



## Macroinvertebrate and fish population surveys in eleven New Forest streams, September 2019

### Higher Level Stewardship Agreement

The Verderers of the New Forest AG00300016

March 2020



Forestry England



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*This report has been prepared for The Verderers of the New Forest Higher Level Stewardship Agreement. The HLS partners shall have the sole right to publish the report and results of the survey, with an appropriate acknowledgement of the work or material contributed by the Contractor. This report should be cited as: "Harrison A., Davy-Bowker J. and Pinder A. (2020) Macroinvertebrate and fish population surveys in eleven New Forest streams, September 2019. BU Global Environmental Solutions (BUG) report (BUG2846) to Forestry Commission. 118 pp. Higher Level Stewardship Agreement The Verderers of the New Forest AG00300016".*

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## EXECUTIVE SUMMARY

Wetland restoration in the New Forest has been undertaken since the late 1990s. The current programme of works, under the Higher Level Stewardship (HLS) scheme's main objectives, is to bring the New Forest riverine and wetland habitat to Favourable Condition, in accordance with its statutory designation as a Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC). The HLS scheme aims to improve the condition of each unfavourable SSSI unit and maintain the condition of those in a favourable condition within the New Forest SSSI and SAC.

This data report summarises the findings of 15 electric fishing surveys and 26 macroinvertebrate surveys at 12 locations (in 11 different streams and wetland areas).

Surveys were undertaken at Dockens Water, Ferny Croft, Harvestslade, Highland Water, Latchmore Brook, Mill Stream, Millersford Brook, Ober Water, Pondhead, Redhill/Holmhill, Wootton Phase 1 (Avon Water) and Wootton Phase 2 (Avon Water).

Key findings are presented below:

### FISH POPULATION SURVEYS

Table 1 summarises the fish species recorded at each location.

**Table 1. Species recorded at each location (in numerical abundance order).**

Location	Year restoration undertaken / planned	Fish species recorded
Dockens Water		Minnow, 3-spined stickleback, stone loach, brown trout
Highland Water		Bullhead, minnow, brown trout, R/B lamprey, stone loach
Latchmore Brook Site 1	No plan to restore	Minnow, chub, roach, stone loach, perch, pike
Latchmore Brook Site 2	No plan to restore	Minnow, chub, stone loach, brown trout, eel, roach
Mill Stream		R/B lamprey, minnow, bullhead, stone loach, brown trout, eel
Millersford Bottom Site 2	No plan to restore	Brown trout
Millersford Bottom Site 3	No plan to restore	Brown trout
Millersford Fish Site 1		No fish captured
Ober Water		Minnow, stone loach, bullhead, chub, eel, R/B lamprey, gudgeon
Pondhead Site 1	2018	Stone loach, bullhead, R/B lamprey, minnow, roach, brown trout, 3-spined stickleback, eel
Pondhead Site 2	2018	Stone loach, bullhead, minnow, 3-spined stickleback, R/B lamprey, brown trout
Wootton Phase 1 Site 1	2016	Bullhead, brown trout, minnow, stone loach, R/B lamprey
Wootton Phase 1 Site 2	No plan to restore	Bullhead, brown trout, minnow, stone loach, eel
Wootton Phase 2 Site 1	No plan to restore	Bullhead, brown trout, minnow, stone loach, R/B lamprey, eel
Wootton Phase 2 Site 2	2018	Bullhead, stone loach, brown trout, minnow, 3-spined stickleback, R/B lamprey



## MACROINVERTEBRATE SURVEYS

Table 2 presents the lowest Observed/Expected ratios of biotic indices at each location.

**Table 2. Lowest Observed / Expected ratios of biotic indices at each location.**

Location	Year restoration undertaken / planned	Observed / Expected ratios of key biotic indices
Dockens Water Upstream		Slightly degraded
Rakes Brakes Downstream		Very degraded
Ferny Croft Control	2017 and 2018	Very degraded
Ferny Croft Impact	2017 and 2018	Very degraded
Harvestslade Control	No plan to restore	Slightly degraded
Harvestslade Site 1	2015	Very degraded
Harvestslade Site 2	2015	Slightly degraded
Highland Water Upstream		Moderately degraded
Latchmore Site 1	No plan to restore	Moderately degraded
Latchmore Downstream	No plan to restore	Moderately degraded
Thompson Castle Downstream	No plan to restore	Moderately degraded
Thompson Castle Upstream	No plan to restore	Very degraded
Millstream Upstream		Within expected range
Millersford Brook 1	No plan to restore	Slightly degraded
Millersford Brook 2	No plan to restore	Slightly degraded
Millersford Brook 3	No plan to restore	Slightly degraded
Millersford Upstream Control	No plan to restore	Very degraded
Ober Water upstream		Slightly degraded
Pondhead Downstream		Within expected range
Redhill / Holmhill Control		Very degraded
Redhill / Holmhill Downstream		Very degraded
Redhill / Holmhill Upstream		Very degraded
Wootton Phase 1 Site 1	2016	Moderately degraded
Wootton Control	No plan to restore	Within expected range
Wootton Phase 2 Site 1	No plan to restore	Within expected range
Wootton Phase 2 Site 2	2018	Moderately degraded

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## 1. INTRODUCTION

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The New Forest HLS scheme objectives are to restore resectioned channels to their historic meanders to prevent further erosion of the specialist mire / wet heath habitats, increase the availability of in-channel habitat and reconnect the floodplain, with a view to bringing the SSSI units back into Favourable Condition according to their conservation objectives. The scheme is a catchment-based approach of naturalising and sustaining the landscape into the future, maintaining grazing and the complex biodiversity of the New Forest open habitats.

Geo- and hydromorphological restoration of flowing water bodies are widely regarded as being of positive environmental benefit; however, this can be difficult to justify to local land owners, interest groups and other organisations without sound supporting evidence. This project has been designed to focus specifically on freshwater fish and macroinvertebrate communities as indicators of in-stream ecological quality and to detect whether any temporal changes in community structure (positive or negative) can be attributed to the physical re-engineering of stream profiles.

This data report summarises the findings of 15 electric fishing surveys and 26 macroinvertebrate surveys at 12 locations (in 11 different streams and wetlands).

Surveys were undertaken at Dockens Water, Ferny Croft, Harvestslade, Highland Water, Latchmore Brook, Mill Stream, Millersford Brook, Ober Water, Pondhead, Redhill/Holmhill, Wootton Phase 1 (Avon Water) and Wootton Phase 2 (Avon Water).

### 1.1 Aims and objectives

The specific aims and objectives of this report are as follows:

- Provide fish and macroinvertebrate survey data for the selected New Forest streams and wetlands.
- Highlight any rare species afforded conservation protection under the following designations:
  - Schedule 5 Wildlife and Countryside Act (1981) Species
  - Red Data Book Species
  - UK BAP Priority Species
  - Nationally and Regionally Scarce Species

*Note: This work is delivered under Call-Off Contract 1 under Framework 304/NF/16/1326 Specialist Ecological Surveys.*

## 2. METHODOLOGY

### 2.1 Site selection

In advance of the surveys being undertaken, Forestry Commission provided BUG with National Grid Reference (NGR) coordinates for the upstream and downstream extent of each fish survey site and the NGR of each macroinvertebrate survey site (Table 2.1). The location of each stream surveyed was mapped in ArcGIS, to provide an overview of the location of each area of interest in relation to the wider New Forest area (Figure 2.1).

**Table 2.1. Location of fish and invertebrate sites and dates surveyed.**

Site name	Upstream limit	Downstream limit	Fish survey	Invert survey	Survey date
Dockens Water	SU2185312276	SU2179612229	✓		19/09/2019
Dockens Water Upstream	SU2185512278	N/A		✓	26/09/2019
Rakes Brakes Downstream	SU2210412363	N/A		✓	19/09/2019
Ferny Croft North Downstream	SU3779006079	N/A		X	N/A - no habitat
Ferny Croft Control	SU3773805554	N/A		✓	24/09/2019
Ferny Croft Impact	SU3796805394	N/A		✓	24/09/2019
Harvestslade Site 1	SU2071005605	N/A		✓	25/09/2019
Harvestslade Site 2	SU2063605377	N/A		✓	25/09/2019
Harvestslade Control	SU2059205305	N/A		✓	25/09/2019
Highland Water	SU2699107639	SU2702907517	✓		26/09/2019
Highland Water Upstream	SU2699507646	N/A		✓	26/09/2019
Latchmore 1	SU1908112649	SU1899312648	✓		18/09/2019
Latchmore 2	SU1826712470	SU1817712443	✓		17/09/2019
Latchmore 3	SU2154814036	SU2146013970	X		N/A - dry
Latchmore 4	SU2203714235	SU2195014290	X		N/A - dry
Thompson Castle Upstream	SU1847713063	N/A		✓	18/09/2019
Thompson Castle Downstream	SU1852712720	N/A		✓	18/09/2019
Latchmore Downstream	SU1827512472	N/A		✓	17/09/2019
Latchmore Site 1	SU1909612654	N/A		✓	18/09/2019
Latchmore Upstream 2	SU2155014044	N/A		X	N/A - dry
Latchmore Control	SU2221814290	N/A		X	N/A - dry
Latchmore Upstream	SU2273815944	N/A		X	N/A - dry
Mill Stream	SU2955609636	SU2961009690	✓		19/09/2019
Mill Stream Upstream	SU2955209630	N/A		✓	19/09/2019
Millersford Bottom Site 1	SU1951816719	SU1944816766	X		N/A - dry
Millersford Bottom Site 2	SU1838416240	SU1831216191	✓		16/09/2019
Millersford Bottom Site 3	SU1907116841	SU1897816825	✓		16/09/2019
Millersford Fish Site 1	SU1956517527	SU1953917437	✓		17/09/2019
Millersford Brook 1	SU1957717553	N/A		✓	17/09/2019
Millersford Brook 2	SU1831816197	N/A		✓	16/09/2019
Millersford Brook 3	SU1896616820	N/A		✓	16/09/2019

Site name	Upstream limit	Downstream limit	Fish survey	Invert survey	Survey date
Millersford Control	SU1953016713	N/A		X	N/A - dry
Millersford Upstream Control	SU2030017866	N/A		✓	17/09/2019
Ober Water	SU2583303717	SU2590003660	✓		30/09/2019
Ober Water Upstream	SU2582503723	N/A		✓	30/09/2019
Pondhead Site 1	SU3242706944	SU3250406973	✓		20/09/2019
Pondhead Site 2	SU3234006861	SU3240206908	✓		20/09/2019
Pondhead Control	SU3087707665	SU3096007610	X		N/A – very low flow
Pondhead Downstream	SU3239106903	N/A		✓	20/09/2019
Pondhead Control	SU3086607667	N/A		X	N/A – very low flow
Redhill / Holmhill Upstream	SU2687702294	N/A		✓	24/09/2019
Redhill / Holmhill Downstream	SU2706902666	N/A		✓	24/09/2019
Redhill / Holmhill Control	SU2680002250	N/A		✓	24/09/2019
Wootton Phase 1 Site 1	SZ2484699689	SZ2492399700	✓		27/09/2019
Wootton Phase 1 Site 2	SU2324500427	SU2330200392	✓		27/09/2019
Wootton Phase 1 Site 1	SZ2483799696	N/A		✓	27/09/2019
Wootton Control	SU2325300422	N/A		✓	27/09/2019
Wootton Phase 2 Site 1	SZ2631898912	SZ2637898823	✓		23/09/2019
Wootton Phase 2 Site 2	SZ2576899463	SZ2580999433	✓		23/09/2019
Wootton Phase 2 Site 1	SZ2631698916	N/A		✓	23/09/2019
Wootton Phase 2 Site 2	SZ2579399435	N/A		✓	23/09/2019
<b>TOTAL NUMBER OF SITES</b>			<b>15 Fish</b>	<b>26 Inverts</b>	

Further details on each survey site are provided in Sections 2.1.1 to 2.1.12 below. A more detailed description of fish survey site characteristics is provided within the introduction to each site in the results Section 3.



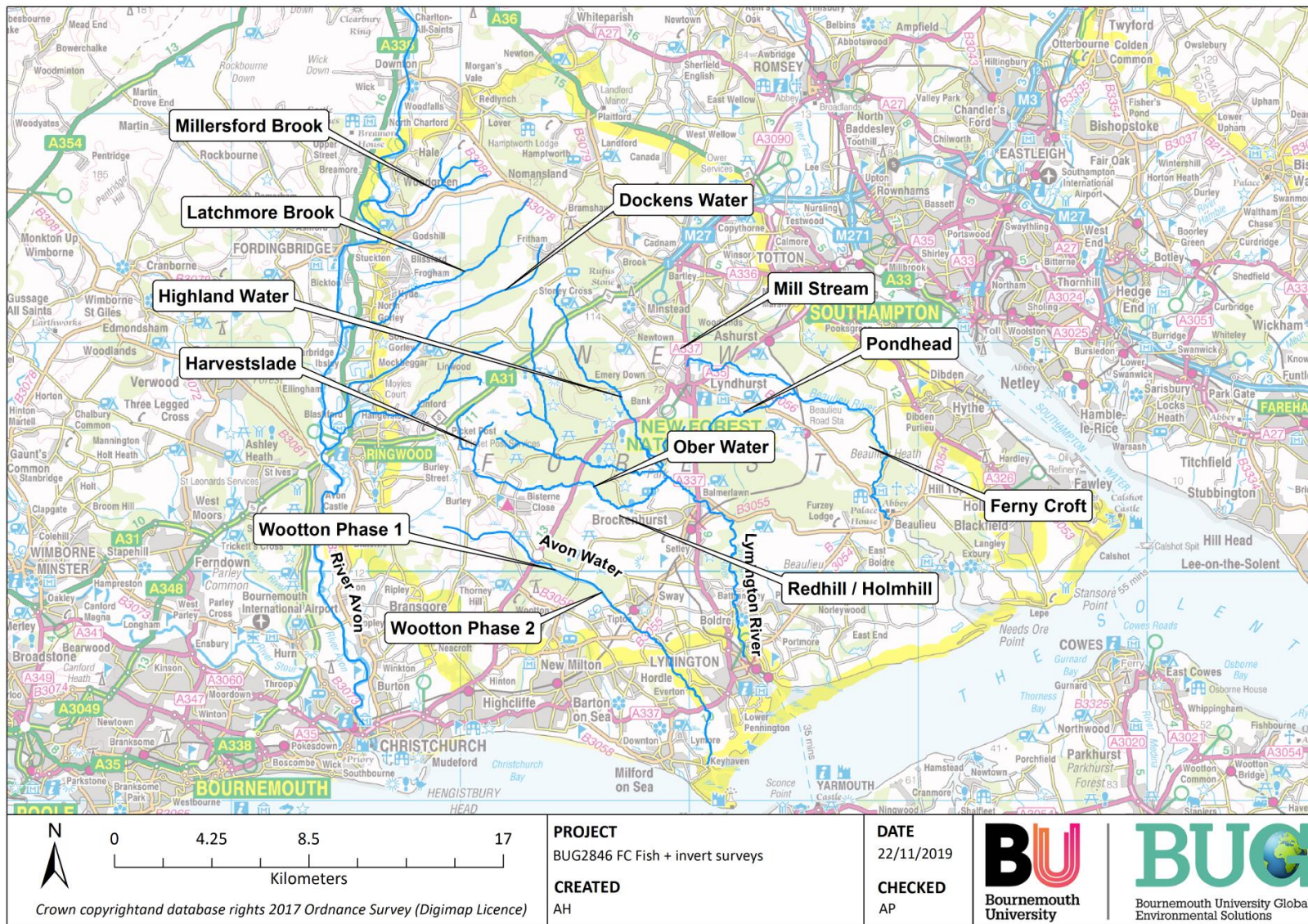
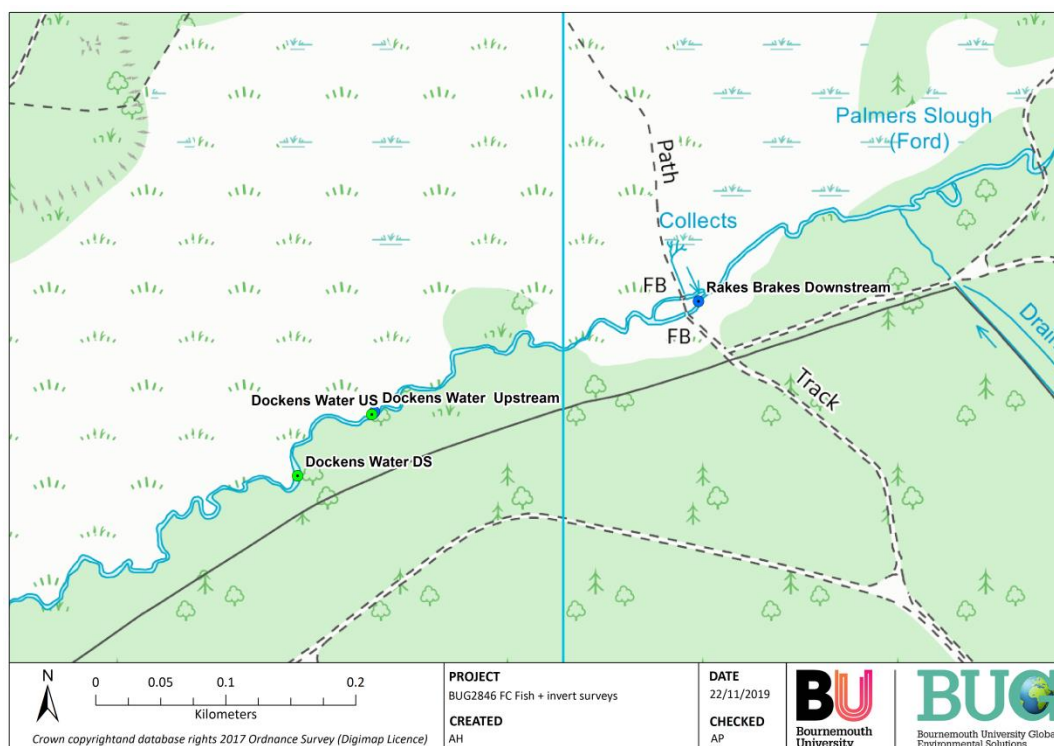


Figure 2.1. Location of each of the eleven streams surveyed during 2019.

### 2.1.1 Dockens Water

Dockens Water is a small tributary of the River Avon (Figure 2.1). The upstream and downstream extents of the 100 m electric fishing site (green dots) and invertebrate kick-sampling sites (blue dots) are shown in Figure 2.2 and summarised in Table 2.2. A full description of the fish survey site is provided within the results Section 3.1.



**Figure 2.2. Location of survey sites at Dockens Water. Green = fish survey sites, blue = invertebrate survey sites.**

**Table 2.2. Location of survey sites at Dockens Water.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Dockens Water (Fish)	SU2185312276	SU2179612229	100	19/09/2019
Dockens Water Upstream (Inverts)	SU2185512278	N/A	N/A	26/09/2019
Rakes Brakes Downstream (Inverts)	SU2210412363	N/A	N/A	19/09/2019



### 2.1.2 Ferny Croft

Ferny Croft is located on two small tributaries of the Beaulieu River (Figure 2.1). The location of the three proposed macroinvertebrate sampling sites are shown in Figure 2.3 and summarised in Table 2.3.

Note: Ferny Croft North Downstream was not surveyed due to a lack of suitable habitat, which comprised of flooded grassland.

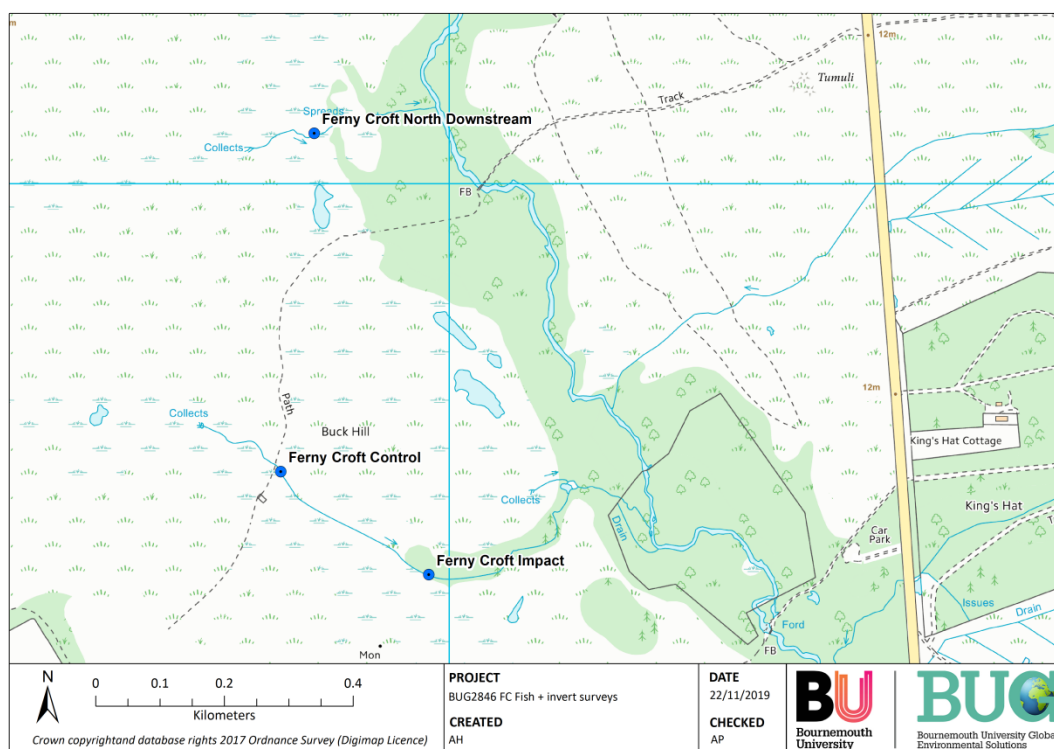


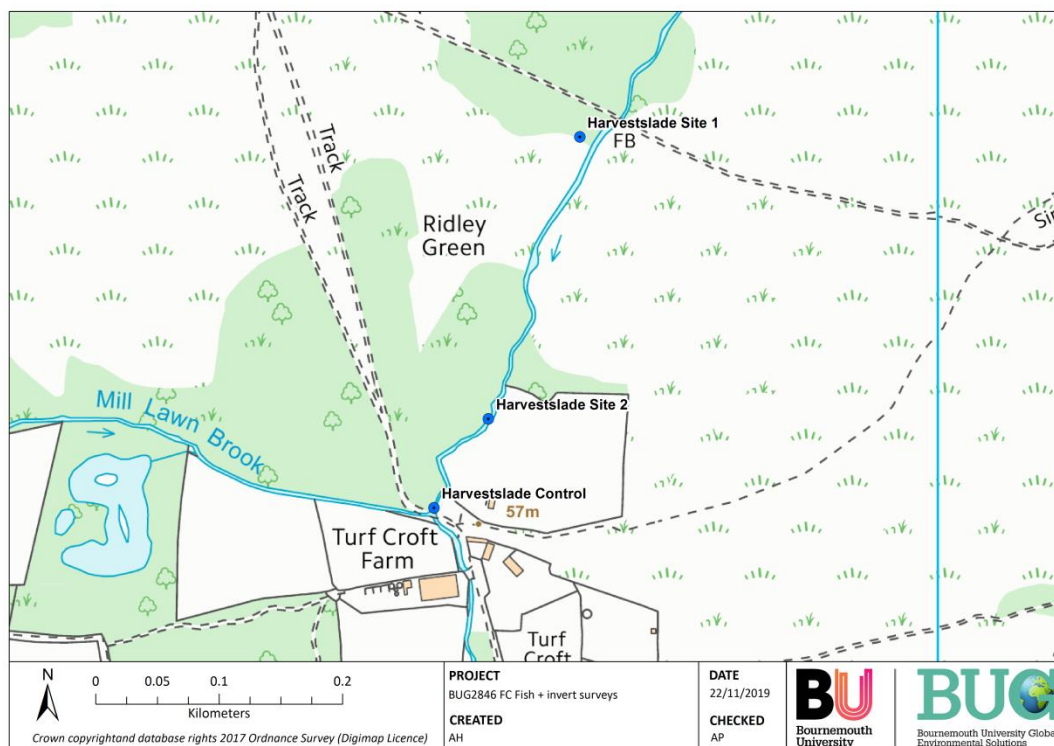
Figure 2.3. Location of survey sites at Ferny Croft.

Table 2.3. Location of survey sites at Ferny Croft.

Site	NGR	Date of survey
Ferny Croft North Downstream	SU3779006079	N/A - no habitat / grass substrate
Ferny Croft Control	SU3773805554	24/09/2019
Ferny Croft Impact	SU3796805394	24/09/2019

### 2.1.3 Harvestslade

Harvestslade is located on a small tributary of Mill Lawn Brook, which flows into the Lymington River (Figure 2.1). The location of the three macroinvertebrate sampling sites are shown in Figure 2.4 and summarised in Table 2.4.



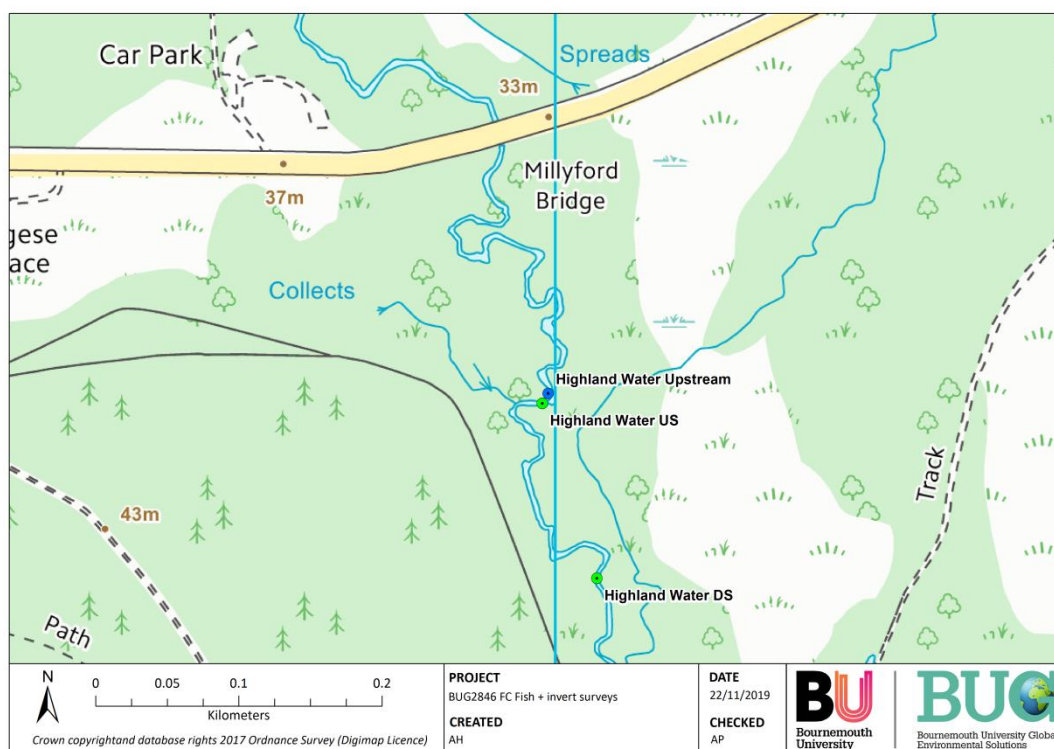
**Figure 2.4. Location of survey sites at Harvestslade.**

**Table 2.4. Location of survey sites at Harvestslade.**

Site	NGR	Date of survey
Harvestslade Site 1	SU2071005605	25/09/2019
Harvestslade Site 2	SU2063605377	25/09/2019
Harvestslade Control	SU2059205305	25/09/2019

#### 2.1.4 Highland Water

Highland Water flows southwards through the centre of the New Forest before becoming the Lymington River as it flows past Brockenhurst (Figure 2.1). The upstream and downstream extents of the 100 m electric fishing site (green dots) and the invertebrate kick-sampling site (blue dot) are shown in Figure 2.5 and summarised in Table 2.5. A full description of the fish survey site is provided within the results Section 3.2.



**Figure 2.5. Location of survey sites at Highland Water. Green = fish survey sites, blue = invertebrate survey sites.**

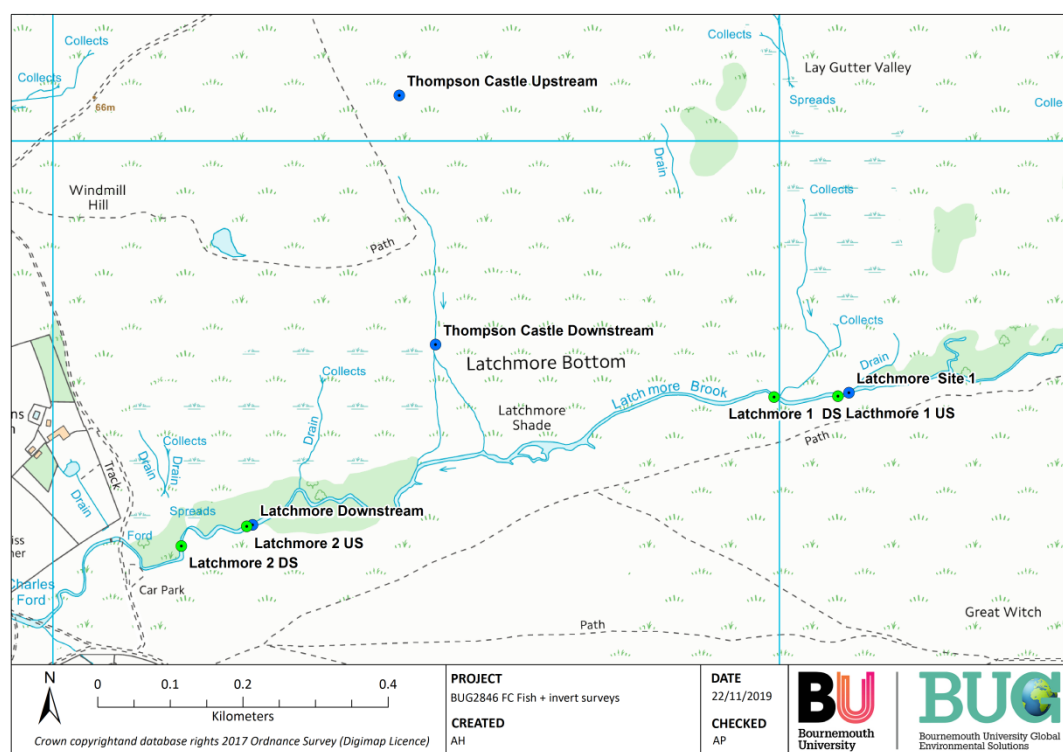
**Table 2.5. Location of survey sites at Highland Water.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Highland Water (Fish)	SU2699107639	SU2702907517	100	26/09/2019
Highland Water Upstream (Inverts)	SU2699507646	N/A	N/A	26/09/2019

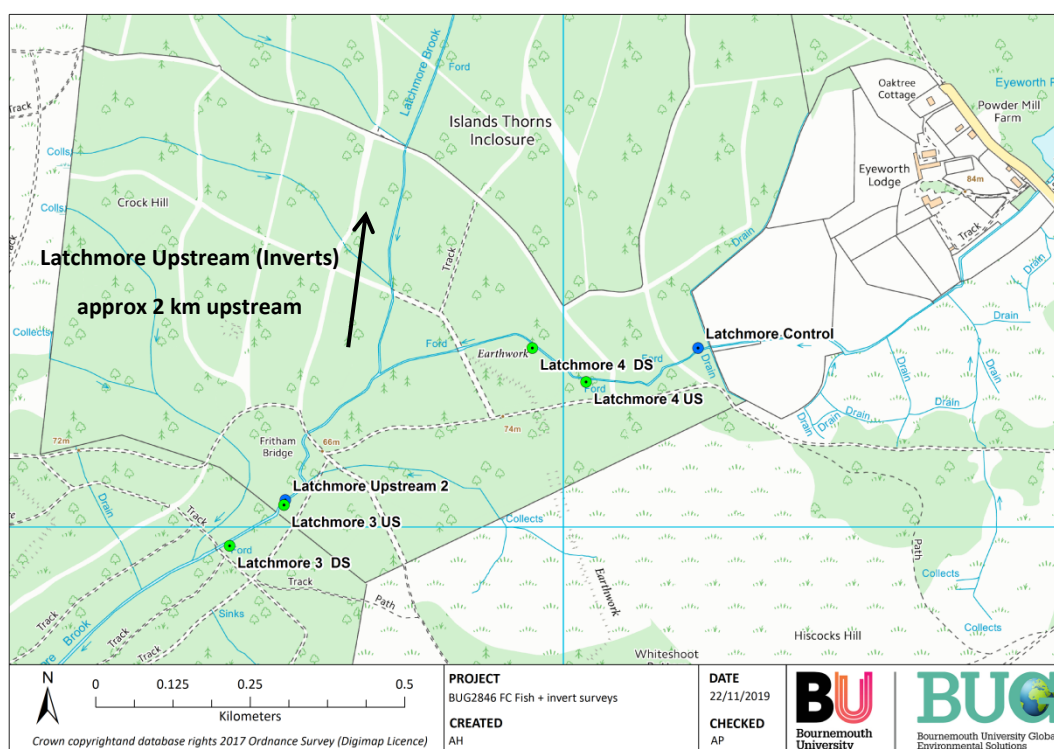
### 2.1.5 Latchmore Brook

Latchmore Brook (changing downstream to Huckles Brook) is a small tributary of the River Avon (Figure 2.1). The upstream and downstream extents of the 100 m electric fishing sites (green dots) and the invertebrate kick-sampling sites (blue dots) are shown in Figure 2.6 and Figure 2.7 and summarised in Table 2.6. A full description of the fish survey sites are provided within the results Sections 3.3 and 3.4.

Note: The upstream sites (Figure 2.7) were not completed due to being dry at the time of the survey.



**Figure 2.6. Location of survey sites at Latchmore Brook (downstream stretch). Green = fish survey sites, blue = invertebrate survey sites.**



**Figure 2.7. Location of survey sites at Latchmore Brook (upstream stretch). Green = fish survey sites, blue = invertebrate survey sites.**

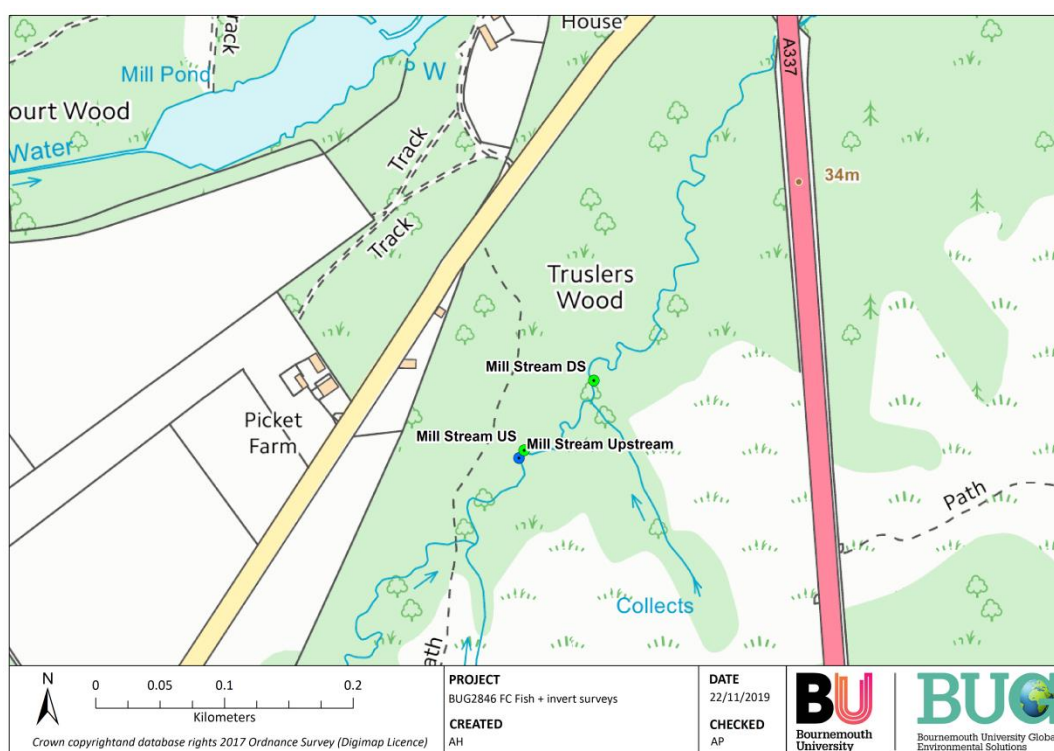
**Table 2.6. Location of survey sites at Latchmore Brook.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Latchmore 1 (Fish)	SU1908112649	SU1899312648	100	18/09/2019
Latchmore 2 (Fish)	SU1826712470	SU1817712443	100	17/09/2019
Latchmore 3 (Fish)	SU2154814036	SU2146013970	100	N/A - dry
Latchmore 4 (Fish)	SU2203714235	SU2195014290	100	N/A - dry
Thompson Castle Upstream (Inverts)	SU1847713063	N/A	N/A	18/09/2019
Thompson Castle Downstream (Inverts)	SU1852712720	N/A	N/A	18/09/2019
Latchmore Downstream (Inverts)	SU1827512472	N/A	N/A	17/09/2019
Latchmore Site 1 (Inverts)	SU1909612654	N/A	N/A	18/09/2019
Latchmore Upstream 2	SU2155014044	N/A	N/A	N/A - dry
Latchmore Control	SU2221814290	N/A	N/A	N/A - dry
Latchmore Upstream (Inverts)	SU2273815944	N/A	N/A	N/A - dry



### 2.1.6 Mill Stream

Mill Stream is a small tributary of Bartley Water, which flows eastwards from just north of Lyndhurst and enters the River Test at Eling (Figure 2.1). The upstream and downstream extents of the 80 m electric fishing site (green dots) and invertebrate kick-sampling site (blue dot) are shown in Figure 2.8 and summarised in Table 2.7. A full description of the fish survey site is provided within the results Section 3.5.



