Cyfoeth Naturiol Cymru
Natural Resources Wales

Skomer Marine Conservation Zone Annual Report 2014

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NRW Evidence Report No. 69

Contents

Synopsis

This is the Skomer Marine Nature Reserve 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.

Crynodeb

Dyma Adroddiad Blynyddol Gwarchodfa Natur Forol Sgomer (GNFS) i'w Phwyllgor Ymgynghorol. Mae'r Pwyllgor Ymgynghorol yn cynnwys sefydliadau ac unigolion sydd â diddordeb yn yr ardal y mae GNFS yn ymdrin â hi.

Fe fydd yr adroddiad yn crynhoi pob agwedd ar waith GNFS, gan gynnwys dadansoddiad o amser gwaith maes y staff, gwaith stad, y defnydd a wneir o'r warchodfa wrth hamddena, digwyddiadau, gwaith cydgysylltu, wardenio, patrolio, monitro a gwaith ymchwil. Hefyd, mae canlyniadau rhai prosiectau monitro a rhai o grynodebau adroddiadau sydd wedi eu cyhoeddi, wedi eu cynnwys yma.

Introduction and Foreword

Welcome to the first annual report of the Skomer Marine Conservation Zone! Skomer MNR officially became Skomer Marine Conservation Zone on 12th December 2014.

This is an automatic change brought about by commencement of provisions in the Marine and Coastal Access Act 2009. Skomer will be the first Marine Conservation Zone (MCZ) in Wales and the Welsh Government has made a commitment to ensuring there is no fall in the level of protection afforded to the area as a result of this change. The waters around the island are currently protected through byelaws which will remain in force.

Also, Natural Resources Wales is committed, for the time being, to continuing with the local management arrangements at Skomer. Longer term, however, management arrangements at Skomer will be considered as part of the Wales wide review of Marine Protected Area (MPA) management arrangements being undertaken by the Wales MPA Management Steering Group.

Over the next 12-18 months in line with the Marine Act's provisions for MCZs the Welsh Government intends to establish features and conservation objectives for Skomer. Stakeholders will be given the opportunity to comment on these and a timetable for this process including engagement and full public consultation is being developed.

2014 started really well in that we were able to make Jen Jones' contract permanent, which will remove much of the usual uncertainty about our ability to carry out fieldwork. As for the rest of the year the weather certainly helped us get out on the water without too much problem throughout the season, the only problem was being able to see anything underwater when we got there! This was due to very high levels of silt in the water, possibly left over from the winter's storms. Despite this we managed to cover most of the monitoring programme, including the volunteer diver surveys of the eelgrass bed in North Haven and our four-yearly stock take of sea slug species.

The eelgrass surveys have been used to test acoustic methods developed by colleagues in NRW's Fisheries Assessment Team for assessing eelgrass beds without having to get (too) wet. Our thanks go out to the volunteers who have made this project such a success.

The sea slug survey dives turned up 51 species, including some species not seen for many years and some species awaiting DNA analysis to see if they are new to our species list. Volunteer divers found 31 species in Martin's Haven alone!

The MCZ team has worked to make our operations safer both on the water, by completing the RYA Yachtmaster course, and under it, by taking part in a dive safety event held in Dale and attended by scientific divers from all over the UK.

We have endeavoured to establish good connections with new colleagues in NRW, and what better way than to take them out on the boat while we carry out some of our monitoring work (especially if the sun is shining)? We have hosted Mary Youell (NRW Operations Manager South West Wales), staff from our health and safety team, IT team and the entire licencing team.

Much of our work with other organisations has continued as reported in previous newsletters and annual reports and a variety of papers in the scientific press have resulted, helping to raise the MCZ's profile further. I will include further details in this year's annual report in due course. We were also able to help out with a fundraising event to benefit the Skokholm Bird Observatory by providing boat support for Dave Astins, who swam from Marloes Sands to Skokholm Island.

2 Staff

2.1 Staffing

Phil Newman (PN), Mark Burton (MB) and Kate Lock (KL) remain as MCZ staff. In 2014, after 3 years with the Skomer MNR/MCZ, Jen Jones (JJ) was appointed to a permanent position as seasonal assistant albeit for only six months of the year to coincide with the main fieldwork season of April to September.

At the beginning of 2015 it was confirmed that, as part of the new NRW staff structure, MCZ staff would become part of a NRW Marine team of approximately 12 staff across southwest Wales.

Local NRW marine colleagues Anne Bunker and Lily Pauls also supported MCZ staff when their time allowed.


Blaise Bullimore

As ever we have benefitted from the generosity of a variety of volunteers to help with various aspects of our work above and below water:

- Supplementing our own diving team were Blaise Bullimore, John Archer Thomson, Lloyd Jones, Rob Spray, Kerry Lewis, Rich West, Nick Owen, Jon Moore, Francis Bunker and Ross Bullimore.
- Honorary Wardens (see Section 2.2) helped keep records of visitors, disturbance incidents, infringements of MCZ Codes of Conduct and records of species sightings. They also helped to keep the MCZ exhibition open for as many days per week as possible.
- Jasmine Collins and Helen Horsler from Dale Fort and Eleanor Smart from NRW's marine licencing team, who helped with non-diving work.
- The teams of volunteer divers involved in the eelgrass monitoring surveys.


Kerry Lewis


Maya in the rain

MCZ staff also hosted two work experience/placements, Jenny Allen and Maya Jakes, who accompanied us on non-diving work.

2.2 Honorary and Voluntary Wardens

The following served as Honorary Wardens (HW):
The whole Bullimore family
Sue Burton
Dr Robin Crump
Brian Dilly, dive charter operator
Kenny Gainfort, Skipper *Dale Princess*
Carl Wonnacot, crew *Dale Princess*
Barry Davies and Lionel Jewell, Martin's Haven National Trust car park attendants
Jane Hodges, PCNPA
Ivor Johnson, Old Mill Diving Services
Bruce Jones, BSAC
James Perrins.

2.3 Training

In April MCZ staff took part in the interagency dive safety refresher course based at Dale Fort Field Studies Centre. KL and JJ carried out most of the organisation on the course, which was attended by diving staff from each of the conservation agencies in the UK. The course included practical sessions as well as a formal assessment for the recently introduced UK Scientific Diving Supervisory Committee Supervisor certificate.

Kate tries to hide from the examiner under a coat and Phil attempts to hang himself using the hand-bearing compass

PN, MB and KL undertook their RYA Yachtmaster practical examination in April. The qualifications gained mean that the MCZ team are able to skipper vessels further afield than just the MCZ.

Other training attended by Skomer MCZ staff included first aid refresher training, a workshop on applying the ecosystem approach to management plans, NRW environmental management system training, an RYA radar operation course and MB attended training for the new NRW geographical information system.

KL assisted in training NRW staff in Shoreline Clean-up and Assessment Training (SCAT) for pollution incidents.

2.4 Health and Safety

PN represents local marine interests on NRW's Welfare, Health and Safety Forum and has also been involved in NRW's Personal Protective Equipment and Working On or Near Water task and finish groups.

MCZ safety documents continue to be updated and Dive Project Plans and risk assessments, required under HSE Agreed Code of Practice (ACoP) for Scientific and Archaeological Diving Projects, are prepared as required for each diving project.

One near miss/accident was reported in 2015 when a Western Power Distribution vehicle backed into and damaged the MCZ vehicle (see 3.3.3). No one was injured in the low speed collision.

PN was involved in a meeting with HSE Inspectors following a diving incident involving NRW staff in 2013. Although no MCZ staff were involved in the incident it was an opportunity to check MCZ practices and procedures with HSE Inspectors and review where necessary.

3 Estate

3.1 Buildings

Project: ME12/01

The maintenance of Fisherman's Cottage continues to be carried out by a NRW contractor, although MCZ staff carry out minor jobs in order to save time.

All MCZ waste handling and energy consumption continues to be monitored and audited in line with ISO 14001 and in 2014 the MCZ's environmental management systems were audited.

The MCZ exhibition continues to be popular with visitors of all shapes and sizes (see Section 8.2) and the "swallow flap" has seen much use. As a result several broods of chicks have been raised with a heightened awareness of marine conservation due to their surroundings.

Squatters!

3.2 Boats

Project: MM00/01

3.2.1 Boats

Skalmey spent 70 days at sea in 2014 and logged 246 engine hours

Most boat work with *Skalmey* involved the various diving projects the MCZ carry out, but also included sediment infauna monitoring in Milford Haven on behalf of Milford Haven Waterway Surveillance Group (see Section 7.5). Skalmey was also used as support vessel for a sponsored swim to Skokholm Island (see Section 6.2).

Skalmey's winch was also retested during 2014.

Following a variety of issues with *Skalmey's* engine in 2013 it was removed at the end of 2014 to replace the oil pump and to get the gearbox serviced. The exhaust system was also extensively rebuilt during 2014.

A drastic approach to weight reduction?

The MCZ RIB *Morlo* spent 43 days at sea in 2014 and logged 137 engine hours.

Morlo is used mainly for weekend patrol work, seal monitoring, and for supporting work on intertidal monitoring sites around the MCZ.

In 2014 *Morlo* was also used to support NRW staff carrying out Water Framework Directive (WFD) water sampling in the Three Rivers and Loughour estuary (see Section 7.5).

Even the MCZ inflatable tender has been travelling further afield in 2014, being used to carry out sampling in Carew Mill pond as part of NRW's programme of lagoon monitoring (see Section 7.5). Inventive application of the MCZ's long-suffering sack trolley helped mitigate the manual handling issues involved with getting the dinghy to the pond.

3.2.2 Seatime

Staff and vessel seatime are shown in Table 3.1.

Table 3.1 Summary of Staff Boat and Seatime

	1996	1997*	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Days at sea																			
Skalmey	90	19	9	23	42	48	73	77	52	48	58	72	58	61	69	99	95	65	70
SkalmeyII/Morlo	52	99	71	39	38	31	37	32	40	43	40	38	36	38	48	36	35	30	43
Total	**142**	**118**	**80**	**62**	**80**	**79**	**110**	**109**	**92**	**91**	**98**	**110**	**94**	**99**	**117**	**135**	**130**	**95**	**113**
MCZ Staff seatime (hrs)																			
Skalmey	919	181.55	70	195	492.5	622	883	777	640	618	621	933	685	747	718	942	743	684	815
SkalmeyII/Morlo	352	733	514	219	254	226	277.4	279	461	405	331	339	278	278	295	313	234	188	288
Total	**1271**	**914**	**584**	**414**	**746**	**847**	**1160**	**1056**	**1101**	**1023**	**952**	**1272**	**962**	**1025**	**1013**	**1255**	**977**	**872**	**1103**
MCZ Staff days at sea																			
Skalmey	223	51	14	42	96	129	225	205	154	158	165	202	170	189	183	279	253	178	211
SkalmeyII/Morlo	104	214	149	62	60	58	80	70	104	99	86	84	73	73	93	76	75	65	89
Total	**327**	**265**	**163**	**104**	**156**	**187**	**305**	**275**	**254**	**257**	**251**	**286**	**243**	**262**	**276**	**355**	**328**	**243**	**300**
Other Staff seatime (hours)																			
Skalmey	n/a	n/a	n/a	n/a	274	197	204	88	76.7	75.25	233	257	107	225	390.4	220	279	140	220
SkalmeyII/Morlo	n/a	n/a	n/a	n/a	106	89	89.7	69	107	88	142.5	77	113	77.5	157	51	50	39	100
Total					**379**	**286**	**293**	**157**	**184**	**163**	**376**	**334**	**220**	**303**	**547**	**271**	**329**	**179**	**320**
Other Staff days at sea																			
Skalmey	n/a	n/a	n/a	n/a	40	36	23	21	15	18	30	26	26	57	94	48	83	35	57
SkalmeyII/Morlo	n/a	n/a	n/a	n/a	17	19	22	15	21	17	22	12	29	18	35	11	14	9	24
Total					**57**	**55**	**45**	**36**	**36**	**35**	**52**	**38**	**55**	**75**	**129**	**59**	**97**	**44**	**81**
Total Staff seatime (hrs)																			
Skalmey	n/a	n/a	n/a	n/a	766	819	1087	865	717	693	854	1190	791	973	1109	1162	1022	825	1034

SkalmeyII/Morlo	n/a	n/a	n/a	n/a	360	315	367	348	568	493	473	416	392	355	452	313	284	227	388
Total					**1126**	**1134**	**1454**	**1213**	**1285**	**1186**	**1328**	**1606**	**1183**	**1328**	**1561**	**1475**	**1634**	**1051**	**1422**
Total Staff days at sea																			
Skalmey	n/a	n/a	n/a	n/a	213	242	248	226	169	176	195	228	196	246	277	327	336	213	268
Morlo	n/a	n/a	n/a	n/a	77	77	102	85	125	116	108	96	102	91	128	87	89	74	113
Total					**213**	**319**	**329**	**311**	**294**	**292**	**303**	**324**	**298**	**337**	**405**	**414**	**425**	**287**	**381**
Engine hours																			
Skalmey	210	43.9	27.5	83.47	188.03	181.1	245.3	284.54	171.07	150.16	169	244.38	168.62	224	241	322	266	222	249
SkalmeyII/Morlo	95.75	212.5	161	100.5	142	99	118	96	162.7	160	141.25	120.5	144.67	139	157	118	110	139	137
Total	**305.75**	**256.4**	**188.75**	**184**	**330**	**280.1**	**363.3**	**380.54**	**333.8**	**310.2**	**310.25**	**364.9**	**313.3**	**363**	**398**	**440**	**376**	**361**	**386**

*1997 includes Jan - March 98 - all subsequent years are for April to March

MCZ Staff = Philip Newman, Kate Lock, Mark Burton, Jen Jones

Other Staff = CCW Staff and Volunteers

Staff days at sea = total days on which each member of staff went out in a boat.

Staff seatime = total of each member of staff's seatime.

Boat days at sea = number of times the boat left its moorings.

3.3 Equipment

Project: AI10/01
All Skomer MCZ equipment details, including new purchases or disposal, are kept in an electronic inventory, which is checked annually by NRW Regional administrative staff.

3.3.1 Safety, diving and protective equipment

Project: MM20/01
Life raft provision for Skomer MCZ vessels follows MCA Workboat Code requirements, with *Skalmey's* life raft undergoing an annual inspection and a Solas-approved life raft hired for *Morlo*.

MCZ lifejackets have been upgraded to higher buoyancy versions following recommendations from NRW safety staff. Other personal protective equipment was maintained or purchased as required.

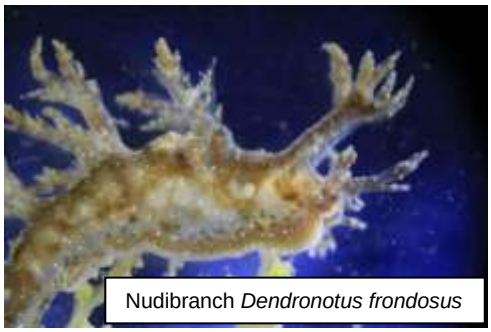
Project: MM20/02
Diving regulators were all serviced and cylinders tested as per HSE requirements.

Other Skomer MCZ diving equipment was maintained by MCZ staff or by contractor.

3.3.2 Optical, photographic and scientific

Project: MM20/03
All video and stills cameras and flashguns were serviced and repaired by contractor during the winter season. New digital compact cameras were purchased to replace older ones damaged by seawater after seals failed on the waterproof housings.

The trinocular low power microscope acquired in 2013 was put to good use during the 2014 nudibranch survey for photographing specimens as part of the recording process.


Nudibranch *Dendronotus frondosus*

Project: MM20/04
Skomer MCZ scientific instruments were serviced and calibrated as necessary. The automatic weather station was part way through its service in December 2014 when work had to be stopped when the wind strength threatened to blow the contractor off the roof of the Coastguard hut where the instruments are mounted! The work was completed in March 2015.

3.3.3 Vehicles

Project: MM00/03
The MCZ Ford Ranger suffered minor damage when a Western Power Distribution Land Rover backed into it, but has been repaired (and polished!).


Straighter and shinier

3.4 Estate Work

Project: ME01/01
"No-anchoring" marker buoys were again deployed in North Haven to help reduce damage from anchors to the North Haven eelgrass bed.

Project: ME02/01
Skomer MCZ moorings in Martins Haven and at Dale continue to be maintained.

Project: ME02/02
Skomer MCZ visitor moorings in North Haven continue to help protect the eelgrass bed by providing an easy alternative to anchoring. The moorings were again maintained by MCZ staff and are as popular with visiting recreational (and occasional commercial) boats as ever.

Project: ME04/01
Skomer MCZ staff continue to manage waste in accordance with the standards described in Section 3.1.

In 2014 much of Martin's Haven beach rubbish was dealt with by the local village warden, who also maintained the toilets at Martin's Haven. Management of the toilets passed to outside contractors late in 2014, but the warden was still clearing beach litter. Occasional litter encountered at sea, including fishing rope, nets and large pieces of wood were recovered if considered to be a hazard to navigation or wildlife.

Seabed litter clearances were carried out at a number of sites around the MCZ by Neptune's Army of Rubbish Collectors (NARC). NARC also removed several lost shellfish pots, which were unbuoyed, but were still catching large numbers of crabs and lobsters (see Section6.6 for details).

Both the Keep Wales Tidy ‘Angle bin’ at the Deer Park entrance and the new MCS “big” bin at the end of the coast path next to Martins Haven beach, were maintained by MCZ staff. The bins are meant to encourage anglers to deposit their angling rubbish responsibly, rather than just dump it on the ground.

To minimise seabed littering ‘Angling tips for Martins Haven’ leaflets produced by NARC and Pembrokeshire Federation of Angling Coaches (PFAC) detailing how to minimise tackle loss continue to be distributed via leaflet dispensers positioned at the Deer Park entrance and on the coast path signpost at the bottom of Martins Haven lane. Leaflet dispensers are kept topped up by MCZ staff.

3.5 Diving Operations

Details of diving operations are shown in Table 3.2 and Figures 3.1 and 3.2.

The biggest challenge to the MCZ diving programme in 2014 was the underwater visibility. The year was beset by cycles of heavy silt being re-suspended on each spring/neap tidal cycle, notably in the nearshore area (see photograph above). This made underwater photography impossible on many occasions and diving conditions sufficiently bad as to warrant aborting dives.

MCZ staff even experimented with underwater “hoovers” to try to clear quadrats of silt before photography, but with limited success.

Image quality was compromised for a number of projects and the planned extension of monitoring to new sites was not possible. Despite (or perhaps because of) this issue the numbers of dives carried out by MCZ staff was higher than in the previous 2 years and significantly higher than the MCZ average number of dives (193).

Diving commenced in late April and continued through to November.

