LLŶR FLOATING OFFSHORE WIND PROJECT

Llŷr 1 Floating Offshore Wind Farm

Environmental Statement

Volume 6: Appendix 22A, Annex C – Additional Model-Based Maps

August 2024

Prepared by: Llŷr Floating Wind Ltd

FLOVENTIS ENERGY

Document Status

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Approval for Issue

Prepared by	HiDef Aerial Surveying Ltd
Prepared for	Llŷr Floating Wind Limited
Approved by	Jay Hilton-Miller

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Acronyms and abbreviations

Acronym, Abbreviation	Definition	Acronym, Abbreviation	Definition
%	Percentage	CV	Coefficient of Variation

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).

Term	Definition
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.
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.

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22A. Annex C – Additional Model-Based Maps

1. This **Annex C** to the **Technical Appendix 22A: Marine Ornithology Baseline** presents the additional model-based estimate maps (lower and upper 95% credible limits and coefficient of variation (CV)) for key seabird species recorded within the Llŷr marine ornithology survey area.
2. Model-based densities were apportioned to account for unidentified birds (all species) and corrected for availability bias where possible (guillemot, razorbill, puffin) (see detailed methodology in **Appendix 22A: Marine Ornithology Baseline**).

22.1 Kittiwake

22.1.1. Lower Credible Limit Density Maps

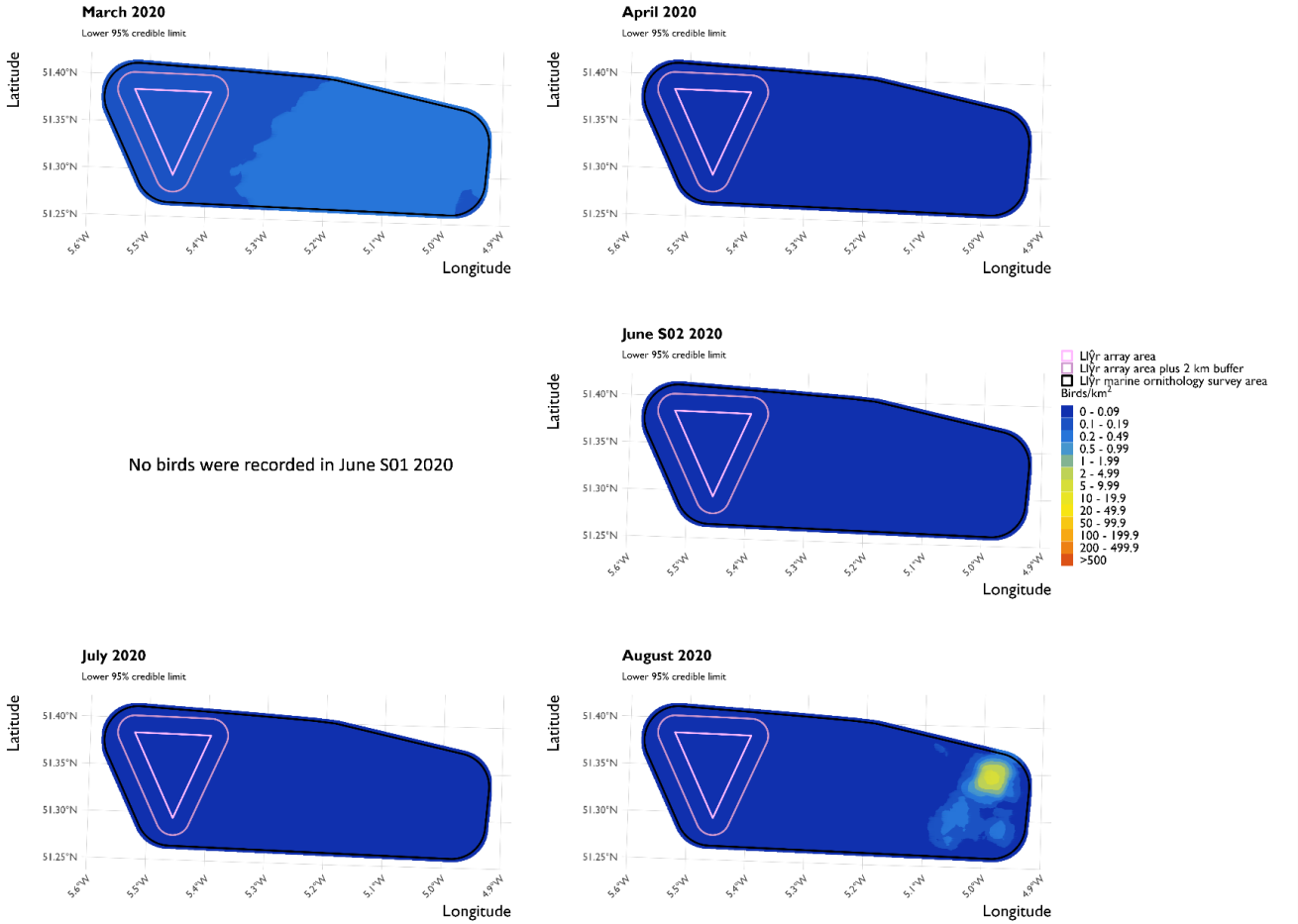

Figure 22A-1. Lower credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

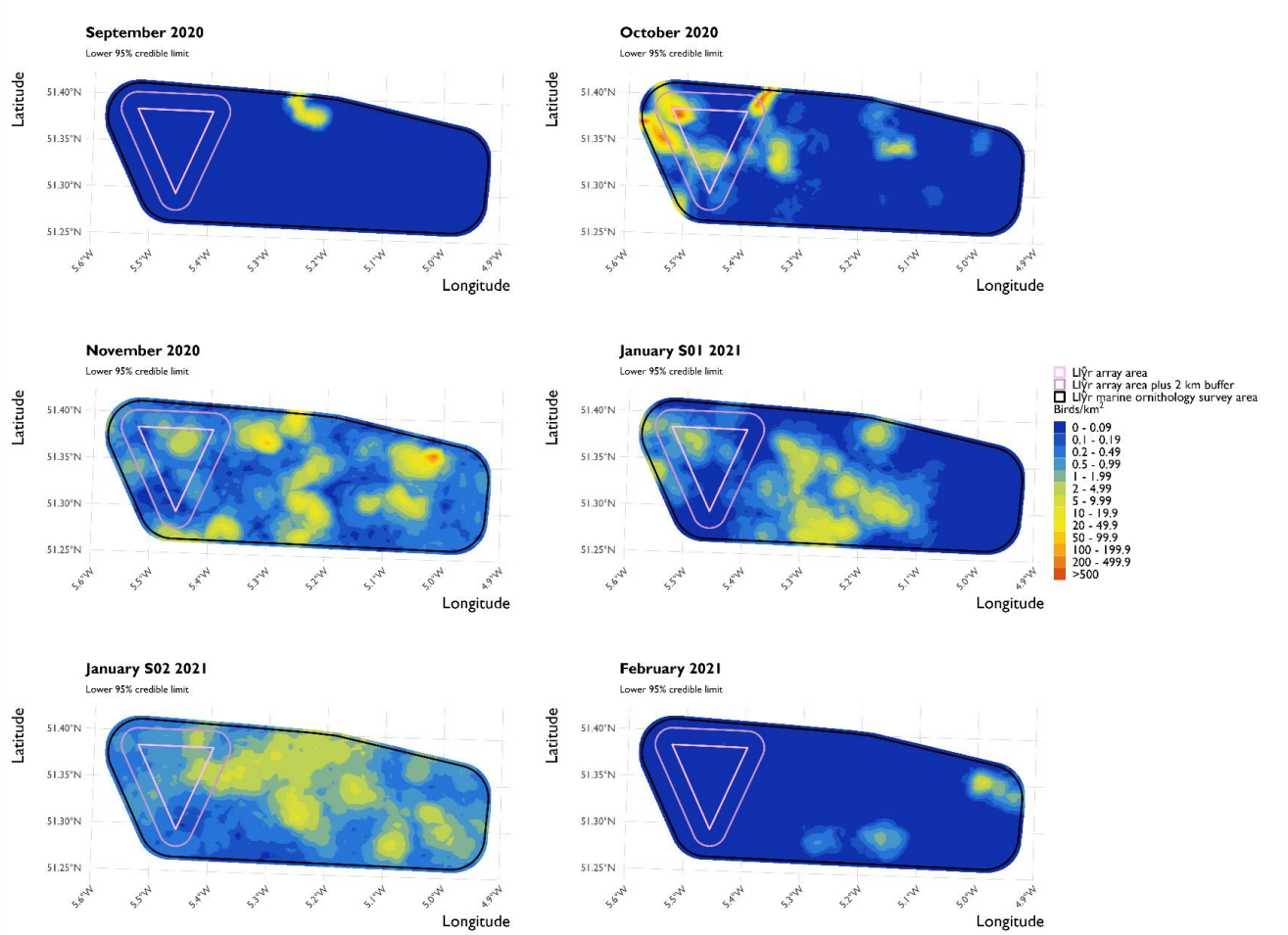

Figure 22A-2. Lower credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

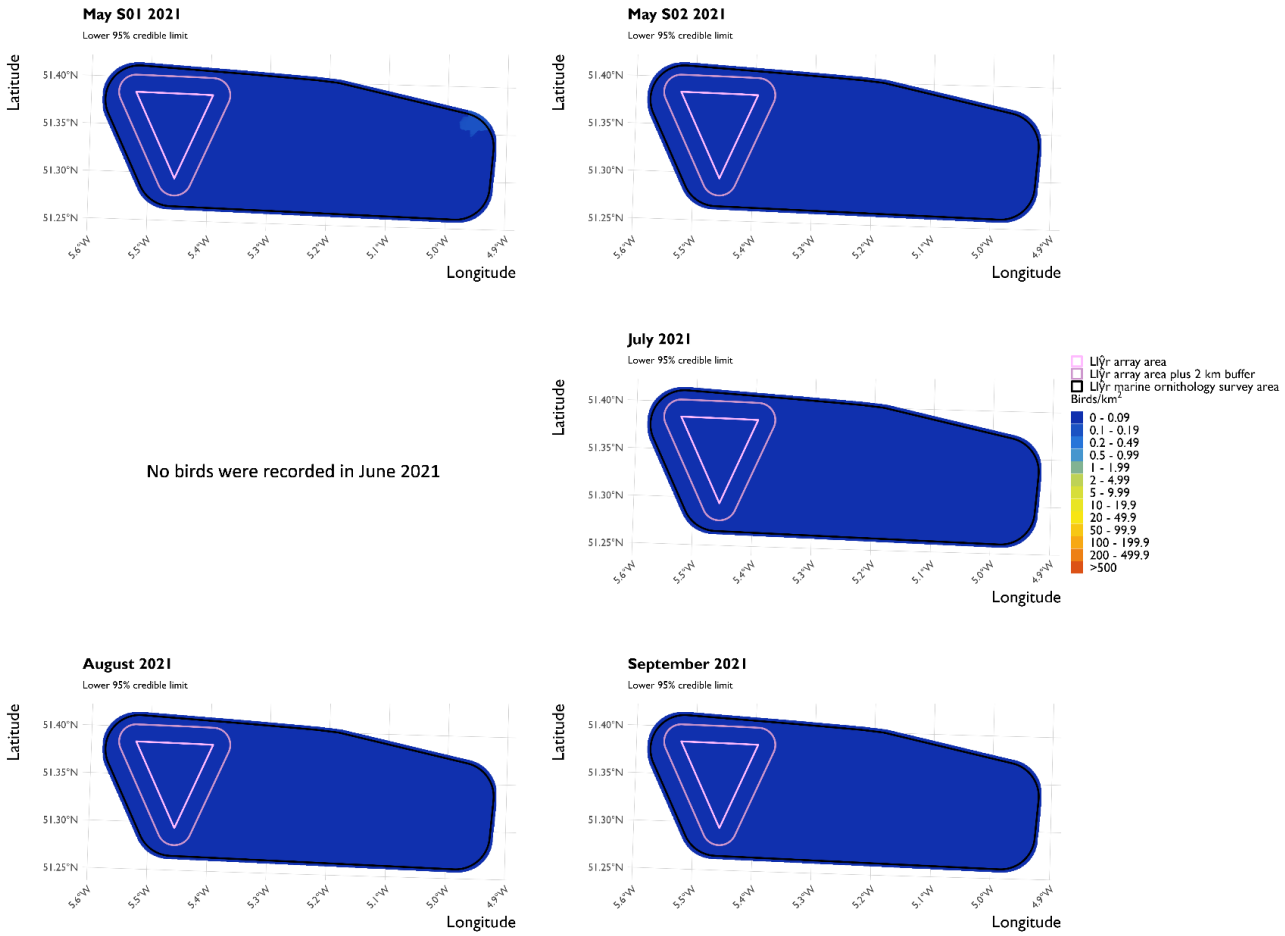

Figure 22A-3. Lower credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

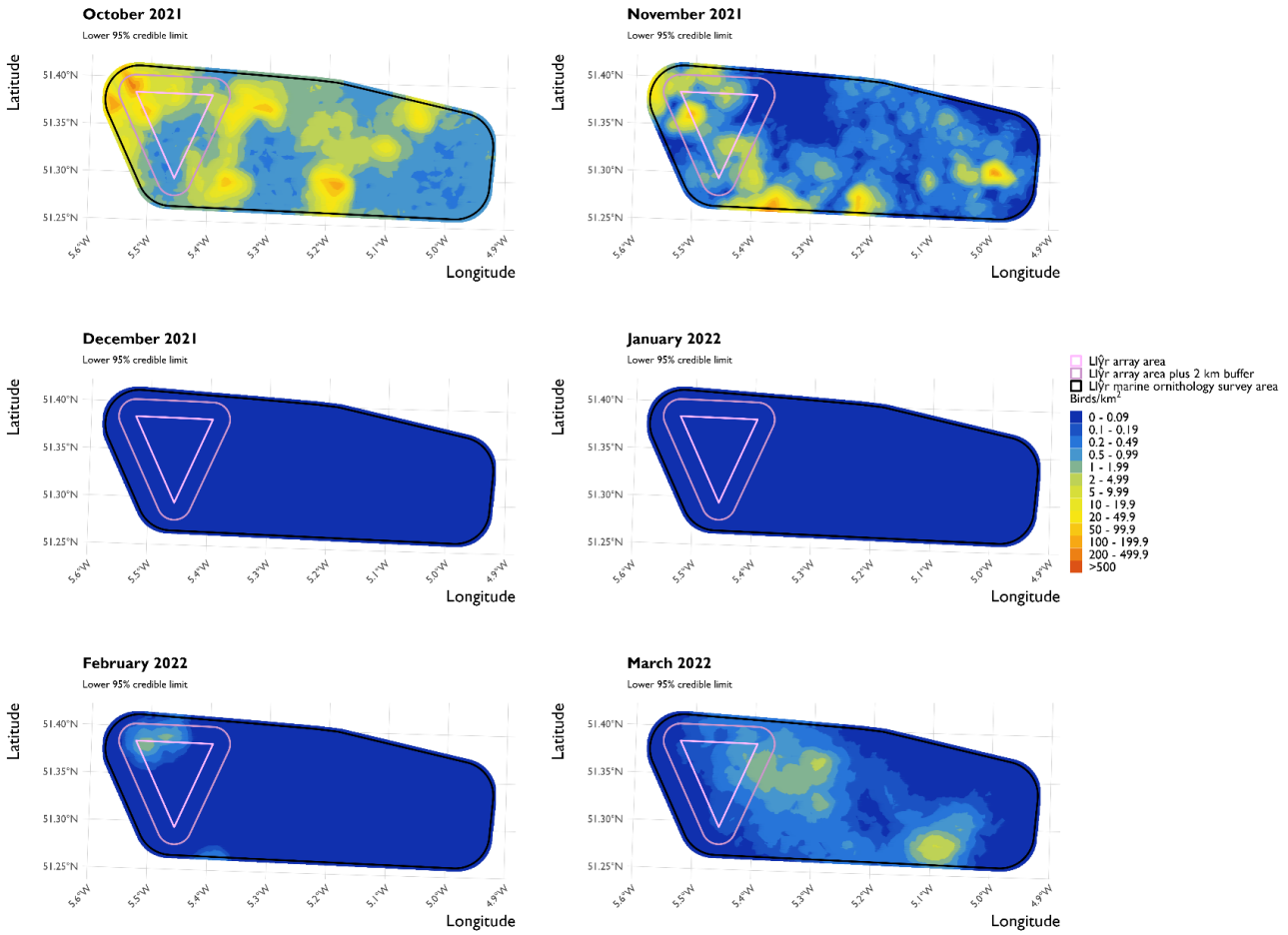

Figure 22A-4. Lower credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.1.2. Upper Credible Limit Density Maps

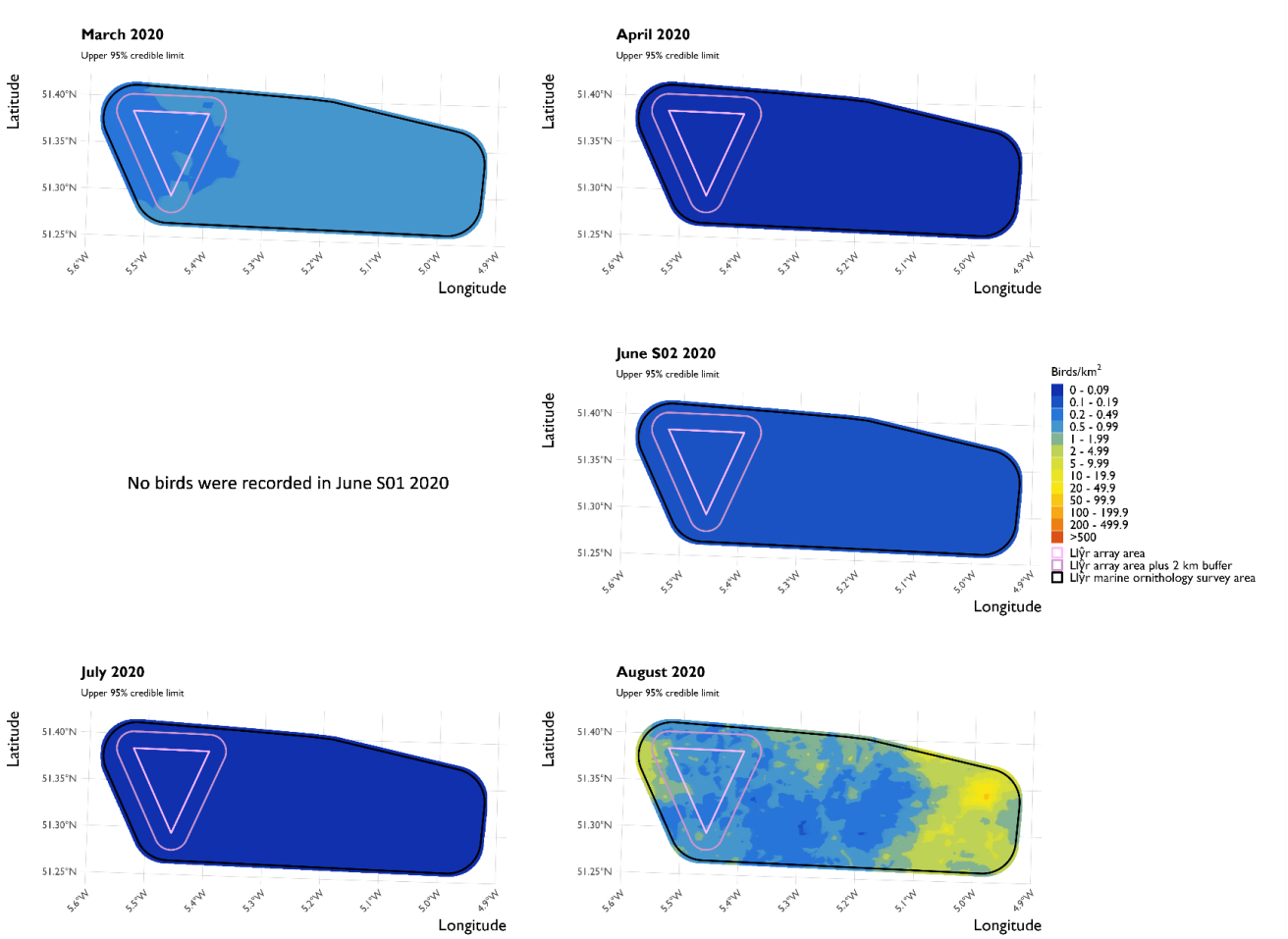

Figure 22A-5. Upper credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

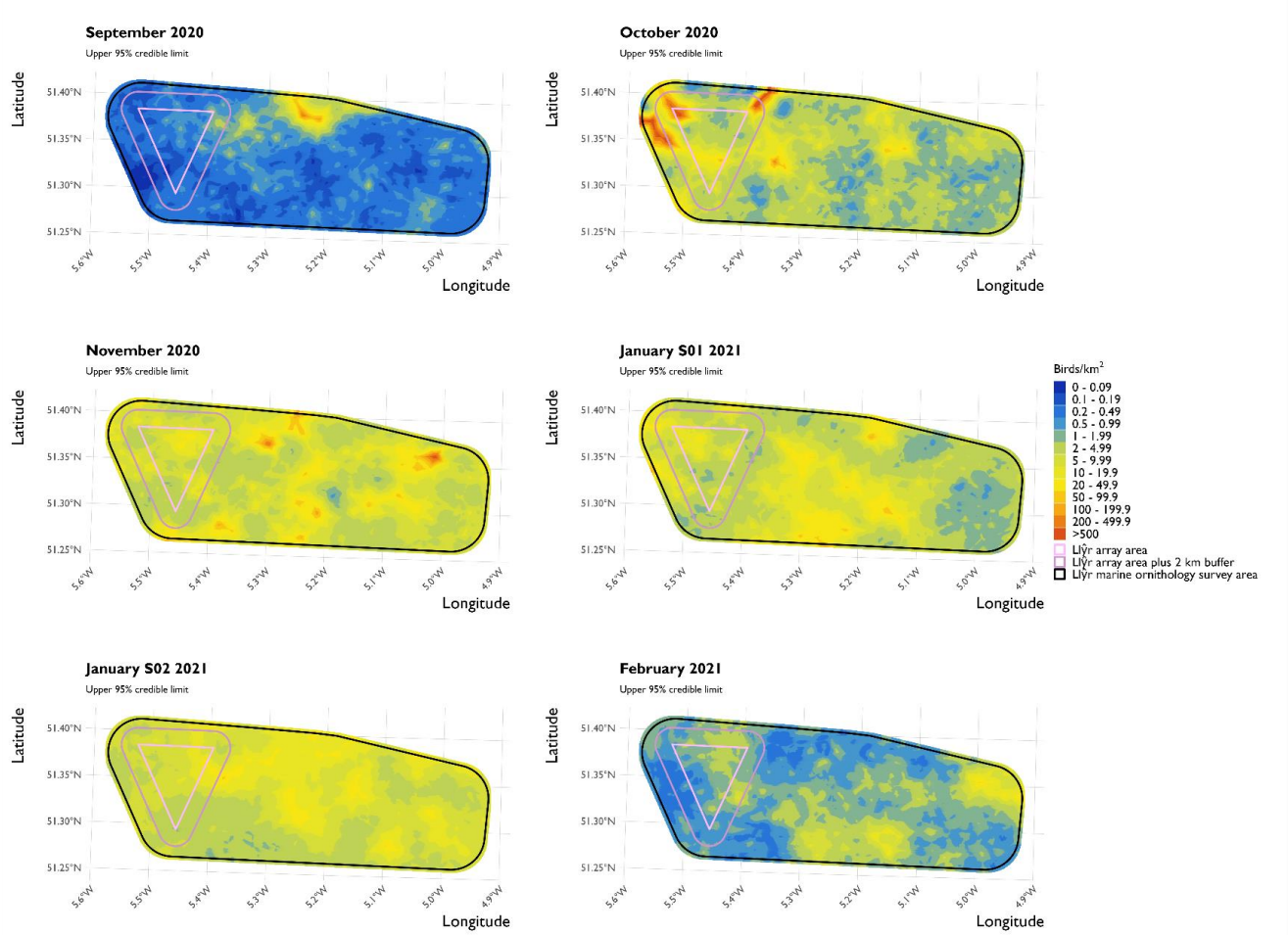

Figure 22A-6. Upper credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

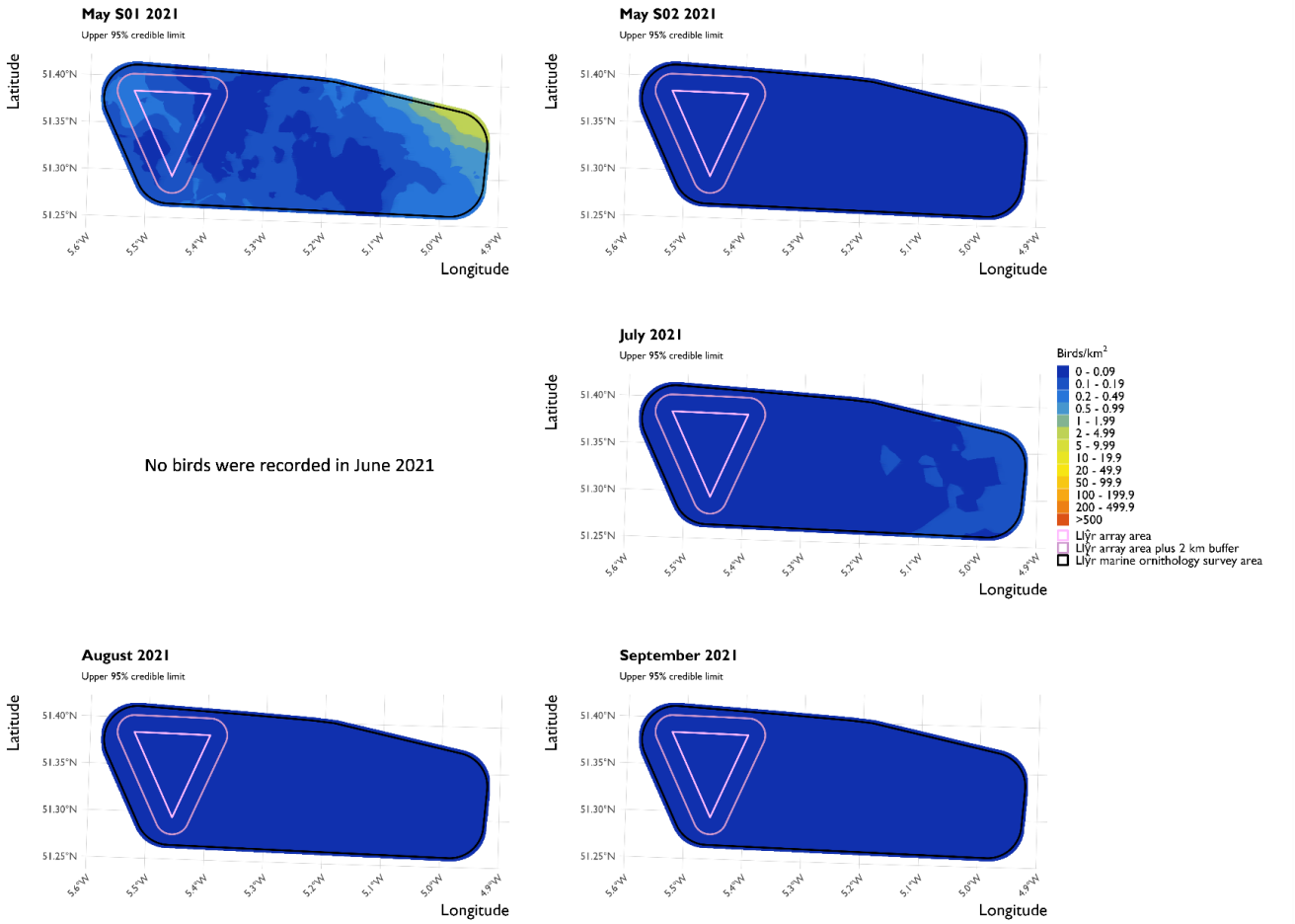

Figure 22A-7. Upper credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

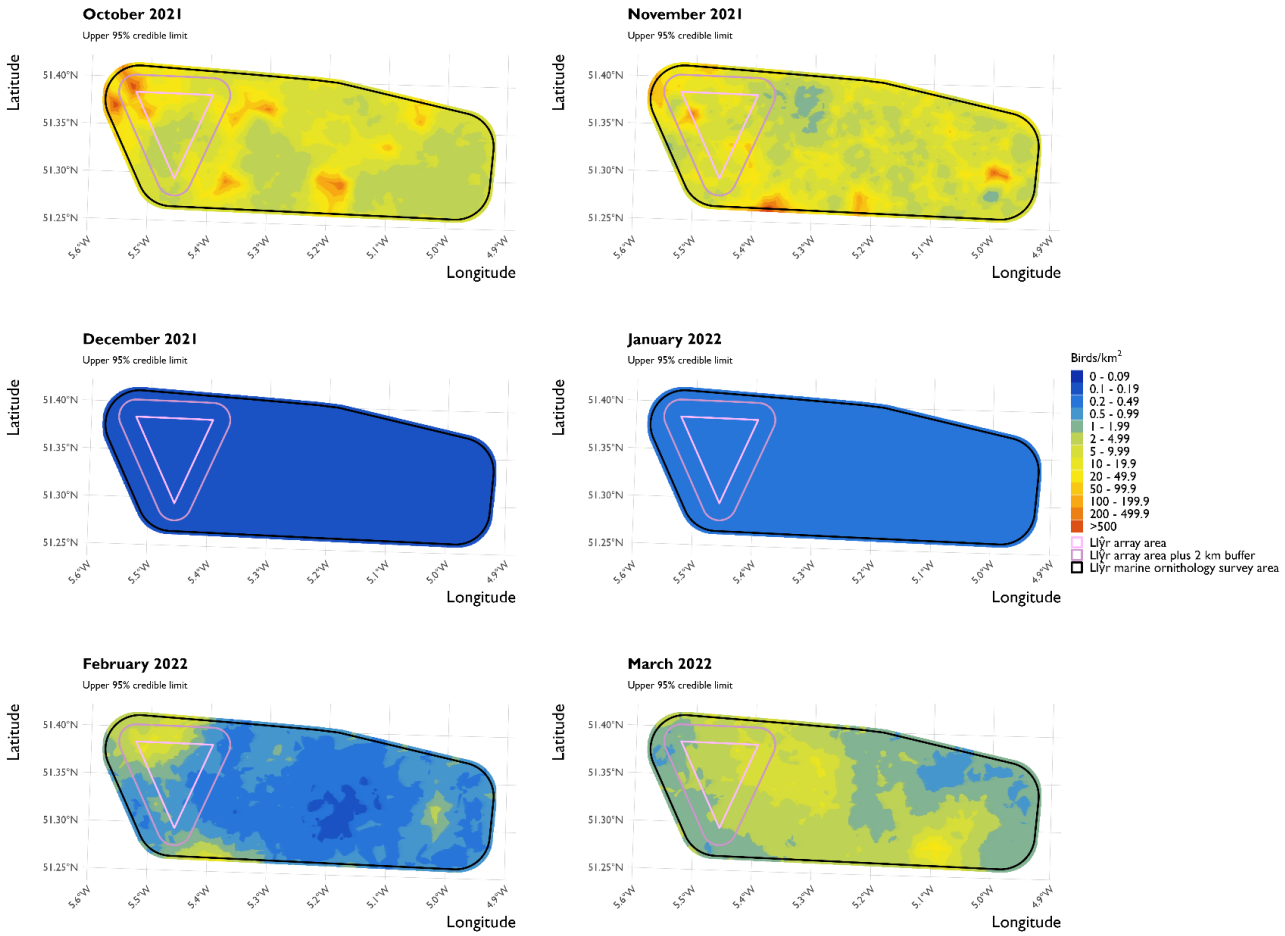

Figure 22A-8. Upper credible limit model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.1.3. Coefficient Of Variation Density Maps

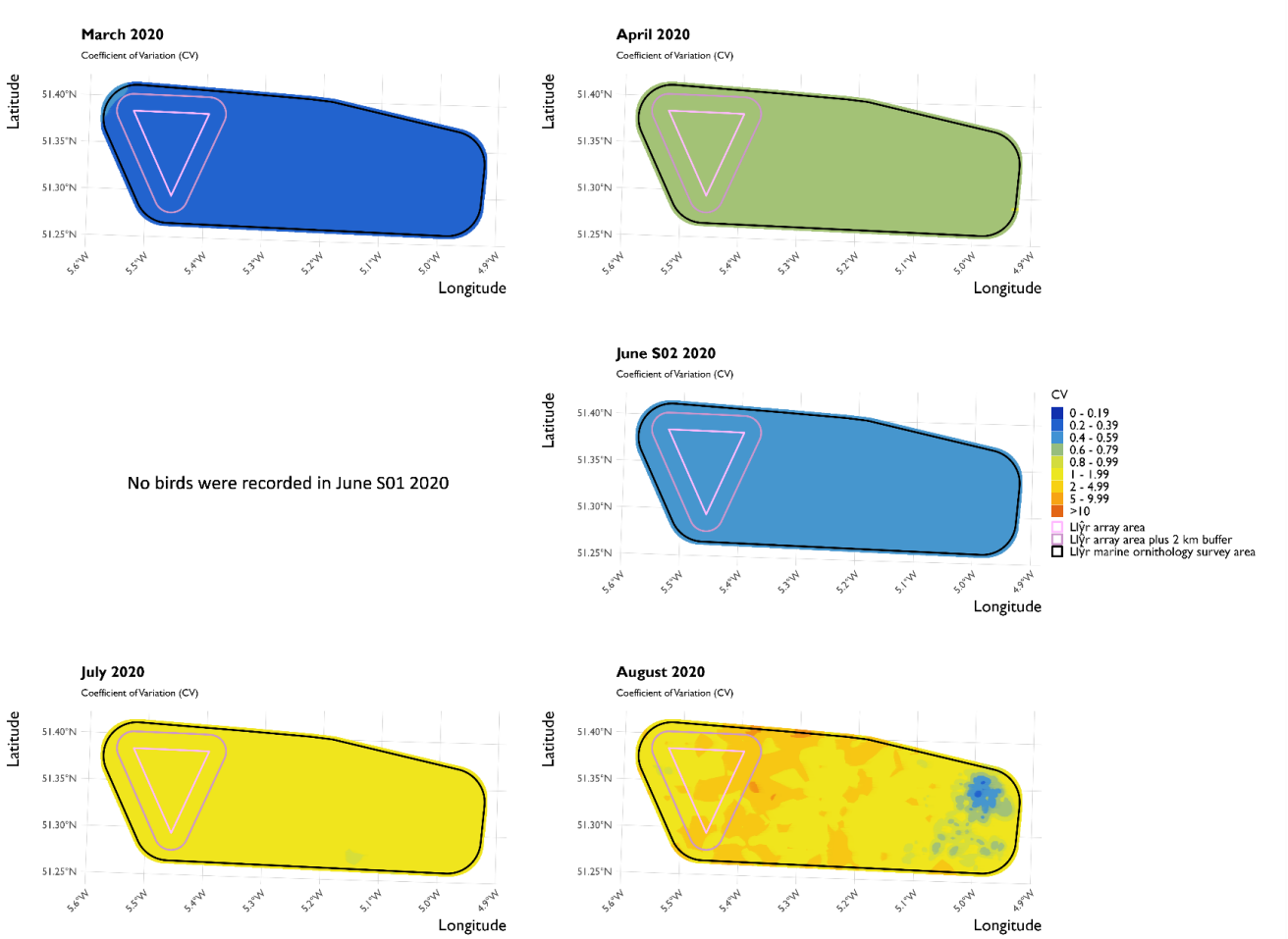

Figure 22A-9. Coefficient of Variation model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

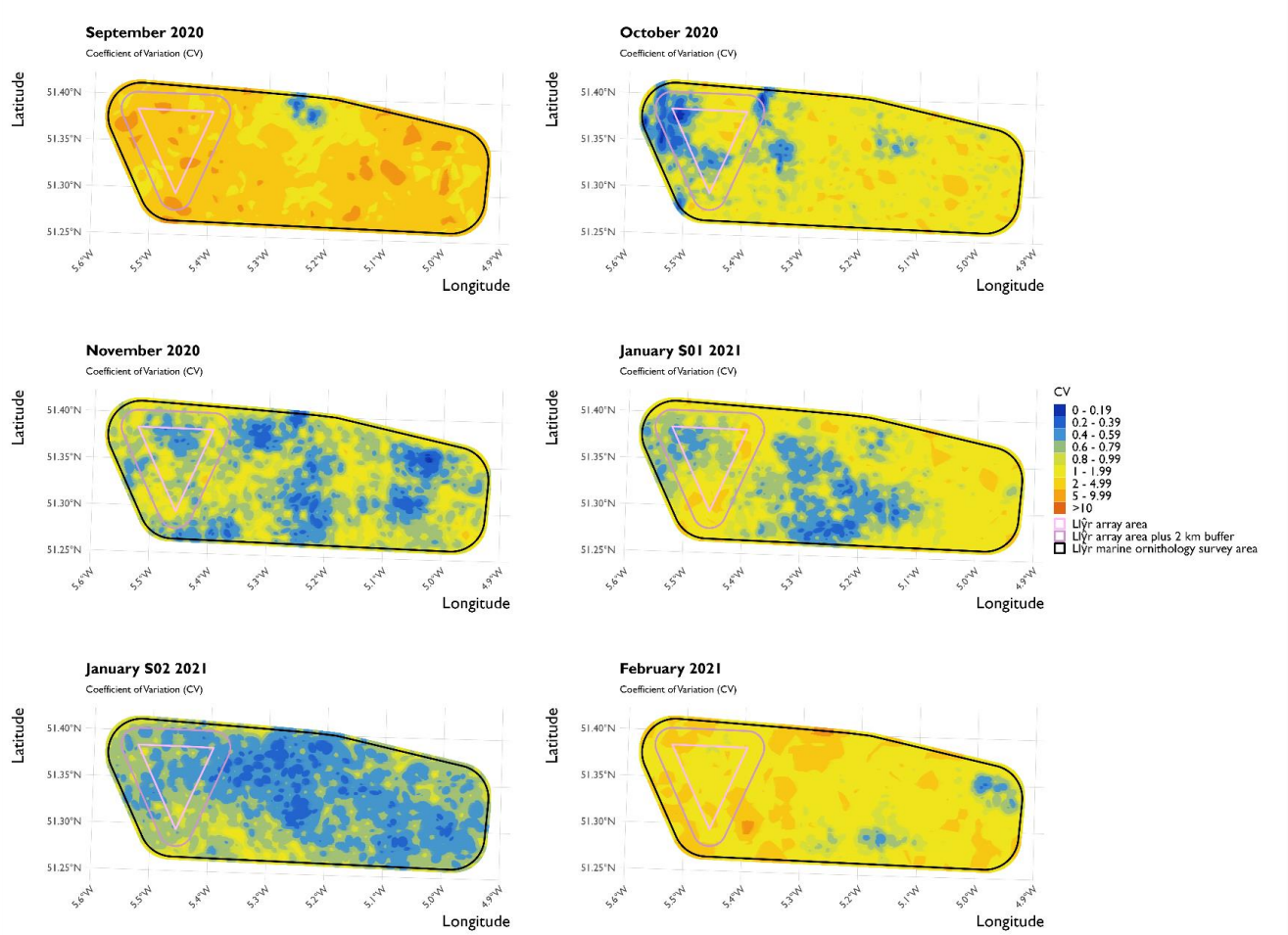

Figure 22A-10. Coefficient of Variation model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

