

SMALL MAMMAL SURVEYS
in the
LINDISFARNE NATIONAL NATURE
RESERVE
May to November 2010



Wood Mouse by John Rae

by
Berwick Wildlife Group

A Report on the 2010 Small Mammal Surveys

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Acknowledgements

This work grew out of a conversation between John Rae (Berwick Wildlife Group), Andrew Craggs (Natural England) and Veronica Carnell (Northumbria Mammals Group), during which it transpired that there were very few records on small mammals within the Lindisfarne National Nature Reserve. Also, due to Holy Island's long isolation from the mainland, there was the possibility of there being sub-species living on the island.

It was decided that live trapping should be undertaken to identify species present in the reserve. At the same time samples of both hair and faeces would be taken for future DNA analysis to identify sub-species.

Veronica Carnell would undertake the surveys on the island whilst Berwick Wildlife Group would survey the mainland. This report covers the surveys undertaken on the mainland during 2010. There is a separate report (Autumn Report September 2010.doc) for the surveys on the Island.

The following members of the Group took part in the fieldwork: Fiona Aungier, Stephen Block, Molly Hardie, Jenny Prince, Sally & John Rae, Enid Turnbull and with the expert help from Veronica & John Carnell Carnell (Northumbria Mammals Group).

Credit should go to all who took part in the surveys, especially at Cocklawburn Dunes in November where we all thought that we were going down with hypothermia due to the wind chill factor.

Finally we would like to thank –

- Mr Whiteford, Borewell Farm, the manager of the land for Greenwich Hospitals, who readily gave permission for the surveys on Cocklawburn Dunes to go ahead.
- Andrew Craggs of Natural England for his support of our surveys.
- Veronica Carnell of the Northumbria Mammals Group for her support and additional training of Berwick Wildlife Group members.

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Aims of the Surveys

1. To get a measure of small mammal populations within the Lindisfarne National Nature Reserve.
2. To take samples suitable for future DNA analysis, comparing animals from the mainland and Holy Island. It is hoped to start exploring the possibility of an island race of small mammals.
3. To discuss and share best practice. (Trapping procedure and DNA sample collection).

Due to the very limited information on small mammals in north Northumberland, Berwick Wildlife Group undertook surveys at three locations on the mainland within the Lindisfarne National Nature Reserve.

These were at

- Cocklawburn Dunes: 10th to 12th May & 8th to 10th November 2010
- Cheswick Dunes: 11th to 13th October 2010
- Beal Point: 13th to 15th October 2010

Trapping was carried out in differing habitats at each location.

- Cocklawburn Dunes: dune grassland with some marshy areas, spoil material and scrubby wild rose.
- Cheswick Dunes: grey (mature) dune on the slopes, with dune grassland adjacent in hollows. Traps were set near the edge of a Marram dominated area above the break of the slope.
- Beal point: a narrow (20m wide) strip of rough grassland lying between the high tide mark and the arable fields, dominated by *Arrhenatherum* and *Elytrigia repens*. It is very poor in plant species.

All this information will be passed on to Natural England, the Northumbria Mammal Group and the EYE Project.

Summary of captures assuming no re-captures

<u>Species</u>	<u>Cocklawburn Dunes</u> May	<u>Cheswick Dunes</u> October	<u>Beal Point</u> October	<u>Cocklawburn Dunes</u> November
Bank Vole		-	1	3
Field Vole		1	3	-
Common Shrew	5	1	-	-
Pygmy Shrew		-	-	-
Water Shrew		-	-	-
Wood Mouse	1	11	4	6

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Description of Surveyed Sites



Location map 1 of the survey areas.



Location map 2 of the survey areas.

