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Session A7: Use of Telemetry for Fish Ecological Survey in Europe

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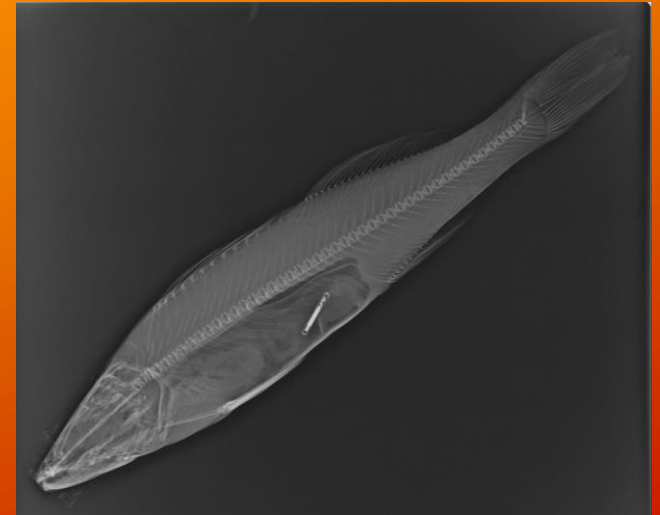
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Use of Telemetry for Fish Ecological Survey in Europe



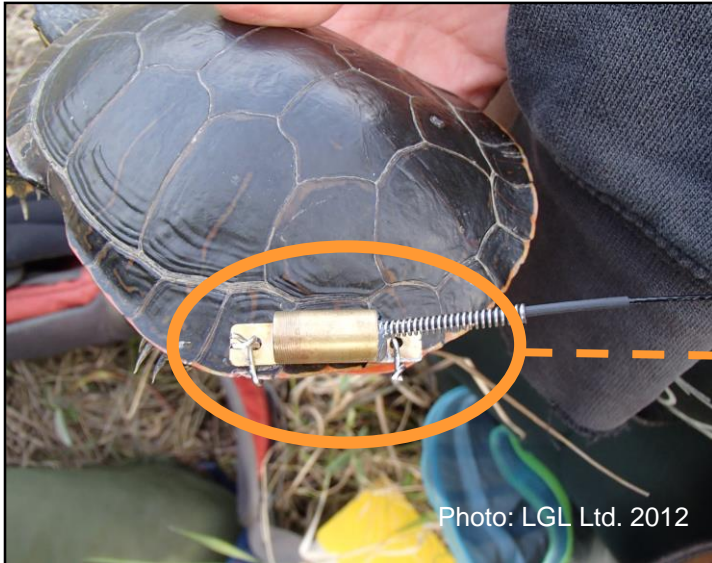
Photo: Blue Leaf Environmental Inc. 2012



Dr. Beate Adam

Kirtorf-Wahlen / Germany

Telemetry is ...



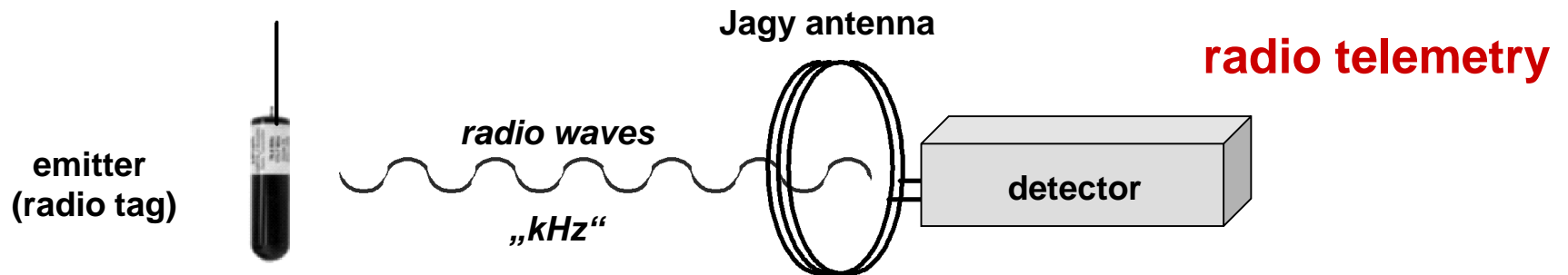
... measuring the position
of an animal over a ± big distance



Topics

- **What types of telemetric systems are available ?**
- **Which kind of telemetric surveys have been done in Europe ?**
- **What about the demands of the European Animal Welfare Act due to telemetric projects ?**

Telemetric technologies

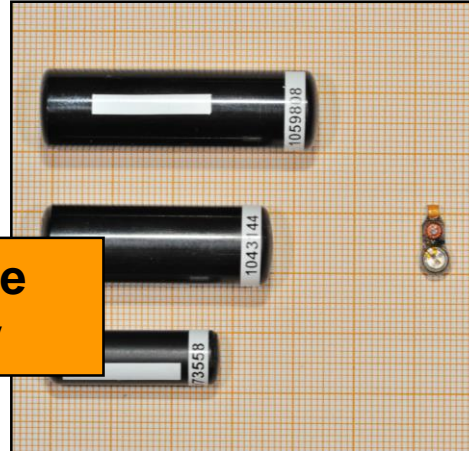


Emitters

radio telemetry:
tag (mostly) with an
external drag antenna



life time is limited by the
capacity of the battery



acoustic telemetry:
tag without external
drag antenna



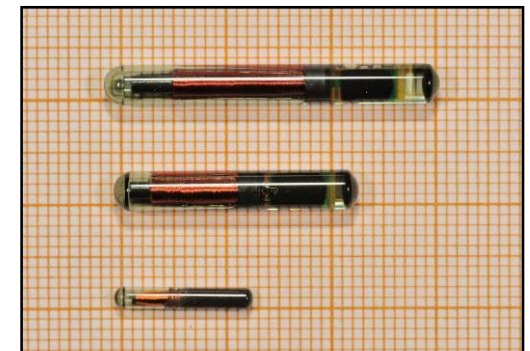
RFID:

