

G.10 Amphibian

RESULTS OF AMPHIBIAN CAPTURE PROGRAMME AT DAMHEAD CREEK POWER STATION, KINGSNORTH, KENT

RESULTS OF AMPHIBIAN CAPTURE PROGRAMME AT DAMHEAD CREEK POWER STATION, KINGSNORTH, KENT

For: Entergy Power Development Corporation

By: Penny Anderson Associates Consultant Ecologists 'Park Lea' 60 Park Road Buxton Derbyshire SK17 6SN

July 1998

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1. **INTRODUCTION**

1.1 Penny Anderson Associates has been commissioned by Entergy Power Development Corporation to resolve the problem posed by a colony of great crested newts *Triturus cristatus* in the vicinity of the construction site for the new Damhead Creek Power Station, at Kingsnorth on the Isle of Grain in Kent. This report provides a description of the work carried out to capture and relocate amphibians on site, as required under English Nature's licence agreement.

Protected Species Status

- 1.2 The great crested newt receives special protection in the UK under extensive legislation. Statutory national protection is provided under Schedule 5 of the *Wildlife and Countryside Act*, 1981 and international protection is given under Annexes II and IVa of the Habitats and Species Directive (EC Directive 92/43/EEC on *Conservation of Natural Habitats and Wild Fauna and Flora*). Under this legislation both the species and its breeding habitat are protected.
- 1.3 Section 10 of the Wildlife and Countryside Act allows for the resolution of conflicts between the presence of great crested newts and a legal development. The requirement is to take reasonable measures to avoid killing, disturbance and habitat destruction. When direct impact to a colony from a legal development is unavoidable, it can be appropriate to consider translocating great crested newts away from the construction area. In such cases alternative breeding and foraging habitat, with refuges and hibernation features, can be set aside to provide a suitable receptor area.

Background

- 1.4 Despite extensive ecological survey of the site and surrounding land to the north in 1992-93, no evidence of this protected species had been found, and the 'possible' presence of a colony was only identified at the end of the consultation process for Detailed Planning Permission in January 1998. The County Ecologist drew attention to an ecological assessment report produced by Bright & Associates (August 1996) for the Kingsnorth Integrated Waste Management Facility (KIWMF). This document refers to possible amphibian interest associated with a ditch immediately south of, and parallel to, the southern boundary of the Damhead Creek Power Station development, and states that 'great crested newts are believed to occur in very small numbers'.
- 1.5 As great crested newt colonies can disperse over 500m or more, although the bulk of the population will be within c.250m, much of the development site therefore had the potential to contain individuals. Given the considerable constraint posed by the 'possible' presence of such a colony it was unfeasible to either undertake advance surveys aimed at detecting the presence and size of a colony, or to modify the development so as to minimise the potential impact.

1.6 For this reason it was therefore assumed that a colony was present and that any individuals within the development site would need to be relocated. An Action Plan for the translocation of any amphibians within the development site using capture fencing was devised and submitted to English Nature for approval on 21st January 1998. This was duly granted a license (No. 19980149) on 2nd February.

2. <u>RESULTS</u>

Capture Fencing Results

- 2.1 A network of capture fencing was installed across the site (see Figure 1) by 25th March 1998, while a holding compound for any captured amphibians, which included grassland for foraging, an artificial hibernaculum and a new pond, was completed by 2nd April. The capture system consisted of in excess of 3000m of temporary amphibian fencing (also known as TAF) and 180 associated bucket traps. A permanent amphibian fence (also known as PAF) was constructed along the southern boundary to delineate the development site, and this will prevent significant numbers of amphibians moving in from the ditch.
- 2.2 The trap system was operated over a 12 day period between 29th March and 9th April, during which the bucket traps were searched every day before 10:00 hours. During this period no great crested newts, or indeed any other amphibian, were found and so the decision was taken to suspend the capture programme. The results were thought to suggest that this species was either absent from the site, or occurred in very low numbers. It was also possible that the warm early spring had caused amphibians on site to migrate to the ditch prior to the capture fence system being installed.
- 2.3 On the advice of English Nature's Conservation Officer in Kent we then approached Bill Jones at the Kingsnorth Nature Study Area, who was thought to have some knowledge of the land immediately south of the development site. He confirmed that great crested newts had been encountered in the ditch in question, and that during a de-watering exercise in March 1998, over 20 individuals had been encountered. He also confirmed that the spring 1998 migration had been particularly early in this part of Kent.
- 2.4 It was decided to abandon the capture fence trapping programme and, to ensure that no remaining amphibians were present particularly amongst the rubble area to the west of the development, it was proposed to conduct a hand search. This approach was agreed with English Nature on 23rd April.

Hand Search Results

- 2.5 The entire development site was hand searched on 20th and 21st May. A single female common toad *Bufo bufo* was located along one of the TAF fences, but otherwise no amphibians were detected.
- 2.6 During the course of these investigations, a pool previously hidden by bramble tangles (*Rubus fruticosus* agg.) was discovered. This waterbody had formed within a square, concrete-lined depression within the footings of the former hanger building. The pond was partially vegetated with an emergent stand of sea clubrush *Bolboschoenus maritimus*, and occasional plants of starwort *Callitriche stagnalis* agg. and common water-crowfoot *Ranunculus*

aquatilis. The underlying sediments consisted of deep layers of silt and leafy detritus and the water level appeared to fluctuate between c.0.5 - 1.2m.

2.7 Over a period of approximately 2 hours searching using a pond net, great crested newts were found to be present (see Figure 2), and the following amphibian life stages were recorded:

•	Great crested newt	- 2 adult males, 2 adult females,
		1 egg
•	Smooth newt Triturus vulgaris	- 7 adult males, 9 adult females,
		sub-adults/juveniles, 30 larvae.

- 2.8 Given that such few numbers of great crested newt were found, it was decided to relocate these off site into the ditch. This decision was made to ensure that the potential breeding population within the new receptor pond was not too small to be sustainable. These newts are also highly likely to have colonised from the ditch and so would be part of the same meta-population.
- 2.9 English Nature were advised of the results on 2nd June and informed that it would be our intention to de-water this pool, capture and remove any amphibian life stages, and then in-fill with spoil to destroy this breeding site.

De-watering Operation

- 2.10 The pool was carefully de-watered on 14th July using a pump fitted with a hessian filter. Once part of the sediment bottom was revealed, a sump was excavated to improve the de-watering process and the retrieval of amphibian life stages. Throughout the day pond netting was undertaken. After the pool was emptied and thoroughly searched, any movable concrete block and rubble was lifted using a JCB backacter and the area beneath also searched for amphibians.
- 2.11 The capture results were as follows:
 - Great crested newts over 300 metamorphs (larvae about to emerge onto land) and c.50 larvae.
 - Smooth newts c.90 metamorphs (many of which had emerged).
- 2.12 All the amphibians were again relocated to the ditch.

3. <u>CONCLUSIONS</u>

- 3.1 The development site has now been effectively cleared of great crested newts and other amphibians. This work commenced on 21st January and finished on 14th July.
- 3.2 The southern boundary of the development site now has a PAF fence to avoid recolonisation of the development site from amphibians in the southern ditch, and this will remain in place until the end of the construction works. This fenceline will need to be maintained throughout the development period.
- 3.3 It is important to keep the outer face of the PAF fence free from tall vegetation such as grasses and ruderal herbs, as these can fall over the fence and compromise its efficiency. This is not thought to be a problem on site, as there a large numbers of rabbits which keep the vegetation low at this point. The area between the ditch and the amphibian fence lies outside the development and so the rabbit populations here will not be affected.
- 3.4 The receptor site has not been used to receive any amphibians, as decisions were made at various points during the capture programme against the viability of a translocated great crested newt colony. These decisions were largely based on the small numbers captured.

4. **<u>RECOMMENDATIONS</u>**

- 4.1 The PAF fence along the southern boundary will need to be maintained, and any rips or damage to its integrity repaired as soon as possible.
- 4.2 The receptor site does not contain any translocated amphibians, and so it is not important to maintain the integrity of its associated PAF fencing.
- 4.3 Sufficient and appropriate capture effort has been undertaken to translocate great crested newts from the development site, as required under the License. Any remaining great crested newts encountered on site during the various development activities should be carefully contained, and a licensed newt handler approached to remove the individual(s) to the ditch along the southern boundary.
- 4.4 Future monitoring of the great crested newt colony associated with the ditch along the southern boundary is not considered appropriate. It would not be possible to examine the outcome of introducing individuals from the capture programme as no baseline population data for the ditch is available.

FIGURES

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Key 	Scale metres 100 Fences with black triangle need the base of the polythene sheet to point in this direction i.e post would be installed on opposite side All other fences, the base can be in either direction Location of bucket traps	Penny A Cons Pent Buxto Tel: 01290 E-meil: pa

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n, Derbys. SK17 6SN 8 27086 Fax:01298 23776 a@psa-ecol.demon.co.uk	Date:	Apr-98	Drawing number: Fig. 1	

Comparison in size between great crested newt (above) and smooth newt (below)



Adult male great crested newt Note: Crest falls over when not supported in water



Male (over turned in centre) and two female great crested newts



Great crested newts and smooth newts in holding bucket



PHOTOGRAPHS OF NEWT CAPTURES AT KINGSNORTH POWER STATION, ISLE OF GRAIN, KENT

FIG. 2

KINGSNORTH, ISLE OF GRAIN, KENT

AMPHIBIAN CAPTURE PROGRAMME ADDITIONAL WORKS

BWP

KINGSNORTH, ISLE OF GRAIN, KENT

AMPHIBIAN CAPTURE PROGRAMME ADDITIONAL WORKS

January 1999

Penny Anderson Associates Park Lea 60 Park Road Buxton Derbyshire SK17 6SN

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APPENDICES

1. Letter from English Nature

1. <u>INTRODUCTION</u>

1.1 Penny Anderson Associates were commissioned by Entergy Power Development Corporation to resolve the problem posed by a colony of great crested newts (*Triturus cristatus*) in the vicinity of the construction site for the new Damhead Creek Power Station at Kingsnorth on the Isle of Grain in Kent.

Protected Species Status

- 1.2 The great crested newt receives special protection in the UK under extensive legislation. Statutory national protection is provided under Section 9 of the Wildlife and Countryside Act 1981, and international protection is given under Annexes II and IVa of the Habitats and Species Directive (EC Directive 92/43/EEC on Conservation of Natural Habitats and Wild Fauna and Flora). Under this legislation both the species and its breeding habitat are protected.
- 1.3 Section 10 of the Wildlife and Countryside Act allows for the resolution of conflicts between the presence of great crested newts and a legal development. The requirement is to take reasonable measure to avoid deliberate killing, disturbance and habitat destruction. When direct impact to a colony from a legal development is unavoidable, it may be appropriate to consider translocating great crested newts away from the construction area. In such cases alternative breeding and foraging habitat, with refuges and hibernation features, can be set aside to provide a suitable receptor area.

Background

1.4 Despite extensive ecological survey of the site and surrounding land to the north in 1992-93, no evidence of this protected species had been found, and the 'possible' presence of a colony was only identified at the end of the consultation process for Detailed Planning Permission in January 1998. The County Ecologist

drew attention to an ecological assessment report produced by Bright & Associates (August 1996) for the Kingsnorth Integrated Waste Management Facility (KIWMF). This document refers to possible amphibian interest associated with a ditch immediately south of, and parallel to, the southern boundary of the Damhead Creek Power Station development, and states that *"great crested newts are believed to occur in very small numbers...."*.

- 1.5 As great crested newt colonies can disperse over 500m or more, although the bulk of the population will be within c.250m, much of the development site, therefore, had the potential to contain individuals. Given the considerable constraint posed by the 'possible' presence of such a colony, it was unfeasible to either undertake advanced surveys aimed at detecting the presence and size of a colony, or to modify the development so as to minimise the potential impact.
- 1.6 For this reason, it was therefore assumed that a colony was present and that any individuals within the development site would need to be relocated. An Action Plan for the translocation of any amphibians within the development site using capture fencing was devised and submitted to English Nature for approval on 21st January 1998. This was duly granted a licence (no. 19980149) on 2nd February.
- 1.7 The Action Plan was implemented throughout spring 1998. The results of the capture are presented in detail elsewhere (PAA 1998).

Additional Works

1.8 Requirements for flood defence and site drainage subsequently gave rise to limited additional construction work outside the area previously cleared of amphibians during spring 1998. The construction of a flood defence bund across the ditch which runs contiguous with the southern site boundary was required (Fig. 1). In addition to this, a drainage outfall pipe was required to

cross the eastern end of the same ditch (Fig 1). As the ditch is known to contain what is believed to be a small population of great crested newts, appropriate mitigation measures were necessary.

- 1.9 The winter period is far from ideal for disturbing and handling amphibians. English Nature will not normally issue a licence for operations undertaken at this time of year. However, after extensive consultations with English Nature, a licence to undertake mitigation works was issued, as only a small area of the site was to be disturbed by the works. However, English Nature have recorded their concern over the timing of the works (Appendix I).
- 1.10 The following report describes the mitigation measures undertaken and presents the results of the works.

2. <u>METHOD</u>

2.1 All activities on site were undertaken by suitably experienced and licensed individuals. All herptiles encountered were handled using medium weight, latex surgical gloves. This allowed adequate sensitivity to ensure safe handling of the animals, whilst minimising heat transfer to potentially torpid animals.

Flood Defence Bund

2.2 The construction of a flood defence bund was proposed at the western end of the ditch (Fig. 1). This involved the construction of a bund approximately 20m wide and 3m high, which would tie in with the flood defence bund on the southern side of the ditch. The flood defence bund meant the loss of a limited amount of terrestrial habitat, plus a 20m section of the ditch which had to be piped beneath the bund.

- 2.3 Such works require that reasonable effort be spent ensuring the area in question is free from newts, in order to prevent infringement of the Wildlife and Countryside Act. Due to the timing of the operation it was not possible to use the standard method of temporary amphibian fencing (TAF) and pitfall traps (PFTs) since the majority of amphibians would be in hibernation and would not, therefore, be moving. An alternative method involving direct searching had to be implemented.
- 2.4 TAF was installed around the terrestrial habitat affected by the bund, to prevent recolonisation of the area after searching, with sheet piling used to act as a barrier across the ditch (Fig. 2). The terrestrial areas were then hand-searched for amphibians. Effort was concentrated in areas which appeared to be more suitable for sheltering amphibians, such as the base of scrub, discarded piles of rubble and in small mammal burrows.
- 2.5 The ditch was netted using a 0.5mm-mesh, long-handled pond net prior to dewatering. Two 2" pumps were used to remove the water from the ditch; each was fitted with a 2mm wire mesh to prevent any animals being pulled into the pump. Once the ditch was dry, the remaining silt and vegetation was hand-searched for the presence of amphibians.
- 2.6 Once the on-site, supervising ecologist was satisfied that adequate effort had been exercised in searching the area for amphibians, the amphibian fencing which separated the bund area from the existing development area was removed. This was undertaken carefully as herptiles may have been sheltering at the base of the fence. A total of 7.5 person-days were invested in searching this area.
- 2.7 Prior to the construction of the bund, the topsoil within the area had to be removed. This was undertaken with the use of an excavator under the close supervision of the on-site ecologist.

Outflow Pipe

- 2.8 The clearance of the line of the outflow pipe at the far eastern end of the site was carried out in a similar manner to that of the bund area (Fig. 3). The habitat within this region appeared less suitable as terrestrial amphibian habitat, consisting of rank, species-poor grassland. No areas of scrub or rubble were present.
- 2.9 An area of terrestrial habitat adjacent to the ditch had to be fenced and searched separately. This was to allow tracked machinery access to the edge of the ditch. The presence of an underground petroleum pipeline meant that sheet piling could not be installed at one end of the ditch. A bund constructed of clay was used instead.
- 2.10 On the completion of the works, amphibian fencing was reinstalled along the original fence line to prevent recolonisation of the main development site.

3. <u>RESULTS</u>

- 3.1 A total of three great crested newts were encountered during the mitigation works. All of which were sub-adult females. The first individual was found approximately 4" below ground level within the area designated for the bund construction. The other two individuals were discovered within the "toe" of the amphibian fencing which was removed around the outfall pipe area. In addition to the great crested newts, a single sub-adult smooth newt/palmate newt was found under the same fencing. All amphibians were immediately released to a safe area.
- 3.2 At the time of release, day-time temperatures were unusually mild, reaching a maximum of 15°C. Consequently, the animals released were not torpid when

captured. Under these conditions, it was considered appropriate to release captured animals as close as possible to the point of capture. Nevertheless, the animals were released into a temporary hibernaculum constructed on-site from rubble and oil, as a precaution against sharp frosts, allowing the animals time to find alternative suitable shelter.

3.3 A number of reptiles were also found during this phase of the works; these taxa were previously unknown from the site. A total of 16 common lizard (six adult, 10 sub-adults) and three slow worms (two adults, one sub-adult) were also caught and translocated to a safe area within the site.

4. <u>CONCLUSIONS</u>

- 4.1 The areas subject to additional development works were cleared of amphibians during December 1998 and January 1999, thus allowing works to commence without infringement of the Wildlife and Countryside Act.
- 4.2 The weather during the period of additional mitigation works was exceptionally mild, with daytime maximum temperatures reaching 15°c at times. It is believed that due to these seasonally high temperatures the possibility of the herptiles encountered experiencing unnecessarily high levels of stress was greatly reduced.

REFERENCES

PAA, 1998. Results of Amphibian Capture Programme at Damhead Creek Power Station, Kingsnorth, Kent. Report prepared for Entergy Power Development Corporation.