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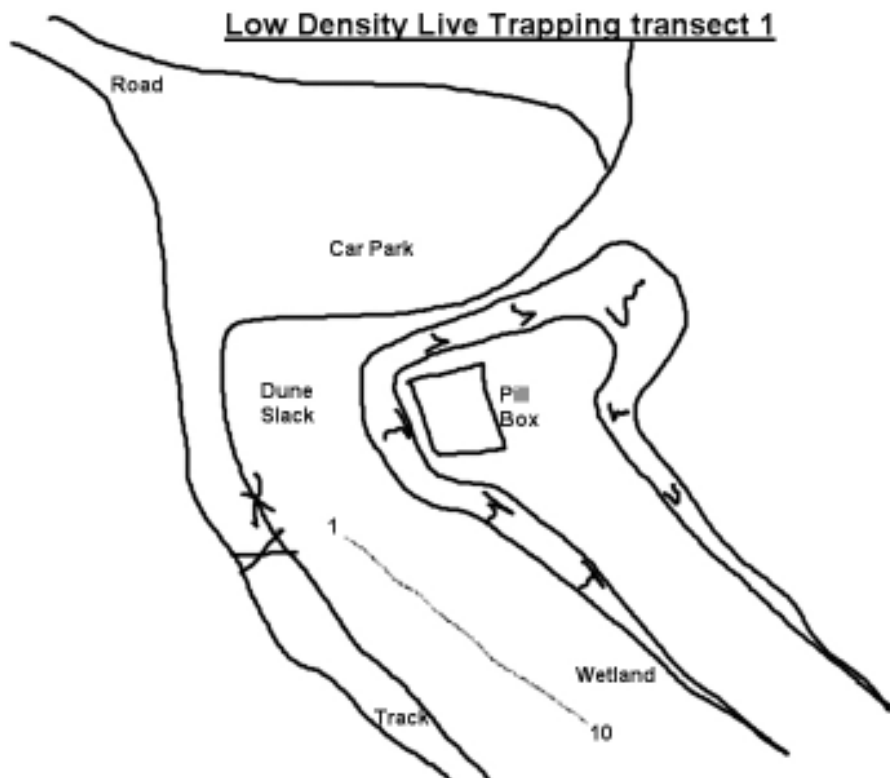
Cocklawburn Dunes

Cocklawburn Dunes are situated on the coast 5km south of the river Tweed at approx. NU 032 480.

Although at first glance the area is normal dune grassland (newest grassland being near the sea) and rough pasture, the site includes lime kiln spoil heaps, an old brick pit, clay areas, tracks, etc. as well as natural dune. It is part of the Lindisfarne Site of Special Scientific Interest (and is contiguous with the Lindisfarne National Nature Reserve which covers the dune and intertidal areas as far north as Cheswick Black Rocks).

The area is the subject of an Environmental Stewardship Agreement, including light grazing by Aberdeen Angus cattle the effects of which are being monitored by Natural England and Berwick Wildlife Group.

This survey line ran parallel to the base of the slope on the southwest side of an artificial incline built in the early part of the 19th C to enable tipping of lime into railway wagons, and which in World War II was used for a raised bunker and gun emplacement.



The habitat is mature dune grassland and rough pasture, marsh and limestone spoil with some shrubby wild rose. Very variable substrate and hence varied flora.

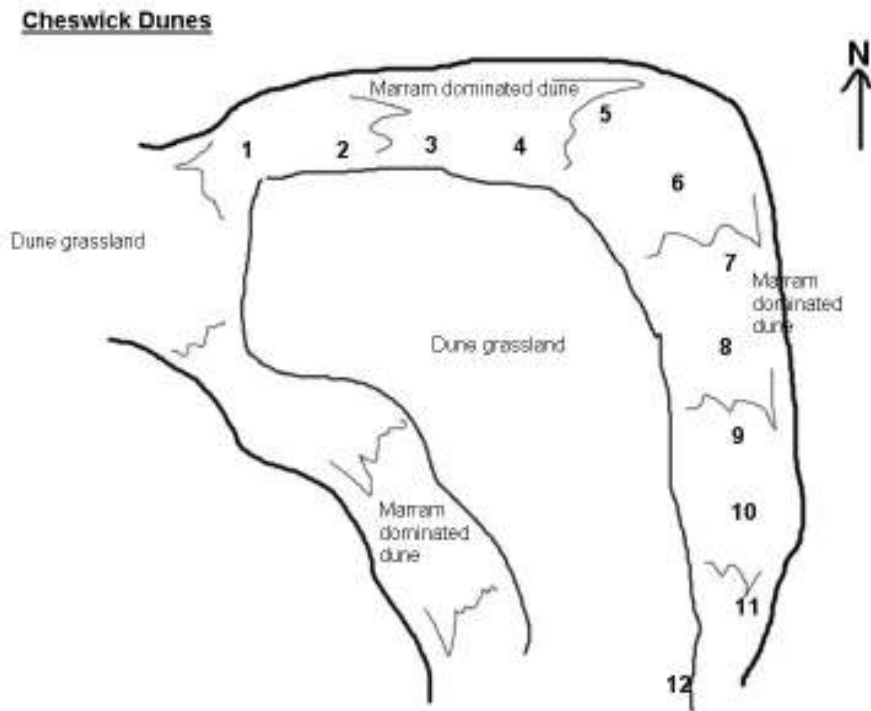
As the latest survey was undertaken in November it was decided to postpone doing the full habitat quadrats until spring 2011.

