ANDERSON MARINE SURVEYS

Report To: Scottish Sea Farms

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Fishnish B video survey

Introduction

The Fishnish B site is located in the Sound of Mull (Figure 1). This report describes findings of a video transect survey carried out in July 2018; with reference to general seabed habitat and condition, visible biota, and the presence of any Priority Marine Features[1].

Methods

Survey operations were carried out on 19 July 2018 from AMSL's 6.7m survey vessel *Mollie B*. Positioning was provided by Positioning and depth data were provided by a Simrad NSS7 evo.2 with fixes at 1s intervals logged directly to PC.

A single transect was defined by start and end points (Figure 2).

Video survey of defined transects was carried out using a camera frame fitted with a Bowtech DIVECAM-550C-AL-I4 camera, GoPro video camera and two high intensity LED lights. The system was also equipped with two parallel laser pointers at 20cm separation. The camera frame was towed along a pre-determined transect line at approximately 0.5 knots just above the seabed, and allowed to settle briefly on the seabed at frequent intervals.

Site descriptor, position, elapsed time and depth overlays were added to the video post-survey, and deployment and recovery periods edited from the final video files in mp4 format.

Video footage has been examined and interpreted in 2-minute segments. Fauna was identified using standard sources (primarily Southward and Campbell 2006, Naylor 2011, Porter 2012, Wood 2013, Hayward and Ryland 2017, Bowen et al. 2018). Still images of representative views and individual species were captured from the video.

[1] Listed in Priority Marine Features in Scotlands Seas, SNH 2014. https://www.nature.scot/sites/default/files/2018-05/Priority%20Marine%20Features%20in%20Scotlands%20seas.pdf accessed 22/08/2018

