

SafeCatch

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Executive Summary

Commercial ocean fishing is a very dangerous occupation. High rates of fatalities and injuries can be attributed in part to the inherently dangerous working conditions involved. Yet, since actual levels and types of occupational health and safety risks vary across fisheries, jurisdictions and time, social, economic, cultural and regulatory factors must also be playing a role.

The SafeCatch project was designed, as a part of the broader SafetyNet research program in workplace health and safety, to deepen our understanding of trends in SAR incidents and injuries and fatalities in the Newfoundland and Labrador fisheries during the period between 1989 and the present. The project is composed of six linked components: the Comparative Analysis of Regulatory Regimes (CARR) component; the Fishing Vessel Safety Longitudinal Analysis (FVSLA) component; the Perceptions of Risk (POR) Component; the Safer Sea-Keeping Component; the Injured Fishers Component (not funded by SAR-NIF) and the Community Healthy Fisheries Component (CHFP).

1. Comparative Analysis of Regulatory Regimes Component

The CARR component has studied the contribution of regulatory regimes to health and safety risks in fishing. It has developed a comprehensive framework of the potential impacts, both direct and indirect, of regulatory regimes on health and safety in order to identify possible pathways from regulation to fishing safety. Using this framework, it has generated a comprehensive description of the regulatory regimes that directly or indirectly affect fishing safety in Canada and five other countries (the U.S., the U.K., New Zealand, Iceland and South Africa). We highlight the similarities and differences in these regulatory regimes. We also sought to compare data across our six cases in order to document and compare trends in the recent history of accidents, fatalities and SAR incidents in these countries. We have established collaborative efforts with researchers and regulatory agency representatives in relevant countries, with the intention of meeting near the end of the study in order to review and disseminate the results of the CARR project and to encourage the development of research initiatives designed to extend this work.

Our framework and the resulting national profiles have confirmed our understanding that the factors contributing to fishing health and safety risks are multiple and include not only environmental risks but also labour conditions, culture, vessel design, fisheries management, transport and safety regulatory regimes. These factors interact with one another in complex ways that our various projects seek to describe and understand. Comparing our six cases, we also found a broad pattern of overall similarity among the relevant regulatory regimes. In all cases, safety regimes have expanded over time from an initially narrow focus on vessels and survival equipment to more comprehensive and mandatory, policies covering a wider range of risks and a wider range of vessel sizes and occupations. Overall, we found that the six CARR countries have generally similar administrative structures in terms of the agencies responsible for policies directly affecting fishing health and safety. Similarly, in all our countries, we found that regulatory regimes affecting the fisheries were highly compartmentalized, with jurisdiction within the purview of many agencies. Thus regulations and policies initiated by administrative

agencies that are directly responsible for fishing OHS, as well as those initiated by agencies with responsibility for other aspects of the fishery, can both influence OHS. Given this simple truth, it is surprising that the majority of national and international fisheries policies, especially those governing fisheries management, have traditionally been developed without regard for their potential impacts on health and safety.

Our review of the available international data for fishing-related accidents was disappointing. We found a serious lack of consistency in the manner in which countries categorize and count fishing health and safety outcomes. Approaches to tracking injury, fatality, and illness varied not only among countries but also among the sub-national jurisdictions of individual countries. This lack of standardized reporting and the uneven quality of the data are particularly troubling given that commercial fishing is consistently ranked as one of the most dangerous of occupations and that accurate information on levels of risk is essential to assessing and improving the effectiveness of health and safety policies. Given these problems with the data, the compartmentalization of administrative responsibility, and the spatial and temporal diversity and dynamism of fisheries, we found that it is difficult to correlate trends in fishing fatalities with the implementation of specific regulatory policies. The Fishing Vessel Safety Longitudinal Analysis (FVSLA) component of SafeCatch seeks to rectify this situation for the Newfoundland and Labrador case by linking available accident statistics from multiple sources in order to provide more complete and reliable data.

