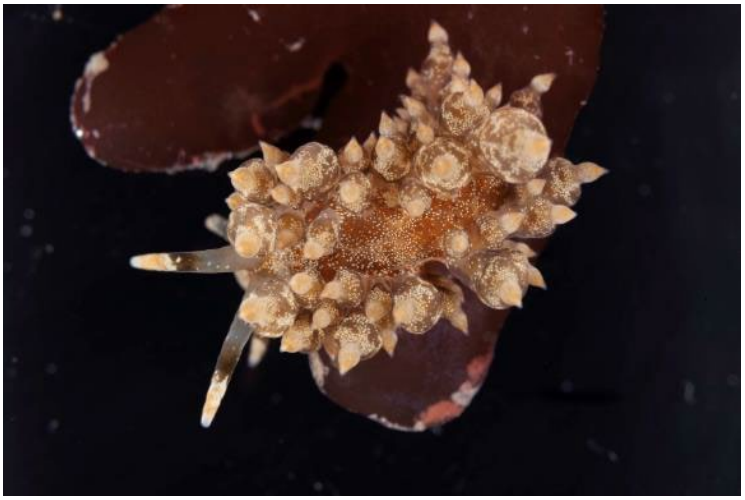
Skomer Marine Conservation Zone Nudibranch Diversity Survey 2022

NRW Evidence Report No. 654

J. Jones, K. Lock, M. Burton, A. Massey



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Crynodeb Gweithredol

Mae noethdagellogion yn nodwedd o Barth Cadwraeth Morol (PCM) Sgomer, ble mae amrywiaeth y rhywogaethau a phresenoldeb rhywogaethau prin neu anfynych yn briodoleddau a ddefnyddir i asesu statws cadwraeth. Arolygwyd cyfanswm o 16 safle sy'n cynrychioli amrywiaeth o gynefinoedd ar gyfer rhywogaethau o noethdagellogion yn ystod 2022, gan arwain at gofnodi 55 o rywogaethau.

Rhwng 1972 a 2022, cofnodwyd cyfanswm o 83 o rywogaethau o noethdagellogion yn PCM Sgomer, a hynny drwy gynnal arolygon plymio a thrwy arolygu'r isfilod a oedd yn byw yn y gwaddodion. Daethpwyd o hyd i 75 o rywogaethau yn yr arolygon a gynhaliwyd rhwng 2002 a 2022, ac yn eu plith roedd 14 o rywogaethau na chawsant eu cofnodi yn PCM Sgomer cyn 2002. Mae'r rhywogaethau o noethdagellogion a gofnodwyd yn cynnwys nifer yr ystyrir eu bod yn anfynych yn genedlaethol neu nad ydynt i'w cael yn eang ledled Ynysoedd Prydain.

Mae amrywiaeth y rhywogaethau o noethdagellogion yn PCM Sgomer yn uchel iawn, gyda 70% o holl rywogaethau'r DU yn cael eu cynrychioli. Mae'r nifer uchel hwn yn adlewyrchiad o'r amrywiaeth o gynefinoedd ac amodau amgylcheddol a geir yn y PCM a'r cymunedau cyfoethog y mae'r rhain yn eu cynnal. Fel ysglyfaethwyr arbenigol, mae gan rywogaethau'r noethdagellogion ddewis dethol iawn o organebau ysglyfaeth, ac felly maent yn ddangosydd da o iechyd cyffredinol yr ecosystem.

Mae targed monitro'r PCM ar gyfer amrywiaeth rhywogaethau o noethdagellogion wedi'i gyrraedd. Mae noethdagellogion yn cyfrannu'n ffafriol at yr amcan nodweddiadol ar gyfer gwarchod rhywogaethau yn Ardal Cadwraeth Arbennig Forol Sir Benfro.

Executive summary

Nudibranchs are a feature of the Skomer Marine Conservation Zone (MCZ) for which species diversity and the presence of rare or scarce species are attributes used to assess conservation status. A total of 16 sites representing a range of habitats were surveyed for nudibranch species during 2022 resulting in 55 species being recorded.

A total of 83 nudibranch species have been recorded in the Skomer MCZ between 1972 and 2022 from both diving and sediment infauna surveys. Seventy five species have been found on those surveys carried out between 2002 and 2022, of which 14 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 all UK species represented. This high number is a reflection of the diversity of habitats and environmental conditions found in the MCZ and the rich communities that they support. As specialised predators nudibranch species have a very selective choice of prey organisms, and they are therefore a good indicator of the overall ecosystem health.

The MCZ monitoring target for nudibranch species diversity has been met. Nudibranchs contribute favourably to the typical species conservation objective for the Pembrokeshire Marine Special Area of Conservation.

1. Introduction

Nudibranchs are a feature of the Skomer Marine Conservation Zone (MCZ) 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.

The Skomer MCZ is within the Pembrokeshire Marine Special Area of Conservation (SAC) and data collected here is used to help assess the condition of features of the SAC. The main relevant features are 'Reef' and 'Large Shallow Inlet and Bay'. The nudibranch data is applicable to some of the attributes of Favourable Conservation Status, particularly those relating to species richness and diversity.

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 to 30 minutes searches for nudibranchs along arbitrary transects of the seabed, species were counted, and samples collected for identification in a laboratory. Thirty five 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).

In 2002 Skomer MCZ staff completed a nudibranch species survey to establish a baseline over a short timescale 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, these were chosen as species easily identifiable in the field and that could be recorded during other Skomer MCZ monitoring dives. The list included

Duvaucelia odhneri a nationally scarce species found on pink sea fan *Eunicella verrucosa*. A target of observing 12 of the 16 species annually was set, and it was recommended that a full nudibranch species survey was carried out every 4 years.

In 2003 and 2004 all 16 species from the checklist were recorded. The checklist was not completed in 2005.

Trapania tartanella, photo DK

In 2006 surveys were completed at 13 sites representing a range of habitats for nudibranch species. Thirty five species were recorded during 21 dives. Notable records were *Doris sticta,* a nationally scarce species (Moore, 2002), and two species not previously recorded in the historical data set, *Doto eireana* and *Atalodoris pusilla* (Burton et al., 2007).

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, also *Doto hystrix* and *Trinchesia 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).

Trapania lineata, photo DK

In 2010 14 sites were surveyed resulting in a total of 55 species of nudibranchs. The number of species was 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 lineata,* and the uncommon *Doto hystrix* was again found at Rye Rocks.

In 2011 *Diaphoreolis 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, photo MB

In 2013, 15 of the 16 species from the check list were recorded, including *Duvaucelia odhneri* on pink sea fan, *Eunicella verrucosa* at Rye Rocks. Notable records from volunteer divers were *Trinchesia caerulea, Diaphoreolis viridis and Diaphorodoris 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.

Lomanotus marmoratus, photo DK

In 2014, 13 survey sites were surveyed with 49 nudibranch species recorded. Three species had not been recorded since 1992, namely *Cuthonella concinna, Capellinia fustifera* and *Doto floridicola*. *Doto floridicola* had previously been recorded as *Doto sp 'A'* in 1990 (Bunker et *a*l, 1992), and its identification was confirmed in 2002 (B. Picton 2002 pers. comm., August 1st).

In 2015, 15 of the 16 species from the annual check list were recorded, also *Doris sticta* at Thorn Rock. In both 2016 and 2017, 14 species from the annual check list were recorded. *Duvacelia odhneri* was recorded in 2016 at North Wall east and in 2017 at Rye Rocks during pink sea fan, *Eunicella verrucosa* monitoring dives. Other notable records included:

Lomonotus genei at Junko's Reef and *Facelina bostoniensis* at North of the Neck in 2016, and *Okenia elegans* at Martins Haven West in 2017.

Lomanotos genei, photo RB

In 2018 all 16 species from the annual check list were recorded. During the survey *Amphorina linensis* was recorded for the first time in the reserve at several sites, and *Doto hydrallmaniae* was also recorded for the first time at South Middleholm. Other notable records included *Duvaucelia odhneri and Okenia elegans.* During other MCZ monitoring projects *Palio nothus* was recorded at the The Loaf, North Haven by Kerry Lewis (Lock et al., 2019).

Palio nothus, photo KLE

1.2 2022 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 and in an aquarium.
- To produce a 2022 survey species list and compare to previous surveys. Combine survey data to produce a Skomer MCZ nudibranch species list and augment the long-term dataset.

2. Method

Sites around the Skomer MCZ are chosen to provide a range of habitats and environmental conditions. At each site, divers firstly search for nudibranch spawn and prey species and then search nearby for the animal; special attention being given to the base of hydroids and bryozoans on which spawn is found. Photographs of the nudibranch, the spawn and prey species are taken as a record of each species. Animals that can't be identified in situ are taken to the laboratory for further examination. For animals that are difficult to spot in situ, a small amount of hydroid, bryozoan and algal turf is collected and carefully sorted under a microscope. Voucher specimens are preserved for DNA work by Bernard Picton and all other live nudibranchs are returned to the MCZ.

Nudibranch species are identified using the online Encyclopaedia of Marine Life of Britain and Ireland (http://www.habitas.org.uk/marinelife/), Picton & Morrow (1994), Thompson (1976), Thompson & Brown (1984). Species names currently listed in the World Register of Marine Species (WoRMS) are used (www.marinespecies.org).