FIGURES






APPENDIX I

Letter from English Nature 9th December 1998

16 DEC 1998



English Nature

Northminster House, Peterborough PE1 1UA Telephone (01733) 455000 Fax (01733) 568834

Mr D. Hughes Penny Anderson Associates Park Lea 60 Park Road Buxton Derbyshire SK17 6SN

9 December 1998

Dear Mr Hughes,

Licence application for great crested newt conservation at Kingsnorth Power Station

I write to advise that English Nature will issue a licence to allow the movement of great crested newts for conservation purposes in this instance. This is possible only because the work relates to a very small area of the site and that the circumstances in this case can be regarded as exceptional.

However we feel it appropriate to advise you that such operations would not normally be licensed given the time of year and the fact that this process goes against best practice. We record our concern about the timing of the works and the fact that, despite newts having been translocated to the ditch in question, that measures to exclude animals from the area being crossed by the flood defence bund seem only to have been considered at a very late stage. This is despite the presence of the species being known for some while.

We would draw your attention to the extreme difficulty of locating newts at this time of year and to the fact that we are unsure of the effect that movement will have on the survival of torpid animals. We are aware that newts often aggregate in their over-wintering sites, and our primary concern is that the area being developed could have a significant concentration of animals (though, by the same token, we appreciate that there may be few, or no newts, in the area). In this context we draw your attention to the proportional increase in effort that may be deemed appropriate for fulfilling the need for 'reasonable avoidance' of killing and injuring this protected species. We note that your revised method statement and our phone conversation of 8 December show that you have taken this issue on board. Also, given the uncertainty of the effects of any movement during the winter, we would ask you to consider developing some system where by the survival of any translocated newts might be assessed. Particular consideration must be given to the weather conditions when looking for newts.

It is also important to ensure that any potential damage to great crested newt habitat is minimised. In particular the impacts of vehicles and plant need to be restricted only to those areas cleared of newts. This should be marked by tape / markers as appropriate. The timing of construction work needs to be carefully phased. Animals should not be given the opportunity to recolonise an area.one-deemed to be free of newts. This will be affected by weather. If any delay in work is perceived, or there be a reasonable likelihood of a period of mild weather, we would recommend the construction of amphibian fencing.

Yours sincerely,

Ony Gent

Dr Tony Gent



Sandy Toy



DAMHEAD CREEK LTD

DAMHEAD CREEK POWER STATION, KINGSNORTH, KENT

1999 AMPHIBIAN SURVEY

DAMHEAD CREEK LTD

DAMHEAD CREEK POWER STATION, KINGSNORTH

1999 AMPHIBIAN REPORT

Penny Anderson Associates 'Park Lea' 60 Park Road Buxton Derbyshire SK17 6SN

Date 1999

This project has been undertaken in accordance with PAA policies and procedures on quality assurance.

Signed:_____

1999 Amphibian Report

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1. <u>INTRODUCTION</u>

- 1.1 Penny Anderson Associates has been commissioned by Damhead Creek Ltd. to undertake an amphibian monitoring survey within mitigation land at Kingsnorth during 1999. This work has been carried out as part of the on-going Kingsnorth Management Plan (PAA, January 1998), and follows an amphibian capture programme for great crested newts (GCN) *Triturus cristatus* carried out in the vicinity of Damhead Creek Power Station under English Nature Licence 19980149.
- 1.2 This report discusses the results of the 1999 survey work undertaken under English Nature Licence 19991014. It will be issued to English Nature's South-East Office and their Peterborough Headquarters for approval, as required under the licence agreement.
- 1.3 The GCN receives special protection in the UK under extensive legislation. Statutory national protection is provided under Schedule 5 of the *Wildlife and Countryside Act,* 1981 and international protection is given under Annexes II and IVa of the Habitats and Species Directive (EC Directive 92/43/EEC on *Conservation of Natural Habitats and Wild Fauna and Flora*). Under this legislation both the species and its breeding habitat are protected.
- 1.4 When direct impact to a colony from a legal development is unavoidable, as occurred at Kingsnorth, translocation techniques are usually employed to relocate the colony in a suitable receptor area. As part of the translocation, English Nature require monitoring surveys in future years to ensure that the GCN colony has re-established and that the breeding status of this amphibian is secured.

Background

- 1.5 An Action Plan for the translocation of any amphibians within the development site using capture fencing was devised and submitted to English Nature for approval on 21st January 1998. This was duly granted and by 25th March 1998 a network of capture fencing was installed across the site. This also included a holding compound for any captured amphibians, and a permanent amphibian fence (also known as PAF) constructed along the southern boundary to prevent amphibians entering the site from the ditch. In the event no amphibians were captured using this trapping method.
- 1.6 The entire development site was hand searched on 20th and 21st May 1998 and during the course of these investigations, a pool previously hidden by bramble tangles (*Rubus fruticosus* agg.) was discovered where GCN were found to be present. English Nature were advised of the results on 2nd June and informed that the pool would need to be de-watered and any amphibian life stages present removed. The pool was carefully de-watered on 14th July using a pump

fitted with a hessian filter. Overall, 355 GCN life stages were removed from this waterbody, including 4 adults, 300 metamorphs, 50 larvae and a single egg. Due to the timing of the operations these were all translocated to the adjacent ditch along the southern boundary rather than into the holding compound. Decisions were made at various points during the capture programme against the viability of creating a new GCN colony within the receptor area. These decisions were largely based on the small numbers of adults captured, and the unsuitability of the newly created receptor pond (too turbid).

2. <u>METHODOLOGY</u>

- 2.1 All of the six waterbodies within the Power Plant Site and surrounding Mitigation Land were examined, as shown on Figure 1.
- 2.2 The survey was specifically aimed at detecting GCN in its various life stages, but also included surveys for other amphibians and incidental fish records, as these can all be determinants of GCN occupation. The approach is partly based on English Nature (1994 *et seq.*) and British Herpetological Society (1996) guidelines for amphibian surveying, and employs all of the recommended newt survey techniques, namely netting, torching, trapping and egg searches. Particular attention is given to egg searches as these are particularly effective for determining GCN presence.

<u>Netting</u>

2.3 This is not a particularly good technique to use when searching for GCN as the adults are hard to catch (responding quickly to disturbance and shadows), but sub-adults and larvae from the previous year can often be revealed. The standard methodology is to conduct 15 minutes of daytime netting along pond perimeters of up to 50m in length, and an additional 15 minutes for each successive 50m. Population estimates derived from using this technique would be assessed with reference to Nature Conservancy Council (1989), Grayson *et al.* (1991) and BHS (1996).

Torching

2.4 A 0.5 million candle power torch was used for the night-time searches. Torchlight counts are conducted during the early part of the evening, when the night-time temperature should ideally exceed 10°C. If the night count was not possible due to murky water or weed concentrations, then this would have been substituted by netting using the standard English Nature methodology. Population estimates derived from using this technique were evaluated using NCC (1989), Grayson *et al.* (1991) and BHS (1996).

<u>Bottle Traps</u>

2.5 It was unfeasible to install bottle traps along the margins of all the waterbodies at an intensity of one per 2m perimeter length, as individual ditches alone are of considerable length. By adopting a less intense bottle trap strategy it is acknowledged that this places more reliance on the other survey techniques. All bottles were checked in accordance with English Nature guidelines and, with the reservation due to reduced sampling effort, population estimates were made using NCC (1989) and BHS (1996) guidelines.

Egg Searches

2.6 Searches for GCN eggs were carried out using quantitative estimations of egg numbers, based on the methodology of Grayson *et al.* (1991).

Terrestrial Searches

2.7 The site was thoroughly searched for amphibians, paying particular attention to rubble piles, stone, logs, litter accumulations and vegetation tussocks. Although this technique can be efficient at recording presence it cannot be used to provide any estimation of population size.

3. <u>RESULTS</u>

- 3.1 Amphibian surveys were undertaken on the 18th and 19th of May 1999, and the results are presented on Tables 1-5, and summarised on Table 6. The results demonstrate that following their discovery in 1998, GCNs are still present in the vicinity of the Power Plant Park. The survey did not, however, indicate how successful the amphibian translocation work undertaken in 1998 has been.
- 3.2 Although undertaken at the correct time in the season, the handnet searches (see Table 2) did not reveal any amphibian life stages in the six waterbodies. This was unexpected as the weather conditions were ideal, being warm with periodic showers. However, as many of the waterbodies were clear and amphibians respond quickly to shadows and disturbance, this technique may have been compromised in certain waterbodies such as the Coastal Corridor Pond and along the Southern Perimeter Ditch within the Power Plant Park. Relatively deep waterbodies (in excess of 1m depth), as found in nearly all the ponds and ditches on site, provide ample opportunity for amphibians to avoid capture by this technique.
- 3.3 The torchlight searches were more revealing (see Table 3), locating amphibians in three of the six waterbodies. Great crested newts were found in the Pumping Station Pond and the Southern Perimeter Ditch, all in the vicinity of the Power

Plant Park. While the presence of GCNs along the Southern Perimeter Ditch was expected (as amphibians had been translocated here in 1998), the Pumping Station Pond has never been properly investigated and so represents an extension to the envisaged distribution. This pond consists of a flooded concrete-lined pit beneath pipework that enters the disused pumping station, and is no more than 0.2m in depth. Despite vertical sides to this feature, or perhaps as a consequence of overhanging vegetation, no less than five adults and one juvenile were found here. Interestingly, during amphibian rescue work along the nearby bund as part of flood defence and site drainage works (English Nature licence 19981845), two sub-adult GCNs and a juvenile newt (unconfirmed but most likely to be a smooth newt) were found here, within 50m of the Pumping Station Pond. In both waterbodies where GCNs were found, the torchlight results revealed numbers that suggest 'low' sized populations (NCC, 1989; Gent & Gibson, 1998).

- 3.4 Smooth newts were also located in the Pumping Station Pond, and elsewhere in the Coastal Corridor Pond. All occurred in numbers that suggest 'low' sized populations (NCC, 1989; Gent & Gibson, 1998).
- 3.5 Torchlight surveys in the three remaining waterbodies, the Western Corridor Pond, the Grassland Translocation Pond and the original Receptor Pond were not possible as the water was too murky. The latter two ponds still possess rather turbid water quality conditions due to the underlying exposed clays.
- 3.6 With the exception of the Pumping Station Pond, which is not possible to survey using bottle traps, no amphibian life stages were detected in any of the waterbodies using this technique. Again, this is curious as this method is usually very efficient at catching newts, in particular, but may be a consequence of the low numbers of traps installed relative to perimeter length.
- 3.7 Considerable effort was given to egg searches in all of the waterbodies, but only the Pumping Station Pond was found to contain amphibian eggs. Here, single numbers of GCN eggs were found which, combined with torchlight counts of adults and one juvenile, implies the presence of a small breeding population.

Implications of the 1999 Survey Results

- 3.8 Following amphibian relocation work in 1998, no life stages of GCN were found within the Power Plant Park during the 1999 survey in either the terrestrial habitats or within the Grassland Translocation Pond. This suggests that residual numbers in the vicinity of the Power Plant construction works, if any, are small.
- 3.9 A single adult GCN was found along the Southern Perimeter Ditch, where in 1998 adults, metamorphs and larvae were translocated. There is therefore no evidence yet to indicate whether breeding in 1999 has occurred here, and therefore the success of the translocation project here remains uncertain.

3.10 Elsewhere, in the vicinity of the Pumping Station Pond, a new GCN breeding pond has been detected and adults from this waterbody have been found both within this pond and on the nearby flood defence bank. Individuals here are therefore within the expected range of the unused receptor pond and associated hibernaculum installed during 1998, and so future colonisation of this waterbody remains likely.

4. <u>RECOMMENDATIONS OF THE 1998 AMPHIBIAN REPORT</u>

- 4.1 The following recommendations were made in 1998 amphibian report, and subsequently implemented in 1999 as follows.
- 4.2 'The PAF fence along the southern boundary will need to be maintained, and any rips or damage to its integrity repaired as soon as possible'. Throughout 1999 the PAF fences was maintained, but following sustained damage from rabbits and high winds, the fence has now deteriorated to a point where it requires replacement. Given that most of the construction works in the eastern half of the Power Plant Park were completed in 1998-99, a revised PAF fence layout is proposed, see Figure 2.
- 4.3 *'The receptor site does not contain any translocated amphibians, and so it is not important to maintain the integrity of its associated PAF fencing'.* With the finding of a new breeding pond beside the Pumping Station, it remains important for a PAF fence to be present along the northern boundary of the development, as part of the overall layout proposed on Figure 2.
- 4.4 'Sufficient and appropriate capture effort has been undertaken to translocate great crested newts from the development site, as required under the License. Any remaining great crested newts encountered on site during the various development activities should be carefully contained, and a licensed newt handler approached to remove the individual(s) to the ditch along the southern boundary'. There have been no reports of GCN found within the development site. This recommendation remains, however, a legal requirement during the power station development. As a result of the 1999 survey, it is now thought more appropriate to relocate all future amphibians encountered within the construction site to the Receptor Pond.
- 4.5 'Future monitoring of the great crested newt colony associated with the ditch along the southern boundary is not considered appropriate. It would not be possible to examine the outcome of introducing individuals from the capture programme as no baseline population data for the ditch is available'. With the difficulty in surveying along this ditch combined with finding large numbers of stickleback along this ditch, it is not recommended that survey efforts are concentrated on determining a breeding population here. Instead, future efforts should concentrate on ensuring the integrity of the PAF fence along southern boundary, maintaining

breeding in the Pump Station Pond and ensuring that GCNs can establish breeding in the original Receptor Pond. Future monitoring should target the Pump Station Pond and Receptor Pond, in particular.

5. <u>RECOMMENDATIONS OF THE 1999 SURVEY REPORT</u>

- 5.1 A new PAF fencing layout is proposed, see Figure 2, which takes into account progress in construction work across the Power Plant Park. This fencing should be erected by mid-February at the latest, to ensure that amphibians emerging early from hibernation can not enter the construction site. The existing PAF should be cut off at ground level and left below ground as amphibians may be present at the toe of the PAF. If the fencing posts are to be re-used *in situ* however, it will be necessary for a licensed amphibian handler to be present during any excavation work.
- 5.2 Any amphibians encountered within the construction site during 2000 should be relocated to the Receptor Pond by a licensed newt handler.
- 5.3 Future monitoring of GCNs in 2000, as a requirement of the Kingsnorth Management Plan, should be restricted to the following four waterbodies: Pumping Station Pond, Grassland Translocation Pond, Receptor Pond and Southern Perimeter Ditch. The same survey methods used in the 1999 survey should be employed, but the following changes are recommended:
 - utilise torchlight counting on three separate nights within the breeding period, to ensure that peak numbers are revealed;
 - discontinue handnet searching;
 - amplify the bottle trapping search, by ensuring that the appropriate number of traps are deployed (one trap per 3m of shoreline);
 - refine the egg search by installing plastic egg traps at the start of the breeding period.
- 5.4 As the Pumping Station Pond is steep sided and much covered by bramble tangles, it is recommended that amphibian access to/from the pond is improved by installing wooden ramps at either end and cutting back brambles from the eastern end. By improving amphibian access, this should ensure that both the migrating adults and emerging metamorphs are not trapped within the pond.
- 5.5.1 The proposed wetland creation works within the eastern half of the Power Plant Park and along the Coastal Corridor should proceed as soon as possible, so that new potential breeding habitat for GCNs can begin to develop. As new

waterbodies take time to develop suitable egg-laying substrate and larval food supplies, it is important to create these potential breeding ponds early.

REFERENCES

British Herpetological Society, 1996. *Surveying for Amphibians*. BHS Conservation Committee publication.

English Nature, 1994 et seq. Species Conservation Handbook. EN publication.

Gent, T. and Gibson, 1998. Herpetofauna Workers Manual.

Grayson, R.F., Parker, R. and Mullaney, A.S., 1991. Atlas of the amphibians of Greater Manchester County and new criteria for appraising UK amphibian sites. *Lancashire Wildlife Journal*, **1**, pp. 4–20.

Griffiths, R.A., Raper, S.J. and Brady, L.D., 1996. Evaluation of a standard method for surveying common frogs and newts. *JNCC Report No. 259.* Joint Nature Conservation Committee, Peterborough.

Nature Conservancy Council, 1989. Guidelines for the selection of Biological Sites of Special Scientific Interest. NCC, Peterborough.

Penny Anderson Associates (1998) Management Plan for Land at Kingsnorth, Isle of Grain. Prepared for Damhead Creek Ltd.

TABLES

TABLE 1Netting and Bottle Trapping Survey Methodology Employed at
Kingsnorth, Isle of Grain

Waterbody	Perimeter Length (m)	Time for Hand Netting (mins)	No. Bottle Traps	No. Bottle Traps per Metre Length Perimeter
Pond in Western Corridor	100	30	9	0.09
Pond in Coastal Corridor	70	30	12	0.17
Pumping Station Pond	36	15	N/A	N/A
Southern Perimeter Ditch	610	90 ¹	13	0.02
Grassland Translation Pond	80	30	6	0.08
Amphibian Receptor Pond	20	15	6	0.30

Key:

¹ Less than required time (should be 180 minutes), but thought appropriate as waterbody, very deep and much infilled with emergent vegetation.

