

FINAL REPORT  
TO THE SELECT BOARD  
ON SEA LEVEL RISE IN BLUE HILL

FROM

THE TASK FORCE ON SEA LEVEL RISE

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## INTRODUCTION

Less than a year ago, a citizen asked the Select Board if there was a plan to understand the issue of Sea Level Rise for the town of Blue Hill. The short and simple answer came from Select Board member Ellen Best, “No!” she said. All agreed that it was an issue in need of investigation. By May of this year the current Task Force had been selected and all invited to do the work made the commitment so to do. It was that simple.

The Select Board charged the Task Force with the following charges:

“The Select Board hereby creates an ad hoc committee, the Sea Level Rise Advisory Committee, to advise it on the potential impacts of sea level rise, storm surges and increased freshwater runoff from major rain storm events on the infrastructure of the Town of Blue Hill, with the following charge:

1. Gather the best scientific data available from national and state governmental agencies, nonprofit organizations and universities on projected rises in the sea level, projected increases in storm events and the timeline for these projected changes.
2. Identify the town infrastructure that would be impacted by these changes, including town and state maintained roads, wharves and any other town owned structures or facilities or public utility.
3. Develop alternative strategies for adapting to and/or mitigating the impact of these changes on each element of infrastructure.
4. Develop rough cost estimates on each mitigation strategy.
5. Recommend a preferred adaptive strategy for each element of infrastructure, considering cost, complexity and sustainability.
6. Recommend a prioritization schedule for addressing each element of infrastructure requiring an adaptation or mitigation strategy, based on vulnerability and time frame for impact.
7. Identify potential funding sources for the required work.
8. Identify professional assistance, such as engineering studies, that will be required to prepare the town to address these changes and implement adaptation strategies adequately.
9. Create a written report by September 1, 2020 that includes all of the above.”

It is fair to say that we have failed on the ninth charge as we are two weeks late in submitting our report. We have also taken the liberty of changing the name of our group to the Task Force on Sea Level Rise.

We have met as a group on 16 occasions including our first meeting on May 22, 2020. We have submitted three written interim reports. We represented the town of Blue Hill as being the first town in Hancock County, Maine to complete the The Maine Flood Resilience Checklist, a 46 page document and questionnaire used to assess the starting point readiness for a community to manage the future of sea level rise. We interviewed Shawna Ambrose, Scott Miller, Ellen Best, Judy Jenkins, Billy Cousins, Mike Astbury and Matt Dennison in our process of completing the checklist.

In addition to those listed above we would like to share our thanks with the Select Board to the many advisers we met and from whom we learned so much:

Jim Fisher, Town Manager, Deer Isle

Kathleen Billings, Town Manager, Stonington

Henry Teverow Economic Development officer, Stonington

Leila Pike, PE

Stephenie MacGlagan of the Island Institute

Joyce Taylor, Chief Engineer, DOT, State of Maine

Jeremy Gabrielson of the Maine Coast Heritage Trust

Annaleis Haffert of Olver Associates

Travis Higgins, Manager of the Blue Hill Wastewater Facility

Peter Slovinsky, Manages the Island Institute Resiliency Checklist, Coastal Geologist and member of the Scientific and Technical COMMITTEE of the Maine Climate Council

Jarod Farn-Guilette, Executive Director of the Hancock County Planning Commission

Heather Richard of the Shaw Institute

Ruta Dzenis, Senior Planner, Municipal Planning Assistance Program, Maine Department of Agriculture, Conservation and Forestry

Ciona Ulbrich of the Maine Coast Heritage Trust, Guidance and Support

The Task Force was not charged with establishing the certainty of Sea Level Rise. We have undertaken this task with an understanding that the sea is rising. We believe that it will continue to rise well past the year 2100 which is currently the last year that is being considered for planning purposes by this state or any other of

which we are aware. We understand that the seas will continue to rise for many years after the turn of the next century. We hope that you will read this report with that concept in mind.

## **Objective # 1**

### **Best Scientific Data**

**Gather the best scientific data available from national and state governmental agencies, nonprofit organizations and universities on projected rises in the sea level, projected increases in storm events and the timeline for these projected changes.**

According to data from the three tide gages along the Maine coast (Portland, Bar Harbor and Eastport), sea levels have been gradually rising for the past century. In recent decades, the rate at which sea level has risen has increased substantially. The Scientific and Technical Committee of the Maine Climate Council released a report written by Stephen Dickson (Maine Geological Survey), Peter Slovinsky (Maine Geological Survey), and Joseph Kelley (University of Maine) highlighting Maine's best and most recent data on sea level rise and storm surges.<sup>1</sup>

### **Reasons for Increased Sea Level Rise**

There are two widely accepted reasons for the increase in sea level rise in Maine and around the world. First is the result of thermal expansion in which water molecules expand as a result of warming temperatures, causing the volume of water to expand. Second is an increase in ocean volume as a result of melting ice sheets and mountain glaciers. These two factors have contributed to 86% of sea level rise in the past several decades (MCC report pg. 72).

### **Sea Level Rise Scenarios: Committing to Manage, Prepare to Manage**

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<sup>1</sup> "Over the last century, sea levels in Maine have been rising about 0.7 feet/century, but over the last few decades, the rate has accelerated to about 1 foot/century. Based on an intermediate scenario, there is a 67% probability that sea level will rise between 3 and 4.6 feet by the year 2100. With this rate of sea level rise, not accounting for increased intensity and frequency of storms, Maine would see a 10-fold increase in coastal flooding by 2050. There will be significant impacts to both the built and natural coastal environments from an intermediate path of sea level rise." (excerpt from the MCC report, 9/9/20)

The Science and Technical Subcommittee of the Maine Climate Council recommended that the Climate Council uses the approach of *committing to manage* for higher probability, lower risk events while *preparing to manage* for lower probability, higher risk scenarios. Members of the sea level rise task force met with Peter Slovinsky at the Maine Geological Survey, who recommended this approach for towns like Blue Hill as well. Furthermore, the Science and Technical Subcommittee recommends that the Climate Council ask the State of Maine and its municipalities to **commit to manage** for sea level rise of 1.1-1.8 feet by 2050 and 3.0-4.6 feet by 2100. The sea level rise task force of Blue Hill recommends that the town take a similar approach in **committing to manage** for 1.1-1.8 feet of sea level rise by 2050 and 3.0-4.6 feet of sea level rise by 2100. Additionally, the task force recommends that the town of Blue Hill **prepare for** significantly higher sea level rise scenarios including 3 feet by 2050 and 8.8 feet by 2100. In the context of this concept should be the consideration for the risk tolerance of different kinds of infrastructure, particularly in the case of Blue Hill's wastewater treatment facility. The task force acknowledges that sea level rise projections are a moving target that are trending in the direction of more severe scenarios. It is in the best interest of the town to stay updated on the latest science and projections around sea level rise in Maine. The Science and Technical Subcommittee recommends that regional sea level rise scenarios be revisited at least every four years (STS MCC report pg. 83).

### **Storm Surge and Nuisance Flooding**

It is also important to consider the effects of storm surges and nuisance flooding when considering the effects of sea level rise on Blue Hill infrastructure. The real risks of storm surges in the context of sea level rise occur when storm surge events coincide with high tides. These events are known as storm tides. High tide levels have risen in recent years as a result of sea level rise and are projected to continue to do so. This will increase flood risk in coastal Maine towns such as Blue Hill. According to Peter Slovinsky, when you combine factors of sea level rise, high tides and storm surge events, one foot of sea level rise would result in a ten year event (a storm surge with a 10% chance of occurring every year) reaching the water levels of a current 100 year event (a storm surge with a 1% chance of occurring

every year). One foot of sea level rise will drastically increase the frequency of nuisance flooding. Nuisance flooding is defined as recurring flooding that occurs at high tide. According to the Scientific and Technical committee, If a 1-foot rise in sea level occurred on top of the historical data regarding nuisance flooding in Portland between 1912 and 2019, nuisance flooding would have occurred approximately 54 times per year (STC MCC pg.88).



