Revised 12/30/2016

STELLER SEA LION (*Eumetopias jubatus*): Eastern U.S. Stock

STOCK DEFINITION AND GEOGRAPHIC RANGE

Steller sea lions range along the North Pacific Rim from northern Japan to California (Loughlin et al. 1984), with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands (Fig. 1). Individual sea lions disperse widely outside of the breeding season (late May-early July), probably to access seasonally important prey resources. This results in marked seasonal patterns of abundance in some parts of the range and potential for intermixing of eastern and western stock sea lions in foraging areas (Sease and York 2003). Despite the wide-ranging movements of juveniles and adult males in particular, exchange between rookeries by breeding adult females and males (other than between adjoining rookeries) is low, although males have a higher tendency to disperse than females (NMFS 1995, Trujillo et al. 2004, Hoffman et al. 2006, Jemison et al. 2013). A northward shift in the overall breeding distribution has occurred, with a contraction of the range in southern California and new rookeries established in Southeast Alaska (Pitcher et al. 2007).

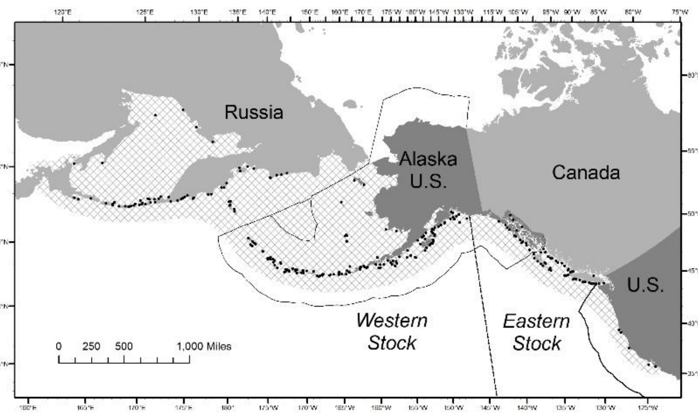

Figure 1. Generalized distribution (crosshatched area) of Steller sea lions in the North Pacific and major U.S. haulouts and rookeries (50 CFR 226.202, 27 August 1993), as well as active Asian and Canadian (British Columbia) haulouts and rookeries (points: Burkanov and Loughlin 2005; S. Majewski, Fisheries and Oceans Canada, pers. comm.). Black dashed line (144°W) indicates stock boundary (Loughlin 1997) and solid black line delineates U.S. Exclusive Economic Zone.

Loughlin (1997) considered the following information when classifying stock structure based on the phylogeographic approach of Dizon et al. (1992): 1) Distributional data: geographic distribution continuous, yet a high degree of natal site fidelity and low (<10%) exchange rate of breeding animals among rookeries; 2) Population response data: substantial differences in population dynamics (York et al. 1996); 3) Phenotypic data: differences in the length of pups (Merrick et al. 1995, Loughlin 1997); and 4) Genotypic data: substantial differences in mitochondrial DNA (Bickham et al. 1996). Based on this information, two separate stocks of Steller sea lions were recognized within U.S. waters: an Eastern U.S. stock, which includes animals born east of Cape Suckling, Alaska (144°W), and a Western U.S. stock, which includes animals born at and west of Cape Suckling (Loughlin 1997; Fig. 1). However, Jemison et al. (2013) summarized that there is regular movement of Steller sea lions from the western Distinct Population Segment (DPS) (males and females equally) and eastern DPS (almost exclusively males) across the DPS boundary. Most of this movement, but not all, is likely to access seasonally available, but important, prey resources as discussed above.

All genetic analyses (Baker et al. 2005; Harlin-Cognato et al. 2006; Hoffman et al. 2006, 2009; O'Corry-Crowe et al. 2006) confirm a strong separation between western and eastern stocks and there may be sufficient morphological differentiation to support elevating the two recognized stocks to subspecies (Phillips et al. 2009). However, a recent review by Berta and Churchill (2012) characterized the status of these subspecies assignments as "tentative" and requiring further attention before their status can be determined. Phillips et al. (2011) addressed the effect of climate change, in the form of glacial events, on the evolution of Steller sea lions and reported that the effective population size at the time of the event determines the impact of change on the population. The results suggested that during glacial periods, dispersal events were correlated with historically low effective population sizes, whereas range fragmentation type events were correlated with larger effective population sizes. This work again reinforced the stock delineation concept by noting that ancient population subdivision likely led to the sequestering of most mtDNA haplotypes as DPS or subspecies-specific (Phillips et al. 2011).

