

Red Squirrels in Poole Harbour

Dorset Wildlife Trust and Bournemouth University

Geographical area of conservation work

Poole Harbour, Dorset, UK.

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Key partners

National Trust
Dorset Wildlife Trust
Bournemouth University
(and previously NERC and CEH)

Resources

Typical Resource available	Number of people
Paid Contractors (1-6 months)	Monitoring Furzey 1 (< 1 week typically per year)
Paid Contractors (7-12 months)	N/A
Volunteers involved with Grey Squirrel Control	0
Active Volunteers	None on Furzey
Other info	A number of student projects have been carried out on Brownsea squirrels. Approx. 110 hectares of Rhododendron were eradicated over 50 years with squirrel conservation one of several targets of the management on Brownsea.

Introduction

Thought to be the largest natural harbour in Europe, Poole Harbour consists of extensive shallow water, intertidal saltmarsh and fringing reedbed habitats. The northern shoreline consists of almost continual urban development from the town of Poole round to the Harbour entrance at Sandbanks with a high grey squirrel population. The southern shoreline is mostly undeveloped with extensive heathland and pine woodland.

Poole Harbour retains a remnant population of red squirrel confined to Brownsea and Furzey Islands with animals occasionally making movements beyond these. Brownsea Island, the largest of the five main Islands in the Harbour is approximately 250 hectares in extent and the population, believed to average around 200 individuals, is considered native.

Poole Harbour is designated a Site of Special Scientific Interest (SSSI) a Special Protected Area (SPA) and a Ramsar site. The heathlands surrounding the harbour have been designated a Special Area of Conservation (SAC). Some areas of the harbour have also been declared local and national nature reserves. Much of the Harbour is also within Purbeck Heritage Coast and part of an Area of Outstanding Natural Beauty (AONB).

No formal project exists for red squirrels in Poole Harbour but considerable *ad hoc* work has been undertaken to ensure stability and continuity of the population over the last 50 years. This reflects the significance of the population in southern Britain and also the cultural value placed locally on their presence.

Project aims

- To maintain a viable population of red squirrels on Brownsea and Furzey islands.
- To protect the population from any incursion from grey squirrels and to protect it from Squirrelpox virus and any other diseases.
- To maximize public access to, and understanding of, red squirrels and issues affecting them.

Description of the project

Brownsea Island

In 1962 the National Trust acquired Brownsea Island, the largest of five main islands in Poole Harbour, Dorset. The Island retained a population of red squirrels when they were becoming extremely uncommon in the rest of the county. Following several decades of benign neglect by the previous owner, the woodlands on the Island contained a dominant understory of *Rhododendron ponticum*. In addition, a fire in 1934 burnt over 50% of the island, leaving an even aged woodland structure.

National Trust leased the northern portion (100 hectares) of the Island to Dorset Wildlife Trust (DWT) and the two organisations concentrated on *Rhododendron* clearance and woodland regeneration. Scots (*Pinus sylvestris*) and maritime pine (*P. pinaster*) dominate, but there are also areas of mixed broadleaves. The removal of *Rhododendron* on Brownsea is almost complete. On the DWT managed land, the clearance was completed in 2010, after 48 years, and is estimated to have recovered 56 football pitches of habitat and deployed approximately 40,000 volunteer days.

The difficulties of establishing woodland structure are compounded by the presence of a large, and highly mobile, population of introduced Sika deer (*Cervus nippon*). Efforts to control the deer population have borne little fruit so far, and on Brownsea, deer and rabbit-proof fencing has been deployed to encourage woodland re-growth.



Figure 1. Using modified mink traps to monitor squirrels on Brownsea Island by mark-release-recapture. The wooden box provides shelter for the animal until it is extracted

In 2010, NT and DWT entered into a 10-year Higher Level Stewardship (HLS) agreement with Natural England. This is primarily aimed at heathland restoration to 1950's levels, effectively doubling the open area of heath with a substantial reduction in woodland on those parts of the Island. There is a strong emphasis on management of the retained woodland to provide continued viable habitat for the red squirrels. A student project showed maritime pine cones to be the optimal prey type on the island due to a significantly higher net energetic gain per unit time (Gregory 2007).

In the early 1990s, a mark-recapture survey by the Institute of Terrestrial Ecology estimated between 100 to 150 squirrels on the island. Surveys of the red squirrel population since have been undertaken on a relatively informal basis (including distance sampling and drey counts by students). These indicate a population averaging 200 animals but with extensive fluctuations. Periodically, an as yet indeterminate disease infects a proportion (estimated as up to 20%) of animals. This manifests itself with swelling around the face, especially the ears, and sometimes affects limbs and genitals. A number of corpses have been collected over the years but results are inconclusive (Animal Plant Health Agency, Penrith) Observations of recognisable individuals suggests that the animals can survive for many months with the condition.

