

Agenda Item 6.2: Post-mortem and stranding schemes

**Information submitted by Parties and Range States
in response to post-mortem research questionnaire**

Submitted by: Secretariat



**NOTE:
IN THE INTERESTS OF ECONOMY, DELEGATES ARE KINDLY REMINDED TO BRING
THEIR OWN COPIES OF THESE DOCUMENTS TO THE MEETING**

	FRANCE
Institution	Marine Mammal Research Centre (CRMM) - La Rochelle
Respondent	O. Van Canneyt - V. Ridoux
Which data are recorded routinely?	Species, location, date found, condition of carcass, probable cause of death, by catch sign or not, body measurements. All coasts of France : English Channel, Atlantic and Mediterranean
Methods and units used	Stranding Network - S.I units (metric units)
What tissue samples are taken ?	Teeth, blubber, muscle, kidney, liver, gonads, stomach, spleenn, parasites.
How are these preserved ?	Teeth (alcohol), blubber (frozen), kidney (frozen/alcohol), liver (frozen), gonads (formalin), stomach (frozen), spleen (frozen), parasites (alcohol).
Carcass disposal	Squaring, national disposal to take it in charge by the knackers
Computer database	CRMM database on Personal Computer
Number of data sets	11201 records
Software used	Microsoft Access (Windows)
Problem with common database ?	Problems of use data not published, and data homogeneity
Advantage of common database ?	Better description for the distribution, relation and comparison to show trends or accidents

Questionnaire
on post mortem research schemes
within the ASCOBANS Agreement area

Name and address of reporting institution	Germany: Area of Mecklenburg-Vorpommern Deutsches Meeresmuseum Katharinenberg 14/20, 18439 Stralsund, Germany
Name of respondent	Dr. Harald Benke/ Klaus Harder
What data are recorded routinely?	Species, location of finding, date of finding, circumstances, finder, by-catch/stranding/life stranding, state of preservation, estimated age, frozen before necropsy or dissected freshly
Description of methods and units of measurement used	Post mortem examination were performed together with Dr. Peter Wolf, country veterinary department of Mecklenburg-Vorpommern, according to the Proceedings of the First ECS Workshop on Cetacean Pathology (Kuiken and Hartmann, 1993). Measurement were taken in metric systeme. Kuiken, T. and Hartmann, M. G. (1993). Dissection techniques and tissue sampling. <i>Proceedings of the ECS Workshop</i> , Leiden, 39 pp.
List of tissue samples usually taken	In close co-operation with Dr. Peter Wolf, country veterinary department of Mecklenburg-Vorpommern and Dr. Ursula Siebert, University of Kiel, all organ systems were examined macroscopically and samples of lesions and different organ systems, including lungs, trachea, stomach (1 st , 2 nd , and 4 th compartment), intestine, esophagus, liver, pancreas, thyroid gland, adrenal gland, kidney, urinary bladder, testis, uterus, ovary, spleen, thymus, pulmonary and intestinal lymph nodes, retropharyngeal lymph nodes, heart, aorta, skeletal muscles, rete mirabilis of the intercostal musculature, skin, blubber, brain, spinal cord, eye, bone, bone marrow, and tissue of the aural peribullar cavity, blood, urine etc.
How are the samples preserved?	Formalin, alcohol, other special fixation, frozen at -20-30°C or 70-80°C, OCT etc.
How are carcasses disposed of?	Incineration

Are data recorded in a computer database? Please describe	Data base on important biological parameters of harbour porpoises and seals from the German Baltic Sea (e.g. morphometrics, genetics, chemical analyses, stomach content, age, reproductive data, pathological data)
How many data sets (by species) do you have?	Since 1951 all strandings of cetaceans at the coast of Mecklenburg-Vorpommern were collected by the Deutsches Meeresmuseum
Which computer software is used?	Excel
Do you foresee any problems (e.g. regarding intellectual property rights etc.) related to a central database?	Data should be put in an international data base after publication. Use and interpretation of data sets should be restricted
What advantages would you expect from a central database?	Exchange and comparison of all data collected in different countries. This will give a more precise picture of the different subpopulations of harbour porpoise.
Additional information	

Questionnaire
on post mortem research schemes
within the ASCOBANS Agreement area

Name and address of reporting institution	Lower Saxony Federal State Office for Consumer Protection and Food Safety – Veterinary Institute for Fish and Fishery Products Cuxhaven Schleusenstr. 1 D – 27472 Cuxhaven Tel.: +4721 6989-24 / FAX: +4721 698916 e-mail: Michael.stede@laves.niedersachsen.de
Name of respondent	Dr. Michael Stede
What data are recorded routinely?	Place and date of stranding; sex and estimated age; condition of carcas; according to the possibility of the condition -, of taking and transport there will be an autopsy done by the reporting institution.
Description of methods and units of measurement used	Autopsy according to the general principles of veterinary autopsies, - further analysis according to the condition of the animal: Histology; Parasitology; Xenobiotics,, Radiology, Bacteriology
List of tissue samples usually taken	Histology: -according to the condition of the carcas: all main organs; Bacteriology: according to the affected organ system:-in general: liver, lung, spleen. Xenobiotics,Radiology: Blubber, liver, kidney, muscle
How are the samples preserved?	1. frozen (-20 ⁰ to – 70 ⁰ C; 2. Formaldehyd or other special preservatives according to the target of examination
How are carcasses disposed of?	1. If not to be transported (outer sands, wadden sea, deserted islands): - by digging in; 2. Rendering plants; but no production of commercial value. 3. Museums; 4. only entitled persons/institutions are allowed to take over the carcasses after autopsy according to nature conservation regulations
Are data recorded in a computer database? Please describe	no
How many data sets (by species) do you have?	Approx. 152 on a paper form
Which computer software is used?	no
Do you foresee any problems (e.g. regarding intellectual property rights etc.) related to a central database?	Yes: beside others use only by a restricted number of persons who contribute to the base

