

FINAL REPORT

CRITICAL REVIEW AND SOME RECOMMENDATIONS REGARDING THE STANDARD LEASE
APPLICATION OF BAILEY COFFIN FOR THE BOTTOM AND SUSPENDED CULTURE OF SHELLFISH
ON 6.83 ACRES OF BOTTOM WEST OF SOW AND PIGS ISLAND IN CASCO BAY,
FREEPORT, CUMBERLAND COUNTY, MAINE

For

Protect the Passage
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By

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Summary

I have reviewed the application of Bailey Coffin for the lease of 6.83 acres of bottom in Casco Bay for bottom and suspended culture of various shellfish, and recommend that the lease be denied as proposed primarily due to the well-documented, extensive presence of eelgrass on the proposed lease site and the likely negative impact that the proposed aquaculture activity will have on this eelgrass essential fish habitat. If the application is revised and then considered by MDMR, the proposed lease should be reduced in size so as to maintain a minimum separation distance of 100 feet from all observed eel grass in the 2021 MDMR survey. Additionally, I have concerns about potential impacts of the proposed lease on other commercial and recreational fishing activities, navigation and riparian ingress / egress, and recommend that MDMR give serious consideration to the negative impacts of the proposed lease on those activities.

Introduction

At the request of the group, "Protect the Passage", I have reviewed the standard lease application by Bailey Coffin for the bottom and suspended culture of American/eastern oysters (*Crassostrea virginica*), northern quahogs (*Mercenaria mercenaria*), Arctic surf clams (*Mactromeris polynyma*), razor clams (*Ensis directus*), European oysters (*Ostrea edulis*), bay scallops (*Argopecten irradians*), and soft-shell clams (*Mya arenaria*), and on 6.83 acres of subtidal bottom between west of Sow and Pigs island, in Casco Bay, Freeport, Cumberland County. This application was deemed complete by MDMR on 17 May 2021. I am familiar with this area on the west side of upper Casco Bay.

I have more than 50 years of professional experience including almost a decade as a commercial fishermen and shellfish aquaculturist, and three decades as a professor of Fisheries and Aquaculture at the University of Rhode Island. I have published numerous papers on shellfish aquaculture, and have many former students working that are now operating successful shellfish aquaculture farms, and working as aquaculture extension agents at state institutions in New England. An abbreviated resume is attached to this report (Appendix 1).

This application is for a standard lease of about 6.83 acres on the west side of upper Casco Bay. Ms. Coffin proposes suspended and bottom culture of shellfish of the following species: American/eastern oysters, northern quahogs, Arctic surf clams, razor clams, European oysters, bay scallops, and soft-shell clams. He is proposing to grow the shellfish using a combination of bottom planting (no gear) and floating and submerged cages/mesh bags. According to the lease application 700 rigid mesh bags with floats would be deployed in the northwest corner of the proposed lease, adjacent to a proposed 10x20 foot covered float/raft, in 7-8 parallel rows, with each row measuring 150 feet in length. Additionally, 800 semi-rigid mesh bottom bags with wire feet (400 would measure 18"x36"x9" and 400 would measure 18"x36"x6") are proposed for the remainder of the northern portion of the proposed lease area. Bottom bags, which would be onsite throughout the year and would be used to culture all proposed species, would be deployed in up to (7-8) 150-foot lines located along the boundary of the northern half of the proposed lease. The southern portion of the proposed lease would be free of gear and reserved for bottom planting only. Activities on the proposed commercial shellfish culture lease will vary seasonally, but some activities may be conducted throughout the year. The application includes various aerial photographs of the area, plot plans of the proposed lease area, and a presentation of the methods and equipment that will be employed to conduct the bottom and suspended culture of shellfish.

