The distribution and baseline survey of the crayfish populations in the River Thame

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THE DISTRIBUTION AND BASELINE SURVEY OF THE CRAYFISH POPULATIONS IN THE RIVER THAME

Executive summary

1. Thirty six sites on the River Thame were test trapped on 14 & 15 November 1995 to determine the distribution of the white clawed crayfish *Austropotamobius pallipes* and the signal crayfish *Pacifastacus leniusculus*.

2. No white clawed crayfish were captured and no signal crayfish were captured above Thame, or below Brookhampton. Within their range the distribution of signal crayfish was discontinuous.

3. Using the data from the initial survey and information on the activities of the principle commercial crayfisherman three reaches were selected for more detailed study in 1996. The three reaches have the following characteristics; one containing a commercial fishery; one outside the commercial fishery, but supporting a significant crayfish population; and one reach with no crayfish of any species.

4. The lengths of the reaches for study have been reduced to 1 km from 3 km. This is because none of the reaches, which have characteristics complying with the requirements of the detailed study, are greater than 1 km in length.

5. It is recommended that this baseline survey is repeated in July/August to confirm the distribution of signal crayfish and absence of white clawed crayfish in the River Thame.

Introduction

There is known to be a large population of signal crayfish in the River Thame, and that commercial fishermen are exploiting this population. There have been previous reported sightings of white clawed crayfish; at Thame Bridge in 1977 and in Scotsgrove Brook in 1980. More recently they have been reported in the Latchford Brook, 1987, at Notley Abbey, 1988, 1989 and 1990 and in the Milton Ditch at Wheatley, 1992 (NRA Biologists Reports). The distribution of these two species and the current status of the white clawed crayfish in the River Thame are currently unknown.

A broader study is being planned for next year with the specific objectives of:-

(a) determining the environmental impact of the signal crayfish on the flora and fauna of the River Thame

(b) establishing the likely effect of the fishery on white clawed crayfish populations.

This requires the monthly fishing of three reaches with the following characteristics; a reach containing the commercial fishery; a reach outside the commercial fishery, but which supports signal crayfish; and a reach which has no crayfish at all.

The objective of this baseline survey was to detail the distribution of signal and native crayfish, and to identify the most suitable stretches of river to be used as the three reaches for detailed study the following year.

Site description

The River Thame runs from just north of Aylesbury, through Thame to join the River Thames south of Oxford. It is approximately 60 km in length and for the greater part it drains improved pasture.

Its proximity to the two conurbations of Aylesbury and Thame and the use of the adjacent land for pasture, means there is pressure to manage the river for flood control purposes. The greater part of the river is embanked and dredged approximately every 5 years to reduce the risk and incidence of flooding. In 1995 when the main channel was dredged for 1 km above Ickford Bridge and between Shabbington Island and Thame Bridge.

This type of flood relief management will have had deleterious effects on the distribution of crayfish in the River Thame, as it makes the habitat less suitable for these animals (Hogger, 1988).

Once the river flows past Aylesbury the river is used extensively for coarse fish angling. The anglers find the signal crayfish a nuisance because they remove bait from hooks. This is particularly a problem when the crayfish are numerous and angling organisations have been known to ask commercial crayfishermen to reduce the density of crayfish.

Methods

On 14 and 15 November 1995, 36 sites between the source of the River Thame and its confluence with the River Thames were test trapped for the presence of crayfish. The sites included the main river and most of its major tributaries (Figs 1-3; Annex A). Test trapping involved placing 2 disinfected commercial baited traps in the river on 14 November, leaving them overnight and recovering them the next day. Crayfish captured inside the traps were counted, identified and measured.

The sites sampled are shown on the maps at Fig 1-3, and a list with their grid references is at Annex A.

One of four categories of abundance were assigned to each site depending on the number of crayfish captured in each trap. These categories were absent, less than 5 per trap, between 5 and 9 per trap and 10 or more per trap.

Discussions were also held with Alan Mitchell, the principle commercial fisherman, regarding the sites that he currently exploits, areas where he has not fished but believes that crayfish are present, areas which he intends to fish in the following year and areas fished by other commercial and small scale fishermen.

Results

No white clawed crayfish were captured and no signal crayfish were captured above Thame (NGR SP 700 065), or below Brookhampton (NGR SU 598 977). The distribution was discontinuous with crayfish being captured in small pockets but being apparently absent in adjacent sites (Fig 1-3). There were a few tributaries with large crayfish populations, notably the Haseley Brook (Sites 30 & 32, Fig 2). Smaller populations were shown to be present in the Gainsbridge Brook (Site 31, Fig 2), Denton Brook (Site 23, Fig 2) and the Tiddington Brook (Site 15, Fig 2).

