

**Condition of the Intertidal Mussel Bed at Western Undercliff and Pegwell Bay, Ramsgate, in terms of encroachment by wild Pacific Oysters
Period 2016-2022**

A Report to the NEKMPA Management Team



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North East Kent Scientific Coastal Advisory Group



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Summary

An inter-tidal mussel bed within the North East Kent Marine Protected Area was mapped and surveyed over a six-year period providing a baseline assessment and highlighting trends in terms of the spread of wild Pacific oysters *Magallana gigas*. Results show oysters present across the expanse of the site but at a low level of abundance. In addition, an alarming decline in the distribution and abundance of the mussel population *Mytilus edulis* was recorded. This decline does not appear to be associated with the spread of *M.gigas*.

Introduction

Inter-tidal mussel beds are protected habitats providing shelter and foraging opportunities for a range of marine species including birds. *M. gigas* is an invasive non-native species. Its larvae settle on mussel shells to the extent that established mussel bed habitats can be modified to become oyster reefs resulting in the decline of some species associated with mussels. Inter-tidal mussel beds are required to be maintained in favourable condition. The aim of this report is to provide the NEKMPA Management Team with evidence based data showing the condition of the mussel bed in terms of encroachment by wild Pacific oysters thereby enabling a strategic response.

Method

The location selected for this report was identified as an inter-tidal zone containing a stable mussel bed at risk from the spread of wild Pacific oysters. The survey site is located in the inter-tidal zone between Western Undercliff and Pegwell Bay in the town of Ramsgate, Kent, UK. The port of Ramsgate is at the eastern boundary and to the west are mudflats, saltmarsh and the estuary of the River Stour. The site is within Sandwich Bay and Pegwell Bay National Nature Reserve and holds SAC, SPA, SSSI and Ramsar designations. Figure 1 shows location of the site and Table 1 shows site parameters.

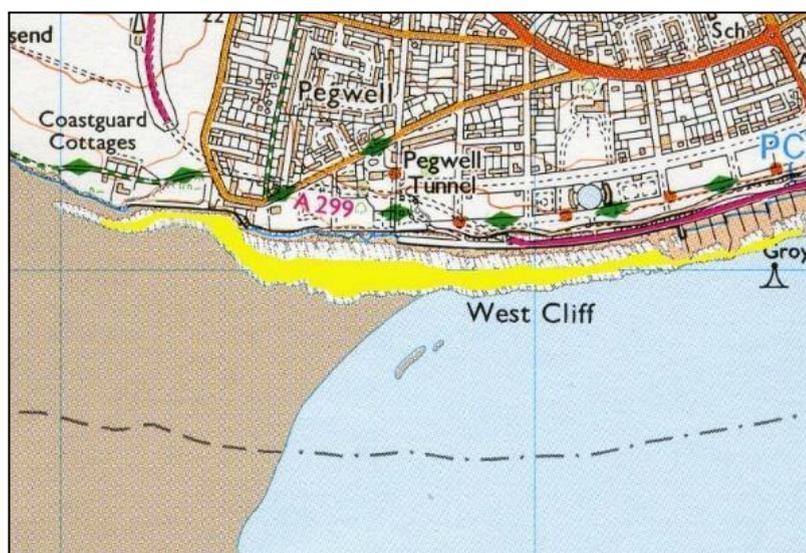


Figure 1: Location of intertidal mussel bed (yellow).

Table 1: Site parameters.

Start: OS Easting	End: OS Easting	Length	Area	Number of Transects	Number of Samples
TR 36075	TR 37495	1.42km	5.49ha	285	2499

Surveys were conducted biennially in 2016, 2018, 2020 and 2022 providing a baseline and showing trend. The following site features were recorded:

- mussel abundance
- mussel distribution
- oyster abundance
- oyster distribution

A detailed description of the methods used can be found in Transactions of the Kent Field Club *TBA*

Results

Figure 2 shows mussel and oyster abundance as % of samples for the period 2016-2022. Samples with an oyster/oysters present are also shown.

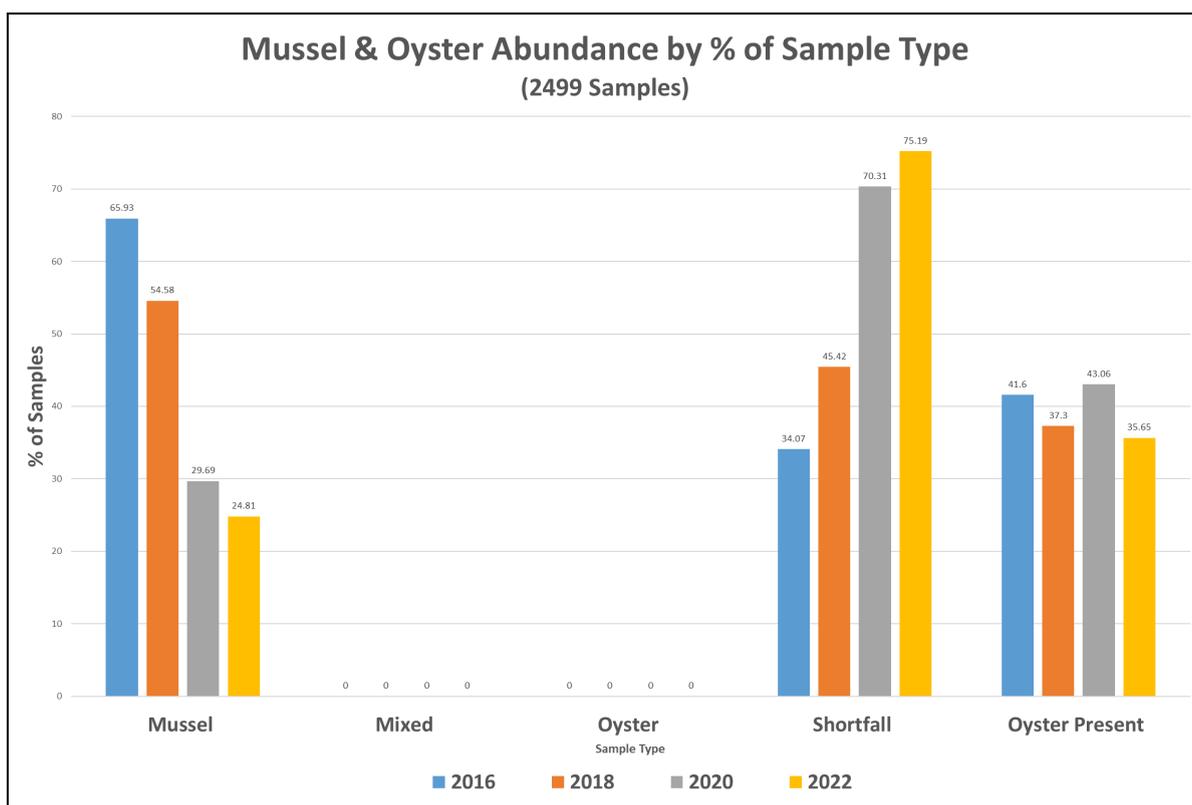


Figure 2: Mussel & Oyster abundance plus samples with an oyster/oysters present. shown as % of samples.

