

# Anders fischen...

... Technische Lösungen für eine nachhaltige Fischerei?

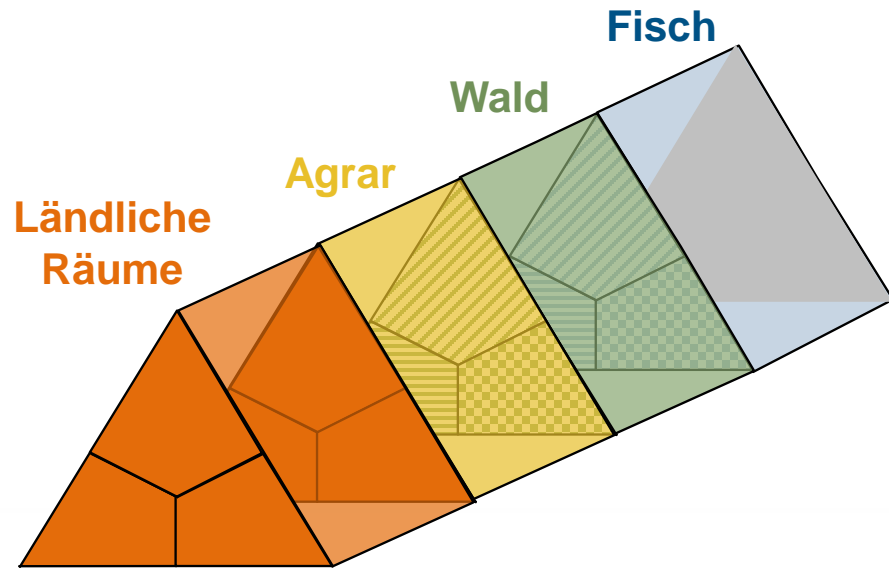
Dr. Daniel Stepputtis und Kolleg\*innen

Thünen-Institut für Ostseefischerei, Rostock



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# Die Struktur des Thünen-Instituts



Ostseefischerei

Seefischerei

Fischereiökologie

# Thünen-Institut für Ostseefischerei



## Nachhaltige Nutzung der Fischereiressourcen

- Bestandsberechnung
- Grundlagenforschung
- Politikberatung
- alternative Managementansätze
- Entwicklung ressourcenschonender Techniken

# AG Fischerei- und Surveytechnik





# AG Fischerei- und Surveytechnik



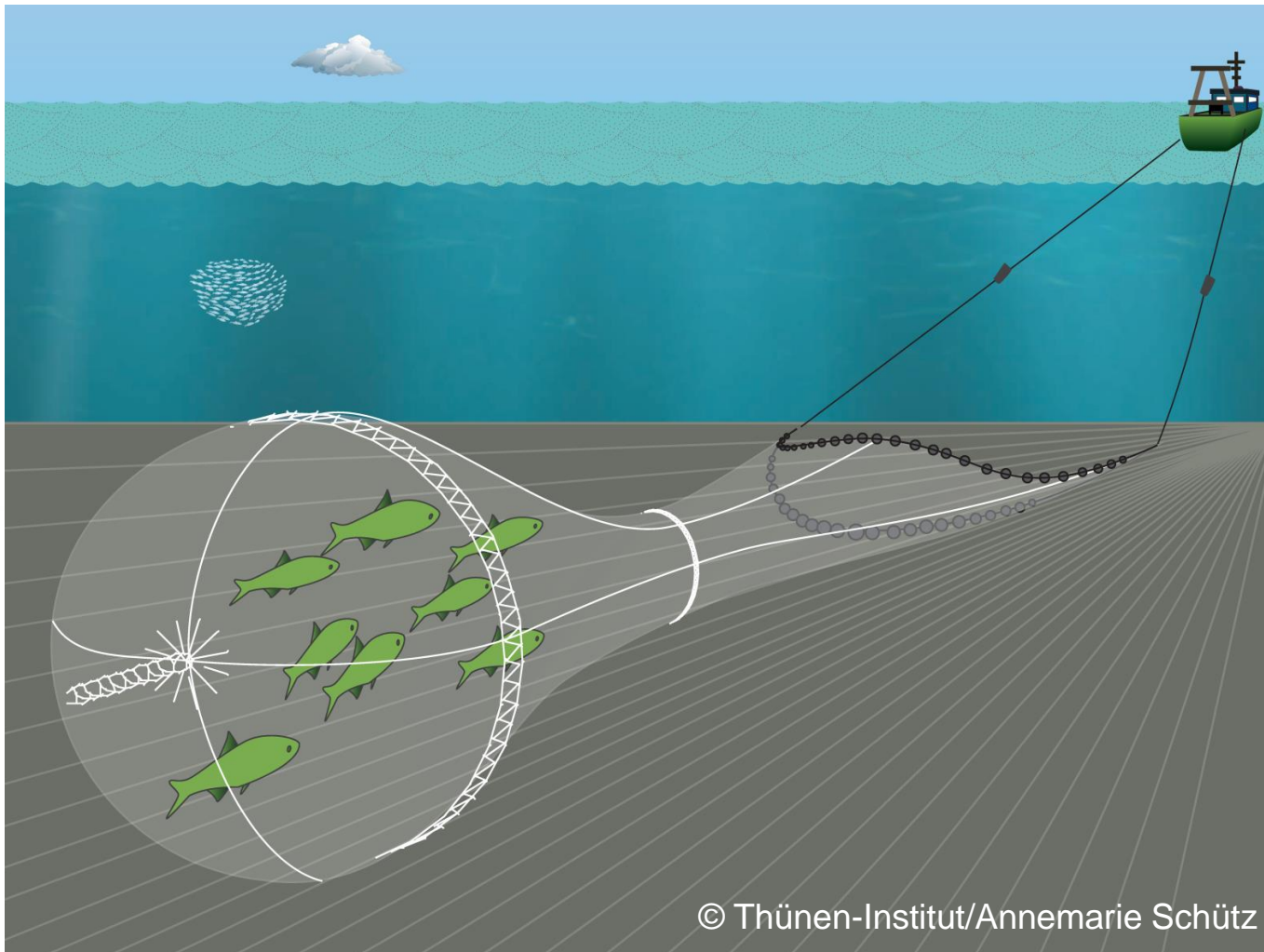
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# Grundsätzliches - Selbstverständnis

- jede menschliche Aktivität greift in das Ökosystem ein
- wir wollen marine Ressourcen nutzen
- **Umweltauswirkungen sollen minimiert werden**

ökologisch  
ökonomisch  
sozial

# Die ideale Welt...



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# Umweltauswirkungen



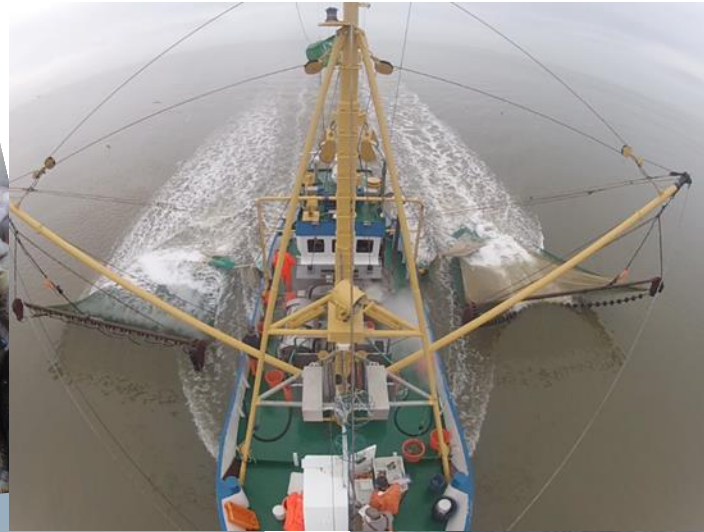
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# Lösungen



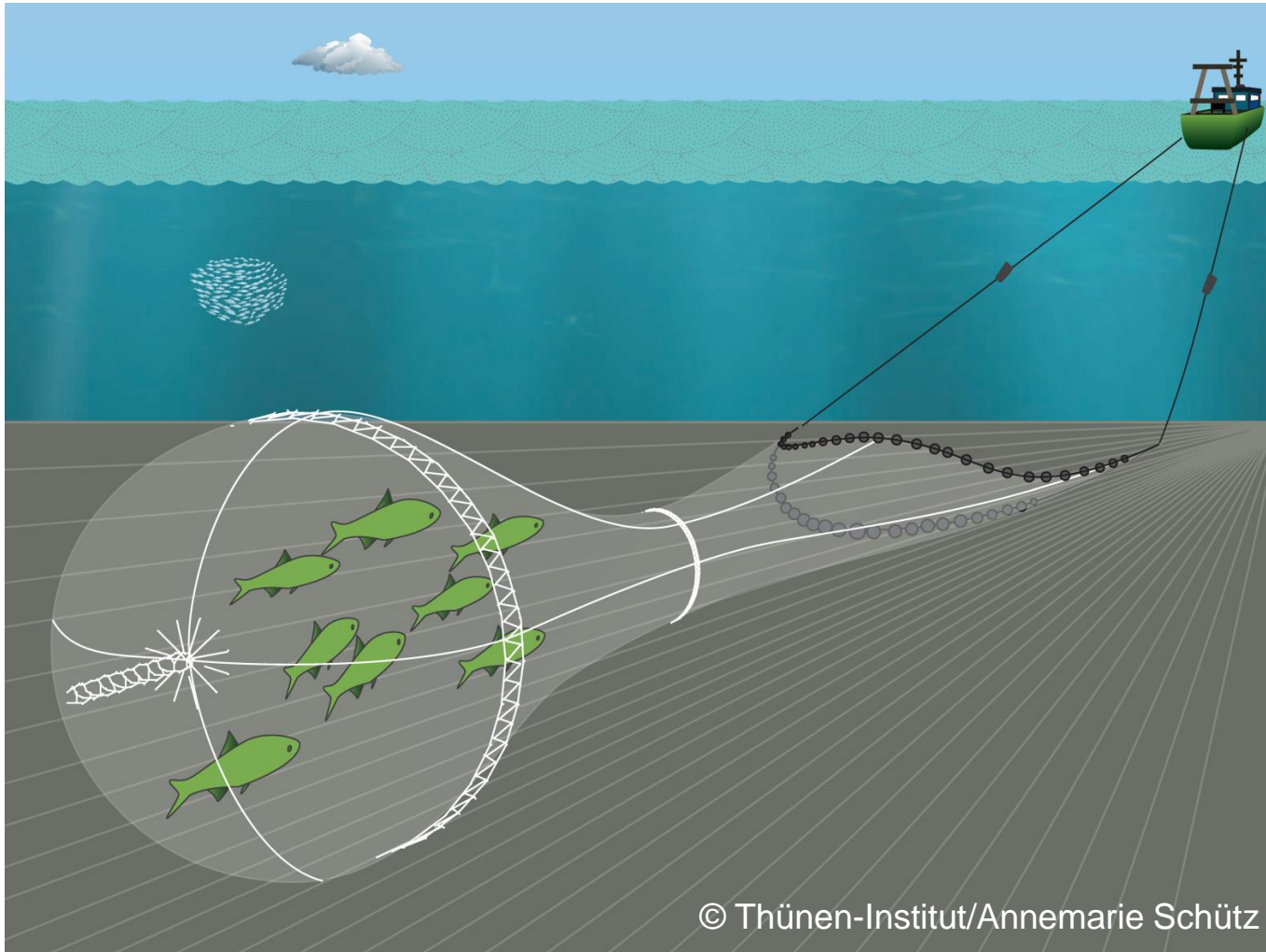
# Fischereien



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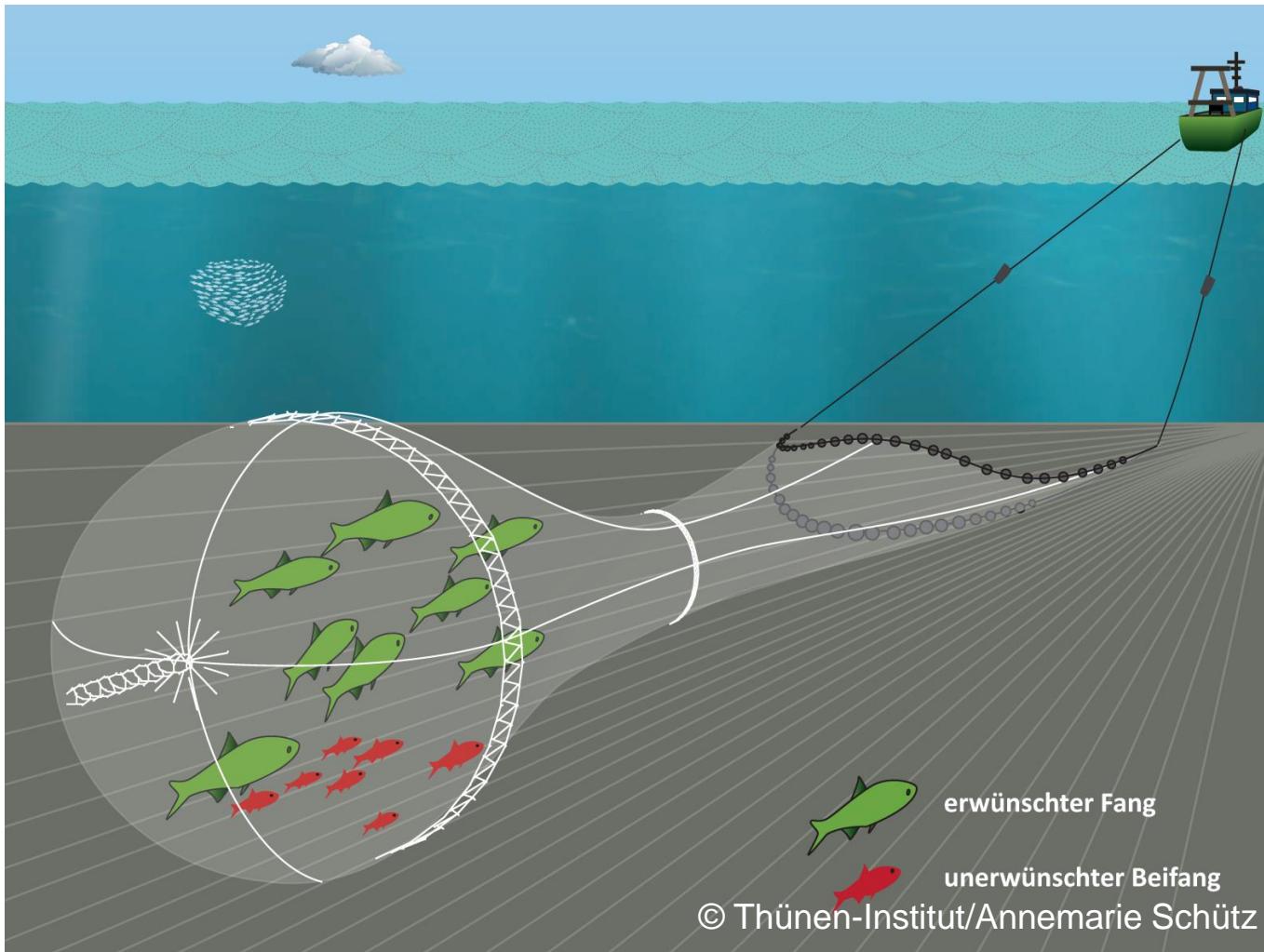
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# The dream...



