Supporting Information

Table S1. There is no clear difference between the absolute error between radial and transect surveys. The table shows the results in terms of absolute error of the three different surveys for each survey pattern for comparing the accuracy of using a radial survey pattern verses a transect survey pattern, along with the Mean Absolute Error (MEA) of each pattern. The additional flight time for radial surveys when conducting them at scale makes it prohibitive to apply them at the colony scale compared to transect surveys, and so we chose to use transect surveys for our developing our method.

Replicate	Radial Survey	Transect Survey
1	5	15
2	39	9
3	29	21
Mean Absolute Error	24.3	15.0

Table S2 provides a breakdown for how the values for total time required for completing a census of the Isles of Scilly grey seal population using UAVs at different GSDs were calculated. Depending on conditions, a drone battery change is required for approximately every 22 minutes of survey time when using the DJI Mavic 2 Pro or DJI Mavic 2 Enterprise Advanced UAVs. This is a conservative estimate to ensure plenty of battery (return at 30 - 40%) to return to and land on the boat, and adds an additional constraint as the number of batteries one can take into the field is limited by their cost, weight, and space for equipment. Each battery change takes approximately 5 - 10 minutes of flying back, landing, changing the battery, taking off, and returning to the point the survey was paused. For instance, at the Isles of Scilly, carrying out the census at 40 m added an additional 490 minutes and 16 battery changes compared to censusing at 60 m, the equivalent of approximately two days in the field.

Table S2. The time for surveys increases with decreasing ground sampling distance (GSD; Box 1). A breakdown of the time that it would be required to census the Isles of Scilly grey seal population at different GSDs using the DJI Mavic 2 Enterprise Advanced UAV.

GSD	**0.8cm px^{-1}**	**1.0cm px^{-1}**	**1.2cm px^{-1}**
Flight Time (Minutes)	1263	1056	934
Battery Changes Required	58	48	43
Battery Change Time (Minutes)	580	480	430
Total Time Required (Minutes)	1843	1536	1364

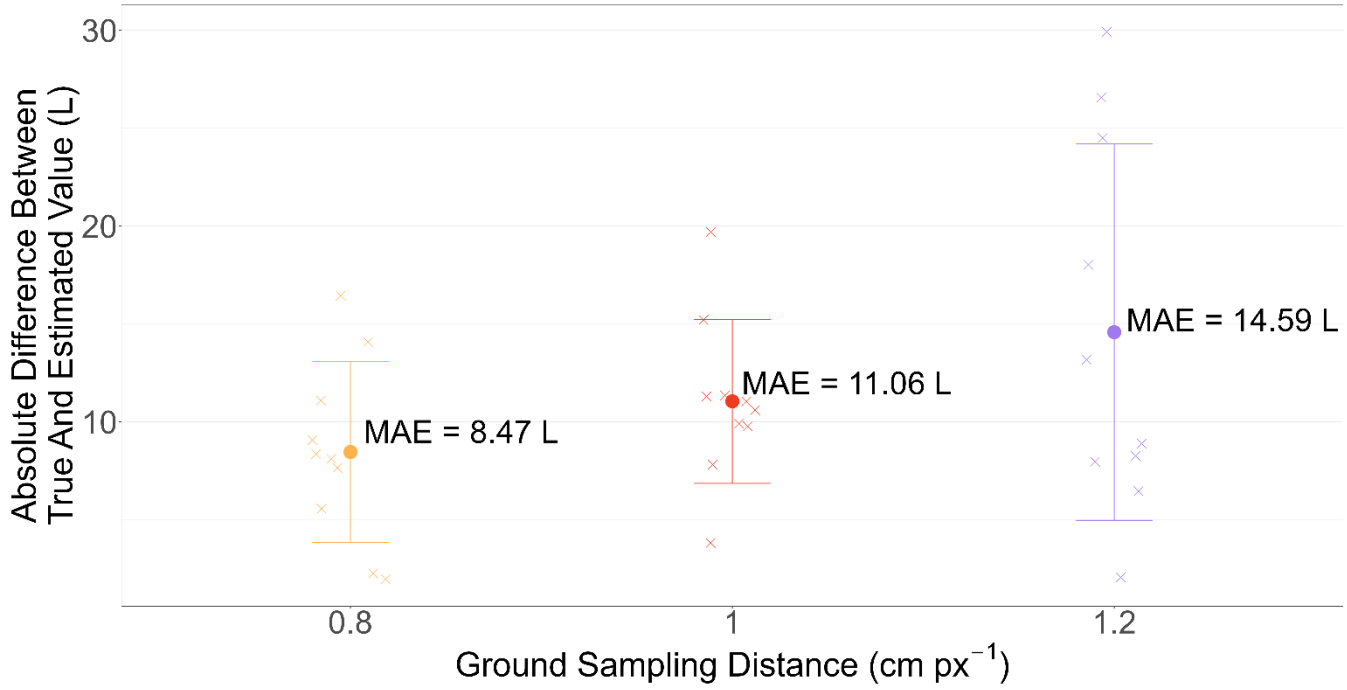

Figure S1. The mean absolute error (MAE) decreases with decreasing altitude. The scatter plot shows the absolute difference between the true volume and each estimate of the volume of the inflatable object used for testing the accuracy of our method in litres (L) at the three ground sampling distances (GSDs) tested. For reference, the true volume of the inflatable object is 210.8L. Mean Absolute Error (MAE) was calculated following the following $MAE = \frac{1}{n}\sum_{i=1}^{n}|x_i - x|$, where x is the true volume of the inflatable object and x_i is each volume estimate.