

A Geographical Information System (GIS) to support management of marine resources and biodiversity in Fiordland

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ABSTRACT

Fiordland is a unique marine environment that contains valuable marine resources having a high degree of endemism, several species of special concern and exceptional marine biodiversity. The physical structure of Fiordland produces highly subdivided and diverse array of marine habitats that require special management considerations.

The challenge confronting Fiordland managers is to plan for increasing use of this marine environment in such a way that does not compromise the wilderness value and biodiversity of the region or the valuable fisheries and to insure that decisions are based on sound ecological knowledge. As such, a GIS model for Fiordland was chosen as the favourable means for disseminating regional information to stakeholders. This model based on physical and biological data collected by the University of Otago Marine Science Department and the Department of Conservation in the course of different research projects aims to identify possible physical indicators for ecological community structure and test scenarios for region-wide representation of biodiversity.

A combination of MapInfo, ArcView, ArcGIS and ArcInfo softwares was used to integrate the following data layers. Physical variables include fiord bathymetry, aspect, slope, temperature, salinity, effective freshwater depth and an index of open ocean wave exposure. Biological variables include distribution and abundance of sea urchins, macroalgal survey data, shallow water habitat assemblages and habitat forming organisms.

Later stages of this multi-year project will involve the additions of further parameters like resource uses in Fiordland, light exposure for surface waters and land-based modelling (e.g. catchment analysis, runoff, soil types, etc...). Ground-truthing of preliminary model predictions is also an integral part of this project.

Keywords and phrases: GIS, ecological modelling, Fiordland, habitat classification