



Wellfleet Selectboard

Note: Start Time of 7pm

The Wellfleet Selectboard will hold a public meeting on **Tuesday, May 30, 2023, at 7:00 p.m.** The Chapter 2 of the Acts of 2023, this meeting will be conducted in person and as a courtesy via remote means, per 940 MCR 29.10 and the Town's Remote Participation Policy. While an option for remote attendance and/or participation is provided as a courtesy to the public, the meeting/hearing may not be suspended or terminated if technological problems interrupt the virtual broadcast unless otherwise required by law.

Joining the Meeting:

In-person at the Wellfleet ACC, 715 Old King's Highway, Wellfleet, MA, 02667

Join the meeting hosted in Zoom by using the following link:

<https://us02web.zoom.us/j/85689604806?pwd=blplVFFBZzViQ0xNWkZKMm9iMVdrdz09>

By Phone: **phone +1 929 205 6099** and enter **Meeting ID: 856 8960 4806** | **Passcode: 611877**

Landline callers can participate by dialing *9 to raise their hand.

To Participate during public comment:

- Zoom: Raise hand to be called on to speak.
- Phone: dial *9 to raise your hand.

It is at the Chair's discretion to call on members of the public. All speakers must to recognized to speak. If attending a meeting in person, please find the closest available microphone and confine any personal conversations to the outside of the meeting room. Anyone may record the session but must notify the Chair and may not interfere with the meeting to record it.

Additionally, the meeting will be broadcast live, in real time, via live broadcast on Comcast cable (Wellfleet Government TV Channel 18), also available via livestream or Video on Demand (VOD) recordings at wellfleet-ma.gov

I. *Announcements, Open Session and Public Comments*

Note: *Public comments are limited to no more than two minutes per speaker. The Board will not deliberate or vote on any matter raised solely during Announcements & Public Comments.*

II. *Dredging of area II and Mitigation*

- A. Dredging Task Force members will provide more information and answer questions about the town's proposed mitigation plan required by the Army Corps of Engineers to secure the permit to dredge the harbor mooring field, thus allowing dredging of the first half of the mooring field to begin.

III. *Adjournment*

Wellfleet
proposed
changes

Wellfleet Harbor Dredge Mitigation Plan

Wellfleet, Massachusetts

Submitted to:

US Army Corps of Engineers
New England Division
Regulatory Division
696 Virginia Road
Concord, MA 01742

Submitted by:

Town of Wellfleet
300 Main Street
Wellfleet, MA 02667

GEI Consultants, Inc.
124 Grove St, Suite 300
Franklin, MA

May 22~~21~~24, 2023
Project No. 2004486

Mitigation Plan 33CFR 332(c) (2) though (14)

A. Goals and Objectives:

The Town of Wellfleet has proposed the dredging of 23.8 acres of tidal mudflats along with sub and intertidal resource areas as Area 2 in project plans. It is well understood that intertidal mudflat habitat is beneficial for many reasons. Mudflats can provide nursery habitat and food supplies for larger fisheries, support bird populations and protection of coastlines through the absorption and lessening of storm forces. There are however factors that influence the functionality of a mud flat.

The compensatory mitigation plan is submitted to offset the dredging work in Wellfleet Harbor Area 2, South Mooring Field. The mitigation plan consists of enhancing a 14-acre site of intertidal land in the Herring River, until the primary restoration area is accessible. The primary restoration site is a 28-acre parcel in Blackfish Creek. The Herring River area is currently designated as “conditional” by the shellfish regulatory authority, the Commonwealth of Massachusetts, while Blackfish Creek is designated in the “open” status, year-round by the state. This mitigation plan is separate from the Herring River Restoration Project (HRRP) and therefore is independent of the implementation, details, and effects of the HRRP. The mitigation plan will be implemented in two phases, each phase being defined by the location of its acreage. The designated areas will be restored initially by cultching, followed by shellfish propagation which will lead to improved water quality, and increased biodiversity resulting in the successful restoration of what was formerly a very productive shellfish habitat, and will provide protection of tidal mudflat habitat.

Objective enhancement would be measured using oyster density levels of twenty-five (25) individuals/m² throughout a 28-acre area (an areal density identified in the Chesapeake Bay Oyster Metrics Workgroup). It is important to note that the Massachusetts’ Division of Marine Fisheries uses a metric of approximately six (6) oysters per square meter as an indicator of “significant oyster resource”. Over a five-year period, our efforts will be to enhance this area so as to enhance oyster density with a target goal of 25 oysters/m². An increase in oyster density has been shown, though prior work in Wellfleet, to lead to a dramatic increase in biodiversity and water quality. Water quality success would be measured in relation to the EPA’s definition of “excellent” water quality designation. Biodiversity success would be measured through density and diversity of species as indicated in the attached performance standard. It is anticipated that the area would also become a resource for local shore birds, turtles, a wide variety of marine species and juvenile fish protection.

B. Site Selection:

The proposed mitigation sites are also classified as mudflat habitat and have also been influenced by human interaction. The proposed mitigation sites are in areas that had previously been degraded ~~for a variety of reasons, predominantly including through ice damage, harvest pressure, overfishing in the case of Blackfish Creek, as well as, restriction of water flow, disease, and, destruction from ice, increasing anthropogenic sources of pollution, or~~ other human influences. The proposed enhancement will positively affect areas outside of the proposed mitigation areas. Restoration of shellfish populations, water quality

and increased biodiversity in the restored areas will have wide ranging benefits for the Wellfleet Harbor system.

Each of the mitigation sites were carefully selected, based on its location and more importantly, for its restorative capabilities to return the designated area to its former habitat - a highly productive tidal mudflat with rich shellfish beds, naturally symbiotic flora and fauna, reduction in nuisance sedimentation and increased water quality and clarity. Each of these characteristics has been declining in the Wellfleet Harbor system over the last several decades. These factors combined with the proposed additional enhancement through cultching and protection of oyster habitat, will lead to a restoration and enhancement of 28 acres of mudflat habitat to the overall benefit of an enhanced Harbor ecosystem, benefitting all users.

Herring River (HR) Site 1 is the initial planned mitigation site; it is located in the Herring River in an area marked as conditional for shellfishing. HR 1 Site will be relinquished after the Blackfish Creek 1 Site workplan has been initiated. Refer to Appendix A, Figure 1 for location details. Blackfish Creek (BFC) Site 1 is the primary mitigation site; it is located in Blackfish Creek. Refer to Appendix A Figure 2 for location details.

C. Site Protection Instrument:

The proposed mitigation areas, along with all shellfishing areas in Wellfleet, are governed by MA GL Chapter 130. Shellfishing habitat in these areas is regulated through the Municipal Propagation Permit as granted to the Town by the State and regulated under MA DMF Shellfish Planting Guidelines. With respect to activities in the National Seashore (which is where the Phase 1 14-acre parcel is located), The Act of August 7, 1961, authorizing the establishment of Cape Cod National Seashore (75Stat. 284) says that “The Secretary may adopt regulations concerning hunting and fishing, subject to consultation with the Commonwealth and towns and the stipulation that all aspects of the propagation and taking of shellfish shall be left to the towns” (Cape Cod National Seashore Masterplan 10/7/1970).

The mitigation area in Blackfish Creek is designated as protected by the MA ACEC program (see Figure 2). This area is therefore subjected to closer scrutiny to avoid or minimize adverse environmental impacts by local and state agencies (<https://www.mass.gov/service-details/acec-program-overview>). The area will be indicated as a resource protection area on official shellfish maps, with local signage and routine patrol 364 days a year at each low tide during daylight.

The Town further agrees not to disturb the mitigation area through addition of a mooring basin, piers or other development (see attached Appendix B). Due to Division of Marine Fisheries regulations the area cannot be closed to harvest for longer than a three-consecutive year period. The Town of Wellfleet Shellfish Department will open the area for harvest in such a way as to ensure minimum density of oyster populations.

D. Baseline Conditions:

A pristine mudflat in an area of little human development, lower impact to the sediment, ~~and~~ little or no point source pollution, ~~and no harvest pressure~~ would be considered a pristine mudflat habitat with high functionality and value to the ecosystem.

The mudflat at Wellfleet Harbor and Shirt Tail Point has been consistently influenced by human use since 1644. The first modern era occurrence established the existing mooring field in 1955, although the area was used as a harbor previous to that time.