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Cheswick Dunes

Cheswick Dunes are situated on the coast 7km south of the river Tweed at approx. NU 042 470.

There is grey (mature) dune on the slopes, with dune grassland adjacent in hollows. The 12 traps were set near the edge of a Marram dominated area, above the break of a slope.

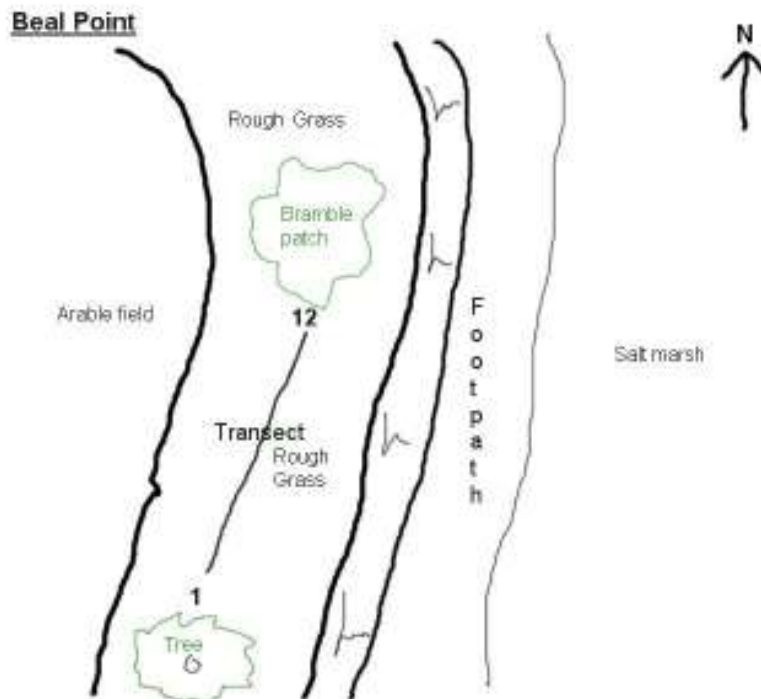


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Beal Point

Beal Point is located just to the north of the car park on the mainland end of the causeway across to Holy Island at approx. NU 080 430.

The area surveyed was a narrow (20m wide) strip of rough grassland lying between the high tide mark and the start of fields and is dominated by *Arrhenatherum* and *Elytrigia repens*. Very species poor. MG1



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Method

Small mammal transects are a way of identifying the variety of species present at a site. The basic method adopted for these surveys follows that laid down by the Northumbria Mammal Group and the Mammal Society.

The two surveys at Cocklawburn Dunes were undertaken as part of the Mammal Society's National Small Mammal Monitoring Scheme. The methodology stipulated for these surveys is to make the traps live in the evening using a lot of bait and bedding and only visiting the following morning to check the catch.

Because of this during 2011 we propose to undertake additional surveys at Cocklawburn Dunes to those required for the National Small Mammal Monitoring Scheme, using the same methodology as used for the other surveys (Cheswick Dunes and Beal Point) within the reserve.

DNA sampling

Samples of both faeces and hair were taken for future DNA analysis.

Collection of faecal samples is a recognised practice for species identification using DNA.

Samples of hair were clipped and/or plucked from captures, and/or faecal samples were collected from the trap tunnels. These have been stored frozen by Natural England for future DNA analysis.

A small amount of hair was also clipped from the captures to aid identification of individuals that had been previously trapped.

Shrews are a partially protected species (Wildlife & Countryside Act 1981, Schedule 6) which means they cannot be deliberately trapped without a licence. This is because they are very vulnerable to adverse conditions.

