FRENCHMAN BAY ACTION PLAN

FRENCHMAN BAY PARTNERS

2013

PREFACE

Frenchman Bay Partners and Conservation Planning

Between 2010 and 2011, after a year and a half of stakeholder gatherings, work group meetings and conversation about the future of Frenchman Bay, a core team of stakeholders committed to forming a coalition of partners called the **Frenchman Bay Partners** (FBP). This core group agreed that a conservation planning method would best serve the development of a Frenchman Bay Plan and adopted the *Conservation Measures Partnership (CMP) Open Standards for the Practice of Conservation* (https://miradi.org/openstandards) as a planning tool (Figure 1).

Figure 1. Diagram of the *Conservation Measures Partnership Open Standards for the Practice of Conservation* (https://miradi.org/openstandards). This approach was adopted by the Frenchman Bay Partners for bay planning for Frenchman Bay.

In accordance with Step 1 of the *Open Standards,* the group defined the **GEOGRAPHIC SCOPE** of the Frenchman Bay planning process as the entire Frenchman Bay watershed, encompassing 13 towns, three unorganized territories, and three rivers. The **VISION** of the Frenchman Bay Partners was defined as, **"a healthy and sustainable future for Frenchman Bay where multiple users can enjoy the inherent beauty and benefit from the ecological and economic viability of the bay."**

Conservation targets, or habitats and species of greatest concern, and threats to these were identified and prioritized during a planning retreat held on October 16 and 17, 2011, at Schoodic Education and Research Center (SERC) Institute in Winter Harbor, Maine. The conservation targets prioritized for the Frenchman Bay planning process

were mudflats, eelgrass, subtidal benthic habitats (bottom habitats), and diadromous (migratory) fishes. The group also prioritized marine-based livelihoods.

The core planning team that participated in the two day planning retreat which resulted in a first draft of the Frenchman Bay Plan included:

- Bob Deforrest: Maine Coast Heritage Trust
- Jane Disney: MDI Biological Laboratory
- George Kidder: MDI Biological Laboratory
- Antonio Blasi: Hancock Point Kayak Tours, Hancock County Planning Commissioner, Hancock Planning Board member
- Frank Dorsey: Friends of Taunton Bay & Frenchman Bay Conservancy
- Chris Petersen: College of the Atlantic
- Glen Mittelhauser: Maine Natural History Observatory
- Abe Miller-Rushing: Acadia National Park
- Fiona de Koning: Acadia AquaFarms

Also in attendance were University of Maine graduate students Britt Cline and Bridie McGreavy and AmeriCorps Volunteer Leader, Molly Miller.

The FBP has since reached out to a greater number of bay stakeholders by conducting focus sessions and by making presentations to different user groups. This has included outreach to, and support from, municipalities around the bay.

Structure of the Frenchman Bay Partners

While in 2011 and 2012, a steering committee coordinated most of the efforts of the FBP, an executive committee was elected at the FBP first annual meeting held on February 2, 2013:

- President, Jane Disney: MDI Biological Laboratory
- Vice President, Chris Petersen: College of the Atlantic
- Secretary, Bridie McGreavy: PhD Candidate at the Margaret Chase Smith Policy Center, University of Maine
- Executive Officer at Large, Bob Deforrest: Maine Coast Heritage Trust
- Executive Officer at Large, Fiona DeKoning: Acadia Aqua Farms

Four subcommittees were also created at the February 2 meeting to focus directly on conservation planning for each of the four ecological conservation targets (mudflats, eelgrass, diadromous fishes, and subtidal benthic habitats). An additional subcommittee was also created to focus on FBP communications.

Development of the Frenchman Bay Action Plan

Step 2 of the *Open Standards* calls for the development of an Action Plan, which includes the definition of **GOALS** for each conservation target and the development of **STRATEGIES** to ultimately achieve these goals.

On November 8, 2012, the FBP met at Mount Desert Island Biological Laboratory in Salisbury Cove, Maine, to begin to set goals for each of the four ecological conservation

targets. Viability assessments were conducted for each conservation target in order to set quantifiable goals. A viability assessment involves explicitly and clearly defining "healthy" or viable targets and addresses the questions:

- What normally sustains these targets in a good condition?
- How are they doing now?
- How do we want them to be in the future?

This version of the Frenchman Bay Action Plan incorporates the preliminary goals identified during this session and preliminary strategies for achieving these goals.

GEOGRAPHIC SCOPE

The geographic scope of the Frenchman Bay Action Plan is the entire Frenchman Bay watershed including 13 towns, three unorganized territories, and three rivers (Figure 2).

