Cyfoeth Naturiol Cymru
Natural Resources Wales

Sand Lizard and Natterjack Toad Recovery Project 2011-2014

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Amphibian and Reptile Conservation Trust

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We work to support Wales' economy by enabling the sustainable use of natural resources to support jobs and enterprise. We help businesses and developers to understand and consider environmental limits when they make important decisions.

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Dim ond 168 o stribedi grifft a gofnodwyd yng Nghymru yn 2011, er bod 2012 wedi bod yn flwyddyn arbennig o dda â 454 o stribedi grifft wedi cael eu cyfri (tua un a hanner gwaith yn fwy nag yn 2008) (Tabl 1). Gellir priodoli'r cyfri grifft cymharol isel yn 2011 i'r tywydd sych a fyrhaodd y tymor magu. Er iddi ddechrau'n sych, trodd 2012 yn wlyb iawn a chafodd llyffantod y twyni dymor magu hir a llwyddiannus.

Y cyfanswm a gofnodwyd yn 2012 oedd yr uchaf erioed, ac mae'n adlewyrchu'r cynnydd yn y boblogaeth, y tywydd da a chynnydd yn nifer y pyllau dŵr yn Nhalacre ar ôl cael cyllid gan y Prosiect Miliwn o Byllau. Gellir priodoli'r cyfri cymharol isel o 131 o stribedi grifft yn 2013 yn rhannol i'r tywydd, y dechreuad oer a fyrhaodd y tymor magu, a'r posibilrwydd nad oedd y benywod mewn cyflwr da iawn i fagu. Mae'r boblogaeth a'r cynefinoedd magu yn debygol o fod ar eu lefel uchaf ers dechrau'r prosiect ailgyflwyno yn 1995.

Tab1. Cyfri stribedi grifft llyffantod y twyni

2013	2012	2011	2010	2009	2008	
85	290	50	79	81	118	Cwningar Talacre (BHP Billiton)
23	71	11	19	25*	81	Presthaven Sands (Bourne Leisure)
23	93	107	58	48	66	Gronant (Cyngor Sir Ddinbych)
131	**454**	**168**	**156**	**154**	**265**	Cyfanswm Blynyddol

* collwyd rhywfaint o'r data cofnodi

Mae cynnydd yn dal i gael ei wneud â'r gwaith o adfer cynefin y twyni ym mhob rhan o'r SoDdGA (tir BHP Billiton a Presthaven Sands ar Gwningar Talacre a thir Cyngor Sir Ddinbych yng Ngronant) ac mae gwaith rheoli blynyddol yn cynnal a chadw pyllau bas ar gyfer magu a'r ardaloedd o'u hamgylch.

Roedd madfall y tywod (*Lacerta agilis*) i'w weld ar un adeg yn systemau twyni gogledd a gorllewin Cymru. Collwyd y poblogaethau hyn y gwyddid amdanynt o ganlyniad i erydu, datblygu a phwysau cyhoeddus cynyddol. Mae Cyfoeth Naturiol Cymru (Cyngor Cefn Gwlad Cymru gynt) wedi dal i ddarparu cyllid er mwyn canfod statws y rhywogaeth drwy fonitro safleoedd, ac mae wedi darparu cyllid ar gyfer

rhaglenni magu mewn caethiwed a thrawsleoli, er mwyn adfer hen gynefin y rhywogaeth.

Mae'r cyfleusterau magu madfallod y tywod mewn caethiwed yn Sŵ Caer, Penrith, Blackpool a Sheffield yn cael eu cynnal mewn partneriaeth â Rhaglen Magu mewn Caethiwed a Thrawsleoli ARC/CNC/NE.

Mae rhaglen drawsleoli newydd wedi'i dechrau ar safle BHP Billiton, Talacre lle cafodd 65 o fadfallod ifanc a oedd wedi cael eu magu mewn caethiwed eu rhyddhau yn gynnar ym mis Medi. Cyfunwyd hyn â hyfforddiant i staff a gwirfoddolwyr lleol a rhoddwyd cyhoeddusrwydd llwyddiannus i'r digwyddiad gan bob un o'r partneriaid.