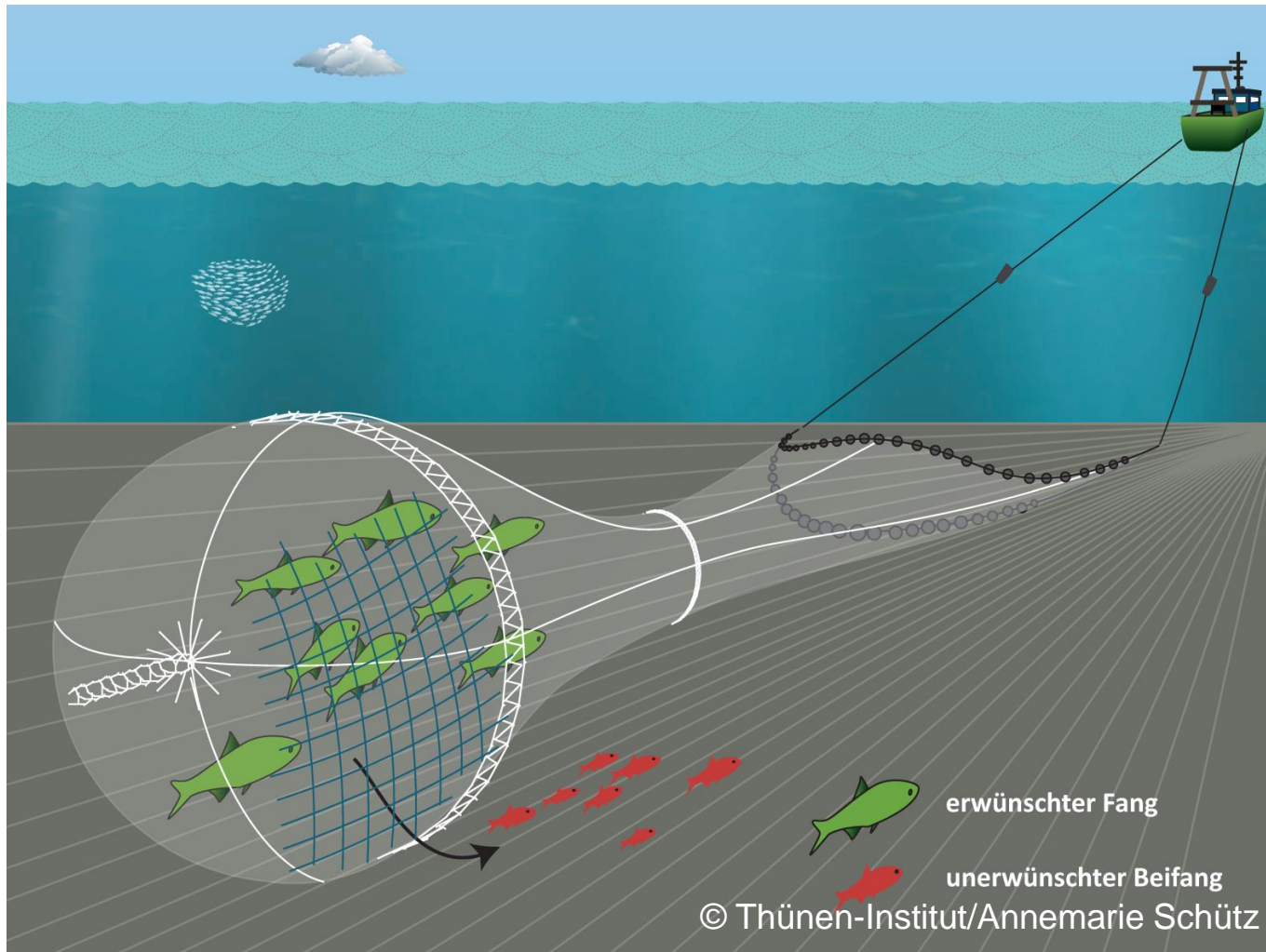
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# The reality...



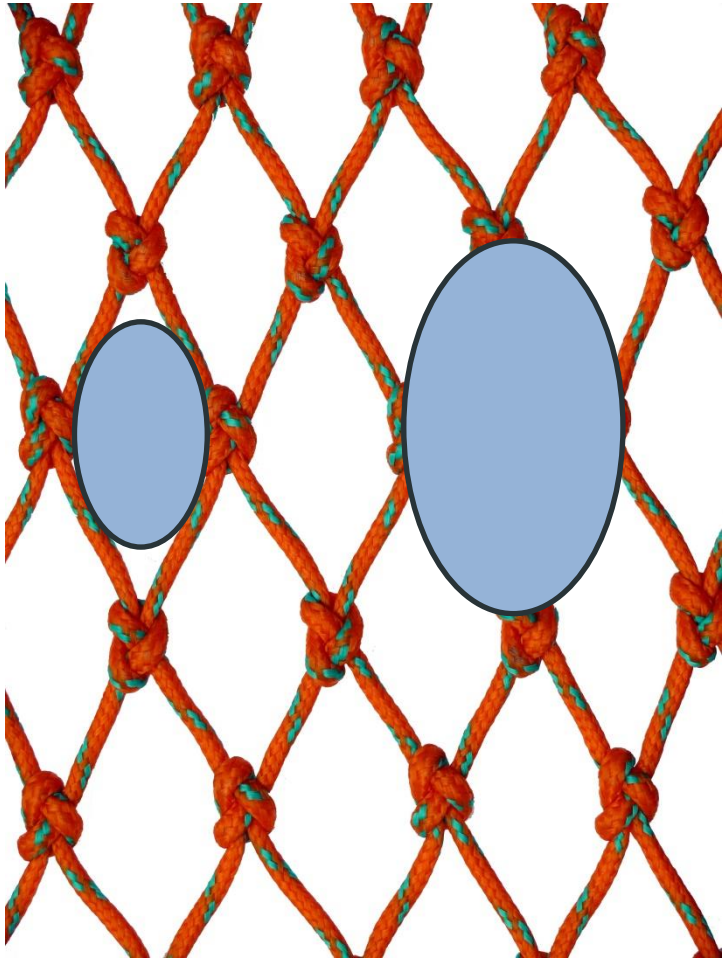


# The reality...



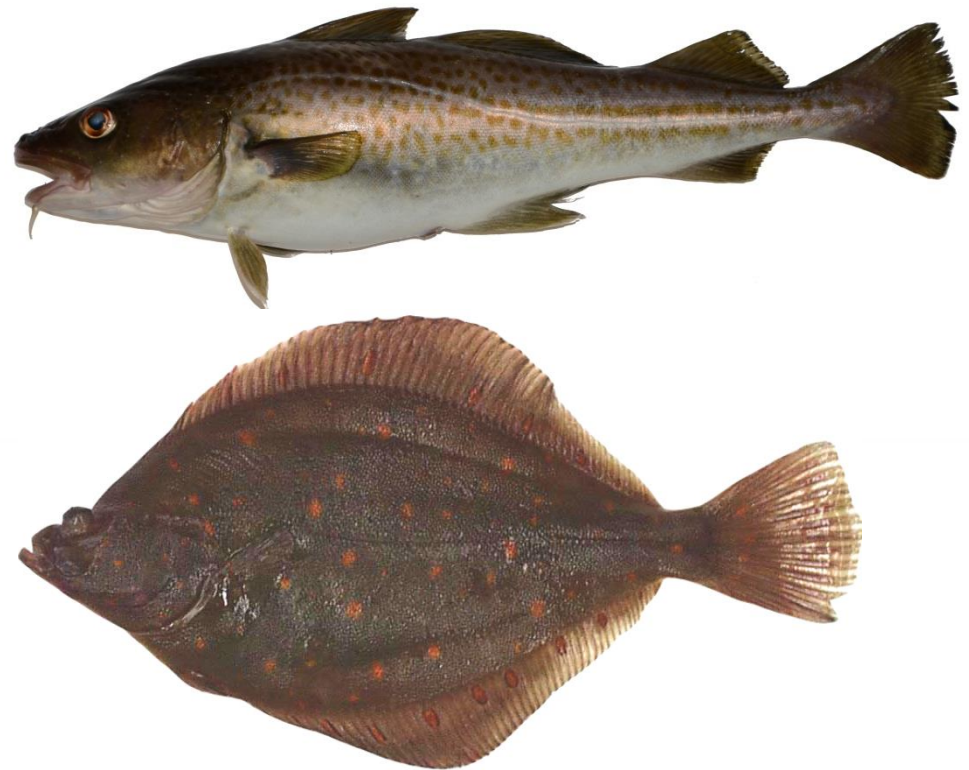
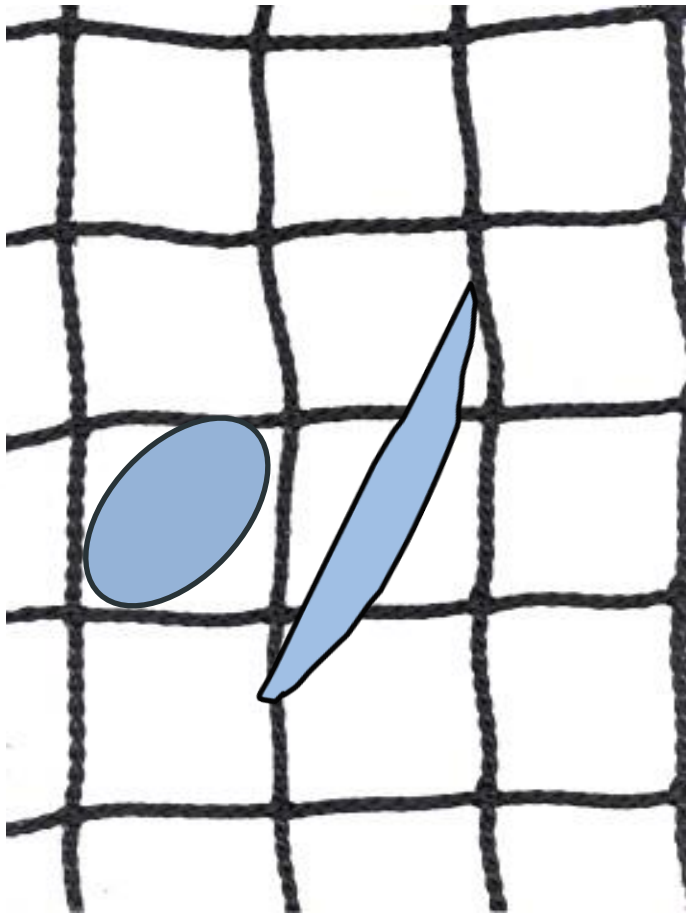


# Schleppnetzselektion



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# Das Problem ...



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# The harsh reality...





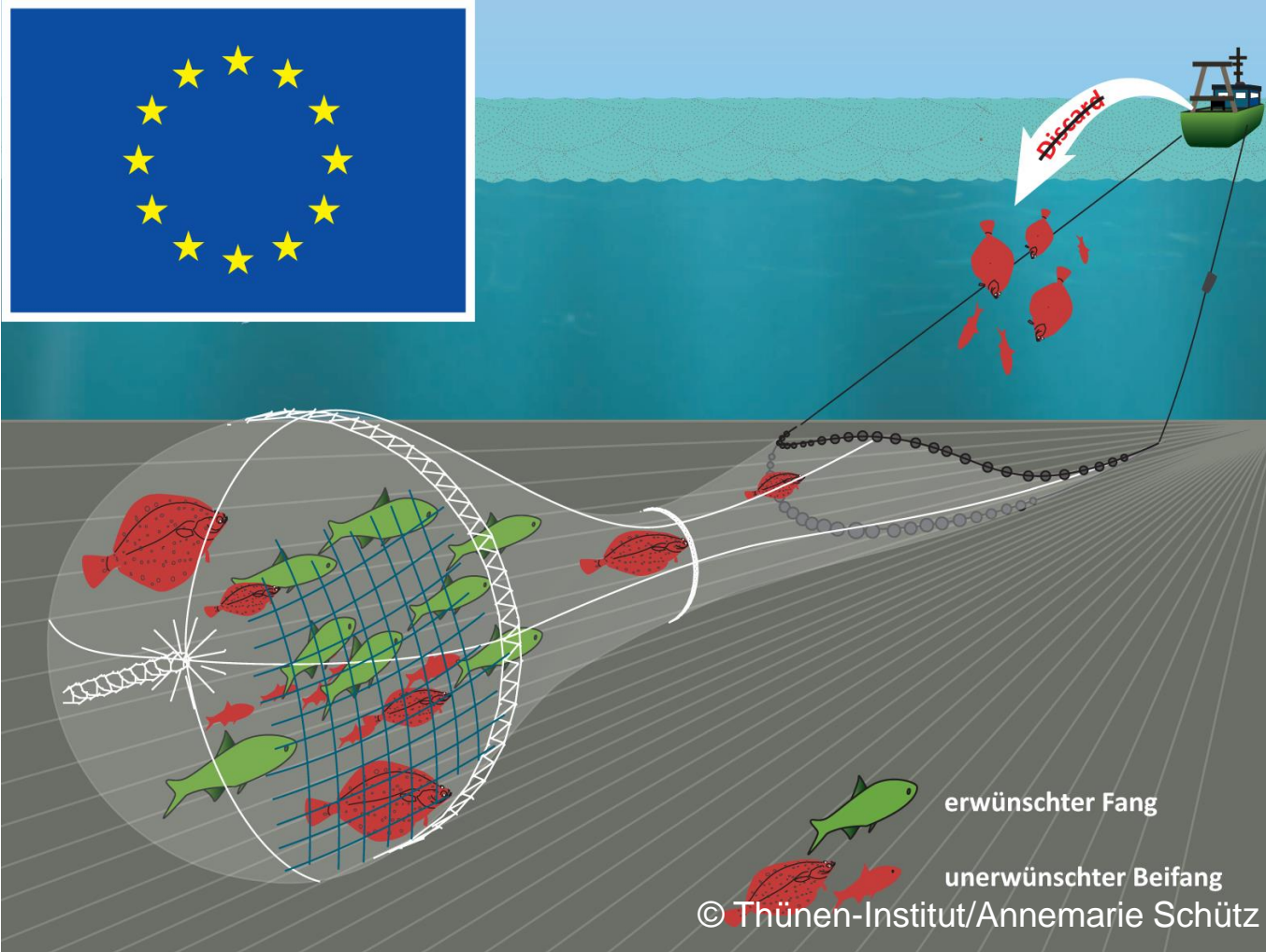
# The harsh reality...



