Hafod Quarry and Landfill Great Crested Newt monitoring report 2016

Oakwood Ecology

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Summary

In 2016, Great Crested Newt (GCN) monitoring surveys were carried out on Hafod Quarry and Landfill Site by Oakwood Ecology. For management purposes, the site has been divided into three units: Hafod R1, Hafod R2 and Hafod Lagoons, which together include a total of 25 ponds. Hafod R1 and Hafod R2 are part of the Johnstown Newt Sites Special Area of Conservation (SAC).

The clearance of trees and scrub to reduce shading at some ponds was carried out during the winter of 2015/16, but logistical constraints prevented any other planned works.

Survey methodologies followed industry best practice guidelines (Langton *et al.*, 2001), and yielded a peak count of 277 adult GCNs (in the spring) and 17 ponds containing GCN larvae (in early August). Overall, the peak count of adults on the R1 and R2 sites are above the targets set by the Countryside Council for Wales (CCW) in the SAC Core Management Plan (2008). The larval count on these sites is also above the CCW target. The medium-term trend of the Great Crested Newt population on the R1 and R2 sites (both individually and collectively) is positive, which is contrary to the regional trend.

Other newt species were also surveyed, and their populations appear to be stable.

Several management recommendations are made, and, apart from the routine management of shading vegetation around some of the ponds, these include the following operations:

- Pond SLH-3 should be filled in, and *Crassula helmsii* should be excavated from SLH-1, -2a & -7 to eradicate it from the site;
- Ponds SLH-5a & 5b should be combined and re-profiled, and Ponds SLH-6a & -28 should be re-profiled, to make them more suitable for Great Crested Newts;
- Excessive aquatic vegetation should be removed from all ponds on the R1 and R2 sites;
- Pond SLH-36 should be lined with clay;
- Five new ponds should be excavated to compensate for the recent and ongoing decrease in the total number of ponds overall. This will also provide material for the infill of pond SLH-3;
- New refuges and hibernacula should be constructed using the arisings from excavations and scrub clearance.

1 Introduction

1.1 Background

1.1.1 Since 2010, Oakwood Ecology has carried out surveys of the Great Crested Newt (GCN) population and associated habitat management works at Hafod Landfill for Cory Environmental (Central) Ltd (CORY). This is part of a long-term monitoring program established when the first mitigation licence was granted by the Countryside Council for Wales in 2004, although survey data are available as far back as 1992 (Jones, 2007). A detailed management strategy for the sites is presented in 'The Long-Term Nature Conservation Scheme' (CORY, 2010). This scheme forms part of the conditions to the landfill Modification Order and has been approved by Natural Resources Wales and Wrexham County Borough Council.

1.2 Site description

1.2.1 The part of the site subject to GCN monitoring is mostly included within the Johnstown Newt Sites SAC (**Figure 1**) (notified as one component Site of Special Scientific Interest (SSSI) - the Stryt Las a'r Hafod SSSI), and has been managed in accordance with the Conservation Objectives laid out in the SAC Core Management Plan (CCW, 2008).

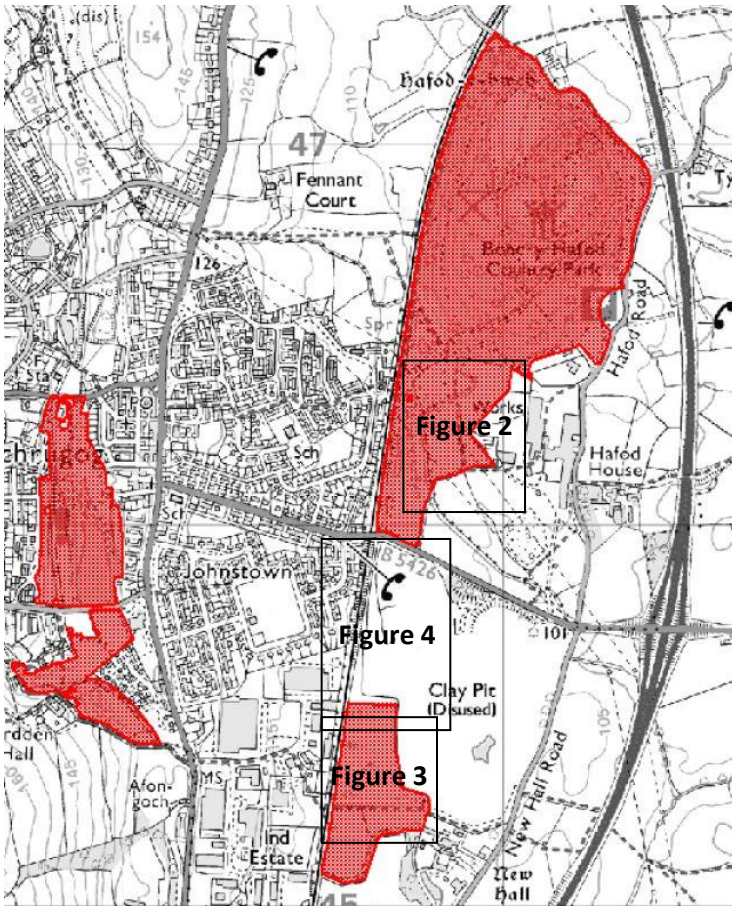


Figure 1. Map of the Johnstown Newt Sites SAC (shaded red) (taken from CCW, 2008).

1.2.2 The area included in this report is divided into three management units: Hafod Receptor Site 1 (R1: SAC Management Unit 13), Hafod Receptor Site 2 (R2: SAC Management Unit 2), which both received translocated newts from the original quarry before land-filling operations commenced, and the Hafod Lagoons site (not in the SAC).

Hafod R1

1.2.3 There are 15 ponds in this area, set in grassland with mature hedgerows dividing the area into small fields (**Figure 2**). The ponds are populated by a relatively wide variety of aquatic plant species. The oldest ponds (SLH-1, -2, -3, -4, -5, -6, -7, -8 & -9) are larger and deeper than the more recent generations of ponds.

