

A Program and Policy Review of Canada's Federal Ghost Gear Fund in the Maritimes Region

By

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## **Abstract**

Abandoned, lost, or otherwise discarded fishing gear (ALDFG) has received increased global attention in recent decades owing to its pervasive impacts on the marine environment. As international interest and awareness continues to grow, many nations have since taken steps to enact policies and initiatives to specifically combat ALDFG. This study seeks to examine Canada's efforts towards addressing ALDFG by reviewing the federally-led Ghost Gear Fund (GGF), established by Fisheries and Oceans Canada (DFO) over an initial 2-year period (2020-2022). To identify the challenges and opportunities of this program, past GGF partners from DFO's Maritimes Region were invited to participate in an online survey and follow-up interview to share their insights and experiences with the GGF. Additionally, to help inform recommendations for Canada's ALDFG strategies more broadly, legislation and initiatives adopted in the United States (U.S.) and Norway were evaluated for comparative purposes. Based on the findings of this study, it is recommended that any future iteration of the GGF program for DFO's Maritimes Region be implemented over a multi-year timeframe and with the adoption of several operational changes to address common challenges and issues expressed by GGF partners.

*Keywords:* Abandoned, lost, or otherwise discarded fishing gear (ALDFG); ghost gear; fisheries management; Ghost Gear Fund; Fisheries and Oceans Canada (DFO); United States (U.S.); Norway.

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## List of Abbreviations

ALDFG	Abandoned, Lost, or otherwise Discarded fishing gear
C&P	Conservation and Protection
DFO	Department of Fisheries and Oceans Canada
FGRS	Fishing Gear Reporting System
FAO	Food and Agriculture Organization of the United Nations
DFG	Derelict Fishing Gear
FGRS	Fishing Gear Reporting System
FGR	Fishing (General) Regulations Act
FSC	Food, Social, or Ceremonial
GGF	Ghost Gear Fund
GGGI	Global Ghost Gear Initiative (known as the “triple GI”)
IUU	Illegal, Unregulated, and Unreported (Fishing Gear )
IFM	Indigenous Fisheries Management
IMO	International Maritime Organization
MDP	Marine Debris Program
NDF	Norwegian Directorate of Fisheries (Fiskeridirektoratet)
NOAA	National Oceanic and Atmospheric Administration
RM&L	Resource Management and Licensing
SCH	Small Craft Harbours
SWNS	Southwest Nova Scotia
SFSRSCP	Sustainable Fisheries Solutions and Retrieval Support Contribution Program
WAHVA	Wrecked, Abandoned, and Hazardous Vessels Act

## **Chapter 1.0 Introduction**

### **1.1 – Abandoned, Lost, or otherwise Discarded Fishing Gear (ALDFG)**

The issue of marine debris has surfaced in recent decades as greater global awareness continues to be gained regarding its pervasive impacts on marine habitats and wildlife (Arthur et al., 2014; Goodman et al., 2021). Marine debris can be defined as any persistent solid waste (manufactured or processed) that is disposed of or abandoned in marine environments (NOAA, 2021), with by far the most abundant and widespread source represented by plastic (Walker, 2017). Borelle et al. (2020) determined that for 2016, approximately 19-23 million tonnes (11% of global plastic production) were input into both freshwater and marine ecosystems world-wide, anticipating this value to increase to 52 million tonnes per year by 2030, further noting that it is inherently difficult to quantify the magnitude of plastic pollution on a global scale. When looking specifically at marine ecosystems, Jambeck et al. (2015) calculated a global input of approximately 4.8-12.7 million tonnes for 2010, with the United National Environment Programme (UNEP) predicting that this value will be nearly tripled by 2040 (23-47 million tonnes) (UNEP, 2021). A study by Morales-Caselles et al. (2021) sought to classify the composition of global marine litter, finding that synthetic rope and fishing-related debris represented the fourth and fifth most dominant categories respectively. It is widely cited that about 80% of marine plastic pollution originates from land-based sources (Ambrose et al., 2019; Chassignet et al., 2018; Goodman et al., 2020; Veiga et al., 2016). The prevalence of this issue is only expected to magnify in the future.

Alongside the global attention on marine debris, there has likewise been heightened awareness regarding the rapid influx in past decades of Abandoned, Lost, or Otherwise Discarded Fishing Gear (ALDFG) (Richardson et al., 2019) (Figure 1). This influx, observed largely over the last half century, has been attributed to several factors including a rapid increase in fishing intensity and a transition to synthetic and longer-lasting fishing gear materials (e.g., nylon, polyethylene, and polypropylene) (Chassignet et al., 2021; Cooke et al., 2019; MacFayden, 2009; Stelfox et al., 2016). As this concept has only emerged on the global radar in recent years, an internationally agreed-upon term remains to be established for this type of gear; however, common terms in addition to ALDFG include Derelict Fishing Gear (DFG) and ghost gear (Hodgson, 2022). For this study, ALDFG refers to any fishing-related equipment or other means capable of being used for the harvesting of marine resources, which has been lost or



disposed of and as such is no longer under regular use or operational control by harvesters (Hodgson, 2022; Stelfox et al., 2016). The magnitude of the impacts caused by ALDFG will vary considerably based on the quantity, size, and type of gear disposed of, especially given that various gear types (e.g., nets, lines, buoys, pots, and traps) have different propensities for being lost depending on how and where they are used (Goodman, 2020; Thomas et al., 2019). Given that most cases go unreported and unobserved, it is difficult to quantify the exact amount of ALDFG that contributes to global marine debris (Hodgson, 2022; Pichel et al. 2012; Stelfox et al., 2016). Greater accuracy is afforded at smaller scales, such as by gear types or by geographic regions (Richardson et al., 2021; Thorbjørnsen et al., 2023). For example, of the 79,000 tonnes of plastic circulating in the Great Pacific Garbage Patch (GPGP), Lebreton et al. (2018) determined that at least 46% was comprised of ALDFG (Thorbjørnsen et al., 2023).



**Figure 1.** *Examples of Abandoned, Lost, or otherwise Discarded Fishing Gear.*

Despite the difficulty, global estimates have since been determined, with one such widely cited estimate provided by MacFayden et al. (2009) stating that ALDFG makes up less than 10% of all marine debris, which the Food and Agriculture Organization of the United Nations (FAO)

determined would amount to approximately 705,500 tonnes being lost annually (Drinkwin, 2020). The validity of these estimates has since been called into question (Richardson et al. 2021), and though the exact proportion of ALDFG within marine debris may remain uncertain, additional studies have since indicated that about 2% of all fishing gear winds up as ALDFG (Richardson et al., 2022). This would still comprise of approximately 2,962 km<sup>2</sup> of gillnets, 75,049 km<sup>2</sup> of purse seine nets, 218 km<sup>2</sup> of trawl nets, 739,583 km of longline mainlines, and over 25 million pots and traps being lost on an annual basis; despite the uncertainty, ALDFG still comprises a substantial portion of marine debris (Stelfox et al., 2016).

### *1.1.1 – Sources of ALDFG*

Some degree of gear loss is inevitable and to be expected given the unpredictable and dynamic environment in which fishing activities occur (MacFayden et al., 2009) (Table 1). The majority of lost gear arises due to unforeseen or accidental circumstances (Gilman, 2015; Goodman et al., 2019). The most prominent means of gear loss is due to unfavorable weather conditions (e.g., severe storms, turbulent currents, differing sea-bed conditions, and strong winds and swell), which present challenges and safety risks for harvesters attempting to deploy or retrieve gear (MacFayden et al., 2009). The recent example of Hurricane Fiona which hit much of eastern Canada on September 23<sup>rd</sup>, 2022, demonstrates firsthand the influence severe weather events can have on causing high rates of ALDFG (DFO, 2022a) (Figure 2).



**Figure 2.** Collection of Abandoned, Lost, or Otherwise Discarded Fishing Gear (ALDFG) and specifically, ropes (A) and traps (B), collected following the aftermath of Hurricane Fiona that hit Nova Scotia in September 2022 (Titan Maritime, 2022).

Fishing gear can also become snagged on submerged features or rough bottom conditions, and once detached, it is often transported vast distances by a combination of ocean circulation patterns, wind and density-driven currents, and tides (MacFayden et al., 2019). As a result, where ALDFG is observed may not necessarily be where it was originally lost (Gilman, 2015; MacFayden et al., 2009; Thomas et al., 2019). Detached gear that remains close to the surface may combine with additional floating debris to create large aggregations of derelict gear called tangles or snarls, which can entangle in-use fishing gear and further contribute to ALDFG (Goodman et al., 2019; MacFayden et al., 2009) (Figure 3). Aside from environmental factors, ALDFG has also been noted in cases of gear conflicts, such as in heavily congested or highly competitive fishing areas, where there may be an increased likelihood of gear being set up too close to or on top of other gear (Goodman et al., 2019). Additional conflicts may arise with passing vessels; for example, when static fishing gear is inadvertently towed away by trawlers or dredgers or when marker buoy moorings are accidentally cut by ship propellers (Goodman et al., 2019; Gilman, 2015). Another cause might be that onboard tracking systems either malfunction or stop operating properly, leaving harvesters uncertain as to the precise locations of their fishing gear (Gilman, 2015). In terms of gear use and condition, those gears that have increased soak times (i.e., the duration that gear remains submerged in water), or are in poor condition (i.e., whether due to old age, improper design, or not having necessary components being replaced) run the risk of becoming broken or severed more easily as a result of compromised gear integrity (Gilman, 2015; MacFayden et al., 2009; Thomas et al., 2019).



**Figure 3.** Examples of ensnarled and entangled Abandoned, Lost, or Otherwise Discarded Fishing Gear (ALDFG), which resulted from Hurricane Fiona that hit eastern Canada on September 23rd, 2022 (Coastal Action, 2022).

Though ALDFG is most often attributed to accidental reasons, there are also situations in which gear may be intentionally abandoned or discarded (DFO, 2021a; Gilman, 2015; MacFayden et al., 2009). Retrieval of gear may be too technically complicated or time-consuming in some cases, with the outcome not warranting the effort, especially when the gear is old and thus of little economic value (MacFayden et al., 2009). It may also be more cost-effective for harvesters to intentionally cut their gear in cases where spatial pressures have led to conflicts and entanglements with other gear, to make up for lost time and instead maximize their fishing time at sea (MacFayden et al., 2009). Alternatively, gear may also be intentionally cut through vandalism against other harvesters, or when harvesters are trying to evade detection or enforcement from fishery authorities, more commonly seen in situations where Illegal, Unreported, and Unregulated (IUU) fishing is occurring (Broderick et al., 2020; Gilman, 2015). Indirectly, disposal at sea may also arise when harvesters are not left with adequate alternatives to dispose of their end-of-life fishing gear (i.e., gear that is no longer safe or useful for harvesters to us), such as the lack of access to land-based disposal or recycling facilities, or tipping fees, transportation costs, and remotely located port reception or storage facilities (FGCAC, 2021; Gilman, 2015; MacFayden et al., 2009). Considering the various causes of ALDFG, both accidental and intentional, it is therefore important that management measures take steps to adequately address these causes and to mitigate the associated impacts.

**Table 1.** Summary of Abandoned, lost, or otherwise Discarded Fishing Gear (ALDFG) sources.

<b>Sources</b>	
Accidental	<ul style="list-style-type: none"> <li>• Environmental conditions (e.g., severe storms, fast currents and tides, and strong winds)</li> <li>• Conflicts with in-use fishing gear</li> <li>• Interaction with passing vessels</li> <li>• Snags beneath the surface on submerged features</li> </ul>
Intentional	<ul style="list-style-type: none"> <li>• Vandalism</li> <li>• Intentional disposal at-sea</li> <li>• Cutting entangled lines</li> <li>• Disposal to avoid fishery authorities in cases of IUU fishing</li> </ul>

### 1.1.2 – Ecological and Socioeconomic Impacts

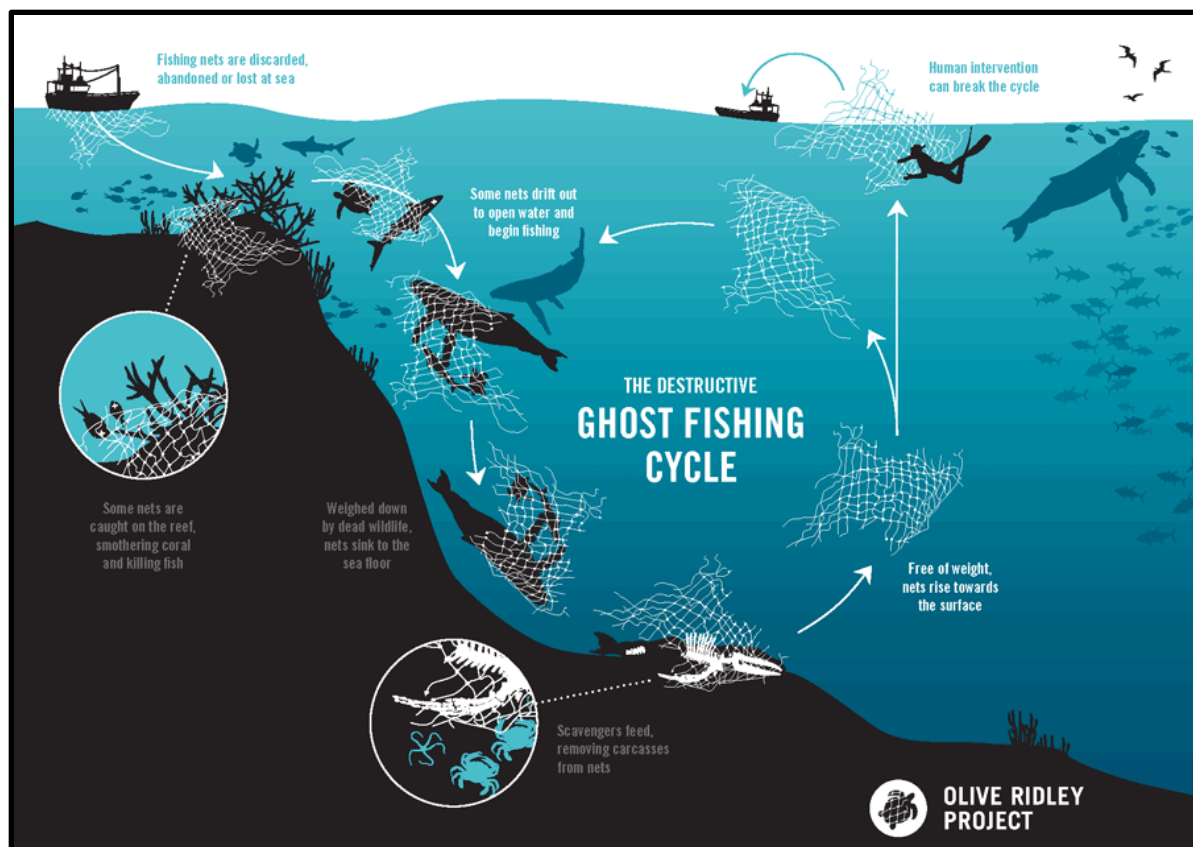
Increased attention has been directed at ALDFG in large part due to its numerous and often detrimental impacts not only on marine habitats and wildlife but also on those that use and depend on marine spaces (Fulton, 2021a; Morishige and McElwee, 2012) (Table 2). One

significant environmental concern is ghost fishing, which is a phenomenon in which derelict gear will continue fishing both target and non-target species indiscriminately, earning it the moniker of ghost gear (Gilman et al., 2022; Goodman et al., 2019; Richardson et al., 2019; Stelfox et al., 2016) (Figure 4 and 5). Considering that lost gear is no longer being actively monitored or under operational control by harvesters, it is difficult to quantify the extent to which ghost fishing occurs as much of it goes unobserved (Goodman, 2019; Stelfox et al., 2016). However, some factors are known to influence the likelihood that ghost fishing will occur, including gear type, composition, and design (MacFayden et al., 2009). Static or fixed gear types (e.g., gillnets, trammel nets, pelagic/demersal longlines, pots, and traps), where the capture process relies on the movement of organisms into the gear, exhibit higher rates of ghost fishing in comparison to active gear types (e.g., seine nets, trawl net fragments, and fish aggregating devices), where the catching process typically ceases as the gear collapses upon detachment from the fishing vessel (Gilman, 2015; Thorbjørnsen et al., 2023). Ghost fishing can be heightened for any lost gear that has been designed with synthetic materials that improve its durability and optimal configuration, as indiscriminate fishing can occur for as long as it takes before the gear eventually degrades enough to lose its catchability (Arthur et al., 2014; Goodman et al., 2019; Gilman, 2015; Selfox et al., 2016; Thorbjørnsen et al., 2023).



**Figure 4.** Examples of bycatch found on derelict fishing gear collected from Southwest Nova Scotia, primarily derelict traps (Titan Maritime, 2022).

One aspect of ghost fishing that highlights its pervasiveness is the tendency for the self-baiting cycle to occur, in which organisms that become trapped and eventually perish end up attracting scavengers who likewise become trapped and killed themselves, reinforcing the cycle of indiscriminate fishing (Goodman et al., 2019) (Figure 5).



**Figure 5.** Schematic showcasing the cycle of ghost fishing, highlighting potential sources of derelict gear, and demonstrating that human intervention is the best means of breaking the cycle (Olive Ridley Project, 2021).

A study by Goodman et al. (2021) that conducted 60 retrieval trips in the Bay of Fundy to retrieve 7.1 tonnes of ALDFG, 66% of which was comprised of lobster traps, encountered 15 different species observed as bycatch (including 239 lobsters, 67% of which were market-sized). Similarly, out of 870 gillnets recovered from the inland waters of Washington State, U.S., Good et al. (2010) documented over 32,000 marine organisms trapped in the nets, which included 31,278 invertebrates (76 species), 1,035 fishes (22 species), 514 birds (16 species), and 23 mammals (4 species). In addition to environmental concerns, ghost fishing likewise has implications for commercial fisheries who may experience reduced catch rates and economic losses in areas of high ALDFG density where indiscriminate fishing of commercially-viable species like Atlantic lobster (*Homarus americanus*) and Chesapeake blue crab (*Callinectes sapidus*) may be heightened (Gilman, 2015). One study that looked at the Dungeness crab (*Metacarcinus magister*) fishery in the Washington State region of the Salish Sea determined that derelict traps killed approximately 178,874 crabs each year, representing about 4.5 % (USD

744,000) of the annual harvest (Antonelis et al., 2011). If these derelict traps were removed, Antonelis et al. (2011) predicted an annual net value in savings of US 450,657-744,290 for this fishery alone. Similarly, a study by Scheld et al. (2021) estimated an increased annual yield of USD 13 million for the blue crab fishery in Virginia, U.S., if 15-40% of derelict traps were removed. The problem of ghost fishing is one of both environmental and socioeconomic impacts, highlighting the severity and concern of the issue.