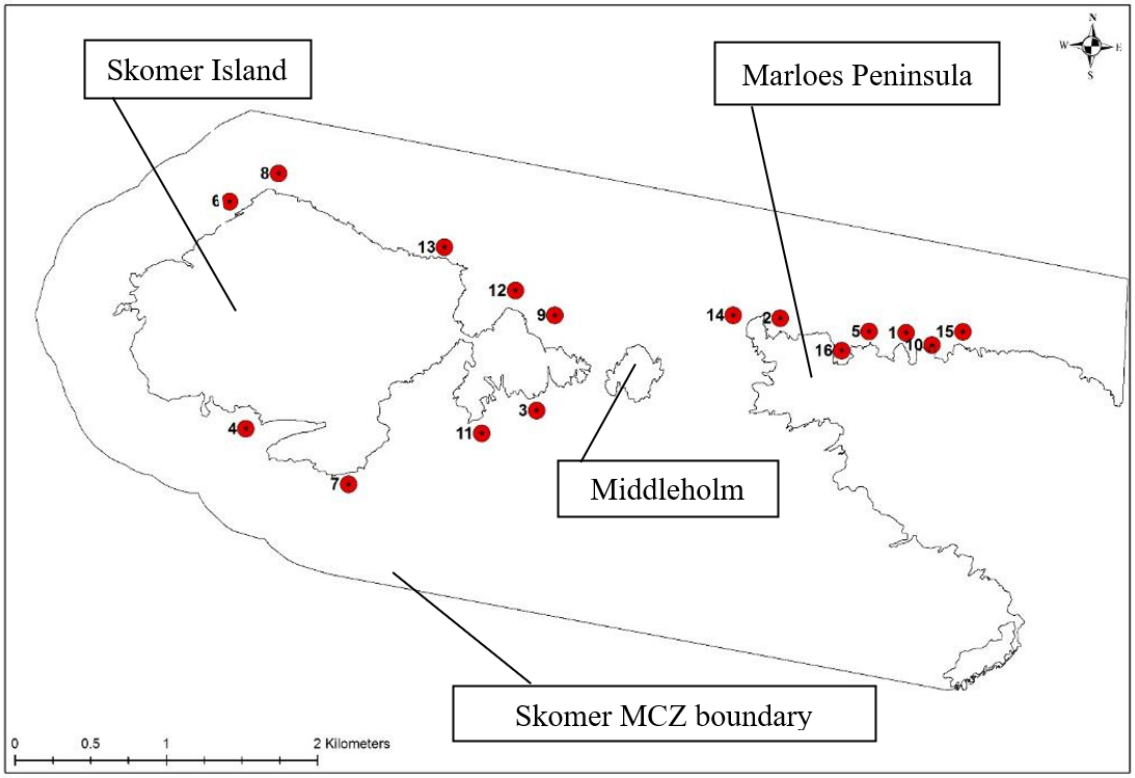
The sublittoral habitat found at each site is described briefly and associated nudibranch species recorded as a list for each site. In addition, an overall list of species is compiled for the Skomer MCZ.

3. Results

A total of 55 nudibranch species were recorded at 16 survey sites in the Skomer MCZ during the 2022 survey.

Twenty seven nudibranch recording dives were completed at 16 sites by the Skomer MCZ team and volunteers between 13th June and 25th June 2022. Fifteen Seasearch divers surveyed Martins Haven on 25th June as part of a specialist nudibranch course run by Bernard Picton and Christine Morrow, and a total of 9 species were recorded collectively. Additional sites were also briefly explored during other Skomer MCZ monitoring dives. A survey site location map is shown in Figure 1, and sites are described in Section 3.1.

Figure 1 Nudibranch diversity survey 2022 site location map



SITE No.	ABBREVIATION	SITE NAME
1	WHK	West Hook
2	JUN	Junko's Reef
3	TRK	Thorn Rock
4	WCK Reef	Wick Reef
5	MHVe	Martins Haven East
6	PRK	Pains Rock
7	MST	Mew Stone
8	GST	Garland Stone
9	PRO	Prothero's Dock
10	LPT	Low Point
11	HCR	High Court Reef
12	RRK	Rye Rocks
13	NWA	North Wall
14	TSK	Tusker Rock
15	HPT	High Point
16	MHV	Martins Haven shore

3.1 2022 Site Records

The sublittoral habitat found at each site is described briefly below, with the total number of dives undertaken and associated nudibranch species listed in alphabetical order for each site. Species names with associated authority are listed in Appendix 3.

Site 1. **West Hook (WHK). 1 dive, 11 species.**

A site located on the north Marloes Peninsula. Steeply sloping bedrock walls with gullies and boulder slopes extending down to 15m below chart datum (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. Species recorded:

Antiopella cristata
Crimora papillata
Doto dunnei
Doto fragilis
Doto pinnatifida
Duvaucelia lineata
Facelina annulicornis
Facelina auriculata
Favorinus branchialis
Limacia clavigera
Polycera kernowensis

Site 2. Junko's Reef (JUN). 2 dives, 17 species.
Rocky reef with steep walls, exposed to moderate to strong currents. The rocks are covered in large expanses of *Alcyonium digitatum* and *Corynactis viridis.* Species recorded:

Antiopella cristata
Atalodoris oblonga
Crimora papillata
Diaphorodoris luteocincta
Diaphorodoris alba
Doto dunnei
Doto fragilis
Duvaucelia lineata
Facelina annulicornis
Facelina auriculata
Favorinus branchialis
Limacia clavigera
Polycera capitata/norvegica
Polycera faeroensis
Polycera kernowensis
Rostanga rubra
Thecacera pennigera

Site 3. Thorn Rock (TRK). 3 dives, 14 species.
A rocky reef extending to 18m bcd with rock platforms and gullies covered with fine silt and exposed to moderate currents. Rock covered in hydroid and bryozoan turf and a rich sponge community. Lush algal meadows found in the shallows. Species recorded:

Antiopella cristata
Diaphorodoris luteocincta
Doris sticta
Doto cuspidata
Doto floridicola
Doto fragilis
Doto lemchei
Doto pinnatifida
Duvaucelia lineata
Edmundsella pedata
Favorinus branchialis
Polycera faeroensis
Polycera kernowensis
Rubramoena rubescens

Site 4. Wick Reef (WCK reef). 2 dives, 15 species.
This reef is located at the entrance of The Wick and features 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 present on wave scoured boulders at the bottom of steep walled gullies. Species recorded:

Antiopella cristata
Capellinia fustifera
Diaphorodoris luteocincta
Doto coronata agg.
Doto dunnei
Doto fragilis
Doto hydrallmaniae
Doto lemchei
Doto pinnatifida
Duvaucelia lineata
Duvaucelia odhneri
Edmundsella pedata
Polycera faeroensis
Polycera kernowensis
Polycera quadrilineata

Site 5. Martins Haven East (MHVe). 4 dives, 25 species.
A rocky reef extending to 20m bcd with moderate current exposure. Tall hydroid turf dominated by *Nemertesia antennina* and *N. ramosa* with lush algal communities. Below the reef is a plateau of mixed sediments with encrusted cobbles. Species recorded:

Amphorina andra
Amphorina farrani
Amphorina linensis
Ancula gibbosa
Antiopella cristata
Crimora papillata
Diaphorodoris luteocincta
Diaphorodoris alba
Doto eireana
Doto pinnatifida
Doto tuberculata
Duvaucelia lineata
Edmundsella pedata
Eubranchus tricolor
Facelina annulicornis
Facelina auriculata
Facelina bostoniensis
Favorinus branchialis
Goniodoris nodosa
Limacia clavigera
Polycera kernowensis
Polycera quadrilineata
Rubramoena amoena
Trinchesia caerulea
Trinchesia cuanensis

Site 6. Pains Rock (PRK). 1 dive, 5 species.
Steep sided rock pinnacle descending to approx. 35m bcd with strong wave action and tidal currents. Abundant faunal turf with brown and red algal communities at the shallower depths. Species recorded:

Antiopella cristata
Doto koenneckeri
Doto millbayana
Microchlamylla gracilis
Tritonia hombergii

Site 7. Mew Stone (MST). 2 dives, 6 species.
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* spp. Species recorded:

Antiopella cristata
Cuthonella concinna
Doris pseudoargus
Doto coronata agg.
Doto koenneckeri
Rostanga rubra

Site 8. Garland Stone (GST). 1 dive, 8 species.
Steep current swept vertical walls, extending to below 40m bcd. Gullies up to 4m wide, with scoured boulders at the bottom. The walls are smothered with carpets of the jewel anemone *Corynactis viridis* and oaten pipe hydroids *Tubularia* spp., along with rich communities of hydroids and bryozoans. Species recorded:

Antiopella cristata
Doto fragilis
Doto pinnatifida
Duvacelia plebeia
Edmundsella pedata
Eubranchus tricolor
Facelina auriculata
Geitodoris planata

Site 9. Prothero's Dock (PRO). 1 dive, 13 species.
Bedrock outcrop semi-exposed to current with tall hydroid and algal communities giving way to a mixed sediment plain at 18m bcd. Species recorded:

Diaphorodoris luteocincta
Diaphorodoris alba
Doto coronata agg.
Doto cuspidata
Doto floridicola
Doto fragilis
Duvaucelia lineata
Facelina annulicornis
Favorinus branchialis
Fjordia browni
Goniodoris nodosa
Limacia clavigera
Thecacera pennigera

Site 10. Low Point (LPT). 1 dive, 6 species.
Sloping bedrock walls with mixed sediment at the base. Algal turf at the shallower depths leading to diverse faunal turf including hydroid and bryozoan communities, ascidians and sponges. Species recorded:

Amphorina farrani
Amphorina linensis
Duvaucelia lineata
Edmundsella pedata
Limacia clavigera
Thecacera pennigera

Site 11. High Court Reef (HCR). 2 dives, 13 species.
A series of rock pinnacles with vertical walls up to 15m high and deep wide gullies between up to 5m wide, with large boulders. Vertical walls covered in rich sponge and bryozoan communities. Species recorded:

Aegires punctilucens
Antiopella cristata
Capellinia fustifera
Doto coronata agg
Doto fragilis
Doto pinnatifida
Doto tuberculata
Duvaucelia lineata
Edmundsella pedata
Facelina annulicornis
Facelina auriculata
Polycera kernowensis
Rubramoena rubescens

Site 12. Rye Rocks (RRK). 2 dives, 13 species.
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 approx. 40m bcd. Between the rocky areas patches of coarse shell gravel and sand have accumulated and boulder slopes are found. The diverse nature of the seabed substrate in turn leads to a diverse range of habitats and species. Species recorded:

Amphorina farrani
Diaphorodoris luteocincta
Doto dunnei
Doto floridicola
Doto fragilis
Doto lemchei
Doto pinnatifida
Doto tuberculata
Duvaucelia lineata
Facelina annulicornis
Facelina auriculata
Limacia clavigera
Polycera quadrilineata

Site 13. North Wall (NWA). 2 dives, 13 species.
Vertical cliffs and boulder slopes down to a depth of below 30m bcd, semi-exposed to wave action from the north and moderate tidal currents. The reef is richly covered in bryozoan and hydroid turf and *Eunicella verrucosa* is regularly recorded. Species recorded:

Antiopella cristata
Crimora papillata
Diaphorodoris luteocincta
Doto fragilis
Doto lemchei
Doto pinnatifida
Edmundsella pedata
Eubranchus tricolor
Facelina annulicornis
Facelina auriculata
Favorinus branchialis
Limacia clavigera
Polycera kernowensis

Site 14. Tusker Rock (TSK). 1 dive, 4 species.
Steep bedrock 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. Species recorded:

Doto coronata agg.
Facelina annulicornis
Goniodoris nodosa
Limacia clavigera

Site 15. High Point (HPT). 1 dive, 8 species.

