Science Using Captive Birds to Address Management and Conservation Priorities

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SEADUCKS FOR CAPTIVE RESEARCH STUDIES

Black Scoter (*Melanitta nigra*)

Surf Scoter (*Melanitta perspicillata*)

White-winged Scoter (*Melanitta fusca*)

Long-tailed Duck (Oldsquaw) (*Clangula hyemalis*)

Harlequin Duck (*Histrionicus histrionicus*)
(Female and Male)

Ruddy Duck Male
(*Oxyura jamaicensis*)

Instrumented Lesser Scaup Female with Male and Duckling (*Aythya a[illegible]*)

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Tracking


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Atlantic and Great Lakes Sea Duck Migration Study

- Transmitters surgically implanted
  - focus on adult females
    - 38-42 g in scoters
  - 26 g in long-tailed ducks

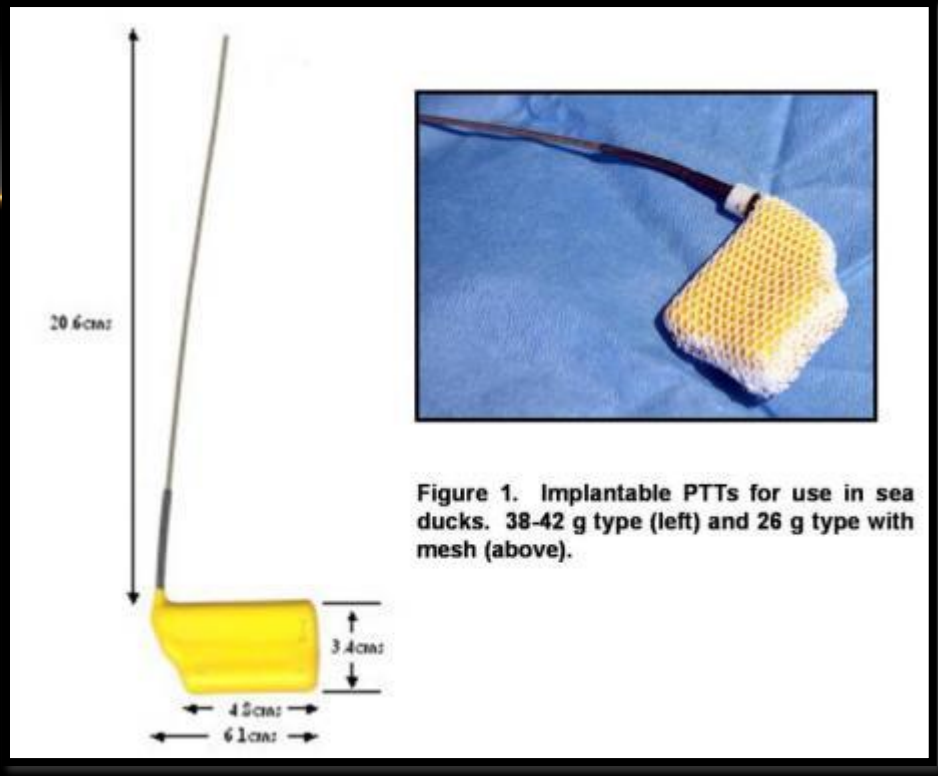

Figure 1. Implantable PTTs for use in sea ducks. 38-42 g type (left) and 26 g type with mesh (above).


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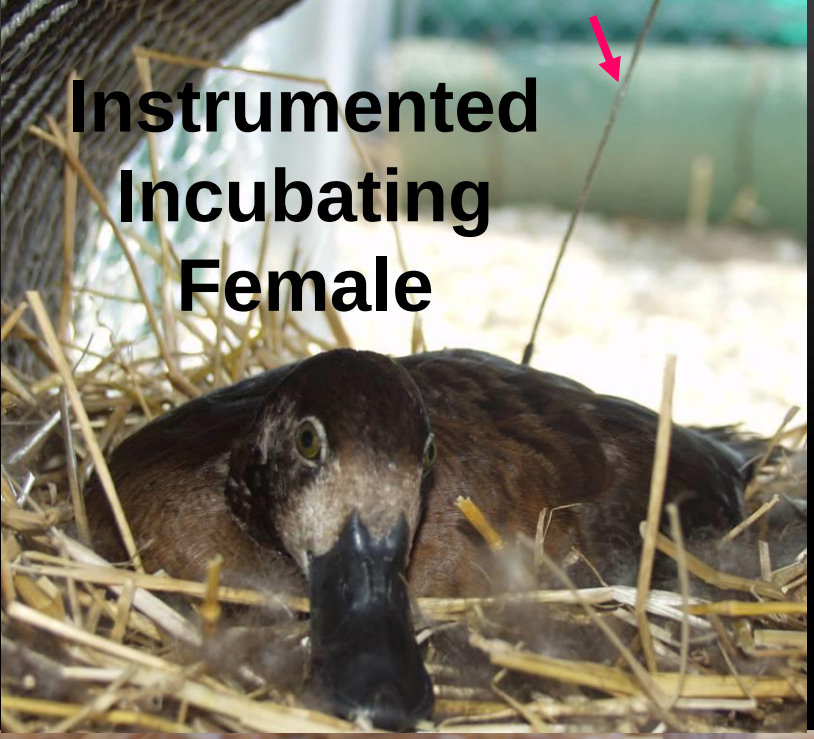

