**ECOLOGY OF THE SHORT-BEAKED COMMON DOLPHIN (Delphinus delphis) OFF SOUTHERN SPAIN**

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SMRU and CREEM stuff:
Jason Matthiopoulos, David Borchers, Sharon Hedley, Mike Lonergan, ........

CREPAD - Spanish Space Agency (satellite images)
IFAW (Logger software)
Spanish Ministry for the Environment
Earthwatch
European Union LIFE-Nature

**Conservation issues**

- Common dolphin is believed to have declined in the Mediterranean
- ACCOBAMS has developed a Conservation Plan
- Effective conservation depends on our understanding of the ecology
- The Alborán Sea is its most important remaining habitat – constitutes a vital source of information

**Methods**

**Distribution and abundance:**
- Spatial modelling (GAMs) was used using “extrinsic” (environmental) variables (e.g. depth, slope, sea surface temperature, chlorophyll concentration, distance from coast, distance from the shelf edge)
- Two steps were used: – modelling abundance of groups (probability of detection combined with spatial analysis), resulting group sizes
- Differences were examined among:
  a) Sub-areas
    - Western Alborán
    - Southern Almeria
    - Gulf of Vela
  b) Groups of years
  c) Seasons
    - summer: June to September
    - winter: October to May

**Differences were examined among:**
- Sub-areas
- Groups of years
- Seasons
- Intrinsic variables:
  - Behaviour
  - Presence of calves
  - Interspecies aggregations

**Results: abundance**

- Total abundance: 19,429 animals (density = 1.01 animals/km²)
  95% CI = 15,377 - 22,804
  CV = 0.11 – 0.18
- Geographical differences:
  - W. Alborán = 1.55 animals/km²
  - Almería = 0.97 animals/km²
  - G. of Vela = 0.14 animals/km²
- Bimodal distribution pattern

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**Results: abundance**

- Seasonal differences:
  - Summer = 7,148 animals (0.69 animals/km², 95% CI = 5,628 – 7,677)
  - Winter = 2,429 animals (0.23 animals/km², 95% CI = 1,628 – 3,951)
- Change in distribution pattern

**Results: trends in abundance**

- No trends in Southern Almería and the Alborán Sea
- Decline in the Gulf of Vera:
  1992-1995 = 0.34 animals/km²
  1996-2004 = 0.11 animals/km²

**Results: ‘intrinsic’ variables**

- Groups with calves > preference for more coastal waters
- Groups without calves > preference for deeper waters

**Results: ‘intrinsic’ variables**

- Single species groups > preference for more coastal waters
- Mixed species groups > preference for deeper waters

**Results: ‘intrinsic’ variables**

- Groups feeding > preference for more coastal waters
- Groups socialising > bimodal pattern
- Groups traveling > general pattern

**Results: ‘intrinsic’ variables**

- Single species socialising groups > preference for more coastal waters
- Mixed species socialising groups > preference for deeper waters
Conclusions

1. Estimated abundance fairly stable in the northern Alborán Sea since 1992
   - In contrast with the decline in the rest of the Mediterranean
   - Despite reported by-catch rate Moroccan driftnets in southern Alborán Sea (approx. 1,500 per year)

Conclusions

2. There is a significant drop in density in the Gulf of Vera since 1996
   - Exponential growth of aquaculture since mid 1990s
   - Catches of round sardinella (Sardinella aurita) to feed the fish have also increased exponentially
   - This may have led to a reduction in prey availability
   - It could also be due to similar reasons as for the rest of the Mediterranean

Conclusions

3. Shelf edge areas, especially off Malaga and Almería, are preferred habitats, particularly when feeding and with calves
   - This is also the area with the strongest impact from human activities
   - This kind of information could lead to specific management measures for those areas

Conclusions

4. Introducing ‘intrinsic’ factors leads to a clearer picture of habitat use
   - Improves our understanding of the ecology of the species
   - Should also lead to more effective conservation
   - Outcomes are easy for administrators