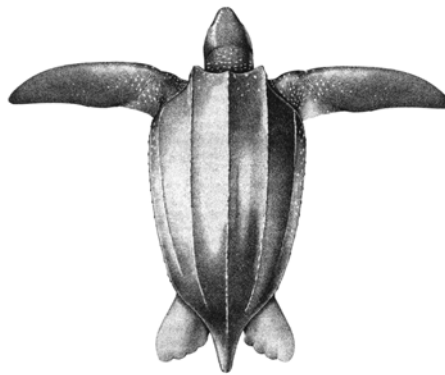


[www.strandings.com](http://www.strandings.com)

## UK & Eire Marine Turtle Strandings & Sightings Annual Report 2002

R.S.Penrose. January 2003



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## **1. INTRODUCTION**

In 1990, the Collaborative UK Marine Mammal Strandings Project was initiated and part-funded by the UK Department of the Environment (now Defra). The project involves detailed pathological and other investigations of stranded marine mammal carcasses (mostly cetacean) from UK waters. It forms part of the Department's international obligations towards conservation agreements, including the Agreement on the conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS). The UK Defra contract is held by the Natural History Museum (NHM), with research being co-ordinated in England and Wales by the Zoological Society of London (ZSL) and the Scottish Agricultural College (SAC) in Scotland. A number of other organisations are involved with the collaboration which include Marine Environmental Monitoring (MEM), the Centre for Environmental Fisheries and Aquaculture Science (CEFAS), the University College Cork and the Department of Agriculture for Northern Ireland. *Post-mortem* examinations are carried out by the Department of Veterinary Pathology, University of Liverpool, the Zoological Society of London, the Veterinary Investigation centre, Truro and the Scottish Agricultural College, Inverness. In addition to pathological and related investigations, a range of frozen and fixed material, collected *post-mortem*, are currently archived at the Zoological Society of London. As from 2001, marine turtles have been included within the project and dead carcasses have been routinely collected, wherever possible, for *post-mortem* examination.

Records of sightings and strandings of live and dead marine turtles are kept by the Welsh Strandings Co-ordinator within the "Collaborative UK Marine Mammal & Marine Turtle Strandings Project".

### **1.1 The UK Turtle Implementation Group.**

In 1999, English Nature published the UK Marine Turtles Grouped Species Action Plan (SAP) on behalf of the UK Biodiversity Group. The SAP is part of the UK Biodiversity Action Plan and aims to enhance marine turtle conservation in UK waters and in the UK Overseas Territories as well as raise awareness and knowledge of their occurrence, legal protection and measures to enhance conservation amongst marine users and the general public. The SAP is being implemented by a group of organisations led by joint lead partners the Marine Conservation Society (MCS) and the Herpetological Conservation Trust (HCT). The contact agency is Scottish Natural Heritage (SNH). The Turtle Implementation Group (TIG) consists of the following organisations:-

- **Countryside Council for Wales** The Countryside Council for Wales is the statutory advisor to government on sustaining natural beauty, wildlife and the opportunity for outdoor enjoyment throughout Wales and its inshore waters. Contact: *Tom Stringell 01248 385780*
- **English Nature** is the Government agency that champions the conservation of wildlife and natural features throughout England. Contact: *Jim Foster 01733 455241*
- **Environment and Heritage Service** is the agency responsible for the implementation of government environmental policy in Northern Ireland. Its aim is "to protect and conserve the natural and man-made environment and to promote its appreciation for the benefit of present and future generations". Contact: *John Milburne 02890 546558*
- **MEDASSET**, founded in 1988, is an international non-governmental organisation registered as a charity in the UK and as a non profit organisation in Greece, working for the conservation of sea turtles and their habitats throughout the Mediterranean. Its scientific and educational website [www.euroturtle.org](http://www.euroturtle.org), was developed by Roger Poland, and is hosted by Exeter University. Contact: *Marc-Antoine Dunais +30 210 3613572*
- **Herpetological Conservation Trust** are an authority on reptile and amphibian issues and are Lead Partners or joint Lead Partners for all five of the reptile and amphibian Action Plans within the UK BAP. Contact: *Tony Gent 01202 391319*
- The **Marine Conservation Society (MCS)** is the UK charity dedicated to the protection of the marine environment and its wildlife. MCS is joint Lead Partner of the Marine Turtles Grouped Species Action Plan and coordinates the TIG with support from the Cheltenham & Gloucester plc. Contact: *Peter Richardson 01989 566017*
- **Marine Environmental Monitoring (MEM)** is a member of the DEFRA "Collaborative UK Cetacean & Marine Turtle Strandings Project", [www.strandings.com](http://www.strandings.com). MEM also manages 'TURTLE' a UK & Eire database holding both records of sightings and strandings of marine turtles dating back to 1748. Contact: *Rod Penrose (Reporting telephone No. 01348 875000)*
- **The Marine Turtle Research Group** ([www.seaturtle.org/mtrg](http://www.seaturtle.org/mtrg)), University of Wales Swansea carries out research and conservation projects regarding turtles in UK waters, Mediterranean and the UK Overseas Territories. Staff edit the international Marine Turtle Newsletter ([www.seaturtle.org/mtn](http://www.seaturtle.org/mtn)). Contacts: *Dr Brendan Godley & Dr Annette Broderick 01792 295445*

- **Professor John Davenport** is Head of Department of Zoology & Animal Ecology at University College Cork. He has worked on most species of sea turtles since the early 1980s, conducting fundamental studies on their physiology and biomechanics. He is currently linked to turtle conservation programmes in Bermuda and Cephalonia. Contact: +353 21 490 4051
- **Scottish Natural Heritage (SNH)** is a government body responsible to the Scottish Executive and Scottish Parliament. SNH promotes the care, improvement, responsible enjoyment, understanding, appreciation and sustainable use of Scotland's natural heritage. SNH is the contact government point for the Marine Turtles Grouped Species Action Plan. Contact: *Dr Martin Gaywood 0131 446 2444*
- **The Wildlife Trusts** is a partnership of 47 Wildlife Trusts, across the UK, caring for more than 2,400 nature reserves. It campaigns for the protection of wildlife and invests in the future by helping people of all ages to gain a greater appreciation and understanding of nature. Contact: *Colin Speedie 07836 746197*

## **2. MATERIALS AND METHODS**

Contact details vary for different parts of the UK and the Turtle Code (Appendix 2) should be consulted for the relevant contacts. In England & Wales a 24 hour answerphone (**01348 875000**), is interrogated at regular intervals. A message requests callers to leave details of the stranding or sighting and location, along with their name and contact phone number, so they may be reached if confirmation of details are required. (If the stranding is a live stranding then a message on the answerphone informs the caller to contact the RSPCA immediately. see 2.1).

The following criteria are applied: -

### **2.1 Live**

(Condition code 1)<sup>1</sup>

In 1994 the Marine Animal Rescue Coalition (MARC) was formed. This consists of all the major animal welfare and conservation bodies involved with marine mammals in the UK. It has been agreed that in the case of a live stranding the first point of call would be the RSPCA (England & Wales), SSPCA (Scotland) as they support a manned 24-hour emergency phone. The RSPCA/SSPCA would then contact the relevant organisations, Marine Environmental Monitoring etc.

Contacts and advice can be found in the UK Turtle Code (Appendix 2).

### **2.2 Dead**

(Condition code 2a extremely fresh as if just died)<sup>1</sup>

(Condition code 2b slight decomposition)<sup>1</sup>

Health and safety precautions are followed with the animal only being handled with gloved hands. It is then taken immediately for *post-mortem* examination.

(Condition code 3 moderate decomposition)<sup>1</sup>

Health and safety precautions are followed with the animal only being handled with gloved hands. Preferably it is taken immediately for *post-mortem* examination. Storage at +4<sup>0</sup> Celsius is permissible for a maximum of 1 week.

(Condition code 4 advanced decomposition)<sup>1</sup>

(Condition code 5 mummified carcass)<sup>1</sup>

Species identified, basic measurements taken together with skin for DNA. Health and safety precautions being observed. Local Authorities then contacted for safe disposal of remains.

All live and dead marine turtles are allocated a "T0000/01" number. "T" designates the animal as a marine turtle, 0000 is the year and /01 is an individual number for each record of the same year. Records of all strandings & sightings in the UK & Eire are kept by the Strandings Co-ordinator. Copies of *post-mortem* examination reports are sent from the Strandings Co-ordinator to the finder and others associated with the relevant stranding.

<sup>1</sup> Body condition based on the Zoological Society of London condition code.

### 3. RESULTS

Table 1.

2002 Total number of reported marine turtles for UK & Eire (live & dead).													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Green turtle ( <i>Chelonia mydas</i> )	0	1	0	0	0	0	0	0	0	0	0	0	1
Hawksbill turtle ( <i>Eretmochelys imbricata</i> )	0	0	0	0	0	0	0	0	0	0	0	0	0
Kemp's ridley turtle ( <i>Lepidochelys kempii</i> )	0	0	0	0	0	0	0	0	0	0	0	0	0
Leatherback turtle ( <i>Dermochelys coriacea</i> )	0	2	0	0	1	5	12	28	9	3	0	0	60
Loggerhead turtle ( <i>Caretta caretta</i> )	1	3	1	1	1	5	3	0	0	0	0	1	16
Unidentified	0	0	0	0	0	2	5	2	0	0	0	0	9
<b>Total animals</b>	<b>1</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>12</b>	<b>20</b>	<b>30</b>	<b>9</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>86</b>

Table 2.

2002 Number of live marine turtles.													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Green turtle ( <i>Chelonia mydas</i> )	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawksbill turtle ( <i>Eretmochelys imbricata</i> )	0	0	0	0	0	0	0	0	0	0	0	0	0
Kemp's ridley turtle ( <i>Lepidochelys kempii</i> )	0	0	0	0	0	0	0	0	0	0	0	0	0
Leatherback turtle ( <i>Dermochelys coriacea</i> )	0	0	0	0	1	4	12	28	9	2	0	0	56
Loggerhead turtle ( <i>Caretta caretta</i> )	1	1	0	1	0	2	2	0	0	0	0	0	7
Unidentified	0	0	0	0	0	1	3	2	0	0	0	0	6
<b>Total animals</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>7</b>	<b>17</b>	<b>30</b>	<b>9</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>69</b>

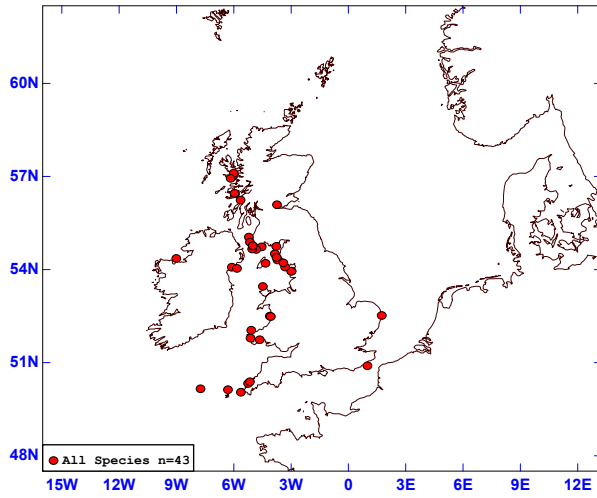
Table 3.

2002 Number of dead marine turtles.													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Green turtle ( <i>Chelonia mydas</i> )	0	1	0	0	0	0	0	0	0	0	0	0	1
Hawksbill turtle ( <i>Eretmochelys imbricata</i> )	0	0	0	0	0	0	0	0	0	0	0	0	0
Kemp's ridley turtle ( <i>Lepidochelys kempii</i> )	0	0	0	0	0	0	0	0	0	0	0	0	0
Leatherback turtle ( <i>Dermochelys coriacea</i> )	0	2	0	0	0	1	0	0	0	1	0	0	4
Loggerhead turtle ( <i>Caretta caretta</i> )	0	2	1	0	0	3	1	0	0	0	0	1	8
Unidentified	0	0	0	0	0	1	2	0	0	0	0	0	3
<b>Total animals</b>	<b>0</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>16</b>

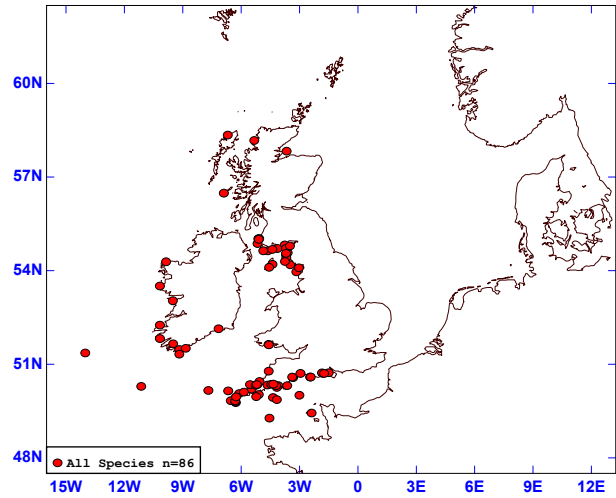
No information on 'live' or 'dead' status can be ascertained on a loggerhead turtle stranding from the Aran Islands, Co Galway on the 29<sup>th</sup> May. This record is included in Table 1. and plotted in Figure 8. 'loggerhead strandings' but consequently does not appear in either Table 2. 'live turtles' or Table 3. 'dead turtles'.