**Figure 2.8. Location of survey sites at Mill Stream. Green = fish survey sites, blue = invertebrate survey sites.**

**Table 2.7. Location of survey sites at Mill Stream.**

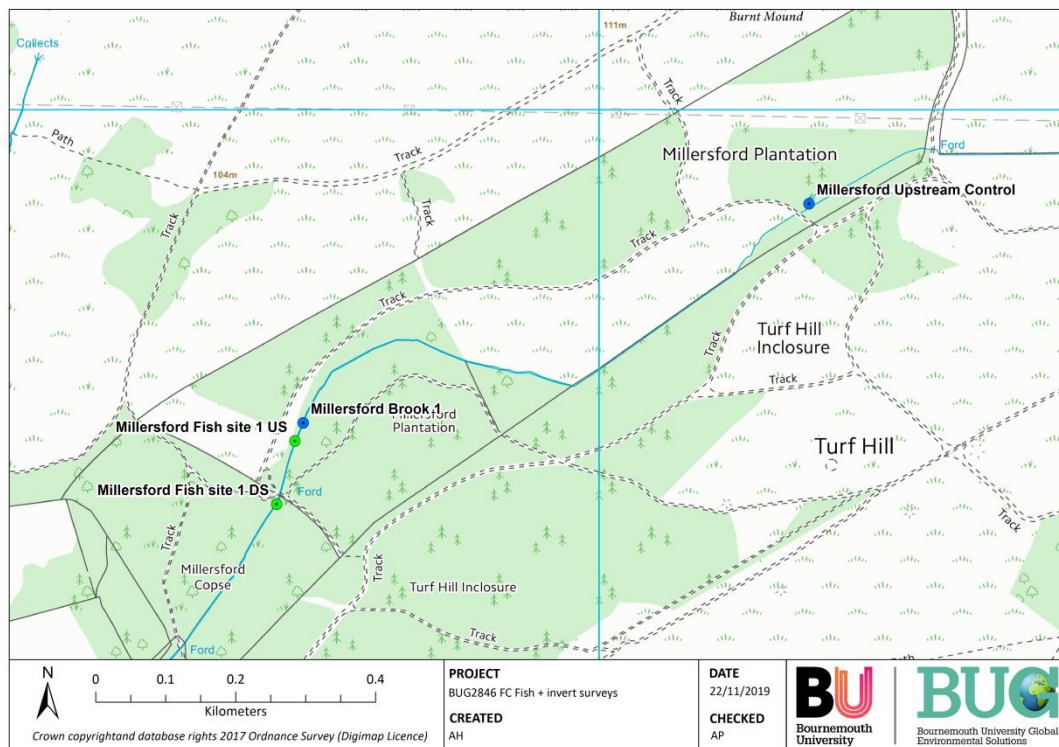
Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Mill Stream (Fish)	SU2955609636	SU2961009690	80	19/09/2019
Mill Stream Upstream (Inverts)	SU2955209630	N/A	N/A	19/09/2019



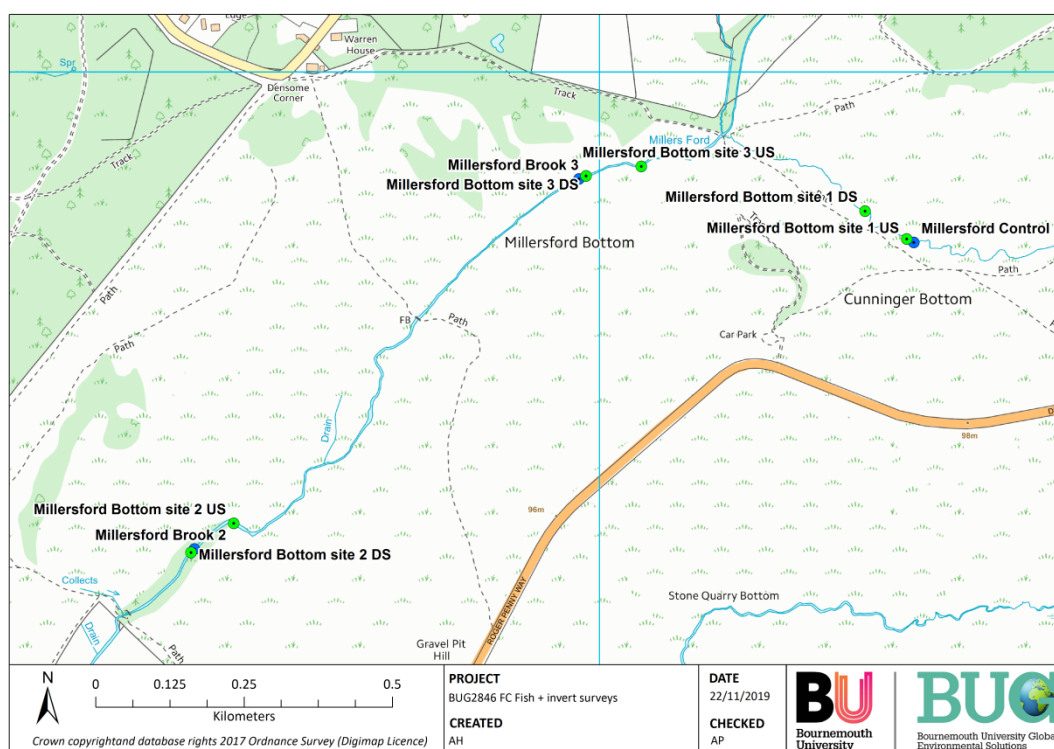
### 2.1.7 Millersford Brook

Millersford Brook is a tributary of the River Avon (Figure 2.1). The upstream and downstream extents of the four proposed 100 m electric fishing sites (green dots) and five invertebrate kick-sampling sites (blue dots) are shown in Figure 2.9 and Figure 2.10 and summarised in Table 2.8. Full descriptions of the fish survey sites are provided within the results Sections 3.6 to 3.8.

Note: Millersford Bottom Site 1 (Fish) and Millersford Control (Inverts) were not completed due to being dry at the time of the survey.



**Figure 2.9. Location of survey sites at Millersford Brook (upstream stretch). Green = fish survey sites, blue = invertebrate survey sites.**



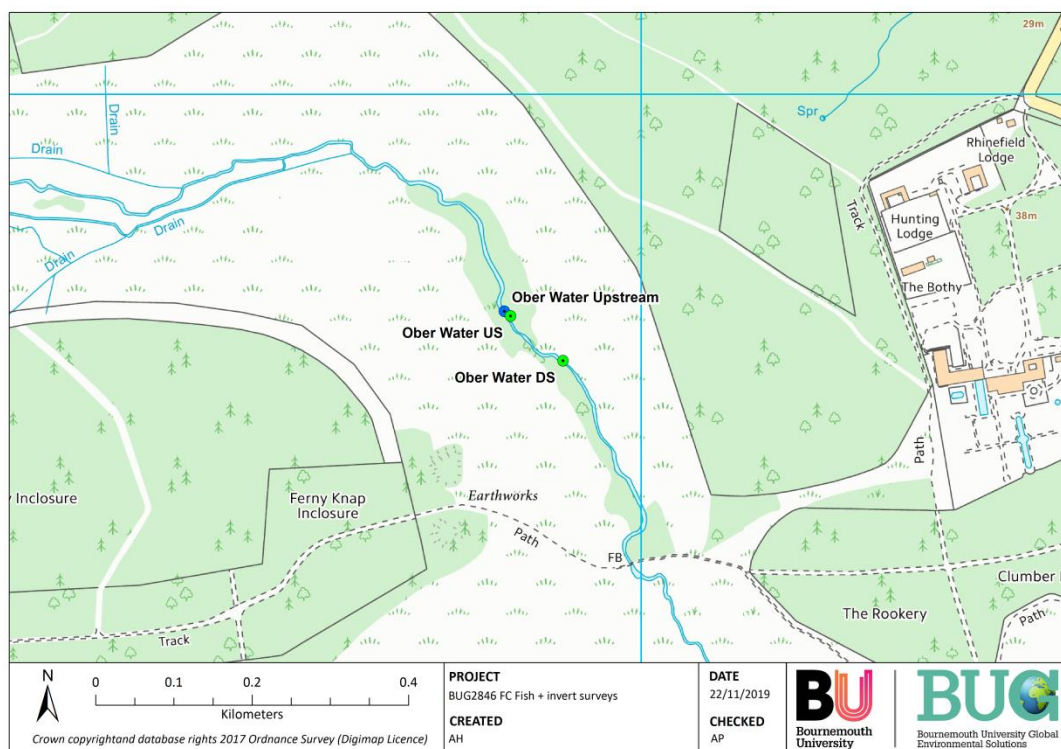
**Figure 2.10. Location of survey sites at Millersford Brook (downstream stretch). Green = fish survey sites, blue = invertebrate survey sites.**

**Table 2.8. Location of survey sites at Millersford Brook.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Millersford Bottom Site 1 (Fish)	SU1951816719	SU1944816766	100	N/A - dry
Millersford Bottom Site 2 (Fish)	SU1838416240	SU1831216191	100	16/09/2019
Millersford Bottom Site 3 (Fish)	SU1907116841	SU1897816825	100	16/09/2019
Millersford Fish Site 1	SU1956517527	SU1953917437	100	17/09/2019
Millersford Brook 1 (Inverts)	SU1957717553	N/A	N/A	17/09/2019
Millersford Brook 2 (Inverts)	SU1831816197	N/A	N/A	16/09/2019
Millersford Brook 3 (Inverts)	SU1896616820	N/A	N/A	16/09/2019
Millersford Control (Inverts)	SU1953016713	N/A	N/A	N/A - dry
Millersford Upstream Control (Inverts)	SU2030017866	N/A	N/A	17/09/2019

### 2.1.8 Ober Water

Ober Water is located on Mill Lawn Brook, a small tributary of the Lymington River (Figure 2.1). The upstream and downstream extents of the 100 m electric fishing site (green dots) and the invertebrate kick-sampling site (blue dot) are shown in Figure 2.11 and summarised in Table 2.9. A full description of the fish survey site is provided within the results Section 3.9.



**Figure 2.11. Location of survey sites at Ober Water. Green = fish survey sites, blue = invertebrate survey sites.**

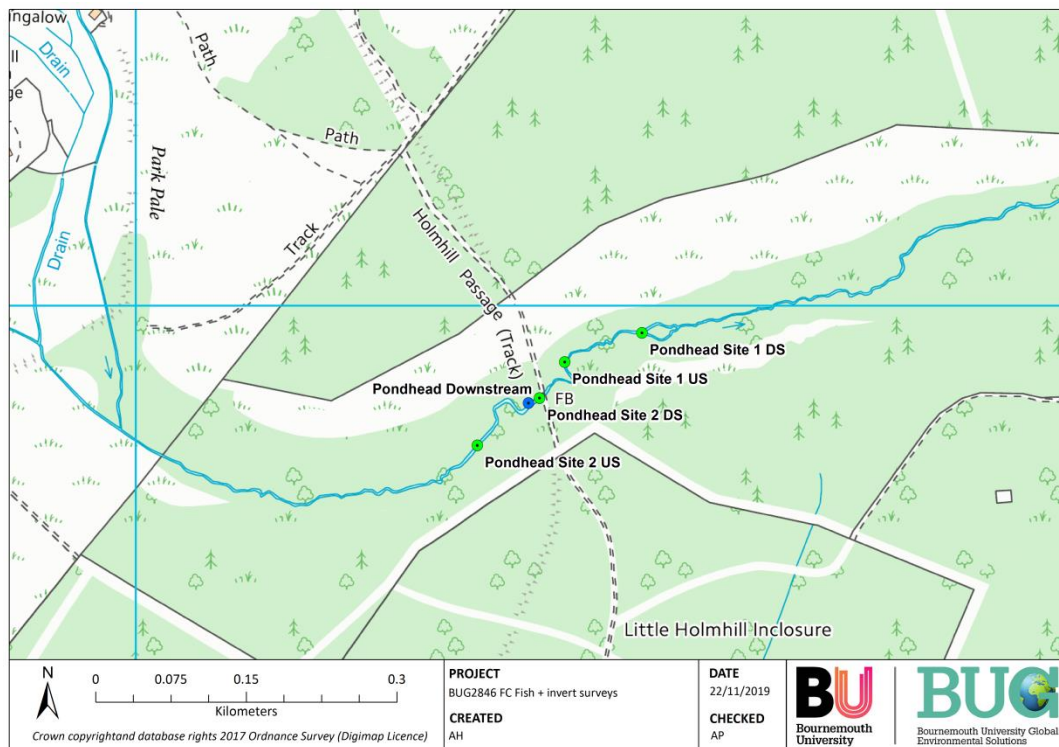
**Table 2.9. Location of survey sites at Ober Water.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Ober Water (Fish)	SU2583303717	SU2590003660	100	30/09/2019
Ober Water Upstream (Inverts)	SU2582503723	N/A	N/A	30/09/2019

### 2.1.9 Pondhead

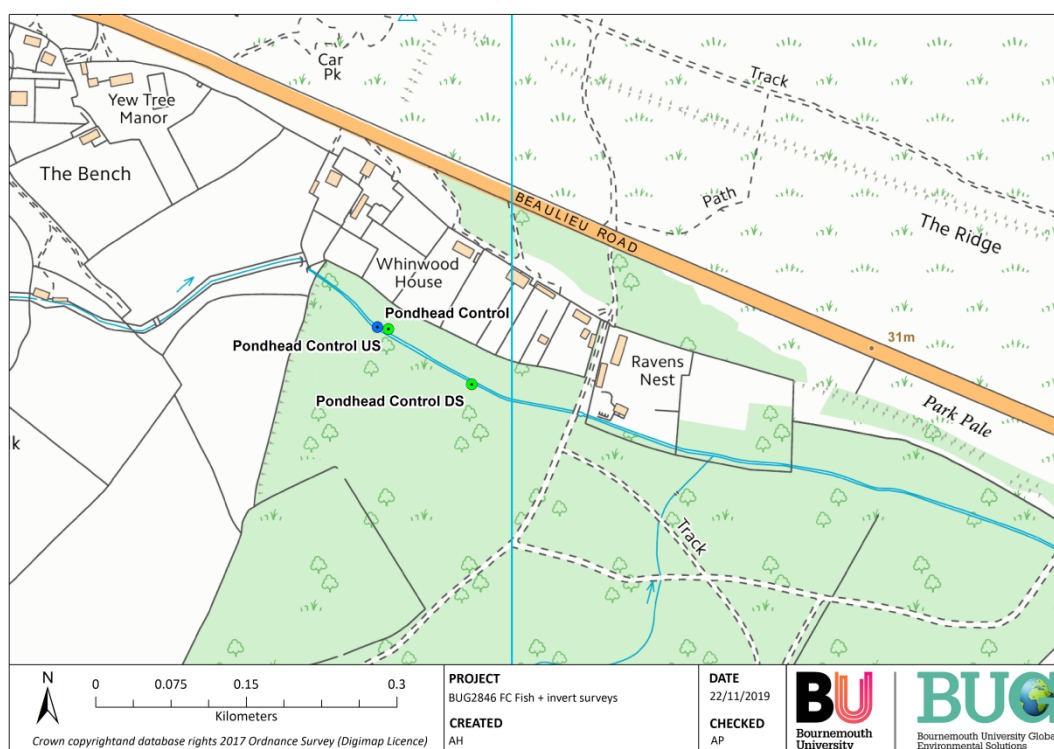
Pondhead is located on a small tributary of the Beaulieu River (Figure 2.1). The upstream and downstream extents of the 100 m electric fishing sites (green dots) and the invertebrate kick-sampling sites (blue dots) are shown in Figure 2.12 and Figure 2.13 and summarised in Table 2.10. A full description of the fish survey sites are provided within the results Sections 3.10 and 3.11.

Note: The upstream sites (Figure 2.13) were not completed due to having extremely low flow at the time of the survey.



**Figure 2.12. Location of survey sites at Pondhead (downstream stretch). Green = fish survey sites, blue = invertebrate survey sites.**





**Figure 2.13. Location of survey sites at Pondhead (upstream stretch). Green = fish survey sites, blue = invertebrate survey sites.**

**Table 2.10. Location of survey sites at Pondhead.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Pondhead Site 1 (Fish)	SU3242706944	SU3250406973	100	20/09/2019
Pondhead Site 2 (Fish)	SU3234006861	SU3240206908	100	20/09/2019
Pondhead Control (Fish)	SU3087707665	SU3096007610	100	N/A – very low flow / stagnant
Pondhead Downstream (Inverts)	SU3239106903	N/A	N/A	20/09/2019
Pondhead Control (Inverts)	SU3086607667	N/A	N/A	N/A – very low flow / stagnant

### 2.1.10 Redhill / Holmhill

Redhill / Holmhill is located on a small tributary of Mill Lawn Brook, which flows into the Lymington River (Figure 2.1). The location of the three macroinvertebrate sampling sites are shown in Figure 2.14 and summarised in Table 2.11.

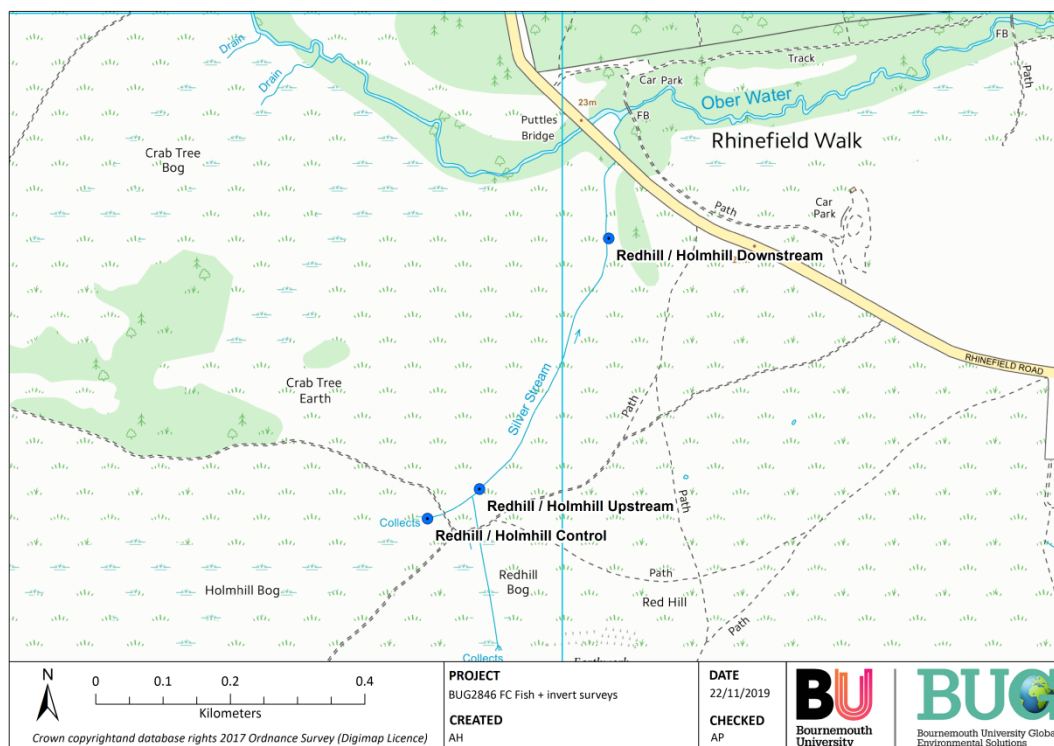


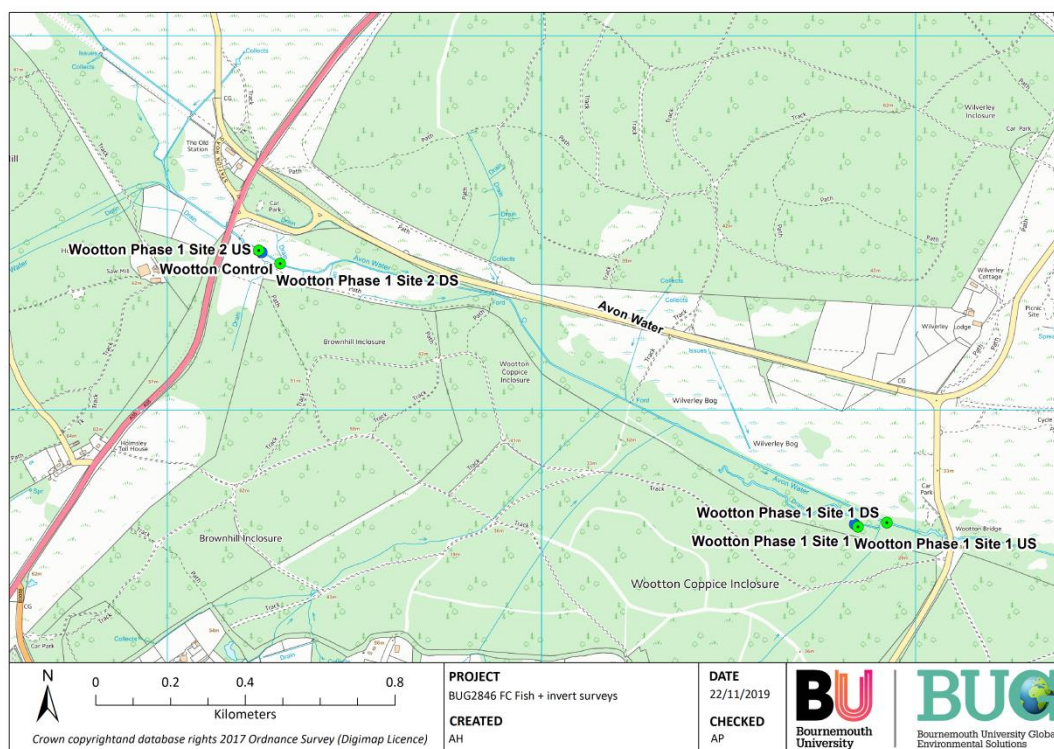
Figure 2.14. Location of survey sites at Redhill / Holmhill.

Table 2.11. Location of survey sites at Redhill / Holmhill.

Site	NGR	Date of survey
Redhill / Holmhill Upstream	SU2687702294	24/09/2019
Redhill / Holmhill Downstream	SU2706902666	24/09/2019
Redhill / Holmhill Control	SU2680002250	24/09/2019

### 2.1.11 Wootton Phase 1

Wootton Phase 1 is located on the Avon Water (Figure 2.1). The upstream and downstream extents of the 100 m electric fishing sites (green dots) and the invertebrate kick-sampling sites (blue dots) are shown in Figure 2.15 and summarised in Table 2.12. A full description of the fish survey sites are provided within the results Sections 3.12 and 3.13.



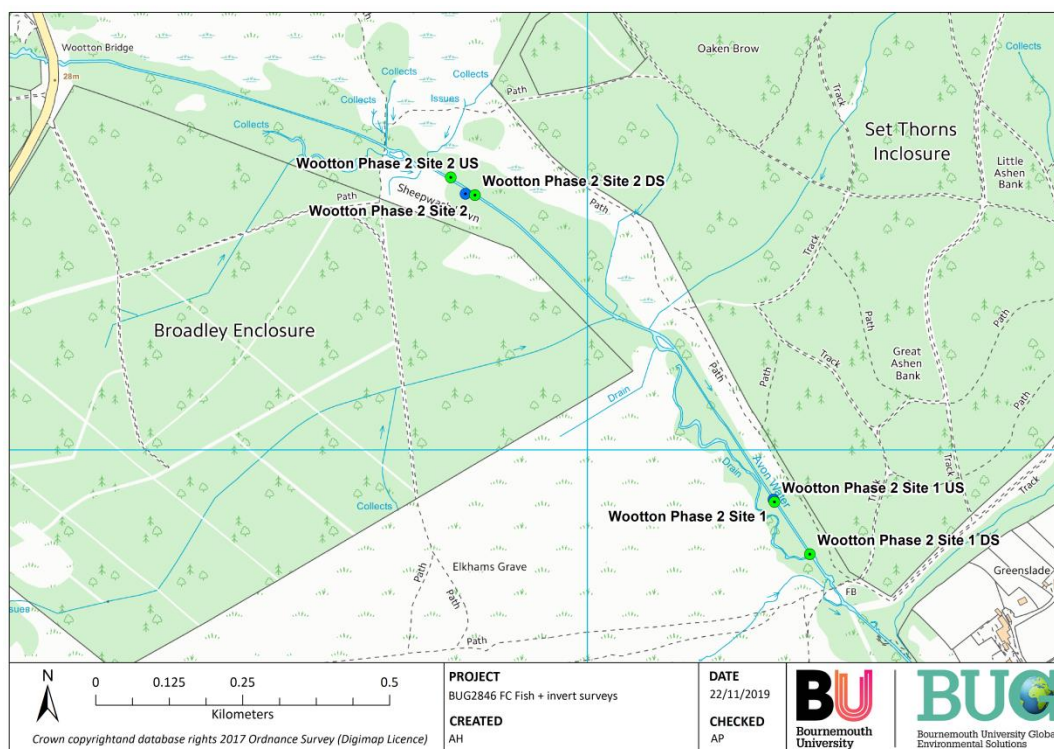
**Figure 2.15. Location of survey sites at Wootton Phase 1. Green = fish survey sites, blue = invertebrate survey sites.**

**Table 2.12. Location of survey sites at Wootton Phase 1.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Wootton Phase 1 Site 1 (Fish)	SZ2484699689	SZ2492399700	100	27/09/2019
Wootton Phase 1 Site 2 (Fish)	SU2324500427	SU2330200392	70	27/09/2019
Wootton Phase 1 Site 1 (Inverts)	SZ2483799696	N/A	N/A	27/09/2019
Wootton Control (Inverts)	SU2325300422	N/A	N/A	27/09/2019

### 2.1.12 Wootton Phase 2

Wootton Phase 2 is located on the Avon Water (Figure 2.1). The upstream and downstream extents of the 100 m electric fishing sites (green dots) and the invertebrate kick-sampling sites (blue dots) are shown in Figure 2.16 and summarised in Table 2.13. A full description of the fish survey sites are provided within the results Sections 3.14 and 3.15.



**Figure 2.16. Location of survey sites at Wootton Phase 2. Green = fish survey sites, blue = invertebrate survey sites.**

**Table 2.13. Location of survey sites at Wootton Phase 2.**

Site	Upstream extent of survey area	Downstream extent of survey area	Length of survey area (m)	Date of survey
Wootton Phase 2 Site 1 (Fish)	SZ2631898912	SZ2637898823	100	23/09/2019
Wootton Phase 2 Site 2 (Fish)	SZ2576899463	SZ2580999433	100	23/09/2019
Wootton Phase 2 Site 1 (Inverts)	SZ2631698916	N/A	N/A	23/09/2019
Wootton Phase 2 Site 2 (Inverts)	SZ2579399435	N/A	N/A	23/09/2019



## 2.2 Electric fishing

At each site, a fully-quantitative (triple run) electric fishing survey was conducted using backpack electric fishing kit. Stop-nets were positioned at both the upstream and downstream extent of the survey site to isolate a 100 m stretch (where possible). In combination with measurement of river habitat characteristics at 10 m intervals (e.g. width, depth and substrate), the total survey area was calculated for each site.

All fish captured were identified to species, a representative sub-sample of each species was measured, and all fish allowed to recover in aerated holding tanks prior to their release. Fish from each electric fishing run were processed separately to facilitate calculation of population densities using catch depletion models.

Fish capture, processing, data recording and analyses was completed in accordance with best practice guidance (e.g. Joint Nature Conservation Committee Common Standards Monitoring).

Where relevant, 0+ and 1++ brown trout densities were classified according to the National Fisheries Classification Scheme (NFCs), shown in Table 2.14 below.

**Table 2.14. National Fisheries Classification Scheme for brown trout.**

Classification	Density (No./100m <sup>2</sup> )	
	Trout fry (0+)	Trout parr (1++)
A (Excellent)	>= 38	>= 21
B (Good)	17 – 37.9	12 – 20.9
C (Fair)	8 – 16.9	5 – 11.9
D (Fair / Poor)	3 – 7.9	2 – 4.9
E (Poor)	< 3	< 2
F (Fishless)	Absent	Absent

## 2.3 Invertebrate kick-sampling

### 2.3.1 Survey methodology

Macroinvertebrate samples were collected in accordance with the standard Environment Agency (EA) three-minute kick sampling procedure using a 1 mm mesh pond net (set out in *‘Procedures For Collecting and Analysing Macroinvertebrate Samples’*. BT001 3.0, Third Issue; 1991) and by the procedure for collecting and analysing macroinvertebrate samples for RIVPACS (Murray-Bligh *et al.* 1992).

At each sampling site, a basic suite of physico-chemical parameters (pH, temperature, conductivity, dissolved oxygen) and general habitat characteristics (water velocity category, width, depth and substratum composition) were recorded on standard RIVPACS/RICT *‘Sample Area’* forms. These variables are useful both for describing the general sampling site characteristics, and also as predictor variables for running the RIVPACS (River Invertebrate and Prediction and Classification System) model (see Section 2.3.5).

All samples were accompanied by a GPS reading, and sampling site sketch map to facilitate subsequent return to the same location for re-survey work. In addition, the presence of aquatic macrophytes and other species observed incidentally during the macroinvertebrate sampling (e.g. fish) were also recorded.

All sampling equipment, chemical analysis probes and personal protective equipment had been thoroughly dried prior to visiting the site and all equipment was checked for foreign species, as recommended by the GB Non-Native Species Secretariat 'Check, Clean, Dry' campaign (GB NNSS 2015). As an additional precaution, all equipment that might come into contact with the sampling sites was sprayed with 'Virkon® S' (DuPont™) a powerful broad-spectrum virucidal, bactericidal and fungicidal disinfectant prior to visiting the sampling sites to prevent the transfer of crayfish plague or other pathogens.

Macroinvertebrate samples were fixed at the riverbank using 4% formaldehyde. The use of formaldehyde is considered superior to 70% Industrial Methylated Spirits due to its more rapid and thorough fixation of organic matter and the greatly enhanced shelf life of the samples and the invertebrate specimens they contain. Sample pots were clearly labelled both internally, using pencil and waterproof paper labels, and externally using a waterproof bullet marker. Samples were returned to the laboratory for processing.

### 2.3.2 Laboratory sample processing

Macroinvertebrate samples were sorted, identified and enumerated following the procedures set out in 'Procedures For Collecting and Analysing Macroinvertebrate Samples'. BT001 3.0, Third Issue; 1991) and by the procedure for collecting and analysing macroinvertebrate samples for RIVPACS (Murray-Bligh *et al.* 1992). Samples were processed to species-level, specifically RIVPACS Taxonomic Level 'TL5' (Davy-Bowker *et al.* 2010), and numerical abundances of all taxa were estimated and recorded on laboratory sample data sheets.

Examination of picked invertebrates was made using a binocular/compound microscope, as required. Appropriate taxonomic keys were used for identification, making reference to a reference collection, where necessary. All samples were reconstituted (put back into their original sample pots and re-preserved) and retained for subsequent quality assurance purposes. Where any specimens were retained for addition to a reference collection, this was clearly marked on the laboratory sample analysis sheets. All sample analyses were carried out by John Davy-Bowker.

### 2.3.3 Data entry and validation

Macroinvertebrate data from sample analysis laboratory datasheets were entered into a Microsoft® Access data entry database. Following data entry, sample validation reports (lists of entered species names and abundances) were printed out and manual data validation checks were performed to ensure that no errors arose due to data entry. Any data entry errors were corrected and the validation process was repeated until the data were error-free. Following validation, data were then exported for the calculation of biotic indices and RIVPACS/RICT Observed/Expected ratios.

### 2.3.4 Calculation of biotic indices

Data were imported into a Microsoft® Access database containing queries for the automatic calculation of a wide range of freshwater macroinvertebrate biotic indices at family and/or species levels.

Further information on the biotic indices is provided below (commonly used index abbreviations, the full name of each index, sources/references and typical types of environmental stress described by each index):

- **BMWP, NTAXA, ASPT**

Name: Biological Monitoring Work Party  
Reference(s): Armitage *et al.* 1983; Hawkes 1997  
Stressor described: General degradation

- **WHPT, NTAXA, ASPT**

Name: Whalley, Hawkes, Paisley, Trigg  
Reference(s): UKTAG 2014  
Stressor described: General degradation

- **AWIC(sp) Murphy**

Name: Acid Water Indicator Community  
Reference(s): Murphy *et al.* 2013  
Stressor describe: Acidity/acidification stress

- **WFD AWIC(sp) McFarland**

Name: *WFD Acid Water Indicator Community*  
Reference(s): McFarland 2010; UKTAG 2014  
Stressor described: Acidity/acidification stress

- **LIFE(sp)**

Name: Lotic-invertebrate Index for Flow Evaluation  
Reference(s): *Extence et al. 1999*  
Stressor described: Flow stress

- **PSI(sp)**

Name: Proportion of Sediment-sensitive Invertebrates  
 Reference(s): *Extence et al. 2013*  
 Stressor described: Sedimentation stress

- **SPEAR(sp)%**

Name: Species At Risk  
 Reference(s): *Beketov et al. 2008*  
 Stressor described: Pesticide stress

- **CCI**

Name: Community Conservation Index  
 Reference(s): Chadd and Extence 2004  
 Stressor described: Conservation value

### 2.3.5 RIVPACS/RICT Observed/Expected ratios

In addition to the calculation of observed biotic indices for the macroinvertebrate samples (described above) RIVPACS/RICT classification was undertaken using the RIVPACS IV predictive model (Davy-Bowker *et al.* 2008), run through the web-based RICT (River Invertebrate Classification Tool) software:

[www.sepa.org.uk/environment/water/classification/river-invertebrates-classification-tool/](http://www.sepa.org.uk/environment/water/classification/river-invertebrates-classification-tool/)

RIVPACS IV is the current RIVPACS model used by the Environment Agency and others to perform WFD quality assessments and is the industry standard for assessing the biological condition of running waters.

RIVPACS (River Invertebrate Prediction and Classification System) is a predictive model that uses environmental variables such as stream width and depth, distance from source, altitude, etc. to predict the reference (undisturbed) values of a range of biotic indices (Wright *et al.* 1997; Clarke *et al.* 2003). RIVPACS is based on a dataset of 685 GB reference sites that are grouped into similar 'end groups' whose biological communities are similar to each other. Predicted biotic indices for test samples were obtained by gathering the same environmental variables (environmental predictor variables) and running these through the model. Each test sample is assigned a probability of RIVPACS end group membership based on its environmental variables. The biotic index values of the reference sites in the various end groups then contribute to the predicted index values for the test sample. Rather than drawing the prediction solely from one end group of reference sites, the predictions of reference condition biotic indices are derived by the model as a weighted average depending upon probability of end group membership (Clarke *et al.* 2011).

The observed values of a wide range of commonly used biotic indices from the test samples were then compared to the RIVPACS expected values of the indices by the calculation of

observed/expected ratios. For example, an observed biotic index value of 75 would be divided by an expected value of the same index, of say 85, to give an observed/expected (O/E) ratio of 0.882. An O/E ratio of greater than 1.0 indicates that a test sample has exceeded its predicted biotic index value (it is better than similar reference condition sites in the model); an O/E ratio of slightly below 1.0 (e.g. 0.882) indicates that a test sample is close to its predicted index value and is, therefore, only minimally impacted; an O/E ratio close to zero indicates that a test sample falls a long way short of its predicted biotic index value and it is, therefore, heavily stressed or degraded.

