

# Skomer Marine Conservation Zone Annual Report 2022/23

NRW Evidence Report No: 657

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- Securing our data and information;
- Having a well resourced proactive programme of evidence work;
- Continuing to review and add to our evidence to ensure it is fit for the challenges facing us; and
- Communicating our evidence in an open and transparent way.

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# 1. Crynodeb Gweithredol

Dyma Adroddiad Blynyddol Parth Cadwraeth Morol Sgomer i'r Pwyllgor Cyngori. Mae'r Pwyllgor Cyngori yn cynnwys sefydliadau ac unigolion sydd â diddordeb yn yr ardal y mae'r Parth Cadwraeth Morol yn ei gwmpasu.

Mae'r adroddiad yn crynhoi pob agwedd ar waith y Parth Cadwraeth Morol gan gynnwys dadansoddiad o waith maes staff, gwaith ystâd, defnydd hamdden o'r warchodfa, digwyddiadau, cyswllt, wardeinio, goruchwyllo, monitro a gwaith ymchwil. Mae hefyd yn cynnwys canlyniadau rhai prosiectau monitro a chrynodebau o adroddiadau a gyhoeddwyd.

## 1. Executive Summary

This is the Skomer Marine Conservation Zone Annual Report to its Advisory Committee. The Advisory Committee is made up of organisations and individuals with an interest in the area covered by the MCZ.

The report summarises all aspects of the work of the MCZ including a breakdown of staff fieldwork, estate work, recreational use of the reserve, incidents, liaison, wardening, patrol, monitoring and research. Also included are results of some monitoring projects and summaries of published reports.

## 2. SMCZ and Sustainable Management of Natural Resources

The Environment (Wales) Act 2016 and the Wellbeing of Future Generations (Wales) Act 2015 provide the framework for NRW's work to pursue the sustainable management of natural resources (SMNR) as defined in the former, whilst maximising our contribution to the well-being goals set out in the latter.

Sustainable management of natural resources follows nine main principles and the work of Skomer MCZ can be shown to apply (and to have been applying for many years) these principles:

**Adaptive management** – the management of Skomer MCZ is not set in stone. Our monitoring programme provides the evidence we need to review our management actions and where necessary change them.

**Scale** – whereas the boundary of the site was decided decades ago, our extensive knowledge of the MCZ allows us to apply aspects of our management to specific and appropriate areas. For instance, we are confident that the seabed in South Haven and parts of North Haven can tolerate current and historical levels of recreational anchoring, but this would not be sustainable elsewhere in the site. This allows us to identify areas where recreational anchoring can happen rather than try to impose a blanket ban on anchoring. Similarly, we would not wish to restrict access to the coastline of Skomer without good reason, when it is specific small areas that are more sensitive to disturbance at different times of year. For this reason, our seasonal access restrictions are designed to protect breeding seals and birds at the most sensitive sites in the autumn and spring, respectively.

**Collaboration and engagement** – this report demonstrates the importance we place upon liaison with academic institutions to increase our knowledge of the site by providing help with research projects. This report further documents our connections with regulatory and recreational organisations to ensure legal and voluntary measures are effective in protecting the site. The Skomer MCZ Advisory Committee is pivotal in this respect.

**Public participation** – without public participation we would be unable to carry out as much monitoring work as we do. From teams of volunteer divers carrying out intensive surveys of species and habitats like scallops and eelgrass, to individuals making up our own dive team to allow work to continue in the absence of staff, we are dependent on volunteers. Our voluntary controls would be unworkable without public support, and the local community provide valuable help in safeguarding the site through their vigilance.

**Evidence** – gathering evidence is our bread and butter, whether we are collecting it ourselves or relying on our extensive collaborative network to provide it to us.

**Multiple benefits** – we are fully aware of the intrinsic value of a site such as Skomer MCZ where people can come to enjoy wildlife in as unspoilt a marine area as we are likely to have anywhere in Wales. We can only theorise on the level of benefits to the wider marine environment of larval export from communities and species deriving a high level of protection as a result of the fishery byelaws we have.



**Long term** – at Skomer MCZ we are in an almost unique position in being able to report on the long-term consequences of marine conservation management actions taken over two decades ago.

**Preventative action** – the site-based nature of the team at Skomer MCZ is a major contributory factor in the protection of the site. We are able to respond quickly to potentially damaging events and intervene. Sometimes this is by our mere presence acting as a deterrent, sometimes by educating those who might cause harm unknowingly.

**Building resilience** – by applying nature conservation principles we can help to build diversity, populations, and connectivity; all of which contribute to the maritime ecosystem's resilience in the face of anthropogenic change.

### 3. Introduction

Wonderful weather and calm seas through spring and summer allowed the diving fieldwork to go smoothly this year.

A return to our sea fan sites confirmed 12 fans missing from 2021 and a further 3 fans missing in 2022 to be confirmed next year. The continued loss of sea fans, along with the poor condition we are observing for some fans due to large numbers of catshark eggs, necrosis (dead tissue) and other attached seaweeds and animals is a concern. We worked with the *Natur am Byth* project to complete a review of pink sea fans in Wales with management options for recovery and restoration, and as part of this work a stakeholder workshop was held in May 2022.

The nudibranch species survey was completed over the last two weeks of June. We were joined by a team of volunteer divers, boosting our survey effort. A total of 55 nudibranch species were recorded at 16 survey sites, representing 70% of the 80 nudibranch species that have now been recorded on dives in the Skomer MCZ.

After a two year delay the scallop volunteer diving survey was able to take place and over two weekends 25 volunteers took part. Forty nine transects were completed at 7 sites and 3,256 scallops were measured, aged and returned to the water. The average scallop density was estimated to be 62 / 100m<sup>2</sup>, this is a 12.4-fold increase since 2000.

A priority this year was to complete the shore monitoring programme which was not completed in either 2020 or 2021. We were very lucky to have the weather on our side and managed to access and survey all our shores.

In August we teamed up with Skomer Island staff and their volunteers to clear rubbish from both the Wick and South Haven. South Haven in particular required multiple shuttles of debris using the Island inflatable and Skalmey. Debris included remains from the aluminium container that landed on the shore back in winter 2019 and vast quantities of fishing rope. Sorting of the rubbish allowed 70% to go to recycling.

Skomer MCZ's seal pups continued to do well in 2022, with 447 births at island and mainland sites combined.

During the autumn, we supported other NRW marine monitoring surveys, including a week with Skalmey in Milford Haven completing the Water Framework Directive (WFD) fish survey.

## 4. Staff

### 4.1 Staffing

The staff complement at Skomer MCZ: Kate Lock, Mark Burton and Jen Jones with Ali Massey joining the team in March 2022, make up the NRW team based at Martins Haven. Kate and Mark are both full-time, Ali works year-round on a 3 day week and Jen is full time from April to October. This allows the team to field a 4-person team during the diving field season as required for HSE diving at work, and to complete the busy fieldwork schedule.

The Skomer MCZ team is part of the Marine Monitoring, Assessment and Reporting Team within NRW's Marine Service. The MMART team is responsible for delivering all marine monitoring work in Wales and has a team of skilled staff that support each others work. In 2022 the SMCZ team helped with Special Area of Conservation (SAC) lagoon, MarClim shore, WFD fish and SAC drop down video surveys, and conducted water sampling at different sites during the winter months. We were provided with diving assistance by Matt Green and Mike Camplin when we were low on staff and Adam Leyshon also helped with boat maintenance work on Skalmey.

### 4.2 Volunteers

Diving volunteers continued to supplement our own diving team when we were short-handed and ensured that our core diving projects were completed. In 2022 this was valuable with the nudibranch survey, run over two weeks in June. A big thank you to Phil Newman, Blaise and Ross Bullimore, Rob Spray, Jon Chamberlain and Jon Moore.

Volunteer Nicki Meharg supported weekend patrol work, and Becky Tooby assisted with both the shore and lagoon surveys.

Phil Newman, who retired from the Skomer MCZ team in October 2021 but continues as a volunteer, received his MBE for services to marine conservation from HRH Prince of Wales in February 2023.

Figure 4.1 HRH Prince of Wales and Philip Newman MBE



In 2022 we were able to welcome back the teams of volunteer divers over two weekends to complete the scallop survey, following a two year delay due to Covid restrictions.

Figure 4.2 Scallop survey volunteer dive teams



### 4.3 Development and training

In April 2022 divers from NRW's Marine Monitoring, Assessment and Reporting Team came together to complete a two day dive safety refresher in Pembrokeshire. It was completed on the NRW dive boats Skalmey and Pedryn, allowing the team to practise diver recovery drills and become familiar with dive rescue operations on these boats. This was followed by a one day boat familiarisation and safety training day for the whole team and other NRW marine staff, involving Skalmey and Pedryn and additionally Salar Vie (primarily used for WFD work) and our RIB Morlo.

Figure 4.3 Dive safety training



Figure 4.4 Boat safety training, Skalmey and Salar Vie



Ali completed a lot of training in 2022 allowing her to become familiar with NRW working practises and take part in both diving and boat work, these included: diver nitrox and oxygen administration certification, first aid and survival at sea refreshers, HSE dive supervisor qualification, RYA radio certification, RYA advanced power boat and RYA day skipper training. In January 2023 she completed her skipper competency exam allowing her to gain her commercial endorsement required to skipper work boats – congratulations to Ali. In February 2023 also she completed the NRW intertidal training.

In February 2023 the whole team attended RYA first aid at sea training.

Kate and Jen attended the Porcupine Marine Natural History Society conference held at Bangor University in March 2023.

## 4.4 Health and Safety

MCZ staff continue to maintain health and safety documentation linked to diving and boat operations as well as more routine office-based safety elements. We have also advised on corporate boat working procedures and policies.

In 2022 Covid restrictions were lifted, the team were happy to be functioning again both in the office and whilst working on the boats. The team continued to follow current Covid guidelines. Both Ali and Kate took a week off when they tested positive, but luckily this was not at the same time and in both cases the rest of the team tested negative so could continue to operate with the help of volunteers.

## 4.5 Diving Operations

Diving operations at Skomer MCZ continue to operate under the Scientific and Archaeological Diving Agreed Code of Practice, with staff assuming the legal responsibilities associated with the role of diving supervisor and Kate acting as NRW's Skomer Dive Project Manager.

Harry Goudge acts as NRW’s Dive Project Manager and is the representative on the Scientific Diving Supervisory Committee, which is the HSE-recognised representative body for the Scientific and Archaeological diving sector.

Numbers of dives and dive times in 2022 returned to pre-Covid levels (Figure 4.6.) A total of 214 dives were completed and 127 hours logged underwater, see Table 4.5. Biological monitoring contributed to 66% of the dives and 77% of the dive time, see Figures 4.7. The nudibranch survey completed over 2 weeks in June made up 20% of the total dives, this is high as volunteer divers supported the survey for the duration, boosting our survey effort.

Table 4.5 Summary of MCZ Diving Activity 2022

	MCZ staff	Volunteer divers	Total
<b>Dives</b>	154	60	214
<b>Dive time (mins)</b>	4993	2637	7630
<b>Dive time (hours)</b>	83.22	43.95	127.17
<b>Average dive time (mins)</b>	32	44	35.65
<b>Diving days</b>	n/a	n/a	36

Figure 4.6 Summary of MCZ diving activity 1992 to 2022

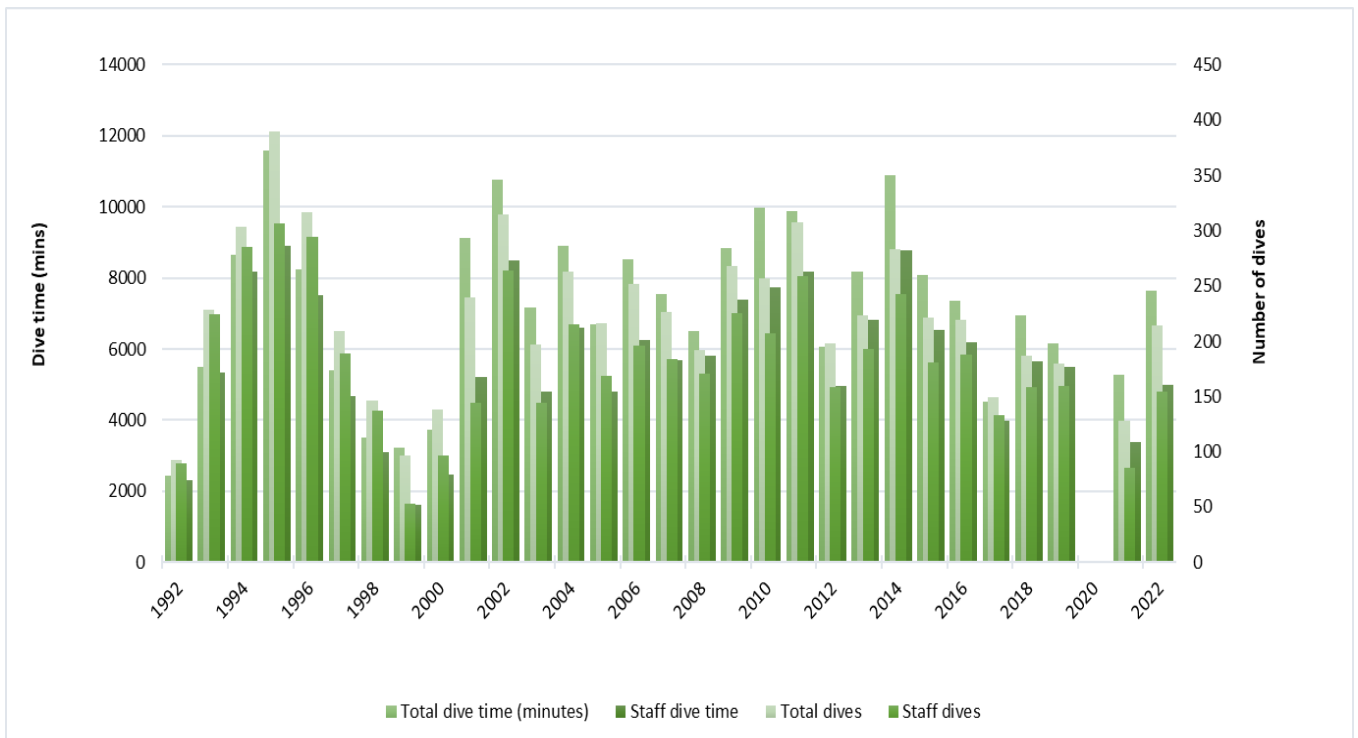
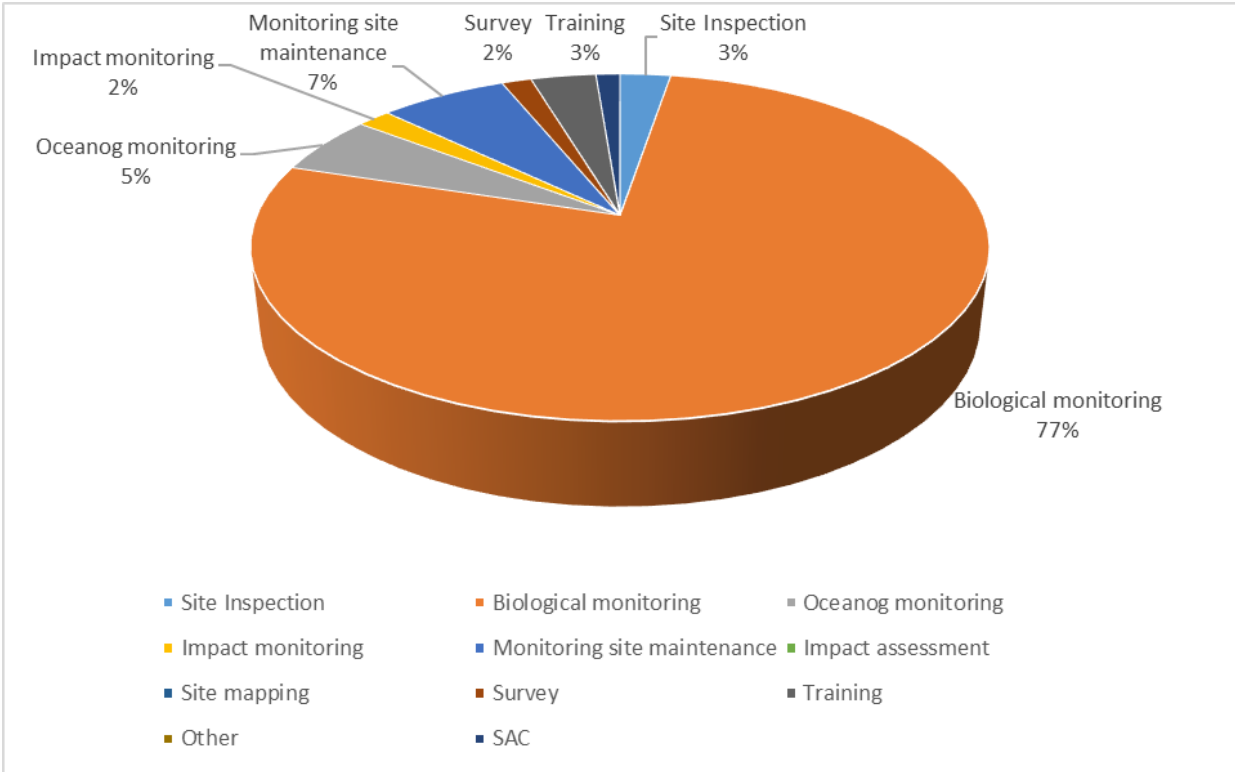


Figure 4.7 Skomer MCZ Diving Operations 2022, dive time



## 5. Estate

### 5.1 Buildings

MCZ buildings include the office and exhibition centre at Fisherman's Cottage in Martins Haven and the industrial unit in Milford Haven, where larger and more robust items of equipment are stored. All waste handling for MCZ buildings, use of consumables and energy are monitored in accordance with the ISO14001 environmental standard.

