A REVIEW OF INVERTEBRATE DATA FOR THE CARLYON BAY AREA FROM THE ENVIRONMENTAL RECORDS CENTRE FOR CORNWALL AND THE ISLES OF SCILLY

Dr. Mark G. Telfer

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Dr. Mark G. Telfer
10, Northall Road
Eaton Bray
DUNSTABLE
Bedfordshire
LU6 2DQ
mark@carabids.fsnet.co.uk
http://markgtelfer.co.uk/

1. Introduction

In 2009, I carried out an invertebrate survey of an area at Carlyon Bay, part of which is subject to a development proposal. In my report (Telfer, 2009) I also reviewed previous entomological work on the site: (i) an entomological survey in 2004 (Carlyon Bay Sea Defence EIA, Ecological Technical Report, October 2004), and (ii) a published study of the moths recorded at the Carlyon Bay site during 1989 to 1993 (Spalding, 1995).

Subsequently, Baker Consultants Ltd have obtained additional invertebrate data for the area from the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS) and I have been commissioned to review these records. This review aims:

- to determine which of the ERCCIS records relate to the actual Carlyon Bay survey area;
- to determine which of the ERCCIS records from the actual Carlyon Bay survey area relate to species unrecorded by Spalding (1995), the entomological survey of 2004, or Telfer (2009);
- to determine the conservation status of these additional species;
- if necessary, to reassess the entomological importance of the Carlyon Bay survey area in the light of the additional records; and
- if necessary, to provide additional or amended impact assessment and recommendations.

2. Data review

ERCCIS have supplied data for the Carlyon Bay survey area by extracting records with grid references which fall within a 2km radius of SX059521 (a central grid reference of the survey area). This search radius covers a much wider area than the survey area and thus many of the records supplied are from nearby areas which will not be directly affected by the proposed development. The records have been manually filtered to exclude records which have certainly been made outside the Carlyon Bay survey area, as follows:

- All records from 1km × 1km grid squares other than SX0551, SX0552 and SX0652 are certainly not from the Carlyon Bay survey area.
- Records from within the 1km × 1km grid squares SX0551, SX0552 and SX0652 but with 6-figure (i.e. 100m × 100m) grid references which fall clearly outside the Carlyon Bay survey area have also been excluded.
- Location name has been used to identify any further records which clearly fall outside of the Carlyon Bay survey area.

After this additional filtering, many records remain that have only 1km × 1km resolution grid references and with a name which could apply equally to the survey area or other parts of the same grid square, e.g. “Carlyon Bay SX0552”. All such records are considered here as possibly being from the survey area.

Five invertebrate groups are represented in the ERCCIS data:

2.1. Butterflies

There are 227 records of 14 species of butterfly in the ERCCIS data.

There are 56 records of 7 species which may have been recorded within the Carlyon Bay survey area (Table 1). The records span the period 1939 to 2007.

Table 1: the 7 species of butterfly from the ERCCIS data which may have been recorded within the Carlyon Bay survey area.

Species: English name	**Species: scientific name**	**National conservation status**	**BAP**
Brimstone Butterfly	*Gonepteryx rhamni*		
Monarch Butterfly	*Danaus plexippus*		
Purple Hairstreak Butterfly	*Neozephyrus quercus*		
Silver-studded Blue	*Plebejus argus*	Nationally Scarce (Nb)	BAP Priority Species
Small Heath	*Coenonympha pamphilus*		BAP Priority Species (research only)
Wall Butterfly	*Lasiommata megera*		BAP Priority Species (research only)
Wood White	*Leptidea sinapis*	Nationally Scarce (Nb)	BAP Priority Species

It is apparent that the data held by ERCCIS are biased towards rarer species, probably because either recorders are more diligent at recording rarer butterflies, and/or because ERCCIS are more diligent at adding records of rarer species to their database. This bias is not a problem (indeed it is an entirely sensible way for recorders and records centres to prioritise their activities) but it needs to be borne in mind when interpreting the records: one is not more likely to see a Monarch butterfly at Carlyon Bay than a Large White despite the absence of records of the latter!

17 species of butterfly were recorded by the 2004 survey. Only two of these (Small Heath and Wall) are also recorded by ERCCIS, bringing the cumulative butterfly list for the area to 22 species.

Telfer (2009) recorded 12 species of butterfly from the Carlyon Bay survey area, including two additional species (Green Hairstreak *Callophrys rubi* and Comma *Polygonia c-album*), bringing the cumulative butterfly list for the area to 24 species.

2.2. Moths

There is a published study of the moths recorded at the Carlyon Bay site during 1989 to 1993 (Spalding, 1995) which lists 331 species. Spalding (1995) found the site to be of 'some importance in national terms' though no Red Data Book species were found, and 'a very important coastal site for Lepidoptera in local terms'.

There are 374 records of 42 species of moth in the ERCCIS data.

The vast majority of these records (322 records (86%) of 35 species) are for "Carlyon Bay" and most of them probably relate to the actual Carlyon Bay survey area. The records span the period 1989 to 2003.

