



**Cyfoeth
Naturiol
Cymru**
**Natural
Resources
Wales**

Skomer Marine Conservation Zone Nudibranch Diversity Survey 2014

NRW Evidence Report No. 67

K. Lock, P. Newman, M. Burton, J. Jones



Contents

CRYNODEB	3
SYNOPSIS	4
1. INTRODUCTION	5
1.1 HISTORICAL SURVEYS	5
1.2 2014 SURVEY AIMS	7
2. METHOD	7
3. RESULTS	8
3.1 SITE RECORDS	9
3.2 SPECIES RECORDS	14
3.3 SKOMER MCZ RECORDS	29
3.4 MARTINS HAVEN NUDIBRANCH "BIOBLITZ" RECORDS	31
3.5 NOTABLE NUDIBRANCH SPECIES	32
4. DISCUSSION.....	39
5. RECOMMENDATIONS	40
6. ACKNOWLEDGEMENTS.....	41
7. REFERENCES	42

Crynodeb

Mae noethdagelloigion yn nodwedd o Warchodfa Natur Forol Sgomer, ble mae amrywiaeth rhywogaethau'n un o'r priodoleddau a ddefnyddir i asesu statws cadwraeth. Cafodd cyfanswm o 13 o safleoedd a oedd yn cynrychioli amrywiaeth o gynefinoedd eu harolygu ar gyfer rhywogaethau o noethdagelloigion yn ystod 2014, a'r canlyniad oedd cyfanswm o 49 o rywogaethau.

Roedd nifer y rhywogaethau a gofnodwyd ychydig yn is nag yn arolygon 2010 (55 rhywogaeth) ond roedd yn sylweddol uwch nag arolygon 2002 (32 rhywogaeth) neu 2006 (34 rhywogaeth).

Rhwng 1972 a 2014, cofnodwyd cyfanswm o 76 o rywogaethau o noethdagelloigion yng Ngwarchodfa Natur Forol Sgomer, a hynny drwy gynnal arolygon deifio a thrwy arolygu'r isfilod a oedd yn byw yn y gwaddodion. Daethpwyd o hyd i 63 o rywogaethau yn yr arolygon a wnaed rhwng 2002 a 2014, ac yn eu plith yr oedd 5 rhywogaeth na chawsant eu cofnodi yng Ngwarchodfa Natur Forol Sgomer cyn 2002. Mae'r rhywogaethau o noethdagelloigion a gofnodwyd yn cynnwys nifer a ystyrir yn anfynych yn genedlaethol neu'n rhai y ceir nifer cyfyngedig ohonynt yn Ynysoedd Prydain.

Mae amrywiaeth mawr o rywogaethau o noethdagelloigion yng Ngwarchodfa Natur Forol Sgomer, gyda 70% o rywogaethau'r DU yn cael eu cynrychioli mewn ardal o 13.2 o gilometrau sgwâr. Mae'r amrywiaeth eang hon yn adlewyrchiad o'r amrywiaeth o gynefinoedd a'r amodau amgylcheddol a geir yn y Warchodfa Natur Forol a'r cymunedau cyfoethog y mae'r rhain yn eu cynnal. Fel ysglyfaethwyr arbenigol mae gan rywogaethau'r noethdagelloigion ddewis dethol o organebau ysglyfaeth, ac o'r herwydd maent yn ddangosydd da o iechyd cyffredinol yr ecosystem.

Synopsis

Nudibranchs are a feature of the Skomer MCZ for which species diversity is an attribute used to assess conservation status. A total of 13 sites representing a range of habitats were surveyed for nudibranch species during 2014 resulting in a total of 49 species.

The number of species recorded was slightly lower than the 2010 survey (55 species) but is considerably higher than the 2002 (32 species) or 2006 (34 species) surveys.

A total of 76 nudibranch species have been recorded in the Skomer MCZ between 1972 and 2014 from both diving and sediment infauna surveys. 63 species have been found on those surveys carried out between 2002 and 2014, of which 5 species were unrecorded in the Skomer MCZ before 2002. Nudibranch species recorded include several classed as nationally scarce or with limited national distribution in the British Isles.

The diversity of nudibranch species in the Skomer MCZ is very high with 70% of UK species represented in an area of 13.2 square kilometres. This high diversity is a reflection of the diversity of habitats and environmental conditions found in the MCZ and the rich communities that these support. As specialised predators nudibranch species have a very selective choice of prey organisms, they are therefore a good indicator of the overall ecosystem health.

1. Introduction

Nudibranchs are a feature of the Skomer Marine Conservation Zone (MCZ) (previously Skomer Marine Nature Reserve) for which species diversity and the presence of rare or scarce species are attributes used to assess conservation status. As top predators they can act as an indicator of the health of the communities they rely on.

Nudibranchs are molluscs of the Subclass Opisthobranchia in which the adult stage has completely lost both the shell and operculum. They share this character with the plant eating Sacoglossa (e.g., *Elysia viridis*) which are not covered in the present survey. Similarly the Anaspidea or Sea Hares (e.g., *Aplysia punctata*) are also excluded. All known nudibranchs are carnivorous and most are specialised predators feeding on specific prey organisms (Picton & Morrow, 1994). Some feed on ephemeral prey, such as hydroids and tend to exhibit several short-lived generations each year, whilst others feed on perennial prey and tend to live for one year or more. Such knowledge of food preference is useful in searching for nudibranch species and the timing of diversity surveys.

1.1 Historical Surveys

Up to the 1970's sublittoral organisms were accessible only through rather crude sampling by dredge and net. Increased use of aqualungs facilitated direct sublittoral observation and collection and this helped produce many additions to marine fauna and flora lists. In 1972-73 Peter Hunnam at Dale Fort Field Centre and Greg Brown a nudibranch mollusca specialist at Bristol University completed the first nudibranch sublittoral survey at 12 sites between Skomer and the mouth of Milford Haven. They completed 20-30 minute searches for nudibranchs along arbitrary transects of the seabed, species were counted and samples collected for identification in a laboratory. 35 nudibranch species were recorded at 6 sites located within the Skomer MCZ, (Hunnam & Brown 1975). These are listed in Appendix 1.

Between 1975 and 1991 general species records were made by Bernard Picton and Francis Bunker during both their own diving and during a series of identification courses held at Dale Fort Field Centre. A total of 99 dives at 44 sites were carried out in the Skomer area, during which 61 species of nudibranchs were recorded. (Bunker, Picton & Morrow 1992). Although these observations are of interest, in the long-term a different approach is required for monitoring fluctuations in species diversity.

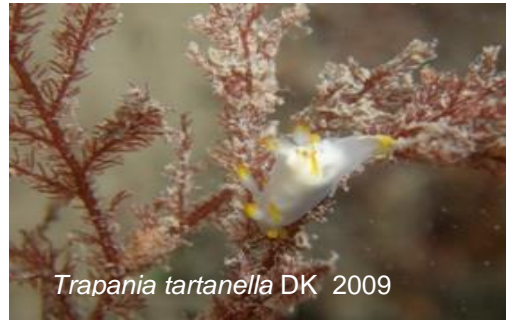
In 2002 Skomer MCZ staff completed a nudibranch species survey to establish a baseline over a short time-scale that could be used for future monitoring. A total of 16 sites representing a range of habitats were surveyed on 20 dives, resulting in a total of 32 species (Luddington, 2002). For monitoring purposes a checklist of 16 species (see Appendix 2) was selected with a target of observing 80% of these species annually, and it was recommended that a full species survey was carried out every 4 years.

2003 and 2004 all 16 species from the checklist were recorded. A notable record was *Tritonia nilsodhneri* on the pink sea fan, *Eunicella verrucosa* at 2 sites. *T. nilsodhneri* is a nationally scarce species (Moore, 2002).



Tritonia nilsodhneri

In 2006 surveys were completed at 13 sites representing a range of habitats for nudibranch species. 35 species were recorded during 21 dives. When the species lists for 2002 and 2006 were combined the data revealed that 46 species were recorded during 41 dives at 20 sites. This was lower than the full 'diving' species list of 61 species but the survey effort was far less than that for the historical data. Notable records were *Doris sticta*, a nationally scarce species (Moore, 2002), and three species not previously recorded in the historical data set, *Cadlina laevis*, *Doto eireana* and *Onchidoris pusilla* (Burton et al., 2007).



Trapania tartanella DK 2009

In 2007 14 of the 16 species from the check list were recorded and in 2009 15 of the 16 species. Notable records in 2009 were *Trapania tartanella*, a new record for both Skomer and Wales; *Doto hystrix* and *Cuthona caerulea* which had not been found on either the 2002 or 2006 surveys. These were recorded and photographed at Rye Rocks by diving volunteers Sarah Bowen and David Kipling (Lock et al., 2010).

In 2010 14 sites were surveyed resulting in a total of 55 species of nudibranchs. The number of species were considerably higher than the 2002 or 2006 surveys, this may have been due to extra efforts made to target a wider range of habitats. These included mixed sediment sites at Martins Haven east, West Hook, Martins Haven and Prothero's



Dock. There was a general perception within the MCZ survey team that nudibranch abundance and species diversity were particularly high during the 2010 season compared to previous years. Specialist help from Bernard Picton also contributed to additional species being recorded. Two species not previously recorded in the Skomer MCZ were *Eubranchus vittatus* and *Trapania pallida*.

In 2011 *Cuthona viridis*, a further new species, was identified in a photo taken at Martins Haven by volunteer George Brown during the 2010 survey. *Aeolidia papillosa* was found during a shore survey at Martins Haven. Although this is a widespread and relatively common species in the UK it is rarely recorded at Skomer MCZ.



Aeolidia papillosa MB

In 2013 15 of the 16 species from the check list were recorded, including *Tritonia nilsodhneri* on pink sea fan, *E. verrucosa* at Rye Rocks. *Onchidoris pusilla* was recorded at the Mew Stone and *Okenia elegans* at the Pool and Thorn Rock. Notable records from volunteer divers were *Cuthona caerulea*, *Cuthona viridis* and *Diaphorodoris luteocincta* var. *alba* at Martins Haven west recorded by Kerry Lewis and *Lomanotus marmoratus* (not recorded in the MCZ since 1991) at High Point recorded by David Kipling.