Aside from ghost fishing, additional environmental concerns of ALDFG include the risk of entanglement and microplastic-ingestion by marine species, as well as the deterioration of crucial benthic habitats (Gilman, 2015). Though fishing gear entanglements do not always result in marine wildlife mortality, the likelihood of death and disruption to healthy functioning and behavior increases in cases where wildlife are unable to disentangle themselves from the gear (Gilman, 2015; Vanderlaan et al., 2011). These cases are of significant concern for at-risk marine mammals like the critically endangered North Atlantic Right Whale (*Eubalaena glacialis*), for which entanglements in fishing gear (86% of cases are attributed to trap and pot as well as gillnet gear types) represent the leading cause of mortality, second only to ship strikes (Taylor and Walker, 2017; Vanderlaan et al., 2011); acknowledging that North Atlantic right whale entanglements could be the result of ghost gear or active fishing gear. Plastic pollution from the shedding and breakdown of gear is another concern since most gear is produced with synthetic materials (e.g., nylon, polyethylene, polypropylene, and polyvinyl chloride) that persist in the marine environment as harmful and potentially ingested as microplastics as the gear begins to degrade (Cooke et al., 2019; Goodman et al., 2020; UNEP, 2018). Ingestion of plastic fragments and toxic chemicals can cause marine organisms to experience negative effects on mobility, growth rate, fecundity, and mortality, as well as disruptions to normal behaviors such as foraging, mating, and predator avoidance (Carbery et al., 2018; Prinz and Korez, 2019). Microplastics have been found in the stomach contents of seabirds, sea turtles, invertebrates, plankton, marine mammals, as well as commercially important fish species, which also has implications for human health if seafood is intended for human consumption (Carbery et al., 2018; Goodman et al., 2019; Karbalaei et al., 2018, 2019; Prinz and Korez, 2019).

The deterioration and degradation of benthic habitats is also a concern, as ALDFG dragged along the seafloor can cause abrasion of fragile and sensitive benthic habitats like seagrass meadows, eelgrass beds, coral reefs, and sponge fields, all of which play a vital role in

the functioning of marine ecosystems by providing foraging areas, nursery or nesting areas, fish spawning grounds, and migration routes (Gilman, 2015; Richardson et al., 2019; Thomas et al., 2019). Derelict gear may obstruct or smother microhabitats and alter seabed characteristics, consequently leading to the disruption of community processes and ecosystem functioning (Gilman, 2015). One such example includes the obstruction of regular water flow in some cases, which could result in the creation of anoxic conditions and mass mortality events (Gilman, 2015). Another indirect way that benthic habitats may become compromised is through the potential for ALDFG to introduce invasive or alien species, which poses a significant threat to biodiversity (Barnes 2002; Gilman, 2015; OECD, 2021). ALDFG significantly increases the risk of alien species dispersal (e.g., encrusting organisms like bacteria, diatoms, algae, hydroids, and tunicates) by providing increased rafting opportunities for these species to be transported over vast distances of the ocean to new areas where they may then outcompete and disrupt native biota (Barnes, 2002; OECD, 2021).

In addition to these detrimental ecological concerns, there are many socioeconomic concerns linked to ALDFG, with impacts affecting industrial fishing as well as small-scale fisheries (Lovell, 2023). First, lost gear can pose a substantial hazard to both safety-at-sea and navigation for marine vessels (MacFayden et al., 2009). Derelict gear like nets and lines can become ensnarled or snagged on boat propellers or other components of passing vessels (Goodman et al., 2019). Additionally, ALDFG may foul or obstruct in-use fishing gear in fishing areas of high ALDFG density, negatively impacting fishing efficiency and leading to reduced catch rates for harvesters (Gilman, 2015; Goodman et al., 2019; Pichel et al., 2012; Walker et al., 2020). Similarly, lost gear is often expensive to replace, though exact monetary losses will vary between fisheries and by gear type (DFO, 2021a; Goodman et al., 2019). Additionally, derelict gear that washes ashore and pollutes beaches can further incur economic losses to the tourism industry in the form of lost revenue and beach clean-up costs (Walker et al., 2006). For example, an analysis conducted by the U.S. National Oceanic and Atmospheric Administration (NOAA) determined that eliminating nearly all marine debris in Orange Beach, California would increase beach visits of recreational users by up to 2.1 million visits, leading to an additional USD 187 million in tourism spending (English et al., 2019). These numerous direct and indirect impacts on all aspects of the marine environment highlight the need for measures to be taken on both an international and national scale to address the pervasive issue of ALDFG (Gilman, 2015).



**Table 2.** Summary of Abandoned, lost, or otherwise Discarded Fishing Gear (ALDFG) impacts.

<b>Environmental Impacts</b>
• Indiscriminate fishing of target and non-target species (ghost fishing)
• Entanglement of marine wildlife
• Shedding of harmful and ingestible microplastics
• Deterioration of benthic habitats (e.g., smothering, abrasion, and obstruction)
• Potential for the introduction of invasive species
<b>Socioeconomic Impacts</b>
• Navigational hazard for marine vessels
• Obstruction of in-use and active fishing gear
• Reduced catch rates for commercial fisheries
• Economic losses to tourism
• Beach clean-up and at-sea retrieval costs

### 1.1.3 – Management Measures

As a greater understanding continues to be gained regarding ALDFG’s many potential sources and impacts, the impetus for nations to implement management measures specific to combating ALDFG is also on the rise (Bilkovic et al., 2016; MacFayden et al., 2009). As previously outlined, harvesters play a central role in the generation of ALDFG, whether intentionally or unintentionally, and therefore should be engaged in the development of solutions to combat gear loss. However, attention should also be placed on the solutions that gear manufacturers, fishing organizations, fisheries authorities, port authorities, and researchers can offer in mitigating this issue (Huntington, 2021). Measures in support of ALDFG management are widely recognized as falling under one of three categories: 1) prevention, 2) mitigation and 3) remediation (Huntington, 2021) (Table 3).

The first approach, ‘prevention’, is what most fishery management authorities aim to prioritize, given that these measures seek to address the issue at its source so that ALDFG is prevented outright (Huntington, 2021). Examples of preventative measures include education and awareness, improved disposal options for end-of-life fishing gear, vessel or gear design modifications to reduce partial or whole loss of fishing gear, spatial and temporal measures (i.e., restricting fishing to specific regions or time of year to limit conflicts with other fisheries or marine-based industries), and better marking and identification of fishing gear (Huntington, 2017, 2021). Improved gear marking is an essential best practice for reducing ALDFG and it has the added benefit of making it easier to identify the rightful owners of any retrieved gear and to

ensure that it is returned given it is still in good condition (OECD, 2021). Targeted education and awareness-building campaigns for harvesters can improve best practices and due-diligence on their part, provided they are likewise supported by management bodies through appropriate regulatory measures and initiatives (Huntington, 2021). Additional preventative practices include gear use limits, soak time limits for static gear, use of alternative gears, rigging options that minimize gear loss, good communication between harvesters, and the sharing of seabed/local current mapping data to reduce gear conflicts (Huntington, 2021).

The second approach, ‘mitigation’, includes measures that attempt to minimize the impacts of ALDFG once it is already in the marine environment (Huntington, 2021). Specifically, for traps and pots, which have higher rates of ghost fishing in comparison to other gear types, designs that incorporate escape mechanisms (e.g., biodegradable escape cords or panels) or features that prevent entry (e.g., excluder devices) to effectively disable its ability to continue fishing if lost (OECD, 2021). Additional features include those that might help to facilitate an animal’s self-release if entangled, such as weak braided sleeves or rope inserts, though there remain unique challenges to using these options, including difficulty for harvesters retrieving this kind of gear at depths greater than 100 m during hauling (Huntington, 2021; OECD, 2021).

The last approach, ‘remediation’, focuses on measures that contribute to the recovery of ALDFG from the marine environment (Huntington, 2021). Retrieval efforts are often incredibly expensive and time-consuming, and so are the least cost-effective approaches when looking at larger geographic scales (Huntington, 2021; Thorbjørnsen et al., 2023). The most common means of retrieving ghost gear is through the use of grapples hooks, which are towed after a vessel with the intent of snagging on lost gear to be hauled to the surface (Thorbjørnsen et al., 2023). Lost gear reporting represents another measure, though mandatory reporting requirements have only been implemented in a few nations owing to challenges with a lack of standardization of fishing gear units, reporting methods, database structures, and difficulty in monitoring retrieval rates (Huntington, 2021). Benefits of reporting include providing information on derelict gear hotspots that can then be targeted by retrieval efforts, as well as making it easier to potentially return retrieved gear if it is known where and by whom it was initially lost (Huntington, 2021). Although ALDFG retrieval can reduce the generation of additional lost gear through snags with active gear, retrieval is unable to completely address the cause of the issue.

Therefore, efforts by management authorities should also be taken to ensure adequate access to port reception and disposal options for end-of-life fishing gear (OECD, 2021). Though outlining effective derelict gear management measures will depend on the region and type of fishery, these actions may help to inspire action as well as aid to combat the detrimental impacts of ALDFG.

**Table 3.** Summary of Abandoned, lost, or otherwise Discarded Fishing Gear (ALDFG) management measures, listed under one of three categories: 1) Prevention, 2) Mitigation, and 3) Remediation.

<b>Management Measures</b>	
Prevention	<ul style="list-style-type: none"> <li>• Spatial and/or temporal measures</li> <li>• Gear design to reduce whole or partial loss of the fishing gear</li> <li>• Vessel design to reduce gear littering/discarding</li> <li>• Improved marking and gear identification</li> <li>• Improved access to and availability of disposal facilities for end-of-life fishing gear</li> <li>• Education and awareness-building initiatives</li> <li>• Improved fisheries management regime</li> <li>• Good practice for avoidance and response</li> </ul>
Mitigation	<ul style="list-style-type: none"> <li>• Gear design to reduce the incidence and duration of ghost fishing</li> </ul>
Remediation	<ul style="list-style-type: none"> <li>• Lost gear reporting systems</li> <li>• Lost gear recovery and retrieval initiatives</li> <li>• Port reception and gear disposal options</li> <li>• Lost gear 'hotspot' mapping</li> <li>• Extended Producer Responsibility</li> </ul>

## **Chapter 2.0 International and Canadian Context**

### **2.1 – Global Efforts**

As global awareness of ALDFG continues to rise, so too does the recognition of the need for international policies and initiatives that specifically seek to mitigate this issue (Hodgson, 2022). There are many ongoing international, multilateral, and bilateral initiatives dedicated to outlining best management practices and approaches towards ALDFG, with global efforts on this front being led by the Global Ghost Gear Initiative (GGGI) (Broderick et al., 2020). The GGGI is the largest cross-sectoral alliance committed to combatting ALDFG, fostering collaboration on this front between industry, government, private sector, and academia (Broderick et al., 2020; Haggert, 2020; Richardson et al., 2019). They have since developed the largest freely available global data portal, called the Ghost Gear Reporter App, to which members can share their observed, collected, or retrieved derelict gear data, to which Canada has recently become the first country to share their national data that was obtained by Fisheries and Oceans Canada (DFO)

(GGGI, 2022). As a research-based organization, the GGGI is promoting the reporting portal so that they may incorporate this data into their targeted retrieval efforts and so that strategic recommendations for best practices can be made publicly accessible (GGGI, 2022).

Alongside this global movement, many nations have similarly strived to incorporate ALDFG mitigation strategies and initiatives into their national policy frameworks and legislation (Hodgson, 2022). Two noteworthy countries include the United States (U.S.) and Norway. Similar to Canada, both nations possess incredibly lucrative fishing industries and have likewise partnered with the GGGI to mitigate ALDFG. For context as to the value of each nation's commercial fisheries, the U.S. exported a total of 1 million tonnes of fish and seafood products (valued at USD 5.27 billion) in 2021 (USDA, 2021), with Norway exporting a record-breaking 3.1 million tonnes in the same year (valued at NOK 120.8 billion or USD 5.27 billion) (Holland, 2022). There is a high incentive for each nation to implement national policies and legislation targeted at mitigating the impacts of ALDFG. These examples were chosen as case studies owing largely to their different approaches to establishing ALDFG legislation. Specifically, the U.S. represents a rather unique case as it possesses several stand-alone legislative tools and instruments that directly focus on ALDFG (Broderick et al., 2020). In contrast, Norway's approach most similarly mirrors that of Canada's, where ALDFG mandates are embedded within already established fisheries legislation (Broderick et al., 2020). By comparing and contrasting each approach with that of Canada, the potential benefits and limitations of Canada's approach might be determined.

### *2.1.1 – United States*

In the U.S., the leading federal authority on ocean management is NOAA (NOAA, 2021). In 2006, NOAA implemented the *Marine Debris Research, Prevention, and Reduction Act* (Public Law No: 109-449), hereafter referred to as the 'Marine Debris Act' (NOAA, 2021). This act has since been amended three times, first in 2012, then in 2018 under the *Save our Seas Act* (Public Law No: 115-265), and most recently, in 2020 under the *Save our Seas Act 2.0* (Public Law No: 116-224) (NOAA, 2020). Under the Marine Debris Act, the Marine Debris Prevention and Removal Program (Marine Debris Program) was established by the federal fisheries management agency (NOAA) and the U.S. Coast Guard (Broderick et al., 2020). The overarching objective of the Marine Debris Program is to address the adverse impacts of marine pollution on the U.S.

economy, marine environment, and safe navigation at varying levels (regional, national, and international) (NOAA, 2021). The preferred terminology used by NOAA and U.S. legislation when referring to ALDFG is Derelict Fishing Gear (DFG), which will be used whenever reference is made to the U.S. context to reflect this standard. As outlined under the Marine Debris Program Action Plan, the six main program goals are as follows: 1) prevention, 2) removal, 3) research, 4) response, 5) coordination, and, 6) monitoring and detection (NOAA, 2020). This program supports a wide variety of initiatives, such as research efforts related to DFG monitoring and detection, disaster response and preparation (i.e., to mitigate disaster debris related to hurricanes and typhoons), and education and outreach (NOAA, 2021).

In addition to federal policies and programs, there are numerous examples of DFG-specific laws being enacted at the regional and/or state level in the U.S. (Broderick et al., 2019). The adoption of Senate Bill 6313 in Washington State represents one noteworthy example, as the passing of this bill served to develop a DFG program, with an emphasis on developing effective methods for DFG retrieval, eliminating regulatory barriers to DFG retrieval, and preventing future gear losses (Broderick et al., 2020; GGGI, 2018). Per Washington State law, state departments are required to publish guidelines for the safe retrieval and disposal of DFG (Washington Law RCW 77.12.865), as well as for reporting cases of lost gear, in addition to creating a publicly available database for known cases of DFG (Washington Law RCW 77.12.870) (Broderick et al., 2020). To encourage reporting compliance among harvesters, Washington has a ‘no fault’ reporting system (no penalties incurred if reporting occurs within 24 hours of the gear loss); however, some reporting rates are lower than would be expected with this type of system (Broderick et al., 2020). This may be due to some harvesters feeling overburdened with regulations and lacking trust in the regulatory outcomes (Broderick et al., 2020). Additionally, this bill allows for the retrieval of DFG without any required permits provided that removal guidelines are followed (GGGI, 2018). Though the outcome of these state regulations has received mixed opinions, the passing of these laws will serve as a solid foundation upon which more targeted efforts can be developed.

### *2.1.2 – Norway*

In contrast to the U.S.’s stand-alone ALDFG legislation, in Norway, many of the mandates developed that target ALDFG has been embedded under broader fisheries legislation

(Broderick et al., 2020). The leading federal authority in Norway is the Norwegian Directorate of Fisheries (NDF) (Norwegian: Fiskeridirektoratet), and the main legislation for fisheries management governance is the *Marine Living Resources Act* (2009) (Broderick et al., 2020; Norwegian Government, n.d.), which replaced the *Sea-Water Fisheries Act* (1983). The overarching purpose of this act is to ensure that wild living marine resources are managed on a national scale in a way that is both sustainable and economically profitable (NDF, 2015). Despite this broad scope, this act does include several mandates pertaining to the management of ALDFG (Broderick et al., 2020). Specifically, any fisher that loses fishing gear is required to search and retrieve it if possible (Section 17), the dumping of fishing gear or other objects is strictly prohibited (Section 28), and anyone who retrieves ALDFG must report it to the owner if possible (Section 29) (Broderick et al., 2020). Norway has also adopted a ‘no-fault’ system seen in the U.S. to encourage lost gear reporting by harvesters to the Coast Guard. Additionally, reported cases of ALDFG are made publicly available online, allowing harvesters to avoid areas of high ALDFG densities and prevent gear conflicts (Broderick et al., 2020). Unlike the U.S., harvesters in Norway pay an annual tax that goes towards ALDFG retrieval efforts, led by the Norwegian government following the end of the fishing season (Broderick et al., 2020). As an incentive to minimize rates of gear loss, this tax is adjusted and reduced if harvesters begin to lose less gear; however, evidence of decreasing rates of gear loss remains to be seen (Broderick et al., 2020).

Another noteworthy example is Norway’s involvement with KIMO International in the “*Fishing for Litter*” campaign, which was established on a national scale in 2016 by the Norwegian Environmental Agency (KIMO International, 2021a). This campaign aims to address the issue of marine pollution by directly involving harvesters on a volunteer-basis to collect any debris, including ALDFG, that gathers in their gear and equipment during their regular fishing activities (KIMO International, 2021b). Port authorities then collect this gathered debris and ensure that it is either recycled or disposed of through collaboration with certain waste management agencies (KIMO International, 2021b). Since 2016, 755 tonnes of marine debris have been removed through this campaign, with one of the added benefits being that awareness regarding the impacts of marine debris is raised among harvesters who are encouraged to be active stewards of the marine environment (KIMO International, 2021b). There are additional initiatives that Norway is currently considering, including a “no special fee” system for any

waste collected by harvesters and others at sea and a new Extended Producer Responsibility (EPR) scheme on plastic items used in the fishing and aquaculture industry (Towards Osaka Blue Ocean Vision, 2021).