Parhaodd y gwaith monitro ym mhob un o'r safleoedd trawsleoli, er bod y tywydd gwael yng ngwanwyn 2013 wedi cyfyngu rhywfaint arno. Cafwyd canlyniadau cadarnhaol ar gyfer oedolion a rhai ifanc ym mhob un o'r safleoedd trawsleoli sydd wedi'u sefydlu.

Mae'r rhan fwyaf o ddata monitro madfallod y tywod 2013 wedi cael ei gofnodi yng nghronfeydd data ARC a Chofnod, ond nid ydym wedi derbyn y cofnodion i gyd eto. Mae'r gwaith o ddosbarthu'r canlyniadau hyn i bob grŵp perthnasol yn mynd rhagddo.

Mae'r adroddiad sy'n coladu gwybodaeth am bosibiliadau ar gyfer rhagor o weithgareddau trawsleoli madfallod y tywod yn dal yn seiliedig ar gasgliadau Adroddiad Contract Gwyddonol CCGC Rhif 788 (HCT, 2007). Roedd y dewisiadau "blaenoriaeth" byrdymor yn cynnwys Gwarchodfa Natur Genedlaethol Cwningar Niwbwrch a SoDdGA Aberffraw.

2. Executive Summary

Natterjack toad breeding activity was recorded in all three sections of Gronant Dunes and Talacre Warren SSSI in 2013. The breeding pools were monitored and the data presented to the annual recorders meetings. A project to establish natterjacks at the Old Colliery site was started in 2009, but the initial translocation was unsuccessful. In 2010, Environment Agency Wales created about 30 pools at the site and further modified them for natterjacks in 2012. Their hydro-periodism was observed during 2013 and the translocation programme will start afresh in 2014.

A total of only 168 spawn strings was recorded in Wales in 2011, whereas 2012 was a record year with 454 spawn strings (about one and a half times more than in 2008) counted (Table 1). The relatively low spawn count in 2011 can be attributable to the dry weather that shortened the breeding season. In stark contrast to a dry start, 2012 became very wet and the natterjacks had a long and successful breeding season. The total recorded in 2012 was the highest ever, a reflection of the strengthening population, good weather conditions and an increase in the number of pools at Talacre through the Million Ponds Project funding. The relatively low spawn count of 131 strings in 2013 can be attributed in part to the weather, a cold start that shortened the breeding season, and the possibility that females were in poor breeding condition. The population and breeding range is likely to be at its highest level since the re-introduction project began in 1995.

Table 1. Natterjack toad spawn string counts

2013	2012	2011	2010	2009	2008	Site name
85	290	50	79	81	118	Talacre Warren (BHP Billiton)
23	71	11	19	25*	81	Presthaven Sands (Bourne Leisure)
23	93	107	58	48	66	Gronant (Denbighshire County Council)
131	**454**	**168**	**156**	**154**	**265**	Annual Total

* some recording data lost

On all sections of the SSSI (BHP Billiton and Presthaven Sands land holdings at Talacre Warren and DCC land at Gronant) progress continues to be made in restoring the dune habitat and management on an annual basis maintains breeding scrapes and their surrounds.

The sand lizard (*Lacerta agilis*) was formerly known from dune systems in north and west Wales. These known populations were lost due to erosion, development and increased public pressure. Natural Resources Wales (formerly CCW) has continued to provide funds to ascertain the status of the species via site monitoring and provided funding for captive breeding and translocation programmes, to restore the species former range.

The sand lizard captive breeding facilities at Chester Zoo, Penrith, Blackpool and Sheffield have been maintained in partnership with the ARC/NRW/NE Captive Breeding and Translocation Programme.

A new translocation has been initiated at BHP Billiton, Talacre where 65 captive bred juveniles were released in early September. This was combined with training staff and local volunteers and was successfully publicised by all partners.