2. Fishing vessel safety longitudinal analysis (FVSLA) component

Longitudinal analyses using linked datasets can deepen our understanding of fishing occupational health and safety issues. The primary research tool for the FVSLA component of SafeCatch is a new, linked database that has been designed, negotiated and established for the purposes of this research. This linked database includes data extracted from:

- the Newfoundland and Labrador Workplace Health Safety and Compensation Commission (NL WHSCC) Claims Database for the Newfoundland and Labrador Fishing Industry from 1989 to 2001 inclusive;
- the Search and Rescue (SAR) SIRSAR Database of resources tasked to fishing vessels in Newfoundland and Labrador waters from 1994 to 2001 inclusive; and
- the DFO Catch and Effort Database which combines the Trip Logs and Purchase Slip Databases for fishing vessels sailing from Newfoundland and Labrador from 1989 to 2001 inclusive.

The FVSLA linked database will provide many opportunities for analysis over the next several years. To date, we have completed a descriptive summary of the NL WHSCC data for trends over time in incidence of reported accidents and fatalities, nature of accident, body part injured, source of injury, severity of injury, and time lost. We are now preparing a pilot project that will allow us to use data from the other databases to deepen our understanding of the larger context associated with workers' compensation claims and SAR incidents. We are using a small linked database to pre-test our methods before testing hypotheses generated from the NL WHSCC data as well as from other Safecatch component studies. For example, we are interested in what kinds of accidents and injuries are related to crab fishing in comparison to shrimp fishing: we want to know when and where these accidents occur in relationship to the trip cycle and how fishing

effort on these vessels changed over time and with what impact on fishing safety. For this pilot project, we have linked 28 WHSCC claims with 28 SAR incidents, and then successfully linked these cases to the DFO database. Through this process we can see the connections among the variables, identify the difficulties associated with integrating the databases, and perfect the techniques that must be used to handle these large datasets.

3. Perceptions of Risk (POR) Component

The insights on accidents and injuries made possible by these linkage-enhanced data are supplemented by the Perceptions of Risk (POR) component which explores many of the same questions from a different angle through interviews with fish harvesters. The main objective of this component of SafeCatch was to document harvesters' experiences with risky situations, their perceptions of fishery risks, and their perceptions about the ways safety training, regulatory and other changes introduced in the Newfoundland and Labrador fishery have influenced risk. The component explores gaps between perceived and real risks among fish harvesters but our main focus is on gathering harvesters' observations and knowledge in order to deepen our understanding of risks, their origins and how they interact with fish harvesters' knowledge and practice to influence decision-making and ultimately safety and health within our fisheries. We used three methods: focus groups, a phone survey, and boat tours. 17 focus groups were completed involving 94 fish harvesters (83 men and 11 women) from the island portion of the province. Forty-six harvesters participated in our phone survey and we have completed seven boat tours.

Component results suggest widespread under-reporting of accidents, injuries and near-misses in fishing administrative data. This suggests that data trends revealed through the FVSLA study may be under-estimated and should be interpreted with caution. A very wide range of risky situations and types of injury were described by our participants. Exactly 50 percent (23) of those surveyed in the phone interviews reported having an accident in the past 10 years and 44 percent said they have health problems that are related to fishing. Of the 23 harvesters who reported having an accident, 14 of those described experiencing injuries. Harvesters tend to see some injuries as part of the job. Harvesters also tend to normalize the risks to safety posed by bad weather. However, they also see weather risks as mediated by forecasting, by experience with the vessel and with different types of conditions, as well as by regulations.

Regulations can both mitigate and enhance risk. The regulations our participants think matter most to risk include those that limit vessel length, set season lengths, that include strict rules about when gear can be in the water, and that require mandatory safety equipment and training. Study participants often described fishing for crab in inappropriate vessels and without vital equipment such as radar and survival suits during the early years of the temporary permit snow crab fishery. Most were "experienced" harvesters with many years on the water, but their experience and vessels were tied to particular fisheries and to coastal locations. As they moved offshore and into this new fishery, they discovered new challenges and risks. Since the beginning of the small boat crab fishery, many harvesters appear to have adjusted their vessels and equipment to better suit the risks associated with snow crab fishing. However, serious challenges persist. These impacts of regulations on fishing OHS are also discussed in detail in the CARR component.

