ICES WGVHES REPORT 2015

Report of the Working Group on the value of Coastal Habitats for Exploited Species (WGVHES)

29 June – 3 July 2015

Palermo, Italy

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International Council for
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Contents

Executive summary

This report summarizes the work of the ICES Working Group on the Value of Coastal Habitats for Exploited Species (WGVHES) from 2013 to 2015 (17–21 June 2013, Copenhagen, Denmark; 30 June – 4 July 2014 at the University of Lisbon, Portugal; 29 June – 3 July 2015, Palermo, Italy); participants included scientists within the fields of modelling, marine ecology, fishery management, and conservation biology.

The primary goal of this working group was to provide the foundation for integrating habitat value quantitatively in models of the population dynamics of exploited species, for which ICES gives management advice, as well as for those species that are important in the food web of ICES species. The group has evaluated the overall importance of coastal habitat for ICES species. Furthermore, the relative value of coastal habitat functions, i.e. nursery habitats (e.g. seagrass beds, salt marshes, kelp beds, rocky bottom), feeding grounds, spawning areas and migration was assessed. A modelling case study was published on the population response to offshore migration of fish juveniles (Van de Wolfshaar *et al.* MEPS). A paper was published on patterns and processes of habitat-specific demographic variability in exploited marine species (Vasconcelos *et al.* ICES Journal of Marine Science). A second review paper by Seitz *et al.* 2013 was very well received and brings forth the importance of coastal areas for commercially exploited species in numbers. Collectively, 44% of all ICES species utilized coastal habitats, and these stocks contributed 77% of the commercial landings of ICES-advice species, indicating that coastal habitats are critical to population persistence and fishery yield of ICES species. A fourth manuscript that reviews mathematical modelling of quantitative habitat value for exploited species was reviewed and is expected to be submitted in 2015. Results were presented in four different presentations at the ICES ASC 2013 and used for educational purposes at university level. Overall the results show the need for more knowledge on the habitat dependence of commercially exploited species from life stage to population and ecosystem level.

1   Administrative details

Working Group name

Working Group on The value of coastal habitats for exploited species (WGVHES)

Year of Appointment

2013

Reporting year concluding the current three-year cycle

3

Chair(s)

Rom Lipcius, USA

Håkan Wennhage, Sweden

Meeting venue(s) and dates

17–21 June 2013, Copenhagen, Denmark, (8 participants)

30 June – 4 July 2014, Lisbon, Portugal, (9 participants)

29 June – 3 July 2015, Palermo, Italy, (12 participants + 2 guests)

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2   Terms of Reference a) – z)

a)   Produce a review paper that synthesizes and critically reviews the evidence for the importance of coastal habitats to exploited species and general patterns that may be applicable over a broad range of situations;

b)   Produce a review paper on the characteristics and function of natural and anthropogenic hard bottom habitats for fish and invertebrates in coastal waters;

c)   Assess availability of coastal habitat maps and distribution for integration into demographic models;

d)   Quantify the importance of habitats for exploited species.

3   Summary of Work plan

Year 1	Two review papers falling under ToR a will be revised and prepared for publication in *ICES Journal of Marine Science* (JMS). The remaining review under ToR d will be completed and prepared for submission to ICES JMS. In the meeting of 2013 ToR c and d will be started investigating what models will be used and species will be studied
Year 2	Focus on modelling work
Year 3	Finalize modelling work and identify future research priorities

4   Summary of Achievements of the WG during 3-year term

Papers

- Vasconcelos R.P., Eggleston D.B., Le Pape O., Tulp I. Patterns and processes of habitat-specific demographic variability in exploited marine species. ICES Journal of Marine Science 71: 638-647.

- Seitz R., Wennhage H., Bergstrom U., Lipcius R., Ysebaert T. Ecological value of coastal habitats for commercially and ecologically important species. ICES Journal of Marine Science 71: 648-665.

- Lipcius R., Eggleston D.B., Fodrie J., Rose, K., Van der Meer J., Van de Wolfshaar K.E., Vasconcelos R, M. Wilbur, Genny Nesslage. Populations models quantifying the value of coastal habitats for exploited species. In preparation for submission 2015.