The old Coastguard lookout hut on the Deer Park is used to host the NRW automatic weather station.

The area at the back of Fisherman's Cottage was animal stock proofed when a fence was erected by Pembrokeshire based NRW National Nature Reserve (NNR) wardens in January 2022. The old wooden table was replaced by a new durable table made from recycled materials.

Figure 5.1 Fencing and new table at Fisherman's Cottage



In March 2022 Pembrokeshire County Council completed works to improve the access road to Martins Haven. This work also included improvements to the drainage at the front of Fisherman's Cottage.



Figure 5.2 Martins Haven improved access road and drainage at Fisherman's Cottage



## 5.2 Boats

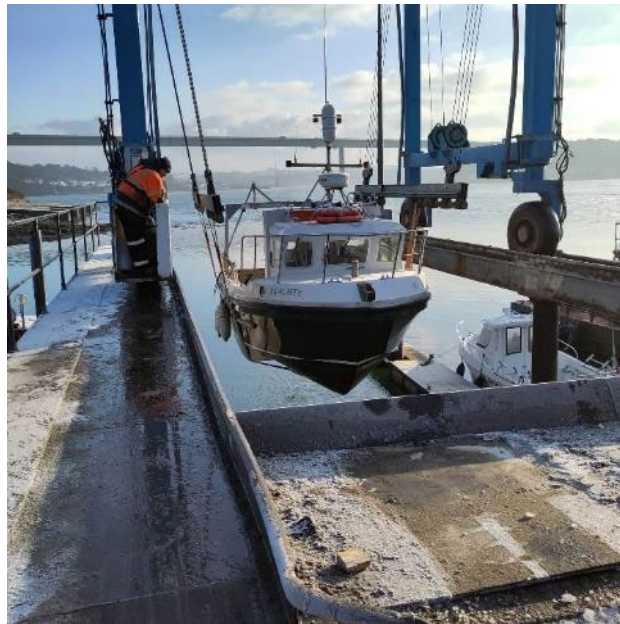
*Skalmey* spent 60 days at sea between April 2022 to end March 2023 and logged 207 engine hours. A summary of MCZ boating activity from 2002 to 2022 is summarised in Table 5.1.

In the winter of 2021/22 the Hamilton jet drive was given a full overhaul and the impeller was sent away for refurbishment and rebalancing. Sea trials in March 2022 witnessed *Skalmey* (not loaded with heavy kit) able to reach 25 knots and get on the plane for the first time in years, although performance was less when loaded with equipment.

At the end of May *Skalmey* hit a boulder when unloading kit at Martins Haven, luckily there was no hole but there was certainly a fracture and 'light' shining through a thin layer of fibreglass! A phone call to Dale Sailing boat yard and an immediate trip back to Neyland allowed *Skalmey* to be lifted out despite being past closing time and shutting the yard down for a bank holiday weekend. Mark then spent the weekend grinding out the fractured hull and completing a fibre glass repair allowing the boat to be back in action the following week. A huge thanks to both Dale Sailing and Mark.

In December, the mechanism in Dale Sailings lift had frozen solid so needed to be de-iced before lifting *Skalmey* out ready for routine winter maintenance.

Figure 5.3 *Skalmey* lift out at Dale Sailing boat yard in icy conditions December 2022.



The MCZ rigid hull inflatable boat *Morlo* spent 34 days at sea and logged 114 engine hours between April 2022 to end of March 2023 (Table 5.1). *Morlo* was used on weekend patrols, plankton and water sampling and for intertidal survey work. Winter maintenance work was completed in the Milford Haven unit.

The small inflatable tender *Suzimar* was, as ever, useful for our lagoon sampling efforts, especially at Carew millpond.

Table 5.1 Summary of MCZ Boating Activity 2022/23

Survey year recorded from April to end March  
 Staff = MCZ staff, other NRW Staff and Volunteers,  
 Staff seatime = total of each member of staff's seatime.  
 Staff days at sea = total days on which each member of staff went out in a boat.

Days at Sea	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022
<i>Skalmey</i>	73	77	52	48	58	72	58	61	69	99	95	65	70	73	69	49	79	65	62	60
<i>RIB Morlo</i>	37	32	40	43	40	38	36	38	48	36	35	30	43	32	34	36	40	33	25	34
<b>Total</b>	100	109	92	91	98	110	94	99	117	135	130	95	113	105	103	85	119	98	87	94

Staff seatime (hours)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022
<i>Skalmey</i>	1087	865	717	693	854	1190	791	973	1109	1162	1022	825	1034	893	973	563	847	805	887	848
<i>RIB Morlo</i>	367	348	568	493	473	416	392	355	452	313	284	227	388	277	337	275	403	280	164	319
<b>Total</b>	1454	1213	1285	1186	1328	1606	1183	1328	1561	1475	1634	1051	1422	1170	1310	838	1250	1085	1052	1167

Staff days at sea	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022
<i>Skalmey</i>	248	226	169	176	195	228	196	246	277	327	336	213	268	243	256	175	314	256	225	229
<i>RIB Morlo</i>	102	85	125	116	108	96	102	91	128	87	89	74	113	88	108	97	115	83	46	87
<b>Total</b>	329	311	294	292	303	324	298	337	405	414	425	287	381	331	364	272	429	319	271	316

Engine hours	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022
<i>Skalmey</i>	245	284	171	150	169	244	169	224	241	322	266	222	249	284	237	145	259	207	216	207
<i>RIB Morlo</i>	118	96	162	160	141	120	145	139	157	118	110	139	137	98	105	97	129	105	85	114
<b>Total</b>	263	380	334	310	310	365	313	363	398	440	376	361	386	382	342	242	388	312	301	321

## 5.3 Optical, photographic and scientific equipment

Photographic equipment continues to be serviced by a contractor on an annual basis with routine maintenance carried out by MCZ staff.

A new digital camera and housing was purchased in March 2022 to be used for our underwater photo monitoring projects, helping improve image quality. The previous camera and housing which has been used since 2008 is still in working condition and will be stored as a spare. Underwater housings and lighting equipment were serviced to maintain them in good working order.

Scientific equipment is serviced and calibrated according to manufacturer recommendations with minor maintenance (battery replacement, etc.) carried out by MCZ staff.

The weather station was serviced in February 2023 (Figure 5.4). It was recommended to invest in a new integrated wind system that will combine the wind vane which needs replacing and the anemometer into one unit with no moving parts. Currently the anemometer cups/bearings need to be replaced every 2 years and we lose data when they fail.

Figure 5.4 Weather station maintenance work.



## 5.4 Vehicles

The Isuzu 4-wheel-drive pickup truck continues to be a 'good workhorse' and the sliding tray installed in the boot makes loading and unloading much easier, Figure 5.5.

The RIB and box trailers were both serviced in February by a local contractor.

Figure 5.5 Isuzu pickup truck with sliding boot tray.



The fuel bowser with its powered pump has made fuelling Skalmey at Martins Haven much easier. The tank is double-skinned to prevent spillages and we carry absorbent materials if the worst should happen.

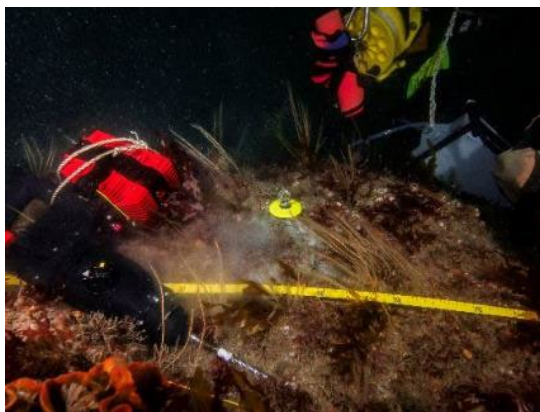
## 5.5 Marine estate work

The moorings for MCZ vessels in Martins Haven and the visitor moorings at North Haven were maintained at the beginning of the season through a contract with Dale Sailing Company using their barge *KitKat* to haul the moorings to the surface for shackle replacement. The mooring risers and buoys are prepared by MCZ staff who also continue to complete routine mooring checks during the season.

Skomer MCZ staff continue to maintain visitor moorings in North Haven as part of the site's management to protect the eelgrass bed in the bay. The moorings normally operate from Easter through to autumn at which point the buoys and riser ropes are replaced with temporary marker buoys advising "no mooring". The North Haven "no-anchoring" buoys are deployed at the same time as the visitor moorings and maintained by MCZ staff.

Monitoring site maintenance work was carried out with the use of the underwater battery-powered drill (Figure 5.6).

Figure 5.6 Underwater battery-powered drill used for survey site marking (photo: Ross Bullimore)



## **6. Management**

### **6.1 Wardening and Patrol**

Skomer MCZ staff carried out boat patrols on 18 Sundays and bank holiday weekend days between the end of May and September 2022. Three days were lost due to bad weather and three days lost to allow the team to complete scallop survey and shore survey work. Observations of visiting recreational and commercial users were also made during routine monitoring surveys throughout the season.

The patrols are not just for us to keep an eye on visitors, but also serve a valuable purpose in providing a point of contact for visiting vessels to obtain information about the MCZ, and a way for MCZ staff to promulgate the byelaws and codes of conduct to visiting recreational users. We are fortunate that the majority of recreational users and sightseeing commercial users are coming to the site to enjoy its wildlife and therefore well disposed towards the aims of the MCZ. However, our visible presence helps deter those whose activities may be illegal (under fishery or conservation byelaws) or at least contrary to the voluntary codes of conduct. See Section 8 for all data relating to visitors and use of the MCZ.

In the interest of efficiency, mapping of fishing effort (see Section 7.1), sampling for water quality and plankton monitoring (see Sections 9.2.4 and 9.1.7) are carried out during weekend patrols.

### **6.2 Information**

In addition to the information available for Skomer MCZ via NRW's website, paper copies of the zone map and the safety information are also made available to visitors out on the water. We are still using a stock of waterproof zone map leaflets printed in 1996 as they have proved to be almost indestructible and many regular visitors still have them aboard their boats years after being given them. The MCZ booklet and seal watching guide are dispensed via the MCZ exhibition room (see section 10.1).

### **6.3 Management Issues**

#### **6.3.1 Dredging/beam trawling**

No illegal dredging or beam trawling was recorded or reported to MCZ staff in 2022.

#### **6.3.2 Potting**

Commercial fishing vessels operating in the MCZ are listed in Section 7.1 and fishing effort records are presented in Figures 7.1 and 7.2.

#### **6.3.3 Tangle and gill netting**

No tangle or gill netting was observed in 2022.

#### **6.3.4 Collection of shellfish by divers**

No collection of shellfish by divers was observed in 2022.

### 6.3.5 Collection of curios

No collection of curios was observed in 2022.

### 6.3.6 Collection of specimens for education and research

NRW Skomer MCZ Permits were issued to Bernard Picton for the collection of nudibranch specimens and to Francis Bunker for seaweed collection, both for the purpose of research.

A Welsh Government Marine and Fisheries Division Dispensation was provided for the Skomer MCZ scallop survey 2022.

### 6.3.7 Disturbance or entanglement of seals

Seal disturbance was recorded by Skomer Island staff. On May 8th cruise ship RIBs went too close to seals hauled out on the Garland Stone, they were radioed and asked to move away. Two canoeists were seen climbing out on to the Garland Stone causing the seals to enter the water, and a further two canoeists went too close to seals also at the Garland Stone.

During the seal pupping survey, the Skomer seal worker maintained a log of all possible seal disturbance, this is shown in table 6.1. No major disturbances were observed.

Table 6.1. Seal disturbance (records by Skomer Island staff) on Skomer Island in 2022.

Level of disturbance: 1 = little disturbance (lifting of heads); 2 = Seals enter water in response to perceived threat; 3 = major disturbance involving abandonment of pup or similar

Date	Time	Location	Type	Severity	Comment
16/08/22	12:00	South Haven	yacht	2	went with dinghy close to where newly born pup was calling, cow went into water
16/08/22	13:18	South Haven	yacht	1	anchor noise made cow look up
24/08/22	13:00	North Haven	RIB	2	dropping off/collecting divers close to Rye rocks, seals entering the water
28/08/22	13:00	North Haven	motorboat	1	seals on Rye rocks lift heads due to boat loud speaker system
12/09/22	14:20	North Haven	fishing boat	2	went past Rye rocks, seals entering water
18/09/22	17:30	Matthew's wick	dinghy	2	went into Amy's reach and Matthew's wick, seals entering water
20/10/22	08:58	North Haven	helicopter	1-2	flew 4 times past North Haven between 8:58 and 10:13h, some seals rushing towards water but not entering

Monofilament line and netting were the most visible pollutants affecting seals in 2022. Forty one individual seals on Skomer (2 males, 34 females and 5 immatures) were photographed with obvious signs of being entangled in nets at some time in their lives, most commonly a deep scar around their necks, often with netting still embedded. This is similar to 2021 when 40 individual seals were recorded with netting.

Seal watching leaflets which include information on how to safely observe with minimal disturbance were dispensed in the visitor exhibition room and by National Trust car park attendants. National Trust seal signs were also used to inform visitors on how to minimise disturbance.

Figure 6.1 National Trust seal sign located at Martins Haven.



### 6.3.8 Disturbance to cliff-nesting birds

In 2022 there were no observations of bird disturbance by MCZ staff and two incidents by Skomer Island staff who reported: a yacht tender in North Haven causing birds to flush off ledges and in August a small boat angling in the Wick under the Kittiwakes.

### 6.3.9 Spear-fishing

No spear-fishing was recorded in 2022.

### 6.3.10 Angling

See Section 7.2 for records of visiting anglers.

Although numbers of anglers recorded in Skomer MCZ was at an all-time low, especially shore anglers, sea bed angling litter still presents a problem where angling gear gets snagged on the seabed.

Neptune's Army of Rubbish Collectors (NARC) have continued to clear seabed litter, including lost angling tackle, from the MCZ. They have also provided information advising



anglers how best to avoid snagging and losing tackle in the Martins Haven area, both on-line and in the form of paper leaflets. Leaflet dispensers are positioned next to the two 'angling bins' positioned at the entrance to the Deer Park and besides the coast path at Martins Haven beach. The bins are occasionally used by anglers to dispose of waste gear and emptied annually by MCZ staff.

Figure 6.2 Angle bins located at Martins Haven



### 6.3.11 Mooring and anchoring

All vessels appear to be complying well with the no-anchoring code of conduct and there have been no reports of vessels anchoring other than in the permitted areas of North and South Haven.

The visitor moorings in North Haven continue to be popular with all visiting vessels.

### 6.3.12 General boating

Most incidents of speeding are covered in Sections 6.3.7 and 6.3.8 above.

### 6.3.13 Wrecks

The Lucy wreck was buoyed through most of the 2022 season but the buoy went missing in September, this will be replaced in 2023.

On the 7<sup>th</sup> December 2022 the fishing boat *Frelsi* collided with Thorn Rock on the south side of Skomer at 01:41 hours, it then drifted west before landing on the Mewstone. The boats tracker is shown in Figure 6.3. The boat was holed but managed to stay afloat overnight (see Figure 6.4), when the owners towed it back to Milford Haven.

Bait was stored on the boat and therefore there was a risk of rats going ashore, as a result bio-security monitoring by Skomer staff was immediately set up and continued for the

following 5 days. There was no evidence of rat activity found but biosecurity monitoring will continue in 2023.

Figure 6.3 Fishing boat *Frelsi* tracker, 7<sup>th</sup> December 2022.



Figure 6.4 Fishing boat *Frelsi* on the Mewstone.



### 6.3.14 Oil pollution

No oil pollution was recorded at Skomer MCZ during the 2022/23 season.

### 6.3.15 Litter

Litter has been picked up from Martins Haven beach and at sea throughout 2022.

In August we joined Skomer Island Wardens and volunteers for a day of cleaning South Haven beach. A huge effort was required to remove the last remains of the shipping container that landed here back in December 2019. Large quantities of aluminium casing and polystyrene and foam insulation were removed alongside huge bundles of fishing ropes, netting and buoys. The islands inflatable was used to shuttle the debris out to Skalmey so that it could be transported and unloaded at Martins Haven (Figure 6.6). A second day was then spent clearing the Wick. This is a narrow inlet where flotsam and jetsam tend to accumulate and wash up onto the beach.

The joint team effort helps to ensure potentially harmful litter is kept away from the nesting seabirds and breeding seals.

Where possible the rubbish was sorted for re-use and recycling as shown in Table 6.2.

Intact buoys are kept for reuse in research projects. Damaged buoys, crates and rope bundles were taken to the Sea Trust's Recycle Môr project which aims to reduce marine plastic pollution by providing free end-of-life disposal for plastic fishing gear across Pembrokeshire.

