Fisheries Oceanographic Study Using GIS for Understanding the Changes in the Distribution of Mahi Mahi Based on Tagging Data

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The main aspect of this research is to characterize the functional relationships that exist between dolphin fish (*Coryphaena hippurus*) and their oceanic ecosystem. GIS is being used as a tool to help identify and quantitatively characterize the environmental parameters that appear important in understanding changes in the distribution based on tag and recapture data. This research is a multi-disciplinary study involving fisheries biology, physical oceanography, and remote sensing. Part of this study is the development of image processing and visualization tools to evaluate and merge data that exist in different spatial and temporal resolutions, as well as, different spectral bands. Infrared and ocean color - chlorophyll data will be derived from the AVHRR and MODIS sensor on the NOAA, Aqua, and Terra satellites. Evaluation of the development and coherence in time and space of such physical parameters as ocean frontal boundaries (temperature, chlorophyll, turbidity, etc.) related to coastal plumes, as well as, Gulf Stream circulation features (e.g. meanders and eddies) is a critical aspect of this research. The ultimate goal is to provide diagnostic and predictive bio-physical models on the effects of ocean climate variability to fisheries resource managers and policy makers.

KEY WORDS: GIS, mahi mahi, *Coryphaena hippurus*, tagging data

Estudio Oceanográfico de las Industrias Pesqueras Usando Sistema de Información Geografica para Entender los Cambios en la Distribución de Mahi Mahi Basada en Datos de Marcaje y Recaptura

El principal aspecto de esta investigación es caracterizar las relaciones funcionales que existen entre el dorado (*Coryphaena hippurus*) y su ecosistema oceánico. Se están utilizando el sistema de información geografica (GIS) como una herramienta para ayudar a identificar y a caracterizar y cuantificar

los parámetros ambientales que parecen importantes para entender los cambios en su distribución basados en datos de marcaje y recaptura. Esta investigación es un estudio multidisciplinario que involucra las areas de biología pesquera, la oceanografía física, y la detección remota. Parte de este estudio es el desarrollo de las herramientas del proceso y de la visualización de imagenes para evaluar y para combinar los datos que existen en diversas resoluciones espaciales y temporales, así como, diversas bandas espectrales. Infrarrojo y color del océano - los datos de la clorofila serán derivados del sensor del AVHRR y de MODIS en los satélites de NOAA, Aqua, y Terra. Evaluación del desarrollo y de la coherencia en tiempo y espacio de los parámetros físicos tales como los límites frontales del océano (temperatura, clorofila, turbiedad, etc.) relacionado con los plumes costeros, tan bien como, las características de la circulación de la corriente del golfo (e.g. meanders y los remolinos) son un aspecto crítico de esta investigación. La última meta es proporcionar modelos biofísicos de diagnóstico y predicion en los efectos de la variabilidad del clima del océano a los encargados de administrar los recursos pesqueros y a los encargados de crear las políticas de administración.

The Distribution of Recreational Fishing Effort and Harvest in the Waters Around Puerto Rico

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The National Marine Fisheries Service's Marine Recreational Fisheries Statistics Survey (MRFSS) has elicited catch and effort data from anglers throughout the U.S. since 1979. However, the MRFSS collects little information about where anglers fish once they leave the shore. This information is needed to evaluate the spatial aspects of recreational fisheries, including the effects of management strategies such as marine protected areas.

As part of a pilot study in Puerto Rico, questions were added to the 2003-04 MRFSS asking anglers where they hooked the most fish and where they spent the most time. We describe the development of the interview maps for this project and report preliminary results for the winter months of data