



LLYR

LLYR FLOATING OFFSHORE WIND PROJECT

Llyr 1 Floating Offshore Wind Farm

Environmental Statement

Volume 6: Appendix 21A, Annex B – Design-Based Estimates

August 2024





Document Status

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 Prepared for Llŷr Floating Wind Limited
 Approved by Jay Hilton-Miller

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Glossary of Project Terms

Term	Definition
The Applicant	The developer of the Project, Llŷr Floating Wind Limited
Array	All wind turbine generators, inter array cables, mooring lines, floating sub-structures and supporting subsea infrastructure within the Array Area, as defined, when considered collectively, excluding the offshore export cable(s).
Array Area	The area within which the wind turbine generators, inter array cables, mooring lines, floating sub-structures and supporting subsea infrastructure will be located
Floventis Energy	The company developing the proposed Project, a joint venture between Cierco Ltd and SBM Offshore Ltd
Landfall	The location where the offshore export cable(s) from the Array Area, as defined, are brought onshore and connected to the onshore export cables (as defined) via the transition joint bays (TJB).
Llŷr 1	The proposed Project, for which the Applicant is applying for Section 36 and Marine Licence consents. Including all offshore and onshore infrastructure and activities, and all project phases.
Marine Licence	A licence required under the Marine and Coastal Access Act 2009 for marine works which is administered by Natural Resources Wales (NRW) Marine Licensing Team (MLT) on behalf of the Welsh Ministers.
Offshore Development Area	The footprint of the offshore infrastructure and associated temporary works, comprised of the Array Area and the Offshore Export Cable Corridor, as defined, that forms the offshore boundary for the S36 Consent and Marine Licence application
Offshore Export Cable	The cable(s) that transmit electricity produced by the WTGs to landfall.
Offshore Export Cable Corridor (OfECC)	The area within which the offshore export cable circuit(s) will be located, from the Array Area to the Landfall.
Onshore Development Area	The footprint of the onshore infrastructure and associated temporary works, comprised of the Onshore Export Cable Corridor and the Onshore Substation, as defined, and including new access routes and visibility splays, that forms the onshore boundary for the planning application.
Onshore Export Cable(s)	The cable(s) that transmit electricity from the landfall to the onshore substation
Onshore Export Cable Corridor (OnECC)	The area within which the onshore export cable circuit(s) will be located.
proposed Project	All aspects of the Llŷr 1 development (i.e. the onshore and offshore components).
Onshore Substation	Located within the Onshore Development Area, converts high voltage generated electricity into low voltage electricity that can be used for the grid and domestic consumption.



Term	Definition
Section 36 consent	Consent to construct and operate an offshore generating station, under Section 36 (S.36) of the Electricity Act 1989. This includes deemed planning permission for onshore works.

Acronyms and abbreviations

Acronym, Abbreviation or Unit	Definition	Acronym, Abbreviation or Unit	Definition
%	Percentage	n	Number
CV	Coefficient of Variation	SD	Standard Deviation
km ²	Kilometre square	UCL	Upper Confidence Limit
LCL	Lower Confidence Limit		



