Skomer Marine Conservation Zone Annual Report 2023/24

NRW Evidence Report No: 751

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1. Crynodeb Gweithredol

Dyma Adroddiad Blynyddol Parth Cadwraeth Morol Sgomer i'r Pwyllgor Cynghori. Mae'r Pwyllgor Cynghori 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, goruchwylio, 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 (Skomer MCZ) 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 Skomer MCZ.

The report summarises all aspects of the work of the Skomer 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. Skomer MCZ 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 Skomer 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. Summary of the Year

Good weather and calm seas through spring and early summer allowed most of the diving fieldwork to be completed, but it was a challenging season as in early July *Skalmey* broke down and despite all efforts the boat was not operational until the end of September.

Calm weather in August allowed the intertidal survey to be completed at all sites with the help of the MarClim project team.

A return to our sea fan sites re-confirmed 3 fans missing from 2022 and a further 1 fan missing in 2023 to be confirmed this year. The continued loss of sea fan, along with the poor condition we are observing due to large numbers of catshark eggs, necrosis (dead tissue) and other attached seaweeds and animals is of concern. PhD student Kaila Wheatley, from Exeter University, joined the team for a week to collect small samples for DNA work. Her study will include determining whether reproduction is taking place, aging fans, connectivity with other populations, larval supply and potential links to sea water temperature.

Fieldwork for the sponge diversity survey was completed. Species are recorded from different sites and where identification is not possible in the field, photos and samples are taken. The samples have been preserved ready for processing and identification; this work will be completed during 2024.

The North Haven eelgrass mapping survey was completed despite challenging underwater conditions during the survey. A blanket of floating algae covered the eelgrass making laying survey lines, tapes and completing eelgrass density counts very difficult. The survey was completed with the help of volunteer dive teams. The results show a 2.3% decrease in area of extent compared to the last survey in 2018 but a slight increase in shoot density across the bed. The shoot density continues to increase from the low counts in 2014, with 2023 showing the highest average shoot density recorded to date.

Seal pup production in the Skomer MCZ continued to do well in 2023, with 425 births at island and mainland sites combined. Since 2009 there has been a steady increase in pup production at both the island and mainland sites. Pup production for the past 5 years has shown the highest totals recorded for the area, with annual production averaged for 2019-23 being 429 pups.

The Skomer MCZ team have supported other marine monitoring surveys during 2023, these include Water Environment Regulations (2017) water quality sampling and Special Area of Conservation (SAC) lagoon and diving surveys. We also helped with a NRW led Milford Haven maerl bed Nature Networks investigative project.

4. Staff

4.1 Staffing

The staff complement at Skomer MCZ: Kate Lock, Mark Burton, Jen Jones and Ali Massey, 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. Jen is full time but splits her year: 6 months with the Skomer MCZ from April to September, and then from October to March completes other work within the Marine Monitoring team. This allows the Skomer MCZ 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 other's work areas. In 2023 the Skomer MCZ team helped with Pembrokeshire Special Area of Conservation (SAC) lagoon and diving surveys, MarClim shore, NRW Maerl diving survey and conducted water sampling at different sites during the winter months. We were provided with shore survey assistance by Mike Camplin and Paul Brazier, and Adam Leyshon helped with boat maintenance work on *Skalmey*.

4.2 Volunteers

Diving volunteers continued to supplement our own diving team when required. In 2023 this was particularly valuable with the eelgrass survey. Poor weather and underwater conditions during the planned weekend surveys meant that many of the transects needed to be completed by our diving team with support from our volunteers. A big thank you to Phil Newman, James Perrins, Becky Tooby, Blaise Bullimore, Francis Bunker, Rob Spray and Kaila Wheatley.

Volunteer Becky Tooby also assisted with both the shore and lagoon surveys.

In 2023 we welcomed teams of volunteer divers over two weekends to complete the eelgrass survey (see Figure 4.1). The volunteers faced very difficult underwater conditions and poor weather during the survey, we are grateful for their efforts and perseverance.

Figure 4.1 Eelgrass survey volunteer dive teams

4.3 Development and training

In April 2023 the Skomer MCZ team, along with volunteers Kaila Wheatley and Becky Tooby, completed a one-day dive refresher training day. The training allowed the team to practise diver recovery drills and become familiar with dive rescue operations on *Skalmey*.

This was followed by a one-day boat familiarisation and safety training day for the team, including volunteers Phil Newman and James Perrins and NRW marine monitoring staff Mike Camplin and Matt Green.

The team all completed Carbon Literacy training, and Ali completed her four-wheel drive and trailer towing training.

Kate presented at the Marine Evidence Conference held in Bangor in February. Kate and Jen attended the Porcupine Marine Natural History Society conference held at Bournemouth University in March 2024.

4.4 Health and Safety

Skomer MCZ team continue to maintain health and safety documentation linked to diving and boat operations as well as more routine office-based safety elements.

Diving and boat safety and rescue procedures are tested during the annual training days.

Mark represents NRW on the Workboat Association, the trade association for workboat owners, operators, stakeholders and professionals. Mark advises on coding workboats, corporate boat working procedures and policies.

4.5 Diving Operations

Diving operations at Skomer MCZ continue to operate under the HSE's 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 in the marine monitoring team acts as NRW's Dive Project Manager and is the representative on the Scientific Diving Advisory Committee, which is the HSE-recognised representative body for the Scientific and Archaeological diving sector.

In 2023 36 dive days were completed with a total of 221 dives and 154 hours logged underwater, the average dive time was 41.8 minutes (Table 4.1). 17 % of the dives were completed by volunteers supporting the Skomer MCZ team.

Biological monitoring contributed to 67% of the dive time (see Figure 4.3) with a total of 34% on the eelgrass survey. 10% of dive time was spent on SAC dive surveys, this included the team supporting NRW contractors completing a maerl bed diving survey in Milford Haven waterway and Kate joining the NRW Pembrokeshire SAC dive survey.

Table 4.1 Summary of Skomer MCZ Diving Activity 2023

	Skomer MCZ staff	Volunteer divers	Total
Dives	183	38	221
Dive time (mins)	7436	1809	9245
Dive time (hours)	123.93	30.15	154.08
Average dive time (mins)	41	48	41.83

Figure 4.2 Summary of Skomer MCZ diving activity 1992 to 2023

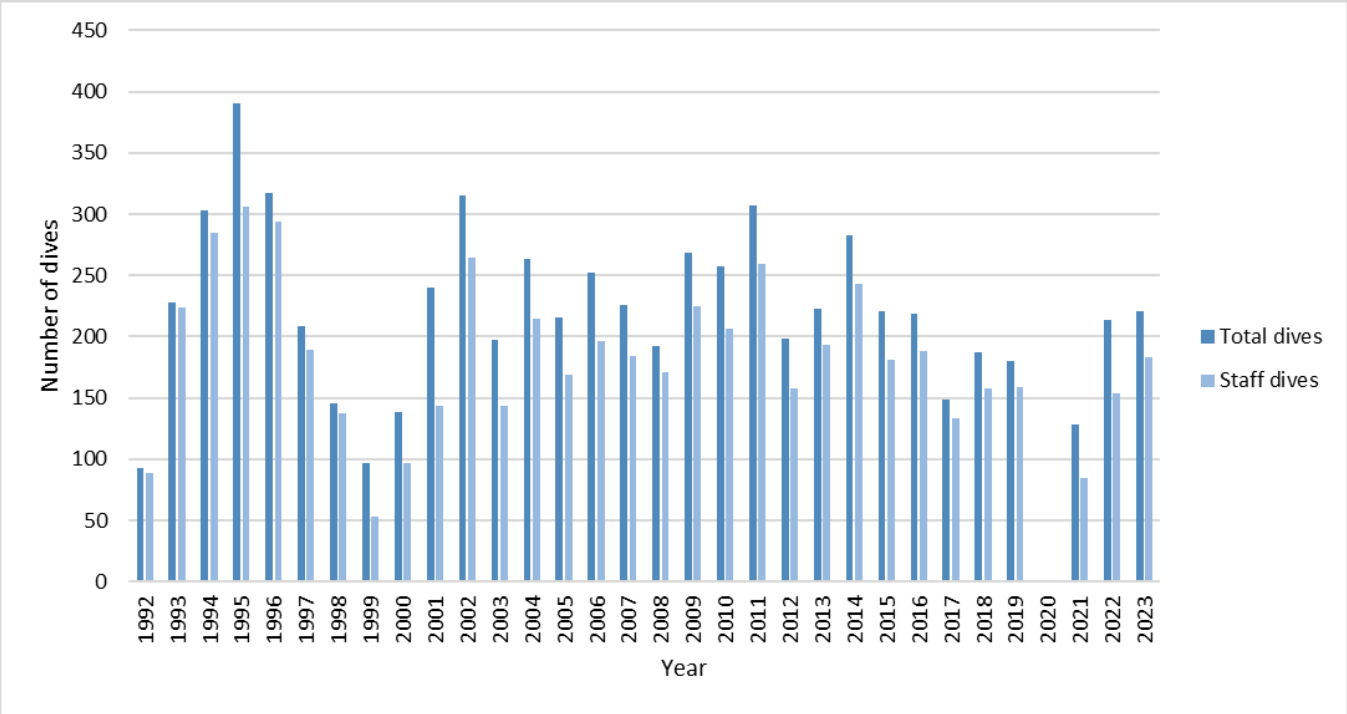
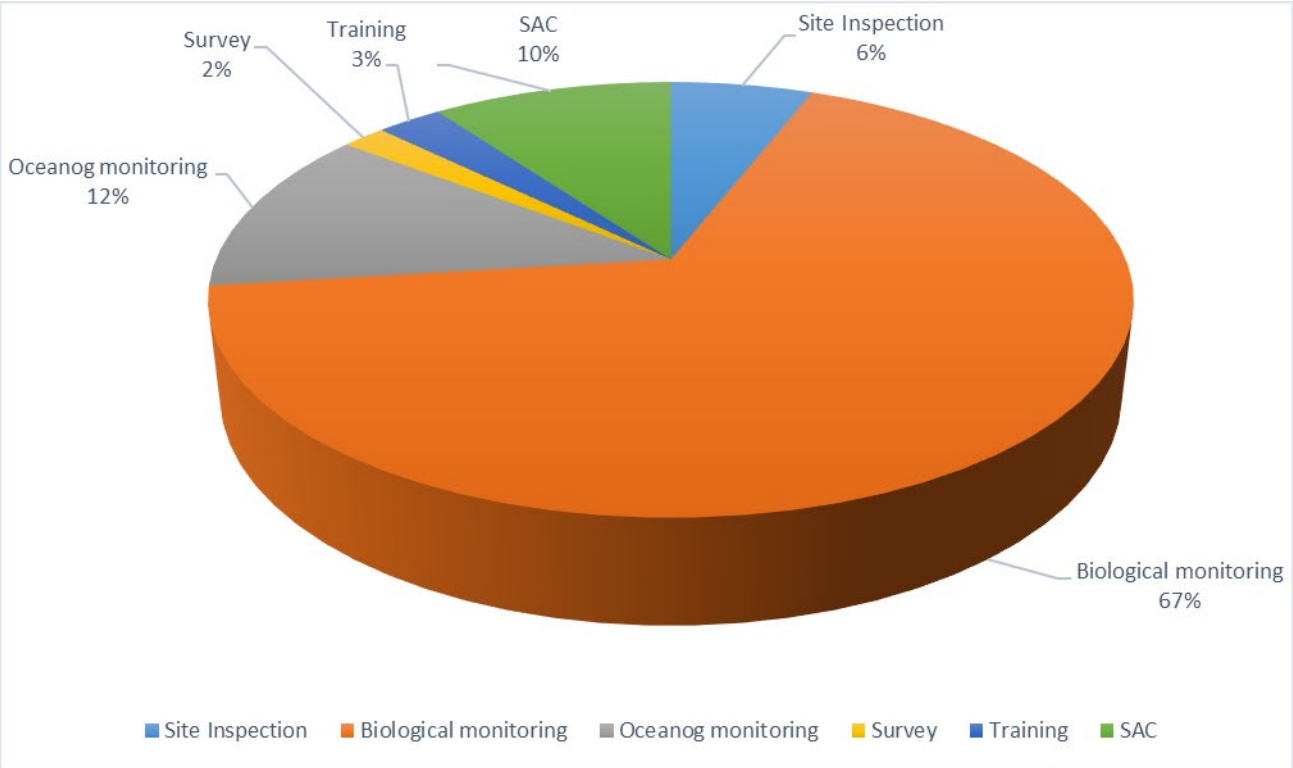


Figure 4.3 Skomer MCZ Diving Operations 2023, dive time



5. Estate

5.1 Buildings

Skomer 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 buildings, use of consumables and energy are monitored in accordance with the ISO14001 environmental standard. In August 2023 Martins Haven had an external audit and maintained its BSI ISO14001 certification.

Emergency preparedness and response plans for pollution incident response are in place for both Fisherman's Cottage and Unit 4, these were both tested in 2023.

5.2 Boats

Skalmey spent 45 days at sea between April 2023 to end March 2024 and logged 156 engine hours. A summary of boating activity from 2002 to 2023 is given in Table 5.1.

At the beginning of July *Skalmey* broke down. The engineers attempted to fix the engine, but multiple issues developed. The engine was lifted out and transported to workshops in Poole, where they could complete tests and replace injectors. The engine was finally returned and refitted before sea trials could be completed in early October. *Skalmey* returned to Martins Haven on 7th October to allow 1 day of diving to finish the season. *Skalmey* was out of action for 3 months, impacting fieldwork operations.

Figure 5.1 *Skalmey* engine repairs July 2023

Routine winter maintenance was completed and new echo sounder and chart plotter has been purchased that will be installed and tested ready for 2024 season.

During the annual boat safety training it was identified that improvements were needed on how to fix the emergency backup outboard engine onto the back of *Skalmey*. A new fixing to the stern platform has been designed and was tested in February with positive result, it was easy to attach and made mounting the engine much easier.

Figure 5.2 *Skalmey* stern platform and fixing for outboard engine

The rigid hull inflatable boat *Morlo* spent 47 days at sea and logged 124 engine hours between April 2023 to end of March 2024 (Table 5.1). *Morlo* was used on weekend patrols, plankton and water sampling and for intertidal survey work. *Morlo* was also used to allow some dive survey work to be completed during August and September. Winter maintenance work was completed in the Milford Haven unit.

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

A new workboat code from the Maritime and Coastguard Agency (MCA Workboat Code Edition 3) came into force in December 2023, to be fully complied with by 2026. These codes will apply to both *Skalmey* and *Morlo*. To enable preparation of the boats, NRW, with Mark as the lead, have joined the Workboat Association. The new codes will also require further training for the team.

Table 5.1 Summary of Skomer MCZ Boating Activity 2023-24

Survey year recorded from April to end March
Staff = Skomer 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	2023
Skalmey	73	77	52	48	58	72	58	61	69	99	95	65	70	73	69	49	79	65	62	60	44
RIB *Morlo*	37	32	40	43	40	38	36	38	48	36	35	30	43	32	34	36	40	33	25	34	47
Total	100	109	92	91	98	110	94	99	117	135	130	95	113	105	103	85	119	98	87	94	91

Staff seatime (hours)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022	2023
Skalmey	1087	865	717	693	854	1190	791	973	1109	1162	1022	825	1034	893	973	563	847	805	887	848	691
RIB *Morlo*	367	348	568	493	473	416	392	355	452	313	284	227	388	277	337	275	403	280	164	319	367
Total	1454	1213	1285	1186	1328	1606	1183	1328	1561	1475	1634	1051	1422	1170	1310	838	1250	1085	1052	1167	1058

Staff days at sea	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022	2023
Skalmey	248	226	169	176	195	228	196	246	277	327	336	213	268	243	256	175	314	256	225	229	177
RIB *Morlo*	102	85	125	116	108	96	102	91	128	87	89	74	113	88	108	97	115	83	46	87	125
Total	329	311	294	292	303	324	298	337	405	414	425	287	381	331	364	272	429	319	271	316	302

Engine hours	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022	2023
Skalmey	245	284	171	150	169	244	169	224	241	322	266	222	249	284	237	145	259	207	216	207	156
RIB *Morlo*	118	96	162	160	141	120	145	139	157	118	110	139	137	98	105	97	129	105	85	114	124
Total	263	380	334	310	310	365	313	363	398	440	376	361	386	382	342	242	388	312	301	321	280

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 Skomer MCZ staff.

A GoPro video camera and housing was purchased in March 2023, it was primarily used to complete a BRUVS (baited remote underwater video system) survey in North Haven eelgrass bed.

Figure 5.3 GoPro fixed to underwater frame

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

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.

The RIB trailer was serviced in June by a local contractor.