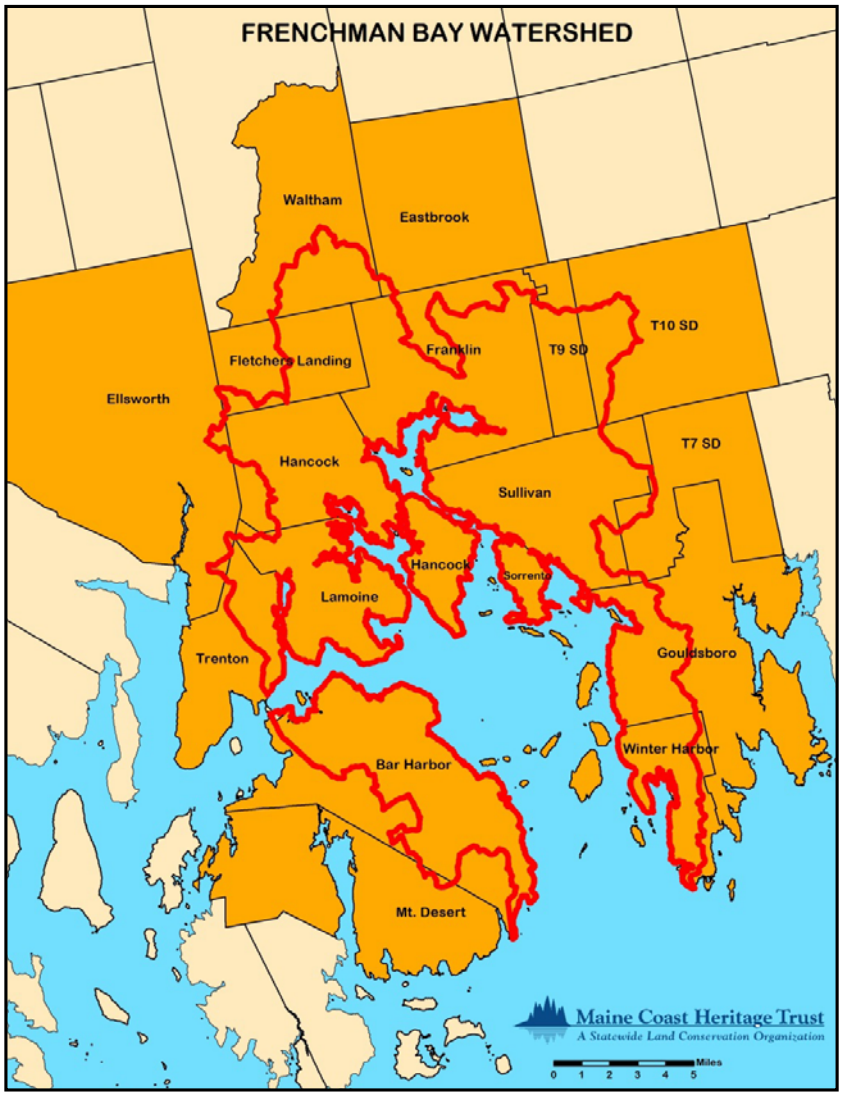

Figure 2. Map delineating the Frenchman Bay watershed; the geographic scope of the Frenchman Bay Action Plan. Source: Maine Coast Heritage Trust.

CONSERVATION TARGETS

Out of the array of species and habitats represented in Frenchman Bay (Box 1), mudflats, eelgrass, subtidal benthic habitats, and diadromous fishes were prioritized by the Frenchman Bay Partners and are the focus of this Action Plan. The ecological health of all conservation targets is integral to marine livelihoods in Frenchman Bay. Therefore, setting goals and developing strategies for the conservation targets is expected to benefit the human welfare target that was also prioritized by the Partners.

Box 1. Conservation Targets in Frenchman Bay

- Mudflats*
- Eelgrass*
- Subtidal benthic (bottom) habitats*
  - Bottom invertebrates (lobster, cucumber, urchin, scallop, shrimp, mussels)
  - Groundfish
- Diadromous (migratory) fishes*
- Coastal wetlands (salt marsh)
- Estuarine habitats
- Islands
  - Shorebirds and seabirds (and birds in other habitats)
- Rocky intertidal and subtidal
  - Kelp
  - Rockweed
- Open water habitats
- Marine mammals
  - Harbor seals, porpoises

**Prioritized for bay planning*

Mudflats are economically and ecologically valuable habitats in Frenchman Bay that support commercially harvested clams, mussels, and worms, and also serve as important feeding grounds for birds and fish.

Eelgrass is a marine flowering that forms a structurally complex and highly productive habitat. Eelgrass serves as habitat during the life cycles of a variety of marine fish and invertebrates, including lobsters and flounder, and in Frenchman Bay, mussel seed has

been found in eelgrass. Eelgrass beds also help to stabilize sediments and trap particulate matter from the water column, which improves water clarity.

Subtidal benthic habitats, or subtidal bottom habitats, include a range of seabed habitat types (e.g. rocky, muddy, sandy, reefs) and support lobsters, groundfish, and other commercially important bottom-dwelling species, including sea cucumbers, urchins, scallops, shrimp, and mussels. Ultimately, goal setting for this conservation target will be to the benefit of multiple species and habitats in Frenchman Bay.

