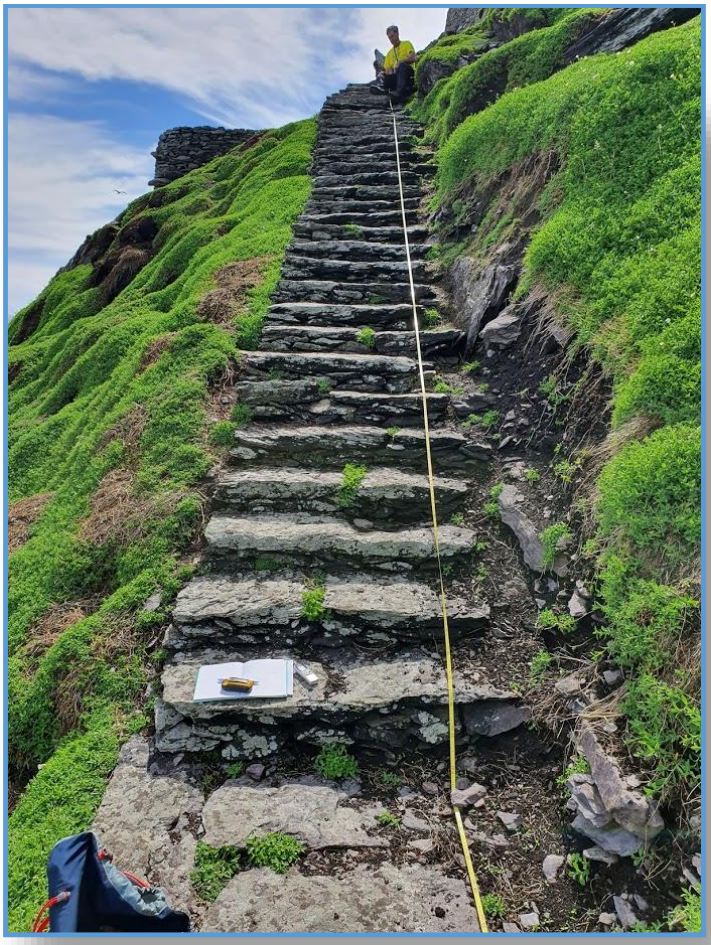
Skellig Michael Storm Petrel Monitoring July 2020



NPWS August, 2020

Summary

The Sceilg Mhichíl Draft Management Plan 2020 – 2030 sets out the intention for greater focus on the monitoring of the island's Storm Petrel breeding population. In July, 2020 NPWS with the support of OPW undertook a breeding Storm Petrel survey across a significant proportion of the island's built heritage. The precise survey methods employed here is as per those of a 2018 survey and this allows the direct comparison of estimated populations over time of the island's three sets of steps associated with the monastic settlement. A comparison detailed in this short report does not identify any pronounced change in the island's breeding Storm Petrel population. The 2020 monitoring work allows a comparison of the relative importance of the various areas surveyed. The associated data accrued has been processed and stored and is an easy to access resource for any future monitoring work.

Acknowledgements

The magnitude of the work done could not have been achieved without the expertise and patience of rope specialist Brendan O'Connor and to this end were are sincerely grateful. Thanks also to Fergus McCormick and other colleagues in the OPW for facilitating this survey work – it is very much appreciated.

Introduction

Listed on Annex I to the European Birds Directive, the European Storm Petrel (hereafter Storm Petrel), *Hydrobates pelagicus*, is Europe's smallest seabird with a population size of an estimated 438,000-514,000 breeding pairs in Europe, of which approximately 10 - 43% are believed to breed in Ireland and approximately 10,000 pairs breeding on Skellig Michael (Mitchell et al., 2004). Skellig Michael is part of Skellig SPA (004007) and Storm Petrel is listed as a special conservation interest for this Natura 2000 site (see SI No 74 of 2010).

Compared to other seabird species the particular behavioural breeding ecology of Storm Petrel makes the derivation of robust breeding parameters quite challenging and significant data gaps exists in terms overall breeding population estimates at the site and sub-site scales as well as estimating breeding productivity and describing phenological patterns. Commissioned by NPWS and building upon previous work, Arneill (2018) developed and assessed methods to census and monitor burrow-nesting seabirds (including Storm Petrel) for an Irish context. This work has set the standard for Storm Petrel census and monitoring for Ireland.

During the period 17th – 24th of July, 2020 NPWS with the support of OPW surveyed a significant amount of Strom Petrel habitat on Skellig Michael. An overview of the results of this work are presented here and are compared to previous Storm Petrel breeding population estimates for discreet areas of the island's built heritage.

Methods

Informed by Arneill (2018), the draft NPWS methods manual associated with the latter and Arneill & Quinn (2018) the breeding population of various areas of the built heritage of Skellig Michael was estimated by way of tape-playback survey. The surveyed areas consisted of parts of the monastic ruins and their associated steps and the lighthouse walls.

