



EXECUTIVE SUMMARY

Sea otters (*Enhydra lutris*) once lived in coastal environments across the north Pacific Rim, from Hokkaido, Japan to Baja California, Mexico. A target of hunting for the maritime fur trade of the 1700s and 1800s, by 1911 the species was nearly extinct and survived in only a few small disjunct populations. As a result of slow population recovery and past reintroduction efforts, sea otters once again inhabit some areas of their historical range but are still absent from a substantial portion of the Pacific coast of the contiguous United States.

With the passage of Public Law 116-260 on December 27, 2020, in recognition of the sea otter's critical ecological role as a keystone species that significantly affects the structure and function of its marine environment, the U.S. Fish and Wildlife Service (Service or USFWS) received direction "to study the feasibility and cost of reestablishing sea otters on the Pacific Coast of the contiguous United States." This Feasibility Assessment of Sea Otter Reintroduction to the Pacific Coast (Assessment) constitutes our report to Congress.

To develop this Assessment, we relied upon the principles of the International Union for the Conservation of Nature (IUCN) guidelines for evaluating conservation reintroductions (IUCN/SSC 2013). These guidelines call for the identification of clear objectives for a reintroduction; an assessment of whether the reintroduction will result in a net conservation benefit to the species and its ecosystem; an evaluation of feasibility from a biological, socioeconomic, and legal perspective; and an evaluation of the risks to ecological, social, and economic interests associated with the reintroduction.

Approach and Scope of this Assessment

This Assessment is intended to be read as a companion to a study of the feasibility of restoring sea otters to the Oregon coast released on August 30, 2021, by an Oregon non-profit organization, the Elakha Alliance. The Elakha Alliance Feasibility Study (EAFS) is available online at <https://www.elakhaalliance.org/feasibility-study/>. Because the Elakha Alliance has already compiled much of the best available scientific information on the topic, we largely adopt and incorporate their compendium of the science by reference, and to avoid duplication of effort in our Assessment we emphasize the socioeconomic and legal aspects of feasibility (section 1.2). This Assessment expands the scope of geographic consideration beyond the Oregon coast; as explained in section 1.2.1, we focus our study of feasibility on the potential reintroduction of sea otters to the largest remaining gap in their historical range, from northern California (from San Francisco Bay) into Oregon.

Objectives of Reintroduction: Benefits to the Species and to the Ecosystem

Sea otter reintroduction would advance two interrelated and overarching conservation goals (section 3.1):

1. Restoration of the species, *Enhydra lutris*, within important gaps in its historical range, including improving the status of the federally threatened subspecies, *E. l. nereis* or southern sea otter, and
2. Restoration of ecosystem function, including enhancing ecosystem resilience, biodiversity, carbon sequestration, and resilience to the effects of climate change.

We conclude there would be multiple substantial benefits to the species from a reintroduction of sea otters to their historical range in northern California and Oregon. These benefits would stem from the improved conservation status of the species rangewide, and depending on the reintroduction scenario, could benefit the threatened southern sea otter in particular through range expansion and enhanced genetic diversity (section 6.1.1).

There would also be multiple substantial biological and ecological benefits to the nearshore marine ecosystem from a reintroduction of sea otters to their historical range in northern California and Oregon. These benefits would be realized as a consequence of the ecological effects of the sea otter as a keystone predator and its positive indirect effects in restoring ecosystem function, including facilitating recovery of kelp and seagrass systems, greater biodiversity, enhancing resilience of these systems to the effects of climate change, and other valuable ecosystem services (section 6.1.2).

Feasibility and costs of sea otter reintroduction

On the basis of our evaluation of the biological, socioeconomic, and legal aspects of reintroduction, we conclude overall that the reintroduction of sea otters to northern California and Oregon is feasible. The ultimate success of reintroduction, however, would require additional work to overcome some challenges, particularly in the socioeconomic sector.

Biological feasibility

The sea otter has been the subject of intensive biological study for many decades. Although our knowledge is by no means complete, a remarkable amount of data exist on the biological and ecological needs and interspecific relationships of the sea otter, as well as a growing understanding of sea otter behavior and population dynamics. The EAFS provides a thorough summary of the state of biological and ecological knowledge of the sea otter, which we have further supplemented in this report. The EAFS includes a web-based population model that is specifically designed to forecast sea otter population growth and expansion under various reintroduction scenarios on the Oregon coast. A similar integrated population model was recently developed for the southern sea otter in California. These models serve as essential tools for any future decision making regarding potential sea otter reintroductions.

We also have the advantage of learning from past reintroductions of sea otters. Although not all were successful, and many experienced high levels of post-release dispersal and/or mortality, most ultimately resulted in significant improvements to the conservation status of the sea otter following its near extinction. Populations established through past translocations account for roughly one-third of all sea otters in existence today and have successfully restored the species in many parts of its historical range. Experiences with past translocations have also informed the improvement of reintroduction techniques.

