

Report of the “Task team 2016/04: Operational Oceanography for supporting Sustainability of Top Predators (OOSTOP)”

2017/03/22 Diego Alvarez-Berastegui

1. Key activities over the year 2016

The main activities, in relation to the objectives defined in the “terms of reference” document have been the following:

- Terms of reference, task 1: Establish a network of multidisciplinary experts jointly connecting the three identified key areas (assessment/management; ecology; operational oceanography)

Researchers from various institutions in different countries have been contacted: NOAA (Miami headquarters, Mississippi Laboratory, SWFSC Environmental Research Division, EEUU), School for the Environment, University of Massachusetts (Boston); Spanish Oceanographic institute (Malaga and Balearics Hedquarters, Spain), AZTI-TECNALIA (Pasaia headquarters, Spain), Havforskninginstituttet (Bergen, Norway), Marine Environment and Technology Center of Instituto Superior Técnico (Portugal), Stanford University (United States), National Parks Authority (Spanish Ministry of Environment), Universidad de Málaga (Spain).

At present, the list of participants resulting from those contacts includes 17 researchers from 4 countries in Europe and EEUU.

Participant list OOSTOP (Alphabetic order)

Dana K Briscoe	Stanford University, United States
Diego Alvarez-Berastegui (Contact Person)	SOCIB-Balearic ISlands coastal and Observing System, Spain
Einar Svendsen	Havforskninginstituttet, Bergen, Norway
Francisco Alemany	Instituto Español de Oceanografía, Spain
Francisco Campuzano	Marine Environment and Technology Center of Instituto Superior Técnico, Portugal
John Lamkin	National Oceanic and Atmospheric Administration (NOAA), United States
Jon Lopez	AZTI-Tecnalia, Spain
José Amengual	National Parcks Authority, Spanish Ministry of Environment
José Manuel Hidalgo	Instituto Español de Oceanografía, Spain
Juan Moreno Navas	Universidad de Málaga, Spain
Kylie Scales	National Oceanic and Atmospheric Administration (NOAA), United States
Leif Rasmuson	National Oceanic and Atmospheric Administration (NOAA), United States
Patricia Reglero	Instituto Español de Oceanografía, Spain
Pilar Tugores	Instituto Español de Oceanografía, Spain
Rosa Balbín	Instituto Español de Oceanografía, Spain
Walter Ingram	National Oceanic and Atmospheric Administration (NOAA), United States
Chi Hin Lam	University of Massachusetts Boston

Task 2- Link species of interest, management/assessment approaches and the oceanographic processes driving the species ecology

List of activities developed to: i) identify key species, ii) identify oceanographic processes driving species ecology and iii) connect oceanographers and biologist to improve assessment and management:

- AZTI-TECNALIA, SOCIB and IEO started collaborating in the study of oceanic habitats of Silky shark (*Carcharhinus falciformis*), a bycatch specie in the Tropical tuna purse seine fisheries.
- University of Miami, NOAA, SOCIB and IEO, started a collaboration to develop a spawning habitat model of Bluefin tuna (*Thunnus thynnus*) in the Atlantic waters based on knowledge derived from larval ecology studies from both the Mediterranean and the Gulf of Mexico.
- IEO, SOCIB and the INSTM started a collaboration to compare environmental drivers of Atlantic Bluefin tuna spawning and larval habitats in the Westerns and Central Mediterranean.
- NOAA, SOCIB, IEO attended ICCAT SCRS data preparatory meeting to present advances on including habitat information in the larval indices to assess spawning stock biomass.
- Participants of the task group attended the first GBYP workshop of larval ecology. One of the main objective of this workshop was to discuss how operational oceanography and habitat modeling improves assessment of Atlantic tunas. The activities of the task group OOSTOP were also presented in the meeting for dissemination and networking.