I have also reviewed the Maine DMR site review report prepared by Flora Drury, Marcy Nelson, and Cheyenne Adams dated 22 January 2022. This report is based on field observations made during site visits conducted by Marcy Nelson, Flora Drury and Cheyenne Adams on 8 and 28 July, 2021. The report provides a review of the application with regard to MDMR criteria for determining the suitability of an aquaculture operation for a particular area (MDMR Regulations Chapter 2.37(A)). Appendix 2 of this report provides the text of these criteria from the Maine DMR website. This report begins with a general description of the proposed lease area, then considers the area based on relevant MDMR standards. The MDMR report notes that proposed lease area is subtidal, but relatively shallow at low tide. Given these shallow depths, MDMR believes that it is likely that the proposed float and lines of floating bags would rest on the seafloor, and that some lines of bottom cages would be partially exposed at some lower tidal stages. Based on underwater observations the MDMR report notes that the shallower sections of the proposed lease, which are located along the boundaries to the west and north, are dominated by shell hash, while the deeper, southeast section of the proposed lease is composed of semi-firm mud. The MDMR site review report is comprehensive and present data collected in the site visit, but only draws some limited conclusions with regard to the above mentioned criteria. The purpose of the this report is to provide additional interpretation of the MDMR data relative to the MDMR criteria. I believe that the MDMR report underestimates the impacts of the proposed lease especially on the eelgrass beds both within and adjacent to lease. Additionally, the MDMR report does not fully address the impacts of the lease on other commercial fishing activities in the area and potential impacts of the lease on navigation.

I have also reviewed the eelgrass distribution maps available on the Maine DMR Historical Eelgrass viewer.

<https://maine.maps.arcgis.com/apps/MapSeries/index.html?appid=ac2f7b3d29b34268a230a060d6b78b25&entry=1>, and I have reviewed the Atlantic Environmental report by Tim Forrester dated 19 July 2021 that describes the results of both a desktop analysis of historical eelgrass presence, and a field study of the eel grass distribution on the proposed lease site on 12 July 2021. These sources clearly indicate that the area included in the Bailey Coffin lease application has both a long history of being covered with eelgrass beds, and that the proposed lease site currently has an extensive presence of eelgrass habitat in 2021, contrary to the statements of the applicant in the lease application. The MDMR report while noting that proposed lease was a once an eelgrass bed less than 20 years ago, does not address the fact that an historical presence of eelgrass is among the most highly rated factors in predicting the potential for eelgrass restoration in an area.

Review and Professional Opinion

Based on my review of the Bailey Coffin application, the MDMR site review, the MDMR eelgrass maps for the 1990s and 2000s, the Atlantic Environmental report, and my professional experience as a educator, researcher, and outreach specialist at the University of Rhode Island for 30 years, I would like to offer the following professional opinions relative to this application based on selected MDMR criteria. The following presentation addresses these criteria in the order of significance to the evaluation of this proposed lease.

1. First and most important, with regard to DMR Evaluation Criteria No. 5, the Existing Support System, and the impact of the proposed lease on the ecosystem, the Bailey Coffin lease application erroneously indicates that there is no eelgrass within the 6.84 acre proposed lease area (section D.5 Environmental Characterization, page 14 of his application).

Eelgrass is a submerged aquatic plant (vegetation), typically referred to as SAV. It grows on the seabed in clean shallow water, as it requires sunlight, in a sandy silt-clay sediment type, and would easily be observed from the surface in a boat at low tide in the lease area. Eelgrass is considered an essential fish habitat by NOAA NMFS, because of its high habitat value to juvenile fish. Given the significance and diversity of the functions and services provided by seagrass, Costanza et al. (2007) determined seagrass ecosystems to be one of Earth's most valuable. While it has also been demonstrated that shellfish aquaculture gear by itself has also a high habitat value (DeAlteris and Kilpatrick, 2004), the DeAlteris and Kilpatrick study did not evaluate the impacts of the practice of shellfish aquaculture on the ecosystem, it only addressed the habitat value of the gear. SAV has been in decline in Maine in the last two decades for a number of reasons, mostly related to the invasive green crab (Malyshev and Quijo'n, 2011), habitat degradation and disease. In many states the general protocol with regard to the shellfish farming and SAV is to avoid, minimize and mitigate (NOAA Fisheries, West Coast Region, 2014). In New England, the US Army Corps of Engineers has established guidance for its review of projects that may impact SAV (USA CoE, 2016). That guidance established a policy with regard to eelgrass restoration. The guidance notes that the long-term sustainability of conditions suitable for SAV is key to successful eelgrass mitigation and restoration. The USA CoE recommends that creation of a 100-meter buffer around existing beds to minimize impacts from any activities that may impact existing eelgrass, so as to provide the opportunity for the beds to expand naturally. In general, eelgrass restoration is best accomplished where eelgrass has been documented to exist previously (historical presence) and where there are nearby eelgrass beds that can provide seed (Lescgen et al 2010). Short et al (2002) developed a site selection

model for the optimum success in the restoration of eelgrass that considered the historical presence of eelgrass in the area to be a mostly highly rated factor. Orth et al (1994) noted that the adjacency (<100m or >100m) of a natural eelgrass bed is important depending on the restoration strategy, natural or by transplanting shoots.