Instrumented
Incubating
Female

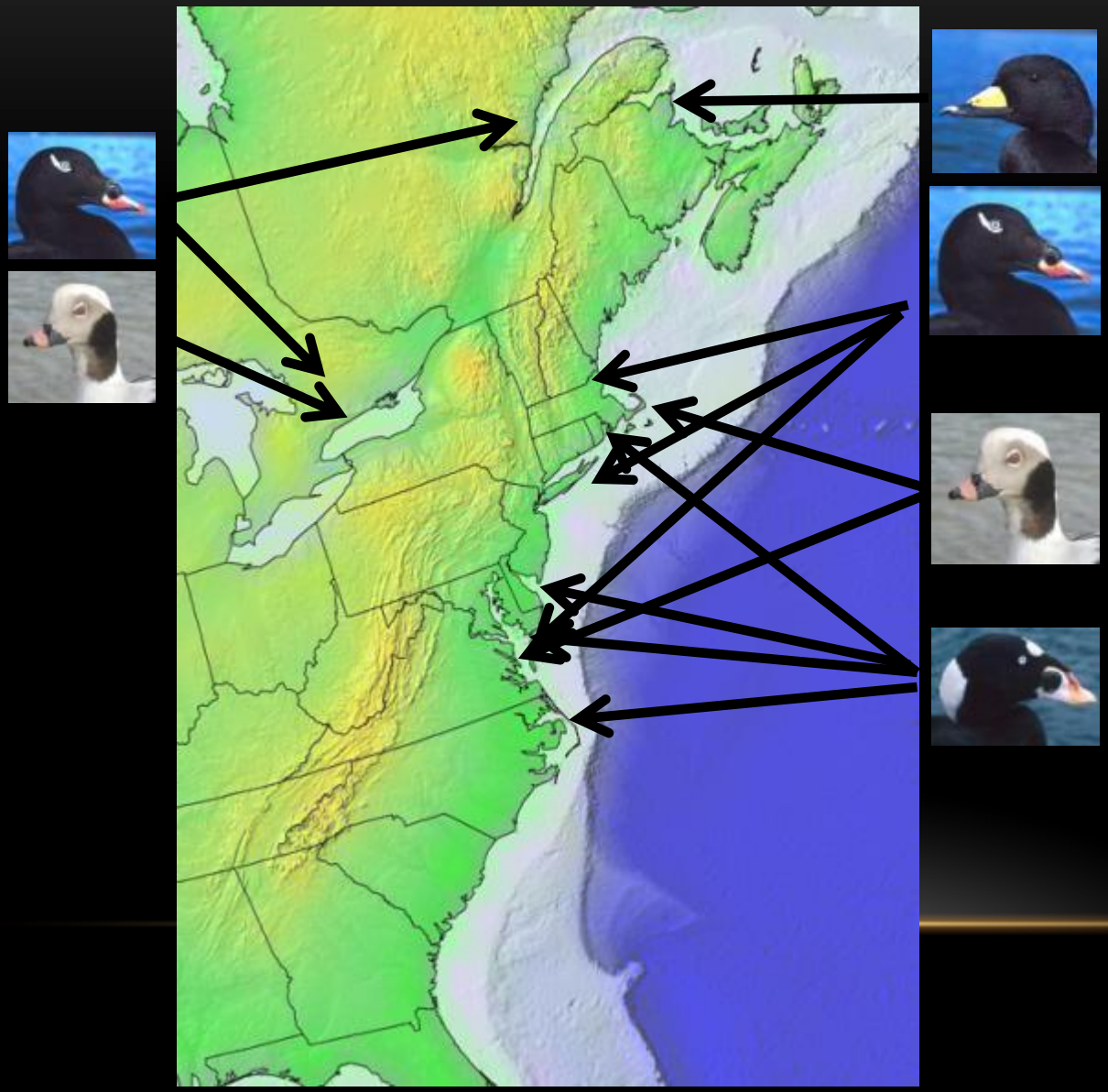

Malformed Eggs


Control Female and Brood
USGS


Instrumented Female
with Male
And Duckling

Atlantic and Great Lakes Sea Duck Migration Study

Capture Locations



Geographically representative sample for each species

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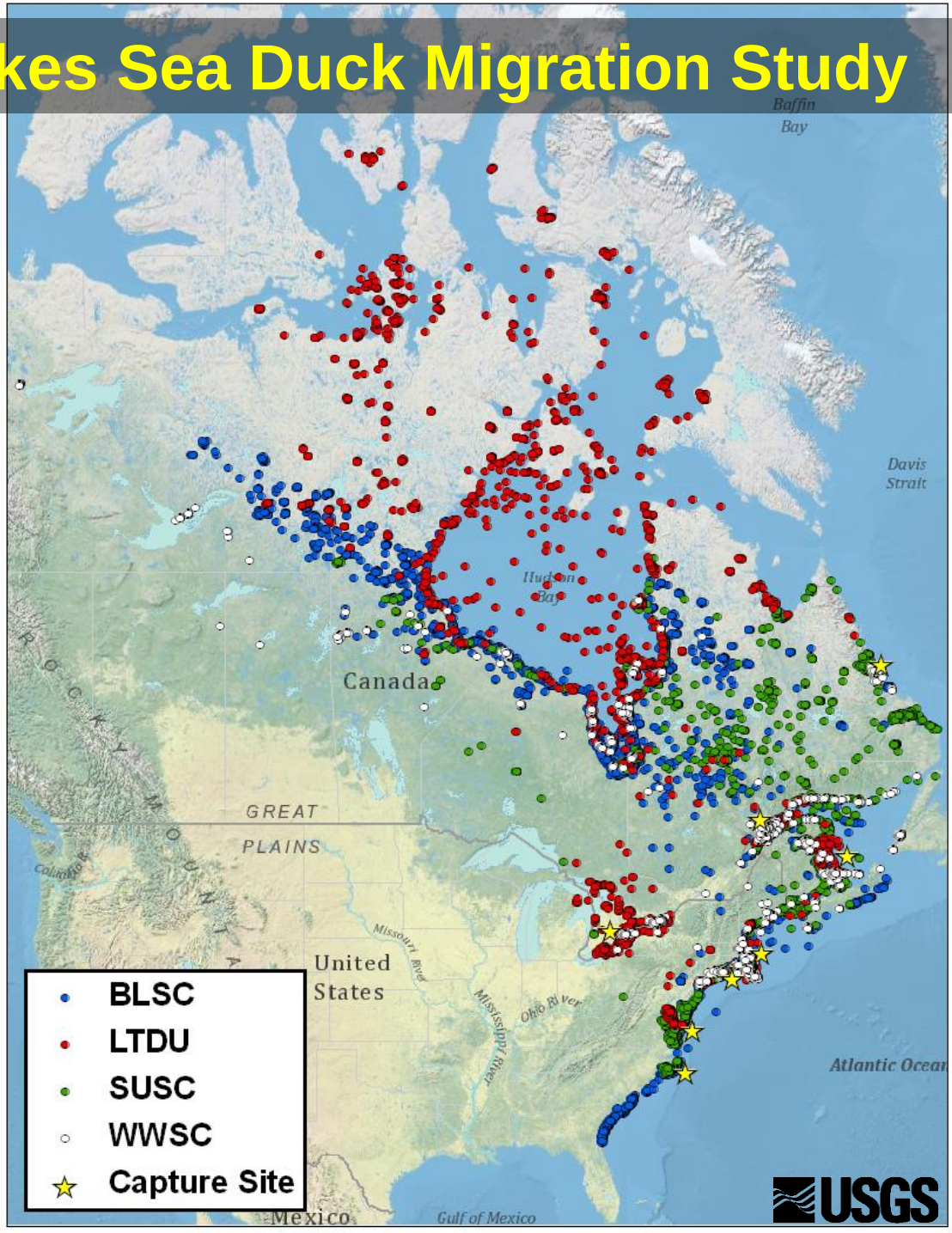
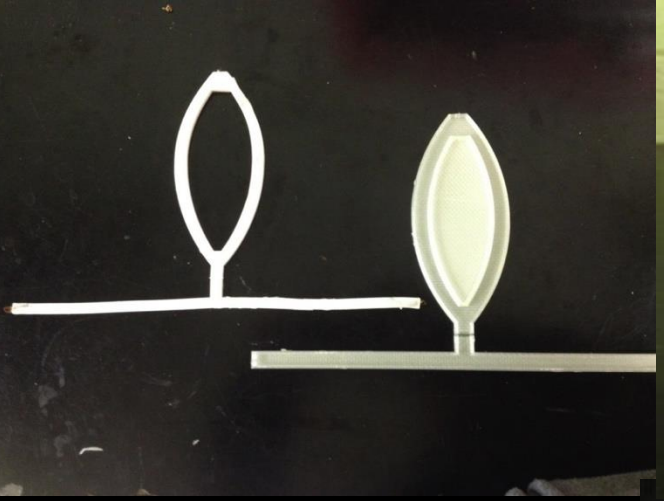
Atlantic and Great Lakes Sea Duck Migration Study

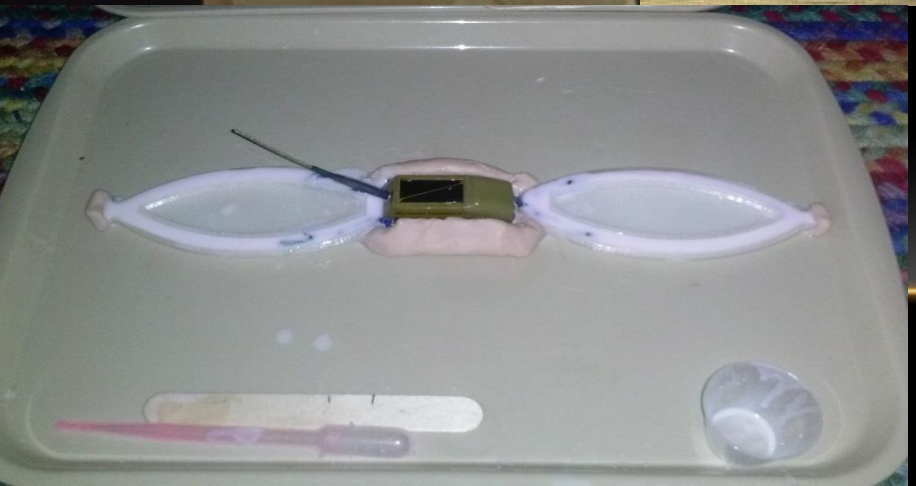
- 4 focal species
- Range-wide scale
- U.S. and Canada
- 200-300 transmitters
- Multi-year



Impact of Offshore Wind Energy on Seabird Migration

- Transmitters surgically implanted & GPS solar-powered backpack transmitters
- surf scoters, northern gannets, red-throated loons





