

## **Acoustic surveys reveal the distribution and abundance of water rail *Rallus aquaticus* over-wintering on Alderney.**

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### **Summary**

A 'call count' survey of water rail *Rallus aquaticus* using broadcast vocalisations to elicit a response was field tested on Alderney over two consecutive winters and found the species widespread on the island. Surveys were undertaken in late December and early January of 2018/19 and 2019/20. Calls were broadcast from 80 sample points within suitable habitat and found 34 birds in both winters giving a population density of 4.3 birds/km<sup>2</sup>. Most birds were found in the same places each winter but there was some variation between surveys in the number of birds detected at each sample point. The birds occupied a diverse range of habitats with densely vegetated cover. Most, 59% in both winters, were found in places adjacent to water bodies bordered by emergent vegetation or along wooded valleys and creeks with dense ground cover and running water. However, the remaining 41% unexpectedly occupied sometimes drier terrain among bramble thickets. These data have revealed new sites of ornithological interest but also the practicality of using acoustic surveys to monitor this cryptic species elsewhere in winter. Repeat surveys have the potential to monitor changes in distribution and abundance that can aid conservation management in the future.

### **Introduction**

Water rails are cited as a common winter resident on Alderney (Sanders 2007) but no documented estimates of their abundance exist. Records dating back to the 19th century occur most regularly between September and April with some extra-limital sightings also occurring from mid-July (Sanders 2007, [www.guernseybirds.org.gg](http://www.guernseybirds.org.gg)). Breeding has not been confirmed although it is suspected to sometimes occur (Sanders 2007).

Water rails are widespread in Europe and locally abundant in some wetland habitats but their population is thought to be in decline (Hagemeijer and Blair 1997) and data on this difficult to census species is uncertain. With rapid changes in wetland habitat occurring and only poor estimates of population available there is a need for more complete survey data as well as information on habitat preferences (Taylor & van Perlo 1998). A method to monitor their presence on Alderney each winter would therefore be useful to help detect changes in their distribution and numbers in the future.

Counting rails is not straight forward. Rails are secretive birds that prefer habitats with dense vegetation and plenty of cover. They are notoriously difficult to see. However, many species are highly vocal, particularly in defence of their territory and this trait can be used to reveal their presence using broadcast vocalisations to elicit a response. Many species of rails have been censused in this way (e.g. Brambilla and Rubolini 2004, Gibbs and Melvin 1997) and its effectiveness on estimating breeding densities of Water Rail has also been corroborated against local populations of known size (Brambilla and Jenkins 2009). Although water rails remain vocal

throughout the year and are known to defend territories in the non-breeding season (Cramp & Simmons 1980, King 1980) the technique has been little used in winter despite remaining an effective way to monitor the birds' presence (Lislevand and Kjølstvedt 2005).

The aim of this study was to field test a survey method using broadcast vocalisations to estimate the abundance of water rail wintering on Alderney and to establish coarse-scale habitat selection to aid conservation management.

## Method

Over two consecutive winters, in between 30th December 2018 and 24th January 2019 and in between 31st December 2019 and 9th January 2020, broadcast vocalisations were used to elicit a response from water rail holding territory on Alderney. Vocalisations were played from 80 points across the island, comprising 68 points in 2018/2019 and 72 points in 2019/2020. Figs. 1 and 2. A 'call count' was then used to estimate the population size. Sampling occurred in mid-winter to avoid counting birds on passage.

The sample points were not randomly selected but chosen according to their suitability for water rail following information on habitat preferences available in Cramp & Simmons (1980) and Taylor & van Perlo (1998). On Alderney the sample points were selected from three types of habitat or biotopes with the following characteristics; 1) wooded valleys or creeks with running streams and dense ground vegetation such as ivy *Hedera helix*, ferns *Asplenium sp.*, willow carr *Salix sp.* and alder *Alnus glutinosa* in wet woodland or rushes *Juncus sp.* and bracken *Pteridium aquilinum* elsewhere, 2) water bodies, including ponds and flooded quarries, with emergent vegetation such as reed *Phragmites sp.* *Typha sp.* and iris *Iris pseudocorus*, and sometimes sedges *Carex sp.* rushes or willow carr and 3) bramble thickets *Rubus sp.* with various amounts of bracken rank grass and interspersed scrub, fig.1. Habitats not assessed included urban areas, recreational green spaces and gardens, brownfield sites, beaches, open grassland, open agricultural land such as pasture, tilled fields and allotments, woodland without ground cover, tall scrub, steeped sided hills, cliff edges, poorly vegetated quarries and heathland comprising gorse and heather.

