Fisheries and Oceans Canada / Pêches et Océans Canada
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National Capital Region

Canadian Science Advisory Secretariat
Science Response 2025/033

STELLER SEA LION (*EUMETOPIAS JUBATUS*) ABUNDANCE IN CANADIAN PACIFIC WATERS IN 2021

CONTEXT

Steller sea lions are listed as Special Concern under the *Species at Risk Act* (SARA) based on vulnerability associated with highly concentrated breeding aggregations. As required under SARA, Fisheries and Oceans Canada (DFO) developed a Management Plan for Steller sea lions, which includes recommendations for ongoing range-wide monitoring of distribution and abundance. The information obtained through such surveys is necessary to monitor risk to the population, by identifying new or re-established rookeries on the coast of British Columbia (BC), and to inform management actions that serve to protect the species from identified threats.

Science was requested to provide an update on abundance, range and population trends for Steller sea lions in Canadian Pacific waters to support the following:

- Monitoring of Steller sea lion population recovery;
- Monitoring of key prey populations for recovering Transient killer whales;
- Assessment of potential competition with Resident killer whales for fish prey species;
- Marine Protected Areas (MPA) planning; and,
- Oil-spill response.

An estimate of Potential Biological Removal (PBR) was also requested to meet new requirements under the *Marine Mammal Protection Act* (MMPA) and support assessment of emerging proposals for harvest.

This Science Response Report results from the national peer review of December 2, 2024, on Updated Population Status Assessment for Steller Sea Lion (*Eumetopias jubatus*) in Canadian Pacific Waters.

BACKGROUND

The Steller sea lion *(Eumetopias jubatus)* resides year-round and breeds in Canadian waters as part of its pan-Pacific range, representing approximately one third to one half of the Eastern stock (extending from California to Alaska). Steller sea lions occur throughout the coastal waters of British Columbia (BC), with distinct seasonal patterns in distribution. Following Bigg (1985) and Olesiuk (2018), three categories of Steller sea lion haul-out sites are recognized: rookeries (R), year-round haul-out sites (Y) and winter haul-out sites (W). Animals are highly aggregated at rookeries (defined as having >50 pups) and outer coast year-round haul-out sites during the summer breeding season, with dispersal to other areas through fall and winter. While year-round sites (and all BC rookeries) are occupied during all seasons, winter sites refer to haul-outs only used during winter; as the population grows and distribution shifts, some of these winter sites become year-round haul-out sites over time and in turn, some of these become rookeries once the 50 pup threshold is surpassed (Majewski et al. 2024).

Description of the BC portion of the Eastern stock of Steller sea lions

Since the early 1970s, DFO has conducted a series of 14 standardized aerial surveys to estimate the abundance of Steller sea lions in BC during the summer breeding season. Prior to the work presented here, the last survey was conducted in 2017. Surveys are timed to coincide with the end of the breeding season (June 27-July 9), by which time most pups have been born and are still confined to rookeries, and the highest number of non-pups (juveniles and adults) are expected to be hauled out (Olesiuk 2018). Counts of pups and non-pups made from aerial survey photos taken of rookeries and year-round haul-out sites are used to provide information on abundance and distribution. The timing of recent breeding season surveys has been coordinated with United States (US) agencies to support range-wide assessment of the breeding stock.

The numbers of Steller sea lions in BC during the breeding season appeared to have been relatively stable during the 1970s and early 1980s; most of the increase in BC occurred since the mid-1980s, resulting in more than a fourfold increase in abundance since the species was protected in 1970 (Olesiuk 2018; Majewski et al. 2024). This increase resulted in the recolonization of historical rookeries, occupancy of new rookeries and expanded number of year-round and winter haul-out sites. In the previous 2017 assessment, Steller sea lions bred at eleven rookeries, six of which were newly established since 2006 (Majewski et al. 2024). During summer, animals are also found at year-round haul-out sites. There were about 35 such sites distributed throughout coastal BC, primarily along the outer exposed coast. In 2017, a continued expansion of site use in BC waters was observed although the total abundance for the BC stock was estimated to be similar to the previous assessment in 2013 (DFO 2021). A small decline was also observed in pup counts and population growth rate relative to those reported in 2013.

Trends in Steller sea lion abundance, population growth rate and distribution in BC (including the expansion of haul-out and rookery sites) observed in the last assessment were generally consistent with those in other parts of their range. As of 2017 the BC portion of the raw counts represented ~43% of the range-wide total breeding season stock (~50% of non-pups and 41% of pups) (Majewski et al. 2024; Muto et al. 2020).

ANALYSIS AND RESPONSE

Analytical approach

A new abundance estimate for Steller sea lions in BC was obtained in 2021 by surveying all known rookeries and year-round haul-outs on the BC coast using fixed-wing aircraft between June 27 – July 4, 2021, as well as all major winter haul-out sites (Figure 1) and any new haul-out sites reported by trusted observers or observed during DFO harbour seal surveys (Tucker et al. 2025). Standardized breeding season survey protocols and analysis were conducted according to methods described by Olesiuk (2018) and Majewski et al. (2024).

Briefly:

1. Counts of pups and non-pups were made at the site level;
2. Counts of both pups and non-pups between 1971-2021 were fit with regression models (exponential, second order polynomial and logistic) to derive trends and current rates of change; Akaike Information Criterion (AIC) was used to select the best models (Burnham and Anderson 2002; Majewski et al. 2024);
3. A correction for non-pups at sea at the time of the survey was applied to non-pup counts on land; and,

4. Pups and non-pups were summed across all sites to provide a BC-wide estimate of abundance (see Appendix for further detail).