Figure 6.6 Transporting and unloading at Martins Haven

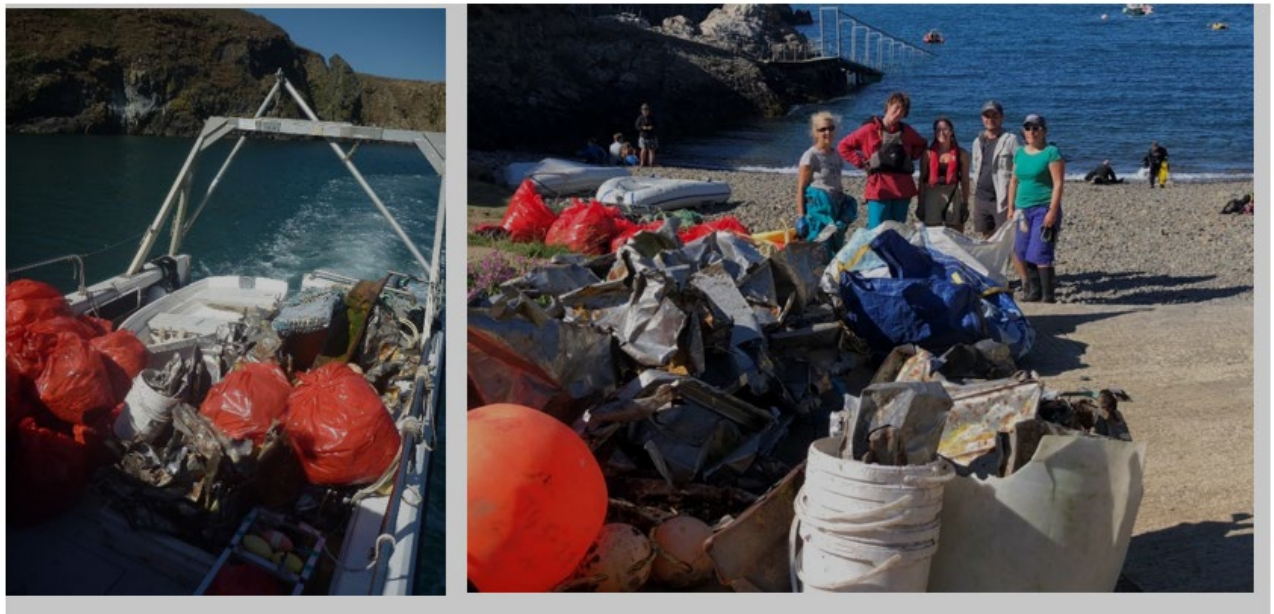


Table 6.2 Beach waste destination

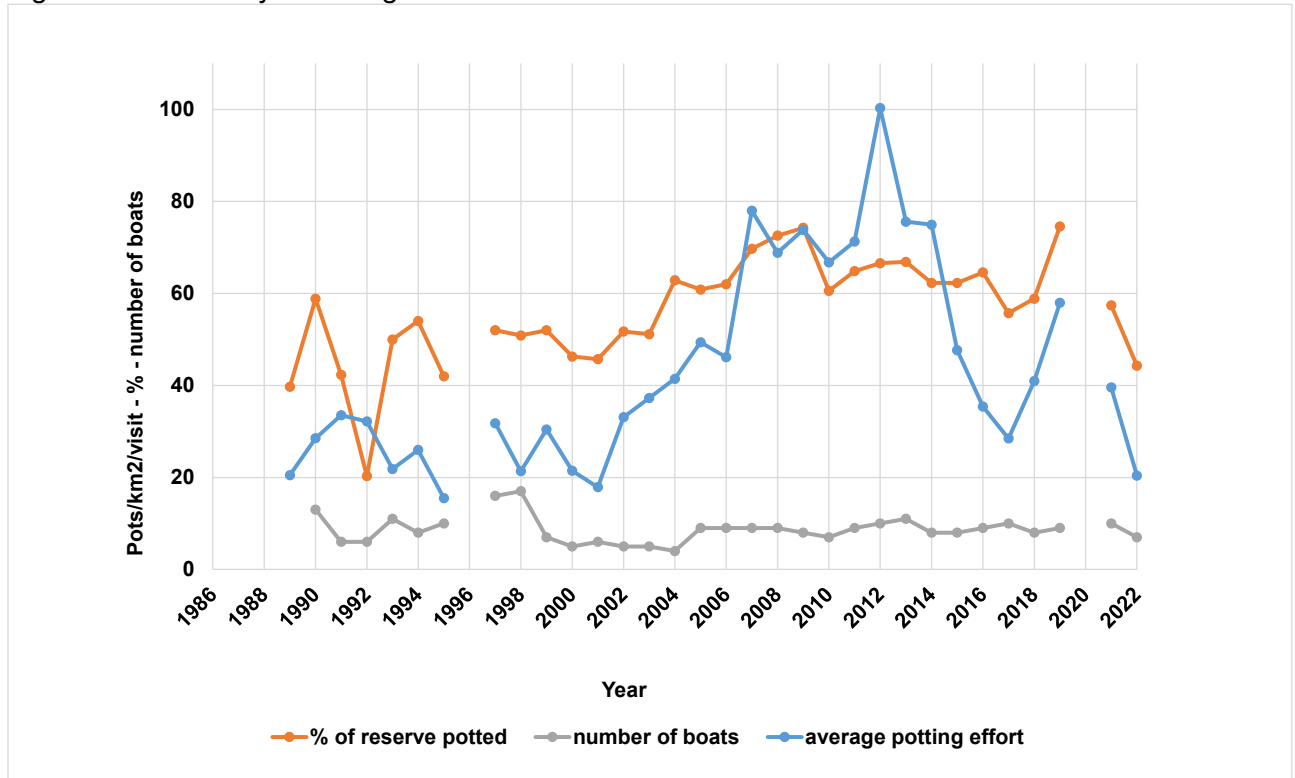
<b>Beach Waste Collected</b>	<b>Destination</b>
Over 20 intact buoys	Kept for re-use, Skomer MCZ research projects
2 x Lobster pots	Donated as garden decoration to local resident
Numerous damaged buoys	Delivered to the Sea Trust's Recycle Môr recycling scheme: <a href="#">Recycle Môr – Sea Trust</a>
3 x Plastic fishing crates	Delivered to the Sea Trust's Recycle Môr recycling scheme: <a href="#">Recycle Môr – Sea Trust</a>
3 x 1m <sup>3</sup> bags of rope and line	Delivered to the Sea Trust's Recycle Môr recycling scheme: <a href="#">Recycle Môr – Sea Trust</a>
Over 20 bags of insulating foam, small pieces	Landfill
Sheet metal from the container	Recycled
10 bags of plastic bottles and hard plastic	Recycled

## 7. Visitors and Use of the MCZ

### 7.1 Commercial use

Fishing vessels recorded (or whose gear was recorded) operating within Skomer MCZ during 2022/23 included *Stephanie R* (M150), *Marie Louise* (M36), *Thomas Crean* (M380) and *Martha Rose* (M75)

Figure 7.1 Summary of fishing effort within Skomer MCZ 1989 to 2022



The number of commercial fishing vessels operating within Skomer MCZ has remained steady over the past 15 years. However, fishing effort has varied substantially. Effort reached a peak in 2012 and then declined until 2017. After 2017 there was a rapid increase up to 2019. No surveys were conducted in 2020. Both fishing effort and the proportion of the reserve that is fished have decreased in 2021 and 2022 (Figure 7.1).

The distribution of fishing effort is shown in figure 7.2 and the potting intensity at the main Skomer MCZ survey areas from 1989 to 2021 is shown in figure 7.3.

The highest density of fishing taking place along the north-east coast of Skomer and around the Bull Hole area on the west coast, these areas cover a high proportion of the sea fan *Eunicella verrucosa* and ross coral *Pentapora foliacea* monitoring sites. Thorn Rock on the south side of the neck is also the main sponge monitoring site. Another fishing hotspot is along the north Marloes peninsula, the location of two *Pentapora* sites. The North Marloes peninsula area has had a very high intensity of fishing in previous years. In 2022 there was a notable drop in fishing effort in this area and a decrease in the number of vessels placing pots in the area.

Figure 7.2 Pot fishing intensity within Skomer MCZ 2022

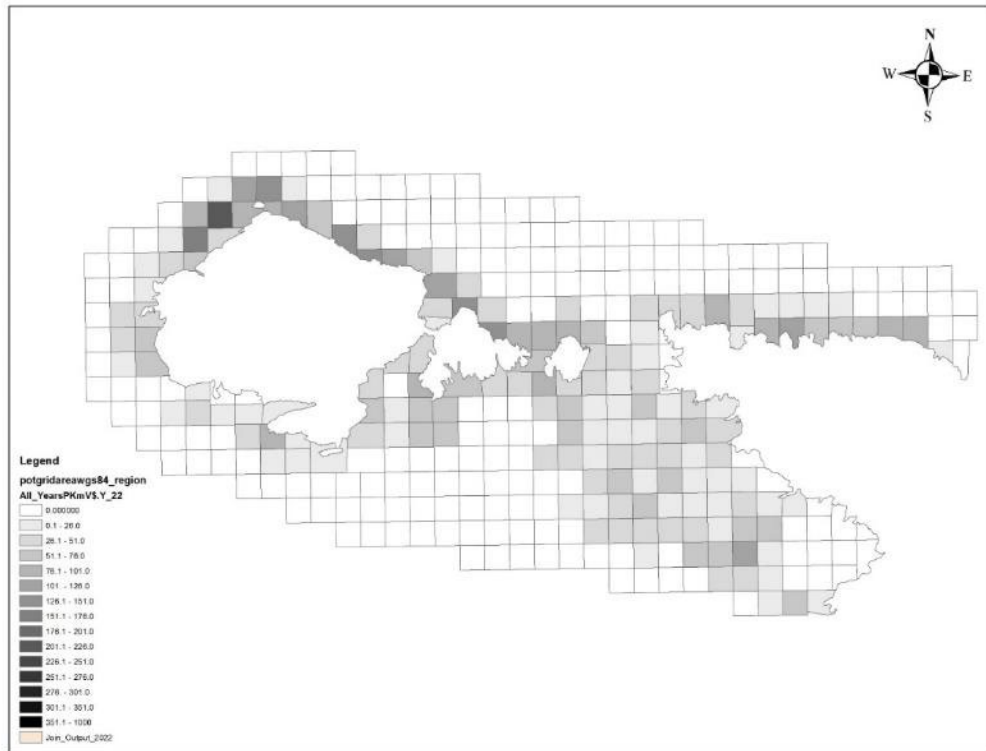
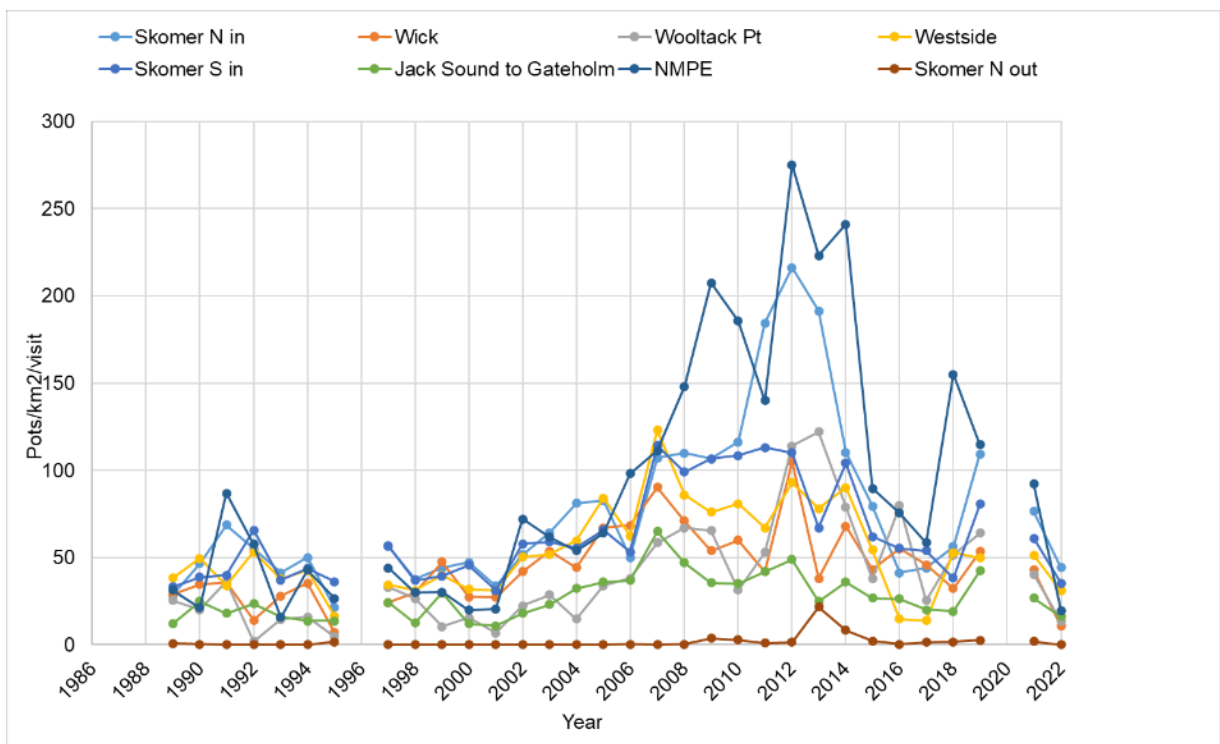


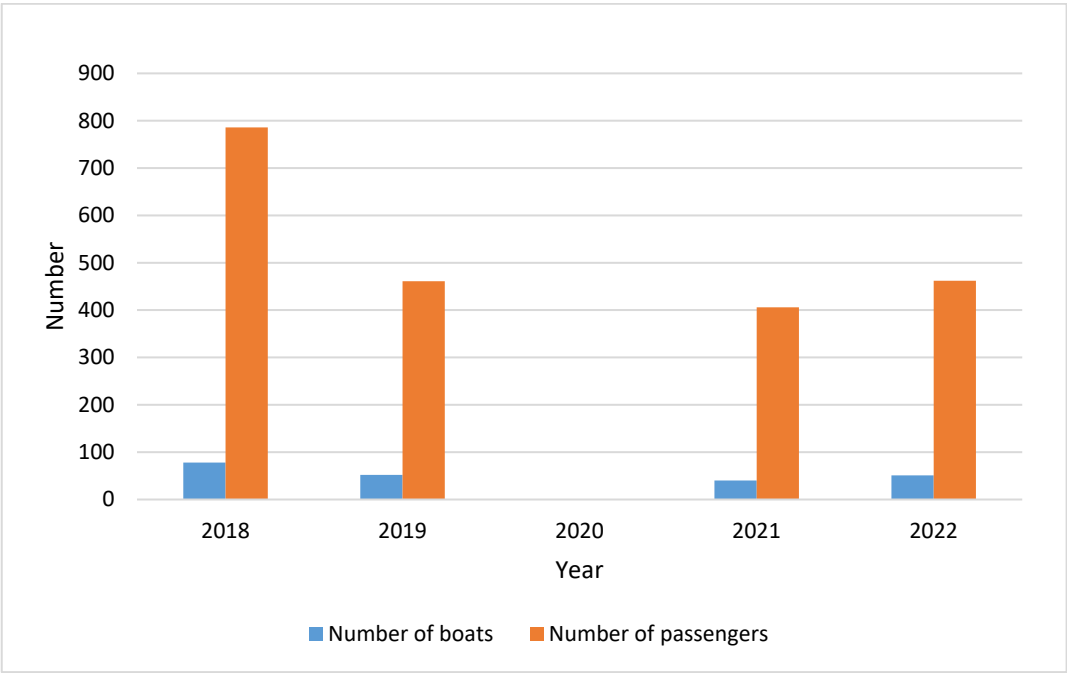
Figure 7.3 Potting intensity around Skomer MCZ split into the main monitoring areas 1989 to 2022



Another major commercial presence at Skomer MCZ is sightseeing vessels, these include operators from Martins Haven, Milford Haven and North Pembrokeshire (Ramsey) in addition to occasional cruise ship visitors. Pre-2018 the numbers of sightseeing operated boats fluctuated year to year but was generally less than 15 boats per season. In 2018 a large increase in the number of boats (78 boats) was observed so a decision was made to put more effort into recording these vessels due to their economic importance, see Figure 7.4. In 2022 51 boats with 462 passengers were recorded.

These figures do not include the Dale Sailing operated ferry between Martins Haven and Skomer or their sightseeing 'round island' trips. It should be noted that in 2022 the *Dale Princess* (max 50 passengers) was replaced by the *Dale Queen*, a much bigger boat that can carry 95 passengers, although the numbers landed onto Skomer has not changed (maximum 200 people per day). However, the numbers of sightseeing passengers on the 'round island' trips has significantly increased.

Figure 7.4 Sightseeing vessels (excluding Dale Princess/Dale Queen) and total people on board 2018 to 2022



Commercial dive, snorkelling and angling charter boats also operate in the Skomer MCZ and these records along with the sightseeing boats are included in the recreational boat use data, see Figures 7.5 to 7.8.

Tanker movements within St Brides Bay have been logged for many years by Skomer MCZ staff and now automated methods are used to record use of this anchorage that lies within Pembrokeshire Marine Special Area of Conservation.

## 7.2 Recreational use

Recreational use of Skomer MCZ is presented in figures 7.5 to 7.8, records are from April 2022 to March 2023. Recreational craft are recorded by both MCZ staff whilst out on the water and by Skomer island staff observations, from April to the end of October. Recreational use figures are lower for all activities in 2022/23 than in previous years: peak time for all activities is between May and August.

The numbers of recreational craft (combined dive, angling, yacht and motor boats and canoes) have fluctuated over the years ranging between 928 (2018) to 406 (2007) with 553 recorded in 2022, see Figure 7.6. The greatest change has been seen in the number of canoes. From 1982 to 2003 less than 100 were recorded each year, this has gradually increased to a highest record of 308 in 2018 with 207 recorded in 2022.