Shellfish culture activities are generally considered to negatively impact healthy eelgrass beds (Ferriss et al, 2019). In particular, on-bottom culture simply competes for space with eelgrass, and will destroy a bed. Off bottom aquaculture reduces the availability of light to eelgrass beds, and again reduces the viability of the eelgrass. Finally, the practice of onsite cleaning the shellfish aquaculture gear results in the release of biofouling organisms directly into the water column and onto the seabed. This loading of the water column with suspended material released as a result of intensive cleaning of the shellfish aquaculture gear reduces light penetration and thus negatively impacts eelgrass, and the settlement onto seabed with dead organic material reduces oxygen and buries eelgrass vegetation. In some coastal states there is legislation that protects eelgrass beds from degradation shellfish culture activity and other activities that may negatively impact this essential fish habitat.

While Ms. Coffin's application indicates that there was no eelgrass within the proposed lease site, the MDMR site report (Drury et al, 2021) clearly states that the survey team observed eelgrass within and nearby the proposed lease area in drop camera, snorkel, and scuba transect video footage collected on July 8 and July 28, 2021 (**Figure 1** in this report taken from Figure 8 in Drury et al, 2021). On these dates, eelgrass beds were observed near the southeast corner of the proposed lease area. Additionally, the Atlantic Environmental report (Forrester, 2021) reports that eelgrass was observed in the southern and western portions of the proposed lease area.

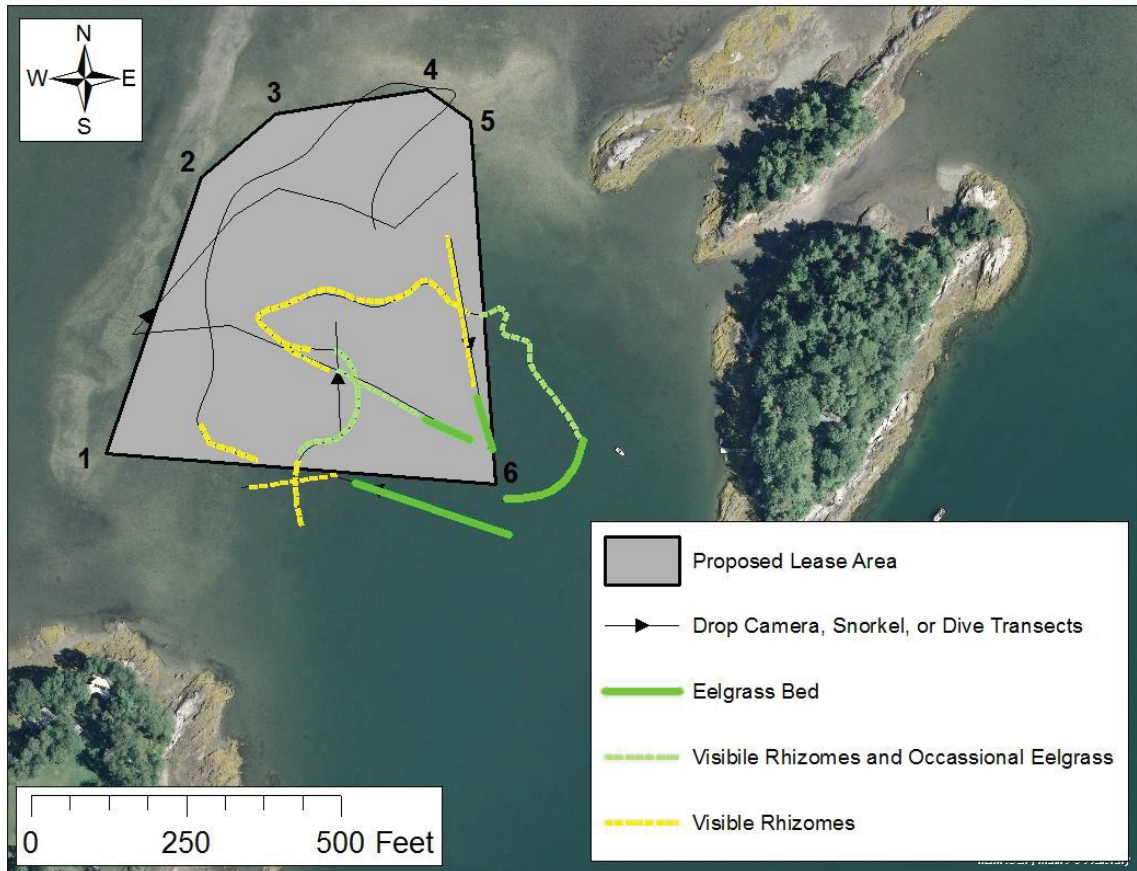


Figure 1. Eelgrass (*Z. marina*) observed within and near the proposed lease site during July 8, 2021 drop camera transects and July 28, 2021 snorkel and scuba transects (taken from Figure 8 in Drury et al 2021)