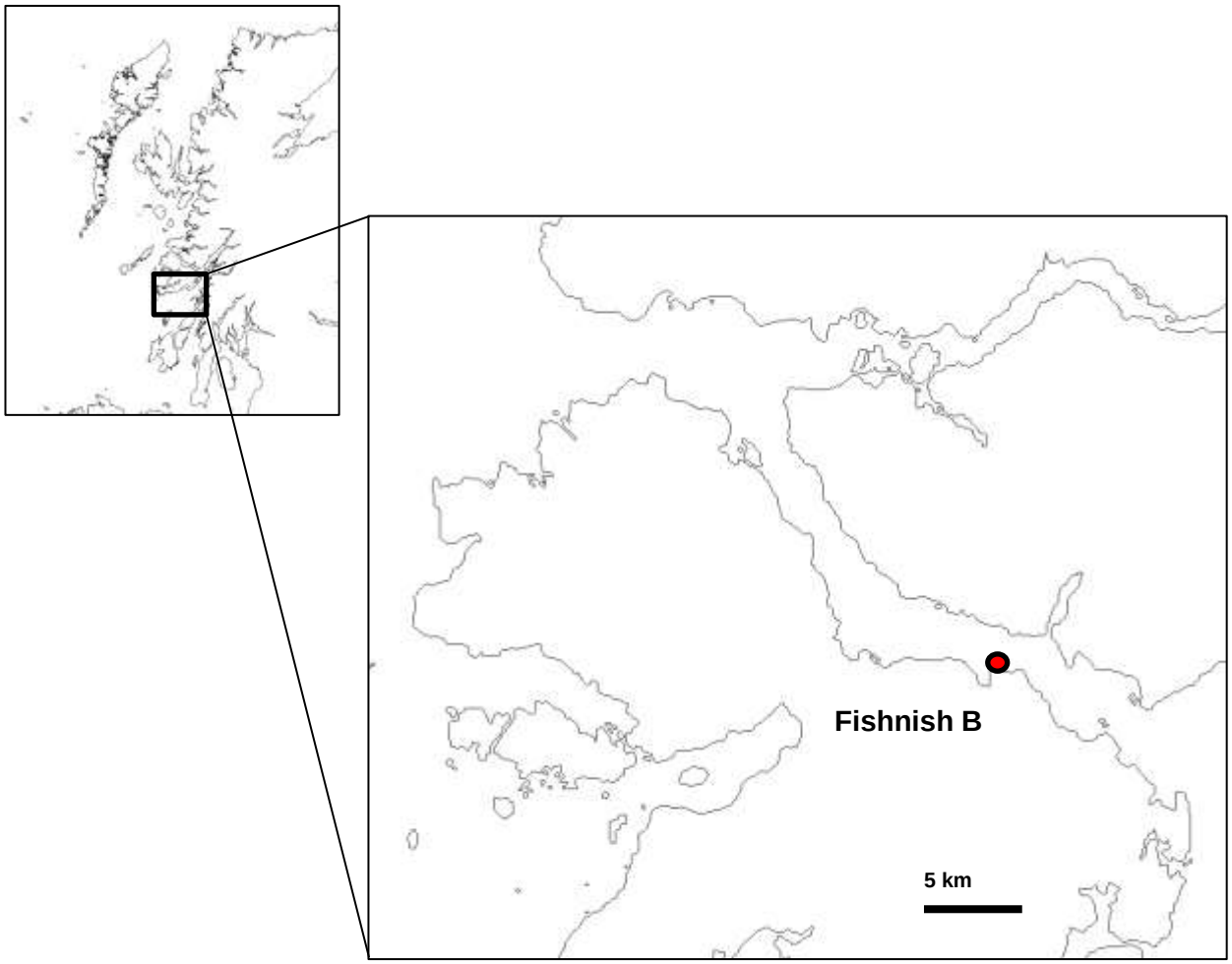

Figure 1. Fishnish B, general location

Results

Total transect length, calculated as cumulative distance between successive fixes (including periods lifted to clear mooring lines) was 1472m. The transect crossed lateral moorings from the cage group and therefore required to be lifted and re-deployed a total of six times.

Positions of individual 2-minute transect segments are shown in Figures 3.
Descriptive notes for each segment are tabulated in Appendix A.
Still images are listed in Appendix B and are available on accompanying electronic media. Still image numbering is continued from the accompanying video survey at Fishnish A (still images for Fishnish B are therefore #47 to #69).

Substrate along the transect varied from gravelly, muddy sand with scattered boulders at the west end (water depth 33m) to fine sand and then muddy sand at the east end (28m). No burrows attributable to *Nephrops norvegicus* or other megafaunal burrowing species were present.

No debris and no physical disturbance of the seabed were observed.

The west end of the transect, on gravelly sediments, was notable for aggregations of the brittlestar *Ophiocomina nigra* (Figure 5); together with hydroids *Nemertesia antennina* (Figure 10), *N. ramosa* and *Halecium sp*., and abundant tube anemones *Cerianthus lloydii* (Figure 9).

The east end of the transect, on muddy sand, had no *Ophiocomina* but moderate densities of buried *Amphiura* (probably *filiformis*) with arms exposed for filter-feeding.

Anemones identified from the transect were *Actinothoe sphyrodeta* (Figure 7), *Urticina feline* (Figure 9), *Sagartia elegans* and the plumose anemone *Metridium dianthes*. Anemones tend to occur in a variety of colour morphs and diagnostic characteristics of the column and tentacle arrangement can be difficult to distinguish from video footage.

Other sessile epifauna included the hydroid *Hydrallmania falcate* (Figure 8), bryozoan *Securiflustra securifrons* and holothurian *Neopentadactyla mixta.*

Occasional tubes projecting from the sediment surface (Figures 6, 10) were tentatively identified as belonging to the polychaete *Chaetopterus variopedatus*, although it is possible that these were in fact bivalve siphons (although the observed tubes were clearly single, i.e. not paired inhalant/exhalent as typical of most candidate bivalve species; sometimes appearing paired with a similar tube at around 10 – 20 cm distance, which would be typical of the infaunal form of *C. variopedatus*).

As on the Fishnish A survey, apparently paired feeding palps or tentacles were observed on several occasions, originating from an infaunal species and extending 10-15cm on the sediment surface (Figure 13). On two occasions, however, these were observed to be a single bifid proboscis (Figures 12, 14) and the species is therefore identified with more confidence as an echiuran, possibly *Bonellia viridis* although this species is recorded as very rare off Norway and Ireland, but common in the Mediterranean (Hayward and Ryland 2017, Marine Species Identification Portal[2]).

Common mobile epifaunal species included the brittlestars *Ophiura ophiura* (Figure 4) *and O. albida*, hermit crab *Pagurus sp*. (probably *bernhardus*), swimming crab *Liocarcinus depurator*, spider crab *Hyas araneus* (Figure 11), squat lobster *Munida rugosa*, starfish *Asterias rubens* and *Crossaster papposus*, queen scallop *Aequipecten opercularis* and gastropod *Turritella communis* (many of which may have been shells occupied by hermit crabs). These were all present at densities considered typical of natural habitat of this type.

