

# Oryx

## From an otter mother: the feel-good science behind California's sea otter recovery

By Monterey Bay Aquarium, 23rd September 2019

Ask not (only) what you can do for sea otters, but what sea otters can do for California.

That's one of the thoughts on the minds of Monterey Bay Aquarium scientists in the wake of a new scientific study, which confirms the power of sea otters to restore coastal ecosystems.

Since 2002 the Aquarium has reared rescued sea otter pups for release to the wild. Female otters in our exhibit serve as their 'surrogate mothers', teaching them critical life skills such as how to groom themselves and forage. The hope is that when the pups are released in Elkhorn Slough, a wetland c. 30 km north of the Aquarium, they'll be able to thrive on their own. A [newly published study](#) confirms that these surrogate-reared pups are surviving as well as their wild kin—and the resulting bump in the otter population at Elkhorn Slough is helping to restore the estuaryecosystem.



The new research paper confirms that surrogate-reared pups survive at a rate comparable to that of their wild

kin. Surrogate mom “Toola” raised otter 327 at Monterey Bay Aquarium.

The remarkable success of the Aquarium’s program, documented in [Oryx](#), highlights a tremendous opportunity: to help sea otters contribute to the revival of other coastal estuaries along the California coast.

Historically hunted for their fur, southern sea otters were nearly wiped out in California in the 19th century. Thanks to federal protection and a concerted conservation program, the population has slowly recovered in recent decades. But California’s wild population has plateaued at just over 3,000 sea otters—far below the historical level of 18,000-20,000. As a keystone species, sea otters have earned the title of ‘[ecosystem engineers](#)’ because they can deliver [outsized benefits](#) to degraded stretches of coastline.

The Aquarium’s sea otter surrogacy program is the first of its kind—a pioneering approach to rescuing, rearing and returning sea otter pups to the wild. During 2002-2016, Aquarium staff released 37 surrogate-reared pups in Elkhorn Slough, a national estuarine research reserve. Scientists now estimate that those surrogate-raised otters and their wild offspring account for more than half of Elkhorn Slough’s otter population growth over the past 15 years.



For 35 years Monterey Bay Aquarium has pioneered southern sea otter research, rescue and rehabilitation. A new study released Sept 23 reveals that the Aquarium’s feel-good story of helping sea otters return to the wild is also helping the local population of otters recover. Here, a surrogate-reared otter leaps into Elkhorn Slough on the central coast of California.

‘The success of those individuals wound up having both population-level and ecosystem-level impacts’, says Karl Mayer, sea otter field response coordinator at the Aquarium and lead author of

the study. 'This lays the groundwork for a new discussion around returning sea otters to more of their historical range.'

'We knew this was a great program and a feel-good story', Aquarium Chief Scientist Dr. Kyle Van Houtan added. 'Now we know this is great science.'



Otter 451, who was part of this study, plunges into Elkhorn Slough after being raised by a surrogate otter mother as part of Monterey Bay Aquarium's one-of-a-kind sea otter surrogacy program.

### In need of a nudge

Before the onset of the fur trade, sea otters ranged from northern Japan through Alaska and down the West Coast all the way to Mexico's Baja California. But today, California's sea otters are limited to a 480-km stretch of the Central Coast, from around Santa Cruz to Santa Barbara.

'In the center of their range, sea otter populations are dense and close to carrying capacity', Karl says. 'However, at the northern and southern edges, kelp is sparse, providing [little shelter for otters to evade white shark bites](#). For the population to grow in a meaningful way, the range itself might need to expand into historical habitats to which sea otters have not yet returned. Through our surrogacy program, we may have figured out how to facilitate that expansion.'

In the 1960s and 1970s, wildlife managers succeeded in several attempts to move sea otters from established territories to waters they inhabited before the fur trade. They helped sea otters return to south-east Alaska, British Columbia and Washington state, but an effort to reestablish sea otters in Oregon failed.

In California, translocation took a hit after over 100 wild sea otters were moved to San Nicolas Island, 113 km south of Ventura, starting in 1987. The effort was politically fraught and biologically unsuccessful. More than 80% of the translocated sea otters disappeared or swam back to the mainland. Although the island's sea otter population has grown in recent years (one estimate puts it at over 80 animals), many still remember the translocation's initial shortcomings.

'Any new proposals to reintroduce sea otters to more of their historical range', Karl cautions, 'must consider the lessons of San Nicolas Island'.



Surrogate-reared otter 327 has now returned to the wild where she raised her very own pup.

Where to go from here?

When the Aquarium first started pairing exhibit otters with orphaned pups, the goal was not to help sea otters return to their historical range. The Aquarium team simply hoped the surrogate otter mothers would have more success teaching these rescued pups than the humans who tried it before them.

The new research article confirms that surrogate-reared pups survive at a rate comparable to that of their wild kin. Unlike the animals translocated to San Nicolas Island, these wild-released otters are accepting Elkhorn Slough as their home territory.

'Typically, if a sea otter has an established home range, it's going to want to move back to it,' Karl states. 'I think that's what we saw with the majority of the animals that were moved to San Nicolas. They tried to go back home.'

By contrast, most of the surrogate-reared sea otters stayed put after they were released into Elkhorn Slough. Karl says that's because they were 'ecologically naive' when they got separated from their mothers. 'They just hadn't been alive long enough to establish a territory', he says. 'In many cases, they probably stranded on the day they were born.'



Surrogate mothers like "Abby" (left) at Monterey Bay Aquarium help raise wild-born, stranded pups. Eventually surrogate-reared otters will be released back into the wild to contribute to the recovering southern sea otter population along California's central coast.

The surrogate-reared otters' lack of site fidelity, combined with survival and reproduction rates on par with their wild counterparts, makes reintroducing these animals elsewhere a concept worth investigating.

Historically, estuaries along the entire California coast supported sea otter populations. 'Today', Kyle remarks, 'many of our state's ecologically degraded estuaries could benefit from the sea otters' return'.

'Surrogate-reared females were among the first to produce pups in Elkhorn Slough', he says. 'The fact that they have no ecological memory of another home makes them better candidates for reintroduction to unfamiliar habitat.' Where and when further reintroductions might be attempted remains to be seen. For now, the Aquarium is literally taking baby steps.

All photos: Monterey Bay Aquarium

The article [Surrogate rearing a keystone species to enhance population and ecosystem restoration](#)

is available in *Oryx—The International Journal of Conservation*.



## Monterey Bay Aquarium

With a mission to inspire conservation of the ocean, the Monterey Bay Aquarium is the most admired aquarium in the United States, a leader in science education, and a voice for ocean conservation through comprehensive programs in marine science and public policy. Everything we do works in concert to protect the future of our blue planet. This story was written by a team of writers and scientists: Dan Potter, Karl Mayer, Jessica Fujii, Michelle Staedler, Kyle Van Houtan, Athena Copenhaver, Kera Abraham Panni, and Ken Peterson, all of whom work with the Aquarium to conduct scientific research, create outreach content, or manage communications.