Since the early 1990s, there has been more attention to safety training in the media and in fish harvester organizations. The focus group and the survey data suggest a tension between experiential approaches to fishing safety and reliance on formal safety training.

Respondents also indicated that harvesters tend to follow the example of others when deciding whether to invest in more safety equipment. Harvesters reported numerous strategies to fish safely, including traveling to and from the grounds with other vessels, routine maintenance and related record-keeping. Harvesters also reported modifying their deck space to prevent chronic injuries by adding anti-fatigue mats or tables on which to pick cod out of their nets or sort crab thereby reducing bending and the risk of back injury. The high cost and limited availability of safety training were among the issues discussed in the focus groups and the phone surveys. We noted a tendency for some harvesters to equate safety with owning safety and navigational technologies, an attitude that could contribute to a tendency to take greater risks and to over-reliance on the technologies based on the assumption that, should something go wrong, they will be able to save themselves and the boat. Despite the significant risks associated with fishing identified by participating harvesters, most report a high level of satisfaction with their jobs.

4. Safer Fishing Vessel Sea-Keeping (SFVS) Component

In the last three-to-four years, the Institute for Ocean Technology (IOT) and Memorial University of Newfoundland (MUN) have joined together to establish motion profiles of the Newfoundland fishing fleet. The objective has been to develop and validate a numerical tool, called MOTSIM that will be used to evaluate motion stress profiles using the notion of Motion Induced Interrupts (MIIs) (or any other similar parameter) and their impact on crew safety. The aim of this component is to develop and validate a numerical prediction tool for ship motions with the intention of using it to assess the physical stress levels on fishers associated with vessel motions on board fishing vessels. Stress levels are evaluated on the basis of the number of ‘motion induced interrupts’ (MII) per minute that occur at a particular location on a boat. A MII is effectively a ‘loss of balance’ incident, where the fisher has to make a special effort to avoid ‘tipping or slipping’ either by adjusting his stance or by holding on. Such incidents are associated with accelerations due to the boat’s motions and depend on where the fisher is working. The boat motions depend on the sea conditions and the shape and size of the boat. If the boat motions can be correctly predicted, then so can the number of MII per minute that occur at any location on the vessel. In this research, the prediction of a ‘loss of balance’ incident is based on a ‘rigid body’ modeling of the fisher and may, therefore, under- or over-predict the ‘destabilizing’ effects of particular accelerations acting on the human body (which of course is flexible).

The project has conducted sea trials of vessels representative of the Newfoundland and Labrador fleet and run corresponding model tests in the wave basin of IOT (only the smallest of the vessels has been tested at IOT to date). In parallel, MOTSIM has been further developed and validated using the full scale and experimental results. The project encountered substantial numerical challenges in simulating these trials and the model test. Some methods were developed to overcome these challenges. Based on the results, the numerical simulations seem to correlate reasonably well with the trials and the experiments. There is now sufficient evidence to have some confidence that the motion and MII predictions of MOTSIM will allow us to analyse the motion stress levels on vessels in the Newfoundland fleet. An example is presented of the

methodology involving MII values to demonstrate the effect of fishing vessel length on crew comfort and safety. This engineering-based research provides additional insight into the findings by both the CARR and the POR components that the specifically Canadian regulatory approach of vessel-length limitation has unintended negative impacts on safety.

