

Current state of amphibians in Kent*



Kent Reptile & Amphibian Group

*This account will be a chapter in the 'State of Nature in Kent' report, to be published at kentnature.org.uk

Summary

- Kent's native amphibian fauna consists of five species. Of these there are three different newt species, the common frog and the common toad.
- The great crested newt is a European Protected Species and all other amphibians have partial protection under the Wildlife and Countryside Act. Although trends at a county level are difficult to establish, expert opinion suggests that populations of all of Kent's species are reasonably stable, though significant losses of all species are likely to have occurred throughout the 20th century that were primarily linked to the loss of breeding ponds.
- The marsh frog has become established in Kent over the last 80 years and the range of the species continues to expand. The impact of the marsh frog on native amphibian species is still unclear.
- Amphibians are dependent upon the presence of breeding ponds with suitable terrestrial habitat. Lowering of pond density can result in damaging levels of population fragmentation. The Low Weald has the highest pond density in Kent and is consequently the stronghold of great crested newts.
- The amount of suitable habitat, and particularly suitable breeding ponds, has been the most critical driver of change over the last century. This remains the case and conservation efforts need to focus on the creation and management of high quality, connected breeding ponds. Disease and climate change also pose considerable threats to amphibian species.
- The Kent Reptile and Amphibian Group and its partners will continue to focus their efforts on long-term recording projects. These projects will aim to establish changes in the range of each amphibian species as well as monitor the long-term changes at well-studied sites.

Amphibian fauna of Kent

Great Britain has only six native species of amphibian with the reintroduced pool frog sometimes being classed as a seventh. The number of native amphibian species in countries at similar latitudes around the world is often much higher than in Britain. The formation of the British Isles after the last ice age, the poor dispersal abilities of amphibians and the loss of a land bridge to

Europe left Britain with a very low number of species. Consequently, Kent can boast only five native species of amphibian. However, just 20 or so miles away in northern France it is possible to record three times that number in a single survey session. As the climatic conditions and available habitat are largely similar on the British side of the English Channel, Kent is vulnerable to the release of

non-native species with the marsh frog (*Pelophylax ridibunda*) and the alpine newt (*Ichthyosaura alpestris*) having established viable breeding populations over the last century and continuing to expand their range.

Of the five native species of amphibian in Kent, two are frogs and toads and three are newts. They are the common frog (*Rana temporaria*), the common toad (*Bufo bufo*), the smooth newt (*Lissotriton vulgaris*), the palmate newt (*Lissotriton helveticus*) and the great crested newt (*Triturus cristatus*) (Fig. 1). The great crested newt has European Protected Species status and the common toad is on England's list of species of principle importance.



Figure 1: Male great crested newt in breeding condition (photo Jason Steel)

The natterjack toad (*Epidalea calamita*) became extinct in Kent in the 1960s and native pool frogs (*Pelophylax lessonae*) have never been recorded in the county.

Status and trends

Although the recording effort of amphibians in Kent has been extensive, amphibians are cryptic animals and unless formal survey work takes place, most species are rarely recorded. During the breeding season, amphibians congregate at ponds and so may

be relatively easy to record; at other times they are rarely encountered. Consequently, getting a full understanding of the conservation status of amphibians in Kent can be problematic. The occupancy rates for each species (Table 1) shows that the common frog is the most widespread amphibian species with the palmate newt having a range that is more restricted than the introduced marsh frog.

Table 1. Occupancy of the 4,365 kilometre squares of the Vice Counties East and West Kent by amphibian species, including a correction for survey effort.

Species	Occupied km squares	% squares occupied	% Occupancy controlled for survey effort
Common frog	965	22.1	35.3
Common toad	698	15.9	25.5
Great crested newt	589	13.4	21.5
Palmate newt	290	6.6	10.6
Smooth newt	776	17.7	28.4
Marsh frog (non-native)	291	6.6	10.6

There is little evidence to support significant changes in the range of Kent's five native amphibian species over the last century. Kent surveys have not been designed to quantify changes in populations of the native species though general trends of habitat loss across the 20th century suggest that populations have declined over this time period. As pond loss slowed at the end of the 20th century and survey effort increased, there have been several assessments made of the percentage of ponds occupied

nationally by different amphibian (Table 2). Pond occupancy has remained relatively stable over this period but pond occupancy is not necessarily a proxy for population size. Research suggests that the percentage of ponds occupied by newts in Kent is significantly higher than those shown in the Table 2. For example, it has been estimated that 44% of ponds in Kent are occupied by great crested newts with 32% of ponds suitable for breeding (Lee Brady, personal communication).