TABLE 2 Handnetting Results Within Waterbodies at Kingsnorth, Isle of Grain

	T	Ċ	Tv		Th		Rt		Bb		Fish	
Pond	18/05	19/05	18/05	19/05	18/05	19/05	18/05	19/05	18/05	19/05	Combined Survey Results	
Pond in Western Corridor	-	-	-	-	-	-	-	-	-	-	++ 3-spined stickleback	
Pond in Coastal Corridor	-	-	-	-	-	-	-	-	-	-	+++ 3-spined stickleback	
Pumping Station Pond	-	-	-	-	-	-	-	-	-	-	-	
PPP: Southern Perimeter Ditch	-	-	-	-	-	-	-	-	-	-	+++ 3-spined stickleback + 10-spined stickleback	
PPP: Grassland Translocation Pond	-	-	-	-	-	-	-	-	-	-	-	
PPP: Amphibian Receptor Pond	-	-	-	-	-	-	-	-	-	-	-	

Key:

Tc Triturus cristatus

Tv Triturus vulgaris

Th Triturus helveticus

Rt Rana temporaria

, Bb Bufo bufo

	Тс	Τv	Th	Rt	Bb	Fish
Pond	18/05	18/05	18/05	18/05	18/05	Combined Survey Results
Pond in Western Corridor ¹	-	-	-	-	-	-
Pond in Coastal Corridor	-	1f	-	-	-	+++ 3-spined stickleback
Pumping Station Pond	3m,2f,1juv	2m	-	-	-	-
PPP: Southern Perimeter Ditch	1m	-	-	-	-	+++ 3-spined stickleback + 10-spined stickleback
PPP: Grassland Translocation Pond ¹	-	-	-	-	-	-
PPP: Amphibian Receptor Pond ¹	-	-	-	-	-	-

TABLE 3 Torchlight Results Within Waterbodies at Kingsnorth, Isle of Grain

Key:

Tc Triturus cristatus

Tv Triturus vulgaris

Th Triturus helveticus

Rt Rana temporaria

Bb Bufo bufo

¹ Water too murky to survey properly

		Тс		Tv		Th		Rt		b	Fish
Pond	18/05	19/05	18/05	19/05	18/05	19/05	18/05	19/05	18/05	19/05	Combined Survey Results
Pond in Western Corridor	-	-	-	-	-	-	-	-	-	-	++ 3-spined stickleback
Pond in Coastal Corridor	-	-	-	-	-	-	-	-	-	-	+++ 3-spined stickleback
Pumping Station Pond											
PPP: Southern Perimeter Ditch	-	-	-	-	-	-	-	-	-	-	+++ 3-spined stickleback + 10-spined stickleback
PPP: Grassland Translocation Pond	-	-	-	-	-	-	-	-	-	-	-
PPP: Amphibian Receptor Pond	-	-	-	-	-	-	-	-	-	-	-

TABLE 4 Bottle Trap Results Within Waterbodies at Kingsnorth, Isle of Grain

Key:

Tc Triturus cristatus

Tv Triturus vulgaris

Th Triturus helveticus

Rt Rana temporaria

, Bb Bufo bufo

	Тс	Τv	Th	Rt	Bb
Pond	19/05	19/05	19/05	19/05	19/05
Pond in Western Corridor	-	-	-	N/A	N/A
Pond in Coastal Corridor	-	-	-	N/A	N/A
Pumping Station Pond	1s	-	-	N/A	N/A
PPP: Southern Perimeter Ditch	-	-	-	N/A	N/A
PPP: Grassland Translocation Pond	-	-	-	N/A	N/A
PPP: Amphibian Receptor Pond	-	-	-	N/A	N/A

TABLE 5 Egg Search Results Within Waterbodies at Kingsnorth, Isle of Grain

Key:

Tc *Triturus cristatus*

Tv Triturus vulgaris

Th Triturus helveticus

Rt Rana temporaria

Bb Bufo bufo

TABLE 6 Summary of Amphibian Interest Within Waterbodies at Kingsnorth, Isle of Grain

Pond	Тс	Τv	Th	Rt	Bb
Pond in Western Corridor	-	-	-	?	?
Pond in Coastal Corridor	-	Adults present	-	?	?
Pumping Station Pond	Adults, juveniles, eggs present BREEDING	-	-	?	?
PPP: Southern Perimeter Ditch	Adults present	-	-	?	?
PPP: Grassland Translocation Pond	-	-	-	?	?
PPP: Amphibian Receptor Pond	-	-	-	?	?

Key:

Tc Triturus cristatus

Tv Triturus vulgaris

Th Triturus helveticus

Rt Rana temporaria

Bb Bufo bufo

FIGURES





DAMHEAD CREEK LTD

DAMHEAD CREEK POWER STATION KINGSNORTH, KENT

2001 AMPHIBIAN MONITORING

2001 Amphibian Monitoring

DAMHEAD CREEK LTD

DAMHEAD CREEK POWER STATION KINGSNORTH, KENT

2001 AMPHIBIAN MONITORING

Penny Anderson Associates Ltd 'Park Lea' 60 Park Road Buxton Derbyshire SK17 6SN

February 2002

This project has been undertaken in accordance with PAA policies and procedures on quality assurance.

Signed:_____

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1. <u>INTRODUCTION</u>

- 1.1 In 2001, Penny Anderson Associates Ltd was commissioned by Damhead Creek Ltd to undertake a great crested newt (*Triturus cristatus*) (GCN) monitoring programme within development land at Damhead Creek Power Station, Kingsnorth, Kent (PAA 1998a). This area of land has been made subject to a Nature Conservation Management Plan (PAA 1998b) that establishes a series of development, maintenance and monitoring works over a five year period.
- 1.2 The maintenance and enhancement of GCN populations is required under Prescriptions P17 (translocation and construction of receptor pond and amphibian barrier fence) and P26 (construction of hibernacula) of the Management Plan. Monitoring of any translocated GCN populations is required under Prescription MOP6.
- 1.3 This monitoring forms the second GCN survey following a capture and relocation of all GCN during a translocation programme undertaken in 1998. The results of the translocation and first year of monitoring are presented in full in earlier reports (PAA 1998a and PAA 2000). However, the background to this work is outlined in brief below.

Background to the Study

- 1.4 In 1998 the possibility of a small GCN colony along the southern perimeter ditch adjacent to the development site (the Power Plant Park) led to the development of an Action Plan to capture and translocate GCN and other amphibians in this area, under licence from English Nature.
- 1.5 In March 1998 an amphibian barrier fence was constructed along the southern perimeter ditch to exclude GCNs and other amphibians from entering the development site. A trapping programme was then implemented over twelve weeks (29th March 9th April 1998) to remove any GCNs remaining on the development site. In the event, no GCN or any other amphibians were captured using this trapping method.
- 1.6 The development site was further searched by hand in May 1998 and during the course of these investigations GCNs were found in a small pool previously hidden by bramble (*Rubus fruticosus* agg.). This waterbody had formed within a square, concrete-lined depression within the footings of the former hangar building. The pond was partially vegetated with an emergent stand of sea clubrush (*Bolboschoenus maritimus*) and occasional plants of starwort (*Callitriche stagnalis* agg.) and common water-crowfoot (*Ranunculus aquatilis*). The underlying sediments consisted of deep layers of silt and leafy detritus and the water level appeared to fluctuate between c.0.5 1.2m. The pool was de-

watered and over 355 GCNs were removed by netting and hand searching, including 4 adults, 300 metamorphs (larvae about to emerge onto land), over 50 larvae and a single egg.

- 1.7 As part of the translocation programme an amphibian receptor pond was constructed in 1998 within the Mitigation Land adjacent to the Power Plant Park development site. This receptor pond was not used during the translocation exercise as the pond was recently constructed and contained only depauperate vegetation and highly turbid waters. The GCNs were actually translocated to the southern perimeter ditch. The results of this capture and translocation programme are reported in PAA 1998a.
- 1.8 Following the capture and relocation of all GCN found during the 1998 translocation programme, a monitoring programme was developed to ascertain how successful the GCN translocation had been. Criteria used to assess translocation success are:
 - the presence of GCN colonies within the waterbodies of interest, and;
 - the re-establishment of a breeding GCN colony within the waterbodies of interest.
- 1.9 This report presents the results of two monitoring episodes (1999 and 2001), discusses the implication of the findings and recommends a course of action for future monitoring.

Species Protection and Conservation

- 1.10 Great crested newts receive protection in the UK under extensive national and international legislation. The species is listed on Annexes IIa and IVa of the Habitats and Species Directive (EC Directive 92/43/EEC on *Conservation of Natural Habitats and Wild Fauna and Flora*), identifying the GCN as a European Protected Species. The species is also listed on Appendix II of the Bern Convention.
- 1.11 Statutory protection is given under Schedule 5 of the *Wildlife and Countryside Act* 1981, which has recently been updated and strengthened under the *Countryside Rights of Way Act* 2000. Section 9 of this legislation makes it an offence to:
 - intentionally kill, injure or take a GCN;
 - possess or control any live or dead specimen or anything derived from a GCN;
 - intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a GCN;

- intentionally or recklessly disturb a GCN while it is occupying a structure or place which it uses for that purpose.
- 1.12 Protection is also given under Schedule 2 of the *Conservation (Natural Habitats,* &c.) *Regulations* 1994. Under Regulation 39 of this legislation it is an offence to:
 - deliberately capture or kill a GCN;
 - deliberately disturb a GCN;
 - deliberately take or destroy the eggs of a GCN;
 - damage or destroy a breeding or resting place of a GCN.
- 1.13 In addition, the GCN is a Priority Species within the UK Biodiversity Action Plan (BAP) (Anon. 1995) with a Species Action Plan (SAP) aimed at maintaining the existing range and population status, as well as increasing the number of populations through re-colonisation. There is also a local SAP presented in the Kent BAP (Kent Biodiversity Action Plan Steering Group 1997) defining similar aims to the UK BAP with a target to create or restore 20 ponds per year in areas with suitable terrestrial habitat for GCN.

2. <u>METHODOLOGY</u>

- 2.1 Six waterbodies on the Power Plant Park and associated mitigation land were monitored in 1999: the western corridor pond, the coastal corridor pond, the receptor pond, the grassland translocation pond, the pumping station pond and the southern perimeter ditch (Figure 1). In 2001, three of these waterbodies were selected for further monitoring based on the 1999 results (see PAA 2000). These were the grassland translocation pond, the receptor pond and the pumping station pond (Figure 2).
- 2.2 The 1999 monitoring consisted of surveys undertaken on two consecutive days (18th and 19th May). In 2001 the sampling effort was increased and three surveys were undertaken on two separate occasions; one survey during 23rd and 24th May, and two surveys during the 30th, 31st May and 1st June.
- 2.3 The overall approach followed published guidance (Gent and Gibson 1998; British Herpetological Society 1996; Griffiths *et al.* 1996; English Nature 1994; Grayson *et al.* 1991), and best practice based upon field experience and reasonable effort. The methods used in both 1999 and 2001 were netting, bottle trapping, night-time torch surveys and egg searching, and are outlined below.

Netting

2.4 The methodology followed Griffiths *et al.* (1996), Nature Conservancy Council (1989) and English Nature (1994). A single net-sweep was used per 2m of bankside, and netting was carried out for at least 15 minutes along pond perimeters up to 50m in length, with an additional 15 minutes netting for each 50m thereafter.

<u>Torching</u>

2.5 A 0.5 million candle power torch was used for the night-time searches. Torchlight counts were conducted during the early part of the evening when the night-time temperature should exceed 10°C.

Bottle Trapping

2.6 In 2001, traps were set at 2m intervals around the perimeter of all three ponds, following the methods of Griffiths *et al.* (1996). The intensity of trapping in the pumping station pond was slightly less as the concrete base of the pond and the shallow water depth made setting bottle traps difficult in some parts. In 1999

trapping was carried out at a lower intensity, as detailed in PAA 2000. All bottles were checked in accordance with English Nature (1994) guidelines.

Egg Searches

- 2.7 Searches for GCN eggs were used to estimate egg numbers, based on the methodology of Grayson *et al.* (1991).
- 2.8 The conservation status of the newt populations monitored in 2001 was assessed using the method of Griffiths *et al.* (1996), and population size was estimated using the Nature Conservancy Council guideline (NCC 1989).

3. <u>RESULTS</u>

- 3.1 The results of the 2001 monitoring are presented below, and discussed with reference to the 1999 monitoring. The results of the 1999 monitoring have been fully reported elsewhere (PAA 2000), however the results of both the 1999 and 2001 amphibian monitoring are presented in Table 1 and summarised in Table 2.
- 3.2 Fewer GCN were found during the 2001 monitoring, with one adult being found in 2001 in comparison with six adults/juveniles in 1999. In addition, no GCN egg or larvae were detected in 2001, compared with small numbers of both in 1999.
- 3.3 The single adult GCN was netted in the receptor pond in 2001 where there were previously (1999) no records of GCN. In contrast, no evidence of GCN was found in the pumping station pond in 2001 where, in 1999, five adults, one juvenile and one egg were monitored.
- 3.4 In 2001 no smooth newts were found in the pumping station pond, while in 1999 two adults were observed during torchlight survey. However, in the receptor pond, 21 adults and nine larvae were found in 2001, where there were previously (1999) no newt records. In 1999 no smooth newts of any life stage were detected.
- 3.5 Twelve adult male and nine adult female smooth newts (*Triturus vulgaris*) were recorded in 2001 by netting and bottle trapping, also within the receptor pond. In addition, nine smooth newt larvae were netted within the receptor pond. No smooth newt eggs were found during egg searches.
- 3.6 No palmate newts (*Triturus helveticus*) were found during the 1999 or 2001 monitoring.
- 3.7 No adult or juvenile common frogs (*Rana temporaria*) or common toads (*Bufo bufo*) were found during the 1999 or 2001 monitoring.
- 3.8 Smooth newt populations in the area monitored were found to be of average to below average conservation status, based on the methodology of Griffiths *et al.* (1996). The NCC (1989) guidance put the smooth newt population just within the minimum number required for classification as a good population. These data are presented in Table 3. Population estimates for GCN in 2001 could not be reliably estimated on the basis of one individual. However, the single GCN record suggests a low population (NCC 1989) of below average conservation status (Griffiths *et al.* 1996).

4. <u>DISCUSSION</u>

- 4.1 Following the translocation of over 300 great crested newts (GCN) from the development site (the Power Plant Park) to the southern perimeter ditch in 1998, it was anticipated that the new receptor pond would provide additional habitat for GCN to disperse to and breed. However, the monitoring so far indicates only one adult GCN in the receptor pond, suggesting populations have not yet established. Some possible reasons for this are discussed in the following paragraphs.
- 4.2 The southern perimeter ditch to which the GCN were translocated has now been found to contain three-spined stickleback (*Gasterosteus aculeatus*). The GCN population monitored here in 1999 now appears to be very small (one adult found by torchlight survey). These factors are likely to be linked, as three-spined stickleback eat the eggs and larvae of newts, and GCN larvae are particularly vulnerable to fish predation as they are active within the water column rather than remaining close to the pond bottom.
- 4.3 The initial translocation was predominantly of GCN metamorphs (larvae about to emerge onto land), with only four adults included. GCN larvae have a high mortality rate, as noted above, and the majority of these larvae/metamorphs are unlikely to have survived to produce breeding adults.
- 4.4 Given the probability of a small population of GCN in the southern perimeter ditch, possibly suppressed by fish predation, the likelihood of adult GCNs migrating from the ditch to the new receptor pond appears to be low. There is expected to be enough suitable habitat in the southern perimeter ditch for a small population to be maintained.
- 4.5 The sampling effort was increased in 2001 to try to better establish the presence of GCN on the site. However, this increased sampling effort may provide a better assessment of GCN activity if the three visits are in future spread out over April and May.
- 4.6 The 21 smooth newts recorded in the receptor pond suggest the site now holds a smooth newt population of average conservation status (Griffiths *et al.* 1996) where previously no smooth newts were found. The presence of larvae indicates the smooth newts are breeding here. Future survey will help to establish if this population is maintained.
- 4.7 Smooth newts within the vicinity therefore appear to be dispersing to, and breeding within, the receptor pond three years after its construction in 1998. This suggests that the receptor pond is becoming a more suitable habitat for smooth newt populations. This may be linked to the continued development of
aquatic and marginal vegetation required for refuge and egg laying, along with an increasing variety of aquatic invertebrates for food.

- 4.8 The pumping station pond, identified as a new GCN breeding pond in 1999 (PAA 2000), showed no evidence of GCN activity in 2001. Adults and juveniles from this waterbody are within the expected dispersal range of the receptor pond and the perimeter ditches. It is possible that the GCN have dispersed from this pond to other areas, in particular to the southern perimeter ditch. It should be noted, however, that the presence of a large population of green algae within the water column may have reduced the efficiency of netting and torchlight surveys, while the concrete base and shallow water levels reduced the sampling density of bottle traps.
- 4.9 No newts were observed in the grassland translocation pond in either 1999 or 2001. The presence of a large number of thee-spined sticklebacks observed in this pond in both 1999 and 2001 is likely to reduce this pond's suitability for newts, as these fish eat the eggs and larvae of newts.