5. Injured Fishers (IF) Component

This component had four main aims: 1) to describe the character of the fish harvesters' work and the most common types of accidents and injuries; 2) to describe the impact of the injuries on the fish harvesters' everyday lives; 3) to describe the fish harvesters' experience of current support services; and, 4) to develop recommendations for improvements in support services for injured fish harvesters. The NL WHSCC identified from their records a total of 206 fish harvesters who were currently receiving extended earnings loss (EEL) benefits. WHSCC sent a package of information about the project to these injured fish harvesters. A total of 35 fish harvesters replied and, of these, 26 were interviewed. All of the injured fish harvesters stressed the intense satisfaction they had gained from their work. Their whole identity and lifestyle and that of their families were closely intertwined with the fishery. They defined themselves as fish harvesters. The participants had experienced a variety of accidents. The most common types were slips and falls on the boat and on the wharf. Accidents involving equipment or machinery on the boat or onshore were often mentioned. Out at sea the fishing boat is constantly in motion. In order to do their work the fishermen have to hold their bodies in a certain way so as to maintain their balance. The fishermen felt that this in itself could cause wear and tear on them physically. Related to this were the cramped working conditions many of the fishermen had to work in. Both groups of fish harvesters also emphasized the role of the skippers who were under considerable pressure to maximize the catch even in dangerous waters contributing to pressure to intensify the pace of work and associated risk. These accounts enrich the analysis of many of the risks identified in the POR component and provide a context within which to assess the accident data reported in the FVSLA component.

Serious injuries had a major impact on the lives of these fish harvesters. The initial shock was followed by an open-ended period of readjustment. The initial shock was compounded by the realization that they could not go back to sea. These early days post-injury were described as 'unreal.' For many of the fish harvesters, the shock continued for an extended period. Participants experienced loss of identity, of purpose, of physical ability, of financial investment, of income, of opportunity, and of family role. The most common long-term impact was depression. Harvesters recounted interactions with the WHSCC and its predecessor as time-consuming and frustrating. An on-going complaint was the perceived lack of respect and suspicion shown not only by some of the caseworkers but also by neighbours. A second complaint was the perceived lack of understanding of the nature of the disability. A constant source of frustration was the amount of compensation. The orientation of WHSCC staff seemed to be to get the injured worker back to work despite evidence that this might be foolhardy. Several of the deep-sea fishermen had participated in some form of retraining, but all of them found it to be a waste of time for different reasons. Although they recognized that they could not return to the fishing industry, the injured fish harvesters still wanted a job with some of its qualities such as freedom and independence. Some felt that fishermen need to take more responsibility for their actions and be safety conscious.

6. Community Healthy Fisheries Project (CHFP) Component

Government agencies and the fish harvesters' unions have pursued a range of strategies designed to reduce the number of accidents in the industry. These programs have focused on improving individual fish harvesters' knowledge of basic safety regulations and the procedures to follow in case of an emergency. Together they have contributed to creating a safer industry. However, there is a need to explore new ways of promoting a safety culture throughout fishing communities, particularly since other components of SafeCatch have revealed serious deficiencies in many aspects of fishing OHS. The aim of this project was to explore the potential role of different community arts activities in promoting increased safety awareness in fishing communities. The project was conducted in three fishing communities in Newfoundland: Bonavista, St. Brides/Cuslett and Petty Harbour/ Maddox Cove. It was designed to encourage community control and ownership of the program. Project activities varied from community to community and included schools-based activities, play and video production, ecumenical services and other activities. Informal discussion with the key project participants confirmed their enthusiasm not only to participate in the project but to initiate similar activities in subsequent years. This impact was particularly noticeable among those community residents who were not themselves fish harvesters suggesting that the participation of teachers, town officials and plant workers in the project made them aware of their potential role in increasing safety in the fishing industry. Community arts workers also became aware of their role in promoting awareness of safety in fishing communities. While they had taken up a variety of issues in their previous work, they had not focused on safety as an issue. The success of this approach appears to be linked to a number of factors including reliance on a community development approach; the presence of local capacity in the form of community leaders with appropriate expertise; effective planning, shared responsibility and tools for maintaining morale and support of committee members. Community resources such as schools, community centres, local media, the presence of members of the arts community and involvement of church, union and council leaders were also important to the success of these projects. Challenges included limited resources, unanticipated delays, and the need for stronger engagement of local fish harvesters.

Introduction

This document summarizes the research conducted by SafeCatch, a six-part research program carried out by SafetyNet. Funded primarily by the Canadian Institutes for Health Research (CIHR), SafetyNet is a Community Research Alliance on Health and Safety in Marine and Coastal Work based at Memorial University in St. John's and linked to partner organizations and researchers in Newfoundland & Labrador, the Maritime Provinces and elsewhere in Canada., SafetyNet is the first major research program investigating occupational health and safety in Atlantic Canada's marine, coastal and offshore industries.

