

# Environmental Studies Research Fund

Annual Report 2021 - 2022



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## MESSAGE FROM THE CHAIR

On behalf of the ESRF Management Board, I am pleased to submit the Environmental Studies Research Fund (ESRF) 2021-2022 Annual Report.

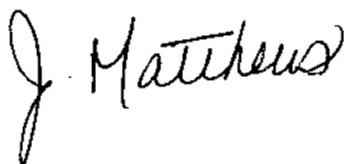
Previously, the COVID 19 pandemic presented challenges for ESRF funded researchers who had to delay field programs and in-person collaboration opportunities.

2021-2022 was an exciting year for ESRF as researchers were able to resume fieldwork and continue their research. This year, ESRF continued funding field research looking at the effect of seismic sound on groundfish resources as well as the migratory behaviour of Atlantic salmon in regions of offshore oil and gas activities. The Fund also sponsored four new projects. One such project helped facilitate laying the groundwork discussion to gain a better understanding of traditional Indigenous knowledge systems and the use of the Two-eyed Seeing concept. Two other projects focus on using tracking technologies to evaluate the overlap of Leach's Storm-petrel with offshore oil and gas platforms as well as their attraction to artificial lighting. The final project is using undersea autonomous glider technology to monitor marine mammals and noise in the Beaufort Sea.

Under the Fund's list of accomplishments this year, is the completion of a very important study, led by Chris Bridger and Benjamin de Jourdan from the Huntsman Marine Science Centre, investigating the effects of crude oil and dispersant on early life stages of commercially harvested marine species, such as Atlantic herring, Atlantic cod, American lobster and snow crab. Toxicological end-points established by this project can help determine the best course of action in the unlikely event of an oil spill.

The Fund's ongoing support of research in Canada's frontier lands would not be possible without the dedication of the ESRF Management Board members and the Secretariat. This year, I would specifically like to thank Philip Walsh, Marielle Thillet, Mark Hopkins and Patrice Simon for their service to the Board. I would also like to welcome, Daniel Van Vliet, Julie vanTol, Liisa Peramaki and Thomas McKeever as new members of the Management Board. They bring with them combined experience with the Canadian oil and gas industry, marine environment management, research, regulatory and southern and northern issues.

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



Jennifer Matthews  
Chairperson, ESRF Management Board  
May 30, 2022

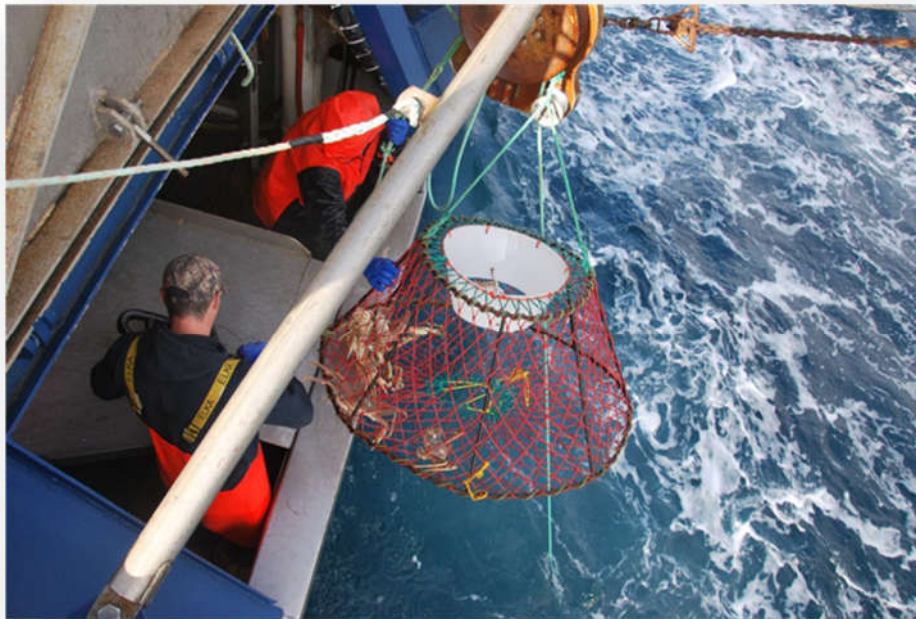


## MANDATE

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 *Canada Petroleum Resources Act (CPRA)*, proclaimed in February 1987. As well, the *Canada-Newfoundland Atlantic Accord Implementation Act* and the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* provide legislative direction in the Fund's Southern Regions.



