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Monitoring Invertebrate
features on SSSIs: *Tetragnatha
striata* on Newport Wetlands
NNR, Gwent

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Crynodeb gweithredol

Arolygwyd y pryf copyn *Tetragnatha striata* yng Ngwarchodfa Natur Genedlaethol Gwlyptiroedd Casnewydd ar 2-3 Medi 2013, er mwyn sefydlu protocol monitro safonau cyffredin ar gyfer y nodwedd hon o'r SoDdGA. Gwelwyd fod y pryf copyn yn gyffredin ar draws y warchodfa, ond wedi'i gyfyngu yn ei hanfod i'w gynefin penodol, sef *Phragmites australis* ffiniol sy'n ymddangos wrth ymyl dŵr agored. Yma roedd y pryf copyn yn creu ei godenni wyau ar ddail tua 65cm uwch ben wyneb y dŵr. Cofnodwyd cyfanswm o 73 o bryfed cop a 625 o godenni wyau ar 480 o safleoedd dyddodi.

Canfuwyd mai arolygon trawslun mewn cwch oedd y dulliau mwyaf addas o fonitro'r nodwedd hon yn y SoDdGA, yn hytrach na chwilio ar droed. Sefydlwyd protocol monitro safonau cyffredin yn seiliedig ar raddfa'r cynefin addas a'r cyfrif o godenni wyau/pryfed cop (yn deillio o arolygu trawslun mewn 6km bron o gynefin addas). Credir fod nodwedd y SoDdGA mewn cyflwr ffafriol ar hyn o bryd yng Ngwarchodfa Natur Genedlaethol Gwlyptiroedd Casnewydd.

Hefyd cofnodwyd y pryf copyn linyffid nodedig yn genedlaethol, *Hypomma fulvum*, yn ystod yr arolwg, a dyma'r unig ardal lle mae i'w ganfod yng Nghymru hyd y gwyddom ni, a hefyd 16 o rywogaethau cyffredin o bryfed cop.

Executive summary

The spider *Tetragnatha striata* was surveyed at the Newport Wetlands NNR on the 2–3 September 2013, in order to establish a Common Standards Monitoring protocol for this SSSI feature. The spider was found to be widespread across the reserve, but essentially restricted to its specific habitat of emergent, marginal *Phragmites australis* next to open water. Here the spider constructed its egg-sacs on leaves about 65 cm above the water surface. In total 73 spiders and 625 egg-sacs at 480 deposition sites were recorded.

Boat transect surveys were found to be the most suitable means of monitoring this SSSI feature, as opposed to searching on foot. A Common Standards Monitoring protocol was established based on extent of suitable habitat and egg-sac/spider counts (derived from transect surveying almost 6 km of suitable habitat). The SSSI feature is currently considered to be in favourable condition on the Newport Wetlands NNR.

The Nationally Notable A linyphiid spider *Hypomma fulvum* was also recorded during the survey at its only known Welsh locality, along with 16 common spider species.

1 Introduction

The spider genus *Tetragnatha* is represented in Britain by six species: *Tetragnatha extensa*, *T. montana*, *T. nigrita*, *T. obtusa*, *T. pinicola* and *T. striata*. This report concerns *Tetragnatha striata*, a species which is listed as Nationally Notable B.

The Spider Recording Scheme holds 322 British records of *Tetragnatha striata*. However, in Wales, it has only been recorded from five locations: Cors Goch NNR; Conwy RSPB Reserve; Parc Menai, Bangor; Kenfig NNR; Newport Wetlands NNR. It was first discovered at the Newport Wetlands NNR in 2001, when a population was found inhabiting emergent *Phragmites* at what is now known as Reedbed-6 (Fig. 6) (Gallon 2001).

Tetragnatha striata occupies a very specific ecological habitat – namely *Phragmites australis* growing over standing water (Locket & Millidge, 1951, Roberts, 1985, Harvey *et al.* 2002, Almquist, 2005). Mature females are recorded between April and October, and mature males between May and September. The spider constructs a small orb-web on reeds, but is highly cryptic, folding itself along a reed stem when at rest (Fig. 1). Egg-sacs are typically attached to live *Phragmites* leaves (1 m above the water surface), where they resemble circular white/black bird droppings, laid either singly or in a multiple row. Although egg-sacs are easily observed, only occasionally do you find female spiders accompanying them (Figs. 2–4).