- Van de Wolfshaar K.E., Tulp I. Wennhage, H., Støttrup J. Modelling population effects of juvenile offshore fish displacement towards adult habitat. Under review with Marine Ecology Progress Series.

Presentations at ICES ASC 2013

THEME SESSION: Quantitative value of coastal habitats for exploited species.

Organizers: Romuald Lipcius (USA), Ingrid Tulp (The Netherlands), Håkan Wennhage (Sweden)

- Rita P. Vasconcelos, Olivier Le Pape, Dave B. Eggleston, Håkan Wennhage, Ingrid Tulp. Quantitative assessment of the value of coastal habitats for exploited marine fish and invertebrates: a review

- Rochelle D. Seitz, Håkan Wennhage, Ulf Bergström, Romuald N. Lipcius, Tom Ysebaert. Coastal habitat use by commercially and ecologically important species

- Romuald N. Lipcius, David B. Eggleston, Joel Fodrie, Julia Moore, Sebastian J. Schreiber, Jaap van der Meer, Karen van de Wolfshaar, Rita Vasconcelos. Population models quantifying the value of coastal habitats for exploited species

- Nicholas Ducharme-Barth, Romuald N. Lipcius, Leah B. Shaw, Junping Shi. Habitat effects on population dynamics and fishery production of the eastern oyster

5   Final report on ToRs,workplan and Science Implementation Plan

ToR a. Produce a review paper that synthesizes and critically reviews the evidence for the importance of coastal habitats to exploited species and general patterns that may be applicable over a broad range of situations

Under ToR a two papers have been published in primary literature. Two other papers are in progress.

1) Seitz R., Wennhage H., Bergstrom U., Lipcius R., Ysebaert T. Ecological value of coastal habitats for commercially and ecologically important species. *ICES Journal of Marine Science* 71: 648-665. 2013

Many exploited fish and macroinvertebrates that utilize the coastal zone have declined, and the causes of these declines, apart from over-fishing, remain largely unresolved. Degradation of essential habitats has resulted in habitats that are no longer adequate to fulfil nursery, feeding, or reproductive functions, yet the degree to which coastal habitats are important for exploited species has not been quantified. Thus, we reviewed and synthesized literature on the ecological value of coastal habitats (i.e. seagrass beds, shallow subtidal and intertidal habitats, kelp beds, shallow open water habitats, saltmarshes, mussel beds, macro algal beds, rocky bottom, and mariculture beds) as feeding grounds, nursery areas, spawning areas, and migration routes of 59 taxa, for which the International Council for the Exploration of the Sea (ICES) gives management advice, and another 12 commercially or ecologically important species. In addition, we provide detailed information on coastal habitat use for plaice (*Pleuronectes platessa*), cod (*Gadus morhua*), brown shrimp (*Crangon crangon*), and European lobster (*Homarus gammarus*). Collectively, 44% of all ICES species utilized coastal habitats, and these stocks contributed 77% of the commercial landings of ICES-advice species, indicating that coastal habitats are critical to population persistence and fishery yield of ICES species. These findings will aid in defining key habitats for protection and restoration and provide baseline information needed to define knowledge gaps for quantifying the habitat value for exploited fish and invertebrates.

2) Vasconcelos R.P., Eggleston D.B., Le Pape O., Tulp I. Patterns and processes of habitat-specific demographic variability in exploited marine species. ICES Journal of Marine Science 71: 638-647.