The O/E ratios of the Observed/Expected biotic indices were fitted into five bands, indicating the degree of disparity between the observed values and those expected by RIVPACS/RICT in the unstressed state. The five bands of O/E ratios used were as follows:

- > 1.3                      Observed score better than expected
- 1.3 – 0.7                  Observed score within expected range
- 0.7 – 0.5                  Observed score slightly degraded compared to expected score
- 0.5 – 0.3                  Observed score moderately degraded compared to expected score
- < 0.3                      Observed score very degraded compared to expected score

It is important to note that the bands above are not WFD ecological status classes (which exist only for the WHPT biotic indices). They do, however, give a consistent framework to examine deviations of observed and expected biotic index values across all biotic indices used and, therefore, provide a framework to quantify the effects of a wider range of environmental stressors than WFD classification alone.

### 3. RESULTS – ELECTRIC FISHING SURVEYS

#### 3.1 Dockens Water

##### 3.1.1 Site description

Dockens Water is located within an area of moorland / heath, with limited canopy cover along the river stretch (see Section 2.1.1). Table 3.1 below summarises the key physical characteristics of the 100 m survey site, and Appendix 1 provides a photographic record of habitat variability. The mean wetted width was 1.49 m, with an overall surveyed area of 149.1 m<sup>2</sup>.

Substrate was largely comprised of gravel and pebbles, with some cobbles and sand; however, a layer of fine silt was evident throughout and dominated the substrate in slower flowing stretches. The channel comprised largely of shallow riffle, with instream vegetation present in slower flowing sections. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.2.

**Table 3.1. Habitat data recorded during the electric fishing survey at Dockens Water.**

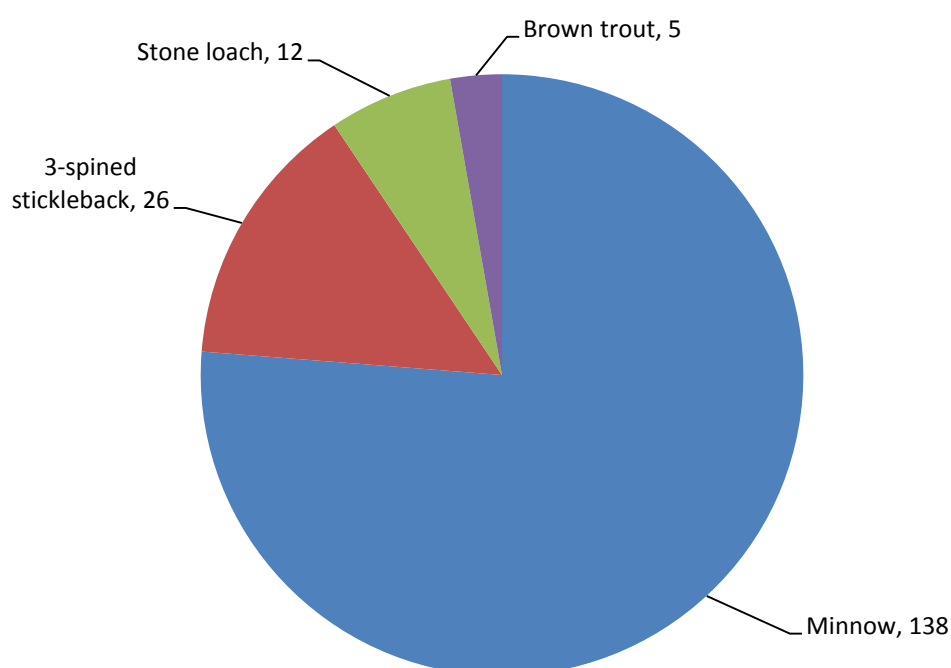
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	40	20	10	10	10	10		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		20	10	40	20	10		
Instream vegetation: <b>30 %</b>		Silted? <b>Yes</b>		Substrate: <b>Unstable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		40	20			20	20	
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	20	20						
Right bank %	20	20						
Total LB fish cover: <b>40 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>40 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Overhanging Boughs (%): <b>5</b>			RB Overhanging Boughs (%): <b>5</b>			Canopy Cover (%): <b>5</b>		

**Table 3.2. Physico-chemical parameters recorded during fish survey at Dockens Water.**

Parameter	Value
Temperature (°C)	10.5
Dissolved Oxygen (%)	86.6
Dissolved Oxygen (mg l <sup>-1</sup> )	9.86
Conductivity (µScm <sup>-1</sup> )	69.8

### 3.1.2 Electric fishing survey results

A total of 181 fish were captured at Harvestslade Site 1, comprising four species. Minnow comprised the majority of fish captured, followed by 3-spined stickleback and stone loach. (Figure 3.1).



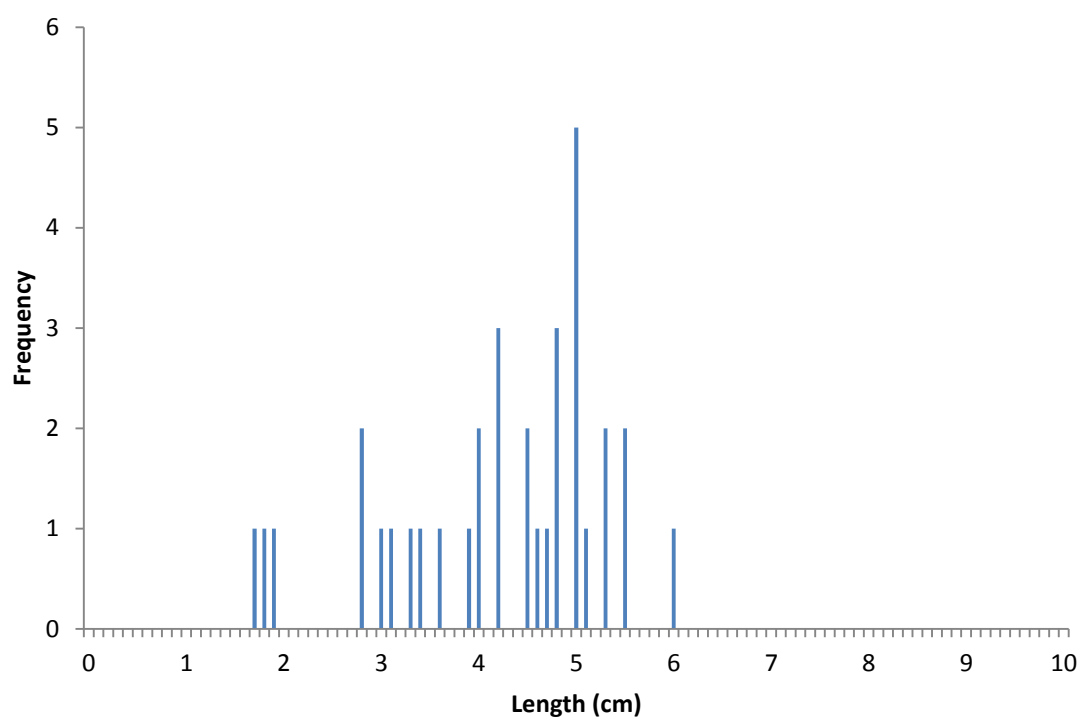
**Figure 3.1. Species composition (total number captured) at Dockens Water.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.3. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.3. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Dockens Water. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

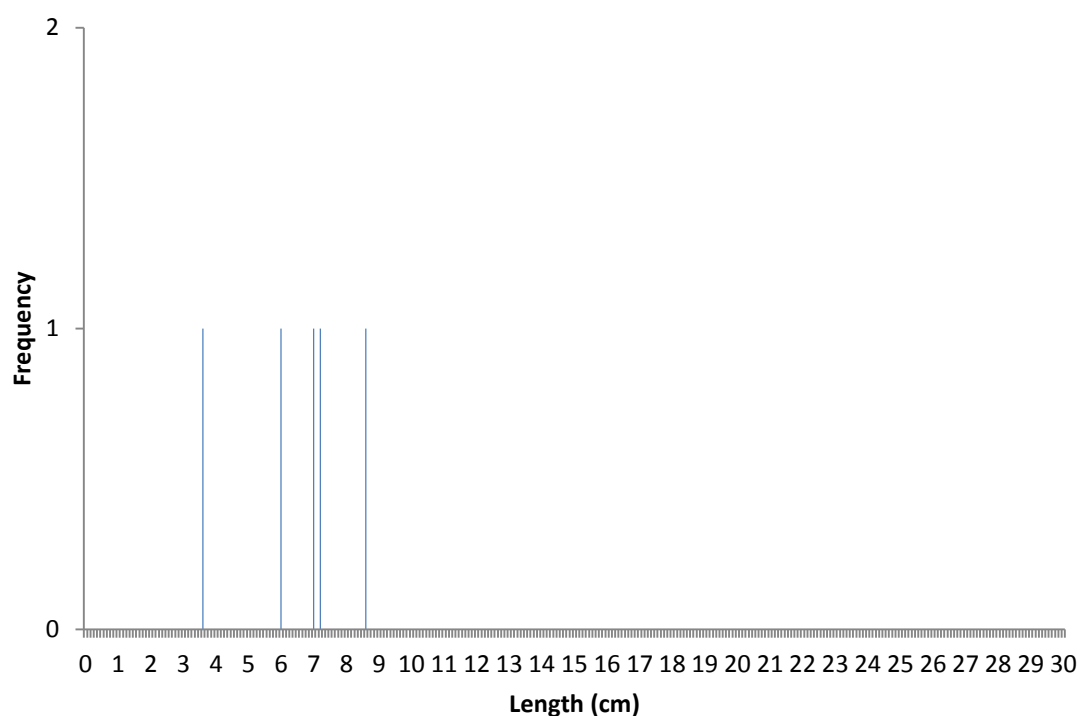
Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Minnow	138 (1.7 – 9.2)	182	0.37	141	223	122	N/A
3-spined stickleback	26 (1.9 – 3.2)	80	0.12	-172	333	54	N/A
Stone loach	12 (3.0 – 9.1)	21	0.23	-19	61	14	N/A
Brown trout (0+)	5 (3.6 – 8.6)	5	0.63	3	7	3	D (Fair / Poor)
Brown trout (1++)	0	N/A	N/A	N/A	N/A	N/A	F (Fishless)
<b>TOTAL</b>	<b>181</b>						

Length frequency charts for minnow and brown trout are provided in Figure 3.2 and Figure 3.3 below.



**Figure 3.2. Length frequency of minnow captured at Dockens Water (n=34).**





**Figure 3.3. Length frequency of brown trout captured at Dockens Water (n=5).**

### 3.1.3 Fish species of conservation importance

Table 3.4 highlights the fish species of conservation importance that were recorded at Dockens Water during the electric fishing survey.

**Table 3.4. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Dockens Water.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	N
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	N
Lamprey (Brook)	Habitats Directive (Annex II)	Y	N
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

## 3.2 Highland Water

### 3.2.1 Site description

Highland Water is located within an area of broadleaf / mixed woodland, with good canopy cover along the river stretch (see Section 2.1.4). Table 3.5 below summarises the key physical characteristics of the 100 m survey site, and Appendix 2 provides a photographic record of habitat variability. The mean wetted width was 3.66 m, with an overall surveyed area of 366.4 m<sup>2</sup>.

Substrate was largely comprised of gravel and pebbles, with some cobbles, sand and silt. The channel comprised a complexity of habitats with riffle, run, pool sequences throughout. Flow conditions during the survey were moderate.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.6

**Table 3.5. Habitat data recorded during the electric fishing survey at Highland Water.**

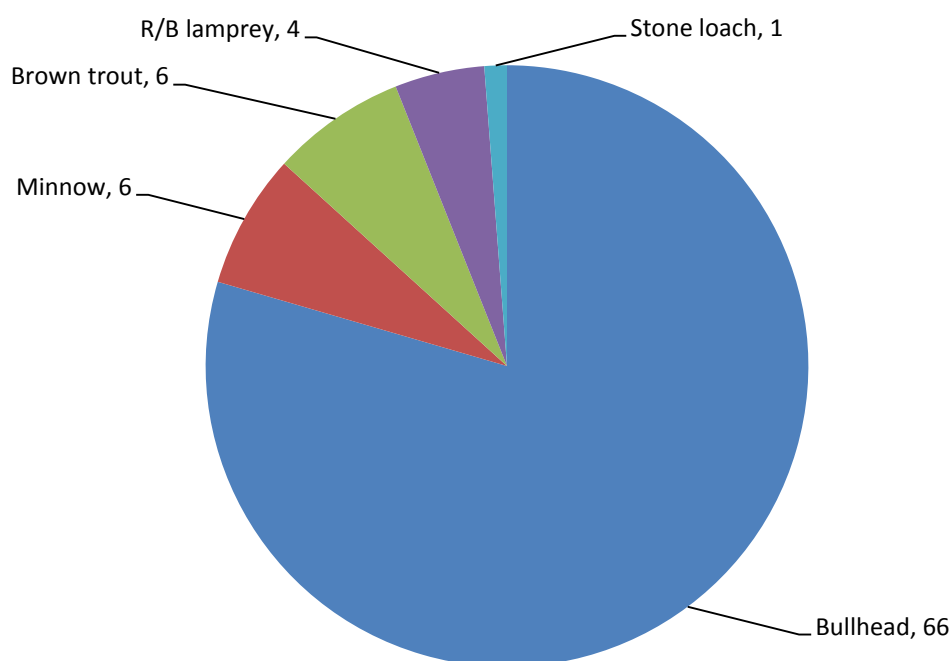
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	10	10	20	20	20	20		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		5	5	30	50	10		
Instream vegetation: <b>0 %</b>		Silted? <b>No</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		10		10	10	50	20	
Speed / Level: <b>Mod</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	10	10						
Right bank %	10	10						
Total LB fish cover: <b>20 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>20 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Overhanging Boughs (%): <b>5</b>			RB Overhanging Boughs (%): <b>5</b>			Canopy Cover (%): <b>100</b>		

**Table 3.6. Physico-chemical parameters recorded during fish survey at Highland Water.**

Parameter	Value
Temperature (°C)	15.5
Dissolved Oxygen (%)	92.9
Dissolved Oxygen (mg l <sup>-1</sup> )	9.23
Conductivity (µScm <sup>-1</sup> )	132.5

### 3.2.2 Electric fishing survey results

A total of 83 fish were captured at Highland Water, comprising five species. Bullhead was the most abundant species captured, followed by minnow and brown trout (Figure 3.4).



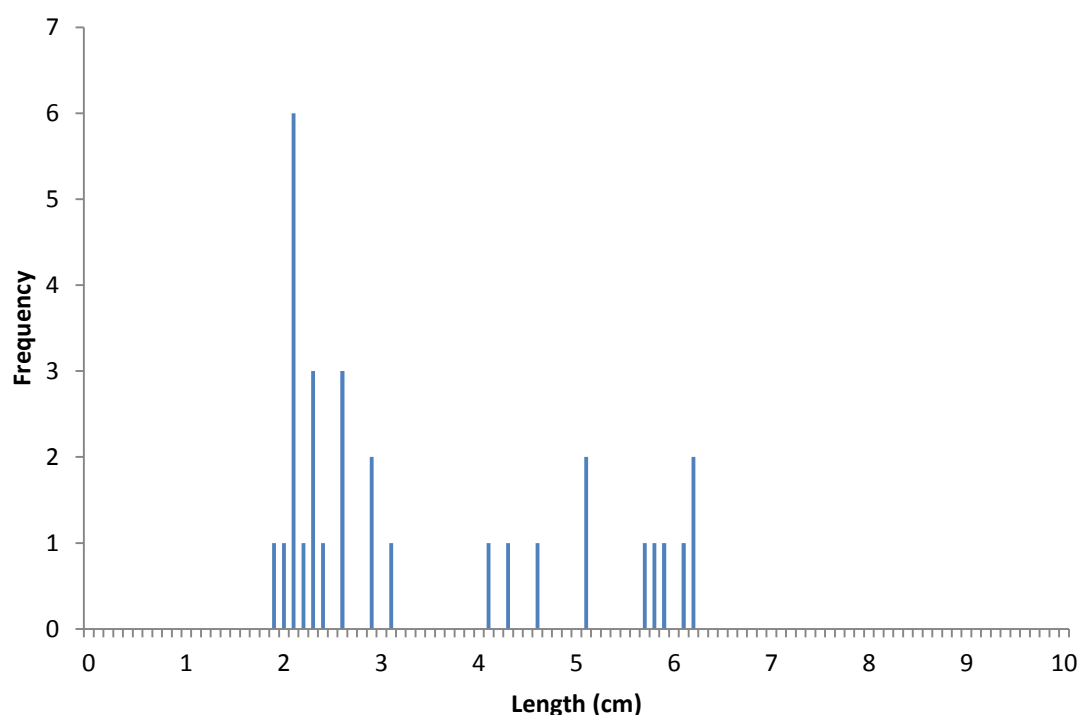
**Figure 3.4. Species composition (total number captured) at Highland Water.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.7. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

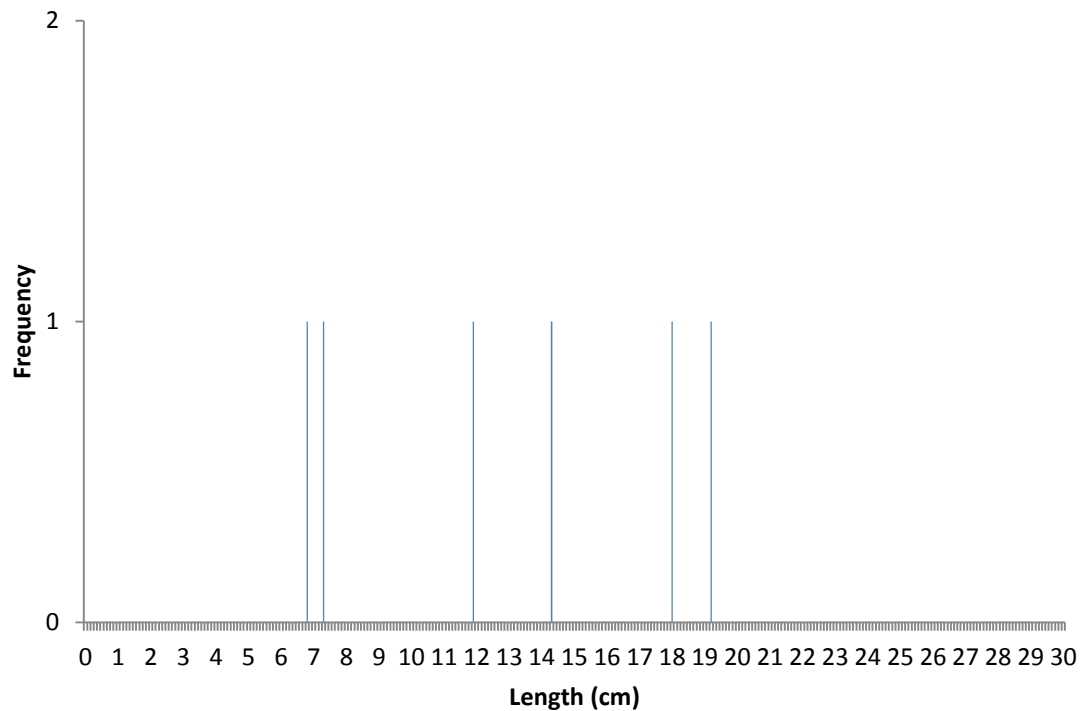
**Table 3.7. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Highland Water.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Bullhead	66 (1.9 – 6.2)	72	0.55	63	81	20	N/A
Minnow	6 (3.0 – 7.8)	6	0.67	5	7	2	N/A
R/B lamprey	4 (10.5 – 12.0)	4	0.44	0	8	1	N/A
Brown trout (1++)	4 (11.9 – 19.2)	4	0.57	2	6	1	E (Poor)
Brown trout (0+)	2 (6.8 – 7.3)	2	1	2	2	1	E (Poor)
Stone loach	1 (4.6)	1	1	1	1	<1	N/A
<b>TOTAL</b>	<b>83</b>						

Length frequency charts for bullhead and brown trout are provided in Figure 3.5 and Figure 3.6 below.



**Figure 3.5. Length frequency of bullhead captured at Highland Water (n=30).**



**Figure 3.6. Length frequency of brown trout captured at Highland Water (n=6).**

### 3.2.3 Fish species of conservation importance

Table 3.8 highlights the fish species of conservation importance that were recorded at Highland Water during the electric fishing survey.

**Table 3.8. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Highland Water.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	N
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.3 Latchmore Brook Site 1

#### 3.3.1 Site description

Latchmore Brook Site 1 is located within an area of open moorland / heath (see Section 2.1.5). Table 3.9 below summarises the key physical characteristics of the 100 m survey site, and Appendix 3 provides a photographic record of habitat variability. The mean wetted width was 3.04 m, with an overall surveyed area of 303.6 m<sup>2</sup>.

A mixed substrate was present throughout, with minimal instream vegetation present in slower and shallower sections (Table 3.9). Fish habitat appeared suitable for a variety of lithophilic species, including salmonids; although, marginal vegetation and shading was largely lacking. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.10.

**Table 3.9. Habitat data recorded during the electric fishing survey at Latchmore Brook Site 1.**

Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	40	10	10	10	10	20		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		10	10	20	50	10		
Instream vegetation: <b>5 %</b>		Silted? <b>Yes</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		40			10	10	40	
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	20	20						
Right bank %	20	20						
Total LB fish cover: <b>40 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>40 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Overhanging Boughs (%): <b>5</b>			RB Overhanging Boughs (%): <b>5</b>			Canopy Cover (%): <b>0</b>		

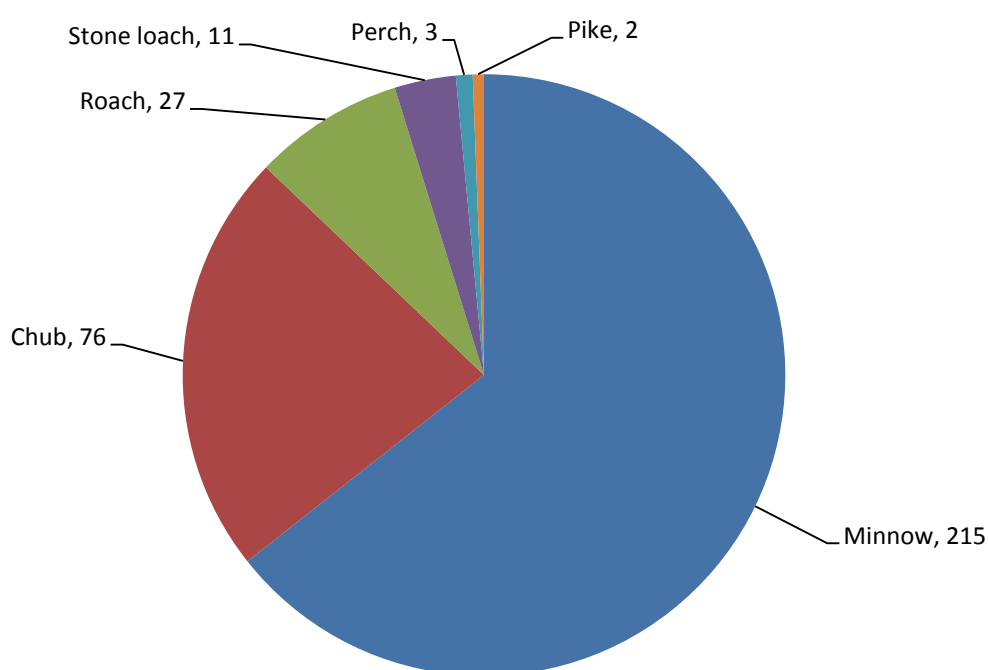


**Table 3.10. Physico-chemical parameters recorded during fish survey at Latchmore Brook Site 1.**

Parameter	Value
Temperature (°C)	13.3
Dissolved Oxygen (%)	95.7
Dissolved Oxygen (mg l <sup>-1</sup> )	10.2
Conductivity (µScm <sup>-1</sup> )	61.9

### 3.3.2 Electric fishing survey results

A total of 334 fish were captured at Latchmore Site 1, comprising six species. Minnow was the most abundant species captured, followed by chub and roach (Figure 3.7).



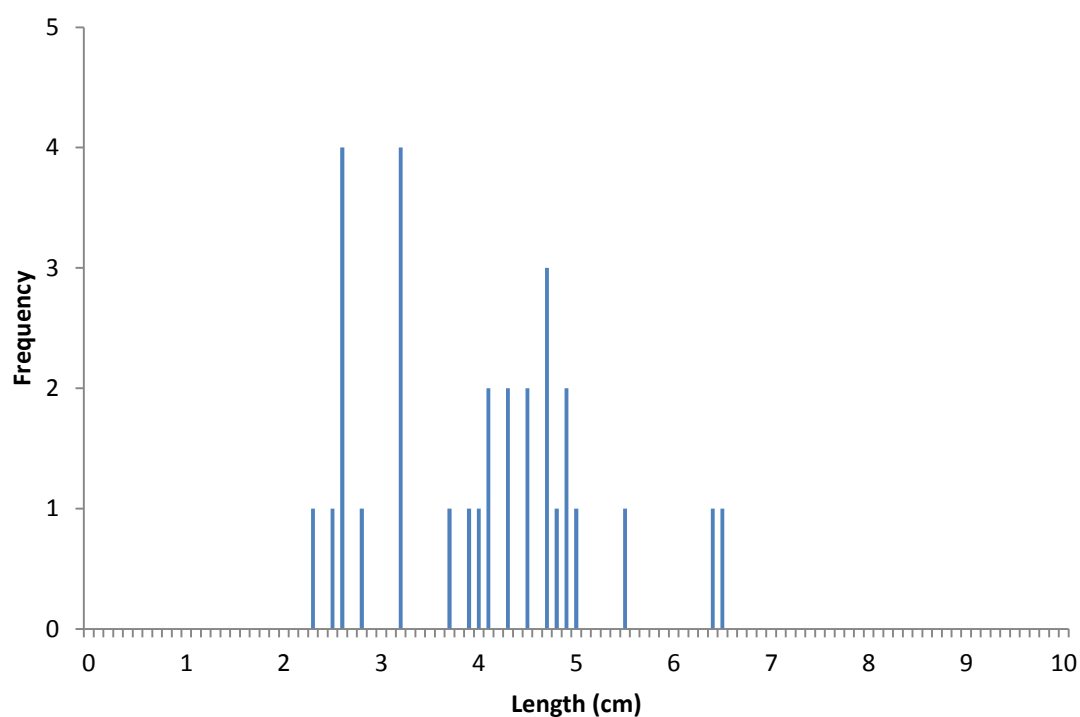
**Figure 3.7. Species composition (total number captured) at Latchmore Brook Site 1.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.11.

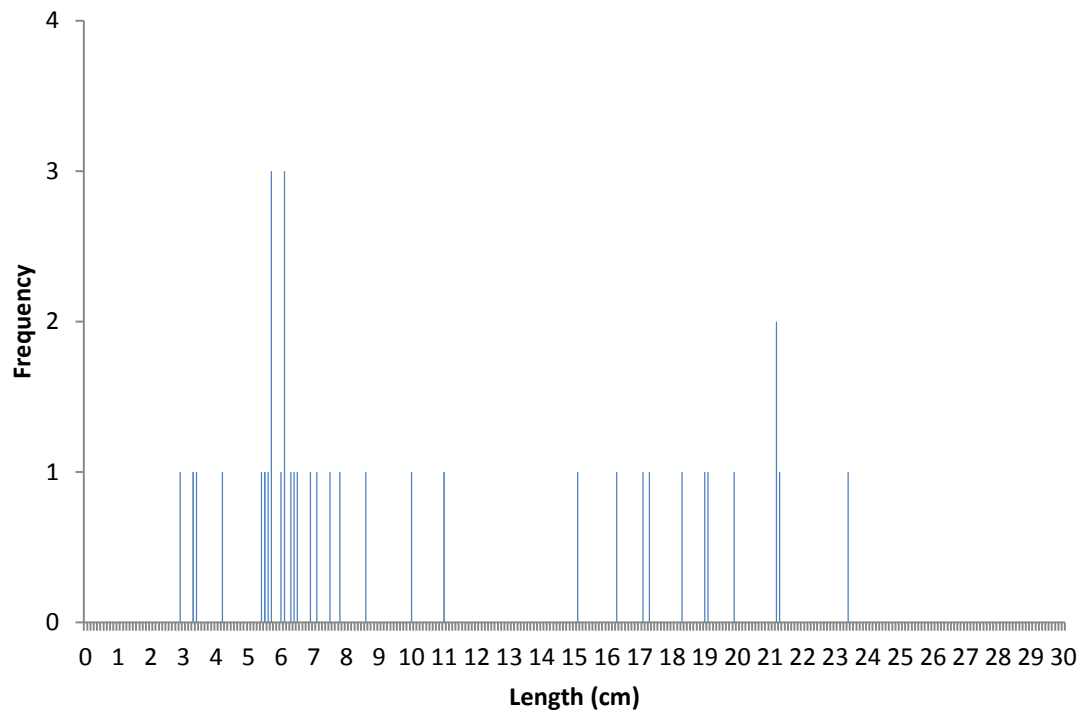
**Table 3.11. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Latchmore Brook Site 1.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )
Minnow	486 (2.3 – 6.5)	486	0.18	176	796	160
Chub	92 (2.9 – 23.4)	92	0.43	72	112	30
Roach	27 (2.6 – 15.7)	27	1.00	27	27	9
Stone loach	13 (3.2 – 7.9)	13	0.42	5	21	4
Perch	3 (17.5 – 18.8)	3	0.75	2	4	1
Pike	2 (30.0 – 33.7)	2	0.67	1	3	1
<b>TOTAL</b>	<b>334</b>					

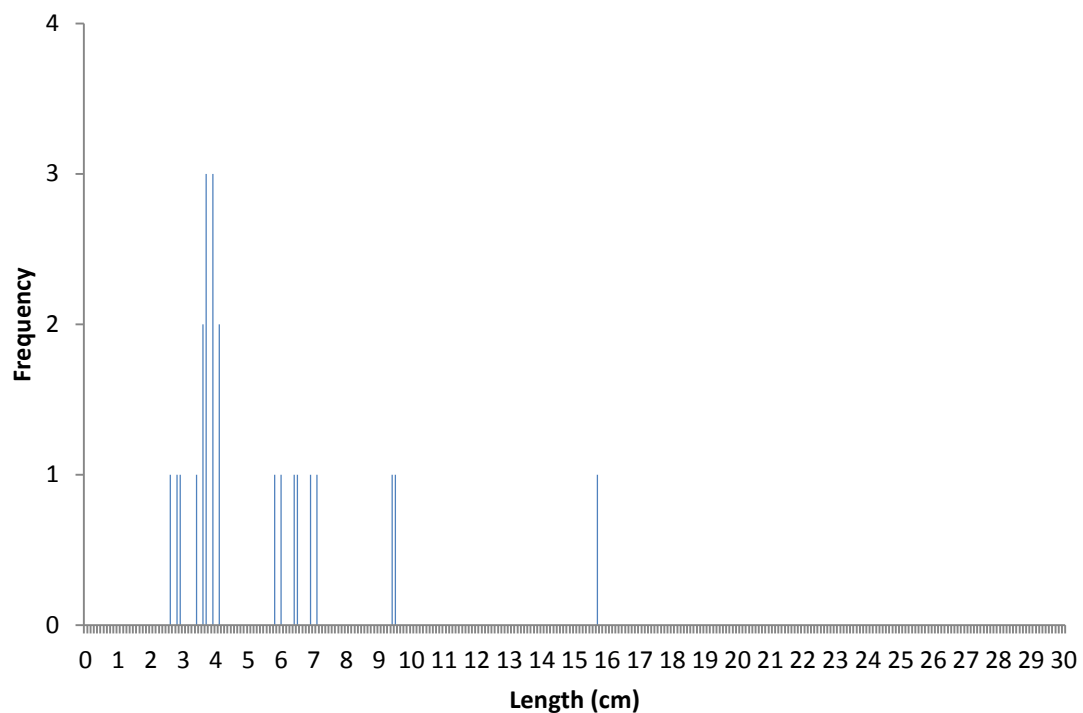
Length frequency charts for the most abundant fish species recorded are provided in Figure 3.8 to Figure 3.10 below.



**Figure 3.8. Length frequency of minnow captured at Latchmore Brook Site 1 (n=30).**



**Figure 3.9. Length frequency of chub captured at Latchmore Brook Site 1 (n=36).**



**Figure 3.10. Length frequency of roach captured at Latchmore Brook Site 1 (n=23).**

### 3.3.3 Fish species of conservation importance

Table 3.12 highlights the fish species of conservation importance that were recorded at Latchmore Brook Site 1 during the electric fishing survey.

**Table 3.12. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Latchmore Brook Site 1.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	N
Bullhead	Habitats Directive (Annex II)	Y	N
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	N
Lamprey (Brook)	Habitats Directive (Annex II)	Y	N
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

## 3.4 Latchmore Brook Site 2

### 3.4.1 Site description

Latchmore Brook Site 2 is located within an area of broadleaf / mixed woodland and moorland / heath (see Section 2.1.5). Table 3.13 below summarises the key physical characteristics of the 100 m survey site, and Appendix 4 provides a photographic record of habitat variability. The mean wetted width was 2.41 m, with an overall surveyed area of 240.9 m<sup>2</sup>.

A mixed substrate was present throughout, with minimal instream vegetation present in slower and shallower sections (Table 3.13). Fish habitat appeared suitable for a variety of lithophilic species, including salmonids, with abundant instream and marginal cover. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.14.

**Table 3.13. Habitat data recorded during the electric fishing survey at Latchmore Brook Site 2.**

Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	20	20	20	20	10	10		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		10		30	50	10		
Instream vegetation: <b>0 %</b>		Silted? <b>No</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		30	30		20	20		
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	20	10			5			
Right bank %	20	10			5			
Total LB fish cover: <b>35 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>35 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Overhanging Boughs (%): <b>5</b>			RB Overhanging Boughs (%): <b>5</b>			Canopy Cover (%): <b>95</b>		

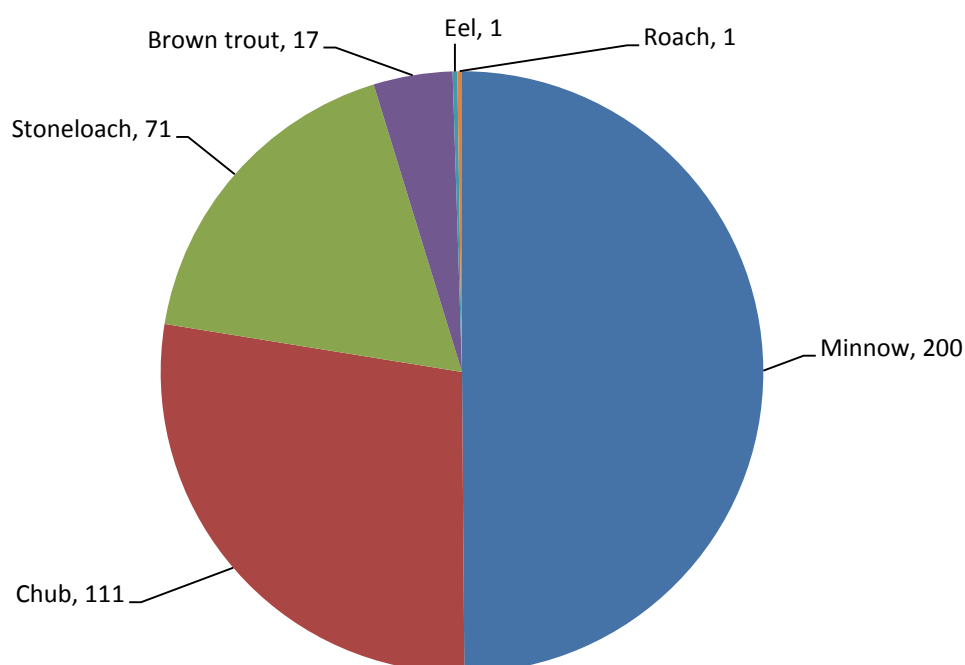


**Table 3.14. Physico-chemical parameters recorded during fish survey at Latchmore Brook Site 2.**

Parameter	Value
Temperature (°C)	14.6
Dissolved Oxygen (%)	95.9
Dissolved Oxygen (mg l <sup>-1</sup> )	9.69
Conductivity (µScm <sup>-1</sup> )	64.5

### 3.4.2 Electric fishing survey results

A total of 401 fish were captured at Latchmore Brook Site 2, comprising six species. Minnow was the most abundant species captured, followed by chub and stone loach (Figure 3.11).



