



our river habitats



**River habitats in Thames River Basin District:
Current state and character**

Photo © Judy England
River Mimram, near Hertford, Hertfordshire, Thames RBD

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Contents

1 Introduction	3
2 Current state	6
Habitat modification – current state	6
Habitat Modification Class	6
Resectioning	7
Reinforcement	8
Riverside trees – current state	9
Channel shading	9
Tree features – exposed bankside roots and woody debris	10
Invasive non-native plants on river banks – current state	11
Himalayan balsam	11
Giant hogweed	12
Japanese knotweed	13
In-channel depositional bars – current state	14
3 Comparison with 1995-96	15
Habitat modification - comparison with 1995-96	15
Reinforcement	15
Riverside trees - comparison with 1995-96	16
Channel shading	16
Invasive species – comparison with 1995-96	17
Himalayan balsam	17
Giant hogweed	18
Japanese knotweed	19

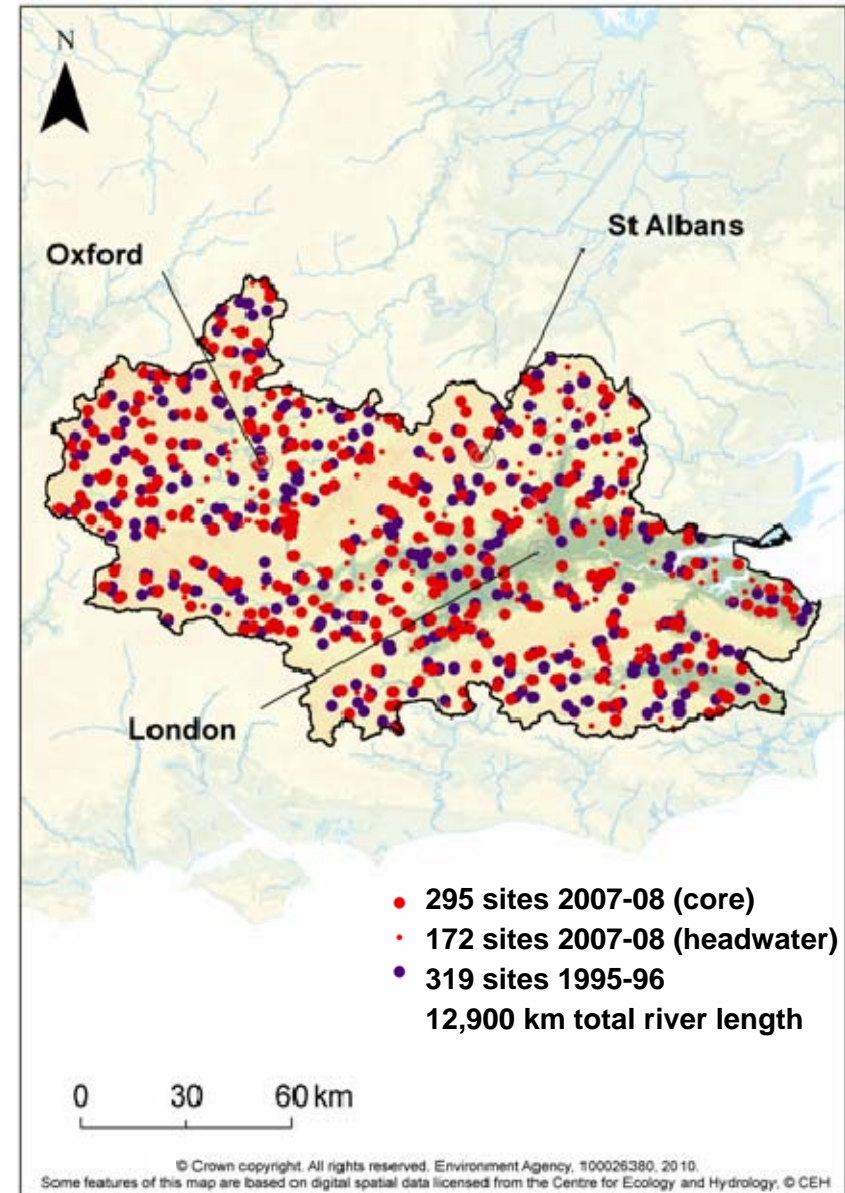


Figure 1: Location of River Habitat Survey baseline sites in Thames RBD from 1995-96 and 2007-08. 2007-08 baseline sites are split into small river (headwater) and large river (core) datasets.

1 Introduction

We have produced this document for those with a general or professional interest in rivers and how they are managed to benefit wildlife, fisheries and conservation. This is one in a series of reports presenting data from the River Habitat Survey (RHS) baseline survey carried out across England and Wales in 2007-08. Here, we provide an overview of the current state of river habitats in Thames River Basin District (RBD) and show comparisons with the first baseline survey carried out in 1995-96.

A snapshot report provides a general introduction to the series, while a document covering England and Wales gives an overall assessment of current state and changes. We also show further detail in separate reports for each of the 11 river basin districts (RBDs), Wales and the Isle of Man (which was surveyed in 1997 and 2006). Each report includes basic statistical terms, while a separate document gives a full description of how we produced our figures. Each of the 16 documents in this series of RHS baseline survey reports are listed below:

- | | | |
|--|--|--------------------------|
| 1. The state of river habitats in England, Wales and Isle of Man: a snapshot report | 5. Dee | 11. South East |
| 2. England and Wales: current state and changes since 1995-96 | 6. Humber | 12. South West |
| 3. RHS baseline survey: statistical methods | 7. North West | 13. Thames |
| 4. Anglian | 8. Northumbria | 14. Western Wales |
| | 9. Severn | 15. Wales |
| | 10. Solway Tweed (England only) | 16. Isle of Man |

All of these reports use information collected on the *RHS field survey form*, but focus only on selected parts of the full dataset.

River Habitat Survey (RHS)

The River Habitat Survey (RHS) is a standard field survey of a 500 metre stretch of river. Data are collected about the physical character of the banks and channel. At ten 50m intervals a 'spot-check' transect records specific details about the bank and channel structure. These details include natural features, artificial modifications, land-use and bankside vegetation structure. An overview of the extent of key features across the 500m reach is recorded in the 'sweep-up' section, where features and modifications are recorded as absent, present (up to 33 per cent of the site) or extensive (more than 33 per cent).

You can find detailed information in the *River Habitat Survey Guidance Manual: 2003 version*.



RHS surveyors on the banks of the River Colne in Denham, Thames RBD.

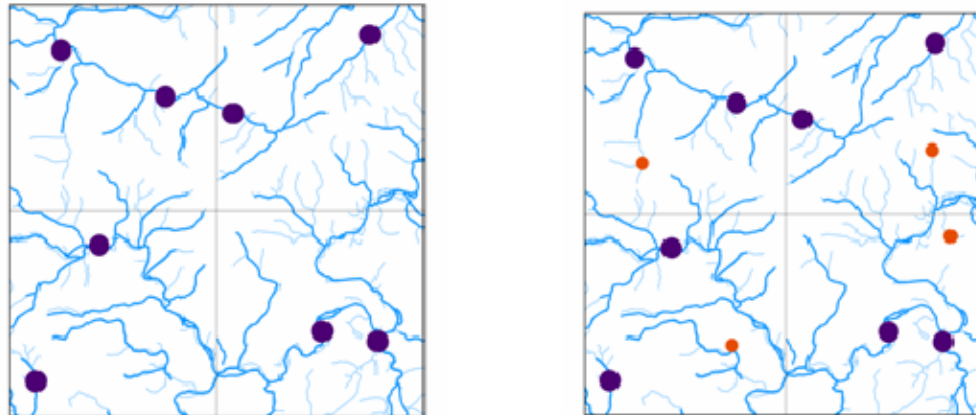
The main aim of the RHS baseline survey was to provide an authoritative assessment of the physical character of river habitats and assess changes across England and Wales since 1995-96. A sample of three sites per 10 km grid square is not enough to provide statistically valid results at a smaller, local scale. Results shown here indicate the distribution of features and modifications at the 467 baseline sites in Thames RBD sampled in 2007-08 and the 319 sites sampled in 1995-96.