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 should spillage occur. The bowser trailer is serviced and maintained by Briggs (NRW contractor), a structural failure was identified in autumn 2022 but sourcing of parts etc. caused delays to repair which finally were completed in August 2023, causing the bowser to be out of action for the whole fieldwork season.

5.5 Marine estate work

The moorings for Skomer MCZ boats in Martins Haven were maintained at the beginning of the season by staff who also completed 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 through the season.

To help keep users away from the seabird cliffs on the east side of North Haven a sign has been fixed to the no anchoring buoy located on the east side of the bay, see Section 6.2. A further signage buoy is also planned to be installed in 2024 in collaboration with Pembrokeshire Coastal Forum, see Section 8.4.4

Monitoring site maintenance work is carried out with the use of an underwater battery-powered drill. Sadly, the drill stopped working and following further investigation by volunteer Phil Newman it was confirmed that seawater had flooded the internal mechanism and it was not reparable. As a result, no underwater site maintenance was completed during 2023. During monitoring dives, notes have been made where site markers need replacement, providing a 'maintenance to do list'.

6. Management

6.1 Wardening and Patrol

Skomer MCZ staff carried out boat patrols on 21 Sundays and Bank Holiday weekend days between the end of April and September 2023. Two days were lost due to bad weather. 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 Skomer MCZ, and a way for 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 are therefore well disposed towards the aims of Skomer 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 Skomer MCZ.

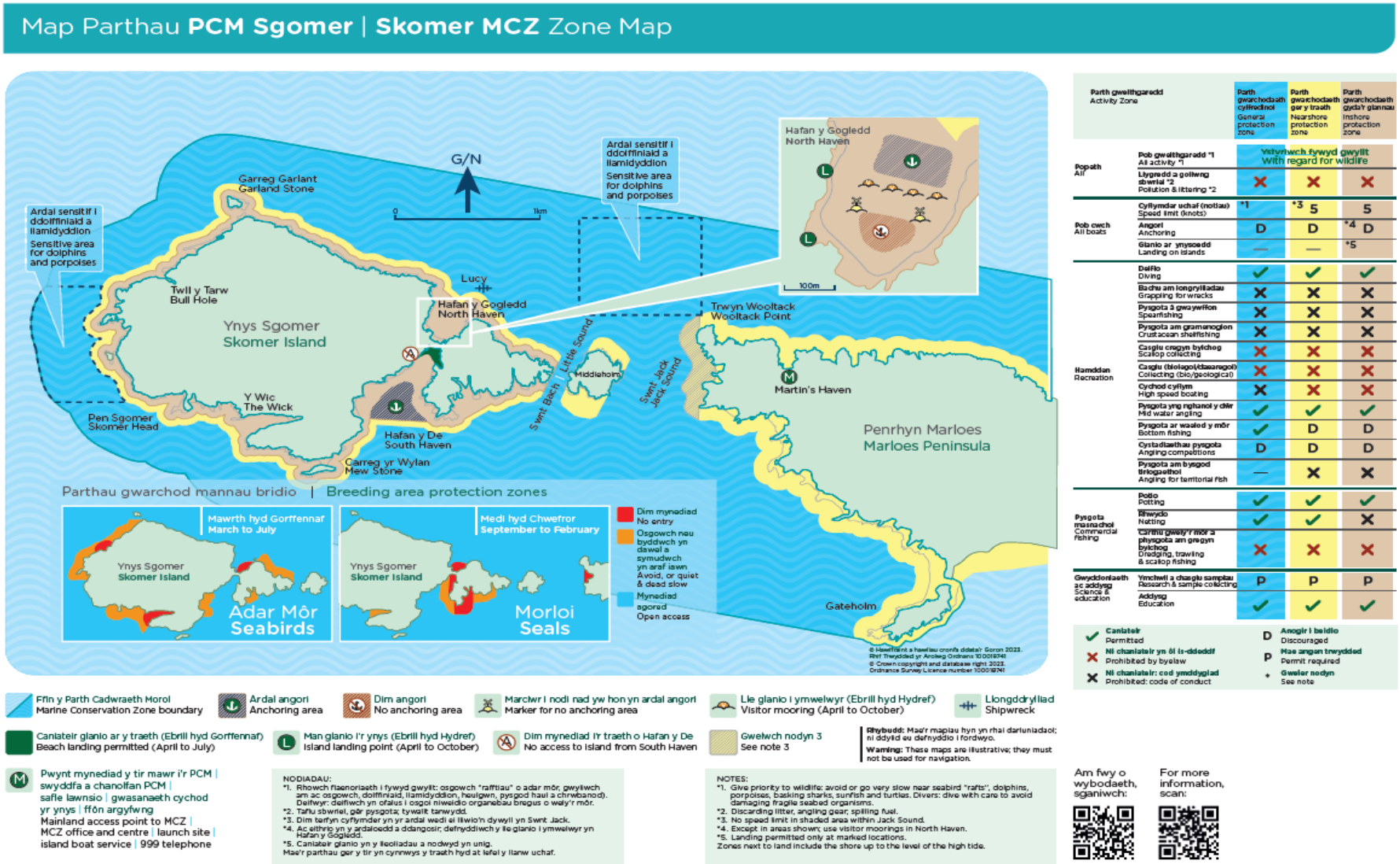
In the interest of efficiency, mapping of fishing effort (see Section 7.1), sampling for water quality and plankton monitoring (see Sections 9.2.4 and 9.1.7) are carried out during weekend patrols.

6.2 Information

The Skomer MCZ User Regulation leaflet has been revised to include some amendments to the zone map. The breeding protection zones for both the seals and seabirds were reviewed with the Skomer warden. It was identified that large numbers of seabirds now use the cliffs on east side of North Haven. The leaflet and maps were updated and re-designed with NRW branding. It has been printed on waterproof paper for distribution at Martins Haven and to visitors out on the water, see Figure 6.1.

The zone map display panel at Martins Haven has been replaced and the information on NRW website updated. The changes to the seabird protection zones have also been updated on the Pembrokeshire Marine Code Maps.

Figure 6.1 Skomer MCZ User Regulation Zone Map, byelaws and codes of conduct



To help keep users away from the seabird cliffs on the east side of North Haven a sign has been fixed to the no anchoring buoy located on the east side of the bay. The sign requests that all water-based users keep 50m away from the sea bird cliffs. The sign has been made in collaboration with the South and West Wales Wildlife Trust and the Pembrokeshire Marine Code team at Pembrokeshire Coastal Forum, see Figure 6.2.

The Skomer MCZ booklet and seal watching guide continue to be dispensed via the exhibition room (see section 10.1).

Figure 6.2 New seabird sign fixed to No anchoring buoy.

6.3 Management Issues

6.3.1 Dredging/beam trawling

No illegal dredging or beam trawling was recorded or reported in 2023.

6.3.2 Potting

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

In May 2024 a sunken fishing pot buoy was spotted off the Marloes Peninsula and we asked Neptune's Army of Rubbish Cleaners (NARC) to investigate. A tangled mess of pots and ropes were found and over 2 days the team managed to retrieve 18 inkwell and parlour pots along with large quantities of rope. The pots had been abandoned and appeared to have been ghost fishing for a while, efforts were made to remove marine life and return it to the sea. We are very grateful for the fantastic effort from the NARC team.

Figure 6.3 Abandoned inkwell pot and ropes encrusted with marine life (photo: Anne Lloyd Morris, NARC)

6.3.3 Tangle and gill netting

No tangle or gill netting was observed or reported in 2023.

6.3.4 Collection of shellfish by divers

No collection of shellfish by divers was observed or reported in 2023.

6.3.5 Collection of curios

No collection of curios was observed or reported in 2023.

6.3.6 Collection of specimens for education and research

A NRW Skomer MCZ permit was issued to Francis Bunker for seaweed collection for the purpose of education and research.

Francis has been making an educational video on kelp forests and the different species found within them for the British Phycological Society. Francis collected a limited number of seaweeds in order to film microscopic features of the seaweeds to include in the video.

Following a series of dives, Francis submitted a species list for the archive. Included is a new record for the MCZ of *Umbraulva dangeardii* (confirmed by DNA sequencing). The video 'North East Atlantic Kelp Forests and their Associated Flora' will be published on YouTube with a link on the British Phycological Society web site.

6.3.7 Disturbance or entanglement of seals

Seal disturbance was recorded by Skomer Island staff. On 7th and 10th September 2023 kayaks were observed close to the Garland Stone, resulting in seals being flushed off the rocks.

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 (level 3 & 4) were observed.

Table 6.1. Seal disturbance (records by Skomer Island staff) on Skomer Island in 2023.

Level of disturbance: 1 = unaware of human presence); 2 = alert/aware of human presence but stay on beach 3 = Panic and rush into the water, stay nearshore 4= Panic rush into water and swim away from shore.

Date	Location	Type of boat	Level of disturbance	Notes
15/8/23	MWK/CBY	Lobster Potter	1	Laying pots right into mouth of MWK and CBY
16/8/23	NHV	RIB	2	Cruised close to cliffs and beach, made hauled-out seals on RRK look up and one entered the water
20/8/23	NHV	Lobster Potter	1	Went close to seals on RRK
28/8/23	SHV	Zodiac	1	Divers
1/9/23	NHV	Dale Queen	1	One seal hauled-out lifted head
2/9/23	GST	Kayak	2	Disturbed haul-out on GST
8/9/23	NHV	Lobster Potter	2	The boat was too fast, too close and talked too loudly.
8/9/23	NHV	Lobster Potter	1	Disturbed haul-out on RRK
10/9/23	CBY	5 Kayaks	2	Disturbed seals on CBY, went past close to mouth of bay, 10+ seals entered water
10/9/23	PSB	4 Kayaks	2	Kayaks disturbed seals at Pigstone Bay
12/9/23	SHV	Yacht	1	Pembrokeshire Sailing yacht
15/9/23	NHV	Motorboat	1	Divers inside no access zone, talking and whooping, seals on NHV beach looking at them
15/9/23	NHV/SHV	Microlite	1	
15/10/23	NHV	9 Kayaks	2	Were too noisy, disturbed haul-out on NHV main beach, later pulled kayak onto rocks at landing steps
25/10/23	NHV	Lobster Potter	2	Went up to RRK too fast

Monofilament line and netting were the most visible pollutants affecting seals in 2023. 29 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.

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 located at Martins Haven were also used to inform visitors on how to minimise disturbance.

6.3.8 Disturbance to cliff-nesting birds

In 2023 Skomer Island staff logged 5 incidents of boats or kayaks in the Wick in May, but no significant disturbances were reported. A fishing boat was also reported laying pots in restricted zones at Bull Hole and High Cliffs. In June two kayaks were seen under the cliffs on the east side of North Haven. Following the installation of the sign (see Section 6.2) there were no further incidents at this site.

6.3.9 Spearfishing

No spearfishing was recorded in 2023.

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 in 2023, 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 sites in the Skomer 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.

In 2023 the angling bins, which were getting very tatty after 10 plus years of service, were replaced with two new bins (see Figure 6.4). These were funded by the Welsh Partnership of Marine Protected Areas and are designed specifically for anglers to safely dispose of broken hooks and line; the bins are emptied during the year by Skomer MCZ staff (see Figure 6.5).

Figure 6.4 Angling waste bin located at Martins Haven

Figure 6.5 Angling litter and rubbish emptied from bins.

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 Wrecks

The buoy marking the wreck of The Lucy was lost in September 2022. In June 2023 a new rope and buoy were installed. The Lucy continues to be a popular dive site.

6.3.13 Oil pollution

No oil pollution was recorded at Skomer MCZ during the 2023/24 season.

6.3.14 Litter

Litter has been picked up from Martins Haven beach and at sea throughout 2023. A large bundle of netting was also recovered from North Haven beach (see Figure 6.6).

Figure 6.6 Net recovery from North Haven

In August Skomer Island Wardens and volunteers cleared and bagged rubbish on South Haven beach and stowed it at the top of the beach. The following day the Skomer MCZ team came into the beach at high water with RIB *Morlo* to retrieve the rubbish and return it to Martins Haven. The joint team effort helps to ensure potentially harmful litter is kept away from breeding seals before the start of the seal pupping season.

Where possible the rubbish was sorted for re-use and recycling. Intact buoys are kept for re-use in research projects. Damaged buoys, crates and rope bundles were taken to the Sea Trust's Recyle Môr project, which aims to reduce marine plastic pollution by providing free end-of-life disposal for plastic fishing gear across Pembrokeshire (see Figure 6.7).

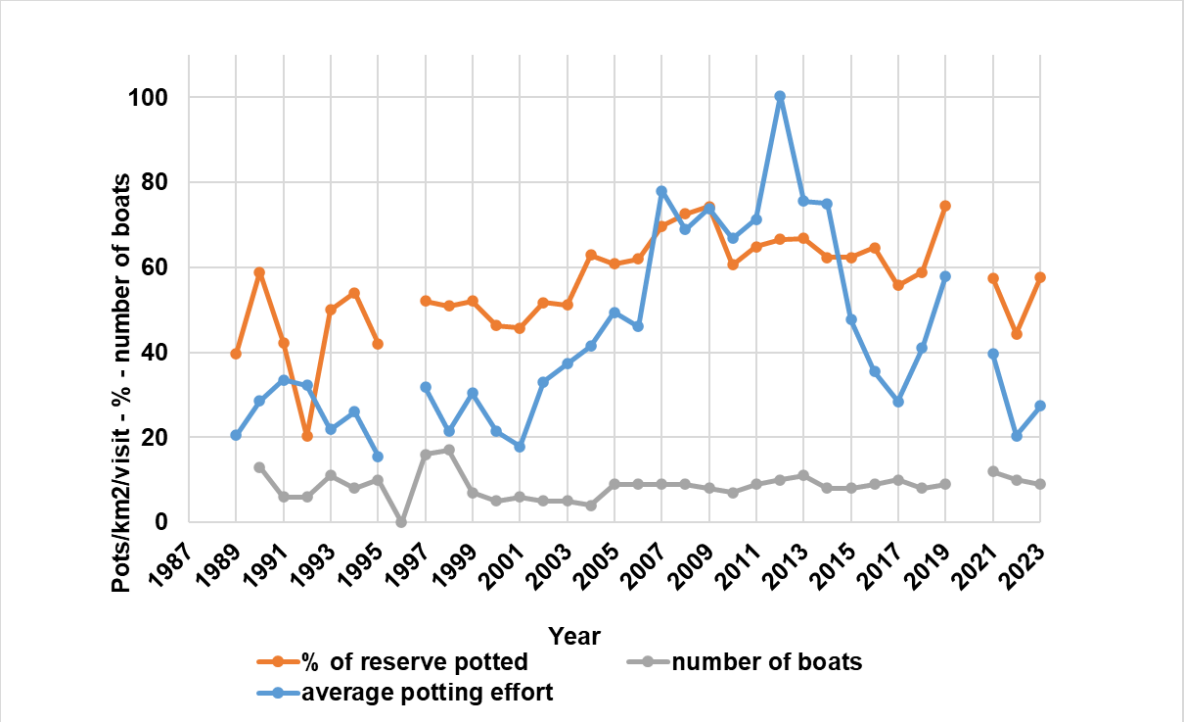
Figure 6.7 Recycle Môr collection bin at Neyland.

7. Visitors and Use of the Skomer MCZ

7.1 Commercial use

Fishing vessels recorded (or whose gear was recorded) operating within Skomer MCZ during 2023 included *Stephanie R* (M150), *Emma Jane* (M119), *Marie Louise* (M36), *Thomas Crean (M380)* and *Martha Rose* (M75).

Figure 7.1 Summary of fishing effort within Skomer MCZ 1989 to 2023



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 decreased in 2022 but a slight increase was recorded in 2023 (Figure 7.1).

The distribution of fishing effort in 2023 is shown in Figure 7.2, and the potting intensity at the main Skomer MCZ survey areas from 1989 to 2023 is shown in Figure 7.3.

The highest density of fishing is 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.

