

## CHAPTER 3: RABBIT MONITORING ON ST AGNES, GUGH AND ST MARY'S 2013 - 2016

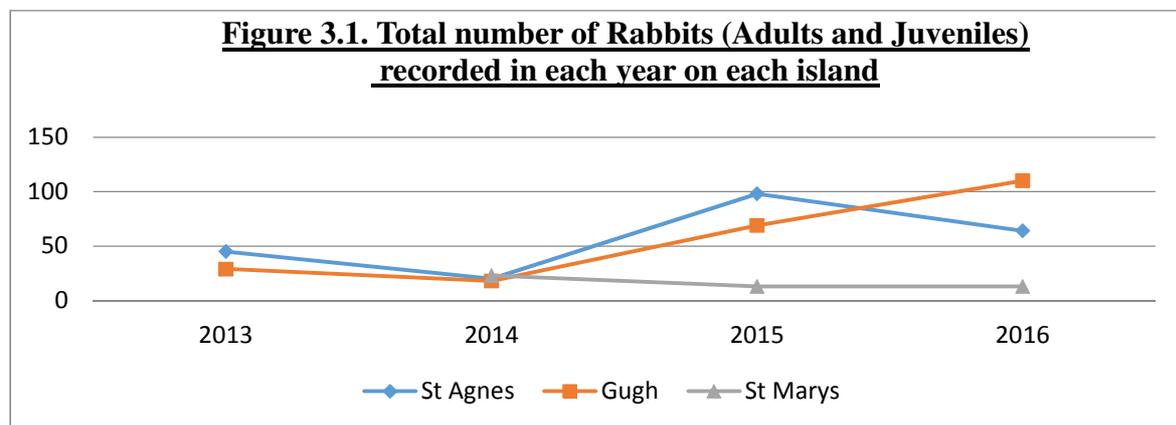
### 3.1. SUMMARY OF RESULTS

It was expected that the rabbit populations on St Agnes and Gugh would increase as a result of the removal of the rats as their numbers were believed to be being limited by predation.

This is not what was seen between 2013 and 2014, pre rat removal and the first year following the removal of the rats, as the number of rabbits recorded on both St Agnes and Gugh decreased significantly. However subsequently in 2015 and 2016 there has been a significant increase in the number of rabbits on both of these islands when compared to the 2013 survey counts.

It is not clear why the rabbit numbers fell between 2013 and 2014 but it may be that the severe weather over the winter reduced the population; disease may also be responsible as well as increased levels of shooting. The sandy spit of land at Wingletang where the main rabbit warren is located was badly damaged by the winter storms in 2013-2014 and was inundated with water; this may be one reason why rabbit numbers on St Agnes were lower in 2014. However this would not explain the decrease seen on Gugh where the warren is high up on the island away from the coast. In late 2013 a control was set up on St Mary's; this will be used in future years for comparison.

The rabbit numbers of Gugh have increased each year since 2014 with the numbers on St Agnes having increased steeply between 2014 and 2015 but falling between 2015 and 2016 but to nowhere near the levels seen in 2013. The number of rabbits in the control have remained fairly stable.



**Table 3.1. Showing trends in the number of Rabbits recorded for each habitat on St Agnes and Gugh between 2013 and 2016**

Island	Habitat				
	Heathland	Gorse Scrub	Coastal Grassland	Foreshore/bramble scrub	Farmland
St Agnes	↓	↑	↓	↑	↑
Gugh	↑	↑	↑	↑	↑

## **3.2. AIM OF SURVEYS**

To monitor rabbit numbers on St Agnes and Gugh for three years following the successful rat removal, to compare them to the number of rabbits recorded in 2013, and to monitor rabbit numbers on St Mary's over the same period, beginning in 2014, to establish a control for comparison.

