

Project information

Project title

Historical and current ecosystem structure and use of marine resources

Year

2011/2012

Project leader

Paul Renaud, Akvaplan-NIVA

Participants

- Paul Renaud, APN
- Elin Rose Myrvoll, NIKU
- William Ambrose, Beverly Johnson, Bates College, USA

Flagship

Fjord and coast, Theme: Human dimensions of ecosystem response to climate change

Funding Source

Fram Centre

Summary of Results

The project has chosen three archaeological sites in Finnmark county. Samples of fish bones have been analysed (at Bates College Environmental Analysis Lab, USA). The samples from early and late Middle Ages were taken from two multi-room house sites in Berlevåg municipality and one Late Stone age site in Nesseby municipality was also used. All three sites are situated in coastal areas of Finnmark county. In addition, samples of modern cod bones have been taken, and constitute a fourth time period. At this time, the Late Stone Age and modern samples remain to be analysed, and this should happen in late 2011.

The Multi room house sites, Berlevåg municipality

During the medieval period the northern coastal region that hosted the multi-room houses became transformed into a meeting ground for the natives and newcomers from both the West Atlantic and Eastern areas. The multi-room sites were found feasible for several ethnic groups. They were satellite settlements initiated from afar and administrated by representatives of distant powers. The cod and haddock specimens from the midden deposits at Kongshavn could be characterised as a fish processing site for long term storage within the concept of "North Atlantic norm". However the butchery marks found on fish bones are not in accordance with this "norm" since the cod is mainly represented by decapitated fish heads. Similar butchery technics are found at a medieval Sámi site by the Varangerfjord. One of the conclusions based on the archaeological and zoo-archaeological material from Berlevåg is that fish processing, hunting and gathering may have been carried out by Sámi personnel staying seasonally or permanently at the multi-room sites. Furthermore, during the 13th century and onwards, the native Sámi were involved in networks of trade and taxation (Olsen et al. 2011). The multi-room house site in Kongshavn was excavated in 2002-2004 and the site was probably built during the second half of the 13th century and its main occupation phase lasting throughout the 14th century. Eleven samples from the multi - room in Kongshavn have been analysed. The Løkvik site has four multi-room houses. Excavations were carried at the site in 2003. Radiocarbon dates from the site suggest a late medieval and early modern habitation (Olsen et al. 2011). Four samples from the site have been analysed.

The Late stone age site, Nesseby municipality

The Early Stone age site at Bergeby in Nesseby municipality has remnants of 30 houses which were built close to the contemporary shore line. Today, the houses are situated 14-18 metres above sea level. These houses, also called "Gressbakken-houses", have characteristic features like three entrances and a double hearth organised along the mid-axis of the floor. Similar sites and houses are found along the shore line from Western Finnmark to the Kola Peninsula. Excavations were carried out in house 18 at the Bergeby site in 1991. The subsistence at these dwelling sites was both fishing and hunting-gathering. Fishing equipment (fishhooks and sinkers) was found as well as middens containing fish bones from more than 10 species, shells mussels, and bones from mammals. The hearth in house 18 was radiocarbon dated to BC 2210-1965 and the adjacent midden to BC 2025 – 1740 (Schanche 1994). Radiocarbon dates from sites with Gressbakken-houses suggest that these sites were abandoned about BC 1800-1700.

From house 18 at Bergeby 15 cod (*Gadhus morhua*) bone samples from the site have been analysed. The samples are taken from cod bones found in the midden in front of the house.

Preliminary results

Little inter-13C content of the cod bones have been identified from either of the Middle Age sites, suggesting harvesting from similar nearshore 15N content, however, indicates fish were feeding lower on the food chain (or perhaps the fish were younger) in the later Middle Age period compared to the early Middle Age. We will sample more specimens from each of these sites, as well as the two other periods, to confirm results. Knowledge gained from archaeological information, such as that above, will help interpretation as to harvesting patterns and climate-related effects that may be reflected in the data.

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Published Results/Planned Publications

Renaud PE, Myrvoll ER, Ambrose WG, Locke W, Johnson, BJ. Food-web structure and harvesting patterns of north Norwegian fisheries over the past 4000 years: insights from archaeological samples and stable isotopes (to be submitted 2012).

Communicated Results

None yet. Chemical results are only now becoming available.

Interdisciplinary Cooperation

The following disciplines are involved in the project: Marine Ecology, Archaeology. This project is an example of the tight coupling between natural and social science that is requested from Fram Centre activities. Neither discipline alone could offer the insights on historical habitat use and ecosystem structure that this combination of efforts provides. There will be some challenges in taking full advantage of the expertise on each side, but so far we have developed good communication and a mutual understanding of the potential of the collaboration, so we have little doubt that this will be possible.

Budget in accordance to results

The budget is sufficient for this pilot study, even considering the expenses associated with the analytical component. We have only recently obtained all the samples necessary to complete the study and work will continue into 2012. Results should be sufficient for at least one publication.

Could results from the project be subject for any commercial utilization

No

Conclusions

a) Indicate future research and/or perspectives which the project results have led to

Environmental variability on decadal or centennial scales may strongly impact both the structure of ecosystems (species present, trophic interactions, etc.) and human use of these ecosystems, particularly by subsistence populations. For example, loss of a key prey species through natural or human-mediated processes, changes in river flow patterns, or habitat degradation could result in a shift food-web structure, or in spatial distribution of fishing effort. Fishing equipment like fishhooks and sinkers of different types are abundant at archaeological sites along the Arctic coast. However we do not know where or how far they went fishing in prehistoric times. Additional analyses of fish bones and shells from other archaeological sites along the Arctic coast could yield important knowledge about the human use of ecosystems and their adaptation to changes. We hope to build upon the results here and increase our analytical database from these sites, others in northern Norway, and compare results to other midden sites dated to similar time periods from the Shetland islands and the northeast coast of the US (in collaboration with our US partner).

b) List and describe new methods or techniques that have been developed during the project or that the project has revealed a need for

Whereas we have not developed new technologies, we have combined disciplines that do not often come together in a common research project in Norway.