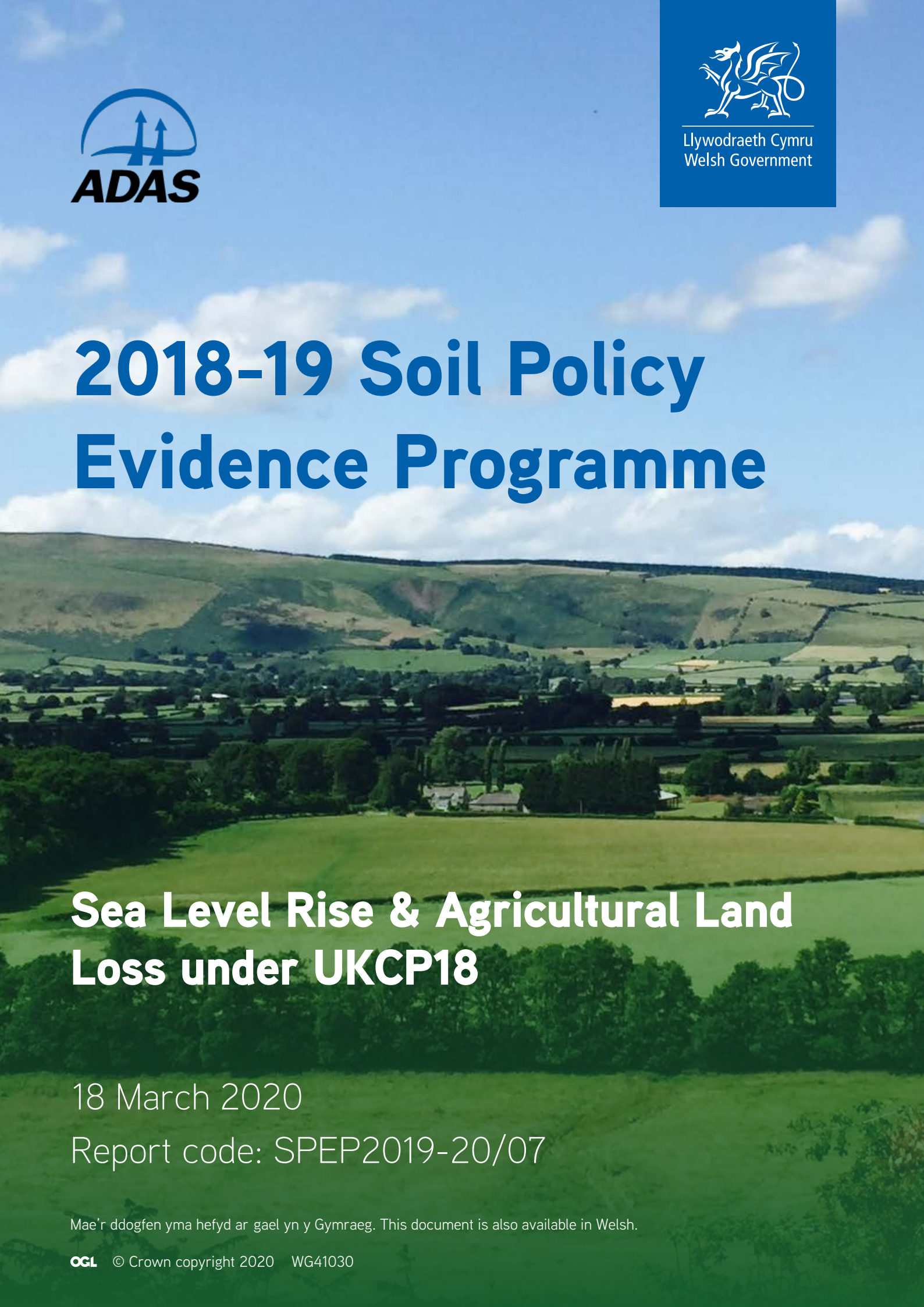


ADAS

Llywodraeth Cymru
Welsh Government

2018-19 Soil Policy Evidence Programme

Sea Level Rise & Agricultural Land Loss under UKCP18

18 March 2020

Report code: SPEP2019-20/07

Mae'r ddogfen yma hefyd ar gael yn y Gymraeg. This document is also available in Welsh.