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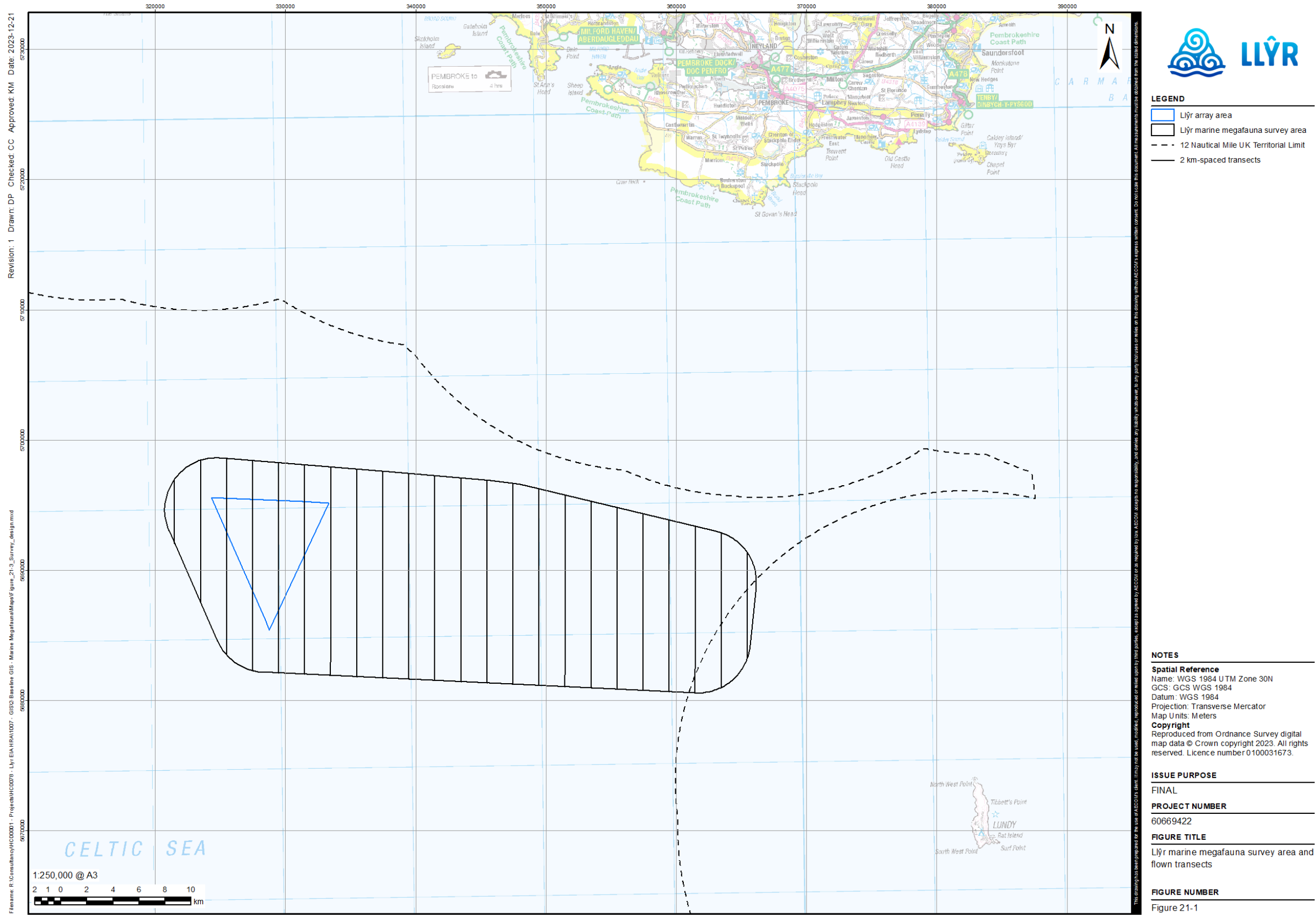
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21-A ANNEX B – DESIGN-BASED ESTIMATES

1. This **Annex B** to the **Technical Appendix 21A: Marine Mammal and Megafauna Baseline** presents the design-based estimates for all key marine mammal and megafauna species recorded within the Llŷr marine megafauna survey area (**Annex B Figure 21-1**).
2. Design-based densities were apportioned to account for unidentified animals (all species) and corrected for availability bias (harbour porpoise and common dolphin) (see detailed methodology in **Appendix 21A**).
3. Estimates are presented in the form of density (number of animals per square kilometre (n/km^2)); the lower and upper confidence limits (LCL and UCL); population (the number of animals in the area); the standard deviation of the population estimate (SD) and the coefficient of variation (CV (%)).