Tape-playbacks were carried out in conditions of Beaufort 4 or lower to avoid false negative results. Rather than adopt a randomised subsampling approach across various strata of built heritage a complete survey approach of as many individual structures within the given survey period was undertaken. In order to

compare this year's survey results with a subset of discreet sections surveyed using the same survey methods in July 2018 (as reported out in Arneill and Quinn 2018) the surveying of the three sets of steps (i.e. North, South and East Steps) were considered a priority for 2020. Another priority was to resurvey the lighthouse wall from Cross Cove to the New Lighthouse with a view to comparing this year's survey findings with those of Money and Newton (2009) and Newton and Lynch (2015).

Built heritage structures were divided up into various transects of default length of 30m. However particular transect lengths deviated from the default where it was considered more appropriate to end or begin transects at obvious features (e.g. transition from steps to path) or to conform to transects defined by Arneill and Quinn (2018) for comparative purposes. See Appendix I for more detail on the various sections and transects surveyed in 2020.

The actual playback of consisted of male Storm Petrel's 'purr' call played through a Sony Dictaphone (Sony ICD-BX140 4GB Digital Voice Recorder) at full volume (considered to be > 80db) facing, and within one metre of, the wall or steps for approximately 10 seconds, followed by approximately 30 seconds of listening to detect any responses. This was repeated every two metres along the length of the steps and if the wall was higher than two meters further proportionate number of tape-plays were undertaken. For each section the number of tape-plays and the number of responses by Storm Petrel were recorded.

In order to derive a response rate estimate for the 2020 survey a number of Storm Petrel Apparently Occupied Sites (AOS) were identified by way of calling birds at night or for those birds that responded to a tape play back on the first night on the island. These flagged sites were revisited on six occasions during the following days and their response or lack thereof to the 10 second playback was noted (See Appendix II for more detail)

Coverage

The primary constraints to producing an all-island estimate of breeding Storm Petrel on Skellig Michael are (1) health and safety considerations due to the fact that many of the walls with suitable habitat can only be surveyed safely with the use of ropes and (2) available surveyor time to cover such a large and complex island. During the period 17th – 24th of July, 2020 the areas set out in Table 1 were surveyed.

Table 1 – 2020 Survey Areas

Section Name	Notes
North Steps	Fully surveyed
South Steps	Fully surveyed
East Steps (parts of)	The lower sections of these steps were not surveyed due to time and H&S constraints (unsafe to survey during rain and wind)
Lighthouse Wall (huts to new Lighthouse)	Fully surveyed
Lighthouse Wall (Cross Cove to huts)	Fully surveyed
Monastery Complex (parts of)	The majority surveyed but significant amounts left surveyed due to time constraints, poor weather and the need for rope support – see Appendix III for more details
Old Lighthouse Complex	Sea facing walls associated with the Old Lighthouse Buildings not comprehensively surveyed
Miscellaneous ruins	Two relatively small discreet structures either side of the South Steps.

The most significant amount, in terms of size and potential suitability, of Storm Petrel habitat that was not surveyed is the wall between the lighthouses. Other unsurveyed areas of built heritage include the South Peak and smaller structures around the island. Of course it is very likely that Storm Petrel nest on Skellig Michael outside of the built heritage on scree and other rocky habitat as well as in and around the Puffin and Manx Shearwater breeding areas. Thus the relative importance of the island's Storm Petrel population nesting in natural habitats is not yet quantified.

Results

Over the course of six sampling periods and based on 33 – 37 AOS a response rate of 0.334 ±0.046 was estimated (see Appendix II). In total and across all survey transects (n = 72) 1,458 tape play backs were executed yielding 636 recorded responses of Storm Petrel. This equates to an estimated Storm Petrel breeding population of 1,904 (1,672 – 2,211) AOS of the total area surveyed.

Figure 1 (below) gives an indication of the relative importance of the various areas surveyed both in terms of the total number of responses recorded per area (the higher the sphere on the Y-axis the greater the number of recorded responses) and the relative density of recorded responses (the larger the sphere the higher the estimated density value). It should be noted that the latter figure is quite crude and is derived by dividing the total number of recorded responses per survey area by the total number of playbacks executed per survey area and thus should be treated as indicative only.

