Whinchat *Saxicola rubetra*) Long-term Monitoring Project 2023

Male whinchat in Glen Rosa (photo by author).

2023 report written by Bethany Walsh

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1. Abstract

Across the UK, whinchats (*Saxicola rubetra*) are experiencing decline, with a 57% reduction in overall population between 1995 and 2020 (BTO, 2023). Whinchat surveys have been taking place every five years in Glen Rosa on the Isle of Arran since 1995, thanks to efforts by the NTS Arran Ranger Service. Due to a sharp decline recorded in 2021, it was decided that a 2023 survey was necessary to monitor the situation. This year, the survey found two (and a possible third) successful breeding attempts, down from 7 in 2016 and 4 in 2021. Brood size has remained relatively consistent. Based on previous research, it is likely that reduction in recruitment during the breeding season is the cause of such decline, and may be due to large-scale drivers such as climate change, habitat change, and biodiversity loss. Due to the severity of the decline, it is recommended that surveys are continued to be carried out more frequently that every five years to monitor the situation.

2. Aims & Objectives

The aim of this report is to present the findings of the 2023 whinchat (*Saxicola rubetra*) monitoring project undertaken by the National Trust for Scotland's (NTS) Arran Ranger Service. It outlines field survey and data analysis methods, comparing this year's results against previous findings. Whinchats have been surveyed in Glen Rosa on a five-yearly basis since 1995.

3. Introduction and Background

3.1 Whinchats (*Saxicola rubetra*)

Whinchats (*Saxicola rubetra*) are an Afro-Palearctic migrant passerine. They spend the winter in the tropical humid zone of west Africa and breed across north Europe and northwest Asia. They arrive to the United Kingdom from their wintering grounds in late April and early May, returning on migration by late September.

Whinchats are found in open grass moorland habitats and heathland and bog with high presence of bracken (*Pteridium aquilinum*) cover and low tree density. They are a perching species and can frequently be seen using bracken and other scrub plants as perches during song or foraging activity. They have a typical lifespan of 2 years although the maximum age found of a ringed bird is 6 years.

Nesting begins following the establishment of breeding territories, with the first egg clutches being laid between mid-May and mid-June. Clutch sizes are usually 5-6 eggs, and usually only one clutch is laid. Eggs hatch after around 13 days of incubation, and fledging occurs at two weeks. Juvenile survival rates are typically ~0.34 in the first year (BTO, 2023).

3.2 Previous records

Across the UK, there has been a 57% decline in whinchat populations from 1995 to 2020, with around 50,000 pairs currently returning to breed each year. Whinchats are red listed in the UK Birds of Conservation Concern list but are categorised 'of least concern' in the global IUCN Red List. Proposed causes of population decline include habitat loss, decline in invertebrate prey, and reduced breeding success (BTO, 2023).

It has been theorised that their decline is due to issues encountered during migration. However, due to weak migratory connectivity, varying routes taken, and movement between

overwintering areas, it is likely that whinchats are somewhat able to avoid changes in non-breeding conditions (Burgess et al, 2020). Fay et al (2021) found that survival rates in migrating adults were unrelated to overall population trends, implying that the survival of fledging adults across breeding and migration seasons is remaining consistent. Therefore, they suggest that a decrease in population recruitment during the breeding season could be the cause of decline.

Calladine and Jarrett (2021) found that a reduction in grazing of lowland areas and the resulting growth in trees and shrubs at low elevations favoured by whinchats caused an upward elevational shift in breeding territories. However, breeding attempts at higher elevations were less successful. Stanbury et al (2022), however, found that there is no shortage of breeding habitat in the UK with only 41.1% of suitable upland habitat occupied. Reduced recruitment could therefore be due to environmental conditions (e.g., extreme weather (Halliwell et al, 2023)), reduction in habitat quality and structure, and invertebrate food source decline (BTO, 2023).

On Arran, long-term monitoring of whinchat populations has been taking place since 1995, with surveys conducted every 5 years. An average of 7 breeding pairs have been recorded each year between 1995 and 2016. However, in 2021 a dramatic population decline was observed and only 4 breeding pairs were recorded. Therefore, a survey was conducted this year (2023) to monitor the situation.

The remainder of this report will outline the methods used and results gathered during this year's survey.

4. Methods

4.1 Location and Context

Weekly transect surveys were walked along 2 transects in Glen Rosa on the Isle of Arran (Fig.1). Numbers and locations of male, female and juvenile birds sighted were recorded alongside any other breeding activity. Whinchats (*Saxicola rubetra*) usually arrive in Glen Rosa in early May. Surveys were carried out from the arrival of the first whinchats until they left for migration in September.

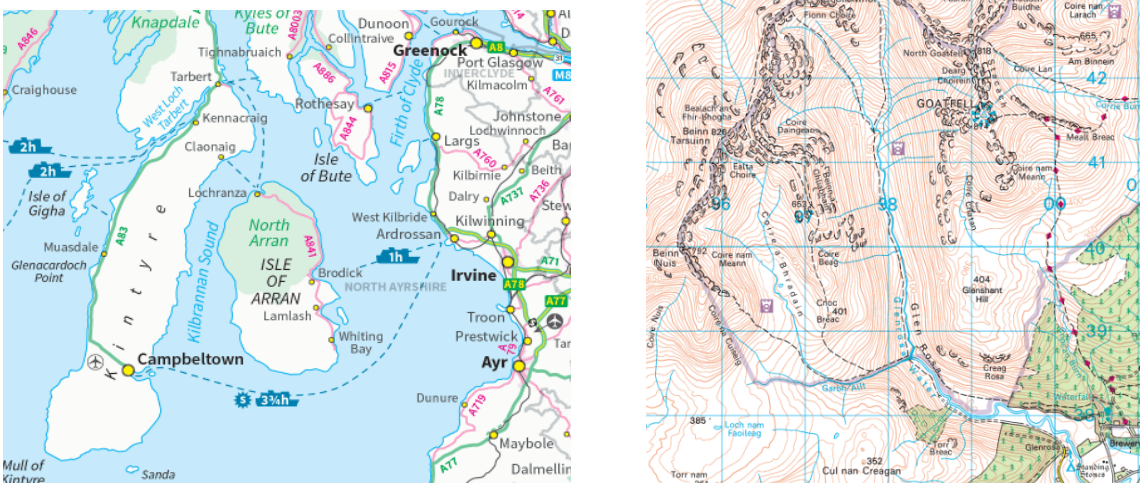


Figure 1 Map of Arran (left) and Glen Rosa (right).

Transect A (Fig.2) begins at the edge of the conifer plantation (NR 99418 38123) at the foot of the glen, along the path which runs adjacent to the river on its north side. The length of Transect A is 1.2km. However, any whinchats seen between the end of Transect A and the start of Transect B were also recorded.

Transect B (Fig.2) begins at NR 98216 38858 just after the bridge which crosses the Glenrosa Water. In previous survey years Transect B ended at the gate into the tree exclosure at ns 98198 39560. However, this year it was decided that Transect B should extend through to the far end of the exclosure to monitor whether any breeding activity was taking place in this area. The total length of Transect B is now therefore 1.2km.

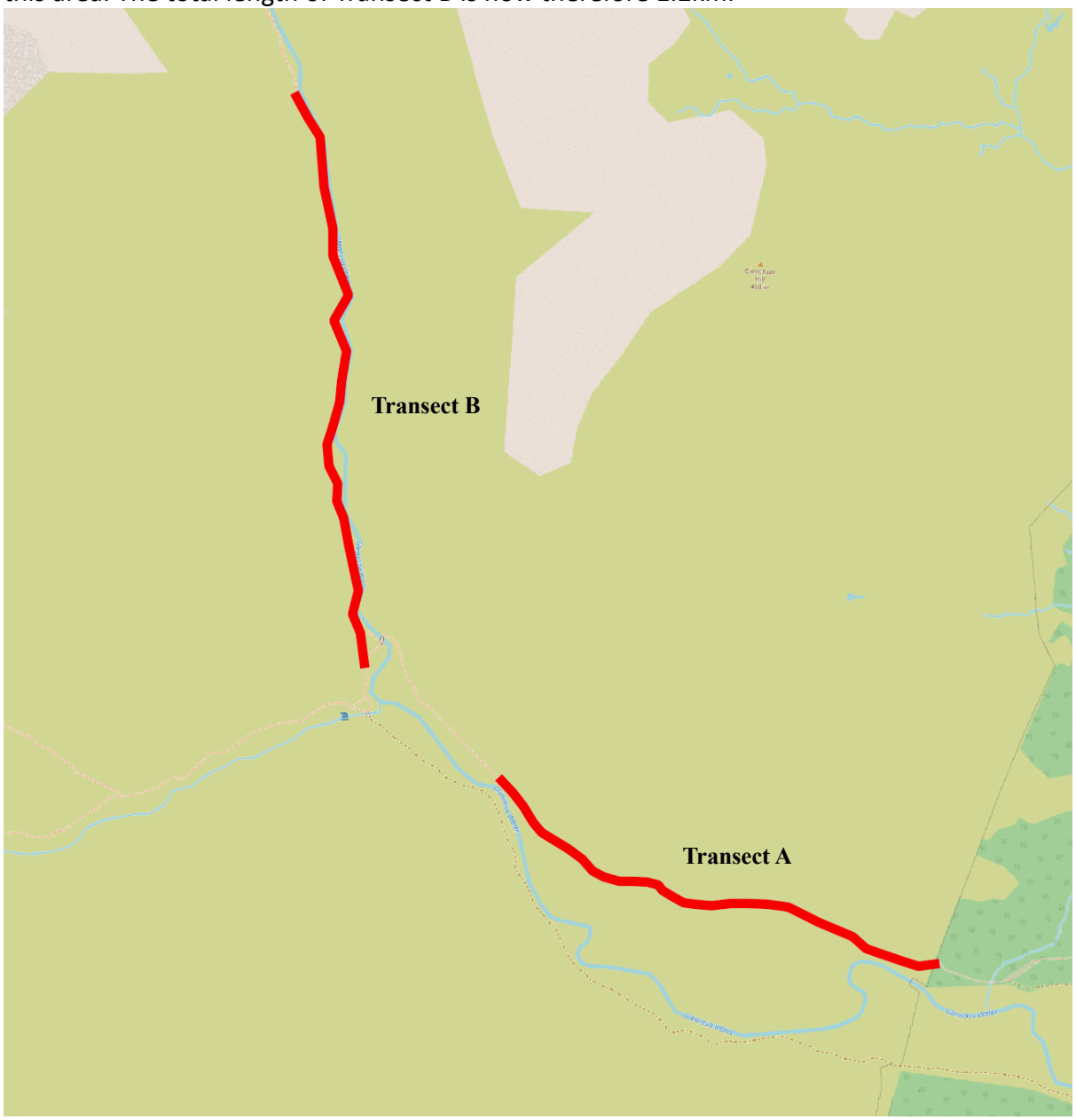


Figure 2 Transects A & B.

Glen rosa is a mix of grassland, bracken and increasing heather cover further into the glen in Transect B. The exclosure in Transect B contains silver birch (*Betula pendula*) and Arran whitebeam (*Sorbus arranensis*) trees.