5. <u>RECOMMENDATIONS</u>

- 5.1 In summary, the results indicate that there is a very small population of GCN on the site, although no firm evidence of breeding was recorded. In view of the highly protected status of the GCN, it is recommended that additional monitoring should be undertaken to seek to confirm whether a breeding population establishes, and whether the project can be regarded as a success. The following recommendations are therefore made based on the findings of the monitoring programme to date and recently published guidance on GCN mitigation (English Nature 2001).
- 5.2 Further amphibian surveys should continue to monitor the presence of GCN populations within the pumping station pond, the grassland translocation pond and the receptor pond. In particular it is still necessary to establish if GCN are breeding on the site after translocation, as required by Prescription MOP6 of the Management Plan (PAA 1998b).
- 5.3 It is recommended that monitoring should next be undertaken in spring 2002. This will provide three post-translocation monitoring periods (1999, 2001, 2002). English Nature (2001) guidelines advise a minimum of four years of monitoring for translocation programmes involving a small GCN population and the loss of a breeding pond. It is therefore recommended that monitoring also be undertaken in 2003.
- 5.4 The recently published English Nature (2001) guidelines on GCN mitigation recommend minimum levels of survey for monitoring and detecting GCN populations. In view of this, and the evidence of a very low population recorded in 2001, it is recommended that the future monitoring methodology should include following modifications:
 - the monitoring should be undertaken on three separate occasions from mid-March to mid-June, with two visits occurring between mid-April and mid-May;
 - (2) the southern perimeter ditch should be included to assess GCN populations in this waterbody. However, given the length of this ditch (610m) it is suggested that bottle trapping is carried out in a number of previously defined 10m long sections, rather than along its full length, and combined with the additional survey method of using egg laying strips to detect GCN;
 - (3) additional data should be collected on the habitat suitability of the ponds and ditches, including the presence of egg-laying plants, fish and water depth/permanence. This is of particular importance for the decisions relating to the management of the receptor pond.

- 5.5 The amphibian barrier fence should be checked on at least a monthly basis and carefully maintained according to the specification already provided to ensure amphibians are not able to disperse into the development area of the Power Plant Park. The checking and maintenance should be undertaken by the specified contractor and the findings of every check logged and reported back to the Barton Willmore Project Manager. Any severe breaches in the fencing observed outside of regular inspections should also be reported to the Project Manager, while minor breaches should be reported to the specified contractor.
- 5.6 Great crested newts recorded in the pumping station pond in 1999 appear to have dispersed without additional management. Therefore, no additional management of this pond for amphibians is required.
- 5.7 The receptor pond appears to be establishing suitable habitat for smooth newt colonisation. However, the establishment of a GCN colony is still uncertain. It is recommended that a survey of the receptor pond and its vegetation is undertaken in 2002 to assess its suitability for GCNs.
- 5.8 The grassland translocation pond appears to provide less suitable habitat for newt colonisation, as no newts have been recorded there. This may be due, at least in part, to the presence of high numbers of predatory three-spined stickleback. The pond does, however, provide additional habitat for other aquatic species and no additional management for amphibians is recommended at this stage.

REFERENCES

Anonymous, 1995. *Biodiversity: The UK Action Plan*. HMSO, London.

- British Herpetological Society, 1996. *Surveying for Amphibians*. BHS Conservation Committee publication.
- English Nature, 1994. Species Conservation Handbook. English Nature, Peterborough.
- English Nature, 2001. Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.
- Gent, T. and Gibson, S., 1998. *Herpetofauna Workers Manual*. Joint Nature Conservation Committee, Peterborough.
- Grayson, R.F., Parker, R. and Mullaney, A.S., 1991. Atlas of the amphibians of Greater Manchester County and new criteria for appraising UK amphibian sites. *Lancashire Wildlife Journal*, 1: 4–20.
- Griffiths, R.A., Raper, S.J. and Brady, L.D., 1996. Evaluation of a standard method for surveying common frogs and newts. *JNCC Report No. 259*. Joint Nature Conservation Committee, Peterborough.
- Kent Biodiversity Action Plan Steering Group, 1997. Kent Biodiversity Action Plan. A Framework for the Future of Kent's Wildlife. Kent County Council, Maidstone.
- Nature Conservancy Council, 1989. *Guidelines for the selection of Biological Sites of Special Scientific Interest*. Nature Conservancy Council, Peterborough.
- PAA, 1998a. Results of the Amphibian Capture Programme at Damhead Creek Power Station, Kingsnorth, Kent. Prepared for Damhead Creek Ltd.
- PAA, 1998b. Management Plan for Land at Kingsnorth, Isle of Grain, Kent. Prepared for Damhead Creek Ltd.
- PAA, 2000. Damhead Creek Power Station, Kingsnorth. 1999 Amphibian Report. Prepared for Damhead Creek Ltd.

TABLES

Table 1Numbers of amphibians recorded in May 1999 and 2001, using four different methodologiesDamhead Creek Power Station, Kingsnorth, Kent

Method of Survey	Western Po	Corridor ond	Coastal Po	Corridor ond	Pumping Por	Station d	Southern Di	Perimeter tch	Gras Transloca	sland ition Pond	Recep	tor Pond
5	1999	2001	1999	2001	1999	2001	1999	2001	1999	2001	1999	2001
Netting												
Great crested newt	-	ns	-	ns	-	-	-	ns	-	-	-	1(m)
Smooth newt	-	ns	-	ns	-	-	-	ns	-	-	-	1(m), 6(f), 9(l)
Common frog	-	ns	-	ns	-	-	-	ns	-	-	-	-
Common toad	-	ns	-	ns	-	-	-	ns	-	-	-	-
Bottle Trapping												
Great crested newt	-	ns	-	ns	-	-	-	ns	-	-	-	-
Smooth newt	-	ns	-	ns	-	-	-	ns	-	-	-	8(m), 3(f)
Common frog	-	ns	-	ns	-	-	-	ns	-	-	-	-
Common toad	-	ns	-	ns	-	-	-	ns	-	-	_	-
Torching				·								
Great crested newt	-	ns	-	ns	3(m), 2(f), 1(l), 1(e*)	-	1(m)	ns	-	-	-	-
Smooth newt	-	ns	1(f)	ns	2(m)	-	-	ns	-	-	-	3(m)
Common frog	-	ns	-	ns	-	-	-	ns	-	-	-	-
Common toad	-	ns	-	ns	-	-	-	ns	-	-	-	-

Notes

1999 = combined data from 18th - 19th May.

2001 = combined data from 23rd - 24th May & 30th May 2001 - 1st June.

Frog and toad spawn not surveyed.

*Egg detected by egg searches.

Key

ns = not surveyed m = adult male f = adult female l = larvae

e = egg

	Western	Corridor nd	Coastal (Po	Corridor nd	Pumping Por	Station	Southern	Perimeter tch	Gras Transloca	sland tion Pond	Recept	or Pond
	1999	2001	1999	2001	1999	2001	1999	2001	1999	2001	1999	2001
Great crested newt	-	ns	-	ns	7 (a+l+e) Breeding	-	1 (a)	ns	-	-	-	1 (a)
Smooth newt	-	ns	1 (a)	ns	2 (a)	-	-	ns	-	-	-	30 (a+l)
Common frog	-	ns	-	ns	-	-	-	ns	-	-	-	-
Common toad	-	ns	-	ns	-	-	-	ns	-	-	-	-
Three-spined stickleback	Present	ns	Present	ns	-	-	Present	ns	Present	Present	-	-

Table 2Summary of amphibian monitoring results for 1999 and 2001Damhead Creek Power Station, Kingsnorth, Kent.

Key

ns = not surveyed

a = adult

l = larvae

e = egg

Table 3An assessment of the conservation status of smooth and great crested newt populations
derived from the 2001 monitoring data for the receptor pond

Method of Survey	Receptor pond perimeter length (m)	Total no. adults surveyed	No. adults per 2m perimeter	Conservation status of population*	
Great Crested Newt					
Netting	20m	1	0.1	below average	
Bottle trapping	20m	0	0.0	n/a	
Torching	20m	0	0.0	n/a	
Smooth Newt					
Netting	20m	7	0.7	average	
Bottle trapping	20m	11	1.1	average	
Torching	20m	3	0.3	below average	

Notes

Data for GCN insufficient for a meaningful assessment of conservation status.

*Based on the methodology of Griffiths et al. (1996).

Following the NCC (1999) guidelines there is a low population of great crested newt, and a good population of smooth newt on the site at present.

FIGURES





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DAMHEAD CREEK POWER STATION KINGSNORTH, KENT

2002 AMPHIBIAN MONITORING

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2002 AMPHIBIAN MONITORING

Penny Anderson Associates Ltd 'Park Lea' 60 Park Road Buxton Derbyshire SK17 6SN

August 2002

This project has been undertaken in accordance with PAA policies and procedures on quality assurance.

Signed:_____

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- 1 Location of Ponds and Ditches Included in 1999 and/or 2001 Surveys
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1. <u>INTRODUCTION</u>

- 1.1 In 2002, Penny Anderson Associates Ltd was commissioned by Damhead Creek Ltd to undertake a great crested newt (GCN) (*Triturus cristatus*) monitoring programme within land at Damhead Creek Power Station, Kingsnorth, Kent (PAA 1998a). This area of land has been made subject to a Nature Conservation Management Plan (PAA 1998b) that establishes a series of development, maintenance and monitoring works over a five year period.
- 1.2 The maintenance and enhancement of GCN populations is required under Prescriptions P17 (translocation and construction of receptor pond and amphibian barrier fence) and P26 (construction of hibernacula) of the Management Plan. Monitoring of any translocated GCN populations is required under Prescription MOP6.
- 1.3 The monitoring here forms the third year of GCN survey following a capture and relocation of all GCN during a translocation programme undertaken in 1998. The results of the translocation, first and second year of monitoring are presented in full in earlier reports (PAA 1998a, 2000, 2001). However, the background to this work is outlined in brief below.

Background to the Study

- 1.4 In 1998 the possibility of a small GCN colony along the southern perimeter ditch adjacent to the Power Plant Park development site led to the production of an Action Plan to capture and translocate GCN and other amphibians in this area, under licence from English Nature.
- 1.5 In March 1998 an amphibian barrier fence was constructed along the southern perimeter ditch to exclude GCNs and other amphibians from entering the development site. A trapping programme was then implemented over two weeks (29th March 9th April 1998) to remove any GCNs remaining on the development site. In the event, no GCN, or any other amphibians, were captured using this trapping method.
- 1.6 The development site was further searched by hand in May 1998 and during the course of these investigations GCN were found in a small pool previously hidden by bramble (*Rubus fruticosus* agg.). This waterbody had formed within a square, concrete-lined depression within the footings of a former building. The pond was partially vegetated with an emergent stand of sea clubrush (*Bolboschoenus maritimus*) and occasional plants of common water-starwort (*Callitriche stagnalis*) and common water-crowfoot (*Ranunculus aquatilis*). The underlying sediments consisted of deep layers of silt and leafy detritus and the water level appeared to fluctuate between c.0.5–1.2m. The pool was de-watered

and over 355 GCNs were removed by netting and hand searching, including 4 adults, 300 metamorphs (larvae about to emerge onto land), over 50 larvae and a single egg.

- 1.7 As part of the translocation programme an amphibian receptor pond was constructed in 1998 within the Mitigation Land adjacent to the Power Plant Park development site. This receptor pond was not used during the translocation exercise as the pond was recently constructed and contained only depauperate vegetation and highly turbid waters. The GCNs were actually translocated to the southern perimeter ditch. The results of this capture and translocation programme are reported in PAA 1998a.
- 1.8 Following the capture and relocation of all GCN found during the 1998 translocation programme, a monitoring programme was developed to ascertain how successful the translocation had been. Criteria used to assess translocation success are:
 - the presence of GCN colonies within the waterbodies of interest, and;
 - the re-establishment of a breeding GCN colony within the waterbodies of interest.
- 1.9 This report presents the results of three post-translocation monitoring episodes (1999, 2001 and 2002), discusses the implication of the findings and recommends a course of action for future monitoring.

Species Protection and Conservation

- 1.10 Great crested newts receive protection in the UK via extensive national legislation and international directives. The species is listed on Annexes IIa and IVa of the Habitats and Species Directive (EC Directive 92/43/EEC on *Conservation of Natural Habitats and Wild Fauna and Flora*), identifying the GCN as a European Protected Species. This Directive in implemented in the UK through the *Conservation (Natural Habitats, &c.) Regulations* 1994. The species is also listed on Appendix II of the Bern Convention.
- 1.11 Under Schedule 2 of the *Conservation (Natural Habitats, &c.)* Regulations 1994, Regulation 39 it is an offence to:
 - deliberately capture or kill a GCN;
 - deliberately disturb a GCN;
 - deliberately take or destroy the eggs of a GCN;
 - damage or destroy a breeding or resting place of a GCN.

- 1.12 Statutory protection is also given under Schedule 5 of the *Wildlife and Countryside Act* 1981, which has recently been updated and strengthened under the *Countryside and Rights of Way Act* 2000. Section 9 of this legislation makes it an offence to:
 - intentionally kill, injure or take a GCN;
 - possess or control any live or dead specimen or anything derived from a GCN;
 - intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a GCN;
 - intentionally or recklessly disturb a GCN while it is occupying a structure or place which it uses for that purpose.
- 1.13 In addition, the GCN is a Priority Species within the UK Biodiversity Action Plan (BAP) (Anon. 1995), with a Species Action Plan (SAP) aimed at maintaining the existing range and population status, as well as increasing the number of populations through re-colonisation. There is also a local SAP presented in the Kent BAP (Kent Biodiversity Action Plan Steering Group 1997) defining similar aims to the UK BAP with a target to create or restore 20 ponds per year in areas with suitable terrestrial habitat for GCN.

2. <u>METHODOLOGY</u>

- 2.1 Six waterbodies on the Power Plant Park and associated mitigation land were monitored in 1999: the western corridor pond, the coastal corridor pond, the receptor pond, the grassland translocation pond, the pumping station pond and the southern perimeter ditch (Figure 1). In 2001, three of these waterbodies were selected for further monitoring based on the 1999 results (see PAA 2000). These were the grassland translocation pond, the receptor pond and the pumping station pond. In 2002, the southern perimeter ditch was also included in the monitoring (Figure 2).
- 2.2 The 1999 monitoring consisted of surveys undertaken on two consecutive days in May. In 2001 and 2002 the sampling effort was increased and three surveys were undertaken over spring and summer. The survey dates for all three years are presented in Table 1.
- 2.3 The overall approach followed published guidance (Gent and Gibson 1998; British Herpetological Society 1996; Griffiths *et al.* 1996; English Nature 1994; Grayson *et al.* 1991). In addition, the 2002 survey methodology included reference to the recently published English Nature (2001) guidelines. The methods used were netting, bottle trapping, night-time torch surveys and egg searching, and these are outlined below.

Netting

2.4 A single net-sweep was used per 2m of bankside, and netting was carried out for at least 15 minutes along pond perimeters up to 50m in length, with an additional 15 minutes netting for each 50m thereafter.

Torching

2.5 A 0.5 million candle power torch was used for the night-time searches. Torchlight counts were conducted during the early part of the evening when the night-time temperature exceeded 10°C.

Bottle Trapping

2.6 In 2001 and 2002, traps were set at 2m intervals around the perimeter of all three ponds. The intensity of trapping in the pumping station pond was slightly less as the concrete base of the pond and the shallow water depth made setting bottle traps difficult in some parts. In 2002, the additional monitoring of the southern perimeter ditch included setting traps at intervals along the sections of

the ditch at a density equivalent to 1 trap per 2m. All bottles were checked in accordance with English Nature (1994, 2001) guidelines.

Egg Searches

- 2.7 Searches for GCN eggs were used to estimate egg numbers, based on the methodology of Grayson *et al.* (1991). In 2002, egg-strips were included in the survey to increase egg-laying opportunities for newts, following the guidelines of English Nature (2001). These were put in place in March and remained there throughout the summer.
- 2.8 The conservation status of the newt populations monitored in 2002 was assessed using the method of Griffiths *et al.* (1996), and population size was estimated using the Nature Conservancy Council guideline (NCC 1989).

3. <u>RESULTS</u>

- 3.1 The results of the 2002 monitoring are presented below, and discussed with reference to the 1999 and 2001 monitoring. The results of the 1999 and 2002 monitoring have been reported in full elsewhere (PAA 2000, 2002), however the survey results of the 1999, 2001 and 2002 amphibian monitoring are presented in Table 2 and summarised in Table 3.
- 3.2 A larger total number of adult GCN were found during 2002 (16 GCN) than in either the 1999 (eight GCN) or 2001 (one GCN) monitoring. However, no GCN eggs or larvae were detected in 2002 or 2001.
- 3.3 The majority of GCN were detected using the bottle-trap method, and they were found in both the pumping station pond (eight GCN) and the grassland translocation pond (seven GCN). Only one GCN was detected during torching (in the pumping station pond) and no GCN were netted.
- 3.4 In 2002, smooth newts (*Triturus vulgaris*) were found in all four water bodies surveyed, totalling 27 adults, compared to two adults in 1999 and 21 adults (and 9 larvae) in 2001.
- 3.5 Bottle-trapping and torching detected similar numbers of smooth newts, 13 and 14 adults respectively, while netting did not capture any. The majority of smooth newts (17) were recorded in the southern perimeter ditch, while six were found in the grassland translocation pond, and the remaining water bodies held two adults each.
- 3.6 No palmate newts (*Triturus helveticus*) were found during the 1999, 2001 or 2002 monitoring.
- 3.7 Six adult common frogs (*Rana temporaria*) were found in the pumping station pond in 2002, but none were present in the remaining water bodies. No adult or juvenile common toads (*Bufo bufo*) were found during the 1999, 2001 or 2002 monitoring.
- 3.8 GCN and smooth newt populations in the ponds and ditches monitored were found to be of below average conservation status, based on the methodology of Griffiths *et al.* (1996). For some of these data, newt records are very low resulting in unreliable population estimates. However, the NCC (1989) guidance put the smooth newt population at Kingsnorth just within the minimum number required for classification as a good population, while GCN have a low population. These data are presented in Tables 4 to 7.