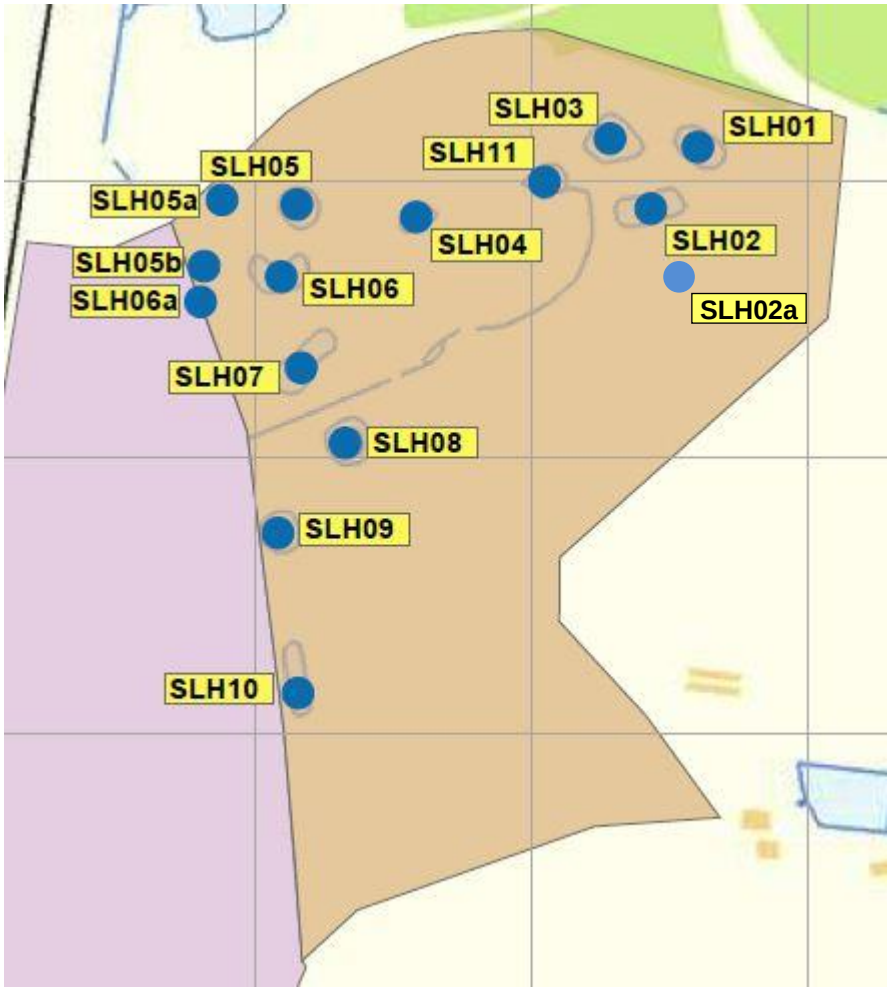


Figure 2. Map of the Hafod R1 area.

Hafod R2

1.2.4 This area includes eight ponds set in scattered or dense scrub which is developing into broadleaved semi-natural woodland (**Figure 3**). Four of the ponds pre-date the 2005 translocation, (SLH-30, -31,-32 & -34), two were created in 2005 (SLH-33 & -

36), and two ponds were created in 2009 (SLH-28 & -29) to improve the connectivity between the R2 ponds and the Hafod Lagoons.

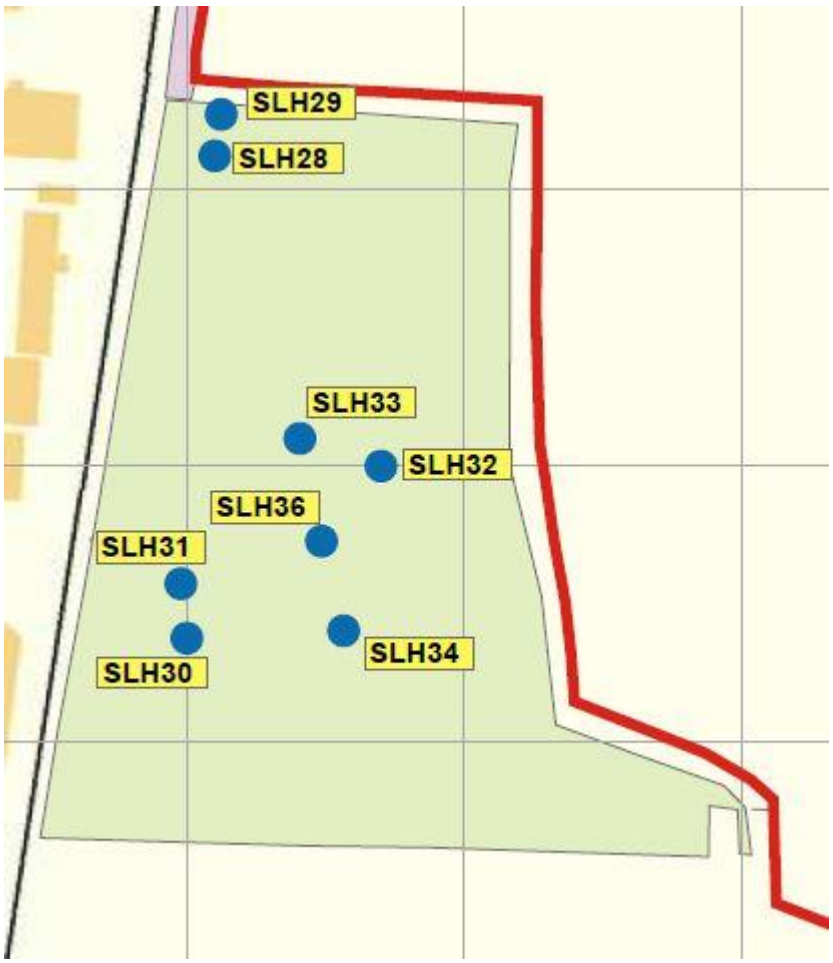


Figure 3. Map of the Hafod R2 area.

Hafod Lagoons

1.2.5 The two water bodies in this area are settling ponds for the landfill's surface water drainage scheme, and are surrounded by sheep-grazed grassland (**Figure 4**). This area is located outside the SAC, but has been identified as a potentially valuable wildlife corridor between otherwise separated parts of the SAC.



Figure 4. Map showing the location of the Hafod Lagoons.