## **3.3. INTRODUCTION**

The long-term viability of rabbit populations depends on a range of factors, such as:

- food resource - grazing availability
- amount of scrub providing safe havens
- amount of disturbance - the site is currently regularly disturbed by dog walkers
- number of predators – cats, Great and Lesser Black-backed Gulls and people
- connectivity with other nearby populations
- exposure to and resistance to disease

### **3.3.1. Rabbit ecology**

Rabbits are originally from Iberia and Southern France and are believed to have been introduced to the UK and onto the Isles of Scilly in the 11th century. On the Isles of Scilly they occur on several of the islands, including some of the larger uninhabited islands. They are currently absent from Samson but we understand that they have recently been found again on Bryher.

They occur in a range of habitats but are most commonly associated with short grassland, dry heathland and agricultural pasture. In addition the soil conditions are important as they can limit the creation of burrows. Rabbits will use both burrows and natural shelter (e.g. scrub and boulders) for cover (Harris and Yalden, 2008).

## **3.4. METHODOLOGY**

The methodology was to carry out a walked transect on each island (St Agnes, Gugh and St Mary's) which followed the same transect routes as established and followed in 2013. Originally the walked transect was carried out once monthly starting in May 2013 on St Agnes and Gugh and on St Mary's in September 2013. No surveys were carried out in spring and August in 2013, whereas in 2014 surveys were carried out in each month between December 2013 and September 2014. However for comparison only the survey results for May, June, July and September for each year are used.

The limitations of the chosen survey methodology were as follows:

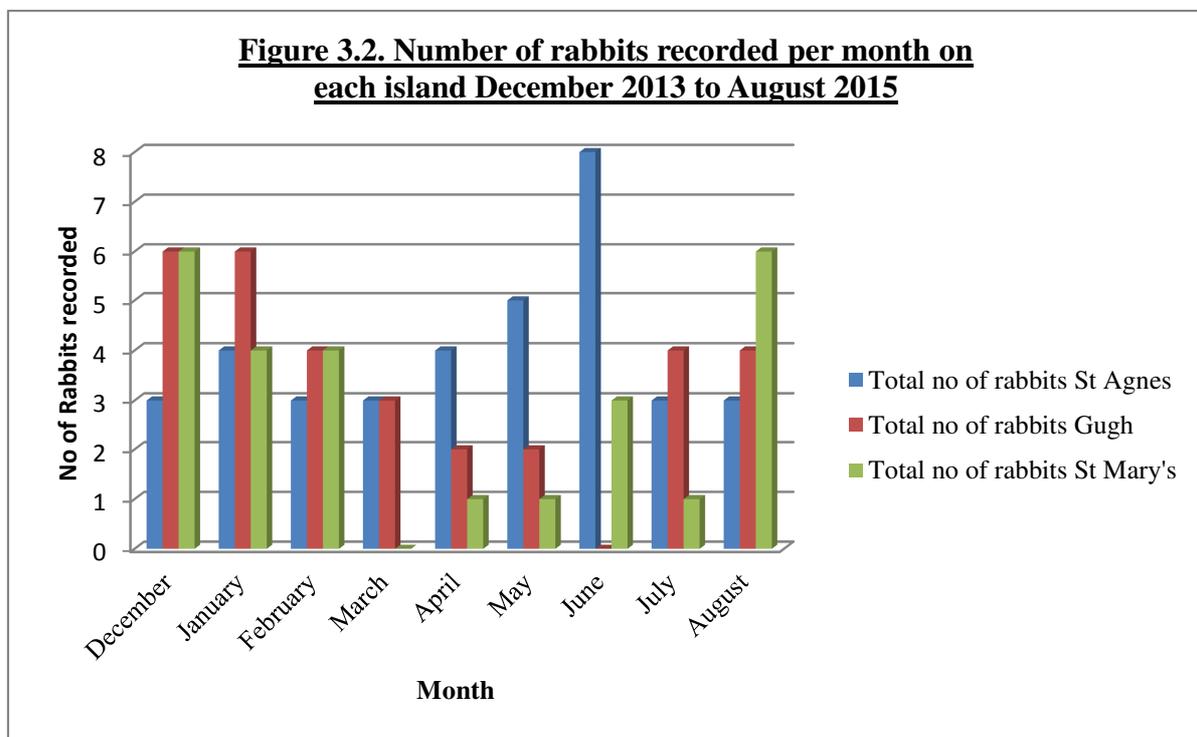
- The presence of dense scrub and bracken in some areas limited the ability to record the presence of rabbits.
- Using volunteers, there were inevitable differences in the skills of the surveyors.
- The surveys did not cover the whole of the islands and on St. Agnes under represented the farmed land. However, access to agricultural land, especially at night, can be difficult to arrange, especially for a long-term (i.e. 3 year) project.

