

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

SafetyNet

Centre for Occupational Health & Safety Research

Understanding Weather and Fishing Safety: Getting Started

Barb Neis, James Shewmake and Joel
Finnis

1. Why weather and fishing safety?
2. Literature Review Methods
3. Emerging Insights
4. Research gaps
5. Next steps and session overview

The opportunity...



MEOPAR



NL-FHSA

FISH HARVESTING
SAFETY ASSOCIATION



FRONTIER INSTITUTE

Funding for a multidisciplinary and mixed methods weather and fishing safety study

Newly established NL-FHSA to work with

NL-FHSA survey and community meetings – weather and weather forecasting among fishermen's top concerns

The problem

Marine weather = key contributor to vessel losses, fatalities, injuries...

What are the key weather-related hazards?

What do we know about those hazards and their impacts?

Data gaps?

Methods and tools to deepen our knowledge?

The program of research

1. Literature review
2. Large-scale, longitudinal weather, fishing traffic and Search and Rescue Incident analysis (quantitative) – with Pelot/Rezae
3. Qualitative fishermen's knowledge and weather study
4. Qualitative (roundtable/interviews) forecasting production and stakeholder needs study
5. Community-engaged approach
6. Iterative refinement and expansion of the research moving forward

Literature Review – Methods

Phase I: 2014 scoping literature review - updated in 2017

1. Search string: Fishing AND Safety AND Weather
2. 6 indexes (multiple disciplines)
3. Review of titles and abstracts
4. Removal of duplicates; irrelevant sources; inaccessible/weak papers
5. Review full papers (24 in 2014)

Phase 2

1. Cross-check with FS bibliographies and other known sources – limited overlap
2. Broaden the search
3. Adopt a thematic approach
4. Review papers with *and* without attention to weather and fishing safety
5. Synthesize key findings and gaps

1. Weather-related major incidents contribute to investigations & improvements in forecasting
2. Weather-related hazards often poorly defined:
 - a) “worst situations of weather” (Jensen 1997)
 - b) “severe weather conditions” (Schilling 1993)
 - c) “extreme weather” (Matheson et al. 2001)
 - d) “heavy seas” (Noorish and Cryer 2004)
 - e) “adverse weather” (Roberts 2004)
 - f) “heavy weather” (Lucas and Lincoln 2007)
 - g) “rough seas” “heavy seas” “freak waves” (Roberts 2010)

Norway: winter months associated with highest accident rates (McGuinness et al. 2013)

N.C.: small-scale harvesters rank rough weather and water conditions as leading stressors (Kucera and McDonald (2010)

Alaska:

- relationship hazardous weather and fatal falls strongest in pot fisheries in Alaska
- weather most commonly interacted with “working gear” (setting/retrieving) vs other tasks to amplify risk (Lucas and Lincoln 2007)

BUT: U.K. ‘heavy weather’ leading cause only 1% of at-sea accidents 1992-1997 in Marine Accident investigation branch data (Wang et al. 2005)

Systematic assessments of relationship weather-related hazards and FS relatively recent and rare?

Wu et al (2009) argue:

“There is a long history of studying the relationship between weather and maritime activities” (pg. 985)

Wu et al. (2005, 2009) take weather apart...

- ❖ Use: SAR incident data + weather data + traffic data
- ❖ Explore: relationship between incidents and 6 weather factors: wave height, SST, air temp; ice concentration; fog presence; ppt
- ❖ Found: increase RIR with general deterioration of weather but highest with ice concentration and, without ice, higher waves

- ❖ Rezaee et al. (2016 a,b,c) start to take 'fishing' apart – what weather hazards contribute most to RIR, for what fisheries?
- ❖ Roberts (2010) starts to look at weather and fishing activities/tasks; see also Lucas and Lincoln (2007) and others

Preliminary Conclusions

1. Fishing safety researchers rarely systematically assess weather-related hazards
2. Marine risk researchers = limited data/knowledge about fishing activities/processes
3. Fishing injury analyses = limited analysis of weather --- work on moving platforms literature?
4. Other gaps/limits? Weather, safety and...
 - a) forecasting?
 - b) harbour-related injuries/fatalities?
 - c) gear entanglement? STF? noise and communication? fatigue?
 - d) ports of refuge?
 - e) fisheries management?
 - f) a conceptual framework for understanding FVS and weather?

