Harbor Seals in the Bay

by Diane Kopec

Harbor Seal / FWS Photo

An early morning fog on the Bay obscures the horizon, focusing our senses on the narrow slough and bordering marsh slipping by the boat. The fog muffles the noise from the commute traffic on 101 to the west, and from the sewage treatment plant to the north. Only nearby sounds are heard, the slap of water, the brush of pickleweed on the hull as we turn toward shore, and, when the boat is still, the random call of a harbor seal pup. "MAAAA....MAAAA!" The sound is ancient and wild, rooted in the history of San Francisco Bay.

Before European development, before placer mining loaded the bay with mercury-laden silt, before tidal marshes were diked for cattle and salt, and before the waste from industrialization made water quality a concern, harbor seals lived in the bay. In the south bay, harbor seal bones have been found in Native American shell mounds that are dated at approximately 3,000 years old. Through all the changes we have made to the bay, successive generations of seals have continued to inhabit it, proof of successful efforts to sustain a healthy ecosystem, and evidence of the need to continue those efforts.

The harbor seals which live year-round in San Francisco Bay, *Phoca vitulina*, are found throughout the northern hemisphere, in the near-shore waters of the Atlantic and Pacific Oceans. Our local subspecies, *Phoca vitulina richardsi*, ranges from Baja California to the Aleutian Islands in the north. Before the 1972 Marine Mammal Protection Act (MMPA), hunting and population reduction programs kept seal numbers unnaturally low throughout their range. In fact, our oldest written record of harbor seals in the bay, from the1890's, describes a Department of Fish and Game seal hunt in the marshes at the extreme southern tip of the Bay near Alviso. With passage of the MMPA, human predation was reduced to random shootings, and for the next twenty years, the seal population on the outer coast began to increase steadily.

Here in the bay, the results were not as promising. Seal counts remained unchanged. Folks began wondering why the bay seals were not bouncing back to pre-exploitation levels. Many theories were proposed, from shoreline habitat loss, to disturbance at haul-out sites, to fewer prey fish in the bay, to toxic contaminants effecting reproduction or mortality. In the early 1990's my colleagues and I began a broad study examining San Francisco Bay's regional seal population. We made detailed counts and observations at harbor seal haul-out sites, tracked seal movements using radio transmitters, collected scat to identify seal prey, and analyzed seal blood samples for information on health and the accumulation of toxic pollutants. Some of our findings are woven into the following discussion of harbor seal natural history.

SEAL OR SEA LION?

Harbor seals are very reclusive, quiet creatures, often confused with their noisy brethren the California sea lion, which conveniently haul on now abandoned docks at Fisherman's Wharf. Unlike sea lions, harbor seals do not bark. Except for the pups' call in the spring, the only other sound harbor seals make is an occasional growl of protest, erupting when one seal is unwilling to share haul-out space with an interloper. Harbor seals may be cream, brown, grey or black, with contrasting spots and eye-spots more numerous on the back than on the belly. Sea lions are a solid color, ranging from golden to dark brown. Harbor seals do not have a discernible neck, nor do they have external ears. Their blunt snouts and wide heads blend smoothly into their torso. Sea lions have a long, narrow snout, a head shaped like a collie dog, and small external ear flaps often visible in profile.

Perhaps the greatest difference between these two pinnipeds is their method of locomotion on land. Harbor seals are extremely awkward on land. To move on land, seals lunge their upper bodies forward like a sausage-shaped inchworm. This structural limitation that results in the inability to escape land predators, is the primary cause of harbor seals' extreme sensitivity to disturbance when they are hauled out on land. Sea lions are much more agile on land. They are able to lift their bodies off the ground and waddle along the shore.

In the water, harbor seals are very swift and graceful, propelling themselves forward by sweeping their powerful hindflippers back and forth in a sculling motion. When foraging, seals may dive to depths of 1,600 feet, though foraging dives in San Francisco Bay are

obviously more shallow. Harbor seals are primarily bottom feeders, and forage opportunistically on a variety of fish and molluscs. Seals in San Francisco Bay feed primarily on plainfin midshipman, yellowfin goby, white croaker, Pacific staghorn sculpin and northern anchovy. During the winter herring may also make up a large part of the seals' diet. Harbor seals primarily feed at night, allowing them to rest on land during the warmer daylight hours.

SURVIVAL DEPENDS ON HAULOUT SITES

Harbor seal physiology requires them to routinely haul-out on land. When in cold ocean waters, their core body temperature is maintained by an insulating layer of blubber and increased metabolic heat production. Restricted blood flow to the skin and extremities lowers heat loss by reducing the flow of blood outside the insulating blubber layer. Despite these adaptations to conserve heat, the seals' metabolic heat production increases the longer they remain in the water. To avoid depleting their blubber layer, this increased head production must be fueled by eating more fish, which in turn requires spending more time in the water foraging. This cycle can be potentially harmful.

Regular hauling out on land reduces the thermal stress on the seals, permitting increased blood flow to the skin and extremities, which allows any cuts or would to heal normally, and reducing the need for metabolic heat production. These benefits underlie the seals' physiological need to haul-out on land. When captive seals are deprived of haul-out time for an extended period, they compensate for the loss by hauling almost continuously for days after the option is restored.