What advantages would you expect from a central database?	Faster and better detection of problems; Faster cooperation; safer basis for proposals prepared for governmental decisions.
Additional information	

Questionnaire
on post mortem research schemes
within the ASCOBANS Agreement area

Name and address of reporting institution	Germany: Area of Schleswig-Holstein Forschungs- und Technologiezentrum Westküste (FTZ) Werftstr. 6, 25761 Büsum, Germany
Name of respondent	Dr. Ursula Siebert
What data are recorded routinely?	Species, location of finding, date of finding, circumstances, finder, by-catch/stranding/life stranding, state of preservation, estimated age, frozen before necropsy or dissected freshly
Description of methods and units of measurement used	Post mortem examination were performed according to the Proceedings of the First ECS Workshop on Cetacean Pathology (Kuiken and Hartmann, 1993). Measurement were taken in metric systeme. Kuiken, T. and Hartmann, M. G. (1993). Dissection techniques and tissue sampling. <i>Proceedings of the ECS Workshop</i> , Leiden, 39 pp.
List of tissue samples usually taken	All organ systems were examined macroscopically and samples of lesions and different organ systems, including lungs, trachea, stomach (1 st , 2 nd , and 4 th compartment), intestine, esophagus, liver, pancreas, thyroid gland, adrenal gland, kidney, urinary bladder, testis, uterus, ovary, spleen, thymus, pulmonary and intestinal lymph nodes, retropharyngeal lymph nodes, heart, aorta, skeletal muscles, rete mirabilis of the intercostal musculature, skin, blubber, brain, spinal cord, eye, bone, bone marrow, and tissue of the aural peribullar cavity, blood, urine etc.
How are the samples preserved?	Formalin, alcohol, other special fixation, frozen at -20-30°C or 70-80°C, OCT etc.
How are carcasses disposed of?	Incineration
Are data recorded in a computer database? Please describe	Data base on important biological parameters of harbour porpoises from the German North an Baltic Sea (e.g. morphometrics, genetics, chemical analyses, stomach content,

	age, reproductive data, pathological data)
How many data sets (by species) do you have?	Between 1990 and 2004 the following number of data sets has been collected per species: Phocoena phocoena: 1348 Delphinus delphis: 4 Lagenorhynchus albirostris: 22 Physeter catodon: 6 Balaenoptera acutorostrata: 6 Balaenoptera physalus: 3 Globicephala melaena: 3
Which computer software is used?	Ingres, Excel, Filemaker
Do you foresee any problems (e.g. regarding intellectual property rights etc.) related to a central database?	Data should be put in an international data base after publication. Use and interpretation of data sets should be restricted
What advantages would you expect from a central database?	Exchange and comparison of all data collected in different countries. This will give a more precise picture of the different subpopulations of harbour porpoise.
Additional information	

Questionnaire Dnr 121-2154-04 Nv
on post mortem research schemes within the ASCOBANS Agreement area 2003

Name and address of reporting institution	Contaminant Research Group Swedish Museum of Natural History Box 50007, SE-104 05 Stockholm
Name of respondent	Anna Roos
What data are recorded routinely?	Date, location, finder, length, weight and sex of specimen, cause of death, type of gear if bycaught, what samples are taken.
Description of methods and units of measurement used	Skagerrak - Kattegat area:, a piece of the fin and some teeth are sent to the Swedish Museum of Natural History (SMNH). The Baltic: the whole carcass is sent to the SMNH and go through standard procedures of the same kind as used for marine mammals including autopsy.
List of tissue samples usually taken	Specimen from the Baltic: blubber, skin, muscle, liver, kidney, lung, blood, and complete skeleton. Skagerrak-Kattegat: fin and some teeth.
How are the samples preserved?	Samples are packed in aluminium foil and plastic and kept in the Environmental specimen bank, in a freezer (-28°C), at the SMNH. Skull and skeleton are cleaned and kept dry.
How are carcasses disposed of?	Carcasses are sent to a disposal plant specialized in dealing with this kind of material.
Are data recorded in a computer database? Please describe	Yes, data are incorporated in the Environmental specimen bank database. Here, all data about the animal are recorded and can be retrieved at will.
How many data sets (by species) do you have?	Approximately 20, with additional subsets.
Which computer software is used?	Microsoft Excel, but we are switching to MySQL.
Do you foresee any problems (e.g. regarding intellectual property rights etc.) related to a central database?	No
What advantages would you expect from a central database?	Make it easier for international co-operation.
Additional information	Porpoises from the Skagerrak- Kattegat are not received whole, and therefore we do not get all information that we would like to have.