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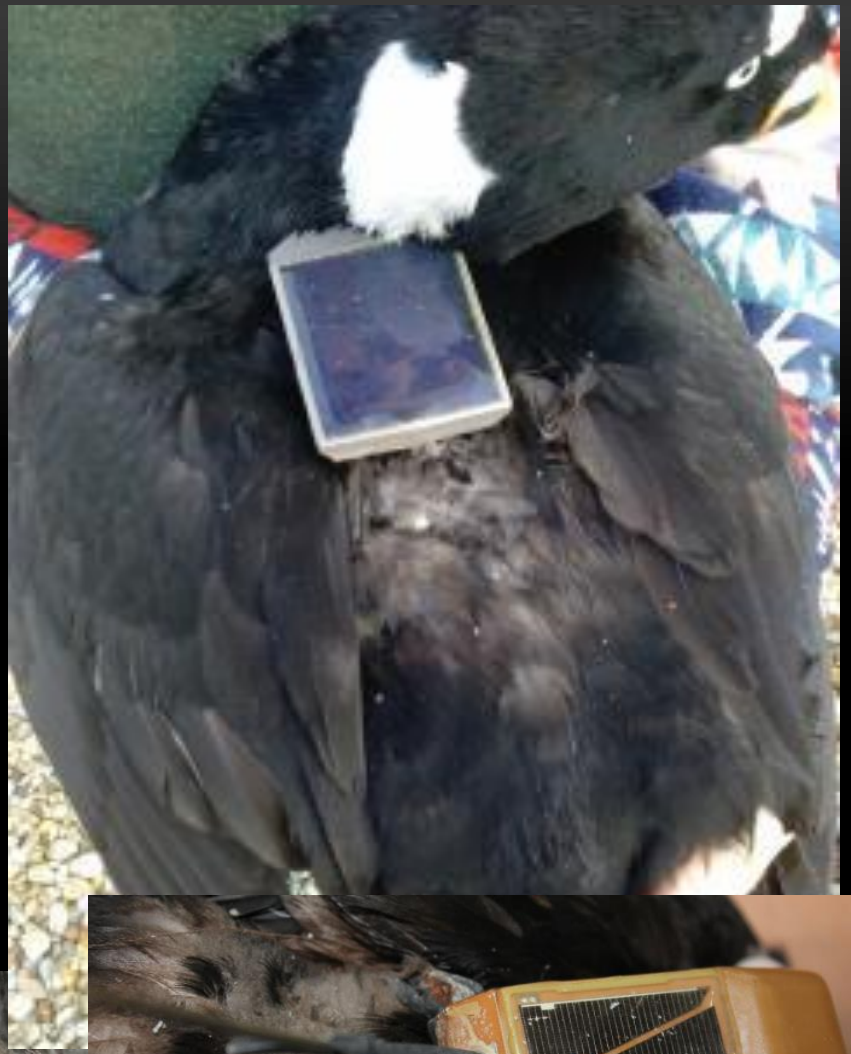

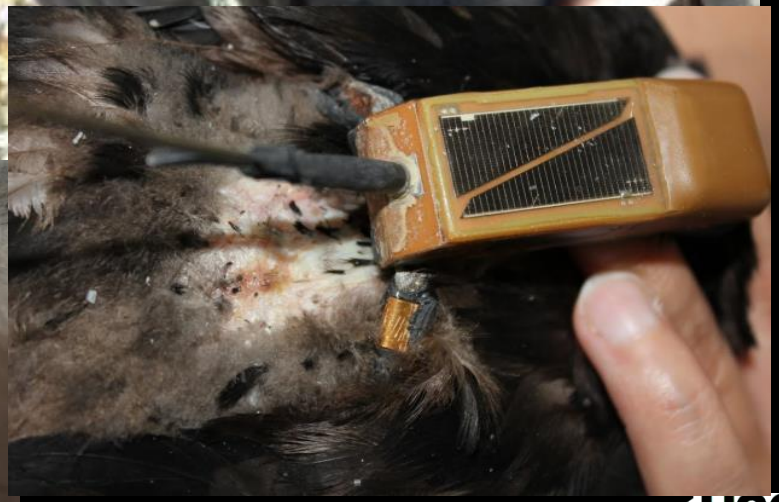

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Fig. 1. Surf scoter female seen foraging at the bottom of the dive tank while outfitted with a transmitter.

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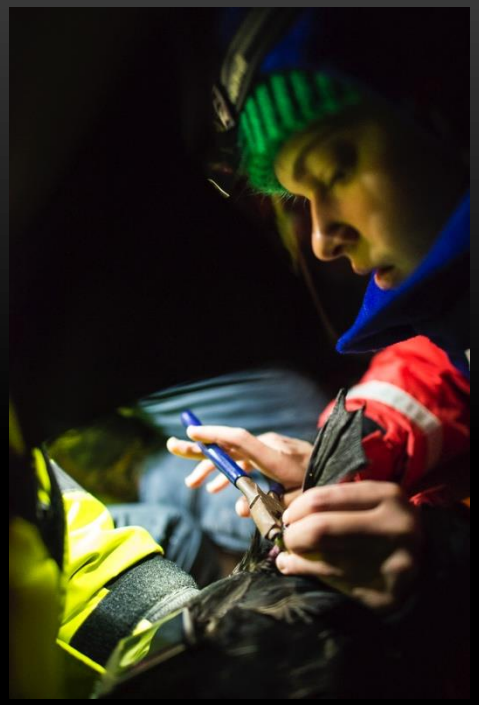