(Please note that these figures do not include the dives carried out by the volunteers on the eelgrass survey)

TABLE 3.2 Summary of Diving Activity 2014

	MCZ STAFF	CONTRACT & VOL DIVERS	TOTAL
Dives	243	40	283
Dive time (min)	8781	2095	10876
Dive time (hrs)	146.35	34.92	181.27
Average dive time (mins)	36	52	38.43
Diving days			46

Figure 3.1 Summary of MCZ Diving Activity 1992-2014
(Including contract and volunteer divers where they are part of the MCZ diving team)

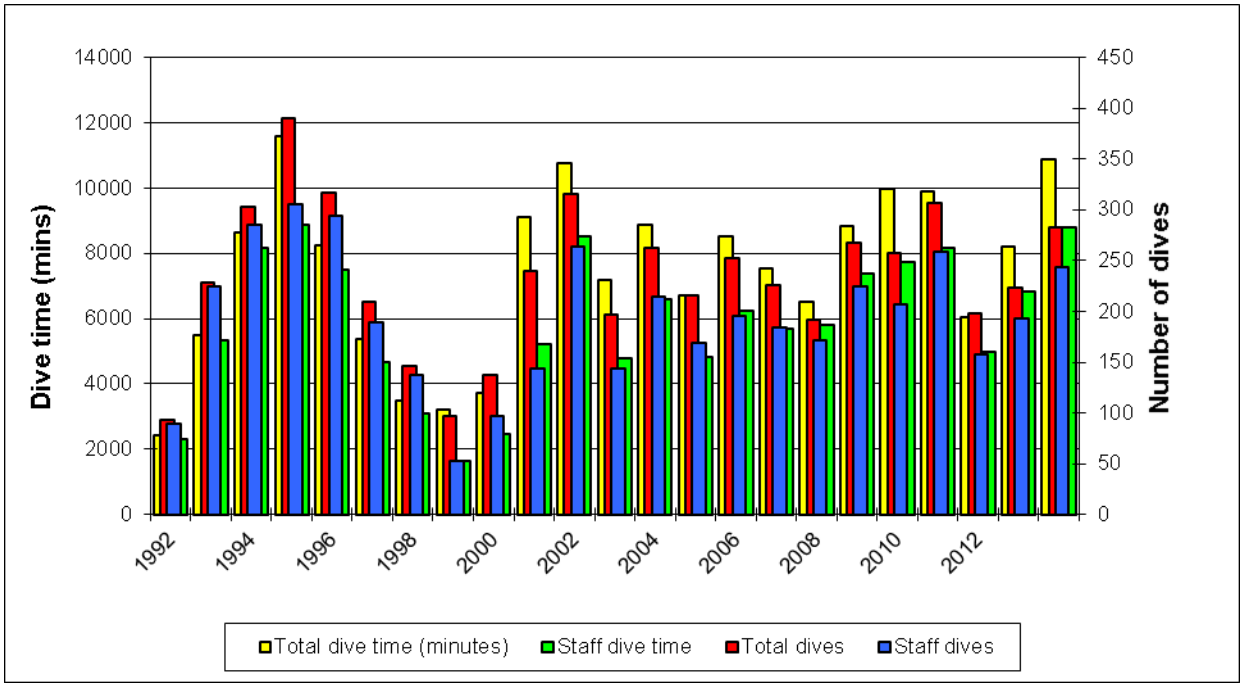
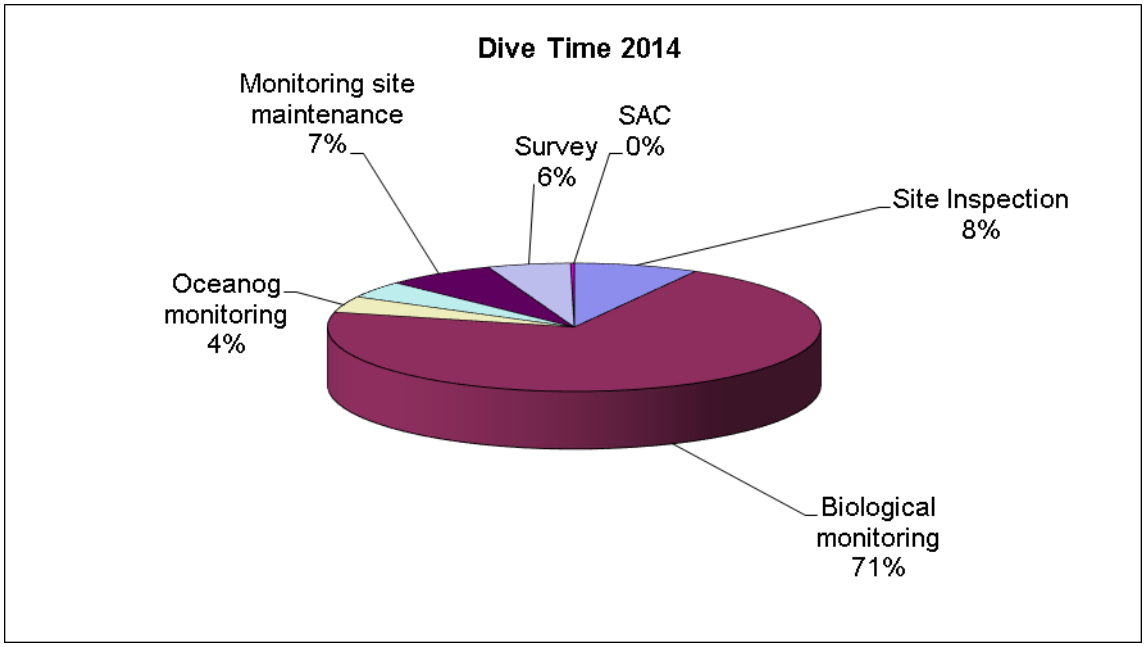
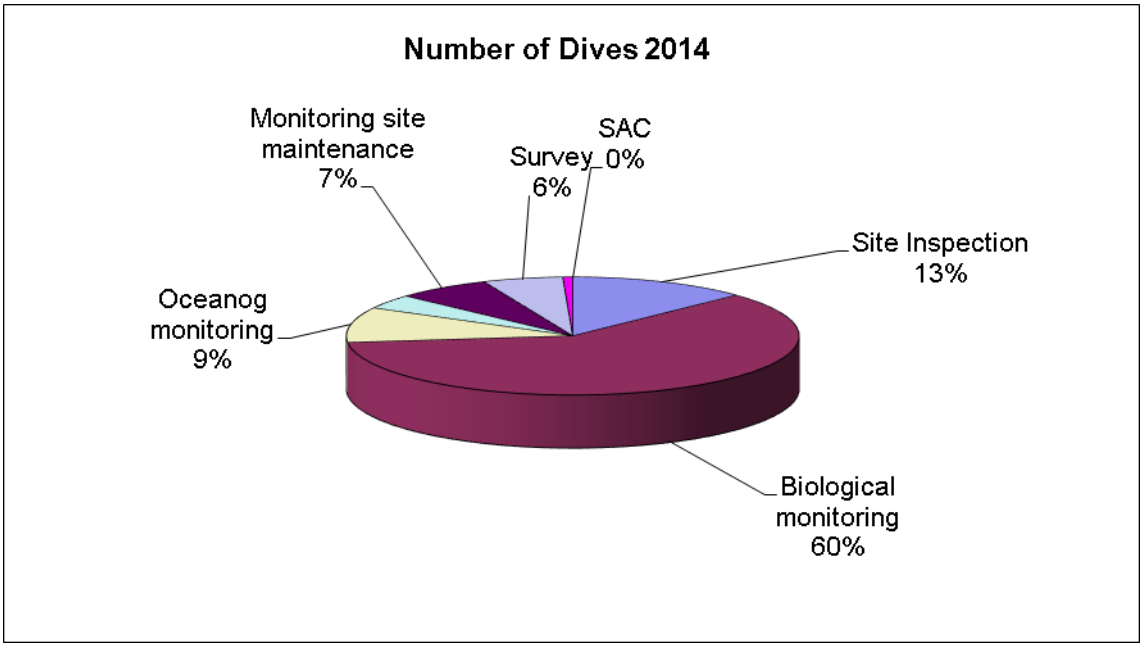


Figure 3.2 MCZ Diving Operations 2014
(Including contract and volunteer divers where they are part of the MCZ diving team)





4 Management

4.1 Wardening and Patrol

Project: MP00/01
Skomer MCZ staff maintained a high profile presence and watching brief on the water in 2014, partly through routine fieldwork, but also by carrying out dedicated site patrol on 21 Sundays and Bank Holiday weekend days between May and September. Weekend boat time is also used for mapping fishing effort (see Section 5.1) and carrying out sampling for water quality and plankton (see Section 7.3).

For sea time statistics see table 3.1. Data for all observed visitors and use of the MCZ from April 2014 to end of March 2015 is shown in Section 5.

4.2 Information

The MNR interpretative booklet “Stars, squirts and slugs…marine life in an underwater refuge” has not been available since the end of the 2012 season when stocks ran out. The booklet was originally considered an essential component of the interpretative function of the MCZ display at Martin’s Haven as it provided written information to support the display’s images and video footage (see section 8.2).

However, funding has been found for a reprint and reformat of the booklet and we hope to have stocks ready for the 2015 season. Unfortunately it has not been possible to get any more of the MNR computer-generated seascape poster created by Mike Camplin produced.

Fortunately our stock of MNR “User Regulations” leaflets is sufficient to continue to be distributed and is now supported by Pembrokeshire Marine Code maps with relevant information for boat users. The “Diver Safety” leaflet is printed out or supplied electronically on request.

The booklet and leaflets will be available electronically on the NRW website when it is fully functioning.

4.3 Management Issues

4.3.1 Dredging/beam trawling

No beam trawling or dredging was observed in 2014

4.3.2 Potting *Project: RH03/05 Watching brief*

Vessels operating in the MCZ in 2014/15 are listed in Section 5.1 and for fishing effort estimates see Figures 5.1 and 5.2.

Incidents of potting gear impacts on fragile seabed species continue to be recorded by MCZ staff where they are observed during monitoring dives.

MCZ staff are becoming increasingly aware of a substantial number of unmarked lobster pots that have not changed position for several years. This has been reported to WG Marine Enforcement staff via NRW fisheries enforcement colleagues, but other than one buoy tagged with a notice to mark the gear, no other action appears to have been taken.

Knitting with pot ropes

One cluster of buoys which were heavily overgrown with seaweed and were only visible on a low tide were investigated by MCZ staff and volunteers. The buoys appeared to be from three distinct sets of gear (different forms of pots, types of ropes, etc.), all heavily encrusted and most apparently still capable of catching shellfish. An attempt was made from the surface to disentangle them, but the tangle of pots and rope on the seabed was too heavy to haul with *Skalmey's* winch.

If MCZ staff find lost individual pots they endeavour to recover them if possible, but otherwise they are left in place but opened to prevent "ghost" fishing.

Some lost pots were removed by Neptune's Army of Rubbish Collectors (see Section 6.6 for details.

4.3.3 Tangle and gill netting *Project: RH03/06 Watching brief*

None observed in 2014.

4.3.4 Collection of shellfish by divers *Project: RH36/01 Watching brief*

No collection of shellfish was recorded in 2014

4.3.5 Collection of curios *Project: RH36/01 Watching brief*

None observed in 2014.

4.3.6 Collection of specimens for education and research

No permits for collection of specimens were issued in 2014. Some specimens of diseased sponge were collected by MCZ staff, but only for our own purposes in trying to identify the cause of some *Cliona* sponges turning black (see Section 7.3).

4.3.7 Disturbance to seals *Project: RH03/04 Watching brief*

Permits were issued to the Wildlife Trust South and West Wales seal workers under contract to NRW on Skomer to enable them to approach and dye-mark seal pups.

The old MNR 'Seal Watching leaflet' has now reached the end of its stocks, but sufficient were available for the 2014 seal pup season and were distributed as usual via the MCZ exhibition, WTSWW staff at Lockley Lodge and the NT car park attendants.

The leaflet was given a NRW-style makeover in February 2015 to reflect the new corporate style and with newer photographs. 5000 copies were printed and will be distributed in the same way as before.

Sources of seal disturbance in 2015 included tenders from a cruise ship visiting Skomer Island and kayaks coming close in shore at the Garland Stone to avoid overfalls. Concern was expressed by Skomer Island staff that divers were disturbing seals hauled out on Rye Rocks, but on reflection it was thought likely that the seals were going into the water to investigate the divers.

Several pups were born on Martin's Haven beach in 2014 to the delight of visitors. The cows involved seemed remarkably undisturbed by the close proximity of people, although one cow was notable for her aggression and some visitors had to

be warned not to approach. All the pups in question appeared to feed and grow well.

Photo: B. Buche & E. Stubbings

In 2014 32 different cows, twelve bulls, one immature seal and two weaned pups 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.

4.3.8 Disturbance to cliff nesting seabirds *Project: RH03/03 Watching brief*

Disturbance to cliff nesting birds was caused by a fishing vessel in North Haven in May 2014.

4.3.9 Spear fishing *Project: RH36/01 Watching brief*

No incidents of spearfishing were recorded in 2014.

4.3.10 Angling *Project: RH03/08 Watching brief*

See Section 5 for numbers of anglers observed.

Neptune's Army of Rubbish Collectors (NARC) have included the MCZ in their efforts to clear seabed litter, including discarded or tangled fishing line, from the seabed as well as at other sites around Pembrokeshire (see Section 6.6 for detail). Despite this, angling litter continues to be a problem in the MCZ, particularly at seabed sites adjacent to popular shore angling ledges.

Efforts are continuing to encourage anglers to dispose of their discarded line responsibly via "angle bins" situated at Martins Haven (see Section 3.4).

4.3.11 Mooring and Anchoring *Project: RH36/01 Watching brief*

No observations were made of boats anchoring in any part of the MCZ in 2014.

The day visitor moorings at North Haven continue to be maintained and are very popular with visiting boats.

4.3.12 General Boating *Project: RH03/02* *Watching brief*

Most incident observations in 2014 regard speeding, particularly within North and South Havens, involving motor vessels and occasionally personal water craft.

4.3.13 Wrecks

The *Lucy* wreck continues to be a very popular dive site, the top buoy marking the wreck was maintained.

4.3.14 Oil *Project: RH07/01* *Watching brief*

Photo: B. Buche & E. Stubbings

One seal pup was observed with a patch of tar on its coat and a gull was observed “covered in oil” by Skomer Island staff in 2014 although neither Island nor MCZ staff observed oil on any beaches.

4.3.15 Water Quality *Project: RP63/03*

Bathing water quality data for Martins Haven continues to be collected by Pembrokeshire County Council. Results for the 2011 to 2014 period show water quality in Martin’s Haven to be “Excellent” according to the revised Bathing Water Directive standards.

5 Visitors and Use of the MCZ

5.1 Commercial Use

Project: RH90/01
Commercial fishing activity is recorded within Skomer MCZ through the use of GPS to mark the positions of pot marker buoys during on-water patrols and by observing fishing vessels operating in the area whenever the opportunity arises.

Pot mapping waypoints were recorded on 20 occasions between April and September 2014 and these were analysed (following considerable effort by MB) using NRW's new GIS mapping system Arc. The summary maps for 2014 can be seen in Figure 5.1 and a graph summarising fishing effort since 1989 in Figure 5.2.

Fishing boats operating in the MCZ during 2013 were recorded (either seen directly or from presence of marked gear) as Ashaley (M59), KTJ (SU02/M38), Rapid Return (M77), Storm Child (M83), Warren Edwards (M15) and M643.

Mapping of pot marker buoys has revealed that some vessels were leaving gear in the MCZ without moving it for prolonged periods of time and in some cases it was evident that whatever the buoys were marking had been abandoned. Previous experience and research has proved that unretrieved gear actively "ghost fishes" with trapped and dying shellfish acting as bait for the next victims. WG Fisheries staff have been informed (see Section 4.3.2) and further cases will be reported to them in 2015. See also observations from Neptune's Army of Rubbish Collectors in Section 6.6.

Potting activity appears to have levelled off in terms of area covered, but although the number of pots (effort) has decreased from the 2012 peak, the average potting effort in 2014 is still about four times higher than recorded in 2001.

Figure 5.1 Pot fishing intensity Skomer MCZ

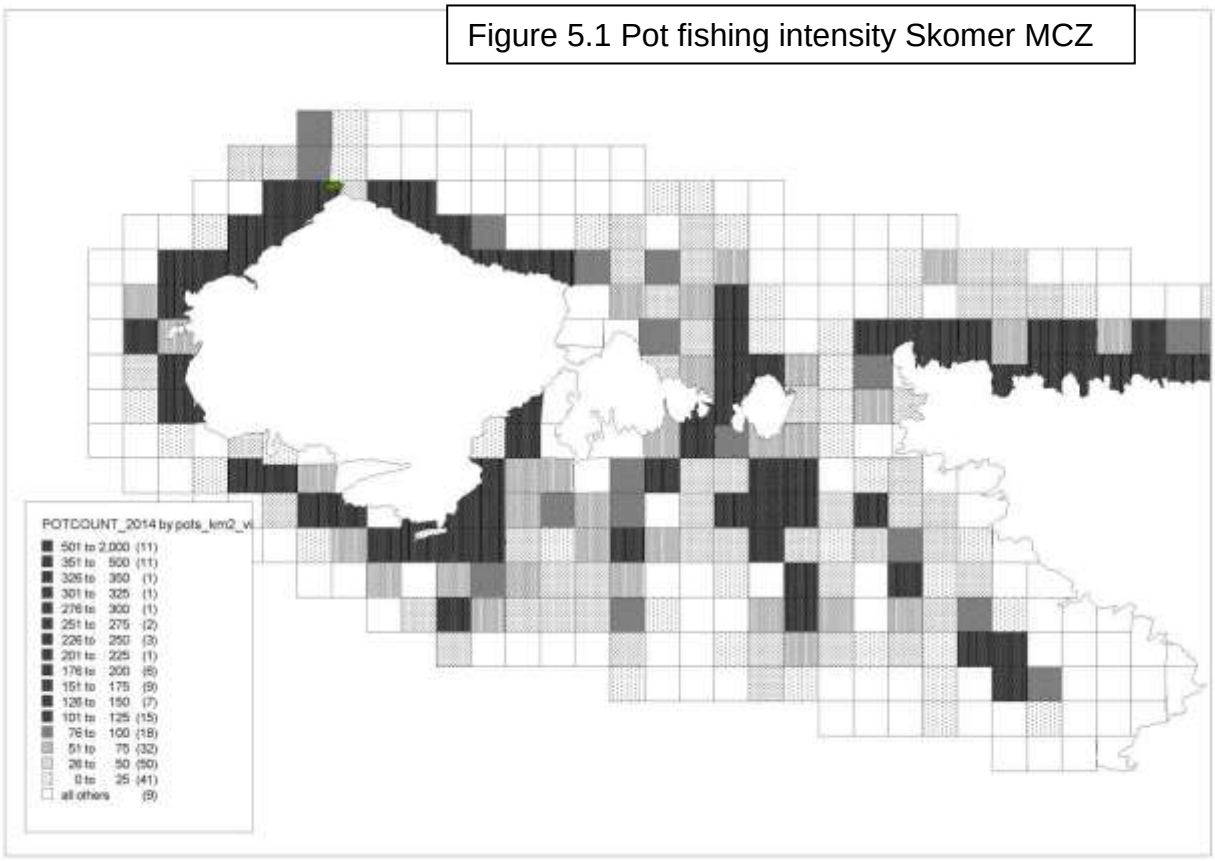
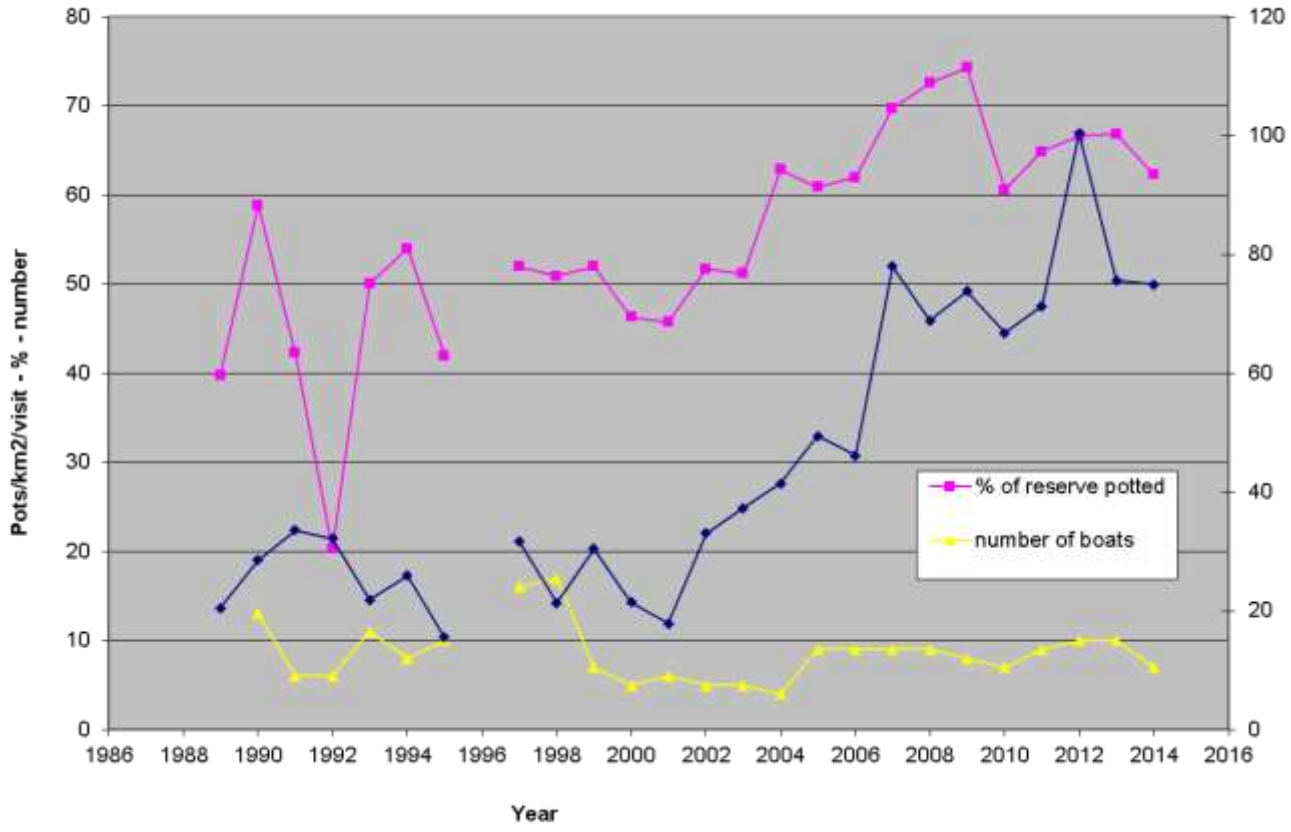


