**Terms of Reference**

**sGSL Snow crab Framework Assessment on the Standardization of historical snow crab (*Chionoecetes opilio*) survey abundance and biomass indices in the context of recent survey catchability issues.**

**Regional Science Response Process – Gulf Region**

**December, 2021**

**Moncton, New Brunswick**

Chairperson: ? (DFO Gulf Region)

**Context**

A change in snow crab survey vessel in 2019 was accompanied by an apparent 30-40% increase in catchability among sub-legal male and mature female snow crab. Investigations indicated that part of the issue was an increase in unaccounted dragging of the trawl, dubbed the passive trawling phase, that was caused by slow winch operation and forward vessel movement after active trawling was assumed to have ended. These issues raised doubts as to the comparability of the 2019 abundance indices with the historical time series, resulting in uncertainty when assessing stock status (ref). In spite of a protocol adjustment, these issues persisted during the 2020 survey and assessment (ref). In addition to these recent issues, other factors related have been highlighted as causes of bias of stock indices, among them the current practice relocating sampling stations to alternates in response to trawl damage, progressive expansion of survey area through time, changes in spatial sampling design, multiple changes in survey vessel, and inter-annual variability in survey fishing practices.

**Objectives**

* Evaluate whether end-of-tow protocol changes brought during the 2021 survey were able to **control** the extent and variability of **passive trawling phase**.
* Consider methods to **retroactively standardize the historical survey time series** of stock biomass indices. Two approaches will be considered. The first approach will focus on how **trawl configuration and behavior** has varied throughout survey history, with special focus on quantifying the extent of the passive phase. The second approach will consider how **catchability** is seen to vary through within a **population dynamics model**.
* Evaluate whether the current practice of **relocating survey sampling stations** when trawl damage is incurred leads to spatial sampling biases in survey catches.

**Expected Publications**

* CSAS Research Document containing results, discussions and conclusions regarding historical changes in trawl configuration and passive phase trawling characteristics in past snow crab surveys.
* Technical Report detailing population modelling results and discussion.

**Expected Participation**

* Fisheries and Oceans Canada (Ecosystems and Science Branch, Ecosystems and Fisheries Management Branch).
* Experts in statistical analysis, population modelling and/or bottom trawling.
* Snow crab industry representatives.

**References**

Add references SVP