Each

Figure 3 shows mussel abundance by size class:

Size Class 1 = 1-15mm, Size Class 2 = 16-30mm, Size Class 3 = 31-45mm, Size Class 4 = >45mm

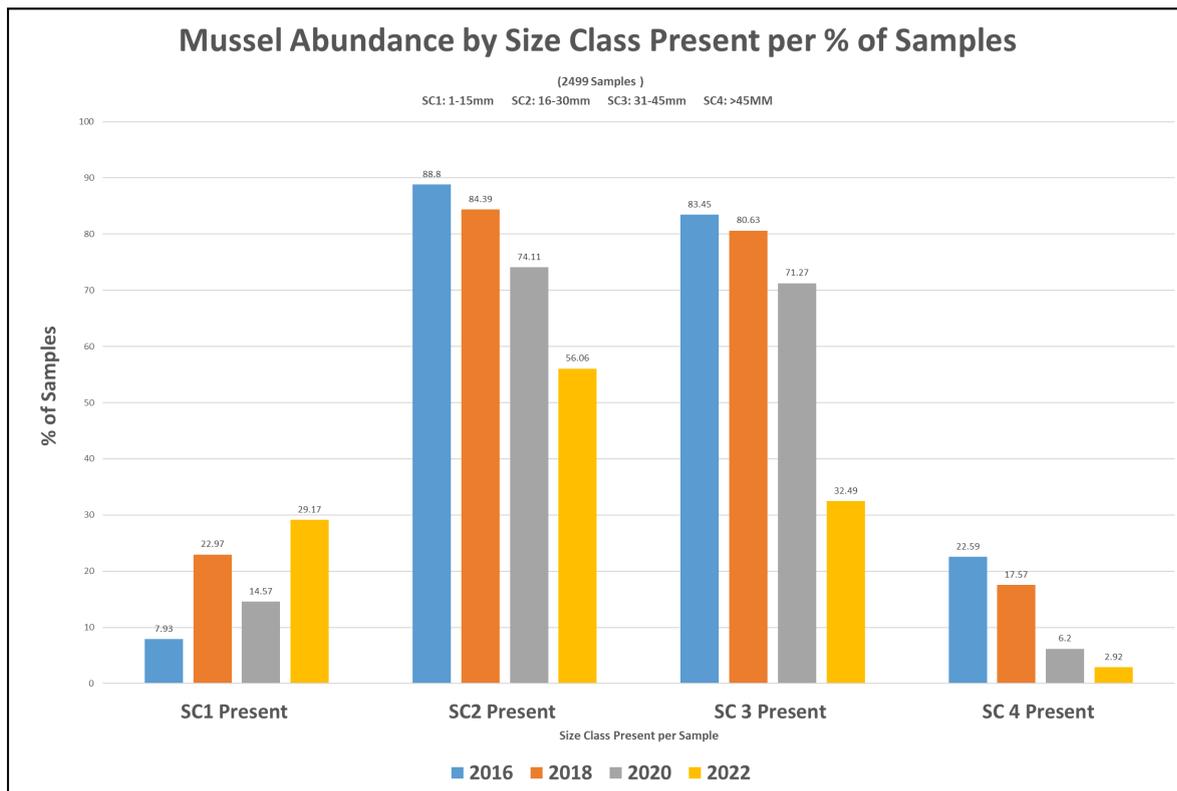


Figure 3. Mussel abundance by size class in terms of % of samples.

Figure 4 shows mussel abundance by dominant size class:

Size Class 1 = 1-15mm, Size Class 2 = 16-30mm, Size Class 3 = 31-45mm, Size Class 4 = >45mm

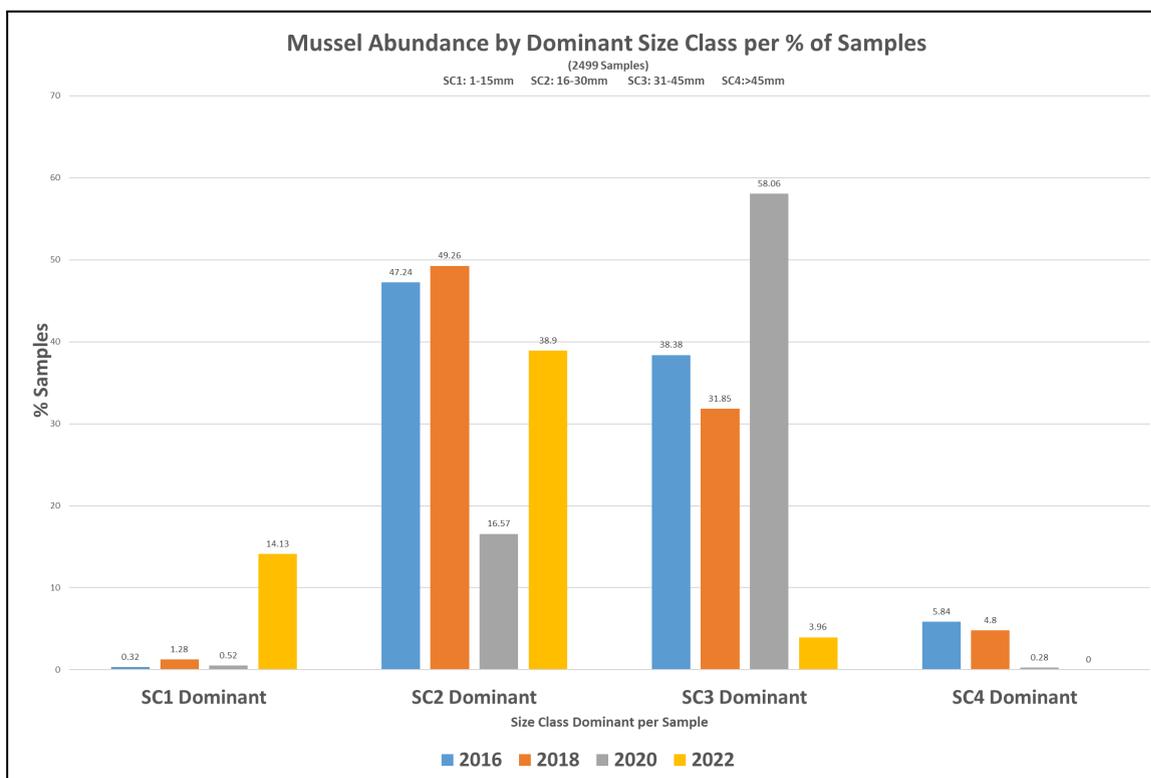


Figure 4. Dominant mussel size class per sample shown as percentage of samples.