Onchidoris pusilla MB 2013



Lomanotus marmoratus DK 2013

1.2 2014 Survey Aims

- To complete a nudibranch species diving survey at sites representing a range of habitats in the Skomer MCZ.
- To photograph nudibranch species, both *in situ* or in an aquarium.
- To produce a 2014 survey species list and compare to previous surveys. Combine survey data to produce a Skomer MCZ nudibranch species list.

2. Method

Sites around the Skomer Marine Conservation Zone are chosen to provide a range of habitats and environmental conditions. At each site divers firstly search for nudibranch spawn and prey species and search nearby for the animal; special attention being given to the base of hydroids and bryozoans on which spawn is found. Secondly, a small amount of hydroid, bryozoan and algal turf is collected and carefully sorted under a microscope. Nudibranch species are identified using Picton & Morrow (1994), Thompson (1976) and Thompson & Brown (1984). Species names currently listed in the World Register of Marine Species (WoRMS) are used. *In situ* as well as surface photographs are also taken as a record of each species.

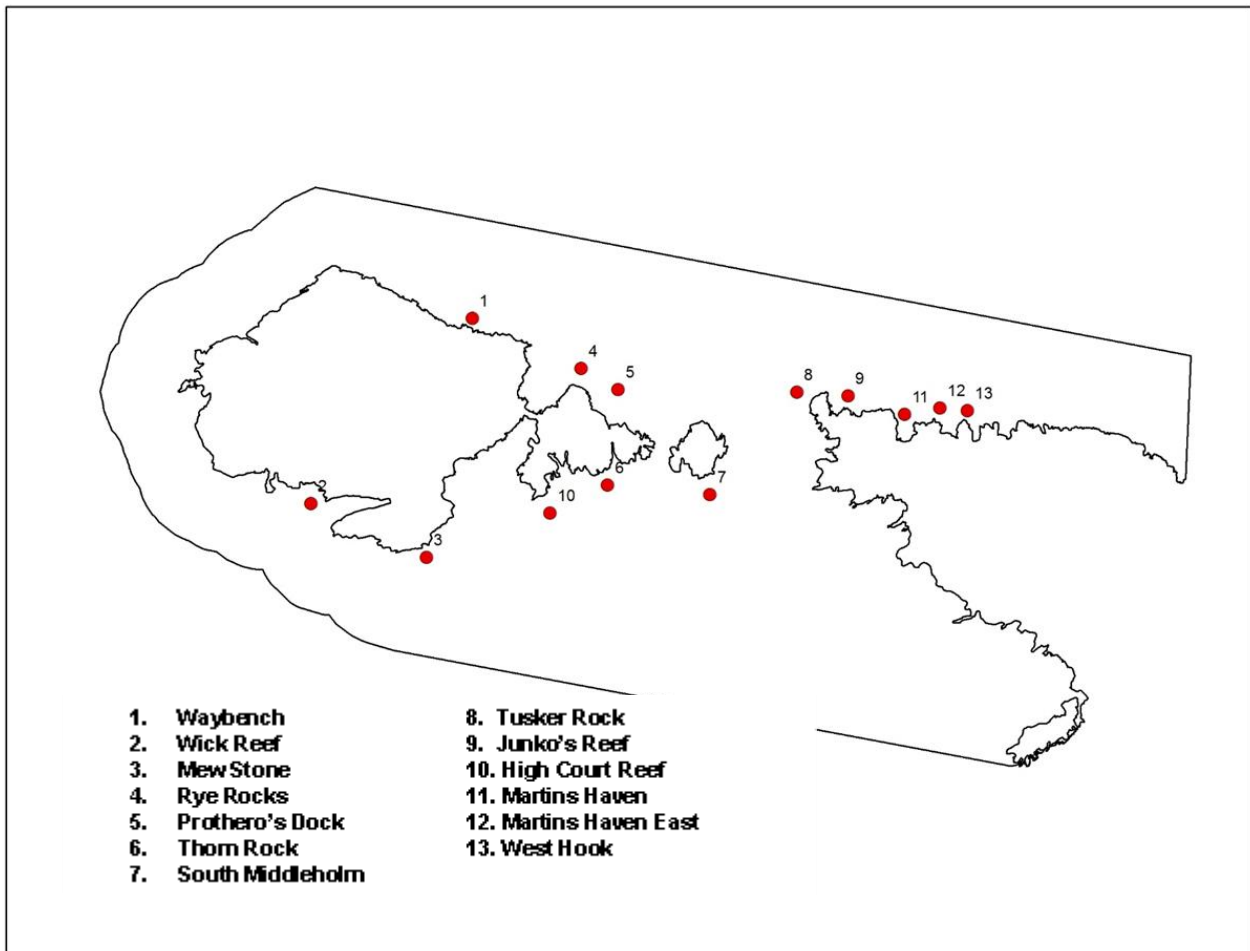
The sublittoral habitat found at each site is described briefly and associated nudibranch species recorded as a list for each site. In addition, an overall list of species is compiled for the Skomer MCZ.

3. Results

A total of 49 nudibranch species were recorded at 13 survey sites in the Skomer MCZ during the 2014 survey.

19 dives at 12 sites were completed by the Skomer MCZ team between 16th June and 26th June 2014. An additional site (Martins Haven) was surveyed by Seasearch divers (24 dives) as part of a nudibranch “Bioblitz” weekend 28/29th June 2014. A survey site location map is shown in Figure 1.

Figure 1. Site map for nudibranch diversity survey, Skomer MCZ, 2014



3.1 Site Records

The sublittoral habitat found at each site is described briefly and associated nudibranch species recorded (alphabetical order) as a list for each site. Species names with associated authority are listed in Appendix 3.

Site 1. Martins Haven East (MHVe) 7 species, 1 dive.

A rocky reef extending to 20m below chart datum (bcd) with moderate current exposure, tall hydroid turf dominated in *Nemertesia antennina* and *N. ramosa* and lush algal communities. Below the reef is a plateau of mixed sediments and encrusted cobbles.

Crimora papillata
Diaphorodoris luteocincta
Doto pinnatifida
Flabellina lineata
Goniodoris nodosa
Janolus cristatus
Polycera faeroensis

Site 2. Junko's Reef (JUN) 16 species, 1 dive.

Rocky reef with steep walls, exposed to moderate to strong currents. The rocks are covered in large expanses of *Alcyonium digitatum* and *Corynactis viridis*.

<i>Crimora papillata</i>	<i>Flabellina pedata</i>
<i>Diaphorodoris luteocincta</i>	<i>Janolus cristatus</i>
<i>Doto dunnei</i>	<i>Jorunna tomentosa</i>
<i>Doto fragilis</i>	<i>Limacia clavigera</i>
<i>Doto pinnatifida</i>	<i>Polycera faeroensis</i>
<i>Facelina annulicornis</i>	<i>Polycera quadrilineata</i>
<i>Facelina auriculata</i>	<i>Thecacera pennigera</i>
<i>Flabellina lineata</i>	<i>Tritonia lineata</i>

Site 3. Thorn Rock (TRK) 21 species, 3 dives.

A rocky reef extending to 18m bcd with rock platforms and gullies covered with fine silt and exposed to moderate currents. Rocks covered in hydroid and bryozoan turf and rich sponge community. Lush algal meadows are found in the shallows.

<i>Acanthodoris pilosa</i>	<i>Facelina annulicornis</i>
<i>Cadlina laevis</i>	<i>Facelina auriculata</i>
<i>Cuthona rubescens</i>	<i>Favorinus branchialis</i>
<i>Diaphorodoris luteocincta</i>	<i>Flabellina lineata</i>
<i>Doris sticta</i>	<i>Flabellina pedata</i>
<i>Doto cuspidata</i>	<i>Janolus cristatus</i>
<i>Doto fragilis</i>	<i>Jorunna tomentosa</i>
<i>Doto lemchei</i>	<i>Polycera faeroensis</i>
<i>Doto pinnatifida</i>	<i>Polycera quadrilineata</i>
<i>Doto tuberculata</i>	<i>Tritonia lineata</i>
<i>Eubranchus tricolor</i>	

Site 4. South Middleholm (SMD) 11 species, 1 dive.

A rocky reef extending to 18 m bcd with rock plateau, gullies and boulders. Exposed to moderate currents. Short hydroid and bryozoan turf including dense patches of *Alcyonidium diaphanum*. Rich algal meadows in the shallows.

Cadlina laevis
Crimora papillata
Cuthona concinna
Doto coronata
Doto fragilis
Flabellina lineata

Flabellina pedata
Janolus cristatus
Polycera faeroensis
Polycera quadrilineata
Tritonia lineata

Site 5. Tusker Rock (TSK) 18 species, 2 dives.

Steep rock reef with wide gullies and boulder areas, exposed to strong currents. Lush algal meadows in the shallows, dense walls of *Alcyonium digitatum* and a rich diversity of bryozoan and hydroid turf.

Crimora papillata
Cuthona amoena
Doris pseudoargus
Doto coronata
Doto cuspidata
Doto dunnei
Doto fragilis
Doto maculata
Doto millbayana

Doto pinnatifida
Facelina annulicornis
Flabellina gracilis
Flabellina lineata
Flabellina pedata
Janolus cristatus
Jorunna tomentosa
Limacia clavigera
Polycera faeroensis

Site 6. Prothero's Dock (PRO) 16 species, 2 dives.

Bedrock outcrop semi-exposed to current and with tall hydroid and algal communities giving way to a mixed sediment plain at 18m bcd.

Cuthona rubescens
Diaphorodoris luteocincta
Doto dunnei
Doto floridicola
Doto fragilis
Facelina annulicornis
Facelina auriculata
Favorinus branchialis
Flabellina lineata

Flabellina pedata
Goniodoris nodosa
Janolus cristatus
Limacia clavigera
Polycera faeroensis
Polycera quadrilineata
Thecacera pennigera

Site 7. Mew Stone (MST), 16 species, 1 dive.

A steep rocky reef extending to 18m bcd with strong wave action and tidal currents. The walls are carpeted in ascidians and *Mytilus edulis*. Hydroid species include *Tubularia sp.*

*Cuthona gymnota**Dendronotus frondosus**Doto coronata**Doto eireana**Doto millbayana**Eubbranchus farrani**Eubbranchus pallidus**Eubbranchus tricolor**Flabellina gracilis**Facelina auriculata**Facelina bostoniensis**Janolus cristatus**Jorunna tomentosa**Limacia clavigera**Polycera faeroensis**Polycera quadrilineata***Site 8. Wick Reef (WCK reef) 10 species, 2 dives.**

This reef is located at the entrance of the Wick, steep vertical cliffs and rock platforms exposed to strong wave action. The walls are covered in bryozoan turf with large numbers of the feather star *Antedon bifida*. Small numbers of *Balanophyllia regia* were found on wave scoured boulders at the bottom of steep walled gullies.