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 Northern Affairs 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 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

**Julie vanTol**  
Southern Regions

**Vicki Sahanatien**  
Northern Regions

#### Government of Canada

**Daniel Van Vliet**, 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

### ESRF Contact Information:

#### ESRF Secretariat

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Website: [www.esrfunds.org](http://www.esrfunds.org)



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. The composition of the Board and the collective experience of its members provides a means to this end, as does the advice from the Board's East Coast Advisory Committee and Northern Advisory Committee. Those advisory groups are comprised of a diverse group of stakeholders from each specific regions with interests in, and concerns for, offshore oil and gas development.

Due to the northern moratorium on offshore oil and gas activities, no new funding for research is levied in the north at the moment. However, the Environmental Studies Research Fund is currently funding one marine monitoring project using funds levied prior to the 2016 moratorium.

### 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 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 threatened species ([COSEWIC, 2020](#)), 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

The recent Regional Assessment of Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador 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, Prince Edward Island, Newfoundland and Labrador and Quebec in relation to areas of concentrated oil and gas activities in the Northwest Atlantic.



In collaboration 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.

## CLIMATE CHANGE

The Board recognizes that climate change is a global challenge and driving factor in many exploration and development considerations, and is cognizant of the large and growing body of research both domestically and internationally in this space.

The Board will continue to consider potential research priorities that would positively contribute to our understanding of the issue in the specific context of regulatory decision-making for oil and gas activities in frontier regions.

## 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 (2003-2010);
- modeling the effects of noise on marine mammals in Nova Scotia's Gully area (2015-2017);
- assessing the effects of oil platform operational discharges on larval stages of commercial fish species (2016-2018);
- testing the toxicity of crude oil with or without the addition of dispersant (2014-2020);
- assessing the effects of marine seismic survey noise on snow crabs and fish (2014-2020); and,
- comparing of various methods for detecting marine mammals at sea (2014-2019).

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. Similarly, work on the East Coast marine soundscape noted under the Marine Noise priority area below, served to map the distribution of marine mammals across the East Coast offshore and detected the presence of bottle-nosed whales in an area not previously identified as a congregation area for the species in the past.

The Fund's current research priorities related to marine mammals and fish are building on past ESRF sponsored 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 high importance as the oil and gas industry moves to explore and develop operations 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 may change in the coming decades in response to 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 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 potential 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 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 2021-2022

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

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**Project Leads:** Chris Bridger and Benjamin de Jourdan  
**Organization:** Huntsman Marine Science Centre  
**ESRF Funding:** \$1,629,285 over five years

#### **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.



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

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### *Assessment of Potential Risks of Seismic Surveys to Affect Groundfish Resources*

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**Project Lead:** Corey Morris  
**Organization:** Fisheries and Oceans Canada  
**ESRF Funding:** \$6,171,500 over five years

#### **Project Description**

Oil and gas exploration in East Coast offshore 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).



Credit: Corey Morris, DFO

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

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**Project Lead:** Martha Robertson  
**Organization:** Fisheries and Oceans Canada  
**ESRF Funding:** \$11,789,453 over five years

### **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-smolt) salmon migrate from their native freshwater river to the Atlantic Ocean to feed, sometimes even as far as the Labrador Sea. This project is using acoustic tags with an 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/>



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

Credit: Kyle Denny

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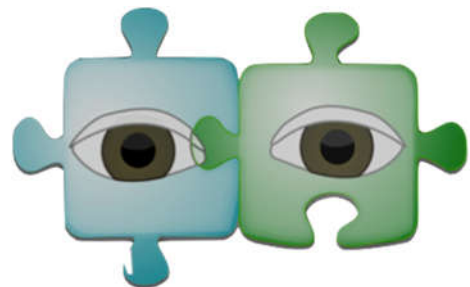
## ***Laying the Groundwork: Enhancing Cross Cultural Understanding through Two-Eyed Seeing***