Exposed eelgrass rhizomes with occasional blades were observed in the center of the southern half of the proposed lease area, and outside of eastern boundary of the proposed lease area (Image 18 & Figure 8 in Drury et al 2021). Exposed rhizomes without blades were also observed in the center of the proposed lease area, and southern boundary of the proposed lease area (Images 10 & 19 & Figure 8 in Drury et al 2021).

The MDMR report also notes that eelgrass was also observed within the proposed lease area during an eelgrass survey conducted in 2018 by the Maine Department of Environmental Protection (MDEP) in cooperation with the Casco Bay Estuary Partnership; the survey transect cut through the southern portion of the proposed lease. According to MDEP, this eelgrass observation was omitted from the MDEP maintained feature layer18 in error, but underwater video conducted in 2018 as part of

this survey shows “sparse but regularly distributed, healthy appearing eelgrass” within the proposed lease area

The presence of eelgrass to the west of Sow and Pigs island is well documented in the MDMR website entitled Maine eelgrass, (<https://www.maine.gov/dmr/science-research/species/eelgrass/>), and **Figure 2** shows the abundance of eelgrass in the 1990s and 2000s, and **Figure 3** shows the gains in density and extent of eelgrass in the same period.

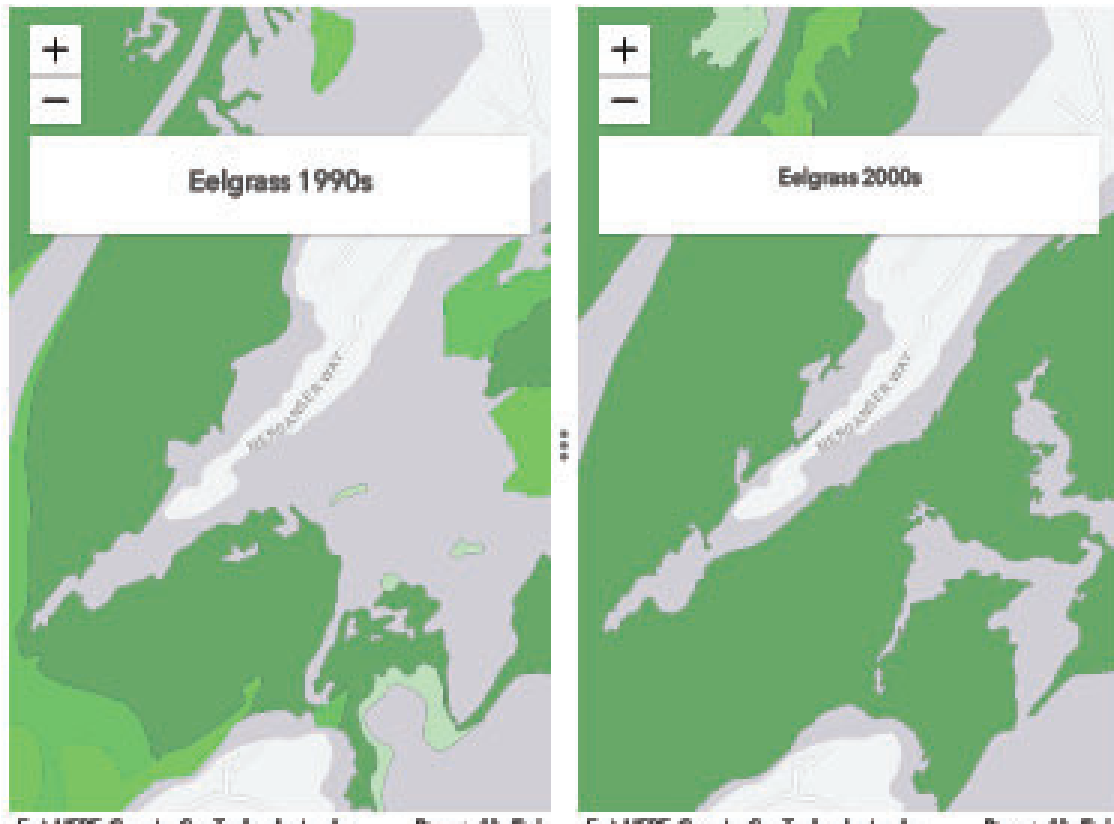