The area around the harbor is well developed with housing surrounding much of the coastline, especially to the north, east and south. This leads to significant sources of run off and non-point source pollution as well as ~~potential leaching from local septic systems~~ or other point source contaminants that may occur less frequently. Equally as significant is the location of the Town mooring docks, boat ramp, refueling station and other commercial buildings all located immediately to the north of the Area 2 dredge site. This area served as the major docking and refueling station for the Town prior to 1985. While there has not been a significant spill or leak in this time it is expected that the higher rate of human occupation of these areas contributes to the degradation of the mud flat habitat. State records dating from 1937 show the constant use of this area with over 25 completed projects including shoreline protection, establishment of the channel and mooring field, improvements, and expansions of the fueling docks and parking lots and establishment of docks and piers adjacent to the Area 2 mooring basin and a large jetty protecting the Harbor Basin. The mooring basin itself is not an undisturbed mudflat and the sediments are not like mudflat but have been characterized as “black custard” and not capable of supporting shellfish. Since 1957, approximately 340 ground tackle and mooring lines/buoys have been cored into the bottom in the spring and dragged through the sediments to the shore each fall to be recovered. This activity completely disturbs the area each year. Recently, due to a lack of dredging approximately 80 moorings have been lost due to an inability to access them due to a lack of water at low tide or so restricted a tidal window as to make them undesirable. This has resulted in a loss of approximately \$80,000/year in marina related revenue based on data from Wellfleet Marine Corporation.

The proposed compensatory mitigation project sites are considered mudflat habitat and have been mapped by MA Mapper as shellfish suitability area for American Oysters (*Crassostrea virginica*).

The proposed Phase 1 restoration would take place in the conditional shellfish growing area of the Herring River, and once a chapter 91 permit for cultching the Phase 2 area in Blackfish Creek has been obtained, the Phase 2 restoration would begin. This area is in the Open status year-round as part of the Commonwealth of Massachusetts’ shellfish growing area classification.

These areas have been historically productive mudflat used consistently for shellfishing. However, in the last few decades Herring River has degraded ~~largely due to fecal coliform from animal/wildlife run-off~~ requiring a downgrade in harvest classification to conditional in the lower region and prohibited in the region near and above the Herring River Dyke. The western area of Blackfish Creek, many decades ago, was highly productive but in more recent decades was so reduced in oyster population and productivity that it qualified for licensing private shellfish grants (less than six oysters per square meter). In addition, the area immediately west of the proposed mitigation area was highly productive and was a major stop on the Shellfish Department’s daily patrols during the early to mid-2000’s, but in more recent years, shellfish populations have decreased there. It appears that this reduction in productivity was due to ~~overfishing which destabilized the sediments, ?? and~~ consecutive large ice events; and the Shellfish Department’s cultch program alone has not been able to bring it back. More recently, in the eastern regions of the proposed mitigation area, extremely low shellfish populations remain, and the Shellfish Department has observed very little shellfishing due to a lack of resources. Areas to be cultched currently have nitrogen reduction targets which could be improved with increased oyster populations and the in-migration of other organisms.

A baseline biological survey was conducted on May 10, 2023 at the HR mitigation

site. Twelve samples were taken for sediment characterization and biodiversity measurements. This information can be found in Appendix C.

A biological survey will be conducted in Spring / Early Summer of 2024 (pre-restoration) to determine the baseline for the Blackfish Creek mitigation site. Performance metrics to be measured are included in the attached table.

E. Determination of Credits:

The plan for restoration and enhancement of 28 acres of equivalent mudflat habitat will generate the required 7.16 mitigation credits and offset the impacts of the dredging of the Wellfleet Harbor Area 2, South Mooring Field.

F. Mitigation Work Plan:

The mitigation work plan proposes a phased approach to enhancement of mudflat habitat in the Wellfleet Harbor system. The initial phase will be to enhance a 14-acre parcel of mudflat in the Herring River system to the southwest of the Chequessett Neck Road dike (see Fig 1). This area is currently conditionally approved for shellfish propagation and harvest. There is also a portion of the proposed area that is currently permitted through a MA DEP Chapter 91 license for cultching. Cultch has been used for over 100 years in Wellfleet Harbor to provide substrate for larval oysters (spat) to attach. Without oysters, shell or suitable substrate, natural set, which is uniquely abundant in Wellfleet Harbor, would otherwise die. Replacement of substrate through cultching is well established for maintaining and restoring oyster populations. The addition of cultch and subsequent sets of oysters that can grow there will improve the water quality of the area through the natural filter feeding and symbiotic relationship of oysters and benthic organisms that off gas nitrogen directly to the atmosphere while removal of phytoplankton improves water clarity, thus promoting light penetration for other marine and plant life of the oysters. The cultch strips also improve biodiversity through providing substrate for other organisms to use for food or refuge.

Phase 1 enhancement of the Herring River parcel would begin in summer of 2023. These areas would be enhanced with cultch (sea clam shell) and oyster seed from locally available resources. Cultch will be trucked from a whole sea clam processing plant to the Town Transfer Station and supplemented with oyster shell from recycling programs with restaurants and the general public. This material is properly aged then loaded by front-end loader and delivered to a custom-built cultch barge. The barge has a hopper which delivers a strip of shells approximately 4'x100' with about 6 inches of relief on the bottom. Cultch has been shown to be the ideal material for "catching a natural set" of oyster spat due to Wellfleet's significant locally spawning oyster population without using "spat on-shell" or extensive seeding which is necessary in areas where there is not a local "set". It is anticipated that the enhancement through cultching in the Herring River would be completed in one year, and then the Town would request the relinquishment of this site for mitigation use and transfer the mitigation to a 28-acre contiguous parcel in South Wellfleet.

A 28-acre parcel of mudflat habitat has been identified in Blackfish Creek (BFC), east and south of Pleasant Point (see Fig 2). This area is currently approved for shellfish propagation and harvest. A baseline biological survey will be performed in BFC in the spring or early summer of 2024 that will identify water quality metrics, current substrate, density of oysters and other biodiversity. In summer of 2024, provided the proper MA DEP permits are in place, it is expected that all restoration focus will shift to BFC. Cultching

will be conducted as described above. It is expected that restoration efforts of cultching and seed placement will take approximately 5 years to reach the desired levels of oyster density, biodiversity, and water quality improvement.

Basic yearly timelines would be as follows:

Herring River 2023

The area will be marked with additional signage and buoys, communication will be sent to all shellfishermen establishing the temporary mitigation area

Eight cultch strips would be placed in the first 2 weeks of June 2023

~~Local Oyster seed will be purchased in June of 2023 and raised on the Shellfish Department's farm~~

~~May of 2024 seed will be deployed adjacent to the placed cultch lines~~

Blackfish Creek 2023⁴ (- 2029)

~~June 2023 - local oyster seed will be purchased and raised on the Shellfish Department's farm.~~

~~Fall 2023/Early Summer (2023) - spat on shell bags will be placed in Chipman's Cove for spat settlement. Spat on shell will subsequently be deployment in 2024/Fall 2023 to Blackfish Creek.~~

~~Fall 2023 28-acre mitigation area in Blackfish Creek will be marked with signage and buoys, communication will be sent to all shellfishermen establishing the mitigation area.~~

~~May 2024 quahog (*Mercenaria mercenaria*) relay will take place from the Taunton River into the Blackfish Creek mitigation area.~~

~~May/June 2024, the oyster seed from the Shellfish Department's farm will be deployed in Blackfish Creek.~~

~~May 2024 28-acre mitigation area in Blackfish Creek will be marked with signage and buoys, communication will be sent to all shellfishermen establishing the mitigation area.~~

~~May 2024 quahog (*Mercenaria mercenaria*) relay will take place from the Taunton River into the Blackfish Creek mitigation area.~~

June 2024 during the first two weeks of June, 10 strips of cultch will be laid in Blackfish Creek

June 2024 oyster seed from local sources will be purchased and raised on the Shellfish Department's farm.

Sept / Oct 2024 large oyster seed will be placed adjacent to the cultch strips.

When quahog relay placement begins in 2024 it will start the three-year closure for the area.

After three years the shellfish department will evaluate the oyster density and propose an opening of a portion of the area for harvest as per MA DMF regulations that will not adversely affect the stated performance metrics.

