

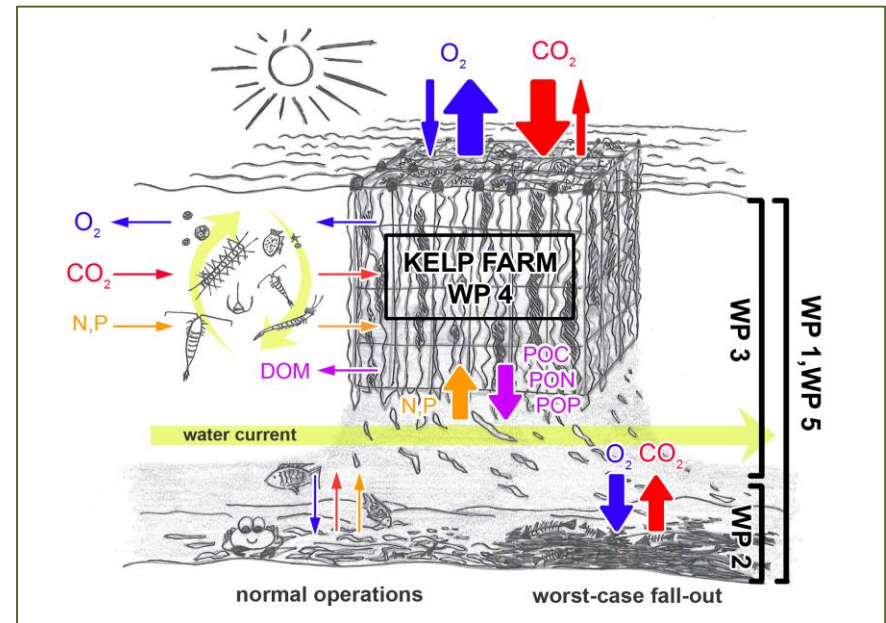
KELPPRO

Kelp industrial production: Potential impacts on coastal ecosystems

WP#2: Effects of industrial kelp farming on sea floor ecosystems

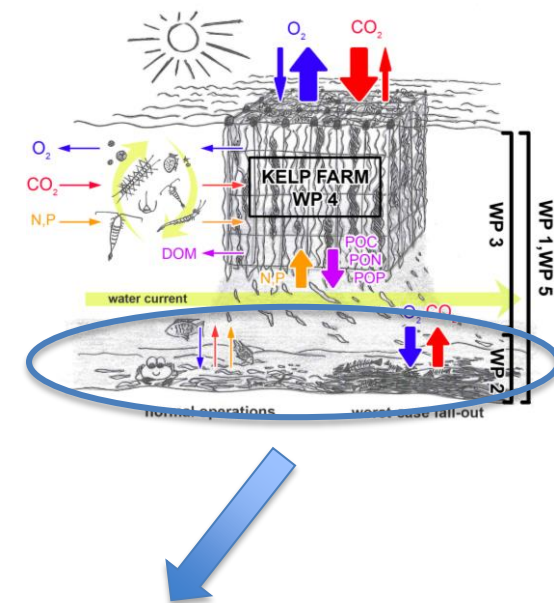
T2.3 Impact studies on seafloor biodiversity and function

