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Marine mammals: challenges and regulations

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Background: Norwegian Institutions involved in marine mammal research

- University of Oslo (ecology, genetics)
 - University of Trondheim (toxicology)
 - UiT – the Arctic University of Norway (physiology, ecology)
 - Institute of Marine Research (management, ecology, toxicology)
 - Norwegian Polar Institute (management, ecology, toxicology)
 - Norwegian Defence Research Establishment (sound/noise impacts, ecophysiology)
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- (National Institute of Nutrition and Seafood Research (NIFES))
 - (UNIS)
 - (NINA)
 - (Bergen Aquarium)
 - (Lofoten Aquarium)
 - (Polaria)

First, some background information on key methodology:

Background: Methods for live capture of seals

Hoop net – "rush & grab"



Darting sedative (airgun/blowtube/jabstick)



Photo: Christian J. Wenker

...or just "walk & grab"



Photo: Lars Folkow

Net capture



Photo: University of California, Davis

Background: Methods for tagging/sampling seals

Tagging

Flipper roto-tags (ID)



**Branding
(bleach, dye, heat)**

**Radio-/satellite-/data-
loggers (glued to fur)**



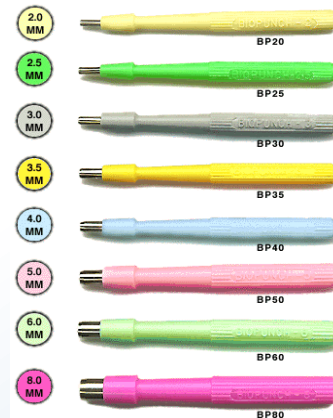
**Belts/harnesses (rarely
used, risk of entanglement)**

Sampling

Blood sampling



**Biopsy
skin/blubber/muscle**



**Whiskers
DNA, stable isotopes**



**Post mortem
sampling**

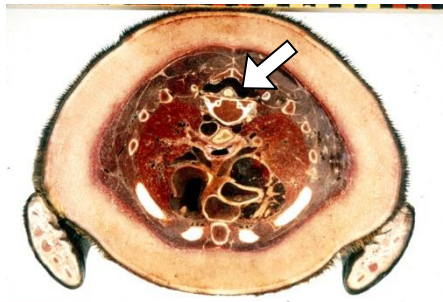


Photo: HealthLink

Photo: Paul Soders

Photo: Lars Folkow

Photo: E.S. Nordøy

Underlined text: actions requiring permit/authorization

Background: Methods for live capture of whales

- Small toothed whales may be captured with nets



- Hoop nets may be used for belugas, narwhals, pilot whales...



- ...but large whales cannot be live-captured. Some opportunistic studies of entangled whales are carried out.



Background: Methods for tagging/sampling whales

Tagging

Bolt, dorsal fin



Bolt, dorsal ridge (beluga, narwhal)



Suction cup



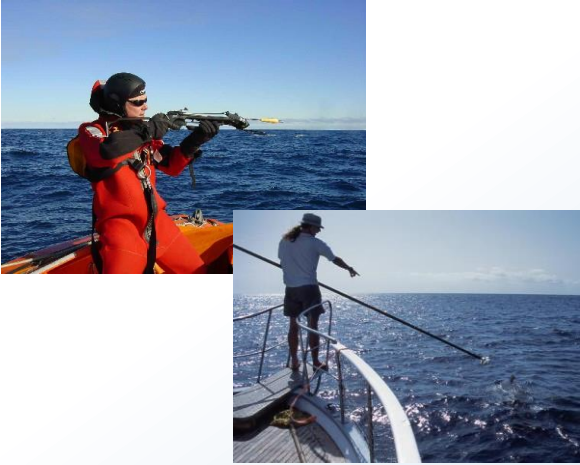
Dart tag



Sampling

Blood sampling (small whales)

Biopsy skin/blubber/muscle



Post mortem sampling



Photo ID/acoustic survey



Red text: actions requiring permit/authorization

Sedation of cetaceans is largely inapplicable

Re: Tagging/sampling whales

Size and lifestyle make cetaceans more difficult to capture and handle, compared to pinnipeds (e.g., sedation is rarely applicable)

To optimize methodology and animal welfare (and to minimize adverse effects of tagging, in particular), international experts have met and developed a draft for a

«Cetacean Tagging Best Practice Guidelines»

to be debated and hopefully ratified by the IWC & NOAA.