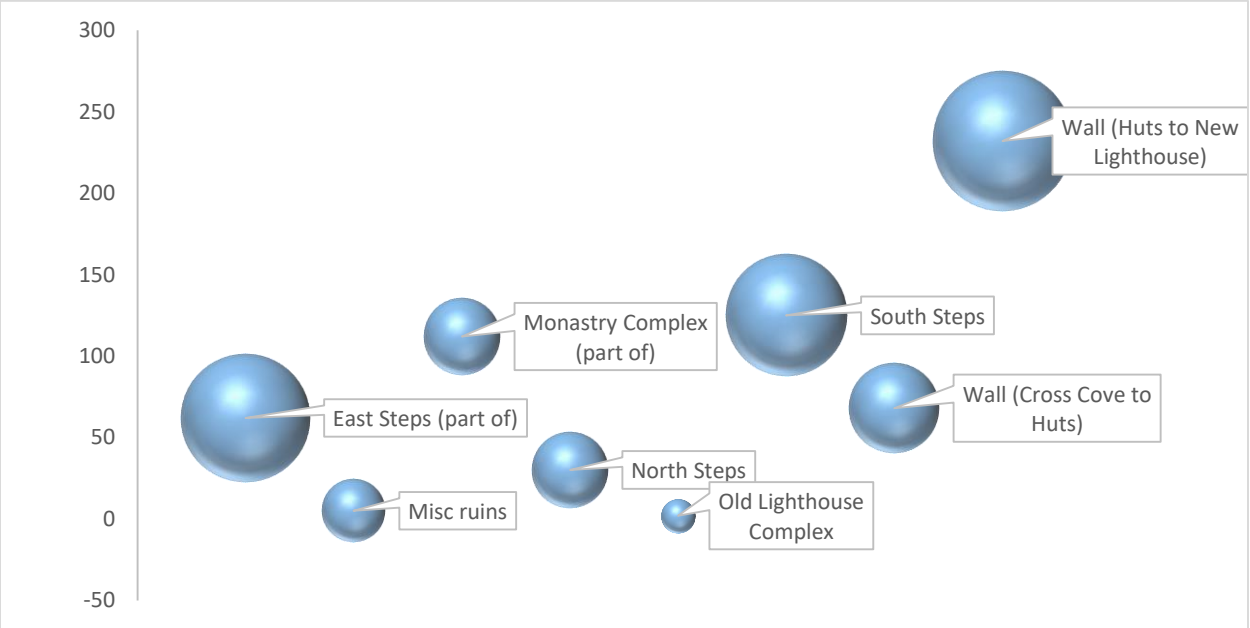


Figure 1 Responses to playbacks per survey section: relative abundance and approximate relative density

Comparisons with previous monitoring

Deriving island wide population estimates of their Storm Petrel breeding population can be labour intensive and logistically difficult. Therefore revisiting particular areas to survey on a regular basis can yield valuable insights into potential changes to an island's breeding population through time. Building on

the work set out in Arneill and Quinn (2018) the re-surveying the Skellig Michael's three sets of steps in 2020 continues this monitoring initiative. Figure 2 sets out like for like comparisons of the three sets of steps for the survey years of 2018 and 2020. The value of this monitoring will increase with repeated surveys. Figure 2 sets out side by side the 95% Confidence Interval population estimates of the three sets of steps that were surveyed both in 2018 and in 2020. This initial comparison indicates that the breeding population of Skellig Michael is broadly stable. Further repeated surveys will help to identify any on-going population trends with greater certainty.

