Executive Summary

CarbonNet, on behalf of the Crown in right of Victoria, conducted the Pelican three-dimensional (3D) marine seismic survey (MSS) in the Gippsland Basin in greenhouse gas assessment permits VIC-GIP-002 (Commonwealth waters) and GGAP006386(V) (Victorian waters). Seismic acquisition was carried out, as planned, from the *Polarcus Naila* between the 10th and 24th of February 2018 and took 14 days to complete.

The impacts and risks associated with the MSS were comprehensively assessed in the Environment Plan (EP) for the activity which was accepted by Commonwealth and Victorian regulators under the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations* 2009 and the Victorian *Offshore Petroleum and Greenhouse Gas Storage Regulations 2011*. As part of the EP, CarbonNet committed to completing pre- and post- seismic survey offshore habitat assessments.

Underwater sound and its potential impact on the marine environment was a key issue raised by stakeholders, particularly the commercial fishing industry. In response, CarbonNet put in place initiatives to address concerns, including:

* Undertaking marine habitat assessments before and after the MSS;
* Establishing an independent Advisory Panel to provide advice on the marine habitat assessments;
* Monitoring underwater sound levels to assess predictions from the sound model used to assess the impact in the EP;
* Contributing to an independent study on scallop stock assessment by the Victorian Fisheries Authority (VFA).

Advisian Pty Ltd was commissioned to design and undertake the marine habitat assessments. This report presents the findings from both the pre- and post-MSS assessments.

The objectives of the habitat assessments were to determine the abundance of key biological receptors before and after the MSS and to determine whether any differences could be attributed to the MSS. Biological receptors monitored were:

* Commercial scallops (*Pecten fumata*);
* Southern rock lobster (SRL) (*Jasus edwardsii*);
* Finfish; and
* Zooplankton.

To ensure that the habitat assessments were undertaken in a scientifically robust manner, an Advisory Panel was established consisting of representatives from regulatory agencies, academia and the fishing industry. Its role was to provide advice on:

* The methodology to undertake the pre- and post-MSS habitat assessments;
* Information about the relevant fisheries;
* The results from the pre- and post-MSS habitat assessments;
* The interpretation of the assessment results and their implications.

The Advisory Panel comprised members from the following organisations:

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| **ROLE** | **ORGANISATION** |
| Co-Chair | IC Independent Consulting |
| Co-Chair | Victorian Department of Environment, Land, Water and Planning |
| Member | Seafood Industry Victoria |
| Member | Seafood Industry Victoria |
| Member | Seafood Industry Victoria |
| Member | Victorian Fisheries Authority |
| Support for Co-Chair | CSIRO Oceans and Atmosphere |
| Support for Co-Chair | Geoscience Australia |
| Secretariat | CarbonNet |

The Advisory Panel read and absorbed a great deal of material and conducted eight meetings between December 2017 to November 2018 to discuss, review, and make recommendations regarding the planning and the results of the pre- and post-MSS environmental assessments. Prior to undertaking the pre-MSS assessment, the methodology for conducting the assessments for each of the four biological receptors was reviewed, modified where appropriate and endorsed by the Advisory Panel. Monitoring sites were selected for each receptor within the MSS acquisition area and surrounds (the latter as reference sites). Underwater sound transmission loss modelling guided the positioning of the reference sites, the requirement being that they had to be in comparable habitat, but far enough away from the sound source not to be impacted. These distances were verified after the MSS using the underwater sound monitoring information collected during the MSS.

Best practice in environmental monitoring was used by Advisian to develop a suitable methodology which considered the limitations in what could be achieved to ensure that the methods proposed were both cost effective and scientifically meaningful. The timing of the assessments was informed by current scientific literature and recommendations made by the Advisory Panel.

Field activities for the pre-MSS habitat assessments were carried out between the 15th and 26th of January 2018. Post-MSS habitat assessments were carried out in a staged approach with zooplankton assessments completed on the 26th of February (within 3 days of the final MSS acquisition line), finfish and rock lobster assessments completed between the 10th and 12th of July, and scallop assessments completed between the 22nd and 23rd of August 2018. The assessments were conducted in a non-invasive manner, with only the monitoring of plankton requiring the permanent removal of marine species.

Underwater sound measurements carried out between 31 January and 6 February 2018 using sound and particle motion recorders placed on the seafloor confirmed that measured sound levels were less than those predicted by the modelling.

Overall, no impact was observed that could be attributed to the MSS. Scallop numbers were extremely low both before and after the MSS. Rock lobster numbers increased post the MSS. Results from fish and zooplankton were highly variable with both pre – and post–MSS samples considered typical of a healthy temperate marine ecosystem. A more detailed summary for each biological entity is provided below.

**Scallops**

For the scallop assessment, 36 sites were monitored, including: 16 sites within the acquisition area; nine reference sites within 1.2 km of the acquisition area border; six reference sites at 10 km from the southwest and northeast boundary; and five reference sites coinciding with those from the VFA stock assessment (done over December 2017/January 2018). Eighty-one (81) towed video transects were completed pre-MSS and 64 were completed post-MSS.

The key finding from this assessment was the very low numbers of commercial and doughboy scallops present throughout the acquisition area and surrounds (less than 10 scallops per 100 m transect). This was consistent with the VFA stock assessment which also found very low numbers inside or in close proximity to the MSS acquisition area. Due to the low numbers, no conclusions could be drawn about any effects of the MSS on scallops.

**Rock Lobster**

For the rock lobster assessment, ten sites (in areas of reef) were monitored, including six sites within the acquisition area and four reference sites located more than 15 km to the northeast. The locations of these sites were recommended as known or potential rock lobster habitat by the local fisherman who assisted with the sampling. This person was also a member of the Advisory Panel.

At all sites, more rock lobsters were retrieved during the post-MSS assessment, with 81 individuals trapped during the pre-MSS assessment compared to 122 trapped post-MSS. This increase in numbers post-MSS was most likely due to seasonal effects rather than any impact of the MSS.

**Finfish**

For the fish assessment, BRUVS (Baited Remote Underwater Video Stations) were deployed across the same reef sites used for the rock lobster assessment. The results showed that fish abundance was higher in the pre-MSS assessment, with 637 individuals being observed before and 523 individuals being observed after. In contrast, species richness was lower in the pre-MSS assessment with a total of 39 species recorded, compared to 43 species post-MSS. Twenty-seven species were common to both assessments. The most abundant (and common) species recorded during both assessments was the Barber Perch, *Caesioperca razor*.

As with the other taxa, no conclusions about any impact from the MSS could be made.

**Zooplankton**

For the zooplankton assessment, prior to the MSS, six sites within the acquisition area and four reference sites to the north and south of the acquisition area were sampled. Post-MSS sampling was undertaken within three days of acquiring the final seismic line, consisting of three sites in close proximity to the final MSS line, and repeats at three reference sites.

Pre-MSS plankton samples collected were dominated by copepods, cladocerans and salps. Post-MSS plankton samples were dominated by the dinoflagellate *Noctiluca scintillans*. Variance both between and within assessments was high, with samples exhibiting levels of diversity and abundance typical of healthy temperate coastal waters. Neither lobster nor scallop larvae were present in any of the samples assessed.

Results showed a high proportion of live copepods at all sites both pre- and post-MSS, but also a high proportion of dead cladocerans. Cladocerans are known for their delicate structure and were most likely destroyed during the sampling process, rather than any impact from the MSS. This was evidenced by the fact that high mortality rates were seen in samples collected both before and after the MSS.

The full report contains commercial-in-confidence information on commercial fisheries, and as such is not for public release.