

# Full Proposals for International Polar Year 2007-2008 Activities

## Proposed IPY Activity Details

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### 1.0 PROPOSER INFORMATION

(Activity ID No: 122)

#### 1.1 Title of Activity

ECOSYSTEM WEST GREENLAND

#### 1.2 Short Form Title of Proposed Activity

ECOGREEN

#### 1.3 Activity Leader Details

Torkel Gissel Nielsen  
National Environmental Research Institute  
Denmark

#### 1.4 Lead International Organisation(s) (if applicable)

#### 1.5 Other Countries involved in the activity

Sweden  
Norway  
Iceland  
Germany  
France  
Canada  
USA  
UK  
Poland  
Greenland

#### 1.6 Expression of Intent ID #'s brought together in this proposed activity

773, 735

#### 1.7 Location of Field Activities

Arctic

#### 1.8 Which IPY themes are addressed

1. Current state of the environment
2. Change in the polar regions
4. Exploring new frontiers
5. The polar regions as vantage points
6. The human dimension in polar regions

#### 1.9 What is the main IPY target addressed by this activity

Natural or social science

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## 2.0 SUMMARY OF THE ACTIVITY

The overall focus of the ECOGREEN consortium is to establish the scientific basis for a long-term ecosystem-based management of marine resources in West Greenland. The West Greenland society relies almost entirely on marine resources for industrial as well as subsistence utilisation. Today, the West Greenland marine ecosystem is very productive and sustains fisheries which contribute 95% of Greenland's total export value. The Greenland Marine ecosystem also sustains seals and whales who feed in the area during summer, and, from the entire North Atlantic, seabirds by the million find a critical winter habitat resource in the ice-free area. Human use of the West Greenland marine ecosystem presents a complex mosaic of small- and large-scale commercial fishing, as well as subsistence and recreational fishing and hunting.

The Arctic marine environment is vulnerable to impacts of human activities and is of high climatic sensitivity. In the Arctic, greenhouse warming over the next century is predicted to be 2-4 times higher than at lower latitudes. Increased human impact on marine ecosystems combined with effects of global climate change heightens the need for sustainable ecosystem-based management. Today, knowledge of the interaction between climate change, natural resources, human behaviour, and governance structure is fragmentary. Consequently, the knowledge base for ecosystem management is inadequate. There is a need for co-ordination of research efforts to overcome the fragmentation of these diverse fields of enquiry. An integrated research approach is needed to develop models for sustainable ecosystem management.

The West Greenland marine ecosystem is an ideal model area for integrated studies of ecosystems, resources, and associated social factors, where general theory for ecosystem dynamics and ecosystem management can be developed and tested. Management systems must take into account the wishes and influences of diverse domestic users, science-based advice from national and international bodies, and the influence of national and international public opinion. Finally, ECOGREEN can serve as a model for integrated studies of ecosystems, resources, and associated social factors for indigenous people in other Arctic regions and form the basis for establishing a real decision support system.

Specific tasks will include:

Describing and improving the understanding of physical and bio-geo-chemical interactions through field observations and empirical, dynamic and predictive modelling with emphasis on 1) Climate change (atmosphere, ice, physical and bio-logical oceanography) 2) Pelagic-benthic coupling 3) Lateral coupling (fjord, shelf and Deep Ocean)

Quantifying and improving the understanding of the eco-system structure and productivity with emphasis on 1) Biodiversity 2) Interactions and coupling between tropic levels, and 3) Spatial and temporal scales

Identifying and describing the main social, economic and institutional drivers behind environmentally significant human behaviours with emphasis on 1) Fishing and hunting 2) Governance institutions and social interactions

Identifying and quantifying interactions between human activities and the ecosystem with emphasis on 1) Ecosystem impacts of hunting and fishing, including by-catch, discards, fish processing offal, habitat impacts of fishing gear, habitat disturbance or loss due to other human activities 2) Ecosystem impacts of other anthropogenic disturbances

Analysing the transfer of the West Greenland experiences to a generic approach for a sustainable ecosystem-based management with emphasis on 1) Reflections and operationalisation of the concept of ecosystem-based management and 2) Transfer of the West Greenland experiences to a generic approach for ecosystem management applicable into a broader Arctic context

### **2.1 What is the evidence of inter-disciplinarity in this activity?**

The concept of ECOGREEN and the international network behind it originated from a multi-disciplinary workshop recently hosted in Nuuk, Greenland. The attendees were scientists used to co-operate in arctic research projects, stakeholders and policy makers. It was decided to establish the scientific basis for a sustainable ecosystem-based management system for the marine resources off West Greenland, formulated in the present ECOGREEN project plan. More than 40 Institutes/ partners are involved in this initiative.