Sampling strategy and assessment of change

The sampling strategy used for the 2007-08 baseline survey was designed to:

- accurately assess the current state of river habitats
- provide a comparison with the original baseline dataset collected during 1995-96

We used a random sampling design to provide a geographically representative and unbiased picture of river habitats across England, Wales and the Isle of Man. To do this, we used 10 km OS map grid squares to stratify the sample, which ensured an even coverage across the country. We then randomly selected three survey points in each of those grid squares. In 2007-08, we selected two of these from larger rivers (which only appear on the 1:250,000 scale river network), selecting the third selected from smaller rivers (which only appear on the 1:50,000 scale network).



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Figure 2: Core baseline sites (purple dots) from the 1:250,000 river network (dark lines in bold), shown on the left. For the 2007-08 survey, these are supplemented by the headwater sample (orange dots) from sites only on the 1:50,000 network (fine blue lines), as shown on the right.

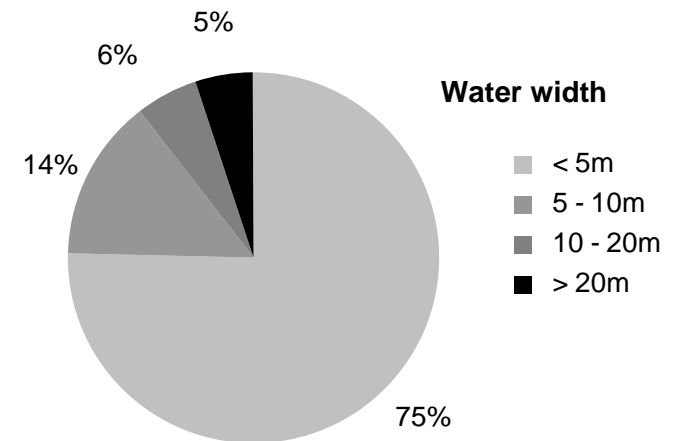


Figure 3: Size distribution of all 2007-08 baseline sites located in Thames RBD, expressed in water width categories.

This sampling strategy ensured that our sample was representative not only of larger rivers, but also smaller streams, many of which are headwaters (Figure 2). Three quarters of all 2007-08 baseline sites in Thames River Basin District had a water width of 5m or less (Figure 3).

This means that we now have both a dataset consisting of sites at the 1:250,000 scale (the **core sample**), and an additional dataset comprised of the 1:50,000 scale surveys (the **headwater sample**). In the first part of this document we have combined these to produce information on the overall current state of river habitats, including smaller headwater streams.

In the second part of this document, we have used only the core network to provide a comparison with 1995-96, because this original baseline survey only sampled sites on the 1:250,000 scale river network (Raven *et al.*, 1998). We did not re-visit original sites, so the locations of our latest baseline surveys are different to the original. However, by comparing surveys selected using the same sampling strategy we are able to compare like with like. This comparison between the two surveys forms the second half of the document.

Because guidance provided to surveyors has improved, we are confident that the results of the 2007-08 baseline survey are more accurate than the 1995-96 survey. This means we have only made comparisons where we are sure that any changes are genuine, and not caused by differences in the way we collected data. For example, we have improved the way we train surveyors to identify resectioning (a major component of overall habitat modification class). As we are unable to confidently identify how much of the difference between baseline surveys is due to a genuine increase in occurrence as opposed to more accurate recording, we have chosen not to include analysis of change for resectioning.

Similarly, differences in flow levels between sites and surveys mean that it may not be valid to compare some in-channel features, as high flows can obscure depositional features. Overall, water levels in rivers during the 2007-08 survey season were higher than those in 1995-96, and this may have influenced the results.

When comparing results between different areas, it is important to consider variations in river character due to landscape and geology. Height of river source, shown in Figure 4, is a good indicator of the difference in river habitat at a broad scale between regions of England and Wales.

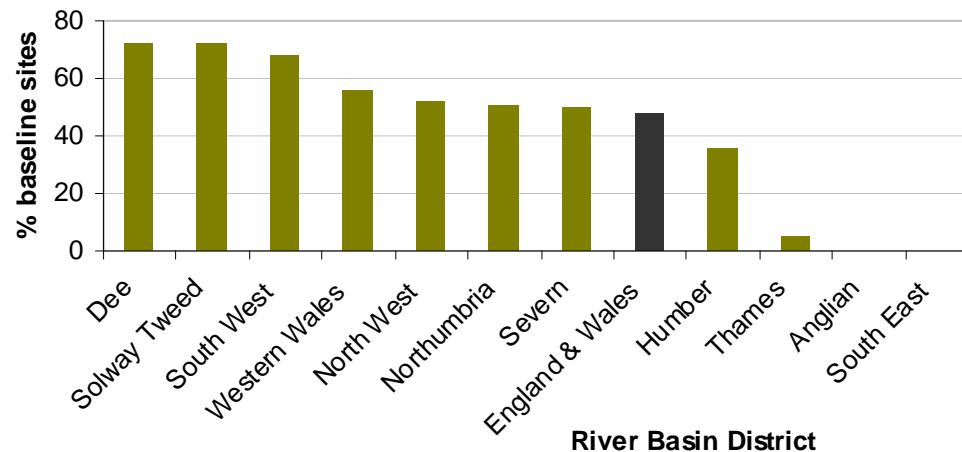


Figure 4: The proportion of baseline sites with height of source above 200m. Black bar shows the average percentage of baseline sites with height of source above 200m across England and Wales.

2 Current state

In this section we use 2007-08 data taken from 467 sites, representing both the core sample and the headwater sample (see *page 4* for more details).

Dot maps show unadjusted, observed data from individual baseline sites, whereas 'smoothed' maps show the predicted occurrence of features (adjusted for variation in river length between 10km grid squares) across England and Wales. For more detail see *RHS baseline survey: statistical methods*.

Habitat modification – current state

- Only 10 per cent of sites are classified as near-natural or predominantly unmodified, while 60 per cent fall into the severely modified category.

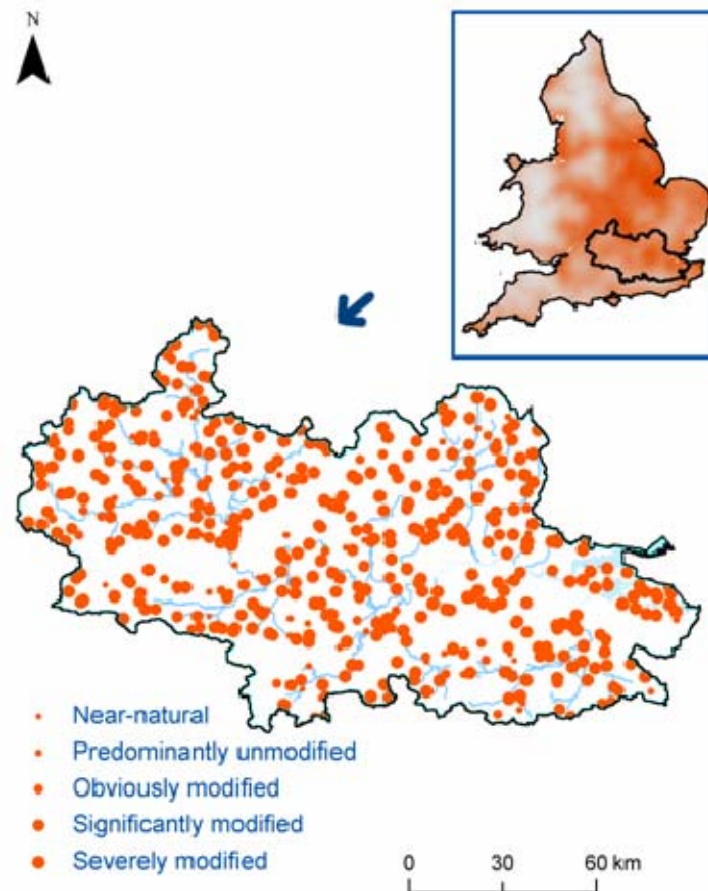
Habitat Modification Class

The Habitat Modification Class (HMC)* indicates the overall level of modification to the banks and channel of a given survey reach (for more details see *River Habitats in England and Wales: current state and changes since 1995-96*).

The majority of sites fall into the most modified of the habitat modification classes, while less than three per cent are classified as near-natural. This reflects the high level of modification present (including resectioning, reinforcement, culverts, weirs and embankments). The modified and less modified sites are distributed fairly evenly across the area.