Annex B Figure 21-1. Proposed Project marine megafauna survey design



21.1 Focal Species

21.1.1. Grey Seal

Annex B Table 21-1. Relative design-based density and abundance estimates of grey seals recorded in the Llŷr marine megafauna survey area (where n = number; LCL = Lower Confidence Limit; UCL = Upper Confidence Limit, SD = Standard Deviation of the Population; CV = Coefficient of Variation)

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.02	0.00	0.06	16	0	40	11	68.18
14 April 2020	0.02	0.00	0.06	16	0	39	11	67.18
08 June 2020	0.00	0.00	0.00	0	0	0	0	0.00
24 June 2020	0.02	0.00	0.06	16	0	40	11	67.46
21 July 2020	0.04	0.00	0.08	24	0	54	13	54.02
31 August 2020	0.03	0.00	0.06	17	0	40	11	66.11
12 September 2020	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2020	0.00	0.00	0.00	0	0	0	0	0.00
26 November 2020	0.00	0.00	0.00	0	0	0	0	0.00
10 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
25 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 February 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 May 2021	0.01	0.00	0.04	8	0	24	7	93.77
27 May 2021	0.02	0.00	0.06	16	0	40	12	70.80
15 June 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 July 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 August 2021	0.00	0.00	0.00	0	0	0	0	0.00
01 September 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2021	0.00	0.00	0.00	0	0	0	0	0.00
20 November 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 December 2021	0.00	0.00	0.00	0	0	0	0	0.00
05 January 2022	0.00	0.00	0.00	0	0	0	0	0.00
26 February 2022	0.02	0.00	0.06	16	0	40	11	66.06
20 March 2022	0.00	0.00	0.00	0	0	0	0	0.00



21.1.2. Harbour Porpoise

Annex B Table 21-2. Absolute design-based density and abundance estimates of harbour porpoise recorded in the Llŷr marine megafauna survey area

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.27	0.06	0.53	174	42	336	78	44.63
14 April 2020	0.06	0.00	0.17	38	0	108	36	94.80
08 June 2020	1.27	0.65	2.07	813	416	1321	236	28.99
24 June 2020	0.55	0.18	1.00	353	114	639	140	39.70
21 July 2020	0.15	0.00	0.37	97	0	239	64	65.65
31 August 2020	0.00	0.00	0.00	0	0	0	0	0.00
12 September 2020	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2020	0.34	0.00	0.77	220	0	490	124	56.00
26 November 2020	0.63	0.17	1.26	405	112	803	188	46.27
10 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
25 January 2021	0.22	0.00	0.59	141	0	375	105	74.10
22 February 2021	0.38	0.09	0.73	240	60	467	104	43.33
14 May 2021	0.13	0.00	0.32	83	0	204	56	67.46
27 May 2021	0.19	0.00	0.51	122	0	324	89	72.59
15 June 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 July 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 August 2021	0.00	0.00	0.00	0	0	0	0	0.00
01 September 2021	0.08	0.00	0.26	53	0	167	54	101.78
22 October 2021	0.00	0.00	0.00	0	0	0	0	0.00
20 November 2021	0.09	0.00	0.27	58	0	173	56	97.53
16 December 2021	0.09	0.00	0.33	56	0	211	54	95.42
05 January 2022	0.00	0.00	0.00	0	0	0	0	0.00
26 February 2022	0.28	0.00	0.83	180	0	529	172	95.93
20 March 2022	0.11	0.01	0.25	74	8	163	40	54.08



21.1.3. Common Dolphin

Annex B Table 21-3. Absolute design-based density and abundance estimates of common dolphins recorded in the Llŷr marine megafauna survey area

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.74	0.00	1.87	471	0	1197	331	70.18
14 April 2020	0.93	0.00	2.78	595	0	1777	567	95.26
08 June 2020	24.70	14.27	36.39	15776	9111	23240	3730	23.64
24 June 2020	115.48	41.29	237.97	73757	26370	151987	34212	46.38
21 July 2020	14.50	4.34	28.58	9260	2773	18252	4038	43.60
31 August 2020	30.47	17.21	45.02	19458	10990	28754	4523	23.24
12 September 2020	6.47	2.28	12.64	4134	1455	8071	1655	40.03
22 October 2020	16.29	2.41	39.79	10406	1539	25413	6910	66.41
26 November 2020	24.70	13.86	37.05	15778	8856	23666	3859	24.46
10 January 2021	2.89	0.00	6.47	1848	0	4135	1034	55.96
25 January 2021	34.25	3.57	92.49	21874	2283	59073	16638	76.06
22 February 2021	11.27	2.04	23.44	7200	1303	14970	3528	48.99
14 May 2021	3.02	0.00	9.10	1930	0	5815	1896	98.25
27 May 2021	35.33	11.97	66.04	22567	7648	42176	9191	40.73
15 June 2021	52.67	27.63	86.09	33642	17646	54984	9231	27.44
14 July 2021	18.68	6.31	33.32	11930	4033	21280	4306	36.09
16 August 2021	0.55	0.00	1.46	355	0	935	256	72.11
01 September 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2021	0.39	0.00	1.15	253	0	735	243	96.42
20 November 2021	5.49	1.13	10.57	3509	725	6751	1549	44.13
16 December 2021	4.65	0.00	11.18	2971	0	7141	1812	60.99
05 January 2022	13.95	5.23	23.65	8910	3344	15107	3083	34.60
26 February 2022	0.00	0.00	0.00	0	0	0	0	0.00
20 March 2022	0.37	0.05	0.93	237	32	592	150	62.93