1.3 Recent habitat management work

1.3.1 In line with the recommendations given in the 2015 GCN Monitoring Report (Cope, 2015), and permitted by the Conservation Licence issued by CCW for this purpose (licence no. 68583:OTH:CA:2016), general scrub and tree clearance was carried out where necessary during the winter of 2015/16.

1.3.2 Due to logistical constraints, i.e., either the lack of availability of site plant due to ongoing engineering and gas infrastructure works at the site or very high water levels, it was not possible to carry out some of the recommendations made in last year's report.

2 Methodology

2.0.1 In 2016, monitoring of the GCN population was carried out using torch surveys and a netting survey, in accordance with the best practice guidelines given in Langton *et al.* (2001). In addition to GCN's, other species of amphibian and reptile were also recorded during these surveys.

2.1 Torch surveys

2.1.1 These surveys were carried out in the spring, when adult newts normally return to the ponds to breed. Each pond was searched systematically by torchlight beginning shortly after dusk. The survey was repeated three times during the height of the breeding season – usually from mid-April to mid-May in a season with average temperatures.

2.1.2 A suitable night is one with a temperature >5˚C (when the newts are most active), and with little or no wind and no rain (for maximum visibility through the water surface). The maximum combined count from all the ponds on any one night (the peak count) is used as an index.

2.2 Netting surveys

2.2.1 The reproductive success of GCN's is indicated by the presence of larvae in a pond in late summer. These are caught by sweeping a hand net through the pond and aquatic vegetation for a specified amount of time related to the size of the pond, i.e., 15 minutes per 50m of shoreline. One visit to each pond is sufficient for this survey, and no estimate is made regarding the size of the population– the larvae are deemed either present or absent.

2.2.2 Ponds that have been colonised by *Crassula helmsii* were not netted, in accordance with the best practice guidelines (*Ibid.*).

2.3 Other observations

2.3.1 Throughout the various surveys, several other attributes were also noted which correspond to the Performance Indicators outlined in the Johnstown Newt Sites SAC Core Management Plan (CCW, 2008). These include: macrophyte plant cover, water depth, the presence of pollution, the extent of shading, the quality of adjacent terrestrial habitat, the functionality of dispersal routes, and the presence of wildfowl, fish and non-native invasive plant species.

3 Results

3.1 Torch surveys

3.1.1 The torch surveys were carried out by Simon Cope (licence no. 71444:OTH:SA:2016) and Nicola Wheeler (licence no. 71445:OTH:SA:2016). A summary of the results of these surveys are presented in **Table 1**. The counts for the individual ponds are shown in **Appendix 1**.

	Great Crested Newt				Smooth Newt			Palmate Newt			Smooth/ Palmate female	Smooth/ Palmate unknown	Total Smooth/ Palmate	Unknown newt
Date	Male	Female	unknown	Total	Male	Female	unknown	Male	Female	unknown				
Hafod R1: SLH-1 – SLH11														
12/04/16	103	46	20	169	43	0	0	26	0	0	48	112	229	6
26/04/16	111	24	14	149	26	0	0	0	0	0	7	37	70	7
09/05/16	58	39	41	138	10	3	2	1	0	0	24	36	76	4
Hafod R2: SLH-28 – SLH-37														
12/04/16	39	27	3	69	31	0	0	9	0	0	22	103	165	1
26/04/16	60	7	16	83	15	0	0	8	0	0	9	45	77	2
09/05/16	13	2	5	20	4	0	0	4	0	0	2	41	51	4
Hafod Lagoons: SLH-38 & 39														
12/04/16	3	0	0	3	6	0	0	1	0	0	7	21	35	0
26/04/16	6	1	0	7	3	0	0	0	0	0	1	5	9	0
09/05/16	93	14	12	119	35	1	0	14	1	0	64	86	201	0
GCN peak count for all sites (visit #3):				277							Smooth / Palmate peak count for all sites (visit #1):		429	

Table 1. Summary of the spring 2016 torch survey results. Total counts for the different areas and peak counts over the whole site are highlighted in red.

3.2 Netting surveys

3.2.1 The netting surveys were carried out by Simon Cope and Nicola Wheeler on the 8th of August, 2016. The results are summarised in **Table 2**, and presented in full in **Appendix 2**.

Management Unit	Number of ponds	Ponds with GCN larvae	Ponds with Smooth / Palmate Newt larvae
Hafod R1	10 (1 other pond was dry and 4 others were not surveyed)	10	10
Hafod R2	6 (2 other ponds were dry)	6	6
Hafod Lagoons	2	1	2
TOTAL	18	17	18

Table 2. Results of the 2016 summer netting survey.

3.3 Performance indicators

3.3.1 Since 2010, the R1 and R2 sites have been assessed against the Performance Indicators outlined in CCW (2008). The results of this assessment are presented in **Table 3.** The observations recorded at each pond are shown in **Appendices 1 & 2.**

Performance indicator	Operational limit		2016 level	
	Hafod R1	**Hafod R2**	**Hafod R1**	**Hafod R2**
A1. Torch survey peak count	75	50	169	83
A2. GCN larvae	5 ponds	5 ponds	10 ponds	6 ponds
F1. Extent of breeding / display ponds	11 ponds altogether		16 ponds surveyed (plus 3 dry ponds)	
F2. Macrophyte plant cover	60% of ponds will have 50-75% cover		6% (1 of 16)	
F3. Water depth	>50% of ponds will have between 10m and 10cm water depth between July and September		80% (16 of 20)	
F4. Presence of pollution	No surface sheens or algal blooms in breeding season		7 ponds with algal blooms	

Performance indicator	Operational limit		2016 level	
	Hafod R1	Hafod R2	Hafod R1	Hafod R2
F5. Extent of shading	>50% of ponds will have <20% shading on southern margin or <50% shading of entire pond margin		100% (20 of 20)	
F6. Adjacent terrestrial habitat	Either refuge area, foraging area or potential hibernacula within 250m of breeding/display ponds	Refuge area, foraging area and potential hibernacula all within 250m of breeding/ display pond	Present	Present
F7. Dispersal routes	No increase in barriers, and no loss or fragmentation of habitat (baseline: 2006)		No change	
F8. Presence of wildfowl	≤3 pairs of wildfowl per hectare of open water between April and September		One pair recorded on Ponds SLH-2, -5, -10, -31 & -34 on one visit each	
F9. Presence of fish	No fish present		Present in SLH-11	
F10. Presence of non-native aquatic plant species, especially *Crassula helmsii*	Not present in any ponds		*C.* helmsii recorded in 4 ponds	

Table 3. Additional findings recorded during the 2016 torch and netting surveys, with reference to the Performance Indicators outlined in the Johnstown Newt Sites SAC Core Management Plan (CCW, 2008). Levels highlighted in red are outside recommended operational limits.

