



Stefanos Kalogirou

📍 **Address:** Agricultural University of Athens, School of Animal Sciences, , Department of Animal Science, Iera Odos 75, 11855, Athens, Greece

📍 **Address:** Eolou 68, 17561, Athens, Greece

✉ **Email address:** stefanos.kalogirou@aua.gr ☎ **Phone number:** (+30) 6909214383

Gender: Male **Date of birth:** 12/01/1981 **Nationality:** Greek, Swedish

WORK EXPERIENCE

[18/01/2022 – Current] **Professor (Assistant) in fisheries biology, assessment and management**

Agricultural University of Athens

City: Athens

Country: Greece

Main activities and responsibilities:

Faculty member of Agricultural University of Athens. Main duties include lectures to undergraduate and postgraduate students, research in the associated field, applications for funding research and education at University level.

[17/10/2016 – 17/01/2022] **Senior Analyst**

Swedish Agency for Marine and Water Management

City: Gothenburg

Country: Sweden

Main activities and responsibilities:

Main areas of responsibility have been the Common Fisheries Policy including analyses of proposals, negotiations - representing Sweden in different fora as an expert or as a Swedish delegate, and national implementation of EU-legislation. The Swedish Agency for Marine and Water Management is a national Agency under the remit of the Ministry of Environment.

[01/08/2011 – 16/10/2016] **Researcher**

Hellenic Centre for Marine Research

City: Rhodes

Country: Greece

Main activities and responsibilities:

Main activities included the research in management of fisheries and establishment of non-indigenous species in the Mediterranean Sea. One of the projects I was Principal Coordinator for was the Plesionika Manage pilot fishing study of the decapod shrimp *Plesionika narval* (Narval shrimp). The study was funded by the Ministry of Rural Development and Food, within the framework of the Operational program (OP) FISHING 2007-2013 in Priority "3" COMMON MEASURES INTEREST, Measure 3.5: "PILOT PROJECTS" co-financed by the EUROPEAN FISHERIES FUND (ETA). The latter project led to the amendment of national Presidential Decrees and the ecosystem based management through a participatory process with local fishermen in an area with limited possibilities for economic diversification.

EDUCATION AND TRAINING

[01/08/2007 – 13/05/2011] **PhD in marine ecology**

University of Gothenburg <https://www.gu.se/en>

Address: Universitetsplatsen 1, Göteborgs universitet , 405 30, Gothenburg, Sweden

Field(s) of study: Marine ecology , Agriculture, forestry, fisheries and veterinary :
Fisheries , Natural sciences, mathematics and statistics : *Biology*

Final grade: PhD

Thesis: <https://gupea.ub.gu.se/handle/2077/24869>

<https://gupea.ub.gu.se/handle/2077/24869>

[19/08/2001 – 10/06/2005] **M.Sc. in marine biology**

University of Gothenburg <https://www.gu.se/en>

Address: Universitetsplatsen 1, Göteborgs universitet , 405 30, Gothenburg, Sweden

LANGUAGE SKILLS

Mother tongue(s): Swedish, Greek

Other language(s):

English

LISTENING C2 READING C2 WRITING C2

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2

DIGITAL SKILLS

Microsoft Excel | Microsoft Word | Microsoft Powerpoint | Outlook | Google Docs |
Zoom | Google Drive | Skype | Microsoft Office | LinkedIn | Power Point

The contribution of Area-Based Fisheries Management Measures to Fisheries Sustainability and Marine Conservation: a global scoping review protocol

<https://riojournal.com/article/70486/instance/7198173/>

Reference: Petza, D., Anastopoulos, P., Coll, M., Garcia, S.M., Kaiser, M., Kalogirou, S., et al. (2021).

Objective: This scoping review (ScR) aims to identify and map the evidence base on the contribution of area-based fisheries management measures (ABFMs) to fisheries sustainability and marine conservation. Emphasis will be given to the research that has been conducted in terms of the methodologies applied and the key findings acknowledged.

Introduction: ABFMs have been used for centuries and are present in modern fisheries management plans and regulations. Although ABFMs are commonly related to the sustainable exploitation of the target species of the managed fishery, they may also be considered as wider conservation measures, in the cases where their outcomes include the protection or reduction of impact on biodiversity or ecosystem structures and functions.

Inclusion criteria: Studies that perform an assessment of the contribution of ABFMs on either fisheries sustainability or on area-based marine conservation (or both) will be considered. All types of ABFMs in the marine realm globally, which are established as management measures by any type of designation authority or jurisdiction and for any type of fishing activity, gear, target species and/or habitats will be considered. Peer-reviewed and grey literature will be included. There will be no search limitations applied by year of publication. Studies in English, French, Greek, Italian, Spanish and Swedish will be reviewed.

Methods: The ScR will be conducted in accordance with the JBI (Joanna Briggs Institute) methodology. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) extension for ScRs will guide the protocol. The bibliographic databases to be searched include Scopus and Web of Science. Sources of grey literature will include databases, pre-print archives, organisational websites and web-based search engines. The design of the search strategy will be guided by a librarian/ information specialist. The Zotero software, Sysrev platform and EviAtlas tool will be used for data management, extraction and presentation. Data will be extracted by two reviewers. Tables, graphs and maps along with a narrative summary of the outcomes will be presented.