## **Objective # 2**

### **Town infrastructure impacted by sea level rise**

**Identify the town infrastructure that would be impacted by these changes, including town and state maintained roads, wharves and any other town owned structures or facilities or public utility.**

The sea level rise task force has determined that a multitude of town infrastructure has the potential to be impacted by sea level rise, storm surges and nuisance flooding. The town of Blue Hill would be prudent to consider sea level rise and storm surge projections outlined in Section 1 and consider the impacts on critical infrastructure. The town infrastructure that we recommend be examined includes the town wastewater treatment facility, Blue Hill Fire Department, the town wharf at 42 Water Street, the cemetery, and the town park in addition to a variety of state and town owned roads.

#### **I. Blue Hill Wastewater Treatment Facility**

The Blue Hill wastewater treatment facility, located at 48 Water Street, is one of Blue Hill's most vulnerable assets. Members of the sea level rise task force met on sight with Travis Higgins, town of Blue Hill Wastewater Treatment Plant Manager and Annaleis Hafford, Town of Blue Hill Wastewater Treatment Plant Supervisory engineer on August 8th, 2020. The Wastewater treatment facility is located less than one foot above the highest annual tide (HAT) and has already experienced trouble with outflow as pressure builds during high tides, necessitating the use of temporary measures. Rising sea levels and storm surge events have the potential to cause increasing harm. Olver Associates is in the process of producing a report for the town about the future of the plant.

#### **II. Wharf in South Blue Hill**

#### **III. Blue Hill Fire Department and Town Landing**

The Blue Hill Fire Department and town landing at 42 Water Street are vulnerable to sea level rise and storm surge events as a result of their low lying location. The fire station and town landing have already experienced flooding as a result of high tides and storm surge events. Projected sea level rise in the coming century will dramatically increase the vulnerability of this infrastructure.

Matt Dennison, Fire Chief, and Bill Cousins, Road Commissioner, both identified the Hospital and the fire station as vulnerable infrastructure. Both cited a flood that impacted the Fire Station and the Hospital across the street. According to Bill Cousins, the flood was caused by an unusually high tide that caused the outflow of a culvert, located behind the hospital to back up. It is reasonable to assume that as sea levels rise, these events will only become more likely over time.

#### **IV. Seaside Cemetery**

The cemetery located on the East Blue Hill Road (Route 176) is vulnerable to sea level rise and storm surge events due to the shoreline bluffs of soft gravel and dirt that support it. On the site, there are already signs of erosion, which will only worsen as sea levels rise and storm surge events become more frequent.

#### **V. The Town Park**

The town park is also located on Water Street and is likely to experience similar vulnerability to infrastructure such as the fire station and wastewater treatment facility located nearby. Similar to the cemetery, the town park rests on a bluff of soft gravel and dirt, making it susceptible to shoreline erosion.

#### **VI. Town and State Roads and Bridges**

The sea level rise task force, with the assistance of Bill Cousins, have identified seven town and state owned roads and bridges vulnerable to sea level rise and storm surge events. The roads identified are as follows: Parker Point Road

(longitude -68.569, latitude 44.3969), Water Street,<sup>2</sup> The road and bridge at the Mill Stream (longitude -68.5873, latitude 44.4136), Route 176 at Peter's Cove (longitude -68.5723, latitude 44.4142),<sup>3</sup> Jay Carter Road (longitude -68.5254, Latitude 44.4188), The bridge over Mcheard stream,<sup>4</sup> and Curtis Cove Road (Longitude -68.5254, Latitude 44.4188).

Members of the sea level rise task force had interviews with Bill Cousins, Blue Hill Road Commissioner. Bill Cousins said that he has already seen an increase in flooding of town roads and anticipates greater damage in the coming decades as a result of sea level rise and storm surge events. He said that he can raise road beds and increase culvert sizes to help mitigate the risk from flooding and inundation. He said that he has begun to upsize culverts from three to four feet. He noted that all current repairs to Blue Hill town roads have been prioritized according to the Road Evaluation Report for the Town of Blue Hill, conducted by CES Inc. in February of 2020, however, the report does not mention vulnerability to sea level rise.

Additionally, members of the sea level rise task force met with Joyce Taylor, Chief Engineer at the Maine Department of Transportation. She agreed with Bill Cousins that increasing culvert size and raising road beds are the two most effective ways to adapt to sea level rise and storm surge events. She said that the Maine DOT maintains that all culverts must meet the capacity for a 1% storm.

An engineering study to examine the risks and vulnerability of town roads and bridges is likely necessary, however this is outside the purview of the sea level rise task force. Nevertheless in the short run, Bill Cousins has expressed a willingness to work with the town to examine town roads and document what he sees as most vulnerable to sea level rise, storm surge events and nuisance flooding. The sea level rise task force would recommend that the town work with Bill Cousins and

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<sup>2</sup> Near the town landing and fire department

<sup>3</sup> State owned road

<sup>4</sup> State owned bridge

the Maine DOT to coordinate and prioritize road repairs including upsizing culverts and rising road beds in order to mitigate the risks related to sea level rise.

### **Objective #3**

#### **Sea Level Rise Adaptation and Mitigation Strategies**

**Develop alternative strategies for adapting to and/or mitigating the impact of these changes on each element of infrastructure.**

To properly recommend the best procedure to mitigate the effects of sea-level rise, formal engineering studies need to be completed. The task force can only suggest what may work best from our novice understanding of these adaptation strategies. In addition, it is important to note the difference in definition between the words Adaptation and Mitigation. Adaptation means that something, in our case, sea-level rise, has already occurred and damage has been done. The impacted party must take measures to stop or relieve the damage caused, and adapt to the present situation. Mitigation is steps taken before a damaging event occurs. In this way, the damage caused by an impending event, such as a storm surge or flooding, is lessened.

As identified, several town-owned properties of Blue Hill will be drastically changed by the event of sea-level rise and storm surge. In order to combat the damage done, the sea level rise task force has identified a number of paths that the town of Blue Hill may pursue to mitigate the intrusion of the ocean into the area. Already, many private residents have implemented measures to reduce the effects of erosion on their property. The task force sees this as a viable option for the town as well. The following is a list of potential infrastructure (mitigation options) to be put in the areas identified as most vulnerable to sea-level rise.

#### **Rip Rap**

Rip Rap is granite blocks or chunks deposited along the shoreline and above on a property to lower the wave impact and effects of erosion. The process of placing rip rap requires excavators and dump trucks. One of the biggest issues pertaining to that is access. Oftentimes, special access roads need to be made in order for the equipment to properly reach and stabilize the shoreline.

#### **Living Shoreline**

A Living Shoreline is made of native plant species, planted on a soft ground incline in order to establish root systems into the soil and hold the material in place against waves and tides. While this is a lower impact solution compared to rip rap, it is less tested and requires more maintenance in order to be successful. There are several organizations that implement living shorelines. The Maine government website also identifies invasive species that shouldn't be used for such projects, for example, Rugosa Roses.

### **Sea Wall**

Sea Walls are usually the initial method individuals use to stop erosion and sea-level rise. Usually made of concrete or brick, sea walls only stop the waves without diverting the energy elsewhere. Usually rendered ineffective after powerful winter storms, the maintenance of a sea wall can be an annual expense.