Overall Habitat Modification Class is derived from various components, including resectioning and reinforcement, which we now explore individually.

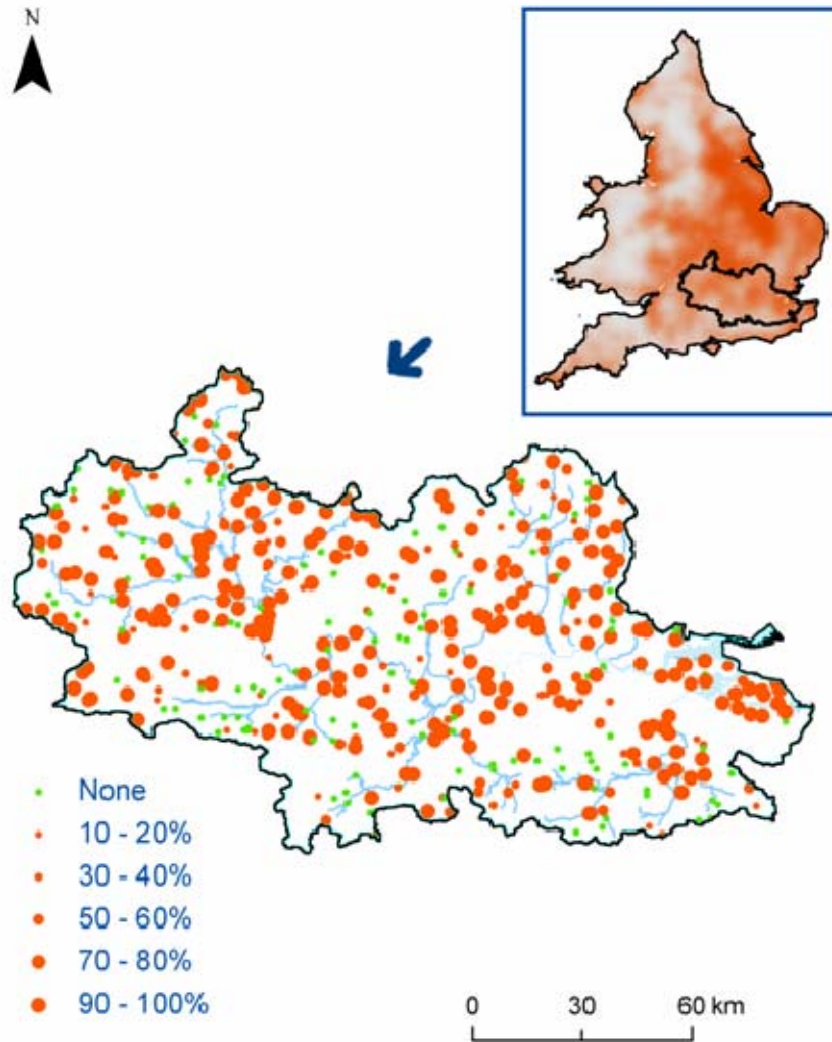
* The terms used for HMC differ from those describing ecological status under the Water Framework Directive (WFD) and also the category of 'heavily modified' water body.



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Figure 5: Extent of bank and channel modification at baseline sites in Thames RBD, 2007-08. Orange areas on the inset map of England and Wales indicate a higher probability of modification.

Resectioning



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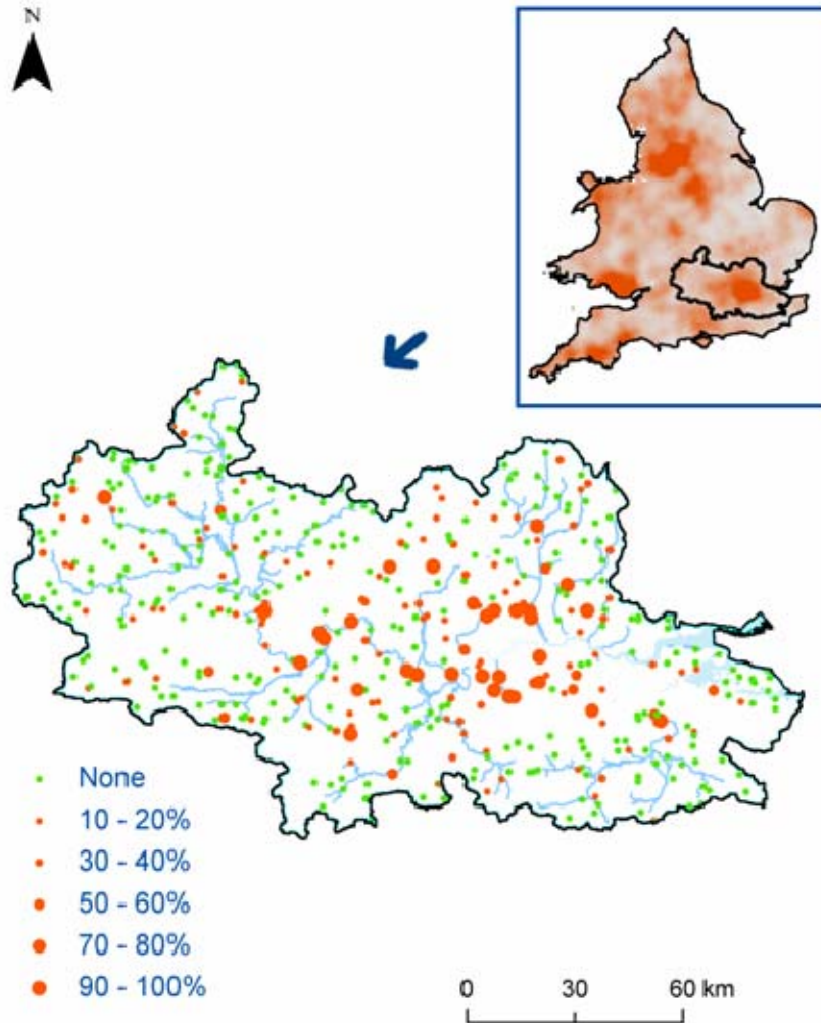
Figure 6: Extent of resectioning along river banks and channel at baseline sites within Thames RBD, 2007-08. Orange areas on the inset map of England and Wales indicate a higher probability of resectioning.

Resectioning was recorded at almost three quarters of baseline sites.

More than 40 per cent of 2007-08 baseline sites have bank or channel resectioning present along as much as 90-100 per cent of their total length. Relatively few baseline sites (16 per cent) have resectioning present along less than half of their total length.

Baseline sites with no resectioning present (27 per cent) are mostly located on headwater streams towards the upper reaches of river catchments.

Reinforcement



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Figure 7: Extent of reinforcement along river banks and channel at baseline sites within Thames RBD, 2007-08. Orange areas on the inset map of England and Wales indicate a higher probability of reinforcement.

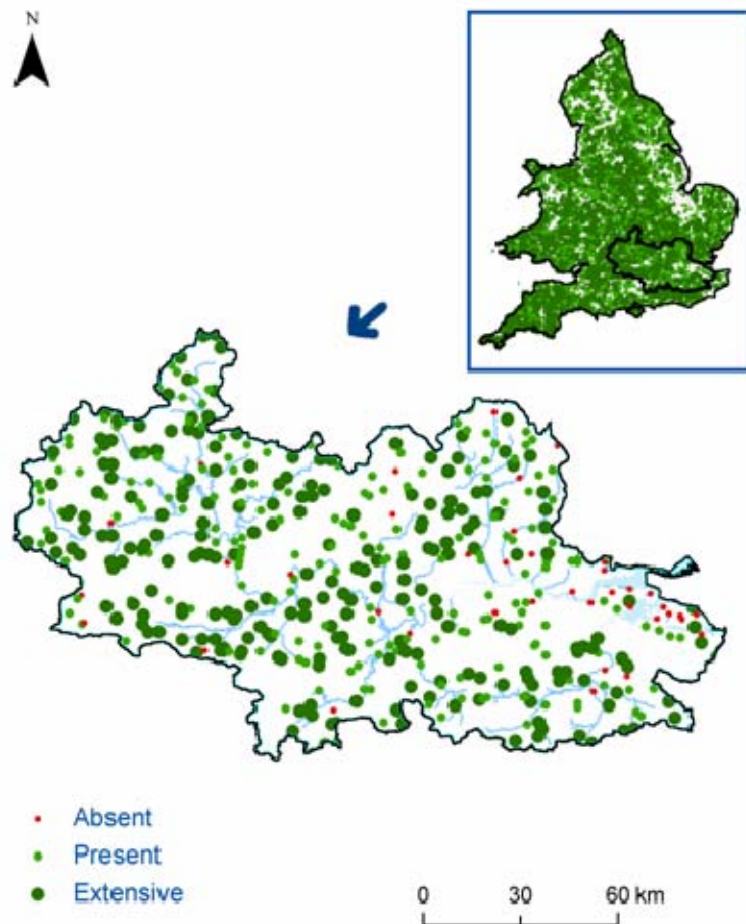
Reinforcement was recorded at a third of baseline sites, many of which are located within the urban conurbations surrounding London.