[2021] **Fishery reforms for the management of non-indigenous species**

<https://doi.org/10.1016/j.jenvman.2020.111690>

Reference: Kleitou, P., Crocetta, F., Giakoumi, S., Giovos, I., Hall-Spencer, J.M., Kalogirou, S., et al.

Marine ecosystems are undergoing major transformations due to the establishment and spread of Non-Indigenous Species (NIS). Some of these organisms have adverse effects, for example by reducing biodiversity and causing ecosystem shifts. Others have upsides, such as benefits to fisheries or replacing lost ecological functions and strengthening biogenic complexity. Stopping the spread of NIS is virtually impossible and so the societal challenge is how to limit the socioeconomic, health, and ecological risks, and sustainably exploit the benefits provided by these organisms. We propose a move away from the notion that NIS have only negative effects, and suggest a turn towards an Ecosystem-Based Fishery Management approach for NIS (EBFM-NIS) in the Mediterranean Sea, the world's most invaded marine region. A structured, iterative, and adaptive framework that considers the range of costs and benefits to ecosystems, ecosystem services, and fisheries is set out to determine whether NIS stocks should be managed using sustainable or unsustainable exploitation. We propose fishery reforms such as multiannual plans, annual catch limits, technical measures for sustainable exploitation, and legitimization of unlimited fishing of selected NIS and introduction of a radical new license for NIS fishing for unsustainable exploitation. Depending on local conditions, investment strategies can be included within the EBFM-NIS framework to protect/enhance natural assets to improve ecosystem resilience against NIS, as well as fishery assets to improve the performance of NIS fisheries. Examples of the former include the enhancement of Marine Protected Areas, harvesting of invasive NIS within MPAs, and protection of overfished predators and key species. Examples of the latter include market promotion and valorisation of NIS products, development of novel NIS products, and innovative/alternative NIS fishing such as fishery-related tourism ('pescatourism'). The application of the suggested EBFM-NIS would create jobs, protect and enhance ecosystem services, and help to meet the United Nations Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

Habitat suitability, niche unfilling and the potential spread of *Pterois miles* in the Mediterranean Sea

<https://doi.org/10.1016/j.marpolbul.2020.111054>

Reference: oursanidis, D., Kalogirou, S., Azzurro, E., Parravicini, V., Bariche, M., and zu Dohna, H. (2020).

The common lionfish *Pterois miles* has rapidly spread across the eastern Mediterranean Sea. We compiled occurrence data from both native and invaded range under the framework of Species Distribution Modelling (SDM). Through a construction of an environmental suitability model and estimation of spread rates we investigated the lionfish climate niche in both its native and invaded domains, this latter represented by the Mediterranean region. Model projections allowed to identify suitable areas for lionfish establishment in the Mediterranean. Spread analysis suggested that a further geographical expansion in this basin could be completed within the next years. Our results did not provide evidence for niche expansion but highlighted a high degree of niche unfilling thus prospecting a likely spread of Mediterranean lionfish invasion beyond the predictions of current SDMs. These findings provide novel inputs to forecast the future geographical evolution of the lionfish in the Mediterranean Sea and assess the related risk of invasion.

[2020] **That's All I Know: Inferring the Status of Extremely Data-Limited Stocks**

<https://doi.org/10.3389/fmars.2020.583148>

Reference: Pantazi, V., Mannini, A., Vasilakopoulos, P., Kapiris, K., Megalofonou, P., and Kalogirou, S. (2020)

There is a growing number of methods to assess data-limited stocks. However, most of these methods require at least some basic data, such as commercial catches and life history information. Meanwhile, there are many commercial stocks with an even higher level of data limitation, for which the inference of stock status and the formulation of advice remain challenging. Here, we present a stepwise approach to achieve the best possible understanding of extremely data-limited stocks and facilitate their management. As a case study we use a stock of the shrimp *Plesionika edwardsii* (Decapoda, Pandalidae) from the eastern Mediterranean Sea, where the only available data was a sub-optimal sample of length frequencies coming from a small-scale trap fishery. We use a suite of different methods to explore and process the data, estimate the growth parameters, estimate the natural and fishing mortalities, and approximate the reference points, in order to provide a preliminary evaluation of stock status. We implement multiple methods for each step of this process, highlighting the strong and weak points of each one of them. Our approach illustrates the better insights that can be gained by applying ensembles of models, rather than a single 'best' model when working with limited data of poor quality. The stepwise approach we propose here is transferable to other extremely data-limited stocks to elucidate their status and inform their management.

[2019]

Premium small scale: the trap fishery for *Plesionika narval* (Decapoda, Pandalidae) in the eastern Mediterranean Sea

<https://doi.org/10.1007/s10750-018-3739-0>

Reference: Vasilakopoulos, P., Maravelias, C.D., Anastasopoulou, A., Kapiris, K., Smith, C.J., and Kalogirou S

Small-scale fisheries (SSFs) constitute a substantial component of European fisheries and have a high socioeconomic importance, especially for remote insular areas. Traps produce catches of high quality and value, associated with limited bycatch and low habitat impact. Long-standing trap SSFs in both the Mediterranean and the Atlantic showcase the potential of such SSFs to support remote fishing communities; however, trap SSFs remain relatively understudied. Here, we investigate the spatial and temporal dynamics of a Greek trap SSF targeting *Plesionika narval* (Fabricius, 1787) in the eastern Mediterranean, by means of Generalized Additive Models fitted on fishers' logbook data from 2005 to 2014. The dynamics of both catch per unit effort (CPUE) and profits suggest a pronounced seasonality for this fishery, while there are also signs of local overexploitation in the traditional fishing grounds. Additionally, small vessels (< 12 m) report higher CPUEs than larger vessels. Our results point to management measures that could improve the sustainability of this valuable SSF, such as changes in the spatial and temporal allocation of fishing effort, and in fleet composition. The insights gained from this study are relevant to other localized trap SSFs and illustrate the socioeconomic potential of such fisheries for remote fishing communities.