More broadly, Norway has also implemented various initiatives to align with the Norwegian Government's commitment to the Sustainable Development Goal (SDG) 14.1, which states that the world should significantly reduce all forms of marine pollution by 2025 (Norwegian Government, 2020). In 2018, the NDF launched the Norwegian Development Programme to Combat Marine Litter and Microplastics, with the intent of allocating 1.6 billion NOK (or USD 200 million) to fund projects and initiatives dedicated to mitigating marine debris on an international scale over a 5-year funding period (2019-2024) (Norwegian Government, 2020). Though this program targets marine debris more broadly, several of the funded projects have had an ALDFG component, including a partnered project between the Food and Agricultural Organization of the United Nations (FAO) and the International Maritime Organization (IMO) that sought to build regulatory capacity in developing nations to make it easier for them to implement and enforce mandates targeted at reducing marine pollution from shipping and fishing vessels (Royal Norwegian Embassy, n.d.).

## **2.2 – Canada's Efforts**

### *2.2.1 – ALDFG in Canada*

The fishing and aquaculture industries represent one of Canada's most lucrative sectors, with fish and seafood exports valued at CAD 8.79 billion in 2021 (an 8% increase from the previous year as the market has largely recovered from disruptions associated with the Covid-19 pandemic) (DFO, 2022b). Of these fish and seafood exports, 75% was attributed to the following three fisheries: Atlantic lobster (CAD 3.26 billion); crab (refers to snow crab, Dungeness crab, and unspecified species) (CAD 2.18 billion); and salmon (farmed and wild) (CAD 1.12 billion) (DFO, 2022b). The most profitable provinces are Nova Scotia (NS) (CAD 2.48 billion), New Brunswick (NB) (CAD 2.21 billion), and Newfoundland and Labrador (NFL) (CAD 1.42 million) (DFO, 2022b). Canada's most lucrative lobster fishing grounds are located in Southwest Nova Scotia (SWNS), with Lobster Fishing Area (LFA) 34 accounting for roughly 20% of all lobster landed in Canada alone (Withers, 2022). Owing to both the immense economic value and nature of lobster fishing (e.g., use of static gear such as traps), there has been heightened

awareness directed at the connection between this industry and rates of gear loss. A study by Goodman et al. (2021) examined the extent of marine debris in the Bay of Fundy (and specifically in LFAs 33 and 34) and determined that approximately 66% of all debris was comprised of derelict lobster traps. Additionally, Goodman et al. (2021) assessed the baseline impacts of ALDFG in SWNS and found that the annual commercial loss of target species (such as lobster) directly attributed to ghost fishing was between CAD 82,000 to CAD 172,000. Owing to the determinantal socioeconomic impacts of ALDFG on Canada's lucrative fishing industry, there is a clear incentive for federal and provincial measures to be taken that seek to address and mitigate this issue (Gilman, 2015).

### *2.2.2 – Canada's Ghost Gear Fund (GGF)*

In response to growing awareness of ALDFG, Canada has committed to several initiatives that seek to mitigate its impacts, including launching the Ocean Plastics Charter, Charlevoix Blueprint for Healthy Oceans, Seas and Resilient Coastal Communities, and the Canada-wide Strategy on Zero Plastic Waste (DFO, 2021b). Additionally, Canada became a member of the GGGI in 2018, highlighting its commitment to addressing ALDFG on a national scale (Goodman, 2020). Canada has since implemented the Ghost Gear Fund (GGF), which is administered under the Ghost Gear Fund program, and was previously named the Sustainable Fisheries Solutions and Retrieval Support Contribution Program (SFSRSCP) (DFO 2022c; Haggert, 2020). Authority for ghost gear retrievals under this program is partially derived from the *Wrecked, Abandoned or Hazardous Vessels Act* (S.C. 2019, c.1; WAHVA), which seeks to promote the protection of the coastal environment by regulating abandoned or hazardous vessels and/or wrecks found in Canadian waters (Broderick et al., 2020). ALDFG is not defined under this act, but for the purpose of program administration ALDFG is interpreted under the definition of a 'wreck' (defined as any equipment that is or was on board a vessel and that is currently sunk, adrift, or stranded) and therefore subject to removal (Broderick et al., 2020). Through the GGF, Fisheries and Oceans Canada (DFO) seeks to support Canada's broader commitments to reduce the occurrence and impacts of marine debris by highlighting the need to address the issue of ALDFG (DFO, 2022c). During the initial 2020-2022 administration period, the GGF provided funding opportunities to projects that addressed one or more of the following program pillars: 1) ghost gear retrieval, 2) ghost gear disposal, 3) acquisition and piloting of available ghost gear



prevention and/or ghost gear detection and retrieval technology, and 4) international leadership (DFO, 2022b) (Table 4).

**Table 4.** Description of project pillars for Fisheries and Oceans Canada (DFO)’s Ghost Gear Fund (GGF) (DFO, 2022c).

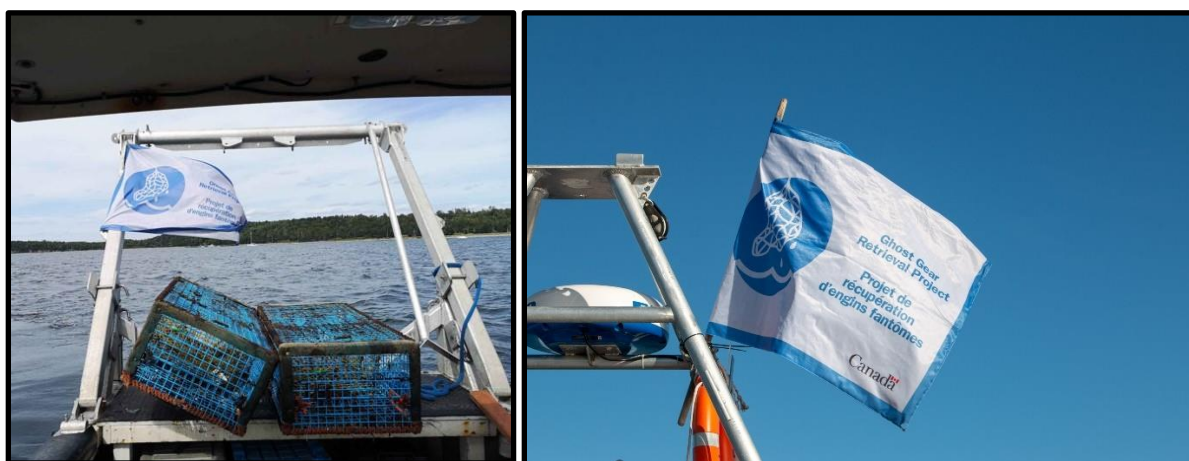
GGF Pillars	Description
1) Ghost Gear Retrieval	Retrieval projects will identify areas of high ALDFG concentrations and conduct ALDFG retrieval efforts. Some retrieval trips will target areas of known habitat for species at risk and areas where ALDFG will have a greater impact on the marine environment (e.g., gillnets, pots, and traps)
2) Responsible Disposal	Disposal projects will collaborate with partners (e.g., port authorities and waste management facilities) to identify and facilitate measures related to the responsible disposal and recycling of ALDFG, including projects with a focus on devising innovative recycling solutions, transporting, and/or storing ALDFG and end-of-life fishing gear.
3) Acquisition and Piloting of Technology	Technology projects encourage the acquisition and/or piloting of technologies aimed at preventing, reducing, detecting, and/or retrieving ALDFG, with emphasis on technology that is economically viable and limits impacts on the marine environment.
4) International Leadership	International leadership projects involve collaborating with a recognized international organization to assist developing states with the development of their own long-term sustainable fisheries practices to address and mitigate ALDFG. These projects must also fall under one of the three previously listed pillars.

As much of the focus of the GGF is on ALDFG retrieval, it is important to first establish the current regulatory conditions surrounding this process in Canada. It is illegal in Canada to have usable fishing gear on board a vessel without an authorized licence and/or permit, and as ALDFG falls under the classification of fishing gear, a Section 52 Scientific (s.52) license is required for anyone conducting at-sea ALDFG retrieval work in federal jurisdiction (classified as the area below the high-tide mark) (FGCAC, 2022). The Fishery (General) Regulations of the *Fisheries Act* (RSC, 1985, c. F-14), which authorizes the issuance of a s.52 license for those seeking to fish for 1) Scientific, 2) Experimental, 3) Educational, 4) Public Display or 5) Aquatic Invasive Species control purposes (DFO, 2019). As Canada lacks stand-alone marine debris or ALDFG legislation, the s.52 license mechanism was adopted for the authorization of at-sea ALDFG retrieval. Though a s.52 license is required for all at-sea ALDFG retrieval activities, these activities do not necessarily have to be funded under the GGF, though must be conducted outside of active fishing seasons. DFO Resource Management (RM) facilitates the licensing approval process, with consultation involving various internal groups such as DFO Conservation and Protection (C&P), DFO Indigenous Fisheries Management (IFM), and DFO Small Craft Harbours (SCH) (Table 5).

**Table 5.** Summary of Fisheries and Oceans Canada (DFO) ’s interdepartmental roles and responsibilities in relation to the Ghost Gear Fund and ghost gear retrievals.

Roles	Responsibilities
DFO Resource Management (RM)	<ul style="list-style-type: none"> <li>• Lead the negotiation process to finalize the Contribution Agreements</li> <li>• Lead the s.52 scientific license approval process</li> <li>• Provide oversight of project operations and reporting</li> </ul>
DFO Conservation and Protection (C&P)	<ul style="list-style-type: none"> <li>• Provide input on proposed retrieval sites, participants, and enforcement concerns</li> </ul>
DFO Indigenous Fisheries Management (IFM)	<ul style="list-style-type: none"> <li>• Provide input on proposed retrieval sites and timing</li> </ul>
DFO Small Craft Harbours (SCH)	<ul style="list-style-type: none"> <li>• Lead the setup and management of storage compounds for ghost gear retrievals and liaison with Harbour Authorities</li> </ul>

Once a gear retrieval project is approved, DFO provides retrievers “*Ghost Gear Flags*” that are directed to be attached to the vessel authorized for retrieval activities, to aid in the identification of vessels authorized to conduct at-sea retrievals (Goshulak, L., pers, comm., 2022) (Figure 6).



**Figure 6.** Ghost Gear Retrieval Project flags provided to all vessels permitted to retrieve ALDFG in Canada (Left: CSR Geosurveys, 2022; Right: T Buck Suzuki Foundation, 2022).

In Canada, as part of commercial fishing licence conditions, harvesters have a responsibility to prevent the disposal of gear and waste at-sea. To formalize this, Canada has included a condition in all commercial fishing gear licences that requires reporting of lost gear and retrieved ALDFG to DFO within 24 hours of the end of the fishing trip, which will improve understanding of ALDFG in Canada and help inform future ALDFG retrieval efforts (Broderick et al., 2020). However, despite also adopting a ‘no-fault’ reporting system as seen in the U.S. and Norway, some perceptions remain among harvesters of viewing mandatory lost gear reporting

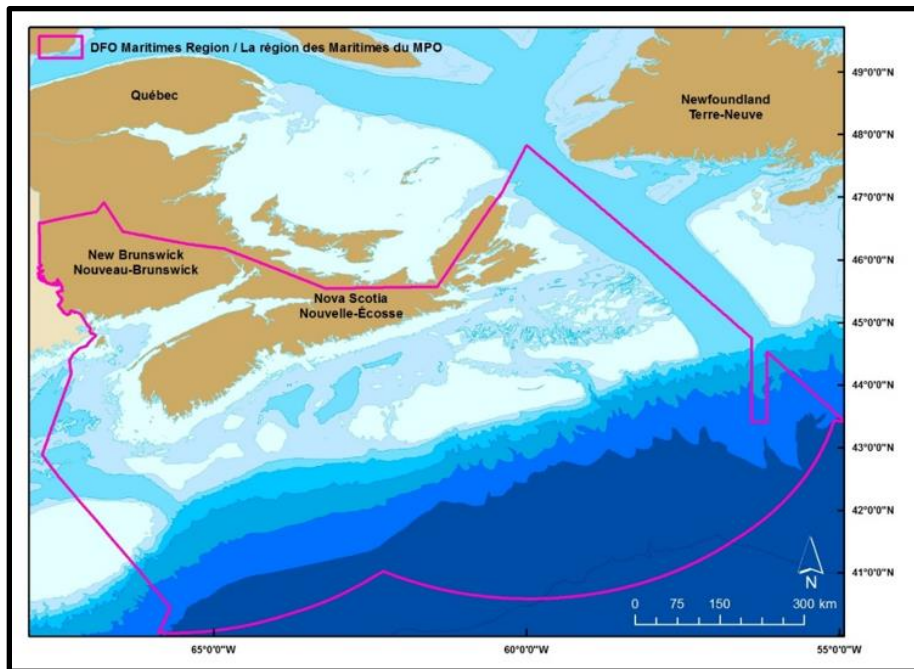
conditions as a means of charging someone for the loss of gear, rather than for not complying with the reporting requirement (Broderick et al., 2020). Additionally, harvesters are unable to retrieve other harvesters' lost gear that they naturally come across in their normal fishing activities due to regulatory restrictions against interfering with other harvesters' set gear. As a result, this limitation restricts at-sea retrievals to require a licence and be limited to closed fishing seasons to reduce the risk of conflict with active fishing gear (Broderick et al., 2020). Towards addressing some of these challenges, DFO has taken steps to engage harvesters through an environmental stewardship lens and to ensure awareness regarding ALDFG impacts and the benefits of lost gear reporting (Broderick et al., 2020)

DFO facilitates public outreach regarding the GGF via a Call for Proposals, encouraging applicants to complete a form that outlines key components including their organization, proposed activities, and proposed budget (DFO, 2022g). Proposed activities must fall under one of the previously listed program pillars: 1) retrieval; 2) disposal; 3) technology; and 4) international leadership. Successful applicants then work with DFO to develop a 'Contribution Agreement' (CA) for the proposed project, which outlines items such as the amount of funding to be allocated, anticipated expenses, start and end dates of proposed activities, project deliverables, and reporting requirements. All GGF partners are required to provide project reports to DFO according to a schedule established in their Contribution Agreement (i.e., year-end and mid-year, if required).

For projects with a focus on ALDFG retrieval, there are additional stipulations. Once ghost gear is retrieved and brought to the shore, it is required to be stored securely. DFO, through SCH, coordinates secure compounds managed by local Harbour Authorities for retrievers to store tagged, usable gear for return to gear owners. DFO also requires that retrieval projects provide notice of their intent to conduct retrievals via a "hail out" (which is typically initiated by the project coordinator) at least two business days before each retrieval period (i.e., before each trip or before a group of retrieval trips) in order to assess any potential conflicts with the proposed activity. Information to be added in this hail-out includes captains' names, vessel names, vessel registration number (VRN), departure and arrival time information, and retrieval location (i.e., the area where retrieval efforts will be concentrated in). If there is a change to this hail, an amendment must be submitted to DFO to provide notice. DFO must receive hail-out information before retrievals take place to confirm that retrieval efforts can be conducted safely

and do not interfere with work being carried out by DFO in those areas. When in the field during the retrieval activities, retrievers are required to fill out data collection forms provided to them by DFO for each trip and submit the data into the online Fishing Gear Reporting System (FGRS) within 48 hours. Information collected includes the type and quantity of retrieved ALDFG, retrieval location, condition of retrieved ALDFG, and the type and quantity of bycatch, and is used to facilitate gear returns to owners and track the relevant metrics throughout the duration of the effort.

Over its initial two-year period from 2020-2021, the GGF funded 49 projects (for a total of CAD 16.7 million) with 4 of the 49 occurring internationally (DFO, 2022d). On a regional scale, 12 projects were funded across the DFO Maritimes Region, which encompasses the marine waters of eastern and southwest NS on the Scotian Shelf and southwest NB and northwest NS in the Bay of Fundy (DFO, 2020; DFO, 2022d) (Figure 7; Table 6). Of the twelve projects funded in the DFO Maritimes Region, five (42%) received funding over the full two-years (2020-2022), whereas seven (58%) received funding in the second year only (2021-2022) (Goshulak, L., pers. comm., 2022). National highlights from this program from its first two-years included the successful retrieval of 7,342 units of gear (approximately 1,295 tonnes) and more than 153 km of rope from the Region's marine waters (DFO, 2022e).



**Figure 7.** Map delineating boundaries of Fisheries and Oceans Canada (DFO) Maritimes Region (DFO, 2021c).

**Table 6.** Summary of Ghost Gear Fund partners in Fisheries and Oceans Canada (DFO) 's Maritimes Region, 2020-2022 (DFO, 2022c).

No.	Organization	Project Title	Pillar	Year
1	Cape Breton Fish Harvester's Association	Ghost Gear Removal in LFA 27	Retrieval Technology	2020-2022
2	Coastal Action	Collaborative Remediation of Abandoned, Lost, and Discarded Fishing Gear (ALDFG) in Southwest Nova Scotia	Retrieval Disposal	2020-2022
3	CSR Geosurveys Ltd.	LFA 36-38 ALDFG Survey, Retrieval, and Disposal	Retrieval Technology	2020-2022
4	Confederacy of Mainland Mi'kmaq	Keskaqowey Apuktuk Memjeway Mi'kma'ki (Ghost Gear in Mi'kma'ki)	Retrieval Disposal	2021-2022
5	Eastern Nova Scotia Marine Stewardship Society	Smart Buoy Technology to Track Fishing and Aquaculture Gear in the Maritimes.	Technology	2020-2022
6	Friends of McNabs Island Society	McNabs and Lawlor Islands Cleanup – Education and Awareness Initiative	Retrieval Disposal	2021-2022
7	Fundy North Fishermen's Association	Responsible Disposal of End-of-Life Lobster Traps	Retrieval Disposal	2020-2022
8	Goodwood Plastics Products	Maximizing Recycling Efficiency and Value of End-of-Life Plastic Fishing Gear in Atlantic Canada	Disposal	2021-2022
9	Marine Thinking	Lobster trap tracking, monitoring, and retrieval system	Technology	2021-2022
10	Maliseet Nation Conservation Council	Using diving to remove ghost-gear and other marine debris from the Bay of Fundy	Retrieval Disposal	2020-2022
11	Richmond County Inshore Fisherman's Association	Ghost Gear retrieval of St. Peter's Bay, Richmond County, Nova Scotia	Retrieval Disposal	2021-2022
12	Titan Maritime	Titan Maritime Proposal to DFO for SFSRSCP Funding	Retrieval Disposal Technology	2021-2022

For DFO's Maritime Region, approximately 1,115 retrieval trips (at-sea, shoreline, and aquaculture) were conducted, leading to the successful retrieval of 7,609 units of traps/pots, 1,362 units of other gear (i.e., nets, trawls, longline, seine, troll, and other), and 188 km of rope (Goshulak, L., pers, comm., 2022). These regional findings highlight the GGF's successes over its initial two-year implementation period (July 2020-October 2022) (Goshulak, L., pers, comm., 2022). Upon conclusion of these two years, the GGF was extended for a third year until March 2023, with CAD 10 million in funding allocated (DFO, 2022f; Goshulak, L., pers, comm., 2022). Additional funding was made available following the aftermath of Hurricane Fiona and

associated damages to portions of Atlantic Canada: DFO provided CAD 1.5 million to projects for immediate cleanup efforts in 2022-2023, and up to \$28.4 million was announced through a new call for GGF proposals in 2023-2024 for those partners carrying out work in areas directly impacted by the Hurricane (FFAW, 2022).