Nine per cent of baseline sites had bank or channel reinforcements extending for half, or more, of their total length.

Two thirds of baseline sites have no reinforcements present. These sites are mainly located in the upper reaches of river catchments, towards the perimeter of the RBD.

Riverside trees – current state

- Channel shading, exposed tree roots and large woody debris are all found less frequently at baseline sites in the east of this RBD, in the lower lying areas towards the Thames estuary.



Channel shading

Channel shading was found to be extensive at almost half of the baseline sites in this RBD. These sites are distributed fairly evenly across the area.

40 of the 467 baseline sites have no channel shading. Many of these sites are located in the east of the RBD, in the lower lying areas towards the Thames estuary.

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Figure 8: Extent of channel shading at baseline sites within Thames RBD, 2007-08. Green dots on the inset map of England and Wales indicate baseline sites with tree shading.

Tree features – exposed bankside roots and woody debris

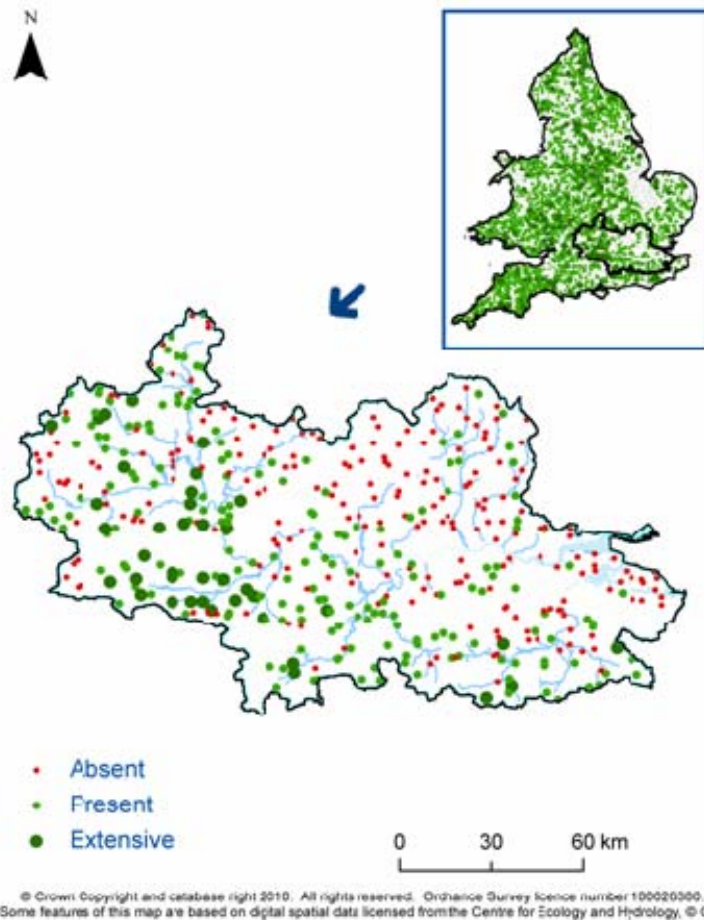


Figure 9: Extent of exposed bankside roots at baseline sites within Thames RBD, 2007-08. Green dots on the inset map of England and Wales indicate baseline sites with bankside roots.

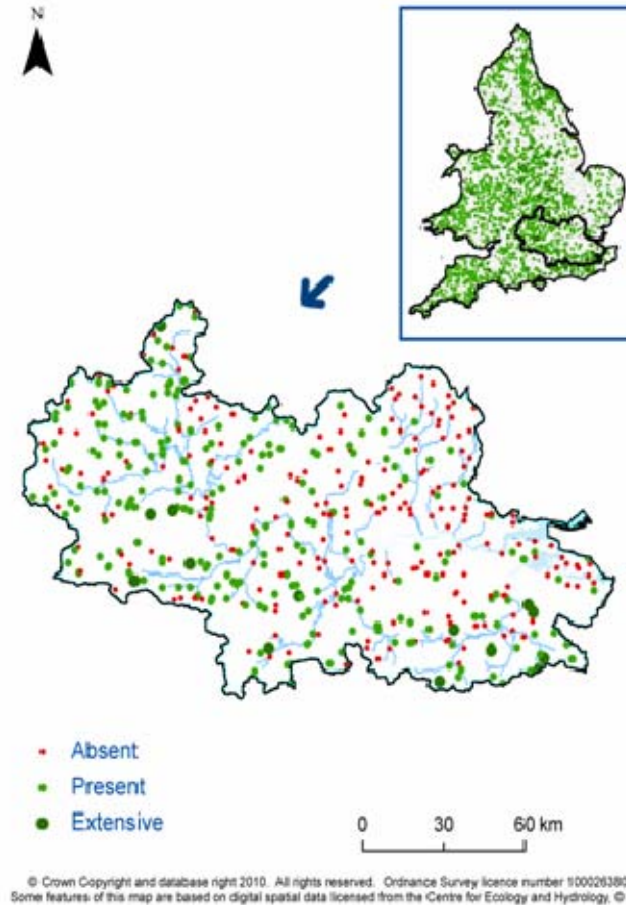


Figure 10: Extent of large woody debris at baseline sites within Thames RBD, 2007-08. Green dots on the inset map of England and Wales indicate baseline sites with large woody debris.

Both exposed tree roots and large woody debris were recorded more frequently at baseline sites towards the south and west of this RBD. These features are typically absent from many of lower lying streams towards the Thames estuary.

Invasive non-native plants on river banks – current state

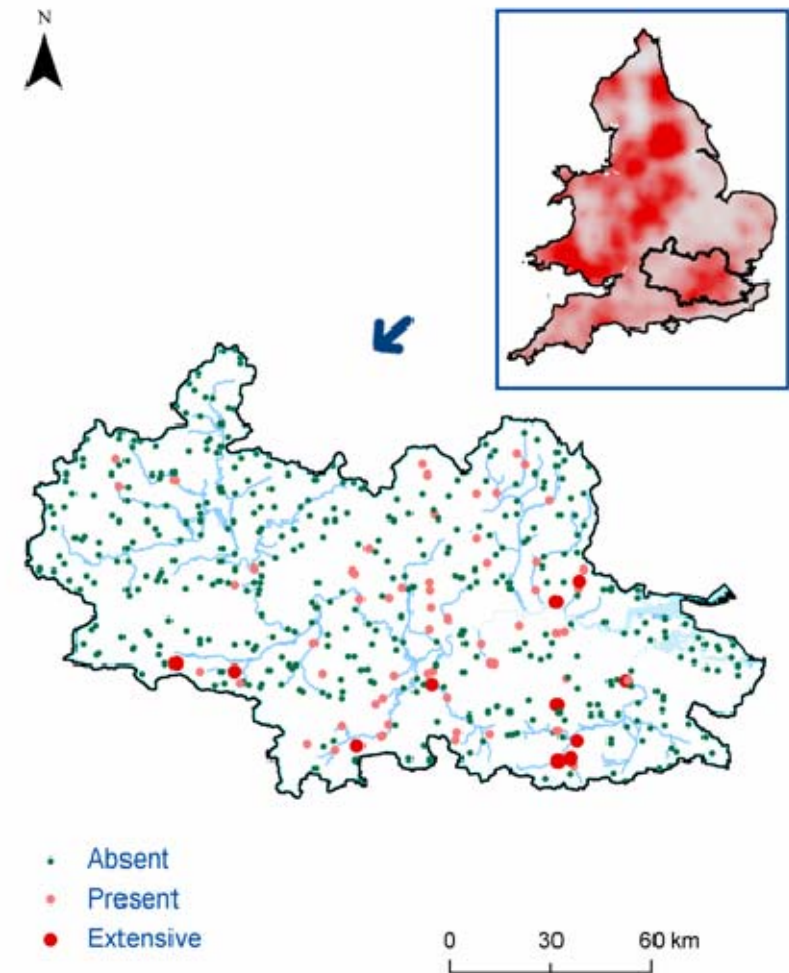
- **Himalayan balsam, giant hogweed and Japanese knotweed are all more common along river banks towards the densely populated urban areas surrounding Greater London.**
- **Himalayan balsam is more common along river banks than either Japanese knotweed or giant hogweed.**

Across England and Wales all three species, and Himalayan balsam in particular, tend to occur more frequently on larger rivers rather than small streams (see page 14 in *River habitats in England and Wales: current state and changes since 1995-96*).