In 1998, a single Steller sea lion pup was observed on Graves Rock just north of Cross Sound in Southeast Alaska, and within 15 years (2013) pup counts had increased to 551 (DeMaster 2014). Mitochondrial and microsatellite analysis of pup tissue samples collected in 2002 revealed that approximately 70% of the pups had mtDNA haplotypes that were consistent with those found in the western stock (Gelatt et al. 2007). Similarly, a rookery to the south on the White Sisters Islands, where pups were first noted in 1990, was also sampled in 2002 and approximately 45% of those pups had western stock haplotypes. Collectively, this information demonstrates that these two most recently established rookeries in northern Southeast Alaska have been partially to predominately established by western stock females. While movements of animals marked as pups in both stocks support these genetic results (Jemison et al. 2013), overall the observations of marked sea lion movements corroborate the extensive genetic research findings for a strong separation between the two currently recognized stocks. O'Corry-Crowe et al. (2014) concluded that the results of their study of the genetic characteristics of pups born on these new rookeries "demonstrates that resource limitation may trigger an exodus of breeding animals from declining populations, with substantial impacts on distribution and patterns of genetic variation. It also revealed that this event is rare because colonists dispersed across an evolutionary boundary, suggesting that the causative factors behind recent declines are unusual or of larger magnitude than normally occur." Thus, although recent colonization events in the northern part of the eastern DPS indicate movement of western sea lions into this area, the mixed part of the range remains small (Jemison et al. 2013) and the overall discreteness of the eastern from the western stock remains distinct. Hybridization among subspecies and species along a contact zone such as now occurs near the stock boundary is not unexpected as the ability to interbreed is a primitive condition whereas reproductive isolation would be derived. In fact as stated by NMFS and the U.S. Fish and Wildlife Service (USFWS) in a 1996 response to a previous comment regarding stock discreteness policy (61 FR 47222), "*The Services do not consider it appropriate to require absolute reproductive isolation as a prerequisite to recognizing a distinct population segment*" or stock. The fundamental concept overlying this distinctiveness is the collection of morphological, ecological and behavioral, and genetic evidence for stock differences initially described by Bickham et al. (1996) and Loughlin (1997), and supported by Baker et al. (2005), Harlin-Cognato et al. (2006), Hoffman et al. (2006, 2009), O'Corry-Crowe et al. (2006), and Phillips et al. (2009, 2011).

POPULATION SIZE

The eastern stock of Steller sea lions has historically bred on rookeries located in Southeast Alaska, British Columbia, Oregon, and California. However, within the last several years a new rookery has become established on the outer Washington coast (at the Carroll Island and Sea Lion Rock complex), with >100 pups born there in 2015 (R. DeLong and P. Gearin, NMFS-AFSC-MML, pers. comm.). Counts of pups on rookeries conducted near the end of the birthing season are nearly complete counts of pup production. The dates of the most recent aerial photographic and land-based surveys of eastern Steller sea lions have varied by region. Southeast Alaska was surveyed in June-July 2015 (Fritz et al. 2015), while counts used in population analyses for the contiguous U.S. (i.e., Washington, Oregon, and California) are from 2013 surveys and counts from Canada (i.e., British Columbia) are from the 2010 survey effort (NMFS, Fisheries and Oceans Canada, Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, unpubl. data). For trend and population estimates, we used agTrend (Johnson and Fritz 2014) to augment missing counts in order to estimate 2015 counts. The 2015 estimated total eastern stock pup count is 19,423 (95% credible interval of 16,318-23,309). The 2015 estimated total eastern stock non-pup count is 52,139 (95% confidence interval of 45,428-59,711); this estimate does not account for animals at sea.

Minimum Population Estimate

Because of the uncertainty regarding the use of a pup multiplier or haulout rate to estimate N, we use the best estimate of the total count of eastern Steller sea lions as the minimum population estimate (N_{MIN}). The agTrend (Johnson and Fritz 2014) total count estimate of pups and non-pups for the entire eastern stock of Steller sea lions in 2015 is 71,562 (52,139 non-pups plus 19,423 pups). The estimated U.S. total count of the eastern stock of Steller sea lions is 41,638 (30,917 non-pups plus 10,721 pups; Table 1) and it will be used as the N_{MIN}. These counts are considered minimum estimates of population size because they have not been corrected for animals that are at sea during the surveys.

