



Environmental Studies Research Fund



ANNUAL REPORT 2020 - 2021

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Message from the Chair

I am very pleased, on behalf of the ESRF Management Board, to submit the Environmental Studies Research Fund (ESRF) 2020 -2021 Annual Report.

It was an extraordinary year of accomplishments and challenges with the global spread of COVID-19. I applaud the Management Board for adapting to a “new normal” of virtual meetings and their unwavering support for the ESRF. Last year, Board members experienced first-hand the importance of ESRF-funded research with the completion of the research project titled “An Assessment of the Potential Risks of Seismic Surveys to Affect Snow Crab Resources”. This research, led by Dr. Corey Morris, Fisheries and Oceans Canada, demonstrated that “if seismic surveying impacts commercial snow crab, based on factors considered by our experiments, it is within the range of natural variability.” This research helps to address knowledge gaps on the potential impacts of seismic and assists governments with policy development and regulatory decision making. On behalf of the ESRF Management Board, I wish to congratulate Dr. Morris and the team with representatives from the Science Branch, Fisheries and Oceans Canada St. John’s, NL, JASCO Applied Sciences, the Fish Food and Allied Workers Union, and the Department of Ocean Sciences, Memorial University of Newfoundland.



This is an exciting time for ESRF as we implement new research priority areas identified as part of the 2020-2025 plan. This year, the Management Board has approved new research projects related to the environment and social impacts of offshore oil and gas activities on Canada’s frontier lands in the areas of the migratory behavior of Atlantic salmon and Indigenous Knowledge.

The identification of 2020-2025 research priorities has led to the single-largest, multi-year award to date by the ESRF to study Atlantic salmon migratory behaviour while at sea that will increase our understanding of possible interaction between this species and offshore oil and gas activities on Canada’s east coast.

As we move forward with these new research projects, we will also pursue new initiatives in the areas of climate change, coral and sponges, Indigenous Knowledge, oil spill effects and responses, and marine noise.

In closing, I would like to wish the best of luck to all researchers this field season and we look forward to discussing your progress and research findings.

A handwritten signature in black ink that reads "J. Matthews". The signature is written in a cursive, flowing style.

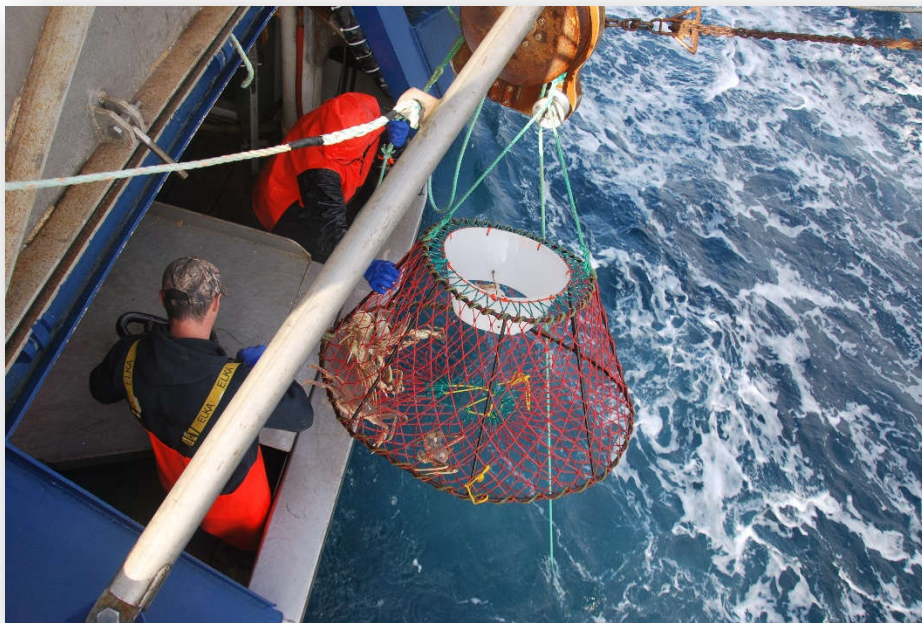
Jennifer Matthews
Chairperson, ESRF Management Board
May 29, 2021

Mandate

The Environmental Studies Research Fund (ESRF) is a research program that sponsors studies on environmental and social implications related to oil and gas exploration and development in Canada's frontier lands.