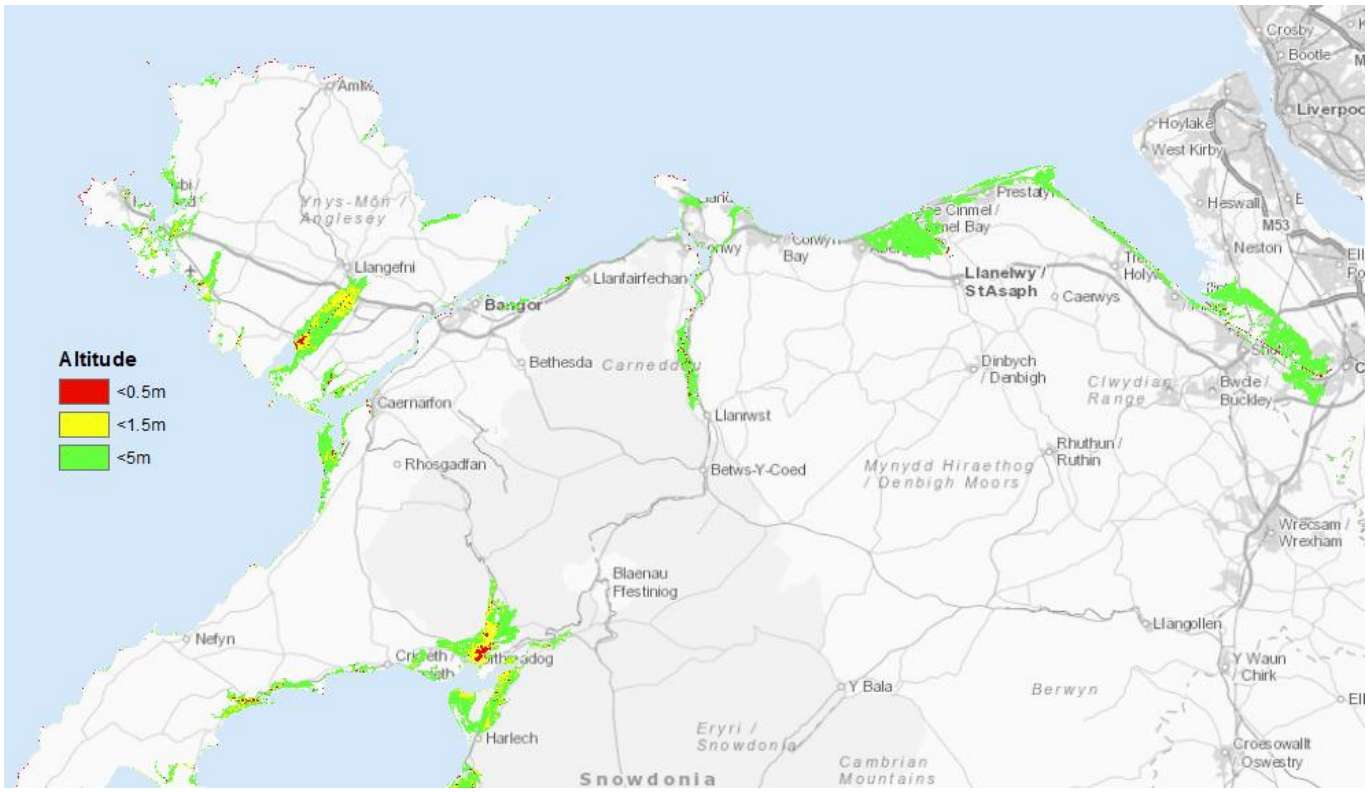
Soil Policy Evidence Programme

Report SPEP2019-20/07

Sea Level Rise & Agricultural Land Loss under UKCP18

Prepared by: Caroline Keay

Date: *18 March 2020*



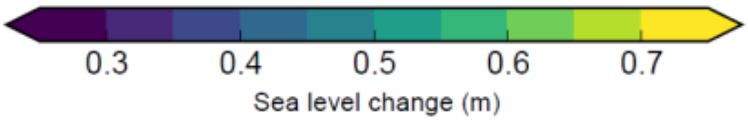
Contents

1 INTRODUCTION

A short report quantifying the hectare loss of agricultural land by ALC grades under UKCP18 sea level rise scenarios. Areas at risk from sea level rise identified using the OSTERRAIN50 altitude around the coast below 0.5m, 1.5m and 5m. This covers all ranges under each emissions scenario for 5th and 95th percentiles (see Table 1). Cardiff and Belfast appear to be the most representative range for expected sea level rise from South to North Wales.

Table 1 Range of sea level change (m) at UK capital cities in 2100 relative to 1981-2000 average for a low (RCP2.6), medium (RCP4.5) and high (RCP8.5) emissions scenario from table in Section 1.2 Palmer et al (2018)

	RCP2.6		RCP4.5		RCP8.5	
	5th	95th	5th	95th	5th	95th
London	0.29	0.70	0.37	0.83	0.53	1.15
Cardiff	0.27	0.69	0.35	0.81	0.51	1.13
Edinburgh	0.08	0.49	0.15	0.61	0.30	0.90
Belfast	0.11	0.52	0.18	0.64	0.33	0.94



2 METHOD

The OSTERRAIN50 altitude dataset provided by the Ordnance Survey gives the altitude in metres on a 50m grid. This dataset was used in the generation of Welsh Governments new Predictive Agricultural Land Classification Map (2019). Areas at risk from sea level rise were identified in three categories, those less than 0.5m above sea level, those less than 1.5m and those less than 5m. Defended areas have not been taken into account in order to identify the maximum extent of risk. Figures 2 to 6 show the distribution of these areas around the coast of Wales.

Table 2 provides a summary of ALC Grade loss for each sea level rise category by 2100 under the current ALC criteria.

Tables 3 - 5 take into account the predicted ALC Grade loss for each sea level rise category under future possible climates (figure 1). UKCP probabilistic projections were assessed for three emission scenarios (RCP4.5, RCP6.0 & RCP8.5) over three 30-year average time points (2020, 2050 & 2080). RCP2.6 was not assessed. This provides the greatest possible range for ALC grade loss projections. No one scenario is any more likely than the other.

3 RESULTS

Table 2 Summary of Area (Ha) Lost by Sea Level rise by 2100

Sea Level Rise by 2100	Grade 1	Grade 2	Grade 3a	Grade 3b	Grade 4	Grade 5	Non Agric	Total
0.5m	14.75	200	173.5	294.75	265.25	1106.5	274.75	2329.5
1.5m	14.75	562.75	591.25	802.5	628	2083.5	434.75	5117.5
5m	186.5	4753.75	4063.5	8037.75	5228.75	7697.25	3852	33819.5

Table 3 Area (Ha) by ALC Class at risk from 0.5m sea level rise

Predictive ALC	Current (Ha)	Low Scenario			Medium Scenario			High Scenario		
		2020L	2050L	2080L	2020M	2050M	2080M	2020H	2050H	2080H
1	14.75	3	2	0	3	2	0	3	1.25	0
2	200	144	71.75	15.5	144.75	75.75	29.5	143.5	30	0
3a	173.5	264	254.5	151.75	263.25	256.75	98.25	257.75	185	28.75
3b	294.75	264	344.25	359.5	264	339.75	311.5	270.75	354.25	172.25
4	265.25	277.5	282.25	428	277.5	280.5	515.5	277.75	384.25	754.5
5	1106.5	1102.25	1100	1100	1102.25	1100	1100	1102	1100	1099.25
NA	274.75	274.75	274.75	274.75	274.75	274.75	274.75	274.75	274.75	274.75
Total	2329.5	2329.5	2329.5	2329.5	2329.5	2329.5	2329.5	2329.5	2329.5	2329.5

Table 4 Area (Ha) by ALC Class at risk from 1.5m sea level rise

Predictive ALC	Current (Ha)	Low Scenario			Medium Scenario			High Scenario		
		2020L	2050L	2080L	2020M	2050M	2080M	2020H	2050H	2080H
1	14.75	3	2	1.25	3	2	0	3	0	0
2	562.75	201.75	184	100.5	202.25	189	29.5	201	20.5	0
3a	591.25	1012.75	677.5	633.5	1011.25	686	510.75	1004	649.5	30
3b	802.5	699	1017.5	694.25	700	1008	684.75	705.5	685.25	792.75
4	628	835	949.5	1410.5	835.5	945.5	1626.5	846.5	1490.25	2070
5	2083.5	1931.25	1852.25	1842.75	1930.75	1852.25	1831.25	1922.75	1837.25	1790
NA	434.75	434.75	434.75	434.75	434.75	434.75	434.75	434.75	434.75	434.75
Total	5117.5	5117.5	5117.5	5117.5	5117.5	5117.5	5117.5	5117.5	5117.5	5117.5

