

# Draft Environmental Assessment

## Reevaluation of Aquaculture and Commercial Shellfishing at Congressman Lester Wolff Oyster Bay National Wildlife Refuge

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Refuge

Oyster Bay, NY

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## Table of Contents

Executive Summary.....	1
Chapter 1: Introduction.....	2
1.1 Background.....	2
1.2 Purpose and Need for Action.....	3
1.3 Proposed Action .....	4
Chapter 2: Alternatives .....	5
2.1 Decision Framework .....	5
2.2 Alternatives .....	6
Alternative A – Allow Aquaculture and Commercial Shellfishing without FWS Oversight and Use Stipulations – No Action Alternative .....	6
Alternative B – Allow Aquaculture and Commercial Shellfishing with Use Stipulations – Preferred Alternative .....	7
Alternatives Considered, But Dismissed from Further Consideration .....	8
Alternative C – Allow Aquaculture but Prohibit Commercial Shellfishing .....	8
Alternative D – Prohibit All Aquaculture and Commercial Shellfishing .....	8
Chapter 3: Affected Environment and Environmental Consequences .....	9
3.1 General Description of Affected Environment Applicable to All Affected Resources .....	9
3.2 Natural Resources .....	10
Habitat and Vegetation: Affected Environment.....	10
Habitat and Vegetation: Environmental Consequences.....	11
Wetlands: Affected Environment.....	14
Fish and Wildlife Species: Affected Environment.....	14
Fish and Wildlife Species: Environmental Consequences.....	17
Candidate, Threatened and Endangered Species and Critical Habitat: Affected Environment .....	25
Candidate, Threatened and Endangered Species and Critical Habitat: Environmental Consequences.....	26
Water Quality: Affected Environment .....	27
Water Quality: Environmental Consequences .....	27
3.3 Cultural Resources.....	29

*Draft Environmental Assessment: Aquaculture and Commercial Shellfishing Reevaluation at Congressman Lester Wolff Oyster Bay NWR*

Cultural and Historic Resources: Affected Environment .....	29
3.4 Socioeconomics .....	29
Local and Regional Economies: Affected Environment .....	29
Local and Regional Economies: Environmental Consequences .....	30
Public Health and Safety: Affected Environment .....	30
3.5 Refuge Resources .....	30
Visitor Use and Experience: Affected Environment .....	30
Management, Operations, and Administration: Affected Environment .....	31
Management, Operations, and Administration: Environmental Consequences .....	31
3.6 Summary of Analysis.....	32
Alternative A – No Action Alternative .....	32
Alternative B –Preferred Alternative .....	33
<b>Chapter 4: Consultation and Coordination.....</b>	<b>34</b>
4.1 Public Involvement .....	34
4.2 State, Federal, and Local Agency Coordination .....	34
4.3 Tribal Consultation .....	34
<b>Chapter 5: List of Preparers and Sources .....</b>	<b>35</b>
5.1 List of Preparers.....	35
5.2 List of Sources Consulted.....	35
<b>Appendix A: Applicable Statutes and Executive Orders .....</b>	<b>45</b>

## Executive Summary

This environmental assessment (EA) evaluates three action alternatives and a no action alternative. The proposed action would allow aquaculture and commercial shellfishing with U.S. Fish and Wildlife Service (FWS) oversight and stipulations at the Congressman Lester Wolff Oyster Bay National Wildlife Refuge (refuge) based on a finding that it is compatible and contributes to the achievement of refuge purposes or the mission of the National Wildlife Refuge System (Refuge System) (50 C.F.R. § 29.1). Shellfishing has occurred at the refuge for decades through the reserved rights of the Town of Oyster Bay (Town). Under the no action alternative, aquaculture and commercial shellfishing would continue to occur within the refuge but without FWS oversight or stipulations ensuring compatibility.

This EA examines the potential environmental impacts associated with the proposed action and complies with the National Environmental Policy Act (NEPA)<sup>1</sup> in accordance with the Department of the Interior NEPA regulations (43 C.F.R. part 46; 516 Department Manual, or DM, 8), FWS policy (550 Service manual, or FW, 3), and other relevant regulations and requirements. NEPA requires examining the proposed action's effects on the natural and human environment.

The following resources were analyzed in the EA: habitat and vegetation; wetlands; fish and wildlife species; candidate, threatened, and endangered species; water quality; cultural and historic resources; socioeconomics; public health and safety; visitor use and experience and refuge management, operation, and administration (see Chapter 3 for more information). The FWS initially considered several other resources (such as floodplains, air quality, geology and soils, soundscapes, climate, and land use), which were ultimately dismissed from further analysis because neither the proposed action nor its alternatives would have the potential to result in impacts on these resources.

Based on the analysis presented in the EA and coordination and consultation with all appropriate federal, State, and local agencies, as well as federally recognized Native American tribes, the FWS has determined that the impacts associated with the proposed action and its

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<sup>1</sup> Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), and a Presidential Memorandum, Ending Illegal Discrimination and Restoring Merit-Based Opportunity (Jan. 21, 2025), require the Department to strictly adhere to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq. Further, such Order and Memorandum repeal Executive Orders 12898 (Feb. 11, 1994) and 14096 (Apr. 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such Orders is a legal impossibility. The FWS verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 C.F.R. Part 46 and Part 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum. The FWS has also voluntarily considered the Council on Environmental Quality's rescinded regulations implementing NEPA, previously found at 40 C.F.R. Parts 1500–1508, as guidance to the extent appropriate and consistent with the requirements of NEPA and Executive Order 14154.

*Draft Environmental Assessment: Aquaculture and Commercial Shellfishing Reevaluation at Congressman Lester Wolff Oyster Bay NWR*

alternative would not individually or cumulatively have a significant impact on the quality of the natural and human environment.

The draft EA will be available for public comment for a minimum of 30 days. Intra-service Endangered Species Act Section 7, Essential Fish Habitat, and National Historic Preservation Act section 106 consultations are ongoing.

## Chapter 1: Introduction

### 1.1 Background

National Wildlife Refuges (NWR) are guided by the mission and goals of the Refuge System, the purposes of an individual refuge, federal laws and executive orders, FWS policy, and international treaties. Relevant guidance includes but is not limited to the National Wildlife Refuge Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 United States Code [U.S.C.] §§ 668dd *et seq.*) (Refuge Improvement Act); and selected portions of the Code of Federal Regulations (CFR) and the FWS manual.

See Appendix A for a list of relevant laws and regulations.

The mission of the Refuge System, as outlined by the Refuge Improvement Act, is:

“to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

The Refuge Improvement Act directs the Secretary of the Department of the Interior to ensure that refuges are fulfilling the intended mission of the refuge system and the purposes of individual refuges (16 U.S.C. § 668dd(5)(a)(3)(A-M)).

Congressman Lester Wolff Oyster Bay National Wildlife Refuge (renamed from Oyster Bay NWR in 2020) was established in 1968 “...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds...” (Migratory Bird Conservation Act, as amended [16 U.S.C. §§ 715-715d, 715e, 715f-715r]). The refuge includes more than 3,000 marine acres composed of bay bottom in portions of Oyster Bay and Cold Spring Harbor, donated to the FWS by the Town. The refuge is part of the Long Island NWR Complex (Complex) with headquarters located in Shirley, New York.

Goals from the 2006 Long Island NWR Complex Comprehensive Conservation Plan (CCP) relevant to this EA’s proposed action include:

- Restore the biological health of aquatic habitats to high quality conditions on the Complex salt marshes, bays, tidal tributaries, and impoundments to benefit waterfowl and shorebirds dependent on these systems, while also supporting other native, wetland-dependent species.
- Provide priority wildlife-dependent recreational and educational opportunities when compatible with the resources and available funding.
- Communicate and collaborate with local communities and partners throughout Long Island to promote the Refuge System and the Complex.

The 1968 deed that established the refuge by donation from the Town reserved the Town’s right to issue leases, agreements and permits for shellfishing. The deed states that “the conveyance of such lands shall be subject to existing leases and agreements including without limiting leases for piers and shellfish, renewals of leases and agreements covering same, permits for taking shellfish or other products therefrom... provided that...such leases, agreements, renewals, and permits are not incompatible with the use of such lands for a migratory bird refuge, and fish and wildlife purposes.”

## 1.2 Purpose and Need for Action

The purpose of the proposed action is to fulfill the agency’s responsibilities under the Refuge Improvement Act regarding appropriate and compatible uses of the refuge, and thus ensure that aquaculture and commercial shellfishing, when administered by the Town in collaboration with FWS, would contribute to the achievement of the refuge purpose or the Refuge System mission.

The need for the proposed action is to comply with the Refuge Improvement Act’s mandate to reevaluate this type of use every ten years, and to meet terms of a legal settlement in *North Oyster Bay Baymen’s Ass’n v. U.S. Fish and Wildlife Service, et al.*, C.A. No. CV-23-3155 (E.D.N.Y.) See 16 U.S.C. § 668dd(d)(3)(B)(vii); 50 C.F.R. § 26.41(a)(15). The legal settlement involved a lawsuit by the North Oyster Bay Baymen’s Association and Center for Food Safety on April 26, 2023, which alleged that FWS violated the Administration Act by failing to reevaluate the compatibility of shellfishing and failing to issue special use permits for commercial activities in the refuge. The lawsuit was settled on April 29, 2024, requiring that FWS issue a compatibility determination (CD) evaluating whether shellfish harvesting, including via hydraulic and mechanical dredging, is compatible with the refuge’s purposes or Refuge System mission.

This EA serves as the NEPA compliance that analyzes the anticipated impacts on environmental, cultural, and historic resources if aquaculture and commercial shellfishing on the refuge is allowed. A separate EA and CD analyze the impacts of recreational shellfishing on the refuge. FWS is distinguishing recreational shellfishing from commercial shellfishing—due to differences

in harvest methods, tools, environmental impacts, locations, and seasonal timing. Recreational shellfishing is considered a wildlife-dependent, priority public use of the refuge, whereas commercial shellfishing is not. As a result, each use is subject to a different standard when evaluating compatibility under policy (50 C.F.R. § 29.1).

### 1.3 Proposed Action

The FWS proposes to find that the Town's reserved right to administer aquaculture and commercial shellfishing within the refuge boundary is compatible with refuge purposes or the mission of the Refuge System. The finding is based on a reevaluation of the impacts of aquaculture and commercial shellfishing use in the refuge.

Aquaculture and commercial shellfishing on the refuge are closely linked — as evaluated in the compatibility determination and analyzed throughout this environmental assessment, without restoration of shellfish populations through aquaculture, sustained commercial harvesting is not currently compatible. Moreover, the socioeconomic benefits of commercial harvesting provide a strong incentive for a successful, ecologically restorative aquaculture program. Planned aquaculture activities are primarily intended to restore shellfish populations to densities providing ecological benefits, with secondary goals of supporting recreational and commercial harvesting. Aquaculture may include seeding, transplanting, and rearing of shellfish, and oyster reef construction including placement of approved substrates. These activities are expected to focus on two bivalve species regulated by New York State (State) that occur in Oyster Bay: hard clams or northern quahogs (*Mercenaria mercenaria*) and Eastern oysters (*Crassostrea virginica*) although these techniques could be employed in the restoration of other shellfish species.

Commercial shellfishing refers to the harvesting of shellfish within the refuge that could be sold for income or revenue or traded for goods or services. This includes the harvesting of bivalves as defined by New York State (6 CRR-NY §§ 15.1 and 47.1) and regulated by the Town and New York State that may occur in the refuge: hard clams or quahogs, soft shell clams (*Mya arenaria*), Eastern oysters, blue mussels (*Mytilus edulis*), bank or ribbed mussels (*Geukensia demissa*), and bay scallops (*Argopecten irradians*).

A special use permit (SUP) from FWS is required for economic activities under Refuge System policy (50 C.F.R. § 29.1). Specifically, SUPs are required for harvesters approved and permitted by the Town and New York Department of Environmental Conservation (NYDEC) that are seeking to perform the commercial harvesting activities described in the CD. Activities must be conducted in accordance with State and local laws and regulations, the stipulations in Commercial Shellfishing and Aquaculture CD, and any additional stipulations or permits required by the Town or State of New York.

As the Town reserved the rights to shellfish and aquaculture activities, FWS will not require the Town or its authorized agents (contractor, nonprofit, nongovernmental organization) acting on

the Town's behalf to obtain a SUP. The Town is responsible for administering the permits program for authorized aquaculture operators and for commercial shellfishing (separate from FWS SUPs).