*Cadlina laevis**Cuthona rubescens**Diaphorodoris luteocincta**Doto dunnei**Flabellina pedata**Janolus cristatus**Limacia clavigera**Polycera faeroensis**Polycera quadrilineata**Tritonia lineata***Site 9. Waybench (WAY) 15 species, 1 dive.**

Vertical cliffs and boulder slopes down to a depth of 30 bcd, semi-exposed to wave action from the north and moderate tidal currents. The reef is richly covered in bryozoan and hydroid turf, *Alcyonium digitatum* is abundant and *Eunicella verrucosa* is regularly recorded.

*Crimora papillata**Cuthona rubescens**Dendronotus frondosus**Diaphorodoris luteocincta**Doto coronata**Doto dunnei**Doto fragilis**Doto turberculata**Eubbranchus doriae**Facelina auriculata**Flabellina lineata**Flabellina pedata**Janolus cristatus**Onchidoris oblonga**Polycera faeroensis*

Site 10. West Hook (WHK) 10 species, 2 dives.

Steeply sloping bedrock walls with gullies and boulder slopes extending down to 15m bcd. Semi-exposed to wave action from the north and moderate tidal currents. The vertical walls are covered in the soft coral *Alcyonium digitatum* and rich in bryozoan and hydroid turf. At the bottom of the bedrock a gently sloping plain of muddy shell gravel leads down to 20m bcd.

*Crimora papillata**Diaphorodoris luteocincta**Doto coronata**Doto millbayana**Doto pinnatifida**Facelina auriculata**Flabellina pedata**Limacia clavigera**Polycera faeroensis**Polycera quadrilineata***Site 11. Rye Rocks (RRK) 21 species, 2 dives.**

A rock outcrop, semi-exposed to wave action and moderate tidal currents. The bedrock drops down in a series of 5m steps to a depth of around 40m bcd. Between the rocky areas patches of coarse shell gravel and sand have accumulated and boulder slopes were found. The diverse nature of the seabed substrate in turn leads to a diverse range of habitats and species.

*Aegires punctilucens**Crimora papillata**Cuthona amoena**Diaphorodoris luteocincta**Doto fragilis**Doto lemchei**Doto pinnatifida**Doto tuberculata**Eubranchus exiguus**Eubranchus pallidus**Facelina annulicornis**Facelina auriculata**Flabellina lineata**Flabellina pedata**Goniodoris nodosa**Limacia clavigera**Onchidoris oblonga**Polycera faeroensis**Polycera quadrilineata**Tergipes tergipes**Tritonia lineata***Site 12. High Court Reef (HCR) 14 species.**

A series of rock pinnacles with vertical walls up to 15m high and deep wide gullies between up to 5m width with large boulders. The vertical walls are covered in rich sponge and bryozoan communities.

*Doto cuspidata**Doto fragilis**Doto maculata**Doto pinnatifida**Facelina annulicornis**Facelina auriculata**Flabellina lineata**Flabellina pedata**Janolus cristatus**Jorunna tomentosa**Limacia clavigera**Polycera faeroensis**Polycera quadrilineata**Tritonia lineata*

Site 13. Martins Haven shore dive (MHV) 33 species, Seasearch 24 dives.

Rocky reef exposed to moderate wave action and currents with tall hydroid turf and algal communities, reef gives way to a mixed sediment plateau with burrowing anemones and scallops.

Ancula gibbosa

Crimora papillata

Cuthona amoena

Cuthona rubescens

Diaphorodoris luteocincta

Doris pseudoargus

Doto coronata

Doto dunnei

Doto floridicola

Doto fragilis

Doto lemchei

Doto pinnatifida

Doto tuberculata

Eubranchus doriae

Eubranchus exiguus

Eubranchus tricolor

Facelina annulicornis

Facelina auriculata

Facelina bostoniensis

Favorinus branchialis

Flabellina gracilis

Flabellina lineata

Flabellina pedata

Janolus cristatus

Jorunna tomentosa

Limacia clavigera

Okenia elegans

Onchidoris oblonga

Polycera faeroensis

Polycera quadrilineata

Rostanga rubra

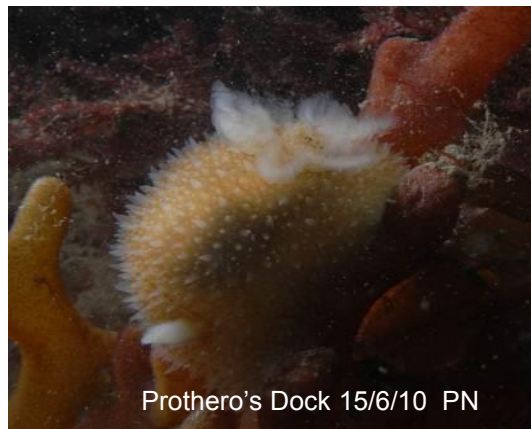
Tritonia hombergi

Tritonia lineata

3.2 Species Records

49 nudibranch species were recorded in the Skomer MCZ during the 2014 survey. These are listed alphabetically below with sites codes (see Appendix 4) and photographs. Species names with associated authority are listed in Appendix 3.

1. ***Acanthodoris pilosa*** 1 site TRK (7 sites in 2010) Feeds on *Alcyonidium diaphanum*.



2. ***Aegires punctilucens*** 1 site RRK. Feeds on *Leucosolenia botryoides*.



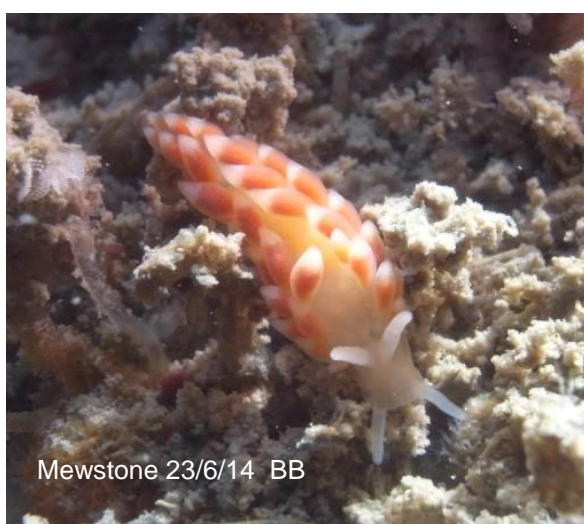
3. ***Ancula gibbosa*** 1 site MHV Feeds on minute kampotozoans.



4. ***Cadlina laevis*** 3 sites TRK, SMD, WCK. (1 site in 2010)
Feeds on *Dysidea fragilis*.



5. ***Cuthona gymnota*** 1 site MST. Feeds on *Tubularia larynx*.



6. ***Crimora papillata*** 8 sites MHVe, JUN, SMD, TSK, WAY, RRK, WHK, MHV.
Feeds on *Chartella papyracea* and *Securiflustra securifrons*.



7. ***Cuthona amoena*** 3 sites TSK, RRK, MHV. Feeds on *Halecium halecinum*.



Martins Haven 28/6/14 JC



Tusker Rock 16/6/14 MB

8. ***Cuthona concinna*** 1 site SMD

9. ***Cuthona rubescens*** 5 sites TRK, PRO, WAY, WCK, MHV
(not found in 2010)



Prothero's Dock 25/6/14 RS



Thorn Rock 24/6/14 KL

10. ***Dendronotus frondosus*** 2 sites MST, WAY. Feeds on *Tubularia indivisa* and *Sertularia argentea*.



Mew Stone 23/06/14 RS

11. ***Diaphorodoris luteocincta*** 9 sites MHVe, JUN, TRK, MHV, PRO, WCK, WAY, WHK, RRK. Feeds on *Crisia* sp.



Tusker Rock 16/6/14 KL



Martins Haven 28/6/14 HC

12. ***Doris pseudoargus*** 2 sites TSK, MHV. Feeds on sponges.



Tusker Rock 17/6/14 KL

13. ***Doris sticta*** 1 site TRK (not found in 2010)



Thorn Rock 24/6/14 KL

14. ***Doto coronata*** 6 sites MHV, WHK, MST, TSK, SMD, WAY Feeds on *Sertularia argentea* and *Obelia geniculata*.
Doto coronata is possibly more than one species and DNA work is currently being completed to investigate this further, Picton *pers. comm.*



Mew Stone 23/6/14 RS

15. ***Doto cuspidata*** 3 sites TSK, TRK, HCR. Feeds on *Nemertesia ramosa*.



Thorn Rock 24/6/14 KL

16. ***Doto dunnei*** 5 sites MHV, TSK, JUN, PRO, WAY, WCK (found at 1 site in 2010) . Feeds on *Kirchenpaueria pinnata*



Tuskers Rock 17/6/14 MB

17. ***Doto eireana*** 1 site MST. Feeds on *Amphisbetia operculata*.

18. ***Doto floridicola*** 2 sites MHV, PRO (not found in 2010)



Prothro's Dock
25/6/14 KL

19. ***Doto fragilis*** 9 sites JUN, HCR, TRK, SMD, TSK, PRO, WAY, MHV, RRK. Feeds on *Nemertesia antennina*, *N. ramosa* and *Halecium halecinum*. *Doto fragilis* is possibly more than one species and DNA work is currently being completed to investigate this further, Picton pers. comm.



South Middleholm 24/6/14 JJ



Martins Haven 28/6/14 JC

20. ***Doto lemchei*** 3 sites TRK, MHV, RRK. Feeds on *Aglaophenia tubulifera*.



Rye Rocks 25/6/14 KL

21. ***Doto maculata*** 2 sites TSK, HCR. Feeds on *Halopteris catharina*.



High Court Reef
23/6/14 MB

22. ***Doto millbayana*** 3 sites TSK, WHK, MST. Feeds on *Plumularia setacea*.



Tusker Rock, 16/6/14 MB

23. ***Doto pinnatifida*** 7 sites MHVe, TRK, TSK, WHK, RRK, MHV, JUN, HCR. Feeds on *Nemertesia antennina*.