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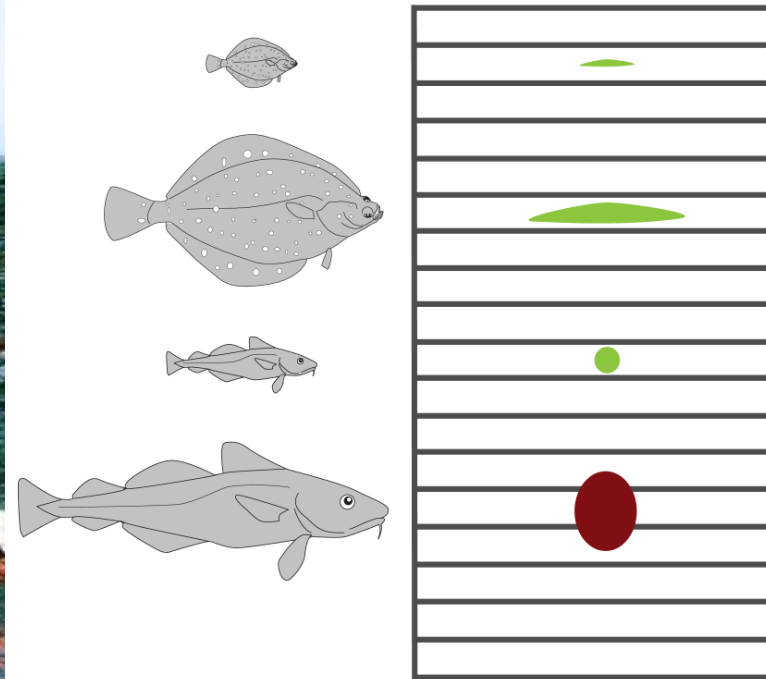
# Neue Regeln





# Mehrarartenselektion 1

# Vilnis-Grid



# Mehrartenselektion 1

# Vilnis-Grid



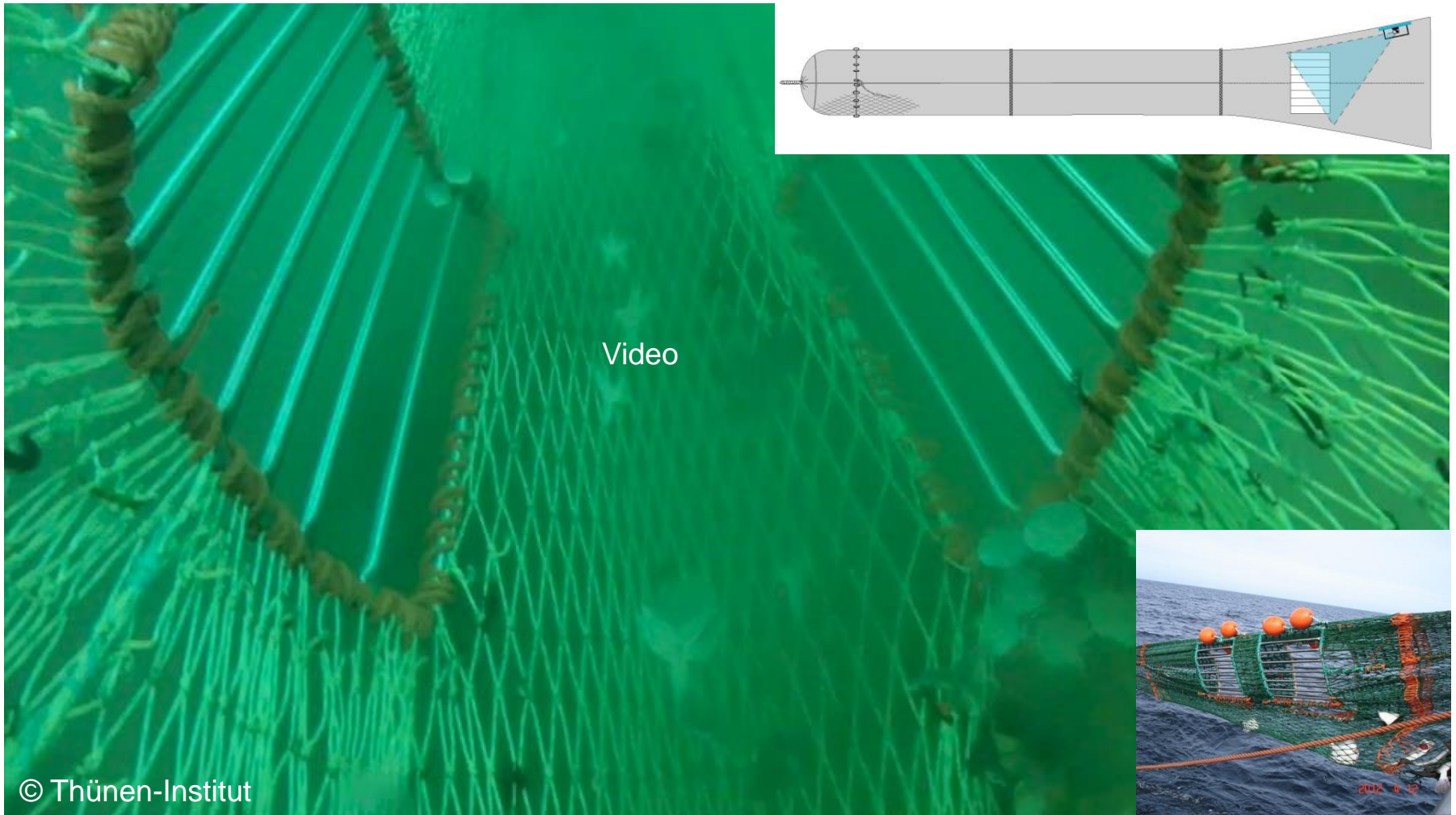
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# Mehrartenselektion 1

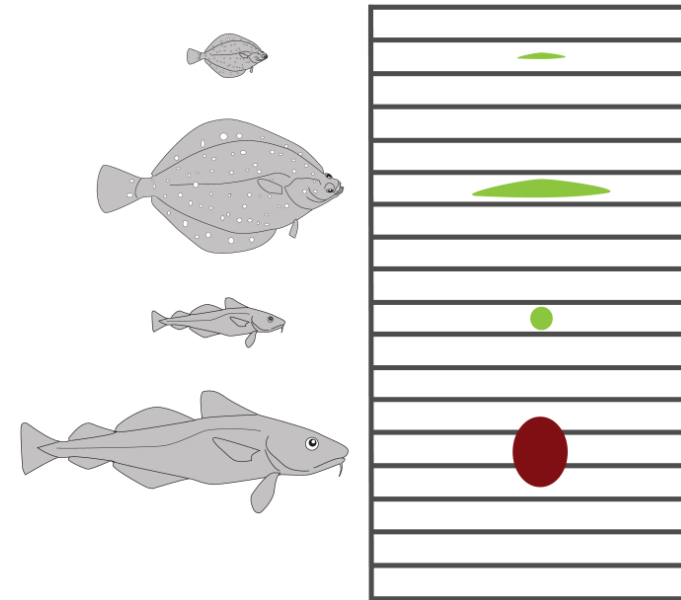
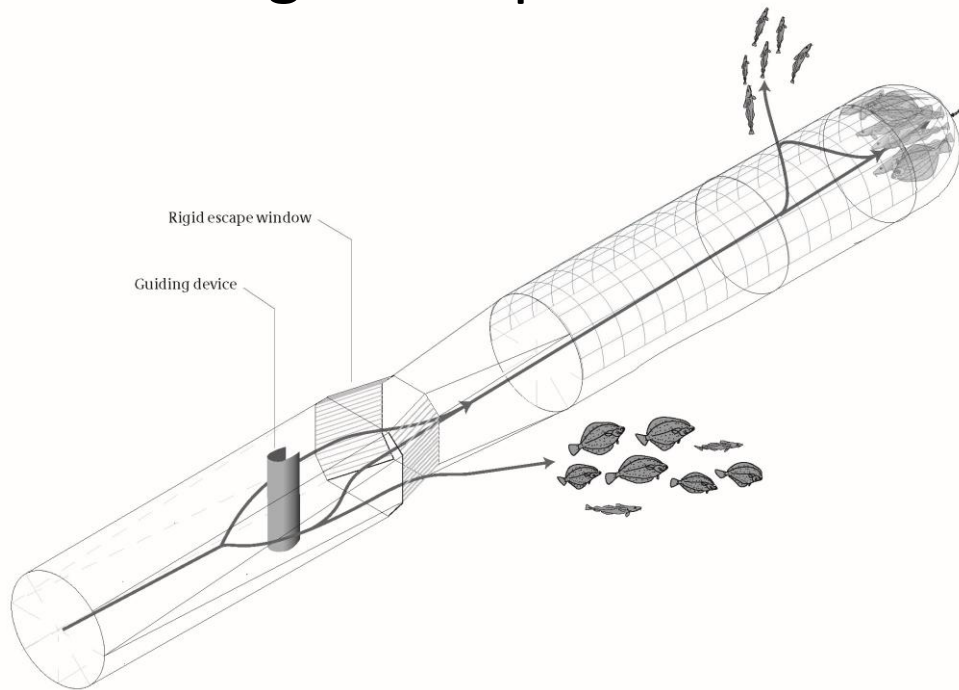
# Vilnis-Grid



Video

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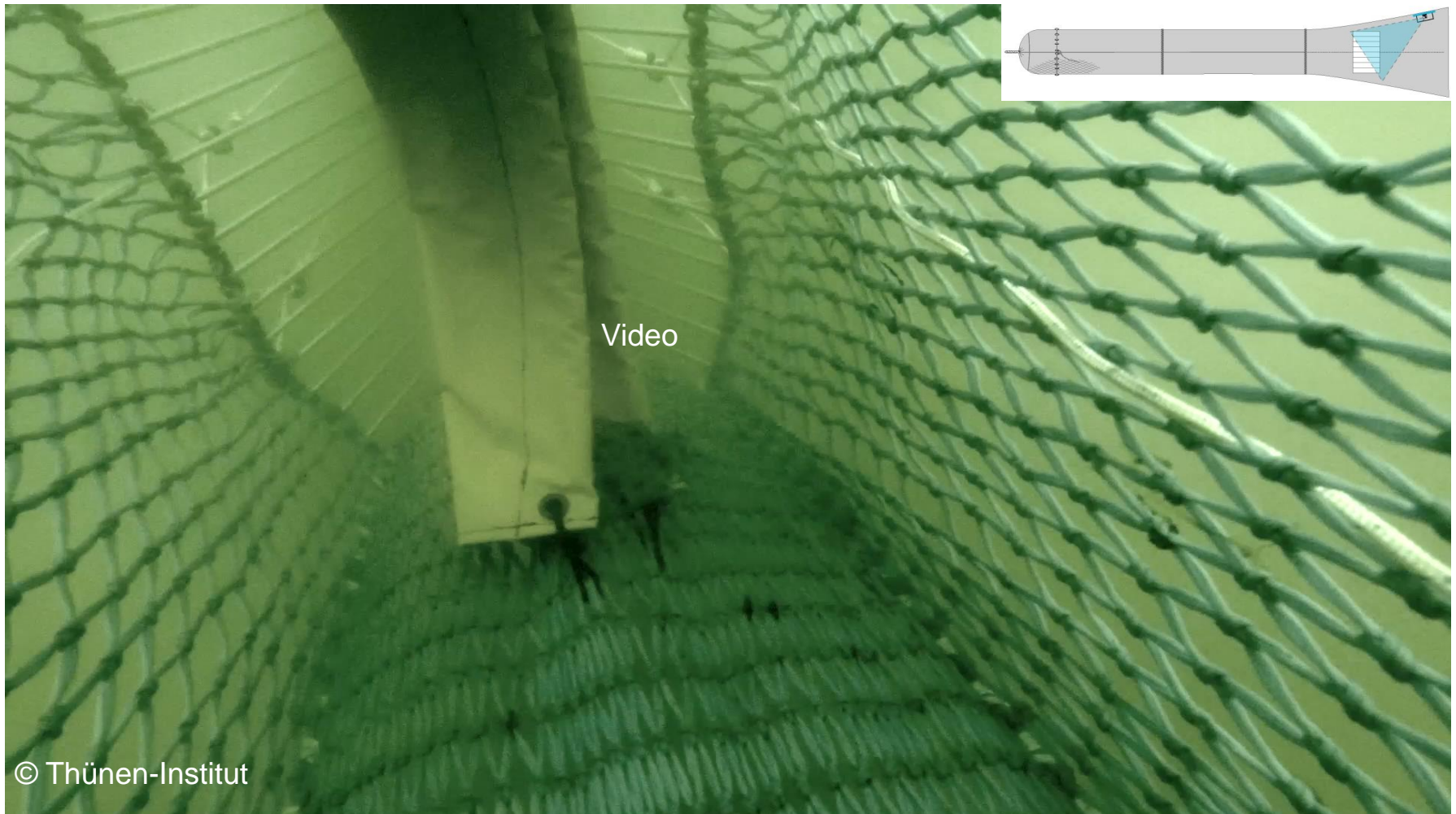
## Flatfish Rigid EEscape WINDows



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# Mehrartenselektion 1

# FRESWIND



Video

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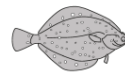


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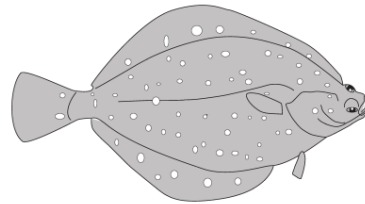
# FRESHWIND



