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# Baseline survey of the riffle beetle *Normandia nitens* on the Lower Wye SSSI, Wales

Andy Harmer

Evidence Report No. 47

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## 1. Crynodeb Gweithredol

Comisiynodd CNC arolwg i ymchwilio i bresenoldeb, dosbarthiad a helaethrwydd y chwilen *Normandia nitens* brin yn SoDdGA Gwy Isaf. Mae *Normandia nitens* wedi'i dynodi fel rhywogaeth sydd 'mewn perygl' ym Mhrydain dan feini prawf Yr Undeb Rhyngwladol dros Gadwraeth Natur (IUCN) (Foster 2010). Mae arolygon a gynhaliwyd yn y gorffennol wedi canfod y chwilen yn Afon Gwy, er bod y cofnod diwethaf yng Nghymru i'w olrhain yn ôl i 1998.

Roedd yr arolwg yn ymestyn o Warchodfa Natur Genedlaethol Lady Park Wood yn y gogledd i Bont Bigsweir yn y de, sef terfyn llanwol uchaf yr afon. Dim ond ochr Cymru o'r afon a arolygwyd. Yn ystod yr arolwg, a gynhaliwyd fis Hydref 2014, roedd Afon Gwy yn eithriadol o ddwfn ac roedd y llif yn gyflym. Roedd nifer o gynefinoedd ymylol wedi'u gorchuddio'n gyfan gwbl gan ddŵr.

Mae'r chwilen yn hoff o welâu gro ynghanol y sianel a chynefinoedd ymylol, er enghraifft mewn gwreiddiau coed ac ar glogfeini mwsoglyd. Cerddwyd ar hyd y rhan hon o'r afon i gyd, a chafodd lleoliadau addas eu samplu, lle gellid dod o hyd i gynefinoedd dewisol neu lle'r oedd mynediad yn bosibl. Treuliwyd rhwng awr a dwyawr yn samplu ar bob safle.

Samplwyd un ar bymtheg o safleoedd a chofnodwyd sbesimenau unigol o *Normandia nitens* ar bump o'r rhain. Cafodd y chwilen ei dal mewn rhwyd ar gynefinoedd ymylol mewn pum safle, a amrywiai o wreiddiau coed tanddwr a changhennau gordo (gyda, neu heb, weddillion wedi ymgorddeddu) i glogfeini tanddwr. Ychydig o debygrwydd a geid rhwng y pum safle. Roedd rhwydo'r chwilod yn anodd mewn ambell leoliad oherwydd dyfnder a chyflymder yr afon. Daethpwyd o hyd i *Normandia* yn y naill ben a'r llall i'r rhan hon o'r afon. Mae'n debygol fod y chwilen i'w chael drwy'r rhan hon i gyd, ond bod llif cyflym yr afon yn ystod y gwaith samplu wedi llesteirio'r dasg o ddod o hyd i'r chwilen ar safleoedd eraill.

Cofnodwyd y mathau eraill o *Coleoptera* a gafodd eu rhwydo yn ystod y gwaith samplu, gan gynnwys un sbesimen o'r chwilen *Macronychus quadrituberculatus* (Dan Beth Bygythiad IUCN).

## 1. Executive Summary

A survey was commissioned by NRW to investigate the presence, distribution and abundance of the rare riffle beetle *Normandia nitens* within the Lower Wye SSSI. *Normandia nitens* is designated as 'Endangered' in Britain under IUCN criteria (Foster 2010). Previous surveys have located the beetle within the River Wye, although the last record in Wales was from 1998.

The survey stretched from Lady Park Wood National Nature Reserve in the north to Bigsweir Bridge in the south, which is the upper tidal limit of the river. Only the Welsh side of the river was surveyed. The River Wye was extremely deep and fast-flowing during the survey, which took place in October 2014. A number of marginal habitats were completely submerged.

The beetle favours mid-channel gravel beds and marginal habitats of the river, such as within tree roots and on mossy boulders. The whole river section was walked and suitable locations were sampled, where the preferred habitat could be located or where access was possible. Between one and two hours was spent sampling at each site.

Sixteen sites were sampled and single specimens of *Normandia nitens* were recorded at five of these. The beetle was netted within marginal habitats of the five sites, which varied from submerged tree roots and overhanging branches (with or without entangled debris) to submerged boulders. There was little similarity between the five sites. Netting was difficult in some locations due to the depth and speed of the river. *Normandia* was found at either end of the river section and it is probable that the beetle occurs throughout this stretch of river and that adverse flow conditions during sampling hindered locating the beetle at other sites.