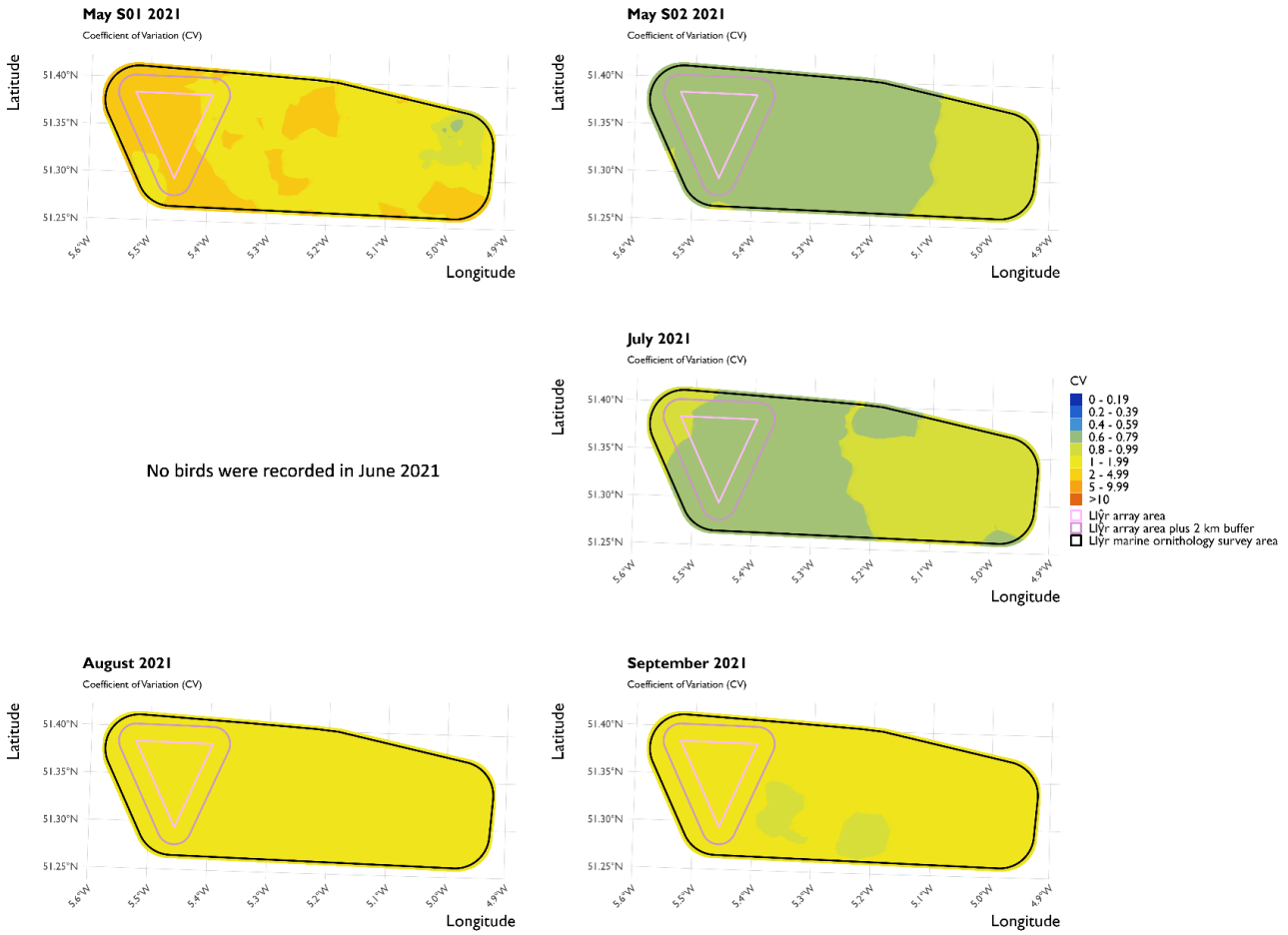

Figure 22A-11. Coefficient of Variation model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

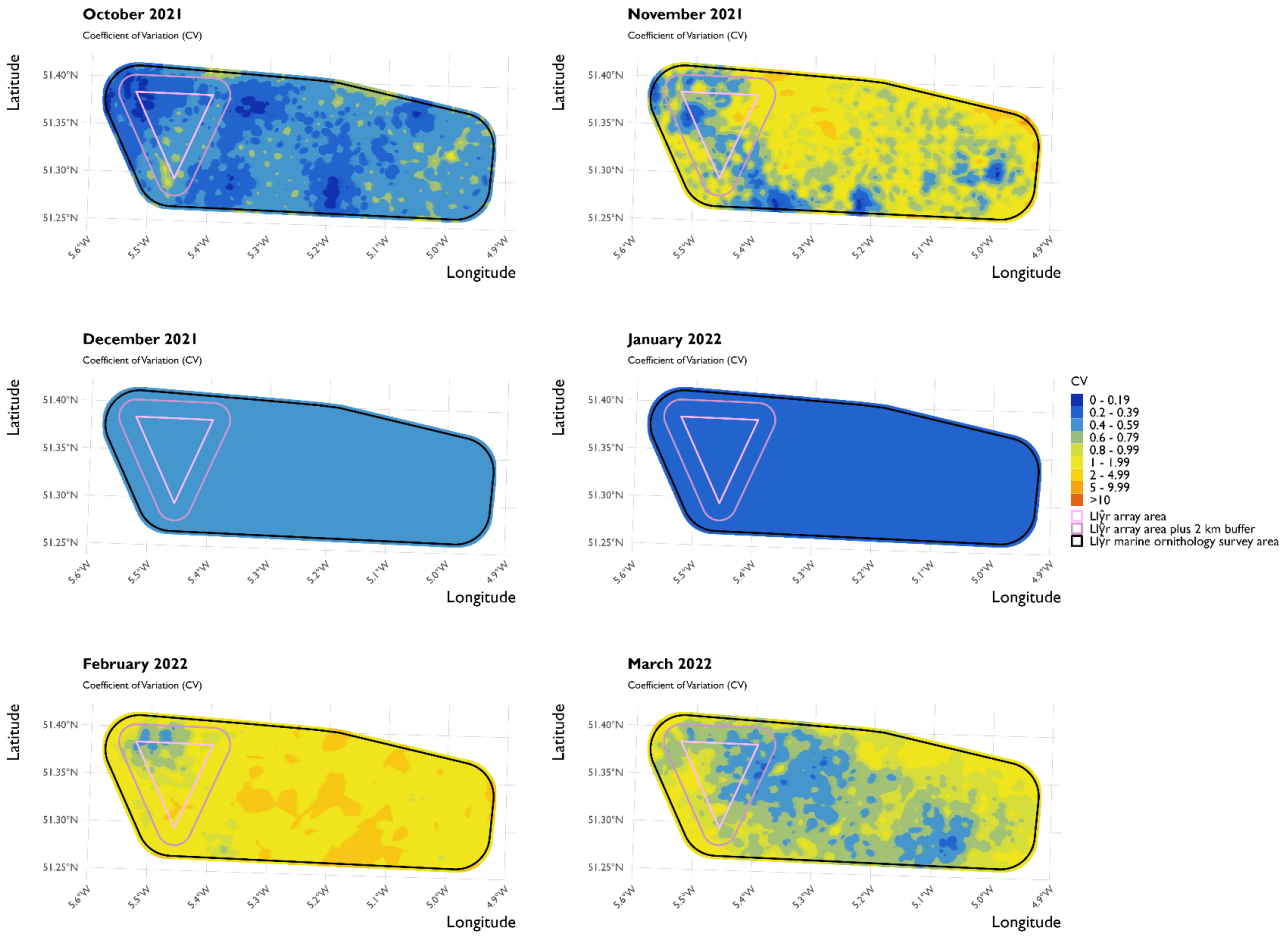

Figure 22A-12. Coefficient of Variation model-based density surface for all kittiwakes (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.2 Lesser Black-Backed Gull

22.2.1. Lower Credible Limit Density Maps

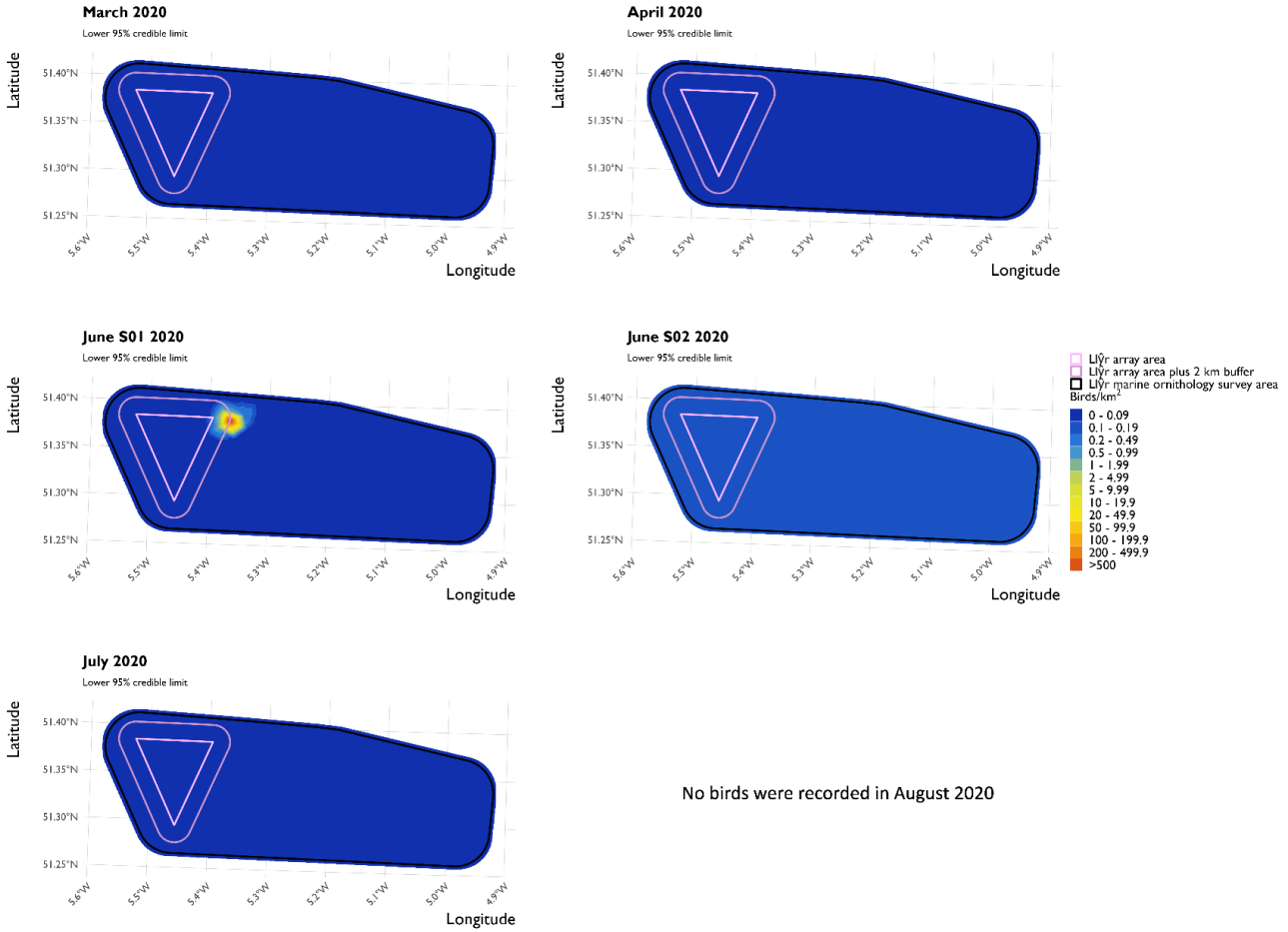

Figure 22A-13. Lower credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

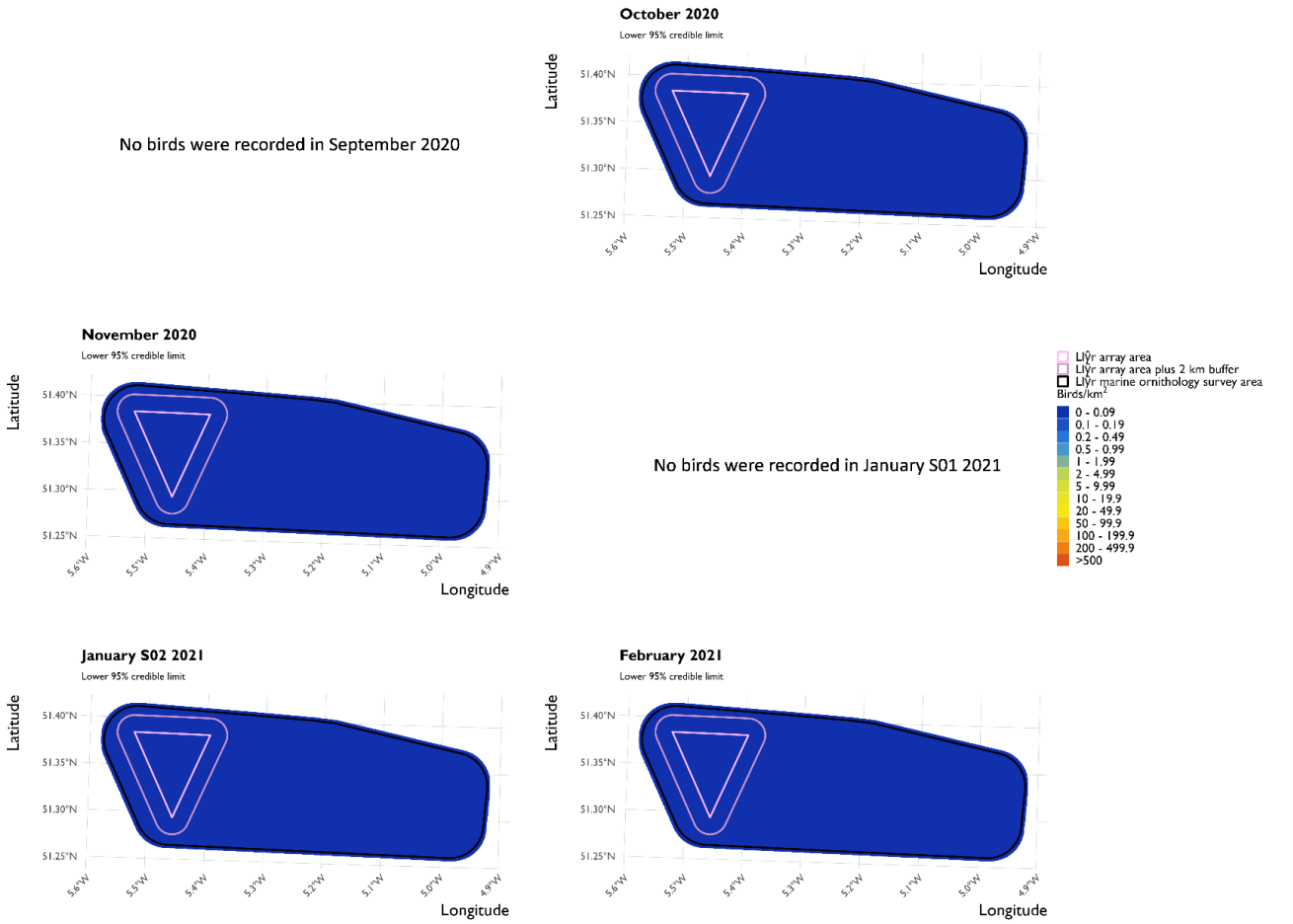

Figure 22A-14. Lower credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

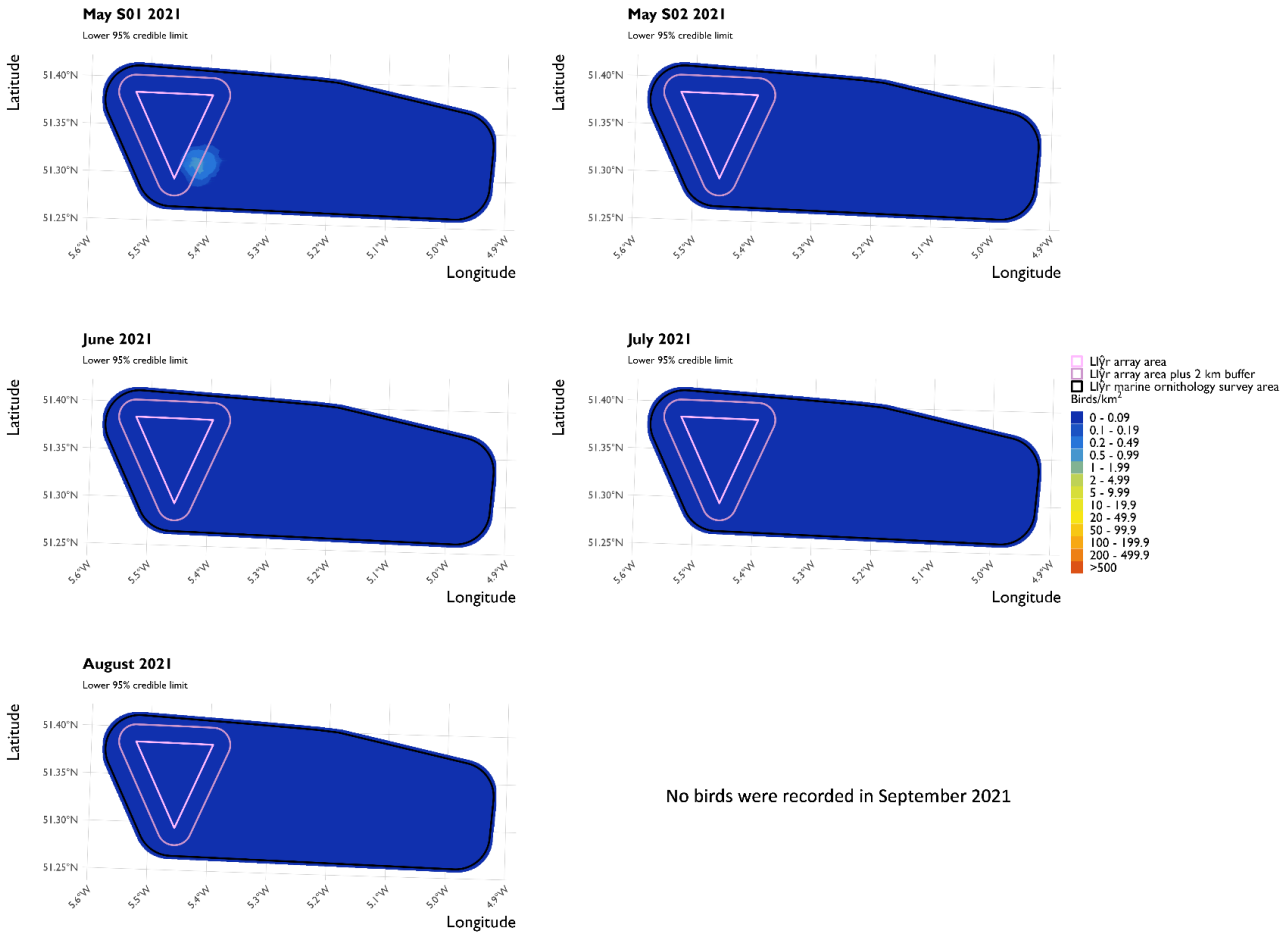

Figure 22A-15. Lower credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

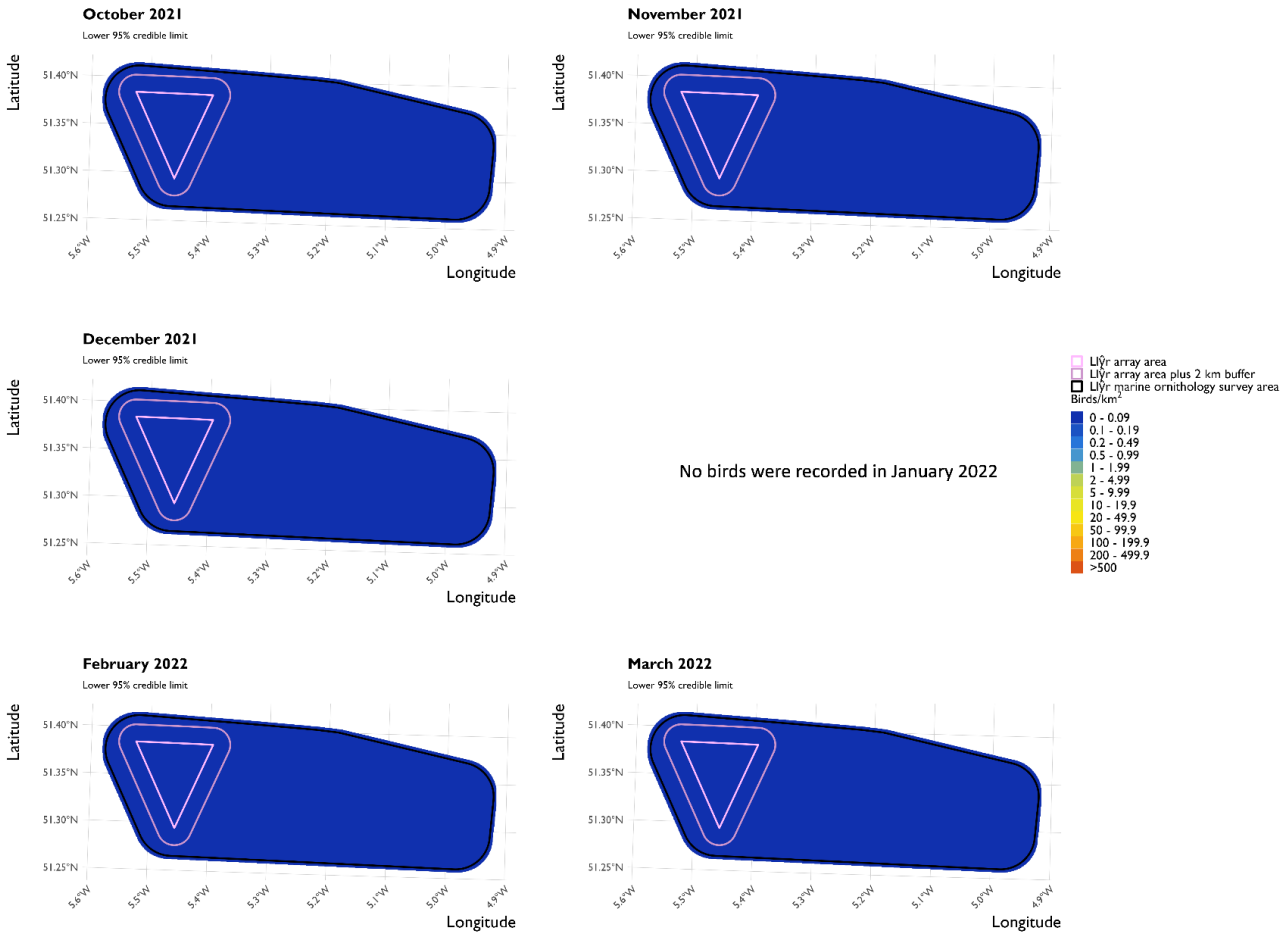

Figure 22A-16. Lower credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.2.2. Upper Credible Limit Density Maps

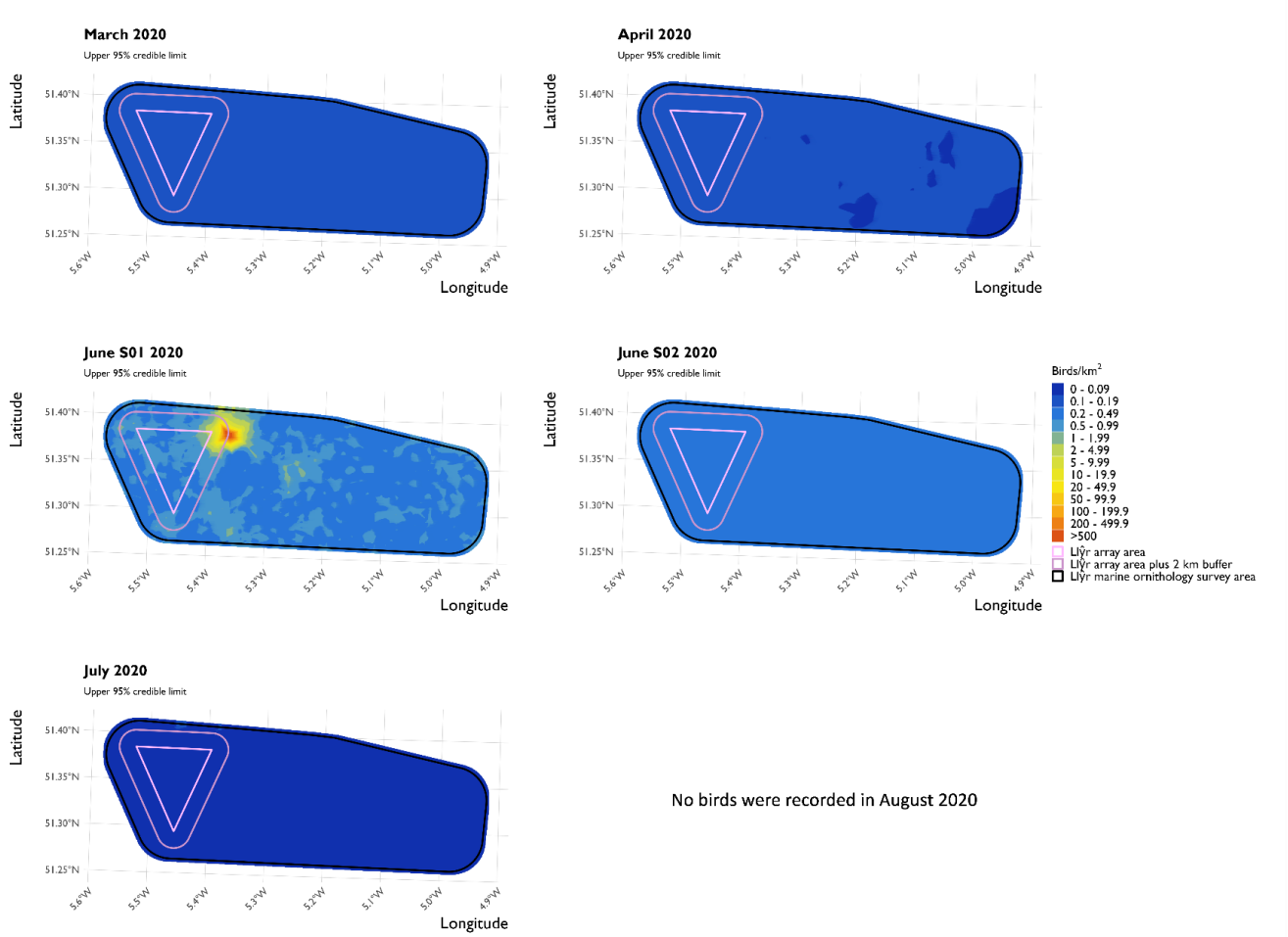

Figure 22A-17. Upper credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

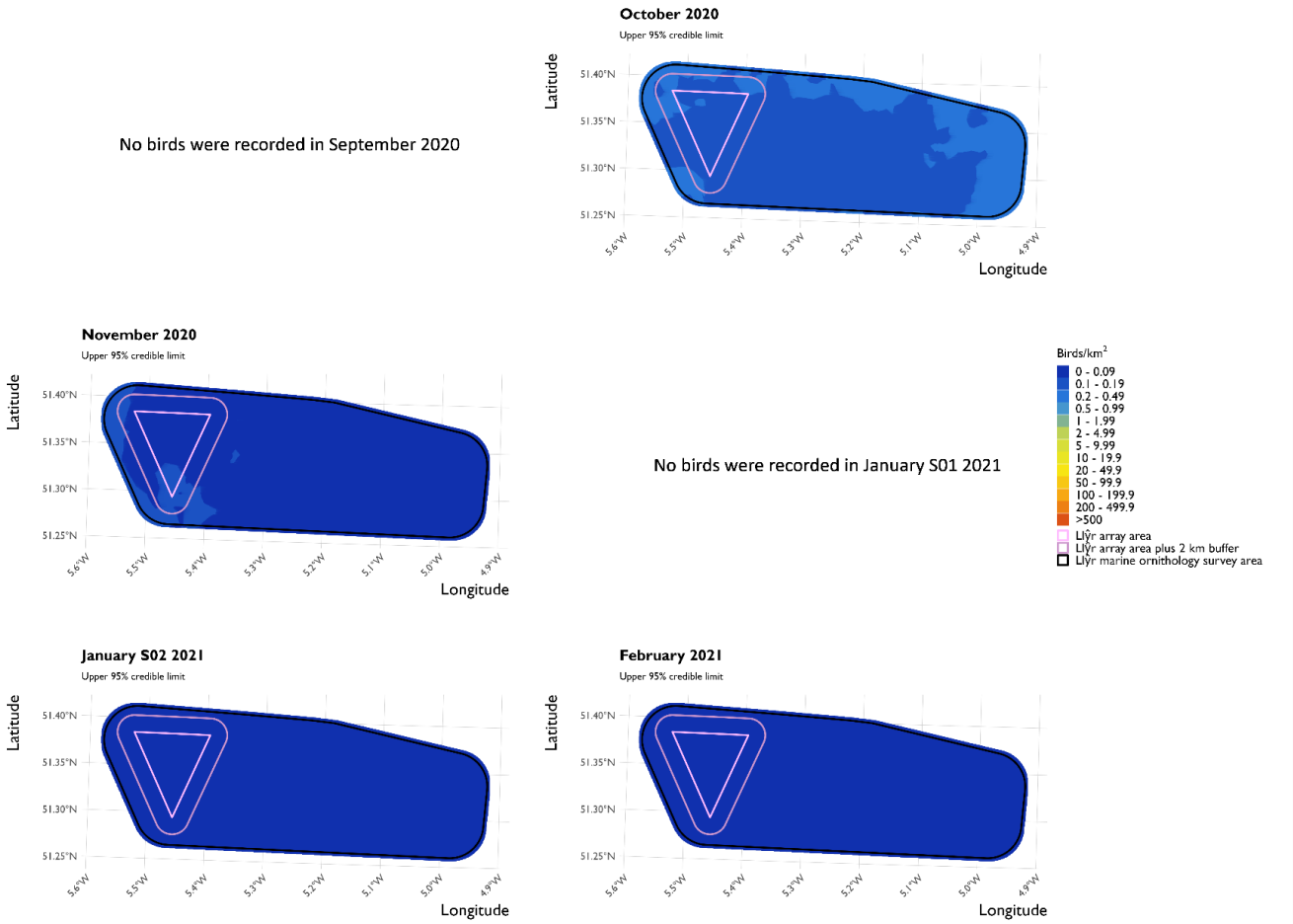

Figure 22A-18. Upper credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

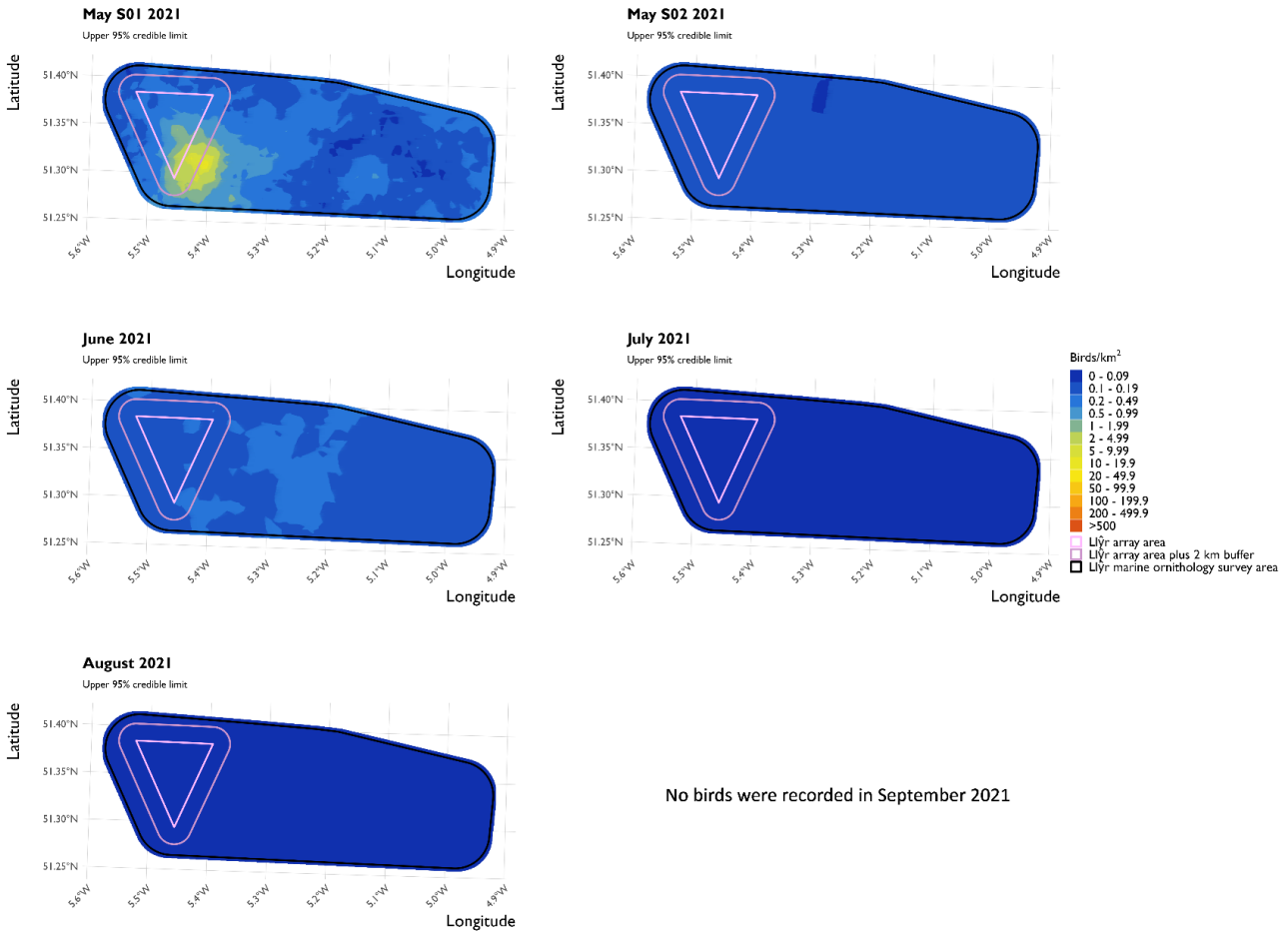

Figure 22A-19. Upper credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

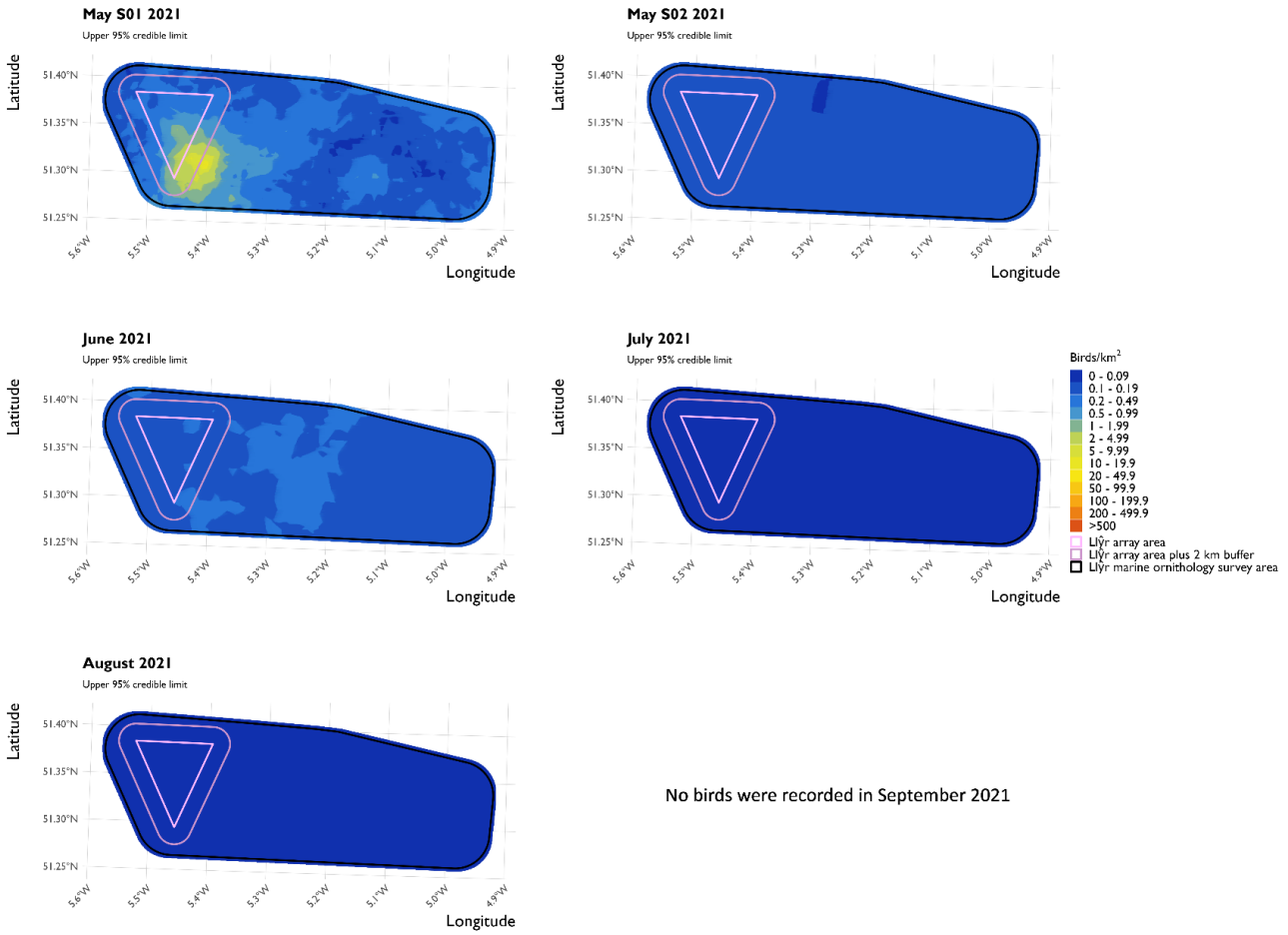

Figure 22A-20. Upper credible limit model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.2.3. Coefficient Of Variation Density Maps

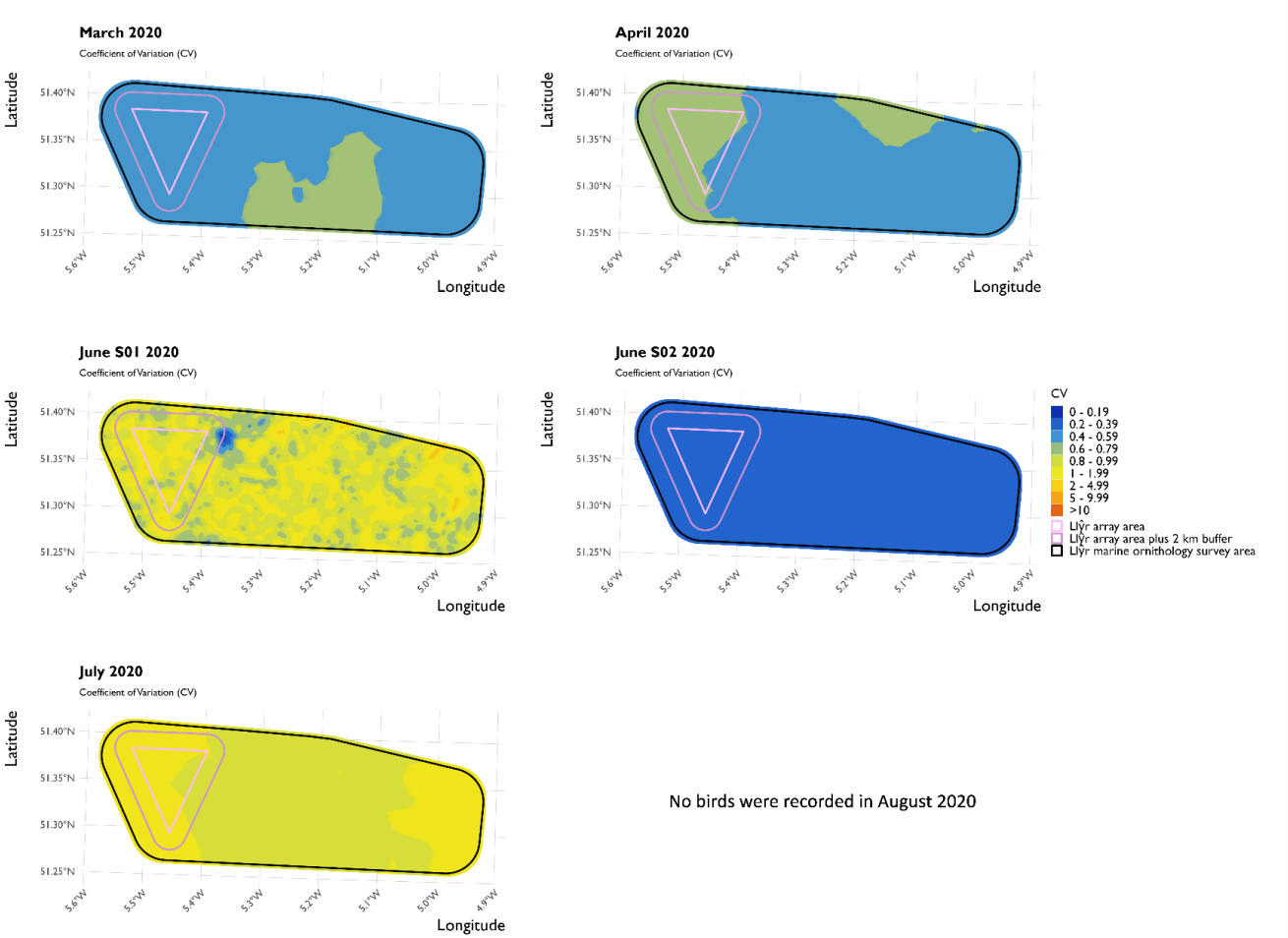

Figure 22A-21. Coefficient of Variation model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