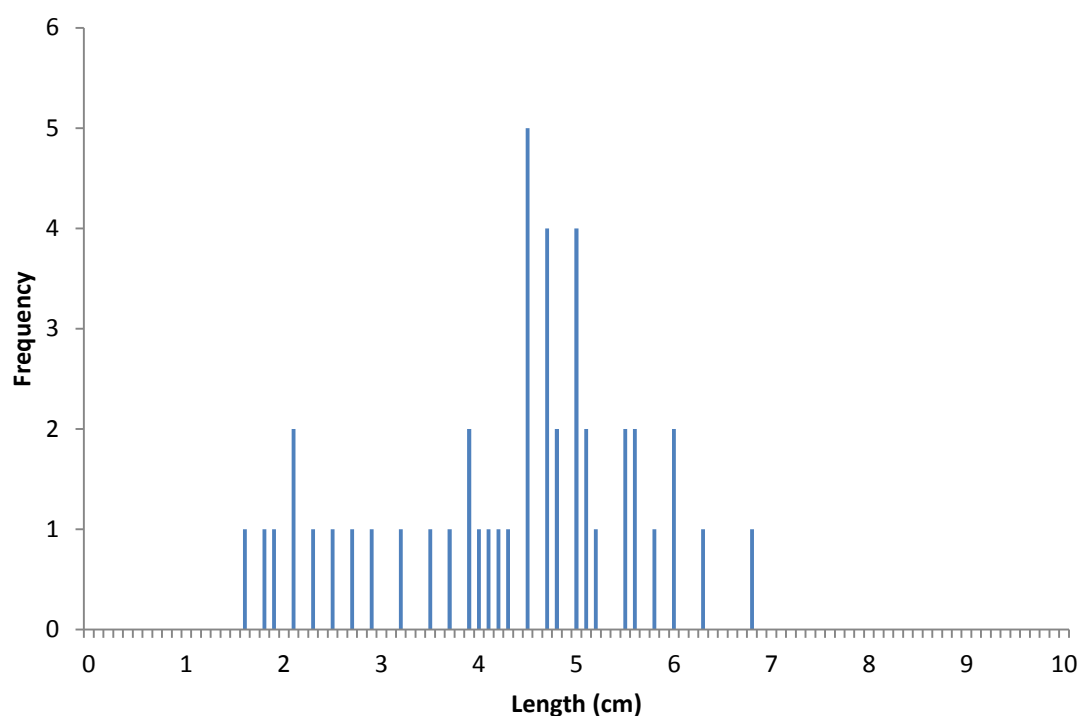
**Figure 3.11. Species composition (total number captured) at Latchmore Brook Site 2.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.15. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.15. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Latchmore Brook Site 2. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Minnow	200 (1.6 – 6.8)	262	0.38	214	310	109	N/A
Chub	111 (3.2 – 22.0)	119	0.59	110	128	49	N/A
Stone loach	71 (3.2 – 8.9)	148	0.19	3	293	61	N/A
Brown trout (0+)	12 (5.9 – 7.3)	13	0.52	8	18	5	D (Fair / Poor)
Brown trout (1++)	5 (14.0 – 16.0)	5	0.83	5	5	2	D (Fair / Poor)
Eel	1 (16.0)	1	0.50	0	2	<1	N/A
Roach	1 (10.5)	1	0.33	-3	5	<1	N/A
<b>TOTAL</b>	<b>401</b>						

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.12 to Figure 3.15 below.



**Figure 3.12. Length frequency of minnow captured at Latchmore Brook Site 2 (n=45).**

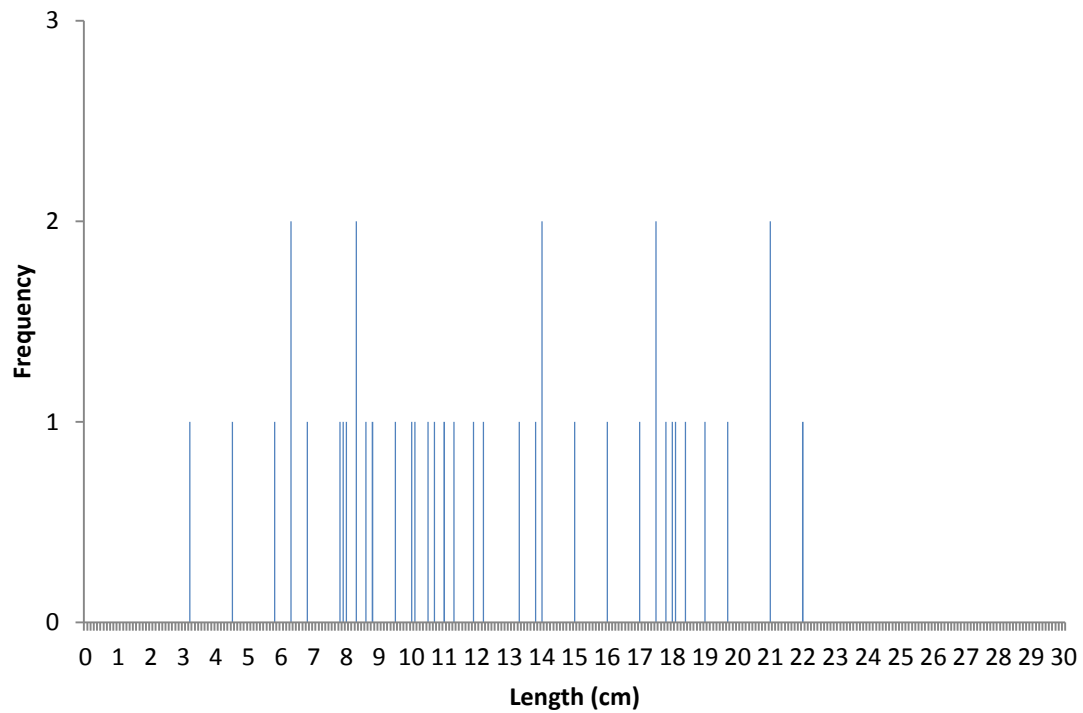


Figure 3.13. Length frequency of chub captured at Latchmore Brook Site 2 (n=40).

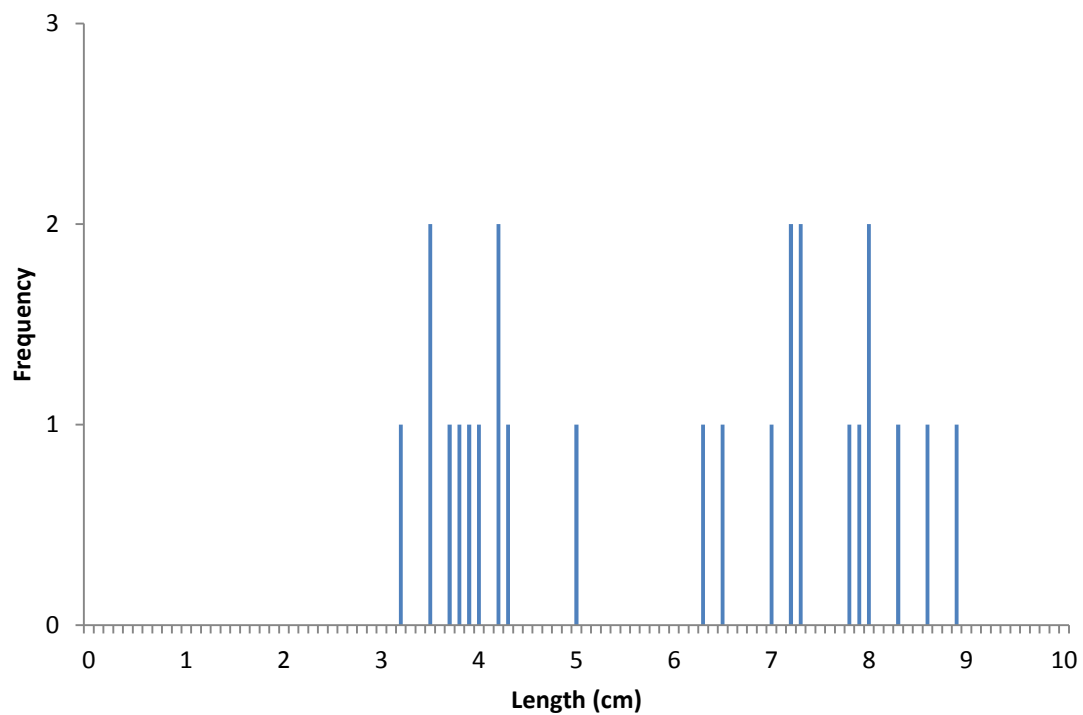
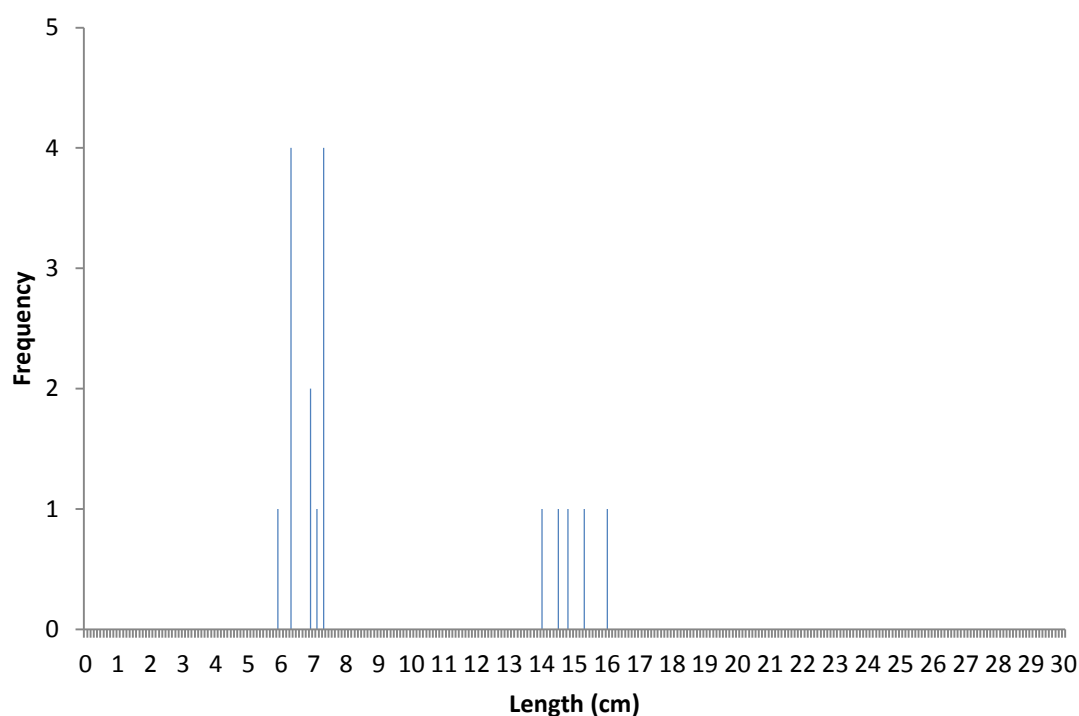


Figure 3.14. Length frequency of stone loach captured at Latchmore Brook Site 2 (n=25).



**Figure 3.15. Length frequency of brown trout captured at Latchmore Brook Site 2 (n=17).**

### 3.4.3 Fish species of conservation importance

Table 3.16 highlights the fish species of conservation importance that were recorded at Latchmore Site 2 during the electric fishing survey.

**Table 3.16. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Latchmore Brook Site 2.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	N
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	Y
Lamprey (Brook)	Habitats Directive (Annex II)	Y	N
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.



## 3.5 Mill Stream

### 3.5.1 Site description

Mill Stream is located within an area of broadleaf / mixed woodland, with good canopy cover along the river stretch (see Section 2.1.6). Table 3.17 below summarises the key physical characteristics of the 80 m survey site, and Appendix 5 provides a photographic record of habitat variability. The mean wetted width was 1.33 m, with an overall surveyed area of 106.7 m<sup>2</sup>.

Substrate was largely comprised of gravel and pebbles, with some cobbles, sand and silt. The channel comprised a complexity of habitats with riffle, run, pool sequences throughout. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.18.

**Table 3.17. Habitat data recorded during the electric fishing survey at Mill Stream.**

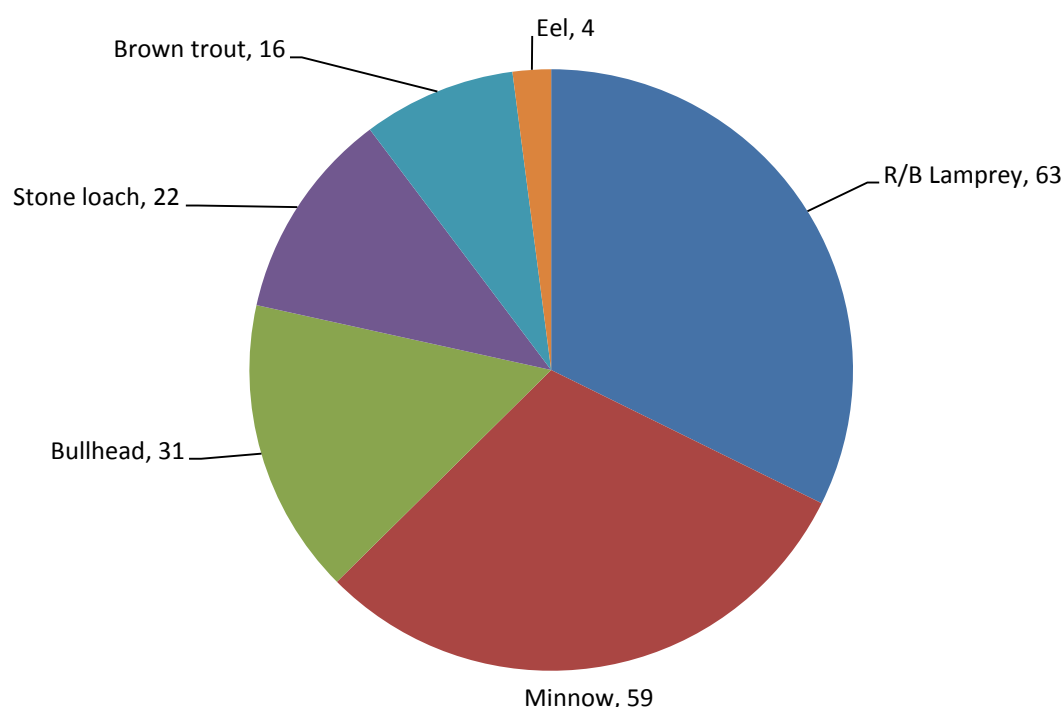
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	40	20	10	10	10	10		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		10	10	20	50	10		
Instream vegetation: 5 %		Silted? Yes		Substrate: Stable & Uncompacted				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent	10	30		10		10	40	
Speed / Level: Low	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	10	10						
Right bank %	10	10						
Total LB fish cover: 20 %	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: 20 %								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Overhanging Boughs (%): 20			RB Overhanging Boughs (%): 20			Canopy Cover (%): 80		

**Table 3.18. Physico-chemical parameters recorded during fish survey at Mill Stream.**

Parameter	Value
Temperature (°C)	11.5
Dissolved Oxygen (%)	87.8
Dissolved Oxygen (mg l <sup>-1</sup> )	9.52
Conductivity (µScm <sup>-1</sup> )	205.6

### 3.5.2 Electric fishing survey results

A total of 195 fish were captured at Mill Stream, comprising six species. Lamprey was the most abundant species captured, followed by minnow and bullhead (Figure 3.16).



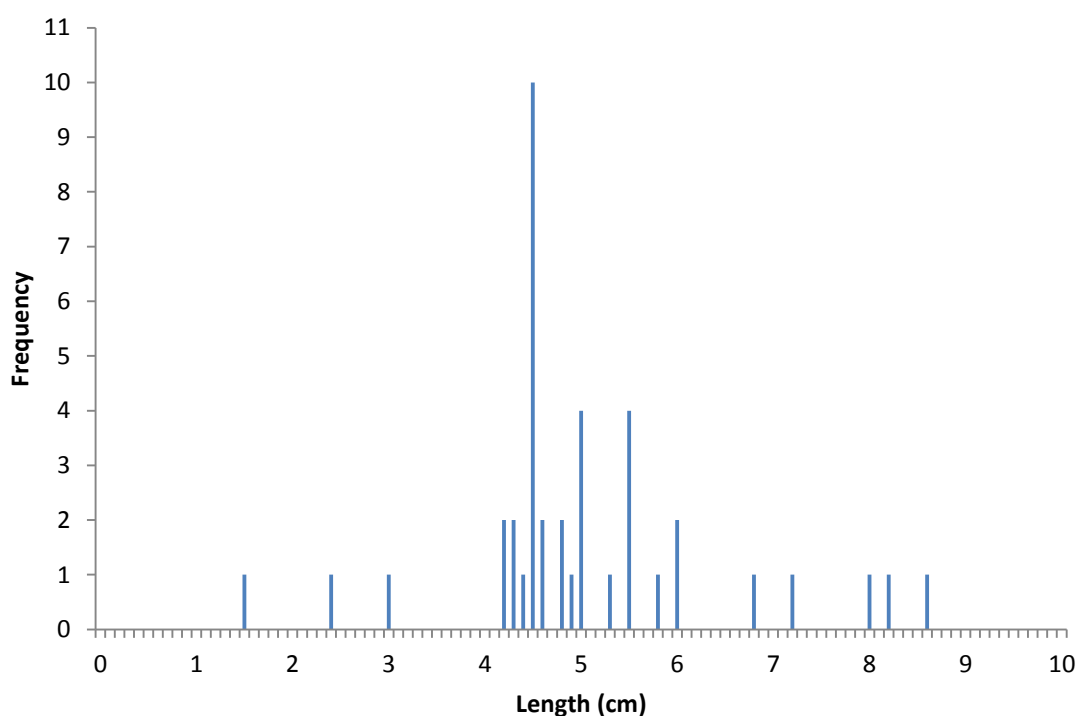
**Figure 3.16. Species composition (total number captured) at Mill Stream.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.19. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.19. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Mill Stream. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
R/B lamprey	63 (5.8 – 12.0)	138	0.18	-19	295	129	N/A
Minnow	59 (1.5 – 8.6)	73	0.42	53	93	68	N/A
Bullhead	31 (2.0 – 7.0)	32	0.65	29	35	30	N/A
Stone loach	22 (5.5 – 10.5)	22	0.71	20	24	21	N/A
Brown trout (0+)	13 (4.5 – 7.0)	13	0.87	13	13	12	C (Fair)
Eel	4 (25.0 – 28.0)	4	0.57	2	6	4	N/A
Brown trout (1++)	3 (12.0 – 15.0)	3	0.60	2	4	3	D (Fair / Poor)
<b>TOTAL</b>	<b>195</b>						

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.17 to Figure 3.20 below.



**Figure 3.17. Length frequency of minnow captured at Mill Stream (n=40).**

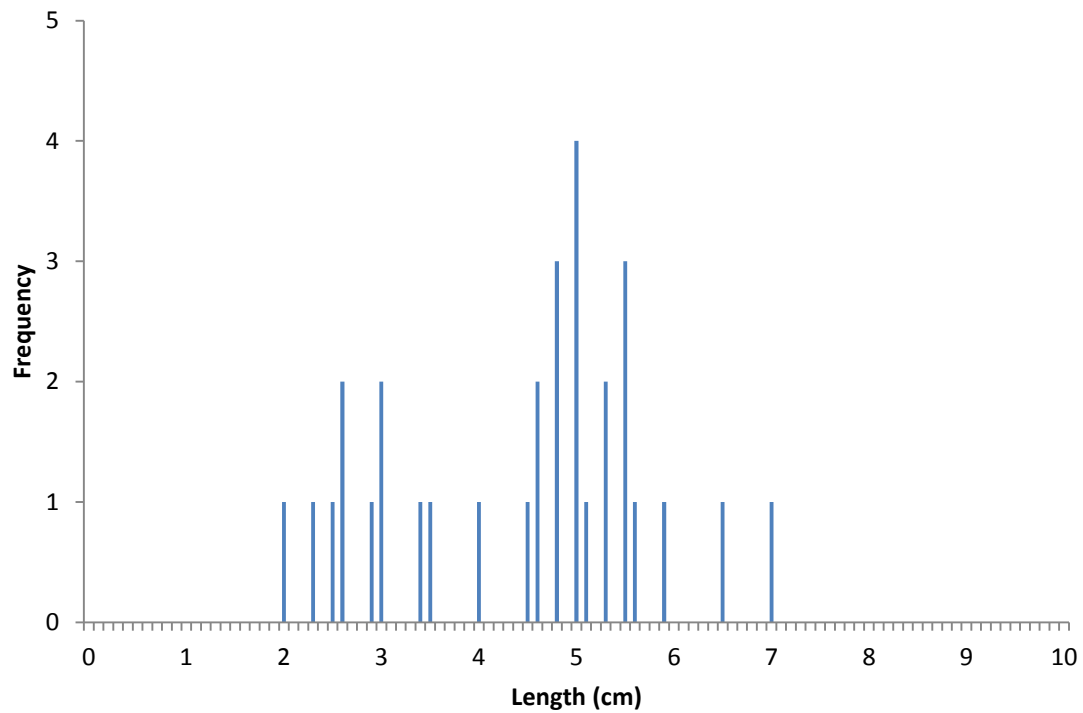


Figure 3.18. Length frequency of bullhead captured at Mill Stream (n=31).

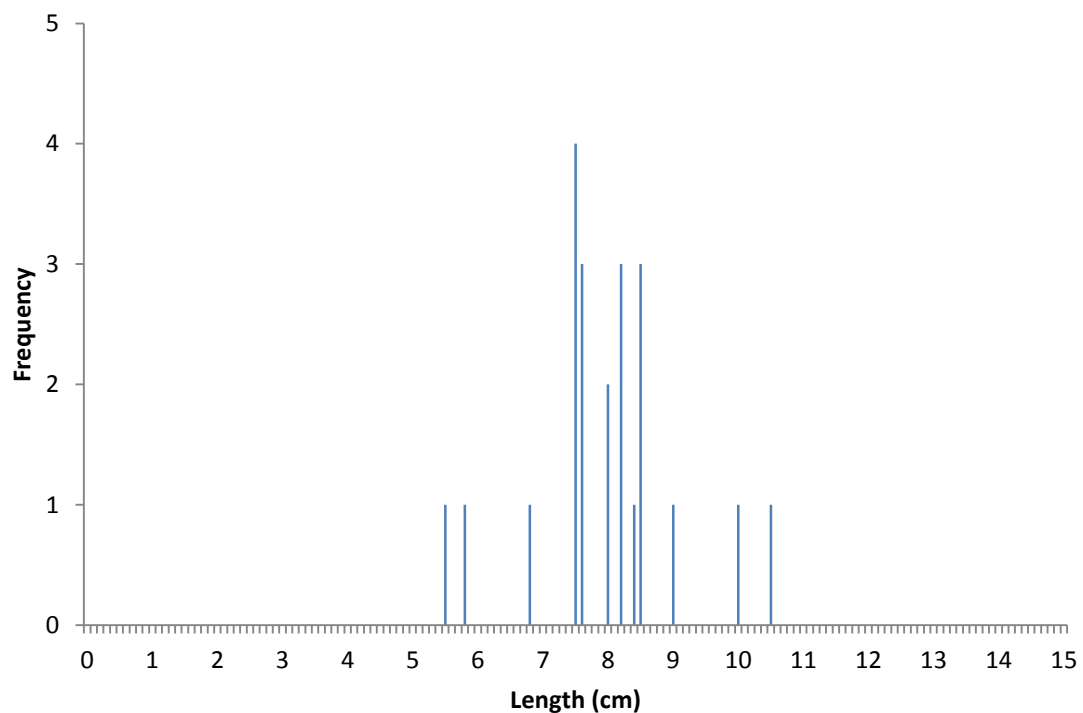
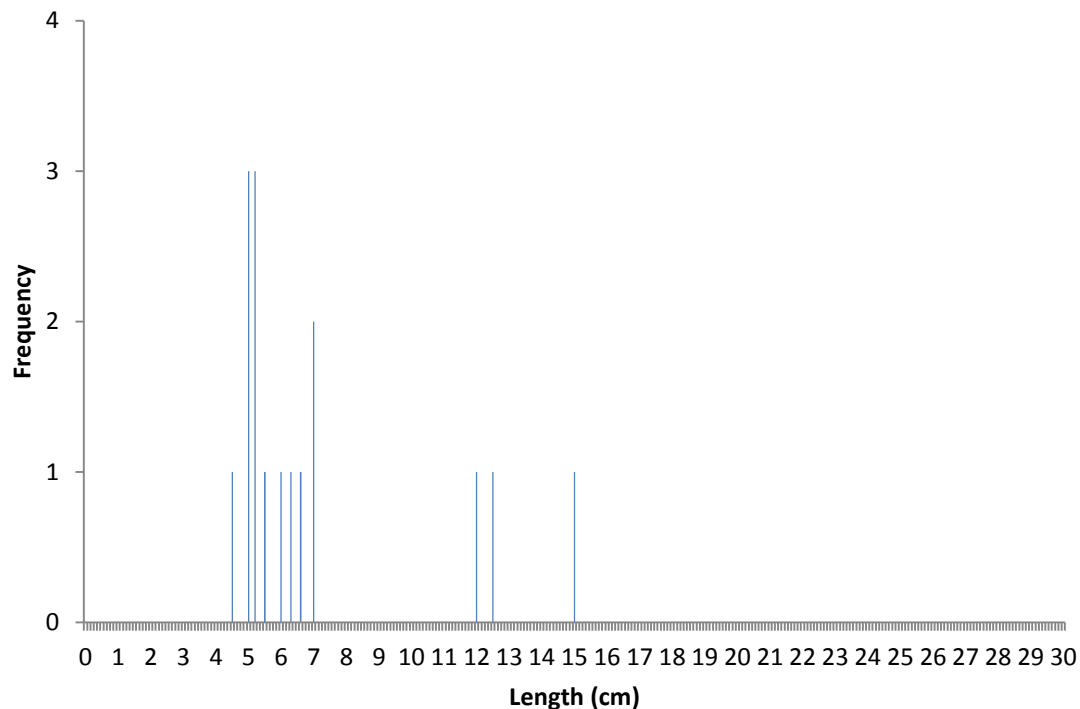


Figure 3.19. Length frequency of stone loach captured at Mill Stream (n=22).



**Figure 3.20. Length frequency of brown trout captured at Mill Stream (n=16).**

### 3.5.3 Fish species of conservation importance

Table 3.20 highlights the fish species of conservation importance that were recorded at Mill Stream during the electric fishing survey.

**Table 3.20. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Rhinefield.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	Y
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.



<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

## 3.6 Millersford Bottom Site 2

### 3.6.1 Site description

Millersford Bottom Site 2 is located within an area of broadleaf / mixed woodland and moorland / heath (see Section 2.1.7). Table 3.21 below summarises the key physical characteristics of the 100 m survey site, and Appendix 6 provides a photographic record of habitat variability. The mean wetted width was 1.59 m, with an overall surveyed area of 159.1 m<sup>2</sup>.

Substrate mainly comprised mixed gravel, pebble and cobble, with abundant bankside cover and marginal vegetation. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.22.

**Table 3.21. Habitat data recorded during the electric fishing survey at Millersford Bottom Site 2.**

Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	40	20	20	10	5	5		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		10		30	30	30		
Instream vegetation: <b>0 %</b>		Silted? <b>No</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent	10	10	10	10	10	10	40	
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	20	30						
Right bank %	20	30						
Total LB fish cover: <b>50 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl. fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>50 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Overhanging Boughs (%): <b>50</b>			RB Overhanging Boughs (%): <b>50</b>			Canopy Cover (%): <b>100</b>		

**Table 3.22. Physico-chemical parameters recorded during fish survey at Millersford Bottom Site 2.**

Parameter	Value
Temperature (°C)	14.4
Dissolved Oxygen (%)	92.7
Dissolved Oxygen (mg l <sup>-1</sup> )	9.44
Conductivity (µScm <sup>-1</sup> )	293.0

### 3.6.2 Electric fishing survey results

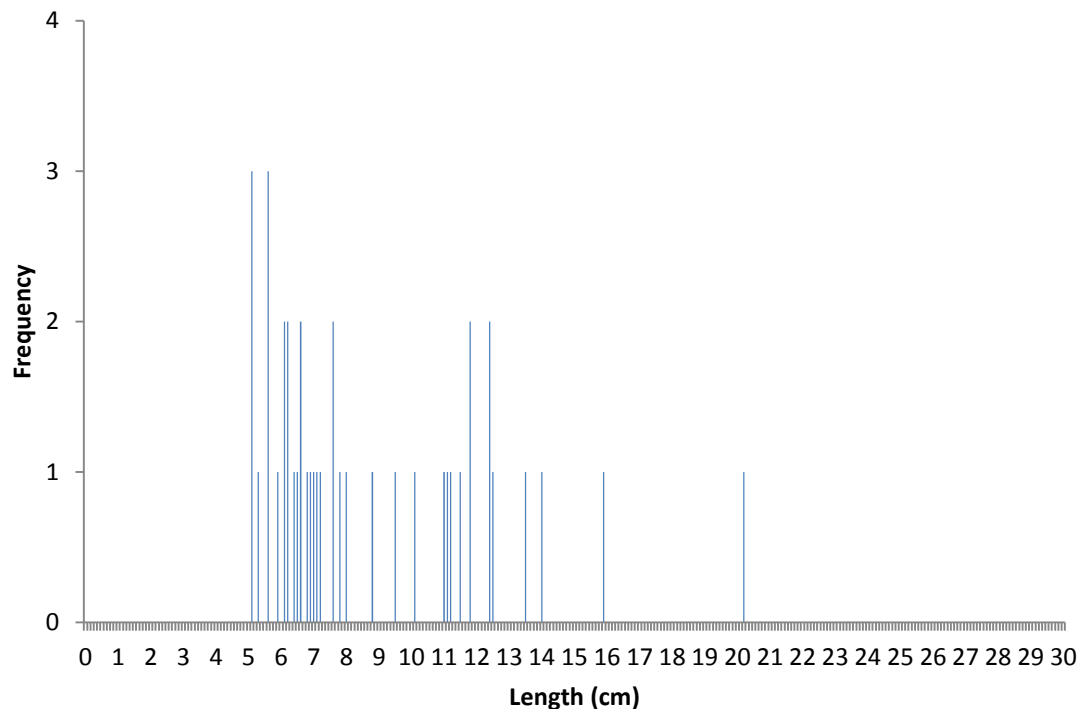
A total of 41 fish were captured at Millersford Bottom Site 2, comprising a single species; brown trout.

The total number captured, length range (cm) and catch depletion density estimate is shown in Table 3.23. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.23. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for brown trout recorded at Millersford Bottom Site 2. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Brown trout (1++)	27 (10.1 – 20.2)	27	0.84	25	29	17	B (Good)
Brown trout (0+)	14 (5.1 – 9.5)	16	0.61	8	24	10	C (Fair)
<b>TOTAL</b>	<b>41</b>						

A length frequency chart for brown trout is provided in Figure 3.21 below.



**Figure 3.21. Length frequency of brown trout captured at Millersford Bottom Site 2 (n=41).**

### 3.6.1 Fish species of conservation importance

Table 3.24 highlights the fish species of conservation importance that were recorded at Millersford Bottom Site 2 during the electric fishing survey.

**Table 3.24. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Millersford Bottom Site 2.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	N
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	N
Lamprey (Brook)	Habitats Directive (Annex II)	Y	N
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.7 Millersford Bottom Site 3

#### 3.7.1 Site description

Millersford Bottom Site 3 is located within an area of broadleaf / mixed woodland and moorland / heath (see Section 2.1.7). Table 3.25 below summarises the key physical characteristics of the 100 m survey site, and Appendix 7 provides a photographic record of habitat variability. The mean wetted width was 1.45 m, with an overall surveyed area of 145.5 m<sup>2</sup>.

Substrate mainly comprised mixed gravel, pebble and cobble, with abundant bankside cover and marginal vegetation. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.26.

**Table 3.25. Habitat data recorded during the electric fishing survey at Millersford Bottom Site 3.**

Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	40	10	10	10	10	20		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent	10	20	10	20	20	20		
Instream vegetation: <b>0 %</b>		Silted? <b>Yes</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent	10	20	10	10	10	20	20	
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	30	20						
Right bank %	30	20						
Total LB fish cover: <b>50 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>50 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Overhanging Boughs (%): <b>50</b>			RB Overhanging Boughs (%): <b>50</b>			Canopy Cover (%): <b>100</b>		

**Table 3.26. Physico-chemical parameters recorded during fish survey at Millersford Bottom Site 3.**

Parameter	Value
Temperature (°C)	14.4
Dissolved Oxygen (%)	92.7
Dissolved Oxygen (mg l <sup>-1</sup> )	9.44
Conductivity (µS cm <sup>-1</sup> )	293.0

### 3.7.2 Electric fishing survey results

A total of 32 fish were captured at Millersford Bottom Site 3, comprising a single species; brown trout.

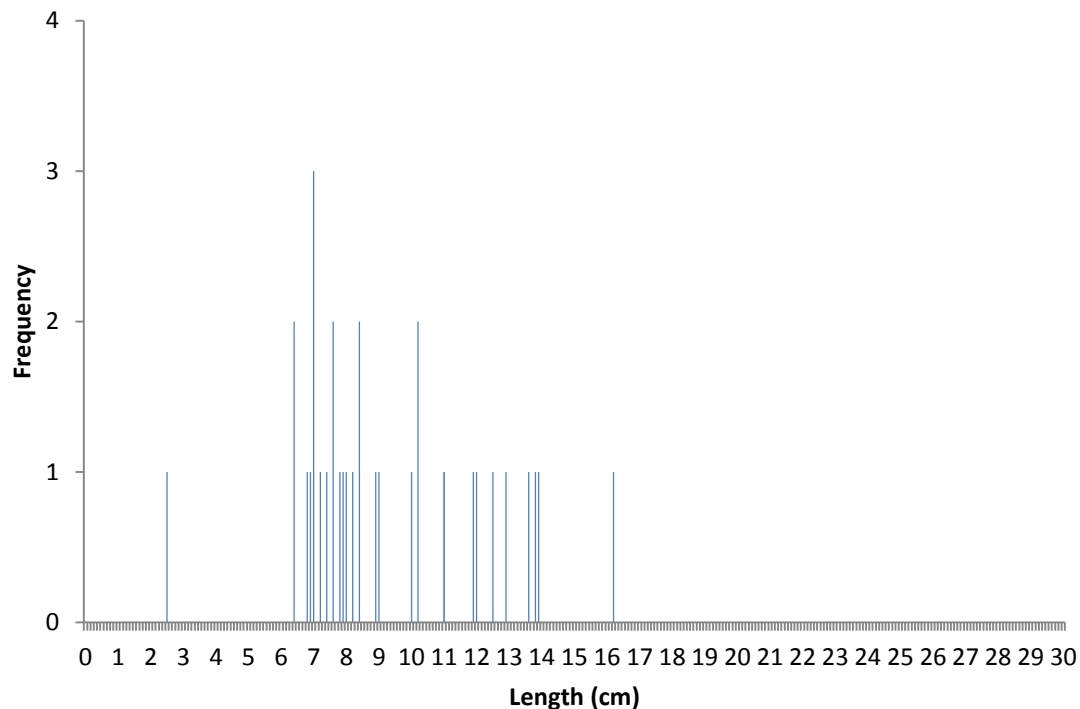
The total number captured, length range (cm) and catch depletion density estimate is shown in Table 3.27. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.27. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for brown trout recorded at Millersford Bottom Site 3. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Brown trout (0+)	21 (2.5 – 9.0)	23	0.68	17	29	16	C (Fair)
Brown trout (1++)	11 (10.0 – 16.2)	11	0.79	9	13	8	C (Fair)
<b>TOTAL</b>	<b>32</b>						

A length frequency chart for brown trout is provided in Figure 3.22 below.





**Figure 3.22. Length frequency of brown trout captured at Millersford Bottom Site 3 (n=32).**

### 3.7.3 Fish species of conservation importance

Table 3.28 highlights the fish species of conservation importance that were recorded at Millersford Bottom Site 3 during the electric fishing survey.

**Table 3.28. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Millersford Bottom Site 3.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	N
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	N
Lamprey (Brook)	Habitats Directive (Annex II)	Y	N
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.8 Millersford Fish Site 1

#### 3.8.1 Site description

Millersford Fish Site 1 is located within an area of broadleaf / mixed woodland (see Section 2.1.7); however, the area has been subject to intensive forestry activities and the drained channel is heavily incised. Table 3.29 below summarises the key physical characteristics of the 100 m survey site, and Appendix 8 provides a photographic record of habitat variability. The mean wetted width was 1.45 m, with an overall surveyed area of 144.5 m<sup>2</sup>.

The stream was characterised by very shallow, uniform and channelised habitat, with few holding areas for fish and limited bankside cover. Flow conditions preceding and during the survey were very low. The relatively poor habitat quality was reflected in a lack of any fish captured during the survey.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.30.