Past season(s) enhancement will be evaluated to make adjustments before the next season (through year 4)

After year 5, if performance metrics have been met, the USACE will issue a Certificate of Compliance and the site will move into a monitoring plan only, with no active enhancement of resources. Ongoing harvest opportunities will be decided by the Shellfish Department in such

a way as to ensure minimum density of oyster populations and restoration/harvest management that supports other restoration metrics.

G. Maintenance Plan:

The mitigation plan is predicated on increasing the oyster populations through cultching and seed placement. Over a five-year period, we expect to place approximately 125-200 tons of cultch in MA DEP Chapter 91 approved area for this purpose. Cultching and seeding the entire 28-acre area in one season is not planned as there are many factors that could negatively influence the restoration efforts. Placing all of the cultch strips and seed would leave the area susceptible to negative environmental and biological impacts. Storms or disease could spread quickly through an area that has all been recently enhanced. By enhancing smaller areas over a longer five-year time period, evaluations can be made as to the success of the enhancement, and adjustments can be made to maximize the enhancement of the mudflat habitat allowing the Town to adjust maintenance in real time, over the first 5 years.

H. Performance Standards:

This project will measure water quality, biodiversity, and oyster density to indicate enhancement success. Enhancement success for the following attributes is defined below for each standard.

Water quality: Upon construction of the project, water quality will increase on the site during the 5-year monitoring. Successful water quality is defined as an increase in targeted metrics year over year for the 5 years. Ultimately the site will exceed the metrics established in the baseline and is envisioned to meet exceed EPA’s definition of “excellent” water quality designation.

Oyster density: Success for the site is defined as surviving oyster density on the total acres of the site at 25 oysters / m². This will be measured at baseline, with a linear progression expected over the 5 years.

Biodiversity: Success for this attribute is defined as increase over the baseline. particularly in the first few years, and then leveling off. progressively for the 5 years. Each year biodiversity will increase, and at a minimum will not decrease. Given the transient nature of some of the species to be measured, it is understood that not all species will be found or increase year after year. Biodiversity success will be measured by overall species richness.

Quahog population increase: 70 bushels of quahogs per year, for five years will be placed in Blackfish Creek in accordance with the Massachusetts Contaminated Quahog Relay Program, which requires that full spawning potential is reached by keeping the area closed to harvest (June 15-Sept 15).

The performance standards will be recorded utilizing these metrics:

Wellfleet Mitigation Performance Metrics Black Fish Creek Location						
Seasonal Average based upon a statistically significant sample	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5

Oyster Density/m2		6	12	15	20	25
Water Quality						
temperature_C						
salinity						
dissolved_oxygen_mg/L						
chlorophyll_ug/L						
pheophytin_ug/L						
turbidity_NTU						
nitrate_nitrite_uM						
ammonium_uM						
ortho_phosphate_uM						
silicate_uM						
particulate_organic_nitrogen_uM						
particulate_organic_carbon_uM						
total_dissolved_nitrogen_uM						
total_dissolved_phosphorus_uM						
total_nitrogen_uM						
total_phosphorus_uM						
total_nitrogen_TDN_PON						
Coliform (Total Fecal Coliform)						
Biodiversity						
Amphipod						
Anemone						
Asian Shore Crab						
Barnacle						
Hard Clam						
Mites						
Mud Snail						
Oyster Drill						
Polychaete						
Ribbed Mussel						
Whelk						

Performance standards will be measured according to the [attached above](#) table. Metrics will include water quality indicators as well as oyster density and biodiversity. The basic conclusion is that an oyster density of 25 oysters/m2 (Restoration Goals, Quantitative Metrics and Assessment Protocols for Evaluating Success on Restored Oyster Reef Sanctuaries Report of the Oyster Metrics Workgroup Submitted to the Sustainable Fisheries Goal Implementation Team of the Chesapeake Bay Program, December 2011) is considered a successful restoration and is expected to be self-sustaining. One caveat is that these densities do not assume harvest. MA DMF regulations require that areas be open for a minimum of a day every three years in order to be in compliance with Massachusetts law. For the initial five years of enhancement, monitoring and reporting will take place yearly. This will include an evaluation of substrate health, including bottom relief, increased

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bottom structure and distribution relative to other performance goals such as biodiversity and water quality. On-going monitoring will determine if recruitment is self-sustaining. After the initial five year work plan has achieved a target goal of 25/m², we will evaluate future harvest opportunities and timing in order to ensure healthy oyster resources and habitat, in the context of continuing to meet our restoration goals. Harvest, productivity, disease, weather events, ice mortality and other previously unforeseen impacts will be closely monitored in relation to impacts on performance standards.

I. Monitoring Requirements:

The mitigation areas will be monitored by a set of third-party organizations. Reports will be compiled by the Town and submitted yearly to the USACE for review. Any potential adjustments to the work plan will be made at that time in consultation with the USACE. Water quality monitoring is conducted by the Center for Coastal Studies as part of the larger Wellfleet Harbor monitoring that is already underway.

1) Phase I Herring River

The Herring River mitigation site will be monitored for water quality, biodiversity and oyster density following the 2023 season. Oyster density will be measured primarily in the areas that have been cultched. Density measurements shall include oysters of all sizes, including spat. A baseline biodiversity and sediment characterization survey was performed on May 10, 2023. A monitoring survey will be performed in September of 2023 at the locations marked on the attached maps (see Appendix C). Water quality data will be received through the Center for Coastal Studies monitoring program. A comprehensive monitoring report will be submitted to the USACE for the Herring River site in December of 2023.

2) Phase II Black Fish Creek

An additional water quality monitoring point will be added in the Blackfish Creek mitigation area to better capture the Water Quality metrics listed above. This monitoring occurs once in February and twice a month from April – September as conducted by the Center for Coastal Studies. An improvement in water quality will be tracked through the changes in this data over the five-year work period.

Oyster density is the second measure of mitigation success. Oyster density is expected to increase yearly with the laying of cultch. The laying of cultch is expected to recruit natural oyster spat within the Wellfleet Harbor system. The addition of seed oysters will also increase the density of the oyster population. The five-year goal of the project is a density of 25 oysters / m² as calculated across the entire mitigation area. Density will be measured in the early summer and in the late fall in areas where recruitment has occurred and averaged across the entire site. This data will be reported to the USACE yearly.

Biodiversity will be measured twice yearly in the spring and fall at the stations marked on the attached map (see Figure 2). This data will be included in the yearly reporting to the USACE as shown in the above table. It is expected that the largest increase in biodiversity will be seen in the areas that have been cultched where oyster reefs are established.

J. Long-Term Management Plan:

The Long-Term Management Plan will be managed by The Long-Term Steward

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of the site, which is the Town of Wellfleet. The detailed Long Term Maintenance Plan can be found in Appendix D. This Plan will be enforced to protect the environmental enhancement. In the event of a Force Majeure event leading to death of all the oysters, the Town's responsibility will be to jump start the shellfish population by using Year One activities as listed in the work plan shown above. Oyster density will be reported to the USACE ~~every year for years 6, 7 and 8, and then will be provided~~ in accordance with Mitigation Plan Scenarios Table (Appendix E)

The mitigation area in Blackfish Creek is designated as protected by the MA ACEC program (see Figure 2), therefore subjected to closer scrutiny to avoid or minimize adverse environmental impacts by local and state agencies (<https://www.mass.gov/service-details/acec-program-overview>). The area will be indicated as a resource protection area on official shellfish maps, with local signage and routine patrol 364 days a year at each low tide during daylight. For the first five years, annual quadrat assessment by an academic or governmental institution or creditable nonprofit organization will be performed to assure compliance unless or until such time as USACE determines this is no longer necessary for another approach the Town may offer and to which USACE agrees.

The Town agrees not to disturb the mitigation area through a mooring basin, piers or other development (see Appendix B). Due to Division of Marine Fisheries regulations the area cannot be closed to harvest for longer than a three consecutive year period. The Town of Wellfleet Shellfish Department will open the area for harvest in such a way as to ensure minimum density of oyster populations, ensuring continued overall productivity of the mitigation area.

K. Adaptive Management Plan:

As with any biological system, there are numerous unknowns that can affect results. The main tenants of the adaptive management plan revolve around field performance and initial performance metrics for years one through five. Beyond five years, please see the Long-Term Management Plan. We believe, based upon experience and best available science that a self-sustaining population can be achieved that meets protection of fish species, bio-diversity and water quality improvement goals. However, as noted above, the initial targets of 25 oysters/m² are based on data that is not from Wellfleet Harbor.