Figure 7.2 Pot fishing intensity map within Skomer MCZ 2023

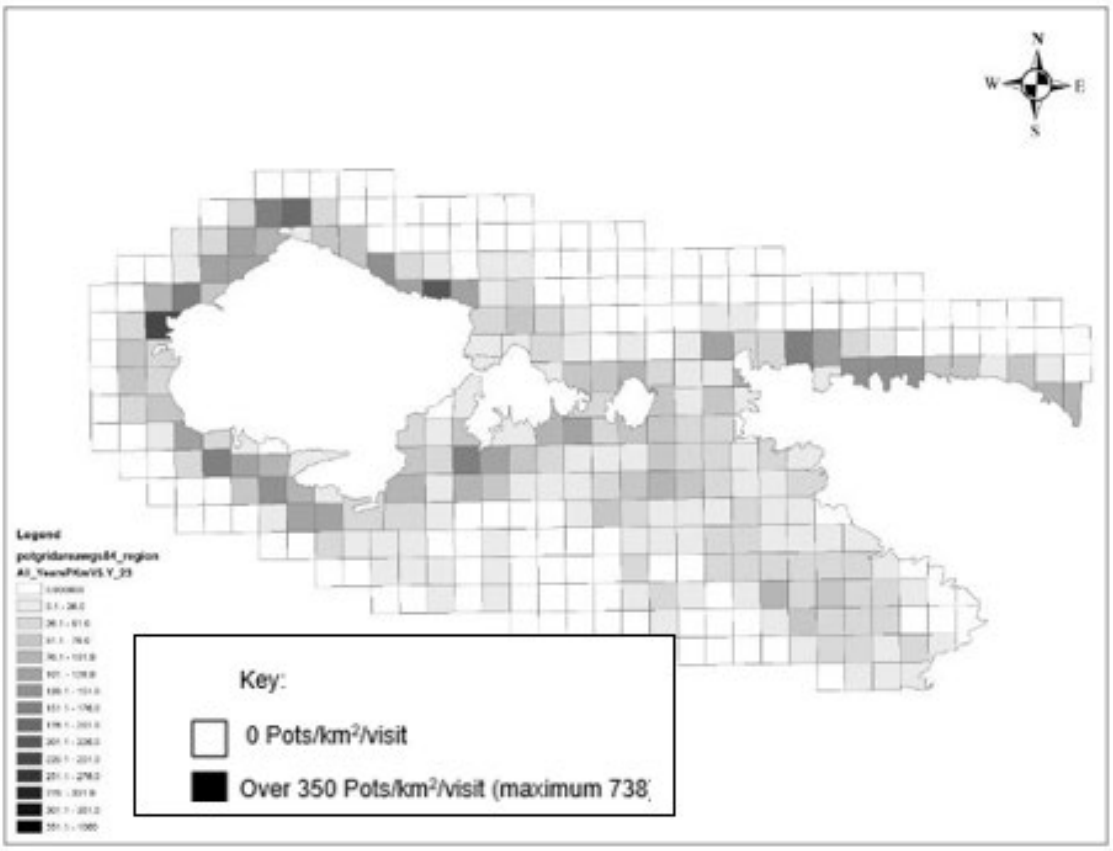
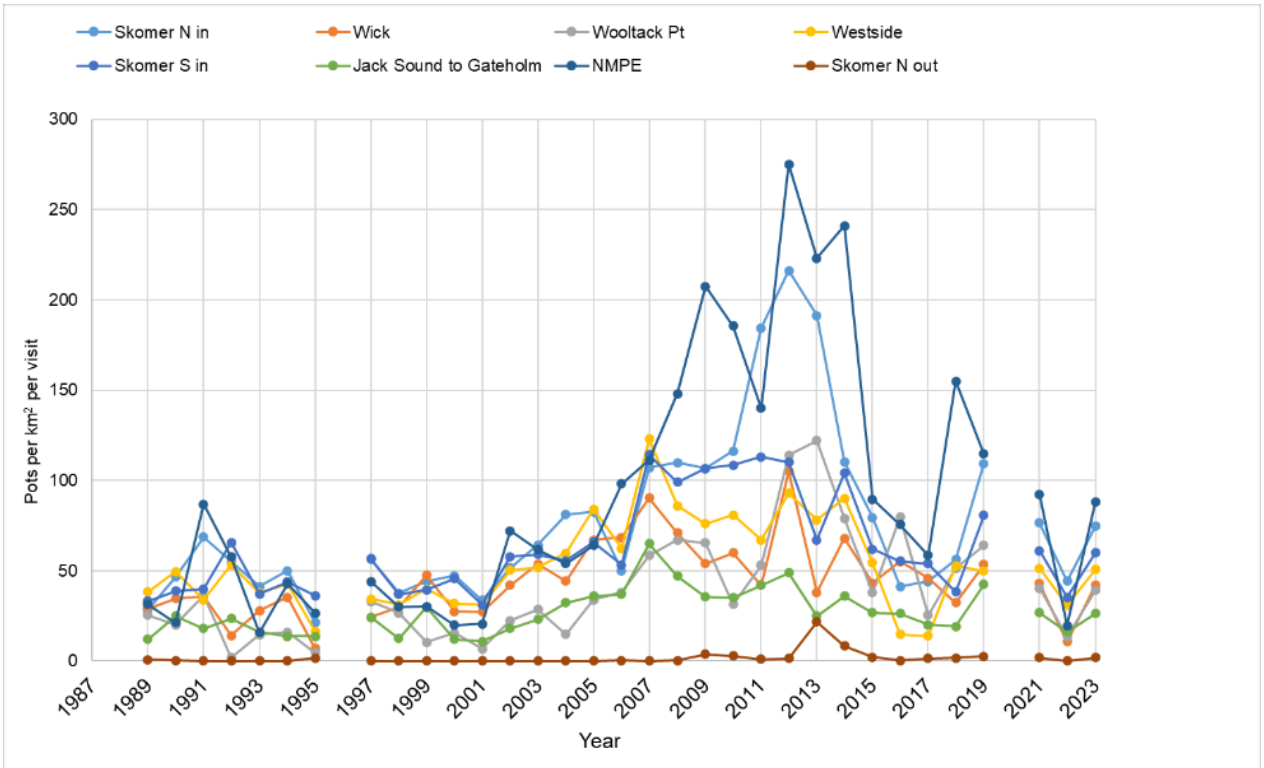


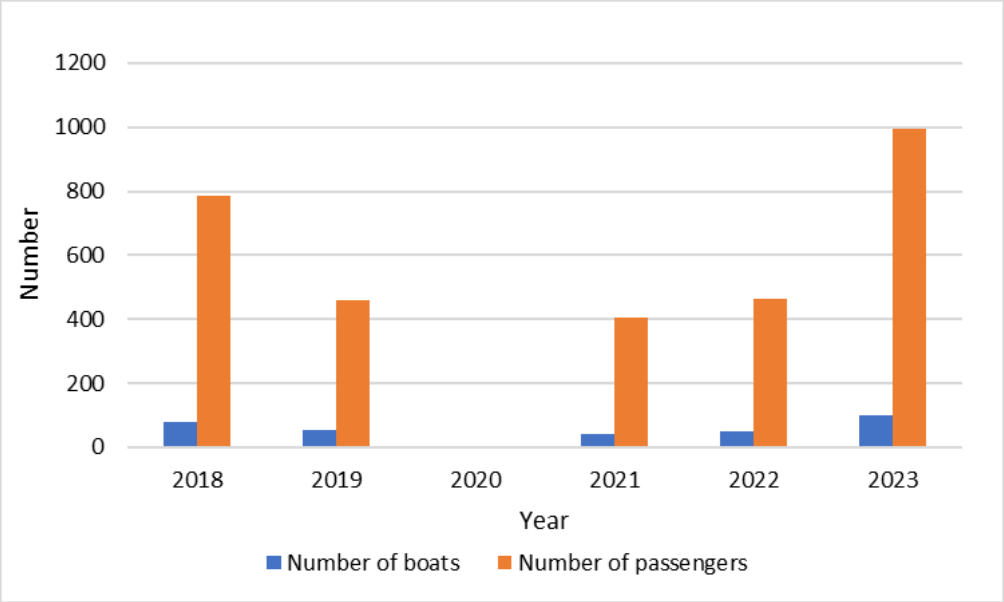
Figure 7.3 Potting intensity around Skomer MCZ split into the main monitoring areas 1989 to 2023



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 recorded total numbers of sightseeing boats fluctuated from year to year but were 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 2023, 98 boats with 993 passengers were recorded, this included one visiting cruise ship with 9 inflatable boats in the water with sightseeing passengers.

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. The numbers landed onto Skomer has not changed (maximum 200 people per day), but the numbers of sightseeing passengers on the 'round island' trips have significantly increased.

Figure 7.4 Sightseeing vessels (excluding Dale Princess/Dale Queen) and total people on board 2018 to 2023



Commercial dive, snorkelling and angling charter boats also operate in Skomer MCZ and these records along with the sightseeing boats are included in the recreational boat use data (see Figures 7.6 to 7.9).

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 7.6 to 7.9, records are from April 2023 to March 2024. Recreational craft are recorded by both Skomer MCZ staff whilst out on the water and by Skomer island staff observations, from April to the end of October. Recreational use figures for divers and anglers remain low, as has been recorded since 2019. There was a slight increase in both recreational boats and total people on board, this is influenced by the changes that have been seen in the different boat visitors; peak time for all activities is between May and August.

The numbers of recreational craft (combined dive, angling, yachts, motor boats and canoes) have fluctuated over the years, ranging between 928 (2018) and 406 (2007) with 738 recorded in 2023 (see Figure 7.7). 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 the highest record of 330 in 2023.

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 507 divers (including snorkel/free divers see Figure 7.5) were recorded in 2023 of which 81 were Martins Haven shore divers (see Figure 7.8).

Figure 7.5 Organised snorkelling activities in South Haven

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), this has dropped to just 90 shore anglers in 2023 (see Figure 7.9). Angling boats have been more consistent over the years with 56 angling boats recorded in 2023. 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.

The changes of recreational craft users from 1989 to 2023 is shown in Figure 7.10. The numbers of dive boats visiting Skomer MCZ has dramatically decreased whilst the number of canoeists has increased, in contrast yachts, motor boats and angling boats have been relatively stable.