### **Lock**

A Lock is a large gate, or damn like structure that controls the amount of sea level that is allowed into a designated harbor. Locks can commonly be found in canals. The purpose of a lock is to control the inflow of water into a closed area, such as a harbor, bay, or inlet. The proposed location would be between Sculpin Point and Parker Point.

### **Break Waters**

Breakwaters are large deposits of rock placed a number of yards away from an affected structure. The purpose is to take most of the impact of incoming tides, and redirect the energy so things such as washout and erosion do not occur so strongly. An example of successful breakwaters can be found at the Souris Cosway in Souris, Prince Edward Island.

The methods listed above are primarily mitigation strategies, done preemptively before major damage can occur. Further plausible adaptation strategies are listed in objective 5.

## **Objective #4**

### **Develop rough cost estimates on each mitigation strategy.**

Due to the limited time in which this report was researched and written, it was impossible for the task force to acquire rough cost estimates as they vary so widely among the cases and areas examined. Nevertheless, below are listed two resources, from the road commissioner and Mike Astbury of Astbury and Sons, who are willing to provide rough estimates prior to the employment of an official engineering firm.

#### **1. Roads**

The Coastal Risk Explorer is an interactive map showing sea levels at various sea levels from 0 - 6 feet above current levels. It is part of the Coastal Resilience Tool in the Nature Conservancy and can be used for automatic preliminary mitigation/adaptation cost estimates. Jeremy Bell, co-developer of this tool, explains that the cost estimates are just for inundated roads using an average price/mile for road repair from Maine DOT times the number of miles. This is not thought to be an accurate reflection of the costs to protect the roads in Blue Hill such that passage is secured to all citizens.

-Ask Road Commissioner and Mike Astbury for additional estimates once an engineering firm can be brought to examine the issues relating to the roads in question.

The following study on the COST OF SEA LEVEL RISE in VINALHAVEN is pertinent to Blue Hill. This is well worth reviewing by the Select Board.

<https://islandinstitute.maps.arcgis.com/apps/MapJournal/index.html?appid=7f1cf3b3f8a243bdb9393a87397aaca>

## **OBJECTIVE #5**

**Recommend a preferred adaptive strategy for each element of infrastructure, considering cost, complexity and sustainability.**

It was beyond the capability of this task force to do a sufficiently technical study for each element of infrastructure in the town currently or potentially threatened by sea level rise. Instead we recommend the following options.

**Option 1** -If adequate funding is available, the town of Blue Hill should hire a consulting engineer(s) to carry out a comprehensive Vulnerability Assessment and Adaptation Plan that would:

- confirm or update current and forecasted GIS inundation maps
- confirm town-owned vulnerable sites
- identify mitigation/adaptation options and their costs
- recommend a prioritization schedule and funding sources

Targets would include town roads and culverts, wastewater treatment plant, wharves, fire station, hospital and the cemetery. Mitigation/adaptation options reviewed would include repair, upgrade, removal, replacement, barrier construction, natural barrier conservation and restoration. An assessment of shoreland erosion impacts present and future should be included. The consulting engineer(s) would also facilitate 1-2 town-wide meetings to review the assessment and options in an effort to seek the broadest public consensus possible. (Stonington and Vinalhaven have been able to carry out versions of this option #1). The advantage to this approach is that funders, neighboring towns and knowledgeable organizations have told us that funders are much more likely to take a town's major funding requests more seriously if they have a comprehensive planning approach.

**Option 2** -Until there is sufficient funding for a full-scale Vulnerability Assessment and Adaptation Plan, the Town's leadership should prioritize the wastewater treatment plant, the wharves and the most vulnerable roads. A lead engineer known to the town could be commissioned to coordinate technical information gathering for these highest priorities. Engineering and planning costs can be minimized by continuing to access some of the excellent no-cost resource



people in other towns and organizations such as the Maine Environmental Water Association, the Maine DOT, The revitalized Hancock County Planning Commission and the Maine Municipal Association. The Olver Associates engineering firm will be presenting a detailed report to the town shortly with recommendations for the wastewater treatment plant. They could also be considered to serve as an overall engineering advisor to the town for the other priority needs. Or at the very least, they could advise the town on the critical elements of an RFP competitive process, if that is preferred, for individual studies related to the other vulnerable areas.

## **OBJECTIVE #6**

**Recommend a prioritization schedule for addressing each element of infrastructure requiring an adaptation or mitigation strategy, based on vulnerability and time frame for impact.**

This objective requests the time frame for the impact of SLR. The time frame for the preservation, mitigation or retreat of these assets will be quantifiably the same as they will need to be dealt with well before the rise of the ocean to 1.5 feet above its current level (by the best conservative estimates) and the associated undermining of the soils at the littoral, by 2050. The same time frame will be impacted by the increased severity of storms, wind, wave action, rain and associated fresh water flooding.

The State of Maine Climate Council offers the following time frame.

“The Science and Technical Subcommittee recommends that the Maine Climate Council consider committing to manage sea level rise for a higher-probability, lower-hazard scenario: 1.6 feet of relative sea level rise by 2050 and 3.9 feet by 2100. The subcommittee also recommends that the Council consider preparing to manage for a lower-probability, higher-hazard scenario: 3.0 feet of relative sea level rise by 2050 and 8.8 feet by the year 2100. In the context of this concept should be the consideration for the risk tolerance of different kinds of infrastructure. Therefore, to explore climate impacts on communities, beaches, and marshes, we used sea level rise scenarios throughout these volumes that align with this subcommittee recommendation and best available sea level rise inundation maps (+/- 1/10 foot). This economic analysis focuses on 1.6 feet of sea level rise, 3.9 feet of sea level rise, and 8.8 feet of sea level rise. The rationale can be found in Volume 2.” [From MCC 200909]

We observe that the time frames are targets with many variables having contributions to the endpoint. At each time offered the height of the water is likely to be higher than predicted as indicated in the last sentence from Scientific and Technical Subcommittee, above.

Prioritization Schedule:

Will be based on:

- ☐ Level above HAT (highest annual tide)
- ☐ Intrinsic need of the asset

- ❑ Time Frame will be the same for all impacted infrastructure elements and will need to adapt for ever increasing rate of rise of the sea level
- ❑ Ease (inverse of complexity) of adaptation. Modifying the Wastewater Treatment Facility (WTF) is a bit more complex than moving the Blacksmith Shop or the Stavola House
- ❑ Not Cost

The Task Force has generated a list of assets owned by the town of Blue Hill that are at risk of deterioration due to sea level rise. As the level of sea level rise is not known specifically, the list is bound to expand as the sea will not stop rising based on a human generated arbitrary time interval known as the end of a century. The sea will continue to rise after that.

The priority list represents an ordered list with an understanding that the first property on the list is in the property at greatest risk due to its likelihood of damage and its loss of value to the town. Value here is not limited to monetary value as we have included on the list the Seaside Cemetery, which has great sentimental value to the entire town. We suspect that it may be listed on an accounting sheet as a liability. Roads have a value above the monetary value of their repair and maintenance.

I. The Wastewater Treatment Facility is the asset of the town at greatest risk due to its location with regard to the current sea level at high tide. We believe that you will see a detailed analysis of this balance, high water v gravity fed drainage of treated water in a pending report from Olver Engineering. This is to say that at full moon tides and with storm surge and other high tides, the treatment facility is currently needing to use creative approaches to maintain the mission of the WTF. It will be an expensive task to upgrade the current facility as well as to plan for a final disposition no later than the end of the century.

The Olver Associates engineering company will be delivering a detailed factual consultation report, in the near future, proposing a timeline for the entire project and when it will need to be completed.