The variables that may lead to implementing changes to the mitigation plan include:

- Weather*
- Recruitment*
- Cultch volumes*
- Survival rates*
- Bottom condition*
- Disease*
- Predator Pressure*
- Growth rate*
- Poaching*
- Water Quality*
- Ice mortality*

Each of these variables may require different management responses. Those responses could include increased or decreased need for cultch or spawning stock. Increased or decreased allowance for harvest. Changes in how harvest can be conducted

to protect other ecosystem functions. Other potential measures to ensure successful ecosystem restoration could include seeding the area with additional brood stock or “spat on shell” stock from other productive areas. It is likely that as conditions and influences on the mitigation area change, a combination of these approaches will be necessary to meet our performance goals. Oyster density of 25/m² is a proxy for overall enhancement of the mitigation site and is expected to lead to improvements in water quality and biodiversity. Therefore, if water quality and biodiversity are improving, an oyster density below 25/m² may be sufficient to show enhancement. Any proposed modifications to the work plan will be sent to the Corps for approval prior to implementation.

Long-term and adaptive management will be conducted by the Wellfleet Shellfish Department. Consistent with other shellfish designations such as conditional, prohibited, seasonal closures and rotations, and the required harvest openings, this area will be managed to achieve a density of 25 oysters/m² with the goal for it to become self-sustaining and providing enhanced ecoservices with a contingency buffer against disease, ice mortality or other resource destruction.

In addition, there may be compelling reasons, based on local conditions, to decrease any of the metrics such as oyster density, biodiversity or water quality. Based on monitoring data, the Town will have a meeting with the USACE mitigation team after one year to assess progress to date and determine whether any substantive changes are required. Based on monitoring results, this may result in adjustments to performance goals. The Town may alter the workplan to include additional cultch, location of cultch, additional seed or additional input of other shellfish. Additionally, there may be a need to reassess the location of the mitigation.

The Town will be judged to be in compliance with the mitigation agreement so long as the agreed upon work plan is being executed. After five years of implementation and monitoring, if performance standards have been achieved, the USACE will issue a Certificate of Compliance.

Due to the vagaries of natural resource habitats specific achievement of any performance standard may require changes to the work plan but would not constitute noncompliance. Please see Appendix E for potential adaptive and ~~long-term~~long-term management scenarios.

L. Financial Assurances:

The Town of Wellfleet will purchase a \$50,000 performance bond that totals the first-year objectives and project implementation for Blackfish Creek. The Town of Wellfleet will request release of the performance bond after a post construction report has been submitted to the Corps and the Corps approves release.

FY 2024 ³				FY 2025 ⁴			
Item	amount	price	total	amount	price	total	
racks	55	\$100.00	\$5,500.00				
4mm bags	100	\$7.75	\$775.00				
9mm bags	333	\$7.75	\$2,580.75				
bag assembly	433	\$2.00	\$866.00				
zipties	1332	\$8.60	\$120.40				
condos - 8 bay	13	\$240.00	\$3,120.00				

candy striped poles	5	\$10.00	\$50.00				
buoys	10	\$22.00	\$220.00				
poly line roll	1	\$150.00	\$150.00				
cultch	2.5	\$1,250.00	\$3,125.00	2.5	\$1,250.00	\$3,125.00	
fuel cultching and relay	96	\$5.29	\$507.84	96	\$5.29	\$507.84	
oil cultching and relay	4	\$30.00	\$120.00	4	\$30.00	\$120.00	
oyster seed R6-8 hatchery (100K/price is per 1,000)	100	\$37.85	\$3,785.00	100	\$37.85	\$3,785.00	
quahog relay	0	0	0	70	\$27.25	\$1,907.50	
JM OT cultching/relay	20	\$53.27	\$1,065.47	20	\$53.27	\$1,065.47	
CM OT cultching/relay	20	\$47.69	\$953.75	20	\$47.69	\$953.75	
WSD labor planting and farm ops	IN KIND			IN KIND			
Baseline Survey			XXX				
Chapter 91 Permit Amendment			\$40,000				
Monitoring Survey(s)			\$20,000			\$20,000.00	
			\$82,939.21			\$131,464.56	
				<i>*same for five years but we need to expect increases in prices</i>			

Sent to USACE
w/ proposed edits

MITIGATION PLAN SCENARIOS

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PRIOR TO ISSUANCE OF CERTIFICATE OF COMPLIANCE		
Scenario	Applicable Document	Required Action
Year Five - oyster population has not reached 25/square meter.	Adaptive Management Plan	Continue the cultch and seed for additional years and/or implement additional actions to increase the population. However, if the oyster population has steadily increased in prior years (but not reached 25/square meter) and the other metrics (biodiversity and water quality) have improved, USACE may issue a Certificate of Compliance.
Years One through Five - severe weather event(s) destroys, or disease decimates the oyster population.	Adaptive Management Plan	Year Two or similar effort, and continue with the Plan, thus adding additional years to the mitigation plan timeline. Jump start the enhancement by following Year one <u>Year Two</u> cultch / seed protocol or similar <u>actions as proposed by the Shellfish Department and reviewed pending consultation with the Wellfleet Shellfish Department and the USACE. (Year Two protocol includes 10 lines of cultch and 80,000 to 100,000 seed)</u>
During the Workplan period (<u>i.e., after Year Five but before a Certificate of Compliance has been issued</u>) - severe weather or disease destroys the oyster population.	Adaptive Management Plan	Viewed as if this event had occurred after having already received a Certificate of Compliance. <u>Jumpstart by implementing the Year Two components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE. Pending consultation with The number of restarts or Year Two initiatives will not exceed <u>five (5) attempts over the life of the Mitigation Plan, after which no further action is required.</u></u>

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MITIGATION PLAN SCENARIOS

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AFTER ISSUANCE OF CERTIFICATE OF COMPLIANCE		
Scenario	Applicable Document	Required Action
Years 1 - 10, AFTER issuance of Certificate of Compliance - oyster population falls below 25 /square meter.	Long Term Management Plan	<p>The Shellfish Department will close the area (consistent with MA DMF regulations) to allow the population to naturally increase.</p> <p>If populations do not recover (after one year) or continue to fail, there would be <u>a jump start by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.</u></p> <p>by evaluation of the Shellfish department and using the best propagation input for the current system. Pending consultation with the USACE.</p>
Years 1- 10, AFTER issuance of Certificate of Compliance - severe weather event or disease destroys the oyster population	Long Term Management Plan	<p>Jump start <u>by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.</u></p> <p>evaluation of the Shellfish department and using the best propagation input for the current system. Pending consultation with the USACE.</p>
Years 10 and beyond, AFTER issuance of Certificate of Compliance - severe weather event or disease destroys the oyster population	Long Term Management Plan	<p>Jump start <u>by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.</u></p> <p>evaluation of the Shellfish department and using the best propagation input for the current system. Pending consultation with the USACE.</p>

MITIGATION PLAN SCENARIOS

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<p>Years 10 THROUGH 15 AFTER Issuance of Certificate of Compliance - oyster population falls below 25 /square meter.</p>	<p>Long Term Management Plan</p>	<p>Jump start by <u>implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.</u> <u>evaluation of the Shellfish department and using the best propagation input for the current system. Pending consultation with the USACE.</u></p>
<p>Years 16 and beyond, AFTER Issuance of Certificate of Compliance - oyster population falls below 25 /square meter.</p>	<p>Long Term Management Plan</p>	<p>Jump start by <u>implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.</u> <u>evaluation of the Shellfish department and using the best propagation input for the current system. Pending consultation with the USACE.</u></p>

MITIGATION PLAN SCENARIOS

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ANYTIME PRIOR TO OR AFTER ISSUANCE OF CERTIFICATE OF COMPLIANCE		
Scenario	Applicable Document	Required Action
Town desires to opt out of the mitigation Plan	Opt Out Clause	<p>The <u>opt Out Clause can be invoked by the Town at any time throughout the life of the Mitigation Plan.</u></p> <p>Pay a permit fee for the required 7.16 mitigation credits (or fewer credits if mitigation plan results at that time has resulted in a reduction to required credits). The amount of the Fee will be based on the MA In Lieu Fee (ILF) Program, then pertaining.</p>

MITIGATION PLAN SCENARIOS

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REPORTING REQUIREMENTS		
Self-Verification Definition	Self-verification shall include information on oyster density in the reporting year; dates that the Blackfish Creek site has been opened for harvest, and the extent of harvest (commercial, recreational, etc.) for each year since the previous report.	
Scenario	Applicable Document	Required Action
Years 1 through 10 AFTER Issuance of Certificate of Compliance.	Self-verification shall be provided every two years. With the first report being two years after issued certificate of compliance.	Continued reporting maintains the status of the self-reporting requirements and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.
Years 11 through 15 AFTER Issuance of Certificate of Compliance.	Self-verification shall be provided every five years.	Continued reporting maintains the status of the mitigation plan and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.
Years 16 AFTER Issuance of Certificate of Compliance.	Self-verification shall be provided every five years	Continued reporting maintains the status of the mitigation plan and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.