Surveys took place weekly with days remaining flexible to allow surveys to take place on good weather days. They usually begun around 10am. Although they are active throughout the day, whinchats tend to be most active in the mornings. Surveys took between 2 and 5 hours in total, depending on the amount of activity observed.

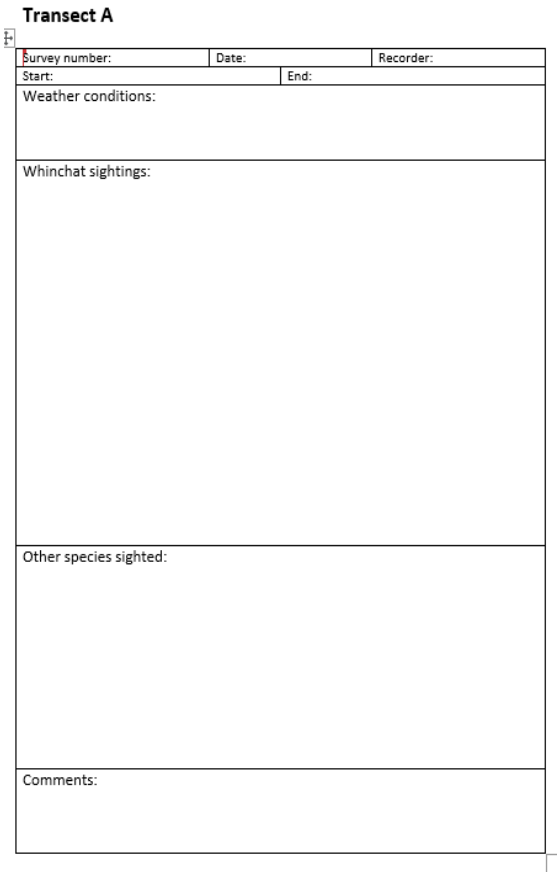
Whinchats were identified visually and through their song. Where a sighting did not occur following song being heard, the rough location of the bird was recorded. Whinchats can be identified through their distinct light supercilium and buff coloured breast. Males have darker head markings and a lighter supercilium. Juveniles also have a light supercilium and light tips to their emerging feathers.

Figure 3 Male (left) and Juvenile (right) whinchats displaying classic perching behaviour. [Photos by author].

4.2 Field techniques

4.2.1 Materials

The record sheet shown below was used to record activity (Fig.4). Locations were recorded using the OS Map app and on physical copies of transect maps. The sex of the bird seen was



Transect A

Survey number:	Date:	Recorder:
Start:	End:	
Weather conditions:		
Whinchat sightings:		
Other species sighted:		
Comments:		

Figure 4 Field Record Sheet

recorded, and where possible the behaviour being displayed. Weather conditions were recorded, as well as other species seen. Other materials taken included a waterproof map case, ID sheet, pencil, binoculars, and a camera.

4.2.2 Recorders

It was hoped that a single recorder would be used to gather data to reduce bias and human error which can occur due to multiple recorders. However, due to time commitments, three recorders were used during the survey period. Clear communication was maintained and efforts were made to ensure that methods remained consistent.

4.2.3 Analysis

Analysis involved collating data together in order to identify the locations of breeding territories and successful breeding attempts. QGIS was used to visually analyse results. Each of the recorders was involved in analysis in order to validate conclusions drawn.

5. Results

There were a total of 17 site visits between 1st May and 5th September 2023. Unfortunately, field data for Survey 1 was lost, and so data from Survey 2 onwards has been included in this analysis.

34 hours of data collection took place in total, with 2 hours of data collection per week on average.

5.1 Birds Sighted

The following tables show the date and whinchat sightings which occurred during field surveys, including other species observed on each visit.

Table 1 Whinchat (S. rubetra) sightings in Transect A

Survey Week	Date	Males	Females	Juveniles	Unidentified	Other species sighted
2	09/05/2023	2	0	0	1	golden eagle, meadow pipit, whitethroat
3	17/05/2023	1	2	0	0	reed bunting, stonechat (1F, 2M), whitethroat

4	25/05/2023	4	2	0	0	whitethroat, tree pipit (2), cuckoo (2), stonechat (1M, 2J)
5	31/05/2023	3	3	0	0	stonechat (3M, 3F)
6	09/06/2023	5	4	0	0	stonechat (2J, 3F, 1M), whitethroat
7	14/06/2023	3	2	1	2	whitethroat, reed bunting, stonechat
8	21/06/2023	3	1	0	0	whitethroat, reed bunting, stonechat, sand martin
9	29/06/2023	1	1	2	0	stonechat (4M, 3F, 2J), whitethroat (F)
10	05/07/2023	2	2	1	0	stonechat (3F), whitethroat (1J), raven (3), kestrel, meadow pipit
11	14/07/2023	1	1	0	0	stonechat (1M), buzzard (2), golden eagle, kestrel (2), blackcap (1)
12	21/07/2023	0	2	2	0	buzzard, kestrel (2), whitethroat, stonechat (9J, 2M), robin (J), sand martin (3)
13	28/07/2023	0	0	2	1	buzzard, stonechat juveniles
14	04/08/2023	0	1	5	0	stonechat (2M, 5J), robin (1J), willow warbler, great tit, whitethroat, golden eagle
15	17/08/2023	0	0	1	0	stonechat (J), dunnock, wren, kestrel
16	25/08/2023	0	0	0	0	wren, kestrel, carrion crow, meadow pipit, dunnock, stonechat (J)
17	05/09/2023	0	0	0	0	buzzard (2), stonechat (2J), wren, great tit (2), robin, dunnock, kestrel
	Average (across 16 visits for which records exist)	**1.56**	**1.31**	**0.88**	**0.25**	
	Mean (across visits during which whihchats were sighted)	**2.50**	**1.91**	**2.00**	**1.33**	
	Median (across visits during which whinchats were sighted)	**2.5**	**2**	**2**	**1**	
	Mode (across visits during which whinchats were sighted)	**1**	**2**	**1**	**1**	

Table 2 Whinchat (S. rubetra) sightings in Transect B

Survey Week	Date	Males	Females	Juveniles	Unidentified	Other species sighted
2	09/05/2023	0	1	0	1	stonechat (1F, 3M)
3	17/05/2023	0	0	0	1	stonechat (1F, 1M)
4	25/05/2023	3	0	0	0	tree pipit, willow warbler, cuckoo, grey heron, stonechat (3M, 3F)
5	31/05/2023	2	0	0	1	willow warbler
6	09/06/2023	2	0	0	1	stonechat (2J, 3F, 1M), whitethroat
7	14/06/2023	4	1	0	1	grey wagtail, stonechat (2F, 1M), meadow pipit
8	21/06/2023	5	2	0	0	stonechat, meadow pipit
9	29/06/2023	0	0	0	0	stonechat (2), meadow pipit
10	05/07/2023	1	0	0	0	stonechat (1F)
11	14/07/2023	0	1	3	0	stonechat (1J, 1M), one dead stonechat (J)
12	21/07/2023	0	0	1	0	great tit (1A, 1J)
13	28/07/2023	0	0	0	0	whitethroat, stonechat
14	04/08/2023	0	0	1	0	stonechat (3J, 2M)
15	17/08/2023	0	0	0	0	wren, chaffinch
16	25/08/2023	0	0	0	0	blue tit, wren, stonechat (1M, 2J)
17	05/09/2023	0	0	0	0	stonechat (2J, 2M), willow warbler, wren
	Average (across 16 visits for which records exist)	1.06	0.31	0.31	0.31	
	Mean (across visits during which whihchats were sighted)	2.83	1.25	1.67	1.00	
	Median (across visits during which whinchats were sighted)	2.50	1.00	1.00	1.00	
	Mode (across visits during which whinchats were sighted)	2.50	1.00	1.00	1.00	

Transect A had more activity than Transect B, although this difference was less clearly marked than previous years. For Transect A, whinchats were seen during a total of 14 out of

16 visits (87.5% success rate). For Transect B, whinchats were seen on a total of 11 out of 16 visits (68.75% success rate).

5.2 Breeding Territories

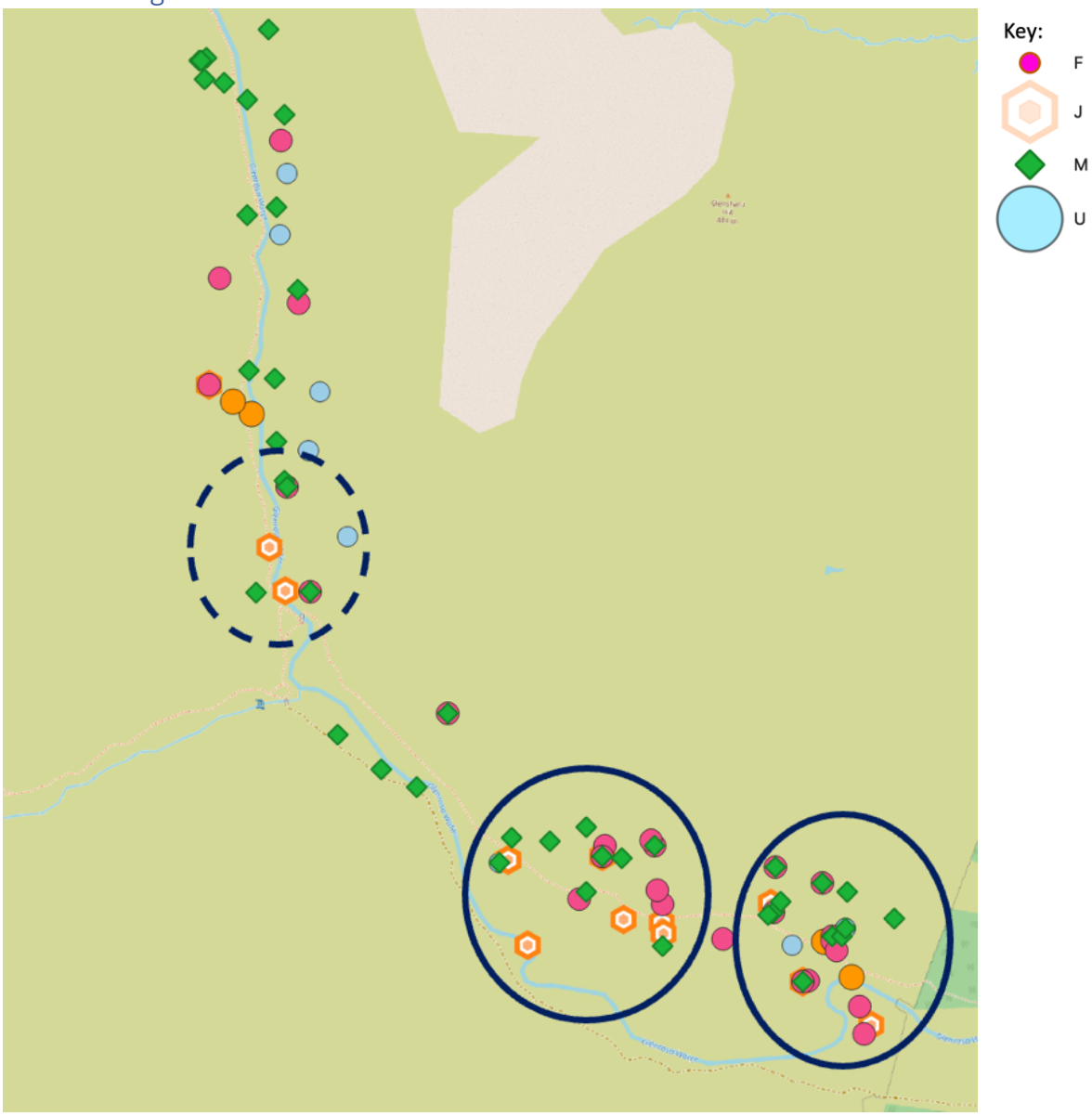


Figure 5 Map of whinchat sightings and breeding territories. F = female, J = juvenile, M = male, U = sex unidentified.