Special use permits issued by FWS in close coordination with the Town may include specific allowable harvest volumes, and may place limitations on access to, or use of, specific locations of the refuge during specified times in efforts to achieve a sustainable population trend accounting for restoration and aquaculture inputs balanced with harvest extraction. Special use permits will also involve reporting requirements including, but not limited to, areas targeted for operations and harvesting, dates and duration of effort expended, and harvest volumes to include size classes.

Per FWS policy, aquaculture and commercial shellfishing are considered a "refuge management economic activity" (602 FW 2.6. N), which is "a refuge management activity on a national wildlife refuge that results in generation of a commodity which is or can be sold for income or revenue or traded for goods or services." As such, these uses will only be allowed if FWS determines "the use contributes to the achievement of the national wildlife refuge's purposes or the National Wildlife Refuge System mission" (50 CFR 29.1). FWS has concluded that aquaculture and commercial shellfishing collectively contribute to refuge purposes by being integral to ecological restoration that is expected to have a host of direct and indirect benefits for fish, wildlife, and plants, along with ensuring a more sustainable shellfishing program for the refuge and the Town.

A proposed action is an initial proposal and may evolve during the development of alternatives, the impact analysis, and public involvement. The lead federal agency may determine that there are other, better, or less impactful ways to address the purpose and need, resulting in a different preferred alternative. The proposed action and alternatives may change during the NEPA process as the agency refines its proposal and gathers feedback from the public, federally recognized tribes and tribal entities, and other agencies or organizations. Therefore, the final preferred alternative may differ from the initial proposed action and will be finalized at the conclusion of the public comment period after the incorporation of substantive comments. A decision to implement a proposed action will not be made until the environmental review process is complete.

## Chapter 2: Alternatives

### 2.1 Decision Framework

Following completion of the EA, the FWS Assistant Regional Director for Refuges in the Northeast Region will determine if the selected alternative is a major federal action that would significantly affect the quality of the human environment and, require preparation of an environmental impact statement or, alternatively, determine there would be no significant effects to the human environment and complete a Finding of No Significant Impact (FONSI).

The Congressman Lester Wolff Oyster Bay NWR recommends Alternative B: Allow Aquaculture and Commercial Shellfishing with Use Stipulations to the Assistant Regional Director for Refuges.

## 2.2 Alternatives

### Alternative A – Allow Aquaculture and Commercial Shellfishing without FWS Oversight and Use Stipulations – No Action Alternative

This alternative represents the status quo, which is to allow the Town to administer aquaculture and commercial shellfishing on the refuge without FWS oversight or restrictions. This alternative would not require coordination with FWS on temporal, spatial, or harvest methodology limits or biological monitoring by the Town. This alternative would allow the continued harvest of hard clams, soft shell clams, oysters, blue and ribbed mussels and bay scallops in accordance with Town and State regulations. This alternative would allow the Town to conduct aquaculture practices within the refuge for hard clams and oysters.

In the draft CD, FWS finds that aquaculture and commercial shellfishing are compatible with refuge purposes only with the implementation of a set of stipulations that allow mechanisms to adaptively manage the use through methods, timing, and locations of these uses, and that require coordination with FWS on issues such as monitoring of effectiveness and impacts. The stipulations include requiring special use permits for commercial shellfish harvesters.

Historically, both non-mechanical hand tool harvesting and mechanical harvest methods including industrial dredging occurred on the refuge through the Town's reserved rights. Non-mechanical hand tool harvesting generally occurs by manipulating shallow bottom sediments with rakes or tongs, liberating shellfish from the sediment and bringing them to the surface from boats approximately 18–24 feet in length that are not under power at time of harvest. Mechanical harvesting was allowed through a Town lease for underwater lands located within the estuary including portions of the refuge. This method has not been employed since October 2024 as the lease expired in September 2024. Commercial mechanical harvest methods included the use of a dredge that is towed by a vessel under motorized power. To make industrial commercial shellfishing harvesting more efficient, save manpower, minimize damage to the shellfish, and control predators, several companies modified dredges for the use of shellfish harvesting (NOAA, 1948). In recent years, until the Town's moratorium (September 2024), harvest of shellfish on the leased lands was accomplished with the use of a vessel with a Venturi suction dredge and five vessels with a harvest sled equipped with a hydraulically assisted harvesting scrape and basket (U.S. Army Corps of Engineers (USACE), 2022). A suction dredge pulls material from the bottom of the bay and deposits it on a chain mesh conveyor that sorts out objects less than 1 inch in diameter and returns them to the water with a separate conveyor (USACE 2022). The towed sled used for the harvest of hard clams reaches a depth of

3.5 inches, equipped with water jets that push water to the cutting edge of the blade to propel clams into the basket (USACE 2022).

This alternative would not achieve the need as described in Chapter 1 and therefore is not identified as the preferred alternative. Without the implementation of a set of stipulations that allow mechanisms to adaptively manage the use through methods, timing, and locations of these uses, and that require coordination with FWS on issues such as monitoring of effectiveness and impacts and the issuance of special use permits, these uses would not be compatible. Without the stipulations necessary to ensure compatibility and the coordination involved, FWS would not be able to fulfill the agency's responsibilities under the Refuge Improvement Act regarding appropriate and compatible uses of the refuge, and thus ensure that aquaculture and commercial shellfishing, when administered by the Town in collaboration with FWS, would contribute to the achievement of the refuge purpose or the Refuge System mission.

## Alternative B – Allow Aquaculture and Commercial Shellfishing with Use Stipulations – Preferred Alternative

Under the preferred alternative, FWS would allow aquaculture and commercial shellfishing on the refuge, under the condition that the Town and other users adhere to FWS protective stipulations. For example, commercial harvesting stipulations would only allow non-mechanized harvest methods, in alignment with Town Code and to allow for spatial and temporal limits as needed. The Town would coordinate with FWS on the areas it targets for restoration and on biological monitoring. Commercial shellfish harvesting would be allowed for only hard clams and oysters as these species will have active restoration and harvest offset seeding conducted. Commercial harvesting of bay scallops, blue and ribbed mussels, and soft shell clams would currently be prohibited in coordination with the Town, as current populations are low, no active restoration or harvest offset seeding is currently planned, and harvest impacts would currently be incompatible with refuge purposes without active mitigations, restoration, offsets, and further limitations.

Aquaculture would include specifications on adding substrates and safeguards for ensuring disease-free shellfish seed. For more detailed information, see the stipulations section within the CD for Commercial Shellfishing and Aquaculture.

This alternative best accomplishes the purpose and need of this EA, as described in Chapter 1. It would ensure that aquaculture and commercial shellfishing would be conducted on the refuge in a manner that contributes to the refuge purpose and the Refuge System mission. A successful ecological restoration that resulted from the Town's aquaculture and commercial shellfishing program, with oversight from FWS as expressed in the CD stipulations, would benefit many species of migratory birds and other fish and wildlife that inhabit Oyster Bay.

Under the preferred alternative, aquaculture and commercial shellfishing would be permitted to occur with coordination between the Town and FWS.

A set of stipulations aligning with the Town's program and establishing coordination are proposed to be implemented to ensure that commercial shellfishing does not negate the benefits of shellfish restoration. These include stipulations that allow for adaptive management, promote coordination, and enable limitations or reinforcements as needed on programmatic elements, such as allowable harvest methods, timing, locations, and Town-identified restoration areas. Through these coordination, monitoring, and adaptive management efforts, the overall impacts of these combined programmatic uses are anticipated to positively benefit the estuary habitat and ecosystem processes; the detrimental impacts are described in more detail throughout this assessment, but are anticipated to be short in duration, minor to negligible overall, and mitigated through the restoration benefits.

## Alternatives Considered, But Dismissed from Further Consideration

### Alternative C – Allow Aquaculture but Prohibit Commercial Shellfishing

This alternative would allow aquaculture as described under Alternative B, including limits on the methods and locations for placing shellfish seed and substrate, while prohibiting all methods of commercial shellfishing. This alternative was dismissed from further consideration because this action would not achieve the need as described in Chapter 1.

Such an action would require FWS to find that non-mechanical commercial shellfishing uses were not compatible with refuge purposes or the mission of the Refuge System. However, FWS finds commercial shellfishing compatible if protective stipulations are coordinated and implemented by the Town and FWS. Additionally, this alternative is likely to be ineffective in achieving the EA's purpose of ensuring that the proposed uses contribute to the refuge's establishment purpose or the Refuge System mission. The FWS is concerned that absent the socioeconomic benefits to the community from regulated commercial shellfishing, it will not be possible to sustain an aquaculture program that leads to successful restoration of estuary resources. Natural recovery of shellfish, and the fish and wildlife that benefit from them, is likely to be much slower than could be achieved through an active aquaculture program.

### Alternative D – Prohibit All Aquaculture and Commercial Shellfishing

Under this alternative, FWS would prohibit aquaculture and commercial shellfishing on the refuge, reversing decades of historical precedent and denying the Town its reserved rights specified in the donation deed that established the refuge. Such an action would require FWS to find that these uses were not compatible with refuge purposes or the mission of the Refuge System. However, FWS concludes in the draft CD that, if protective stipulations are coordinated and implemented by the Town and FWS, a combined aquaculture and commercial shellfishing

program is compatible with refuge purposes. In the absence of the ecological restoration that would result from a successful aquaculture and commercial shellfishing program, many populations of fish and wildlife, including migratory birds, could be present in much reduced numbers compared to if the estuary were restored. Natural recovery of shellfish, and the fish and wildlife that benefit from them, is likely to be much slower than could be achieved through an active aquaculture program. Given the result of the draft CD, this alternative was not carried forward for further consideration by FWS.

## Chapter 3: Affected Environment and Environmental Consequences

This section is organized by affected resource categories. Each affected resource section discusses the existing environmental baseline in the impact zone (potential area of impact of any of the alternatives) and the effects of the alternatives on each resource. Effects from the proposed action or alternatives are reasonably foreseeable changes to the human environment, whether adverse or beneficial as compared to the environmental baseline for the no action alternative. The impact analysis directly follows the description of the affected environment for a resource and is organized by alternative.

### 3.1 General Description of Affected Environment Applicable to All Affected Resources

The refuge consists of more than 3,000 acres located in the Town of Oyster Bay in Nassau County, New York. The refuge consists primarily of open water bay (92%) with interspersed shoreline habitat (8%). Aquaculture and commercial shellfishing would occur within the open water areas of the refuge in waters deeper than 3 feet. Aquaculture seeding or planting that occurred on the refuge will be concentrated on areas of the refuge with substrates conducive to oysters and hard clams (i.e., harder substrates with sand or shell, not soft mud sediments). Commercial shellfishing would be permitted in areas certified by the State as safe for shellfish consumption and outside of areas the Town designated as Marine Management Areas (MMA) and Shellfish Sanctuary Areas (SSA) resulting in a total harvesting area of approximately 2,250 acres.

Approximately 230 acres of tidal flats exist on the refuge. Although aquaculture and commercial shellfishing activities are not expected to occur here, tidal flats may be colonized by shellfish larvae enhanced by aquaculture cultivation. Recreational shellfishing can occur on these tidal flats.

Terrestrial habitats and species are not addressed here because no impacts are anticipated from aquaculture and commercial shellfishing.

## 3.2 Natural Resources

### Habitat and Vegetation: Affected Environment

The refuge has approximately 3,000 acres of tidally influenced open bay 2 to 9 meters in depth. Benthic (bay bottom) communities perform important ecological functions including cycling of nutrients, providing structure and habitat for other organisms, supporting planktonic food web interactions, and supplying prey to birds and bottom-dwelling fishes (Flanagan et al., 2019). Among the benthic organisms, oysters, clams, and other bivalves are noteworthy in their ecological contributions. As reviewed in Coen et al., (2007), Gobler et al., (2022), and the Long Island Sound Partnership (2018), bivalves serve as “ecosystem engineers” that provide several important ecosystem services. First, oyster reefs and clam beds serve as habitat (Coen et al., 2007), foraging grounds, and food for crabs and other invertebrates, fish, and birds (Long Island Sound Partnership, 2018). Second, they perform substantial filtering of bay waters, removing suspended solids, nutrients, and phytoplankton from the water column (Gobler et al., 2022, Coen et al. 2007, Long Island Sound Partnership 2018). When present in sufficient numbers, they can thereby improve water quality and clarity. This can help in controlling harmful algal blooms and facilitate the growth of submerged aquatic vegetation (SAV) (Gobler et al., 2022). Third, oyster reefs can protect shorelines from storms, supporting the growth of tidal marsh and SAV (Long Island Sound Partnership, 2018). Finally, they support substantial commercial and recreational fisheries (Long Island Sound Partnership, 2018). Over the past 150 years, bivalve populations have declined across the eastern seaboard including Long Island, with one contemporary indication of that being the drop in commercial landings reported over time (NYDEC, 2024), and efforts have been underway to restore their populations. The Town is implementing an aquaculture and ecological restoration program to increase shellfish populations within the estuary.