At each sample point vocalisations were played using an MP3 player (SanDisk clip) and a voice amplifier (Aker MR1505). Vocalisations comprised the generic sequence of territorial calls or 'sharming' pig like squeals that typically initiates a response from either sex (Gilbert *et al.* 1998). The calls were broadcast following the methodology given by Gilbert *et al.* (1998) and used by Jenkins and Omerod (2002) but also incorporated amendments recommended by Lislevand and Kjølstvedt (2005) to allow more time for the birds to respond. A single sequence of 'sharming' calls lasting 20 sec. was played to completion at a natural volume then stopped for two minutes to listen for a response. If no response was heard the calls were played again before stopping and waiting another five minutes to listen for a response. Any responses were noted and their location judged to identify the habitat but also to help count the number of birds present where more than one bird was heard to reply. At sites that required several sample points to adequately cover the habitat each sample point was located a minimum 80m apart and care taken not to re-record the same individuals. Experience indicated that birds greater than 50m away may not respond. Most sample points were surveyed over the space of a one week with only a few visited on extra-limital dates to avoid possible double counting of birds that may have moved between sites. Points were sampled throughout the day in calm weather conditions. Days with winds greater than Beaufort four and/or prolonged rain were avoided to reduce sound interference and possible behavioural diffidence.

## Results

Thirty-four water rails were found in both winters, Table 1, figs 2 and 3. The birds responded well and all those heard almost invariably replied to the broadcast calls by 'sharming', only two birds used an alarm note instead. The birds occupied a diverse range of sites throughout the island, Table 1. In both winters most birds (59%) occupied biotopes associated with water either wet ground and dense cover associated with running streams e.g. the wooded valley at Bonne Terre (fig.1) or water bodies with emergent vegetation e.g. the flooded pool at Mannez quarry (fig. 1). An unexpected large proportion (41%), however, were also found among bramble thickets, fig. 4. Many of these thickets over grew disused fields with wet flushes or springs, e.g. the airport perimeter fields at Plat Cotil, but some also occurred on comparatively drier high ground, e.g. around the old 'central command' bunkers near the summit of Cotil du Val and in disused fields adjacent to heathland, e.g. on the Giffoine, c.f. figs 2 and 3. Preliminary estimates suggested only extensive thickets with at least 0.75ha of near unbroken cover were suitable.

## Discussion

This study demonstrates that water rails are regular and widespread winter visitors to Alderney. It is the first study to quantify their numbers and map their distribution on the island, as far as I know. It also demonstrates that indirect observation by acoustic survey can be used to estimate the numbers of water rail present in their wintering quarters, although the result's accuracy was untested and should be regarded as a minimum count of the birds present.

The final count was likely an under-estimate for the following reasons:

- 1). There is some individual variation in the response times of the birds and a few may not respond at all. For example, in a similar study from Norway, Lislevand and Kjølsvædt (2005) found 8% of birds remained silent and in another study from U.K. Jenkins *et al.* (1995) obtained a higher estimate of a local population when birds were trapped rather than counted by indirect methods.
- 2). Birds may have been missed because they responded after I had left the sample point. Lislevand and Kjølsvædt (2005) noted that a few birds were slow to respond to the broadcast calls and recommended waiting up to ten minutes for a response. In this study all the birds found were heard within five minutes of the last broadcast but I spent up to eight minutes at each sample point if I heard no response. Most birds responded after the first sequence of calls were broadcast but some took longer and these often first approached the player before responding unseen at closer quarters several minutes later. Much to my amusement this sometimes happened from just a few metres away but it also confirmed the recommendation by Lislevand and Kjølsvædt (2005) to wait for a response much longer than the one minute advised by Gilbert *et al.* (1998) following a broadcast.
- 3) Birds were present in places that were not accessible. For example, water rails are occasionally seen in Alderney's private gardens (Sanders 2007); although these records tend to occur during harsh weather when birds normally occupying other habitat are seeking food elsewhere.
- 4) The survey was undertaken after some wintering birds had been lost to predation or starvation. There was evidence found that this was the case following both surveys. For example, in winter 2018/2019 the remains of predated water rails were found at two sites