Current Population Trend

Using agTrend, we modeled the most recent count data to estimate annual trends from 1989 to 2015. This model indicates the eastern stock of Steller sea lions increased at a rate of 4.76% per year (95% confidence intervals of 4.09-5.45%) between 1989 and 2015 based on an analysis of pup counts in California, Oregon, British Columbia, and Southeast Alaska (Table 1, Figs. 2 and 3). A similar analysis of non-pup counts in the same regions plus Washington yielded an estimate of population increase of 2.84% per year (95% confidence intervals of 2.36-3.33%). Pitcher et al. (2007) reported that the Eastern U.S. stock increased at a rate of 3.1% per year during a 25-year time period from 1977 to 2002; however, they used a slightly different method to estimate population growth than the methods reported in NMFS (2013). The Eastern U.S. stock increase has been driven by growth in pup counts in all regions (NMFS 2013).

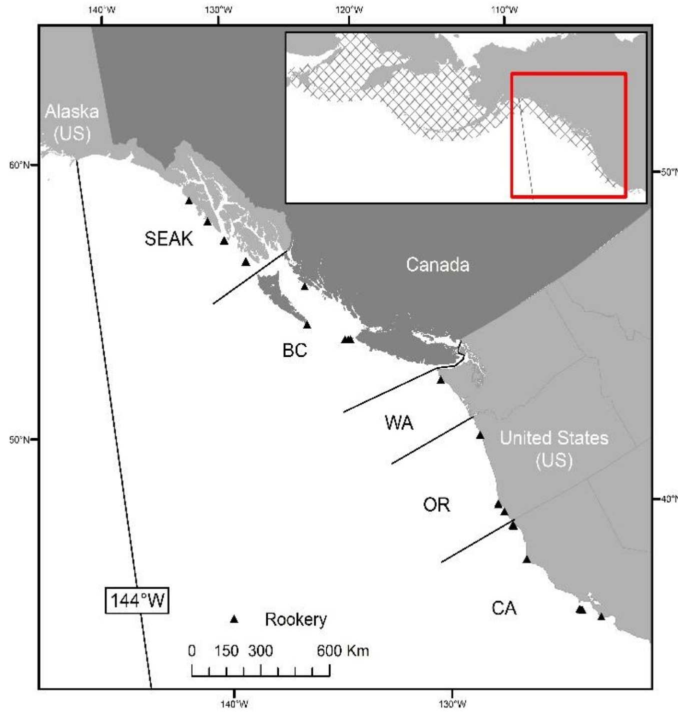

Figure 2. The eastern Steller sea lion rookery sites by region: SEAK (Southeast Alaska), BC (British Columbia, Canada), WA (Washington State), OR (Oregon State), and CA (California State).

Table 1. Trends (annual rates of change expressed as % y^{-1} with 95% credible interval) in estimated counts of eastern Steller sea lion non-pups (adults and juveniles) and pups, by region and total population, for the period 1989-2015 (Johnson and Fritz 2014, Fritz et al. 2015). The agTrend estimated counts of non-pups and pups by region and the overall counts in 2015 are also shown. Total eastern stock counts are slightly greater than the sums of the regional counts due to the modeling process.

	Non-pups					**Pups**			
Region	**Trend**	**-95%**	**+95%**	**2015**		**Trend**	**-95%**	**+95%**	**2015**
California, U.S.	1.95	0.36	3.53	3,120		3.82	2.47	5.05	936
Oregon, U.S.	2.39	1.08	3.54	5,634		3.80	2.58	5.03	1,946
Washington, U.S.*	8.77	6.00	11.37	1,407					
British Columbia, Canada	3.43	2.64	4.22	20,689		7.89	6.22	9.61	8,630
Southeast Alaska, U.S.	2.33	1.54	3.07	20,756		3.20	2.59	3.82	7,838
Total Eastern Stock	2.84	2.36	3.33	52,139		4.76	4.09	5.45	19,423
Total U.S. Eastern Stock				30,917					10,721

*NMFS has never observed Steller sea lion pups born on known sites in Washington except within the last several years. A new rookery has become established on the outer Washington coast (at the Carroll Island and Sea Lion Rock complex), with a confirmed count of 45 pups in 2013 and >100 pups born there in 2015 (R. DeLong and P. Gearin, NMFS-AFSC-MML, pers. comm.).