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**Project Lead:** Melissa Nevin  
**Organization:** Atlantic Policy Congress of First Nations Chiefs Secretariat  
**ESRF Funding:** \$26,800 for 2021-2022

### **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.



Source: Integrative Science

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***Using tracking technologies to evaluate overlap of Leach’s storm-petrel with offshore oil and gas platforms***

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**Project Lead:** April Hedd

**Organization:** Environment and Climate Change Canada

**ESRF Funding:** \$561,500 over three years



Source: Laura MacFarlane Tranquilla

**Project Description**

Seabird attraction to offshore oil and gas installations and vessels in the East Coast offshore has been an issue for more than 20 years. A basic understanding of the nature (if, when, how) and consequences of seabird attraction and interaction with offshore oil and gas platforms is still unavailable. This is of particular concern for Leach’s Storm-petrels, as it is threatened and thought to be one of the species most at risk. The focus of this project is to use emerging miniaturized tracking technologies to rigorously quantify the spatial overlap of breeding Leach’s Storm-petrel marine habitat with offshore oil and gas operations in the region. This project will enhance our understanding of Leach’s Storm-petrel habitat use in space and time in Canada East Coast offshore and contribute significantly to the regulatory decisions that need to be made with respect to the effect of offshore platforms on this species populations.

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***Literature reviews on seabird attraction to artificial light and seabird detection methods for East Coast offshore oil and gas installations***

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**Project Lead:** Justin So

**Organization:** Wood Environment & Infrastructure Solutions

**ESRF Funding:** \$265,790 over two years

**Project Description**

The objective of this project is to carry out a comprehensive and complementary literature reviews - one focused on the attraction of seabirds to artificial light and the second focused on methods of seabird detection that can prove potentially useful in an offshore oil and gas installation context. The Project will build on previous reviews of the scientific literature brought up to date with current peer reviewed literature, other relevant published and unpublished data and information and engagement with stakeholders and recognized experts.

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***Using undersea autonomous glider technology to monitor marine mammals and ship noise in the eastern Beaufort Sea***

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**Project Lead:** Stephen Insley

**Organization:** WCS Wildlife Conservation Society Canada

**ESRF Funding:** \$153,635 over three years



Source: Paul Nicklin

### **Project Description**

Populations of bowhead whales have been difficult to find during the Beaufort Sea annual surveys. Researchers suspect that individuals may have migrated later and/or further offshore than usual, or even the possibility that some did not migrate at all. The use of an autonomous glider will allow to record sound continuously along acoustic transects and to go much further offshore than currently deployed acoustic receivers. The results will inform whether the bowhead migration route and timing has shifted further offshore and later in the season. In addition, the results will also supplement the core-use areas posted for both beluga and bowhead whales used in the Canadian Coast Guard Notice to mariners (NOTMAR) whale avoidance broadcasts and serve as important information for any future assessments of potential oil and gas activities in the area.

# 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 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 2021-2022 fiscal year. All expenses are paid out of the fiscal year in which they are invoiced.

In 2021-2022, the total study expenditures for the ESRF amounted to \$5,176,653. Administration costs for this period were \$243,363. Revenues collected through levies were \$5,555,758, with a total \$468,901 remaining in outstanding levies in the South as of March 31, 2022 (refer to Table 2 for details).

**Table 1 – ESRF Expenditures April 1, 2021 to March 31, 2022 (in dollars)**

REGION	OPENING CASH BALANCE APRIL 1, 2021 (\$)	TOTAL REVENUE, LEVIES & RETURNS (\$)	ADMINISTRATION COSTS (\$)	STUDY PROGRAM COSTS (\$)	CLOSING BALANCE MARCH 31, 2022 (\$)
SOUTH REGION	3,880,947	5,555,758	243,363	5,072,892	4,120,450
NORTH REGION	154,948	0	0	103,761	51,187
TOTAL	4,035,895	5,555,758	243,363	5,176,653	4,171,637

NOTE: The Public Accounts of Canada closing balances for the Southern and Northern Regions at the end of the 2021-22 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 2021-2022 (in dollars)**