NEDAP-Transponder:
with batterie just to
tune the signal, when
transponder is activated



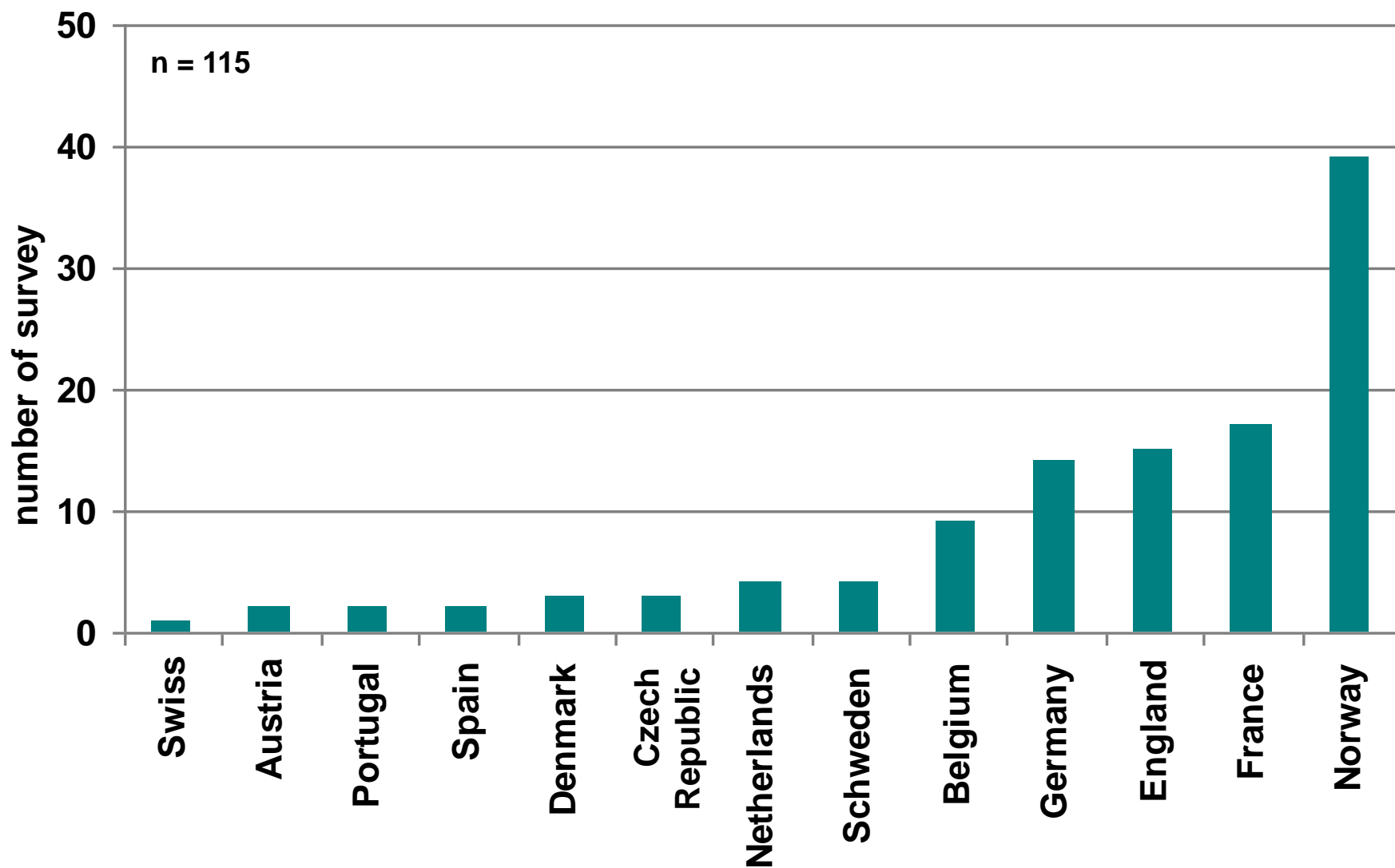
life time depends
on the number of
detections