Population dynamics are governed by four demographic rates: births, deaths, immigration, and emigration. Variation in these rates and processes underlying such variation can be used to prioritize habitat conservation and restoration as well as to parameterize models that predict habitat-specific effects on population dynamics. The current understanding of patterns of habitat-specific demographic variability in exploited marine species, as well as processes underlying these patterns, was reviewed. We describe patterns of (i) habitat-specific density, followed by ontogenetic changes in habitat use, such as (ii) immigration (i.e. use as a settlement habitat) and (iii) emigration (i.e. use as a habitat for secondary dispersal to and from), and demographic rates such as (iv) growth, and (v) mortality. Despite the importance of coastal habitats for fish and invertebrate species and the vulnerability of these habitats to human impacts, there was ambiguous evidence on their role in driving of population dynamics. Roughly 63% of the studies were descriptive, 21% experimental, and 11% used a combination of descriptive and experimental approaches, whereas 5% used meta-analyses. Habitat-specific density was the most common pattern quantified, followed by growth and mortality, with relatively few examples of studies of habitat-specific larval settlement. There were many examples of the influence of coastal habitats on survival, growth, and movement, especially at young stages, and there was an emerging focus on the effects of habitat degradation on demographic rates. There needs to be an increased effort on quantifying habitat-specific demographic rates and integrating these to better predict the effects of coastal habitats on the dynamics of exploited marine populations.

3) Review of quantitative modelling approaches for integrating habitat quality into population models. Current participants: Romuald Lipcius, Jaap van der Meer, Karen van de Wolfshaar, Joel Fodrie, David Eggleston, Rita Vasconcelos, Ken Rose, Mike Wilberg (work in progress).

Many exploited marine and estuarine populations have experienced significant reductions in spawning stock biomass and recruitment. For instance, in an assessment of global FAO marine fisheries data for 210 stocks, 27% were fully exploited, 25% were overexploited, and 16% had collapsed. Concurrently, essential habitats such as nursery and foraging grounds have been degraded in many areas such that these critical habitats are no longer adequate to fulfil nursery, feeding or reproductive functions (Airoldi and Beck, 2007). Although the influence of coastal habitats on specific rates of survival, growth, and reproduction of exploited marine species has been demonstrated widely (Beck *et al.*, 2001; Heck *et al.*, 2003; Minello *et al.*, 2003), the absolute value of these habitats to their population dynamics has rarely been quantified. Consequently, it has been difficult to estimate the optimal extent of habitat required for the persistence and sustainable use of exploited species, and therefore, to effectively manage habitat with respect to abundance of exploited species. In addition, recent research indicates that many species inhabit linked sets of primary (e.g. seagrass beds) and secondary (e.g. salt marsh fringed coves and shorelines) nurseries (e.g. Lipcius *et al.*, 2007). Yet there is little to no information on the relative value of these different nurseries to the population dynamics of exploited species, leading to the recognition that effective fishery management will require modelling the effects of habitat upon population dynamics. Thus, we sought to lay the foundation for determining the quantitative value of coastal nursery habitats, feeding grounds, and spawning areas for exploited species by defining suitable population modelling approaches that assess variation in population abundance and fishery yield as a function of habitat. In the 2012 Workshop on the Value of Coastal Habitats for Exploited Species (WKVHES), we began a comprehensive review of the different modelling approaches (statistical and mathematical) that would be useful for modelling the quantitative effects of habitat upon fisheries production and population dynamics. During the 2013 and 2014 Working Group meetings of WGVHES, we continued the review and added habitat suitability modelling as a complementary tool for integrating habitat into population models. In the review we also describe the methods involved in each of the modelling approaches and provide examples of their implementation and utility to facilitate their use in ecosystem-based fishery management. We expect that such population models will improve predictions of fishery yield and long-term population status for species of commercial and recreational value, and reveal key habitats for restoration efforts. The review is being prepared as a manuscript for submission to MEPS.

4) Dependence of exploited species on coastal habitats, importance of life history and habitat use: a review. Current participants: Elliot Brown, Rita Vasconcelos, Håkan Wennhage, Josianne Støttrup, Karen van de Wolfshaar, Olivier Le Pape, Francesco Colloca.

We aim to identify which life-history typologies are mainly represented among the set of species listed in Seitz *et al.* (2013) and report what has been described in the literature for the consequences of habitat loss or degradation at local and population levels, given the different uses of coastal habitat, namely nursery, feeding and spawning.