In order to avoid distress or cruelty to all small mammal species, the following guidelines were observed. These are designed for a basic survey to detect the presence or absence of species utilising a linear trap line using 10/12 Longworth traps 10m apart. However many of the methods could be used for other types of survey.

Study Site

1. Ideally the study area should be limited to the study personnel.
2. Traps should be placed so the general public will not disturb them.
3. Obtain permission from the landowner or nature reserve manager before work starts.
4. Set a timescale for the study, i.e. 2 days pre-baiting and 1 day trapping.
5. Make a detailed description of the topography and vegetation.
6. Record the grid reference of the centroid of the trap line or of each trap.

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7. When positioning the trap, make sure that the tunnel is horizontal and the nest box angled upwards to facilitate rainwater/urine runoff and minimize soaking of the bedding.
8. Position the traps in a sheltered position and out of direct sunlight to prevent overheating. Place in vegetation, along a likely runway if possible, hidden from predators and other people.
9. Place the traps approximately 10m apart.
10. Having set the trap, take steps to ensure you can find it again later. i.e. Use a short cane or tie a strip of bright plastic to the undergrowth.

Pre-Baiting

1. Set the pre-bait catch to ensure the door cannot be closed.
2. Add half a nest-box full of dry bedding – local vegetation.
3. Latch the two halves of the trap together and bait.
4. **It is essential that no bait is used that may introduce invasive species to the study area**
5. Bait: use casters (blowfly pupae) or mealworms, kibbled maize, kibbled peanuts, kibbled sunflower hearts, sultanas.
6. When placing the traps ensure that they are covered with surrounding vegetation.
7. Try to re-bait at a similar time each day.
8. On the last pre-bait before trapping collect local vegetation for bedding and take home to dry out.

Trapping Day

Have with you -

1. Food for re-baiting
2. Deep plastic box (to work in)
3. Large polythene bag for removing catch from trap. At least 30cm x 20cm.
4. Small polythene “zip” bag for examination and weighing of catch.
5. Pencil, ruler, notebook.
6. Clipboard and Live Trapping Forms.
7. Spring balance for weighing animals. Pesola 50gm.
8. Thin plastic/rubber gloves and antiseptic wipes.

Trapping

1. Do not start trapping unless you are sure you will be able to return to collect the traps at the appropriate time.
2. Set traps for no more than three to four hours without a check
3. Do not trap in freezing conditions or heavy rain or extreme heat.
4. Lift pre-bait traps and clean, wiping out using local vegetation to minimize human scent.
5. Release pre-bait catch and ensure the door will trip when activated.
6. Add half a nest-box full of dry bedding – hay or local vegetation.
7. Bait as with pre-baiting. Add apple pieces for moisture.
8. Shrews have a very high metabolic rate and can eat up to their own weight in food every day. Put a minimum of 20g (2 tblsp) of casters or mealworms in each trap.

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9. When positioning the trap, make sure that the tunnel is horizontal and the nest box angled upwards to facilitate rainwater/urine runoff and minimise soaking the bedding.
10. Ensure that the traps are covered with surrounding vegetation.
11. If the traps are temporarily out of use, remember to leave the door in the 'pre-bait' position to avoid accidental capture.

Checking Traps.

1. Check traps every three to four hours.
2. Remember to handle the animal as little as possible, preferably with gloves, and to release it at the same point as it was caught.
3. If the door of the trap is closed -
 - a. Remember to work inside the large plastic box in case the animal escapes.
 - b. Lift the trap with the tunnel pointing upwards and place into the large polythene bag; keep the bag entrance closed as much as possible.
 - c. Carefully split the tunnel from the nest box
 - d. Shake out the tunnel and ensure it is empty and remove from bag.
 - e. Shake out the nest box and as soon as the animal comes out carefully remove the nest box from the bag.
 - f. Isolate the animal in one corner of the bag and identify if possible.
 - g. Remove as much of the bedding as possible.
 - h. To remove the animal isolate it with its head in the corner of the bag, slide your other hand in and grip its neck skin with your thumb and forefinger.
 - i. Remove the animal from the large plastic bag, confirm species, sex and check its condition, fleas/mites etc. Then place it into a small plastic bag and zip closed.
 - j. If the animal escapes into the large box it can be re-captured using the nest box part of the trap and placed into the small bag.

Whilst in small bag.