The map above (Fig.5) shows two clear successful breeding attempts in Transect A (solid lines), and one possible breeding attempt in Transect B (dashed line). The boundaries between territories were less clear than in previous surveys, and so data was analysed week by week to understand the establishment of territories and when juveniles were first sighted. Around surveys 5 and 6, it appeared that there might have been a third breeding pair established in Transect A. However, based on the number of juveniles observed and their locations, it is unlikely that a third breeding attempt in Transect A was successful as juveniles were not spotted outside of the two territories circled.

Whether the juveniles seen in Transect B represent a successful breeding attempt is uncertain. Data from survey weeks 7 and 8 demonstrate the possibility of a breeding pair establishing a territory in Transect B in mid-June. This is later than the usual establishment of

breeding territories. However, juveniles were sighted in the same area in weeks 12 and 14 which would indicate a reasonable timeframe between egg laying and the fledging of young birds. However, it is also possible that these juveniles were fledglings from Transect A who were exploring the glen later in the season.

A breakdown of survey data week by week is shown in Appendix A.

5.3 Juvenile Sightings

The table below shows the highest number of juveniles observed in each breeding territory at any one time, thereby giving an indication of brood size. Unlike in previous years, data is shown week by week to provide additional detail on when fledglings started to appear in the glen. Territory 1 is the first territory in Transect A, and Territory 3 is the potential breeding territory in Transect B. On survey week 11, 3 juveniles were seen outside the potential breeding territory established in Transect B.

Table 3 Indicative Brood Sizes

Survey	Territory	Number of juveniles seen at one time
7	2	1
9	1	2
10	2	1
11	Transect B (general)	3
12	3	1
13	2	2
14	2	4
14	3	1
15	1	1
Average Brood Size		**1.78**

The table below compares the results of previous years with this year's survey. We can see an ongoing marked reduction in the number of breeding pairs, but a brood size remaining similar to previous years.

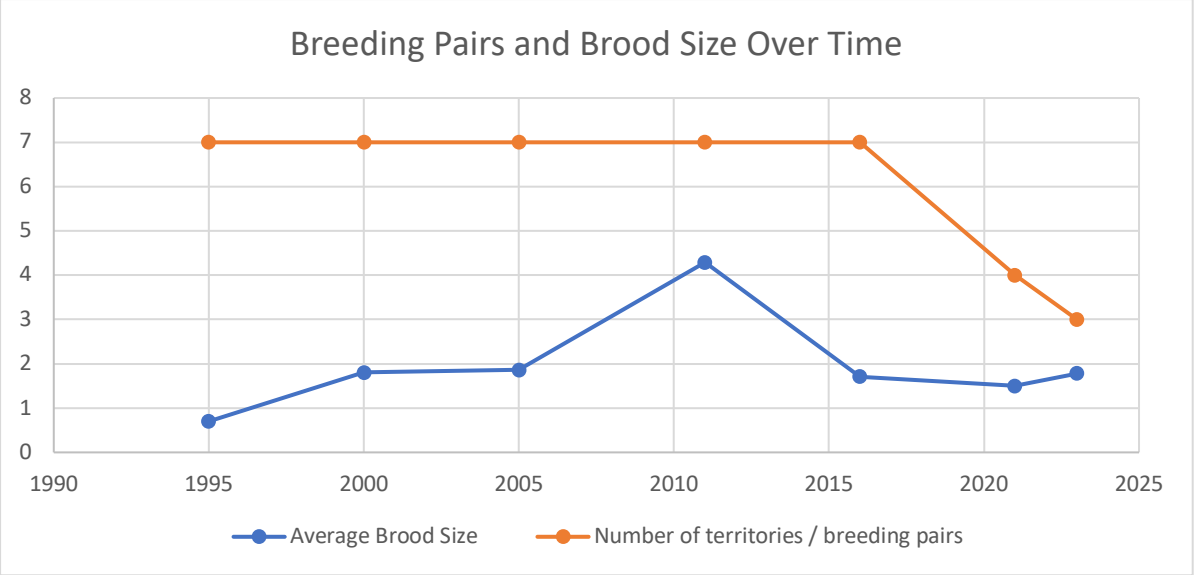


Figure 6 Whinchat (S. rubetra) brood sizes & number of breeding territories in Glen Rosa between 1995 & 2023.

It should be noted that in 2011 the survey method differed to that of other years, thereby rendering it somewhat of an anomaly. The 2023 average brood size was 1.78, while in 2021 it was 1.5 and in 1997 it was 0.7.

For further insight into this year's survey results see Appendix A. For previous survey records, paper copies of these can be accessed upon request at the Brodick Castle Ranger Centre.

6. Discussion

In 2023, there were two (possibly 3) successful breeding attempts by whinchats in Glen Rosa. Two of these were in Transect A which, in line with previous studies, houses a higher proportion of suitable bracken-dominated lowland habitat than Transect B (Stanbury et al, 2022).

However, 2023 also marked increased sightings of whinchats in Transect B. In part, this may be due to the extension of the transect to include the tree exclosure. Many unpaired males were seen in this area, suggesting that either whinchats are moving further into the glen, or that birds in the exclosure were unaccounted for in previous years' surveys. Whinchats are not usually found in woodland areas, and so it would be interesting to monitor the presence of whinchats in the exclosure as the trees mature.

Stanbury et al (2022) estimated that 41.1% of suitable habitat is occupied by whinchats across the UK. However, they also suggest that this figure may be overestimated since unpaired males often occupy lower quality habitat. This can be seen in Transect B, which is a mixture of mostly heather and birch scrub, where mostly unpaired males were seen.

Overall, the number of successful breeding attempts in Glen Rosa is continuing to decline, in line with the trend across the UK and Europe (BTO, 2023; Fay et al, 2021). This is of major

concern, given a lack of understanding of what is causing such rapid decline. As highlighted above, Stanbury et al (2022) suggest that factors other than habitat availability may explain it. Others have suggested that issues during migration may be causing their decline. Burgess et al (2020) used geolocators on whinchats to uncover migratory routes and found that these have low connectivity and that whinchats tend to move around during the overwintering period.

This therefore suggests that if issues during migration are to blame for their decline, these are large-scale drivers rather than local issues, for example biodiversity loss and declines in invertebrate prey, and climate change and resulting changing weather patterns (Burgess et al, 2020). Halliwell et al (2023) found that temperatures at local extremes experienced during the early life stages actually increased recruitment and survival rates over the winter period. Climate change may also cause birds to move to higher elevations and less suitable habitats.

While issues encountered during migration are often blamed for the decline of UK breeding birds, Fay et al (2021) found that survival rates of ringed birds returning from migration are remaining consistent, but rather insufficient reproduction (declining brood sizes) and lack of recruitment may be causing their decline. Issues such as bad weather and lack of prey (invertebrates) may reduce the breeding success and fledgling survival (Calladine and Jarrett (2021). In addition, increased vegetation density can reduce access to ground invertebrates (BTO, 2023). Disturbance through intensive agriculture is also a common cause of nest failure (Tome et al, 2020). While this is not applicable to Glen Rosa, it may be that other forms of disturbance are.

However, in Glen Rosa brood size has remained relatively consistent since 1995. Therefore, it appears that it is a lack of establishment of breeding pairs and territories (rather than fledgling survival) which may be causing their decline here. Previous research has suggested that nest losses at the egg stage are increasing (BTO, 2023). Whinchats rarely nest twice in a single year but may re-attempt nesting following failure. The potential 3rd successful breeding attempt observed in Transect B may indicate a previous nest failure elsewhere in the glen, such from the third territory that was briefly observed from surveys 5 to 7 in Transect A. (Appendix A).

Finally, the 2021 study highlighted the late arrival of whinchats to Glen Rosa as a concern with none recorded until the 21st May 2021. This year, however, whinchats were recorded from the first week of May.

6.1 Future Study and Limitations

Due to the severity of the decline, it is recommended that surveys are continued to be carried out more frequently that every five years to monitor the situation. Future surveys should continue to be undertaken to monitor if and how both brood size and number of established breeding territories changes. Ringing data would also be useful to understand the return rates of whinchats to Glen Rosa following migration.

A comparison of weather conditions across survey years could therefore be useful for understanding if climate change or extreme weather may be impacting whinchat breeding

success (BTO, 2023). However, due to the selection of survey days based on good weather conditions, there would be risk of bias here. Continued monitoring of habitat availability and change in Glen Rosa could also provide insight into the trends observed.

The study is limited by the number of recorders (3). Although all of the recorders were suitably experienced, there is chance that bias and human error may have increased as a result. Increased ringing and nest finding effort would help to improve the accuracy of whinchat population counts.

Due to the increasing size of the available dataset since 1995, the opportunity for a combined analysis and statistical comparison of long-term data could provide fruitful insight into the decline of whinchats across the UK.

7. Conclusions

In conclusion, data from 2023 whinchat surveys showed a continued decline in the number of whinchat breeding territories in Glen Rosa, on the Isle of Arran. While brood size has remained relatively consistent, a reduction in the number of territories from 7 across the years 1995 to 2016 to 2 confirmed territories this year is of serious concern. This year, more whinchats were recorded in Transect B than previously, although breeding attempts were more successful in Transect A. Whinchats were UK red listed in 2015 and continue to be in decline across the country with a 57% population decline between 1995 and 2020 and a 47.9% range contraction during the same period (BTO, 2023). It is therefore integral that monitoring efforts are maintained in Glen Rosa to contribute to a wider understanding of the causes and rates of their decline.