ToR b. Produce a review paper on the characteristics and function of natural and anthropogenic hard bottom habitats for fish and invertebrates in coastal waters

Participants: Josianne Støttrup, Rochelle Seitz, David Eggleston

Rationale: Hard-bottom habitats are vital to the health and function of coastal ecosystems. These habitats provide nursery areas for juveniles and feeding grounds for adult fish of commercially important fish species. Recent reviews on the importance of coastal habitats for exploited species recognized that there is a lack of information on how fish utilize some habitat types in the North Atlantic, particularly complex hard-bottom habitats such as kelp forests, rocky shores, and macroalgae, where many census techniques are inadequate for quantitative studies (Vasconcelos *et al.* 2014; Seitz *et al.* 2014). Thus, additional information on fish and invertebrate use of these habitats can help promote awareness of the importance of these habitats, and a determination of gaps in knowledge can help direct future research. In Europe, reef habitats are biologically important habitats and are one of the few marine habitat types included in the EU Habitats Directive (1170 Reef Habitat; Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora). For this reason, reef areas are included in national Nature-2000 networks such as the Danish Nature2000 network. In the United States, the Environmental Protection Agency (US EPA) has the Environmental Monitoring and Assessment Program's National Coastal Assessment, which collects estuarine and coastal data from hundreds of stations along the coasts of the continental United States to evaluate the estuarine condition of US estuaries. Types of data include assessment of water quality, benthic communities, demersal fish, and tissue contaminants (http://www.epa.gov/emap/nca/html/data/index.html). In addition, each state has different management efforts for protection of hard-bottom habitats (e.g. North Carolina has the Coastal Habitat Protection Plan).

With this working group, we have been conducting a review of temperate hard-bottom habitats and their value for exploited species. Given the lack of information on the characteristics and functions of hard-bottom habitats for fish and invertebrates in coastal waters, we address our review on these habitats. We concentrate on the temperate hard-bottom habitats, which are of particular interest to ICES countries and management. We focus on both natural habitats and artificial reefs. We characterize the use of hard-bottom habitats by both fish and sessile invertebrates. Our objectives are to promote awareness of the importance of these habitats for exploited species and to direct future research.

Approach: Our approach is to use a literature search using the following keywords: hard bottom, rocky reefs, stone reefs, reefs (natural), macroalgae, kelp, riprap (common on US coastlines), wind farms, turbines (common in Danish and Swedish waters), and novel ecosystems. We are reviewing the available literature, and results will be inserted into a table that can be later used in a publication on this subject.

Organization: We will use separate sections for each type of hard-bottom habitat, and the results for each section will include the species supported, structure, function, and demographic rates for organisms supported by the hard-bottom habitat. We will highlight the importance of habitats in terms of density, growth, survival, and spawning, or in serving the functions of biodiversity, fish and invertebrate production, and anthropogenic use (e.g., recreational fishery, coastal defence). We will write a critical review of monitoring methods used for sampling on hard-bottom habitats. These methods include

trawls, baited fishing gear, video monitoring, quadrat sampling, etc. We will conclude with an assessment of the needs and knowledge gaps, including those for appropriate and effective monitoring methods.

The work on the review will take place during the current and future working group meetings.

ToR c. Assess availability of coastal habitat maps and distribution for integration into demographic models.

Mapping fish habitats in the Sound. Current participants: Josianne Støttrup, Håkan Wennhage

The Sound between Denmark and Sweden hosts a myriad of recreational and commercial activities including commercial gillnet fishing, angling and sports diving, shipping, wind energy and marine aggregate extraction. Conflicts between the fishing sector and sectors impacting the sea floor and its habitats need to be resolved and require knowledge of fish habitats, their type and value. A project was therefore carried out in 2014-2015 in the Danish part of the Sound with the aim to collect information from all existing sources. Potential habitats for commercially important species could be obtained from available information and knowledge on fish abiotic requirements using GIS layers. As fishery independent data was limited to a few stations, interviews with small-scale commercial gillnetters and anglers were conducted to map the habitats of ecological importance for selected fish species of commercial value. The combined information from a number of commercially important species could inform managers on hot-spots for habitats of ecological significance and commercial value. Further work is needed to verify these habitats and obtain more detailed information on the spatial heterogeneity.