Fish species were tentatively identified as dragonet *Callionymus lyra*, dab *Limanda limanda* and gobies (probably *Pomatoschistus spp*.).

[2] http://species-identification.org/species.php?menuentry=soorten&species_group=macrobenthos_misc

Conclusions

Habitats and species were as expected for a moderately tidal location on the west coast of Scotland. Physical disturbance of the seabed and debris was negligible, and there was no indication of organic enrichment.

No Priority Marine Features were observed.

References

Bowen, S., Goodwin C., Kipling, D. and Picton, B. (2018). Sea Squirts and Sponges of Britain and Ireland. Wild Nature Press, Plymouth, UK.

Hayward PJ and Ryland JS (2017). Handbook of the Marine Fauna of North-West Europe. Second Edition. Oxford University Press.

Naylor P. (2011). Great British Marine Animals. Third Edition. Sound Diving Publications.

Porter J. (2012). Seasearch Guide to Bryozoans and Hydroids of Britain and Ireland. Marine Conservation Society, Ross-on-Wye.

Southward E.C. and Campbell A.C. (2006). Echinoderms: Keys and Notes for Identification of British Species (Synopses of the British Fauna). Field Studies Council.

Wood C. (2013). Sea Anemones and Corals of Britain and Ireland. Second Edition. Wild Nature Press, Plymouth, UK.

APPENDIX A. VIDEO INTERPRETATION

Fishnish B	00:00:00	gravelly, muddy sand, 33m. Philine? 00:04. Hyas araneus 00:17. Ophiothrix/Ophiocomina, Securiflustra 00:21. Ophiura 00:30 still 47. Munida. Sponge 00:39. Cerianthus. Nemertesia antennina 00:52. Nemertesia ramosa 00:59. Asterias. Liocarcinus.
	00:02:00	as above. Liocarcinus. Ophiura. Urticina 02:06 still 48. Abundant Ophiocomina, Halecium 02:21 still 49, 50. Suberites? [Alcyonium?] 02:27. Abundant Cerianthus. Asterias. Chaetopterus, Nemertesia ramosa 03:10 still 51. Alcyonium digitatum 03:36
	00:04:00	as above, Ophiocomina, N ramosa. Echinus. Ophiura. Liocarcinus. Cerianthus. Neopentadactyla? 04:41 still 52. Actinothoe sphyrodeta 04:42 still 53. Hydrallmania falcata 05:10 still 54. Metridium.
	00:06:00	as above, muddy gravel with occasional boulders. Ophiocomina, N ramosa. Cerianthus, Echinus, Metridium, Ophiura. Halecium 06:38. Asterias.
	00:08:00	as above. Nemertesia antennina 08:05. Cerianthus Metridium, Actinothoe, hydroids, Echinus. Liocarcinus. Pagurus.
	00:10:00	as above. Cerianthus. Pagurus. Liocarcinus. Actinothoe. Nemertesia antennina. Asterias. Urticina 10:58. Echinus, Metridium. Dab 11:52. (No Ophiocomina)
	00:12:00	as above. Cerianthus. N. anntenina. Asterias. Echinus. Liocarcinus. Metridium. Urticina 13:16 still 55. Pomatoschistus. Chaetopterus 13:32 still 56 Neopentadactyla 13:46 (edge frame).
	00:14:00	as above. N. ramosa. Cerianthus. Liocarcinus. Echinus. N. antennina. Aequipecten 14:46 still 57. Chaetopterus. Crossaster papposus 15:02 still 58. Urticina. Munida. Pomatoschistus.
	00:16:00	as above. Cerianthus. Pagurus. Asterias. N. antennina. Liocarcinus. Philine? 16:25. Metridium, Liocarcinus 16:44 still 59. Aequipecten. N. ramosa. Pomatoschistus. Actinothoe? 17:06 still 60. Urtica 17:16. Crossaster 17:52.
	00:18:00	as above. Cerianthus. N. anntenina. Liocarcinus. Hyas 18:33 still 61. Dragonet? 18:35 still 62. Hooked 19:00. Seabed 19:24, Hyas still 63. Lifted.
	00:20:00	lifted
	00:22:00	seabed 22:44. As above. Cerianthus. N. antennina. Liocarcinus. Asterias. Urticina. Metridium. Halecium. Alcyonium. N. ramosa. 23:24 still 64.
	00:24:00	as above. Hung up 24:15, lifted.
	00:26:00	Lifted, seabed 26:56. As above. Cerianthus. N. ramosa. Liocarcinus. Halecium. Urticina 27:01. Asterias. Echinus. Hyas. Pagurus. Metridium. Sagartia elegans 27:44 still 65..
	00:28:00	As above. Cerianthus. N. ramosa, Halecium. Liocarcinus. Hung up 28:25. Lifted
	00:30:00	Lifted
	00:32:00	Lifted
	00:34:00	Lifted
	00:36:00	Lifted
	00:38:00	Lifted, seabed 38:40. As above, Cerianthus, N. antennina. Turritella. Metridium. Asterias. Pagurus. N. ramosa. Urticina. Hyas. Spirobranchus. Ophiura. Actinothoe.
	00:40:00	N. ramosa. Cerianthus. Turritella. Echinus Pagurus. Hooked 40:25. Lifted
	00:42:00	Lifted
	00:44:00	Lifted, seabed 45:08. As above. Cerianthus. Asterias. Liocarcinus. Dragonet. N. ramosa, N. antennina. Actinothoe 45:29 still 66. Metridium. Urticina. Echinus.
	00:46:00	As above. Cerianthus. Hooked 46:20. Lifted
	00:48:00	Lifted, seabed 49:40. As above. Cerianthus. N. antennina.
	00:50:00	As above, tending to medium sand and stones. Cerianthus. N. antennina. Crossaster. Metridium. Asterias. Pagurus. N. ramosa. Liocarcinus. Paired palps 50:53 still 67. Ophiura ophiura. Suberites. Hooked 51:15. Lifted
	00:52:00	Lifted
	00:54:00	Lifted, seabed 54:42. Fine sand and shell. Halecium. Asterias. Urticina. N. ramosa. Actinothoe. Liocarcinus. Ophiura albida. Hyas. Flatworm? [possibly palps]55:37. Dab. Metridium.
	00:56:00	As above. Sparse Cerianthus. Asterias. N. antennina. Liocarcinus. Ophiura ophiura. Amphiura. Tending to muddy sand. Aequipecten. Psolus. Metridium. Urticina. Pomatoschistus. Palps retracting 57:54 still 68.
	00:58:00	As above. Palps 58:05 still 69.