Pupping increases the need to haul-out. Harbor seals give birth on land and nurse only on land or in very shallow water. For the pup, adequate milk consumption during the lactation period, is crucial to its survival after weaning. When the roughly 4-week old pups are weaned, they live off their accumulated blubber reserves while they learn to catch fish and other prey, guided only by previous observations of their mother's foraging behavior. Without adequate time on land, milk consumption is lowered, pups gain less weight and pup mortality rates increase.

The physiological need to haul-out combines with the seal's reproductive cycle to create a seasonal pattern in haul-out activity. In San Francisco Bay, and along the central California coast, harbor seals pup from mid-March through May. Seals generally haul on a daily basis for long periods of time. Our radio telemetry studies found that at pupping sites in the south bay, certain females regularly hauled for 20 hours a day. The summer molt, when seals completely shed and replace their fur, extends from the first week in June through early August. During the molt, haul-out time reaches its annual peak, for normal hair growth requires unimpeded blood flow to the skin to supply the nutrients and trace elements needed for hair formation. In the fall and winter months, seals haul less frequently, every 1 - 3 days and spend shorter amounts of time on land.

These seasonal variations in haul-out activity affect our perception of the number of harbor seals in the area. During the spring pupping season and summer molt, a greater

percentage of the total bay population is hauled on land at any given time, causing an annual peak in seal counts.

Established haul-out sites are used continually by generations of seals. Seals are very habitual in the shoreline areas they use as haul-out sites. This is a survival instinct that keeps them returning to an area known to be safe rather than risking their lives on an untested area of shoreline.

Seals do not haul-out at sites with high disturbance and abandon established haul-outs if disturbance develops and persists. More than half of the harbor seal haulout sites used historically in San Francisco Bay have been abandoned. At two of these sites, researchers documented disturbance as the primary cause for abandonment.

Haul-out sites are critical habitat for the survival of harbor seals within a given region. Harbor seals' physiological requirement to regularly haul on land ties them to near-shore areas, and, if shoreline haul-out areas are lost due to development or disturbance, seals will leave the area.

Depending on the season, 250 to 450 seals haul-out on land on a given day in the entire bay. San Francisco Bay retains nine primary haul-out sites, used year-round by 10 or more seals, and eight secondary sites used sporadically or seasonally.

Disturbance is a tremendous threat to the seals continued presence in San Francisco Bay. Over the years I have witnessed some incredible acts of disturbance. They range from the malicious - a cabin cruiser pulling close to shore and blasting its air horn, causing a panicked flush of 300 harbor seals - to the well-intentioned but uninformed folks attempting to feed hauled seals by throwing frozen fish at them, flushing all the seals including nursing pups.

How can humans co-exist with the Bay's harbor seals? Here are some guidelines.

1. MAINTAIN A SAFETY ZONE OF 650 FEET AROUND HAULED SEALS
This is just over the length of two football fields set end to end. From this distance you will not be able to get a detailed look at the seals without field glasses or a spotting scope. That's OK, the objective is to co-exist with these wild animals. However, causing the seals to flush in order to obtain the perfect photograph can have serious consequences.

2. MONITOR HARBOR SEAL BEHAVIOR AND MOVE AWAY IF SEALS ALERT
Seals' sensitivity to disturbance is influenced by season, weather, the history of disturbance at a haul-out, and recent events in the area (you may be the fourth boat today to come a little too close to the haul-out). Given these variables, you may force the seals to "alert" even if you are outside the safety zone. Seals showing alert behavior raise their heads, look directly at you, roll to their stomachs, and push up on their fore-flippers. They feel threatened and are just about to flush into the water.

Even one or two seals threatened by your presence and showing alert behavior could precipitate a flush by the entire herd. Seals haul in large herds in order to benefit from the surveillance of others and they will flush solely in response to other seals.

3. AVOID HAULOUT SITES ALONG SLOUGH CHANNELS.
If possible, do not cruise by slough channel haul-out sites in your boat. The slough channels are usually too narrow to allow you to pass by without flushing the seals. If you come upon a haul-out site, turn around, go back and avoid that route in the future. If you have no alternative route, pull far to the opposite side of the slough, maintain speed, sit low in your boat and DO NOT make eye contact with the seals. They will be watching you closely. Do not threaten them by returning their stare.

Harbor seals are especially sensitive to canoes and kayaks. Even though they are quiet, these small craft flush seals as often as motorboats. Odd, but look at it from a seal's perspective. A human comes toward them, waving their arms and brandishing a large stick.

4. PREVENT BALLOONS, PLASTIC BAGS, FISHING LINES, AND NETS FROM ESCAPING INTO THE ENVIRONMENT
How does this relate to harbor seals? I once saw 260 seals flush into the water as a pink latex balloon with a trailing ribbon skittered across the near-shore waters. Those devilishly indestructible mylar balloons can also get their ribbon tangled in the marsh plants bordering a haul-out, preventing any seals from hauling within sight of it. Similarly, the handles of plastic grocery bags get tangled on a branch, the bag fills with air, and blows across the water like a strange sea monster. Fishing lines and other trash can also cause serious harm to harbor seals. Seals may become entangled while swimming in the bay and accidentally ingest foreign objects.

We must provide harbor seals with undisturbed haul-out sites. If the harbor seals flourish, so will other species native to the bay. We cannot return to the historical ecosystem that thrived before European development. However, your actions can ensure the protection and gradual restoration of the remaining harbor seal habitat that survives amidst our modern industrial landscape.

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