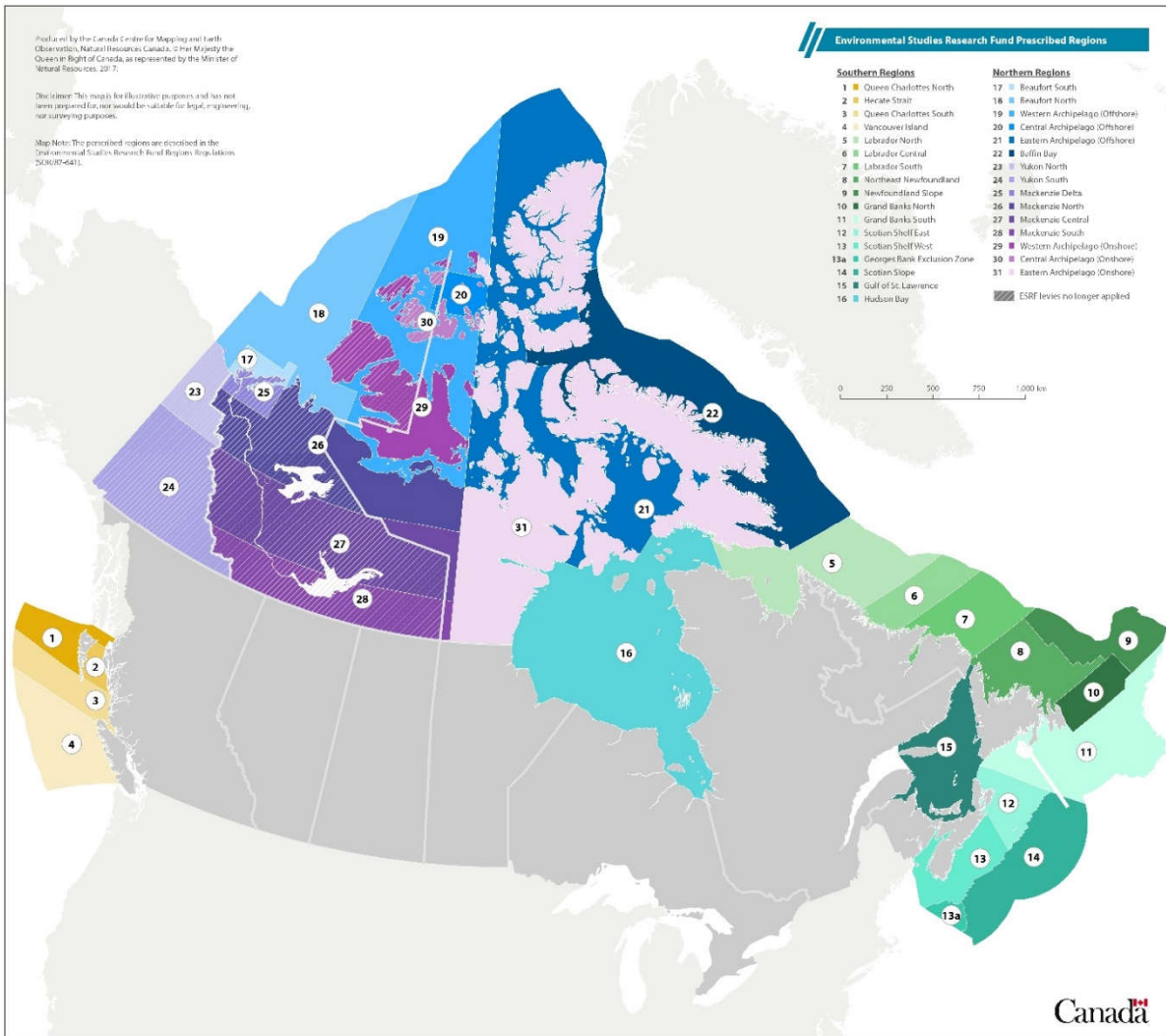
REGION	LEVY RATE Levy 33 2021-2022 (\$/Hectare)	REVENUES <sup>1</sup> Levy 33 2021-2022 (\$)	REVENUES Back Levies (\$)	TOTAL LEVY INCOME (\$)
1	Queen Charlottes North	0	-	-
2	Hecate Strait	0	-	-
3	Queen Charlottes South	0	-	-
4	Vancouver Island	0	-	-
5	Labrador North	0.6726	5,671	5,671
6	Labrador Central	0.6726	11,850	11,850
7	Labrador South	0.6726	4,406	4,406
8	Northeast Newfoundland	0.6726	202,090	202,090
9	Newfoundland Slope	0.6726	3,196,674	3,196,674
10	Grand Banks North	0.6726	1,026,094	1,026,094
11	Grand Banks South	0.6726	187,306	187,306
12	Scotian Shelf East	0.6726	78,011	78,011
13	Scotian Shelf West	0.6726	-	-
14	Scotian Slope	0.6726	843,656	843,656
15	Gulf of St. Lawrence	0.6726	- <sup>2</sup>	-
16	Hudson Bay	0	-	-
	<b>Total South</b>		<b>\$5,555,758</b>	<b>\$0</b>
				<b>\$5,555,758</b>
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	-	-
	<b>Total North</b>		<b>\$0</b>	<b>\$0</b>
	<b>TOTAL</b>			<b>\$5,555,758</b>

