

# Portbury Wharf Nature Reserve

## Dragonfly and Damselfly Survey 2018

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Migrant Hawker Dragonfly (*Aeshna mixta*)

### Portbury Wharf Nature Reserve

Portbury Wharf Nature Reserve (PWNR) lies adjacent to the Bristol Channel east of Portishead, and comprises approximately 46 hectares (113 acres) of mixed habitat. The reserve's combination of large pools, ponds, rhynes (large drainage ditches), grazing meadow, scrub and wooded areas provides varied habitats which support dragonflies and damselflies<sup>1</sup> throughout their lifecycles. The reserve is managed by North Somerset Council. A map of the reserve and adjacent areas is presented in Figure 1.

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<sup>1</sup> Note: Dragonflies (Anisoptera) and damselflies (Zygoptera) are suborders belonging to the order Odonata. The term dragonflies, however, is commonly used when referring to dragonflies and damselflies collectively. Dragonflies are generally large-bodied insects, with prominent eyes that touch, possessing strong flight and perching with their wings at right angles to their bodies. Damselflies are smaller, having eyes that do not touch, with weak flight and most species perch with their wings parallel to their bodies. For the purposes of clarity, the term Odonata is used in this report when referring collectively to dragonflies and damselflies. The terms dragonfly and damselfly are used when referring to the specific suborder.



## **Survey Purpose**

There are approximately 46 Odonata species found in Britain. Of these, about one third can be classified as being rare, or only locally distributed. A similar proportion is considered to be endangered, or threatened. Information obtained from a local naturalist [1] indicates that up to 14 Odonata species have previously been observed at the reserve. This represents a significant proportion of the total British species-list and suggests that PWNR could be amongst the South West’s most important Odonata sites. Furthermore, throughout Britain, the impact of climate change has had a positive effect on some Odonata species, in that their distribution ranges are expanding and hitherto unrecorded species could, potentially, colonise areas such as PWNR. The British Dragonfly Society [2] has recently highlighted under-recording of Odonata data in North Somerset between Bristol and Weston-super-Mare, including PWNR.

The key purpose of this survey was twofold. Firstly, to generate data and make it available to North Somerset Council to help inform its reserve management decisions. Secondly, to collect and report data to local and national databases, thereby contributing to the improved knowledge of Odonata distribution.

## **Target Survey Outputs**

Target outputs from the survey are listed in Table 1.

1	Identification of Odonata species present at the reserve throughout the 2018 ‘Odonata season’ (May to October).
2	Estimation of abundance throughout the flight period for each Odonata species observed.
3	Determination of species distribution across the reserve.
4	Data production to inform PWNR management strategy.
5	Data production to support local and national biodiversity databases.

Table 1: Target survey outputs for PWNR

## **Survey Method**

The design of the survey method comprised:

1. Consideration of the reserve's different habitats to establish locations where Odonata species were most likely to be present;
2. Defining transects (routes) linking potential locations along which observations could be made;
3. Periodic walking of the transects throughout the Odonata season to record the presence and abundance of Odonata species;
4. Reporting of the survey results, primarily to North Somerset Council as PWNR managers, in addition to national and local biodiversity databases.

Two transects were defined and each was walked approximately every three to four weeks throughout the season. The surveys were generally undertaken during the period late morning to early afternoon on clear, sunny days when the air temperature was 17°C, or higher. Exceptionally, the 17/09/18 survey was undertaken early to late afternoon and the air temperature, during the 19/10/18 survey, did not exceed 15°C. Capture of Odonata for identification purposes was not used. Binoculars and photography were employed to assist in identification of species and to estimate the ratio of similar species, particularly Common Blue / Azure Damselflies.

A limitation of the method, due to resource availability, was that only a sample of the reserve was systematically surveyed by transect monitoring. Consequently, significant areas of PWNR, with the potential to support Odonata species, were not thoroughly investigated. As such, the results of this survey are likely to under-represent the Odonata populations across the reserve. However, this was partially mitigated by undertaking less formal surveys employing unprescribed routes across areas of PWNR not covered by the transects.

The routes taken by Transects 1 and 2 are illustrated in Figure 2.