3.4 Other amphibian species

3.4.1 The populations of both Smooth (*Lissotriton vulgaris*) and Palmate Newt (*L. helveticus*) appear to be secure, with a combined peak count of 429. Two toads and one Common Frog were also recorded during the torch surveys.

4 Discussion and Conclusions

4.1 The 2016 survey results

The R1 and R2 sites

4.1.1 The spring torch surveys yielded a peak count of 252 adult GCN's across these sites. This is well above the combined operational limit of 125 given for both the R1 and R2 sites in **Table 3**.

4.1.2 A total of 16 ponds were found to contain larvae, which is also above the threshold set by the PI target of ten ponds for the combined R1 and R2 sites.

The Hafod Lagoons

4.1.3 The night of the peak count for the whole site (Visit #3) was also the peak count for the Lagoons, with 119 GCN's recorded. Lagoon 3 also contained GCN larvae in July.

4.1.4 The lagoons host a wide range of wild-fowl species that are known predators of newt larvae, and the ponds may consequently be acting as an 'ecological trap' whereby the adult newts keep returning to breed despite the unsuitability of the ponds for successful larval maturation. However, the utilitarian function of these ponds as settling lagoons for the surface water drainage of the site takes precedence over newt conservation.

Performance Indicators

4.1.5 The operational limits referred to in this section relate specifically to the R1 and R2 sites only.

F1: Extent of breeding/display ponds

4.1.6 The 16 ponds that held water throughout the breeding and larval development stages, and the numbers of adult newts and ponds with larvae observed during the surveys, bodes well for the recruitment of GCN's into the local population.

F2: Macrophyte plant cover

4.1.7 The percentage of surveyed ponds that contain between 50 and 75% macrophyte plant cover has decreased to 6%, with only SLH-5a falling within the recommended limits. Of the ponds that fell outside these criteria, all contained more than 75% cover. Of the five recently desiccated ponds, four were also observed to contain >75% cover of aquatic macrophyte species (SLH-8, -11, -28 & -36). It has been three years since any removal of aquatic macrophytes has taken place.

F3: Water depth

4.1.8 Water levels throughout the breeding and larval development phases resulted in the total desiccation of three ponds (SLH-5b, -28 & -36) and low water levels (<10cm) in SLH-8.

F4: Pollution

4.1.9 No obvious sources of pollution were observed during the surveys. Blanket weed was present in seven ponds, although never in large quantities.

F5: Extent of shading

4.1.10 Water levels were high throughout the winter of 2015/16, which hindered the effective management of marginal scrub. In some cases, it was not possible to remove scrub arising from deep water (SLH-8, -30 & -34). However, all ponds were within the recommended limits of this performance indicator.

F6: Adjacent terrestrial habitat

4.1.11 The arisings from scrub clearance were added to existing hibernacula and refuges, and no other changes occurred.

F7: Dispersal routes

4.1.12 There have been no changes to the dispersal routes on the sites.

F8: Presence of wildfowl

4.1.13 Wildfowl were recorded on SLH-2, -5, -10, -31 & -34 on one visit each during the torch surveys, but only for one visit at each pond. They are not considered to be resident.

F9: Presence of fish

4.1.14 Fish were recorded in pond SLH-11, and have been recorded in SLH-2 in 2015.

F10: Presence of non-native aquatic plant species, especially *Crassula helmsii*

4.1.15 *Crassula helmsii* is present in ponds SLH-1, -2a, -3 & 7.

4.2 Medium-term trends

R1 site

4.2.1 Although there are survey data for the Hafod Quarry and Landfill sites going back to 1992, the torch survey methodology has only been consistent since 2006, so the graph below is calculated using data from that year onwards.

4.2.2 The curved line linking the peak counts in **Figure 5** shows large scale fluctuations in numbers, but the general trend is positive.

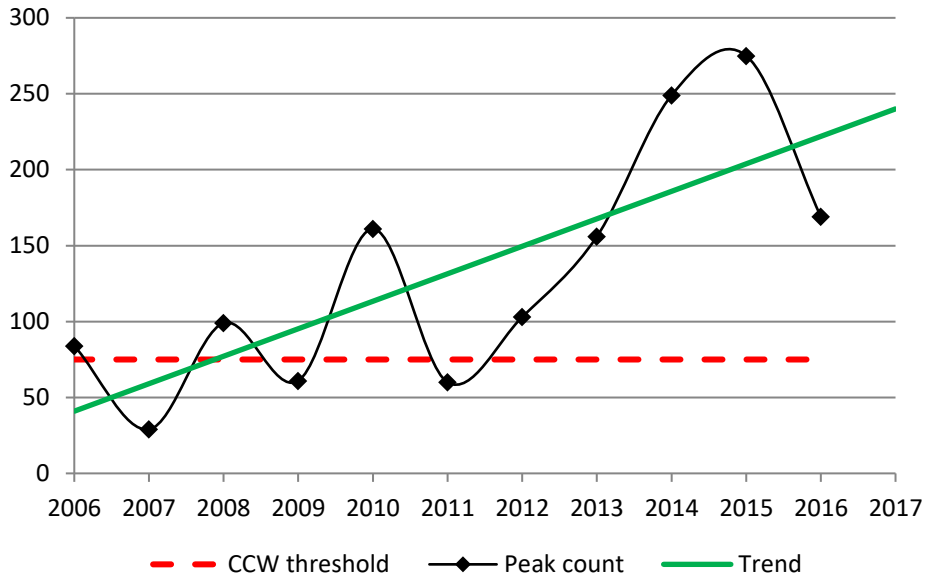


Figure 5. Medium-term trend of GCN peak counts on the R1 site, 2006-2016.