SafeCatch is the largest of the eight research projects being carried out by SafetyNet. SafeCatch has been jointly funded by CIHR, the Search and Rescue Secretariat's New Initiatives Fund (NIF), Memorial University, and the Newfoundland and Labrador Centre for Applied Health Research at Memorial. Other contributions to the project have been provided by: the Institute of Ocean Technology; the Workplace Health, Safety and Compensation Commission of Newfoundland and Labrador; the RURAL program at Dalhousie University ("Research Towards Understanding Rural Health in Atlantic Canadian Landscapes"); the Offshore Safety and Survival Centre of Memorial University's Marine Institute; the Professional Fish Harvesters Certification Board of Newfoundland and Labrador; the Canadian Coast Guard; and the Fish, Food and Allied Workers.

A multi-faceted, interdisciplinary research program, SafeCatch is designed to include an unusual degree of involvement by community partners of various kinds— provincial government units, public regulatory agencies both provincial and national, private firms, associations of workers and of employers, and local community groups. Using these partnerships, SafeCatch has, incorporated a substantial knowledge exchange component from the design phase of the research right through to its final dissemination stages.

The central objective of SafeCatch is to identify the regulatory, economic, social, psychological and vessel-design factors associated with accidents, injuries and fatalities in fish harvesting in Newfoundland and Labrador in a context of rapid and substantial industrial and regulatory change. We have sought to interpret the factors that influence the occupational health and safety of fish harvesters, assess how those factors inter-relate, and to deliver results that can be used directly in communities and workplaces or that can inform and improve the development and implementation of prevention programs, the planning and delivery of SAR and other public services, and the development of fishing safety policy at the regional and national levels.

A Changing Industry

Many changes took place in the Newfoundland and Labrador fishery between 1983 and 2002. As indicated in Figure One, the relatively large, industrial offshore groundfish dragger fleet has virtually disappeared. During the same period, there has been a roughly 50% drop in the number of licensed vessels in the < 35 foot fleet sector with many of the remaining vessels in this fleet sector increasing somewhat in length up to the limit permitted in the regulations. The number of licensed vessels in the 35-45 foot fleet has also declined. In contrast, the number of vessels

between 45 and 65 feet has stayed relatively constant or even increased slightly. Some expansion in offshore, industrial factory freezer trawler activity, particularly within the shrimp fishery, has also taken place since the early 1990s.

