## 3. DISCUSSION

Here, we developed a minimally invasive method of inferring individual sperm whale age-class and sex leveraging prior knowledge on sperm whale morphometric development. To our knowledge, this is the first published implementation of a UAV-photogrammetric method for assessing demographic traits based on a dataset of individuals of unknown sex and age.

Using a low-cost, commercially available UAV, we obtained total body length estimates that allowed for more narrow age-class assignments than traditional field work observations. Nose-to-body ratio measures based on snout to flipper distances (*NRflipper*) reliably captured the sexual dimorphism in sperm whales’ noses, providing a useful means of inferring individual sex. While parameter estimates for male and female *NRflipper*growth curves were sensitive to measurement error (between images/within individuals), optimal models were consistently able to differentiate likely mature females (MF) from males. Still, some individuals between 8.5 – 12 m long were assigned ambiguous probabilities of being female. Additionally, we found that the relationship between *NRflipper*and *TL* for males <17 m is linear, rather than logistic. Our initial observations of individuals engaging in peduncle diving generally fit our expectations; only calves and juveniles were observed doing peduncle dives, and most individuals receiving peduncle dives fell within the female size range and had a high probability of being female.

### Differentiating males from females

### Differentiating age classes

### Peduncle Diving

### Limitations