The correction factor (CF) to account for animals that were at sea during breeding season survey conditions (33% of individuals) and therefore not captured in photographs was estimated at 1.48 (or 1/(1-0.33); CV=5.6%) from telemetry data (Olesiuk 2018). Uncertainty around the abundance estimate includes error associated with the CF as well as error associated with counts (reader error; estimated from between-reader variability in a subset of site counts). To calculate the total variance, we used the delta-method approximation (see Appendix for description of calculations; Olesiuk 2018, Majewski et al. 2024, Majewski et al. In prep[1]).

To examine relative shifts in pup and non-pup distribution among different areas in BC (as per Olesiuk 2018), counts were summarized by region (Figure 2). The seven regions were:

1. West Coast Vancouver Island (WCVI);
2. Scott Islands (SI);
3. Johnstone and Queen Charlotte Straits (JQCS);
4. Strait of Georgia (SOG);
5. Central Mainland Coast (CMC);
6. North Mainland Coast (NMC); and,
7. Haida Gwaii (HG).

PBR was calculated according to Wade (1998) and DFO (2025) (see Appendix for further detail).

Results

Distribution

The number of rookeries and year-round haul-outs used by Steller sea lions in BC continued to increase in 2021 (Figure 2). Two year-round haul-out sites were redesignated as rookeries in 2021, with > 50 pups counted at Perez Rocks near Estevan Lighthouse (WCVI) and Pearl Rocks near Calvert Island (CMC). One new haul-out site with non-breeding animals (possibly a year-round haul-out site) was also observed, with four sites previously identified as winter-only sites being redefined as year-round haul-out sites in 2021, including two sites in the Strait of Georgia.

A continued increase in the relative use of rookeries on the central mainland coast was observed in 2021, as well as an increase in non-pup abundance in the Strait of Georgia during the summer breeding season (Figures 3 and 4). The Scott Islands at the northern tip of Vancouver Island continued to hold the majority of the BC breeding stock and pup production, with 58% in 2021, compared to 61% in 2017 and 68% in 2013 (DFO 2021).

Breeding season abundance

Counts from the most recent breeding season survey (June 28 – July 8, 2021) indicate that the number of pups and non-pups increased marginally over past surveys in BC (Table A1). A total

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[1] Majewski, S., Nordstrom, C.A., Szaniszlo, W., Bowker, A., Trzcinski, K., and Tucker, S. In prep. Population Status Assessment and Potential Biological Removal (PBR) for the California Sea Lion *(Zalophus californianus)* in Canadian Pacific Waters, Based on 2020-2021 Winter Surveys. DFO Can. Sci. Advis. Sec. Res. Doc.

of 32,919 Steller sea lions were counted in 2021 (25,396 non-pups and 7,523 pups) as compared to a count of 32,142 individuals in 2017 (25,502 non-pups and 6,640 pups)[2]. Models fit to the counts indicate a probable slowing in the annual rate of increase in pup production and non-pup abundance since 2017 (Figure 5). A logistic model of counts provided the best fit for both groups (Table A2).

Rates of change in counts calculated for the 2017-2021 interval were estimated to be 1.4% per year for pups and 1.8% per year for non-pups. Using the updated data and model fits the 2013-2017 rates of increase are 2.5% per year for pups and 2.7% for non-pups.

Adjusting for animals not hauled out at the time of the survey (CF 1.48) at each haul-out site and summing across sites, the estimated breeding season abundance of Steller sea lions in 2021 was 44,235 (95% CI of 35,855 to 54,574), as compared to an estimate of 43,938 (95% CI of 38,712 to 49,869)[3] in 2017, suggesting there was no change in abundance over the four year period. The CV of 9.4% for the 2021 estimate included a reader error for pups and non-pups (as per DFO 2023), an error for the haul-out correction factor and uncertainty due to the underlying binomial distribution of counts.

Potential Biological Removal (PBR)

A recovery factor of 1.0 was determined to be most appropriate for this population due to its overall abundance, ongoing expansion of breeding and year-round haul-out sites, and the available time series data (Majewski et al. 2024). Using an N_{MIN} of 40,876, a recovery factor of 1.0 and the default R_{max} of 12%, the PBR for Steller sea lions during the summer 2021 breeding season is 2,453 individuals. PBR takes into account all removals (e.g., aquaculture sites, bycatch, harvest).

CONCLUSIONS

Abundance of Steller sea lions in BC was estimated at 44,235 individuals (95% CI: 35,855–54,574) in 2021, with a PBR of 2,453.

The rate of change in pup and non-pup components both appear to be slowing relative to previous survey intervals. However, expansion of rookeries and year-round haul-out sites continues to occur in BC, with evidence for continued redistribution.

Comparing summer survey counts in the US portion of the stock (36,308 individuals including 25,641 non-pups and 10,667 pups (Young et al. 2024)), Steller sea lions in BC represent ~48% of the total breeding season stock in 2021 (~50% of non-pups and 41% of pups).

Trends in Steller sea lion abundance, stock growth rate, and distribution in BC (including the expansion of haul-out and rookery sites) are generally consistent with those observed in other parts of their range in the Eastern Pacific. In southeast Alaska (SEAK), non-pup counts remained relatively stable from 2015 to 2019, although a 19% decline was observed between 2019 and 2021; in contrast, pup counts remained relatively unchanged since ~2010 (Sweeney et al. 2022). A northward shift in the overall breeding distribution has occurred in recent decades, with a contraction of the range in southern California and new rookeries established in SEAK and most recently, Washington State (Stocking and Wiles 2021). An integrated range-wide analysis will be required to better understand drivers affecting abundance and distribution for the Eastern Pacific stock as a whole.

