A.N. Severtsov Institute of Ecology and Evolution

Russian Academy of Sciences

Research Program of the Okhotsk-Korean Gray Whale (Eschrichtius robustus) Population Range

Using Satellite Telemetry

Western North Pacific Gray Whale spyhopping inshore of oil extracting platform (Sakhalin)

Gray whale

1. The most ancient baleen whale species
2. Known life duration up to 80 years
3. Females larger than males; max length - 19 м, - 17,5.
4. Feed primarily on benthos →at the bottom for 4-5 moth.The rest of the year= 7 month fast, surviving on fat deposits (2 north and south bound migrations and at breeding grounds
5. Calves born in late February-March; usually once in 2 years
6. Calves wean in August at feeding grounds where they start feeding independently from mothers and migrate to the wintergrounds independent from momes.

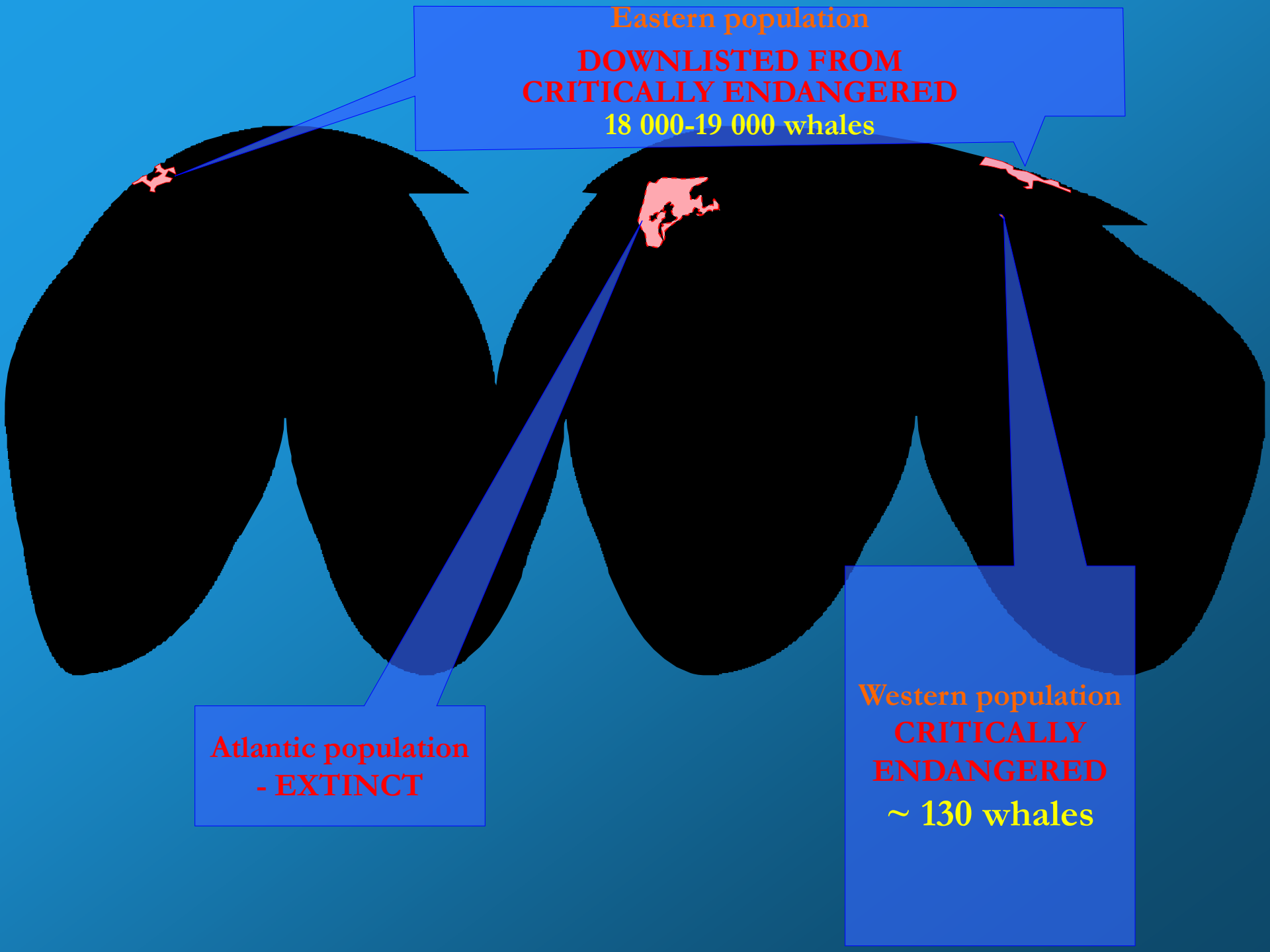
Feeding

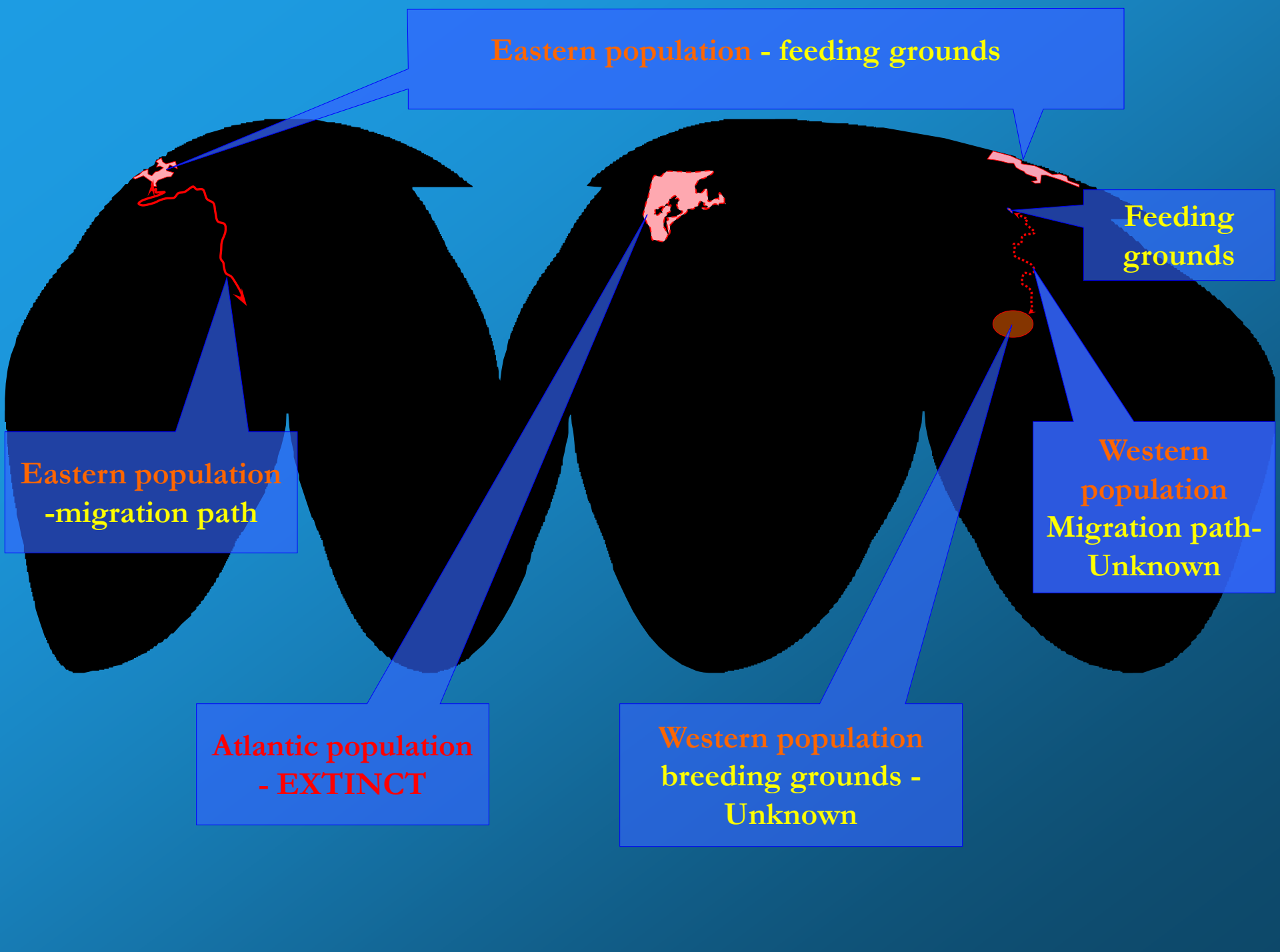
Southbound migration

Breeding\wintering grounds

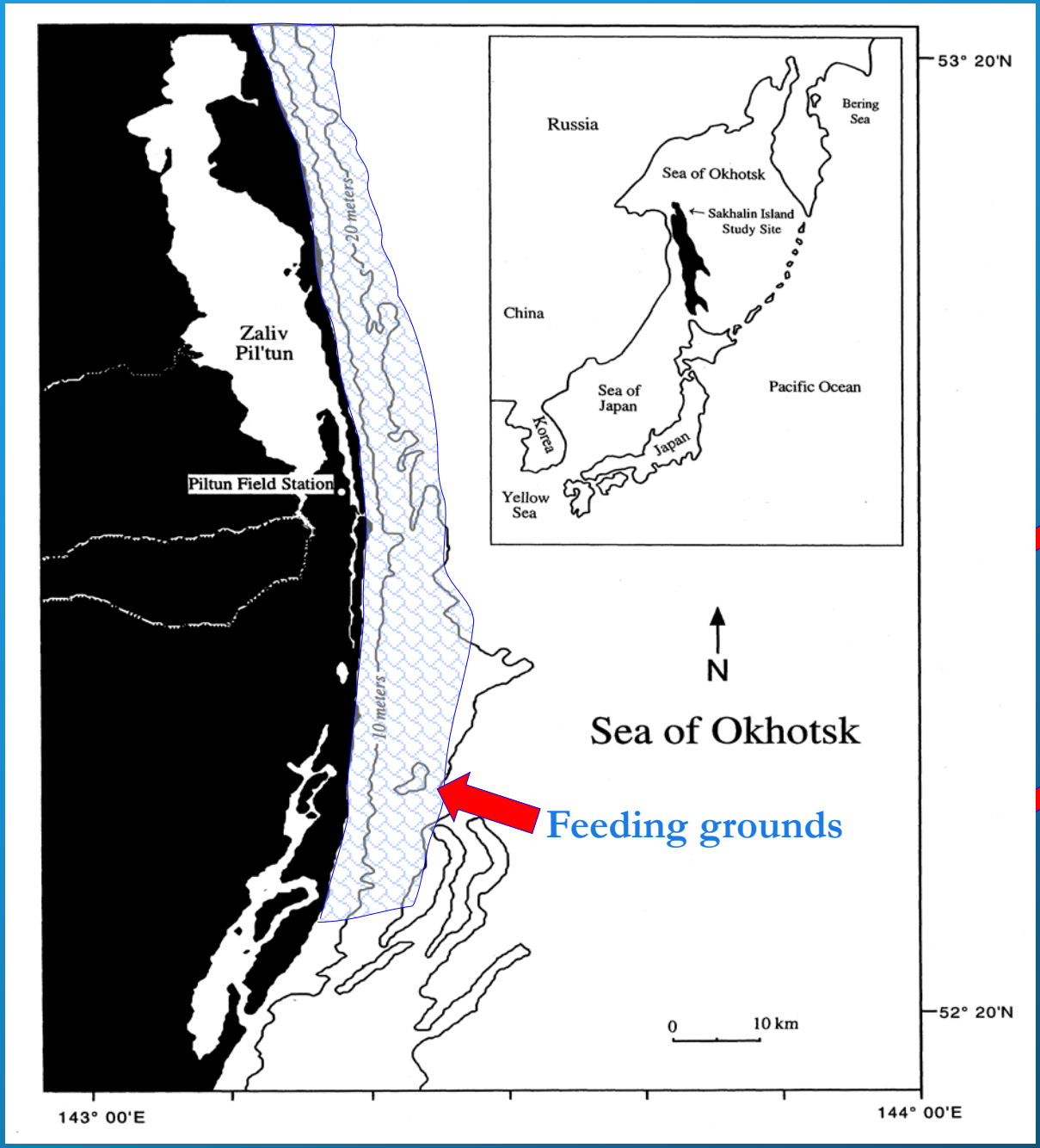
Northbound migration

Fasting!!!

