POP2011-03 Protected fish – review of interactions and populations
Presentation of methodology

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Objectives

Overall objectives:

- To describe the nature and extent of interactions between commercial fishing and protected fish species within the New Zealand EEZ to the extent possible from existing information

- To describe population information relevant to assessing risk to protected fish species from commercial fishing to the extent possible from existing information

Objectives

Specific objectives:

- To review existing information to describe the nature and extent of interactions between commercial fishing and
    - basking sharks
    - nurse sharks
    - white pointer sharks
    - whale sharks
    - manta rays
    - spinetail devil rays
    - giant groupers
    - spotted black groupers

- To identify information gaps in the understanding of the nature and extent of interactions between commercial fishing and protected fish species within the New Zealand EEZ, and provide recommendations for further research to address any gaps identified

Objectives

Specific objectives:

- To review existing information to describe population information relevant to assessing risk from commercial fishing within the New Zealand EEZ to
  - basking sharks
  - nurse sharks
  - white pointer sharks
  - whale sharks
  - manta rays
  - spinetail devil rays
  - giant groupers
  - spotted black groupers

- To identify population information gaps relevant to assessing risk from commercial fishing to protected fish species within the New Zealand EEZ, and provide recommendations for further research to address any gaps identified

Protected species

White shark (*Carcharodon carcharias*)

Main bycatch is in set nets (also longlines, trawl)

Photo: Kina Scollay

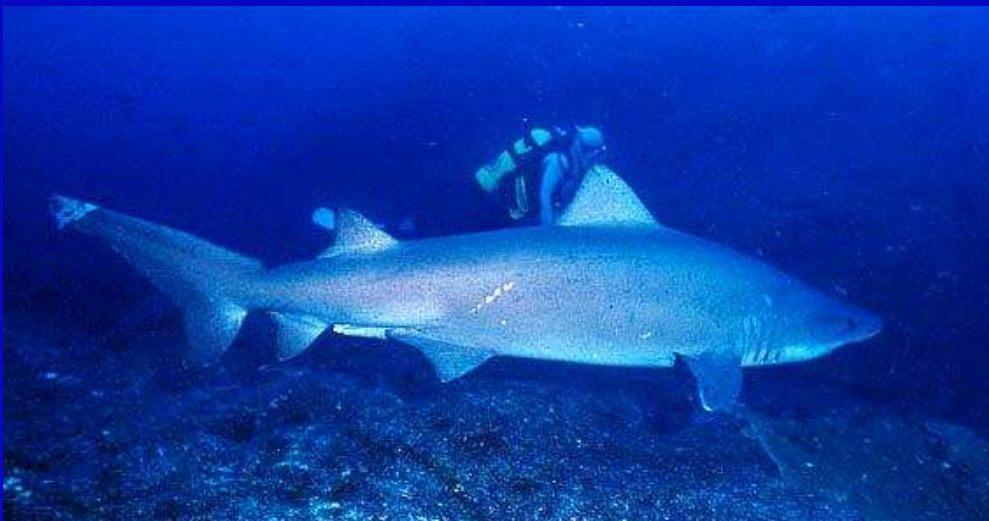Basking shark (*Cetorhinus maximus*)

Trawl (also set nets)

Photo: MFish

Protected species

Whale shark (*Rhincodon typus*)

No known bycatch in NZ (potentially purse seines)

Deepwater nurse shark (*Odontaspis ferox*)

Lines, set nets (trawl)

Photo: Kim Westerskov

Protected species

Manta ray (*Manta birostris*)

Possibly purse seines

Spinetail devilray (*Mobula japanica*)

Purse seines

Photo: Will White

Protected species

Spotted black grouper (*Epinephelus daemelii*)

Lines (set nets)

Giant (Queensland) grouper (*Epinephelus lanceolatus*)

Potentially lines, set nets

Photo: Reid Quinlan

Methodology

Information on the extent of catches of protected species in commercial fishing gear around New Zealand will be obtained from three main sources:

- Published and unpublished literature.

- The commercial catch and effort database (warehou) maintained by the Ministry of Fisheries (MFish) will be searched for all records of the eight species up to the end of the 2010-11 fishing year. We will plot maps of the location data, and summarise reported catches (in whole weight) by method, region, month and year.

- Data, photographs and notes from logbooks completed by MFish observers. Search MAF Central Observer Database (COD). Characterise the composition of the bycatch and identify the vulnerable species and life history stages. We will plot maps of the location data, and summarise observed catches (in numbers and whole weight) by method, region, month and year.

Methodology

- We will present a comprehensive review of interactions between commercial fisheries and protected fishes in New Zealand waters. The fisheries, regions and seasons during which the highest bycatch occurs will be identified for each species, and an assessment made of the significance of the bycatch in relation to known species distributions and presumed population sizes.

- We anticipate that significant gaps in our knowledge will become obvious. Likely problems include failure of fishers to identify and report protected species accurately, and low or no observer coverage of some key fisheries. Nevertheless, increased observer coverage in inshore fisheries in recent years may provide some new and useful data.

- Priorities for future observer coverage and improved data reporting by fishers will be identified from the above analysis, and expressed as a set of specific recommendations to the Department of Conservation. Species identification issues by fishers and observers should be addressed shortly by the recently published MFish series of species identification guides prepared by NIWA.

Methodology

- Population information will be sought from New Zealand and overseas sources. Four main categories of information are relevant to this study: stock identification information (for determining the effective population unit), biological information (for assessing a species' productivity), distribution of the species and fisheries (to assess the extent of population overlap with fisheries), and evidence of population response to exploitation (to determine their resilience under fishing pressure).

- The specific data types of interest include:
    - Stock identification - genetic stock structure, evidence of the scale of movement and migration from tagging studies, world distribution and any barriers to movement, habitat requirements and constraints
    - Biological - growth rate, longevity, length and age at maturity, length and age at sex reversal (groupers only), fecundity and reproductive rate, natural mortality rate
    - Distribution - spatial and temporal distribution of species, distribution of relevant fisheries, vulnerable components of population (size and sex composition), population response to exploitation, trends in population biomass, trends in size composition, trends in catches

Methodology

- Information sources:
    - Existing resources compiled during the course of previous studies, particularly on basking shark, great white shark, and spotted black grouper
    - Search of published and grey literature, and conference abstracts and proceedings, through scientific abstracting services
    - Search of IUCN Redlist background information documenting the redlist categories applied to relevant species
    - Liaison with governmental organisations with responsibility for managing the protected species elsewhere (e.g. Department of Sustainability, Environment, Water, Population and Communities, Australia, with responsibility for spotted black grouper (= black cod))
    - Identification and liaison with scientists working on these species worldwide. Sources include a wide range and number of personal collaborators and contacts, as well as umbrella organisations representing many such scientists, for example the IUCN Shark Specialist Group (SSG), IUCN Groupers and Wrasses Specialist Group (GWSG), the American Elasmobranch Society (AES), and the Oceania Chondrichthyan Society (OCS).

Methodology

- Identify gaps in our knowledge. We define a gap to include both the categories of information where nothing is known, and categories where the available information is inadequate. The gaps for each species will then be classified by:

  - The value of the missing data in defining the actual or potential risk to the species
  - The feasibility (including scientific, technical, logistical and financial considerations) of conducting research to fill the gap
  - The geographical location where such a study would have to be conducted (i.e. within New Zealand or at some overseas location). (Some of the protected species are rare in New Zealand waters and the feasibility of conducting research into their population biology may be low.)

- Priorities for research on the protected species will be derived from the above analysis, and expressed as a set of specific recommendations to the Department of Conservation.