The information arising from these studies is designed to assist all involved stakeholders, including citizens, industry and government, in their decision-making related to oil and gas exploration and development.

Initiated in 1983 under the *Canada Oil and Gas Act (COGA)*, the ESRF now receives its legislated mandate through the superseding legislation, the *Canadian Petroleum Resources Act (CPRA)*, proclaimed in February 1987.



Testing catch rates of commercial snow crab before, during and after seismic survey.
Credit: Corey Morris, DFO

ESRF research is funded by levies on oil and gas companies that hold licenses for exploration and development in Canada's frontier lands.

The Minister of Natural Resources is responsible for the administration of the ESRF South Account for regions mainly south of 60° latitude, including the Hudson Bay, and the Minister of Intergovernmental and Northern Affairs and Internal Trade is responsible for the administration of the North Account for regions north of 60° (See Annex 1 for a map of ESRF Prescribed Regions).

ESRF Management Board

The ESRF is directed by a twelve-member joint government/industry/public Management Board and is administered by a Secretariat that resides within the Offshore Petroleum Management Division of Natural Resources Canada.

The ESRF Management Board members are selected for their expertise and specialized technical knowledge relative to the mandate of the Fund. Management Board members are appointed jointly by the Minister of Crown-Indigenous Relations and Northern Affairs, and the Minister of Natural Resources.

The ESRF Management Board directs the business of the Fund, sets priorities for study topics, determines the program budget and facilitates the development of study proposals.

Members

Private Sector

Jennifer Matthews, Chairperson
Canadian Association of Petroleum Producers

Sherry Becker
Imperial

Steve Bettles
Cenovus Energy

Thomas McKeever
Equinor Canada Ltd

Public Sector

Philip Walsh
Southern Regions

Vicki Sahanatien
Northern Regions

Government of Canada

Daniel VanVliet, Vice-Chairperson
Crown-Indigenous Relations and Northern Affairs Canada

Janine Murray
Environment and Climate Change Canada

Liisa Peramaki
Fisheries and Oceans Canada

Anastassia Manuilova
Canada Energy Regulator

Offshore Petroleum Boards

Dena Murphy
Canada-Nova Scotia Offshore Petroleum Board

Elizabeth Young
Canada-Newfoundland & Labrador Offshore Petroleum Board

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ESRF Management Board members (October 2019)
Credit: Julie Marcil

ESRF Research Priority Areas 2020 - 2025

The ESRF Management Board (Board) sets its research priority areas by considering the issues and data gaps in the context of its mandate, which is to provide targeted environmental and socioeconomic research to support regulatory decision making for Canada's Offshore Areas. The composition of the Board and the collective experience of its members provides a means to this end, as does the advice from its East Coast Advisory Committee, which is comprised of a diverse group of East Coast stakeholders with interests in, and concerns for, offshore oil and gas development.

Seabirds

From the beginning of oil and gas production operations on the East Coast in the 1990s, there has been concern over the effect of oil spills on seabirds and the possible issue of seabird attraction to offshore oil and gas installations. Environmental assessments on the East Coast have consistently identified the potential effects of oil spills on seabird populations as significant. Consequently, the Fund has supported various seabird studies including, but not limited to:

- updating baseline data on seabird population distributions across the East Coast Offshore,
- considering the effects of low levels of hydrocarbons on seabird feathers,
- experimental studies on the ability of observers to detect and track actual and surrogate seabird carcasses in support of estimates of seabird mortality due to oil spills; and,
- seabird attraction to offshore platforms

In the coming years, the Fund will support projects to further study seabird attraction to offshore oil and gas platforms, with a specific emphasis on Leach's storm-petrel, a species that is declining on the East Coast. These initial studies will provide the basis for making research decisions on a broader research program that may include experimental work on attraction of seabirds to offshore installations.