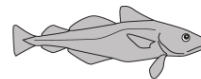
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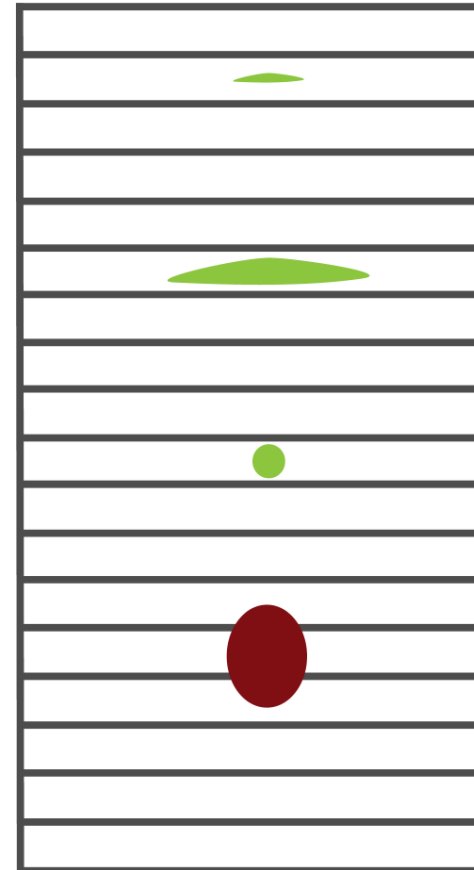
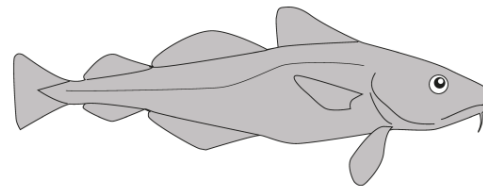
-54%



-32%



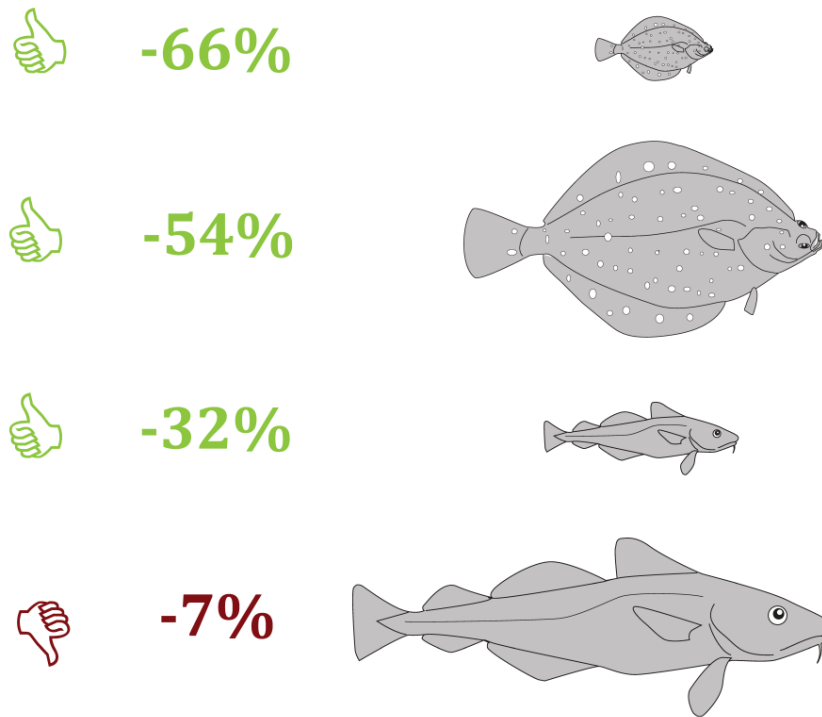
-7%



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# Mehrartenselektion 1

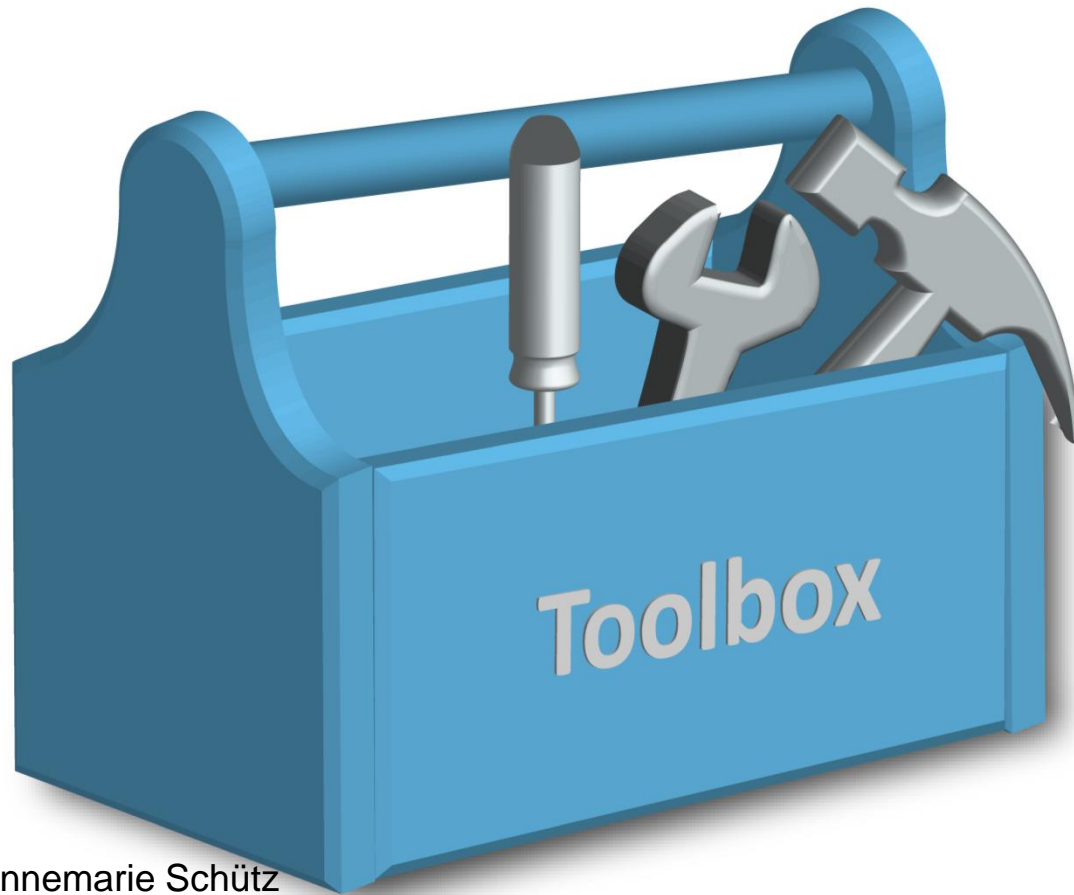
# FRESWIND



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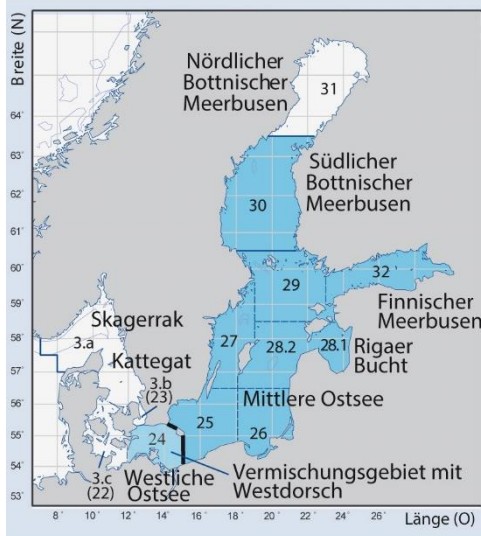
Juan Santos, Bent Herrmann, Bernd Mieske, Daniel Stepputtis, Uwe Krumme, Hans Nilsson  
(2015) Reducing flatfish bycatch in roundfish fisheries. Fisheries Research 184, 64-73  
<http://dx.doi.org/10.1016/j.fishres.2015.08.025>

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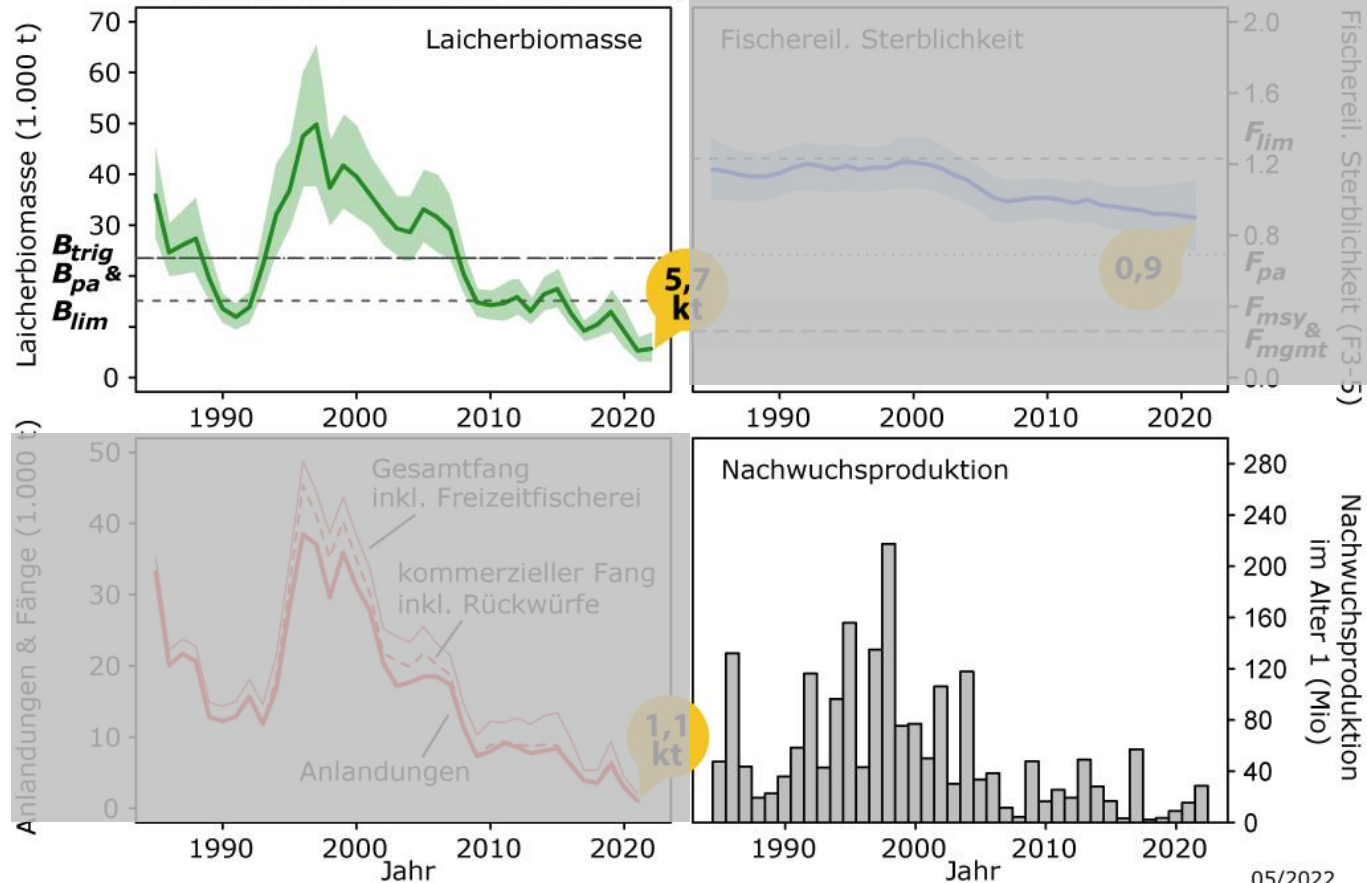


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# Dorsch...



