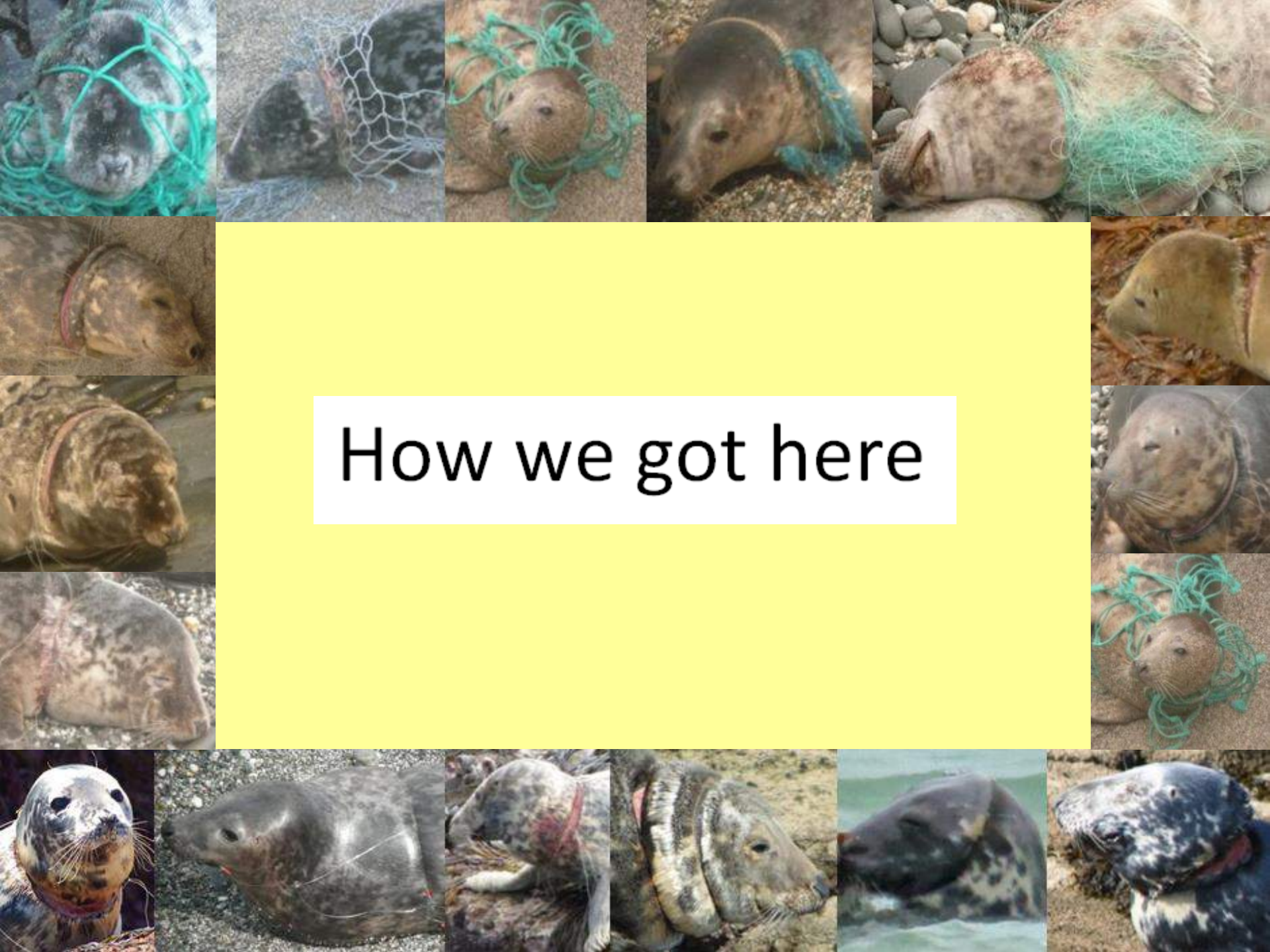
Observations to action

Research to global campaign

Ghost gear impacts

Grey seals in SW



How we got here

Figure 1: Example entangled seal 53 'Lywans' showing her development from 2001 to 2014.

20 times + 11 times (5)

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

2000 – 2014: Data collection at West Cornwall

2004: Set up Cornwall Seal Group

2008 – 2014: Incrementally more people/sites

2010: Analysed our seal entanglement data

2012: Paper in the Marine Pollution Bulletin





Marine Pollution Bulletin 64 (2012) 2815–2819

Contents lists available at SciVerse ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

Entanglement of grey seals *Halichoerus grypus* at a haul out site in Cornwall, UK

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ARTICLE INFO

Keywords:
Halichoerus
Grey
Seal
Net
Entanglement
Debris

ABSTRACT

Entanglement in marine debris has been internationally recognised as a potential threat to marine species. Sightings records and a photo identification catalogue from a haul out site in southwest England were used to establish entanglement records for grey seals *Halichoerus grypus*. Between 2004 and 2008 the annual mean entanglement rates varied from 3.6% to 5%. The maximum recapture period for entangled seals compared to paired control seals was significantly less ($p = 0.045$) suggesting an increased mortality rate for affected seals. Of the 58 entangled cases in the catalogue, 64% had injuries that were deemed serious. Of the 15 cases where the entangling debris was visible, 14 were entangled in fisheries materials. The entanglement reported at this site could indicate a high rate of mortality and should be monitored carefully. On a more immediate level, entanglement represents a welfare issue for the affected animals.

1. Introduction

Entanglement in marine debris has been internationally recognised as a potential threat to marine species since the 1984 International Workshop on the Fate and Impact of Marine Debris (Shomura and Yoshida, 1985). In a review of the impacts of entanglement Laist (1997) reported that 135 species of marine wildlife had been recorded as entangled in marine debris. This included 19 of the 34 pinniped species.

Entanglement has welfare implications for individual pinnipeds; injuries sustained by debris, or increased drag caused by trailing material result in increased foraging times to meet raised metabolic demands, and at the same time movement is often impaired making foraging more difficult (Feldkamp, 1985; Feldkamp et al., 1989; Bengston in Laist, 1997). In many cases the entangling item causes a constriction around the neck or body of the affected animal and it is assumed that these combined effects will eventually be fatal (Derraik, 2002). As an indicator of mortality, entanglement rates are likely to be an underestimate; for every entangled animal recorded on land an unknown proportion are likely to die at sea, entrapped in debris too large to swim against or entangled beneath the surface, and therefore drowning (Laist, 1997). For some species entanglement mortality has been significant enough to be implicated in population level effects (Fowler, 1987). For the endangered Hawaiian *Monachus schauinslandi* and critically endangered Mediterranean *M. monachus* monk seals it has been identified as a major factor threatening the survival of these species (Henderson, 2001; Boland and Donohue, 2003; Karamanlidis et al., 2008).

Where identified, the majority of the entangling material is fisheries related, although debris from other sources are also commonly reported (Arnould and Croxall, 1995; Hanni and Pyle, 2000; Boren et al., 2006). Seals may become entangled due to interactions with either operational or discarded fishing gear although it is difficult to ascertain which is responsible for the majority of cases. As outlined by the United Nations (1995) incidental mortality caused by either live or discarded fishing gear can be regarded as fisheries bycatch.

The British Isles are home to a substantial proportion (approximately 45%) of the world population of grey seals *Halichoerus grypus* which recent estimates by the Sea Mammal Research Unit (2008) put at 180,000 (confidence intervals: 96,200–346,000) individuals living and breeding around the coasts. Data suggests that grey seals found around Wales and SW England form a genetically distinct subpopulation of approximately 5000 animals (Sea Mammal Research Unit, 2006).

Grey seals at a mainland haul out site in Cornwall have become the focus of a long term study by the Cornwall Seal Group (CSG) since 2000. Numbers of seals counted at the site averaged 25 between 2000 and 2008, but there was great seasonal variation and sightings of over 100 animals were common during the spring moulting period (Sayer et al., 2009; Leeney, 2010).

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http://dx.doi.org/10.1016/j.marpolbul.2012.09.005

- Average annual entanglement rates 3.1% - 5%
- Entangled seals account for 8.7% of seals in photo ID catalogue for this site (n=58)
- Rates of entanglement an order of magnitude lower have been implicated in population decline for other species

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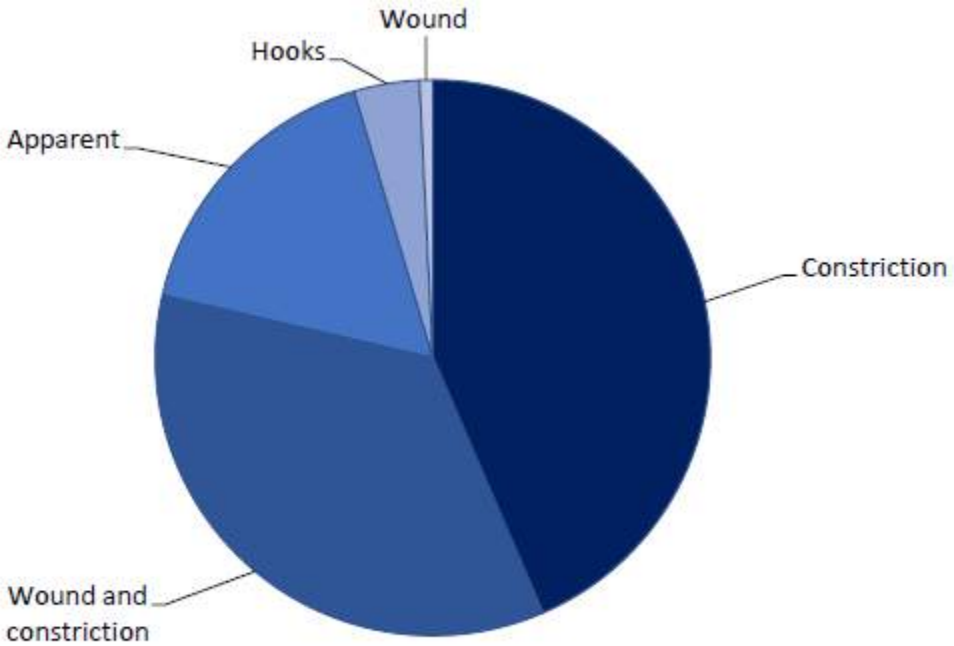
Photos Sue Sayer; Dave McBride ; Terry Thirlaway; Bex Allen – monofilament net and line. Allen et al 2010

Cornwall SEAL Group

Where visible, 14 out of 15 materials were fisheries related and 9 had trailing material

Reduced survivorship for entangled seals;
some known to survive for 10+
20 were rescued by BDMLR



64% had severe injuries

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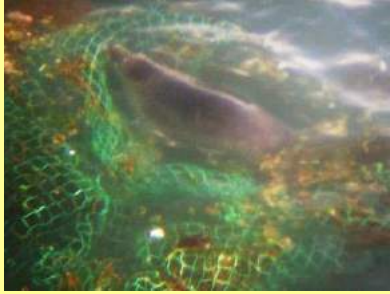
Photos Sue Sayer – multifilament net

Take home messages



- Entanglement is a major welfare issue for seals in Cornwall with potential population effect
- Cumulative effect with other impacts
- Not all ghost gear is locally generated
- Potentially all net used becomes ghost gear
- Picking up looped gear from a beach can save lives!