Diver numbers from 1987 to 2005 ranged between 2000 to 3500 divers per year, but since 2006 the numbers have decreased, ranging between 500 to 1600 divers per year. Only 500 divers (including snorkel/free divers) were recorded in 2022 of which 160 were Martins Haven shore divers, see Figure 7.7. It should be noted that diving activities throughout the UK have seen significant reductions, there are fewer dive clubs and boats along with the infrastructure of dive shops and dive charter boats.

The numbers of anglers have fluctuated over the years, but the last 10 years have seen reductions. From 1987 to 2011 shore anglers ranged between 766 (1993) and 313 (2010), In 2012 202 were recorded and this has dropped to just 95 shore anglers in 2022, see Figure 7.8. Angling boats have been more consistent over the years with 60 angling boats recorded in 2022. The highest numbers of boat anglers were recorded between May to July, whereas shore angler numbers were low but consistent through the season. It is expected that the number of shore anglers is higher as many come in the evenings and these are not recorded



Figure 7.5 Recorded Recreational Use Skomer MCZ

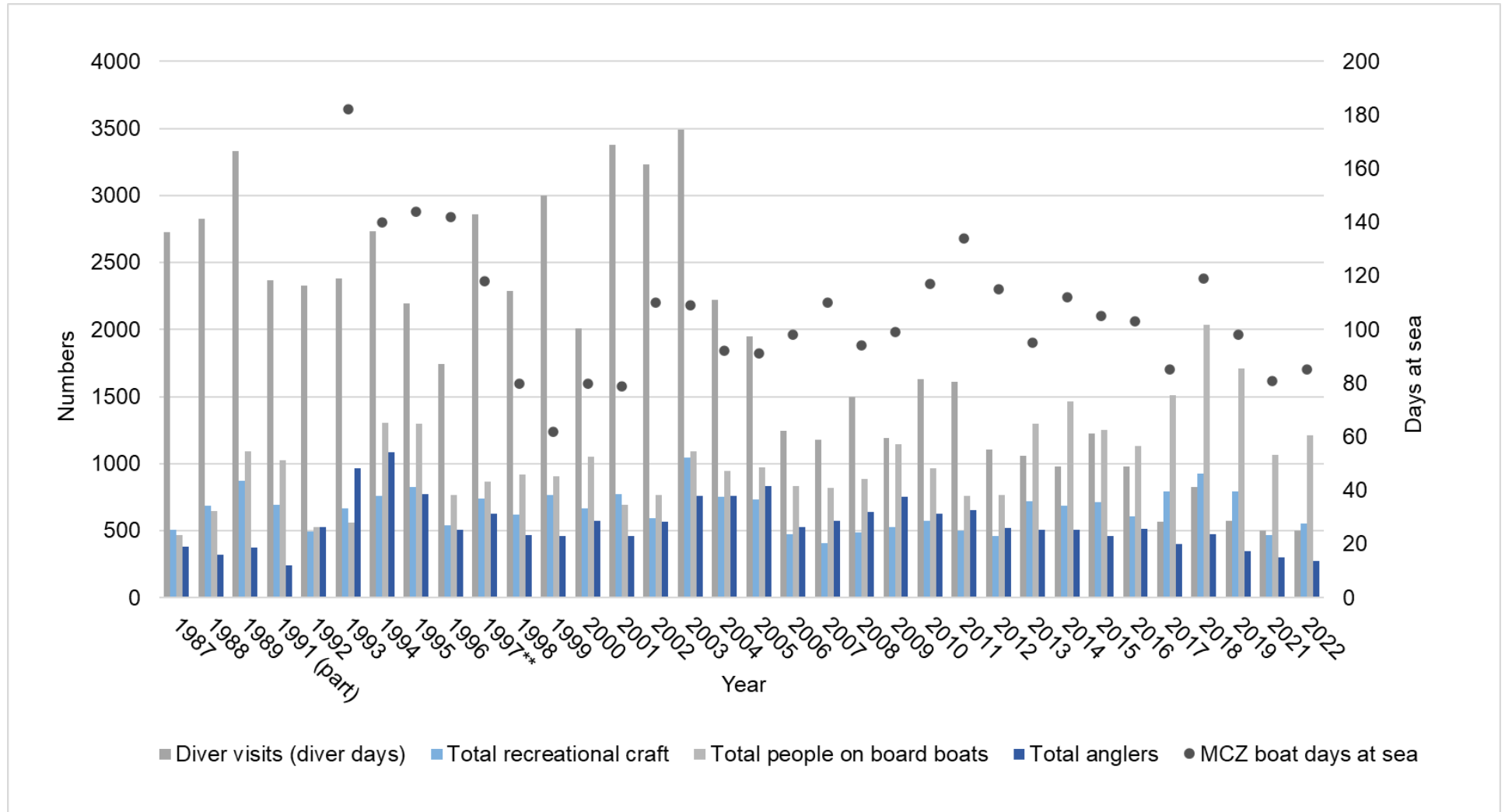


Figure 7.6 Skomer MCZ 2022/23 Recreational Craft

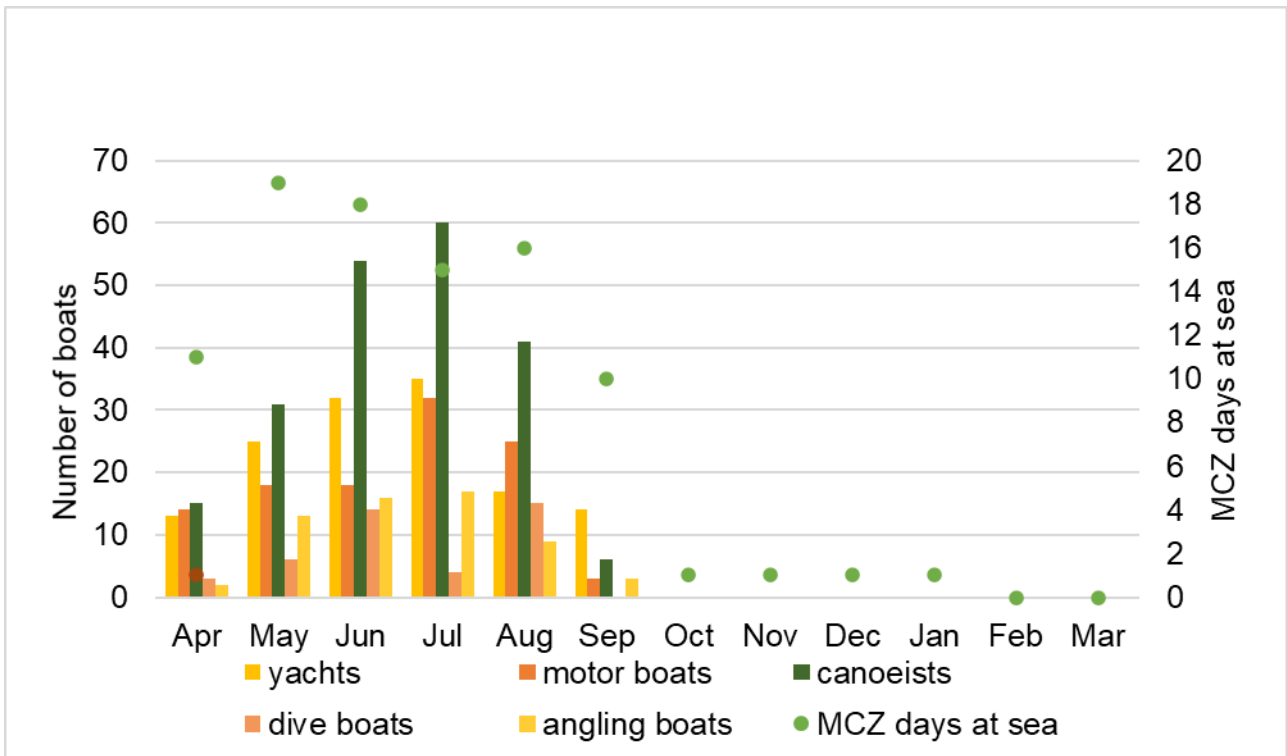


Figure 7.7 Skomer MCZ 2022/23 Divers

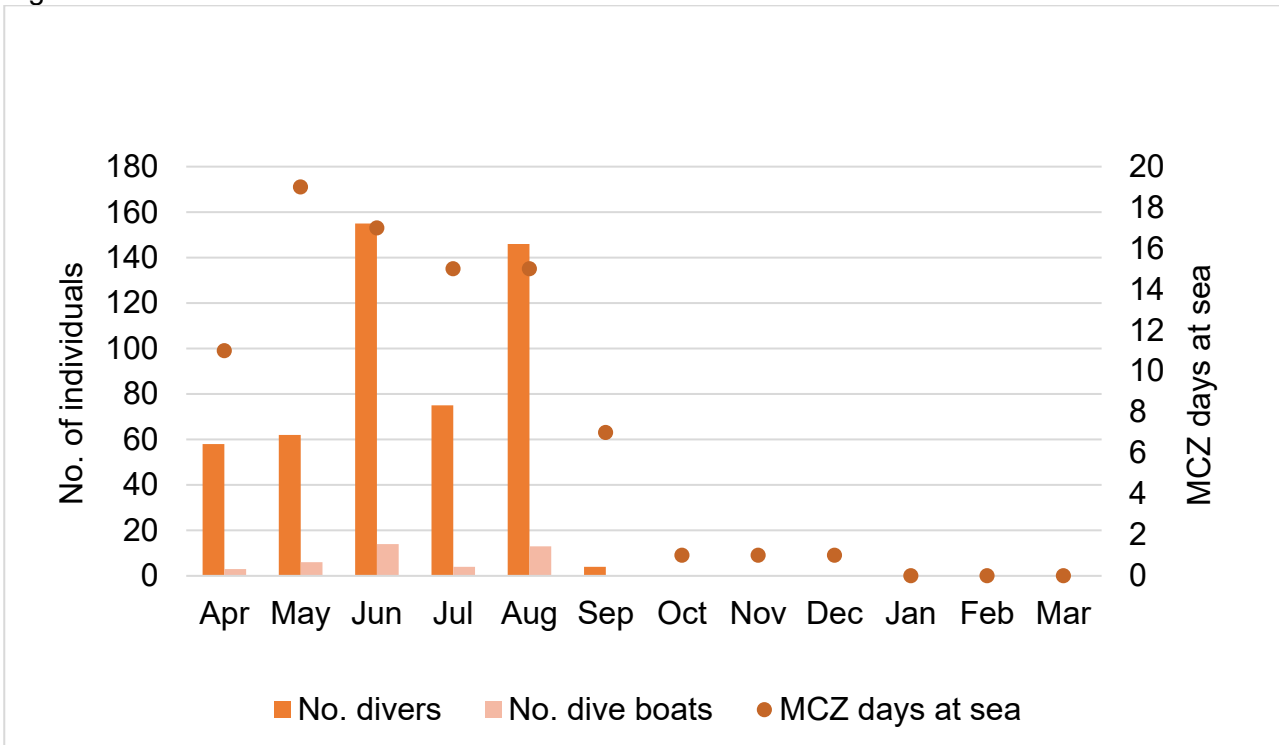
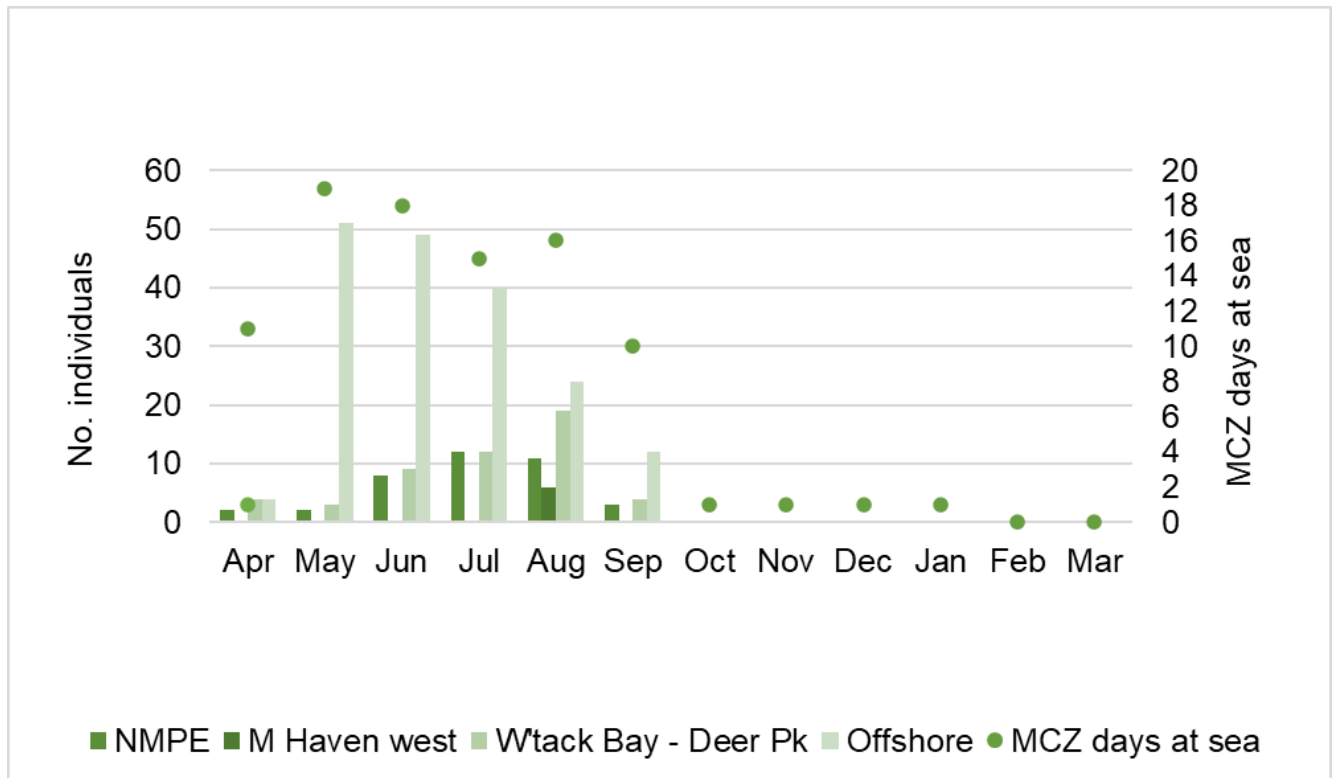


Figure 7.8 Skomer MCZ 2022/23 Anglers



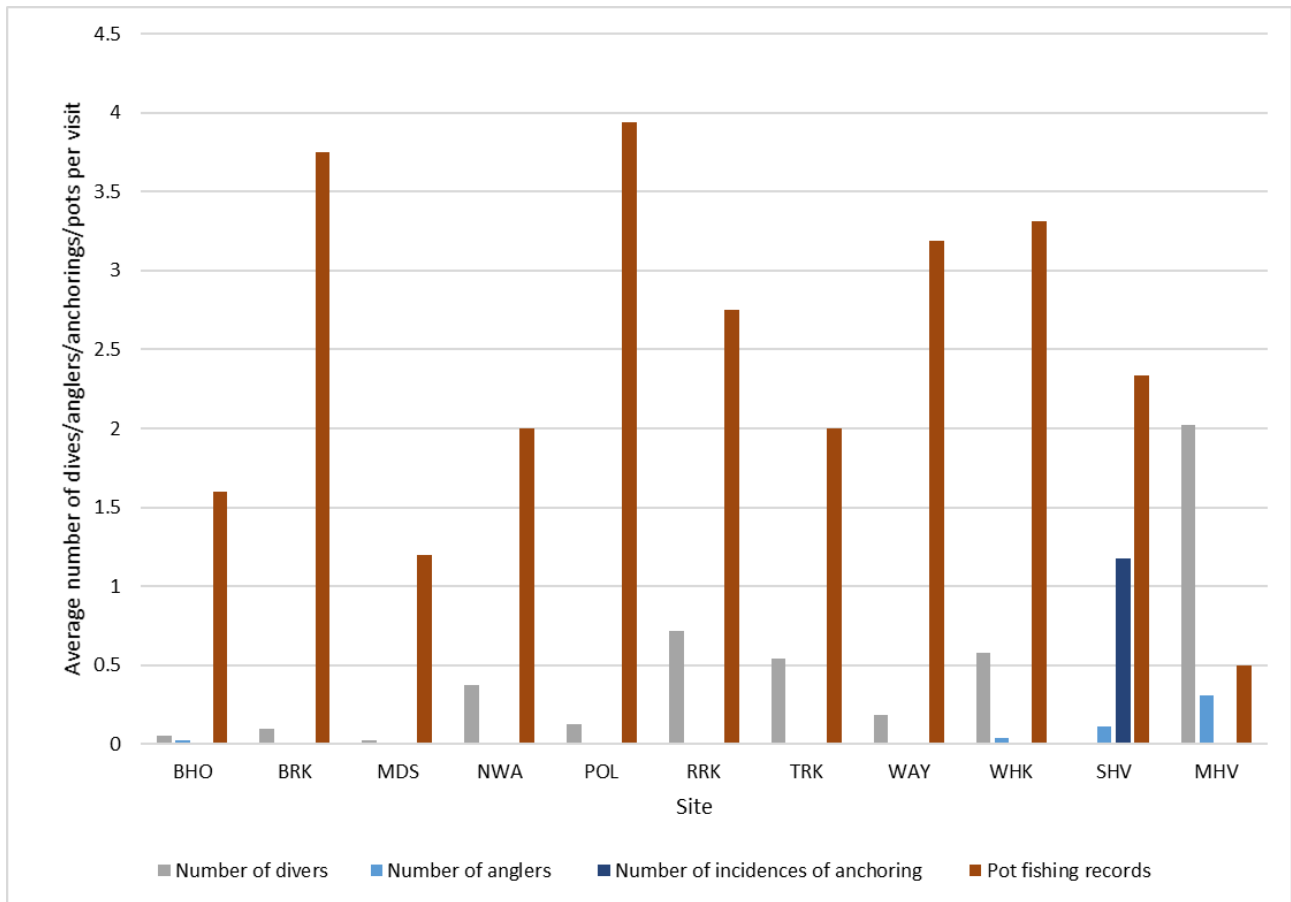
### 7.3 Seabed contact activities

All activities in the MCZ during 2022 with the potential to make contact with the seabed that have been recorded at monitoring sites for fragile species (sea fan *Eunicella verrucosa*, ross coral *Pentapora foliacea* and erect sponge species) are shown in Figure 7.9. Recorded activities include numbers of divers, anglers, incidences of anchoring and pot fishing.