**Table 3.29. Habitat data recorded during the electric fishing survey at Millersford Fish Site 1.**

Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	30	30	20	10	5	5		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		10		20	50	20		
Instream vegetation: <b>0 %</b>		Silted? <b>Yes</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		10	10	10	10	30	30	
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	5			5				
Right bank %	5			5				
Total LB fish cover: <b>10 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>10 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Overhanging Boughs (%): <b>5</b>			RB Overhanging Boughs (%): <b>5</b>			Canopy Cover (%): <b>5</b>		

**Table 3.30. Physico-chemical parameters recorded during fish survey at Millersford Fish Site 1.**

Parameter	Value
Temperature (°C)	12.7
Dissolved Oxygen (%)	100.0
Dissolved Oxygen (mg l <sup>-1</sup> )	10.3
Conductivity (µS cm <sup>-1</sup> )	54.0

### 3.8.2 Electric fishing survey results

No fish captured

## 3.9 Ober Water

### 3.9.1 Site description

Ober Water is located within an area of moorland / heath, with limited canopy cover along the river stretch (see Section 2.1.8). Table 3.31 below summarises the key physical characteristics of the 100 m survey site, and Appendix 9 provides a photographic record of habitat variability. The mean wetted width was 2.57 m, with an overall surveyed area of 257.3 m<sup>2</sup>.

Substrate was largely comprised of gravel, pebbles and cobbles, with some sand and silt. The channel comprised a complexity of habitats with riffle, run, pool sequences throughout. Flow conditions during the survey were moderate.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.32.

**Table 3.31. Habitat data recorded during the electric fishing survey at Ober Water.**

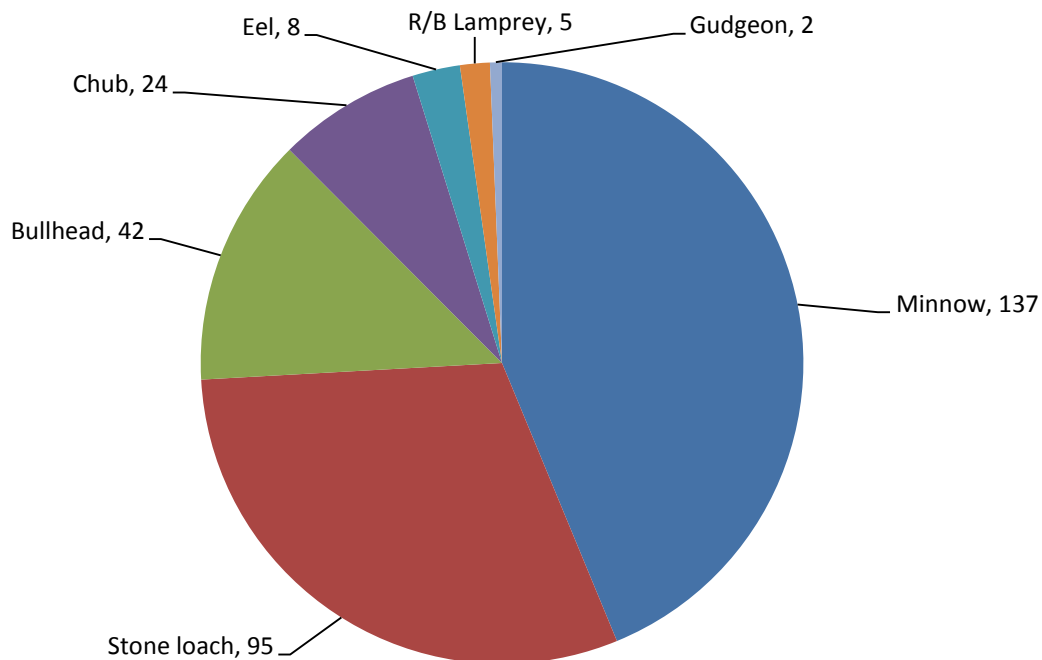
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	10	20	20	20	10	20		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		10	10	20	40	20		
Instream vegetation: <b>50 %</b>		Silted? <b>No</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		10	10	10	10	40	20	
Speed / Level: <b>Mod</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	10	10						
Right bank %	10	10						
Total LB fish cover: <b>20 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>20 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Overhanging Boughs (%): <b>5</b>			RB Overhanging Boughs (%): <b>5</b>			Canopy Cover (%): <b>5</b>		

**Table 3.32. Physico-chemical parameters recorded during fish survey at Ober Water.**

Parameter	Value
Temperature (°C)	15.3
Dissolved Oxygen (%)	101.6
Dissolved Oxygen (mg l <sup>-1</sup> )	10.12
Conductivity (µScm <sup>-1</sup> )	149.6

### 3.9.2 Electric fishing survey results

A total of 313 fish were captured at Ober Water, comprising seven species. Minnow was the most abundant species captured, followed by stone loach and bullhead (Figure 3.23).



**Figure 3.23. Species composition (total number captured) at Ober Water.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.33.

**Table 3.33. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Ober Water.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )
Minnow	137	214	0.29	134	294	83
Stone loach	95	220	0.17	-3	443	86
Bullhead	42	68	0.27	16	120	26
Chub	24	25	0.62	21	29	10
Eel	8	10	0.36	0	20	4
R/B lamprey	5	5	0.50	2	8	2
Gudgeon	2	2	1.00	2	2	1
<b>TOTAL</b>						

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.24 to

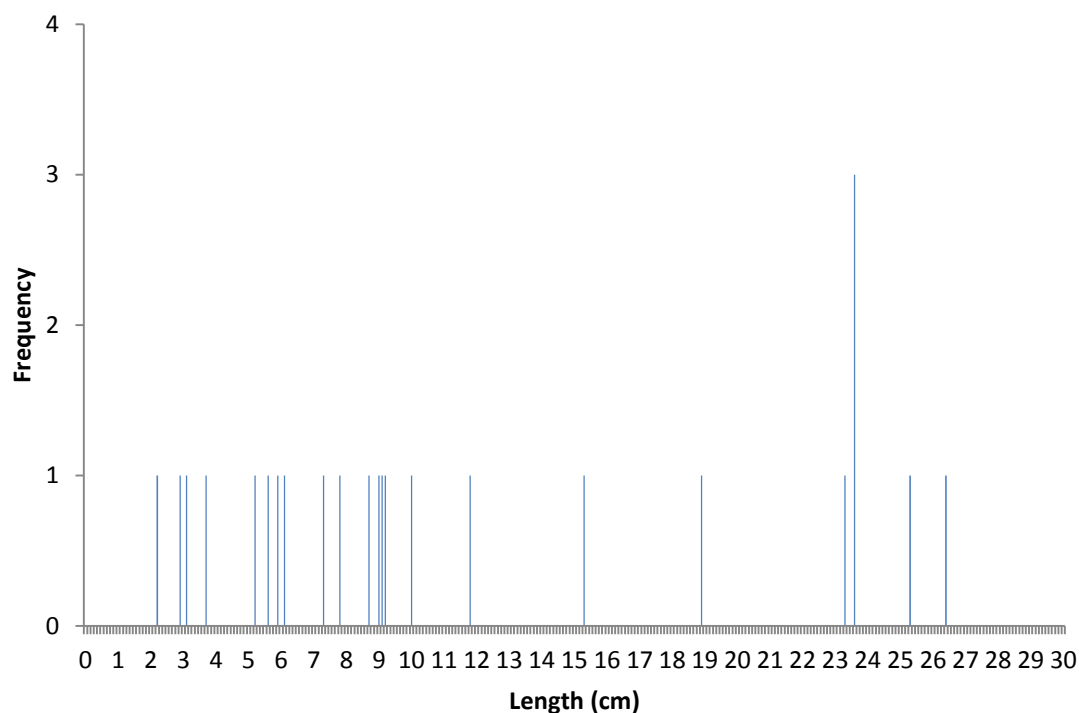


Figure 3.27 below.



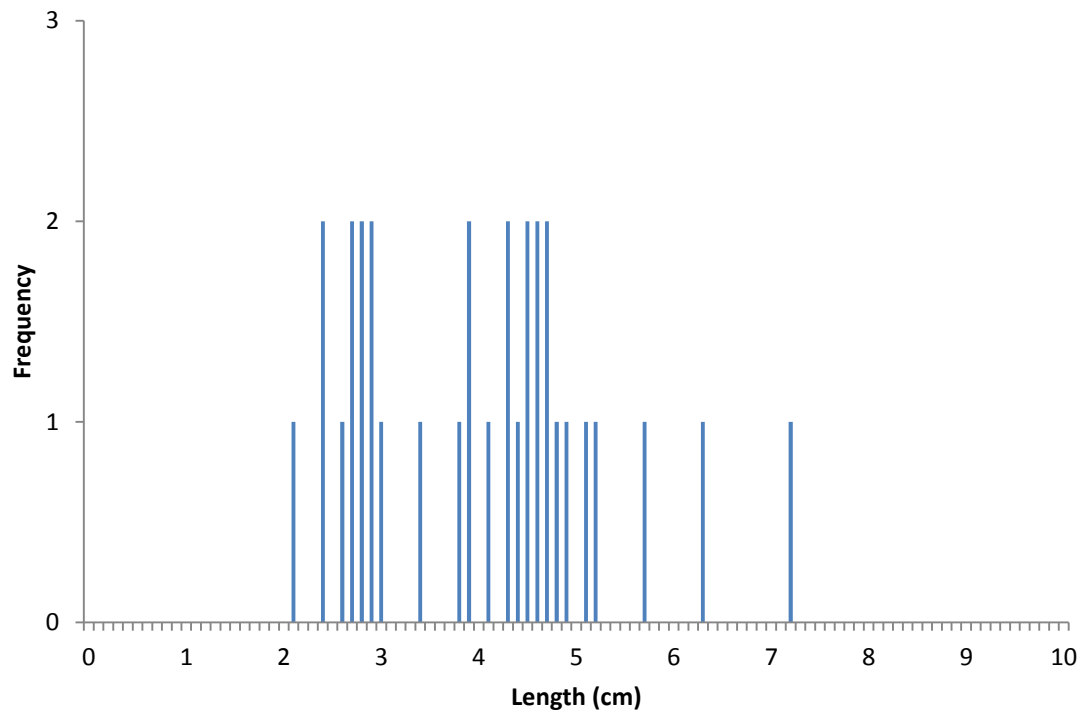


Figure 3.24. Length frequency of minnow captured at Ober Water (n=32).

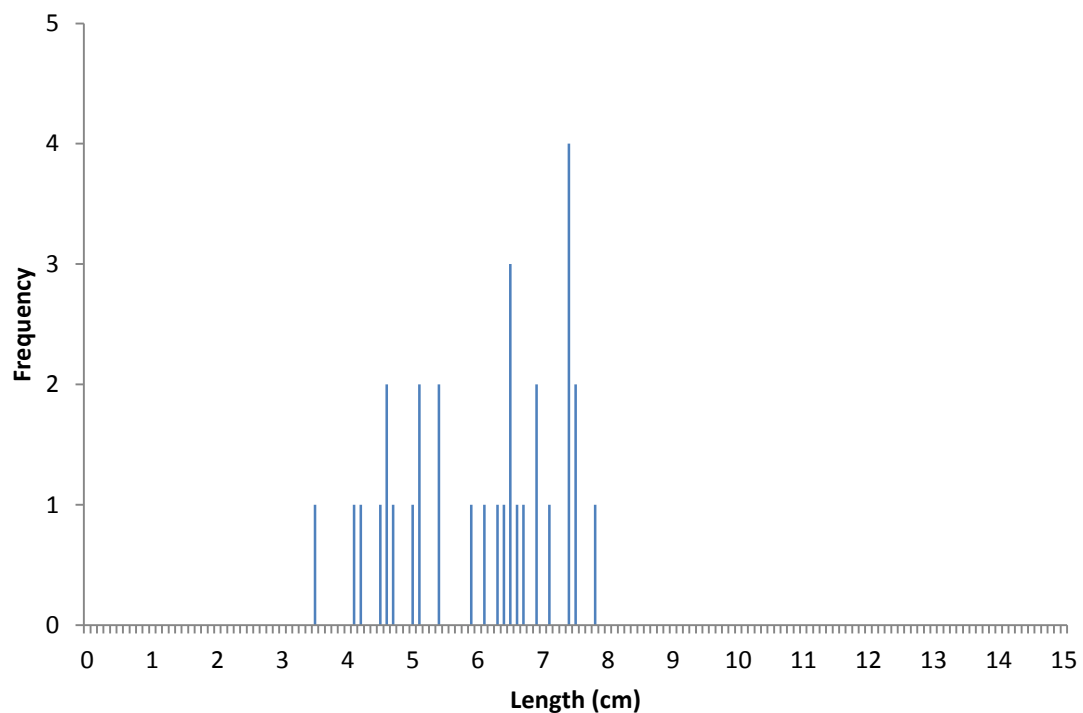


Figure 3.25. Length frequency of stone loach captured at Ober Water (n=31).

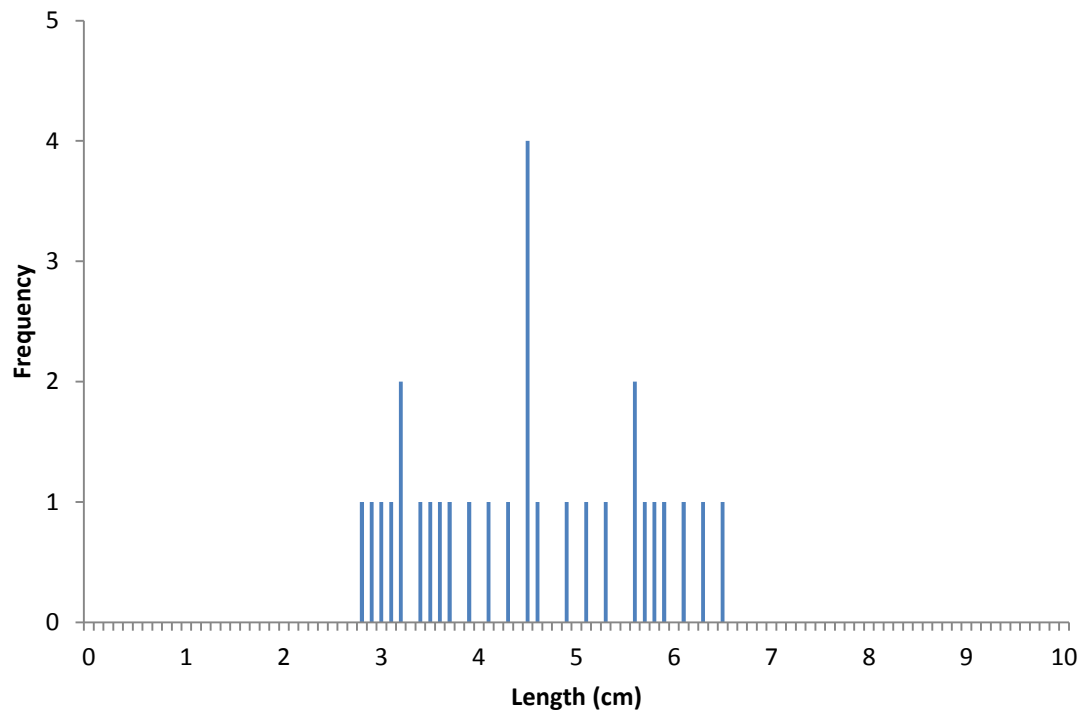


Figure 3.26. Length frequency of bullhead captured at Ober Water (n=29).

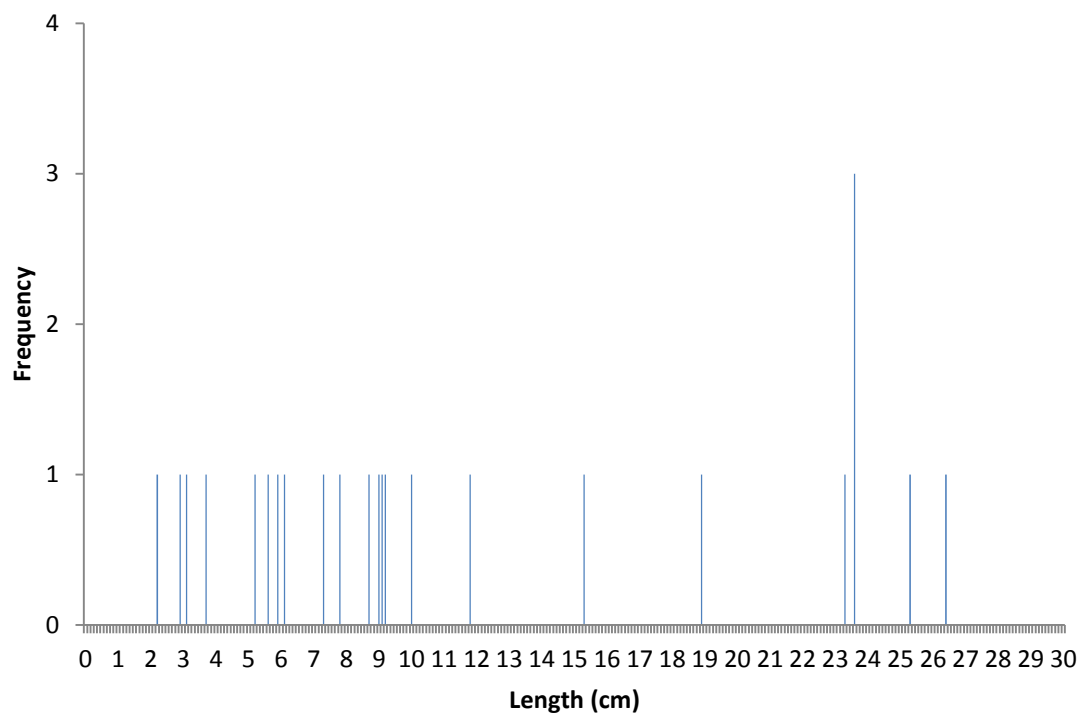


Figure 3.27. Length frequency of chub captured at Ober Water (n=24).

### 3.9.3 Fish species of conservation importance

Table 3.34 highlights the fish species of conservation importance that were recorded at Ober Water during the electric fishing survey.

**Table 3.34. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Ober Water.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	N
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	Y
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.10 Pondhead Site 1

#### 3.10.1 Site description

Pondhead Site 1 is located within an area of broadleaf / mixed woodland, with canopy cover along approximately 90 % of the surveyed river stretch (see Section 2.1.9). Table 3.35 below summarises the key physical characteristics of the 100 m survey site, and Appendix 10 provides a photographic record of habitat variability. The mean wetted width was 1.71 m, with an overall surveyed area of 170.9 m<sup>2</sup>.

The river reach comprised a diversity of habitat types. Substrate was largely comprised of gravel, pebble and cobbles. Flow conditions preceding and during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.36.

**Table 3.35. Habitat data recorded during the electric fishing survey at Pondhead Site 1.**

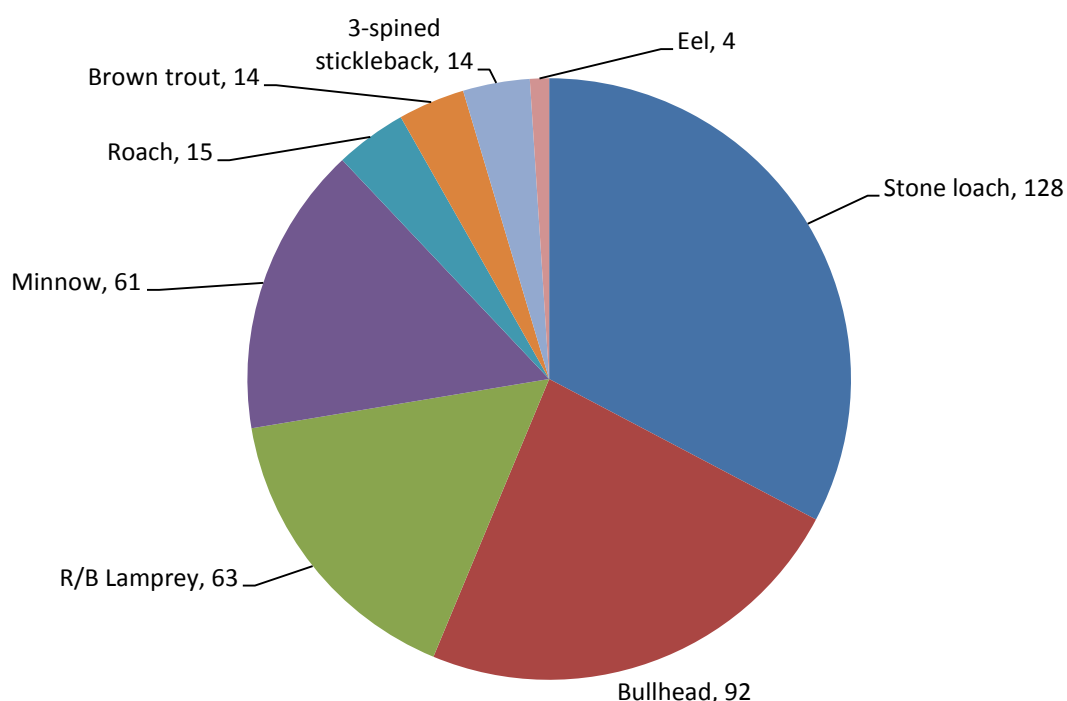
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	30	10	10	10	10	30		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent	10	10	10	30	30	10		
Instream vegetation: <b>0 %</b>		Silted? <b>Yes</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent	10	30	20			10	30	
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	30	20						
Right bank %	30	20						
Total LB fish cover: <b>50 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>50 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Bankface vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				RB Banktop vegetation: Bare / Uniform / Simple / <u>Complex</u>				
LB Overhanging Boughs (%): <b>5</b>			RB Overhanging Boughs (%): <b>5</b>			Canopy Cover (%): <b>90</b>		

**Table 3.36. Physico-chemical parameters recorded during fish survey at Pondhead Site1.**

Parameter	Value
Temperature (°C)	10.9
Dissolved Oxygen (%)	87.4
Dissolved Oxygen (mg l <sup>-1</sup> )	9.62
Conductivity (µScm <sup>-1</sup> )	227.8

### 3.10.2 Electric fishing survey results

A total of 391 fish were captured at Pondhead Site 1, comprising eight species. Stone loach was the most abundant species captured, followed by bullhead, R/B lamprey and minnow (Figure 3.28).



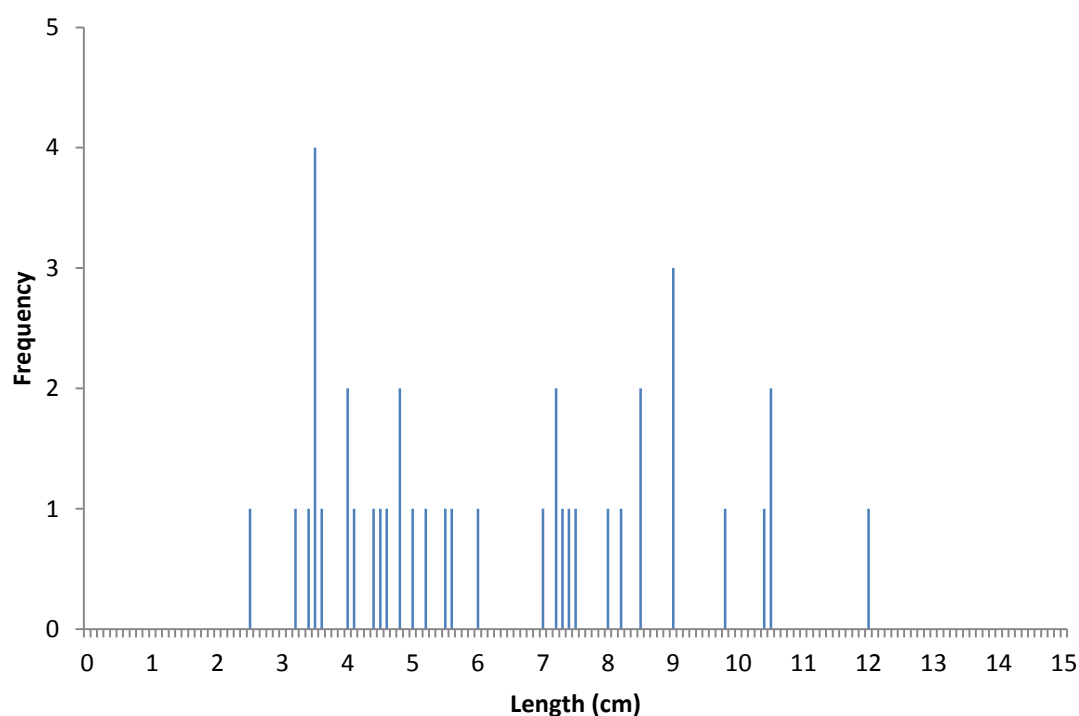
**Figure 3.28. Species composition (total number captured) at Pondhead Site 1.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.37. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.37. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Pondhead Site 1. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Stone loach	128 (2.5 – 12.0)	152	0.46	129	175	89	N/A
Bullhead	92 (2.2 – 6.6)	151	0.27	72	230	88	N/A
R/B lamprey	63 (10.0 – 16.0)	174	0.14	-116	464	102	N/A
Minnow	61 (2.0 – 10.0)	72	0.46	56	88	42	N/A
Roach	15 (10.2 – 14.0)	15	0.75	14	16	9	N/A
3-spined stickleback	14 (2.0 – 4.5)	16	0.45	8	24	9	N/A
Brown trout (0+)	8 (7.2 – 9.5)	8	0.57	5	11	5	D (Fair / Poor)
Brown trout (1++)	6 (13.0 – 23.5)	6	1.00	6	6	4	D (Fair / Poor)
Eel	4 (16.0 – 23.0)						N/A
<b>TOTAL</b>	<b>391</b>						

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.29 to Figure 3.33 below.



**Figure 3.29. Length frequency of stone loach captured at Pondhead Site 1 (n=39).**

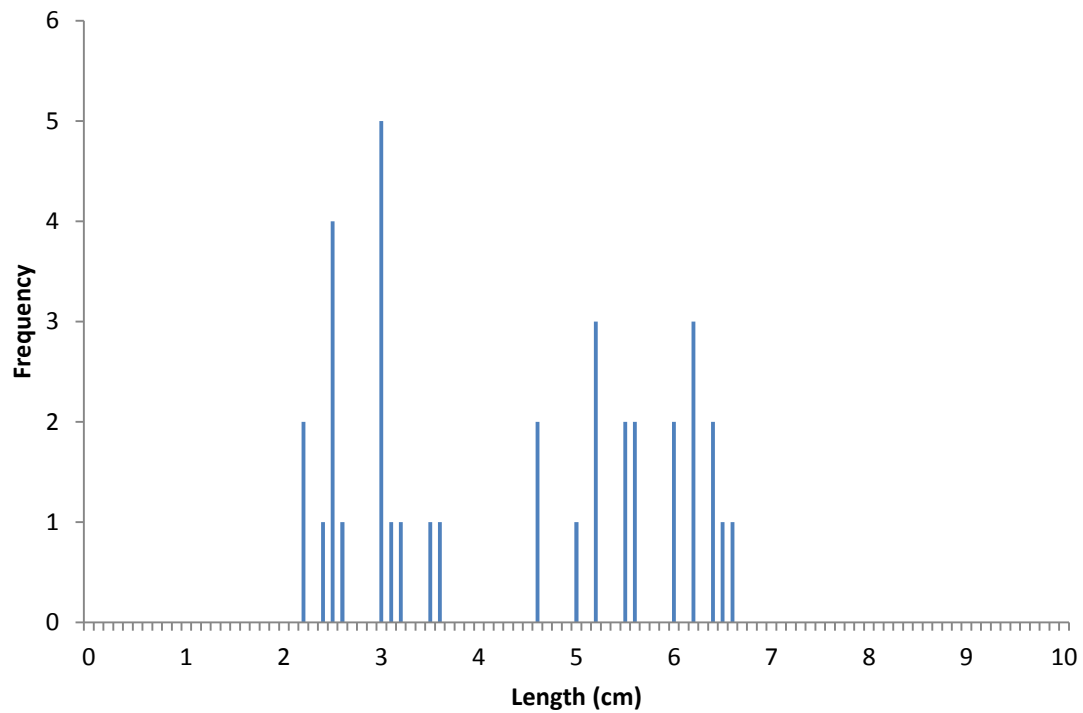


Figure 3.30. Length frequency of bullhead captured at Pondhead Site 1 (n=36).

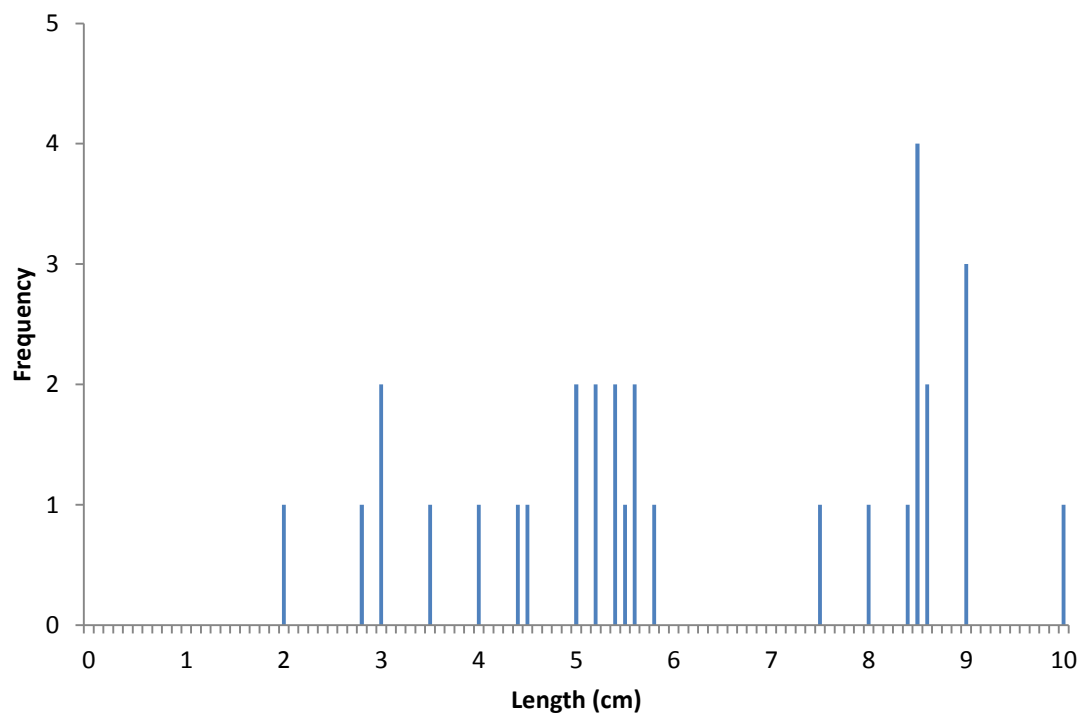
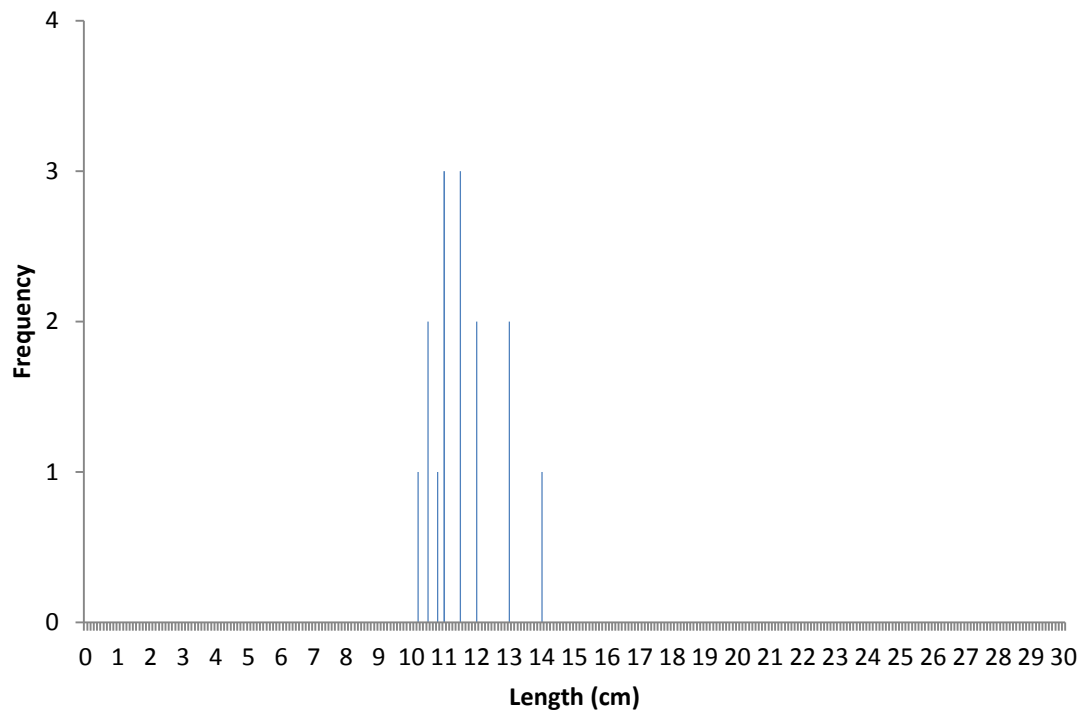
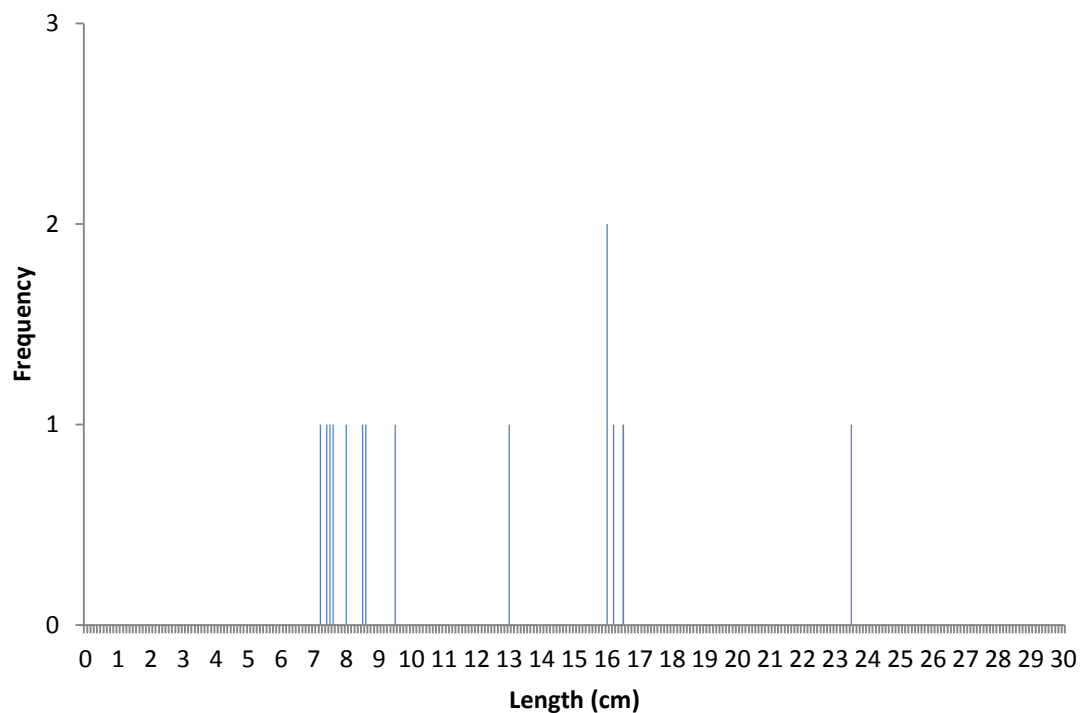


Figure 3.31. Length frequency of minnow captured at Pondhead Site 1 (n=31).





**Figure 3.32. Length frequency of roach captured at Pondhead Site 1 (n=15).**



**Figure 3.33. Length frequency of brown trout captured at Pondhead Site 1 (n=14).**

### 3.10.3 Fish species of conservation importance

Table 3.38 highlights the fish species of conservation importance that were recorded at Pondhead Site 1 during the electric fishing survey.

**Table 3.38. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Pondhead Site 1.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	Y
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.11 Pondhead Site 2

#### 3.11.1 Site description

Pondhead Site 2 is located within an area of broadleaf / mixed woodland, with canopy cover along approximately 90 % of the surveyed river stretch (see Section 2.1.9). Table 3.39 below summarises the key physical characteristics of the 100 m survey site, and Appendix 11 provides a photographic record of habitat variability. The mean wetted width was 1.07 m, with an overall surveyed area of 107.3 m<sup>2</sup>.

The river reach comprised mainly shallow riffle habitat, with limited deeper pools. Substrate was largely comprised of gravel and pebble. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.40.