Marine mammal studies – summary of aims and methods

(Approaches in parenthesis; those requiring permit in red):

A) Management:

- **How many? Are there genetically separate sub-populations?**
(photo ID; passive acoustics; aerial surveys/photographing; tagging; biopsies (genetics); location transmitters)
- **How/where are they distributed? Are they disturbed by, or interact with, human activities (fisheries, tourism, ship traffic, oil operations, military)? How does climate change affect their distribution? –**
(photo ID; passive acoustics; tagging; location transmitters; dive recorders/cameras/accelerometers)
- **What, and how much, do they eat?**
(dive recorders/cameras/accelerometers; tissue samples (isotope analyses); scat sampling; culling & stomach sampling)
- **What is their health status/body condition/pollutant levels?**
(tissue samples (contaminants); culling & sampling; dive recorders/cameras/accelerometers)

B) Research:

- **Ecology**
(tagging; dive recorders/cameras/accelerometers; tissue samples; sampling culled animals)
- **Physiology**
(dive recorders/cameras/accelerometers; study captive animals; tissue samples; sampling culled animals)
- **Technology development**
(dive recorders/cameras/accelerometers; test new prototypes on captive animals)

For marine mammals, management and research objectives and methodology tend to blend.

Extracts from *FOR-2015-06-18-791/DIRECTIVE 2010/63/EU* - potential challenges for marine mammal studies & management: Research vs. management

§ 2. *Saklig og personelt virkeområde* - equivalent to Articles 1-2 and 1-5 of DIRECTIVE 2010/63/EU

and

§ 10. *Formål med forsøket* - equivalent to Article 5 of DIRECTIVE 2010/63/EU:

COMMENT:

- **Potential challenge:** The above paragraphs describe when Regulations do/do not apply, but there is no specific mentioning of «non-experimental managemental practices».
- Nevertheless, from a marine mammal perspective, managemental objectives are more or less exclusively hypothesis-driven and consequently use procedures for scientific purposes that require authorization (e.g., to assess resources use/needs, how climate change affects distribution, disease, etc.).
- **Examples of scientific publications based on managemental research objectives:**
 - **The underwater soundscape in western Fram Strait: Breeding ground of Spitsbergen's endangered bowhead whales.** [Mar Pollut Bull.](#) 2017 Sep 19. pii: S0025-326X(17)30754-3. doi: 10.1016/j.marpolbul.2017.09.019. [Epub ahead of print] [Ahonen H¹](#), [Stafford KM²](#), [de Steur L³](#), [Lydersen C³](#), [Wiig Ø⁴](#), [Kovacs KM³](#).
 - **Interdecadal changes in the marine food web along the west Spitsbergen coast detected in the stable isotope composition of ringed seal (*Pusa hispida*) whiskers.** *Polar Biology* 40 pp. 2027-2033 (2017) DOI 10.1007/s00300-017-2122-3. Andrew Lowther, Aaron Fisk, Kit M. Kovacs, Christian Lydersen.
- **A possible exception? Ad hoc tagging of cetaceans prior to release from entanglement:**

Extracts from *FOR-2015-06-18-791/DIRECTIVE 2010/63/EU* - challenges for marine mammal (mainly pinniped) studies & management: Sedation & Anaesthesia

§ 6. *Godkjenning av forsøk* – these statements, cited below, are not to be found anywhere in

Mattilsynet kan tillate at andre enn veterinærer og fiskehelsebiologer iverksetter total eller lokal bedøvelse av dyr, under forutsetning av at disse personene har gjennomført relevant opplæring. Dette skal fremgå av godkjenningen. Dette gjelder ikke medikamentell immobilisering av vilt. [My underlining]

TRANSLATION: Regulations state that the Norwegian Food Safety Authority (NFSA) may grant non-veterinarians permit to sedate/anaesthetize animals, provided they have adequate competence. This possibility is not open if the animal is 'wild'.