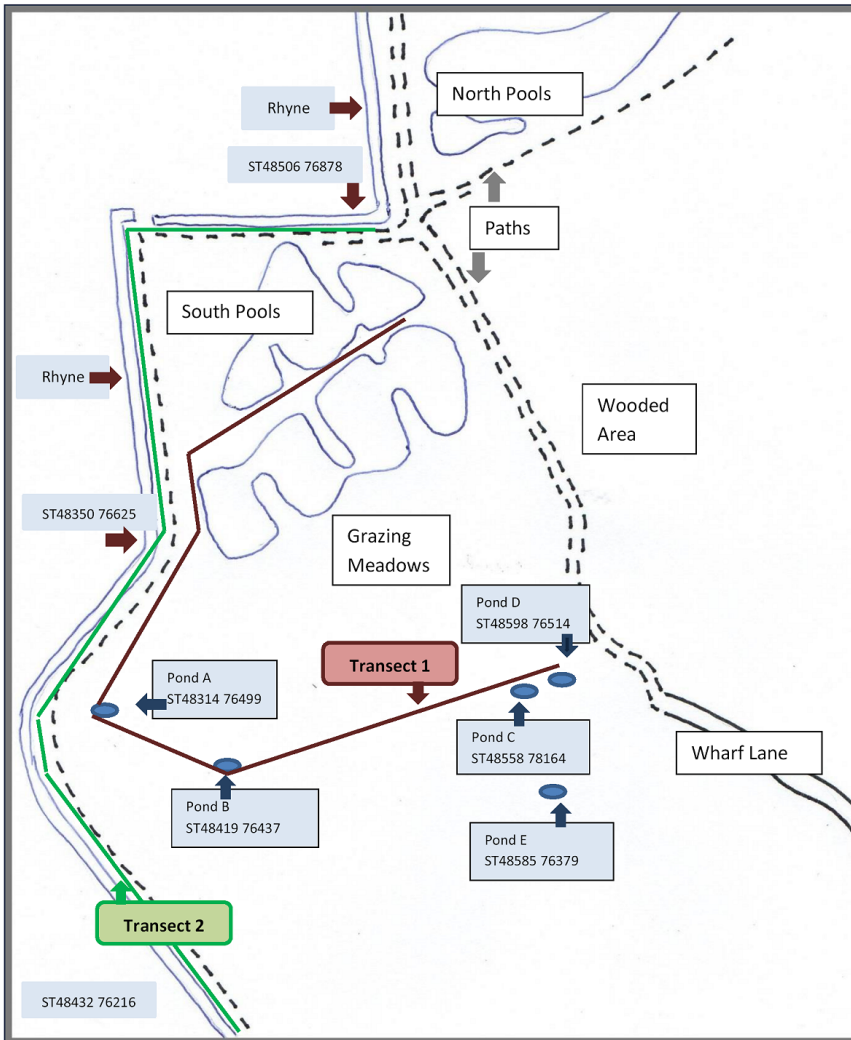


Fig. 2: Sketch map (not to scale) showing Transect Routes 1 and 2 used for the Odonata surveys of Portbury Wharf Nature Reserve

## Survey Results

### Identification of Odonata species observed at PWNR during the survey period

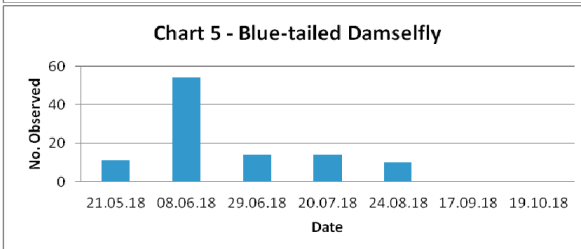
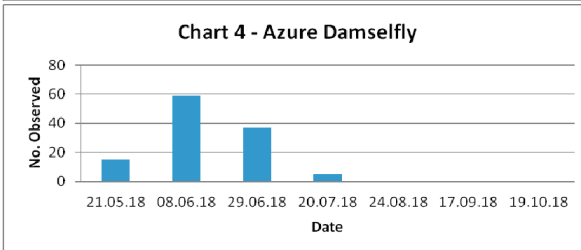
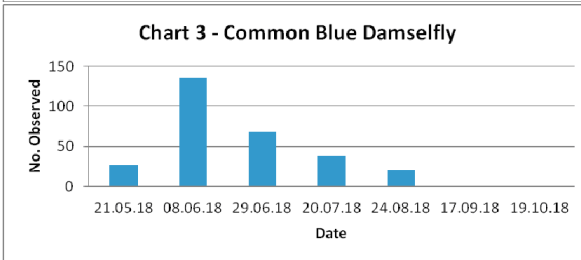
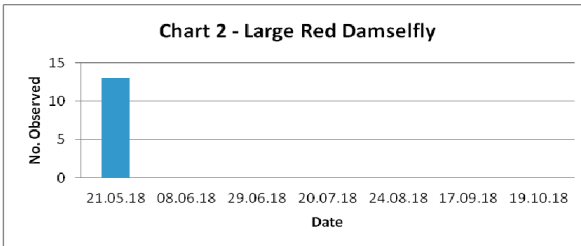
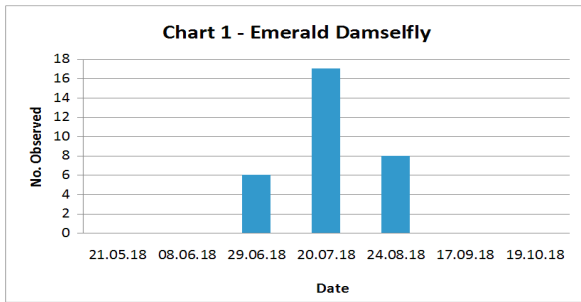
Surveys of Transects 1 and 2, along with other reserve locations not forming part of the transects, identified a total of 16 Odonata species. These are listed in Table 2.