1. Weigh the animal.
2. Photograph if required.
3. Release the animal into the large box to study it and for further photos.
4. Carefully tip box to release the animal in the same place that it was trapped.

Removing traps.

1. As soon as you have lifted all the traps at the end of a session, completely empty them immediately and remove the bedding and bait from the site. This ensures that animals that may be hiding in the trap do not get left in the trap by accident and minimises the risk of spreading invasive species of plant.
2. After lifting the traps clean and wash with water as soon as possible before storing

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3. Always store the traps in such a way that small animals do not become trapped in them.

After each survey the observations were given to John Rae, who entered them into a standard Excel spreadsheet for evaluation.

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Summary of Observations

Cocklawburn Dunes – 10 to 12 May 2010

Site - Cocklawburn Dunes

Trap	Day 1	Day2	Day 2	Day 2	Day 3	Day 3	Aspect	Grid Ref.
	Prebait	Set	Trap Round 1	Trap Round 2	Trap Round 3	Trap Round 4		
	10/05/2010	11/05/2010	12/05/2010 07:00	12/05/2010 12:00	0	0		
NE 1	Prebait	Set	Empty	Empty			Flat, West	NU 03220 48035
NE 2	Prebait	Set	Empty	Empty			Flat, West	NU 03220 48035
NE 3	Prebait	Set	Empty	Empty			Flat, West	NU 03220 48035
NE 4	Prebait	Set	Empty	Empty			Flat, West	NU 03220 48035
NE 5	Prebait	Set	Empty	Empty			Flat, West	NU 03220 48035
NE 6	Prebait	Set	Empty	Empty			Flat, West	NU 03220 48035
NE 7	Prebait	Set	Common Shrew escaped No samples taken	Common Shrew female 12.5gm No samples taken			Flat, West	NU 03220 48035
NE 8	Prebait	Set	Wood Mouse male 25.0gm No samples taken	Empty			Flat, West	NU 03220 48035
NE 9	Prebait	Set	Common Shrew male 9.0gm No samples taken	Empty			Flat, West	NU 03220 48035
NE 10	Prebait	Set	Common Shrew male 12.0gm No samples taken	Common Shrew female 11.0gm No samples taken			Flat, West	NU 03220 48035
Weather	Showers, E force 3, cool 9C.	showers, strong W force 5, cold	Heavy showers, strong W force 5, cold.	0	0	0		

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Cheswick Dunes – 11 to 13 October 2010

Site - Cheswick Dunes

Trap Number	Day 1	Day 2	Day 2	Day 2	Day 3	Day 3	Aspect	Grid Ref.
	Prebait	Set	Trap Round 1	Trap Round 2	Trap Round 3	Trap Round 4		
	11/10/2010 14.00	12/10/10 13.00	12/10/10 17.30	12/10/10 23.30	13/10/10 07.00	13/10/10 12.00		
NE 1	Prebait	Set	None	None	None	None	Sloping south	NU 04155 47032
NE 2	Prebait	Set	None	Wood mouse male 16.5gm Faeces CheswickDunes_0013.JPG	Wood mouse male 17.0gm Hair/Faeces CheswickDunes_0006.JPG	None	Sloping south	NU 04159 47037
NE 3	Prebait	Set	None	Wood mouse male 17.0gm Faeces CheswickDunes_0015.JPG	Tripped but empty	None	Sloping south	NU 04164 47045
NE 4	Prebait	Set	Field vole male 10.0gms Hair/Faeces CheswickDunes_0003.JPG	Common shrew female 6.0 gm Faeces CheswickDunes_0017.JPG, CheswickDunes_0018.JPG	Wood mouse female 17.5gm Hair/Faeces CheswickDunes_0007.JPG, CheswickDunes_0008.JPG	None	Sloping south	NU 04171 47048
NE 5	Prebait	Set	None	Wood mouse male 17.5gm Faeces CheswickDunes_0019.JPG	Wood mouse escaped Faeces	None	Sloping south	NU 04173 47057
NE 6	Prebait	Set	None	None	Wood mouse female 15.5gm Hair/Faeces CheswickDunes_0009.JPG	None	Sloping west	NU 04182 47058
NE 7	Prebait	Set	None	Wood mouse male 15.0gm Faeces CheswickDunes_0020.JPG	Wood mouse male 20.0gm Hair/Faeces CheswickDunes_0010.JPG, CheswickDunes_0011.JPG	None	Sloping west	NU 04189 47050
NE 8	Prebait	Set	None	Wood mouse male 19.0gm Faeces CheswickDunes_0021.JPG	Wood mouse male 16.0gm Hair/Faeces CheswickDunes_0012.JPG	None	Sloping west	NU 04197 47044
NE 9	Prebait	Set	None	None	None	None	Sloping west	NU 04206 47036
NE 10	Prebait	Set	None	None	None	None	Sloping west	NU 04211 47028
NE 11	Prebait	Set	None	None	None	None	Sloping west	NU 04218 47021
NE 12	Prebait	Set	None	None	None	None	Sloping west	NU 04216 47011

