

The logo for SafetyNet, featuring the word "Safety" in a blue script font and "Net" in a green sans-serif font, set against a background of a stormy sea with white-capped waves under a cloudy sky.

*SafetyNet*

Centre for Occupational Health & Safety Research

# *Noise Exposure of Fish Harvesters In Newfoundland and Labrador*

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## *Presentation Overview*

- Outline and scope of the research ( slides 1-4)
- Analysis of the fleet and sample ( slides 5-6)
- Methods (slides 7-9)
- Noise exposure among fish harvesters (slides 10-12)
- Noise levels onboard fishing vessels (slides 13-15)
- Conclusions and future recommendations (slide 16-17)

## Background

- > 9,000 Newfoundland and Labrador (NL) fish harvesters
- Noise-induced hearing loss (NIHL) = known hazard for fish harvesters.
- NL compensation claims for NIHL = high relative to other sectors
- Noise exposures and harvester concerns = undocumented
- Regulatory requirement for NL employers to
  - a. assess risk of noise impairment
  - b. take action if needed
- Applies to NL fish harvesters
- Shrimp vessel government testing found elevated exposures

## *Scope and goals*

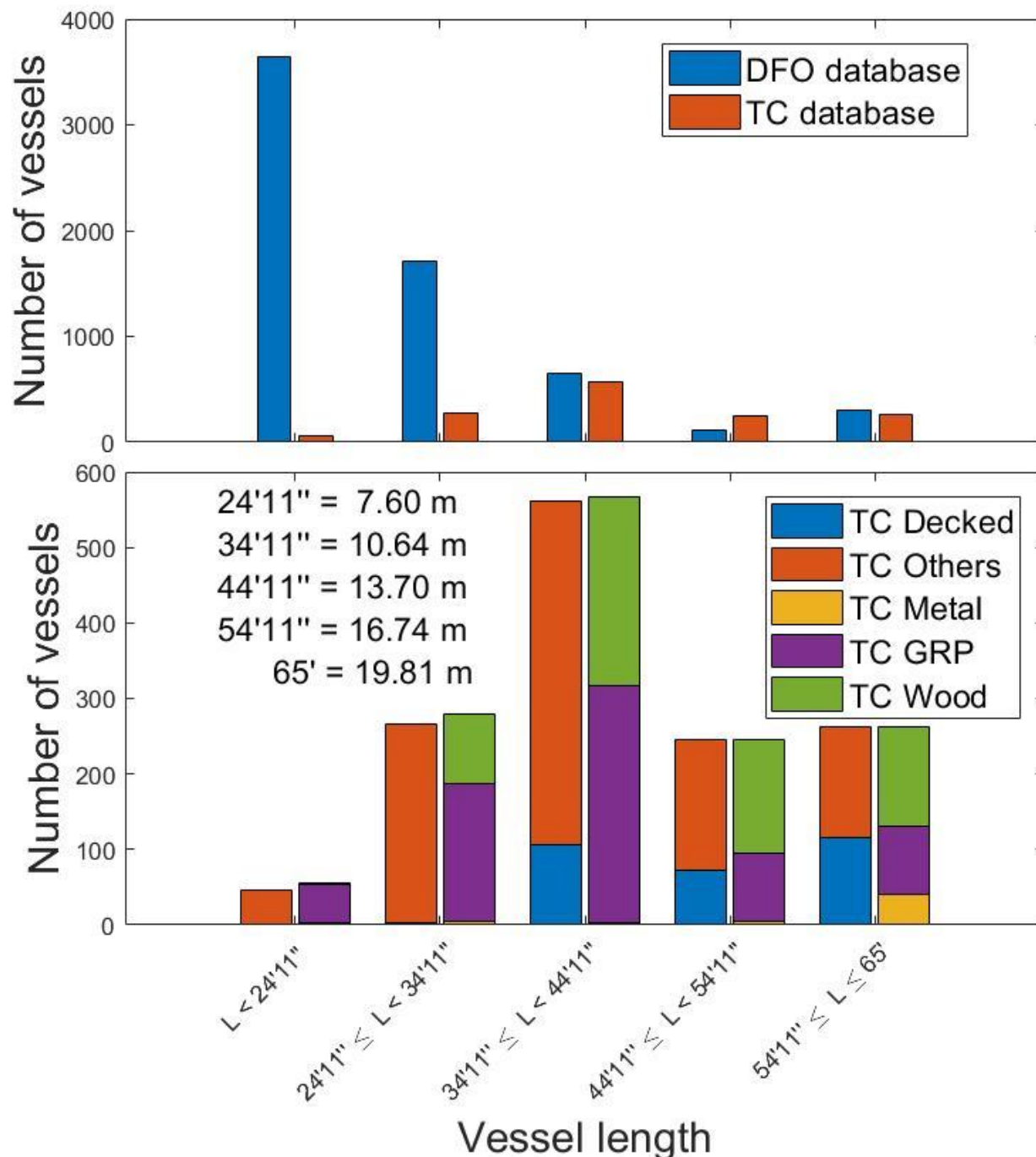
- ❖ **SCOPE:** Document exposures and identify strategies to reduce noise exposure (as needed) in NL fleet using
  1. Short-Term Strategies:  
Vessel adaptation and PPE
  2. Longer-Term Solutions for vessel refit/new vessel construction:  
Design solutions to reduce noise levels to acceptable levels
  3. Education on hearing and noise:  
Give fish harvesters information on noise exposures, NIHL and some knowledge and tools to address the problem