Sloping bedrock wall with smaller pinnacles around. Rich and diverse faunal turf including *Alcyonium digitatum*, hydroids and abundant bryozan species.
Species recorded:

Crimora papillata
Diaphorodoris luteocincta
Doto fragilis
Duvaucelia lineata
Facelina annulicornis
Limacia clavigera
Polycera faeroensis
Polycera kernowensis

Site 16. Martins Haven (shore). 4 dives, 15 species
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. Species recorded:

Crimora papillata
Doto cuspidata
Doto fragilis
Doto lemchei
Doto pinnatifida
Doto tuberculata
Edmundsella pedata
Eubranchus exiguus
Facelina annulicornis
Facelina auriculata
Favorinus branchialis
Limacia clavigera
Microchlamylla gracilis
Rubramoena amoena
Trinchesia caerulea

An additional 5 species were recorded at Martins Haven during the Seasearch course:

Amphorina andra
Diaphorodoris luteocincta
Diaphorodoris alba
Duvaucelia lineata
Polycera quadrilineata

Other records in 2022 by volunteer divers: *Onchidoris bilamellata* at Martins Haven (MHV) and *Trapania lineata* at North Middleholm (MDN). *Acanthodoris pilosa* was found at Thorn Rock (TRK) during another Skomer MCZ monitoring project.

3.2 Species Records

Fifty five nudibranch species were recorded in total during the 2022 survey year. These are listed alphabetically below with site codes of where they were recorded and photographs. Species names with associated authority are listed in Appendix 3.

1. *Acanthodoris pilosa* 1 site: TRK. Feeds on bryozoan *Alcyonium diaphanum*.

Thorn Rock 21/9/2022 PN

2. *Aegires punctilucens* 1 site: HCR. Feeds on sponges *Leucosolenia* spp.

Prothero's Dock (2018) MB

3. *Amphorina andra* 2 sites: MHVe, MHV. Feeds on hydroids *Obelia* spp. and *Aglaophenia pluma*.

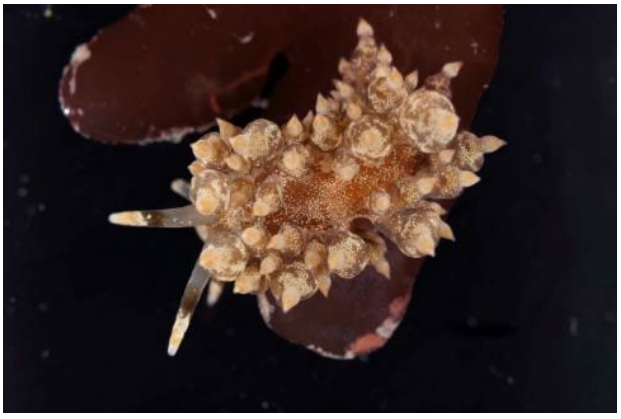
Martins Haven east 14/6/22 © Bernard Picton

4. *Amphorina farrani* 3 sites: MHVe, LPT, RRK. Feeds on hydroids *Obelia* spp. and *Aglaophenia pluma*.

Martins Haven east 14/6/22 © Bernard Picton

5. *Amphorina linensis* 2 sites: MHVe, LPT. Feeds on hydroids *Obelia* spp. and *Aglaophenia pluma*.

Martins Haven east 14/6/22 © Bernard Picton



6. *Ancula gibbosa* 1 site: MHVe. Feeds on entoprocta *Pedicellina* spp.

Martins Haven east 14/6/22 © Bernard Picton

7. *Antiopella cristata* 10 sites: WHK, JUN, TRK, WCK reef, MHVe, PRK, MST, GST, HCR, NWA. Feeds on bryozoan *Bugulina flabellata*.

Thorn Rock 15/6/22 KL

8. *Atalodoris oblonga* 1 site: JUN. Feeds on bryozoan *Cellaria fistulosa.*

Prothero's Dock (2018) BEP

9. *Capellinia fustifera* 2 sites: WCK reef, HCR. Feeds on hydroid *Kirchenpaueria similis*.

Prothero's Dock (2018) KLE

10. *Crimora papillata* 6 sites: MHV, WHK, JUN, MHVe, NWA, HPT. Feeds on bryozoan *Chartella papyracea*.

Martins Haven 24/6/2022 BB

11. *Cuthonella concinna* 1 site: MST. Feeds on hydroid *Sertularia argentea*.

Photo from Strangford Lough © Bernard Picton

12. *Diaphorodoris alba* 4 sites: MHV, JUN, MHVe, PRO. Feeds on bryozoa.

Martins Haven east 14/6/2022 RB

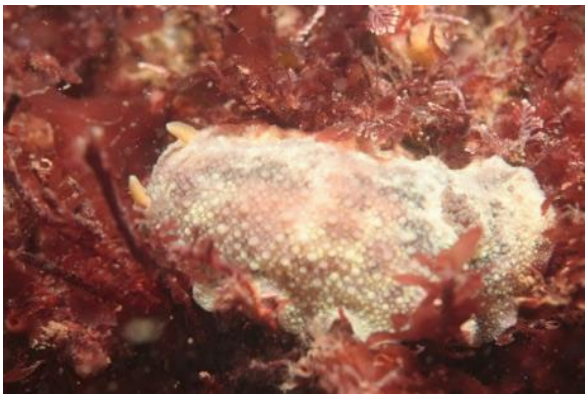
13. *Diaphorodoris luteocincta* 9 sites: MHV, JUN, TRK, WCK Reef, MHVe, PRO, RRK, NWA, HPT. Feeds on bryozoa *Nolella* spp.

High Point 14/6/2022 AM

Junko's 13/6/2022 PN

14. *Doris pseudoargus* 1 site: MST. Feeds on sponges.

Mew Stone 15/6/2022 MG

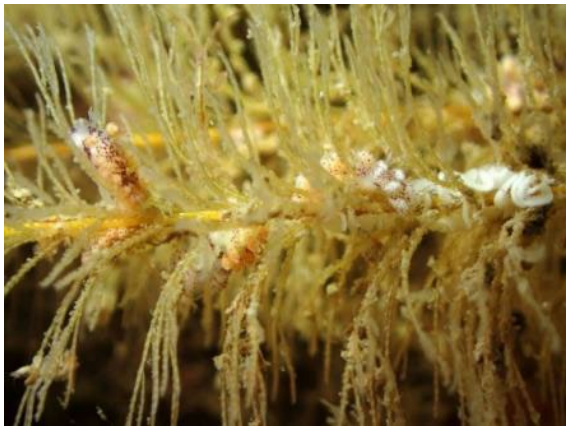


15. *Doris sticta* 1 site: TRK. Feeds on sponges.

Thorn Rock 15/6/2022 RB

16. *Doto coronata* agg. 5 sites: WCK Reef, MST, HCR, PRO, TSK. Feed on a variety of hydroids. *Doto coronata* is possibly more than one species and DNA work is currently being completed to investigate this further (Picton, pers. comm).

Prothero's Dock (2018) BB



17. *Doto cuspidata* 3 sites: MHV, TRK, PRO. Feeds on *Nemertesia ramosa*.

Thorn Rock (2014) KL

18. *Doto dunnei* 4 sites: WHK, JUN, WCK Reef, RRK. Feeds on hydroid *Kirchenpaueria pinnata*.

West Hook 14/6/2022 BB

19. *Doto eireana* 1 site: MHVe. Feeds on hydroid *Amphisbetia operculata*.

Martins Haven east 16/6/2022 © Bernard Picton

20. *Doto floridicola* 3 sites: TRK, PRO, RRK. Feeds on hydroid *Aglaophenia kirchenpaueri*.

Thorn Rock 15/6/2022 KL

21. *Doto fragilis* 11 sites: MHV, WHK, JUN, TRK, WCK Reef, GST, PRO, HCR, RRK, NWA, HPT. Feeds on hydroids *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).

Rye Rocks 22/6/2022 AM

22. *Doto koenneckeri* 2 sites: PRK, MST. Feeds on hydroid *Aglaophenia pluma*.

Photo taken in Strangford Lough © Bernard Picton

23. *Doto hydrallmaniae* 1 site: WCK Reef. Feeds on hydroid *Hydrallmania falcata.* First recorded in the MCZ in 2018.

Photo taken in Isle of Man © Bernard Picton

24. *Doto lemchei* 5 sites: MHV, TRK, WCK Reef, RRK, NWA. Feeds on hydroid *Aglaophenia tubulifera*.

Thorn Rock 15/6/2022 KL

25. *Doto millbayana* 1 site: PRK. Feeds on hydroid *Plumularia setacea*.

Thorn Rock (2018) KL

26. *Doto pinnatifida* 9 sites: MHV, WHK, TRK, WCK Reef, MHVe, GST, HCR, RRK, NWA. Feeds on hydroid *Nemertesia antennina.*

West Hook 14/6/2022 BB

27. *Doto tuberculata* 4 sites: MHV, MHVe, HCR, RRK. Feeds on hydroid *Sertularella gayi.*

Prothero's Dock (2018) BB

28. *Duvaucelia lineata* 11 sites: MHV, WHK, JUN, TRK, WCK Reef, MHVe, PRO, LPT, HCR, RRK, HPT. Feeds on octocoral *Sarcodictyon catenatum*.

Wick Reef 22/6/2022 © Bernard Picton

29. *Duvaucelia odhneri* 1 site: WCK reef. Feeds on soft coral *Eunicella verrucosa*.

Prothero's Dock (2010) PN

30. *Duvaucelia plebeia* 1 site: GST. Feeds on soft coral *Alcyonium digitatum*.