- Additional dead bycatch (estimated 266 seals in 2010 for UK set nets in VIIa,e,f,g,h,j and VIII)
most in tangle/trammel nets (SMRU)

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Photos by Bex Allen and Terry Hocking

World Animal Protection
Sea Change Campaign

Global Ghost Gear Initiative

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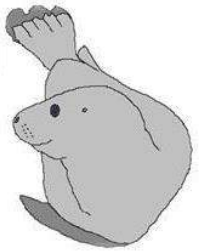

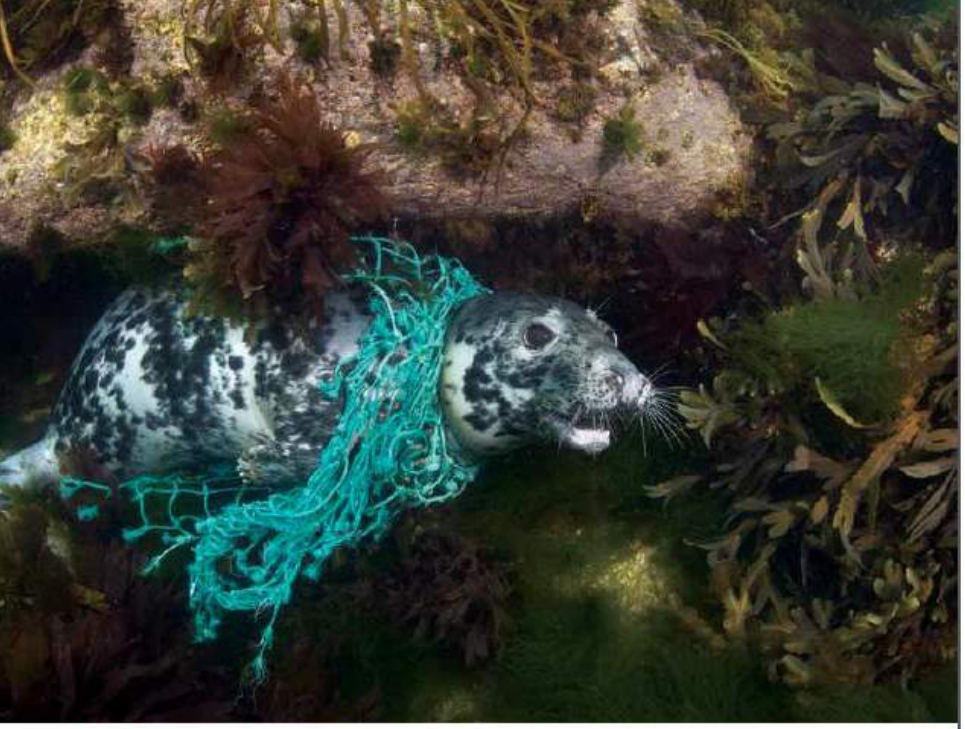

Executive summary

Fishing's phantom menace

WORLD ANIMAL PROTECTION

How ghost fishing gear is endangering our sea life

Ocean death trap

Our oceans are an unsafe place to live. Every year millions of animals, including whales, seals, turtles and birds, are mutilated and killed by 'ghost' fishing gear – nets, lines and traps that are abandoned, lost or discarded in our oceans.

This report shows the scale of this problem, and the particular threat ghost gear poses to our most iconic marine animals. Among the animals most frequently reported wounded and killed are fur seals, sea lions, and humpback and right whales.

Critically, we conclude that it is possible to solve the problem through cross-sectoral cooperation and action between the seafood industry, governments, intergovernmental and non-governmental organisations.

The United Nations Environment Programme (UNEP) and the Food and Agriculture Organization of the United Nations (FAO) conservatively estimate that some 640,000 tonnes of fishing gear are left in our oceans each year. In just one deep water fishery in the north-east Atlantic some 25,000 nets, totalling around 1,250km in length, were recorded lost or discarded annually.

We were known as WSPA (World Society for the Protection of Animals)

#seachange

Photo left: Juvenile gray whale entangled in ghost gear. North Pacific Ocean. Brandon Cole/naturepl.com*

Photo reverse: Female grey seal entangled in a ghost net, Devon, United Kingdom. Alex Mustard/naturepl.com

Each net is a floating death trap. For example, when 870 ghost nets were recovered off Washington State in the US, they contained more than 32,000 marine animals, including more than 500 birds and mammals.

Animals entangled may either drown within minutes, or endure long, slow deaths lasting months or even years, suffering from debilitating wounds, infection and starvation.

Analysing the current scientific evidence available, World Animal Protection estimates that entanglement in ghost gear kills at least 136,000 seals, sea lions and large whales every year. An inestimable number of birds, turtles, fish and other species are also injured and killed.

What lies beneath

Ghost fishing gear often travels long distances from its point of origin and accumulates in hotspots around oceanic currents. Even remote Antarctic habitats are not free from this pollution – every ocean and sea on earth is affected.

A recent scientific expedition to southern Alaska's beaches found up to a tonne of garbage per mile, much of it plastic fishing nets and lines washed in by the tides.

The materials used to make fishing gear cause long-lasting dangers. The plastics used are very durable, some persisting in the oceans for up to 600 years. Some are almost invisible in the water, and they are extremely strong and resistant to biting and chewing by entangled animals so they cannot escape.

The net effect

As well as causing needless animal suffering and death, ghost fishing gear causes large-scale damage to marine ecosystems and compromises yields and income in fisheries. US researchers have estimated, for example, that a single ghost net can kill almost $20,000 (USD) worth of Dungeness crab over 10 years.

Governments and marine industries spend many millions of dollars annually to clean up and repair damage caused by ghost gear. It also threatens human life and health, particularly divers and those trying to navigate the oceans in both small and large vessels.

Sea change in the oceans: campaign to save a million lives

Launching in 2014, World Animal Protection's Sea Change campaign aims to save 1 million marine animals by 2018. We will do this by measurably reducing the volume of ghost gear added to our seas, removing gear that is already there, and rescuing animals already entangled.

At the heart of our campaign approach is our plan to form a cross-sectoral Global Ghost Gear Initiative, uniting people and organisations with the knowledge, power and influence to deliver solutions for ghost-gear-free seas.

With the Global Ghost Gear Initiative, we aim to forge an alliance of governments, industry, intergovernmental and non-governmental organisations, with a shared commitment to understanding and tackling the problem of ghost fishing gear.

The initiative will share data, intelligence and resources to understand global ghost gear abundance, causes, impacts and trends. Critically, it will enable the expansion and replication of the most effective solutions to reduce ghost gear at source and remove existing gear, as well as the development of new solutions. The initiative will direct and drive solution delivery in ghost gear hotspots, and create opportunities for provision of seed funding of solution projects using best practice models. It will also enable global monitoring and showcasing of the impact of solution projects to catalyse further change.

An estimated...

640,000

tonnes of fishing gear are left in our oceans each year.

25,000

nets in the north-east Atlantic were recorded lost or discarded annually.

1

ghost net can kill almost...

$20,000 (USD)

worth of Dungeness crab over 10 years.

870

nets recovered in the US contained more than...

32,000

marine animals.

World Animal Protection

Commissioned

Grey seal net entanglement update

Ghost gear surveys

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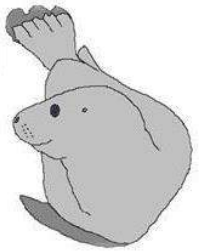

Grey seal
net entanglement report

World Animal Protection Commissioned Report

Entanglement

and its effects on grey seals (*Halichoerus grypus*)

2000 to 2013

Cornwall and North Devon, UK

Sue Sayer, Kate Hockley and Rebecca Allen

DP102 'Railway Arch'

Report compiled January 2015

www.cornwallsealgroup.co.uk

S313 Young seal rescued from lost trawl net by British Divers Marine Life Rescue

Introduction

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By 1997, Laist had entanglement records for 19 of the 24 existing species of pinnipeds including grey seals.

Around 112,000 grey seals (38% of the World's population) are found across the UK and are described as a UK 'special responsibility species'* for the EU Habitat's Directive where they are listed in Annexes II and V (JNCC).

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Method

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Figure 2: Example patterns from net entangled photo identification catalogues; males (DP122, LP152, DP600) and females (S140, S218).

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At first sighting

- Age and sex of the seal
- Details about entangling material, its position and extent
- Information on the entanglement injury
- Body condition
- Likelihood of re-identification
- Number of ID recaptures over number of years
- Maximum capture period (MCP)
- Number of sites visited.

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Results

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5691 surveys

25 sites

13 full calendar years

262 entangled seals

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Entanglement rates:

constant for a decade

Mostly adults – even gender split

Moderate or well nourished

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Neck (with effects)

Visible (n=92)

Monofilament

Trailing (n=81)

Constriction/wound/both (n=208)

Link to survivorship – trailing and deep

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All but one of the entangling materials were fisheries related

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Figure 18: Examples of seals with a deep constriction (bottom left) and trailing material (main and top right inset).