where no birds were later detected during the survey. These were on the slopes of Fort Albert and at La Grande Folie near the coast at Houmet Herbe (fig. 2). A dead water rail with signs of malnourishment was also found at Longis pond just 10 days before the survey, fig. 2. In winter 2019/2020 no water rails were also found during the survey on the golf course and at another site in the community woodland (fig. 3) where birds had been heard calling earlier in the winter.

Taking these misgivings into account the accuracy of the survey could be improved in the future by commencing them earlier in the winter nearer the likely end of autumn migration and adjusting up the duration of time spent waiting for birds to respond after each broadcast. Further research to compare the 'call count' against a local site of known population size would help corroborate the findings too but also establish a standard proportion of likely non-responders that may be applied to surveys elsewhere. This might be feasible if all birds at one location could be trapped, ringed and then monitored using camera traps and/or observation.

The large proportion of birds occupying bramble thickets was unexpected and demonstrated the more eclectic habitat preferences of the species outside the breeding season. In winter water rail are known to exploit many habitats that provide dense vegetation for cover and wet ground for foraging, including bramble thickets if poorly drained and partially water-logged (Cramp & Simmons 1980). However, the high proportion of birds using them on Alderney was unexpected, particularly as some of the occupied thickets were on high ground and not water-logged e.g. on the Giffoine and around the community woodland near Cotil du Val (c.f. figs. 2 and 3).

## Conclusion

This survey documents the number of water rails wintering on Alderney for the first time. It provides new information about the birds' distribution and habitat use on the island. It also demonstrates the practicality of acoustic surveying this cryptic species in its winter quarters. Future surveys might be improved by beginning them earlier in the winter and perhaps spending more time waiting for birds to respond to the broadcast calls. If repeated elsewhere, they could provide a useful index of the species abundance, distribution and habitat use which can help monitor change in the future and aid conservation management.

## Acknowledgements

I'd like to thank Tim Earl (formerly of Alderney Bird Observatory) and Phil Atkinson (British Trust for Ornithology) for their encouragement and comments on an earlier draft. I also owe much gratitude to the Alderney Wildlife Trust for giving me the time to present this work.

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Table 1. The 'call count' survey results for water rail using broadcast vocalisations from 80 points on Alderney in the winters of 2018/2019 and 2019/2020 (c.f. Figs. 2 and 3).