A challenge for the town will be to find a mechanism to gain funds to finance this and other projects threatened by the rise of the sea.

This site is at risk due to sea level rise and not freshwater runoff. The replacement of this site in the decades to come will need expert engineering advice well above the capability of this task force.

II. The second town owned asset at risk is the wharf in South Blue Hill at 21 Wharf Road.

This property has already been over flowed by high sea level such that it was underwater in a king tide. This type of event will likely repeat itself as 100 year storms become ten year storms and finally annual events. This property is a major resource for the economic well being of the town as well as the peninsula due to its use as the major landing site for marine harvesters locally.



South Blue Hill Wharf: B. Smythe

We are told that the wharf was originally constructed to be approximately two feet higher than it is now. The wharf was then renovated to its current height. A

reconversion should be considered but only as a stop gap measure and not as a final solution.

This site is at risk due to sea level rise and not freshwater runoff.

### III. Fire House and Town Landing at 42 Water Street.

These two assets are listed as one as they are found as one in the account and card tally of town properties. The same account is used for the WTF. It is listed separately above as that asset is thought to be of a higher priority for the town.

Like the wharf in South Blue Hill, this is a town asset that has had experience with both rising sea level and with stormwater runoff. In both instances the building has been flooded by storm water and the landing has been submerged by high ocean waters. These are scenarios that will likely repeat themselves as the climate continues to warm, storms become more intense and powerful and as the ocean continues to rise.



Blue Hill wharf as seen from the wastewater treatment plant: T.Higgins

The storm water impact is a result of the freshwater runoff from all of the Tenney Hill watershed that retreats down the hill to the ravine behind the Weekly Packet Building and the Bar Harbor Banking & Trust Building. The waters then enter a

storm sewer drain pipe which empties into the harbor between the WTF and the town landing. When this system is overwhelmed, the waters flood the Firehouse.

The frequency of flooding will increase due to both mechanisms, runoff and rising sea level. A plan to protect these assets is needed. Due to the location in the town with proximity to the hospital and other low lying properties, a combined plan should be considered.

#### IV. Seaside Cemetery

This land is owned and maintained by the town of Blue Hill. It is one of the best real estate purchases to be found on the coast of Maine though the lots are small. The laws regarding the distinction of ownership of the plots wherein the remains of people are buried and the ownership of the entire property, the cemetery has not been investigated by this task force. Our concern is that the littoral boundary of the cemetery is falling into the bay. The banks of the cemetery are high bluffs of soft gravel and dirt. They are held in place by brush and large trees whose roots help to stabilize the banks. On a brief walk around the perimeter of the cemetery one can see that some parts of the bank have been undermined and that some of the bank has fallen in with trees that are tilting and falling, pulling their roots up and adding more erosion from above. Some of the gravestones are now on the edge and will need to be rearranged. This will be a complex process.

As the mitigation of the process of bank erosion will be time consuming, costly, legally complicated, and in need of a permanent solution, not just mitigation, it is included here as a high priority for the town. The process should begin before the first grave falls into the harbor.





Seaside Cemetery rip rap: R.Curtis

## V. The Town Park

This property suffers from having the identical issue as the cemetery. It is on a bluff. It is of the same soil structure and it will erode from below by mechanisms of undermining and soil collapse accelerated by the tilt and final loss of trees into the harbor. Due to the slow pace of the process and the amount of park space available it is of a lower priority. It is understood that the level of the sea will be 4-8 feet higher than its current level by the turn of the century. The pace of erosion will certainly accelerate in that time frame.



Town Park shoreland erosion: R.Curtis

#### VI. LAND ON EAST SIDE OF BRIDGE OVER THE MILL STREAM ACROSS FROM THURSTON & CO.

This is a tiny piece of land that is identified only to people who walk down to see it. It is marked as a FIRE LANE. There is a dam below the bridge that is used to gather fresh water from the stream before it overflows the dam and enters the bay. This pond, containing lovely ducks and ducklings, is used as a fresh water source by the fire department for the downtown section of Blue Hill. At a new moon high tide as on 19 August, 2020, there were 3-4 inches to go before that tide would have been above the dam and seawater would have entered the pond.

This is listed with a priority as the function of the dam will be diminished once high tides are a regular phenomenon that rise above the dam. In addition to that phenomenon will be added erosion of the bank. There may well be a benefit to the



town as the property contains the bridge itself. The bridge and its supporting structures are a responsibility of the state's Department of Transportation. This will likely relieve the town of the majority of expense for the mitigation planning and execution of the mitigation process against sea level rise.

#### VII & VIII. BLACKSMITH SHOP AND STAVOLA

These are two buildings on the same lot as the fire station and the town landing. They are at risk from sea level rise and flood waters due to their location at the north end of the lot and the south end.

The black smith shop is a small building on the seaside of the bank below and southerly of the fire station. It is a slab foundation and is currently a storage building for marine equipment. It can be easily damaged by fresh water flooding as well as sea level rise in the form of "king tides" now and higher waters to come. As it is a building that is replaceable and or easy to dismantle and move to higher ground it is low on the list of priorities. It is an asset worth preserving yet not in its current location.

The Stavola House is situated at the north end of the Fire Station lot. It has no subterranean foundation. It is currently rented by the town and serves there as a source of rental income. It is situated slightly higher than the black smith building and the fire station, but only slightly.

#### **PROPERTIES OF THE TOWN OF BLUE HILL MAINE, [AT RISK FOR SLR](#)**

ACCNT	NAME	LOCATION	MAP-LOT
01740	001	TOWN OF BLUE HILL 21 WHARF RD	002-049
		TOWN LANDING OFF OF RT 175 SOUTH BLUE HILL ON THE SHORE	
		<a href="#">AT RISK FOR SLR</a>	
00560	001	TOWN OF BLUE HILL LAND-TAX AC-SALT PND	010-002
		ON THE SALT POND INSIDE THE BRIDGE	
		<a href="#">AT RISK FOR SLR</a>	
00249	001	TOWN OF BLUE HILL LAND-TOWN PARK	015-015
		THE TOWN PARK IN BLUE HILL HARBOR	
		<a href="#">AT RISK FOR SLR</a>	
00250	001	TOWN OF BLUE HILL 42 WATER ST	015-017

42 WATER ST FIRE DEPT, WTF & TOWN LANDING - [AT RISK FOR SLR](#)

00263 001 TOWN OF BLUE HILL 48 WATER ST- BLCKSMT 015-017-ON1  
OLD BLACKSMITH SHOP, NOW A BOUTIQUE [AT RISK FOR SLR](#)

01668 001 TOWN OF BLUE HILL 28 WATER ST STAVOLA 015-017-ON2  
[AT RISK FOR SLR](#)

01736 001 TOWN OF BLUE HILL LAND-MAIN STREET 015-020  
LAND ON EAST SIDE OF BRIDGE IN BLUE HILL - [AT RISK FOR SLR](#)

01741 001 TOWN OF BLUE HILL LAND-JOHNS ISLAND 015-031  
IT IS JOHNS ISLAND - [AT RISK FOR SLR](#)

1592 001 SEASIDE CEMETERY 017-020 - IN THE TOWN REPORT IT IS  
LISTED AS SEASIDE CEMETERY. IT IS NOT LISTED AS BEING IN THE  
PROPERTIES OF THE TOWN OF BLUE HILL. IT IS REPORTED BY TOWN  
OFFICIALS TO BE A TOWN OWNED PROPERTY - [AT RISK FOR SLR](#)