[2] Counts from the 2017 BC survey (Majewski et al. 2024) were updated to reflect 388 non-pups previously missed at a former winter haul-out (Pine Island - JQCS).

[3] Estimated abundance from the 2017 survey was updated to reflect the revised non-pup count.

Sources of Uncertainty

Changes in patterns of haul-out use were observed, including redistribution of animals among known haul-out sites and establishment of new sites. It is possible that newly identified haul-outs were previously occupied but missed during past surveys; there is also the possibility that additional undocumented haul-outs were missed during the 2021 surveys. However, the 2021 survey was the most expansive to date, with more sites visited and more hours flown than in any previous survey. In addition, having flown the majority of the coast for harbour seal counts and by checking all known sea lion sites (including major winter only sites) missed sites seem unlikely.

To provide an estimate of abundance, non-pup counts are corrected for the proportion of animals at sea during surveys (and therefore not included in counts from survey photos). It is uncertain whether haul-out behavior has remained consistent since survey correction factors were developed based on animals tagged in 2005 (Olesiuk 2018), and whether the current survey correction factors remain applicable, despite potential changes in population distribution, demographics, predator abundance, changing ocean conditions and dynamic prey availability. Tagging of Steller sea lions commenced in 2024, with data analyses underway to update survey correction factors for future stock assessments within a framework which accounts for correlated behaviour between animals (Doniol-Valcroze et al. 2016; Tucker et al. 2025).

With changing climate and the increased occurrence of extreme events (i.e., marine heat waves (Freeland 2015), the application of mean correction factors may become problematic for accurate abundance estimation. For example, record high temperatures occurred throughout the BC coast during the 2021 survey window. This could have impacted haul-out behavior of juveniles and adults, possibly resulting in lower non-pup counts (e.g. Suryan et al. 2021) and an under-correction for animals missed at sea. While it is uncertain whether extreme heat would affect the survey correction factor (and estimated abundance), there is anecdotal observation of an increased number of animals in the waters immediately surrounding and between haul-outs in 2021 (and consequently not part of the count). Other aspects of sea lion biology and ecology such as diet (Maniscalco 2023) and survival (Hastings et al. 2023) have been impacted by severe marine heatwaves.

Another potential source of variability is related to hour-to-hour and day-to-day changes in numbers of animals at individual haul-out sites. Breeding season surveys are conducted under standardized conditions when maximum numbers of animals are expected to be hauled out; the two most important factors considered are date and time-of-day (Olesiuk 2018). Surveys are undertaken when most pups are expected to have been born but before animals begin to disperse from rookeries. During the pupping and breeding period, non-pups can leave on foraging trips, typically in the evening and returning in the morning; it is therefore assumed that the survey can be conducted at any point during daylight hours when peak numbers should be hauled out. The best way to quantify this uncertainty is with repeated surveys to estimate variability in numbers of animals observed at haul-outs within the survey window and to confirm the timing of pupping and the related survey window.

Between-reader error is identified as a source of error in the counts themselves. The error is estimated using multiple independent counts from a subset of sites. Depending on the site, multiple photos are typically required to cover the entire haul-out. Readers may vary in photo selection to reconstruct the entire site. There is also variability between readers in identifying animals and distinguishing pups in survey images. A full count of all survey sites by multiple readers, including counts from previous surveys, could further refine the estimate of variability associated with counts and support trend analysis.

There is uncertainty around the contribution of animals immigrating from neighboring rookeries in SEAK, Washington, Oregon and California to breeding season populations in BC waters and comparability between counts in the US and Canada (due to differences in methodology and possible differences in behavior). However, satellite telemetry data and sightings of animals branded at US rookeries in BC waters throughout the year confirm that Steller sea lions move widely throughout their range and that animals born at US rookeries overwinter and breed in Canada. There is no evidence to suggest that haul-out behavior is different throughout the range. While summer breeding season surveys capture the breeding population in BC as part of the range wide context, there is evidence of an increasing influx of both Steller and California sea lions from neighboring US waters outside of the breeding season (Majewski et al. 2024); dedicated winter surveys are required to assess changes in abundance and distribution of sea lions overwintering in BC waters.

Steller sea lion populations have rebounded in BC waters since protection in the 1970's and now appear to have stabilized. Given the apparent decline in the rate of pup production and the apparent stabilization in estimated abundance, it appears that various mechanisms could now be regulating the stock. These could include competition for prey resources (including from increasing presence of California sea lions), predation from a growing population of Bigg's Killer whales, and a range of cascading impacts induced by climate change. None of these factors are well understood and continued efforts should be made to monitor and explore patterns of abundance and distribution as well as ecological drivers of Steller sea lion abundance and haul-out behavior throughout their range.