Diadromous (migratory) fishes. The Frenchman Bay watershed serves as habitat for important migratory fish species which are dependent on both freshwater and marine habitats in order to complete their life cycles. Of particular interest to the FBP are alewives, which migrate *from* the sea to spawn in ponds and lakes and are an important food source for many organisms across freshwater and marine habitats and American eels, which migrate *to* the sea to spawn and the returning juvenile elvers are harvested and are of high economic value.

DIRECT THREATS TO PRIORITIZED CONSERVATION TARGETS

According to the *Conservation Measures Partnership*, "direct threats" are human induced actions or events that directly degrade one or more conservation targets. In Frenchman Bay, threats to habitats and species of concern were identified by FBP as:

- Legal but unsustainable harvesting practices
  - Habitat modification
  - Overharvesting
- Exotic invasive species
  - Green crabs, potentially Asian shore crabs and *Codium* algae
- Dams and physical obstruction to fish passage
- Sewage treatment and bacterial pollution
  - Nutrient inputs
- Inappropriate residential and commercial construction practices
- Increased impervious surfaces
- Misuse of household / landscape chemicals and petroleum products
- Illegal harvesting practices
- Human disturbance to wildlife
- Waterfront infrastructure (docks, mooring)
- Inappropriate agricultural practices
- Finfish aquaculture

FBP ranked the threats listed above in terms of scope, severity, and irreversibility relative to the conservation targets to which the threat applies.

Legal but unsustainable fishing practices had the highest threat ranking. By this, it is meant that although a fishing practice or quota is legal, it may be unsustainable over the long run in Frenchman Bay, given the current status of ecosystems, or current status of a given local population of organisms. Examples of legal but unsustainable fishing practices include the use of drags in some target habitats, which can damage the habitat and associated organisms, and the harvest of species beyond the limit that can be sustained in a given habitat without taking conservation measures. For example, clam

flat surveys at Hadley Point in Frenchman Bay reveal occasional conservation closures are necessary for clams to rebound after periods of sustained harvesting.

Exotic invasive species had the second highest threat rating. Invasive species may compete with or prey on native species, alter local community and habitat structure, and introduce disease. The green crab, *Carcinus maenus,* is native to Europe and was introduced to the eastern US in the mid-1800s. This species feeds on economically important shellfish species, including the soft-shell clam, which has had negative impacts on shellfisheries in New England. This species is found in Frenchman Bay. Other exotic species, like the Asian shore crab, *Hemigrapsus sanguineus*, the algae known as Dead man's fingers, *Codium fragile*, and the invasive tunicate *Botrylloides violaceus,* an organism which can foul fishing equipment, are known to occur in Maine. The Asian shore crab has been observed in one instance at Schoodic Peninsula in the eastern part of Frenchman Bay and *Botrylloides* and possibly *Codium* occur in outer Frenchman Bay and neighboring Blue Hill Bay.

Dams and physical obstruction to fish passage had the next highest threat rating and this threat is most relevant to the diadromous fish conservation target. The Frenchman Bay watershed serves as habitat for important migratory fish species, including alewives and the American eel, which are dependent on both freshwater and marine habitats during their life cycles. Obstruction caused by dams or improperly functioning culverts can prevent these species from reaching their spawning habitats. This can have negative impacts on fish populations and their persistence in Frenchman Bay, which, in turn, can have negative economic repercussions.

Sewage treatment and bacterial pollution was the fourth highest threat identified by the FBP. Malfunctioning septic systems, overboard discharges, and boat discharges introduce nutrients and bacterial pollution to the environment, which can lead to a decline in habitat quality for the organisms which occupy the affected habitats. Bacterial pollution can also impact human uses of affected areas (e.g. contaminated shellfish are rendered unmarketable and contaminated beaches are unsuitable for recreation).

A CONCEPTUAL MODEL FOR FRENCHMAN BAY

A conceptual model is a diagram that portrays what is happening at a project site. It shows the major factors that are influencing the conservation targets (i.e. threats and opportunities) and lays out the relationships among those factors. After establishing the conservation targets and ranking the direct threats, the FBP planning team was able to assemble a conceptual model using *Miradi* software*. Miradi* is a computer program that guides users through a series of step-by-step interview wizards based on the *CMP Open Standards* and allows users to design, manage, monitor, and learn from their projects to more effectively meet their conservation goals.

The FBP planning team drafted strategies to address the top-ranked threats and incorporated these into a conceptual model. As the whole conceptual model is quite complex, the portion of the model addressing fish passage is depicted in Figure 3 and a summary of draft strategies and the linkages between threats and conservation targets is presented in Table 1. The full conceptual model can be viewed on the FBP website at www.frenchmanbaypartners.org.