## *Partnership with NL-FHSA*

- ❖ The NL-FHSA gathered concerns from fish harvesters about NIHL
- ❖ Reached out for a partnership with SafetyNet
- ❖ Active role in recruitment through sending invitation to fish harvesters
- ❖ Support and knowledgebase on fishing activities, gears, operations

## Research Design: Fleet Structure



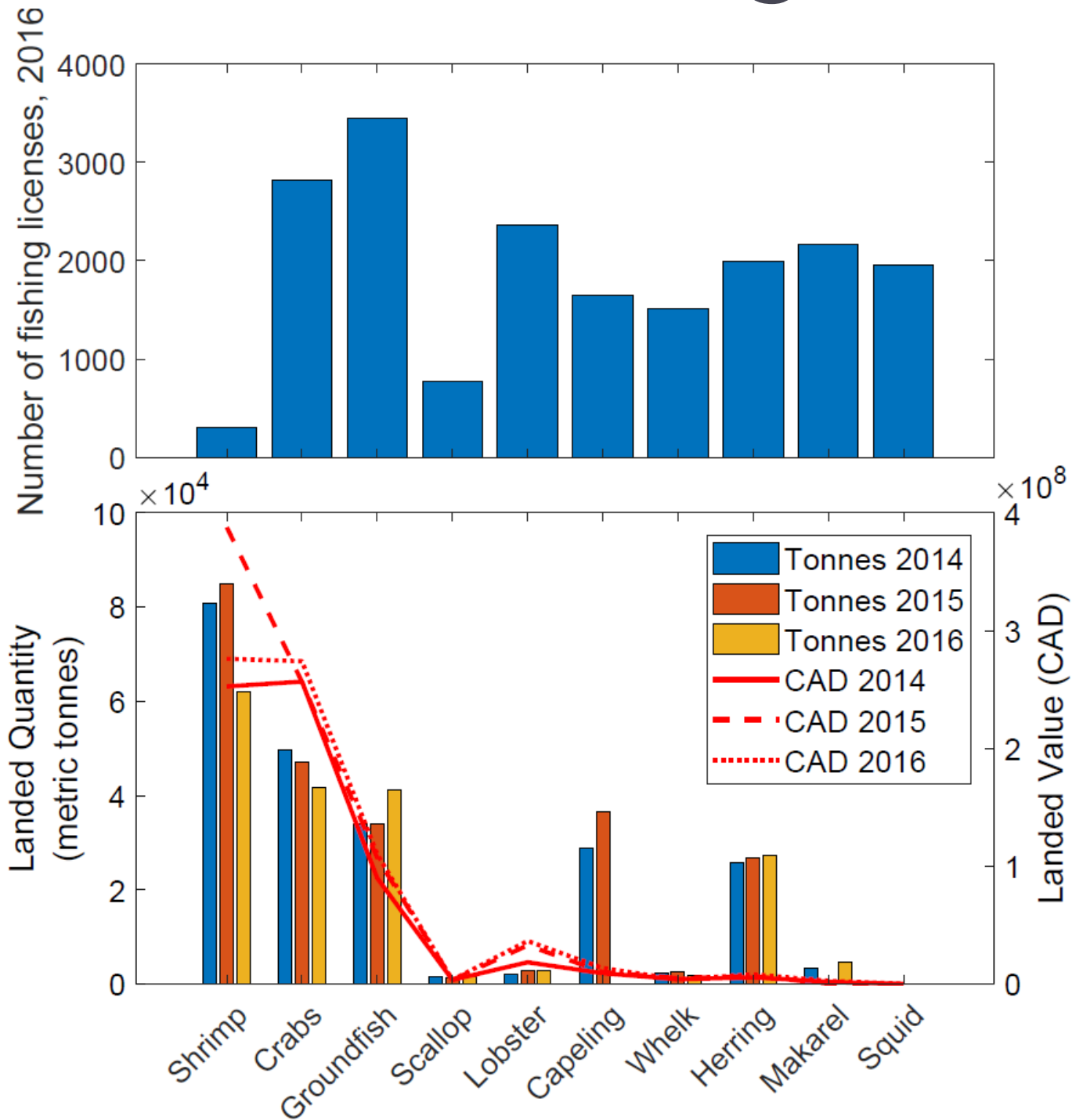
### Data from 2 databases on

- Length (partial)
- Vessels' specifications (partial)