Thorn Rock 24/6/14 KL



Martins Haven 28/6/14 JC

24. ***Doto tuberculata*** 4 sites TRK, MHV, RRK, WAY. Feeds on *Sertularella gayi*.



Rye Rocks 25/6/14 MB

25. ***Eubranchus doriae*** 2 sites MHV, WAY Feeds on *Kirchenpaueria similis*.

26. ***Eubranchus exiguus*** 2 sites RRK, MHV. Feeds on *Obelia geniculata*.

27. ***Eubranchus farrani*** 1 site MST. Feeds on *Obelia sp.* and *Aglaophenia pluma*.



Mew Stone 2013 MB



Mew Stone 23/6/14 BB

28. ***Eubranchus pallidus*** 2 site MST, RRK. Feeds on *Obelia dichotoma* and *Halecium halecinum*.



Mew Stone 16/06/10 PN



Mew Stone 16/06/10 ©BP (aquarium)

29. ***Eubranchus tricolor*** 3 sites MHV, MST, TRK (9 sites in 2010) Feeds on *Nemertesia antennina* and *N. ramosa*



Thorn Rock 23/6/14 KLE

30. ***Facelina annulicornis*** 7 sites JUN, TRK, HCR, TSK, PRO, RRK, MHV. Feeds on hydroids and other aeolid nudibranchs.



Rye Rocks 25/6/14 KLE



High Court Reef 23/6/14 RS

31. ***Facelina auriculata*** 9 sites TRK, WHK, JUN, HCR, MST, PRO, WAY, RRK, MHV. Feeds on *Obelia geniculata* and other hydroids.



Martins Haven 28/6/14 KLE



Rye rocks 25/6/14 KL

32. ***Facelina bostoniensis*** 2 site MHV, MST. Feeds on *Tubularia larynx*.



Mew Stone 23/6/14 BB



Martins Haven 28/6/14 SB

33. ***Favorinus branchialis*** 3 sites MHV, TRK, PRO Feeds on spawn of other nudibranchs.



Thorn Rock 23/6/14 KL

34. ***Flabellina gracilis*** 3 sites MST, TSK, MHV. Feeds on *Eudendrium* spp.



Mewstone 23/6/14 RS

- 35. *Flabellina lineata*** 10 sites MHV, TRK, MHVe, JUN, TSK. PRO, SMD, RRK, WAY, HCR. (7 sites in 2010). Feeds on *Tubularia indivisa* and other hydroids.



Tusker Rock 16/6/14 PN



Waybench 26/6/14 KLE

- 36. *Flabellina pedata*** 11 sites JUN, HCR, TRK, SMD, TSK, PRO, WCK, WHK, RRK, MHV, WAY. Feeds on *Eudendrium* spp.



West Hook 18/6/14 MB



Tusker Rock 16/6/14 PN

- 37. *Goniodoris nodosa*** 3 sites MHVe, PRO, RRK Feeds on *Dendrodoa grossularia* and *Alcyonidium* spp.

Martins Haven east
17/06/14 PN

- 38. *Janolus cristatus*** 11 sites MHVe, JUN, TRK, SMD, TSK, PRO, MST, WCK, WAY, MHV, HCR Feeds on *Bugula spp.*



South Middleholm 24/6/14 JJ



Thorn Rock 24/6/14 KL

- 39. *Jorunna tomentosa*** 6 sites (2 sites in 2010) TRK, TSK, JUN, HCR, MST MHV. Feeds on *Haliclona spp.*

Thorn Rock
23/6/14 KL

- 40. *Limacia clavigera*** 9 sites WCK, TSK, JUN, HCR, PRO, MST, WHK, RRK, MHV. Feeds on *Electra pilosa*.



Martins Haven east 20/05/10 MB



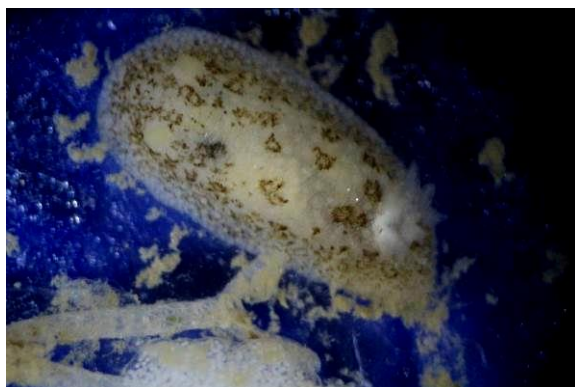
Martins Haven 28/6/14 JC

41. ***Okenia elegans*** 1 site MHV. Feeds on *Polycarpa rustica*.

Martins Haven
28/6/14 HC



42. ***Onchidoris oblonga*** 3 sites RRK, WAY, MHV. Feeds on *Cellaria fistulosa*.



Rye Rocks 25/6/14 MB

43. ***Polycera faeroensis*** 13 sites MHVe, JUN, TRK, SMD, TSK, PRO, MST, WCK, HCR, WAY, WHK, RRK, MHV. Feeds on *Crisia* spp and *Bicellariella ciliata*.

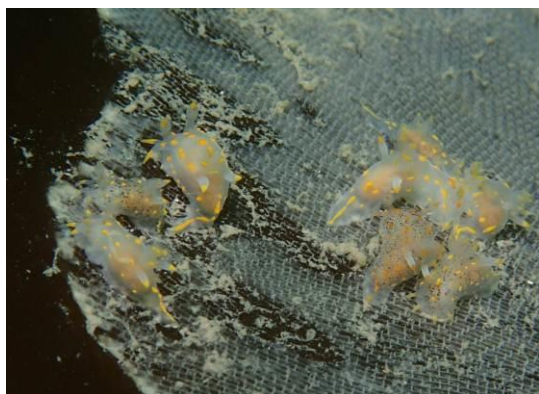


Thorn Rock 24/06/14 MB



Martins Haven 28/6/14 K Lewis

44. ***Polycera quadrilineata*** 10 sites (5 sites in 2010) TRK, WHK, JUN, HCR, MST, SMD, WCK, PRO, RRK, MHV. Feeds on *Membranipora membranacea*.



Rye Rocks 25/6/14 KL



Prothero's Dock 25/6/14 RS

45. ***Rostanga rubra*** 1 site MHV. Feeds on *Ophlitaspongia papilla*.



Prothero's Dock
3/06/10 MB

46. ***Tergipes tergipes*** 1 sites RRK. Feeds on *Obelia geniculata*.



Prothero's Dock
15/06/10 BP

47. ***Thecacera pennigera*** 2 sites (4 sites in 2010) JUN, PRO. Feeds on *Bugula plumosa*.



Junko's Reef 18/6/14 KL

48. ***Tritonia hombergii*** 1 sites (3 sites in 2010) MHV. Feeds on *Alcyonium digitatum*.



South Middleholm 25/05/10 PN

49. ***Tritonia lineata*** 7 sites TRK, JUN, HCR, SMD, WCK. RRK, MHV. Feeds on octocorals such as *Sarcodictyon catenatum*.



South Middleholm 24/6/14 JJ



South Middleholm 24/6/14 RS

3.3 Skomer MCZ Records

Nudibranch survey records for 2002, 2006, 2010 and 2014 have been combined, along with previous records from both diving surveys and sediment grab sampling surveys to produce a list of all current known records for the Skomer MCZ. The combined total recorded is 76 species.

Table 1. Nudibranch species recorded in the Skomer MCZ (alphabetical order).

Species	2002	2006	2010	2014	Years
<i>Acanthodoris pilosa</i>	1		1	1	3
<i>Aegires punctilucens</i>	1		1	1	3
<i>Aeolidia papillosa</i>		1			1
<i>Ancula gibbosa</i>			1	1	2
<i>Cadlina laevis</i>		1	1	1	3
<i>Crimora papillata</i>	1	1	1	1	4
<i>Cuthona amoena</i>		1	1	1	3
<i>Cuthona concinna</i>				1	1
<i>Cuthona gymnota</i>		1	1	1	3
<i>Cuthona pustulata</i>		1	1		2
<i>Cuthona rubescens</i>	1			1	2
<i>Cuthona viridis</i>			1		1
<i>Dendronotus frondosus</i>		1	1	1	3
<i>Diaphorodoris luteocincta</i>	1	1	1	1	4
<i>Diaphorodoris luteocincta var alba</i>	1		1		2
<i>Doris pseudoargus</i>	1	1	1	1	4
<i>Doris sticta</i>		1		1	2
<i>Doto coronata</i>	1	1		1	3
<i>Doto cuspidata</i>	1	1	1	1	4
<i>Doto dunnei</i>			1	1	2
<i>Doto eireana</i>		1	1	1	3
<i>Doto floridicola</i>				1	1
<i>Doto fragilis</i>	1	1	1	1	4
<i>Doto koenneckeri</i>	1		1		2
<i>Doto hystrix</i>			1		1
<i>Doto lemchei</i>	1		1	1	3
<i>Doto maculata</i>			1	1	2
<i>Doto millbayana</i>	1	1	1	1	4
<i>Doto pinnatifida</i>	1	1	1	1	4
<i>Doto tuberculata</i>	1		1	1	3
<i>Eubranchus doriae</i>				1	1
<i>Eubranchus exiguus</i>	1		1	1	3
<i>Eubranchus farrani</i>	1	1	1	1	4
<i>Eubranchus pallidus</i>		1	1	1	3
<i>Eubranchus tricolor</i>	1	1	1	1	4
<i>Eubranchus vittatus</i>			1		1
<i>Facelina annulicornis</i>	1	1	1	1	4