ToR d. Quantify the importance of habitats for exploited species

1) A paper is now in the review process with Marine Ecology Progress Series, entitled 'Modelling population effects of juvenile offshore fish displacement towards adult habitat' with participant Van de Wolfshaar K.E., Tulp I. Wennhage, H. and Støttrup J. The abstract is as follows:

Recent studies of fish distribution patterns, highlight shifts in the spatial distributions of particular life-stages. Focus has thus far been on changes in habitat use and possible drivers for these changes, such as climate change. Yet, small scale shifts in habitat use of certain life stages may have consequences on population dynamics through changes in resource use and competition. To explore the possible consequences of habitat shifts on population dynamics a conceptual stage-structured model was developed with three stages and two resources and allowing a move of large juvenile from the shallow to the deep habitat. Large juveniles compete with small juveniles in shallow and with adults in deeper waters. Alternative stable states occur, with one state dominated by small juvenile biomass and the other dominated by adult biomass. The model results show for both states that while large juvenile biomass responds to a change in time spent in the deep habitat, the biomass of small juveniles and adults is barely affected. There is a profound different population response between the two states to increased fishing mortality. In the adult biomass dominated state adult biomass is hardly affected while juvenile biomass increases until the population collapses. In the small juvenile dominated state adult and small juvenile biomass decrease, large juvenile biomass increases. This state persist

for much higher fishing mortality values than the adult biomass dominated state. Safeguarding nursery functions in a changing environment requires monitoring of juvenile life-stages in a range of habitats and an adaptive management strategy.

2) Dynamic Energy Budget model for prey of flatfish such as plaice. Current participants: Rochelle Seitz, Jaap van der Meer.

Data have been collected from various sites at the European coast on demographic parameters (recruitment, growth, survival, condition) of M. balthica to compare production rates and see to what extent they are recruitment-driven. Not much work has been done on the modelling, but the idea is to do this intersessionally, such that at the next meeting the proposed DEB, that incorporates regrowth of body parts, can be discussed and refined.

3) Dynamic Energy Budget (DEB) model and population model for oyster species including *Ostrea* and *Crassostrea* spp. Current participants: Jaap van der Meer, Romuald Lipcius, David Eggleston, Rochelle Seitz

Three of the main biotic and environmental drivers expected to affect habitat suitability of fish and invertebrates in coastal habitats are water temperature, food availability, and dissolved oxygen levels. Water temperature has been increasing, dissolved oxygen levels have been depleted, and food availability has varied significantly, and these are expected to influence metabolic demands, growth and reproduction of fish and invertebrates. As examples of these effects we will model the influence of temperature, food availability and dissolved oxygen on two species of oysters, the European flat oyster *Ostrea edulis* and the eastern oyster *Crassostrea virginica*, using DEB models as described above. In addition, we will use an existing DEB model of the Pacific oyster *Crassostrea gigas*, an exotic species introduced to Europe, to assess the likelihood that these two species will co-occur in Europe's coastal habitats in the future. We will also adapt an existing demographic model for the eastern oyster to assess the role of harvest-induced degradation on oyster reef habitats and populations.

Science highlights

The review paper by Seitz *et al.* 2013 was very well received and brings forth the importance of coastal areas for commercially exploited species in numbers. Collectively, 44% of all ICES species utilized coastal habitats, and these stocks contributed 77% of the commercial landings of ICES-advice species, indicating that coastal habitats are critical to population persistence and fishery yield of ICES species. These findings will aid in defining key habitats for protection and restoration and provide baseline information needed to define knowledge gaps for quantifying the habitat value for exploited fish and invertebrates.
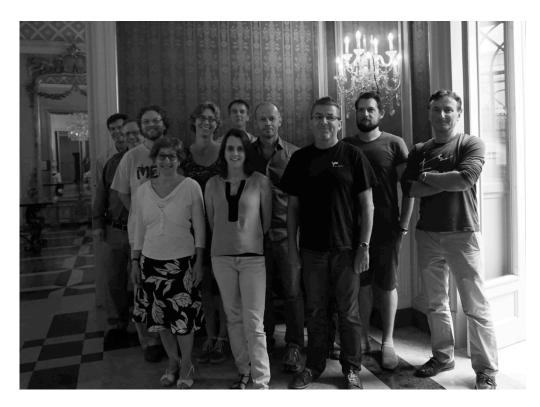
6   Cooperation