References

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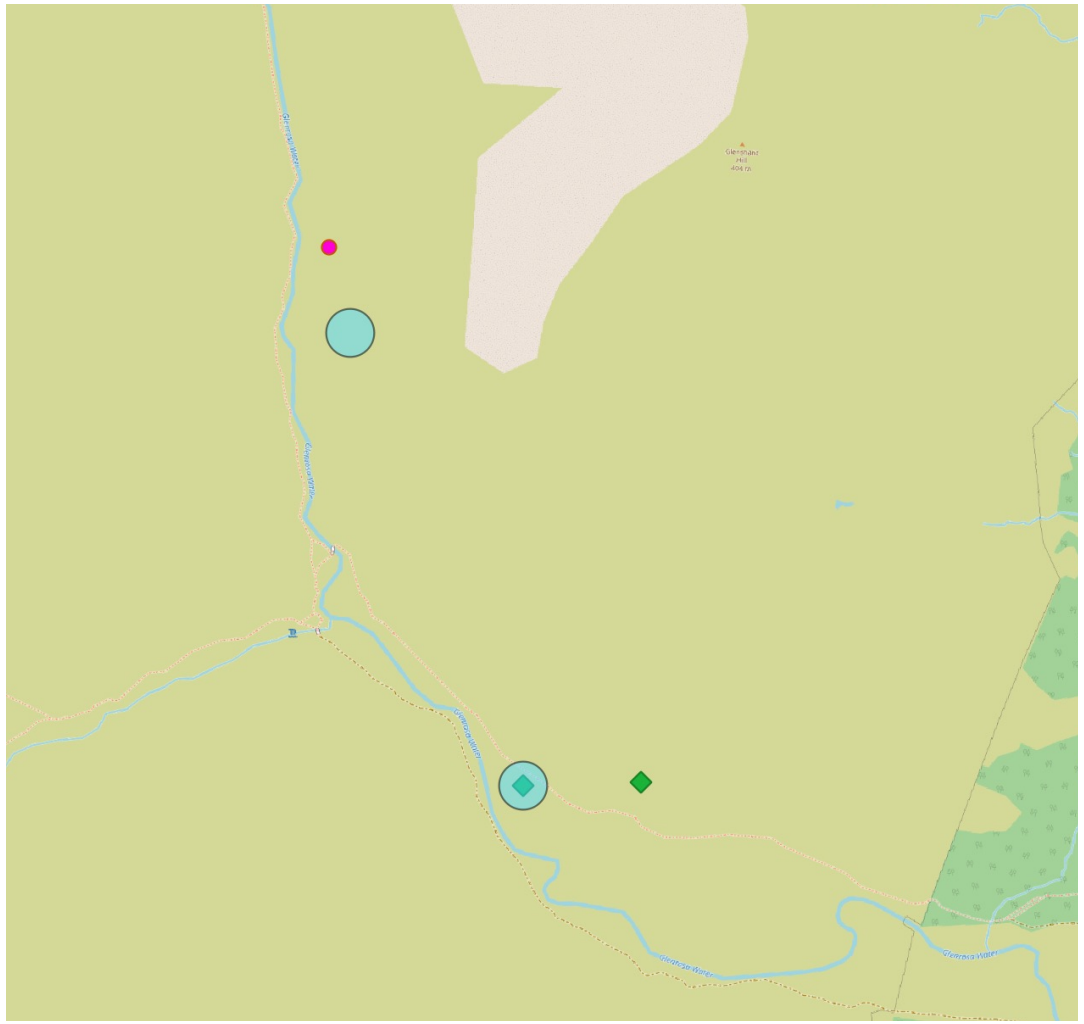
Appendix A: Week by Week Breakdown of Whinchat Activity.

Survey 2: 09/05/2023



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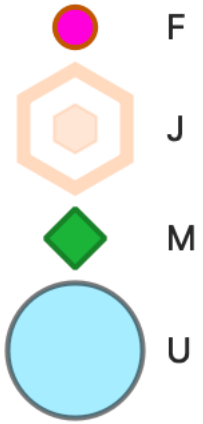
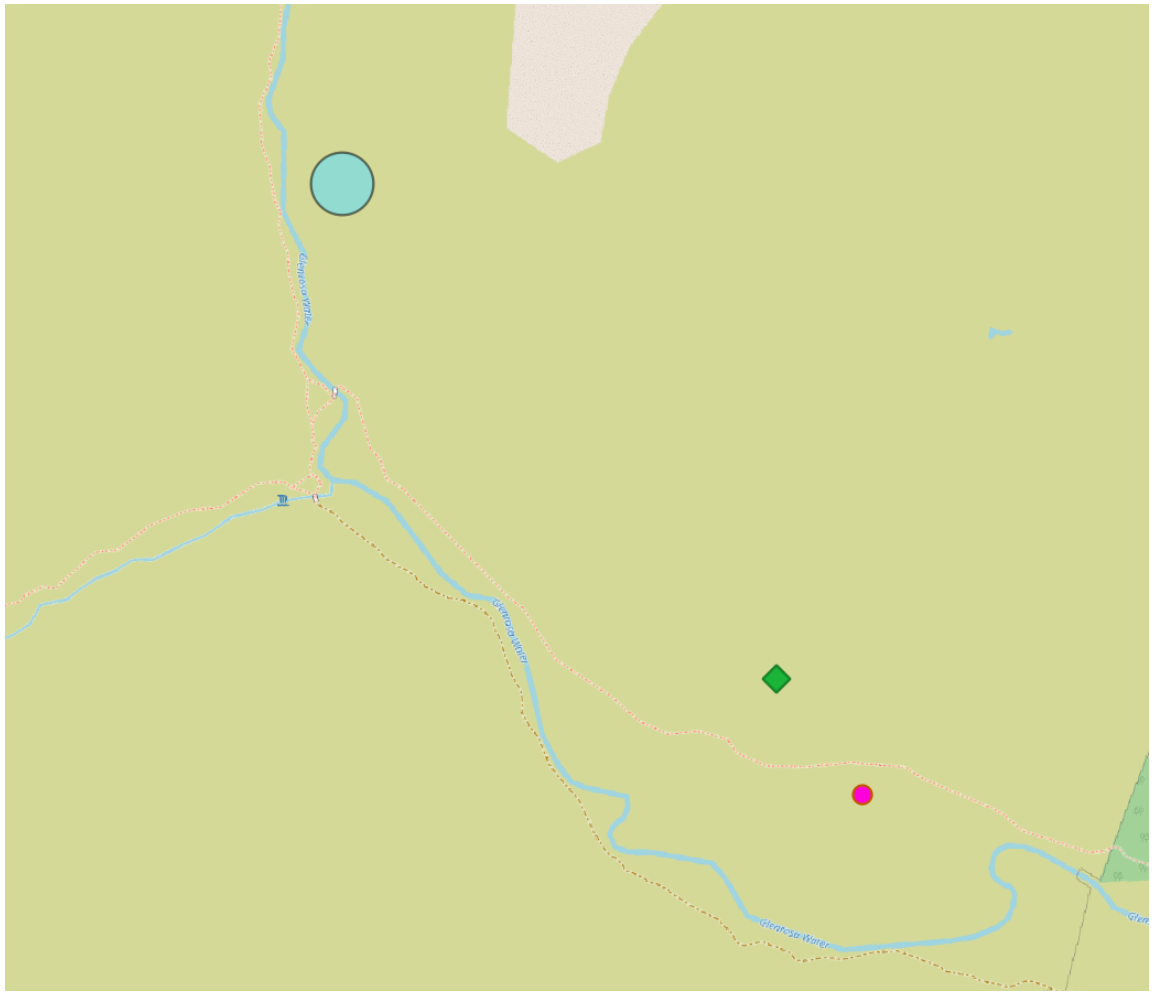


Analysis:

Whinchats have begun arriving in the Glen.

Can see possible establishment of breeding territory towards end of Transect A.

Survey 3: 17/05/2023



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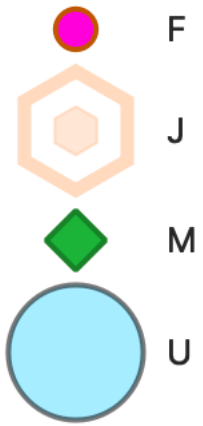
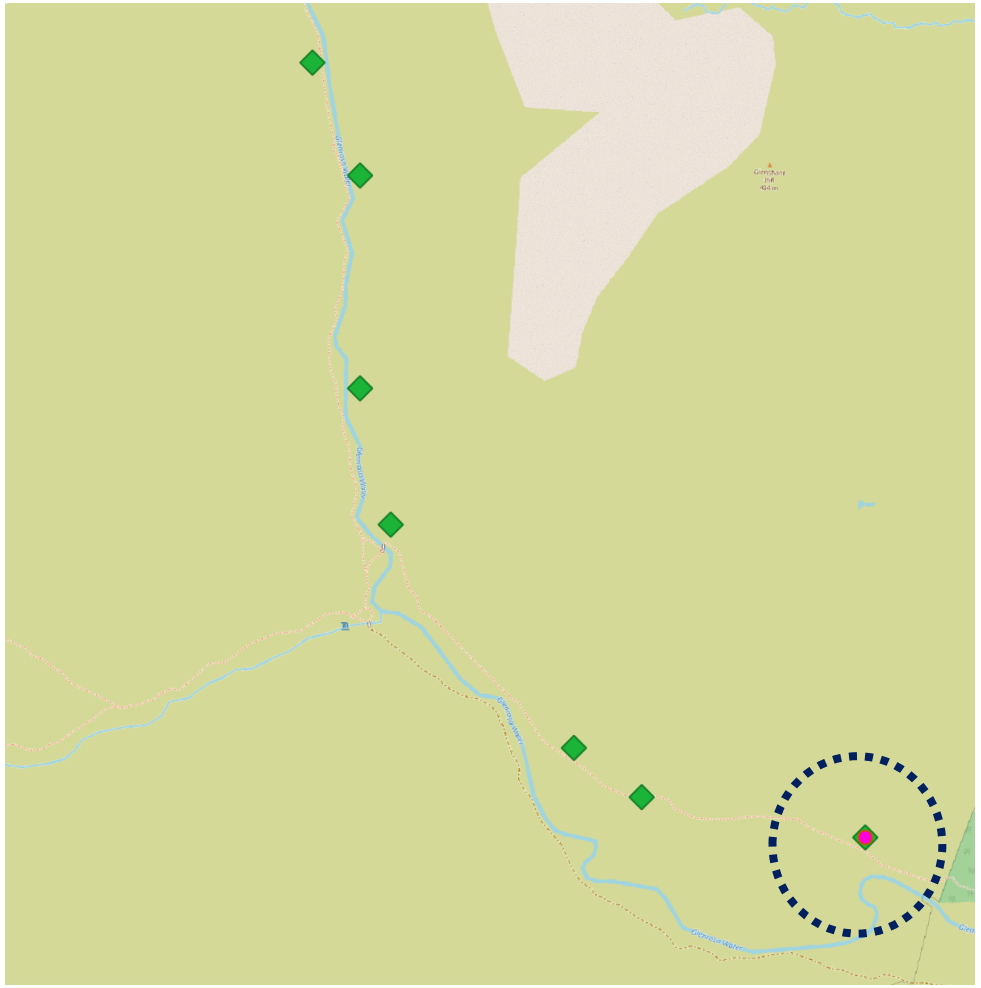


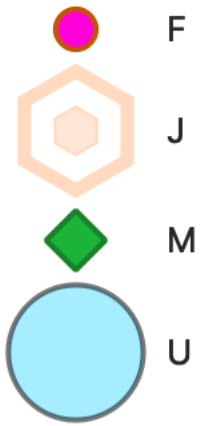
Analysis:

Continued arrival of whinchats into the Glen.