R2 site

4.2.3 The trend analysis for the R2 site (**Figure 6**) runs from 2007 and discounts the data from 2006 because a large number of GCN's were translocated here during 2005, which will have 'artificially' boosted the local population at that time.

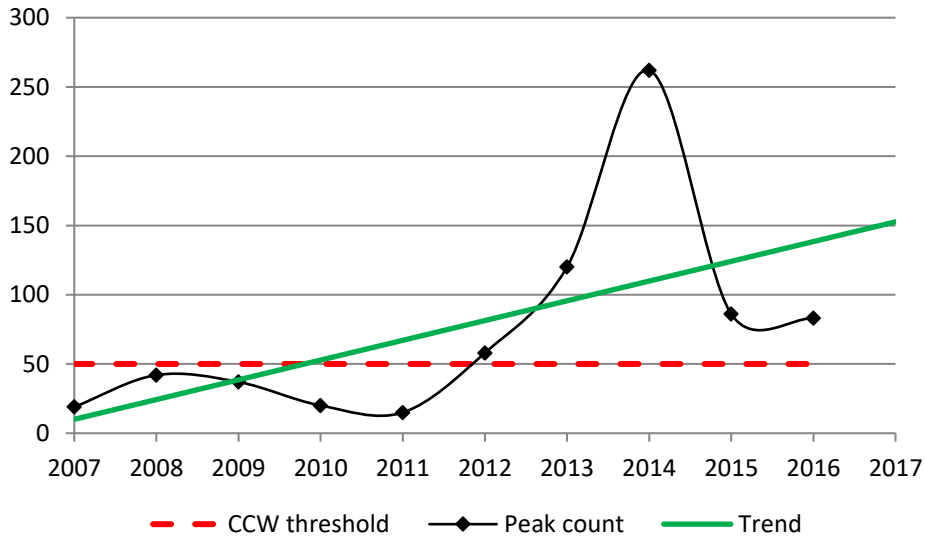


Figure 6. Medium-term trend of GCN peak counts on the R2 site, 2007-2016.

4.2.4 Again, the general trend is positive, and the peak count for this site has been above the target threshold set by CCW since 2012.

R1 and R2 sites combined

4.2.5 The green trend line in **Figure 7** is also calculated using data from 2007 onwards, so that the translocation in 2005 does not unduly skew the data. Overall, the trend is positive, and the peak count has recovered from the low numbers of 2011.

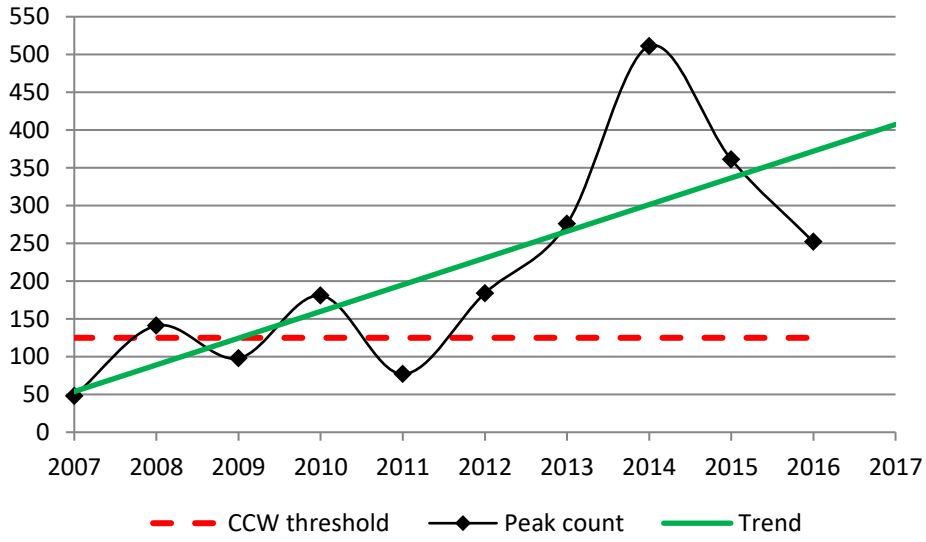


Figure 7. Medium-term trend of GCN peak counts for the R1 and R2 sites combined, 2007-2016.

4.2.6 The major fluctuations seen in the peak counts from year to year are most likely to be related to external factors such as weather conditions, because none of the site-specific factors appear to have changed that much on a similar time-scale.

Comparison with the regional trend

4.2.7 An analysis of the trends in peak counts at eight other sites in north-east Wales that have been monitored over a comparable period indicates that the growth of the GCN population at Hafod is in marked contrast to the generally declining regional trend, with declines recorded at seven of those eight sites in recent years (M. Ellis, pers. comm.). This contrast is thought to be at least partly attributable to the active management that is being carried out at Hafod.

5 Recommendations

5.1 General recommendations

F2: Macrophyte plant cover

5.1.1 Ponds with more than 75% aquatic macrophytes cover should be partially cleared using a mechanical excavator. GCN's need some soft-leaved plants to lay their eggs on, so this process should be selective. A suitably qualified and licensed ecologist (SQE) should be present during this operation to provide guidance and to deal with any newts that are found.

F3: Water depth

5.1.2 Pond SLH-5b should be combined with SLH-5a and re-profiled to make it deeper, Ponds SLH-6a & -28 should be re-profiled to make them deeper, and pond SLH-36 should be lined with clay so that it holds water throughout an average summer.

F9: Presence of fish

5.1.3 In previous years, fish in some ponds have been naturally eradicated by periodic total desiccation. Given that the extraction of all fish from a pond is a labour-intensive and costly process, coupled with the fact that Ponds SLH-2 & -11 are known to periodically dry out, it is recommended that no action is taken with regard to the fish but that the situation is monitored in the coming years, with a more pro-active approach being taken if natural desiccation does not occur within the next five years (i.e., before 2022).

F10: Presence of Crassula helmsii

5.1.4 In the absence of any effective control mechanism, it is again recommended, and permitted under the conservation license, that pond SLH-3 is filled in. The water will need to be drained and the pond base inspected by an SQE for GCN's before any infilling occurs. A suitable bio-security protocol has been approved by NRW.