MITIGATION PLAN SCENARIOS

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OPTIONAL REPORTING:
YEAR 16 and beyond
AFTER Issuance of
Certificate of Compliance.

Optional Reporting: Self
verification be provided every five
years.

Continued reporting maintains the status of the mitigation plan and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.

sent to USACE May 24, 2023
Proposed edits

USACE Standard Condition Language to be included in the Mitigation Plan:

Should a site not meet the ecological performance objectives of the project, the Corps of Engineers will work with the permittee to determine appropriate measures to remedy the deficiencies. This may include site modifications, design changes, revisions to maintenance requirements, revised monitoring requirements, use of a different site. Alternately, the Town could invoke the Mitigation Plan Opt-out Clause and ~~or~~ purchase ~~of~~ credits from the MA ILF Program or a third-party bank or ILF program. Performance standards may be revised in accordance with adaptive management to account for measures taken to address deficiencies. They may also be revised to reflect changes in management strategies and objectives if the new standards provide ecological benefits that are comparable or superior to those originally approved. No other revisions to performance standards will be allowed except in the case of natural disasters.

Sent back to Wellfleet
from USACE

Wellfleet Harbor Dredge Mitigation Plan

Wellfleet, Massachusetts

Submitted to:

US Army Corps of Engineers
New England Division
Regulatory Division
696 Virginia Road
Concord, MA 01742

Submitted by:

Town of Wellfleet
300 Main Street
Wellfleet, MA 02667

GEI Consultants, Inc.
124 Grove St, Suite 300
Franklin, MA

May 24, 2023
Project No. 2004486

Mitigation Plan 33CFR 332(c) (2) though (14)

A. Goals and Objectives:

The Town of Wellfleet has proposed the dredging of 23.8 acres of tidal mudflats along with sub and intertidal resource areas as Area 2 in project plans. It is well understood that intertidal mudflat habitat is beneficial for many reasons. Mudflats can provide nursery habitat and food supplies for larger fisheries, support bird populations and protection of coastlines through the absorption and lessening of storm forces. There are however factors that influence the functionality of a mud flat.

The compensatory mitigation plan is submitted to offset the dredging work in Wellfleet Harbor Area 2, South Mooring Field. The mitigation plan consists of enhancing a 14-acre site of intertidal land in the Herring River, until the primary restoration area is accessible. The primary restoration site is a 28-acre parcel in Blackfish Creek. The Herring River area is currently designated as “conditional” by the shellfish regulatory authority, the Commonwealth of Massachusetts, while Blackfish Creek is designated in the “open” status, year-round by the state. This mitigation plan is separate from the Herring River Restoration Project (HRRP) and therefore is independent of the implementation, details, and effects of the HRRP. The mitigation plan will be implemented in two phases, each phase being defined by the location of its acreage. The designated areas will be restored initially by cultching, followed by shellfish propagation which will lead to improved water quality, and increased biodiversity resulting in the successful restoration of what was formerly a very productive shellfish habitat, and will provide protection of tidal mudflat habitat.

Objective enhancement would be measured using oyster density levels of twenty-five (25) individuals/m² throughout a 28-acre area (an areal density identified in the Chesapeake Bay Oyster Metrics Workgroup). It is important to note that the Massachusetts’ Division of Marine Fisheries uses a metric of approximately six (6) oysters per square meter as an indicator of “significant oyster resource”. Over a five-year period, our efforts will be to enhance this area so as to enhance oyster density with a target goal of 25 oysters/m². An increase in oyster density has been shown, though prior work in Wellfleet, to lead to a dramatic increase in biodiversity and water quality. Water quality success would be measured in relation to the EPA’s definition of “excellent” water quality designation. Biodiversity success would be measured through density and diversity of species as indicated in the attached performance standard. It is anticipated that the area would also become a resource for local shore birds, turtles, a wide variety of marine species and juvenile fish protection.

B. Site Selection:

The proposed mitigation sites are also classified as mudflat habitat and have also been influenced by human interaction. The proposed mitigation sites are in areas that had previously been degraded for a variety of reasons including ice damage, harvest pressure, disease, and other human influences. The proposed enhancement will positively affect areas outside of the proposed mitigation areas. Restoration of shellfish populations, water quality and increased biodiversity in the restored areas will have wide ranging benefits for the Wellfleet Harbor system.

Each of the mitigation sites were carefully selected, based on its location and more importantly, for its restorative capabilities to return the designated area to its former habitat - a highly productive tidal mudflat with rich shellfish beds, naturally symbiotic flora and fauna, reduction in nuisance sedimentation and increased water quality and clarity. Each of these characteristics has been declining in the Wellfleet Harbor system over the last several decades. These factors combined with the proposed additional enhancement through cultching and protection of oyster habitat, will lead to a restoration and enhancement of 28 acres of mudflat habitat to the overall benefit of an enhanced Harbor ecosystem, benefitting all users.

Herring River (HR) Site 1 is the initial planned mitigation site; it is located in the Herring River in an area marked as conditional for shellfishing. HR 1 Site will be relinquished after the Blackfish Creek 1 Site workplan has been initiated. Refer to Appendix A, Figure 1 for location details. Blackfish Creek (BFC) Site 1 is the primary mitigation site; it is located in Blackfish Creek. Refer to Appendix A Figure 2 for location details.

C. Site Protection Instrument:

The proposed mitigation areas, along with all shellfishing areas in Wellfleet, are governed by MA GL Chapter 130. Shellfishing habitat in these areas is regulated through the Municipal Propagation Permit as granted to the Town by the State and regulated under MA DMF Shellfish Planting Guidelines. With respect to activities in the National Seashore (which is where the Phase 1 14-acre parcel is located), The Act of August 7, 1961, authorizing the establishment of Cape Cod National Seashore (75Stat. 284) says that “The Secretary may adopt regulations concerning hunting and fishing, subject to consultation with the Commonwealth and towns and the stipulation that all aspects of the propagation and taking of shellfish shall be left to the towns” (Cape Cod National Seashore Masterplan 10/7/1970).

The mitigation area in Blackfish Creek is designated as protected by the MA ACEC program (see Figure 2). This area is therefore subjected to closer scrutiny to avoid or minimize adverse environmental impacts by local and state agencies (<https://www.mass.gov/service-details/acec-program-overview>). The area will be indicated as a resource protection area on official shellfish maps, with local signage and routine patrol 364 days a year at each low tide during daylight.

The Town further agrees not to disturb the mitigation area through addition of a mooring basin, piers or other development (see attached Appendix B). Due to Division of Marine Fisheries regulations the area cannot be closed to harvest for longer than a three-consecutive year period. The Town of Wellfleet Shellfish Department will open the area for harvest in such a way as to ensure minimum density of oyster populations.

D. Baseline Conditions:

A pristine mudflat in an area of little human development, lower impact to the sediment, little or no point source pollution, and no harvest pressure would be considered a pristine mudflat habitat with high functionality and value to the ecosystem.