FIGURES

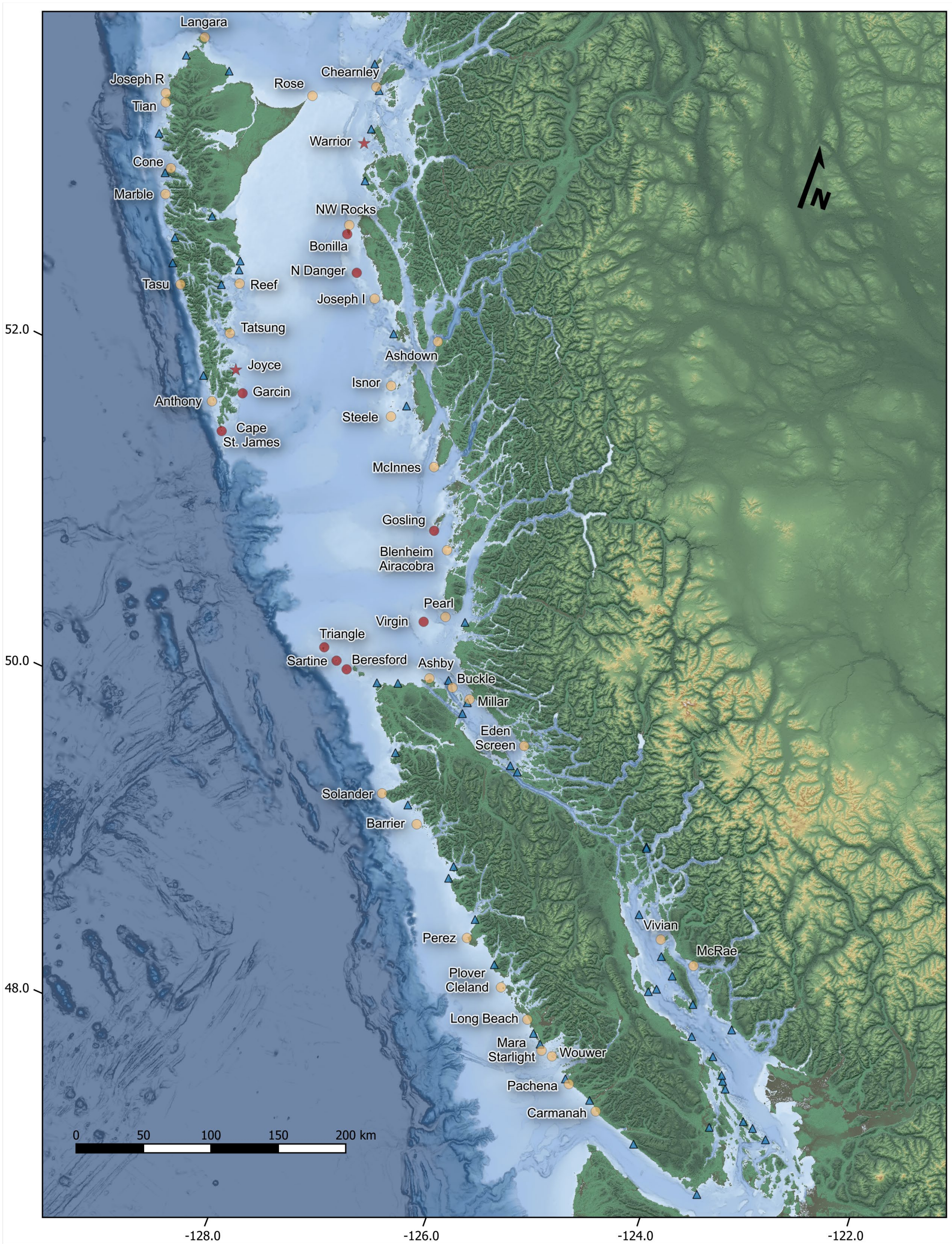

Figure 1. Map showing location of Steller sea lion breeding rookeries (red circles), new rookeries observed in 2017 (red stars), year-round haul-out sites (yellow circles), and major winter haul-out sites (blue triangle) observed in British Columbia (BC) 2016-17 (adapted from Majewski et al. 2024). All sites shown were surveyed during the 2021 breeding season survey.