- No notes on warren size were made in 2014, 2015 or 2016 to provide comparisons with 2013 data.

### 3.5. RESULTS

#### 3.5.1. Summary of results of the monthly surveys across St Agnes, Gugh and St Mary's carried out in 2013/14

On St Agnes the number of rabbits recorded was fairly stable from December to March after which numbers increased month on month peaking in June at eight individuals and then dropping before stabilising at 3 individuals. On both Gugh and St Mary's the number of rabbits recorded started higher than on St Agnes at six individuals before decreasing to April staying low into May. Then on Gugh the number of rabbits dropped further before then recovering and stabilising to 4 individuals. On St Mary's numbers increased before dropping again and then returning to their December peak number. On St Mary's in the period September to November 2013 the number of rabbits was higher than recorded in 2014 with nine individuals being recorded in September before dropping to seven individuals.



**Table 3.2. Number of rabbits recorded during the survey work carried out between 2013 and 2016 on each island (data shaded in pink used for year on year comparison)**

Island	Month	2013		2014		2015		2016	
		Adult	Juv	Adult	Juv	Adult	Juv	Adult	Juv
St Agnes	Dec	3	0	-	-	-	-	-	-
	Jan	n/a		4	0	-	-	-	-
	Feb	n/a		3	0	-	-	-	-
	March	n/a		3	0	-	-	-	-
	April	n/a		4	0	-	-	-	-

	May	6	1	3	2	9	0	21	4
	June	9	6	5	3	20	0	12	0
	July	18	0	3	0	28	2	14	0
	Aug	n/a		3	0				
	Sept	10	0	4	0	35	4	13	0
<b>Totals of records highlighted pink</b>		<b>43</b>	<b>7</b>	<b>15</b>	<b>5</b>	<b>92</b>	<b>6</b>	<b>60</b>	<b>4</b>
<i>Total number of rabbits December 2013 to September 2014</i>				35	5				
<b>Gugh</b>	Dec	6	0	-	-	-	-	-	-
	Jan	n/a		6	0	-	-	-	-
	Feb	n/a		4	0	-	-	-	-
	March	n/a		3	0	-	-	-	-
	April	n/a		2	1	-	-	-	-
	May	5	0	2	1	9	0	10	1
	June	7	0	0	5	30	2	17	0
	July	13	1	4	1	14	0	22	0
	Aug	n/a		4	0				
	Sept	3	0	5	0	14	0	55	5
<b>Totals of records highlighted pink</b>		<b>28</b>	<b>1</b>	<b>11</b>	<b>7</b>	<b>67</b>	<b>2</b>	<b>104</b>	<b>6</b>
<i>Total number of rabbits December 2013 to September 2014</i>				<u>36</u>	<u>8</u>				
<b>St Mary's</b>	Sept	n/a		9	0	-	-	-	-
	Oct	n/a		7	0	-	-	-	-
	Nov	n/a		7	0	-	-	-	-
	Dec	n/a		6	0	-	-	-	-
	Jan	n/a		4	0	-	-	-	-
	Feb	n/a		4	0	-	-	-	-
	March	n/a		0	0	-	-	-	-
	April	n/a		1	0	-	-	-	-
	May	n/a		1	0	2	0	3	0
	June	n/a		3	0	5	0	3	0
	July	n/a		1	0	5	0	2	0
	Aug	n/a		6	0				
Sept	n/a		n/a	n/a	1	0	5	0	
<b>Totals of records highlighted pink</b>				<b>11</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>13</b>	<b>0</b>
<i>Total number of rabbits December 2013 to September 2014</i>				26	0				