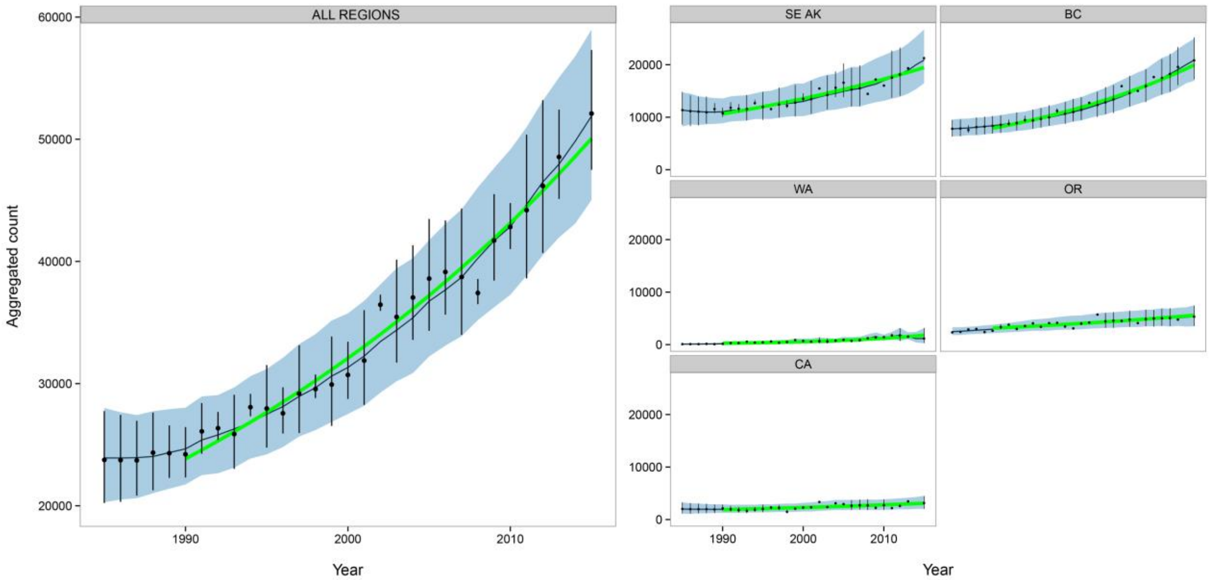

Figure 3. Estimated counts (modeled with agTrend) of eastern Steller sea lion non-pups (adults and juveniles) for the period from 1989 to 2015, with estimated trend (green line) from 1990 to 2015 for all regions and for the five separate regions: Southeast Alaska (SEAK), British Columbia (BC), Washington (WA), Oregon (OR), and California (CA) (Johnson and Fritz 2014, Fritz et al. 2015).

While the eastern stock of Steller sea lions has been increasing in all regions from 1990 to 2015, the most significant growth has been observed in Southeast Alaska and British Columbia, Canada (Fig. 3). These two regions comprise almost 85% of the total eastern stock count. Non-pups in Oregon and Washington have been increasing since 1990, though at a lower rate. Non-pup counts in California ranged between 4,000 and 6,000 with no apparent trend from 1927 to 1947 but subsequently declined. At Año Nuevo Island off central California, a steady decline in abundance began in 1970, and there was an 85% reduction in the breeding population by 1987 (LeBoeuf et al. 1991). Non-pup counts increased slightly from 1989 to 2015, ranging from approximately 2,000 to 3,100.

The net magnitude of Steller sea lion movements during the breeding season between the eastern and western stocks appears to be relatively small and would have a negligible impact on non-pup trend estimates in either area (Fritz et al. 2013, Jemison et al. 2013). However, there were significant differences by sex in cross-boundary movements: for females, there was a net increase of ~600 in the east and very few moved from east to west, while males moved in both directions but with a net increase of ~500 males in the west. This pattern of movement is supported by mitochondrial DNA evidence that indicated that the newest rookeries in northern Southeast Alaska (eastern stock) were colonized in part by western females (Gelatt et al. 2007, O'Corry-Crowe et al. 2014).