Table 5 Area (Ha) by ALC Class at risk from 5m sea level rise

Predictive ALC	Current (Ha)	Low Scenario			Medium Scenario			High Scenario		
		2020L	2050L	2080L	2020M	2050M	2080M	2020H	2050H	2080H
1	186.5	18.5	2	0	18.5	3	0	18.5	1.25	9.25
2	4753.75	3709.75	1508.75	140	3722	1563.25	125.5	3657.25	678.5	50.5
3a	4063.5	5659.75	6608.5	3808	5666.25	6628.75	2761.25	5552	4409.75	90
3b	8037.75	6933	7674.75	7483	6918.75	7625.25	7438	7061.75	8312.25	4512.5
4	5228.75	6299.25	7258	11659	6293.75	7230.5	12787.25	6371.75	9674	18919.25
5	7697.25	7347.25	6915.5	6877.5	7348.25	6916.75	6855.5	7306.25	6891.75	6386
NA	3852	3852	3852	3852	3852	3852	3852	3852	3852	3852
Total	33819.5	33819.5	33819.5	33819.5	33819.5	33819.5	33819.5	33819.5	33819.5	33819.5

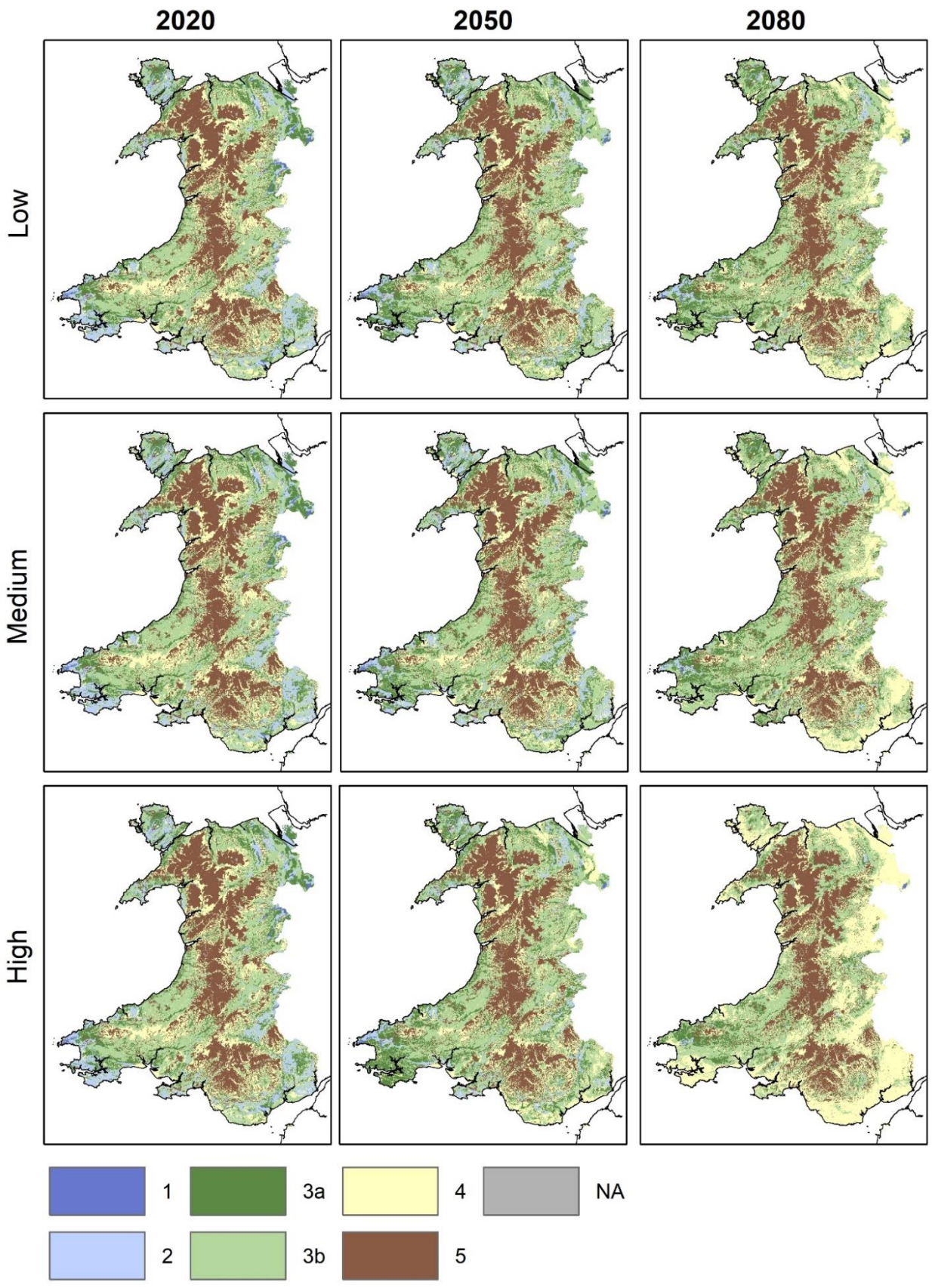


Figure 1 Predictive ALC grade from soil and climate parameters only (including urban or non agricultural areas) (Welsh Government (2019)