Figure 5: Shows mussel population structure per size class. A normal distribution, though declining population, can be seen until a tipping point is reached between 2020 and 2022.

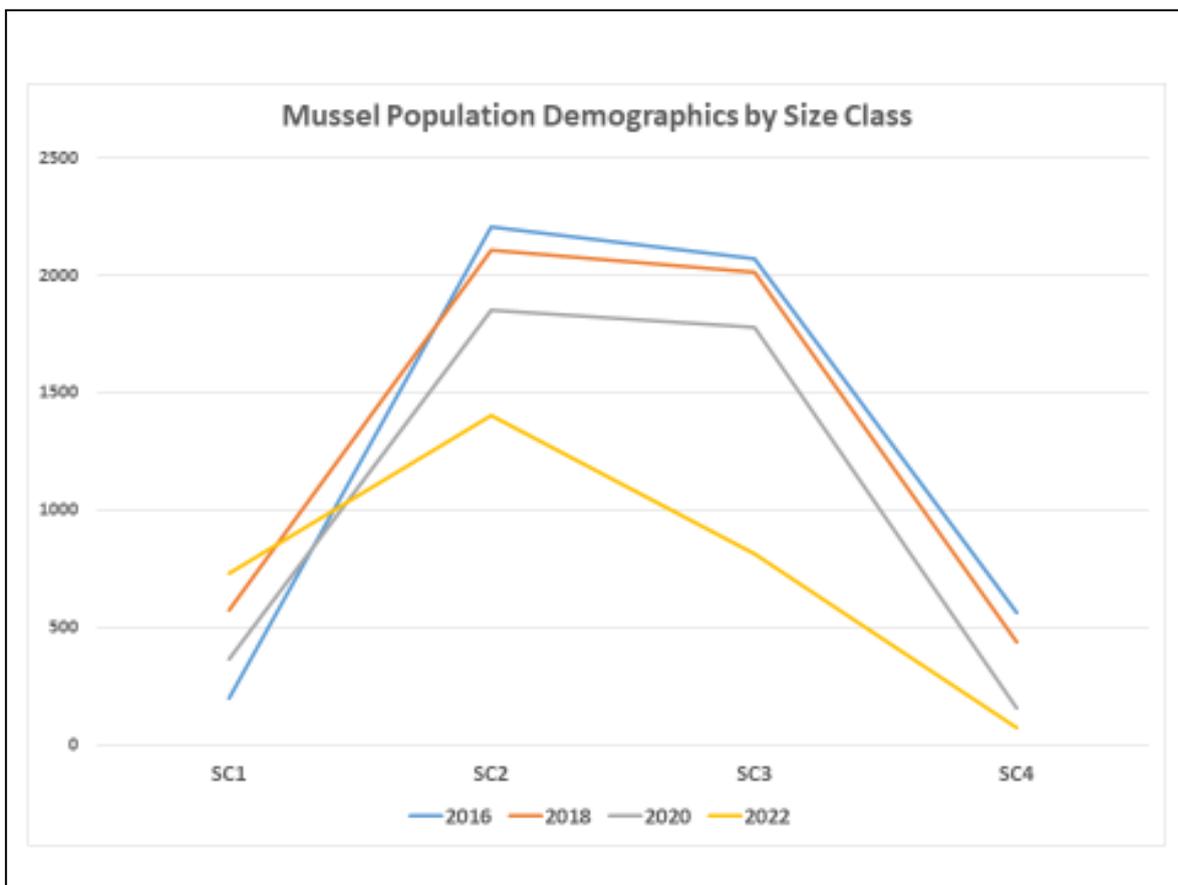


Figure 5: Mussel population structure by size class 2016 – 2022.

The distribution of mussels and oysters is shown in a series of maps. Table 2 lists maps which are filed in Appendix 1.

Table 2. List of distribution maps located in Appendix 1.

Map Number	Subject	Appendix
1/8	Distribution of Mussel (M), Mixed (X) and Oyster (O) samples.	1.1
2/8	Distribution of Oyster Present (P) samples.	1.2
3/8	Distribution of samples by Dominant Mussel Size Class.	1.3
4/8	Distribution of samples by Mussel Size Class 1 present.	1.4
5/8	Distribution of samples by Mussel Size Class 2 present.	1.5
6/8	Distribution of samples by Mussel Size Class 3 present.	1.6
7/8	Distribution of samples by Mussel Size Class 4 present.	1.7
8/8	Distribution of samples by Mussel Present.	1.8

Conclusions

Oysters are present across the expanse of the site. However, no Mixed samples or Oyster samples have been recorded suggesting oyster abundance is low and the population may be stable. This stability may be associated with local factors such as the presence of the Oyster-herpes virus and ongoing control work by volunteers removing oyster from this site.

An alarming trend in mussel abundance and distribution has been recorded with the number of Mussel samples declining from 65.93% in 2016 to 24.81% in 2022. This decline is reflected in all four mussel size classes. The cause of this rapid decline is not clear but does not appear to be associated with the spread of wild Pacific oysters. It is clear that recruitment is not keeping pace with mortality. Similar population reductions have been observed in other inter-tidal mussel beds in Thanet (I.Tittley personal comment) and in Swale (B.Lamb personal comment). The impact of this decline can be seen in Figures 6.1 – 6.4 in Appendix 2.

Recommendations

- An opportunity exists for further research to identify the cause and consequences of mussel population reduction at intertidal mussel beds in Thanet and beyond.
- A further replicate of the survey process should be undertaken in Sept–Nov 2024 at the trial site to record ongoing trend.
- The field trial which produced this assessment should be extended to other Thanet inter-tidal mussel beds.
- Volunteer control work at Western Undercliff and Pegwell Bay should be maintained to impede the spread of oysters within the mussel bed and prevent establishment on the mudflats.