Indigenous Knowledge

Recent strategic environmental assessment on offshore exploration drilling highlighted Indigenous communities' concerns over the implications of offshore oil and gas development for Atlantic Salmon survival at sea. The Fund is currently supporting work on this topic by a research consortium led by Fisheries and Oceans Canada. This project involves a tagging and tracking study that will document the migratory behavior of Atlantic Salmon from their natal rivers in Nova Scotia, New Brunswick, Newfoundland and Labrador and Quebec in relation to areas of concentrated oil and gas activities in the Northwest Atlantic.

Furthermore, in consultations with the Atlantic Policy Conference of First Nations Chiefs Secretariat, the Fund is supporting a webinar project to communicate Indigenous perspectives to stakeholders engaged in offshore oil and gas development and regulation. Following this initial project, the Fund is planning additional engagement with East Coast Indigenous communities to explore their concerns and associated research priorities about offshore oil and gas development,

Climate Change

Research undertaken by the Federal government and the global community over many years has provided information to assist regulatory decision making for offshore oil and gas development. The progress made in climate modelling and the documentation of the effects induced by climate change allows the Board to consider research in this area relevant to its specific mandate.

In the coming years, the Board will look at what specific research priorities can be identified that will support its mandate but not duplicate what is already in progress. In general, it is foreseen that any work undertaken will fall into the area of response or adaptation to climate change in the context of the regulatory decisions that are needed to address the current and future challenges faced by the offshore oil and gas industry on the East Coast.

Marine Mammals and Fish

This research priority area has encompassed a wide variety of ESRF-funded studies in the past, including

- mapping of fish spawning areas across the East Coast;
- modeling the effects of noise on marine mammals in Nova Scotia's Gully area;
- assessing the effects of oil platform operational discharges on larval stages of commercial fish species;
- testing the toxicity of crude oil with or without the addition of dispersant;
- assessing the effects of marine seismic survey noise on snow crabs and fish; and,
- comparing of various methods for detecting marine mammals at sea.

Research undertaken by ESRF often informs more than one research priority area. Current work on Atlantic Salmon described in the Indigenous Knowledge priority area above is an example of cross-cutting research. As is work on the East Coast marine soundscape noted under the Marine Noise priority area below, which, among other things, served to map the distribution of marine mammals across the East Coast offshore showing detections of bottle-nosed whales in an area not previously identified to be a congregation area for the species in the past.

The Fund's current research priorities related to marine mammals and fish are building on the above studies with a focus on the need to improve understanding of marine mammal distributions in the deeper waters of the Newfoundland and Labrador Offshore. This is of obvious importance as the oil and gas industry moves to explore and produce in the deep waters off the continental shelf. Equally important, especially in the context of climate change, is building understanding of fish spawning and rearing areas in the offshore and how they will change in the coming decades in response to linked and changing oceanographic parameters such as temperature, salinity and acidity.

Coral and Sponge Communities

The Fund identified the topic of potential effects of drill cuttings on coral and sponge communities near offshore drilling operations as worthy of study. This is a concern given the fact that oil and gas exploration and potential production operations are moving into deeper shelf slope and off-shelf waters.

In the early 2000s, the Fund supported an effort to map sponges and corals across the East Coast Offshore in collaboration with Fisheries and Oceans Canada. Since then, in the context of the marine protected areas initiative, the Federal Government has undertaken considerable research and policy development in this area.

In future calls for proposals, the Board will consider if targeted work on effects of drill cuttings on sponges and corals in relation to oil and gas activities is needed to support regulatory decision making.

Oil Spill Effects and Response

The environmental implications of oil spills and responses to these events have long been a focus of East Coast environmental assessment processes and consequently for the Fund, reaching back to the Hibernia Project environmental assessment in the 1980s.