### **TOWN ROADS AT RISK**

1. PARKER POINT ROAD, Longitude-68.569, Latitude 44.3969
2. PARKER POINT ROAD NEAR SALT POND AT THE COUNTRY CLUB,  
Longitude -68.5741, Latitude 44.4018
3. WATER STREET AT THE TOWN LANDING AND FIRE DEPARTMENT
4. ROAD/BRIDGE AT THE MILL STREAM, Longitude -68.5873, Latitude,  
44.4136
5. ROUTE 176 AT PETER'S COVE, Longitude, -68.5723, Latitude, 44.4142
6. JAY CARTER ROAD AT THE CULVERTS BETWEEN JIM DOW AND  
TREITLERS, Longitude, -68.5254, Latitude, 44.4188
7. BRIDGE OVER MCHEARD STREAM, East Blue Hill, Long -68.525, Lat  
44.417
8. CURTIS COVE ROAD AT THE CURTIS COVE BEACH, Longitude,  
-68.5254, Latitude, 44.4188
9. THE CAUSEWAY ON THE FALLS BRIDGE ROAD. lat 44.377137, Long  
68.562002
10. SOUTH BLUE HILL WHARF, LAT 44.353779, LONG, -68.547035

The roads at risk are listed above. They are included as they are low lying roads likely to flood and or erode, block access and egress to many citizens' homes and businesses if obstructed or are dead end roads. There is a need for emergency vehicles to gain access to all inhabited buildings and for fire control for all buildings.

The bridges are maintained by the state Department of Transportation. The causeways are not.

#### Recommendations for Roads:

1. The causeway approaching the Falls Bridge. As the state and the town are investing greatly in the construction of a new bridge, it is hoped that the state is also planning to contribute to a plan for mitigation and maintenance of the causeway. If not the town, the town will need to consider how this will be accomplished as a long term solution. The towns of Deer Isle and Stonington are working on a similar project. Combining efforts for the solution of the causeway crisis may be the best way to proceed.
2. Parker Point Road. This road has two low points as listed above. With sea level rise and the loss of entrance or egress through both low lying sections of the road will strand many people, structures and homes. We recommend that a Vulnerability Study be funded and done to address this and other road related issues.
3. Route 176 at Peter's Cove. This section of Route 176 is impacted by both storm water flooding and by sea level rise. The bridge at Peter's Brook is frequently in repair by the state. This is due primarily to the impact of rainwater runoff. The management of this bridge will be up to the State DOT. Of equal concern will be the impact of flooding on the road at Little Peter's Brook less than 100 yards to the west of the bridge. There is ongoing erosion at that site due to water runoff. As the sea level rises, more undermining will occur to destabilize that section of the road. Long term solutions will rest with consultation, cooperation and collaboration with the State DOT for a long term plan to resolve the issues around this particularly long stretch of road. It is conceivable that in a storm, one may need to get to Newt Grindle's house by way of Surry should the road wash out. We recommend that a Vulnerability Study be funded and done to address this and other road related issues.



4.

Little Peters Brook Road before repair. B. Smythe

5. The Jay Carter Road. There are two areas of low lying roads along this road. It is a dead end road with approximately 20 residences potentially cut off should the road not be maintained. Over the course of the summer a project was completed with new culverts being installed under the road. The culverts are stacked nearly vertically which will not help with water drainage under the road until the stream nearly covers or drowns the lower of the two culverts. We recommend that a Vulnerability Study be funded and done to address this and

other road related issues. See photo below.



Jay Carter Rd double culvert: J. Milliken

6. The Curtis Cove Road. All who come to the Curtis Cove beach in the summer are aware of the sinkhole at the bottom of the hill. This too is a section of road that is and will be impacted by both rainwater flooding as well as sea level rise. This road and the Little Peter's Brook section of route 176 may be the lowest roads in the town. The road is currently being undermined by fresh water runoff and will need a new approach to that issue. We recommend that a Vulnerability Study be funded and done to address this and other road related issues.
7. Water Street at the Town Landing and Fire Station. It is anticipated that the issue of street access to these town assets will be taken up with planning and implementation of the plans for those assets.

## **Recommendations for Structures**

I. WTF. Anticipate a report from Olver Associates for the short term management of the WTF. The Task Force is impressed by the professionalism of the team that serves this town for this project.

II South Blue Hill Wharf. This will require a new plan for its modification, landward extension so that it may rise up the hill as the sea level rises, and possible addition of sea wall construction to the south for protection against stronger storms.

III. Develop a combined engineering approach to manage the entirety of lot 17 on Map 10 along with the hospital and the WTF.

IV. Seaside Cemetery. Develop a plan for the long term management of the cemetery lands, the graves at risk, of loss to erosion, and ultimately loss of the land to the sea by the turn of the century. This is an issue of such complexity that it likely will require its own long term planning committee if such a body does not now exist.

V. The Town Park. As the park is well within the inner harbor it will suffer most from the increase in height of tides over time. This park can best benefit from green solutions for the short term. Combined in a comprehensive plan with a supervising engineer, the long term solution will need to be worked out.

VI. Land on the east side of the Mill Stream Bridge across from Thurston & Co. Consider elevating the level of the small dam at the foot of the bridge so as to maintain a supply of fresh water for the use of the fire department. The town will need to work closely with the DOT to coordinate a plan to preserve the bridge and the low land to the east.

VII. Blacksmith building. This should be dismantled/moved to higher ground.

VIII. Develop a long term plan for the maintenance (or not) of the Stavola House. This should be dismantled/moved to higher ground.

## OBJECTIVE #7

### Identify potential funding sources for the required work.

The following potential funders have been identified and further information is provided below or in an appendix. All of them will require assistance in grant proposal preparation from volunteer advisors or consultants experienced in these funding sources and in the sea level rise vulnerability assessments and adaptation plans. We focused on grant programs aimed at helping communities with their planning phases leaving the infrastructure construction funding for later once more detailed information was researched and prioritization plans were carried out. One of the most important points made by state planners and funders was that Blue Hill needed to have an updated comprehensive plan that was consistent with the state's Growth Management Act and many federal funding requirements if the Town was to be competitive for most of the limited grant funds and subsidized loan programs.

#### 1. Island Institute:

##### - ShoreUp Grants

ShoreUp Grants are aimed at helping municipalities and other Maine coastal and island communities that are **addressing resilience to sea-level rise and coastal flooding** in partnership with Island Institute. **The Institute strongly advises communities to carry out a comprehensive Vulnerability Assessment and Adaptation Plan early on** and is committed to assist in that process with no-cost technical advice in addition to the cash grant. Grants may range from \$500 to \$10,000. Applications are welcome on a rolling basis and require **a 1:1 match which can include in-kind services**. Since 2012 the Institute has made almost \$200,000 in community infrastructure support across 27 communities.

Example eligible projects (including, but not limited to):

- Flood map corrections/updates
- Assessing the vulnerability of working waterfront infrastructure (including, fuel tanks, bait coolers, and other infrastructure related to handling lobsters)
- Incorporating SLR into comprehensive, permitting or disaster preparedness plans
- Modeling future SLR impacts · Walking a community through the Maine Flood Resilience Checklist
- Preparing federal or other grant applications
- Regionalizing national data sets
- Community exchanges to learn from elsewhere
- Bringing in experts for presentations



Contact: Meghan Grabill: [mgrabill@islandinstitute](mailto:mgrabill@islandinstitute)  
<http://www.islandinstitute.org/tom-glenn-community-impact-fund>

***Task Force Comment:** The Blue Hill Sea Level Rise Task Force was assisted significantly by Stephenie MacLagan of the Island Institute who has since been hired by the Maine Dept of Economic and Community Development where she could be a good contact for Blue Hill since she is now quite familiar with Blue Hill infrastructure issues. Her replacement at the Institute will be Meghan Grabill assisted by Craig Olson. Apparently as of Aug 20th, there was \$25,000 of grant money still available in this funding cycle and no information yet available on amounts for the next cycle. Blue Hill has been urged by the Institute, CGI Engineers, the Municipal Planning Assistance program and others to not delay in applying.*

## **2. Maine Dept of Agriculture, Conservation and Forestry ( DACF)**

### **-Coastal Community Grants**

This program is run by the Maine Municipal Planning Assistance Program (MMPAP) within DACF with funding provided by NOAA through the Maine Coastal Program which is within the ME Dept of Marine Resources. In FY20 4 grants were made totaling \$143,229 ranging from \$17,802 to \$46,187. FY21 grants are expected to be approximately \$150,000 total with **at least 50% going to adaptation planning with a focus on coastal storms, erosion and flooding.** Each project should involve regional or local partnerships and each recipient needs to provide **a minimum of 25% in matching funds or in-kind services.** Their website includes a list of 65 projects which have received \$1.7 million since 2012. Grant applications generally due in April.