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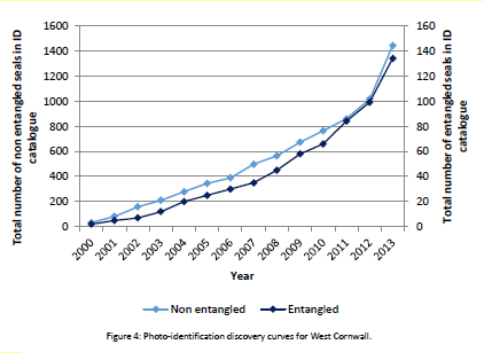
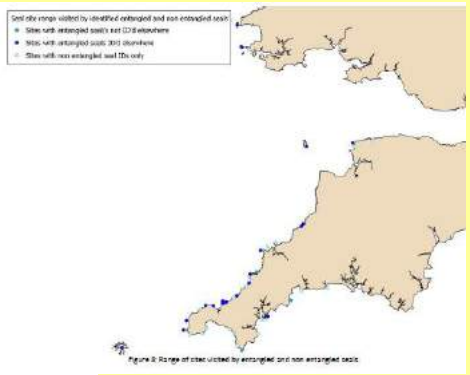


Figure 4: Photo-identification discovery curves for West Cornwall.



Subset consistent

Recruitment

Movements

Range

Subset different

Survivorship

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Insights from photo ID

Entanglement can kill rapidly

Flesh and skin can heal over embedding material

Wounds can deteriorate quickly and movement alone is enough to deepen them

Entangled seals can survive for years with welfare implications and reproduction may be affected

Wounds heal quickly once entanglement removed

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Conclusion

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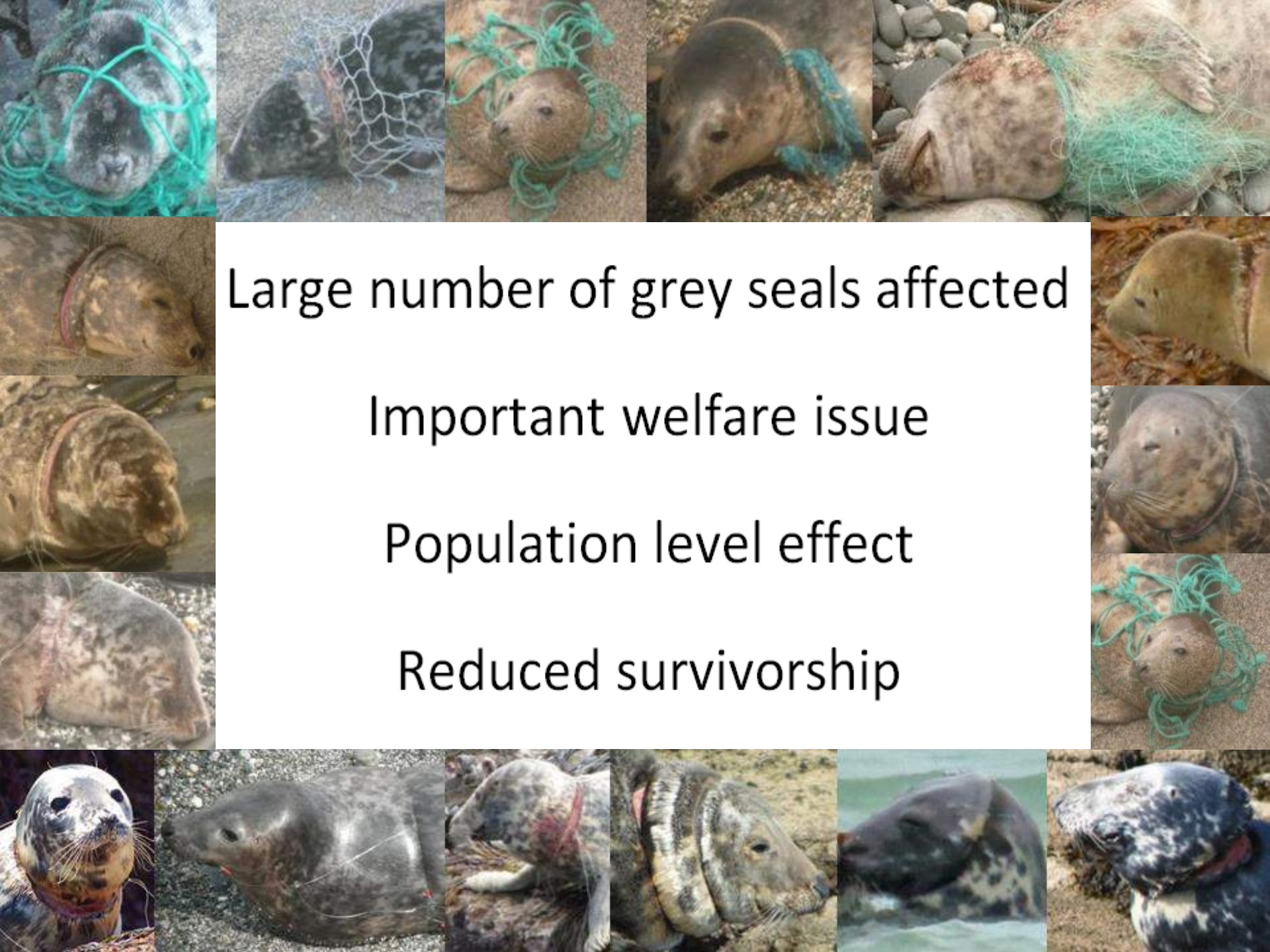

Large number of grey seals affected

Important welfare issue

Population level effect

Reduced survivorship

Table A1.12 Seal bycatch estimates by metier and by ICES Division

STRATUM:	Estimate	LCL	UCL	UCL-1-sided
BY METIER				
Drift demersal	0	0	62.24	50.64
Drift pelagic	0	0	47.82	38.9
Gill	19.52	0.4943	108.59	92.49
Gill hake	0	0	24.73	20.11
Gill light	0	0	267.6	217.44
Gill flatfish	60.61	1.5345	336.88	286.96
Tangle Trammel	388.82	283.3756	521.45	499.5
BY ICES DIVISION				
IVa	29.489	22.037	38.86	37.312
IVb	6.855	4.104	17.843	15.866
IVc	30.448	16.318	149.747	127.855
VIb	6.9	4.96	9.343	8.939
VIIa	3.282	2.151	19.547	16.532
VIId	95.5	33.537	479.526	409.475
VIIe	138.555	91.55	343.232	306.239
VIIf	107.94	74.935	208.143	190.291
VIIg	21.65	16.49	53.731	47.872
VIIh	13.879	9.2	24.528	22.665
VIII	5.629	4.01	9.315	8.669
VIIj	8.828	6.094	15.502	14.329
TOTALS	469 (CV=0.117)	285	1369	1206

266 in 2010 for same areas
VII e and f Cornish inshore waters: 246 in 2013 alone!

Entangled seals can be successfully rescued and rehabbed

It is not a solution

Action needed to reduce the amount of ghost gear

Reduce

Remove

Recycle

Redesign

Reorganise

Replicate

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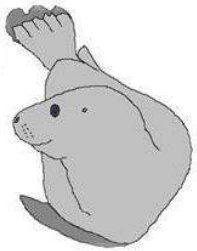






Acknowledgements

We sincerely thank those who have made contributions to this work, shared photos of entangled seals for ID (they know who they are) and to those whose online photos have been used (user IDs not listed) including: T Bain, J Barnett, S Beadle, S Bone, D Boyle, R Brookes, B Buche, K Buffery, A Cawthray, G Clegg, J Clegg, J Coates, R Collins, T Cooper, C Curtis, D Drake, K Drake, R Durrant, A Dutton, A Farr, E Farr, R Girling, B Godley, L Grenfell, V Hall, A Hambly Staite, D Harding, M Harding, P Harry, L Hawkes, J Hirons, T Hocking, C Hood, D Jarvis, D Jarvis, L Jarvis, D Jenkins, C Jose, C Lewis, K Lock, J Loveridge, J Loveridge, S Leary, A Lowe, B Lowe, C Lowe, K Lewis, D McBride, B MacDonald, K Metcalfe, K Middleton, L Morgan, R Morton, S Morton, D Murphy, D Murphy, P Oaten, F Parrott, I Parrott, P Pocock, R Pope, P Ripley, J Ross, L Sargeant, W Sargeant, C Selway, E Stubbings, M Stephens, J St Ledger, T Thirlaway, M Thorne, N Tomalin, L Tozer, D Warmsley, R Warwick, R Wells, P Welsh, A Williams, B Williams, D Williams, K Williams, J Williams, M Witt and R Wynn. This reasearch depended on contributions from you all, irrespective of your level of interest.

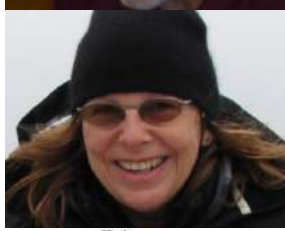
We are grateful to collaborate with so many amazing organisations including Area of Outstanding Natural Beauty, British Divers Marine Life Rescue; the Cornish Seal Sanctuary; Cornwall Wildlife Trust's Marine Team, Seaquest SW and Marine Strandings Network; the Landmark Trust; Morte Wildlife Group; the National Trust; Natural England; Natural Resources Wales; RSPB; RSPCA Wildlife Hospitals; Wildlife Trusts from Devon, the Isles of Scilly and South and West Wales.

Thank you to all the operators who make a living in the marine environment and contribute to our work: Atlantic Diving, Charles Hood, Dive Scilly, Koru Kayaking, Marine Discovery, Orca Sea Safaris, Padstow Sea Safaris and Scilly Seal Snorkelling.