CURRENT AND MAXIMUM NET PRODUCTIVITY RATES

There are no estimates of the maximum net productivity rate for Steller sea lions. Pitcher et al. (2007) observed a rate of population increase of 3.1% per year for the eastern stock but concluded this rate did not represent a maximum rate of increase. NMFS (2013) estimated that the eastern stock increased at rates of 4.18% per year using pup counts and 2.99% per year using non-pup counts between 1979 and 2009. Here, we estimated that counts of pups and non-pups increased at rates of 4.76% and 2.84% per year, respectively, between 1989 and 2015 (Table 1). Until additional data become available, it is recommended that the theoretical maximum net productivity rate (R_{MAX}) for pinnipeds of 12% be employed for this stock (Wade and Angliss 1997).

POTENTIAL BIOLOGICAL REMOVAL

Under the 1994 reauthorized Marine Mammal Protection Act (MMPA), the potential biological removal (PBR) is defined as the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: PBR = $N_{MIN} \times 0.5R_{MAX} \times F_R$. On 4 December 2013, the eastern stock of Steller sea lions was removed from the list of threatened species under the Endangered Species Act (ESA; 78 FR 66140, 4 November 2013). NMFS' decision to delist this species was based on the information presented in the Status Review (NMFS 2013), the factors for delisting in section 4(a)(1) of the ESA, the biological and threats-based recovery criteria in the 2008 Recovery Plan (NMFS 2008), the continuing efforts to protect the species, and information received during public comment and peer review. NMFS' consideration of this information led to a determination that the eastern population has recovered and no longer meets the definition of a threatened species under the ESA. As recently noted within the humpback whale ESA listing final rule (81 FR 62259, 8 September 2016), in the case of a species or stock that achieved its depleted status solely on the basis of its ESA status, such as the eastern stock of Steller sea lions, the species or stock would cease to qualify as depleted under the terms of the definition set forth in MMPA Section 3(1) if the species or stock is no longer listed as threatened or endangered. Therefore, NMFS considers this stock not to be depleted; the recovery factor is 1.0 (recovery factor for a stock within its Optimum Sustainable Population), and the PBR = 2,498 (41,638 × 0.06 × 1.0).

ANNUAL HUMAN-CAUSED MORTALITY AND SERIOUS INJURY

Fisheries Information

Detailed information (including observer programs, observer coverage, and observed incidental takes of marine mammals) for federally-managed and state-managed U.S. commercial fisheries is presented in Appendices 3-6 of the Alaska Stock Assessment Reports (for fisheries in Alaska waters) and Appendix 1 of the U.S. Pacific Stock Assessment Reports (for fisheries in Washington, Oregon, and California waters).

During 2010-2014, no incidental mortality or serious injury of eastern Steller sea lions was observed in the 22 federally-regulated commercial fisheries in Alaska monitored for incidental mortality by fisheries observers (Breiwick 2013; MML, unpubl. data).

U.S. West Coast groundfish fishery observers monitored three federally-regulated commercial fisheries in 2010-2013 in which Steller sea lions from this stock were taken incidentally: the Washington/Oregon/California (WA/OR/CA) groundfish bottom trawl, WA/OR/CA groundfish midwater trawl (shoreside hake sector), and WA/OR/CA midwater trawl (at-sea hake sector) fisheries, resulting in a mean annual mortality and serious injury rate of 14 Steller sea lions from this stock (Table 2; Jannot et al. 2016).

The estimated mean annual mortality and serious injury rate incidental to U.S. commercial fisheries is 14 eastern Steller sea lions, based on observer data for 2010-2013 (Table 2). Due to limited observer program coverage, no data exist on the mortality of marine mammals incidental to Canadian commercial fisheries (i.e., those similar to U.S. fisheries known to take Steller sea lions). As a result, the number of Steller sea lions taken in Canadian waters is not known.

Table 2. Summary of incidental mortality and serious injury of Eastern U.S. Steller sea lions due to U.S. commercial fisheries in 2010-2013 (Jannot et al. 2016) and calculation of the mean annual mortality and serious injury rate.