Similarly to the butterfly data, it is apparent that the data held by ERCCIS are biased towards rarer species.

12 of the 35 species are additional to those listed for Carlyon Bay by Spalding (1995) (Table 2).

Table 2: The 12 additional species of moth in the ERCCIS data.

Family	Species: scientific name	Species: English name	National conservation status	BAP
Gelechiidae	*Argolamprotes micella*	a gelechiid moth	pRDB3	
Gelechiidae	*Scrobipalpa ocellatella*	Beet Moth	Nationally Scarce	
Geometridae	*Ennomos fuscantaria*	Dusky Thorn		BAP Priority Species (research only)
Geometridae	*Hemistola chrysoprasaria*	Small Emerald		BAP Priority Species (research only)
Geometridae	*Perizoma albulata*	Grass Rivulet		BAP Priority Species (research only)
Geometridae	*Scopula marginepunctata*	Mullein Wave		BAP Priority Species (research only)
Noctuidae	*Agrochola lychnidis*	Beaded Chestnut		BAP Priority Species (research only)
Noctuidae	*Brachylomia viminalis*	Minor Shoulder-knot		BAP Priority Species (research only)
Noctuidae	*Eugnorisma glareosa*	Autumnal Rustic		BAP Priority Species (research only)
Noctuidae	*Melanchra pisi*	Broom Moth		BAP Priority Species (research only)
Pyralidae	*Dolicharthria punctalis*	a pyralid moth	Nationally Scarce (Nb)	
Pyralidae	*Eudonia delunella*	a pyralid moth	Nationally Scarce (Nb)	

The 2004 survey recorded 120 species of moth but did not record any of the 12 species listed in Table 2.

Telfer (2009) recorded only 9 species of moth in what was an exclusively diurnal survey but this did include a first for Cornwall: *Chrysoclista lathamella* (Cosmopterigidae) which is provisionally Endangered (pRDB1).

2.3. Dragonflies (Odonata)

There are 484 records of 18 species of dragonfly in the ERCCIS data.

There are 43 records of 6 species which may have been recorded within the Carlyon Bay survey area. The records span the period 1966 to 2001.

One of the 6 species (*Enallagma cyathigerum* Common Blue Damselfly) was recorded by the 2004 survey as well as an additional three species, bringing the cumulative Odonata list for the site to 9 species.

Two of the 9 species (*Enallagma cyathigerum* Common Blue Damselfly and *Libellula depressa* Broad-bodied Chaser) were recorded by Telfer (2009) who also recorded two further species of Odonata, bringing the cumulative Odonata list for the site to 11 species.

All 11 species have been given the Least Concern conservation status (Daguet *et al*., 2008).

2.4. True bugs (Hemiptera)

Three species of true bug are represented in the data, each by a single record. Similarly to the butterfly and moth data, it is apparent that the data held by ERCCIS are biased towards rarer species: all three of the true bug species are Nationally Scarce. All three records were certainly made outside the Carlyon Bay survey area.

33 species of true bug were recorded by the 2004 survey: none of these 33 had any national conservation status.

40 species of true bug were recorded by Telfer (2009): none of these 40 had any national conservation status but one was 'County Scarce'.

2.5. Molluscs

One species of mollusc (*Manzonia crassa*, a small marine snail) is represented in the ERCCIS data, by a single record from "Carlyon Bay SX0652" in 1997 which was probably recorded within the Carlyon Bay survey area. It appears to be a widespread species:

http://www.conchsoc.org/encyclopedia/speciesInfo.php?taxon_version_key=NBNSYS0000176369

No molluscs were recorded by the 2004 survey.

Marine molluscs were not covered by Telfer (2009) but 17 species of terrestrial mollusc were recorded.

3. The entomological importance of the Carlyon Bay survey area

The ERCCIS records include 22 species unrecorded by Spalding (1995), the entomological survey of 2004, or Telfer (2009) as follows:

- 5 butterflies
- 12 moths
- 4 dragonflies, and
- 1 marine mollusc

No attempt has been made in this review to validate or verify these records but it is accepted that errors in dates, locations and species names, including errors of identification, can and do exist within any set of biological records.

Four of the butterflies and all 12 of the moths are species which either have a national conservation status and/or are listed as BAP Priority Species. These 16 species will be referred to as 'key species' and each is discussed below.