<i>Facelina auriculata</i>	1	1	1	1	4
<i>Facelina bostoniensis</i>			1	1	2
<i>Favorinus branchialis</i>	1	1	1	1	4
<i>Favorinus blianus</i>			1		1
<i>Flabellina browni</i>		1	1		2
<i>Flabellina gracilis</i>	1		1	1	3
<i>Flabellina lineata</i>		1	1	1	3
<i>Flabellina pedata</i>	1	1	1	1	4
<i>Goniodoris nodosa</i>		1	1	1	3
<i>Janolus cristatus</i>	1	1	1	1	4
<i>Jorunna tomentosa</i>			1	1	2
<i>Limacia clavigera</i>	1	1	1	1	4
<i>Lomanotus genei</i>			1		1
<i>Okenia aspersa</i>			1		1
<i>Okenia elegans</i>			1	1	2
<i>Onchidoris pusilla</i>		1			1
<i>Onchidoris oblonga</i>			1	1	2
<i>Polycera faeroensis</i>	1	1	1	1	4
<i>Polycera quadrilineata</i>	1	1	1	1	4
<i>Rostanga rubra</i>		1	1	1	3
<i>Tergipes tergipes</i>	1		1	1	3
<i>Thecacera pennigera</i>		1	1	1	3
<i>Trapania pallida</i>			1		1
<i>Tritonia lineata</i>	1	1	1	1	4
<i>Tritonia hombergii</i>	1		1	1	3
<i>Tritonia nilsodhneri</i>			1		1
Totals	30	34	55	49	63

63 species recorded on MNR diving surveys

Other diving records in Skomer MCZ

<i>Cuthona caerulea</i>	09 RRK, 13 MHVe
<i>Cuthona foliata</i>	75 Saunders
<i>Geitodoris planata</i>	72 JSD, 75 BHO, 89 RRK&NWA
<i>Goniodoris castanea</i>	72 JSD, 88 RRK
<i>Onchidoris bilamellata</i>	72 NNK
<i>Polycera elegans</i>	72 NWA, 75 WTK
<i>Lomanotus marmoratus</i>	91 MHV. 13 HLP
<i>Trapania tartanella</i>	09 RRK
<i>Tritonia plebeia</i>	72 NNK, 89 PRK, 90 GST, 91 MST

72 species recorded on ALL diving surveys

Additional records from Sediment Infauna surveys (Rostron 93, 96, Barfield 98,03,07)

<i>Adalaria loveni</i>	93 site 1
<i>Embletonia pulchra</i>	98 site 7 WTP
<i>Onchidoris muricata</i>	93 sites 12, 19
<i>Onchidoris sparsa</i>	98 sites 6/7, 03 sites 5/7/12, 07 site 6.

76 species recorded on all diving and grab sampling surveys

3.4 Martins Haven Nudibranch “Bioblitz” records

Nudibranch “Bioblitz” records, by volunteer Seasearch divers in 2010 and 2014 are shown in Table 2. The combined total recorded is 40 species.

Table 2. Martins Haven Seasearch ‘Nudibranch bioblitz’ 2010 and 2014 species list.


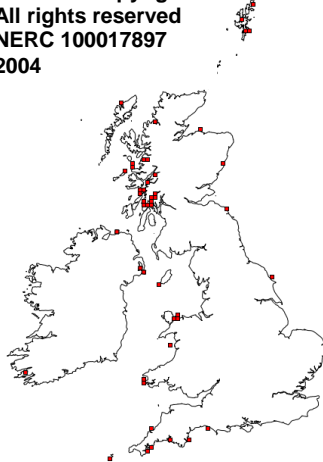

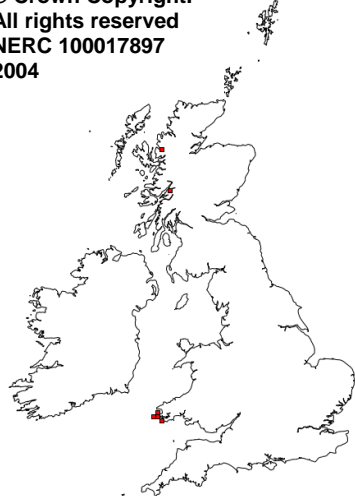
Species	2010	2014		Species	2010	2014
<i>Acanthodoris pilosa</i>	Y			<i>Facelina bostoniensis</i>		Y
<i>Aegires punctilucens</i>	Y			<i>Favorinus branchialis</i>	Y	Y
<i>Ancula gibbosa</i>		Y		<i>Flabellina browni</i>	Y	
<i>Crimora papillata</i>	Y	Y		<i>Flabellina gracilis</i>		Y
<i>Cuthona amoena</i>		Y		<i>Flabellina lineata</i>	Y	Y
<i>Cuthona rubescens</i>		Y		<i>Flabellina pedata</i>	Y	Y
<i>Diaphorodoris luteocincta</i>	Y	Y		<i>Goniodoris nodosa</i>	Y	Y
<i>Diaphorodoris luteocincta var alba</i>	Y			<i>Janolus cristatus</i>	Y	Y
<i>Doris pseudoargus</i>	Y	Y		<i>Jorunna tomentosa</i>	Y	Y
<i>Doto coronata</i>		Y		<i>Limacia clavigera</i>	Y	Y
<i>Doto dunnei</i>		Y		<i>Okenia elegans</i>	Y	Y
<i>Doto floridicola</i>		Y		<i>Onchidoris oblonga</i>	Y	Y
<i>Doto fragilis</i>	Y	Y		<i>Polycera faeroensis</i>	Y	Y
<i>Doto lemchei</i>	Y	Y		<i>Polycera quadrilineata</i>		Y
<i>Doto maculata</i>	Y			<i>Rostanga rubra</i>	Y	
<i>Doto pinnatifida</i>	Y	Y		<i>Thecacera pennigera</i>	Y	
<i>Doto tuberculata</i>	Y	Y		<i>Trapania pallida</i>	Y	
<i>Eubranchus doriae</i>		Y		<i>Tritonia lineata</i>	Y	Y
<i>Eubranchus exiguus</i>	Y	Y		<i>Tritonia hombergii</i>	Y	Y
<i>Eubranchus tricolor</i>	Y	Y			31	33
<i>Facelina annulicornis</i>	Y	Y		40 Species recorded at Martins Haven		
<i>Facelina auriculata</i>	Y	Y				

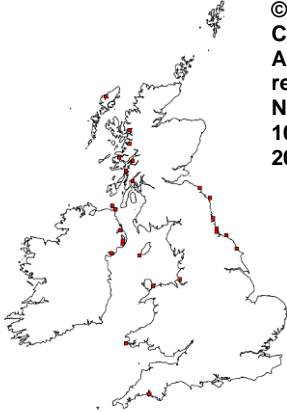
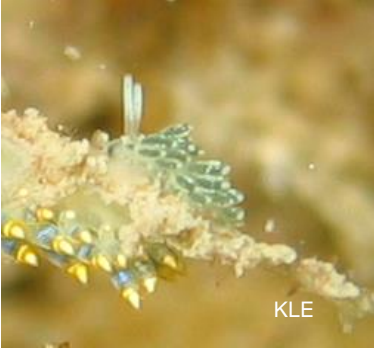
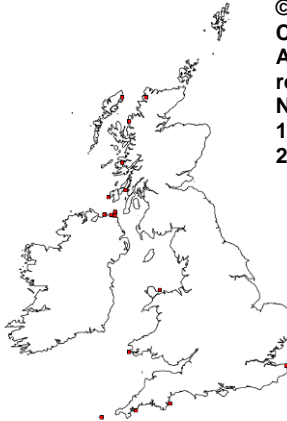




3.5 Notable Nudibranch Species

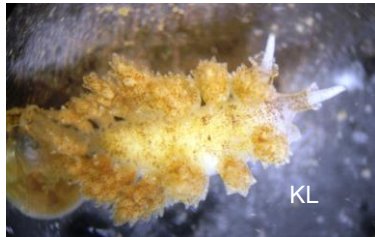
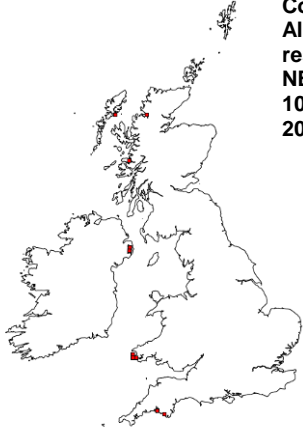

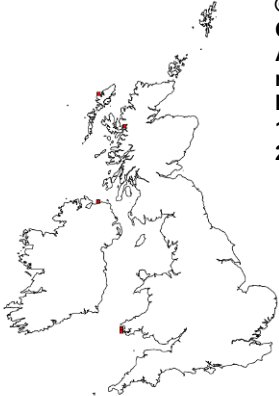


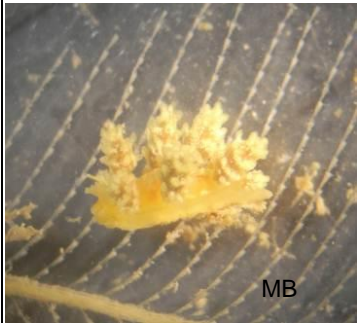

A list of notable species has been selected from diving surveys between 2002 and 2014. These include dives not completed on the dedicated nudibranch surveys. Some of the species are new records to the Skomer MCZ; others are notable due to their national scarcity or limited national distribution, see Table 3. The current distribution of each species can be seen on the UK distribution maps from the National Biodiversity Network (NBN) Gateway, contributors to this data are shown in Appendix 5.

