

Progress report towards building a general photographic database for the IWC's IDCR/SOWER and POWER cruises

JESS TAYLOR AND GREG DONOVAN

INTRODUCTION

The IWC undertook some three decades of international cruises in the Antarctic (IDCR/SOWER) and is now undertaking cruises in the North Pacific (POWER). Amongst other things this has led to a vast quantity of photographic material. While photo-identification catalogues have and are being developed for the more 'traditional' species such as blue and humpback whales, we have been working on a major effort to archive and build a complete digital photographic database of all of the material. The focus to date has been on photographs that are already in digital format i.e. the most recent cruises. Considerable effort will be required to digitise the non-digital images. The objective is to assess all of the photographs for quality, characteristics and keywords and to geo-reference them from the cruise datasheets. This note reports on the progress made thus far.

SOWER

Over 35,000 digital photographs have been imported into an Adobe Photoshop Lightroom database from the Southern Ocean Whale and Ecosystem Research Programme (SOWER). To date some 30,800 (94%) have been examined and coded in terms of:

- Quality of photograph (very poor / poor / medium / good / excellent);
- Characteristics (potential use for photo-ID / characteristic species ID feature / further work needed to alter image in editing software / duplicate image); and
- Keywords for: species, cruise, year, vessel, association, behaviour, health assessment / photo-ID, land / seascape, other marine life (pinnipeds / seabirds), people (crew / researchers), scientific work.

Some 11,515 have been geo-referenced. The work is summarised in the following tables.

Categorising/key wording the images in Lightroom has worked to develop the catalogue into a functional resource for several objectives, including:

- high quality general interest images;
- photo-identification population studies;
- images of rarely-documented species for research and education e.g. field guides;
- documentation of serious injuries with implications for healing efficiency;
- documentation of deleterious anthropogenic influences;
- the potential to assist with various research topics using the database includes analyses of:
 - documented behaviours such as feeding type, nursing, social activity;
 - documented associations such pods with calves or yearlings, ratio of males to females in a pod, ratio of juveniles to adults;
 - rate of nicks in dorsal fin / flukes for various species;
 - rate of rake marks from killer whales for various species, and location on body;
 - rate of healing in individuals documented over time with scars or injuries;
 - evidence of entanglement, vessel collisions, or other anthropogenic influence with implications of where these events may be occurring;
 - temporal and spatial variations: residence time, site fidelity, habitat use etc.
 - data on non-target taxa opportunistically documented, such pinnipeds and seabirds

Once, as is our intention the photographic catalogue is combined with biopsy and acoustic databases, as well as the existing IWC-DESS database, this will further strengthen its value.

Table 1

Overview of photographs and quality

Category	Number of Images
Total SOWER images processed	30,792
Very Poor Quality (including spacers)	1,335
Poor Quality	5,551
Medium Quality	20,194
Good Quality	3,560

Category	Number of Images
Excellent Quality	152
Candidate for photo-ID use	17,841
Characteristic Species ID features shown	105
Breakdown of photographs by cruise	
1990-91	58
1991-92	23
1992-93	117
2001-2	16
2003-4	563
2005-6	2,639
2006-7	21,579
2007-8	5,251
2009-10	627

Table 2
Species

Cetaceans	Large whales (29,223)	Blue whale	17,314	
		Antarctic minke whale	2,797	
		Fin whale	1,127	
		Humpback whale	5,615	
		Sei whale	6	
		Southern right whale	2,317	
		Sperm whale	47	
	Odontocetes (not sperm whale)	Beaked whales		126
		Beaked whales	Gray's	89
			Southern bottlenosed	37
		'Porpoises'		72
		'Porpoises'	Spectacled porpoise	72
		'Whales'		1,860
		'Whales'	Killer whale	1,736
Long-finned pilot whale	124			