Monitoring at all of the translocation sites continued though was constrained by poor spring weather in 2013. Positive results of both adults and juveniles have been obtained at all established translocation sites.

The majority of the 2013 sand lizard monitoring data has been entered into the ARC and Cofnod databases, though we have not yet received all of the records. Dissemination of these results to all relevant groups is ongoing though needs to be improved.

The report collating information on further potential sand lizard translocations remains based on HCT, 2007. Short term “priority” options included both Newborough Warren NNR and Aberffraw SSSI.

3. General Items of Work: Natterjack Toad

3.1. Training and advice for monitoring and habitat management at north Wales sites 2011-2013

Liaison and co-ordination for the whole project is delivered via the North Wales and Dee Estuary Steering Group which promulgates good practice and acts as a forum for the provision of advice. Training events for monitoring volunteers were held every April at BHPB's Field Study Centre, Talacre. Two additional training events were provided for Bangor University students and staff and West Wales ARC and Reaseheath College in 2013.

The North Wales and Dee Estuary Natterjack Strategy Group meetings are held in January every year to plan the seasons training and monitoring programme, discuss habitat management requirements and organise spawn translocation. Minutes are circulated widely and reports from north Wales are given at the UK Natterjack Toad meetings twice per year.

Advice has been provided on natterjack toad requirements to the CCW/NRW sand dune rejuvenation project. The Old Colliery site at Talacre was chosen in 2009 as a new translocation site and 30 ponds were created by Environment Agency Wales in 2010. Hydrological difficulties prevented successful metamorphosis, but habitat modification undertaken in 2012 was assessed in 2013 and translocation will take place during 2014.

3.2. Biodiversity Action 2011-2013

Species Action Plans for all native reptile and amphibian species can be found on the Amphibian and Reptile Conservation Trust (ARC) Web site. These are UK level plans that suggest appropriate actions at all levels from UK to LBAP. These are being fully utilised to produce country level plans for Wales. The natterjack SAP has targets based on a conservation status approach, where population size is measured by the number of breeding females, and range by the number of occupied vice counties and 10km squares. Denbighshire and Flintshire County Councils are in the process of producing a joint LBAP that compliments the Wales and Regional plans. Elements of the natterjack plan are also now contained in Denbighshire's Coastal Ecosystems Action Plan which is on BARS2.

With the current re-examination of the determination of Favourable Conservation Status for European Protected Species, John Buckley and Trevor Beebee authored *Natterjack toads – Achieving Favourable Conservation Status (FCS)* (2012). As a result, ARC will further develop the plan through a 6 month project, which begins in February 2014. It is hoped that it will describe the current and define the 'favourable' status of natterjack toad across its UK range with a clear rationale for conservation actions in a spatial context. The outputs will include monitoring, surveillance and data communication needs and establish appropriate monitoring protocols, data exchange and information systems, all products to aid conservation of the species.

Current status, FCS under 'present day scenarios' and developing approaches to conservation planning and prioritisation will be determined by

- defining favourable conservation status and rationale (using a generic cross-taxa approach?) and determining appropriate metrics (FVAs) for status assessment and for conservation applications
- GIS mapping of distribution and status mapping: linking data to maps and site assessments to identifying / communicating conservation needs and actions
- establishing monitoring protocols and data exchange, management and analysis systems

Subsequent phases could look at: (i) possible future scenarios relating to environmental change in the coastal fringe and (ii) historic status, mapping possible distributions in different historic land uses and climate regimes

The aim of the Deeside Natterjack Species Plan is to restore the natterjack toad to sites within its historical range along the coast of North Wales and the Dee Estuary. Details of the known historical sites for this area are given in HCT 2001. No further records have come to light since that report was written. The habitat restoration and management work begun in 2005 continues; the cumulative effect of the habitat management work (scrub and tree removal) will enable the already large population to develop on Gronant Dunes and Talacre Warren SSSI.

Further consideration of other translocation sites in this area have been made:

- Plans for Flood Risk Management works on the lower reaches of the Afon Clwyd will result in at least one river wall being set back at some time in the next 20 years. This will create upper saltmarsh habitat and a series of borrow pits which should result in some suitable for natterjack toads.

