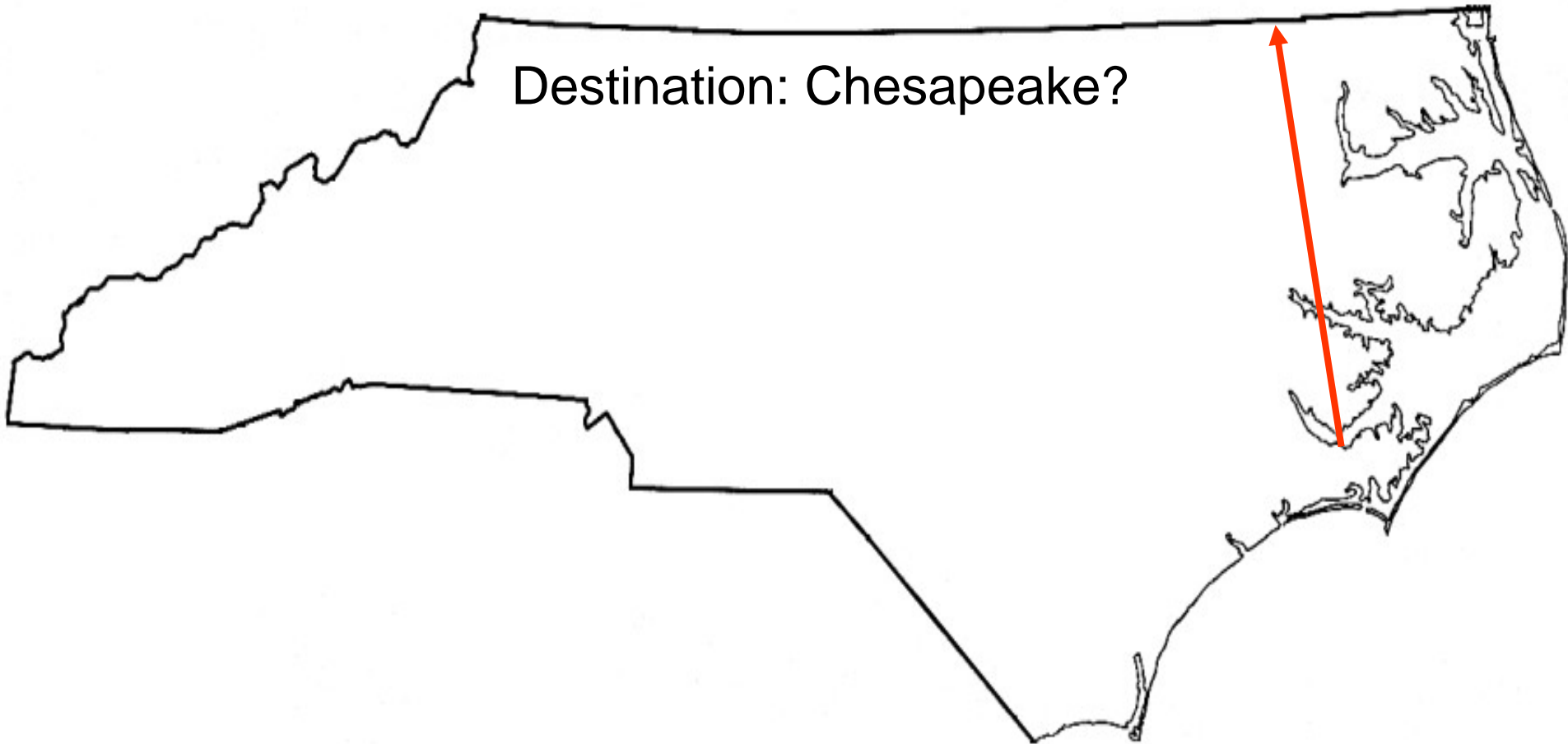


Species?



K. McGowan

Destination: Chesapeake?