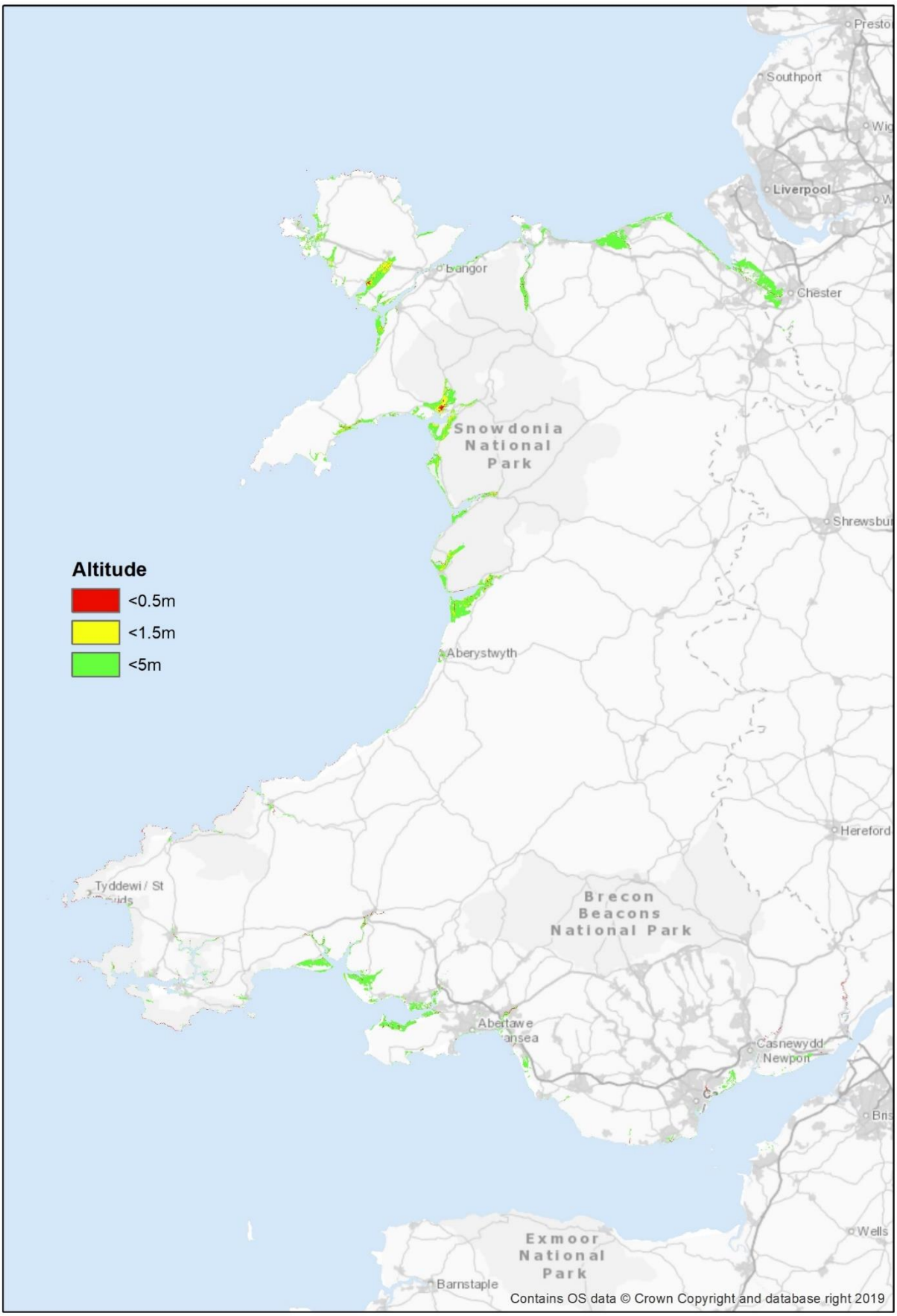


Figure 2 Distribution of areas around the coast of Wales at risk from sea level rise