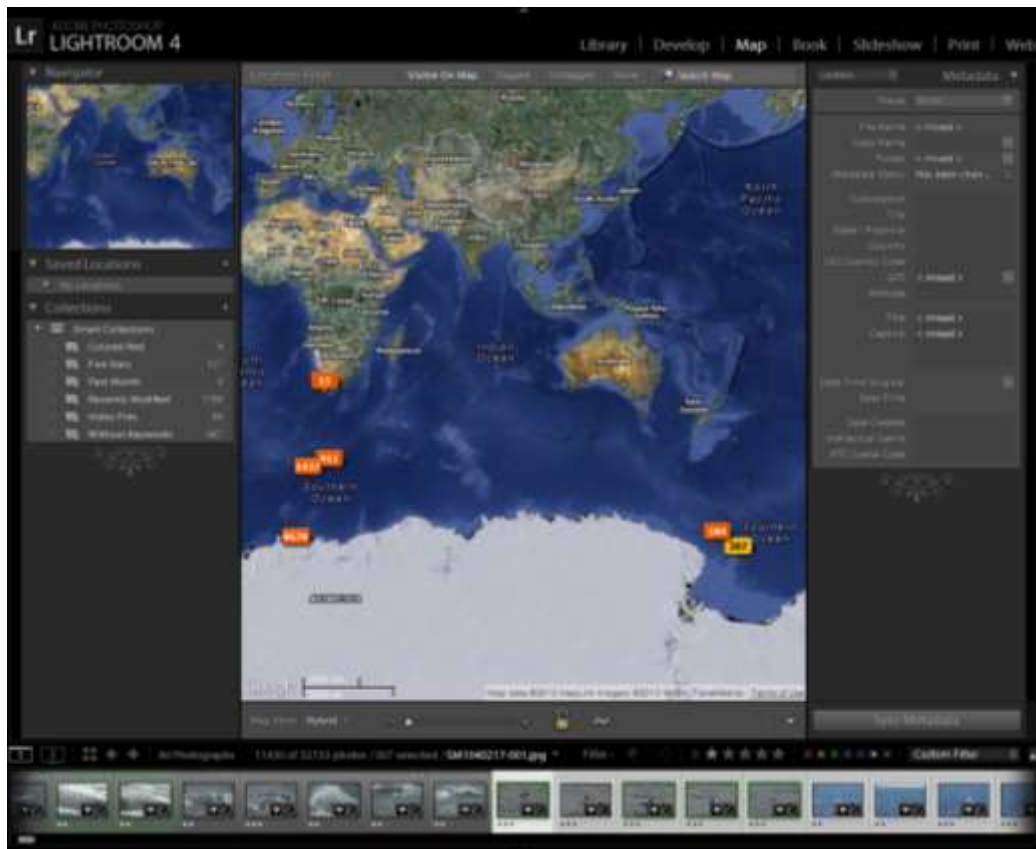
Table 3: Keyword summaries

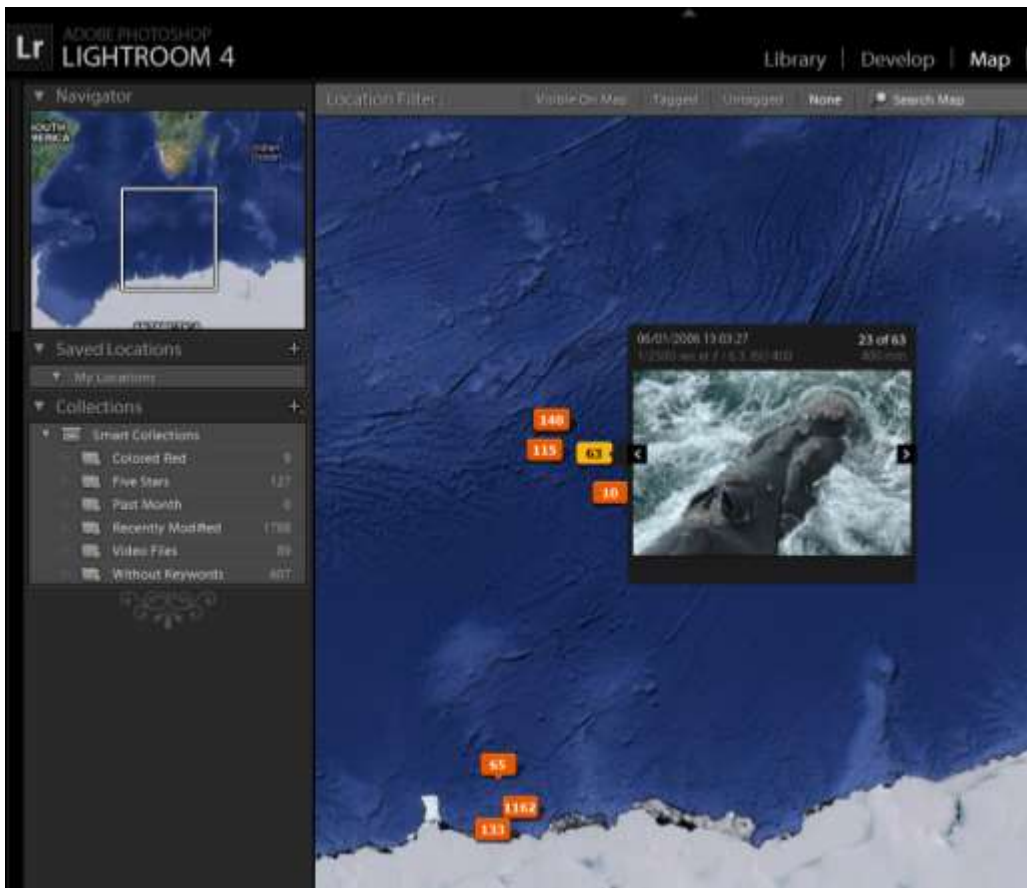
Category		Number of Images	
Associations (296)	Calf	211	
	Multi-species	4	
	Yearling	81	
Behaviour (2,159)	Breach	50	
	Curious	36	
	Dead	Floating carcass	4
		No skin on carcass	0
		Skin on carcass	3
	Defecation	10	
	Fast movement	1,051	
	Feeding	26	
	Feeding	Mouth closing	3
	Flipper slash or slap	19	
	Fluke slash, breach, flick or slap	77	
	Lamprey	4	
	Porpoising	5	
	Posturing	4	
	Reaction to dart	29	
	Reaction to platform	4	
	Roll	78	
	Spy hop	44	
	Subsurface	502	
	Underwater exhalation	4	
Visible baleen	6		
Visible eye	25		
Visible flipper	96		