FDX and HDX-transponder:
no batterie

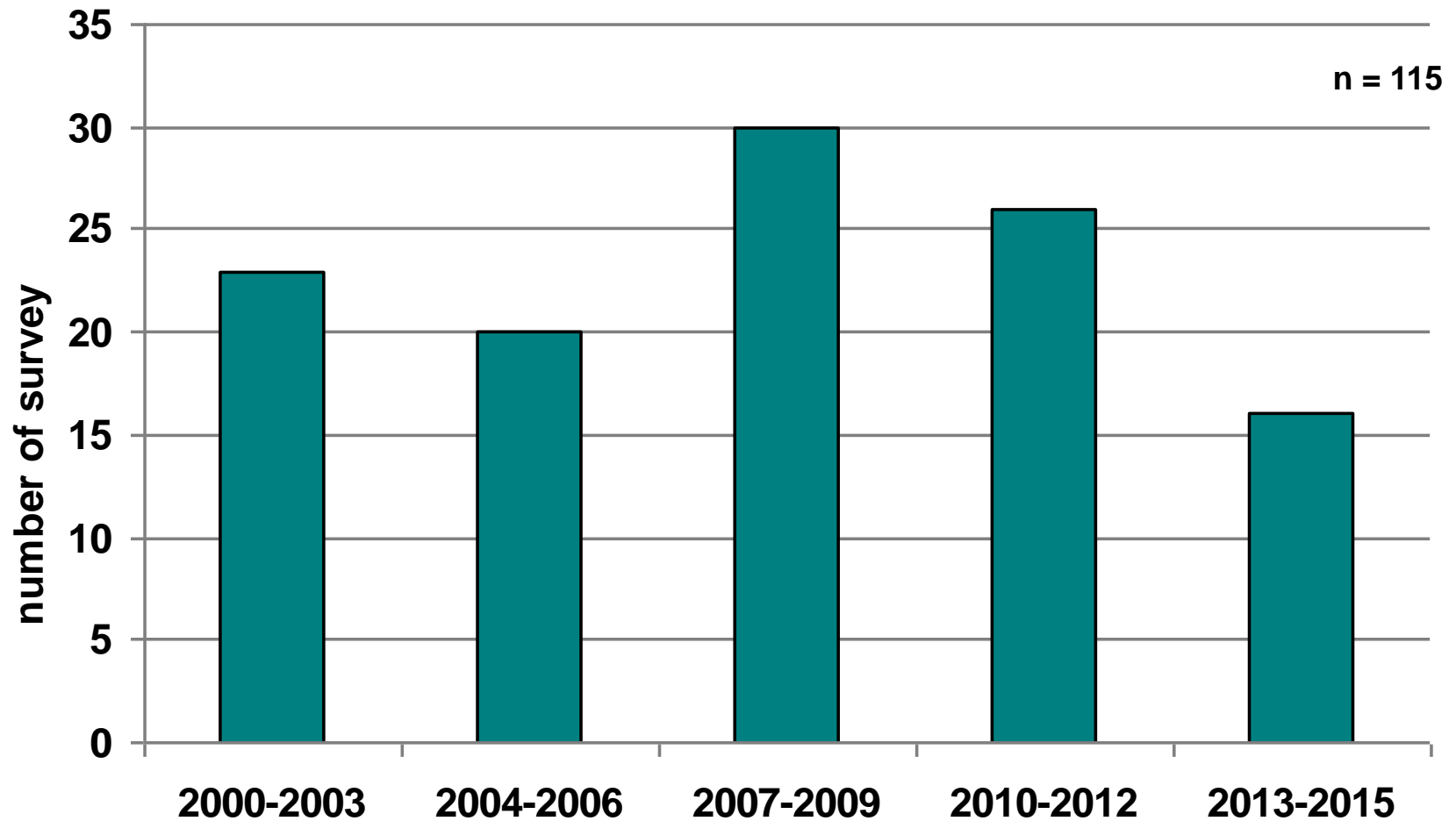


works as long as the
animal lives

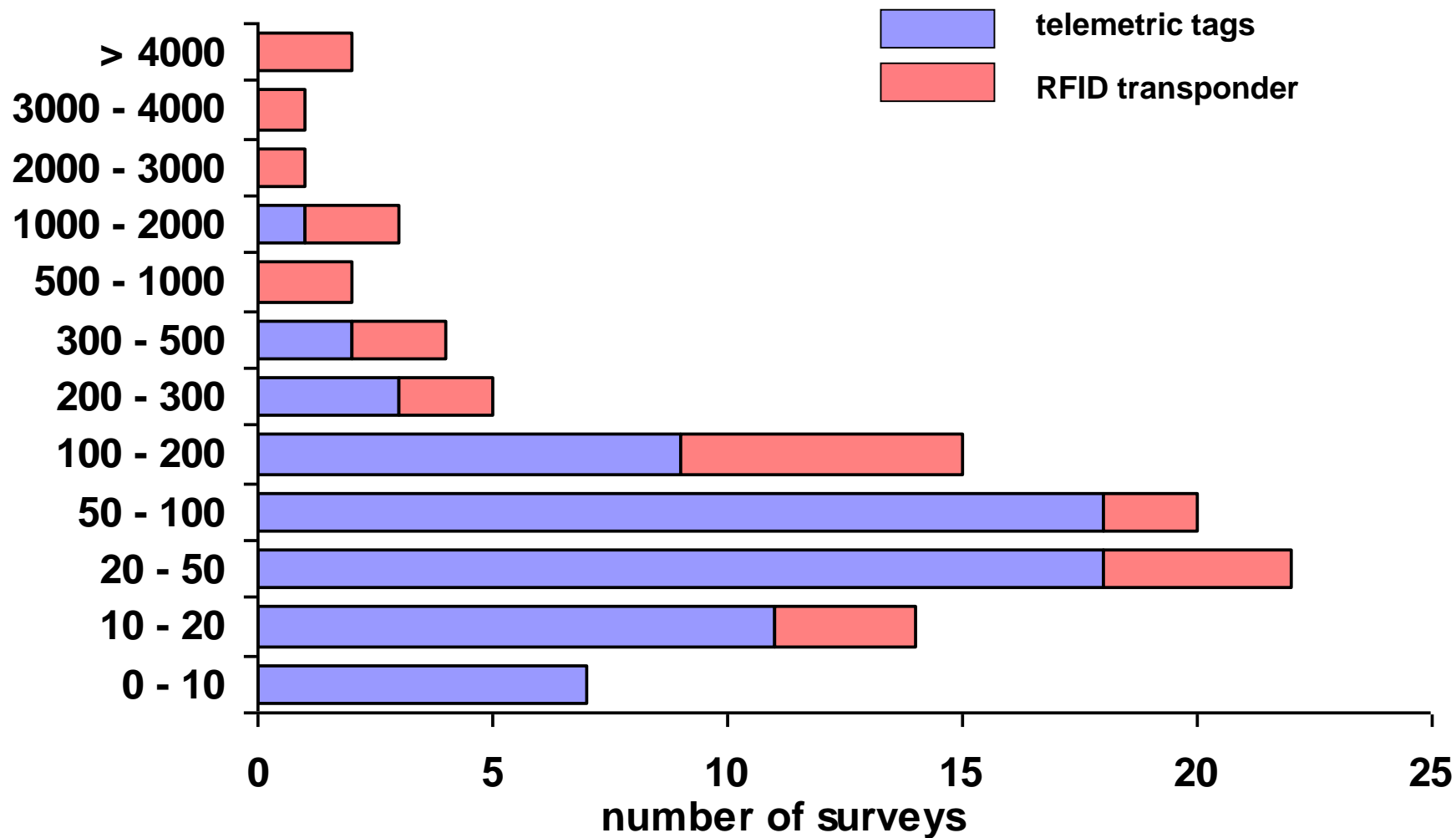
Telemetry with fish in Europe since 2000



