

Histologic Findings in Southern Right Whales (*Eubalaena australis*) Beached at Península Valdés, Argentina

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INTRODUCTION: Between June 2003 and December 2010, 423 southern right whale (SRW) deaths were recorded at or near Península Valdés, Argentina with peaks in 2007 (n=83), 2008 (n=96), and 2009 (n=80). These represent the highest, consistent, recorded mortalities in a baleen whale species relative to population size. Most (88%) of the dead whales were young, first-year calves (Fig. 1). Gross necropsy and sample collection for histology was performed as part of ongoing efforts to establish a cause for these deaths.

MATERIALS AND METHODS: Tissue samples were collected from SRW in good to poor post-mortem condition (code 2 to 4) and of both sexes. Histologic examination was performed on a total of 607 samples from 108 of 423 (26%) SRW carcasses (Table 1). Reviewed samples from each carcass included sections of one or more of 42 different tissue types.

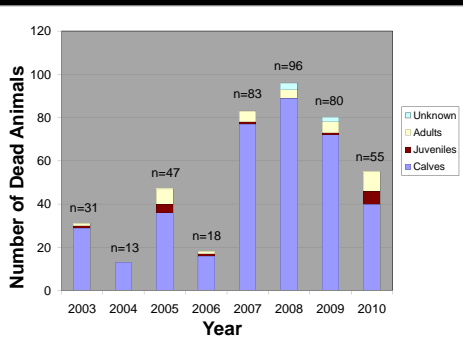


Figure 1. Age stage of dead SRW whales

Year	Total Beached/Stranded	Case Material Received	No. Tissues Received (range)	Average No. Tissues/Case	No. Histologic Findings	Average No. Histologic Findings/Case	Cases with Histologic Cause of Death
2003	31	7	53 (3-14)	8	23	3	0
2004	13	4	62 (8-22)	16	11	3	0
2005	47	11	81 (1-18)	7	25	2	1
2006	18	5	41 (1-18)	8	2	0	0
2007	83	5	15 (1-10)	3	8	2	0
2008	96	37	98 (1-10)	3	24	1	0
2009	80	27	123 (1-15)	5	27	1	0
2010	55	12	134 (1-21)	11	4	0	0
Total	423	108	607				

Table 1: Materials received for histology and number of cases in which histology established a probable cause of death.

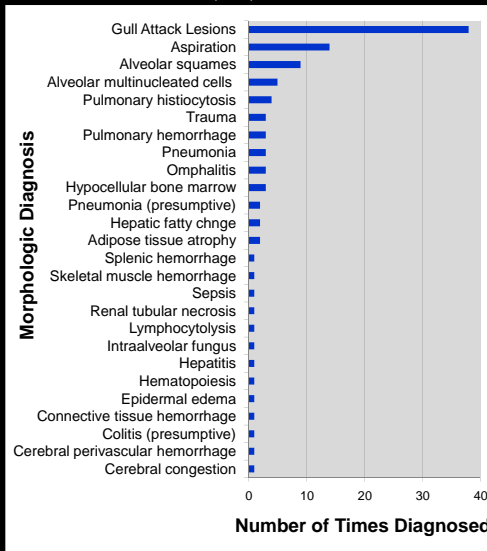


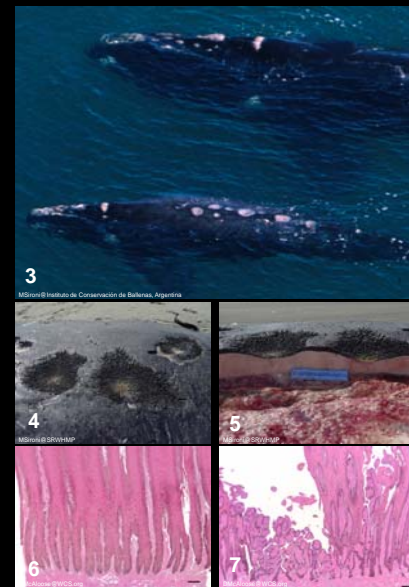
Figure 2. Significant histologic findings by disease process.

RESULTS: Eighty three significant histologic findings were identified (Fig. 2). Histology suggested a possible cause of death in one case (sepsis possibly related to infected gull attack wound). Post-mortem autolysis was seen in all cases, ranged from mild to severe and was consistent with post-mortem condition code. Histologic assessment and interpretation were highly dependent on tissue preservation and availability.

Included in the examined tissues were skin samples from 44 carcasses listed as having ante-mortem gull attack wounds (Fig. 3-5), a common occurrence (81%)^{1,2} in SRW cow/calf pairs in and near Península Valdés. The most significant, consistent histologic findings in affected skin were moderate to severe epidermal erosion (68%) and clefting (66%) (Fig. 7) and mild to moderate hyperplasia (50%) of the deep epidermis. Less common findings included acute to chronic dermatitis (35%) that typically was not deeper than the superficial dermis, or acute or chronic ulcers (23%). Active necrosis (14%) bacterial infection (7%) or vasculitis (2%) were relatively uncommon.

REFERENCES: ¹Rowtree, V. et al. 1998. Increased harassment of right whales (*Eubalaena australis*) by kelp gulls (*Larus dominicanus*) at Península Valdés, Argentina. *Marine Mammal Science* 14(1): 99-115. ²Sironi, M., et al. 2009. Kelp Gulls (*Larus dominicanus*) feeding on southern right whales (*Eubalaena australis*) at Península Valdés, Argentina. Updated estimates and conservation implications. IWC paper SC/51/BG/19, 12pp.

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Figures 3-5. SRW. Gull attack wounds in live (Fig. 3) and dead (Figs. 4, 5) SRW. Figure 6. Skin. Normal histology. HE. Bar = 250µ. Figure 7. Skin. Abnormal with epidermal erosion and clefting. HE. Bar = 250µ.

CONCLUSIONS: A variety of histologic lesions (typically mild) were identified in examined tissues. Findings to date have not identified consistent or significant lesions in or between years to explain the ongoing SRW mortalities. Infectious disease does not appear to be a significant factor in the mortalities. Though grossly dramatic, examined gull attack wounds were confined primarily to the epidermis and superficial dermis, and evidence of complications, such as bacterial infection or secondary systemic disease, was rare.

ONGOING AND FUTURE NEEDS: Ongoing monitoring for independent, interrelated or concurrent disease processes is needed to establish the cause(s) of and identify potential risk factors for the recurrent and significant mortalities in SRW at Península Valdés. This includes continuing gross and histologic examinations, application of existing and novel technologies for identifying infectious diseases, expanded testing for toxic or nutritional diseases, assessment of environmental factors and food availability in/at feeding grounds, and developing adequate measurements of maternal and calf fitness.