



## North Pacific Fisheries Commission

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### Proposed framework for monitoring VME recovery in NPFC Convention Area

In the NPFC Convention Area, research has identified areas of the seafloor with VME indicator taxa present that have been impacted by anthropogenic activities and these VME indicator taxa show signs of recovery from impacts. We are proposing the following framework/guidelines to monitor changes in VME that may indicate recovery (or lack of recovery).

- 1) Comparison of impacted VME to un-impacted VME (control sites) in similar depths, on similar substrates and with comparable environmental conditions (e.g. oxygen concentration, temperature, etc) should be made to gauge the total impact and signs of recovery. The metrics that should be examined over time include
  - a. Density of VME indicator taxa
  - b. Diversity of VME indicator taxa
  - c. Size of VME indicator taxa
- 2) The functional characteristics of impacted VME should also be examined and compared to un-impacted VME. Metrics examined to determine functional recovery include
  - a. Associated fish and invertebrate taxa and their abundance
  - b. Size of VME indicator taxa
- 3) Ongoing sources of impact should also be monitored. For example, continuing fishing effort inside a recovering VME and the bycatch of VME indicator taxa should be monitored and reported.
- 4) Potential recruitment (e.g. the appearance of small VME indicator taxa individuals) and natural mortality (e.g. the number of dead VME indicator taxa individuals) should also be monitored throughout recovery.
- 5) Ideally monitoring would be conducted at impacted and control sites annually. However, given the potentially long time frame for VME recovery, a 3-5 year revisiting of sites for monitoring would also be acceptable.

No specific standard for moving from “impacted” to “recovered” has yet been identified, but it is likely that this can be established through comparisons of the metrics listed above for impacted and un-impacted VME communities. Achievement of recovered status would then be indicated by sufficient progress towards an un-impacted state across multiple metrics (e.g. the density of impacted VME is 80% of the un-impacted VME and the mean size of impacted VME indicator taxa is 75% of the mean size of un-impacted VME indicator taxa).