- At Horton's Nose, Rhyl there is still delay and plans for a bridge and a marina reduce the habitat area available for a reintroduction.

- The Bagillt Colliery site north of Fflint has been allocated for a recreation area, but this will be checked with Flintshire Rangers.

- Other sites that will be visited include Sealand Ranges, Burton Point and the upper saltmarsh on the Dee Channel owned by NRW. The Sealand Ranges are currently undergrazed as the sheep farmers are reluctant to turn out stock due to the high incidence of liver fluke. Similarly, the adjacent RSPB land (upper saltmarsh) is much less well grazed than formerly. The area is currently therefore unsuitable for natterjacks

- The Flintshire County Council site at Bettisfield is steadily being improved for a possible natterjack translocation. There is a single ephemeral pool and the potential for two further pools that would need liners. The smaller fenced off area will have further sand added to provide a good substrate for burrows.

3.3 Chytrid

Chytrid has been known from natterjacks in north Wales since 2004. No mass mortality events have been recorded and no amphibian declines have been linked to chytrid there. Natterjack populations have not suffered ill effects from chytrid. Poor habitat is more likely to be behind any local declines. Pete Minting undertook a PhD study into the effect of chytrid on natterjacks in the wild in Cumbria over four years (Minting, 2012). He found that individual natterjacks with a high chytrid score had a 15-20% lower chance of being recaptured (surviving) than individuals with a low score, but this might not be due to chytrid. It could be that the high scores were due to those individuals spending more time in water and thus being more open to predation for example.

4. General Items of Work: Sand lizard

The sand lizard (*Lacerta agilis*) was historically known to have inhabited sand dune systems in north and west Wales. In north Wales there have been persistent records of the species in two non-dune areas of the Lleyn Peninsula, and along the sandy coasts from Conway to Flint. In west Wales the species has been found at Aberdyfi and Llwyngwril and there have been unconfirmed records at Ynyslas NNR. However, it is likely that all of these populations have been lost, most probably due to development, erosion and increased public pressure.

Re-introduced populations of the species have been established at two localities at Morfa Harlech and on Talacre, Gronant, Tywyn and Ynyslas. Monitoring has confirmed that these re-introductions have been successful. Future translocation sites within the species known and presumed historic range are currently being assessed.

The sand lizard recovery plan is delivered in Wales through a project with the Amphibian and Reptile Conservation Trust (ARC). This includes

- Maintenance of captive breeding facilities for sand lizard re-introductions.
- Re-introduction of sand lizards to BHP Billiton, Talacre and provision of training for both monitoring and management.
- Monitoring sand lizard populations at 5 re-introduction sites.
- Sand lizard monitoring data uploaded to Rare Species Database.
- Collation of information on potential further sand lizard re-introduction sites, focussing on north-west Wales.

4.1. Captive breeding

Natural Resources Wales, Natural England, JNCC, IUCN, Amphibian & Reptile Conservation, British Herpetological Society, Zoo Federation, Institute of Zoology and independent herpetologists involved with the captive breeding programme, have agreed protocols for best practice concerning captive breeding and translocations. The protocols include animal husbandry techniques, maintenance of genetic integrity and diversity and health screening for pathogens. Re-introductions follow the IUCN/JNCC guidelines for translocations (JNCC, 2003 and IUCN, 2013).

The Merseyside ‘race’ vivaria at Penrith and Blackpool remained viable and have produced juveniles for the re-introductions. However, from post hibernation analysis it was discovered that further animals (especially females) would be required for both Chester Zoo and Sheffield, to ensure that sufficient juveniles (c.50) were available for the BHP Billiton release. Although licencing was in place to obtain c. 6 female animals from the Sefton Coast dunes, the continuous poor spring weather nullified attempts to catch and retain these animals. Further attempts will be made in 2014, but despite this, the four vivaria produced 65 juveniles for the re-introduction.