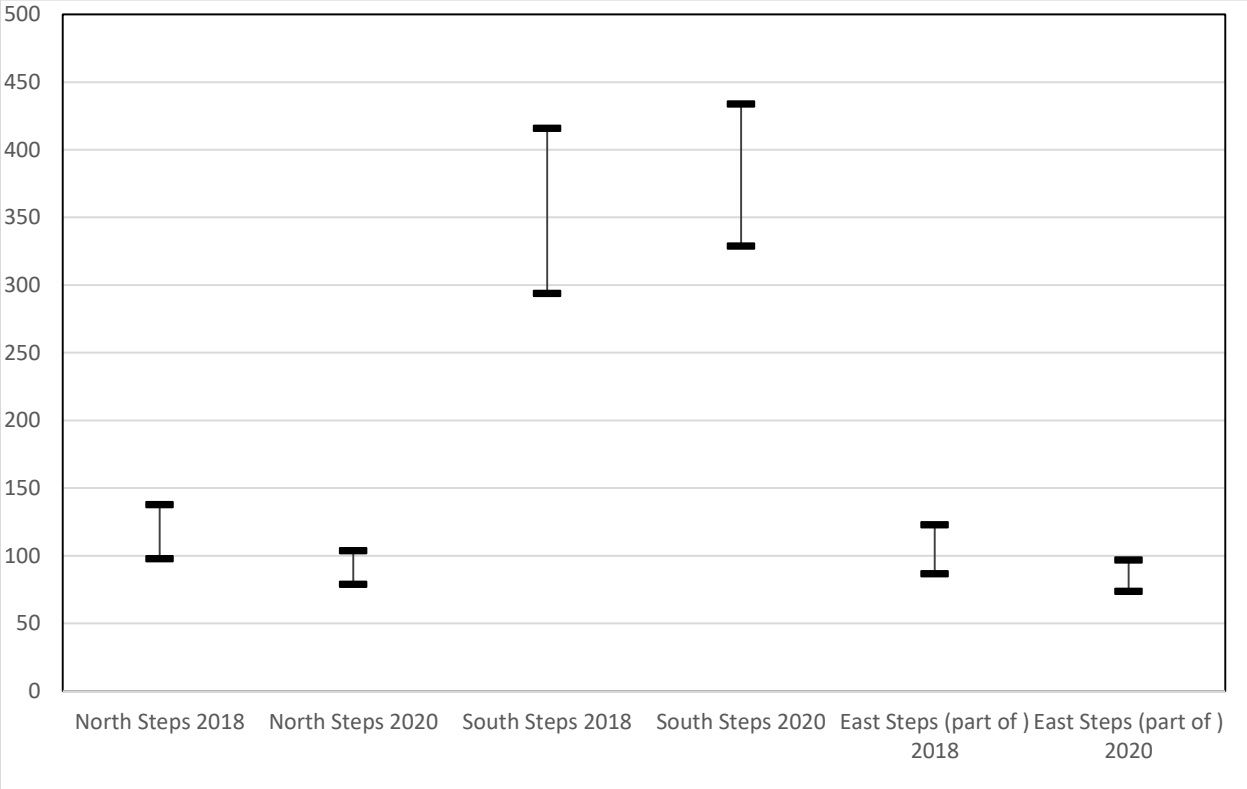


Figure 2 95% Confidence interval bands around the mean population estimates for the North, South and East (parts of) Steps that were surveyed using the same methods in 2018 and 2020.

The survey results collected in July 2020 and outlined here can be used to explore any potential changes in numbers surveyed on the light house wall in 2009 and 2015 as reported out in Money and Newton (2009) and Newton and Lynch (2015).

Conclusion

The Storm Petrel work undertaken on Skellig Michael in July 2020 successfully derived robust and comparable population estimates for a large proportion of the island's built heritage. These data are integral to the continued monitoring of the island's Storm Petrel's breeding population through time as well as contributing to the evidence base to allow ecological assessments of the breeding Strom Petrel population from various activates on-going and in the future at this important site.

References

Arneill, G. E. 2018. Developing and assessing methods to census and monitor burrow-nesting seabirds in Ireland. PhD Thesis, University College Cork

Arneill G. and J. Quinn 2018. Census of European storm petrels (*Hydrobates pelagicus*) on multiple islands off the south-west coast of Ireland.

Money, S. & Newton, S.F. 2009. A survey of the European Storm-petrel *Hydrobates pelagicus* population in the lower lighthouse road wall on Skellig Michael. BirdWatch Ireland Conservation Report 2009/02, Kilcoole, Co. Wicklow.

Newton, S.F, & Lynch, J. 2015. A re-survey of the European Storm-petrel *Hydrobates pelagicus* Population nesting repaired sections of the Lower Lighthouse Road wall on Skellig Michael. BirdWatch Ireland Conservation Report 2009/02, Kilcoole, Co. Wicklow

Mitchell, P.I., Newton, S.F., Ratcliffe, N., Dunn, T.E., 2004. Seabird populations of Britain and Ireland. London, United Kingdom: T. & A.D. Poyser.

Appendix I – Further information on the 2020 survey sections and their transects

Section information & notes

Storm Petrel Survey Areas - Section ID	Storm Petrel Survey Areas - Section Name	Transect ID	Notes
Section A	South Steps including walls immediately adjacent to steps	A0.0	
		A1.0	
		A2.0	
		A3.0	
		A4.0	
		A5.0	
		A6.1	
		A6.2	
		A7.0	
Section B	Wall from Cross Cove to the OPW Huts	B_Heli	
		B1.1	
		B1.2	
		B2.0	
		B3.0	
		B4.0	
		B5.0	
Section C	Wall from OPW Huts to the New Lighthouse Sheds	C1.0	From gate to New Lighthouse sheds
		C2.0	
		C3.0	
		C4.0	
		C5.0	Wall behind the new hut
		C6.0	
		C7.0	Wall behind the workers' huts
		C8.0	
Section D	Old Lighthouse Complex	D1.0	
		D10	
		D11	
		D12	
		D2.0	
		D3.0	
		D4.0	
		D5.0	
		D6.0	
		D7.0	
		D8.0	
		D9.0	
Section E	The North Steps	E1.0	Highest section of the North Steps
		E2.0	
		E3.0	
		E4.0	"The wall"
		E5.0	This transect starts at the beginning of the steps and ends lower down described in notes as 1/2 way down the steps. Distance not recorded but I am assuming that it is 30m
		E6.0	Total distance of this transect not recorded but I am assuming 30m
Section F	The East Steps	F1.0	
		F2.0	