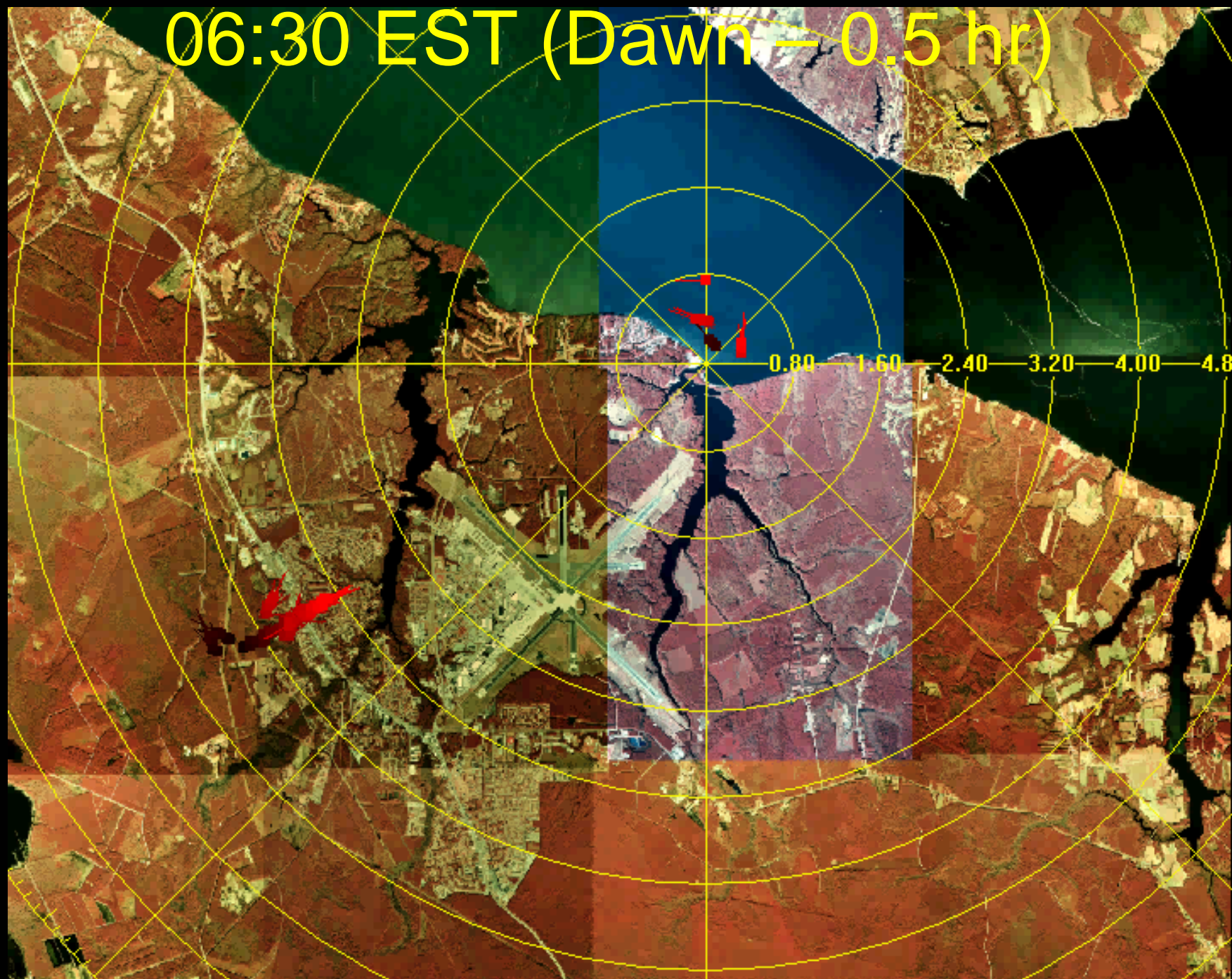


Unobserved Diurnal Movements

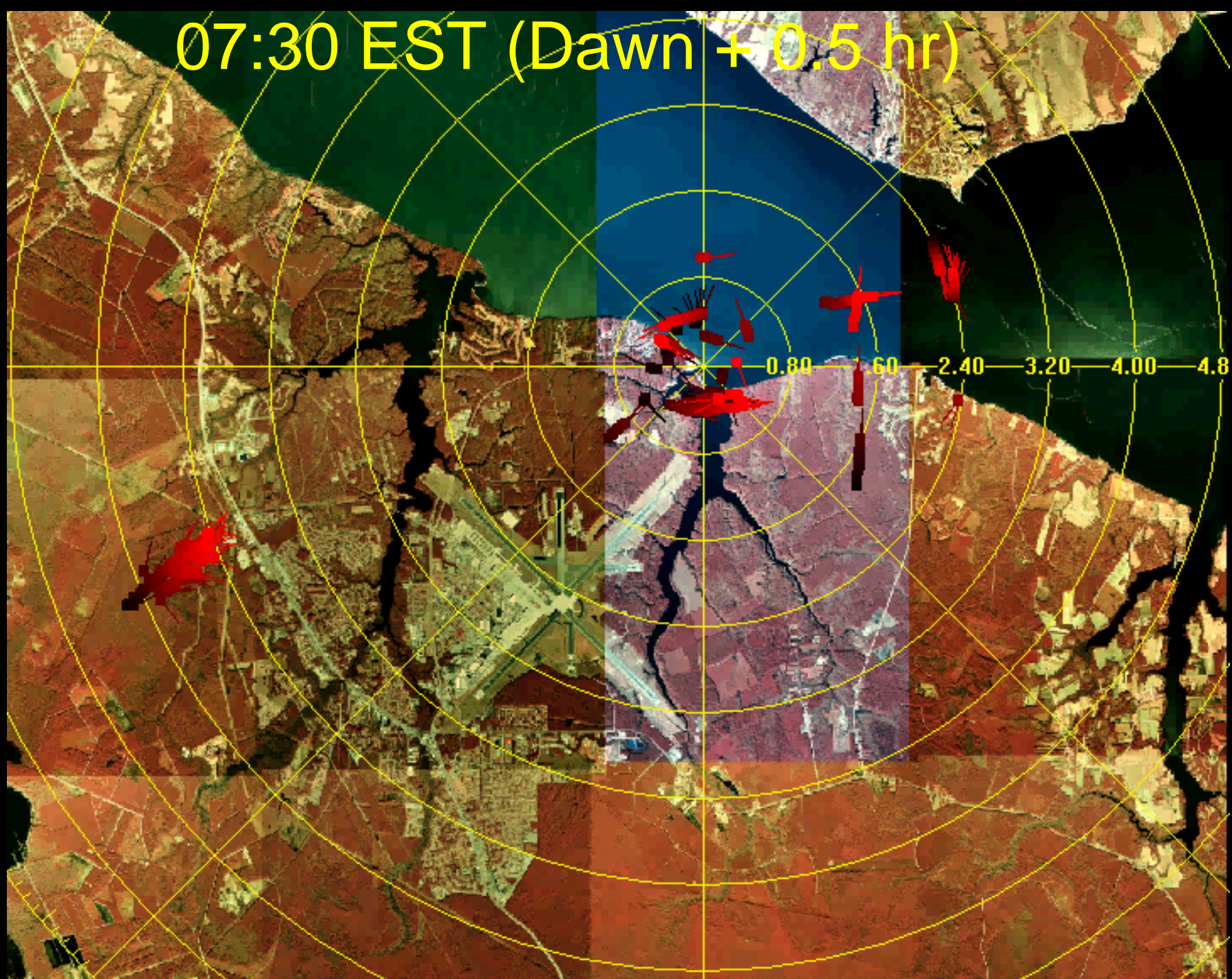
- 06:30 (Dawn – 0.5 hr)
- 07:30 (Dawn + 0.5 hr)
- 08:30 (Dawn + 1.5 hr)