Gunhild Borgersen, NIVA

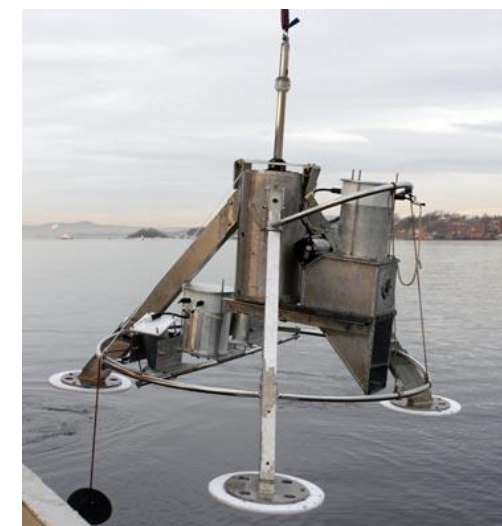
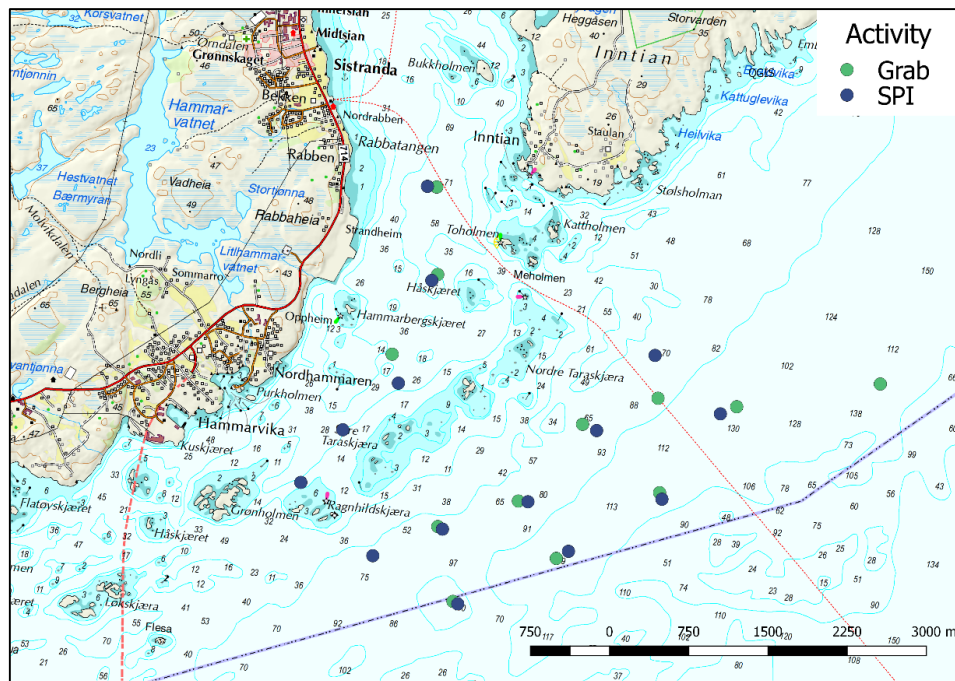


T2.3 Impact studies on sea floor biodiversity and function

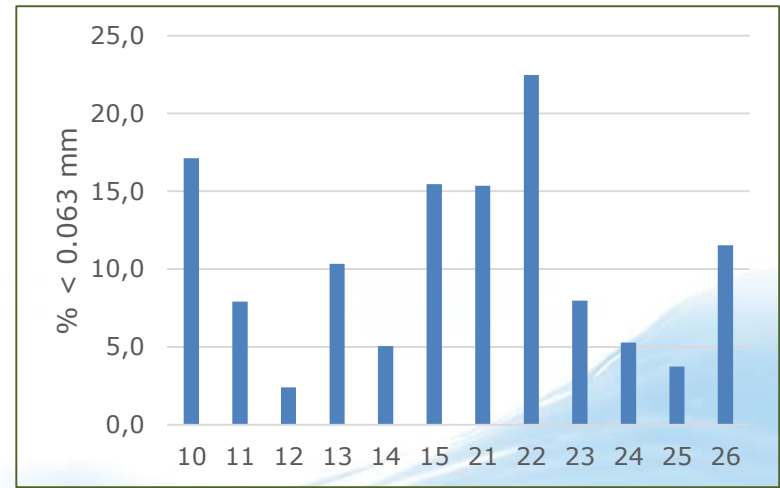
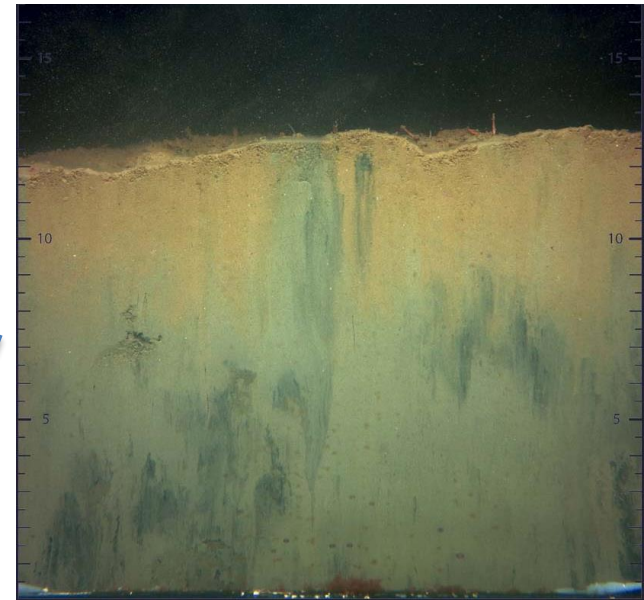
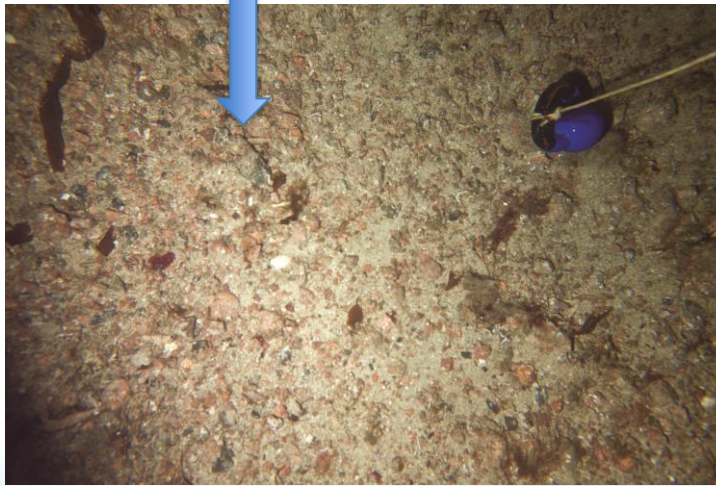
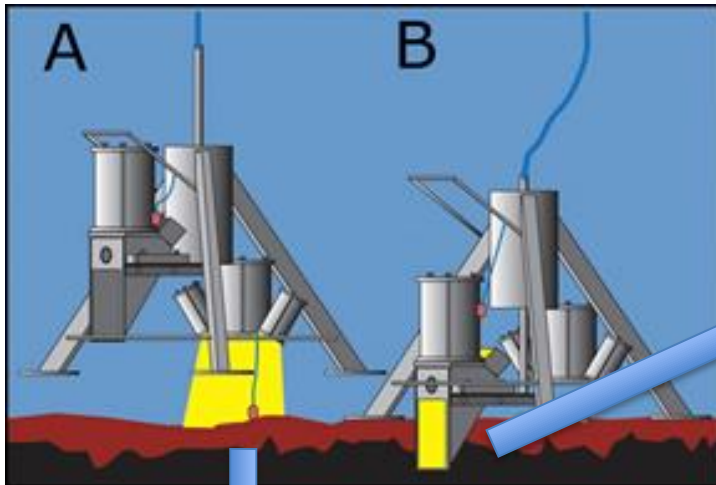
- **Benthic macrofauna** (>1 mm) abundance and diversity will be estimated from grab samples across a **density gradient of kelp detritus** (including TOC, total N, grain size).
- Different indices for **species composition** will be calculated to assess the 'ecological quality' of deposit areas, compared to control sites.
- Species will be assigned functional traits related to morphology, physiology, phenology and behavior in order to describe and quantify **ecosystem functioning**.
- *In situ* **documentation of kelp deposit areas** will be assessed using underwater video and SPI camera surveys.
- Data will support assessment of changes in ecosystem functioning and form guidelines for monitoring methods (WP#5).