21.1.4. Minke Whale

Annex B Table 21-4. Relative design-based density and abundance estimates of minke whales recorded in the Llŷr marine megafauna survey area

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.00	0.00	0.00	0	0	0	0	0.00
14 April 2020	0.00	0.00	0.00	0	0	0	0	0.00
08 June 2020	0.00	0.00	0.00	0	0	0	0	0.00
24 June 2020	0.04	0.00	0.10	26	0	64	17	64.51
21 July 2020	0.00	0.00	0.00	0	0	0	0	0.00
31 August 2020	0.00	0.00	0.00	0	0	0	0	0.00
12 September 2020	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2020	0.00	0.00	0.00	0	0	0	0	0.00
26 November 2020	0.00	0.00	0.00	0	0	0	0	0.00
10 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
25 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 February 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
27 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
15 June 2021	0.02	0.00	0.06	16	0	39	11	70.13
14 July 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 August 2021	0.00	0.00	0.00	0	0	0	0	0.00
01 September 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2021	0.00	0.00	0.00	0	0	0	0	0.00
20 November 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 December 2021	0.00	0.00	0.00	0	0	0	0	0.00
05 January 2022	0.00	0.00	0.00	0	0	0	0	0.00
26 February 2022	0.00	0.00	0.00	0	0	0	0	0.00
20 March 2022	0.00	0.00	0.00	0	0	0	0	0.00



21.2 Non-Focal Species

21.2.1 Basking Shark

Annex B Table 21-5. Relative design-based density and abundance estimates of basking sharks recorded in the Llŷr marine megafauna survey area

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.00	0.00	0.00	0	0	0	0	0.00
14 April 2020	0.00	0.00	0.00	0	0	0	0	0.00
08 June 2020	0.04	0.00	0.10	24	0	64	17	70.43
24 June 2020	0.00	0.00	0.00	0	0	0	0	0.00
21 July 2020	0.00	0.00	0.00	0	0	0	0	0.00
31 August 2020	0.00	0.00	0.00	0	0	0	0	0.00
12 September 2020	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2020	0.00	0.00	0.00	0	0	0	0	0.00
26 November 2020	0.00	0.00	0.00	0	0	0	0	0.00
10 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
25 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 February 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
27 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
15 June 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 July 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 August 2021	0.00	0.00	0.00	0	0	0	0	0.00
01 September 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2021	0.04	0.00	0.11	25	0	69	18	73.37
20 November 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 December 2021	0.00	0.00	0.00	0	0	0	0	0.00
05 January 2022	0.00	0.00	0.00	0	0	0	0	0.00
26 February 2022	0.00	0.00	0.00	0	0	0	0	0.00
20 March 2022	0.00	0.00	0.00	0	0	0	0	0.00



21.2.2. Blue Shark

Annex B Table 21-6. Relative design-based density and abundance estimates of blue sharks recorded in the Llŷr marine megafauna survey area