		F3.0	
		F4.0	
		F5.0	
		F6.0	
Section G	Monastery Complex	G1.0	Pathway from South Steps up to the 1st Archway
		G10	Graveyard
		G11	Veranda and side wall of Cell E
		G12	Oratory 3
		G13	Internal walls surrounding Oratory 3 this includes the 'toilet' but not the sea facing wall)
		G14	The Church wall to the corner with the grill/grid
		G15	Lower garden wall from east steps, archway to 1/2 (approx.) along the wall - we had to stop because we would need ropes to survey safely
		G16	Lower Monks' garden - all interior walls and steps surveyed - noted perimeter walls not surveyed in this subsection
		G17	Central Wall East (east of the Archway
		G18	Back Wall West - up from the beehive huts (possible mistake with 1st grid ref)
		G19	Central wall west to the Archway to the beehive huts - this subsection includes the archway
		G2.0	Lower wall from 1st Archway to the west
		G20	Cell B (full grid ref not recorded)
		G21	Oratory 2
		G22	Cell D
		G3.0	“Miniwall” to the west of beehives
		G4.0	Small wall in Shed Garden
		G5.0	Cell A & environs (including the walls just after the archway)
		G6.0	Cell C
		G7.0	Veranda of Cells B, C, D & F
		G8.0	Cell F
		G9.0	Cell E
Section H	Ruins away from Monastery Complex	H1.0	walled garden close to lower part of the South Steps
		H2.0	Monastic ruins North of the South Steps

Note a photographic record of the majority of the beginning and end points for these transects are held by NPWS

Section information & notes

Transect ID	Survey Date	Time approx.	Start X ITM	Start Y ITM	End X ITM	End Y ITM	Length	Number of Playbacks	Number of Responses	Rain	Wind
A0.0	19/07/2020	11:30	424702	560665	424721	560696	38	21	27	No	2
A1.0	20/07/2020	19:00	424702	560631	424700	560656	?	16	13	No	2
A2.0	20/07/2020	18:30	424692	560604	424699	560631	?	23	14	No	2
A3.0	20/07/2020	18:00	424735	560607	424691	560607	44	38	20	No	2
A4.0	20/07/2020	17:20	424770	560614	424735	560609	36	33	24	No	2
A5.0	20/07/2020	16:15	424789	560593	424772	560613	36	28	13	No	2
A6.1	20/07/2020	16:00	424799	560591	424789	560591	9	10	9	No	2
A6.2	20/07/2020	17:00	424775	560589	424788	560583	20	17	1	No	2
A7.0	20/07/2020	15:30	424774	560568	424768	560574	26	20	4	No	2
B_Heli	24/07/2020	11:00	424834	560608	424839	560597	0	21	5	Yes	4
B1.1	23/07/2020	17:05	424824	560582	424800	560567	30	25	21	No	2
B1.2	23/07/2020	18:00	424812	560575	424838	560594	32	20	11	No	2
B2.0	21/07/2020	18:00	424804	560634	424831	560607	64	36	13	No	2
B3.0	21/07/2020	17:00	424832	560647	424805	560635	30	19	3	No	2
B4.0	21/07/2020	16:00	424852	560667	424835	560648	30	19	7	No	2
B5.0	21/07/2020	15:00	424889	560704	424853	560669	52	65	8	No	2
C1.0	23/07/2020	08:15	424636	560451	424615	560428	33	48	56	No	2
C2.0	23/07/2020	11:20	424656	560479	424638	560454	30	48	41	No	2
C3.0	23/07/2020	16:00	424676	560500	424656	560485	30	56	49	No	2
C4.0	23/07/2020	17:45	424702	560518	424678	560502	30	61	36	No	2
C5.0	22/07/2020	17:00	424706	560529	424703	560520	8	4	0	No	2
C6.0	22/07/2020	16:00	424736	560545	424721	560545	16	19	4	No	2
C7.0	22/07/2020	11:00	424755	560556	424738	560544	20	18	20	No	2
C8.0	22/07/2020	12:15	424785	560565	424756	560554	36	35	26	No	2
D1.0	22/07/2020	09:00	424472	560596				2	0	No	2
D10	22/07/2020	11:15	424454	560625				4	0	No	2
D11	22/07/2020	11:30	424458	560626				4	0	No	2
D12	22/07/2020	11:45	424461	560637				5	0	No	2
D2.0	22/07/2020	09:15	424469	560596				2	0	No	2
D3.0	22/07/2020	09:30	424468	560599				5	1	No	2
D4.0	22/07/2020	09:45	424465	560600				3	0	No	2
D5.0	22/07/2020	10:00	424463	560602				8	0	No	2
D6.0	22/07/2020	10:15	424458	560607				5	1	No	2
D7.0	22/07/2020	10:30	424450	560611				2	0	No	2
D8.0	22/07/2020	10:45	424450	560613				2	0	No	2
D9.0	22/07/2020	11:00	424461	560621				1	0	No	2
E1.0	18/07/2020	10:15	424686	560690	424693	560715	30	19	6	No	4
E2.0	18/07/2020	10:45	424692	560716	424994	560744	30	20	3	No	4
E3.0	18/07/2020	11:30	424695	560743	424700	560771	30	20	3	No	4
E4.0	18/07/2020	12:30	424702	560774	424705	560807	36	19	9	No	4
E5.0	18/07/2020	13:00	424705	560808	424707	560836	30	27	4	No	4
E6.0	18/07/2020	13:20	424709	560838	424713	560861	30	22	5	No	4
F1.0	18/07/2020	16:00	424800	560777	424816	560779	20	11	4	No	3
F2.0	18/07/2020	16:30	424816	560781	424837	560797	30	16	3	No	3
F3.0	18/07/2020	17:00	424839	560796	424853	560812	30	16	7	No	3
F4.0	18/07/2020	17:30	424851	560810	424870	560823	30	16	5	No	3
F5.0	18/07/2020	18:15	424870	560822	424891	560831	30	16	7	No	3
F6.0	18/07/2020	19:00	424894	560831	424909	560841	30	16	2	No	3
G1.0	20/07/2020	08:30	424728	560705	424781	560758	78	45	34	No	2
G10	20/07/2020	13:15	424812	560809				11	0	No	2
G11	20/07/2020	13:30	424804	560813	424809	560824	14	8	2	No	2
G12	20/07/2020	14:00	424805	560832				10	0	No	2
G13	20/07/2020	13:45	424805	560831				8	0	No	2
G14	19/07/2020	19:30	424810	560799	424817	560806	12	32	2	No	2
G15	19/07/2020	18:00	424800	560777	424813	560787	18	35	15	No	2
G16	19/07/2020	18:40	424810	560793				50	13	No	2
G17	19/07/2020	17:00	424792	560787	424809	560799	20	24	20	No	2
G18	19/07/2020	13:20	424800	560817	424776	560791	36	19	8	No	2
G19	19/07/2020	15:00	424759	560743	424792	560786	60	56	15	No	2
G2.0	20/07/2020	10:00	424781	560764	424752	560736	38	42	17	No	2
G20	19/07/2020	12:30	424797					10	3	No	2
G21	19/07/2020	12:45	424804	560803				18	2	No	2
G22	19/07/2020	12:30	424800	560808				6	2	No	2
G3.0	20/07/2020	10:35	424776	560777	424786	560790	16	9	0	No	2
G4.0	20/07/2020	10:40	424755	560764				5	0	No	2
G5.0	20/07/2020	11:30	424795	560799				29	3	No	2
G6.0	20/07/2020	12:00	424798	560805				9	6	No	2
G7.0	20/07/2020	12:15	424797	560800	424809	560812	18	10	4	No	2
G8.0	20/07/2020	12:45	424812	560813				10	0	No	2
G9.0	20/07/2020	13:00	424806	560815				20	0	No	2
H1.0	20/07/2020	14:30	424778	560591			0	21	0	No	2
H2.0	20/07/2020	19:30	424737	560616			0	10	5	No	2