Questionnaire
on post mortem research schemes
within the ASCOBANS Agreement area

Name and address of reporting institution	The Natural History Museum (NHM), Cromwell Road, South Kensington, London, SW7 5BD, United Kingdom
Name of respondent	Richard C. Sabin, UK Cetacean Strandings Project Coordinator, Department of Zoology, The Natural History Museum, London.
What data are recorded routinely?	Standardised morphometric data, species, sex, date carcass found, location (including Ordnance Survey grid reference), carcass condition. Routine data collection began in 1913.
Description of methods and units of measurement used	See attached strandings record sheet (sheet routinely used by H.M. Coastguard, RSPCA, The Wildlife Trusts and other national bodies)
List of tissue samples usually taken	The NHM recovers skeletal material from around the UK for incorporation into its research collections. The NHM has been collecting cetacean skeletal material for more than 100 years.
How are the samples preserved?	Climate-controlled Natural History Museum storage facility in London.
How are carcasses disposed of?	Biological waste is disposed of using an approved commercial waste-disposal company.
Are data recorded in a computer database? Please describe	All records received since 1913 - 2004 have been entered onto computer database (ongoing).
How many data sets (by species) do you have?	13,000 records comprising 25 cetacean species.
Which computer software is used?	Smart
Do you foresee any problems (e.g. regarding intellectual property rights etc.) related to a central database?	A central database has the potential to be successful. Undoubtedly issues of intellectual property rights will arise, but these can be dealt with by standard data access agreement(s) between contributing organisations/individuals to protect contributors interests. For example, in the UK data held in the NHM Cetacean Strandings database is protected by an agreement that precludes the access, analysis, or distribution to third parties of any data without permission from the NHM.
What advantages would you expect from a central database?	Closer European integration. Promote/facilitate international research collaboration.
Additional information	Please see attached NHM strandings record form. Please also see the NHM's Cetacean Strandings website at the following address: http://www.nhm.ac.uk/zoology/stranding

This form should be filled in and posted, immediately after telephoning or sending a fax, to:

Department of Zoology,
The Natural History Museum,
Cromwell Road, London SW7 5BD
Tel: 0207 942 5155 Fax: 020 7942 5054



Stranded Whales, Dolphins and Porpoises

Note: Rubber gloves should be worn when handling cetaceans, alive or dead.

Place and date where carcase first seen

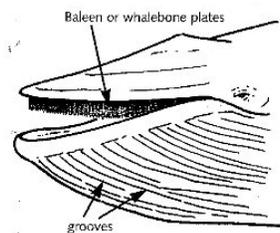
The position of a locality not likely to be given on an OS map should be indicated by its relation to some better known place, bay or headland.

		Date							
Place									
County		Grid ref.							
Name of Finder									

Is the tail horizontal? If the answer to this question is 'No', it is <u>not</u> necessary to fill up the rest of this form as the animal is therefore not a whale, dolphin or porpoise.	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
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Is there a hole ('blowhole') on the top of the head?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Is it a single hole or a pair of holes?	Single	<input type="checkbox"/>	Pair	<input type="checkbox"/>
Does the mouth contain teeth /tooth sockets or baleen/whalebone plates?	Teeth	<input type="checkbox"/>	Baleen	<input type="checkbox"/>
If neither teeth nor baleen can be found, state whether the two halves of the lower jaw are:	(a)	<input type="checkbox"/>	(b)	<input type="checkbox"/>
(a) Arched outwards and widely separated half way back (In which case the specimen is a Whalebone Whale, and the baleen has been washed out);				
(b) Close together in front, where the jaw is accordingly narrow (A Toothed Whale in which the teeth are concealed beneath the gum).				

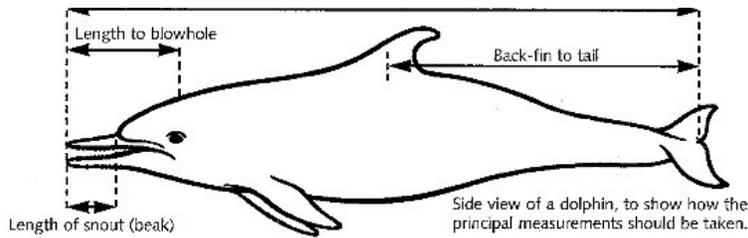
Whalebone Whales if baleen present, state:



(a) The colour of the baleen plates. If not everywhere alike indicate the arrangement; e.g. 'white for ...cm at front end of right side, the rest as stated				
(b) The colour of the hairy fringes of the plates				
Grooves Is the throat marked by numerous deep grooves?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Grooves Is the throat marked by a pair of grooves?	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

Toothed Whales if teeth are present, state:

	(a) Whether they occur in both jaws or in the lower jaw only.	Both	<input type="checkbox"/>	Lower	<input type="checkbox"/>
	(b) The number of teeth and empty sockets of one side of the upper jaw.	Teeth	<input type="checkbox"/>	Empty sockets	<input type="checkbox"/>
(c) The number of teeth and empty sockets of one side of the lower jaw.	Teeth	<input type="checkbox"/>	Empty sockets	<input type="checkbox"/>	
(d) If only few teeth & sockets present, their position in the jaw.	Front	<input type="checkbox"/>	Back	<input type="checkbox"/>	
(e) The diameter of one of the largest teeth.	Diameter				
(f) Whether teeth spade-shaped or conical/needle-shaped.	Spade-shaped	<input type="checkbox"/>	Needle-shaped	<input type="checkbox"/>	



Total length of the animal measured in a straight line. (preferably in metric units)

Length from the tip of the snout to the blowhole.

