

Sound & Marine Life Joint Industry Program



Overview

- Research studies since 2006
- Funding: Phases 1-3: \$24M, \$13M, \$18M = \$55M
- Guidance from regulators, academic researchers, NGO's
- Significant scientific progress; 70 contracts
- Broad respect; > 20 peer-reviewed publications

Objectives

- Understand & define the environmental risks
- Decrease regulatory uncertainty
- Develop cost effective, credible mitigation measures
- Improve planning for offshore project development



Joint Industry Program

Research Focus Areas

- I. Sound source characterization and propagation
- II. Physical and physiological effects
- III. Behavioral effects and their biological significance
- IV. Mitigation and monitoring technologies
- V. Research tools and methods

www.soundandmarinelife.org





- The Marine Vibrator Joint Industry Project (MVJIP) was started by Exxon Mobil Corporation, Shell Exploration and Production Company, and Total E&P Research and Technology USA which recognized the desirability of an alternative to air gun arrays.
- The main goal of the MVJIP is to develop a commercially viable marine vibrator source. This alternative source could be used for marine seismic surveys in environmentally sensitive areas, for areas where a better seismic signature is needed, and for an improved source for certain operational environments, such as shallow water, where air gun arrays perform sub-optimally.
- The project was established through the Global Petroleum Research Institute (GPRI), which is affiliated to Texas A&M University.
- The first task of this JIP was to develop a set of minimum required specifications for a marine vibrator seismic source. After establishing the key specifications, a wide range of possible vendors were evaluated to gauge interest and suitability. The three most promising vendors have been contracted (2013-2014) and have each begun to develop their unique solutions. After designing, building, and testing prototypes of each marine vibrator over the next two years, the intention is to build full source arrays for commercialization.

ExxonMobil.



International, Cross-Sector Business Leadership Alliance

Cross sector voice for ocean industries (e.g. shipping, oil/gas, fisheries, aquaculture, tourism, offshore renewables)

Forum for Business Leadership and Collaboration

Risk reduction, Mitigation

Goal: A healthy and productive global ocean and its responsible use

Members:

Direct Ocean Users

Ocean User Support Industries

(e.g. shipbuilders)

Essential Ocean Use “Infrastructure”

(e.g. Insurance, Finance, Legal)



The International Business Alliance
for Corporate Ocean Responsibility

www.oceancouncil.org

The Joint Venture Project on Seal Distribution and Migration Patterns in the Greater Barents Sea Area



Harp Seal



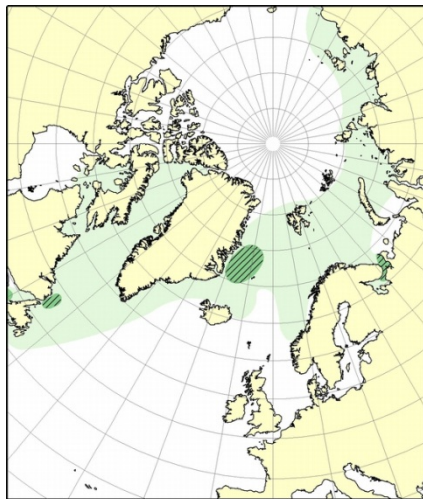
Hooded Seal



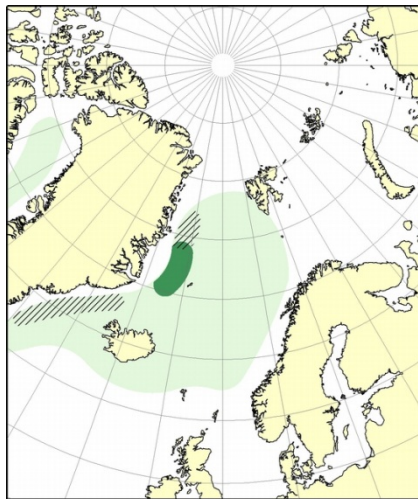
Grey Seal



Harbor Seal



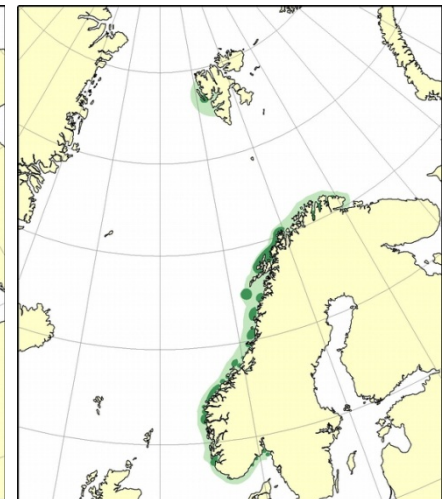
Grenlandssel
 Hårfellingsområde
 Kasteområde
 Utbredelsesområde



Klappmyss
 Kasteområde
 Hårfellingsområde
 Utbredelse



Havert
 Høy konsentrasjon
 Omr. med mye vandring
 Utbredelsesområde



Steinkobbe
 Høye konsentrasjoner
 Utbredelsesområde (innefor 12NM)

