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MEXICAN GULF OF MEXICO MODEL

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The Gulf of Mexico is a deep marginal sea, and the 9th largest body of water in the world. The continental shelf of the Gulf covers more than 500,000 km^2 and is extremely topographically diverse with smooth slopes, escarpments, knolls, basins and submarine canyons. Traditional Gulf of Mexico fisheries include penaeid shrimp and menhaden. Newer fisheries include reef fish, coastal migratory pelagic fish, and large oceanic pelagics. The species in the Mexican Gulf of Mexico of regional and local economic and social importance include pink shrimp (*Farfantepenaeus duorarum*), octopus (*Octopus maya*), and red grouper (*Epinephelus morio*). All of these have been intensely exploited and have different problems for management.

The trophic interdependencies of these species reflect how their dynamics within individual ecosystems can be integrated into a whole ecosystem. In this sense this study integrates information from several continental shelves of the Mexican Gulf of Mexico (Tamaulipas, Veracruz, Tabasco, Campeche, and Yucatan) into a mass balance model to describe the whole trophic structure and biomass flow in the entire system. The model is based on the Ecopath with Ecosim software and includes both hard-bottom and soft-bottom communities (marine mammals sea birds, fishes, mollusks, crustaceans, echinoderms, primary producers and groups no-lived). Some important functional groups well represented in the model were taken directly from the subsystem models and were kept independent (e. g. pink shrimp, brown shrimp, lobsters, octopus, groupers, and king mackerel).

The biological components of the model represent average values that take into account both annual (seasonal) changes and ontogenetic changes. The model also includes several fisheries (trawl shrimp, long line, purse seine, gill net, hook line). Trophic structure and function of the ecosystem is described through the attributes of trophic levels, total system production, total consumption, flows to respiration, flows to detritus, gross efficiency, throughput cycled; as well as connectance index, system omnivory index, Finn's cycling index, etc. A total of 99 functional groups are included in the model which are located in trophic level ranking 1 (primary producers) at 4.6 (top predators). The main predators in whole ecosystems occupied trophic levels (TL) ranging from 4.27 to 4.6, and these were dolphins_ Tam-Ver (4.6) seabirds_Cam-Yuc (4.37); large demersal predators_ Tam-Ver (4.31); large demersal predators_ Cam-Yuc (4.3); coastal sharks_Tam-Ver (4.3); dolphins_Cam-Yuc (4.28); pelagic oceanic piscivores_Cam-Yuc (4.28) and groupers demersal large predators_ Tam-Ver (4.27).

Most flows occur at mid trophic levels and among groups with similar longevity (or size, expressed as inverse of P/B ratio). Total system throughput reached 37552 $tkm^{-2}year^{-1}$, of which total consumption made up % 41%, respiratory flows made up 22.5%, and flows to detritus made up 23.5%, the remaining flows are exported of the system (4548 $tkm^{-2}year^{-1}$). Preliminaries important findings derived from the integration of different mass-balanced models previously constructed were the gaps related to migratory patterns and catch records reliable. An important trait is the high degree of coupling between benthic and pelagic and costal and oceanic components and the importance of detritus to the balance of the system.