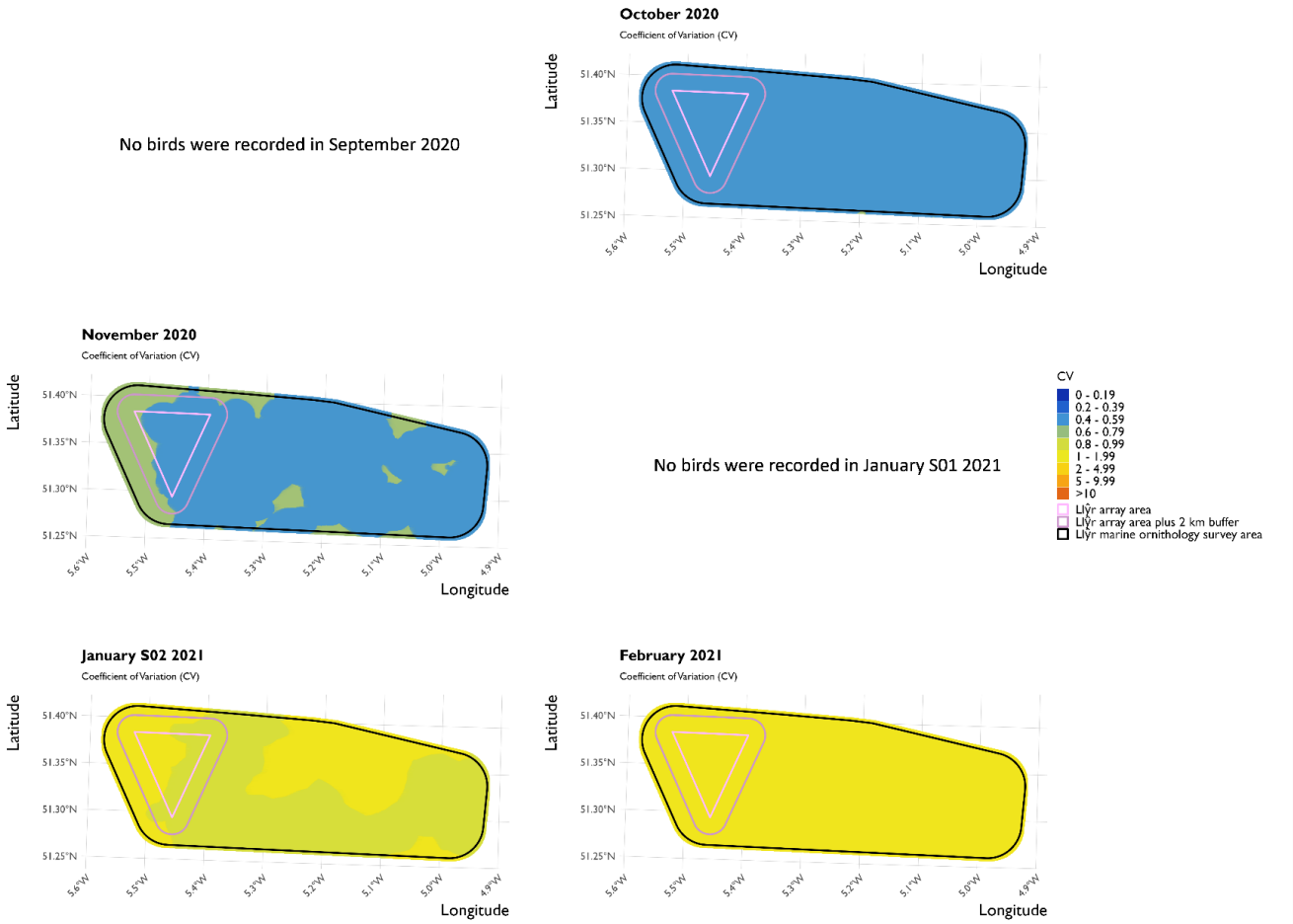

Figure 22A-22. Coefficient of Variation model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

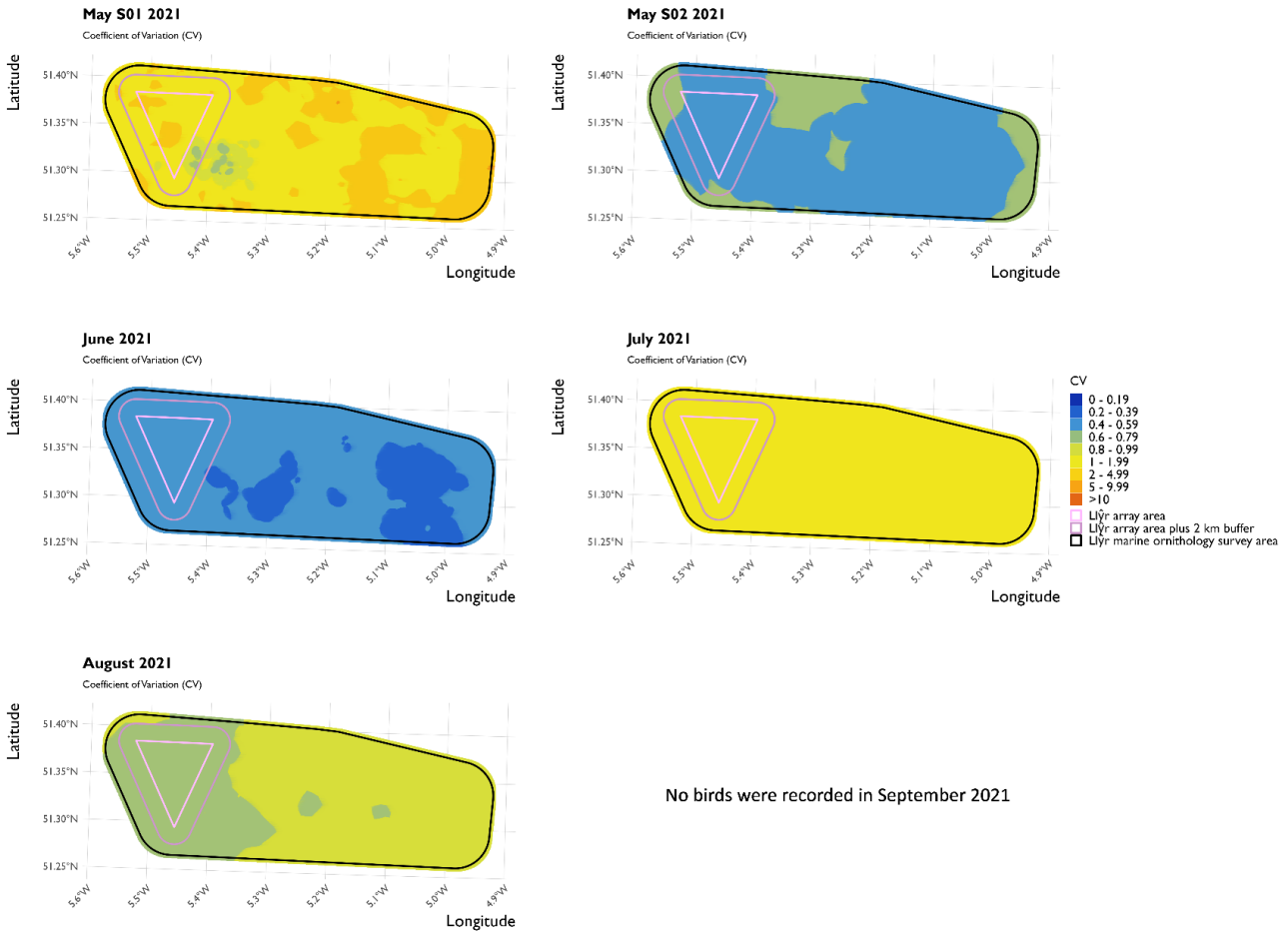

Figure 22A-23. Coefficient of Variation model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

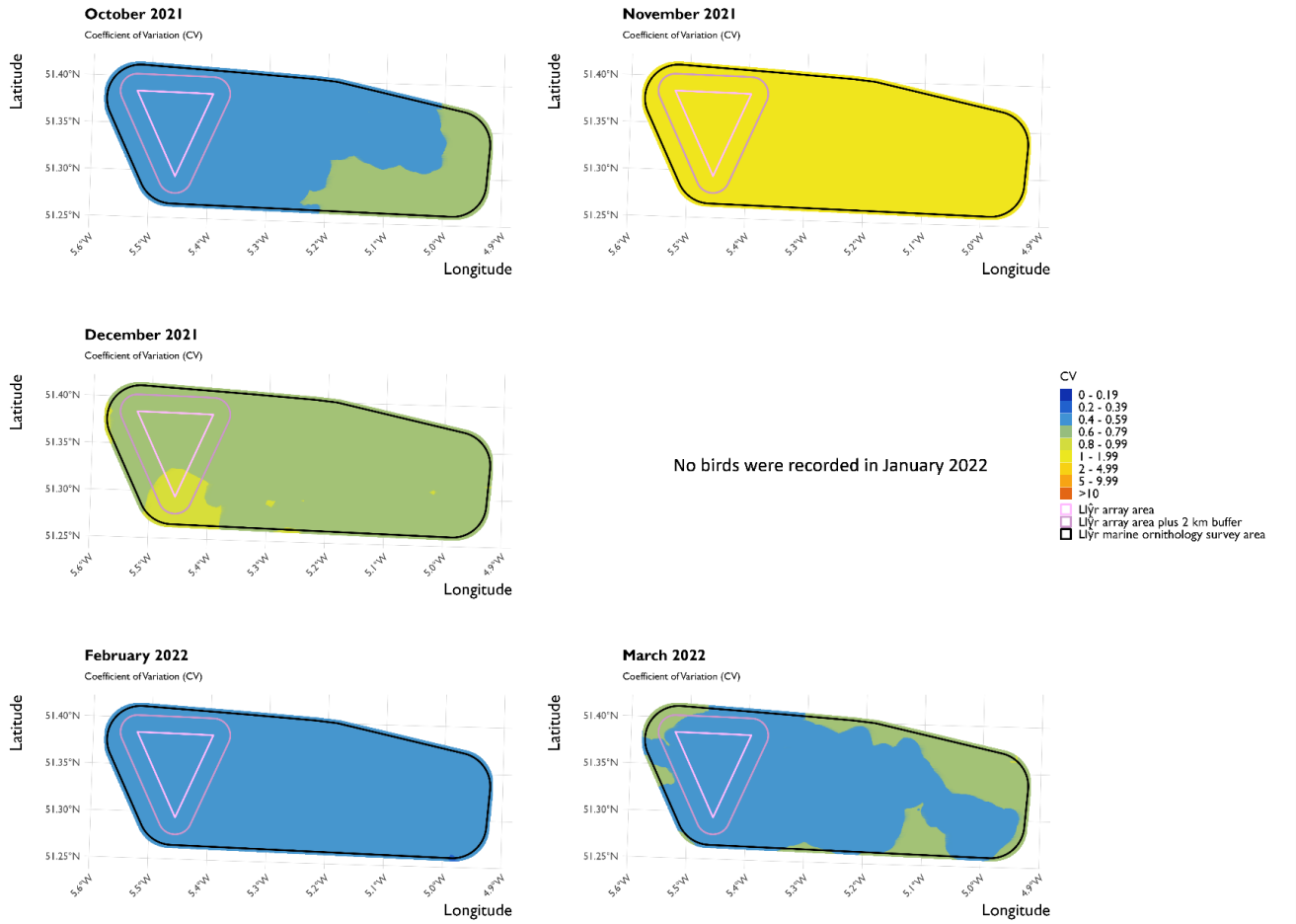

Figure 22A-24. Coefficient of Variation model-based density surface for all lesser black-backed gulls (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.3 Guillemot

22.3.1. Lower Credible Limit Density Maps

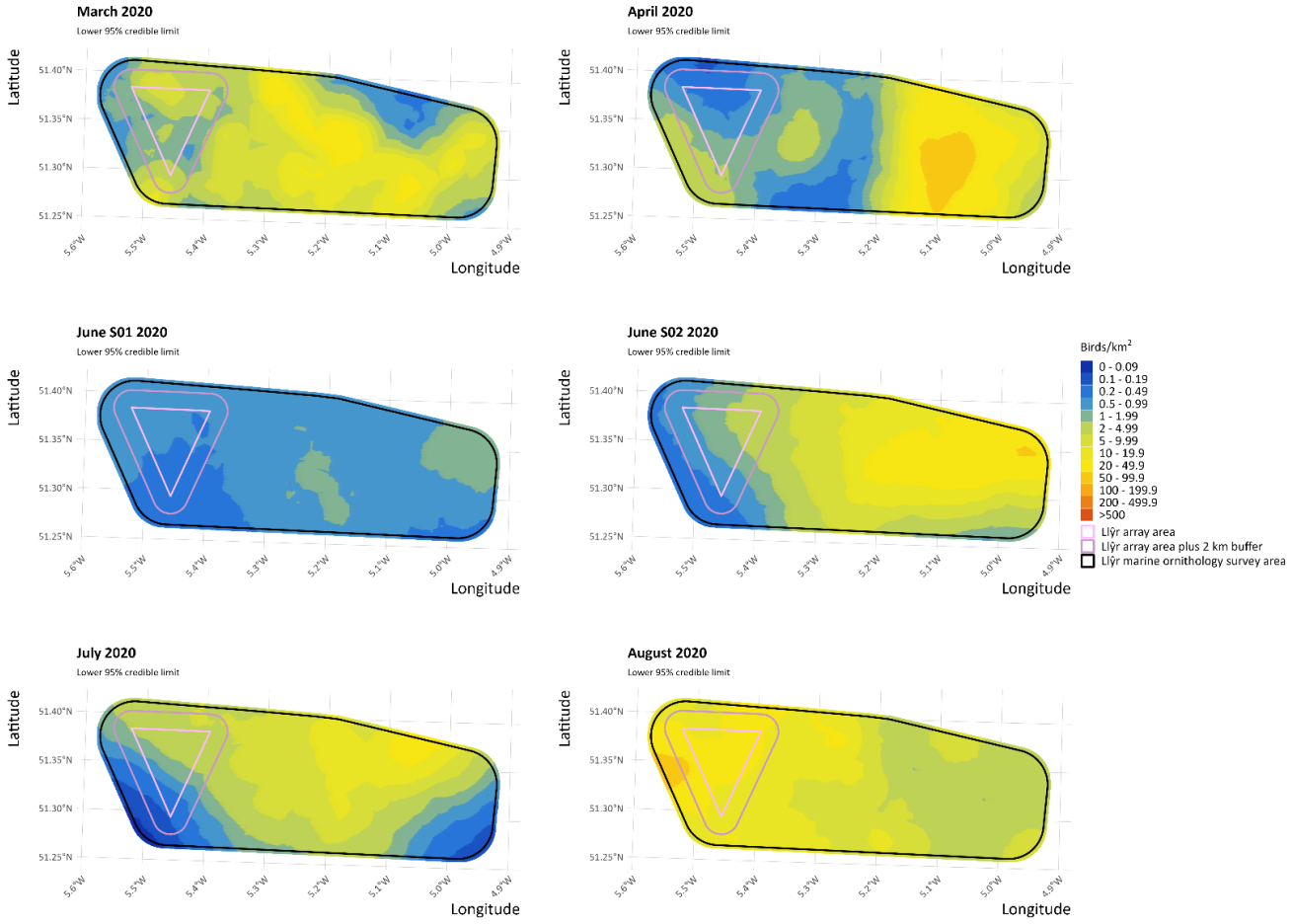

Figure 22A-25. Lower credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

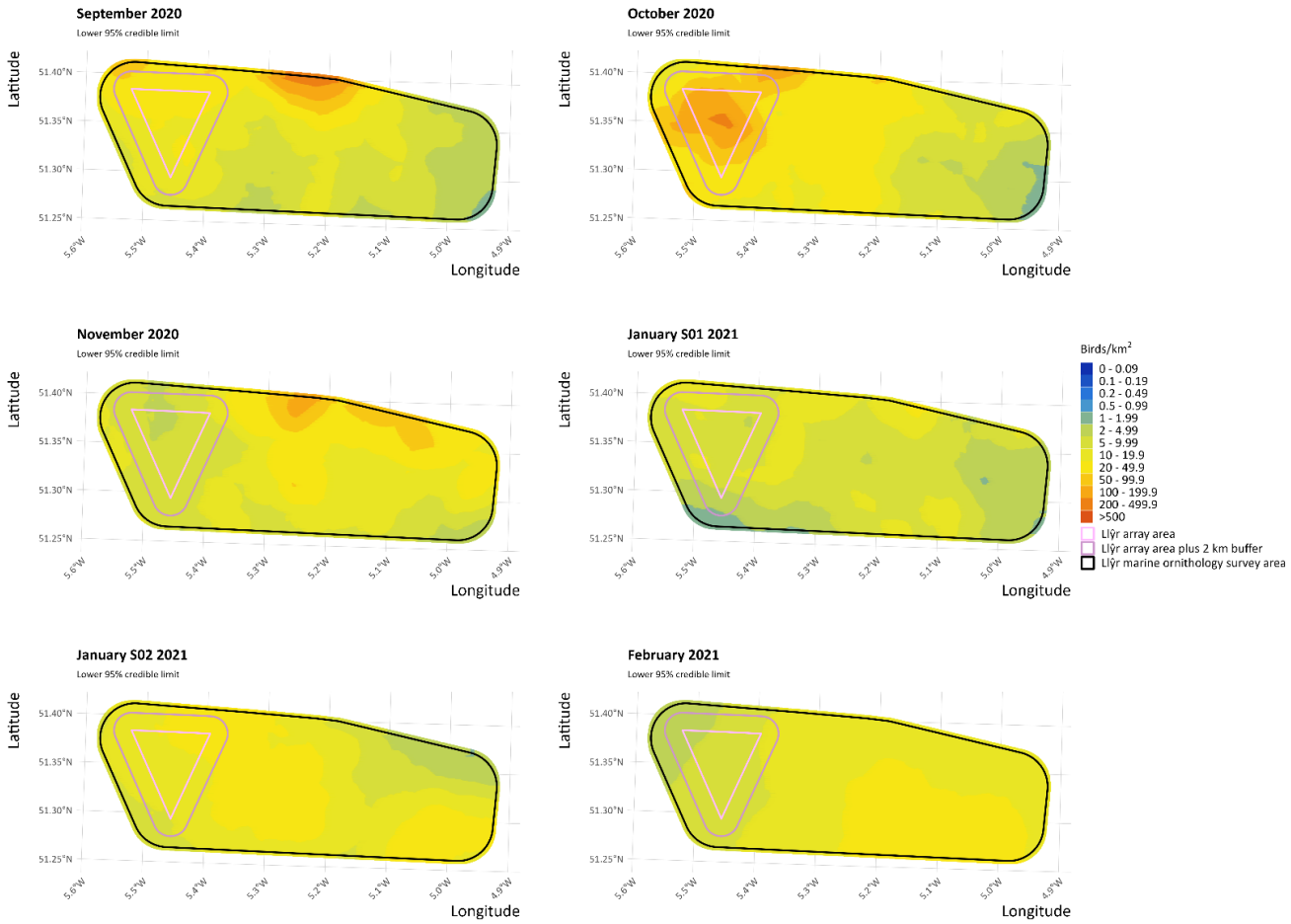

Figure 22A-26. Lower credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

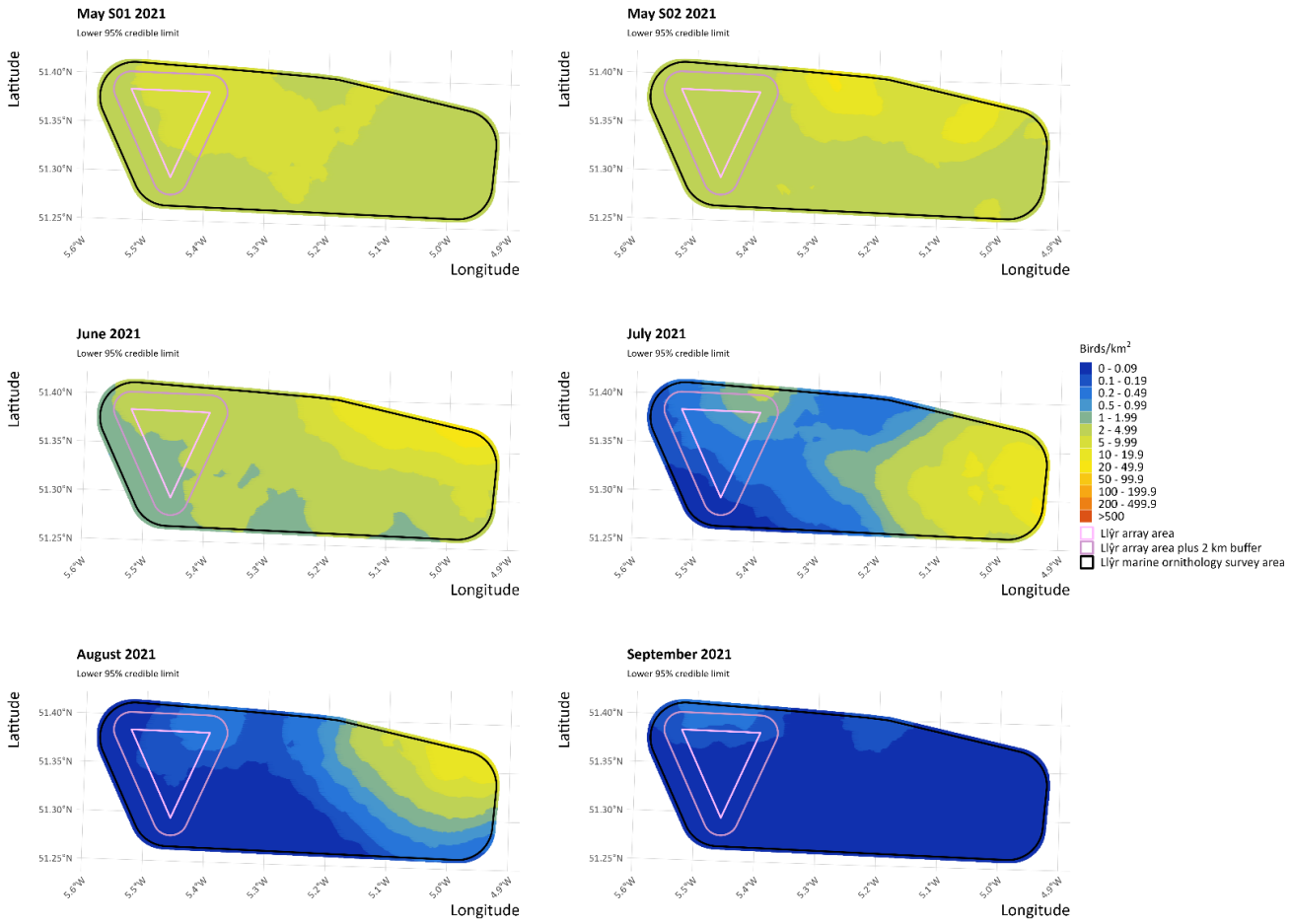

Figure 22A-27. Lower credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

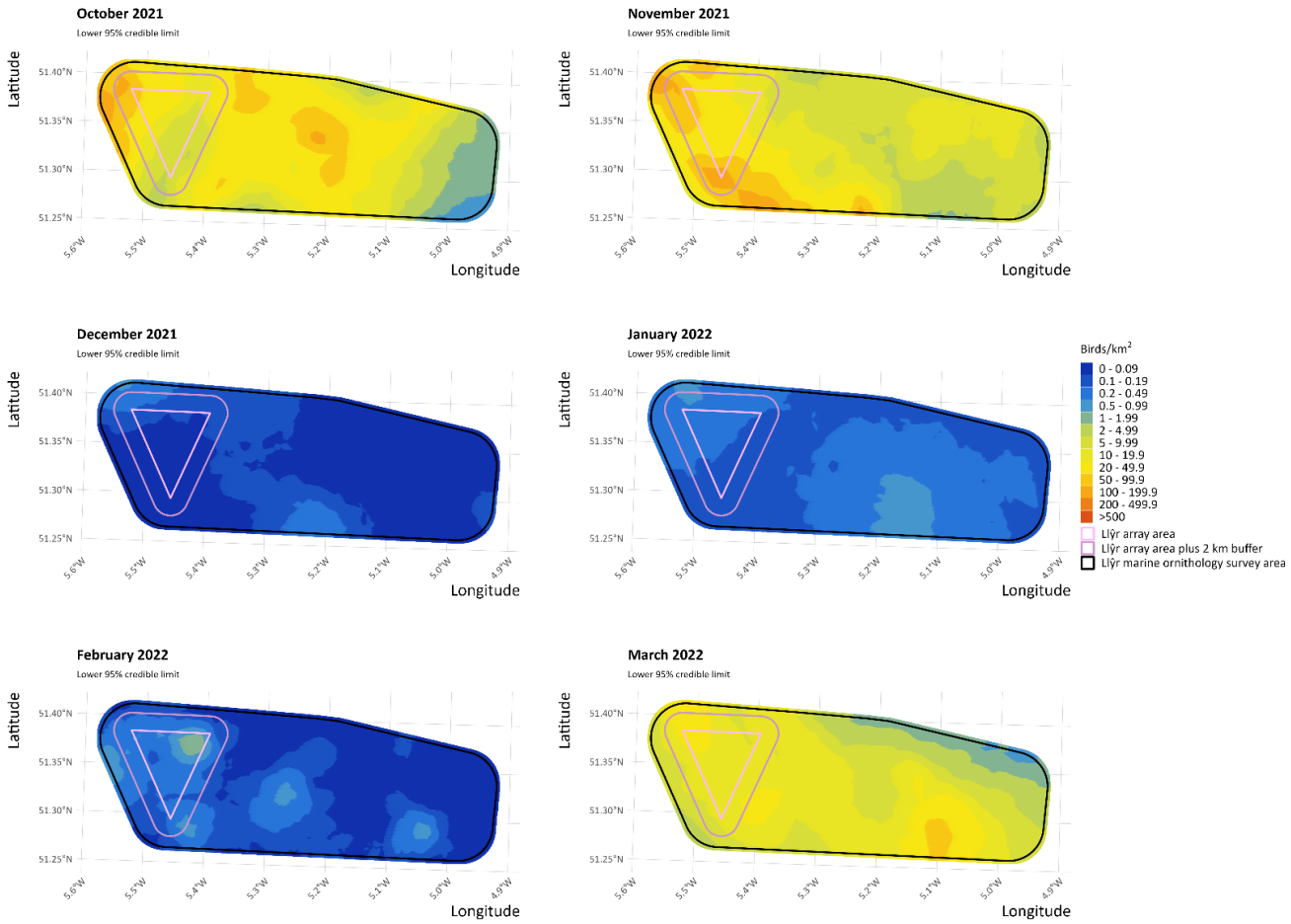

Figure 22A-28. Lower credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.3.2. Upper Credible Limit Density Maps

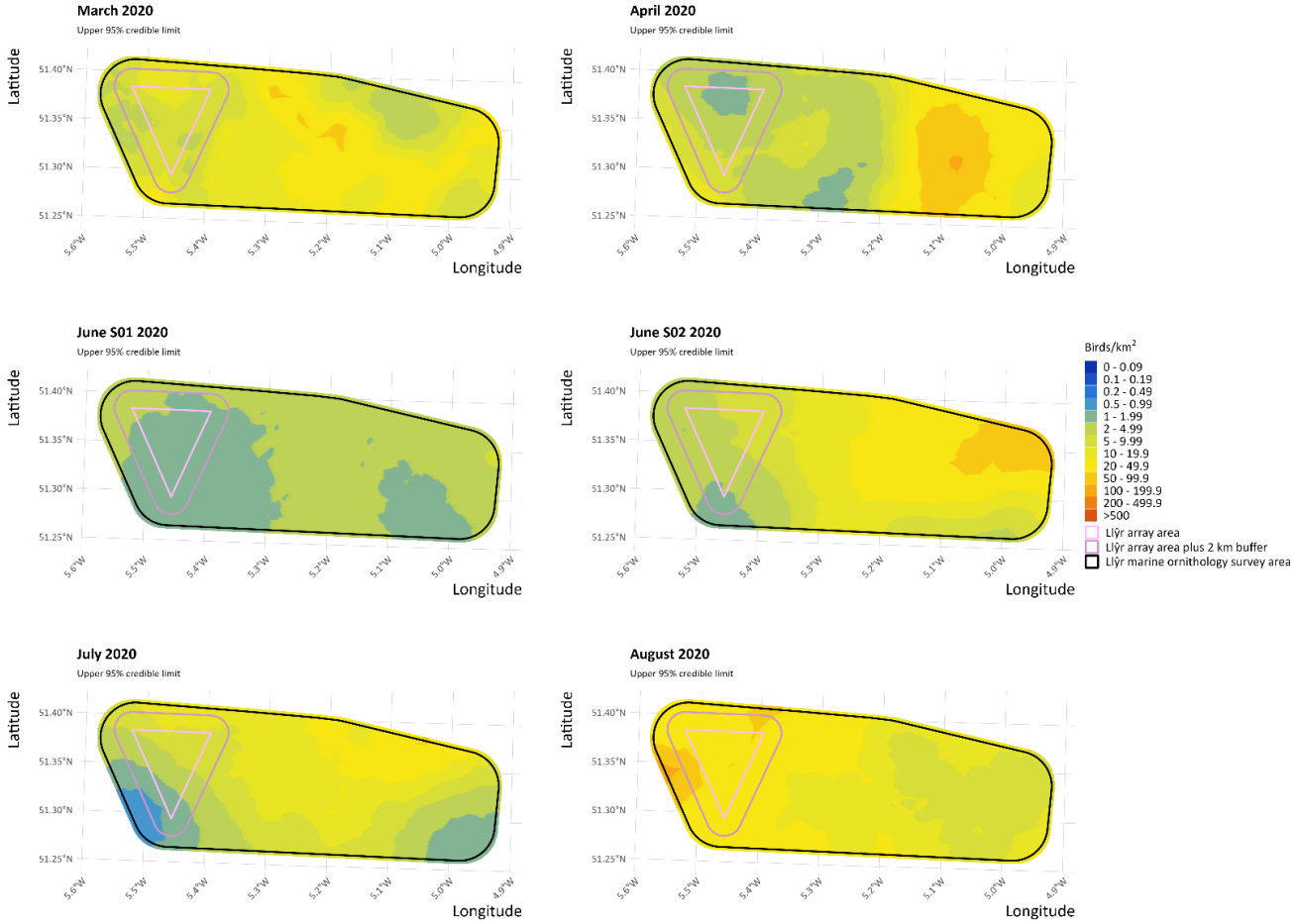

Figure 22A-29. Upper credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

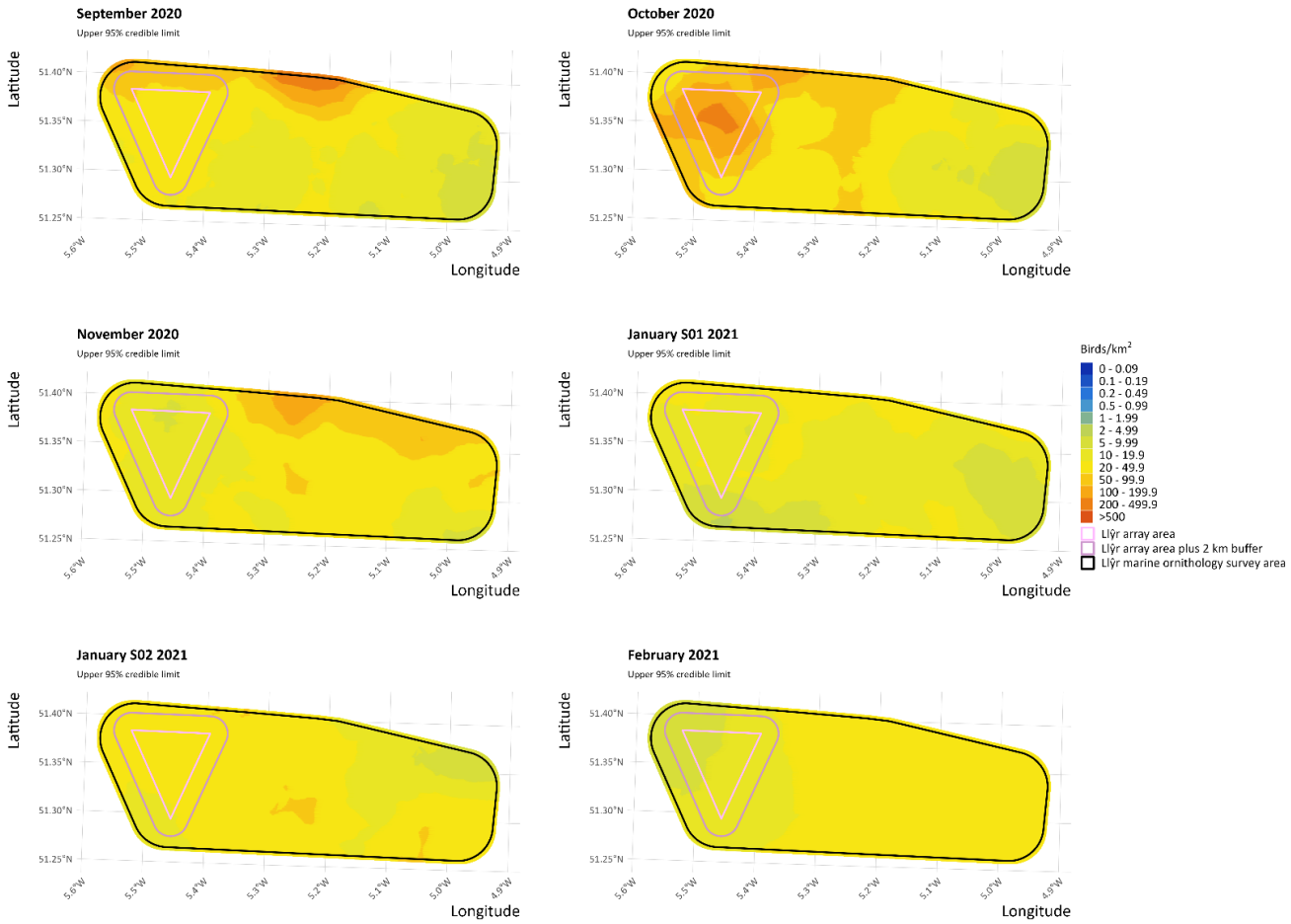

Figure 22A-30. Upper credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

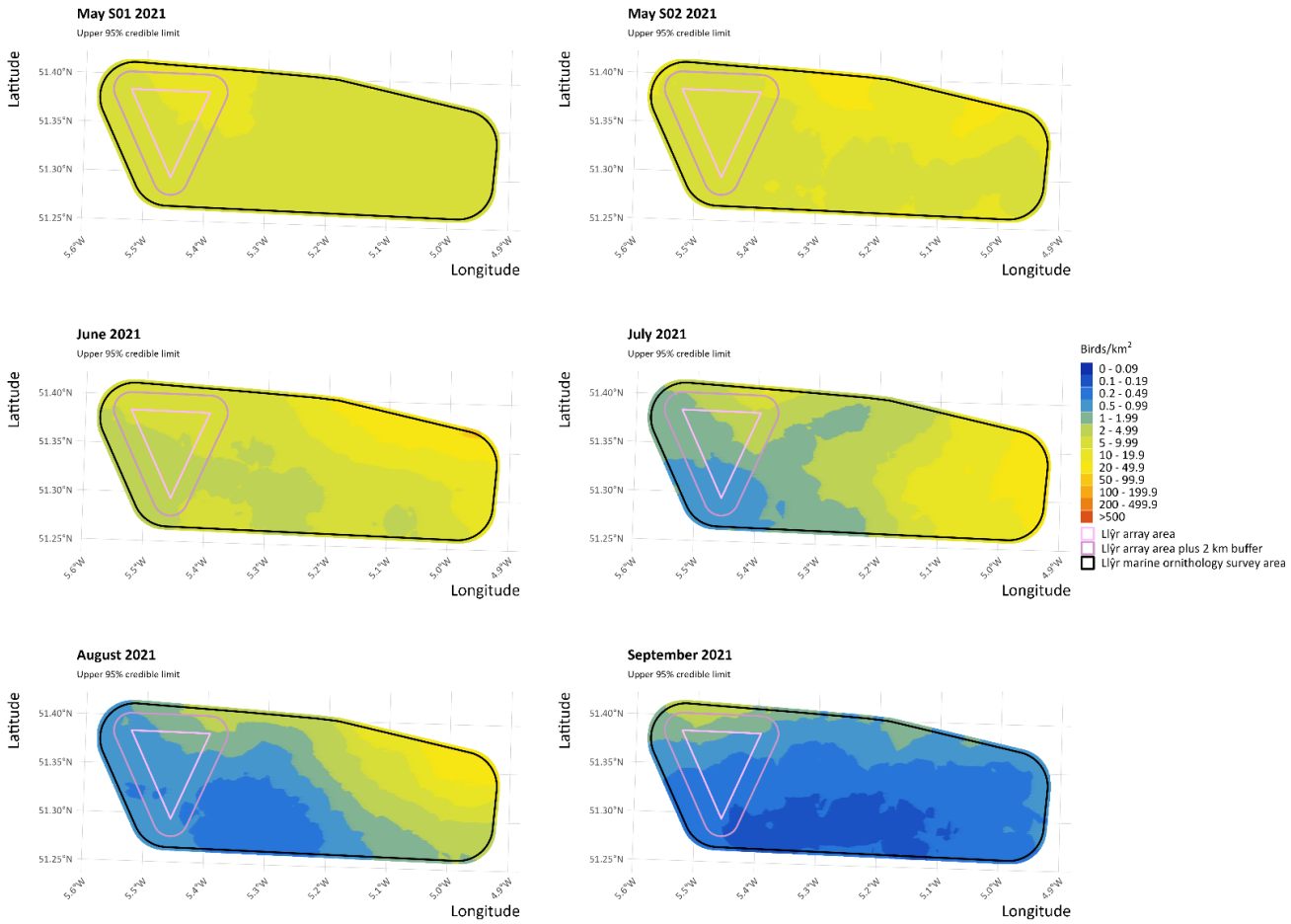

Figure 22A-31. Upper credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

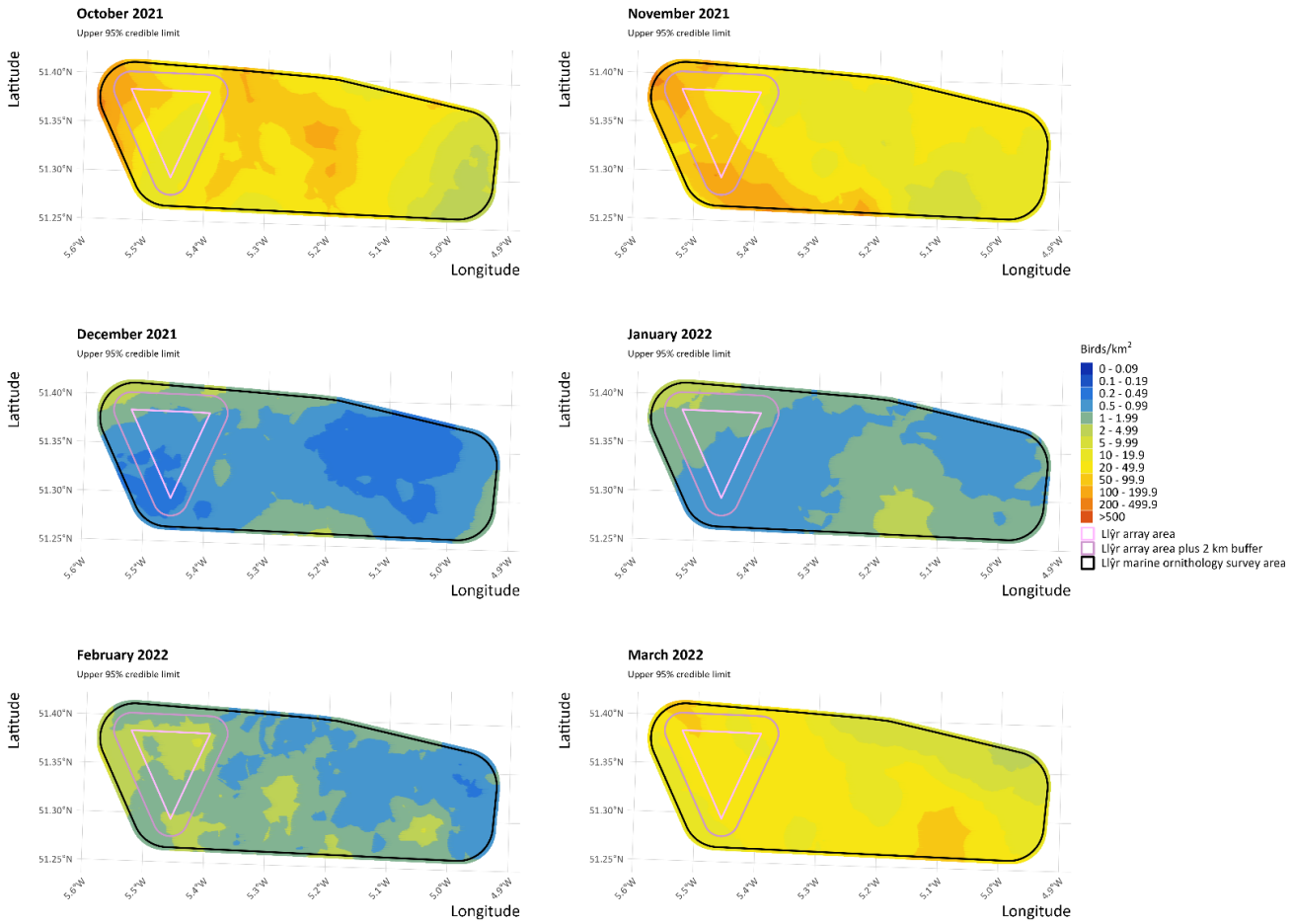

Figure 22A-32. Upper credible limit model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.3.3. Coefficient Of Variation Density Maps