5.1.5 An attempt will be made to excavate the *C. helmsii* that has colonised the margin of Ponds SLH-1, -2a & -7.

New ponds

5.1.6 To compensate for the ponds that have been or will be lost by either infilling or combination, it is recommended that five new ponds are excavated. The number of suitable places is limited on the R2 site by the topography, so it is proposed that the majority of these are constructed on the R1 site.

5.1.7 The two scrapes already prepared on the R1 site, along with any other new ponds, should be excavated so that they are similar in size to the oldest generation of ponds on this site.

Improvements to terrestrial habitat

5.1.8 The proposed excavations will generate a large amount of spoil, some of which can be used to fill in Pond SLH-3 (containing *C. helmsii*). The remainder can be used to construct more hibernacula, and the structure of these should follow the design given in **Figure 8**. This design mimics artificial and natural conditions in which great crested newts have frequently been found overwintering. Dimensions should not be below 2m length x 1m width x 1m height.

5.1.9 The illustrated design would be suitable for locating on an impermeable substrate. On free-draining substrates, like most of the available ground at Hafod, the design is largely similar but the bulk of the fill is sited in an excavated depression in the ground. Hibernacula should ideally be positioned across a site, both close to and distant from breeding ponds, always in suitable terrestrial habitat and above the flood-line (English Nature, 2001).

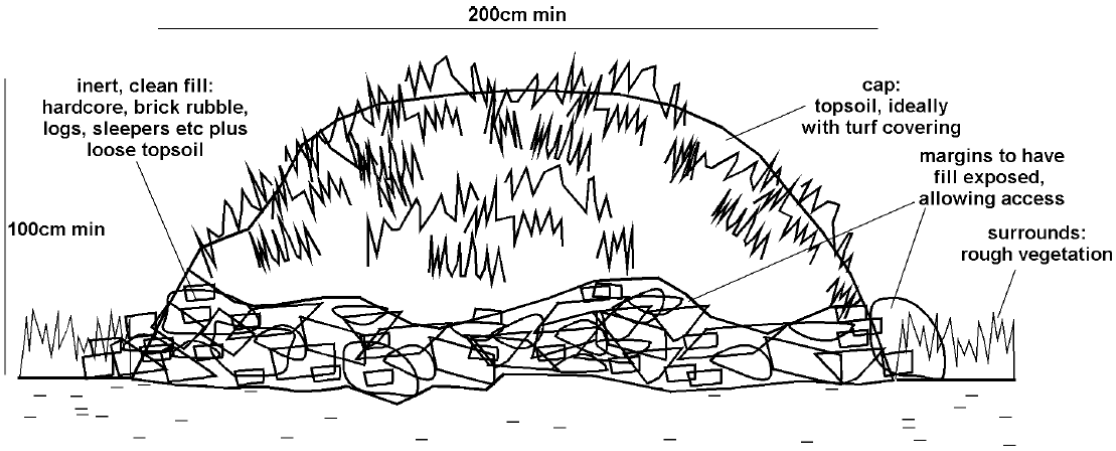


Figure 8. Suggested hibernacula design (taken from English Nature, 2001).

5.1.10 Other arisings from tree-felling or scrub clearance can be left as log and brash piles which will also act as refuges.

Other considerations

5.1.11 The infilling of the ponds containing *Crassula helmsii* should take place after all the other works have been completed, to prevent the transfer of this plant to other ponds.

5.2 Detailed recommendations (pond by pond)

5.2.1 Every effort will be made to carry out the following recommendations in 2016/17. However, due to the logistical constraints outlined in 1.3.2, it may not be possible to complete all of them, in which case they will be scheduled for the following year.

SLH-1

- Excavate *Crassula helmsii*.

SLH-2

- Remove excessive macrophyte plant cover.
- Monitor for desiccation and the presence of fish.

SLH-2a

- Excavate *Crassula helmsii*.

SLH-3

- Fill in due to the presence of *Crassula helmsii*.

SLH-4

- Remove excessive macrophyte plant cover.

SLH-5

- Remove excessive macrophyte plant cover.

SLH-5a and -5b

- Combine and re-profile.

SLH-6

- Remove excessive macrophyte plant cover.

SLH-6a

- Re-profile to increase surface area and depth
- Remove excessive macrophyte plant cover.

SLH-7

- Excavate *Crassula helmsii*.

SLH-8

- Remove excessive macrophyte plant cover.

SLH-9

- Remove excessive macrophyte plant cover.

SLH-10

- Remove excessive macrophyte plant cover.

SLH-11

- Remove excessive macrophyte plant cover
- Monitor for desiccation and the presence of fish.

SLH-28

- Re-profile to increase surface area and depth
- Remove excessive macrophyte plant cover.

SLH-29

- Remove excessive macrophyte plant cover.

SLH-30

- Remove excessive macrophyte plant cover.

SLH-31

- Remove excessive macrophyte plant cover.

SLH-32

- Remove excessive macrophyte plant cover.

SLH-33

- Remove excessive macrophyte plant cover.

SLH-34

- Remove excessive macrophyte plant cover.

SLH-36

- Line with clay.

5.3 Licensing

5.3.1 The conservation license, which allows some of the more invasive management practices, has been renewed and now expires on the 28th of February, 2021 (Licence no. 68583:OTH:CA:2016).

6 References

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Appendix 1:
Results of spring torch surveys

Site Name:	JOHNSTOWN (Hafod Landfill sites)
Surveyors	Simon Cope & Nicola Wheeler
Date:	12/04/2016
Survey start time:	21:19
Survey finish time:	00:48
Rain (Y/N):	N

Torch model:	Clulite CB2 Li-ion
Brightness:	1 million cfp

♂ = Male; ♀ = Female; U = Unknown; E = Eggs; L = Larva.
Pond suitability for torching: 1 = Good ; 2 = Moderate; 3 = Poor