The general geographical distribution of each species, strandings and sightings, are plotted on the following maps. Although the maps are generated directly from the data stored, they should be regarded as showing distribution of animals rather than giving absolute counts. While the co-ordinate system and the mapping software can theoretically differentiate between points as close as 1 metre apart, even separations of 100 metres at the scale at which these maps are presented, any two or more such symbols may appear to overlap completely.



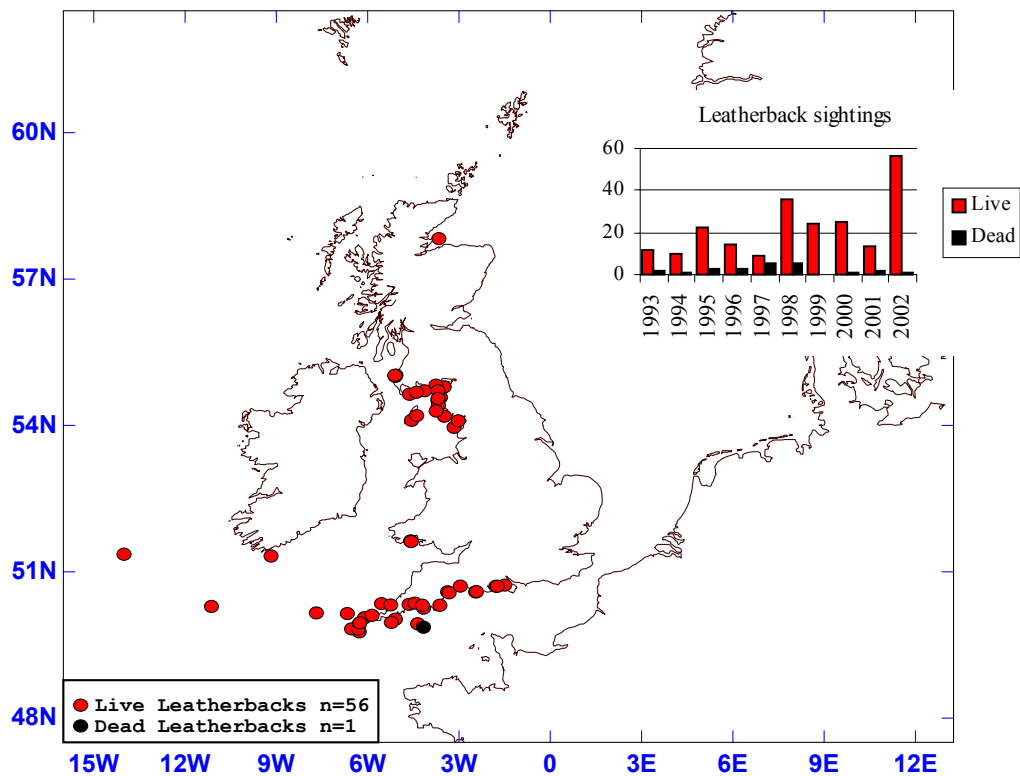


**Figure 1.** All species sightings & strandings 2001.



**Figure 2.** All species sightings & strandings 2002.

### 3.1 Sightings.



**Figure 3.** Leatherback sightings 2002.

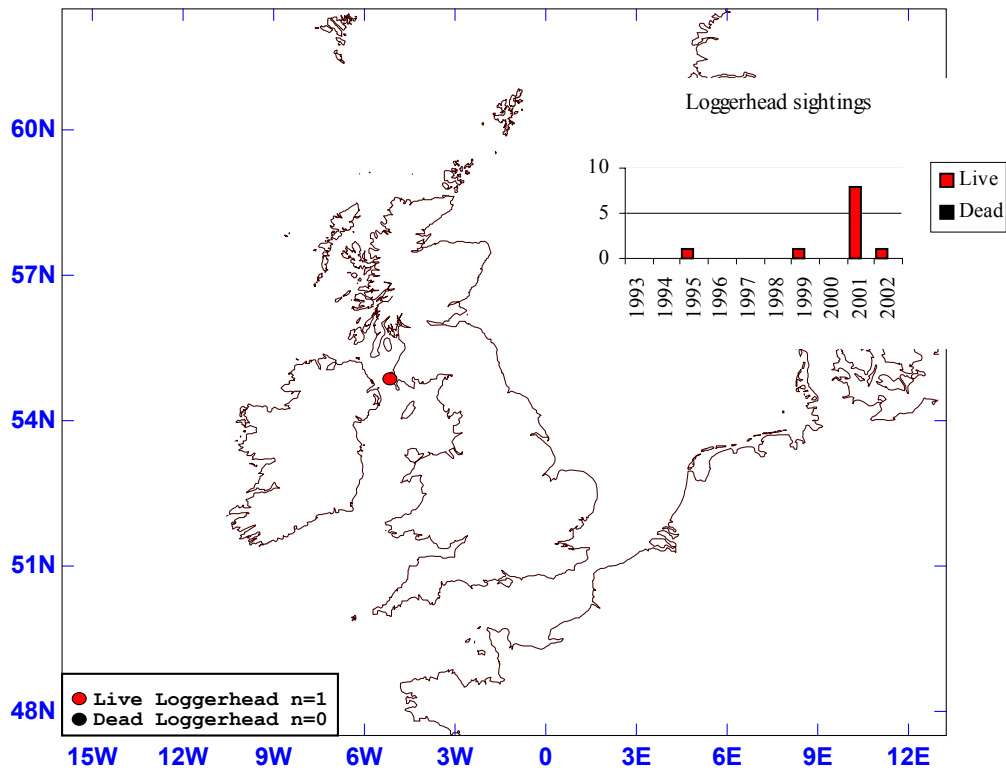


Figure 4. *Loggerhead sightings 2002.*

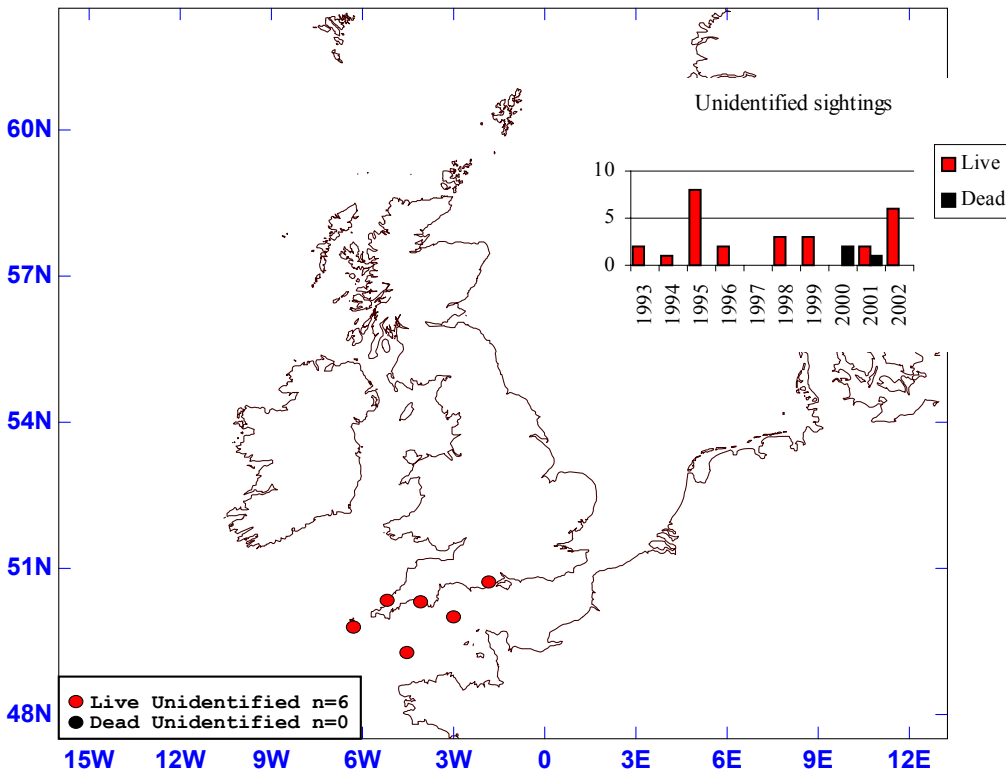


Figure 5. *Unidentified sightings 2002.*

### 3.2 Strandings.

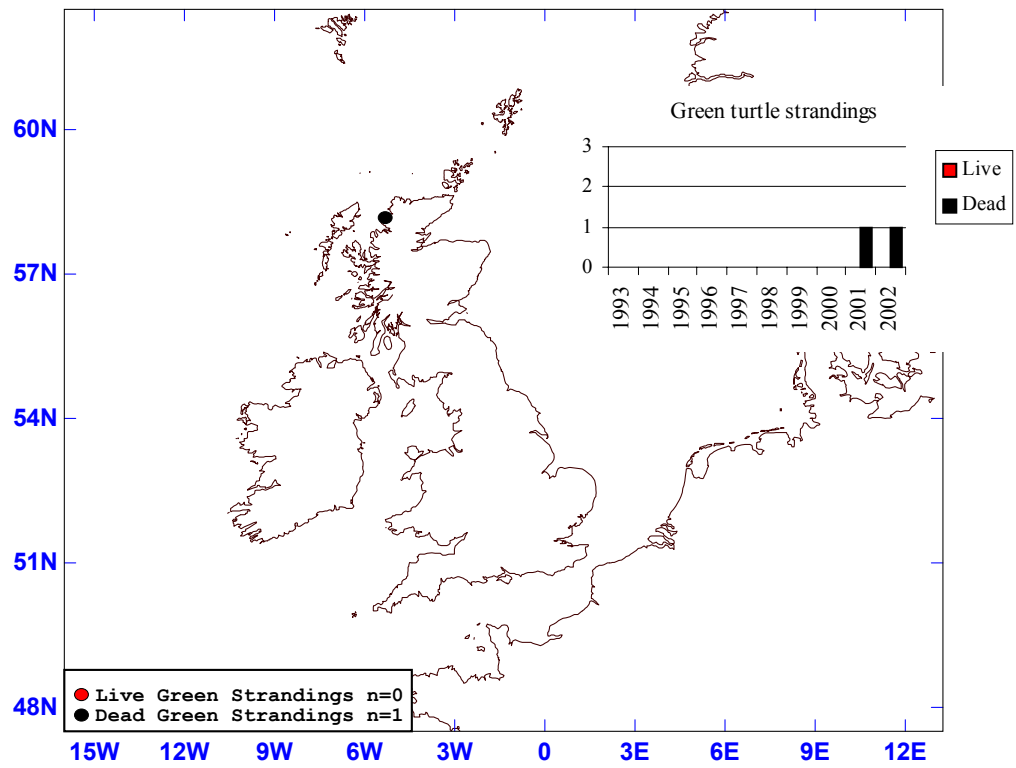


Figure 6. *Green turtle strandings 2002.*

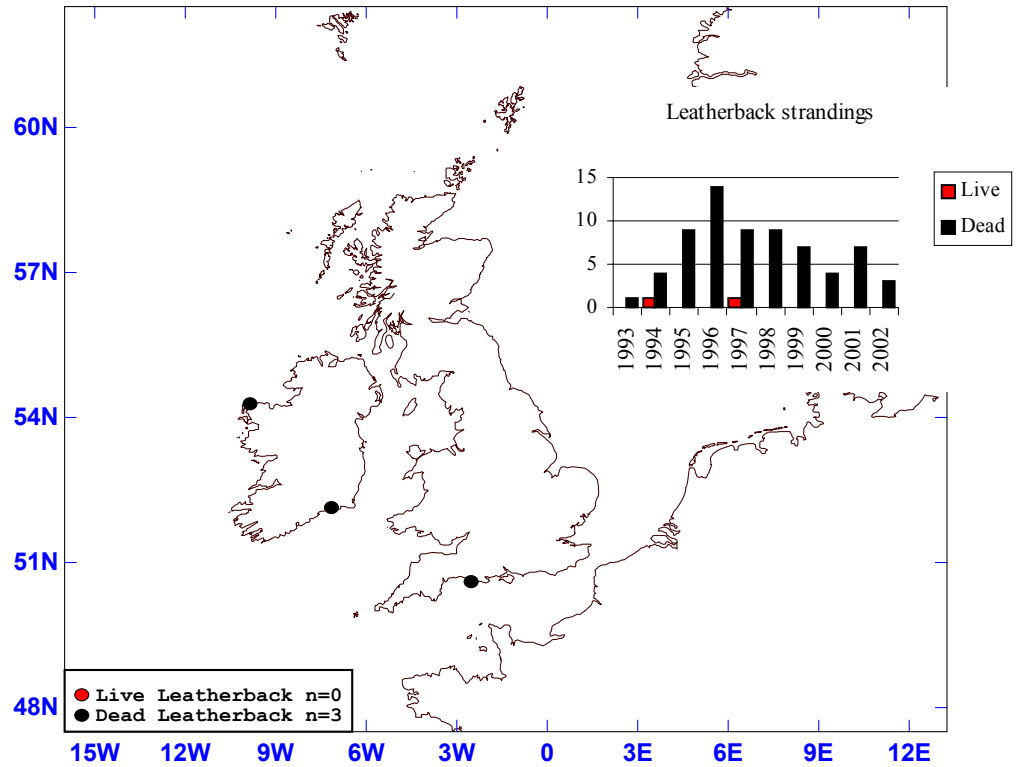
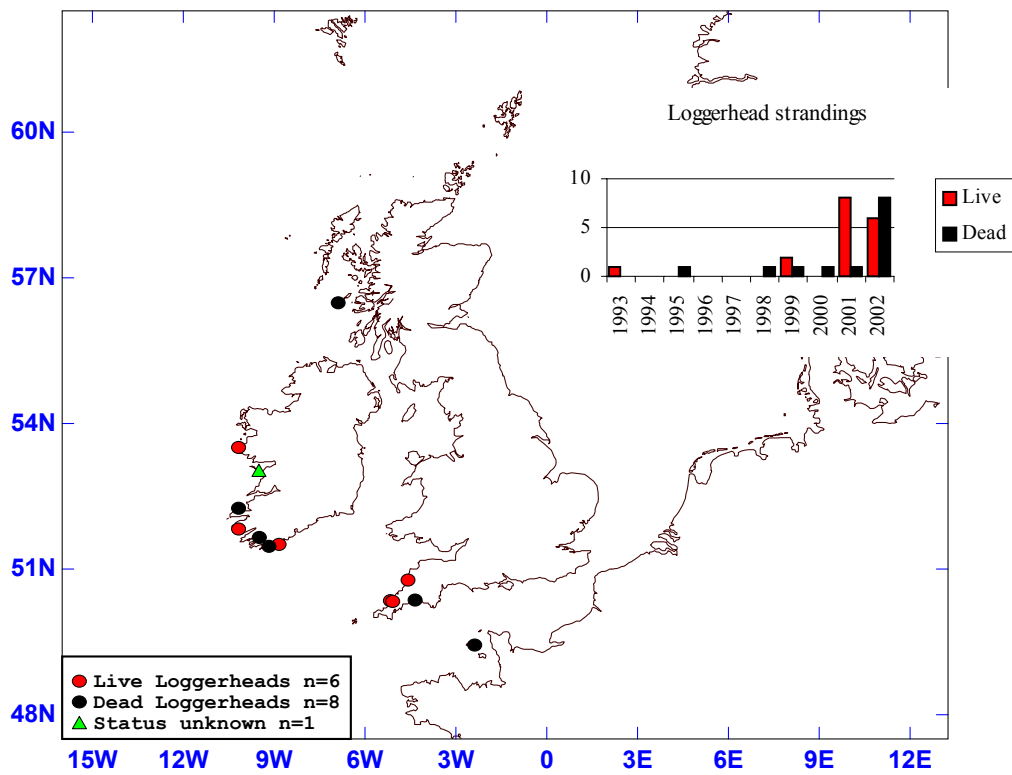
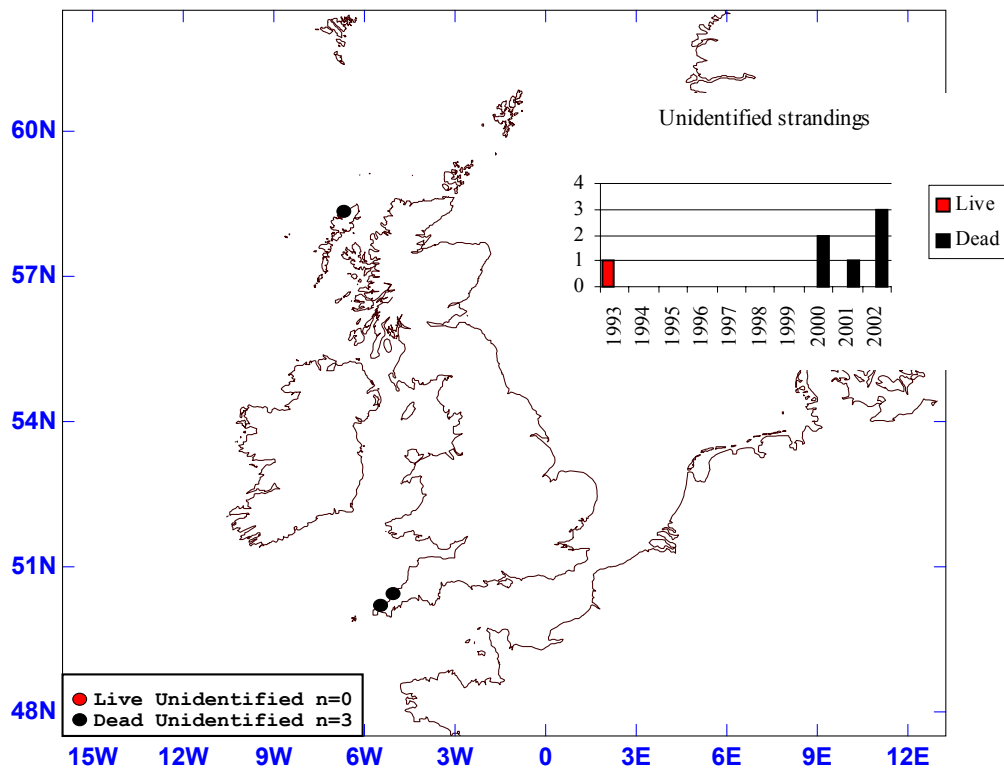


Figure 7. *Leatherback strandings 2002.*

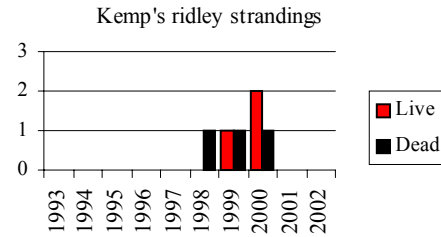


**Figure 8.** *Loggerhead strandings 2002.*



**Figure 9.** *Unidentified strandings 2002.*

No live or dead green turtle or Kemp's ridley turtle 'sightings' were reported during this ten year review however, 'strandings' of both live and dead Kemp's ridley turtles have been recorded during this period **Figure 10**. It is thought that numbers of Kemp's ridley turtles visiting UK shores may steadily increase due to the recent protection of their nesting beach in Mexico. The *post-mortem* examination reports and contaminant analysis of the 3 Kemp's ridley turtles that were found stranded and died in Cornwall and south Wales in 2000 are included as Appendix 3.



**Figure 10.** Live and dead Kemp's ridley strandings from 1993 - 2002.

The 'Turtle Code' was distributed throughout 2002 to Sea Fisheries Committees (SFC's), Fish Producers Organisations (FPO's), dive clubs, marinas, harbour masters, sailing clubs, RSPCA, Solway firth partners and wildlife NGO's in England and Wales. Towards the end of 2002 turtle codes were sent to all DEFRA fisheries offices in England. In total, 11,886 turtle codes were distributed between March and December 2002 (Peter Richardson MCS pers. comm.).

The comprehensive mailing of 'Turtle codes' distributed by MCS in 2002 may account for the increase in leatherback sightings around Cornwall, Devon and the Solway firth, **Figure 3**. However this does not explain the paucity of reports from the Irish Sea/Welsh coast that would be expected if these animals are moving through the Irish Sea.

**Table 4.**

<b>2002 Total number of records for each country.</b>	
Channel Islands	2
Eire	14
England	56
N. Ireland	0
Scotland	12
Wales	2

## **4. MATTERS ARISING.**

### **4.1 2000**

Results on the contaminant analysis of the three Kemp's ridley turtles that stranded in Cornwall and south Wales in 2000 were received from CEFAS in 2002. The full report funded by WWF and the EA is attached as Appendix 3.

### **4.2 2001**

**T2001/21** A loggerhead turtle (*Caretta caretta*) that live-stranded on Preesall beach, Blackpool, Lancashire on the 29<sup>th</sup> November 2001 was driven to Weymouth for rehabilitation under the care of Julie Ions, Bio Services at Weymouth SeaLife centre.

Advice on rehabilitation techniques, being gathered by TIG, was forwarded to Julie and after nearly 4 months the turtle, now named 'Shelly', was successfully released back into the warmer waters of the Canary Islands on the 19<sup>th</sup> March 2002. **Plate 1.**

Again, the kind assistance of Airtours International and Gran Canaria state veterinarian Pascual Calabuig made the repatriation possible.

The event was documented by the television program "Pet Rescue" and can be viewed on the attached CD-ROM (Appendix 4).