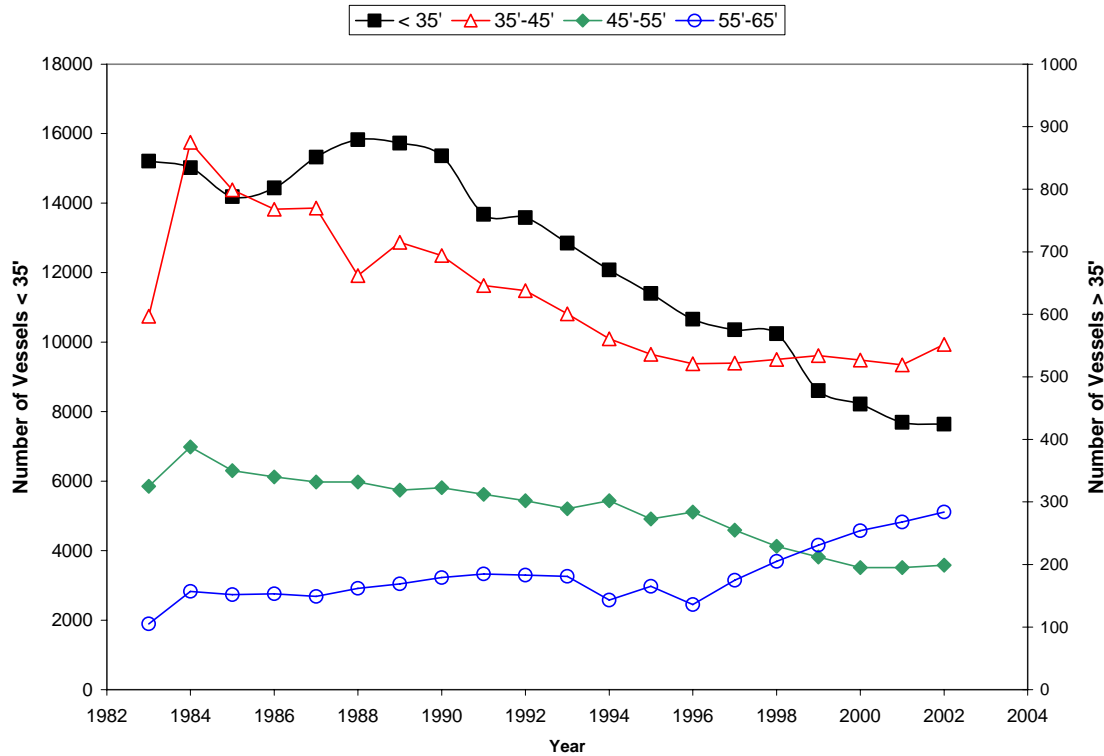


Figure 1. Number of licensed fishing vessels in Newfoundland and Labrador by length category, 1983-2002.

This fleet transformation reflects the virtual disappearance of the cod fishery in many areas, reductions in other groundfish fisheries, and substantial increases in effort, landings and landed value within the lobster, snow crab and shrimp fisheries. There has also been a substantial increase in sealing activity over the period under study linked to increased quotas and prices for seal pelts and fat. Related changes have taken place in the seasonality of fisheries; in the intensity and distribution of fishing activity (Pelot 2000); in fishing, navigation, fish-finding and gear-handling technologies; and in the regulatory regime governing both fishing and fishing safety (See the Comparative Analysis of Regulatory Regimes (CARR) component; Wiseman and Burge, 2000; Pelot, 2000). Requirements and realities of fish harvester safety training have changed along with the overall costs of fishing and the relative importance of different species for harvesters' incomes. Changes have also taken place in the relations between harvesters and processors (CCPFH 2005); in the average age and gender composition of the fish harvester labour force (Grzetic 2005; CCPFH 2005); in the distribution, maintenance and management of fishing infrastructure such as docks and wharves (Coastal Communities Network 2004); and in the location of weather forecasting capacity.

