



CETIA 2011-14

Coastal environment, technology and innovation in the Arctic

Arctic Frontiers 2012

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CETIA basics

- ENPI Kolarctic programme (EU)
- 2011-2014, 36 months
- **Objective:** CETIA will contribute with knowledge, innovation and expertise in addressing challenges posed by offshore developments in the sensitive marine environment of the Arctic.
- The project will provide an integrated approach, with dedicated work-packages on environmental science, technology and innovation, and education.



Kolarctic

ENPI CBC | CROSS-BORDER COOPERATION



CETIA participants,



Länsstyrelsen
Norrbotten



CETIA: 3 work-packages.

WP1: Coastal environment

- Sensitivity of coastal ecosys.
- Effects of crude oil on King crab

WP 2: Bioremediation

- Artificial sorbents
- Algae-based bioremediation
- Molecular tools bioremediation
- Risk, operation and reliability analysis

WP 3: Education

- Exchange agreement for master courses 'Safety and Environment'
- Joint master program 'Environmental Management in the Arctic.'

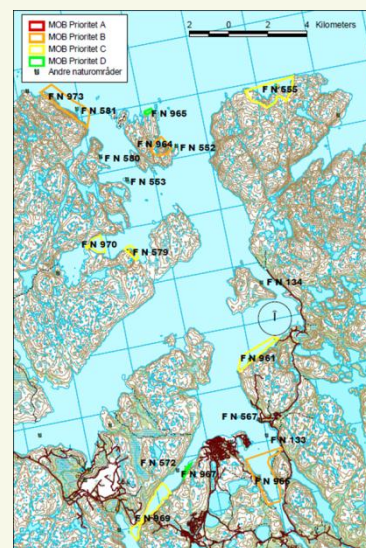
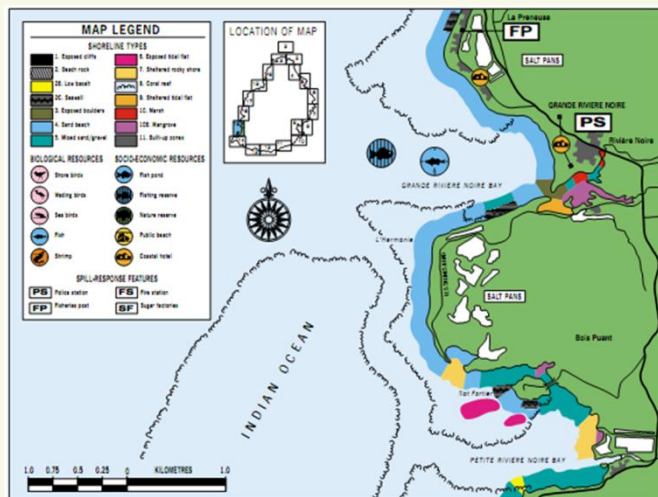


Task 1: Sensitivity of coastal ecosystems – comparison of alternative methods

Larsen Akvaplan-Niva



- Approach: Map two areas in Finnmark and the Kola Peninsula using three different methods: IMO-IPIECA, Norwegian MOB and Russian method.
- Deliveries: Evaluation of environmental sensitivity mapping methods, maps and GIS applications.
- Define environmental sensitivity criteria for coastal areas of the Barents Sea – step in harmonizing methods.



4.4 Шторм, Г.Р. Ильяш. Оценка экологической уязвимости Баренцева моря на основе картографии

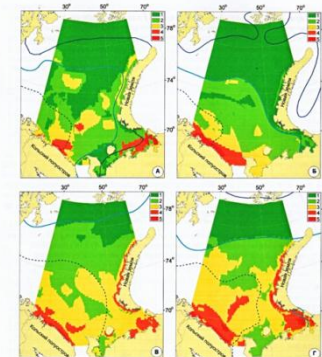


Рис. 10.2. Карты «чувствительности» экологической уязвимости Баренцева моря с учетом сезонных различий в количественных показателях распространения гидробиоты: А – зима (I кв.), Б – весна (II кв.), В – лето (III кв.), Г – осень (IV кв.). Учетно-исходные распределения сумм компонентов уязвимости (см. формулу 10.1), использованы модифицированные 10,5 (размер ячейки 0,1°)

Таблица 10.6

Сезон	Среднее значение	Среднее квадратическое отклонение	Максимальное значение	Минимальное значение
Зима (I кв.)	6 502	2 927	18 531	3 501
Весна (II кв.)	54 618	24 443	164 828	30 790
Лето (III кв.)	58 199	27 807	164 157	10 523
Осень (IV кв.)	21 211	10 605	52 103	6 427

Task 2: Effects of crude oil on King crab

Sokolov (PINRO)

- Need of new tools for biomonitoring effects of petroleum compounds on Arctic species.
- Basline natural levels of chemicals (PINRO)
- Bioaccumulation study (PINRO)
- Biomarker study (APN)
- Scallops will be exposed to mechanically dispersed oil and fed to King crab
- Experiments both Murmansk and Tromsø.