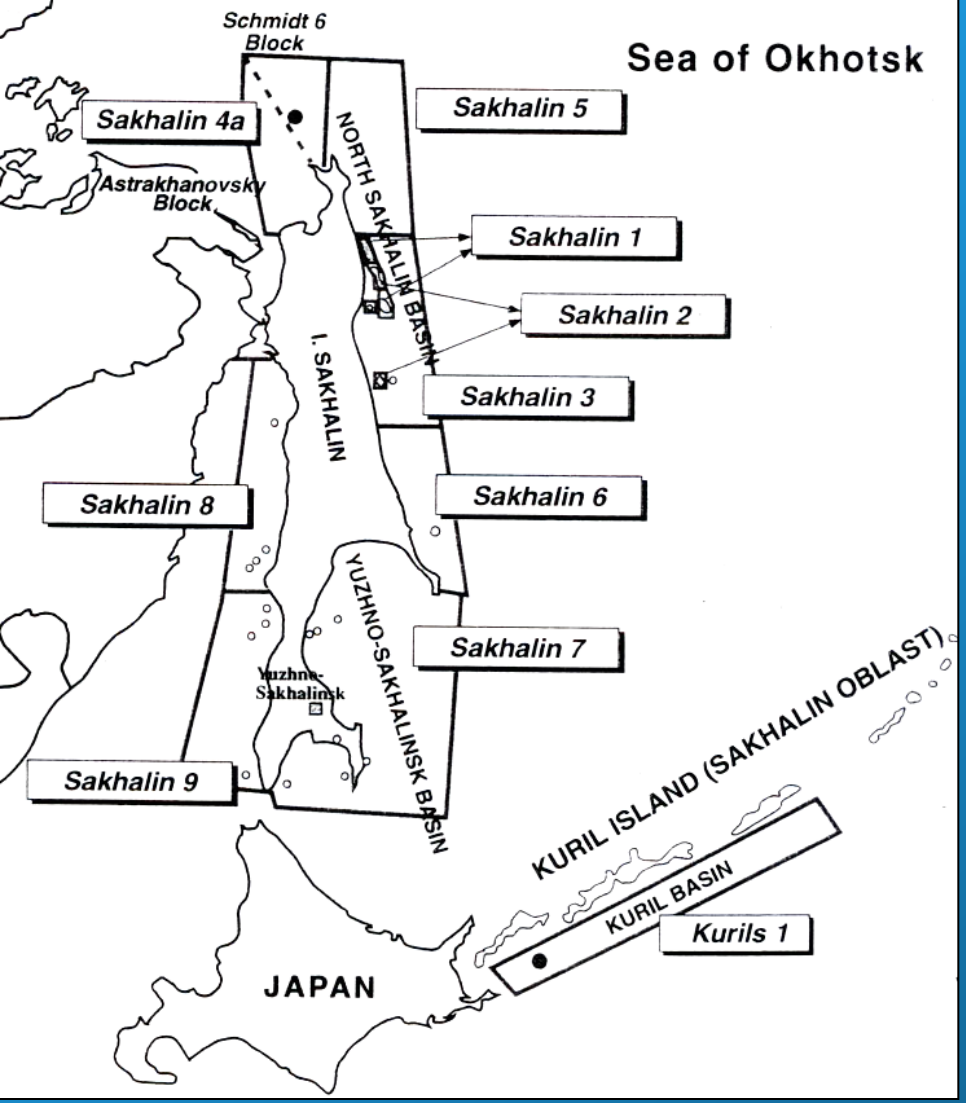

Eastern population
DOWNLISTED FROM
CRITICALLY ENDANGERED
18 000-19 000 whales
Atlantic population
- EXTINCT
Western population
CRITICALLY
ENDANGERED
~ 130 whales


Eastern population - feeding grounds
Feeding grounds
Eastern population -migration path
Western population Migration path- Unknown
Atlantic population - EXTINCT
Western population breeding grounds - Unknown

WGW status:



- **CRITICALLY ENDANGERED**
- **Only about 125-130 whales left**
- **Only 25 reproductive females**
- **Prolonged calving interval (3years)**
- **60/40 male to female bias (75/25 in calves)**
- **Only known feeding grounds neighbor the oil & gas development areas**
- **Migration routes unknown**
- **Breeding grounds unknown**



- Physical disturbance (i.e. noise)
- Collisions with ships;
- Habitat degradation;
- Waste discharges;
- Oil spills

Threats outside Russia\Sakhalin:

Entanglement in the fishing gear, illegal whaling, ship-whale collisions, etc Unknown!!!