The mudflat at Wellfleet Harbor and Shirt Tail Point has been consistently influenced by human use since 1644. The first modern era occurrence established the existing mooring field in 1955, although the area was used as a harbor previous to that time. The area around the harbor is well developed with housing surrounding much of the coastline, especially to the north, east and south. This leads to significant sources of run

off and non-point source pollution as well as other point source contaminants that may occur less frequently. Equally as significant is the location of the Town mooring docks, boat ramp, refueling station and other commercial buildings all located immediately to the north of the Area 2 dredge site. This area served as the major docking and refueling station for the Town prior to 1985. While there has not been a significant spill or leak in this time it is expected that the higher rate of human occupation of these areas contributes to the degradation of the mud flat habitat. State records dating from 1937 show the constant use of this area with over 25 completed projects including shoreline protection, establishment of the channel and mooring field, improvements, and expansions of the fueling docks and parking lots and establishment of docks and piers adjacent to the Area 2 mooring basin and a large jetty protecting the Harbor Basin. The mooring basin itself is not an undisturbed mudflat and the sediments are not like mudflat but have been characterized as “black custard” and not capable of supporting shellfish. Since 1957, approximately 340 ground tackle and mooring lines/buoys have been cored into the bottom in the spring and dragged through the sediments to the shore each fall to be recovered. This activity completely disturbs the area each year. Recently, due to a lack of dredging approximately 80 moorings have been lost due to an inability to access them due to a lack of water at low tide or so restricted a tidal window as to make them undesirable. This has resulted in a loss of approximately \$80,000/year in marina related revenue based on data from Wellfleet Marine Corporation.

The proposed compensatory mitigation project sites are considered mudflat habitat and have been mapped by MA Mapper as shellfish suitability area for American Oysters (*Crassostrea virginica*).

The proposed Phase 1 restoration would take place in the conditional shellfish growing area of the Herring River, and once a chapter 91 permit for cultching the Phase 2 area in Blackfish Creek has been obtained, the Phase 2 restoration would begin. This area is in the Open status year-round as part of the Commonwealth of Massachusetts’ shellfish growing area classification.

These areas have been historically productive mudflat used consistently for shellfishing. However, in the last few decades Herring River has degraded largely due to fecal coliform from wildlife run-off, requiring a downgrade in harvest classification to conditional in the lower region and prohibited in the region near and above the Herring River Dyke. The western area of Blackfish Creek, many decades ago, was highly productive but in more recent decades was so reduced in oyster population and productivity that it qualified for licensing private shellfish grants (less than six oysters per square meter). In addition, the area immediately west of the proposed mitigation area was highly productive and was a major stop on the Shellfish Department’s daily patrols during the early to mid-2000’s, but in more recent years, shellfish populations have decreased there. It appears that this reduction in productivity was due to consecutive large ice events and the Shellfish Department’s cultch program alone has not been able to bring it back. More recently, in the eastern regions of the proposed mitigation area, extremely low shellfish populations remain, and the Shellfish Department has observed very little shellfishing due to a lack of resources. Areas to be cultched currently have nitrogen reduction targets which could be improved with increased oyster populations and the in-migration of other organisms.

A baseline biological survey was conducted on May 10, 2023 at the HR mitigation site. Twelve samples were taken for sediment characterization and biodiversity measurements. This information can be found in Appendix C.

A biological survey will be conducted in Spring / Early Summer of 2024 (pre-restoration) to determine the baseline for the Blackfish Creek mitigation site. Performance metrics to be measured are included in the attached table.

E. Determination of Credits:

The plan for restoration and enhancement of 28 acres of equivalent mudflat habitat will generate the required 7.16 mitigation credits and offset the impacts of the dredging of the Wellfleet Harbor Area 2, South Mooring Field.

F. Mitigation Work Plan:

The mitigation work plan proposes a phased approach to enhancement of mudflat habitat in the Wellfleet Harbor system. The initial phase will be to enhance a 14-acre parcel of mudflat in the Herring River system to the southwest of the Chequessett Neck Road dike (see Fig 1). This area is currently conditionally approved for shellfish propagation and harvest. There is also a portion of the proposed area that is currently permitted through a MA DEP Chapter 91 license for cultching. Cultch has been used for over 100 years in Wellfleet Harbor to provide substrate for larval oysters (spat) to attach. Without oysters, shell or suitable substrate, natural set, which is uniquely abundant in Wellfleet Harbor, would otherwise die. Replacement of substrate through cultching is well established for maintaining and restoring oyster populations. The addition of cultch and subsequent sets of oysters that can grow there will improve the water quality of the area through the natural filter feeding and symbiotic relationship of oysters and benthic organisms that off gas nitrogen directly to the atmosphere while removal of phytoplankton improves water clarity, thus promoting light penetration for other marine and plant life.. The cultch strips also improve biodiversity through providing substrate for other organisms to use for food or refuge.

Phase 1 enhancement of the Herring River parcel would begin in summer of 2023. These areas would be enhanced with cultch (sea clam shell) and oyster seed from locally available resources. Cultch will be trucked from a whole sea clam processing plant to the Town Transfer Station and supplemented with oyster shell from recycling programs with restaurants and the general public. This material is properly aged then loaded by front-end loader and delivered to a custom-built cultch barge. The barge has a hopper which delivers a strip of shells approximately 4'x100' with about 6 inches of relief on the bottom. Cultch has been shown to be the ideal material for "catching a natural set" of oyster spat due to Wellfleet's significant locally spawning oyster population without using "spat on-shell" or extensive seeding which is necessary in areas where there is not a local "set". It is anticipated that the enhancement through cultching in the Herring River would be completed in one year, and then the Town would request the relinquishment of this site for mitigation use and transfer the mitigation to a 28-acre contiguous parcel in South Wellfleet.

A 28-acre parcel of mudflat habitat has been identified in Blackfish Creek (BFC), east and south of Pleasant Point (see Fig 2). This area is currently approved for shellfish propagation and harvest. A baseline biological survey will be performed in BFC in the spring or early summer of 2024 that will identify water quality metrics, current substrate, density of oysters and other biodiversity. In summer of 2024, provided the proper MA DEP permits are in place, it is expected that all restoration focus will shift to BFC. Cultching will be conducted as described above. It is expected that restoration efforts of cultching and

Commented [BTMCUC(1): Still need maps displaying placement of cultch.

seed placement will take approximately 5 years to reach the desired levels of oyster density, biodiversity, and water quality improvement.

Basic yearly timelines would be as follows:

Herring River 2023

The area will be marked with additional signage and buoys, communication will be sent to all shellfishermen establishing the temporary mitigation area
Eight cultch strips would be placed in the first 2 weeks of June 2023

Blackfish Creek 2023 (- 2029)

June 2023 - local oyster seed will be purchased and raised on the Shellfish Department's farm.

Early Summer (2023) – shell bags will be placed in Chipman's Cove for spat settlement. Spat on shell will subsequently be deployed in Fall 2023 to Blackfish Creek.

Fall 2023 28-acre mitigation area in Blackfish Creek will be marked with signage and buoys, communication will be sent to all shellfishermen establishing the mitigation area.

May 2024 quahog (*Mercenaria mercenaria*) relay will take place from the Taunton River into the Blackfish Creek mitigation area.

June 2024, the oyster seed from the Shellfish Department's farm will be deployed in Blackfish Creek. June 2024 during the first two weeks of June, 10 strips of cultch will be laid in Blackfish Creek

June 2024 oyster seed from local sources will be purchased and raised on the Shellfish Department's farm.

Sept / Oct 2024 large oyster seed will be placed adjacent to the cultch strips.

When quahog relay placement begins in 2024 it will start the three-year closure for the area.

After three years the shellfish department will evaluate the oyster density and propose an opening of a portion of the area for harvest as per MA DMF regulations that will not adversely affect the stated performance metrics.

Past season(s) enhancement will be evaluated to make adjustments before the next season (through year 4)

After year 5, if performance metrics have been met, the USACE will issue a Certificate of Compliance and the site will move into a monitoring plan only, with no active enhancement of resources. Ongoing harvest opportunities will be decided by the Shellfish Department in such a way as to ensure minimum density of oyster populations and restoration/harvest management that supports other restoration metrics.

G. Maintenance Plan:

The mitigation plan is predicated on increasing the oyster populations through cultching and seed placement. Over a five-year period, we expect to place approximately 125-200 tons of cultch in MA DEP Chapter 91 approved area for this purpose. Cultching and seeding the entire 28-acre area in one season is not planned as there are many factors that could negatively influence the restoration efforts. Placing all of the cultch strips and seed would leave the area susceptible to negative environmental and biological impacts. Storms or disease could spread quickly through an area that has all been recently enhanced.

By enhancing smaller areas over a longer five-year time period, evaluations can be made as to the success of the enhancement, and adjustments can be made to maximize the enhancement of the mudflat habitat allowing the Town to adjust maintenance in real time, over the first 5 years.