Deployment of telemetric surveys in Europe

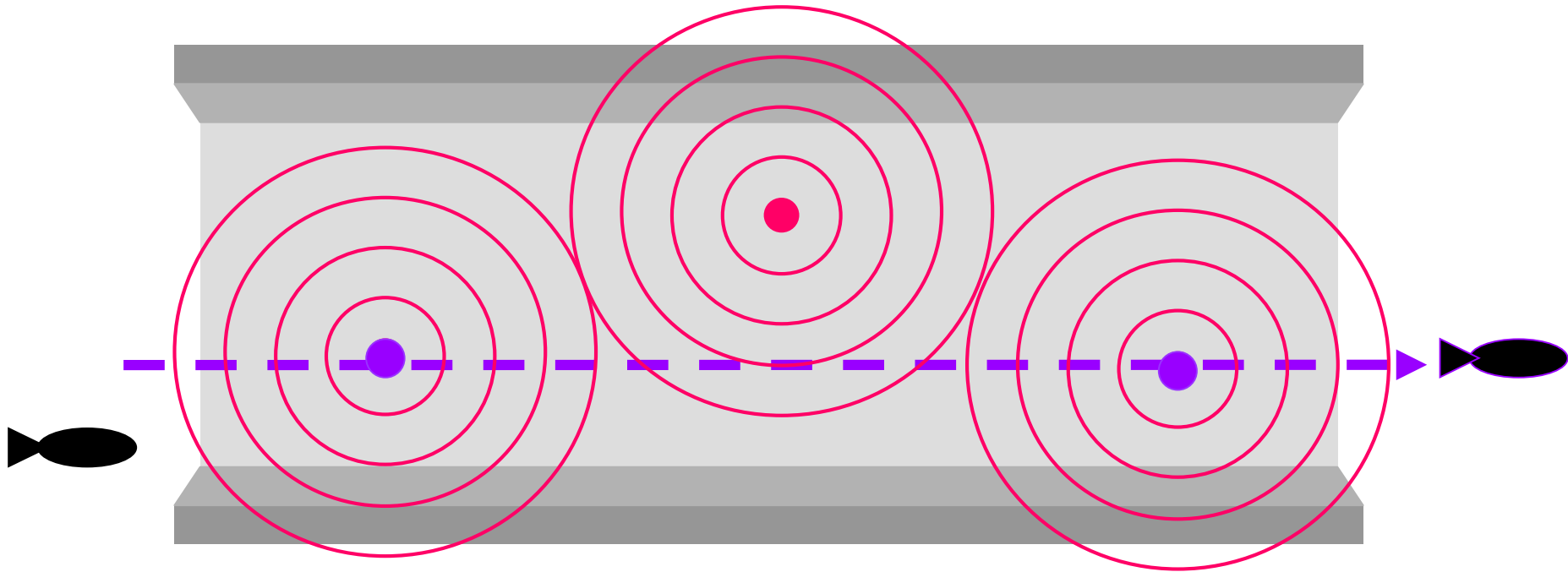


Type of used emitters



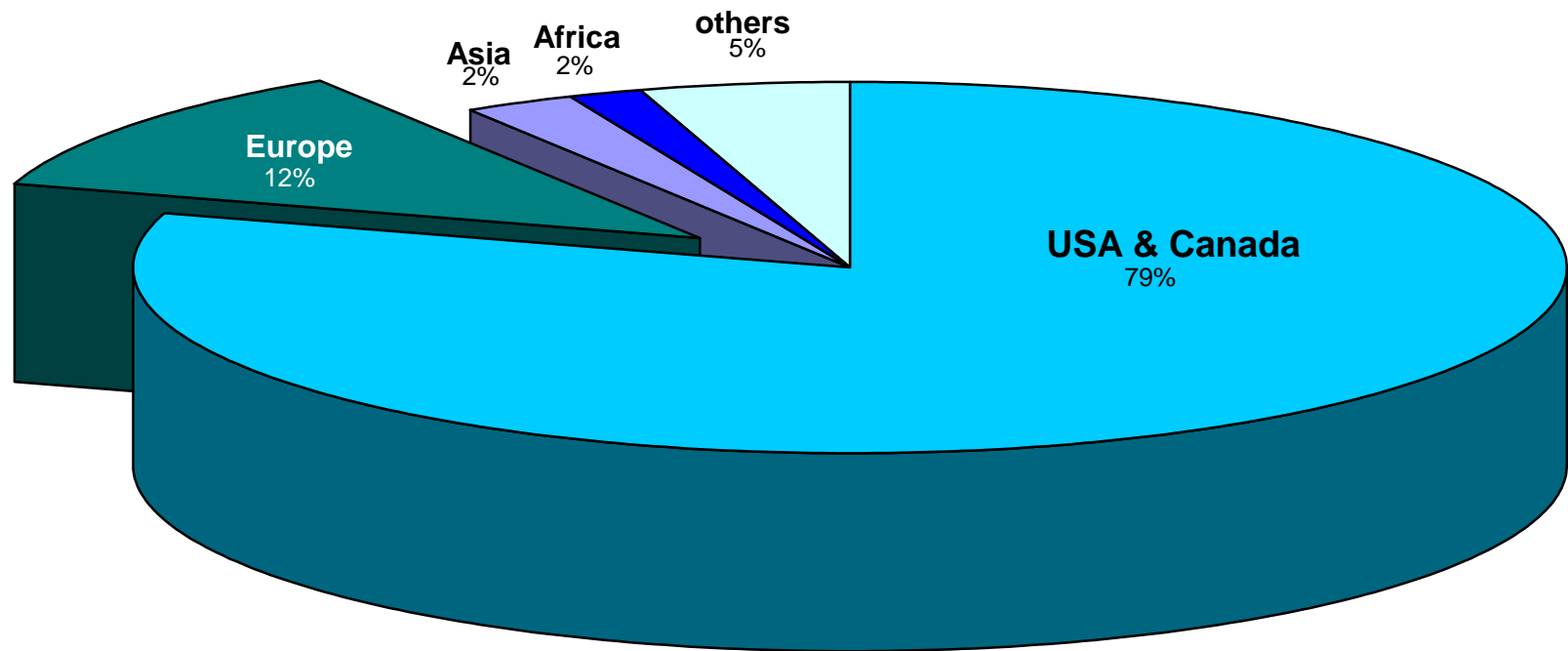
presence/absence telemetry

