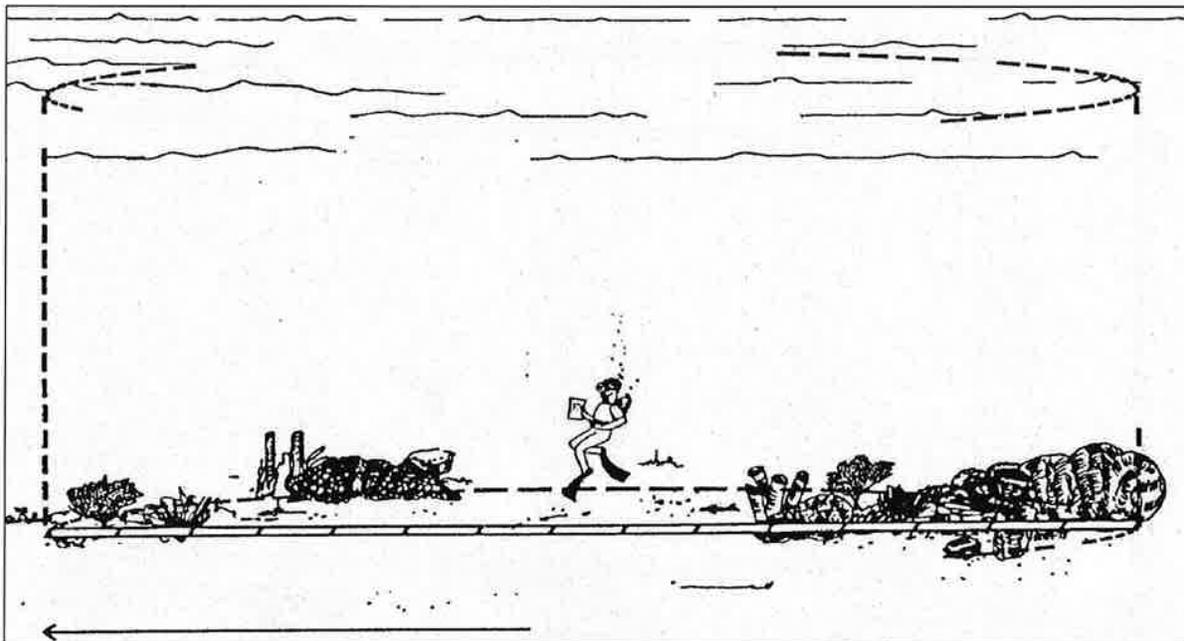


## 2012 Sampling Report: Reef Fish Visual Census Monitoring in the Florida Keys Reef Tract

**Project History.** This fishery-independent monitoring of the Florida Keys began in 1979. Thus, continuing our time series of reef fish monitoring enables us to make inferences about changes in populations over decadal time scales across the ecosystem. Since 1979, sampling has greatly expanded in intensity and spatial coverage from a relatively small number of samples annually on a relatively small number of reefs, to hundreds to thousands of samples spanning the entire FL coral reef tract (Dry Tortugas to Martin County). Results have been published widely and data are directly used for fisheries and ecosystem management by multiple state and federal agencies including FKNMS, NMFS, NPS, the South Atlantic and Gulf of Mexico Fishery Management Councils, and Florida's Department of Environmental Protection and Fish and Wildlife Conservation Commission.

Standardized survey monitoring methods were developed and adopted by multiple agencies including NOAA Southeast Fisheries Science Center (SEFSC, NMFS), the Florida Fish and Wildlife Conservation Commission (FFWCC), the National Park Service (NPS), Florida Department of Environmental Protection (FDEP) and University of Miami. Survey design uses a probabilistic sampling approach to visually survey reef habitats and provide population and community metrics for stock assessment and resource management. The strategy uses environmental features that correlate with the spatial distribution of reef-fishes to partition the survey area into subarea strata of low, moderate, and high variation in abundance (Ault et al., 1998). Geo-referenced environmental data including bathymetry and benthic habitat characteristics are compiled for the south Florida coastal ecosystem using a geographic information system (GIS) gridded into 200 x 200-m cells that represented the minimum mapping units for defining unique reef habitat classes. The survey spatial domain encompasses the full extent of mapped and classified live-coral reef habitats to 33 m depth.