Garland stone 23/6/2022 © Bernard Picton

31. *Edmundsella pedata* 8 sites: MHV, TRK, WCK Reef, MHVe, GST, LPT, HCR, NWA. Feeds on hydroid *Eudendrium ramosum.*

Martins Haven 13/6/2022 © Bernard Picton

32. *Eubranchus exiguus* 1 site: MHV. Feeds on hydroid *Obelia* spp.

Martins Haven (2018) © Bernard Picton

33. *Eubranchus tricolor* 3 sites: MHVe, GST, NWA. Feeds on hydroid *Nemertesia ramosa*.

Prothero's Dock (2018) PN

34. *Facelina annulicornis* 10 sites: MHV, WHK, JUN, MHVe, PRO, HCR, RRK, NWA, TSK, HPT. Feeds on a variety of hydroids.

Martins Haven east 13/6/2022 KL

35. *Facelina auriculata* 8 sites: MHV, WHK, JUN, MHVe, GST, HCR, RRK, NWA. Feeds on hydroids *Obelia geniculata* and *Tubularia indivisa*.

Junko's Reef 13/6/2022 RB

West Hook 14/6/2022 BB

36. *Facelina bostoniensis* 1 site: MHVe. Feeds on hydroids *Tubularia* spp.

Martins Haven east 14/6/2022 RB

37. *Favorinus branchialis* 7 sites: MHV, WHK, JUN, TRK, MHVe, PRO, NWA. Feeds on opisthobranch eggs.

Martins Haven east 13/6/2022 JC

38. Fjordia browni 1 site: PRO. Feeds on hydroids *Tubularia* spp. and *Eudendrium* spp.

Prothero's Dock 16/6/2022 RB

39. *Geitodoris planata* 1 site: GST. Feeds on sponges including *Mycale rotalis*.

Garland stone 23/6/2022 © Bernard Picton

40. *Goniodoris nodosa* 3 sites: MHVe, PRO, TSK. Feeds on bryozoans *Alcyonidium* spp. and ascidians.

Tusker Rock 16/6/2022 MG

41. *Limacia clavigera* 10 sites: MHV, WHK, JUN, MHVe, PRO, LPT, RRK, NWA, TSK, HPT. Feeds on bryozoan *Electra pilosa*.

Martins Haven 9/8/2022 BB

42. *Microchlamylla gracilis* 2 sites: MHV, PRK. Feeds on hydroids *Eudendrium* spp.

Tusker Rock (2018) PN

43. *Onchidoris bilamellata* 1 site: MHV. Feeds on barnacles.

44. *Polycera capitata/norvegica* 1 site: JUN. Feeds on bryozoa *Membranipora membranacea* and *Electra pilosa*

45. *Polycera faeroensis* 4 sites: JUN, TRK, WCK reef, HPT. Feeds on bryozoa *Bicellariella ciliata* and *Crisia* spp.

Thorn Rock 15/6/2022 RB

46. *Polycera kernowensis* 8 sites: WHK, JUN, TRK, WCK Reef, MHVe, HCR, NWA, HPT. Feeds on bryozoa *Crisia* spp.

Wick Reef, 22/6/2022 BB

47. *Polycera quadrilineata* 4 sites: WCK Reef, MHVe, RRK, MHV. Feeds on bryozoa *Membranipora membranacea* and *Electra pilosa*.

Martins Haven east 24/6/2022 © Bernard Picton

48. *Rostanga rubra* 2 sites: JUN, MST. Feeds on sponges *Ophlitaspongia papilla* and *Microciona atrasanguinea.*

Mew Stone 15/6/2022 MG

49. *Rubramoena amoena* 2 sites: MHV, MHVe. Feeds on hydroid *Halecium halecinum*.

Thorn Rock (2014) RS

50. *Rubramoena rubescens* 2 sites: TRK, HCR. Feeds on hydroid *Halecium halecinum*.

Prothero's Dock (2018) BB

51. *Thecacera pennigera* 3 sites: JUN, PRO, LPT. Feeds on bryozoan *Crisularia plumosa*.

Martins Haven east 24/6/2022 BB

52. *Trapania lineata* 1 site: MDN. Feeds on kamptozoans.

53. *Trinchesia caerulea* 2 sites: MHV, MHVe. Feeds on hydroid *Sertularella polyzonias*.

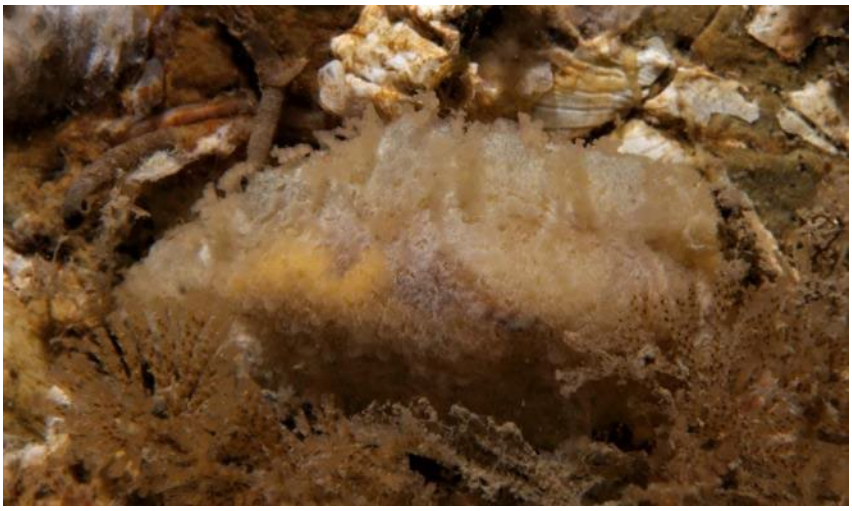
Martins Haven 13/6/2022 © Bernard Picton

54. *Trinchesia cuanensis* 1 site: MHVe. Feeds on hydroid *Sertularella polyzonias*.

Martins Haven east 13/6/2022 © Bernard Picton

55. *Tritonia hombergii* 1 site: PRK. Feeds on soft coral *Alcyonium digitatum.*

Pain's Rock 21/6/2022 © Bernard Picton



3.3 Skomer MCZ records

Nudibranch survey records for 2002, 2006, 2010, 2014, 2018 and 2022 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 (Table 1, Table 2, Table 3). The combined total recorded is 83.

Table 1 Nudibranch species and entities recorded in the Skomer MCZ during MCZ diving surveys

Species	2002	2006	2010	2014	2018	2022	No. of years recorded
Acanthodoris pilosa	Yes	No	Yes	Yes	Yes	Yes	5
Aegires punctilucens	Yes	No	Yes	Yes	Yes	Yes	5
Aeolidia papillosa	No	Yes	No	No	No	No	1
Amphorina andra	No	No	No	No	No	Yes	1
Amphorina farrani	Yes	Yes	Yes	Yes	Yes	Yes	6
Amphorina linensis	No	No	No	No	Yes	Yes	2
Amphorina pallida	No	Yes	Yes	Yes	Yes	No	4
Ancula gibbosa	No	No	Yes	Yes	No	Yes	3
Antiopella cristata	Yes	Yes	Yes	Yes	Yes	Yes	6
Atalodoris pusilla	No	Yes	No	No	Yes	No	2
Atalodoris oblonga	No	No	Yes	Yes	Yes	Yes	4
Cadlina laevis	No	Yes	Yes	Yes	No	No	3
Capellinia fustifera	No	No	No	Yes	Yes	Yes	3
Crimora papillata	Yes	Yes	Yes	Yes	Yes	Yes	6
Cuthonella concinna	No	No	No	Yes	No	Yes	2
Catriona aurantia	No	Yes	Yes	Yes	Yes	No	5
Dendronotus frondosus	No	Yes	Yes	Yes	Yes	No	5
Diaphoreolis viridis	No	No	Yes	No	Yes	No	2
Diaphorodoris luteocincta	Yes	Yes	Yes	Yes	Yes	Yes	6
Diaphorodoris alba	Yes	No	Yes	No	Yes	Yes	4
Doris pseudoargus	Yes	Yes	Yes	Yes	Yes	Yes	6
Doris sticta	No	Yes	No	Yes	No	Yes	3
Doto coronata agg.	Yes	Yes	No	Yes	Yes	Yes	5
Doto cuspidata	Yes	Yes	Yes	Yes	Yes	Yes	6
Doto dunnei	No	No	Yes	Yes	Yes	Yes	4
Doto eireana	No	Yes	Yes	Yes	Yes	Yes	5
Doto floridicola	No	No	No	Yes	Yes	Yes	3
Doto fragilis	Yes	Yes	Yes	Yes	Yes	Yes	6
Doto koenneckeri	Yes	No	Yes	No	No	Yes	3
Doto hydrallmaniae	No	No	No	No	Yes	Yes	2
Doto hystrix	No	No	Yes	No	Yes	No	2
Doto lemchei	Yes	No	Yes	Yes	Yes	Yes	5
Doto maculata	No	No	Yes	Yes	Yes	No	3
Doto millbayana	Yes	Yes	Yes	Yes	Yes	Yes	6