Himalayan balsam

Himalayan balsam occurs along river banks at 15 per cent of baseline sites.

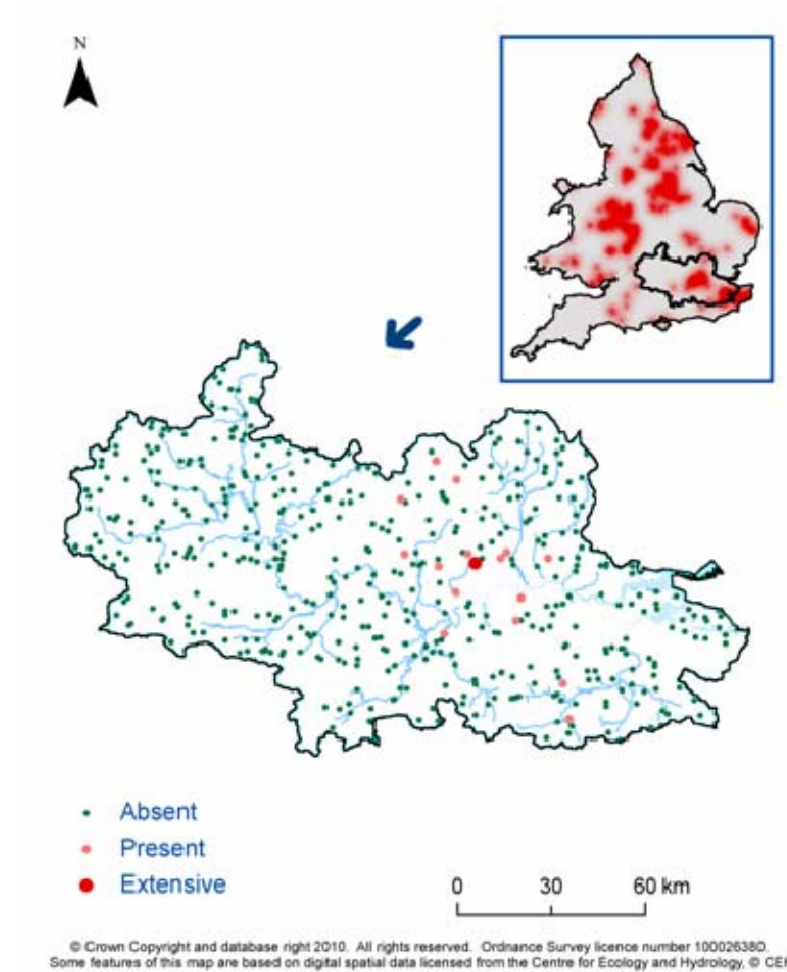
It was more common towards eastern areas of the RBD, in the urban areas surrounding Greater London.



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Figure 11: Extent of Himalayan balsam along river banks at baseline sites within Thames RBD, 2007-08. Dark red areas on the inset map of England and Wales indicate a higher likelihood of Himalayan balsam along river banks.

Giant hogweed



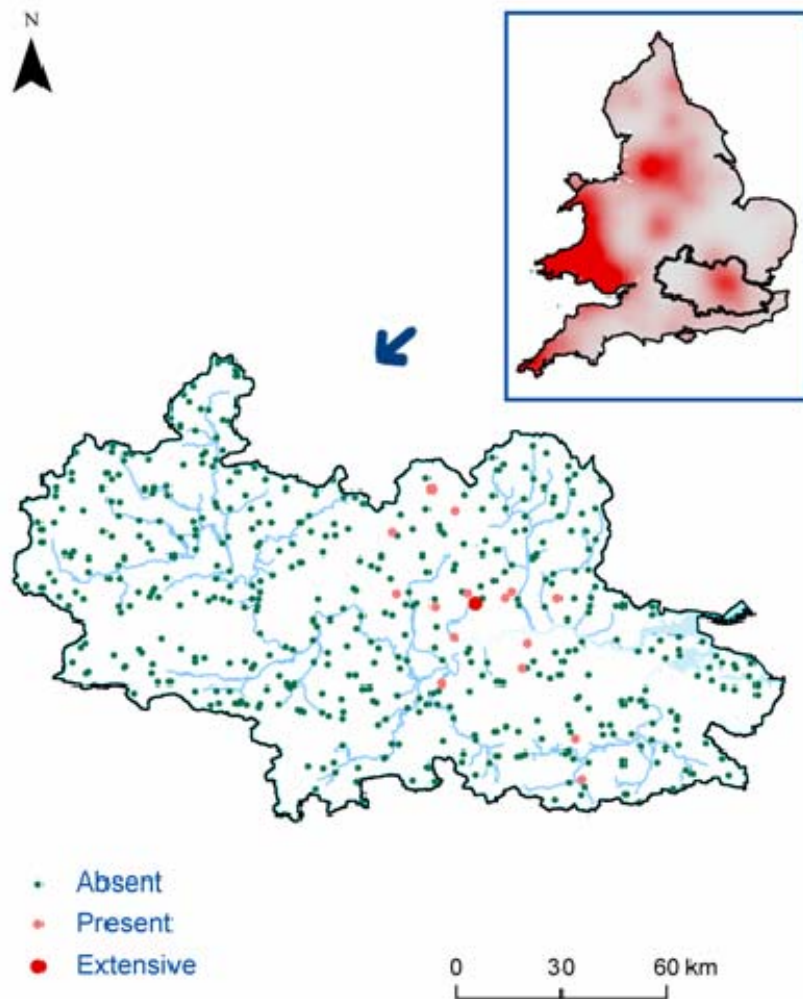
Giant hogweed was recorded at twenty sites during the 2007-08 baseline survey.

These sites are mainly in the central and eastern part of the RBD and most are located towards Greater London.

Giant hogweed was only found to be extensive at one of these baseline sites.

Figure 12: Extent of giant hogweed along river banks at baseline sites within Thames RBD, 2007-08. Dark red areas on the inset map of England and Wales indicate a higher likelihood of giant hogweed along river banks.

Japanese knotweed



Japanese knotweed occurred along the river banks at 16 of the 467 baseline sites sampled in 2007-08.

The majority of baseline sites with Japanese knotweed are located towards Greater London.

It was only recorded as extensive at one survey site in this RBD.