The Cashin Associates (2023) and Mueller (2023) studies found that most of the estuary bottom consists of a mixture of the three sediment classes – mud, sand, and gravel (including shell) – with the former lease areas containing relatively greater proportions of sand and gravel, while the unleased areas open to non-mechanical harvesting have greater proportions of mud. According to results of bottom surveys sponsored by the Town, the composition of much of the sediment in the former lease grounds (including areas of the refuge) is indicative of good clam habitat (higher amounts of shell, gravel and sand). However, the 2025 draft survey report indicated low hard clam densities (as of 2024), potentially due to prior shellfish harvest by commercial dredging without the benefit of shellfish seeding. Outside of the former lease areas, a greater proportion of the refuge is underlain by soft silt and clay sediments, especially the portions in Cold Spring Harbor and northeastern Oyster Bay; such areas are lesser quality habitat for oysters and hard clams. Mueller (2023) estimated that approximately 991 acres of Oyster Bay Harbor (not all of which is part of the refuge) showed the presence of dredge tracks

(both fresh and various aged tracks). A much smaller portion of the harbor, estimated at 136 acres, showed the presence of narrow, linear depressions left by commercial non-mechanical shellfish harvesters (Mueller, 2023).

Meadows of eelgrass (*Zostera marina*) were historically the most abundant SAV in Long Island Sound and are an important component of estuarine systems. There are two historically mapped locations of eelgrass meadows within the estuary but they are no longer present (Long Island Sound Partnership, 2003). Eelgrass meadows create structure, act as a nursery and settlement site for fish and shellfish, and are a food source to numerous estuarine and marine species including waterfowl (Carroll et al., 2008) and green sea turtles (*Chelonia mydas*). Eelgrass is especially important in the diets of American wigeon (*Mareca americana*) and brant (*Branta bernicla*), and many other dabbling ducks, diving ducks, and geese also consume eelgrass (Kollars et al., 2017).

## Habitat and Vegetation: Environmental Consequences

### Alternative A – No Action Alternative

The Town has designated 151 acres of the refuge (~5%) as no-harvest Shellfish Sanctuary Areas, with an additional 241 acres (~10%) designated Marine Management Areas for shellfish restoration that could allow future shellfish harvest. Recognizing that the estuary no longer contains wild oyster reefs (Fuss & O'Neill, 2009) and that hard clam populations have decreased, the restoration areas could have substantial benefits to the estuary. The potential for the sanctuary and management areas to serve as sources of eggs and larvae holds promise of dispersing shellfish with their beneficial impacts beyond the management areas. The enhancement of vertical structure and complexity has the potential to benefit many species of fish and wildlife, including migratory birds for which the refuge was established, while meeting a core component of the Refuge System mission of habitat restoration. This would be a long-term beneficial impact to the estuary. Adverse impacts to habitat from aquaculture seeding and placement of shells are expected to be minimal and temporary while the resulting habitat restoration will be beneficial.

There are few studies (Cerrato & Holt, 2008; Cashin Associates P.C., 2023; Mueller, 2023; Cashin Associates, P.C., 2025) available on the impacts of shellfish harvesting within the refuge, so we use the best available information on impacts of shellfish harvesting in similar habitat types where active research, study, data, and documentation exist (primarily along the eastern seaboard of the United States) to draw inferences on potential impacts within the refuge. The degree to which such impacts will occur is highly dependent on factors such as the frequency, duration, intensity (number of harvesters, areal extent and depth of harvesting activities), and efficiency of harvest effort; the physical nature of the substrate (bottom); and the types of tools used by the harvesters.

The physical actions of shellfishing may loosen and turn over bottom sediment, causing turbidity. Suspended sediments and accompanying sedimentation may smother or otherwise inhibit bottom-dwelling organisms, especially sensitive eggs and larvae (Nightingale & Simenstad, 2001; Wilber & Clarke, 2001) and stationary species. Abrasion and excavation of the seabed (including oyster beds, where these beds may be present once restored) may change the physical structure of the substrate, which constitutes habitat for a variety of organisms (Mercaldo-Allen and Goldberg, 2011). Alteration of sediment and vertical structure may negatively impact organisms through the loss of suitable habitat for larval settlement, foraging habitat, and removal of fauna (Dernie et al., 2003). Raking for shellfish could also uproot eelgrass (should it be restored) and other SAV. If eelgrass were to be restored on the refuge, raking could potentially adversely affect eelgrass beds. Use of rakes to harvest shellfish within eelgrass beds has been found to cause a loss in eelgrass biomass, with the severity depending on the type of rake used (McLaughlin et al., 2007; Peterson et al., 1987). Commercial dredging may have more severe effects than non-mechanical raking. Following commercial shellfish dredging, eelgrass beds may take more than five years to recover (Cole, 2016; Neckles et al., 2005).

The extent of potential physical impacts of non-mechanical harvesting in the estuary has been investigated by Cashin Associates, P.C. (2023) and Mueller (2023). Impacts to habitat and vegetation from non-mechanical harvest are expected to cause physical changes to the substrate from abrasion and excavation. The area disturbed depends on sediment type and characteristics of the raking tools, with sediment disturbance likely to be greater in soft bottoms or mud than in areas with a hard bottom. Powered by sails and tide sheets, the baymen rock a harvesting rake back and forth to move through the sediment. When the rake or other tool is pulled up to the surface, a sediment plume is formed as sediment is washed out of the rake. The area disturbed and extent of the plume varies depending on sediment type and characteristics of the raking tools, with sediment disturbance likely to be greater in soft bottoms or mud than in areas with a hard bottom. Mueller (2023) found that non-mechanical shellfishing generated linear depressions extending 0.3m (about 1 foot) deep. The total area of bottom affected was estimated to be 0.55km<sup>2</sup> (136 acres), much of which was in the refuge. Future commercial harvesting would be expected to continue to generate shallow sediment tracks, with their extent and persistence depending on factors such as the intensity and location of harvesting activities.

Decreased landings (NYDEC, 2024) and a recent population study conducted (Cashin Associates, P.C., 2023) indicate that shellfish populations on the refuge are currently at decreased levels relative to historical conditions but are likely to be improved and recovered through the Town's proposed aquaculture program and restoration efforts. Aquaculture that leads to restored oyster reefs and clam beds could have positive impacts to habitat and vegetation. Oyster reefs provide complex, three-dimensional structure that can serve as habitat for a variety of organisms that dwell or feed on the bottom (Ayvazian et al., 2020, 2022; Dumbauld et

al., 2009). Clam shells may also contribute to surface structure of the bottom. Shellfish restoration is therefore expected to create more complex habitats favored by or supporting various fish and wildlife species, as described in subsequent sections, thereby changing benthic habitats to conditions closer to those that existed prior to intensive shellfishing harvests. By improving water quality, shellfish restoration has the potential to facilitate recovery of SAV in the estuary. At the same time, restoring oyster reefs will displace existing bottom habitat for some species; the impacts from the conversion of soft bottom to oyster reef are considered minor and mostly beneficial to the estuary. Oyster reefs can also protect shorelines from storms, mitigating erosion and sustaining tidal marshes and SAV (Scyphers et al., 2011). Though not as obvious as for oyster reefs, clam shells may also contribute to surface structure of the bottom (Dumbauld et al., 2009). At the same time, restoring shellfish beds will displace existing bottom habitat for some species, with impacts depending upon the spatial area of the restoration (Dumbauld et al., 2009).

Under the no action alternative, the FWS would have less awareness, involvement, and coordination with the Town regarding the positive impacts to habitat and vegetation anticipated from aquaculture; FWS also would have less certainty about the impacts of commercial shellfishing on habitat and vegetation of the refuge. Without coordination, it would be difficult for FWS to understand impacts through time and collaborate on adaptive management to mitigate any developing, or cumulative impacts to habitat and vegetation. Absent coordination, FWS would have less influence on impacts and would rely on the Town independently performing aquaculture management. However, if the use increases to the point where impacts become more substantial—such as significant sediment disturbance or SAV loss—and those impacts exceed what is considered minor and temporary or not offset by the aquaculture program benefits, FWS would lack a mechanism to modify or manage the activity to ensure it remains compatible with refuge purposes or the Refuge System mission. This alternative would not achieve the need as described in Chapter 1.

## Alternative B – Preferred Alternative

The impacts under the preferred alternative are the same as those described for aquaculture and non-mechanical harvest methods as described under Alternative A, with the exception that FWS would collaborate with the Town through permitting, use stipulations, and monitoring. Mechanical harvest impacts as described under Alternative A would not occur as this harvest method does not align with use stipulations. This would ensure the impacts remain no more than minor and the use remains compatible with refuge purposes or Refuge System mission and to also understand the benefits described above are realized. A monitoring program will provide data on impacts and inform potential mitigation measures or adaptive management modifications that FWS and the Town could need to coordinate to maintain compatibility of the use should impacts arise or increase.

## Wetlands: Affected Environment

Although wetlands border some of the shores of the refuge, they are not expected to be directly nor significantly affected by aquaculture and commercial shellfishing, which occur in open water habitats. There is an expectation that wetlands will experience beneficial effects stemming from the restoration of oyster reefs and estuary-wide improvements to water quality. Environmental consequences to wetlands are not further considered here.

## Fish and Wildlife Species: Affected Environment

Congressman Lester Wolff Oyster Bay NWR, despite its dense neighboring human population, supports a wide variety of species, including marine mammals, birds, fish, and aquatic invertebrates. Several designations highlight the importance of the estuary for fish, birds and wildlife. The State of New York considers Oyster Bay and Cold Spring Harbor and associated tributaries to be Significant Coastal Fish and Wildlife Habitats (NYSDOS, 2005a, 2005b). Oyster Bay is also identified as a State Priority Important Bird Area (IBA) by the National Audubon Society. Important Bird Areas are discrete sites that support a large concentration of birds or provide habitat for a threatened or rare species or provide habitat for a bird with a limited range. The Oyster Bay IBA is described as having a developed shoreline but still offering significant wetland, shrub/scrub and forest habitats that benefit waterfowl, waterbirds and migratory songbirds (National Audubon Society, 2025).

The estuary is located within the Long Island Sound watershed, a designated “Estuary of National Significance.” National estuaries are established to protect and restore water quality and ecological integrity. Conservation issues identified in the estuary include water pollution and water quality, contaminants and nutrient loading, sedimentation, and potential future development leading to increased pollution and disturbance problems within the watershed (National Audubon Society, 2025). Additional concerns include the need to avoid or reduce activities that lead to degraded water quality, impacts to vegetated upland buffer zones, alterations of tidal patterns and impacts from navigational dredging (Fuss & O’Neill, 2009; Long Island Sound Partnership, 2025; NYSDOS, 2005a, 2005b). The Long Island Sound Partnership, Friends of the Bay and other organizations have identified a number of strategies to address conservation issues, improve habitats, and increase the abundance of wildlife in the estuary and broader Long Island Sound watershed published in the Comprehensive Conservation Management Plan (Long Island Sound Partnership, 2025) and the State of the Watershed (Fuss & O’Neill, 2009). In coordination with the Town and other stakeholders and partners, management of the refuge includes current understanding of the surface, subtidal, and benthic resources, combined with broad focus for a variety of migratory birds, shorebirds, and a host of additional species and habitat types discussed in this assessment resulting in an ecosystem-based management approach.

To interpret potential direct and indirect effects of aquaculture and shellfish harvesting in the refuge, it is important to consider the historical context and other conditions that may affect ecosystems. These include the historical presence and gradual loss of shellfish resources; numerous impacts to the Oyster Bay watershed from development and commercial shellfishing; water quality concerns such as elevated levels of bacteria and nutrients; the extent of allowable commercial shellfishing, and the Town's planned aquaculture program to restore shellfish populations and reverse some of the accumulated adverse impacts to the bay.