Figure 5.2 Summary of Fishing Effort Skomer MCZ



5.2 Recreational Use

Project: RH33/01
Recreational on-water visitor numbers for 2014 are summarised for the main categories of visitor in Table 5.1 and Figures 5.3 to 5.6.

Relatively good weather and calm conditions are reflected in higher numbers of boat visitors, particularly kayaks/canoes, compared with the last few years. Interestingly the number of anglers fishing from boats is higher than the number of shore anglers recorded in the MCZ for the fourth year in a row. This may well be as a result of local landowners closing access routes across their land following problems with litter: Anglers are now having to walk much further along the Coastal Path to access angling sites like East Hook, which used to be the most heavily used and now seldom have anglers recorded at them. Diver numbers are at an all-time low, not helped by the appalling visibility encountered not just around Skomer, but apparently at many dive sites in South-West Britain in 2014.

Figures do not include the routine sailings of the Dale Princess or commercial sightseeing boats passing through the MCZ. Our thanks again to the Skomer Wardens and staff for maintaining logs of recreational boats, which contribute considerably to the data collected by MCZ staff.

Figure 5.3 Recorded Recreational Use Skomer MNR

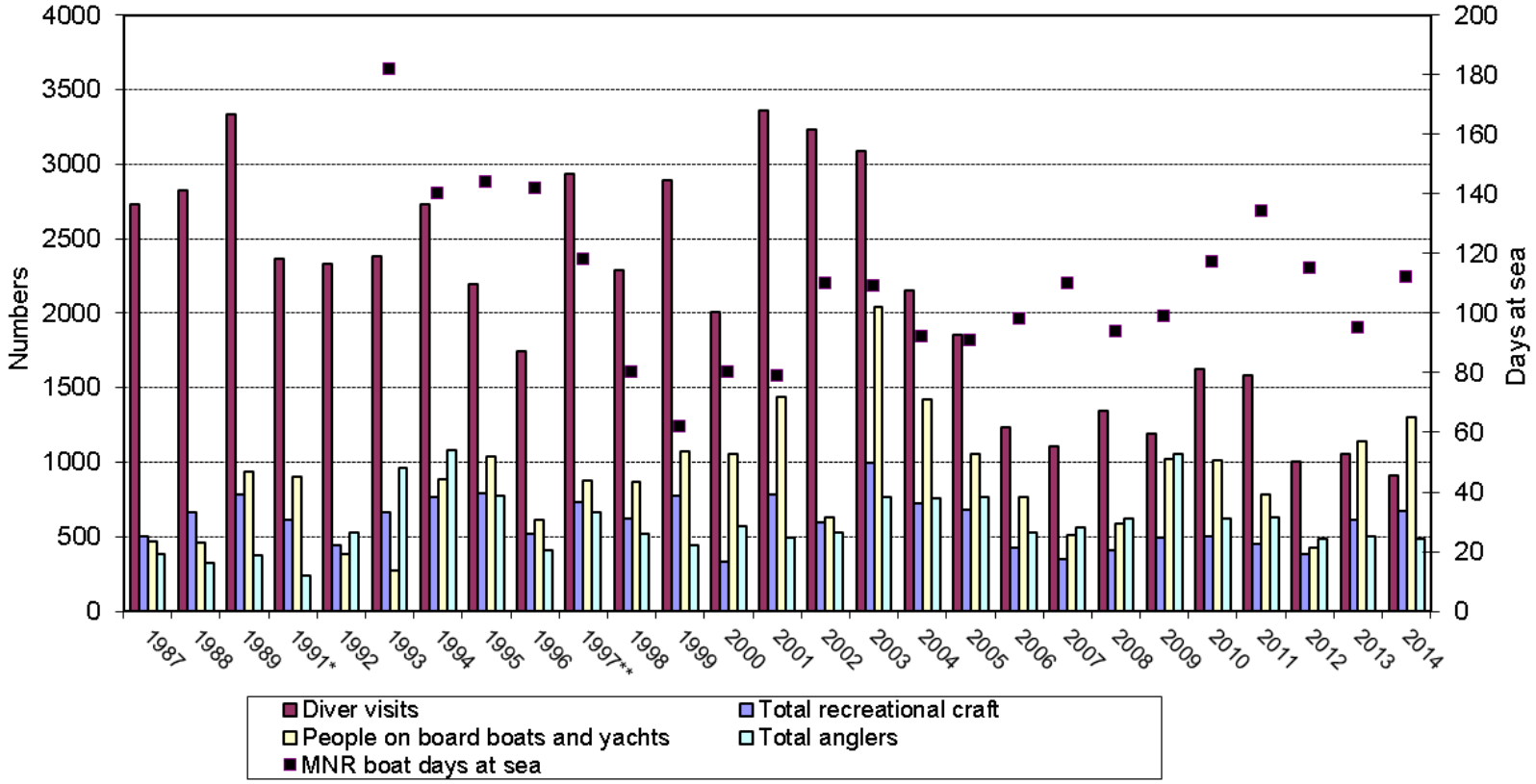


Table 5.1 Recorded Recreational Use of Skomer MCZ

	1987	1988	1989	1991 *	1992	1993	1994	1995	1996	1997 **	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Diver visits (diver days)	2727	2827	3334	2368	2327	2379	2730	2192	1745	2934	2287	2893	2008	3360	3234	3089	2154	1854	1230	1102	1342	1189	1629	1579	1008	1059	912
Shore dives @ Martins Haven	418	511	662	34	436	678	848	537	482	814	817	500	537	537	539	522	666	458	470	411	468	293	428	368	347	242	291
Dive boat visits	358	410	477	341	293	325	394	354	247	361	254	378	278	349	367	350	224	257	97	127	138	106	107	144	75	89	70
Total yachts	147	139	237	203	99	155	213	299	173	218	183	221	232	266	121	338	218	163	128	92	120	115	140	146	118	248	237
Total motor boats	-	37	65	70	47	95	129	65	39	70	87	95	93	153	70	225	187	155	102	65	87	89	93	43	47	188	148
Canoes	-	80				91	27	74	62	84	98	79	63	48	38	80	108	110	101	68	68	184	163	121	140	176	221
Total recreational craft	505	666	779	614	439	666	763	792	521	733	622	773	333	779	596	993	721	685	428	352	413	494	503	454	380	612	676
Total people on board boats	470	460	939	905	380	273	883	1041	612	874	868	1075	1051	1435	626	2041	1424	1059	764	512	591	1022	1013	784	428	1140	1300
Shore anglers	383	216	300	199	437	766	735	600	331	630	433	386	501	396	458	519	556	569	378	398	333	752	313	308	192	160	223
Boat anglers	-	108	73	43	93	199	347	173	81	30	89	60	72	55	70	243	199	210	150	168	290	306	309	322	291	346	263
Total anglers	383	324	373	242	530	965	1082	773	412	660	522	446	573	494	528	762	755	769	528	566	623	1058	622	630	483	506	486

** Figures are for Jan 97 to end of March 98 All subsequent figures are for financial year April to end of March

Figure 5.4 Skomer MCZ 2014 Anglers

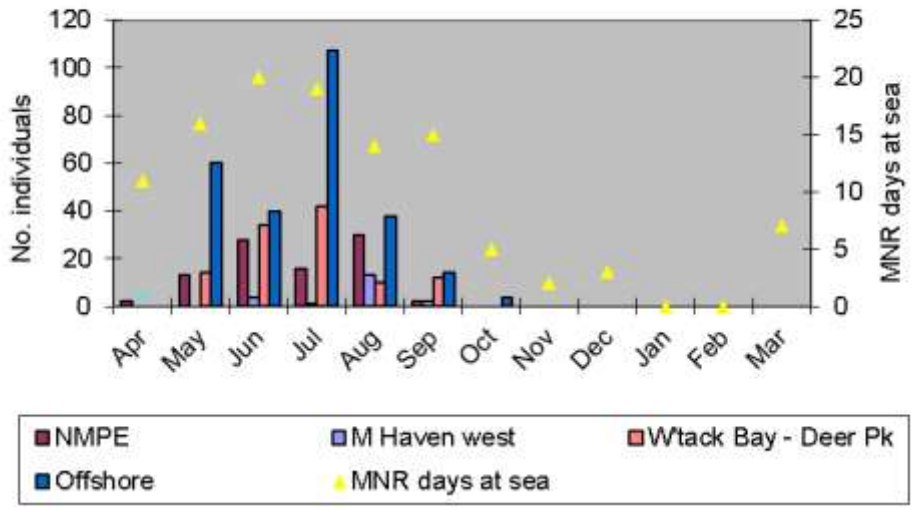


Figure 5.5 Skomer MCZ 2014SCUBA divers

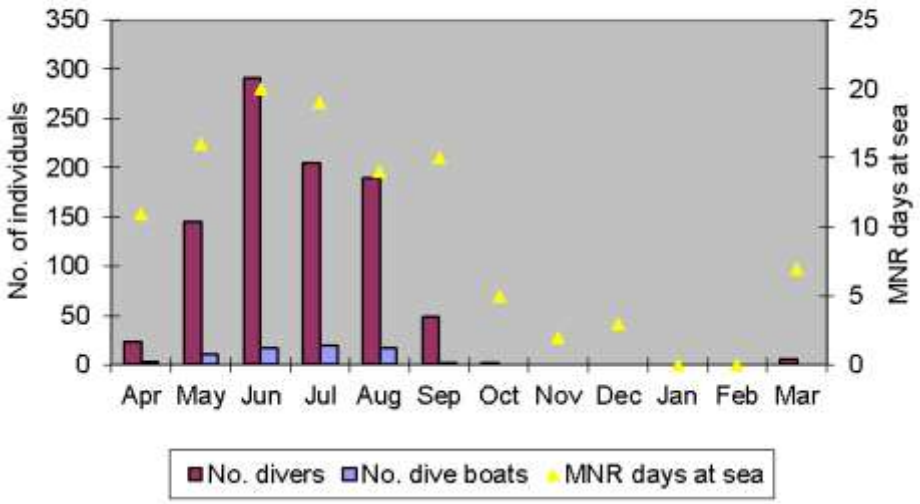
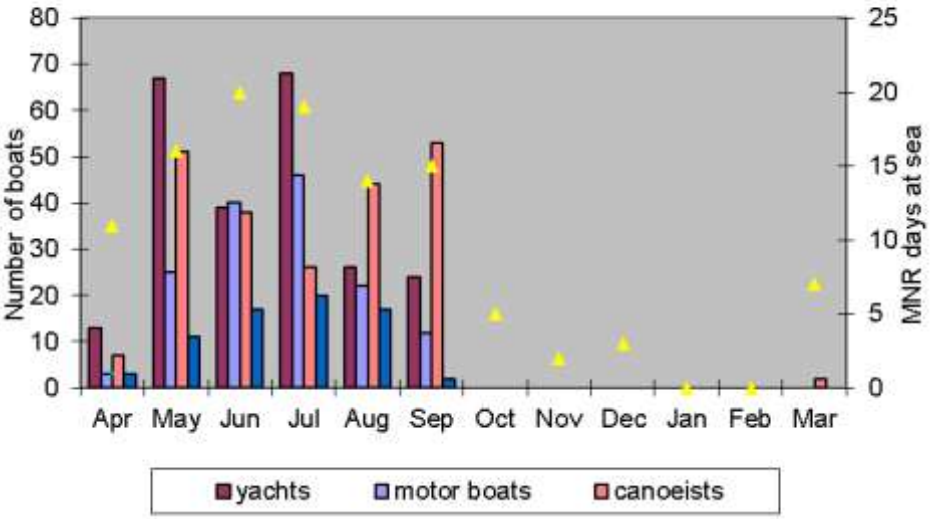


Figure 5.6 Skomer MCZ 2014 Recreational Craft



6 Liaison and Advisory Committees

6.1 Advisory Committee

Project: ML80/01
The annual Advisory Committee meeting, held in April 2014, was attended by 21 members as well as MCZ staff. Dr Robin Crump continued as chairman of the main committee, and MCZ staff acted as secretariat. Updates were given on the monitoring programme, the future of Skomer MCZ and a summary of the Annual Report was presented.

6.2 Wildlife Trust South and West Wales

Project: ML30/02
Skomer MCZ staff continued to liaise with Skomer Island NNR wardens Eddie Stubbings and Bee Buche, and their staff and with other Wildlife Trust South and West Wales staff. MCZ staff helped to support NNR staff by providing cover when crossing Jack Sound in bad weather and by inspecting the Island's boat mooring.

MCZ staff were involved when emergency repairs to the landing access were needed in 2014 and again when the full repair contract commenced in early 2015. The retaining wall had been badly undercut by wave action during the winter storms of 2013/14.

Because of the sensitivity of the shore habitat in North Haven adjacent to the repair area, MCZ staff were asked to provide guidance to the building contractors to avoid environmental damage both during the works and during landing and removal of materials.

Getting building materials to Skomer – never simple!

The Trust was also the contractor for the annual seal pup monitoring project (see Section 7.2).

6.3 Welsh Government Fisheries Enforcement

Project: RH90/01
Liaison has been maintained with staff of Fisheries Operations within WG's Marine and Fisheries Division via membership of the Skomer MCZ Advisory Committee.

6.4 Pembrokeshire Coast National Park

Project: ML40/03

Close liaison continues with:
Jane Hodges MBE, Advisory Committee member and HW, until her retirement in 2014;
Michel Regelous: Environmental Policy;
Ian Meopham: North Pembrokeshire Ranger.
MCZ staff also supplied video footage of seals for a display at Oriel y Parc in St Davids.

6.5 National Trust

Project: ML30/03
Skomer MCZ staff continued to liaise with National Trust. Informal liaison is maintained with Andrew Tuddenham and Matthew Thompson through the Advisory Committee and visits to Martin's Haven.

NT car park attendants at Martin's Haven continue to serve as HW's (see Section 2.2) and assisted MCZ staff with the opening and closing of the MCZ exhibition.

6.6 Other Organisations and Individuals

Liaison with a wide range of other organisations and individuals has continued.

Project: ML30/01
Project: ML50/01
Project: ML40/01

Local community interests included MCZ neighbours at West Hook, East Hook and Treehill farms, local community council members and members of Pembrokeshire County Council staff, either through representation on the Advisory Committee or through informal meetings.
One member of the local community, Malcolm Cullen, who was formerly a Ranger with PCNPA, kindly made his archive of seal research available to MCZ staff. The archive includes examples of unpublished data from research carried out on Skomer and the Marloes Peninsula in the years prior to the designation of the MNR.
PCC continue to kindly supply water quality results for Martin's Haven (see Section 4.3.15).
KL was also involved in Pembrokeshire Fish Week.

Project: ML60/01
MCZ staff maintain contact with the Maritime and Coastguard Agency during fieldwork and also on an informal basis. MB is an auxiliary with the local Coastguard cliff rescue team. MCZ staff and *Morlo* were involved in retrieving the belongings of an angler who was rescued by a Coastguard team from Three-Doors bay having become trapped there overnight.

Project: ML80/02
Liaison with local fishermen continues with MCZ staff making a point of introducing themselves to fishermen new to the MCZ as and when opportunity presents out on the water.

Project: ML80/06
Project: MI20/01
MCZ staff maintained liaison with a number of different academic establishments during 2014:

Dr Jim Bull and his student Roma Banga, from Swansea University have been using MCZ seal pup data to study the population dynamics of seals.

The Skomer MCZ eel grass bed in North Haven has been the focus of much academic interest in 2014:
MCZ staff helped collect seawater samples for a student from Gloucester University looking to better understand sea grass conservation by studying organic pollutants in seawater adjacent to sea grass beds and comparing sites of increasing and decreasing abundance.
Ben Jones, who MCZ staff assisted in taking small samples of eelgrass in 2013, sent a copy of his M.Res. dissertation looking at using eelgrass as an indicator of ecological status (see Appendix 1).
MCZ staff also received a copy of Cardiff University student Emma Evans' Master degree dissertation on invasive non-native species, which we assisted with (see Appendix 2).
Workers from Swansea University published the results of work with remote underwater cameras looking at fish populations in eelgrass beds that Skomer MCZ staff helped with in its initial stages. Unfortunately, footage from North Haven was not used in the study, partly because of poor water clarity, but also as a result of the inquisitiveness of the seals in the bay and the effect of their presence on fish behaviour.