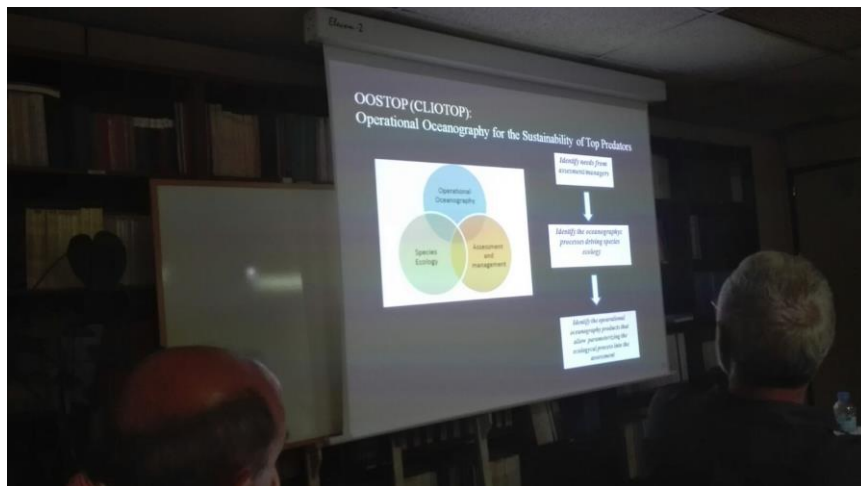


Figure: presentation of the OOSTOP task group on the first GBYP early life WP meeting.

- Miami University, NOAA, IEO and SOCIB researchers meet in the Balearic Islands for developing software tools to improve assimilation of environmental information in Bluefin tuna larval indices

Task 3- Identify/design operational data products informing about ecological process related to task 2.

The main activities directed to the exploration and application of operational oceanography derived data and the design of new products were:

Software development.

- SOCIB and AZTI-TECNALIA developed and shared software for reading and processing operational oceanography data from the Copernicus Marine environment monitoring service in the framework of the modeling of Silky shark ocean habitats.
- SOCIB and Miami University developed and shared software for reading and processing operational oceanography data from HYCOM hydrodynamic models in the framework of modeling and forecasting spawning habitats.
- SOCIB and NOAA explored statistical approaches to include non linear effects on habitat models for larval indices.

Explore application of remote sensing and hydrodynamic models data derived products in the framework of OOSTOP.

- SOCIB, IEO and IMEDEA started a study directed to evaluate the applicability of Lyapunov characteristic exponents, derived from satellite altimetry, in larval habitat modeling used to standardize larval abundance indices. Larval abundance indices are applied now in the framework of ICCAT to assess bluefin tuna spawning stock biomass.

2. Opportunities for funding and development of collaborations

Main activities for getting access to funding and improving collaborations have been developed in the framework of the International Commission for the Conservation of Atlantic Tunas (ICCAT). Members of the OOSTOP in collaboration with researchers working on early life fish ecology responded to a specific research call from GBYP focused on the science improvements for assessment and management of Atlantic Bluefin tuna. The grant is currently under evaluation.

3. Publications

The OOSTOP activities facilitated communication among researchers what has derived in following publications:

- A. Carbonell, P.J. Llombart, M. Gaza, A. Mir, A. Aparicio, D. Álvarez-Berastegui, R. Balbin, and JE Cartes (accepted 2017) Long-term climatic influences on the eco-physiological condition of the red shrimp *Aristeus antennatus* in the Western Mediterranean Sea, *Climate Research - Ms. No. 201603006*, Accepted: 9-January-2017
- Ingram W., Alvarez-Berastegui D., Reglero P., Balbín R., García A., Alemany F. (accepted 2017) Incorporation of hábitat information in the development of índices of larval bluefin tuna (*Thunnus thynnus*) in the Western Mediterranean sea (2001-2013). *Deep Sea Research Part II Special issue CLIOTOP III* (accepted, March, 2017)
- Reglero P., Santos M., Balbín R., Láiz-Carrión R., Alvarez-Berastegui D., Ciannelli L., Jiménez E., Alemany F. (accepted 2017) Environmental and biological characteristics of Atlantic bluefin tuna and albacore spawning hábitats based on their egg distributions. *Deep Sea Research Part II Special issue CLIOTOP III* (accepted, March, 2017)
- Muhling, B., J. Lamkin, F. Alemany, A. Garcia, J. Farley, W. Ingram, D. Alvarez Berastegui, P. Reglero, R. Laiz Carrion (accepted, 2017) Reproduction and larval biology

in tunas, and the importance of restricted areas spawning grounds. Reviews in Fish Biology and Fisheries.