## **Chapter 3.0 Methodology**

### **3.1 – Management Problem**

Many current ALDFG policies and initiatives on both an international and national scale have only been implemented in the past decade. Owing to the novelty of these initiatives, it is therefore important that they be systematically reviewed and assessed to determine their possible successes and limitations. Canada's GGF was initially implemented over two years (2020-2022) and has yet to undergo such a review process by a third party external to DFO. Though this research sought to examine DFO's GGF through a primarily academic lens, this study was conducted in close collaboration with DFO GGF program contacts and it cannot, therefore, claim to be fully external or independent. Rather than serving as a limitation, however, this close collaboration enabled a thorough understanding of operational government proceedings necessary to understand the current structure of Canada's GGF program to be obtained and utilized. Thus, the management problem that this study seeks to address is to determine what the opportunities and challenges associated with the GGF are, with a focus on recommendations that can be provided for improving the implementation of the GGF in DFO's Maritimes Region and at the national level.

#### *3.1.1 Study Objectives*

The overarching objective of this study is to review Canada's GGF over its initial two-year period (2020-2022) with a focus on how this program operated in DFO's Maritimes Region. Specific study objectives include:

- 1) Examine ALDFG mitigation strategies and policies implemented in other nations' case studies – the U.S. and Norway - and compare them to Canada's approach.
- 2) Determine the GGF's successes and limitations to provide best practices and recommendations to DFO, should this program be extended or expanded in the future.

## 3.2 – Study Design

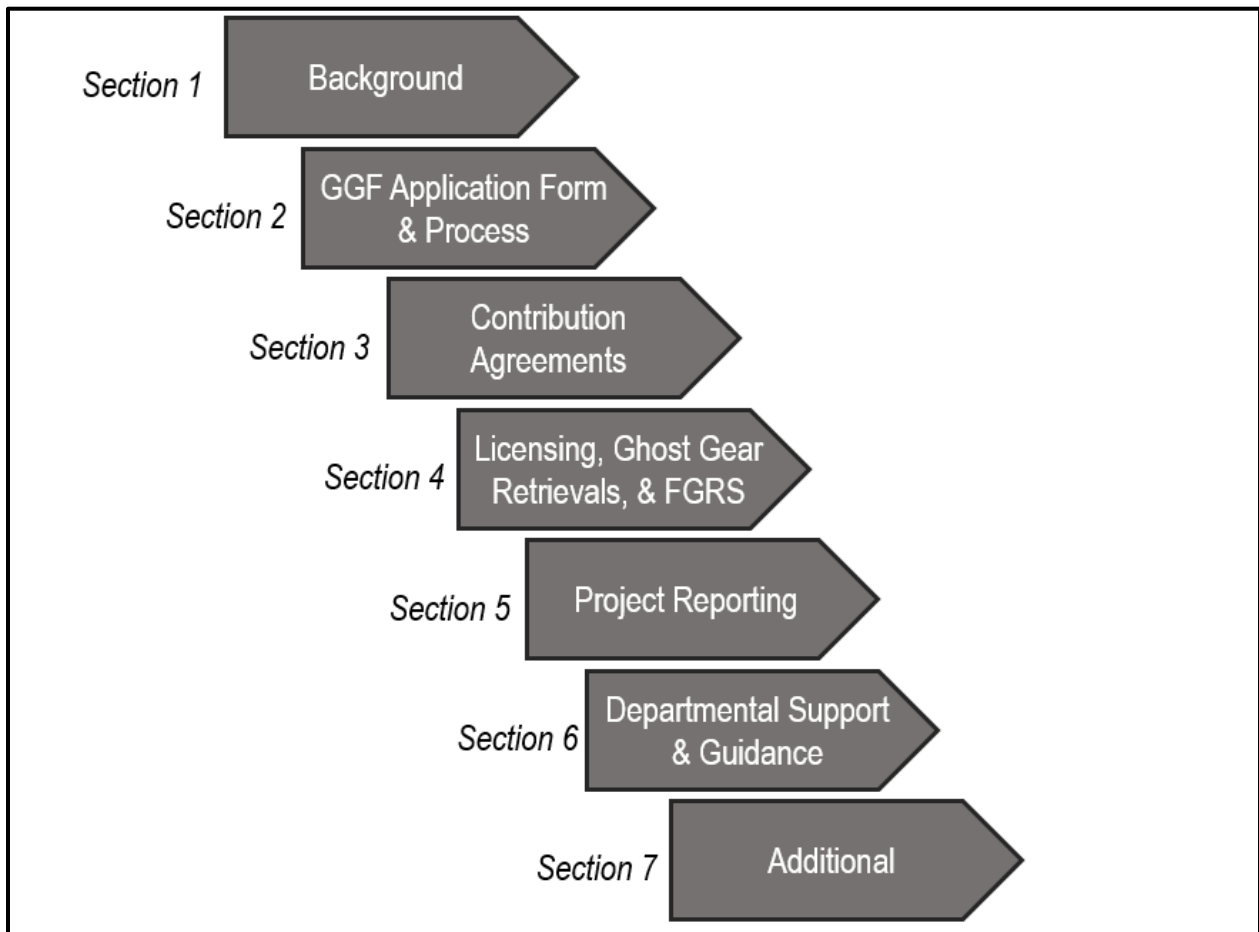
The research approach taken for this study consisted of three main steps – Literature review, data collection, and data analysis. First, a desk-top literature review was conducted to 1) summarize the sources, impacts, and management measures of ALDFG, 2) provide an overview of international ADLFG policies and highlight two case studies: the U.S. and Norway, and 3), provide an overview of Canada’s ALDFG policies and examine in depth the federally led GGF program. The literature review provided the necessary context that helped to guide the development of a mixed-methods approach (utilizing an online survey and follow-up interviews with GGF partners funded to conduct work in the DFO Maritimes Region). To ensure compliance with institutional standards on the ethical conduct of research involving humans, ethics approval was sought and obtained from the Marine Affairs Program Ethics Review Standing Committee, Dalhousie University, Halifax, Nova Scotia (MAPERSC #: 2022-09).

### 3.2.1 – *Online Survey and Interviews*

A total of 12 organizations working exclusively in DFO’s Maritimes Region received funding under the GGF over its initial 2-year period (2020-2022). For this study, participants are defined as individuals who were leading or directly supporting the funded project for a significant portion of its duration. Though the majority of groups had a single individual overseeing the funded project, for some, there were multiple project leads or primary supporting staff over the project’s duration. To ensure a broader base of information was obtained and to enhance data reliability, the decision was made to contact all project leads involved from 2020-2022. As a result, 18 individuals, representing the 12 funded organizations in DFO Maritimes Region, were contacted in total and invited to participate in this study. A total of 11 agreed to complete the online survey with nine also participating in follow-up interviews.

Participants were provided with information about the study before completing the survey and were required to sign a consent form to ensure that they understood the research conditions and how their privacy would be maintained. The survey was distributed digitally using Opinio survey software (version 7.20) via targeted e-mails. Survey questions were formatted as multiple choice or select-all-that-apply, with an open-ended question that allowed for additional comments or recommendations at the end of each section (the survey is included in Appendix I). Participants could choose to skip any question that they did not want to answer or

that did not apply to their project (e.g., the ‘*Licensing, Ghost Gear Retrieval, and FGRS*’ section was only completed by groups who conducted retrievals). The survey consisted of 50 questions and was estimated to take between 15-20 min to complete. The survey was divided into seven categories, which represented various elements of the broader GGF program structure: 1) Background, 2) GGF Application Form and Process, 3) Contribution Agreements, 4) Licensing, Ghost Gear Retrieval, and FGRS, 5) Project Reporting Requirements, 6) Departmental Support and Guidance, and 7) Additional (Figure 8).



**Figure 8.** Flow chart depicting the survey design utilized for this study.

All survey participants were invited to take part in an optional follow-up interview in case they wanted to expand or elaborate on any of their survey responses. Interviews were carried out remotely based on the preference of the participant (e.g., Microsoft Teams, Zoom, or by phone). Interviews ranged from 30 min to 1 hr and 30 min in duration and were not recorded, though detailed notes were taken during the conversation. Nine individuals were interviewed in



total; however, as two participants were interviewed together (given that the initial contact invited their current project lead to also participate in the interview and share their insights), their set of interview responses was compiled and analyzed as one. Therefore, for the analysis, eight individuals are said to have been interviewed. Given the flexible nature of these interviews, the questions were largely based on individual survey responses and followed the same order of questioning, rather than a standard set of designated questions. Interviewees were asked to provide additional comments and/or recommendations for each of the survey sections and were provided a chance to expand on or clarify any of their survey responses at any point.

## **Chapter 4.0 Study Analysis**

### **4.1 – Results**

A total of 18 individuals were invited to participate in this study (Table 7). Eleven individuals completed the online survey and eight agreed to participate in follow-up interviews. Nine of the 12 organizations that received funding under the GGF from 2020-2022 for DFO’s Maritimes Region were represented among the study participants. To supplement the analysis, direct quotations from survey responses have been included with the consent of the participant. Quotations are indicated by italics and quotation marks and will be associated with a unique identifier code to preserve participant anonymity.

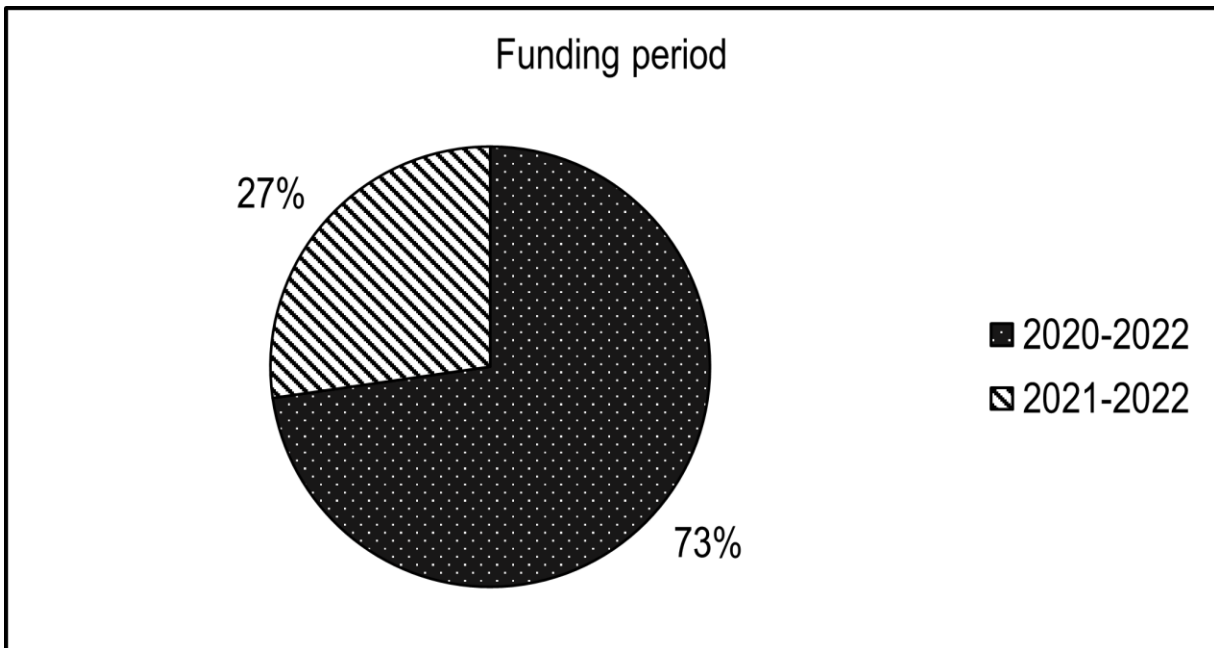
*Table 7. Summary of study participants.*

<b>Challenges</b>	<b>Count</b>
Total population (N)	18
Study population (n) - Online survey	11
Study population (n) - Interviews	8
Total number of GGF recipients in DFO’s Maritimes Region (2020-2022)	12
Number of GGF recipients in DFO’s Maritimes Region (2020-2022) represented in this study	9

#### Section 1. Background

Of the surveyed participants, 7 (63%) indicated that their projects received funding over the full two-years (2020-2022), 3 (27%) received funding over the second year only, and 1 (9%) over the first year only (2020-2021). It is thought that this question may have been misinterpreted or misunderstood by participants, given several discrepancies among the set of survey responses (i.e., organizations that received funding over two years selecting only a single

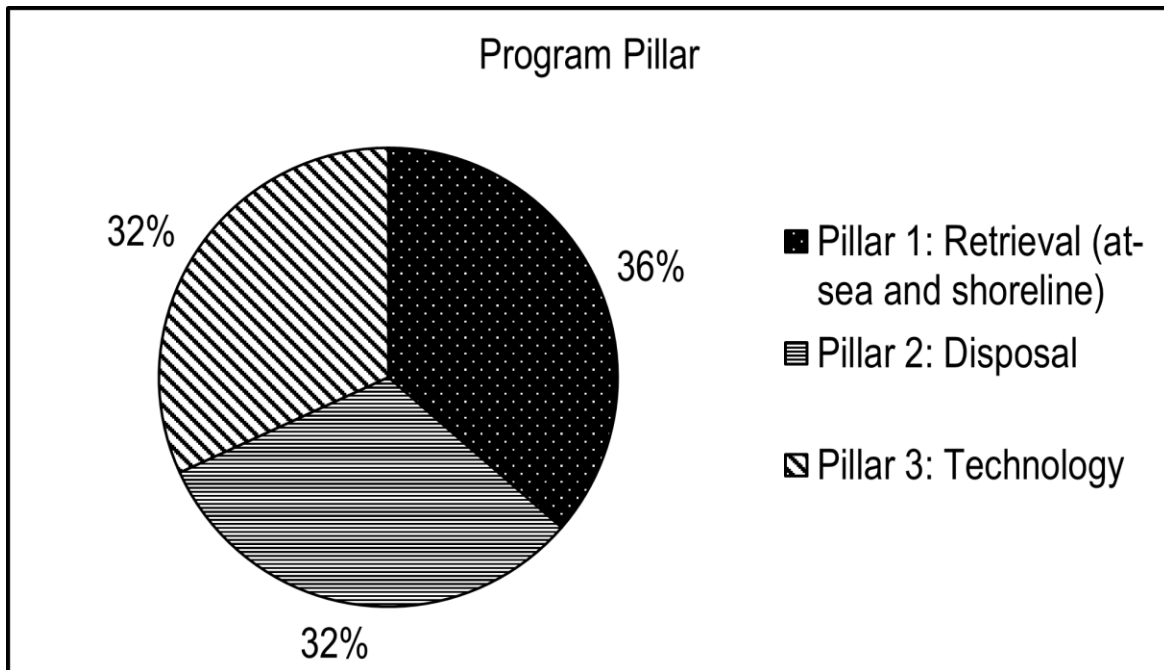
year or the incorrect year). Given this discrepancy, it was decided to rely on the funding periods that were reflected in each organization's Contribution Agreement to accurately reflect the funding periods for each organization, with the updated results showing that of those surveyed, 73% (n=8) were funded over the initial two-years (2020-2022) and 27% (n=3) received funding over the second year only (2021-2022) (Figure 9). Another key distinction to make is that given the new and ongoing development of the GGF, it has already undergone various stages of operational and administrative change since its initial implementation in 2020. Therefore, there may be cases in which certain comments and/or suggestions provided by participants may no longer be applicable or as relevant given these changes. Similarly, some project leads were not involved with the project over its entire duration, which also may have influenced some survey responses.



**Figure 9.** Percentage of funded projects for Fisheries and Oceans Canada (DFO)'s Maritimes Region that received funding over the Ghost Gear Fund (GGF)'s initial two years (2020-2022) (n=6) or over the final year only (2021-2022) (n=3).

Survey participants were asked to select all of the GGF pillars that applied to their projects with the following results: Retrieval (at-sea and/or shoreline) (32%, n= 8), 2) Responsible Disposal (28%, n= 7), 3) Acquisition and piloting of innovative technology (28%, n= 7), and 4) International Leadership (12%, n= 3). Though some participants selected leadership as a pillar, it should be noted that this was typically in the context of anticipated

international benefits or partnerships, rather than the intended use of identifying work that takes place outside of Canada. As a result of this misinterpretation, it was decided to eliminate the ‘leadership’ pillar from the analysis as none of the projects funded in DFO’s Maritimes Region operated on an international scale, with the updated set of responses reflecting this removal as follows: Retrieval (at-sea and/or shoreline) (36%, n= 8), 2) Responsible Disposal (32%, n= 7), and 3) Acquisition and piloting of innovative technology (32%, n= 7) (Figure 10).



**Figure 10.** Percentage of funded projects that fell under one or more of the following four Ghost Gear Fund (GGF) pillars: 1) Retrieval (at-sea and/or shoreline)(n=8), 2) Responsible Disposal (n=7), and 3) Acquisition and piloting of innovative technology (n=7).