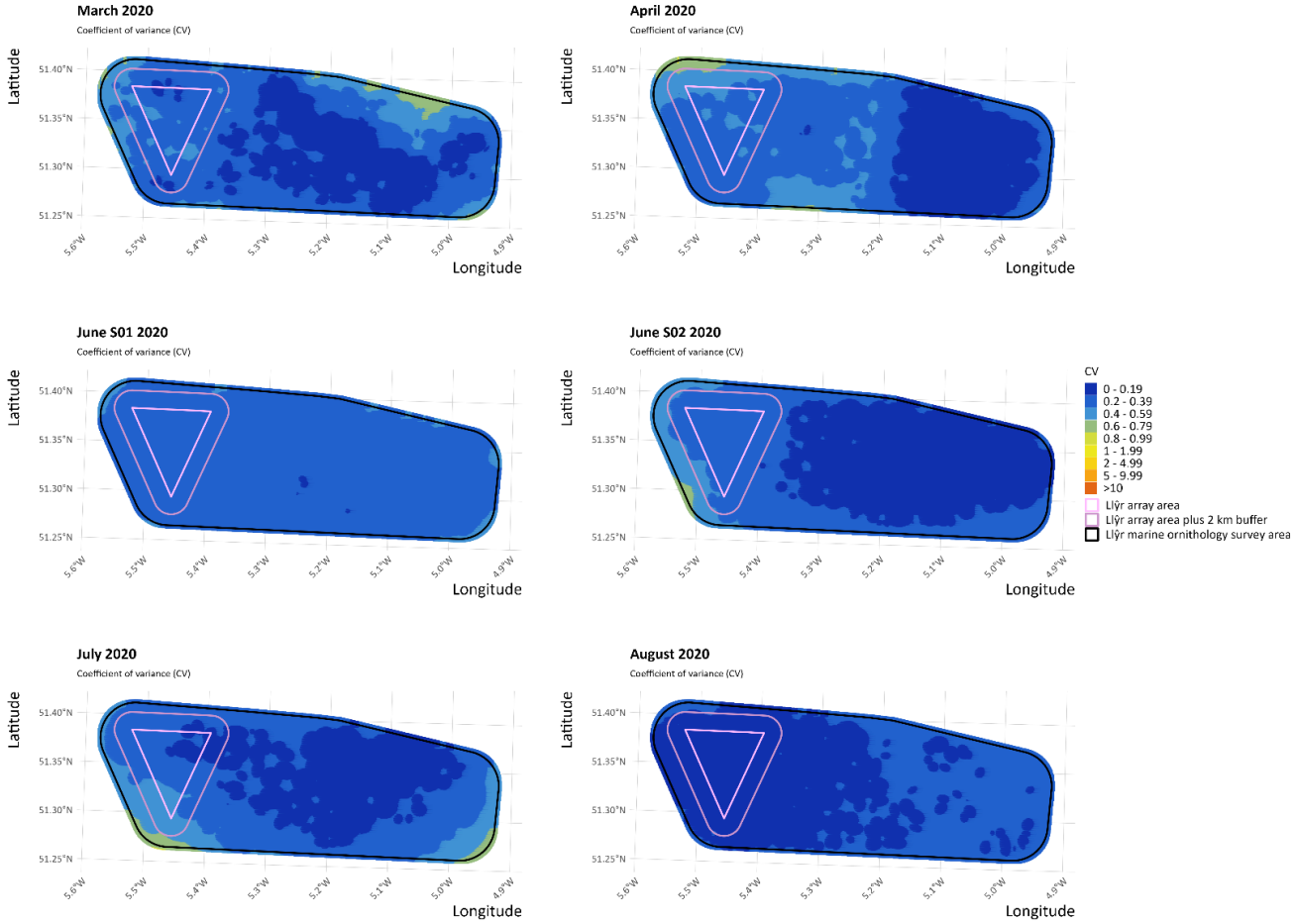

Figure 22A-33. Coefficient of Variation model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

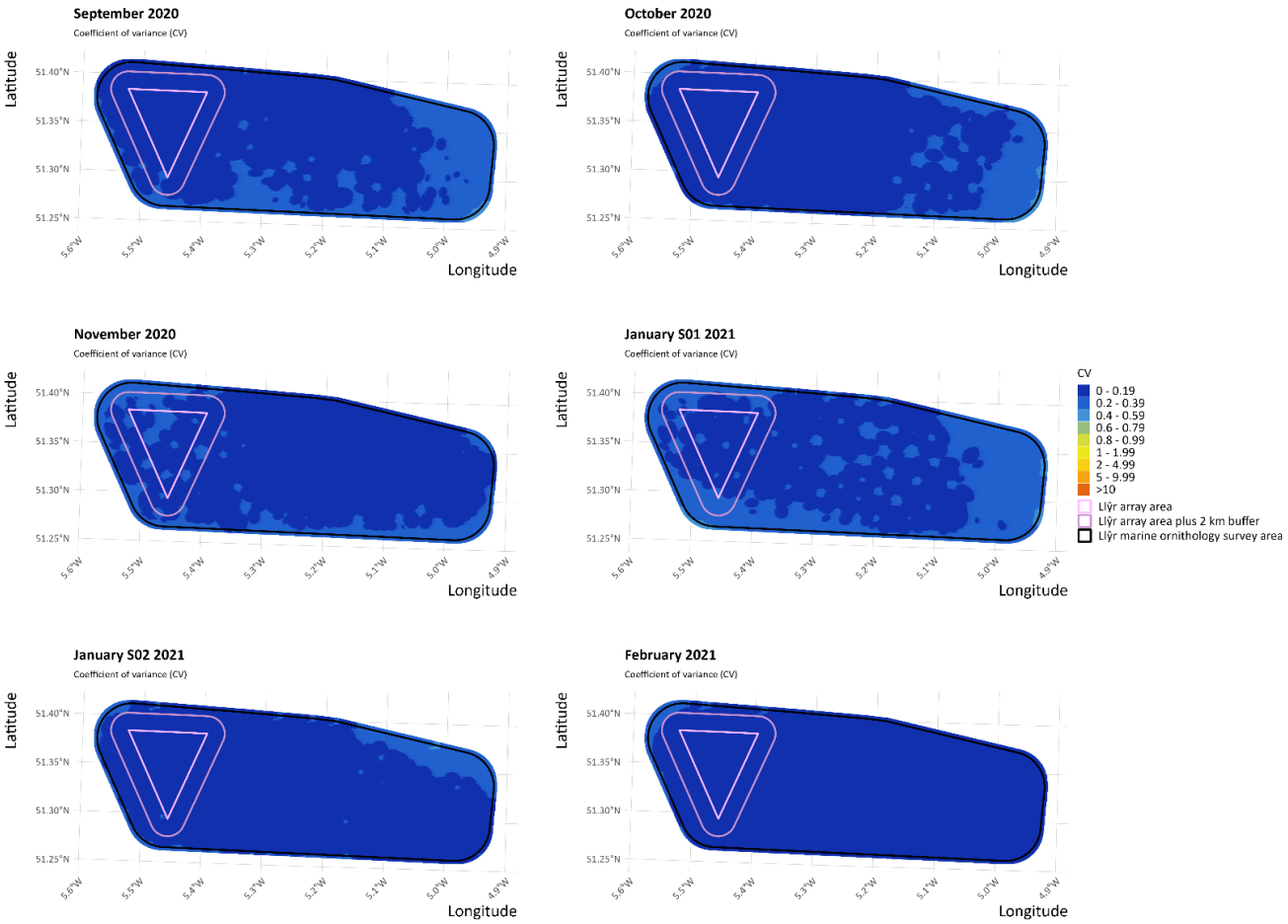

Figure 22A-34. Coefficient of Variation model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

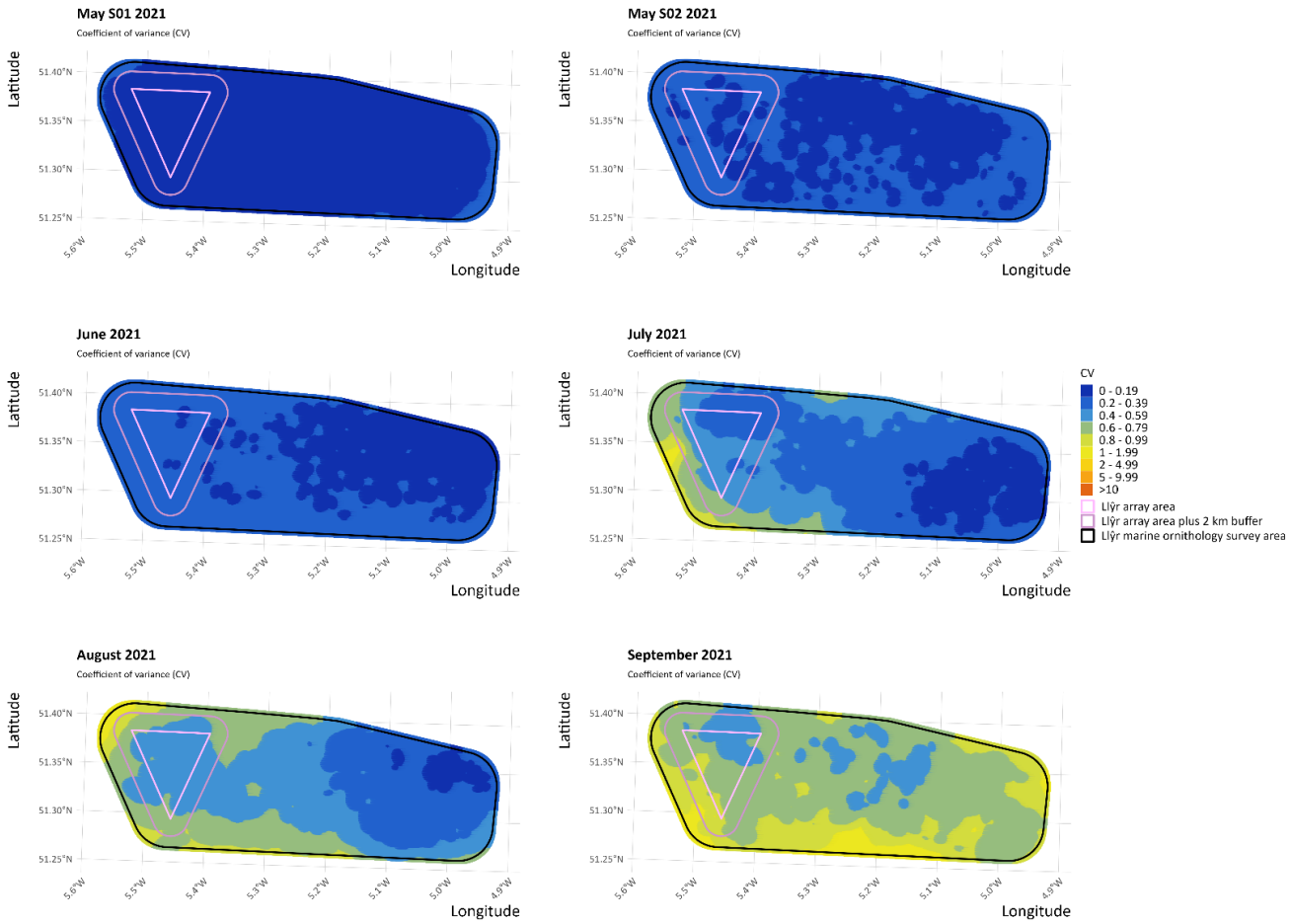

Figure 22A-35. Coefficient of Variation model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

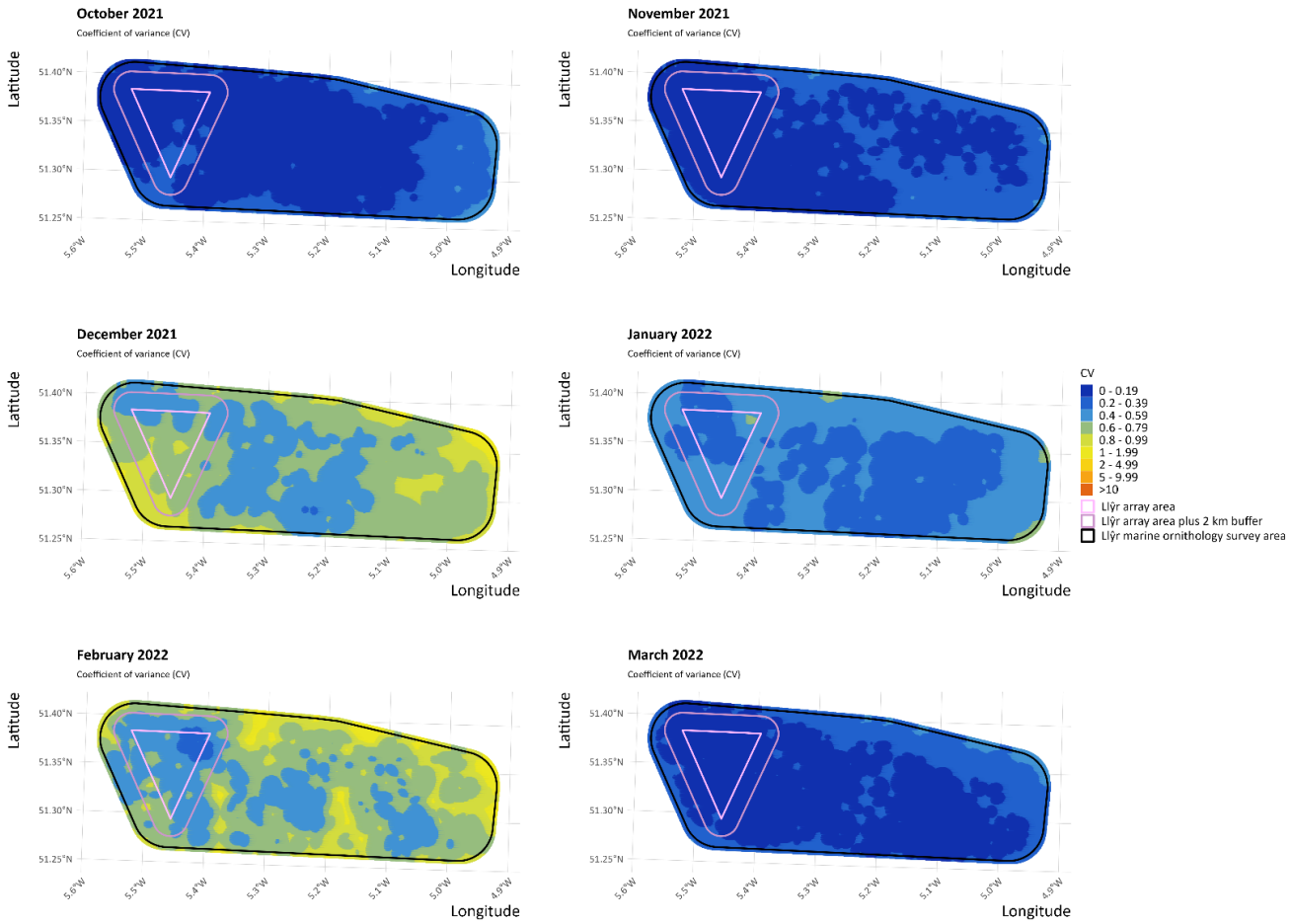

Figure 22A-36. Coefficient of Variation model-based density surface for all guillemots (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.4 Razorbill

22.4.1. Lower Credible Limit Density Maps

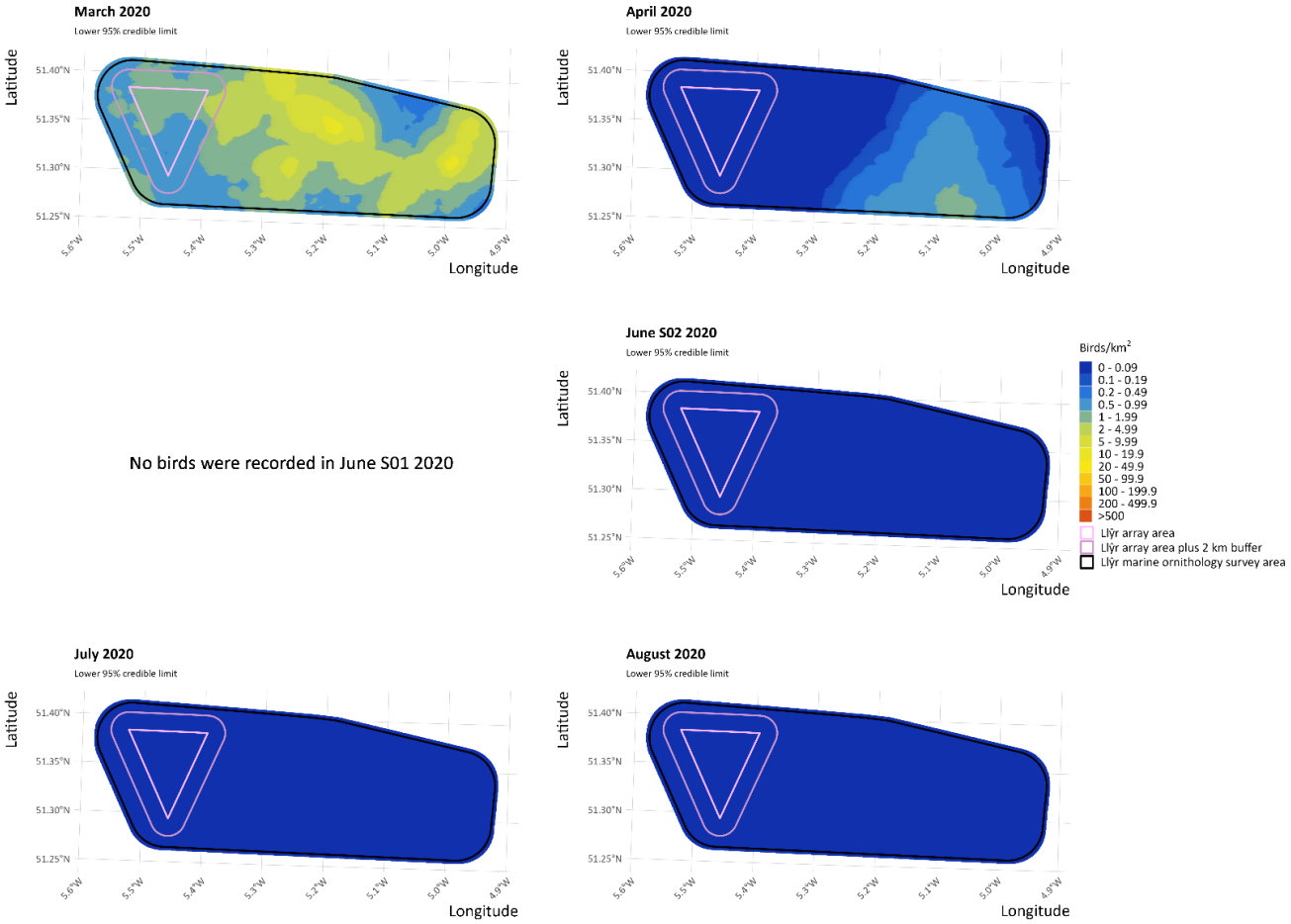

Figure 22A-37. Lower credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

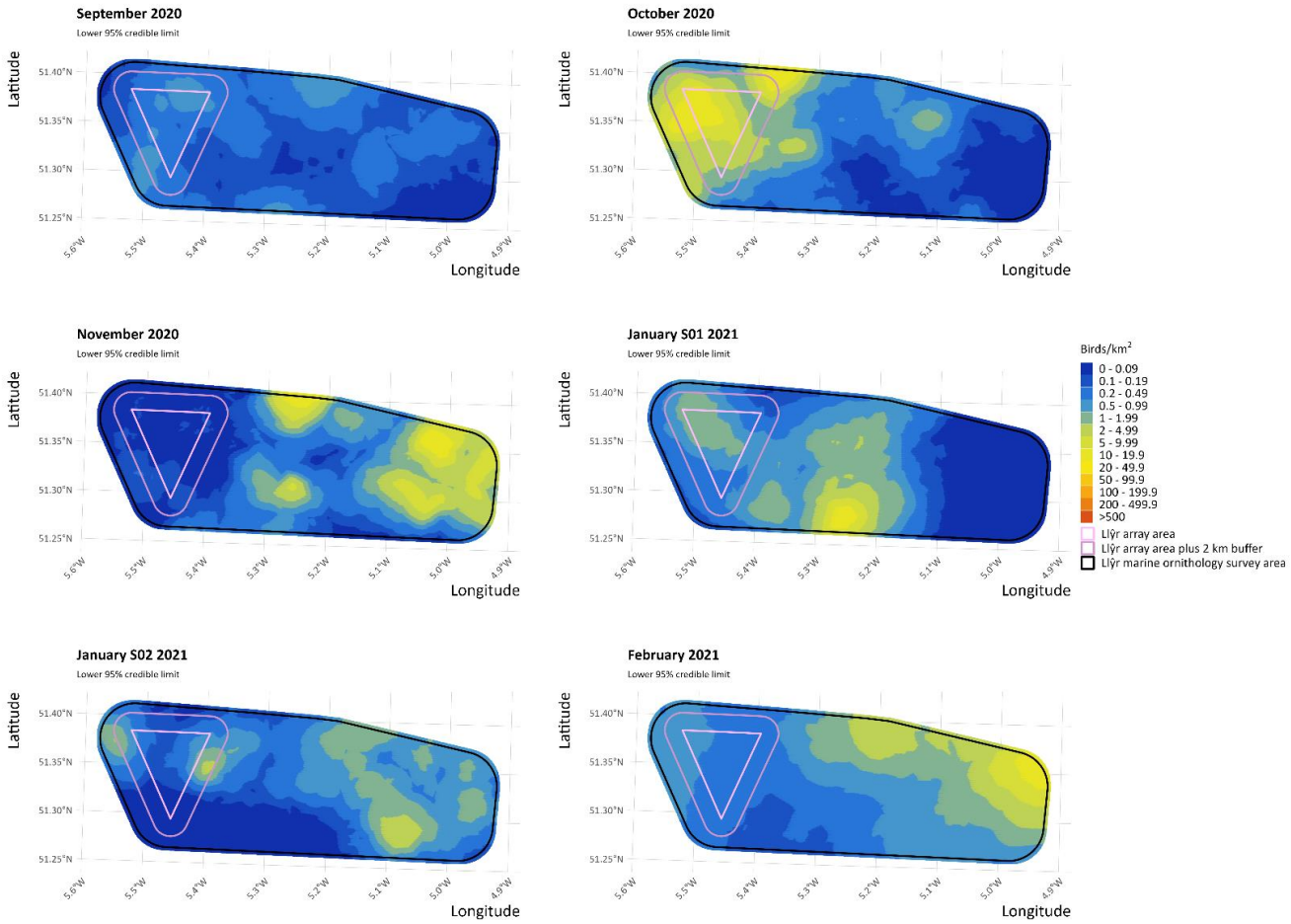

Figure 22A-38. Lower credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

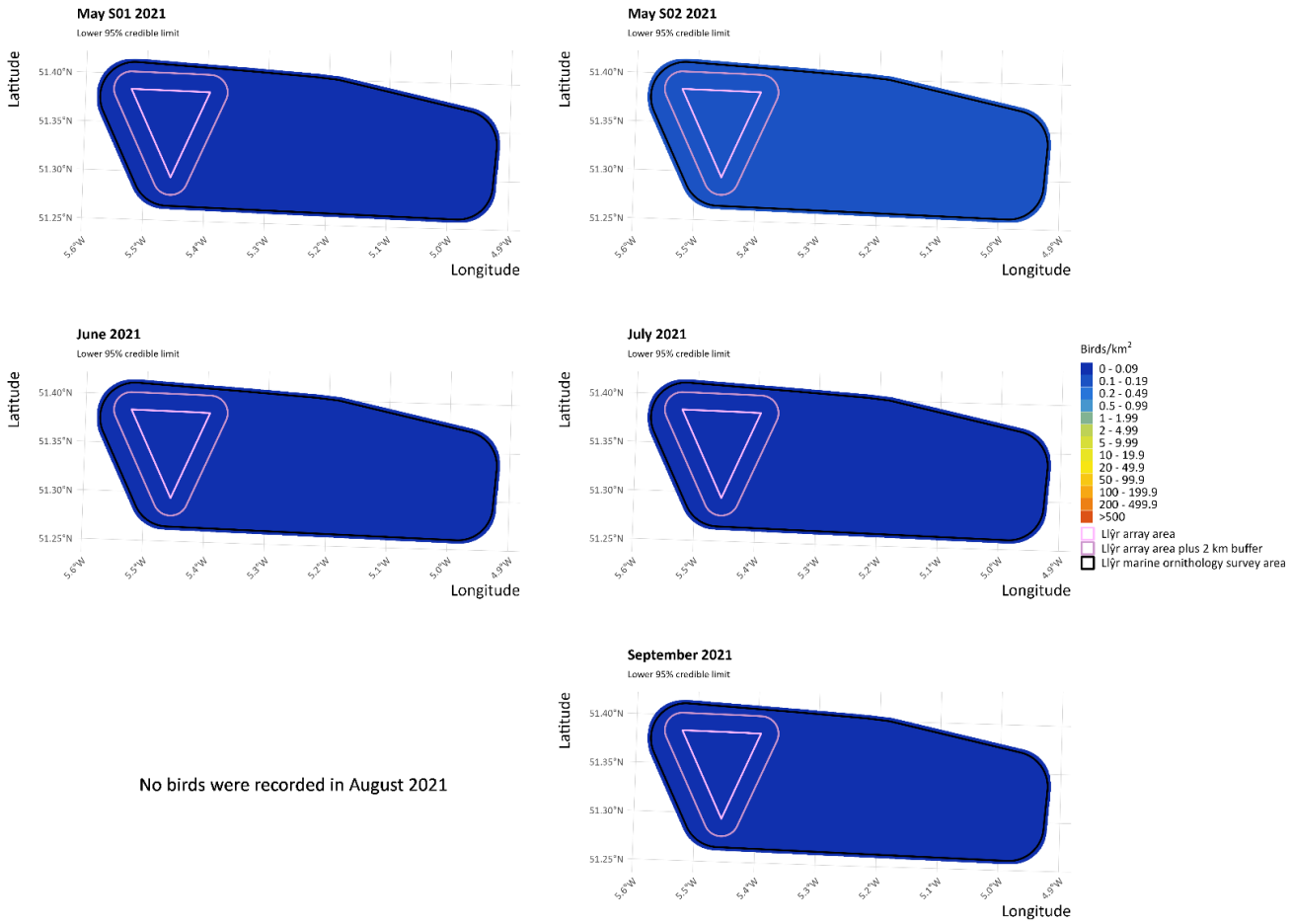

Figure 22A-39. Lower credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

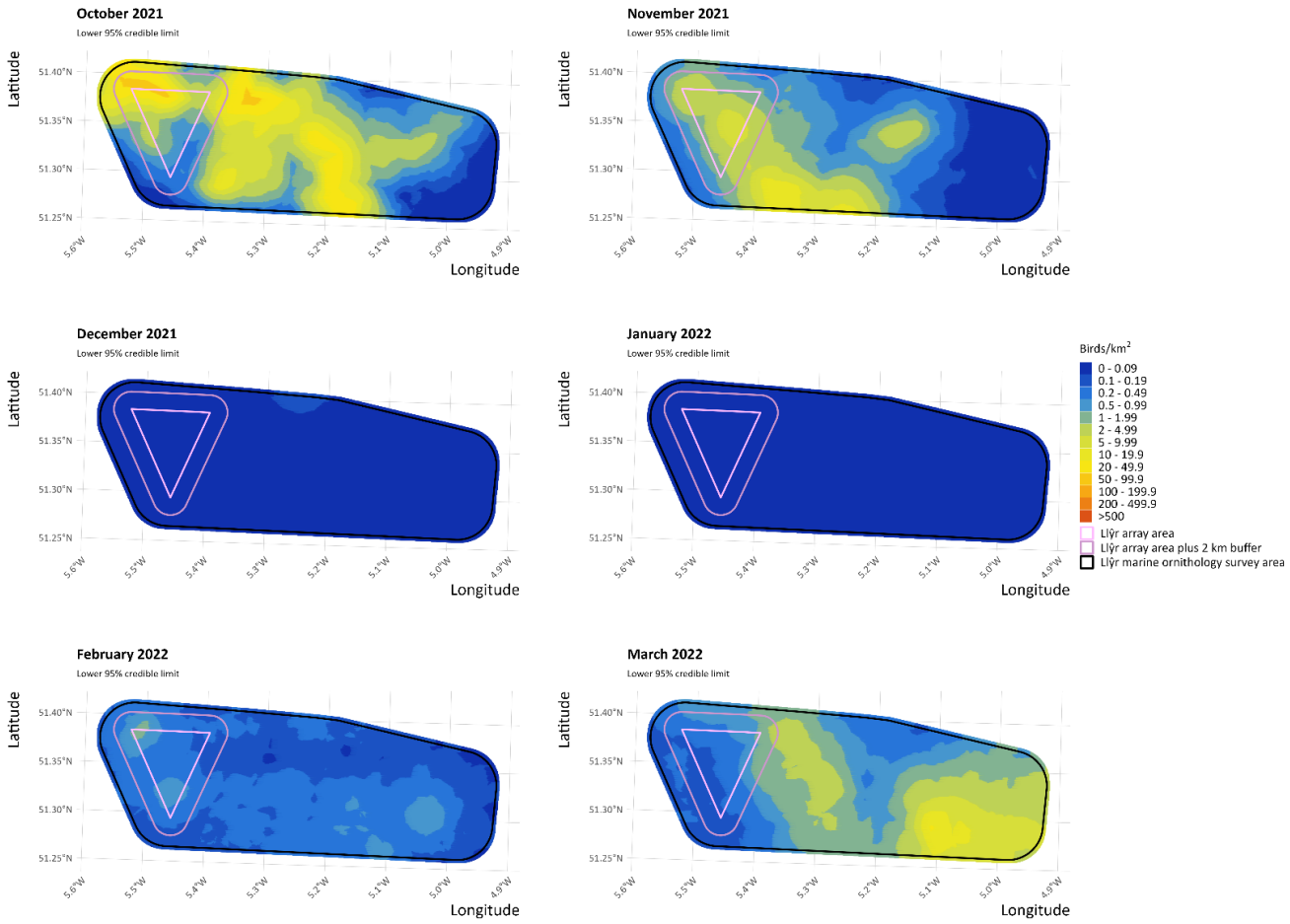

Figure 22A-40. Lower credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.4.2. Upper Credible Limit Density Maps