The session:

- a) James Shewmake – climatology of marine weather hazards *and* navigating risk (fish harvesters' weather-related practices)
- b) Joel Finnis – marine forecast production and application in Atlantic Canada
- c) Devon Telford – impact based indices and FVS

References Cont.

- Jensen, O. C. (1997). Health hazards while fishing in heavy weather. *Occupational and Environmental Medicine*, 54(2), 141.
- Lucas, D. L., & Lincoln, J. M. (2007). Fatal falls overboard on commercial fishing vessels in Alaska. *American Journal of Industrial Medicine*, 50(12), 962–968. doi:10.1002/ajim.20509
- Matheson, C., Morrison, S., Murphy, E., Lawrie, T., Ritchie, L., & Bond, C. (2001). The health of fishermen in the catching sector of the fishing industry: a gap analysis. *Occupational Medicine-Oxford*, 51(5), 305–311. doi:10.1093/occmed/51.5.305
- McGuinness, E., Aasjord, H. L., Utne, I. B., & Holmen, I. M. (2013). Injuries in the commercial fishing fleet of Norway 2000-2011. *Safety Science*, 57, 82–99. doi:10.1016/j.ssci.2013.01.008
- Norrish, A., & Cryer, P. (1990). Work related injury in New-Zealand commercial fishermen. *British Journal of Industrial Medicine*, 47(11), 726–732. *Journal of Maritime Affairs* 16, no. 1 (2017): 1–17. <https://doi.org/10/gdwp49>.
- Rezaee, Sara, Ronald Pelot, and Joel Finnis. “The Effect of Extratropical Cyclone Weather Conditions on Fishing Vessel Incidents’ Severity Level in Atlantic Canada.” *Safety Science* 85 (2016): 33–40. <https://doi.org/10/gdwp46>.
- Rezaee, Sara, Ronald Pelot, and Alireza Ghasemi. “The Effect of Extreme Weather Conditions on Commercial Fishing Activities and Vessel Incidents in Atlantic Canada.” *Ocean & Coastal Management* 130 (2016): 115–127. <https://doi.org/10/gdwp4z>.

References

- Rezaee, Sara, Christian Seiler, Ronald Pelot, and Alireza Ghasemi. (2016). “Will Commercial Fishing Be a Safe Occupation in Future? A Framework to Quantify Future Fishing Risks Due to Climate Change Scenarios.” *Weather and Climate Extremes* 13: 73–85. <https://doi.org/10/gdwp48>.
- Roberts, S. E. (2004). Occupational mortality in British commercial fishing, 1976-95. *Occupational and Environmental Medicine*, 61(1), 16–23.
- Roberts, S.E. (2010). Britain’s most hazardous occupation: commercial fishing. *Accident Analysis and Prevention* 42(1), 44-49. <https://doi.org/10.1016/j.aap.2009.06.031>
- Schilling, R. (1993). Hazards of deep-sea fishing (Reprinted from Brit J Industrial Med, pg 27, 1971). *British Journal of Industrial Medicine*, 50(11), 962–970.
- Wang, J., Pillay, A., Kwon, Y. S., Wall, A. D., & Loughran, C. G. (2005). An analysis of fishing vessel accidents. *Accident Analysis and Prevention*, 37(6), 1019–1024.
- Wu, Y., Pelot, R. P., & Hilliard, C. (2009). The Influence of Weather Conditions on the Relative Incident Rate of Fishing Vessels. *Risk Analysis*, 29(7), 985–999. doi:10.1111/j.1539-6924.2009.01217.x