## Section 2. GGF Application Form and Process

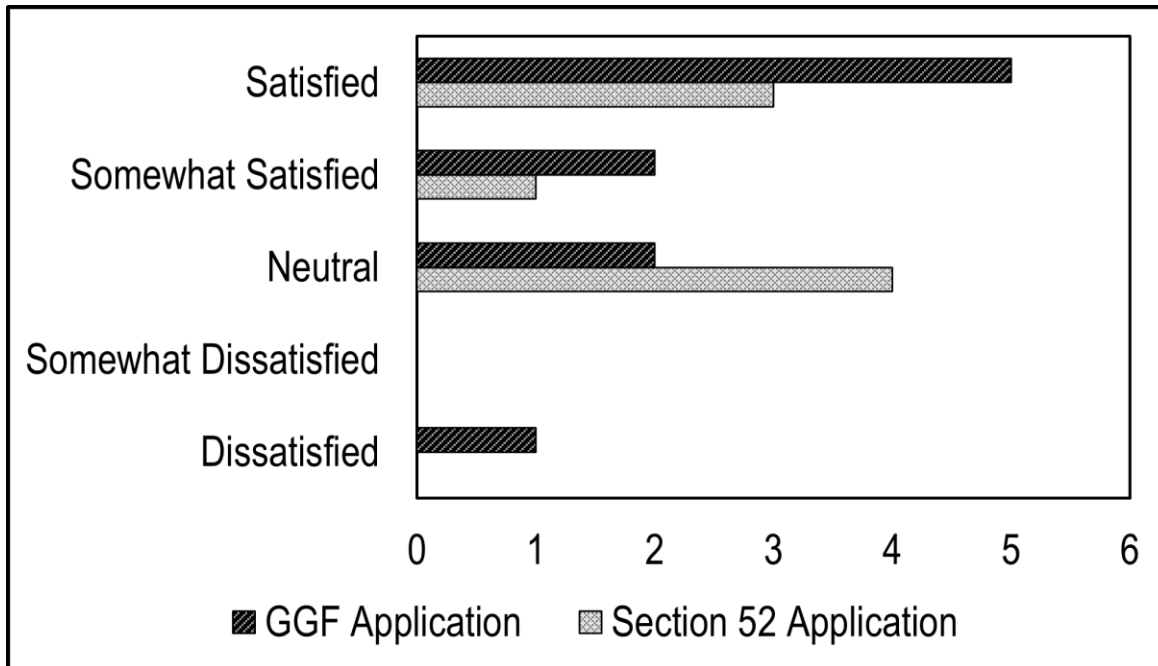
In terms of the application form and/or process, the common issues and concerns that were expressed by participants are as follows:

- Some sections were somewhat confusing and/or difficult to understand (n=7)
- The application timeline was tight and did not align with the ideal start for proposed project activities (e.g., when fisheries were inactive and retrievals were possible) (n=3)
- It was unclear which sections of the application form could be skipped as some were not applicable (n=3)
- Uncertainty regarding DFO’s expectations for GGF partners (n=3)

- There was insufficient time to complete the application (n=2)
- Uncertainty regarding the likelihood of the applicant’s success or rejection (n=2)
- Confusion over internal DFO roles and responsibilities (n=2)
- The application form was time-consuming (n=1)

Two participants expressed the same frustration with not being provided with any feedback or means of understanding how their applications were being assessed by DFO to determine the success or rejection of the applicant and suggested either a grading rubric that outlines criteria amongst which applications will be assessed. When asked to rate their satisfaction with the overall GGF application form and/or process, participants provided Dissatisfied (n=1), Neutral (n=2), Somewhat Satisfied (n=2), and Satisfied (n=5) (Figure 11). Specific comments related to the GGF application and timeline include:

- *“The timeline for applying to the funding to be sooner in the year due to summer months being the easiest to retrieve. Also, having a quicker approval for conditions and licensing.” (A2)*
- *“Early submission of applications and turnaround time will help us to be able to conduct retrieval in the summer - which is much more feasible and desirable for captains who want to be involved (June-August). This will also amplify the 1-year of funding and allow us to retrieve more gear in the allotted timeline.” (A6)*
- *“The application deadline should have been sooner in the year. We've missed the entire summer to try to locate fixed gear in the area. We are aware that fishing seasons differ in areas, however the summer months are the easiest to do retrievals due to captains time, weather, and being able to look for fixed gear without grappling. The timeline was not great and we were dissatisfied due to it.” (A2)*



**Figure 11.** Satisfaction rating for the Ghost Gear Fund Application Form & Process (n=10) as well as the Section 52 License Application Form and Process (n=8).

Section 3. Contribution Agreements

The Contribution Agreement phase involved negotiations between the GGF-funded organization and DFO to finalize project elements such as proposed activities, funding amounts allocated, and project deliverables. Common issues and challenges related to the Contribution Agreement negotiation process include:

- The finalization of the negotiation process produced delays to the start of proposed project activities and impacted their group’s ability to complete project objective(s) on time (n=8)
- The funding amount was insufficient to carry out proposed project activities, posing challenges with securing alternate funding sources and/or reducing proposed expenditures (n=6)
- Some sections were confusing and/or difficult to understand (n=5)
- Did not receive timely responses from DFO throughout the negotiation process (n=1)

The most prominent challenge that arose when interviewees were asked to elaborate on their survey responses included that it was a lengthy process, which led to delays in receiving

funding and approval, impacting the ability of some groups to achieve their project objective(s). This was especially the case for projects centered around retrieval work, given that ghost gear retrieval can be dangerous and many groups had a narrowed window of opportunity for which to conduct retrievals. This window of opportunity is dictated by the timing of the funding period (following the fiscal year schedule) and active fixed gear fishing seasons (retrievals typically only take place outside of this activity), which typically led to retrievals being done in the fall or winter, which was less than ideal given the unfavorable weather conditions that characterize this time of year. It should be noted that the GGF is managed consistently with the Government of Canada fiscal year (April 1 to March 31), and this timeline does not align ideally with active fisheries or preferable gear retrieval seasons when weather conditions might be more favorable (e.g., spring/summer). Another challenge, expressed by two participants, was frustration in having to wait until all the Contribution Agreements between GGF recipients and DFO were finalized before being permitted to publicly share their involvement with the GGF. As many of these funded projects seek partnership opportunities, this delay posed a challenge to participants being able to identify other recipients in the effort of forming potential partnerships with them. Specific comments expressed by participants include:

- *"Funding for salaries was reduced but total deliverables were not changed, which meant that salaries had to come from somewhere else." (A1)*
- *"Funding timeline doesn't match the need to start retrieval, as there are permit requirements, etc. that delay the start of the project. More time would allow for less stress on the part of the organization and the partners involved." (A6)*

#### Section 4. Licensing, Ghost Gear Retrieval, and FGRS

This next section applied only to groups with activities that centered around ghost gear retrieval. Questions were separated into the following three sub-categories: 1) Section 52 (s.52) permitting form and/or process, 2) ghost gear retrievals and storage compounds, and 3) ghost gear reporting requirements using the FGRS. Common issues and challenges related to s.52 permitting include:

- Acquiring/amending the s.52 permits was somewhat challenging (n=5)
- Increased expectations for conducting retrieval work than was initially realized (n=2)

- Some permit sections/conditions were somewhat confusing and/or difficult to understand (n=1)
- Increased transparency at an earlier stage regarding the requirements/clauses in the s.52 to ensure project leads can plan accordingly (i.e., ensure all team members are familiar with the regulatory conditions well in advance) (n=1)
- Confusion over when to go about applying for a s.52 permit (n=1)

At least one participant expressed confusion as to the approval for conducting at-sea retrieval work falling under the s. 52 permitting process, which is specifically designated for activities that fall under one of the following categories: 1) Scientific, 2) Experimental, 3) Educational, 4) Public Display or 5) Aquatic Invasive Species control purposes. Several participants expressed that they were unaware of all of the requirements for conducting retrieval work before undergoing the s.52 application process. Another challenge expressed was the uncertainty related to which regions might be considered off-limits for conducting retrieval work. One participant stressed that the issues their team experienced were not necessarily with the s.52 permit application form and/or process itself, but rather changes to their proposed retrieval activities (e.g., change in retrieval sites or change in retrieval dates) which necessitated an amendment on short notice. During the interviews, several participants also commented that they hadn't been prepared for how many additional requirements and clauses were included in the s.52 permit application (e.g., clauses about invasive species and marine mammals). They stated that they were not aware of these requirements before gaining funding approval and felt that they would have appreciated greater transparency on DFO's part earlier in the funding process to better prepare for what would be required of them and their retrieval captains. When asked to rate their satisfaction with the s.52 permit form and/or process, participants provided Neutral (n=4), Somewhat Satisfied (n=1), and Satisfied (n=3) (Figure 11). Specific comments related to the s.52 permitting process include:

- *“It did take some time to receive the permit, which underscores the importance of starting early to avoid project delays.” (A4)*
- *“[Would like] more communication on when to get the S52 in so that we don't delay retrieval efforts.” (A6)*

Common issues and challenges related to ghost gear retrievals, available lost gear data, retrieved gear reporting, and gear drop-offs at designated storage compounds include:

- Lack of usable ghost gear hotspot data provided by DFO (from harvesters' submitted lost gear reports) (n= 7)
- Designated storage compounds were inconveniently located at times (i.e., far from where retrieval work was occurring which necessitated long transport times and/or associated costs) (n= 6)
- Concerns with encountering/managing Illegal, Unregulated, and Unreported (IUU) fishing gear (n= 5)
- Challenges coordinating with SCH to manage drop-offs of tagged gear (n= 4)
- Concerns with encountering and potentially interfering with active Indigenous Food, Social, or Ceremonial (FSC) fishing gear (n= 3)
- Limited accessibility to recycling/disposal options (n= 2)
- Rigid expectations for dropping off gear (i.e., gear had to be dropped off within 24 hrs of each retrieval period) (n= 1)

For all retrieval groups that were asked about how they determined the sites they identified for retrieval purposes, all said that they relied mainly on local knowledge from harvesters, retrieval vessel captains, and their networks, rather than use any hotspot data that was provided to them by DFO. The lack of ghost gear hotspot data provided in an appropriate format by DFO was a common source of frustration for those conducting retrieval work. Several participants stated that what they were provided by DFO was virtually unusable to inform which sites they might want to target for ghost gear retrieval efforts (i.e., no exact coordinates were provided, only maps depicting points representing cases of reported lost gear, etc.), and instead, retrieval groups largely relied on word of mouth or local fisher knowledge to inform potential retrieval sites. The option to obtain exact coordinates from DFO for each reported case of lost gear is possible however, as this dataset is massive it is not immediately offered to retrieval groups unless directly requested.

Additionally, several participants expressed frustrations at the rigid expectations put on those conducting retrieval work. For example, the requirement to provide DFO with a hail-out notice at minimum two business days in advance of any upcoming retrieval periods felt



restrictive according to two participants. Owing to the inherently variable nature of conducting at-sea retrieval work, many planned trips may be delayed due to waiting on favorable weather conditions for example, it was sometimes difficult to provide notice the full two days in advance as groups wanted to maximize all retrieval opportunities. This rigidity was expressed as a frustration again when it came to discussing the expectations for gear drop-offs once the ghost gear was retrieved. DFO required all retrieved gear to be dropped-off at designated storage compound(s) at the end of the retrieval day. This proved to be a common challenge for several groups, given the lack of accessible storage compound(s), as many were inconveniently located far from where retrieval work was concentrated, necessitating long transport times and associated high costs in some cases. Similarly, it was also challenging for a few participants to manage retrieved gear that was tagged/useable (as DFO seeks to identify owners of such gear to facilitate its return). Commons challenges include some Harbour Authority Facilities not being adequately equipped with storage compound(s) and necessary equipment for storage of tagged/useable ghost gear, as well as some Harbour Authorities or Port Authorities being unavailable when given 4 hours' notice to provide access to the storage compound(s) for gear drop-off. It should be noted that the issues expressed by a few participants regarding coordinating with Harbour Authority Facilities were only the case for some, and operations for coordinating gear drop-offs in others locations ran smoothly. Additionally, two participants stated that DFO's current system for identifying gear owners is inefficient and that they would like to see improvements to this process.

Another note of concern arose as a general comment by at least three participants of potential contracted retrievers not trusting or willing to work with DFO. This mistrust of DFO on the part of certain harvester's led to some difficulties with retrieval groups in securing interested harvesters to become involved with retrieval work. This element of mistrust surfaced throughout the interviews again when it came to the reporting conditions and requirements for lost gear. Additionally, several participants commented that in general, harvesters appeared to be wary of using the FGRS as a means of reporting their lost fishing gear given a general lack of awareness of what DFO is using this data for. Lastly, one comment that arose specifically among retrieval groups was a general lack of clarity and communication from DFO regarding some parts of the retrieval process, and more specifically, what exact processes needed to be carried out with gear

once it had been retrieved (i.e., how to manage tagged gear and go about coordinating gear drop-offs).

Lastly, many participants expressed frustrations with using the FGRS, which DFO required for all lost gear retrieval reporting in the 2021-2022 funding period after the system's launch in 2021. Before this period, alternative datasheets for reporting (Excel or PDF format) were utilized for reporting purposes to DFO. It should be noted that the FGRS, like the GGF itself, has also undergone various iterations since its initial development, and as a result, some of the issues and concerns listed by participants in this study may no longer be applicable or relevant. Specific issues that were raised include:

- Expectations were rigid and timing for submitting data was insufficient (i.e., data had to be uploaded into the FGRS within 24 hrs of each retrieval period) (n= 6)
- Technical difficulties were frequent (i.e., the system would freeze up/lock up and data would be lost or it would slow down considerably due to the amount of data being inputted) (n= 5)
- Reporting was time-consuming and the workload was doubled – data was recorded once in the field using physical data sheets and again when uploaded into the FGRS (n= 2)
- No offline option (i.e., data could not be inputted and saved in the field to be uploaded once the system was online again) (n= 2)
- Physical data sheets were too small and compact to be used practically when in the field (n= 1)

Additionally, several participants expressed that they felt the reporting options in the FGRS were inadequate, with specific issues being flagged including:

- Some sections were mandatory but not applicable to them (had to fill in with inaccurate data to get past)
- Difficult to obtain daily weight for retrieved ghost gear given heavy/extensive biofouling
- Some data fields were inadequate (i.e., no option to input how many of each bycatch were found alive vs. dead, it was only possible to input the weight of retrieved rope but not the length)
- Limitations to the quantity of information that can be inputted at a time (i.e., limited to 25 data inputs at a time)

- Inconsistency with units of measurement (imperial and metrics)
- Colours missing for tag colours
- Not able to input multiple options for bycatch (i.e., can report the same species but not distinguish quantity for different species caught)
- Discrepancies between the physical data collection sheets and online FGRS

### Section 5. Project Reporting Requirements

Overall, there were few issues and/or concerns raised regarding the project reporting requirements by study participants. All participants indicated that they had sufficient time to complete the mid-year and/or year-end reports, with general comments indicating that this process was “*long and tedious*” (A1) and that it “*may be more difficult for someone just starting out*” (A5). However, one common challenge that several participants raised was related to the expenditure/budget reporting section, which was expressed as being confusing and tedious to fill out. Additionally, another participant expressed frustration that many of the sections in the project reporting templates seemed catered to retrieval work, which did not apply to their funded project given that they had focused on disposal/recycling as their project pillar. For the most part, however, participants expressed that they experienced minimal challenges with this process, which may be attributed to the routine training sessions that DFO offers that specifically outline the reporting requirements and expectations for GGF partners at this stage. One participant mentioned however, that though this training session was informative, they would have liked for it to be held at a more opportune time of year (towards the end of the field season) or held on more than one occasion to facilitate the attendance of more team members.

### Section 6. Departmental Support and Guidance

There were a few concerns raised regarding the support and guidance provided by DFO throughout the GGF period. Specific comments include:

- The provision of additional background/informational materials related to ghost gear and the GGF beyond what is currently provided could have been beneficial (n=7)
- Unable to find all information related to the GGF on DFO’s website (n=5)

One participant specified that they would have liked to have seen DFO provide an alternate means for supplying information related to the GGF (i.e., outside of its website), which they stated might help to diversify the pool of applicants by raising awareness. DFO did publish this information on platforms additional to their website (e.g., LinkedIn and Facebook), however, the suggestion to broaden the ways in which this is communicated to interested proponents should still be considered given there may be a general lack of awareness of alternative communication methods. The same participant mentioned that the circulation of the Call for Proposals for the GGF could also be improved to increase awareness among eligible organizations that might be interested in conducting ghost gear-related activities in the future. The issue of lack of publicly-accessible information was commonly raised, with those involved with retrieval work specifically mentioning that it was difficult at times to find information on DFO's website specific to how to go about conducting retrieval work (i.e., processes for carrying out land-based and at-sea retrievals, how to apply for the s.52 permit, who to contact at DFO for particular issues such as coming across washed up ghost gear or illegal gear, what the incentives to reporting are and how to report lost gear, and what DFO is using the data from lost gear reports for, etc.). Additionally, one participant mentioned that they had challenges accessing contact networks for the region and that their organization had to rely largely on word of mouth and internal networks to identify potential partners and collaborators, while assistance from DFO towards sharing their contact networks (i.e., fishery associations, etc.) would have been appreciated.