**Figure 1. Conceptual diagram showing diver collecting data in a 7 m radius circular plot cylinder.**

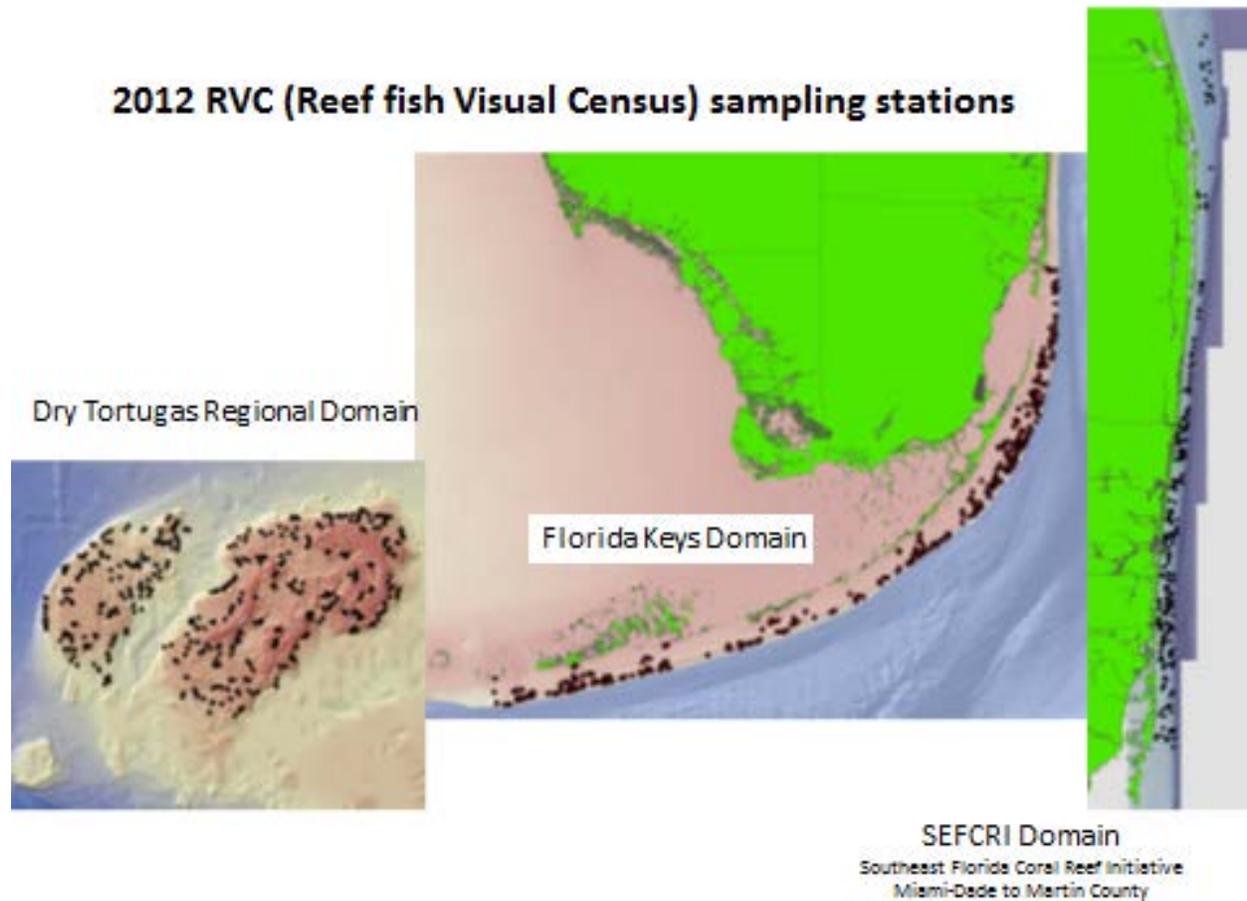
**Goals.** Southeast Fisheries Science Center (SEFSC) conducts continuous, spatially-based, non-destructive visual monitoring of coral reef habitat and reef fish composition, occurrence, abundance, and size structure in the Florida reef tract to assess population changes, ontogenetic habitat associations, and ecosystem responses to fishing, recreational use, pollution, MPA zoning, and Everglades restoration. Ultimate goals are: (1) detect trends in reef fish habitat and reef fish species composition, abundance, and sizes; (2) assess effectiveness of marine reserves, MPA zoning, and other regulatory interventions to achieve management objectives; and (3) provide data to support habitat, ecosystem, and length-based fishery stock assessments. Monitoring emphasis is on assessing effectiveness and impacts of marine reserves established in 1997 and other zones in the Florida Keys National Marine Sanctuary.

**FY2012 Summary of Work.** In FY12 abundance and size data for reef-fishes were collected by highly trained and experienced SCUBA divers using a standard, in situ, nondestructive monitoring method (Bohnsack and Bannerot 1986; Brandt et al. 2009). A probabilistic sampling approach was used to visually survey reef-fishes and provide population and community metrics for resource management (Smith et al, 2011).

Divers conducted RVC fish surveys (2-4 samples per site) at 1072 sites (~4074 samples) throughout the Florida Keys in FY12. This total includes 423 sites (1599 samples) in the Dry Tortugas, 415 sites (1594 stations) Key West to Miami and 234 sites (881 stations) in the SEFCRI region (Figure 2). Reef fish community composition, habitat composition, and abundance and size structure for more than 300 reef fish species on the coral reef tract were obtained. Data will be used to assess population and habitat trends (eg, whether species are overfished) and ecosystem responses to fisheries management actions, including the effectiveness of no-take MPA's. For example, Ault et al. (2013) discusses the effectiveness of protected management areas on black grouper and mutton snapper populations in the Dry Tortugas, suggesting the Dry Tortugas is a major source for recruitment of these species to the entire Florida reef tract.

Highlights of the 2012 survey included two charter cruises to the Dry Tortugas in June and July, sampling 423 sites, and 1 charter cruise to the Florida Keys, which sampled 55 sites. The system that developed into Tropical Storm Debbie disrupted the Keys cruise, and only allowed us 2.5 effective sampling days out of 7 planned operation days. Also, scientists completed a five year monitoring and assessment of coral reef in the Research Natural Area (RNA), a no-take marine reserve, in Dry Tortugas National Park in 2012 as a cooperative between SEFSC, the National Park Service, Florida Marine Research Institute (FMRI), and the University of Miami (Ault et al. 2013). Final results were presented and well received by the Florida Fish and Wildlife Conservation Commission in its June 2012 meeting. Data collected show the effectiveness and importance of the RNA for restoring fish populations and supporting coral reef fisheries in Florida. 2012 was also the first year of northern expansion (SEFCRI region) of the RVC program. Nova Southeastern University was contracted (with help of cooperating state and local agencies) to conduct RVC surveys from Miami/Dade County to Martin County. SEFSC and RSMAS

personal conducted several training programs (from sampling design, to sampling protocols, to data management) to facilitate the expansion and provide congruency throughout the Florida region as a whole.



**Figure 2. Location of 2012 reef fish visual census data collections sites in the Florida Reef Tract.**

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