MCZ staff also deployed an experimental Photosynthetically Active Radiation (PAR) meter housing in North Haven. The device, designed and built by workers at Swansea University, is designed to record the amount of light available for photosynthesis by eelgrass, which can be affected by sunshine hours or by turbidity in the water column. The housing incorporates a motorised lens cleaner to prevent fouling organisms growing over and affecting the detector.

Dr James Bell continues his connection with the MCZ, with sponge quadrat photos from Skomer being worked on by his PhD students at the Victoria University of Wellington, New Zealand.

MB and other MCZ staff carried out MarClim surveys both within the MCZ and also now at 6 other sites in Pembrokeshire, since MB assisted the Wardens on Skokholm to set up a new site there.

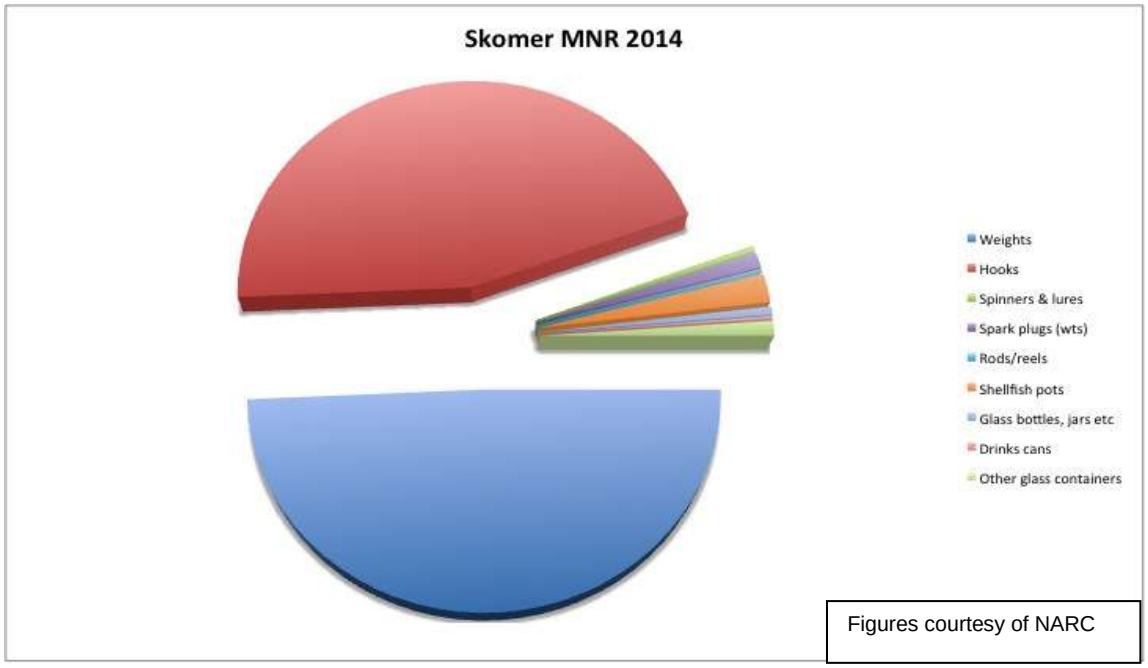
The MCZ's collaboration with the Institute of Oceanology at the Polish Academy of Sciences has continued with the maintenance of settlement plates as part of a Europe-wide research project. The new settlement plate frame, damaged last year by fishing gear, appears to be working well and a paper on some of the findings of the study has been published in the Journal of the Marine Biological Association (see Appendix 3 for summary).

Various Skomer MCZ data and information was supplied to academic workers from Bangor University and the Marine Biological Association and Aberystwyth University students visited the MCZ office to discuss projects with staff.

Project: ML80/05
MCZ staff continue to liaise with a wide variety of other organisations and individuals, including:
Pembrokeshire Biodiversity Partnership, JNCC, MCS, Pembrokeshire Coastal Forum, SEACAMS at Swansea University, the Pembrokeshire Marine SAC Relevant Authority Group, the National Coastwatch Institution, SPEEL, Stephen Evans as County Plant Recorder, Malcolm Smith (former CCW Chief Scientist), UK Cetaceans Strandings Investigation Programme, SNH, CEFAS, Cruise Development Officer at Milford Haven Port Authority, World Society for the Protection of Animals, and Endurance Life (organisers of the Coastal Trail running events).

The MCZ has been benefitting again from the attentions of Neptune's Army of Rubbish Cleaners (NARC). NARC are Britain's only group of dedicated underwater debris-collectors. Since its foundation in 2005 NARC has carried out 34 seabed clean-ups in the Skomer MNR / MCZ, 19 of which were at Low Point where angling weights, hooks and line were first removed by the MNR team and volunteers in 1994. Although comprehensive records were not kept on all occasions, the data that has been collected show that NARC has collected almost 3,500 weights, that's about a third of a ton of lead, and well over 3,000 hooks from the seabed in the MNR, not to mention numerous rods, reels and spark plugs (used as weights).
Following the winter storms of 2013-14 a specific effort was made to follow up reports of lost pots and 21 were successfully recovered from the MNR. Most were intact, undamaged and actively fishing, from which 19 lobsters, 29 brown crabs, 26 spider crabs and three fish were released.

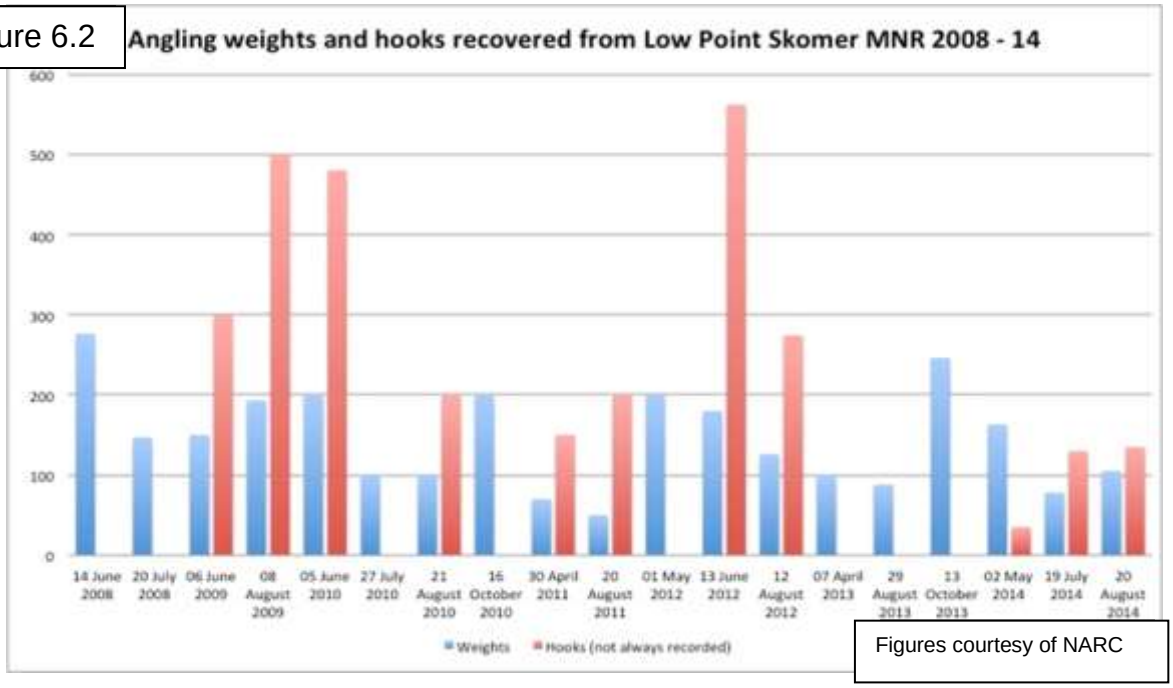
Figure 6.1 shows the items most frequently recovered from the MNR in 2014, a slightly atypical year in that several dives specifically targeted reported lost pots rather than the usual recreational angling sites.
NARC divers also routinely find and release or untangle wildlife snared on hooks or tangled in line caught up on the seabed. Crustaceans are the usual victims of entanglement but a fair few pink sea fans have also been freed from fishing line, plastic bags and other debris. Dogfish (catsharks) are the fish most frequently freed from hooks snagged on the seabed but wrasse and even a tompot blenny have been found and released.



Figures courtesy of NARC

NARC has returned to Low Point two or three times a year since 2008. Although fewer anglers seem to be fishing there and the amount of lost angling gear has decreased over time, Figure 6.2 shows that considerable quantities are still recovered on every visit (the wide variation in numbers of items recovered owes more to the number of divers and underwater visibility than necessarily to the amount of debris present).

Figure 6.2



Figures courtesy of NARC

In June PN accompanied the Welsh Government Environment and Sustainability Committee on a boat trip out to Skomer organised by Wales Environment Link.

MCZ staff have also hosted visits from a number of new NRW colleagues in an effort to promote good networking. Mary Youell (NRW Operations Manager South West Wales), staff from our health and safety team, IT team and the entire marine licencing team were all tempted out onto the water in 2014.

6.7 Wider Marine Environmental Initiatives

MCZ staff continue to contribute to the work of various UK agencies to ensure commitments under EU Water Framework and Marine Strategy Framework Directives are met:
PN attended a workshop organised by Defra, the Marine Management Organisation (MMO) and Natural England (NE) to help review the evidence base of the physical impacts of potting on designated features in Marine Protected Areas (including European Marine Sites and Marine Conservation Zones) and presented some of the work the MCZ has carried out measuring fishing intensity.
KL attended a workshop organised by the Marine Pathways project who are working on invasive non-native species.
KL also attended a Natural England-organised workshop to look at methods of integrating seal data from south west England and Wales into the UK dataset to assist seal abundance and distribution reporting. She has also been working with NRW colleagues on collating seal identification photographs for Pembrokeshire and ensuring their inclusion into the Sea Mammal research Unit (SMRU) database.

KL continued as the southwest Wales coordinator for the MCS Seasearch project in 2014. This project has amassed a huge amount of useful information about marine habitats and species in and out of MPAs in Wales and especially in Pembrokeshire. Many volunteer divers have been trained up and gained valuable experience in marine surveying over the years, ensuring data collected is reliable and consistent in quality. Unfortunately, at the time of writing, funding for 2015 appears to have been withdrawn completely by NRW.

MCZ staff have continued to be involved with MarClim (see Section 6.6 above) and carried out sediment sampling for Milford Haven Environmental Surveillance Group in Milford Haven waterway.

Following on from last year's trials of sonar methods for assessing eelgrass populations for NRW's Water Framework Directive work, colleagues from NRW Fisheries Assessment Team came out on Skalmey again in 2014 to ground-truth their technique against the results of the volunteer diving survey of the North Haven eelgrass bed (see Section 7.2). MCZ staff fabricated a rather more elegant mounting bracket this year in anticipation of using the technique in the future.

6.8 Marine and Coastal Access Act

Project: AS00/01
Skomer MNR officially became Skomer Marine Conservation Zone on 12th December 2014.

In April 2014 Welsh Government issued a briefing note to members of the SMNR (as was) Advisory Committee laying out how this change would affect Skomer MNR. It explained that existing byelaws would continue to remain in force when the area became an MCZ and that "the existing management regime at Skomer will continue and the Welsh Government continues to work with Natural Resources Wales to maintain this position". However, it went on to say that the Welsh Government would be reviewing the management regime of all MPAs with management authority representatives. This review may suggest a change in the way Skomer is managed as an MCZ as part of the MPA network.
It went on to say that, in time and including consultation with stakeholders, conservation objectives would be developed and once agreed an order will be made which would trigger the other MCZ protection measures under the Marine Act, such as:

- A general offence of intentionally or recklessly damaging the protected features of an MCZ;
- Introduction of duties on public authorities when exercising functions and when making certain decisions.

A number of Advisory Committee members responded to the briefing note with concerns regarding any change to the management of Skomer that resulted in the loss of the long-term data acquisition, site safeguard and public liaison work currently carried out by NRW staff at Skomer. Any decrease in the levels of protection afforded to the site were seen as unacceptable and a number of members were disappointed that the opportunity to increase protection for the MCZ had not been taken. Members also wanted to know who would be involved in any consultations.

In June 2014 the acting head of Welsh Government Marine Conservation & Biodiversity, Marine and Fisheries Division wrote to NRW's Chief Executive regarding Skomer's transition from MNR to MCZ. In the letter he stated that:
"*The Welsh Government is committed to ensuring that there is no change to the level of protection afforded to the area as a result of this change. The transitional provisions within the Marine Act secure this commitment by providing that the existing conservation byelaw remains in force as if it is a conservation order under the Marine Act. There are currently no immediate plans to review the two byelaws of the former South Wales Sea Fisheries Committee which relate to fishing within the Skomer Marine Nature Reserve. This work is being taken forward on a thematic basis, as part of our Sustainable Fisheries Project, with the aim of removing, consolidating or updating the legislation on a priority basis.*

To deliver the commitment on the ground and ensure that there is no change in the level of protection to the area it is the Welsh Government's expectation that Natural Resources Wales will continue to maintain an effective management regime for the area as a Marine Conservation Zone."

During 2014 PN, together with other NRW colleagues, met with Welsh Government officials to begin discussions on changes to features and conservation objectives. This work has been suspended due to other priorities dominating the work programme of the Welsh Government department involved, but is expected to resume later in 2015.

PN has continued to work with NRW colleagues to provide information on Skomer MCZ to the NRW Marine Programme Board and the joint Welsh Government/NRW Marine Protected Area Management Steering Group.

7 Science

7.1 Research and Education Subcommittee

No meetings of the research and education subcommittee were held in 2014.

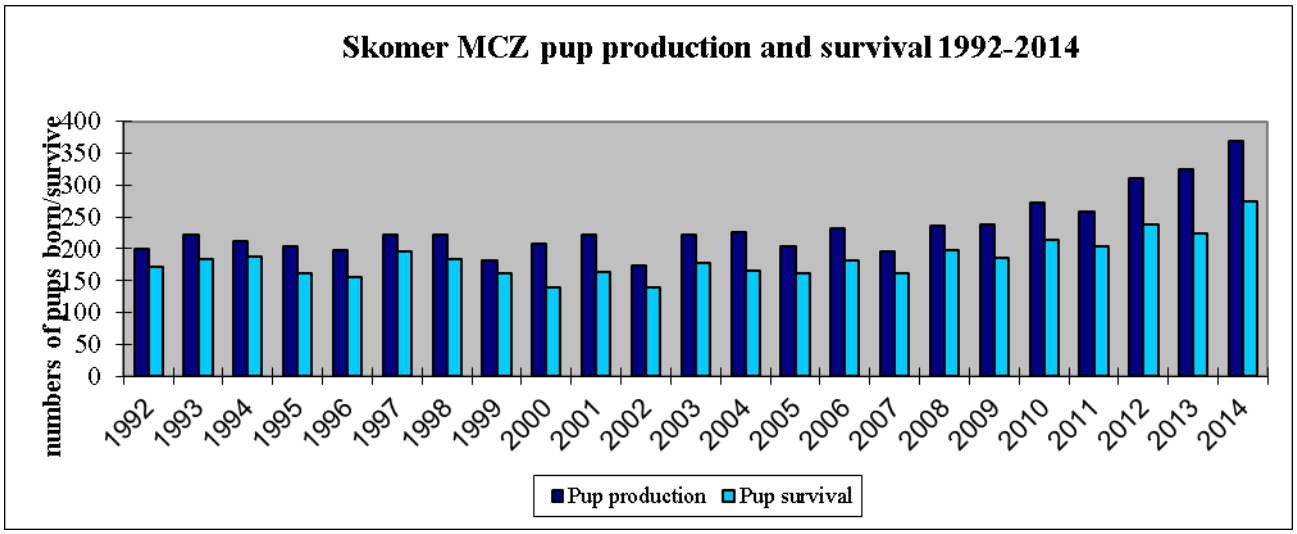
More detail on all of the research projects undertaken in the MCZ can be found in NRW evidence report no. 66 - “Skomer Project Status Report 2014/15”.

7.2 Contract Science

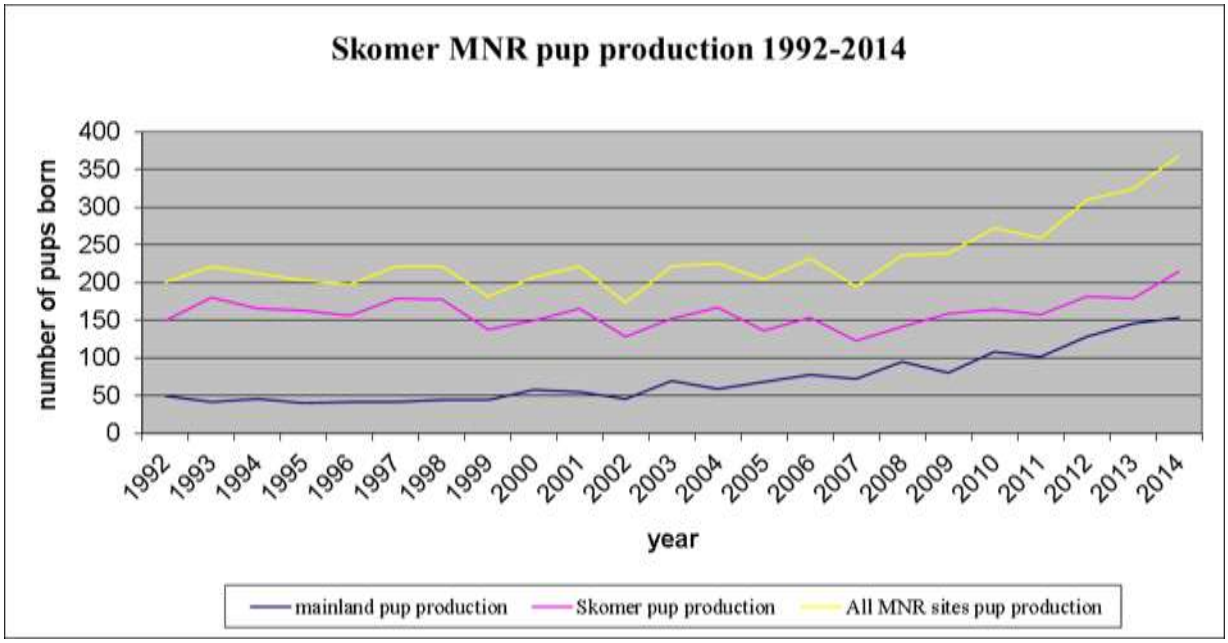
Project code: RA03/01 Monitoring Grey Seals

Grey seal pup production on Skomer Island breeding sites was monitored under contract by the Wildlife Trust South and West Wales and by MCZ staff on the mainland sites (See Appendix 4 for the Island report summary).