## Dorsch westliche Ostsee 22-24

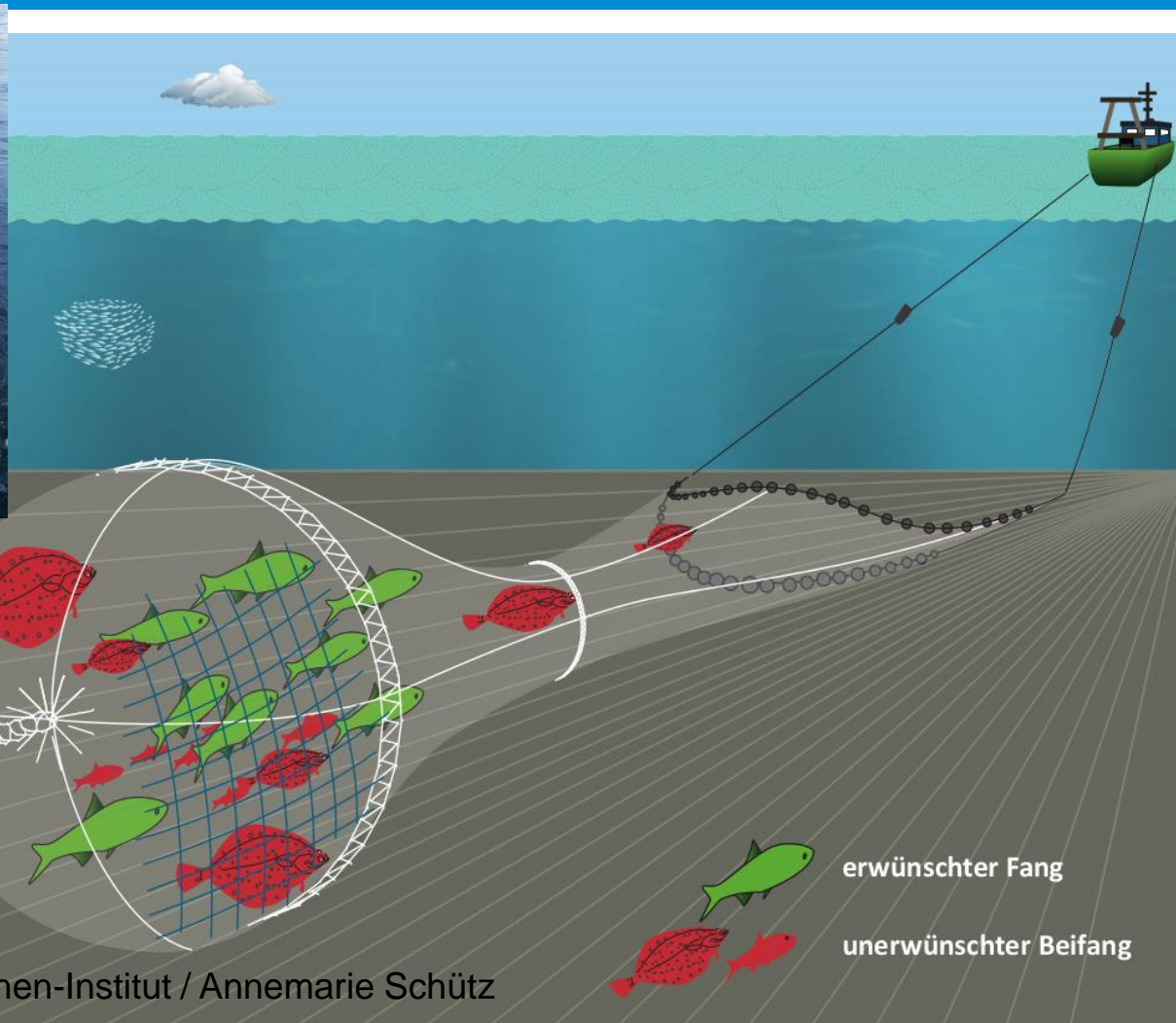


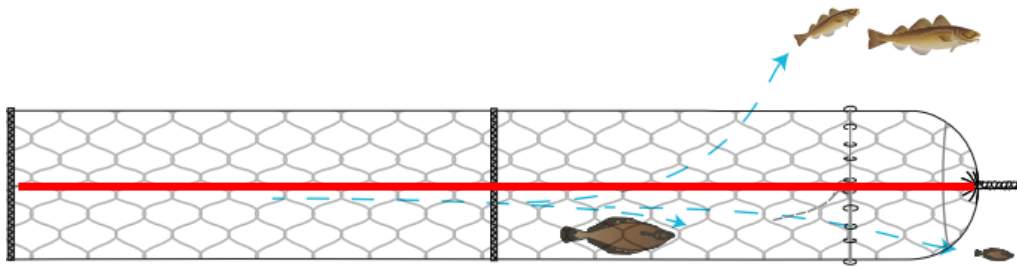
05/2022

Fischbestaende-online.de

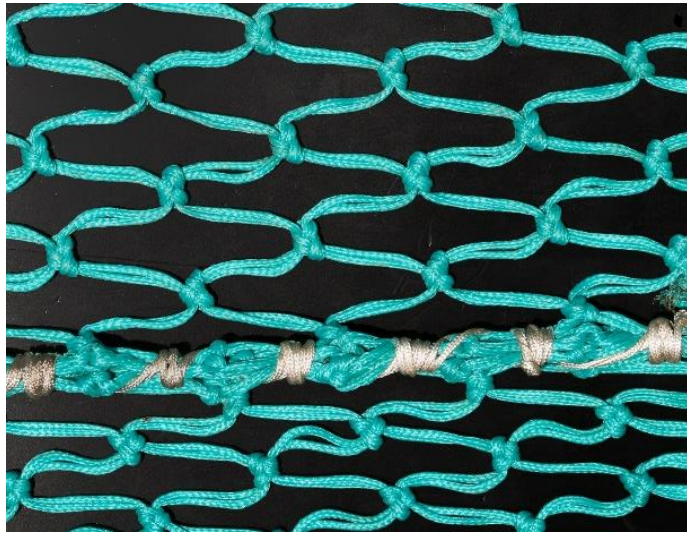


# Trawl





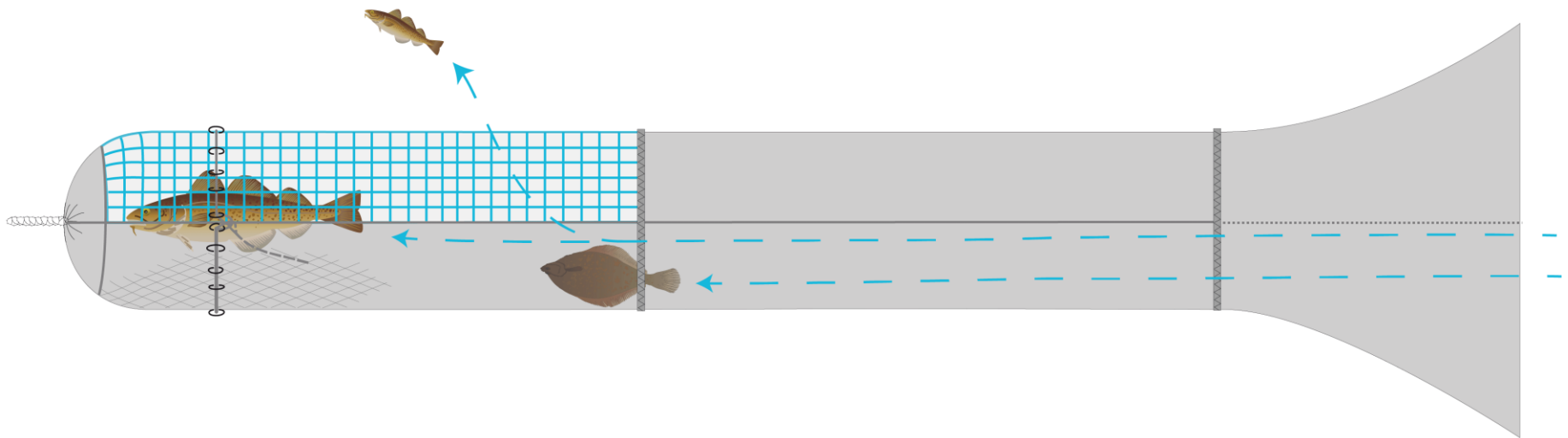
Ohne Laschenverstärkung



Mit Laschenverstärkung



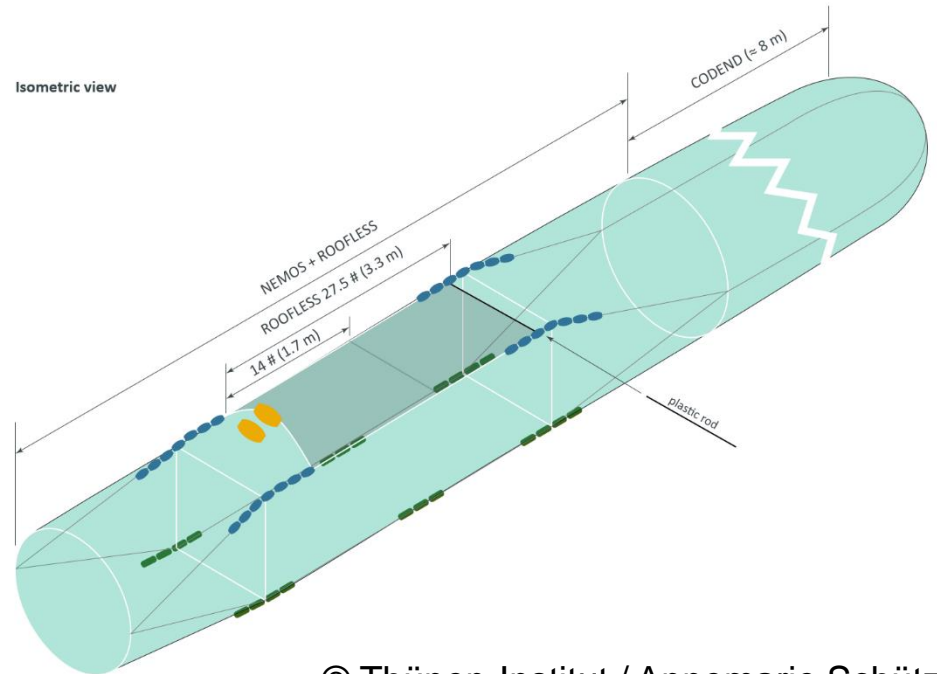
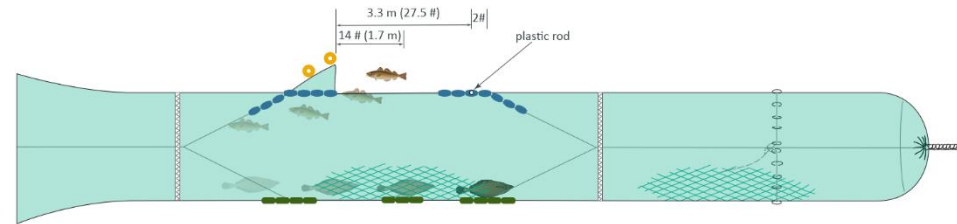
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# Dorsch

## 2. ROOFLESS



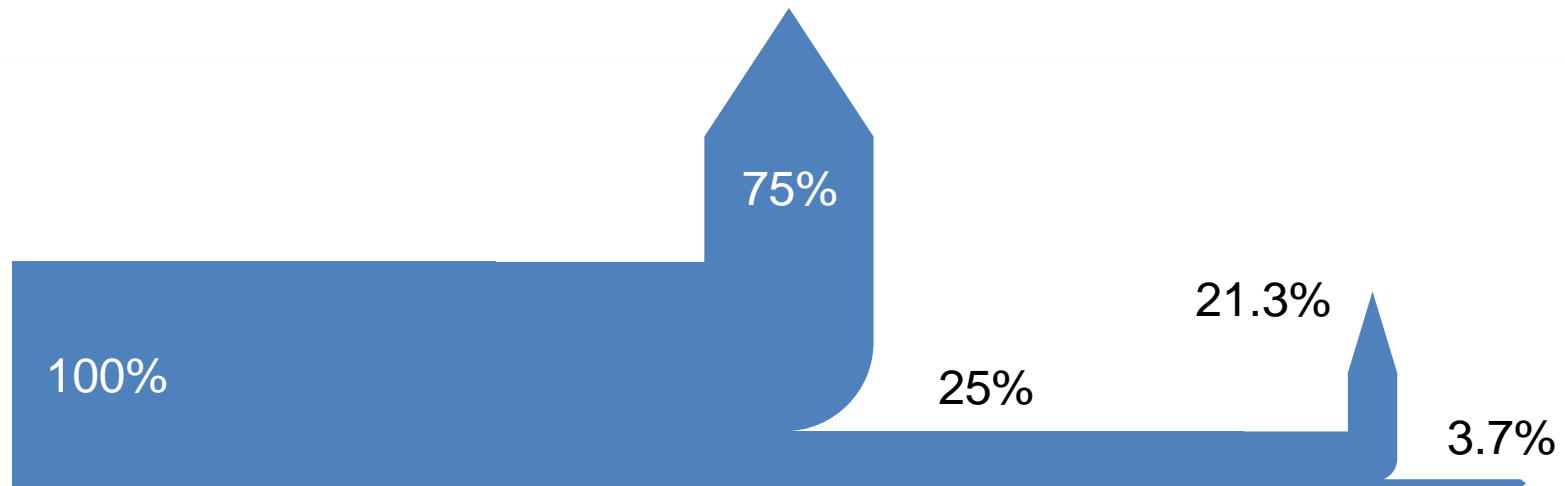
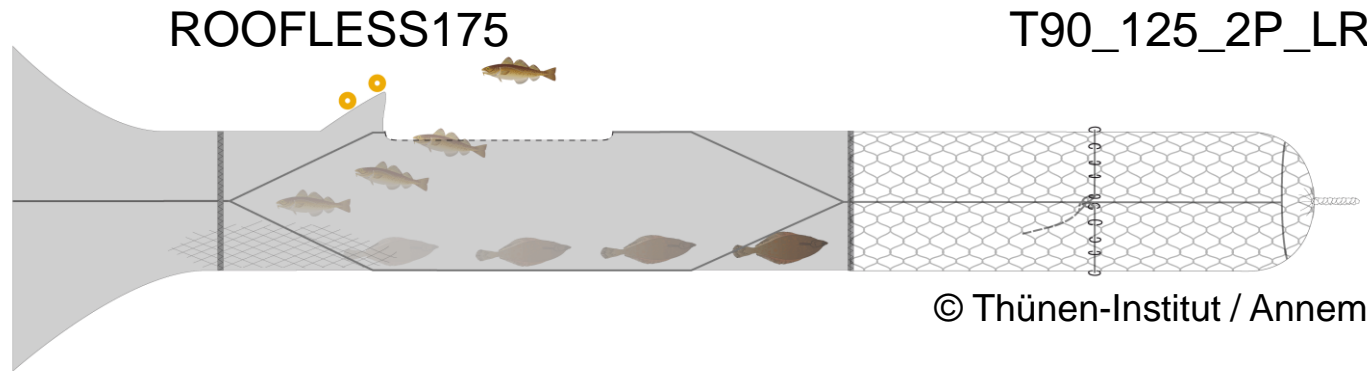
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Video

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[https://www.thuenen.de/media/institute/of/Arbeitsbereiche/Forschung/Fischerei\\_und\\_Surveytechnik/Factsheets/01\\_Report\\_Technical\\_approaches\\_to\\_avoid\\_cod\\_catches\\_.pdf](https://www.thuenen.de/media/institute/of/Arbeitsbereiche/Forschung/Fischerei_und_Surveytechnik/Factsheets/01_Report_Technical_approaches_to_avoid_cod_catches_.pdf)



# Dolly Ropes



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# Dolly Ropes



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# Dolly Ropes



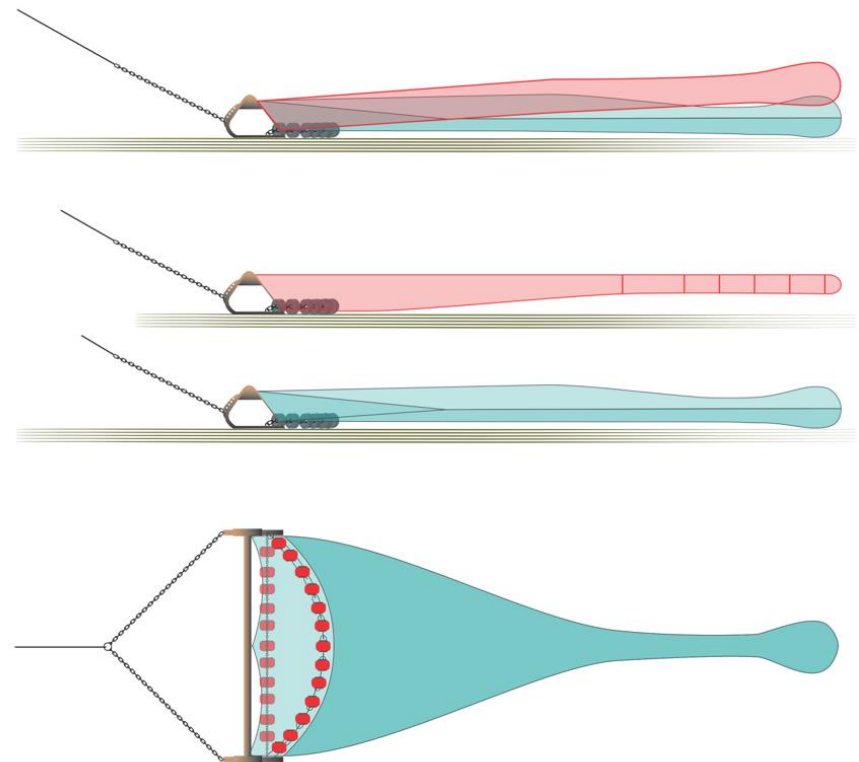
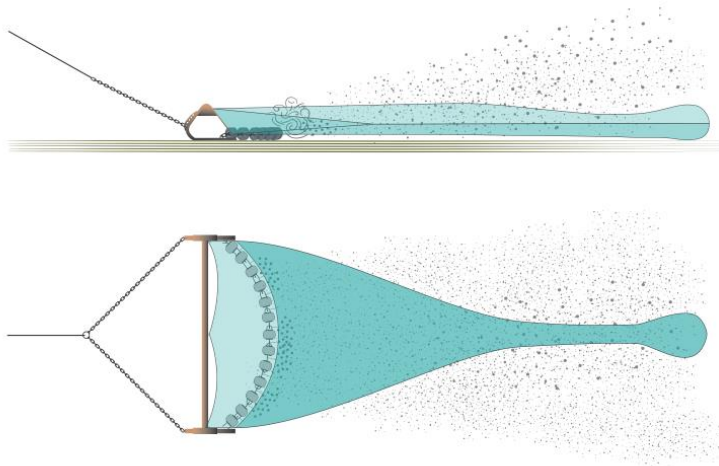
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## Alternative Materialien