Survey 4: 25/05/2023



Key:

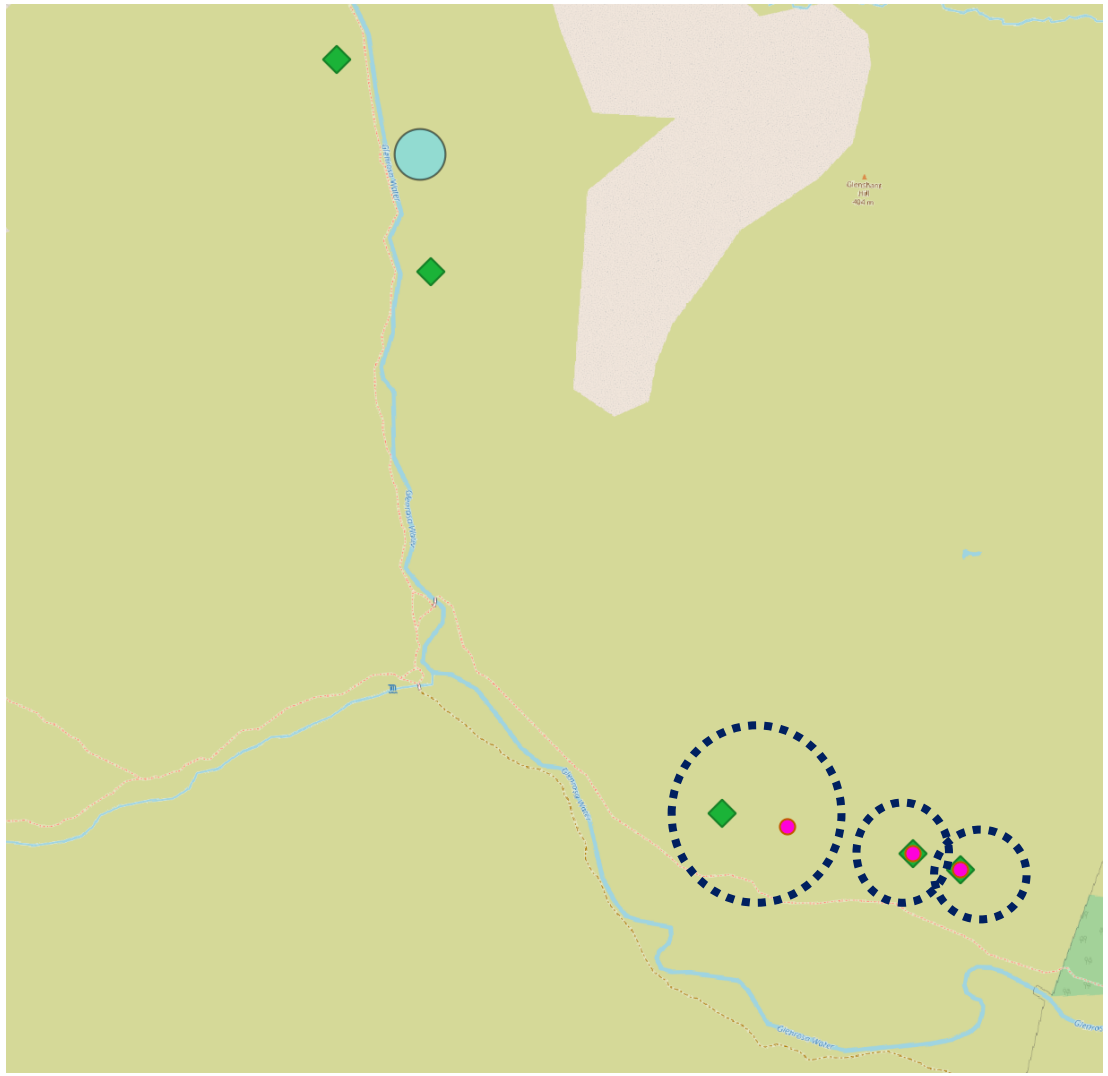


Analysis:

Clear breeding territory being established at the start of transect A to the right of the path (circled).

Lone males in Transect B.

Survey 5: 31/05/2023



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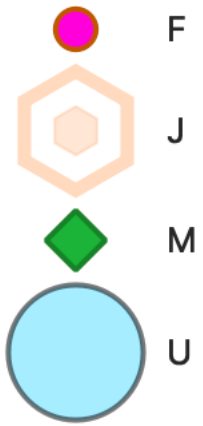
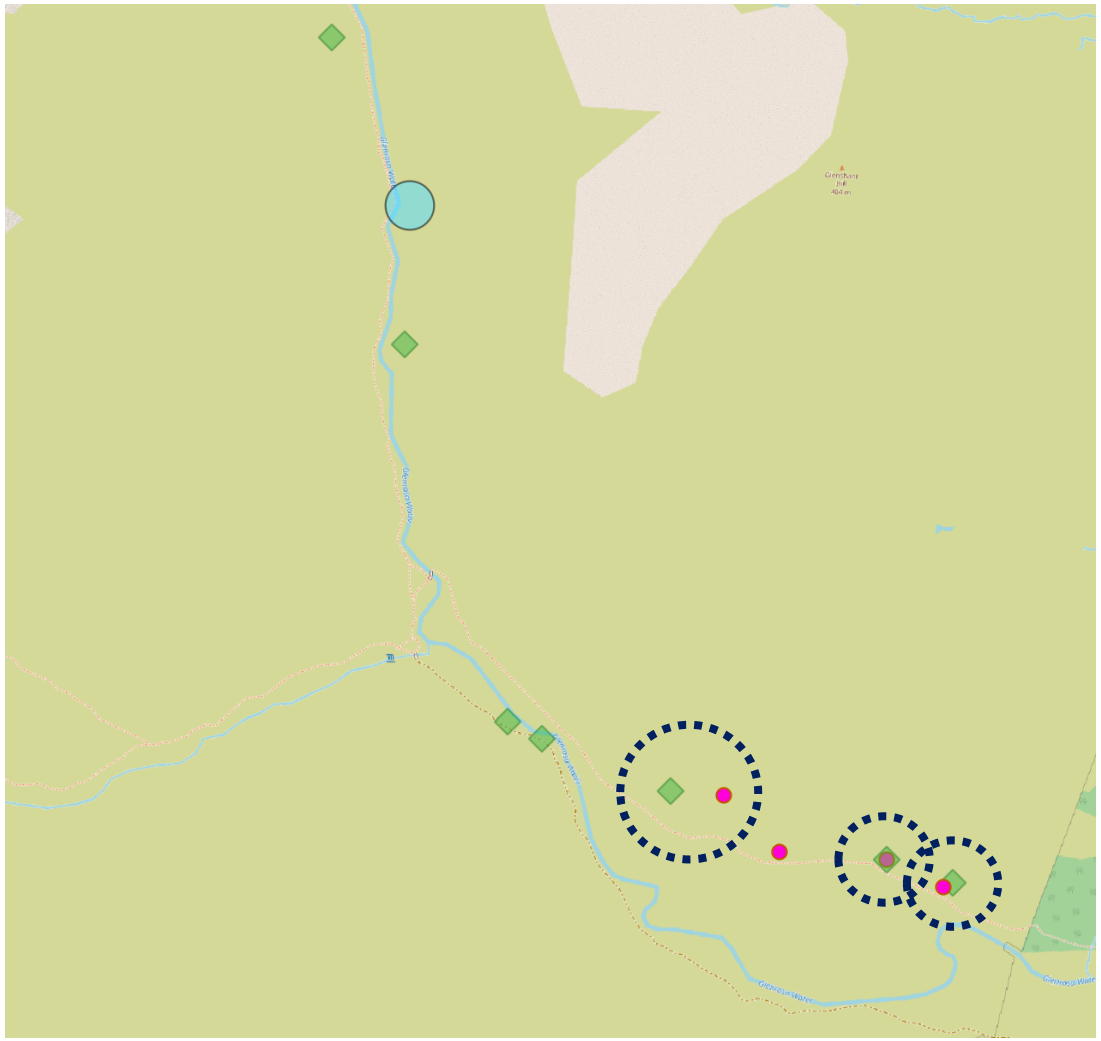


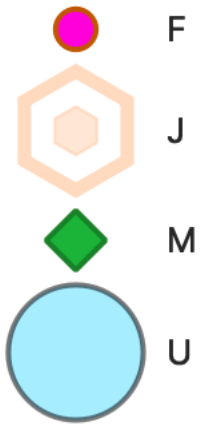
Analysis:

Two (possibly 3) breeding territories established in Transect A.

Survey 6: 09/06/2023



Key:

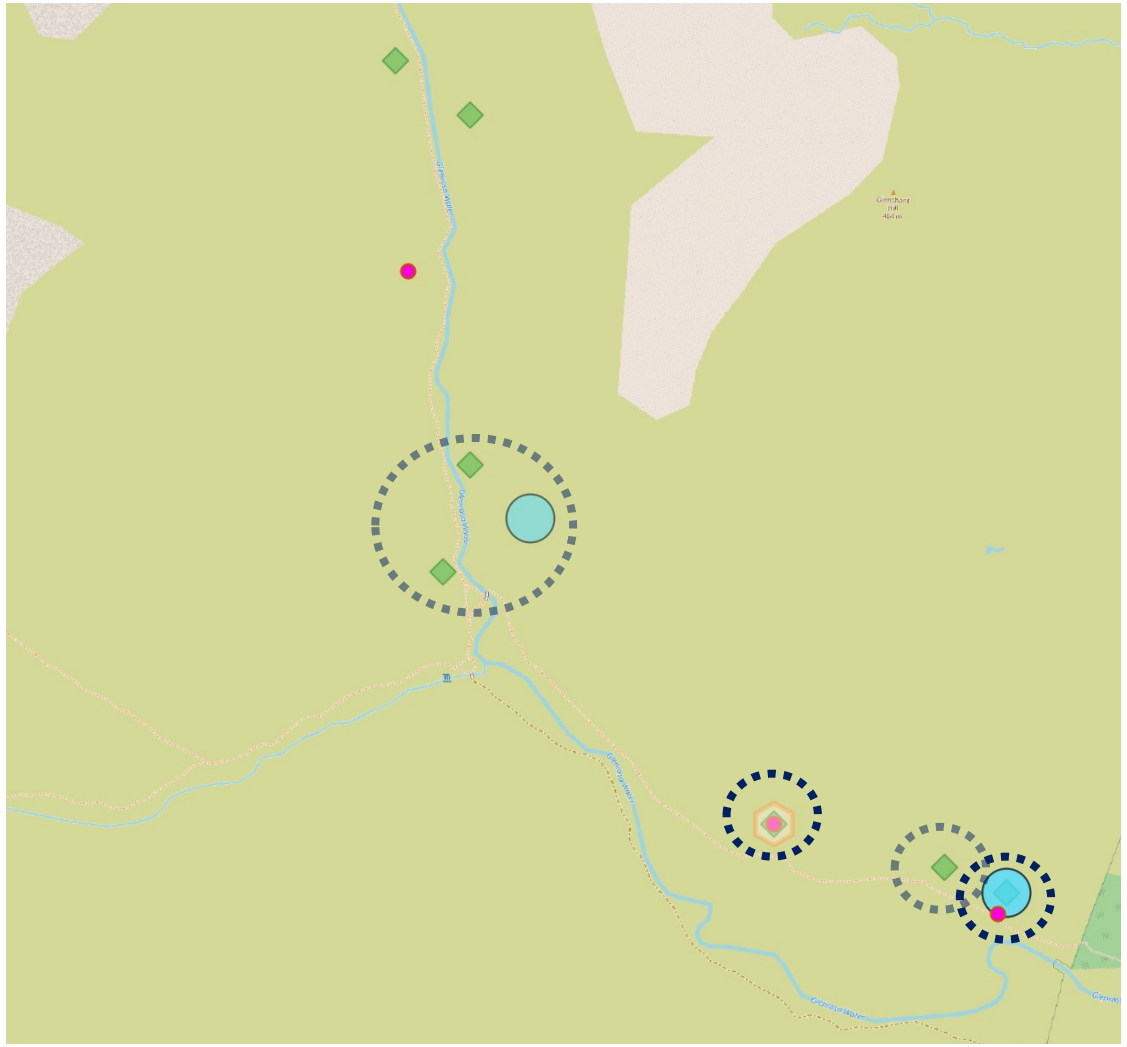


Analysis:

Two pairs seen again at the start of Transect A, and a third further along. One unpaired female and a couple of males also in Transect A.

