

Reconnect. Reconciling conservation and exploitation of a keystone species through networks of Marine Protected Areas

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Marine Protected Areas (MPAs) can function as an effective tool for conservation and management, useful as conservative strategies to face the increasingly growing anthropogenic impacts on marine biodiversity. In a network, MPAs are expected to perform synergistically, producing greater benefits than the sum of the benefits by the single MPAs. The demographic linking of local populations through dispersal of individuals among them (connectivity) is a key process supporting the long-term resilience of marine assemblages and exploited population through replenishment and transfer of genetic variability (gene flow). Larval dispersal connects populations between sources and sink locations, thus promoting gene flow and supporting biodiversity persistence. Hence, it is crucial to identify sources and sink populations and evaluate connectivity patterns between MPAs. These are the main aims of the project “*Reconnect*”, that will focus on the dusky grouper, *Epinephelus marginatus* (Lowe, 1834), to assess if the current distribution and boundaries of the Sicily’s coastal waters MPAs effectively work as an ecological network and suggesting new areas for protection. By collecting data on biology, distribution, relatedness, and genetic population structure, “*Reconnect*” will describe the distribution of dusky grouper adult populations and the dispersal capacity and connectivity patterns among populations. Implementation of Lagrangian simulations will contribute to predict potential larval dispersal patterns from larval sources to sinks (i.e. larval corridors) and to assess connectivity patterns between the currently established and proposed MPAs. By developing habitat suitability models, “*Reconnect*” will identify critical sites for the species’ life history (i.e. nursery areas and spawning grounds) and ultimately provide crucial information for the planning of an effective MPA network in the central Mediterranean Sea with potential ecological and socio-economic benefits of new MPAs.