Other aquatic Coleoptera netted during sampling were recorded, including a single specimen of the riffle beetle *Macronychus quadrituberculatus* (IUCN *Near Threatened*).

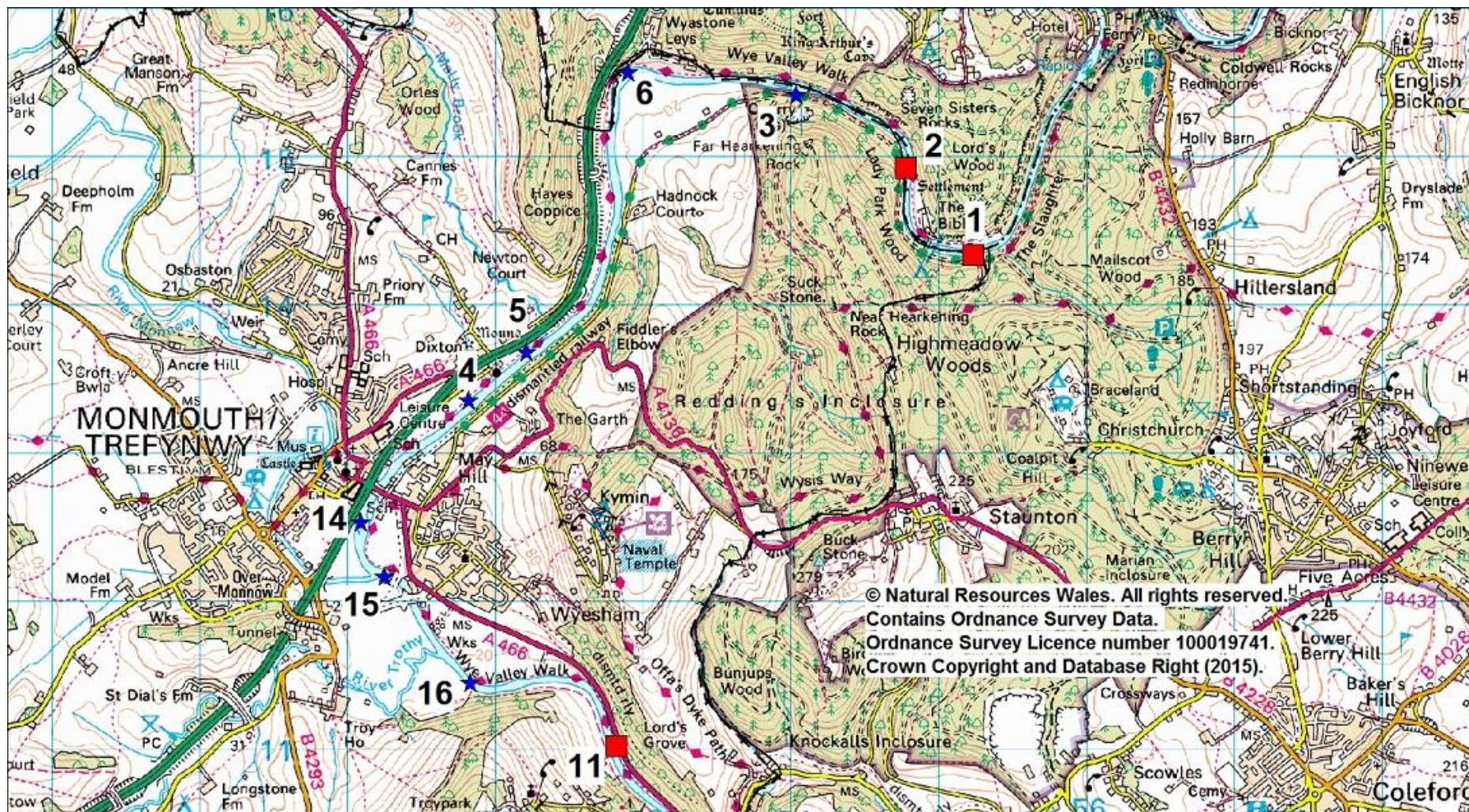
## 2. Introduction

- 3.1 Andy Harmer Limited was commissioned in 2014 by Natural Resources Wales (NRW) to undertake a survey of a section of the River Wye (Afon Gwy), to establish the baseline distribution of the riffle beetle *Normandia nitens*.
- 3.2 The River Wye flows from Plynlimon in the Welsh mountains to Chepstow, in the Severn Estuary. The survey was conducted within the Lower Wye SSSI, Gwent, from Lady Park Wood National Nature Reserve in the north to Bigsweir Bridge in the south, which is the upper tidal limit of the river.
- 3.3 *Normandia nitens* (Coleoptera: Elmidae) is a rare riffle beetle. It is a Red Data Book species and is designated as 'Endangered' under IUCN criteria (Foster 2010). A taxon is classed as 'Endangered' when it is not 'Critically Endangered' but is facing a very high risk of extinction in the wild in the near future. The beetle favours 'well-oxygenated stretches of large, warm, lowland rivers' (Gerend 2011). It can be found within gravel beds mid-channel or within the marginal habitats of the river, such as on tree roots and boulders.