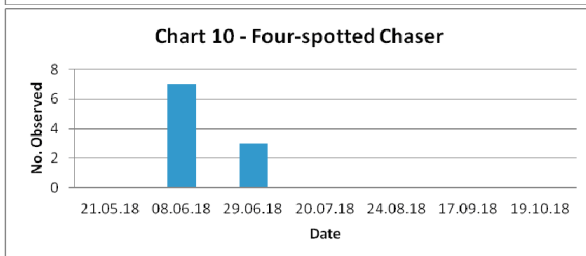
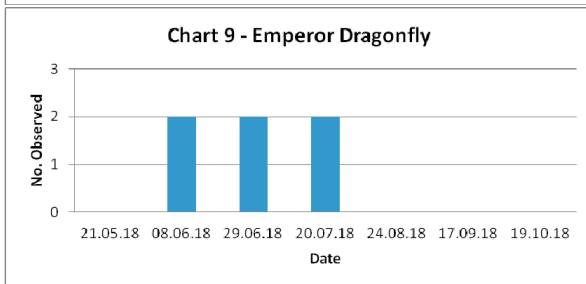
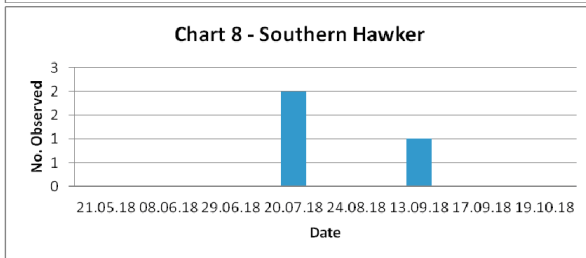
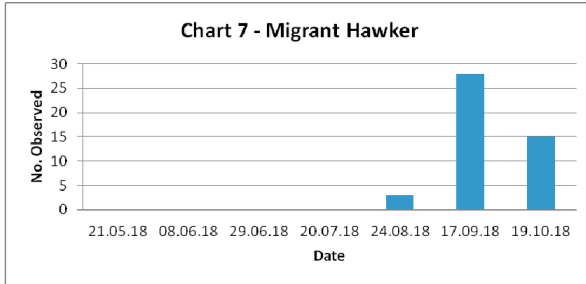
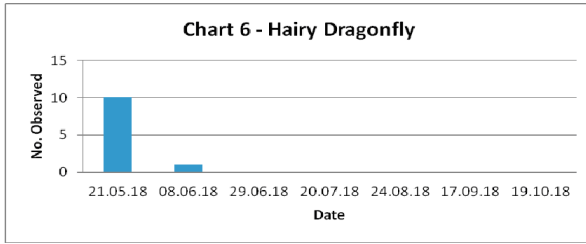
Damselflies		Dragonflies	
Common Name	Scientific Name	Common Name	Scientific Name
Emerald	<i>Lestes sponsa</i>	Hairy	<i>Brachytron pratense</i>
Large Red	<i>Pyrrhosoma nymphula</i>	Migrant Hawker	<i>Aeshna mixta</i>
Azure	<i>Coenagrion puella</i>	Southern Hawker	<i>Aeshna cyanea</i>
Common Blue	<i>Enallagma cyathigerum</i>	Emperor	<i>Anax imperator</i>
Blue-tailed	<i>Ischnura elegans</i>	Four-spotted Chaser	<i>Libellula quadrimaculata</i>
Small Red-eyed	<i>Erythromma viridulum</i>	Broad-bodied Chaser	<i>Libellula depressa</i>
		Scarce Chaser	<i>Libellula fulva</i>
		Black-tailed Skimmer	<i>Orthetrum cancellatum</i>
		Common Darter	<i>Sympetrum striolatum</i>
		Ruddy Darter	<i>Sympetrum sanguineum</i>
Total damselfly species = 6		Total dragonfly species = 10	