**Table 3.39. Habitat data recorded during the electric fishing survey at Pondhead Site 2.**

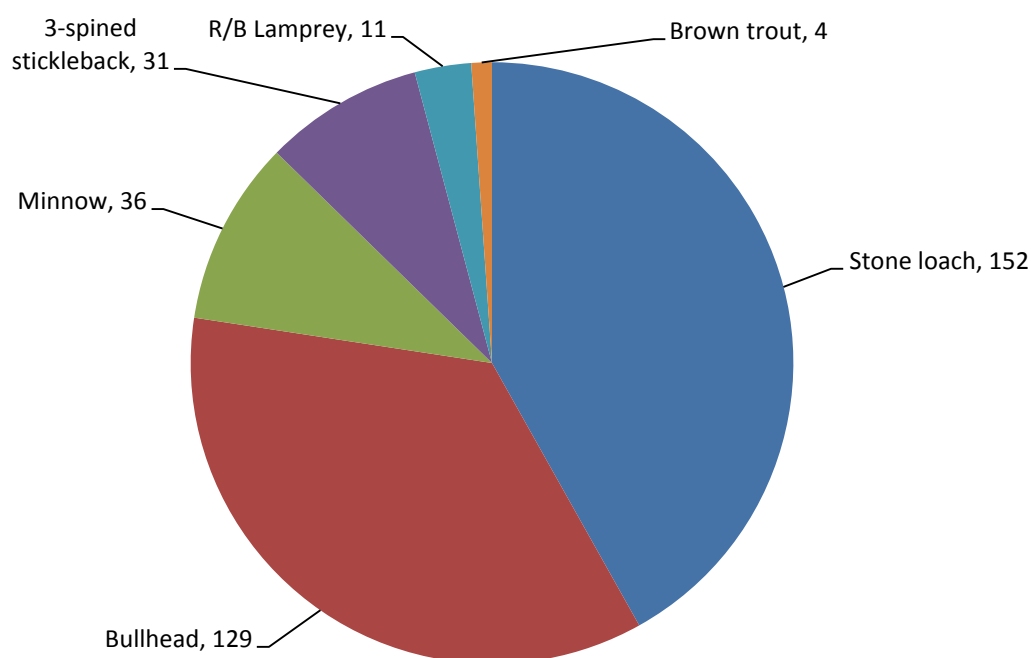
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	70	20			5	5		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		20		20	60			
Instream vegetation: <b>0 %</b>		Silted? <b>Yes</b>		Substrate: <b>Unstable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		10					90	
Speed / Level: <b>Low</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	5							
Right bank %	5							
Total LB fish cover: <b>5 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>5 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Overhanging Boughs (%): <b>0</b>			RB Overhanging Boughs (%): <b>0</b>			Canopy Cover (%): <b>80</b>		

**Table 3.40. Physico-chemical parameters recorded during fish survey at Pondhead Site 2.**

Parameter	Value
Temperature (°C)	10.9
Dissolved Oxygen (%)	87.4
Dissolved Oxygen (mg l <sup>-1</sup> )	9.62
Conductivity (µScm <sup>-1</sup> )	227.8

### 3.11.2 Electric fishing survey results

A total of 363 fish were captured at Pondhead Site 2, comprising six species. Stone loach was the most abundant species captured, followed by bullhead and minnow (Figure 3.34).



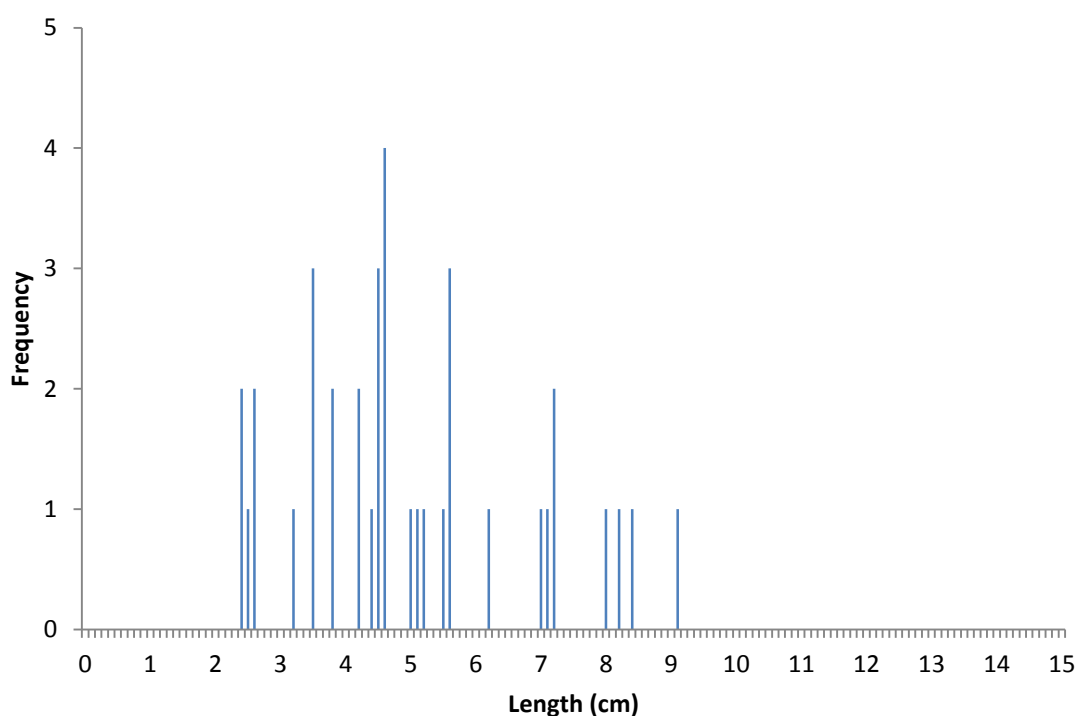
**Figure 3.34. Species composition (total number captured) at Pondhead Site 2.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.41. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.41. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Pondhead Site 2. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Stone loach	152	213	0.34	157	269	199	N/A
Bullhead	129	301	0.17	38	564	281	N/A
Minnow	36	36	0.73	34	38	34	N/A
3-spined stickleback	31	35	0.49	26	44	33	N/A
R/B lamprey	11	15	0.32	-1	31	14	N/A
Brown trout (0+)	3	3	1.00	3	3	3	D (Fair / Poor)
Brown trout (1++)	1	1	1.00	1	1	1	E (Poor)
<b>TOTAL</b>	<b>363</b>						

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.35 to Figure 3.38 below.



**Figure 3.35. Length frequency of stone loach captured at Pondhead Site 2 (n=37).**

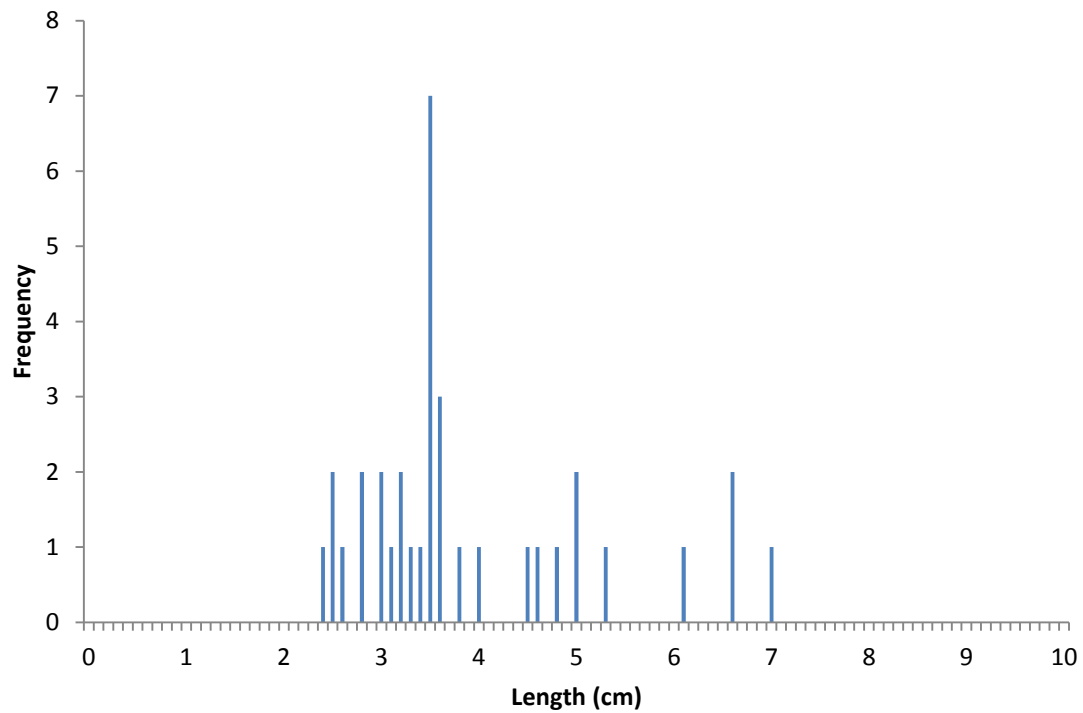


Figure 3.36. Length frequency of bullhead captured at Pondhead Site 2 (n=35).

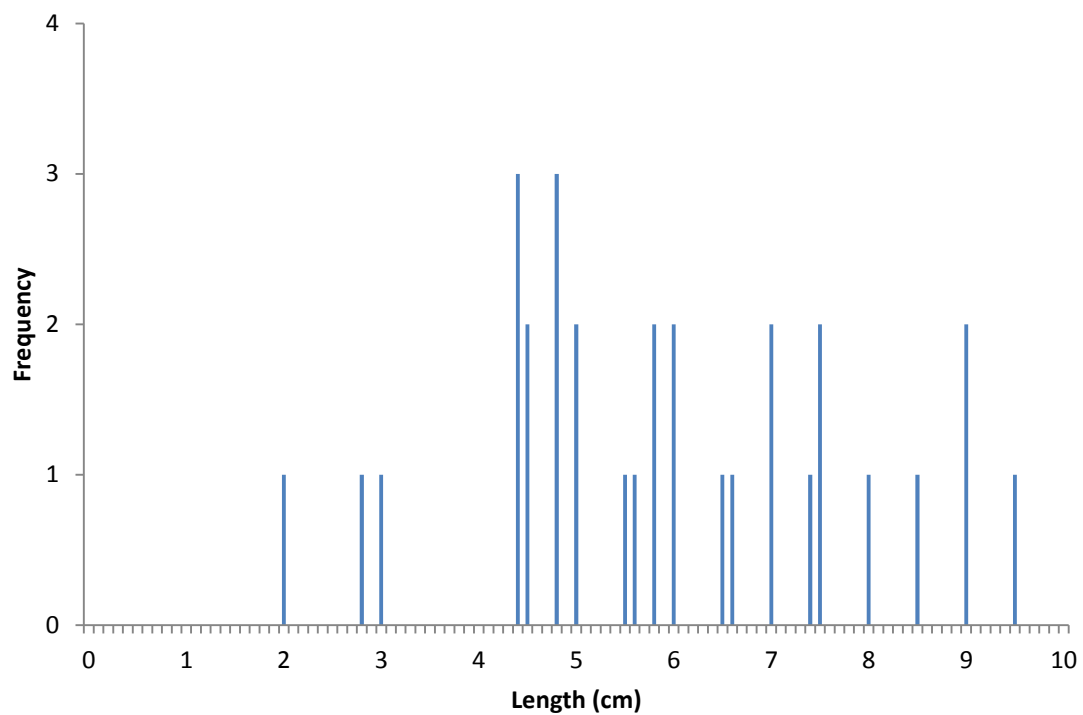
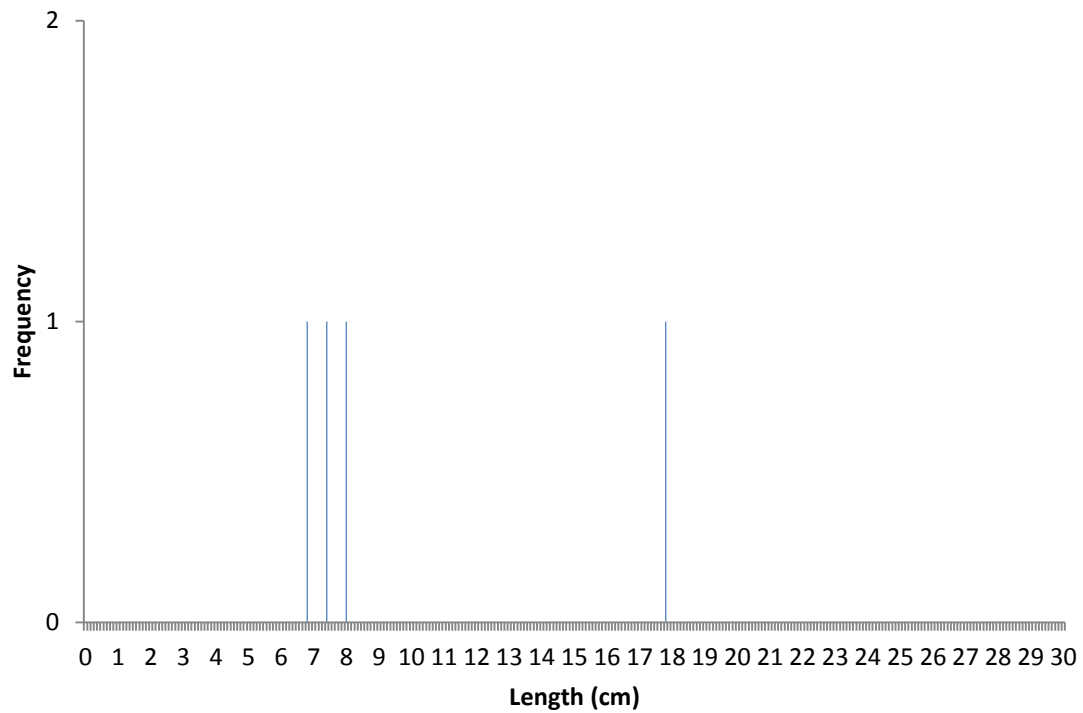


Figure 3.37. Length frequency of minnow captured at Pondhead Site 2 (n=31).



**Figure 3.38. Length frequency of brown trout captured at Pondhead Site 1 (n=4).**

### 3.11.3 Fish species of conservation importance

Table 3.42 highlights the fish species of conservation importance that were recorded at Pondhead Site 2 during the electric fishing survey.



**Table 3.42. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Pondhead Site 2.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	N
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.12 Wootton Phase 1 Site 1

#### 3.12.1 Site description

Wootton Phase 1 Site 1 is located within an area of broadleaf / mixed woodland (see Section 2.1.11). Table 3.43 below summarises the key physical characteristics of the 100 m survey site, and Appendix 12 provides a photographic record of habitat variability. The mean wetted width was 2.35 m, with an overall surveyed area of 234.5 m<sup>2</sup>.

The river reach comprised mainly shallow riffle habitat, with limited deeper pools. Substrate was largely comprised of gravel and pebble. Flow conditions during the survey were moderate.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.44.

**Table 3.43. Habitat data recorded during the electric fishing survey at Wootton Phase 1 Site 1.**

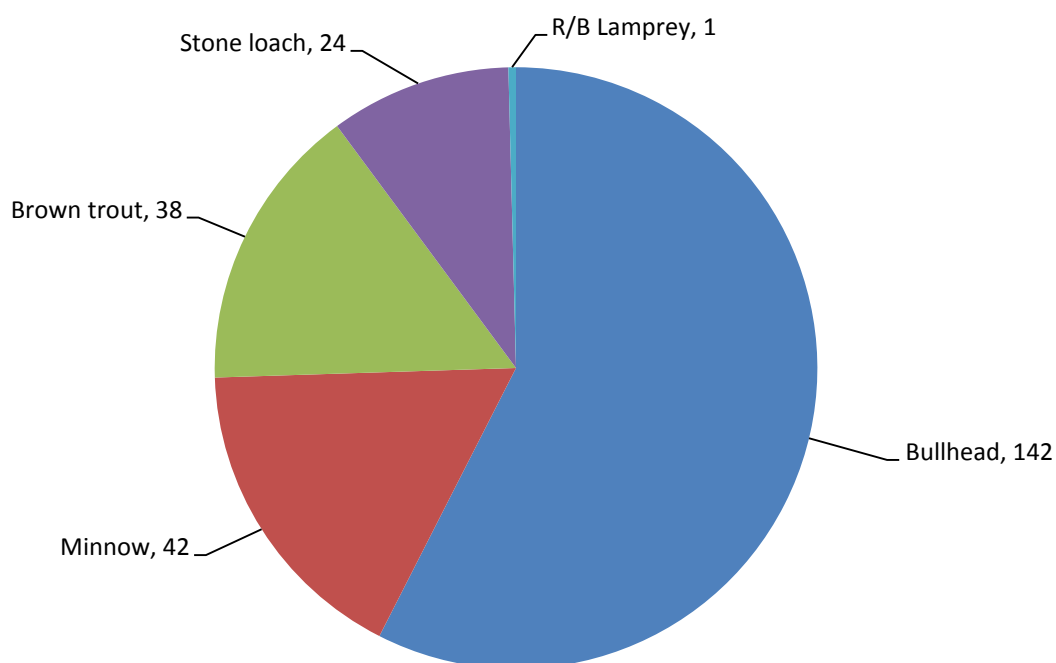
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	10	20	20	20	20	10		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		10	20	50	20			
Instream vegetation: <b>0 %</b>		Silted? <b>No</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		10	10	10	10	30	30	
Speed / Level: <b>Mod</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	10	10						
Right bank %	10	10						
Total LB fish cover: <b>20 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>20 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Overhanging Boughs (%): <b>0</b>			RB Overhanging Boughs (%): <b>0</b>			Canopy Cover (%): <b>100</b>		

**Table 3.44. Physico-chemical parameters recorded during fish survey at Wootton Phase 1 Site 1.**

Parameter	Value
Temperature (°C)	14.4
Dissolved Oxygen (%)	98.2
Dissolved Oxygen (mg l <sup>-1</sup> )	10.4
Conductivity (µS cm <sup>-1</sup> )	127.1

### 3.12.2 Electric fishing survey results

A total of 247 fish were captured at Wootton Phase 1 Site 1, comprising five species. Bullhead was the most abundant species captured, followed by minnow and brown trout (Figure 3.39).



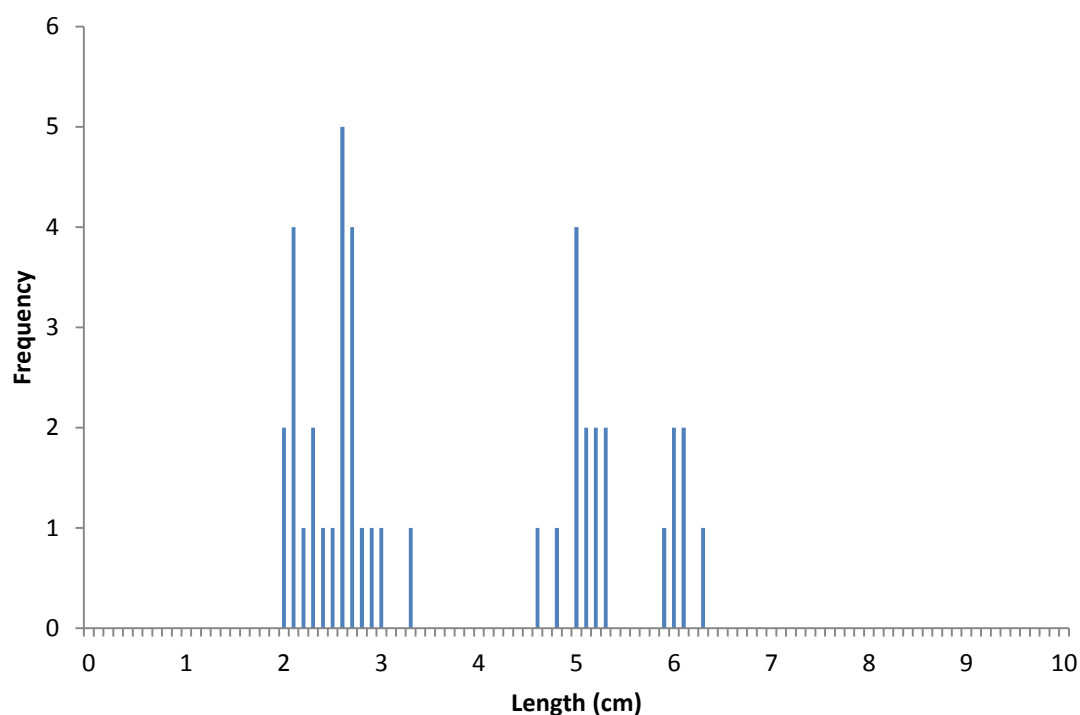
**Figure 3.39. Species composition (total number captured) at Wootton Phase 1 Site 1.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.45. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.45. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Wootton Phase 1 Site 1. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Bullhead	142 (2.0 – 6.3)	203	0.45	139	265	87	N/A
Minnow	42 (2.3 – 7.5)	43	0.82	40	46	18	N/A
Stone loach	24 (4.8 – 10.2)	26	0.69	20	32	11	N/A
Brown trout (0+)	19 (5.1 – 7.9)	21	0.66	14	28	9	C (Fair)
Brown trout (1++)	19 (10.0 – 24.5)	21	0.66	14	28	9	C (Fair)
R/B lamprey	1 (11.0)	1	0.5	-2	4	<1	N/A
<b>TOTAL</b>		<b>247</b>					

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.40 to Figure 3.43 below.



**Figure 3.40. Length frequency of bullhead captured at Wootton Phase 1 Site 1 (n=42).**

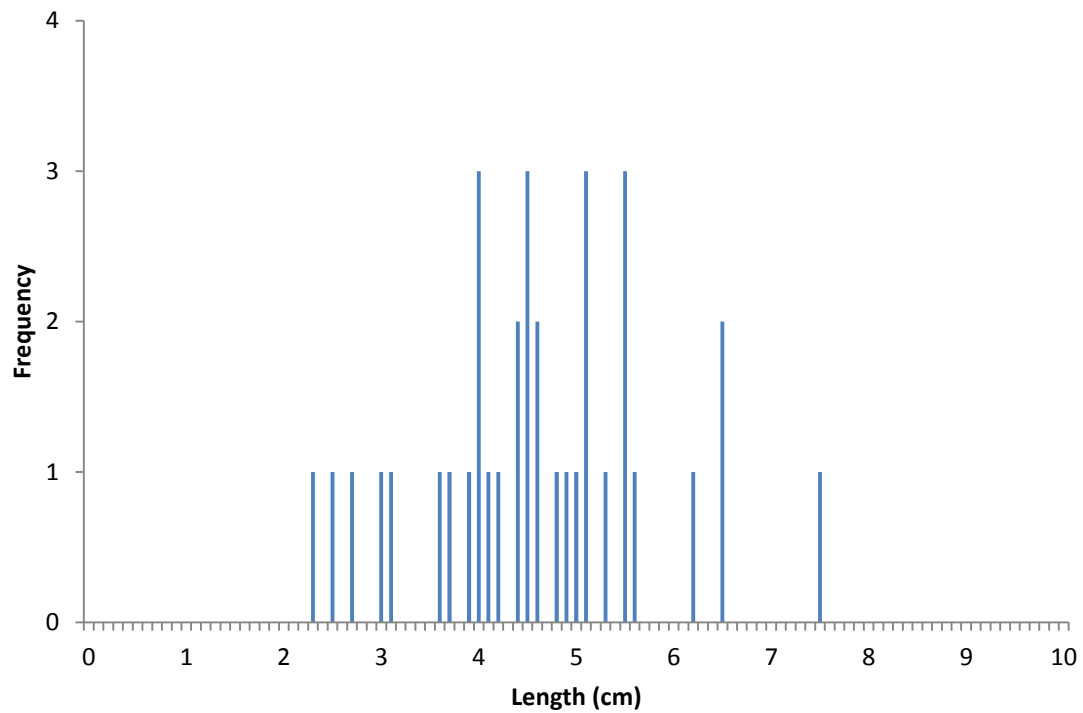


Figure 3.41. Length frequency of minnow captured at Wootton Phase 1 Site 1 (n=35).

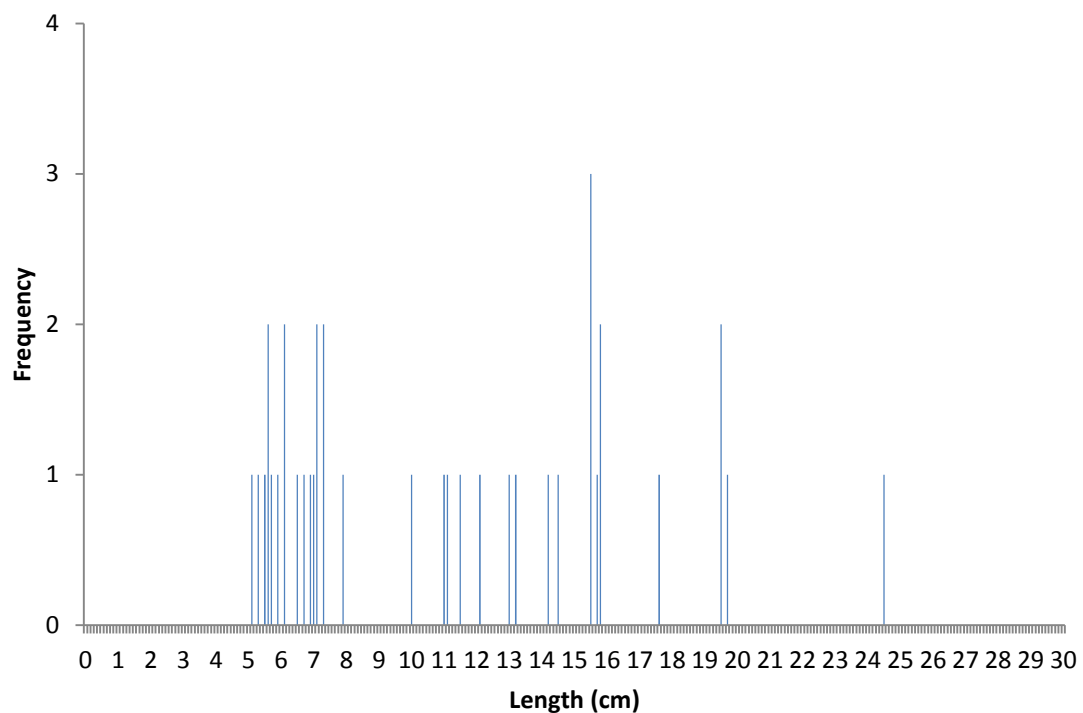
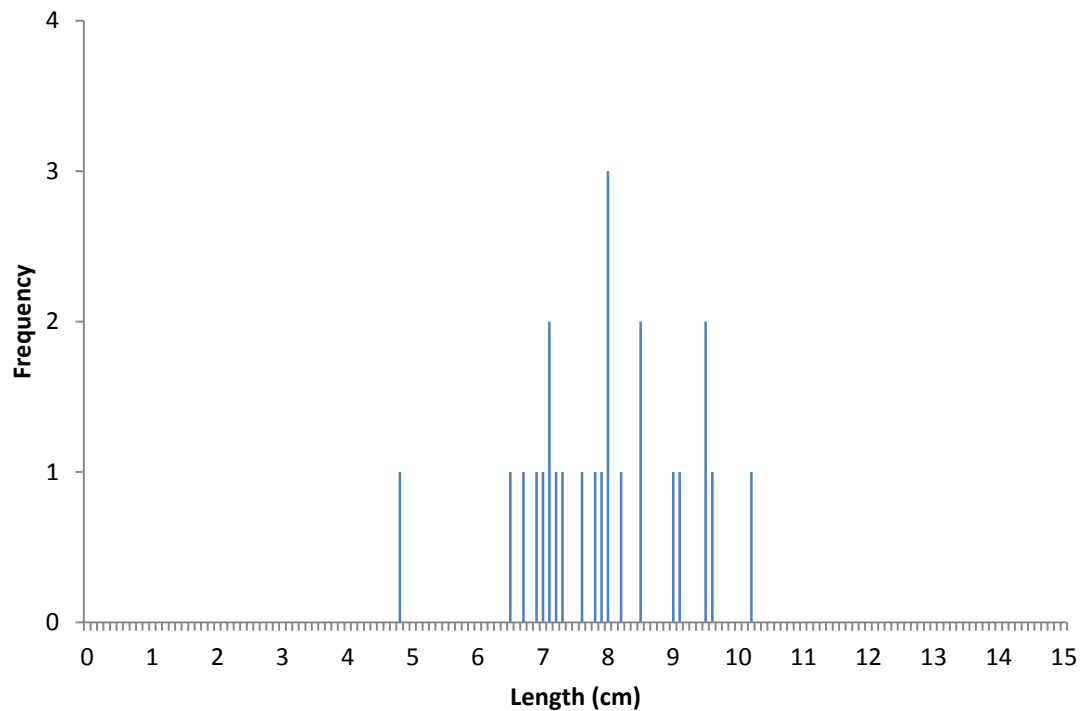


Figure 3.42. Length frequency of brown trout captured at Wootton Phase 1 Site 1 (n=38).



**Figure 3.43. Length frequency of stone loach captured at Wootton Phase 1 Site 1 (n=24).**

### 3.12.3 Fish species of conservation importance

Table 3.46 highlights the fish species of conservation importance that were recorded at Wootton Phase 1 Site 1 during the electric fishing survey.

**Table 3.46. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Wootton Phase 1 Site 1.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	N
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.



### 3.13 Wootton Phase 1 Site 2

#### 3.13.1 Site description

Wootton Phase 1 Site 2 is located within an area of rough pasture (see Section 2.1.11). Table 3.47 below summarises the key physical characteristics of the 80 m survey site, and Appendix 13 provides a photographic record of habitat variability. The mean wetted width was 2.13 m, with an overall surveyed area of 138.7 m<sup>2</sup> (taking account of 15 m of inaccessible river channel).

Substrate mainly comprised gravel and pebble, with some sand and silt. Although the channel was relatively straight in areas; abundant bankside cover and marginal vegetation was present throughout. Flow conditions during the survey were low.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.48.

**Table 3.47. Habitat data recorded during the electric fishing survey at Wootton Phase 1 Site 2.**

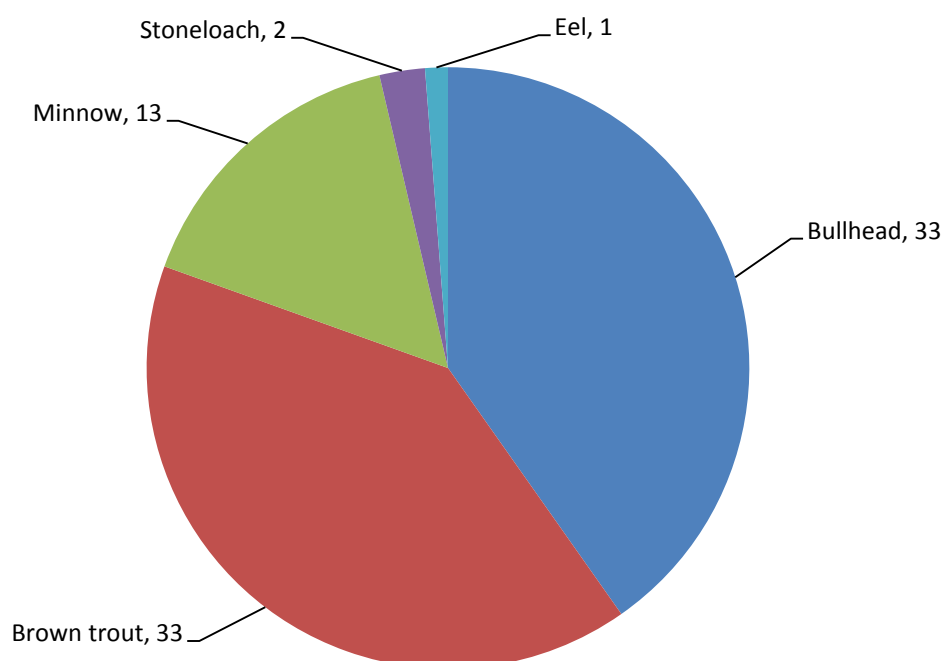
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	10	10	20	20	20	20		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent	10	10	20	30	30			
Instream vegetation: <b>20 %</b>		Silted? <b>No</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		20		10	10	40	20	
Speed / Level: <b>Mod</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	20	20						
Right bank %	20	20						
Total LB fish cover: <b>40 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>40 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Overhanging Boughs (%): <b>40</b>			RB Overhanging Boughs (%): <b>40</b>			Canopy Cover (%): <b>50</b>		

**Table 3.48. Physico-chemical parameters recorded during fish survey at Wootton Phase 1 Site 2.**

Parameter	Value
Temperature (°C)	14.4
Dissolved Oxygen (%)	92.6
Dissolved Oxygen (mg l <sup>-1</sup> )	9.47
Conductivity (µS cm <sup>-1</sup> )	114.0

### 3.13.2 Electric fishing survey results

A total of 82 fish were captured at Wootton Phase 1 Site 2, comprising five species. Bullhead was the most abundant species captured, followed by brown trout and minnow (Figure 3.44).



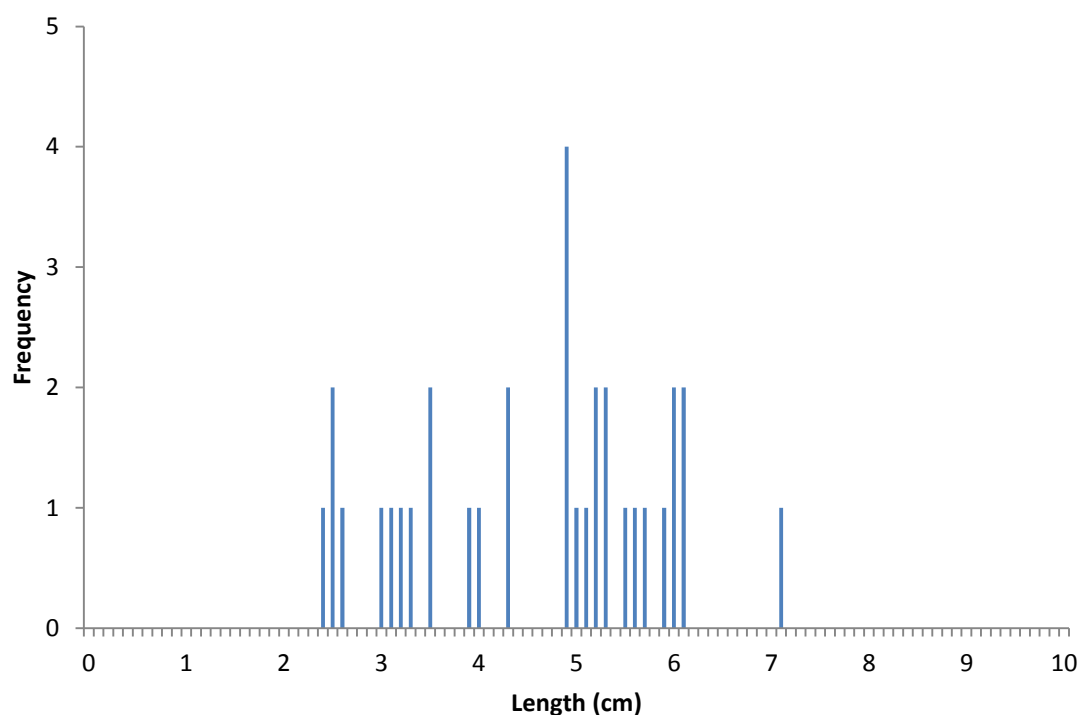
**Figure 3.44. Species composition (total number captured) at Wootton Phase 1 Site 2.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.49. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

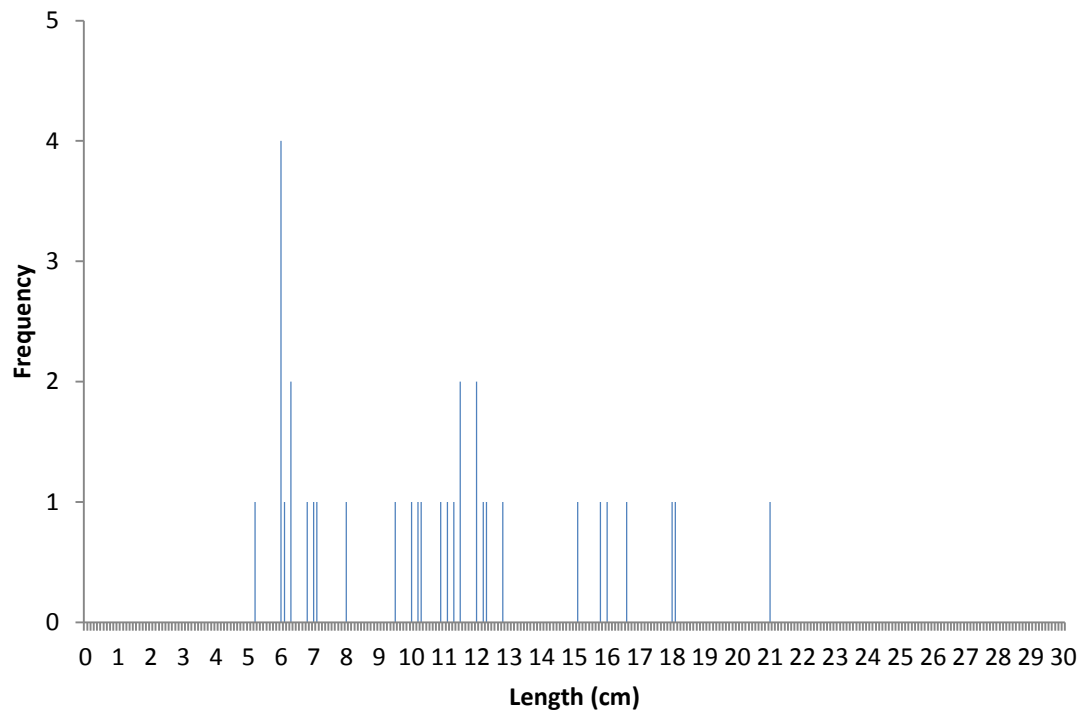
**Table 3.49. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Wootton Phase 1 Site 2. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Bullhead	33 (2.4 – 7.1)	36	0.69	29	43	26	N/A
Brown trout (1++)	19 (10.0 – 21.0)	19	0.86	17	21	14	B (Good)
Brown trout (0+)	14 (5.2 – 9.5)	14	0.86	13	15	10	C (Fair)
Minnow	13 (4.1 – 8.1)	15	0.59	7	23	11	N/A
Stone loach	2 (7.1 – 8.5)	2	0.67	0	4	1	N/A
Eel	1 (28.0)	1	1	1	1	1	N/A
<b>TOTAL</b>	<b>82</b>						

Length frequency charts for bullhead and brown trout are provided in Figure 3.45 and Figure 3.46 below.