Fishery name	Years	Data type	Percent observer coverage	Observed mortality	Estimated mortality	Mean estimated annual mortality
WA/OR/CA groundfish (bottom trawl)[a]	2010 2011 2012 2013	obs data	18 100 100 100	7 20 7 5	7[b] 20 7 5	9.8
WA/OR/CA groundfish (midwater trawl - shoreside hake sector)[c]	2011 2012 2013	obs data	100 100 100	1 0 0	1 0 0	0.3
WA/OR/CA groundfish (midwater trawl - at-sea hake sector)	2010 2011 2012 2013	obs data	100 100 100 100	9 2 1 2	9 2 1 2	3.5
Minimum total estimated annual mortality						14

[a]The bottom trawl fishery was a limited entry fishery in 2010 and a catch shares fishery in 2011-2013.
[b]The observed mortality and serious injury for this fishery will be used until published estimates are available.
[c]Fishery observers began monitoring the shoreside hake sector of the fishery in 2011.

Reports to the NMFS Alaska Region stranding network and the Alaska Department of Fish and Game (ADF&G) of Steller sea lions entangled in fishing gear or with injuries caused by interactions with gear provide additional information on fishery-related mortality and serious injury (Table 3; Helker et al. 2016). During 2010-2014, one Steller sea lion interaction with a recreational Southeast Alaska salmon troll fishery was reported, resulting in a minimum mean annual mortality and serious injury rate of 0.2 Steller sea lions per year in recreational troll fisheries. An additional 154 Steller sea lion interactions with troll fisheries were reported in 2010-2014 (including 11 that occurred in the Southeast Alaska salmon troll fishery and 99 that occurred in unidentified Southeast Alaska troll fisheries). In each case, animals had either ingested troll gear or were hooked in the mouth; however, it is not clear whether these interactions involved recreational or commercial components of the fisheries. Three of the animals that were seriously injured in the Southeast Alaska troll fisheries had dependent pups, so the pups were also considered seriously injured. Other fishery-related mortality and serious injury of eastern Steller sea lions in 2010-2014 was due to interactions with longline gear, monofilament gear, trawl gear, and unidentified fishing gear. The minimum mean annual mortality and serious injury rate due to all non-commercial fishery interactions reported to the NMFS Alaska Region and ADF&G in 2010-2014 is 38 eastern Steller sea lions: 0.2 in recreational fisheries + 38 in unknown (commercial, recreational, or subsistence) fisheries (Table 3; Helker et al. 2016). Estimates of fishery-related mortality and serious injury from stranding data are considered minimum estimates because not all entangled animals strand, and not all stranded animals are found or reported.

An additional four Steller sea lions initially considered seriously injured in a Yakutat salmon set gillnet (1 in 2011), Southeast Alaska pot gear (1 in 2012), Southeast Alaska salmon drift gillnet (1 in 2012), and marine debris (1 in 2014) were disentangled and released with non-serious injuries in Alaska waters, and one Steller sea lion pup with serious injuries caused by human harassment was rehabilitated and released with non-serious injuries in Washington waters in 2014 (Helker et al. 2016). None of these animals were included in the average annual mortality and serious injury rate for 2010-2014.

Table 3. Summary of Eastern U.S. Steller sea lion mortality and serious injury, by year and type, reported to the NMFS Alaska Region marine mammal stranding network and ADF&G in 2010-2014 (Helker et al. 2016).

Cause of injury	2010	2011	2012	2013	2014	Mean annual mortality
Hooked by recreational SE Alaska salmon troll gear	0	0	0	0	1	0.2
Hooked by Gulf of Alaska longline gear*	1	0	0	0	0	0.2
Entangled in SE Alaska halibut longline gear*	0	1	0	0	0	0.2
Entangled in SE Alaska longline gear*	0	1	0	0	0	0.2
Hooked by SE Alaska salmon troll gear*	0	0	0	3	8	2.2
Hooked by SE Alaska troll gear*	42	30	27	-	0	25[a]
Dependent pup of animal seriously injured by SE Alaska troll gear*	2	0	1	-	0	0.8[a]
Hooked by troll gear*	0	0	0	3	41	8.8
Entangled in SE Alaska monofilament gear*	1	1	0	0	0	0.4
Entangled in trawl gear*	0	0	0	0	1	0.2
Hooked by unidentified fishing gear*	0	0	2	0	0	0.4
Entangled in marine debris	25	32	24	-	26	27[b]
Dependent pup of animal seriously injured by marine debris	0	1	0	-	3	1[b]
Entangled in foreign high-seas gillnet	1	0	0	0	0	0.2
Gunshot[c]	-	-	15	16	14	15[d]
Struck by arrow	0	0	0	1	0	0.2
Explosives	0	0	0	0	1	0.2