**Plate 1.** T2001/21 'Shelly' being released back into the warmer waters of Gran Canaria by Julie Ions.

photo courtesy of: Bournemouth News.

Curved carapace length on stranding 25cm, Weight 1.8kg.

Curved carapace length on release 27cm, Weight 2.35kg.

PIT tag inserted on release from UK in rear left thigh. No. 826 098100 319937.

**T2001/24** Originally reported and recorded as a loggerhead turtle (*Caretta caretta*). The carcass had stranded at Knot End near Blackpool, Lancashire on the 30<sup>th</sup> December 2001. The turtle was kindly stored at -20<sup>0</sup> C at the Fleetwood Museum until collection for full examination could be arranged within the DEFRA led 'Collaborative UK Marine Mammal & Marine Turtle Strandings Project'. Under *post-mortem* examination at the Zoological Society of London, the carcass was found to be a green turtle (*Chelonia mydas*). **Plate 2.**



**Plate 2.** T2001/24 Green turtle (*Chelonia mydas*) awaiting post-mortem examination at the Zoological Society of London.

On further examination a fragment of plastic was found lodged in the oesophagus **Plate 3** together with other items of plastic in the stomach including a large fragment (approx. 10cm x 5cm) of blue balloon **Plate 4**.



**Plate 3.** Fragment of plastic lodged in the oesophagus of green turtle T2001/24.



**Plate 4.** Stomach contents of green turtle T2001/24 showing large fragment of blue balloon.

The entrance to the intestinal tract was completely blocked by seaweed, feather shafts and fragments of plastic. Cause of death was given as oesophageal impaction and stomach impaction resulting from ingestion of plastic.

At the time of stranding this animal represented the fifth recording of this species since 1748.

## **5. LIVE STRANDING EVENTS 2002.**

There were 6 live-strandings of marine turtles reported through 2002, all were reported as loggerhead turtles (*Caretta caretta*).

**T2002/24** was found stranded on the 28<sup>th</sup> January at Claddaghduff, County Galway, Eire and taken to Ocean World, Dingle, County Kerry for rehabilitation. The turtle was eventually found to be fit for release and flown to veterinarian Pascual Calabuig on Gran Canaria where it was released on the 23<sup>rd</sup> December into a sea temperature of 19<sup>o</sup> Celsius.

**T2002/25** was found stranded on the 25<sup>th</sup> April at Waterville Strand, County Kerry, Eire and taken to Ocean World, Dingle, County Kerry for rehabilitation. Possible release in 2003. No further info.

**T2002/13** was found stranded on the 17<sup>th</sup> June at Red Strand near Clonakilty, County Cork, Eire and taken to Ocean World, Dingle, County Kerry for rehabilitation. Possible release in 2003. No further info.

**T2002/16** named 'Buddy' was found stranded on the 30<sup>th</sup> June at Millook Haven near Bude, Cornwall and taken to the Blue Reef Aquarium, New Quay. The turtle was eventually found to be fit for release and flown together with T2002/18 to veterinarian Pascual Calabuig on Gran Canaria on the 12<sup>th</sup> August.

**T2002/20** named 'Kevin' was found stranded on the 4<sup>th</sup> July at Perran Bay, Perranporth, Cornwall and taken to the Blue Reef Aquarium, New Quay. The turtle died early that evening and was stored ready for collection for a *post-mortem* examination at the Zoological Society of London. Results from the *post-mortem* examination indicated the animal was in an extremely poor nutritional status and had starved for some time. **Plate 5.**

**T2002/18** named 'Perry' was found stranded on the 4<sup>th</sup> July at Perranporth, Cornwall and taken to the Blue Reef Aquarium, New Quay. The animal had a substantial part of the right flipper missing **Plate 6.** but was eventually found to be fit for release and flown together with T2002/16 to veterinarian Pascual Calabuig on Gran Canaria on the 12<sup>th</sup> August.