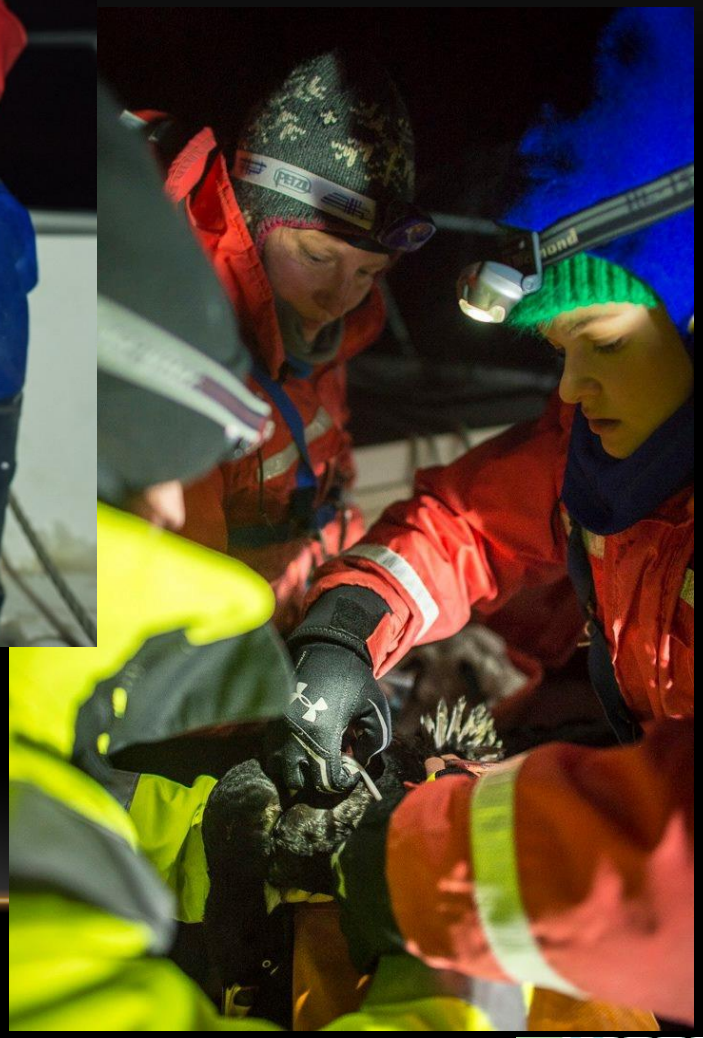

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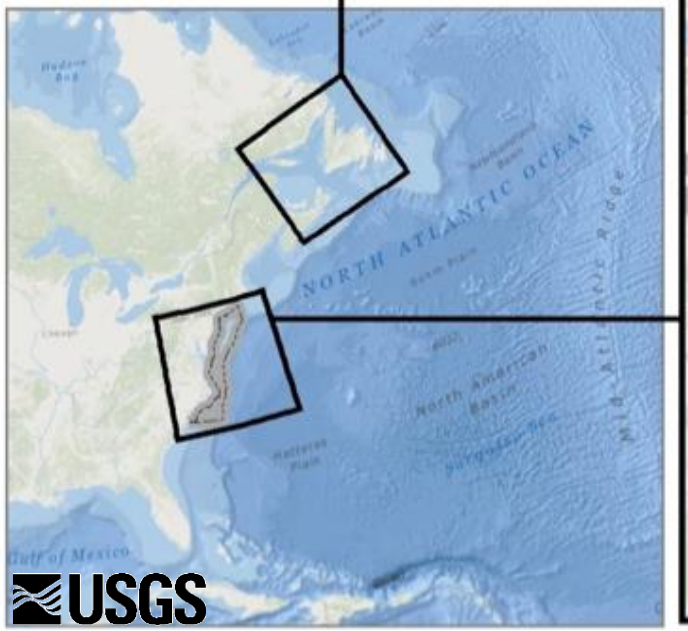
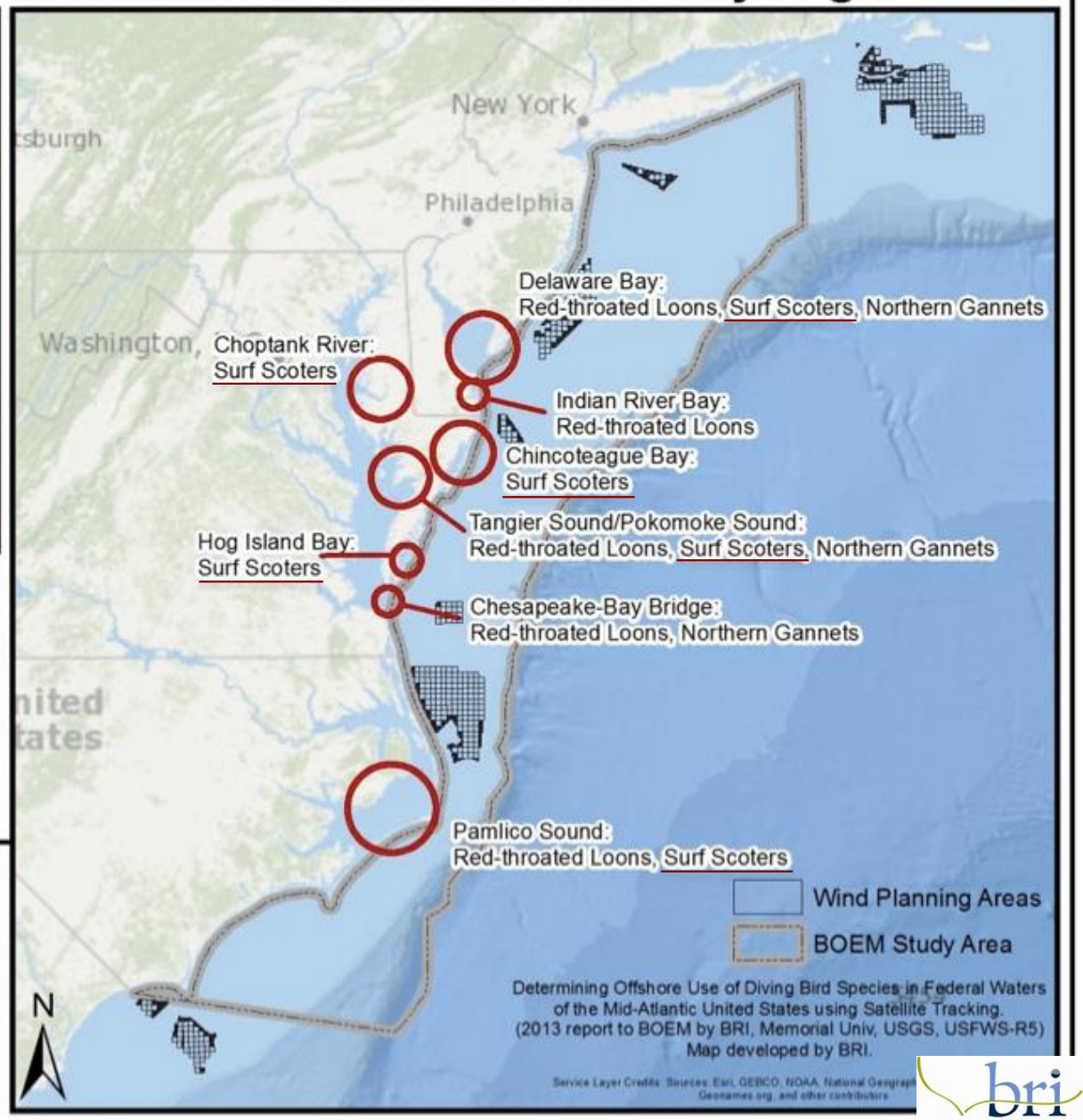
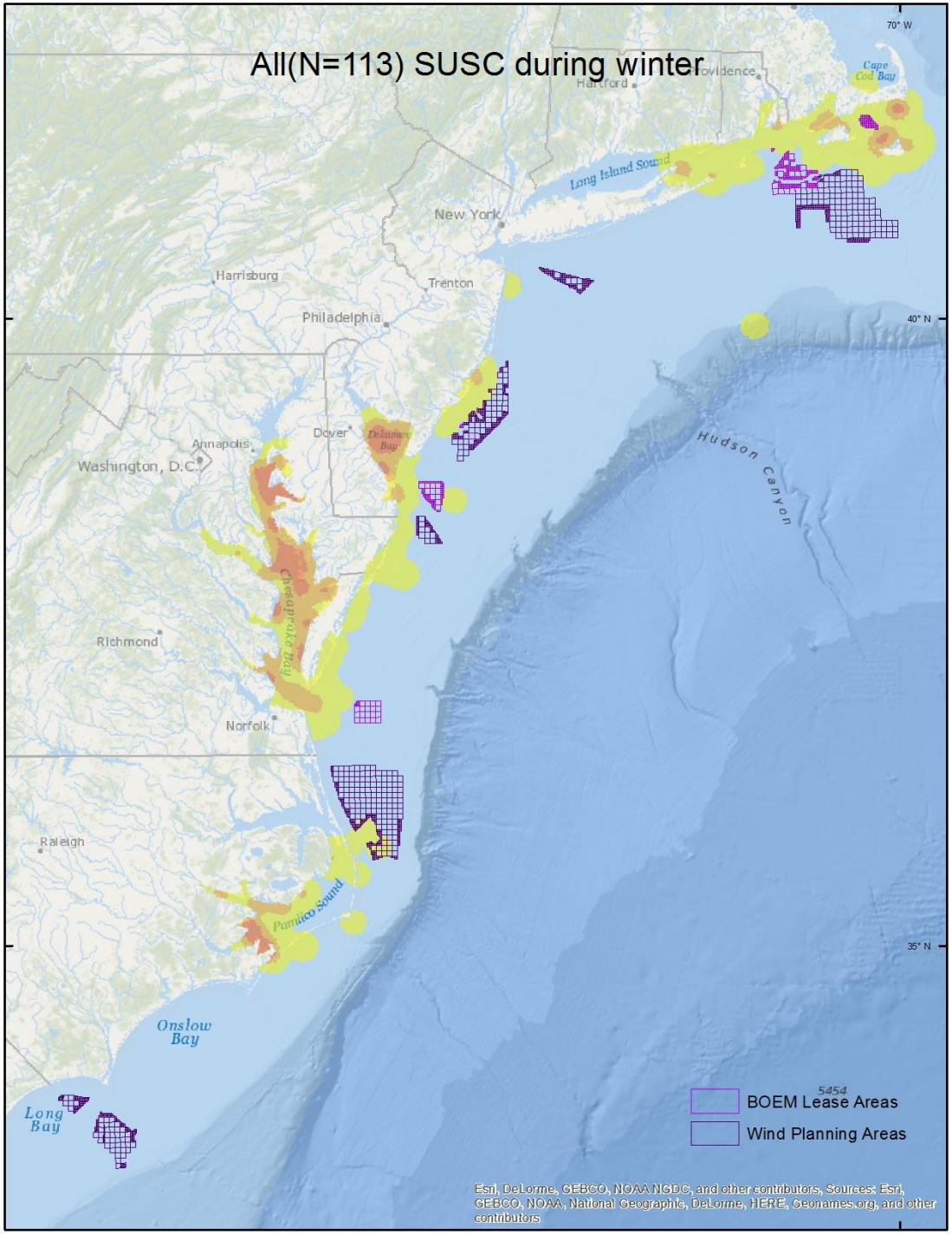
Capture Areas in 2012/2013 of Northern Gannets, Surf Scoters and Red-throated Loons Fitted with Satellite Telemetry Tags