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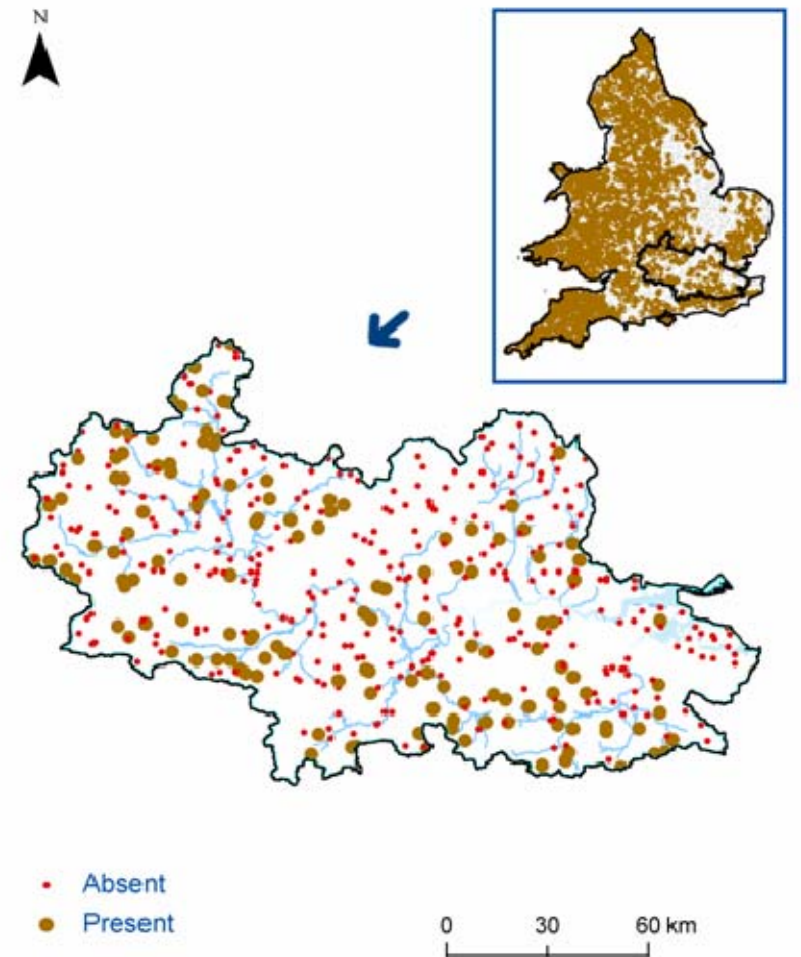
Figure 13: Extent of Japanese knotweed along river banks at baseline sites within Thames RBD, 2007-08. Dark red areas on the inset map of England and Wales indicate a higher likelihood of Japanese knotweed along river banks.

In-channel depositional bars – current state

- Bars were present at 29 per cent of 2007-08 baseline sites.

Unvegetated depositional bars, which may form valuable habitat for a number of rare invertebrates, were found to be present at 29 per cent of 2007-08 baseline sites in this RBD.

Depositional bars are frequently absent in baseline sites towards the north and east of this RBD. Many of these sites also had a high proportion of modification, especially resectioning.



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Figure 14: Extent of exposed unvegetated depositional bars along river banks and channel of baseline sites within Thames RBD, 2007-08. Brown dots on the inset map of England and Wales indicate the location of baseline sites with unvegetated depositional bars.

3 Comparison with 1995-96

This section compares the results from 1995-96 and 2007-08 using data solely from the core baseline network, sampling rivers that appear only on the 1:250,000 network (larger rivers) (see page 4 for more details).

We did not revisit sites from the 1995-96 survey in 2007-08. Both surveys are based on a random sample, with different site locations used between the two surveys. This section, which compares results from the two surveys, does not, therefore, show changes at specific sites, but highlights overall differences between the two datasets. The level of sampling is not high enough to detect small changes at RBD level, so maps are provided just as a visual indication only.

Habitat modification

- Little change is evident in the distribution of baseline sites with bank and channel reinforcements.

Reinforcement

There have not been any obvious changes in the distribution of baseline sites where reinforcements were recorded, or the extent of reinforcement at each of these sites.

Baseline sites that are reinforced throughout the majority of the site length remain concentrated in and around Greater London.

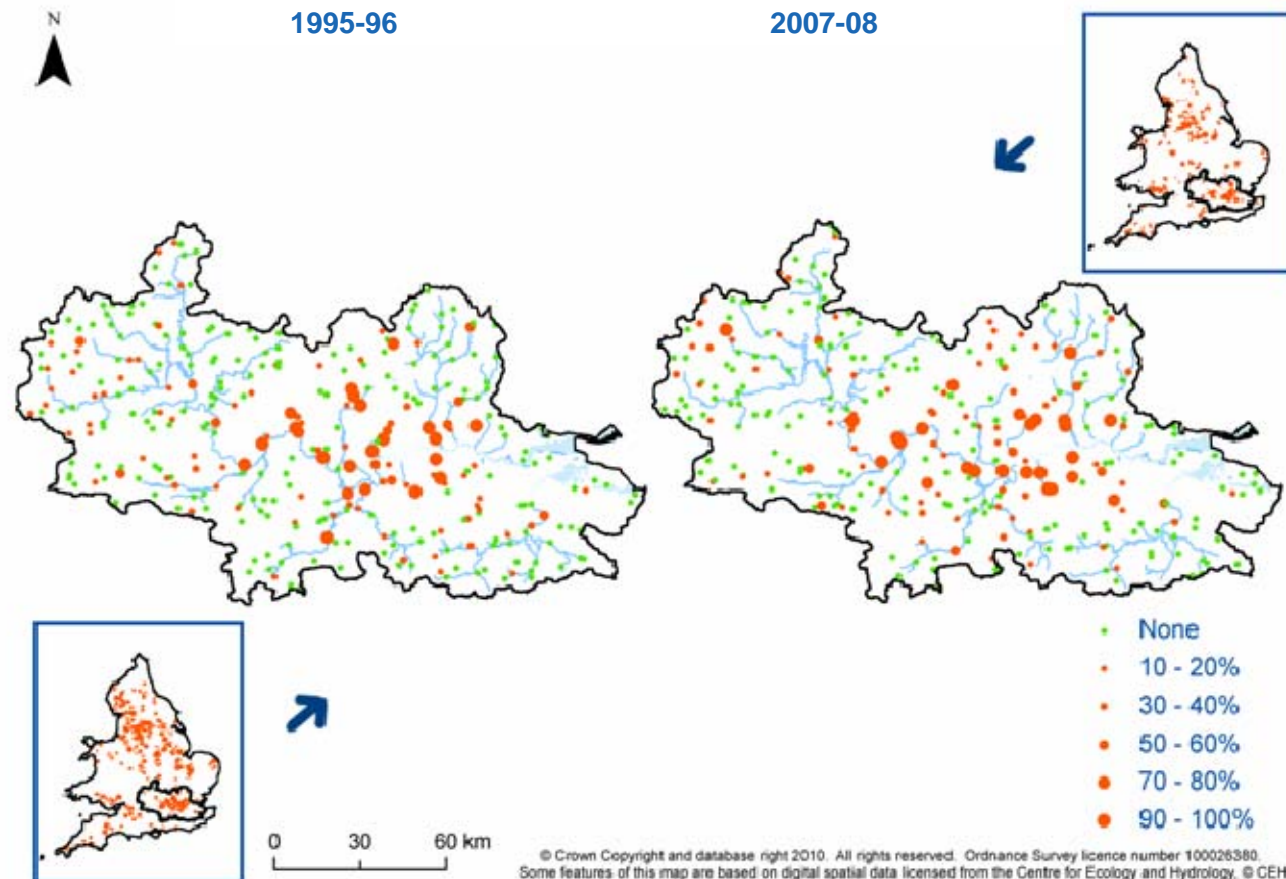


Figure 15: Reinforcement along river banks at baseline sites within Thames RBD, shown as percentage extent within each 500m baseline site. Orange dots on the inset maps of England and Wales indicate baseline sites with reinforcements.

Riverside trees - comparison with 1995-96

- Survey results indicate little change in the distribution of baseline sites with channel shading from riverside trees.