In the following review, species that the State of New York has identified as being of Special Status (such as being listed as endangered or threatened by the State) are marked with an asterisk (\*). Federally threatened and endangered species (which typically are also of State concern) are reviewed in a separate section.

## Birds

More than 125 bird species have been documented at the refuge, including 23 species of waterfowl (USFWS, 2006). Numerous waterfowl species overwinter in the estuary, with more than 20,000 ducks reported for one survey conducted during peak use. Other waterbirds found on the refuge in large numbers include double-crested cormorants (*Nannopterum auritum*), Forster's (*Sterna forsteri*) and common\* terns (*Sterna hirundo*), wading birds, and shorebirds. Certain areas of Oyster Bay, like Mill Neck Creek and Frost Creek, provide breeding habitat for American black duck\* (*Anas rubripes*), clapper rail (*Rallus crepitans*), and osprey\* (*Pandion haliaetus*), among others.

*Raptors*—Raptor species observed at Oyster Bay include osprey, northern harrier\* (*Circus hudsonius*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), sharp-shinned hawk\* (*Accipiter striatus*), and bald eagle\* (*Haliaeetus leucocephalus*).

*Waterfowl*— The refuge has the greatest winter waterfowl use of any of the refuges in the Complex. The numbers of waterfowl using Oyster Bay are lowest from May through August and start to increase in September and October. Dabbling ducks such as American black duck, gadwall (*Mareca strepera*), and mallard (*Anas platyrhynchos*) start migrating to the refuge in early autumn, and their diversity begins to increase in November. Waterfowl numbers peak and remain high from December through March, then decline in April. The New York State Department of State's Coastal Management Program (NYSDOS, 2005b) has singled out Oyster Bay as having the greatest concentration of waterfowl on Long Island's north shore. The three waterfowl species that most commonly use the refuge in winter, comprising approximately 85 percent of ducks, are greater scaup (*Aythya marila*), bufflehead (*Bucephala albeola*), and American black duck. The Bayville, Cold Spring Harbor, and Mill Neck Creek areas support waterfowl use during the same timeframes identified for Oyster Bay.

*Shorebirds, Gulls, Terns and Allied Species*— The most common waterbird on the refuge is the double-crested cormorant, which is seen year-round. Its numbers are highest from April through October. Great cormorants (*Phalacrocorax carbo*) appear at low numbers in the winter. Other waterbirds that use the refuge include loons (*Gavia* spp.), grebes (*Podilymbus podiceps* and *Podiceps grisegena*), herons and egrets (Ardeidae). Gulls are common in the refuge and normally reach a maximum of about 1,500 birds in the winter. Herring gulls (*Larus smithsonianus*) are more numerous in winter than in the warmer months. Great black-backed gulls (*Larus marinus*) are present year-round but are less numerous than herring gulls. Ring-billed gulls (*Larus delawarensis*) also are common in the winter months but they, too, are fewer than herring gulls. Laughing gulls (*Leucophaeus atricilla*) use the refuge in the summer, and Bonaparte's gulls (*Chroicocephalus philadelphia*) in the winter. Terns use Oyster Bay from May through October. The habitat is valued as a tern forage site with common and least\* tern (*Sternula antillarum*) use heaviest from May through August. Forster's terns are present on the refuge in September and October. Seven species of shorebirds are commonly observed on the refuge. The most common include black-bellied plovers (*Pluvialis squatarola*), dunlins (*Calidris alpina*), greater yellowlegs (*Tringa melanoleuca*), and least (*Calidris minutilla*) and spotted sandpipers (*Actitis macularius*) (USFWS, 2006). Semipalmated sandpiper\* (*Calidris pusilla*), short-billed dowitcher\* (*Limnodromus griseus*), and Hudsonian whimbrel\* (*Numenius phaeopus*) are all listed as special status species by NYDEC and could have suitable habitat in areas of the refuge and adjacent areas.

## Mammals

Harbor seals (*Phoca vitulina*) are primarily observed on and near the refuge in March. Several species of bats are also known to occur in the area of the refuge, but no impacts from aquaculture or commercial shellfishing are anticipated, and bats are not assessed further.

## Reptiles and Amphibians

The northern diamondback terrapin (*Malaclemys terrapin*) is common within the estuary, particularly in the Frost Creek and Mill Neck Creek areas.

## Aquatic Invertebrates

*Bivalves and other mollusks*—The estuary is home to populations of Eastern oyster\* and hard clam\*, along with soft shell clams, blue mussels, bank or ribbed mussels, and bay scallops\*. Other mollusks may include shortfin squid (*Illex illecebrosus*), longfin squid (*Doryteuthis (Amerigo) pealeii*), and a variety of snail species (NOAA, 2025).

*Crustaceans*—Common crustaceans that inhabit Long Island Sound and may be found in the estuary include American lobster (*Homarus americanus*), blue crab (*Callinectes sapidus*), and Atlantic northern shrimp (*Pandalus borealis*) (NOAA, 2025).

*Arthropods*—Horseshoe crabs (*Limulus polyphemus*), are residents of Long Island Sound utilizing the waters of the estuary and the surrounding beaches.

## Fish

A variety of fish species are known to exist, forage, and migrate through the bay and refuge waters. The National Oceanic and Atmospheric Administration (NOAA) has designated areas of the refuge as “Essential Fish Habitat (EFH)” for a number of species, including all of those listed in the remainder of this section. Species include Atlantic herring (*Clupea harengus*), Atlantic mackerel (*Scomber scombrus*), bluefish (*Pomatomus saltatrix*), black sea bass (*Centropristis striata*), pollock (*Pollachius virens*), scup (*Stenotomus chrysops*), and red hake (*Urophycis chuss*), among many others. Demersal/benthic fish species include summer flounder (*Paralichthys dentatus*), winter flounder\* (*Pseudopleuronectes americanus*), windowpane flounder (*Scophthalmus aquosus*), winter skate (*Leucoraja ocellata*), and little skate (*Leucoraja erinacea*) (NOAA, 2025). Some of these fish are important prey for birds, marine mammals, turtles, and other fish.

## Fish and Wildlife Species: Environmental Consequences

### Alternative A

FWS expects a recovery in habitat due to the proposed shellfish restoration. The physical recovery would be manifested by a more complex, three-dimensional structure to the bottom provided by oyster reefs and clam beds, beginning in the aquaculture seeding areas and eventually spreading to other areas of the refuge following spawning of established shellfish. Over time, the habitat recovery could benefit other fish and wildlife via direct and indirect mechanisms. The vertical structure would provide habitat for a variety of benthic invertebrates and fish. These organisms could serve as prey for other fish, birds, and harbor seals. Improved water quality and clarity could benefit SAV and a variety of other species. Increasing populations of clams and oysters could serve as food sources for many species such as crabs, horseshoe crabs, sea stars, diamondback terrapins, and diving ducks, including greater scaup.

The aquaculture program is intended to increase shellfish populations, a direct beneficial impact on the ecosystem. As noted previously, bivalves can serve as ecosystem engineers that substantially alter the physical and chemical environment, with indirect benefits to the other species that inhabit the area. Notably, oyster reefs are important nursery habitat for juvenile fish and are associated with high fish species diversity and fish densities (Ozbay et al., 2017). Oyster reefs have also been associated with increased populations of crabs and other marine invertebrates (Peterson et al., 2003; Searles et al., 2022). Oyster reefs are prime settling habitat for larval oysters, thus potentially resulting in a positive feedback loop from oyster restoration (Breitburg et al., 2000). Lehnert and Allen (2002) found that shells on subtidal bottoms could be essential habitat for juvenile species and foster a diverse assemblage of fishes and crustaceans.

The direct effect on shellfish populations from aquaculture and commercial harvesting will influence population numbers and distribution. The seeding of clams and oysters through enhancement activities will increase shellfish density within placement areas and influence populations outside of these areas as the shellfish spawn and larvae are dispersed. In 2025, the Town acquired 8,477,000 shellfish to grow out and distribute into the estuary. This included 5,133,000 oysters and 3,343,800 clams. The Town has identified the MMAs and SSAs based on suitable habitat characteristics including substrate type to offer optimal habitats for settlement and successful recruitment. The Town has indicated it intends to seed 20 million oyster and hard clam larvae per year (combined), if sources are sufficient, with seeding rates rising over time.

Commercial harvesting of shellfish can be expected to reduce populations of shellfish introduced by aquaculture, although this may also open new areas where shellfish larvae can settle as described in Mercaldo-Allen and Goldberg (2011). Recent shellfish harvesting data may inform what future harvesting could look like. The Town has reported 19 commercial permits were issued as of January 2026 for all Town waters (Oyster Bay Harbor, Cold Spring Harbor, Hempstead Bay and Town of Oyster Bay waters on the south shore of Long Island) during the 2025-2026 permit year. Based on 2024 harvest data, we estimate that the commercial non-mechanical harvesters removed approximately 1.7 million individual clams and 3,816 individual oysters from Oyster Bay and Cold Spring Harbor harvest units; the refuge is located within these units. Although harvest data do not directly distinguish between mechanical and non-mechanical commercial harvests, the September 2024 moratorium on mechanical harvesting allowed inferences on the magnitude of non-mechanical harvesting, as mechanical harvest was only allowed between July and September. While these estimates have considerable uncertainty, they nonetheless suggest the potential for harvesting to reduce shellfish populations within the refuge. Shellfish sanctuaries and other measures can reduce adverse impacts to shellfish being restored.

Impacts to shellfish populations from aquaculture and commercial shellfishing may be both short-term and long-term. In the short term, these activities collectively are expected to result in an immediate increase in shellfish populations. Over the long-term, successful restoration coupled with managed shellfishing should result in an even larger magnitude of increase in clam and oyster populations within the estuary that are more self-sustaining and less reliant on seeding and planting operations. Benefits would be enhanced by a sustained commitment by the Town to restoration coupled with other measures to protect estuary water quality from sources such as runoff of nutrients and contaminants.

Restoring shellfish populations through aquaculture can positively impact invertebrates, fish, sea turtles, and birds (Lehnert and Allen, 2002). Possible injuries, disturbances, and other impacts of commercial shellfishing on these organisms have also been outlined (Mercaldo-Allen and Goldberg, 2011). Applying these findings to the refuge, species of particular concern include fish, horseshoe crabs, and migratory birds. Oyster Bay and Cold Spring Harbor are identified as EFH for several species including demersal fish: juvenile and adult summer flounder, winter skate, little skate and all life stages of windowpane and winter flounder. These

species, especially during the juvenile stages, can be impacted by raking and dredging (Nightingale and Simenstad, 2001). With persistent, widespread, or long-term dredge activity this may result in lower densities of adults in these species (Nightingale and Simenstad, 2001). Placement of shells and planting of shellfish also has the potential to harm demersal fish eggs if placement occurs when eggs are present. On the other hand, aquaculture that successfully restores shellfish populations can be expected to benefit many fish. Overall, FWS anticipates a net benefit to fish populations from the restoration program that entails measures to protect sensitive fish life stages and allows for non-mechanical, sustainable shellfish harvesting.

Limited information is available on direct impacts of shell placement for aquaculture on benthic organisms, but it is plausible that some injury could occur. Less mobile and less robust species and life stages, such as eggs of species like winter flounder that lay their eggs on the bottom, would be more susceptible.

Research has shown a mutualistic relationship between bivalves and SAV communities, such as eelgrass (Carroll et al., 2008), and therefore shellfish restoration could play a role in facilitating reestablishment of SAV in places where it has been extirpated, such as Oyster Bay. Hard clams and oysters benefit from eelgrass communities as juveniles are provided with structure in which to grow and shelter from predators, and eelgrass (and other SAV) helps to provide sediment stabilization and oxygenation (Carroll et al., 2008). Additionally, healthy and productive shellfish beds may provide optimal conditions for eelgrass growth and bed expansion (Carroll et al., 2008), another indirect impact of shellfish restoration.

Population increases in shellfish, crustaceans, fishes, and aquatic vegetation due to shellfish restoration may benefit a variety of bird species that feed on these resources. Such indirect beneficial impacts are expected to outweigh potential direct negative impacts such as temporary disturbance of waterfowl during seeding operations. The timing of aquaculture operations (estimated to be June to October) does not overlap with the presence of wintering waterfowl (typically November through March), which is important given the refuge's purpose of protecting migratory birds. Aquaculture seeding operations from boat are anticipated to only occur a few times per year from one or two vessels that navigate slowly through the refuge. These operations may overlap with migratory bird stopover time windows, however the operations are so limited in scale and scope that the disturbance and level of impacts are likely to be very limited and minimal resulting in no to negligible impact on migratory bird populations and use of the refuge.