Length from the middle of the base of the back-fin to the middle of the tail

Length of one of the two flippers.

Length, in the middle line, of the snout or beak if present

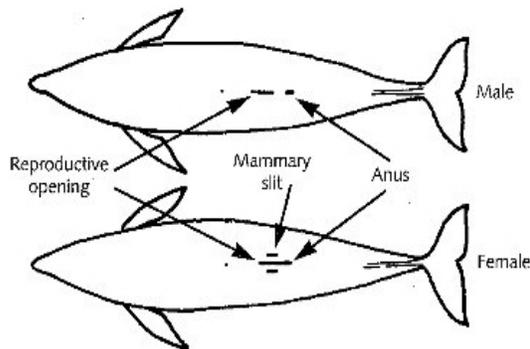
Vertical height of the back-fin if present.

Is the animal male or female? (In male, penis may be extruded. In female, mammary slits usually visible).

Male Female

Length of gap between Reproductive opening and The anus.

cm



Shape of the head (for instance, 'beak absent' or 'beak six inches long, forehead much swollen').

Colour of the skin, calling attention to the position of any white parts or stripes observed.

Please fill in diagram at top of page.

Condition of the animal when first seen : Live Dead Fresh Uncertain Decomposed

Comments on condition (e.g. smelly, leaking body fluids, bones visible, penis extruded, small cuts, big wounds).

Is it lying in such a position that it could be secured for the Museum if wanted, either entire, or its head, flippers or complete skeleton?

Additional Comments (if tangled in netting, please keep a sample).

Name and address (please print).

Tel. nos

Fax. nos

Date of completion of form:

E-mail

Questionnaire
on post mortem research schemes
within the ASCOBANS Agreement area

Name and address of reporting institution	Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, UK. SAC Veterinary Science Division (Inverness), Drummondhill, Stratherrick Road, Inverness, IV2 4JZ
Name of respondent	Dr. Paul D. Jepson (email: paul.jepson@ioz.ac.uk) Bob Reid (email: WildlifeUnit@ed.sac.ac.uk)
What data are recorded routinely?	Morphometrics (standardised), species, sex, date, location (including grid reference), carcass condition, date necropsy, pathologist, pathological findings (macroscopic and microscopic), bacteriology, mycology. Some animals also have toxicological (especially harbour porpoises) and other diagnostic test results (e.g. age, morbillivirus serology).
Description of methods and units of measurement used	See attached UK cetacean post-mortem examination protocol and report form.
List of tissue samples usually taken	Range of frozen and formalin-fixed tissues for diagnostic tests and UK national marine mammal tissue archive.
How are the samples preserved?	Samples for virology held at -80 ⁰ C. Other frozen samples held at -20 ⁰ C. Formalin-fixed tissues preserved in 10% neutral-buffered formalin.
How are carcasses disposed of?	Usually by incineration.
Are data recorded in a computer database? Please describe	All data derived from pathological investigations of UK-stranded cetaceans held in central UK database (Poseidon) held jointly at the Institute of Zoology and at the Scottish Agricultural College (Inverness).
How many data sets (by species) do you have?	Since 1990, pathological investigations using standardised methodology have been conducted on 18 cetacean species (> 2,500 individuals) and 5 pinniped species (>400 individuals) in the UK.
Which computer software is used?	UK Central Strandings Pathology database (Poseidon) has historically run on Fox-Pro (Microsoft), but this is soon to be converted to Access (Microsoft). Cetacean post-mortem reports are held electronically as Word (Microsoft) files. Excel (Microsoft) and statistical packages (e.g. SYSTAT) are also frequently used for data analysis. Digital photoimages are routinely stored in jpg format.

<p>Do you foresee any problems (e.g. regarding intellectual property rights etc.) related to a central database?</p>	<p>A central database has the potential to be successful. Undoubtedly issues of intellectual property rights will arise, but these can probably be dealt with by standard data access agreement(s) between contributing organisations/individuals to protect contributors interests. For example, in the UK data held in the central database (Poseidon) is protected by an agreement that precludes the access, analysis, or distribution to third parties of any data without permission from the contributor of the specific data.</p>
<p>What advantages would you expect from a central database?</p>	<p>Closer European integration. Promote/facilitate international research collaboration.</p>
<p>Additional information</p>	<p>The cetacean postmortem protocol and report form currently used in the UK is attached.</p>

CETACEAN POSTMORTEM REPORT

When this report has been completed, please send a copy to: Marine Mammal Strandings Project, Veterinary Science Division, Institute of Zoology, Regent's Park, London NW1 4RY, Tel: 020 7449 6691 or 6672 Fax: 020 7586 1457 email: paul.jepson@ioz.ac.uk or rob.deaville@ioz.ac.uk

SW NO. : PM NO. :

SPECIES : SEX :

LOCATION FOUND :

DATE FOUND : FOUND BY :

.....