APPENDIX B. CAPTURED STILL IMAGES, FISHNISH B

still		video file time
47	Ophiura ophiura	00:00:30
48	Urticina felina	00:02:06
49	Ophiocomina nigra, Halecium sp.	00:02:21
50	Ophiocomina nigra	00:02:21
51	Nemertesia ramosa, Chaetopteris variopedatus	00:03:10
52	Neopentadactyla?	00:04:41
53	Actinothoe sphyrodeta, Urticina felina, Munida rugosa	00:04:42
54	Hydrallmania falcata, Ophiocomina nigra	00:05:10
55	Urticina felina, Cerianthus lloydii	00:13:16
56	Chaetopterus variopedatus, Nemertesia antennina	00:13:32
57	Aequipecten opercularis, Metridium dianthus, Nemertesia antennina, Chaetopterus variopedatus	00:14:46
58	Crossaster papposus, Cerianthus lloydii	00:15:02
59	Liocarcinus depurator, Metridium dianthes	00:16:44
60	Actinothoe sphyrodeta	00:17:06
61	Hyas araneus	00:18:33
62	Dragonet Callionymus lyra	00:18:35
63	Hyas araneus, Cerianthus lloydii	00:19:24
64	Nemertesia ramosa, Halecium sp., Cerianthus lloydii	00:23:24
65	Sagartia elegans, Asterias rubens, Cerianthus lloydii	00:27:44
66	Actinothoe sphyrodeta	00:45:29
67	Unidentified palps, echiuran?	00:50:53
68	Unidentified palps, echiuran?	00:57:54
69	Unidentified palps, echiuran?	00:58:05