Weather	Overcast, cool, no wind, dry 14C	Overcast, cool, no wind, dry 15C	Overcast, cool, no wind, dry 13C	Overcast, dry, calm, 10C	Overcast, dry, calm, 12C	Overcast, dry, NW1 wind, 10C
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Beal Point – 13 to 15 October 2010

Site - **Beal Point**

Trap Number	Day 1	Day2	Day 2	Day 2	Day 3	Day 3	Aspect	Grid Ref.
	Prebait	Set	Trap Round 1	Trap Round 2	Trap Round 3	Trap Round 4		
	13/10/2010 14.00	14/10/2010 13.00	14/10/10 17.30	14/10/10 23.30	15/10/10 07.00	15/10/10 12.00		
NE 1	Prebait	Set	none	None	Field vole male 20.0gm Hair/Faeces BealPoint_0010.jpg & BealPoint_0011.jpg	None	Flat, East	NU 08018 42934
NE 2	Prebait	Set	none	None	Field vole male 21.0gm Hair/Faeces BealPoint_0012.jpg, BealPoint_0013.jpg & BealPoint_0014.jpg	None	Flat, East	NU 08025 42947
NE 3	Prebait	Set	none	Wood mouse male 18.5gm Hair/Faeces BealPoint_0006.jpg, BealPoint_0007.jpg	Tripped, empty, stuffed solid with grass	None	Flat, East	NU 08029 42957
NE 4	Prebait	Set	none	None	None	None	Flat, East	NU 08029 42968
NE 5	Prebait	Set	none	None	Wood mouse male 17.0gm Hair/Faeces BealPoint_0016.jpg	None	Flat, East	NU 08033 42976
NE 6	Prebait	Set	none	None	Field vole male 32.0gm Hair/Faeces BealPoint_0017.jpg	None	Flat, East	NU 08036 42986
NE 7	Prebait	Set	none	None	None	None	Flat, East	NU 08040 42996
NE 8	Prebait	Set	none	Wood mouse female 15.5gm Hair/Faeces BealPoint_0009.jpg	Wood mouse male 26.0gm Hair/Faeces BealPoint_0019.jpg	None	Flat, East	NU 08043 43009
NE 9	Prebait	Set	none	None	Tripped, empty	None	Flat, East	NU 08047 43021
NE 10	Prebait	Set	none	None	None	None	Flat, East	NU 08051 43030
NE 11	Prebait	Set	none	None	None	None	Flat, East	NU 08056 43040
NE 12	Prebait	Set	none	None	None	Bank vole male 16.0gm Hair/Faeces BealPoint_0020.jpg	Flat, East	NU 08057 43050

Weather	NW2 wind, dry, 13C	cool, NW2 wind, light	Overcast, dry, NW2, 13C	Overcast, dry, calm, 10C	Overcast, light rain, NW1, 11C	Overcast, light rain, NW1, 13C

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Cocklawburn Dunes – 8-10 November 2010

