Delmoges Project
Common Dolphin Species Action Plan

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Hundreds of dolphins are stranded on the Atlantic coast each year.

Marks of capture on most individuals stranded during winter.

Origin of stranded individuals

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Delmoges structure & objectives

Knowledge acquisition

- To better understand of the bycatch mechanisms
- To built remediation scenarios through action lever
Common Dolphins in the Bay of Biscay

- To characterize the common dolphin population(s) affected by bycatch in the Bay of Biscay, and the coast-wide structuring
- To provide information on ecology aspects that could influence the risk of capture levels, the spatial distribution, the fine-scale winter movements, and feeding ecology
CAPECET aerial survey

- 8 840 km covered
- 3 371 marine mammals of 8 different species were detected (2 473 small delphinids, mostly common dolphins)
- 25 dead cetacean carcasses
CAPECET aerial survey

High density of dolphins and porpoises around Rochebonne and off the Gironde plume
DelGOST surveys

June 2022 and 2023

30 biopsy samples/year

+ 11 water samples (eDNA)/year

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Using eDNA to characterize intrapopulation genetic diversity in common dolphins

Mitochondrial control region (461 bp)
- 81 different sequences among 6 sampling sites
- 37 haplotypes among biopsy/necropsy samples
- 18 are shared between the two approaches

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Contamination (Per- and polyfluoroalkyl substances / PFAS)

« fluorinated substances containing at least one fully fluorinated methyl or methylene carbon atom, i.e., with a few exceptions, any chemical containing at least one perfluorinated methyl (-CF3) or perfluorinated methylene (-CF2) group is a PFAS »

- Maximum of concentrations in 2005
- Minimum of concentrations between 2020 and 2023

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Key points

• Offshore observations show groups of dolphins composed of few individuals. They do not approach the ship.

• The individuals present a great genetic diversity.

• The contamination (PFAS) in dolphin tissues decreases since 2005.
Cascades in the Ecosystem

- To link the distribution of common dolphins to the dynamics of their environment
- To characterize their probability of occurrence in habitats in relation to physical and trophic conditions

Survey at sea

Data modeling
Habitats evolution

SEA SURFACE TEMPERATURE

Mean Map  Pattern of Variability  Environmental Index Time Series

MAY  OCT  NOV  DEC

Longitude  Longitude  Time (year)

Index

+0.80°C over 23 years in the South-eastern part

Differentiated warming of the southeast part in autumn and winter

+0.57°C over 23 years in the North-western part

North Atlantic Oscillation is the main driver

+0.69°C over 23 years along the French coast

Rise in temperature of coastal waters in winter

No significant SST change offshore

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Habitats evolution

CHLOROPHYLL-A

- Wind-induced turbulence is the main driver
  - Decrease in CHL-a in winter in coastal waters under the influence of river plumes
  - Phosphorus input is the main driver
    - Decrease in CHL-a in the inner part of the shelf at all months
  - No significant variation in chlorophyll-a in other areas

- Over 23 years along the French coast
  - CHL-a concentration (µg L⁻¹)
Drix survey

Detection of large, dense schools of small pelagic fish at the bottom of the water column (off Les Sables-d’Olonne and south of Yeu Island)

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Key points

Habitats evolution (2000-2020):

- Temperature increased (especially in coastal regions)
- Nitrogen flow and phytoplankton production decreased

During the winter season (2023), dolphins preys were detected at the bottom of the water column.
Fisheries and dolphins interactions

- To characterize the spatio-temporal and individual interactions of common dolphins with fishing activities and gear
Individual fishing strategies & fishing effort

AIS & VMS data

ITras package

Iapesca package

Vessel Fishing effort

Gear Fishing effort

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Individual fishing strategies

- Prevailing strategy: straight

- Interannual variation within strategy

Increase of fishing operation (11% → 27%) since 2017

Decrease of fishing operation (43% → 37%) since 2017

Decrease of fishing operation (34% → 26%) since 2017

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Individual fishing strategies

- Prevailing strategy: straight
- Interannual variation within strategy
  - Increase of fishing quotas
  - Annual catch limits
  - Shutdown period in winter

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Individual fishing strategies

Distribution of fishing operations

Common dolphin mortality zone according to strandings data

Spatial and temporal co-occurrence analysis (GAM)

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Identification of annual fishing strategies

Landed taxa (sp, spp, family, order, isscaap code):
→ fished taxa diversity
→ weight and economic value of fished taxa
→ main fished taxa

Vessel’s characteristics

Spatial activity (ZEE, ICES areas, statistic rectangles, distance to the coast)

Fishing gears

Temporal activity (fishing effort, time at sea, main period of activity)

From fishing information to detailed yearly behaviours
Identification of high-risk strategies

~90% of all accidental bycatches observations (2019-2022) included in these 4 strategies

Strategies with at least one accidental bycatch event (Common dolphin)

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Sphyrna survey

Characterization of dolphin individual behaviour near fishing vessel (acoustics)
Risk mapping

Winter season 2022-2023
Potential risk of capture on all continental shelves:

- higher risk at less than 100m depth, in a continuous zone along the 50m isobath, from the Gironde to Noirmoutier;
- lower and more dispersed risk between 100 m and the edge of the continental shelf.
Key points

- Highlighting of possible changes in fishing practices in the Bay of Biscay
- Co-occurrence between fishing operations and dolphin mortality
- Identification of high risk strategies and regions
Fisheries and dolphins interactions

- Facilitate the co-construction of remedial measures and evaluate their performance according to multiple qualitative and quantitative criteria.
Incentives approaches

• Validate a typology of incentive measures
• Review international case studies
• Identify opportunities and obstacles
• Discuss the Bay of Biscay case study
Incentives approaches

Two prerequisites:
• a credible threat
• detailed information on the conditions under which bycatch occurs
Online platform

- Facilitate discussion and compromise
- Allow the general public to react to proposals
- Help implement remediation scenarios
Key points

• Need for measures adapted to the environment

• Importance of maintaining dialogue with all parties
Thank you for your attention