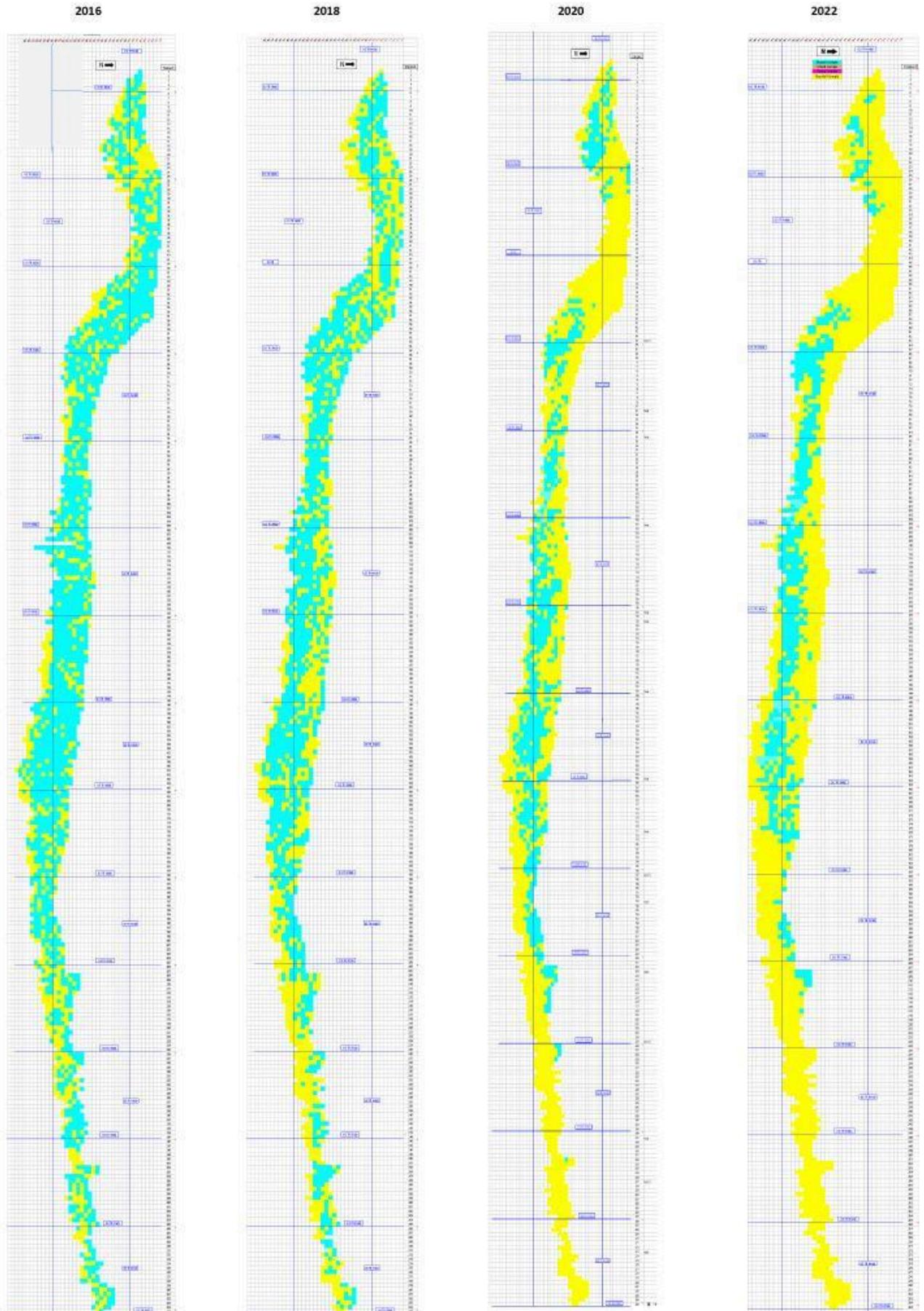
Appendix 1.1

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Assessing the long term condition of inter-tidal mussel beds in terms of encroachment by wild Pacific oysters.

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Map 1/8: Distribution of M X O S samples. Key



Appendix 1.2

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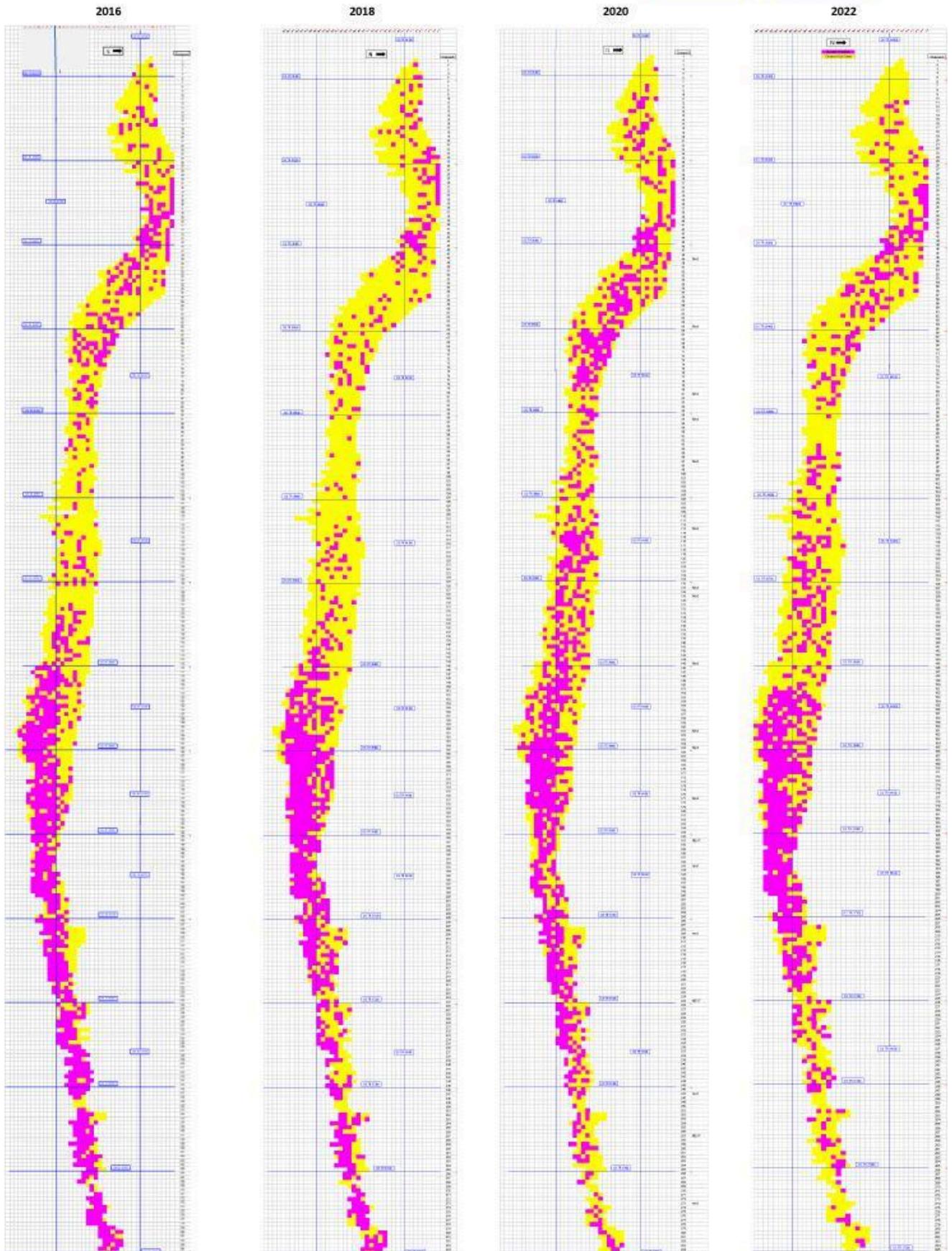
Assessing the long term condition of inter-tidal mussel beds in terms of encroachment by wild Pacific oysters.