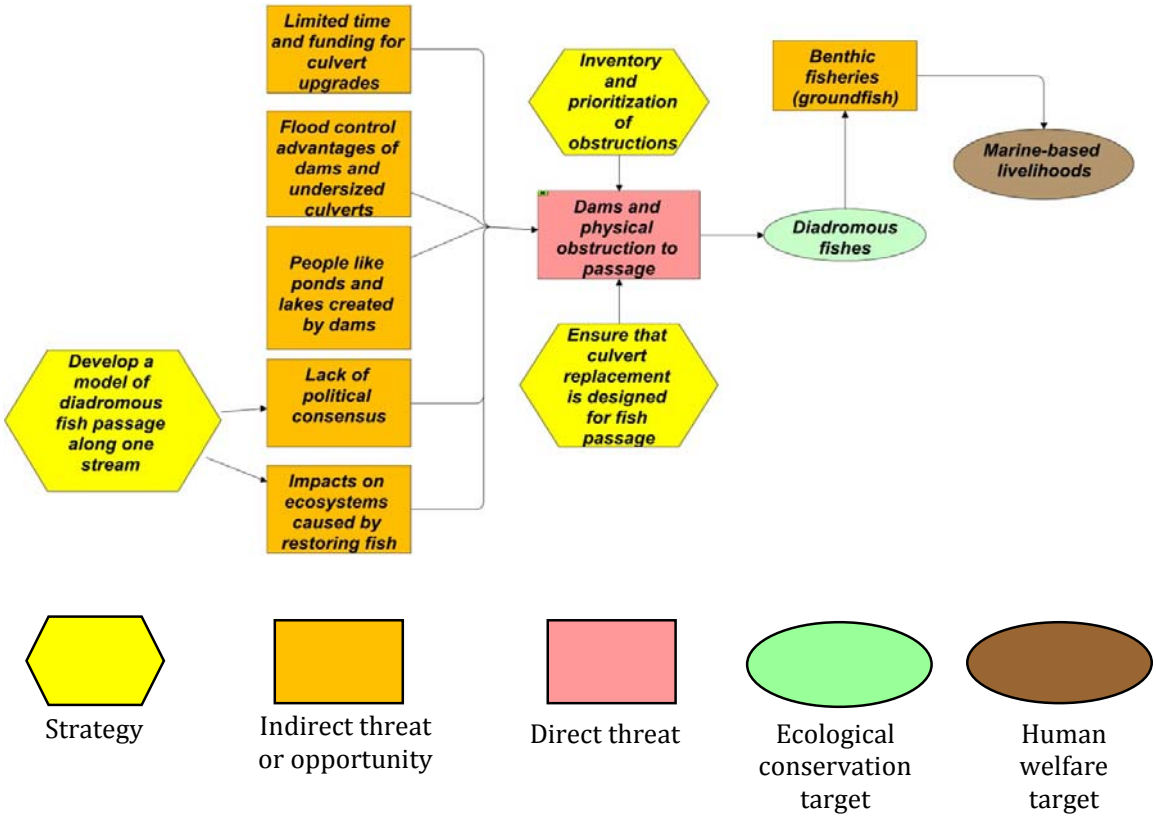

Figure 3. Conceptual model for obstruction to fish passage in Frenchman Bay, including contributing factors and strategies to address this threat. This model was developed by the Frenchman Bay Partners using *Miradi* software.

Table 1. Direct threats of highest concern to the four conservation targets prioritized for conservation planning by the Frenchman Bay Partners and proposed strategies to address threats.

Direct Threats	Conservation Targets	Strategies
Legal but unsustainable harvesting practices -Habitat modification -Overharvesting	-Mudflats -Eelgrass -Subtidal benthic habitats -Diadromous fishes	-Create a communication plan for Frenchman Bay users -Facilitate discussions to encourage community-based management **More strategies are needed but are to be developed by the fishing community*
Exotic invasive species	-Mudflats -Eelgrass	-Promote EPA "no discharge" zoning -Monitor for invasive species -Scenario planning for invasive species -Eradicate green crabs
Dams and physical obstruction to passage	-Diadromous Fishes	-Inventory and prioritize obstructions -Ensure that culvert replacement is designed for fish passage -Develop a model of migratory fish passage along one stream
Sewage treatment and bacterial pollution - Bacterial Pollution - Nutrient Inputs	-Mudflats -Eelgrass -Diadromous Fishes	-Conduct shoreline or watershed surveys -Identify and address major sources of bacterial pollution -Conduct a build-out scenario for whole bay -Create buffers and set backs -Research impact of not treating sewage in winter -Provide incentive ordinances for innovative small-scale sewage treatment -Help residents get septic system replacement grants

GOALS FOR CONSERVATION TARGETS

Mudflats

Using the information at hand during the November 8, 2012, goal-setting session, it was determined that 610 acres of mudflats in Frenchman Bay are closed and classified as restricted due to bacterial contamination.