Site - **Cocklawburn Dunes**

Trap Number	Day 1	Day 2	Day 2	Day 2	Day 3	Day 3	Aspect	Grid Ref.
	Prebait	Set	Trap Round 1	Trap Round 2	Trap Round 3	Trap Round 4		
	8/11/10 16:00	9/11/10 07.30	10/11/10 07.30					
NE 1	Prebait	Set	Wood mouse female 21.0gm Plucked Hair/Faeces No photo				Flat, West	NU 03220 48035
NE 2	Prebait	Set	Bank vole male 17.0gm Plucked Hair/Faeces NSMMSNov2010-0021.jpg				Flat, West	NU 03220 48035
NE 3	Prebait	Set	Bank vole male 15.0gm Plucked Hair/Faeces NSMMSNov2010-0023.jpg				Flat, West	NU 03220 48035
NE 4	Prebait	Set	Bank vole male 15.0gm Plucked Hair/Faeces NSMMSNov2010-0024.jpg & NSMMSNov2010-0025.jpg				Flat, West	NU 03220 48035
NE 5	Prebait	Set	Wood mouse male 18.0gm Plucked Hair/Faeces NSMMSNov2010-0026.jpg & NSMMSNov2010-0027.jpg				Flat, West	NU 03220 48035
NE 6	Prebait	Set	Wood mouse male 18.0gm Plucked Hair/Faeces NSMMSNov2010-0029.jpg				Flat, West	NU 03220 48035
NE 7	Prebait	Set	Wood mouse male 18.0gm Plucked Hair/Faeces No photo				Flat, West	NU 03220 48035
NE 8	Prebait	Set	Packed with leaves, NSMMSNov2010-0030.jpg				Flat, West	NU 03220 48035
NE 9	Prebait	Set	Wood mouse, escaped				Flat, West	NU 03220 48035
NE 10	Prebait	Set	Wood mouse male 18.0gm Plucked Hair/Faeces NSMMSNov2010-0031.jpg				Flat, West	NU 03220 48035
Weather	Showers, E force 3, cool 9C.	showers, strong W force 5, cold						

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Conclusion

The data from these surveys have been sent to Natural England, Northumbria Mammal Society and the ERIC Project. Very few surveys on small mammals have been undertaken in north Northumberland so there is a shortage of records.

Summary of captures assuming no re-captures

<u>Species</u>	<u>Cocklawburn Dunes</u> May	<u>Cheswick Dunes</u> October	<u>Beal Point</u> October	<u>Cocklawburn Dunes</u> November
Bank Vole	-	-	1	3
Field Vole	-	1	3	-
Common Shrew	5	1	-	-
Pygmy Shrew	-	-	-	-
Water Shrew	-	-	-	-
Wood Mouse	1	11	4	6

The May results from Cocklawburn Dunes may indicate that the small mammal population had been hard hit by the very bad winter of 2009/2010. In September 2009 our survey there had resulted in 13 Bank voles, 1 Field vole, 3 Common shrews and 4 Wood mice.

Even the survey this November suggests that the population has not recovered to the population density of 2009. This could be partially due to the cool, dry summer (see Appendix 1) reducing the supply of invertebrates in the dunes.

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References

Gurnell & Flowerdew. *Live Trapping Small Mammals – A Practical Guide* by (Mammal Society)

Corbet & Harris. *Handbook of British Mammals*.

Kevin O'Hara for the Northumbria Mammal Group. *Water shrew survey booklet*

Northumbria Mammal Group
Website – <http://www.nwt.org.uk>

The Mammal Society
website - <http://www.mammal.org.uk>

Wikipedia – mammals
website - http://en.wikipedia.org/wiki/List_of_British_mammals

Identify British Rodent Skulls
website - <http://www.skullsite.co.uk/Skullkeys/Rodentkey.htm>

Further information may be obtained from the Mammal Society.

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Appendix 1

Monthly Weather Reports through the Summer 2010

April was been drier than usual, but lacked mild spring-like days. On the occasion of clear sunny weather it always seemed to be tempered by a cold wind from the north or the east. A cold clear night on the 2nd was the last white frost of the month with -2.2°C., (28.0° F), further slight frosts coming on three nights mid-month. Milder air swept in on the 24th. Total rainfall for the month was 23mm (0.9 inches), a dry month like April 2009. The warmest day was the 28th, with 19.0°C (66.2°F).

May was a rather cold month. It seemed the cold wind from a northerly quarter would never cease, so when a warm Atlantic sou-westerly came on the 19th bringing us a few days of high temperatures (22°C (71.6°F) on the 23rd), we thought summer had arrived. Not so. A return to the wind from the north-east brought cold temperatures and a late frost in some areas on the 26th. Rainfall was scarce with most coming overnight on the 6th, 14th, and the 30th, the total for the month being 39.5mm (1.6 ins). In addition to the slight frost on the 26th, there was frost on three night at the beginning of the month, with the coldest night on the 3rd when it fell to 1.1°C (34.0°F). By the end of the month the temperatures had crept back up to something like normal.