Survey Results

Pond:	SLH 1	SLH 2	SLH 2a	SLH 3	SLH 4	SLH 5	SLH 5a	SLH 5b	SLH 6	SLH 6a	SLH 7	SLH 8	SLH 9	SLH 10	SLH 11	SLH 28	SLH 29	SLH 30	SLH 31	SLH 32	SLH 33	SLH 34	SLH 36	Lagoon 3	Lagoon 4	Terrestrial	Total
Great Crested Newt (♂)		1			15	34	1	1	26			2	19		4			7	12	8	1	11		3			145
(♀)		2			6	12			9	1		1	14		1			1	5	3	2	14	2				73
(U)					4	3	1		8	1			3									3					23
Smooth Newt (♂)		13			4	10	1		6			7	1		1		1	5	5	12		6	2	3	3		80
(♀)																											0
(U)																											0
Palmate Newt (♂)		11			8	6							1				1		1	2		4	1	1			36
(♀)																										1	1
(U)																											0
Smooth/Palmate Newt (♀)		18			15	8			4			2	1				3		4	6	2	7		6	1		77
Smooth/Palmate Newt (U)		19			23	23	3		21	1		9	12	1		1	4	3	29	14	8	38	6	14	7		236
Newt Unknown (U)		1				3						1			1							1					7
Common Frog (♂)																											0
(♀)																											0
(U)																											0
Spawn/ Tadpoles																											
Common Toad (♂)																											0
(♀)																											0
(U)																											0
Spawn/ tadpoles																											
Fish present (0/1)		0?													1												
Waterfowl pairs present (0/1)																									1		
Non-native aquatic plants present (0/1)	1		1	1							1																
Pond suitability for torch surveying (1-3)		2			2	1-2	2-3	2-3	1-2	2-3		1-2	1	2-3	2	3	3	2-3	2	1-2	1-2	1	2-3	3	3		
Reasons		turbid & veg. debris			veg. debris	turbid & veg. debris	turbid	turbid	turbid & veg. debris	turbid		turbid		turbid	turbid & algae	turbid, algae & veg. debris	algae & veg.	veg.	veg.	veg.	veg.		turbid	turbid	turbid		
Percentage of pond edge surveyed		100			100	100	100	100	100	100		100	100	100	95	100	80	100	100	100	100	100	100	100	100		
Comments																											

Total GCN:	241
Total other newts:	437
Total Frog:	0
Total Toad:	0

GCN	Male	Female	Unknow	Total
R1	103	46	**20**	**169**
R2	39	27	3	69
Lagoons	3	0	0	3
Terresti	0	0	0	0
Total	145	73	23	241

Smooth	Male	Female	Unknow	Total
R1	43	0	**0**	**43**
R2	31	0	0	31
Lagoons	6	0	0	6
Terresti	0	0	0	0
Total	80	0	0	80

Palmate	Male	Female	Unknow	Total
R1	26	0	**0**	**26**
R2	9	0	0	9
Lagoons	1	0	0	1
Terresti	0	1	0	1
Total	36	0	0	37

S/P ♀	S/P U	Total S/P	U newt
48	112	229	6
22	103	165	1
7	21	35	0
		1	0
77	236	430	7

Results of the torch survey on Visit #1 (12th April, 2015)

Site Name:	JOHNSTOWN (Hafod Landfill sites)	**Torch model:**	Clulite CB2 Li-ion
Surveyors	Simon Cope & Nicola Wheeler	**Brightness:**	1 million cp
Date:	26th April, 2016		
Survey start time:	21:45		
Survey finish time:	01:30	♂ = Male; ♀ = Female; U = Unknown; E = Eggs; L = Larva.	
Rain (Y/N):	N	Pond suitability for torching:1 = Good ; 2 = Moderate; 3 = Poor	

Survey Results

Pond:	SLH 1	SLH 2	SLH 2a	SLH 3	SLH 4	SLH 5	SLH 5a	SLH 5b	SLH 6	SLH 6a	SLH 7	SLH 8	SLH 9	SLH 10	SLH 11	SLH 28	SLH 29	SLH 30	SLH 31	SLH 32	SLH 33	SLH 34	SLH 36	Lagoon 3	Lagoon 4	Terrestrial	Total
Great Crested Newt (♂)		2			8	31	4	1	55	1		4	5				9	7	13	11	8	11	1	6			177
(♀)		2			3	1			10			5	3				1	1	3	1			1		1	1	33
(U)		1			2	6			4				1				14		1			1					30
Smooth Newt (♂)		2			2	6	3	1	6			4	2					1	8	2	2	2		3			44
(♀)																											0
(U)																											0
Palmate Newt (♂)																1		1	3	1	2						8
(♀)																											0
(U)																											0
Smooth/Palmate Newt (♀)							1		5			1							2	4	2	1			1		17
Smooth/Palmate Newt (U)		2			4	12			12			6	1					2	15	8	11	9		4	1		87
Newt Unknown (U)						1			3			1	2						2								9
Common Frog (♂)																											0
(♀)																											0
(U)																											0
Spawn/ Tadpoles																											
Common Toad (♂)																											0
(♀)																											0
(U)																											0
Spawn/ tadpoles																											
Fish present (0/1)															1												
Waterfowl pairs present (0/1)		1																				1		1	1		
Non-native aquatic plants present (0/1)																											
Pond suitability for torch surveying (1-3)		2			2	1	2	2	1	2		2	1	2-3	2	3	3	3	2	2	2	2	3	2	3		
Reasons		floating veg.			floating veg.		turbid	veg.		veg.		veg.		turbid	veg. & algae	veg. & algae	veg. & algae	veg.	veg.	veg. & algae	veg.	algae	veg. & algae	turbid	turbid		
Percentage of pond edge surveyed		100			100	100	100	100	100	100		100	100	100	100	100	80	100	100	100	100	100	100	100	100		
Comments	Floating detached mass in Pond 2 & 4; Heron vomit in Pond 9; Pond 28 needs re-profiling (deeper); Pond 29 has marginal vegetation and algae, fairly clear in middle; Pond 36 is choked with vegetation. Ditch near Pond 7 needs blocking to prevent spread of Crassula helmsii.																										