Pursuant to the Oceans Protection Plan, the Government of Canada has placed emphasis on improvements to Canada's oil spill response regime with research on alternative spill response measures, including the use of spill treating agents (e.g., dispersants). The Fund has conducted targeted research in this area for many years with recent projects focused on the toxicity of dispersed oil and dispersants to early life stages of commercially-important fish and shellfish species. In addition, effects on seabirds from oil spills has also been a research focus as outlined under that research priority below.

The Fund's currently stated research priorities encompass timely and effective oil spill treatment strategies and spill fate and effects modeling. In this context, the Management Board is closely monitoring the Federal Multi-Partner Research Initiative under the Oceans Protection Plan to ensure any specific research projects it might fund complement and/or follow up on the outcomes of that initiative.

Marine Noise

Stemming from the ongoing concerns of fishers for the effect of seismic surveys on catch rates of commercial fish species, the Fund is supporting cutting-edge research on the effects of 2D and 3D seismic on snow crab and groundfish in offshore Newfoundland and Labrador. It is currently supporting similar innovative work on commercial groundfish species.

In addition, research on the soundscape and sound propagation at some 20 locations across the East Coast offshore, with the objective of improving sound propagation modelling including marine mammals, was recently published under the Fund.

Current Research Projects 2020 – 2021

Investigation of effects of East Coast Canada Water Accommodated Fraction (WAF) and Chemically Enhanced Water Accommodated Fraction (CWF) on Early Life Stages of Commercially Harvested Marine Species

Project Leads: Chris Bridger and Benjamin de Jourdan
Organization: Huntsman Marine Science Centre

Project Description

The potential effects of exposure of commercial fish species to a crude oil spill and any dispersants used to mitigate the effects of such a spill are a concern. This study examines the toxicology of those fractions of a representative east coast crude oil that are entrained in water, both naturally and as a result of dispersant use, to the early life stages of Atlantic herring, Atlantic cod, American lobster and Northern shrimp.

ESRF Funding: \$1,629,285 over 5 years



Image of less than 24-hr old American lobster larvae. This sensitive, early life stage was utilized in toxicity testing to better understand the effects of physically and chemically dispersed crude oil on this commercially important fishery.
Credit: Benjamin de Jourdan, Huntsman Marine Science Centre

Assessment of Potential Risks of Seismic Surveys to Affect Groundfish Resources

Project Lead: Corey Morris
Organization: Fisheries and Oceans Canada

Project Description

Oil and gas exploration in Southern Atlantic frontier regions has been very active at a time when the fishing industry in this same area is becoming increasingly reliant on rebuilding the groundfish fishery. The effects of ocean noise on marine life is a growing concern globally, however the specific impacts including non-lethal effects and how they are manifested remains poorly defined for many species groups including fish. This project will examine potential risks of seismic air gun surveys to affect commercially important and culturally important groundfish species, including commercial catchability, and fish behaviour (movement).

ESRF Funding: \$6,171,500 over four years



Credit: Corey Morris, DFO

Atlantic salmon in the Eastern Canadian offshore regions: timing, duration and the effects of environmental variability and climate change

Project Lead: Martha Robertson

Organization: Fisheries and Oceans Canada

Project Description

Of the Atlantic Canadian fish species, Atlantic salmon has one of the most complex life histories and migration patterns. Post-spawned adult (kelt) and juvenile (post-molt) salmon migrate from their native freshwater river to the Atlantic Ocean to feed, sometimes even as far as the Labrador Sea. This project will use acoustic tags with array of tag tracking receivers and satellite telemetry to better understand the migratory behaviour (location and habitat use) of salmon while at sea. The objective of this project is to determine when, where and for how long Atlantic salmon from different life stages (juvenile post-smolt, post-spawned kelt and multi-sea winter adults) are in the Eastern Canadian offshore regions. Results will support regulatory decision making in Canada's areas of offshore oil and gas activity.

