Is entanglement a relevant indicator of the impact of marine litter on marine mammals?

*The contribution of the **INDICIT** European project.*

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1 Context

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3 Results & discussion

4 Perspective

32nd ECS annuel conference, La Spezia, April 6th 2018
Joint ACCOBAMS/ASCOBANS/IWC workshop on marine debris and cetacean stranding

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1 Context

Marine policies need indicators

Regional Sea Conventions and European directives for marine environment

- Target = Good Environmental Status (GES) of seas
  (MSFD GES = "Properties and quantities of marine litter do not cause harm to the coastal and marine environment")
- 3 criteria for litter: abundance, repartition,

impact on biota

ingestion

entanglement

Indicator of entanglement to be defined for long-term monitoring programs

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2 Methods

Evaluating new possible indicators

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Feb 2017- Jan 2019
7 countries, 12 partners

State of art ⇒ **analysis of literature** *(5 global publications, 52 within target area)*

Feasibility ⇒ **survey** *(8 countries, 21 quest.)*
+ data collection *(7 data sets = turtles, birds)*

Targeted species


Photo: Picardie nature
Marine mammals


Photo: Guy Flohart/GON
Sea birds


Photo: HCMR
Sea turtles


Sharks


Photo: C. Iokeimidis
Invertebrates

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3 Results

- **Literature :** 53 marine mammal sp. Gap of knowledge , data on prevalence but no standardized sampling.
- **Main material:** parts of fishing gear.
- **Feasibility:** available data and sampling devices/marine compartment.
- **Constraints identified**

TAXA	PREVALENCE	OCEANIC COMPARTMENTS /SAMPLING DEVICES									CONSTRAINTS		
		coast			surface			water column		floor	method.	biol.	logist.
		RC	STN	NN	AES	RC	ASC	RC	ASC	ASC			
MAMMALS													
seals	0.25-6.5%												
cetaceans	0.1-30%												

prevalence and criteria for feasibility

STN*= stranding network* ***NN****= nesting monitoring networks* ***ASC****= at sea campaigns* ***RC****= rescue centers* ***AES****= aerial surveys* *method.= methodological ; biol. = biological ; logist. = logistical.*

Minke whale (*Balaenoptera acurostrata*) stranded in the Canary Islands, from Diaz-Delgado 2015.

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3 Results

Methodological constraints

Entanglement or bycatch?

Possible confusion between litter from fisheries and material from active bycatch

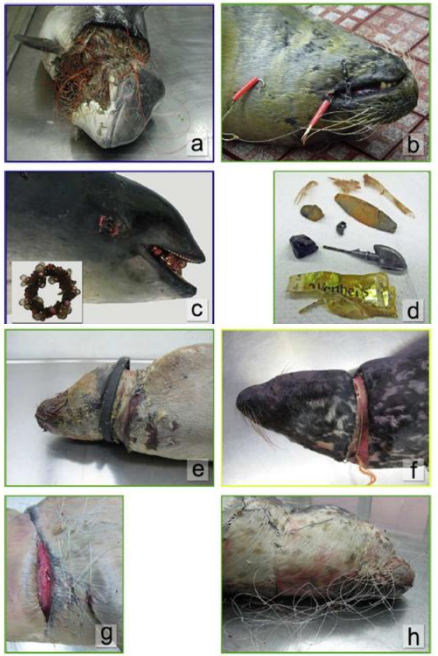
Possible mis-detection:

Floating specimens **uneasy to detect,** as well as material responsible for entanglement.

Specimens **sinking** or **predated.**

Strandings = **unknown part** of entangled number.

Few long term studies, no standard method.



Entangled marine mammals found stranded in Germany

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3 Discussion

Marine mammals monitoring

- **Availability of data/networks:** rescue centers (seals), stranding networks, NGOs, wide-scale surveys (boats/planes)
- **Monitoring feasibility:** factors = standard method, training, stable funding resources

Marine mammals as indicator species?

- **Pros:** possible terrestrial monitoring, existing networks
- **Cons:** seals mainly in Helcom/Ospar areas, possible mis-identification litter /bycatch, migrations

Methodological constraints

Exclude fishing material? What about risk of missing specimen?

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3 Discussion

Which approach?

Is entanglement a relevant indicator of the impact of marine litter on marine mammals?

→ too early to confirm: more work needed

Better approach: species or compartment?

Fossi et al (2017): approach for choosing bio-indicators

*RAC/SPA (2017) for Mediterranean : « consider several zoological groups (cetaceans, birds, reptiles, fishes, and invertebrates) and organize monitoring **by compartments** (beaches via stranding networks, surface and seabed via during oceanographic campaigns) »*

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4 Perspective

Recommendations

Further steps advised to Regional Sea Conventions and EU

Provided per type of constraint: list of gaps of knowledge and actions requested

Constraints	Type of knowledge	Action requested	Recommendation
Biological	number of species to monitor	choose small number of target species or whole taxon	draw a proposal
	biology and life cycle	test data sets	continue data collection
	probability of encountering litter	mapping risk areas	study
	prevalence /rate of entanglement	prioritize at risk populations	draw a proposal
	description of induced pathologies	list criteria for diagnosis	veterinary workshop
Environmental	confirm significance/ representativity as a pollution indicator	test data sets	study
Methodological	standard protocols (ROV-invertebrates; examination-megafauna)	improve/ develop protocols	disseminate/ test protocol proposal
	criteria distinguishing entanglement/strangling due to litter from active fishing gear.	draw typology of material responsible for entanglement	workshop with halieutic experts
	identify possible factors interfering with results	acquire knowledge on movements, speed of decomposition	study
	organise data collection taking in account seasonal variations (litter -fishing activity, tourist season; species – migration)	acquire / compile knowledge	study
	quality insurance and banking arrangements and procedures	survey	pursue survey with data producers
Logistic	cost of the monitoring	survey	pursue survey with data producers
	accessibility of samples and data	survey	draw a recapitulative table per country
	prior existence of permanent (no constraints related to seasonal variations) or seasonal data collection arrangements	survey	draw a recapitulative table per country

Enlarge network/technical exchanges on entanglement indicators ?

INDICIT dissemination meeting (Athens, December 4, 2018)

- Presentation of tools (protocols/video tutorial [ingestion])
- Panel discussion with RSCs and EU stakeholders:
  all participants welcome (video streaming)

Other initiatives following this ECS workshop?

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ECS LA SPEZIA 2018

Grazie mille !

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