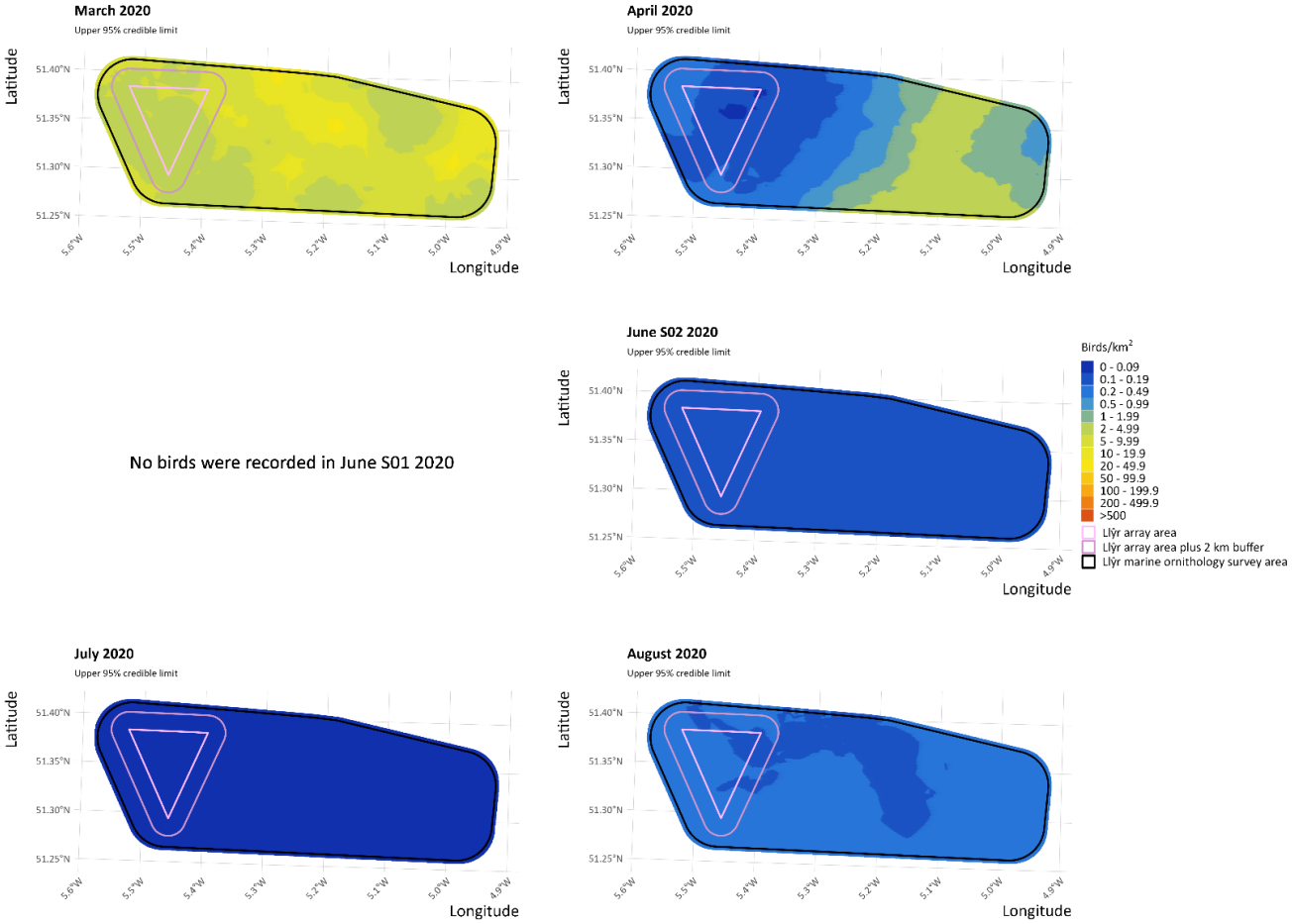

Figure 22A-41. Upper credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

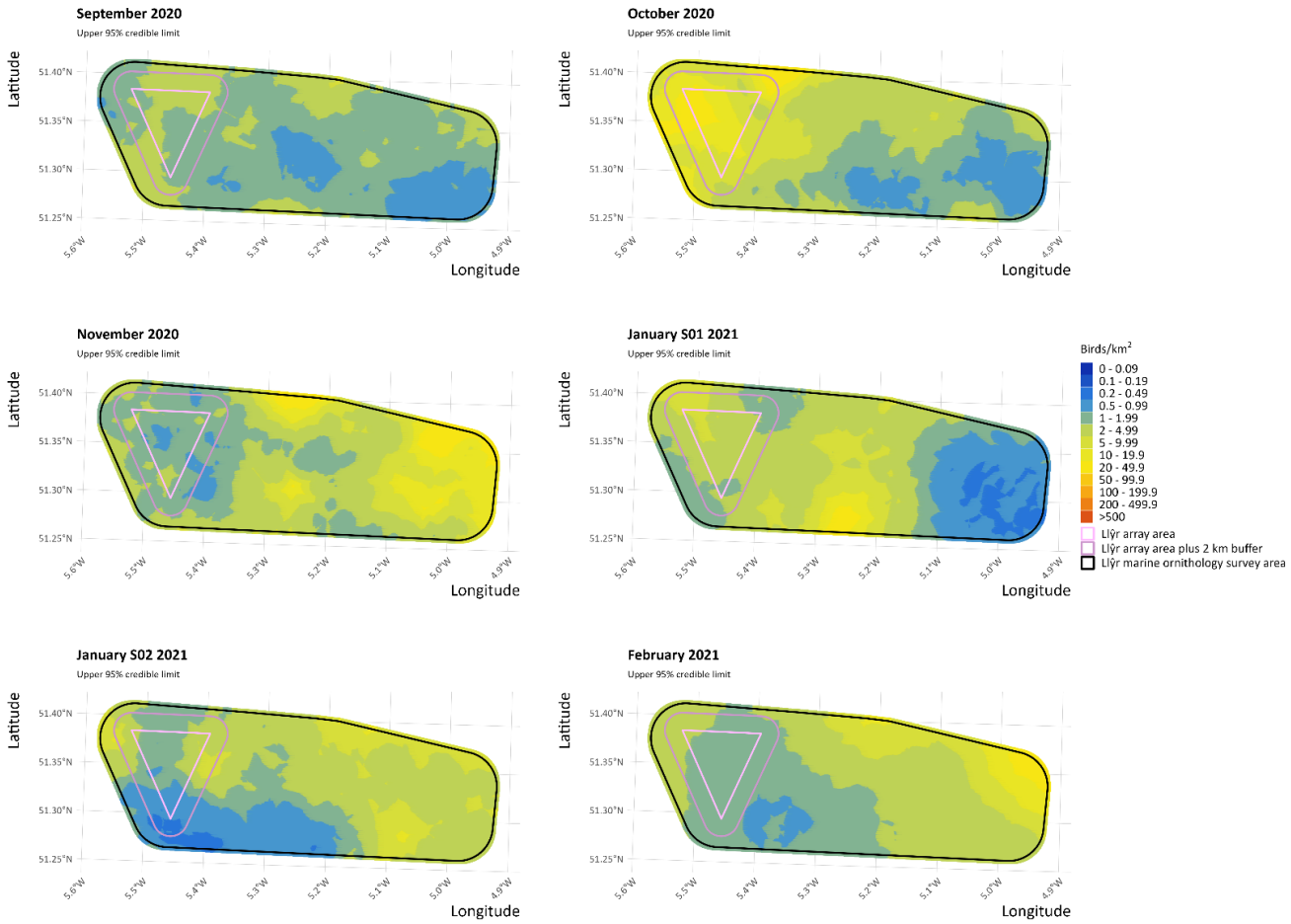

Figure 22A-42. Upper credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

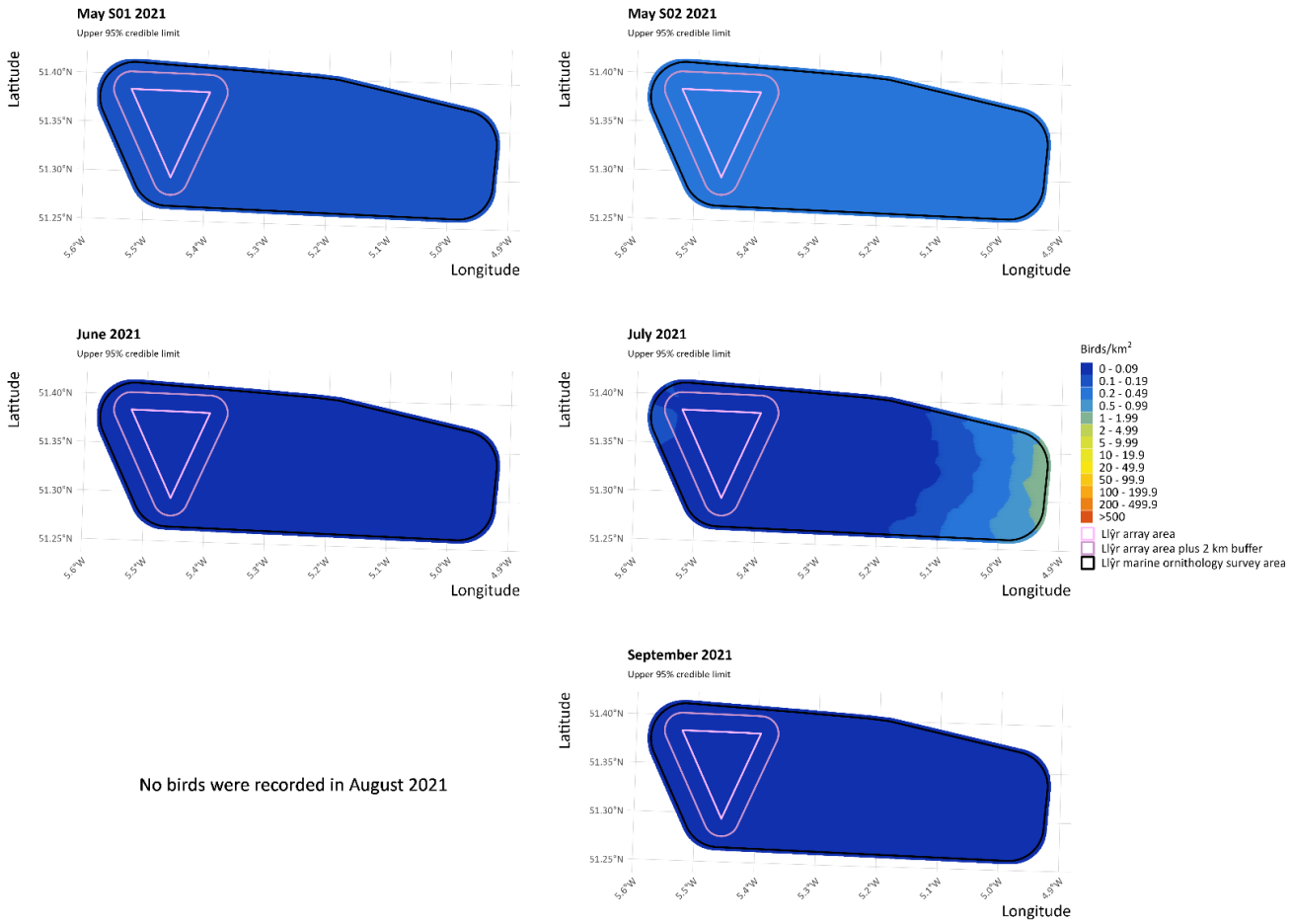

Figure 22A-43. Upper credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

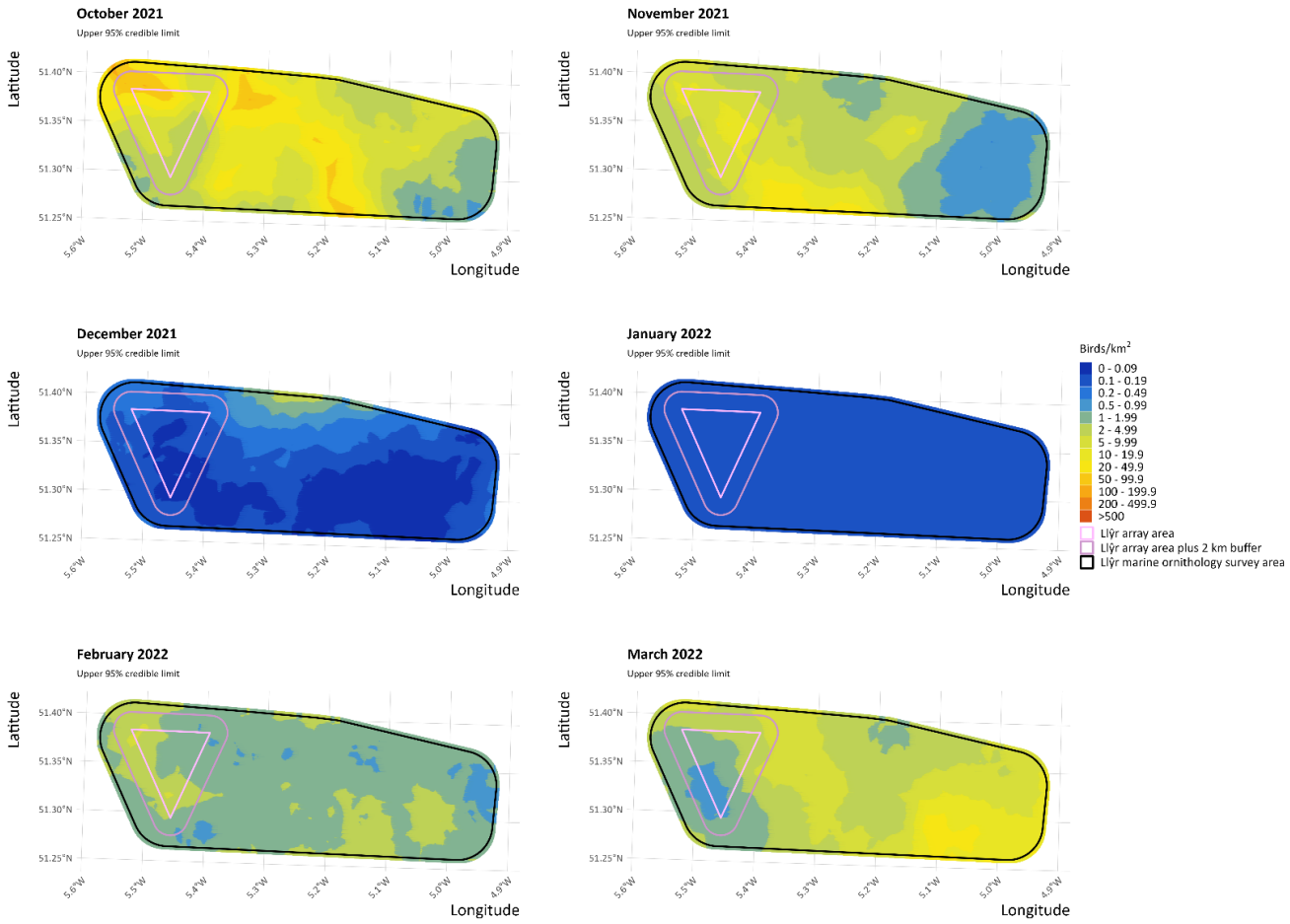

Figure 22A-44. Upper credible limit model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.4.3. Coefficient Of Variation Density Maps

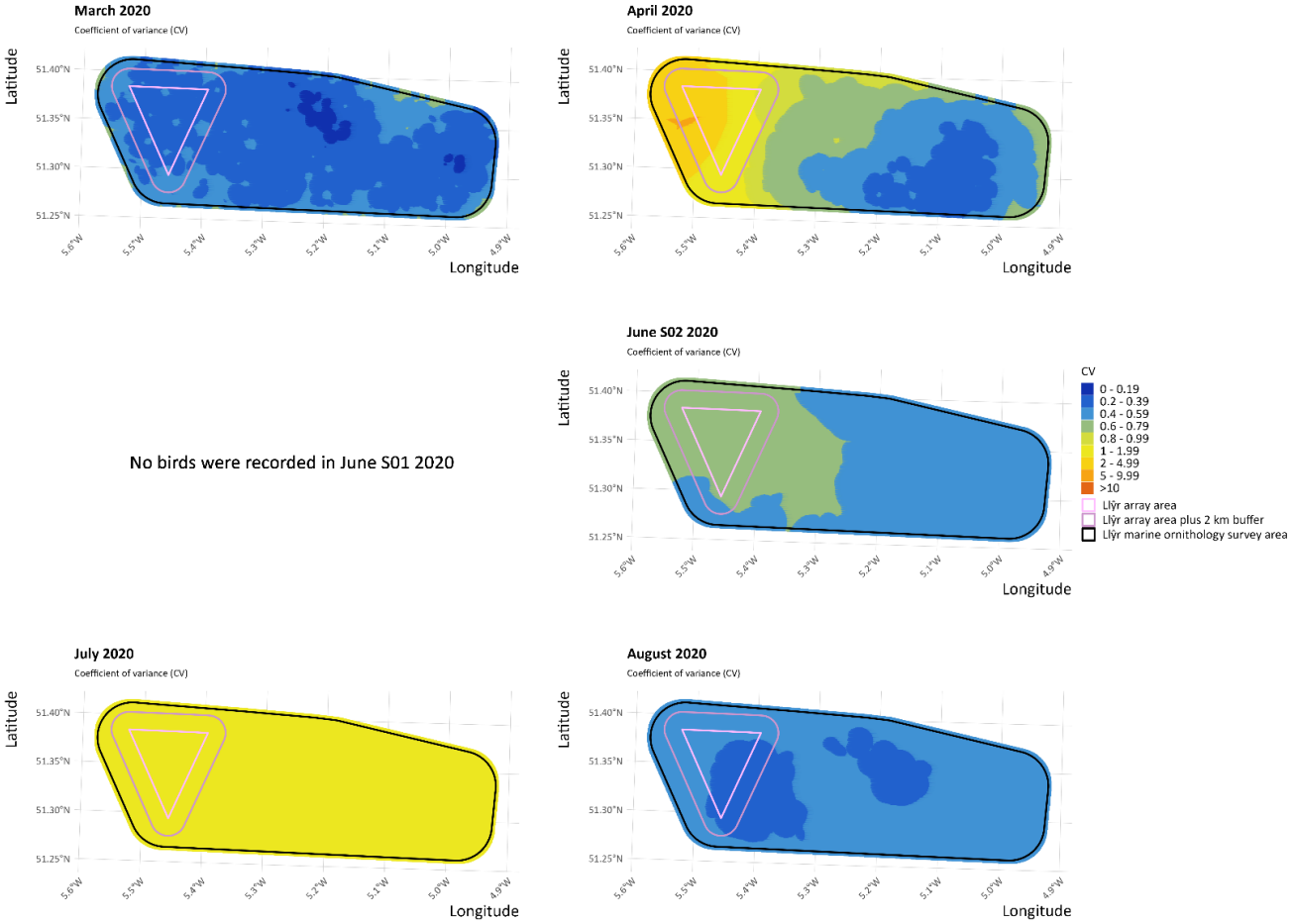

Figure 22A-45. Coefficient of Variation model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

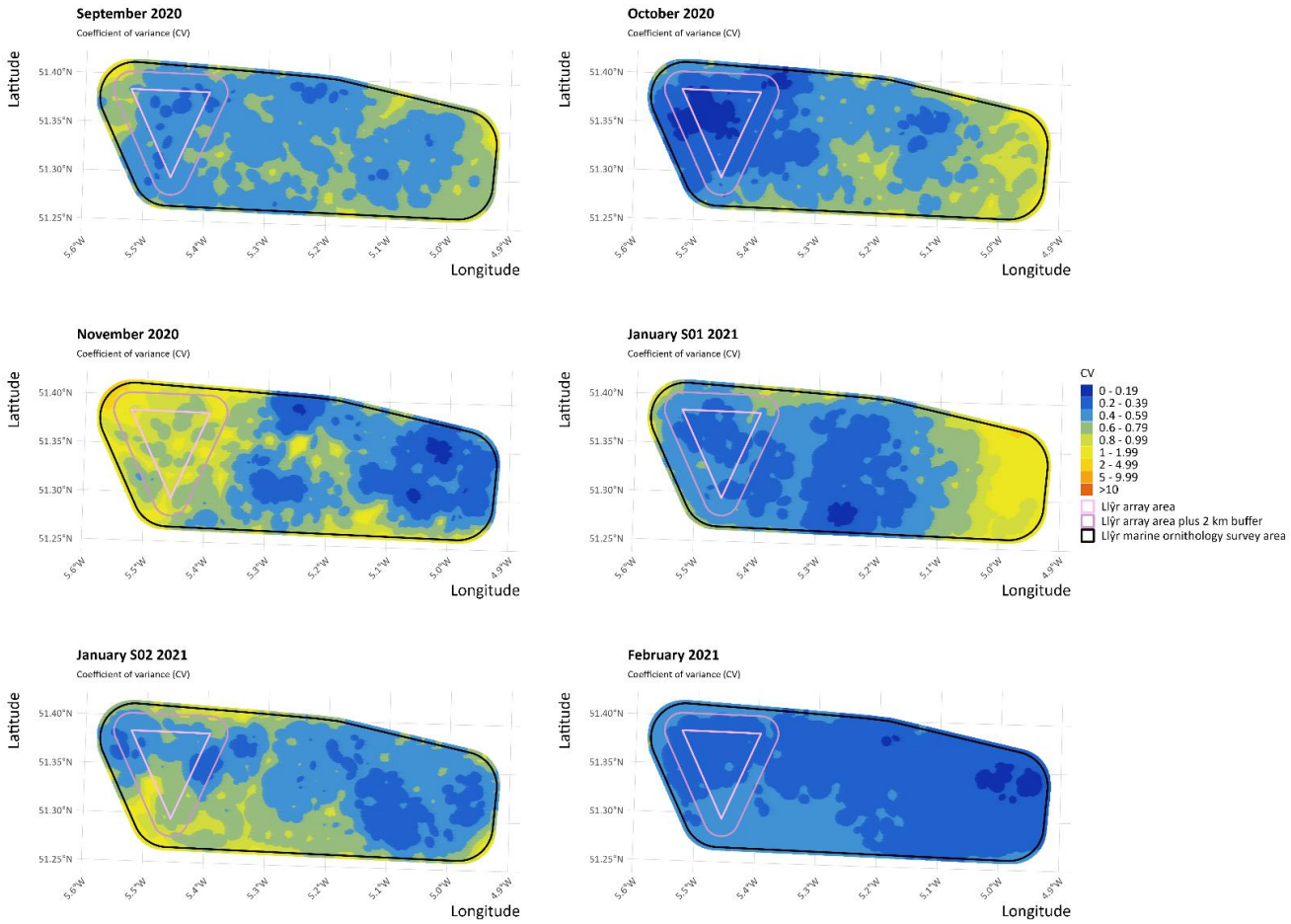

Figure 22A-46. Coefficient of Variation model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

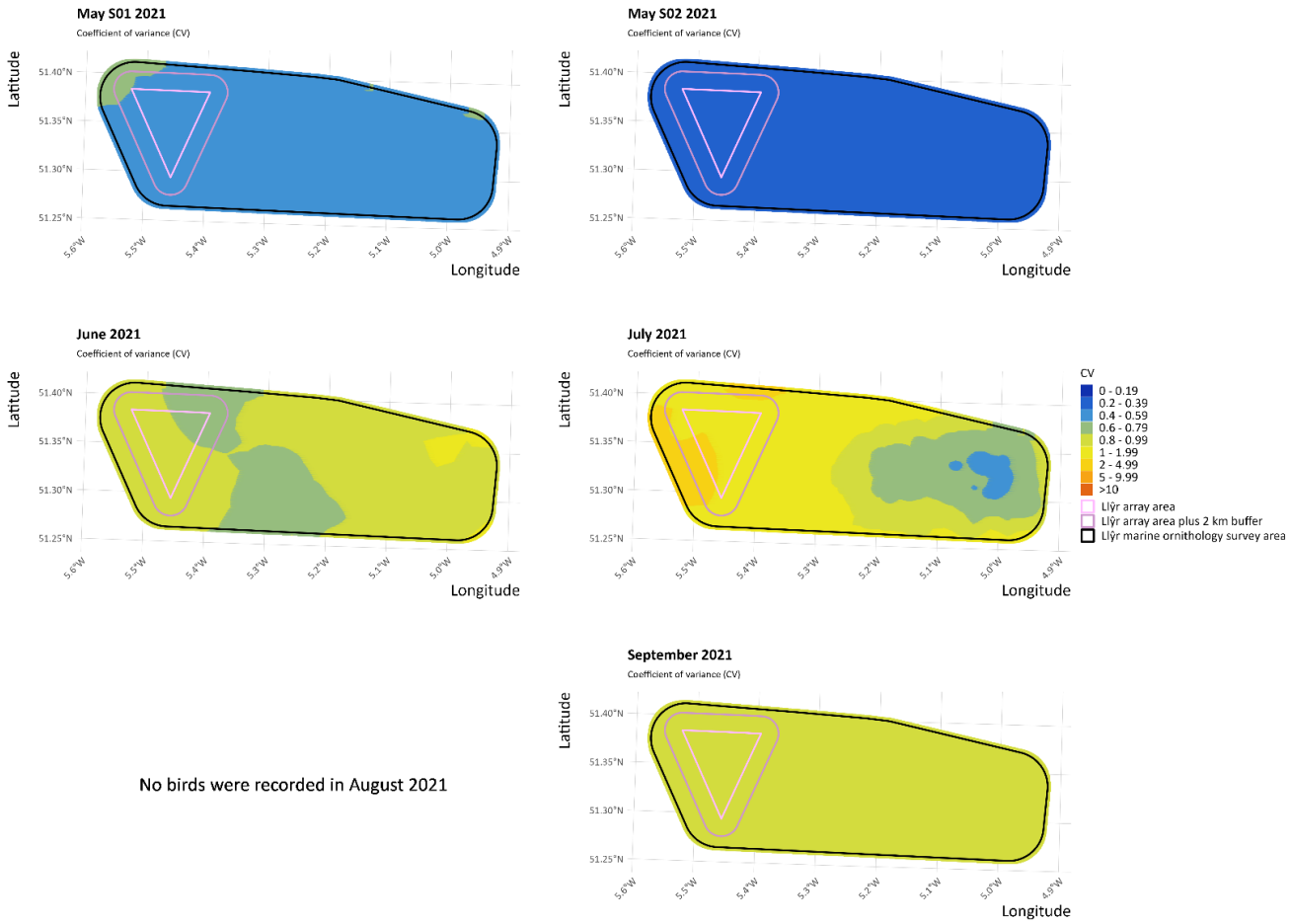

Figure 22A-47. Coefficient of Variation model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

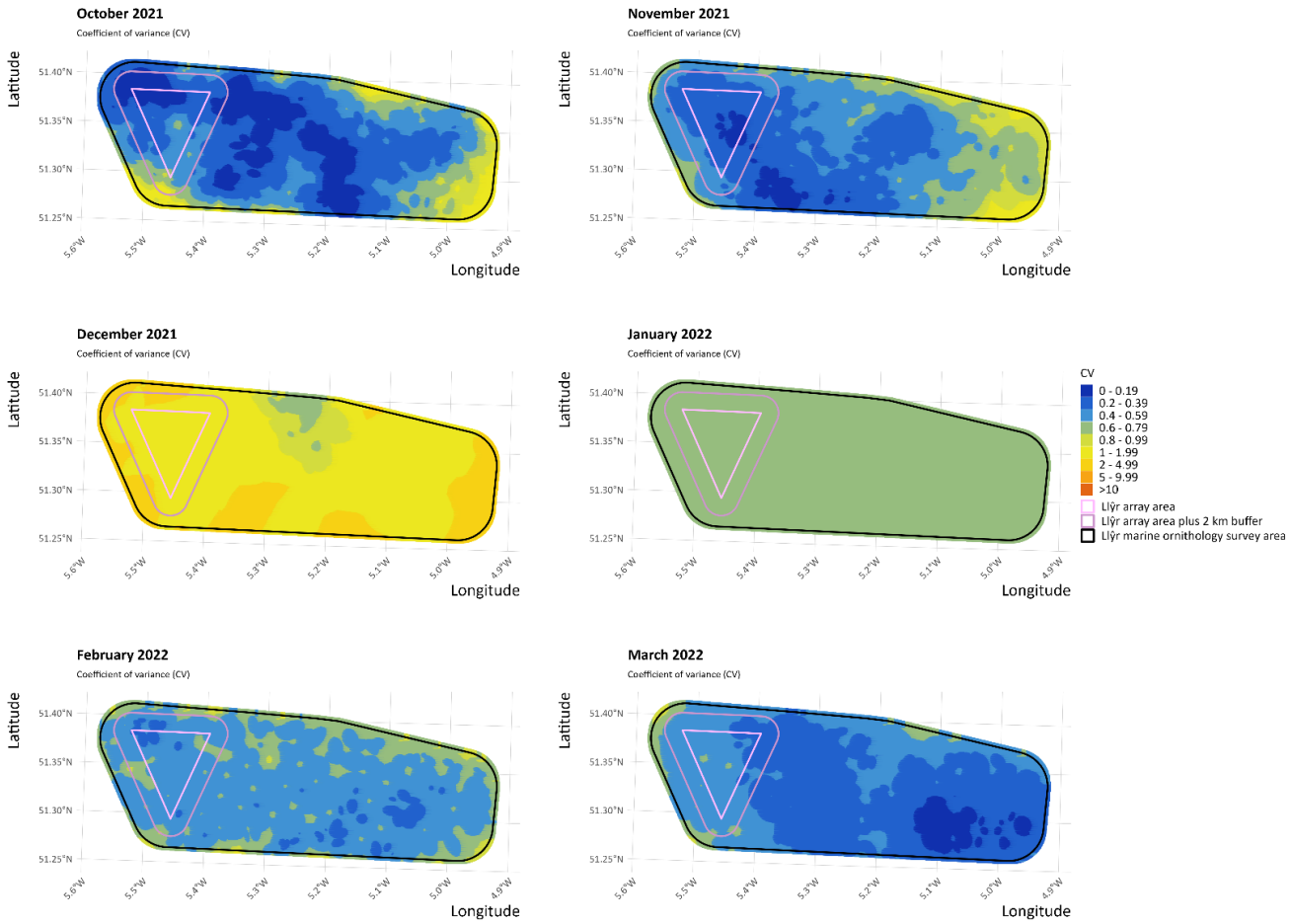

Figure 22A-48. Coefficient of Variation model-based density surface for all razorbills (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.5 Puffin

22.5.1. Lower Credible Limit Density Maps

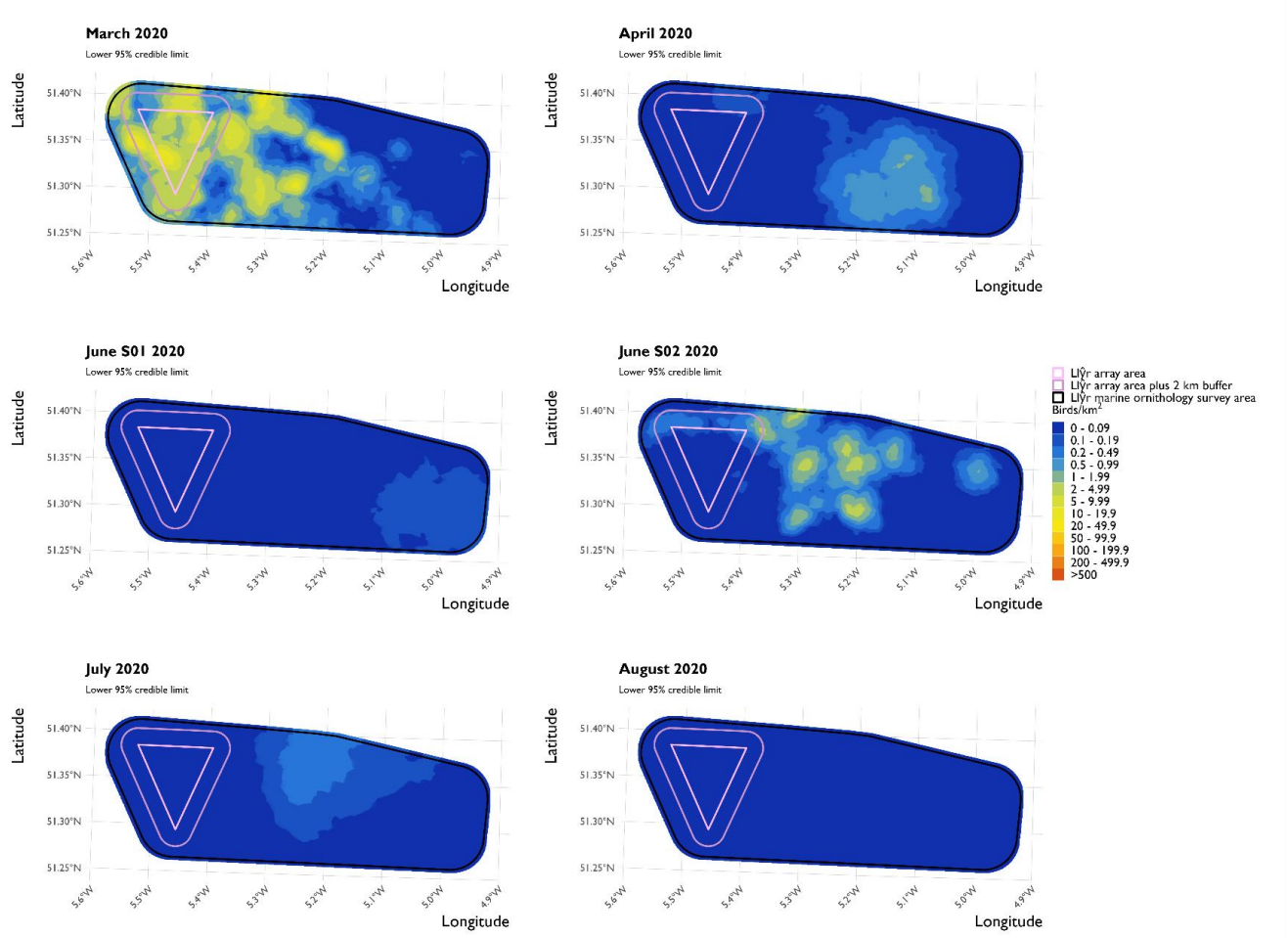

Figure 22A-49. Lower credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

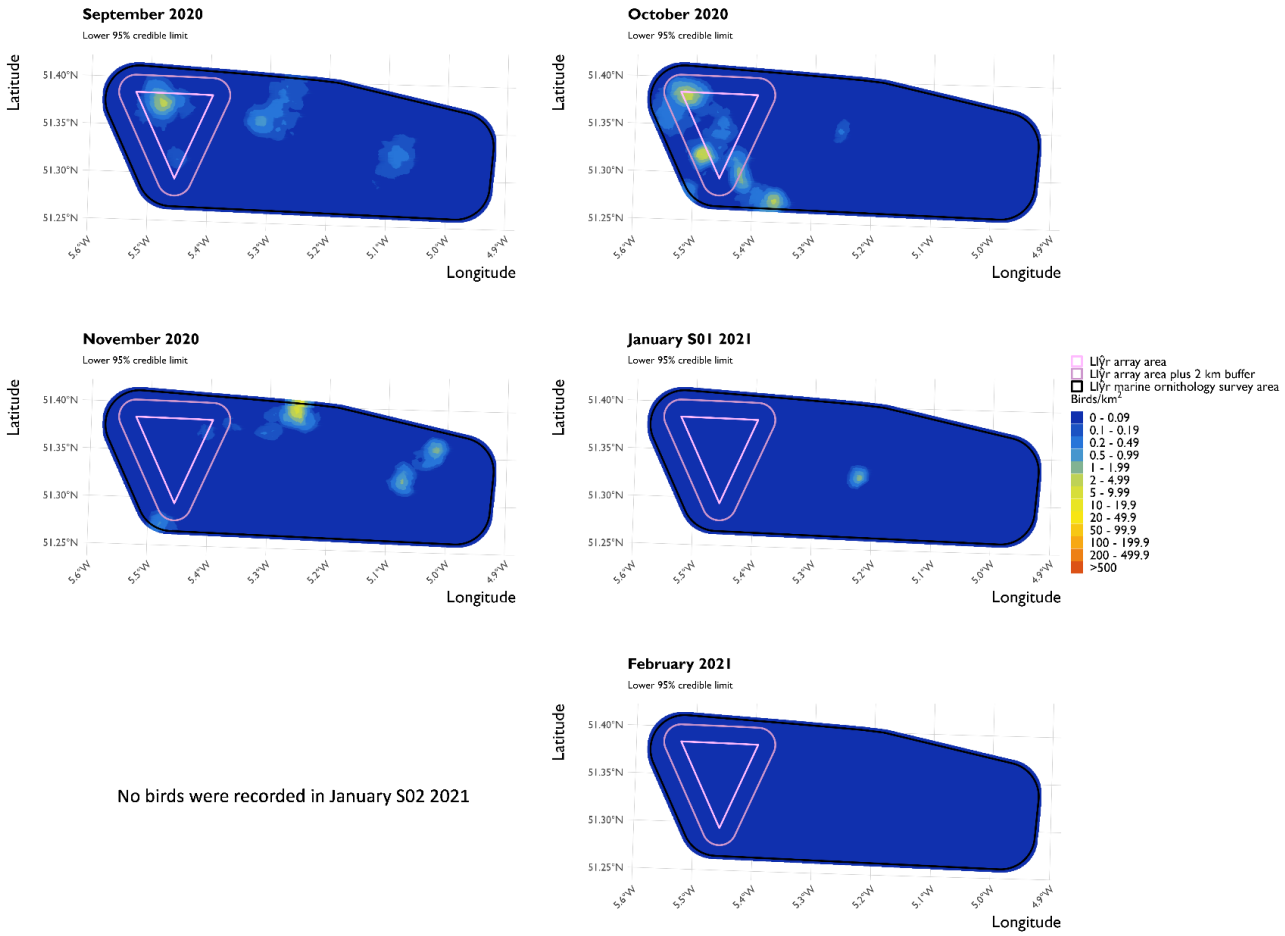

Figure 22A-50. Lower credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

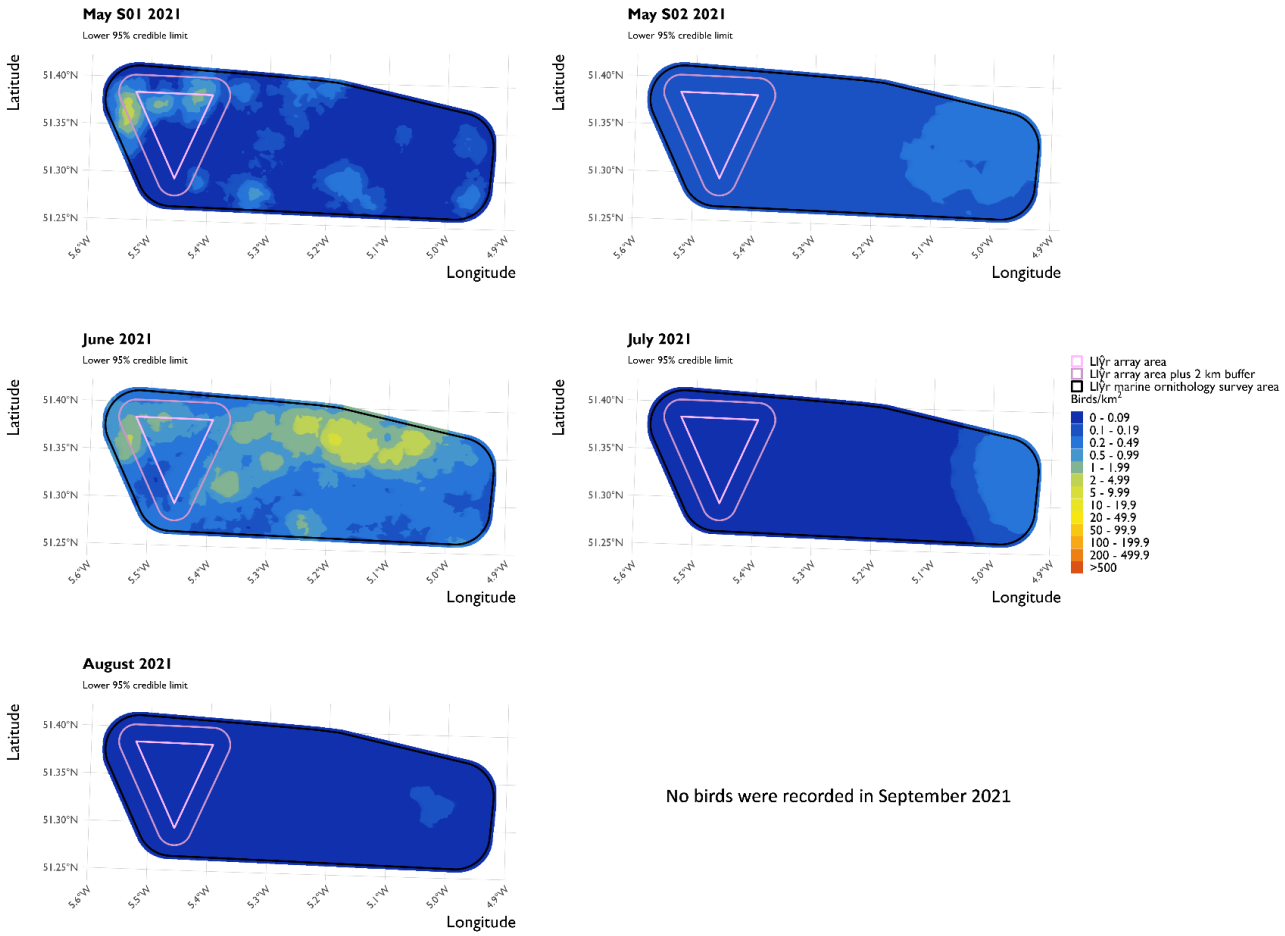

Figure 22A-51. Lower credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

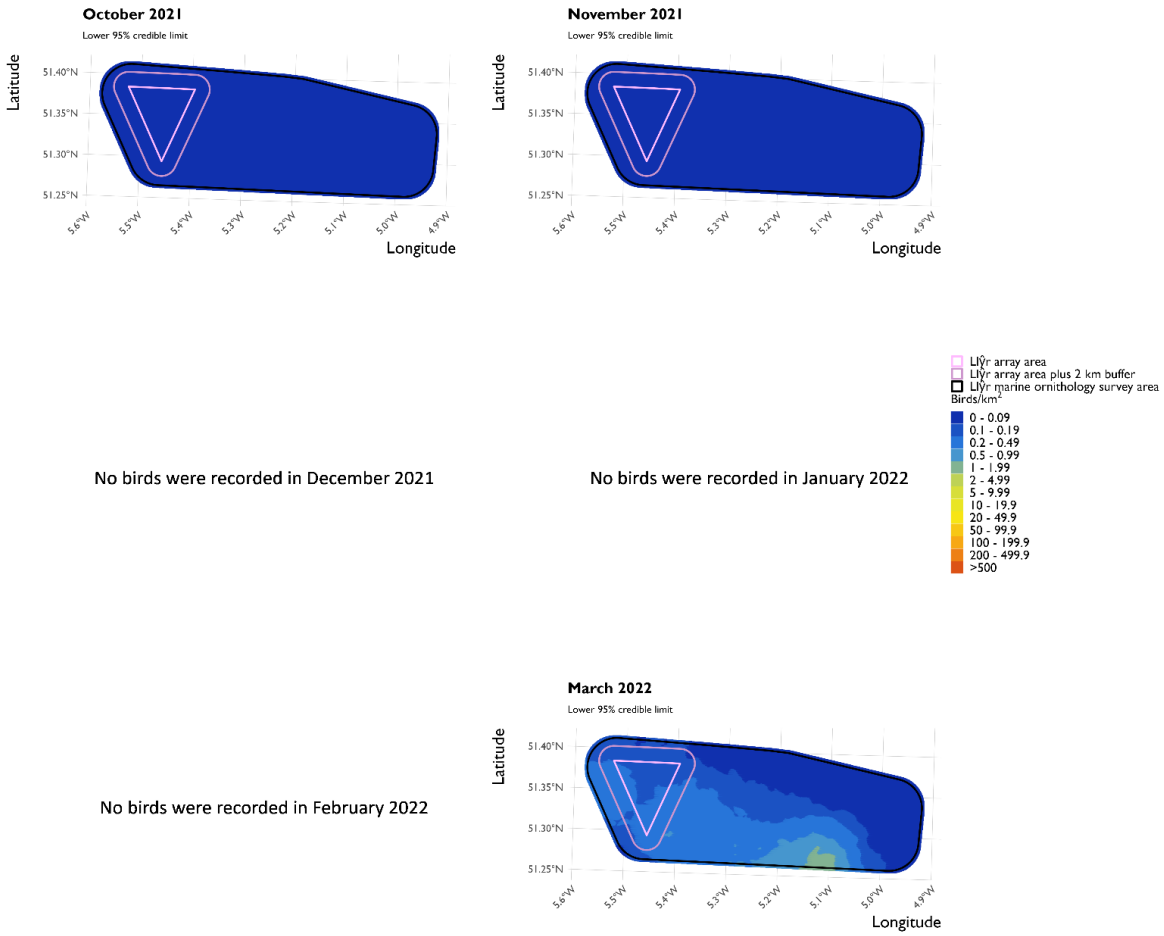

Figure 22A-52. Lower credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022) (NB: maps are presented in order of survey number and named after the month used for analysis