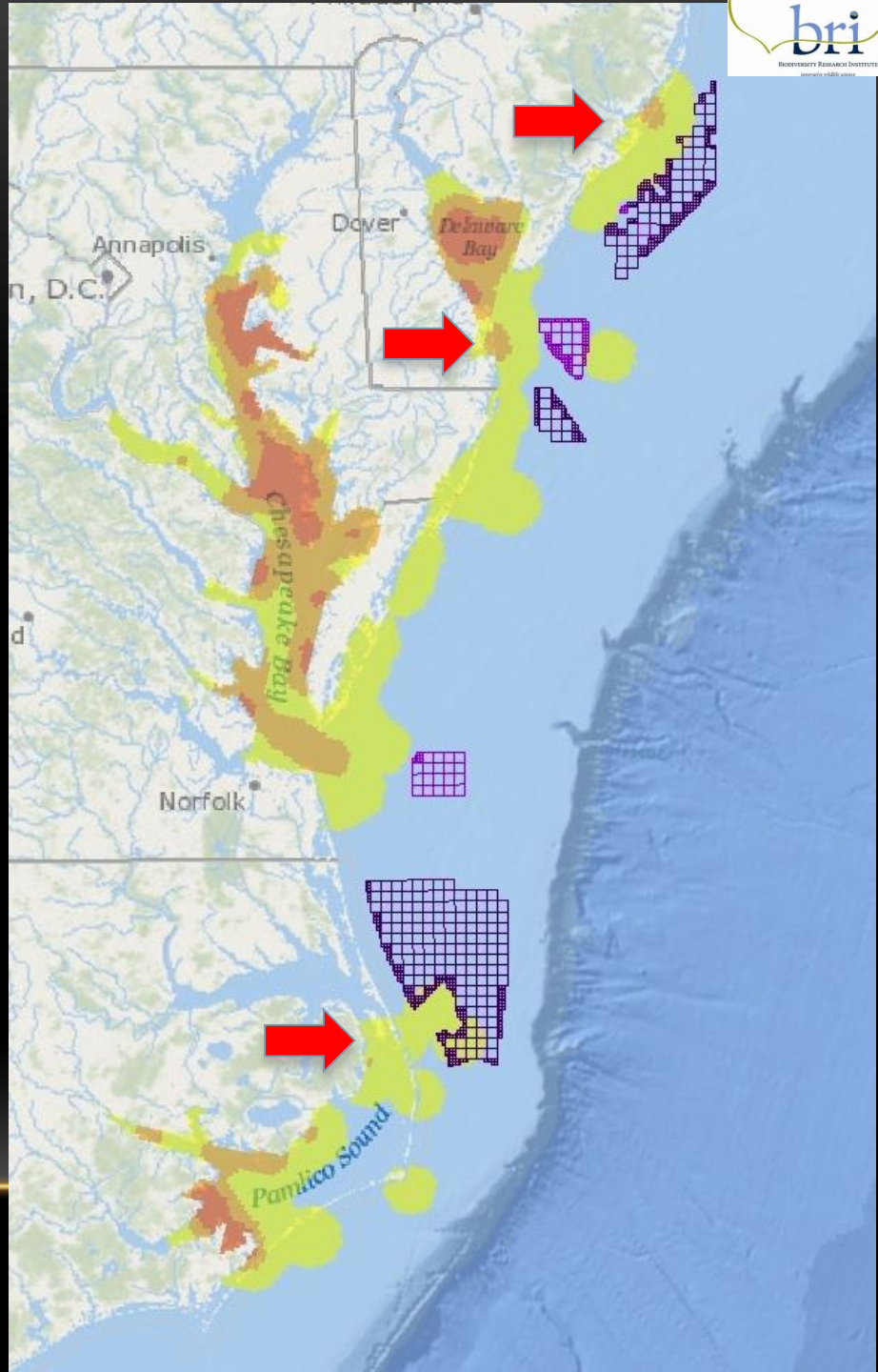





All(N=113) SUSC during winter
70° W
40° N
35° N
Hartford
Providence
Cape Cod Bay
Long Island Sound
New York
Harrisburg
Trenton
Philadelphia
Annapolis
Dover
Delaware Bay
Washington, D.C.
Hudson Canyon
Chesapeake Bay
Richmond
Norfolk
Raleigh
Pamlico Sound
Onslow Bay
Long Bay
5454
BOEM Lease Areas
Wind Planning Areas
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors. Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org, and other contributors

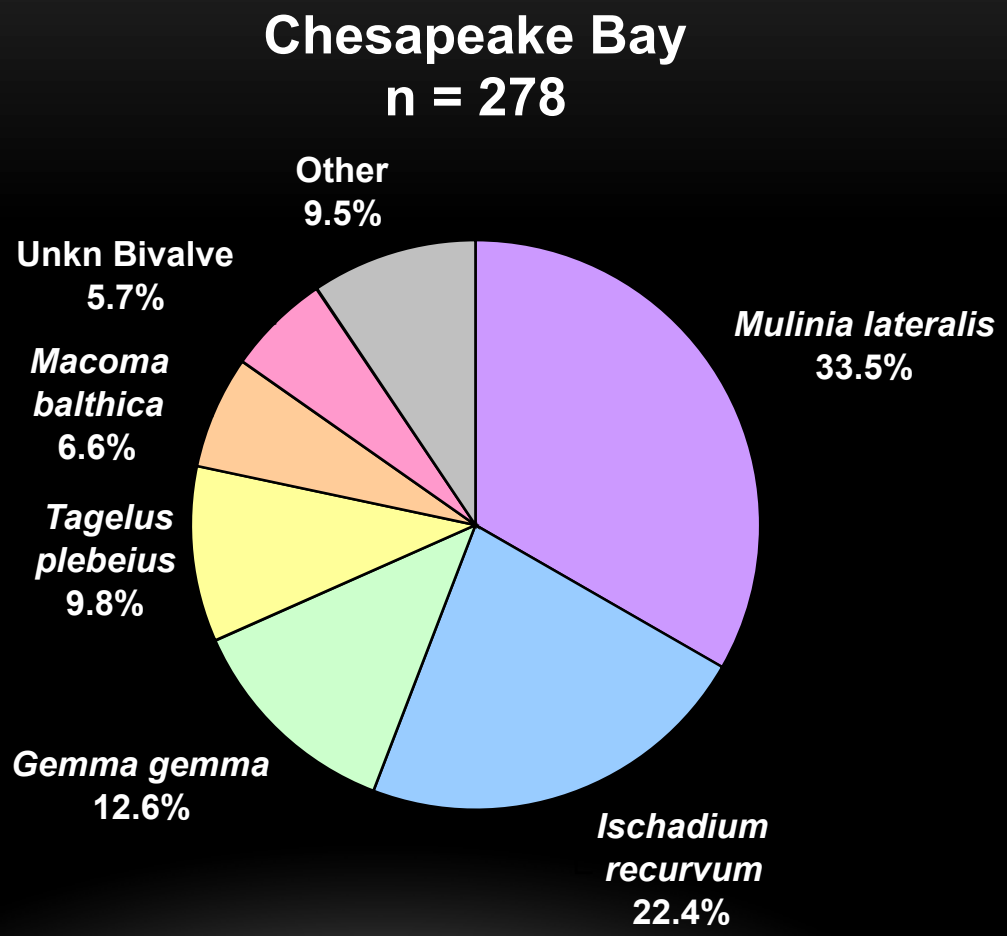
Preliminary Conclusions

- Minimal use of proposed federal WEAs
- Stay in near-shore corridors
- Concern about state plans
- What will be combined impact of state & federal plans?
- With large spacing between turbines will potential artificial reef habitat provide more prey, changing stopovers.



Foraging Energetics and Behavior

FOOD HABITS



Perry et al. 2006

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THE SITUATION

Changes in Water Quality (anoxic events, sedimentation)

↓

Decline in Oysters / hard substrate availability (1% of historical abundance)

↓

Decline in mussels (*Ischadium recurvum*)

↓

Surf Scoter population & distribution

→ Switch?

More opportunistic species, *Mulinia lateralis*

If scoters are forced to prey on *M. lateralis*, can they obtain their daily energetic requirement?

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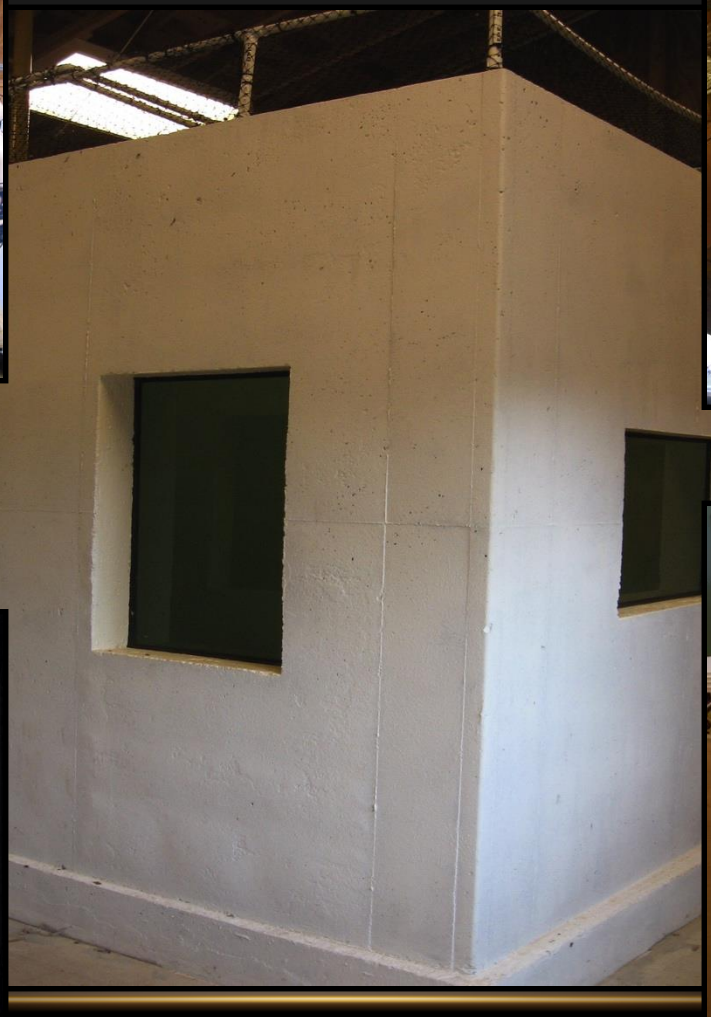
METHODS



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2007/01/31 17:03:06
05 %
CH 1
31-JAN-2007 10:42:28
CAMERA01
NTSC_D1
159.189.24.21

THE BOTTOM LINE!