Seal photo ID projects (PIPs) - CASPIP, INTPIP, IOSPIP, LISPIP, LIZPIP, MERIFIC, POLPIP, STAPIP that have involved hundreds of volunteer surveyors have contributed hugely to our ID effort and have been organised by the following groups: CSG, Cornwall Wildlife Trust, Cornwall College, Looe Marine Conservation Group, Newquay Marine Conservation Group, National Trust, Polzeath Marine Conservation Group, St Agnes Marine Group and the University of Exeter.







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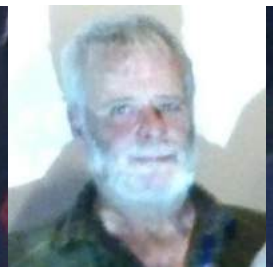

Cornwall SEAL Group

Observations to action

Research to global campaign

Ghost gear surveys in Cornwall

Ghost gear survey report

World Animal Protection Commissioned Report

Ghost gear in Cornwall, UK

2014 to 2015

(Interim report February 2015)

Sue Sayer and Kate Williams

Rob Wells, St Austell Bay: Adult male grey seal (LM10 'Wotsit') about to haul over a mixed ball of ghost gear

Report compiled February 2015

www.cornwallsealgroup.co.uk

Sue Sayer, 11/11/14: This shag in a gill net was rescued by Bex Allen during a World Animal Protection funded boat survey

Introduction

Photo Charles Hood – grey seal trapped in keep cage

Entanglement affects grey seals

Ghost gear recording

Systematic and opportunistic

All around the coast of Cornwall

Boat and land based surveys

Motivated volunteers

At last data wanted

Informing global campaign with actions

Photos John Hepburn – trawl net over wave cut platform (2009) and along strand line (2008)

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Method

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Contacted recorders globally

↓

Took advice

↓

Designed forms

↓

Trialled at sea and on land

↓

Re-designed

↓

Trialled for two months

↓

Finalised form

Cornwall SEAL Group

Date		**Time**		**Recorder**		**Please take photos**	
Reference number (can mark numbers on map if drawing one)	**Location** (gear in sea give nearest land name and waypoint if you have one) Tick if **photo** taken and **photo number** if lots of items	Where specifics **Depth if in sea** - (surface, 1m, >1m) or **Part of beach** (N/E/S/W side; Top, Mid, Bottom or High Tide/Mid Tide/Low tide)	No. of items	**Type** of gear **B** Buoy **F** Float **L** Line **NM** Net monofilament **NT** Net trawl **P** Pot **RO** Rope **RU** Rubber **O** Other **Colour/Size/Shape/Materials**	**Size** **Length and width** (in cm/m); AND/OR **Volume** (Fist, head, arm, leg, torso, person, cow, box van, house) **Mesh** size in cm (pull knots tight to close mesh measure knot to knot) **Attached to gear** - hooks, lures, floats, animals? Has it been seen before? Y/N Retrieved/Removed? Y/N Where disposed of?	**Possibility of interaction** (U=Unlikely P=Possible L=Likely W=Witnessed) Risk assessment*	**Possibility of entanglement** if washed out (U=Unlikely P=Possible L=Likely W=Witnessed) Risk assessment*
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

* Interaction (**P** if seals use area routinely; **L** if seals seen within 5m of item; **W** if seal within touching distance of item otherwise **U**)

* Entanglement (**P** if looped/meshed/balled mass; **L** if seals seen within 5m of looped/meshed/balled item; **W** if seal seen entangled otherwise **U**)

Appointed boat survey co-coordinators

↓

Publicised – single contact

↓

Got overwhelmed

↓

Appointed data manager

↓

Accept all – photos as minimum

↓

Return to volunteers to validate

Cornwall SEAL Group

Date 8th February 2015 **Time** **Recorder** Malcolm McKenzie **Please take photos**

Reference number (can mark numbers on map if drawing one)	**Location** (gear in sea give nearest land name and waypoint if you have one) Tick if **photo** taken and **photo number** if lots of items	Where specifics **Depth if in sea** - (surface, 1m, >1m) or **Part of beach** (N/E/S/W side; Top, Mid, Bottom or High Tide/Mid Tide/Low tide)	No. of items	**Type** of gear **B** Buoy **F** Float **L** Line **NM** Net monofilament **NT** Net trawl **P** Pot **RO** Rope **RU** Rubber **O** Other **Colour/Size/Shape/Materials**	**Size** **Length and width** (in cm/m); AND/OR **Volume** (Fist, head, arm, leg, torso, person, cow, box van, house) **Mesh** size in cm (pull knots tight to close mesh measure knot to knot) **Attached to gear** - hooks, lures, floats, animals? Has it been seen before? Y/N Retrieved/Removed? Y/N Where disposed of?	**Possibility of interaction** (U=Unlikely P=Possible L=Likely W=Witnessed) Risk assessment*	**Possibility of entanglement** if washed out (U=Unlikely P=Possible L=Likely W=Witnessed) Risk assessment*
1	Poldhu Cove, Mullion	On beach	1	RO: NM: rope, mostly yellow and a small bit of mono net	Size: Arm, Not seen before, Not removed: too heavy, Photo: PU8	U	p
2	Poldhu Cove, Mullion	On beach	1	RO: heavy blue rope, some broken down	Size: Arm, Not seen before, Not removed: too heavy, Photo: PU9	U	p
3	Poldhu Cove, Mullion	On beach	1	RO: NM: rope, mostly orange and a small bit of mono net	Size: Arm, Not seen before, Not removed: too heavy, Photo: PU10	U	p
4	Poldhu Cove, Mullion	Tangled in rocks	1	NT: blue trawl net	Size: Arm, Not seen before, Not removed: too heavy, Photo: PU11	U	P
5	Poldhu Cove, Mullion	On beach	1	RO: orange multi-filament rope, split down into separate filaments	Size: Arm, Not seen before, Not removed: too heavy, Photo: PU12	U	P
6	Poldhu Cove, Mullion	On beach	1	NT: blue trawl net	Size: Head, Not seen before, Not removed: too heavy, Photo: PU13	U	P
7	Poldhu Cove, Mullion	On beach	1	P: black pot net	Size: Head, Not seen before, Not removed: too heavy, Photo: PU13	U	P
8							
9							
10							

* Interaction (**P** if seals use area routinely; **L** if seals seen within 5m of item; **W** if seal within touching distance of item otherwise **U**)

* Entanglement (**P** if looped/meshed/balled mass; **L** if seals seen within 5m of looped/meshed/balled item; **W** if seal within touching distance of item otherwise **U**)





Collate

↓

Calculate

↓

Share, feedback and thank

↓

Analyse

↓

Synthesise

↓

Report

↓

Disseminate

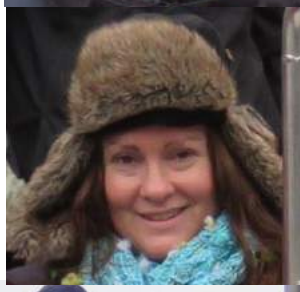
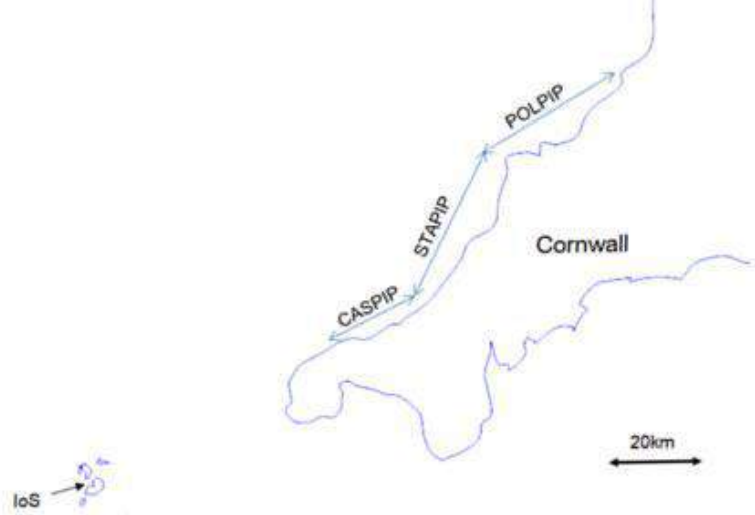
Cornwall SEAL Group









