

USE OF SPOT IMAGES TO ESTIMATE FISH STOCKS AND TO MODEL TROPHIC STRUCTURE IN TUAMOTU ATOLLS: PRELIMINARY RESULTS FROM THREE ATOLLS

KULBICKI M. and ANDREFOUET S.

ORSTOM, BP. A5, 98848 Nouméa Cedex, New Caledonia

The lagoon fish communities of 10 morphologically different atolls of the Tuamotu archipelago (French Polynesia) were studied using underwater visual censuses (UVC). This study allowed to obtain information on the density and biomass in each atoll for more than 250 species. It was also possible to determine the trophic structure of these fish communities in each of these atolls. The UVC were done according to a stratified sampling, based on the relative importance of geomorphologic strata (motu, hoa, bare reef crest, pinacles and passes), intervals of depth, nature of substrate and exposition. In order to estimate the stock of these fish assemblages and to understand their trophic functioning, it was necessary to estimate the area of each of these strata. The only available method was by using high resolution satellite imagery. The analysis of SPOT images from these 10 atolls indicates that only a part of the atolls was accessible. In particular, to obtain a high degree of confidence, bathymetric information was limited to 12 m and substrate information was limited within the 0-5 m stratum. The radiometric substrate information obtained from SPOT was related to 4 major categories of habitats. The consequences on stock assessment, in particular its precision, are analyzed for three lagoons of increasing size: Tekokota (5.11 ± 0.05 km²), Haraiki (12.40 ± 0.05 km²) and Marokau (217.50 ± 0.05 km²). The width of the confidence intervals on fish stock increases with atoll size, in particular for the deeper living species. The trophic structure of these fish assemblages are better defined in small atolls, the imprecision becoming important for the deepest strata and also for the pinacles and passes which actually represent only a small percentage of the total surface of the atolls.

Kulbicki Michel, Andrefouet S.

Use of SPOT images to estimate fish stocks
and to model trophic structure in Tuamotu
atolls : preliminary results from three atolls.

In : Marine benthic habitats conference :
programme and abstracts.

Nouméa : ORSTOM, 1997, p. 66 multigr.

Marine Benthic Habitats Conference,
1997/11/10-16, Nouméa