### Section 7. Additional

Participants were asked to provide any additional comments related to what they would like to see from the GGF going forward if it gets extended or expanded beyond its current iteration. Recommendations included:

- Extended timelines for the funding period (n=4)
- Increased available funding (n=3)
- Increased investment at the federal level into funding recycling options/companies to facilitate ease of lost gear disposal (n=2)
- Communicate what the next steps for the GGF might be (n=2)

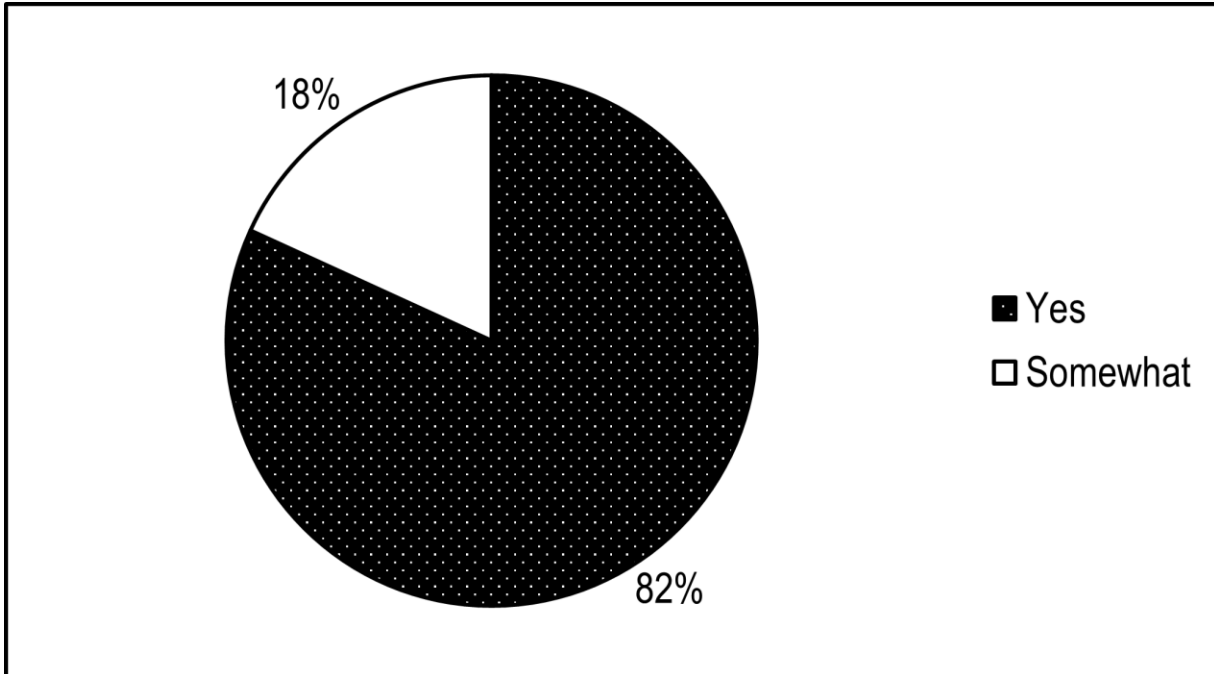
- Would like to see some administrative processes streamlined to ensure faster turnaround times (n=1)
- Provide training/capacity-building pillars for Indigenous communities and organizations to develop and gain expertise in ghost gear-related activities (n=1)
- Increased communication regarding the purpose of lost gear reporting (n= 1)
- Implement a gear tagging system for retrieved gear (i.e., receive tags that can be attached to retrieved ghost gear to differentiate it from active fishing gear, with storage compounds made available year-round to support retrieval efforts) (n=1)
- Develop and share lessons learned from other funded partners (i.e., DFO to organize a conference call with all funded members to discuss or DFO to distribute a summary of this information by email) (n=1)

Several participants expressed frustration with DFO being unable to confirm months in advance that funding under the GGF would be available for the next year, which left a substantial amount of uncertainty for many groups regarding if they would be able to continue their activities or not. This uncertainty made it difficult for groups to know what their hiring capabilities and project scope for the next year would be, and many expressed a desire for DFO to provide announcements related to funding opportunities earlier in the year to account for this. Specific survey responses related to this include:

- *“DFO's support via the Ghost Gear Fund has been phenomenal. Their continued support is crucial as is placing even more emphasis on the need to continue and expand ghost gear retrieval by making even more funding available for retrievers to be able to continue this vital role.” (A5)*
- *“Important to also support the development of recycling programs actively for existing fishing gear.” (A8)*

Despite some of these challenges that select groups faced throughout the GGF process, many participants expressed overwhelming support for applying for the GGF in the future should it program be extended or further expanded, with 82% saying they would be interested in reapplying and 18% saying they may be interested in reapplying (Figure 12). This illustrates the importance of maintaining and improving the program so that it is more streamlined and

functional for future applicants, as well as ensuring that Canada remains committed to addressing and mitigating the issue of ALDFG on a national and international scale.



*Figure 12. Percentage of responses when participants were asked if they were interested in reapplying to the GGF if it should be extended or expanded in the future, with 18% selecting 'Somewhat' (n=2) and 82% selecting 'Yes' (n=9).*

## **Chapter 5.0 Discussion**

### **5.1 – Case Studies: United States and Norway**

The stand-alone ALDFG legislation seen in the U.S. represents a unique model upon which future Canadian policies might seek inspiration. Canada's current approaches towards ALDFG legislation have been to embed them within broader fisheries management mandates (e.g., *WHAVA*, *Fisheries Act*, and the *Fisheries (General) Regulations Act*), though it may be beneficial for long-term commitments towards addressing ALDFG to consider drafting and implementing stand-alone ALDFG legislation, regulations, and/or policies or amending existing legislation and regulations to more specifically address ALDFG. The benefit to stand-alone and more targeted legislation, regulations, and/or policies is that GFF objectives will likely be clearer and less limited, though this approach will undoubtedly require more dedicated and upfront effort and time, as with enacting any kind of new legislation (Broderick et al., 2020). Amending

existing legislation that already pertains to fishery or waste management might be a faster process.

One example that DFO might consider is amending the s.52 permits to expand its objectives to include ALDFG more directly. In comparison to Washington State, the passing of Senate Bill 6313 served to eliminate various regulatory barriers to DFG retrieval, which is something Canada should consider going forward to encourage and legitimize retrieval efforts. So long as harvesters in Washington State adhere to DFG removal guidelines outlined in state regulations, they are not required to possess any licence or permit to carry out retrieval work. In Canada, DFO might consider amending the existing s.52 permitting process to model that which is demonstrated in Washington State (i.e., implement a retrieval tagging system for ghost gear). Additionally, if Canada has its own targeted ALDFG legislation that fell under a broader marine debris or pollution piece of legislation, like in the U.S. with their *Marine Debris Act*, this could similarly help to address retrieval concerns as ALDFG would no longer be classified under fishing gear but rather as a subset of marine debris. Alternatively, Canada could explore drafting ALDFG regulations under section 50 of the *Fisheries (General) Regulations*, or explore alternate pieces of legislation such as Canada's *Oceans Act*.

In reviewing the numerous legislative approaches and initiatives implemented by Norway over the past decade alone, it is apparent why they are considered one of the leading nations for ALDFG mitigation. Though there are many similarities between Norway and Canada, such as in implementing a 'no-fault' reporting system for lost gear, mandating reporting as a licence requirement, and supporting retrieval efforts on a national and international scale, there are many ways that Norway might serve as a model for ALDFG mitigation strategies in Canada. Specifically, the idea of an annual tax on harvesters that funds government-led ALDFG retrieval efforts on an annual basis, with potential adjustments as incentives for reducing ALDFG is worth exploration in Canada. One foreseeable issue is that this kind of system appears to not acknowledge the fact that some degree of ALDFG will always be inevitable, and especially in Canada, the majority of ALDFG cases arise owing to accidental factors so having this tax adjusted based on the quantity of ALDFG may not necessarily be advised for that matter.

Norway's "*Fishing for Litter*" campaign is another interesting example worth exploring in Canada. It is important to highlight that with the issue of marine debris, harvesters should be considered key stakeholders owing to the detrimental impacts they experience due to ALDFG.

Opportunities must be taken in Canada to promote harvesters as responsible environmental stewards, and such a campaign as seen in Norway might be one way to go about this initiative. If harvesters are encouraged to remove debris that they come across during their normal fishing activities and provided with the means to do so (e.g., collection bags and materials and ease of accessible disposal options) increased efforts towards mitigating the impacts of ghost gear may be achieved. Additionally, Canada should consider implementing potential EPR schemes on plastic materials used in the manufacturing of fishing and aquaculture equipment, such as a tax that could fund future initiatives centered around ALDFG retrieval or prevention. Regardless of how Canada proceeds in further developing a GGF program, the experiences gained to date have demonstrated potential in developing a new ocean industry related to ADLFG removal and sustainable disposal, which contributes to Canada's blue economy and may become a viable industry that is marketable to other countries globally.

## **5.2 – Recommendations**

### *5.2.1 – DFO's GGF*

The recommendations in this study propose practical steps to act upon in addressing several of the key issues and concerns expressed by participants from the DFO Maritimes Region who have been involved with the GGF's implementation over its initial two-year period (2020-2022). What the future holds for the GGF remains to be seen; however, if the GGF is extended or expanded over the long term, the findings of this study may serve to address common challenges and concerns, thereby improving the experience for future recipients. The extent to which these recommendations may be considered feasible or applicable on a national scale (across DFO regions) is uncertain, given the focus of this study on DFO's Maritimes Region. It is believed, however, that there are many commonalities experienced by GGF partners across DFO regions such that many of the issues and recommendations outlined in this study are broadly applicable at the national program level.

The following GGF recommendations again are provided with the specific regional context and focus being on DFO's Maritimes Region, with potential lessons to be considered transferable to DFO at a national scale in the implementation of the GGF. Further, as with any new funding program, future implementations of the GGF are expected to run more smoothly with some of the issues presented in this study likely being addressed and ironed out. That being



said, the following list of general recommendations has been compiled to address several of the issues that were most commonly raised throughout this study, with it by no means representing an exhaustive list given the small sample size and limitation to DFO's Maritimes Region. For the sake of clarity and flow, suggestions that specifically address challenges expressed in the 'Additional' section were organized under their applicable topic (i.e., if a comment was raised in this section that applied to the application process, any suggestions related to it are listed under the 'GGF Application Form and Process' instead). Therefore, the discussion only highlights suggestions for the following core components of the GGF process, which are as follows: 1) GGF Application Form and Process, 2) Contribution Agreements, 3) Licensing, Ghost Gear Retrievals, and FGRS, 4) Project Reporting Requirements, and 5) Departmental Support and Guidance.

### Section 1. GGF Application Form and Process

To start, one of the common challenges expressed among study participants about the GGF process was experiencing delays at various stages, such as during the GGF and s.52 permit application as well as during the negotiation of the Contribution Agreements. The GGF operates to be consistent with government fiscal years (April 1 to March 31) with funded projects set to wrap up within the fiscal year. The initial round of funding provided funds over the course of two years, but subsequent rounds of funding have only provided funds for a single year. Many participants expressed a desire to see this timeline extended to a multi-year period, as this would alleviate some of the time constraints and administrative burdens imposed on funded partners. This flexibility would help to ensure that future GGF partners, as well as DFO administrators, are provided with adequate time to process applications, negotiation agreements, and permits promptly. For at-sea retrieval groups, it would have the added benefit of enabling proposed activities to better align with fishery closures and more favorable weather conditions (spring/summer) in certain areas, as many retrieval groups expressed frustrations with having to wait until the fall to conduct fieldwork (on account of less favorable weather as well as active fishing seasons in the late fall imposing further restrictions to fieldwork). The recommendation to implement any future iteration of the GGF over a multi-year timeframe is critical as it will aid in alleviating some of these challenges expressed by participants and ensure that the funding

period can provide more flexibility that supports more ideal start dates for future proposed activities.

Another suggestion is to improve the level of engagement with GGF partners from the start, such as through the implementation of an informative session that outlines the GGF process in greater detail and highlights what will be expected of partners in terms of reporting and deliverables. Specifically for the application form and/or process, it may be beneficial to organize training sessions that go over various components of the form and provide participants with a chance at requesting clarification without the need for email exchanges, which can contribute to delaying the process. Additionally, one participant suggested that DFO provide a fact sheet or informative document that outlines various roles and responsibilities that are internal to DFO, namely RM&L, C&P, and SCH, the latter two of which would primarily be involved with providing input for projects that are proposing at-sea retrieval based work. Another idea that may be worthwhile for DFO to consider beginning with a shorter Expression of Interest (EOI) form with a successful EOI being screened through to the more detailed Application form, to reduce the burden on applicants who are deemed inadmissible at the EOI stage. Two participants also expressed an interest in being provided with a grading rubric that clearly outlines the evaluation criteria against which applicants are assessed, so that they may better understand what DFO is looking for among applicants beyond the eligibility currently available on DFO's website, which they mentioned was rather vague. Additionally, DFO might consider taking steps to communicate the Call for Proposals broadly and incentivize Indigenous partners to apply for future funding opportunities. Similarly, it is likely to be worthwhile for DFO to continue to prioritize or increase investment into future projects specifically centered around responsible disposal of ghost gear, as the problem of what to do with ghost gear once it's been retrieved remains an issue given the lack of recycling capacity and limited disposal options for retrieved ghost gear in the DFO Maritimes Region.

### Section 2. Contribution Agreements (CA)

One common complaint regarding the CA process was that partners received insufficient funding under the GGF to carry out their proposed activities, presenting the challenge of seeking alternate funding sources or narrowing their project scope and reducing their project expenditures. That is, DFO reduced the level of funding being applied for when they approved funded projects for continuation into the CA stage, and the project scope needed to be adjusted

accordingly. As the vast majority of study participants expressed an interest in reapplying for the GGF in the future, it is recommended that DFO continue to prioritize funding for this program in the future and consider increasing the funding made available to GGF partners under their CAs. This would enable future funded projects to expand the scope of their work, as many participants expressed an interest in expanding their current projects beyond what was feasible to them under the GGF funding agreement and timeframe. For example, one participant involved with retrievals mentioned that their team was keen to also develop recycling and disposal options alongside their retrieval efforts and another participant expressed an interest among their team members to develop an instructional video targeted at harvesters, which outlines best practices and safety considerations for conducting at-sea retrieval work.

Aside from increased funding under the CAs, additional recommendations include that DFO revisits the CA template to determine if there are sections that can be simplified, based on feedback from past participants. Another suggestion related to improving clarity and transparency includes the provision of informative materials beyond the CA (e.g., formal info packages, fact sheets, or detailed emails with direction in it, to ensure partners are adequately informed from the start of the negotiation process), though this is likely to be more relevant for first-time applicants that have not gone through the funding process beforehand. This distinction is important, as several participants expressed that despite them not necessarily experiencing major challenges with the overall GGF process, CAs included, they mentioned that they could see it being trickier to navigate for newcomers.

### *Section 3. Licensing, Ghost Gear Retrieval, and FGRS*

Concerning the s.52 permitting process, two participants felt that they were not presented with as much information regarding the requirements outlined in the s.52 permit as they had wished before applying, and stated that they would have appreciated greater transparency earlier in the application stage related to the specific clauses outlined in the s.52 permit. Additionally, one participant mentioned that they were confused over when exactly they were required to apply for the s.52 permit throughout the entire GGF process and would have likewise wanted to see increased clarity regarding the GGF timeline and when partners are expected to pursue various phases such as the s.52 permit. Given that there were no regulatory standards or guidelines for authorizing the retrieval of ghost gear before this program, the s.52 permitting

process was adopted for this purpose without the need for drafting and implementing entirely new regulatory frameworks. However, as the s.52 permit was not intended to initially address ghost gear, it may be beneficial for DFO to consider pursuing ghost gear-specific regulations, standards, and/or guidelines that might forfeit the need for a s.52 permit in the future (e.g., forgoing with the current definition of ghost gear as fishing gear to simplify the regulatory nature of retrieving ghost gear). The last suggestion, raised by several participants, is that the turnaround time for amending the s.52 permit become faster, to prevent further delays in their field season. This suggestion may be a reflection of the fact that some retrieval groups already experienced a narrower window of opportunity for conducting retrievals and therefore wanted to prevent any further delays at any rate, and not necessarily a reflection of the DFO administrative process being slow.

Aside from revising the s.52 application form, it is recommended that DFO consider providing additional training sessions and/or materials earlier in the GGF process that would serve to provide greater clarity on various aspects of the GGF process (e.g., how to go about applying for s.52s, what the negotiation process would entail, and expectations for project deliverables and expenditures). It may be beneficial to provide GGF recipients with additional informative materials that detail various procedures in greater detail, such as providing those undertaking retrieval efforts with a best practices framework that can be followed that outlines essential considerations such as: what constitutes ghost gear/IUU gear/FSC gear and how to go about managing each if encountered, where retrievals are not authorized, what the s.52 permit is, how to apply for it, what to do with retrieved gear, what the steps are in the GGF process, using the FGRS, what DFO uses reported data for, protocols for how best to go about managing illegal/FSC gear if countered, who to contact if they run into issues, and how to go about coordinating with SCH. Lastly, for retrieval projects, partners noted that it would be helpful if DFO endeavored to provide information regarding ghost gear hotspots in a form that is useful to partners (i.e., providing exact coordinates) so that they might reference this alongside their information obtained directly from harvesters or word of mouth and improve the efficacy of targeting highly concentrated ghost gear spots.

For projects that carried out ghost gear retrieval activities, there are numerous avenues for which DFO may consider improving flexibility for partners to alleviate certain time constraints. The rigidity of certain expectations provided unique challenges expressed by many participants,

such as the two business day minimum notice period for providing DFO with hail-outs, the 48 hour time limit for submitting data to FGRS, as well as the requirement to drop off retrieved tagged gear at designated storage compounds within the same day after retrievals are complete. Changing the hail-out notice period from two business day minimum to a shorter timeframe, and/or modifying the hail-out procedure to support day-of requests on an as-needed basis, may serve to address this concern as captains would be permitted to take advantage of opportune weather and may better align with their schedules. Additionally, greater flexibility with dropping-off gear once it's been retrieved is also suggested, given that some of the designated storage compounds depending on the area were inconveniently located (i.e., far from where retrieval activities were concentrated) and thus required long transport times with associated expenses. Similarly, improved access to storage compounds should also be prioritized, given that the inconvenient location for some was an issue raised by several participants. Another suggestion raised by multiple participants is for DFO to be more transparent regarding non-approved sites (those where retrieval activities are not authorized) before the s.52 application phase. These participants expressed a desire to be made aware of these non-authorized sites beforehand as it would aid them in planning potential retrieval sites, without necessitating major or minor amendments (and thereby delays to their negotiations/permitting approval) to their proposed sites if their initial ones are non-approved.

Further, the FGRS should be reevaluated and updated to address common issues experienced with reporting retrieved ghost gear, such as improving the consistency between physical data collection sheets and FGRS and providing an offline option for reporting. The offline option would aid in alleviating the burden that comes from double reporting, as not having the option to upload directly while in the field (due to lack of wireless access) meant that groups had to manually record data using physical data sheets and again following their retrieval period directly into the FGRS. The suggestion from one participant to provide retrieval groups with an enlarged physical data sheet was also mentioned, given the impracticality of using the sheets they were provided with initially while in the field (owing to small font sizes and columns), as well as improving the consistency between these physical sheets and the FGRS.

These suggestions related to the physical data sheets would not necessarily be relevant if the option to input data offline was permitted, as groups could directly input their data into the FGRS while in the field and save it to be uploaded at a later time once a connection to the

internet is re-established. Based on suggestions from participants, it is also recommended that the FGRS be updated to reflect the following reporting options: improve the consistency between units (enable for metric and imperial), include all color options for gear tags (some years were missing), include 'bait bag' as an option for the type of ghost gear, provide the option to input multiple bycatch, enable an option to distinguish quantity of alive vs. dead bycatch specimens, including the option to input length of collected rope as well as weight, and increase data input limit above 25 at a time to improve reporting efficiency. Lastly, once the FGRS was up and running, in 2022, training sessions were provided though albeit on an as-needed basis. Therefore, this training should be formally provided to all partners to ensure they are made aware of how to go about using the FGRS system for retrieved ghost gear reporting. Lastly, including technical issues reporting forms within the FGRS system may be beneficial to ensure that users can provide feedback related to the FGRS directly to DFO.