The data presented is effort corrected for differences in the numbers of days on which data were collected for different activities and at different sites to allow comparisons to be made. Data for South Haven (SHV) and Martins Haven have been included for context as South Haven is a highly popular (and permitted) anchorage and Martins Haven a popular shore diving site.

Diving numbers include both recorded recreational dives and Skomer MCZ monitoring dives. The activity most often recorded at all monitoring sites is lobster potting. It should be noted that all data are likely to be an underestimate of actual activity, but more so for commercial fishing effort, which is only usually recorded once per week between May and September.

Figure 7.9 Seabed activity recorded at Skomer MCZ monitoring sites for fragile species corrected for recording effort 2022.



## **8. Liaison and Advisory Committees**

### **8.1 Advisory Committee**

The Skomer MCZ Advisory Committee meeting was held on 5<sup>th</sup> April 2022 in Marloes village hall, chaired by Dr Madeleine Havard. Twenty three members attended together with 4 Skomer MCZ staff. Members discussed a range of issues from presentations made by MCZ staff to updating committee members on MCZ management and monitoring work.

Chris Jenkins (Welsh Government) provided an update on the MPA network completion programme in Wales and the current status of the Skomer MCZ transition. The MPA network programme is following a phased approach and is still at the early stages of Step 2 'Areas of search' which will involve broad consultations with a wide stakeholder engagement. Skomer MCZ transition will be part of the later steps and it is planned that there will be a bespoke approach taken for developing a feature list for the Skomer MCZ, which will differ from the ongoing MCZ designation programme, and which will result in a larger feature list. Conservation objectives for the site can then be set, this is likely to happen after the wider MCZ designation consultation. As previously noted, a statement was made by Welsh Government in 2014 that there would be no reduction in protection during the transition. Chris Jenkins confirmed that this will remain the case following final designation.

Guest speakers were welcomed. Dr James Bull (Swansea University) gave a presentation on the research currently being carried out on grey seal population and pupping trends, using the 30 years of data collected from Skomer MCZ. Sue Burton (Pembrokeshire Marine SAC) gave a brief introduction to Natur am Byth, its marine projects include: water quality, native oysters, eelgrass, crawfish and pink sea fan. An update of Project Seagrass (Dale eelgrass restoration project) was also provided by Sue Burton on behalf of Dr Richard Unsworth (Swansea University).

Members agreed that the research talks were a welcome addition to the meeting and proposed a longer meeting to be held in 2023, encompassing both a summary of the MCZ activities and talks by invited speakers. This will bring management and science together along with more opportunity for stakeholder feedback.

### **8.2 Wildlife Trust South and West Wales**

In 2022 Leighton Newman returned for his second year as Skomer warden with Ceri Aston again employed as assistant warden. Island staff and volunteers assisted with collecting data of both recreational boat activities, disturbances and cetacean sightings. This data is valuable and significantly boosts our records.

The NRW Skomer seal survey contract was completed by the Wildlife Trust with Bee Buche again returning to the island in August to complete the survey. Bee's experience is welcome as she completed the survey in 2021 and during the years that she previously worked as the island warden.

In August we teamed up with the Island staff to clear beach rubbish at South Haven and the Wick (see Section 6.3.15).

The assistance of the staff at the Wildlife Trust shop at Lockley Lodge with opening up the MCZ exhibition was very much appreciated again in 2022. This enabled us to maximise the number of days the exhibition was open even when MCZ staff were off-site. Mark provided boat support for a Wildlife Trust fundraising event involving David Astins and Amanda Love swimming around Skomer Island in August.

MCZ staff also liaised with the wardening staff on Skokholm during MarClim intertidal surveys (see Section 10.4) and with the Pembrokeshire Islands Manager Lisa Morgan, both locally and via the Advisory Committee.

### **8.3 Welsh Government Marine Enforcement**

Skomer MCZ staff did not make contact with Marine Enforcement staff in 2022, which could be taken as a positive in that there were no observations of fishery byelaw infractions for us to report.

### **8.4 Pembrokeshire Coast National Park**

Skomer MCZ staff continue to liaise with Pembrokeshire Coast National Park (PCNPA) staff locally and via the Advisory Committee.

### **8.5 National Trust**

Liaison with National Trust staff continues through the Advisory Committee and also directly with Matt Thompson, local Ranger, and James Roden, lead ranger in North Pembrokeshire. National Trust seal signs were put up at Martins Haven to inform visitors on how to minimise disturbance to seals (see Section 6.3.7)

### **8.6 Academia**

A number of academic institutions and students have worked with MCZ staff during 2022.

Dina-Leigh Simons from Sheffield University accompanied Dr Nova Mieszkowka to complete the intertidal MarClim surveys in August, Figure 8.1. Dina took water samples for environmental-DNA (eDNA) analysis for her PhD titled 'Assessing rocky intertidal biodiversity in light of climate change using eDNA metabarcoding'.

In September 2022 Kaila Wheatley began a PhD titled "Factors limiting marine connectivity at a species range edge – the case of the pink sea fan, *Eunicella verrucosa*" supervised by Dr Jamie Stevens, Exeter University. Over the next two years we will be working closely with Kaila.

Figure 8.1 Dina, Mark and Nova processing samples at the outdoor lab.



Dr Joseph Ironside and Masters student Katarzyna from Aberystwyth University joined the team during the scallop survey, Figure 8.2, to take water samples for eDNA analysis in order to identify the presence of the non-native American slipper limpet *Crepidula fornicata*.

Figure 8.2 Ali and Joe Ironside collecting water samples



## 8.7 Other organisations and individuals

Visitors to the Skomer MCZ in 2022 included Chris Collins, NRW Head of Evidence accompanied by Mike Camplin.

NRW colleagues formerly known as the Fishery Assessment Team have continued to provide valuable support for our work in monitoring the eelgrass bed in North Haven by providing an annual estimate of the extent of the bed using their acoustic imaging systems as shown in Figure 8.3 and 8.4. This supplements the 4-yearly volunteer diver surveys (last carried out in 2018).

Figure 8.3 Mapping the eelgrass bed in North Haven using acoustic imaging 2022

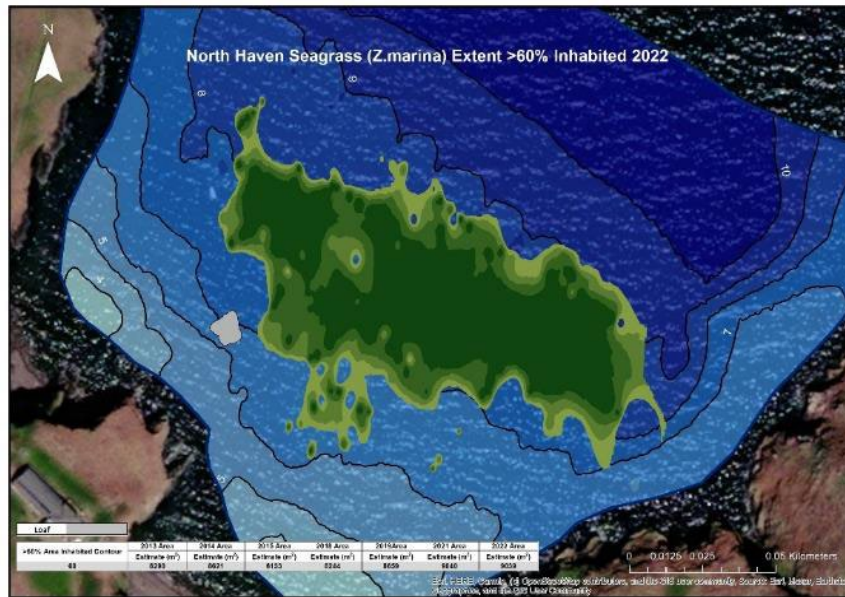
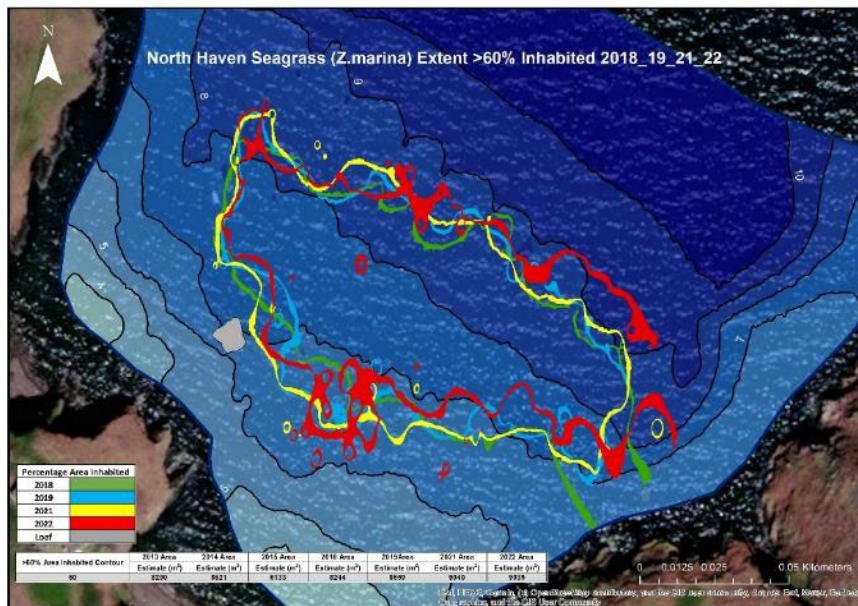


Figure 8.4 Mapping the eelgrass bed in North Haven using acoustic imaging systems 2018, 2019, 2021 and 2022.



The second generation “Sea-Hives” continue to be deployed at OMS and having survived the winter appear to still be colonised successfully by a variety of marine organisms. These modular glass structures are intended to provide shelter to marine organisms and provide a foothold for natural habitats to re-establish in damaged seabed areas (Figure 8.5). This project is one of a number we have carried out over the years where there is no impact on the MCZ and where a minimal amount of effort is required on our behalf to collaborate in innovative work.



Figure 8.5 Sea-Hives at OMS site (photo Blaise Bullimore)



Skomer MCZ have loaned Pembrokeshire based eco-tourism company Celtic Deep equipment to mount video cameras onto, to enable them do some drop down video work. The Celtic Deep team are particularly interested in gathering elasmobranch records in Pembrokeshire waters, to do this they are free diving at different locations and using drop down video. Some sites will be targeted within the Skomer MCZ and in February 2023 they headed out to survey around Martins Haven (Figure 8.6).

Figure 8.6 Celtic Deep free diving team and drop down video equipment at Martins Haven.



The local community has continued to be very supportive of the Skomer MCZ team, helping to protect the MCZ by reporting potential incidents and by their active participation in the Advisory Committee.

Skomer MCZ continues to work with Pembrokeshire Coastal Forum, and in 2022 Kate contributed to a one day workshop on grey seals for Pembrokeshire activity providers (see Section 10.2).

Other organisations and individuals that Skomer MCZ staff have worked alongside include the National Coastwatch Institution, who maintain watches at the former Coastguard lookout on the Deer Park.

## **8.8 Wider marine environmental initiatives**

In 2022 Kate was the local coordinator for the Marine Conservation Society Seasearch volunteer diving surveys that continue to make valuable contributions to the knowledge of our marine habitats in Wales (and the UK).

Skomer MCZ contributed to Wales' flagship Green Recovery project: Natur am Byth partnership. The project unites nine environmental charities with NRW to deliver the country's largest natural heritage and outreach programme to save species from extinction and reconnect people to nature. The marine programme which includes the pink sea fan is being led by the Marine Conservation Society. In 2022 a desktop study to review pink sea fans in Wales was completed by contractors. The study's aim was to collate current information on techniques suitable for sea fan's restoration in Wales, including possible management options for natural recovery as well as more active restoration techniques. The study used Skomer MCZ sea fan data to look at growth, spawning, sex ratios and genetic connectivity. Consideration was also given to known information regarding factors that could impact sea fan restoration including disease and impacts (e.g. shark egg entanglement and anthropogenic seabed activities). In May 2022 a virtual workshop with stakeholders was held to highlight outputs of the review and determine how best to proceed with recovery options developed. One output recommended further research into factors limiting connectivity of sea fans, and as a result new research at Exeter University has commenced and Skomer MCZ team will be working closely with the researchers (See Section 8.6).

Mark represents NRW and the Skomer MCZ for the 'Big Picture' a JNCC led project involving multiple government, non-government and academic organisations. The purpose of the Big Picture is to collaborate and develop the use of imagery and annotation techniques for marine images and video. In 2022 Mark attended and contributed to online workshops and in January 2023 attended a face-to-face conference in Birmingham.

# 9. Science

All science monitoring and recording projects completed in the 2022 season are reported in detail in the **Skomer MCZ Project Status Report 2022/23 (NRW Evidence Report number 656)**, which is available via the NRW website. Brief summaries of these projects are provided below.

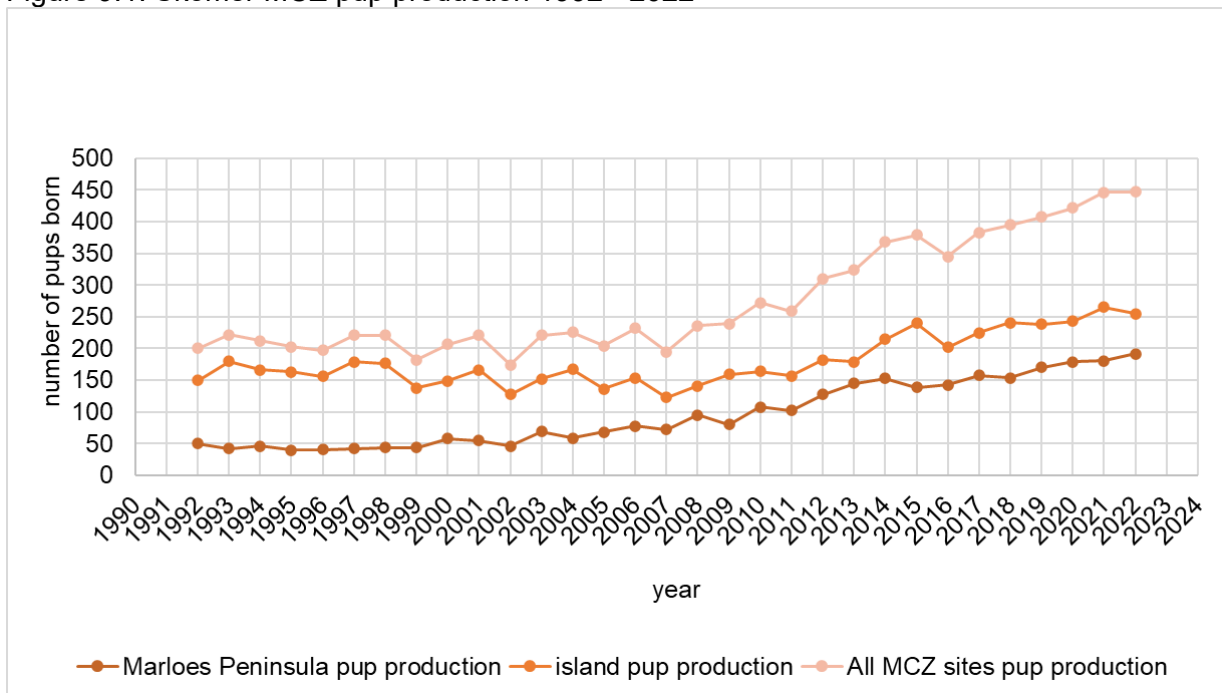
## 9.1 Biology

### 9.1.1 Monitor Seals

Grey seal monitoring was carried out for Skomer Island sites by Wildlife Trust of South and West Wales workers under contract to NRW (see Appendix 1 for the contract report executive summary). Sites on the mainland within the MCZ were monitored by the Skomer MCZ team.

In 2022, 255 pups were born at Skomer Island sites and 192 pups at mainland sites giving a total of 447 pups born in the MCZ (Figure 9.1).

Figure 9.1. Skomer MCZ pup production 1992 - 2022



Pup production in the Skomer MCZ for the past 5 years has shown the highest totals recorded for the area, with production averaged for 2018-22 being 423 pups. The pup production from 1992 to 2008 remained fairly consistent, within expected natural fluctuations, and with an average of 208 pups. Since 2009 there has been a steady increase in pup production at both the island and mainland sites.

In 2022, pup survival through to moult was recorded as 73% for Skomer sites and 88% for Marloes Peninsula sites, with a combined survival for the Skomer MCZ of 79%.