Figure 7.6 Recorded Recreational Use Skomer MCZ

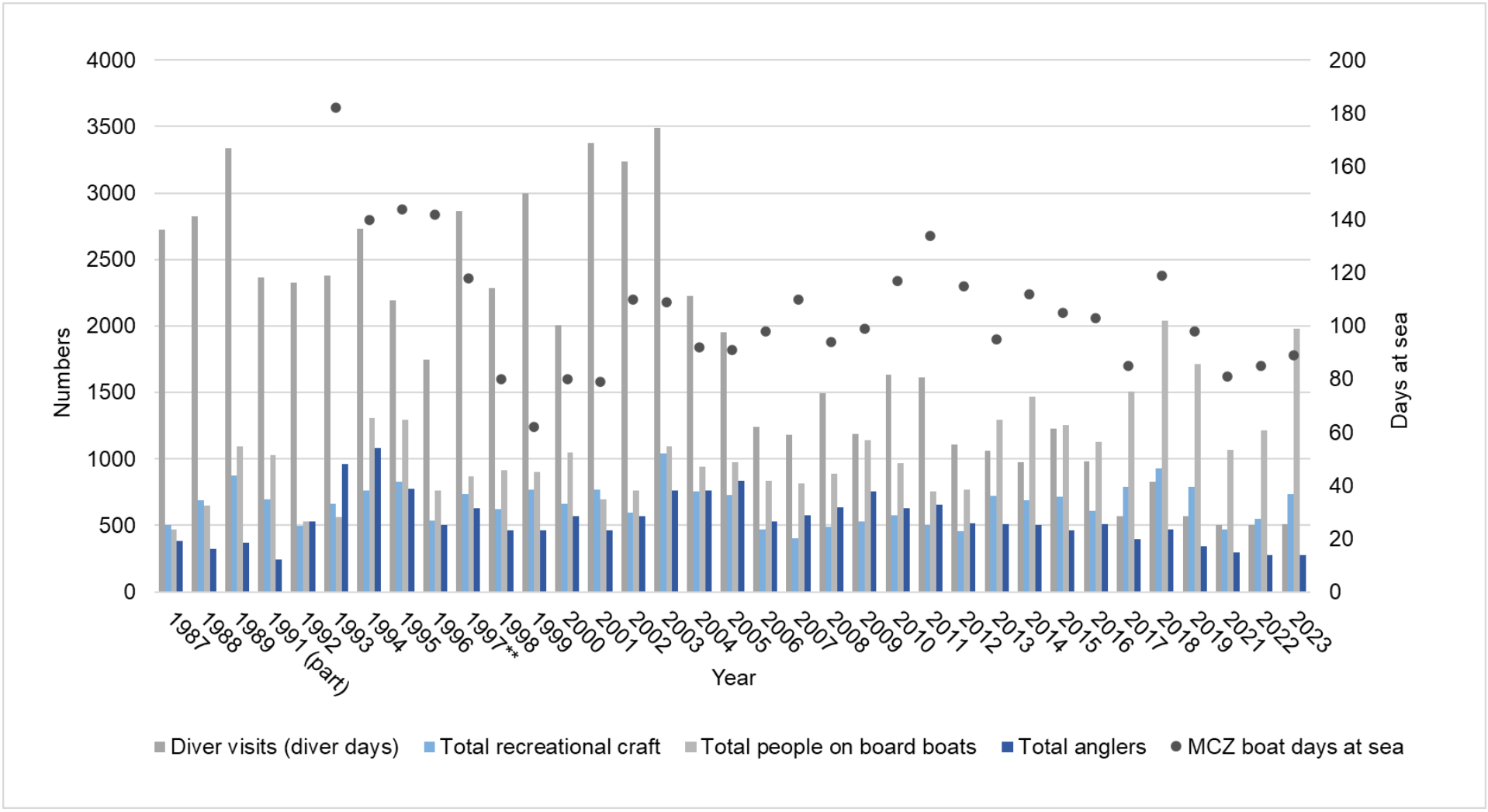


Figure 7.7 Skomer MCZ 2023/24 Recreational Craft

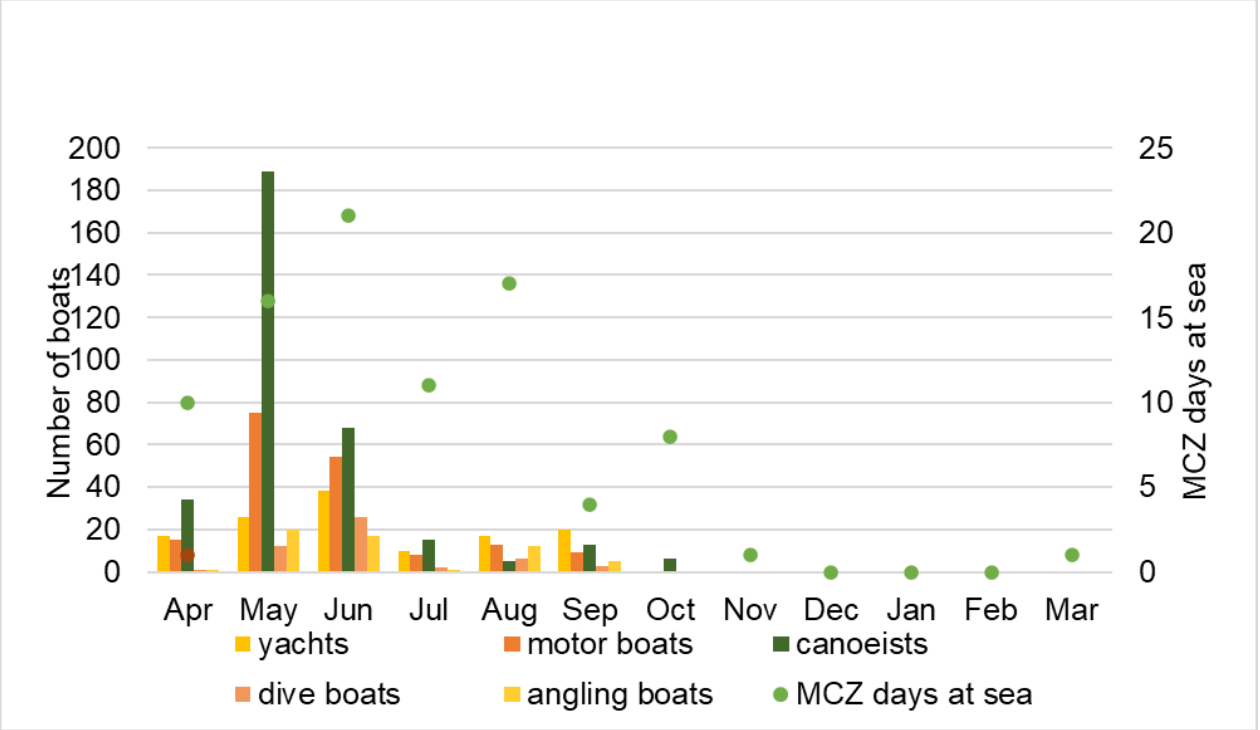


Figure 7.8 Skomer MCZ 2023/24 Divers

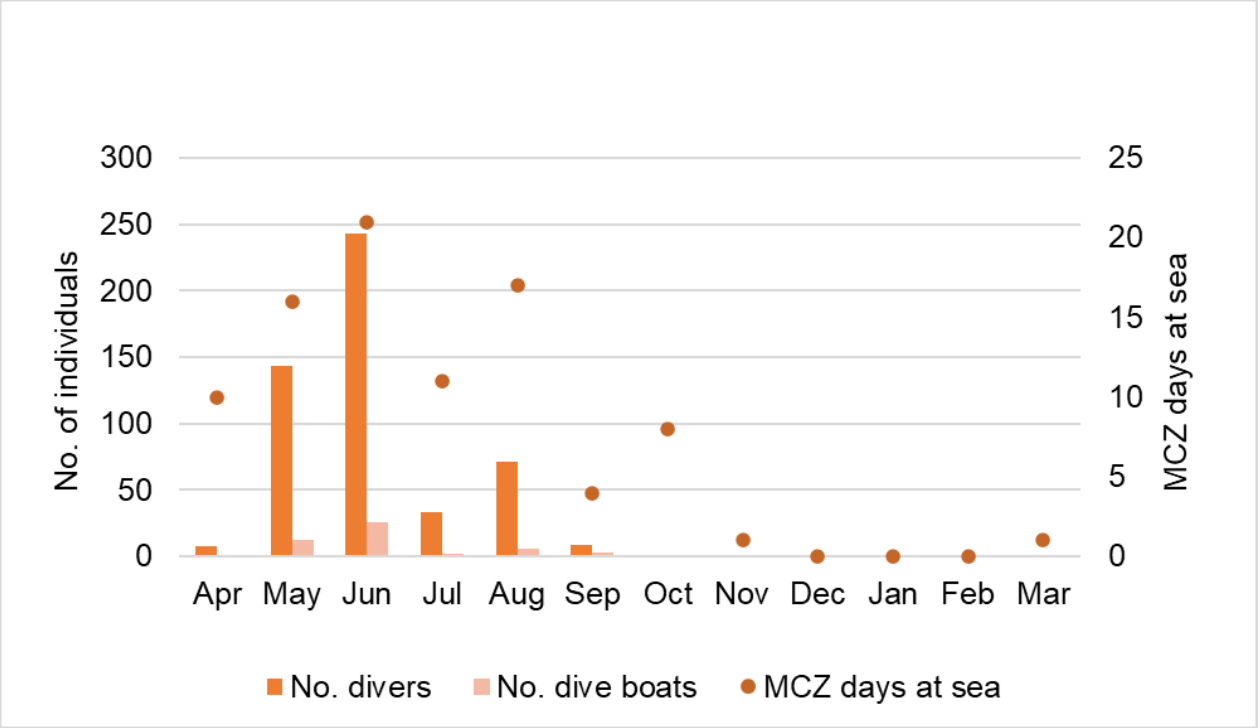


Figure 7.9 Skomer MCZ 2023/24 Anglers

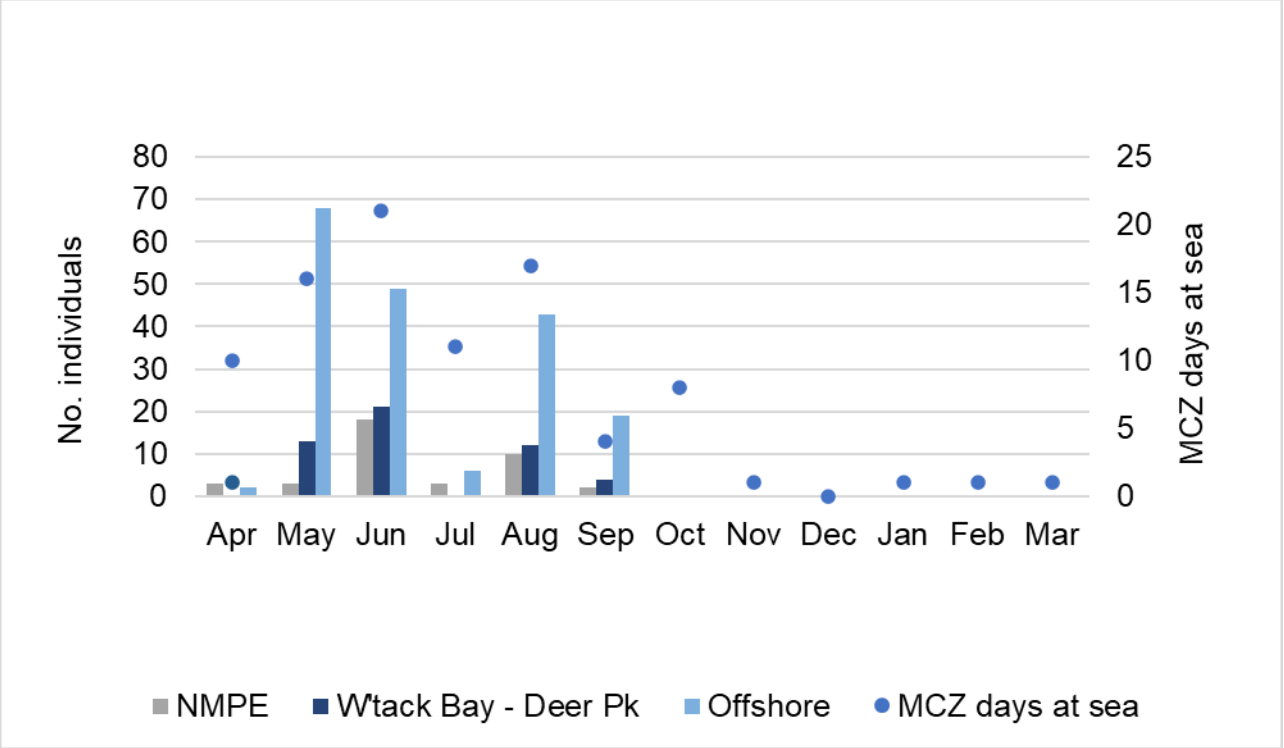
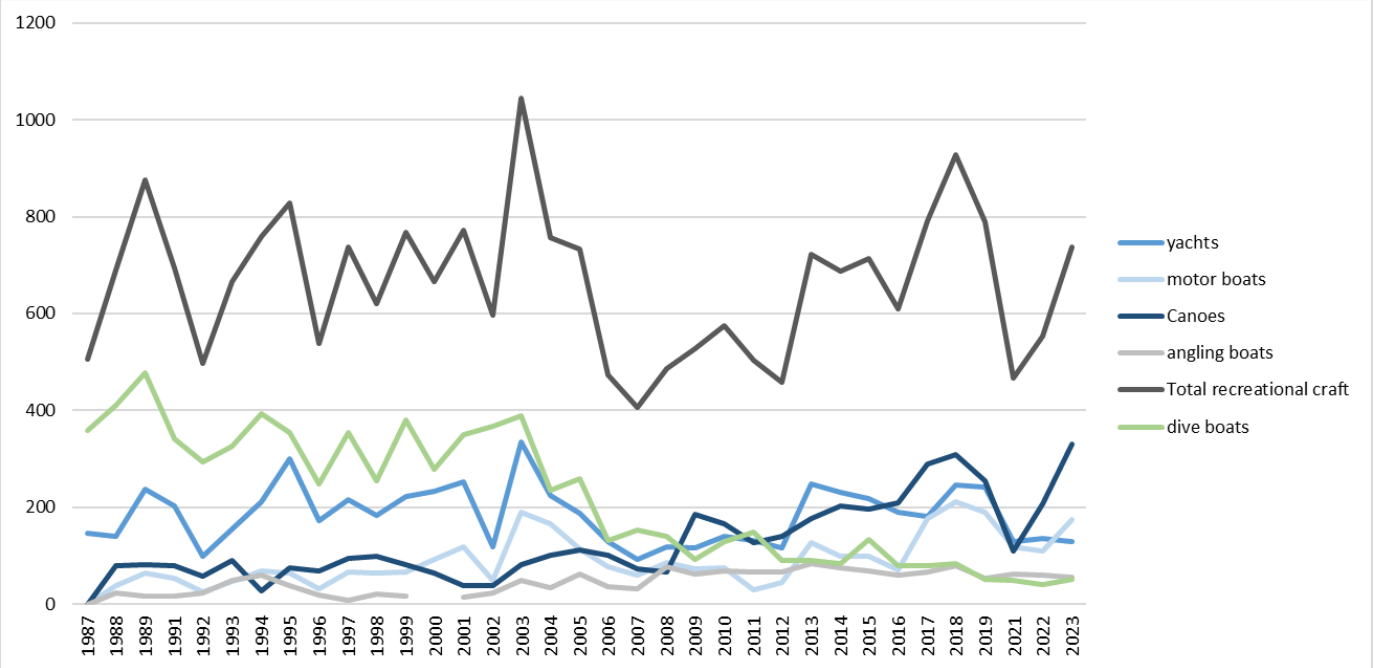


Figure 7.10 Skomer MCZ Recreational craft use 1989 to 2023



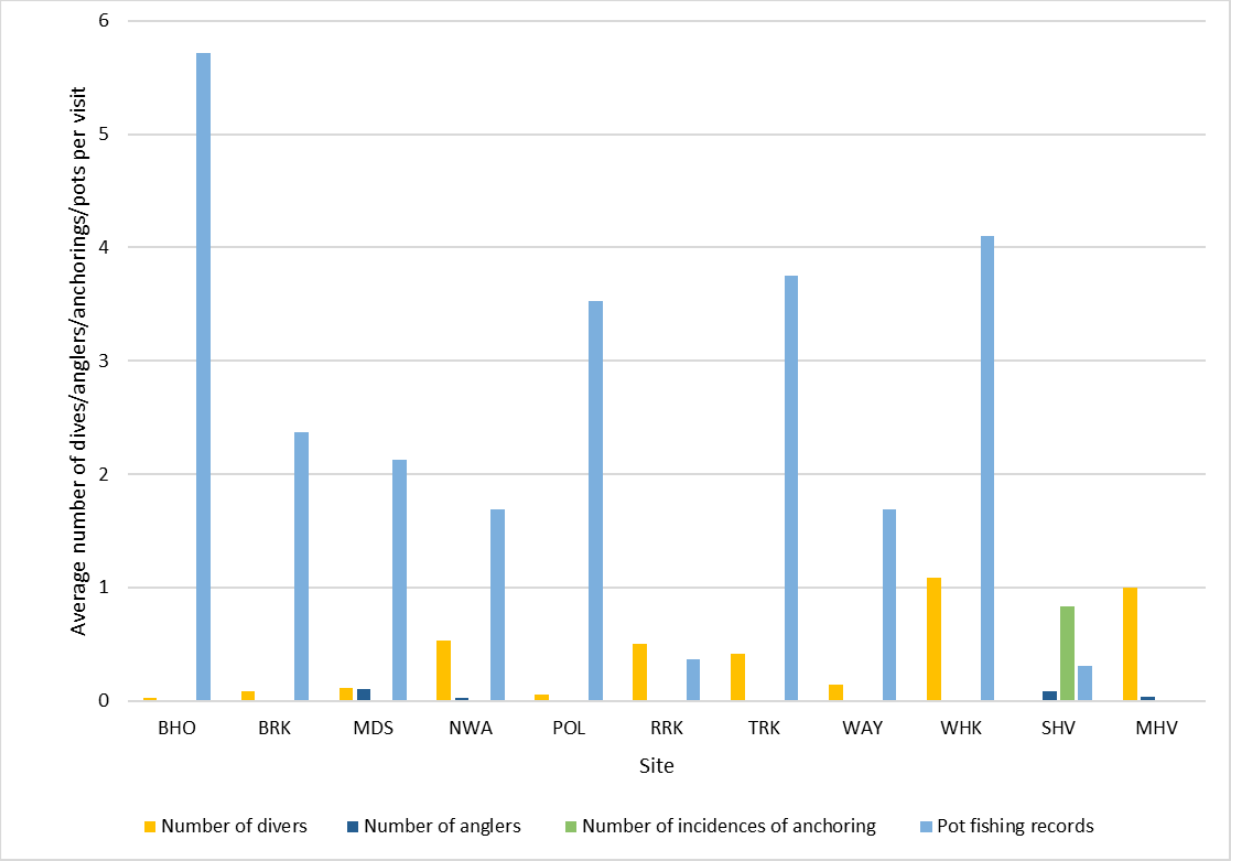
7.3 Seabed contact activities

All activities in Skomer MCZ recorded during 2023 with the potential to contact the seabed have been recorded at monitoring sites for fragile species (pink sea fan *Eunicella verrucosa*, ross coral *Pentapora foliacea* and erect sponge species), and are shown in Figure 7.11. 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 (MHV) 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 7.11 Seabed activity recorded at Skomer MCZ monitoring sites for fragile species corrected for recording effort 2023.
(Sites: Bullhole BHO, Bernies Rock BRK, South Middleholm MDS, Northwall NWA, Pool POL, Rye Rocks RRK, Thorn Rock TRK, Waybench WAY, West Hook WHK, South Haven SHV, Martins Haven MHV)



8. Liaison and Advisory Committees

8.1 Advisory Committee

The Skomer MCZ Advisory Committee meeting was held on 4th April 2023 in Marloes village hall, chaired by Dr Madeleine Havard, twenty-five members attended. Members discussed a range of issues from presentations made by Skomer MCZ staff updating committee members on management and monitoring work.

At the start of the meeting, members welcomed the opportunity to reflect on the huge input that Dr Robin Crump had made to marine education, and to the establishment and work of Skomer MCZ.

Andrea Winterton, NRW Head of Marine Service provided an update on behalf of Welsh Government on the Marine Protected Areas in Wales and Skomer MCZ transition. There is going to be a bespoke approach for Skomer MCZ that will differ from the ongoing Marine Conservation Zones in Wales designation process. This will result in a larger feature list reflecting the importance of the Skomer MCZ's diversity. Having a defined feature list will allow for the setting of conservation objectives for the site and there will be no reduction in protection. There will be a 12-week consultation for the new MCZs, intended to be going ahead in 2024. The intention is to include the information needed for the designation order for Skomer, e.g. MCZ features, conservation objectives and transfer of byelaws, within this consultation.

Guest speakers were welcomed. Dr Nova Mieszkowska from the Marine Biological Association/Liverpool University gave a talk on MarClim, a UK wide project to establish a long-term network of sites to monitor change, forecast future change and inform policies on the marine environment. Kartarzyna Zejc, Aberystwyth University, gave a presentation on developing and testing techniques for eDNA monitoring of *Crepidula fornicata*. Kaila Wheatley, Exeter University, gave a presentation on her PhD studentship to study factors effecting the distribution and genetics of the pink sea fan (*Eunicella verrucosa*). Members welcomed the research talks, agreeing that their inclusion in the meeting usefully brings management and science together.

8.2 Wildlife Trust South and West Wales

In 2023 Leighton Newman returned for his third 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 has completed the survey now for 9 seasons.

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

The assistance of the staff at the Wildlife Trust shop at Lockley Lodge with opening up the Skomer MCZ exhibition was very much appreciated again in 2023. This enabled us to maximise the number of days the exhibition was open, even when Skomer MCZ staff were off-site.

Skomer 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 contact Marine Enforcement staff in 2023, which could be taken as a positive in that there were no observations of fishery byelaw infractions to report.

8.4 Pembrokeshire organisations

8.4.1 Pembrokeshire Coast National Park

Skomer MCZ staff continue to liaise with Pembrokeshire Coast National Park (PCNPA) staff locally and via the Advisory Committee. Mark and Ali participated in a meeting organised by PCNPA to discuss managing coastal visitors in areas sensitive to seal disturbance.

8.4.2 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.

8.4.3 Pembrokeshire Marine Special Area of Conservation

Skomer MCZ has continued to liaise and collaborate with Sue Burton, Pembrokeshire Marine SAC officer who also leads the marine projects in Pembrokeshire for the Wales' flagship Green Recovery project: *Natur am Byth* Partnership.

8.4.4 Pembrokeshire Coastal Forum

Skomer MCZ continues to work with Pembrokeshire Coastal Forum and the Pembrokeshire Marine Code team, collaborating on the production of signage at North Haven (see Section 6.2) and provision of a signage buoy that we plan to install in 2024.

8.4.5 Marloes Community Council

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

8.4.6 Other Organisations

Skomer MCZ staff have worked alongside others including the Neptune's Army of Rubbish Collectors (Section 6.3.2 and 6.3.10) and National Coastwatch Institution, who maintain watches at the former Coastguard Lookout on the Deer Park.

8.5 Academia

A number of academic institutions and students have worked with Skomer MCZ staff during 2023.

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. Kaila visited the Skomer MCZ for a week in May 2023, diving with the team to collect samples to complete DNA analysis (see Figure 8.1). Kaila has produced a poster to illustrate her research (see Appendix 2).