### Length distribution

- Concentrated on  $<65'$
- No clear indication of workforce
- Different layouts

## Research Design: Fisheries composition



### Data from DFO databases on

- Licenses from 2016
- Landings and Values

### Where to concentrate

- 10 most frequent licenses
- No clear indication of workforce

### Efforts to recruit 20 fishing vessels to cover variability of fleet

# *Methods*



## Methods (1)

### **Vessel Design Inspections:**

- Inspection of vessels structure and main noise sources
- Identification of tasks and jobs for noise exposure assessments

### **Noise Exposure Assessments:**

- Based on ISO 9612 – use of task and job based measurements
- Personal noise dosimeters (personal noise exposure) & hand-held microphones (tasks noise exposure)
- Owners and crew
- Post-trip debriefing to identify the performed activities

## *Methods (2)*

### **Noise levels assessment:**

- Levels are measured onboard without any impulsive noise components
- In both Steaming and Fishing conditions, in relevant vessel spaces
- IMO noise limits used for comparison

## *Methods (3)*

### **HPD**

- Selection of class of HPD using CSA Z94.2-14
- According to collected noise exposure data
- Identified for specific tasks

## *Results*



## Sample of Surveyed Vessels

<b>Vessel ID</b>	<b>Length (m)</b>	<b>Boat Type</b>	<b>Fishery</b>	<b>Gear</b>	<b>Noise Meas. ?</b>
vessel 1	5.8 (19')	Skiff, GRP	Lobster	Pots	yes
vessel 2	6.7 (22')	Skiff, GRP	Lobster	Pots	yes
vessel 3	10.7 (34'11")	1 Deck, Wood	Cod	Handline	yes
vessel 4	10.7 (34'11")	1 Deck, GRP	Cod	Gillnet	yes
vessel 5	11.9 (39')	1 Deck, Wood	Whelk	Pots	yes
vessel 6	10.7 (34'11")	1 Deck, Wood	Crab	Pots	yes
vessel 7	19.8 (65')	2 Decks, GRP	Cod	Gillnet	yes

## Preliminary results on Noise Exposure Assessment

Fishery	$L_{EX8h}$ dB(A) +Uncertainty
(vessel 1) Lobster	$L_{EX8h} > 85$
(vessel 2) Lobster	$80 < L_{EX8h} < 85$
(vessel 3) Cod (jigging)	$L_{EX8h} < 80$
(vessel 4) Cod (gillnet)	$80 < L_{EX8h} < 85$
(vessel 7) Cod (gillnet)	$L_{EX8h} > 85$
(vessel 6) Crab (pots)	$L_{EX8h} > 85$
(vessel 5) Whelk (pots)	$L_{EX8h} > 85$

Unacceptable
Risky
Acceptable

- Values + uncertainty compared with 85 dB(A) limit
- Difference per used gear
- Difference in jobs performed

## Noise Levels Assessment (I)

### Preliminary results from noise levels assessment:

#### 1. Open Boats:

High noise levels:  $69 \leq L_{A,eq} \leq 95$  [dB(A)]

#### 2. Boats with Front Wheelhouse:

High noise levels found in: Crew spaces:  $70 \leq L_{A,eq} \leq 82$  [dB(A)]

Wheelhouses:  $70 \leq L_{A,eq} \leq 76$  [dB(A)]

#### 3. Boats with Front Wheelhouse:

Noise levels in Wheelhouses:  $64 \leq L_{A,eq} \leq 78$  [dB(A)]

#### 4. Boat with Front Wheelhouse and 2 Decks:

High noise level in the Messroom:  $L_{A,eq} = 73$  [dB(A)]

## *Noise Levels Assessment*

- Crew spaces, wheelhouses are not `quiet` spaces.
- Main sources identified were the engine and auxiliaries
- Poor acoustical designs



## Possible design flaws





## *Short-Term Strategies*

- Small, open boats: only viable solution seems to be adoption of HPD
- Larger, decked boats: noise exposure could be reduced by:
  - 1) HPD use while fishing
  - 2) Controlling noise exposures onboard



## *Conclusions & Future Work*

### **Conclusions to date**

1. Noise exposure is an issue for fishing vessels:  
highly gear dependent, concentrated while fishing
2. Noise levels are hazardous, noise control is an issue
3. Short-term vessel design strategies identified for HPD use

### **Ongoing and future work**

1. Ongoing efforts to recruit missing fisheries and vessel types
2. Assessment of HPD options – Class B
3. Modelling (numerical and experimental) of noise transmission for design solutions for future vessel construction

## Acknowledgements

- ❖ This work was supported by Mitacs through the Mitacs Accelerate Program.
- ❖ The project was partnered and co/funded by NL-FHSA
- ❖ We would like to thank all the fish harvesters who volunteered in this research



**NL-FHSA**  
FISH HARVESTING  
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*Thank you for your attention!*  
*Questions?*