Akvaplan
niva



Control



Medium



High



WP II: Bioremediation

- Use of intrinsic abilities of living organisms to cope with and degrade pollutants
- Use of sorbents against oil contaminated soils: (Task 3)
- Algae-boom for marine oil-spill containment and decontamination (Task 4)
- Molecular diagnostic tools for monitoring bacterial communities (Task 5)
- Assessment of technologies: safety, maintainability etc. (Task 6)



Task 3: Sorbent, plants and bacteria

Prof. Masloboyev (INEP)

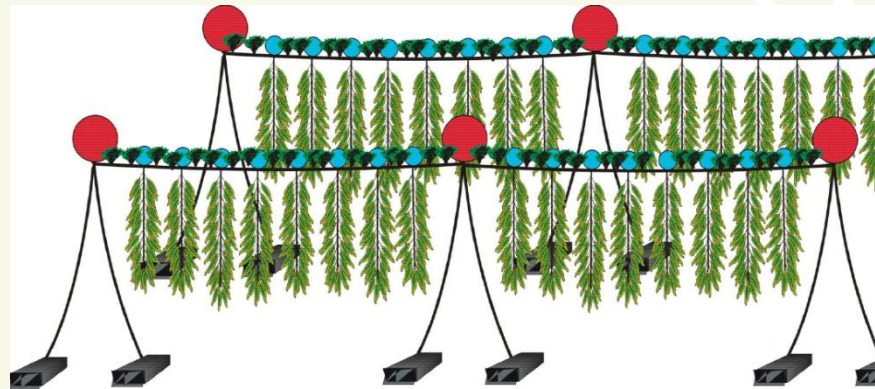
- Assess the use of raw materials (vermiculite and alike) in combination with plants for the bioremediation of oil contaminated soils .
- C-verade (vermiculite) is a new type of metal-carbon absorbents
- Blended in soil, bound by plant roots, cares hydrocarbon-degrading bacterial community
- Cheaper than existing vermiculites, local availability
- Screening for the most suitable grasses
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Task 4: Combating oil-spills at sea using algae-booms and bacteria

Prof. Voskoboynikov (MMBI)

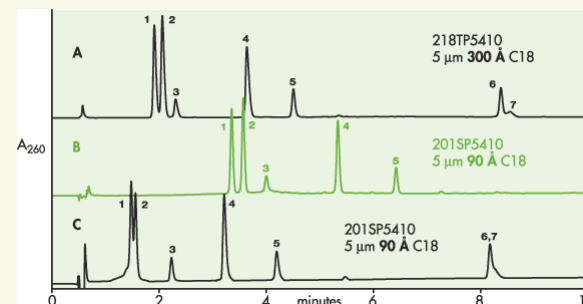
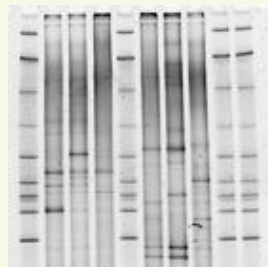
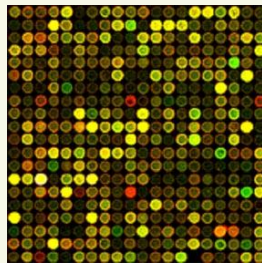
- Investigate the possibility of using brown algae and bacterial associations in bioremediation of oil polluted waters.
- Algal surface suitable for oil containment
- Bacteria that oxidise hydrocarbons are associated with those surfaces (culture collection)
- Test-sites: Murmansk (& Troms)



Task 5: Molecular tools for monitoring oil-degrading bacteria

Dr. Liaimer (UiT)

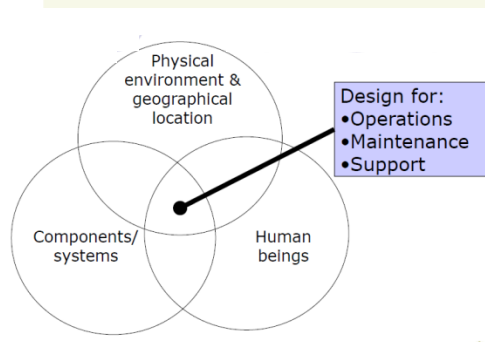
- Monitoring microbial communities used for oil-spill bioremediation
- Identify phylogenetic and functional gene markers (**what bacteria are there** and **doing what**)
- Develop quick (culture independent) diagnostics of the microbial community and processes
- Contribute to knowledge on biological oil-degradation in the north



Task 6: Risk, reliability and maintainability analyses

Prof. Kumar (LTU)

- Develop a scientific foundation for implementing cost-effective strategies for Artificial sorbents and Algae-based bioremediation.
- Risk analysis
- Operation and maintainability
- Guidelines for training personell



Task 7 Exchange agreement on master courses in 'Safety and environmental management'

- CETIA partners develop agreements to exchange lecturers and courses to be provided
 - as optional courses
 - in established study programs
 - in the field of safety and environmental management
- Conducted in English
- Output: agreements to be finalised by the autumn of 2013



Task 8 Master programme in 'Environmental Management in the Arctic'

- Taught in English
- Based on E-learning
- Multi-disciplinary including courses in natural science, engineering, law and organisational science
- Based on existing science and academic courses offered at the partner-institutions
- Course modules and programmes must be accepted at the respective universities
- Output: Curriculum and study plan for a joint international master programme in 'Environmental Management in the Arctic'.



Thank you for your attention