H. Performance Standards:

This project will measure water quality, biodiversity, and oyster density to indicate enhancement success. Enhancement success for the following attributes is defined below for each standard.

Water quality: Upon construction of the project, water quality will increase on the site during the 5-year monitoring. Successful water quality is defined as an increase in targeted metrics year over year for the 5 years. Ultimately the site will exceed the metrics established in the baseline and is envisioned to meet EPA’s definition of “excellent” water quality designation.

Oyster density: Success for the site is defined as surviving oyster density on the total acres of the site at 25 oysters / m². This will be measured at baseline, with a linear progression expected over the 5 years.

Biodiversity: Success for this attribute is defined as increase over the baseline, particularly in the first few years, and then leveling off. Given the transient nature of some of the species to be measured, it is understood that not all species will be found or increase year after year. Biodiversity success will be measured by overall species richness.

Quahog population increase: 70 bushels of quahogs per year, for five years will be placed in Blackfish Creek in accordance with the Massachusetts Contaminated Quahog Relay Program, which requires that full spawning potential is reached by keeping the area closed to harvest (June 15-Sept 15).

Commented [T2]: This is a work item not a standard. The benefits of this work will contribute to the overall enhancement of the area. Relocate to work plan.

The performance standards will be recorded utilizing these metrics:

Wellfleet Mitigation Performance Metrics Black Fish Creek Location	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
Seasonal Average based upon a statistically significant sample						
Oyster Density/m2		6	12	15	20	25
Water Quality						
temperature_C						
salinity						
dissolved_oxygen_mg/L						
chlorophyll_ug/L						
pheophytin_ug/L						
turbidity_NTU						
nitrate_nitrite_uM						
ammonium_uM						
ortho_phosphate_uM						

silicate_uM							
particulate_organic_nitrogen_uM							
particulate_organic_carbon_uM							
total_dissolved_nitrogen_uM							
total_dissolved_phosphorus_uM							
total_nitrogen_uM							
total_phosphorus_uM							
total_nitrogen_TDN_PON							
Coliform (Total Fecal Coliform)							
Biodiversity							
Amphipod							
Anemone							
Asian Shore Crab							
Barnacle							
Hard Clam							
Mites							
Mud Snail							
Oyster Drill							
Polychaete							
Ribbed Mussel							
Whelk							

Performance standards will be measured according to the above table. Metrics will include water quality indicators as well as oyster density and biodiversity. The basic conclusion is that an oyster density of 25 oysters/m² (Restoration Goals, Quantitative Metrics and Assessment Protocols for Evaluating Success on Restored Oyster Reef Sanctuaries Report of the Oyster Metrics Workgroup Submitted to the Sustainable Fisheries Goal Implementation Team of the Chesapeake Bay Program, December 2011) is considered a successful restoration and is expected to be self-sustaining. One caveat is that these densities do not assume harvest. MA DMF regulations require that areas be open for a minimum of a day every three years in order to be in compliance with Massachusetts law. For the initial five years of enhancement, monitoring and reporting will take place yearly. This will include an evaluation of substrate health, including bottom relief, increased bottom structure and distribution relative to other performance goals such as biodiversity and water quality. On-going monitoring will determine if recruitment is self-sustaining. After the initial five year work plan has achieved a target goal of 25/m², we will evaluate future harvest opportunities and timing in order to ensure healthy oyster resources and habitat, in the context of continuing to meet our restoration goals. Harvest, productivity, disease, weather events, ice mortality and other previously unforeseen impacts will be closely monitored in relation to impacts on performance standards.

Commented [BTMCUC(3): Remove, if harvest is going to impact oyster density numbers then perhaps reducing harvesting or alter methods of harvest.

I. Monitoring Requirements:

The mitigation areas will be monitored by a set of third-party organizations. Reports will be compiled by the Town and submitted yearly to the USACE for review. Any potential adjustments to the work plan will be made at that time in consultation with the

USACE. Water quality monitoring is conducted by the Center for Coastal Studies as part of the larger Wellfleet Harbor monitoring that is already underway.

1) Phase I Herring River

The Herring River mitigation site will be monitored for water quality, biodiversity and oyster density following the 2023 season. Oyster density will be measured primarily in the areas that have been cultched. Density measurements shall include oysters of all sizes, including spat. A baseline biodiversity and sediment characterization survey was performed on May 10, 2023. A monitoring survey will be performed in September of 2023 at the locations marked on the attached maps (see Appendix C). Water quality data will be received through the Center for Coastal Studies monitoring program. A comprehensive monitoring report will be submitted to the USACE for the Herring River site in December of 2023.

Commented [BTMCUC(4)]: Does not include spat that was placed.

2) Phase II Black Fish Creek

An additional water quality monitoring point will be added in the Blackfish Creek mitigation area to better capture the Water Quality metrics listed above. This monitoring occurs once in February and twice a month from April – September as conducted by the Center for Coastal Studies. An improvement in water quality will be tracked through the changes in this data over the five-year work period.

Oyster density is the second measure of mitigation success. Oyster density is expected to increase yearly with the laying of cultch. The laying of cultch is expected to recruit natural oyster spat within the Wellfleet Harbor system. The addition of seed oysters will also increase the density of the oyster population. The five-year goal of the project is a density of 25 oysters / m² as calculated across the entire mitigation area. Density will be measured in the early summer and in the late fall in areas where recruitment has occurred and averaged across the entire site. This data will be reported to the USACE yearly.

Biodiversity will be measured twice yearly in the spring and fall at the stations marked on the attached map (see Figure 2). This data will be included in the yearly reporting to the USACE as shown in the above table. It is expected that the largest increase in biodiversity will be seen in the areas that have been cultched where oyster reefs are established.

J. Long-Term Management Plan:

The Long-Term Management Plan will be managed by The Long-Term Steward of the site, which is the Town of Wellfleet. The detailed Long Term Maintenance Plan can be found in Appendix D. This Plan will be enforced to protect the environmental enhancement. In the event of a Force Majeure event leading to death of all the oysters, the Town's responsibility will be to jump start the shellfish population by using Year One activities as listed in the work plan shown above. Oyster density will be reported to the USACE in accordance with Mitigation Plan Scenarios Table (Appendix E)

The mitigation area in Blackfish Creek is designated as protected by the MA ACEC program (see Figure 2), therefore subjected to closer scrutiny to avoid or minimize adverse environmental impacts by local and state agencies (<https://www.mass.gov/service-details/acec-program-overview>). The area will be indicated as a resource protection area on official shellfish maps, with local signage and routine patrol 364 days a year at each low tide during daylight. For the first five years, annual quadrat assessment by an academic or governmental institution or creditable

nonprofit organization will be performed to assure compliance unless or until such time as USACE determines this is no longer necessary for another approach the Town may offer and to which USACE agrees.

The Town agrees not to disturb the mitigation area through a mooring basin, piers or other development (see Appendix B). Due to Division of Marine Fisheries regulations the area cannot be closed to harvest for longer than a three consecutive year period. The Town of Wellfleet Shellfish Department will open the area for harvest in such a way as to ensure minimum density of oyster populations, ensuring continued overall productivity of the mitigation area.

K. Adaptive Management Plan:

As with any biological system, there are numerous unknowns that can affect results. The main tenants of the adaptive management plan revolve around field performance and initial performance metrics for years one through five. Beyond five years, please see the Long-Term Management Plan. We believe, based upon experience and best available science that a self-sustaining population can be achieved that meets protection of fish species, bio-diversity and water quality improvement goals. However, as noted above, the initial targets of 25 oysters/m² are based on data that is not from Wellfleet Harbor.

The variables that may lead to implementing changes to the mitigation plan include:

- Weather*
- Recruitment*
- Cultch volumes*
- Survival rates*
- Bottom condition*
- Disease*
- Predator Pressure*
- Growth rate*
- Poaching*
- Water Quality*
- Ice mortality*

Each of these variables may require different management responses. Those responses could include increased or decreased need for cultch or spawning stock. Increased or decreased allowance for harvest. Changes in how harvest can be conducted to protect other ecosystem functions. Other potential measures to ensure successful ecosystem restoration could include seeding the area with additional brood stock or “spat on shell” stock from other productive areas. It is likely that as conditions and influences on the mitigation area change, a combination of these approaches will be necessary to meet our performance goals. Oyster density of 25/m² is a proxy for overall enhancement of the mitigation site and is expected to lead to improvements in water quality and biodiversity. Therefore, if water quality and biodiversity are improving, an oyster density below 25/m² may be sufficient to show enhancement. Any proposed modifications to the work plan will be sent to the Corps for approval prior to implementation.