June cruise: sampling and photo (SPI) survey



Sediment profile camera (SPI) - general principles



October cruise: sampling for KELPPRO and Blue Carbon



Plan for 2019

Time	Grab samples (fauna)	Chla	TOC	Grain size	Kelp detritus	Surface images (SPI)	CTD	Sediment cores
23 rd -24 th June 2018	12	36	36	12	12	14 sites	3 sites	
15 th -17 th Oct 2018	12 + 6	52	54	18	18			13

- **Fauna:**
 - Species composition
 - Species diversity and other indices
- **Sediment:**
 - Organic carbon content
 - Grain size
 - Chlorophyll
 - Estimate of kelp detritus

- **Ecosystem functioning**
 - Biological traits analysis
 - Functional diversity
 - NIVAs traitsdatabase

	Adult life habit						Mobility (relative)				Feeding habit					Normal adult size									
	Sessile	Perm tube	Semi-perm tube	Burrower	Surface crawler	Swimmer	None	Low	Medium	High	Suspension	Surf deposit	Subsurf dip	Deep deposit	Dissolved/symbionts	Scraper	Scavenger	Carnivore	Parasite	< 0,5 cm	0,5-1 cm	1-3 cm	3-6 cm	6-10 cm	> 10 cm
Paramphinome jeffreysii				1	2				1	2											1	2			
Antinoella sarsi					3				3												1	1	2	1	
Harmothoe sp.				2	2			2	2										1	1	2	1			
Eteone sp				2	1				3												1	2	2	1	1
Phyllodoce groenlandica				2	1				3												1	2	2	1	
Nephtys incisa				2	2			1	2								1	2				1	2	1	
Nephtys paradoxa				2	2			1	2								1	2			1	2	2	1	
Lumbrineris scopa				3				2	1												1	2	1		
Lumbrineris fragilis				3				2	1												1	2	2	2	
Leitoscoloplos mammosus				1	2			2	1				3								1	2			
Apistobranchus tullbergi				2	2			2	1				2	1							1	2			
Arliciidea sp.				3				2	1			3									1	2	1		
Levinsenia gracilis				3				2	1			1	2								2	1			
Paradoneis lyra				3				2	1			3									2	1			
Laonice cirrata				3				3				3										2	2	1	
Polydora caulleryi				3				2	1			1	2								1	2			
Polydora sp				3				2	1			2	2								1	2			