Project's Facebook page: <https://www.facebook.com/groups/1620973028291992/>

ESRF Funding: \$11,789,453 over five years

Laying the Groundwork: Enhancing Cross Cultural Understanding through Two-Eyed Seeing

Project Lead: Melissa Nevin

Organization: Atlantic Policy Congress of First Nations Chiefs Secretariat

Project Description

The purpose of this project is to promote the understanding of Indigenous knowledge and appropriate use of Indigenous knowledge in decision-making on offshore oil and gas projects in Atlantic Canada. Fundamental to this is the need to build a common and consistent understanding of Indigenous Knowledge concepts within the oil and gas industry. This project will use the knowledge system approach to enhance cross-cultural understanding, focusing on what is Indigenous knowledge, the relation between the Indigenous and Western knowledge systems and ways both can be used for the benefit of all, using the concept of Two-Eyed Seeing.

ESRF Funding: \$26,800 for 2021-2022



Team member holding a tagged salmon in the current after its recovery from the anesthetic and tagging procedures.

Credit: Kyle Denny

Financial Statements

STATEMENT OF FINANCIAL POSITION

The ESRF Management Board is responsible for the presentation of the annual financial statements to the Ministers of Natural Resources and Crown-Indigenous Relations and Northern Affairs pursuant to the *Canada Petroleum Resources Act*.

Levies are collected from oil and gas companies that hold licenses for exploration and development in Canada's frontier lands. In accordance with the *Canada Petroleum Resources Act*, when a license is issued during the course of the year, levies are collected for the current year and the two years prior. The collection of unpaid levies is pursued on an ongoing basis by the ESRF Secretariat.

Table 1 below shows the fiscal information for the annual expenditures for ESRF in the 2020-2021 fiscal year. All expenses are paid out of the fiscal year in which they are invoiced.

In 2020-2021, the total study expenditures for the ESRF amounted to \$1,888,350. Administration costs for this period were \$232,680. Revenues collected through levies were \$122,040, with a total \$389,044 remaining in outstanding levies in the South as of March 31, 2021 (refer to Table 2 for details).

Table 1 – ESRF Expenditures April 1, 2020 to March 31, 2021 (in dollars)

REGION	OPENING CASH BALANCE APRIL 1, 2020 (\$)	TOTAL REVENUE, LEVIES & RETURNS (\$)	ADMINISTRATION COSTS (\$)	STUDY PROGRAM COSTS (\$)	CLOSING BALANCE MARCH 31, 2021 (\$)
SOUTH REGION	5,879,937	122,040	232,680	1,888,350	3,880,947
NORTH REGION	154,948	0	0	0	154,948
TOTAL	6,034,885	122,040	232,680	1,888,350	4,035,895

NOTE: The Public Accounts of Canada closing balances for the Southern and Northern Regions at the end of the 2020-21 fiscal year may differ. Given accounting processes at year-end, the distribution of Administration Costs between the regional accounts is not possible until the new fiscal year. The Administration Costs in this table account for the redistribution of funds between the accounts.