Artificially concentrated populations of shellfish sometimes found in aquaculture operations can create conditions favorable for the spread of pathogens and parasites, which may adversely impact not only the cultivated species, but also wild populations (Paillard et al., 2004). Ford et al. (2002) found a significant trend between higher planting densities and increased Quahog Parasite Unknown levels, highlighting the importance of following current research and industry standards for seeding at reasonable rates backed by monitoring. Using non-local sources for bivalve seeding stock risks the introduction of parasites (O'Shaughnessy et al., 2014); thus, seeding stock has been and should continue to be sourced locally. If direct negative impacts to shellfish populations from disease were not prevented or contained, it could lead to

further negative indirect impacts to fish and wildlife that benefit from healthy shellfish populations.

Invasive species, such as biofouling sea squirts (tunicates) (Carman et al., 2010), may have significant impacts on terrestrial and marine ecosystems when introduced via contaminated equipment. As in the case of shellfish disease, invasive species pose a risk of direct negative biological effects to shellfish and indirect effects to other fish and wildlife. Best management practices for shellfish sourcing, rearing and seeding as well as for substrate and shell sourcing and decontamination can greatly reduce and minimize these potential risks (O'Shaughnessy et al., 2014).

Shellfish harvesting may have both direct and indirect effects on organisms. Migratory birds and other vertebrates may be more affected by indirect than direct effects, but indirect effects are more difficult to assess because of the complexity of marine food webs and the variety of factors other than shellfishing that simultaneously affect marine organisms. A consistent theme in the shellfishing literature is that biological impacts are highly dependent on the specific location and harvest scenario considered as well as the characteristics of the organism. Even if an impact has occurred in one locale, that does not guarantee that it will occur at another, demonstrating the need for long-term site-specific information to accurately assess impacts.

Commercial shellfishing will reduce the adult shellfish population in the local harvest area. The significance and duration of such a reduction depends on several important factors, such as the intensity of shellfishing pressure, shellfish density, and quality of habitat. If local shellfish density is high such that individuals are competing with each other for space and resources, then removal of large shellfish could benefit remaining shellfish and shellfish larvae that can take advantage of the newly available resources and available habitat (Mercaldo-Allen & Goldberg, 2011). Mercaldo-Allen and Goldberg (2011) identified evidence of positive impacts from dredging, resulting in shellfish enhancement as a function of algae and silt removal and increasing available shell and sand within the dredge track for shellfish spat settlement. A similar benefit is anticipated as a result of non-mechanical raking. The ability of larval shellfish to recolonize an area also depends on factors such as predation pressure by crabs and other predators.

Bycatch refers to the unintentional capture of organisms during a harvest practice targeted at other species. There is limited literature available on the bycatch resulting from non-mechanical harvest. Fish and other mobile organisms should be able to evade hand tools, although more sessile and delicate organisms could be injured during the harvest process. In the case of dredging, impacts have been documented but bycatch generally is not collected or reported. Even when bycatch is returned to the water, injury and mortality may occur depending on the type of gear used, water oxygen levels, and surface temperatures. Smaller bivalves, with thinner shells, may be more susceptible to damage or mortality as a result of shellfish dredging for hard clams or oysters (Mercaldo-Allen & Goldberg, 2011).

Shellfish harvesting can affect benthic communities by directly injuring or displacing organisms

in the path of the gear. Injuries, displacement, or removal of sediment, even if not fatal by themselves, may attract predators that can more easily access the affected prey (Mercaldo-Allen & Goldberg, 2011). Organisms that live within and on top of the sediment will be most vulnerable, especially less mobile and less robust species and life stages, including eggs. Munari et al. (2006) found that non-mechanical raking resulted in changes to the macrobenthic community (which consisted largely of polychaete worms) but benthic organisms were able to recolonize raked areas relatively rapidly. Eelgrass provides habitat for these organisms. If eelgrass were to be restored on the refuge, raking could potentially adversely affect eelgrass beds. Use of rakes to harvest shellfish within eelgrass beds has been found to cause a loss in eelgrass biomass, with the severity depending on the type of rake used (McLaughlin et al., 2007; Peterson et al., 1987). Commercial dredging may have more severe effects than non-mechanical raking. Following commercial shellfish dredging, eelgrass beds may take more than five years to recover (Cole, 2016; Neckles et al., 2005).

Horseshoe crabs, which are important components of coastal ecosystems, may be injured during mechanical shellfishing. These injuries can lead to mortality or diminished reproductive success (Smith et al., 2017). Impacts are of concern because horseshoe crab eggs and larvae are a critical component of the diet of shorebirds on their northward migration (Beekey et al., 2013; Bopp et al., 2019), especially the federally threatened red knot. Adult horseshoe crabs are also important prey for endangered sea turtles and are predators of benthic organisms.

Demersal fish species, like flounder, are particularly vulnerable to dredging activities as they reside on or in the bottom substrates with life-history strategies of burrowing or hiding in the bottom substrate (Nightingale & Simenstad, 2001). Winter flounder eggs are especially susceptible to destruction or burial from dredging as they are clustered on the substrate surface. Demersal species may be injured by hydraulic water jets or dredge teeth.

Disturbance can be defined as human activity that alters the normal behavior of an organism, resulting in increased energy expenditure and potentially reducing productivity and survival rates (Knight & Gutzwiller, 1995; Mengak & Dayer, 2020). Commercial shellfishing is likely to cause some impact to wildlife from disturbance. Among the bird species potentially affected, waterfowl and gulls are present year-round on the refuge, with numbers peaking from December to March (USFWS, 2006). Terns and osprey feed on fish in open waters during warmer months. Other species including fish and marine species may experience disturbance from activities in the estuary.

Harbor seals can be found from November through May in the Long Island Sound and adjacent waters. Threats to harbor seals include entanglement, illegal feeding, harassment, habitat degradation, vessel collisions and chemical/microplastic contaminations (NOAA, 2025). Commercial shellfishing could lead to an increase in harassment or disturbance if harvesters are accessing sites near where seals are hauled out (resting on land). The Marine Mammal Protection Act (MMPA) requires that a minimum of 50 yards buffer be maintained around seals to avoid harassment. Based on the timing of the harbor seal presence and commercial shellfishing taking place exclusively in waters deeper than three feet, disturbance to harbor seals is likely to be negligible, especially if harvesters maintain the minimum distance from the

seals. Harbor seals are generalist species who forage primarily on fish. Although they may also feed on shellfish, based on their preference for fish and the limited level of commercial shellfishing the impact of reduced forage availability from commercial shellfishing is anticipated to be minor.

Boating can be a source of disturbance, with the degree depending on the species, time of year, behavioral activity, level of visitation, boat type, boat operator, and the juxtaposition of boaters and wildlife (DeLong, 2002). Potential impacts include general disturbance such as flushing of birds and behavioral changes as well as nest disturbance, direct and indirect mortality, nest abandonment, and habitat destruction from boating (Bouffard, 1982; DeLong, 2002; Knight & Cole, 1995; Knight & Gutzwiller, 1995; Purdy et al., 1986). Passing boats may also decrease fish abundance or otherwise impact communication and behavior among fish (Becker et al., 2013; Whitfield & Becker, 2014). These types of disturbance are temporary and generally localized and may vary depending on wildlife species or type of bird (Batten, 1977). Disturbances to wildlife and other harvesters by non-motorized boats are generally less than motorized activities due to the quiet nature of non-motorized boating, and generally low volume of use in any given area.

The direct physical, chemical, and biological impacts of commercial non-mechanized and mechanized harvesting described previously—such as abrasion of sediments and removal, injury and disturbance of organisms—can lead to a complex cascade of indirect biological effects that may be adverse, neutral, or beneficial, depending on the species or ecological function considered.

Turbidity, sedimentation, and alteration of vertical structure caused by shellfish harvesting could render areas less hospitable for some benthic organisms including shellfish, crustaceans and other invertebrates, and bottom-dwelling fishes. For example, Kaiser et al. (2001) found that, over the short-term, hand raking for the cockle (a European bivalve) increased damage rates to small cockles and adversely affected the benthic community. Communities recovered within a year, and the authors noted that recovery rates are highly variable depending on the sediment type and harvest practices evaluated. Logan (2005) found that the abundance of an amphipod (a type of benthic invertebrate) was lower in plots subjected to clam digging than in undisturbed plots. However, shellfishing studies have not always identified significant biological effects. Goldberg et al. (2012) did not find appreciable short-term differences in the benthic community between hard clam beds subject to hydraulic dredging vs. untreated control plots.

Predators may be adversely or positively affected by shellfishing depending on the prey species, harvest methods, and timescale considered. Shellfishing activities that disturb the sediment and injure or expose benthic organisms in the short-term may increase efficiency of predators such as fish that prey on benthic invertebrates (Mercaldo-Allen and Goldberg, 2011). Turbidity, on the other hand, may impair hunting efficiency of predators in addition to impeding respiration (Wilber & Clarke, 2001). If collective physical, chemical, and biological effects were severe significant enough to reduce alter plant and prey populations over a wide area over the long term, herbivore and predator populations and dynamics could be expected to be adversely affected as well. Affected species could include waterfowl that feed on aquatic vegetation or

shellfish, fish-eating waterbirds, sea turtles, and predatory fish. All these changes might result in reduced biodiversity, altered community structure, and other ecosystem effects (Alves et al., 2003).

Considering ecosystem-level impacts, shellfish dredging has been shown to cause changes in biodiversity, species composition, feeding habitats, and community structure (Goss-Custard et al., 2004; Gravestock & Pengelly, 2016). Reductions in heterogeneity of species over large spatial and temporal scales have negative consequences for diversity and stability at the population, community, and ecosystem scales (Leitão et al., 2009; Sewell et al., 2007).

The refuge was established specifically as a sanctuary for migratory birds, so effects of aquaculture and commercial shellfishing on migratory birds are of particular interest to FWS. Potential effects include both direct disturbance and indirect effects through the foods on which the birds feed. Regarding disturbance, as context, substantial commercial and recreational boat traffic and other water activities unrelated to shellfishing occur within the estuary and refuge. We have previously estimated that on peak weekends, approximately 3,000 recreational boats use the refuge (USFWS, 2006). Given their magnitude, it is anticipated that aquaculture and non-mechanical commercial shellfishing would provide only a minor level of additional impacts. Aquaculture-related boating will occur only occasionally, and the motorized boats employed in commercial shellfishing (not under power during active harvesting) are not expected to be highly disturbing. We do not anticipate disturbance to shorebirds because commercial oyster and hard clam harvesting do not occur on the mudflats where shorebirds rest and feed.

Indirect effects on birds could be more substantial. Birds of concern include waterfowl (ducks, geese, and swans), gulls and terns, cormorants, loons, and raptors (osprey and bald eagle). The diets of waterfowl on the refuge are diverse, with some specializing on shellfish (e.g., scoters), others on fish (e.g., mergansers), while still others prefer vegetation (e.g., wigeon). Terns, raptors, cormorants, loons, and (to a lesser degree) gulls consume primarily fish. All these species could benefit from shellfish restoration resulting from aquaculture due to the cascading of largely positive impacts of shellfish populations on other invertebrates, fish, and aquatic vegetation. If excessive shellfish harvesting interrupted this cascade, birds would not reap these benefits to the same degree.

Considering overall biodiversity of the estuary, Cerrato and Holt (2008) found that invertebrate species assemblages present in the sediment were opportunists and associated with recent disturbance, and Oyster Bay had low species richness compared to analogous areas (Cerrato & Holt, 2008). These findings point to the need to carefully manage and monitor aquaculture and shellfishing on the refuge.

As in the case of impacts to target shellfish populations, impacts to non-target species may be both short-term and long-term. Direct impacts such as injury of biota and disturbance of behavior during shellfishing operations are short-term in nature. Aquaculture may have short-term positive impacts via improved water quality, enhanced vertical structure that serves as habitat for other organisms, and increased prey availability for consumers of shellfish. Long-term increases in shellfish populations in the estuary, as intended by the Town's restoration

program, could have a cascade of beneficial effects through improved physical habitat, enhanced water quality, and stable or increasing populations of fish and wildlife that benefit from healthy shellfish populations.