Uncertainties with regard to whether nearshore marine systems will be suitable to support a reintroduced population of sea otters due to the negative effects of climate change are often raised as a risk factor. We view the expansion of the sea otter's range and the establishment of additional populations as essential to enhancing the capacity of sea otters to adapt and persist in the face of these increased stressors. Our position is that reintroduction would reduce the risk to the species or subspecies associated with climate change.

On the basis of the current state of knowledge of sea otter biology, ecology, behavior, and habitat availability, as well as the demonstrated success of past translocation efforts, we conclude sea otter reintroduction is feasible from a biological perspective.

Socioeconomic feasibility

Biological feasibility alone does not determine the probable success of a species reintroduction; social and economic factors are also essential considerations (IUCN/SSC 2013). This report identifies both the potential benefits and potential negative impacts of restoring sea otters to their historical range on the Pacific coast from a socioeconomic perspective, adding to the discussion provided in the EAFS to inform decisions regarding a possible reintroduction.

We conclude the species and ecosystem will benefit from the restoration of this keystone species, but we are aware of concerns regarding potential socioeconomic impacts of sea otters, in particular with regard to competition for shellfish resources. Recent studies have demonstrated an overall net economic benefit in areas where sea otters have recolonized, with economic gains from increased ecotourism and ecosystem benefits such as carbon sequestration substantially outweighing losses to the shellfish industry. We recognize that such a high-level approach does not fully appreciate the economic and potentially cultural impacts to individuals, families, and businesses or communities that could be most directly affected by a reintroduction effort. Although ultimately sea otter reintroduction might result in net economic gains, there will be inequities in who will share in those gains. In this document we recommend the exploration of both traditional and innovative measures to mitigate potential negative economic impacts and increase the likelihood of reintroduction success.

Our initial but necessarily cursory evaluation leads us to conclude that substantial widespread economic impacts from the reintroduction of sea otters to northern California and Oregon are unlikely and that socioeconomic impacts that may be experienced are likely to remain localized for the foreseeable future (see Socioeconomic Feasibility, section 4.2). We therefore conclude that reintroduction is feasible overall from a socioeconomic perspective. However, there is a significant degree of uncertainty (and therefore risk) associated with that conclusion. In part this is due to the fact that specific reintroduction sites have yet to be identified. It is important to understand the likely socioeconomic impacts, both positive and negative, that will be experienced specific to the areas, communities, and stakeholders that would be affected by a specific reintroduction effort. The need for a comprehensive socioeconomic impact assessment focused on likely reintroduction sites is one of our primary recommendations in this Assessment.

Legal feasibility

Implementing the reintroduction of sea otters would involve navigating multiple regulatory and administrative processes to ensure compliance with all applicable laws. We have not identified any legal issues that would prevent the reintroduction of sea otters to northern California and/or Oregon; thus, reintroduction is legally feasible. However, we have identified a few legal issues that, while not insurmountable, may require more attention to increase the likelihood of reintroduction success.

For the southern sea otter, the concern of some stakeholders is that the Marine Mammal Protection Act (MMPA) specifically excludes the subspecies from the section of the statute that allows for the authorization of incidental take in the course of commercial fishing operations (16 USC §1387). Another issue is that the take moratorium for marine mammals under the MMPA (16 USC §1371) does not easily allow for the subsequent removal of sea otters (by capture or culling) should they be deemed a problem¹ (e.g., if they were determined to have significant negative impacts on catch or harvest in shellfisheries), as some ocean user groups have suggested as a prerequisite for reintroduction.

Cost estimates

The actual costs of reintroducing sea otters are uncertain and will vary based on the source population, distance to reintroduction site, capture techniques, transportation methods, and number of sea otters captured annually. To estimate potential costs, we evaluated a range of plausible reintroduction scenarios (section 4.4). Based on these scenarios, we estimated that the total cost of sea otter reintroduction will range from \$26 million to \$43 million dollars over a 13-year period. This estimate includes pre-reintroduction habitat evaluation (3 years), acquisition and release of sea otters (releases of wild captured otters over 5 years and/or surrogate reared otters over 10 years), habitat and population monitoring (10 years), and postmortem and oil spill response programs.

Risk Assessment

Species reintroductions are intended to achieve conservation benefits, but they can also carry risks to ecological, social, and economic interests. A wise decision as to whether to proceed with a reintroduction therefore relies upon a thoughtful and informed evaluation of both the benefits and risks of the action. We used the IUCN's definition of risk as "the probability of a risk factor occurring, combined with the severity of its impact" (IUCN/SSC 2013). If a potential risk factor has a low probability of occurring or the anticipated impacts are inconsequential, we did not consider that factor to pose a risk. As described in our Risk Assessment (section 5), we concluded that several of the potential risk factors we assessed are either unlikely to be realized or would have negligible adverse impacts. We did, however, identify a few important risk factors that require further consideration.