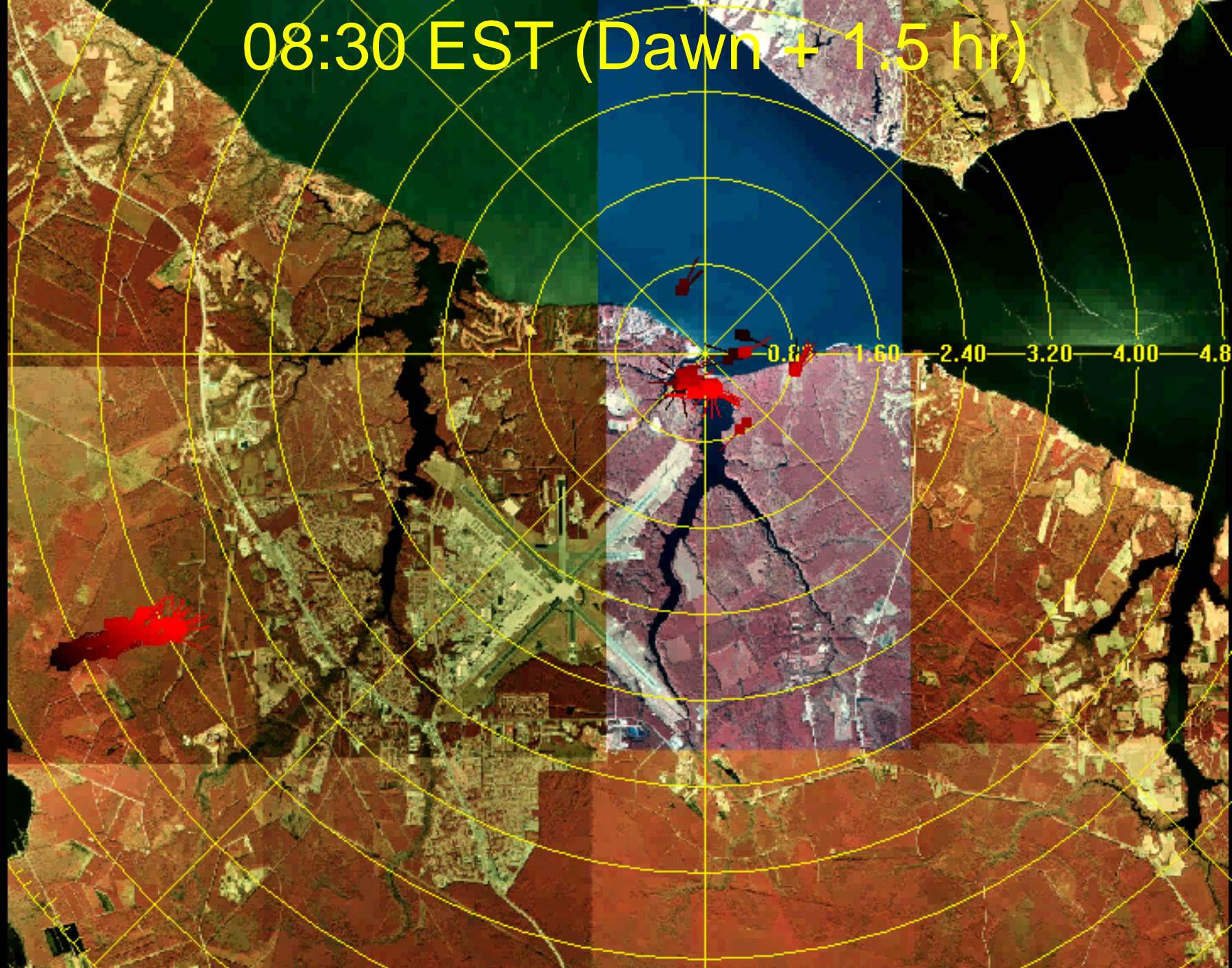
06:30 EST (Dawn – 0.5 hr)



07:30 EST (Dawn + 0.5 hr)