Goal 1: *Get all 610 acres of mudflats that are closed and classified as restricted due to bacterial pollution open for harvesting.*

Strategies underway for Goal 1

Building capacity for shoreline or watershed surveys

In May 2013, the Frenchman Bay Regional Shellfish Committee (RSC) received a Maine Community Foundation Capacity Building Grant for $7,500. Hancock County Planning Commission is serving as fiscal sponsor for the grant. Other partners are serving as advisors to the project. The grant will help the RSC to work on building capacity toward conducting watershed surveys as a part of the larger goal of opening 610 acres of restricted-closure clam flats (Figure 4). The Regional Shellfish Committee will be collecting data, working with municipalities, identifying sources of pollution, and determining strategies for remediation. Frenchman Bay Partners are pursuing additional grant opportunities to help with the creation of a multi-municipality watershed management plan and to create a septic system repair and replacement fund to assist property owners with dysfunctional systems.

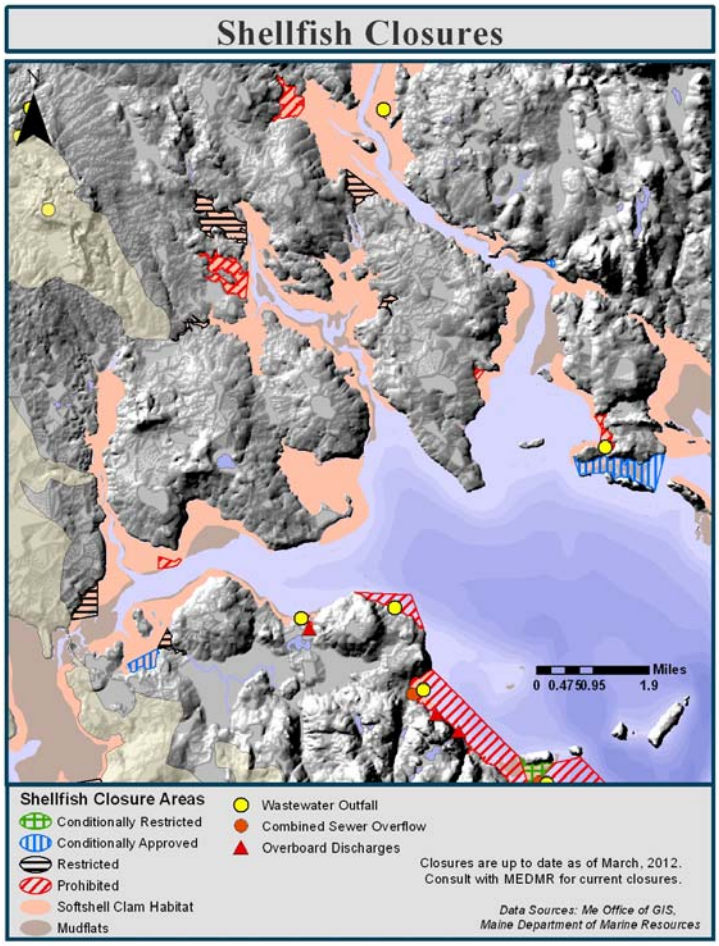

Figure 4. The majority of restricted mudflats are in DMR pollution area 49B in the municipalities of Lamoine and Hancock; these will be immediate focus areas for the Frenchman Bay Partners. Map source: adapted from a map in the Frenchman Bay Atlas (http://www.coa.edu/pubsandpresentations.htm)

Eelgrass

Based on mapping carried out by the Department of Marine Resources, there were 3,174 acres of eelgrass in Frenchman Bay in 1996. In 2008, mapping revealed 1,076 acres; only 34% of what was there. Since 2010, eelgrass has also been lost in the Jordan River and Goose Cove (Figure 5) and in 2013 there has been an apparent lack of eelgrass throughout the upper bay.