<sup>1</sup> Due to unforeseen circumstances, the 2020-2021 levy rates for ESRF Prescribed for Regions 1-16 were set at the end of last fiscal year (March 30, 2021) by the Minister of Natural Resources. As such, revenues from the 2020-2021 levies were received during the 2021-2022 fiscal year and are combined with the 2021-2022 revenues.

<sup>2</sup> A levy of \$468,901 remains outstanding in this region as of March 31, 2022.



# ANNEX 1: ESRF REGIONAL MAP



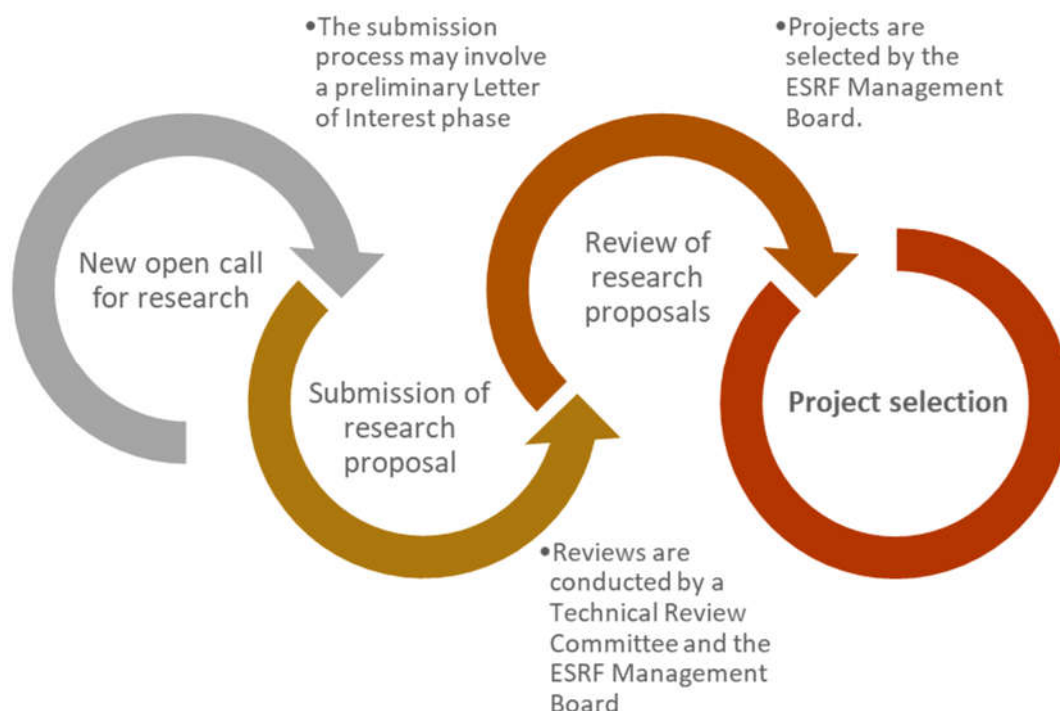
## ANNEX 2: OPEN CALL FOR RESEARCH & STUDY SELECTION PROCESS

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 - 2021

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.

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

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