Table 2: Odonata species identified at PWNR during May-October 2018

### Odonata flight period for each species identified along Transects 1 and 2

Charts 1–15 illustrate the number of each specific Odonata species observed along Transects 1 and 2 for each of the surveys undertaken during the survey period.





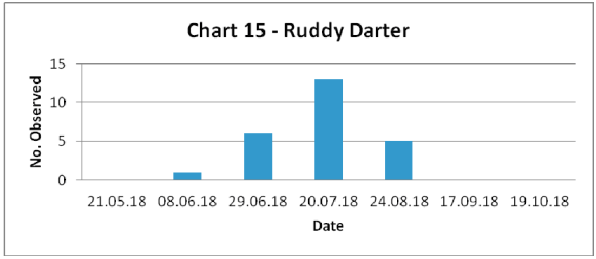
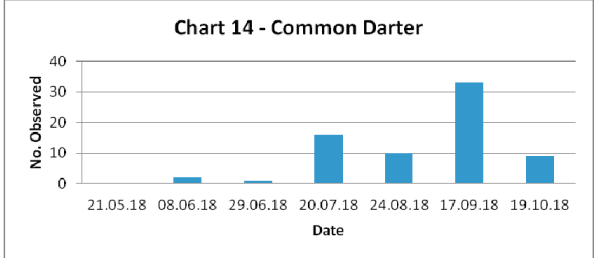
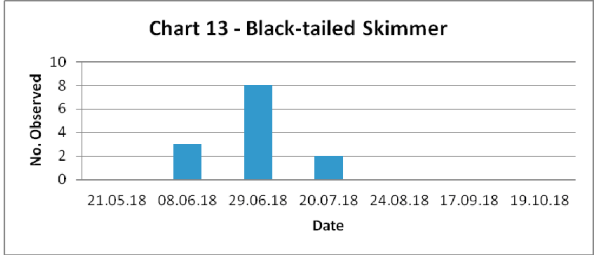
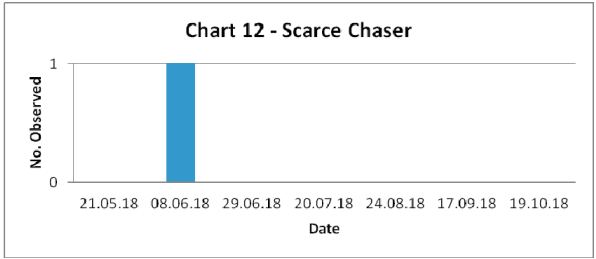
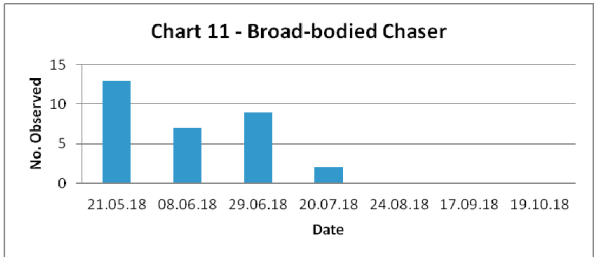


Table 3 combines the results of all surveys to show the total number of each individual Odonata species observed, throughout the survey period, at specific locations along Transects 1 and 2.