Figures 1–2: 1. *Tetragnatha striata* folded cryptically along *Phragmites* stem next to its orb web. 2. Adult female *Tetragnatha striata* next to two egg-sacs on *Phragmites* leaf.



Figure 3: Adult female *Tetragnatha striata* next to two egg-sacs on *Phragmites* leaf.



Figure 4: Three *Tetragnatha striata* egg-sacs in a single deposition site on a *Phragmites* leaf.

Tetragnatha striata is a feature of the Newport Wetlands SSSI. This report details the distribution of this feature across the NNR and proposes a Common Standards Monitoring protocol to enable its condition to be monitored and assessed in the future.

2 Methods

2.1 *Tetragnatha striata* survey methods

This survey was conducted on the 2–3 September 2013 at the Newport Wetlands NNR by Richard Gallon, and assisted by Reserve Manager Kevin Dupé.

The largely linear nature of the NNR's open water, together with its dense marginal growth of *Phragmites*, were key factors in choosing to conduct most of the surveying from a boat (flat bottomed punt). This allowed safe and rapid surveying of the known habitat used by *Tetragnatha striata* – *Phragmites* emerging from standing water. Attempts to record this spider on foot from reed (ditch) banks would have been extremely difficult, since both progress and vision would have been severely impeded by the reeds, and it was not possible to wade into many of the ditches due to water depth (over 145 cm in places). Survey locations in this report are depicted in Figures 5–8.

2.1.1 Boat ditch transects

The ditches of Reedbeds 4–9, the Back Ditch (East & West sections) and the pool at Reedbed-2 were surveyed by boat (Figs. 6–8). One man paddling the boat slowly alongside one of the banks (about 1.5m from the emergent reed margin), with the surveyor counting all egg-sacs and spiders observed on emergent vegetation that side of the ditch.

Initially (Back Ditch East & West – both North and South banks) each egg-sac's location was recorded by GPS, and its height above water estimated, but this was found to be impractical due to the number of egg-sacs encountered. Thereafter just total counts of egg-sacs and spiders were made for the lengths of the ditches (determined using GIS). Where multiple egg-sacs were deposited in a row, this information was also captured, but still defined as one 'deposition site'.

Several spider specimens were collected throughout the survey to ensure other *Tetragnatha* species were not occupying the same habitat, and to verify that the observed egg-sacs were those of *Tetragnatha striata* (females collected next to egg-sacs).

2.1.2 Foot survey

It was not possible to use the boat at some locations on the NNR, due to the shallow water depth and presence of thick mud (Fig. 17). In order to confirm the presence of *Tetragnatha striata* on the eastern lagoons (Lagoons 2–3, Fig. 8) and the small pool within Reedbed-11 (Fig. 18) waders were used to walk along sections of emergent reed.

At the Old Lagoon and the Southern RSPB Reedbed egg-sac investigations were carried out from the bank using binoculars.

2.1.3 Reed shaking

During the foot survey at Lagoons 2–3 (Fig. 8) it was found that by grabbing an arm-load of attached reeds and shaking it over the water surface, numerous spiders (including *T. striata*) would be dislodged and fall onto the water surface, from where they could be collected. This method was used at the pool in Reedbed-11 (Fig. 6) and also trialled as a monitoring method by boat transect at Reedbed-7 (North Bank - West).

The monitoring trial at Reedbed-7 involved paddling for one minute, stopping to shake an arm-load of reeds and counting the dislodged *Tetragnatha striata*, then paddling for a further minute before the next shake sample. Seven shake sampling stops were made during this trial.