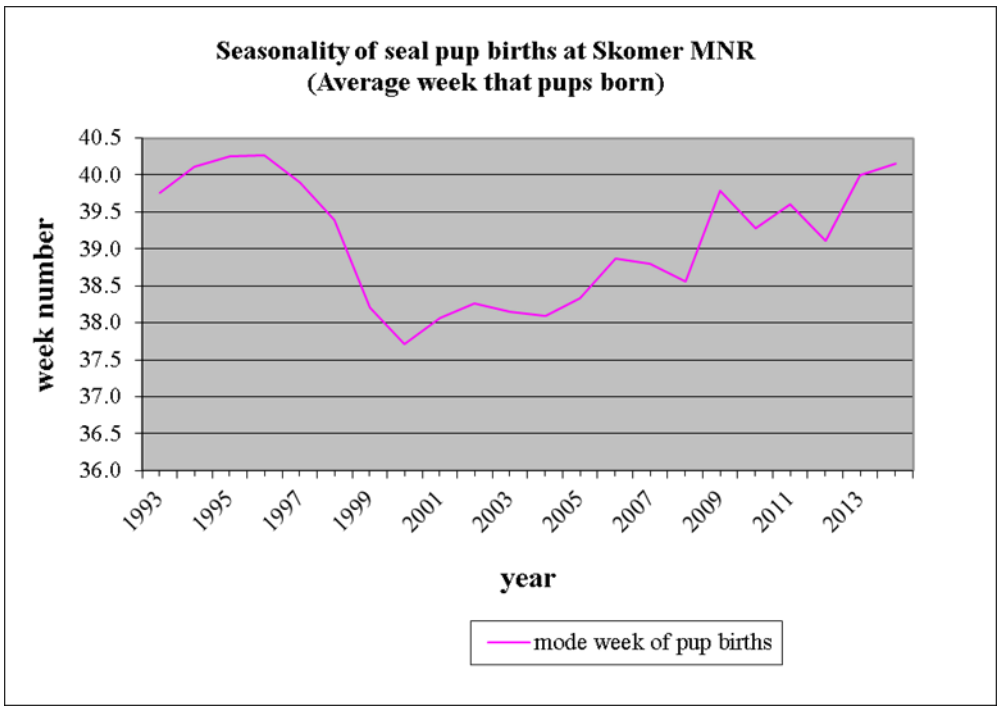
In 2014 215 pups were born at island sites and 153 pups at mainland sites giving a total 368 pups born in the MCZ with a recorded combined survival of 75% through to moult. Pup production was above the annual target (190 births) and survival was above the annual target (70%) set for the MCZ.



Pup production in the Skomer MCZ for the past 3 years has shown the highest totals ever recorded: 2012 (310 pups). 2013 (324 pups) and 2014 (368 pups). The pup production at the island sites shows the expected natural fluctuations and from 1992 to 2013 has remained fairly consistent with an average of 157 pups, production in 2014 shows a slight increase in numbers. The mainland sites show larger increases in pup production and these have contributed to the overall increase in numbers for the whole MCZ. Between 1992 and 2002 an average of 50 pups was born at the mainland sites, in contrast the average between 2003 and 2014 is 96 pups.



In 2014 pup production was 9% in August, 34% in September, 52% in October and 9% in November, and modal week of production was week 40 (1-7th October). The trend over the last 23 years shows that from 1993 to 1998 the modal week of production was week 40 and then it shifted to an earlier modal production of week 38 (17-23rd Sept) from 1999 to 2008. Since 2009 the pattern has shown that modal production has moved back to week 40.



7.3 In-House Monitoring

Project code: RF23/01 Monitor *Zostera marina* Populations

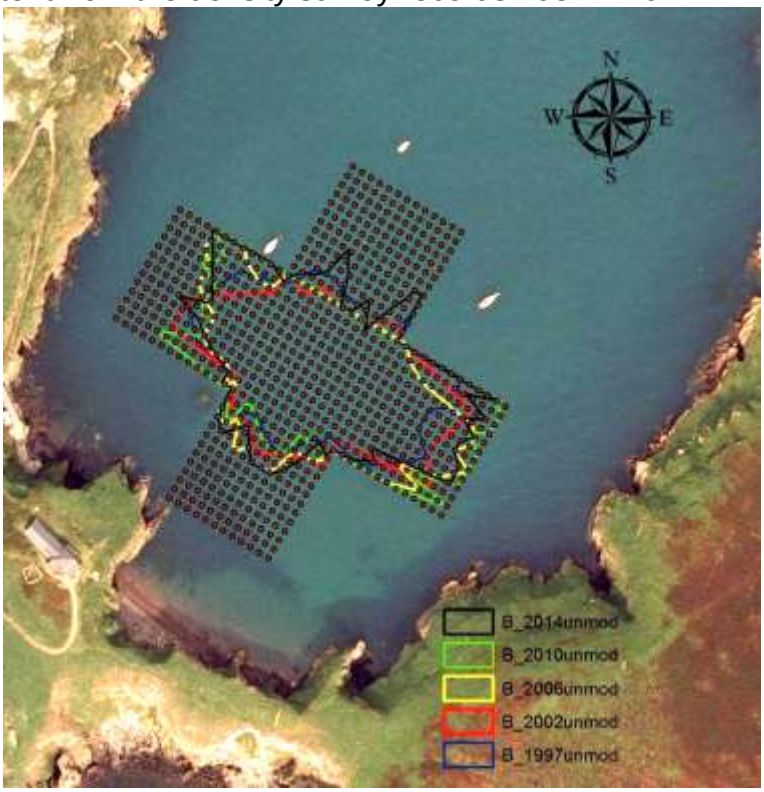
Full details of eelgrass work at Skomer MCZ can be found in NRW evidence report number 68 (see Appendix 5 for summary).

Teams of up to 10 volunteer divers surveyed the eelgrass (*Zostera marina*) bed in North Haven over three weekends in June/July 2014. The methods devised in 1997 and refined in 2006 were used to complete a map of extent and shoot density.

The area of extent had increased from 8044.0 m2, in 2010, to 8224.6 m2 in 2014. Comparisons with the first detailed survey in1997 shows an increase in extent to the north, west and east.

Year	Area Estimate m^2 (from survey grid) MapInfo	Area Estimate m^2 (from survey grid) ArcGIS	Area Estimate m^2 (from swim)
1982	3788		
1997	6333.4	6484.2	
2000	No survey		7007.8
2002	6569.5	6439.6	7683.20
2004	No survey		6817.5
2006	7336.6	7587.2	
2010	7980.6	8044.0	
2014		8224.6	

Eelgrass bed extent from the density survey records 1982 – 2014



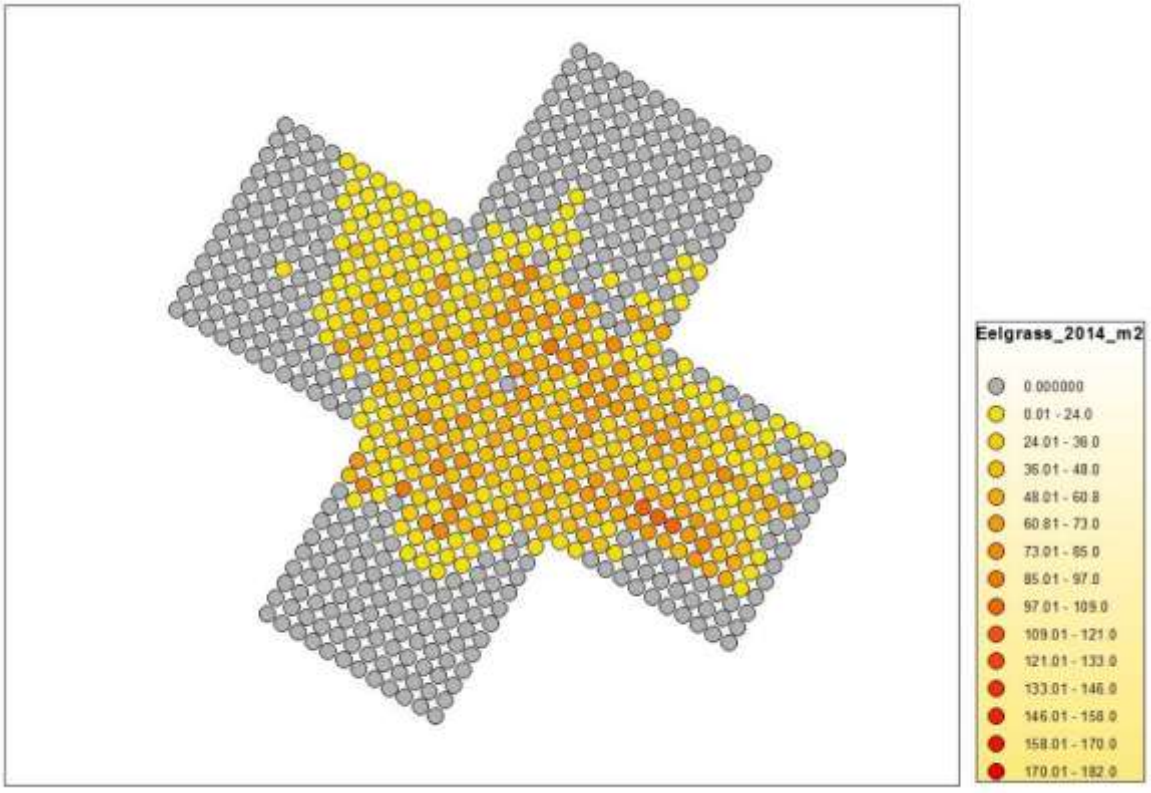
The mean shoot density had decreased from 41.1 shoots /m2 from 2010 data to 35.1shoots /m2 in 2014. This decrease was not significant (at 5% significance level) when tested with ANOVA. Most of the decreases occurred in the eastern area of the bed.

Comparison of Overall Shoot Density (per m^2) for All Years 1997 - 2014

(Only using data from sample stations with replicates in every sampling year)

	1997	2002	2006	2010	2014
Mean	**36.2**	**53.6**	**48.0**	**41.1**	**35.1**
Std Dev	27.3	38.5	31.4	30.6	23.3
Variance	746.0	1478.4	987.8	933.6	544.4
Std error	1.6	2.3	1.8	1.8	1.4
n	289	288	289	289	289
min	0	0	0	0	0
max	104	156	128.7	182.7	104.7

Density map of 2014 survey



Following trials in 2013 further acoustic surveys have been completed by the NRW Fisheries Assessment Team using a Biosonics DT-X split beam echo sounder. These surveys have proved valuable in assessing area of extent and providing an estimate of stand height (shoot length). The acoustic method is quick and gives comparable area estimates. However, at this time the acoustic method cannot estimate shoot density.

Comparison of Acoustic and In-situ Diver Survey Data 2014.

The North Haven *Z. marina* bed is currently within the specified limits as defined by the Skomer Marine Nature Reserve management plan 2000. There is a declining trend in shoot density over the past 8 years, but area of extent has been increasing.

Project code: RA01/01 Record Cetaceans

The crew of the Dale Princess have continued to record cetacean sightings within the MCZ. These records are collated along with sightings from Skomer Island staff and MCZ staff. Notable sightings in 2014 were Common dolphins (see photographs) and Risso's dolphins.

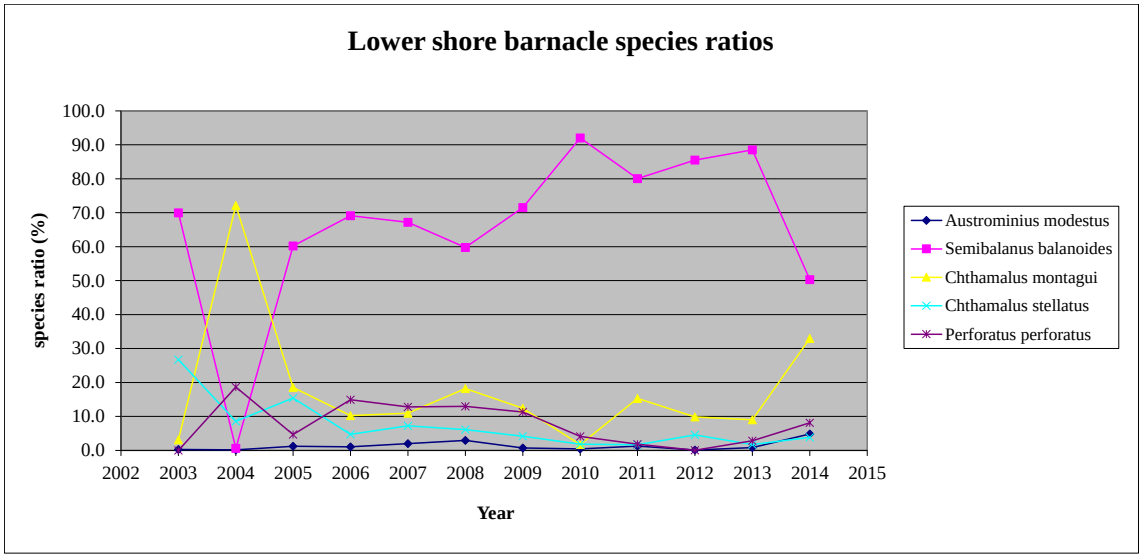
Project code: RB01/01 Record Vagrant & Alien Species

Vagrant and alien species were recorded by MCZ staff and the crew of the Dale Princess. Species recorded in 2014 included sunfish (*Mola mola*).

Project code: RB03/01 Monitor Littoral Habitats / Communities

Viewpoint digital photographs were taken for all sites on the Deer park, Martin's Haven and on Skomer Island.
All the permanent quadrat sites within the MCZ were surveyed in 2014.
The results in summary:

Barnacle populations showed most change out of the species studied at MCZ sites. In 2014 the species ratios in the lower shore saw a significant drop in *Semibalanus balanoides* at all shore zones with an increase in *Chthamalus montagui*. These same species underwent some dramatic changes in 2004 with *Semibalanus* declining and being immediately replaced by *C. montagui*. This may be due to a poor settlement of *S. balanoides* spat in the winter of 2002/3 (possibly linked to mild sea temperatures) *C. montagui* individuals would then benefit from a lack of competition.



In 2014 all sites saw a decrease in barnacle cover in the middle & lower shores, perhaps due to the extreme weather of the winter of 2013-14.

Otherwise 2014 did not show any major variations from the overall trends seen since 2003.

Project code: RB04/01 Plankton Recording

Samples continued to be taken in 2014 using methods replicating those used by Plymouth Marine Laboratory to allow comparison with their existing "L4" time series.

Samples were taken from April 2014 to October 2014 and in March 2015. Results of analyses are awaited.

Project code: RB06/01 Species Recording

Skomer MCZ continued to host a Europe-wide research project led by Professor Piotr Kuklinski from Warsaw Oceanographic Institute and the Natural History Museum in London. Settlement plates at different locations within the MCZ have been maintained with a monthly programme of photography and panel exchange at each site. This project is already established at sites in Spitzbergen, the Baltic and the Mediterranean. The Skomer based monthly panels have now been analysed for the 2009 to 2011 data and a paper was published in Journal of the Marine Biological Association of the United Kingdom (see Appendix 3 for abstract).

Crawfish *Palinurus elephas* was recorded at a number of sites in the MCZ during monitoring dives. This data has been entered onto the National Seasearch crawfish database.

In 2014 volunteer diver Jon Chamberlain took a gravel sample from Martin's Haven, which was sent to the Conchological Society for sorting and species identification. Both live and shell only species were identified and the abundance (based on ACFOR scale) was recorded. These records have been added to the ConchSoc dataset and the National Biological Network (NBN). The full list of 42 species can be seen in the 2014/15 Project Status Report.

Project code: RM03/01 Monitor Epibenthic Rock Communities:Meso-Scale

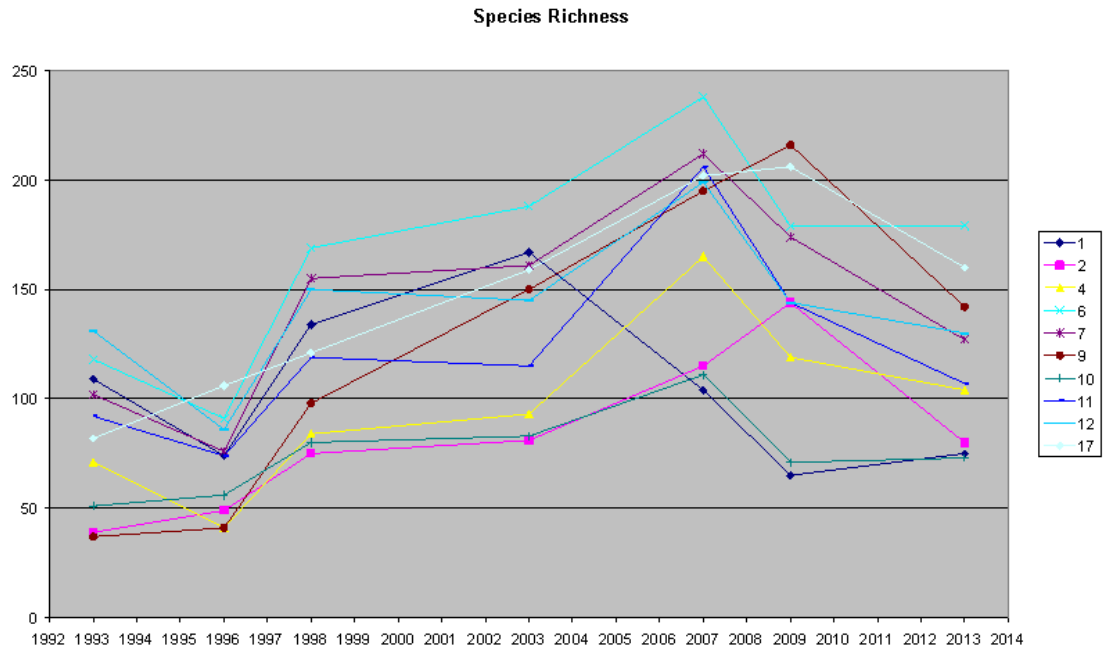
One set of stereo photographs was taken at the North Wall for epibenthic rock community photo monitoring in 2014, but attempts to photograph quadrats at Thorn Rock were foiled by bad underwater visibility.

Project Code: RM03/04 Monitor Sediment Infauna Communities
Results for the 2013 surveys were worked up in 2014:

Table showing average species richness (S), average number of individuals (N) and average taxonomic diversity (Delta+).