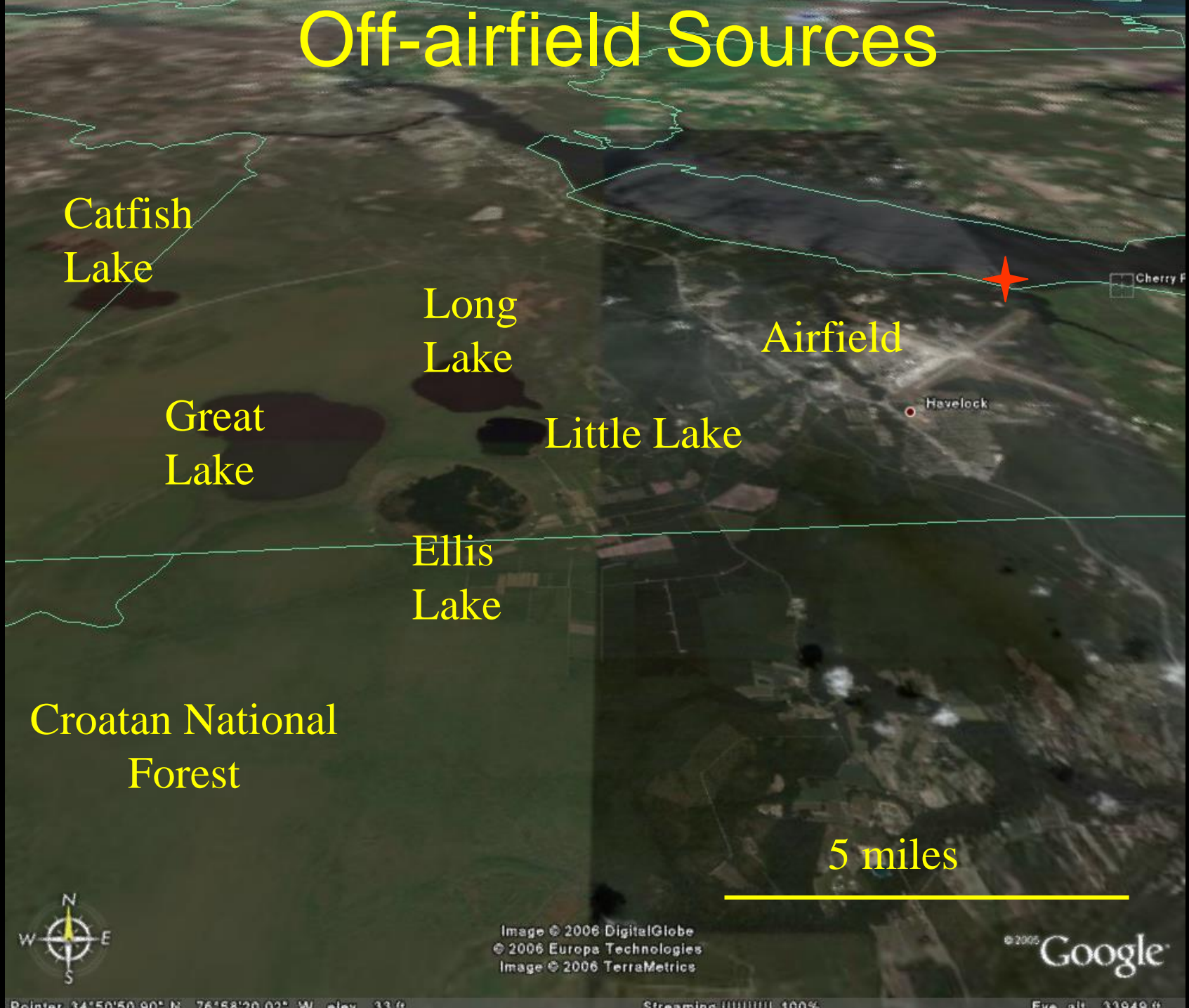
08:30 EST (Dawn + 1.5 hr)