Surf Scoters can meet their daily energy requirement with high densities of *Mulinia*, but *Ischadium* was the energetically optimal prey item!

Oyster Restoration

Restore native oyster habitat and populations in 20 tributaries out of 35 to 40 candidate tributaries by 2025.

Rodney and Paynter (2006)

Degraded bars	15 m^{-2}
Restored bars	3,409 m^{-2}

A spatial plan and trophic model to evaluate, inform, and quantify the ecological services of oyster reef habitat on wintering seaduck utilization.

Discussions with USACE, NOAA, and USFWS CBFO about incorporating waterbird monitoring protocols into oyster restoration efforts.

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Allegra Schafer

Yellow Shore Crab
Hemigrapsus oregonensis

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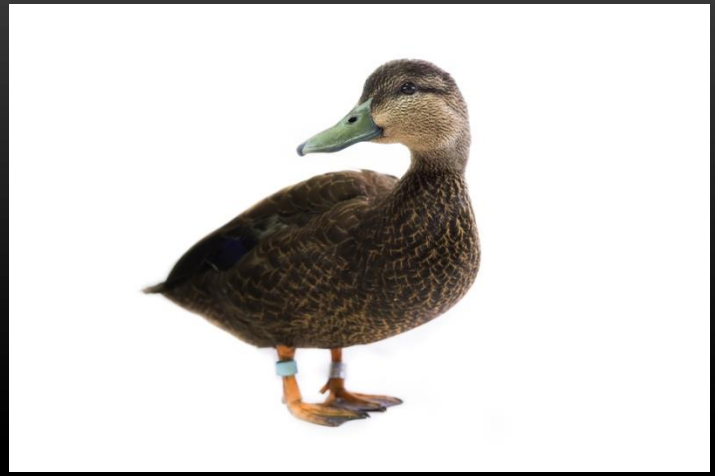
BLACK DUCKS



- Executive order 13508 Chesapeake Bay Strategy
  - three-year average wintering population of 100,000 birds by 2025.
- Refuges within the Bay are charged by EO with a 10% increase in available habitat by 2025!
- Carrying capacity of available wintering habitat along Atlantic Coast. (BDJV, ACJV, DU)
- Assessment of availability and quality of existing habitats within the Bay refuge and island areas for wintering BLDUs to provide mgmt recommendations and baseline data in the face of sea-level rise and land-use change scenarios.

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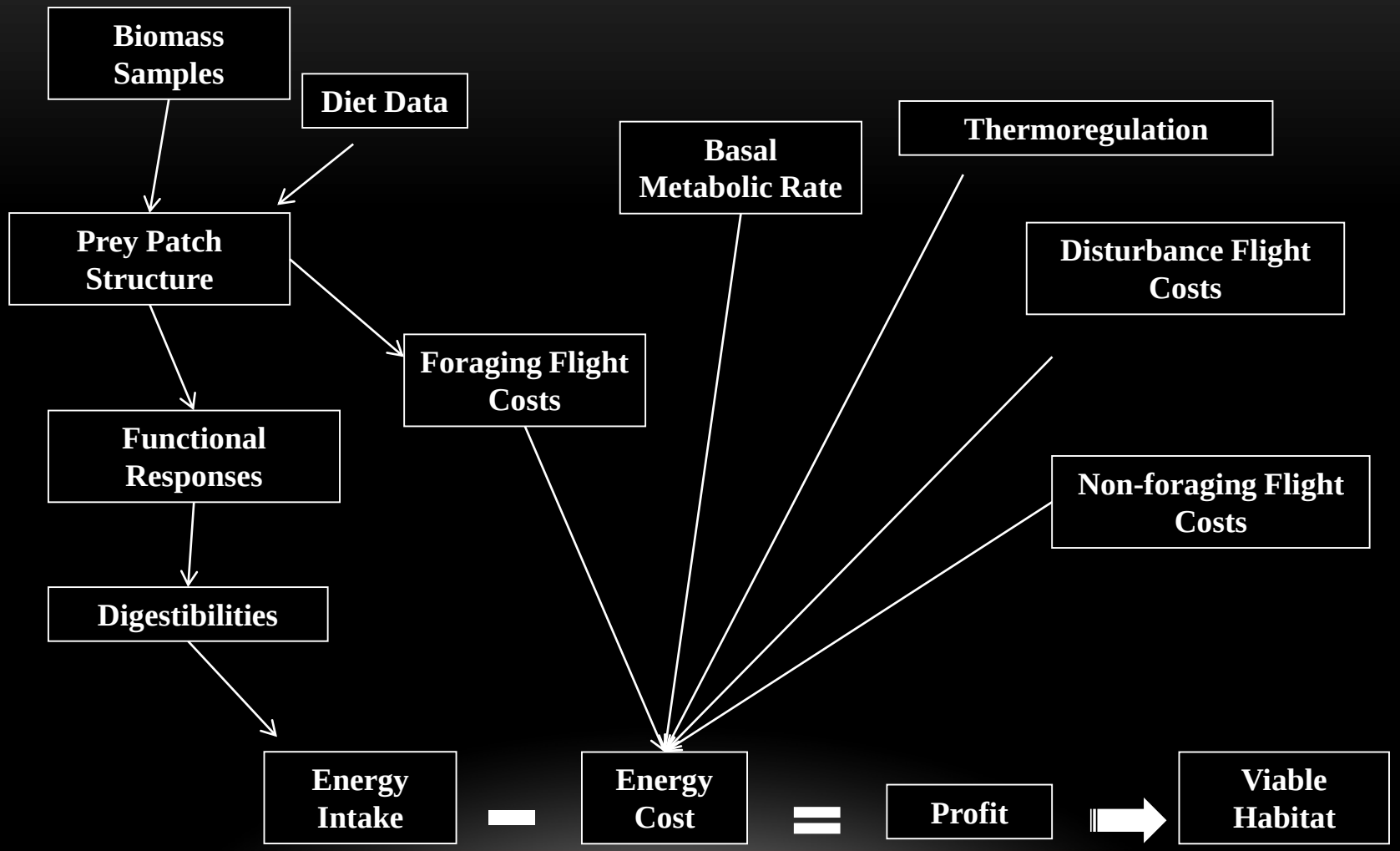
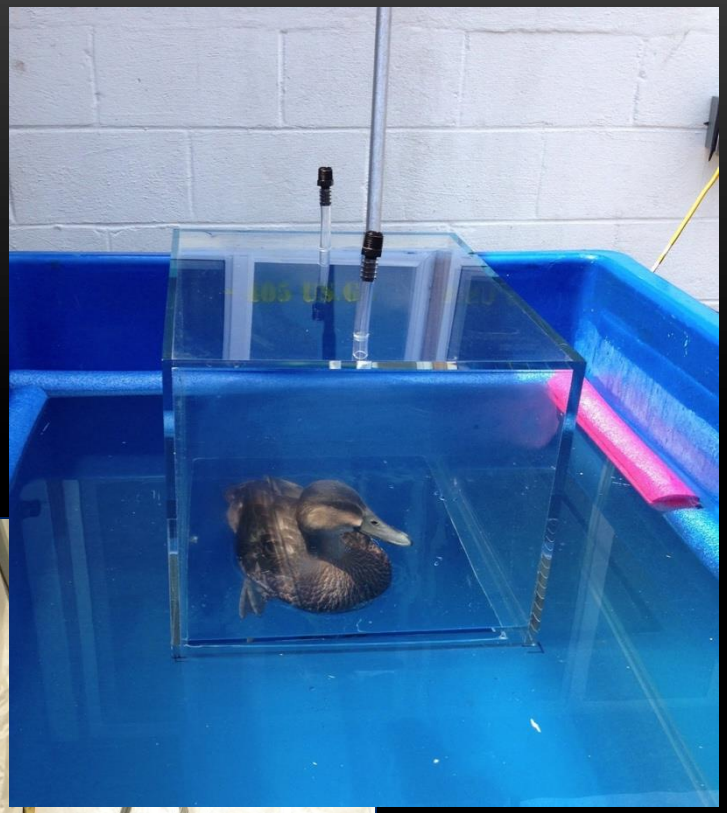