Furzey Island

The 13 hectare island lies approximately 400m from Brownsea and includes six hectares of mixed woodland with some areas dominated by *Pinus sylvestris*. The island has been used for oil extraction since the 1980s and the operators (BP, subsequently Perenco) have sponsored regular population monitoring of the squirrels by ITE, CEH and Bournemouth University. The squirrels on Furzey were introduced from Cannock chase, Staffordshire in 1977 (Kenward 1989). They have been monitored with annual mark re-capture estimates from 1989 to 2009 giving a median of 34 squirrels on the island, including juveniles. Single day trapping assessments (2010 to 2014) suggested that numbers caught were within this normal range (based on first-day catch records). This relatively high density of red squirrels may benefit from feed provided to the resident golden pheasants although many of the pine trees also provide a substantial seed crop, and radio-tracking suggested that the pheasant feeding stations were not centres of squirrel activity (Kenward et al. 1995). Fortunately, the disease signs noticed on Brownsea have not been recorded in the Furzey squirrels.

Grey Squirrels

To date, there has only been a single authenticated record of a grey squirrel on Brownsea (1976) but a grey squirrel contingency plan, based on one for the Isle of Wight has been produced. The plan was agreed by the island stakeholders:

National Trust, Dorset Wildlife Trust, John Lewis Partnership (Brownsea), Perenco (Furzey) and owners and managers of Green and Round Islands. Green Island is comparatively small and has a transient population of a few red squirrels but is identified as a potential refuge in the plan.

Success indicators of project

- Maintaining the Brownsea and Furzey island populations free from grey squirrels.
- Maintain the Brownsea and Furzey Island populations free from Squirrelpox virus.

Major difficulties faced

- The pre-requisite to better woodland management, *Rhododendron* removal, proved an attritional project that took nearly five decades to achieve on Brownsea.
- On Furzey, the requirement to maintain a visual screen for oil well pumping sites means that dense understory is required in areas. Some trees have also been cleared on the island, under the management plan, to create open areas for heathland restoration. Consequently, there is a lack of regenerating pine - which threatens the long-term persistence of the red squirrel population.

Major lessons learned

- Partnership working has proven very successful, drawing on considerable goodwill, and a high value placed on red squirrels locally.
- Brownsea Island has a natural carrying capacity, surveys since the 1990's suggest a population consistently around 200 individuals.
- Long-term management projects (i.e. *Rhododendron* eradication) are achievable with determination, especially in an Island context.
- Given the importance of these island populations, it will be essential to maintain adequate woodland habitat. Further discussion with relevant agencies will be required to ensure that conservation priorities for woodland and open habitats do not conflict to the detriment of the red squirrels on the islands.

Success of project

Success or Failure	
Highly Successful	
Successful	
Partially Successful	X
Failure	

Reason(s) for success/failure of the project

- The red squirrel population in Poole Harbour remains healthy and viable.
- Measures are in place to deal with the threat of grey squirrels through support of a network of partners.
- There is still no adequate understanding of the pox type disease that periodically afflicts a percentage of the Brownsea red squirrels.
- There is inadequate pine regeneration on Furzey Island.

Future project development

- It is planned to continue the grey squirrel contingency plan within the Harbour, through the Harbour Islands Safety Group, and to continue to use Brownsea to maximise public interest in red squirrels.
- Poole Harbour may prove to be a fertile study ground for further academic research.
- We hope to resume Furzey Island population monitoring with trapping and health checks every five years. We also hope to work with the leaseholders and agencies to ensure management for pine regeneration occurs.
- Hair samples from squirrels on Furzey and Brownsea have been taken to extract mtDNA in order to investigate the ancestry of the squirrels and the genetic diversity within the two populations. This work is ongoing and is being carried out by staff at Bournemouth University (Dr Wei-Jun Liang and colleagues).

References

- I. Gregory A (2007) Interspecific and intraspecific selection of Scots Pine cones (*Pinus sylvestris*) and maritime pine cones (*Pinus pinaster*) by red squirrels on Brownsea Island with reference to optimal foraging theory. Unpublished MSc Applied Ecology and Conservation thesis, University of East Anglia.
- II. Kenward RE (1989) Monitoring of Wytch Farm Oilfield: The red squirrel population on Furzey Island in 1988. Unpublished report.
- III. Kenward RE, Hodder KH, Rose RJ (1995) Conservation of red squirrels: second annual report. For WWF (UK) Ltd and the Rutland Group of Companies. Institute of Terrestrial Ecology, Furzebrook, Dorset, UK.