- antennas report a signal with time and location of detection



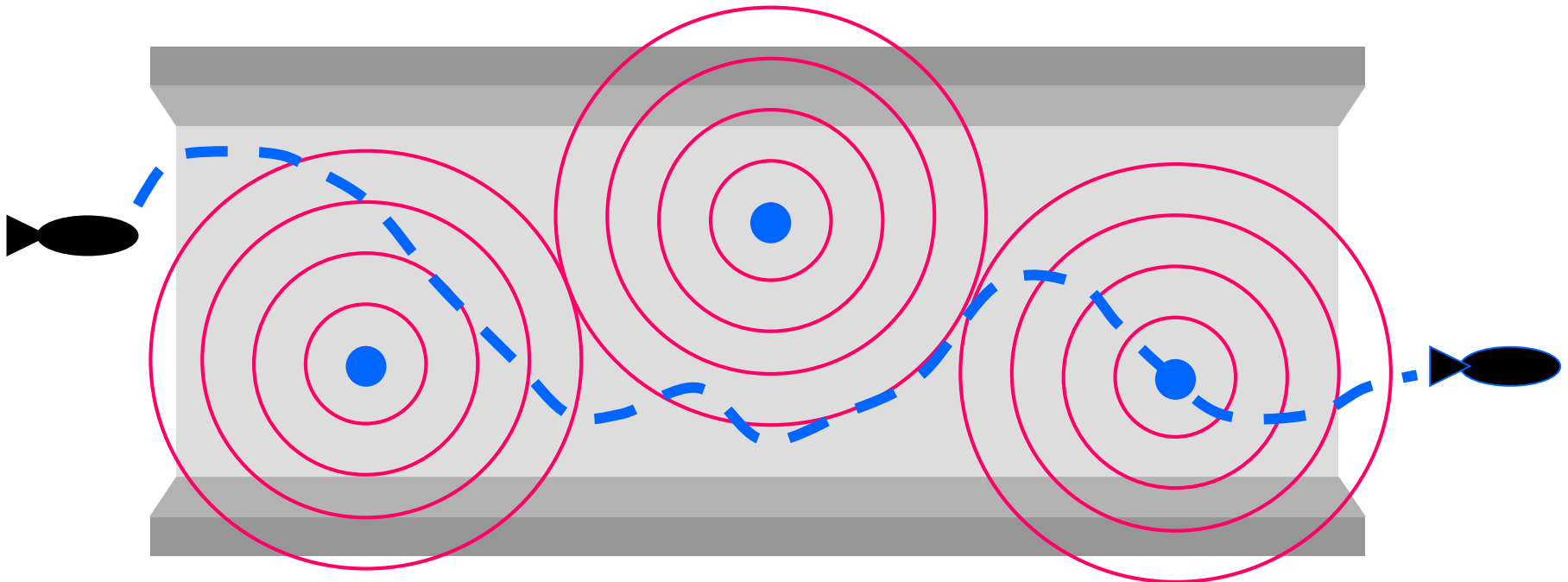
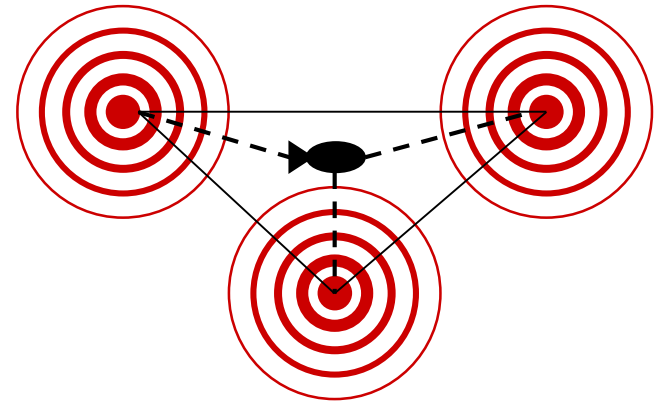
Telemetric studies on freshwater fish

(incl. diadromous species)