Species	2002	2006	2010	2014	2018	2022	No. of years recorded
Doto pinnatifida	Yes	Yes	Yes	Yes	Yes	Yes	6
Doto tuberculata	Yes	No	Yes	Yes	Yes	Yes	5
Duvaucelia lineata	Yes	Yes	Yes	Yes	Yes	Yes	6
Duvaucelia odhneri	No	No	Yes	No	Yes	Yes	3
Duvaucelia plebeia	No	No	No	No	No	Yes	1
Edmundsella pedata	Yes	Yes	Yes	Yes	Yes	Yes	6
Eubranchus exiguus	Yes	No	Yes	Yes	Yes	Yes	5
Eubranchus tricolor	Yes	Yes	Yes	Yes	Yes	Yes	5
Eubranchus vittatus	No	No	Yes	No	Yes	No	2
Facelina annulicornis	Yes	Yes	Yes	Yes	Yes	Yes	6
Facelina auriculata	Yes	Yes	Yes	Yes	Yes	Yes	6
Facelina bostoniensis	No	No	Yes	Yes	No	Yes	3
Favorinus branchialis	Yes	Yes	Yes	Yes	Yes	Yes	6
Favorinus blianus	No	No	Yes	No	Yes	No	2
Fjordia browni	No	Yes	Yes	No	Yes	Yes	4
Fjordia lineata	No	Yes	Yes	Yes	Yes	No	4
Fjordia chriskaugei	No	No	Yes	No	No	No	1
Geitodoris planata	No	No	Yes	Yes	Yes	Yes	4
Goniodoris nodosa	No	Yes	Yes	Yes	Yes	Yes	5
Jorunna tomentosa	No	No	Yes	Yes	Yes	No	3
Limacia clavigera	Yes	Yes	Yes	Yes	Yes	Yes	6
Lomanotus genei	No	No	Yes	No	No	No	1
Microchlamylla gracilis	Yes	No	Yes	Yes	Yes	Yes	5
Okenia aspersa	No	No	Yes	No	No	No	1
Okenia elegans	No	No	Yes	Yes	Yes	No	3
Onchidoris bilamellata	No	No	No	No	No	Yes	1
Palio nothus	No	No	No	No	Yes	No	1
Polycera capitata/norvegica	No	No	Yes	Yes	No	Yes	3
Polycera faeroensis	Yes	Yes	Yes	Yes	Yes	Yes	6
Polycera kernowensis	No	Yes	Yes	Yes	Yes	Yes	5
Polycera quadrilineata	Yes	Yes	Yes	Yes	Yes	Yes	6
Rostanga rubra	No	Yes	Yes	Yes	Yes	Yes	5
Rubramoena amoena	No	Yes	Yes	Yes	Yes	Yes	5
Rubramoena rubescens	Yes	No	No	Yes	Yes	Yes	4
Tergipes tergipes	Yes	No	Yes	Yes	Yes	No	4
Thecacera pennigera	No	Yes	Yes	Yes	Yes	Yes	5
Trapania lineata	No	No	Yes	No	No	Yes	2
Trinchesia caerulea	No	No	No	No	No	Yes	1
Trinchesia cuanensis	No	No	No	No	Yes	Yes	2
Tritonia hombergii	Yes	No	Yes	Yes	Yes	Yes	5
Zelentia pustulata	No	Yes	Yes	No	Yes	No	3
Total no. species for each year	**30**	**35**	**59**	**52**	**59**	**55**	

The number of species and entities recorded during MCZ diving surveys to 2022 is 75.

Table 2 Other diving records of nudibranchs in Skomer MCZ

Species	Years recorded	Site name
Cuthona foliata	1975 (recorded by Saunders)	Not known
Goniodoris castanea	1972, 1988	JSD, RRK
Polycera elegans	1972, 1975	NWA, WTK
Lomanotus marmoratus	1991, 2013	MHV, HPT
Trapania tartanella	2009	RRK

The number of species and entities recorded during ALL diving surveys to 2022 is 80.

Table 3 Additional records from sediment infaunal surveys (Rostron 1993, 1996; Barfield 1998, 2003, 2007).

Species	Years recorded	Site number or name
Embletonia pulchra	1998	7, WTP
Onchidoris muricata	1993	12, 19
Onchidoris sparsa	1998 2003 2007	6, 7 5, 7, 12 6

The number of species and entities recorded during ALL diving and grab sampling surveys to 2022 is 83.

3.4 Martins Haven Nudibranch ‘Bioblitz’ records

Nudibranch “Bioblitz” and specialist course records by volunteer Seasearch divers in 2010, 2014, 2018 and 2022 from Martins Haven are shown in Table 4. The combined total recorded over all years is 44 species.

Table 4 Nudibranch "Bioblitz" and specialist records by volunteer Seasearch divers from Martins Haven during Survey years 2010, 2014, 2018 and 2022

Species	**2010**	**2014**	**2018**	**2022**
Acanthodoris pilosa	Yes	No	No	No
Aegires punctilucens	Yes	No	No	No
Amphorina andra	No	No	No	Yes
Amphorina farrani	No	No	Yes	No
Amphorina linensis	No	No	Yes	No
Ancula gibbosa	No	Yes	No	No
Antiopella cristata	Yes	Yes	Yes	No
Atalodoris oblonga	Yes	Yes	No	No
Capellinia fustifera	Yes	Yes	No	No
Crimora papillata	Yes	Yes	Yes	Yes
Diaphorodoris luteocincta	Yes	Yes	Yes	Yes
Diaphorodoris alba	Yes	No	Yes	Yes
Doris pseudoargus	Yes	Yes	No	No
Doto coronata agg.	No	Yes	No	No
Doto dunnei	No	Yes	Yes	No

Species	**2010**	**2014**	**2018**	**2022**
Doto floridicola	No	Yes	Yes	No
Doto fragilis	Yes	Yes	Yes	No
Doto lemchei	Yes	Yes	Yes	No
Doto maculata	Yes	No	No	No
Doto millbayana	No	No	Yes	No
Doto pinnatifida	Yes	No	Yes	No
Doto tuberculata	Yes	Yes	Yes	No
Duvaucelia lineata	Yes	Yes	Yes	Yes
Edmundsella pedata	Yes	Yes	Yes	Yes
Eubranchus exiguus	No	Yes	No	No
Eubranchus tricolor	Yes	Yes	Yes	No
Eubranchus vittatus	No	No	Yes	No
Facelina annulicornis	Yes	Yes	Yes	No
Facelina auriculata	Yes	Yes	Yes	Yes
Facelina bostoniensis	No	Yes	No	No
Favorinus branchialis	Yes	Yes	Yes	No
Fjordia browni	Yes	No	No	No
Fjordia lineata	Yes	Yes	Yes	No
Goniodoris nodosa	Yes	Yes	Yes	No
Jorunna tomentosa	Yes	Yes	No	No
Limacia clavigera	Yes	Yes	Yes	Yes
Microchlamylla gracilis	No	Yes	Yes	No
Okenia elegans	Yes	Yes	No	No
Polycera faeroensis	Yes	Yes	Yes	No
Polycera quadrilineata	No	Yes	Yes	Yes
Rostanga rubra	Yes	No	Yes	No
Rubramoena amoena	No	Yes	Yes	No
Rubramoena rubescens	No	Yes	No	No
Thecacera pennigera	Yes	No	Yes	No
Trapania lineata	Yes	No	No	No
Tritonia hombergii	Yes	Yes	No	No
Total no. of species recorded each year	**31**	**32**	**29**	**9**

3.5 Notable Nudibranch species

Notable species found within Skomer MCZ from diving surveys between 2002 and 2022 have been selected and listed below together with current UK distribution maps for each species. The maps have been taken from the National Biodiversity Network (NBN) Atlas, contributors to this data are shown in Appendix 4. The species list includes records from dives not completed on the dedicated MCZ nudibranch surveys (Bunker et al, 1992, Picton & Morrow 1994, www.habitas.org.uk). Some of the species are new records to the Skomer MCZ; others are notable due to their national scarcity or limited national distribution.

1. *Amphorina andra* (Figure 2). This species was described in 2020 but it was previously considered to be a morphotype of *Eubranchus farrani*, now *Amphorina farrani*. It was recorded for the first time at Skomer MCZ during the 2022 survey. No distribution map is available for this species.

Figure 2. *Amphorina andra*, (photo credit BEP)

2. *Amphorina linensis* (Figure 3). This species was first described in 1990 in Spain and has been recorded in Portugal and the Netherlands. It was first recorded in the UK in 2015, and in Wales it was first recorded in St Brides Bay in 2017. Subsequently recorded in the 2018 MCZ survey for the first time and found again in 2022. However, these records do not currently show on the distribution map (Figure 4) as the species was not present in the Marine Recorder species directory at the time of data entry. This will shortly be remedied.

Figure 3. *Amphorina linensis* (photo credit BEP)

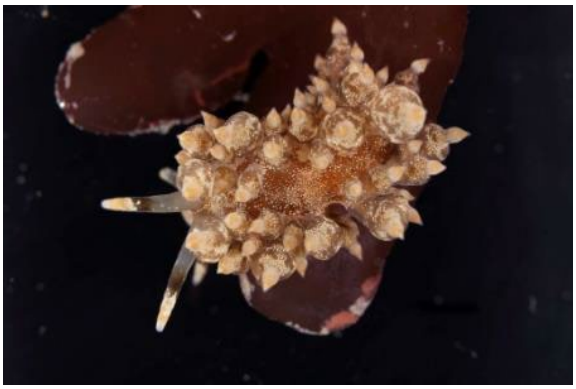


Figure 4. Distribution map of *Amphorina linensis* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

3. *Ataladoris oblonga* (Figure 5). This species is found scattered on the south and west coasts of Britain, and Northern Ireland, but rarely recorded (Figure 6). Found in the Skomer MCZ in 1987, 1989 and recorded on the 2010, 2014, 2018 and 2022 surveys.

Figure 5. *Ataladoris oblonga* (Photo credit PN)

Figure 6. Distribution map of *Ataladoris oblonga* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

4. *Ataladoris pusilla* (Figure 7). Found all around the coast of Britain but rarely recorded as it is particularly well camouflaged. Feeds on encrusting bryozoans. New record for Skomer MCZ in 2006. Found again in 2013 and recorded on the 2018 survey but not in 2022. Due to a delay in data being uploaded on to the NBN Atlas from some Marine Recorder datasets, the distribution map does not show the species being recorded from the MCZ, however it does show its limited occurrences in the UK. (Figure 8).

Figure 7. *Ataladoris pusilla* (Photo credit MB)

Figure 8. Distribution map of *Ataladoris pusilla* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

5. *Capellinia fustifera* (Figure 9). This is a very small camouflaged species. Few records exist however it has been found on the west and south coasts of Britain (Figure 10). Recorded at Skomer MCZ in 1997 and subsequently on the 2014 and 2018 surveys, but not in 2022.

Figure 9. *Capellinia fustifera* (photo credit KLE)

Figure 10. Distribution map of *Capellinia fustifera* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

6. *Cuthonella concinna* (Figure 11). This is a northern species with sparse records from Skomer MCZ and the south coast (Figure 12). It feeds on the hydroid *Sertularia argentea* which is usually found in strong tidal flows or wave action. Recorded in 1989 and 1992. First recorded on a survey in 2014 and found again in 2022.