The SafeCatch Research Program

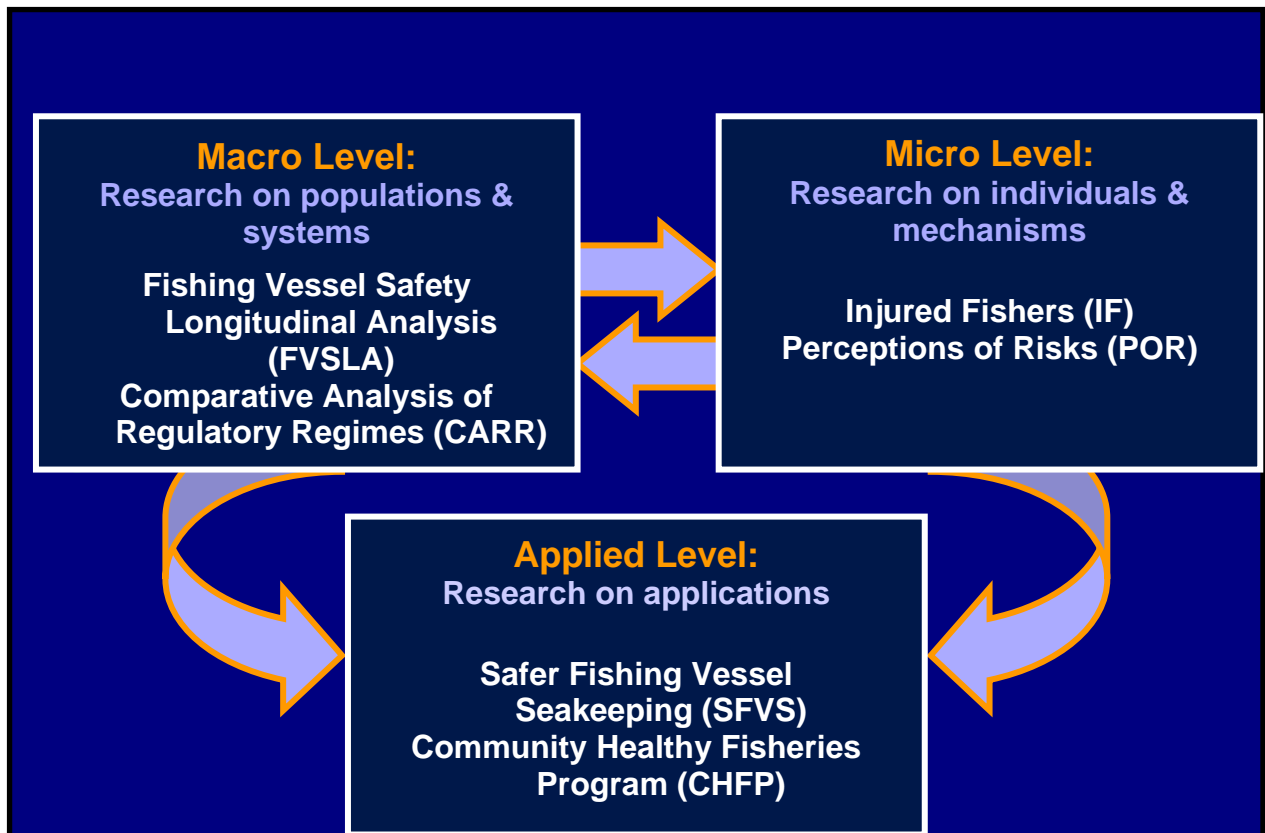
The SafeCatch research program has six main components. All the components share the core objective of producing and translating results that will:

- reduce the number and severity of fish harvester injuries and fatalities and of SAR incidents;
- promote safety awareness;
- support the development of improved safety education programs for fish harvesters; and
- help to improve decision-making related to fishing practices, training, vessel design and public policy.

The component projects are:

1. **Comparative Analysis of Regulatory Regimes (CARR):** A comparative analysis of fishery regulatory regimes and management practices and of their impact on fishing accidents in Canada and other countries.
2. **Fishing Vessel Safety Longitudinal Analysis (FVSLA):** A longitudinal analysis (1989-2001) that uses a new comprehensive, inter-sectoral linked database to identify and interpret the factors that influence the rates of injuries, fatalities and SAR incidents.
3. **Perceptions of Risk (POR):** A study based on focus groups and interviews conducted with fish harvesters on their perceptions of the causes of accidents and near-misses and their suggested solutions.
4. **Safer Fishing Vessel Seakeeping (SFVS):** An engineering study to collect sea-trial data in order to complete and validate a computer model for predicting the impact of vessel design on seakeeping characteristics and fish harvester occupational safety.
5. **Injured Fishers (IF):** An interview-based study of injured fishers, investigating their experiences and the psychological and social impacts of occupation- related long-term disability (**this component was not funded by SAR-NIF but we have included a summary report because of its relevance to the other study components**).
6. **Community Healthy Fishery Program (CHFP):** The development of an interactive, community-based OHS and fishing vessel safety education program for fish harvesters.

These project components have been designed and implemented to operate at three levels: the macro level of research on populations and systems; the micro level of research on individuals and mechanisms; and the applied level of policy and implementation.



SafeCatch was designed so that relevant questions and results from each component would be relevant for the research design and interpretation of results in the others. Several of the components are yielding results of direct relevance to SAR in relation to the planning, development and implementation of programs and services. Working in collaboration with our partners and with other relevant stakeholders, we are developing a series of policy and management recommendations to promote safety in the fishing industry in Newfoundland and Labrador and in Canada more broadly. In addition, the research should both inform and promote the development of effective inter-sectoral collaboration to reduce accidents and SAR incidents in the fishing industry.