### **2.2 What will be the significant advances/developments from this activity? What will be the major deliverables? What are the outputs for your peers?**

Implication of climate change for the ecosystem and the society

- 1) Implemented coupled physical-biological models, tested against observations from the project period
- 2) Forecasts of oceanographic conditions and primary/secondary productivity under different climate scenarios
- 3) Assessment of implication of climate-induced habitat changes for species biodiversity.
- 4) Forecasts of resource (fish/shellfish/birds/mammals) distributions, based on habitat/production scenarios from coupled physical-biological models
- 5) Forecasts of population distribution and functional/geographic response of harvest regime from resource distribution models under different climate scenarios

Impact of fishing and hunting on ecosystem functioning

- 1) Estimates of magnitude and geographical distribution of harvests, by-catch, other unintended mortalities, and discards
- 2) Estimates of seabird consumption of discards and fish offal, assessment of critical dependence
- 3) Model-based analysis of the fisheries impacts on the ecosystem, including direct and indirect impacts on fish and shellfish populations and potential for recovery of depleted stocks
- 4) Models that predict the effects of different harvest regimes on key populations of marine birds and mammals
- 5) Evaluation of marine birds and mammals, as well as hunting activities, as nutritional, cultural, and/or tourism resources in relation to their other effects on the marine ecosystem

Impact of fishing and hunting on ecosystem structure

- 1) Benthic habitat maps of selected areas, including description of the associated benthic communities
- 2) Assessment of the geographical extent and magnitude of habitat disturbances and/or habitat changes by hunting and fishing activities
- 3) Estimate of existing/potential impacts of fishing activities on biodiversity.

Institutional framework for ecosystem-based management

- 1) Identification of the social and institutional drivers and analysis of how these drivers impact on responsible/irresponsible behaviour
- 2) An analysis of the perceptions, actions, and vested interests of stakeholders
- 3) Development and evaluation of efficient mitigation strategies to reduce the conflict between conservation goals and the use of environmental resources
- 4) And, on this basis, evaluation of possible institutional frameworks which can serve as facilitators of conflict resolution, dialogue between stakeholders to reach management decisions, implement mitigation strategies and which are able to adapt and respond to new challenges that might threaten sustainability as they arise

### **2.3 Outline the geographical location(s) for the proposed field work (approximate coordinates will be helpful if possible)**

Locations	Coordinates
South Western Greenland, with emphasis on the Fylla Bank area at 64 N	60 N to 70 N

### **2.4 Define the approximate timeframe(s) for proposed field activities?**

Arctic Fieldwork time frame(s)	Antarctic Fieldwork time frame(s)
March 2007 – March 2009	

## 2.5 What major logistic support/facilities will be required for this project?

Research Vessels  
Laboratory facilities

**Further details** – Several logistic facilities are required for the project 1) Local Research vessels Paamiut and Adolf Jensen and Åge V Jensen II, and 2) Laboratory facilities at the Greenland Institute of Natural Resources. These facilities can be shared with other projects.

## 2.6 How will the required logistics be supplied? Have operators been approached?

Source of logistic support	Likely potential sources	Support agreed
Consortium of national polar operators		
Own national polar operator		
Another national polar operator	Y	Y
National agency	Y	Y
Military support	Y	Y
Commercial operator		
Own support		
Other		

## 2.7 If working in the Arctic regions, has there been contact with local indigenous groups or relevant authorities regarding access?

## 3.0 STRUCTURE OF THE ACTIVITY

### 3.1 Origin of the activity

This activity is the start of a new programme that will outlive IPY

### 3.2 How will the activity be organised and managed? Describe the proposed management structure and means for coordinating across the cluster

#### ORGANISATIONAL STRUCTURE

The organisational structure of ECOGREEN is based on work packages, which constitute the basic units of action. This allows a degree of delegation in the responsibility for the organisation, execution, and reporting of ECOGREEN. It also brings quality to the management, as all the WP leaders have experience in leading large projects, or major divisions in their home institutions, and have been involved in several large international programmes.