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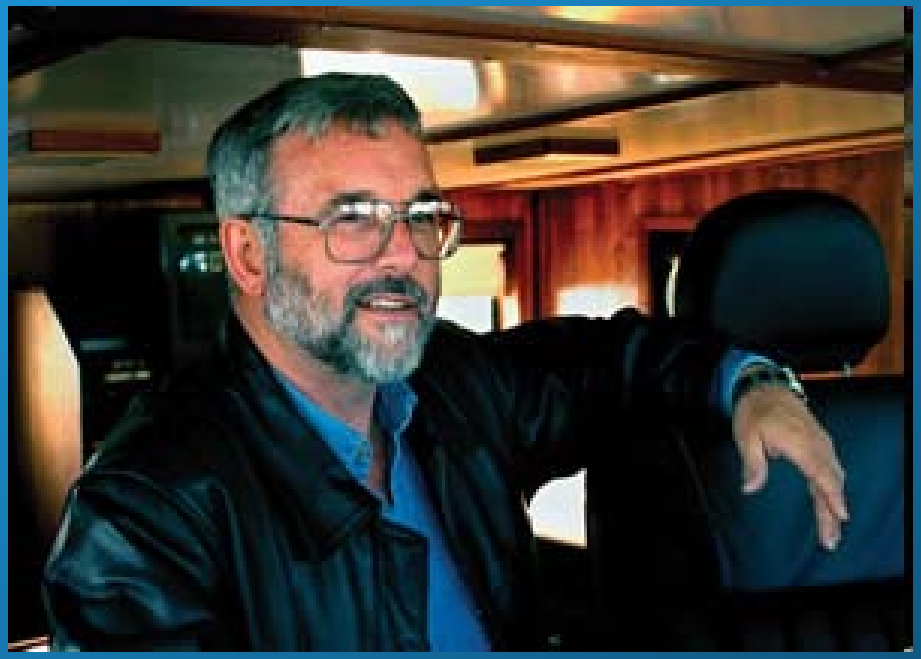
- A.N. Severtsov Institute of Ecology and Evolution Russian Academy of Sciences
  - Oregon State University, Marine Mammal Institute
  - In coordination with International Whaling Commission (IWC) and International Union for Nature Conservation (IUCN)

Internationally established and agreed safeguards for WGW tagging

- 12 animals
- Known, genetically confirmed males only
- In good body condition
- Identified in the field immediately prior tagging by the WGW photo-ID specialist (A. Bredford)
- Tagging technology first tested on EGW and proven success and no harm for whales
- Tags deployment conducted by experienced team (Mate +)