Liaison with Welsh Mountain Zoo is ongoing to assess if they would like to be involved with the captive breeding education programme.

All “private” captive breeding establishments now have a protocol for health screening with the Institute of Zoology, London. Additionally, genetic sampling of all animals from the 4 vivaria is planned for 2014 to determine whether more animals are needed to maximise genetic variability.

4.2. Re-introduction at BHP Billiton, Talacre

The most important component of the sand lizard Species Action Plan in Wales is the re-introduction of the species to favourable habitats within its former range.

In general, three annual releases of c.50 juveniles are undertaken to establish a viable population. These animals are (where possible) health screened prior to release to check for pathogens. Captive-bred juveniles of the Merseyside ‘race’ from four breeding colonies (see above) are used for Welsh sites.

Based on the known and presumed historic range, negative on-site species surveys, present suitable habitat and land-management practices, the historic former species sites of Harlech, Tywyn and Gronant have been used as translocation sites (Corbett, 1994 and HCT, 2007). After meetings and discussions with NRW staff and land-managers, translocations have also been completed at Ynyslas.

During 2012-13 a re-introduction proposal was submitted to NRW, BHP Billiton and both the Flintshire and Denbighshire Rangers to assess its feasibility within current management regimes. All partners agreed to the proposal and some additional absence monitoring was stipulated for 2012-13. The required 10 visits were achieved with continued negative results showing species absence.

With NRW and BHP Billiton, consent the re-introduction was commenced in early September 2013. This was preceded by a monitoring and management training event which was well attended by BHP, NRW, Flintshire and Denbighshire wardens and local volunteers. In total, 65 captive bred sand lizards were released. Media promotion was prearranged by ARC, NRW, Chester Zoo and BHP staff. This ensured that good media coverage was attained, including ITV Wales and on-line news, which successfully highlighted the partners work, linking the essential work of local staff and volunteer networks.

A further release was planned for September 2014.

4.3. Monitoring sand lizard populations at re-introduction sites

Visual searches for the species, concentrating on suitable habitats in suitable weather conditions, were undertaken by trained volunteers (many from the volunteer ARG’s), site staff from Denbighshire and Flintshire wardens, NRW and Snowdonia National Park, and ARC personnel.

At Talacre and Gronant these surveys were undertaken by the Denbighshire and Flintshire Rangers, North East Wales Wildlife (NEWW) & ARGUK volunteers with some input from Merseyside ARG volunteers. Online recording and data dissemination is via the Local Record Centre for north Wales, Cofnod.

Monitoring at Harlech, Tywyn and Ynyslas was mainly undertaken by Maria Wagland with additional input from NRW and Snowdonia National Park site staff and volunteers. Stuart Graham, undertaking a PhD on sand lizard and common lizard resource competition, has been able to extend his work and now covers these 3 sites which will allow additional monitoring coverage.

During 2013, 13 targetted surveys were undertaken at Gronant and 18 surveys at Talacre (Presthaven). Sand lizards were found on both sites; 2 on Gronant (1 female and one juvenile) and 14 on Talacre (10 adults/sub-adults and 4 juveniles).

Although we have not obtained the final reports for 2014, we can confirm that adult sand lizards have been located at Harlech, Tywyn and Ynyslas. More animals were found at both Harlech and Tywyn (than at Ynyslas) as these sites are now well established.

Habitat assessments were also undertaken at all translocation sites to assess the impact of storm damage in January 2014, on both lizard populations and habitat. It is apparent that significant frontal erosion (the species' primary niche habitat) has occurred. This has been most significant at Tywyn where the range of erosion of 4-8m has partially impacted the initial release area. The re-introduction areas at Ynyslas, Harlech, Talacre and Gronant have not as yet been directly affected.

4.4. Sand lizard monitoring data

The majority of the positive sand lizard records for 2013 have been received and have been updated on the Rare Reptile Database. These have been obtained from Flintshire and Denbighshire staff and volunteers, Cofnod, NMARG, David Cowley, Maria Wagland, Chris Davis and Mick Brummage.