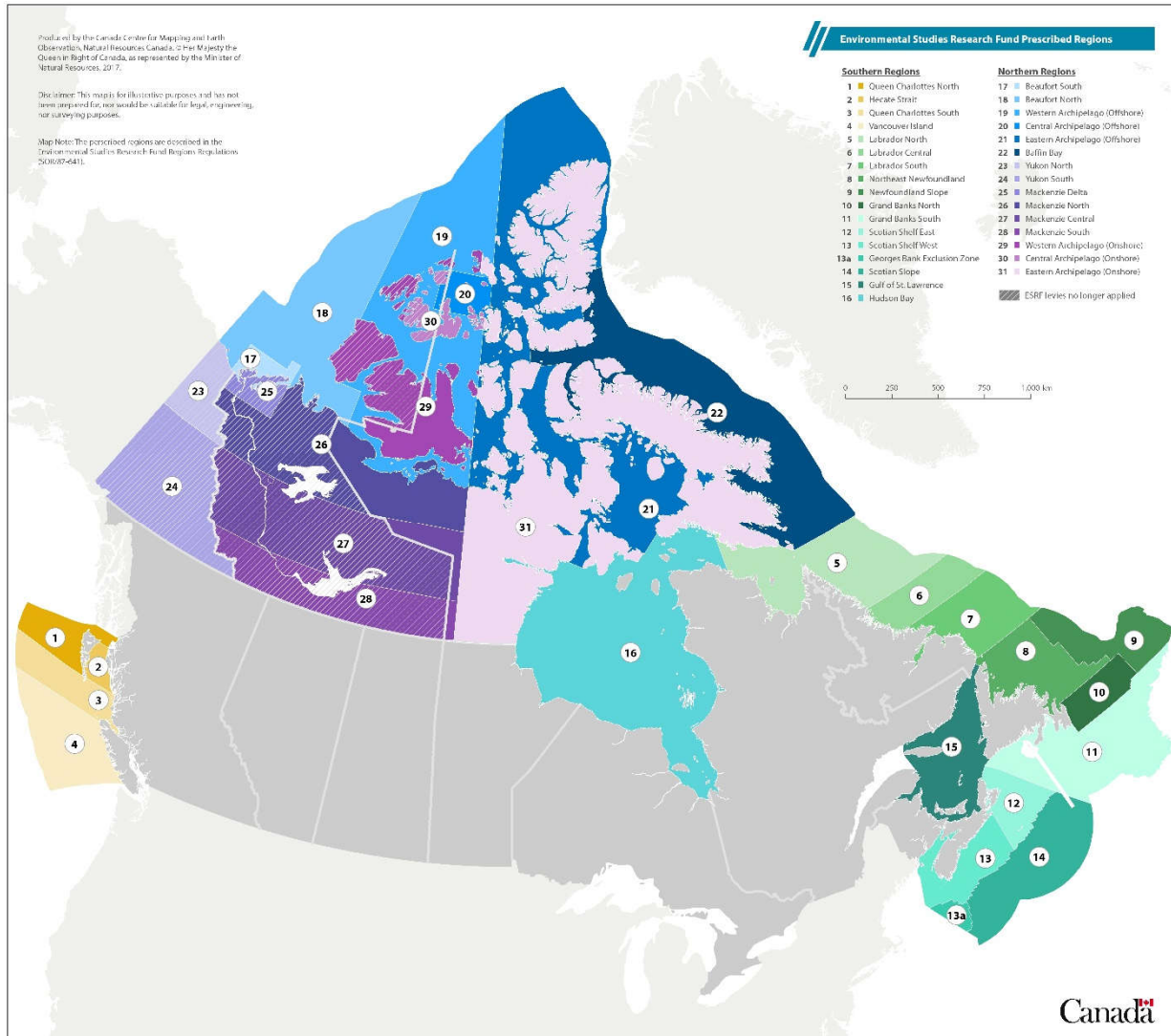
Table 2 – ESRF Regional sub accounts – Levy income 2020-2021 (in dollars)