- 3.4 *Normandia nitens* is a Qualifying Feature of the Lower Wye SSSI. The beetle was last recorded in the survey area in 1998, at Monmouth. The results from this survey aim to give an understanding of the beetles distribution and status, which will be used towards developing a Conservation Objective in order to achieve Favourable Condition for the SSSI.

## 3. Methodology

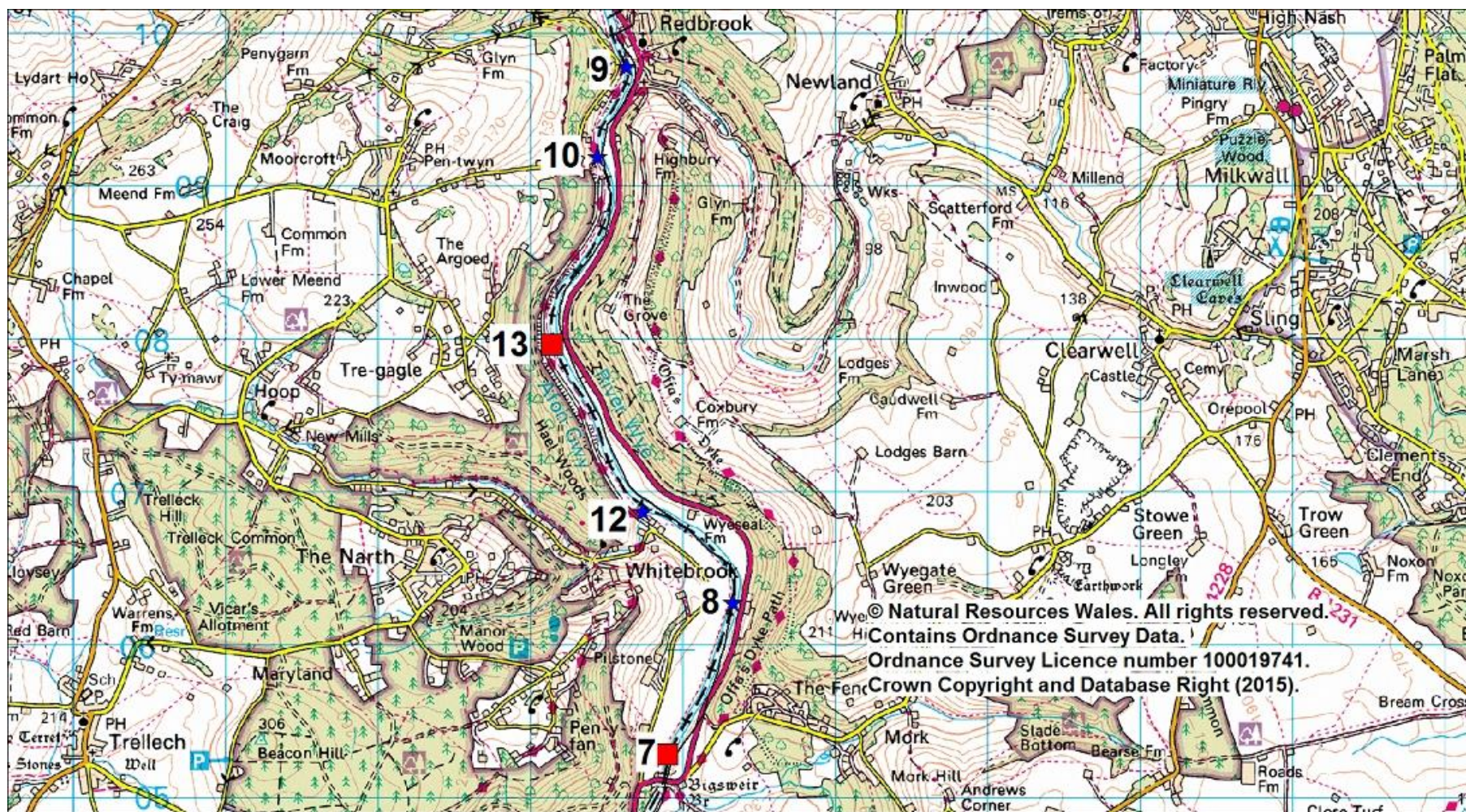
- 4.1 Andy Harmer, with assistance from Rachel Hacking, undertook the field work. Andy has over fourteen years of experience in aquatic macro-invertebrate surveys. The survey took place between 14-18 October 2014.
- 4.2 The entire survey section was walked and sixteen sample sites were chosen (Maps 1 & 2), based on accessibility as well as perceived favourable habitat being present (e.g. boulders and/or tree roots).
- 4.3 At each site, the marginal habitats of the river were extensively sampled. The water and aquatic vegetation was systematically netted using a heavy-duty pond-net. The larger boulders were scraped whereas smaller boulders were removed from the water, held over a net, and searched for the beetle. Tree roots were also netted.
- 4.4 All Coleoptera caught were potted in 70% ethanol to be identified later, unless identification could be made in the field, in which case the animal was released.
- 4.5 Andy Harmer undertook the majority of the identification, using Foster & Friday (2011). A specimen of *Normandia nitens* was sent to Dr. Bill Bellamy, a flowing water macro-invertebrate expert who specialises in Quality Assurance, to be confirmed.