#### OBJECTIVES

The project management shall:

- 1) Establish a strong co-operative and co-ordinated network and exchange of knowledge across disciplines in particular and all partners by optimisation of human and technological resource in general.
- 2) Ensure that the programme proceeds as anticipated.
- 3) Ensure that the project tasks and deliverables are completed in a timely and orderly fashion according to the project plan.

A sound decision and advisory structure shall assist the project management in assessment of project performance, achievements, fulfilment of objectives and deliverables of the work packages.

### Co-ordination

The overall co-ordination and management of the project is comprised of three tasks: Scientific co-ordination, administrative and financial management and communication. Professor Torkel Gissel Nielsen, NERI, is the scientific and technical project co-ordinator and Dr. Erik Buch the managing co-ordinator; they will be assisted by a project assistant. This co-ordination unit is assisted by the general administration of DMI (Administrative and Financial Department), which has several years of experience in administration of EU-funded projects. The support of large national agencies, such as NERI and DMI, is a strong asset in providing efficient management to the project.

### Work Package Leaders (WPL)

The WPL will co-ordinate the tasks within their sectors of activity: integrate the work of the partners, control and update planning of the tasks, organise thematic meetings as appropriate, monitor production, co-ordinate work with other activities and stimulate scientific and technical exchange within their activity. The WPL report to the co-ordinator.

### Core Management Team (CMT)

The scientific co-ordinator, the managing co-ordinator and the WPL constitute the ECOGREEN CMT. Together with the co-ordinator, the CMT will monitor closely the day-to-day progress of the project, identify and anticipate problems, and take action to remedy. The CMT will ensure that the planning is respected, the milestones met, and the deliverables provided.

### **3.3 Will the activity leave a legacy of infrastructure and if so in what form?**

ECOGREEN will build an ecosystem-based management system taking into account natural and social sciences for the West Greenland area. At the end of the project, this system will be transferred to the Greenland Institute of Natural Resources, who will implement and use it as scientific basis in their work managing the natural resources and advising the Greenland Government. The system will be developed so that it can be adapted, with few modifications, for implementation in other parts of the Arctic region.

### **3.4 Will the activity involve nations other than traditional polar nations? How will this be addressed?**

Since a particular objective of ECOGREEN is to build an ecosystem-based management system, through which natural and social sciences are combined, and which is ready for implementation in other regions of the world, Workshops, PhD schools and scientific conferences will be open for scientists outside the ECOGREEN community.

### **3.5 Will this activity be linked with other IPY core activities? If yes please specify**

"Arctic Marine Changes and Implications for Arctic Societies" is a self contained interdisciplinary cluster. As a lead project, ECOGREEN is based on extensive inter-national collaboration and meets all the criteria identifying an IPY project, including most of the additional criteria listed. However, there is a clear link to the Arctic marine themes in the cluster "Life under Natural and Anthropogenic Changes: Stress, Responses and Adaptations". Also, the marine components of the cluster entitled "Natural Resources, Uses, Management and Conservation" as well as the Arctic part of "Marine Biodiversity" share common objectives.

### **3.6 How will the activity manage its data? Is there a viable plan and which data management organisations/structures will be involved?**

The data collected during ECOGREEN consists of a variety of physical, chemical, biological, economic and social data, which will be managed by the lead organisations responsible for collection of the individual parameters, each of which has long-term experience in handling and managing large monitoring and research databases. These organisations will also take responsibility for data quality assurance, storing of data and metadata, and reporting to international databases when appropriate. ECOGREEN will additionally establish a data and information facility with a view to facilitating the routine exchange of high-quality information, data and products within the project and the provision of appropriate information for a wide range of external users. Since data and products will be generated in different institutions, efficient provision of information and products from a single user portal will require a network of 'virtual

data centres'. The tasks of this network include the management of the ECOGREEN information system, its design, the development and assessment of the users portal; and the development and maintenance of interfaces with thematic data centres, and modelling and application centres. ECOGREEN will build this system to be as transparent as possible so that users are able to determine which information is available, where the information is managed and which data can be accessed. After the IPY the management system developed during the present programme will be handed over to the Greenland Institute of Natural Resources.

### **3.7 Data Policy Agreement**

**Will this activity sign up to the IPY draft Data Policy (see website)**

Yes

### **3.8 How will the activity contribute to developing the next generation of polar scientists, logisticians, etc.?**

A unique cross-disciplinary platform for training Master, PhD and post-doctoral candidates will be established through close co-operation between universities and research institutions within and outside ECOGREEN.