Biomass Samples
Diet Data
Prey Patch Structure
Functional Responses
Digestibilities
Foraging Flight Costs
Basal Metabolic Rate
Thermoregulation
Disturbance Flight Costs
Non-foraging Flight Costs
Energy Intake
Energy Cost
Profit
Viable Habitat

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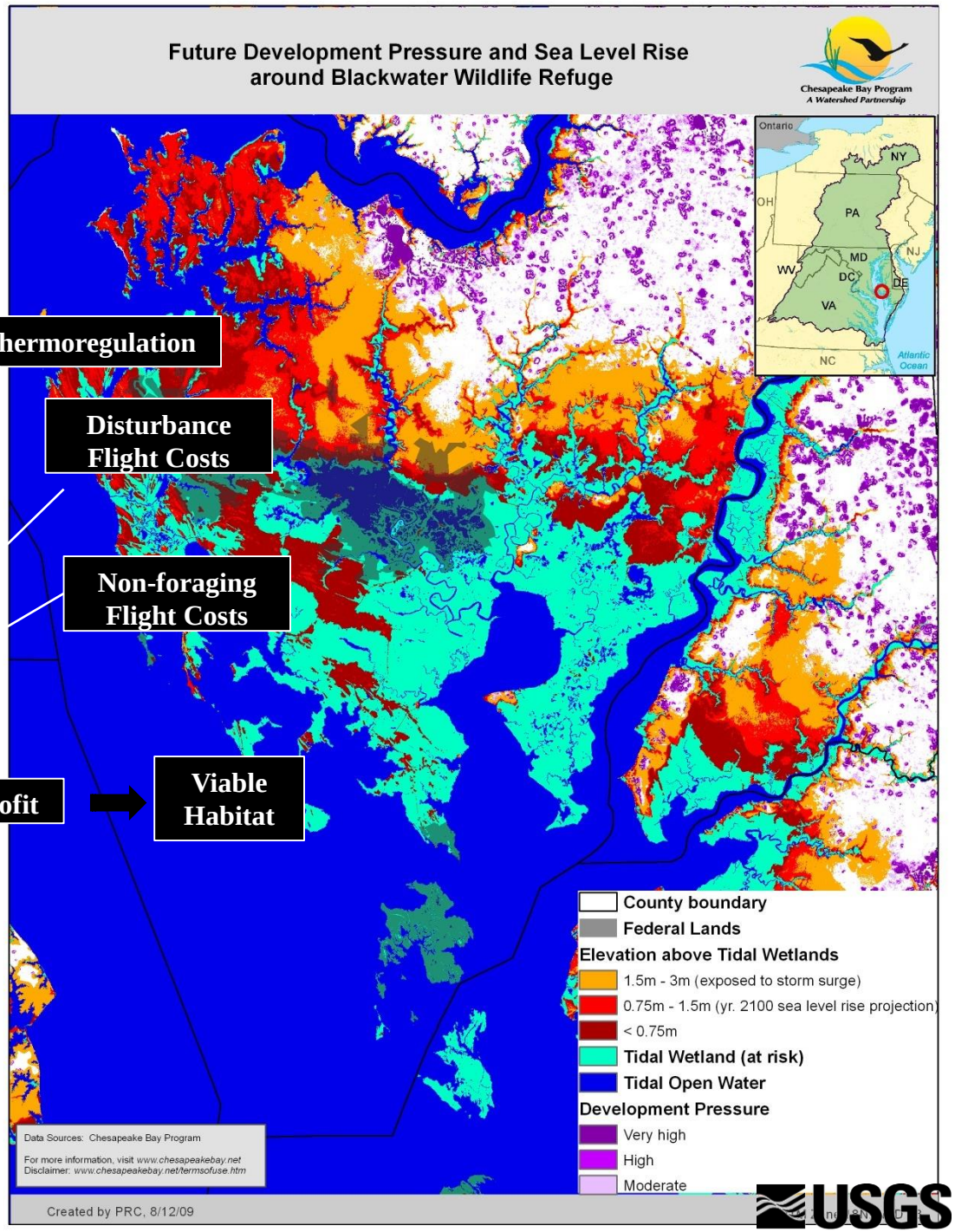
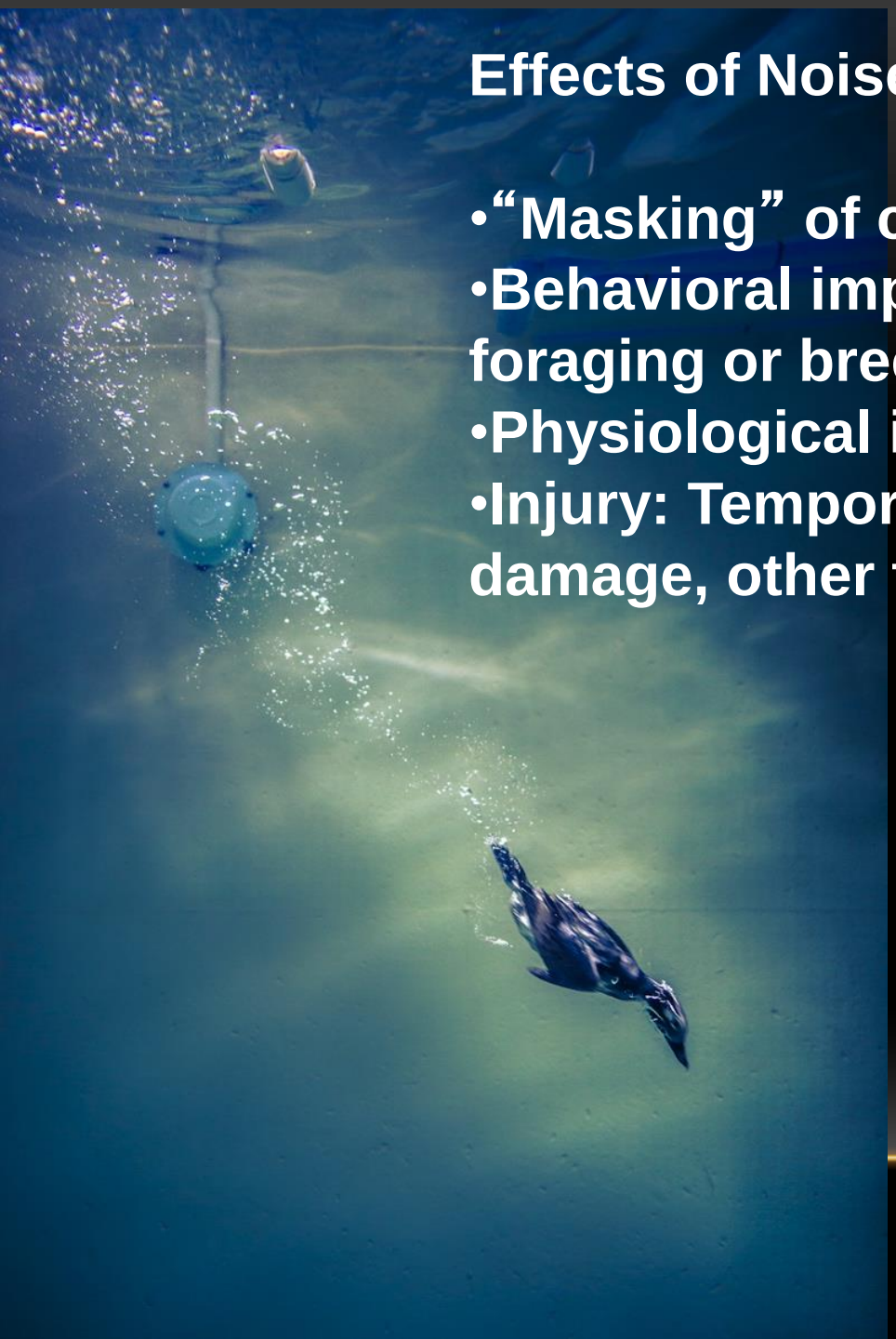