Still no clear breeding territories in Transect B.

Survey 7: 14/06/2023



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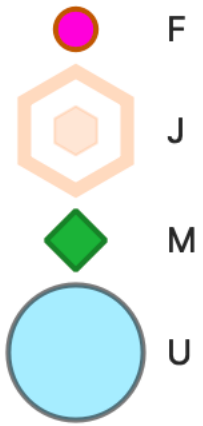


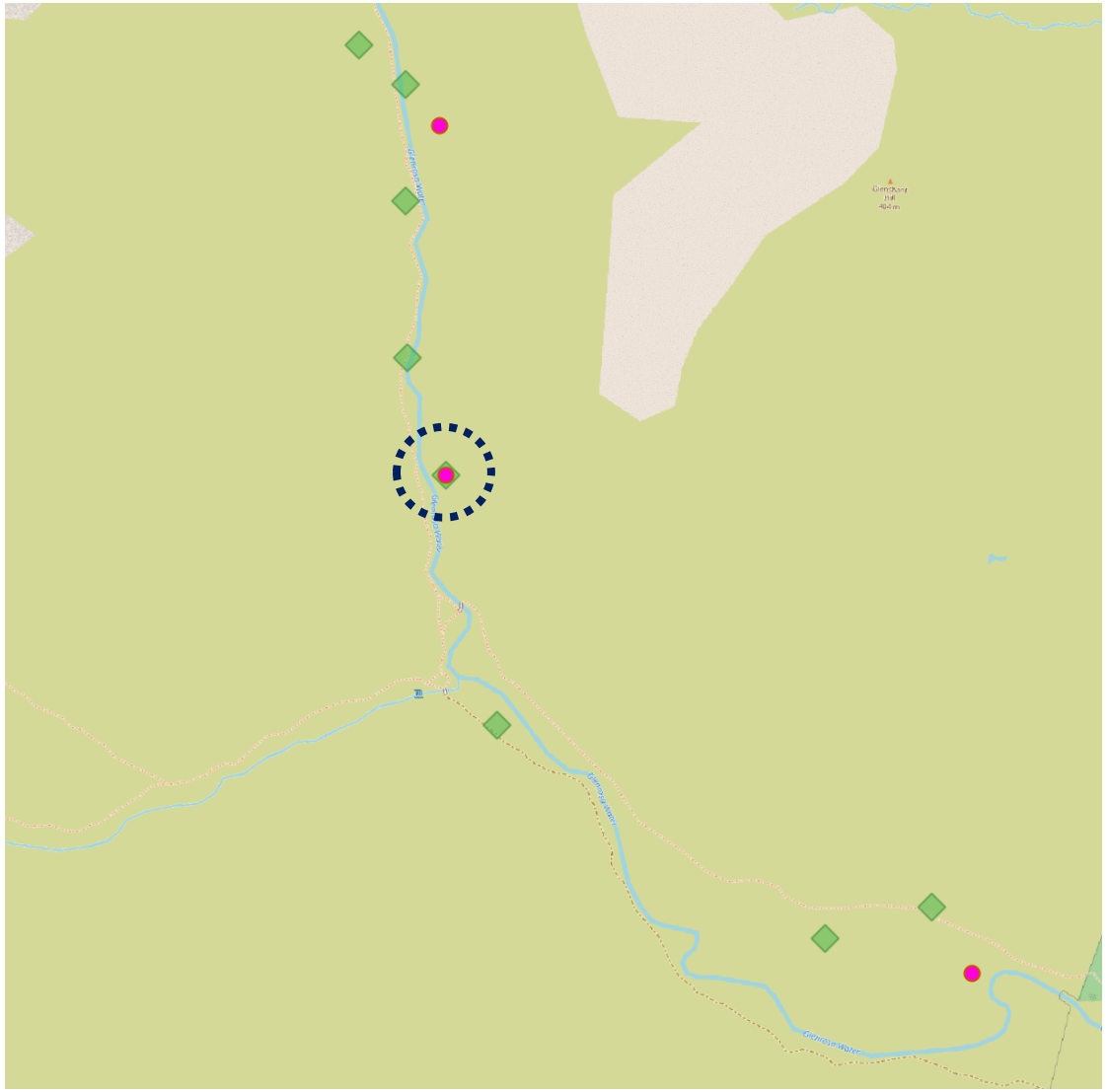
Analysis:

First juvenile seen in Transect A. Still clear second breeding territory (and possibly a 3rd) at the start of Transect A.

First confirmed sighting of a female in Transect B. Continued sightings of lone males in Transect B.

Potential breeding territory at start of Transect B (see Survey 8).

Survey 8: 21/06/2023



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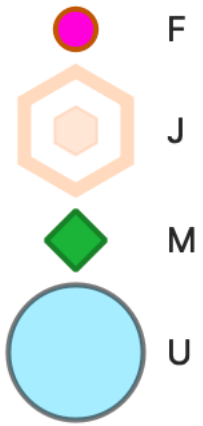


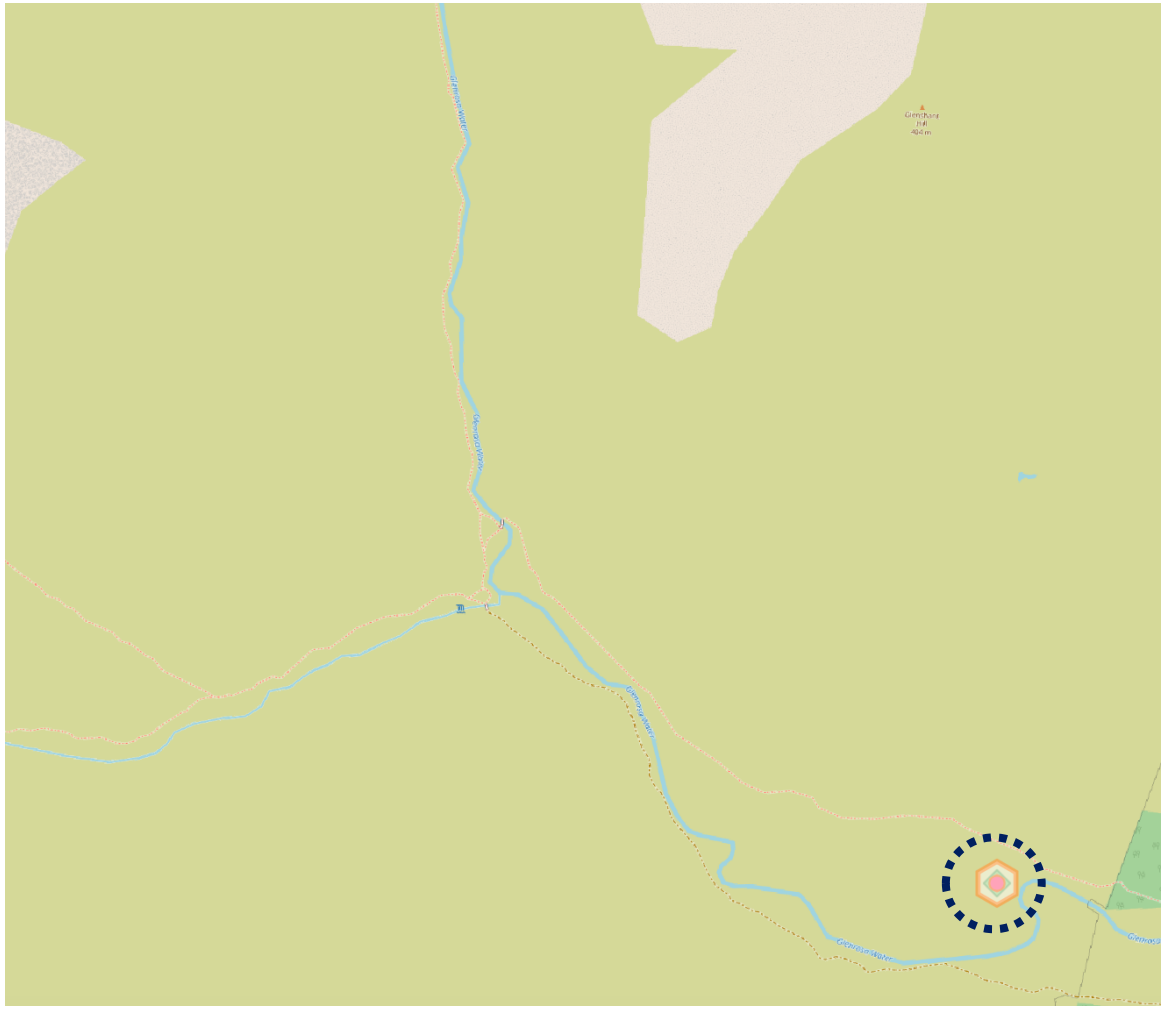
Analysis:

Male and female seen together after blue pools in Transect B – a possible late establishment of a breeding territory.

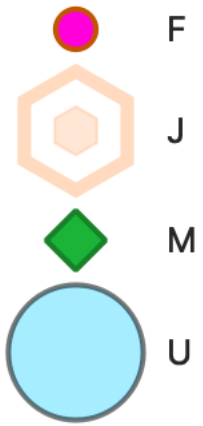
Second female also seen in the tree exclosure in Transect B.

Remaining likelihood of 2 successful breeding territories in Transect A.