[2020]

Filling the Gap of Data Limited Fish Species in the Eastern Mediterranean Sea: A Contribution by Citizen Science

<https://doi.org/10.3390/jmse8020107>

Reference: Naasan Aga Spyridopoulou, R., Langeneck, J, Bouziotis, D., Giovos, I, Kleitou, P, Kalogirou S

The biodiversity of the Mediterranean Sea is rapidly changing due to anthropogenic activity and the recent increase of seawater temperature. Citizen science is escalating as an important contributor in the inventory of rare and data-limited species. In this study, we present several records of five data-limited native fish species from the eastern Mediterranean Sea: *Alectis alexandrina* (Geoffroy Saint-Hilaire, 1817), *Ranzania laevis* (Pennant, 1776), *Dalatias licha* (Bonnaterre, 1788), *Lophotus lacepede* (Giorna, 1809), and *Sudis hyalina* (Rafinesque, 1810). All of the records were collected by a participatory process involving fishers and validated by associated taxonomic experts of the citizen science programme "Is it Alien to you? Share it!!!". This study fills an important gap for the distribution of the reported species and signifies the important role of citizen participation as a tool for extending marine biodiversity knowledge and fisheries management in an area with several gaps of knowledge on targeted and non-targeted species.

[2019] **Shrimp trap selectivity in a Mediterranean small-scale-fishery**

<https://doi.org/10.1016/j.fishres.2018.11.006>

Reference: Kalogirou, S., Pihl, L., Maravelias, C.D., Herrmann, B., Smith, C.J., Papadopoulou, N., et al.

Small-scale shrimp trap fisheries, which have received very little attention in areas with limited potential for economic diversification, could offer a sustainable and socially beneficial option for profitable businesses in these regions. This study explores the effect of mesh size on selectivity of the commercially important narwal shrimp, *Plesionika narval*, in the Mediterranean Sea. Three different mesh sizes (8 × 8, 12 × 12 and 12 × 25 mm) were tested in fishing trials, with a theoretical Minimum Landing Size (MLS) using a defined maturity size of 12 mm to support interpretation of the results. Using the retention rates and the estimations on population fractions above and below MLS, we show that the use of the smallest- and largest-sized meshes would not support sustainable or efficient fishery. The results demonstrate a significant decrease in capture probability of undersized narwal shrimps with increased mesh size. The medium-sized mesh traps prove to be the best compromise for the fishery with high catch efficiency of commercial size shrimp and a low capture probability of undersized individuals. The results outlined in this article could be used to develop management plans for small-scale trap fisheries as a basis for developing viable enterprises in remote coastal communities.

[2019] **Consistency of impact assessment protocols for non-native species**

<https://doi.org/10.3897/neobiota.44.31650>

Reference: González-Moreno, P., Lazzaro, L., Vilà, M., Preda, C., Adriaens, T., Bacher, S., et al.

Standardized tools are needed to identify and prioritize the most harmful non-native species (NNS). A plethora of assessment protocols have been developed to evaluate the current and potential impacts of non-native species, but consistency among them has received limited attention. To estimate the consistency across impact assessment protocols, 89 specialists in biological invasions used 11 protocols to screen 57 NNS (2614 assessments). We tested if the consistency in the impact scoring across assessors, quantified as the coefficient of variation (CV), was dependent on the characteristics of the protocol, the taxonomic group and the expertise of the assessor. Mean CV across assessors was 40%, with a maximum of 223%. CV was lower for protocols with a low number of score levels, which demanded high levels of expertise, and when the assessors had greater expertise on the assessed species. The similarity among protocols with respect to the final scores was higher when the protocols considered the same impact types. We conclude that all protocols led to considerable inconsistency among assessors. In order to improve consistency, we highlight the importance of selecting assessors with high expertise, providing clear guidelines and adequate training but also deriving final decisions collaboratively by consensus.

[2019]

Citizen-science for monitoring marine invasions and stimulating public engagement: a case project from the eastern Mediterranean.

<https://doi.org/10.1007/s10530-019-02083-w>

Reference: Giovos, I., Kleitou, P., Poursanidis, D., Batjakas, I., Bernardi, G., Crocetta, F., et al.

The distribution of marine life has been alarmingly reshaped lately and the number of non-indigenous species and their impacts are rapidly escalating globally. Timely and accurate information about the occurrence of non-indigenous species are of major importance for the mitigation of the issue. However, still large gaps in knowledge about marine bioinvasion exist. Mediterranean Sea is among the most impacted ecoregions globally. In this work we present a comprehensive overview of the project "Is is Alien to you? Share it!!!" which monitors non-indigenous species in Greece and Cyprus with the help of citizen scientists. The goal of this work is to present this project as a case study in order to demonstrate how citizen science can substantially contribute to the monitoring of biological invasions. We compared the projects database with the databased of ELNAIS and EASIN, for discuss weaknesses and advantages and future steps for advancing the effort. In total 691 records of marine alien and cryptogenic species were collected in these 2 years from Greece and Cyprus, with the density of records reaching 20 observations per km² in some locations. The project has contributed significantly in the assessment of descriptor D2 "Exotic Species" of the Marine Strategy Framework Directive, with 3 new species for Greece. Future steps should focus on training citizens to report less reported taxa and raising the awareness of all relevant stakeholders.