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Map 2/8: Distribution of samples by Oyster Present (P). Key

Oyster Present

Not Seen



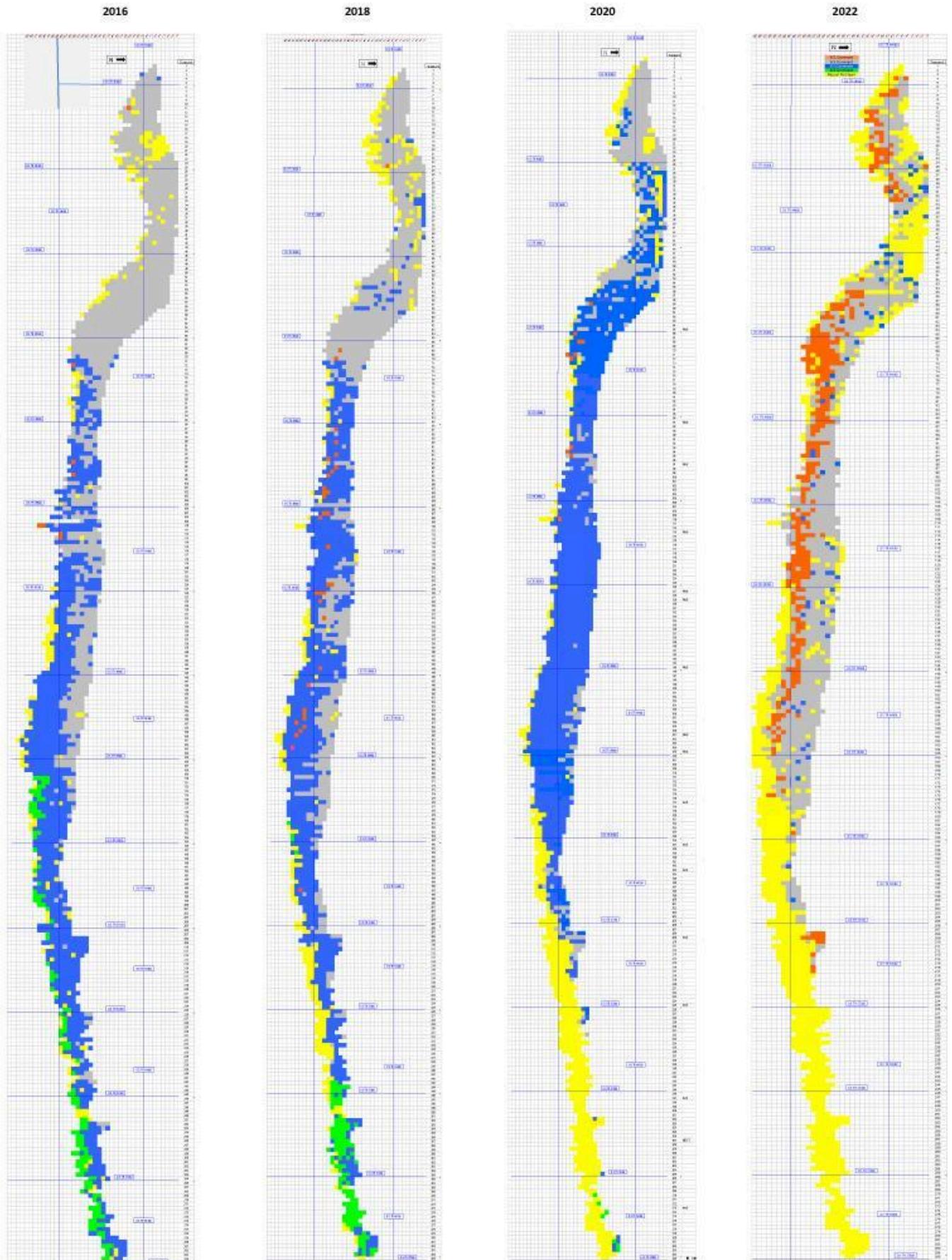
Appendix 1.3

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Map 3/8: Mussel distribution by dominant size class 2022. Key **SC1** **SC2** **SC3** **SC4** **Shortfall**