Table 2: Percentage pond occupancy for native species in Great Britain (Source: Wilkinson and Arnell, 2012)

Species	Common frog	Common toad	Great crested newt	Smooth newt	Palmate newt
Pond occupancy (%) Swan & Oldham (1993)	52	30	11	22	11
Pond occupancy (%) NARRS 2007 – 2009	60	33	13	26	30
Pond occupancy (%) NARRS 2007 - 2012	60	33	12	28	27

The status of Kent’s amphibians is very strongly linked to the number of ponds that can be used for breeding. Although a wide range of ponds can be used by different species there is a need for these ponds to be surrounded by habitat suitable for the terrestrial phase of amphibians. As pond loss has been so significant over the 20th century, it can be assumed that the size of Kent’s amphibian populations have mirrored these declines. However, there are factors that impact the conservation status of each

species which will be outlined in the following paragraphs.

The common toad, common frog and smooth newt are found throughout Kent where habitat is suitable, though in areas of low pond density, such as the chalky areas of the North Downs, their populations are often small and largely isolated. The status of common frogs appears to depend largely on the number of small ponds available that are free of fish and newts. Their strategy of breeding early in the season allows them to use small ponds that have a tendency to desiccate early in the year. Consequently, common frogs are doing increasingly well in urban areas where small garden ponds are popular but are often absent from ponds in the wider countryside that are larger and may have been colonised by fish and newts that predate heavily on frogspawn and render attempts to breed unsuccessful.

Conversely, common toads tend to favour large ponds and can co-exist with fish as bufotoxins found in their skin makes them unpalatable. Large populations may be found at single ponds and the loss of certain ponds can be particularly damaging to local populations. The toad patrol project in Kent is monitoring toad numbers at specific sites in the county and although numbers of toads at most sites have declined over the last eight years of the study, it is still too early to tell whether these declines represent cyclical changes or a more permanent loss

Smooth newts and palmate newts are similar in size and life history. They frequently occupy the same ponds that are usually fish-free. However, palmate newts are more tolerant of acidic conditions (Brady & Griffiths, 1995) and consequently, palmate newts are more often found in woodland

ponds. An analysis of palmate newt observations in Kent has shown that it is absent from areas that are not heavily wooded such as Dungeness, Thanet and Sheppey. Studies in The Blean (Kent's most wooded area) have shown many ponds are only occupied by palmate newts despite both smooth newts and great crested newts being regularly encountered on the margins of the woodland complex.

Great crested newt (Fig. 1) conservation status is most influenced by the density of rural ponds. As the Low Weald has very high pond density, it is one of the most important great crested newt areas anywhere within its range. Great crested newts are largely absent from areas with low pond density such as Thanet and the North Downs. Pond loss and neglect have been associated with major declines in great crested newt populations throughout the 20th century to which both European and UK authorities have responded with legislation to protect both the newts and their habitats. The future status of the great crested newt in Kent is likely to go hand in hand with pond creation schemes throughout the range of the species.

The historical range of the natterjack toad in Kent is not well understood though elsewhere in Britain and where it occurs in Northern France the species prefers sand dune, salt marsh and heathland habitats. These habitats are not common in Kent and coastal defence work during the 20th century, coupled with the loss of heathland has resulted in there being very little suitable habitat. A reintroduction of natterjack toads that took place in Kent just over 10 years ago

appears not to have been successful although breeding did take place.