[2019]

Diet composition and temporal changes in the trophic patterns of *Plesionika narval* (Crustacea-Decapoda) in the Aegean Sea (Eastern Mediterranean Sea)

<https://doi.org/10.1016/j.rsma.2019.100739>

Reference: Bordbar, L., Kapiris, K., Anastasopoulou, A., Maravelias, C.D., Smith, C.J., Voutsinas, E., et al.

The feeding habits of the *Plesionika narval*, narwal shrimp, from the south-eastern Aegean Sea (E. Mediterranean) were studied monthly during an annual cycle between 2014–2015. A total of 2516 specimens (1631 females and 885 males) was studied from two depth zones (A =

10–30 m, C =

150–170 m). *P. narval* consumed a wide variety of preys, mostly dominated by crustaceans, molluscs and polychaetes. The Shannon–Wiener diversity index (H'), did not reveal significant differences in its diet composition, either between sexes or seasons. However, the female's diet was found to significantly differ between months and depth zones. The diet varied within sex, the average dietary dissimilarities were 18.87% among males and 12.04% among females, possibly attributed to the sexual dimorphism and/or the size differences between sexes. The low variation (<16%) in the diet composition from shallow and deep water was most possibly related to migration of females to shallower waters during spring and summer and differences in benthic preys inhabiting the two depth zones studied. The high repletion index (%RI) values observed for females in late spring and summer and for males in autumn and winter could be associated with metabolic processes, such as reproduction and moulting. The highest number of stomach emptiness in females during August in the deeper depth zone coincides with the spawning period of this species in the area under study and migration of females to shallower waters.

[2018]

Premium small scale: the trap fishery for *Plesionika narval* (Decapoda, Pandalidae) in the eastern Mediterranean Sea.

<https://doi.org/10.1007/s10750-018-3739-0>

Reference: Vasilakopoulos, P., Maravelias, C.D., Anastasopoulou, A., Kapiris, K., Smith, C.J., and Kalogirou,

Small-scale fisheries (SSFs) constitute a substantial component of European fisheries and have a high socioeconomic importance, especially for remote insular areas. Traps produce catches of high quality and value, associated with limited bycatch and low habitat impact. Long-standing trap SSFs in both the Mediterranean and the Atlantic showcase the potential of such SSFs to support remote fishing communities; however, trap SSFs remain relatively understudied. Here, we investigate the spatial and temporal dynamics of a Greek trap SSF targeting *Plesionika narval* (Fabricius, 1787) in the eastern Mediterranean, by means of Generalized Additive Models fitted on fishers' logbook data from 2005 to 2014. The dynamics of both catch per unit effort (CPUE) and profits suggest a pronounced seasonality for this fishery, while there are also signs of local overexploitation in the traditional fishing grounds. Additionally, small vessels (< 12 m) report higher CPUEs than larger vessels. Our results point to management measures that could improve the sustainability of this valuable SSF, such as changes in the spatial and temporal allocation of fishing effort, and in fleet composition. The insights gained from this study are relevant to other localized trap SSFs and illustrate the socioeconomic potential of such fisheries for remote fishing communities.

Participatory management in a high value small-scale fishery in the Mediterranean Sea

<http://dx.doi.org/10.1093/icesjms/fsy119>

Reference: Maravelias, C.D., Vasilakopoulos, P., Kalogirou, S.

In the Mediterranean Sea, the dominant type of fisheries is small-scale. Coastal communities remain dependent on fisheries for their income, some of them with limited potential for economic diversification. The top-down micro-management regime has proven ineffective to secure ecological and social sustainability as it lacks flexibility and adaptation to local and regional conditions. This paper explores the advantages of using a participatory approach and a bio-economic model to develop management scenarios in a high value small-scale shrimp trap fishery in Greece. Seeking active stakeholder involvement throughout the management process advanced the identification of management measures aiming at MSY, with high levels of acceptance from stakeholders. It also increased transparency and legitimacy of the proposed management measures and could be considered as a first step towards co-management and regionalization. The participatory approach undertaken could promote compliance and facilitate the transition to sustainable fishing, ensuring the viability of coastal communities and, thus, social sustainability.

[2018]

First evidence of ingested plastics by a high commercial shrimp species (*Plesionika narval*) in the eastern Mediterranean

<https://doi.org/10.1016/j.marpolbul.2018.09.030>

Reference: Bordbar, L., Kapiris, K., Kalogirou, S., and Anastasopoulou, A.

This study provides the first evidence of nylon filament occurrence in the stomach of an economically important target shrimp species in the Mediterranean Sea, *Plesionika narval* (Fabricius, 1787). Samples were collected monthly from November 2014 to October 2015 from shallow (10–30 m) and deeper waters (150–170 m). The occurrence of plastics in the stomachs of the Narwal shrimp was 5.93% and identified as Nylon by FT-IR analysis. Higher percentages of ingested plastics were found in females from shallower depths and in males from deeper waters. The maximum number of plastics was recorded in January and March, possibly related to the higher feeding intensity of females prior to their reproduction period. A total of 10.3% of females and 4.8% of males with ingested plastics had almost empty stomachs. The presence of plastics in the stomach of *P. narval* is an evidence of passive ingestion which in this study related to fishing activities.