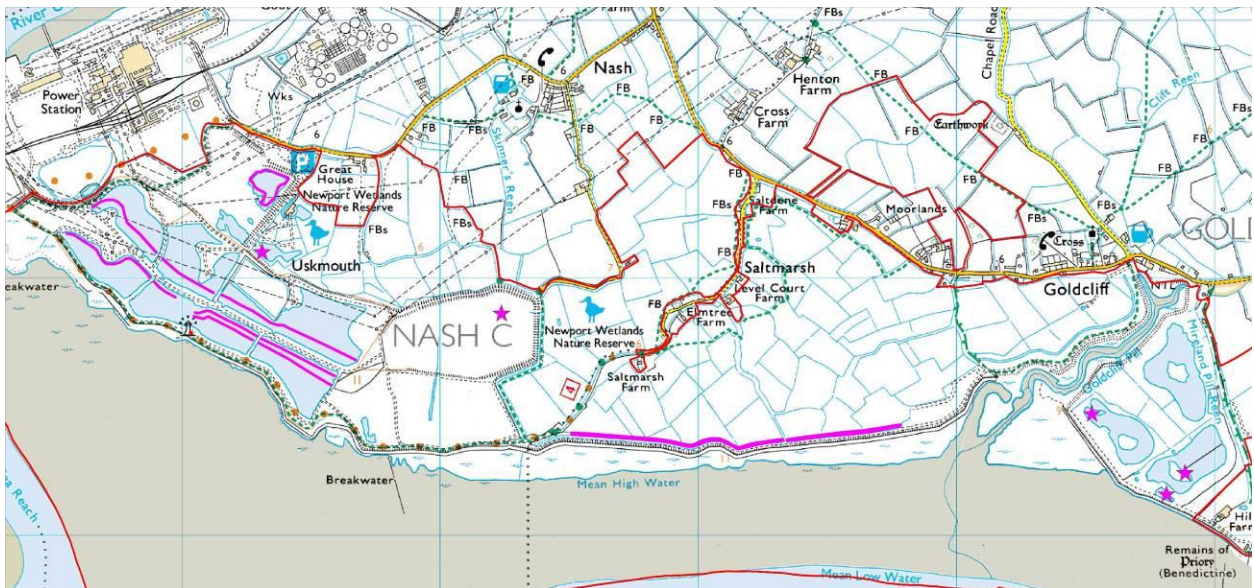


Figure 5: Overview map showing *Tetragnatha striata* survey areas on Newport Wetlands NNR. Key: NNR boundary red; survey transects and sample points in pink.

