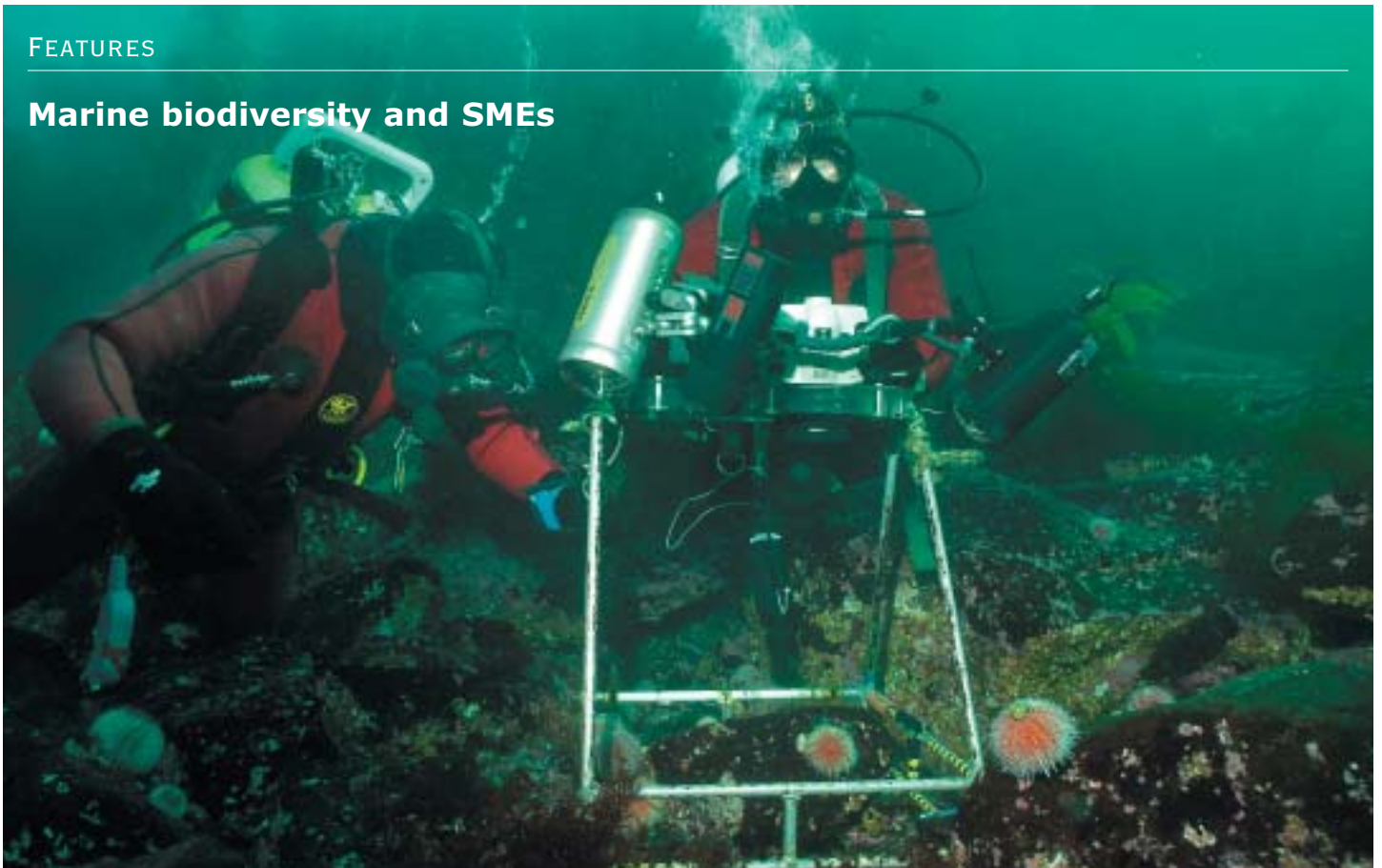


Marine biodiversity and SMEs



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ASBD includes the study of the long-term variability of shallow, hard-bottom substrata which utilises one of the longest continuous photographic series in northern Europe (annual for 24 years).