Species	Locations							
	Transect 1						Transect 2	
	Grazing Meadow	South Pools*	Ponds				North Rhyne Section	South Rhyne Section
			A	B	C	D		
<b>Damselflies – total observations from all surveys</b>								
Emerald	1	2	9	7	6	4		2
Large Red			3		2			8
Azure	15	11	15	20	12	13	40	
Common Blue	74	13	17	27	18	31	104	2
Blue-tailed	16	2	10	30	13	25	2	5
<b>Dragonflies - total observations from all surveys</b>								
Hairy		2	1		1		1	6
Migrant Hawker	11	7	4	9	9	2	4	
Southern Hawker						3		
Emperor		5						1
Four-spotted Chaser		8	2					
Broad-bodied Chaser		10	5	2	3	4	7	
Scarce Chaser							1	
Black-tailed Skimmer		13						
Common Darter	4	10	12	17	12	3	2	11
Ruddy Darter	1	2	11	3	2	3		3
*Includes meadows adjacent to the South Pools								

Table 3: Distribution of Odonata Species and indication of abundance at locations along Transects 1 and 2

The less formal surveys of PWNR, undertaken at locations not covered by the transects, demonstrated a wide distribution of Odonata across the reserve. Table 4 presents the locations where significant numbers of Odonata were seen throughout the survey period and the species observed there.

	Non-transect location where Odonata observed			
	Sanctuary	North Pools	Wharf Lane	Ecology Park (Including the Frog Ponds, Swan Lake and surrounding habitat)
<b>Damselflies</b>				
Emerald	✓			✓
Large Red			✓	✓
Azure	✓	✓	✓	✓
Common Blue	✓	✓	✓	✓
Blue-tailed	✓	✓	✓	✓
Small Red-eyed	✓			
<b>Dragonflies</b>				
Hairy				✓
Migrant Hawker	✓	✓	✓	✓
Southern Hawker		✓		
Emperor	✓		✓	✓
Four-spotted Chaser	✓		✓	✓
Broad-bodied Chaser			✓	✓
Black-tailed Skimmer			✓	✓
Common Darter	✓	✓	✓	✓
Ruddy Darter	✓			✓

Table 4: Observation of Odonata at non-transect locations

## Discussion

Fifteen Odonata species were recorded along Transects 1 and 2, and one further species, the Small Red-eye Damselfly, was observed at a non-transect location. The total of 16 Odonata species observed during the survey indicates that PWNR is an important site for both damselflies and dragonflies. The number seen compares favourably with Odonata species found at other nearby sites that are recognised as being important for Odonata. Examples of such sites are given in Table 5.

<b>Wildlife Location</b>	<b>Number of Species at location</b>	<b>Reference</b>
RSPB Newport Wetlands	16	[3]
RSPB Hamwall, Somerset Levels	16	[4]
RSPB Nagshead Nature Reserve, Forest of Dean	19 (No. species seen since 1993)	[5]
WWT Slimbridge, Gloucestershire	19 (No. species seen since 2013)	[5]
Orchard Pools, Severnbeach	15	[5]
Priddy Mineries, Mendip Hills, Somerset	15	[6]

Table 5: Examples of nearby Odonata sites and the number of recorded species

The majority of Odonata species identified during the survey can be classified as being common and widespread [7]. Table 6 provides the British status of Odonata recorded during the survey. Three species (shown emboldened in the table) are less well distributed and worthy of comment.

<b>Damselflies</b>	
Emerald	Fairly common and widespread
Large Red	Common and widespread
Azure	Common and widespread
Common Blue	Common and widespread
Blue-tailed	Common and widespread
<b>Small Red-eyed</b>	<b>Widespread in southern, eastern and central areas of England</b>
<b>Dragonflies</b>	
<b>Hairy</b>	<b>Scarce and local</b>
Migrant Hawker	Common
Southern Hawker	Common
Emperor	Common and widespread
Four-spotted Chaser	Common and widespread
Broad-bodied Chaser	Fairly common
<b>Scarce Chaser</b>	<b>Very local, GB Red List, Near threatened</b>
Black-tailed Skimmer	Locally common
Common Darter	Common and widespread
Ruddy Darter	Locally common

Table 6: British status of Odonata species recorded during the survey

**Small Red-eyed Damselfly:** This damselfly was first recorded in Britain, on the Essex coast, in 1999. The extent and rate of distribution of the species has been dramatic and it is now widespread in southern, central and eastern England. Its presence at PWNR is consistent with the current known limit of its distribution, but this is likely to change as it expands its range westward. The species was recorded during informal surveys of PWNR's Sanctuary area. Up to twenty adults were observed on at least two occasions and pairs were seen in tandem and ovipositing. It is believed that the presence of Small Red-eyed Damselflies has not been previously recorded at the reserve, but the number of individuals present is evidence supporting the likely existence of a breeding colony.