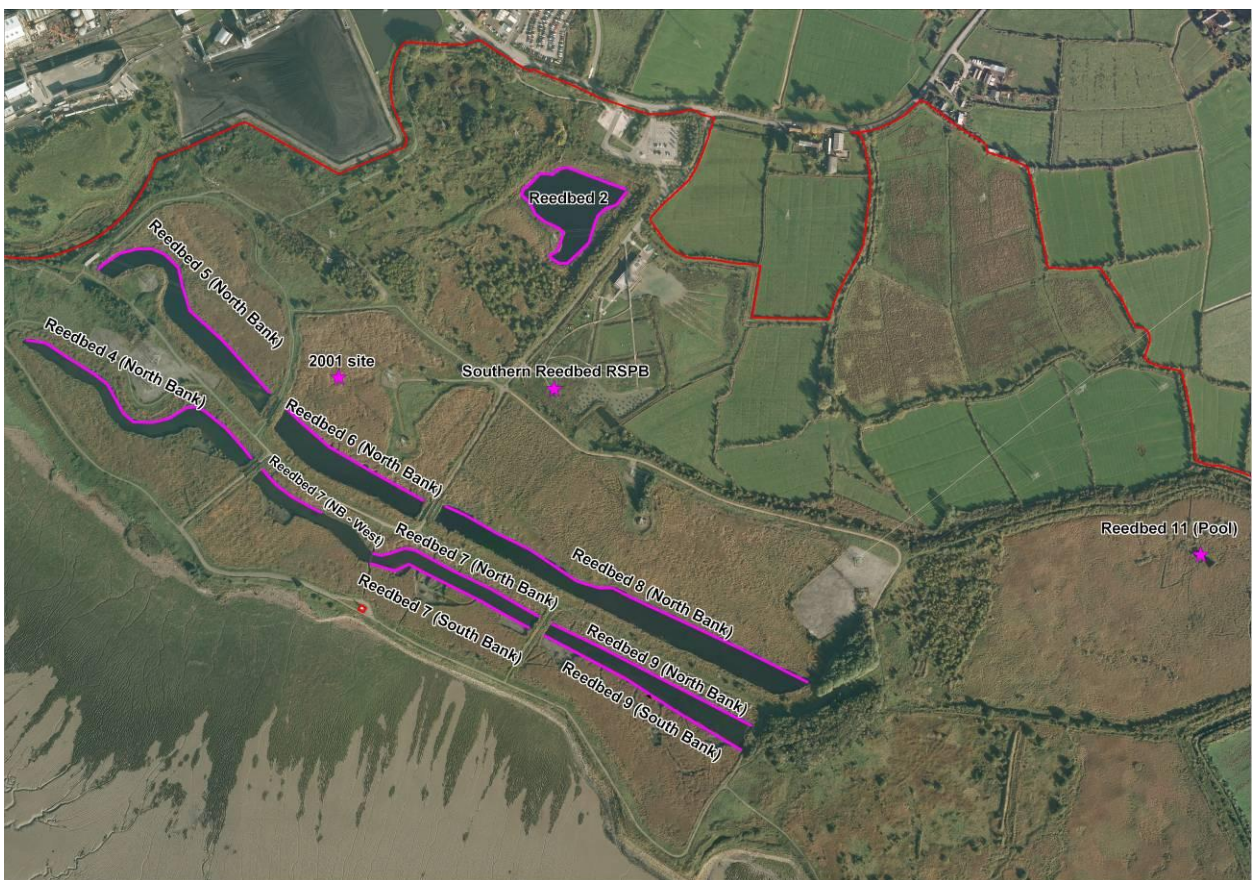


Figure 6: Map showing *Tetragnatha striata* survey areas on western section of Newport Wetlands NNR. Key: NNR boundary red; survey transects and sample points in pink.



Figure 7: Map showing *Tetragnatha striata* survey areas of Back Ditch section of Newport Wetlands NNR. Key: NNR boundary red; survey transects in pink.



Figure 8: Map showing *Tetragnatha striata* survey areas of Newport Wetlands NNR Lagoons. Key: NNR boundary red; survey sample points in pink.

3 Results

3.1 General survey results

All of the areas specifically surveyed for *Tetragnatha striata* during this study produced records of their egg-sacs or the spiders themselves (Figs. 5–8). *Tetragnatha striata*, as a SSSI feature, is therefore widely distributed throughout the NNR, but only in its specific habitat (marginal *Phragmites australis* standing in open water). Attempts to find specimens or their egg-sacs within dense reed stands (i.e. while walking through dense reedbed-11 to access the small pool) and dry areas of reedbed were unsuccessful.

In total 625 *T. striata* egg-sacs at 480 deposition sites were recorded. However, only 73 spiders were recorded using all survey methods employed.

The transect boat survey counts (Back Ditch East & West, Reedbeds 2, 4–9) yielded 613 egg-sacs at 472 deposition sites, and 40 spiders. These transects covered 5793 m in total; hence 0.106 egg-sacs per/m, 0.081 egg-sac deposition sites per/m, 0.007 spiders per/m of suitable habitat.

Although live *Phragmites australis* (90%, *n.* 266) was by far the most favoured plant used by *Tetragnatha striata* to lay its egg-sacs on, some egg-sacs were found on *Glyceria maxima* (8%, *n.* 266), *Malus* sp. (<1%, *n.* 266), *Rosa* sp. (<1%, *n.* 266) and *Typha latifolia* (<1%, *n.* 266). The mean egg-sac height above water was 65 cm (*n.* 266).

A small number of other spider species (17 additional species) were recorded during the survey period (Tables 16, 17, 20). Of these the Nationally Notable A linyphiid spider *Hypomma fulvum* was of note. *Hypomma fulvum* is widespread in southeast England, but is known only from the Gwent Levels in Wales. During this survey it was found easily by shaking *Phragmites* over water and collecting the specimens from the water surface.

Back Ditch East (North Bank); boat survey (Figs. 7, 9)

02/09/2013

ST3578182432 – ST3534282379

Transect length: 444m

Table 1	
Number of spiders	6 female (total = 6)
Total number of egg-sacs	217
Number of egg-sac deposition sites	151
Number of deposition sites with 1 egg-sac	111
Number of deposition sites with 2 egg-sacs	21
Number of deposition sites with 3 egg-sacs	14
Number of deposition sites with 4 egg-sacs	4
Number of deposition sites with 5 egg-sacs	0
Number of deposition sites with 6 egg-sacs	1
Mean egg-sac height above water surface	59 cm
Deposition site on <i>Phragmites australis</i>	131
Deposition site on <i>Glyceria maxima</i>	18
Deposition site on <i>Rosa</i>	1
Deposition site on <i>Rubus fruticosus</i> agg.	1
Egg-sac deposition sites per/m of bank	0.34
Egg-sacs per/m of bank	0.49

Back Ditch West (North Bank); boat survey (Figs. 7, 10)