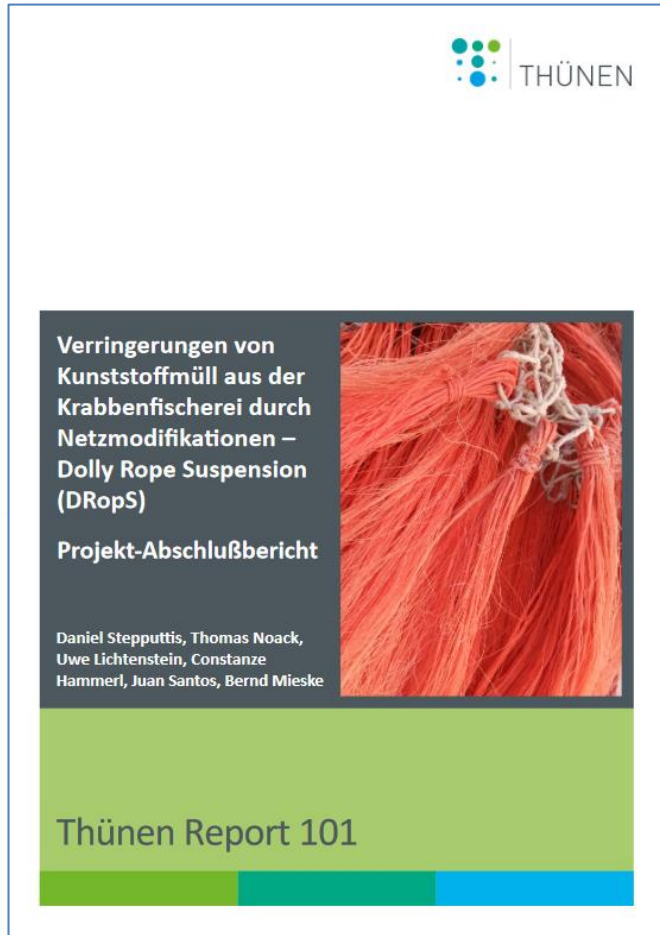
- Natürliche Materialien
- Robustere Materialien
- Abbaubare Materialien

z.B. Projekt „DollyRopeFree“ (NL)

## Änderungen am Fanggerät



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## Projekt „DRopS“



„...dass ausreichende Alternativen zur Verwendung von Dolly Ropes bestehen.“

„Ein vollständiger Verzicht der gesamten Fischerei auf Dolly Ropes wäre durch die Schaffung wirksamer Anreize oder durch gesetzliche Regelungen erreichbar.“

<https://www.thuenen.de/de/fachinstitute/ostseefischerei/projekte/fischerei-surveytechnik/verringerung-von-kunststoffmuell-aus-der-krabbenfischerei-durch-netzmodifikationen-drops>



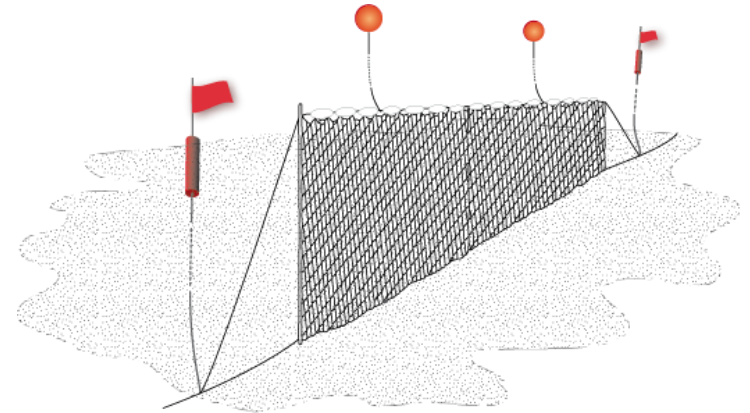
# Beifangreduktion Meeressäuger/Vögel



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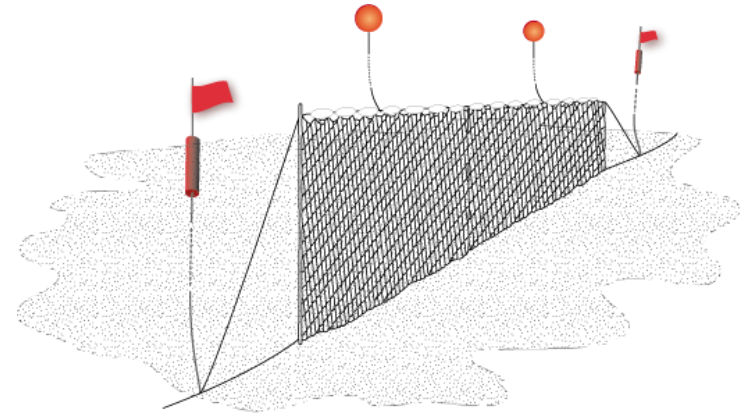
# Stellnetz

- sehr selektiv
- schont Meeresboden
- fangeffizient
- energieeffizient
- lokale und regionale Versorgung
- Arbeitsplätze in strukturschwachen Regionen
- kulturelle Identität & Tourismus



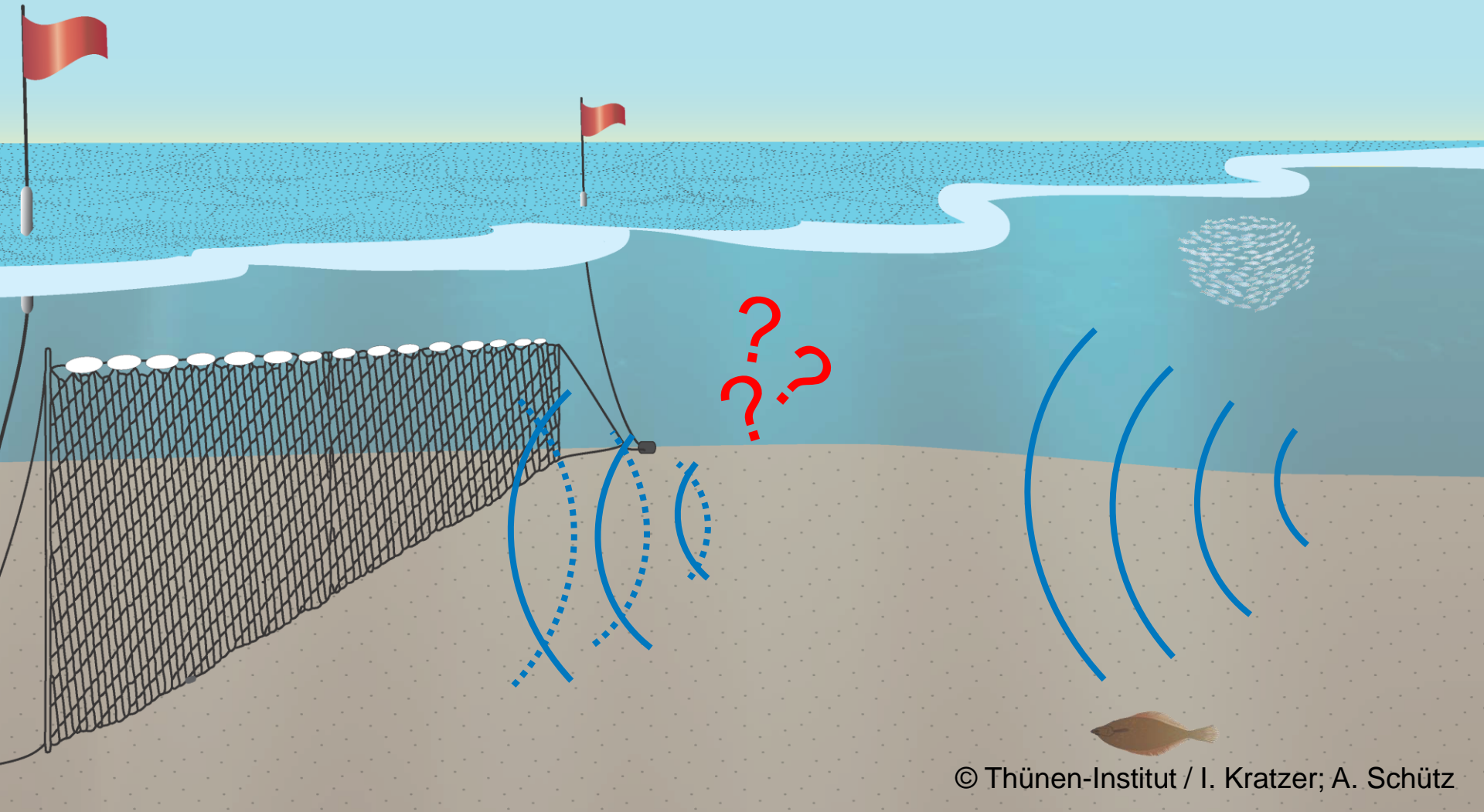
# Stellnetz

- viele Vorteile
- Beifänge
  - Seevögeln
  - Meeressäugern



# Stellnetz vs. Schweinswal

STELLA

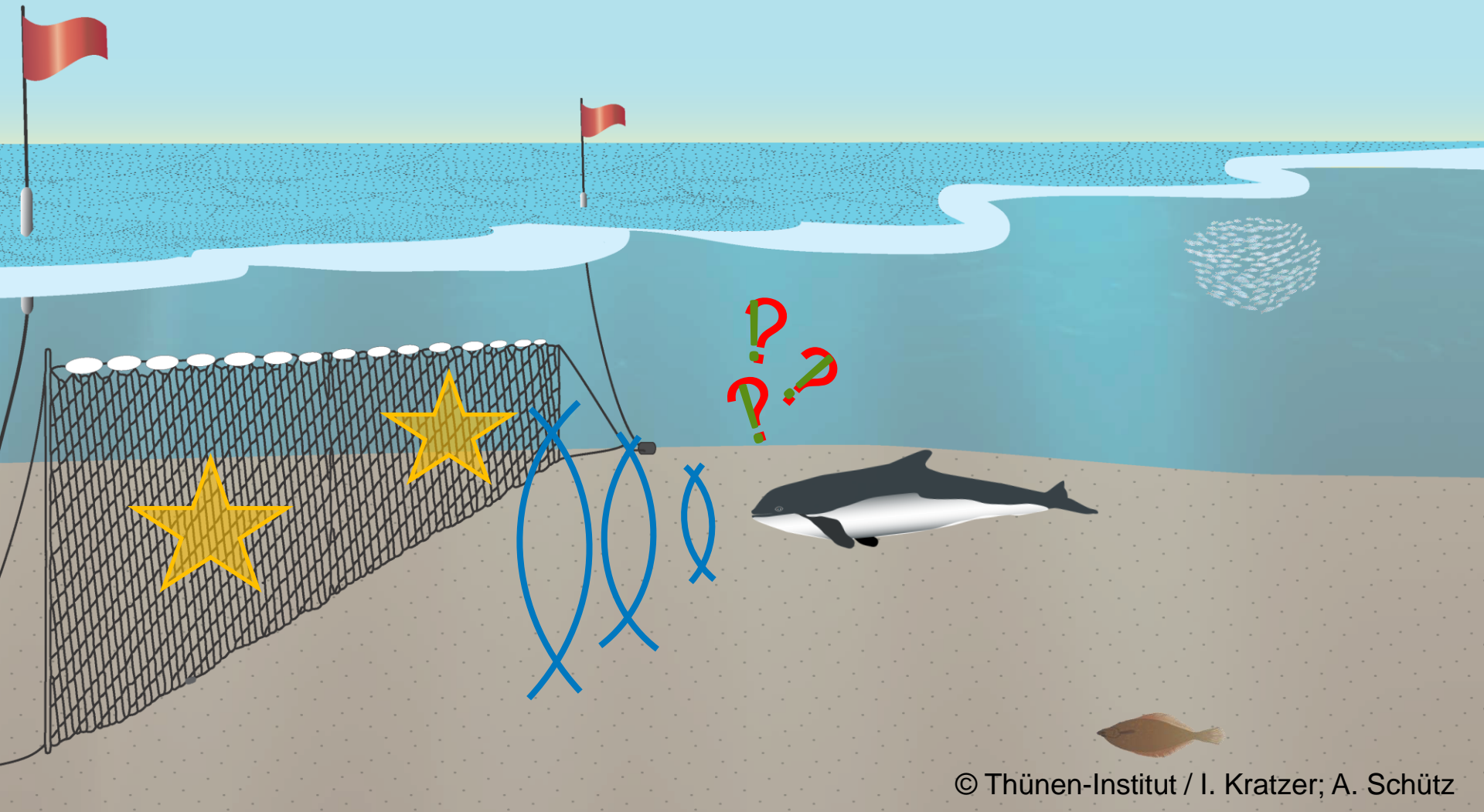


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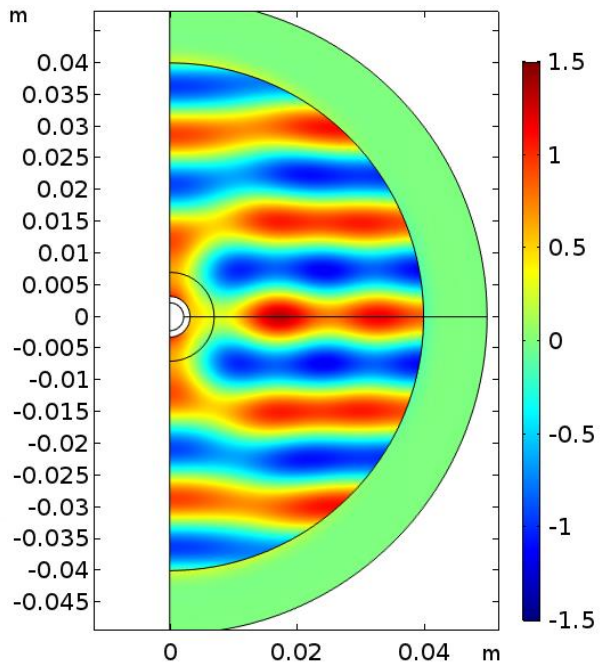
# Stellnetz vs. Schweinswal