**Hairy Dragonfly:** This dragonfly is scarce and the importance of PWNR for this species is well known.

**Scarce Chaser:** Whereas only one Scarce Chaser was seen during the formal surveys, a further two individuals were spotted during informal surveys. All observations occurred on the North Rhyne Section of Transect 2. This close proximity, rather than a wider dispersal of the species across the reserve, could infer that a small breeding colony exists at PWNR. However, evidence of mating or ovipositing was not observed. This section of the reserve, which is difficult to see due to extensive reed growth, is worthy of close scrutiny in future seasons to determine whether this uncommon dragonfly has established a breeding colony.

A limitation of the survey was that all areas of the reserve could not be systematically studied. Primarily, this resulted from the time and resource available to undertake the survey. Additionally, vegetation growth resulted in sections of Transect 2 being obscured, particularly later in the season when reeds concealed most of the associated rhyne. Large Red Damselflies are generally the first Odonata to appear on the wing; as early as April, through to July. This species was only seen on the survey undertaken on the 21/05/2018. It is possible that this species emerges earlier at PWNR and more individuals might have been seen had the surveys commenced in April. There is, therefore, a strong likelihood of under-reporting of the numbers of dragonflies and damselflies present during each survey.

There is a possibility of further Odonata species being present at PWNR that were not observed during this season. Brown Hawker dragonflies (*Aeshna grandis*) have previously been recorded on the reserve [1], but none were seen during the survey. Casual observation of areas immediately adjacent to PWNR [1,8] identified breeding colonies of Banded Demoiselles (*Calopteryx virgo*). This species prefers slow flowing, or standing water habitat, which is present in various locations within the reserve. The potential exists for Banded Demoiselles to colonise sites at PWNR.

Visitors to PWNR are likely to see Odonata species almost anywhere in the unrestricted areas of the reserve, particularly at locations close to rhynes, including

the north section of Wharf Lane and along the Seasonal Track. An excellent place to observe a range of dragonflies and damselflies is from the boardwalk passing through the area marked as the Frog Pond in Figure 1.

## Conclusion

PWNR is an important site offering a wide range of habitats to support many different Odonata species. The presence of Small Red-eyed damselflies indicates that new species are potentially able to establish colonies not previously recorded at the reserve. Other species known to be expanding their ranges within Britain could also colonise the reserve, thereby further increasing the importance of PWNR as one of the South West's primary Odonata sites. The presence of Scarce Chaser and Hairy Dragonflies on the reserve presents North Somerset Council with the opportunity to assist in the preservation of these uncommon dragonflies. Careful management of the site, including maintenance of the existing ponds and creation of new ponds, would support and assist in securing the existence of current species and potentially attract new species. Locations were noted during the survey where creation of new Odonata-friendly habitats could be easily created and are worthy of consideration for inclusion in the PWNR management plan.

## References

- [1] Horlick, D. & Horlick C. (2017) Private record.
- [2] Isles, C. (Spring 2018) *Darter Magazine*, British Dragonfly Society, Issue 35.
- [3] RSPB Newport Wetlands website (2018) Seasonal Highlights, Summer.
- [4] Morris, G. (2017) RSPB Hamwall Odonata surveyor.
- [5] Twizell, I. (April 2016) *Dragonflies & Damselflies of Gloucestershire*. The Gloucestershire Naturalist' Society.
- [6] Wikipedia (2018) Priddy Pools.
- [7] Smallshire, D. & Swash, A. (2014) *Britain's Dragonflies*, Princeton University Press.
- [8] Brighton, M. (2018) Private record.

## Editor's Note

Our Invertebrate Section Chair, Ray Barnett, writes:

“This important paper presents a snapshot of the Odonata fauna to be found at the Portbury Wharf site, part of the North Somerset Levels and Moors. For more detail about how this site relates to other nearby locations, reference to *Dragonflies and Damselflies of the Bristol Region* published in 2013 by BRERC with support from the BNS is recommended, as are the Bristol and District Invertebrate Reports published annually in *Nature in Avon*.

The former publication includes summaries of the fauna from Puxton Moor, Biddle Street and Tickenham, Nailsea and Kenn Moors for comparison, where 15 species have been recorded in one ditch on occasion. The reports in *Nature in Avon* have helped chart the increase of the Scarce Chaser and the recent colonisation of the region by the Small Red-eyed Damselfly, both now reported from Portbury Wharf.”

### **Reference**

Barnett, R.J., Andrews, R.M., Corner, T., Higgins, R.H., Martin, J.P. & Pedlow, A. (2013) *Dragonflies and Damselflies of the Bristol Region*. Bristol Regional Environmental Records Centre (BRERC), Bristol.