Monofilament line and netting were the most obvious pollutants affecting seals in 2021. 41 individual seals on Skomer were photographed with obvious signs of being entangled in nets at some time in their lives, most commonly a deep scar around their necks, often with netting still embedded.

### 9.1.2 Monitor Cetaceans

MCZ staff collate all sightings of cetaceans collected by Skomer Island staff, MCZ staff and Dale Sailing boat crews. The effort is variable not just between years but also during the season which makes the data difficult to effort correct. Very few records were received from Dale Sailing staff in 2017 or 2018, records were received in 2019 but none for 2020 - 2022. As several cetaceans are frequently seen together during the same sighting, total numbers of cetaceans reported are higher than total sightings reported.

The total numbers of harbour porpoise sightings between 2001 and 2022 is shown in Figure 9.2.

Figure 9.2 Harbour porpoise sightings Skomer MCZ 2001 – 2022



Common dolphin (*Delphinus delphis*) use the area infrequently but they can appear in large numbers. In 2022 sightings were made by Skomer Island staff, 49 sightings totalling 912 individuals were recorded.

In 2022 5 Bottlenose dolphin (*Tursiops truncatus*) and no Risso’s dolphin (*Grampus griseus*) were recorded in the MCZ.

### 9.1.3 General Species recording

There are many species in the Skomer MCZ that do not have a dedicated monitoring project. However, it is important that species lists are maintained, particularly for phyla that are under-recorded or of particular conservation importance. Recording of species of principal importance as defined under Section 7 of the Environment Act (Wales) 2016 and 'Alien' invasive and non-native species (INNS) are just two examples. Records are entered into the JNCC-administered Marine Recorder database for access via the National Biodiversity Network Atlas on-line gateway. General recordings of unusual, rare, scarce or vagrant species are also maintained.

One sunfish *Mola mola* was recorded in July 2022.

Crawfish *Palinurus elephas* is an Environment Act (Wales) 2016, Section 7 species of principal importance. From 2009 to 2022 it was recorded in low numbers in Skomer MCZ by staff and volunteers.

The ocean quahog *Arctica islandica* is an Environment Act (Wales) 2016, Section 7 species of principal importance and on the OSPAR list of threatened and/or declining species. The ocean quahog is a bivalve mollusc that lives buried in sandy seabeds (Figure 9.3). They are very slow growing and extremely long-lived, with individual clams living for hundreds of years. In 2022 it was recorded by Skomer MCZ staff during the scallop *Pecten maximus* survey.

Figure 9.3 Ocean quahog, *Arctica islandica*



### 9.1.4 Monitor Littoral Habitats / Communities

Littoral habitat and community surveys were completed in 2022 using different methods at a range of sites as summarised in table 9.1. Viewpoint photos were also taken to provide long term records of shore condition.

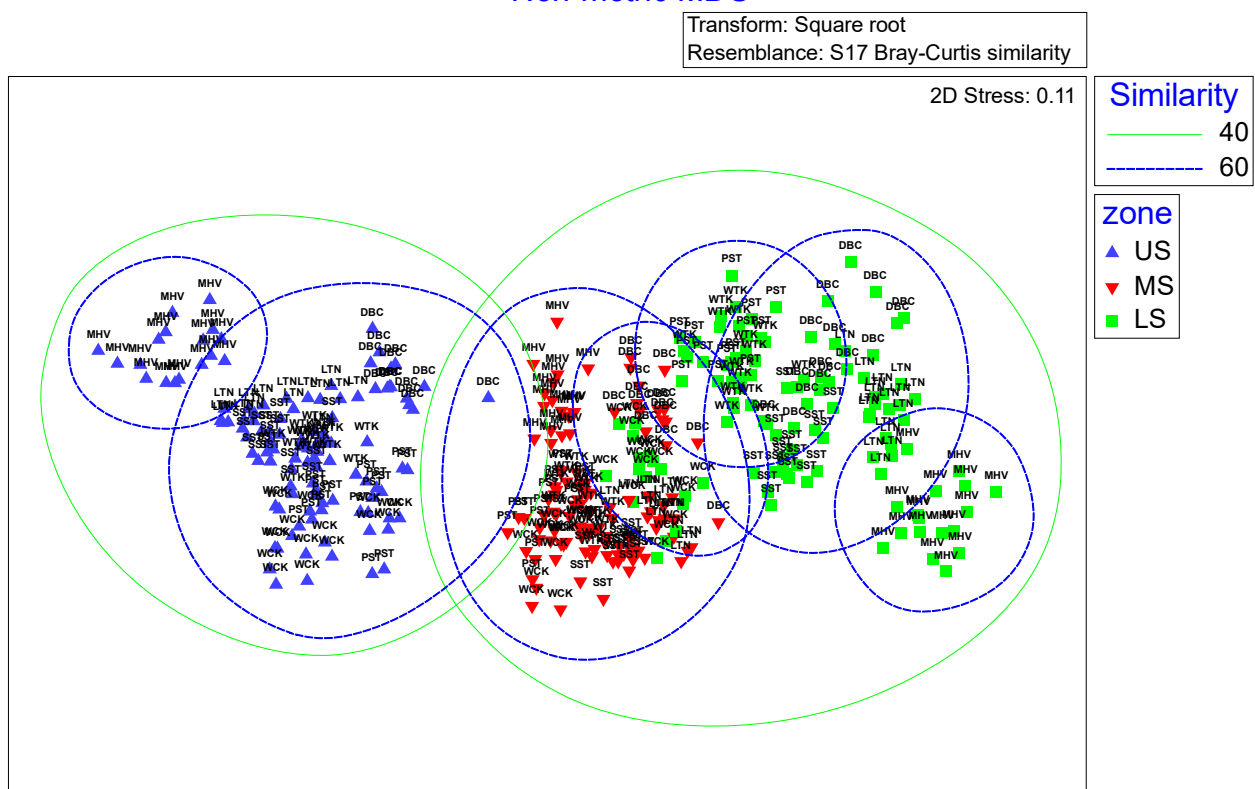
Table 9.1 Summary of methods completed at each littoral site.

Site	Permanent Quadrats	Shore zone quadrats, Limpets, Barnacles	Lichen quadrats	MarClim	Shore clingfish
North Haven	No	No	No	Yes	Yes
South Haven	Yes	No	No	Yes	Yes
South Stream	Yes	Yes	Yes	No	No
The Lantern	Yes	Yes	Yes	No	No
The Wick	Yes	Yes	Yes	No	No
Double Cliff	Yes	Yes	No	No	No
Pig Stone	No	Yes	Yes	No	No
Wooltack	No	Yes	Yes	No	No
Martins Haven	No	Yes	Yes	Yes	Yes
Hopgang	No	No	Yes	No	No

All the shore zone quadrat data are entered into the PRIMER statistics software for community analysis. The results can be visualised as multi-dimensional scaling (MDS) plots, see Figure 9.4.

Figure 9.4 PRIMER Multi-dimensional scaling (MDS) plot of all littoral community data 2004 – 2022 (Upper shore: US, Middle shore: MS, Lower shore: LS)

*Non-metric MDS*



General summary:

- Upper shore sites group neatly on the left.
- Lower shore sites are much more disparate and grouped on the right.
- Middle shore sites sit in between with some overlap (at 60% similarity) with the lower shores.
- Some sites form distinct clusters e.g. MHV Upper, MHV Lower.
- Some sites vary considerably from year to year e.g. PST Lower & WTK Lower.

2022 did not show any major variations from the overall trends seen since 2004. An “ANOSIM” test for differences between years showed no significant difference between any of the years. Sample statistic (R): -0.028. Significance level of sample statistic: 95% The communities on the shores have not shown any major changes during the monitoring period 2003 to 2022. The shores were not surveyed in 2020 or 2021.

The MarClim project offers an opportunity to compare Skomer MCZ shores to the rest of the UK and contribute to the assessment of the effects of climate change on shore communities. Martins Haven, North Haven and South Haven were selected as suitable sites for the project. Community Temperature Index (CTI) is used to look for temperature related changes in communities. The CTI scores derived from MarClim data for the 3 shores surveyed at Skomer show no significant change averaging a CTI of 12°C which would match the ambient sea surface temperatures (from temperature probes at Skomer MCZ) for the same period. This result shows there is no evidence of any shift in the community due to climate change.

### **9.1.5 Plankton Recording**

Zooplankton samples continued to be taken at Skomer MCZ in 2022 using methods recommended following a review by Plymouth Marine Laboratory in 2014. Zooplankton sampling was completed alongside the collection of phytoplankton samples using the Water Framework Directive methodology. This also included the collection of nutrient and chlorophyll samples.

Zooplankton identification was conducted by the Marine Biological Association (MBA) and data entered into the DASSH Pelagic Lifeforms Tool. The annual variation of major zooplankton groups showed that in 2021 general abundances were lower for all groups except decapods. 2022 was also a low abundance year but did show some increases compared to 2021.

Phytoplankton identification is currently being completed by CEFAS. The adoption of the WFD methodologies will allow results to be compared with samples all across the UK.

### **9.1.6 Monitor Sponge Assemblages**

In 2022 quadrats at all sponge monitoring transects were photographed.

Improvement in image quality and resolution has meant that more sponge entities have been recorded from 2009 onwards than in previous years. However, in 2012 and 2014 there was a noticeable drop in the numbers of sponges across all transects. In 2019 all sites decreased in abundance, despite good image quality, this lower number was still present in 2021. In 2022 a new digital camera with increased pixel resolution was used (sensor size: 6720 X 4480 pixels =1.54 increase in resolution compared to old camera), the number of sponges seen increased in 2022 and it was noted that small entities could be confidently identified in the new images. This may account for some of the increases seen in 2022.

Statistical analysis of what types of sponge (based on their morphology) make up the communities at Skomer shows similar results to previous years.

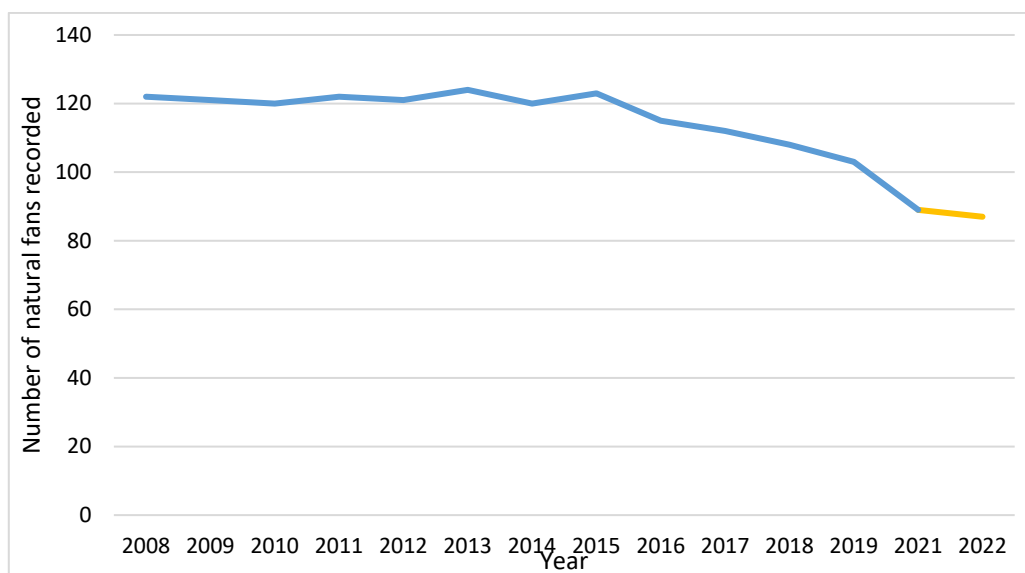
The sponge assemblage at Thorn Rock is a “hot spot” for sponges within the MCZ. The community at Thorn Rock is quite dynamic in terms of total number of sponges visible but the overall community structure appears stable.

### 9.1.7 Monitor Pink Sea Fan Population

All sea fan monitoring sites were visited and individual colonies photographed in 2022. In 2021, 16 natural sea fans and two of the cluster of baby fans at Bull Hole were missing, these were re-checked in 2022, 12 were confirmed as losses and 4 were re-found. In 2022, 3 additional fans were noted missing, these will be checked and their status confirmed in 2023.

A total of 48 losses of natural sea fans and 6 losses of artificially attached fans have been recorded throughout the period of this project (Figure 9.7).

Figure 9.7. Total number of natural sea fans recorded 2005 to 2021 and number of sea fans in 2022 (to be confirmed in 2023). Note: artificially attached sea fans not included in this data.



Sea fan condition assessment methods were reviewed in 2021, when the full data set was revisited, to track the condition of each individual sea fan and to assess the overall condition, looking at levels of necrosis, epiphytes, damage, branch loss and entanglement of catshark eggs. The condition assessment methods were applied to the 2022 photo data set and findings are detailed in the Skomer MCZ Project Status Report 2022/23.

Skomer MCZ has contributed to the sea fan Natur am Byth project, see Section 8.8.

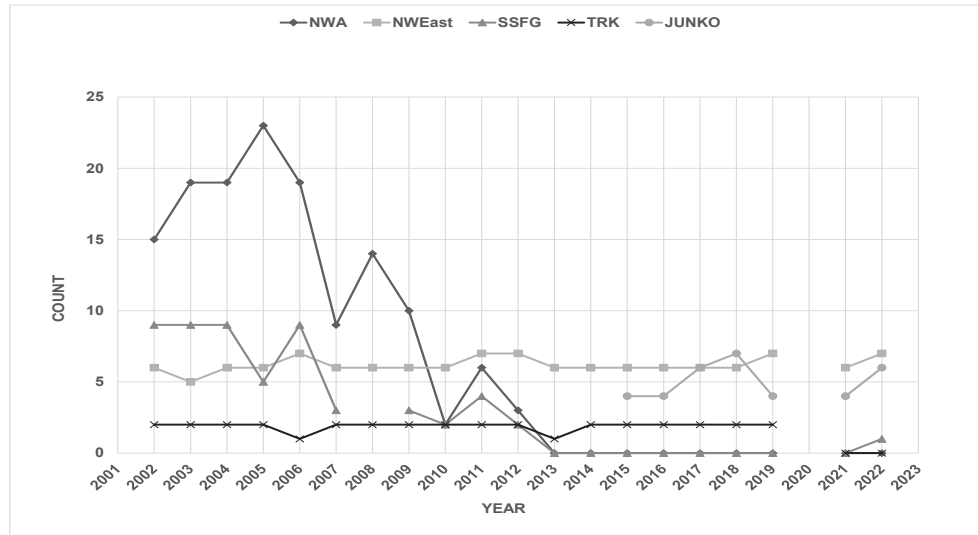
### 9.1.8 Monitor *Alcyonium glomeratum* Population

The abundance of *A. glomeratum* continues to decline at all monitoring sites except for Thorn Rock and Junko’s reef, which have sizable colonies. North Wall main, Rye Rocks and Sandy sea fan gully now have no visible colonies (Figure 9.8).



The reason for this decline is unknown. There is no evidence of disease or physical damage at the monitoring sites and changes in environmental conditions are not thought to be significant enough to cause colony loss.

Figure 9.8 Number of quadrats with *A. glomeratum* present at Skomer MCZ sites 2002 – 2022.



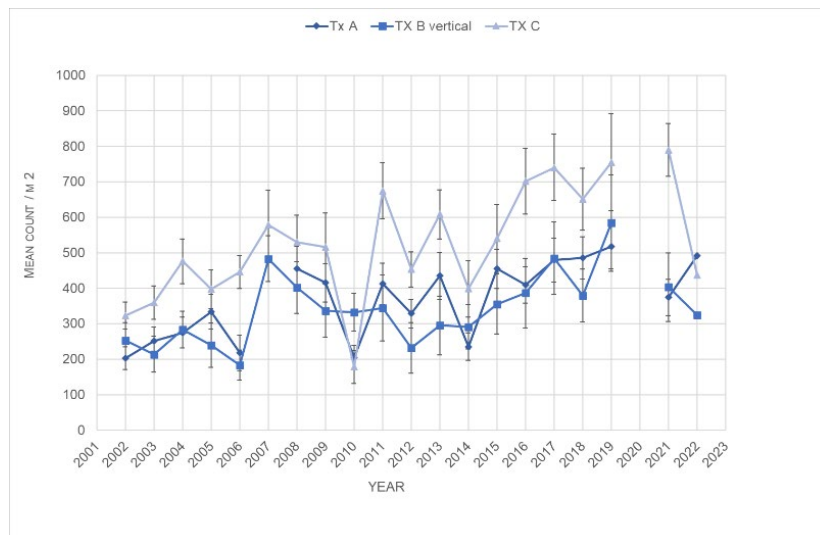
### 9.1.9 Monitor Cup Coral Populations

Quadrats were photographed for both Devonshire cup corals (*Caryophyllia smithii*) and the Lusitanian scarlet and gold cup coral (*Balanophyllia regia*).

