Applying innovative technologies to the conservation of Rays and Sharks

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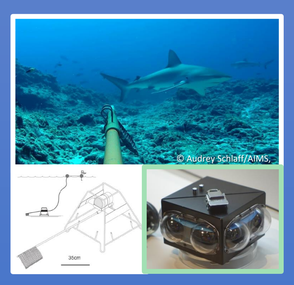
Insufficient knowledge is available for half the species of elasmobranchs (i.e. sharks and rays), impairing our ability to protect them. This project will contribute to the conservation of rays and sharks worldwide by developing and implementing an innovative non-invasive technological approach to survey species' presence and abundance, and assess individual sizes, using Baited Remote Underwater Video (BRUV) and environmental DNA (eDNA) barcoding. It will also contribute to improve local management actions directed at this vulnerable group, and raise public and stakeholder awareness.

GOAL 1 - SURVEY THE PRESENCE, ABUNDANCE AND SIZE OF SHARKS AND RAYS

Baited remote video

Test survey methods

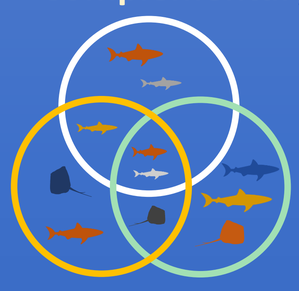


Unidirectional stereo/single camera systems

vs.

360 degree stereo/single camera

Complementary methodologies



Sightings / landings

+

Baited video systems

+

eDNA Barcoding

Linking occurrences to the environment

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- Environmental data
- Fish density
- Habitat complexity

STEP 1 (ongoing): PILOT TEST – OCEANARIO DE LISBOA

(known diversity & abundance)

Method development & optimization

STEP 2 (Aug/2018): FIELD TRIAL - AZORES

(prior knowledge available)

Field testing & validation

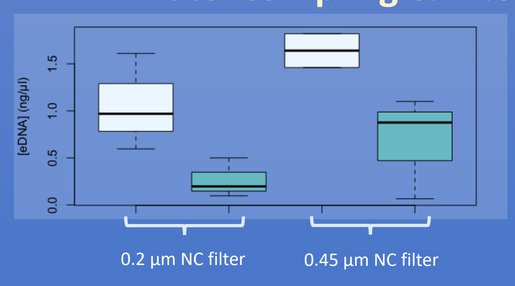
STEP 3 (2019): STUDY SITE - BERLENGAS ISLANDS

(unknown diversity & abundance)

Method implementation

eDNA Barcoding

Water sampling & filtering strategy



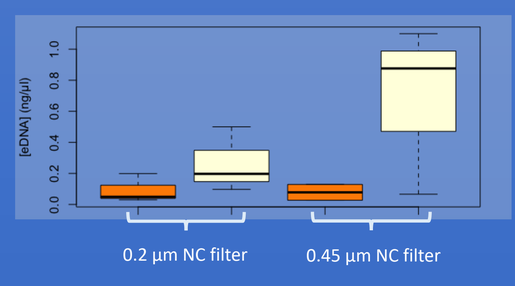
Testing filters & depths

Bottom Water

vs.

Surface Water

eDNA extraction efficiency



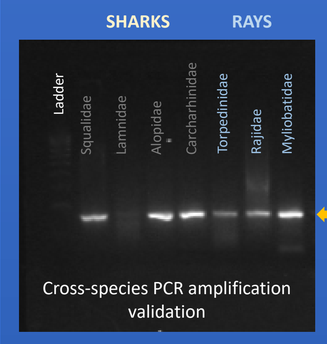
Testing eDNA extraction kits

Qiagen Dneasy Blood & Tissue

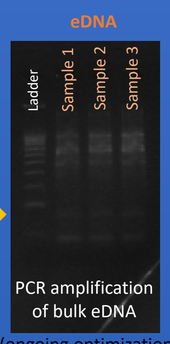
vs.

Omega E.Z.N.A. Tissue DNA

eDNA barcoding efficiency & resolution



Cross-species PCR amplification validation



PCR amplification of bulk eDNA

(ongoing optimization)

Testing primers & read coverage

Amplicon sequencing of eDNA barcodes on a MiSeq platform

Molecular species identification and assessment of community composition

GOAL 2 - PROPOSE ADEQUATE MANAGEMENT ACTIONS

Field Site - Berlengas Isl.

Species inventory

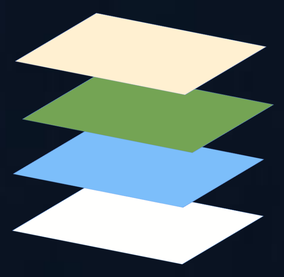
+

Critical Habitat Mapping

+

Population abundance & size

GIS database

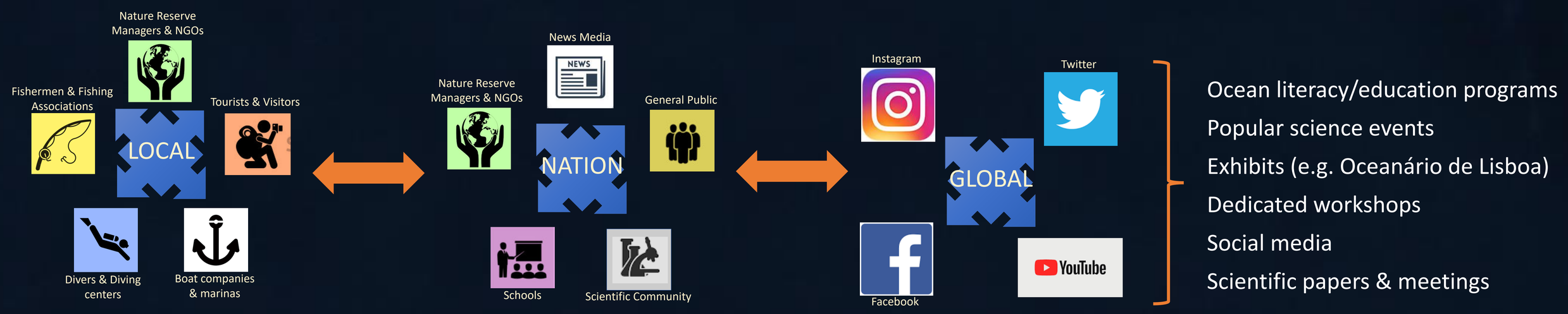


- Species & IUCN status
- Habitat maps
- Human activities
- Human threats/impacts

Actions & Guidelines

- Delimit important habitats/areas
- Propose areas of conservation concern
- Best practice guidelines for current human activities

GOAL 3 - RAISE AWARENESS ON DIFFERENT TARGET GROUPS



For more information, follow our project on facebook.com/findrayshark/.

For a video of the pilot test in Oceanário de Lisboa, use the Qrcode:

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JustDive & HumanEyes

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