Figure 8.1 Pink sea fan samples preserved for DNA work

Dr Joseph Ironside and research student Katarzyna Zejc from Aberystwyth University joined the Skomer MCZ team in June 2023 (previous sampling in 2022) to take further water samples for eDNA analysis in order to identify the presence of the non-native American slipper limpet *Crepidula fornicata*. The eDNA assay detected *C. fornicata* in water samples from 2022 but not from 2023.

Figure 8.2 Kartarzyna Zejc and Joe Ironside collecting water samples

The second generation “Sea-Hives” supplied by David Francis from the Sea Hives project in 2018 continue to be deployed at the ocean monitoring site. 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 8.4). We were asked to test the effectiveness of the sea hives; we can confirm that they have been successfully colonised by a variety of marine organisms. This project is one of a number we have carried out over the years where there is no impact on the Skomer MCZ and where a minimal amount of effort is required on our behalf to collaborate in innovative work.

Figure 8.4 Sea-Hives at OMS site (photo Blaise Bullimore)

8.6 Visiting organisations and groups

Visitors to the Skomer MCZ in 2023 included Carmarthenshire and Pembrokeshire Members of the Senedd, Sam Kurtz and Paul Davies, accompanied by Chloe Wenman from Marine Conservation Society and Andrea Winterton NRW head of Marine Service. Sam is the Grey Seal ‘Species Champion’ in the Senedd, so we completed a walk around the Deer Park to see the seals (see Figure 8.3).

Figure 8.3 Members of the Senedd visit to the Deer Park.

NRW colleagues from the Marine Coastal Planning and Policy team visited to learn about the work that we do and enjoyed a boat trip around the island.

8.7 Wider marine environmental initiatives

Mark represents NRW and the Skomer MCZ for the ‘Big Picture’, a JNCC led project involving 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. Mark is chairman of the annotation software group and attended online meetings during 2023.

9. Science

All science monitoring and recording projects completed in the 2022 season are reported in detail in the **Skomer MCZ Project Status Report 2023/24 (NRW Evidence Report number 750)**, which is available via the NRW website Natural Resources Wales / Marine and coastal evidence reports . Summaries of these projects are provided below.

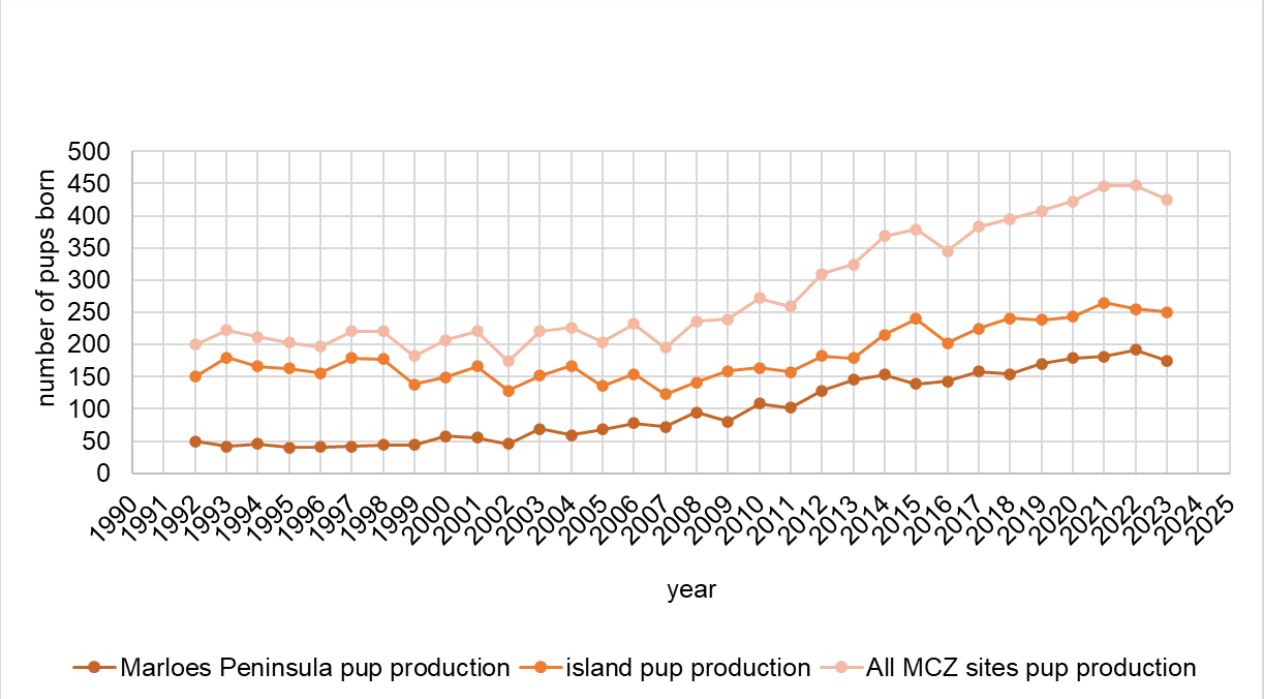
9.1 Biology

9.1.1 Monitoring 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 were monitored by the Skomer MCZ team.

In 2023, 250 pups were born at Skomer Island sites and 175 pups at mainland sites giving a total of 425 pups born in the Skomer MCZ (Figure 9.1).

Figure 9.1. Skomer MCZ pup production 1992 - 2023



Pup production in the Skomer MCZ for the past 5 years has shown the highest totals recorded for the area, with annual production averaged for 2019-23 being 429 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 2023, pup survival through to moult was recorded as 74.8% for Skomer sites and 89% for Marloes Peninsula sites, with a combined survival for the Skomer MCZ of 80%.

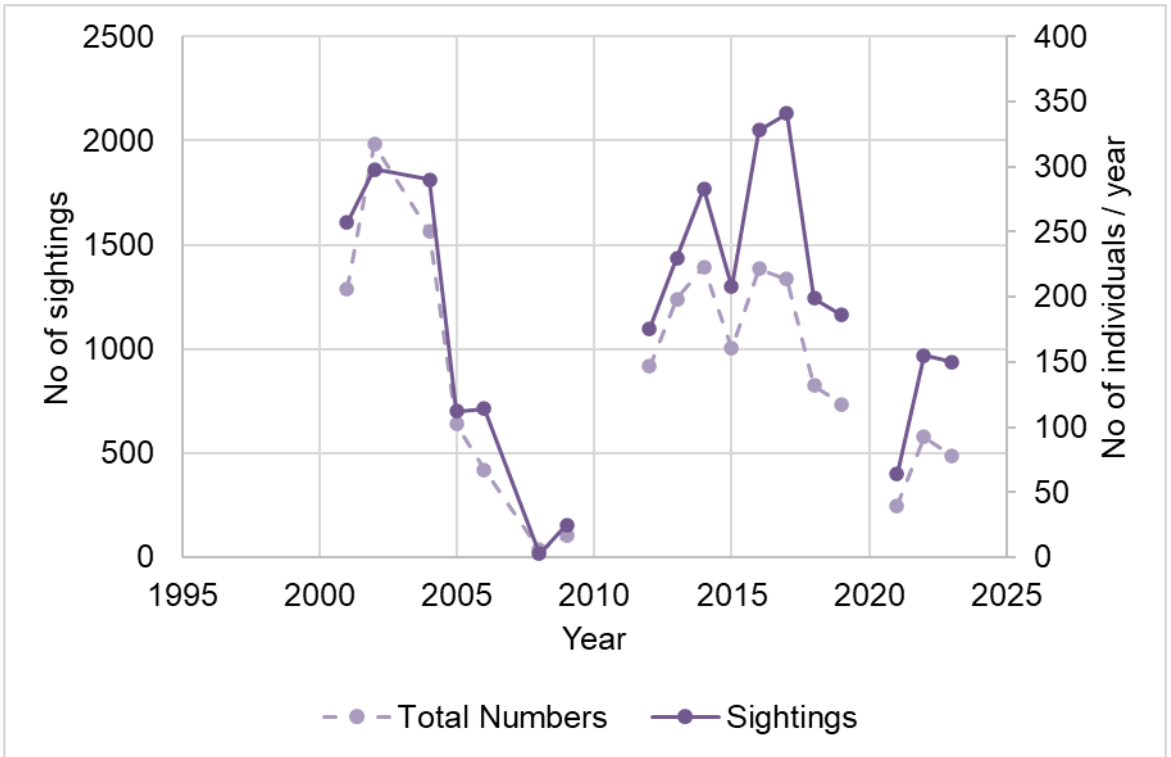
Monofilament line and netting were the most obvious pollutants affecting seals in 2023. 29 individual seals on Skomer were photographed with obvious signs of being entangled in nets at some time in their lives, most commonly a deep scar around their necks, often with netting still embedded.

9.1.2 Monitoring Cetaceans

Skomer MCZ staff collate all sightings of cetaceans collected by Skomer Island staff, Skomer 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 and 2023, 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 (*Phocoena phocoena*) sightings between 2001 and 2023 is shown in Figure 9.2.

Figure 9.2 Harbour porpoise sightings Skomer MCZ 2001 – 2023. (No recording occurred in 2010, 2011 and 2020).



Common dolphin (*Delphinus delphis*) uses the area infrequently, but they can appear in large numbers. In 2023 sightings were made by Skomer Island and Dale Sailing crews staff, there being 41 sightings with 444 individuals recorded.

In 2023 2 sightings with a total of 3 Bottlenose dolphin (*Tursiops truncatus*) and 5 sightings with total of 23 individual Risso's dolphin (*Grampus griseus*) were recorded in the Skomer MCZ.

A single sighting of a Minke Whale (*Balaenoptera acutorostrata)* was recorded for the first time in the Skomer MCZ, it was spotted by Island staff outside of North Haven on the 1st of June 2023.

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 (Wales) Act 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 2023.

Crawfish *Palinurus elephas* is an Environment Act (Wales) 2016, Section 7 species of principal importance. From 2009 to 2023 it was recorded in low numbers in Skomer MCZ by staff and volunteers.

9.1.4 Monitor Littoral Habitats / Communities

Littoral habitat and community surveys were completed in 2023 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.

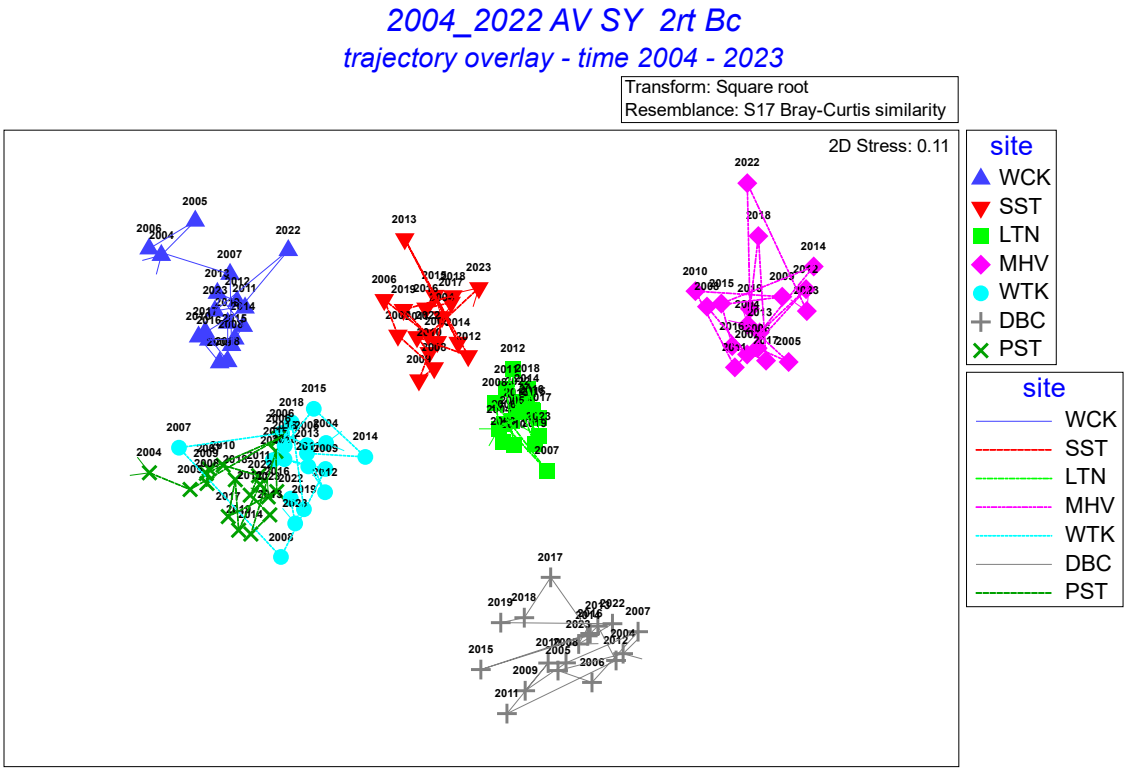
Table 9.1 Summary of methods completed at each littoral site.

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 9.3.

Figure 9.3 PRIMER Multi-dimensional scaling (MDS) plot of all littoral community data 2004 – 2023 (Averaged to site and year with a trajectory line with time).

Site codes: Wick WCK, South Stream SST, Lantern LTN, Martins Haven MHV, Wooltack WTK, Double Cliff DBC, Pig Stone PST.



General summary:

- The sites neatly separate out and stay separate over the twenty-year period. This suggests community composition is consistent across the whole of the Skomer MCZ.
- Between the years there isn't a lot of variation within each site. The communities are stable over the time period.
- No one year consistently sticks out as an outlier, again, suggesting the communities are stable over the time period.

The communities on the shores have not shown any major changes during the monitoring period 2003 to 2023.

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 over the period, averaging a CTI of 12^{o}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 2023 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 Environment Regulations 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 results from Skomer samples show how variable the abundances are between years and between species. Since 2010 210 taxa have been identified and 112 taxa were identified in 2023.

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 2023 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, the number of sponges seen increased in 2022 and it was noted that small entities could be confidently identified in the new images. In 2023 the image quality was again good, and it was noted that there was very little fine sediment on the rock on the day the photographs were taken.

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 Skomer MCZ. The community at Thorn Rock is quite dynamic in terms of total number of sponges visible but the overall community structure appears stable.

A full sponge species diversity survey was completed in 2023 at Thorn Rock sites, High Court Reef and The Wick. Photographs were taken in the field and samples collected, where necessary, for spicule preparations and microscopic analysis to confirm identification. Analysis and reporting will be completed in 2024.

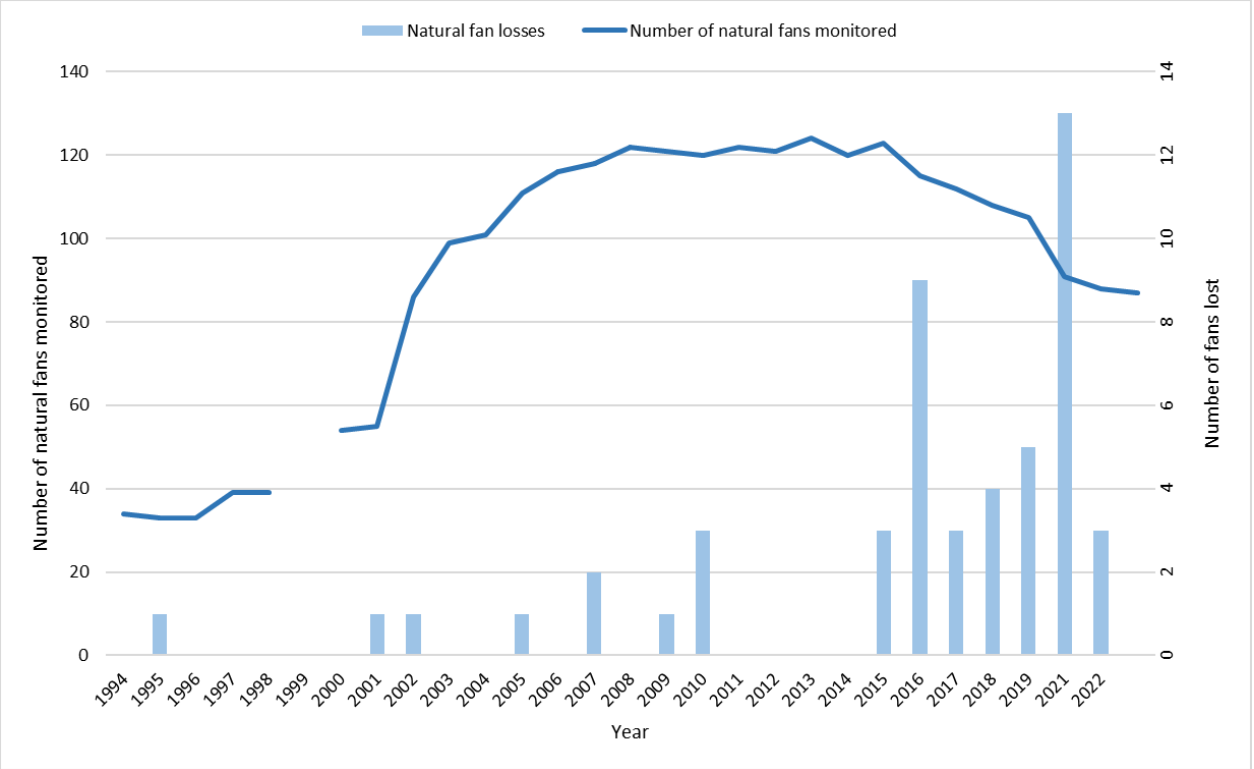
9.1.7 Monitoring Pink Sea Fan Population

All sea fan monitoring sites were visited, and individual colonies photographed in 2023.