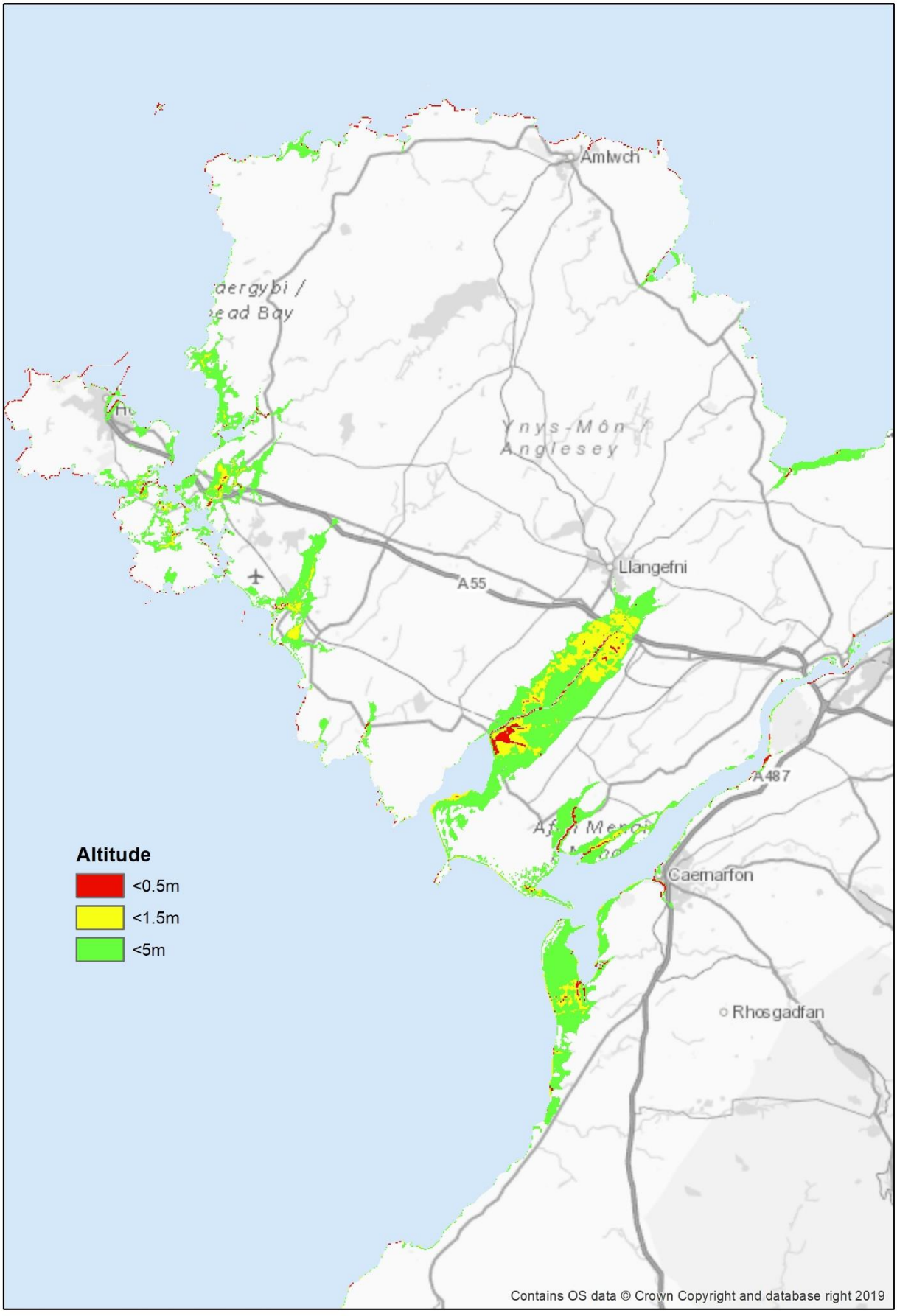


Figure 3 Distribution of areas at risk from sea level rise around Anglesey

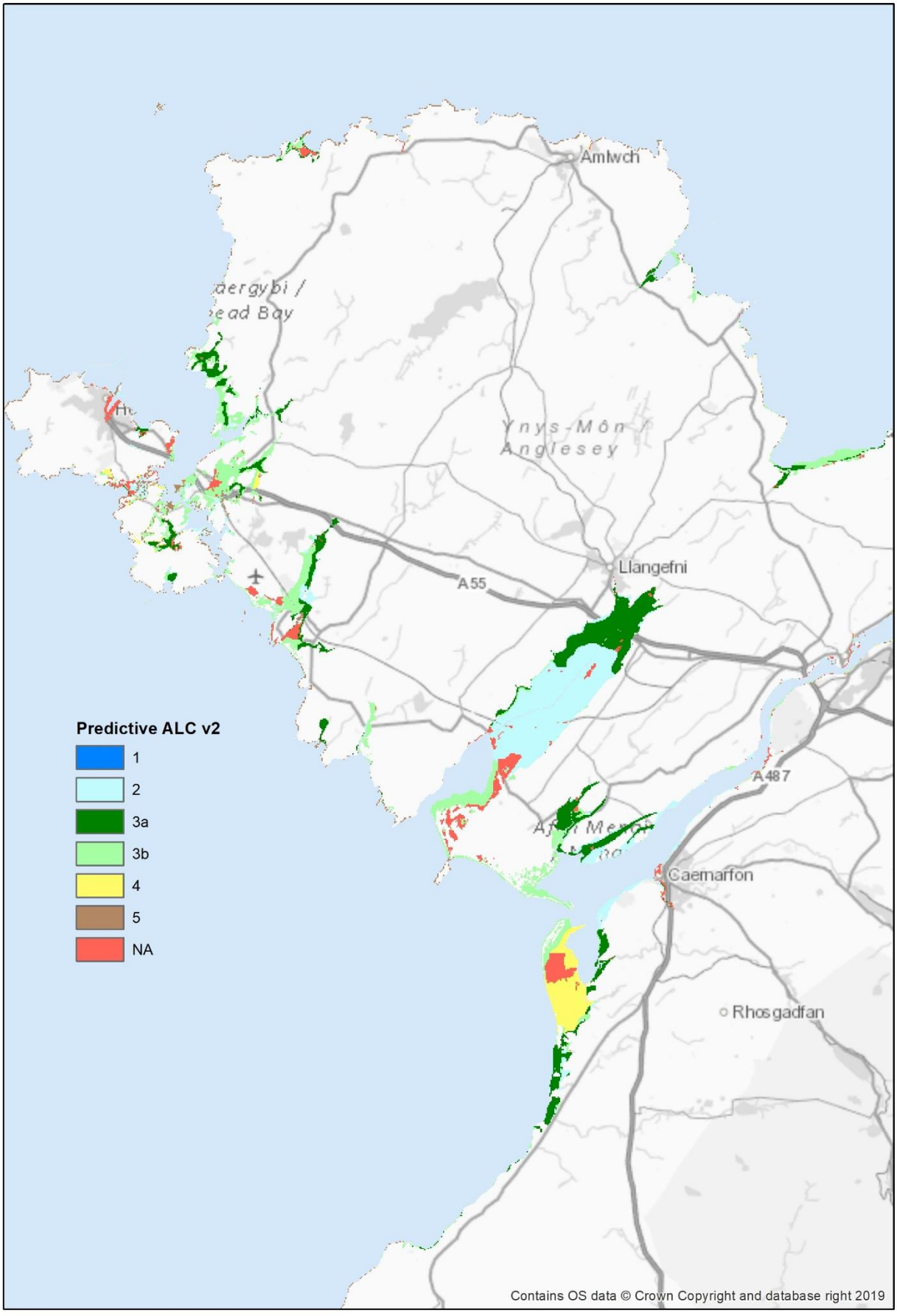


Figure 4 Distribution of Predictive ALC v2 zones at risk from sea level rise around Anglesey

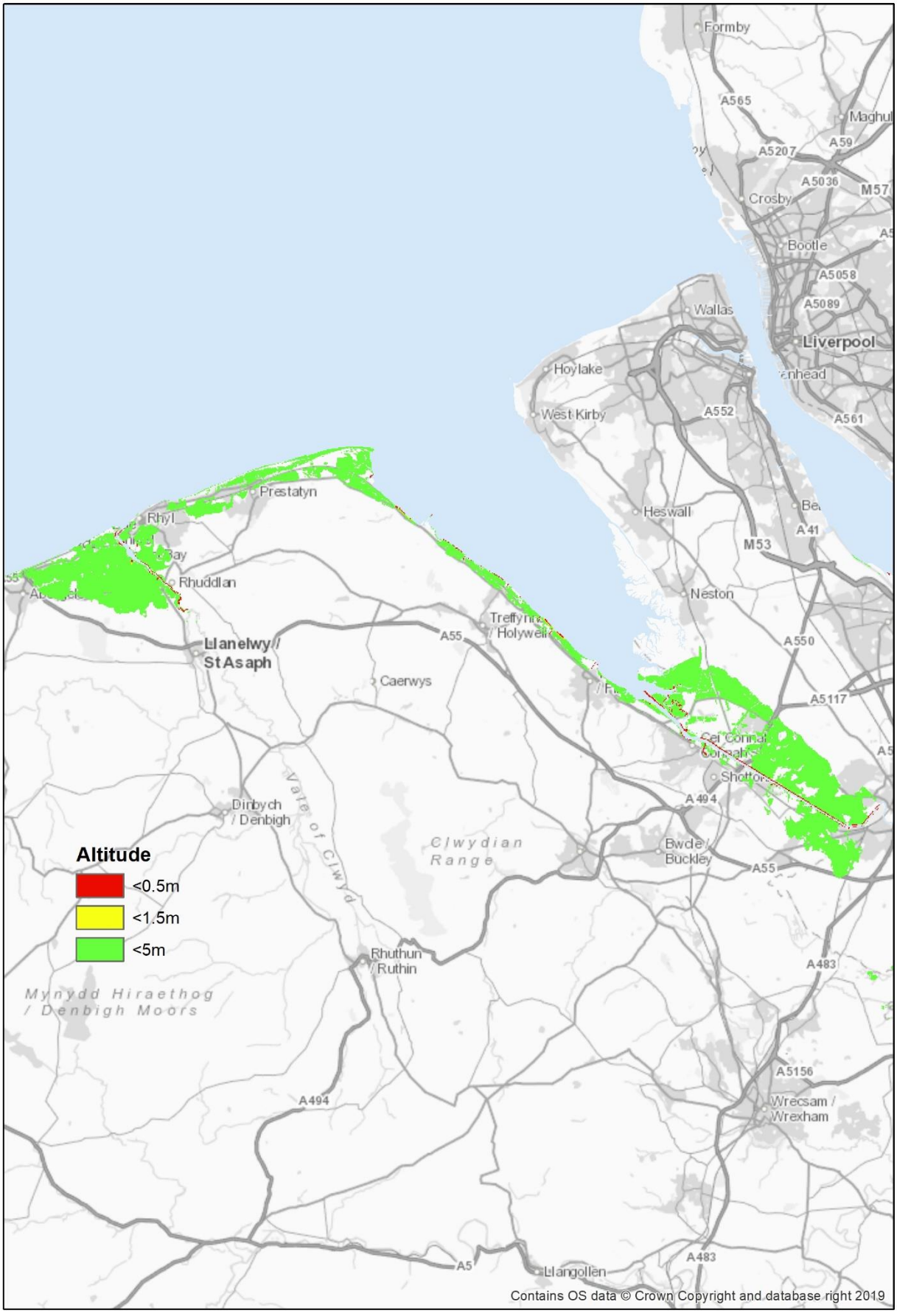


Figure 5 Distribution of areas at risk from sea level rise around the coast of Clwyd