The numbers per trap ranged from an average of 0.5 to 14.5 individuals and all traps contained adult crayfish, with carapace lengths ranging from 21 to 55 mm (Table 1).

The commercial fisherman is intending to fish Shabbington Island and Thame Island in 1996. These correspond to site no's 14 and 36 respectively (Fig. 2). His view is that many of the other sites do not contain populations large enough to warrant fishing, or have been over exploited and need resting for a few years.

Identification of any sites where there are crayfish populations, but which have not been fished is difficult, because of the high efficiency of the principle commercial fisherman. Thus, where there are large populations of crayfish these have been identified and exploited. However, there is one site below Shabbington Island (Site 14) (Fig. 2) where it is believed a large population of crayfish exist, and access to this area has been refused to commercial fishermen by the landowners on both sides of the river. A possible reserve area would be below Ickford Bridge (Site 16) (Fig. 2), which is not fished by Alan Mitchell but is fished quite heavily by another fisherman.

Table 1 Numbers and size of crayfish captured at each site on the R. Thame in November 1995

Site No.	Grid reference	Av. no. per trap	Min - Max Length Carapace Length (mm)
1	SP 782 161	0	-
2	SP 797 154	0	-
3	SP 815 153	0	-
4	SP 771 135	0	-
5	SP 751 123	0	-
6	SP 729 111	0	-
7	SP 723 101	0	-
8	SP 709 100	0	-
9	SP 714 088	0	-
10	SP 711 070	0	-
11	SP 707 078	0	-
12	SP 693 066	0	-
13	SP 685 067	0	-
14	SP 669 070	8	22 - 50
15	SP 649 058	4	21 - 35
16	SP 652 065	14.5	25 - 49
17	SP 632 055	3	23 - 42
18	SP 612 048	9	25 - 55
19	SP 618 051	0	-
20	SP 614 082	0	-
21	SP 611 031	0	-
22	SP 605 039	0	-
23	SP 599 017	0.5	27
24	SP 602 014	10	23 - 39
25	SP 578 011	0	-
26	SU 596 996	3.5	27 - 49
27	SU 576 984	0	-
28	SU 598 985	0	-
29	SU 627 977	0	-
30	SU 627 993	13	27 - 43
31	SP 615 005	2.5	28 - 37
32	SP 612 001	6	23 - 43
33	SU 598 977	1.5	44 - 48
34	SU 599 955	0	-
35	SU 580 936	0	-
36	SP 700 065	10	32 - 54

Discussion and recommendations

The test trapping was done in mid-November. During this period the falling temperatures were likely to have dramatically reduced the foraging rate of crayfish and, undoubtedly, this will have affected the test trapping results. During the warmer months the crayfish range over a wider area and it is probable that if the survey had been undertaken in the summer then crayfish would have been caught in areas where they were not caught in November. During the autumn the mature females are carrying eggs and are therefore much less active and harder to capture with baited traps.

The absence of white clawed crayfish in any of the traps may simply reflect an absence of this species in the River Thame, something that English Nature would expect (Mary Gibson, pers. comm.). However, the most recently reported sightings of the white clawed crayfish in the River Thame catchment were in 1992 near Wheatley in the Milton Ditch and in each year between 1988 and 1990 above Thame, at Notley Abbey (NRA Biologists Reports). This was some time after the signal crayfish invaded the River Thame. Thus there is still some doubt as to the status of the white clawed crayfish in the River Thame and their absence in the traps may be the result of the timing of the test trapping.

The size of the signal crayfish captured was influenced by the design of the trap used in this survey. The commercial traps have entrances large enough to allow the largest crayfish to enter them and the mesh of the trap body is large enough to allow small, young crayfish to escape. For the detailed study taking place in 1996, three trap and mesh sizes will be used, to capture all size categories of crayfish.

The reasons for the discontinuous distribution of the signal crayfish in the River Thame have not been demonstrated in this survey, but could be related to the location of different past, and possibly continuing, introductions. Local habitat is likely to have had an influence, in particular, where this has been affected by dredging activities. Clearly, the flood relief management, will have impacts on both the abundance and distribution of crayfish as well as on the other flora and fauna of the River Thame. Thus to complete the objectives of the detailed study, to take place in 1996, the sites chosen for that study must not differ significantly in their recent historical treatment for flood defence purposes.