Cause of injury	2010	2011	2012	2013	2014	Mean annual mortality
Total in recreational fisheries						0.2
*Total in unknown (commercial, recreational, or subsistence) fisheries						38
Total in marine debris						28
Total due to other sources (gunshot, arrow, foreign gillnet, explosives)						16

[a]A 4-year average (using the 2010-2012 and 2014 data) was calculated for this category, since we did not receive data on mortality and serious injury due to flasher entanglement (which is primarily assigned to SE Alaska troll gear) from the ADF&G in 2013. Although the NMFS Alaska Region did not assign any mortality and serious injury to SE Alaska troll gear in 2014, this mortality and serious injury is accounted for in the more general category of "troll gear" in 2014.
[b]A 4-year average (using 2010-2012 and 2014 data) was calculated for this category, since we did not receive data on mortality and serious injury due to marine debris entanglement from the ADF&G in 2013.
[c]Only animals reported to the NMFS West Coast Region are included in this table because animals reported to the NMFS Alaska Region are likely accounted for as "struck and lost" in the Alaska Native harvest.
[d]A 3-year average (using the 2012-2014 data) was calculated for this category, since we do not have gunshot data for 2010 and 2011.

The minimum estimated mean annual mortality and serious injury rate incidental to all fisheries in 2010-2014 is 52 Steller sea lions: 14 in U.S. commercial fisheries + 0.2 in recreational fisheries + 38 in unknown (commercial, recreational, or subsistence) fisheries.

Alaska Native Subsistence/Harvest Information

Information on the subsistence harvest of Steller sea lions is provided by the ADF&G. The ADF&G conducted systematic interviews with hunters and users of marine mammals in approximately 2,100 households in about 60 coastal communities within the geographic range of the Steller sea lion in Alaska in 2005-2008 (Wolfe et al. 2006, 2008, 2009a, 2009b). The interviews were conducted once per year in the winter (January to March) and covered hunter activities for the previous calendar year. Approximately 16 of the interviewed communities lie within the range of the Eastern U.S. stock. As of 2009, annual statewide data on community subsistence harvests are no longer being consistently collected. Data are being collected periodically in subareas. During 2010-2014, monitoring occurred only in 2012 (Wolfe et al. 2013), when one animal was landed and eight animals were struck and lost. Therefore, the most recent 5 years of data (2005-2008 and 2012) will be retained and used for calculating an annual mortality and serious injury estimate. The average number of animals harvested plus struck and lost is 11 animals per year during this 5-year period (Table 4).

An unknown number of Steller sea lions from this stock are harvested by subsistence hunters in Canada. The magnitude of the Canadian subsistence harvest is believed to be small (Fisheries and Oceans Canada 2010). Alaska Native subsistence hunters have initiated discussions with Canadian hunters to quantify their respective subsistence harvests, and to identify any effect these harvests may have on management of the stock.

Table 4. Summary of the subsistence harvest data for Eastern U.S. Steller sea lions in 2005-2008 and 2012. As of 2009, data on community subsistence harvests are no longer being consistently collected at a statewide level. Therefore, the most recent 5 years of data (2005-2008 and 2012) will be retained and used for calculating an annual mortality and serious injury estimate.

Year	Number harvested	Number struck and lost	Estimated total number taken
2005	0	19	19[a]
2006	2.5	10.1	12.6[b]
2007	0	6.1	6.1[c]
2008	1.7	8.0	9.7[d]
2012	1	8	9[e]
Mean annual take (2005-2008 and 2012)	1.0	10	11

[a]Wolfe et al. (2006); [b]Wolfe et al. (2008); [c]Wolfe et al. (2009a); [d]Wolfe et al. (2009b); [e]Wolfe et al. (2013).

Other Mortality

Illegal shooting of sea lions in U.S. waters was thought to be a potentially significant source of mortality prior to the listing of sea lions as threatened under the ESA in 1990. (Note: the 1994 amendments to the MMPA made intentional lethal take of any marine mammal illegal except for subsistence hunting by Alaska Natives or where imminently necessary to protect human life).