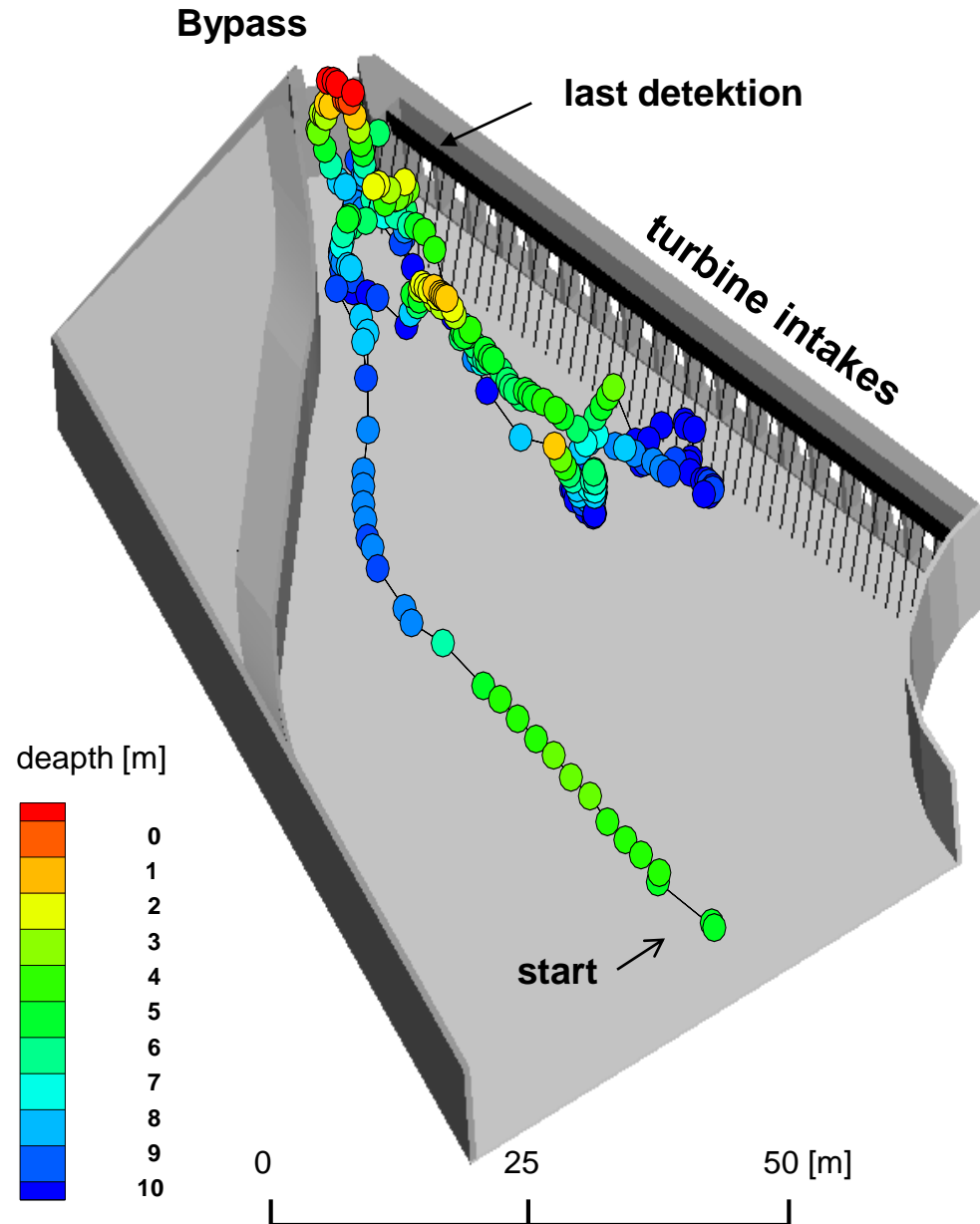


2-dimensional tracking (2d)

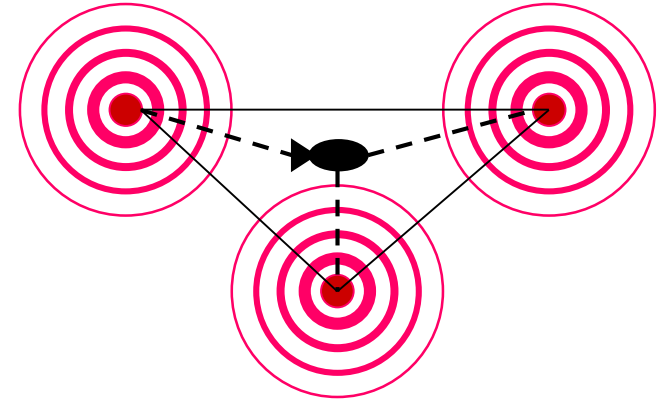
- only acoustic telemetry
- tracking by comparing the runtime of a signal between 3 antennas



3-dimensional tracking (3d)