Arctic Seas Biodiversity Project (ASBD)

Marine biodiversity research, SMEs and industry: bridging the gap

By Chris Emblow¹, Sabine Cochrane¹, Lars-Henrik Larsen¹, JoLynn Carroll¹, Laura H Bracco² and Carlo Alberto Cova³

One of the objectives of MarBEF is to explore and strengthen links between biodiversity research, SMEs and industry and to understand how best marine biodiversity research can be integrated and used in the commercial sector. Within MarBEF, this has been a challenge as the priorities of commercial organisations are not always compatible with those of biodiversity research.

Akvaplan-niva is one of the SME representatives in the MarBEF network and works closely with industry both in a consultancy and a research and development capacity. Through this work, and close co-operation and experiences with MarBEF and other research networks (ARCTOS), Akvaplan-niva has been successful in bridging the gap between research and industry.

In 2006, the oil company Eni Norge invited Akvaplan-niva to discuss and give advice on suitable strategies and topics for biodiversity research targeted towards offshore activities in sensitive arctic areas. In January 2007, Eni Norge commissioned Akvaplan-niva to assess Eni's biodiversity-related requirements, the

status of biodiversity knowledge in legislation and environmental management and, based on this, to outline some biodiversity research topics that would fulfill key knowledge gaps. In December 2007, Eni Norge/Eni E&P commissioned Akvaplan-niva to lead an applied research project, Arctic Seas Biodiversity (ASBD), addressing selected aspects of marine biodiversity in potentially sensitive areas above the Arctic Circle.

Impact prevention policies

Eni identified that the protection of biodiversity entails action in all of their operational sectors and project lifecycle, from exploration and development activities, where it is especially necessary to preserve the

species and habitat of the eco-systems involved, to production and transport phases till decommissioning, where the primary objective is the sustainable use of resources and the restoration of the existing natural environment.

To fulfil this commitment to biodiversity protection and conservation, it is also understood that such actions require further understanding of the environmental and ecosystems science which can only be achieved by supporting research, monitoring and mitigation projects. ASBD will contribute to this understanding of the marine biodiversity of Arctic seas and provide Eni with research-based decision-making power in the field of marine biodiversity.

What ASBD is doing

The ASBD concept is first to understand the needs of the industry, in the context of various environmental guidelines and legislations. Next, an applied research programme is

designed and carried out, which not only will contribute to basic research, but will also advance existing environmental management tools using biodiversity. The final challenge of the project is to channel the knowledge gained through research directly into Eni's operational practices.

The community composition of benthic fauna is recognized as a useful indicator of environmental conditions, and this method is widely used as a major component of the baseline and follow-up surveys in areas of petroleum interests. Therefore, not only a sound understanding of benthic biodiversity is required, but also knowledge of the ecosystem processes that control it is essential for proactive environmental management.

Driving questions

A number of key questions were identified which the ASBD project should address. The questions relate to further understanding the biodiversity of northern waters, how the biodiversity may change due to natural and anthropogenic influences, and how existing tools might be improved to ensure accurate environmental assessment based on good scientific knowledge:

- What impacts might oil and gas development (including an oil spill) have on intertidal and coastal biodiversity?
- What are the baseline conditions and

natural variability, primarily in the Barents and Lofoten area, but also other relevant offshore operations area, including the deep sea?

- What natural and anthropogenic impacts might be expected on the benthic biodiversity, firstly in the Barents Sea and Lofoten area, but also with relevance to other offshore operations area?
- Where are there particularly sensitive biodiversity components in the area; and what might they be sensitive to?
- How can we distinguish anthropogenic changes from natural variability, and are our current tools adequate?
- After removal of the subsea installations, what is the likelihood that the benthic biodiversity will return to its original state, or assume new steady-state characteristics?
- Are there improvements needed to the existing tools for environmental impact assessment using benthic biodiversity, particularly in northern areas?