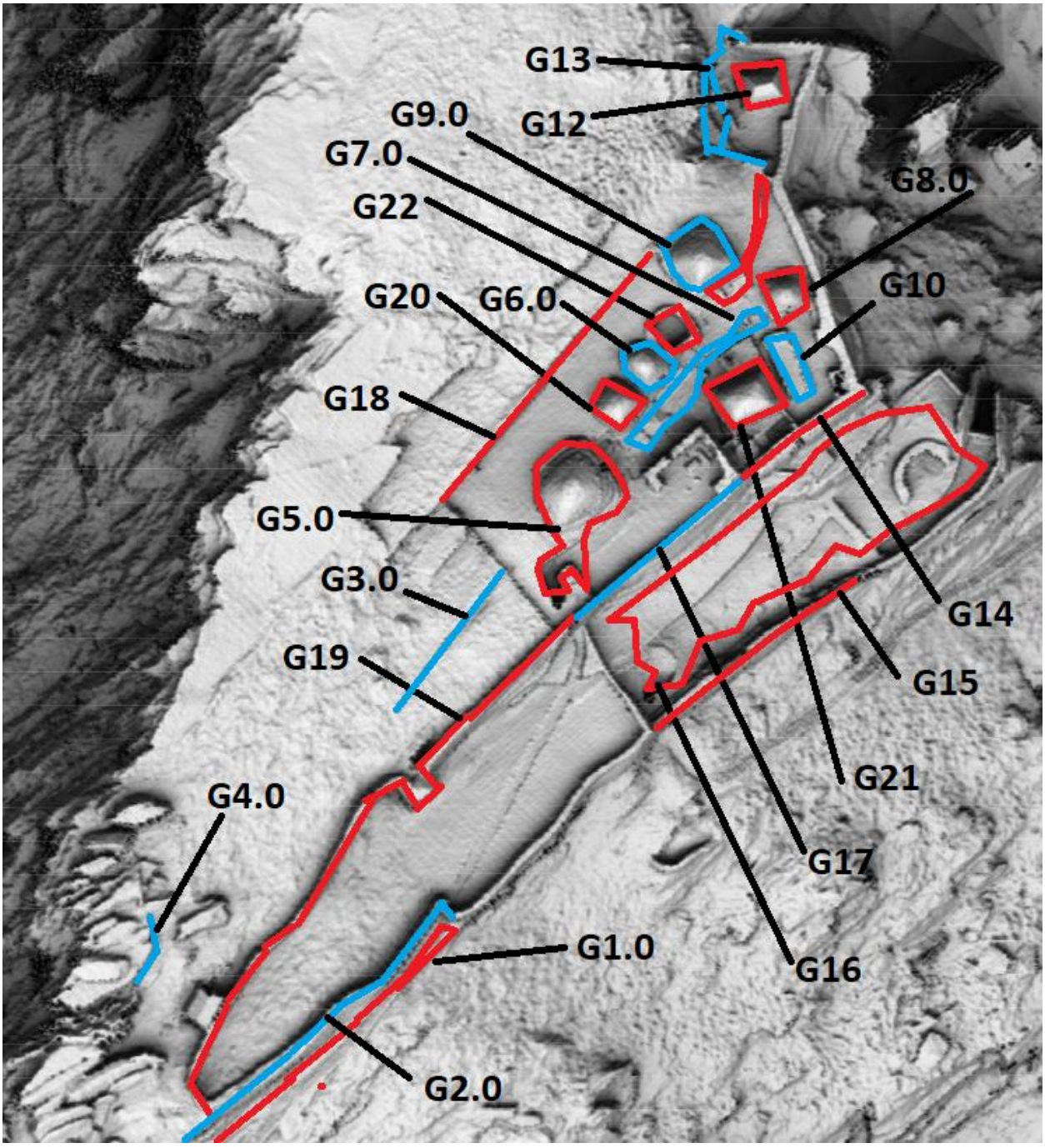
Appendix II – Further information on the calculation of the 2020 response rate