Hearing Abilities



Effects of Noise on Aquatic Animals:

- "Masking" of communication
- Behavioral impacts: Avoidance of important foraging or breeding areas
- Physiological impacts: Stress responses
- Injury: Temporary or permanent hearing damage, other tissue damage

Noise Sources Associated with Wind Power:

- Construction: Short, high-impact (pile-driving)
- Maintenance: Lower level, continuous
- Support: Vessels traveling to and from turbines

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HEARING TESTS -- BEHAVIORAL AUDIOGRAM
DUCKS TRAINED TO RESPOND TO TONES BY TOUCHING A TARGET OBJECT

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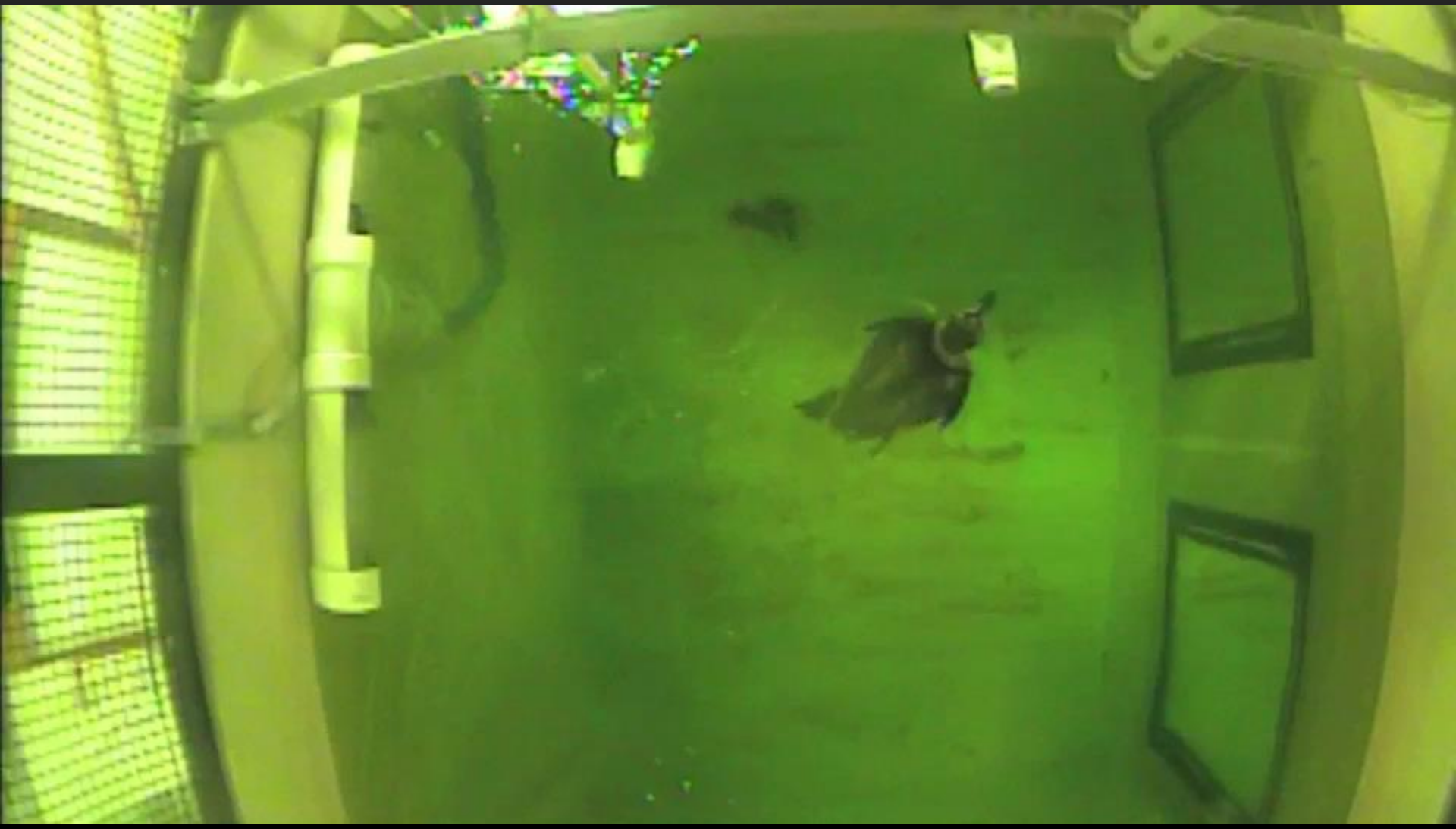

Future: How big are zones 1-4?

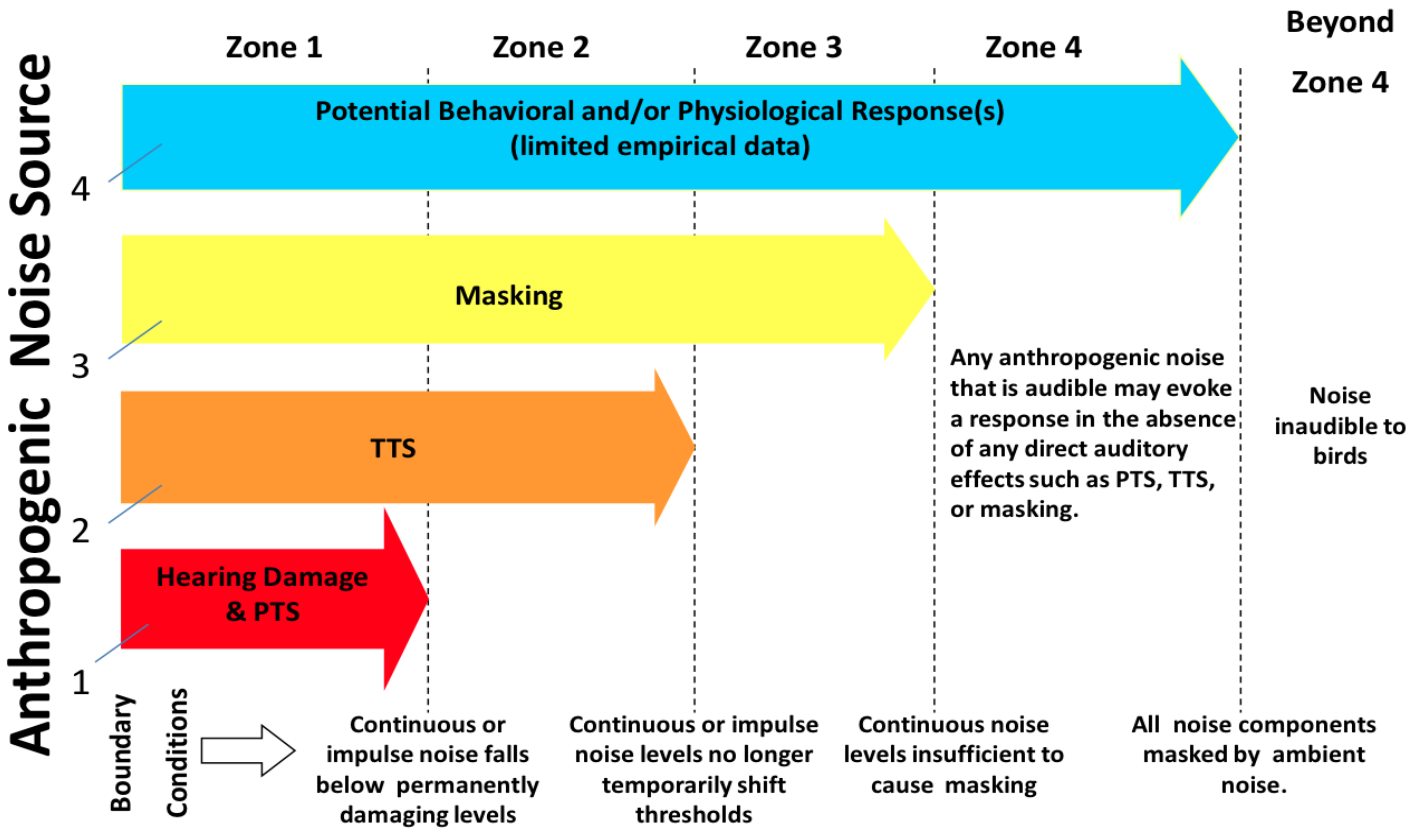

Fig. 1. Relationship between four potential overlapping effects of anthropogenic noise with respect to distance from the noise source (adapted from Dooling and Popper 2007).

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Health Questions

West Nile Virus

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Avian Influenza Challenge Studies

Questions?

All photos in this presentation are by J. Fiely

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