[2017]

Spatial and temporal distribution of narwal shrimp *Plesionika narval* (Decapoda, Pandalidae) in the Aegean Sea (eastern Mediterranean Sea)

<https://doi.org/10.1016/j.rsma.2017.09.014>

Reference: Kalogirou, S., Anastasopoulou, A., Kapiris, K., Maravelias, C.D., Margaritis, M., Smith, C., et al.

In the Aegean Sea the trap fishery for narwal shrimp, *Plesionika narval*, contributes to social and cultural cohesion of local fishery communities. Spatial and temporal distribution patterns of narwal shrimp was studied during an annual cycle, including catch per unit effort (CPUE), sex ratio and proportion of ovigerous females in the population. Shrimps were sampled at five localities within the depth range of 10 to 170 m. Catch per unit effort increased during the summer period at all depths, when seawater temperature increase. Differences in CPUE were observed between depths, with highest catches at depths below 70 m. The proportion of females decreased significantly with depth, a pattern especially evident during the summer period (May to August), indicating a migration of females to shallower waters. Significant higher abundance of ovigerous females was observed during the period May to October, concurrently with a vertical migration of females to warmer waters. To further support this pattern, the proportion of ovigerous individuals among females increased with decreased depth at all seasons. We suggest that the findings of our study have significant implications to current and future management of narwal shrimp in the Mediterranean Sea.

[2017]

Genetics reveal the identity and origin of the lionfish invasion in the Mediterranean Sea

<https://doi.org/10.1038/s41598-017-07326-1>

Reference: Bariche, M., Kleitou, P., Kalogirou, S., and Bernardi, G.

Following aquarium releases, invasive lionfishes have colonized large areas of the Caribbean and western Atlantic, resulting in an immense ecological damage. The early stages of that invasion are poorly known. Indeed, a lag of time between the introduction and detection often preclude genetic characterization of that crucial phase. With elevated awareness, the recent invasion of *Pterois miles* was quickly detected in the Mediterranean Sea. We hereby show that the very first individuals establishing populations in the Mediterranean Sea display haplotypes that nest within the large genetic diversity of Red Sea individuals, thus indicating an invasion via the Suez Canal. We also show that only two haplotypes are detected in the Mediterranean Sea, suggesting that few individuals may have been involved in the invasion. Thus, we conclude that the Mediterranean invasion is the result of a movement of individuals from the Red Sea, rather than from other means, and that low genetic diversity does not seem to have a negative effect on the success and spread of lionfish into the Mediterranean Sea.

[2017]

Reproductive biology of *Plesionika narval* in the SE Aegean Sea (Eastern Mediterranean)

<https://doi.org/10.12681/mms.1944>

Reference: Anastasopoulou, A., Makantasi, P., Kapiris, K., Smith, C.J., Maravelias, C., and Kalogirou, S.

Plesionika narval is a widespread species of the Pandalidae family, of particular high economic importance for small-scale shrimp trap fisheries in the Dodecanese Islands (SE Aegean Sea). Understanding its biology and reproduction are crucial for stock management. Reproductive biology aspects were studied through data collected during monthly experimental surveys with baited shrimps traps from November 2014 to October 2015 at a depth range of 10 - 150m. A total of 3436 individuals within the size range of 6.46 to 20.20 mm carapace length (CL) was analyzed. Overall, mean female size was significantly higher than mean male size, while the mean size of ovigerous females was higher than that of non-ovigerous females. Mean carapace length of ovigerous and non-ovigerous females was significantly correlated to depth. Ovigerous females were observed throughout the study period; however, monthly proportions revealed April to October as the main reproductive period of the species in the area. The sex ratio showed a clear predominance of females in the shallow depth zone (10-25 m) and was found to be affected by sampling area and depth zone. Immature females were found from November to March. Mature females were found all year round, exhibiting higher percentages in March, June, July and September, coinciding with the main reproductive period. *P. narval* seemed to spawn more than one time within the annual reproductive cycle. Gonadosomatic index obtained its highest mean values in May, June and September, thus revealing the main reproductive period. Size at first maturity for females was estimated at CL₅₀=11.7 mm.

[2016]

Fish and cephalopod assemblage structure of green alga *Caulerpa prolifera* (Chlorophyta) meadow in the eastern Mediterranean Sea (Elounda Bay, Crete Island)

<http://dx.doi.org/10.1016/j.rsma.2015.12.002>

Reference: Koulouri, P., Kalogirou, S., Maidanou, M., Koutsoubas, D., and Dounas, C.

The present study investigated for the first time in the eastern Mediterranean Sea species composition, density, wet biomass and body size of fish and cephalopod species associated with a *Caulerpa prolifera* meadow in a shallow semi-enclosed coastal marine ecosystem (Elounda Bay, Crete Island). Quantitative sampling with a local boat seine, revealed 34 fish species belonging to 22 families and three cephalopod taxa. The number and density of species peaked during the summer sampling period due to high numbers of juveniles, while the highest wet biomass was observed during the autumn sampling period. The fish species *Boops boops*, *Spicara smaris*, *Mullus barbatus* and the non-indigenous *Siganus luridus* were dominant, making up a high proportion of the total fish fauna of the studied area. The cephalopod *Sepia officinalis* was the most important species, in terms of wet biomass. The results of the study indicated that the semi-enclosed coastal marine ecosystem of Elounda Bay, characterized by a dense monospecific *C. prolifera* bed as well as specific abiotic and biotic features could be regarded as an important habitat for the development of fish and cephalopod species, thus contributing to the conservation and maintenance of marine biological resources of the area.