22.5.2. Upper Credible Limit Density Maps

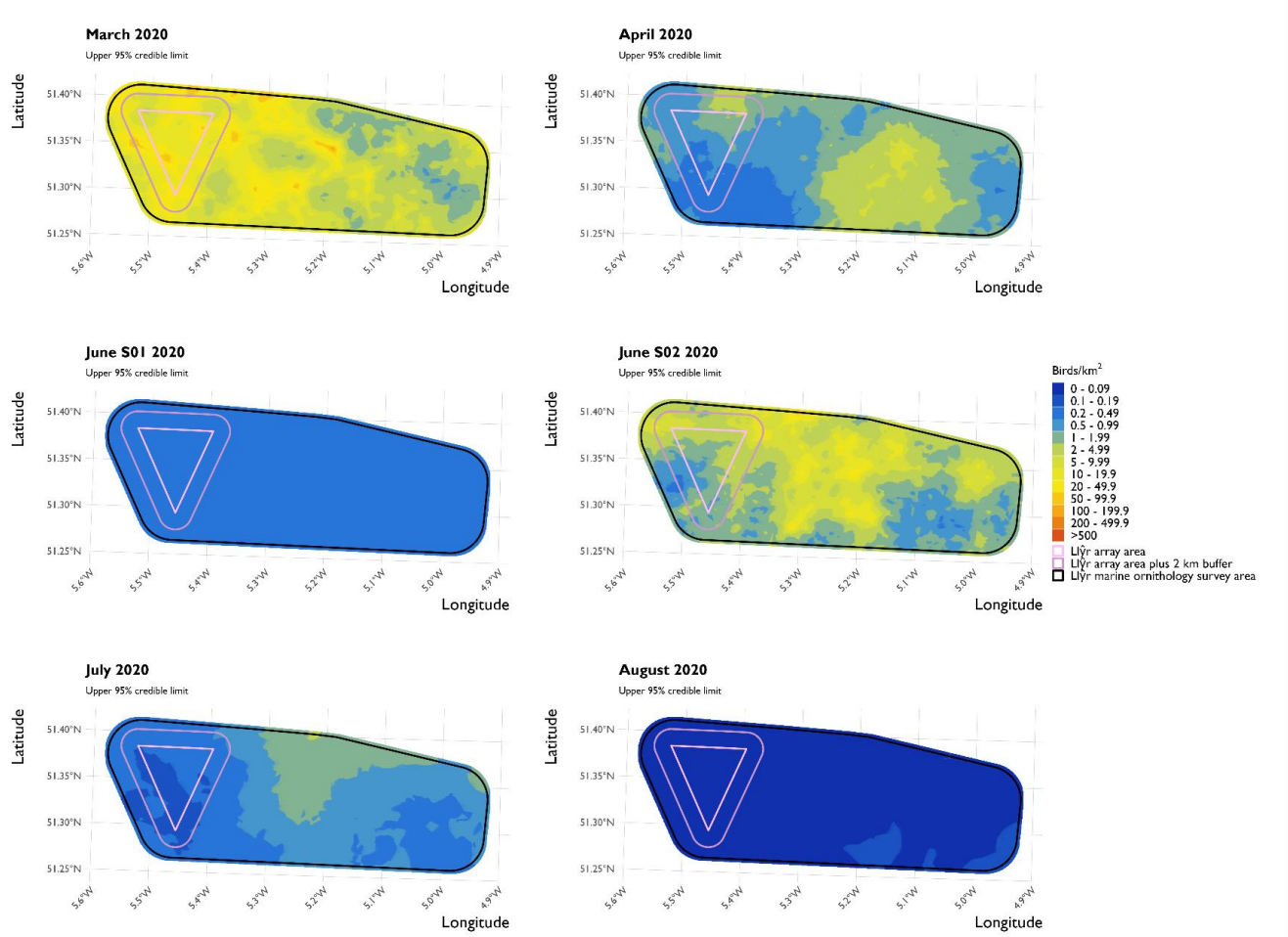

Figure 22A-53. Upper credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

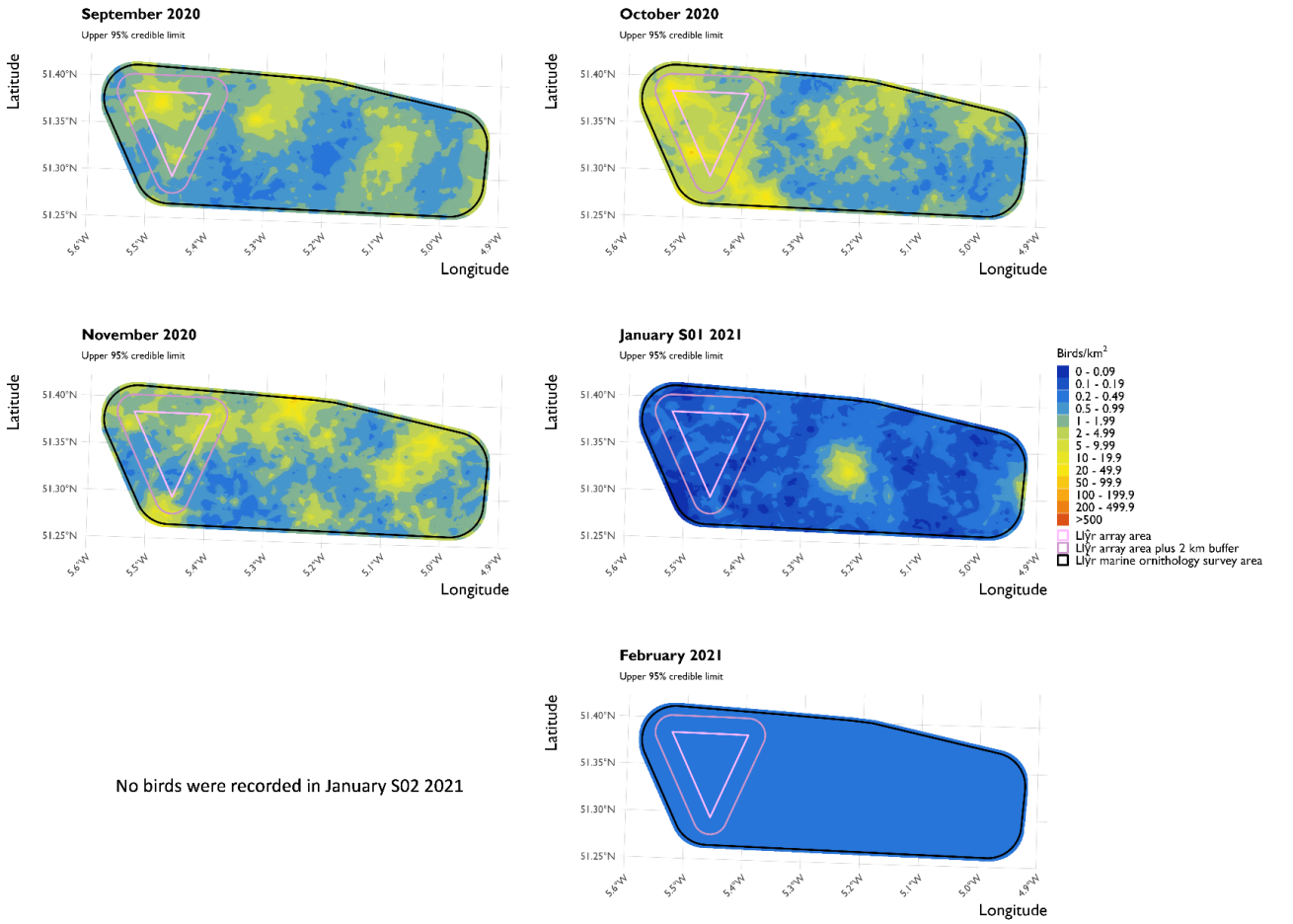

Figure 22A-54. Upper credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

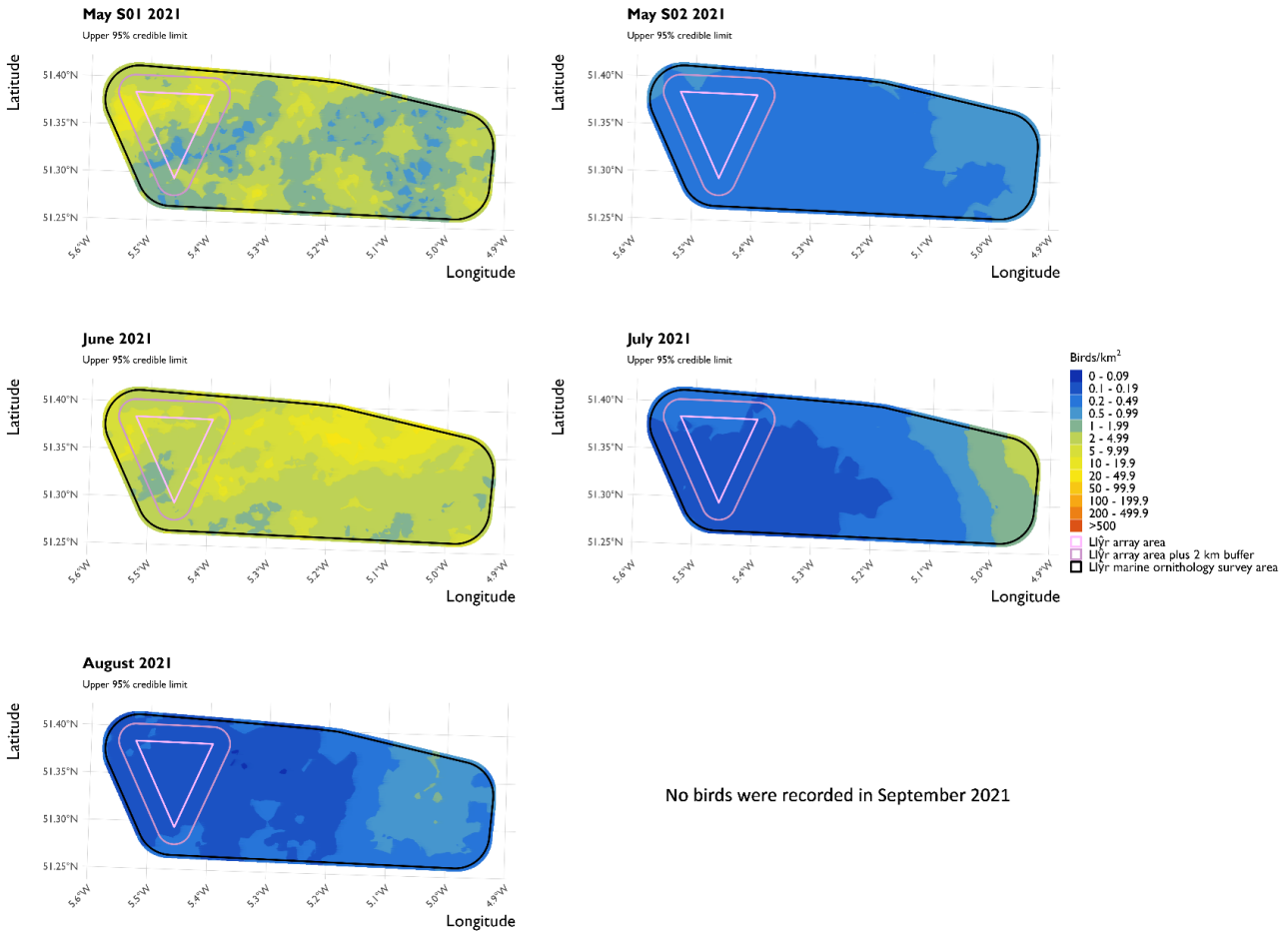

Figure 22A-55. Upper credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

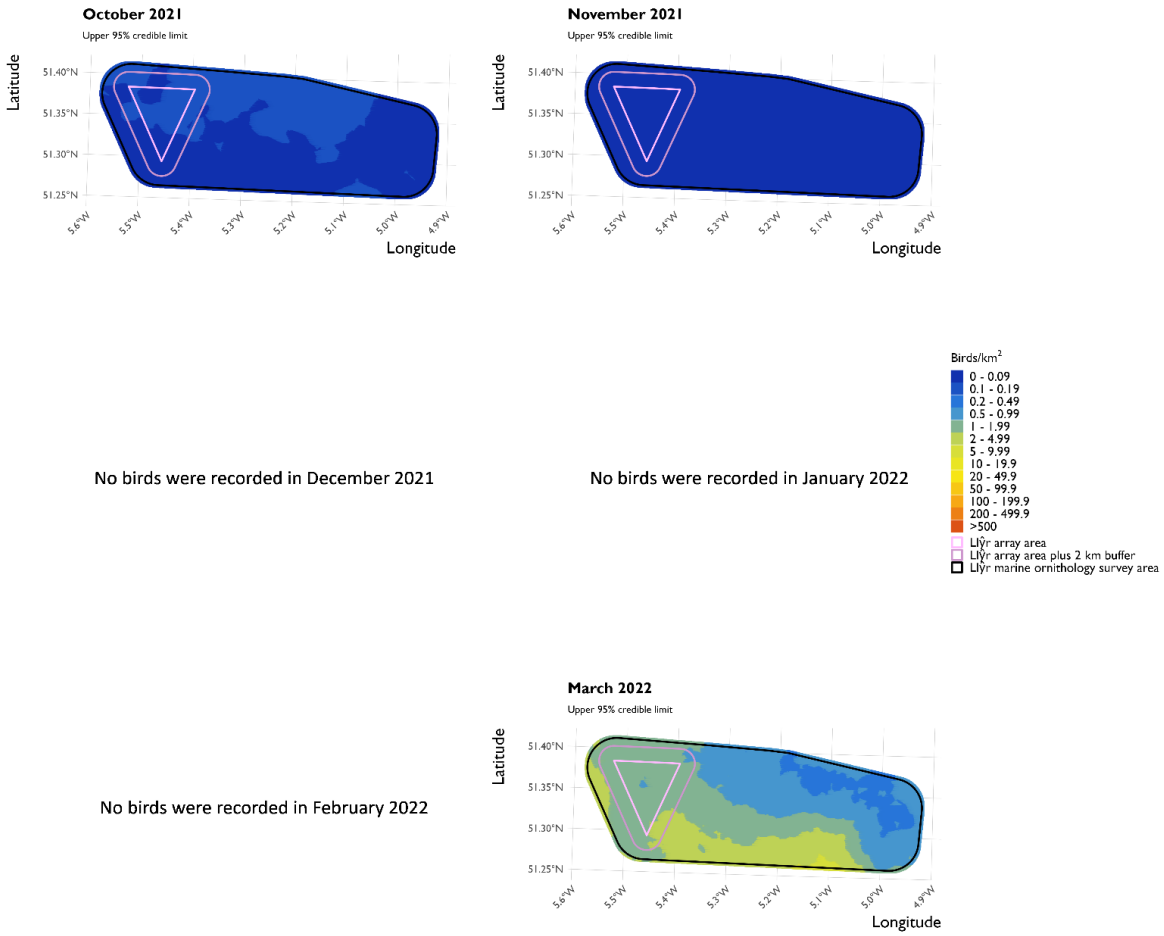

Figure 22A-56. Upper credible limit model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.5.3. Coefficient Of Variation Density Maps

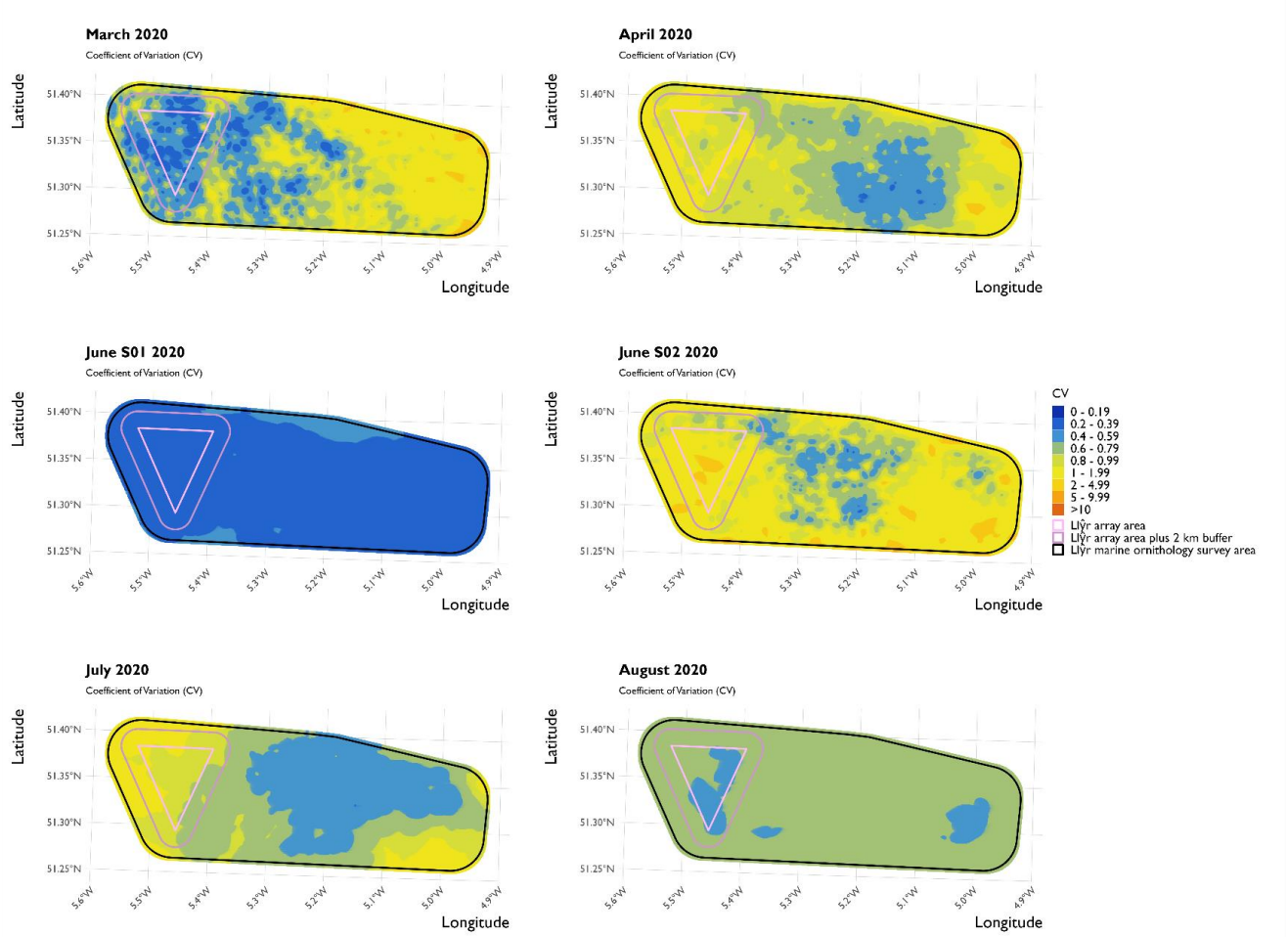

Figure 22A-57. Coefficient of Variation model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

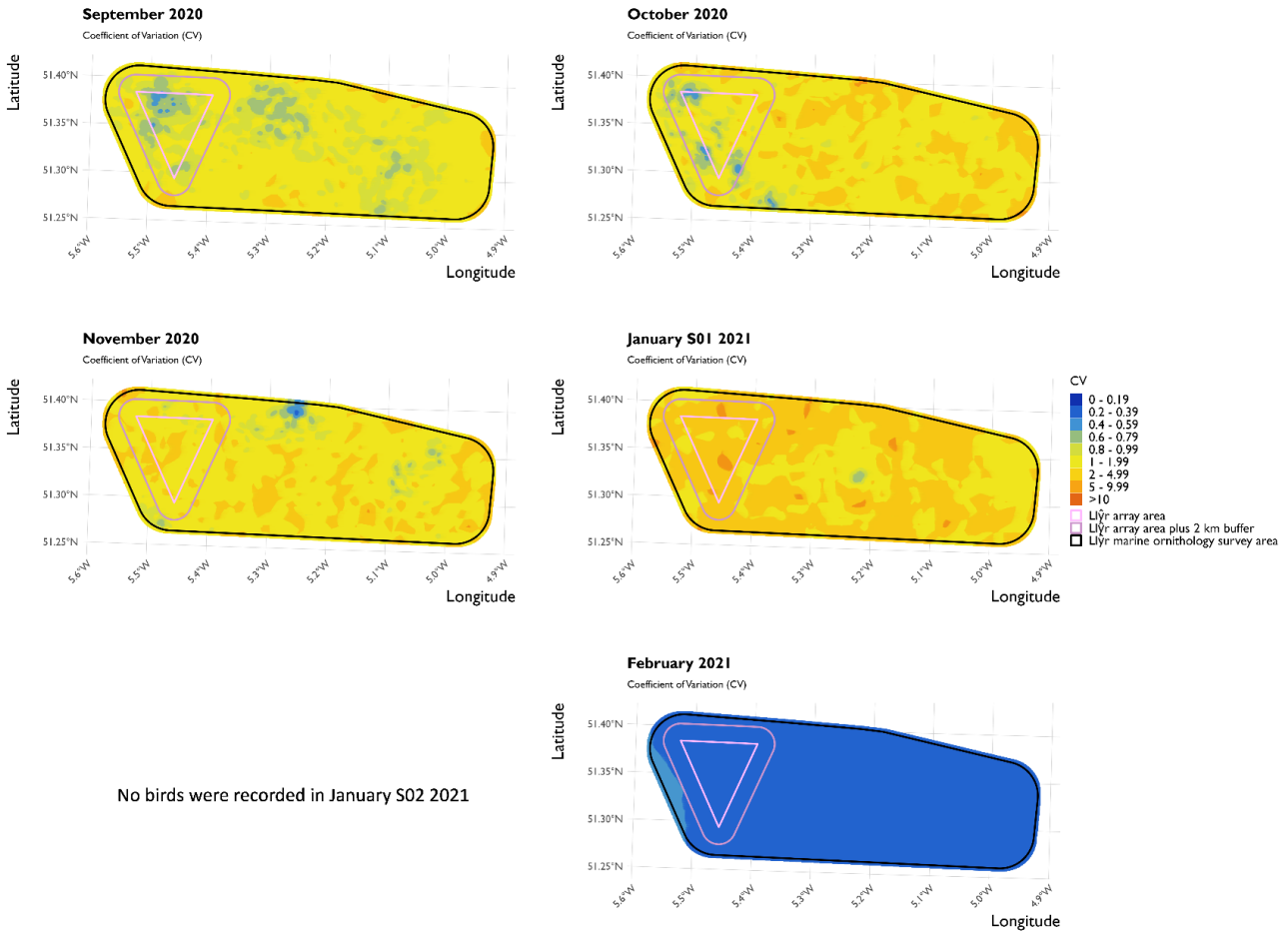

Figure 22A-58. Coefficient of Variation model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

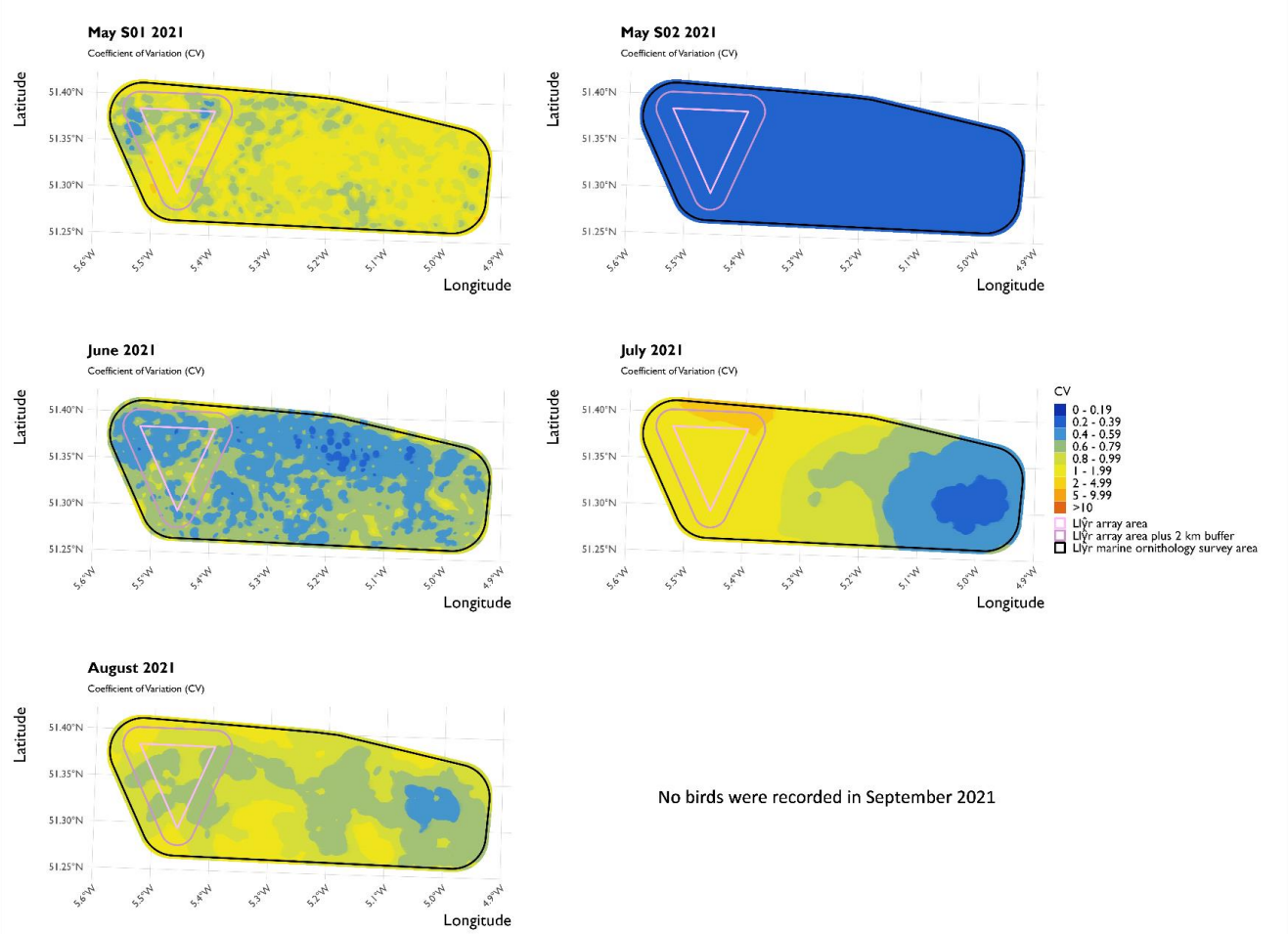

Figure 22A-59. Coefficient of Variation model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

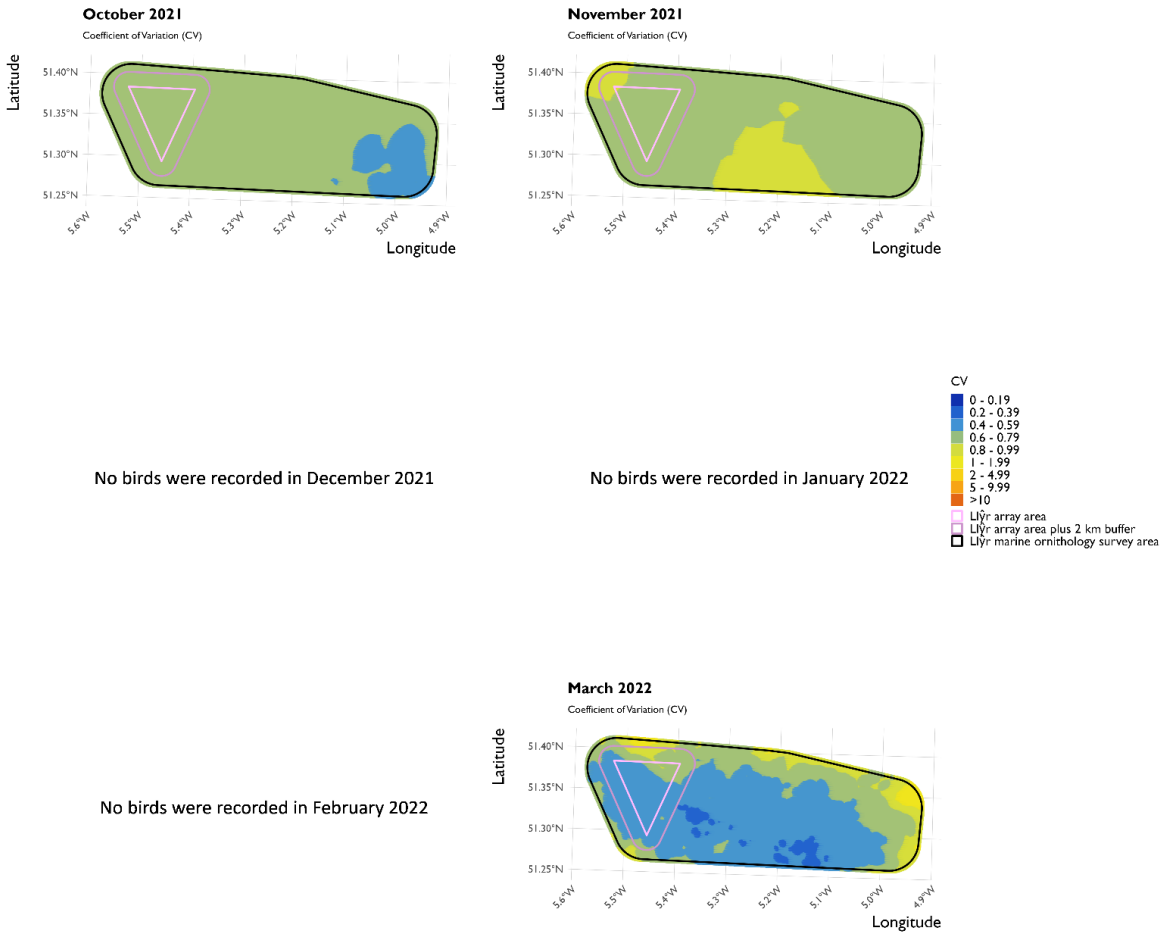

Figure 22A-60. Coefficient of Variation model-based density surface for all puffins (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.6 Manx Shearwater

22.6.1. Lower Credible Limit Density Maps

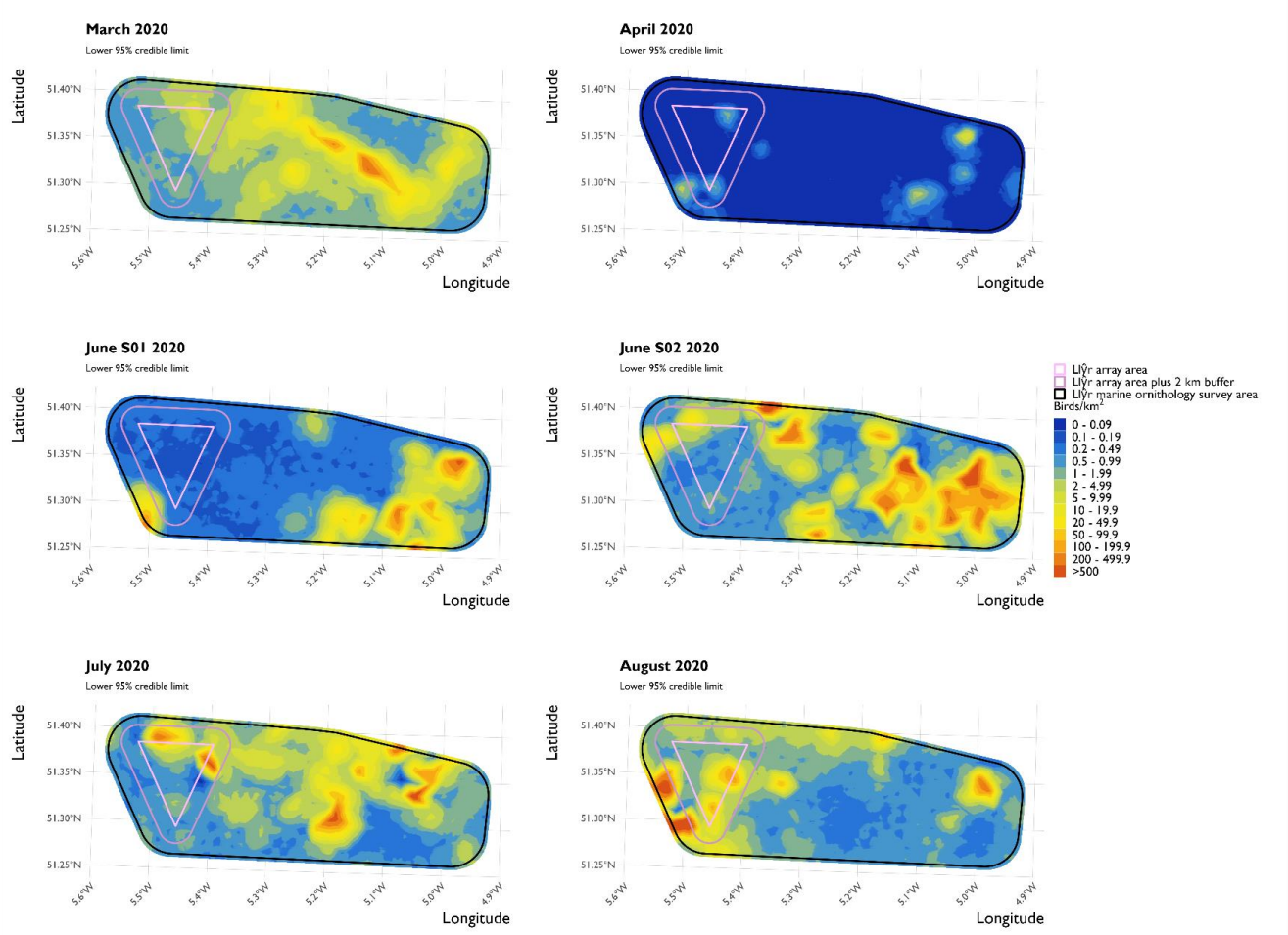

Figure 22A-61. Lower credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

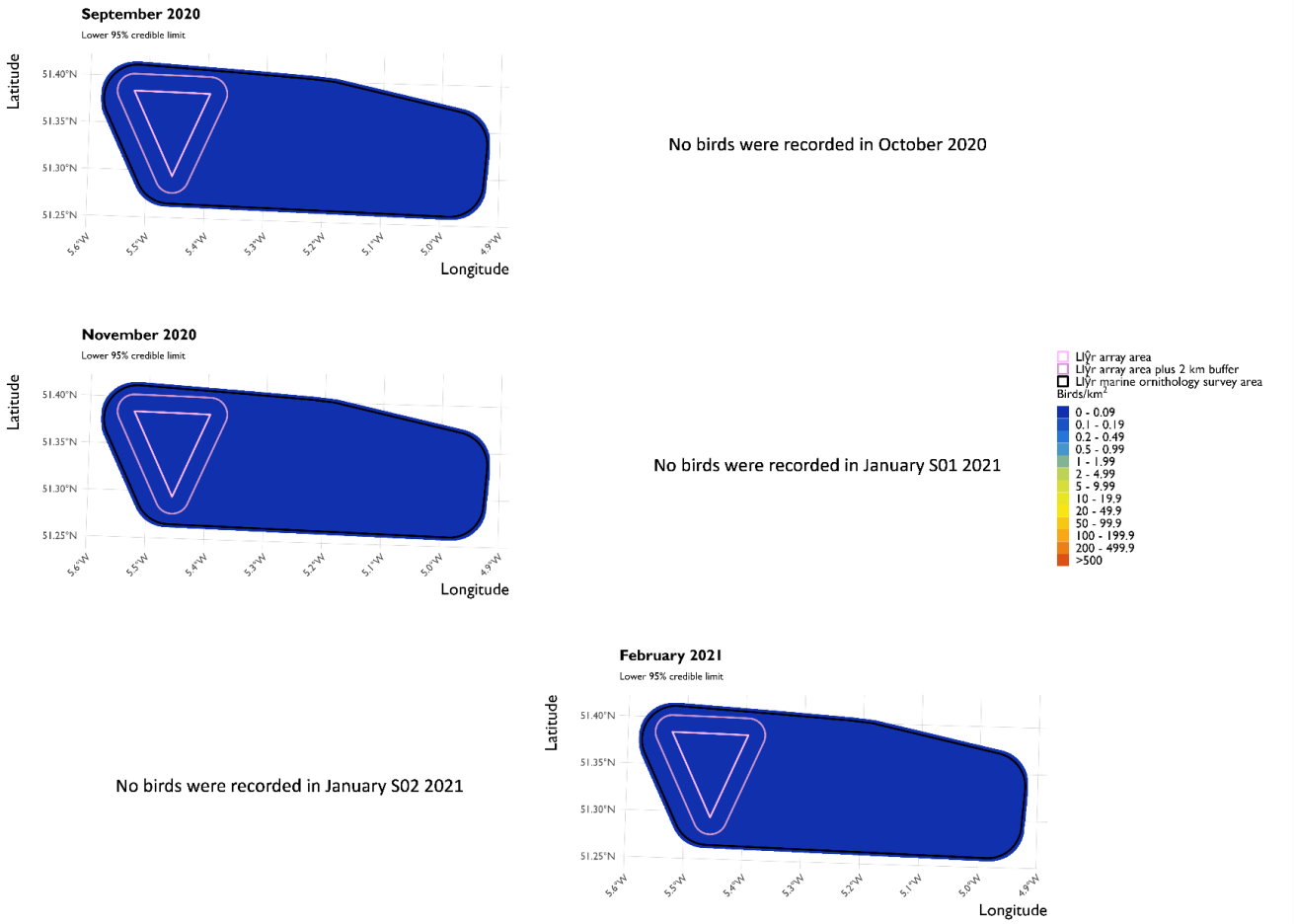

Figure 22A-62. Lower credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

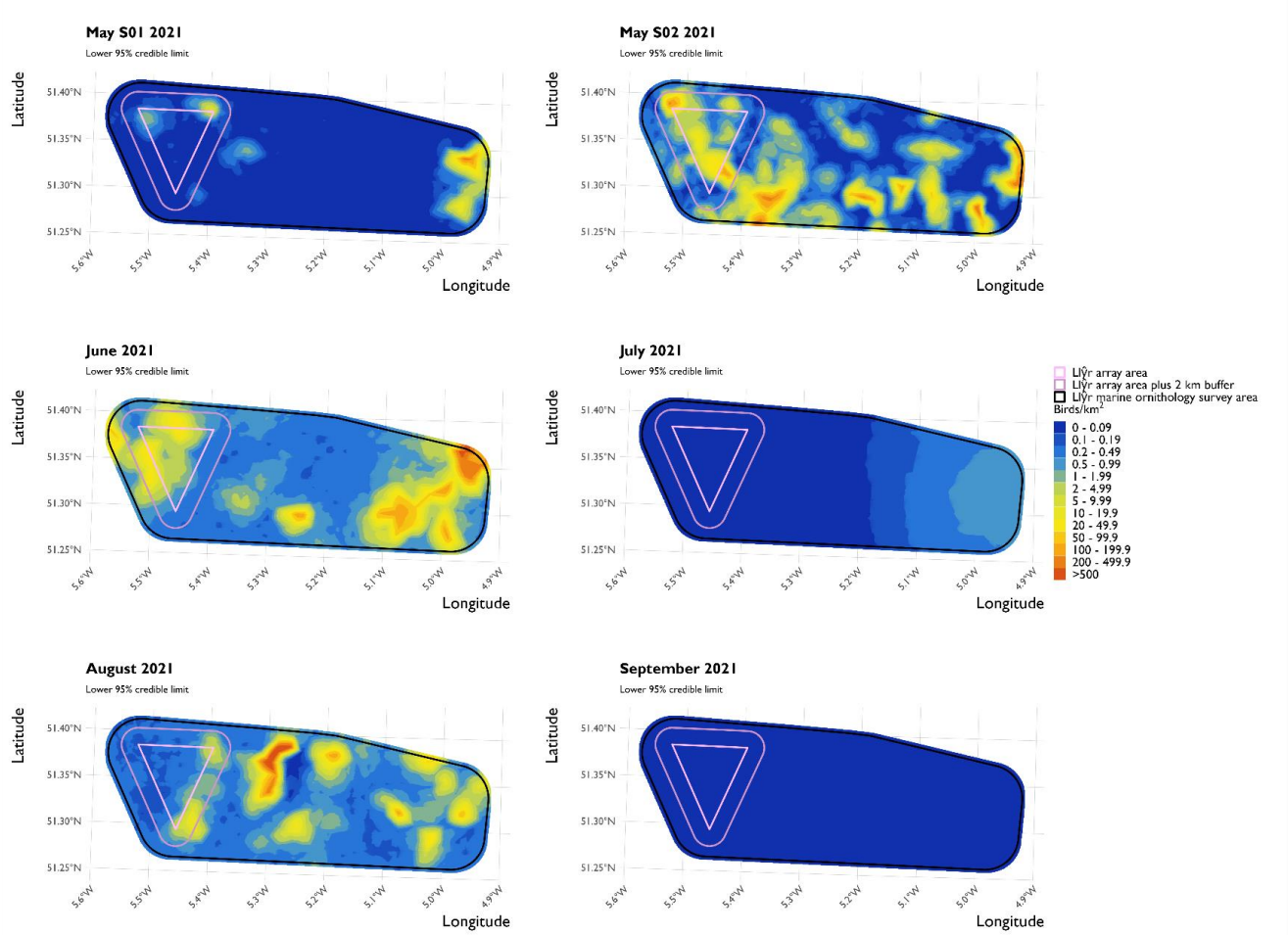

Figure 22A-63. Lower credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

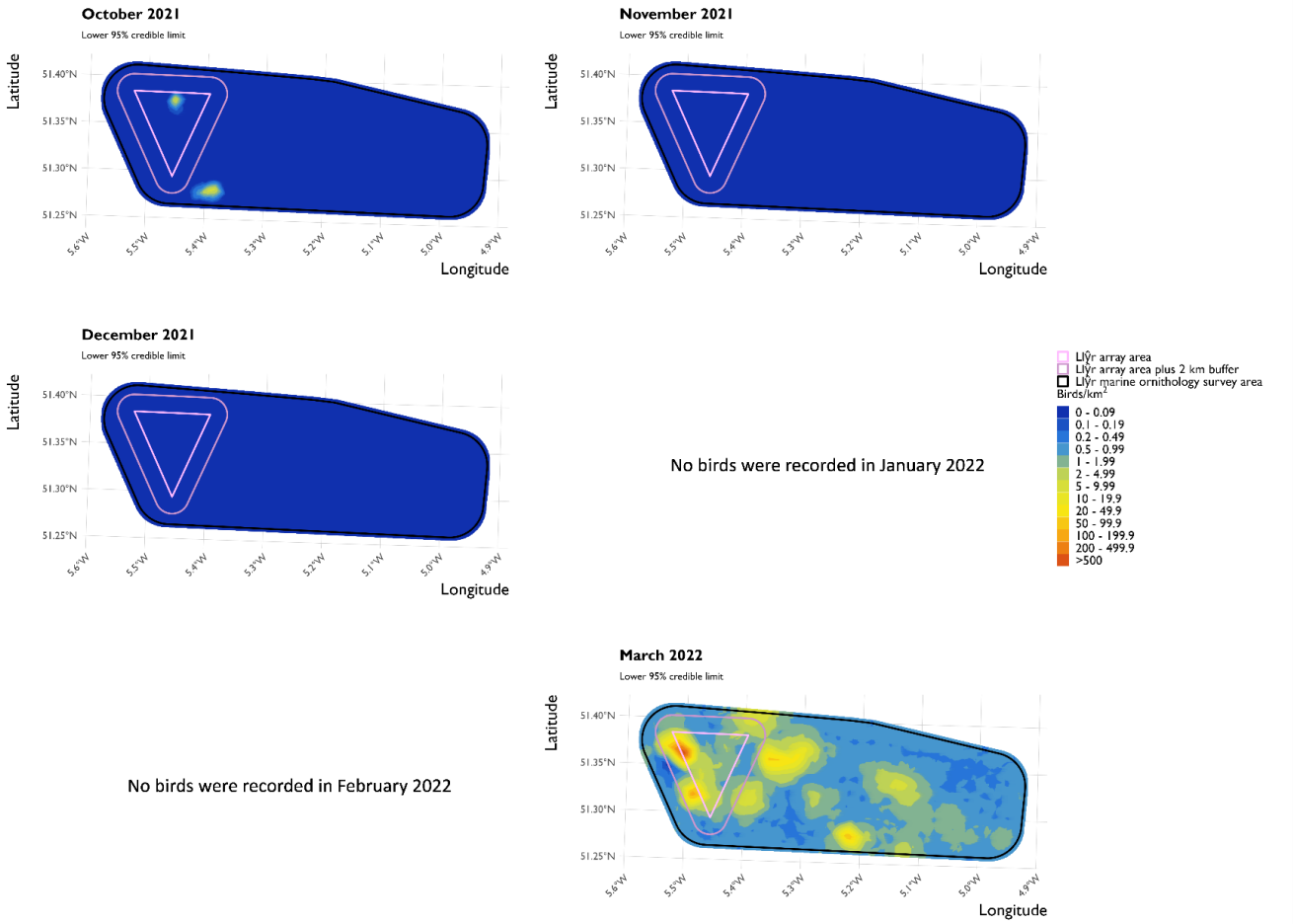

Figure 22A-64. Lower credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.6.2. Upper Credible Limit Density Maps