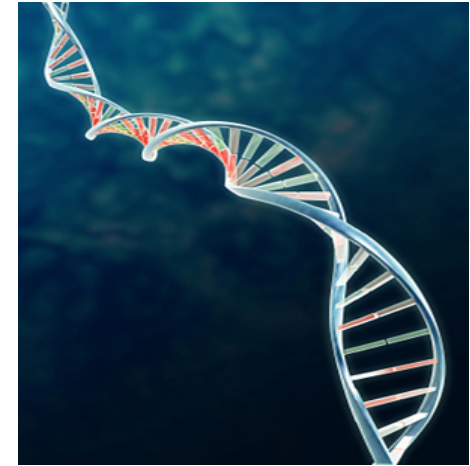
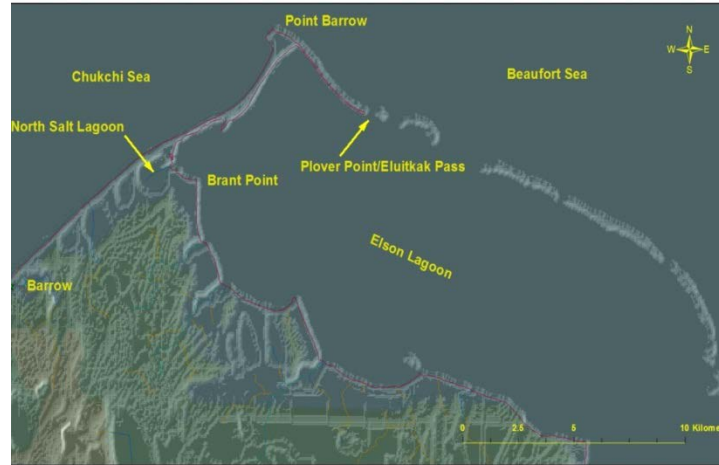


Fisheries and Oceans
Canada

ExxonMobil

Elson Lagoon: Fish environmental-DNA Study

ExxonMobil, Battelle and the North Slope Borough



- Proof of Concept: Qualitative Species Assessment from env-DNA
- Env-DNA extracts from water samples analyzed using DNA sequencing
- Targeting fish DNA
- Results compared with catch data from subsistence fishermen gillnet records.
- Next: Marine Mammals

Protecting the Western Grey Whales

The Russian Arctic

- Monitoring & Protection since 1997.
- Aimed at safeguarding and collecting data on the population's condition, biology and habitat.
- The WGW population is increasing
- Field work components:
 - Acoustic calibration; real time acoustic monitoring
 - Photo Identification
 - Ship and land based distribution surveys
 - Land based behavioral observations
 - Benthic observations
 - Food resources surveys

ExxonMobil working with:

- Marine Biology Institute (Vladivostok);
- Pacific Oceanological Institute (Vladivostok);
- All-Russian Fisheries and Oceanography Research Institute (Moscow);
- Sakhalin State University (Yuzhno-Sakhalinsk)
- Oregon State University (Tagging)
- Texas Tech University (Biopsy analyses)



Photos Courtesy Prof Bruce Mate, Oregon State University

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Examples of Other Research Projects co-funded by ExxonMobil:

- **Evaluating the Effects of Satellite Tagging on Humpback Whales**

NOPP/NFWF Grant (#23318)

Jooke Director, Humpback Whale Studies Program Center for Coastal Studies, Provincetown, MA and
Michelle Pico, Program Director for Marine Conservation; National Fish and Wildlife Foundation

Objective: To provide the first systematic follow-up evaluation of Type 1 (deep implantable) satellite tags on large whales. Status: This new tag will have significant welfare benefits and cost savings.

- **Patagonian Right Whales and the Southern Ocean Ecosystem**

Roger Payne and Ian Kerr, Ocean Alliance; Roxana Schteinbarg and Diego Taboada Instituto de Conservación de Ballenas

Status: By the year 2000, the population had been growing steadily at 6.8% per year since 1971 and included an estimated 2,246 individuals. The 2010 population estimate found that the growth rate had declined to 5.1% per year, apparently as a consequence of increased calf mortality and increased numbers of four-year calving intervals resulting from pre-term fetal losses. Next: Attempting to understand why.

- **Bioenergetics Model & PCOD**

Dan Costa and team at the University of California Santa Cruz

The biogenetics model is an energy balance model for cetaceans and pinnipeds with food consumption as the energy input. Energy outputs include growth, reproduction, repair, waste, and metabolic work (energy expenditure).

Engaging with Local Communities

Imperial Oil and ExxonMobil work to understand and incorporate the perspectives of indigenous peoples through:

- Project planning
- Design
- Execution
- Ongoing operations



Inuvialut community members were **key participants** in the marine mammal observation program to **protect marine mammals during project operations** and to understand their distribution in exploration areas.

Imperial Oil



Engaging with Local Communities

Focus:

1. Workforce Development
2. Supplier Development
3. Strategic Community Investment
4. Partnerships/Volunteerism

Example: Sakhalin-1

- > 13,000 jobs created; 90% Russian Nationals
- 2 of 3 investment \$'s spent doing business with Russian companies or joint ventures with Russian participation
- Community investment expected to be > \$180M over project life
- YTD: lasting positive effect on the local economy
- Respect for, and promotion of, local cultures and customs



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