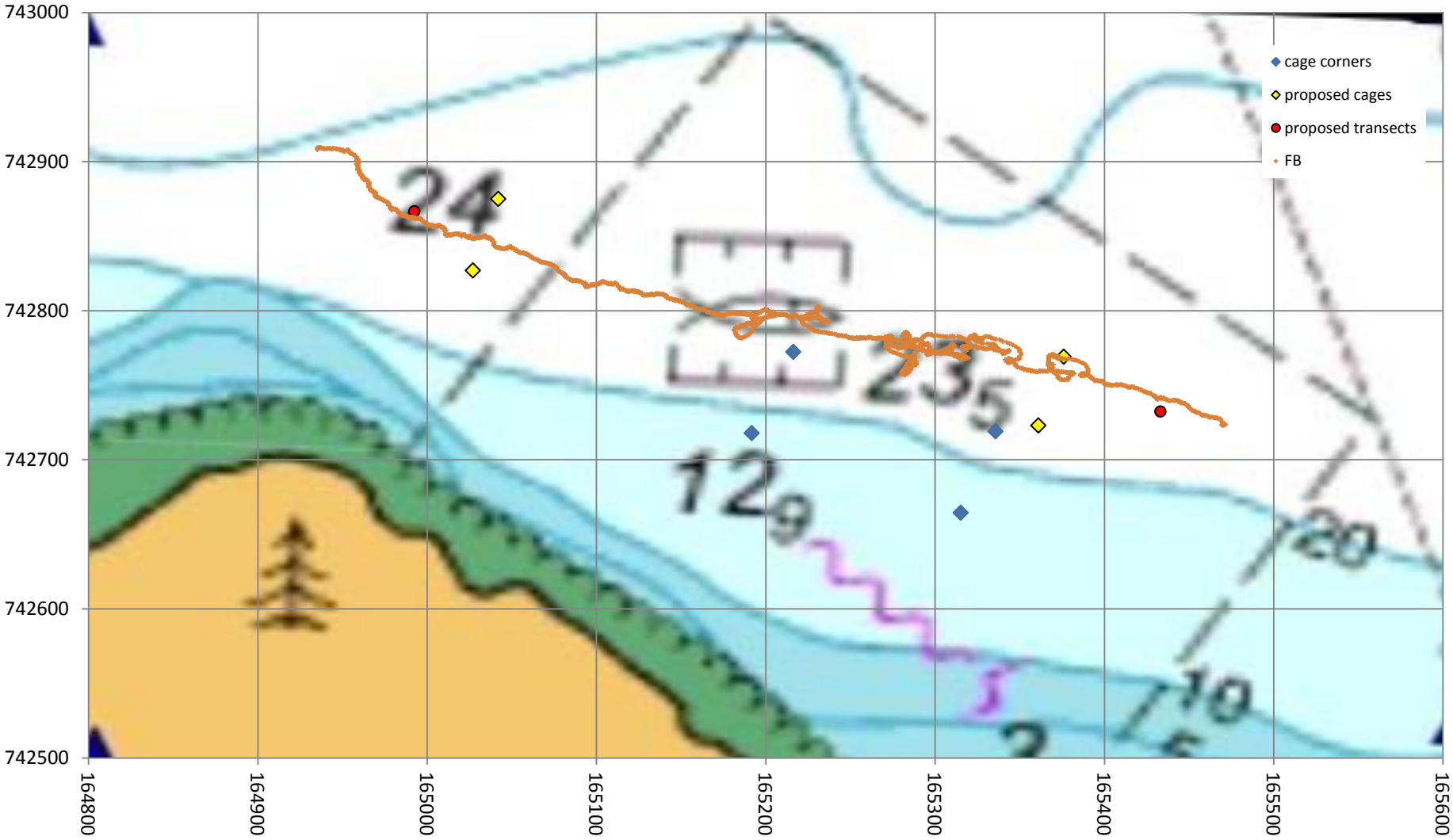

Figure 2. Proposed and actual transect tracks, Fishnish B

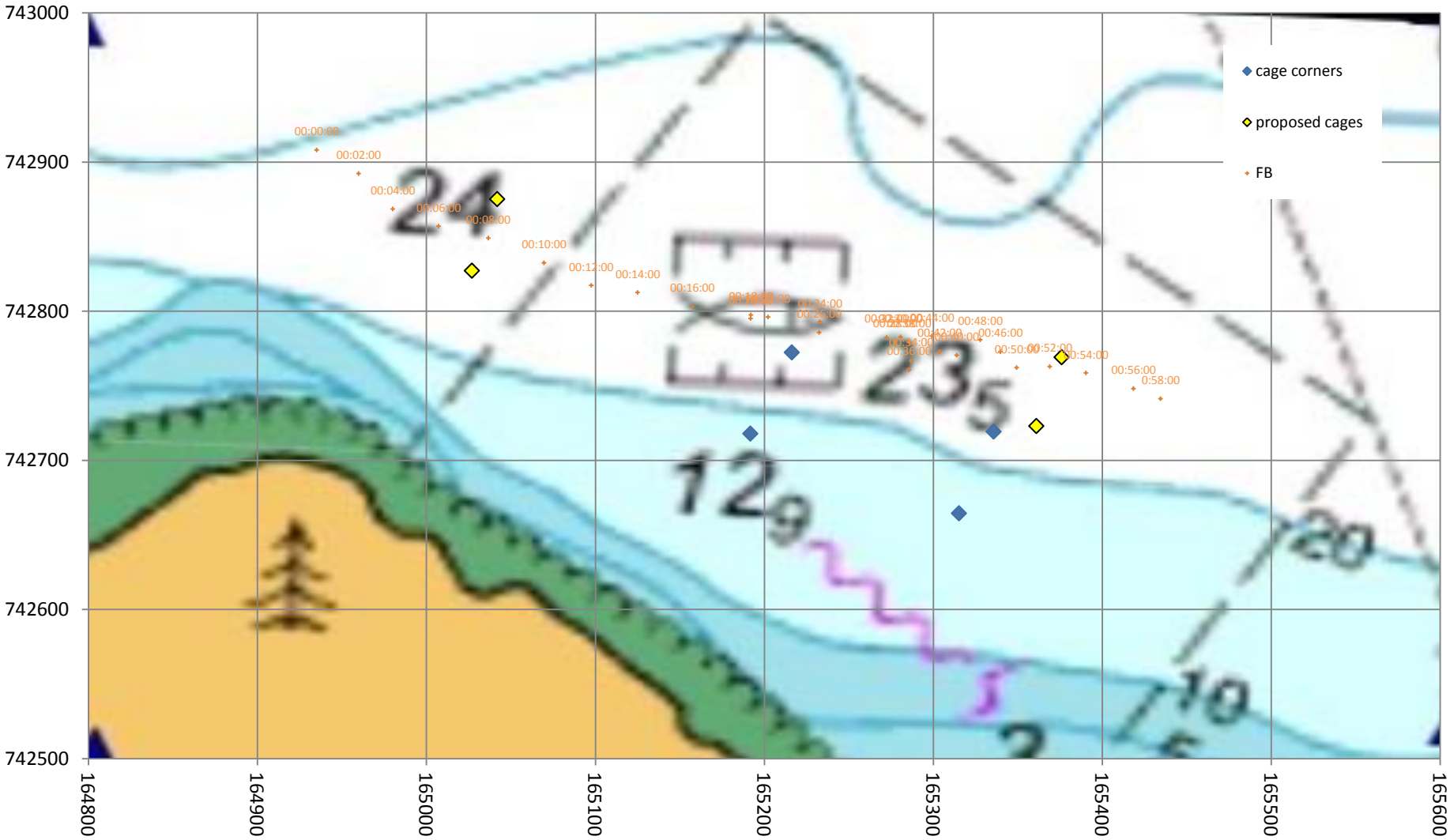

Figure 3. Fishnish B, 2-minute interpretation segments

Figure 4 (still 47). Gravelly, muddy sand, *Ophiura ophiura*

Figure 5 (still 50). *Ophiocomina nigra*

Figure 6 (still 51). *Nemertesia ramosa, Chaetopteris variopedatus*

Figure 7 (still 53). *Actinothoe sphyrodeta, Urticina felina, Munida rugosa*

Figure 8 (still 54). *Hydrallmania falcata*, *Ophiocomina nigra*

Figure 9 (still 55). *Urticina felina, Cerianthus lloydii*

Figure 10 (still 56). *Chaetopterus variopedatus, Nemertesia antennina*

Figure 11 (still 63). *Hyas araneus, Cerianthus lloydii*

Figure 12 (still 67). Proboscis,boniellid echiuran?

Figure 13 (still 68). Proboscis,boniellid echiuran?

Figure 14 (still 69). Proboscis,boniellid echiuran?