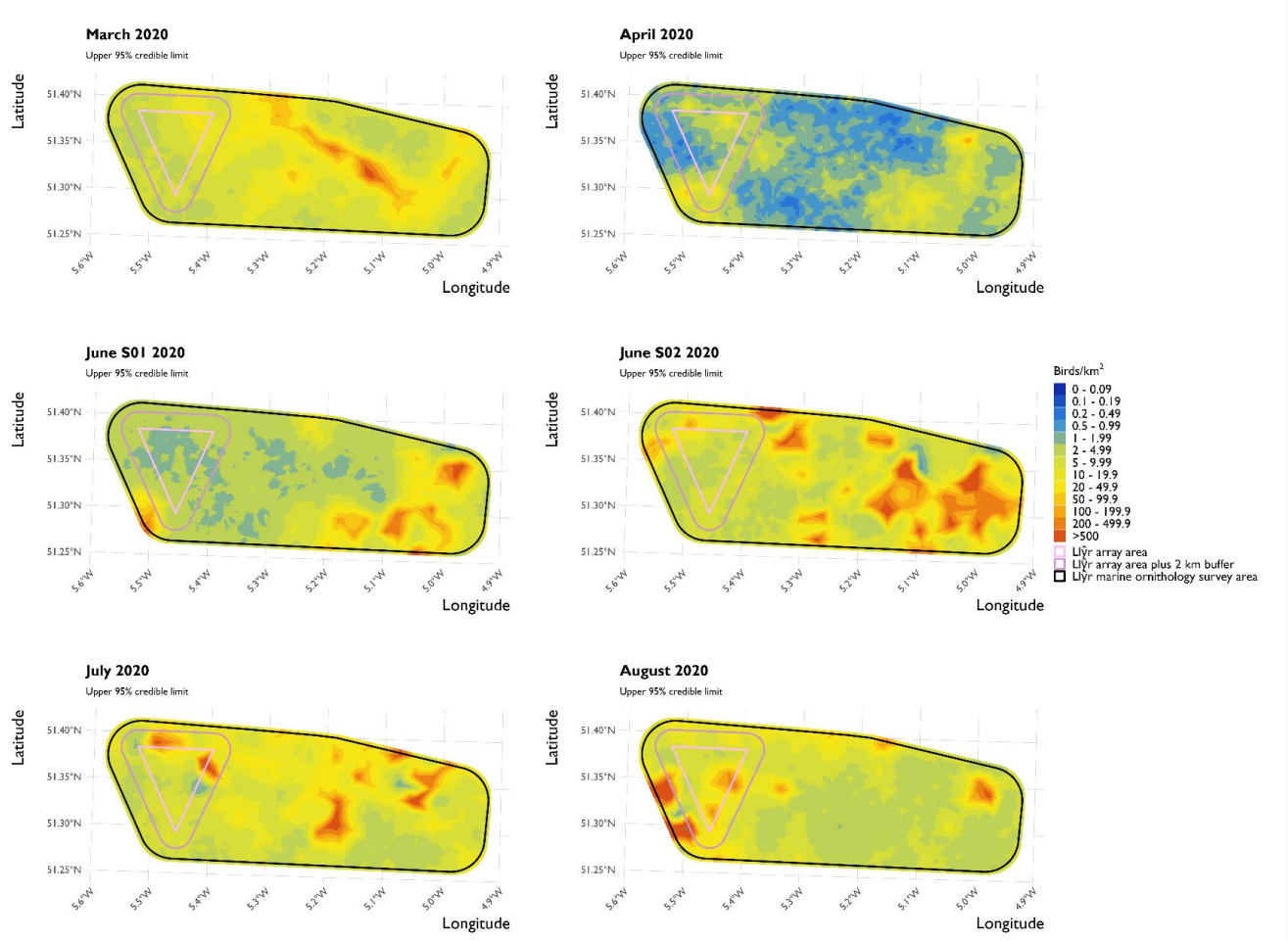

Figure 22A-65. Upper credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

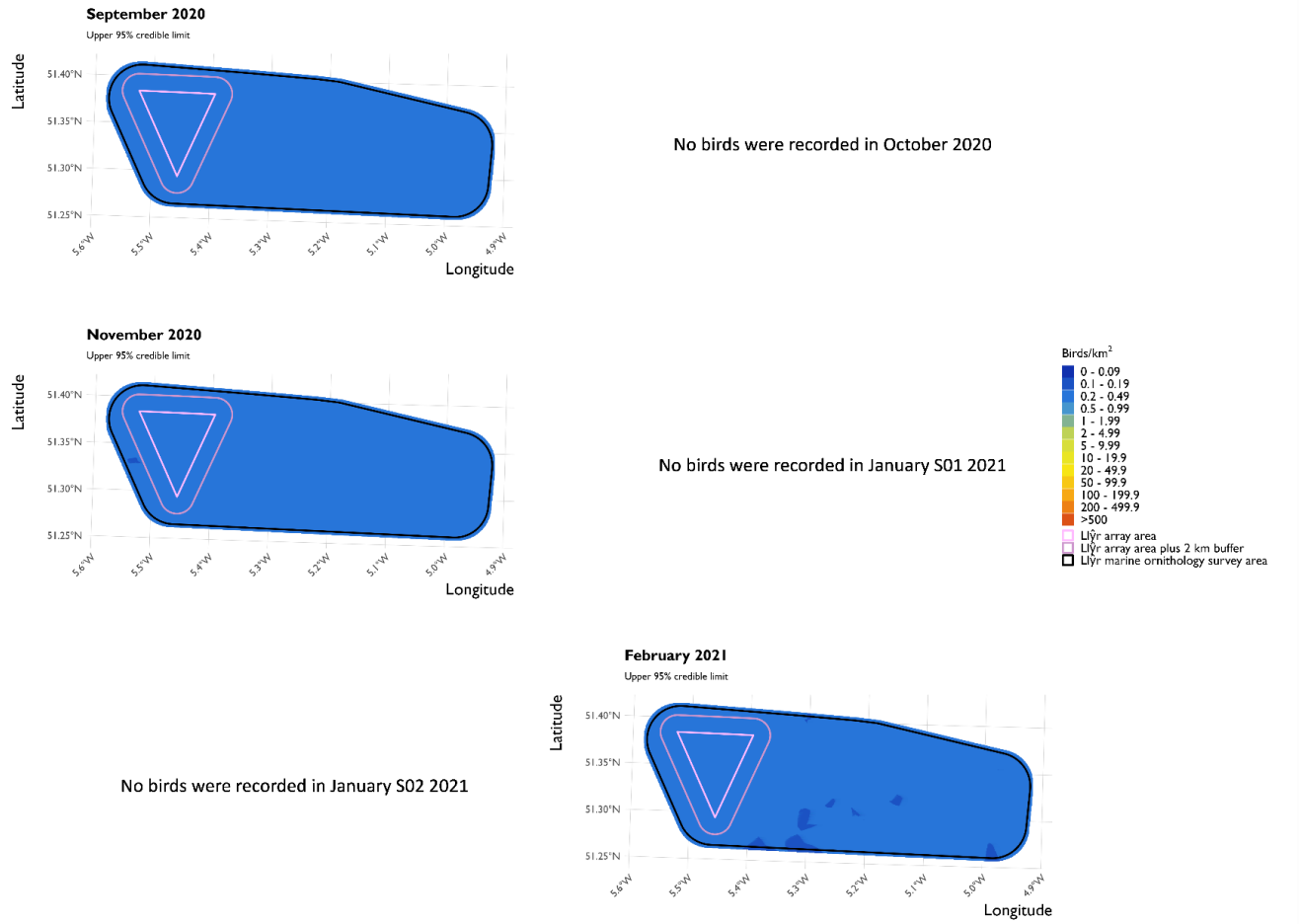

Figure 22A-66. Upper credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

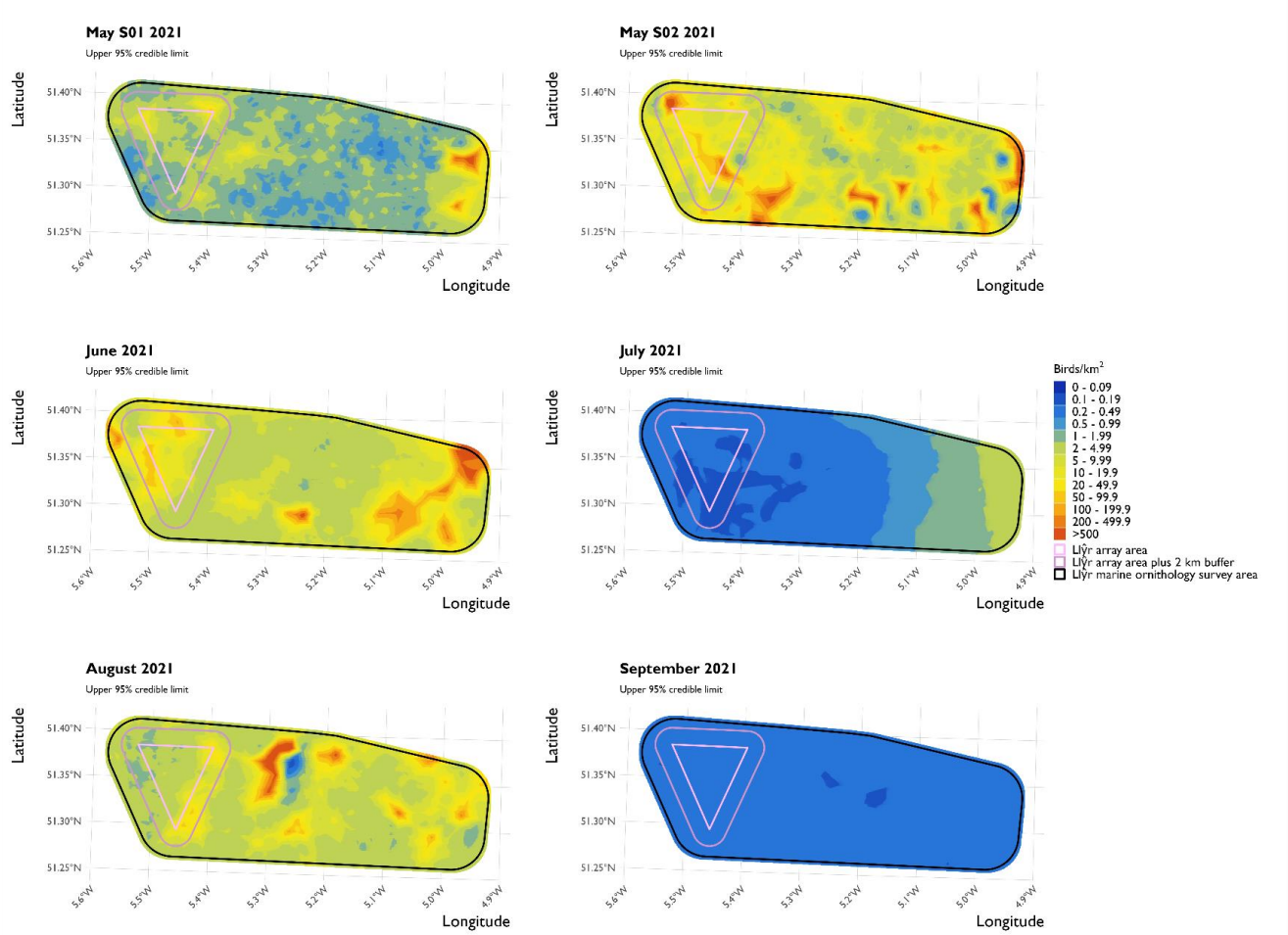

Figure 22A-67. Upper credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

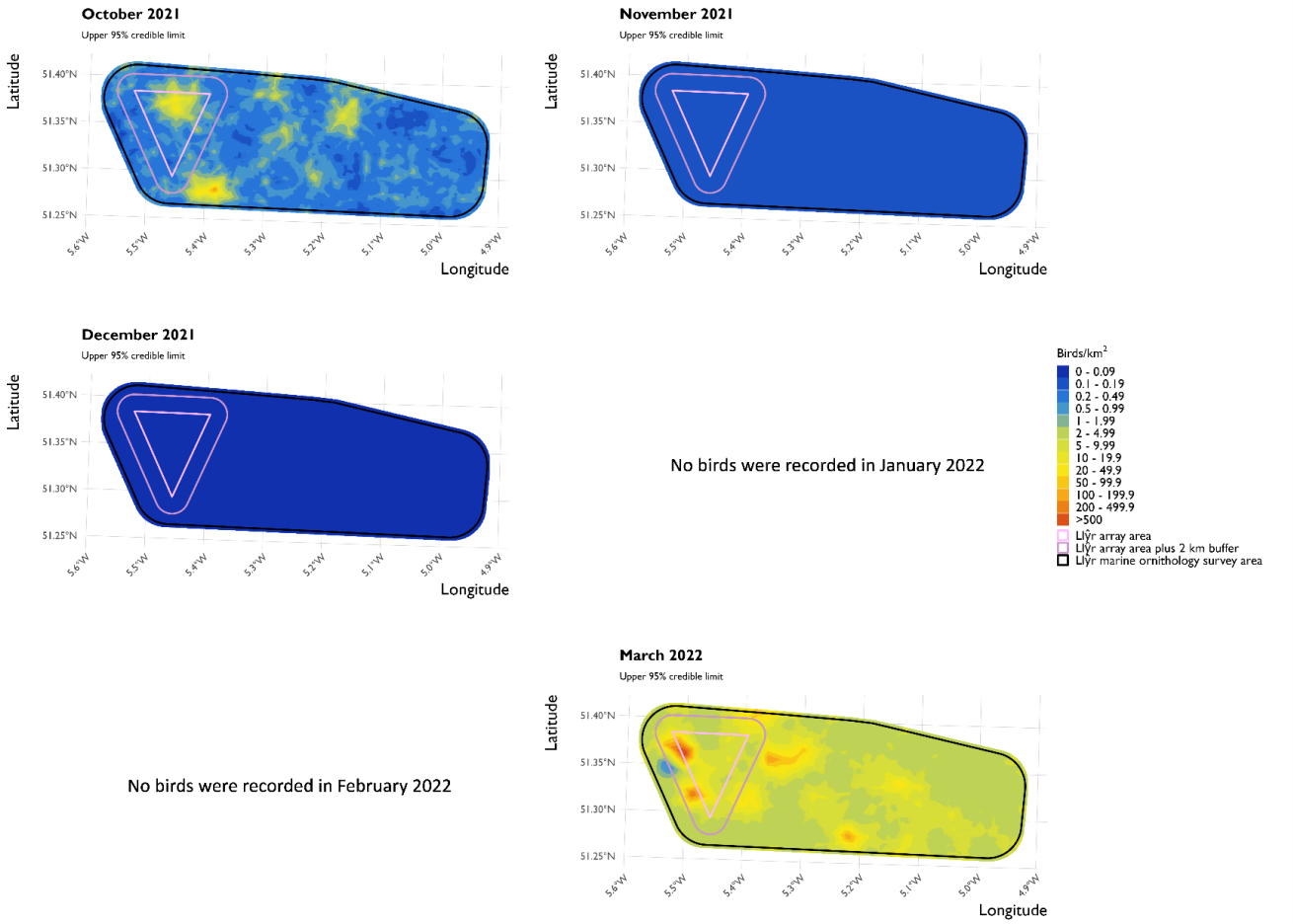

Figure 22A-68. Upper credible limit model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.6.3. Coefficient Of Variation Density Maps

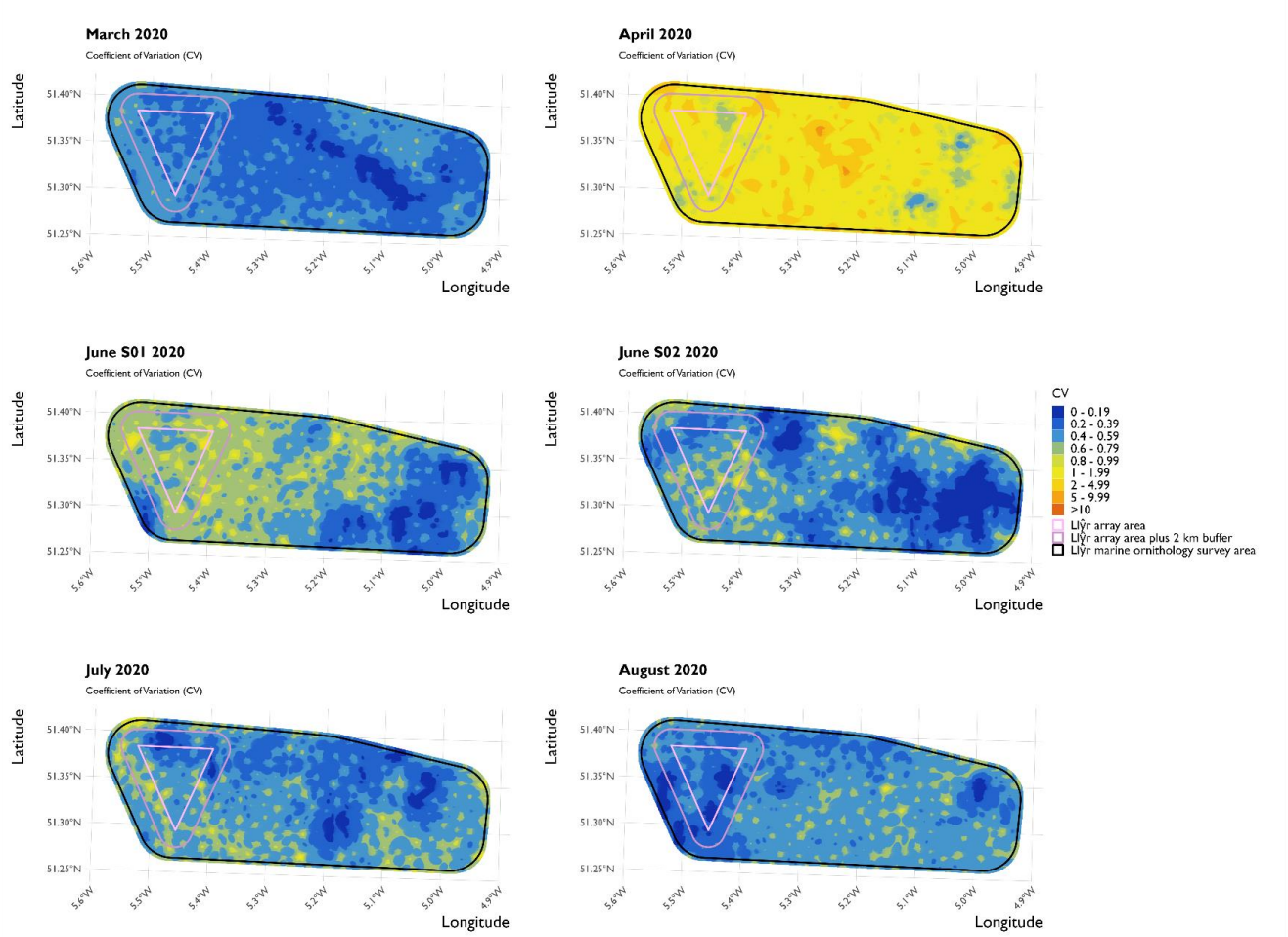

Figure 22A-69. Coefficient of Variation model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

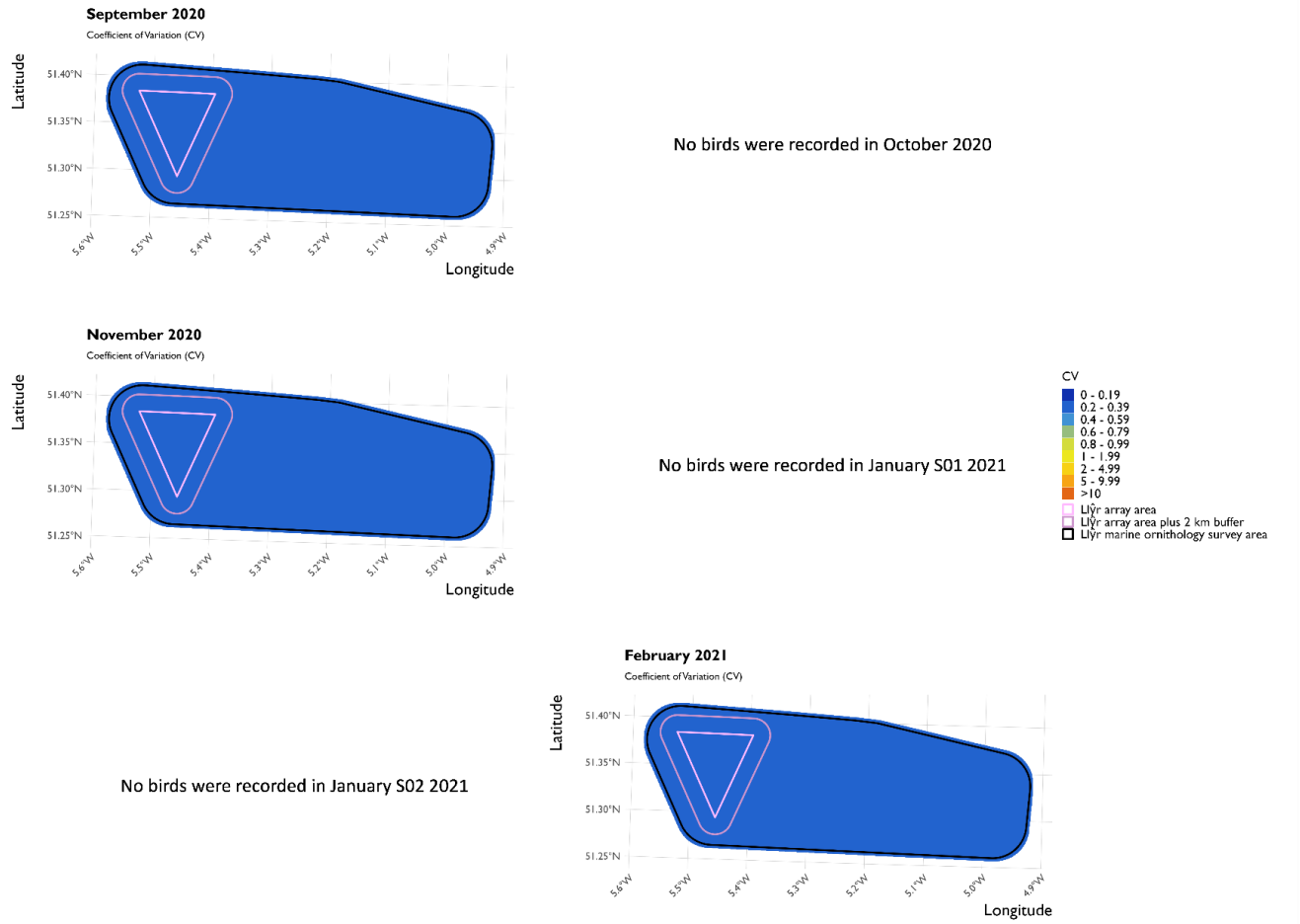

Figure 22A-70. Coefficient of Variation model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

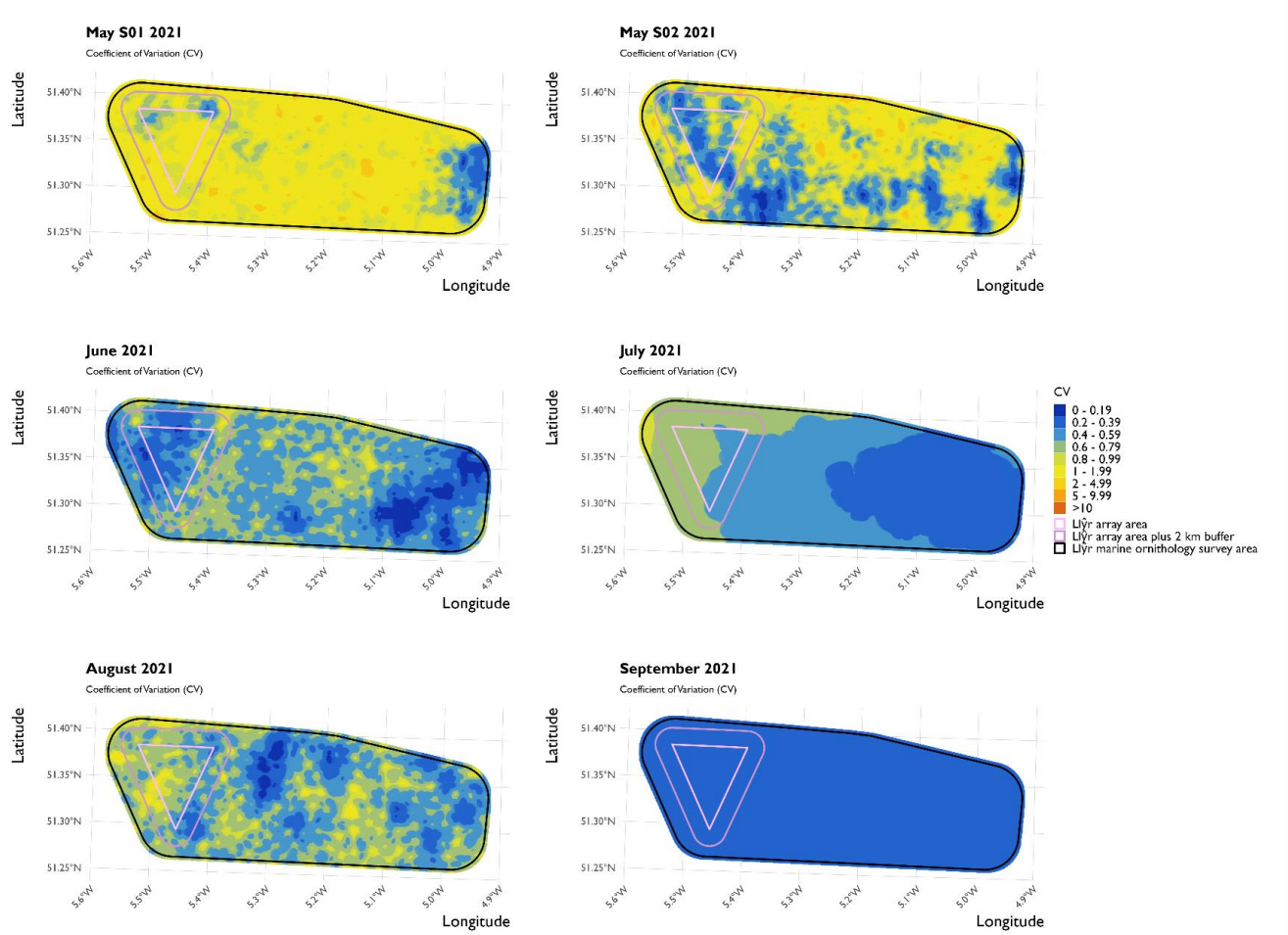

Figure 22A-71. Coefficient of Variation model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

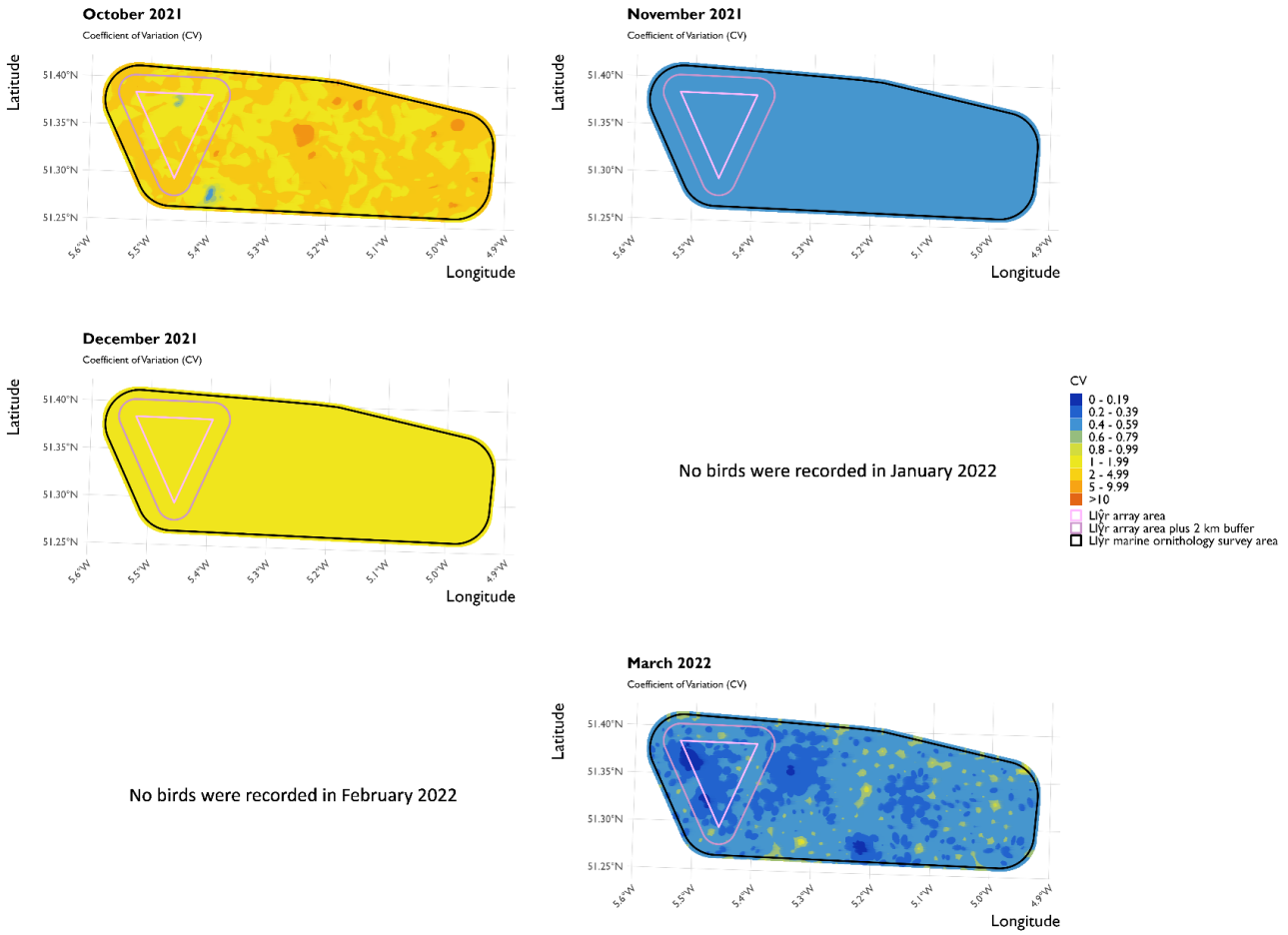

Figure 22A-72. Coefficient of Variation model-based density surface for all Manx shearwaters (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.7 Gannet