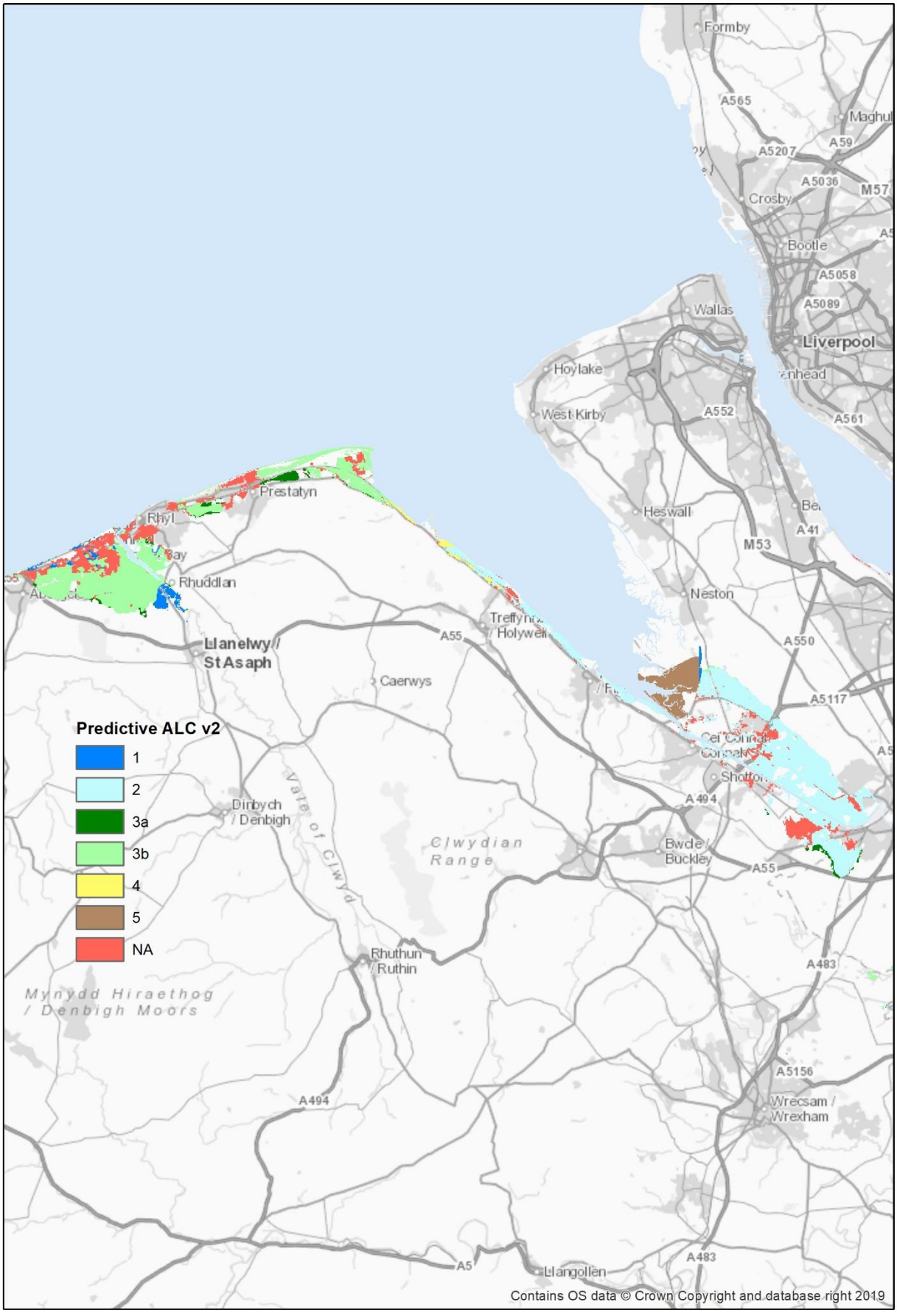


Figure 6 Distribution of Predictive ALC v2 zones at risk from sea level rise around Clwyd