STELLA



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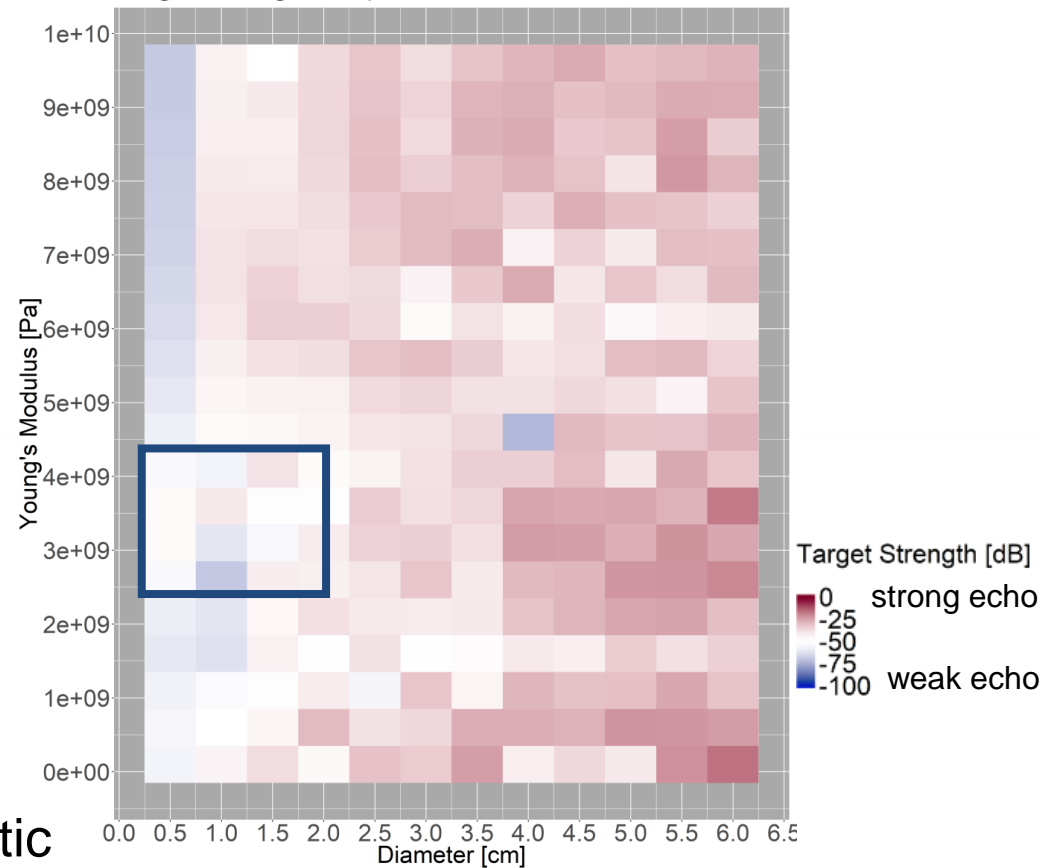
# Simulation



Parameter-Studie:  
Geometrie  
Material Eigenschaften  
Frequenz  
Umweltparameter

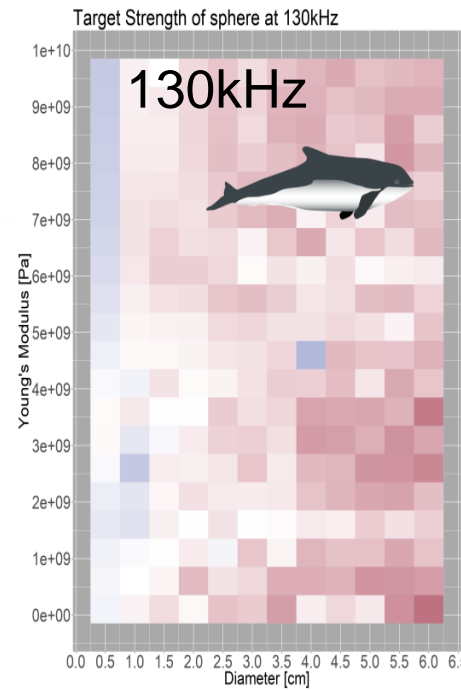
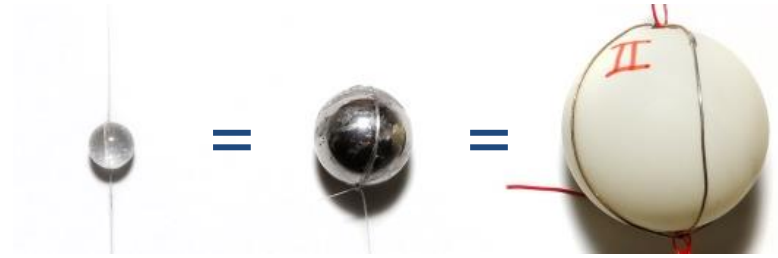
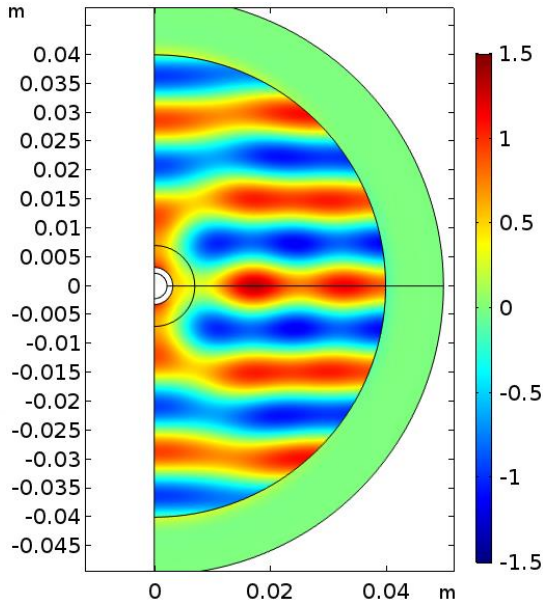
stiff

Target Strength of sphere at 130kHz;



elastic

# Simulation



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# Experimental verification

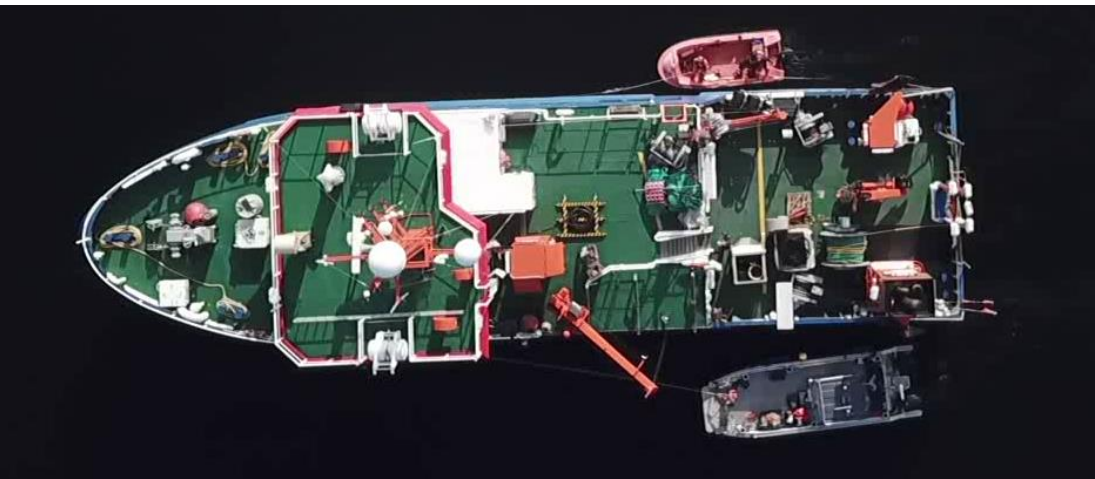


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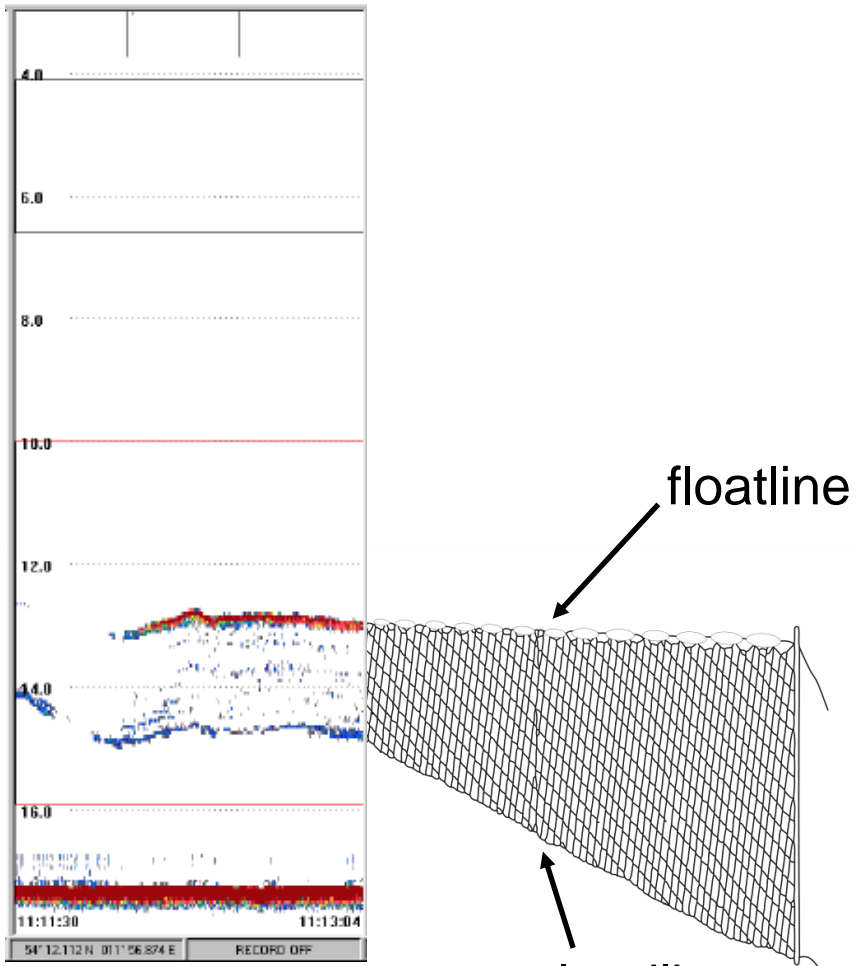
# Experimental verification



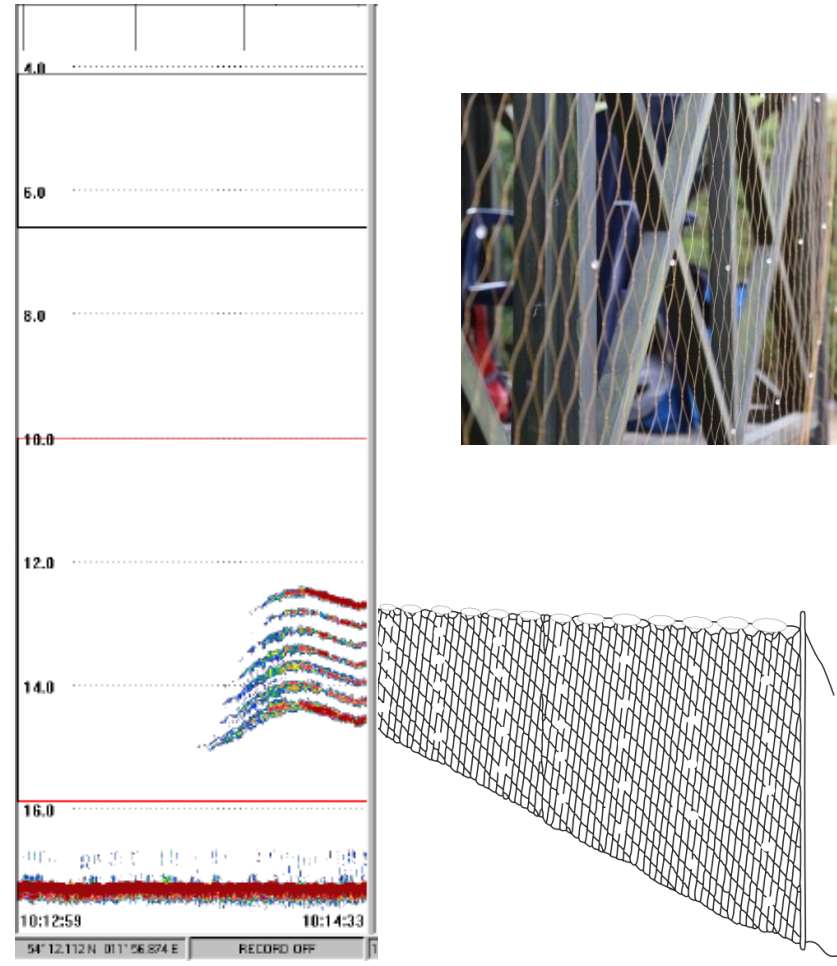
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# PerlenNetz