Channel shading

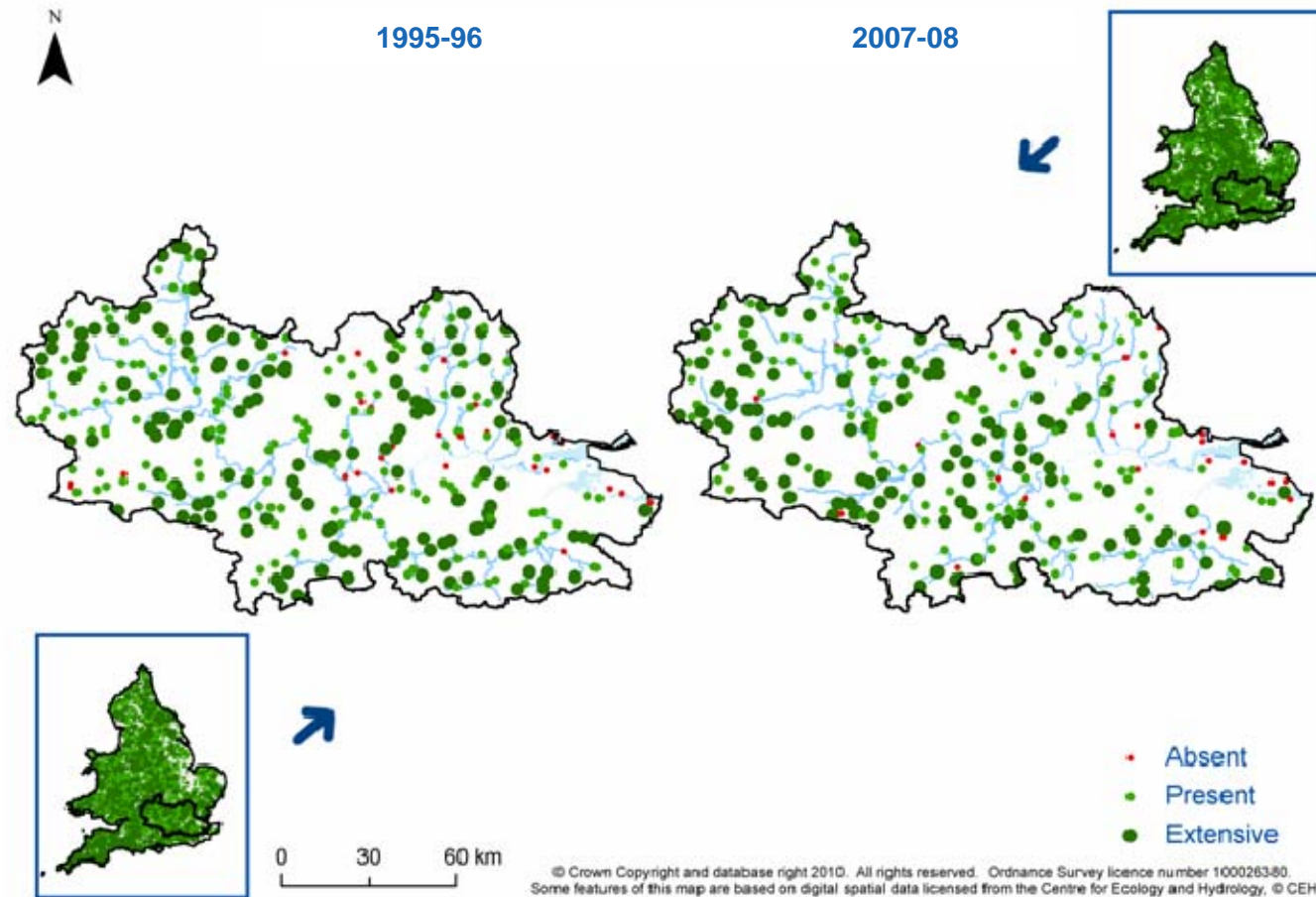


Figure 16: Extent of channel shading from riverside trees at baseline sites within Thames RBD. Green dots on the inset maps of England and Wales indicate baseline sites with channel shading.

There has been little change in the extent or distribution of channel shading since the 1995-96 survey. The majority of sites with no channel shading are still located in the lower lying regions towards the Thames estuary in the east of this RBD.

Invasive species – comparison with 1995-96

- Survey results indicate little change in the distribution of Himalayan balsam since the previous baseline survey.
- Giant hogweed remains absent from the vast majority of baseline sites.
- Japanese knotweed was found at fewer 2007-08 baseline sites than compared to the previous baseline survey.

Himalayan balsam

Survey results indicate little change in the distribution of Himalayan balsam at baseline sites since 1995-96.

It remains more common towards the east of the RBD than in the west.

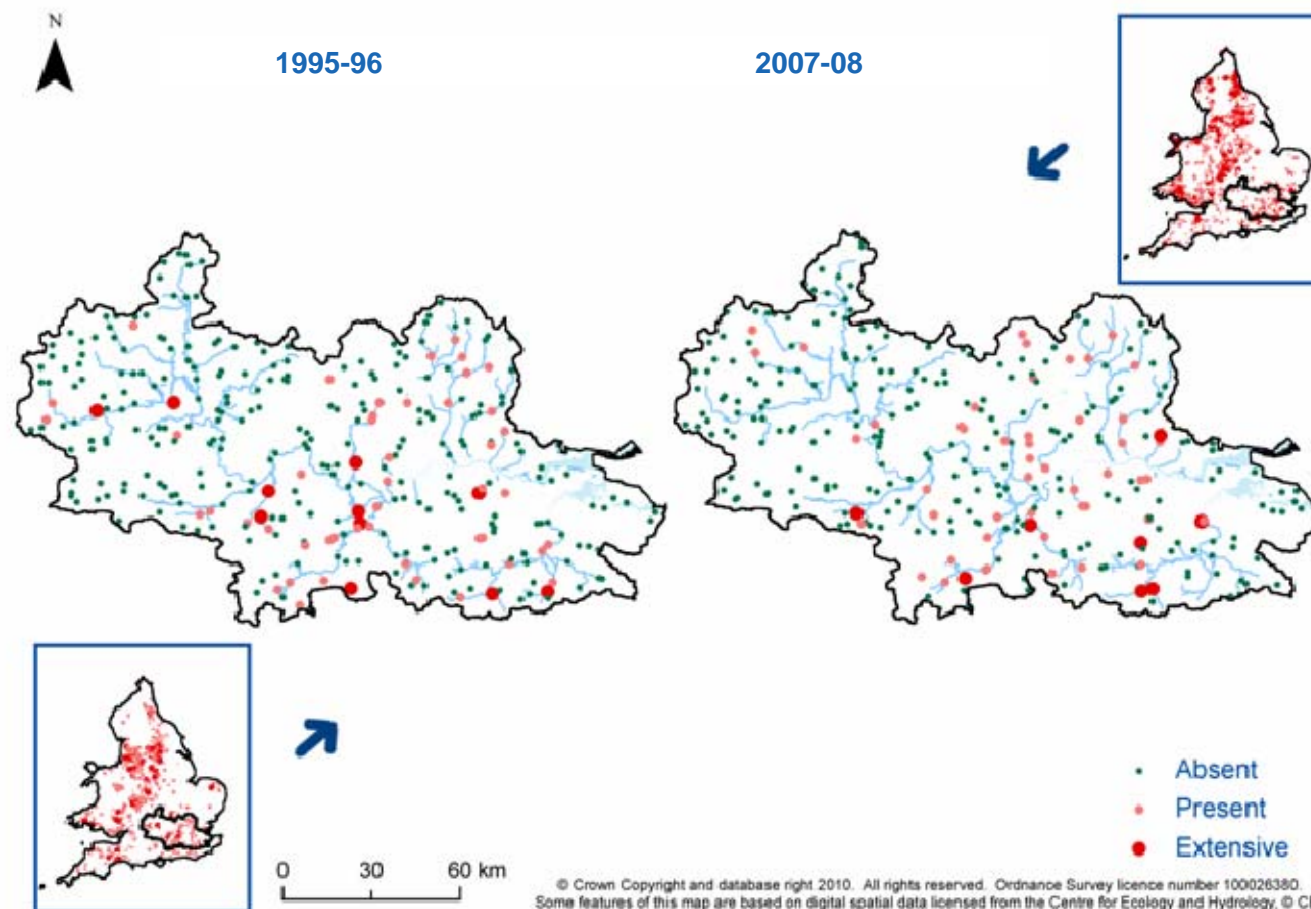


Figure 17: Extent of Himalayan balsam along river banks at baseline sites within Thames RBD. Red dots on the inset maps of England and Wales indicate baseline sites with Himalayan balsam.

Giant hogweed

Giant hogweed was not found at any of the 2007-08 baseline surveys in the west of this RBD, whereas it was recorded at a few sites in the west of the RBD in the 1995-96 survey. It was only recorded as extensive at one of the 2007-08 baseline surveys.