**Plate 5.** Loggerhead turtle **T2002/20**. Curved carapace length was only 19cm.

### **5.1 Rehabilitation**

Blood from both turtles at New Quay, T2002/16 'Buddy' and T2002/18 'Perry', was sent for analysis at various times during their rehabilitation to James Barnett at Vetlab Services, Southwater, Horesham. Analysis was very swift and no charge was levied in this instance, however, if the TIG require this essential information, together with PIT tagging, funding needs to be agreed for the future.

T2002/18 'Perry' was successfully released into the sea from Gran Canaria on the 13<sup>th</sup> August but T2002/16 'Buddy' was held back with what was thought to be a neurological syndrome and spastic problem with the rear flippers causing the animal to swim in circles. Also, a biopsy wound on the right front flipper had not healed.

In the last month of captivity no neurological symptoms were detected and the animal was declared strong and healthy and released into the seas of Gran Canaria on the 15<sup>th</sup> October 2002.



Both animals were PIT tagged in the trailing edge of the front left flippers on departure from the Blue Reef Aquarium.

T2002/16 Curved carapace length on stranding 33.5cm, Weight 3.75kg.

PIT tag inserted on release from UK in trailing edge of the front left flipper. No. 967 000000 586015.

T2002/18 Curved carapace length on stranding 64cm, Weight 25kg.

PIT tag inserted on release from UK in trailing edge of the front left flipper. No. 967 000000 559175.

The repatriation of both T2002/16 and T2002/18 was documented by the BBC TV program 'The Really Wild Show' and should be screened sometime in 2003.



**Plate 6.** *Loggerhead turtle T2002/18 showing a major part of the right flipper missing.*

photo courtesy of: Blue Reef Aquarium.

## **6. OTHER REPORTS OF INTEREST 2002.**

**T2002/02** was found stranded dead on the 25<sup>th</sup> February at Achmelvich, north of Loch Inver, Scotland and taken to the Scottish Agricultural College, Inverness for *post-mortem* examination. The turtle was found to be a green turtle (*Chelonia mydas*), this stranding represents the sixth stranding of this species for the UK and the third for Scotland since 1748.

**T2002/39** was a leatherback turtle (*Dermochelys coriacea*) approximately 2 metres in length. The turtle was found alive at sea entangled in fishing net off the Scilly Isles on the 19<sup>th</sup> August. The animal was successfully disentangled and released by the fisherman.



**Plate 7.** *Loggerhead turtles T2002/16 and T2002/18 at the Blue Reef Aquarium, New Quay, Cornwall.*

photo courtesy of: Blue Reef Aquarium.

## **7. SAMPLES.**

The normal procedure for the taking of samples is from fresh animals that have been taken for *post-mortem* examination within the Collaborative UK or the Irish Strandings project.

Requests have been received from North Carolina, USA for humeri from dead loggerhead turtles that are found stranded on the UK coast. The study is to develop a means to age loggerhead turtles using growth layers in the humeri.

Requests have also been received from IATA-CNR, Italy for 1 to 2 grams of scute plus 2 to 3 marginal bones (where ribs are inserted) from dead loggerhead turtles for Carbon and Oxygen stable isotope determinations to learn more about the peculiarity/differences among populations. This is to compare non-Mediterranean animals to those within the Mediterranean.

Wherever possible the above samples have been collected and archived at MEM, Llechryd. The samples will be forwarded, once numbers have been collected, to both parties with the appropriate CITES agreements.

Samples of skin have continued to be taken by the Strandings Co-ordinator from animals, which would normally have been disposed of. These samples have been archived at  $-20^{\circ}$  C.

## **8. PUBLICITY.**

The Strandings Web-site has been maintained to provide details of both the Collaborative UK & Celtic Strandings Projects. Although this is intended primarily for Wales, key contact details are given for England, Scotland and Ireland. The pages can be viewed at **[www.strandings.com](http://www.strandings.com)** and I would be grateful for any comments on the Web site and any further links to other sites that may be of interest.

The "TURTLE" database will be available on this site in 2003. Morphometrics for turtles has been added to the site at [www.strandings.com/biometrics.html](http://www.strandings.com/biometrics.html)

Posters and leaflets produced to increase awareness of the project have continued to be distributed.

## **9. ACKNOWLEDGEMENTS.**

Jane Newman, Anna Jones, Powell Strong and Jemma Lerwill, for their support with the project.

Pascual Calabuig at Gran Canaria. James Barnett at Vetlab Services, Horsham. Richard Smith at Blue Reef Aquarium. Julie Ions at Weymouth Sealife Centre.

Airtours International for transporting turtles to Gran Canaria free of charge.

Robin Pratt for providing support and base of operations at Fishguard

Marine Environmental Monitoring wishes to acknowledge the financial support of English Nature.

## **10. APPENDICES.**

Appendix 1.	2002 Turtle data.
Appendix 2.	UK Turtle Code.
Appendix 3.	<i>Post-mortem</i> & contaminant results of three Kemp's ridley turtles 2000.
Appendix 4.	CD-ROM.



RECORD No	NOTES	REPORTED BY
T2002/01	Report passed on by Emer Rogan. Described as headless, size of a small minn.	David Burke
T2002/02	Found by Limerick Sub Aqua Club. Stored in fridge Dr. J. Ereen.	Bob Reid SSC
T2002/03	Described as large LBT within 50 metres of the shore, just off the quay. Several Root-mouth jellyfish sighted with animal.	Prof. John Davenport
T2002/04		Ian & Joy O'Leary
T2002/05		Prof. John Davenport
T2002/06	Approx. 2 kg jellyfish in vicinity particularly portuguese man-of-war. Sea stable cabin. SST 55.5F	Doug Herdson, Plymouth National Marine Aquarium
T2002/07	Seen in Portland Harbour feeding on jellyfish. One life in vicinity. Sea very rough. SST 56.1F	Doug Herdson, Plymouth National Marine Aquarium
T2002/08	Seen in Portland Harbour feeding on jellyfish.	Doug Herdson, Plymouth National Marine Aquarium
T2002/09	Seen in Portland Harbour feeding on jellyfish.	Doug Herdson, Plymouth National Marine Aquarium
T2002/10	Seen in Portland Harbour feeding on jellyfish.	Doug Herdson, Plymouth National Marine Aquarium
T2002/11	Taken to LCC	Clare Heardman
T2002/12	Taken by the tide.	Clare Heardman
T2002/13	Taken to Ocean World. Dingle. 00 355 66 9152111. Probable release in 2003.	Clare Heardman
T2002/14		Clare Heardman
T2002/15	To 95 & SAC. Inverness for gms.	Clare Heardman
T2002/16	Taken to Blue Reef Aquarium, New Quay. Flown to Gran Canaria 12th Aug. 2002.	Richard Smith
T2002/17		Richard Smith
T2002/18	Taken to Blue Reef Aquarium, New Quay. Flown to Gran Canaria 12th Aug. 2002.	Richard Smith
T2002/19	Nothing found	Children
T2002/20	Taken to Blue Reef Aquarium, New Quay. Died early evening	LifeGuard
T2002/21	Reported by divers 'nabbing something, thought to be sawweed, off the wreck of the 'Cip'	Tim Allopp
T2002/22	Active	
T2002/23	Taken to Ocean World. Dingle. 00 355 66 9152111 Released in Gran Canaria 23rd Dec. 2002.	Sur Roper LCCS
T2002/24	Reported as between 6ft and 8ft in length	Carina Hassey
T2002/25	Saw only for a couple of seconds. Scales on head were green with yellow outline. About 1-1.5 m across shell	Ken Hay
T2002/26	Reported as between 6ft and 8ft in length	Steve Yatsley
T2002/27	Reported as between 6ft and 8ft in length	Steve Yatsley
T2002/28	About a foot long. Thought to be a juvenile green turtle. Report passed on by Bob Reid	Mr Horeham
T2002/29	10lb	Bob Reid SAC
T2002/30	Washing at surface. Seen from fishing vessel 'Edward Haney'	Peter Davis
T2002/31	Swimming slowly seawards.	Peter Davis
T2002/32	Sunny weather with a light wind and calm seas. 2-2.5 feet across, possibly a loghead	Rosemary Royle
T2002/33	Swimming within 10-20 yards of stem of boat	Steve Newsham
T2002/34	50m distant. Head the size of man's head	Stella Turk
T2002/35	Large leatherback over 6 feet feeding on jellyfish (Rhizostoma octopus)	Mr AJ Cusis
T2002/36	Swimming towards boat, jellyfish also in water. Overcast force 2-3, southerly breeze	Henry Altenberg via Paul Ganney
T2002/37	Approx size 5 feet	Steve Holt
T2002/38	8ft leatherback entangled in nets. Successfully disentangled. Fishing vessel UKSHER F2888	Roger Lewis
T2002/39		David O'Sullivan
T2002/40		Cyrl Nicholas
T2002/41		Cyrl Nicholas
T2002/42		Cyrl Nicholas
T2002/43		Cyrl Nicholas
T2002/44		Tom Joyce
T2002/45	5-ft, surfaced by sailing boat and stayed for quite a while	Paul Semmens
T2002/46	Large	Stephen Pizzard
T2002/47	6-ft turtle seen sailing jellyfish. Dived under boat when approached	Stephen Pizzard
T2002/48	8-ft long, sighted by local fishing vessel	David Dobson
T2002/49	Sea very calm. Turtle 2 metres long; head third to half metre long, 20cm broad. Wallowing, dived/resurficed then disappeared	Graham Jones
T2002/50		Henry May
T2002/51	Feeding on giant jellyfish. Approx 6ft longby, 3-4ft wide	Brian Emms
T2002/52a		Richard Williams
T2002/52b		Nick Stambrook
T2002/53	Large bell-shaped jellyfish in area. Turtle estimated to be 2 - 2.5 metres. Head held clear of water. Water temperature 16C.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/54	Sighting from land approx. 35 metres distance. Swimming north. Elder & H gulls present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/55	Sighting from land approx. 120 metres distance. Swimming south. Gullmots, Gannets present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/56	Sighting from boat approx. 3 metres distance. Swimming north. Herring gulls & Fulmars present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/57	Sighting from boat approx. 3 metres distance. Swimming north. Herring gulls present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/58	Sighting from land approx. 3 metres distance. Swimming west. Gullmots, Gannets & Fulmars present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/59	Sighting from boat approx. 4 metres distance. Swimming north. BH Gulls & Herring Gulls present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/60	Sighting from boat approx. 3 metres distance. Swimming/feeding east. Fulmar & Gannets present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/61	Sighting from land approx. 210 metres distance. Swimming east. H Gulls, Fulmar & Kittiwakes present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/62	Sighting from land approx. 210 metres distance. Swimming east. H Gulls, Fulmar & Kittiwakes present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/63	Sighting from land approx. 210 metres distance. Swimming east. H Gulls, Fulmar & Kittiwakes present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/64	Sighting from boat approx. 2 metres distance. Swimming/feeding east. H Gulls, Fulmar, Gullmots & Gannets present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/65	Sighting from boat approx. 2 metres distance. Swimming south. H Gulls, Fulmar, Kittiwakes present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/66	Sighting from boat approx. 3 metres distance. Swimming south east. H Gulls, Fulmar, Kittiwakes present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/67	Sighting from land approx. 180 metres distance. Swimming/feeding south. H Gulls, BH Gulls, Fulmar, present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/68	Sighting from land approx. 170 metres distance. Swimming south. H Gulls, Fulmar, present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/69	Sighting from land approx. 170 metres distance. Swimming south. H Gulls, Fulmar, present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/70	Sighting from land approx. 170 metres distance. Swimming south. H Gulls, Fulmar, present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/71	Sighting from boat approx. 2 metres distance. Swimming/feeding south. H Gulls, LBB Gulls, Elder present.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/72	Sighting from boat approx. 2 metres distance. Swimming south.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/73	Sighting from boat approx. 2 metres distance. Swimming east.	Norman Hammond, Solway Shark Watch & Sea Mammal Survey
T2002/74	jellyfish nearby and many basking sharks.	Ian Boreham
T2002/75	6ft lg. Half a mile out.	Steve Holyer
T2002/76	6ft 7in lg.	David Bliss
T2002/77	Swam towards boat and dived under it. Minkie whale alongside boat at the time.	Shepper of Mry Sweet Home.
T2002/78	Decomposing carapace only.	Hamish Mackenzie.
T2002/79		Hamish Mackenzie.
T2002/80		Peter Tinsley
T2002/81		
T2002/82		
T2002/83		
T2002/84	No information as to live or dead	
T2002/86		



# The United Kingdom Turtle Code

Advice for sea users on how to deal with marine turtle encounters

As a sea user, you can help in the effort to protect endangered marine turtles by providing information about your encounters with these spectacular creatures in UK waters.