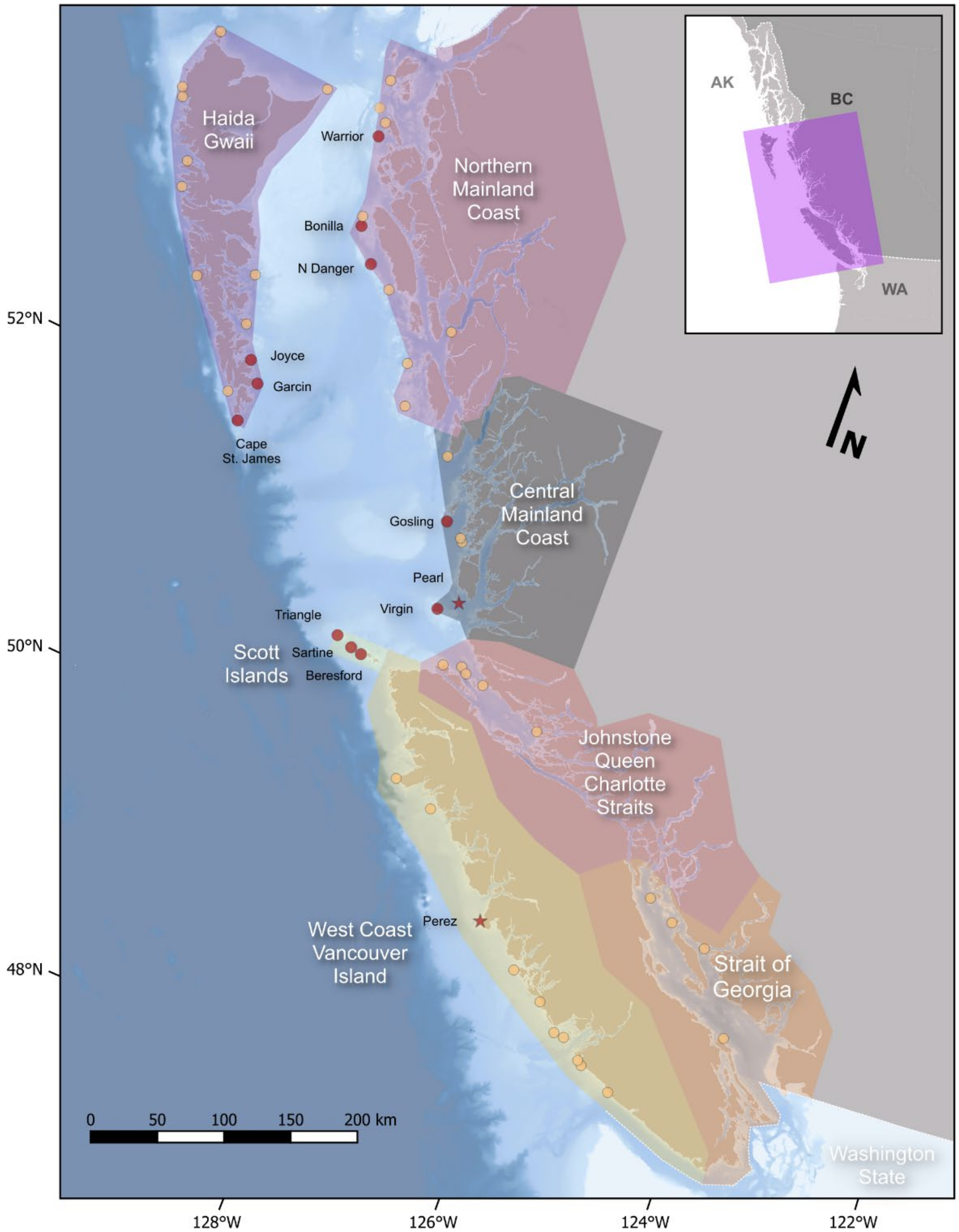

Figure 2. Map showing location by region of Steller sea lion presence observed in 2021 at breeding rookeries (red circles), new rookeries observed in 2021 (red stars) and year-round haul-out sites (yellow circles) in British Columbia (BC). Scaled counts are shown in Figure 3.

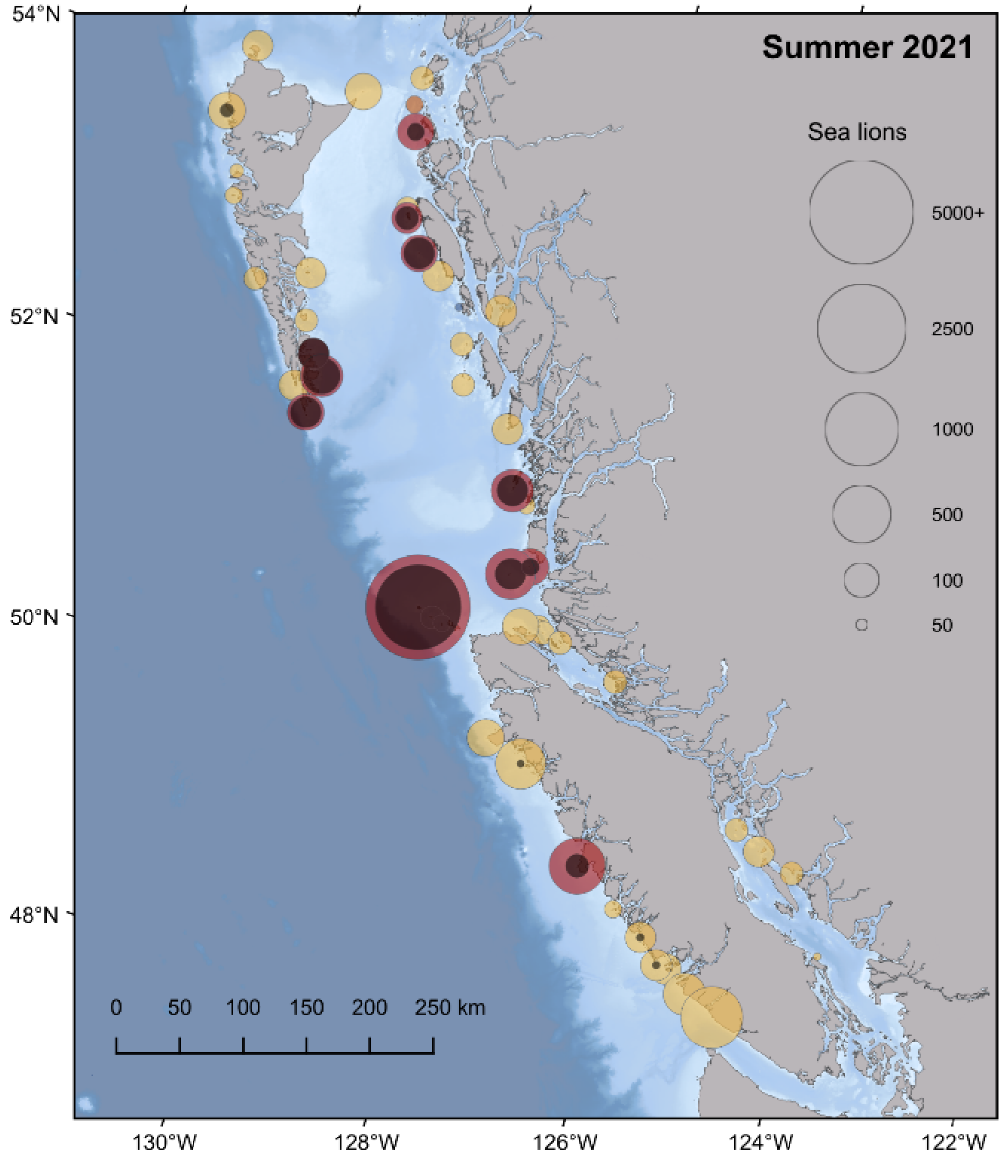

Figure 3. Map showing distribution of Steller sea lion counts for the 2021 breeding season survey. Symbol sizes are proportional to the total number of animals (pups and non-pups) counted at each site. Black circles indicate the proportion of pups. Red symbols denote rookeries and orange symbols year-round haul-outs. Counts of pups and non-pups on rookeries are summarized in Table A1.