### 3.1. Sampling Stations



Map 1 – upstream sampling stations  
 [red squares indicate sample stations where *N. nitens* was recorded]





Map 2 – downstream sampling stations  
[red squares indicate sample stations where *N. nitens* was recorded]

### 3.2. Survey Constraints

- 4.1.1 At the time of the survey, the water level in the River Wye was high and rose during the survey. Most of the boulders were submerged and the ones that were visible were breaking above the water level only slightly. Tree roots were submerged. Therefore, suitable habitat may have been missed beneath the fast and deep flowing water.
- 4.1.2 Parts of the river banks were inaccessible, despite exhibiting what is considered suitable habitat for *Normandia nitens*. These stretches were not surveyed.

## 4. Results

- 5.1 A total of 16 sites were surveyed within the survey area (Maps 1 & 2). *Normandia nitens* was recorded from 5 of these as singletons: S1, S2, S7, S11 and S13.
- 5.2 One site (S1) also supported *Macronychus quadrituberculatus*, another rare riffle beetle. *Macronychus quadrituberculatus* is a Red Data Book species and is classed as IUCN Lower Risk - Near Threatened in Great Britain. A singleton was netted from the gravel in less than 30cm of water.

### 4.1. Site Descriptions

#### **S1 - SO55231434**

Site 1 is a wide section of the river, with dense woodland and scrub on the bank. At the time of the survey the water was very fast-flowing and turbid. Limited boulders could be seen. The river edge has a gravel substrate. *Normandia nitens* (one specimen) was recorded from here in the roots and branches of a collapsed bankside alder *Anus glutinosa*. The beetle was encountered following vigorous netting of roots, leaf and litter debris in no more than 45 centimetres of water. A singleton of *Macronychus quadrituberculatus* was also netted from here in an extensive shallow area of gravel and sporadic small boulders, which were being disturbed by the surveyor's feet in a 'kick-sample' fashion.

Sample date: 15/10/2014

*Normandia nitens*

*Macronychus quadrituberculatus*

*Brychius elevatus*

*Oulimnius tuberculatus*

*Limnius volckmari*

*Nebrioporus elegans*



Figure 1 - Site 1

**S2 - SO54771493**

Site 2 is an open site, mainly unshaded by trees or scrub. Limited aquatic marginal vegetation is present, including Reed Canary-grass *Phalaris arundinacea* and Himalayan Balsam *Impatiens glandulifera*. The water is deep and the bank has a small shelf which slopes abruptly away into deep water. The bare substrate and exposed roots suggest a recent bank collapse. This has a slower flow than at S1. Debris had become entangled in the vegetation and tree roots. Boulders, if present, could not be reached or detected beneath the water.

*Normandia nitens* (one specimen) was recorded from here; it was encountered following a series of deep upward moving scrapes against the clay bank, before lifting the net through roots, leaf and twig debris.

