

## Project information

### Project title

Habitat structure and ecosystem function of eel grass (*Zostera marina*) meadows in the high north in relation to human traditional use and exploitation

### Year

2012/2013

### Project leader

Nina Mari Jørgensen, ApN

### Participants

- Nina Mari Jørgensen (project leader, ApN)
- Guttorm Christensen, Trond Ivarjord (ApN)
- Arild Buanes (Norut), Torstein Pedersen (UiT)
- Hartvig Christie (NIVA)
- Frithjof Moy (IMR)
- Master student: Kristin Nymark Heggland

### Flagship

Fjord and coast, Theme: Structure, function and change in Arctic and boreal fjord systems

### Funding Source

Fram Centre

### Summary of Results

The project had a reduction in funding that resulted in 2012 focus only on fieldwork. The fieldwork was needed in order to ensure the fundament for our master student Kristin Nymark Heggland. No dataanalyses has been performed, other than what was done in the field. Reporting is thus on field work only (see table 1).

We selected three eel grass meadows locations in addition to three sites without or with little eel grass. We performed surveys using fish nets and video surveys. Video surveys covered areas from 0 meters to app. 20 meters, and will provide data on fish (juveniles and adults) distribution and abundance both within eel grass meadows and associated areas. From fish caught in nets, we sampled fish stomachs. Plants and algae was sampled by divers, and rinsed on land in order to sample benthic fauna for qualitative, descriptive analyses. Fish and plants/algae were sampled for analyses of stable isotop (C and N) in order to map the food web structure and trophic interactions.

Status quo per november 2012 is that Kristin will start selection of species for stomach analyses before christmas 2012.

For Kristins master studies, the focus is on:

- Fish species caught in either eel grass habitat or one-year algae (Chorda) habitat in Balsfjorden and Porsanger (location Porsanger is not related to this project).
- Stomach content.
- Comparison of habitats and associated algae and percentage cover.

Data analyses, such as trophic studies/isotop analyses, benthic fauna and analyses of video transects has not been performed due to cuts in funding. Future funding will be sought in order to perform these.

Through diving surveys using frames and sampling, we assessed biomass, population and community structure of the eel grass meadows. We also assessed flowering and seed production of the meadows and collected seeds for laboratory follow up studies of maturation and germination capacity. The preliminary results of these studies shows some differences between our stations on density and lengths, but the number of shoots are the same (4,5 shoots). The seeds have not germinated yet, but it is too early to conclude on the success of the test.

The mapping of local ecological knowlegde (LEK) is being performed in november 2012. Historical data on fish landings will be compiled where available.

Table 1. Status for the work packages.

	<b>Particip.</b>	<b>Coordin.</b>	<b>Aug.</b>	<b>Oct./ Nov</b>	<b>2013</b>	<b>Dec.</b>
			<b>2012</b>	<b>2012</b>		<b>2013</b>
WP 1 Nursery ground for fish	APN, NIVA, UiT	GNC				

	Particip.	Coordin.	Aug. 2012	Oct./ Nov 2012	2013	Dec. 2013
- Fieldwork			x			
- Analyses of fish stomach (master student)					x	
- Analyses of stable isotops					x	
- Report						x
WP 2 Community and structure	APN, NIVA, IMR	NMJ				
- Fieldwork			x			
- Analyses					x	
- Report						x
WP 3 LEK	Norut	AB				
- Interviews				x		
- Analyses					x	
- Report						x
WP Synthesis	All partners	NMJ				
- Reporting				(x)		x

#### Published Results/Planned Publications

A preliminary abstract of the work done by the master student on the project, Kristin Nymark Hegglund, has been submitted for Arctic frontiers 2013.

Title: Habitat for 0-group coastal cod (*Gadus morhua*) in Balsfjorden and Porsangerfjorden

Submitted:

Eelgrass, *Zostera marina*, populations in northern Norwegian fjords are genetically isolated and diverse

Jeanine L. Olsen<sup>1\*</sup>, James A. Coyer<sup>2</sup>, Wytze T. Stam<sup>1</sup>, Frithjof E. Moy<sup>3</sup>, Hartvig Christie<sup>4</sup>, Nina Mari Jørgensen<sup>5</sup>

Submitted 2012:

Abundance of eelgrass (*Zostera marina*) in the high north – a decline over the last century

Jørgensen, N.M<sup>1\*</sup> and Bekkby, T.<sup>2</sup>

#### Communicated Results

This years fieldwork has been communicated on the framcentre webpages and forskning.no

<http://www.framsenteret.no/leter-etter-fisk-i-enga.5079046-141503.html>

<http://www.forskning.no/blog/helge.markusson@framsenteret.no/330270>"><http://www.forskning.no/blog/helge.markusson@framsenteret.no/330270>

A story of the marine life in Balsfjorden focusing on the eel grass meadows was published in the local newspaper "Nye Troms" 25.10.2012 (se previously reported story).

#### Interdisciplinary Cooperation

The project included a social science part on local ecological knowlegde (LEK). We have high expectations to the results, and the interviews are performed this autumn/winter.

#### Budget in accordance to results

The funding has helped initiate the project.

#### Conclusions

##### **Our goals were to:**

Main objective 1: Establish baseline data on the function and structure of eel grass meadows in the high north, study site Balsfjorden:

- Are eelgrass meadows preferred as nursery habitat for fish larvae and juvenile fish compared to other inshore habitats?
- How are the eel grass meadows structured (related to shoot density, shoot lenght and biomass) and how is the associated community assemblage structured (related to macroalgae, fish and epifauna) and linked through trophic interaction?
- To what extent do seedlings contribute to reproduction? Flowers and stands with immature seeds were observed in 2011, but is the growth season sufficient for production of mature seeds?

Main objective 2: Perform a survey of the local ecological knowlegde on eel grass meadows in Balsfjorden and the socio-economic value of local fisheries:

- How important is the commercial and household fisheries?
- Which species are caught, and how have the catches varied since 1940?
- Which of these species depend on utilizing eel grass meadows as important nursery areas?
- To what extent do local resource users have knowledge of historical and present state of the eel grass meadows?

These main goals and questions will be approached through validated and tested scientific methods. Goal 1 will be approached through use of well established field techniques, including diving surveys, video surveys and catch of fish by use of nets and tagging of fish. Goal 2 will be approached thorough interviews. The selection of study sites in goal 1 is partially relying on information retrieved through the interviews in goal 2. Results on eel grass meadow structure will be compared to relevant data from southern Norway.

##### **We can not conclude on main objective 1 due to:**

1. **Ongoing work by the master student**
2. **Data analyses not performed due to cut in funding**
3. **Seedling studies are not completed.**

**As for main objective 2, the interviews are being performed at present.**