## MARINE TURTLES ARE LEGALLY PROTECTED

There is no offence if turtles are caught accidentally in fishing gear. Nor is it an offence to help turtles if entangled or stranded, or temporarily to hold dead turtles for later examination by experts.

However, marine turtles are protected in Britain.

This means that:

- turtles may not be deliberately killed or caught
- live turtles may not be landed unless for the purpose of tending them or enabling their subsequent release
- dead turtles or shells obtained from turtles in UK waters may not be possessed unless the animal was lawfully acquired
- turtles and their derivatives may not be sold or offered for sale without UK government permission unless they are antiques acquired before 1st June 1947 (with documented proof)
- turtles and their derivatives may not be imported or exported without UK government permission

The following legislation pertains to marine turtles:

- Wildlife and Countryside Act (1981, as amended)
- Conservation (Natural Habitats, &c.) Regulations (1994)\*
- Control of Trade in Endangered Species (Enforcement) Regulations (1997)
- Council Regulation (EC) No. 338/97

\* transposes EC Habitats Directive 1992 to domestic legislation

## PLEASE REPORT ALL ENCOUNTERS

### ENGLAND/WALES

#### ALL RECORDS

Rod Penrose, Marine Environmental Monitoring  
01348 875000 (24 hrs)  
[www.strandings.com](http://www.strandings.com)

#### LIVE STRANDINGS/ ENTANGLEMENTS

RSPCA 08705 555999

### REPUBLIC OF IRELAND

Prof. John Davenport  
00353 (0)21 4904140 (w)  
00353 (0)21 4897392 (h)

### SCOTLAND

#### ALL RECORDS

Dr Martin Gaywood, Scottish Natural Heritage 0131 4474784

#### DEAD STRANDINGS

Bob Reid, Scottish Agricultural College 01463 243030/  
07979245 893

#### LIVE STRANDINGS/ ENTANGLEMENTS

SSPCA 0131 3390111

### N. IRELAND

#### ALL RECORDS

Lynne Rendle, Ulster Museum & Botanical Gardens 02890 383144

#### LIVE/DEAD STRANDINGS / ENTANGLEMENTS

Ian Irvine, Portrush Countryside Centre  
02870 823600  
07770 570350 (24 hrs)

This code is available online at [www.mcsuk.org](http://www.mcsuk.org)

## RECORD THE FOLLOWING DETAILS

All information is valuable, but the following details are particularly useful:

- A description** of the turtle (alive or dead), identification of species (at least to leatherback/hard-shelled level) and overall straight length. Note any damage e.g. cuts, scars
  - Location** (longitude & latitude/ OS grid reference), **date** and **time** of sighting
  - Other observations**, such as turtle's behaviour, whether caught in fishing gear (including exact nature of entanglement, gear involved) etc
  - Presence of tags**. Many conservation projects place plastic or metal tags on turtles' flippers, which display identification numbers and a return address. Record any tag details if this can be done without causing disturbance to the turtle
- Please report all dead turtles, even if they have to be discarded at sea. Records from diaries or logbooks, however old, are also of interest.**

## WHAT TO DO IF YOU FIND A SICK OR ENTANGLED TURTLE

Immediately report the turtle to the relevant contact. Marine turtles will drown if trapped underwater. However, prompt action can save them. A turtle that is entangled or trapped is likely to be stressed. Large turtles deliver a serious bite and a blow from a flipper can be painful, so be careful. Due to possible health risks involved in handling turtles, always wear rubber gloves.

## TURTLES ENTANGLED AT SEA

Approach calmly and cautiously and ensure first of all that the turtle's head is above water so that it can breathe if it is alive.

**ALIVE**  
AVOID TOWING TURTLES TO SHORE. THEY SHOULD BE DISENTANGLED AND RELEASED AT SEA WHENEVER POSSIBLE

### Alert & active

- Do not use a gaff to pull the turtle alongside and do not haul leatherbacks aboard
- Avoid pulling hard on the turtle's flippers as they may dislocate or break
- Carefully disentangle the turtle, making sure that as much net and line as possible has been removed before the animal is released
- Make sure that the vessel is stopped and out of gear before carefully sliding the turtle back into the water
- Ensure that the turtle is clear of the vessel before moving away

**ONLY if disentanglement at sea is impossible should the turtle be brought ashore**

Tow leatherbacks very slowly and make sure the animal's head is above water so that it can breathe. Release leatherbacks in shallow water, not on land. Other species should be retained and reported.

### Traumatised/inactive

(no or slight movement, limbs flexible and limp, no decomposition)

Severely traumatised hard-shelled turtles can be saved if they are small enough to fit on your boat

- Wrap the turtle in a towel soaked in seawater. Do not cover the nostrils
- Place the animal in a sheltered and secure place on its belly. To drain the lungs, raise the back end of the shell so the turtle is resting at approximately 30°. Keep it in this position until you return to shore
- Leatherbacks should **not** be hauled aboard. If inactive, they can be towed to shore very slowly, ensuring they are able to breathe at all times

## DEAD

There may be serious health risks involved in handling dead turtles. Inexperienced individuals are advised not to touch them. Where possible, record the details listed above and, only if the specimen is fresh, bring it back to shore and place in cold storage. Always wear rubber gloves when handling turtles.

## TURTLES STRANDED ON LAND

### Leatherback turtles

Leatherbacks found stranded on beaches are usually very weak, dead or dying, but might still be saved.

### If apparently uninjured:

- Carefully drag the turtle back to the sea and release it (enlist the help of several people and pull the shell rather than the flippers).
- Do not drag the animal over rocks, as this will cause severe damage.
- If stranded on rocks, it may be better to wait for the incoming tide to provide some buoyancy before dragging the turtle back to sea.

### Other species (hard-shelled)

Loggerhead, Kemp's ridley, green and hawksbill turtles encountered on UK shores are usually cold stunned juveniles and should not be placed back in the sea.

- Wrap the turtle in a towel soaked in seawater, do not cover the nostrils
- Place the animal in a sheltered and secure place on its belly. If inactive, raise the back end of the shell so the turtle is resting at approximately 30° to drain the lungs. Report the turtle as soon as possible.

Dead turtles of all species are valuable for research and should be reported as soon as possible. Fresh specimens should be preserved in a cold store where possible. These animals will undergo a full post-mortem examination within the DEFRA-funded UK Cetacean and Turtle Strandings Project.



# Marine turtles in the UK

Endorsed by

**DEFRA**

Department for  
**Environment,  
Food & Rural Affairs**

**SEAFISH**

Of the world's seven marine turtle species, five have been recorded in UK waters. They are the leatherback, loggerhead, Kemp's ridley, green and hawksbill turtles. The leatherback, the largest marine turtle, is the species most frequently recorded in UK waters. Leatherbacks have a flexible, leathery shell and are unique among reptiles in that they are able to metabolically raise their body temperature above that of their immediate environment, allowing them to survive in colder waters. Each summer leatherbacks migrate from tropical nesting beaches to UK waters where they feed on jellyfish. The other four species have hard shells and are less frequently encountered in UK waters, where they usually occur as stray juveniles carried by currents from warmer seas.

## LEATHERBACK TURTLE

(*Dermochelys coriacea*)

Most frequently recorded species in UK waters

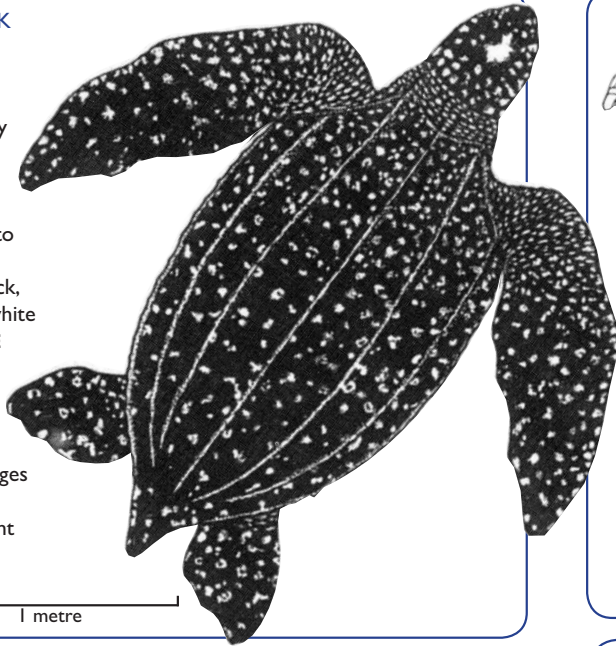
**LENGTH:** up to 2.91 metres

**COLOUR:** black, spotted with white

### DISTINCTIVE FEATURES:

large, up to 916 kg, pronounced longitudinal ridges on shell, which tapers to a blunt spike

SCALE 1 metre



## KEMP'S RIDLEY TURTLE

(*Lepidochelys kempii*)

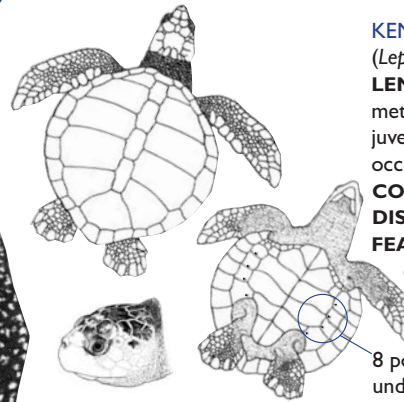
**LENGTH:** up to 1 metre, but usually juveniles (0.3-0.5 metres) occur in UK waters

**COLOUR:** grey/olive

### DISTINCTIVE FEATURES:

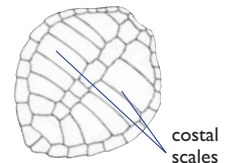
shell width equal to or greater than shell length.

8 pores visible on underside (4 either side)



### NB: The olive ridley turtle

(*Lepidochelys olivacea*) occurs in the Atlantic, but has not been recorded in UK waters to date. Similar to Kemp's ridley with 8 pores on underside, but has 5-9 pairs of costal scales on shell.



## GREEN TURTLE

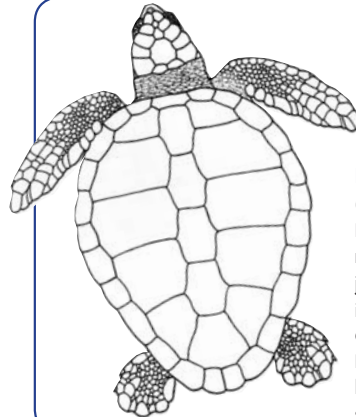
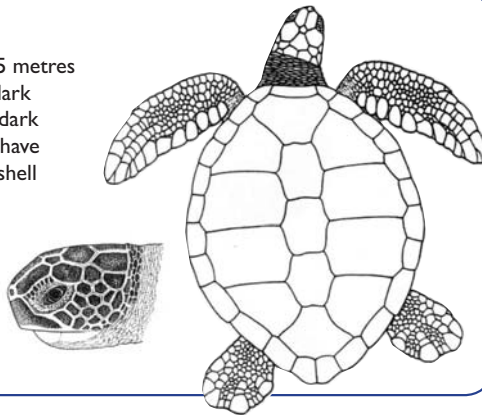
(*Chelonia mydas*)

**LENGTH:** up to 1.5 metres

**COLOUR:** adults dark olive or grey with dark blotches, juveniles have chestnut coloured shell

### DISTINCTIVE FEATURES:

smooth shell, rounded (not angular) facial profile



## LOGGERHEAD TURTLE

(*Caretta caretta*)

**LENGTH:** adults up to 1.5 metres, but usually juveniles (0.3-0.5 metres) occur in UK waters

**COLOUR:** reddish brown

### DISTINCTIVE FEATURES:

large head, juveniles have small spikes along spine of shell

## HAWKBILL TURTLE

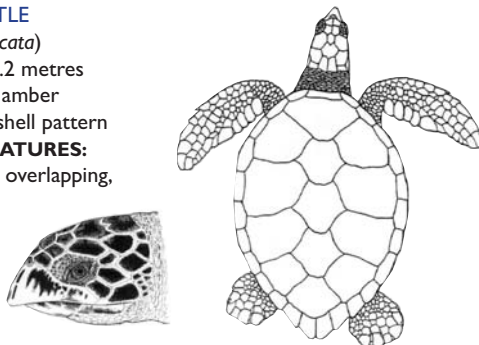
(*Eretmochelys imbricata*)

**LENGTH:** up to 1.2 metres

**COLOUR:** brown, amber and black tortoiseshell pattern

### DISTINCTIVE FEATURES:

central shell scales overlapping, narrow tapered head with bird-like beak



## MARINE TURTLES ARE ENDANGERED

In UK waters threats include:

- **Marine litter**, especially plastic, which turtles mistake for jellyfish. Once ingested, plastic can block a turtle's gut leading to starvation
- **Boat collisions**. Turtles often bask and must surface regularly to breathe, leaving them vulnerable to boat strike
- **Entanglement in fishing gear**. Although turtles can dive to great depths, they become stressed and drown when trapped underwater by fishing gear. Fishing gear discarded at sea may also entangle and kill turtles

**PLEASE DO NOT DISCARD FISHING GEAR AT SEA**

Illustrations are taken, with permission, from: Eckert, K.L., K.A. Bjorndal, F.A. Abreu-Grobois, and M. Donnelly (Editors). 1999. *Research and Management Techniques for the Conservation of Sea Turtles*. IUCN/SSC Marine Turtle Specialist Group Publication No. 4.