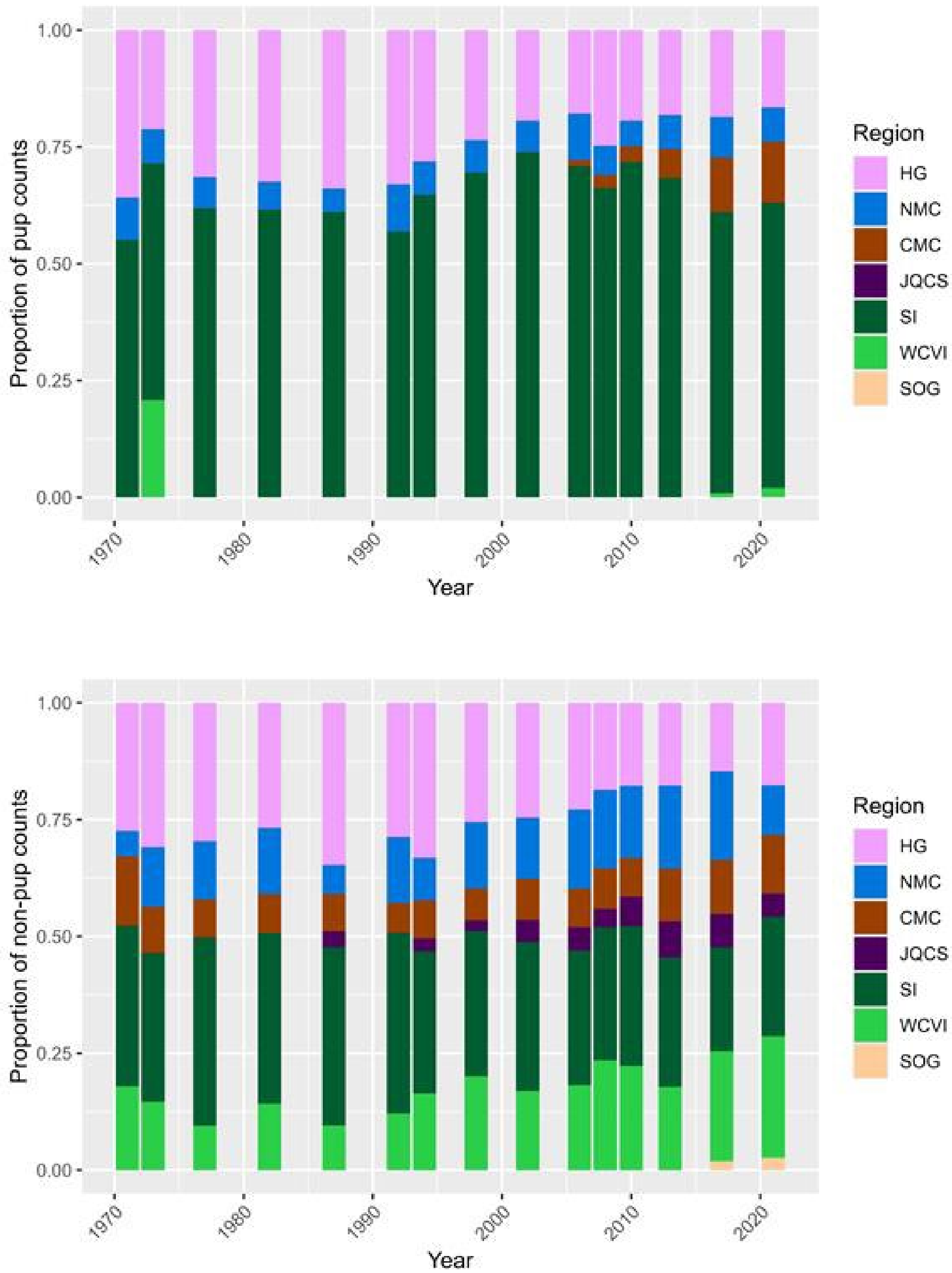

Figure 4. Proportion of pup counts (top panel) and non-pup counts (bottom panel) by region during province-wide aerial surveys 1971-2021. The seven regions were the West Coast Vancouver Island (WCVI), Scott Islands (SI), Johnstone and Queen Charlotte Straits (JQCS); Strait of Georgia (SOG), Central Mainland Coast (CMC), North Mainland Coast (NMC) and Haida Gwaii (HG).