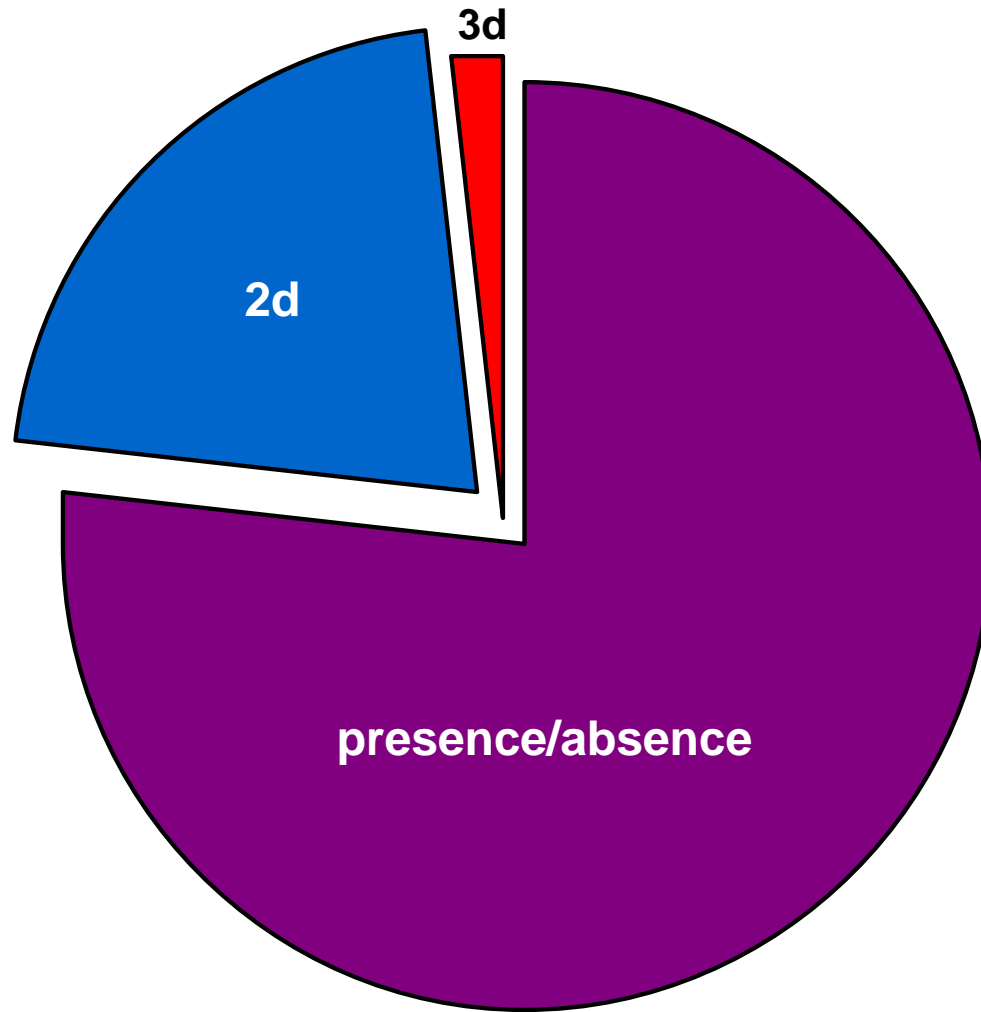


- only by acoustic telemetry



- tracking by comparing the runtime of a signal between 3 stable positioned and time synchronized hydrophones

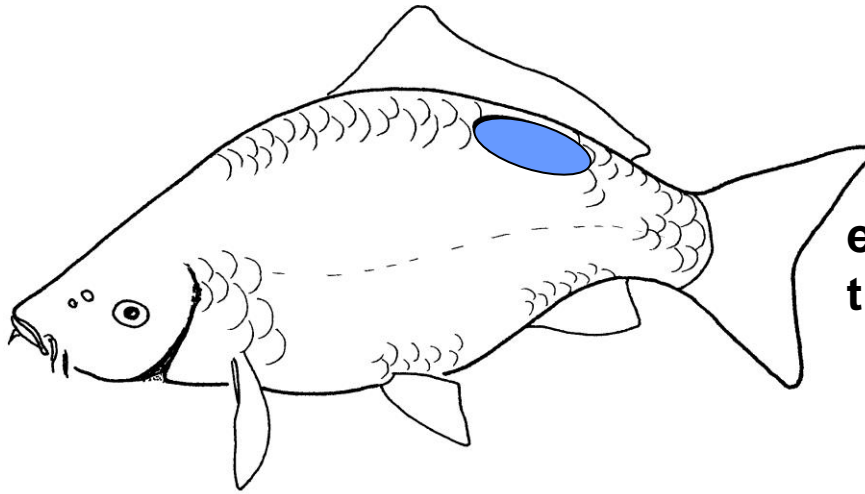
Kind of tracking



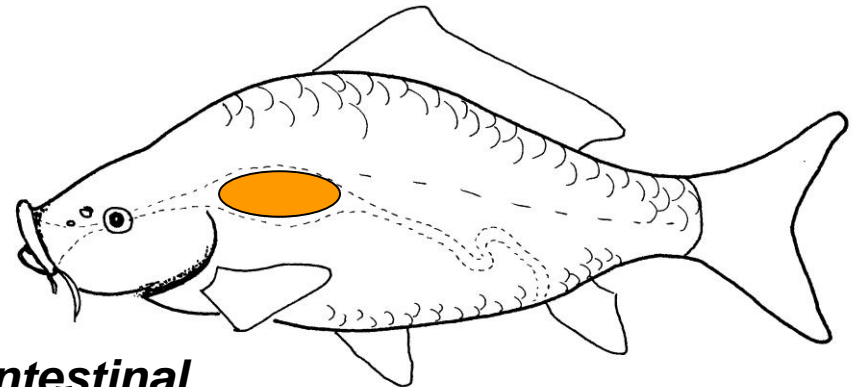
Criteria to choose the best fitting telemetric system

technology (acoustic, radio, RFID)	turbulence, bubbles, turbidity
	conductivity (more or less 800 $\mu\text{S}/\text{cm}$)
	water depth
	required detection range and precision
	presence/absence, 2d- or 3d-tracking