#### Section 4. Project Reporting Requirements

Similar to the forms/templates for funding applications and CA negotiations, it is recommended that DFO revisit the project reporting template (for the year-end and mid-year reports) to determine if there are sections that may be simplified, with a focus on the financial/expenditure reporting section as this was commonly identified as a challenge by several participants. Another suggestion offered by one participant is that separate templates be used for groups depending on their project pillar, as many of the sections were found to be only relevant for ghost gear retrieval activities, which caused some confusion for groups that did not conduct any retrieval work. For at least one participant, the suggestion for providing alternate means of reporting was also stated. Specifically, they mentioned that they would prefer to have an informal means of reporting such as via a phone call, as the template was deemed to be rather long and tedious (i.e., administrative burden placed on often small GGF partner organizations). However, they did point out that they understand why it is important for DFO to receive standard reports from all groups, and therefore this does not necessarily represent a feasible suggestion. Lastly, though DFO has provided routine reporting training sessions each year prior to the mid-year reporting period, one participant expressed a desire for this training to occur at a later date within the GGF timeframe (i.e., closer to the end date for most proposed activities). They reasoned that they were the only one on their team able to attend the training given that other

team members were preoccupied with retrieval work (and the fact that they were maximizing every opportunity to get out in the field given the narrowed window of opportunity). It is recommended that DFO consider holding these sessions later in the overall GGF process or have multiple sessions throughout, to enable greater attendance.

### Section 5. Departmental Support & Guidance

In terms of the guidance provided by DFO throughout this process, many participants expressed in the interviews that they felt well-supported and received timely responses to their inquiries throughout. In terms of improvement, however, it is recommended that DFO seek to provide greater engagement at earlier stages throughout the overall GGF process. Specifically for those carrying out ghost gear retrievals, several participants expressed a desire to be provided with more information that touched on critical components of conducting retrievals, such as how to go about conducting land-based or at-sea retrieval, how to apply for the s.52 permit (and what regulatory conditions are outlined in this permit) and go about amending it, who to contact at DFO for particular issues such as coming across washed up ghost gear or illegal gear, coordinating gear drop-offs with SCH, how to report retrieved ghost gear using the FGRS, what the incentives to reporting are, and what DFO is using the data from lost gear reports for. Additionally, multiple participants mentioned that they would have appreciated greater transparency regarding the roles and responsibilities of interdepartmental DFO groups (namely that of RM&L, C&P, and SCH), as they felt it was unclear at times what the involvement of each subgroup was to the overall GGF and ghost gear retrieval process. One participant suggested that this information could be distributed in the form of a fact sheet or flow chart to make the information more accessible or by updating the DFO website where the GGF is referenced.

Additional suggestions offered by participants include the provision of informative materials related to ghost gear and the GGF through a variety of means outside of just the DFO website. For example, one participant suggested improving the circulation and awareness of the Call for Proposals for future GGF opportunities among industry representatives, fishery associations, and Indigenous organizations. The same participant mentioned that this could be complemented with a notice from C&P that reminds harvesters about the importance of lost gear reporting, reporting requirements using the FGRS, and what DFO is using lost gear data for to improve transparency

at the same time. Another participant expressed a desire to have DFO share relevant contact lists with GGF partners as their group experienced challenges with identifying potential partners and collaborators within the region. They said that they relied largely on word of mouth and internal contact networks to do so, but would have appreciated some guidance from DFO for this process, to the extent that DFO is permitted to share this information. Another suggestion includes the development of a DFO/GGF partner working group so that program elements can be reviewed and discussed, which would provide partners with the means of conveying feedback related to common challenges they may have faced and what improvements they would like to see going forward.

One participant additionally suggested that DFO seek to provide training/capacity building for Indigenous communities and organizations so that they may develop and gain expertise in ghost gear-related activities. Another suggestion includes the development and sharing of some ‘lessons learned’ (via a summarized document or conference call) that were devised by each GGF proponent, so that others may hear about and learn from the experiences of other funded groups. Lastly, the desire to know with certainty what the fate of the GGF is was expressed by many participants. Though DFO is not currently in a position to publicly announce its intentions for the GGF beyond the current extension into the 2023 funding period, it is recommended that the GGF continue to be a government priority given the strong interest by most study participants to continue carrying out funded projects centered around addressing ghost gear to some capacity. As was previously stated, numerous participants provided ideas for what they would like their organizations to achieve or look into given future funding opportunities and exhibited frustration with not knowing what the future holds directly for the GGF, as it limits their ability to plan accordingly given the uncertainty that they will even receive funding or not. Lastly, future iterations of the GGF should seek to increase investment in projects centered around responsible disposal and recycling, as the issue of what is to be done with ghost gear once it’s been retrieved continues to be one of regional concern given a lack of recycling capacity in the Maritimes.

### *5.2.2 – Canada’s ALDFG Approaches*

In addition to recommendations specifically targeted at DFO’s GGF, additional suggestions were made that speak more broadly to Canada’s overall approach towards ALDFG



mitigation. This distinction is made as there were various issues raised by participants that fell outside of the scope of the GGF, and would more appropriately be listed as a broad consideration for Canada's national management of ALDFG. DFO could seek to increase the promotion of education and awareness campaigns that specifically outline the benefits of reporting lost gear and retrieved ghost gear and targeting those campaigns at harvesters themselves. Additional training sessions or informative materials that clearly outline the purposes of lost gear reporting, how to go about reporting lost gear using the FGRS, and what DFO is using this reported data for should be prioritized. It is also recommended that for any informative materials that are developed, DFO attempt to diversify the means of dissemination outside of simply utilizing the DFO website (i.e., pamphlets, informational fact sheets, use of infographics, or PowerPoint slides). Providing this information in a variety of ways may help to reduce barriers to reporting and help spread awareness among harvesters about why it is important to report one's lost gear (i.e., mapping of ghost gear hotspots and aids in identifying owners of lost gear to facilitate the return of gear).

Similarly, efforts should be taken to improve the transparency of information related to both the GGF and the issue of ghost gear more broadly. Though the issue of ghost gear is rapidly gaining global awareness and heightened attention, there remains a gap in understanding among the general public regarding the causes, impacts, and measures related to ghost gear. Additional ways to make this information publicly available and accessible should be looked into to improve knowledge mobilization and raise awareness outside of harvesters. More broadly, it is recommended that the federal government continue to invest in projects and companies specifically looking to develop recycling and/or disposal options for ghost gear. Given that the retrieval of ghost gear is only one part of the issue and the lack of accessible options for recycling in the NS, greater prioritization of projects centered around this would aid in developing and strengthening provincial disposal capacity and ensure that retrieved gear is recycled responsibly. Lastly, the development of a DFO/GGF Partner working group to review program elements and allow partners to convey feedback regarding general areas of program improvement to the Department (e.g., forms, etc.) could help advance many of the issues and recommendations highlighted above. The challenges and suggestions discussed above have been summarized for quicker reference (Table 8).

**Table 7. Summary of challenges and potential solutions offered by survey and/or interview participants in relation to various components of Fisheries and Oceans Canada (DFO)'s Ghost Gear Fund (GGF).**

GGF Components	Challenges	Recommendations for DFO
<b>GGF Application Form &amp; Process</b>	<ul style="list-style-type: none"> <li>-The application form is time-consuming</li> <li>-The application timeline did not align with the ideal start for project activities (primarily ghost gear retrievals)</li> <li>-Some sections were confusing and/or difficult to understand</li> <li>-Not all sections were applicable, making it confusing to know which sections were mandatory to fill out</li> <li>-Confusion over internal DFO roles/responsibilities (i.e., RM&amp;L, C&amp;P, and SCH)</li> <li>-Uncertainty regarding DFO's expectations for GGF partners</li> <li>-Uncertainty regarding the applicant's likelihood of approval or rejection</li> </ul>	<ul style="list-style-type: none"> <li>-Implement the GGF over a multi-year period</li> <li>-Offer training courses on how to fill out the application form.</li> <li>-Adopt a shorter Expression of Interest (EOI) form with a successful EOI being screened through to the more detailed Application form, to decrease the burden on applicants who are deemed inadmissible at the EOI stage.</li> <li>-Provide applicants a fact sheet outlining internal DFO roles/responsibilities (e.g., RM&amp;L, C&amp;P, and SCH)</li> <li>-Provide applicants with a grading rubric that clearly outlines evaluation criteria and eligibility beyond what is currently available on DFO's website</li> <li>-Prioritize support for applications that are co-submitted by Indigenous Organizations and Fishery Harvester Associations</li> <li>-Communicate Call for Proposals broadly and incentivize Indigenous partners to apply</li> </ul>
<b>Contribution Agreements (CA)</b>	<ul style="list-style-type: none"> <li>-Some sections were confusing and/or difficult to understand</li> <li>-Budget limitations posed challenges with securing alternate funding and/or reducing project expenditures</li> <li>-Delays with CA negotiations impacted the ability to achieve project deliverables (e.g., many retrieval groups missed the spring/summer season for conducting retrievals)</li> <li>-Unable to publicly announce GGF approval until all CAs finalized, impacting the ability to form partnerships with other GGF partners</li> </ul>	<ul style="list-style-type: none"> <li>-Revisit the CA template to see if it can be simplified</li> <li>-Provide increased guidance for navigating the CA process (e.g., DFO to offer training courses on how to fill out the form, provision of informative materials, etc.)</li> <li>-A faster turnaround for CA finalization and/or to extend the GGF over a multi-year period to alleviate time constraints and better align funding periods with proposed retrieval work</li> </ul>
	<p style="text-align: center;"><i>s.52 Scientific Permit</i></p> <ul style="list-style-type: none"> <li>-Some sections were somewhat confusing and/or difficult to understand</li> <li>-Acquiring/amending the s.52 permits was somewhat challenging (e.g., delays with approval to major/minor licence amendments)</li> <li>-More requirements in license conditions than initially expected (e.g., clauses related to invasive species, marine mammals, etc.)</li> <li>-Frustration with not knowing beforehand which potential retrieval sites would be considered unauthorized by DFO</li> <li>-Confusion over authorization for ghost gear retrievals falling under s.52 permitting</li> </ul>	<ul style="list-style-type: none"> <li>-Develop a new regional website/application form to simplify the s.52 permitting process</li> <li>-A Quicker turnaround for s.52 permit amendments (i.e., changing proposed activity locations)</li> <li>-Increased transparency at an earlier stage regarding the requirements/clauses in the s.52 to ensure project leads can plan accordingly</li> <li>-Increased transparency regarding non-approved sites/locations for ghost gear retrieval work</li> <li>-Develop legislation/permitting that is specific to ghost gear retrieval</li> <li>-Increased clarity related to when retrieval groups are expected to apply for the s.52 permit</li> <li>-Pursue regulations, standards, and/or guidelines that forfeit the need for a s.52 permit, including not defining ghost gear as fishing gear</li> </ul>

Licensing, Ghost Gear Retrievals, & FGRS		-Confusion with the timing for the s.52 permit application	-Implement a ghost gear tagging system upon retrieval to differentiate it from fishing gear
	<i>Ghost Gear Retrievals</i>	-Concerns with managing IUU and/or FSC gear if encountered -Lack of usable ghost gear hotspot data from DFO (many relied on local fisher knowledge to identify ghost gear hotspots) -Rigid expectations for providing hail-outs (48hr notice) -Narrow window for conducting retrieval activities (missed the summer season when weather was favorable due to delays and the GGF operating on fiscal years) -Initial mistrust of DFO by harvesters made recruiting captains/harvesters a challenge initially	-More guidance from DFO on managing IUU and/or FSC fishing gear if encountered during retrieval work -Provide ghost gear hotspot data in a useable format (i.e., exact coordinates) to supplement information gathered from local fisher knowledge -Increased flexibility for hail-outs (extend the deadline beyond the current 48hr notice) -Implement the GGF over a multi-year period to align retrieval activities with ideal fieldwork seasons (spring/summer) -Promote educational campaigns targeted at harvesters to raise awareness regarding: the impacts of ghost gear, DFO's GGF, the importance of lost gear reporting, and what DFO is using reported data for (promote the notion of harvesters as environmental stewards with the responsibility to retrieve ghost gear rather than relying on third parties for retrieval work) -Increased investment in projects centered around responsible disposal to improve regional recycling capacity
	<i>Ghost Gear Storage Compounds</i>	-Confusion with managing tagged gear and storage compounds -Some storage compounds were inconveniently located (i.e., far from where retrieval activities were occurring which necessitated long transport times and/or associated costs) -Challenges with coordinating with SCH to manage drop-offs of tagged ghost gear -DFO's current means of identifying owners of lost tagged gear is inefficient -Rigid storage compound regulations (e.g., 24hr deadline to drop off gear) -Limited accessibility to recycling/disposal options	-Increased clarity regarding DFO's expectations for managing retrieved tagged gear -Improved accessibility to storage compounds to alleviate the burden of long transportation times and/or associated costs -Ensure Harbour Authorities are equipped with storage compound(s) and necessary equipment for storage of tagged ghost gear -Improve efficiency for the identification of owners of lost tagged gear -Increased flexibility with gear drop-off expectations (i.e., extend the deadline past 24hrs) -Increased investment in projects centered around responsible disposal to improve regional recycling capacity
Licensing, Ghost Gear Retrievals, & FGRS	<i>Ghost Gear Reporting Requirements</i>	-Technical difficulties while using the FGRS were commonly experienced (e.g., the system would freeze/lock/malfunction) -No offline option for FGRS which doubled the workload (reporting had to be completed twice – first by hand on the boat and again on the computer into the FGRS which made it time-consuming and burdensome) -Inadequate reporting options (e.g., inconsistency with units, missing color tags, unable to input multiple bycatch, difficulty obtaining the daily weight for	-Provide offline data input option to alleviate the administrative burden of double reporting (data could be inputted in the field and saved to be uploaded at a later time once wireless connection was secured) -Include user feedback form or technical issues reporting form within the FGRS system -Expand reporting options (e.g., expand the selection of units to include imperial and metric, ability to input more than 25 at a time, include 'bait bag' as a gear option, expand the list of color tags, expand bycatch criteria to include an option for dead vs. alive, include an option to input length of collected rope as well as weight, increase capacity for how much data can be inputted at a time,

	<ul style="list-style-type: none"> <li>retrieved ghost gear given heavy/extensive biofouling, limited to 25 data inputs at a time, sections that were mandatory but not applicable had to be filled in inaccurately to bypass them, etc.)</li> <li>-Rigid expectations for submitting data into the FGRS (24hr deadline following each retrieval period)</li> <li>-Discrepancies between physical data collection sheets and FGRS</li> <li>-Physical data collection sheets were not ideal for field work (i.e., fonts/fields were too small and compact)</li> </ul>	<ul style="list-style-type: none"> <li>review sections to see if they can be left simply as optional, etc.)</li> <li>-Increased flexibility with gear drop-off expectations (i.e., extend the deadline past 24hrs)</li> <li>-Improve consistency between physical data collection sheets and FGRS</li> <li>-Provide enlarged physical data collection sheets to make them more practical for use in the field</li> </ul>
<b>Project Reporting Requirements</b>	<ul style="list-style-type: none"> <li>-Year-end and/or mid-year reports were time-consuming</li> <li>-Some sections were confusing and/or difficult to understand (e.g., budget/project expenditure reporting)</li> <li>-Many sections did not apply to projects falling outside of the Retrieval Pillar</li> <li>-Training sessions were held at inopportune times, limiting the attendance of certain team members</li> <li>-Preference for less formal options for project reporting</li> </ul>	<ul style="list-style-type: none"> <li>-Revisit year-end and/or mid-year report templates to see if they can be simplified to reduce the administrative burden</li> <li>-Determine if separate project reporting templates divided by project pillar may represent a feasible option</li> <li>-Provide multiple training sessions at various times or a single training session closer to the end of the year/field season to enable attendance from additional team members that would otherwise be in the field</li> <li>-Provide additional means of reporting to accommodate personal preferences (e.g., by phone)</li> </ul>
<b>Departmental Support &amp; Guidance</b>	<ul style="list-style-type: none"> <li>-General lack of awareness regarding DFO's online information related to the GGF's successes and highlights</li> <li>-Unable to find all information related to the GGF on DFO's website (especially with conducting at-sea ghost gear retrievals)</li> <li>-Limited options for information delivery (mainly limited to DFO's website)</li> <li>-Challenges accessing contact networks for the Maritimes Region to identify potential collaborators/partners</li> </ul>	<ul style="list-style-type: none"> <li>-Improved transparency on DFO's website regarding some of the logistical considerations related to ghost gear retrievals (e.g., processes for carrying out land-based and at-sea retrievals, how to apply for the s.52 permit, who to contact at DFO for particular issues such as coming across washed up ghost gear or IUU/FSC gear, what the incentives to reporting are and how to report lost gear, and what DFO is using the data from lost gear reports for)</li> <li>-Provide additional background/informational materials related to ghost gear and the GGF</li> <li>-Deliver information through a variety of means (outside of website announcements) to help diversify the pool of applicants and improve awareness of funding opportunities</li> <li>-Share contact lists (e.g., Fishery Associations, Recycling companies, etc.)</li> <li>-Develop and share lessons learned from all GGF partners via a summary document or participatory conference call</li> <li>-Provide training/capacity-building pillars for Indigenous communities and organizations to develop and gain expertise in ghost gear-related activities</li> <li>-Develop a DFO/GGF Partner working group to review program elements and allow partners to convey feedback regarding general areas of program improvement (e.g., forms, etc.)</li> </ul>

## 5.4 – Study Limitations and Future Studies

Several study limitations should be noted. First, it is important to address that the sample size for study participants did not fully encompass the entirety of those who received funding under the GGF in the DFO Maritimes Region. Only seven of the 12 funded partners in this region were represented in this study, and therefore, it is difficult to generalize the experiences to all groups. Similarly, though the decision to expand the study to include all past project leads instead of only those currently working in that position helped to ensure that a broader understanding was gained, it also meant that some organizations were disproportionately represented in cases where more than one project lead was surveyed and/or interviewed. This again highlights the fact that the findings presented in this study cannot be generalized to all the GGF partners for the DFO Maritimes Region, and some gaps will invariably exist in the program and policy recommendations provided in this report. Similarly, the findings put forth in this study are limited in their application on a national scale, and the listed recommendations that may work in the DFO Maritimes Region may not necessarily apply to other DFO regions (e.g., Newfoundland and Labrador, Gulf, Quebec, Arctic, and Pacific) or even possible for DFO to implement due to privacy or regulatory limitations and funding program restrictions. Another limitation includes that during the interviews, certain issues were brought up that ultimately had to be excluded from the analysis as they fell outside of the project scope, which sought specifically to highlight challenges with the GGF and provide recommendations to address those issues.