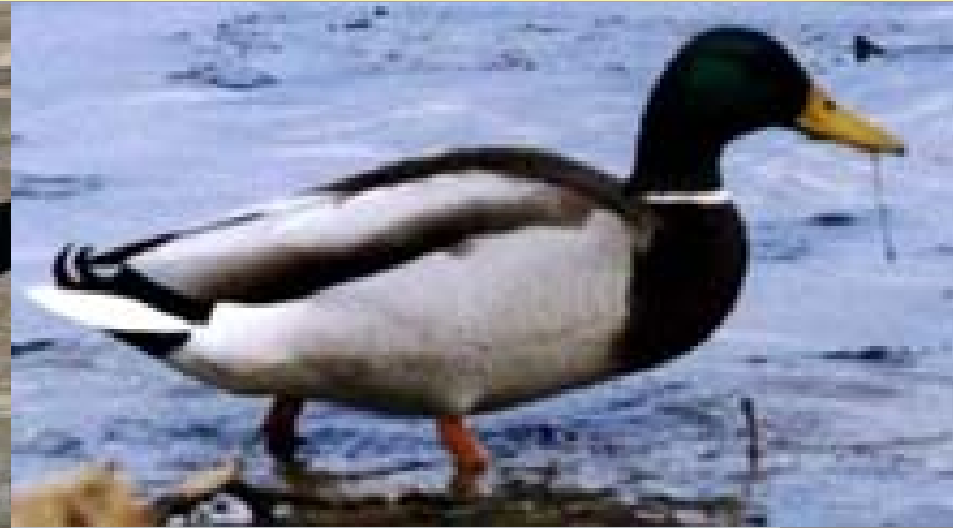
What the Birds See



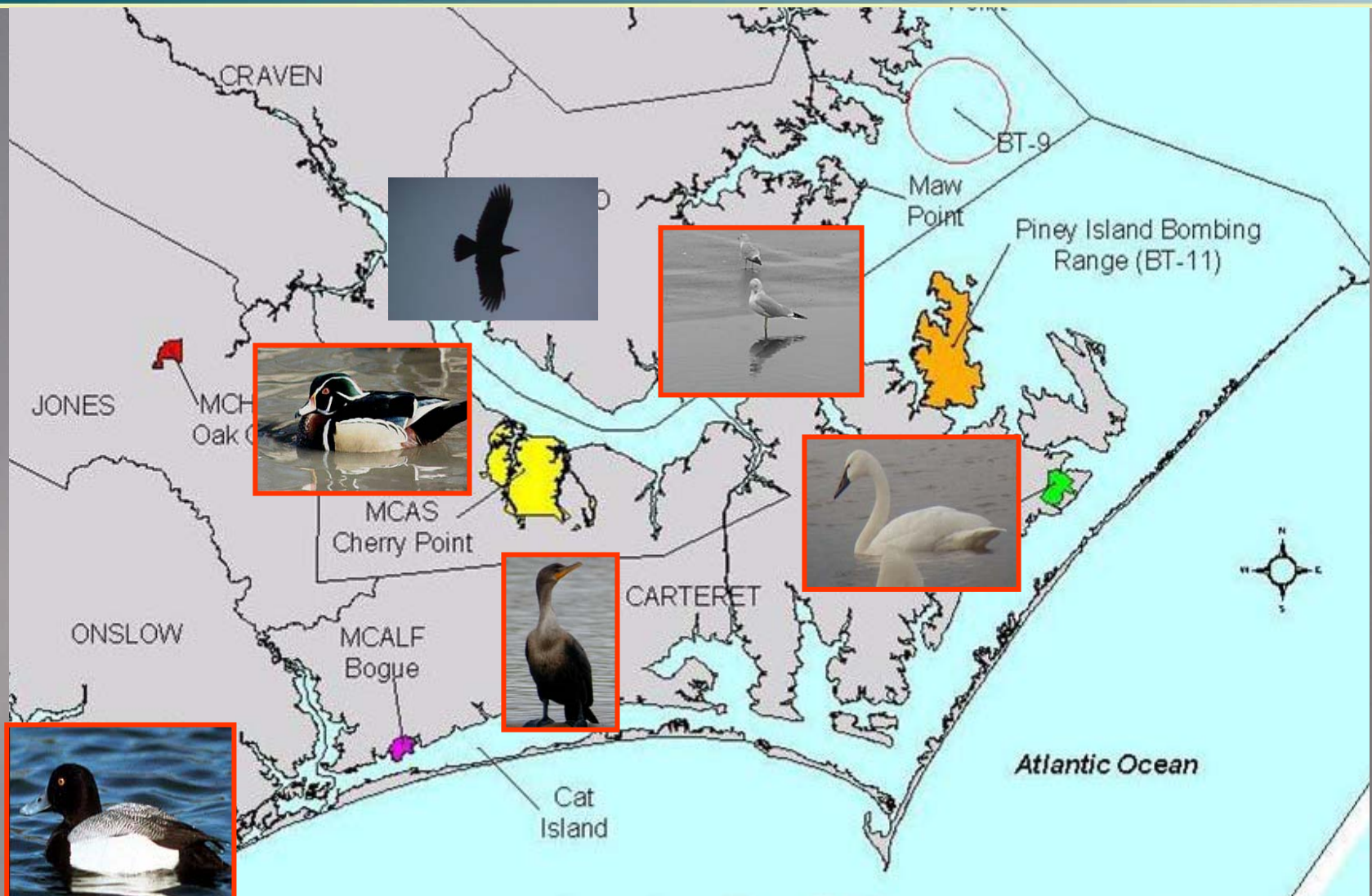
Off-airfield Sources



Which Species are Present?



Off-Airfield Environment