Considering the collective physical, chemical, and biological impacts of aquaculture and non-mechanical commercial harvesting, restoration of shellfish populations in the refuge has the potential to provide net short-term and long-term benefits for many species of fish and wildlife that occur within the refuge and adjacent habitats. Restoration of shellfish populations and their viability through aquaculture practices can lead to structural and functional benefits to overall ecosystem dynamics and ecological integrity. Carefully managed harvest using non-mechanized tools targeting areas of high-density clams while adhering to Town regulations is unlikely to have lasting impacts on Oyster Bay resources given the dynamic tides and currents that regularly impact the sediment and the adaptations of marine organisms to this dynamic environment. This determination included a consulting conversation with NYDEC staff to ensure that consequences to New York Special Status Species were adequately addressed (K. Feade, personal communication, September 25, 2025).

The Town's Code does not currently allow hydraulic dredging for shellfish in the estuary. This kind of mechanical shellfishing appears to result in fundamentally more severe impacts than recreational or non-mechanical shellfishing via physical transformation of the substrate, increased turbidity and sedimentation, greater shellfish removal rates, increased injury to and bycatch of nontarget organisms, and indirect effects to fish, birds, and other wildlife due to reduced prey availability.

The prohibition on commercial hydraulic dredging of shellfish would prevent many potential adverse effects to fish and wildlife that result from abrasion and excavation of the seabed, large-scale removal of shellfish, turbidity and sedimentation, and injury and mortality from the dredging equipment.

Under the no action alternative, FWS would have less awareness and coordination regarding the expected recovery of fish and wildlife populations from a successful shellfish aquaculture program, as described under Alternative B. Absent coordination, FWS would have less understanding of impacts through time and less collaboration on adaptive management mitigations, relying on the Town's independent management of aquaculture.

The FWS also would have less certainty about the impacts of commercial shellfishing on fish and wildlife of the refuge under the no action alternative. It would be difficult for FWS to ensure an absence of adverse impacts to fish and wildlife or to coordinate and collaborate with the Town to refine adaptive management efforts to mitigate.

## Alternative B

The impacts under the preferred alternative are the same as those described for aquaculture and non-mechanical harvest methods as described under Alternative A, with the exception that FWS would collaborate with the Town through permitting, use stipulations, and monitoring. Mechanical harvest impacts as described under Alternative A would not occur as this harvest

method does not align with use stipulations. Additional stipulations avoiding substrate placement during flounder reproductive times (per coordination with NOAA Fisheries and the Town) and prohibiting impactful harvest of soft shell clams, scallops, and mussels helps to increase population recovery potential for those species. Under the preferred alternative, in alignment with Town Code, commercial shellfishing would be restricted to non-mechanical methods. Harvest would occur only in areas permitted by the Town outside of areas they target for sanctuary (estimated to compose about 5-15% of the refuge). In recent years, the Town has issued approximately 20 commercial shellfishing permits per year. Commercial harvesters would be required to obtain special use permits from FWS under the preferred alternative. The FWS proposes to coordinate with the Town on a monitoring program to confirm the success of the restoration program and ensure commercial shellfishing does not reverse the benefits of aquaculture to fish and wildlife.

If harvest effort, amount, or frequency increases detrimental impacts to the system or surpasses a sustainable harvest yield maintained by aquaculture activities, adjustments will need to be made to ensure the use remains compatible. Therefore, FWS will coordinate with the Town and other appropriate partner organizations in the development of a monitoring program that can inform assessment of impacts to wildlife and ecosystems from the aquaculture program and commercial shellfishing. A monitoring program will provide data on impacts and inform potential mitigation measures or adaptive management modifications that FWS and the Town could need to coordinate on to maintain compatibility of the use should impacts arise or increase.

### Candidate, Threatened and Endangered Species and Critical Habitat: Affected Environment

Federally listed endangered or threatened birds known to occur in Oyster Bay aquatic habitats are piping plover (*Charadrius melodus*), roseate tern (*Sterna dougallii*), and red knot (*rufa* subspecies, *Calidris canutus rufa*). Piping plovers are occasionally observed at Oyster Bay but have not been documented nesting in the area in the past fifteen years. Red knot and roseate tern appear to be rare visitors. Among sea turtles, Atlantic green (*Chelonia mydas*), and loggerhead (*Caretta caretta*) sea turtles are known to forage in Oyster Bay. It is possible that Kemp's ridley (*Lepidochelys kempii*) and leatherback (*Dermochelys coriacea*) sea turtles could occur occasionally. In general, sightings of sea turtles are rare in Oyster Bay, typically sea turtles in the Bay are victims of an injury or cold stunning. We are not aware of confirmed records of Atlantic sturgeon (*Acipenser oxyrinchus*) in Oyster Bay, but this endangered fish species is documented in Long Island Sound.

## Candidate, Threatened and Endangered Species and Critical Habitat: Environmental Consequences

### Alternative A

Aquaculture and commercial shellfishing are not expected to have significant impacts to threatened and endangered species or critical habitats. However, there may be less certainty of positive impacts from restoration, and less ability for FWS to influence outcomes, under the no action alternative. Although rare in the area, federally listed threatened and endangered species such as roseate tern possibly could benefit from restoration of the estuary.

Horseshoe crabs feed on marine invertebrates and themselves serve as food for shorebirds (in the form of eggs and larvae) and other organisms such as sea turtles. It is reasonable to expect that horseshoe crabs may benefit from ecological restoration of the estuary, and FWS is not aware of information that would indicate that non-mechanical shellfishing has significant impacts on horseshoe crabs. However, they may be vulnerable to mechanical harvesting practices, if those practices were resumed. The Town does restrict the take, injury, or destruction of any horseshoe crab between May 15 and July 15 (Town of Oyster Bay Code §196-39), but spawning can occur after this period, into September. Furthermore, outside of the spawning season, juvenile crabs remain in near-shore environments, which may have overlapped with previous hydraulic dredging operations.

Horseshoe crabs, which are important components of coastal ecosystems, may be injured during mechanical shellfishing. These injuries can lead to mortality or diminished reproductive success (Smith et al., 2017). Impacts are of concern because horseshoe crab eggs and larvae are a critical component of the diet of shorebirds on their northward migration (Beekey et al., 2013; Bopp et al., 2019), especially the federally threatened red knot. Adult horseshoe crabs are also important prey for endangered sea turtles and are predators of benthic organisms.

### Alternative B

The impacts under the preferred alternative are the same as those described for aquaculture and non-mechanical harvest methods as described under Alternative A, with the exception that FWS would collaborate with the Town through permitting, use stipulations, and monitoring. Mechanical harvest impacts as described under Alternative A would not occur as this harvest method does not align with use stipulations. A monitoring program will provide data on impacts and inform potential mitigation measures or adaptive management modifications that FWS and the Town could need to coordinate on to maintain compatibility of the use should impacts arise or increase.

## Water Quality: Affected Environment

Oyster Bay and Cold Spring Harbor are subtidal open bays with water depths ranging from two to nine meters. The main threats and concerns related to water quality are commercial shipping traffic, municipal sewage treatment facility outfalls, aging septic systems near the shoreline, and run-off from impervious surfaces associated with developed areas (Turner & Wurster, 2018). Overall water quality is generally considered good or healthy (USFWS, 2006). Although recent nitrogen sampling is not available, the advanced wastewater treatment facility serving the Oyster Bay Sewer District since 2006 has reduced daily nitrogen discharges by as much as 75% (Fuss & O'Neill, 2023). Seasonal fecal coliform levels have generally been declining over the past two decades, but fecal coliform levels periodically exceed the shellfish standard at some sites (Fuss & O'Neill, 2023). The State of New York has established permanent and seasonal shellfish closure areas based on proximity to known pollution sources, pathogen outbreaks, and other risk factors (NYDEC, 2025). These State-determined shellfishing closures include the entirety of the Mill Creek portion of the refuge (year-round) and the mouth of the river in Oyster Bay (seasonally). Small portions of the remainder of the refuge in Oyster Bay are closed year-round, with a small portion of the refuge in Cold Spring Harbor being closed seasonally.

## Water Quality: Environmental Consequences

### Alternative A

Shellfish populations are expected to increase substantially on the refuge through the aquaculture program.

Shellfish filter large volumes of water, which can improve water clarity and reduce nutrient levels (Barr et al., 2024; Ray & Fulweiler, 2021). Lower nutrient levels can mitigate harmful algal blooms and improve conditions for other marine life (Newell, 2004; Searles et al., 2022). Oyster reefs also promote efficient nutrient cycling (Ray & Fulweiler, 2021). Therefore, shellfish restoration has the potential for water quality effects that are regarded as largely positive.

The effectiveness of filtration is highly variable, however, depending on local conditions including bivalve population densities and estuarine flushing rate. If population densities are too low, water filtration capability is reduced and associated benefits to water quality, biodiversity, and sediment stability and content may diminish (Turner et al., 2019). Conversely, if population densities become too high in a location, capability of sediments to maintain nitrification processes may be overwhelmed. This leads to depletion of oxygen and disruption of normal benthic processes (Rice, 2008). Measurable reductions in particulate pollutants may only be achievable in smaller, closed systems (Kreeger et al., 2018).

Sediment disturbance in estuarine environments can remobilize nutrients and contaminated sediment from the bay bottom to the water column; additionally, algae using elevated

nutrients can deplete local oxygen (Coen, 1995; LaSalle, 1990; Roberts, 2012). If excessive, harvest of shellfish could be anticipated to dampen the multiple positive effects of filtration of the water column described above for shellfish restoration, including reduction in nitrogen and other nutrients. Effects could be short-term if population reductions were brief, or long-term if shellfish populations did not recover.

Shellfish restoration, such as long-term hard clam restoration that included spawner sanctuaries (no harvest zones with high adult clam density) in another region of Long Island (Gobler et al., 2022), has been demonstrated to have measurable improvements in water clarity and reductions in harmful algae. Such findings offer qualified support for benefits to water quality of the estuary from shellfish restoration, thus enhancing refuge ecological health and integrity, in alignment with the Refuge System mission. These positive impacts may be long-term if healthy shellfish populations are sustained. Quantitative predictions of the effects on water quality of the estuary from shellfish restoration would require more information on factors such as shellfish density, filtration rates, and estuary water circulation patterns.

Realizing these benefits requires both effective restoration and ensuring that shellfish harvesting does not offset the resulting water quality gains. Under this alternative, FWS would have no mechanism to impose limits on harvesting or restrict methods of take to avoid or reduce negative impacts.

Motorized boats used for aquaculture operations and commercial shellfishing also have the potential for chemical impacts. Boating can negatively affect wildlife through minor effects including water pollution from exhaust gases and spilled fuel. Motors may not be used during shellfishing, which should reduce the risk of fuel discharges. Measures should be implemented by boaters to prevent spills such as proper maintenance of outboard/inboard engines and carrying appropriate supplies to effectively clean up unintended spills or leaks.

Under the no action alternative, FWS would have less assurance that the improvements to water quality from a successful shellfish aquaculture program, as described under Alternative B, would actually occur. Absent coordination, FWS would have less influence on impacts and adaptive management mitigations and would rely on the Town to independently administer aquaculture management.

The FWS also would have less certainty about the impacts of commercial shellfishing on water quality under the no action alternative. It would be difficult for FWS to ensure an absence of adverse impacts to fish and wildlife or to coordinate and collaborate with the Town to refine adaptive management efforts to mitigate.

## Alternative B

The impacts under the preferred alternative are the same as those described for aquaculture and non-mechanical harvest methods as described under Alternative A, with the exception that FWS would collaborate with the Town through permitting, use stipulations, and monitoring. Mechanical harvest impacts as described under Alternative A would not occur as this harvest method does not align with use stipulations. A monitoring program will provide data on impacts

and inform potential mitigation measures or adaptive management modifications that FWS and the Town could need to coordinate on to maintain compatibility of the use should impacts arise or increase.

### **3.3 Cultural Resources**

#### Cultural and Historic Resources: Affected Environment

Section 106 of the National Historic Preservation Act (NHPA), as amended, requires FWS to evaluate the effects of any of its actions on historic properties (historic, architectural, and archeological properties). This affects assessment from the considered uses and alternatives contained in this environmental assessment and the associated compatibility determination have been reviewed and concurred upon by the FWS's regional historical preservation officer and cultural resource staff. There are no known underwater archaeological or historic sites that fall within the boundaries of the proposed refuge aquaculture and shellfishing areas.