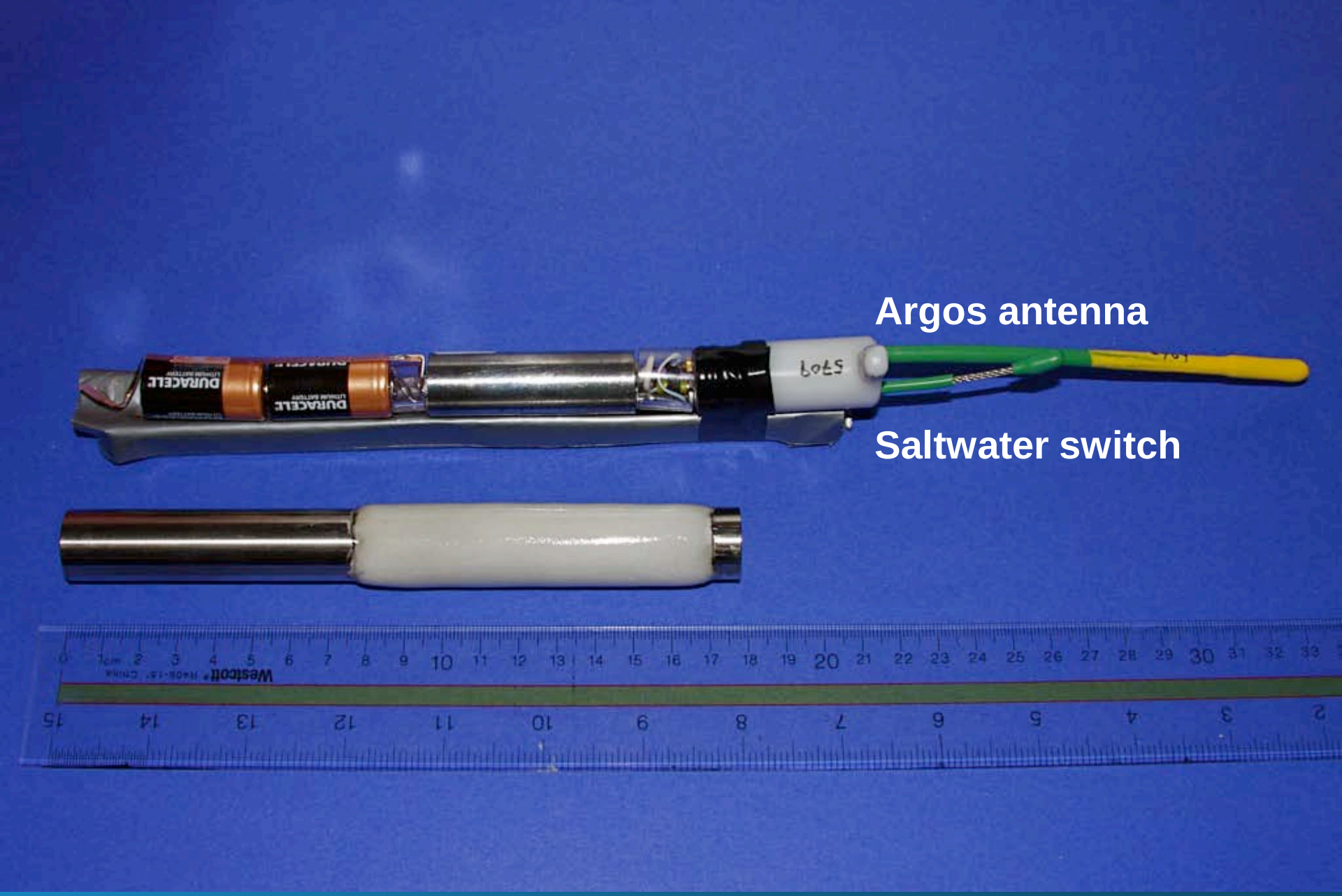
Further materials provided by Dr. Bruce Mate,Director of Marine mammal Institute, Oregon State University



Sometimes it is hard to figure out where whales go.

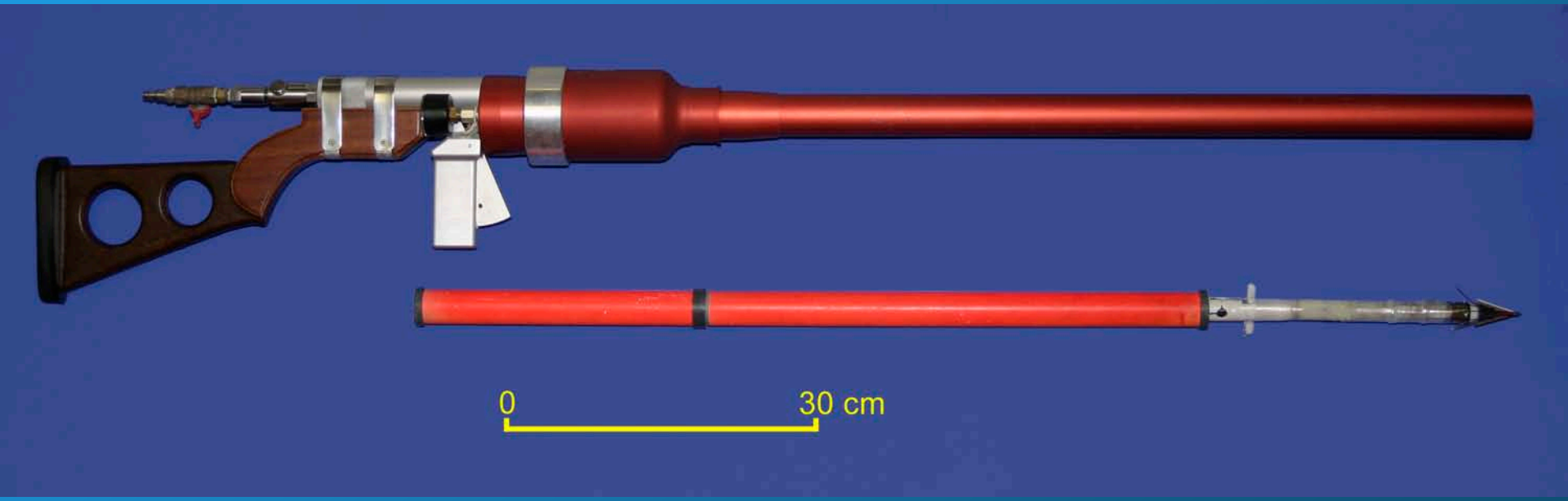
Argos-tags are made with surgical-quality stainless steel, Delrin plastic & a long-term dispersant antibiotic.