Figure 11. *Cuthonella concinna* (photo credit BEP)

Figure 12. Distribution map of *Cuthonella concinna* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

7. *Diaphoreolis viridis* (Figure 13). This species is more common in the north of the British Isles, though scattered records exist from all around the UK (Figure 14). First recorded at Skomer MCZ in 2010. Found again in 2013 and 2018 but not in 2022.

Figure 13. *Diaphoreolis viridis* (photo credit KLE)

Figure 14. Distribution map of *Diaphoreolis viridis* (NBN Atlas, accessed 6/10/22 https://nbn.org.uk/)

8. *Diaphorodoris alba* (Figure 15). Originally thought to be a variety of *Diaphorodoris luteocincta*, the variety *alba* was confirmed to be a distinct species in 2016. It occurs in the Mediterranean, on the north coast of France and south coast of Britain (Figure 16). First recorded at Skomer MCZ in 2002 and on several surveys since including 2022.

Figure 15. *Diaphorodoris alba*, photo credit RB

Figure 16. Distribution map of *Diaphorodoris alba* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

9. *Doris sticta* (Figure 17). A nationally scarce species found on the west of Ireland and south west Britain (Moore, 2002) (Figure 18). Feeds on sponges but it is unknown which species. Recorded in 1975, 1990 and 1991. Found on both 2006 and 2014 surveys and in 2015. Also recorded on the 2018 and 2022 surveys.

Figure 17. Image of *Doris sticta*, photo credit RB

Figure 18. Distribution map of *Doris sticta* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

10. *Doto floridicola* (Figure 19). First recorded at Skomer MCZ as "*Doto* sp A" in 1990. In 2002 Bernard Picton confirmed it to be *Doto floridicola*. It is a southern species found in the Azores and Mediterranean. The only records of it in the UK are from Skomer MCZ (Figure 20). Recorded in 2014, 2018 and again in 2022.

Figure 19. *Doto floridicola*, photo credit RB

Figure 20. Distribution map of *Doto floridicola* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

11. *Doto hydrallmaniae* (Figure 21). Described from the Isle of Man in 1992. Feeds on the hydroid *Hydrallmania falcata*, found mainly on rocks, stones and pebbles in areas subject to scour. Scattered records mainly on the west of Britain and northern Ireland (Figure 22). First recorded at Skomer MCZ on the 2018 survey and found again in 2022. These records have not yet been included on the distribution map.

Figure 21. *Doto hydrallmaniae*, photo credit BEP

Figure 22. Distribution map of *Doto hydrallmaniae* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

12. *Doto hystrix* (Figure 23). A scarce species found in deep waters below 25m feeding on the hydroid *Schizotricha frutescens*. A north west species with occasional records at Skomer MCZ, Lundy and south west England (Figure 24). Recorded in 1988 and on the 2010 and 2018 surveys, but not found in 2022.

Figure 23. *Doto hystrix*, photo credit MB

Figure 24. Distribution map of *Doto hystrix* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

13. *Duvaucelia odhneri* (Figure 25). A nationally scarce species (Moore, 2002) found in the south west of Britain (Figure 26). Feeds on the pink sea fan *Eunicella verrucosa*. Present in small numbers within Skomer MCZ and monitored on the pink sea fan surveys that are conducted yearly.

Figure 25. *Duvaucelia odhneri*, photo credit PN

Figure 26. Distribution map of *Duvaucelia odhneri* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

14. *Duvaucelia plebeia* (Figure 27). Frequent all around the British Isles (Figure 28), but inconspicuous, usually hiding at the base of it's food, the soft coral *Alcyonium digitatum*. First recorded in the Skomer MCZ in 1972, and in 1989, 1990 and 1991. Not seen again until the 2022 MCZ survey.

Figure 27. *Duvaucelia plebeia*, photo credit BEP

Figure 28. Distribution map of *Duvaucelia plebeia* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

15. *Eubranchus vittatus* (Figure 29). A frequent species in the north west of Britain but scarcer in the south (Figure 30). It feeds on the hydroid *Kirchenpaueria pinnata*. A new record for Skomer MCZ in 2010 and found again in 2018.

Figure 29. *Eubranchus vittatus*, photo credit KL

Figure 30. Distribution map of *Eubranchus vittatus* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

16. *Facelina annulicornis* (Figure 31). An uncommon species but with a widespread distribution in Britain (Figure 32). It is particularly common in the Skomer MCZ and has been recorded during all diving surveys since 2002 (Figure 33).

Figure 31. *Facelina annulicornis*, photo credit MB

Figure 32. Distribution map of *Facelina annulicornis* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

Figure 33. Local distribution of *Facelina annulicornis* within the Skomer MCZ (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

17. *Favorinus blianus* (Figure 34). Distributed mainly along the north and west coasts of Britain (Figure 35). Collected in 1972 and subsequently described as a new species in 1974 with Martins Haven being the type locality (Hunman & Brown, 1975). Recorded in 1975, 1989 and on the 2010 and 2018 surveys. Not found in 2022.

Figure 34. *Favorinus blianus*, photo credit KL

Figure 35. Distribution map of *Favorinus blianus* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

18. *Fjordia chriskaugei* (Figure 36). Recently described in 2017 from Norway. Previously confused with *Fjordia lineata*. Currently known from southern Norway to Croatia, including around Britain and Ireland (Figure 37). Recorded in the 2010 survey but has not been recorded since.

Figure 36. *Fjordia chriskaugei,* photo credit PN

Figure 37. Distribution map of *Fjordia chriskaugei* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

19. *Lomanotus genei* (Figure 37). A scarce species but with a wide distribution from the west coast of Scotland to the Mediterranean (Figure 39). It feeds on the hydroid *Nemertesia ramosa*. Found in 1988, on the 2010 survey and at one site in 2016. Not recorded in 2018 or 2022.

Figure 38. *Lomanotus genei*, photo credit RG

Figure 39. Distribution map of *Lomanotus genei* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

20. *Lomanotus marmarotus* (Figure 40). This is a highly camouflaged species and most likely under-recorded. There are sparse records from all around the British Isles (Figure 41). Recorded at Skomer MCZ in 1989 and 2013 but has not been found on any of the dedicated surveys.

Figure 40. *Lomanotus marmarotus*, photo credit DK

Figure 41. Distribution map of *Lomanotus marmarotus* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

21. *Okenia aspersa* (Figure 42). A scarce burrowing nudibranch that feeds on the ascidian *Molgula oculata*. These ascidians live buried in muddy sediment and often the only clue to *Okenia aspersa's* presence is the distinct spawn, shaped like coiled springs. Sparse records from all around the British Isles (Figure 43). Found in 1989, and recorded on the 2010 survey. Not seen since, although egg masses were recorded in 2014 and 2018.

Figure 42. *Okenia aspersa*, photo credit KL

Figure 43. Distribution map of *Okenia aspersa* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

22. *Okenia elegans* (Figure 44). A nationally scarce species that feeds on *Polycarpa scuba*. Recorded from scattered locations on the south and west coasts of Britain (Moore, 2002) (Figure 45). First recorded in the Skomer MCZ in 1991, and seen regularly since. It was recorded during the 2010, 2014 and 2018 surveys, but not found in 2022.

Figure 44. *Okenia elegans*, photo credit KL

Figure 45. Distribution map of *Okenia elegans* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

23. *Palio nothus* (Figures 46). This species has a wide distribution all around the UK and north to the Arctic circle (Figure 47), but not in great numbers. It was first recorded in the Skomer MCZ during the 2018 survey, but was not found in 2022.

Figure 46. *Palio nothus*, photo credit KLE

Figure 47. Distribution map of *Palio nothus* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

24. *Polycera capitata/norvegica.* There is currently some taxonomic confusion regarding the name of this species, however in the past all specimens were considered to be a morphotype of *Polycera quadrilineata* and were recorded as such. Re-inspection of photographs of individuals labelled *P. quadrilineata* during previous Skomer MCZ surveys has revealed that some are in fact *P. capitata/norvegica*. Both species were recorded during the 2022 survey.

25. *Polycera kernowensis* (Figure 48). This species has only recently been described, but in the past has been confused with and recorded as *Polycera faeroensis* (Figure 49). Re-inspection of photographs of individuals labelled *P. faeroensis* during previous Skomer MCZ surveys has revealed that some are in fact *P.kernowensis.* Both species appear to occur frequently and have been found in all surveys since 2006.

Figure 48. *Polycera kernowensis*, photo credit HC

Figure 49. Distribution map of *Polycera faeroensis* and *P. kernowensis* combined (NBN Atlas, accessed 6/10/22 https://nbn.org.uk/)

26. *Thecacera pennigera* (Figure 50). This is a species that is confined to the south and west coasts of Britain (Figure 51). It is regularly recorded from Skomer MCZ, and has been found during all surveys since 2006.

Figure 50 *Thecacera pennigera*, photo credit RB

Figure 51. Distribution map of *Thecacera pennigera* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

27. *Trapania lineata* (Figure 52). A scarce species recorded from western Scotland to the Atlantic coast of Spain (Figure 53). First recorded in the Skomer MCZ in 2010, and found again in 2022.

Figure 52. *Trapania lineata*, photo credit DK

Figure 53. Distribution map of *Trapania lineata* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

28. *Trapania tartanella* (Figure 54). Found on the Atlantic coasts of Spain and Portugal. A rare species first recorded in Britain at the Manacles, Cornwall in 2007 (Figure 55). The first record for Wales was from Skomer MCZ in 2009, but it has not been recorded there since. This record is not showing on the distribution map as it was not entered into the Marine Recorder database at the time. This will hopefully be remedied shortly.

Figure 54. *Trapania tartanella*, photo credit DK

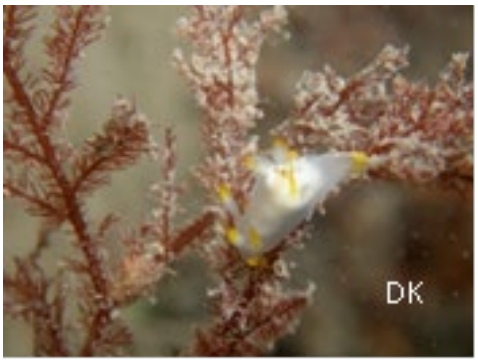


Figure 55. Distribution map of *Trapania tartanella* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

29. *Trinchesia caerulea* (Figure 56). Found all around the British Isles but most frequently on the west coast of Scotland (Figure 58). First recorded at Skomer MCZ in 1975, and again in 1989 and 2009 and 2014. First seen during a MCZ survey in 2022.