### **3.9 How will this activity address education, outreach and communication issues outlined in the Framework document?**

Master, PhD and post-doctoral training is an integral component of the project. Within the project a multi-disciplinary research school will be established and serve as a platform for a genuine multi-disciplinary approach within the project. It is desirable to stimulate interest in the youth audience as a means to attracting future scientists and to increase public awareness of the role of the ocean in the environment, emphasising the interplay between nature and human activities. Material addressing high school and university students as well as the general public is planned. An interesting challenge in this respect is to produce a multimedia CDROM describing the marine ecosystem and the human interaction.

The project partners will communicate project results and developments as appropriate in scientific and technical journals and at conferences. Reports will be delivered to appropriate international committees. Brochures, multimedia presentations and posters will be created to enhance visibility of the project and recognition of its achievements. These promotional materials will be distributed during international meetings or conferences where ECOGREEN will be presented.

Hard-copy material about ECOGREEN products (forecast data, observational data, software, interface tool, bulletins, web sites etc.) will be distributed to partners and intermediate users (including policy makers) in order to disseminate information about the availability and the main characteristics of the ECOGREEN products.

ECOGREEN results and progress reports will be published in popular form through established and well-known web sites of the partners. The DMI web site serves as an example. It has an established and recognised tradition for presenting ocean, weather and climate research to the public. The site is one of the most visited web sites in Denmark and is therefore a unique outreach facility for ECOGREEN.

### **3.10 What are the proposed sources of funding for this activity?**

The strategy for ECOGREEN funding is to apply a substantial fund to cover all or most of ECOGREEN activities supplemented with small funds. The Danish and Greenland partners can apply for financial support from the Danish Research Councils. International partners will be offered logistic support from the facilities provided by the outlined project. The project consortium will, if possible, apply for EU or other international findings.

### **3.11 Additional Comments**

If working in the Arctic regions, has there been contact with local indigenous groups or relevant authorities regarding access? -  
Greenland Institute of Natural Resources, Greenland Home Rule Government, Asiaq, Greenland

Fisheries Organisations (APK), Greenland Fisherman and Hunters Association (KNAPK), Royal Greenland.

ECOGREEN will support the establishment of a unique scientific network integrating natural and social sciences and thus improving the understanding of the marine ecosystem off West Greenland. Furthermore, implications of climate change for the structure and functioning of the ecosystem will be uniquely combined with studies on social systems and governance institutions. This project will generate a novel basis for scientific co-operation between natural and social sciences, within a well-defined ecosystem, and will also create a platform for exchange of knowledge and training of young scientists. The project will benefit from the established long-term monitoring activity in both East (Zackenbergs Basic) and West (Nuuk Basic) Greenland as well as from existing oceanographic and meteorological monitoring programmes around Greenland.

## 4.0 CONSORTIUM INFORMATION

### 4.1 Contact Details

#### Lead Contact

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### 4.2 Other significant consortium members and their affiliation

Name	Organisation	Country
Dr. Ronnie N Glud	Marine Biological Laboratory, University of Copenhagen	Denmark
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Dr. Kai Wieland	Greenland Institute of Natural Resources, Nuuk	Denmark
Dr. Bo Bergström	Greenland Institute of Natural Resources, Nuuk	Denmark
Dr. Erik Born	Greenland Institute of Natural Resources, Nuuk	Denmark

Prof. M Nuttall	University of Alberta, Department of Anthropology	Canda
Prof. Eddie Carmarck	Institute of Ocean Sciences	Canada
Prof. Louis Fortier	Université Laval	Canada
Dr. David G. Barber,	University of Manitoba, Winnipeg,	Canada
Prof. Bernard Sainte-Marie	Department of Fisheries and Oceans, Mont-Joli, Qc.	Canada
Dr. Peter Munk	Danish Institute for Fisheries research	Denmark
Dr. Astrid Jarre	Danish Institute for Fisheries research	Denmark
Prof .Thomas Kiørboe	Danish Institute for Fisheries research	Denmark
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Dr. Julian Gutt	Alfred Wegener Institute for Polar and Marine Research	Germany
Dr. Frank Wenzhöfer	Max Planck Institute for Marine Microbiology	Germany
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