THIS DOCUMENT WAS PRODUCED BY THE MARINE CONSERVATION SOCIETY (MCS), WITH SUPPORT FROM ENGLISH NATURE, THE ENVIRONMENT AND HERITAGE SERVICE AND **C&G Cheltenham & Gloucester**

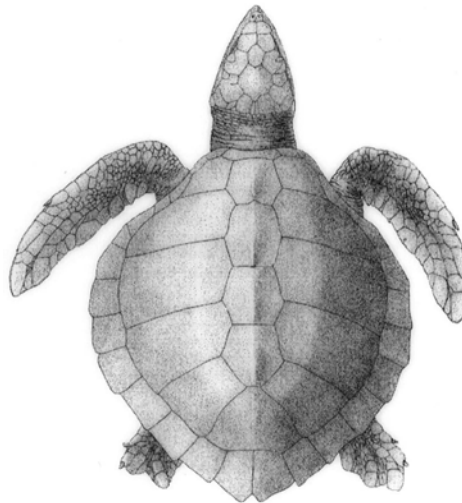




[www.strandings.com](http://www.strandings.com)

Post-mortem & contaminant analysis results of three Kemp's ridley turtles stranded on the UK coast in 2000.

R.S.Penrose. May 2002



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Environment  
Agency Wales**

## **INTRODUCTION**

The Kemp's ridley turtle (*Lepidochelys kempii*) is classified as 'Critically Endangered' and 95% of the population nest on one beach "Rancho Nuevo" in Mexico. The population had declined drastically from 40,000 in 1947 to 5,000 in 1997 mainly due to the taking of eggs from nest sites. Rancho Nuevo has now become a National Nature Reserve and we should hopefully see a rise in this population.

This report covers all three Kemp's ridley turtles reported stranded on the UK shores in 2000. These animals were submitted for *post-mortem* examination (PME) prior to the inclusion of these species in the "Collaborative UK Marine Mammal & Marine Turtle Project" and examinations were funded by Animal World, New Quay, the Cornwall Wildlife Trust and Marine Environmental Monitoring with contaminant analysis of T2000/19 and T2000/20 funded by WWF-UK<sup>1</sup> and T2000/21a by the Environment Agency, Wales.

*Post-mortem* examinations were carried out at the Veterinary Investigation Laboratory, (VI centre), Polwhele by Vic Simpson and contaminant analysis at the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) by Robin Law.

These strandings at Newquay, Cornwall and Kenfig, south Wales are only the 14<sup>th</sup> and 15<sup>th</sup> record of this species for England and only the fifth record of this species for Wales since 1748. ('TURTLE' database 1999 Peirpoint & Penrose).

## **RESULTS**

The three Kemp's ridley turtles are referred to in this report by their database numbers allocated in "TURTLE".

### **T2000/19**

Kemp's ridley turtle, straight overall length (SOL) 36.5cm straight carapace width (SCW) 25cm weight 3.232kg.

Found live-stranded at Fistril Beach, Newquay, Cornwall on the 21<sup>st</sup> November 2000 and taken to Blue Reef Aquarium, Newquay for rehabilitation. Died 23<sup>rd</sup> November 2000. Allocated VLA 22/M98/11/00 at the VI centre, Polwhele. (PME report appendix 1).

### **T2000/20**

Kemp's ridley turtle, straight overall length (SOL) 94cm straight carapace width (SCW) 62cm weight 23.4kg.

Found dead, moderately decomposed at Newquay, Cornwall on the 29th November 2000 and taken to the VI centre by Phillipa Brakes, Newquay Zoo. Allocated VLA 22/M125/11/00 at the VI centre, Polwhele. (PME report appendix 2).

### **T2000/21a**

Kemp's ridley turtle, straight overall length (SOL) 34cm straight carapace width (SCW) 23.5cm weight 1.912kg.

Found live-stranded at Kenfig National Nature Reserve (NNR), Bridgend, south Wales on the 5<sup>th</sup> December 2000 and taken to Blue Reef Aquarium, Newquay for rehabilitation. Died 10<sup>th</sup> December 2000. Allocated VLA 22/M50/12/00 at the VI centre, Polwhele. (PME report appendix 3).

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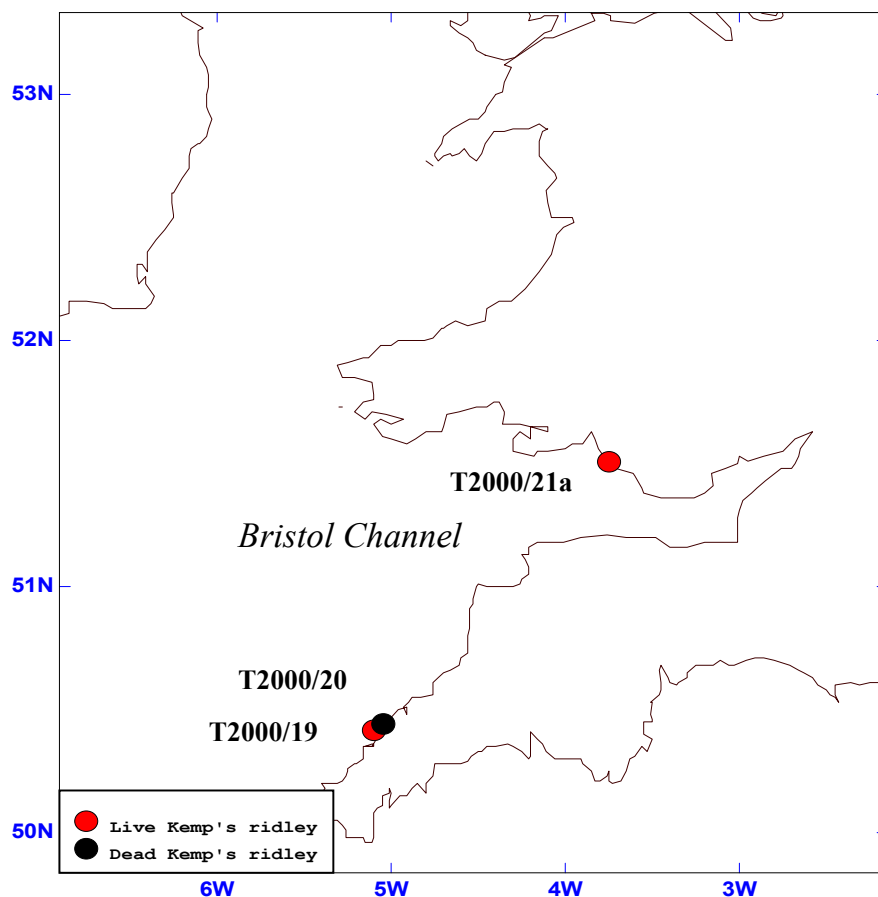
<sup>1</sup> WWF-UK registered charity number 1081247 A company limited by guarantee number 4016725 Panda symbol ©1986 WWF ® WWF registered trademark owner.



Two further dead hard-shell turtles were reported together with T2000/21a on the 5<sup>th</sup> December 2000 at Kenfig NNR but nothing was found by a subsequent search by rangers. These have been recorded in the TURTLE database as:-

**T2000/21b** Unidentified.

**T2000/21c** Unidentified.



**Figure 1.** All three Kemp's ridley turtle strandings plotted on the UK coast.

Copies of the Veterinary Investigation Laboratory *post-mortem* examination reports and CEFAS contaminant analysis are included as appendices.

### **ACKNOWLEDGEMENTS.**

Richard Smith at the Blue Reef Aquarium, veterinarian Mike King, Phillipa Brakes, Animal World, the Cornwall Wildlife Trust and Graham Holmes Kenfig NNR.

Contaminant analysis of the two Kemp's ridley turtles, T2000/19 and T2000/20, which stranded in England, were funded by WWF-UK.

T2000/21a, which stranded in Wales, was funded by the Environment Agency Wales.

**APPENDICES.**

- Appendix 1. T2000/19 *post-mortem* examination report.
- Appendix 2. T2000/20 *post-mortem* examination report.
- Appendix 3. T2000/21a *post-mortem* examination report.
- Appendix 4. CEFAS contaminant analysis.

**T2000/19** liver & fat samples LSN 2001/1497 liver.  
LSN 2001/1500 fat.

**T2000/20** liver & fat samples LSN 2001/1498 liver.  
LSN 2001/1501 fat.

**T2000/21a** liver & fat samples LSN 2001/1499 liver.  
LSN 2001/1502 fat.

- Appendix 5. Morphometrics chart.

(Please note a Leatherback turtle is used for illustration purposes on the morphometrics chart).

**T2000/19**

Veterinary Laboratories Agency - Truro  
 Polwhele, Truro, Cornwall TR4 9AD  
 Telephone: (01872) 272150 Fax: (01872) 223443



VLA Reference No. 22/M98/11/00

Duchy Veterinary Hospital  
 53 Henvy Road  
 Newquay  
 TR7 3DQ

Client: Animal World  
 Specimen: Turtle carcase x 1  
 Kemp's ridley turtle  
 Date Received: 23 November 2000  
 Serial No: A48730

Case Veterinary Surgeon: M King

**Report No: 1 - Preliminary Report****Post Mortem Examination**

An immature Kemp's ridley turtle was submitted in freshly dead condition. The following morphometrics were taken following the diagram provided by Rod Penrose:-

Code	Dimension
CCL	29 cm
SCL	27 cm
SCW	25 cm
SOL	36.5 cm
SFF	48 cm
Flipper	16 cm
Neck	20 cm
Tail 1	3.5 cm
PTL	1.7 cm

The carcase weighed 3232 gm. The carapace was covered in an algal growth and there were localised areas of pitting erosions, mostly about 2 - 4 mm diameter and about 2 mm in depth. There were what appeared to be areas of inflammation involving the skin over the ventral surface of the legs. The carcase appeared anaemic. Although there were widespread fat deposits, those around the periphery of the body cavity showed a marked greenish/khaki discolouration. There was a focal area of bruising and haemorrhage over the point of the left side of the jaw. There was also a large area of haemorrhage over the anterior aspect of the thigh muscles of the left hind leg.

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Continuation sheet: 22/M98/11/00 - Kemp's ridley turtle  
submitted 23 November 2000

No abnormalities were seen in the mouth and the oesophagus appeared healthy, although the mucosal surface was most unusual in that it was covered in numerous conical, spike-like structures.

The stomach was empty and the mucosal surface appeared normal. However the mucosa of the duodenum appeared inflamed and there was brownish watery fluid throughout the proximal small intestine. There were numerous greyish sub-serosal nodules, mostly about 2 mm diameter, over the caudal half of the stomach and the anterior small intestines. The lower part of the intestines appeared normal. The cloaca appeared normal. The liver was large and fatty and showed numerous areas of congestion. The gall bladder appeared normal. Both kidneys were unremarkable and there was what appeared to be a urinary bladder opening into the alimentary tract at the beginning of the cloaca. No definite gonads could be identified, although there was a single roughly spherical body, about 4 mm diameter, in the dorsal mid line.

The heart appeared normal but the trachea, bronchi and lungs contained a very large quantity of clear, bubbly, watery fluid.

Bacteriological Examination

No organisms were isolated from heart blood, liver or lung. The intestines yielded a pure heavy growth of non-haemolytic coliforms.

Haematological Examination

Examination of a stained blood smear showed no abnormalities

Histological Examination

A wide range of tissues have been held in fixative pending possible future examination.

Toxicological Examination

Samples of fat, liver and kidney have been held for possible toxicological examination and a sample of skin has been retained for possible DNA analysis.

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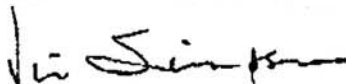
Continuation sheet: 22/M98/11/00 - Kemp's ridley turtle  
submitted 23 November 2000

Comment

The areas of haemorrhage over the angle of the jaw and left leg were consistent with trauma, although it is difficult to see how the left leg could have been bruised as the affected area was covered by the ventral carapace. It could possibly have been the result of the leg being over extended. The animal had not been eating recently but the most significant finding was probably the very large amount of watery fluid in the respiratory system. This, coupled with the obvious anaemia, could possibly have been the result of rehydration treatment.

