

Biology and Ecology of the Steller Sea Lion by Dr. Markus Horning

The Steller sea lion:

The Steller sea lion has the scientific name *Eumetopias jubatus*. The common name was given after the German physician and naturalist Georg Steller who travelled to Alaska on the 1741 Russian expedition led by the Danish-born captain Vitus Bering (after whom the Bering Sea is named). The Steller sea lion is sometimes also called the 'Northern sea lion'. It is the largest of all sea lions, and the largest of the so-called 'eared seals' or scientifically the otariids (the Latin name for 'eared seals'). The 'eared seals' are a group of species composed of several different sea lions and also fur seals. Examples of sea lions are the Steller sea lion, the California sea lion, the Galapagos sea lion, the South American sea lion, and others. Examples of fur seals are the Northern fur seal, the Galapagos fur seal, the Antarctic fur seal, and others. All the eared seals have very small external ear 'shells' or 'horns', hence the name 'eared seals'. They are also distinguished by their ability to fold their flippers underneath their body and 'walk' on all four limbs. This way they manage to get around on land quite well. In fact an adult male Steller sea lion can out-run a human quite easily. Generally, however, the eared seals or otariids do not move around on land very much or very fast, and they are really much more at home in the water. Underwater, they are very capable swimmers and divers. Eared seals move through the water by using their fore-flippers very much the way birds use their wings to fly in air. They stroke their fore-flippers up and down to generate forward thrust. These features (ears, articulated flippers and how they swim) set the otariids apart from what we call the 'earless seals' or 'true seals' (or 'phocids' by their Latin name).

True seals include species we can observe along the shores of the Pacific Northwest, such as harbor seals and Northern elephant seals, but also other species such as harp seals, grey seals, ribbon seals and many more. Earless seals only have small holes for their ears; they have no external ear shells. They cannot fold their flippers underneath their bodies, and are therefore much slower on land, only being able to 'wallow' or hobble along with their whole body sliding across sand or rocks. True seals swim by swinging their hind flippers back and forth in sideways motion, very similar to what fish do with their tails. Together with the walrus, the eared seals and the true seals make up the so-called pinnipeds, which is Latin for fin-footed animals. There are about 35 pinnipeds species found in all oceans of the world, and even in some fresh water lakes (like the Lake Baikal seal in Siberia).

Steller sea lions - like all eared seals - exhibit a large degree of 'sexual dimorphism'. Sexual dimorphism means that males and females have different shapes or sizes. In this case the males are much, much bigger than females. Steller sea lion bulls can weigh over 1,200 kg. That's as much as a small car. Females only weigh up to about 300 kg, or only ¼ the weight of adult males. Steller sea lions are found around the rim of the North Pacific Ocean and in the Bering Sea, so in northern California, Oregon, Washington, British Columbia (Canada), Southeast Alaska, the Gulf of Alaska, the Aleutian Island and the Bering Sea, and all the way to the Kamchatka Peninsula and the Sea of Okhotsk, and even all the way to Japan. There used to be well over 300,000 Steller sea lions worldwide, but now there are far fewer of them around (see below). Steller sea lions are very fast swimmers and reasonably good divers. They can remain submerged and hold their breath for 15 minutes or longer (though typically they remain submerged for only 3-5 minutes at a time) and can dive to depths

deeper than 500 meters. (If you are wondering about the measurement units I use such as meters and kilograms, that is because in science we only use the so-called International System of Measurements or the SI for short. It is very similar to the metric system.) While these are certainly remarkable feats, they do pale in comparison to what some true seals can accomplish. For example, Northern elephant seal females are known to dive beyond 1,700 meters in depth, and Weddell seals in Antarctica can remain submerged while holding their breath for more than 90 minutes.

Steller sea lions, like most 'pinnipeds', are not highly specialized in their diet. They eat a mixed diet of many different fish and 'cephalopods' (that refers to squid and octopus). For example, Steller sea lions may eat herring, pollock, Atka mackerel, Pacific mackerel, hake, sandlance, salmon, sturgeon, flatfish such as halibut and various flounders, skates, lampreys, capelin, eulachon, rockfish and various species of squid and octopus. They are not picky, and often adjust their feeding habits to what they can find depending on region or season. However, in many regions where Steller sea lions occur, and during all seasons of the year, Stellers seem to eat pollock.