PATHOLOGIST : DATE OF PM :

FROZEN?: Y / N

1. BASIC MEASUREMENTS

BODY CONDITION USING CONDITION CODE :

Condition code:

- | | |
|--|--|
| <p>1) live (becomes code 2 at death)</p> <p>2a) extremely fresh (as if just died, no bloating, meat is considered by most to be edible)</p> <p>2b) slight decomposition (slight bloating, blood imbibition visible)</p> <p>3) moderate decomposition (moderate bloating, skin peeling, penis may be extended in males, organs still intact, excluding postmortem damage)</p> | <p>4) advanced decomposition (major bloating, skin peeling, penis extended in males, organs beyond recognition, bones exposed due to decomposition)</p> <p>5) indeterminate (mummified carcass or skeletal remains, no organs present)</p> |
|--|--|

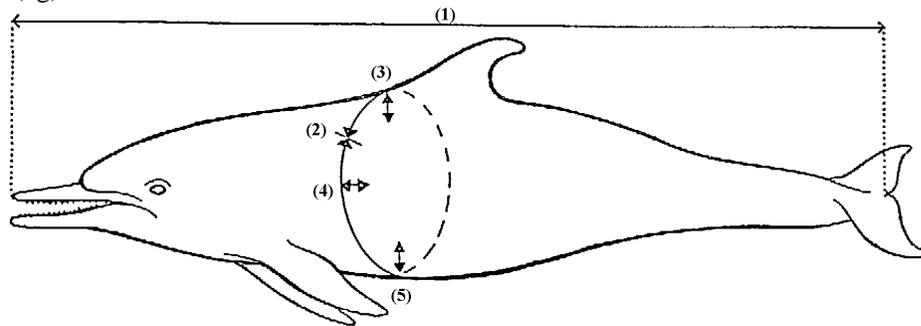
PHOTOGRAPHS TAKEN

- lateral views whole body, both sides: Y/N
- lateral views dorsal fin, both sides: Y/N
- baleen whales: ventral view tail flukes: Y/N
- other photographs (list):
-
-

LENGTH, GIRTH AND BLUBBER THICKNESS (see diagram below):

- tip upper jaw to tail notch (cm) (1):
- girth in front of dorsal fin (cm) (2):
- blubber thickness in front of dorsal fin:
- dorsal mid-line (mm) (3):
- lateral (mm) (4):
- ventral mid-line (mm) (5):

BODY WEIGHT (kg):



3. CHECKLIST OF STANDARD SAMPLES

In each square, enter: \mathcal{A} = sample taken

Blank = sample not taken or not present

Record any *extra* samples taken in section 4.

Weights

left testis	(g):	liver	(g):
right testis	(g):	kidney	(g):
heart	(g):	spleen	(g):
food remains cardiac section stomach	(g):	thymus	(g):

Ethanol

<input type="checkbox"/> food remains	all
from:	
.....	
.....	
.....	
<input type="checkbox"/> parasites from:	pref. all
.....	
.....	
.....	
.....	
.....	
.....	
.....	
.....	

Freeze at -20°C

<input type="checkbox"/> blubber	2 x 20g
<input type="checkbox"/> epidermis	4 cm ²
<input type="checkbox"/> foetus/placenta	whole
<input type="checkbox"/> kidney	2 x 20 g
<input type="checkbox"/> liver	2 x 20g
<input type="checkbox"/> milk	up to 20 ml
<input type="checkbox"/> muscle	2 x 20g
<input type="checkbox"/> rib (fifth)	15 cm
<input type="checkbox"/> scapula	whole
<input type="checkbox"/> serum (also haemolytic)	up to 20 ml
<input type="checkbox"/> skull	whole
<input type="checkbox"/> teeth (baleen plates)	>4 (2 sets)

10% Formalin

<input type="checkbox"/> adrenal glands	both
<input type="checkbox"/> bladder	1 cm ³
<input type="checkbox"/> brain	whole
<input type="checkbox"/> eyes	both
<input type="checkbox"/> heart	1 cm ³
<input type="checkbox"/> kidney	1 cm ³
<input type="checkbox"/> liver	1 cm ³
<input type="checkbox"/> lung	4 x 1 cm ³
<input type="checkbox"/> mammary gland	1 cm slice
<input type="checkbox"/> mesenteric ln.	1 cm slice
<input type="checkbox"/> ovaries	both
<input type="checkbox"/> pancreas	1 cm ³
<input type="checkbox"/> pituitary	whole
<input type="checkbox"/> pulm. ass. ln.	1 cm slice
<input type="checkbox"/> spleen	1 cm ³
<input type="checkbox"/> testes	both/slices
<input type="checkbox"/> thymus	1 cm ³
<input type="checkbox"/> thyroid	1 cm ³
<input type="checkbox"/> tympanic bullae/cochlea	both
<input type="checkbox"/> uterus	1 cm ³

Bacteriology

<input type="checkbox"/> kidney	swab/block
<input type="checkbox"/> liver	swab/block
<input type="checkbox"/> lung	swab/block

Virology (freeze at -70°C)

<input type="checkbox"/> brain	1 cm ³
<input type="checkbox"/> kidney	1 cm ³
<input type="checkbox"/> lung	1 cm ³

4. LIST OF EXTRA SAMPLES

Extra samples of lesions taken for histological examination (list):

-
-
-
-
-
-

Extra samples of lesions taken for bacteriological examination (list):

-
-
-
-
-
-

Other extra samples taken (list):

-
-
-
-
-
-

5. DESCRIPTION OF ABNORMALITIES ON GROSS PATHOLOGICAL EXAMINATION

(add extra pages if necessary)

PRELIMINARY DIAGNOSIS OF GROSS PATHOLOGICAL EXAMINATION (in order of importance):

a.

b.

c.

d.

e.