Cooperation with other WG

WGVHES contacted WGMHM for information on habitat maps. It was concluded that WGMHM has limited detail on coastal fish habitats (too coarse a scale). The group decided not to pursue a general search for maps of fish habitats in coastal areas; working on a case study basis is adopted as more fruitful.

7   Summary of Working Group self-evaluation and conclusions

Four papers were published by the group, of which one is already used in teaching at the university level, exemplifying the connections between coastal habitats and commercial species. The group organised a theme session at ICES ASC 2013 attracting 20 contributions, of which four presentation were given by group members. Advice from group members was given on including habitat more specifically in monitoring programs. The working group has finalized its first three years with literature reviews and case studies and wants to progress in a new term into more quantification of habitat and management uses. The knowledge on habitat dependence of fish can be used to inform spatial management decisions such as MPAs and MFD, stock recovery or bycatch reduction and may aid understanding in ecosystem level approaches.

Annex 1: List of participants

Name	Institute	Email
Elliot Brown	DTU Aqua - National Institute of Aquatic Resources Denmark	elbr@aqua.dtu.dk
Francesco Colloca	National Research Council Institute for Coastal Marine Environment (IAMC) Italy	francesco.colloca@iamc.cnr.it
David Eggleston	Center for Marine Sciences and Technology, North Carolina State University USA	eggleston@ncsu.edu
Genny Nesslage	Center for Environmental Science, Chesapeake Biological Laboratory USA	nesslage@umces.edu
Jaap van der Meer	Royal Netherlands Institute for Sea Research The Netherlands	Jaap.van.der.Meer@nioz.nl
Kenneth Rose	Louisiana State University, Dept of Oceanography and Coastal Sciences USA	karose@lsu.edu
Olivier le Pape	Agrocampus Ouest UMR INRA-Agrocampus Ecology et Santé des Ecosysteme France	Olivier.le.pape@agrocampus-ouest.fr
Josianne Støttrup	National Institute of Aquatic Resources, Technical University of Denmark Denmark	jgs@aqua.dtu.dk
Karen van de Wolfshaar	Wageningen IMARES The Netherlands	karen.vandewolfshaar@wur.nl
Rita Vasconcelos	Universidade de Lisboa, Centro de Oceanografia, Faculdade de Ciências, Portugal	rpvasconcelos@fc.ul.pt
Håkan Wennhage (Chair)	Swedish University of Agricultural Sciences, Department of Aquatic Resources Sweden	hakan.wennhage@slu.se
Mike Wilberg	Center for Environmental Science, Chesapeake Biological Laboratory USA	wilberg@umces.edu

Participants in year 3 of the ICES working group on the value of coastal habitats for exploited species in Palermo, Italy. Front row: Josianne Støttrup, Rita Vasconcelos, Olivier Le Pape. Back row: Dave Eggleston, Kenneth Rose, Mike Wilberg, Karen van de Wolfshaar, Jaap van der Meer, Håkan Wennhage, Elliot Brown, Francesco Colloca, (Genny Nesslage, not in picture)

Annex 2: WGVHES draft resolution 2016–2018

The **Working Group on the Value of coastal Habitat for Exploited Species** (WGVHES), chaired by Josianne Stottrup Denmark*, Rochelle Seitz*, USA [TO BE CONFIRMED] and Karen van de Wolfshaar*, the Netherlands, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2016	TBA	TBA	Interim report by 1 August to SSGEPI	
Year 2017			Interim report by	
Year 2018			Final report by	