Commercial shellfishing has occurred continuously in this area of the refuge since the early 1900s and utilized several collection methods, including hydraulic suctioning and raking of 1,800 acres of the bottom of the bay. Due to the destructive nature of these activities, any cultural resources that potentially existed on the bottom of the bay have likely already been disturbed and have consequently lost their archaeological integrity. While viewshed impacts on historic properties are an effect consideration of the NHPA, the activities involved in aquaculture and commercial shellfishing will have no impact on the viewshed since the activities occur under water, and any intrusion into the viewshed is temporary during the collection process. Effects are therefore not further considered.

### **3.4 Socioeconomics**

#### Local and Regional Economies: Affected Environment

Within Nassau County, New York, 60.7% of the population over the age of 16 years old is employed, 37.2% is not in the labor force, and the unemployment rate is 3.2%. The mean income for Nassau County, New York, is \$236,623.

The Town of Oyster Bay has a population of 6,900 individuals (U.S. Census Bureau, 2023) with a median income of \$102,540 annually. Median property value is \$634,600 with a home ownership rate of 51.3%.

Historically, the estuary was one of the most productive areas for shellfish in New York, with 90% of the State's oysters harvested there (Fuss & O'Neill, 2009). At their peaks, oyster and hard clam harvesting had a significant economic impact on the community. Shellfish harvesting has dropped dramatically in the past 20 years. In recent years, the Town has issued about 20

permits annually for commercial, non-mechanical harvesting, as well as about 300 permits for recreational shellfishing. To receive a permit, a harvester must be a Town resident. There does not appear to be significant sales of shellfishing equipment in the Town.

## Local and Regional Economies: Environmental Consequences

### Alternative A

Under the no action alternative, the socioeconomic impacts of the aquaculture and commercial shellfishing programs are difficult to predict. Over the long-term, if successful, aquaculture has the potential to restore oyster and hard clam populations. This in turn could increase the extent and profitability of shellfishing, with indirect economic benefits to the community through services and sales associated with shellfishing. Nevertheless, non-mechanical shellfishing without motorized power is a physically challenging occupation that requires specialized equipment and skills. The projected response by commercial harvesters and consequent socioeconomic impacts are therefore uncertain. A successful aquaculture program could increase opportunities for recreational shellfishing.

### Alternative B

FWS anticipates a similar potential for positive socioeconomic impacts as described for Alternative A. Positive impacts depend upon successful restoration of shellfish populations within Oyster Bay.

## Public Health and Safety: Affected Environment

Regardless of the actions taken by FWS, we anticipate that the NYDEC and the Town will continue their efforts to protect public health by preventing consumption of unsafe shellfish, such as through closure of contaminated shellfish beds to harvesting. We therefore do not further analyze risks to public health and safety.

## 3.5 Refuge Resources

### Visitor Use and Experience: Affected Environment

The refuge allows numerous recreational opportunities for visitors including canoeing, kayaking, boating, fin fishing, and recreational shellfishing. Per Town Code, recreational shellfishing is restricted to Town residents. It has been estimated that 50,000 visitors utilize the refuge annually (USFWS, 2006). All of these activities could continue under the two alternatives considered, and FWS is not aware of conflicts between commercial shellfish harvesters and

other visitors. Therefore, the impacts to visitor use and experience are not further considered here.

## Management, Operations, and Administration: Affected Environment

The refuge is part of the Long Island NWR Complex and is administered out of the Complex headquarters located in Shirley, NY. There is no visitor infrastructure at the refuge other than boundary signage. No staff are exclusively located there; rather, staff of the complex are responsible for the management, operation, and administration of the refuge. Because we determined in 1994 that FWS does not have jurisdiction over aquaculture and shellfishing at the refuge, current refuge management effort and expenditures related to aquaculture and commercial shellfishing are negligible.

## Management, Operations, and Administration: Environmental Consequences

### Alternative A

Under the no action alternative, impacts to refuge management, operations, and administration from aquaculture and commercial shellfishing would remain negligible.

### Alternative B

Under the proposed action alternative, refuge staff would take an active role in aquaculture and commercial shellfishing activities occurring on the refuge.

Refuge resources are required to ensure that the Town administers the use/program in a way that contributes to the fulfillment of the refuge purpose(s) and the Refuge System mission. Recurring refuge staff time can be expected to include:

- Annual consultation with the Town and review of annual reports about the aquaculture and commercial shellfishing program, including harvest.
- Regular consultation with the Town to ensure the shellfish program is adequately followed and implemented, including ongoing coordination on adaptive management and monitoring strategies.
- Cooperation with the Town, and potentially other partners, on implementing a monitoring program that can inform assessment of impacts to wildlife and ecosystems from aquaculture and shellfishing. This may involve shellfish monitoring; monitoring of migratory birds; and monitoring of habitats and other resources.
- Review of impacts on refuge resources provided by the Town or other authorities through the monitoring program at least every three years.

- Review and issuance of SUPs for commercial harvesters.

The FWS estimates that annual expenditures would be on the order of \$20,000 per year, with additional costs in the first year to establish consultations, plans, and processes. These costs have been itemized and estimated specifically in the associated compatibility determination availability of resources section. These expenditures would be necessary to protect refuge resources and ensure compatibility of aquaculture and commercial shellfishing with refuge purposes and the mission of the Refuge System. Some of the administrative costs necessary to administer this program will be offset with permit application and processing fees.

### 3.6 Summary of Analysis

#### Alternative A - No Action Alternative

Under the no action alternative, aquaculture and commercial shellfishing could occur without routine coordination and co-management occurring between the Town and FWS. If the Town's restoration program is successful, a number of beneficial impacts could occur. Restored shellfish populations would provide complex structure and habitat that could directly and indirectly benefit many species of fish, wildlife, and plants, including aquatic invertebrates, SAV, fish, turtles, marine mammals, and birds. Birds could benefit by feeding directly on shellfish as well as by feeding on SAV, fish, and other invertebrates. Although rare in the area, federally listed threatened and endangered species such as roseate tern possibly could benefit from restoration of the estuary. Adverse impacts to habitat from aquaculture seeding and placement of shells are expected to be minimal and temporary while the resulting habitat restoration will be beneficial.

In the absence of routine coordination and co-management occurring between the Town and FWS, FWS would have less certainty and less influence on impacts to habitats and wildlife from aquaculture and commercial shellfishing compared to the preferred alternative. If the prohibition on commercial hydraulic dredging were to be reversed in the future, potential adverse impacts could include abrasion and excavation of the seabed, large-scale removal of shellfish, turbidity and sedimentation, and injury and mortality from the dredging equipment. Impacts from non-mechanized shellfish harvesting are less intense, but without oversight, it could be difficult to ascertain whether adverse impacts to the sea floor and associated fish and wildlife were occurring and to mitigate such effects.

Impacts to water quality, if any, would be expected to be positive due to filtering of water by shellfish, assuming the Town proceeds with aquaculture activities. No impacts to wetlands are expected.

No known underwater archaeological or historic sites occur within refuge open waters, so no impacts to such resources are expected.

Socioeconomic impacts could be positive if the Town's restoration efforts are successful, enhancing recreational and commercial shellfishing opportunities. No conflicts with refuge visitors are expected from aquaculture and commercial shellfishing.

Impacts to refuge management, operations, and administration would be negligible under the no action alternative.

## Alternative B –Preferred Alternative

Under the preferred alternative, aquaculture and commercial shellfishing would continue to occur with routine coordination and co-management occurring between the Town and FWS. The impacts under the preferred alternative are the same as those described for aquaculture and non-mechanical harvest methods as described under Alternative A, with the exception that FWS would collaborate with the Town through permitting, use stipulations, and monitoring. Mechanical harvest impacts as described under Alternative A would not occur as this harvest method does not align with use stipulations. A monitoring program will provide data on impacts and inform potential mitigation measures or adaptive management modifications that FWS and the Town could need to coordinate on to maintain compatibility of the use should impacts arise or increase.

The benefits for Alternative B match those described under Alternative A for shellfish restoration through aquaculture

A set of stipulations aligning with the Town's program and establishing coordination are also proposed to be implemented to ensure that commercial shellfishing does not negate the benefits of shellfish restoration. These include stipulations that allow for adaptive management, promote coordination, and enable limitations or reinforcements as needed on programmatic elements, such as allowable harvest methods, timing, locations, and maintenance of Town-identified sanctuary area that are closed to shellfishing.

Regarding refuge management, operations, and administration, refuge staff would take an active role in aquaculture and commercial shellfishing activities occurring on the refuge. Recurring refuge staff time can be expected to include regular consultation and cooperation with the Town on adaptive monitoring and management, as well as overseeing special use permits for commercial harvesters. Annual expenditures would be on the order of \$20,000 per year, with additional costs in the first year to establish consultations, plans, and processes. These expenditures would be necessary to protect refuge resources and ensure compatibility of aquaculture and commercial shellfishing with refuge purposes and the mission of the Refuge System.

## Chapter 4: Consultation and Coordination

### 4.1 Public Involvement

This draft environmental assessment will be available for public review and comment for 30 days from April 20, 2026, to May 20, 2026. Members of the public will be notified of the availability of the draft documents through the refuge website, refuge social media, and the refuge visitor center. The draft document will be made available at the Wertheim NWR visitor center [340 Smith Road, Shirley, NY, 11967], via email [longislandrefuges@fws.gov] or it can be downloaded from the refuge website [<https://www.fws.gov/refuge/congressman-lester-wolff-oyster-bay>]. To access the document in an alternative format, contact the refuge. Comments may be submitted in writing via email or by mail to the refuge. Any comments, concerns, suggestions, or other feedback will be incorporated into the final environmental assessment if a substantive response is required.

### 4.2 State, Federal, and Local Agency Coordination

As part of the environmental assessment and compatibility determination for aquaculture and commercial shellfishing, State, federal, and local government and agency coordination was undertaken. Several conversations, email exchanges, and in-person meetings were conducted with the NYDEC Divisions of Fish and Wildlife and Marine Resources. New York State Parks, Recreation, and Historic Preservation were consulted to identify important related cultural and historically significant areas of concern and consideration.

Initial informal consultations, and later formal consultations were undertaken with FWS Ecological Services and NOAA National Marine Fisheries Service relating to Endangered Species Act Section 7 and Essential Fish Habitat concerns.

Close coordination and consultation with the Town of Oyster Bay's Department of Environmental Resources took place through email, calls and in-person meetings to discuss important considerations of the assessment and related determinations.

### 4.3 Tribal Consultation

One federally recognized Tribe is located on Long Island, New York: the Shinnecock Nation. The Shinnecock Nation primarily holds jurisdiction over tribal territory at Shinnecock Neck, a peninsula that juts into the Shinnecock Bay encompassing approximately 900 acres, and as well as land at Westwoods in Hampton Bays encompassing approximately 100 acres along the Peconic Bay. The Shinnecock Nation have been contacted as part of the tribal consultation process for this EA.

The Unkechaug Nation and the Matinecock Tribe will be notified of the opportunity to comment.

## Chapter 5: List of Preparers and Sources

### 5.1 List of Preparers

Noah Kahn, Conservation Planner, Division of Natural Resources and Conservation Planning, U.S. Fish and Wildlife Service Northeast Region  
Laurence Levesque, Refuges Planning Chief, U.S. Fish and Wildlife Service Northeast Region  
Patrick Moffett, Superintendent, Northeast Canyons and Seamounts Marine National Monument, U.S. Fish and Wildlife Service Northeast Region  
Meagan Racey, Chief of Staff, U.S. Fish and Wildlife Service Northeast Region  
Scott Schwenk, Chief, Division of Natural Resources and Conservation Planning, U.S. Fish and Wildlife Service Northeast Region  
Terra Willi, Wildlife Biologist, Long Island National Wildlife Refuge Complex, U.S. Fish and Wildlife Service Northeast Region  
Henry Woolley, Biologist, U.S. Fish and Wildlife Service Northeast Region  
Shaun Ziegler, Project Leader, Long Island National Wildlife Refuge Complex, U.S. Fish and Wildlife Service Northeast Region

### 5.2 List of Sources Consulted

The Shinnecock Nation  
National Oceanic and Atmospheric Administration National Marine Fisheries Service  
U.S. Fish and Wildlife Service Ecological Services  
New York State Department of Environmental Conservation Division of Fish and Wildlife  
New York State Department of Environmental Conservation Division of Marine Resources  
New York State Parks, Recreation, and Historic Preservation  
The Town of Oyster Bay Department of Environmental Resources

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*Draft Environmental Assessment: Aquaculture and Commercial Shellfishing Reevaluation at Congressman Lester Wolff Oyster Bay NWR*

Appendix A: Applicable Statutes and Executive Orders

**Applicable Statutes**

**American Indian Religious Freedom Act (AIRFA) of 1978:** Applicable. The proposed action requires tribal consultation, including considerations covered under the American Indian Religious Freedom Act (AIRFA) of 1978. Consultation details are provided in section 4.3 of this EA.