**Figure 3.45. Length frequency of bullhead captured at Wootton Phase 1 Site 2 (n=33).**



**Figure 3.46. Length frequency of brown trout captured at Wootton Phase 1 Site 2 (n=33).**

### 3.13.3 Fish species of conservation importance

Table 3.50 highlights the fish species of conservation importance that were recorded at Wootton Phase 1 Site 2 during the electric fishing survey.

**Table 3.50. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Wootton Phase 1 Site 2.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	Y
Lamprey (Brook)	Habitats Directive (Annex II)	Y	N
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.14 Wootton Phase 2 Site 1

#### 3.14.1 Site description

Wootton Phase 2 Site 1 is located within an area of broadleaf / mixed woodland (see Section 2.1.12). Table 3.51 below summarises the key physical characteristics of the 100 m survey site, and Appendix 14 provides a photographic record of habitat variability. The mean wetted width was 3.75 m, with an overall surveyed area of 374.5 m<sup>2</sup>.

Substrate mainly comprised gravel and pebble, with some sand and silt. Although the channel was relatively straight; abundant bankside cover, marginal vegetation and holding pools were present throughout. Flow conditions during the survey were moderate.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.52.

**Table 3.51. Habitat data recorded during the electric fishing survey at Wootton Phase 2 Site 1.**

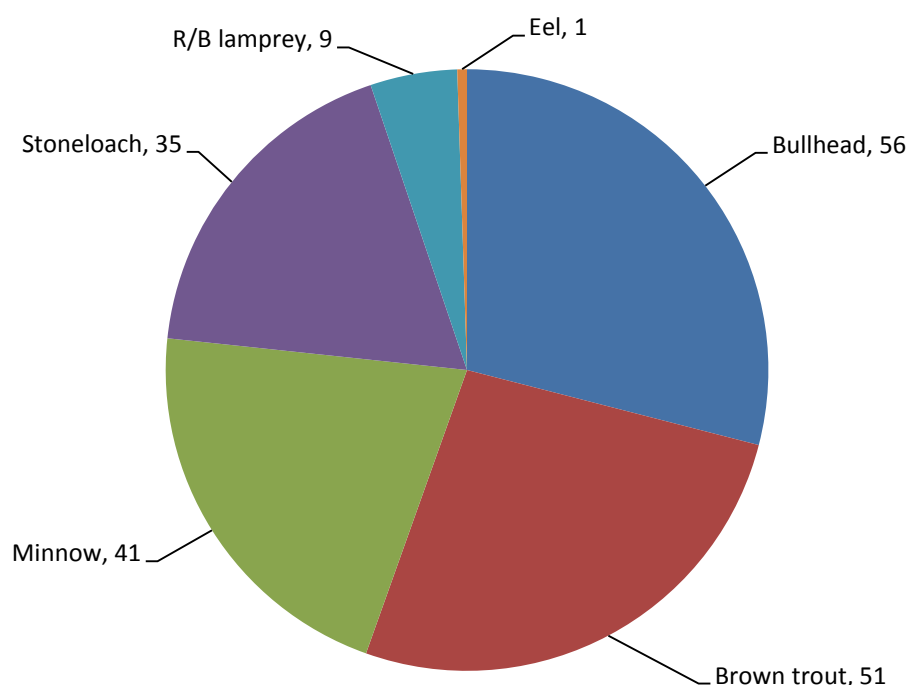
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	10	20	20	20	20	10		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		5	5	40	50			
Instream vegetation: <b>0 %</b>		Silted? <b>No</b>		Substrate: <b>Stable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent		10	10	10	10	50	10	
Speed / Level: <b>Mod</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	40	5			5			
Right bank %	40	5			5			
Total LB fish cover: <b>50 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>50 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Bankface vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				RB Banktop vegetation: Bare / Uniform / Simple / <b>Complex</b>				
LB Overhanging Boughs (%): <b>25</b>			RB Overhanging Boughs (%): <b>25</b>			Canopy Cover (%): <b>90</b>		

**Table 3.52. Physico-chemical parameters recorded during fish survey at Wootton Phase 2 Site 1.**

Parameter	Value
Temperature (°C)	13.9
Dissolved Oxygen (%)	98.9
Dissolved Oxygen (mg l <sup>-1</sup> )	10.09
Conductivity (µS cm <sup>-1</sup> )	121.5

### 3.14.2 Electric fishing survey results

A total of 193 fish were captured at Wootton Phase 2 Site 1, comprising six species. Bullhead was the most abundant species captured, followed by brown trout, minnow and stone loach (Figure 3.47).



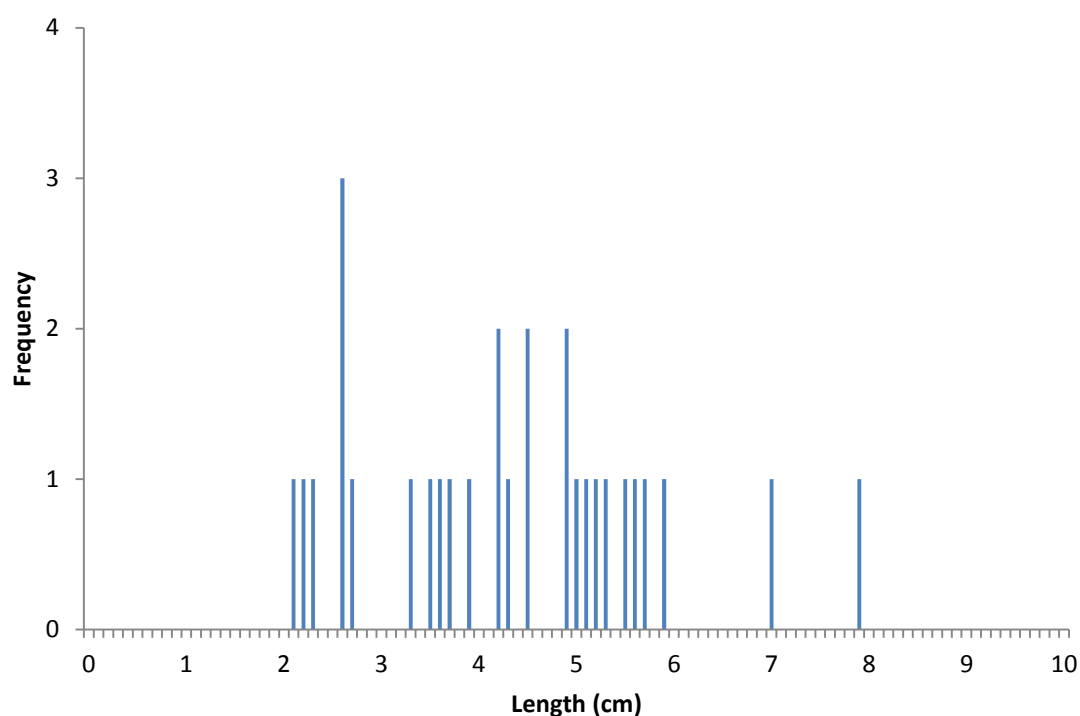
**Figure 3.47. Species composition (total number captured) at Wootton Phase 2 Site 1.**

The total number captured, length range (cm) and catch depletion density estimate (where relevant) for each fish species are shown in Table 3.53. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.53. Number captured and catch depletion estimates (Carle & Strub), including Upper and Lower 95 % Confidence Intervals, for all species recorded at Wootton Phase 2 Site 1. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	Catch depletion population estimate	Catch depletion probability of capture	Catch depletion 95% LCI	Catch depletion 95% UCI	Catch depletion density (No./100m <sup>2</sup> )	NFCS Classification
Bullhead	56 (2.1 – 7.9)	78	0.34	44	112	21	N/A
Minnow	41 (2.0 – 9.4)	84	0.20	-23	191	22	N/A
Brown trout (1++)	41 (10.2 – 23.8)	43	0.62	38	48	11	C (Fair)
Stone loach	35 (4.7 – 12.0)	52	0.30	16	88	14	N/A
Brown trout (0+)	10 (5.3 – 7.2)	10	0.83	10	10	3	D (Fair / Poor)
R/B lamprey	9 (6.9 – 10.0)	29	0.10	-158	216	8	N/A
Eel	1 (45.0)	1	1.00	1	1	<1	N/A
<b>TOTAL</b>	<b>193</b>						

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.48 to Figure 3.51 below.



**Figure 3.48. Length frequency of bullhead captured at Wootton Phase 2 Site 1 (n=30).**



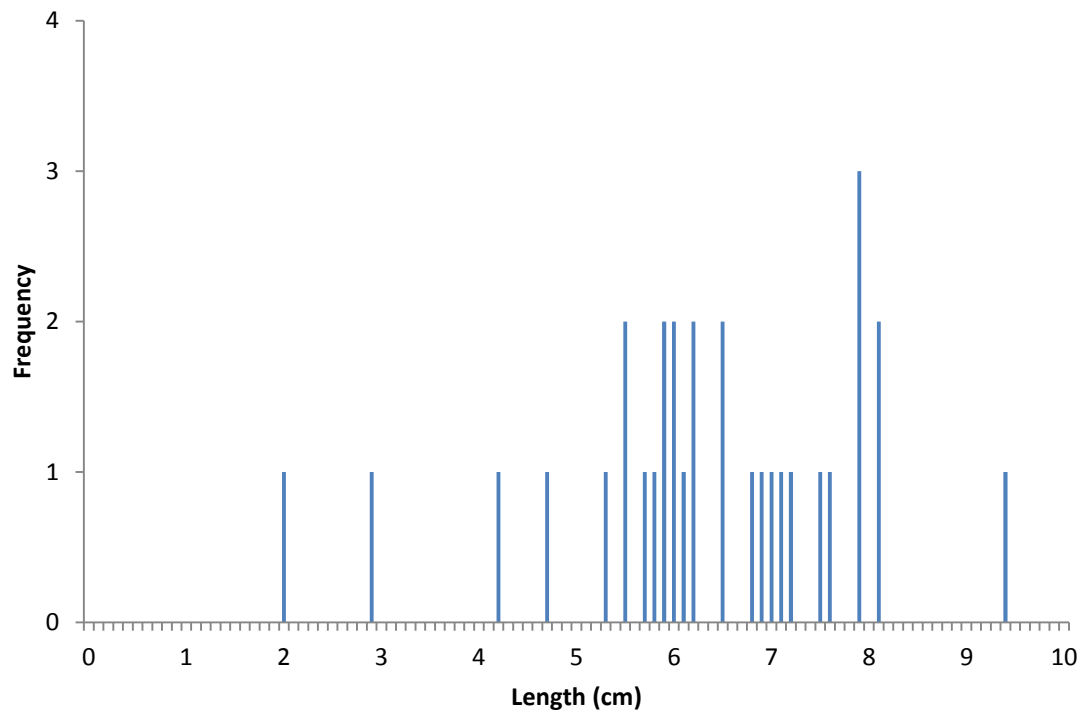


Figure 3.49. Length frequency of minnow captured at Wootton Phase 2 Site 1 (n=31).

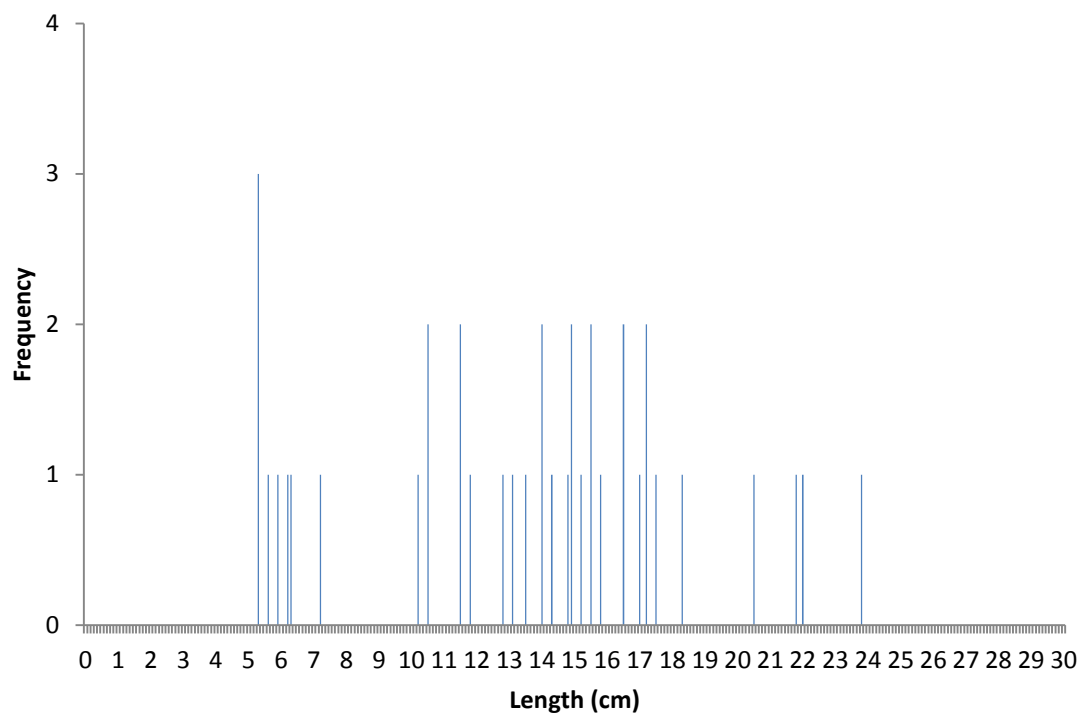
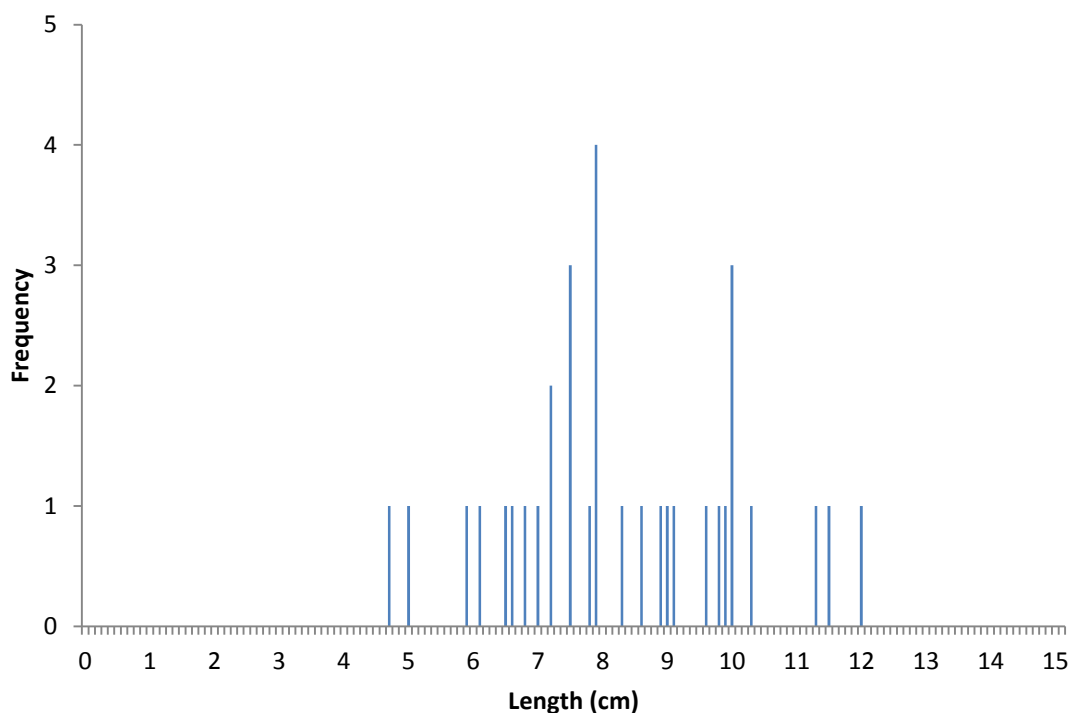


Figure 3.50. Length frequency of brown trout captured at Wootton Phase 2 Site 1 (n=38).



**Figure 3.51. Length frequency of stone loach captured at Wootton Phase 2 Site 1 (n=33).**

### 3.14.3 Fish species of conservation importance

Table 3.54 highlights the fish species of conservation importance that were recorded at Wootton Phase 2 Site 1 during the electric fishing survey.

**Table 3.54. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Wootton Phase 2.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	Y
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.

<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

### 3.15 Wootton Phase 2 Site 2

#### 3.15.1 Site description

Wootton Phase 2 Site 2 is located within an area of broadleaf / mixed woodland (see Section 2.1.12). Table 3.55 below summarises the key physical characteristics of the 100 m survey site, and Appendix 15 provides a photographic record of habitat variability. The mean wetted width was 2.55 m, with an overall surveyed area of 254.5 m<sup>2</sup>.

The survey site was located in a remnant meander which has been reactivated as the main channel as part of the restoration works at this location. The old channel has been filled in and the new channel excavated to reinstate historic meanders with an elevated bed profile. Substrate was largely comprised of gravel, pebble and cobbles. A fine layer of fine silt was evident throughout. Flow conditions during the survey were moderate.

Physico-chemical parameters recorded during the time of the survey are provided in Table 3.56.

**Table 3.55. Habitat data recorded during the electric fishing survey at Wootton Phase 2 Site 2.**

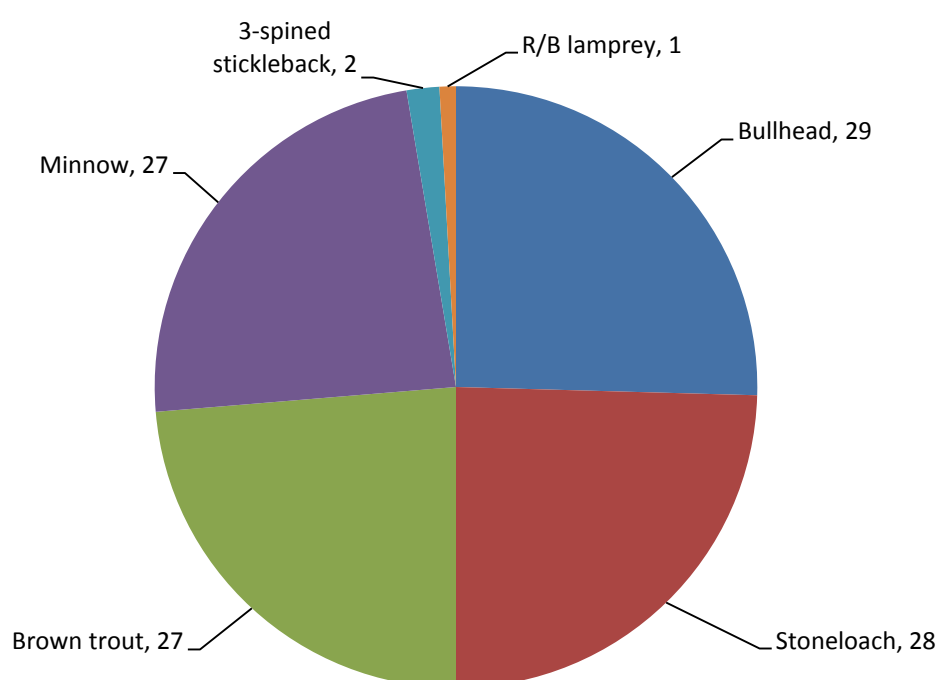
Depths (cm)	< 10	11 - 20	21 - 30	31 - 40	41 - 50	> 50		
Percent	20	20	20	20	10	10		
Substrate	Organic	Silt	Sand	Gravel	Pebble	Cobble	Boulder	Bedrock
Percent		30	10	30	30			
Instream vegetation: <b>10 %</b>		Silted? <b>Yes</b>		Substrate: <b>Unstable &amp; Uncompacted</b>				
Flow	SM	DP	SP	DG	SG	RU	RI	TO
Percent	10	20	10			20	40	
Speed / Level: <b>Mod</b>	FLOW DEFINITIONS: SM <10cm still/eddy, smooth, silent; DP ≥30cm slow/eddy, smooth, silent; SP <30cm slow/eddy, smooth, silent; DG ≥30cm mod/fast, smooth, silent; SG <30cm mod/fast, smooth, silent; RU fast, unbroken waves, silent; RI fast, broken waves, audible; TO white water, noisy, substrate invisible							
Bankside cover	UC	DR	BA	MA	RT	RK	OTH	
Left bank %	5							
Right bank %	5							
Total LB fish cover: <b>5 %</b>	DEFINITIONS: UC undercut banks; DR vegetation rooted in riparian zone, branches/leaves touch or almost touch surface; BA no cover or fish can't get to cover due to lack of water; MA veg rooted in stream, excl fully aquatic veg; RT cover provided by exposed roots; RK cover from rocks within bank structure; OTH other bankside cover							
Total RB fish cover: <b>5 %</b>								
Bankside land use								
LB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Bankface vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				RB Banktop vegetation: Bare / Uniform / <u>Simple</u> / Complex				
LB Overhanging Boughs (%): <b>0</b>			RB Overhanging Boughs (%): <b>0</b>			Canopy Cover (%): <b>20</b>		

**Table 3.56. Physico-chemical parameters recorded during fish survey at Wootton Phase 2 Site 2.**

Parameter	Value
Temperature (°C)	13.9
Dissolved Oxygen (%)	98.9
Dissolved Oxygen (mg l <sup>-1</sup> )	10.09
Conductivity (µS cm <sup>-1</sup> )	121.5

### 3.15.2 Electric fishing survey results

A total of 114 fish were captured at Wootton Phase 2 Site 2, comprising six species. Bullhead was the most abundant species captured, followed by stone loach, brown trout and minnow (Figure 3.52).



**Figure 3.52. Species composition (total number captured) at Wootton Phase 2 Site 2.**

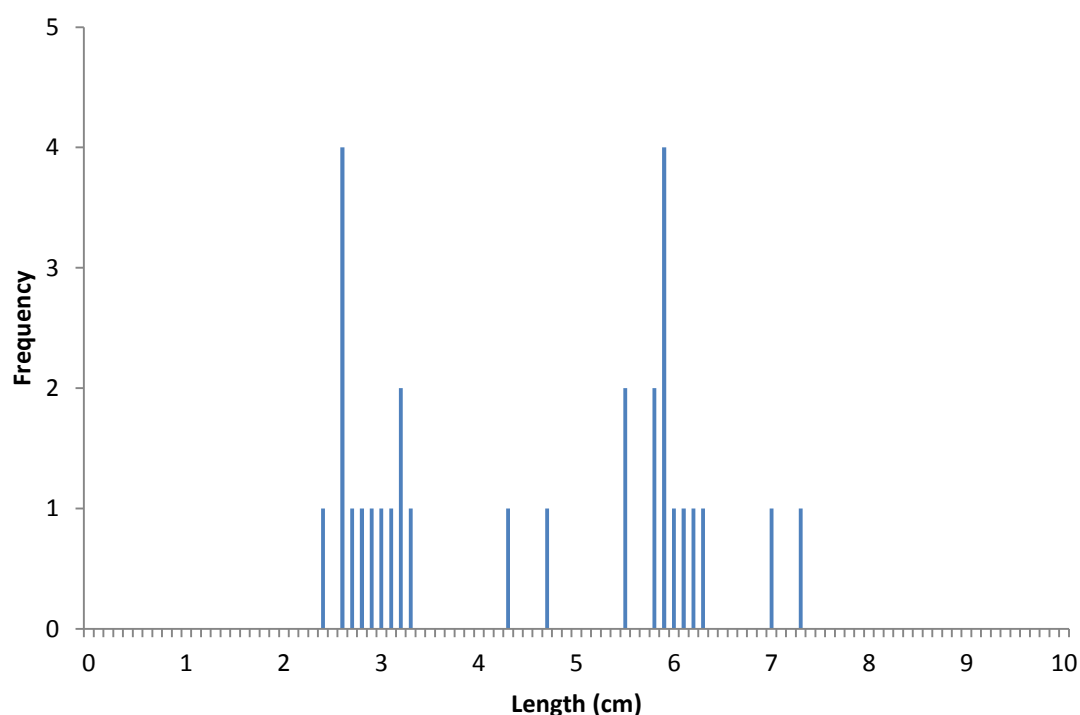
The total number captured and length range (cm) are shown in Table 3.57. Due to weather conditions (heavy rain), electric fishing was stopped after the first run. Catch depletion estimates are, therefore, not provided and data are minimum density estimates only. The National Fisheries Classification Scheme (NFCS) classifications for 0+ and 1++ brown trout are also shown.

**Table 3.57. Number captured and length ranges for all species recorded at Wootton Phase 2 Site 2. National Fisheries Classification Scheme (NFCS) grades are also provided for brown trout.**

Species	No. captured (length range, cm)	MINIMUM density estimate (No./100m <sup>2</sup> )	NFCS Classification
Bullhead	29 (2.4 – 7.3)	11	N/A
Stone loach	28 (3.2 – 10.0)	11	N/A
Minnow	27 (3.5 – 7.3)	11	N/A
Brown trout (0+)	17 (4.9 – 9.0)	7	D (Fair / Poor)*
Brown trout (1++)	10 (10.0 – 28.5)	4	D (Fair / Poor)*
3-spined stickleback	2 (2.6 – 3.5)	1	N/A
R/B lamprey	1 (12.0)	<1	N/A
<b>TOTAL</b>	<b>114</b>		

\* Based on minimum density estimates only

Length frequency charts for the most abundant fish species recorded are provided in Figure 3.53 to Figure 3.56 below.



**Figure 3.53. Length frequency of bullhead captured at Wootton Phase 2 Site 2 (n=29).**

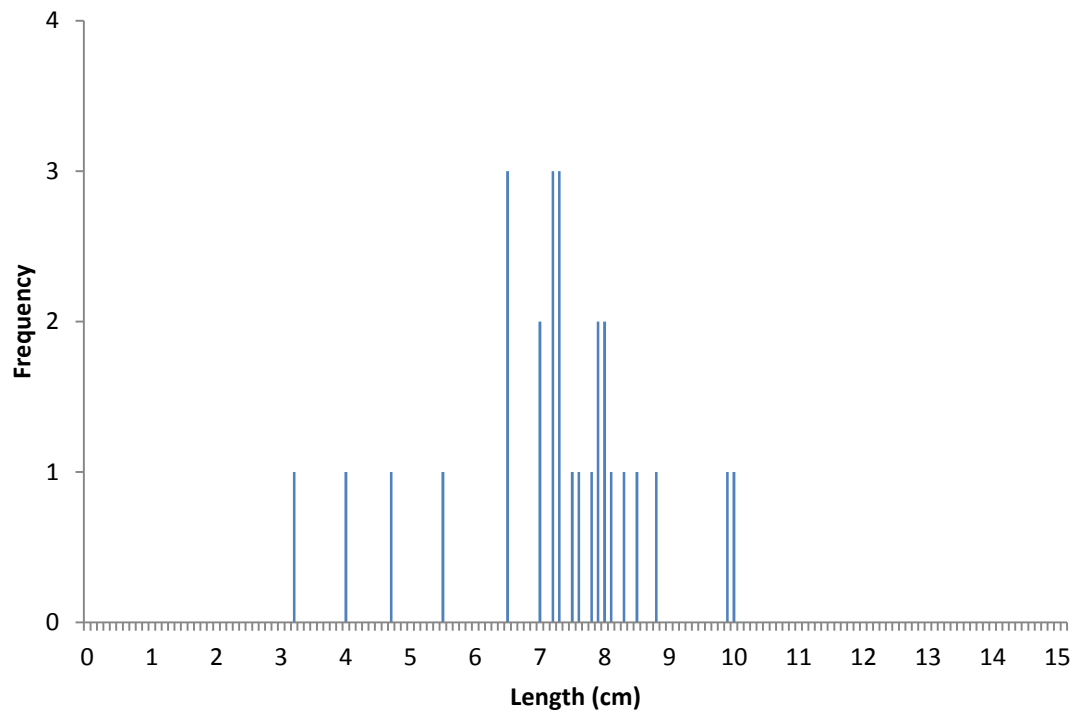


Figure 3.54. Length frequency of stone loach captured at Wootton Phase 2 Site 2 (n=28).

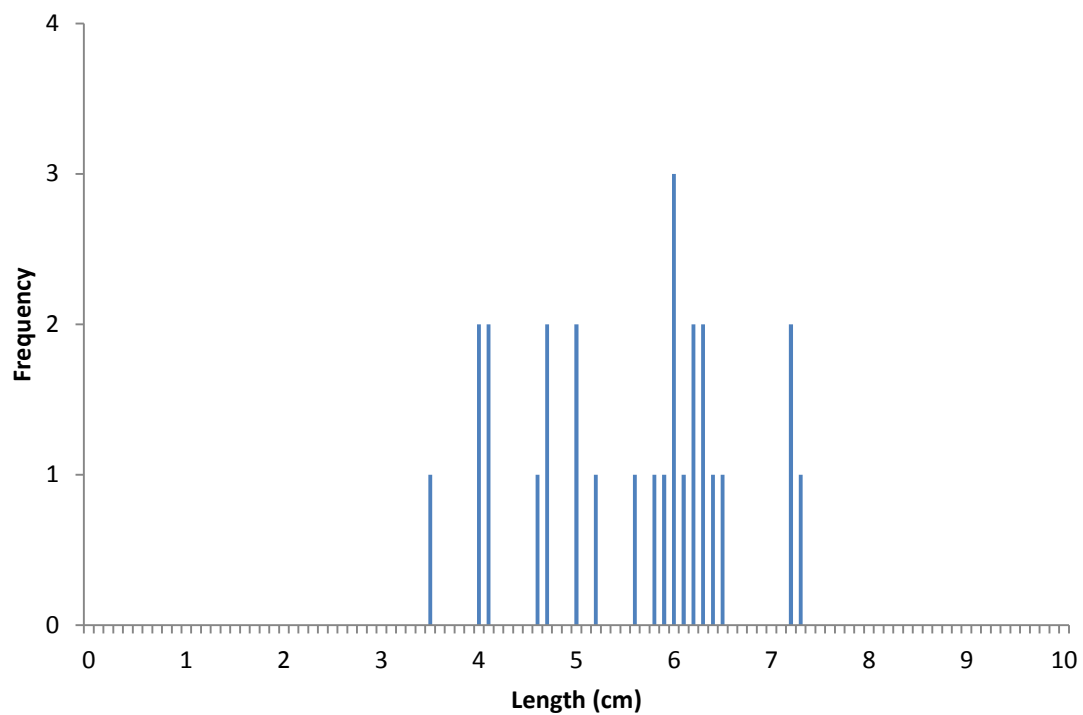
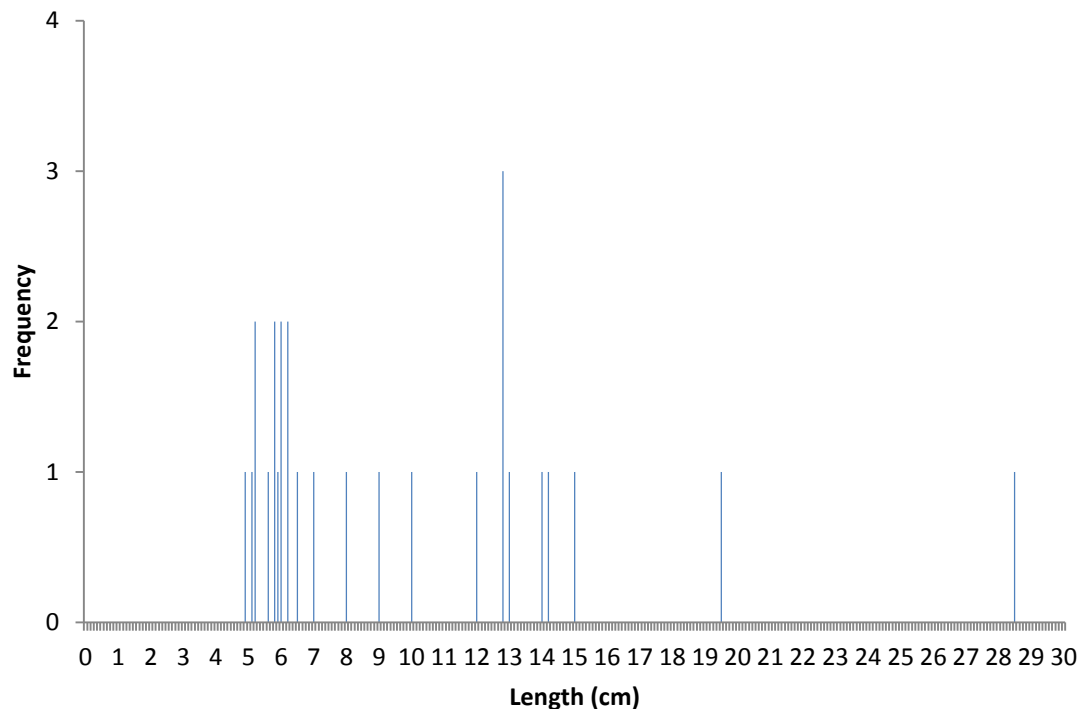


Figure 3.55. Length frequency of minnow captured at Wootton Phase 2 Site 2 (n=27).



**Figure 3.56. Length frequency of brown trout captured at Wootton Phase 2 Site 2 (n=27).**

### 3.15.3 Fish species of conservation importance

Table 3.58 highlights the fish species of conservation importance that were recorded at Wootton Phase 2 Site 2 during the electric fishing survey.

**Table 3.58. Species of conservation importance that could potentially be present and species that were recorded during the fish survey at Wootton Phase 2 Site 2.**

Species	Conservation designation	Within natural range? <sup>1</sup>	Recorded?
Brown trout / Sea trout	UK BAP (Priority Species)	Y	Y
Bullhead	Habitats Directive (Annex II)	Y	Y
Eel	EC Eel Regulation (Eels [England and Wales] Regulations, IUCN Red List (Critically Endangered), UK BAP (Priority Species)	Y	Y
Lamprey (Brook)	Habitats Directive (Annex II)	Y	Y
Lamprey (River)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Lamprey (Sea)	Habitats Directive (Annex II)	Y <sup>2</sup>	N
Salmon	UK BAP (Priority Species), Habitats Directive (Annex II)	Y <sup>3</sup>	N

<sup>1</sup> Natural range as summarised in Maitland (2004) distribution maps of fish occurring in the fresh waters of Britain and Ireland.

<sup>2</sup> River and sea lamprey are anadromous species found around the coast of the UK and, therefore, both species could potentially colonise the New Forest streams. However, it is generally accepted that brook lamprey is the only species to inhabit the New Forest streams. All lamprey recorded are, therefore, assumed to be brook lamprey.



<sup>3</sup> As an anadromous species, salmon have the ability to colonise any rivers with access to/from the sea. However, it is generally accepted that sea trout is the only migratory salmonid species present within the New Forest Streams.