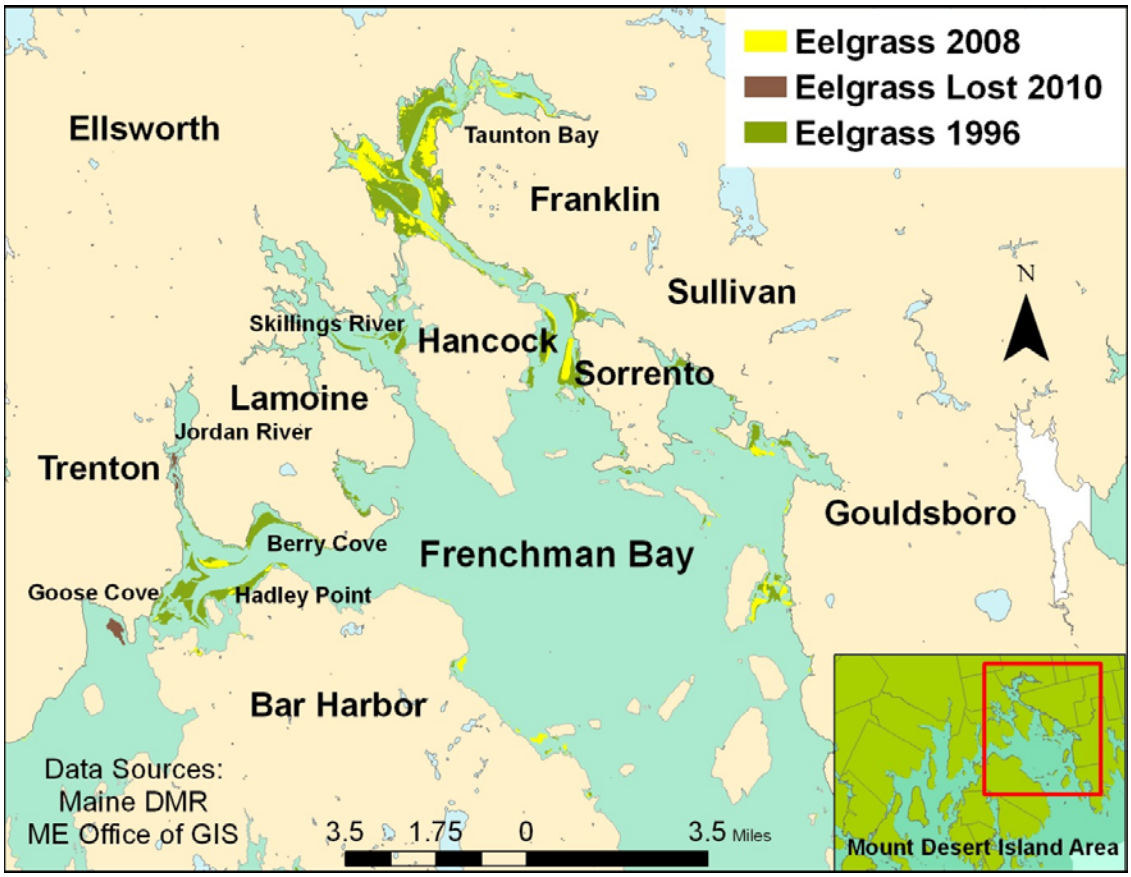

Figure 5. Eelgrass loss in Frenchman Bay, Maine, from 1996 to 2010. Inset shows location in relation to the Mount Desert Island area and mid-coast Maine. Map source: Mount Desert Island Biological Laboratory.

Goal 1: *By 2030, restore eelgrass to 1996 levels at Hadley Point, Thomas Island, part of Berry Cove, and part of the Jordan River.*

Water quality is essential to eelgrass health and survival and water transparency is necessary to ensure that enough sunlight reaches the eelgrass for photosynthesis.

Goal 2: *Beginning in 2013, maintain good water quality (3-4 m transparency) and keep it at that level.*

Strategies underway for Goal 1

Eelgrass restoration and research

Mount Desert Island Biological Laboratory (MDIBL) has been carrying out eelgrass restoration efforts in Frenchman Bay since 2007. MDIBL also conducts research to better understand eelgrass habitat and reasons for its loss in the bay. In response to the

widespread lack of eelgrass in 2013, MDIBL created a website (http://www.eelgrassinmaine.org/) where people can map where they have seen eelgrass in Maine. This will help to determine the geographic scope of the disappearance of eelgrass and will help to guide investigations of the potential environmental differences among areas where eelgrass is present and where it is absent. Research and restoration efforts will continue in the priority areas with continued support from volunteers, interns, AmeriCorps members, and the expanding network of Frenchman Bay Partners.

Communication and collaboration amongst user groups

Successful eelgrass restoration depends, in part, on the effective communication of restoration objectives and activities to different bay users. In January, 2013, FBP representatives from MDIBL met with local mussel harvesters to collaborate on the designation of eelgrass restoration areas and transplant "donor" sites. Live mapping carried out by the FBP representative from Maine Coast Heritage Trust allowed for changes to be made to the proposed restoration areas according to the consensus reached in the room. These conversations were also facilitated in part by the FBP representative from the Margaret Chase Smith Policy Center, University of Maine, Orono. By the end of this meeting, an informal agreement was made recognizing the restoration areas and donor sites depicted in Figure 6 as no-harvest zones, which will reduce the risk of damage caused by harvesting equipment to the eelgrass and its rhizomal, or root, structures.

FBP Statement to the Maine DMR

In response to the Maine Department of Marine Resource's proposal to close much of Maine's coast to mussel harvesting as part of the 2013 Biotoxin Management Proposal, the FBP sent a formal statement* to the DMR to bring attention to the agreements made with local harvesters for no harvesting within eelgrass restoration areas and transplant "donor" sites. As Frenchman Bay tends to stay open when other areas are affected by biotoxin closures, it was important to raise the awareness of the DMR to these local agreements. The FBP statement also pointed out the importance of engaging non-local resource users in the FBP communication loop, possibly with the help of the DMR, in order to protect the local agreements.