Point	Site name	Grid reference		Survey dates		No. of responding birds		Habitat (see key below)	Biotope (see key)
		Latitude	Longitude	2018/2019	2019/2020	2018/2019	2019/2020		
1	Essex sewage works	49.720072	-2.176704	30/12/18	31/12/19	1	1	WW,WS,DU,RS,BT	1
2	Tank wall thickets	49.721506	-2.175404	ns	31/12/19	ns	0	BT	3
3	Longis pond	49.723877	-2.174255	30/12/18	31/12/19	3*	3	WB,RB,BT,WS,RG	2
4	La Grand Folie	49.724146	-2.163981	02/01/19	31/12/19	0*	0	BT,BR	3
5	La Petit Folie	49.728205	-2.159823	02/01/19	31/12/19	0	0	BT,RG	3
6	Cat's bay thicket	49.728648	-2.161205	ns	31/12/19	ns	0	BT	3
7	Lighthouse thickets	49.728188	-2.164932	02/01/19	31/12/19	0	0	BT,RG	3
8	Fort Corblet's thicket	49.728838	-2.169179	02/01/19	31/12/19	0	0	BT,BR	3
9	Mannez rushes	49.727528	-2.166192	30/12/18	31/12/19	0	2	BT,SR,WS,WB	2
10	Mannez quarry	49.726477	-2.164732	30/12/18	31/12/19	4	2	WB,RB,SR,WS,BT	2
11	Berry quarry east	49.726599	-2.170419	02/01/19	31/12/19	0	0	WB,SR,BT,WS	2
12	Berry quarry west	49.726210	-2.171838	02/01/19	31/12/19	3	2	WB,SR,BT,WS	2
13	Corblet's quarry	49.727054	-2.175524	04/01/19	31/12/19	0	0	WB,SW,SR,BT	2
14	Mannez Garenne	49.724418	-2.173545	02/01/19	31/12/19	0	0	BR,BT,RG	3
15	Fort Albert upper slope	49.726602	-2.182281	02/01/19	31/12/19	0	0	BT,RG	3
16	Fort Albert lower slope	49.727466	-2.180658	02/02/19	31/12/19	0*	1	BT,RG	3
17	Barrackmaster's lane 1	49.719577	-2.178142	30/12/18	01/01/20	1	0	RS,WW,WS,DU,FI, BT,BL	1
18	Barrackmaster's lane 2	49.719327	-2.179505	30/12/18	01/01/20	0	0	RS,BT,WV,OU,FI	1
19	Barrackmaster's lane 3	49.718200	-2.182026	30/12/18	01/01/20	0	0	WV,OU,FI,BT	1
20	Essex hill thicket	49.715852	-2.182050	05/01/19	01/01/20	0	0	BT,BR,BL,HT	3
21	Barrackmaster's lane 4	49.716467	-2.185553	30/12/18	01/01/20	0	0	WW,DU,BT,WS,FI	1
22	Community woodland 1	49.716693	-2.188852	03/01/19	01/01/20	0	0	BT,RG	3
23	Community woodland 2	49.717084	-2.190483	03/01/19	01/01/20	2	1	BT,SR,SC,DU	3

Table 1 cont.:

Point	Site name	Grid reference		Survey dates		No. of responding birds		Habitat (see key below)	Biotope (see key)
		Latitude	Longitude	2018/2019	2019/2020	2018/2019	2019/2020		
24	Community woodland 3	49.717869	-2.191160	03/01/19	01/01/20	1	0	BT,SC,BL	3
25	Community woodland 4	49.718286	-2.188710	03/01/19	01/01/20	1	0#	BT,RG,SC	3
26	Braye scramble track centre	49.720909	-2.188323	05/01/19	01/01/20	0	0	BT,RG	3
27	Golf course 1	49.720041	-2.185581	03/01/19	01/01/20	0	0	BT,RG	3
28	Golf course 2	49.721249	-2.181652	ns	01/01/20	ns	0	BT,RG	3
29	Golf course 3	49.720476	-2.18714	ns	01/01/20	ns	0	BT,RG	3
30	Golf course 4	49.719875	-2.180455	ns	01/01/20	ns	0	BT,SC,DU,FI	3
31	Golf course 5	49.720727	-2.179614	ns	01/01/20	ns	0#	BT,SC,DU,FI	3
32	Golf course 6 - Iron age site	49.721201	-2.177991	ns	01/01/20	ns	0	BT,SC	3
33	Lager Borkum	49.714775	-2.188193	24/01/19	01/01/20	0	0	BT,RG	3
34	Impot creek	49.712355	-2.185545	31/12/18	01/01/20	0	0	CR,BT, BR	3
35	Quoire thicket	49.709655	-2.189811	31/12/18	01/01/20	1	0	BT,RG	3
36	Val Longis	49.717241	-2.195440	03/01/19	02/01/20	0	0	WV,OU,FI	1
37	Cotil du Val	49.716013	-2.197303	03/01/19	02/01/20	0	1	BT	3
38	Buttes	49.719831	-2.203293	05/01/19	02/01/20	1	0	BT,SC	3
39	York Hill	49.720806	-2.201993	ns	02/01/20	ns	0	BT,FI	3
40	Platte Saline	49.730578	-2.215170	02/01/19	02/01/20	1	1	WB,SR	2
41	Le Petit Val	49.717018	-2.212074	31/12/18	02/01/20	0	1	WV,.DU,FI,RS	1
42	Saline spring	49.716910	-2.209959	02/01/19	02/01/20	0	0	WV,OU,FI,RS	1
43	La Picaterre	49.719023	-2.208589	31/12/18	02/01/20	0	0	WV,OU,RS	1
44	Wide lane	49.719491	-2.209054	01/01/19	02/01/20	0	0	WW,WS,DU,RS	1
45	Water mill	49.718389	-2.216279	02/01/19	02/01/20	0	0	WW,RS,OU	1
46	Bonne Terre valley 1	49.717132	-2.217177	02/01/19	02/01/20	1	1	WW,WS,DU,RS,SR,BT	1