- Alvarez-Berastegui D., Hidalgo J.M., Tugores M.P., Aparicio A., Ciannelli L., Reglero P., Balbín R., Juza M., Mourre B., Pascual A., Lopez-Jurado J.L., García A., Rodríguez JM, Tintoré J., Alemany F. 2016. Pelagic seascape ecology for operational fisheries oceanography: modeling and predicting spawning distribution of Atlantic bluefin tuna in western Mediterranean. ICES Journal of Marine Science 73, 1851-1862. doi: 10.1093/icesjms/fsw041.
- Antoni Quetglas, Lucía Rueda, Diego Alvarez-Berastegui, Beatriz Guijarro, Enric Massutí, Contrasting Responses to Harvesting and Environmental Drivers of Fast and Slow Life History Species (2016) PLOS ONE, <http://dx.doi.org/10.1371/journal.pone.0148770>

4. CLIOTOP funds spent across the year

No funds were required to CLIOTOP for the 2016 year.

5. Plans for the year 2017.

During first months of 2017 the OOSTOP web site has been designed and implemented (<https://oostop.wixsite.com/oostop/participants>). This web site, currently under development, is intended to full fill the main activities of OOSTOP, aiming at improving the knowledge transference between people working on operational oceanography, species biology and management, to advance towards the conservation and sustainability of marine top predators.

The main task along 2017 is to get all participants of OOSTOP involved in the development of the contents of this web site and to set various meetings to promote it and to get more researchers involved.

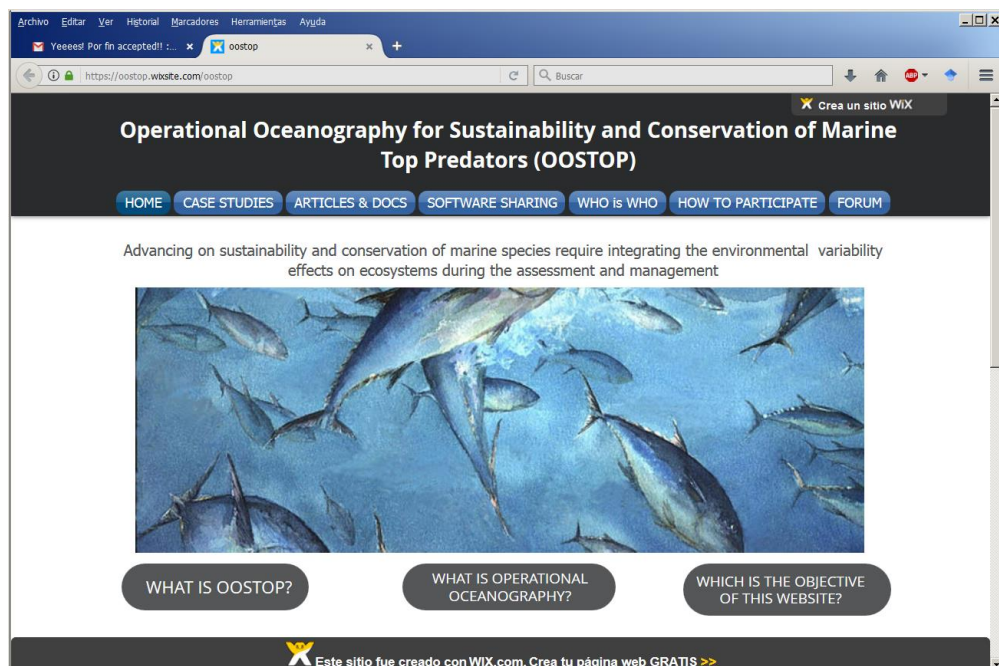


Figure: Screen shot of the OOSTOP site front page.