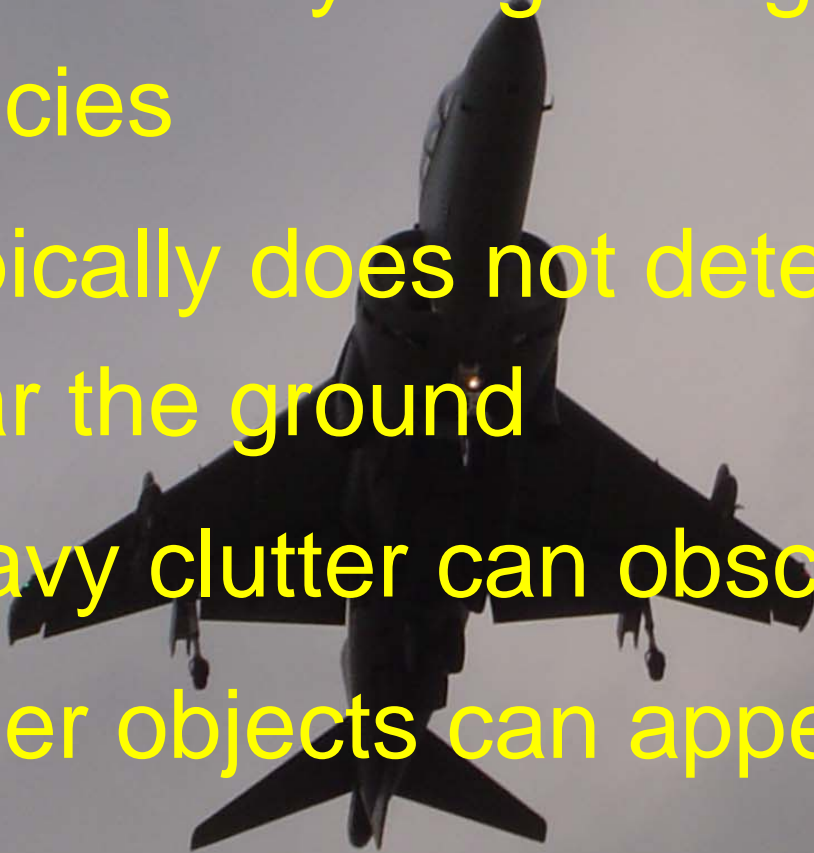
Radar Observations

- Provide for continuous coverage
- Data can be archived and reviewed repeatedly
- Locations can be geo-referenced and exported for further analysis