02/09/2013

ST3529082380 – ST3448882396

Transect length: 850m

Table 2	
Number of spiders	2 female, 1 unsexed, 1 immature (total = 4)
Total number of egg-sacs	65
Number of egg-sac deposition sites	51
Number of deposition sites with 1 egg-sac	43
Number of deposition sites with 2 egg-sacs	4
Number of deposition sites with 3 egg-sacs	3
Number of deposition sites with 4 egg-sacs	0
Number of deposition sites with 5 egg-sacs	1
Number of deposition sites with 6 egg-sacs	0
Mean egg-sac height above water surface	53 cm
Deposition site on <i>Phragmites australis</i>	49
Deposition site on <i>Malus</i>	2
Egg-sac deposition sites per/m of bank	0.06
Egg-sacs per/m of bank	0.08

Back Ditch West (South Bank); boat survey (Figs. 7, 10)

02/09/2013

ST3449182405 – ST3530782375

Transect length: 850m

Table 3

Number of spiders	0
Total number of egg-sacs	47
Number of egg-sac deposition sites	46
Number of deposition sites with 1 egg-sac	45
Number of deposition sites with 2 egg-sacs	1
Number of deposition sites with 3 egg-sacs	0
Number of deposition sites with 4 egg-sacs	0
Number of deposition sites with 5 egg-sacs	0
Number of deposition sites with 6 egg-sacs	0
Mean egg-sac height above water surface	92 cm
Deposition site on <i>Phragmites australis</i>	46
Egg-sac deposition sites per/m of bank	0.05
Egg-sacs per/m of bank	0.06

Back Ditch East (South Bank); boat survey (Figs. 7, 9)

02/09/2013

ST3537282377 – ST3573582424

Transect length: 444m

Table 4

Number of spiders	2 female, 1 unsexed, 2 immature (total = 5)
Total number of egg-sacs	20
Number of egg-sac deposition sites	18
Number of deposition sites with 1 egg-sac	17
Number of deposition sites with 2 egg-sacs	0
Number of deposition sites with 3 egg-sacs	1
Number of deposition sites with 4 egg-sacs	0
Number of deposition sites with 5 egg-sacs	0
Number of deposition sites with 6 egg-sacs	0
Mean egg-sac height above water surface	78 cm
Deposition site on <i>Phragmites australis</i>	14
Deposition site on <i>Glyceria maxima</i>	3
Deposition site on <i>Typha latifolia</i>	1
Egg-sac deposition sites per/m of bank	0.04
Egg-sacs per/m of bank	0.05

Reedbed 9 (North Bank); boat survey (Figs. 7, 11)

02/09/2013

ST3359282619 – ST3336682765

Transect length: 320m

Table 5

Number of spiders	4
Total number of egg-sacs	51
Number of egg-sac deposition sites	34
Number of deposition sites with 1 egg-sac	24
Number of deposition sites with 2 egg-sacs	4
Number of deposition sites with 3 egg-sacs	5
Number of deposition sites with 4 egg-sacs	1
Egg-sac deposition sites per/m of bank	0.11
Egg-sacs per/m of bank	0.16

Reedbed 9 (South Bank); boat survey (Figs. 6, 11)

02/09/2013

ST3329582748 – ST3357782585

Transect length: 320m

Table 6

Number of spiders	3 female, 1 male (total = 4)
Total number of egg-sacs	40
Number of egg-sac deposition sites	32
Number of deposition sites with 1 egg-sac	26
Number of deposition sites with 2 egg-sacs	5
Number of deposition sites with 3 egg-sacs	0
Number of deposition sites with 4 egg-sacs	1
Egg-sac deposition sites per/m of bank	0.10
Egg-sacs per/m of bank	0.13

Reedbed 7 (North Bank); boat survey (Fig. 6)

02/09/2013

ST3328682776 – ST3304982866

Transect length: 260m

Table 7

Number of spiders	4
Total number of egg-sacs	9
Number of egg-sac deposition sites	8
Number of deposition sites with 1 egg-sac	7
Number of deposition sites with 2 egg-sacs	1
Number of deposition sites with 3 egg-sacs	0
Number of deposition sites with 4 egg-sacs	0
Egg-sac deposition sites per/m of bank	0.03
Egg-sacs per/m of bank	0.03

Reedbed 7 (South Bank); boat survey (Fig. 6)