They have been used to identify new habitats, routes, and behavioral data for up to 620 days on 7 species. Size is 22cm depth x 1.9 cm dia.



Telonics ST15 (location-only) tag, showing inside components (in an assembly tray) and housing with antibiotic coating.

A modified air-powered line-thrower applies tags at a distance of <3m, using <100 psi, supplied from a regulator on a SCUBA tank.



A re-usable red plastic push-rod holds the tag outside the barrel with water-soluble tape, It adds in-flight stability to assure accurate placement and floats off.

Gray whale being tagged with Wildlife Computers SPOT-5 semi-implantable tag - September 2009. Yellow foam keeps push-rod from sliding out of barrel. Water-soluble tape usually dissolves within 60s.


Implantable Sat-tag on a sperm whale
Antibiotic coating helps prevent infection as tags encapsulate.

New Wildlife Computers implantable SPOT-5 tag cast in stainless steel housing can vary in length (& operational life). The saltwater switch (unseen here), is incorporated into the base of the Delrin ears (lateral extensions) which prevent inward migration.

Two-battery version shown with ~12 month electronic life. Distal screw at left secures attachments and cutting blades.

Fully assembled 2-battery tag with blades, retention wires, and petals (24 cm attachment depth x 2 cm diameter).

An example of the photo-ID information gathered at the time of tagging, to be used in identification and evaluation of possible visual effects of tagging.

Approaches to tag WGWs will require identification by A. Bradford to avoid tagging known females. Biopsies will not be taken.

Efforts to re-sight tagged whales will continue for years to study potential tag effects.

