

### 3 INCIDENT RESPONSE PROCEDURES

There are several stages involved in responding to a dugong live stranding or carcass incident:

- Receiving the initial report;
- Locating and identifying the live stranding or carcass;
- Assessing the condition of the animal;
- Deciding on appropriate action (release, retrieval, *necropsy*);
- Data collection and reporting.

For reports involving dead animals (carcass reports), specific decisions required include:

- The condition of the carcass;
- The appropriate extent of the *necropsy* to be conducted;
- Whether to conduct the *necropsy* on site or at another suitable location or facility;
- How to transport the carcass (if needed);
- How to dispose of the carcass after *necropsy*.

#### 3.1 Safety

Contact with sick, injured or dead dugongs can pose a risk to people. These risks include injuries sustained from a live animal (e.g. animal thrashing or rolling), contraction of diseases, being cut or injured during the handling and examination of the carcass, or being adversely affected by chemicals used to preserve tissues. Appropriate precautions should be taken during all stages of handling a live or dead dugong.

The risk of humans contracting a zoonotic disease (a disease that can potentially be passed on to humans) from a dead animal is always present, especially when it is not known what the animal has died from (Bryden et al. 1998). Therefore, persons performing necropsies on dead animals should be well aware of the risks of exposing oneself to disease. It is essential that all people present wear protective clothing (gloves, boots, facemask etc.) to avoid bodily contact with any fluids from the animal (see Section 7.1). Use of disinfectant soaps after necropsy, or following exposure should be a routine procedure.

Persons involved with necropsy sampling should also be aware of the risks associated with preservation materials (see Section 5). Some preservatives are carcinogenic, others toxic and flammable. Chemicals should always be used in a well-ventilated area and care should be taken to ensure containers are tightly capped.

Once a carcass has been opened it is impossible to contain all the body fluids and tissue. For sanitary reasons, on-site *necropsy* should not be a regular practice and should only be done if the site is far from recreational areas, and the general public can be kept well back from the *necropsy*. Following the *necropsy*, waste tissue should be contained and immediately incinerated or buried, in compliance with local standards and ordinances, in a location where human and wildlife contact with the remains will be minimal. The work area and equipment should be scrubbed down with disinfectant detergents. Thoroughly wash and sterilise clothing as soon as possible after the *necropsy*. If available, it is preferable to use disposable items (e.g. disposable overalls) to reduce cross contamination during laundry processes.

#### 3.2 Documentation

It is imperative that proper documentation is made at each stage. Data and specimens collected over time from the retrieval and subsequent *necropsy* of dugong carcasses need to be obtained in a standardised, systematic way to allow the records to be comparable and suitable for detailed analyses. Determining the cause of death relies on the collection of relevant

information from sick, injured or dead dugongs through a stranding network. QPWS estimates that a cause of death for dugongs in Queensland could be assigned to only approximately 42% of the cases in 1998, 64% in 1997 and 47% in 1996 (note, these data include some animals listed as dead from disease, QPWS pers. comm. 1999). The percentage of carcasses for which the cause of death can be determined may not increase significantly, as evidenced by the manatee salvage and *necropsy* program run in the United States, which operates a more comprehensive program in a cooler climate, but can not assign a cause of death to 38-69% of their cases (Marine Mammal Commission 1998). However, those carcasses for which a cause of death can be determined provide useful insights into potential impacts on the animals.

### **3.2.1 Record Keeping**

It is important to standardise the methods of measuring carcasses, recording data and collecting specimens to facilitate comparisons over time and among different investigators. Accurate record keeping is accomplished through the consistent use of standardised data collection protocols and forms. Several types of forms can be used to report on different phases of the incident. These forms are described below and examples are provided in Attachments 1–3 (note: forms provided in this book are in use by research and management organisations in Queensland, Australia, at dugong live stranding and carcass incidents and necropsies). Each carcass should be assigned a unique identification number to facilitate record keeping and analysis. It is important to record as much information as possible and take photographs, however the objective is to ‘record’ and not to ‘interpret’. Preconceived ideas can affect later findings, particularly when environmental or weather conditions are difficult, the *necropsy* is rushed, or the carcass is not very fresh.

#### 3.2.1.1 Datasheets

In Queensland, the **Marine Wildlife Stranding and Mortality Report** (Attachment 1) is used to record information at the stranding site before the carcass is moved to a *necropsy* facility or necropsied on site. It is vital to conduct an initial assessment at this stage prior to any transport (see Section 3.3). It is important to include several photographs at this stage (see Section 3.2.2).