In the absence of any specific lesions in the internal organs I do not propose to carry out histological examination on these tissues. I would be happy, however, if you wish to refer them to someone who has specialist knowledge, or interest, in this area. The same comments would apply to the samples which have been held in deep freeze.

cc: Stella Turk



V R SIMPSON  
Veterinary Investigation Officer  
24 November 2000

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The charge for this laboratory work is: £ 31.00 (2A x 1)  
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**T2000/20**

Veterinary Laboratories Agency - Truro  
 Polwhele, Truro, Cornwall TR4 9AD  
 Telephone: (01872) 272150 Fax: (01872) 223443



VLA Reference No. 22/M125/11/00

Animal World  
 Newquay  
 Cornwall

Client: Cornwall Wildlife Trust

Specimen: Turtle carcass x 1

Date Received: 30 November 2000

Serial No: 22/02067

Case Veterinary Surgeon: -

**Report No: 1 - Preliminary Report****Post Mortem Examination**

This specimen was provisionally identified as a Kemp's ridley turtle. The following dimensions are taken from the diagram provided by Rod Penrose:-

SFF	104 cm
SCW	62 cm
CCL	64 cm
SOL	94 cm
SCL	62 cm
Flipper	34 cm
Neck	33 cm
Dorsal tail	14 cm
Ventral tail	7 cm

The carapace showed multiple, circular, focal erosions, often in clusters and about 2-4 mm in diameter and in depth. There was also a large indentation of the carapace on the right side of the mid-line, about 75 mm diameter. There were also numerous ulcerations of the skin, often with necrotic material accumulating on the surface. These were especially prominent at the base of the limbs, eg in the axilla. There were also inflamed, erosive, lesions affecting the scutes of the plastron (ventral carapace). The carcass weighed 23.4 kg.

The peripheral fat deposits were brown, thus resembling foetal fat. No abnormalities were seen in the musculo-skeletal system. The mouth and oesophagus appeared healthy and the stomach

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continuation Sheet: 22/M125/11/00 – Turtle carcass  
(submitted on 30 November 2000)

contained brownish, watery/mucoid fluid. Similar material was present in the small intestine. Small numbers of nematodes were present in the lower intestine.

The spleen, liver, kidneys, testes and adrenal glands all appeared healthy. The atria of the heart were distended with gas bubbles but the myocardium appeared normal. The first few centimetres of the trachea were impacted with sand but the rest of the trachea and the lungs appeared unremarkable.

Bacteriological Examination

A Gram negative bacillus was isolated from heart blood and liver. A Gram positive bacillus, possibly a coryneform, was also isolated from liver and lung. Further identification of both these isolates is proceeding.

Histological Examination

A range of tissues has been held in fixative pending possible future histological examination.

Toxicological Examination

Samples of liver, kidney and fat have been held in deep freeze for possible toxicological examination.

Examination for Viruses

A sample of one of the skin lesions has been submitted for electron microscopy. The thymus has been held at -80°C for possible virological examination.

Comment

The most significant findings in this case were probably those to the skin. They had clearly been developing for sometime and could possibly be the result of a virus infection, eg parapox.

I will hold the fixed and frozen tissues in archive pending instructions on how we should proceed with them.



V R SIMPSON  
Veterinary Investigation Officer  
4 December 2000

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VLA Reference No. 22/M125/11/00

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Animal World Newquay Cornwall	Client: Cornwall Wildlife Trust
cc: Cornwall Wildlife Trust Stella Turk	Specimen: Turtle carcass x 1
	Date Received: 30 November 2000
	Serial No: 22/02067
	Case Veterinary Surgeon:

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**Report No: 2 - Further Report**

**Bacteriological Examination**

The Gram negative bacillus isolated from heart blood and in mixed culture from liver has been identified as *Aeromonas hydrophila*.

  
V R SIMPSON  
Veterinary Investigation Officer  
5 December 2000

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VLA Reference No. 22/M125/11/00

Animal World  
Newquay  
Cornwall

Client: Cornwall Wildlife Trust

Specimen: Turtle carcass x 1

Date Received: 30 November 2000

Serial No: 22/02067

cc: Stella Turk  
CWT

Case Veterinary Surgeon:

**Report No: 3 – Interim Report**

The Gram-positive bacillus isolated from lung has provisionally been identified as *Propionibacterium avidium*.

A handwritten signature in black ink, appearing to read 'L Dannatt'.

LINDSAY DANNATT  
Veterinary Investigation Officer  
7 December 2000

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VLA Reference No. 22/M125/11/00

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Animal World  
Newquay  
Cornwall

Client: Cornwall Wildlife Trust

Specimen: Turtle carcass x 1

Date Received: 30 November 2000

Serial No: 22/02067

Case Veterinary Surgeon: -

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**Report No: 4 – Further Report**

**Examination for Viruses**

Examination of tissues by electron microscopy proved negative for virus particles, although large numbers of bacteria were present.

*M. Gansell*

PP. V R SIMPSON  
Veterinary Investigation Officer  
11 December 2000

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**T2000/21a**

Veterinary Laboratories Agency - Truro  
 Polwhele, Truro, Cornwall TR4 9AD  
 Telephone: (01872) 272150 Fax: (01872) 223443



VLA Reference No. 22/M50/12/00

Duchy Veterinary Hospital  
 53 Henver Road  
 Newquay  
 TR7 3DQ

Client: Animal World, Newquay

Specimen: Turtle carcase x 1

Date Received: 11 December 2000

Serial No: 22/10498

Case Veterinary Surgeon:

**Report no: 1 - Preliminary Report****Post Mortem Examination**

This turtle was submitted in fairly fresh condition and weighed 1912 gm. The following measurements are as requested in the protocol provided by Rod Penrose:-

CCL	26 cm
SCL	24.5 cm
SCW	23.5 cm
SOL	34 cm
SFF	47 cm
Flipper	15 cm
Neck circumference	18 cm
Dorsal tail	4 cm
Ventral tail	2 cm

There were multiple erosions and ulcers of the skin particularly around the articulation of the limbs. The eyes were deeply recessed in the sockets. The costal scutes of the carapace were markedly rectangular and there were four inframarginal scutes on either side of the plastron, each with a marginal pore. These features are considered diagnostic of Kemp's Ridley.

The fat deposits in the margins of the body cavity were dark khaki, whereas those around the heart and liver were yellowish. The mouth and oesophagus appeared normal but the mucosal surface of the stomach was slightly inflamed with several small (1 - 2 mm diameter), ulcers at the tips of the plicae. There were several sub-serosal nodules over the pyloric end of the stomach, each about 1 - 2 mm diameter.

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Continuation sheet: 22/M50/12/00 - Turtle carcase via Animal World

(submitted 11 December 2000)

The duodenum and pancreas appeared normal. Throughout the small intestine there were occasional, slightly irregular, gelatinous balls but no specific pathology was seen.

The liver appeared rather congested and the gall bladder was full. The kidneys appeared healthy and the gonads appeared to be those of an immature female. Spherical bodies, about 5 - 6 mm diameter, were tentatively identified as adrenal glands. The ureters and urinary bladder appeared normal, as did the cloaca.

The heart appeared normal although there was excess, opaque, pericardial fluid. Both lungs were diffusely congested, and possibly inflamed, with localised areas of intense congestion, measuring about 2 - 5 mm across. There was a large quantity of froth in the airways and this extended into the lung parenchyma.

#### Bacteriological Examination

No organisms were isolated from heart blood or liver. The lung yielded a mixed growth of organisms and further identification is proceeding. Cultures of intestines also yielded a mixed growth of organisms.

#### Histological Examination

A variety of tissues have been held in fixative pending possible future examination.

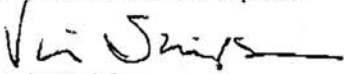
#### Biochemical Examination

Examination of liver for Vitamin A is proceeding. Samples of fat, liver and kidney have been held in deep freeze.

#### Comment

As with the two previous cases, the skin lesions in this animal appear to be quite significant. However, the aetiology is obscure. The only significant internal lesions were those seen in the lungs and pericardium. I suspect that there was a terminal, probably opportunist, bacterial infection.

The species identification in this specimen was carried out using descriptions provided in the book "Turtles of Cornwall, The Isles of Scilly and Devonshire" by Roger Penhallurick. Having compared the external features with those of the two earlier submissions it is now possible to say that all three are Kemp's Ridley and not Loggerhead turtles. I would be grateful if you could amend the two earlier reports.

  
 V R SIMPSON  
 Veterinary Investigation Officer  
 13 December 2000

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Polwhele, Truro, Cornwall TR4 9AD  
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VLA Reference No. 22/M50/12/00

Duchy Veterinary Hospital  
53 Henver Road  
Newquay  
TR7 3DQ

Client: Animal World, Newquay

Specimen: Turtle carcase x 1


Date Received: 11 December 2000

Serial No: 22/10498

Case Veterinary Surgeon:

**Report No: 2 – Interim Report**

The cultures from the lung have been identified as *Aeromonas hydrophila* and *Aeromonas sobria*. Cultures from the intestine have been identified as *Pseudomonas putida* and *Aeromonas sobria*.

  
LINDSAY DANNATT  
Veterinary Investigation Officer  
15 December 2000

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Veterinary Laboratories Agency - Truro  
 Polwhele, Truro, Cornwall TR4 9AD  
 Telephone: (01872) 272150 Fax: (01872) 223443



Rod,  
 This arrived today.  
 All the best

VLA Reference No. 22/M50/12/00

*Rutledge*

Duchy Veterinary Hospital  
 53 Henvy Road  
 Newquay  
 TR7 3DQ

Client: Animal World, Newquay

Specimen: Turtle carcase x 1

Date Received: 11 December 2000

Serial No: 22/10498

Case Veterinary Surgeon:

**Report No: 3 - Further Report**

**Biochemical Examination**

The liver Vitamin A level was 518.6  $\mu\text{mol/kg}$ . Although we have no normal values for turtles, by comparison with other species I suspect that this is a perfectly adequate level. It is unlikely therefore, that the skin lesions were due to hypovitaminosis A.

*V R Simpson*

V R SIMPSON  
 Veterinary Investigation Officer  
 21 December 2000

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# **Contaminant Analysis in Tissues of Three Kemp's Ridley Turtles**

**2002**

**CEFAS Contract report XCHEM**

**CEFAS Burnham Laboratory**

## Samples

Tissue samples from three Kemp's Ridley turtles (*Lepidochelys kempii*) were supplied by Rod Penrose of Marine Environmental Monitoring. The Kemp's Ridley sea turtle has a restricted range and is usually only found in the Gulf of Mexico. However, young turtles can be found as far away as the Moroccan coast and northern European waters. It occurs in both tropical and temperate oceans and likes shallow areas with sandy and muddy bottoms which tend to have many crustaceans.

Details of the tissue samples and the stranding locations of the turtles are given in Table 1. The tissues were homogenised, subsampled for the separate analyses, and stored in plastic bags (trace element analysis only) or pre-cleaned glass jars at -20°C prior to analysis. On examination in the laboratory, sample number 2001/1501 was found not to be fat †, and so was not analysed.

Table 1. Turtle samples supplied for analysis.

LSN *	Location	Date	Tissue
2001/1497	Newquay, Cornwall	21/11/2000	liver
2001/1498	Newquay, Cornwall	29/11/2000	liver
2001/1499	Bridgend, South Wales	5/12/2000	liver
2001/1500	Newquay, Cornwall	21/11/2000	fat
2001/1501 †	Newquay, Cornwall	29/11/2000	fat
2001/1502	Bridgend, South Wales	5/12/2000	fat

\*. LSN : laboratory sample number.

## Contaminant Analyses

Liver samples were analysed for butyltin compounds (TBT, tributyltin; DBT, dibutyltin and MBT, monobutyltin) and a range of trace elements, and fat samples for a range of organochlorine pesticides, 25 individual chlorobiphenyl (CB) congeners, and 14 individual brominated diphenyl ether (BDE) congeners. In all cases fully established and validated methodology was used, and the analyses were conducted under analytical quality control protocols. These involved the analysis of blanks and reference materials (either laboratory reference materials (LRMs) or certified reference materials (CRMs)). The results obtained from the analysis of the reference materials were used to generate control (Shewhart) charts which allowed the batch-to-batch variation in the performance of the methods to be monitored. If the values for a group of determinands fall outside the control limits established by this means the batch of samples is rejected and the analysis repeated.