Non-native and invasive species

The marsh frog (Fig. 2) was introduced to Stone-in-Oxney in 1936, since then their range has expanded continuously. They had become well established in Romney Marsh, Isle of Sheppey, Hoo Peninsula and Stodmarsh by 2000 but they have increasingly been recorded further to the west of Kent, throughout the Lower Stour and the North Kent Marshes in the last 20 years. This expansion in range is shown in Figure 3. The range of marsh frogs is likely to increase further in the next ten years. Pool frogs were once native to Britain but were presumed extinct in 1995 and were thereafter reintroduced to Britain. Edible frogs are a hybrid of pool and marsh frogs and all three are part of the green frog complex. There have been no confirmed cases of pool or edible frogs in the last 10 years, though introduced individuals have been recorded in Kent in the past. However, it is difficult to distinguish different members of the green frog complex from one another so it is likely that some pool frogs and edible frogs are still present.



Figure 2: Marsh frog, an exotic species with an expanding range (photo Jason Steel)

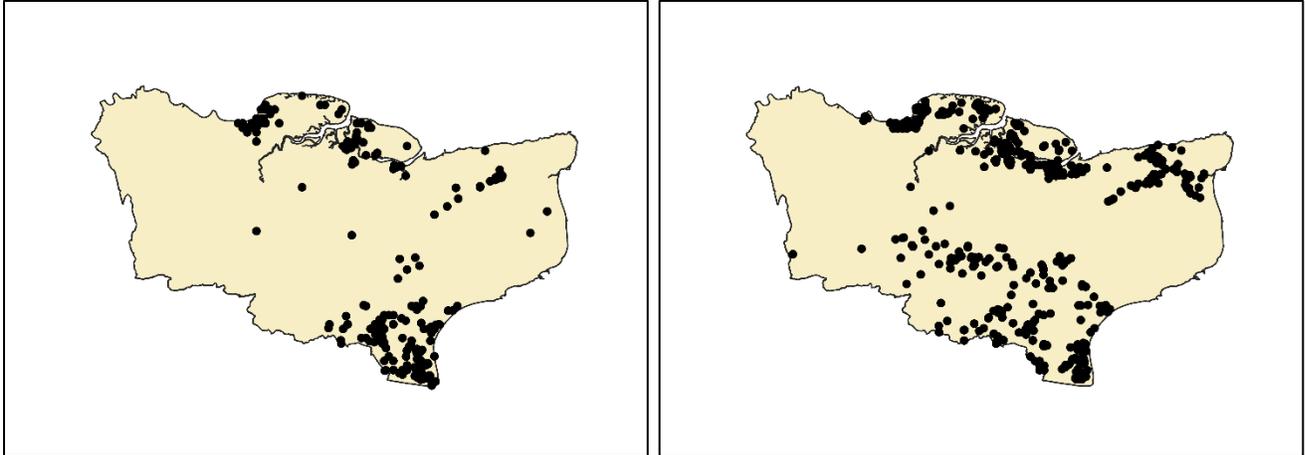


Figure 3: Marsh frog distribution up to 2000 and from 2001 onwards

There have been isolated records of alpine newts in Whitstable and Dartford in 2014 and 2015 respectively and a population in Tyler Hill and Canterbury (also recorded in 2015). Somewhat surprisingly, no further sightings of alpine newts have been received since. Although the species has become well established in isolated populations in Kent there are few signs of significant range expansion in the last 10 years.

American bullfrogs are likely to have been fully eliminated following an eradication programme set up by Natural England. The last confirmed record of American bullfrog in Kent was in 2000.

Key habitats and their protection

Amphibians require habitat that provides foraging, shelter and breeding opportunities. There are three key components to high quality amphibian habitat.

1. Breeding habitat - The Kent Biodiversity Strategy 3 mentions ponds as a key habitat for the county and a high pond density - with good water quality (preferably fish-free) will greatly improve amphibian

breeding opportunities. Amphibians have also been known to breed in larger lakes (particularly common toads), canals, drainage ditches and sometimes even wheel ruts and temporary ponds that desiccate by late spring.

2. Terrestrial habitat - Of equal importance, for forage and shelter, is good quality, structurally complex vegetation, both surrounding and linking ponds together.
3. A connected landscape - In an increasingly fragmented, human dominated landscape, amphibian populations can become isolated, less resilient and ultimately vulnerable to extinction without ponds connected with high quality habitat allowing movement between breeding ponds.