The **Dugong Stranding and Necropsy Data Sheet** (Attachment 2) is used to record information during the *necropsy*. This sheet includes a suggested list of specimens to be collected and space for the names of observers, the specimen number, sex, locality, date, time and cause of death in addition to the place, date and time of the carcass examination. An external description including details of skin colour, scars, ectoparasites (e.g. barnacles), injuries and any other abnormalities should also be included and accompanied with supporting photographs. Any external markings can be recorded in detail on the **Dugong External Examination: Markings Data Sheet** section of the **Dugong Stranding and Necropsy Datasheet** (Attachment 2). Included on this data sheet are spaces listing the samples taken, the method of preservation and the destination or intended recipient for each sample.

The **Evaluation of Human Interaction** section of the **Dugong Stranding and Necropsy Data Sheet** (Attachment 2) should be filled out when human interaction is suspected as a primary or contributing cause of death.

### **3.2.2 Photographs**

Multiple photographs of external and internal features are necessary for documentation of each dugong live stranding or carcass incident. Photographs should be taken of dorsal, ventral, and both *lateral* aspects of each carcass, including dorsal and ventral aspects of the tail fluke. Additional detailed photographs should be taken of any unusual marks, scrapes, scars, wounds,

skin lesions, or natural external features. A ruler or scale of known size should be present in every photograph. A 'data-back' which imprints the date on each photo as it is exposed is useful. A 28-mm wide-angle lens is useful for overall specimen photographs and a 50-mm lens with a macro function is ideal for close-ups. Extra batteries for camera and flash, flash attachment, and extra film should always be carried. If an appropriate camera is not available, use whatever is available or make additional notes and sketches. Each developed photo should be labelled with the specimen number, sex, species, date, location, and a brief description of the subject depicted. Photos should be labelled and stored in organised catalogues in a cool, dry place.

#### 3.2.2.1 Stranding Location

The following photographs should be taken as a matter of standard practice during carcass retrieval:

- Location
- Carcass *in situ* plus surrounding scene (from a distance while approaching)
- A short series of photographs as the retrievers move towards the carcass
- Carcass posture in the water or on the shore where found. If possible, wash off sand etc. to improve photo definition (important for subsequent investigation of possible pathology)
- All persons present at the scene
- Close-ups of any unusual marks, scrapes, scars, wounds or natural features of the animal
- Overall dorsal, ventral, and *lateral* aspects. This may be the only opportunity to thoroughly examine and photograph the back of the entire carcass if the dugong is in the water and thus can be easily rolled. External photographs taken on site are also generally superior because the carcass is in better condition than it will be by the time it reaches the *necropsy* facility.
- Close-ups of head/neck (both sides), flippers (dorsal and ventral views), tail (dorsal and ventral views) and tail stock
- Actions taken to move/remove animal from location, with particular attention to any resulting damage to, or marks on, the animal

#### 3.2.2.2 Necropsy

If time is limited, the priority is to take photographs only where there is a suspicion of unusual circumstances or abnormalities. However, it is ideal to take all photographs suggested in each incident in order to facilitate subsequent re-examination and comparisons between cases.

- External views before incisions
- External abnormalities, old and new scars
- Dermis layers after first incisions
- All organs *in situ* after first incisions
- Gastrointestinal tract including stomach, small intestine, large intestine, caecum, spleen, pancreas
- Transverse colon (when exposed)
- Liver, Gall bladder
- Dorsal and ventral surfaces of the lung and any unusual features
- Heart
- Urinary tract including kidneys
- Entire reproductive tract (male or female - including each ovary)
- Foetus (if present)
- Brain

### **3.2.3 Measurements**

A series of standardised measurements should be recorded for all carcasses. The minimum measurements required are body length, tail fluke width, genital opening to anus distance and teat length (if female) (see page 1 of Attachment 2). There are several additional measurements that can be taken if specific morphometric data from a carcass are desired (e.g. for stock studies). These measurements are outlined in Attachment 3 (also see Heinsohn 1981). Straight-line measurements should not be taken over the body contours but along the side of the animal (such as body length or tail fluke width). Measurements subject to distortion (especially girths) are only accurate if taken from fresh (see Section 3.3) carcasses in which bloating has not occurred, and should not be taken on badly decomposed specimens.

Scar measurements should be recorded on the **Markings Data Sheet** (Attachment 2). Sketches can be made on the data sheet in appropriate places and measurements of scars can be recorded.