ToR descriptors

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
	This should capture the objectives of the ToR	Provide very brief justification, e.g. advisory need, links to Science Plan and other WGs	Use codes	1, 2 or 3 years	Specify what is to be provided, when and to whom
a	Synthesize available information for quantifying the value of coastal habitat for exploited species including an ecosystem service perspective.	Expands on reviews started in the previous term, but focusing on new aspects	6, 11	2 years	Review paper in primary literature
b	Demonstration of the importance of habitats for exploited species on regional scales using modelling and case study approaches.	For many species there is a need to quantify their dependence on the coastal habitat; knowledge that can feed into ToR d	6, 16	2 years	paper in primary literature
c	Characterising the relation between habitat, individual processes and population responses.	There is a need to move from individual level towards population level and from local to regional to fully comprehend the	6, 11	3 years	paper in primary literature

		effects of coastal habitat quality			
d	Investigate how habitat considerations can be incorporated into quantitative tools used in the management process.	Spatial aspects are becoming more important in management processes and the coastal habitat needs to be addressed in this context	6, 15, 16,25	2 year	paper in primary literature and advice/tools/recommendations aiming at survey design, restoration strategies or marine spatial planning

Summary of the Work Plan

Year 1	Finalize project from the previous period under ToR a and start projects under ToR b and ToR c.
Year 2	Continue work from ToR b and ToR c and start on ToR d.
Year 3	Finalize projects and identify future research priorities.

Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority.
Resource requirements	The research programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 8-15 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages with the advisory committees .
Linkages to other committees or groups	There is a close working relationship with all the groups of SSGEPI.
Linkages to other organizations	

Annex 3: Copy of Working Group self-evaluation

1) **Working Group name**: Working Group on the value of Coastal Habitats for Exploited Species (WGVHES)

2) **Year of appointment**: 2013

3) **Current Chairs**: Håkan Wennhage and Rom Lipcius.

4) **Venues, dates and number of participants per meeting**.

17-21 June 2013, Copenhagen, Denmark, (8 participants),
30 June - 4 July 2014, Lisbon, Portugal, (9 participants),
29 June - 3 July 2015, Palermo, Italy, (12 participants + 2 guests).

WG Evaluation

5) If applicable, please indicate the research priorities (and sub priorities) of the Science Plan to which the WG makes a significant contribution: 131,132,134 (within the 2009-2013 Science plan)

6) *In bullet form, list the main outcomes and achievements of the WG since their last evaluation. Outcomes including publications, advisory products, modelling outputs, methodological developments, etc.*

- Information from working group review papers has been integrated into undergraduate and graduate marine science courses taught by David Eggleston at NC State University US and by Oliver Le Pape at Agrocampus Ouest France. Especially Seitz *et al.* 2013 is expected to be used in education at institutions outside this working group.

- Vasconcelos R.P., Eggleston D.B., Le Pape O., Tulp I. Patterns and processes of habitat-specific demographic variability in exploited marine species. ICES Journal of Marine Science 71: 638-647.

- Seitz R., Wennhage H., Bergstrom U., Lipcius R., Ysebaert T. Ecological value of coastal habitats for commercially and ecologically important species. ICES Journal of Marine Science 71: 648-665.

- Lipcius R., Eggleston D.B., Fodrie J., Rose, K., Van der Meer J., Van de Wolfshaar K.E., Vasconcelos R, M. Wilbur, Genny Nesslage. Populations models quantifying the value of coastal habitats for exploited species. In preparation for submission July 2015.

- Van de Wolfshaar K.E., Tulp I. Wennhage, H., Stottrup J. Modelling population effects of juvenile offshore fish displacement towards adult habitat. Revision resubmitted to Marine Ecology Progress Series.