Habitat maps of all of the known historic sites for the species and other potential sites have previously been compiled as part of the Rare Species Database Project and compiled in: The Conservation Status of the Natterjack Toad *Bufo calamita* and Sand lizard *Lacerta agilis* in Wales. (CCW Contract Science Report No: 788).

4.5. Assessment of potential further sand lizard re-introduction sites in north-west Wales

Habitat suitability mapping for all potential sand lizard translocation was completed during 2007 (HCT, 2007) and predictive modelling and mapping was undertaken during 2011 (ARC, 2011).

The reports highlighted that the two most suitable sites in the short-term that met the majority of the re-introduction assessment key factors, were Aberffraw SSSI and Newborough Warren NNR, Anglesey.

Habitat assessments and species absence monitoring at these sites has been undertaken by a local surveyor (David Cowley) since 2011 to assess re-introduction potential. However, in 2012, 14 sand lizards were found at Aberffraw. With land-owner and NRW consent 7 animals were genetically sampled (buccal swabs) to assess if they were a relict native population or from an illegal re-introduction. The

animals were subsequently found to be mainly of Merseyside ‘race’ origin, however, they also showed some Dorset ‘race’ genetic material. Six animals were also found during surveys in 2013.

In 2013, 11 sand lizards were found at Newborough Warren. It is hoped that future genetic testing, via buccal swabbing, could be undertaken to assess their origins. One dead animal that was found on the site has been sent to the Institute of Zoology for pathogen testing (report pending). As a result of these unauthorised releases, these two remaining “high priority” candidate sites cannot now be considered for legitimate re-introductions.

5. Discussion & Recommendations

5.1. Captive breeding

Although the 4 vivaria dedicated to Merseyside “race” animals, the most appropriate stock for re-introductions in Wales, were maintained, we did face some difficulties, not least financial. Natural England cannot now fund any sand lizard SRP work so the majority of maintenance costs at the 3 private vivaria were met by ARC. NRW funding contributed to supporting vivaria and we were fortunate to obtain a donation from BHP Billiton to assist with captive breeding costs in 2013.

In 2012/13 we highlighted a need to bolster the vivaria at Chester Zoo and Sheffield with additional females to supplement breeding capacity. Licencing was in place to catch/retain animals from the Sefton Coast, though continuous poor spring weather nullified all attempts to catch adults. This requirement will be met in 2014.

We are still in ongoing communication with the Welsh Mountain Zoo to assess if they would like to promote the species via a captive educational display.

5.2. Re-introduction to BHP Billiton, Talacre

The first stage of the re-introduction to BHP Billiton in September 2013, was highly successful. An initial training event, led by Chris Davis (ARC), preceded the release and was well attended by site staff and volunteers from BHP Billiton, Flintshire and Denbighshire Councils and ARG’s. This included sand lizard monitoring and management techniques and will assist the long-term monitoring of the 3 re-introductions to the Talacre dune system.

As well as the successful release of 65 captive bred juveniles from Chester Zoo and the private vivaria, the partners were also able to achieve some good media coverage. This was assisted by Chester Zoo, NRW, ARC and Flintshire and Denbighshire staff and ensured that filming of the release by ITV Wales was achieved as well as significant on-line media coverage.

A further two releases of c. 50 juveniles will be programmed for 2014 and 2015 to complete this re-introduction which will then be phased in for full monitoring to assess trends.

5.3. Monitoring sand lizard populations at re-introduction sites

The annual programmes of monitoring were again limited by poor weather; a cold spring followed by a hot summer and autumn. From the repeat monitoring at Talacre and Gronant, we have seen that recruitment has been affected by continuous poor weather for this species since 2008. In the United Kingdom, the species has been most affected in the north-west and it is estimated that most populations (native and re-introductions) are currently either static or showing some decline, solely due to a naturally poor breeding and recruitment cycle. In Wales this could have more effect on the smaller, less established re-introduction sites, which additionally have less capability to withstand change e.g. from erosion.

