Supplement S2

To be included in the catalog as a new individual, images must meet standards of quality. The focus, resolution, contrast, lighting, angle, and visibility of the ventral region must not reasonably prevent a future match from being made. Distinctiveness, a separate measure, is primarily a measure of molt stage in this scheme, as individuals with old, worn fur have indistinct patterning. Individuals with nearly solid coloration (i.e., very minimal patterning) may also be rated as indistinct.

Individuals with distinctiveness ratings of 3/3 are not included in the catalog since it is unlikely that we can positively match them without distinctive features. Individuals with summed quality ratings ≥ 8 are not included in the catalog. As such, an image with a perfect score in 3 categories but the worst score, 5/5, in another category will not be included.

Focus and clarity

Here we focused on the sharpness of the seal in the image and the resolution. An out-of-focus image (or an image in which the focus is on something other than the seal) would receive a low rating, as would an image of a seal in the distance such that, when zoomed in, the resolution of the seal was poor. Images were rated from 1 (best) – 5 (worst) on this scale.

Examples:

Figure S2-1 After zooming in to this image, much of the pattern is still visible, but the detail is less clear. In this category, it rates at 2/5.

Figure S2-2 Poor focus. Some detail is visible which might allow this seal to be matched to an image in the catalog, but is not sufficient to be introduced as a new individual. 4/5

Contrast and Lighting

In this category, we consider whether the lighting creates conditions which prevent matching. This could be strong shadows or glare which cannot be recovered using photo-editing software or over- or under-exposure.
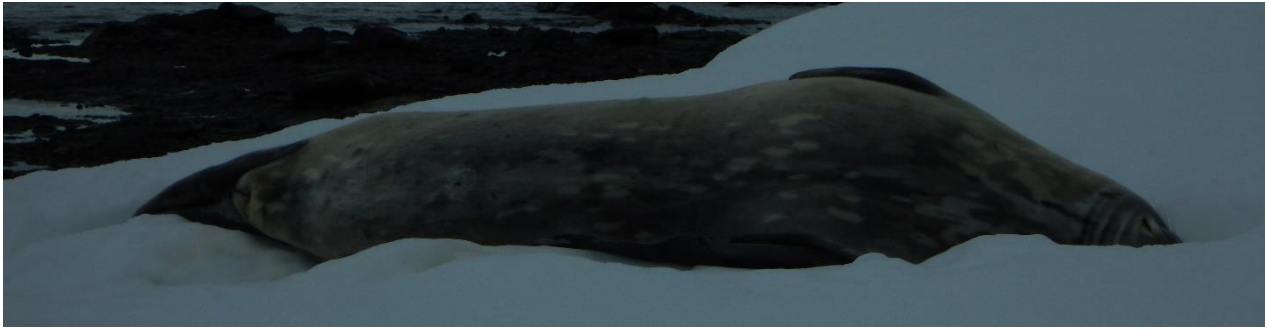
Examples:

Figure S2-3 An underexposed image. Much of the pattern is still visible, but subtle shading differences can't be assessed. 4/5

Figure S2-4 Bright glare on the flank of the seal is outside of the main ventral area of interest, but removes some detail. 3/5

Angle

Extreme angles can both obscure our view of the relevant area and make both human and machine methods unreliable for matching.

Examples:

Figure S2-5 An extreme angle means much of the ventral region is out of view. 4/5

Figure S2-6 A seal at a roughly 45-degree angle. Some of the neck region is out of view, but much of the pattern is visible. 3/5

Visibility of the ventral region

The ventral region can be obscured from a variety of sources. Seals resting for long periods of time may sink into slowly-melting holes, flippers may cover the region, rocks and snow piled up in front of the seal can block the region from view. Similarly, seals resting on their ventral region can obscure the region.

Examples:

Figure S2-7 A seal lying on its front. Only a small section of the ventral region is visible. 5/5

Figure S2-8 Only a portion of this seal was included in the photograph. The pattern on the neck may be sufficient to match an individual to the catalog, but it is insufficient for inclusion as a new individual. 4/5

Figure S2-9 Ice and snow on this iceberg obscure half of the seal. 4/5

EXAMPLE RANKINGS:

Figure S2-10 Focus/Clarity: 1/5; Light/Contrast: 1/5; Angle: 1/5; Ventral: 2/5; Distinctiveness: 3/3. Nearly perfect, however the seal is about to molt and much of the fur is worn, obscuring the patterning. Q: 5, D: 3

Figure S2-11 Focus/Clarity: 1/5; Light/Contrast: 2/5; Angle 1/5; Ventral: 4/5. Dist: 1. The image is sharp but much of the seal is obscured and there are shadows and glare. Q: 8, D: 1

Figure S2-10 Focus/clarity: 1/5; Light/contrast: 3/5; Angle: 1/5; Ventral: 1/5. Dist: 1/5. The glare and exposure create some limitations. Q: 6, D: 1

Figure S2-11 Focus/clarity: 2/5; Light/contrast: 4/5; Angle: 2/5; Ventral: 3/5. Dist: 1/5. The exposure, resolution, and ventral visibility combine to make this a difficult image. Q: 11, D: 1.