REGION		LEVY RATE Levy 32 2020-2021 (\$/Hectare)	REVENUES ¹ Levy 32 2020-2021 (\$)	REVENUES Back Levies (\$)	TOTAL LEVY INCOME (\$)
1	Queen Charlottes North	0	-	-	-
2	Hecate Strait	0	-	-	-
3	Queen Charlottes South	0	-	-	-
4	Vancouver Island	0	-	-	-
5	Labrador North	0.1081	-	-	-
6	Labrador Central	0.1081	-	-	-
7	Labrador South	0.1081	-	-	-
8	Northeast Newfoundland	0.1081	-	-	-
9	Newfoundland Slope	0.1081	-	122,040	122,040
10	Grand Banks North	0.1081	-	-	-
11	Grand Banks South	0.1081	-	-	-
12	Scotian Shelf East	0	-	-	-
13	Scotian Shelf West	0	-	-	-
14	Scotian Slope	0	-	-	-
15	Gulf of St. Lawrence	0.1081	- ²	-	-
16	Hudson Bay	0	-	-	-
	Total South		\$0	\$122,040	\$122,040
17	Beaufort South	0	-	-	-
18	Beaufort North	0	-	-	-
19	Western Archipelago-Offshore	0	-	-	-
20	Central Archipelago-Offshore	0	-	-	-
21	Eastern Archipelago-Offshore	0	-	-	-
22	Baffin Bay	0	-	-	-
23	Yukon North	0	-	-	-
24	Yukon South	0	-	-	-
25	Mackenzie Delta	0	-	-	-
26	Mackenzie North	0	-	-	-
27	Mackenzie Central	0	-	-	-
28	Mackenzie South	0	-	-	-
29	Western Archipelago-Onshore	0	-	-	-
30	Central Archipelago-Onshore	0	-	-	-
31	Eastern Archipelago-Onshore	0	-	-	-
	Total North		\$0	-	\$0
	TOTAL				\$122,040

¹ Due to unforeseen circumstances, the levy rates for ESRF Prescribed for Regions 1-16 were set by the Minister of Natural Resources on March 30, 2021. Revenues from those levies will be received during the 2021-2022 fiscal year and will be combined with the 2021-2022 revenues.

² A levy of \$389,044 remains outstanding in this region as of March 31, 2021.

Annex 1: ESRF Regional Map



Annex 2: Open Call for Research & Study Selection Process

ESRF uses an open call for research proposals to select new projects. These calls are based on research priority areas previously identified by the ESRF Management Board. Open calls are posted on the [Fund's website](#) and distributed via the ESRF mailing list. Anyone interested in being added to the mailing list can contact the [ESRF Secretariat](#).

Eligible funding recipients must be:

- Legal entities validly incorporated or registered in Canada, including:
 - For profit and not for profit organizations such as companies, industry associations, research associations, etc.;
 - Indigenous organizations and groups;
 - Community groups; and
 - Canadian Post-Secondary Institutions; or
- Federal, provincial, territorial, regional and municipal governments and their departments, agencies and research centres.

The study selection process follows four distinct phases



Annex 3: Bibliography of Past ESRF Publications, 1985 - 2020

All ESRF studies are subject to a scientific/technical peer review. Reports that are deemed to be scientifically or technically significant are published in the ESRF Technical Report Series. Since its inception in 1983, the ESRF has published over 200 reports and related studies.

All published reports and studies are available for
download through the ESRF website:
<http://www.esrfunds.org/174>.

Bibliographies

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- 026 Young, S.C. *Bibliography on the Fate and Effects of Arctic Marine Oil Pollution*. March 1986. 212 p.
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- 021 Tidmarsh, W.G., R. Ernst, R. Ackman and T. Farquharson. *Tainting of Fishery Resources*. January 1986. 174 p.
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- 036 Norton, P. and L.A. Harwood. *Distribution, Abundance and Behavior of White Whales in the Mackenzie Estuary*. June 1986. 73 p.
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Environmental Effects and Monitoring

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- 063 Drinnan, R.W., M. Yunker, A. Gillam, N. Charchuk and S.R.H. Davis. *Options for Treatment and Disposal of Oil-based Mud Cuttings in the Canadian Arctic*. February 1987. 167 p.
- 066 Nenninger, R.D. *Monitoring a Sump Containing Drilling Mud with High Salt Content*. March 1987. 47 p.
- 075 Cross, W.E. and B. Humphrey. *Monitoring the Long-Term Fate and Effects of Spilled Oil in an Arctic Marine Subtidal Environment*. August 1987. 120 p.
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- 134 Richard, P.R., A.R. Martin and J.R. Orr. *Study of Summer and Fall Movements and Dive Behaviour of Beaufort Sea Belugas, Using Satellite Telemetry. 1992–1995*. March 1987. 34 p.
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