1. CASPIP (Carracks to St Agnes)
2. STAPIP (St Agnes to Trevose)
3. POLPIP (Trevose to Boscastle east)

F=float;
L=Line;
NT=Net Trawl;
NM=Net Mono;
P=Pot;
RO=Rope;
RU=Rubber
O=Other

Date	Recorder	ea co	Ref	Location	Location detail	Soil / Bird (B) site?	Lat	Long	ay poi	of iter	B	F	L	NM	NT	P	RO	RU	O	1=<1m; 2=2	Size	Volum	Volume	tion risk	ument risk	Photos	een befo	Removed	Comments
08/01/15	Tracey William	NC	1	Perranporth, Perran Sands	On sand	N	50.3596	-5.1513		1		1		1			1			3	Person		80	U	P	Dead s	980	N	N	Whole gill net including monofilament net, ropes and at
10/01/15	Claire Wallerst	SE	1	Cawsand Bay, between San	Caught on rocks, high an	N	50.3309	-4.201		1		1		1			1			50 metres	Person		80	L	W	144012,	N	Y	Full gill net Length: 50m long. Net contained dead Shag,
11/01/15	Liz Clark	NC	1	Constantine Beach, near Pa	On rocks just above stra	N	50.5344	-5.0244		1					1						Torso		35	U	P	Photo1	N	N	Green trawl net (looks like a bag shape wrapped round s
11/01/15	Liz Clark	NC	2	Booby's Bay, near Padstow	In shallows at edge of be	N	50.5386	-5.0268		1					1						Torso		35	W	W	Photo2	N	N	Green trawl net (wrapped round head of dead seal). Rep
11/01/15	Mike Boyse	NC	1	Constantine Beach, near Pa	dstow	N	50.5344	-5.0244		1				1							Head		4	U	W	0986, 09	N	Y	Orange monofiliament net, big bundle of net. Mesh size:
11/01/15	Mike Boyse	NC	2	Constantine Beach, near Pa	dstow	N	50.5344	-5.0244		1					1						Fist		0.5	U	P	0986, 09	N	Y	Black rope tangled with NM recorded above.
12/01/15	Rob Wells	SC	1	Roseland, SW869324 - betw	In rocks	Y	50.1534	-4.9837		1	1										Head		4	P	P	7073, 707	N	N	Yellow buoy, inaccessable. Seal haul out beach
12/01/15	Rob Wells	SC	1	Towan SW869327 (repeat si	High tide line	Y	50.1569	-4.9837		2							2				Head		4	U	P	7094, 709	Y	N	2 bits of old frayed rope, white. Seen before: 5th and 9th
12/01/15	Rob Wells	SC	1	Porthbeor (repeat sighting)	East Cove, on far side of	N	50.1496	-4.9927		1					1		1				2xPerson		160	U	P	7069	Y	N	First seen 31/10/14 Photo 7069 Large lump of old rope a
12/01/15	Rob Wells	SC	2	Porthbeor (repeat sighting)	East Cove, on far side of	N	50.1496	-4.9927		1							1				Torso		35	U	P	7070	Y	N	Seen before: 4/1/15 Photo: 7070, bundle of white rope. S
13/01/15	Kate Williams	NW	1	Portreath	Strandline just after HW	N	50.2614	-5.2943		1					1						Fist		0.5	U	P	2015 01 1	N	Y	NT: Green trawl net, just a square, Mesh: 6cm
13/01/15	Kate Williams	NW	2	Portreath	Strandline just after HW	N	50.2614	-5.2943		1			1								2xFist		1	U	P	2015 01 1	N	Y	L: Bundle of orange monofilament line.
13/01/15	Kate Williams	NW	3	Portreath	Strandline just after HW	N	50.2614	-5.2943		1							1				2xFist		1	U	U	2015 01 1	N	Y	RO: 1 long piece and several short pieces
14/01/15	John Hepburn	DS	1	Wembury Point	Strandline	N	50.3177	-4.0853		1		1		1			1				Leg		12	U	P	Y	N	Y	Monofil gill net with rope and floats
14/01/15	John Hepburn	DS	2	Wembury Point	Back of beach	N	50.3177	-4.0853		1				1							Head		4	U	P	Y	N	Y	Reported as fishing line but looks more like net
15/01/15	Claire Wallerst	SE	1	Seaton Beach	HW strand line	N	50.3645	-4.3858		1							1				Arm		6	U	U	103925	N	Y	RO Blue rope with knot. Length: 1 metre
15/01/15	Claire Wallerst	SE	2	Seaton Beach	HW strand line	N	50.3645	-4.3858		1					1		1				Head		4	U	P	head size	N	Y	NT RO Green trawl net with white frayed rope. Mesh: Est
15/01/15	Claire Wallerst	SE	3	Seaton Beach	HW strand line	N	50.3645	-4.3858		1							1				Head		4	U	P	head size	N	Y	RO Knotted blue rope. Length: 2 to 3 metres
15/01/15	Claire Wallerst	SE	4	Seaton Beach	HW strand line	N	50.3645	-4.3858		1							1				Head		4	U	U	headsize	N	Y	RO Frayed polypropylene rope - matted mass
15/01/15	Claire Wallerst	SE	5	Seaton Beach	HW strand line	N	50.3645	-4.3858		1					1						Leg		12	U	P	leg length	N	Y	NT Green trawl net. Long strip about 1m by 0.5m, Mesh E
15/01/15	Claire Wallerst	SE	6	Seaton Beach	HW strand line	N	50.3645	-4.3858		1				1			1				Torso		35	U	P	torso size	N	Y	NMRO: Gillnet with blue rope. Mesh: Est. 4cm
15/01/15	Claire Wallerst	SE	7	Seaton Beach	HW strand line	N	50.3645	-4.3858		1					1		1				4xPerson		320	U	P	92247	N	N	NMRO: Gillnet (possibly more than 1) with blue rope att
15/01/15	Claire Wallerst	SE	8	Seaton Beach	HW strand line	N	50.3645	-4.3858		1					1		1				4xPerson		320	U	P	92320	N	N	RO NT: Large heap of frayed rope of some kind with some
15/01/15	Claire Wallerst	SE	9	Seaton Beach	HW strand line	N	50.3645	-4.3858		1					1		1				4xPerson		320	U	P	94355	N	N	NT RO: Large tangle of different types of rope and trawl n
15/01/15	Louise Austin	SE	10	Seaton Beach	HW strand line	N	50.3645	-4.3858		1					1		1				4xPerson		320	U	P	already,	N	N	NT RO O: mixed heap of trawl net, rope and wire/cable (a
15/01/15	Richard Morton	SW	1	Penzance, Wherrytown	Beach SW465292	N	50.1098	-5.5445		1				1	1						Head		4	U	P	124	N	Y	Thick monofilament with small bits of trawl net. Mesh: E
16/01/15	Laura Workmai	NC	1	Widemouth	Salthouse end of beach	N	50.7916	-4.558		1					1						Torso		35	U	P	1325.jpg	N	Y	NT: Blue trawl net. Size: 3m x1m, Mesh size: 10 cm (est.)
16/01/15	Laura Workmai	NC	2	Widemouth	Salthouse end of beach	N	50.7916	-4.558		1							1				Torso		35	U	P	1323.jpg	N	N	RO: large clump of tangled rope
16/01/15	Rob Wells	SC	1	Roseland, Towan beach/Jac	between beach & Jack S	Y	50.1534	-4.9837		1		1									Head		4	P	U	7188	N	N	Orange Probably a deflated fender
16/01/15	Rob Wells	SC	2	Porthbeor, East Cove SW866	HW strand line	N	50.1496	-4.9927		1		1									Head		4	U	U	7288	N	N	Yellow float
17/01/15	Zillah Robertso	NC	1	Watergate Bay	On sand	N	50.4446	-5.0424		1					1		1				Torso		35	U	P	image1.j	N	N	Green trawl net with white rope Mesh: estimated at 6cm
17/01/15	Zillah Robertso	NC	2	Watergate Bay	On sand	N	50.4446	-5.0424		1							1				2xPerson		160	U	P	image2.j	Y (later)	N	Huge quantity of white/orange rope, Re-reported by Trac
17/01/15	Zillah Robertso	NC	3	Watergate Bay	On sand	N	50.4446	-5.0424		1							1				Person		80	U	U	image3.j	N	N	Thick mooring rope and a bundle of fraying rope
18/01/15	Claire Wallerst	SE	1	Tregantle, Whitsand Bay, Ar	On sand	N	50.3534	-4.2726		1					1						Person		80	U	U	blueluml	N	N	Matted lump of blue rope and trawl net
18/01/15	Claire Wallerst	SE	2	Tregantle, Whitsand Bay, Ar	In rocks above sand	N	50.3534	-4.2726		1					1						2xPerson		160	U	P	blueluml	N	N	Lump of blue net and white rope
18/01/15	Claire Wallerst	SE	3	Tregantle, Whitsand Bay, Ar	Back of beach	N	50.3534	-4.2726		1					1						2xLeg		24	U	P	blueluml	N	N	Big lump of blue net and white rope, big tangle
18/01/15	Jeff Loveridge	NW		River Cove	On beach	Y	50.2117	-5.5429		1								1		2m	Arm		6	W	U	959	N	N	Spotted in Jeff's seal surbey photo by Sue
18/01/15	Laura Workmai	NE	1	New Polbeath	Back of beach	N	50.5783	-4.92		1						1					Leg		12	U	P	DSC_133	N	Y	Black tight net from a crab/lobster pot
18/01/15	Laura Workmai	NE	2	New Polbeath	On beach	N	50.5783	-4.92		1					1						20xPerso		1600	U	P	DSC_133	N	Y	Green, HUGE! At least 20xPerson, Mesh size: Est. 15cm,
18/01/15	Laura Workmai	NE	3	New Polbeath	On beach	N	50.5783	-4.92		2				1			1				Arm		6	U	P	DSC_133	N	Y	Black pot net, white mono net or line
18/01/15	Laura Workmai	NE	4	New Polbeath	On beach	N	50.5783	-4.92		1							1				2xHead		8	U	P	DSC_133	N	Y	Dirty blue rope, looped plus orange polypropylene fraye
18/01/15	Rob Wells	SC	1	Rowards Quay SX026434	Strandline	Y	50.2572	-4.7697		1	1										2xFist		1	P	U	DSCF738	N	Y	One piece of red buoy
19/01/15	Malcolm McKei	SW	1	Porthoustock	On shingle	N	50.056	-5.0642		1				1							2xFist		1	U	P	P9	N	N	Monofilament net or line with lures
19/01/15	Malcolm McKei	SW	2	Porthoustock	On shingle	N	50.056	-5.0642		1			1								3xFist		1.5	U	P	P10	N	N	Line with lures and weights
19/01/15	Malcolm McKei	SW	3	Porthoustock	On shingle	N	50.056	-5.0642		1									1		Fist		0.5	U	U	P11	N	N	faded orange rubber glove
19/01/15	Malcolm McKei	SW	4	Porthoustock	On shingle	N	50.056	-5.0642		1							1				Fist		0.5	U	P	P11	N	N	broken down multifilament black and blue rope