Total GCN:	240
Total other newts:	165
Total Frog:	0
Total Toad:	0

GCN	Male	Female	Unknow	Total
R1	111	24	**14**	**149**
R2	60	7	16	83
Lagoons	6	1	0	7
Terresti	0	1	0	1
Total	177	32	30	240

Smooth	Male	Female	Unknow	Total
R1	26	0	**0**	**26**
R2	15	0	0	15
Lagoons	3	0	0	3
Terresti	0	0	0	0
Total	44	0	0	44

Palmate	Male	Female	Unknow	Total
R1	0	0	**0**	**0**
R2	8	0	0	8
Lagoons	0	0	0	0
Terresti	0	0	0	0
Total	8	0	0	8

S/P ♀	S/P U	Total S/P	U newt
7	37	70	7
9	45	77	2
1	5	9	0
		0	0
17	87	156	9

Results of the torch survey on Visit #2 (26th April, 2015)

Site Name:	JOHNSTOWN (Hafod Landfill sites)	**Torch model:**	Clulite CB2 Li-ion
Surveyors	Simon Cope, Nicola Wheeler, Matthew Ellis, Keith Meachem & Anthony H	**Brightness:**	1 million cfp
Date:	9th May, 2016		
Survey start time:	22:00		
Survey finish time:	01:25	♂ = Male; ♀ = Female; U = Unknown; E = Eggs; L = Larva.	
Rain (Y/N):	N	Pond suitability for torching:1 = Good ; 2 = Moderate; 3 = Poor	

Survey Results

Pond:	SLH 1	SLH 2	SLH 2a	SLH 3	SLH 4	SLH 5	SLH 5a	SLH 5b	SLH 6	SLH 6a	SLH 7	SLH 8	SLH 9	SLH 10	SLH 11	SLH 28	SLH 29	SLH 30	SLH 31	SLH 32	SLH 33	SLH 34	SLH 36	Lagoon 3	Lagoon 4	Terrestrial	Total
Great Crested Newt (♂)		15			5	7	3		18			4	4	2			4		4	4		1		85	8	5	169
(♀)		2			2	5	1		19			4	6				1	1						14		7	62
(U)		2			6	6	1		22				2	2			1	1	2	1				9	3		58
Smooth Newt (♂)		6							1			3							1	2		1		26	9		49
(♀)													3											1			4
(U)													2														2
Palmate Newt (♂)						1													1	1		2		5	9		19
(♀)																								1		1	2
(U)																											0
Smooth/Palmate Newt (♀)		2			1	8	2		10			1						1		1				48	16		90
Smooth/Palmate Newt (U)		10			4	5	2		2	7		6							8	14	3	15	1	35	51		163
Newt Unknown (U)		1										1	1	1			1		2			1					8
Common Frog (♂)																											0
(♀)																											0
(U)																						1					1
Spawn/ Tadpoles																											
Common Toad (♂)													2														2
(♀)																											0
(U)																											0
Spawn/ tadpoles																											
Fish present (0/1)	1														1												
Waterfowl pairs present (0/1)						1								1					1						1		
Non-native aquatic plants present (0/1)	1																										
Pond suitability for torch surveying (1-3)		2			2-3	1	1	1	2	2		2	1	3	3	3	3	3	2-3	2-3	2-3	2-3	3	1	2		
Reasons		floating veg.			floating veg.				veg.	turbid		veg.		turbid	veg.	veg.	veg. & algae	veg.	veg. & algae	veg.	veg.	veg. & algae	veg. & algae		floating veg. & turbid		
Percentage of pond edge surveyed		100			100	100	100	100	100	100		100	100	100	70	100	80	100	100	100	100	100	100	100	100		
Comments																											

		GCN	Male	Female	Unknow	Total	Smooth	Male	Female	Unknow	Total	Palmate	Male	Female	Unknow	Total	S/P ♀	S/P U	Total S/P	U newt
Total GCN:	289	R1	58	39	**41**	**138**	R1	10	3	**2**	**15**	R1	1	0	**0**	**1**	24	36	76	4
Total other newts:	337	R2	13	2	5	20	R2	4	0	0	4	R2	4	0	0	4	2	41	51	4
Total Frog:	1	Lagoons	93	14	12	119	Lagoons	35	1	0	36	Lagoons	14	1	0	15	64	86	201	0
Total Toad:	2	Terrestri	5	7	0	12	Terrestri	0	0	0	0	Terrestri	0	1	0	1			1	0
		Total	164	55	58	289	Total	49	4	2	55	Total	19	1	0	21	90	163	329	8

Results of the torch survey on Visit #3 (9th May, 2015)

Appendix 2:
Results of summer netting survey

Hafod Great Crested Newt larval survey									Date: 08/08/2016					Recorders: SC & NW			
Pond no.	Larvae		Plant cover			Water depth		Pollution	Shading					Wildfowl	Fish	Alien invasive plants
	GCN	S/P	<50 %	50-75 %	>75 %	<10cm	>10cm	Surface sheen	Algal bloom	<20% of south	>20% of south	<50% of total	>50% of total			
SLH-1																✓
SLH-2	✓	✓			✓		✓			✓		✓				
SLH-2a																✓
SLH-3																✓
SLH-4	✓	✓			✓		✓		✓	✓		✓				
SLH-5	✓	✓			✓		✓			✓		✓				
SLH-5a	✓	✓		✓			✓			✓		✓				
SLH5b	Dry	Dry			✓	✓				✓		✓				
SLH-6	✓	✓			✓		✓			✓		✓				
SLH-6a	✓	✓			✓		✓			✓		✓				
SLH-7																✓
SLH-8	Almost Dry	Almost Dry			✓	✓					✓	✓				
SLH-9	✓	✓			✓		✓			✓		✓				
SLH-10	✓	✓			✓		✓			✓		✓				
SLH-11	Dry	Dry			✓		✓			✓		✓			✓	
SLH-28	Dry	Dry			✓	✓				✓		✓				
SLH-29	✓	✓			✓		✓		✓	✓		✓				
SLH-30	✓	✓			✓		✓		✓		✓	✓				
SLH-31	✓	✓			✓		✓		✓	✓		✓				
SLH-32	✓	✓			✓		✓		✓	✓		✓				
SLH-33	✓	✓			✓		✓		✓	✓		✓				
SLH-34	✓	✓			✓		✓		✓		✓	✓				
SLH-36	Dry	Dry			✓	✓				✓		✓				
Lagoon 3		✓	✓				✓			✓		✓		✓		
Lagoon 4	✓	✓	✓				✓			✓		✓		✓		

Results of the netting survey (8th August, 2016)