02/09/2013

ST3304682851 – ST3327482759

Transect length: 260m

Table 8

Number of spiders	0
Total number of egg-sacs	17
Number of egg-sac deposition sites	15
Number of deposition sites with 1 egg-sac	13
Number of deposition sites with 2 egg-sacs	2
Number of deposition sites with 3 egg-sacs	0
Number of deposition sites with 4 egg-sacs	0
Egg-sac deposition sites per/m of bank	0.06
Egg-sacs per/m of bank	0.07

Reedbed 8 (North Bank); boat survey (Figs. 6, 12)

03/09/2013

ST33658269 – ST3315882938

Transect length: 575m

Table 9

Number of spiders	4 female, 1 immature (total = 5)
Total number of egg-sacs	40
Number of egg-sac deposition sites	31
Number of deposition sites with 1 egg-sac	24
Number of deposition sites with 2 egg-sacs	5
Number of deposition sites with 3 egg-sacs	2
Number of deposition sites with 4 egg-sacs	0
Egg-sac deposition sites per/m of bank	0.05
Egg-sacs per/m of bank	0.07

Reedbed 6 (North Bank); boat survey (Figs. 6, 13)

03/09/2013

ST3311882947 – ST3292083079

Transect length: 240m

Table 10

Number of spiders	0
Total number of egg-sacs	26
Number of egg-sac deposition sites	22
Number of deposition sites with 1 egg-sac	18
Number of deposition sites with 2 egg-sacs	4
Number of deposition sites with 3 egg-sacs	0
Number of deposition sites with 4 egg-sacs	0
Egg-sac deposition sites per/m of bank	0.09
Egg-sacs per/m of bank	0.11

Reedbed 5 (North Bank); boat survey (Figs. 6, 14)

03/09/2013

ST32898310 – ST3266283279

Transect length: 360m

Table 11

Number of spiders	1 female (total = 1)
Total number of egg-sacs	20
Number of egg-sac deposition sites	18
Number of deposition sites with 1 egg-sac	16
Number of deposition sites with 2 egg-sacs	2
Number of deposition sites with 3 egg-sacs	0
Number of deposition sites with 4 egg-sacs	0
Egg-sac deposition sites per/m of bank	0.05
Egg-sacs per/m of bank	0.06

Reedbed 4 (North Bank); boat survey (Figs. 6, 15)

03/09/2013

ST3255783178 – ST3287783010

Transect length: 405m

Table 12

Number of spiders	1 female (total = 1)
Total number of egg-sacs	20
Number of egg-sac deposition sites	16
Number of deposition sites with 1 egg-sac	13
Number of deposition sites with 2 egg-sacs	2
Number of deposition sites with 3 egg-sacs	1
Number of deposition sites with 4 egg-sacs	0
Egg-sac deposition sites per/m of bank	0.04
Egg-sacs per/m of bank	0.05

Reedbed 2 (circumference); boat survey (Figs. 6, 16)

03/09/2013

ST33378340

Transect length: 465m

Table 13

Number of spiders	5 female, 1 male (total = 6)
Total number of egg-sacs	41
Number of egg-sac deposition sites	30
Number of deposition sites with 1 egg-sac	20
Number of deposition sites with 2 egg-sacs	9
Number of deposition sites with 3 egg-sacs	1
Number of deposition sites with 4 egg-sacs	0
Egg-sac deposition sites per/m of bank	0.06
Egg-sacs per/m of bank	0.09

Lagoon Old; foot survey (Fig. 8)

03/09/2013

ST36818216

Field observation

Table 14

Number of spiders	1 female
Total number of egg-sacs	10
Number of egg-sac deposition sites	6
Number of deposition sites with 1 egg-sac	4
Number of deposition sites with 2 egg-sacs	1
Number of deposition sites with 3 egg-sacs	0
Number of deposition sites with 4 egg-sacs	1

Southern Reedbed RSPB; foot survey (Fig. 6)

03/09/2013

ST3331283115

Field observation

Table 15

Number of spiders	0
Total number of egg-sacs	1

Lagoon 3; foot survey (Figs. 8, 17)

03/09/2013

ST36888224

Shook samples (not quantified)

Table 16

<i>Tetragnatha striata</i>	2 female, 1 imm. male, 1 imm. female
<i>Gnathonarium dentatum</i>	2M, 2F
<i>Clubiona phragmitis</i>	2F
<i>Clubiona</i> sp.	2 imms.
<i>Hypomma fulvum</i>	3F