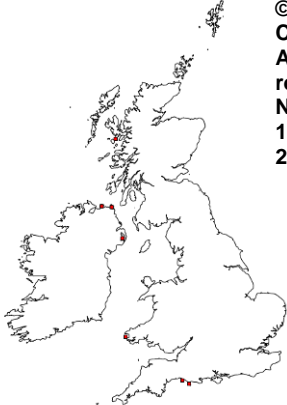

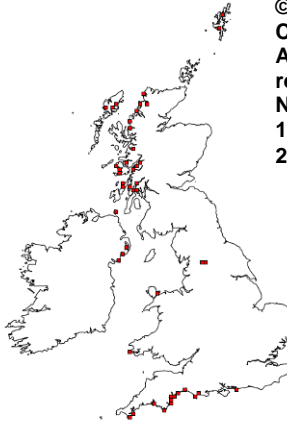

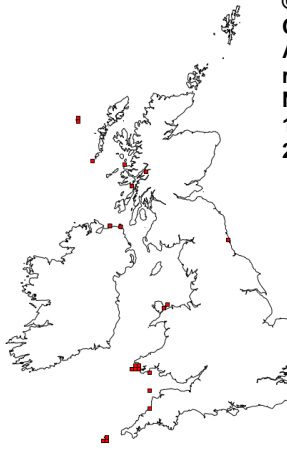

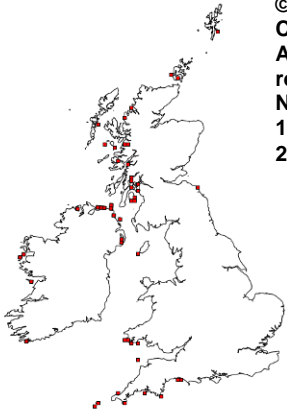
Table 3. Notable nudibranch records for diving surveys 2002-2014


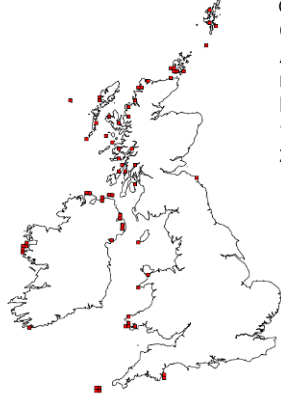

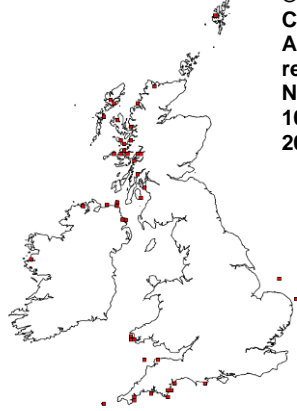

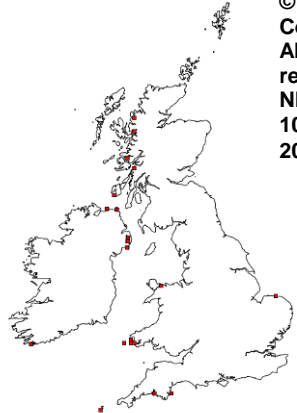

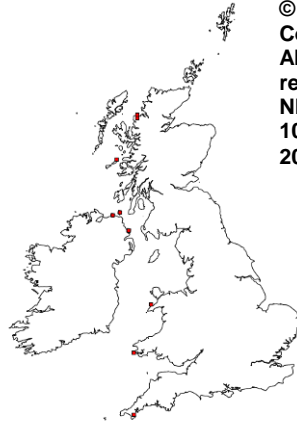
(Maps sourced through the NBN gateway www.data.nbn.org.uk The recorders, data provider¹ and the NBN Trust bear no responsibility for any further analysis or interpretation of the data)


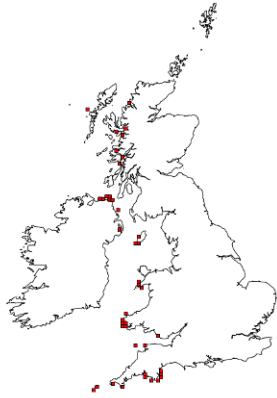

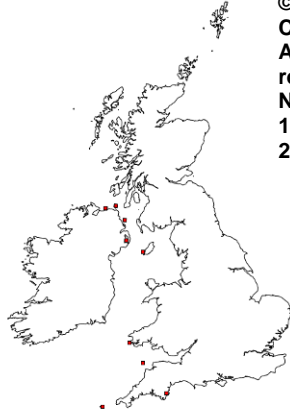

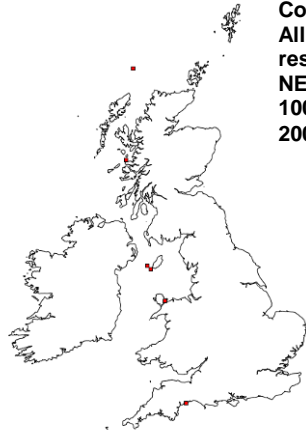

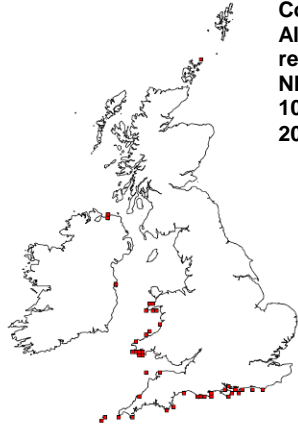
SPECIES	COMMENTS (Bunker <i>et al</i> 1993, Picton & Morrow 1994, www.habitas.org.uk)	DISTRIBUTION MAP (NBN Gateway)
<p><i>Cuthona caerulea</i></p> 	<p>Found all around the British Isles but most frequently on the west coast of Scotland. It feeds on <i>Sertularella</i> hydroids.</p> <p>Recorded in 1975 ,1989, 2009 and 2013.</p>	<p>© Crown Copyright. All rights reserved NERC 100017897 2004</p> 
<p><i>Cuthona pustulata</i></p> 	<p>A northern species but regularly found around Skomer. It feeds on the hydroid <i>Halecium muricatum</i> which is local in its distribution at scattered exposed localities.</p>	<p>© Crown Copyright. All rights reserved NERC 100017897 2004</p> 



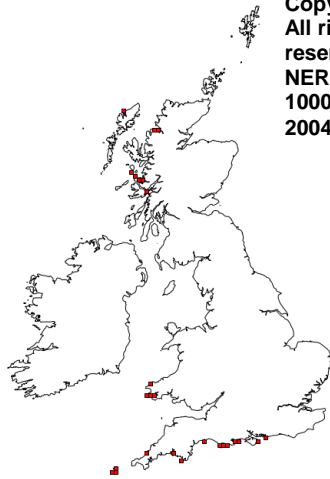

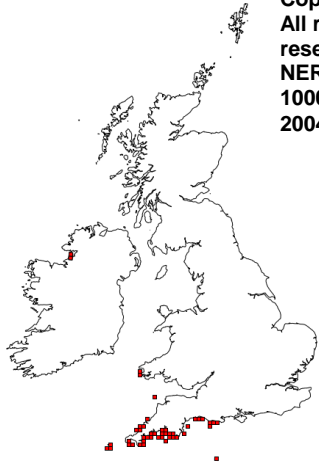
<p><i>Cuthona concinna</i></p>	<p>This is a northern species with sparse records at Skomer and the south coast. It feeds on the hydroid <i>Sertularia argentea</i> which is usually found in strong tidal flows or wave action,</p> <p>Recorded in 1989 and 1992. First record on a survey in 2014.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Cuthona viridis</i></p>  <p>KLE</p>	<p>Found all around the British Isles, however records are sparse as it can often be highly camouflaged. It feeds on <i>Sertuarella</i> hydroids.</p> <p>First record for Skomer in 2010 and again in 2013.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Diaphorodoris luteocincta</i> <i>var. alba</i></p>  <p>RS</p>	<p>Several varieties of <i>D. luteocincta</i> occur in the Mediterranean and the variety <i>alba</i> occurs both in the Mediterranean and the north to south coast of Britain.</p> <p>First record for Skomer in 2002 and on several occasions since.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Doris sticta</i></p>  <p>PN</p>	<p>A nationally scarce species found on the west of Ireland and south west Britain (Moore, 2002). Feeds on sponges but it is unknown which species.</p> <p>Recorded in 1975, 1990 and 1991. Found on both 2006 and 2014 surveys.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>

<p><i>Doto cuspidata</i></p> 	<p>An uncommon species that feeds exclusively on <i>Nemertesia ramosa</i>. It is found in the south of Britain but more regularly in the north.</p> <p>Found in 1988, 1999 and all the Skomer surveys.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Doto eireana</i></p> 	<p>Found on the west coast of Britain, however records are few due to its separation from <i>Doto coronata</i>. It feeds exclusively on <i>Amphisbetia operculata</i>.</p> <p>New record for Skomer in 2006, recorded again in 2010 and 2014.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Doto floridicola</i></p> 	<p>First recorded at Skomer as "<i>Doto sp A</i>" in 1990. In 2002 Picton confirmed it to be "<i>Doto floridicola</i>". It is a southern species found in the Azores and Mediterranean. In Britain it feeds on <i>Aglaophenia kirchenpaueri</i>.</p> <p>Recorded in 1990 and then on the 2014 survey at 2 sites.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Doto hystrix</i></p> 	<p>A scarce species found in deep waters below 25m found on the hydroid <i>Schizotricha frutescens</i>. A north west species with occasional records at Skomer and Lundy.</p> <p>Recorded in 1988 and on the 2010 survey.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>

<p><i>Eubranchus doriae</i></p>	<p>This is a very small camouflaged species. Few records exist however it has been found on the west and south coasts of Britain. It feeds on the plumularian hydroid <i>Kirchenpaueria similis</i>.</p> <p>Recorded in 1997 and on the 2014 survey.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Eubranchus vittatus</i></p>  <p>KL</p>	<p>A frequent species in the north west of Britain but scarcer in the south. It feeds on the hydroid <i>Kirchenpaueria pinnata</i>.</p> <p>New record for Skomer in 2010.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Facelina annulicornis</i></p> 	<p>An uncommon species but with a wide spread distribution in Britain. It feeds on a variety of hydroids and has been known to attack and eat other nudibranchs.</p> <p>It is particularly common at Skomer.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Favorinus brianus</i></p> 	<p>Distributed along the north and west coasts of Britain. It eats other nudibranch spawn.</p> <p>Collected in 1972 and subsequently described in 1974 as a new species with Martins Haven the type locality for the species, Hunnam & Brown (1975).</p> <p>Recorded in 1975, 1989 and on the 2010 survey.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>

<p><i>Favorinus branchialis</i></p> 	<p>Widely distributed in the British Isles but rather local. It feeds on the spawn of other nudibranchs and juveniles feed on <i>Obelia</i>.</p> <p>Found in 1975, 1989 and all the Skomer surveys.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Lomanotus genei</i></p> 	<p>A scarce species with sporadic records but with a wide distribution from the west coast of Scotland to the Mediterranean. It feeds on <i>Nemertesia ramosa</i>.</p> <p>Found in 1988 and on the 2010 survey.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Lomanotus marmoratus</i></p> 	<p>This is a highly camouflaged species and most likely under-recorded. It has been found all around the British Isles. It feeds on <i>Nemertesia antennina</i>.</p> <p>Found in 1989 and 2013.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Okenia aspersa</i></p> 	<p>A scarce burrowing nudibranch that feeds on the ascidian <i>Molgula occulta</i>. <i>M. occulta</i> live buried in muddy sand and often the only clue to <i>O. aspersa</i>'s presence is the distinct spawn shaped like coiled springs.</p> <p>Found in 1989 and on the 2010 survey.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>