Sample date: 15/10/2014

*Normandia nitens*

*Stictotarsus duodecimpunctatus*

*Limnius volckmari*

*Nebrioporus elegans*



Figure 2 – Site 2

**S3 - SO54031543**

Site 3 is a relatively open site, mainly unshaded by trees or scrub. A fallen tree trunk has entered the water and the limbs are also submerged. Debris had caught on the tree and this was surveyed. The water here was very fast-flowing, turbid and deep. No aquatic vegetation was recorded.

Sample date: 15/10/2014

*Stictotarsus duodecimpunctatus*

*Nebrioporus elegans*

*Oulimnius tuberculatus*



Figure 3 – Site 3

**S4 - SO51811336**

Site 4 is close to Monmouth. The river here is very wide. The water is deep and turbid with a relatively slow flow. The banks are poached by cattle and sheep. A Crack Willow *Salix fragilis* lies within the water and Alder *Alnus glutinosa* is establishing on the banks. The substrate here is clay. No boulders could be located.

Sample date: 16/10/2014

*Stictotarsus duodecimpunctatus*

*Nebrioporus elegans*

*Oulimnius tuberculatus*



Figure 4 - Site 4

**S5 - SO52201369**

Site 5 is a boat launch area. A wooden deck is present. The river here is wide. The water is deep and turbid with a relatively slow flow. The substrate is mud/clay. The site is semi-shaded by trees. No boulders could be located beneath the water.

Sample date: 16/10/2014

*Stictotarsus duodecimpunctatus*

*Limnius volckmari*

*Oulimnius tuberculatus*



Figure 5 - Site 5

**S6 - SO52891558**

Site 6 is a shaded site. The banks support dense woodland. The margins of the river have a shallow slope and the water is shallow. Here there are many boulders. The main channel of the river is wide and fast-flowing.

Sample date: 16/10/2014

*Stictotarsus duodecimpunctatus*

*Limnius volckmari*

*Oulimnius tuberculatus*



Figure 6 – Site 6

**S7 - SO53890528**

Site 7 is located close to Bigsweir Bridge. Here, the river is slow-flowing, very wide, turbid and deep. The banks are shallow and support permanent pasture. The site is open with no shading. Boulders were located beneath the water.

*Normandia nitens* (one specimen) was recorded from here. The level of the water had risen to such an extent that the surveyor could only stand on what was previously pasture, so the lip of the river bank was located under water. The net was forced through the water to locate boulders; these were scraped as best as possible on either side, but with the main attention being paid to the protected side away from the flow. Though the net had some protection from the boulders, the strength of the flow undoubtedly impacted upon sampling efficiency, such that the net was regularly dragged from the boulder through the substrate. *Normandia nitens* was encountered in around 0.75 metres of fast flowing water after one such attempt.

Sample date: 17/10/2014

*Normandia nitens*

*Stictotarsus duodecimpunctatus*

*Nebrioporus elegans*

*Oulimnius tuberculatus*



Figure 7 – Site 7

**S8 - SO54320628**

Site 8 is an open, unshaded site. The banks are shallow and support permanent pasture. Occasional mature willows occur along the bank. The river here is deep, wide and fast-flowing. The substrate is rocks and silt. A submerged tree was present and was surveyed. Himalayan Balsam occurs in dense swathes on the banks.

Sample date: 17/10/2014

*Stictotarsus duodecimpunctatus*



Figure 8 – Site 8



**S9 - SO53620979**

Site 9 is close to Redbrook Bridge. The river edges are shallow with exposed boulders. The main channel of the river is deep, wide and slow-flowing. The substrate is boulders and silt, with muddy margins. Tree roots are also present in the water. The site is slightly shaded by the bridge and mature trees on the banks.

Sample date: 17/10/2014

*Stictotarsus duodecimpunctatus*

*Nebrioporus elegans*

*Oreodytes septentrionalis*

*Oulimnius tuberculatus*



Figure 9 – Site 9

**S10 - SO53430920**

Site 10 is a shaded site. The banks support dense woodland. The margins of the river support exposed tree roots. Boulders could just be seen beneath the water. The main channel of the river is wide, fast-flowing and deep. Rapids occur in the main channel. The substrate is stones and silt.

Sample date: 17/10/2014

*Helophorus brevipalpis*

*Stictotarsus duodecimpunctatus*

*Nebrioporus elegans*

*Gyrinus urinator*



Figure 10 – Site 10

**S11- SO52811102**

Site 11 is an open, unshaded site. The river has a moderate flow and is turbid and deep. The banks support grassland and are shallow up until a lip that forms what is the usual river edge. Occasional mature willows occur on the banks of the river.

