

# Ventral and Dorsal Blubber topography in a neonate Pacific Walrus: Which blubber depth measurement is best?

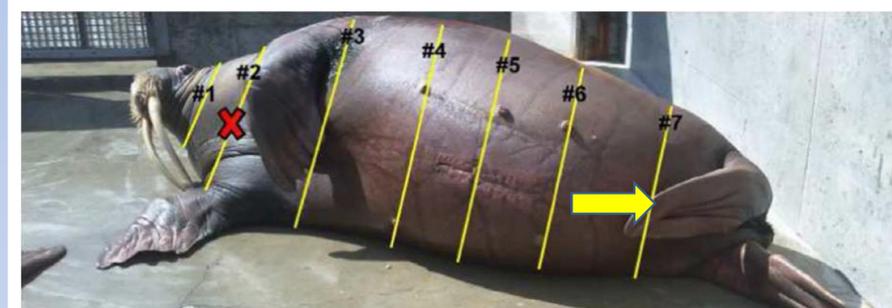
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**Background:** Using ultrasound, body site specific variations in blubber thickness have been recently demonstrated in captive mature female walrus. Results indicated that dorsomedial blubber thickness measurements between the shoulders were a good fit for overall body condition while sternum blubber thickness was a poor indicator. Carcass body condition assessment is important aspect for subsistence harvest monitoring programs as well as during investigations of mortalities due to stampedes. Demographically calves, yearling and subadult walrus are among the most commonly observed fatalities during haul-out associated mortalities. Fat deposition pattern in young pacific Walrus may differ due to different body growth requirements.

## Blubber measurement



**Methods:** In situ ventral midline and dorsomedial blubber thickness measurements were taken in a **freshly dead neonate male walrus pup (July 2015; <1 month, body mass 53 kg; TBL 109 cm; umbilical stump present)** along the 7 girth measurements as previously described by Noren et al. (2014). (see Fig.A ). Ventral and dorsal girth measurements were taken with a survey tape (Fig. B). Using a measured ruler two observers measured dorsomedial and ventromedial for each girth measurement: a) combined skin (epidermis/dermis) and blubber (hypodermis) thickness and b) skin by itself (Fig. C). [note: stab incisions were made through the skin and blubber. Depth of stab incision was guided by visualizing the muscle layer.]



X marks the sternal blubber measurement

1	neck taken behind the base of the skull cape		
2	anterior flippers in front		
3	posterior flippers directly behind		
4	anterior teats		
5	at umbilical scar		
6	posterior teats		
7	hips		

## Results

### Skin thickness (max. to min.)

- Dorsal skin thickness (mm) : 9 mm (site 4); 8mm (site 3, 7); 7mm (site 1, 2); 6 mm (site5)
- Ventral skin thickness (mm): 8 mm (site 3); 7mm (site 2,4,7); 6mm (site 1)

### Blubber thickness (max.to min.):

- Dorsal blubber thickness (mm) : 12 mm (site 1 and 2); 11 mm (site 7) ; 10 mm (site 5) 8 mm (site 3 and 4)
- Ventral blubber thickness (mm) : 16 mm (site 4); 11 mm (site 1 and 7); 10 mm (site 3); 9 mm (site 2)

### Anatomical Caveats for ventral blubber measurements in male neonates:

- Site 5: umbilical stump is present
- Site 6: directly on penis bone
- Site 7: overlies the penile opening, if taken caudal becomes hip measurement

## Conclusions

- Dorsal and ventral skin thickness and blubber depth measurements fall within the range reported by Fay (1982)
- Blubber depth and skin thickness in a neonate varies by body region
- Maximum blubber depth is at site 4 (ventral)
- Sternal blubber depth (site 2) is a poor marker for blubber depth
- Blubber topography in a neonate is different from a female adult
- Multiple anatomical caveats for ventral blubber measurements in male neonates
- More field validation efforts need to be undertaken to clarify the optimum blubber thickness measurement for young walrus i.e. neonates, calves, and yearlings.