Survey 9: 29/06/2023



Key:

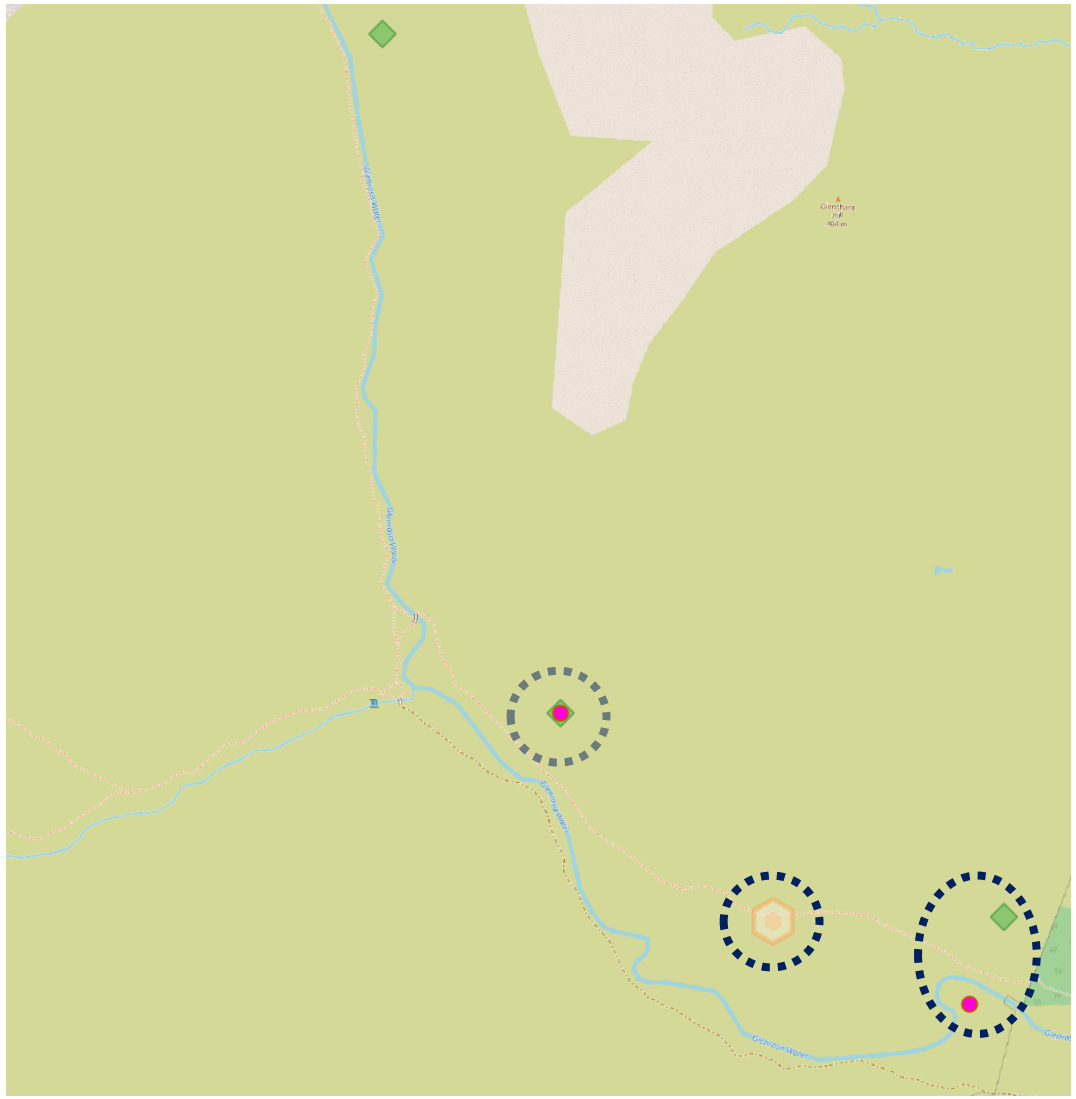


Analysis:

First sighting of juveniles in breeding territory at the start of Transect A. Marks **confirmation of second breeding territory.**

Breezier day (30mph gusts), which may have hindered activity in the Glen and the audibility of whinchat song.

Survey 10: 05/07/2023



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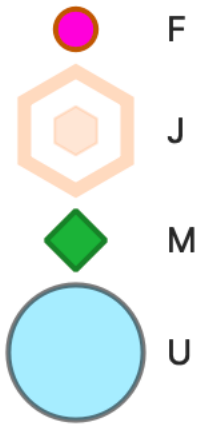
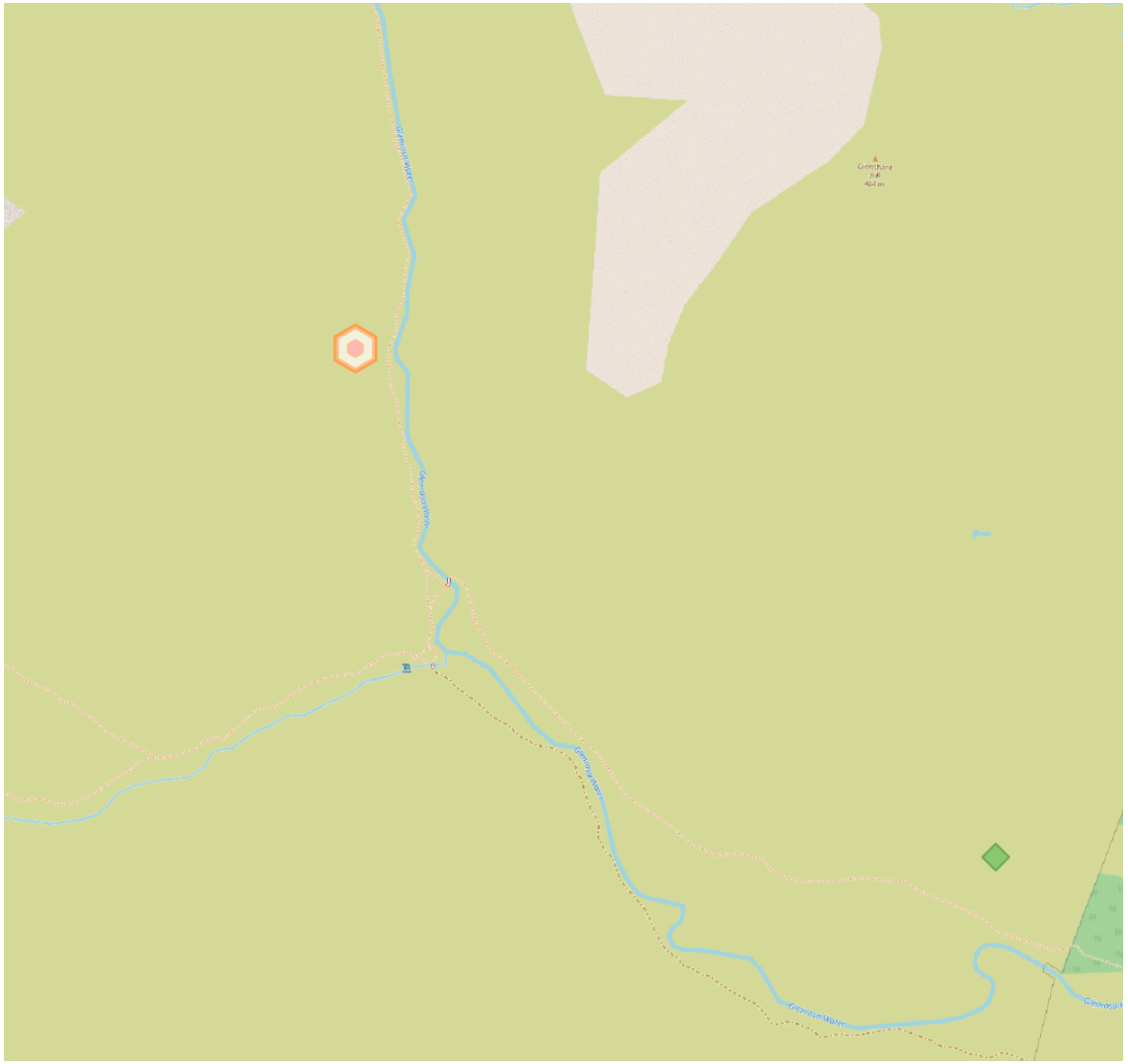


Analysis:

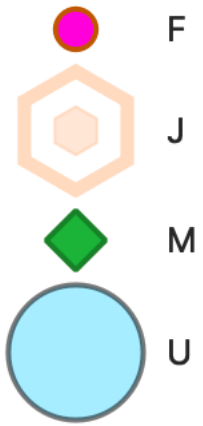
Sighting of juvenile in Transect A. Could be a fledgling from either breeding territory, although darker circles show what is likely the two confirmed breeding territories.

Pair seen together at the end of Transect B (transparent circle). This is further into the Glen than previous sightings of juvenile and pair (e.g., see Week 7). Could be same pair or another attempted breeding territory.

Survey 11: 14/07/2023



Key:

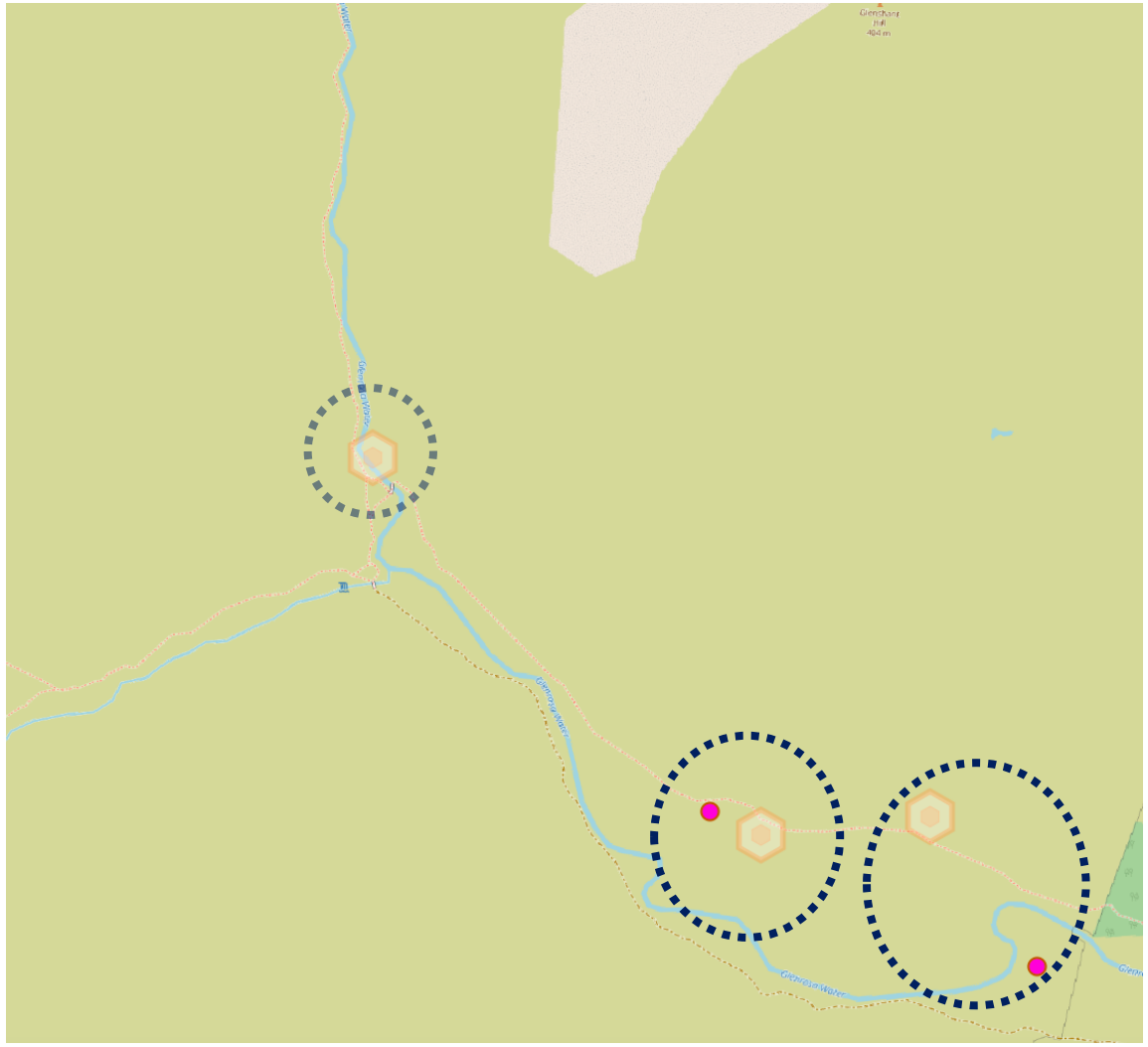


Analysis:

Not much activity recorded. Weather overcast with some heavy rain.