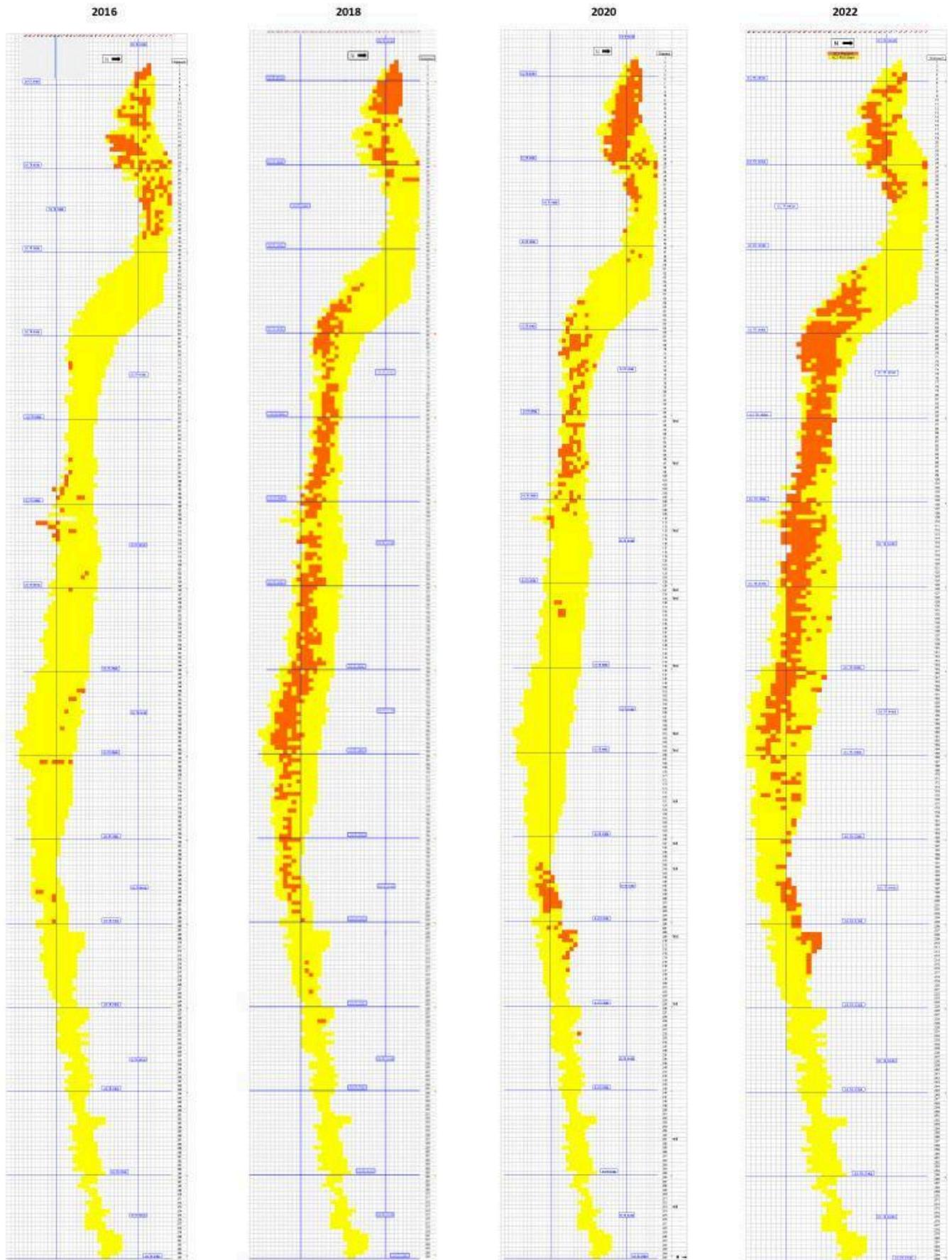
Appendix 1.4

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Map 4/8: Mussel distribution by size class 1 (1-15mm) 2022. Key **SC1 Present** **Not Seen**



Appendix 1.5

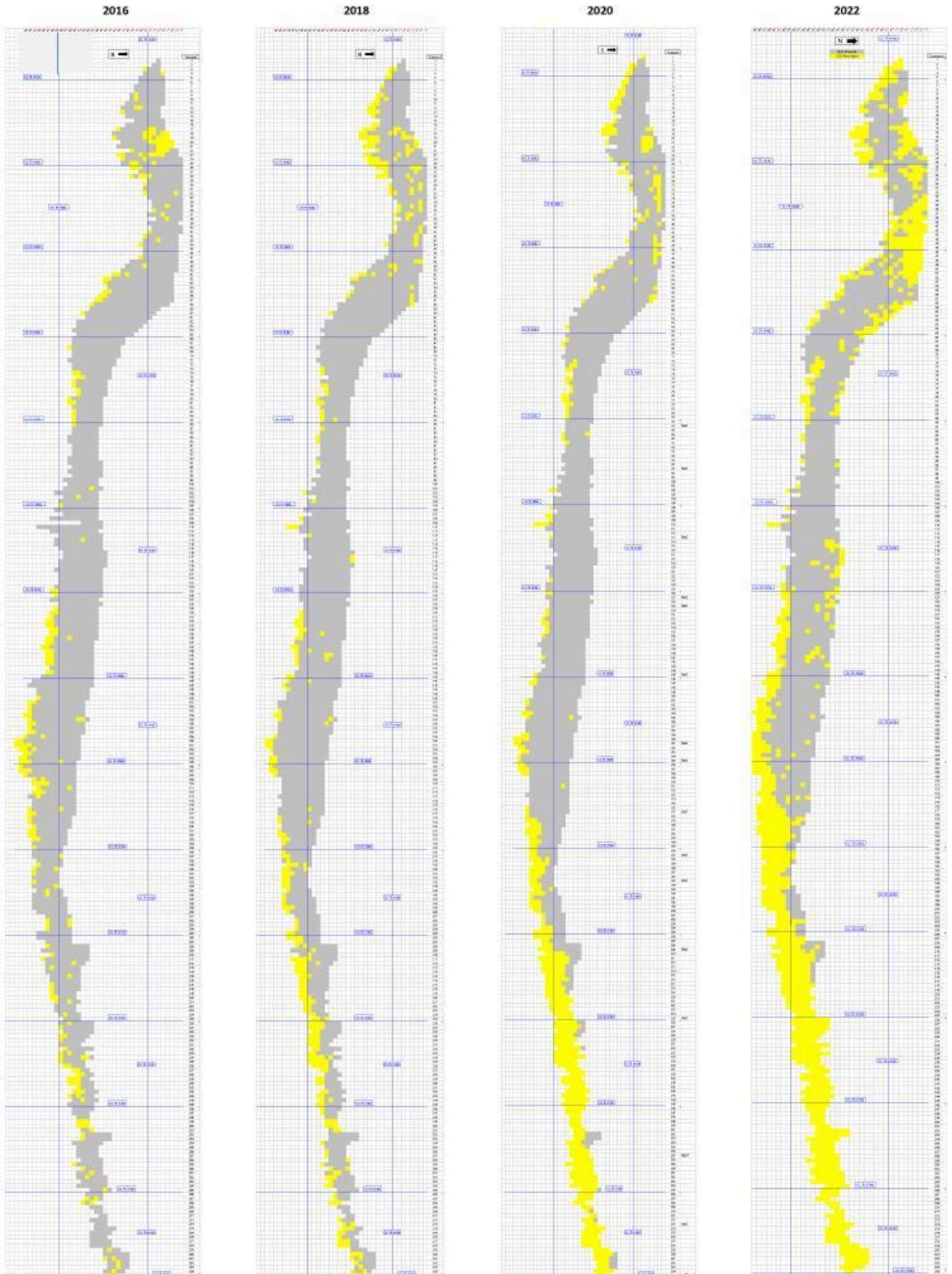
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Map 5/8: Mussel distribution by size class 2 (16-30mm) 2022. Key