Results

Boat surveys

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Five boat surveys

3 Nov, 2 Jan, (3 Feb)

35 sites – entire transect length

10 seal sites including

2 of 3 major haul outs in SW England

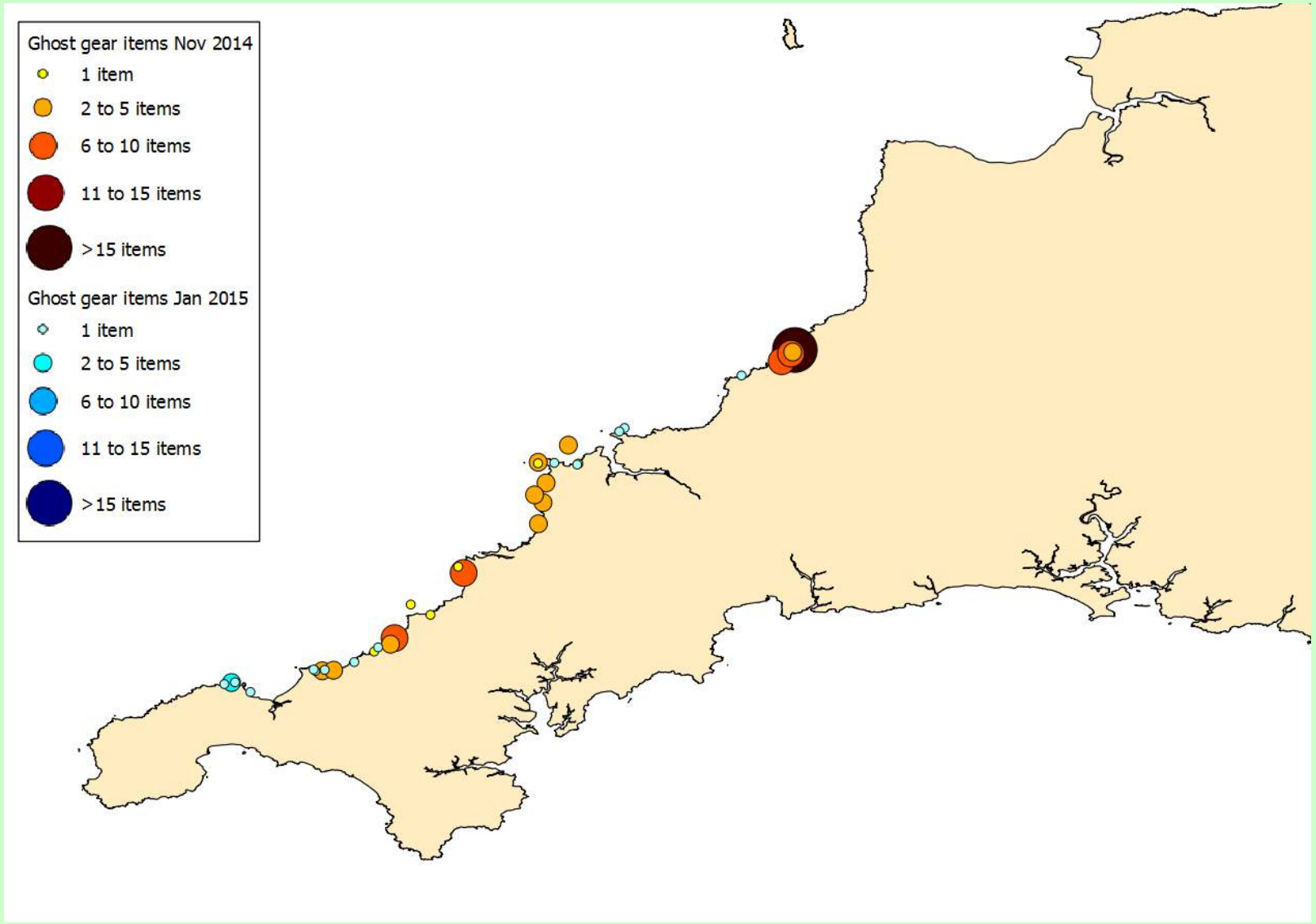
and 4 pupping sites

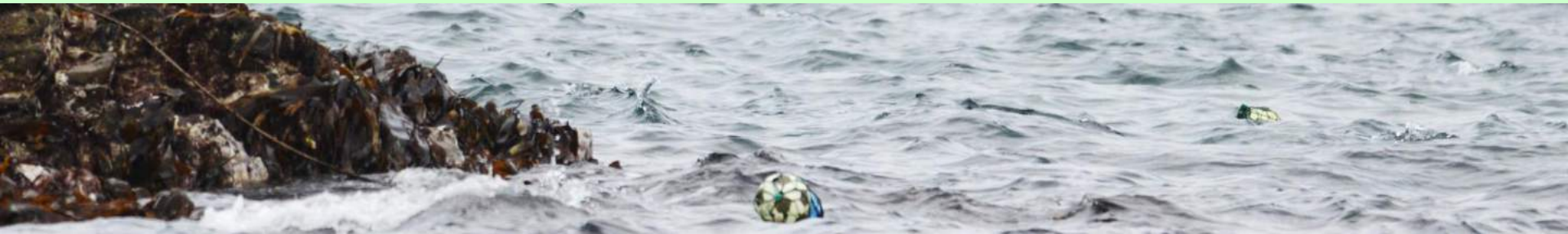
Seven (shags) nests

with orange monofilament

WORLD ANIMAL PROTECTION

Cornwall SEAL Group


Ghost gear items Nov 2014
1 item
2 to 5 items
6 to 10 items
11 to 15 items
>15 items
Ghost gear items Jan 2015
1 item
2 to 5 items
6 to 10 items
11 to 15 items
>15 items



97 items of ghost gear

1615.5 litres (six baths full)