[2016]

Further expansion of the alien seaweed *Caulerpa taxifolia* var. *distichophylla* (Sonder) Verlaque, Huisman & Procacini (Ulvophyceae, Bryopsidales) in the Eastern Mediterranean Sea

<http://dx.doi.org/10.3391/ai.2016.11.1.02>

Reference: plikioti, M., Louizidou, P., Mystikou, A., Marcou, M., Stavrou, P., Kalogirou, S., Tsiamis, K et al

Caulerpa taxifolia var. *distichophylla* (Sonder) Verlaque, Huisman and Procacini is a green alga of Australian origin recently reported as an alien

species in the Mediterranean Sea, where it is known from SE Turkey, Sicily, Cyprus and Malta. In the current study we present additional records

of this taxon, expanding its known distribution into the Eastern Mediterranean Sea, and provide additional records from Cyprus and the first records

from Rhodes Island (Greece). Our specimens were identified through a combination of morphological and molecular methods involving sequencing

of ITS and *tufA*. Locally, *C. taxifolia* var. *distichophylla* occurred in high abundances and dominated the benthic community, suggesting that has

the potential to become a major pest in the Mediterranean. It was also observed over a very wide depth range, from the sea surface to at least 100 m

depth, on a variety of natural soft and hard substrates as well as abandoned fishing nets, suggesting a broad environmental plasticity. One of the

findings reported here constitutes the deepest record of an alien *Caulerpa* in the Mediterranean Sea, even though it remains to be demonstrated that

it actually grows at this site and depth rather than being merely a drift specimen.

[2015]

A MSFD complementary approach for the assessment of pressures, knowledge and data gaps in Southern European Seas: The PERSEUS experience

<http://dx.doi.org/10.1016/j.marpolbul.2015.03.024>

Reference: Crise, A., Kaberi, H., Ruiz, J., Zatsepin, A., Arashkevich, E., Giani, M., et al.

PERSEUS project aims to identify the most relevant pressures exerted on the ecosystems of the Southern European Seas (SES), highlighting knowledge and data gaps that endanger the achievement of SES Good Environmental Status (GES) as mandated by the Marine Strategy Framework Directive (MSFD). A complementary approach has been adopted, by a meta-analysis of existing literature on pressure/impact/knowledge gaps summarized in tables related to the MSFD descriptors, discriminating open waters from coastal areas. A comparative assessment of the Initial Assessments (IAs) for five SES countries has been also independently performed. The comparison between meta-analysis results and IAs shows similarities for coastal areas only. Major knowledge gaps have been detected for the biodiversity, marine food web, marine litter and underwater noise descriptors. The meta-analysis also allowed the identification of additional research themes targeting research topics that are requested to the achievement of GES.

Ecological characteristics of the invasive pufferfish *Lagocephalus scleratus* (Gmelin, 1789) in Rhodes, Eastern Mediterranean Sea. A case study from Rhodes.

<https://doi.org/10.12681/mms.364>

Reference: Kalogirou, S.

In this study, the ecological and social impact of the invasive pufferfish *Lagocephalus scleratus* on the coastal habitats of an area in the eastern Mediterranean Sea (Rhodes Island) was investigated. Seasonal quantitative sampling in two common coastal habitats were used to investigate habitat use by different life-stages. Sandy areas were found to be highly important for the early life stages of *L. scleratus*. In contrast, *Posidonia oceanica* habitats were mainly preferred by larger (>29 cm) reproductive adults, not exceeding 64 cm. *Lagocephalus scleratus* was found to feed on invertebrates and fish, while size classification revealed a

tendency for a diet shift with increased size. During the early life stages, *L. scleratus* inhabits sandy bottoms where it feeds on various invertebrates. The predominant molluscan species found in the diet of larger (> 20 cm) *L. scleratus* individuals were the economically important *Sepia officinalis* and *Octopus vulgaris*. The size at which 50% of individuals have reached maturity was estimated at 36 cm. With increased size, habitat shift to seagrass meadows most possibly occurs to meet both the increased demand in prey availability and requirement for appropriate spawning ground. The condition factor for *L. scleratus* showed significantly higher values during summer than all other seasons and this was attributed to the spawning season and increased feeding. Social impacts were alarming due to increased public attention concerning its lethal effects (presence of tetrodotoxin), if consumed. Its high abundance in coastal fish communities of the studied area combined with ecological and social impacts, clearly classify *L. scleratus* as a pest for fisheries and a potential threat for biodiversity

[2013]

First record of *Albunea carabus* (Linnaeus, 1758) (Decapoda: Anomura: Hippoidea) in the Aegean Sea.

Reference: Corsini Foka, M., and Kalogirou, S.