The Low Weald has one of the highest pond densities in England and this is highlighted by the designation of the Wealden Great Crested Newt Important Area for Ponds by the Freshwater Habitats Trust (Keeble, 2007). With its lowland meadows (foraging), wet woodland (hibernation and foraging) and hedgerows (connectivity and foraging) –

all key habitats for Kent – the Low Weald is justifiably the highest priority for amphibian conservation within the county, especially for great crested newts that are particularly favoured by high pond density (Fig. 4).

Within anthropogenic habitats, the promotion and building of fish free ponds in gardens and community areas should also be a priority, to ensure that amphibian species remain a part of our living environment.



Figure 4: High quality fish free ponds at high density are vital for conservation of amphibians especially the great crested newt

Drivers of change

Habitat loss/gain

In the 20th century, up to 80% of lowland ponds may have been lost due to either neglect or filling in. As ponds are an essential part of an amphibian’s habitat, these losses are generally accepted to have been the main driver of losses in amphibian populations in modern times. Although some evidence suggests that these reverses have been halted (Williams, 2007), and pond numbers may even have increased in places, pond densities are still much lower than historic levels. The current best estimate of the number of ponds in Kent is 18,000, not including most of those found in gardens. Whilst ponds are still being lost due to

changes in agricultural practices and through development, ponds are also being created in Kent. The increasing popularity of wildlife ponds in gardens is believed to be particularly beneficial for common frogs and smooth newts. Loss of good quality habitat near ponds or the creation of good quality ponds without terrestrial habitat can negatively impact all amphibian species. These losses are driven by high intensity farming and often by a desire for neatness in public areas.

Habitat degradation

Good quality amphibian habitats can become lost either through neglect or through unsympathetic management. Lack of knowledge of amphibian populations may result in barriers to dispersal being placed in the way of migrating populations. Common toads make long distance migrations and are thus particularly vulnerable to road building and other development projects. Unsympathetic management of ponds and terrestrial habitat can render them unsuitable for amphibians. Again, this can often happen due to a lack of understanding of amphibian populations and the use of conservation goals that are not compatible with the needs of amphibians. This can include, but is not limited to, introducing fish or wildfowl to a pond, managing the terrestrial habitat of a pond as a wildflower meadow and cutting or grazing during the active season, or the removal of vegetation from a pond. Management plans informed by an understanding of the needs of amphibian populations can help to alleviate this driver for change.

Habitat fragmentation

Amphibians have relatively poor powers of dispersal. As a consequence of this, amphibian populations are particularly

vulnerable to becoming isolated from one another because of relatively minor barriers that prevent populations mixing. The more isolated populations become, the more vulnerable they are to extinction. Fragmentation may happen for a number of reasons including housing development, changes in farming practices and management of terrestrial habitat that limits the ability of populations to migrate. Due to the crucial role that ponds play in the amphibian life cycle, the loss of just a single, critical breeding pond can impact multiple surrounding populations and potentially render them unviable. A better understanding is needed of the important role of well-functioning metapopulations, particularly for great crested newts, and how development, farming practices and management of nature reserves can significantly impact amphibians. Since the Lawton Report (Lawton, 2010) was published, there are signs that the connectedness of wildlife habitats is being taken more seriously.

Government policy

The 25 Year Environment Plan outlines the government's approach to declining biodiversity. However, there are two issues that are likely to impact the health of amphibian populations over the next ten years. The first is the role of agri-environment schemes. Currently, farmers and landowners have a number of options to help improve habitats for amphibians including payments to create ponds, plant and manage hedgerows and leave rough grass buffer strips. These schemes will be replaced by the Environmental Land Management (ELM) scheme and whilst the exact incentives that will be offered to land managers is not yet established, it is hoped that there will be additional opportunities

for wildlife habitat creation. The success of these schemes for amphibians will depend upon good quality advice being given to farmers and other land managers.

Secondly, development mitigation can result in the creation of new ponds and the Great Crested Newt District Level Licensing scheme that was launched in Kent in 2019 is creating new ponds across the county. The impact of District Level Licensing on great crested newts is yet to be established but it could impact both the number of breeding ponds and hence the range of the species. Another change that may impact amphibian populations is the introduction of Biodiversity Net Gain. This is due to be introduced as part of the recently passed Environment Bill, 2020. This will require developments to result in a net gain of habitat, resulting in better quality habitat within development sites or opportunities to mitigate off site on high quality amphibian sites.