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.00	0.00	0.00	0	0	0	0	0.00
14 April 2020	0.00	0.00	0.00	0	0	0	0	0.00
08 June 2020	0.00	0.00	0.00	0	0	0	0	0.00
24 June 2020	0.03	0.00	0.06	17	0	40	11	66.37
21 July 2020	0.01	0.00	0.04	8	0	24	8	98.45
31 August 2020	0.00	0.00	0.00	0	0	0	0	0.00
12 September 2020	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2020	0.00	0.00	0.00	0	0	0	0	0.00
26 November 2020	0.00	0.00	0.00	0	0	0	0	0.00
10 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
25 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 February 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
27 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
15 June 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 July 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 August 2021	0.00	0.00	0.00	0	0	0	0	0.00
01 September 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2021	0.00	0.00	0.00	0	0	0	0	0.00
20 November 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 December 2021	0.00	0.00	0.00	0	0	0	0	0.00
05 January 2022	0.00	0.00	0.00	0	0	0	0	0.00
26 February 2022	0.00	0.00	0.00	0	0	0	0	0.00
20 March 2022	0.00	0.00	0.00	0	0	0	0	0.00



21.2.3. Lion's Mane Jellyfish

Annex B Table 21-7. Relative design-based density and abundance estimates of lion's mane jellyfish recorded in the Llŷr marine megafauna survey area

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.00	0.00	0.00	0	0	0	0	0.00
14 April 2020	0.00	0.00	0.00	0	0	0	0	0.00
08 June 2020	0.00	0.00	0.00	0	0	0	0	0.00
24 June 2020	0.00	0.00	0.00	0	0	0	0	0.00
21 July 2020	0.00	0.00	0.00	0	0	0	0	0.00
31 August 2020	0.00	0.00	0.00	0	0	0	0	0.00
12 September 2020	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2020	0.00	0.00	0.00	0	0	0	0	0.00
26 November 2020	0.01	0.00	0.04	9	0	24	8	93.41
10 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
25 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 February 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
27 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
15 June 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 July 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 August 2021	0.00	0.00	0.00	0	0	0	0	0.00
01 September 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2021	0.00	0.00	0.00	0	0	0	0	0.00
20 November 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 December 2021	0.00	0.00	0.00	0	0	0	0	0.00
05 January 2022	0.00	0.00	0.00	0	0	0	0	0.00
26 February 2022	0.00	0.00	0.00	0	0	0	0	0.00
20 March 2022	0.00	0.00	0.00	0	0	0	0	0.00



21.2.4. Ocean Sunfish

Annex B Table 21-8. Relative design-based density and abundance estimates of ocean sunfish recorded in the Llŷr marine megafauna survey area

Survey date	Density (n/km ²)	LCL (n/km ²)	UCL (n/km ²)	Population (n)	LCL (n)	UCL (n)	SD (n)	CV (%)
25 March 2020	0.00	0.00	0.00	0	0	0	0	0.00
14 April 2020	0.00	0.00	0.00	0	0	0	0	0.00
08 June 2020	0.01	0.00	0.05	9	0	33	9	101.06
24 June 2020	0.04	0.00	0.08	25	0	54	13	51.59
21 July 2020	0.00	0.00	0.00	0	0	0	0	0.00
31 August 2020	0.00	0.00	0.00	0	0	0	0	0.00
12 September 2020	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2020	0.00	0.00	0.00	0	0	0	0	0.00
26 November 2020	0.00	0.00	0.00	0	0	0	0	0.00
10 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
25 January 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 February 2021	0.00	0.00	0.00	0	0	0	0	0.00
14 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
27 May 2021	0.00	0.00	0.00	0	0	0	0	0.00
15 June 2021	0.07	0.00	0.21	48	0	137	39	80.98
14 July 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 August 2021	0.00	0.00	0.00	0	0	0	0	0.00
01 September 2021	0.00	0.00	0.00	0	0	0	0	0.00
22 October 2021	0.00	0.00	0.00	0	0	0	0	0.00
20 November 2021	0.00	0.00	0.00	0	0	0	0	0.00
16 December 2021	0.00	0.00	0.00	0	0	0	0	0.00
05 January 2022	0.00	0.00	0.00	0	0	0	0	0.00
26 February 2022	0.00	0.00	0.00	0	0	0	0	0.00
20 March 2022	0.00	0.00	0.00	0	0	0	0	0.00