In 2022, 3 fans were found missing, these were re-checked in 2023 and confirmed as losses. In 2023 one further sea fan was missing at South Middleholm, this will be checked, and its status confirmed in 2024. An additional sea fan was found broken off at Rye Rocks, it has been re-attached with a cable tie and will be checked again in 2024.

From 1994 new sites were mapped till there were 10 monitoring sites established by 2005, some sites were expanded until there was a peak 124 sea fans in the programme in 2013. A total of 50 losses of natural sea fans have been recorded throughout the period of the project, with 40 of these since 2015 (Figure 9.4). There have also been 6 losses of artificially attached fans.

Figure 9.4. Total number of natural sea fans monitored 1994 to 2022 (2020 omitted as no survey completed) and number of losses each year. Note: artificially attached sea fans not included in these data.



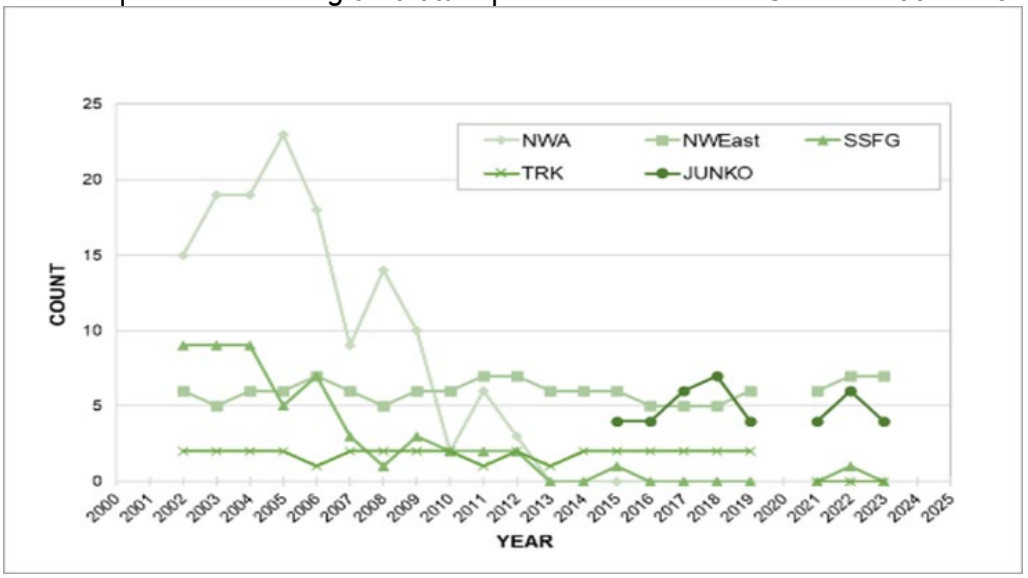
Sea fan condition assessment methods were reviewed in 2021, when the full data set was revisited, to track the condition of each individual sea fan and to assess the overall condition, looking at levels of necrosis, epiphytes, damage, branch loss and entanglement of catshark eggs. The condition assessment methods were applied to the 2023 photo data set and findings are detailed in the Skomer MCZ Project Status Report 2023/24.

9.1.8 Monitoring *Alcyonium glomeratum* Population

The abundance of *A. glomeratum* continues to decline at all monitoring sites except for North Wall East (NWEast) and Junko's reef (JUNKO), which have sizable colonies. North Wall Main (NWA), Rye Rocks (RRK), Thorn Rock (TRK) and Sandy Sea Fan Gully(SSFG) now have no visible colonies (Figure 9.5).

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 9.5 Number of quadrats with *A. glomeratum* present at Skomer MCZ sites 2002 – 2023.



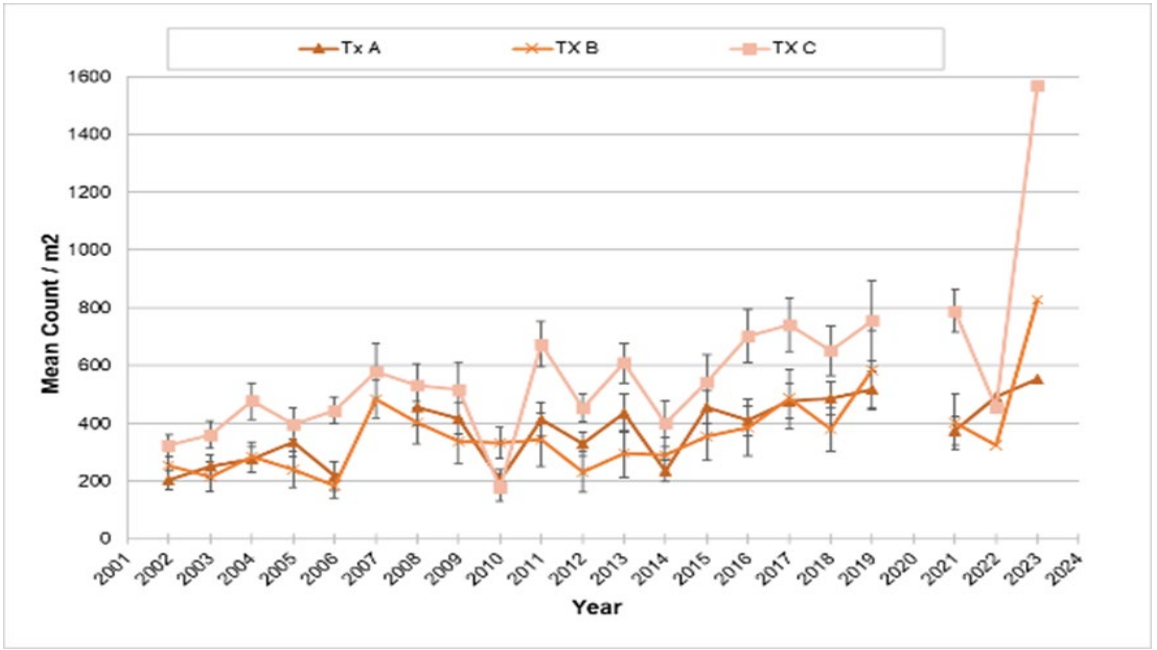
9.1.9 Monitoring Cup Coral Populations

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^2 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). In 2023 there was very little silt and the cup corals were visible, even very tiny ones could be seen, which might explain why counts were their highest for each of the transects (Figure 9.6).

Figure 9.6 *Balanophyllia regia* abundance per metre^2 at Transects A, B and C at the Wick 2002 to 2022

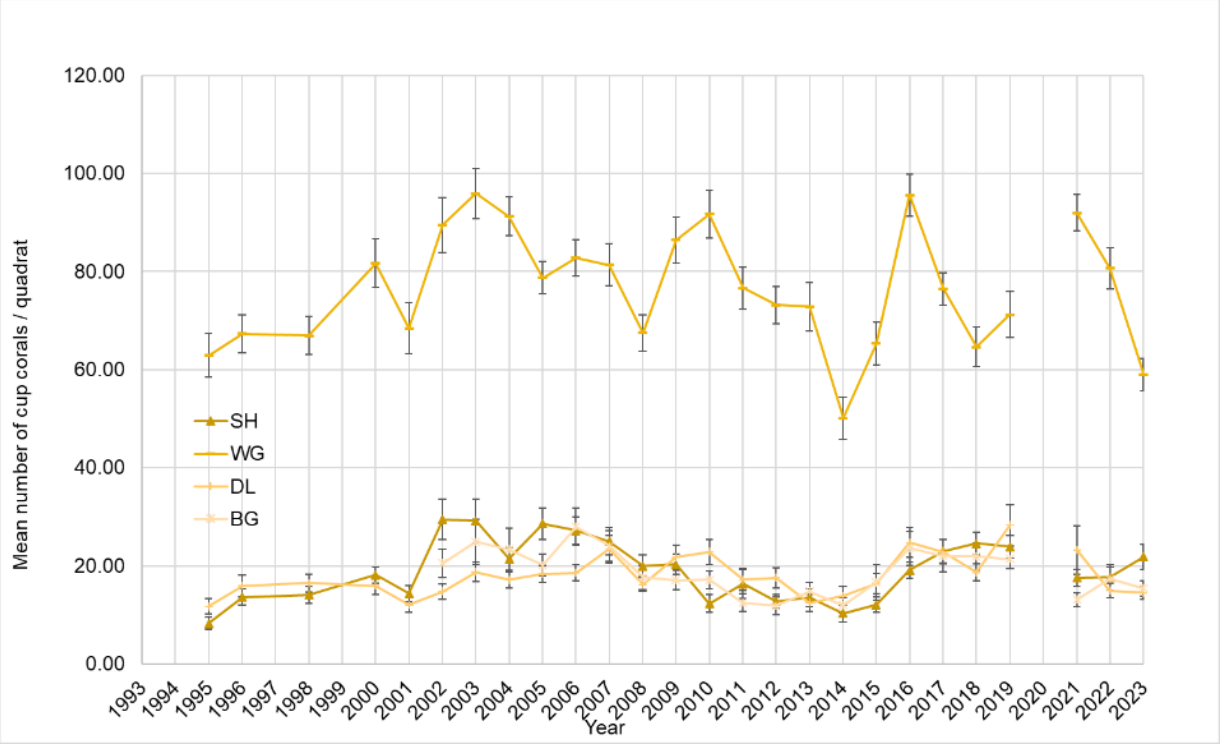


At Thorn Rock five photo quadrats are taken in the Rock Mill and further photo quadrats are taken along two short transects. The average count /m² of *B. regia* has fluctuated at the Rock Mill, variability is most likely due to dense covering of algae obscuring the corals and thick coverings of silt 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 2023 when high photo quality was obtained with clear images of the corals. The average count /m² of *B. regia* at the transects is lower than that at Rock Mill. Further data is needed to monitor trends.

Caryophyllia smithii

The average number/m^2 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 9.7). 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.

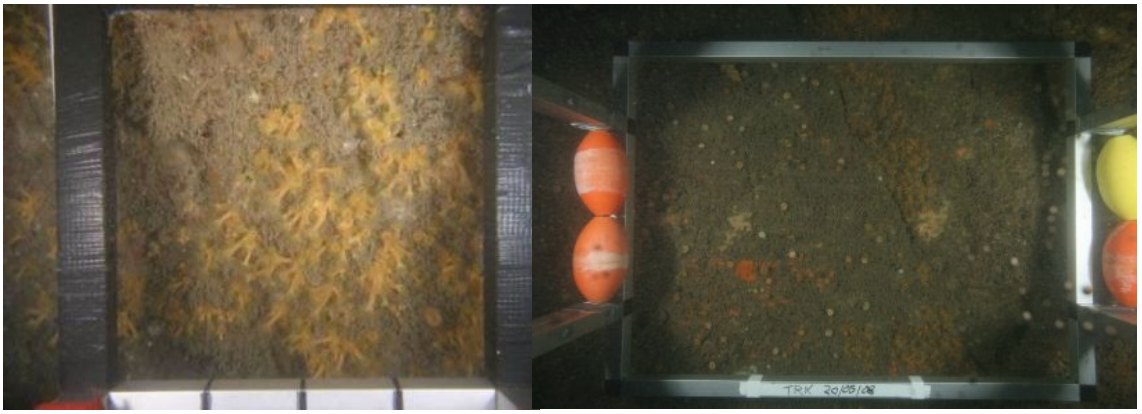
Figure 9.7 Mean Number of *Caryophyllia smithii* per Quadrat at Thorn Rock 1996 – 2023 (Site codes: Spongy Hillocks SH, Windy Gully WG, Dog Leg DL, Broad Gully BG)



9.1.10 Monitoring *Parazoanthus axinellae*

All monitoring sites were visited and all yellow trumpet anemone, *P. axinellae* colonies were still present. Photos are taken to assess both colony area and density (Figure 9.8).

Figure 9.8 Density method: 20 x 20cm framer and Colony area method: 50 x 70cm framer



The colony area and the mean density of *P. axinellae* polyps (numbers of polyps /m^2) at all sites has shown fluctuations year to year, but overall are stable.

The frequency of *P. axinellae* at all sites has shown fluctuations year to year, but overall show a stable population. All sites in 2023 showed a decrease from 2022 (Figure 9.9 and 9.10).

Figure 9.9 Mean frequency of *Parazoanthus axinellae* 2002 – 2023 at Thorn Rock (TRK) transects.

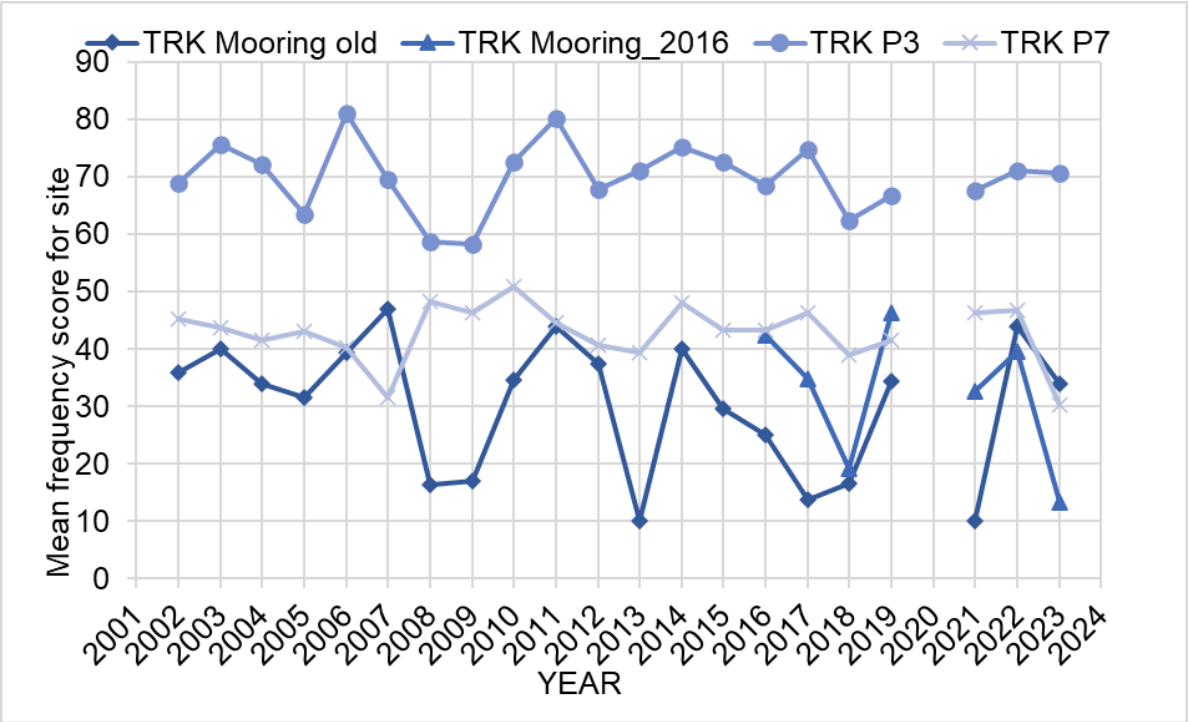
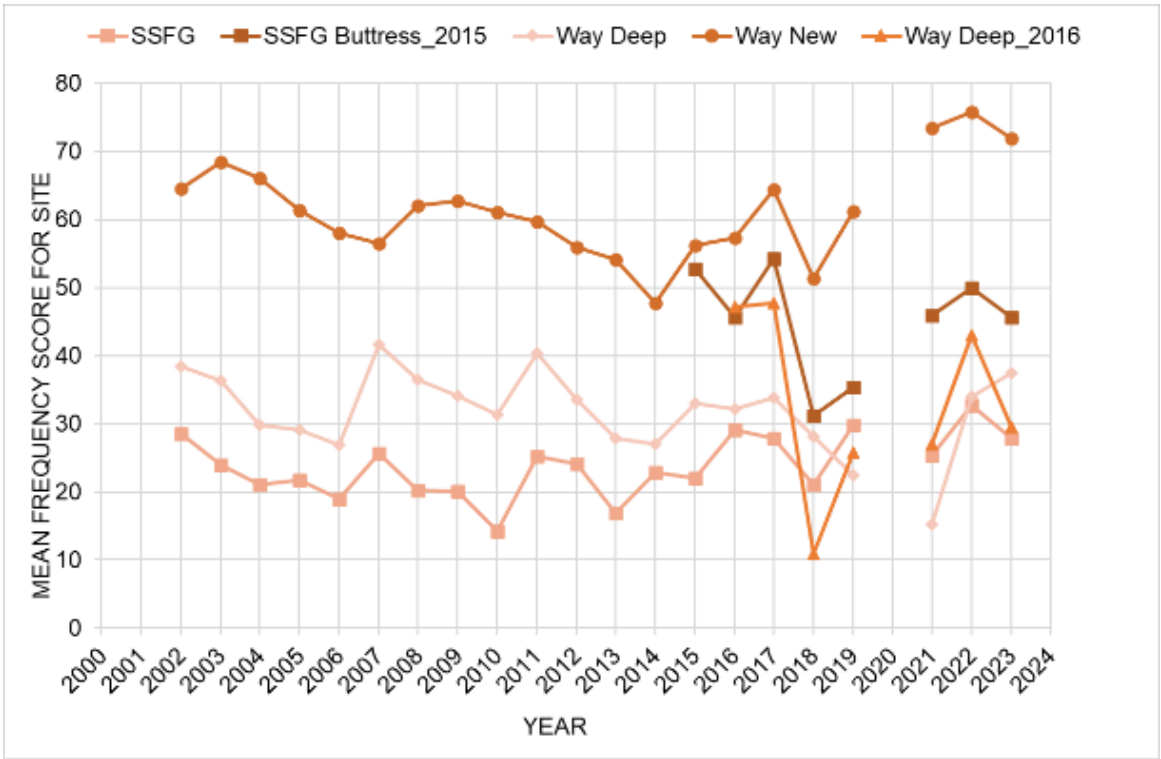