Table 1 cont:

Point	Site name	Grid reference		Survey dates		No. of responding birds		Habitat (see key below)	Biotope (see key)
		Latitude	Longitude	2018/2019	2019/2020	2018/2019	2019/2020		
47	Bonne Terre valley 2	49.716348	-2.217427	02/01/19	02/01/19	1	1	WV,WW,WS,DU,SR,RS,WB	1
48	Bonne Terre valley 3	49.714988	-2.216675	02/01/19	02/01/19	1	0	WV,WW,WS,DU,FI,RS,BT	1
49	Bonne Terre valley 4	49.714397	-2.217536	02/01/19	02/01/19	0	2	WV,WW,WS,DU,FI,RS,BT	1
50	Bonne Terre valley 5	49.713499	-2.218522	02/01/19	02/01/19	1	0	WV,WW,WS,DU,FI,RS,BT	1
51	Tourgis hill (Giffoine)	49.712917	-2.221313	02/01/19	02/01/19	1	0	BT	3
52	Vau Pommier	49.713777	-2.224808	31/12/18	02/01/20	1	1	CR,RS,BT,BL,BR	1
53	Rose farm wood	49.711985	-2.218371	02/01/19	04/01/20	2	1	RS,WW,WS,DU,SR,FI	1
54	Rose farm pond	49.710850	-2.216342	02/01/19	04/01/20	0	0	WB,WW,SR,OU	2
55	Airport aqueduct	49.708914	-2.215668	05/01/19	04/01/20	0	1	WS,RS,BT,SC	1
56	Zig Zag thicket	49.711484	-2.223774	02/01/19	04/01/20	1	1	BT	3
57	The Guns thicket (Giffoine)	49.709237	-2.227978	02/01/19	04/01/20	0	0	BT,RG	3
58	Trois Vaux (upper valley)	49.707441	-2.227258	31/12/18	04/01/20	0	0	CR,RS,BR	1
59	Clos des Cables (thicket)	49.706754	-2.225324	02/01/19	04/01/20	0	0	BT	3
60	Trois Vaux (lower slopes)	49.706037	-2.228470	30/12/18	04/01/20	0	0	CR,RS,SR,BR,BT	2
61	Lager Sylt	49.705062	-2.218403	ns	04/01/20	ns	1	BT	3
62	Val L'Emauve	49.704073	-2.217300	30/12/18	04/01/20	0	0	WB,WS,CR,BR,BT	2
63	Vau Renier 1	49.704457	-2.213043	30/12/18	04/01/20	-	2	BT,WG	3
64	Vau Renier 2	49.705858	-2.211441	ns	04/01/20	-	2	BT,WG	3
65	Vau Renier 3	49.704235	-2.211299	ns	04/01/20	1	1	CR,RS,BR,BT	1
66	Plat Cotil 1	49.705327	-2.210034	24/01/19	04/01/20	2	2	BT	3
67	Plat Cotil 2	49.706100	-2.208863	24/01/19	04/01/20	-	1	BT	3
68	Vau du Saou	49.705725	-2.206846	30/12/18	04/01/20	0	1	WV,RS,WW,WS,DU,FI,BT	1



Table 1 cont:

Point	Site name	Grid reference		Survey dates		No. of responding birds		Habitat (see key below)	Biotope (see key)
		Latitude	Longitude	2018/2019	2019/2020	2018/2019	2019/2020		
69	Les Quartre Vents valley	49.707501	-2.202198	30/12/18	04/01/20	0	0	CR,RS,WS,BR,BT,BL	1
70	Champ Jeanette	49.707350	-2.206335	24/01/19	04/01/20	1	1	BT,WG	3
71	East airfield thicket	49.708538	-2.206809	24/01/19	04/01/20	1	0	BT,RG	3
72	Druid's altar thicket	49.715697	-2.219592	02/01/19	09/01/20	1	0	BT,HT	3
73	Telegraph tower creek	49.703492	-2.223818	30/12/18	ns	0	-	CR,BR,BT	1
74	Clonque bay quarry	49.715385	-2.223014	31/12/18	ns	0	-	BR,BT,RG	3
75	Crabby quarry	49.722144	-2.203427	31/12/18	ns	0	-	WB,BT,RG	2
76	Battery quarry	49.719879	-2.189661	01/01/19	ns	0	-	WB,BT,SC,RG	2
77	Hanaine bay (Giffoine)	49.711236	-2.228286	02/01/19	ns	0	-	CR,HT,BT	1
78	Tourgis hill top (Giffoine)	49.708324	-2.226030	02/01/19	ns	0	-	BT,HT	3
79	Braye scramble track (edge)	49.721938	-2.186330	05/01/19	ns	0	-	BT,RG	3
80	Le Longue Pierre	49.707410	-2.199792	24/01/19	ns	0	-	WC,RG	3
Totals						34	34		

Key: ns = not surveyed, \* dead bird found or remains indicating recent occupation. # bird heard calling at location prior to the survey. Habitat codes: WW = wet woodland, WV= wooded valley, WS = willow scrub, DU = dense understory, OU = open or patchy understory, RS= running stream, SP = spring, BL = blackthorn thicket, BR = bracken, SR = sedge and/or rushes, WG = wet grassland (with flush or spring), RG = rank grassland, SC = scrub, WB = water body (flooded quarry, pond or standing water), RB = Reedbed, BT = Bramble thicket. RG = rocky ground, FI = ferns/ivy understory, HT = heathland (gorse and heather), WC = winter crop (brassicacae), CR= creek or small valley. Habitat Category: 1 = wet woodland, wooded valley or creek with running stream, 2 = water body with emergent vegetation and 3 = bramble thicket.



Fig. 1 Typical water rail habitat on Alderney, including 1) wet wooded valleys or creeks with running streams and dense understory, e.g. the Bonne Terre valley, top left photo; 2) water bodies surrounded by emergent vegetation, e.g. Mannez quarry, bottom photo and 3) bramble thickets, e.g. the overgrown airport perimeter fields at Plat Cotil, top right photo.

Fig. 2. The 68 sample points (c.f. Table 1.) where water rail calls were broadcast during the acoustic survey in winter 2018/2019. Referring to the legend, the points show where no response was heard (white), one bird responded (green with black spot), two birds responded (yellow with black spot), three or more birds responded (red with black spot) and no response was heard but other signs of presence were found before the survey took place (marked white with a black spot).



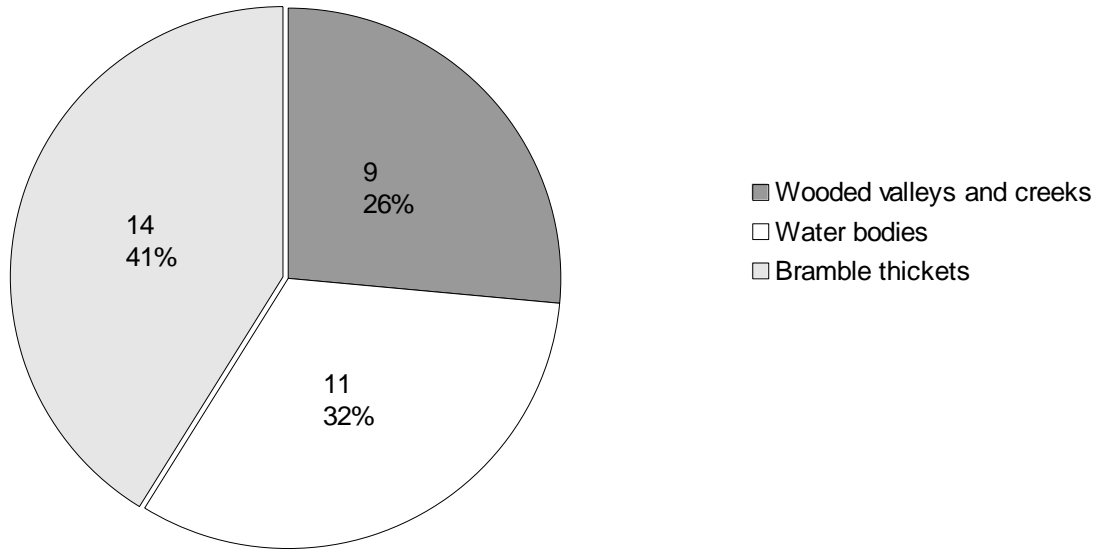
Key.  
 Sites mentioned in the text; BT = Bonne Terre valley, CM = Community woodland, CV = Cotil du Val, FA = Fort Albert, GC = Alderney golf course, GF = Giffoine, HH = Houmet Herbe, LP = Longis Pond, MQ = Mannez Quarry and PC = Plat Cotil.