**This statement can be accessed in the News section of the FBP website.*

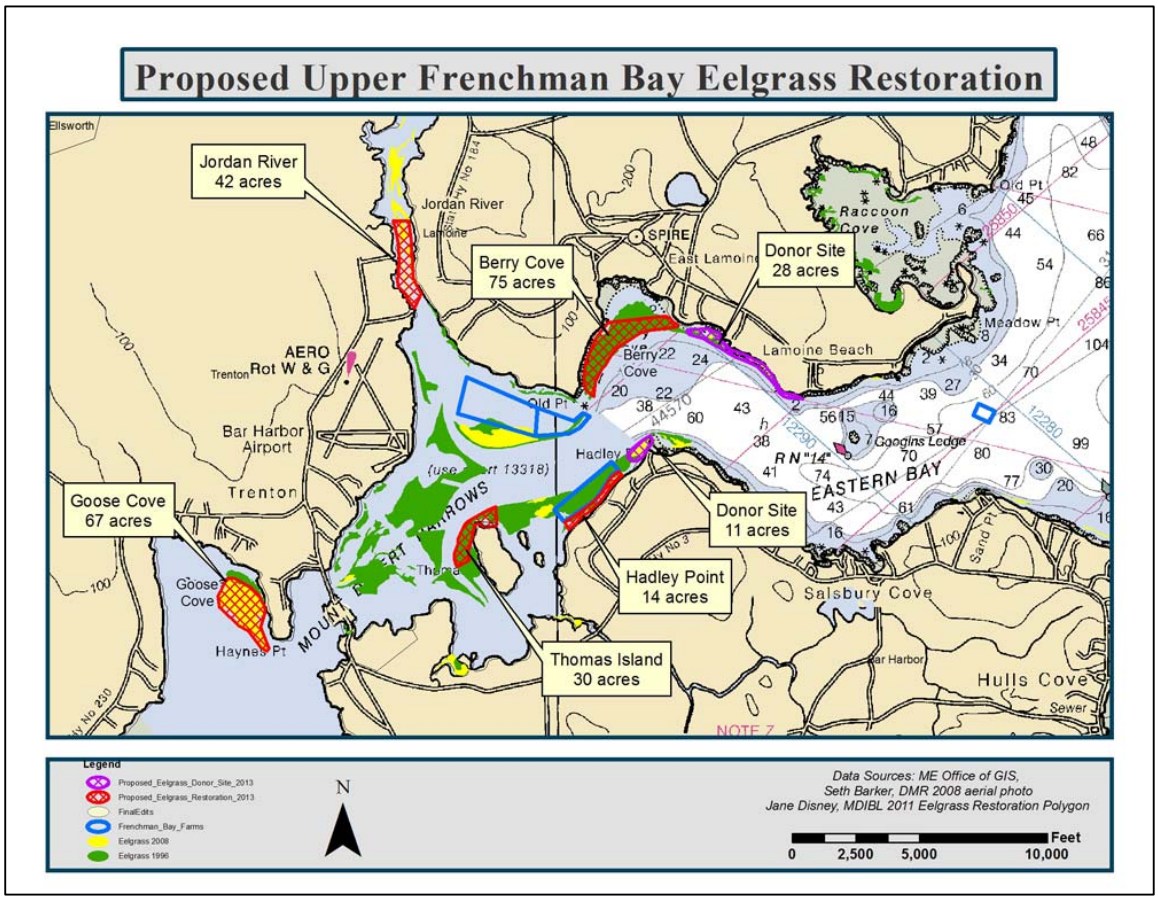

Figure 6. Map representing the agreement with local mussel harvesters regarding proposed eelgrass restoration areas and transplant "donor" sites.

Potential strategies for Goal 2

Shoreline or Watershed Surveys

Frenchman Bay generally has good water transparency, but it will be important to monitor and record transparency in eelgrass areas and other areas of interest to provide baseline data from which deviations in transparency can be readily recognized and addressed. Strategies to address turbidity or low transparency may include shoreline or watershed surveys to identify causes of turbidity and capacity building to mitigate those causes.

Subtidal Benthic Habitats

The collapse of the sea urchin fishery in Maine, the rotational closure of the scallop fishery in Frenchman Bay, and the loss of the thriving groundfisheries that once characterized the bay all point to the significance of setting conservation goals and developing conservation strategies for subtidal benthic habitats that help to buffer the impacts of any one fishery on the targeted resource, non-target bycatch organisms, and the harvested habitats.

Setting goals for subtidal benthic habitats will benefit multiple species, however no goal has been set by the FBP at this point. The first step in goal-setting will be identifying the

spatial variation within the bay; what types of habitats and organisms characterize the seabed?

Strategies for information gathering

Benthic surveying

In the summer 2013, using a Remotely Operated Vehicle (ROV) to collect video footage as well as a grab sampler, MDIBL will be collecting benthic community data from historically important fishing grounds as well as sites that were surveyed in the late 1920s by William Procter. These data will be used to examine changes in marine communities at these sites over time and will also provide valuable baseline information for creating maps of the subtidal benthic habitats and communities in Frenchman Bay, which will help to inform goal-setting.