- THEME SESSION at ICES ASC 2013: Quantitative value of coastal habitats for exploited species. Organizers: Romuald Lipcius (USA), Ingrid Tulp (The Netherlands), Håkan Wennhage (Sweden)

- Rita P. Vasconcelos, Olivier Le Pape, Dave B. Eggleston, Håkan Wennhage, Ingrid Tulp. Quantitative assessment of the value of coastal habitats for exploited marine fish and invertebrates: a review. ICES ASC 2013

- Rochelle D. Seitz, Håkan Wennhage, Ulf Bergström, Romuald N. Lipcius, Tom Ysebaert. Coastal habitat use by commercially and ecologically important species. ICES ASC 2013
- Romuald N. Lipcius, David B. Eggleston, Joel Fodrie, Julia Moore, Sebastian J. Schreiber, Jaap van der Meer, Karen van de Wolfshaar, Rita Vasconcelos. Population models quantifying the value of coastal habitats for exploited species. ICES ASC 2013
- Nicholas Ducharme-Barth, Romuald N. Lipcius, Leah B. Shaw, Junping Shi. Habitat effects on population dynamics and fishery production of the eastern oyster. ICES ASC 2013

7) *Has the WG contributed to Advisory needs? If so, please list when, to whom, and what was the essence of the advice.* Data gaps regarding quantitative information on habitat-specific demographic rates, as well as the data on fisheries production estimates from various habitats, was integrated into funding priorities for North Carolina Sea Grant Program in the U.S.; Rochelle Seitz, Genny Nesslage, and Mike Wilberg participated in the Chesapeake Bay Science and Technology Advisory Committee (U.S. Environmental Protection Agency) workshop on Assessing the Chesapeake Bay Forage Base: Existing Data and Research Priorities, 12-13 November 2014. One of key aspects of advice from WGVHES was the recommendation to enhance monitoring of habitat for forage species and to improve understanding of how habitat modifications affect forage species dynamics.

8) *Please list any specific outreach activities of the WG outside the ICES network (unless listed in question 6). For example, EC projects directly emanating from the WG discussions, representation of the WG in meetings of outside organizations, contributions to other agencies' activities.* The working group started a collaboration with Mediterranean countries which was initiated at the ICES ASC 2013. There has been a cross-fertilization between the working group and national research programs in the US. In addition, an example of mapping marine fish habitats in a data poor situation was provided by Denmark. This was used to advise The Danish Nature Agency under the Danish Ministry of Environment and The Danish AgriFish Agency under the Ministry of Food, Agriculture and Fisheries in a situation where there were conflicts between different human activities and interests.

9) *Please indicate what difficulties, if any, have been encountered in achieving the workplan.* As a new group being in the exploration phase it difficult to quickly find consensus on an approach especially for empirical work where (national) data are required. Between meetings it is difficult to find time to work on projects from the work group; there is no preparation time.

Future plans

10) *Does the group think that a continuation of the WG beyond its current term is required? (If yes, please list the reasons).* Yes, the next 3 years are expected to be more quantitative and applying knowledge gained during the first years. The

value of coastal habitats for exploited species is highly relevant to the new science plan given the focus on integrated ecosystem assessments and advice for ecosystem based management.

11) If you are not requesting an extension, does the group consider that a new WG is required to further develop the science previously addressed by the existing WG.

(*If you answered YES to question 10 or 11, it is expected that a new Category 2 draft resolution will be submitted through the relevant SSG Chair or Secretariat*.)

12) *What additional expertise would improve the ability of the new (or in case of renewal, existing) WG to fulfil its ToR?* Stock connectivity through genetics can be of interest with respect to identifying habitat in MPA or spatial planning; expertise on future scenarios on habitat change with respect to climate change, coastal management/development. In addition, the working group could benefit from expertise in Marine Geospatial Ecology Tools. Such a person could help apply geospatial technologies to issues in marine ecology, resource management and ocean conservation. This expertise intersects several fields, such as building predictive species distribution models; identifying ecologically-relevant oceanographic features in remote sensing imagery; detecting spatiotemporal patterns in fisheries and other time series data.

13) *Which conclusions/or knowledge acquired of the WG do you think should be used in the Advisory process, if not already used? (please be specific).* The knowledge on habitat dependence of fish can be used to inform spatial management decisions such as MPAs and MFD, stock recovery, bycatch reduction.