Figure 2. The distribution of eelgrass in west of Sow and Pigs Island and north of Bustins Island in the 1990s and 2000s, taken from <https://www.maine.gov/dmr/science-research/species/eelgrass/>. Note that in this figures, only the outline of Sow and Pigs Island is shown, but the presence of eel grass is clearly visible.

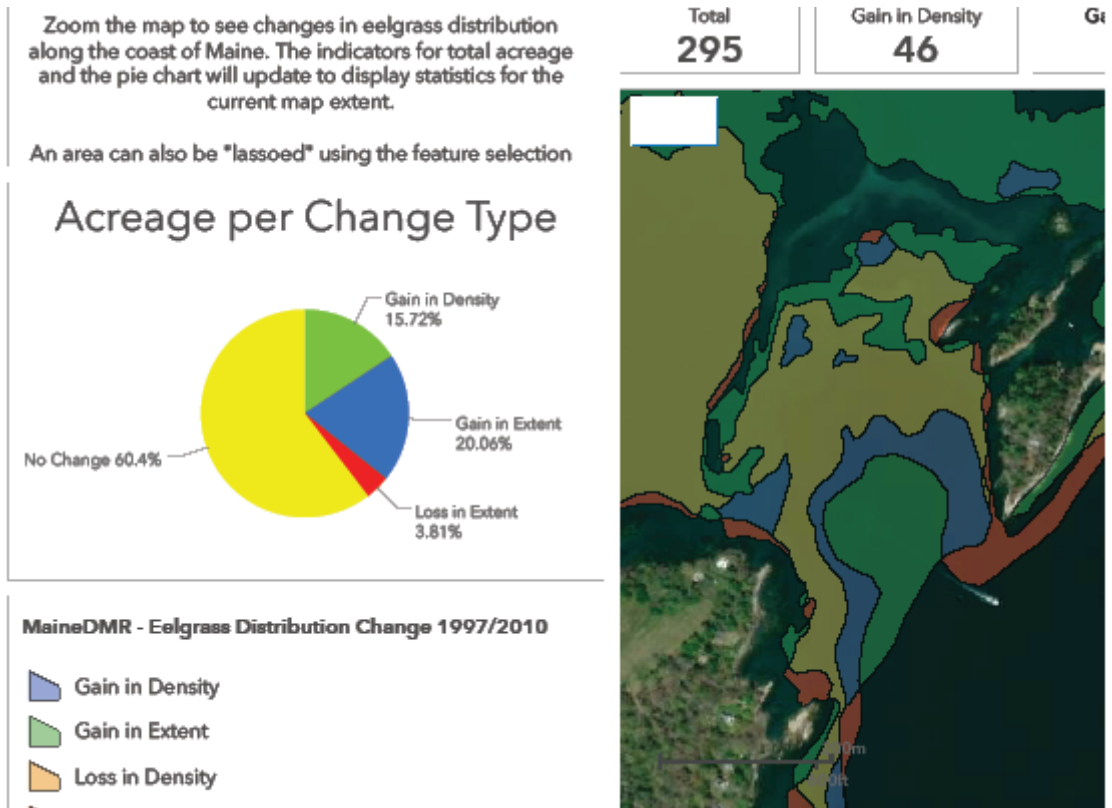


Figure 3. The change in eelgrass to the west of Sow and Pigs island and north of Bustins IIsand in the 1990s and 2000s, taken from <https://www.maine.gov/dmr/science-research/species/eelgrass/>. Note that there was both a gain in density and the extent of eel grass to the west of Sow and Pigs island between the 10990s and the 2000s.

Although the majority of the area in which eelgrass blades and rhizomes were observed during MDMR site visits is proposed to be free of gear, it appears that the southern three proposed lines of bottom cages, along with the eastern-most proposed line of cages would overlap with areas where DMR observed exposed rhizomes. The MDMR suggests that if the proposed lease is granted that no gear should be permitted within 25 feet of areas where eelgrass blades or rhizomes were observed, to ensure that no gear is deployed over existing eelgrass beds or exposed rhizomes and to ensure compliance with the Army Corps of Engineer’s recommendation of a 25-foot setback between aquaculture gear, including moorings, and existing eelgrass.

