Impacts hampering reserve and spill-over effects of two Marine Protected Areas: spatial variation of fish communities in the overcrowded Gulf of Naples.

Luca Appolloni [1,2], Alberto Pagliarani [1], Adele Cocozza di Montanara [1,2], Gianmarco Di Pace[3], Luigia Donnarumma [1,2], Roberto Sandulli [1,2], Maurizio Simeone [3], Giovanni F. Russo [1,2]

[1] Consorzio Nazionale Interuniversitario per le Scienze del Mare (CoNISMa) Piazzale Flaminio 9 – 00196 Roma, Italy;

[2] Department of Science and Technology (DiST), Marine Ecology Laboratory, Parthenope University of Naples, Centro Direzionale—Isola C4, 80143 Napoli, Italy;

[3] Area Marina Protetta Parco Sommerso di Gaiola, Discesa Gaiola, 80123 Napoli NA

Presenting Autor: Luca Appolloni

Presenting Autor e-mail: luca.appolloni@uniparthenope.it

The effectiveness of a Marine Protected Area (MPA) is primarily related to the anthropogenic context, zoning design, management, and surveillance. Reserve and spill-over effects are used to assess the MPA effectiveness, by evaluating spatial variations of commercial fish species. The aim of this study was to investigate these effects of two MPAs located in overcrowded urban areas of the Gulf of Naples.

Statistical analyses were performed on abundance and biomass data of commercial fish species, collected by Visual Census, within the underwater parks of Gaiola and Baia MPAs, established to protect both biological and archaeological features. Protection degrees, substrates and distances from the MPA were considered to assess possible reserve and spill-over effects.

Results showed significant differences between the two MPAs. Gaiola showed differences among the areas within and outside the MPA: the biomasses gradually decreased with depth and increasing distance from the center of the reserve. Baia was characterized by the interaction of protection degrees and substrates: highest values of abundances and biomasses on the hard bottoms were detected within A and C zones and outside the MPAs, while lowest ones were detected within B zone.

Such findings suggest that MPAs show reserve and spillover effects, even though evidences of different impacts. Gaiola is probably more affected by illegal fishing activities in the deepest areas, where direct surveillance is very hard. Baia is probably more impacted by diving and swimming activities, centered on the Roman ruins closest to the coast, were the B zone was established.