Long-term and adaptive management will be conducted by the Wellfleet Shellfish Department. Consistent with other shellfish designations such as conditional, prohibited, seasonal closures and rotations, and the required harvest openings, this area will be managed to achieve a density of 25 oysters/m² with the goal for it to become self-sustaining and providing enhanced ecoservices with a contingency buffer against disease, ice

mortality or other resource destruction.

In addition, there may be compelling reasons, based on local conditions, to decrease any of the metrics such as oyster density, biodiversity or water quality. Based on monitoring data, the Town will have a meeting with the USACE mitigation team after one year to assess progress to date and determine whether any substantive changes are required. Based on monitoring results, this may result in adjustments to performance goals. The Town may alter the workplan to include additional cultch, location of cultch, additional seed or additional input of other shellfish. Additionally, there may be a need to reassess the location of the mitigation.

The Town will be judged to be in compliance with the mitigation agreement so long as the agreed upon work plan is being executed. After five years of implementation and monitoring, if performance standards have been achieved, the USACE will issue a Certificate of Compliance.

Due to the vagaries of natural resource habitats specific achievement of any performance standard may require changes to the work plan but would not constitute noncompliance. Please see Appendix E for potential adaptive and long-term management scenarios.

L. Financial Assurances:

The Town of Wellfleet will purchase a \$50,000 performance bond that totals the first-year objectives and project implementation for Blackfish Creek. The Town of Wellfleet will request release of the performance bond after a post construction report has been submitted to the Corps and the Corps approves release.

FY 2024				FY 2025			
Item	amount	price	total	amount	price	total	
racks	55	\$100.00	\$5,500.00				
4mm bags	100	\$7.75	\$775.00				
9mm bags	333	\$7.75	\$2,580.75				
bag assembly	433	\$2.00	\$866.00				
zipties	1332	\$8.60	\$120.40				
condos - 8 bay	13	\$240.00	\$3,120.00				
candy striped poles	5	\$10.00	\$50.00				
buoys	10	\$22.00	\$220.00				
poly line roll	1	\$150.00	\$150.00				
cultch	2.5	\$1,250.00	\$3,125.00	2.5	\$1,250.00	\$3,125.00	
fuel cultching and relay	96	\$5.29	\$507.84	96	\$5.29	\$507.84	
oil cultching and relay	4	\$30.00	\$120.00	4	\$30.00	\$120.00	
oyster seed R6-8 hatchery (100K/price is per 1,000)	100	\$37.85	\$3,785.00	100	\$37.85	\$3,785.00	
quahog relay	0	0	0	70	\$27.25	\$1,907.50	
JM OT cultching/relay	20	\$53.27	\$1,065.47	20	\$53.27	\$1,065.47	
CM OT cultching/relay	20	\$47.69	\$953.75	20	\$47.69	\$953.75	

WSD labor planting and farm ops	IN KIND			IN KIND			
Baseline Survey			XXX				
Chapter 91 Permit Amendment			\$40,000				
Monitoring Survey(s)			\$20,000			\$20,000.00	
			\$82,939.21			\$31,464.56	
				<i>*same for five years but we need to expect increases in prices</i>			

Sent back to Wellfleet
from USACE

MITIGATION PLAN SCENARIOS

PRIOR TO ISSUANCE OF CERTIFICATE OF COMPLIANCE		
Scenario	Applicable Document	Required Action
Year Five - oyster population has not reached 25/square meter.	Adaptive Management Plan	Continue the cultch and seed for additional years and/or implement additional actions to increase the population. However, if the oyster population has steadily increased in prior years (but not reached 25/square meter) and the other metrics (biodiversity and water quality) have improved, USACE may issue a Certificate of Compliance.
Years One through Five - severe weather event(s) destroys, or disease decimates the oyster population.	Adaptive Management Plan	Year Two or similar effort, and continue with the Plan, thus adding additional years to the mitigation plan timeline. Jump start the enhancement by following Year Two cultch / seed protocol or similar actions as proposed by the Shellfish Department and reviewed with the USACE. (Year Two protocol includes 10 lines of cultch and 80,000 to 100,000 seed)
During the Workplan period (i.e., after Year Five but before a Certificate of Compliance has been issued) - severe weather or disease destroys the oyster population.	Adaptive Management Plan	Viewed as if this event had occurred after having already received a Certificate of Compliance. Jumpstart by implementing the Year Two components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE. The number of restarts or Year Two initiatives will not exceed five (5) attempts over the life of the Mitigation Plan, after which no further action is required.

MITIGATION PLAN SCENARIOS

AFTER ISSUANCE OF CERTIFICATE OF COMPLIANCE		
Scenario	Applicable Document	Required Action
Years 1 - 10, AFTER issuance of Certificate of Compliance - oyster population falls below 25 /square meter.	Long Term Management Plan	The Shellfish Department will close the area (consistent with MA DMF regulations) to allow the population to naturally increase. If populations do not recover (after one year) or continue to fail, there would be a jump start by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.
Years 1- 10, AFTER issuance of Certificate of Compliance - severe weather event or disease destroys the oyster population	Long Term Management Plan	Jump start by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.
Years 10 and beyond, AFTER issuance of Certificate of Compliance - severe weather event or disease destroys the oyster population	Long Term Management Plan	Jump start by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.
Years 10 THROUGH 15 AFTER Issuance of Certificate of Compliance - oyster population falls below 25 /square meter.	Long Term Management Plan	Jump start by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.

MITIGATION PLAN SCENARIOS

<p>Years 16 and beyond, AFTER Issuance of Certificate of Compliance - oyster population falls below 25 /square meter.</p>	<p>Long Term Management Plan</p>	<p>Jump start by implementing the Year 1 components outlined in the Mitigation Work Plan, Section F with respect to the placement of cultch and seed. Alternate actions proposed by the Shellfish Department may be substituted if approved by USACE.</p>
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MITIGATION PLAN SCENARIOS

ANYTIME PRIOR TO OR AFTER ISSUANCE OF CERTIFICATE OF COMPLIANCE		
Scenario	Applicable Document	Required Action
Town desires to opt out of the mitigation Plan	Opt Out Clause	<p>The opt Out Clause can be invoked by the Town at any time throughout the life of the Mitigation Plan.</p> <p>PPurchasethe required 7.16 mitigation credits (or fewer credits if mitigation plan results at that time has resulted in a reduction to required credits). The amount of the Fee will be based on the MA In Lieu Fee (ILF) Program, then pertaining.</p>

MITIGATION PLAN SCENARIOS

REPORTING REQUIREMENTS		
Self-Verification Definition	Self-verification shall include information on oyster density in the reporting year; dates that the Blackfish Creek site has been opened for harvest, and the extent of harvest (commercial, recreational, etc.) for each year since the previous report.	
Scenario	Applicable Document	Required Action
Years 1 through 10 AFTER Issuance of Certificate of Compliance.	Self-verification shall be provided every two years. With the first report being two years after issued certificate of compliance.	Continued reporting maintains the status of the self-reporting requirements and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.
Years 11 through 15 AFTER Issuance of Certificate of Compliance.	Self-verification shall be provided every five years.	Continued reporting maintains the status of the mitigation plan and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.
Years 16 AFTER Issuance of Certificate of Compliance.	Self-verification shall be provided every five years	Continued reporting maintains the status of the mitigation plan and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.

MITIGATION PLAN SCENARIOS

OPTIONAL REPORTING:
YEAR 16 and beyond
AFTER Issuance of
Certificate of Compliance.

Optional Reporting: Self
verification be provided every five
years.

Continued reporting maintains the status of the mitigation plan and as such satisfies the permit requirement for all future dredging in Area 2, South Mooring Field, regardless of the time since the previous dredging. Continued success of the blackfish mitigation site offsets any future potential dredging impacts in the footprint of Area 2.

Commented [BTMCUC(1)]: So delete this. The understanding is that the town can request to modify their permit to submit every 10 years or so, or relinquish monitoring reports at 15 years post certification etc.