4. <u>DISCUSSION</u>

- 4.1 The monitoring effort was increased in 2001 and 2002 to try to better establish the population and distribution of GCN at Kingsnorth. In 2002, monitoring was also spread out over March, April and May to include both early and late breeding activity.
- 4.2 In 2002, adult GCN were recorded in the pumping station pond for the first time since 1999, indicating that the local population still used this pond.
- 4.3 Adult GCN were also recorded for the first time in the grassland translocation pond, indicating that this pond provided suitable habitat despite the presence of stickleback.
- 4.4 However, no GCN were recorded in the receptor pond in 2002, despite there being one adult found there in 2001. The low number in 2001 and lack of records in 2002 suggests this pond has habitat of lower suitability than other waterbodies. This may be because the pond has not developed suitable habitat since its creation in 1998. An alternative, and perhaps more likely explanation (given the receptor pond has been established for 4 years) is that the small number of GCN on the site remain within the longer established waterbodies and are not dispersing to new areas.
- 4.5 Adult GCN are known to repeatedly return to ponds or collections of ponds that they are familiar with (English Nature 2001, Froglife 2001). If these ponds still provide enough suitable habitat for the size of population, the adults will not need to disperse. It appears that the existing waterbodies at Kingsnorth retain enough suitable habitat for the small population existing.
- 4.6 However, monitoring results indicate that although the population of GCN is still small, numbers are increasing over time. However, there has been no confirmation of breeding on site in either 2001 or 2002.
- 4.7 Small numbers of smooth newts were recorded in all four water bodies in 2002. The total numbers remain at a similar number to 2001 (27 to 30 individuals) indicating the site now holds a relatively stable population of smooth newts, at a good population level. For the majority of waterbodies this represents an increase in smooth newts, but for the receptor pond there has been a decline from 27 adults (2001) to 2 adults (2002). No stickleback were found in this pond, so the cause of the population decline in this water body is not clear.

5. <u>RECOMMENDATIONS</u>

- 5.1 In summary, the results indicate that there is a small, but increasing, population of GCN on the site, although no evidence of breeding was recorded. In view of the highly protected status of GCN, and the requirements of the Management Plan, it is recommended that additional monitoring should be undertaken to seek to confirm whether a breeding population establishes, and whether the project can be regarded as a success.
- 5.2 It is recommended that monitoring should next be undertaken in spring 2003. This will provide four post-translocation monitoring periods (1999, 2001, 2002,2003). English Nature (2001) guidelines advise a minimum of four years of monitoring for translocation programmes involving a small GCN population and the loss of a breeding pond.
- 5.3 The monitoring should follow the same methodology as that undertaken in 2002 to allow comparison between years.

REFERENCES

Anonymous, 1995. *Biodiversity: The UK Action Plan*. HMSO, London.

- British Herpetological Society, 1996. *Surveying for Amphibians*. BHS Conservation Committee publication.
- English Nature, 1994. Species Conservation Handbook. English Nature, Peterborough.
- English Nature, 2001. Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.
- Froglife, 2001. Great Crested Newt Conservation Handbook. Froglife, Suffolk.
- Gent, T. and Gibson, S., 1998. *Herpetofauna Workers Manual*. Joint Nature Conservation Committee, Peterborough.
- Grayson, R.F., Parker, R. and Mullaney, A.S., 1991. Atlas of the amphibians of Greater Manchester County and new criteria for appraising UK amphibian sites. *Lancashire Wildlife Journal*, 1: 4–20.
- Griffiths, R.A., Raper, S.J. and Brady, L.D., 1996. Evaluation of a standard method for surveying common frogs and newts. *JNCC Report No.* 259. Joint Nature Conservation Committee, Peterborough.
- Kent Biodiversity Action Plan Steering Group, 1997. Kent Biodiversity Action Plan. A Framework for the Future of Kent's Wildlife. Kent County Council, Maidstone.
- Nature Conservancy Council, 1989. *Guidelines for the selection of Biological Sites of Special Scientific Interest*. Nature Conservancy Council, Peterborough.
- PAA, 1998a. Results of the Amphibian Capture Programme at Damhead Creek Power Station, Kingsnorth, Kent. Prepared for Damhead Creek Ltd.
- PAA, 1998b. Management Plan for Land at Kingsnorth, Isle of Grain, Kent. Prepared for Damhead Creek Ltd.
- PAA, 2000. Damhead Creek Power Station, Kingsnorth. 1999 Amphibian Report. Prepared for Damhead Creek Ltd.
- PAA, 2002. Damhead Creek Power Station, Kingsnorth, Kent. 2001 Amphibian Monitoring. Prepared for Damhead Creek Ltd.

TABLES

FIGURES

TABLE 1Summary of Dates of Amphibian Monitoring During 1999, 2001 and 2002Damhead Creek Power Station, Kingsnorth, Kent

Year	Survey Dates
1999	18th May 19th May
2001	23rd and 24th May 30th and 31st May 31st May and 1st June
2002	7th and 8th March 22nd and 23rd April 14th and 15th May

TABLE 2Numbers of Amphibians Recorded in 1999, 2001 and 2002, Using Four Different Methodologies
Damhead Creek Power Station, Kingsnorth, Kent

Method of Survey	Pump	ing Station	Pond	Southe	rn Perime	ter Ditch	Grassland Translocation Pond			Receptor Pond		
	1999	2001	2002	1999	2001	2002	1999	2001	2002	1999	2001	2002
Netting												
Great crested newt	-		-	-	ns	-	-	-	-	_	1(m)	-
Smooth newt	-	-	-	-	ns	-	-	-	-	-	1(m), 6(f), 9(l)	-
Common frog	-	-	-	-	ns	-	-	-	-	-	-	-
Common toad	-	-	-	-	ns	-	-	-	-	-	-	-
Bottle Trapping					<u>. </u>							
Great crested newt	-	-	6(m), 2(f)	-	ns	-	-	-	5(m), 2(f)	-	-	-
Smooth newt	-	-	1(m), 1(f)	-	ns	3(m), 2(f)	-	-	3(m), 1(f)	-	8(m), 3(f)	2(m)
Common frog	-	-	1	-	ns	-	-	-	-	-	-	-
Common toad	-	-	-	-	ns	-	-	-	-	-	-	-
Torching			<u> </u>		<u>.</u>						<u>.</u>	
Great crested newt	3(m), 2(f), 1(l), 1(e*)	-	1(f)	1(m)	ns	-	-	-	-	-	-	-
Smooth newt	2(m)	-	-	-	ns	12	-	-	2(f)	-	3(m)	-
Common frog	-	-	5	_	ns	-	-	-	-	-	-	-
Common toad	-	-	-	-	ns	-	-	-	-	-	-	-

Notes

Combined data from all surveys (see Table 1) Frog and toad spawn not surveyed. *Egg detected by egg searches.

Key

ns = not surveyed

m = adult male

f = adult female

l = larvae

e = egg

- = surveyed but no amphibians

	Pump	Pumping Station Pond		Souther	Southern Perimeter Ditch		Grassland Translocation Pond			Receptor Pond		
	1999	2001	2002	1999	2001	2002	1999	2001	2002	1999	2001	2002
Great crested newt	7 (a+l+e) Breeding	-	9 (a)	1 (a)	ns	-	-	-	7 (a)	-	1 (a)	-
Smooth newt	2 (a)	-	2 (a)	-	ns	17 (a)	-	-	6 (a)	-	30 (a+l)	2 (a)
Common frog	-	-	6 (a)	-	ns	-	-	-	-	-	-	-
Common toad	-	-	-	-	ns	-	-	-	-	-	-	-
Ten-spined stickleback	-	-	-	-	ns	Present	-	-	Present	-	-	-
Three-spined stickleback	-	-	-	Present	ns	Present	Present	Present	Present	-	-	-

TABLE 3Summary of Amphibian Monitoring Results for 1999, 2001 and 2002Damhead Creek Power Station, Kingsnorth, Kent.

Key

ns = not surveyed

a = adult

l = larvae

e = egg

- = surveyed but no amphibians

TABLE 4An Assessment of the Conservation Status of Smooth and Great Crested Newt Populations
Derived from the 2002 Monitoring Data for the Pumping Station Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*
Great Crested Newt				
Netting	36m	0	0.0	n/a
Bottle trapping	36m	8	0.4	below average
Torching	36m	1	<0.1	below average
Smooth Newt				
Netting	36m	0	0.0	n/a
Bottle trapping	36m	2	0.1	below average
Torching	36m	0	0.0	n/a

TABLE 5An Assessment of the Conservation Status of Smooth and Great Crested Newt Populations
Derived from the 2002 Monitoring Data for the Southern Perimeter Ditch

Method of Survey	Perimeter length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*	
Great Crested Newt					
Netting	610m	0	0.0	n/a	
Bottle trapping	610m	0	0.0	n/a	
Torching	610m	0	0.0	n/a	
Smooth Newt					
Netting	610m	0	0.0	n/a	
Bottle trapping	610m	5	<0.1	below average	
Torching	610m	12	<0.1	below average	

TABLE 6An Assessment of the Conservation Status of Smooth and Great Crested Newt Populations
Derived from the 2002 Monitoring Data for the Grassland Translocation Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*	
Great Crested Newt					
Netting	80m	0	0.0	n/a	
Bottle trapping	80m	7	0.2	below average	
Torching	80m	0	0.0	n/a	
Smooth Newt					
Netting	80m	0	0.0	n/a	
Bottle trapping	80m	4	0.1	below average	
Torching	80m	0	0.0	n/a	

TABLE 7An Assessment of the Conservation Status of Smooth and Great Crested Newt PopulationsDerived from the 2002 Monitoring Data for the Receptor Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*
Great Crested Newt				
Netting	20m	0	0.0	n/a
Bottle trapping	20m	0	0.0	n/a
Torching	20m	0	0.0	n/a
Smooth Newt				
Netting	20m	0	0.0	n/a
Bottle trapping	20m	2	0.2	below average
Torching	20m	0	0.0	n/a




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September 2003

This project has been undertaken in accordance with PAA policies and procedures on quality assurance.

Signed:_____

1. <u>INTRODUCTION</u>

- 1.1 In 2003, Penny Anderson Associates Ltd was commissioned by Damhead Creek Ltd to undertake a great crested newt (GCN) (*Triturus cristatus*) monitoring programme within land at Damhead Creek Power Station, Kingsnorth, Kent (PAA 1998a). This area of land has been made the subject of a Nature Conservation Management Plan (PAA 1998b) that establishes a series of development, maintenance and monitoring works over a five year period.
- 1.2 The maintenance and enhancement of GCN populations is required under Prescriptions P17 (translocation and construction of receptor pond and amphibian barrier fence) and P26 (construction of hibernacula) of the Management Plan. Monitoring of any translocated GCN populations is required under Prescription MOP6.
- 1.3 The monitoring here forms the fourth GCN survey following a capture and relocation of all GCN during a translocation programme undertaken in 1998. The results of the translocation and previous monitoring are presented in full in earlier reports (PAA 1998a, 2000, 2002a, 2002b). However, the background to this work is outlined in brief below.

Background to the Study

- 1.4 In 1998 the possibility of a small GCN colony along the southern perimeter ditch adjacent to the Power Plant Park development site led to the production of an Action Plan to capture and translocate GCN and other amphibians in this area, under licence from English Nature.
- 1.5 In March 1998 an amphibian barrier fence was constructed along the southern perimeter ditch to exclude GCNs and other amphibians from entering the development site. A trapping programme was then implemented over two weeks (29th March 9th April 1998) to remove any GCNs remaining on the development site. In the event, no GCN, or any other amphibians, were captured using this trapping method.
- 1.6 The development site was further searched by hand in May 1998 and during the course of these investigations GCN were found in a small pool previously hidden by bramble (*Rubus fruticosus* agg.). This waterbody had formed within a square, concrete-lined depression within the footings of a former building. The pond was partially vegetated with an emergent stand of sea clubrush (*Bolboschoenus maritimus*) and occasional plants of common water-starwort (*Callitriche stagnalis*) and common water-crowfoot (*Ranunculus aquatilis*). The underlying sediments consisted of deep layers of silt and leafy detritus and the water level appeared to fluctuate between c.0.5–1.2m. The pool was de-watered

and over 355 GCNs were removed by netting and hand searching, including 4 adults, 300 metamorphs (larvae about to emerge onto land), over 50 larvae and a single egg.

- 1.7 As part of the translocation programme an amphibian receptor pond was constructed in 1998 within the Mitigation Land adjacent to the Power Plant Park development site. This receptor pond was not used during the translocation exercise as the pond was recently constructed and contained only depauperate vegetation and highly turbid waters. The GCNs were actually translocated to the southern perimeter ditch. The results of this capture and translocation programme are reported in PAA (1998a).
- 1.8 Following the capture and relocation of all GCN found during the 1998 translocation programme, a monitoring programme was developed to ascertain how successful the translocation had been. Criteria used to assess translocation success are:
 - the presence of GCN colonies within the waterbodies of interest, and;
 - the re-establishment of a breeding GCN colony within the waterbodies of interest.
- 1.9 This report presents the results of the fourth post-translocation monitoring period (2003) and summarises the previous three monitoring episodes (1999, 2001 and 2002), discusses the implications of the findings and recommends a course of action for future monitoring.

Species Protection and Conservation

- 1.10 Great crested newts receive protection in the UK via extensive national legislation and international directives. The species is listed on Annexes IIa and IVa of the Habitats and Species Directive (EC Directive 92/43/EEC on the *Conservation of Natural Habitats and Wild Fauna and Flora*), identifying the GCN as a European Protected Species. This Directive in implemented in the UK through the *Conservation (Natural Habitats, &c.) Regulations* 1994. The species is also listed on Appendix II of the Bern Convention.
- 1.11 Under Schedule 2 of the *Conservation (Natural Habitats, &c.)* Regulations 1994, Regulation 39 it is an offence to:
 - deliberately capture or kill a GCN;
 - deliberately disturb a GCN;
 - deliberately take or destroy the eggs of a GCN;
 - damage or destroy a breeding or resting place of a GCN.

- 1.12 Statutory protection is also given under Schedule 5 of the *Wildlife and Countryside Act* 1981, which has recently been updated and strengthened under the *Countryside and Rights of Way Act* 2000. Section 9 of this legislation makes it an offence to:
 - intentionally kill, injure or take a GCN;
 - possess or control any live or dead specimen or anything derived from a GCN;
 - intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a GCN;
 - intentionally or recklessly disturb a GCN while it is occupying a structure or place which it uses for that purpose.
- 1.13 In addition, the GCN is a Priority Species within the UK Biodiversity Action Plan (BAP) (Anon. 1995), with a Species Action Plan (SAP) aimed at maintaining the existing range and population status, as well as increasing the number of populations through re-colonisation. There is also a local SAP presented in the Kent BAP (Kent Biodiversity Action Plan Steering Group 1997) defining similar aims to the UK BAP with a target to create or restore 20 ponds per year in areas with suitable terrestrial habitat for GCN.

2. <u>METHODOLOGY</u>

- 2.1 Six waterbodies on the Power Plant Park and associated mitigation land were monitored in 1999: the western corridor pond, the coastal corridor pond, the receptor pond, the grassland translocation pond, the pumping station pond and the southern perimeter ditch (Figure 1). In 2001, three of these waterbodies were selected for further monitoring based on the 1999 results (see PAA 2000). These were the grassland translocation pond, the receptor pond and the pumping station pond. In 2002 and 2003, the southern perimeter ditch was also included in the monitoring (Figure 2).
- 2.2 The 1999 monitoring consisted of surveys undertaken on two consecutive days in May. In subsequent monitoring the sampling effort was increased and three surveys were undertaken over spring and summer. The survey dates for all years are presented in Table 1.
- 2.3 The overall approach followed published guidance (Gent and Gibson 1998; British Herpetological Society 1996; Griffiths *et al.* 1996; English Nature 1994; Grayson *et al.* 1991). In addition, the 2002 and 2003 survey methodology includes reference to the English Nature (2001) guidelines. The methods used were netting, bottle trapping, night-time torch surveys and egg searching, and these are outlined below.

Netting

2.4 A single net-sweep was used per 2m of bankside, and netting was carried out for at least 15 minutes along pond perimeters up to 50m in length, with an additional 15 minutes netting for each 50m thereafter.

Torching

2.5 A 0.5 million candle power torch was used for the night-time searches. Torchlight counts were conducted during the early part of the evening when the night-time temperature exceeded 10°C.

Bottle Trapping

2.6 In 2001 and 2002, traps were set at 2m intervals around the perimeter of all three ponds. The intensity of trapping in the pumping station pond was slightly less as the concrete base of the pond and the shallow water depth made setting bottle traps difficult in some parts. In 2002 and 2003, the additional monitoring of the southern perimeter ditch included setting traps at intervals along the

sections of the ditch at a density equivalent to 1 trap per 2m. All bottles were checked in accordance with English Nature (1994, 2001) guidelines.

Egg Searches

2.7 Searches for GCN eggs were used to estimate egg numbers, based on the methodology of Grayson *et al.* (1991). In 2002 and 2003, egg-strips were included in the survey to increase egg-laying opportunities for newts, following the guidelines of English Nature (2001). These were put in place in March 2002 and remained *in situ* throughout 2002 and 2003.

Estimating Newt Populations and Identifying Their Conservation Status

2.8 The conservation status of the newt populations monitored in 2002 was assessed using the method of Griffiths *et al.* (1996), and population size was estimated using the Nature Conservancy Council guideline (NCC 1989).

3. <u>RESULTS</u>

3.1 The results of the 2003 monitoring are presented below, and discussed with reference to the previous monitoring episodes. The results of these previous monitoring episodes have been reported in full elsewhere (PAA 2000, 2002a, 2002b), however the survey results of all amphibian monitoring years are presented in Table 2 and summarised in Table 3.