Figure 56. *Trinchesia caerulea*, photo credit BEP

30. *Trinchesia cuanensis* (Figure 57). This species was described in 2019 but had previously been confused with and recorded as *Trinchesia caerulea*. On re-inspection of a photograph taken of an individual during the 2018 MCZ survey, it was revealed to be *T. cuanensis* and not *T. caerulea* as originally recorded. Both species were recorded during the 2022 survey. The distribution map below (Figure 58) shows occurrences of both species combined.

Figure 57. *Trinchesia cuanensis*, photo credit BEP

Figure 58. Distribution map of *Trinchesia caerulea* and *T. cuanensis* combined (NBN Atlas, accessed 6/10/22 https://nbn.org.uk/)

31. *Zelentia pustulata* (Figure 59). This is a northern species in Great Britain with few records (Figure 60), but regularly found around Skomer and Skokholm Islands (Figure 61). Feeds on the hydroid *Halecium muricatum*. Recorded in the Skomer MCZ during the 2006, 2010 and 2018 surveys, but not found in 2022.

Figure 59. *Zelentia pustulata*, photo credit JJ

Figure 60. Distribution map of *Zelentia pustulata* (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

Figure 61. Map showing distribution of *Zelentia pustulata* in the Skomer MCZ and around Skokholm Island and surroundings (NBN Atlas, accessed 6/9/22 https://nbn.org.uk/)

4. Discussion

Fifty five species were recorded from 16 sites surveyed in 2022, representing 70% of the 80 nudibranch species that have been recorded on dives in the Skomer MCZ. This is similar to 2018 and 2010 (59), and slightly higher than in 2014 (52 species). The lower number of species in 2014 was most likely due to poor diving visibility and the survey sites being covered in a thick layer of silt which buries many of the sessile filter feeding animals: hydroids, bryozoans, sponges and ascidians which are food sources for the different nudibranch species. In contrast there was a low level of silt on the reefs and good diving visibility during both 2010 and 2018 surveys, and again in 2022. However, in spite of the good conditions it was noted by all surveyors that there was a significant reduction in the overall number of nudibranchs present in 2022, even though a relatively high number of species were found. There does not appear to be any obvious reason for this, as all surveys have taken place around the same time of year, and food sources were in good supply.

The total number of species recorded in all surveys since 2010 has been considerably higher than the 2002 (32 species) and 2004 (34 species) surveys (Lock, 2011). This is likely to be due to extra efforts to target a wider range of habitats, including mixed sediment sites at Martins Haven east, West Hook, Martins Haven and Prothero's Dock. A number of species have also been recorded in recent surveys as a direct result of having specialist help from Bernard Picton and Christine Morrow.

In 2010, 2014 and 2018 a weekend was organised for Seasearch volunteer divers to complete a nudibranch "Bioblitz" at Martins Haven. Between 20-34 divers took part in each survey and were assisted by specialist Bernard Picton. The results were impressive with 31 species recorded in 2010, 33 species in 2014 and 29 species in 2018. In 2022 a Seasearch specialist nudibranch identification course was held again in Marloes and run by Bernard Picton and Christine Morrow. Unfortunately, adverse weather and poor conditions meant limited dives could be carried out over the weekend, and only 9 species were recorded. Combining all of the above records, a total of 44 species have been recorded at Martins Haven. The effort at a single site with volunteer divers continues to prove very valuable.

Six Skomer MCZ nudibranch species surveys have been completed (2002, 2006, 2010, 2014, 2018 and 2022), and when combining the survey data, 75 species have been recorded. Of these, 14 species: *Amphorina andra*, *Diaphorodoris alba*, *Doto eireana*, *Atalodoris pusilla*, *Eubranchus vittatus*, *Trapania lineata*, *Diaphoreolis viridis*, *Palio nothus*, *Fjordia chriskaugei*, *Doto hydrallmaniae*, *Polycera capitata/norvegica*, *Polycera kernowensis*, *Trinchesia cuanensis* and *Amphorina linensis* had not been recorded before the 2002 survey.

Five of the above 14 species have previously been recorded during MCZ surveys under a different name, but recent DNA research has resulted in the species being split, and new species being described. These are: *Amphorina andra* (split from *Amphorina farrani*); *Fjordia chriskaugei* (split from *Fjordia lineata*); *Polycera capitata/norvegica* (split from *Polycera quadrilineata*); *Polycera kernowensis* (split from *Polycera faeroensis*) and *Trinchesia cuanensis* (split from *Trinchesia caerulea*).

Doto floridicola was recorded in 2014 and 2018, and again in 2022, 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 the Azores (Picton, 2002). To date it has not been found elsewhere in the UK (Figure 20).

Lomanatus marmoratus has not been recorded on any of the 6 MCZ surveys, but was recorded and photographed by a volunteer diver in 2013. A new species for Wales, *Trapania tartanella*, was recorded in the MCZ in 2009. These records from volunteers are invaluable.

Three nudibranch species were recorded in diving surveys in the Skomer MCZ between 1972 and 2001 but not found since. These are: *Trinchesia foliata (*1975*)*, *Goniodoris castanea* (1972, 1988) and the nationally rare *Polycera elegans* (1972, 1975) (Bunker et al, 1992; Hunman & Brown, 1975), which has not been seen anywhere in the UK since that date. The habitats and food sources for these species need to be targeted in future surveys.

For all diving surveys (1972 to 2022) in the MCZ a total of 80 species have been recorded, with an additional 3 species recorded from sediment infauna surveys. Eighty three 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. The area of the MCZ is only 13.2 square kilometres, and despite only a selection of sites being surveyed, over 70% of the UK species have been recorded here. This high diversity is a reflection of the diversity of habitats and environmental conditions found in the MCZ and the rich communities that they support. As specialised predators, nudibranch species have a very selective choice of prey organisms and they are therefore a good indicator of the overall health of the ecosystem (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. A particularly rich site in the 2022 survey was Martins Haven east (25), followed by Junkos Reef (17), Martins Haven (16), and Thorn Rock and Wick Reef (15 each). However, overall the general diversity and number of species at each site was notably less than in 2018, and similar to 2014. Other sites were selected to target specific prey species found under particular environmental conditions. An example of these species is the hydroid *Tubularia* spp., which is the prey of *Catriona aurantia* and *Dendronotus frondosus* and is found at sites with strong current, e.g. Tusker Rock and Mew Stone. Neither of these nudibranch species were seen in 2022, although they had been recorded in the previous four MCZ surveys, however it was noted that there were lower than usual numbers of *Tubularia* spp. present. Other species notable by their absence were *Cadlina laevis*, *Jorunna tomentosa* and *Fjordia lineata. Acanthodoris pilosa* is usually seen in relatively large numbers at Thorn Rock feeding on the bryozoan *Alcyonidium diaphanum,* but only one individual was recorded in 2022, not during the survey but at a later date in the year.

The most commonly recorded species in the 2022 survey were *Antiopella cristata* (10 sites), *Doto fragilis* (11 sites), *Duvaucelia lineata* (10 sites), *Facelina annulicornis* (10 sites), *Limacia clavigera* (10 sites) and *Doto pinnatifida* (9 sites).

The rare and scarce marine species list for the UK (Sanderson, 1996), which includes nudibranch species *Okenia elegans*, *Duvaucelia odhneri* and *Doris sticta* is now dated.

Since the list was drawn up, other species have been found or described in the UK, and some species have been split. 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) atlas. These distribution maps are useful to highlight notable species in the Skomer MCZ and have been included in this report (Section 3.5), including species with a northern distribution (*Doto hystrix*, *Zelentia pustulata*, and *Doto eireana*); a southern distribution (*Doris sticta*, *Duvaucelia odhneri*, *Doto floridicola*,*Trapania tartanella* (although not currently showing on the map) and *Diaphorodoris alba*), 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.

The distribution maps do not always show up to date records due to the following reasons: a delay in species data being uploaded from a Marine Recorder dataset onto the NBNAtlas (*Ataladoris pusilla, Doto hydrallmaniae*), a species name not being present in the Species Directory at the time of data entry (*Amphorina linensis*), or the record not being entered into the dataset at the time (*Trapania tartanella*). These will hopefully be remedied shortly.

5. Conclusion

The 2022 survey results continue to show a high diversity of nudibranch species within the Skomer MCZ, although with a lower number of individuals being recorded. The annual target of observing 14 of the 16 species on the checklist has not been achieved since the 2018 survey due to records not being kept. The aim is to resume this annual observation task in 2023.

The four-yearly survey and contributions from volunteer divers has provided valuable nudibranch species records for the Skomer MCZ, and species new to the MCZ continue to be found. The long-term data set is now giving us a good indication of species occurrence in the MCZ over time, and we are building up a picture of which species tend to be seen every year (e.g. *Doto fragilis*, *Edmundsella pedata*, *Facelina auriculata*, *Antiopella cristata* and *Polycera* spp.) and which species occur only occasionally (e.g. *Doris sticta*, *Okenia aspersa*, *Facelina bostoniensis*).

The Skomer MCZ four-yearly surveys are providing valuable species information to nudibranch taxonomists which is contributing to the ongoing genetic research being carried out. Skomer MCZ has been cited as a locality in a number of publications describing new species, which further emphasises its importance as a location with high biodiversity.

The Skomer MCZ is within the Pembrokeshire Marine Special Area of Conservation (SAC) and data collected here is used to help assess the condition of features of the SAC. The main relevant SAC features within Skomer MCZ are 'Reef' and 'Large Shallow Inlet and Bay'. The nudibranch data is applicable to some of the attributes of Favourable Conservation Status, particularly those relating to typical species. Examples are shown in Table 5.