6. RESULTS OF HISTOLOGICAL EXAMINATION (add extra pages if necessary)

7. RESULTS OF BACTERIOLOGICAL EXAMINATION

Heart blood:

Lung:

Liver:

Kidney:

Other:

.

.

8. MISCELLANEOUS RESULTS

9. FINAL DIAGNOSIS (in order of importance):

a.

b.

c.

d.

e.

GUIDELINES FOR THE POSTMORTEM EXAMINATION AND TISSUE SAMPLING OF CETACEANS

CONTENTS

- a) Introduction**
- b) Basic measurements**
- c) External examination**
- d) Examination of abdominal organs (except G.I. tract, pancreas, and spleen)**
- e) Examination of organs of head, neck and thorax**
- f) Examination of the G.I. tract, pancreas and spleen**

a) Introduction

These guidelines are meant primarily as an aid to veterinary surgeons carrying out postmortem examinations on stranded cetaceans in the U.K., as a part of the DoE-funded marine mammal projects in England, Wales, and Scotland. They are based partly on guidelines written by Dr John Baker, University of Liverpool, and partly on the protocol produced at the European Cetacean Society workshop on cetacean pathology, held in Leiden, The Netherlands, in September 1991.

All structures must be examined visually and by palpation, making incisions into the organs. A full post mortem record must be kept, preferably on the standard "cetacean postmortem report" form.

Lesions in any organs should be described, photographed and sampled. The description should include the size, location, colour, texture, shape, and the nature of the transition from normal to abnormal tissue. Photographs should include a ruler or similar object to indicate the size of the lesion. According to the suspected etiology of the lesion, samples should be collected for bacteriological examination (especially if the lesion is of a purulent nature), for virological examination, and for parasitological examination. In all cases, a sample of the lesion should be preserved for histopathological examination.

Any parasites found, regardless if they are associated with pathological lesions or not, should be preserved in 70% ethanol for identification. An attempt should be made to estimate the total number of parasites. Some predilection sites for parasites are indicated in the text.

If the state of decomposition of the carcass is advanced (condition code 4 or 5, see below), only the basic measurements, organ weights (when possible), and a limited number of samples (epidermis, skull, teeth, food remains, gonads) should be taken.

The postmortem examination need not take place in the order described below. However, samples for bacteriological and virological examination need to be taken as early as possible. Also, examination of the G.I. tract should be left until last to prevent cross-contamination with enteric micro-organisms.

Paul Jepson
London, November 2000.

b) Basic measurements

photographs	Photographs should be taken of the lateral views of the whole body, from both sides. Particularly in bottle-nosed dolphins, photographs should be taken of the dorsal fin, also from both sides. In baleen whales, the ventral side of the tail flukes should be photographed. Photographs should also be taken of any lesions of interest found during the postmortem.
body condition	Estimate the body condition, that is the state of decomposition of the carcass, using the categories of the condition code ¹ .
body weight	Weigh the carcass. If this is not possible, the body weight can be estimated from the heart weight ² .
body length	Measure the body length by placing the carcass on its belly, holding a measuring tape or ruler next to the carcass in a straight line parallel to the longitudinal body axis and measuring the distance between the notch in the tail flukes and the tip of the upper jaw.
body girth	Measure the body girth at the level of the anterior insertion of the dorsal fin.

c) External examination

nutritional state	Indicate the nutritional state of the carcass, using one of the following three categories: -good: the aspect of the upper flanks on either side of the dorsal fin is rounded; -moderate: the aspect of the upper flanks on either side of the dorsal fin is sloping; -poor: the aspect of the upper flanks on either side of the dorsal fin is hollow (in these animals, one can make out the transverse processes of the lumbar vertebrae, and there is an indentation dorsally just behind the head).
body orifices	Examine the body orifices (mouth, eyes, ear openings, blow-hole, anus, genital slit and mammary slits) for lesions and any discharge. Collect and preserve left and right eyes separately in 10% formalin (only if both eyes are fully intact).
epidermis	Examine the animal for external lesions and sample these accordingly. Examine the skin carefully for any ectoparasites. These are most likely to be found in or near the body orifices and next to the fins and flukes. Take a 4 cm ² piece of epidermis down to the blubber for DNA-studies, and freeze.
milk	Massage the skin in the area cranial to the mammary slits in a caudal direction to express any fluid present in the mammary glands. If fluid can be pressed out, collect a sample for organochlorine analysis in a hexane-washed glass container and freeze. If the lid is made of plastic, separate the sample from this with aluminium foil. Note the volume, colour, and consistency of the fluid.

blubber Cut a transverse strip of blubber about 2 cm wide from the anterior insertion of the dorsal fin, from the mid-dorsal to the mid-ventral region. Make sure to cut at right-angles to the surface of the skin. Measure the thickness of the blubber strip with a ruler 2cm lateral to the dorsal mid-line, mid-laterally, and 2cm lateral to the ventral mid-line. (Using this method, the tension of the blubber tissue is relieved before measuring.)