Great Crested Newts

- 3.2 In 2003, four adult GCN were found, compared to 16 adults in 2002, a single adult in 2001 and eight individuals in 1999 (comprising 6 adults, one larvae and one egg). No GCN eggs or larvae were detected in 2003, and these life stages have only been found in 1999. GCN numbers therefore appear to have declined this year compared to 2002, but are still greater than in 1999.
- 3.3 Three GCN (two male, one female) were detected using the bottle-trap method, and they were found in the pumping station pond. One male GCN was detected in the receptor pond during torching. No GCN were netted and no GCN eggs detected during egg searches.

Other Amphibians

- 3.4 In 2003, smooth newts (*Triturus vulgaris*) were again found in all four water bodies surveyed, totalling 19 adults, compared to 27 adults in 2002, 21 adults (and nine larvae) in 2001 and two adults in 1999. This suggests the smooth newt population is fairly stable at present.
- 3.5 The majority of smooth newts were detected using bottle-trapping, with torching and netting each detecting only a single adult female. The majority of smooth newts (eight) were recorded in the receptor pond, while six were found in the grassland translocation pond, four in the southern perimeter ditch and one adult in the pumping station pond.
- 3.6 No evidence of palmate newts (*Triturus helveticus*) was found during any of the monitoring episodes.
- 3.7 No adult or juvenile common frogs (*Rana temporaria*) or common toads (*Bufo bufo*) were found during 2003, although there was frogspawn present in the grassland translocation pond. Previously only low numbers (five adults) of common frog have been surveyed on site, in 2002.

Newt Population Estimates and Their Conservation Status

3.8 GCN and smooth newt populations in the ponds and ditches monitored were found to be of below average conservation status, based on the methodology of Griffiths *et al.* (1996). These data are presented in Tables 4 to 7. Throughout the four-year monitoring period (1999 – 2003), newts are recorded in only very low numbers, resulting in unreliable population estimates. However, the NCC (1989) guidance identifies the current GCN and smooth newt populations at Damhead Power Station, Kingsnorth as low populations.

4. <u>DISCUSSION</u>

- 4.1 After 1999, the monitoring effort was increased to try to better establish the population and distribution of GCN at Kingsnorth. In 2002 and 2003, monitoring was also spread out over March, April and May to include both early and late season amphibian breeding activity.
- 4.2 In 2003, adult GCN were again recorded in the pumping station pond, indicating that the local GCN population continue to use this pond. This pond did not have any stickleback recorded within it.
- 4.3 An adult GCN was also recorded for a second time in the receptor pond, indicating that this pond provided some potential habitat. Again, this pond did not contain stickleback. The low number suggests this pond has habitat of lower suitability than other waterbodies. This may be because the pond has not developed suitable habitat since its creation in 1998. An alternative explanation is that the small number of GCN on the site remain within the longer established waterbodies and are not dispersing to new areas.
- 4.4 Adult GCN are known to repeatedly return to ponds or collections of ponds that they are familiar with (English Nature 2001, Froglife 2001). If these ponds still provide enough suitable habitat for the size of population, the adults will be less likely to disperse. It appears that the older, established waterbodies at Damhead Creek retain enough suitable habitat for the small population present on site, with the new ponds receiving only limited use. This might alter as newt populations increase.
- 4.5 No GCN were recorded in the grassland translocation pond, despite seven adults being found there in 2002. This year, sticklebacks are noted as abundant within the pond, suggesting an increase from 2002 when they were noted as present in this pond for the first time. Sticklebacks are well known as predators of newt larvae, and GCN are particularly susceptible to this predation, as their larvae tend to remain active within the water column rather than moving to the pond bottom for cover. The increase in sticklebacks is therefore likely to be a significant factor in the reduction in GCN within this pond.
- 4.6 No GCN were recorded in the southern perimeter ditch, as was the case in 2002, and the presence of stickleback is also likely to be a factor within this water body.
- 4.7 For the second year no evidence of GCN breeding on site was obtained, with no eggs or larvae recorded despite the installation of egg strips to provide additional egg laying substrate.

- 4.8 The waterbodies at Damhead Creek Power Station continue to support a small population of GCN of a similar size to that identified on site prior to development works being undertaken. The mitigation works have, therefore, retained the existing population.
- 4.9 The GCN population has not yet shown signs of significant and sustained increase despite the provision of new habitats in the form of pond and wetland creation schemes. However, the 2002 survey suggests populations are increasing to some degree. The new pond and wetland areas have not yet become regularly used by GCN although occasional use is occurring.
- 4.10 This might relate to the fact that the ponds are still developing as a suitable habitat for GCN, combined with the presence of only a small newt population still preferentially using the original pumping station pond. The increase in numbers of predatory fish is also likely to be a factor.
- 4.11 Small numbers of smooth newts were recorded in all four water bodies. The total numbers remain at a similar number to previous monitoring episodes, indicating the site now holds a relatively stable, although small, population of smooth newts. The smooth newts have readily colonised the new ponds on site.
- 4.12 Common frogs are still present, and breeding, on the site in small numbers, while common toad and palmate newts remain unrecorded within the survey area during the period 1999 to 2003.

5. <u>SUMMARY AND RECOMMENDATIONS</u>

- 5.1 In summary, the results indicate that Damhead Creek Power Station continues to support a small population of GCN. There is some evidence from the 2002 survey that the population has begun to increase, but no evidence of breeding has been recorded for two consecutive years.
- 5.2 In addition, there is a small and fairly stable population of smooth newts within the area, along with a small population of common frog that is also breeding on site.
- 5.3 No palmate newts or common toads were recorded in the ponds or ditches sampled during the monitoring period (1999 2003).
- 5.4 Monitoring suggests that the pumping station pond is the more favoured waterbody for GCN, being a well-established pond without a predatory fish population. The grassland translocation pond, created in 1998 but which quickly established a good range of vegetation types due to the translocation of turf around the edges, also appeared favourable in 2002. However, the subsequent increase in sticklebacks is likely to be a factor in the smaller number of GCN recorded this year.
- 5.5 The receptor pond, also created in 1998 but without translocated vegetation, shows little evidence of supporting GCN despite the lack of fish, with only single adults being recorded 2001 and 2003. This might be related to two factors. Firstly, that the small population of GCN on the site are not under pressure to move to new habitat and therefore remain faithful to the longer established ponds such as the pumping station pond. Secondly, those few newts that might migrate from established water bodies are likely to encounter the grassland translocation pond first, as this is the closest water body to the original GCN population.
- 5.6 Four post-translocation monitoring episodes (1999, 2001, 2002, 2003) have now been completed. This is in line with English Nature (2001) guidelines that advise a minimum of four years monitoring for translocation programmes involving a small GCN population and the loss of a breeding pond.
- 5.7 The continuation of annual monitoring is not, therefore, considered necessary at this stage. However, it is suggested that an amphibian survey is repeated in spring 2005 to assess if there has been any increase in the GCN population over the longer term as new habitats become more established.
- 5.8 Given the probable negative impact of increasing fish populations on the already small GCN population on site, consideration should be given to reducing fish numbers within the southern perimeter ditch and the grassland

translocation pond. A recent review of methods for controlling fish within ponds supporting GCN (Watson 2002) suggests that draining down a pond can be effective in reducing predatory fish such as stickleback. However, the effects on associated wildlife can be considerable, particularly invertebrate populations within the pond. An alternative method is to use the biocide Rotenone that is toxic to fish, although not approved for use within the UK without a licence.

- 5.9 If such fish control methods were considered, there should be full consultation with both English Nature and the Environment Agency to ensure any necessary licences are gained and the methodology approved.
- 5.10 If the GCN population continues to remain small and newly created ponds and wetlands are not colonised by individuals migrating from the local population, then there is some potential for these habitats to be used as translocation sites for nearby GCN populations affected by development. This would add to the local population and might encourage breeding. However, any such consideration would need to be discussed in full with English Nature and would be subject to the relevant licences being obtained.

REFERENCES

Anonymous, 1995. Biodiversity: The UK Action Plan. HMSO, London.

- British Herpetological Society, 1996. *Surveying for Amphibians*. BHS Conservation Committee publication.
- English Nature, 1994. Species Conservation Handbook. English Nature, Peterborough.
- English Nature, 2001. Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.
- Froglife, 2001. Great Crested Newt Conservation Handbook. Froglife, Suffolk.
- Gent, T. and Gibson, S., 1998. *Herpetofauna Workers Manual*. Joint Nature Conservation Committee, Peterborough.
- Grayson, R.F., Parker, R. and Mullaney, A.S., 1991. Atlas of the amphibians of Greater Manchester County and new criteria for appraising UK amphibian sites. *Lancashire Wildlife Journal*, 1: 4–20.
- Griffiths, R.A., Raper, S.J. and Brady, L.D., 1996. Evaluation of a standard method for surveying common frogs and newts. *JNCC Report No. 259*. Joint Nature Conservation Committee, Peterborough.
- Kent Biodiversity Action Plan Steering Group, 1997. Kent Biodiversity Action Plan. A Framework for the Future of Kent's Wildlife. Kent County Council, Maidstone.
- Nature Conservancy Council, 1989. *Guidelines for the selection of Biological Sites of Special Scientific Interest*. Nature Conservancy Council, Peterborough.
- PAA, 1998a. Results of the Amphibian Capture Programme at Damhead Creek Power Station, Kingsnorth, Kent. Prepared for Damhead Creek Ltd.
- PAA, 1998b. Management Plan for Land at Kingsnorth, Isle of Grain, Kent. Prepared for Damhead Creek Ltd.
- PAA, 2000. Damhead Creek Power Station, Kingsnorth. 1999 Amphibian Report. Prepared for Damhead Creek Ltd.
- PAA, 2002a. Damhead Creek Power Station, Kingsnorth, Kent. 2001 Amphibian Monitoring. Prepared for Damhead Creek Ltd.
- PAA, 2002b. Damhead Creek Power Station, Kingsnorth, Kent. 2002 Amphibian Monitoring. Prepared for Damhead Creek Ltd.
- Watson, W. 2002. *Review of fish control methods for the Great Crested Newt Species Action Plan.* Countryside Council for Wales, Bangor.

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TABLE 1Summary of Dates of Amphibian Monitoring During 1999, 2001, 2002 and 2003.Damhead Creek Power Station, Kingsnorth, Kent

Year	Survey Dates
1999	19th May 20th May
2001	23rd and 24th May 30th and 31st May 31st May and 1st June
2002	7th and 8th March 22nd and 23rd April 14th and 15th May
2003	19th and 20th March 9th and 10th April 14th and 15th May

TABLE 2Numbers of Amphibians Recorded in 1999, 2001, 2002 and 2003, Using Four Different Methodologies
Damhead Creek Power Station, Kingsnorth, Kent

Method of Survey Pumping Station Pond			Southern Perimeter Ditch				Grassland Translocation Pond				Receptor Pond					
	1999	2001	2002	2003	1999	2001	2002	2003	1999	2001	2002	2003	1999	2001	2002	2003
Netting																
Great crested newt	-	-	-	-	-	ns	-	-	-	-	-	-	-	1(m)	-	-
Smooth newt	-	-	-	1 (f)	-	ns	-	-	-	-	-	-	-	1(m), 6(f), 9(l)	-	-
Common frog	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-
Common toad	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-
Bottle Trapping																
Great crested newt	-	-	6(m), 2(f)	2 (m) 1 (f)	-	ns	-	-	-	-	5(m), 2(f)	-	-	-	-	-
Smooth newt	-	-	1(m), 1(f)	-	-	ns	3(m), 2(f)	3 (m) 1 (f)	-	-	3(m), 1(f)	4 (m) 2 (f)	-	8(m), 3(f)	2(m)	5 (m) 2 (f)
Common frog	-	-	1	-	-	ns	-	-	-	-	-	-	-	-	-	-
Common toad	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-
Torching				\$			\$\$									<u>.</u>
Great crested newt	3(m), 2(f), 1(l), 1(e*)	-	1(f)	-	1(m)	ns	-	-	-	-	-	-	-	-	-	1 (m)
Smooth newt	2(m)	-	-	-	-	ns	12	-	-	-	2(f)	-	-	3(m)	-	1 (f)
Common frog	-	-	5	-	-	ns	-	-	-	-	-	5 spawn	-	-	-	-
Common toad	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-

Notes

Combined data from all surveys (see Table 1) Frog and toad spawn not surveyed.

*Egg detected by egg searches.

Key

ns = not surveyed

m = adult male

f = adult female

l = larvae

e = egg

- = surveyed but no amphibians detected

	Pumping Station Pond		Southern Perimeter Ditch			Grassland Translocation Pond				Receptor Pond						
	1999	2001	2002	2003	1999	2001	2002	2003	1999	2001	2002	2003	1999	2001	2002	2003
Great crested newt	7 (a+l+e) Breeding	-	9 (a)	3(a)	1 (a)	ns	-	-	-	-	7 (a)	-	-	1 (a)	-	1 (a)
Smooth newt	2 (a)	-	2 (a)	1 (a)	-	ns	17 (a)	4 (a)	-	-	6 (a)	6 (a)	-	30 (a+l)	2 (a)	8 (a)
Common frog	-	-	6 (a)	-	-	ns	-	-	-	-	-	5 spawn clumps	-	-	-	-
Common toad	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-
Ten-spined stickleback	-	-	-	-	-	ns	Present	Present	-	-	Present	Abundant	-	-	-	-
Three-spined stickleback	-	-	-	-	Present	ns	Present	Present	Present	Present	Present	Abundant	-	-	-	-

TABLE 3 Summary of Amphibian Monitoring Results for 1999, 2001, 2002 and 2003. Damhead Creek Power Station, Kingsnorth, Kent.

Key ns = not surveyed

a = adult

l = larvae

e = egg - = surveyed but no amphibians

TABLE 4An Assessment of the Conservation Status of Smooth and Great Crested Newt PopulationsDerived from the 2003 Monitoring Data for the Pumping Station Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*		
Great Crested Newt						
Netting	36m	0	0.0	n/a		
Bottle trapping (15)	36m	2	0.1	below average		
Torching	36m	0	0.0	n/a		
Smooth Newt						
Netting	36m	0	0.0	n/a		
Bottle trapping (15)	36m	0	0	n/a		
Torching	36m	1	<0.1	below average		

TABLE 5An Assessment of the Conservation Status of Smooth and Great Crested Newt Populations
Derived from the 2003 Monitoring Data for the Southern Perimeter Ditch

Method of Survey	Perimeter length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*	
Great Crested Newt					
Netting	610m	0	0.0	n/a	
Bottle trapping (30)	610m	0	0.0	n/a	
Torching	610m	0	0.0	n/a	
Smooth Newt					
Netting	610m	0	0.0	n/a	
Bottle trapping (30)	610m	4	0.13	below average	
Torching	610m	0	0.0	n/a	

TABLE 6An Assessment of the Conservation Status of Smooth and Great Crested Newt Populations
Derived from the 2003 Monitoring Data for the Grassland Translocation Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*	
Great Crested Newt					
Netting	80m	0	0.0	n/a	
Bottle trapping (50)	80m	0	0.0	n/a	
Torching	80m	0	0.0	n/a	
Smooth Newt					
Netting	80m	0	0.0	n/a	
Bottle trapping (50)	80m	4	0.08	below average	
Torching	80m	0	0.0	n/a	

TABLE 7An Assessment of the Conservation Status of Smooth and Great Crested Newt PopulationsDerived from the 2003 Monitoring Data for the Receptor Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*		
Great Crested Newt						
Netting	20m	0	0.0	n/a		
Bottle trapping (15)	20m	0	0.0	n/a		
Torching	20m	1	0.1	below avergae		
Smooth Newt						
Netting	20m	0	0.0	n/a		
Bottle trapping (15)	20m	7	0.47	below average		
Torching	20m	2	0.2	below average		

FIGURES





SCOTTISH POWER PLC

DAMHEAD CREEK POWER STATION KINGSNORTH, KENT

AMPHIBIAN MONITORING 2005

2005 Amphibian Monitoring

SCOTTISH POWER PLC

DAMHEAD CREEK POWER STATION KINGSNORTH, KENT

2005 AMPHIBIAN MONITORING

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PLATE

1 The Receptor Pond showing significant encroachment by rushes and bulrush, with very little open water remaining

FIGURES

- 1 Location of Ponds and Ditches Included in Surveys, Damhead Creek, Kingsnorth
- 2 Amphibian Mitigation Area within Power Plant Park, Damhead Creek, Kingsnorth

1. <u>INTRODUCTION</u>

- 1.1 In 2005, Penny Anderson Associates Ltd was commissioned by Scottish Power PLC to undertake a great crested newt (GCN) (*Triturus cristatus*) monitoring programme within land at Damhead Creek Power Station, Kingsnorth, Kent.
- 1.2 This area of land was subject to a Nature Conservation Management Plan (PAA 1998) that established a series of development, maintenance and monitoring works directed toward GCN over a five year period (1998 to 2003). The maintenance and enhancement of GCN populations was required under the previous Management Plan (PAA 1998), along with a programme of monitoring.
- 1.3 Continued monitoring of the GCN population will now be undertaken biannually in 2005 and 2007 as required under the revised Management Plan (BWP 2004) prepared for the period 2004 to 2008.