Additional surveys will also be necessary to increase knowledge of the spatial variation in the bay.

Develop a monitoring program

Once there is a good understanding of the kinds and distributions of habitats and communities within the bay, the development of a benthic monitoring program will allow for changes from this baseline to be tracked and potential sources of change to be identified and addressed. A monitoring program should include consistent monitoring of historic or unique sites of interest as well as monitoring of random sites in the bay to provide a broad picture of the bay and changes over time.

Diadromous Fishes

Using the information available at the November 8, 2012, goal-setting session, it was determined that there are currently there 3 out of 5 alewife runs unobstructed on Frenchman Bay. These runs include Grist Mill and Card Mill Stream (Franklin) and Flanders Stream (Sullivan).

Goal 1: *Restore fish runs on Jones Stream (Gouldsboro) and Morancy Stream (Sullivan), which have a known history of alewives, and maintain all five alewife runs.*

After a meeting of several people with expertise and knowledge of diadromous fishes in the area in April, 2013, this goal needs to be revised in accordance with an assessment of the migratory populations in each of these streams.

Strategies for Goal 1

Alewife monitoring

In the spring of 2013, alewife monitoring was conducted at Flanders Stream with support from the Maine Department of Marine Resources, where a connectivity project was completed by the town of Sullivan in the fall of 2012. This project was led by Gary Edwards in Sullivan, and should improve access to 535 acres of lake habitat and 3 miles of riverine habitat for migratory fishes. Monitoring will help to evaluate whether or not fish passage is effective and monitoring over time will provide information on alewife population status.

Implement projects which facilitate fish passage

Some local people would like to restore the run of alewives on Jones Stream in Gouldsboro. There is a dam at the pond, but the land owner has no problem putting a

fishway in there. The DMR worked with the town a little and encouraged them to work with engineering companies. Opening the alewife run on Jones Stream is in the very preliminary stages of discussion and planning.

Assess migratory populations and dam/culvert inventory
Additional strategies will include assessing the migratory populations in each of these streams as well as making sure that the information we have on the locations of dams and culverts in the watershed is current, as these are potential barriers to fish passage.

NEXT STEPS

At the FBP first annual meeting, four subcommittees were created to continue the work toward conservation planning with direct focus on each of the conservation targets. The next steps in the action planning process for the subcommittees include the following:

Set goals. Goals should be set for each conservation target. The subcommittees should revisit and, if necessary, refine the existing goals and consider additional goals that could help to achieve the desired status of each conservation target.

Draft and rank strategies. It will be important to revisit the conceptual models that were developed in earlier planning sessions of the FBP, which include draft strategies to address the top-ranked threats to conservation targets. The models may need to be revised, but they will help to identify the key factors in the model where action should be taken.

Develop results chains with objectives and assumptions
Objectives represent the intermediate outcomes that will be necessary to achieve the final goal and the assumptions refer to those made about how the strategies will achieve goals and objectives. Ultimately, the subcommittees should be able to develop results chains, which incorporate each of these elements (Figure 7).

Develop Monitoring and Operation Plans
Subsequent work will involve the development of a Monitoring Plan to track progress toward goals and an Operation Plan to identify funding sources and project risk factors. Ultimately, each of these planning documents will be compiled for the development of a Strategic Plan for the conservation of Frenchman Bay.

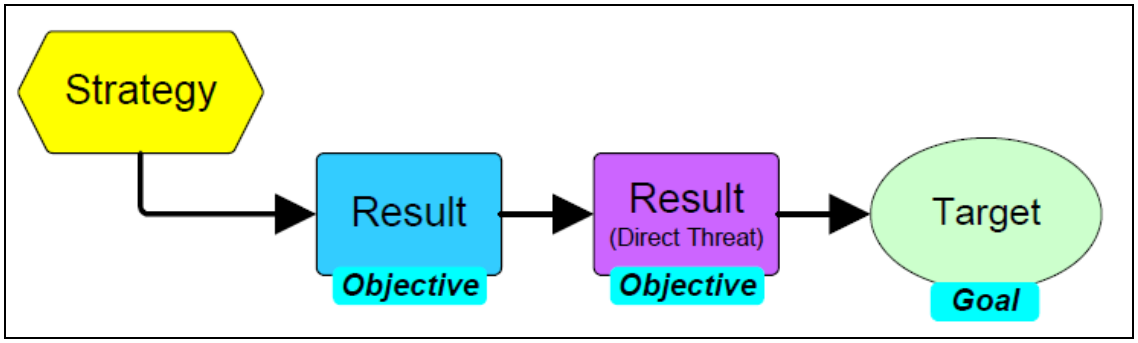

Figure 7. Basic components of a results chain. A results chain reflects the assumptions about how a strategy will help to achieve goals and objectives.