Though the study limitations restrict the applicability and relevance of some of the study findings and proposed recommendations, there are many avenues that future studies can take to shed valuable insight and address some of the gaps that this study has identified. One such example includes a follow-up study that specifically seeks to evaluate the improvements that have been made to the GGF since its initial two-year implementation. Many of the challenges expressed by study participants were related to nationally-scoped issues and a review of the GGF and any of its subsequent iterations may help determine if the recommendations laid out in this study were considered and potentially implemented. Additionally, this would shed valuable insight into what a national policy framework for the GGF might look like and what regional considerations should be noted for other regions aside from the DFO Maritimes Region. Additionally, it may be valuable to compare Canada's regulatory approaches and policies with

international case studies other than the United States and Norway (e.g., Australia, the European Union, and the United Kingdom), to determine additional best management practices for ALDFG mitigation that may be considered and implemented on a national scale. Lastly, though this study did touch briefly on the benefits and limitations of implementing stand-alone ALDFG legislation in Canada, it would be beneficial to conduct a policy review that seeks to systematically evaluate and assess the most optimal legislative approach that Canada should take with regard to ALDFG strategies.

## **5.5 – Conclusion**

Though the Government of Canada has demonstrated progress towards addressing the issue of ALDFG, most notably through the implementation of the GGF and broader Ghost Gear Program, there are many additional opportunities for future regulatory and legislative strategies that can still be considered. The strategies employed in the U.S. and Norway serve as alternative models from which Canada might gain inspiration for any future regulatory approaches they might choose to implement or amend. For the GGF program specifically, experiences from GGF partners from DFO’s Maritimes Region provided valuable insight regarding what improvements could be made to the program, if extended past March 2023. ALDFG is an issue that is not expected to dissipate any time soon, and therefore, it remains as important as ever for Canada to implement appropriate regulatory measures and continue promoting funding opportunities for activities that seek to mitigate ALDFG, such as through the continued implementation of DFO’s GGF program.

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# Appendix I – Survey Script

## Ghost Gear Fund - Maritimes Region Survey

### Introduction

**Primary Researcher:** Ela Cichowski, Master of Marine Management (MMM) Candidate, Dalhousie University

**Project Title:** Fisheries and Oceans Canada’s (DFO) Ghost Gear Fund in the Maritimes Region: A Program and Policy Analysis

**Research Purpose:** The purpose of this survey is to obtain insight regarding the potential successes and limitations of Fisheries and Oceans Canada’s (DFO) Ghost Gear Fund (GGF) program with a focus on the DFO Maritimes Region. This survey is being shared with past GGF participants from the Maritimes region, as the intent of the survey is to ask past participants about their experiences with this program during the 2020-2022 funding period. Collected data will be accessed exclusively by the primary researcher, Ela Cichowski, for the purpose of data analysis. Individual survey responses will not be shared with DFO, nor any information that could be used to identify participants; however, an anonymous summary report of results will be provided to DFO. Survey participants may choose to withdraw their involvement from this study and/or their survey responses at any point up until October 14th, 2022. Any questions or concerns may be emailed directly to the primary researcher at [elacichowski@dal.ca](mailto:elacichowski@dal.ca).

**Survey Instructions:** You may skip any question you prefer not to answer. As you progress through the survey, your answers will be auto-saved on each page, and you may go back to change your responses at any point by clicking the 'Back' button. If you are unable to complete the survey in one sitting, you have the option of saving your survey progress by clicking 'Save' at the bottom left. You will be prompted to provide an e-mail address to which a new link will be sent to you to access the survey. By clicking this link at a later period, you will be able to pick up from where you last left off. To complete the survey, you must click 'Finish' on the last page for your responses to be recorded. Once you complete the survey, you will lose access to the survey, so please make sure that you only click 'Finish' once you are satisfied and have reviewed your responses.

### Section 1. Background

1. I have read and understood the 'Informed Consent Form' sent to me prior to beginning this survey and voluntarily agree to take part in this study.

Yes  No

2. Please enter your name and the organization associated with the Ghost Gear Fund (this is for internal record purposes only - please note that findings will be anonymized for the final report and presentation, and your responses will not be linked to your identity).

3. Please indicate the funding period for your project (select one only).

2020-2021  2021-2022  2020-2022

4. Please indicate the applicable Ghost Gear Fund pillar(s) for your project (select multiple if applicable).

Pillar 1: Retrieval (at-sea and/or shoreline)  Pillar 2: Disposal  Pillar 3: Technology  Pillar 4: Leadership

**Section 2. Ghost Gear Fund Application Form & Process**

5. Did you have sufficient guidance to fill-out the Ghost Gear Fund application form, including amount of detail required to complete the application form?

Yes  Somewhat  No

6. Did you find any sections of the application form confusing or difficult to understand?

Yes  Somewhat  No

7. Did you have sufficient time to complete the application form?

Yes  Somewhat  No

8. On a scale of Dissatisfied to Satisfied, how would you rate the overall application process for the Ghost Gear Fund?

Somewhat Dissatisfied  Dissatisfied  Neutral  Somewhat Satisfied  Satisfied

9. Do you have any additional comments or recommendations on the application form and application process? (please fill-out box below)

**Section 3. Contribution Agreements**

10. Did you find the Contribution Agreement process straight-forward and easy to understand?

Yes  Somewhat  No

11. Did you receive timely guidance and support from DFO throughout the Contribution Agreement development process?

Yes  Somewhat  No

12. Was the funding you received sufficient to complete your project objective(s)?

Yes  Somewhat  No

13. Did you experience any issues receiving your funding that impacted your ability to complete your project objectives(s) on time?

Yes  Somewhat  No



14. Do you have any additional comments or recommendations related to the funding process? (please fill-out box below)

15. Were you able to complete your project objective(s) within the funding timeline?

Yes  Somewhat  No

16. Do you have any additional comments or recommendations related to the project timeline? (please fill-out box below)

**Section 4. Licensing Requirements (to be completed by at-sea and shoreline cleanup retrieval projects only)**

17. Did you have sufficient guidance to fill-out the Section 52 application form, including amount of detail required to complete the application form?

Yes  Somewhat  No

18. Were there sections in the Section 52 License application process that you found confusing or difficult to understand?

Yes  Somewhat  No

19. Did you experience any issues acquiring and/or amending your Section 52 license?

Yes  Somewhat  No

20. On a scale of Dissatisfied to Satisfied, how would you rate the overall application process for the Section 52 License?

Somewhat Dissatisfied  Dissatisfied  Neutral  Somewhat Satisfied  Satisfied

21. Do you have any additional comments or recommendations related to the Section 52 License Application process for ghost gear retrievals? (please fill-out box below)

22. Have you completed or are you interested in completing ghost gear retrieval outside of the Ghost Gear Fund?

Yes  Somewhat  No

23. Did you experience any issues with ghost gear retrieval during or throughout the retrieval process under the Ghost Gear Fund (either at-sea or on-land if applicable)?

Yes  Somewhat  No

24. If you answered 'Yes' or 'Somewhat' to Q. 23, could you provide the top three issues you experienced during or throughout the ghost gear retrieval process (either at-sea or on-land if applicable)? (please fill-out the box below)

25. Did you find that the Harbour Authority facilities were adequately equipped with storage compounds and other necessary equipment for storage of any tagged, usable ghost gear your group retrieved?

Yes  Somewhat  No

26. Did you contact Harbour Authorities or Port Authorities to request the use of their facilities (e.g. berthing, hoist, compound) and any associated fees?

Yes, prior to applying for funding only  Yes, prior to beginning retrievals only  Yes, prior to applying for funding and beginning retrievals  No  Not Applicable

27. Did you experience any issues with Harbour Authorities or Port Authorities being unavailable, when given 4 hours' notice, to provide access to the storage compound(s) for gear drop-off?

Yes  Somewhat  No  Not Applicable

28. Did you receive sufficient support from DFO in identifying ghost gear hotspots, if support was requested?

Yes  Somewhat  No  Not Applicable

29. Do you have any additional comments or recommendations related to ghost gear retrieval and storage? (please fill-out box below)

30. Did you have technical difficulty accessing and completing the Fishing Gear Reporting System (FGRS) online?

Yes  Somewhat  No

31. Did you find that any sections were missing in the FGRS reporting form?

Yes  Somewhat  No

32. Did you have sufficient time to submit data in FGRS?

Yes  Somewhat  No

33. Do you have any additional comments or recommendations related to reporting retrieved ghost gear using the DFO Fishing Gear Reporting System? If providing recommendations for FGRS, please list in order of priority (please fill-out box below).

**Section 5. Project Reporting Requirements**

34. Did you experience any issues with providing year-end and/or progress reports to DFO (e.g., Schedule 7)?

Yes  Somewhat  No

35. Did you have sufficient time to complete the year-end and/or progress reports?

Yes  Somewhat  No

36. Please indicate how long you estimate it took you to fill out the year-end report (e.g., Schedule 7 and general ledger).

Less than 3 hours  Between 3 and 5 hours  More than 5 hours

37. Did you find that any sections were missing in the year-end and/or progress report templates?

Yes  Somewhat  No

38. Did you find any sections in the year-end and/or progress report templates confusing or difficult to understand?

Yes  Somewhat  No

39. Do you have any additional comments or recommendations related to reporting requirements? (please fill-out box below)

**Section 6. Departmental Support & Guidance**

40. Were you able to find all the information you needed about the Ghost Gear Fund on the DFO website?

Yes  Somewhat  No

41. Do you feel that your organization could have benefitted from being provided any additional background/informational materials related to ghost gear or the Ghost Gear Fund (e.g., an informational pamphlet or fact sheet)?

Yes  Somewhat  No

42. Did you receive timely support from DFO in response to any inquiries about the Ghost Gear Fund or program requirements?

Yes  Somewhat  No

43. Do you have any other comments or suggestions for DFO regarding the Departmental Guidance and Support you received from the Ghost Gear Fund program? (please fill-out box below)

**Section 7. Additional**

44. Are you aware that a summary of the Ghost Gear Fund program highlights and findings are publicly accessible on the DFO website?

Yes  Somewhat  No

45. Are you interested in reapplying to the Ghost Gear Fund in the future, if additional funds become available?

Yes  Somewhat  No

46. Do you have any recommendations for DFO's role in continuing to support projects centered around ghost gear if the Ghost Gear Fund is not continued in the future? (please fill-out box below)

47. Do you have any other comments or suggestions for DFO regarding the Ghost Gear Fund? (please fill-out box below)

**Section 8. Concluding Questions**

48. Are you interested in expanding on your survey responses by participating in a follow-up interview (over Microsoft Teams)?

Yes  No

49. Would you like a copy of the final graduate report to be shared with you via e-mail upon completion of the study?

Yes  No

50. If you answered yes to either Q. 48 or 49, please provide an email address you wish to be contacted at:

## Appendix II – Results Tables

**Table A2.1** Responses to which funding period the survey participant’s project fell under.

Response	Count	Percentage
2020-2021	1	9
2021-2022	3	27
2020-2022	7	64
Sum	11	100

**Table A2.2.** Responses to which Ghost Gear Fund pillar the survey participant’s project fell under (participants could choose multiple if applicable).

Response	Count	Percentage
Pillar 1: Retrieval (at-sea and/or shoreline)	8	36
Pillar 2: Disposal	7	32
Pillar 3: Technology	7	32
Sum	22	100

**Table A2.3.** Responses to survey questions that were categorized under ‘Ghost Gear Fund Application Form & Process’.

Section 2. Ghost Gear Fund Application Form & Process				
	Questions			
	<i>Q5. Did you have sufficient guidance to fill out the Ghost Gear Fund application form, including the amount of detail required to complete the application form?</i>	<i>Q6. Did you find any sections of the application form confusing or difficult to understand?</i>	<i>Q7. Did you have sufficient time to complete the application form?</i>	
<b>Responses</b>	Yes	11	1	9
	Somewhat	0	4	2
	No	0	6	0
	Sum	11	11	11

**Table A2.4.** Responses to survey questions that were categorized under ‘Contribution Agreements’ (\*Responses for Q15 were limited to Yes/No).

Section 3. Contribution Agreements						
		Questions				
		<i>Q10. Did you find the Contribution Agreement process straightforward and easy to understand?</i>	<i>Q11. Did you receive timely guidance and support from DFO throughout the Contribution Agreement development process?</i>	<i>Q12. Was the funding you received sufficient to complete your project objective(s)?</i>	<i>Q13. Did you experience any issues receiving your funding that impacted your ability to complete your project objectives(s) on time?</i>	<i>Q15. Were you able to complete your project objective(s) within the funding timeline?</i>
<b>Responses</b>	<i>Yes</i>	7	10	6	3	11
	<i>Somewhat</i>	4	0	3	3	—*
	<i>No</i>	0	1	2	5	0
	<b>Sum</b>	11	11	11	11	11

**Table A2.5.** Responses to survey questions that were categorized under ‘Licensing’ (applicable for retrieval groups only).

Section 4. Licensing (Section 52 Application Form and Process)						
		Questions				
		<i>Q17. Did you have sufficient guidance to fill out the Section 52 application form, including the amount of detail required to complete the application form?</i>	<i>Q18. Were there sections in the Section 52 License application process that you found confusing or difficult to understand?</i>	<i>Q19. Did you experience any issues acquiring and/or amending your Section 52 license?</i>	<i>Q22. Have you completed or are you interested in completing ghost gear retrieval outside of the Ghost Gear Fund?</i>	<i>Q23. Did you experience any issues with ghost gear retrieval during or throughout the retrieval process under the Ghost Gear Fund (either at sea or on land if applicable)?</i>
<b>Responses</b>	<i>Yes</i>	8	1	2	6	3
	<i>Somewhat</i>	0	7	3	1	2
	<i>No</i>	0	0	3	1	3
	<b>Sum</b>	8	8	8	8	8

**Table A2.6.** Responses to survey questions that were categorized under: ‘Ghost Gear Storage Compounds’ (applicable for retrieval groups only).

Section 4. Ghost Gear Storage Compounds				
		Questions		
		<i>Q25. Did you find that the Harbour Authority facilities were adequately equipped with storage compounds and other necessary equipment for storage of any tagged, usable ghost gear your group retrieved?</i>	<i>Q27. Did you experience any issues with Harbour Authorities or Port Authorities being unavailable when given 4 hours’ notice, to provide access to the storage compound(s) for gear drop-off?</i>	<i>Q28. Did you receive sufficient support from DFO in identifying ghost gear hotspots, if support was requested?</i>
<b>Responses</b>	Yes	4	2	3
	Somewhat	1	0	4
	No	3	4	1
	Not Applicable	–	2	0
	Sum	8	8	8

**Table A2.7.** Responses to if survey participants contacted Harbour Authorities or Port Authorities to request the use of their facilities (e.g. berthing, hoist, compound) and any associated fees.

Response	Count
Yes, prior to applying for funding only	0
Yes, prior to beginning retrievals only	4
Yes, prior to applying for funding and beginning retrievals	4
No	0
Not Applicable	0
Sum	8



**Table A2.8.** Responses to survey questions that were categorized under ‘ Fishing Gear Reporting System’ (FGRS) (applicable for ghost gear retrieval groups only).

Section 4. Fishing Gear Reporting System (FGRS)				
		Questions		
		<i>Q30. Did you have technical difficulty accessing and completing the Fishing Gear Reporting System (FGRS) online?</i>	<i>Q31. Did you find that any sections were missing in the FGRS reporting form?</i>	<i>32. Did you have sufficient time to submit data in FGRS?</i>
<b>Responses</b>	<i>Yes</i>	2	3	2
	<i>Somewhat</i>	3	0	5
	<i>No</i>	3	4	1
	<b>Sum</b>	8	7	8

**Table A2.9.** Responses to survey questions that were categorized under ‘Project Reporting Requirements’.

Section 5. Project Reporting Requirements					
		Questions			
		<i>Q34. Did you experience any issues with providing year-end and/or progress reports to DFO (e.g., Schedule 7)?</i>	<i>Q35. Did you have sufficient time to complete the year-end and/or progress reports?</i>	<i>Q37. Did you find that any sections were missing in the year-end and/or progress report templates?</i>	<i>Q38. Did you find any sections in the year-end and/or progress report templates confusing or difficult to understand?</i>
<b>Responses</b>	<i>Yes</i>	0	11	0	2
	<i>Somewhat</i>	2	0	2	4
	<i>No</i>	9	0	9	5
	<b>Sum</b>	11	11	11	11

**Table A2.10.** Responses to how long it took to fill out year-end reports (e.g., Schedule 7 and general ledger).

Response	Count
Less than 3 hours	0
Between 3 and 5 hours	4
More than 5 hours	7
<b>Sum</b>	11

**Table A2.11.** Responses to survey questions that were categorized under 'Departmental Support & Guidance'.

Section 6. Departmental Support & Guidance				
		Questions		
		<i>Q40. Were you able to find all the information you needed about the Ghost Gear Fund on the DFO website?</i>	<i>Q41. Do you feel that your organization could have benefitted from being provided any additional background/informational materials related to ghost gear or the Ghost Gear Fund (e.g., an informational pamphlet or fact sheet)?</i>	<i>Q42. Did you receive timely support from DFO in response to any inquiries about the Ghost Gear Fund or program requirements?</i>
Responses	<i>Yes</i>	5	5	9
	<i>Somewhat</i>	4	2	2
	<i>No</i>	1	4	0
	Sum	10	11	11

**Table A2.12.** Responses to survey questions that were categorized under 'Additional'.

Section 7. Additional				
		Questions		
		<i>Q44. Are you aware that a summary of the Ghost Gear Fund program highlights and findings are publicly accessible on the DFO website?</i>	<i>Q45. Are you interested in reapplying to the Ghost Gear Fund in the future, if additional funds become available?</i>	
Responses	<i>Yes</i>	6		9
	<i>Somewhat</i>	3		-
	<i>Maybe</i>	-		2
	<i>No</i>	2		0
	Sum	11		11