ID	Notes	19/07/2020	Time	20/07/2020	Time	21/07/2020	Time	22/07/2020	Time	23/07/2020	Time	24/07/2020	Time
1	Responded to tape call back 17/07/2020 @ 22:00hrs	0	08:30	0	13:30	1	10:30	1	17:45	1	18:15	0	12:00
2	Responded to tape call back 17/07/2020 @ 22:00hrs	0	08:45	0	13:45	0	10:30	0	10:00			0	12:30
3	Responded to tape call back 17/07/2020 @ 22:00hrs	0	08:55	0	13:50	0	10:30	0	10:00			1	12:30
4	Responded to tape call back 17/07/2020 @ 22:00hrs	0	09:40	0	14:00	0	10:30	0	17:45	0	14:00	0	12:00
5	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	11:10	0	08:30	1	17:50	1	18:30	0	18:30	0	08:30
6	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	11:15	0	08:30	0	17:45	1	18:30	0	18:30	0	08:30
7	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	11:15	0	08:30	0	17:45	0	18:30	0	18:30	0	08:30
8	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	11:15	0	08:30	1	17:45	1	18:30	0	18:30	1	08:30
9	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	11:40	1	08:30	0	17:45	1	18:30	1	18:30	1	08:30
10	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	12:30	0	11:00	0	18:20	0	18:50	0	18:45	0	08:45
11	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	12:30	1	11:00	0	18:20	1	18:50	0	18:45	0	08:45
12	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	12:30	0	11:00	0	18:20	0	18:50	0	18:45	0	08:45
13	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	12:30	0	11:00	0	18:20	0	18:50	1	18:45	0	08:45
14	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	12:30	0	11:00	0	18:20	0	18:50	0	18:45	0	08:45
15	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	13:00	0	11:00	0	18:20	1	18:50	0	18:45	1	08:45
16	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	13:00	1	11:00	0	18:20	1	18:50	0	18:45	0	08:45
17	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	13:00	0	11:00	1	18:20	0	18:50	0	18:45	0	08:45
18	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	13:25	0	11:00	0	18:20	0	19:00	0	18:50	0	08:45
19	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	13:25	1	11:00	1	18:20	0	19:00	0	18:50	0	08:45
20	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	13:50	1	11:30	0	18:00	0	18:45	1	18:45	0	08:40
21	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	13:50	0	11:30	0	18:00	1	18:45	1	18:45	1	08:40
22	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	14:30	1	11:30	0	18:00	0	18:45	0	18:45	0	08:40
23	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	14:40	0	11:30	0	18:00	0	18:45	0	18:45	0	08:40
24	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	14:40	0	11:30	0	18:00	0	18:45	0	18:45	0	08:40
25	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	14:40	0	11:30	0	18:00	1	18:45	0	18:45	0	08:40
26	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	14:40	0	11:30	0	18:00	1	18:45	0	18:45	0	08:40
27	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	14:40	1	11:30	1	18:00	1	19:00	1	18:55	0	09:00
28	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	17:20	0	11:30	1	18:00	1	19:00	0	18:55	1	09:00
29	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	17:20	0	11:30	0	18:10	0	19:00	1	18:55	1	09:00
30	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	17:20	0	11:30	0	18:10	0	19:00	1	18:55	1	09:00
31	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	0	17:30	0	11:30	0	18:10	0	19:00	0	18:55	0	09:00
32	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	17:50	1	11:30	0	18:10	1	19:00	0	19:00	0	09:00
33	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020	1	18:00	1	11:30	0	18:10	0	19:00	0	19:00	1	09:00
Sup1	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020			1	09:15	1	17:55	1	18:30	1	18:30	1	08:40
Sup2	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020			1	09:15	1	17:55	0	18:30	0	18:30	0	08:40
Sup3	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020			1	09:15	1	17:55	0	18:30	1	18:30	0	08:40
Sup4	Recorded calling (no playback stimulus) 00:00 - 02:00hrs 19/07/2020			1	09:15	0	17:55	0	18:30	0	18:30	1	08:40
###	response rate mean	.394		.351		.270		.405		.286		.297	
	n	33		37		37		37		35		37	