### 3.5.2. St Agnes

The transect incorporated all four of the habitats sampled along with an area of farmland, the other major habitat type on the island. Within the survey area a reasonably large warren was

identified in 2013 which was located at the southern end of the island on a spit of land. However this area was badly damaged by the winter storms of 2013-2014.

**Table 3.3. Summary of the number of rabbits recorded in each of the habitats on St Agnes in May, June, July and September per year between 2013 and 2016**

	Total number of rabbits recorded per habitat each year May, June, July and September per year between 2013 and 2016							
	2013		2014		2015		2016	
	A	J	A	J	A	J	A	J
Farmland	3	0	5	3	40	2	8	0
Gorse Scrub	0	0	1	0	0	0	22	0
Heathland	14	0	1	2	9	0	4	3
Foreshore/ Bramble Scrub	14	7	3	0	34	4	16	1
Coastal Grassland	12	0	5	0	9	0	10	0
<b>Totals</b>	<b>43</b>	<b>7</b>	<b>15</b>	<b>5</b>	<b>92</b>	<b>6</b>	<b>60</b>	<b>4</b>

Between the 2013 and 2014 surveys there was a large decrease in the number of rabbits recorded overall in all of the habitats surveyed with the exception of the farmland where there was a small increase. In 2013, 43 adult rabbits and 7 juvenile rabbits were recorded compared to 15 adult rabbits and 5 juveniles in 2014.

Between 2014 and 2015 there was a large increase in the number of rabbits recorded overall within the majority of the habitats surveyed, with the number of rabbits recorded in 2015 being more than double the number of rabbits recorded in 2014 (Table 3.3). In 2015, 92 adult rabbits and 6 juveniles were recorded, compared to 15 adult rabbits and 5 juveniles in 2014 and 43 adult rabbits and 7 juvenile rabbits in 2013.

Between 2015 and 2016 there was a substantial decrease in the number of rabbits recorded overall but the number of rabbits recorded was still greater than was recorded during the 2013 survey before the rats were removed. In 2016, 60 adult rabbits and 4 juveniles were recorded compared to 92 adult rabbits and 6 juveniles in 2015, 15 adult rabbits and 5 juveniles in 2014 and 43 adult rabbits and 7 juvenile rabbits in 2013.

Overall on St Agnes there appears to have seen an increase in the numbers of rabbits over the last 4 years but the population is likely to be subject to a number of pressures, including shooting and disease, which means that the size of the population can change quickly with the number of rabbits falling and recovering very quickly.

### 3.5.3. Gugh

The transect incorporated all four of the main habitats sampled along with a small area of farmland. Just to the north of the area covered by the transect there is a reasonably large warren; occasional single burrows were found around the edges of the island. In the centre of the island at the southern end is a large Lesser Black-backed Gull colony. This is likely to affect the distribution of rabbits on the island as these birds will take young rabbits.

**Table 3.4. Summary of the number of rabbits recorded in each of the habitats on Gugh in May, June, July and September per year between 2013 and 2016**

	<b>Total number of rabbits recorded per habitat each year in May, June, July and September per year between 2013 and 2016</b>							
	<b>2013</b>		<b>2014</b>		<b>2015</b>		<b>2016</b>	
	<b>A</b>	<b>J</b>	<b>A</b>	<b>J</b>	<b>A</b>	<b>J</b>	<b>A</b>	<b>J</b>
Farmland	<b>16</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>32</b>	<b>0</b>	<b>22</b>	<b>0</b>
Gorse Scrub	<b>11</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>22</b>	<b>0</b>	<b>40</b>	<b>1</b>
Heathland	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>22</b>	<b>4</b>
Foreshore/ Bramble Scrub	<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>	<b>5</b>	<b>1</b>	<b>6</b>	<b>0</b>
Coastal Grassland	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>14</b>	<b>1</b>
<b>Totals</b>	<b>28</b>	<b>1</b>	<b>10</b>	<b>7</b>	<b>67</b>	<b>2</b>	<b>104</b>	<b>6</b>