#### *Balanophyllia regia*

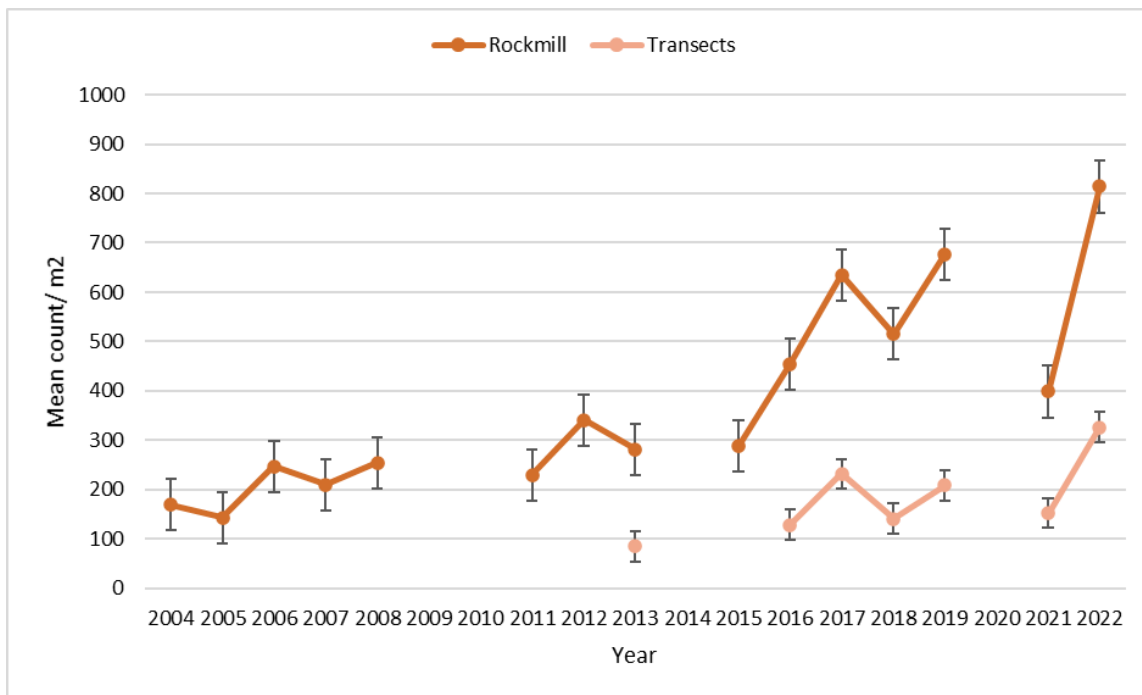
The average number/m<sup>2</sup> of *B. regia* has fluctuated at the Wick transects A, B and C. The variability is most likely to be caused by variations in the covering of silt across the site from year to year. Deep silt can hide individual cup corals and occasionally cause very poor photographic conditions (e.g. 2010), see Figure 9.9.

Figure 9.9 *Balanophyllia regia* abundance per metre<sup>2</sup> at Transects A, B and C at the Wick 2002 to 2022



At Thorn Rock five photo quadrats are taken in the Rock Mill and further photo quadrats are taken along two short transects. The average count /m<sup>2</sup> of *B. regia* has fluctuated at the Rock Mill, variability is most likely due to dense covering of algae obscuring the corals and thick coverings of silt at the site from time to time. Years with data missing are due to poor photographic conditions. An increase in numbers has been recorded over the last ten years with highest counts to date in 2022 when high photo quality was obtained with clear images of the corals. The average count /m<sup>2</sup> of *B. regia* at the transects is lower than that at Rock Mill. Further data is needed to monitor trends, see Figure 9.10.

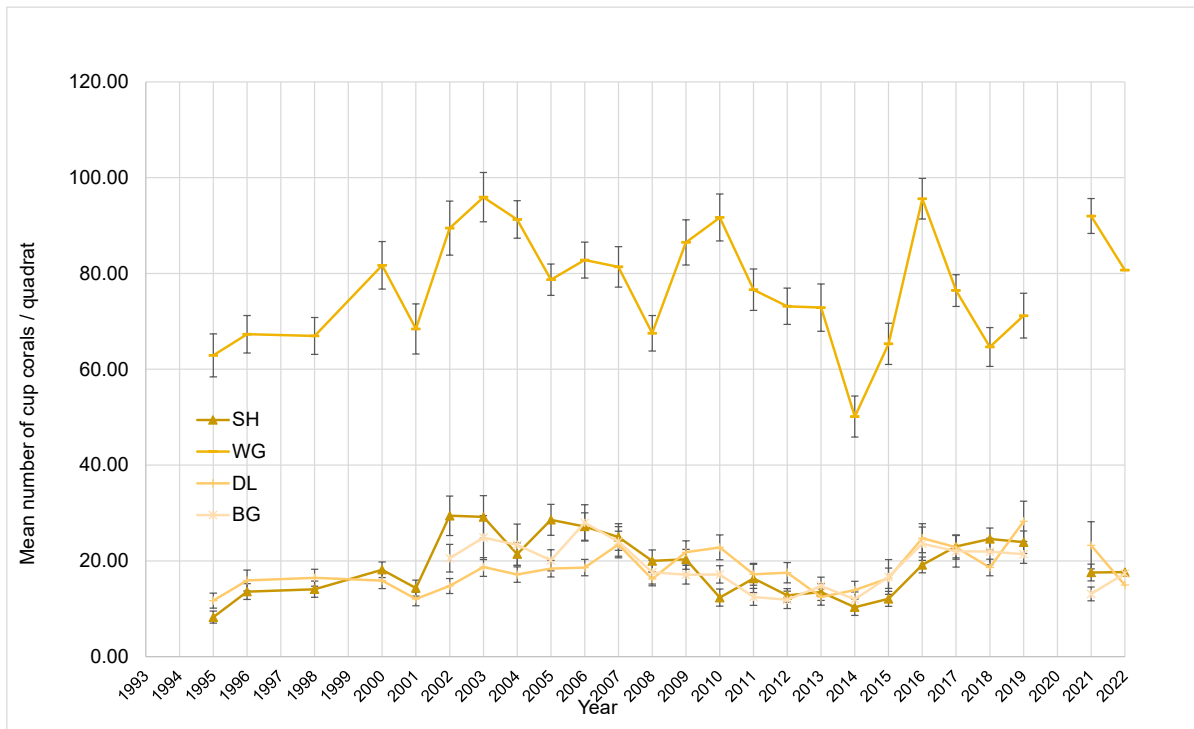
Figure 9.10 Mean abundance per metre<sup>2</sup> (and standard error) of *Balanophyllia regia* at Rock Mill and Transects at Thorn Rock (counted within 50 x 40 cm framers).



### *Caryophyllia smithii*

The average number/m<sup>2</sup> of *C. smithii* has fluctuated at each of the Thorn Rock sites. This may be due to variable levels of surface sediment affecting the actual numbers visible during recording. The Windy Gully (WG) quadrats show significantly higher counts compared to the other sites (Figure 9.11). This is most likely due to it being the only vertical wall site where less surface sediment accumulates. The other three sites are all on horizontal rock.

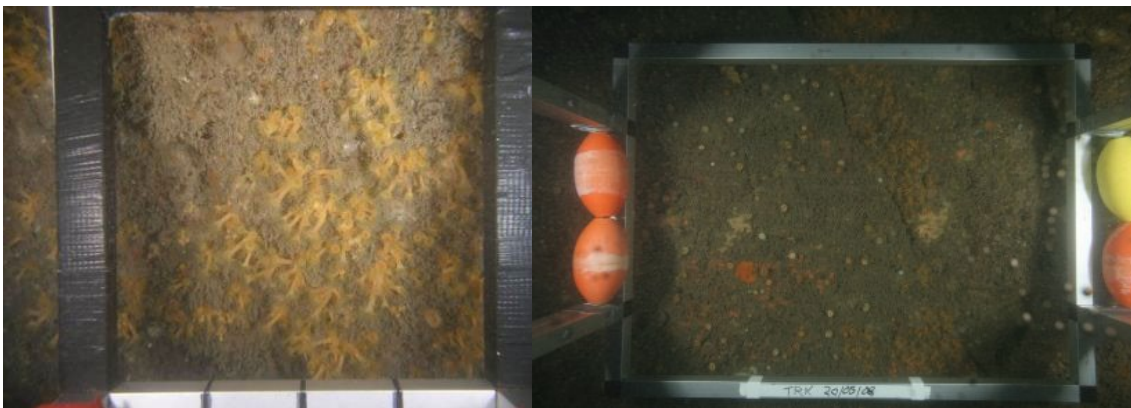
Figure 9.11 Mean Number of Cup Corals per Quadrat at Thorn Rock 1996 – 2022



### 9.1.10 Monitor *Parazoanthus axinellae*

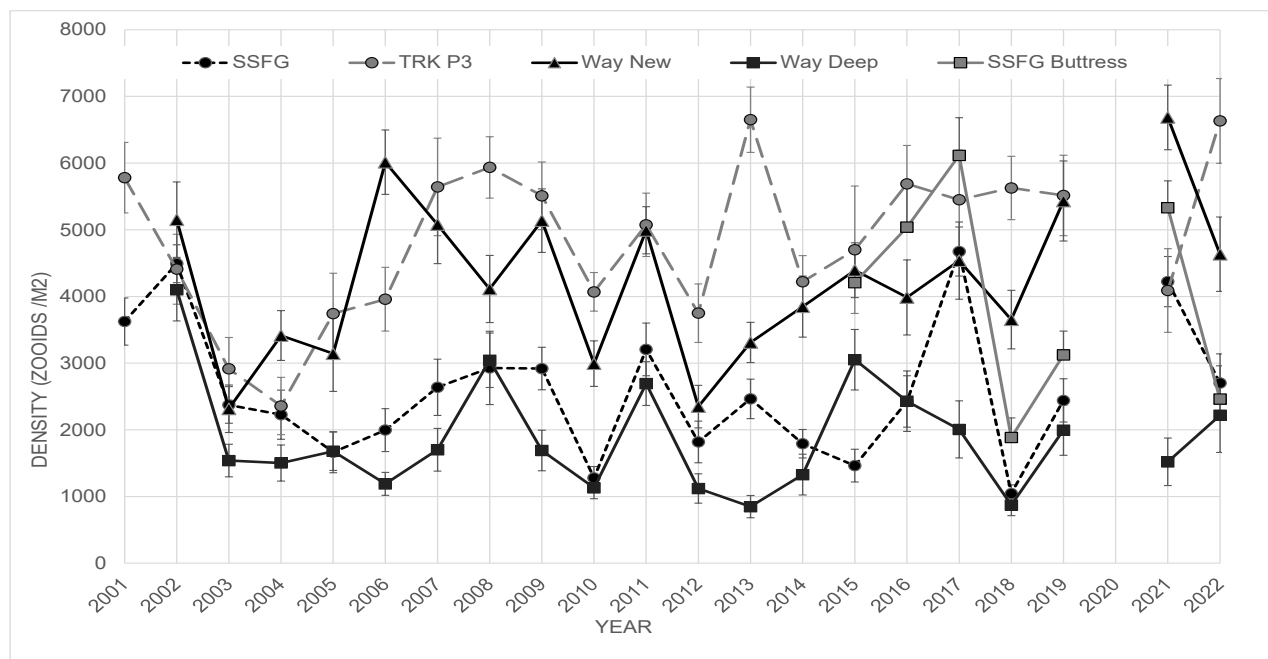
All monitoring sites were visited and all yellow trumpet anemone, *P. axinellae* colonies were still present (Figure 9.12).

Figure 9.12 Density method: 20 x 20cm framer and Colony area method: 50 x 70cm framer



The mean density of *P. axinellae* polyps (numbers of polyps /m<sup>2</sup>) at all sites has shown fluctuations year to year, but overall show a stable density. In 2021 there was a slight decline in density recorded at Thorn Rock (TRK) and Waybench deep (WAY deep) sites but these both showed an increase in 2022, whereas a decrease in density was recorded at both Sandy Seafan Gully (SSFG) sites and Waybench new (WAY new) (Figure 9.13).

Figure 9.13 Mean density of *P. axinellae* (number of zooids /m2) at five Skomer MCZ sites 2001 – 2022 with S.E bars.



The frequency of *P. axinellae* at all sites has shown fluctuations year to year, but overall shows a stable population. All sites showed an increase in 2022

### 9.1.11 Monitor *Pentapora foliacea* Population

In 2022 all *Pentapora* sites were visited and photographed. The classification system developed in 2006 and revised in 2010 has been used to characterise the population at Skomer, see Figure 9.14.

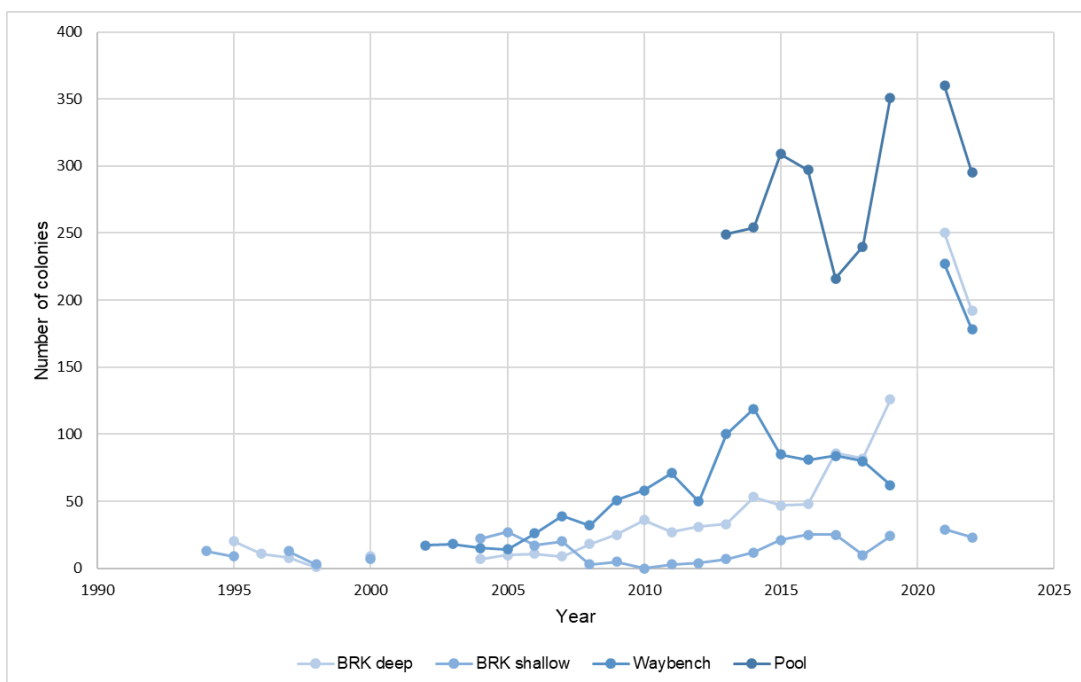
Figure 9.14. *Pentapora foliacea* - examples of Class 4 and Class 5b colonies.



By comparing numbers of class 2-4 colonies, which represent healthy growing colonies, with class 5 colonies, which represent those with deterioration from either natural or anthropogenic factors, it can be demonstrated that there are more class 2-4 colonies than class 5, which might indicate a population with more healthy growing colonies than degraded colonies. However, without comparing this ratio to that for an unimpacted area of seabed, no definite conclusion can be made.

Waybench, Pool and Bernies Rock are the largest sites surveyed, the total number of colonies (all classes) recorded in each survey year is shown in Figure 9.15. The total numbers recorded at each of these sites increased between 2019 and 2021 with a slight drop in numbers recorded in 2022.

Figure 9.15 Total number of *Pentapora foliacea* colonies (all classes) recorded for each year surveyed at Waybench, Pool and Bernies Rock.



### 9.1.12 Nudibranch diversity

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 included several classed as nationally scarce or with limited national distribution in the British Isles, an example is shown in Figure 9.16.

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.

Figure 9.16 Distribution map of *Doto floridicola* (NBN Atlas, accessed 6/9/22 <https://nbn.org.uk>)



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.

All the results are presented in greater detail in the **Skomer Marine Conservation Zone Nudibranch Diversity Survey 2022, NRW Evidence Report 654**.

### 9.1.13 Monitor *Pecten maximus* population

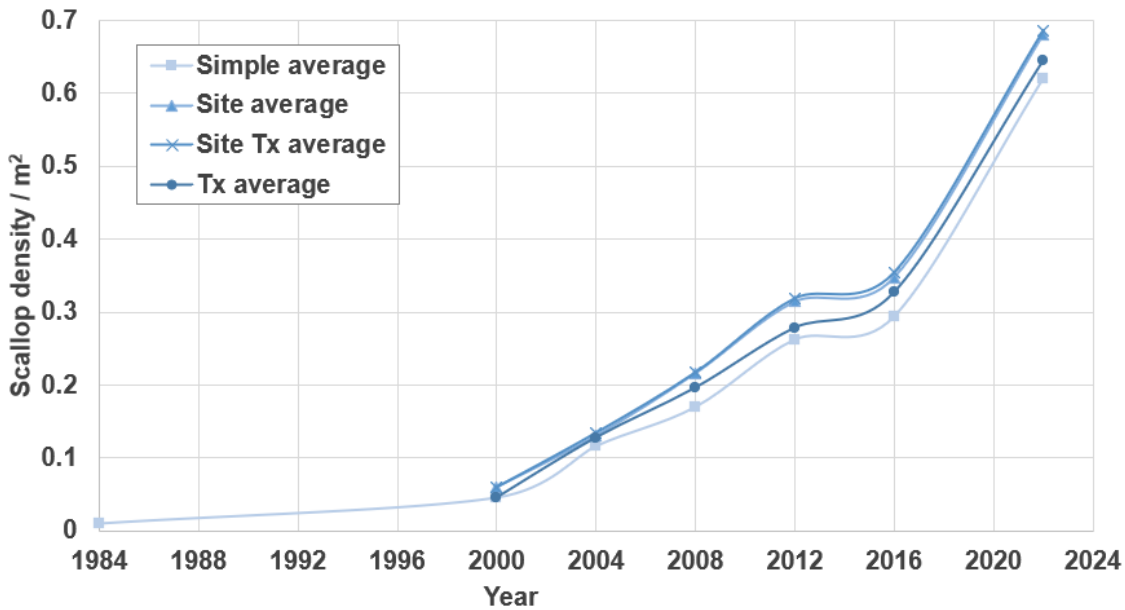
Seven sites were surveyed during the 2022 monitoring survey, and the St Bride's Bay site also repeated. Visibility was poor at the start of the survey, therefore it was decided to reduce the search area to a 1m band either side of 30m length transects at most sites. Twenty three volunteer divers took part, and 39 transects were completed covering 2280 m<sup>2</sup> in total.