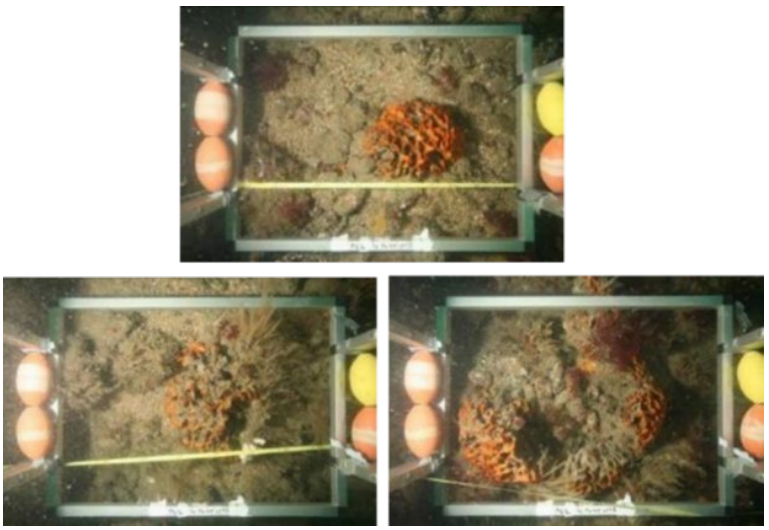
Figure 9.10 Mean frequency of *Parazoanthus axinellae* 2002 – 2023. Waybench (Way Deep, Way New) and Sandy Sea Fan Gully (SSFG, SSFG Buttress) transects.



9.1.11 Monitoring *Pentapora foliacea* Population

In 2023 all *Pentapora* sites except the Pool 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 9.11.

Figure 9.11. *Pentapora foliacea* - examples of Class 4 (above) and Class 5b colonies (below).

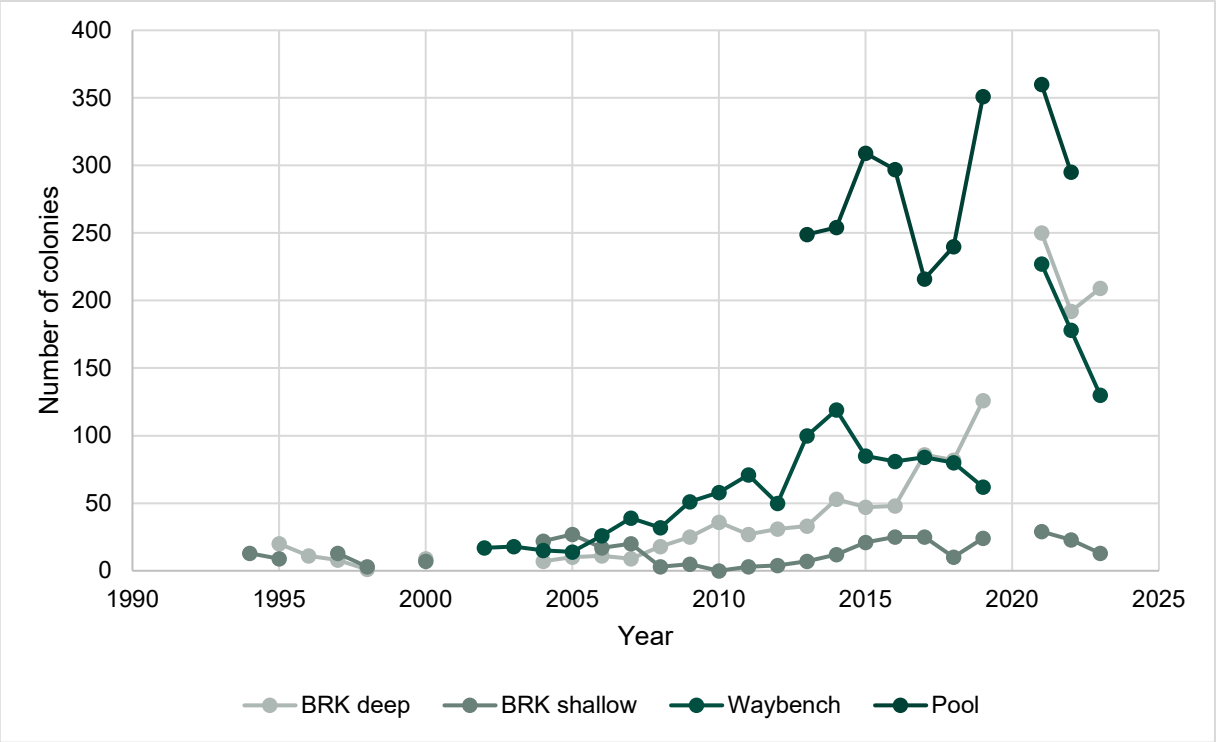


By comparing numbers of Class 2-4 colonies, which represent healthy growing colonies, with Class 5 colonies, which represent those with deterioration from either natural or anthropogenic factors, it can be demonstrated that there are more Class 2-4 colonies than

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 9.12. No survey was completed at the Pool site in 2023.

Figure 9.12 Total number of *Pentapora foliacea* colonies (all classes) recorded for each year surveyed at Waybench, Pool and Bernies Rock (BRK deep and BRK shallow).

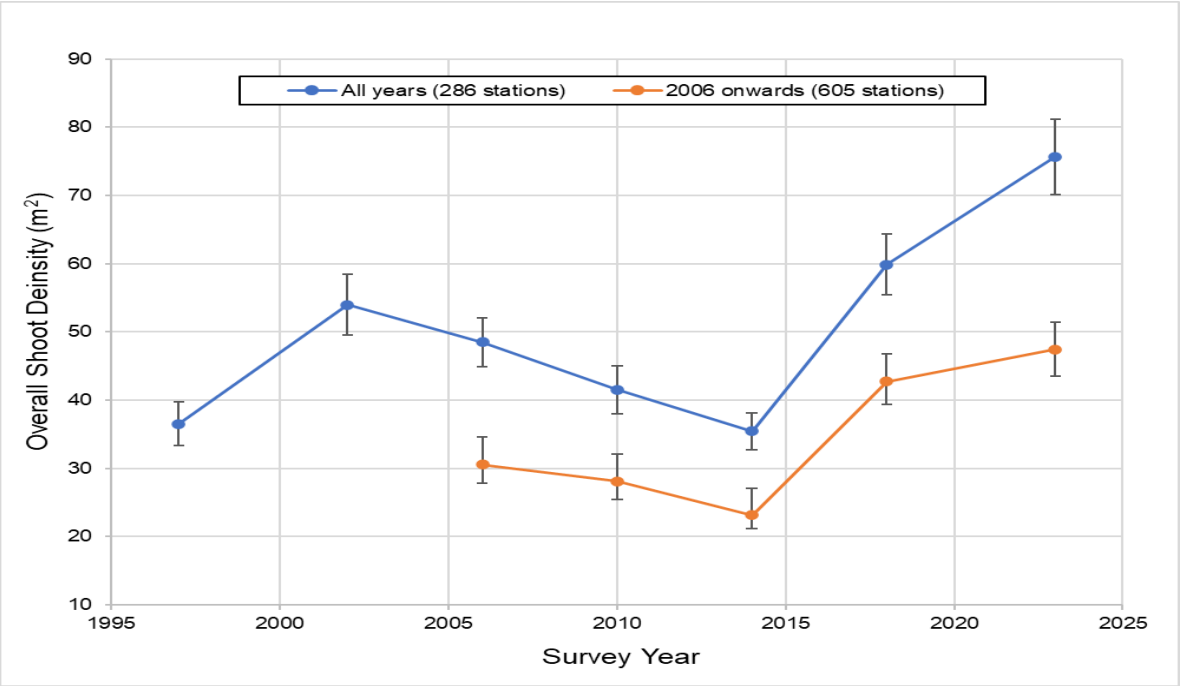


9.1.11 Monitoring *Zostera marina* Population

The *Zostera marina* bed in North Haven was surveyed in 2023, detailed results are reported in the **Skomer MCZ Distribution & Abundance of *Zostera marina* in North Haven, Skomer, 2023. NRW Report No: 753** available on the NRW website.

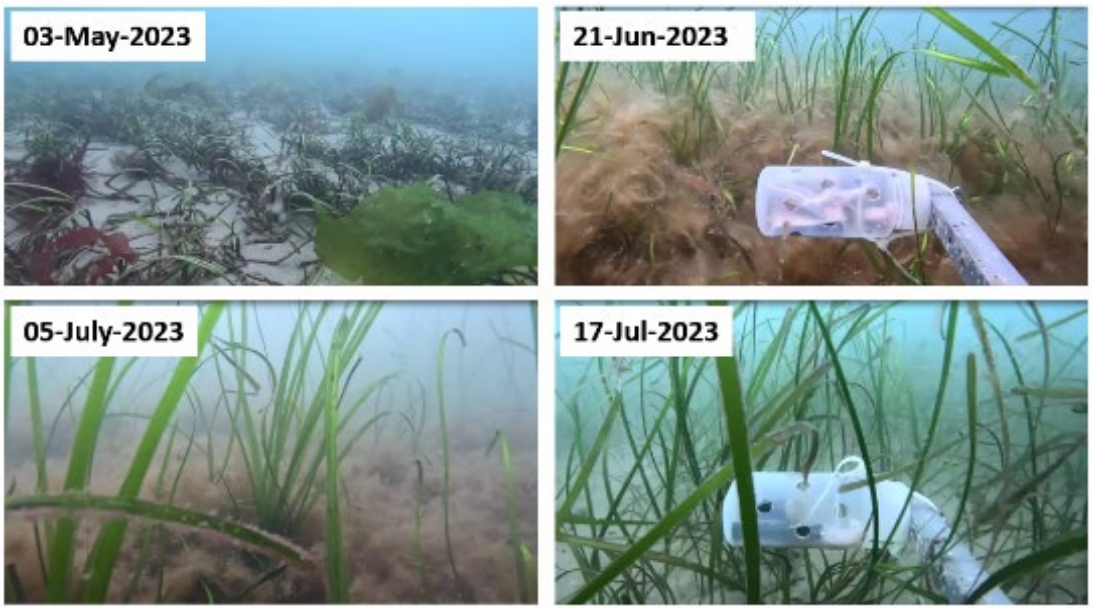
Results show a 2.3% decrease in area of extent compared to the last survey in 2018. There has been a slight increase in shoot density across the bed (number of shoots per m^2 has increased from 42.4 shoots / m^2 in 2018 to 47.4 shoots / m^2 in 2023), see Figure 9.13. The shoot density continues to increase from the low counts in 2014, with 2023 showing the highest average shoot density recorded to date.

Figure 9.13 Comparison of shoot densities 1997-2023 and 2006-2023 (95% S.E. bars) [using data from survey stations sampled in every survey year].



A dense blanket of filamentous brown algae covered the bed during the survey period in June and July (Figure 9.14), this severely hampered the survey work and some modifications to the method were needed. Density counts were completed in 3 quadrats at each station opposed to 6 as completed in previous surveys. A remote underwater video survey was completed to collect mobile species data and to monitor the condition of the bed, deployments were completed from May to September and once in January 2024.

Figure 9.14 Appearance of filamentous brown algae over the North Haven *Zostera marina* bed



9.2 Meteorology/Oceanography

9.2.1 Recording 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).

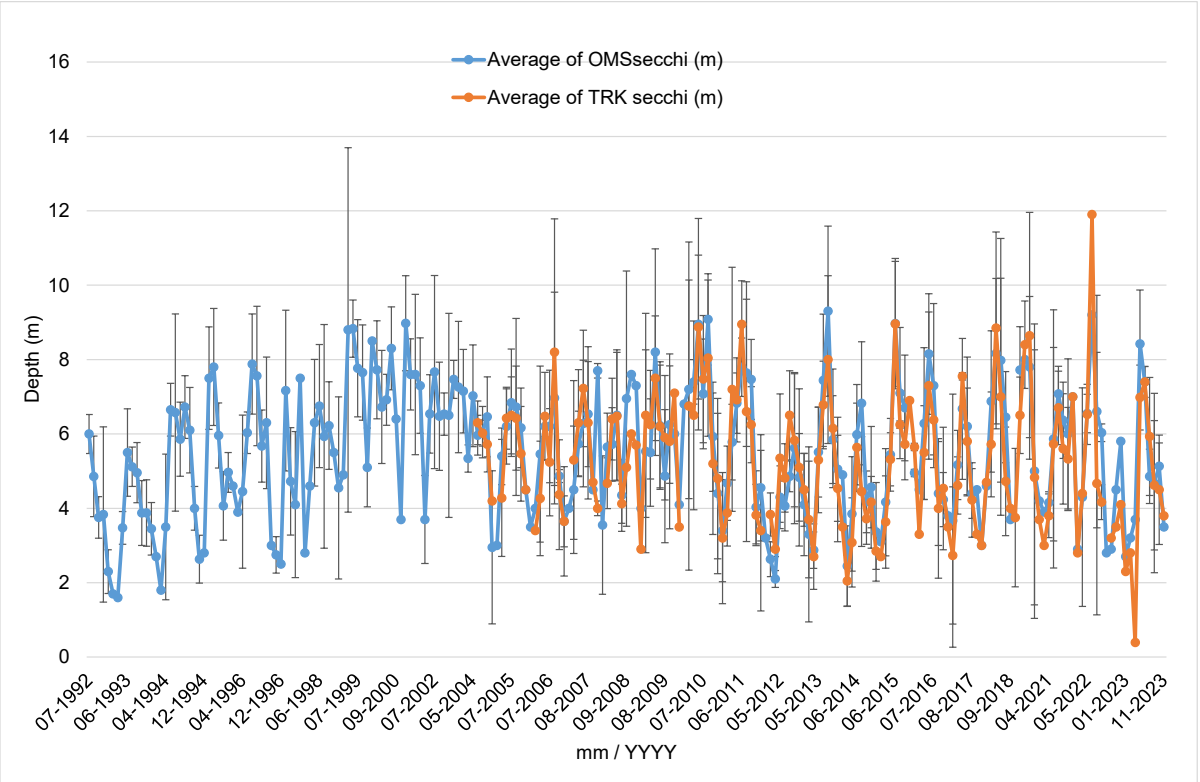
Table 9.3 The highs and lows of temperature and wind recorded in 2023:

Maximum temperature (ºC)	25.9 (September)
Minimum temperature (ºC)	-0.2 (March)
Annual maximum gust (knots)	83.4mph (April)
Direction of maximum gust (degrees)	293

9.2.2 Monitoring Seawater Turbidity / Suspended Sediment

Seawater turbidity was measured using a Secchi disc weekly between May to October at Thorn Rock (TRK) and Ocean Monitoring Site (OMS). Turbidity at Skomer MCZ in 2023 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 9.15.