The sand crab *Albunea carabus* (Linnaeus, 1758) was collected for the first time in the Aegean waters. This

finding contributes to fill a lack of knowledge on the geographical distribution of the species in the Eastern Mediterranean Sea and increases the number of the known Aegean decapod species to 282

[2012] **New Mediterranean biodiversity records (June 2012)**

<https://doi.org/10.12681/mms.33>

Reference: Nicolaidou, A., Alongi, G., Aydogan, O., Catra, M., Cavas, L., Cevik, C., et al.

The present work reports on the extended distribution of nineteen species in the Mediterranean. These are: *Upeneus pori* (Fish: Turkey), *Bursatella leachii* (Mollusca, Opisthobranchia: eastern coast of Spain), *Sparisoma cretense* (Fish: Ionian coast of Greece), *Pseudobryopsis myura* (Chlorophyta: Turkey), *Aplysia dactylomela* (Mollusca, Opisthobranchia: Karpathos island, and Kyklades Archipelago, Greece), *Asparagopsis armata* and *Botryocladia madagascariensis* (Rhodophyta: South Peloponnesos, Greece), *Oxynotus centrina* (Fish: Greece), *Caulerpa racemosa* var. *cylindracea* (Chlorophyta), *Stypopodium schimperi* (Phaeophyta), *Siganus luridus* and *Stephanolepis diaspros* (Fish) *Percnon gibbesi* (Decapoda, Brachyura) (Kyklades Archipelago, Greece), *Cerithium scabridum* (Mollusca, Prosobranchia: Anavissos: Greece) and *Cerithium renovatum* (Mollusca, Prosobranchia: N. Kriti), *Cassiopea andromeda* (Scyphomedusa: Rhodes Island, Greece), *Abra tenuis* (Mollusca Bivalvia: Vouliagmeni Lake, Greece) *Lagocephalus lagocephalus* (Fish: Calabrian coast, Italy) and *Plocamopherus ocellatus* (Mollusca, Opisthobranchia: Iskenderun Bay, Turkey).

[2012]

Non-indigenous species in Mediterranean fish assemblages: Contrasting feeding guilds of *Posidonia oceanica* meadows and sandy habitats

<https://doi.org/10.1016/j.ecss.2011.11.008>

Reference: Kalogirou, S., Wennhage, H., and Pihl, L.

Quantitative sampling in combination with classification of fish species into six major feeding guilds revealed the position and contribution of non-indigenous species (NIS) in the food web of *Posidonia oceanica* and sandy habitats in an area of the eastern Mediterranean. In *P. oceanica* beds and on sandy bottoms 10 and five species, respectively, were non-indigenous fish of Indo-Pacific origin. The proportional contribution of NIS individuals on *P. oceanica* beds was lower than that of sandy bottoms (12.7 vs. 20.4%) a pattern that also followed for biomass (13.6 vs. 23.4%), indicating that low diverse systems may be more liable to introductions than species-rich communities. The two habitats had similar fish feeding guilds, but the biomass contribution from NIS varied within each guild, indicating different degrees of impact on the available resources. This study showed that only few non-indigenous fish species contributed to the differences in biomass between habitats. No support could be found in postulating that taxonomic affiliation could predict invasion success. Size was considered highly important due to habitat shift of species with increased size. Two of the aspects considered in this study, the chance of establishing vs. the chance of being very dominant will depend upon competitive abilities strongly coupled to size and grounds for habitat shift. However, success of establishment will also depend on appropriate food resources in the recipient community as well as competitive abilities and level of competition in the food web within habitats.

[2012]

Feeding ecology of indigenous and non-indigenous fish species within the family Sphyraenidae

<https://dx.doi.org/10.1111/j.1095-8649.2012.03306.x>

Reference: Kalogirou, S., Mittermayer, F., Pihl, L., and Wennhage, H.

The feeding ecology of two common indigenous (Sphyraena viridensis and Sphyraena sphyraena) and one abundant non-indigenous sphyraenid species, Sphyraena chrysotaenia, of Indo-Pacific Ocean origin, was investigated in an area of the eastern Mediterranean Sea. The stomach contents of 738 individuals of varying size, collected during the period December 2008 to August 2009, were examined. The dietary analyses revealed that all three species were specialized piscivores with a diet consisting of >90% fish, both by number and mass. Concurrent sampling of the fish assemblage made it possible to calculate selectivity as well as diet breadth and overlap of these strict piscivores. Even though several prey species were found in the stomachs of the three predators examined, selectivity towards Atherina boyeri was highly significant. For all species examined, >70% of the diet by mass was made up by three indigenous species of commercial value: Spicara smaris, Boops boops and A. boyeri. Diet breadth and size of prey increased with increasing body size for all predators. With increased body size, the diet overlap between indigenous and non-indigenous species decreased. This could be attributed to increased diet breadth and the specific life-history characteristics of indigenous species developing into larger individuals. During winter, the condition factor of the non-indigenous species was significantly lower than that of the indigenous, indicating that winter conditions in the Mediterranean Sea may limit its further expansion north and westward. With this study, the gap in knowledge of the feeding preferences of the most abundant piscivorous species found in coastal areas of the study region is filled. Additionally, the results indicate that non-indigenous species familial affiliation to indigenous ones does not facilitate invasion success.

[2012]

First record of the Indo-Pacific *Champsodon nudivittis* (Ogilby, 1895) (Perciformes, Champsodontidae) in the Aegean waters (eastern Mediterranean Sea)

<http://dx.doi.org/10.3391/bir.2012.1.3.10>

Reference: Kalogirou, S., and Corsini Foka, M.