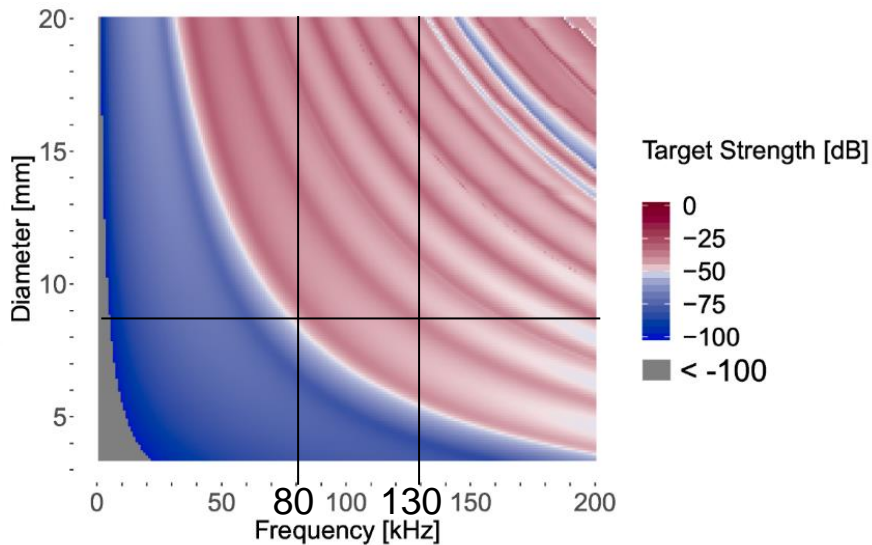


Standard gillnet



Gillnet with acrylic spheres

# Kugel - Simulation der Echostärke



Species	Centroid frequency [kHz]	Sphere size [mm] $\leq 20$ mm (TS [dB])
<i>Lissodelphis borealis</i>	18.2	<b>20 (-61.68)</b>
<i>Delphinus delphis</i>	112	18.6 (- 31.36)
<i>Phocoena phocoena</i>	130	18.5 (- 32.08)
<i>Lagenorhynchus obliquidens</i>	94.6	18.5 (- 31.08)
<i>Phocoenoides dalli</i>	133	18.1 (- 32.22)
<i>Neophocaena phocaenoides</i>	125	19.2 (- 32.03)
<i>Stenella coeruleoalba</i>	40	19.1 (- 30.26)
<i>Pontoporia blainvillei</i>	130	18.5 (- 32.08)
<i>Tursiops truncatus ponticus</i>	80	18 (- 33.38)
<i>Lagenorhynchus obscurus</i>	73.8	19.5 (- 32.73)
<i>Phocoena sinus</i>	132	18.2 (- 32.54)
<i>Phocoena phocoena relicta</i>	presumably 130	18.5 (- 32.08)
<i>Platanista gangetica</i>	64.4	17 (- 32.72)
<i>Orcaella brevirostris</i>	94.6	18.5 (- 31.08)
<i>Inia geoffrensis geoffrensis</i>	101.2	17.2 (- 31.85)
<i>Cephalorhynchus hectori</i>	124	19.4 (- 31.61)

→ „Design guide“ für viele Zahnwalarten

→ Ca. 8 mm ist ideal für Schweinswale





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# Verhalten



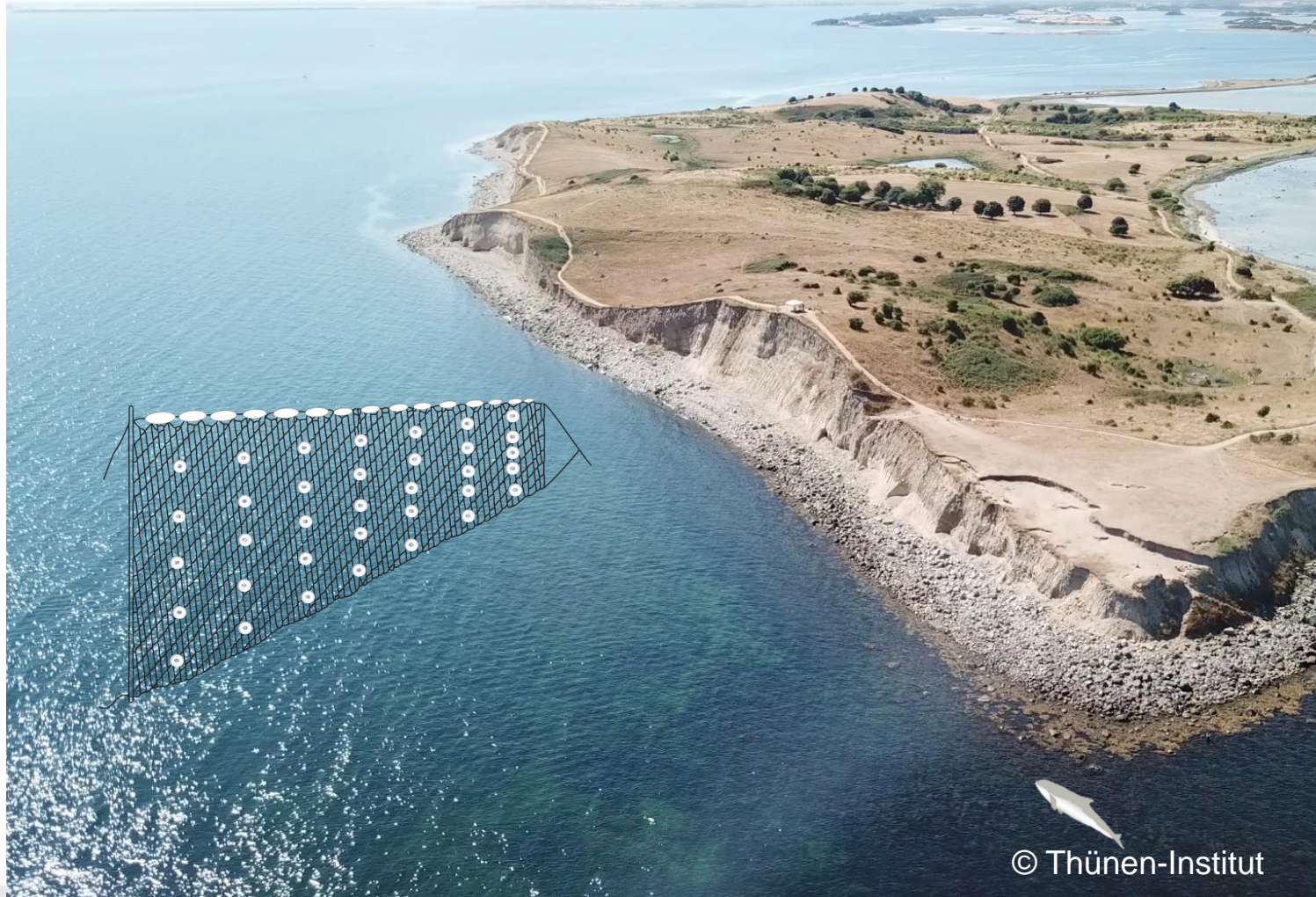
No Net

VS.

Standard net

VS.

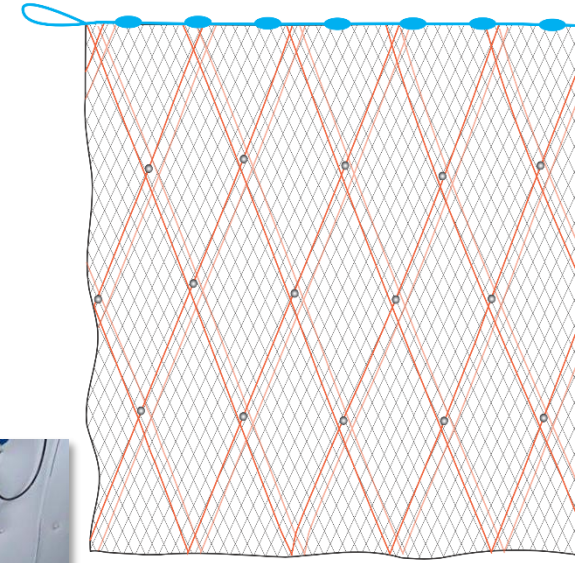
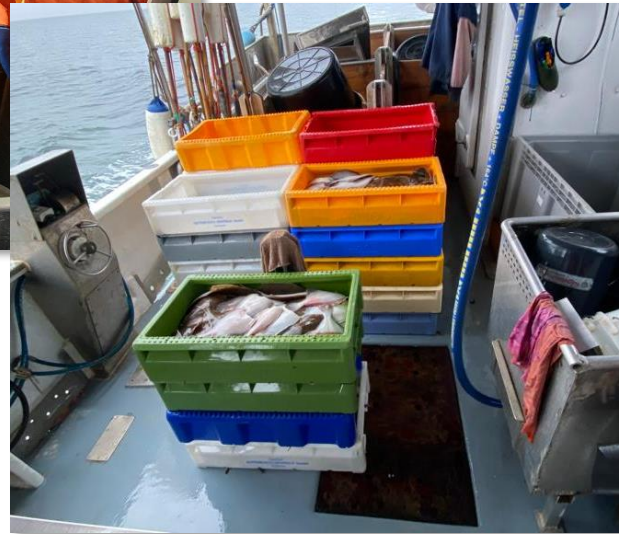
PearlNet



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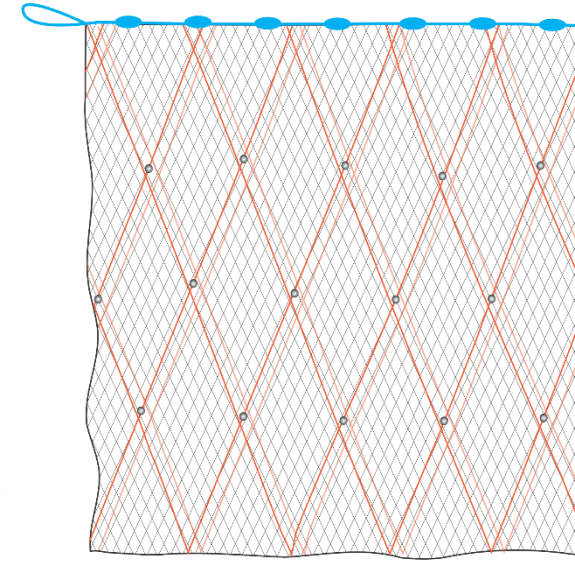
# Fangversuche (Ostsee)



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# Fangversuche (Ostsee)



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# PerlenNetz - Literatur

Isabella M. F. Kratzer, Ingo Schäfer, Arne Stoltenberg, Jérôme C. Chladek, Lotte Kindt-Larsen, Finn Larsen, Daniel Stepputtis (2020) Determination of Optimal Acoustic Passive Reflectors to Reduce Bycatch of Odontocetes in Gillnets. *Frontiers in Marine Science* 7: Article 539, <https://doi.org/10.3389/fmars.2020.00539>

Isabella Maria Friederike Kratzer, Daniel Stepputtis, Juan Santos, Frauke Lütkefedder, Arne Stoltenberg, Lea Hartkens, Matthias Schaber, Lotte Kindt-Larsen, Finn Larsen (2022) Angle-dependent acoustic reflectivity of gillnets and their modifications to reduce bycatch of odontocetes using sonar imaging. *Fisheries Research* 250. 14 pp. <https://doi.org/10.1016/j.fishres.2022.106278>

Isabella Maria Friederike Kratzer, Mollie Elizabeth Brooks, Sabri Bilgin, Süleyman Özdemir, Lotte Kindt-Larsen, Finn Larsen, Daniel Stepputtis (2021) Using acoustically visible gillnets to reduce bycatch of a small cetacean: first pilot trials in a commercial fishery. *Fisheries Research* 243, 10688. <https://doi.org/10.1016/j.fishres.2021.106088>



27.12.23 19:40 Arte Re: „Die Walretter“  
30.12.23 17:35 „Hilfe für Wale“

# Lösungen...



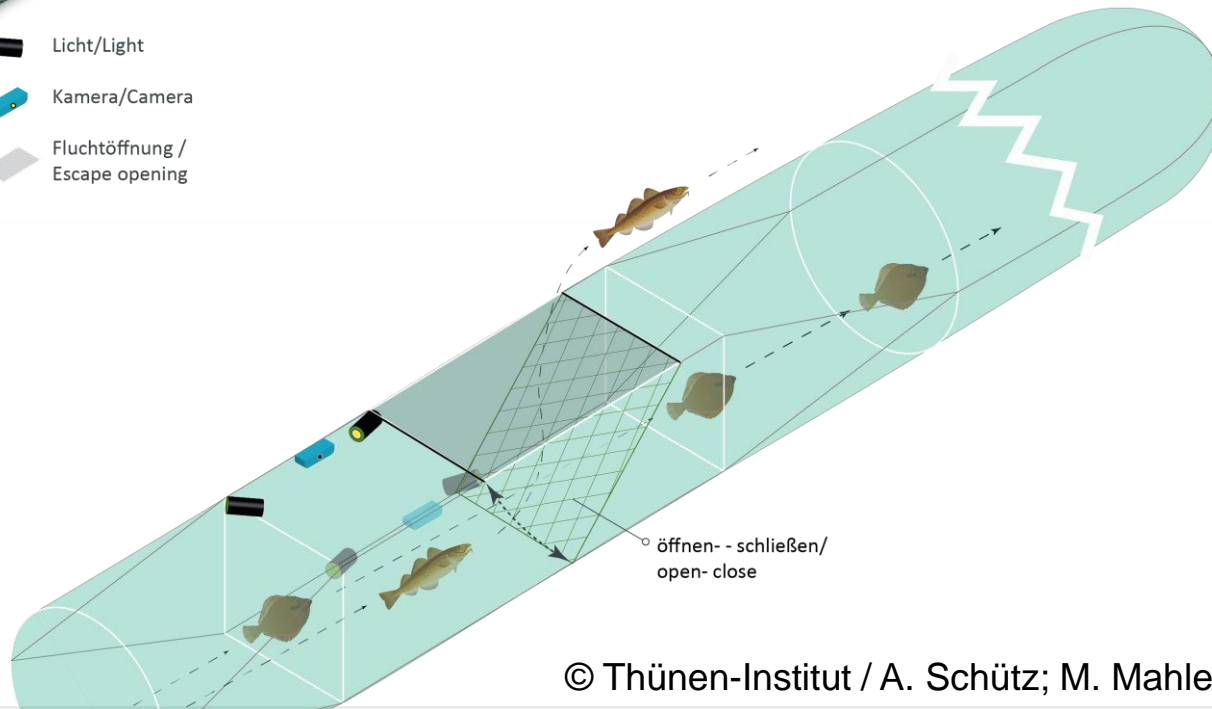
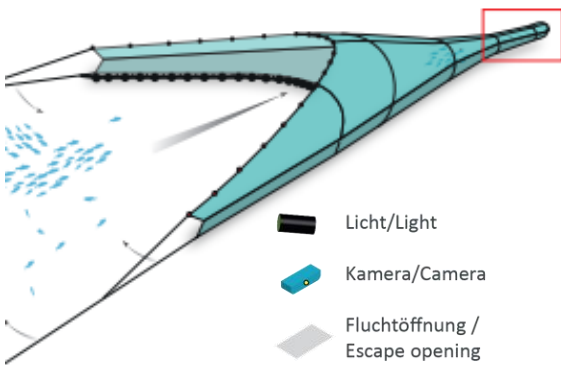
- Einfach (besser als kompliziert)
- Günstig (besser als teuer)
- Flexibel (besser als unflexibel)

# OTC-smartFishing

OCEAN  
TECHNOLOGY  
CAMPUS ROSTOCK



OTC -  
smartFishing



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[daniel.stepputtis@thuenen.de](mailto:daniel.stepputtis@thuenen.de)

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