Cut a strip of blubber a few cm wide and a few cm long at the level of the caudal insertion of the dorsal fin. Make sure to cut at right-angles to the surface of the skin. From this blubber strip, take 2x20 g cross-sectional samples of blubber for organochlorine analysis. It is important to take samples of the whole layer, from the skin to the muscle. Wrap them in hexane-washed aluminium foil and freeze. Alternatively, they can be placed in Sovirel glass tubes.

muscle Take 2x20 g muscle samples for toxicological analysis, at the same location as and directly below the blubber sample, at the level of the caudal insertion of the dorsal fin. Wrap them in hexane-washed aluminium foil and freeze. Alternatively, they can be placed in Sovirel glass tubes.

With the animal on its right side make a mid-line ventral incision from the symphysis of the mandible to a short distance posterior of the anus, circumventing the genital slit and anus. From the posterior end of the ventral incision make a second one almost to the dorsal mid-line. Reflect the skin and blubber off the uppermost side. Any parasites in the blubber should be noted and collected. They may occur as white cysts less than 1 cm in diameter, often in the ano-genital region or the dorsal aspect of the chest wall.

mammary gland In females, examine the mammary gland for pathological changes and parasites. Collect a cross-sectional slice of about 1 cm thick from halfway along the length of the left mammary gland for histopathological examination, and place in 10% formalin.

subcutaneous tissue Examine the subcutaneous tissue for the presence of bruises and parasites.

scapula Remove the left scapula for (future) morphometric analysis and freeze.

d) Examination of abdominal organs (except G.I. tract, pancreas, and spleen)

Remove the left abdominal wall, freeing the testis or ovary and uterus. Any parasites in the abdominal wall (for instance cysts under the peritoneum) should be collected. Remove the left thoracic wall, for example with bone shears.

rib Remove the fifth left rib and freeze a 5 cm section of it.

virology samples	Before handling the internal organs, take a 1 cm ³ sample of lung tissue from the cranio-ventral part of the left lung and a 1cm ³ sample of kidney tissue from the left kidney for virological examination. Also take a sample of lung tissue from the cranio-ventral part of the left lung, a sample of kidney tissue from the left kidney and a sample of liver tissue from the left lobe of the liver for bacteriological examination.
bacteriology samples	Sever the intestine close to the anus and the oesophagus close to the diaphragm. Working forward along the dorsal aspect of the abdominal cavity, remove the stomach, intestines, pancreas, spleen and mesenteric lymph node, attached to each other, from the carcass. Leave the examination of the G.I. tract to the end of the postmortem examination to prevent cross-contamination of other tissues with enteric micro-organisms.
urinary bladder	Open and examine the bladder in situ, noting the contents, if any. Preserve a 1cm ³ sample of the bladder in 10% formalin (for histopathology).
female repr. tract	In females remove the entire reproductive tract, open the vagina and uterus, note any corpora lutea, corpora albicantia or follicles on each ovary and then place the ovaries separately in 10% formalin for reproduction studies. Preserve a 1cm ³ sample of the uterus in 10% formalin (for histopathology).
foetus	If a foetus is present of sufficient size to examine the individual organs, a postmortem examination and tissue sampling of the foetus can take place in the same way as for cetaceans after birth. If it is too small for a full postmortem examination, the whole foetus and its placenta can be wrapped in hexane-washed aluminium foil and stored frozen for organochlorine analysis.
male repr. tract	In males remove the testes and weigh them separately after removing the epididymis. After incision and examination, place the testes in 10% formalin for reproductive studies. If they are heavier than about 50 g each, place a cross-sectional slice about 1 cm thick from mid-way along the length in 10% formalin. Examine the penis and preputium.
adrenal glands	Remove and examine the adrenal glands, and place them separately in 10% formalin.
kidneys	Remove the kidneys from the body cavity and weigh them. Incise both kidneys longitudinally, and if possible, strip the capsule. Then, take 2x20 g samples for toxicological analysis from halfway the length of the left kidney. These samples should be cross-sectional and include both medullary and cortical tissue. Wrap them in hexane-washed aluminium foil and freeze. Alternatively, they can be placed in Sovirel glass tubes. Preserve 1 cm ³ from a kidney in 10% formalin for histopathological examination.

liver Remove and weigh the liver. Examine both surfaces and make multiple incisions into the substance. Examine the bile ducts for parasites. Then, take 2x20 g for trace metal analysis. These samples should include approximately equal amounts of tissue from the edge of the left lobe, the edge of the right lobe, and the hilus of the liver. Wrap them in hexane-washed aluminium foil and freeze. Alternatively, they can be placed in Sovirel glass tubes. Place 1 cm³ of liver tissue in 10% formalin for histopathological examination.

e) Examination of organs of head, neck and thorax

thyroid Carefully remove the superficial muscles overlying the trachea and larynx to expose the thyroid gland. Examine this tissue and preserve 1 cm³ of tissue in 10% formalin for histopathological examination.

Incise along the internal aspects of both mandibles and free the tongue. Once the tongue is free reflect it backwards and cut the hyoid bones close to the skull.