<p><i>Okenia elegans</i></p> 	<p>A nationally scarce species that feeds on <i>Polycarpa rustica</i>. Found at scattered locations on the south and west coasts of Britain. (Moore, 2002)</p> <p>Found in 1991 and the 2010 and 2014 surveys. It is regularly found in the MCZ.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Onchidoris oblonga</i></p> 	<p>It is found at scattered on the south and west coasts of Britain but rarely recorded. It is very small and well camouflaged on its food <i>Cellaria fistulosa</i>.</p> <p>Found in 1987, 1989 and on the 2010 and 2014 surveys.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Onchidoris pusilla</i></p> 	<p>Found all around the coast of Britain but rarely recorded as it is particularly well camouflaged. Feeds on encrusting bryozoans.</p> <p>New record for Skomer on the 2006 survey and found again in 2013.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Thecacera pennigera</i></p> 	<p>A species that is confined to the south and west coasts of Britain. It feeds on the bryozoan <i>Bugula plumosa</i>.</p> <p>It is regularly recorded at Skomer.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>

<p><i>Trapania tartanella</i></p> 	<p>Found on the Atlantic coasts of Spain and Portugal. A rare species first recorded in Britain at the Manacles, Cornwall in 2007.</p> <p>First record for both Wales and Skomer in 2009 was by David Kipling and Sarah Bowen.</p>	<p>Distribution map not available.</p>
<p><i>Trapania pallida</i></p> 	<p>A scarce species found from west Scotland to the Atlantic coast of Spain. It feeds on kamptozoa.</p> <p>First record for the Skomer in 2010.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>
<p><i>Tritonia nilsodhneri</i></p> 	<p>A nationally scarce species (Moore, 2002) found in the south west of Britain. Feeds on the Pink sea fan, <i>Eunicella verrucosa</i>.</p> <p>Present in small numbers around Skomer and monitored on the Pink sea fan surveys.</p>	 <p>© Crown Copyright. All rights reserved NERC 100017897 2004</p>

4. Discussion

A total of 13 sites were surveyed in 2014 resulting in 49 species of nudibranch in the Skomer MCZ. The number of species recorded were lower than in 2010 (55 species) however effort was lower in 2014 with a total of 19 dives completed compared to 14 sites surveyed and 27 dives completed in 2010 (Lock, 2011). The general impression in 2014 was that overall nudibranch abundance and species diversity was lower than in 2010, which was a particularly healthy year. In 2014 most of the survey sites were covered in a thick layer of silt, deposited following the violent storms of winter 2013/14. This silt buried many of the sessile filter feeding animals: hydroids, bryozoans, sponges and ascidians, which are food sources for the different nudibranch species. Plumes of silt were also found all around the MCZ causing particularly high turbidity. This had a significant impact on diving visibility and made working conditions very difficult.

The total of 49 species in 2014, although lower than 2010 (55 species), was considerably higher than the 2002 (32 species) and 2004 (34 species) surveys (Lock, 2011). The greater numbers of species recorded in both 2010 and 2014 may have been due to extra efforts to target a wider range of habitats. These included mixed sediment sites at Martins Haven east, West Hook, Martins Haven and Prothero's Dock. In addition the identification skills of the diving team have increased through experience and training. In both 2010 and 2014 a number of species were also recorded as a direct result of having specialist help from Bernard Picton.

In 2010 and 2014 a weekend was organised for Seasearch volunteer divers to complete a nudibranch "Bioblitz" at Martins Haven. Around 20 divers took part in each survey and were assisted by specialist Bernard Picton. The results were impressive with 31 species recorded in 2010 and 33 species in 2014. Combining these records gives a total of 40 species for Martins Haven. The concentrated effort at a single site with volunteer divers has proven incredibly valuable.

Combining the 2002, 2006, 2010 and 2014 survey data, 63 nudibranch species were recorded. Of these, 5 species, *Cadlina laevis*, *Doto eireana*, *Onchidoris pusilla*, *Eubranchus vittatus* and *Trapania pallida*, had not been recorded before the 2002 survey. In addition a new species for Wales and the Skomer MCZ, *Trapania tartanella*, was recorded in 2009. *Doto floridicola* was recorded in 2014. This had been recorded as *Doto sp 'A'* in previous reports and literature, but it was recognised in 2002 as a species already recorded from the Mediterranean and Azores (Picton, 2002).

6 nudibranch species were recorded in diving surveys in the Skomer MCZ between 1972 and 2001 but not found since. These are *Cuthona foliata*, *Geitodoris planata*, *Gonidoris castanata*, *Onchidoris bilamellata*, *Tritonia plebia* and the nationally rare *Polycera elegans* (Bunker, Picton & Morrow, 1992 and Hunnam & Brown, 1975).

For all diving surveys in the MCZ a total of 72 species have been recorded, with an additional 4 species recorded from sediment infauna surveys. 76 nudibranch species have thus been recorded in the MCZ from approximately 108 described species from the British Isles (Picton & Morrow, 1994).

The diversity of nudibranch species in the Skomer MCZ is very high with 70% of UK species represented in an area of 13.2 square kilometres. This high diversity is a reflection of the diversity of habitats and environmental conditions found in the Skomer MCZ and the rich communities that these support. As specialised predators nudibranch species have a very selective choice of prey organisms, they are therefore a good indicator of the overall ecosystem health (Luddington, 2002).

A number of the survey sites have a wide range of habitats including rock, sediment and algae communities and thus support a high diversity of nudibranch species. Particularly rich were Martins Haven (33 species), Thorn Rock (22 species), and Rye Rocks (21 species). Other sites were selected to target specific prey species which are found under particular environmental conditions. An example is the hydroid *Tubularia spp.*, which is the prey of *Cuthona gymnota* and *Dendronotus frondosus* and is found at sites with strong current, such as Tusker Rock and Mew Stone. The most common species (found at 10 sites or more) were *Flabellina lineata*, *Janolus cristatus*, *Polycera faeroensis*, *Polycera quadrilineata*, *Diaphorodoris luteocincta* and *Flabellina pedata*, all of which feed on common hydroid and bryozoan species.

Notable species for the Skomer MCZ have previously been selected from the rare and scarce marine species list for the UK (Sanderson, 1996). These include *Okenia elegans*, *Tritonia nilsodhneri* and *Doris sticta*. This list is however dated as some species were under recorded and new species have been since found or described in the UK, for example *Trapania tartanella*. The most up to date species distribution maps for the UK are from the Marine Recorder national database administered by the Joint Nature Conservation Council and available on the internet via the National Biodiversity Network (NBN) gateway. These distribution maps are useful to highlight notable species in the Skomer MCZ. This includes species with northern distributions (*Doto hystrix*, *Cuthona pustulata*, *Okenia aspersa* and *Doto eireana*) or southern distributions (*Doris sticta* and *Tritonia nilsodhneri*) and those with a widespread distribution but particularly common in the Skomer MCZ (*Facelina annulicornis*). These highlight the importance of Skomer MCZ as a location for high nudibranch diversity.

5. Recommendations

- Complete the annual check list.
- Photograph and collect any unusual species for identification;
- Skomer MCZ staff to complete specialist identification training;
- Complete a nudibranch species survey in the Skomer MCZ every 4 years.
- Complete a nudibranch “Bioblitz” at Martins Haven with volunteer divers alongside the main survey every 4 years.

6. Acknowledgements

The nudibranch survey could not have been completed without the support of many people. We are grateful for the help of Bernard Picton, who certainly helped boost both the skills of the team and the numbers of nudibranch found. We are grateful for the help and enthusiasm of our diving volunteers that supported the Skomer MCZ dive team during the 2014 survey: Ross Bullimore, Blaise Bullimore, John Archer Thomson, Rob Spray, Kerry Lewis, Richard West, Francis Bunker and John Moore. Each of these volunteers also generously provided their photos for use in the report and other work related to the Skomer MCZ.

Finally many thanks to all the Seasearch volunteer divers who contributed their records from Martins Haven on the 'Nudibranch Bioblitz'. Special mention goes to Bernard Picton, David Kipling, Sarah Bowen, Jon Chamberlain and Hayden Close for their records and the use of their photographs in this report.

Photos are an essential part of the survey, all photos have been credited in this report as follows:

Skomer MCZ diving team:

MB Mark Burton
KL Kate Lock
PN Philip Newman
JJ Jennifer Jones

Volunteer divers:

JAT John Archer Thomson
BB Blaise Bullimore
RB Ross Bullimore
KLE Kerry Lewis
RS Rob Spray
DK David Kipling
BP Bernard Picton
SB Sarah Bowen
JC Jon Chamberlain
HC Hayden Close

7. References

Bunker, F., Picton, B.E. & Morrow, C.C. (1992) New Information on Species and Habitats in the Skomer Marine Nature Reserve (and other sites off the Pembrokeshire Coast). A report to the Countryside Council for Wales from Marine Seen and Ulster Museum.

Burton, M., Lock, K., Gibbs, R & Newman, P (2007). Skomer Marine Nature Reserve Project Status Report 2006/07. CCW Regional Report CCW/WW/07/4.

Hunnam, P & Brown, G, (1975). Sublittoral nudibranch mollusca (sea slugs) in Pembrokeshire waters. Field Studies (1975) 4, 131-159.

Luddington, L (2002) Skomer Marine Nature Reserve, Nudibranch diversity survey 2002. CCW West Area Report No. 18.

Lock, K., Burton, M., Gibbs, R & Newman, P (2010). Skomer Marine Nature Reserve Project Status Report 2009/10. CCW Regional Report CCW/WW/

Lock, K, Newman, P & Burton, M, (2011) Skomer Marine Nature Reserve Nudibranch Diversity Survey 2010. CCW/WW/10/11

Moore, J (2002). An Atlas of marine Biodiversity Action Plan species and habitats and Species of Conservation Concern in Wales. 2nd edition. CCW contract Science Report No. 509.

NBN gateway

Picton, B.E. & Morrow, C.C. (1994) A Field Guide to the Nudibranchs of the British Isles. Immel Publishing, 143 pp.

Picton, B. 2002 (Aug1) Re Doto floridicola from British Isles. (Message in) Sea Slug Forum. Australian Museum, Sydney.

Picton, B.E. & Morrow, C.C., 2002-8. <http://www.habitas.org.uk/marinelife/> Encyclopedia of marine life of Britain and Ireland.