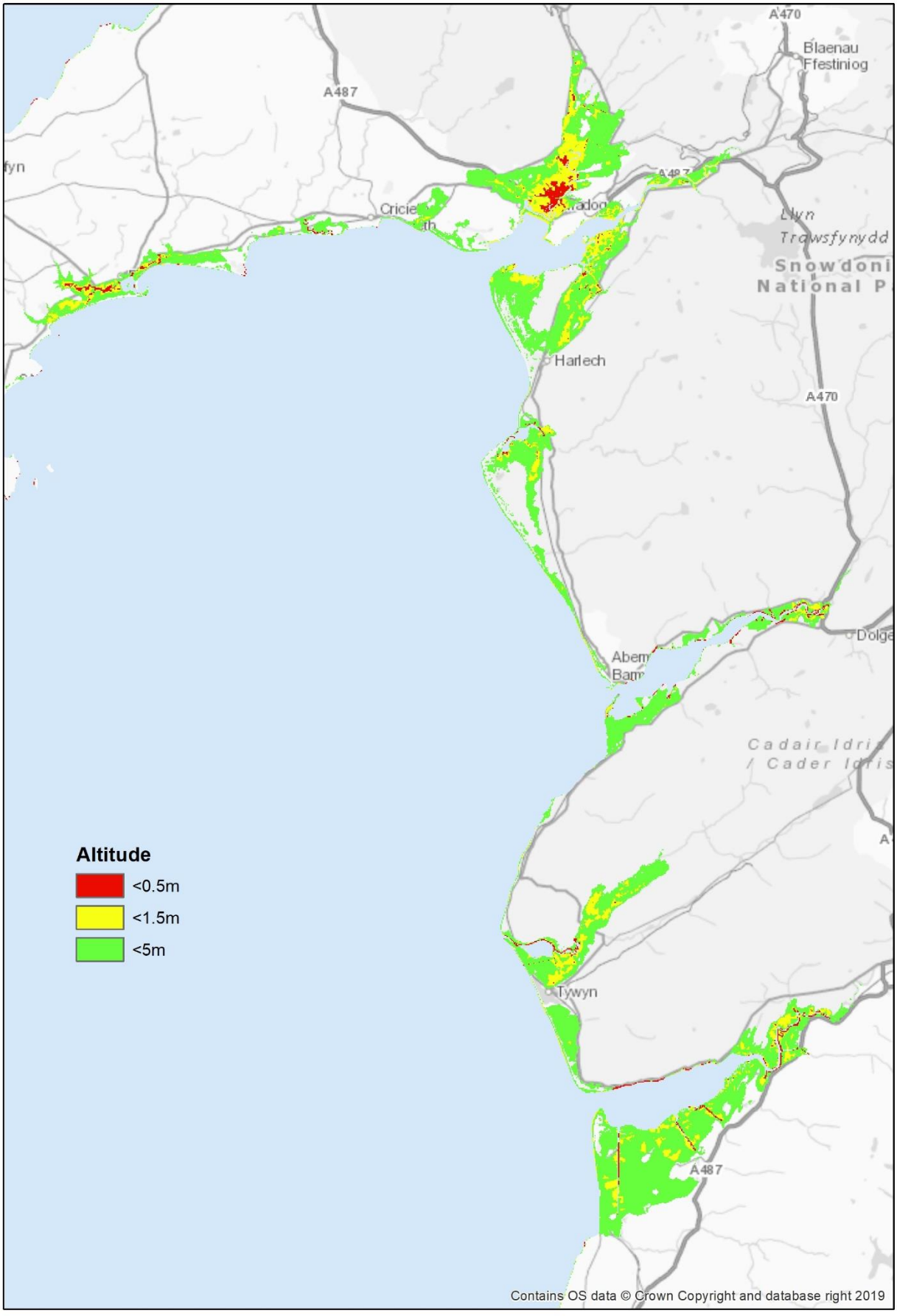


Figure 7 Distribution of areas at risk from sea level rise around the coast of Gwynedd

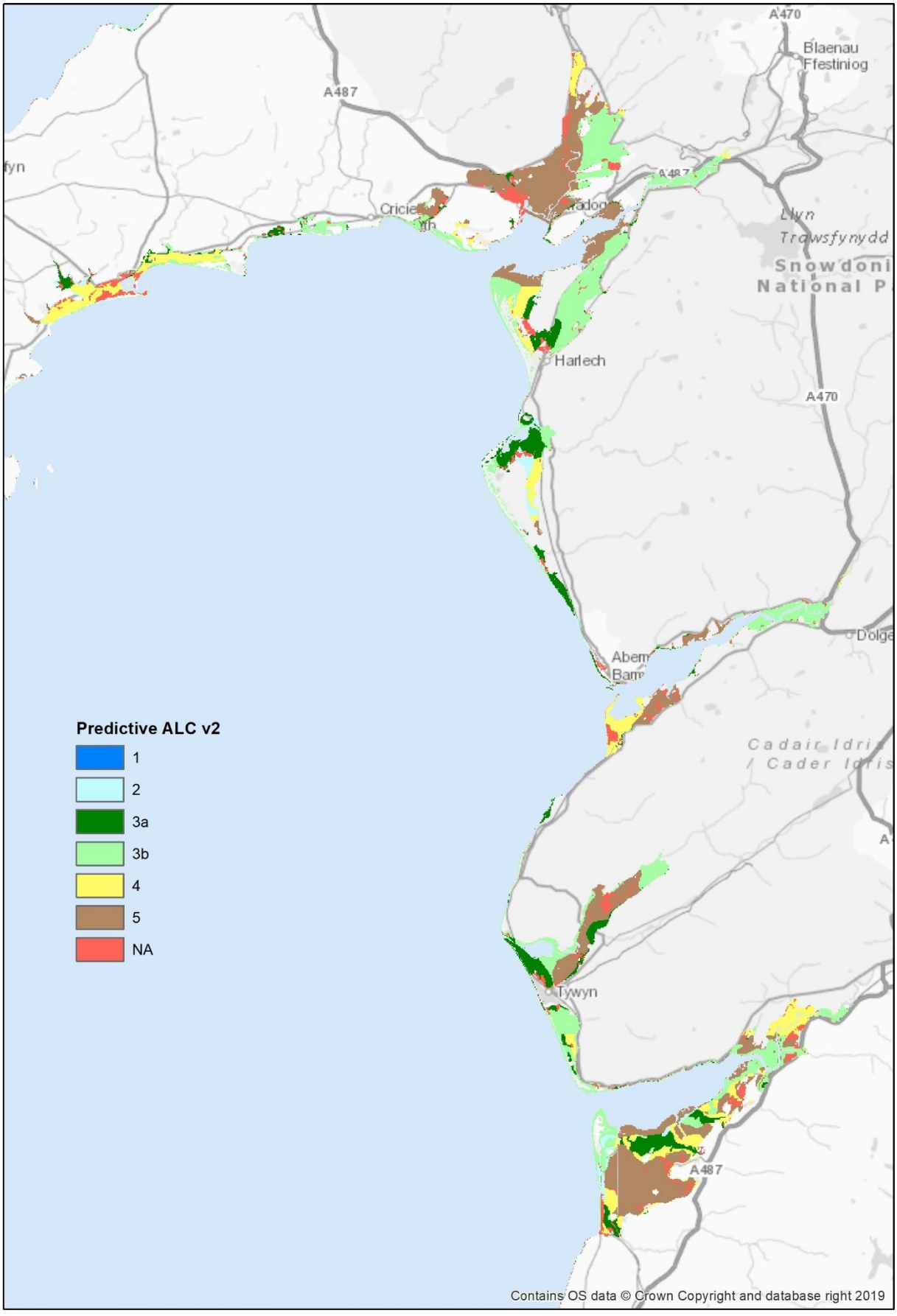


Figure 8 Distribution of Predictive ALC v2 zones at risk from sea level rise around Gwynedd