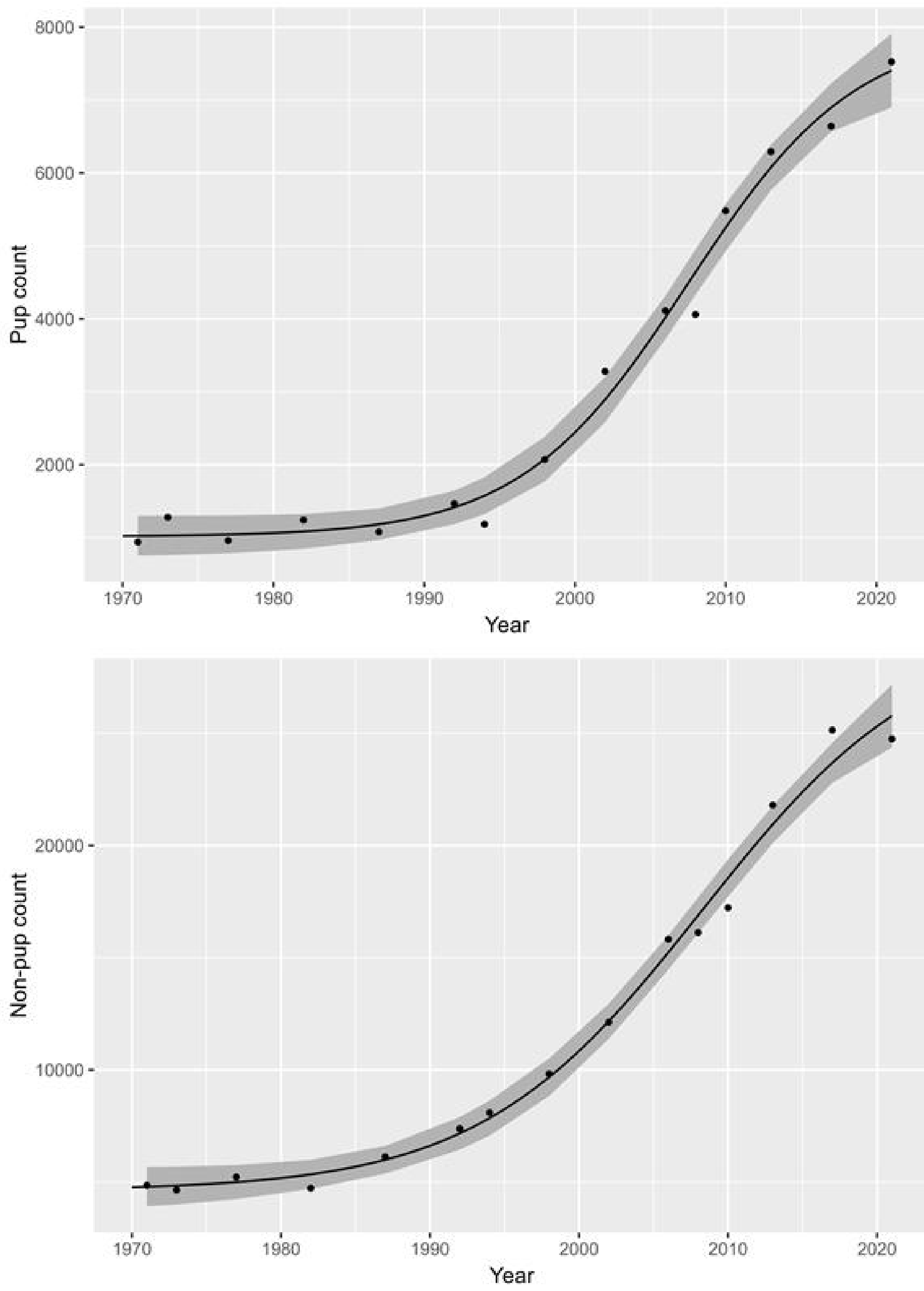

Figure 5. Trends in the number of pups (top panel) and non-pups (bottom panel) counted during surveys flown between 1971-2021; black lines denote the logistic model fit to counts (black dots) and grey shading denotes the 95% confidence interval in model fit. See Table A2 for model results.

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APPENDIX

Theoretical framework

We used the framework described in Doniol-Valcroze et al. (2016) and DFO (2023). Let $\boldsymbol{S_i}$ be the true number of non-pups Steller sea lions at site $\boldsymbol{i}$ and $\boldsymbol{Q_i}$ the true number of pups. Total abundance at each site is given by:

$$\boldsymbol{N_i = S_i + Q_i}$$

If we assume that each non-pup individual spends an average proportion $\boldsymbol{p}$ of its time hauled-out, and if all individuals are independent of one another (within the survey window), the number of non-pups $\boldsymbol{X_i}$ available to be counted at any given time follows a binomial distribution:

$$\boldsymbol{X_i \sim Binomial(S_i, p)}$$

with mean $\boldsymbol{S_i p}$ and variance $\boldsymbol{var(X_i) = S_i p(1-p)}$. As there is uncertainty around the value of the haul-out proportion, $\boldsymbol{p}$ is assumed to be a random variable with a normally distributed error $\boldsymbol{\sigma_p}$ around its point estimate $\boldsymbol{\hat{p} = 0.67}$, which were both obtained from an independent telemetry study (Olesiuk 2018). Here, $\boldsymbol{\sigma_p}$ is the standard deviation of the estimator (i.e., the standard error of the mean), which accounts for the number of individual animals tagged. Since pups are not expected to be in the water, the number of pups available to be counted is equal to $\boldsymbol{Q_i}$ with null variance.

We assumed that counts of non-pups ($\boldsymbol{X_i'}$) and pups ($\boldsymbol{Y_i'}$) were made with a multiplicative lognormal error:

$\boldsymbol{X_i' = X_i \cdot \epsilon_S}$ where $\boldsymbol{\epsilon_S \sim Lognormal(\mu = 0, \sigma_S)}$, with mean $\boldsymbol{M_S = e^{\mu + \sigma_S{}^2/2}}$ and variance $\boldsymbol{V_S = (e^{\sigma_S{}^2} - 1)e^{2\mu + \sigma_S{}^2}}$

$\boldsymbol{Y_i' = Q_i \cdot \epsilon_Q}$ where $\boldsymbol{\epsilon_Q \sim Lognormal(\mu = 0, \sigma_Q)}$, with mean $\boldsymbol{M_Q = e^{\mu + \sigma_Q{}^2/2}}$ and variance $\boldsymbol{V_Q = (e^{\sigma_Q{}^2} - 1)e^{2\mu + \sigma_Q{}^2}}$

Estimating counting error

The lognormal counting error assumes that a normally distributed term is added to the log of each count. Following DFO (2023), we used the difference between the counts made by two readers for each site in a subset of the data (n = 36) to estimate $\boldsymbol{\sigma_S}$ and $\boldsymbol{\sigma_Q}$. Assuming the error made by each reader follows the same distribution (i.e., with equal variance), differences between the log of counts should follow a normal distribution with twice the variance of the error term. Therefore, we estimated $\boldsymbol{\sigma_S = SD_{diff\_S}/\sqrt{2}}$ with $\boldsymbol{SD_{diff\_S}}$ the standard deviation of differences between reader counts of non-pups, and $\boldsymbol{\sigma_Q = SD_{diff\_Q}/\sqrt{2}}$ the standard deviation of differences between reader counts of pups.