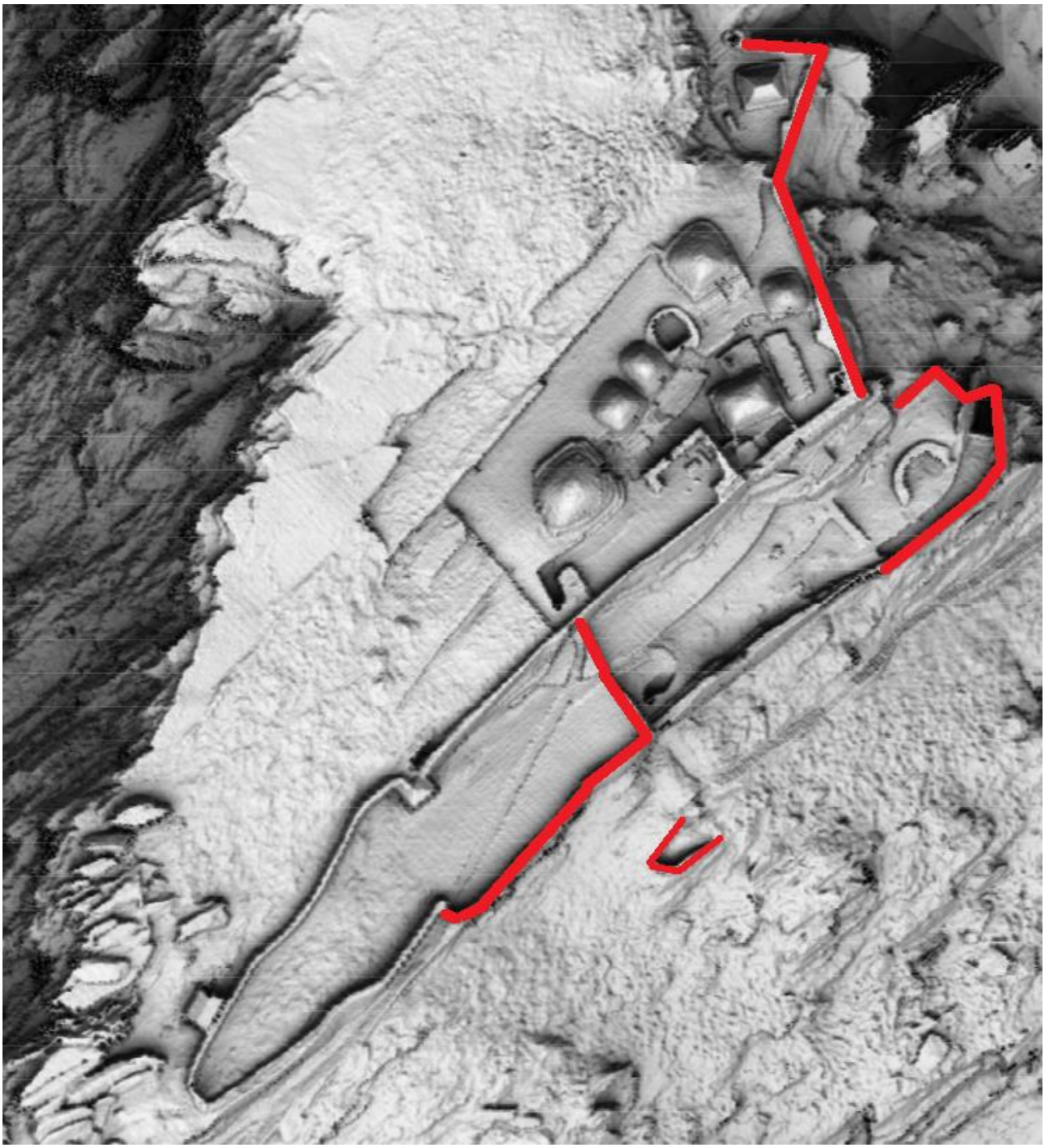
Sample mean	0.334
Sample size	6
Standard Deviation	0.058
SE	0.046

	Upper	0.3803
	Mid	0.334
	Lower	0.2877

Appendix III – Monastery Complex areas surveyed and surveyed



Surveyed in July 2020



Not surveyed in July 2020