Long-term we would wish that all re-introduction sites have consistent monitoring to enable trend assessment, though we have not as yet been able to progress this consistently at Harlech, Tywyn and Ynyslas. We have exceptional sand lizard monitoring in place for Talacre and Gronant due to a partnership with Flintshire and Denbighshire Rangers, trained volunteers, the county recorder, and Cofnod. This facilitates annual volunteer training and licencing as well as set and targeted annual surveys. Data are used for comparison and trend analysis, and the results are uploaded and disseminated.

Although we jointly have insufficient resources and a limitation of volunteer involvement (despite training), monitoring should be expanded where possible via simple methodologies; standard unit area, six annual visits, timed and “sightings”. Stuart Graham’s PhD study will give short-term assessment of trend at these sites though better continuity would be advantageous for long-term assessments.

The storms in January 2014 have been serious and caused severe erosion of c.4-10m of frontal systems on both current re-introduction and potential re-introduction sites. The dynamic nature of dune habitats and limitations in size and capacity of many systems has always been of concern to the sand lizard re-introduction programme. Our joint policy has been to re-introduce to the largest systems, where possible, to ensure that long-term viability is ensured.

Species habitat management has been undertaken at both Talacre and Gronant. Scrub management continues at Talacre (to promote range expansion) and mechanized sand management has been undertaken at Gronant to promote juvenile recruitment.

5.4. Sand lizard monitoring data received at ARC and uploaded to Rare Species Database

Standardised and accurate monitoring and mapping techniques for the Rare Reptile & Amphibian Database have been developed by the sand lizard recovery plan partnership (ARC, NRW and NE). Since 2003, all of the monitoring has been undertaken with GPS units (Garmin) to locate individual animals, populations, re-introductions and to identify primary habitat areas. Linked with accurate maps and aerial photography, highly detailed maps of individual animal locations (c.4m accuracy), populations and the species habitat has been compiled.

Habitat maps for all the known historic sites and other potential sites have previously been compiled as part of the Rare Species Database Project (The Conservation Status of the Natterjack Toad *Bufo calamita* and Sand lizard *Lacerta agilis* in Wales. CCW Contract Science Report No: 788).

The results from these surveys and the Rare Reptile & Amphibian Database will be utilised for Article 17, BARS and the sand lizard Species Recovery Plan reporting.

5.5 Assessment of potential further sand lizard re-introduction sites in north-west Wales

Habitat suitability mapping for all potential sand lizard translocation was completed during 2007 (CCW, Contract Science Report No: 788). The report highlighted that the two most suitable sites (short-term), that met the majority of the re-introduction assessments key criteria, were Aberffraw SSSI and Newborough Dunes NNR, Anglesey.

Since 2011, habitats and species presence/absence monitoring has been undertaken on both sites. In 2012, sand lizards were found along a c. 500m stretch of frontal dunes at Aberffraw which were subsequently found to have Merseyside and Dorset 'race' genetic material. Although not fully conclusive, this suggests that these are not native animals and are most probably from an illegal re-introduction. The range of the animals across the site does suggest that they are well established and have been present for some time.

In 2013, sand lizards were also found at Newborough Warren (c. 500m). Although the PhD study on sand lizard genetics (Russell, 2013) is now complete, it is hoped that future genetic testing could be undertaken. Further survey will be organised to fully assess the range of the lizards on the sites and to highlight any potential impact with legitimate site management.

These two 'high priority' candidate sites cannot now be considered for legitimate re-introductions. This will cause delay to the re-introduction programme as we will now have to re-assess 2nd tier sites and will then have to initiate 5 years presence/absence surveys.

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8. Appendices

Data Archive Appendix

Data outputs associated with this project are available from The Amphibian and Reptile Conservation Trust, Bournemouth.

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue http://libcat.naturalresources.wales/webview/ (English Version) and http://libcat.naturalresources.wales/cnc/ (Welsh Version) by searching 'Dataset Titles'. The metadata is held as record no 115992.

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