COMMENT:

This presents two questions:

1) Why not? 2) What is a 'wild' animal («vilt»)?

- If, in principle, non-veterinarians can learn how to safely sedate/anaesthetize animals in the lab, it should be possible, in principle, to also learn to do this in the field? In contrast, DIRECTIVE 2010/63/EU always uses a wording to the effect that "a competent person" can replace a veterinarian in function.
- Why is this important? Competent scientists have sedated hundreds of seals under the former legislation, but the number of vets with similar experience competence are few. This paragraph may have vast consequences e.g., if you need to do field work with seals on Bouvet Island for 3-4 months and must find a vet willing to join?
- At the very least, «vilt» should be defined in FOR-2015-06-18-791 – this issue is too important for NFSA employees to decide from case-to-case.

*The term «vilt» is, in fact, defined in another legal document, «Viltloven» (LOV-1981-05-29-38), in which § 2 specifies that «vilt» refers to all free-living terrestrial mammals and birds, amphibians and reptiles (but not to seals and whales...)

Extracts from *FOR-2015-06-18-791*/DIRECTIVE 2010/63/EU - challenges for marine mammal studies & management: Culling & sampling does not require authorization

§ 4-a. Definisjoner – «forsøk» - equivalent to Article 3-1 of DIRECTIVE 2010/63/EU:

3-1. Definition: «‘procedure’.... excludes the killing of animals solely for the use of their organs or tissues.»

Thus, *post mortem* sampling of animals does not require an authorization from the Norwegian Food Safety Authority (*also see § 6 Godkjenning av forsøk*)

COMMENT:

- Accordingly, some animals are killed and sampled without prior «forsøk»/‘procedures’.
- Without any ethical authorization (since no-one is needed), studies based on such samples are difficult to publish in some journals.
- Permits to cull marine mammals in Norway, issued by the Directorate for Fisheries or the Governor of Svalbard, are not accepted as documentation of ethical approval in this context, and the study may be rejected by the journal, on formal grounds.
- I have no good suggestion for a solution to this, but it IS a small technical challenge with the current Regulations.

Extracts from *FOR-2015-06-18-791*/DIRECTIVE 2010/63/EU that have implications for marine mammal studies & management: Research on captured wild animals

§ 21 *Viltlevende dyr i fangenskap* - equivalent to Article 9 of DIRECTIVE 2010/63/EU (my underlining & color):

9-1. Animals taken from the wild shall not be used in procedures.

9-2. Competent authorities may grant exemptions from paragraph 1 on the basis of scientific justification to the effect that the purpose of the procedure cannot be achieved by the use of an animal which has been bred for use in procedures.

9-3. The capture of animals in the wild shall be carried out only by **competent persons** using methods which do not cause the animals avoidable pain, suffering, distress or lasting harm.

Any animal found, at or after capture, to be injured or in poor health shall be examined by a veterinarian or another **competent person** and action shall be taken to minimise the suffering of the animal. Competent authorities may grant exemptions from the requirement of taking action to minimise the suffering of the animal if there is scientific justification.

COMMENT:

- I assume that catching a seal in the wild only to collect a blood sample is not in violation with 9-1?
- Regardless, the subsequent 9-2 opens for exemptions based on scientific justification, which is currently given due attention by the Norwegian Food Safety Authority in their evaluation practice.
- 9-3: Note that both 'capture' and 'health examination' may be carried out by a 'competent person' who is not a veterinarian – in contrast to sedation, which (in Norway) must be carried out by a veterinarian.

CONCLUSIONS:

- In practice, «Management» vs. «Research» presents few problems in marine mammal studies, which all represent science and therefore may obtain due authorization from the Norwegian Food Safety Authority.
- As opposed to the Directive, current Norwegian Regulations only allow veterinarians (by profession) to sedate seals, even though many non-veterinarians researchers have vast experience and competence. This practice does not promote animal welfare and may causes large logistic (and financial) challenges.

Thank you!