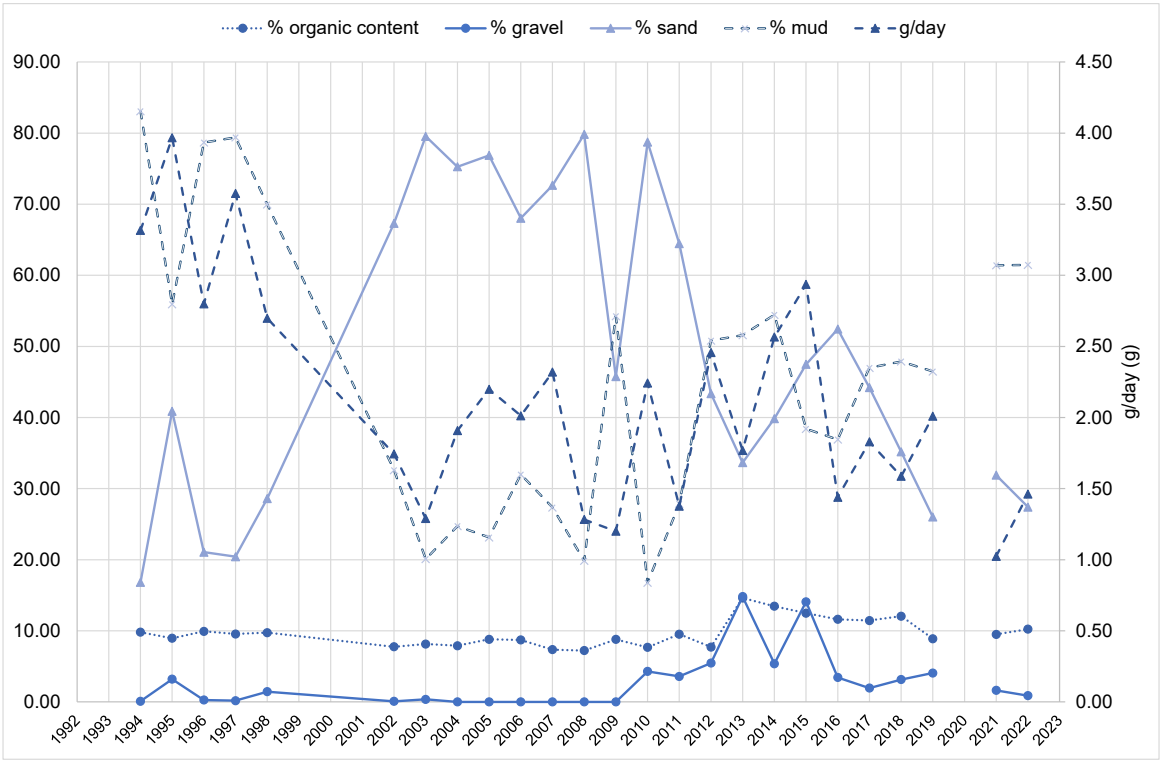
Figure 9.15 Skomer MCZ summary of monthly mean Secchi disc data (m) 1992 – 2023 with 95% standard error bars.



9.2.3 Monitoring Seabed Sedimentation

Seabed sedimentation samples were collected at the Ocean Monitoring Site (OMS) and Thorn Rock (TRK) 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 9.16). 2023 samples are being analysed by the NRW laboratory and this data will be available in 2024.

Figure 9.16 Skomer MCZ sediment trap sample total sediment, particle size analysis and organic content analysis at OMS and TRK sites combined 1994 to 2022.



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

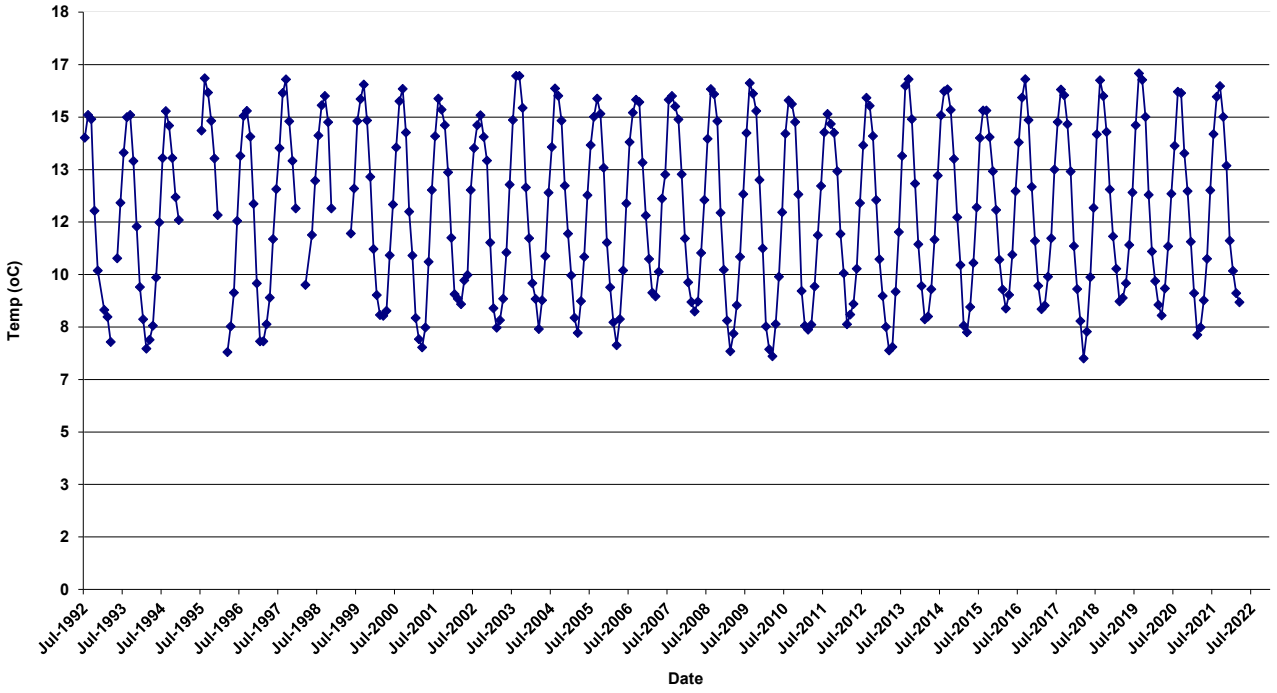
9.2.4 Recording Seawater Temperature

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

A summary of the seabed temperatures for 1992 to 2022 from the logger at 19 m below chart datum is shown in Figure 9.17. The 2023 data will be added to the dataset when the logger is retrieved for downloading in April 2024.

Monthly means have been calculated from seabed temperature but substituted with the vertical profile seabed temperature data where logger data were absent.

Figure 1 Skomer MCZ summary of monthly mean seabed temperature 1992 – 2022.



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.

Skomer MCZ reports continue to be available via the NRW website, Natural Resources Wales / Marine and coastal evidence reports.

9.4 Other work

As team members of the Marine Monitoring, Assessment and Reporting team (MMART), Skomer MCZ staff continue to support the work of the NRW marine monitoring programme, especially where it is most efficient logistically for us to carry out the work or where the Skomer MCZ staff have the necessary skills or equipment. In 2023 this included:

- WFD monthly water sampling at Skomer site and Pickleridge (Dale) lagoon site.
- The team helped with a NRW led Milford Haven maerl bed project. Maerl beds are formed by calcareous red algae that grow as unattached nodules forming dense but relatively open beds of coralline algal gravel that support diverse communities of animals (see Figure 9.18). In April we collected maerl samples for DNA analysis and in August provided diving support for a full survey.

Figure 9.18 Maerl sample

- Mark continued to service a number of temperature loggers around the Pembrokeshire coast, including shore and lagoon sites;

- Mark provided boat support for bird counting work at Stackpole to support NRW's Senior Reserve Manager, Paul Culyer;

- Kate joined the NRW -Pembrokeshire Marine SAC diving team in September to help complete the monitoring dives at sites within Milford Haven waterway, the Smalls and Junko's Reef.

- 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. Non-native species are included in the MarClim project and for the first time the invasive carpet sea squirt *Didemnum vexillum* was found at the Neyland site (see Figure 9.19). Samples were taken and sent to the Marine Biological Association to confirm identification. During October further areas in Milford Haven were explored alongside NRW marine colleagues and samples have been sent to Dr Joe Ironside at Aberystwyth University for DNA analysis.

Figure 9.19 Invasive carpet sea squirt *Didemnum vexillum*

- In January 2023 the whole team completed all the SAC lagoon sampling at Pembrokeshire sites: Pickleridge (Dale), Neyland and Carew lagoons.

10. Education and Interpretation

10.1 Fisherman's Cottage Skomer MCZ Exhibition

The Skomer MCZ exhibition room at Martins Haven was once again opened to the public in 2023. 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 Skomer MCZ staff are away from the site.

In 2023 the interactive touch screen was switched back on for visitors to use. Both the TV screen and the overlaying touch screen are 15 years old and showing their age, and the functioning quality had become very poor. In the autumn a new TV screen was installed to allow a rolling video. A decision was made not to replace the touch screen as experience with their use and longevity has been poor at other NRW visitor centres.

10.2 Talks and Presentations

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

Kate gave a talk in November 2023 on Skomer MCZ seals at Marloes village hall for the local community.

Kate gave a talk at the Marine Evidence Conference held in Bangor in February 2024, the talk presented evidence of the current status of pink sea fan and fragile sponge and anthozoan communities and how this can inform possible management.

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 eelgrass survey, long-term photo monitoring and visitor information on seal watching.

Kate wrote an article published in Natur Cymru- Nature in Wales Summer 2023 publication titled 'Skomer's Pink Sea fan'.

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 eelgrass project diving volunteers and dive charter skippers
- Skomer Island NNR Warden, Leighton Newman, Cerys Aston and the rest of the Skomer Island team
- Phil Newman, Blaise Bullimore, Francis Bunker, James Perrins, Becky Tooby, Kaila Wheatley, Rob Spray for fieldwork support
- The Dale Sailing crews from *Dale Queen, Dale Princess, Wave Dancer and Helen Clare*
- Lockley lodge WTSWW staff for regularly opening the visitor centre
- Neptune's Army of Rubbish Collectors for helping to keep the Skomer 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 2023. NRW Evidence Report number 750.

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 2023, as in previous years, the breeding activities of the grey seals on Skomer Island were observed and recorded using this methodology.

250 pups were born on Skomer in 2023, which is five less than in 2022. On the Marloes Peninsula 175 pups were born, giving a total of 425 pups for the Skomer MCZ as a whole, which is 22 pups less than in the previous year.

2023 was an early pupping season, with the first pups born on North Haven beach and at Driftwood Bay on 28/7/23. The peak of pupping was in weeks 36 and 37. The most productive beaches were North Haven (50 pups) and Matthew's Wick (50 pups).

172 pups are known, or assumed, to have survived on Skomer, the fate of 15 pups is unknown, giving a survival rate 73%. On the mainland 155 pups are known, or assumed to have survived, giving a survival rate of 89%. The overall survival rate for the whole of the Skomer MCZ is 80%.

In 2023 the maximum haul-out (on the main haul-out sites) was 504 seals. North Haven had its peak haul-out count of 198 seals on 14/11/23. Driftwood Bay had 89 seals on 7/11/23, Matthews Wick had 123 seals on 3/11/23 and Castle Bay had 146 seals on 7/10/23.

135 seals with scars or tags were photographed in 2023, of which 61 (52 cows, one seal with unknown sex and eight bulls) were re-identified from previous photos.

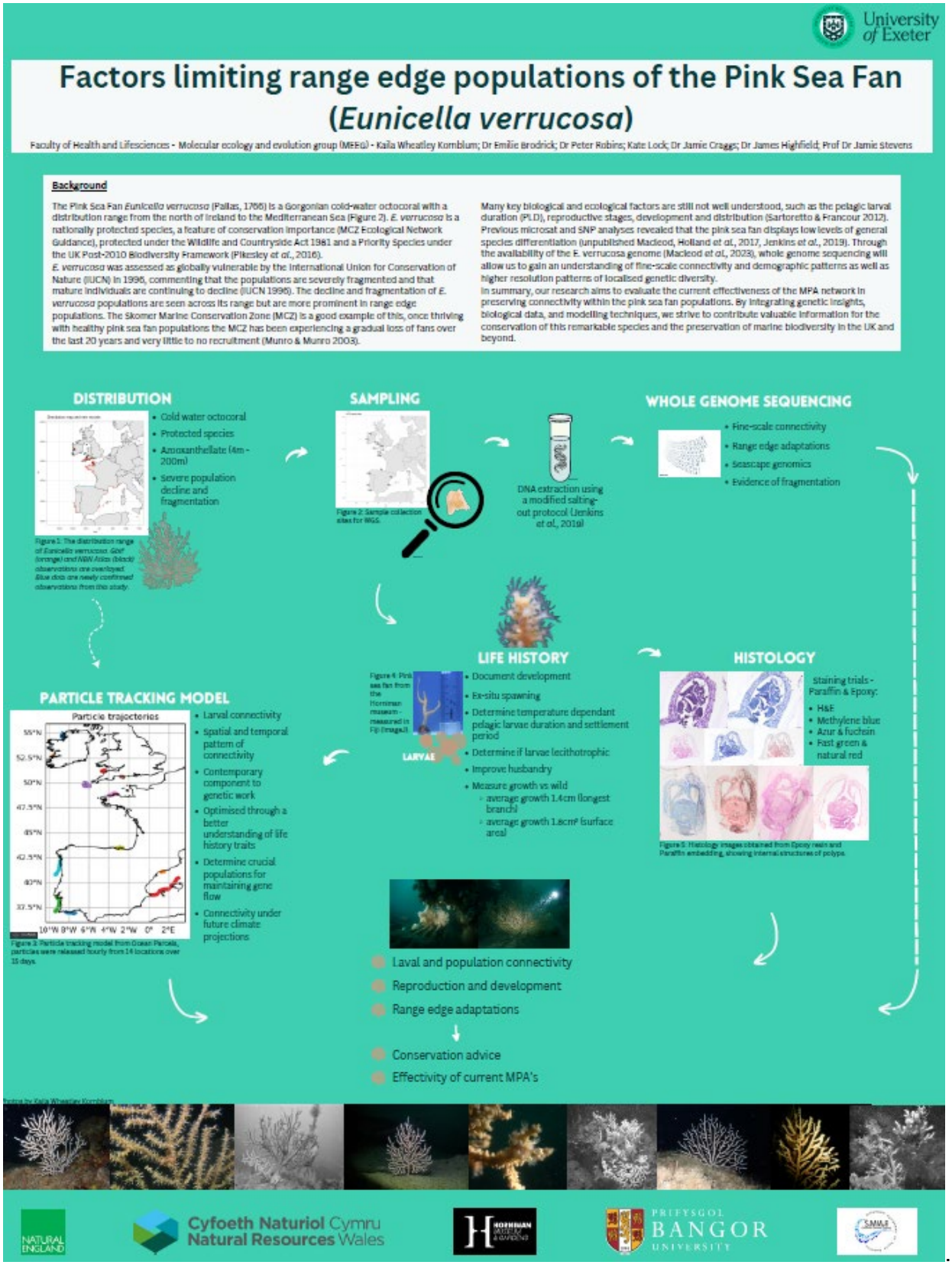
The oldest returning cow was HD-014. This animal was rescued from Penberth, Cornwall and treated for an ulcerated left eye in February 2002. The oldest bulls to have returned to Skomer in 2023 were 12.NHV.B06, NK.065 and NK.068. All three animals were seen for the first time on Skomer in 2012.

In 2023 ten tagged seals were observed of which five were known from previous years. One immature cow which was actually seen in 2022 was identified in 2023. She came from southern France.

Of the 250 cows which pupped on Skomer in 2023, 40 had scars and 48% of identifiable breeding cows were returning cows. The oldest breeding female was LS.017. She was seen on Skomer in 2009 for the first time.

29 individual seals were photographed with obvious signs of being entangled in nets at some time in their lives. Between August and November 2023, the percentage of hauled-out entangled seals fluctuated day to day, the average for the season was 2.1%.

Appendix 2. Factors limiting range edge populations of the Pink Sea Fan.



Data Archive Appendix

No data outputs were produced as part of this project.

The data archive contains: [Delete and / or add to A-E as appropriate. A full list of data layers can be documented if required]

The final report in Microsoft Word and Adobe PDF formats.

Further copies of this report are available from library@cyfoethnaturiolcymru.gov.uk