Tagging positions

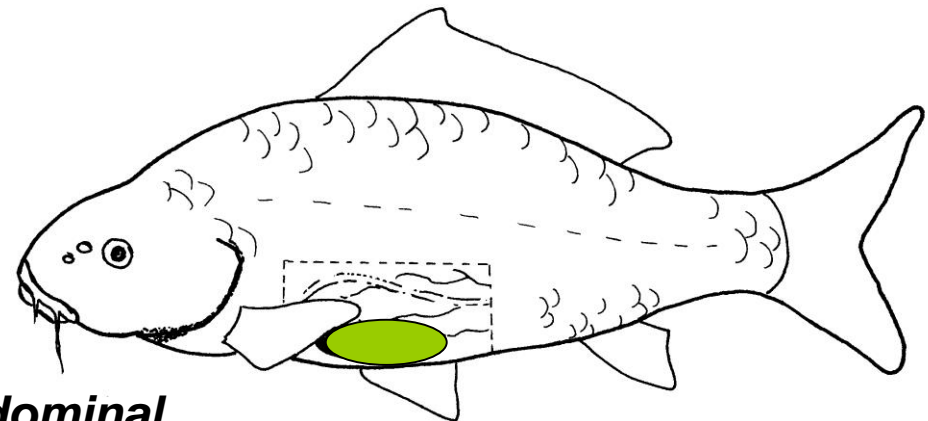


**external fixed
through to the dorsal musculature**

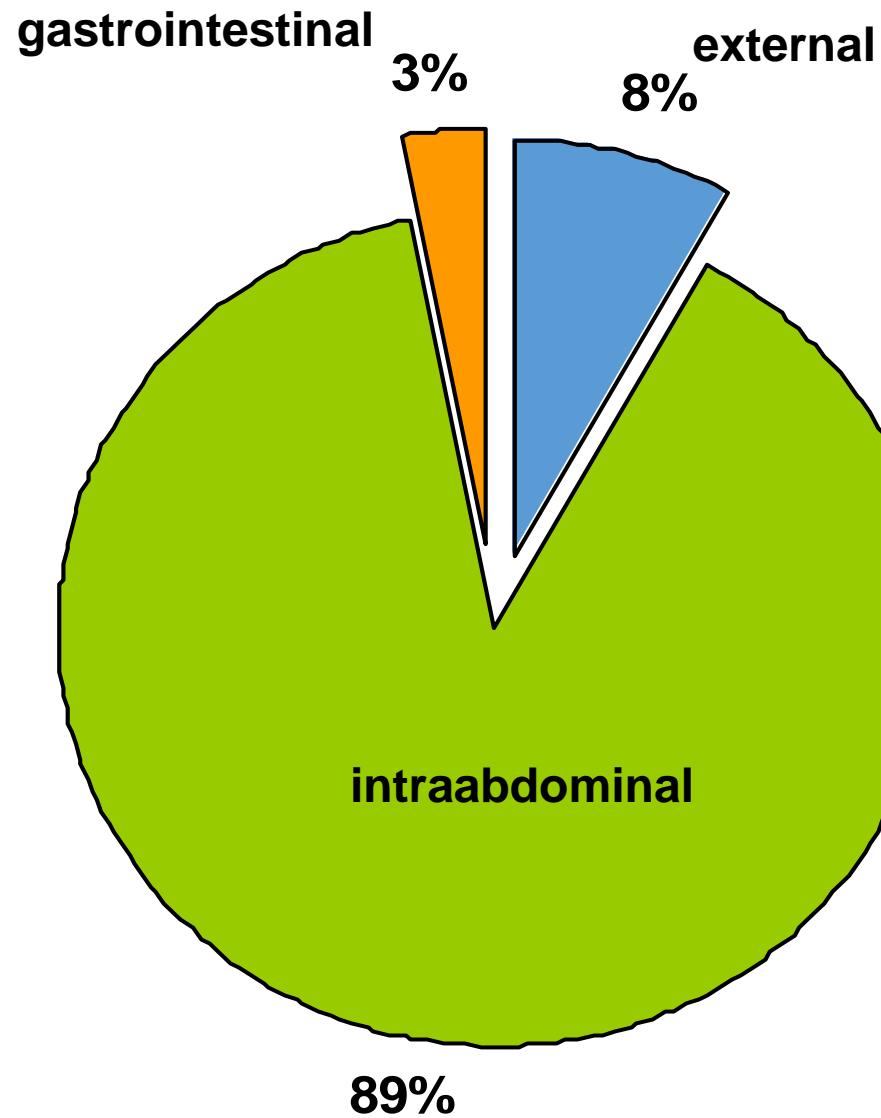


gastrointestinal

internal application



intraabdominal

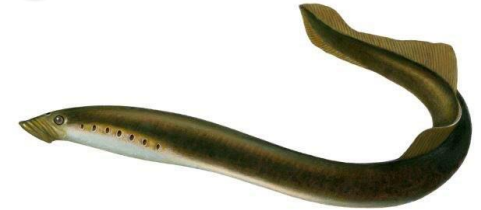


Tagging positions

**„Nobody is allowed to cause an animal pain,
suffering or injuries
without a reasonable agent“**



• vertebrates



• cephalopods

**European Animal
Welfare Act**



• decapods

Telemetrie = animal experiment

- narcotisation to keep fish quiet and relaxed
- surgery for an external or introabdominal application of a tag
- placing the transmitter in the stomage without narcotisis
- increasing the risc of predation for tagged specimen by a tag influenced habitus and behaviour

Manipulations done to lamprey and fish can cause pain, suffering and injuries.

Experiments with animals need to be permitted by gouvernemental authorities for veterinary affairs !

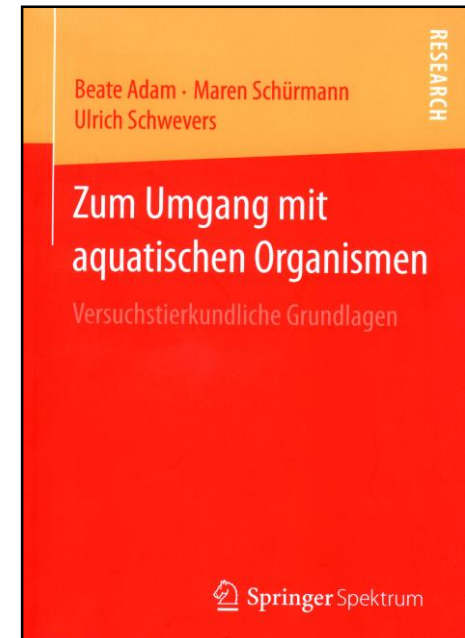
Animal experiments have to be planed and done with respect to the 3R-principle: replace & refine & reduce !

**Experimentators need to be qualified;
their actions are subject to strict control !**

Animal experiment lore

- In Germany and some other European countries, f. e. Norway are specific training courses for researchers available to get the certificate as an experimentator for animal experiments with cephalopods, decapods, lamprey and fish.
- Actual exist no standards in Europe for surgical procedures on aquatic animals ...

- ... just a book how to handle aquatic animals respectfull and gentle.



**Thank's for
your attention !**