Sanderson, W.G. (1996). Rare marine benthic flora and fauna in Great Britain: the development of criteria for assessment. JNCC Report, No. 240.

Thompson, T.E. (1976) Molluscs: Benthic Opisthobranchs. The Linnean Society, 356 pp.

Thompson, T.E. & Brown, G.H. (1984) Biology of Opisthobranch Molluscs, Volume II. The Ray Society No. 56.

World Register of Marine Species www.marinespecies.org

APPENDIX 1.

Nudibranch species records, Hunnam & Brown 1975.						
Diving surveys completed 1972 and 1973						
	Martins Haven	Jack Sound	North Neck	North Wall	Wick	High Cliff
<i>Acanthodoris pilosa</i>	1				1	
<i>Aegires punctilucens</i>	1			1		
<i>Ancula gibbosa</i>	1					
<i>Cadlina laevis</i>		1		1		
<i>Crimora papillata</i>	1	1	1	1		1
<i>Diaphorodoris luteocincta</i>	1	1	1			1
<i>Doris pseudoargus</i>	1	1				
<i>Doris sticta</i>	1			1		
<i>Doris planata</i>	1					
<i>Doto coronata</i>		1				
<i>Doto fragilis</i>	1	1	1	1		
<i>Doto pinnatifida</i>	1	1	1	1		
<i>Eubranchus exiguus</i>		1	1			
<i>Eubranchus farrani</i>	1	1	1			
<i>Eubranchus tricolor</i>		1				
<i>Facelina annulicornis</i>	1	1	1	1		
<i>Facelina auriculata</i>	1	1	1	1		
<i>Facelina bostoniensis</i>	1					
<i>Favorinus blianus</i>	1					
<i>Flabellina pedata</i>	1	1	1			
<i>Goniodoris nodosa</i>	1	1	1		1	
<i>Goniodoris castanea</i>		1				
<i>Janolus cristatus</i>	1	1				
<i>Jorunna tomentosa</i>				1		
<i>Limacia clavigera</i>	1	1		1		
<i>Okenia elegans</i>						1
<i>Onchidoris bilamellata</i>			1			
<i>Polycera elegans</i>				1		
<i>Polycera faeroensis</i>	1	1	1			1
<i>Polycera quadrilineata</i>	1	1	1			
<i>Rostanga rubra</i>			1			
<i>Tergipes tergipes</i>		1	1			
<i>Tritonia lineata</i>	1	1		1		1
<i>Tritonia hombergii</i>	1	1		1		1
<i>Tritonia plebeia</i>			1			
	23	22	16	13	2	6

APPENDIX 2.**Hit list of nudibranch species to be observed annually in the Skomer MCZ**

Number of species	Species	Food preference
1	<i>Acanthodoris pilosa</i>	<i>Alcyonidium diaphanum</i>
2	<i>Doris pseudoargus</i>	Sponges
3	<i>Crimora papillata</i>	<i>Chartella papyracea</i> and <i>Securiflustra securifrons</i> .
4	<i>Diaphorodoris luteocincta</i>	<i>Crisia</i> spp.
5	<i>Doto fragilis</i>	<i>Nemertesia ramosa</i> and <i>Halecium halecinum</i> .
6	<i>Doto pinnatifida</i>	<i>Nemertesia antennina</i> .
7	<i>Eubranchus farrani</i>	<i>Obelia</i> sp. and <i>Aglaophenia pluma</i>
8	<i>Facelina annulicornis</i>	Hydroids
9	<i>Facelina auriculata</i>	<i>Obelia geniculata</i> and <i>Tubularia</i> spp.
10	<i>Flabellina pedata</i>	<i>Eudendrium</i> spp.
11	<i>Janolus cristatus</i>	<i>Bugula</i> spp.
12	<i>Limacia clavigera</i>	<i>Electra pilosa</i>
13	<i>Polycera faeroensis</i>	<i>Crisia</i> spp. and <i>Bugula</i> spp.
14	<i>Polycera quadrilineata</i>	<i>Membranipora membranacea</i>
15	<i>Tritonia lineata</i>	Possibly octocorals
16	<i>Tritonia nilsodhneri</i>	<i>Eunicella verrucosa</i>

APPENDIX 3

Species names and authority recorded in this report

Acanthodoris pilosa (Abildgaard in Müller, 1789)
Adalaria loveni (Alder & Hancock, 1862)
Aegires punctilucens (d'Orbigny, 1837)
Aeolidia papillosa (Linnaeus, 1761)
Ancula gibbosa (Risso, 1818) (Previously *Ancula cristata*)
Cadlina laevis (Linnaeus, 1767)
Crimora papillata Alder & Hancock, 1862
Cuthona amoena (Alder & Hancock, 1845)
Cuthona caerulea (Montagu, 1804)
Cuthona concinna (Alder & Hancock, 1843)
Cuthona foliata (Forbes & Goodsir, 1839)
Cuthona gymnota (Couthouy, 1838) (Previously *Catriona gymnota*)
Cuthona pustulata (Alder & Hancock, 1854)
Cuthona rubescens Picton & Brown, 1978
Cuthona viridis (Forbes, 1840)
Dendronotus frondosus (Ascanius, 1774)
Diaphorodoris luteocincta (M. Sars, 1870) (Includes the variation *alba*)
Doris pseudoargus Rapp, 1827 (Previously *Archidoris pseudoargus*)
Doris sticta (Iredale & O'Donoghue, 1923) (Previously *Doris maculata*)
Doto coronata (Gmelin, 1791)
Doto cuspidata Alder & Hancock, 1862
Doto dunnei Lemche, 1976
Doto eireana Lemche, 1976
Doto floridicola Simroth, 1888
Doto fragilis (Forbes, 1838)
Doto koenneckeri Lemche, 1976
Doto hystrix Picton & Brown, 1981
Doto lemchei Ortea & Urgorri, 1978
Doto maculata (Montagu, 1804)
Doto millbayana Lemche, 1976
Doto pinnatifida (Montagu, 1804)
Doto tuberculata Lemche, 1976
Embletonia pulchra (Alder & Hancock, 1844)
Eubranchus doriae (Trinchese, 1874)
Eubranchus exiguus (Alder & Hancock, 1848)
Eubranchus farrani (Alder & Hancock, 1844)
Eubranchus pallidus (Alder & Hancock, 1842)
Eubranchus tricolor Forbes, 1838
Eubranchus vittatus (Alder & Hancock, 1842)
Facelina annulicornis (Chamisso & Eysenhardt, 1821)
Facelina auriculata (Müller, 1776) (Previously *Flabellina coronata*)
Facelina bostoniensis (Couthouy, 1838) (Previously *Flabellina curta*)
Favorinus branchialis (Rathke, 1806)
Favorinus blianus Lemche & Thompson, 1974
Flabellina pedata (Montagu, 1815)

<i>Flabellina browni</i> (Picton, 1980)	(Previously <i>Coryphella browni</i>)
<i>Flabellina gracilis</i> (Alder & Hancock, 1844)	(Previously <i>Coryphella gracilis</i>)
<i>Flabellina lineata</i> (Lovén, 1846)	(Previously <i>Coryphella lineata</i>)
<i>Geitodoris planata</i> (Alder & Hancock, 1846)	(Previously <i>Discodoris planata</i>)
<i>Goniodoris nodosa</i> (Montagu, 1808)	
<i>Goniodoris castanea</i> Alder & Hancock, 1845	
<i>Janolus cristatus</i> (Delle Chiaje, 1841)	(Previously <i>Antiopella cristata</i>)
<i>Jorunna tomentosa</i> (Cuvier, 1804)	
<i>Limacia clavigera</i> (O. F. Müller, 1776)	
<i>Lomanotus genei</i> Vérany, 1846	
<i>Lomanotus marmoratus</i> (Alder & Hancock, 1845)	
<i>Okenia aspersa</i> (Alder & Hancock, 1845)	
<i>Okenia elegans</i> (Leuckart, 1828)	
<i>Onchidoris muricata</i> (O. F. Müller, 1776)	
<i>Onchidoris pusilla</i> (Alder & Hancock, 1845)	
<i>Onchidoris oblonga</i> (Alder & Hancock, 1845)	
<i>Onchidoris sparsa</i> (Alder & Hancock, 1846)	
<i>Polycera elegans</i> (Bergh, 1894)	(Previously <i>Greilada elegans</i>)
<i>Polycera faeroensis</i> Lemche, 1929	
<i>Polycera quadrilineata</i> (O. F. Müller, 1776)	
<i>Rostanga rubra</i> (Risso, 1818)	
<i>Tergipes tergipes</i> (Forsskål in Niebuhr, 1775)	
<i>Thecacera pennigera</i> (Montagu, 1815)	
<i>Trapania pallida</i> Kress, 1968	
<i>Trapania tartanella</i> (Von Ihering, 1886)	
<i>Tritonia lineata</i> Alder & Hancock, 1848	
<i>Tritonia hombergi</i> Cuvier, 1803	
<i>Tritonia nilsodhneri</i> Marcus Ev., 1983	
<i>Tritonia plebeia</i> Johnston, 1828	

APPENDIX 4**Skomer MNR site code abbreviations**

SITE No.	ABBREVIATION	SITE NAME
1	WAY	Waybench
2	WCK	Wick Reef
3	MST	Mew Stone
4	RRK	Rye Rocks
5	PRO	Prothero's Dock
6	TRK	Thorn Rock
7	SMD	South Middleholm
8	TSK	Tusker Rock
9	JUN	Junko's Reef
10	HCR	High Court Reef
11	MHV	Martins Haven shore
12	MHVe	Martins Haven east
13	WHK	West Hook

APPENDIX 5

National Biodiversity Network gateway: www.data.nbn.org.uk

Data provided by:

Joint Nature Conservation Committee

Marine Conservation Society

Centre for Environmental Data and Recording

Marine Biological Association

Porcupine Marine Natural History Society

Countryside Council for Wales

Scottish Natural Heritage

Natural Resources Wales

Natural England

Published by:
Natural Resources Wales
Cambria House
29 Newport Road
Cardiff
CF24 0TP

0300 065 3000 (Mon-Fri, 8am - 6pm)

enquiries@naturalresourceswales.gov.uk
www.naturalresourceswales.gov.uk

© Natural Resources Wales

All rights reserved. This document may be reproduced with prior permission of
Natural Resources Wales