The primary risks we identified in association with sea otter reintroduction are as follows:

- The possible mortality or dispersal of a high percentage of individuals from the reintroduction site, particularly if reintroduced otters are translocated from the wild as opposed to from a surrogate-raising facility
- Possible negative socioeconomic impacts on shellfish fisheries as a result of reductions in target species from sea otter predation
- Economic losses as a result of potential prohibitions or restrictions on certain fishing gear uses
- Regulatory risk as a result of the take moratorium under the Marine Mammal Protection Act (MMPA), which makes it extremely difficult to authorize take associated with any actions to

¹ The MMPA does allow for individual nuisance animals to be captured and removed.

remove sea otters after reintroduction, should such an action be desired. In addition, section 118 of the MMPA, which allows incidental take of other marine mammals in the course of commercial fisheries, does not authorize incidental take for southern sea otters in the course of commercial fisheries.

- Financial risk due to the as-yet unidentified source of adequate and reliable funding to support all years of reintroduction and monitoring

We also considered the risk associated with not reintroducing sea otters (the “no action” alternative) as suggested by the IUCN Guidelines. We conclude there is risk, particularly to the threatened southern sea otter, from the lack of population redundancy (and therefore vulnerability to random catastrophic events) and diminished genetic diversity (and therefore diminished adaptive potential), that will continue or increase as a result of inaction.

Further information and/or study is required to reduce the uncertainties regarding the relative probability and severity of these risks. We have identified the need for further consideration of these risks under Recommendations (section 6.3) and additionally recommend possible measures to mitigate the degree of risk posed by these factors.

Key Uncertainties or Data Gaps

The following information or actions are recommended for further consideration of potential reintroduction efforts:

- Identification and application of site selection criteria to narrow the range of possibilities for analysis and reduce costs
- Identification and selection of a range of most likely reintroduction scenarios (founder animals, numbers, etc.) to narrow the range of possibilities for analysis and reduce costs
- Baseline evaluation of prey availability, mortality risk, and other biological and ecological criteria for sustaining a healthy sea otter population at potential reintroduction sites
- Comprehensive evaluation of the probable socioeconomic impacts of sea otter reintroduction at specific reintroduction sites, including positive and negative impacts and monetary and non-monetary values
- Exploration of possible regulatory flexibilities or changes, or other ways to mitigate potential negative socioeconomic impacts associated with reintroduction
- Identification of resources to support reintroduction and long-term post-release monitoring and management

Recommendations and Next Steps

To promote continued constructive dialogue regarding possible sea otter reintroduction and enhance the likelihood of success, in section 6.3 we make several recommendations to address key concerns or uncertainties identified in the course of developing this feasibility report for further consideration (see also Measures to Reduce Risk, section 5.2).

Having concluded that the reintroduction of sea otters is feasible, we recommend the following next steps for action presuming consideration of reintroduction to northern California and Oregon continues:

- Convene a series of facilitated structured decision making workshops with stakeholders and scientific experts to engage in collaborative problem-solving regarding the uncertainties or data

gaps identified, and to explore reintroduction options that might present an acceptable level of risk to all parties and increase the likelihood of success of a reintroduction effort

- Develop criteria for selection and evaluation of potential reintroduction sites using facilitated structured decision making workshops described above; criteria should include consideration of socioeconomic as well as biological information
- Initiate a rigorous socioeconomic impact study that considers the full range of negative and positive effects of sea otter reintroduction, including ecosystem services and other non-monetary values, once potential reintroduction sites are identified
- Develop plans for pilot studies and/or small-scale experimental reintroductions to assess the viability of using surrogate-reared southern sea otter pups or small numbers of wild captured sea otters in estuaries as a source for the establishment of new populations
- Integrate the population growth and expansion models that are currently separate for California and Oregon such that simulations can forecast outcomes considering the potential for interaction between reintroduced populations

Conclusion

The reintroduction of sea otters to northern California and Oregon would result in significant conservation benefits to the species, in particular to the threatened southern sea otter, and to the nearshore marine ecosystem.

Sea otter reintroduction is feasible from a biological perspective. Recent analyses demonstrate that suitable habitat is available, and the restoration of this native keystone species is anticipated to have positive effects on biodiversity, enhance kelp and seagrass systems, and provide valuable ecosystem services. Sea otter reintroduction is feasible from a legal standpoint as well, although some regulatory changes may be considered to increase the likelihood of reintroduction success.

Our preliminary evaluation indicates that reintroduction is feasible from a socioeconomic perspective, but we flag this as the factor with the greatest uncertainty (and thus risk). Although sea otters may produce significant economic gains from tourism, ecosystem services, and benefits to finfish fisheries, questions remain regarding the potential severity and scope of negative economic consequences on shellfish fisheries in particular, and sufficient data are not available at this time to inform consideration of these questions at the site-specific level. We recommend the completion of a comprehensive socioeconomic impact assessment once potential reintroduction sites are identified to determine the probability and scope or magnitude of all socioeconomic impacts, positive or negative, that may result from the reintroduction of sea otters to northern California and Oregon.

This document is intended solely to provide information to Congress and the interested public on the feasibility and estimated cost of a potential reintroduction of sea otters to the Pacific coast of the contiguous United States. We do not make any recommendation in this document as to whether reintroductions should take place. This is not a decision document and does not represent or predetermine any proposal for action.