Like all eared seals, Steller sea lions hunt for fish at sea but return to shore to rest, and also to mate, give birth to their young and to suckle their young. They are after all mammals! We generally can find Stellers in two types of locations on shore. We distinguish between 'rookeries' and haul-outs. Rookeries are the breeding colonies where animals mate and females give birth. Haul-outs are areas where the animals rest, but they do not mate or give birth there, though females may suckle their young there. Steller sea lion pups are born between late May and mid-July. Generally, females are thought to have their first pup at the age of five or six years. They only have one pup at a time (singlets, twins have been observed but are extremely rare). Female Steller sea lions suckle their young for long periods of time, typically at least 9-12 months, and often longer than that. In fact, young sea lions even as much as three years old have been observed suckling on their mother. That is rare however, and 12-18 months is probably average. This means that on average, a female Steller sea lion has at most one pup per year, and probably in many cases she does not have a pup every year, but only less often. Females can probably reach an age up to and beyond 30 years, though many die before then. Steller sea lion males follow a very different strategy: they do come ashore as well, but outside of mating do not participate in the raising of their young. Instead, adult males defend a territory, and often engage in fierce fighting with bulls holding neighboring territories. Males typically cannot successfully defend a territory and mate until they are at least 8 or 9 years old, and by the time they are 11 or 12 they may be too worn out and too old. That means they may only have a few mating seasons, and in fact the vast majority of males probably never get to breed. That still works well for the species, because a successful male mates with many females. Males probably don't get nearly as old as females, and it is hard to find males in the wild that are as old as 18 or 19 years. Infant mortality as in many pinnipeds is high. Probably less than 1/3 of all pups born even reach sexual maturity. This characteristic reproductive behavior with adult males defending territories from May through July, and females giving birth to pups and then mating with males during this same period means that it is much easier to see and observe Steller sea lions during the summer, on their rookeries. Outside of this breeding season, it is more difficult to observe Stellers, and we have to look for them both in the rookeries as well as on haul-outs.

The population decline of the Steller sea lion:

It is estimated that from well over 200,000 animals in 1965, numbers declined to around 45,000 in the first decade of this millennium, in the region within the US from the central Gulf of Alaska all the way to the westernmost Aleutian Islands. During the same time frame, the worldwide population of Steller sea lions declined from well over 300,000 animals to under 100,000. As a result of this dramatic decline, the entire Steller sea lion population was listed as 'threatened' under the U.S. Endangered Species Act in 1990. However, soon scientists recognized that the population decline was limited to only a portion of the Steller's US range. Genetic studies then allowed fisheries managers to recognize two distinct portions of the Steller sea lion population. These are not separate species or subspecies, but instead these management units are called 'stocks' or 'distinct population segments'. The stocks are somewhat arbitrarily split at 144 degrees West Longitude - an imaginary line that runs right through the Gulf of Alaska. From this line to the west all the way along the Alaskan peninsula and the Aleutian Islands we find the western stock (including the central Gulf of Alaska and also the Bering Sea, and we also find western stock on the Russian side of the North Pacific). To the east of this line (including the eastern Gulf of Alaska, Southeast Alaska, British Columbia, Washington, Oregon and Northern California) we find the eastern stock. It is only the western stock that has declined so precipitously over the past four decades. The eastern stock has actually increased steadily during this time. While 35 years ago the western stock far outnumbered animals in the eastern stock, the eastern stock has more than doubled and now we have more animals in the eastern stock than in the US portion of the western stock. As a result of the different population trends (increasing eastern and decreasing western stock), the western population was listed as endangered in 1997, and the eastern stock remained listed as threatened. The fact that the eastern stock is still listed as threatened is being challenged right now, because the eastern stock has never declined, in fact, it has continuously increased over the past 4 decades.