Estimating abundance

An unbiased estimator of abundance at each site, using correction factor **CF (= 1/** $\boldsymbol{\hat{p}}$), is given by the sum of the estimator of non-pup abundance $\boldsymbol{\hat{S}_i}$ and the estimator of pup abundance $\boldsymbol{\hat{Q}_i}$:

$$\boldsymbol{\hat{N}_i = \hat{S}_i + \hat{Q}_i = X_i' \cdot \mathrm{CF} + Y_i' = \frac{X_i'}{\hat{p}} + Y_i'}$$

where X_i' is the non-pup count and Y_i' is the pup count at site i. Total abundance over k sites is then given by:

$$\widehat{N} = \sum_{i=1}^{k} \widehat{N}_i$$

The uncertainty around the estimate of abundance $\widehat{N}$ has four components: the variances due to counting errors for pups and non-pups, the binomial variance around the number of sea lions hauled-out, and the uncertainty around the value of $\widehat{p}$. To propagate these sources of variation, we use the delta-method approximation (Thompson and Seber 1994). The estimate of variance for $\widehat{N}$ is given by:

$$var(\widehat{N}) \cong \widehat{S}^2 \frac{V_S}{M_S^2} + \widehat{S}^2 \frac{1-\widehat{p}}{\widehat{p}} + \frac{\widehat{S}^2}{\widehat{p}^2} var(\widehat{p}) + Y'^2 \frac{V_Q}{M_Q^2}$$

The 95% Confidence Interval around total abundance was calculated assuming a lognormal distribution for $\widehat{N}$.

Calculating PBR

Guidelines have been developed to evaluate whether a stock lends itself to a Data Rich or a Data Poor framework within the context of applying the Precautionary Approach to Atlantic seals, with relevance to other marine mammal stocks (DFO 2025). Following Majewski et al. (2024), the BC portion of the Eastern Steller sea lion stock is considered data rich given a series of 15 surveys.

The Potential Biological Removal (PBR), was therefore calculated as:

$$PBR = {}^{1}/_{2}\, R_{max} \cdot \mathrm{f} \cdot N_{min}$$

where R_{max} is the maximum rate of population increase and was set to the default of 12% for pinnipeds (Wade and Angliss 1997; NMFS 2016), Fr is a recovery factor and was set to 1 given the continued increasing trend and total abundance (DFO 2025), and N_{min} is the minimum population size estimated as the 20th percentile of the log-normal distribution of the most recent abundance estimate (Wade 1998).

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Tables

Table A1. Steller sea lion pup and non-pup counts during the 2021 survey. WCVI=West Coast Vancouver Island; SI=Scott Islands; SOG=Strait of Georgia; JQCS=Johnson & Queen Charlotte Straits; CMC=Central Mainland Coast; NMC=North Mainland Coast and HG=Haida Gwaii. Sites were classified as rookeries (R), year-round haul-outs (Y) with usage patterns having changed at some sites over the study period. Sites at which designation changed since the last survey are highlighted in grey. https://open.canada.ca/data/en/dataset/0083baf1-8145-4207-a84f-3d85ef2943a5

Region	Site Type	Site name	Pup count	Non-pup count	Total
CMC	R	Virgin Rocks	485	1131	1616
CMC	Y/R	Pearl Rocks	71	550	621
CMC	R	Gosling Rocks	430	948	1378
CMC	Y	Other	2	547	549
HG	R	Joyce Rocks	326	484	810
HG	R	Garcin Rocks	546	938	1484
HG	R	Cape St. James	319	560	879
HG	Y	Other	55	2541	2596
JQCS	Y	Other	3	1308	1311
NMC	R	North Danger Rocks	260	508	768
NMC	R	Bonilla Island	208	441	649
NMC	R	Warrior Rocks	69	549	618
NMC	Y	Other	12	1389	1401
SI	R	Triangle Island	4323	5226	9549
SI	R	Sartine Island	199	388	587
SI	R	Beresford Island	62	753	815
SI	R	Other	0	1	1
SOG	Y	Other	4	663	667
WCVI	Y/R	Perez Rocks	102	1294	1396
WCVI	Y	Other	47	5177	5224

Table A2. The number of parameters in the model (k), log-likelihood (loglike), Akaike's information criterion corrected for small sample sizes (AICc), AICc differences (∆i), and Akaike weights (w_i) for candidate models (exponential, polynomial and logistic) of Steller sea Lion survey counts by year. Model sets for data collection between 1971 and 2021 (n=15 surveys) are presented for two counts (pups and non-pups) in ascending order of the change in Akaike's information criterion (∆i), with the lowest value being the best fit to the data.

Steller counts	Model	k	loglike	AIC_c	Δi	w_i
Pups	logistic	4	-104.14	224.95	0	0.98
	polynomial	3	-110.26	232.52	7.58	0.02
	exponential	2	-114.34	236.86	11.91	0
Non-pups	logistic	4	-119.44	255.55	0	0.92
	polynomial	3	-124.45	260.91	5.36	0.06
	exponential	2	-127.99	264.17	8.62	0.01

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