Year	S Species richness	N abundance	D Margalef richness	J' Evenness	H'(loge) Shannon	1-Lambda' Simpson	Delta+ Taxonomic distinctness
1993	312	582.88	48.84	0.73	4.19	0.96	88.88
1996	246	173.97	47.49	0.81	4.45	0.98	88.46
1998	359	684.70	54.83	0.77	4.50	0.98	88.71
2003	418	773.50	62.70	0.73	4.41	0.97	90.17
2007	505	1290.90	70.36	0.77	4.81	0.99	88.69
2009	509	867.92	75.08	0.77	4.78	0.98	88.87
2013	380	698.58	57.87	0.77	4.60	0.98	89.11

Graph of Species richness 1993 – 2013



Perhaps one of the most interesting analyses to come out of the 2013 work were the qualitative observations of those analysing the samples:

"There aren't any protected or especially rare species but things worth mentioning are:

- Species diversity is exceptionally high. Even with similar mixed sediments samples we rarely record such diversity throughout all major phyla/groups
- *Amphipod*a diversity- approximately 60 different species found. To put this in some sort of context, looking at sites with a similar sediment type, for example a lot of the MCZ work we have done recently for the EA and NRW, we generally record 20-30 species of amphipod. Both *Iphimedi*a species that were recorded I can't recall seeing before and are very specific to the west coast, in the original paper describing them (1987) they were only from the west coasts of Scotland and Ireland.
- Diversity of encrusting species. Again high, including sponges, hydroids, soft corals, zoanthid anemones, *Sabellaria, Pomatoceros* (now *Spirobranchus*), entoprocts, bryozoans, tunicates. All species that increase species/habitat diversity.
- Presence of species only found on the west coast or rarely recorded elsewhere in the British Isles *including Epizoanthus, Isozoanthus, Iphimedia* (as mentioned above), *Parametopa, Pyura microcosmus* (south west), *Hippoporina* (south west), *Thalassema thalassemum, Mangelia coarctata, Ophiactis balli, Moerella donancina, Pandora pinn*a to name a few."

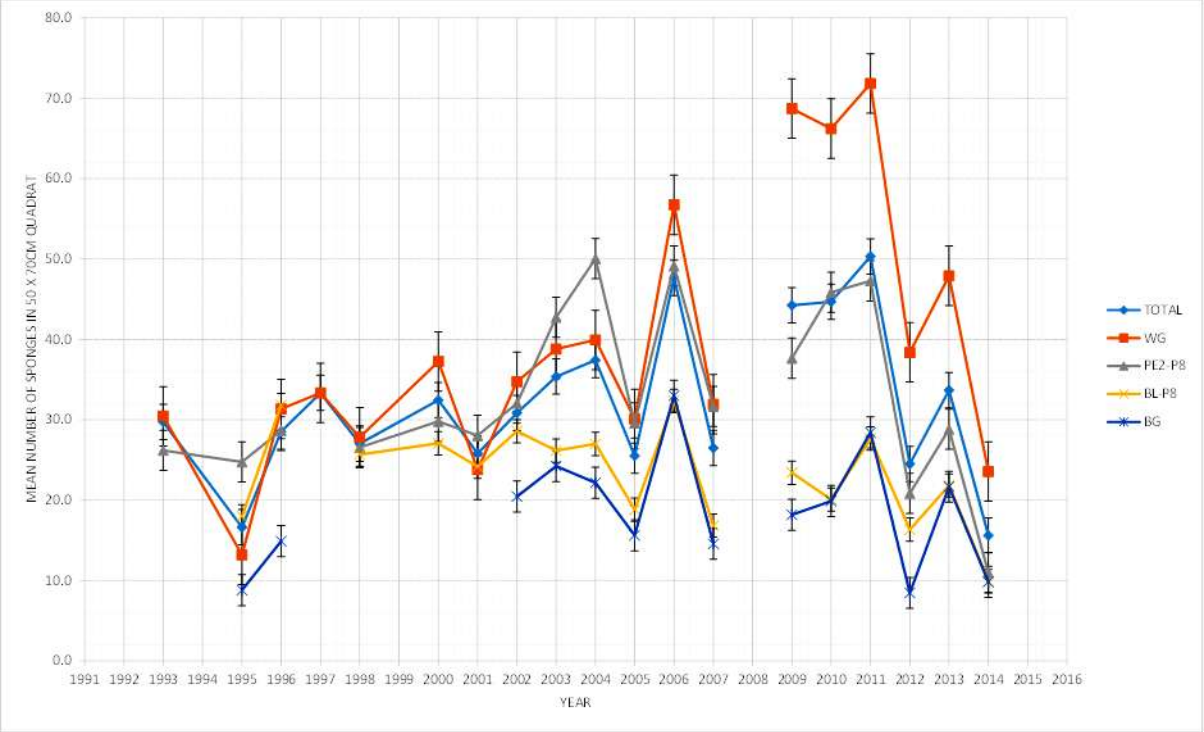
Project code: RM13/01 Monitor Sponge Populations

All sponge monitoring transects were photographed in 2014, including both the fixed transects quadrats and the quadrats set up for the PhD study into seasonal variation in sponge communities at Thorn rock that has been running since 2006 (see Section 6.6).

Statistical analysis of sponge data indicate that 2012 and 2014 differ from other years, but they also coincide with poor image quality caused by poor underwater visibility and heavy seabed silt loads. Thus the following results have to be viewed in this context.

Results from the fixed transect quadrats:

Mean number of sponges counted at 4 sites 1992 - 2014



A somewhat worrying development occurred early in the 2014 diving season when a number of diseased *Cliona celata* sponges were noted with black necrotic tissue across all or the majority of the sponge tissue (see image below).

Most of the black sponges were seen at Bull Hole (West side of Skomer Island) but a small number were also found at West Hook Point (North Marloes Peninsula) and some heavily fouled sponges were seen at Tusker rock (Jack Sound).

According to a number of authorities contacted this “black death” in sponges has been seen at other sites around the world. Dr J Preston of Portsmouth University organised the collection of tissue samples for analysis of the microbial content to see if a pathogen could be identified. These are currently being analysed.

Project code: RM23/01 Monitor *Eunicella* Population

All sites except South Middleholm were visited and fans photographed in 2014.

In 2014 the overall drop of natural fans recorded is due to South Middleholm not being surveyed. There was one confirmed loss of a natural fan, SSFG 23, last seen in 2011, however SSFG 22, which was re-found amongst the seaweed, had not been seen since 2008. NWA 13 was not found for the first time, its status will be confirmed in 2015.

A new sea fan was added to the Rye Rocks site survey. RRK 25, found 3-4m below the mast.

The cluster of 5 baby fans at Bull Hole are all present but very little growth has been observed since 2006 when they were first found. No direct anthropogenic damage (entanglement with pot ropes, removal from substrate with evidence of human activity nearby) to fans was recorded in 2014.

Population survey results 1994 -2013:

year	Sites surveyed	Total fans recorded	Total natural fans	Total attached fans	New recruits (babies)	Natural fan Losses (confirmed)	Attached fan losses	Missing (to be confirmed)
1994	3	30	30					
1995	3	29	29			1		
1996	3	29	29					
1997	4	35	35					
1998	4	35	35					
1999	0							
2000	5	50	50					
2001	5	52	52			1		
2002	9	81	80			1		
2003	9	95	94		1			
2004	9	97	96					
2005	10	110	107	3	1	1		
2006	10	115	112	3	7			
2007	10	117	114	4	1	2		
2008	10	122	118	4		1		
2009	10	124	117	7				
2010	10	122	116	6		3	1	
2011	10	121	117	4			2	
2012	10	121	116	5		1		
2013	10	121	116	5				
2014	9	118	114	4				1
totals					10	11	3	

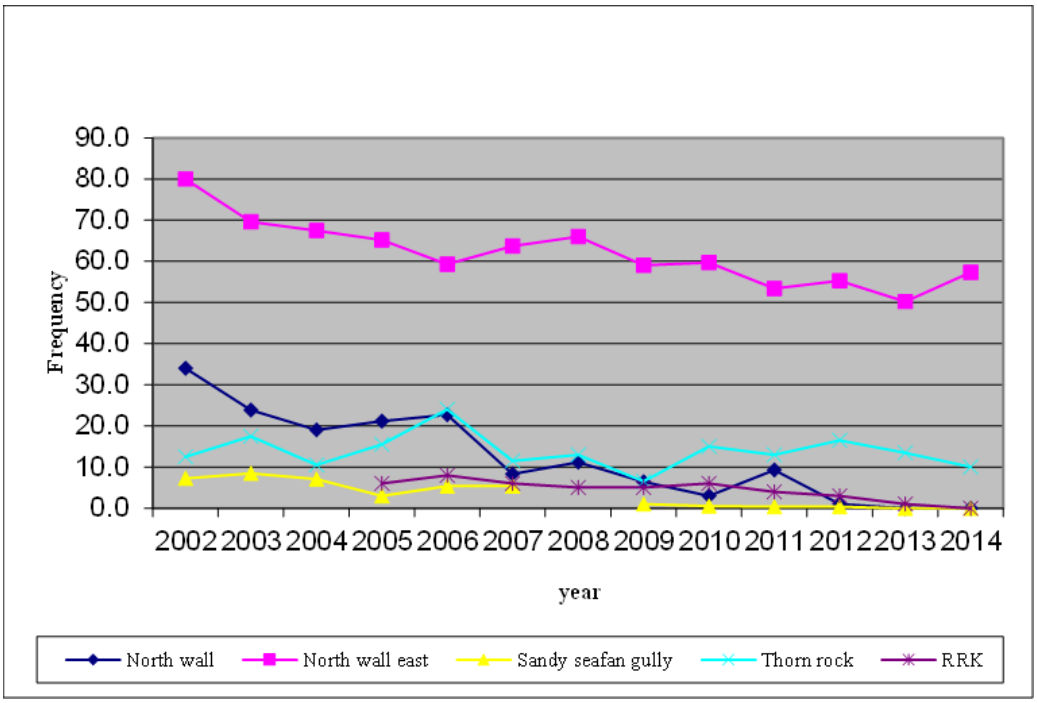
Condition assessments of sea fans were carried out again in 2014 and detailed results can be seen in Skomer MCZ Project Status Report 2014/15. In 2014 necrosis was 38.5%, compared to the average level since 2002 (13 years) of 50.5%.

No *Tritonia nilsodhneri* or *Simnia patula* were recorded in 2014.

Project code: RM23/03 Monitor *Alcyonium glomeratum* Population

All sites except *NWA East* show a decreasing trend in the populations of *A. glomeratum* colonies. In 2013 & 2014 *NWA & SSFG* had no visible colonies of *A. glomeratum* at all.

Graph of the mean frequency of *A. glomeratum* from within the quadrats 2002 to 2014

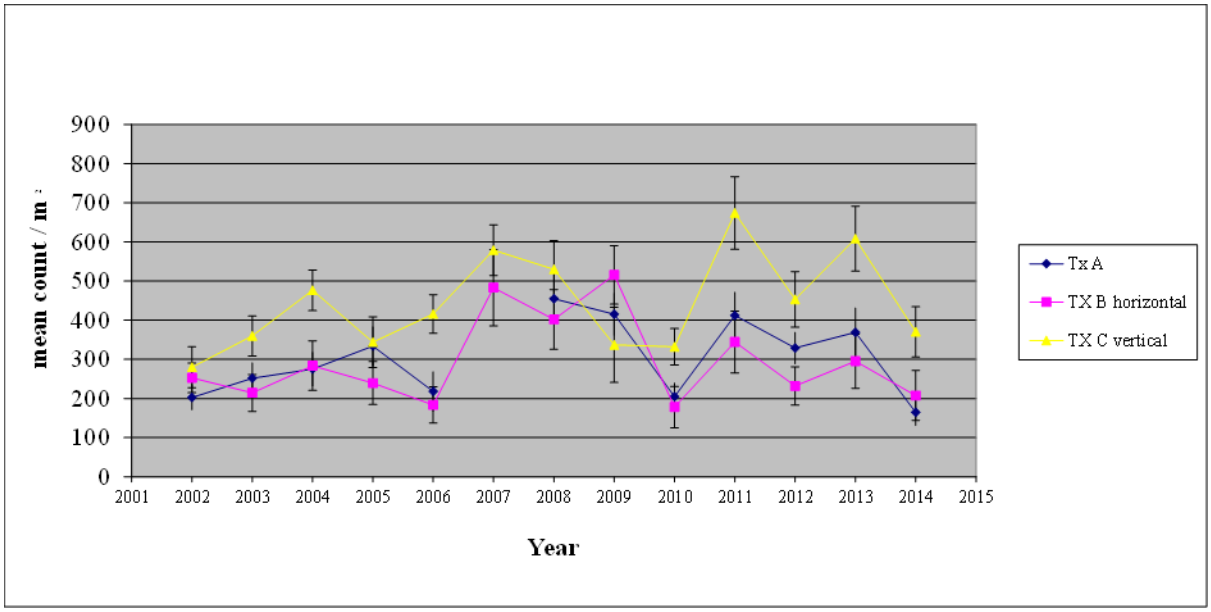


Project code: RM23/04 Monitor Cup Coral Populations

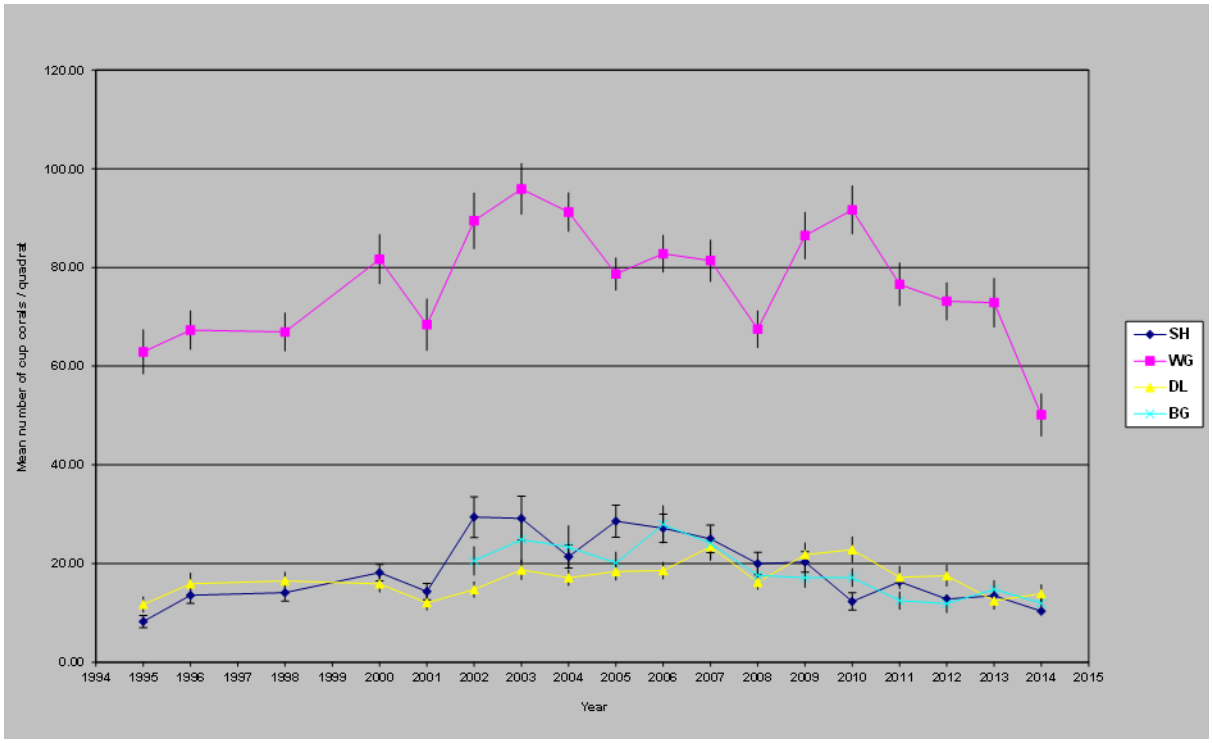
In 2014 all quadrats were completed for both Devonshire cup coral, *Caryophyllia smithii,* and the rarer scarlet and gold cup coral *Balanophyllia regia,* except for Thorn Rock where visibility was so poor photography was not possible.

Variability in numbers recorded is partly due to varying levels of surface sediment. The populations appear stable although there is no firm evidence of recruitment. The photograph quality was very poor in 2014 resulting in all sites showing a drop in numbers.

Balanophyllia regia abundance at Transects A, B and C at the Wick



Mean Number of Cup Corals per Quadrat at Thorn Rock 1996 - 2014



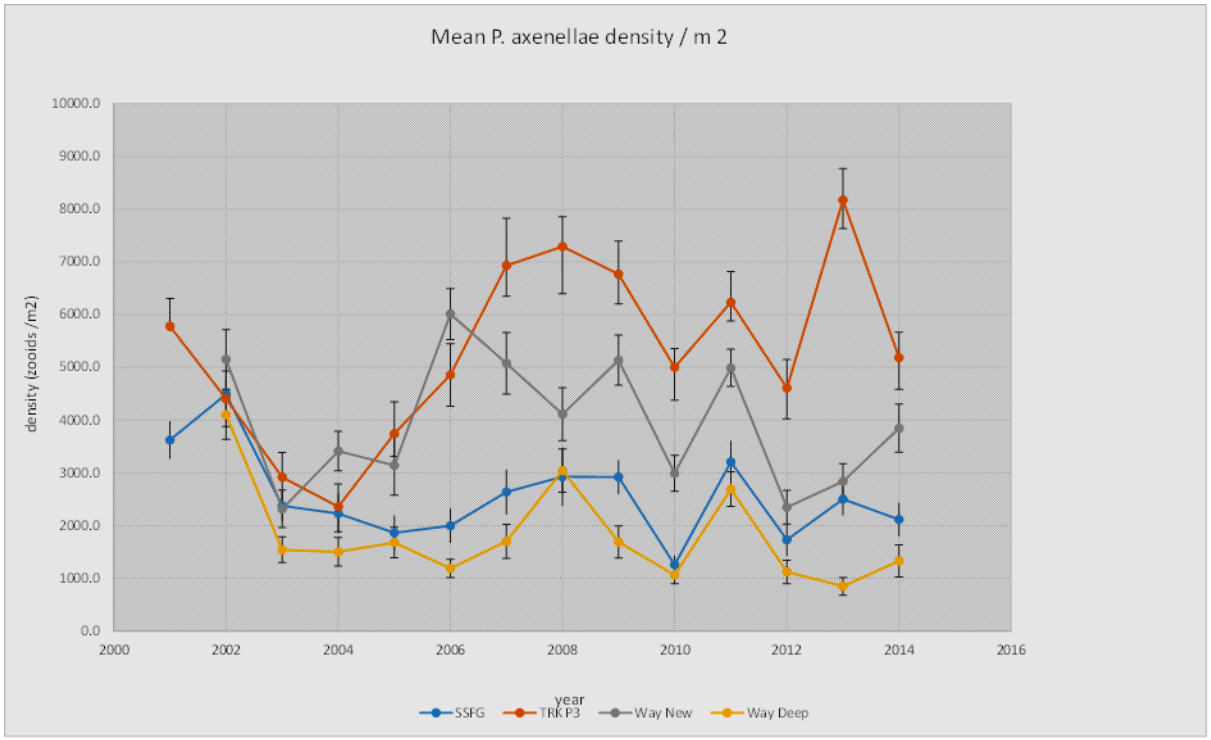
Caryophyllia smithii at Thorn Rock shows changes in mean abundance, this may be due to variable levels of surface sediment affecting the actual numbers visible during recording.

The Windy gully (WG) quadrats show significantly higher counts compared to the other sites, 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.