No crayfish were captured above Thame, and it is recommended that the site without any crayfish is chosen from this area of the river. Although there were sites below Thame where no signal crayfish were captured during the initial survey, they will probably contain crayfish in the warmer months as the crayfish expand their range at peak foraging times. It is probably prudent to consider the whole of the River Thame from Thame to Brookhampton to contain signal crayfish. The selected site is at Long Crendon above Thame (Site 11, Fig. 3).

There are two sites which the commercial fisherman intends to fish next year, these being Shabbington Island (Site 14, Fig. 2) and Thame Island (Site 36, Fig. 2). Shabbington Island was fished in 1995 and was last dredged about five years ago. In contrast, Thame Island was dredged last year and there is a risk that this will adversely impact on the crayfish population there. Therefore the preferred choice for study in 1996 is Shabbington Island. This site has the disadvantage of being one of the few braided reaches of the river resulting in two channels which

are narrower than the adjacent non-braided channel. However, the general habitat characteristics are otherwise similar and the combined lengths of the two braided channels is approximately 1 km.

Selecting a site with signal crayfish that has not been, and is not going to be, fished is extremely difficult as already explained (see Results). However, there is one area below Shabbington Island (Site 14, Fig. 2), where the commercial fisherman has not been allowed access and this is really the only sensible choice for this site. A reserve site below Ickford Bridge was considered (Site 16, Fig. 2), but this is fished quite heavily by another crayfisherman.

The lengths of the reaches for study will have to be much smaller than the 3 km suggested in the tender document. This is because the crayfish are concentrated in pockets which often do not extend 3 km and because there are no suitable reaches 3 km in length which contain populations of crayfish which have not been exploited. It is recommended that all study sites are reduced to 1 km in length.

References

Hogger, J. B. (1988) Ecology, population biology and behaviour. In *Freshwater crayfish: biology, management and exploitation*, edited by D.M. Holdich and R. S. Lowery, 114-144. London: Croom Helm.

Annex A. Grid references and site names of sites test trapped in November 1995.

1	SP 782 161	BERRYFIELDS FARM	PUTLOWES TRIB
2	SP 797 154	QUARRENDON HOUSE FARM	R.THAME
3	SP 815 153	ELMHURST	THISTLE BROOK
4	SP 771 135	EYTHROPE PARK	R.THAME
5	SP 751 123	MAINSHILL FARM	R.THAME
6	SP 729 111	CUDDINGTON MILL FARM	R.THAME
7	SP 723 101	CHEARSLEY	R.THAME
8	SP 709 100	RAILWAY EMBANKMENT	NOTLEY ABBEY TRIB
9	SP 714 088	NOTLEY ABBEY	R.THAME
10	SP 711 070	SCOTSGROVE HOUSE	CUTTLE BROOK
11	SP 707 078	WORKS	R.THAME
12	SP 693 066	THAME BRIDGE	R.THAME
13	SP 685 067	NORTH WESTON	R.THAME
14	SP 669 070	SHABBINGTON	R.THAME
15	SP 649 058	TIDDINGTON	TIDDINGTON TRIB
16	SP 652 065	DRAYCOT	R.THAME
17	SP 632 055	WATERSTOCK	R.THAME
18	SP 612 048	A40 CROSSING	R.THAME
19	SP 618 051	HELTON MILL	HOLTON BROOK
20	SP 614 082	PARSONS FARM	HOLTON BROOK
21	SP 611 031	CUDDESDON MILL	R.THAME
22	SP 605 039	CASTLE HILL	CUDDESDON BROOK
23	SP 599 017	CHIPPINGHURST MANOR	DENTON BROOK
24	SP 602 014	CHIPPINGHURST MANOR	R.THAME
25	SP 578 011	TOOT BALDON	BALDON BROOK
26	SU 596 996	CHISELHAMPTON	R.THAME
27	SU 576 984	MARYLANDS FARM	BALDON BROOK
28	SU 598 985	STADHAMPTON	CHALGROVE BROOK
29	SU 627 977	NR LANGLEY HALL	CHALGROVE BROOK
30	SU 627 993	COWLEASE COPSE	HASELEY BROOK
31	SP 615 005	LITTLE MILTON	GAINSBRIDGE BROOK
32	SP 612 001	COLDHARBOUR	HASELEY BROOK
33	SU 598 977	BROOKHAMPTON	R.THAME
34	SU 599 955	LOWER GRANGE	R.THAME
35	SU 580 936	BRIDGE END	R.THAME
36	SP 700 065	THAME ISLAND	R.THAME