## 4. RESULTS – INVERTEBRATE SURVEYS

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### 4.1 Species composition

Macroinvertebrate species composition for each site is shown in Table 4.1.

Table 4.1. Macroinvertebrate species composition at all sites in the New Forest, surveyed during September 2019.

Group	Species	Dockens Water Upstream	Rakes Brakes Downstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill / Holmhill Control	Redhill / Holmhill Downstream	Redhill / Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2
Flatworms	Polycelis felina (Dalyell, 1814)																							3	10		
Horse Hair Worms	Nematomorpha sp.																							1			
Nematodes	Nematoda sp.	2																									
Snails	Gastropoda sp.				12																						
	Valvata (Cincinna) piscinalis (O.F. Müller, 1774)																		12								
	Potamopyrgus antipodarum (J.E.Gray, 1843)													72		9	64							116	1	1	4
	Bithynia (Bithynia) tentaculata (Linnaeus, 1758)																		7								
	Radix balthica (Linnaeus, 1758)	3				2	2	4	1											32	1	1		3		2	3
	Bathyomphalus contortus (Linnaeus, 1758)																		3	1						1	
	Gyraulus (Gyraulus) albus (O.F. Müller, 1774)																		10								
	Ancylus fluviatilis O.F. Müller, 1774	2							24		3			2					1					2	16	44	3
Bivalves	Pisidium sp.	16	1	34	2	24	6	28	1	1	2	776	2	20		1	6	12	40		19	1	7	9	9	64	8
Worms	Oligochaeta sp.	56	12	92	72	208	104	84	72	4	288	136	2	140	7	72	236	12	520	64	48	48	56	172	188	196	72
Leeches	Glossiphonia complanata (Linnaeus, 1758)	1												3					2					1	2		2
	Helobdella stagnalis (Linnaeus, 1758)	2				2		1		2	8					2			1					2	3		
	Erpobdellidae sp.	2								3	24			1											20	12	
	Erpobdella octoculata (Linnaeus, 1758)										5														3	8	
	Trocheta sp.								3																		
Water Mites	Hydracarina sp.											1					1									1	
Water Fleas	Cladocera sp.																							1			
Ostracods	Ostracoda sp.															2			1		2				5	1	
Crustaceans	Asellus aquaticus (Linnaeus, 1758)									1	2									20				2		12	2
	Proasellus meridianus (Racovitza, 1919)																								3		
	Crangonyx pseudogracilis Bousfield, 1958		36	1						20	36					88	12		4					4			
	Gammarus pulex (Linnaeus, 1758)	40	8						56	4	404			2					6	88				328	792	92	52
	Niphargus aquilex Schiodte, 1855														3											1	
Springtails	Collembola sp.					1																					
Mayflies	Baetidae sp.																								1		
	Baetis rhodani (Pictet, 1843-1845)					1											2			16				2			
	Baetis scambus group																		3								
	Centroptilum luteolum (Müller, 1776)																		1								
	Procloeon pennulatum (Eaton, 1870)									2																	
	Leptophlebiidae sp.									1																1	
	Paraleptophlebia sp.	1				72	40	7	12		5			20		13	1		16	2	3			3	3		1

Group	Species	Dockens Water Upstream	Rakes Brakes Downstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill / Holmhill Control	Redhill / Holmhill Downstream	Redhill / Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2
	Ephemera danica Müller, 1764													228					6	5							
	Serratella ignita (Poda, 1761)																								14		
	Caenis luctuosa group	3																	1								
Stoneflies	Nemouridae sp.	1				72	3	128	12		88			20		304	16		24	44	1		1	24	40	12	128
	Leuctridae sp.																				3						
	Leuctra sp.										4														2		
	Leuctra fusca (Linnaeus, 1758)	2				13	2	6	20		12			9		20	112		2	2				20	40	40	3
	Leuctra nigra (Olivier, 1811)														24												
	Siphonoperla torrentium (Pictet, 1841)																								1		
Dragonflies and Damselflies	Coenagrionidae sp.	3	2				9			9		1	1		7	6		1	2		3		1				
	Calopteryx sp.									2																1	
	Calopteryx virgo (Linnaeus, 1758)									2	1	1		5													
	Cordulegaster boltonii (Donovan, 1807)	1						10			1	8			3	5	6				1				3	1	
	Aeshna sp.		1																								
	Anax imperator Leach, 1815									1																	
	Corduliidae sp.	3																									
	Libellulidae sp.			3			9														5		10				
	Orthetrum sp.											7							1								
True Bugs	Hydrometra stagnorum (Linnaeus, 1758)														1												
	Gerridae sp.									1																	
	Aquarius najas (DeGeer, 1773)													4													
	Sigara (Sigara) sp.	1								1																	
	Sigara (Retrocorixa) venusta (Douglas & Scott, 1869)									1		1															
Water Beetles	Coleoptera sp.				1																						
	Haliplidae sp.				1		1																				
	Dytiscidae sp.													12						4							
	Platambus maculatus (Linnaeus, 1758)													2													
	Agabus didymus (Olivier, 1795)											1															
	Agabus sturmii (Gyllenhal, 1808)		1																								
	Gyrinidae sp.																			4					40	32	1
	Orectochilus villosus (O.F. Müller, 1776)					1																					
	Anacaena sp.														1												
	Helochares punctatus Sharp, 1869				1							1									1						
	Hydraena sp.													1													
	Hydraena riparia Kugelann, 1794																								1		
	Scirtidae sp.																		3								

Group	Species	Dockens Water Upstream	Rakes Brakes Downstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill / Holmhill Control	Redhill / Holmhill Downstream	Redhill / Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2	
	Elodes sp.													2														
	Elmis aenea (Müller, 1806)																								1	1	1	
	Limnius volckmari (Panzer, 1793)	1			1				12		1	1		25		2	13		1					1	52	76	2	
	Oulimnius sp.	14						8	13	1	3			6		40	14		128	24				13	36	32	88	
	Oulimnius tuberculatus (Müller, 1806)					2											1									1		
	Curculionidae sp.													1		1												
Alderflies	Sialis sp.																									1		
	Sialis lutaria (Linnaeus, 1758)	2				1	2							1					36			6					2	
	Sialis fuliginosa Pictet, 1836													12														
Caddisflies	Trichoptera sp.													2														
	Rhyacophila dorsalis (Curtis, 1834)																1							1		1		
	Glossosomatidae sp.																							6	1			
	Hydroptila sp.																		1						1			
	Oxyethira sp.	2					4					32	4		1								5		1			
	Psychomyiidae sp.													1			2											
	Polycentropodidae sp.													1	3											1		
	Cyrnus trimaculatus (Curtis, 1834)	3				4			1	12	6					33	1										1	
	Holocentropus dubius (Rambur, 1842)														1													
	Plectrocnemia sp.															7	6		1									
	Plectrocnemia conspersa (Curtis, 1834)														13		2	1										
	Polycentropus flavomaculatus (Pictet, 1834)															19	13									1		
	Polycentropus irroratus (Curtis, 1835)										1					8												
	Hydropsyche angustipennis (Curtis, 1834)	14											3									7						
	Hydropsyche siltalai Döhler, 1963							2	2		7						6					1			5	16	9	
	Phryganeidae sp.																						2					
	Lepidostoma hirtum (Fabricius, 1775)						8		8	2		4			8		1	6		28	56				24	276	24	12
	Limnephilidae sp.	1							1								8									2		1
	Hydatophylax infumatus (McLachlan, 1865)																									3		
	Potamophylax group														1		3	2								3		1
	Limnephilus lunatus Curtis, 1834																											1
	Goeridae sp.	2																								4		
	Goera pilosa (Fabricius, 1775)	3																		2	1						1	
	Silo sp.																	1							28			
	Silo nigricornis (Pictet, 1834)																				1							
	Sericostoma personatum (Spence in Kirby & Spence, 1826)						28		36	8					12		2	1		2	1				2	60	16	3
	Leptoceridae sp.						16		36						32		1			3	20				4	28	24	16

Group	Species	Dockens Water Upstream	Rakes Brakes Downstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill / Holmhill Control	Redhill / Holmhill Downstream	Redhill / Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2
	Athripsodes sp.								1										1								
	Mystacides sp.						1	6						1		3	1		48	16		1	1		24	3	5
	Adicella reducta (McLachlan, 1865)																								1		
	Oecetis sp.						1	1																	6	32	32
Butterflies and Moths	Pyrilidae sp.	5										2							3						1		
True Flies	Diptera sp.											1		1	1												
	Tipulidae sp.			4	5	1						2															
	Limoniidae sp.													1	1		2	2									
	Pediciidae sp.					5			2					1			1			2				1	2		1
	Ptychopteridae sp.													3													
	Culicidae sp.																	3							1		
	Ceratopogonidae sp.			1	1	4		3						2	6	1	24	1						1	1	2	
	Simuliidae sp.					5									60		68	2	3	1	19		1				
	Chironomidae sp.	11	8	26	3	36	44	24	24	6	20	80		36	28	664	148	116		40		13	40	20	48	68	40
	Tabanidae sp.					1		1						7				2	16	8				7	1	1	1
	Athericidae sp.					2		14																			
	Empididae sp.							1																	1		
TOTAL NUMBER OF SPECIES		28	8	7	10	23	14	21	18	20	21	17	4	37	16	26	30	11	35	23	14	6	10	29	45	39	28

## 4.2 RIVPACS Predictor Variables

RIVPACS predictor variables for each site are provided in Table 4.2.

Table 4.2. RIVPACS environmental predictor variables for the September 2019 RIVPACS samples (input values for RIVPACS).

Variable	Dockens Water Upstream	Rakes Brakes Downstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore 2 Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill/Homhill Control	Redhill/Holmhill Downstream	Redhill/Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2
Sample date	26/09	19/09	24/09	24/09	25/09	25/09	25/09	26/09	18/09	17/09	18/09	18/09	19/09	17/09	16/09	16/09	17/09	30/09	20/09	24/09	24/09	24/09	27/09	27/09	23/09	23/09
Method	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S	K/S
Duration (min)	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1	3+1
Kick Sampler	CA	PD	CA	VDA	CA	CA	CA	CA	PD	AH	VDA	VDA	AH	AH	AH	AH	AH	AP	AH	AH	AH	AH	CA	CA	VDA	CA
Recorder	VDA	VDA	VDA	CA	VDA	VDA	VDA	VDA	VDA	VDA	PD	PD	VDA	VDA	VDA	VDA	BP	AH	VDA	VDA	VDA	VDA	VDA	VDA	CA	VDA
NGR	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SU	SZ	SU	SZ	SZ
	21853	22089	37744	37977	20584	20710	20629	26991	19081	18267	18527	18477	29558	19565	18312	18978	20300	25833	32402	26800	27069	26877	24837	23245	26318	25793
	12276	12374	05555	05418	05307	05605	05383	07639	12649	12470	12720	13063	09644	17527	16191	16825	17866	03717	06908	02250	02666	02294	99696	00427	98912	99435
Altitude (m)	65	67	9	8	58	61	59	30	47	43	45	45	32	75	55	65	95	28	23	30	25	29	28	35	22	25
Slope (m km <sup>-1</sup> )	5.9	5.9	5.0	5.0	7.0	7.0	7.0	4.5	6.2	6.2	6.5	6.5	10.0	14.0	11.0	13.0	20.0	3.3	5.0	7.1	7.1	7.1	4.1	4.0	4.1	4.1
Discharge (category)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Velocity (category)	3	1	2	2	3	2	3	3	1	1	1	1	1	1	1	1	1	1	1	2	1	2	3	2	2	2
Distance from source (km)	3.7	3.5	0	0.3	1.4	1.1	1.3	6.5	6	7	5	5	8	1.3	3.2	2.4	0.5	17.5	3	0.2	0.8	0.3	6	4.3	7	6.6
Mean width (m)	1.5	1.8	2.0	1.6	1.9	3.0	1.6	3.0	2.0	1.9	0.5	1.2	2.0	1.3	2.1	1.4	0.4	3.0	1.5	0.6	1.5	4.0	1.8	1.9	2.0	1.8
Depth at ¼ width (cm)	19	55	15	5	19	25	10	11	30	14	5	1	7	3	18	10	3	40	3	20	60	31	25	21	15	10
Depth at ½ width (cm)	14	55	24	15	24	31	15	4	27	25	5	3	15	3	18	10	3	42	3	35	61	40	40	23	10	60
Depth at ¾ width (cm)	18	55	21	6	24	24	21	11	29	29	5	1	30	3	26	10	3	28	3	20	61	25	34	21	5	11
Mean depth (cm)	17.0	55.0	20.0	8.7	22.3	26.7	15.3	8.7	28.7	22.7	5.0	1.7	17.3	3.0	20.7	10.0	3.0	36.7	3.0	25.0	60.7	32.0	33.0	21.7	10.0	27.0
Boulders and cobbles (%)	0	0	0	0	0	0	0	0	5	1	0	10	20	10	10	10	0	0	0	0	0	0	0	0	0	0
Pebbles and gravel (%)	90	100	95	95	100	50	100	90	80	95	0	80	70	70	70	80	0	80	100	0	90	90	90	100	84	84
Sand (%)	10	0	5	5	0	50	0	10	0	2	0	5	5	10	10	5	50	20	0	10	5	10	10	0	8	8
Silt and clay (%)	0	0	0	0	0	0	0	0	15	2	100	5	5	10	10	5	50	0	0	90	5	0	0	0	8	8
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature (°C)	16.4	10.5	18.3	17.8	15.3	15.6	15.4	15.5	13.3	14.6	13.8	17.3	11.5	12.7	14.4	14.4	12.7	15.3	10.9	16.9	17.8	17.3	14.4	14.4	13.9	13.9
Conductivity (µs)	134.1	69.8	90.1	82.0	73.9	74.2	74.0	132.5	61.9	64.5	54.0	57.2	205.6	54.0	293.0	293.0	54.0	149.6	227.8	60.1	59.5	61.9	127.1	114.0	121.5	121.5
Dissolved Oxygen (%)	101.4	86.6	91.5	91.0	95.4	97.8	96.2	92.9	95.7	95.9	102.3	92.1	87.8	100.0	92.7	92.7	100.0	101.6	87.4	82.2	98.1	92.6	98.2	92.6	98.9	98.9
Dissolved Oxygen (mg l <sup>-1</sup> )	9.92	9.86	8.60	8.70	9.55	9.68	9.60	9.23	10.20	9.69	10.60	8.10	9.52	10.30	9.44	9.44	10.30	10.12	9.62	7.92	8.71	8.85	10.40	9.47	10.09	10.09
Water clarity	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Turbid	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Turbid	Turbid	Clear	Clear
Water colour	Humic	Humic	Clear	Clear	Clear	Clear	Clear	Humic	Humic	Humic	Humic	Clear	Clear	Clear	Clear	Clear	Humic	Humic	Clear	Clear	Clear	Clear	Humic	Humic	Clear	Clear
Algae cover (%)	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0	0	0	0	0	0	0	0	0	0	20	0
Moss cover (%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5
Higher plant cover (%)	60	0	1	0	0	95	0	0	15	0	100	0	0	0	0	0	0	0	0	100	0	50	0	3	0	0
Total cover (%)	60	0	1	0	0	95	0	0	15	0	100	90	0	0	0	1	0	0	0	100	0	50	0	3	20	5
Detritus	✓	✓	Absent	Absent	Absent	Absent	Absent	✓	✓	✓	Absent	Absent	✓	✓	✓	✓	✓	✓	✓	Absent	Absent	Absent	✓	✓	✓	✓



### 4.3 RIVPACS Stream Type Associations

RIVPACS stream type associations for each site are provided in Table 4.3.

Table 4.3. Stream type (environmental end-group associations) for the September 2019 RIVPACS samples (output values from RIVPACS; associations <0.01 not shown).

End Group	Dockens Water Upstream	Rakes Brakes Ddownstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore 2 Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill/Holmhill Control	Redhill/Holmhill Downstream	Redhill/Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2
1																										
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										
16		0.01																								
17																										
18																										
19																										
20																										
21								0.01				0.06	0.01						0.01							
22																										
23																										
24								0.02				0.01	0.03						0.01						0.01	
25	0.01	0.08			0.01			0.03	0.13	0.25		0.06	0.01	0.01				0.01					0.01	0.02	0.02	0.01
26	0.10	0.06			0.01		0.01	0.08	0.05	0.10		0.03	0.18	0.01	0.07	0.07		0.01	0.01				0.02	0.04	0.02	0.01
27	0.74	0.70	0.96	0.95	0.97	0.92	0.98	0.30	0.24	0.30		0.22	0.22	0.54	0.55	0.83			0.72		0.98	1.00	0.24	0.65	0.19	0.12
28	0.01							0.03		0.01		0.50	0.02	0.02	0.01	0.04			0.18						0.01	
29	0.01	0.01						0.01	0.04	0.05	0.01	0.10	0.01	0.02										0.01	0.01	
30				0.05							0.71			0.41			1.00			1.00						
31																			0.01							
32																										
33																										
34																										
35								0.02				0.01	0.01						0.02						0.01	

End Group	Dockens Water Upstream	Rakes Brakes Ddownstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore 2 Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill/Holmhill Control	Redhill/Holmhill Downstream	Redhill/Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2
36																										
37													0.01					0.01								
38								0.01					0.01						0.01						0.01	
39	0.01							0.01	0.01	0.01	0.13		0.04		0.11	0.02		0.01					0.01		0.01	0.01
40	0.10	0.13	0.04		0.01	0.06		0.48	0.52	0.28	0.14		0.45		0.24	0.02		0.95	0.03		0.01		0.70	0.26	0.70	0.83
41																										
42																										
43																										
Probability of model fit	> 5%	< 1%	< 1%	< 0.1%	> 5%	> 5%	> 5%	> 5%	> 5%	> 5%	< 0.1%	< 0.1%	> 5%	< 1%	> 5%	> 5%	< 1%	> 5%	< 5%	< 0.1%	< 0.1%	< 0.1%	> 5%	> 5%	> 5%	> 5%
Suitability code	1	4	4	5	1	1	1	1	1	1	5	5	1	4	1	1	4	1	2	5	5	5	1	1	1	1

#### 4.4 RIVPACS Biotic Indices

Observed biotic indices, expected biotic indices and Observed/Expected ratios are provided in Table 4.4.

Table 4.4. Observed, Expected (reference condition), and Observed/Expected (O/E) ratios for the RIVPACS samples. Colour key: **Blue** = Better than expected, **White** = Within expected range, **Yellow** = Slightly degraded, **Orange** = Moderately degraded, **Red** = Very degraded.

Biotic Index	Dockens Water Upstream	Rakes Brakes Downstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore 2 Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill/Holmhill Control	Redhill/Holmhill Downstream	Redhill/Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2	
OBSERVED biotic index values																											
TL1 BMWP	124	31	25	21	104	75	94	103	79	97	67	16	158	66	108	143	34	157	124	66	23	58	128	179	149	120	
TL1 NTAXA	22	7	6	6	18	13	15	17	16	17	13	4	26	12	17	22	8	25	20	11	6	10	22	29	25	21	
TL1 ASPT	5.636	4.429	4.167	3.500	5.778	5.769	6.267	6.059	4.938	5.706	5.154	4.000	6.077	5.500	6.353	6.500	4.250	6.280	6.200	6.000	3.833	5.800	5.818	6.172	5.960	5.714	
TL2 WHPT Score (AbW,DistFam)	126.0	28.7	25.8	27.6	131.9	65.9	124.9	107.9	77.1	105.9	60.5	17.5	179.4	76.2	114.2	149.0	48.8	161.5	132.0	65.4	22.5	48.0	157.0	213.6	175.0	134.6	
TL2 WHPT NTAXA (AbW,DistFam)	22	8	7	7	21	13	19	17	17	18	13	4	29	13	18	23	11	27	21	11	6	10	26	33	28	22	
TL2 WHPT ASPT (AbW,DistFam)	5.727	3.587	3.686	3.943	6.281	5.069	6.574	6.347	4.535	5.883	4.654	4.375	6.186	5.862	6.344	6.478	4.436	5.981	6.286	5.945	3.750	4.800	6.038	6.473	6.250	6.118	
TL5 AWIC(Sp) Murphy	6.833	9.000	0.000	6.000	6.000	3.000	6.500	7.500	9.000	7.000	5.500	0.000	7.286	4.500	7.000	6.444	0.000	7.286	8.000	5.500	3.000	0.000	7.444	6.900	6.727	7.125	
TL5 WFD AWIC(\$p) Mcfarland	9.500	12.000	0.000	8.000	7.800	5.000	8.250	10.167	12.000	9.500	7.500	0.000	9.857	5.500	9.000	8.556	0.000	9.571	10.750	7.500	5.000	0.000	10.222	9.800	9.273	9.625	
TL5 LIFE(Sp)	7.417	6.333	6.000	8.000	7.273	6.667	7.714	8.000	6.556	7.385	7.500	0.000	7.857	8.200	7.364	7.867	7.000	7.053	7.750	7.800	6.000	8.000	7.625	7.952	7.737	7.214	
TL5 PSI(Sp)	42.308	10.000	0.000	33.333	55.000	25.000	43.750	78.947	35.294	56.000	23.077	0.000	59.259	71.429	57.143	65.517	25.000	33.333	59.091	30.000	0.000	0.000	56.250	69.048	59.459	54.167	
TL5 SPEAR(Sp) %	29.461	0.000	0.000	0.000	36.990	24.861	37.107	26.191	35.062	21.870	20.832	42.280	40.608	38.853	39.426	32.753	11.226	36.775	43.353	0.000	19.729	14.542	23.385	36.854	31.578	30.280	
TL5 CCI	5.000	1.000	1.000	2.000	4.800	1.000	4.714	4.333	14.444	9.231	15.714	0.000	10.357	18.000	10.455	5.143	2.000	8.947	8.636	5.250	1.000	0.000	3.750	9.250	9.250	3.857	
RIVPACS EXPECTED biotic index values																											
TL1 BMWP	137.352	140.005	133.081	129.304	132.323	134.214	132.083	151.798	155.560	151.540	100.641	131.824	151.352	112.696	139.348	132.773	84.786	166.884	131.711	84.777	132.284	131.760	157.852	142.501	157.857	162.310	
TL1 NTAXA	22.968	23.387	22.329	21.706	22.145	22.541	22.107	25.904	26.396	25.200	18.135	22.363	25.718	19.279	23.843	22.266	15.214	29.037	22.324	15.213	22.169	22.065	27.207	24.084	27.264	28.136	
TL1 ASPT	5.948	5.955	5.919	5.908	5.932	5.916	5.931	5.842	5.877	5.997	5.516	5.858	5.870	5.777	5.807	5.922	5.553	5.716	5.862	5.552	5.925	5.927	5.780	5.890	5.766	5.742	
TL2 WHPT Score (AbW,DistFam)	164.490	167.260	160.065	155.949	159.517	161.115	159.276	177.062	181.355	179.229	118.993	159.267	176.843	135.965	164.587	159.792	102.257	189.776	158.137	102.247	159.374	158.907	181.998	168.742	181.908	185.791	
TL2 WHPT NTAXA (AbW,DistFam)	25.971	26.424	25.409	24.710	25.200	25.628	25.162	29.071	29.607	28.209	20.403	24.970	28.787	21.853	26.905	25.238	17.143	32.532	25.233	17.141	25.238	25.127	30.574	27.221	30.609	31.578	
TL2 WHPT ASPT (AbW,DistFam)	6.336	6.334	6.292	6.293	6.318	6.282	6.317	6.109	6.144	6.371	5.839	6.364	6.168	6.173	6.116	6.321	5.949	5.815	6.260	5.948	6.304	6.311	5.962	6.212	5.948	5.879	
TL5 AWIC(Sp) Murphy	6.661	6.655	6.631	6.608	6.635	6.633	6.635	6.669	6.653	6.689	6.364	6.710	6.710	6.444	6.702	6.664	6.156	6.600	6.657	6.155	6.633	6.632	6.616	6.636	6.631	6.608	
TL5 WFD AWIC(\$p) Mcfarland	9.215	9.200	9.176	9.149	9.177	9.182	9.176	9.280	9.236	9.231	8.993	9.295	9.335	8.985	9.330	9.225	8.693	9.240	9.233	8.692	9.176	9.174	9.230	9.203	9.256	9.237	
TL5 LIFE(Sp)	8.284	8.252	8.294	8.329	8.321	8.276	8.323	7.978	7.952	8.158	8.212	8.383	8.026	8.374	8.093	8.320	8.436	7.599	8.297	8.435	8.313	8.322	7.798	8.138	7.791	7.692	
TL5 PSI(Sp)	72.728	72.092	72.990	73.904	73.812	72.448	73.866	63.578	63.444	70.060	68.695	75.134	64.850	74.590	66.709	73.604	75.239	52.447	72.617	75.231	73.508	73.816	58.340	68.491	58.041	55.163	
TL5 SPEAR(Sp) %	46.656	46.572	46.788	46.445	46.979	46.626	46.981	43.873	44.072	45.703	36.187	42.067	44.174	42.373	43.974	46.429	36.317	41.700	44.833	36.313	46.916	46.996	43.124	45.625	42.618	42.302	
TL5 CCI	9.463	9.632	8.929	9.115	8.882	9.035	8.863	10.764	10.997	10.791	13.285	11.869	10.808	11.312	9.681	9.201	14.516	11.773	9.873	14.515	8.863	8.818	11.041	9.792	11.136	11.404	
OBSERVED / EXPECTED ratios																											
TL1 BMWP	0.903	0.221	0.188	0.162	0.786	0.559	0.712	0.679	0.508	0.640	0.666	0.121	1.044	0.586	0.775	1.077	0.401	0.941	0.941	0.779	0.174	0.440	0.811	1.256	0.944	0.739	
TL1 NTAXA	0.958	0.299	0.269	0.276	0.813	0.577	0.679	0.656	0.606	0.675	0.717	0.179	1.011	0.622	0.713	0.988	0.526	0.861	0.896	0.723	0.271	0.453	0.809	1.204	0.917	0.746	
TL1 ASPT	0.948	0.744	0.704	0.592	0.974	0.975	1.057	1.037	0.840	0.951	0.934	0.683	1.035	0.952	1.094	1.098	0.765	1.099	1.058	1.081	0.647	0.979	1.007	1.048	1.034	0.995	
TL2 WHPT Score (AbW,DistFam)	0.766	0.172	0.161	0.177	0.827	0.409	0.784	0.609	0.425	0.591	0.508	0.110	1.014	0.560	0.694	0.932	0.477	0.851	0.835	0.640	0.141	0.302	0.863	1.266	0.962	0.724	
TL2 WHPT NTAXA (AbW,DistFam)	0.847	0.303	0.275	0.283	0.833	0.507	0.755	0.585	0.574	0.638	0.637	0.160	1.007	0.595	0.669	0.911	0.642	0.830	0.832	0.642	0.238	0.398	0.850	1.212	0.915	0.697	
TL2 WHPT ASPT (AbW,DistFam)	0.904	0.566	0.586	0.627	0.994	0.807	1.041	1.039	0.738	0.923	0.797	0.687	1.003	0.950	1.037	1.025	0.746	1.029	1.004	0.999	0.595	0.761	1.013	1.042	1.051	1.041	
TL5 AWIC(Sp) Murphy	1.026	1.352	0.000	0.908	0.904	0.452	0.980	1.125	1.353	1.046	0.864	0.000	1.086	0.698	1.044	0.967	0.000	1.104	1.202	0.894	0.452	0.000	1.125	1.040	1.014	1.078	
TL5 WFD AWIC(\$p) Mcfarland	1.031	1.304	0.000	0.874	0.850	0.545	0.899	1.096	1.299	1.029	0.834	0.000	1.056	0.612	0.965	0.927	0.000	1.036	1.164	0.863	0.545	0.000	1.107	1.065	1.002	1.042	
TL5 LIFE(Sp)	0.895	0.767	0.723	0.960	0.874	0.806	0.927	1.003	0.824	0.905	0.913	0.000	0.979	0.979	0.910	0.946	0.830	0.928	0.934	0.925	0.722	0.961	0.978	0.977	0.993	0.938	
TL5 PSI(Sp)	0.582	0.139	0.000	0.451	0.745	0.345	0.592	1.242	0.556	0.799	0.336	0.000	0.914	0.958	0.857	0.890	0.332	0.636	0.814	0.399	0.000	0.000	0.964	1.008	1.024	0.982	

Biotic Index	Dockens Water Upstream	Rakes Brakes Downstream	Ferny Croft Control	Ferny Croft Impact	Harvest Slade Control	Harvest Slade Site 1	Harvest Slade Site 2	Highland Water Upstream	Latchmore Site 1	Latchmore 2 Downstream	Thompson Castle Downstream	Thompson Castle Upstream	Millstream Upstream	Millersford Brook 1	Millersford Brook 2	Millersford Brook 3	Millersford Upstream Control	Ober Water Upstream	Pondhead Downstream	Redhill/Holmhill Control	Redhill/Holmhill Downstream	Redhill/Holmhill Upstream	Wootton Phase 1 Site 1	Wootton Control	Wootton Phase 2 Site 1	Wootton Phase 2 Site 2
TLS SPEAR(Sp) %	0.631	0.000	0.000	0.000	0.787	0.533	0.790	0.597	0.796	0.479	0.576	1.005	0.919	0.917	0.897	0.705	0.309	0.882	0.967	0.000	0.421	0.309	0.542	0.808	0.741	0.716
TLS CCI	0.528	0.104	0.112	0.219	0.540	0.111	0.532	0.403	1.313	0.855	1.183	0.000	0.958	1.591	1.080	0.559	0.138	0.760	0.875	0.362	0.113	0.000	0.340	0.945	0.831	0.338

#### 4.5 Species with conservation designations

Species recorded with one or more conservation designations are presented in Table 4.5.

**Table 4.5. Species found in the September 2019 RIVPACS samples with one or more current conservation designations.**

Species	Designation	Source	Sites recorded
<i>Cottus gobio</i> (Linnaeus, 1758) Bullhead	Habitats Directive Annex 2 – non-priority species	Animal and plant species of Community interest (i.e. endangered, vulnerable, rare or endemic in the European Community) whose conservation requires the designation of special areas of conservation.	Pondhead Downstream
<i>Cottus gobio</i> (Linnaeus, 1758) Bullhead	Habitats Directive Annex 2 – non-priority species	Animal and plant species of Community interest (i.e. endangered, vulnerable, rare or endemic in the European Community) whose conservation requires the designation of special areas of conservation.	Wootton Phase 1 Site 1
<i>Cottus gobio</i> (Linnaeus, 1758) Bullhead	Habitats Directive Annex 2 – non-priority species	Animal and plant species of Community interest (i.e. endangered, vulnerable, rare or endemic in the European Community) whose conservation requires the designation of special areas of conservation.	Wootton Control
<i>Cottus gobio</i> (Linnaeus, 1758) Bullhead	Habitats Directive Annex 2 – non-priority species	Animal and plant species of Community interest (i.e. endangered, vulnerable, rare or endemic in the European Community) whose conservation requires the designation of special areas of conservation.	Wootton Phase 2 Site 2
<i>Aquarius najas</i> (DeGeer, 1773) River Skater	Nationally scarce (occurring in 16-100 hectads in Great Britain)	Cook A.A. (2015) <i>A review of the Hemiptera of Great Britain: The aquatic and semi-aquatic bugs</i> . Natural England	Millstream Upstream
<i>Hydatophylax infumatus</i> (McLachlan, 1865) Caddisfly	Nationally scarce (occurring in 16-100 hectads in Great Britain)	Wallace I.D. (2016) A review of the status of caddis flies (Trichoptera) in Great Britain. Species Status 27. Joint Nature Conservation Committee, Peterborough	Wootton Control

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Figure A1.1. Typical habitat at Dockens Water (Sept 2019).



Figure A1.2. Typical habitat at Dockens Water (Sept 2019).





**Figure A1.3. Typical habitat at Dockens Water (Sept 2019).**



**Figure A1.4. Typical habitat at Dockens Water (Sept 2019).**





**Figure A2.1. Typical habitat at Highland Water (Sept 2019).**



**Figure A2.2. Typical habitat at Highland Water (Sept 2019).**





**Figure A2.3. Typical habitat at Highland Water (Sept 2019).**



**Figure A2.4. Typical habitat at Highland Water (Sept 2019).**





Figure A3.1. Typical habitat at Latchmore Brook Site 1 (Sept 2019).



Figure A3.2. Typical habitat at Latchmore Brook Site 1 (Sept 2019).





**Figure A3.3. Typical habitat at Latchmore Brook Site 1 (Sept 2019).**



**Figure A3.4. Typical habitat at Latchmore Brook Site 1 (Sept 2019).**





Figure A4.1. Typical habitat at Latchmore Brook Site 2 (Sept 2018).



Figure A4.2. Typical habitat at Latchmore Brook Site 2 (Sept 2018).





**Figure A4.3. Typical habitat at Latchmore Brook Site 2 (Sept 2018).**



**Figure A4.4. Typical habitat at Latchmore Brook Site 2 (Sept 2018).**





Figure A5.1. Typical habitat at Mill Stream (Sept 2019).



Figure A5.2. Typical habitat at Mill Stream (Sept 2019).





**Figure A5.3. Typical habitat at Mill Stream (Sept 2019).**



**Figure A5.4. Typical habitat at Mill Stream (Sept 2019).**





**Figure A6.1. Typical habitat at Millersford Bottom Site 2 (Sept 2019).**



**Figure A6.2. Typical habitat at Millersford Bottom Site 2 (Sept 2019).**





**Figure A6.3. Typical habitat at Millersford Bottom Site 2 (Sept 2019).**



**Figure A6.4. Typical habitat at Millersford Bottom Site 2 (Sept 2019).**





**Figure A7.1. Typical habitat at Millersford Bottom Site 3 (Sept 2019).**



**Figure A7.2. Typical habitat at Millersford Bottom Site 3 (Sept 2019).**





**Figure A7.3. Typical habitat at Millersford Bottom Site 3 (Sept 2019).**



**Figure A7.4. Typical habitat at Millersford Bottom Site 3 (Sept 2019).**





Figure A8.1. Typical habitat at Millersford Fish Site 1 (Sept 2017).



Figure A8.2. Typical habitat at Millersford Fish Site 1 (Sept 2017).





Figure A9.1. Typical habitat at Ober Water (Sept 2019).



Figure A9.2. Typical habitat at Ober Water (Sept 2019).





**Figure A9.3. Typical habitat at Ober Water (Sept 2019).**



**Figure A9.4. Typical habitat at Ober Water (Sept 2019).**





**Figure A10.1. Typical habitat at Pondhead Site 1 (Sept 2019).**



**Figure A10.2. Typical habitat at Pondhead Site 1 (Sept 2019).**





**Figure A10.3. Typical habitat at Pondhead Site 1 (Sept 2019).**



**Figure A10.4. Typical habitat at Pondhead Site 1 (Sept 2019).**





Figure A11.1. Typical habitat at Pondhead Site 2 (Sept 2019).



Figure A11.2. Typical habitat at Pondhead Site 2 (Sept 2019).





**Figure A11.3. Typical habitat at Pondhead Site 2 (Sept 2019).**



**Figure A11.4. Typical habitat at Pondhead Site 2 (Sept 2019).**





Figure A12.1. Typical habitat at Wootton Phase 1 Site 1 (Sept 2019).



Figure A12.2. Typical habitat at Wootton Phase 1 Site 1 (Sept 2019).





**Figure A12.3. Typical habitat at Wootton Phase 1 Site 1 (Sept 2019).**



**Figure A12.4. Typical habitat at Wootton Phase 1 Site 1 (Sept 2019).**





Figure A13.1. Typical habitat at Wootton Phase 1 Site 2 (Sept 2018).



Figure A13.2. Typical habitat at Wootton Phase 1 Site 2 (Sept 2018).





Figure A13.3. Typical habitat at Wootton Phase 1 Site 2 (Sept 2018).



Figure A13.4. Typical habitat at Wootton Phase 1 Site 2 (Sept 2018).





Figure A14.1. Typical habitat at Wootton Phase 2 Site 1 (Sept 2017).



Figure A14.2. Typical habitat at Wootton Phase 2 Site 1 (Sept 2017).





Figure A14.3. Typical habitat at Wootton Phase 2 Site 1 (Sept 2017).



Figure A14.4. Typical habitat at Wootton Phase 2 Site 1 (Sept 2017).





Figure A15.1. Typical habitat at Wootton Phase 2 Site 2 (Sept 2019).



Figure A15.2. Typical habitat at Wootton Phase 2 Site 2 (Sept 2019).





**Figure A15.3. Typical habitat at Wootton Phase 2 Site 2 (Sept 2019).**



**Figure A15.4. Typical habitat at Wootton Phase 2 Site 2 (Sept 2019).**