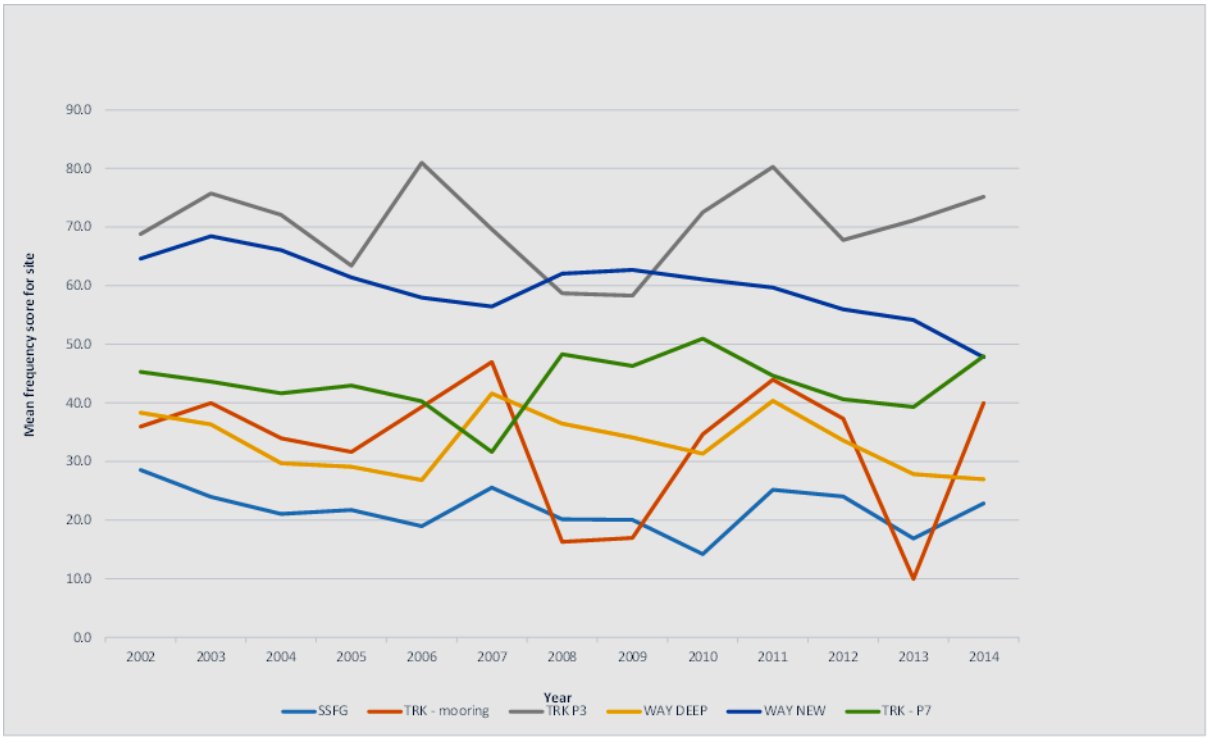
Project code: RM23/05 Monitor *Parazoanthus axinellae*

All the colonies are still present.
Thorn Rock P3 has returned to similar density values to those seen in 2010 & 2012.
The Way Bench sites have seen a slight increase while Sandy Sea-Fan Gully (SSFG) has declined very slightly.

Density of polyp (numbers of polyps /m^2) 2001 – 2014



Mean Frequency of *Parazoanthus* 2002 – 2014



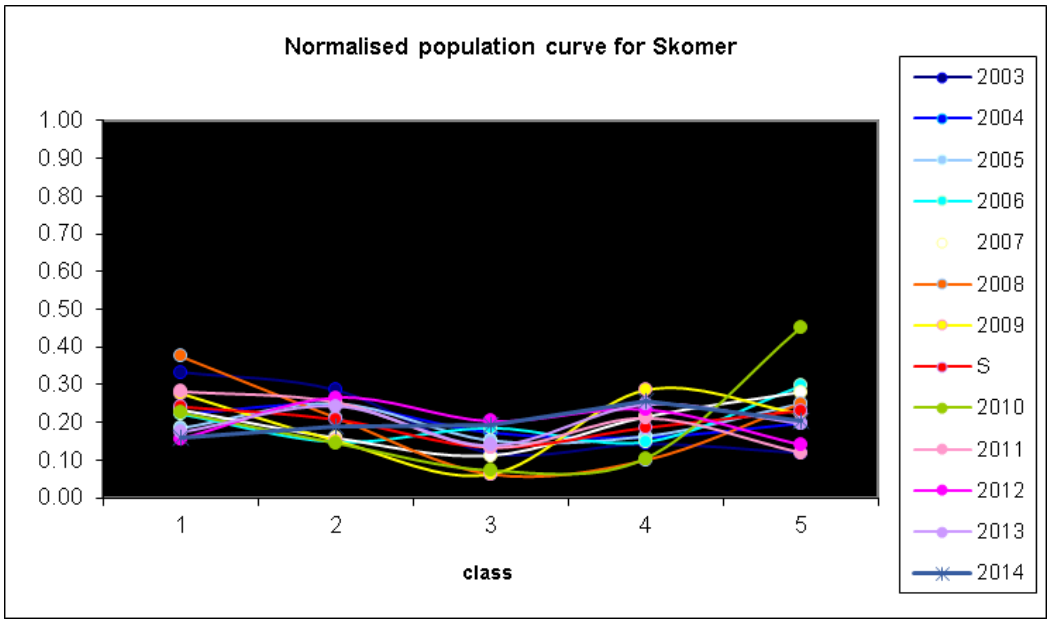
A drop in area occurred at all sites in 2012 which continued in 2013 but in 2014 the TRK sites and SSFG saw an increase in coverage. The two Waybench sites continued to decrease and are now at the lowest levels recorded since 2002.

Project code: RM63/01 Monitor *Pentapora* Population

All monitoring sites were surveyed in 2014, including new ones set up at the Pool.

The morphological classification method developed by Rob Gibbs in 2006 and revised in 2010 has continued and been applied to the 2014 data set.

Population/class patterns found at each site.



Unfortunately only by applying this method to an undisturbed area of seabed where *Pentapora* are present can an understanding be achieved of normal community functioning of *P. foliacea*. Currently there are no such areas within the Skomer MCZ. For more details see Skomer MCZ Project Status Report 2014/15.

Project code: RM54/01 Record Nudibranch Species Diversity

The 2014 survey was completed at 13 survey sites and 49 nudibranch species were recorded. The number of species recorded was lower than in 2010 (55 species), however survey effort was lower in 2014 with a total of 19 dives completed compared to 14 sites surveyed and 27 dives completed in 2010. 3 species not recorded since 1992 were *Cuthona concinna, Eubranchus doriae* and *Doto floridicola*. The identification of *Doto floridicola,* which had previously been recorded as *Doto sp 'A'* in 1990, was confirmed in 2002 (Picton *pers. comm.*).

There was a general perception within the dive team that nudibranch species in general were not abundant and much lower than the last survey in 2010, which was a particularly healthy year. In 2014 most of the survey sites were covered in a thick layer of silt, deposited following the violent storms of winter 2013/14. This silt buried many of the sessile filter feeding animals: hydroids, bryozoans, sponges and ascidians which are food sources for the different nudibranch species.

A review was completed of all records for surveys between 1972 and 2014 including sediment infauna surveys. A total of 76 nudibranch species have been recorded in the Skomer MCZ. This represents 70% of UK species in an area of 13.2 square kilometres. 63 species have been found on those surveys carried out between 2002 and 2014, of which 5 species were unrecorded in the MCZ before 2002. Nudibranch species recorded include several classed as nationally scarce or with limited national distribution in the British Isles, see Appendix 6 for report summary.

Project code: RP04/01 Record Meteorological Factors

Skomer MCZ weather data is recorded via an Environmental Change Network (ECN) compatible weather station. Data was accessible via the 'CCW automated weather stations and buoys' website from where it could be viewed graphically or downloaded in spreadsheet format and where images from the two webcams mounted near the weather station in the Deer Park coastguard hut could be seen. The website is no longer maintained and so weather data is no longer available via this route.

The weather summary for 2014:

Maximum temperature (°C)	23.9 (July)
Minimum temperature (°C)	0.9 (Feb)
Annual Maximum gust (knots)	82.6 (Jan)
Direction of Maximum gust	320.6 degrees

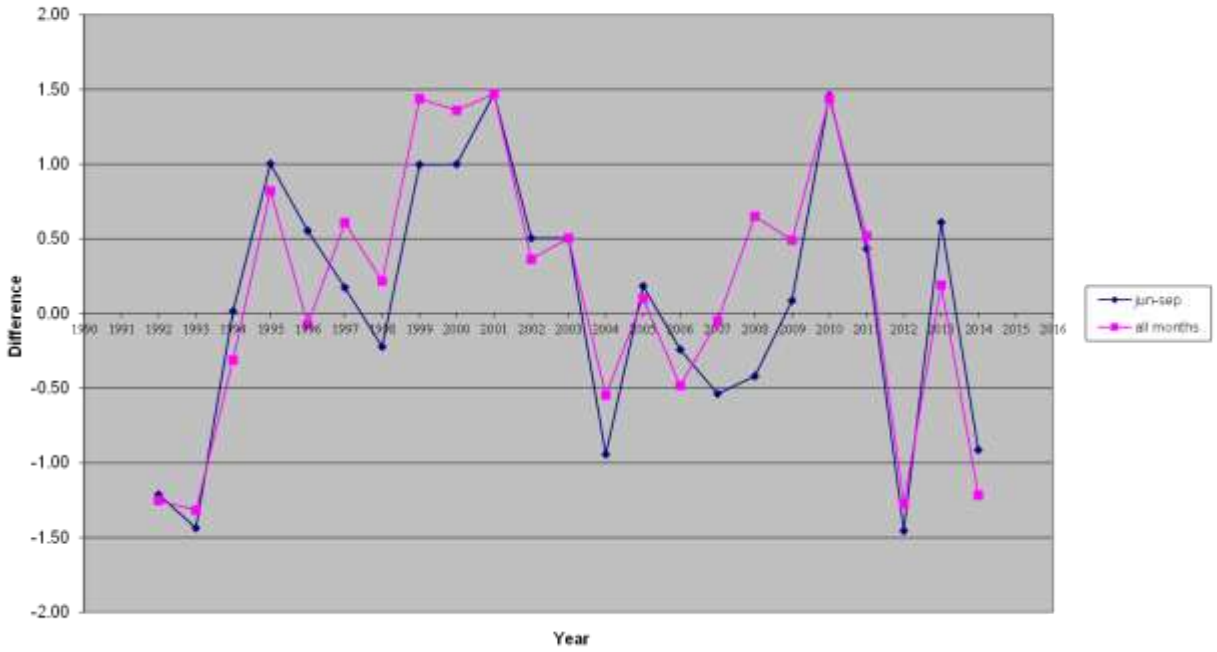
Weather – what weather?

Project code: RP63/01 Monitor Seawater Turbidity / Suspended Sediments

Turbidity in Skomer MCZ was measured by Secchi disc at the OMS and at Thorn Rock and also recorded by a YSI 6600 multi-parameter sonde, mounted on the OMS data buoy 1m below surface.

30 Secchi disc measurements of water turbidity were made at OMS and 28 at Thorn Rock in 2014. The graph shows the monthly mean summary at the OMS from 1992 to 2013. Plotting the mean difference between the monthly average and the overall average highlights any significant fluctuations. Both 2012 and 2014 appear to have been more turbid than the previous 18 years. This would tally with the diver observations of very poor visibility in the corresponding field seasons.

Plot of the mean differences between the monthly average Secchi reading and the overall average at the OMS site (All months = pink, June to Sept = blue line).



Project code: RP63/03 Monitor Sea Water Chemistry

Bathing water quality data for Martins Haven continues to be obtained from Pembrokeshire County Council (see section 4.3.15).

Multi parameter recording using the YSI 6600 sonde mounted on the OMS data buoy, which measured seawater salinity, pH, dissolved oxygen and chlorophyll, came to an abrupt halt in November 2014 when the buoy (and sonde) were lost in a storm.

Project code: **RP63/04 Monitor Seabed Sedimentation**

Seabed sedimentation samples were collected at Skomer MCZ using passive sediment traps at OMS and Thorn Rock. 8 samples were collected at each of the sites in 2014. Analysis of the samples is awaited.

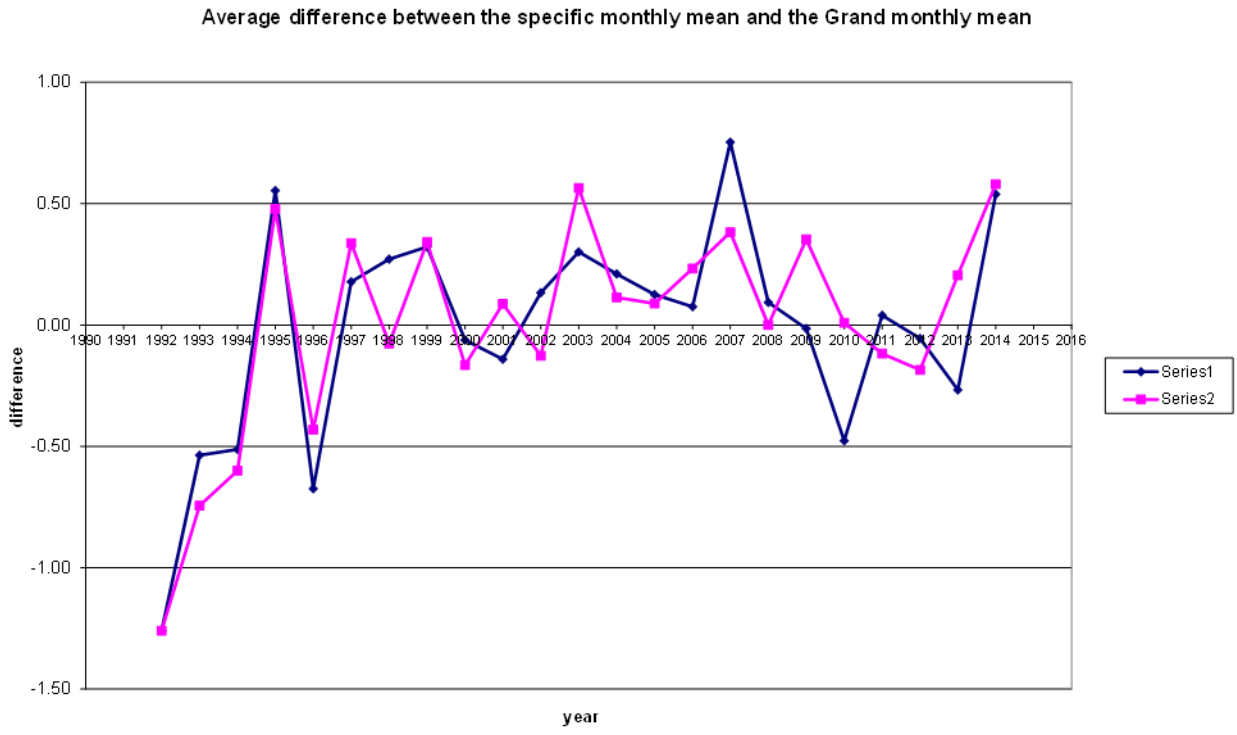
Project code: **RP64/01** **Record Seawater Temperature**

Seawater temperature data was collected at the Skomer MCZ Oceanographic Monitoring Site (OMS) using a Valeport Series 600 MkII conductivity, temperature, depth and salinity probe at depth intervals of 5m from the surface to just above the seabed. Profiles were recorded between April and November 2014 in conjunction with projects to measure turbidity and salinity and sample plankton populations.

Annual maximum and minimum seabed temperature records from 2000 to 2014 are as follows (data from automatic logger deployed at 19m BCD):

Temperature °C	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Minimum	8.4	7.27	8.7	7.6	7.7	7.36	7.5	8.8	8.4	7	6.9
Maximum	16.27	16.3	15.6	17.1	16.76	16.4	16.3	16.3	16.3	16.8	16.8
Year	**2011**	**2012**	**2013**	**2014**							
Minimum	7.6	8.0	6.98	8.14							
Maximum	15.9	16.6	16.82	16.72							

Average difference between the specific monthly mean temperature and the grand monthly mean (1992-2014)



10 Onset Hobo temperature / light loggers have also been placed at various intertidal sites around the Reserve and at other locations in Pembrokeshire. These loggers provide a record of the temperature regime experienced by sessile organisms in the intertidal habitat.

7.4 Data Handling Development

Information technology issues have continued to dog MCZ operations at Martins Haven, not helped by having to transfer over to new systems as a result of the formation of NRW.

NRW staff on the IT transformation team were so appalled by the internet speed at Martin's Haven they were forced to come out on the *Skalmey* with the MCZ team to calm their nerves (and to wait for several large downloads of software).

NRW field support continue to offer good support, but not much can be done with regard to internet access due to our geographical location and the age of the telephone network infrastructure at this remote tip of Wales.

MCZ staff continue to enter records into Marine Recorder, which was CCW's corporate database for marine data and has been adopted by NRW.

MCZ staff (particularly KL) have made considerable efforts to make sure that reports, and other MCZ information are made available on the NRW website. Time will tell how accessible this proves to be!

7.5 Other Work

MCZ staff continue to be involved with wider initiatives, particularly those involving NRW European Directive work programmes.

Colleagues from NRW Fisheries Assessment Team returned to further test sonar methods for assessing eelgrass populations for NRW's Water Framework Directive work. Their visit was timed to coincide with the volunteer diving survey of the North Haven eelgrass bed so that diver-gathered data could be used to ground-truth the sonar technique (see Sections 6.7 and 7.2).

MCZ staff again assisted with sampling at lagoon sites at Pickleridge, Neyland and Carew.

Morlo out of hibernation

NRW colleagues involved in Water Framework Directive water sampling were given assistance when their own boat was unavailable. PN and MB took part in several sampling surveys in the Three Rivers area and in the Loughour River estuary using *Morlo*.

MarClim intertidal surveying and deployment of data loggers was carried out at a variety of sites within Pembrokeshire Marine SAC.

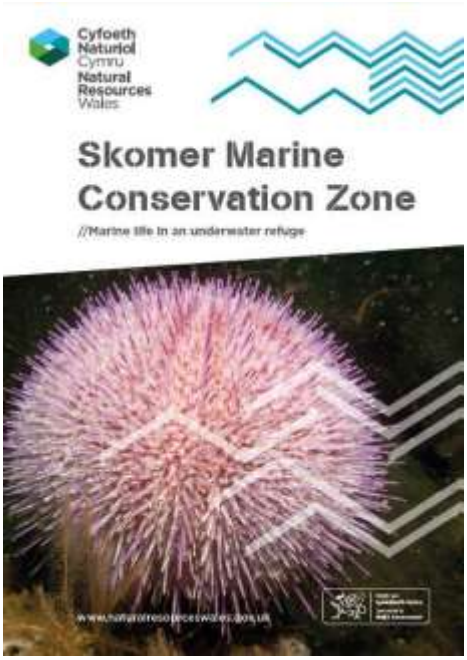
MCZ staff took part in sediment sampling in Milford Haven for the Milford Haven waterway Surveillance Group (see Section 6.7) and also dives at Dragon LNG terminal jetty to inspect for invasive non-native species.