Between the 2013 and 2014 surveys there was a large decrease in the number of rabbits recorded overall in all of the habitats surveyed. In 2013, 28 adult rabbits and 1 juvenile rabbits were recorded compared to 10 adult rabbits and 7 juveniles in 2014.

Between 2014 and 2015 there was a large increase in the number of rabbits recorded overall and across all of the habitats surveyed with the number of rabbits recorded in 2015 being more than double the number of rabbits recorded in 2014 (Table 3.4). In 2015, 67 adult rabbits and 2 juveniles were recorded, compared to 10 adult rabbits and 7 juveniles in 2014 and 28 adult rabbits and 1 juvenile rabbits in 2013.

Between 2015 and 2016 there was again a large increase in the number of rabbits recorded overall and across all of the habitats surveyed. In 2016, 104 adult rabbits and 6 juveniles were recorded, compared to 67 adult rabbits and 2 juveniles in 2015 and 28 adult rabbits and 1 juvenile rabbits in 2013 before the rats were removed.

Overall on Gugh there appears to have seen a substantial increase in the numbers of rabbits recorded with the number of rabbits having increased by 271% when comparing the counts in 2016 and 2013. The rabbits on Gugh are likely to suffer less from predation than the ones on St Agnes (as far as we are aware there are no cats on the island) and we believe there is less shooting of rabbits on Gugh but that the risk of disease is likely to be similar. Therefore it is likely that the increased in the rabbit population is likely to be a result of the eradication of the rats leading to a reduced predation pressure.

#### **3.5.4. St Mary's**

A transect was set up on St Mary's to provide a baseline for comparison with rabbit populations on St Agnes and Gugh. The transect incorporated all four of the main habitats along with a small area of farmland, matching the transect on St Agnes and Gugh. Between September to November 2013 between 9 and 7 individuals were found after which numbers dropped until May before increasing again. This site was not monitored in the summer of 2013.

**Table 3.5. Summary of the number of rabbits recorded in each of the habitats on St Mary's in May, June, July and August/September per year between 2014 and 2016**

	<b>Total number of rabbits recorded per habitat each year May, June, July and August/September per year between 2014 and 2016</b>					
	<b>2014</b>		<b>2015</b>		<b>2016</b>	
	<b>A</b>	<b>J</b>	<b>A</b>	<b>J</b>	<b>A</b>	<b>J</b>
Farmland	5	0	3	0	7	0
Gorse Scrub		0	2	0	0	0
Heathland		0	3	0	1	0
Foreshore/ Bramble Scrub	4	0	1	0	2	0
Coastal Grassland	2	0	4	0	3	0
<b>Totals</b>	<b>11</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>13</b>	<b>0</b>

On St Mary's the number of rabbits remained stable throughout the surveys. There was a small increase between 2014 and 2015, from 11 rabbits in 2014 up to 13 rabbits in 2015, with the same number of individuals being recorded in 2015 and 2016. This is a much lower number than the comparable populations on St Agnes and Gugh. On St Agnes and Gugh the population of rabbits fell to comparable levels to that seen on St Mary's in 2014 but then increased substantially.

We don't have survey data from 2013 from St Mary's but it is likely that there was no decrease in numbers from 2013 to 2014 despite the severe westerly storms as St Mary's is sheltered by St Agnes and Gugh. As a result, there is unlikely to have been an increase in the numbers of rabbits between 2014 and 2015 on St Mary's as happened on Gugh and St Agnes as the rabbit populations here recovered after the storms.