The average density of scallops at the Skomer MCZ monitoring sites as a whole can be calculated in different ways, these are shown in Table 9.2. The trend is the same whichever method is chosen to calculate the annual average density (Figure 9.17). An increase in density was seen between 2000 and 2012, this then appeared to level off in 2016, but a dramatic increase in density is shown in 2022. In 2022 the average scallop density was estimated to be 62 / 100m<sup>2</sup>(simple average density) this is a 12.4-fold increase since 2000.

**Table 9.2. Densities of *P. maximus* / m<sup>2</sup> for the surveyed area within MCZ 1984 – 2022**

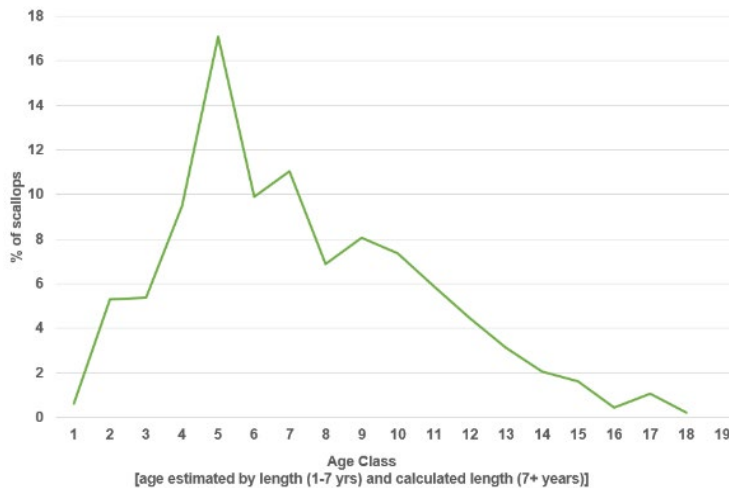
Year	Simple Average Density	Simple Site Density Average	Transect Site Density Average	All Transect Average
1984	0.01	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>
2000	0.05	0.06	0.06	0.05
2004	0.12	0.13	0.13	0.13
2008	0.17	0.22	0.22	0.20
2012	0.26	0.31	0.32	0.28
2016	0.29	0.35	0.35	0.33
2022	0.62	0.68	0.68	0.64

Figure 9.17. Average density *P. maximus* / m<sup>2</sup> for the MCZ survey area 1984 – 2022



All scallops were measured, and age estimates made from annual growth rings. This method is only accurate up to the 7 or 8 yr old age class, beyond this age the rings on the shell are very close together and hard to differentiate. To improve the accuracy for older scallops, an average annual growth rate was derived from that year’s actual measured growth rates for all scallops of the age range seven and over. This growth rate was used to calculate theoretical overall length of scallops at age seven and over for the specific year (Figure 9.18).

Figure 9.18. Age structure of *P. maximus* in 2022 across all MCZ sites. Scallops aged using estimated age from mean length (age 1-7 yrs) and calculated mean length (age 7+ yrs).



The results show ages extending out to 18-year-old scallops. The largest peak is at 5-years-old and small peaks are now seen in the 7, 9 and 10-year old age classes. The peak of 10-year-olds correlates with the peak of 4-year-old scallops seen from the last survey in 2016.

All of the results are presented in greater detail in the **Skomer Marine Conservation Zone Scallop Survey 2022, NRW Evidence Report 655**.

## 9.2 Meteorology/Oceanography

### 9.2.1 Record Meteorological Factors

Weather data at Skomer MCZ continues to be collected via an automatic weather station, which is compatible with other Environmental Change Network sites across Wales (Table 9.3).

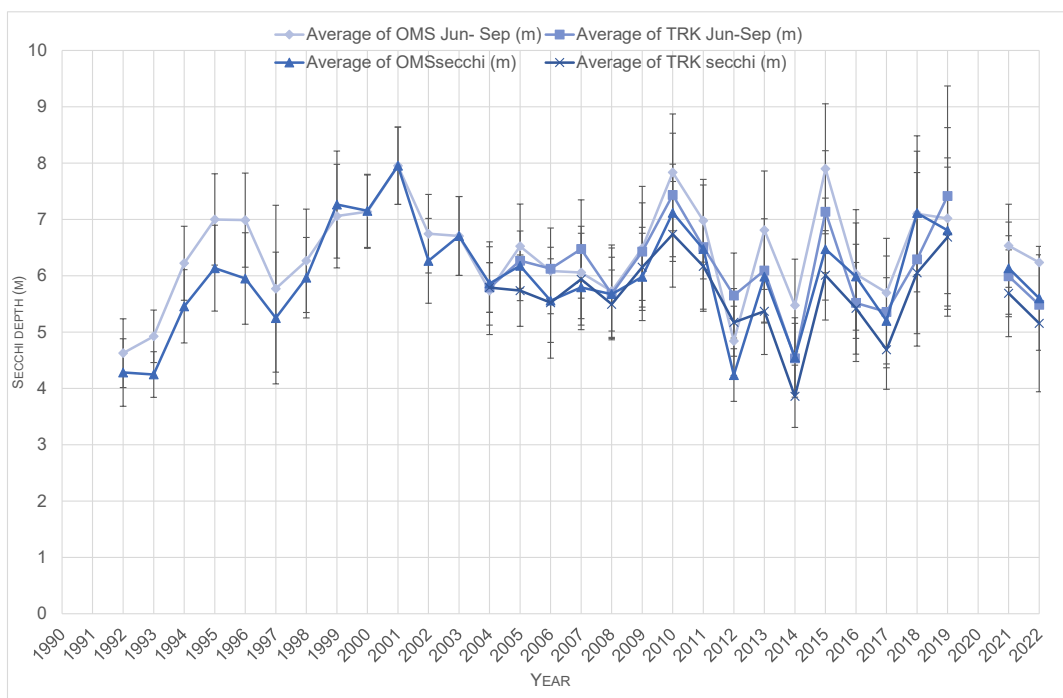
Table 9.3 The highs and lows of temperature and wind recorded in 2022:

<b>Maximum temperature (°C)</b>	26.8 (July)
<b>Minimum temperature (°C)</b>	-2.03 (February)
<b>Annual maximum gust (knots)</b>	113mph (February)
<b>Direction of maximum gust (degrees)</b>	217

### 9.2.2 Monitor Seawater Turbidity / Suspended Sediment

Seawater turbidity was measured using a Secchi disc weekly between May to October at Thorn Rock and OMS. Turbidity at Skomer MCZ in 2022 was average when compared with previous years. TRK and OMS follow a very similar trend over time suggesting that the waters on the north and south side of the island are well mixed, see Figure 9.19..

Figure 9.19 Skomer MCZ summary of annual mean Secchi disc data (m) with 95% S.E. bars

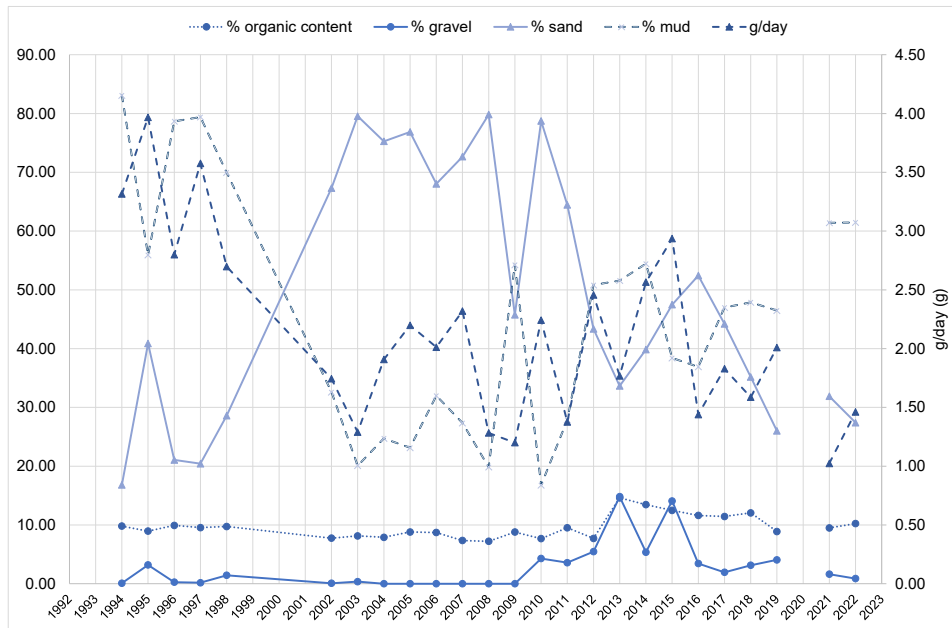


### 9.2.3 Monitor Seabed Sedimentation

Seabed sedimentation samples were collected at OMS and Thorn Rock sites using passive sediment traps. Analysis of the samples is carried out by NRW laboratories for dry weight, organic content, grainsize analysis and metal content (Figure 9.20).



Figure 9.20 Skomer MCZ sediment trap sample total sediment, PSA and organic content analysis at OMS and Thorn Rock sites combined



In general mud-sized particles have increased as a proportion of the total sediment since 2009, whereas the proportion of sand has reduced.

### 9.2.4 Record Seawater Temperature

Seawater temperature data was collected from an automatic logger located at 19m below chart datum at the OMS site and from vertical temperature and salinity profiles carried out from surface to near seabed at the same time as plankton sampling.

Maximum and minimum seabed temperature from the logger are presented in Table 9.4.

Table 9.4 Maximum and minimum seabed temperature from OMS logger

Year	Minimum Temperature (°C)	Maximum Temperature (°C)
2000	8.4	16.27
2001	7.27	16.3
2002	8.7	15.1
2003	7.6	17.1
2004	7.7	16.76
2005	7.36	16.4
2006	7.5	16.3
2007	8.8	16.3
2008	8.4	16.3
2009	7	16.8
Year	Minimum Temperature (°C)	Maximum Temperature (°C)
2010	6.9	16.8
2011	7.6	15.9
2012	8.0	16.6
2013	6.98	16.82

<b>2014</b>	8.14	16.72
<b>2015</b>	7.8	15.98
<b>2016</b>	8.5	16.8
<b>2017</b>	8.3	16.4
<b>2018</b>	6.6	16.6
<b>2019</b>	8.7	17.2
<b>2020</b>	8.4	16.3
<b>2021</b>	7.3	16.4
<b>2022</b>	8.8	Logger not retrieved

## 9.3 Data handling developments

As a remote site with very poor internet connection at Martins Haven, all our documents, data and images are stored on site, but with back-ups made regularly to portable hard drive for storage off-site.

MCZ reports continue to be available via the NRW website, go to [www.naturalresources.wales](http://www.naturalresources.wales) and search for “marine evidence reports”.

## 9.4 Other work

As team members of the Marine Monitoring, Assessment and Reporting team (MMART), MCZ staff continue to support the work of the all Wales monitoring programme, especially where it is most efficient logistically for us to carry out the work or where the MCZ staff have the necessary skills or equipment. In 2022 this included:

- WFD Winter (November to February) DIN (Dissolved Inorganic Nitrogen) water sampling at the Gwaun and Solfach estuaries;
- WFD monthly water sampling at Skomer site and Pickleridge (Dale) lagoon site (Figure 9.21).
- Mark continued to service a number of temperature loggers around the Pembrokeshire coast, including shore and lagoon sites;
- The whole team has continued to fulfil NRW’s commitment to the UK-wide MarClim project, carrying out shore surveys throughout Pembrokeshire, including on Skokholm Island;
- Ali joined other MMART staff to complete drop down video survey work in North Wales;

Figure 9.21 December water sampling



- In January 2023 the whole team completed all the SAC lagoon sampling at Pembrokeshire sites: Pickleridge (Dale), Neyland and Carew;
- Mark provided boat support for bird counting work at Stackpole to support NRW's Senior Reserve Manager, Paul Culyer;
- The whole team supported the WFD Fish survey in the Milford Haven estuary, completed in September (Figure 9.22).

Figure 9.22 WFD fish survey, Milford Haven estuary



## **10. Education and Interpretation**

### **10.1 Fisherman's Cottage MCZ exhibition**

The Skomer MCZ exhibition room at Martins Haven was opened in 2022, however the interactive touch screen was turned off due to continued Covid restrictions. In addition to the permanent displays, temporary posters are displayed on the notice boards and the booklet and leaflet dispensers are kept full. The Skomer MCZ booklet and seal watching booklet continue to be very popular with the public. Thanks again to WTSWW staff at Lockley Lodge for opening the exhibition centre when MCZ staff away from the site

The visitor logger was not in operation in 2022, software issues need to be resolved and hopefully it will be back in operation for the 2023 season.

### **10.2 Talks and presentations**

Pembrokeshire Coastal Forum organised a one day workshop on grey seals for Pembrokeshire activity providers. Kate was a speaker and walk leader alongside Lisa Morgan (WTSWW) and Ian Meophan (PCNP).

Kate and Mark both provided a talk about the Skomer MCZ to Spring and Summer Marine camps held at Dale Fort Field Centre. Mark additionally gave talks to visiting universities at Dale Fort.

Kate gave a talk on Skomer MCZ seals long term monitoring data at the Friends of Skomer and Skokholm Conference meeting in February 2023.

### **10.3 Media**

Skomer MCZ team continue to work with the NRW's Communications Team. Staff posted various articles on NRW's internal social medium, "Yammer", and on Skomer MCZ's Facebook page, including topics such as pink sea fan monitoring, the nudibranch survey, Skomer beach clean, long-term photo monitoring and visitor information on seal watching.

## 11. Acknowledgements

Skomer MCZ staff wish to thank all those who have supported our work or contributed directly to it over the past year.

Special thanks to:

- Members of the Advisory Committee
- All of our scallop project diving volunteers and dive charter skippers;
- Skomer Island NNR Warden, Leighton Newman and the rest of the Skomer Island team;
- Phil Newman, Blaise Bullimore, Ross Bullimore, Rob Spray, Matt Green, Mike Camplin, Jon Moore and Jon Chamberlain for diving support;
- Bernard and Christine Picton and James Perrins for support during the nudibranch survey;
- Nicki Meharg supporting weekend patrol and Becky Tooby helping on intertidal and lagoon surveys;
- The crews of the Dale Sailing boats *Dale Queen*, *Lady Helen* and *Helen Clare*;
- Lockley lodge WTSWW staff for regularly opening the visitor centre;
- Neptune's Army of Rubbish Collectors for helping to keep the MCZ (and indeed the waters of Pembrokeshire) less full of rubbish;

With apologies to anyone missing from the list above.

## **Appendix 1. Büche, B. Blockley, F. Grey Seal Breeding Census Skomer Island 2022. NRW Evidence Report number 353. The Wildlife Trust of South and West Wales.**

The Grey Seal (*Halichoerus grypus*) is an Annex II species for which a Special Area of Conservation (SAC) can be designated and a primary reason for the selection of the Pembrokeshire Marine SAC. They are also recognised as a feature of the Skomer Marine Conservation Zone (MCZ).

In 1983, a systematic approach to seal monitoring on Skomer was established and continued, using the same or at least similar methodology, albeit at varying levels of intensity, until 1996 when Jim Poole standardised the seal monitoring on Skomer further by introducing the Seal Monitoring Handbook (Alexander, 2015). In 2022, as in previous years, the breeding activities of the grey seals on Skomer Island were observed and recorded using this methodology.

255 pups were born on Skomer, which is ten less than in 2021. On the Marloes Peninsula 192 pups were born, giving a total of 447 pups for the Skomer MCZ as a whole, which is one pup more than in the previous year.

The first pup of the season was born at Driftwood Bay on 4/8/22. In total, 28 pups were born in August, 147 in September, 50 in October and 3 in November. The most productive beaches were North Haven (52 pups), South Haven (47 pups) and Matthew's Wick (40 pups).

183 pups are known, or assumed, to have survived on Skomer. The fate of nine pups is unknown, giving a survival rate of 76%. On the mainland 168 pups are known, or assumed to have survived, giving a survival rate of 88%. The overall survival rate for the whole of the Skomer MCZ is 80%.

In 2022 the maximum haul-out of 388 seals was recorded on 12/11/22. North Haven and Driftwood Bay had their peak haul-out counts on 13/11/22 (131 and 67 respectively), Matthew's Wick on 9/11/22 (133) and Castle Bay on 18/10/22 and 4/11/22 (148).

174 seals with scars or tags were photographed in 2022, of which 64 (60 cows, one immature and three bulls) were re-identified from previous photos.

The two oldest returning cows are known from 2002. The oldest returning bull is known from 2015. Of the 255 cows which pupped on Skomer in 2022, 46 had scars. 21 of the scarred cows were identified, hence 33% of identifiable breeding cows were returning cows.

41 individual seals, were photographed with obvious signs of being entangled in nets at some time in their lives, most commonly a deep scar around their necks, often with netting still embedded.

## Data Archive Appendix

No data outputs were produced as part of this project.