Contact: Ruta Dzenis: [ruta.dzenis@maine.gov](mailto:ruta.dzenis@maine.gov)  
<https://www.maine.gov/dacf/municipalplanning/technical/climate.shtml>  
[https://www.maine.gov/dacf/municipalplanning/financial\\_assistance.shtml](https://www.maine.gov/dacf/municipalplanning/financial_assistance.shtml)

***Task Force Comment:** This funding source was highly recommended by the Island Institute, The Nature Conservancy of Maine, The Maine Coast Heritage Trust, and the Towns of Stonington and Deer Isle. Ruta Dzenis, Senior Planner and the Coastal Community Grants Administrator, has also been very helpful to the Task Force with a lot of information and contacts. Ruta urged Blue Hill to do a Flood Vulnerability Assessment and Adaptation Plan of municipal infrastructure early on and encouraged us to also seek early planning funding from the Island Institute's*



*ShoreUp program. She also advised us to have Blue Hill get an updated Findings Statement of Consistency with the Growth Management Act in order to be fully eligible for the grant program. The last Statement for Blue Hill's Comprehensive Land Use Plan was done in 2005 and expired in 2017.*

### **3. Maine Dept of Marine Resources/ Maine Coastal Program:**

#### **-Shore & Harbor Planning Grants**

This program is aimed at helping coastal communities with sound waterfront planning and harbor management and planning for climate resiliency. Funds may be used for waterfront vulnerability assessments and resiliency plans. FY2020 grantees included 11 towns such as Bucksport, Jonesport, Southwest Harbor, and Vinalhaven. The Maine Coastal Program plans to allocate approximately \$120,000 during this 2020 grant round. The maximum award is \$30,000 and the minimum award is \$5,000. Proposals are usually due in June and grants are anticipated to be awarded in July. Projects must begin by late summer and be completed by December. **A non-federal match, equal to 25% of total project cost is required.** The project match can include cash and/or the documented value of in-kind services Partnerships are encouraged and those proposals documenting strong partnerships that further ensure the success of the project are strongly encouraged.

Contact: Kathleen Leyden: [Kathleen.leyden@maine.gov](mailto:Kathleen.leyden@maine.gov)  
<https://www.maine.gov/dmr/mcp/grants/shore-and-harbor-planning-grants.html>

***Task Force Comment:*** Stonington recently received a Shore & Harbor grant and were assisted by water resource engineer Leila Pike of GEI Consultants who specialize in coastal and waterfront engineering. Leila helped write and implement both the Shore and Harbor Planning Grant and a Coastal Community Grant which also included a community engagement component to help the town decide which sea level rise scenario the town should use for planning infrastructure risk and mitigation strategies. ***Leila Pike and Kathleen Billings, Stonington's Town Manager, both recommended to our task force that, early on, Blue Hill should assess their financial reserves policy to ensure adequate match grant funding for future infrastructure upgrading or relocation projects . The Task Force recommends that the town seek a grant in the next funding cycle.***

#### **4. Maine Dept of Environmental Protection:**

##### **-State Municipal Construction Grant Program**

Under this program, and within the availability of funding, the Commissioner is authorized to **grant an amount not to exceed 25% of the costs for preliminary planning of a pollution abatement program and design of a wastewater infrastructure project; and an amount not to exceed 80% of the construction and construction engineering costs for a wastewater infrastructure project, i.e. treatment facilities, sewer systems and effluent outfalls.**

The Department has established that a municipality's affordability points must exceed the total of the State average points by 40% to be eligible for additional financial assistance. Therefore, the sum of a municipality's affordability criteria must be a minimum of 7.0 (140% of 5.0) points to be eligible for possible principal forgiveness under the CWSRF program and/or grants through the Construction Grant Program. Whenever possible, the DEP works with local officials to combine grant funds, loan funds, and other sources of funding from U.S.D.A. Rural Development, U.S. Economic Development Administration, and H.U.D. Community Development Block Grants program in an effort to keep user charges below an affordability threshold.

##### **-Wastewater Planning Grants**

The Department has allocated \$200,000 for Wastewater Planning Grants in state fiscal year 2020. Grants may be awarded in the amount of 15–25% of the eligible costs for preliminary planning of a pollution abatement plan, i.e. facilities plan, preliminary engineering report, etc., up to a maximum of \$10,000 per applicant. To be eligible for a planning grant, applicants with a wastewater treatment system must have affordability points of 7.0, or higher. Lack of an approved comprehensive plan reduces the point score. There is No Deadline for submission of an application and the Wastewater Planning Grant User Rate Calculator. Applications may be submitted throughout the year and will be processed and awarded to eligible applicants in order of receipt, until allocated funds are expended.

##### **-Wastewater Infrastructure Grants**

The Department allocated \$13,450,000 for Wastewater Infrastructure Grants in state fiscal year 2020 for grants in the amount of 15-25% of the eligible costs for design and up to 80% of the eligible construction costs (bidding, construction

administration and inspection, and construction). In awarding the grants, applicant's affordability points will be calculated taking into consideration the estimated project cost and all funding sources. To be eligible for a Design/Construction grant, the applicant's affordability points must be 7.0, or higher (see State Grant Affordability Calculator). The deadline for submitting an application, the Wastewater Infrastructure User Rate Calculator, and a Preliminary Engineering Report for state fiscal year 2020 funding was February 7, 2020 and will likely be around that time in 2021.

### **-Clean Water State Revolving Loan Fund**

Through a partnership between the Maine Municipal Bond Bank (MMBB) and the DEP, the CWSRF program provides low interest loans to municipalities and quasi-municipal corporations (i.e. village corporations, sanitary, sewer & utility districts, etc.) for the construction of wastewater infrastructure projects. The DEP Division of Water Quality Management (DWQM) administers the technical aspects of the CWSRF program and the projects funded by it.

#### **Projects**

The primary purpose of the fund is to acquire, plan, design, construct, enlarge, repair and/or improve publicly-owned sewage collection systems, interceptor sewers, pumping stations, and wastewater treatment plants. In addition, the program also funds public and private non-point source water quality protection and improvement projects; such as landfill closures, sand/salt storage facilities, septic system repair and replacement, stormwater projects, agricultural best management practices, and specific silviculture equipment purchases.

#### **Funding**

The CWSRF program is funded by federal and state contributions which are loaned out and repaid with interest. The repayment and interest money is recycled back into the program to fund additional water quality protection or improvement projects. The revolving nature of the program is designed to provide ongoing funding for water quality projects. The MMBB combines federal, state, and repayment monies to create attractive interest rates. The program offers interim financing at 1%, or two-thirds of the one-year AAA municipal tax-exempt rate, whichever is higher, and long-term financing at, 2% below the market rate, with a minimum 1% interest rate. Loan terms up to 30 years or the useful life of the project, whichever is less, are available. If an entity has the financial capacity to

borrow and that the program has sufficient funding, there is no minimum or maximum amount that an entity must or can borrow.