Lagoon 2; foot survey (Fig. 8)

03/09/2013

ST36528247

Shook samples (x10 arm-loads of *Phragmites*). All *Tetragnatha* collected, incidental records of other spider species.**Table 17**

<i>Tetragnatha striata</i>	2F, 1 imm. M, 1 imm. (total = 4)
<i>Clubiona phragmitis</i>	1F
<i>Hypomma fulvum</i>	1F

Reedbed 11 (Pool); foot survey (Figs. 6, 18)

03/09/2013

ST34238287

Shook samples (not quantified)

Table 18

<i>Tetragnatha striata</i>	10 unsexed, 1 egg-sac
----------------------------	-----------------------

Reedbed 7 (North Bank - West) – boat survey (Fig. 6)

03/09/2013

ST3289582990

Shook samples (x7 arm-loads of *Phragmites*). All *Tetragnatha* and *Clubiona* recorded.

Table 19

Shook sample	<i>Tetragnatha striata</i>	<i>Clubiona</i> spp.
1	0	0
2	0	0
3	0	1
4	2	0
5	2	0
6	4	1
7	6	0
Total	14	2



Figure 9: Back Ditch East (looking West), Newport Wetlands NNR Lagoons.



Figure 10: Back Ditch West (looking West), Newport Wetlands NNR Lagoons.



Figure 11: Reedbed 9 (looking West), Newport Wetlands NNR Lagoons.



Figure 12: Reedbed 8 (looking West), Newport Wetlands NNR Lagoons.



Figure 13: Reedbed 6 (looking West), Newport Wetlands NNR Lagoons.



Figure 14: Reedbed 5 (looking West), Newport Wetlands NNR Lagoons.



Figure 15: Reedbed 4 (looking East), Newport Wetlands NNR Lagoons.



Figure 16: Reedbed 2, Newport Wetlands NNR Lagoons.



Figure 17: Lagoon 3 (looking North), Newport Wetlands NNR Lagoons.



Figure 18: Reedbed 11 Pool, Newport Wetlands NNR Lagoons.

4 Discussion

4.1 Common Standards Monitoring Newport Wetlands NNR

Based on the current extent/condition of suitable habitat, number of *Tetragnatha striata* egg-sacs observed and its wide occurrence across the reserve, this SSSI feature is currently considered in favourable condition.

4.1.1 Conservation Objective for *Tetragnatha striata* at Newport Wetlands NNR

Conservation Objective (for when the feature is in favourable condition)	To maintain <i>Tetragnatha striata</i> at Newport Wetlands in favourable condition where
Lower limit	<p>in one year in 6, a boat-based transect survey of at least 3 ditches (North bank) should record (over at least 700 m of suitable habitat in early September):</p> <p>-----</p> <p>0.08 egg-sacs per/m. (i.e. 56 egg-sacs within 700 m of suitable habitat)</p> <p>Or</p> <p>0.06 egg-sac deposition sites per/m. (i.e. 42 egg-sacs deposition sites within 700 m of suitable habitat)</p> <p>-----</p> <p>And</p> <p>0.006 spiders per/m (i.e. 4 <i>Tetragnatha striata</i>* spiders, whether guarding an egg-sac or not, within 700 m of suitable habitat).</p>
	and
Habitat quality Lower limit	Within the ditch systems in Figures 6 & 7 at least 2000 m of suitable tall marginal <i>Phragmites</i> habitat is maintained.
Definition of suitable <i>Tetragnatha striata</i> habitat	Tall emergent pure stands of <i>Phragmites australis</i> growing marginally to areas of permanently standing open water (either around pools or along ditches). The reeds should not be shaded by trees or shrubs. Reed stolon ingress into open water, with its associated short leafy growth should be maintained.

* In this case it is reasonable to assume that any *Tetragnatha* spider found sitting on *Phragmites* leaves over water is *T. striata*, rather than any other *Tetragnatha* species.

4.1.2 Justification for limits and survey protocol

Although *Tetragnatha striata* and its egg-sacs can be recorded by wading into open water, this method is slow and laborious, and would not cover sufficient ground to assess the condition of the feature adequately. The deep water ditches at Newport Wetlands NNR makes surveying *T. striata* on foot impractical.