Fig. 3. The 72 sample points (c.f. Table 1.) where water rail calls were broadcast during the acoustic survey in winter 2019/2020. Referring to the legend, the points show where no response was heard (white), one bird responded (green with black spot), two birds responded (yellow with black spot), three or more birds responded (red with black spot) and no response was heard but other signs of presence were found before the survey took place (marked white with a black spot).



Key: Sites mentioned in the text; BT = Bonne Terre valley, CM = Community woodland, CV = Cotil du Val, FA = Fort Albert, GC = Alderney golf course, GF = Giffoine, HH = Houmet Herbe, LP = Longis Pond, MQ = Mannez Quarry and PC = Plat Cotil.

2018/2019



2019/2020

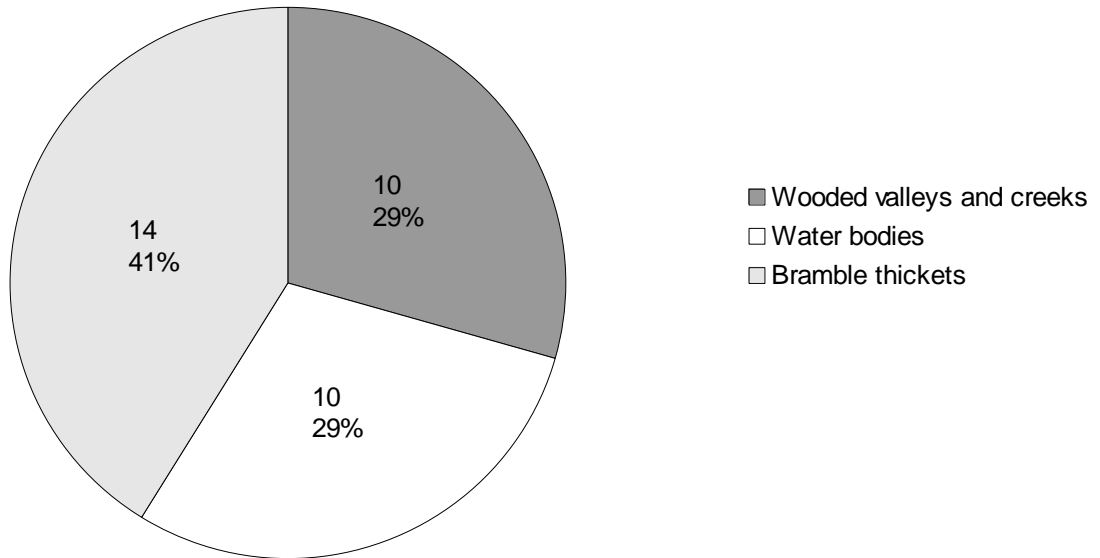


Fig. 4. The habitat types used by all water rails found during acoustic surveys undertaken in the winters of 2018/2019 and 2019/2020. The proportions shown represent the numbers of birds or the percentage of the population that were found in three biotopes. These were 1) wooded valleys or creeks with running streams and dense ground vegetation, 2) water bodies, including ponds and flooded quarries, with emergent vegetation and 3) bramble thickets (see main text for further details).