Category		Number of Images
	Visible genital slit	5
	Visible ventral grooves	74

Category		Number of Images		
Health Assessment / Photo-ID (5,978)	Bite	16		
	Considerable scarring	69		
	Divot	14		
	Dorsal fin hole	18		
	Dorsal fin nick	1,221		
	Dorsal fin part missing	341		
	Dorsal fin protrusion	76		
	Emaciated	2		
	Flipper nick	2		
	Fluke nick	48		
	Fluke tip(s) white	10		
	Flukes cut or part missing	36		
	Flukes droop	6		
	Fresh wound	5		
	Gear present	12		
	Lesions	64		
	Prop wound	49		
	Rake marks	Rake mark around blowholes	1	
		Rake mark on body	235	
		Rake mark on or around dorsal fin	53	
		Rake mark on flukes	Fluke tip	25
			Leading edge	11
			Trailing edge	20
		Rake mark around peduncle	23	
	Rake mark on rostrum	14		
	Scar around blowhole(s)	13		
	Scar on body	595		
	Scar on dorsal fin	2,126		
	Scar on fluke	22		
	Scar on peduncle	32		
	Scar on rostrum	32		
	Scar on rostrum	Scar on lip	38	
	Serious injury	43		
Skin condition	470			
Unusual	236			
Land / seascapes (3,347)	Land / seascapes	1		
	Ice fields	572		
	Icebergs	2,714		
	Stormy seas	60		
Other marine life	Pinnipeds	9		
	Seabirds	590		
	People	182		
Scientific Work	General Interest	379		
	Biopsy sampling	2,164		
	Dart stuck in whale	19		
	Vessels	467		

Sighting locations of 11,515 images populate in the Map feature of Lightroom (one view is shown below) with links to original images.





Below are a few example images of interest from the initial 250 hours of processing.





Spectacled porpoise





Gray's beaked whale (*Mesoplodon grayi*)



Southern bottlenose beaked whale (*Hyperoodon planifrons*)

Signs of anthropogenic influence





Abrasive scarring on dorsal fin and posterior dorsal surface of a humpback whale



Seriously injured humpback whale fluke, likely from a propeller



Humpback whale documented with a serious injury likely from a propeller on the dorsal surface. Image shows the area where the dorsal fin would usually be.



Propeller mark on the dorsal surface of a fin whale (*Balaenoptera physalus*)



Square divot in the left flank of a minke whale (*Balaenoptera bonaerensis*), unknown cause.



Nick in Dorsal Fin

Ranges from small to severe, all useful for photo-ID:

Small nick in dorsal fin of minke whale



Large nick in dorsal fin of killer whale



Large nick / part missing in dorsal fin of an Antarctic blue whale



Considerable Scarring

Considerable scarring on dorsal surface of a humpback whale



Rates and location of bites / rake marks from killer whales:

Bite mark on the left flank of killer whale shown in detail in top image. The pod including calf in the middle is shown in bottom image; adult with bite mark is on the left



Bite taken out of trailing edge on the left fluke tip of a southern right whale, shown in detail in the bottom image



Considerable rake marks on the dorsal fin and body of a blue whale



Considerable rake mark scarring on the flukes of a humpback whale, on leading, trailing edges and fluke tips with parts of fluke missing, likely from bites



Documentation of natural occurrences:

Sperm whale (*Physeter macrocephalus*) with lampreys attached to a possible calf. Top image shows pod of two adults on left, middle is a probable female based on calloused dorsal hump, and possible calf with lampreys on the right. Bottom image shows the calf in detail