4. Key species

Species: scientific name	Species: English name	National conservation status	BAP	Discussion	Conclusion
Plebejus argus	Silver-studded Blue	Nationally Scarce (Nb)	BAP Priority Species	Recorded from "Carlyon Bay SX0552" on 25th August 1987. The record is probably more likely to have been made elsewhere within SX0552 rather than within the Carlyon Bay survey area. However, potential habitat for Silver-studded Blue does occur within the survey area, especially on the cliff-slopes. And despite the absence of records since 1987 it could have been overlooked and still survive.	Heathland on cliff-slopes was identified as a key invertebrate habitat by Telfer (2009). The existing recommendations for this key habitat (section 4.3) remain appropriate and should be followed.
Coenonympha pamphilus	Small Heath		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Lasiommata megera	Wall Butterfly		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Leptidea sinapis	Wood White	Nationally Scarce (Nb)	BAP Priority Species	Recorded "East of St Austell" in August 1939, hence it is doubtful whether the species has ever occurred within the Carlyon Bay survey area, and even more doubtful that it is still present.	In the absence of any recent record for the area, no account should be taken of this species.
Argolamprotes micella	a gelechiid moth	pRDB3		A species of woodlands, gardens and hedgerows where the larval foodplants are raspberry and blackberry. Adult(s) trapped at MV light on 16th July 1997 at SX064523. This places the record in Polgaver Bay, which is the area that held the most extensive woodland on my 2009 survey visits and where the pRDB1 moth *Chrysoclista lathamella* was found.	Telfer (2009) identified the willows in Polgaver as a key invertebrate habitat and recommended retention and management by non-intervention. The ecological requirements of *Eudonia delunella* would also be covered if areas of raspberry and blackberry were retained as well as willows.
Scrobipalpa ocellatella	Beet Moth	Nationally Scarce		A species of coastal shingle and saltmarsh where the larval foodplants are beet *Beta vulgaris* and sea beet *Beta maritima*. Adult(s) trapped at light on 27th August 2003 in SX0652. Given the habitat preference of this species it seems almost certain to have been recorded within the survey area, and from the grid reference would have been in either Shorthorn or Polgaver.	The habitat of this species (coastal shingle supporting sea beet) is not recognised as a key habitat feature by Telfer (2009) but the occurrence of only a single Nationally Scarce species does not merit further consideration.
Ennomos fuscantaria	Dusky Thorn		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.

Species: scientific name	Species: English name	National conservation status	BAP	Discussion	Conclusion
Hemistola chrysoprasaria	Small Emerald		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Perizoma albulata	Grass Rivulet		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Scopula marginepunctata	Mullein Wave		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Agrochola lychnidis	Beaded Chestnut		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Brachylomia viminalis	Minor Shoulder-knot		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Eugnorisma glareosa	Autumnal Rustic		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Melanchra pisi	Broom Moth		BAP Priority Species (research only)	Action for this species should take place through national research programmes, rather than site protection at the local level.	The ecological requirements of this species do not need to be taken account of.
Dolicharthria punctalis	a pyralid moth	Nationally Scarce (Nb)		Associated with coastal cliffs and beaches where the larvae feed on quite a wide range of dead and decaying plants. It is probably associated with the 'Disturbed grassland and bare ground' key habitat identified by Telfer (2009).	The existing recommendations for this key habitat (section 4.2 in Telfer (2009)) remain appropriate and should be followed.

Species: scientific name	Species: English name	National conservation status	BAP	Discussion	Conclusion
Eudonia delunella	a pyralid moth	Nationally Scarce (Nb)		A woodland species whose larvae feed on lichens and mosses on the trunks of ash, apple and sometimes elm. Adult(s) trapped at MV light on 16th July 1997 at SX064523. This places the record in Polgaver Bay, which is the area that held the most extensive woodland on my 2009 survey visits and where the pRDB1 moth *Chrysoclista lathamella* was found.	Telfer (2009) identified the willows in Polgaver as a key invertebrate habitat and recommended retention and management by non-intervention. The ecological requirements of *Eudonia delunella* would also be covered if trees and shrubs other than just willows were retained.

5. Summary and Conclusions

The ERCCIS records include 22 species unrecorded by Spalding (1995), the entomological survey of 2004, or Telfer (2009).

Four of the butterflies and all 12 of the moths are species which either have a national conservation status and/or are listed as BAP Priority Species.

10 are BAP Priority Species for which action is to be through national research programmes rather than local site protection. The ecological requirements of these species do not need to be taken into account.

Wood White (recorded "East of St Austell" in August 1939) may never have occurred at the Carlyon Bay survey area and it is very doubtful that it survives undetected to the present day. This species should not be taken into account.

In order to meet the ecological requirements of the remaining species, the recommendations in Telfer (2009), sections 4.1, 4.2 and 4.3 should be followed, with section 4.1 expanded as follows:

4.1. ~~Willows~~Trees and scrub

- All areas of ~~willow~~ trees and scrub within Polgaver should be retained.
- The areas of ~~willow~~ trees and scrub should be managed by non-intervention unless and until there is evidence that any other form of management would be better for *Chrysoclista lathamella* or *Argolamprotes micella*.

The overall assessment of the Carlyon Bay survey area in Telfer (2009) remains unchanged:

"Carlyon Bay is a site of county importance for invertebrate conservation overall. Some features of the site support invertebrates of national importance or which are unique within Cornwall."

6. References

Daguet, C.A., French, G.C. and Taylor, P. (2008). *The Odonata Red Data List for Great Britain*. Species Status, number **11**. Peterborough: Joint Nature Conservation Committee.

Spalding, A. (1995). The moths at Carlyon Bay, Cornwall recorded 1989-1993. *British journal of entomology and natural history*, **8**, 61 - 71.

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