70% buoys and floats

Largest blue trawl net – car sized

Results

Land surveys

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

514 records in 110 reports

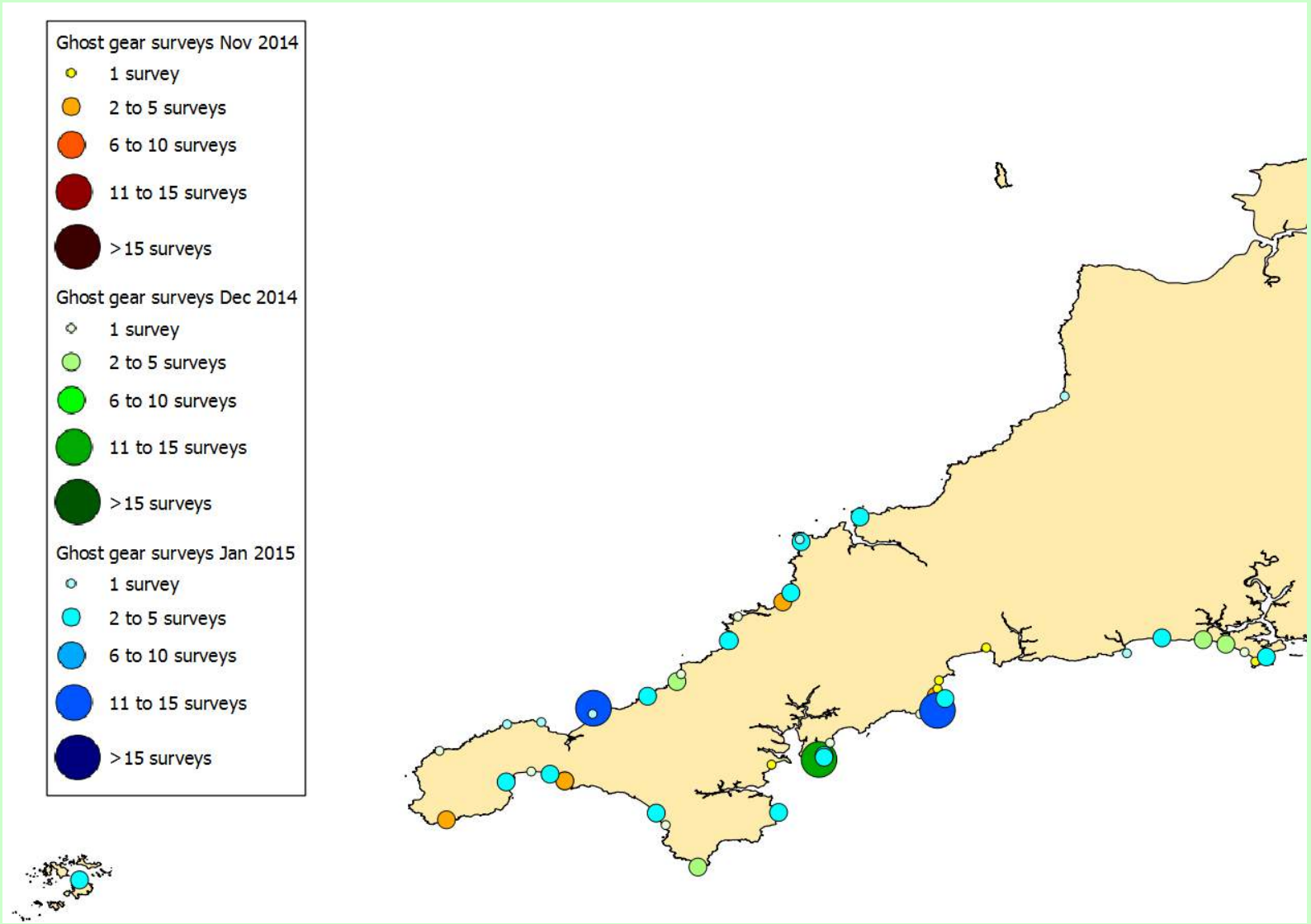
Mean 37 reports per month

Mean 18 recorders per month

Photos John Meakin Port Nadler

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

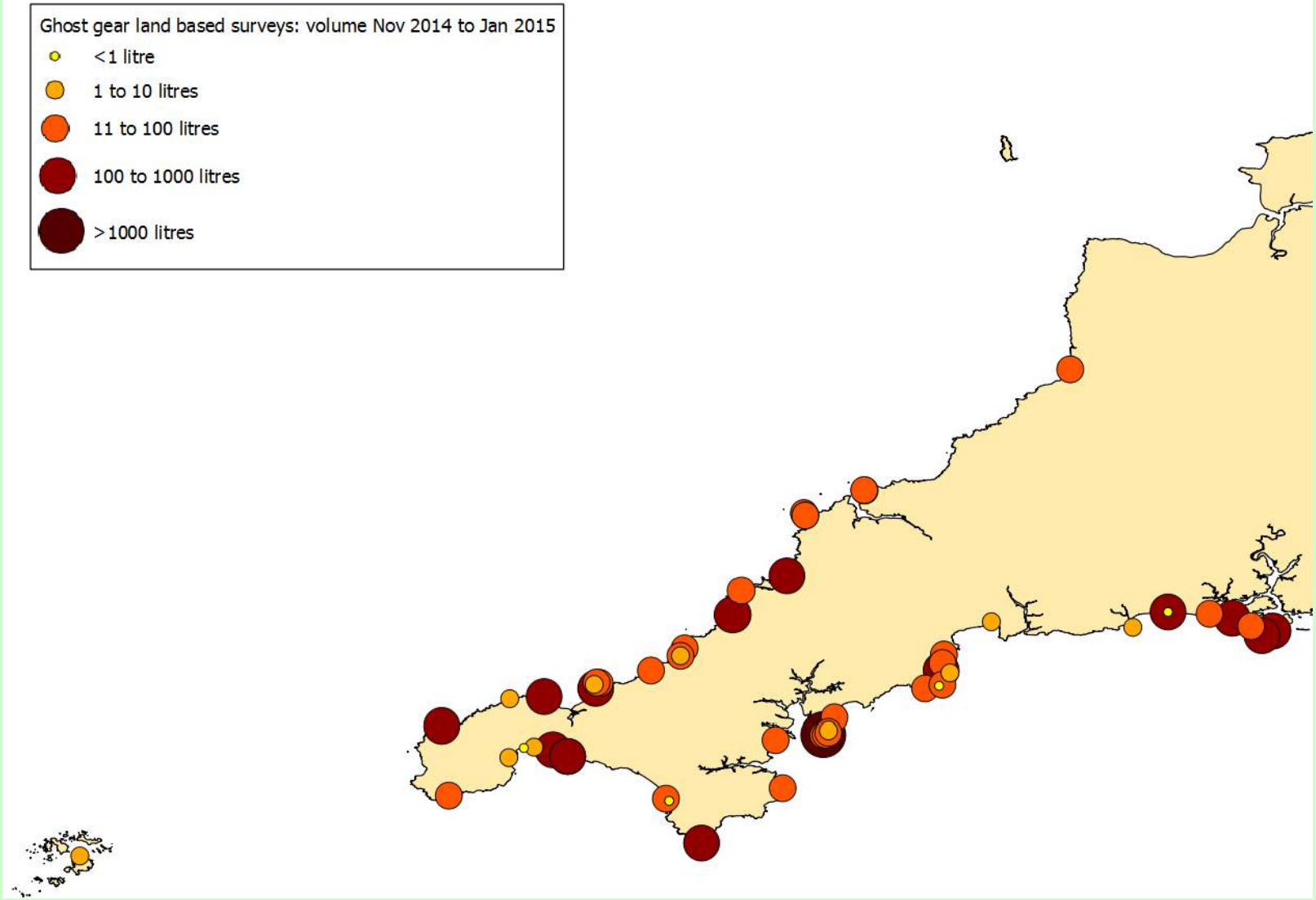

Ghost gear surveys Nov 2014
1 survey
2 to 5 surveys
6 to 10 surveys
11 to 15 surveys
>15 surveys
Ghost gear surveys Dec 2014
1 survey
2 to 5 surveys
6 to 10 surveys
11 to 15 surveys
>15 surveys
Ghost gear surveys Jan 2015
1 survey
2 to 5 surveys
6 to 10 surveys
11 to 15 surveys
>15 surveys







Ghost gear land based surveys: number of items Nov 2014 to Jan 2015
1 item
2 to 10 items
11 to 100 items
>100 items


Ghost gear land based surveys: volume Nov 2014 to Jan 2015
<1 litre
1 to 10 litres
11 to 100 litres
100 to 1000 litres
>1000 litres

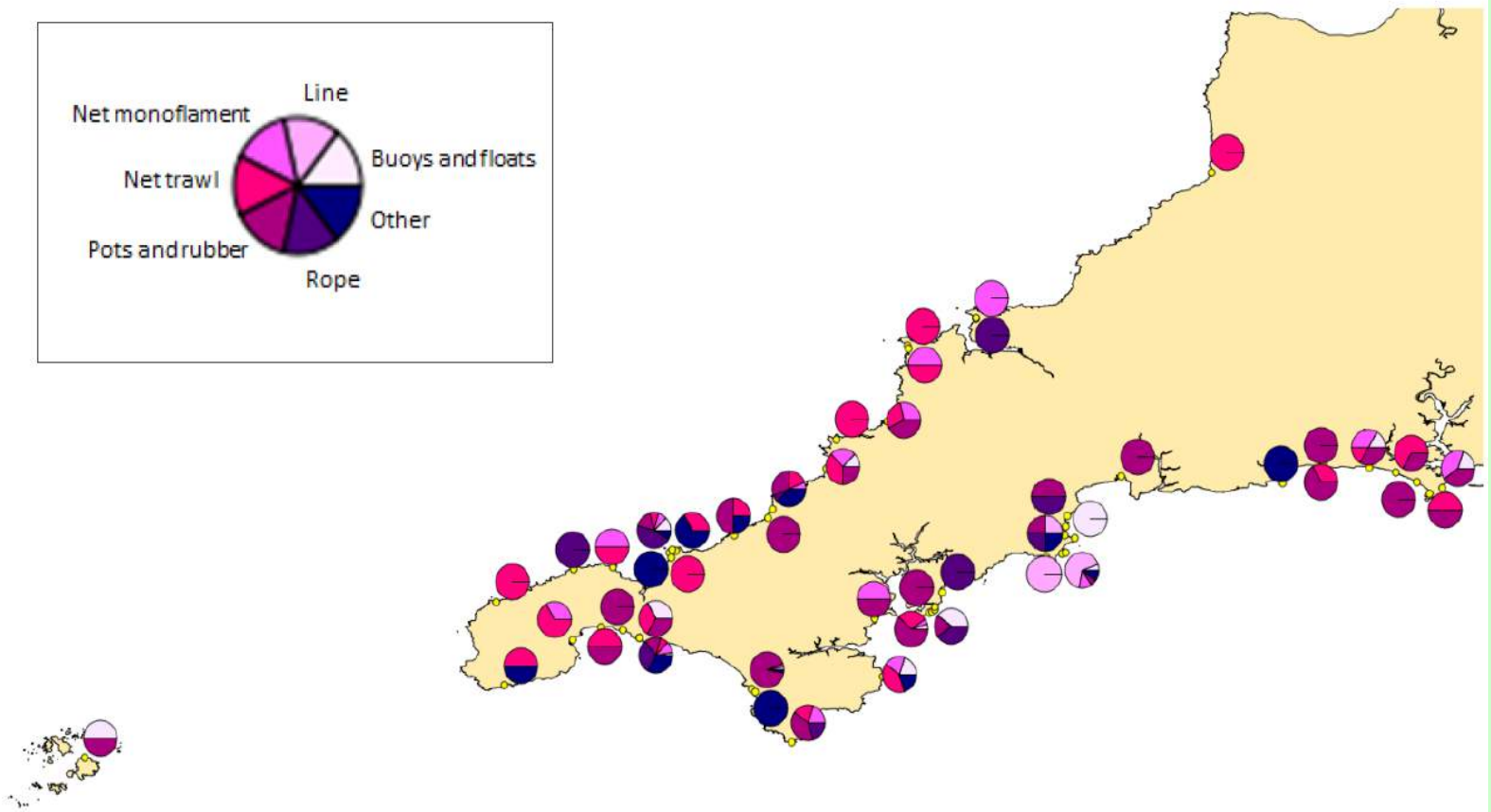


Figure 14: Type of ghost gear recorded from land based surveys Nov 2014 to Jan 2015

Results

Land and boat based surveys

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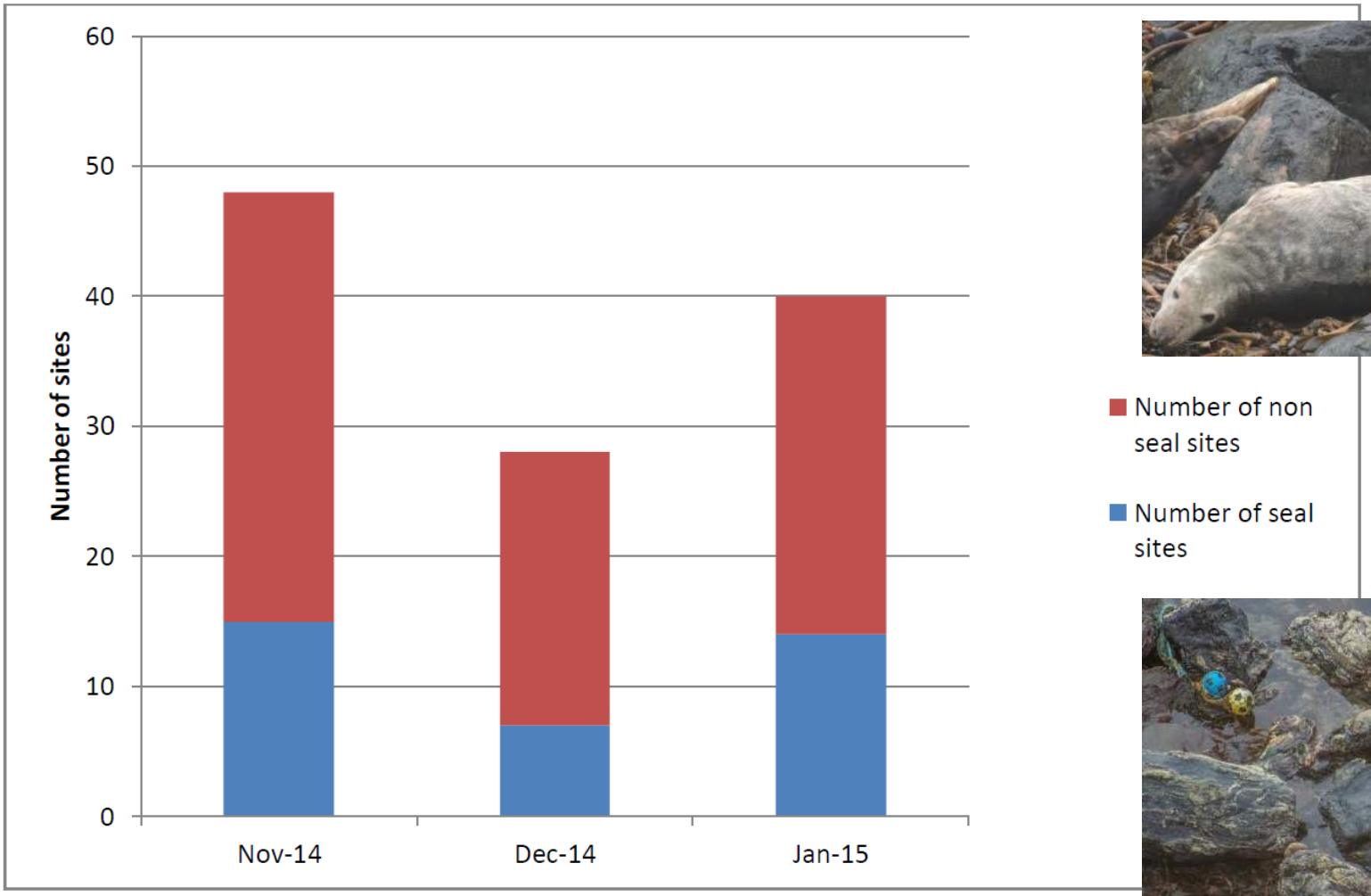
Cornwall SEAL Group