On 12 May 2012, two individuals of *Champsodon nudivittis* were captured off the coasts of Rhodes Island, southeastern Aegean Sea, at 150 m depth. This finding suggests a rapid geographical extension of this Indo-Pacific species along the northeastern Levantine coast of the Mediterranean. With *C. nudivittis*, the number of Lessepsian fishes recorded in the Aegean Sea is raised to 31.

[2010]

Diversity, structure and function of fish assemblages associated with *Posidonia oceanica* beds in an area of the eastern Mediterranean Sea and the role of non-indigenous species

<https://doi.org/10.1111/j.1095-8649.2010.02817.x>

Reference: Kalogirou, S., Corsini Foka, M., Sioulas, A., Wennhage, H., and Pihl, L.

Temporal and spatial variation in density, biomass and body size of littoral fish species associated with nearshore *Posidonia oceanica* meadows was studied over an annual cycle in an area of the eastern Mediterranean Sea. A total of 109 350 littoral fishes were collected, belonging to 34 families and 88 species. Density of fishes peaked during the summer due to high numbers of juveniles. Season was a significant factor determining density, although number of species and biomass did not show any obvious seasonal pattern. Throughout the study, schooling planktivorous fish species such as the picarel *Spicara smaris*, the bogue *Boops boops* and the damselfish *Chromis chromis* were dominant, both in terms of density (80%) and biomass (70%). Temporal variation in density and body size of fishes was used to assess the seasonal and ontogenetic habitat use of each species, with their affinity to seagrass assessed by comparing their respective distribution on sand. Four functional guilds were created (juvenile migrants, seagrass residents, seasonal migrants and occasional visitors) to describe the habitat use of *P. oceanica* meadows by each species. Several species associated with *P. oceanica* meadows used this habitat mainly as juveniles during summer, although many others were present concurrently as adults and as juveniles. Among the species encountered, 11 were non-indigenous of Indo-Pacific origin, of which three used seagrasses mainly as juveniles and four as residents. The non-indigenous silverstripe blaasop *Lagocephalus scleratus* ranked among the 10 most dominant species in terms of biomass (2%) and was classified as a seagrass resident.

[2010]

First record of the non-indigenous fangtooth moray *Enchelycore anatina* from Rhodes Island, south-eastern Aegean Sea

<https://doi.org/10.12681/mms.83>

Reference: Kalogirou, S.

The collection of one specimen of the non-indigenous fangtooth moray *Enchelycore anatina* of

tropical Atlantic origin was for the first time found in an area of the south-eastern Aegean Sea. This

record might not indicate a recent establishment in the area and is hereby considered an overlooked

species, attributed to lack of fish studies on rocky bottoms.

[2010]

Gonioinfradens paucidentatus (A. Milne Edwards, 1861) (Crustacea, Decapoda, Portunidae): a new alien crab in the Mediterranean Sea

<https://doi.org/10.12681/mms.80>

Reference: Corsini-Foka, M., Pancucci-Papadopoulou, M.A., Kondilatos, G. and Kalogirou, S.

The first record for the Mediterranean Sea of the Red Sea/Indo-Pacific portunid *Gonioinfradens paucidentatus* (red swimming crab) is documented. A detailed description of the specimens collected at Rodos Island (southeastern Aegean Sea) is given, while possible introduction vectors of the species in the area are discussed.

[2009]

Closing the gap: Cerithium scabridum Philippi, 1848 found in the South Aegean (Greece, Mediterranean)

Reference: Zenetos, A., Ovalis, P., and Kalogirou, S.

A living population of the alien species *Cerithium scabridum* Philippi, 1848 was found in East Rhodes, Greece. This record extends the known distribution of the species in the Aegean Sea and raises questions concerning its mode of introduction into the Western Mediterranean.

[2008]

On the finding of the Indo-Pacific fish Scomberomorus commerson in Rhodes (Greece)

<https://doi.org/10.12681/mms.147>

Reference: Corsini-Foka, M., Kalogirou, S.

The occurrence of the Indo-Pacific fish *Scomberomorus commerson* was observed for the first time in the Hellenic waters of the SE Aegean Sea during the spring 2008. The record may represent a first indication of a population expansion of this alien species along the southern coasts of the Aegean Sea.

[2007]

Diet of the invasive piscivorous fish Fistularia commersonii in a recently colonized area of eastern Mediterranean

<https://doi.org/10.1007/s10530-006-9088-3>

Reference: Kalogirou, S., Corsini, M., Kondilatos, G., and Wennhage, H

The composition of the diet of the Indo-Pacific cornetfish *Fistularia commersonii* from the SE Aegean Sea is described. The stomach contents of 245 specimens collected between September 2004 and March 2005 were examined. Dietary comparisons were made reflecting the relationship between diet composition, time of year, and fish size. Correlation between predator length and prey length was significant. The diet of the blue cornetfish consists of 96% by number and 99.95% by weight of fish. Size classification and habitat of prey groups (benthic, supra-benthic, and pelagic) showed that with increased body length the blue cornetfish extended its diet to larger prey and more generalist feeding. *Spicara smaris*, *Boops boops*, and Mullidae spp. were the most abundant prey by weight whereas a variety of small benthic fish (especially gobiids) and newly hatched fish constituted the largest number of prey items. Length-weight relationships for the cornetfish were investigated.