Free the larynx from the sphincter muscle holding it in place and pulling the tongue backwards incise along the neck to free the trachea and oesophagus. Then, incising dorsally and ventrally in the thoracic cavity, free the heart and lungs. Note any attachments of the lungs to the thoracic walls. This procedure should give you the tongue, larynx, trachea, oesophagus, thymus, heart and lungs all still fastened together.

tongue Examine the surface of the tongue.

oesophagus Open the oesophagus longitudinally and check for lesions or parasites.

respiratory tract Open the larynx, trachea and major bronchi longitudinally. Make multiple incisions into the substance of both lungs. Any parasites should be collected. Two pieces of lung (about 1 cm³) from the hilus and periphery of the left lung, and the same from the right lung, should be collected in 10% formalin for histopathological examination. The samples should include part of the major bronchial tree. Open all major branches of the pulmonary veins and examine for the presence of parasites. Examine the bronchial and so-called "pulmonary associated" lymph nodes. The latter can be found about halfway along the ventral edges of each lung. Cut a 1 cm thick cross-sectional slice from the middle of the left pulmonary associated lymph node, and place it in 10% formalin for histopathological examination.

thymus Examine and weigh the thymus, if present (noting the presence of any macroscopic cysts). Place 1 cm³ of thymus in 10% formalin for histopathological examination.

serum	Collect any blood present in the heart lumen, to obtain serum for serological examination. The serum, acquired by centrifugation, should be stored frozen. Even if it is haemolytic, it is still of value.
heart	Separate the heart from the lungs by cutting through the major blood vessels where they enter the heart. Open the left and right ventricles and atria for examination and to take out any blood clots present. Any parasites should be collected. Weigh the heart. Cut a 1 cm thick slice of heart tissue, to include a piece of the wall of the left ventricle and of the atrioventricular septum, and place it in 10% formalin for histopathological examination.
tympanic bulla	Examine the tympanic bullae (which in cetaceans are not part of the skull but lie free just behind the mandibles). Carefully dissect each tympanic bulla (and associated cochlea) free of their connective tissue attachments to the skull. Examine the internal cavity of each bulla and recover any nematodes present (with forceps). Preserve the left tympanic bulla/cochlea and right tympanic bulla/cochlea separately in 10% formalin.
teeth (baleen plates)	If possible, remove two sets of (at least) 4 teeth from the middle of the lower jaw for ageing, and store frozen (separately). (In baleen whales, cut off 2 baleen plates as near as possible to their basis and store frozen.)
brain	In freshly dead carcasses (condition code 2), open the skull, and examine the brain. The skull can be opened by making a vertical cut parallel and about 2 cm posterior to the transverse dorsal ridge which is clearly visible and palpable on top of the skull. The second cut should be made in the horizontal plane, through the occipital condyles, making sure to leave the posterior portion of the condyles on the skull, so that the condylo-basal length can still be measured. Both cuts should be extended until they meet each other. The separated piece of skull can then be pried loose using a chisel or flat-bladed screwdriver, and the brain can be removed. Take a 1 cm ³ sample of brain for virological examination. Place the rest of the brain in 10% formalin for at least a week. To allow faster fixation, a longitudinal incision can be made in the cerebrum to expose the lateral ventricles. When it is fixed, make multiple slices into the tissue to look for pathological lesions, including the presence of parasites. Take 1 cm ³ samples of the cortex, midbrain, cerebellum, and medulla, for histopathological examination. Dissect the pituitary gland from the pituitary fossa (located in the cranial floor) and preserve in 10% formalin.
skull	In more decomposed carcasses, leave the skull intact. Both opened and completely intact skulls should be stored frozen for morphometrics studies.

f) Examination of the G.I. tract, pancreas and spleen

spleen Examine and weigh the spleen and put a piece (about 1 cm³), including a section of capsule, in 10% formalin for histopathological examination. One often finds smaller accessory spleens near to the main spleen.

pancreas Examine the pancreas. Look for parasites, particularly in the pancreatic ducts. Place a 1 cm³ piece of pancreas tissue in 10% formalin for histopathological examination.

mesenteric ln. Examine the mesenteric lymph node and put a 1 cm thick cross-sectional slice from halfway its length in 10% formalin for histopathological examination.

stomach Open the cardiac section of the stomach. Collect any fish bones, otoliths and other food remains and preserve in 70% ethanol or freeze for prey studies. Any parasites should be collected. Describe any lesions, including the distribution and size of any ulcers.

Open the fundic and pyloric sections of the stomach. Any food material and parasites should be preserved as for the cardiac section. Any nodules in the walls of the fundic and pyloric sections should be noted and, if they are found, attempts should be made to express the contents. Any parasites found in the contents should be collected.

intestine Open the intestinal tract at several points along its length. Make note of any contents and/or lesions and collect any parasites that are found.

1. *The body condition, or state of decomposition of a carcass, can be described using the following condition code:*

1) **live** (becomes code 2 at death)

2a) **extremely fresh** (as if just died, no bloating, meat is considered by most to be edible)

2b) **slight decomposition** (slight bloating, blood imbibition visible)

3) **moderate decomposition** (bloating, skin peeling, penis may be extended in males, organs still intact, excluding postmortem damage)

4) **advanced decomposition** (major bloating, skin peeling, penis extended in males, organs beyond recognition, bones exposed due to decomposition)

5) **indeterminate** (mummified carcass or skeletal remains, no organs present)

2. *The body weight can be estimated from the heart weight using the formula*

$\log W = (\log H + 2.2) / 0.984$, with H = heart weight and W = body weight, both in kg.