A singleton of *Normandia nitens* was recorded from here. The water level was high so the surveyor could only stand on what was previously pasture. The lip of the river bank was detected and the net was put into the water to locate boulders, which were scraped as best as possible mainly on protected side away from the flow. The depth of the boulders meant that many could only be scraped from their tops, though ones close to the bank had their bases scraped as well. *Normandia nitens* was encountered in around 0.75 metres of fast flowing water.

Sample date: 18/10/2014

*Limnius volckmari*

*Nebrioporus elegans*

*Normandia nitens*



Figure 11 – Site 11

**S12 - SO53730688**

Site 12 is an open, unshaded site. A farm lies close to the site. Many coppiced willows occur on the banks and their roots are within the water. Himalayan Balsam also occurs on the banks. Both the main channel and the sample station is fast-flowing. No aquatic Coleoptera were netted from this site.



Figure 12 – Site 12

**S13 - SO53130797**

Site 13 is a shaded site. The banks support dense woodland. Alder *Alnus glutinosa* trees dominate a deciduous mix on the river margins and their roots are within the water. Leaf detritus and litter debris was attached to the roots and was

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sampled. The substrate at the margins is sand and mud. The main channel is deep and turbid with a moderate flow.

*Normandia nitens* (one specimen) was recorded from here. The beetle was located within a section of submerged Alder roots. The net was forced under the roots and upwards in a scraping or thrashing circular motion. The beetle appears to have been dislodged from the dense lower root system.

Sample date: 18/10/2014

*Normandia nitens*

*Stictotarsus duodecimpunctatus*

*Nebrioporus elegans*

*Gyrinus urinator*



Figure 13 – Site 13

#### **S14 - SO51081254**

Site 14 is located just south of the main bridge in Monmouth. A fishing platform was used as a survey platform for part of the sampling. Aquatic vegetation was not apparent; flooded terrestrial herbage and willows line the margins making the sampling area partially shaded. The substrate is mud. Close to the fishing platform, the water is still. The main channel of the river is wide and fast-flowing.

Sample date: 19/10/2014

*Gyrinus urinator*

*Limnius volckmari*

*Nebrioporus elegans*



Figure 14 – Site 14

**S15 - SO51241217**

Site 15 is a slightly shaded site, located just south of Monmouth. Mature Ash *Fraxinus excelsior* trees line the banks. Fishing platforms are present. The banks support dense vegetation. The water level was very high and tree roots were present beneath the water.

Sample date: 19/10/2014

*Stictotarsus duodecimpunctatus*

*Oulimnius tuberculatus*

*Gyrinus urinator*



Figure 15 – Site 15

**S16 - SO51821145**

Site 16 is an open, unshaded site. Occasional willows occur along the banks, emerging from the water. The margins of the river are shallow and the banks support permanent pasture. No aquatic vegetation could be located.

Sample date: 19/10/2014

*Helophorus brevipalpis*

*Oulimnius tuberculatus*

*Gyrinus urinator*



Figure 16 – Site 16

## 5. Discussion

- 6.1 Five out of 16 sites sampled support *Normandia nitens*; three were marginal habitats containing roots (one with a clay bank), and the remaining two were open river boulders. The beetle was recorded from both the upstream limit of sampling (S1) and the downstream limit (S7). S7 is a slightly brackish part of the river.
- 6.2 *Normandia nitens* was only encountered following the netting of permanent or semi-permanent features, such as roots, boulders, and robust clay banks, never in what could be considered a temporary or mobile feature such as leaf detritus, loose sand or mud. Shade, or lack of shade, appeared not to influence presence as there was stark contrast in light levels between the sites where the beetle occurred. River strength and flow differed at the sample stations where *Normandia nitens* occurred and this possibly shows its tolerance levels rather than preference.
- 6.3 At the time of the survey the river was extremely high and fast-flowing in many places, making access to boulders and tree roots difficult in places; a disproportionate amount of marginal habitat was accessible compared to open river gravel and boulders so the disparity in 'finds' could be misleading.
- 6.4 *Normandia nitens* was located in a range of aspects, shade and substrate, throughout the sampling range and as such no single feature could be used as a strong indicator of presence. As common features such as tree roots, boulders and collapsed banks occur throughout the entire stretch of river surveyed, it is reasonable to assume that *Normandia nitens* also occurs in similar features along the whole stretch.
- 6.5 Further survey work for *Normandia nitens* should be conducted when the river levels are lower than in October 2014.

## 6. References

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