22.7.1. Lower Credible Limit Density Maps

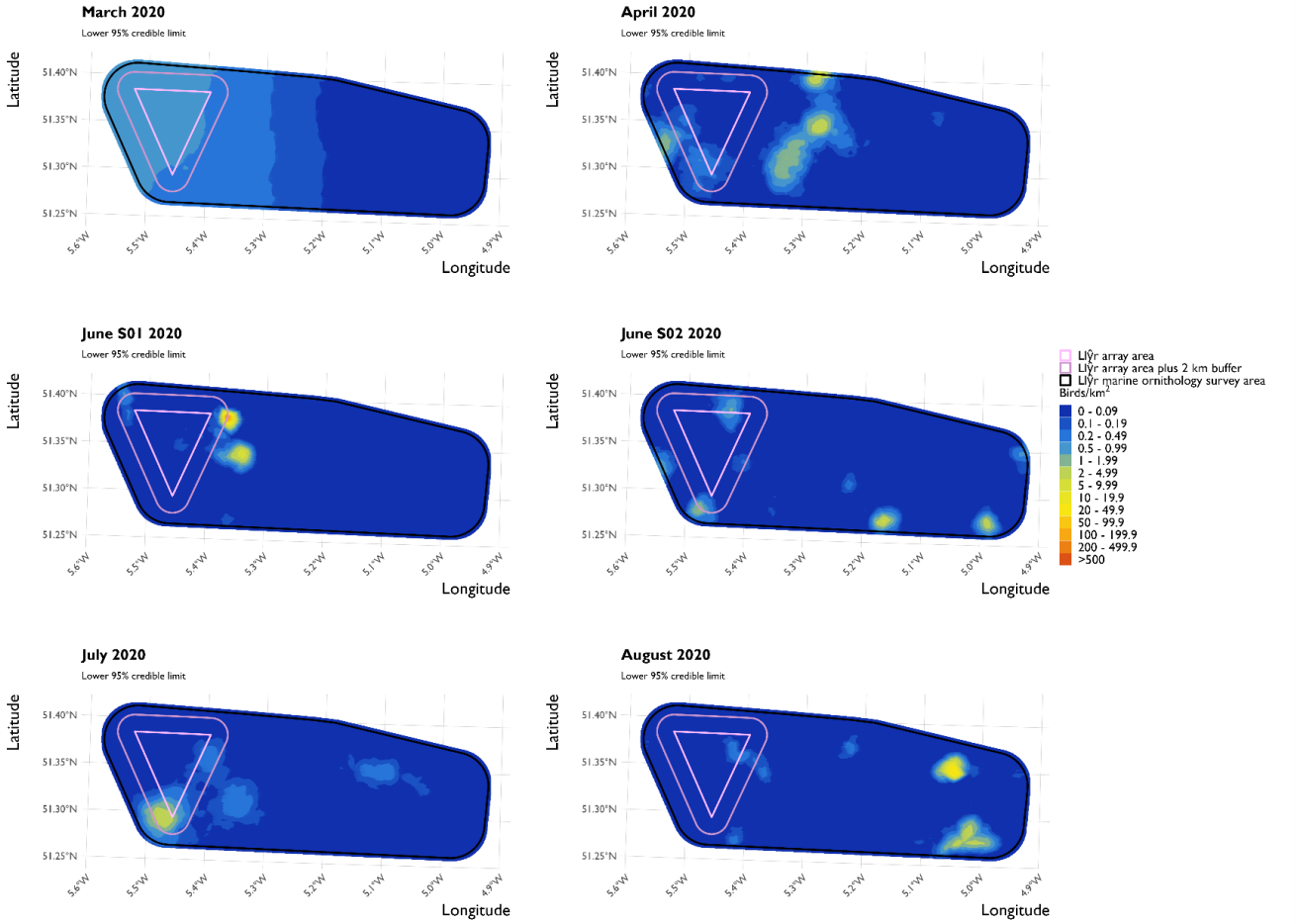

Figure 22A-73. Lower credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

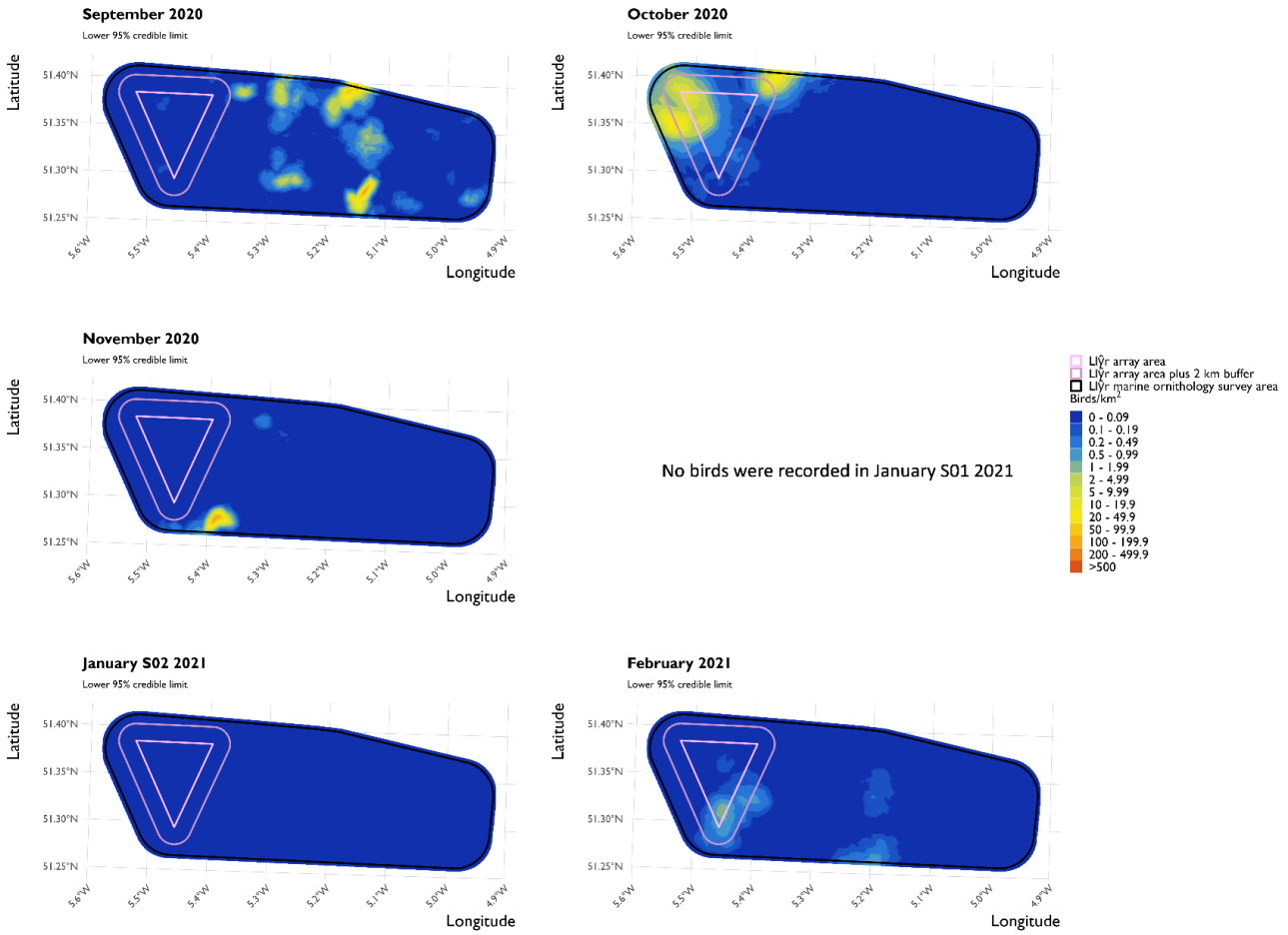

Figure 22A-74. Lower credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

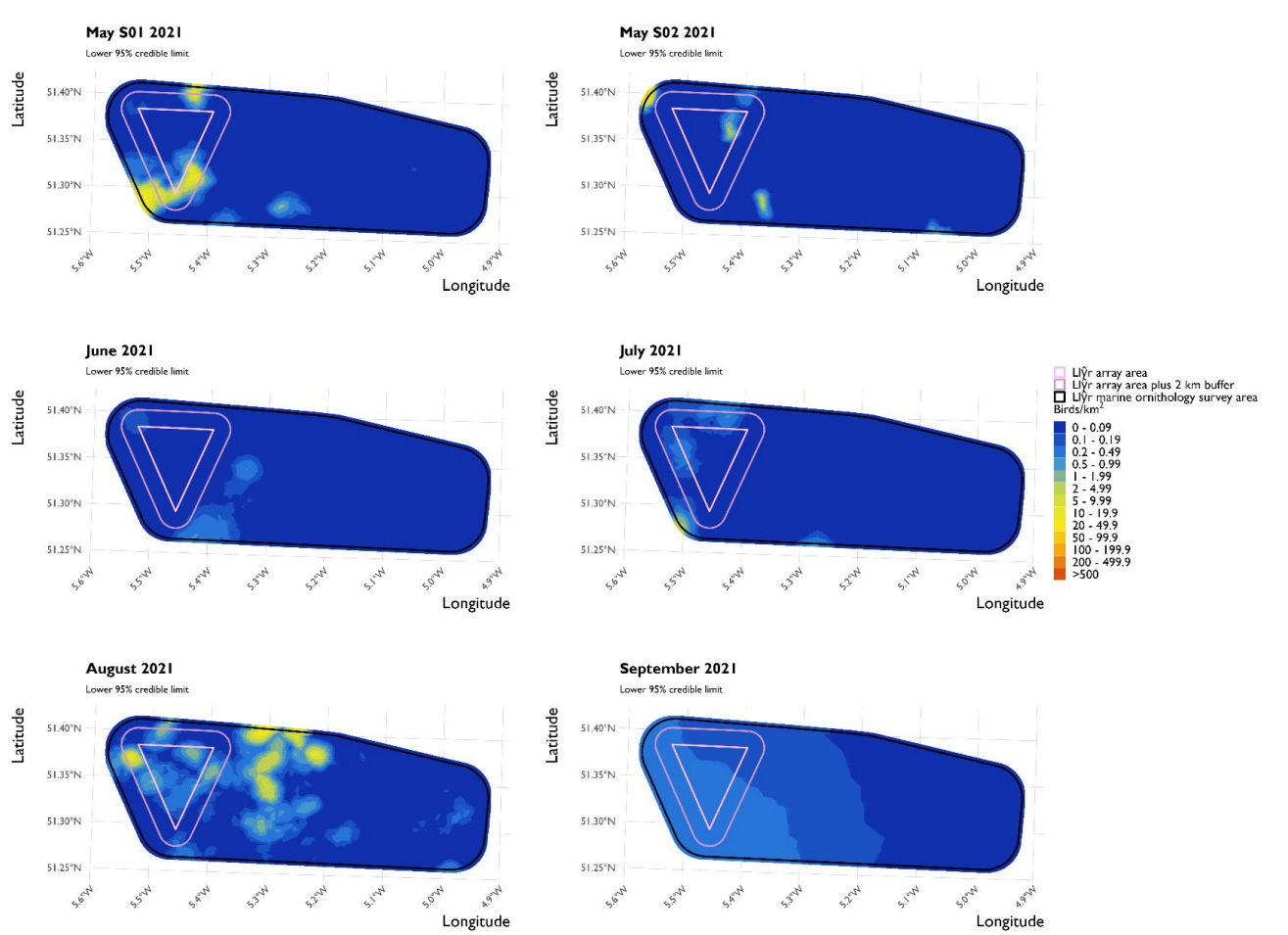

Figure 22A-75. Lower credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

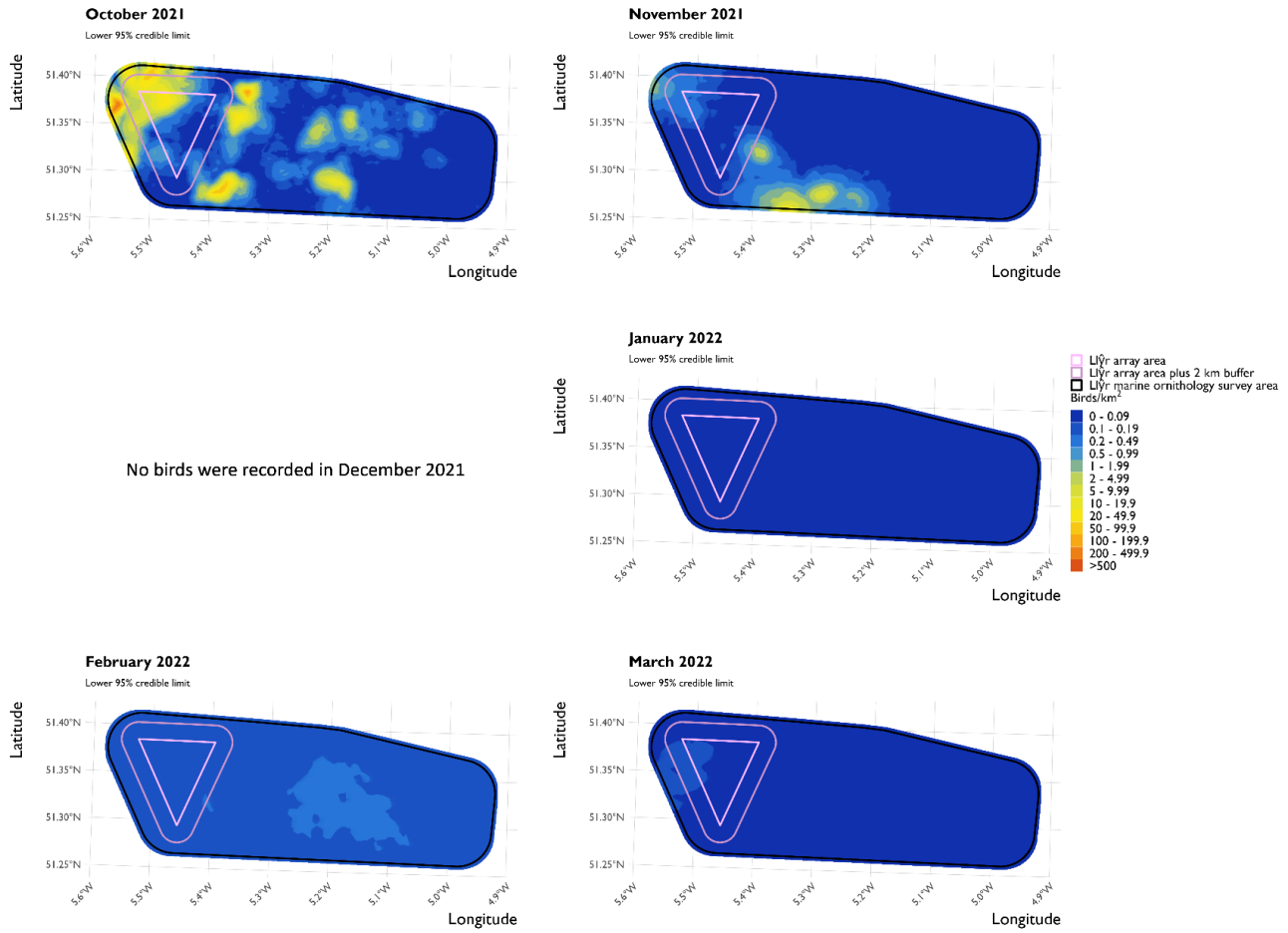

Figure 22A-76. Lower credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.7.2. Upper Credible Limit Density Maps

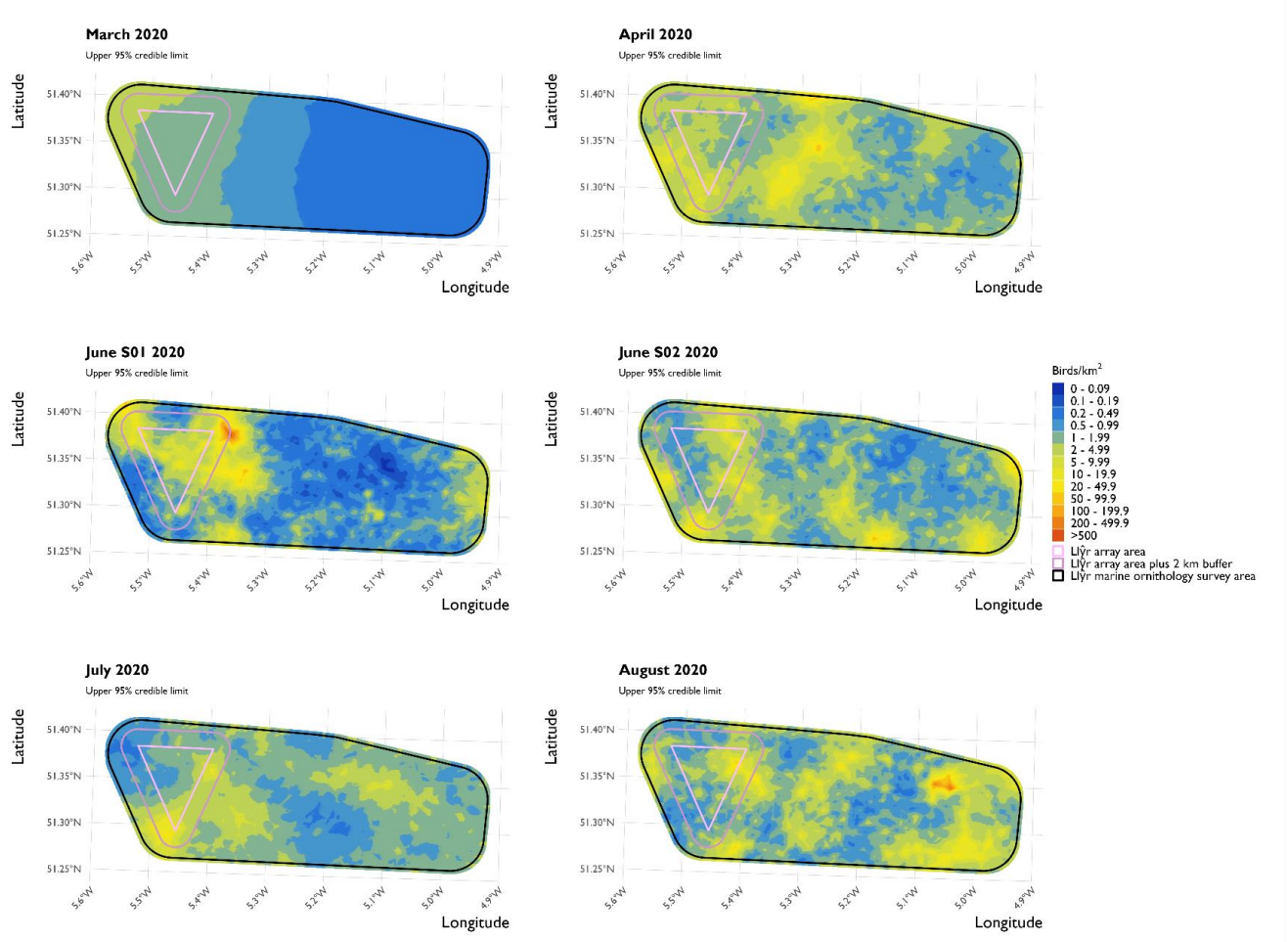

Figure 22A-77. Upper credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2021)

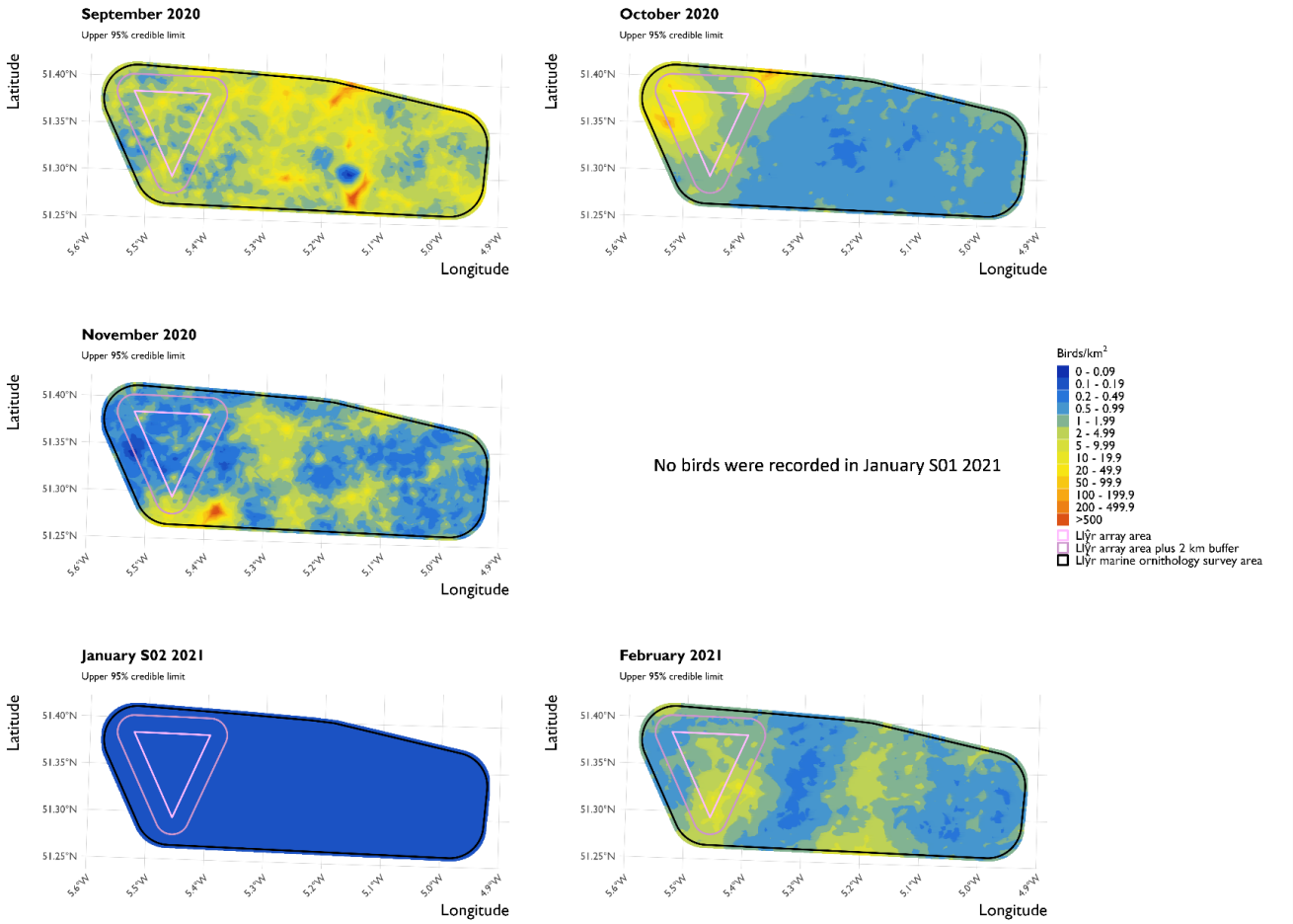

Figure 22A-78. Upper credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

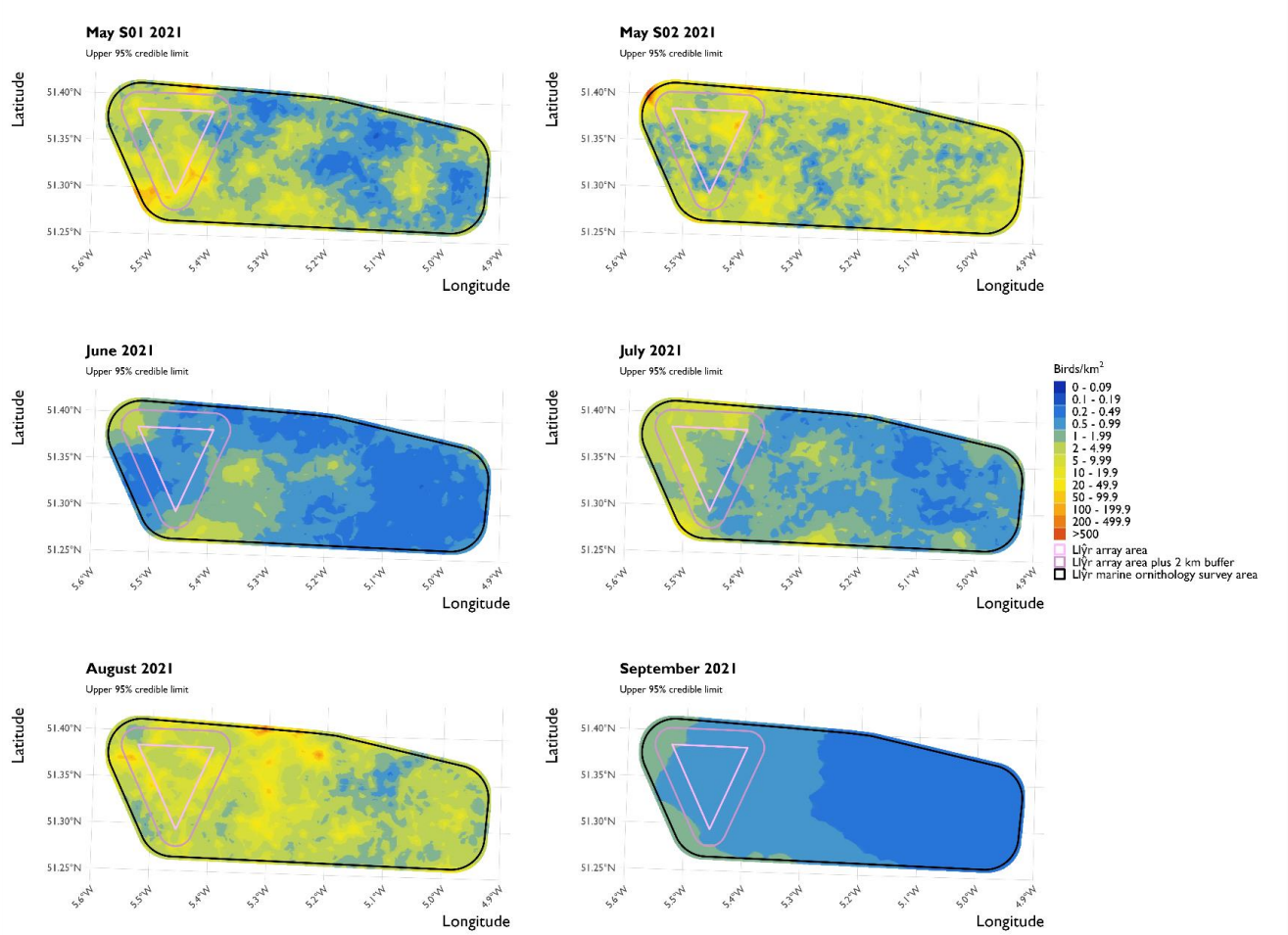

Figure 22A-79. Upper credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

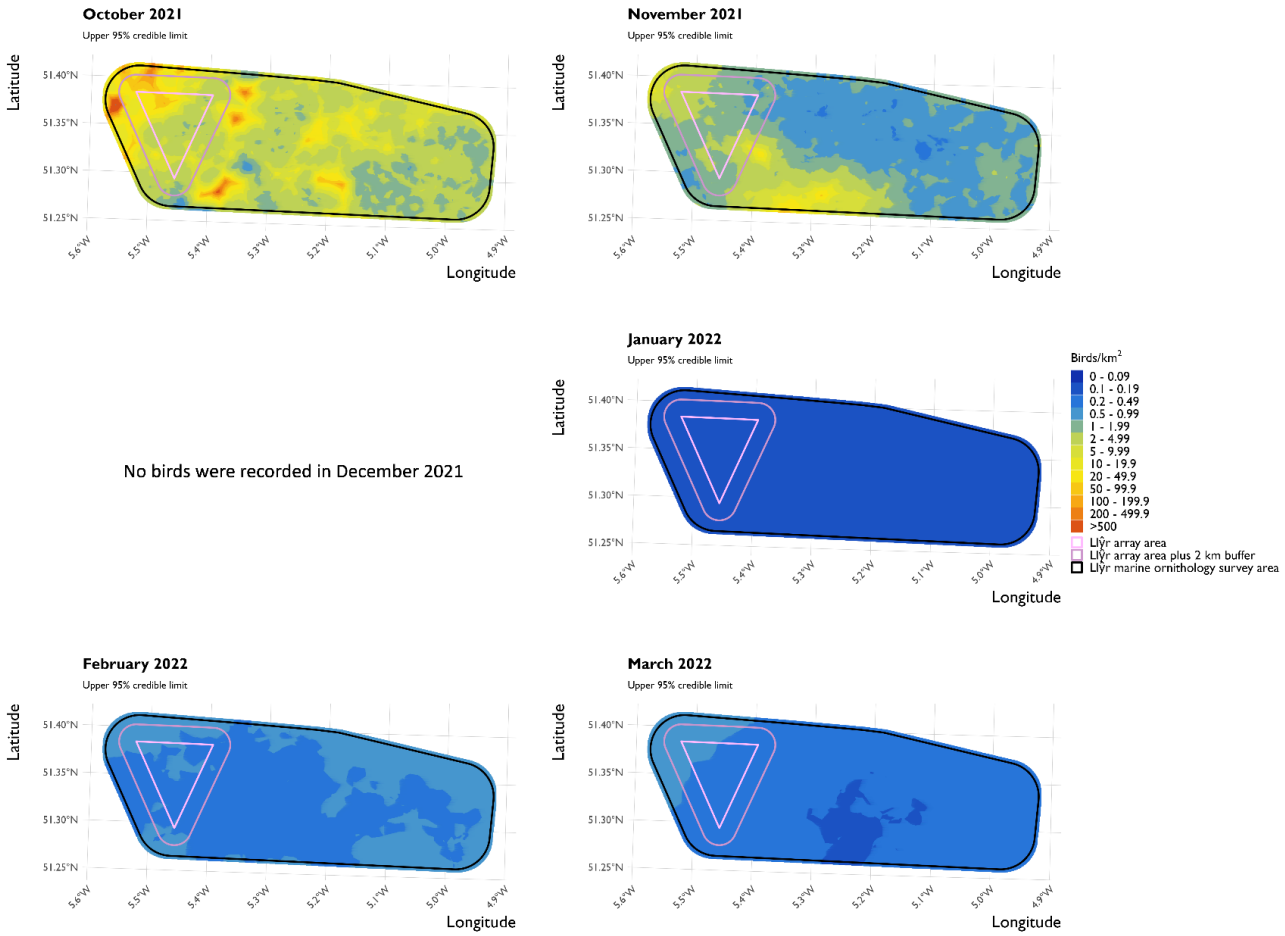

Figure 22A-80. Upper credible limit model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)

22.7.3. Coefficient Of Variation Density Maps

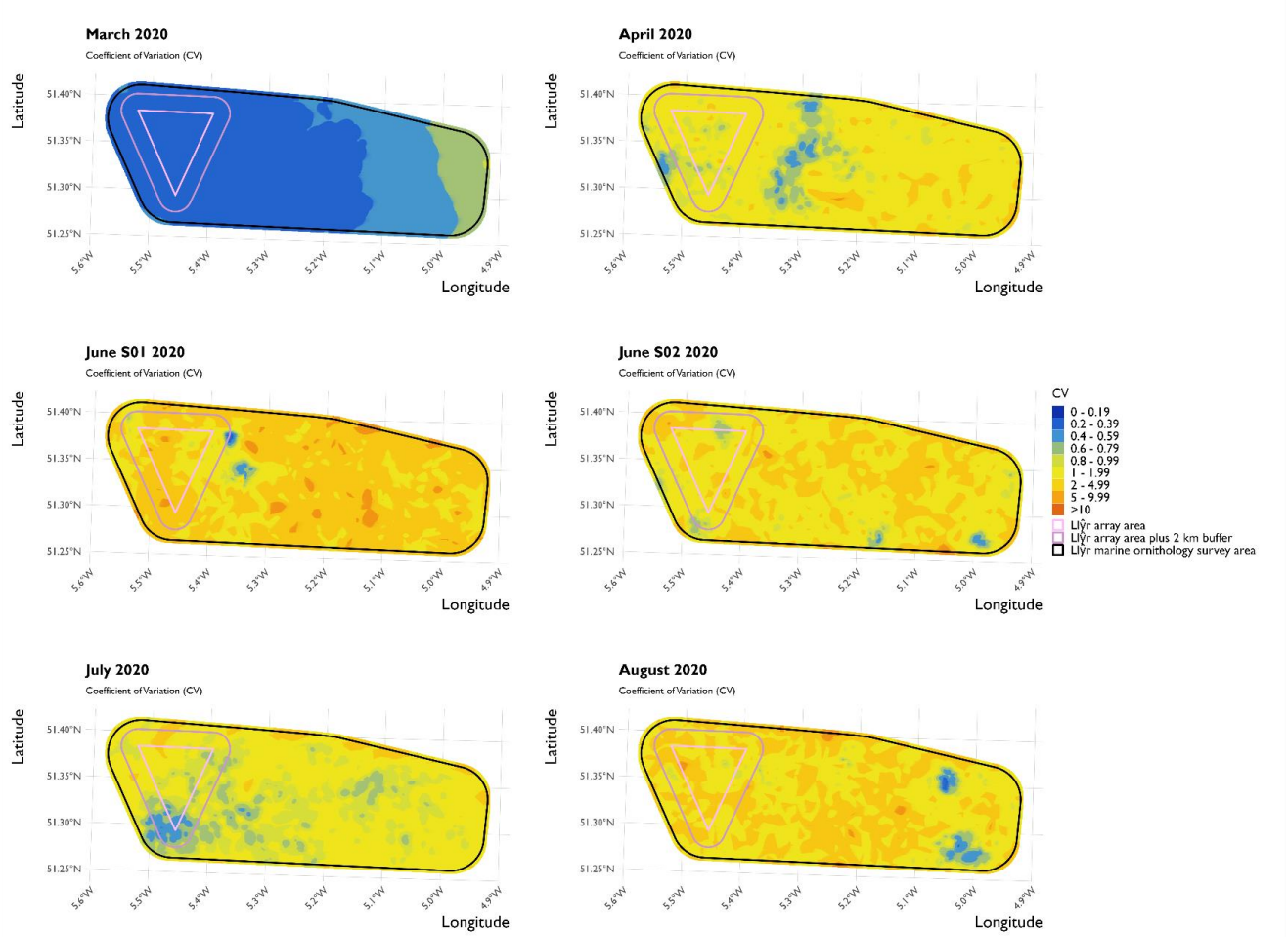

Figure 22A-81. Coefficient of Variation model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 1 (March 2020) and survey 6 (August 2020)

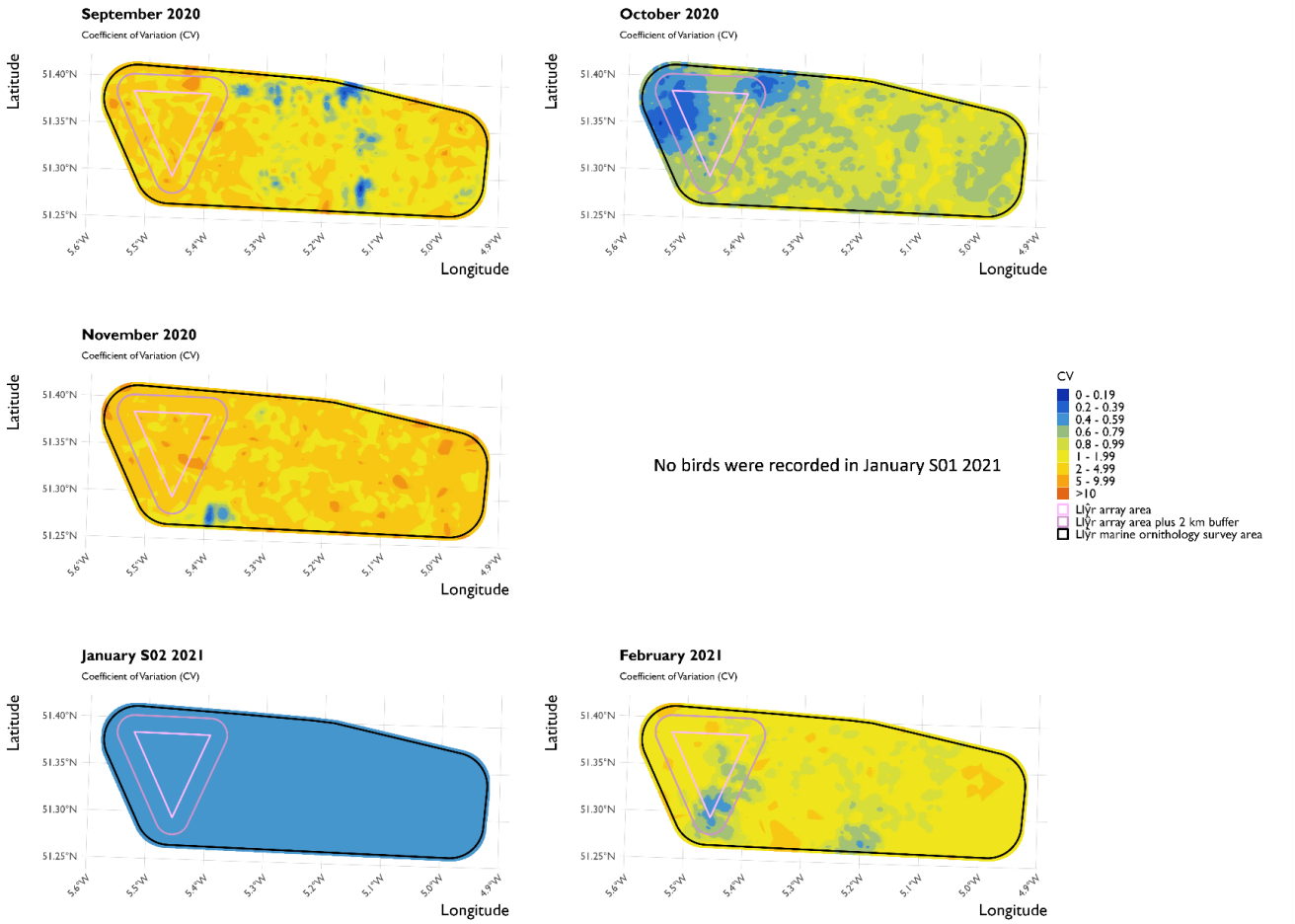

Figure 22A-82. Coefficient of Variation model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 7 (September 2020) and survey 12 (February 2021)

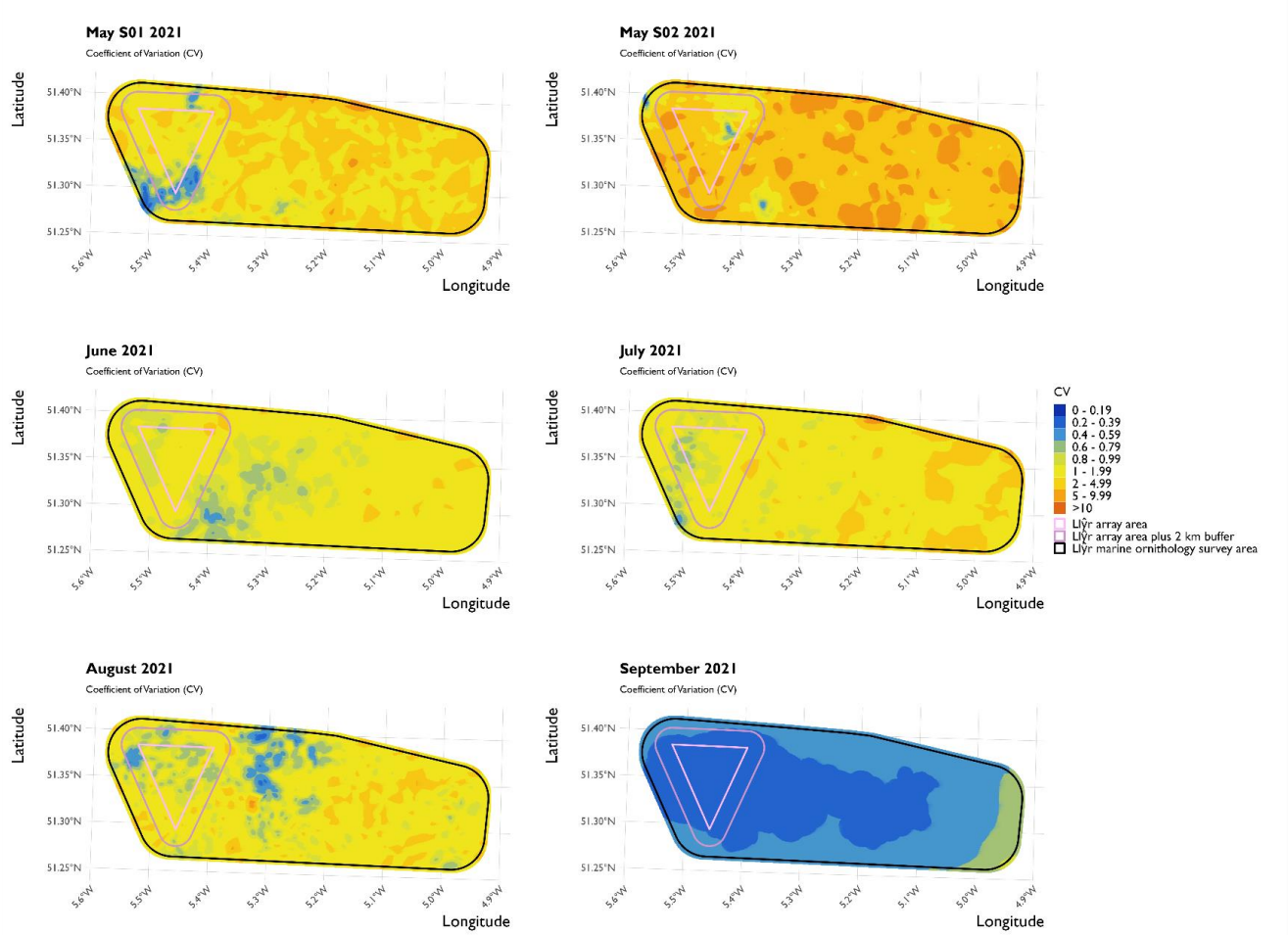

Figure 22A-83. Coefficient of Variation model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 13 (May S01 2021) and survey 18 (September 2021)

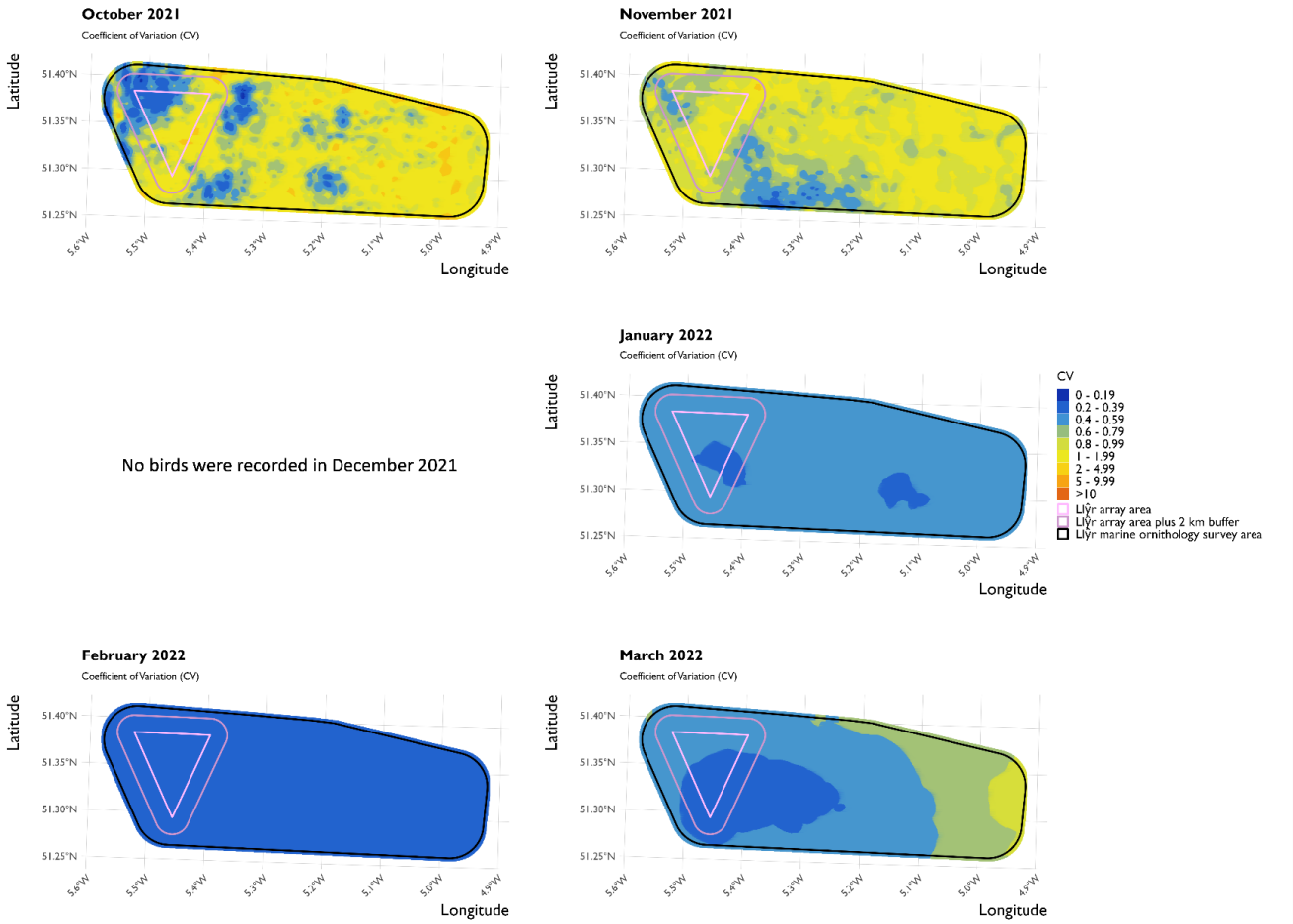

Figure 22A-84. Coefficient of Variation model-based density surface for all gannets (flying and sitting) in the Llŷr marine ornithology survey area between survey 19 (October 2021) and survey 24 (March 2022)