Table 5 Table showing attributes, measures and targets of Favourable Conservation Status Statements for the relevant features of Pembrokeshire Marine SAC

Favourable Conservation Status Statement	**Attribute**	**Measure**	**Target**
Species richness and diversity of Large Shallow Inlets and Bays is not degraded	Number of species	Change in species richness or diversity measures indicative of anthropogenic impact, which is not explained by inherent dynamism in structure and function; indicated, for example, by univariate and multivariate analytical techniques. This measure could include occurrence of non-native species.	No change in species richness or diversity measures indicative of anthropogenic impact, which is not explained by inherent dynamism in structure and function.
No degradation of species richness and diversity. As above.	Taxonomic spread of species	Change in taxonomic distinctness indicative of anthropogenic impact, which is not explained by inherent dynamism in structure and function; indicated, for example, univariate and multivariate analytical techniques.	No change in taxonomic distinctness indicative of anthropogenic impact which is not explained by inherent dynamism in structure and function.

The above two targets have been met for nudibranchs in the Skomer MCZ.

6. Recommendations

- Annually complete the 16 species checklist and photograph unusual species for identification during other Skomer MCZ dive survey work.
- Complete a nudibranch species survey in the Skomer MCZ every 4 years, next survey due 2026.
- Skomer MCZ staff to complete specialist identification training.
- Complete a nudibranch “Bioblitz” at Martins Haven with volunteer divers alongside the main survey every 4 years.
- Feed the data into the Pembrokeshire Marine SAC feature conditions assessments.
- Enter the 4 yearly survey data and species list into the Marine Recorder database for inclusion in the NBN Atlas dataset.

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KL	Kate Lock
JJ	Jennifer Jones
AM	Ali Massey

Volunteer Divers:

BEP	Bernard Picton
BB	Blaise Bullimore
RB	Ross Bullimore
KLE	Kerry Lewis
DK	David Kipling
HC	Hayden Close
JC	Jon Chamberlain
RS	Rob Spray
PN	Philip Newman
MG	Matt Green

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World Register of Marine Species www.marinespecies.org

Appendix 1

List of nudibranch species records at 6 sites from diving surveys completed 1972 and 1973 in Skomer MCZ (Hunman & Brown, 1975)

Species	Martins Haven	Jack Sound	North Neck	North Wall	The Wick	High Cliff
Acanthodoris pilosa	Yes	No	No	No	Yes	No
Aegires punctilucens	Yes	No	No	Yes	No	No
Ancula gibbosa	Yes	No	No	No	No	No
Antiopella cristata	Yes	Yes	No	No	No	No
Cadlina laevis	No	Yes	No	Yes	No	No
Crimora papillata	Yes	Yes	Yes	Yes	No	Yes
Diaphorodoris luteocincta	Yes	Yes	Yes	No	No	Yes
Doris pseudoargus	Yes	Yes	No	No	No	No
Doris sticta	Yes	No	No	Yes	No	No
Geitodoris planata	Yes	No	No	No	No	No
Doto coronata agg.	No	Yes	No	No	No	No
Doto fragilis	Yes	Yes	Yes	Yes	No	No
Doto pinnatifida	Yes	Yes	Yes	Yes	No	No
Eubranchus exiguus	No	Yes	Yes	No	No	No
Amphorina farrani	Yes	Yes	Yes	No	No	No
Eubranchus tricolor	No	Yes	No	No	No	No
Facelina annulicornis	Yes	Yes	Yes	Yes	No	No
Facelina auriculata	Yes	Yes	Yes	Yes	No	No
Facelina bostoniensis	Yes	No	No	No	No	No
Favorinus blianus	Yes	No	No	No	No	No
Edmundsella pedata	Yes	Yes	Yes	No	No	No
Goniodoris nodosa	Yes	Yes	Yes	No	Yes	No
Jorunna tomentosa	No	No	No	Yes	No	No
Limacia clavigera	Yes	Yes	No	Yes	No	No
Okenia elegans	No	No	No	No	No	Yes
Onchidoris bilamellata	No	No	Yes	No	No	No
Polycera elegans	Yes	Yes	Yes	Yes	No	No
Polycera faeroensis	Yes	Yes	Yes	No	No	Yes
Polycera quadrilineata	Yes	Yes	Yes	No	No	No
Rostanga rubra	No	No	Yes	No	No	No
Tergipes tergipes	No	Yes	Yes	No	No	No
Duvaucelia lineata	Yes	Yes	No	Yes	No	Yes
Tritonia hombergi	Yes	Yes	No	Yes	No	Yes
Duvaucelia plebeia	No	No	Yes	No	No	No

Appendix 2

Checklist of 16 species to be observed annually in the Skomer MCZ

	Species	**Food preference**
1.	*Acanthodoris pilosa*	*Alcyonidum diaphanum*
2.	*Doris pseudoargus*	Sponges
3.	*Crimora papillata*	*Chartella papyracea* and *Securiflustra securifrons*
4.	*Diaphorodoris luteocincta*	*Crisia* spp.
5.	*Doto fragilis*	*Nemertesia ramose* and *Halecium halecinum*
6.	*Doto pinnatifida*	*Nemertesia antennina*
7.	*Amphorina farrani*	*Obelia* sp. and *Aglaophenia pluma*
8.	*Facelina annulicornis*	Hydroids
9.	*Facelina auriculata*	*Obelia geniculate* and *Tubularia* spp.
10.	*Edmundsella pedata*	*Eudendrium* spp.
11.	*Antiopella cristata*	*Bugula* sp.
12.	*Limacia clavigera*	*Electra pilosa*
13.	*Polycera faeroensis*	*Crisia* spp. and *Bugula* spp.
14.	*Polycera quadrilineata*	*Membranipora membranacea*
15.	*Duvaucelia lineata*	Possibly octocorals
16.	*Duvaucelia odhneri*	*Eunicella verrucosa*

Appendix 3

Species names and authority recorded in this report

Acanthodoris pilosa (Abildgaard in Müller, 1789)
Aegires punctilucens (d'Orbigny, 1837)
Aeolidia papillosa (Linnaeus, 1761)
Amphorina andra Korshunova et al., 2020
Amphorina farrani (Alder & Hancock, 1844)
Amphorina linensis (Garcia-Gomez et al.,1990)
Amphorina pallida (Alder & Hancock, 1842)
Ancula gibbosa (Risso, 1818)
Antiopella cristata (Delle Chiaje, 1841)
Atalodoris oblonga (Alder & Hancock, 1856)
Atalodoris pusilla (Alder & Hancock, 1845)
Atalodoris sparsa (Alder & Hancock, 1846)
Cadlina laevis (Linnaeus, 1767)
Capellinia fustifera (Loven, 1846)
Catriona aurantia (Alder & Hancock, 1842)
Crimora papillata Alder & Hancock, 1862
Cuthonella concinna (Alder & Hancock, 1843)
Dendronotus frondosus (Ascanius, 1774)
Diaphoreolis viridis (Forbes, 1840)
Diaphorodoris alba (Portman & Sandmeier, 1960)
Diaphorodoris luteocincta (M. Sars, 1870)
Doris pseudoargus Rapp, 1827
Doris sticta (Iredale & O'Donoghue, 1923)
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 hydrallmaniae Morrow et al., 1992
Doto hystrix Picton & Brown, 1981
Doto koenneckeri Lemche, 1976
Doto lemchei Ortea & Urgorri, 1978
Doto maculata (Montagu, 1804)
Doto millbayana Lemche, 1976
Doto pinnatifida (Montagu, 1804)
Doto tuberculata Lemche, 1976
Duvaucelia lineata (Alder & Hancock, 1848)
Duvaucelia odhneri J. Tardy, 1963
Duvaucelia plebeia (G. Johnston, 1828)
Edmundsella pedata (Montagu, 1816)
Embletonia pulchra (Alder & Hancock, 1844)
Eubranchus exiguus (Alder & Hancock, 1848)
Eubranchus tricolor Forbes, 1838
Eubranchus vittatus (Alder & Hancock, 1842)

Facelina annulicornis (Chamisso & Eysenhardt, 1821)
Facelina auriculata (Müller, 1776)
Facelina bostoniensis (Couthouy, 1838)
Favorinus blianus Lemche & Thompson, 1974
Favorinus branchialis (Rathke, 1806)
Fjordia browni (Picton, 1980)
Fjordia lineata (Lovén, 1846)
Fjordia chriskaugei (Korshunova et al., 2017)
Geitodoris planata (Alder & Hancock, 1846)
Goniodoris castanea Alder & Hancock, 1845
Goniodoris nodosa (Montagu, 1808)
Janolus cristatus (Delle Chiaje, 1841)
Jorunna tomentosa (Cuvier, 1804)
Limacia clavigera (O. F. Müller, 1776)
Lomanotus genei Vérany, 1846
Lomanotus marmoratus (Alder & Hancock, 1845)
Microchlamylla gracilis (Alder & Hancock, 1844)
Okenia aspersa (Alder & Hancock, 1845)
Okenia elegans (Leuckart, 1828)
Onchidoris bilamellata (Linnaeus, 1767)
Onchidoris muricata (O. F. Müller, 1776)
Palio nothus (Johnston,1838)
Polycera elegans (Bergh,1894)
Polycera faeroensis Lemche, 1929
*Polycera capitata/norvegica S*ørensen et al., 2020
Polycera kernowensis Korshunova et al., 2021
Polycera quadrilineata (O. F. Müller, 1776)
Rostanga rubra (Risso, 1818)
Rubramoena amoena (Alder & Hancock, 1845)
Rubramoena rubescens Picton & Brown, 1978
Tergipes tergipes (Forsskål in Niebuhr, 1775)
Thecacera pennigera (Montagu, 1815)
Trapania lineata Haefelfinger, 1960
Trapania tartanella (Von Ihering, 1886)
Trinchesia caerulea (Montagu, 1804)
Trinchesia cuanensis Korshunova et al., 2019
Trinchesia foliata (Forbes & Goodsir, 1839)
Tritonia hombergi Cuvier, 1803
Zelentia pustulata (Alder & Hancock, 1854)

Appendix 4

National Biodiversity Network Atlas: www.data.nbn.org.uk data provided by:

- Joint Nature Conservation Committee
- Seasearch
- Centre for Environmental Data and Recording
- Marine Biological Association
- Porcupine Marine Natural History Society
- Scottish Natural Heritage
- Natural Resources Wales
- Natural England
- Conchological Society of Great Britain and Ireland
- Manx Biological Recording Partnership
- Environmental Records Centre North East
- South East Wales Biodiversity Records Centre
- The Wildlife Trusts