Background to the Study

- 1.4 In 1998 the possibility of a small GCN colony along the southern perimeter ditch adjacent to the Power Plant Park development site led to the production of an Action Plan to capture and translocate GCN and other amphibians in this area, under licence from English Nature.
- 1.5 In March 1998 an amphibian barrier fence was constructed along the southern perimeter ditch to exclude GCN and other amphibians from entering the development site. A trapping programme was then implemented over two weeks (29th March 9th April 1998) to remove any GCN remaining on the development site. In the event no GCN, or any other amphibians, were captured using this trapping method.
- 1.6 The development site was further searched by hand in May 1998 and during the course of these investigations GCN were found in a small pool previously hidden by bramble (*Rubus fruticosus* agg.). This waterbody had formed within a square, concrete-lined depression within the footings of a former building. The pond was partially vegetated with an emergent stand of sea clubrush (*Bolboschoenus maritimus*) and occasional plants of common water-starwort (*Callitriche stagnalis*) and common water-crowfoot (*Ranunculus aquatilis*). The underlying sediments consisted of deep layers of silt and leafy detritus and the water level appeared to fluctuate between c.0.5–1.2m. The pool was de-watered and over 355 GCN were removed by netting and hand searching, including four adults, 300 metamorphs (larvae about to emerge onto land), over 50 larvae and a single egg.
- 1.7 As part of the translocation programme an amphibian receptor pond was constructed in 1998 within the Mitigation Land adjacent to the Power Plant Park development site. This receptor pond was not used during the translocation exercise as the pond was recently constructed and contained only depauperate vegetation

and highly turbid waters. The GCN were actually translocated to the southern perimeter ditch. The results of this capture and translocation programme are reported in PAA (1998a).

- 1.8 Following the capture and relocation of all GCN found during the 1998 translocation programme, a monitoring programme was developed to ascertain how successful the translocation had been. Criteria used to assess translocation success are:
 - the presence of GCN colonies within the waterbodies of interest, and;
 - the re-establishment of a breeding GCN colony within the waterbodies of interest.
- 1.9 This report presents the results of the fifth monitoring episode (2005), summarises the previous monitoring (1999, 2001, 2002 and 2003) discusses the implications of the findings and recommends a course of action for future monitoring.

Species Protection and Conservation

- 1.10 Great crested newts receive protection in the UK via extensive national legislation and international directives. The species is listed on Annexes IIa and IVa of the Habitats and Species Directive (EC Directive 92/43/EEC on the *Conservation of Natural Habitats and Wild Fauna and Flora*), identifying the GCN as a European Protected Species. This Directive is implemented in the UK through the *Conservation (Natural Habitats, &c.) Regulations* 1994. The species is also listed on Appendix II of the Bern Convention.
- 1.11 Under Schedule 2 of the *Conservation (Natural Habitats, &c.) Regulations* 1994, Regulation 39 it is an offence to:
 - deliberately capture or kill a GCN;
 - deliberately disturb a GCN;
 - deliberately take or destroy the eggs of a GCN;
 - damage or destroy a breeding or resting place of a GCN.
- 1.12 Statutory protection is also given under Schedule 5 of the *Wildlife and Countryside Act* 1981, which has recently been updated and strengthened under the *Countryside and Rights of Way Act* 2000. Section 9 of this legislation makes it an offence to:
 - intentionally kill, injure or take a GCN;
 - possess or control any live or dead specimen or anything derived from a GCN;
 - intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a GCN;

- intentionally or recklessly disturb a GCN while it is occupying a structure or place which it uses for that purpose.
- 1.13 The above is a summary of the legislation and the original Acts and Regulations should be consulted for the precise wording of the legislation.
- 1.14 In addition, the GCN is a Priority Species within the UK Biodiversity Action Plan (BAP) (UK Biodiversity Steering Group 1995), with a Species Action Plan (SAP) aimed at maintaining the existing range and population status, as well as increasing the number of populations through re-colonisation. There is also a local SAP presented in the Kent BAP (Kent Biodiversity Action Plan Steering Group 1997) defining similar aims to the UK BAP with a target to create or restore 20 ponds per year in areas with suitable terrestrial habitat for GCN.

2. <u>METHODOLOGY</u>

- 2.1 Six waterbodies on the Power Plant Park and associated mitigation land were monitored in 1999: the western corridor pond, the coastal corridor pond, the receptor pond, the grassland translocation pond, the pumping station pond and the southern perimeter ditch (Figure 1). In 2001, three of these waterbodies were selected for further monitoring based on the 1999 results (see PAA 2000). These were the grassland translocation pond, the receptor pond and the pumping station pond. In 2002, 2003 and 2005 the southern perimeter ditch was also included in the monitoring (Figure 2).
- 2.2 The 1999 monitoring consisted of surveys undertaken on two consecutive days in May. In subsequent monitoring the sampling effort was increased and three surveys were undertaken over spring and summer. The survey dates for all years are presented in Table 1.
- 2.3 The overall approach followed published guidance (Gent and Gibson 1998; British Herpetological Society 1996; Griffiths *et al.* 1996; English Nature 1994; Grayson *et al.* 1991). In addition, the 2002, 2003 and 2005 survey methodology includes reference to the English Nature (2001) guidelines. The methods used were netting, bottle trapping, night-time torch surveys and egg searching, and these are outlined below.

<u>Netting</u>

2.4 A single net-sweep was used per 2m of bankside, and netting was carried out for at least 15 minutes along pond perimeters up to 50m in length, with an additional 15 minutes netting for each 50m thereafter.

Torching

2.5 A 0.5 million candle power torch was used for the night-time searches. Torchlight counts were conducted during the early part of the evening when the night-time temperature exceeded 5°C.

Bottle Trapping

2.6 Traps were set at approximately 2m intervals around the perimeter of all three ponds, although in 2005 this was reduced around the Receptor Pond due to vegetation encroachment. The intensity of trapping in the Pumping Station Pond was slightly less as the concrete base of the pond and the shallow water depth made setting bottle traps difficult in some parts. The additional monitoring of the Southern Perimeter Ditch included setting traps at intervals along sections of the ditch at a density equivalent to 1 trap per 2m. All bottles were checked in accordance with English Nature (1994, 2001) guidelines.

Egg Searches

2.7 Searches for GCN eggs were used to estimate egg numbers, based on the methodology of Grayson *et al.* (1991). In 2002 and 2003, egg-strips were included in the survey to increase egg-laying opportunities for newts, following the guidelines of English Nature (2001). These were put in place in March 2002 and remained *in situ* throughout 2002 and 2003. The use of egg-strips was not employed in 2005.

Estimating Newt Populations and Identifying their Conservation Status

2.8 The conservation status of the newt populations monitored in 2002 was assessed using the method of Griffiths *et al.* (1996), and population size was estimated using English Nature guidelines (English Nature 2001).

3. <u>RESULTS</u>

3.1 The results of the 2005 monitoring are presented below, and discussed with reference to the previous monitoring episodes. The results of these previous monitoring episodes have been reported in full elsewhere (PAA 2000, 2002a, 2002b, 2003), however the survey results of all amphibian monitoring years are presented in Table 2 and summarised in Table 3.

Great Crested Newts

- 3.2 In 2005, eight adult GCN were found, compared to four adults in 2003, 16 adults in 2002, a single adult in 2001 and eight individuals in 1999 (comprising six adults, one larva and one egg). No GCN eggs or larvae were detected in 2005, and these life stages have only been found in 1999. GCN numbers therefore appear to have increased from the 2003 monitoring period, and are roughly equivalent to those monitored in 1999. These data indicate the variability of the population over time.
- 3.3 All eight GCN (three male, five female) were detected using the torchlight method, and they were found predominantly in the Pumping Station Pond with a single male in the Grassland Translocation Pond. No GCN were netted or bottle-trapped and no GCN eggs detected during egg searches.

Other Amphibians

- 3.4 In 2005, smooth newts (*Triturus vulgaris*) were found in all waterbodies surveyed, with the exception of the Pumping Station Pond. This totalled seven adults, compared to 19 adults in 2003, 27 adults in 2002, 21 adults (and nine larvae) in 2001 and two adults in 1999. This suggests the smooth newt population is somewhat smaller than in previous years, but is still greater than numbers recorded in 1999.
- 3.5 The smooth newts were detected using both bottle-trapping and torching, with netting not detecting any animals. The majority of smooth newts (six) were recorded in the Receptor Pond and Grassland Translocation Pond, with one adult being found in the Southern Perimeter Ditch.
- 3.6 No evidence of palmate newts (*Triturus helveticus*) was found during the monitoring episodes.
- 3.7 No adult or juvenile common frogs (*Rana temporaria*) or common toads (*Bufo bufo*) were found during 2005. Previously only low numbers of common frog have been surveyed on site, in 2002.

Newt Population Estimates and Their Conservation Status

3.8 GCN and smooth newt populations in the ponds and ditches monitored were found to be of below average conservation status, based on the methodology of Griffiths *et*

2005 Amphibian Monitoring

al. (1996). These data are presented in Tables 4 to 7. Throughout the monitoring period newts are recorded in only very low numbers, resulting in unreliable population estimates. However, using the English Nature (2004) guidance the current GCN numbers at Damhead Power Station, Kingsnorth can be identified as a small population (maximum counts of up to 10 individual GCN per visit).

4. <u>DISCUSSION</u>

- 4.1 After 1999, the monitoring effort was increased to try to better establish the population and distribution of GCN at Kingsnorth. In 2002 and 2003 monitoring was also spread out over March, April and May to include both early and late season amphibian breeding activity. However, in 2005 a cold, wet start to the spring season resulted in monitoring being delayed until May and June.
- 4.2 In 2005, adult GCN were again recorded in the Pumping Station Pond, indicating that the local GCN population continues to use this pond. This pond did not have any stickleback recorded within it.
- 4.3 A single adult GCN was also recorded for a second time in the Grassland Translocation Pond in 2005, indicating that this pond provided some suitable habitat. The low number may be related to the abundance of stickleback in this waterbody as this fish preys on newt larvae. Sticklebacks are well known as predators of newt larvae, and GCN are particularly susceptible to this predation, as their larvae tend to remain active within the water column rather than moving to the pond bottom for cover.
- 4.4 No GCN were recorded in the Receptor Pond in 2005, despite small numbers being present in 2001 and 2003. This may reflect the loss of open water in this pond due to the encroachment of rushes and bulrush (see Plate X). Importantly sticklebacks do not appear to have colonised this waterbody and it is important that it is retained as good quality GCN habitat to encourage newts to breed here.
- 4.5 No GCN were recorded in the Southern Perimeter Ditch, as was the case in 2002 and 2003, and the presence of sticklebacks is also likely to be an inhibitory factor to GCN colonisation within this waterbody.
- 4.6 The waterbodies at Damhead Creek Power Station continue to support a small population of GCN of a similar size to that identified on site prior to development works being undertaken. The mitigation works have, therefore, retained the existing population.
- 4.7 The GCN population on site has not shown signs of significant and sustained increase despite the provision of new habitats in the form of pond and wetland creation schemes. However, the monitoring suggests populations fluctuate over time and short term reductions in the number of GCN do not appear to signify a sustained decline in the population.
- 4.8 GCN appear to be preferentially using the Pumping Station Pond, with other waterbodies being used intermittently. Adult GCN are known to return to ponds or collections of ponds that they are familiar with (English Nature 2001, Froglife 2001) and the continued use of the Pumping Station Pond might reflect this behaviour.

- 4.9 Small numbers of smooth newts were recorded in all waterbodies except for the Pumping Station Pond. The total numbers remain at a similar number to previous monitoring episodes, indicating the site now holds a relatively stable, although small, population of smooth newts. The smooth newts have readily colonised the new ponds on site.
- 4.10 Common frogs were not recorded on site in 2005, although have been occasionally recorded in small numbers in the past. Common toad and palmate newts remain unrecorded within the survey area in 2005 and appear to be absent from this location.

5. <u>SUMMARY AND RECOMMENDATIONS</u>

- 5.1 In summary, the results indicate that Damhead Creek Power Station continues to support a small population of GCN. The relatively long dataset indicates the population is liable to short term fluctuations over time, but that in the longer term numbers remain stable.
- 5.2 In addition, there is a small and fairly stable population of smooth newts within the area, although numbers are reduced in 2005 in comparison to other monitoring years.
- 5.3 No palmate newts or common toads were recorded in the ponds or ditches sampled during the 2005 monitoring. No common frog were recorded, however, it is likely that small numbers of this species do occur on site.
- 5.4 Monitoring suggests that the Pumping Station Pond is the more favoured waterbody for GCN, being a well-established pond without a predatory fish population. The Grassland Translocation Pond, created in 1998 but which quickly established a good range of vegetation types due to the translocation of turf around the edges, also appears to be favourable. However, the subsequent increase in sticklebacks is likely to be a contributory factor in the smaller numbers of GCN typically recorded as using this pond.
- 5.5 The Receptor Pond, also created in 1998 but without translocated vegetation, shows some evidence of GCN use, with a single adult being recorded 2001 and 2003. However, no GCN were recorded in 2005. This might be related to the lack of open water in the pond as emergent vegetation has now encroached across much of the former open water area of this relatively small waterbody.
- 5.6 Both the Grassland Translocation Pond and the Receptor Pond would benefit from careful habitat management to reduce the amount of encroaching emergent vegetation. It is recommended that one third of the area of each pond be cleared of vegetation using the following approach:
 - Management should be on a rotational basis with no more than one third of the encroaching rushes and bulrushes removed in any one year;
 - Removal should preferably be undertaken by hand with spades and as much root material removed as possible;
 - Clumps of vegetation removed should be left at the side of the ponds for at least 24 hours to allow any creatures within the material time to migrate back to the pond;

- Excavated material should then be removed to a suitable location away from any waterbodies;
- Removal should be completed in the winter period (November to January inclusive) to avoid the period when GCN are likely to be present within the pond.
- 5.7 A brief outline of the methodological approach to pond management should be sent to English Nature for information prior to undertaking the work.
- 5.8 The amphibian monitoring scheduled for 2007 will enable the evaluation of this habitat management for GCN and other amphibians on site.

REFERENCES

UK Biodiversity Steering Group, 1995. Biodiversity: The UK Action Plan. HMSO, London.

- British Herpetological Society, 1996. *Surveying for Amphibians*. BHS Conservation Committee publication.
- English Nature, 1994. Species Conservation Handbook. English Nature, Peterborough.
- English Nature, 2001. Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.
- Froglife, 2001. Great Crested Newt Conservation Handbook. Froglife, Suffolk.
- Gent, T. and Gibson, S., 1998. *Herpetofauna Workers Manual*. Joint Nature Conservation Committee, Peterborough.
- Grayson, R.F., Parker, R. and Mullaney, A.S., 1991. Atlas of the amphibians of Greater Manchester County and new criteria for appraising UK amphibian sites. *Lancashire Wildlife Journal*, 1: 4–20.
- Griffiths, R.A., Raper, S.J. and Brady, L.D., 1996. Evaluation of a standard method for surveying common frogs and newts. *JNCC Report No.* 259. Joint Nature Conservation Committee, Peterborough.
- Kent Biodiversity Action Plan Steering Group, 1997. Kent Biodiversity Action Plan. A Framework for the Future of Kent's Wildlife. Kent County Council, Maidstone.
- PAA, 1998. *Management Plan for Land at Kingsnorth, Isle of Grain, Kent*. Prepared for Damhead Creek Ltd.
- PAA, 2000. Damhead Creek Power Station, Kingsnorth. 1999 Amphibian Report. Prepared for Damhead Creek Ltd.
- PAA, 2002a. Damhead Creek Power Station, Kingsnorth, Kent. 2001 Amphibian Monitoring. Prepared for Damhead Creek Ltd.
- PAA, 2002b. Damhead Creek Power Station, Kingsnorth, Kent. 2002 Amphibian Monitoring. Prepared for Damhead Creek Ltd.
- PAA, 2003. Damhead Creek Power Station, Kingsnorth, Kent. 2003 Amphibian Monitoring. Prepared for Damhead Creek Ltd.

PLATE



Plate 1. The Receptor Pond showing significant encroachment by rushes and bulrush, with very little open water remaining.