**Americans with Disabilities Act (ADA) of 1990:** Not applicable. The proposed action does not include any aspects of which would require ADA considerations beyond those already covered in other existing refuge compliance documents.

**Anadromous Fish Conservation Act of 1965:** Not applicable. Oyster Bay NWR is located along the Long Island Sound and is hydrologically connected to the Atlantic Ocean, but not to any freshwater riverine systems or lower classes of freshwater inputs associated with anadromous fish habitat.

**Antiquities Act of 1906:** Not applicable. Oyster Bay NWR neither contains nor is in proximity of lands designated under the Antiquities Act.

**Archaeological and Historic Preservation Act (AHPA) of 1974:** Applicable. The proposed action included required consultation with State and federal agencies regarding the preservation of historic and archaeological resources on refuge lands. Consultation details are provided in section 3.3 of this EA. No significant impacts to cultural resources are anticipated as a result of the proposed action.

**Archaeological Resources Protection Act (ARPA) of 1979, as amended:** Applicable. The proposed action included required consultation with State and federal agencies regarding the preservation of historic and archaeological resources on refuge lands. Consultation details are provided in section 3.3 of this EA. No significant impacts to archaeological resources are anticipated as a result of the proposed action.

**Bald and Golden Eagle Protection Act of 1940, as amended:** Applicable. Potential impacts to species, including those associated with this Act are analyzed in section 3.2 of this EA. Though bald eagles, and on rare occasions, golden eagles may occur on the refuge, the proposed action would not significantly impact these species in a manner associated with the defined protections in the Act.

**Clean Air Act of 1970:** Not applicable. The proposed action would not materially change, introduce, or add to potential sources of air pollution on the refuge, or in the surrounding area.

**Clean Water Act of 1972, as amended:** Applicable. The proposed action would not materially change, introduce, or add to potential sources of water pollution on the refuge, or in the surrounding area. In fact, the elimination of hydraulic dredging and harvesting on refuge lands may result in decreased water pollutants, as only non-motorized vessels may participate in commercial harvest activities. However, the addition of the aquaculture program requires additional analysis of potential impacts. Those analyses are provided in section 3.2 of this EA. No significant impacts to water resources are expected as a result of the proposed action and water quality would improve with the successful implementation of the aquaculture program.

**Coastal Barriers Resources Act of 1982.** Not applicable. The proposed project does not include any new development in undeveloped areas, nor any proposed actions that would relate to the National Flood insurance components of the Act.

**Coastal Zone Management Act (CZMA) of 1972, as amended:** Applicable. The proposed project, with the inclusion of the aquaculture program, directly aligns with Act's goal to "preserve, protect, develop and where possible, to restore or enhance the resources of the nation's coastal zone."

**Emergency Wetlands Resources Act of 1986:** Applicable. The refuge consists of 3,204 acres of bay bottom, tidal and subtidal habitat, along with small pockets of salt marsh and freshwater wetlands. Analyses of potential impacts to these resources are included in section 3.2 of this EA. Adequate mitigation measures will be established and no significant impacts to wetland resources are anticipated as a result of the proposed action.

**Endangered Species Act (ESA) of 1973, as amended:** Applicable. The proposed action requires consultation with NOAA and FWS to analyze potential impacts to listed species. Listed species were identified and either removed from consideration after consultation, or appropriate mitigation measures were established (e.g., the requirement of monitoring conducted by refuge staff and the Town). These analyses, mitigation measures, and details of ESA consultations are provided in section 3.2 of this EA.

**Farmland Protection Act of 1981, as amended:** Not applicable. No designated farmland occurs in the area of the proposed action.

**Federal Cave Protection Act (FCRPA) of 1988:** Not applicable. No caves occur in the area of the proposed action.

**Federal Noxious Weed Act of 1990:** Not applicable. The proposed action falls under the overall management of the refuge, and includes no activities related to, or requiring the need for control of noxious weeds. Noxious weed control, and associated analyses and management strategies are covered under the refuge's various management plans (e.g., CCP, HMP, etc.).

**Fish and Wildlife Act of 1956:** Applicable. The proposed action includes potential impacts to fish and wildlife species. Analyses of potential impacts are provided in section 3.2 of this EA.

**Fish and Wildlife Coordination Act (FWCA) of 1958:** Not applicable. No water resource development projects are associated with the proposed action. Additionally, potential impacts to wildlife resources are already included in the analyses associated with other NEPA (and other applicable statutes/EOs) compliance requirements. Those analyses are included in section 3.2 of this EA.

**Fishery (Magnuson) Conservation and Management Act of 1976:** Applicable. The proposed action required consultation with NOAA on resources covered by this Act. Potential impacts to species were analyzed and no significant impacts are expected for associated species. Analyses of the potential impacts are included in section 3.2 of this EA.

**Lacey Act of 1900:** Not applicable. No aspects of the proposed action would require analysis or considerations related to the Lacey Act. The shellfish harvest component of the program will be run by the Town and the NYDEC is responsible for regulatory oversight.

**Marine Mammal Protection Act of 1972, as amended:** Applicable. The proposed action would occur in an area where marine mammals may be present during portions of the year. Refuge staff consulted with NOAA and FWS to analyze potential impacts to marine mammal species. No significant impacts are expected from the proposed action. Analyses of the potential impacts are included in section 3.2 of this EA.

**Magnuson Stevens Fishery and Conservation Management Act of 1976, as amended:** Applicable. The proposed action required consultation with NOAA on resources covered by this Act. Potential impacts to species were analyzed and no significant impacts are expected for associated species. Analyses of the potential impacts are included in section 3.2 of this EA.

**Migratory Bird Conservation Act of 1929:** Not applicable. The proposed action does not include land/property acquisitions or components related to this Act.

**Migratory Bird Hunting and Conservation Stamp Act of 1934:** Not applicable. The proposed action does not include any land/property acquisitions or components related to this Act.

**Migratory Bird Treaty Act of 1918, as amended:** Applicable. Oyster Bay NWR has documented more than 126 bird species. However, the proposed action does not include activities that substantively change normal impacts and disturbance levels on the refuge or in the surrounding area. Additionally, the addition of the aquaculture program would actively restore depleted resources and habitat. No significant impacts are expected for migratory birds as a result of the proposed action. Analyses of the potential impacts to migratory birds are provided in section 3.2 of this EA.

**National Environmental Policy Act (NEPA) of 1969:** Applicable. This EA serves as recognition of the applicability of NEPA to the proposed action. The analyses and findings within this document, along with the associated FONSI, and consultations, constitute the required documentation for NEPA.

**National Historic Preservation Act of 1966, as amended:** Applicable. The proposed action included required consultation with State and federal agencies regarding the preservation of historic and archaeological resources on refuge lands. Consultation details are provided in section 3.3 of this EA. No significant impacts to historic resources are expected.

**National Wildlife Refuge System Administration Act of 1966, as amended:** Applicable. The proposed action directly addresses statutes in this Act by analyzing impacts associated with, and determining the compatibility of, commercial fishing and aquaculture on the refuge.

**National Wildlife Refuge System Improvement Act of 1997:** Applicable. The proposed action directly addresses statutes in this Act, and the National Wildlife Refuge System Administration Act of 1966 by analyzing impacts associated with, and determining the compatibility of, commercial fishing and aquaculture on the refuge.

**Native American Graves Protection and Repatriation Act (NAGPRA) of 1990.** Not applicable. The proposed action does not occur in an area known to have human remains, or sites with funerary objects, sacred objects and objects of cultural patrimony to lineal descendants of Indian tribes, Alaska Native Corporations and Native Hawaiian organizations.

**Noise Control Act of 1972:** Not applicable. Recreational shellfishing is conducted using only non-motorized vessels and would not produce substantive noise beyond other activities already occurring in the area. The area is densely populated, and vessels are active throughout the year.

**Paleontological Resources Protection Act of 2009:** Not applicable. The proposed action does not occur in an area known to have paleontological resources.

**Refuge Recreation Act of 1962, as amended:** Applicable. The proposed action is associated with a recreational activity.

**Resource Conservation and Recovery Act of 1976:** Not applicable. The proposed action is not associated with any solid or hazardous waste.

**Rivers and Harbors Act of 1899:** Not applicable. The proposed action does not include any construction-related activities, nor modifications to navigable waters.

**Safe Drinking Water Act of 1974:** Not applicable. The proposed action does not have any association with or impact on safe drinking water.

**Water Resources Planning Act of 1965 (sole-source aquifers):** Not applicable. The proposed action does not have any association with or impacts on safe drinking water, nor any association with drinking water aquifers.

**Wild and Scenic Rivers Act of 1968, as amended:** Not applicable. The proposed action does not occur in an area with designated Wild and Scenic Rivers.

**Wilderness Act of 1964, as amended:** Not applicable. The proposed action does not occur in an area with designated wilderness.

## **Executive Orders**

**EO 11593, Protection and Enhancement of the Cultural Environment:** Not applicable.

**EO 11644, Use of Off-Road Vehicles on Public Land:** Not applicable. Off-road vehicle use is prohibited on the refuge, and the proposed action does not include any change to that prohibition.

**EO 11987, Exotic Organisms:** Applicable. Introductions of exotic species are a concern for aquatic habitats in any setting. Adequate monitoring measures will be established in the and conducted in close coordination with the Town. Response actions are species-dependent and will be covered in detail in the monitoring plan.

**EO 11988, Floodplain Management:** Not applicable. The proposed action occurs in a coastal, tidally influenced area along Long Island Sound. While flooding is a possibility due to storm related events and tidal surges, the area falls within the 0.2 percent chance of flooding annually on the Federal Emergency Management Agency (FEMA) Flood Map Service.

**EO 11990, Protection of Wetlands:** Applicable. The refuge consists of 3,204 acres of bay bottom, tidal and subtidal habitat, along with small pockets of salt marsh and freshwater wetlands. Analyses of potential impacts to these resources are included in section 3.2 of this EA. Adequate mitigation measures will be established and no significant impacts to wetland resources are anticipated as a result of the proposed action.

**EO 12866, Regulatory Planning and Review:** Applicable. While no new regulation is associated with the proposed action, existing regulations in relation to this EO have been considered in

this EA. Additionally, the monitoring will be conducted to also account for requirements included in this EO.

**EO 12962, Recreational Fisheries:** Applicable. The proposed action, specifically the introduction of the aquaculture program, would benefit recreational fishing and shellfishing with anticipated benefits to water quality and habitat on the refuge and in surrounding waters.

**EO 12996, Management and General Public Use of the National Wildlife Refuge System:** Applicable. The proposed action will undergo required public review and directly contributes to the refuge-specific mission, along with the overall Refuge System mission. Additionally, the aquaculture program would enhance the existing recreational fishing and shellfishing programs through improved water quality and habitat, along with the re-establishment of healthy shellfish beds.

**EO 13007, Indian Sacred Sites:** Not applicable. The proposed action has been reviewed by the FWS Regional Archaeologist along with required consultations. Consultation details are provided in section 4.3 of this EA.

**EO 13084, Consultation and Coordination with Indian Tribal Governments.** Applicable. The proposed action included required consultation with State and federal agencies, and tribal governments regarding the preservation of cultural, historic, and archaeological resources on refuge lands. Consultation details are provided in section 3.3 of this EA. No significant impacts to archaeological resources are anticipated as a result of the proposed action.

**EO 13175, Consultation and Coordination with Indian Tribal Governments:** Applicable. The proposed action included required consultation with State and federal agencies, and tribal governments regarding the preservation of cultural, historic, and archaeological resources on refuge lands. Consultation details are provided in section 3.3 of this EA. No significant impacts to archaeological resources are anticipated as a result of the proposed action.

**EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds:** Applicable. Oyster Bay NWR has documented more than 126 bird species. However, the proposed action does not include activities that substantively change normal impacts and disturbance levels on the refuge or in the surrounding area. Additionally, the addition of the aquaculture program would actively restore depleted resources and habitat. No significant impacts are expected for migratory birds as a result of the proposed action. Analyses of the potential impacts to migratory birds are provided in section 3.2 of this EA.