During this study 5793 m of emergent, marginal *Phragmites* habitat was examined by boat survey. This method proved to be a reliable and easy way of spotting egg-sacs

adhering to *Phragmites* leaves. It was found to be more difficult observing the egg-sacs along the South banks of the ditches, due to the positioning of the autumn sun causing glare, so it is suggested that monitoring be undertaken along the northern banks of ditches. September is an ideal month in which to conduct monitoring of *T. striata*, since it avoids disturbance of nesting reedbed birds and coincides with a period when adults and egg-sacs of *T. striata* are present.

The survey of 5793 m of suitable habitat produced values of 0.106 egg-sacs per/m, 0.081 egg-sac deposition sites per/m and 0.007 spiders per/m. Given that the surveyed habitat was considered ideal for the species (Locket & Millidge, 1951, Roberts, 1985, Harvey *et al.* 2002, Almquist, 2005), these values have been used to infer the lower limits defined above (with the lower limits set at 80% of these observed values to account for any inconsequential yearly variation in population).

Management likely to be detrimental to *Tetragnatha striata* would include lowering of the water table so that reeds are on dry land, and mowing reeds to ground level. Consequently it is considered reasonable that a suitable habitat lower limit should be defined at 2000 m. This would allow for opposing management practices (i.e. mowing reed fringes for Bittern) to continue, without damaging the *Tetragnatha striata* population entirely. Based on the numbers of egg-sacs encountered during this survey (625), re-colonisation of re-grown, previously mown reedbeds is likely to be rapid (particularly where adjacent blocks of suitable habitat are retained).

Shake sampling of *Phragmites* was trialled as a survey method, but while this proved to be more effective at finding the spiders themselves, it did not help with egg-sac observation. It was felt that egg-sac counting was a more reliable method of monitoring the *Tetragnatha striata* population, since it not only gives an indication of breeding success, but also potential recruitment in the following year. Egg-sac monitoring is also easily undertaken by non-specialists, and does not require the identification skills needed to distinguish *T. striata* specimens from other wetland spiders (e.g. *Clubiona* spp.) present in shook samples.

5 Acknowledgements

Reserve Manager Kevin Dupé is thanked for his help while conducting this survey. He helped by guiding the survey to appropriate sampling habitat and paddling the survey boat almost 6 km during transect counts.

6 References

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Appendix 1:

Incidental spider records collected on the 2nd September 2013

Table 20					
Species	Sex	Grid Ref	Site	Habitat	Notes
<i>Pachygnatha clercki</i>	1F	ST34498234	Newport Wetlands NNR	Saltmarsh	G-vac
<i>Erigone longipalpis</i>	3M 1F	ST34498234	Newport Wetlands NNR	Saltmarsh	G-vac
<i>Oedothorax fuscus</i>	1M	ST34498234	Newport Wetlands NNR	Saltmarsh	G-vac
<i>Pocadicnemis juncea</i>	2F	ST34498234	Newport Wetlands NNR	Saltmarsh	G-vac
<i>Clubiona stagnatilis</i>	1M	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Clubiona phragmitis</i>	1M	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Antistea elegans</i>	1M	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Floronia bucculenta</i>	1F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Tallusia experta</i>	1F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Lophomma punctatum</i>	8M 4F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Gnathonarium dentatum</i>	1M 2F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Tenuiphantes tenuis</i>	1F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Bathyphantes gracilis</i>	1F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Bathyphantes approximatus</i>	1F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Paroligolophus agrestis</i>	2F	ST34548240	Newport Wetlands NNR	Dense <i>Phragmites</i> reem margin	G-vac
<i>Theridion pictum</i>	1F	ST33268275	Newport Wetlands NNR - Reedbed 7	Dead Typha at pool margin	With egg-sac

Appendix 2: Data Archive Appendix

Data outputs associated with this project are archived as Project No. [] and Media No. [] on server-based storage at Natural Resources Wales.

The data archive contains:

The final report in Microsoft Word and Adobe PDF formats.

A full set of maps produced in JPEG format.

A series of GIS layers on which the maps in the report are based with a series of word documents detailing the data processing and structure of the GIS layers

A full set of images produced in [*jpg/tiff*] format.

Metadata for this project is publicly accessible through Natural Resources Wales Catalogue <http://www-library.ccw.gov.uk/olibcgi/w24.cgi> by searching 'Dataset Titles'. The metadata is held as record no [].



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