8 Education and Interpretation

8.1 Research and Education Subcommittee

The Research and Education Committee did not meet in 2014.

Project: M150/02
Stocks of both the MNR interpretative booklet “Stars, squirts and slugs…marine life in an underwater refuge” and the computer generated poster ran out before the start of the 2014 season (See Section 4.2), so there was no printed information to support the purely visual exhibition during 2014.



Fortunately, although at relatively short notice, funds were made available through the cancellation of other NRW projects for the booklet to have a NRW-style “facelift”. The short timescale of the project made it impractical to involve the MCZ research and education committee, instead the decision was taken to “take the money and run”!

The resulting booklet differs very little in content from the original, but format and style have been changed to fit NRW’s corporate designs. It has also been an opportunity to use more recent and better quality images where possible.

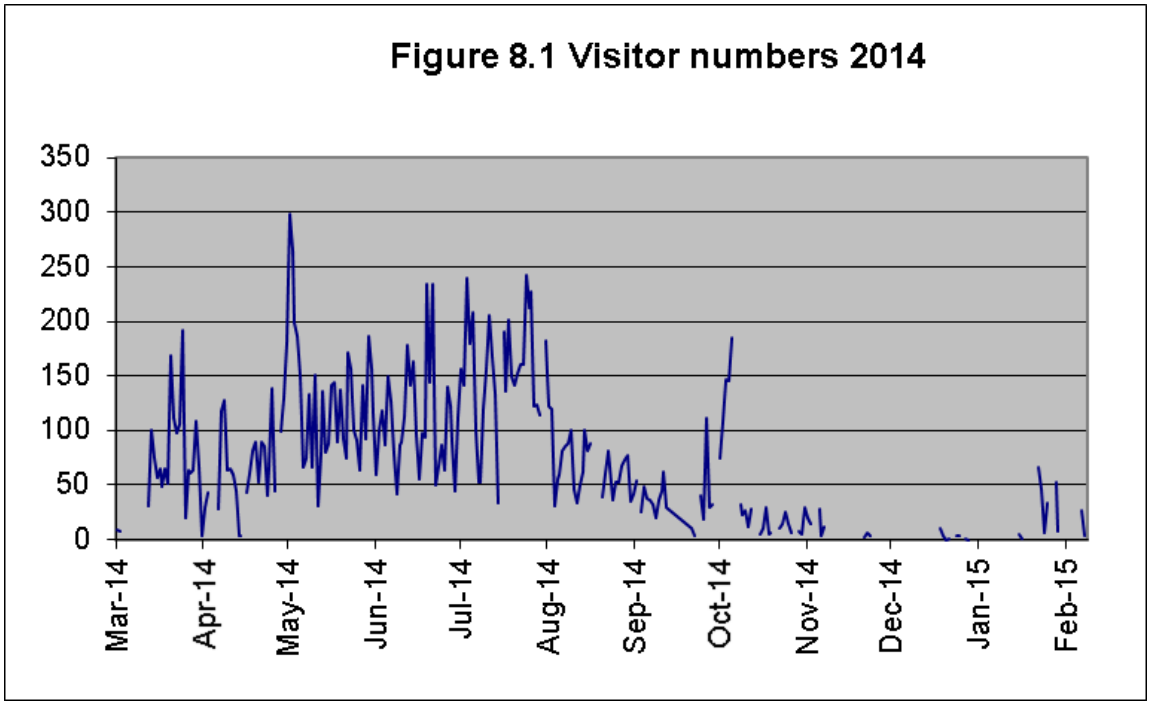
The booklets should be printed in time for the 2015 season.

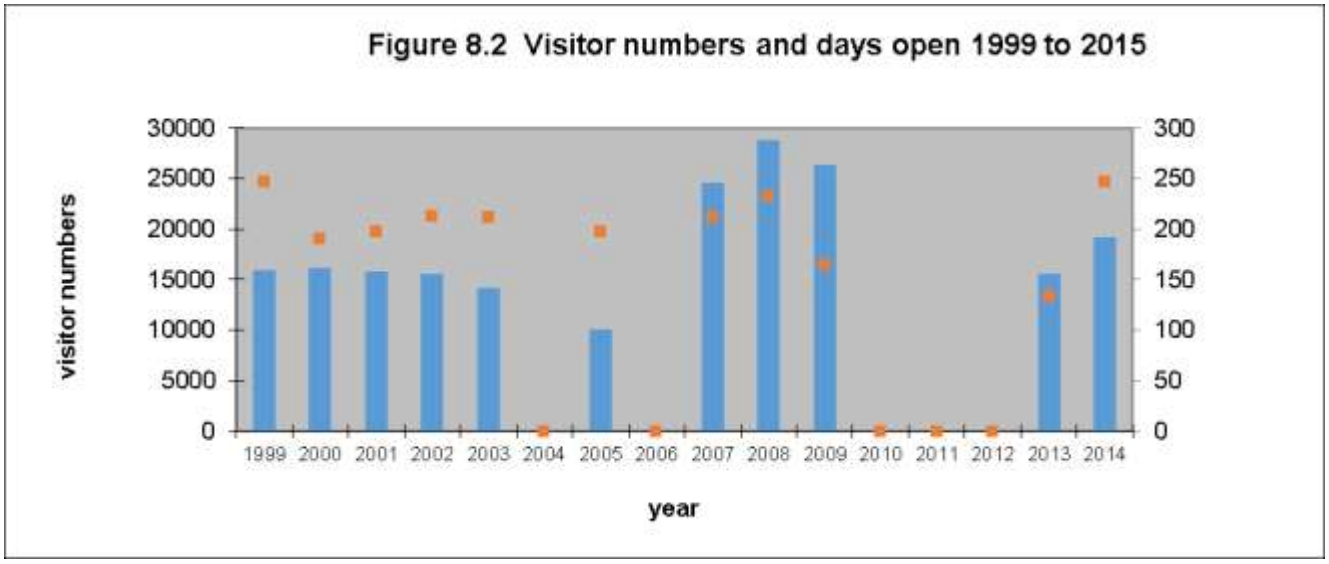
During the autumn the ‘Seal watching’ leaflet is also very popular and this has also been “re-badged” and reprinted (See Section 4.4.7).

8.2 Fisherman’s Cottage MCZ Exhibition

Project: M150/01
The MCZ exhibition at Fisherman’s Cottage continues to attract significant numbers of the visiting public. Because of its largely pictorial displays the exhibition has not needed to be altered to comply with NRW’s corporate appearance.

Equipment used to monitor the number of visitors to the exhibition was replaced after several years of lost or intermittent data. The logger shows that the exhibition attracted 19154 visitors over 246 days of opening in 2014. The pattern of visitor visits over the year can be seen in Figure 8.1 and how each year compares can be seen in Figure 8.2.





8.3 Other Initiatives

Due to the pressure of other work no MNR 'Marine Day', was held in 2014.
PN attended an inaugural meeting of NRW's Interpretation Strategy group, where the importance of the MCZ and its exhibition, as NRW's only site-based marine interpretation facility, was recognised, despite being relatively small-fry compared with some of the former Forestry Commission Wales sites now managed by NRW and which attract visitor numbers in the six-figure bracket.

KL attended a meeting of NRW's Education Focus group in September 2014. She also worked with NRW colleagues to ensure Skomer MCZ content was included on the NRW website.

8.4 Talks, Events and Articles

Project: MI20/01
Skomer MNR liaison with academic and educational bodies continued. This included talks to academic groups and supplying information to students (see Section 6.6).

Project: MI00/01
PN presented some aspects of the long-term data gathering carried out by Skomer MCZ to the "Pembrokeshire's Seabird Islands" conference in Cardiff in early 2014.

KL ran a "snorkel safari" for local school children during Pembrokeshire fish week in 2014. The event was run in conjunction with Pembrokeshire Marine SAC officer, and staff from West Wales Divers and Dale Fort Field Centre.

PN gave a presentation on some of the challenges in dealing with visitors at a marine site to a meeting of NRW's Recreation and Access group in October 2014.

8.5 Media

Project:ML70/01
MCZ staff received enquiries from the production company responsible for the One Show about programme ideas and from the BBC Bitesize education programme looking to use sponge and octopus footage we previously provided for Countryfile.

A video clip from the seal footage used in the exhibition was posted on the NRW U-Tube site, together with another clip showing a seal playing with one of our diving surface marker buoys.

NRW's internal social medium, "Yammer" also hosted photographs and short articles by MCZ staff. PN posted seal photographs, KL posted seal and nudibranch photographs and MB posted photographs and information about Skomer MCZ sediment infauna projects.

An article on Skomer MCZ nudibranch survey appeared in the NRW newsletter in October 2014.

KL also produced an article on the MCZ nudibranch work for the BAP newsletter.

9 Acknowledgements

MCZ staff wish to thank all those who contributed to, or supported in any way the management of the MCZ in 2014.
Thanks to:

- Contributors to the Advisory Committee, especially Dr Robin Crump who chairs the main committee.
- Honorary Wardens;
  Eddie Stubbings, Bee Buche and Skomer Island NNR staff;
- Lloyd Jones, John Archer Thomson, Blaise Bullimore and others for diving support;
- The crew of the *Dale Princess;*
- All our Honorary Wardens for contributing to user records and Barry and Lionel for making sure the exhibition was opened as often as possible.
- 'Neptune's Army of Rubbish Collectors' for organising and completing the underwater litter picks in the MCZ;
- The volunteer diving teams that were involved in the eelgrass survey and the skippers of the dive charter vessels.

With apologies to anyone omitted from above.

10 Appendices

Appendix 1

Accessing the use of seagrass, Zostera marina, as a potential indicator of ecological status in the UK – Ben Jones dissertation

Abstract

The coastal environment of the United Kingdom includes a range of ecosystems. Of these, seagrass, specifically *Zostera marina,* are of particular interest. These systems are of ecological and economical importance in terms of the services they provide. However, coastal ecosystems in the UK are under direct threat from over enrichment, detrimental to seagrass and ecosystem health. Over-enrichment is difficult to detect in marine environments due to constant mixing of water bodies and problems associated with continuous sampling. Seagrasses are unique and respond physiologically and morphologically to changes in environmental nutrients, which are reflected in their leaf tissue nutrients. Due to this, it is proposed that the use of seagrass as an indicator of ecosystem health and over enrichment is developed. To achieve this goal, seagrass was sampled from a number of sites around the UK coast, each with varying degrees of associated perceived anthropogenic activity. Leaf tissue samples were analysed for C, N & P, while morphometrics were also taken. Analysis of these variables suggested that sites with lower perceived anthropogenic activity displayed higher C:N, C:P and N:P ratios, which were associated with higher levels of growth (Shoot biomass, Leaf length, Leaf width, Leaf area, Percentage cover). These characteristics were attributed to a healthy ecosystem. Overall, results indicated that the seagrass associated ecosystems of the UK are in poor condition in comparison to global averages: however, differences were observed between areas, with some sites being considerably worse. Specifically, the meadow at Porthdinllaen, showed warning symptoms of eutrophication, as did the meadows at Gelliswick Bay and Southend-on-Sea, which are heavily influence by riverine inputs. Although deeper understanding is needed to form a full picture of these ecosystems, these findings can be considered as baseline information for further developments into coastal ecosystem monitoring programs in the UK with the approach being readily and easily replicated for future monitoring.

Keywords: Coastal ecosystem condition; Eutrophication; Indicators; Seagrasses; Submerged aquatic vegetation; Water quality; UK

Appendix 2

The Spatial and Temporal Distribution of Marine Invasive Species Along the West Coast of the United Kingdom – Emma Evans dissertation

ABSTRACT

The following report investigates the spatial and temporal distribution of 14 marine invasive species along the west coast of the UK. These 14 species were identified by the Marine Aliens II programme as species of particular interest due to their harmful nature. The location of each marine invasive species was mapped, along with data to explain their distribution. The data contained information on port location, tidal range, wave height, wind speed, marine habitat type and sea surface temperature (SST). All 14 invasive species showed strong initial colonisation and distribution around ports and harbours. *B. amphitrite, B. neritina, F. enigmaticus, P. japonica* and *U. pinnatifida* were located particularly close to a port, all within 15 m. A northwards trend in species distribution along the west study coast was only present in *S. muticum*. Overall, the majority of marine invasive species colonised areas of a similar habitat to their native environment. Levels of exposure, habitat type and SST were the dominant factors determining the location of marine invasive species. Further studies are needed to confirm if marine invasive species with wide temperature tolerances have the greatest potential for future spread.

Appendix 3

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Temporal and spatial variability of zoobenthos recruitment in a north-east Atlantic marine reserve

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*Submerged artificial surface imitates newly available habitat for settlement of marine fauna. It also enables study of the timing of benthic larval settlement. Such knowledge is important if the model of possible recovery after disturbance in protected areas is to be assessed. During this study recruitment of sessile benthic invertebrate fauna at spatial and temporal scales was investigated using artificial panels submerged in the Skomer Marine Nature Reserve (Wales, UK). Panels were exchanged monthly between May 2009 and September 2011 (with the exclusion of winter time). Recruitment was highly variable with regard to time and distribution; abundance and number of recruiting species varied significantly between sites (about 2 km apart from each other), depths (6 and 12 m), position on panels (top or underside) and years without any obvious trends. The highest number of individuals and highest values of species richness were at Bernies Rocks, at the greater depth and on the underside surface of panels. Bryozoans were the dominant taxon on panels in each studied year and month. Most macrofaunal species noted on panels exhibit a colonial life strategy with short-lived, non-feeding larval stage. Although many species settle all year round, levels of settlement usually peak in summer months, showing a seasonal recruitment pattern (*Bugula fulva, Spirobranchus triqueter, Chorizopora brongniarti *and* Escharoides coccinea*). Some species had a pronounced settlement peak in spring (e.g.* Electra pilosa *and* Balanus crenatus*).*

Keywords: settlement, epifauna, colonization, seasonality, fouling community, hard substrate fauna, marine reserve, Skomer

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Appendix 4

Grey Seal Breeding Census Skomer Island 2014 - Birgitta Büche and Edward Stubbings, Wildlife Trust of South and West Wales

NRW Evidence Report No. 65

Summary

215 Grey seal pups were definitely born on Skomer Island in 2014. In addition eleven pups (wanderers) turned up either just before the start of moult, or moulting.

36 more pups were born than last year and this is the highest total ever recorded.

379 pups were born in the Marine Nature Reserve as a whole in 2014: 215 on Skomer and 153 on the mainland.

The busiest week this year was week 41 (06-12/10) when 36 pups were born.

The most productive beaches were Matthew's Wick (41 pups) and South Haven (34 pups). In 2014, in contrast to 2013, Castle Bay (30 pups) was more popular than Driftwood Bay (26 pups) and North Haven beach was more productive (24 pups).

154 pups are known, or assumed to have survived on Skomer, giving a survival rate of 73%, which is slightly higher than last year's rate (68%) but still lower than the average of the last ten years (76%).

The mean size at onset of moult was three; the mean age at onset of moult was 14 days; the mean age at completion of moult was 20 days and the mean duration of moult was six days.

In 2014 the maximum haul-out of 300 was recorded on 16/11/14. The number of seals using the haul-outs was slightly lower than the average for the last ten years.

32 different cows, twelve bulls, one immature and two weaners were photographed with obvious signs of being entangled in nets at some time in their lives, often with netting still embedded.

Photo-monitoring continued in 2014 and nearly 4000 pictures of seals were taken. Ca. 80% of breeding females were photographed and 634 pelage photos were collected and catalogued which will be entered into the SMRU seal ID database. Only Bulls and scarred individuals were identified by eye, in total 135 seals were identified, of which 50 were known from previous years.

Appendix 5

Skomer Marine Conservation Zone. Distribution & Abundance of *Zostera marina* in North Haven 2014. M. Burton, K. Lock, P. Clabburn, J. Griffiths, P. Newman, J, Jones.

NRW Evidence Report No. 68

Synopsis
Volunteer divers were used to survey the seagrass (*Zostera marina*) bed in North Haven within Skomer Marine Conservation Zone (formerly Skomer Marine Nature Reserve). The methods devised in 1997 and refined in 2006 (Lock et al 2006) were used to complete a map of extent and shoot density.

The area of extent had increased from 8044.0 m^2 in 2010, to 8224.6 m^2 in 2014. Comparisons with the first detailed survey in1997 shows an increase in extent to the north, west and east.

The shoot density had decreased from 41.1 shoots /m^2 from 2010 data to 35.1 shoots /m^2 in 2014. This decrease was not significant (at 5% significance level) when tested with ANOVA. Most of the decreases occurred in the eastern area of the bed.

Two acoustic surveys have been completed by the NRW Fisheries Assessment Team (2013 & 2014) using a Biosonics DT-X split beam echo sounder. These surveys have proved valuable in assessing area of extent and providing an estimate of stand height (shoot length). The acoustic method is quick and gives comparable area estimates. As yet the acoustic method cannot estimate shoot density.

The North Haven *Z. marina* bed is currently within the specified limits as defined by the Skomer Marine Nature Reserve management plan 2000. There is a declining trend in shoot density over the past 8 years, but area of extent has been increasing.

Appendix 6

Skomer Marine Conservation Zone Nudibranch Diversity Survey 2014
K. Lock, P. Newman, M. Burton, J. Jones

NRW Evidence Report No. 67

Synopsis

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

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

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

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

Appendix 7

Abbreviations

AcoP	Approved Code of Practice
AWS	Automatic weather station
BAP	Biodiversity Action Plan
BCD	Below chart datum
BS-AC	British Sub-Aqua Club
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CCW	Countryside Council for Wales
DTI	Department of Trade and Industry
DEFRA	Department of Environment, Fisheries and Rural affairs
EA	Environment Agency
NE	Natural England
EU	European Union
FPV	Fisheries Protection Vessel
FSC	Field Studies Council
FTA	Fixed Term Appointment
HSC	Health and Safety Commission
HW	Honorary Warden
JNCC	Joint Nature Conservation Committee
MEP	Member of the European Parliament
MHPA	Milford Haven Port Authority
MNR	Marine Nature Reserve
MCA	Marine Coastguard Agency
MCZ	Marine Conservation Zone
MCO	Marine Conservation Officer
MCS	Marine Conservation Society
MPA	Marine Protected Area
NCI	National Coastwatch Institution
NERC	Natural Environment Research Council
NNR	National Nature Reserve
NRW	Natural Resources Wales
NT	National Trust
NTZ	No Take Zone
OMS	Oceanographic monitoring site
PCC	Pembrokeshire County Council
PCF	Pembrokeshire Coastal Forum
PCNP	Pembrokeshire Coast National Park
PMSAC	Pembrokeshire Marine Special Area of Conservation
PMCG	Pembrokeshire Marine Code Group
POCG	Pembrokeshire Outdoor Charter Group
RIB	Rigid-hulled inflatable boat
RSPB	Royal Society for the Protection of Birds
RYA	Royal Yachting Association
SAC	Special Area of Conservation
SDSC	Scientific Diving Supervisory Committee
SNH	Scottish Natural Heritage
UW	University of Wales
WG	Welsh Government
WTSWW	Wildlife Trust South and West Wales

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