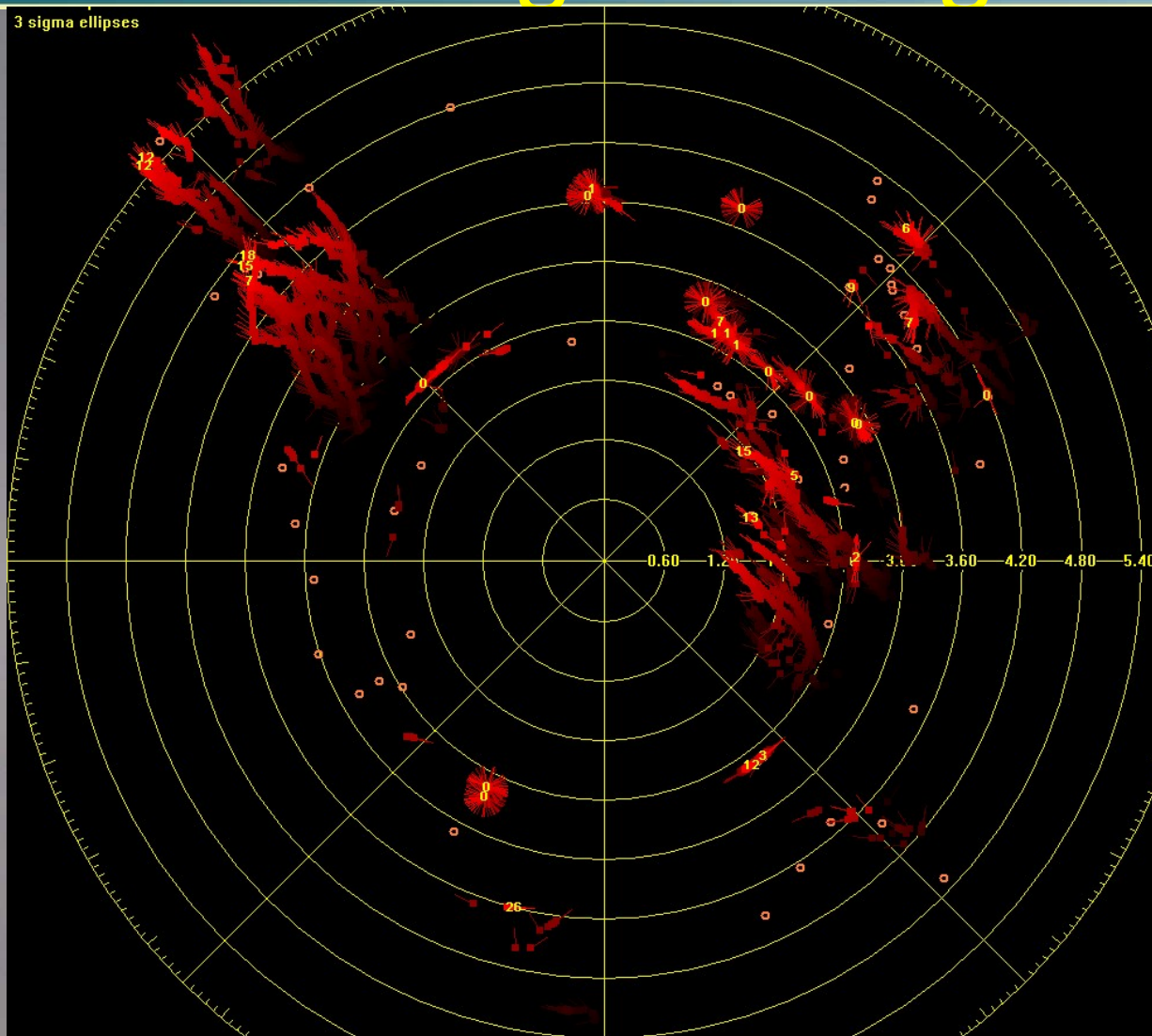


Caveats


- Can identify target to group but not to species
- Typically does not detect birds on or near the ground
- Heavy clutter can obscure birds
- Other objects can appear to be birds



Non-Biological Targets



Conclusions

- Radar is a useful tool for detecting and monitoring bird movements
 - Radar can provide information that is not available otherwise
 - A trained biologist is necessary to interpret and integrate radar data with other sources
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Objective:
Safer Flying for All

Thank you!