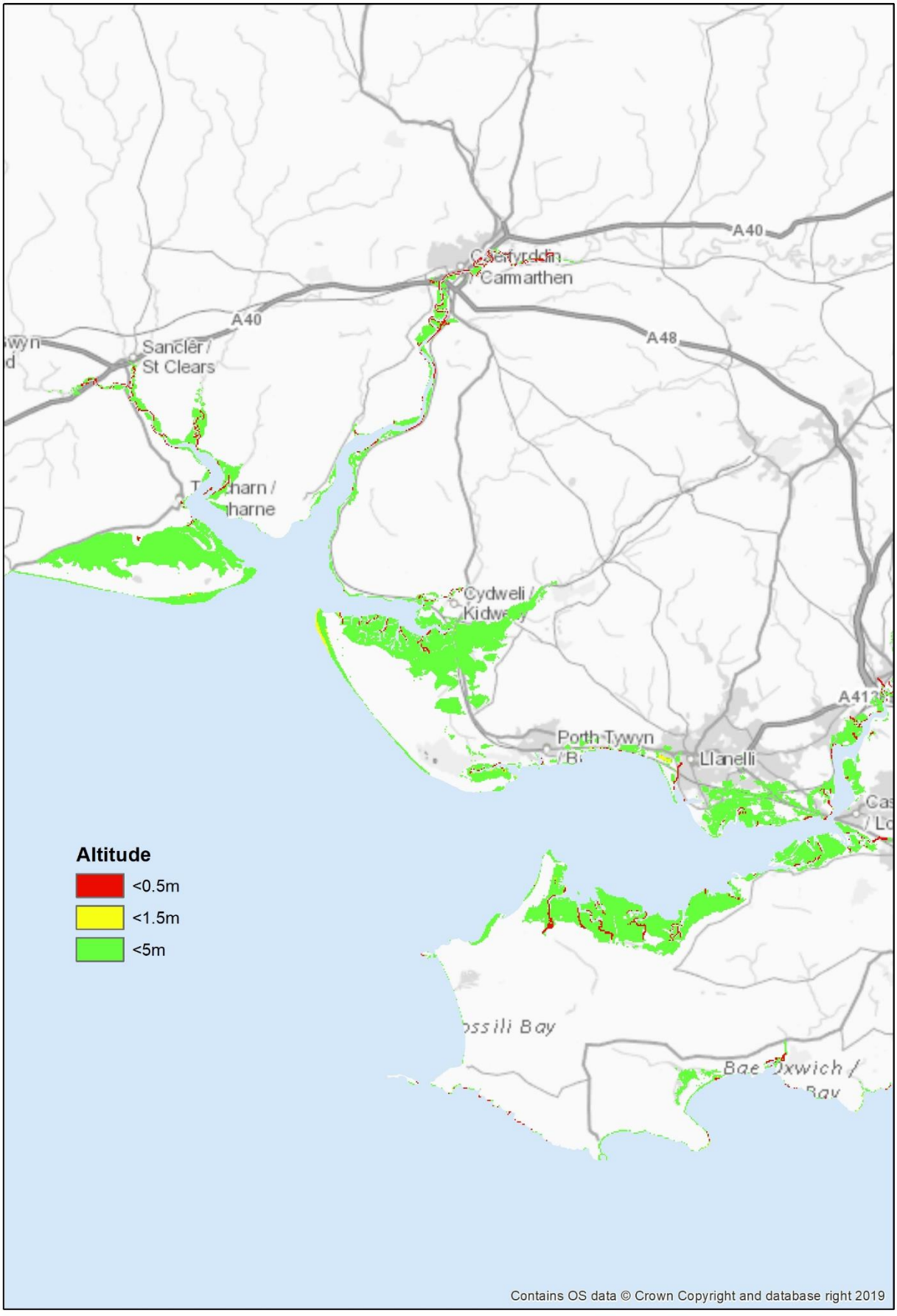


Figure 9 Distribution of areas at risk from sea level rise around the coast of Llanelli and Swansea

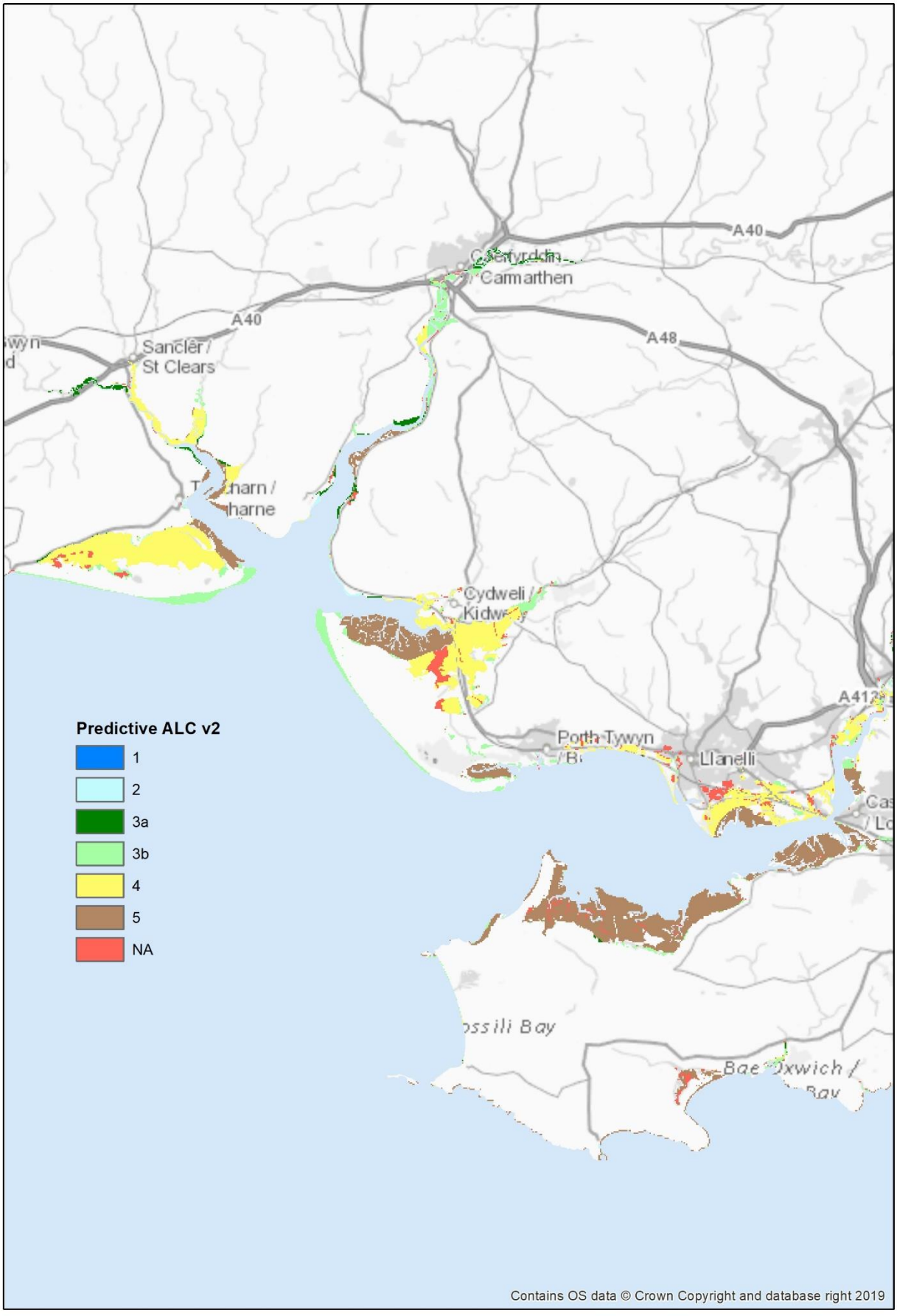


Figure 10 Distribution of Predictive ALC v2 zones at risk from sea level rise around Llanelli and Swansea

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