The methodology used for the analysis of these contaminant groups has been described elsewhere. Briefly, the methods were as follows:

**Butyltins:** tissue samples are digested using methanolic sodium hydroxide, and the butyltin compounds back-extracted into hexane. The butyltins are converted into their respective hydrides by treatment with sodium borohydride, and analysed by gas chromatography with flame photometric detection. The method was developed from that of Waldock *et al.* (1989), which was fully validated during a six year monitoring programme (Waldock and Waite, 1994).

**Trace elements:** tissue samples were digested in nitric acid in sealed, PTFE-lined digestion vessels in a laboratory microwave system. The digests are quantitatively transferred to graduated polystyrene



containers, made up to volume with double-distilled water, and the trace elements determined using inductively-coupled plasma mass spectrometry, inductively-coupled plasma optical emission spectrometry, or (in the case of mercury) cold vapour atomic absorption spectrophotometry. The method was developed from that of Jones and Laslett (1994).

Organochlorine pesticides and chlorobiphenyls: homogenised tissue samples were mixed with anhydrous sodium sulphate and extracted using *n*-hexane in a Soxhlet extractor. Extracts were cleaned and fractionated by chromatography on alumina and silica, and analysed by gas chromatography with electron-capture detection. The method was developed from that of Allchin *et al.* (1989).

Brominated diphenyl ethers: the methodology is similar to that for the organochlorine compounds described above, except that the final determination is made using gas chromatography with negative ion chemical ionisation mass spectrometry, monitoring bromine ions at 79 and 81 Daltons. The method was developed within a joint project undertaken with two laboratories in the Netherlands (de Boer *et al.*, 2001).

## Results

The results of the analyses are given in Tables 2 to 6. To our knowledge, this is the first occasion on which analysis for BDE congeners has been conducted in tissues from turtles. None were found above the detection limit ( $0.2 \mu\text{gkg}^{-1}$  wet weight), in contrast to porpoises and other cetaceans from around England and Wales (Law *et al.*, 2002).

Almost all contaminant concentrations in these turtles were low or undetectable. Cd showed concentrations in the range  $0.9$  to  $1.4 \text{ mgkg}^{-1}$  wet weight, but there is no information on the concentrations of this element in their diet and in marine mammals Cd concentrations are closely related to prey species (squid in their case). Hg concentrations are low (maximum  $2 \text{ mgkg}^{-1}$  wet weight). It is not known whether turtles have a similar detoxification mechanism to that in marine mammals, but if so it is well controlled with an Hg:Se molar ratio of  $0.01$  to  $0.13$  in the three samples (Table 2). Butyltin concentrations are very low ( $\Sigma\text{BT}$  from not detected to  $0.02 \text{ mgkg}^{-1}$  wet weight) (Table 3), as are those of CBs ( $\Sigma\text{25CBs}$  from  $0.024$  to  $0.051 \text{ mgkg}^{-1}$  wet weight) (Table 5). BDEs were not detected in any sample (Table 6). Organochlorine pesticides were in most cases detectable, albeit at low concentrations (Table 4).

Table 2. Concentrations of trace elements in liver tissue (mgkg<sup>-1</sup> wet weight).

LSN	TS%	Cr	Fe	Ni	Cu	Zn	As	Se	Ag	Cd	Hg	Pb	Hg:Se
2001/1497	48.2	0.18	224	0.08	4.8	24	1.2	6.2	<0.02	1.1	0.11	<0.01	0.01
2001/1498	27.0	0.07	1150	0.08	7.5	41	6.7	6.0	0.1	0.89	2.0	0.03	0.13
2001/1499	37.1	0.1	193	0.07	6.7	26	0.98	4.1	<0.02	1.4	0.21	<0.01	0.02

Table 3. Concentrations of butyltin compounds in liver tissue (mgkg<sup>-1</sup> wet weight).

LSN	TBT	DBT	MBT	ΣBT
2001/1497	<0.005	0.02	<0.02	0.02
2001/1498	<0.012	0.009	<0.008	0.009
2001/1499	<0.002	<0.002	<0.004	ND

ND not detected

Table 4. Concentrations of organochlorine pesticides in fat (mgkg<sup>-1</sup> wet weight).

LSN	%HEL	α-HCH	γ-HCH	HCB	<i>p, p'</i> -DDE	<i>p, p'</i> -TDE	<i>p, p'</i> -DDT	Dieldrin	ΣDDT	DDE/ΣDDT
2001/1500	84	<0.001	<0.001	<0.001	0.048	<0.001	<0.001	0.042	0.048	1.00
2001/1502	79	0.001	0.022	<0.001	0.072	0.053	<0.001	0.043	0.125	0.58

%HEL: percentage of hexane-extractable lipid.

Table 5. Concentrations of chlorobiphenyl congeners in fat (mgkg<sup>-1</sup> wet weight).

LSN	%HEL	CB18	CB31	CB28	CB52	CB49	CB47	CB44	CB66	CB101	CB110	CB151
2001/1500	84	0.002	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2001/1502	79	0.002	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
LSN	CB149	CB118	CB153	CB105	CB141	CB138	CB158	CB187	CB183	CB128	CB156	CB180
2001/1500	<0.001	0.004	0.008	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001
2001/1502	0.003	0.009	0.02	<0.001	<0.001	<0.001	<0.001	0.008	<0.001	<0.001	<0.001	<0.001
LSN	CB170	CB194	ΣICES7	Σ25CBs								
2001/1500	<0.001	<0.001	0.019	0.024								
2001/1502	<0.001	<0.001	0.036	0.051								

Table 6. Concentrations of brominated diphenyl ether congeners in fat (mgkg<sup>-1</sup> wet weight).

LSN	BDE28	BDE75	BDE71	BDE47	BDE66	BDE77	BDE100	BDE119	
2001/1500	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
2001/1502	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
LSN	BDE99	BDE85	BDE153	BDE154	BDE138	BDE190	Σ14BDE		
2001/1500	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ND		
2001/1502	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	ND		

ND not detected

## Comparative Data

Contaminant data are sparse for turtles stranded in the UK. Godley *et al.* (1998) reported concentrations of trace elements in liver and organochlorine pesticides and CBs in adipose fat of three leatherback turtles (*Dermochelys coriacea*) which became entangled in fixed fishing gear. The three individuals were sampled from Tenby, Wales (12/9/96; no. 1), Drumbeg, Scotland (18/10/93; no. 2) and Uig, Isle of Skye (24/10/98; no. 3). The liver of the Tenby turtle was also analysed for tributyltin and dibutyltin, but their concentrations were below the limits of detection (0.006 and 0.008 mg kg<sup>-1</sup> wet weight respectively). These data are summarised in Tables 7 and 8. Godley *et al.* also summarised earlier trace metal data reported by Davenport and Wrench (1990) for a leatherback turtle sampled from Porthmadog, Wales, in 1988.

Table 7. Trace element concentrations in liver (mg kg<sup>-1</sup> wet weight).

No	TS %	Cr	Fe	Ni	Cu	Zn	As	Se	Ag	Cd	Hg	Pb
1	31.8	<0.018	5770	<0.062	9.7	42	2.6	6.5	0.17	28	0.37	4.3

Table 8. Organochlorine pesticides and CBs in adipose fat (mg kg<sup>-1</sup> wet weight).

No	Lipid %	$\alpha$ -HCH	$\beta$ -HCH	$\gamma$ -HCH	HCB	Dieldrin	<i>p, p'</i> -TDE	<i>p, p'</i> -DDE	<i>p, p'</i> -DDT
1	41	<0.001	<0.001	<0.001	0.003	0.033	<0.001	0.068	<0.001
2	74	<0.001	ND	<0.001	<0.001	<0.001	<0.001	0.01	<0.001
3	50	<0.001	ND	<0.001	0.002	0.013	<0.001	0.057	<0.001
<b>CB18</b>	<b>CB31</b>	<b>CB28</b>	<b>CB52</b>	<b>CB49</b>	<b>CB47</b>	<b>CB44</b>	<b>CB66</b>	<b>CB70</b>	<b>CB74</b>
<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.006	ND	ND
ND	<0.001	<0.001	0.012	0.002	ND	<0.001	ND	0.002	<0.001
ND	<0.001	<0.001	0.012	0.002	ND	0.003	ND	0.002	0.001
<b>CB101</b>	<b>CB110</b>	<b>CB151</b>	<b>CB149</b>	<b>CB118</b>	<b>CB153</b>	<b>CB105</b>	<b>CB141</b>	<b>CB138</b>	<b>CB158</b>
<0.001	<0.001	<0.001	<0.001	0.012	0.073	0.005	<0.001	0.047	0.001
0.004	<0.001	ND	0.001	0.001	0.008	<0.001	ND	0.005	<0.001
0.006	<0.001	ND	0.004	0.008	0.046	0.003	ND	0.025	0.001
<b>CB187</b>	<b>CB183</b>	<b>CB128</b>	<b>CB156</b>	<b>CB157</b>	<b>CB180</b>	<b>CB170</b>	<b>CB194</b>	$\Sigma$ ICES7	$\Sigma$ CBs
0.033	0.006	0.007	<0.001	ND	0.032	0.013	0.003	0.16	0.23
0.005	ND	<0.001	<0.001	<0.001	0.005	0.001	<0.001	0.035	0.047
0.019	ND	0.004	0.001	0.001	0.024	0.011	0.004	0.12	0.18

ND: not determined

In broad terms, the contaminant concentrations found in this study were similar to those reported for the leatherback turtles in the sparse literature which exists currently. BDEs were not found in these samples, although they do occur at low concentrations in blubber of both toothed and baleen whales and other cetaceans which feed in deep offshore waters of the NE Atlantic Ocean (Law *et al.*, 2002).

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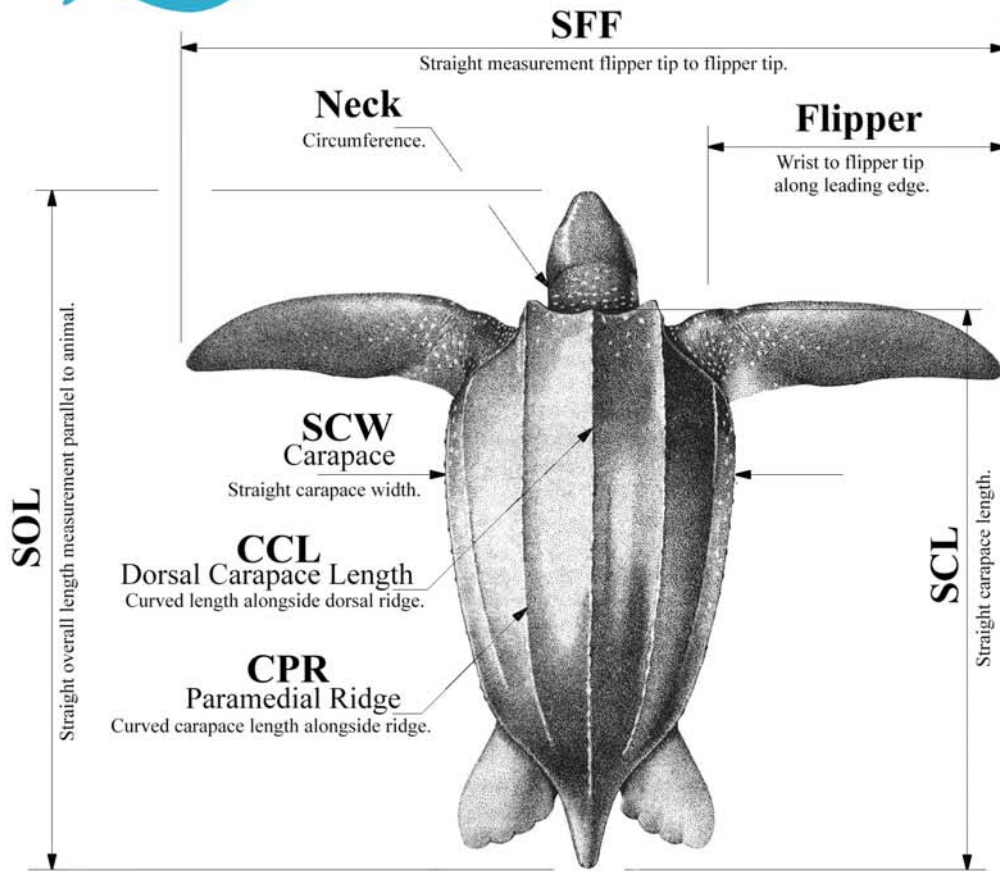
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# UK & Eire Marine Turtle Morphometrics.

Ver.1.2



## Other Measurements Required.

- COL** Curved Overall Length.
- CFF** Curved Flipper tip to Flipper tip over Animal.
- CCW** Curved Carapace Width.
- DMAX** Maximum Body Depth. (Straight).
- TTL** Total Tail Length from Plastron.
- PTL** From Centre of Cloacal Opening to end of Tail.
- WEIGHT** In Kilograms.
- SEX** If Known.