### How to apply

Maine's CWSRF program is an open enrollment program with no application deadline unless the loan applicant is interested in qualifying for a loan with additional subsidy. To apply for a loan without additional subsidy, simply complete the CWSRF Notification of Intent to Borrow form and submit it to the Department as instructed and complete the SRF financial Application located on the MMBB website and submit to the MMBB. Loan applicants interested in qualifying for a loan with additional subsidy are required to submit a different application to the Department by a specific deadline.

Starting October 1, 2014, a **Fiscal Sustainability Plan (FSP)** is required of loan recipients for a project that involves the repair, replacement, or expansion of a treatment works.

The CWSRF Fiscal Sustainability Plan shall contain:

1. Inventory of assets.

The FSP shall include an inventory of all critical assets located in the FSP plan area. At a minimum, this will include: type of asset, installation date, estimated useful life, condition, and service history.

2. Evaluation and Prioritization of Assets.

The plan shall include a system to evaluate the condition and performance and to prioritize the assets. This system should consider, at a minimum, the following asset characteristics: age, condition, service history, remaining useful life, importance to the protection of public health and/or water quality, importance to the operation of the system, and asset redundancy or lack thereof.

3. Evaluation of Water and Energy Conservation Efforts.

Loan recipients shall certify that they have evaluated and will be implementing water and energy conservation efforts as part of the FSP. The evaluation of any projects identified in the FSP shall take into consideration water and energy conservation efforts.

#### 4. Asset Management and Funding Plan.

The FSP shall include a plan and schedule for the maintenance, rehabilitation and/or replacement of assets and a plan for funding the activities. At a minimum, this should include the project descriptions, costs, timeframes, and potential funding sources.

***Recommended Contact:*** Annaleis Hafford/Olver Associates who has managed the Blue Hill Wastewater Treatment Plant for a long time.:

[annaleis@olverassociatesinc.com](mailto:annaleis@olverassociatesinc.com)

#### ***Task Force Comments:***

*When Blue Hill applied for DEP grant funding in 2019 from the grant programs described above, the town's score did not quite meet the affordability points level required for grants but perhaps conditions have changed enough to now meet the criteria. In any case the low interest loan program of the Clean Water State Revolving Loan Fund is still available without the points requirement.*

*Olver Associates reports that grant funding from the DEP was however available for their work on the Blue Hill Fiscal Sustainability Plan without having to meet the same affordability points level required for the subsidized grant programs. The same would be true of the 1% loan funding from the CWSRF program.*

*Olver is very familiar with these DEP programs and they are currently working on a full report for the Select Board. This report will include a list of possible state and federal funding options.*

***Olver will eventually need to hear from the Select Board what their preferred planning scenario is for sea level rise and storm surge impacts as that will affect the Fiscal Sustainability Plan and funding options.***

#### **5. Maine Dept of Economic and Community Development**

##### **-Public Infrastructure Grants**

<https://www.maine.gov/decd/sites/maine.gov.decd/files/inline-files/2020PIAp.pdf>

The Public Infrastructure Grant (PI) Program provides gap funding for local infrastructure activities, which are part of a community development strategy leading to future public and private investments.

**Eligible Activities:** Eligible activities in the PI Program are construction, acquisition, reconstruction, installation, relocation assistance associated with public infrastructure, and public infrastructure limited to supporting construction of fully-funded affordable LMI housing; eligible planning activities necessary to complete the Project Development Phase.

**Match:** All communities applying for PI funds must certify that they will provide a **cash match of at least 25 percent** of the total grant award. This match may consist of all non-Community Development Block Grants (CDBG) loans, grants etc. contributed to the project.

### **-Community Development Block Grant Program**

The Office of Community Development (OCD) is a division within the Department of Economic & Community Development (DECD). The primary focus of OCD is the administration of the HUD funded Community Development Block Grant (CDBG) Program which includes regional technical assistance and training. They work closely with Maine municipalities, regional partnerships and non-profit groups to meet a broad array of economic and community development needs.

Their programs are designed to support initiatives that:

- Are integrated in a long range community strategy;
- Provide for further public and private investment;
- Benefit low-to-moderate income persons;
- Enhance deteriorated residential and business districts;
- Promote quality housing, jobs and sense of community, and
- Maximize citizen participation and regional partnerships.

***Task Force Comment:*** Only governments (state, municipal or Tribal) are eligible. These are significant grant funding sources and can offer up to \$500,000 for projects that fit but they are competitive and take significant time and effort to pull together. Again here, it may be necessary for the Town to consider engaging a firm or individual to assist in applying for this funding source. The Hancock County Planning Commission's new Executive Director, Jarod Guillette, has offered to assist Blue Hill with any priority projects like this.

## 6. Maine Dept of Transportation:

### -Small Harbor Improvement Program

<https://www.maine.gov/mdot/pga/ship/>

The Small Harbor Improvement Program (SHIP) promotes economic development, public access, improved commercial fishing opportunities and works to preserve, and create, infrastructure at facilities in tidewater and coastal municipalities. The SHIP program assists municipalities in improving or creating facilities, such as public wharves, piers, landings and boat ramps. There is **a required 50% local share** under this program. The SHIP program can provide **up to \$250,000** in assistance towards eligible projects.

#### Ongoing Program for Future Funding Assistance

This grant application is open to tidewater communities that can demonstrate a need to improve economic activity and access to a tidewater river or the ocean on publicly-accessible property. Typical types of projects funded under this program include commercial and municipal wharf improvements, hoist systems, boat ramps, gangways, stairways to clam flats, piling replacements, etc.

The goal of this program is to promote economic development, and improve public marine infrastructure and public access. **MaineDOT urges each community to contact them as soon as possible with project ideas/needs to begin the process for potential inclusion in upcoming budgets. MaineDOT will schedule site visits as needed once a letter of intent has been filed. Once a letter of intent project has been deemed eligible, the community will be able to submit an application.**

**Contact:** Matt Burns at 207-624-3409

***Task Force Comment:*** *Maine Coast Heritage Trust has had successful experience with this grant program helping, for example, to raise \$200,000 grant from this program and a \$200,000 grant match from the Boating Facilities Program in the Maine Bureau of Parks and Lands/DACF for improvements at the Bridge End park on Deer Isle a few years ago. **Because of the complexity of such grant***

*applications and their implementation, both the Town of Stonington and MCHT recommend contracting the services of a firm or individual (often an engineering firm) to help put together these kinds of funding packages.*

## **7. Maine Dept of Defense, Veterans and Emergency Management**

### **-Maine Emergency Management Agency**

FEMA has a new \$500 million program for building resilient infrastructure (BRIC) which is channelled through state agencies in each state.

Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes and territories as they undertake **hazard mitigation projects, reducing the risks they face from disasters and natural hazards**. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program.

The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

The program website is <https://www.fema.gov/bric>

They are a source of funding for engineering as well as construction.