### 3.5.5. Comparison of the yearly results for St Agnes, Gugh and St Mary's

**Table 3.6. Comparison of the yearly results for St Agnes, Gugh and St Mary's**

Island	Month	2013		2014		2015		2016	
		Adult	Juv	Adult	Juv	Adult	Juv	Adult	Juv
St Agnes	May	6	1	3	2	9	0	21	4
	June	9	6	5	3	20	0	12	0
	July	13	0	3	0	28	2	14	0
	Sept	10	0	4	0	35	4	13	0
<b>Total no of rabbits each month</b>		<b>38</b>	<b>7</b>	<b>15</b>	<b>5</b>	<b>92</b>	<b>6</b>	<b>60</b>	<b>4</b>
Gugh	May	5	0	2	1	9	0	10	1
	June	7	0	0	5	30	2	17	0
	July	13	1	4	1	14	0	22	0
	Sept	3	0	5	0	14	0	55	5

<b>Total no of rabbits each month</b>	<b>28</b>	<b>1</b>	<b>11</b>	<b>7</b>	<b>67</b>	<b>2</b>	<b>104</b>	<b>6</b>
<b>St Mary's</b>	May	n/a	1	0	2	0	3	0
	June	n/a	3	0	5	0	3	0
	July	n/a	1	0	5	0	2	0
	Aug/Sept	n/a	6	0	1	0	5	0
<b>Total no of rabbits each month</b>			<b>23</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>13</b>	<b>0</b>

On St Agnes there was an initial fall in the rabbit numbers between 2013 and 2014 followed by a substantial increase between 2014 and 2015 with a fall between 2015 and 2016 but not back to the 2013 or 2014 levels. There does not appear to be a pattern in the monthly rabbit numbers but in 2015 they did increase each month.

On Gugh there was an initial fall in the rabbit numbers between 2013 and 2014 followed by a substantial increase between 2014 and 2015 and then again between 2015 and 2016. There does not appear to be a pattern in the monthly rabbit numbers but in 2016 they did increase each month.

On St Mary's the number of rabbits remained stable throughout the surveys. There does not appear to be a pattern in the monthly rabbit numbers recorded.

### 3.6. CONCLUSIONS

Overall it was expected that the rabbit populations of St Agnes and Gugh would increase as a result of the removal of the rats as their numbers were being limited by predation by rats. The population on the control island of St Mary's was expected to remain stable and this is indeed the trend which has been observed over the survey period.

However between 2013 and 2014 the number of rabbits recorded on both St Agnes and Gugh decreased significantly. It is not clear why this occurred. It may be that the severe weather over the winter reduced the population, or disease may be responsible or increased levels of shooting. The sandy spit of land at Wingletang on St Agnes where the main rabbit warren is located was badly damaged by the winter storms in 2013-2014 and was inundated with water; this may be one reason why rabbit numbers were lower in 2014. However this would not explain the decreases seen on Gugh where the warren is high up on the island away from the coast.

However from 2014 onwards the rabbit populations of St Agnes and Gugh behaved more in line with what had been expected with a large increase in the numbers of rabbits recorded on both islands between 2014 and 2015, a further increase in the number of rabbits recorded on Gugh between 2015 and 2016 and a slight decrease in the number of rabbits on St Agnes between 2015 and 2016 but not down to the 2013 pre eradication levels. The reduction in the number of rabbits on St Agnes between 2015 and 2016 could be down to a number of factors including increased shooting or predation by cats. The rabbit numbers on St Mary's were in line with what predictions with the numbers of individuals recorded remaining fairly stable throughout.

## **References**

Caley, P.A. & Morley, C.G. 2002. Assessing growth rates of European rabbit populations using spotlight transect counts. *The Journal of Wildlife Management*. **66**:131-137.

Harris, S. and Yalden, D.W. 2008. *Mammals of the British Isles: Handbook, 4<sup>th</sup> Edition*. The Mammal Society, Southampton.