Climate change

There is no full understanding of how human induced climate change will impact Kent's weather in the future, many studies suggest that there will be warmer, wetter winters. Although more research is needed, Griffiths et al. (2010) suggest, somewhat counter-intuitively, that amphibian populations decline and animal health deteriorates under these conditions. It is thought that warm winters compromise the ability of amphibians to hibernate effectively and that flooding of animals when they are becoming more active may even cause mortalities. Hotter, drier summers may cause the desiccation of ponds earlier in the year and lead to breeding failures. This is more likely to affect newt populations that have a more protracted breeding season. Research by

Dunford and Berry (2012) based on modelling of British species in different climate change scenarios suggests that significant losses of smooth newt, common frog and great crested newt could be expected in Kent by 2080 even in low emission scenarios. Whilst palmate newts and common toads are predicted to have fairly stable populations under low emission scenarios, under high emission scenarios losses can also be expected for these species. There is concern over the status of common toads as declining body condition of female toads, thought to be a consequence of warmer winters, has limited reproductive output as evidenced by Reading and Clarke (1995) amongst others.

Non-native species and disease

The impact of non-native species is not fully understood, but there are likely to be pressures on native populations caused by the ever-expanding range and size of marsh frog populations as well as the persisting alpine newt populations in the Canterbury area. However, what has been established is that non-native species can be carriers of disease making introductions potentially dangerous for other reasons. In the last ten years, significant concern has been voiced over the discovery of the fungi *Batrachochytrium dendrobatidis* and *Batrachochytrium salamandrivorans*, which cause the disease chytridiomycosis. This disease has caused mass mortalities of amphibians across the world and in Europe. Although, detected in multiple species in Britain, no mass mortalities have yet been suffered. However, the ongoing threat of diseases of this nature can't be underestimated. It also highlights the need for good bio-security and to minimise the movement of animals.

Public awareness

The impact of actions by the public can be complex. Inadvertent damage can be done to amphibian populations through the introduction of fish into ponds or the introduction of disease (particularly ranavirus or red leg in common frogs) caused by moving frog spawn from one pond to another. However, public awareness of amphibians and how people can take simple steps to aid their conservation status is greater now than it has ever been. The work of Kent Wildlife Trust's 'Wild About Gardens' project and other similar initiatives have dramatically increased not only the number of fish-free ponds in gardens but the quality of the terrestrial habitat available for amphibians that choose to breed in those ponds.

Recording, monitoring and research

The Kent Reptile and Amphibian Group runs two long-term amphibian recording projects that are dependent upon volunteer effort. The first is the Great Crested Newt Monitoring Project (Fig. 5) which was initiated in 2004 and has trained volunteers in amphibian survey techniques on an annual basis ever since. This project has generated 6348 amphibian records including 974 great crested newt records. The second is the Kent Toad Patrol, and although the primary aim of this project is to prevent toad mortalities on roads during their springtime migration, the project also generates a significant number of records. These records are from the same sites every year producing some significant longitudinal data sets.



Figure 5: Volunteers being trained by Krag to survey for great crested newts

The Durrell Institute of Conservation and Ecology at the University of Kent also conducts significant amounts of recording and research. The long-term study of great crested newts at the field site in Canterbury has now been running for more than 20 years and has contributed to significant advances in the understanding of newt ecology.

Conclusions

The distribution and status of Kent's amphibians is known better now than ever before. Awareness and knowledge of the needs of amphibians in terms of habitat creation and management as well as the need for good biosecurity is also unprecedented. This provides a strong basis for the future conservation of amphibians at a landscape scale. However, the uncertainties around the future of farming in a post-Brexit environment, uncertainties over the protected status of the great crested newt and the continued pressure placed on Kent's landscape by development all cast an uncertain shadow over the future of amphibians in the county. With amphibians considered to be particularly vulnerable to environmental degradation, the need to prioritise their conservation at

strategic and practical levels is as essential in 2021 as it has ever been.

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