Process and Definitions for SLE Analysis

Process reminder: In December 2019 after Jon added sex and age determinations, I returned to the hard copies to cross-reference all entanglements entered into Access and found through photo folders with those that were noted during survey. Duplicates were removed and no photo entanglements were added. Numbers from prior to that revision are incorrect. See “SLE Analysis Summaries – revised.docx”

**Entanglements per Unit Effort (materials)**

Entangling materials are expressed as entanglements per unit effort in order to remove the bias associated with differing sampling effort in different months (lots in summer/fall, little-none in winter/spring). Effort is the number of haulout counts that were completed in a given month in a given year, irrespective of how those counts were distributed among haulout sites (if we break up material by haulout and month this will have to be rethought). The total number of entanglements for a given material in a given month-year were then divided by the number of counts that had been done in that month-year to produce the number of entangled individuals that had been seen per haulout count per month-year. Those values were then averaged over the years to produce the average number of entangled individuals seen per haulout count in each month. This was designed to express seasonality of materials and overall prevalence of materials relative to each other. Entanglements recorded at locations that are not one of the four designated haulout sites were included in material analysis to capture the full suite of entangling materials. It is still appropriate to use an effort measure that only captures haulout counts because the number of counts accomplished in a survey is a good representative of the distance covered over the course of the survey because of how the haulouts are spaced.

**Haulouts**

Haulouts is used to represent the major haulouts sites, including Tatoosh (Cut, East, and Main – anything associated with the island), Bodeltehs (East, West, Guano), Carroll, and Sea Lion Rock. Any other sites where entangled individuals were seen or where counts are taken were excluded from the overall entanglement rate to prevent inflation from single entangled individuals hauled at random locations where counts aren’t always conducted/entangled individuals aren’t always searched for. Effort is expressed in counts of haulouts conducted because it’s a good measure of how thorough a survey was – a single count survey likely only ran to tatoosh and back while a 4-count survey probably covered the whole survey area.

**Overall Average Entanglement Rate**

The overall entanglement rate is the number of entanglements for a single species observed at each haulout per survey divided by the overall number of individuals counted at that haulout during the same survey. This rate is then averaged for each haulout over all the surveys from 2010-2018 to get the rates per haulout, and averaged over all haulouts and surveys for the rate for each species, and averaged over all haulouts, surveys and species for the overall entanglement rate.

**Entanglement Rate by Sex and Age**

To do: Sex and Age ratios from surveys collected [2010-2013] were used to assign the total counts at each haulout-survey to probable sex-age categories. Entanglement rates were then calculated similarly to the overall rates but using the extrapolated total count of individuals that correspond to the same sex-age category being examined. For example, the entanglement rate for female stellers at Tatoosh would be calculated by dividing the number of entangled adult female stellers at Tatoosh on a given survey day by the (total count of Stellers at Tatoosh on the given survey day multiplied by the proportion of female adults calculated from past surveys). This entanglement rate is then averaged over all survey days to get the rate per haulout or over all survey days and haulouts to get the overall rate for adult female stellers.