Steller sea lions were taken in British Columbia during commercial salmon farming operations. Preliminary figures from the British Columbia Aquaculture Predator Control Program indicated a mean annual mortality of 45.8 Steller sea lions from this stock over the period from 1999 to 2003 (Olesiuk 2004). Starting in 2004, aquaculture facilities were no longer permitted to shoot Steller sea lions (P. Olesiuk, Pacific Biological Station, Canada, pers. comm.). However, Fisheries and Oceans Canada (2010) summarized that "illegal and undocumented killing of Steller Sea Lions is likely to occur in B.C." and reported "[s]everal cases of illegal kills have been documented (Department of Fisheries and Oceans, Canada, unpubl. data), and mortality may also occur outside of the legal parameters assigned to permit holders (e.g., for predator control or subsistence harvest)" but "…data on these activities are currently lacking."

Steller sea lion mortality and serious injury caused by gunshot wounds is reported to the NMFS Alaska Region and the NMFS West Coast Region. During 2012-2014, 45 animals with gunshot wounds were reported to the NMFS West Coast Region stranding network, resulting in a minimum average annual mortality and serious injury rate of 15 Steller sea lions from this stock (Table 3; Helker et al. 2016). An additional two animals with gunshot wounds were reported to the NMFS Alaska Region in 2010. Although it is likely that illegal shooting does occur in Alaska, these events are not included in the estimate of the average annual mortality and serious injury rate due to gunshot wounds because it could not be confirmed that the deaths were due to illegal shooting and were not already accounted for in the estimate of animals struck and lost in the Alaska Native subsistence harvest. Other non-fishery human-caused mortality and serious injury reported to the NMFS Alaska Region stranding network in 2010-2014 (and the resulting minimum mean annual mortality and serious injury rates) were due to entanglement in marine debris (27), dependent pups of animals seriously injured by marine debris (1), entanglement in foreign gillnet (0.2), arrow strike (0.2), and explosives (0.2) (Table 3; Helker et al. 2016). These estimates are considered a minimum because not all stranded animals are found, reported, or cause of death determined (via necropsy by trained personnel), and human-related stranding data are not available for British Columbia.

Mortality and serious injury may occasionally occur incidental to marine mammal research activities authorized under MMPA permits issued to a variety of government, academic, and other research organizations. Three mortalities occurred incidental to research on the Eastern U.S. stock of Steller sea lions in 2011 (Division of Permits and Conservation, Office of Protected Resources, NMFS, 1315 East-West Highway, Silver Spring, MD 20910), resulting in a mean annual mortality and serious injury rate of 0.6 sea lions from this stock in 2010-2014.

The minimum mean annual human-caused mortality and serious injury rate in 2010-2014 from sources other than fisheries or Alaska Native harvest is 45 eastern Steller sea lions.

STATUS OF STOCK

Based on currently available data, the minimum estimated mean annual U.S. commercial fishery-related mortality and serious injury rate for this stock (14 sea lions) is less than 10% of the calculated PBR (10% of PBR = 250) and, therefore, can be considered to be insignificant and approaching a zero mortality and serious injury rate. The total estimated annual level of human-caused mortality and serious injury (108 sea lions) does not exceed the PBR (2,498) for this stock. The Eastern U.S. stock of Steller sea lions is currently not listed under the ESA and is not considered depleted under the MMPA. This stock is classified as a non-strategic stock. Because the counts of eastern Steller sea lions have steadily increased over a 30+ year period, this stock is likely within its Optimum Sustainable Population (OSP); however, no determination of its status relative to OSP has been made.

HABITAT CONCERNS

Unlike the Western U.S. stock of Steller sea lions, there has been a sustained and robust increase in abundance of the Eastern U.S. stock throughout its breeding range. In the southern end of its range (Channel Islands in southern California), it has declined considerably since the late 1930s and several rookeries and haulouts south of Año Nuevo Island have been abandoned. Changes in the ocean environment, particularly warmer temperatures, may be factors that have favored California sea lions over Steller sea lions in the southern portion of the Steller's range (NMFS 2008). The risk of oil spills to this stock may increase in the next several decades due to increased shipping, including tanker traffic, from ports in British Columbia and possibly Washington State (COSEWIC 2013, NMFS 2013, Wiles 2014) and LNG facility and pipeline construction (COSEWIC 2013).

CITATIONS

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