SC2 Present Not Seen



Appendix 1.6

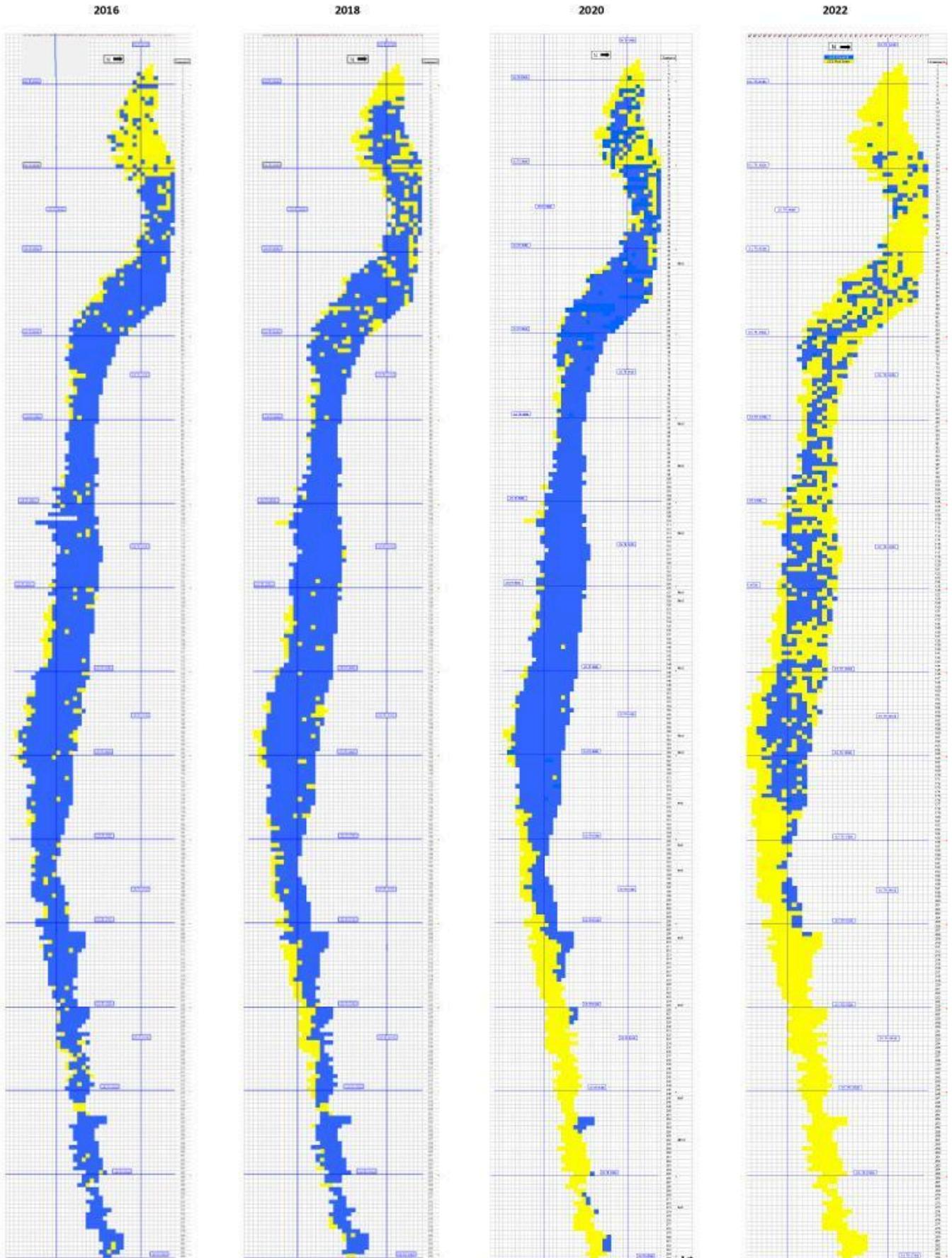
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Map 6/8: Mussel distribution by size class 3 (31-45mm) 2022. Key

SC3 Present (blue box) Not Seen (yellow box)