### **3.3 Initial Assessment**

Detailed data should be recorded at the recovery site for each dead or live dugong examined. The officer in charge (or equivalent) should take notes as per the data sheets (Attachments 1 and 2) and include information on the animal's condition and the general characteristics of the area in which it was found. If possible, note any ongoing human activities in local waters (i.e. boat usage, fishing activities) and how regularly dugongs are seen in the area (daily, seldom, seasonally). If the original reporting source is present, ask the exact location of the animal when first seen (use a map and include latitude and longitude details or a Global Positioning System [GPS] fix if possible) and how it was originally positioned. A detailed description of any external features of the dugong is important.

Injuries should be photographed, measured (if possible), and shown on diagrams; all attached ropes, nets and other apparatus should be photographed and described *in situ* and collected for evidence in a possible court action, but not removed from the dugong (unless alive). Supporting photographs should also be taken (Section 3.2.2).

**Carcass condition** should be described on the data sheet during the initial assessment. This refers to the state of decomposition and is influenced by factors such as ambient temperature, *post-mortem* interval and body size. It is important that a qualified person assess the condition of the carcass. The assessment of carcass condition guides the decision as to whether or not a *necropsy* should be conducted, the types of samples to be taken and the subsequent pathology tests to be done. For example, bacteriology and virology (for disease diagnosis) can only be done on fresh (Categories 1–3) carcasses, while heavy metal, pesticide and DNA analyses can be done on samples collected from fairly decomposed animals. Six types of descriptions to code a carcass are used on the datasheets provided (based on categories outlined in Geraci and Lounsbury 1993):

- 1: Live when first reported but subsequently died.
- 2: Carcass in good condition (fresh/edible).
- 3: Carcass fair (decomposed but organs intact).
- 4: Carcass poor (advanced decomposition).
- 5: Mummified carcass (skin holding bones).
- 6: Disarticulated bones (no soft tissue remaining).

Categories 1–2 (Fresh):

- Little or no bloating due to general tissue decomposition
- Skin not sloughed

- Flippers not stiffened vertically
- Internally all organs intact with material generally suitable for histopathology

Category 3 (Moderately Decomposed):

- Slight bloating
- Some skin sloughing or stiffening of flippers
- All internal organs including the liver show integrity, although autolysis and decomposition may render the tissue matrix unsuitable for standard histopathology

Category 4 (Badly Decomposed)

- Usually bloated
- Missing patches of skin, with flippers stiffened vertically
- Internal organs, particularly the liver, show loss of integrity or complete disintegration.
- In some carcasses bloating may not be evident due to very advanced decomposition or release of gas through wounds

Categories 5–6 (Dried carcasses or bones)

- Advanced to the point where little remains of the carcass other than the skeleton or hide.

External examinations (see Section 4.2) should be conducted on all carcasses. Carcasses in the 1, 2 and 3 categories (as per the stranding data sheet, Attachments 1 and 2) should be necropsied in detail. If possible, these carcasses should be transported to a suitable facility for *necropsy*. After the *necropsy* has been completed the animal should be buried at a designated location. The location of burial should be noted on the datasheet (Attachment 1) to enable recovery if required. Carcasses in the 4, 5 and 6 categories should be examined to the extent possible. An internal examination should always be conducted on intact carcasses because carcasses that appear decomposed externally can be in relatively good condition internally.

### 3.4 Transporting a Carcass

If a carcass is to be transported to a *necropsy* facility, this should occur as soon as possible (preferably within 24 hours). The estimated time of arrival should be given to all parties involved. If possible, a carcass should be chilled during transport by placing it on ice within a body bag or suitable waterproof cover. A rolled plastic tube may also be suitable, as it can be cut to length, the body slid into the tube and a knot tied at each end; ice can then be placed around the tube, held in with a second tube of plastic. However, this may not be possible if time is limited. The carcass should be shaded from the sun before and during transport to minimise tissue decomposition. Loading and transport should be as gentle and efficient as possible to minimise any damage to the carcass which may obscure evidence indicating cause of death. It is important to carefully document any marks or other damage to the carcass caused by handling and transport. Any damage must be documented, preferably by photographs, and recorded on the datasheets.

Equipment needed to transport a carcass should include a truck and trailer equipped with a power winch fitted with a front mounted tow bar. A fully equipped vehicle should carry harnesses, mobile phone, pager, water testing kits, pathological sample kits and a complete list of contact names and telephone numbers for most marine incidents.

A *necropsy* may have to be performed on site if an area is inaccessible by boat, if collecting the carcass either manually or by using lifting machinery is not suitable, or the if carcass is so badly decomposed as to make transport impossible.