Ecosystem research

The research programme comprises both nearshore and open water components. The coastal ecosystem investigations focus on kelp ecology, temporal changes in benthic communities, particularly in relation to climate fluctuations, as well as habitat mapping and spatial predictive modelling.

The open water component focuses on shallow banks as critical habitats, and as key areas of high primary and secondary production. Benthic biodiversity is investigated in the context of energy flow pathways. The combined results of the research activities will provide further knowledge on coastal and offshore ecosystems in the southern Barents Sea area.

Applied research

The ability to understand and monitor environmental change using benthic communities depends on a sound knowledge of the individual organisms, reproductive strategies, life-cycles and responses to environmental variation. The applied research programme of ASBD will, among other things, further our understanding of the benthic fauna in the area, the processes that affect them and offer a direct contribution to improved interpretation of the baseline and follow-up surveys that take place routinely around the sites of petroleum exploration as well as across the area at large.

Focal topics include natural spatial and temporal variability in benthic assemblages, biogeochemical interactions within the sediments, as well as sea-floor recovery from mechanical disturbance.

Implementation of project findings

Any human activity requires concern, updated knowledge on sensitivity and vulnerability of the environment, ecosystems, resources and environmental features. Biodiversity both holds an intrinsic value and is a useful tool when evaluating environmental performance. The term "biodiversity action plan" is not a uniquely defined approach to understand and safeguard biodiversity in areas of operation, but is here defined as a set of performance criteria, processes, choices and decisions, together preventing adverse, unwanted negative effects.

The biodiversity action plan will be a set of recommendations and advice on procedures to be implemented by Eni in a pan-Arctic perspective. The ASBD project results will provide the foundation for the biodiversity action plan.

Data management and outreach

As with MarBEF, ASBD will place emphasis on sharing information on the project progress and results to as wide an audience as possible. Dedicated data management procedures and protocols are established through a data management policy, taking into account commercial and academic sensitivities, such that short- and long-term usage and storage for the data is facilitated.



Intertidal and shallow subtidal areas will be studied. Kelps and associated habitats, such as macroalgal beds and subtidal gravel areas, are critical on the Norwegian coast and throughout the Arctic, as they serve as refuges, feeding sites and settlement areas for a high diversity of invertebrates and fishes. Biodiversity here is still relatively unstudied and therefore poorly understood.

At the start of the project, a communication strategy document was developed. This will be reviewed and revised continually to take into account new developments in the project. The project website (www.arcticbiodiversity.com) will be the main dissemination tool and will act as the focal point for all communications and resources. The outreach team will facilitate and coordinate the publication of popular and scientific articles/posters and papers at meetings and conferences and, in cooperation with Eni, the outreach team will establish a press office and produce a press pack.

The development of ASBD as a project was possible because of the close links that Akvaplan-niva has developed both with its commercial and industry-based clients and its co-operation and participation in international,

European and national research networks and projects. The experiences gained in working with the MarBEF community have provided inspiration and ideas, partners and skills to establish a project which will provide a significant contribution to the understanding, conservation and management of the Arctic seas in relation to oil and gas development.

Acknowledgements

Akvaplan-niva would like to thank Eni-Norge and Eni E&P for the opportunity to carry out this exciting project, and particularly acknowledge the MarBEF community for the inspiration, experiences and close and friendly cooperation during the course of the network. We are proud to present ASBD as a product of the MarBEF cross-linking philosophy.

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CSI — INTERNATIONAL

International Polar Year event

Schools on Board



Schools on Board group, including students and teachers from Scotland, Norway, Sweden, Germany and Canada.

By David MacFadyen and Lucette Barber

In 2002, a network of Canadian Arctic scientists connected to the Canadian Arctic Shelf Exchange Study (CASES) and ArcticNet, supported the concept of creating an outreach programme that would increase awareness of research activities and introduce young Canadians, from coast-to-coast-to-coast, to the many opportunities that exist in the multidisciplinary fields of Arctic science.

Schools on Board was created to promote Arctic sciences through classroom materials and research fieldwork experiences, stimulating greater communication and face-to-face interactions between scientists, students and educators. Since then, ArcticNet and Schools