TABLES

<u>TABLE 1</u>. Summary of Dates of Amphibian Monitoring During 1999, 2001, 2002, 2003 and 2005 Damhead Creek Power Station, Kingsnorth, Kent

Year	Survey Dates
1999	19th May 20th May
2001	23rd and 24th May 30th and 31st May 31st May and 1st June
2002	7th and 8th March 22nd and 23rd April 14th and 15th May
2003	19th and 20th March 9th and 10th April 14th and 15th May
2005	18th and 19th May 7th and 8th June 28th and 29th June

Method of Survey		Pumpi	ng Station I	Pond			Southe	rn Perimet	er Ditch			Grassland	d Translocat	ion Pond			Re	eceptor Pon	d	
	1999	2001	2002	2003	2005	1999	2001	2002	2003	2005	1999	2001	2002	2003	2005	1999	2001	2002	2003	2005
Netting																				
Great crested newt	-	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	1(m)	-	-	-
Smooth newt	-	-	-	1(f)	-	-	ns	-	-	-	-	-	-	-	-	-	1(m), 6(f), 9(l)	-	-	-
Common frog	-	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-	-	-	-
Common toad	-	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-	-	-	-
Bottle Trapping							•													
Great crested newt	-	-	6(m), 2(f)	2(m), 1(f)	-	-	ns	-	-	-	-	-	5(m), 2(f)	-	1(m)	-	-	-	-	-
Smooth newt	-	-	1(m), 1(f)	-	-	-	ns	3(m), 2(f)	3(m), 1(f)	-	-	-	3(m), 1(f)	4(m), 2(f)	1(f)	-	8(m), 3(f)	2(m)	5(m), 2(f)	2(m), 1(f)
Common frog	-	-	1	-	-	-	ns	-	-	-	-	-	-	-	-	-	-	-	-	-
Common toad	-	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-	-	-	-
Torching							•						•							
Great crested newt	3(m), 2(f), 1(l), 1(e*)	-	1(f)	-	2(m), 5(f)	1(m)	ns	-	-	-	-	-	-	-	-	-	-	-	1(m)	
Smooth newt	2(m)	-	-	-	-	-	ns	12	-	1(f)	-	-	2(f)	-	2(f)	-	3(m)	-	1(f)	
Common frog	-	-	5	-	-	-	ns	-	-	-	-	-	-	5 spawn	-	-	-	-	-	-
Common toad	-	-	-	-	-	-	ns	-	-	-	-	-	-	-	-	-	-	-	-	-

<u>TABLE 2</u>. Numbers of Amphibians Recorded in 1999, 2001, 2002, 2003 and 2005, Using Four Different Methodologies Damhead Creek Power Station, Kingsnorth, Kent

Notes

Combined data from all surveys (see Table 1) Frog and toad spawn not surveyed

*Egg detected by egg searches

Key

ns = not surveyed

m = adult male f = adult female

l = larvae

e = egg

- = surveyed but no amphibians detected

PAA

		Pumpi	ng Station	Pond			Southe	ern Perimet	er Ditch			Grassla	nd Transloo	ation Pond			Re	eceptor Por	nd	
	1999	2001	2002	2003	2005	1999	2001	2002	2003	2005	1999	2001	2002	2003	2005	1999	2001	2002	2003	2005
Great crested newt	7 (a+l+e) Breeding	-	9 (a)	3 (a)	7 (a)	1 (a)	ns	-	-	-	-	-	7 (a)	-	1 (a)	-	1 (a)	-	1 (a)	-
Smooth newt	2 (a)	-	2 (a)	1 (a)	-	-	ns	17 (a)	4 (a)	1 (a)	-	-	6 (a)	6 (a)	3 (a)	-	30 (a+l)	2 (a)	8 (a)	3 (a)
Common frog	-	-	6 (a)	-	-	-	ns	-	-	-	-	-	-	5 spawn clumps	-	-	-	-	-	-
Common toad	-	-	-	-	I	-	ns	-	-	-	-	-	-	-	-	-	-	-	-	-
Ten-spined stickleback	-	-	-	-	-	-	ns	Present	Present	-	-	-	Present	Abundant	-	-	-	-	-	-
Three-spined stickleback	-	-	-	-	I	Present	ns	Present	Present	Present	Present	Present	Present	Abundant	Abundant	ŀ	-	-	-	-

<u>TABLE 3.</u> Summary of Amphibian Monitoring Results for 1999, 2001, 2002, 2003 and 2005 Damhead Creek Power Station, Kingsnorth, Kent.

Key

ns = not surveyed

a = adult

l = larvae

e = egg

- = surveyed but no amphibians

TABLE 4.An Assessment of the Conservation Status of Great Crested and Smooth Newt Populations
Derived from the 2005 Monitoring Data for the Pumping Station Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*
Great Crested Newt				
Netting	36m	0	0.0	n/a
Bottle trapping (10)	36m	0	0.0	n/a
Torching	36m	7	0.4	average
Smooth Newt				
Netting	36m	0	0.0	n/a
Bottle trapping (10)	36m	0	0.0	n/a
Torching	36m	0	0.0	n/a

TABLE 5.An Assessment of the Conservation Status of Smooth and Great Crested Newt PopulationsDerived from the 2005 Monitoring Data for the Southern Perimeter Ditch

Method of Survey	Perimeter length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*
Great Crested Newt				
Netting	610m	0	0.00	n/a
Bottle trapping (30)	610m	0	0.00	n/a
Torching	610m	0	0.00	n/a
Smooth Newt				
Netting	610m	0	0.00	n/a
Bottle trapping (30)	610m	0	0.00	n/a
Torching	610m	1	<0.01	below average

TABLE 6.An Assessment of the Conservation Status of Smooth and Great Crested Newt Populatic
Derived from the 2005 Monitoring Data for the Grassland Translocation Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*
Great Crested Newt				
Netting	80m	0	0.00	n/a
Bottle trapping (50)	80m	1	0.03	below average
Torching	80m	0	0.00	n/a
Smooth Newt				
Netting	80m	0	0.00	n/a
Bottle trapping (50)	80m	1	0.03	below average
Torching	80m	2	0.05	below average

PAA

TABLE 7.An Assessment of the Conservation Status of Smooth and Great Crested Newt PopulationsDerived from the 2005 Monitoring Data for the Receptor Pond

Method of Survey	Perimeter Length (m)	Total no. Adults Surveyed	No. Adults per 2m Perimeter	Conservation Status of Population*
Great Crested Newt				
Netting	20m	0	0.0	n/a
Bottle trapping (7)	20m	0	0.0	n/a
Torching	20m	0	0.0	n/a
Smooth Newt				
Netting	20m	0	0.0	n/a
Bottle trapping (7)	20m	3	0.3	below average
Torching	20m	0	0.0	n/a

FIGURES





Damhead Creek Phase II Proposed Development Amphibian Survey, 2007

Prepared by Penny Anderson Associates Ltd

Survey Dates: Four initial survey visits were carried out on 3rd and 17th April 2007, and 1st and 15th May 2007. Two further visits were conducted for waterbodies containing great crested newts (*Triturus cristatus*) (GCN), these were on 2nd and 7th June 2007.

Surveyors: Paul Fisher, Chloe Pritchard, Phil Smith, Sophie Hine.

Background

GCN are known to be present in the wetland creation area (WCA) ponds through past monitoring surveys carried out by Penny Anderson Associates Ltd (PAA) in 2005 as part of the ongoing monitoring of GCN on mitigation land. However, the presence of GCN across other waterbodies on the site and in the wider area are unknown.

In order to determine presence or absence of GCN within 500m of the application site, as recommended in the English Nature guidelines (English Nature 2001), a total of 13 waterbodies were evaluated. These are presented in Figure 1.

Methodology

Initially, evaluation of those data from amphibian surveys in the adjacent Kingsnorth Power Station Environmental Statement (Eon Plc 2006) was completed. This document presented survey results for amphibian surveys on some of the ponds and waterbodies within the 500m radius from the DHC proposed development site. Ponds and waterbodies surveyed in 2006 as part of this ES were not re-visited in 2007. These comprised D1 and D3 south (Figure 1), plus the ditches and ponds to the west of Jacob's Lane (see Figure 1).

Ditch D2 was situated outside Scottish Power owned land, and the 2006 surveys indicated that this ditch was polluted and unsuitable for amphibians. Therefore this ditch was not surveyed in 2007 as it was considered it would be in the same condition as in 2007 and unlikely to support GCN.

Ponds and waterbodies that had not been surveyed in 2006 were assessed via a site scoping survey and the need for amphibian survey work confirmed. Waterbodies that were scoped out of surveys in 2007 were P5 (access too dangerous due to very steep and unstable sides), D5, D6 and P11 (all largely outside, or on the edge of, the 500m zone).

Ponds surveyed in 2007 were therefore P1, P2, P2a, P3, P4, P6, P7, P8, P9, P9a and P10. The ditches surveyed in 2007 were D3 north and D10. These features are shown on Figure 1.

For those ponds and waterbodies identified for survey in 2007, surveys followed recommendations in the Great Crested Newt Mitigation Guidelines (English Nature 2001). Four surveys were completed to determine the presence or absence of GCN. Four initial survey visits were carried out on 3rd April, 17th April, 1st May and 15th May 2007. Two further visits were conducted for waterbodies containing GCN, these were on 2nd and 7th June 2007.

Three standard approaches to identifying the presence of amphibians were adopted on each of the survey dates; these approaches were:

- Bottle trapping;
- Torchlight surveys; and
- Egg searching.

Bottle trapping

This involves setting bottle traps, which are made from 2 litre plastic bottles, around the pond margin and leaving the traps overnight. The traps are set at about 2m intervals, although this may vary with margin conditions and access. Some studies have suggested that this method is the most reliable for detecting the presence of GCN and especially useful in turbid water and weed-covered ponds. Bottle traps were set in the evening and checked early the following morning and carried out in accordance with welfare guidelines. Any captured animals were released into the water once they had been identified and counted.

Torch counting

The ponds were slowly walked around and scanned with a powerful torch at night. Any amphibians seen during a circuit were recorded.

Egg searching

This involves searching live and dead submerged vegetation for GCN eggs. This is an effective method of detecting the occurrence of GCN (Gent and Gibson 1998) and can be used to confirm breeding in ponds.

Survey Constraints

Access to some waterbodies identified for 2007 surveys that fell on land outside of Scottish Power ownership (D4, P4, P6 and P9, on Figure 1) was withdrawn after the third visit, therefore the full four visits were unable to be undertaken. In addition, P2a dried up after the first survey, P8 and D3 north were dry throughout the survey period, and trapping was suspended at P9a initially due to a water shrew¹ (*Neomys fodiens*) being present, and later due to access permission being withdrawn.

Results

The survey results are presented in Table 1. From the surveys, three of the waterbodies contained GCN, these were P1, P2 and P3.

The maximum counts of GCN on any one survey night for P1 and P2 were five and one respectively, indicating a small population size class. Both ponds, however, did show evidence of breeding in the form of GCN eggs in P2 and a gravid female in P1.

The maximum count on any one survey for P3 was 19 GCN which gives the pond a population class of "medium" size. Breeding was also confirmed at this pond with regular records of GCN eggs.

GCN population class sizes as given in English Nature's Great Crested Newt Mitigation Guidelines (2001) can be calculated. Maximum counts of adult GCN identified by torchlight surveys or bottle trapping on any single survey session gives an indication of population size as follows:

- "Small" population size maximum counts up to 10;
- "Medium" population size maximum counts between 11 and 100;
- "Large" population size maximum counts over 100.

¹ Water shrew trapping requires a separate survey licence as shrews can easily die if trapped for any length of time as they need to feed frequently. A licence to capture shrews was not held at the time of survey.

Pond P10 and the associated ditch D10 contained small numbers of smooth newts (*Lissotriton vulgaris*) only. One smooth newt was recorded from P9a, but surveying was ceased due to the capture of the water shrew. Pond P7 surveys revealed one female smooth newt whilst torching. Pond 2a contained two smooth newts but dried up after the second visit.

The waterbodies in the PFA area did not provide good quality breeding habitat for amphibians, although small numbers of common frog (*Rana temporaria*) tadpoles were caught in P4. These waterbodies are possibly too saline (due to their proximity to the estuary) to support good numbers of newt species. Pond P6 did contain other interesting fauna, including shrimps (possibly marine species), isopods and shore crabs which may have colonised the pond through a pipe leading to the estuary.

From the desk study, GCN have been identified via the Kingsnorth Power Station ES (Eon Plc 2006) in three ponds within their ownership. All these ponds are unaffected by the DHC proposals, but two of the three are lost under the Kingsnorth proposals. GCN were also recorded in the ditch running between the two power stations (D3 south). Development proposals for DHC may affect this ditch.

Conclusions and Recommendations

P1 and P2 are confirmed as breeding ponds for GCN at hold small populations, with only one adult recorded from P2 and a maximum of five adults in P1. Pond P3, the larger of the three ponds, has a medium population of GCN but at the lower end of this class size (maximum count of 20 adults) and breeding was also confirmed. These three ponds are likely to support a meta-population of GCN within the WCA, and the accumulated data from this, and previous PAA surveys, suggests an overall small population size. Pond 2 and 3 also held populations of smooth newt.

No other ponds or ditches surveyed were found to contain GCN, although there were small numbers of smooth newts in pond P2a, pond P10 and the associated ditch D10 and P7 (the south coastal corridor pond), all of which are within Scottish Power land. In addition, smooth newts were recorded in a small number of ponds within other land ownership, comprising P9a (a small pond close to the larger P9 fire pond) and P4 (within the former PFA working area).

The GCN ponds are all found within the mitigation land (the WCA and near to the former pump house) which lies next to the grassland areas which would be lost under the proposed DHC Phase II development. These grasslands are classed as high value forage habitat for GCN and also hold opportunities for hibernation within the dense grass tussocks and soil mounds. As such the loss of grassland may have a significant impact on the population, although the amount of grassland lost compared to that being retained and managed within the WCA should be evaluated before a conclusion on level of impact can be reached.

In addition, the desk study indicated D3 contained small numbers of GCN, although the northern section was dry during the 2007 surveys. The ditch should be safeguarded during construction, and a buffer zone of shrub and grassland retained along the DHC side of the ditch to ensure the habitat can still support GCN (this would be required for the protection of water voles along this ditch).

In any case, the grassland to be lost will need to be carefully cleared of GCN using a trapping and translocation programme before any construction can take place. For small populations of GCN the trapping programme should be a minimum of 30 suitable trapping days (i.e. excluding extended dry periods of when the temperature falls <5°C). The ponds and ditch should then be protected by temporary newt fencing to ensure that GCN do not

re-colonise the site during construction activities. Permanent newt fencing is unlikely to be required.

As no ponds are lost under the DHC proposals there would not necessarily be a requirement to provide additional pond habitat, but improved management of ponds and ditches and/or the creation of new ponds for GCN would provide biodiversity benefits.

References

English Nature, 2001. *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

Eon Plc, 2006. Proposed New Generating Units at Kingsnorth Power Station. Environmental Impact Assessment Scoping Statement. October 2006. Eon UK.

Gent, A & Gibson, S, 1998. Herpetofauna Workers' Manual. JNCC, Peterborough.

Table 1 Damhead Creek Amphibian Survey Results 2007

Prepared by Penny Anderson Assoicates Ltd

		Date of visit																																									
		İ		03/0			17/04/2007								01/05/2	2007					1	5/05/2	007					02/0	6/2007			07/06/2007								1			
Waterboo	dy Description		GCN			SN			GCN			SN		CF		GCN			SN		CF		G	CN			SN			GCN			SN			GC	N			SI	N		Comment
		Bottle	Torch	Eggs	Bottle	Torch	h Eggs	Bottle	e Torci	h Eggs	s Bott	le Torc	h Egg	s Tadpo	le Bo	ttle Torch	Eggs	Bottle	Torch	n Eggs	Tadpo	le Bo	ottle To	orch Eg	igs B	Bottle	Torch	Eggs	Bottle	Torch	Eggs	Bottle	e Torci	h Eggs	Bot	tle Tor	ch Eg	gs Bot	ttle T	orch	Larvae	Eggs	3
Pond 1	Pump house, adjacent to WCA	0	1	0	0	0	0	1	0	0	0	0	0	0	C	0 1	0	0	0	0	2		5	1 (0	0	0	0	0	3	0	0	0	0	1	0	C	0 0	D	0	0	0	GCN present. Peak count 5
Ditch 1	Kingsnorth ditch																													1													Surveyed 2006 (no further survey needed)
Pond 2	Medium sized pond, WCA	0	0	0	5	0	0	1	0	0	3	0	0	0	0	D O	4	7	2	0	0	(0	0 0	0	1	1	1	0	0	0	0	1	0	0	0	0	0 1	1	0	2	0	GCN + SN present and breeding in very small numbers. Stickleback presen
Pond 2a	Small pond between P2 and P3	0	0	0	0	0	0	0	0	0	2	0	0	0																													Dried up after second visit
Ditch 2	Kingsnorth ditch																																										Not surveyed 2007, access permission require
Pond 3	Large pond, divided into two, WCA	7	0	0	7	12	0	2	6	1	8	7	0	0	1	9 13	0	28	21	0	0	9	9 2	20 (0	1	15	0	0	10	20+	0	16	0	2	6	6	5 2	2	12	6	0	GCN + SN present and breeding. Peak court 19 (lower medium population score)
Ditch 3	Ditch running along WCA and DHC southern boundary																																										Southern section surveyed in 2006, northern section dry in 2007
Pond 4	PFA pond	0	0	0	0	0	0	0	0	0	0	0	0	5	C	0 C	0	0	0	0	0																						No newts recorded, only common frog. Large gravel bottomed pond, stickleback present
Ditch 4	PFA ditch connected to Pond 4	0	0	0	0	0	0	0	0	0	0	0	0	0	C	0 O	0	0	0	0	0																						No amphibians recorded. Stickleback present, access difficult
Pond 5	PFA pond																																										Not surveyed in 2007, too dangerous to acces
Ditch 5	NEEA (reedbed)																																										Scoped out of 2007 survey as >500m from application site
Pond 6	Double pond in PFA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	D 0	0	0	0	0	0																						No amphibians recorded. Gravel bottomed, litt suitable vegetation. Crabs and shrimps preser
Ditch 6	Bury Wigans drain, running along north of NEEA																																										Scoped out of 2007 survey as >500m from application site
Pond 7	SCCP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0	(0	0 0	0	0	1	0															One record of smooth newt only
Pond 8	Car park waterbody																																										Waterbody dry in 2007
Pond 9	Fire pond	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0	0	0																						No amphibians recorded. Large steep-sided waterbody. Fish present
Pond 9a	Small reedmace pond adjacent Pond 9	te O	0	0	1	0	0																																				Smooth newt recorded. Small reedmace pond water shrew present
Pond 10	Large pond at western end of western PFA embankment	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0 0	0	1	0	0	0	(0	0 0	0	1	1	0															Small numbers of smooth newt only. Large numbers of stickleback
Ditch 10	Ditch running along western PF. embankment, running un to P10	A 0	0	0	1	0	0	0	0	0	5	0	0	0	0	0 0	0	3	10	0	0	(0	0 0	0	4	0	0															Small numbers of smooth newt only. Large numbers of stickleback
Pond 11	Woodland pond, NWEA																																										Scoped out of 2007 survey as >500m from application site

KEY: GCN SN CF

Great crested newt (*Triturus cristatus*) Smooth newt (*Lissotriton vulgaris*) Common frog (*Rana temporaria*)