The MDMR further notes that some of the harvest techniques that are proposed to be conducted throughout the lease, including rake, drag, and clam hoe harvest, would pose a threat to the existing eelgrass beds and associated rhizome system via physical disturbance and sedimentation, and should be prevented throughout the lease area, if

granted, to ensure that existing eelgrass would not be damaged, and further eelgrass reestablishment throughout the proposed area would not be hampered indicates that the proposed lease area was completely covered with eelgrass at a high density in 2001.

The Bailey Coffin lease application also indicates that she intends to use onsite power washing to remove biofouling from her aquaculture gear. This proposed method of cleaning the gear will further exacerbate the degradation of the existing eelgrass habitat either within or adjacent to lease area with the release of biofouling materials into the water column and onto the seabed.

Best management practices described for the East Coast Shellfish Aquaculture Industry (Flimlin et al 2010) clearly state that shellfish aqua culturists should “choose sites with no SAV in the general vicinity” (page 20), and that when possible, they should avoid onsite cleaning of aquaculture gear (page 37). The Maine Aquaculture Association, Guiding Principles for Responsible Aquaculture state: that members “Shall plan and operate aquaculture sites whose characteristics are compatible with long-term sustainable operation with acceptable ecological effects”. Clearly, the proposed lease does not conform to this principle with regard to eelgrass. I believe that the use of onsite power washing will be detrimental to eelgrass within and adjacent to the proposed lease area due to the discharge of biofouling materials onto the seabed, and that onsite power washing should be prohibited, as there are suitable alternatives such as off site cleaning of aquaculture gear.

Given the extent of eelgrass observed in the southern and western portions of the proposed lease area in the 2021 MDMR survey and the Atlantic Environmental survey, I would recommend that minimally no aquaculture be allowed in the southern and western portions of the proposed lease area, and that no aquaculture be allowed within 100 feet of the documented presence of eelgrass in 2021. Given the proposed use of power washing, and the potential for biofouling removed by onsite power washing to negatively impact existing eelgrass habitat, I believe that the 25 foot setback between eelgrass and aquaculture activity recommended by MDMR is inadequate. I believe that a 100 foot setback is minimally required. Further, given the demonstrated presence of eelgrass throughout the proposed lease area in the recent past, I would recommend that more conservatively, that the lease not be granted at all, as proposed.

2. With regard to MDMR evaluation criteria No. 3, Interference with other commercial and recreational fishing. The MDMR report notes in Table 5 that the survey team observed live Northern quahogs and European oysters within the proposed lease area. This is

approximately the same location as the proposed raft / float location. The MDMR report also notes the presence of lobster buoys within the proposed lease area. The Atlantic Environmental report notes the presence of striped bass fining at the surface in the shallow areas of the proposed lease site. These natural populations of wild shellfish, lobsters and finfish will become unavailable to commercial and recreational harvesters and fishermen, if the proposed lease is approved.

3. With regard to MDMR evaluation criteria Nos. 1 and 2, Riparian ingress and egress and Interference with navigation. The MDMR site review provides a clear description of the issues of concern with respect to the impact of the proposed lease on ingress/egress of riparian owners and navigation. In particular the proposed lease with bottom gear in the shallow, northern portion of the proposed lease will interfere with riparian access to Sow and Pigs Island. Additionally, the commercial ferry that operates out of the northwestern tip of Bustins Island regularly crosses the proposed lease, and at lower stages of the tide, the proposed lease would interfere with the navigation of the ferry. Again, it appears that proposed lease will interfere with both riparian access and navigation, if approved as described.

Conclusions

In this report, I have identified some potential issues or problems associated with Bailey Coffin lease application. The proposed lease application should not be granted as proposed due to the presence of eelgrass within the proposed lease area. It is not sufficient to simply reduce the size of the lease to protect the existing eelgrass because the proposed lease overlaps areas that have had an historical presence of eelgrass, and the proposed lease would preclude the natural restoration of eelgrass to the area. If the lease is granted it should be substantially reduced in size, so as to avoid overlap with eelgrass with a minimum setback of 100 feet from existing eelgrass habitat, and the use of power washing should be prohibited on the lease. Additionally, the proposed lease will interfere with riparian access and navigation, as well as preclude access of commercial and recreational fishermen to existing, documented natural populations of shellfish, lobsters and finfish on the proposed lease area.

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