SENSITIVITY OF MARINE BIRDS TO OIL SPILLS IN COASTAL ECOSYSTEMS

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Introduction

- Oil and gas industry in expansion
- Potential danger of some activities - risk of accidents must be mitigated
- Improvement of environmental impacts assessment, monitoring and bioremediation
Environmental Impacts of Oil Spill in Brazilian Coast

- Not many pragmatic approaches applicable to real situations
- Researches on the vegetation and aquatic invertebrates
- Marsh plants (Spartina alterniflora) recover in 4 and 3 months
- Recovery by recolonization of the benthic fauna
- Mortality of seabirds - one of the most visible effects (Camphuysen and Heubeck 2001)
Sensitivity of Marine Birds
Marine Birds: Diversity and Ecology

- 148 species in Brazil, 9 orders and 29 families
- Albatrosses, petrels, penguins, frigatebirds, boobies, gulls and terns
- They depend on marine resources for reproduction, foraging and migration
- Top predators of marine webs
- Bioindicators of fishing productivity and of pollution
Effects of Oil Pollution

- Impacts – contamination of food web, impregnation of the plumage and direct ingestion

- Effects – population decreasing, mortality of juveniles and adults and decreased hatching success of eggs
The Focus on Brown Boobie

- Demographic parameters and foraging behavior of *Sula leucogaster*
Brown Boobie

- Resident in coastal and oceanic islands
- Dives to catch fishes
- One young per breeding season
- One of the commonest species in Brazilian coast
Currais Archipelago, PR

- Six nautic miles from continent
- 54,700 m² of area
- Maximum altitude 55 m under sea level
- One of the most important and huge colonies of marine birds in Brazilian coast
- Studies are being developed since 1992
Demography

- Average weight of adults
- Entry and exit of individuals to reproduce in the colony
- Percentage of adults that breed in the colony
- Time of hatching and recruitment of young
- Proportion of time in each stage of development of youngs
- Average weight of chicks and of young capable of flying
Foraging Behavior

- Area of each sector around the colony – km$^2$
- Flight distance of the colony
- Flight speed - km / min
- Average travel time – min
- Productivity in each sector available for birds - kcal.km$^2$.min$^{-1}$
- Maximum gathering of food items per foraging trip – kcal
- Rate of gain of energy - kcal / min
Disturbance Simulation

- Three scenarios of oil spill
- Different magnitudes, pathways and persistence
- Application over the demographic data and foraging
- Analysis and discussion based on the theoretical formulation
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