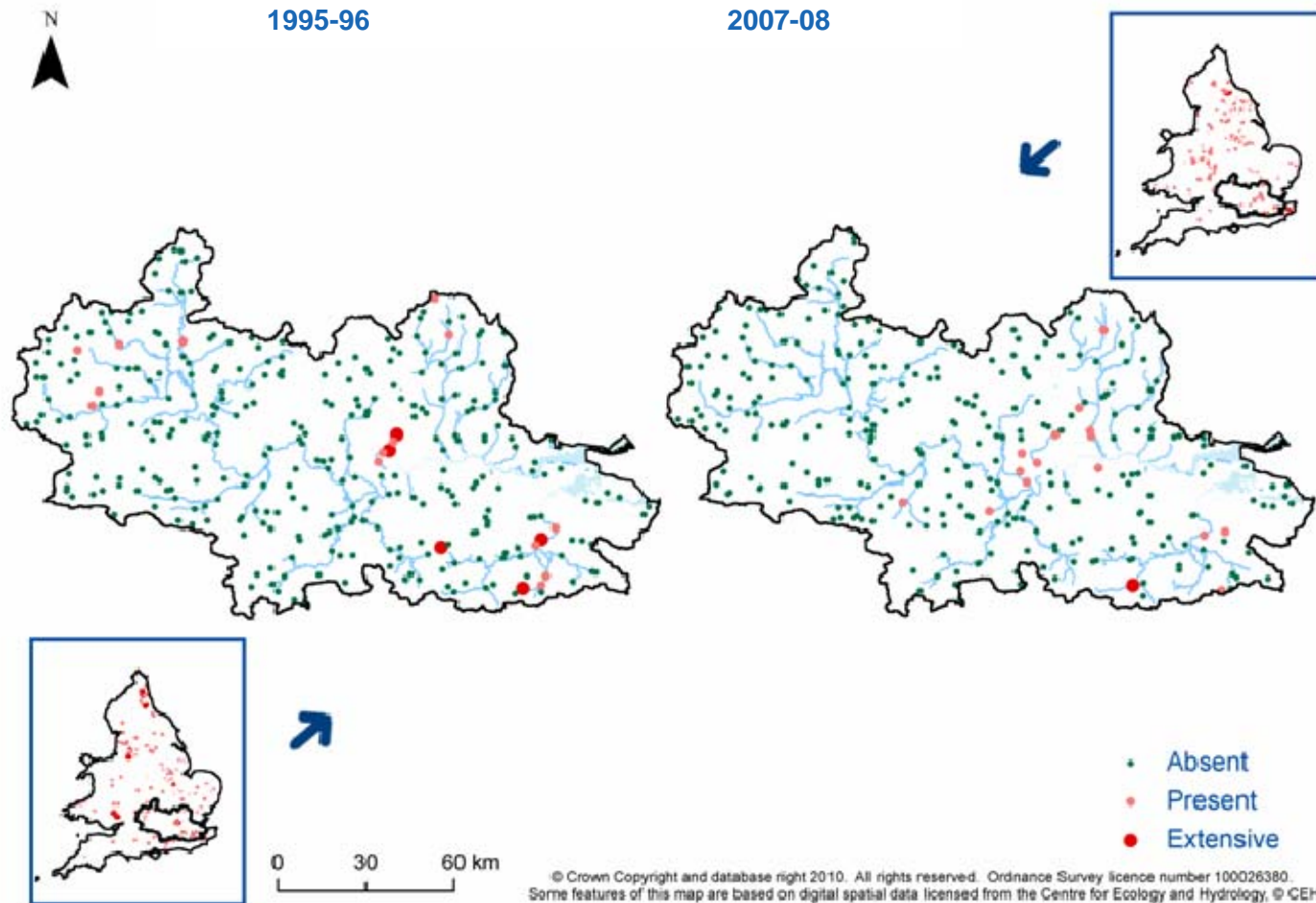


Figure 18: Extent of giant hogweed along river banks at baseline sites within North West RBD. Red dots on the inset maps of England and Wales indicate baseline sites with giant hogweed.

Japanese knotweed

Japanese knotweed was recorded at fewer sites in the 2007-08 baseline survey, compared with results from 1995-96. However the majority of sites where it occurs remain within the area of Greater London.

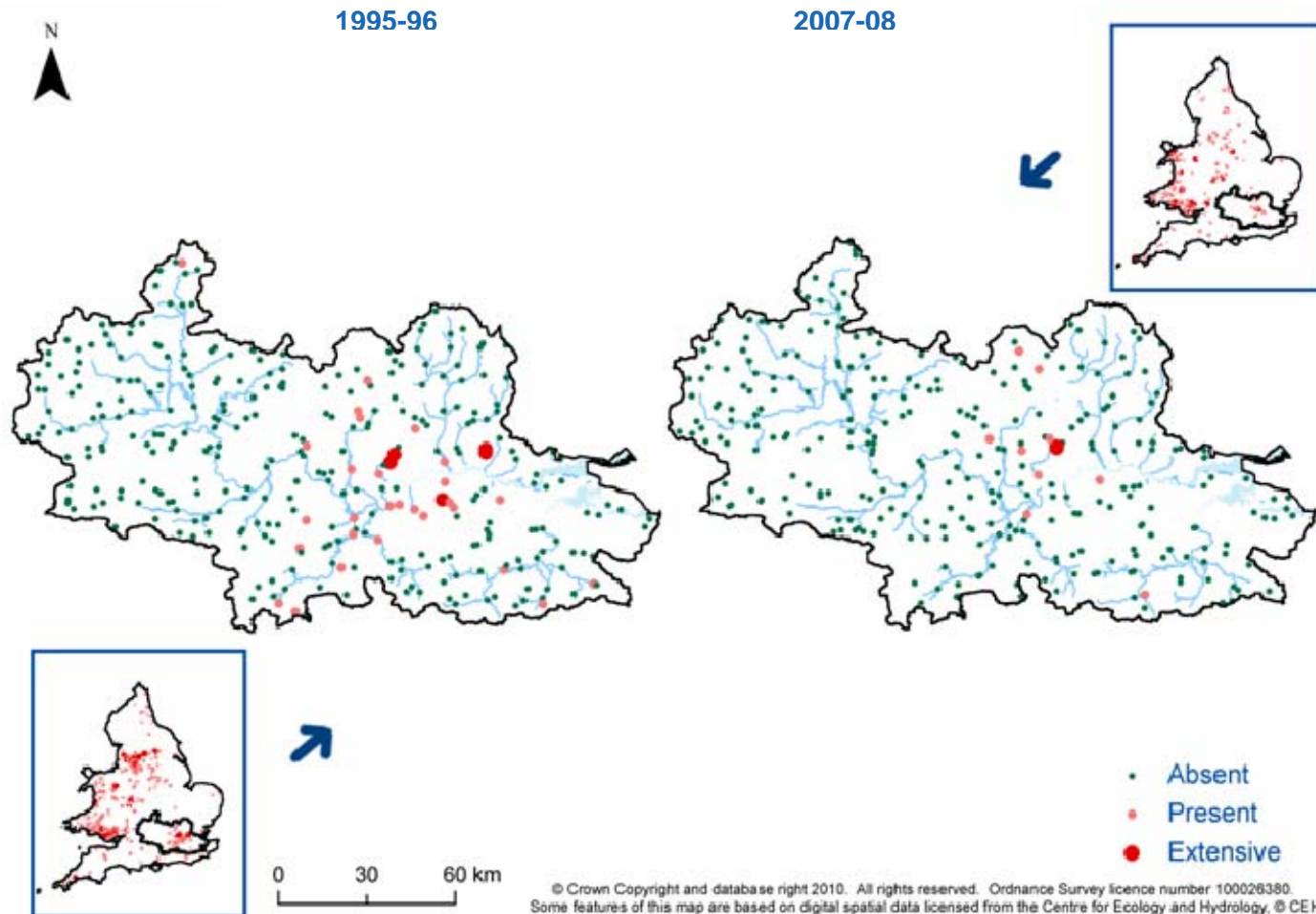


Figure 19: Extent of Japanese knotweed along river banks at baseline sites within North West RBD. Red dots on the inset maps of England and Wales indicate baseline sites with Japanese knotweed.

This document gives a broad overview of baseline sites within Thames River Basin District, but it is not intended to provide detailed characterisation at this level.

In addition to the 467 randomly selected baseline sites shown in Figure 1, data from an additional 2150 RHS surveys in Thames RBD are held on the RHS database. These have been carried out for specific project work and were not necessarily selected on a random basis, but they can be used to provide context at a local scale.

In total, the RHS database holds information for over 24,000 sites distributed across the UK.

References

Raven PJ, Holmes NTH, Dawson FH, Fox PJA, Everard M, Fozzard IR, Rouen KJ (1998). *River Habitat Quality: the Physical Character of Rivers and Streams in the UK and Isle of Man*. Environment Agency, Bristol.

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