Appendix 1.7

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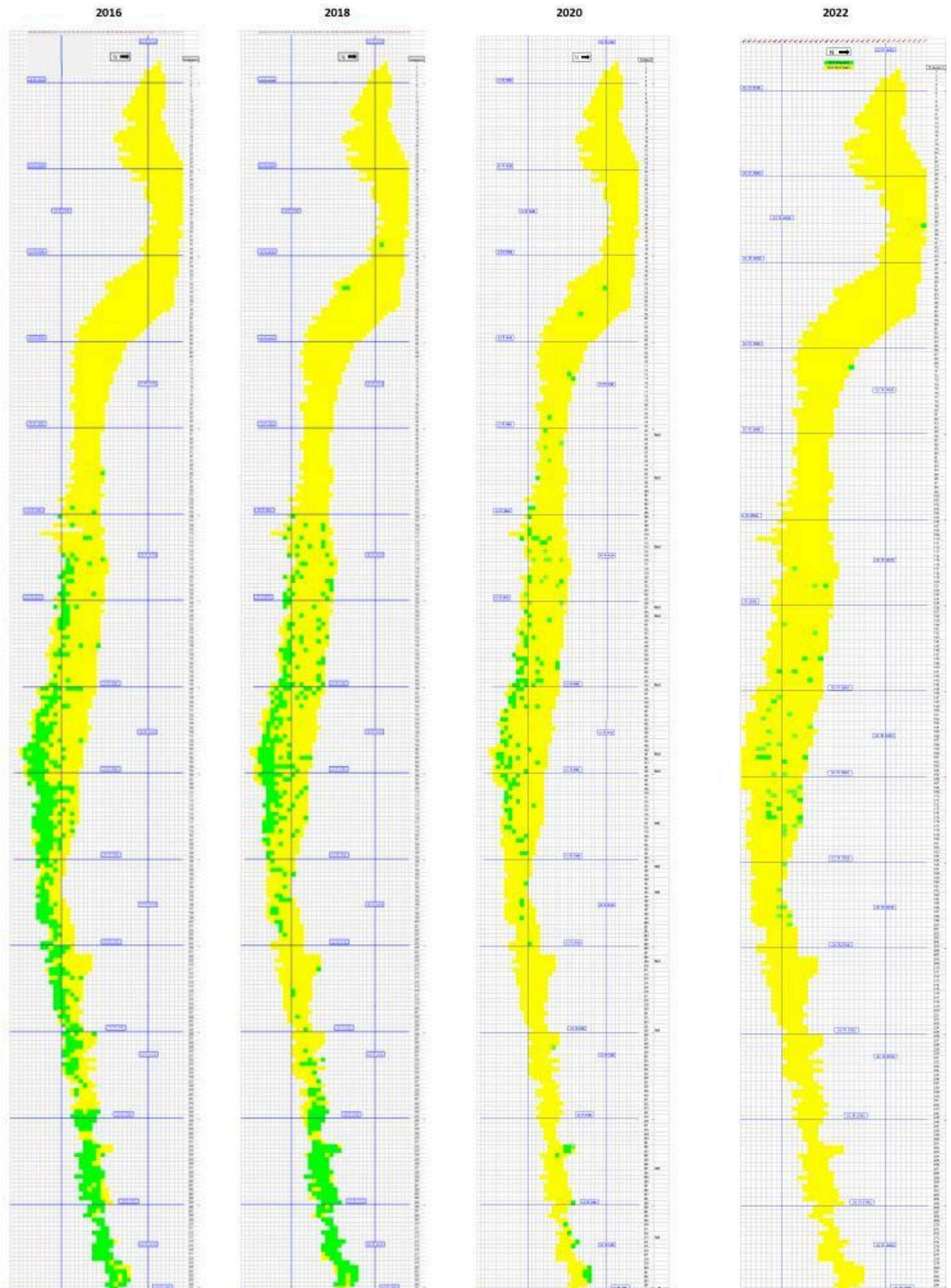
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Map 7/8: Mussel distribution by size class 4 (> 45mm) 2022. Key

SC4 Present

Not Seen



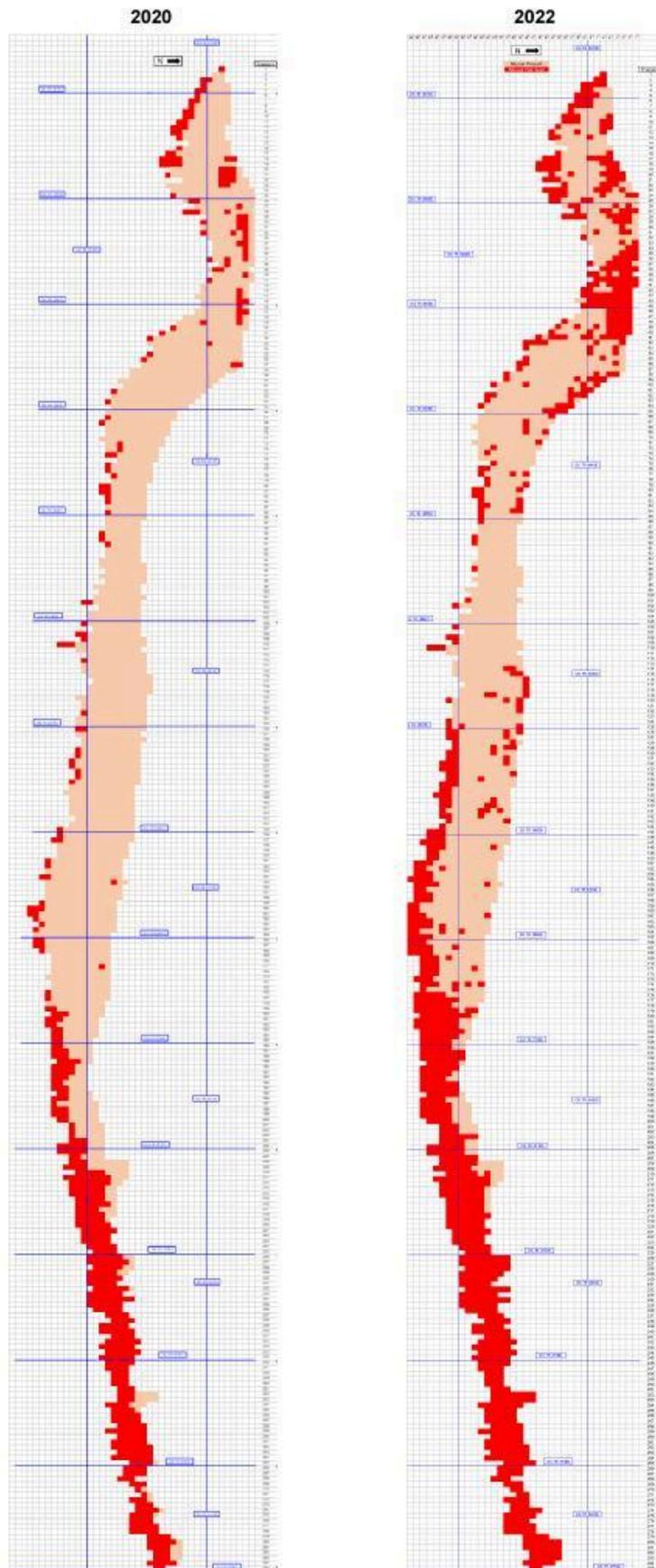
Appendix 1.8

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Map 8/8: Mussel Present by sample 2020. Key Mussel Present Not Seen



Appendix 2



Figure 6.1: 2013 Mussel abundance. Western Undercliff looking east.



Figure 6.2: 2022 Mussel abundance. Western Undercliff looking east.

Appendix 2



Figure 6.3: 2013 Mussel abundance. Western Undercliff looking west.



Figure 6.4: 2022 Mussel abundance. Western Undercliff looking west.