Photos Alec and Enid Farr and Peter Welsh

Figure 17: Spatial extent of ghost gear (above)

WORLD ANIMAL PROTECTION

116 different sites including 36 seal sites

Cornwall SEAL Group

Figure 18: Volume of new gear reported and removed (below)

13098 litres (48 baths full) reported

4974 litres (18 baths full) removed

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Photos Rob Wells , Kate Williams and Claire Wallerstein

Figure 19: Categories of ghost gear (above)

Each month, over 40 items of the following ghost gear items were recorded:

- November 2014: buoys/floats, rope and line.
- December 2014: rope, line and monofilament net
- January 2015: rope, buoys/floats, trawl net and line.

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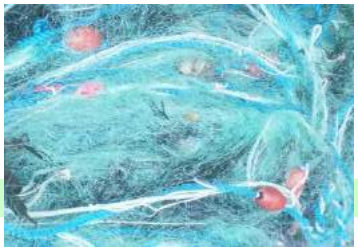
11% of all new ghost gear posed serious risk of interaction and entanglement to seals (10%)



49% of new ghost gear at seals sites posed serious risk of interaction and entanglement to seals (36%)

59% of new ghost gear posed serious risk of entanglement if remobilised (61%)

WORLD ANIMAL PROTECTION

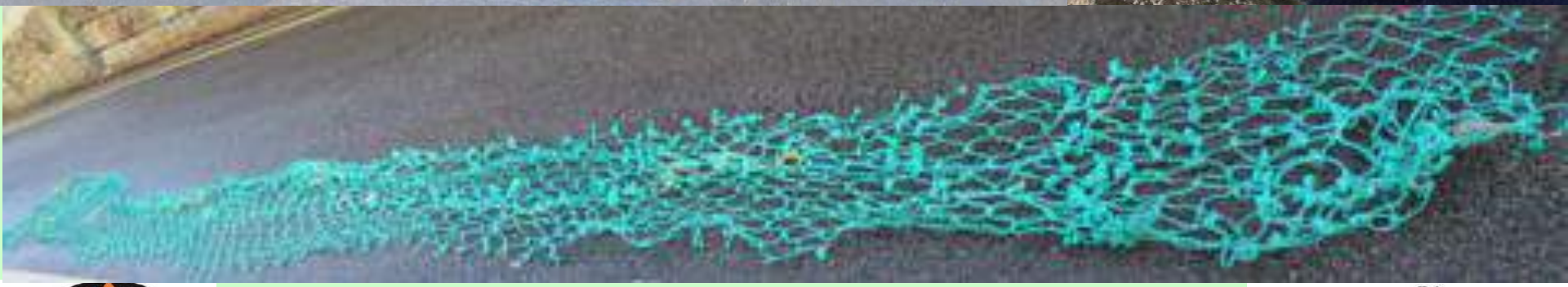
Cornwall SEAL Group

Photos Rob Wells, Tracey Williams, Claire Wallerstein




Witnessed entanglement


Photos Newquay Sea Safaris, Terry Hocking, Fairygirl and Mike Stephens,

WORLD ANIMAL PROTECTION

9m by 1.2m

Photos Lydia Forrester and Sue Sayer: Iron Man

Cornwall SEAL Group

11/01/15

Liz Clark

Booby's Bay

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Claire Wallerstein, Cawsand Bay 10/01/15 Whole gill net with evidence of ghost fishing – dead shag and fish

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Claire Wallerstein, Cawsand Bay 10/01/15 Whole gill net with evidence of ghost fishing – live crab released

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Mike Boyse, Constantine 11/01/15 Pink sea fan

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Sue Sayer, Godrevy Beach 26/10/14 Mussels incorporated monofilament into their growth structures

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Lessons learned

WORLD ANIMAL PROTECTION

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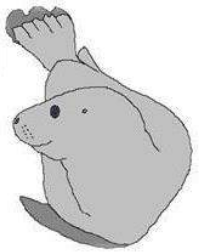

John Hepburn, Wembury 27/03/06 – the blue 'piping' was unlikely to be recorded as ghost gear (NB prior to survey, presented for illustrative purposes only)

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Rob Wells, Jack Sawles 13/11/14 – the metal grill and plastic grid were unlikely to be recorded as ghost gear.

WORLD ANIMAL PROTECTION

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John Hepburn, Wembury 25/11/14: an entire gill net tier draped across the wave cut platform

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Laura Workman, Polzeath 18/01/15: This trawl net was removed from the beach by volunteers

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Tracey Williams, Watergate 28/01/14: 'Rope monster' - tangle of rope (estimated 80 litres in volume)

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Annie Jenkins, Gunwalloe 01/02/14

WORLD ANIMAL PROTECTION

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Sometimes most of the ghost gear mass was buried and not visible

Rob Wells, Elwinick 13/11/14: Buried

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Not all ghost gear is locally generated

Paul Harry, Gunwalloe 25/10/14: Whilst most ghost gear is not marked, this fish box is clearly not local

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Sue Sayer, Gwithian Beach 22/01/15 Dan Jarvis retrieving net from the sea prior to the seal release

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Sue Sayer, Gwithian 22/01/15 Volunteers dragging the same ghost net up to the awaiting trailer

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Even apparently small and trivial pieces of net can entangle a seal or bird, so removing this from a beach will reduce the risk of interaction or entanglement for a marine creature.

Malcolm McKenzie, Church Cove 24/11/14

BDMLR removed these three small pieces of net from grey seal pups on 16/01/15 (Beast), 28/01/15 (Joker) and 12/02/15 (Oracle). Oracle's net had been in the sea some time and had worm casts present. The fragment of net was very small and had presumably not been in place for very long as Oracle's injuries were superficial. In contrast, Beast's injuries (inset below left) and Joker's (inset top right) were deep and considerable.

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Sandy's story – a juvenile female grey seal in Cornwall

Sandy and CSG

Sandy was first identified from a photograph taken by Vic Hall at the North Cornwall haul outs on 04/11/13 when she appeared to be at least 2 years old (from her size compared to other seals on the beach.) She was already severely entangled, possibly from a very young age, but it could not be determined if she had any entangling materials still present due to the distances involved for taking photos at this site.

Sandy and BDMLR

Sandy survived her severe entanglement injury for another 16 months before she travelled to West Cornwall. By this time she had lost her entanglement and was in moderate body condition at the age at least 3 and a half years old. Sandy was found by members of the public on 23/02/15 barely alive lying on Hayle Beach in a pretty unresponsive and hypothermic state. They called the Cornish Seal Sanctuary who alerted British Divers Marine Life Rescue. Dave Jarvis attended and found a juvenile female grey seal being buried in wind blown sand. He called for back up medics and the CSS team with a large rescue cage. Whilst waiting for everyone to be present and in place, five medics stood as a windbreak for over an hour in the freezing cold, force 6 north westerly, to keep the blasting sand from piling up against Sandy and going into her eyes, nose and mouth. Sandy was rescued and taken off Hayle beach by a team of eight to St Ives Bay holiday park.

Sandy and CSS

Assessed by vet Paul Riley, it was decided to give Sandy a chance of recovery. With the considerable care of the animal care team led by Jenny Lewis, Sandy survived her first night at Gweek and appeared to be making some progress. She was found dead on her second morning there (26-27/02/15). She had died within 48 hours of rescue.

Sandy and the Environment and Sustainability Institute

James Barnett post mortemed Sandy on 27/02/15 at Exeter University, Penryn Campus assisted by Kelly Astley, Dan Jarvis and Sue Sayer. By this time, Sandy had

- A moderate body condition
- A 100% linear encircling scar around her neck that was thickened skin under her neck, and a constriction from shoulder to shoulder about 1cm deep at the sides and 3cm deep at the back of her neck. The scar tissue at the back of her neck extended a further 2cm into her healed blubber.
- Probably previously been entangled in monofilament fishing gear.
- Extensive emphysema over her right thoracic wall, around her heart and around and inside her lungs.
- An apparently enlarged and thin right side to her heart.
- Congested lungs, lymph nodes and adrenal glands.
- At least three types of parasites – 2 types of worm and nasal mites.

The precise cause of the gross changes seen on post mortem is being investigated further though histopathology and bacteriology.

Sandy is one of over 250 entangled grey seals suffering as a result of entanglement in lost fishing gear in Cornwall. She was one of the many unlucky ones for whom entanglement contributed to a premature death.

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

It is just as important to remove small pieces of ghost gear

Rob Wells, Colona Bay 21/01/15

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

Conclusion

Effective way of enabling large spatial and temporal effort

Large volume of wide range of gear

11% (all sites) and
49% (seal sites) of ghost gear posed serious risk of interaction and entanglement

59% risk of entanglement

WORLD ANIMAL PROTECTION

Cornwall SEAL Group

A range of dead marine creatures photographed in ghost gear

Volunteers worked hard to remove gear

Ghost gear generates considerable interest affecting perceptions towards the fishing industry

Acknowledgements

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WORLD ANIMAL PROTECTION

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