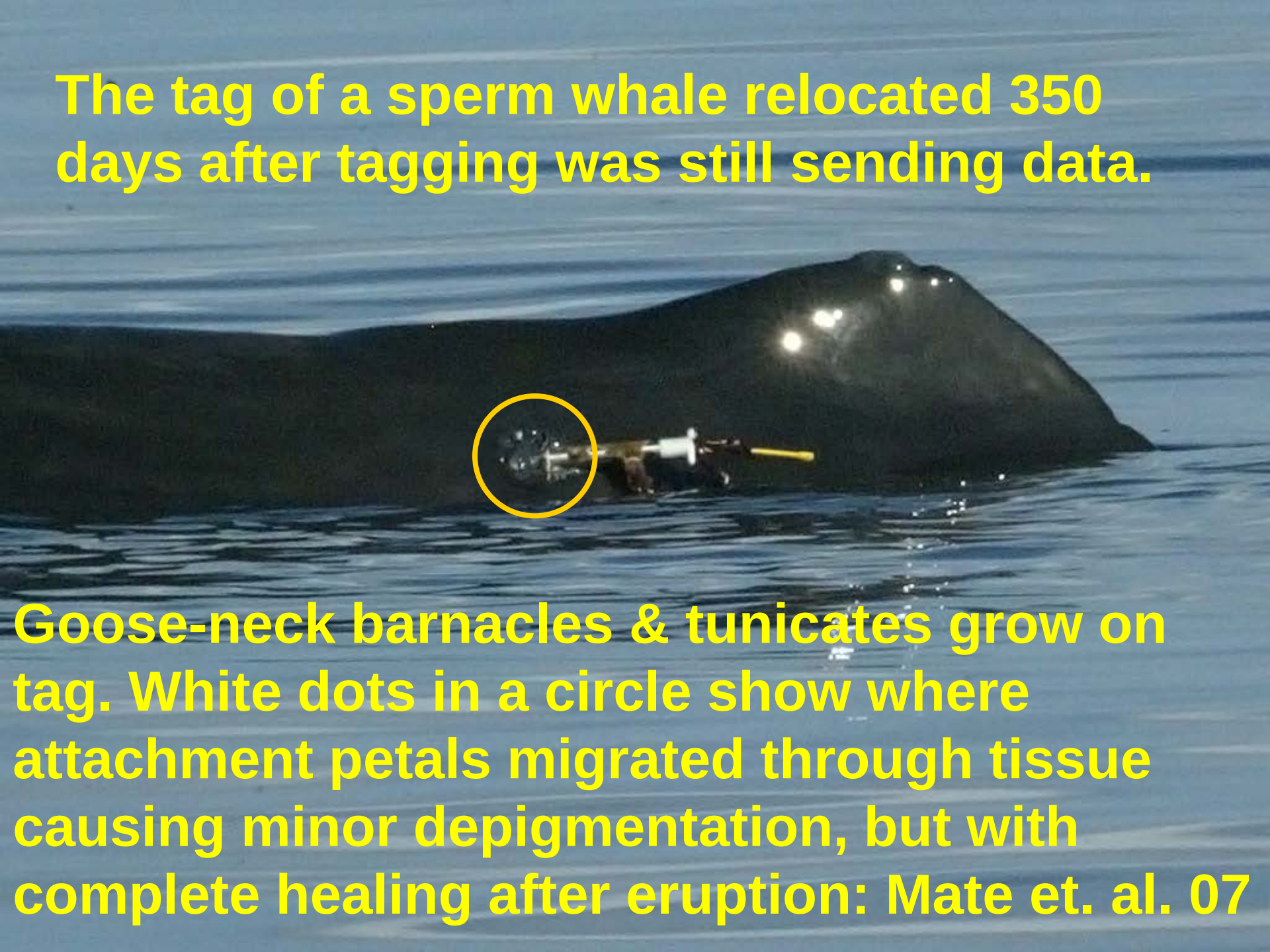
Other equipment:

A 6.4 m rigid hulled inflatable boat (Rhib) w/diesel inboard has been used successfully. A 2 m bowsprit triples successful approaches to tag whales. Note exposure/floatation suits, harnesses, & 4 or 1 point lift.

Ethylene oxide (gas) sterilization is necessary because high heat ruins batteries and transmitter components. The white plastic cover with holes protects the blades, but allows the gas to do its job. The bag remains closed. This is the way tags will be shipped. How do we keep Customs from opening the see-through bags? How do we allow for the “return” (re-export) of unused tags?

Tag Effects

- Whales heal from huge natural wounds (bottom up)
- Philosophy: avoid excess tissue damage/infection
  - Sanitary manufacturing & application processes
  - Reduce entry drag of implantable parts
    - Lubricate tapered entry materials (use of topical antibiotic)
    - minimal clean cuts heal faster; minimize pressure necrosis
  - Minimize vibration (hydrodynamic drag) damage to cells
  - Long-term dispersant antibiotics may reduce infection
  - Make housings & attachments from smooth-surfaced inert materials to reduce injury and galvanic issues
- Learn lessons from re-sightings about construction techniques & plausible cause-effect relationships
- Post-mortems of tagged whales are opportunities


The tag of a sperm whale relocated 350 days after tagging was still sending data.
Goose-neck barnacles & tunicates grow on tag. White dots in a circle show where attachment petals migrated through tissue causing minor depigmentation, but with complete healing after eruption: Mate et. al. 07


This tag was still transmitting after 350 d, even though it had migrated out ~85%. There was no swelling, despite visible attachment petals.