June was generally a pleasant and warm month. It started with several days of early sea-mists with the wind coming from the east. A change came with two nights of light rain on 7th/8th. From mid-month high pressure prevailed, bringing bright and sunny days with balmy sea breezes and rising temperatures, the peak being on the 27th with 26°C (79°F). It proved to be the driest June for at least 10 years with a total of only 12mm (0.5ins), and nationally it was the driest first six months of a year for 80 years

Although July was a warm month, it was short on bright sunny days with soaring temperatures. The warmest day was the 1st and 27°C (80.6°F) was recorded, but it was muggy and overcast with some drizzle. This was the basic pattern for the rest of the month, with only three fully sunny days. Winds were persistent but generally light from a SW quarter, but a passing cold front on the 4th brought strong SW winds up to gale force. A cold night was recorded on the 23rd; with clearing skies and a cool NE wind the temperature fell to a minimum of 7°C (44.6°F). Rainfall, like the previous month, was below average with a monthly total of 65mm (2.6ins).

The weather for August was a little disappointing, as there were few long, hot, sunny days; mostly grey, quiet days interspersed with sunny spells and showers. Often the cloud cover kept it warm at night. A high of 15.6°C (60°F) on 20th and a cooler night brought sea-mist in at dawn. Night time temperatures fell at the end of the month to single figures, bringing the thoughts of the coming Autumn. Rainfall, like the previous 4 months, was below average with only two nights of steady rain, the total for the month being 56mm (2.2 ins).

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September seemed to blow 'hot and cold' throughout, with average temperatures and rainfall. Heavy rain and a strong north-east wind on the 7th was the only stormy day early in the month. An overnight temperature of 14.5°C (58°F) on the 11th was warm for the time of year. A cold night on the 17th did not reach freezing point, so no frosts were recorded. A mild mid-month with light winds changed quickly on the 23rd to a cold northerly and heavy showers, and gale-force winds on the 24th. Total rainfall for the month was 48mm (1.9ins).

October's weather patterns were varied. Damp and mild at the start, mid-month it was colder with winds turning to a northerly quarter and cold nights. Towards the end of the month the wind was back in a sou-westerly direction with typical October Atlantic weather fronts coming in overnight bringing rain, with sunshine during daylight hours and a rise in temperature. The wettest night was the 23rd with 20mm (0.8ins), and total rainfall for the month was 71mm (2.8 ins). The warmest day was the 5th with 17°C (62°F) and the coldest night the 25th at 0°C (32°F). Frost was recorded on two nights, the 20th and the 25th.

November was month of turbulent contrasts. This November has been the wettest month since July 2009, with winds mainly from the north-west and the east. A seasonal westerly gale came on the 7th with heavy overnight rain (12.5 mm, 0.5 ins). By the 17th a strong south-east wind brought more rain overnight with heavy showers each day until the 24th, when the temperature started to drop.

With an overnight fall of 2 inches of snow on the 26th, followed by another 5 inches on the 27th and a further 2 inches on 28th. Add to this constant snow showers through each day giving a level cover of 12-14 inches (320 – 360 mm) on the ground. The coldest night was the 26th with - 4°C (24.8°F). Rainfall for the month was 128.5 mm (5.1 ins).

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Appendix 2

Observed species details and status in the Mammal Society database.

Mammal Society – <http://www.mammal.org.uk>

Common Shrew -

http://88.208.205.92/index.php?option=com_content&view=article&id=214&Itemid=247

Pygmy Shrew -

http://88.208.205.92/index.php?option=com_content&view=article&id=215&Itemid=248

Water Shrew -

http://88.208.205.92/index.php?option=com_content&view=article&id=216&Itemid=249

Wood Mouse –

http://88.208.205.92/index.php?option=com_content&view=article&id=219&Itemid=252

Harvest Mouse –

http://88.208.205.92/index.php?option=com_content&view=article&id=221&Itemid=254

Yellow-necked Mouse -

http://88.208.205.92/index.php?option=com_content&view=article&id=220&Itemid=253

Field Vole –

http://88.208.205.92/index.php?option=com_content&view=article&id=222&Itemid=255

Bank Vole -

http://88.208.205.92/index.php?option=com_content&view=article&id=318&Itemid=353