First sighting of (3) juveniles in Transect B, not far from where a potential breeding pair was seen in B (see survey 8). This juvenile could be successful fledgling from Transect A moving up into Transect B, or a successful breeding attempt in Transect B (see Survey 12).

Survey 12: 21/07/2023



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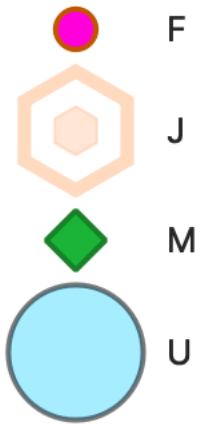


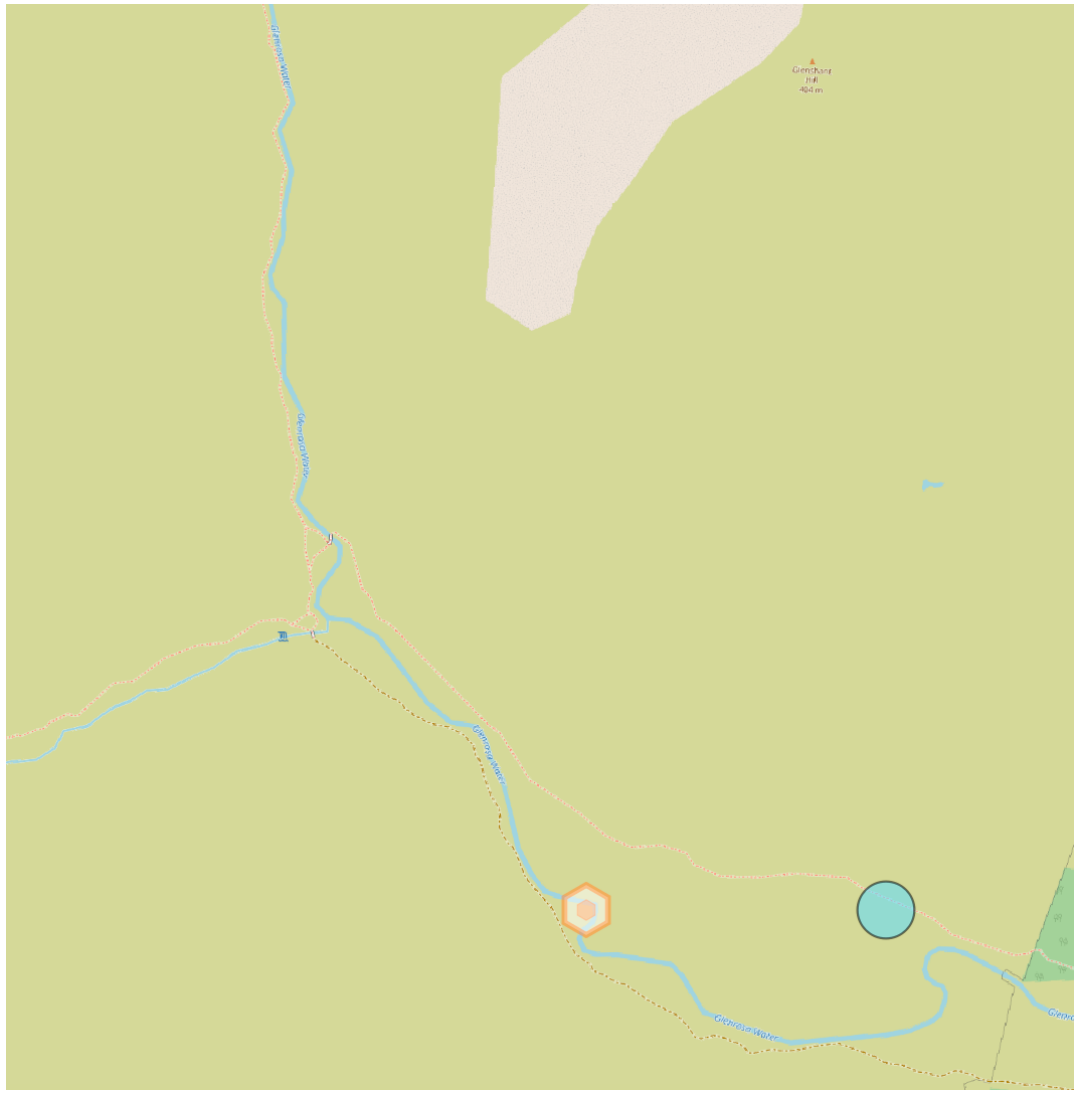
Analysis:

Juveniles seen in two breeding territories in Transect A.

Juvenile seen around location of pair spotted in Transect B in week 8.

Since incubation period is ~13 days, and fledging time is ~2 weeks, it was upon analysing this week's data that it was considered that this may indicate a third late breeding attempt in Transect B. However, it is difficult to determine whether this is the case, or whether these are fledglings from Transect A moving up the glen.

Survey 13: 28/07/2023



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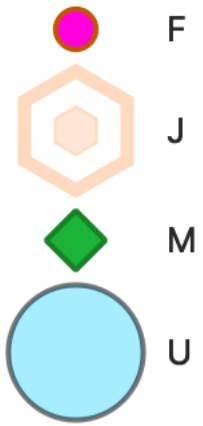
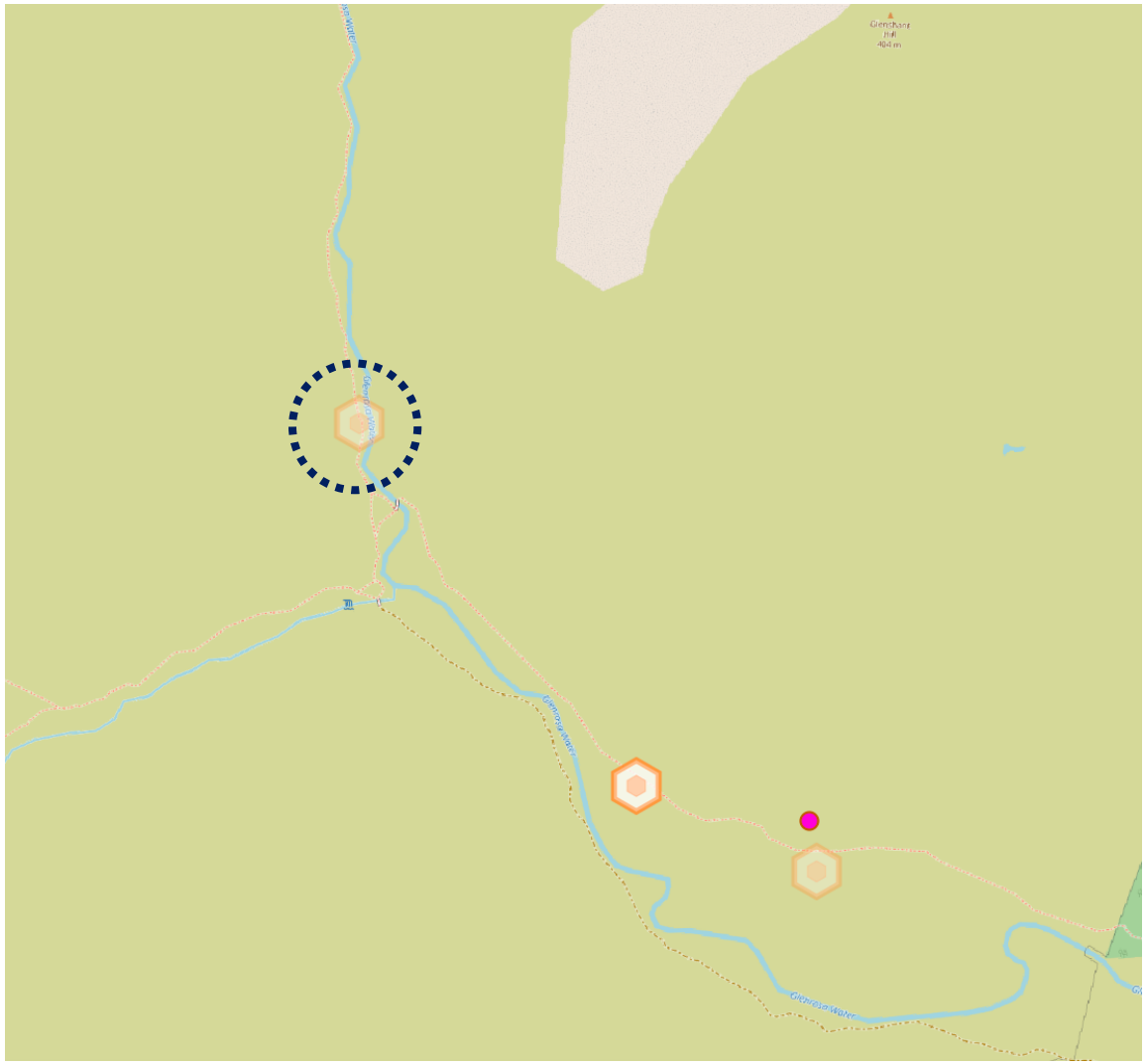


Analysis:

Largely uninteresting sightings. Nothing in Transect B. Weather was a bit cooler than previous weeks (12-14^{o}C).

Survey 14: 04/08/2023



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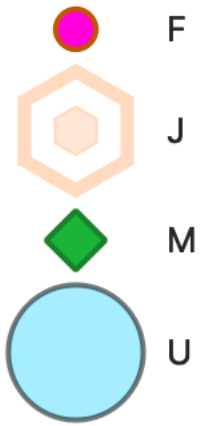


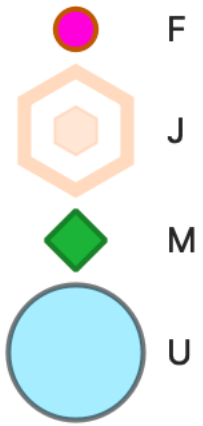
Analysis:

Again, 2 clear groups of juveniles in Transect A. The second group could be fledglings from the possible territory established further up Transect A in week 10, although I think this may be unlikely with lack of further sightings of the pair together. More likely that this is pair from one of the other two confirmed territories in A gathering before migration.

Juvenile seen in the same location in Transect B again.

Survey 15: 17/08/2023

Key:



Analysis:

One juvenile seen at the start of Transect A. No further sightings after this week.