Contact: Anne Fuchs, Director of Mitigation, Planning, and Recovery / State Hazard Mitigation Officer

Office: (207) 624-4466, Cell: (207) 557-3669

[anne.p.fuchs@maine.gov](mailto:anne.p.fuchs@maine.gov)

<http://www.maine.gov/mema/>

***Task Force Comment: This seems to be a funding source worth pursuing after basic vulnerability assessment and adaptation planning has occurred and probably in partnership with organizations like the Hancock County Emergency Management Agency (Andrew Sankey, Director) and the Hancock County Planning Commission (Jarod Guillette, Exec Director) who have both reached out to offer assistance with project planning and grant submissions when Blue Hill is ready.***



## **8. US Dept of Commerce/Economic Development Administration (EDA)**

<https://www.eda.gov/funding-opportunities/>

***Task Force Comment:** The EDA provided \$3M grant to Damariscotta to reconstruct public infrastructure for flood resilience after a significant number of years of planning involving their regional planning commission and various state agencies.*

## **9. US Army Corps of Engineers**

U.S. Army Corps of Engineers potential funding sources for project design and construction:

### **– Small Flood Damage Reduction Projects Grants**

<https://www.nae.usace.army.mil/Missions/Public-Services/Continuing-Authorities-Program/Section-205/>

### **– Hurricane and Storm Damage Reduction Projects Grants**

<https://www.nae.usace.army.mil/Missions/Public-Services/Continuing-Authorities-Program/Section-103/>

***Task Force Comment:** We were unable to find anyone in state government who had had experience with funding of this kind from the USACE*

## **10. US FEMA Hazard Mitigation Assistance Grant Programs:**

**-Pre-Disaster Mitigation Program (now called BRIC-see above)**

**-Hazard Mitigation Grant Program**

**-Flood Mitigation Assistance Program**

***Task Force Comment:** These programs are managed in Maine through the Maine Emergency Management Agency and typically involve larger projects requiring*

*assistance from consulting engineers and the state and county regional planning agencies cited above.*

## **11. US Department of Agriculture Rural Development Programs**

### **-Revolving Funds for Financing Water and Wastewater Projects**

***Task Force Comment:** Blue Hill already has experience with USDA's Rural Development funding for the sewer extension project which was carried out by Olver Associates. Olver will be researching USDA funding options for the Blue Hill treatment plant as part of their upcoming report to the Town.*

## **12. University of Maine/Maine Sea Grant**

### **Program Development Funding Policy**

Each year Maine Sea Grant allocates part of its budget for Program Development (PD) funds. The National Sea Grant Office allows state programs to award these funds to enhance their strategic plan goals. Typical awards are \$1,000 – \$5,000. Awards are generally for small research projects and proof-of-concept with the intent of seeding an idea for later development into larger funding proposals. Other credible uses of these funds include extension, education, communications, travel, graduate student support, and workshops or conferences. Applicants must express how the proposed project will add value to Maine Sea Grant's research, extension, education, and outreach efforts in the program's current strategic focus areas. Program Development awards do not fund PI salaries or indirect costs. The Maine Sea Grant management team will make decisions on Program Development awards two times per year. For 2020, projects that advance Maine's capacity for adaptive coastal resource management and public policy in response to climate-driven ecosystem change will be given preference.

Contact: [umseagrant@maine.edu](mailto:umseagrant@maine.edu)

***Task Force Comment:** MCHT suggested that this could be a potential source of funding for a low cost citizen science component in the schools of Blue Hill (and possibly peninsula-wide) linked to the measurement by students of sea level rise and storm surge. This fits nicely with the challenge teachers face for remote and outdoor distance learning components that can be done by students individually or*

*in small groups. Heather Richard of the Shaw Institute has expressed an interest in helping to explore this option and help with implementation.*

*Shaw Institute 55 Main Street, PO Box 1652, Blue Hill, ME 04614 207.374.2135,  
<https://www.shawinstitute.org/>*

**13. US others: additional NOAA sources, USGS (still to be researched)**

## **OBJECTIVE #8**

**Identify professional assistance, such as engineering studies, that will be required to prepare the town to address these changes and implement adaptation strategies adequately.**

We of the Task Force on Sea Level Rise have had the privilege of meeting several engineers and managers who are expert in the process of developing town plans for the prospect of confronting the issues related to sea level rise. We have received some very good advice and hope to share this with the Select Board.

The concise wisdom that has filtered down to us is the following. The process is best served by having a relationship with a supervising engineer who can guide the town through the process of grant writing all the way through the completion of a comprehensive long term town adaptation project.

The town will need to arrange for a Vulnerability Study. This will require match funding and the involvement of an engineer who may well become a supervising engineer for the town for the long term.

Following the vulnerability study, the town will need to engage a detailed engineering report known as a Mitigation Plan to guide and allow mitigation in terms of abandonment, barrier plans, retreat and or reroute.

There is not an option for dealing with each problem as they arise like filling potholes (reactionary engineering). The town is best served by engaging experts to define and manage a comprehensive SLR plan for the entire town. The town will be best served by engineers who are expert in physical engineering as well as state laws, regulations, writing and acquiring grants and meeting criteria for funds from a variety of sources.

We are under the impression that the town has relationships with engineering companies, such as Olver for the WTF and CES Engineering for the school. We would suggest that the relationship be valued. It is valuable to have a long term relationship with working and local cultural histories for both sides. As the town engages in competitive bidding on contracts, it is imperative that the process begin promptly as the time line from initiation to commencement of the mitigation projects is measured in years. It may well be prolonged should the town need to update the Comprehensive Plan.

The Following list is provided for the Select Board to use as a reference for selecting an engineer in a variety of capacities.

**Supervising Engineer:** These two are being mentioned as it is believed that they have an engineering relationship with the town. Annaleis Hafford is the engineer working with the WTF. It is thought that Travis Noyes at CES has worked with the town on the BHCS projects in the past. I am not able to confirm that through the town office, the superintendent's office or the CES office in Bangor.

- Annaleis Hafford, P.E., Olver Associates, Environmental Engineers, 259 Main St, Winterport, ME, 04496, (207) 223-2232
- Peter J. Tuell, P.E., CES Engineering, One Merchants Plaza, Suite 70, Bangor, ME 04401, T: (207) 989-4824

**Project Engineers.** These engineering firms have been impressive to the Task Force and our local consultants and contacts as we have moved through this process. Each of these people are also capable of serving the town as supervising engineers and can fill that task as well. They are presented in random order. They are:

Ransom Engineers, Nathan Dill, P.E. [nathan.dill@ransomenv.com](mailto:nathan.dill@ransomenv.com), 400 Commercial Street, Suite 404, Portland, Maine, 04101 207-772-2891, Supported by Ciona Ulbrich. The Task Force has liked meetings with Leila Pike. They did the report for the town of Islesboro,  
[http://townofislesboro.com/fileadmin/Departments/selectmen/minutes/IslesboroMeeting-5-31-2017\\_final\\_reduced.pdf](http://townofislesboro.com/fileadmin/Departments/selectmen/minutes/IslesboroMeeting-5-31-2017_final_reduced.pdf)

Andrew McCullough, P.E., Andrew McCullough Engineering, 93 Bucksport Rd, Ellsworth, ME 04605  
Phone: (207) 667-655,1 <https://www.mccullough-engineering.com/> Supported by Jim Fisher.

MILONE & MACBROOM, INC.

100 COMMERCIAL STREET, SUITE 417

PORTLAND, MAINE 04101

They did the Adaptation Planning Study for the town of Damariscotta in December 2015. [https://www.lcrpc.org/uploads/visual\\_edit/20150202-finalreport-revised.pdf](https://www.lcrpc.org/uploads/visual_edit/20150202-finalreport-revised.pdf)

Robert Gerber, Civil Engineer and Geological Consultant, Served as the Facilitator for the Town of Stonington Comprehensive Plan, 2018

Robert Gerber, P.E., C.G.

GEI Consultants, Inc

5 Milk Street

Portland, ME 04101

207.797.8901 phone

[https://www.geiconsultants.com/https://www.stoningtonmaine.org/\\_cmsupl/docs/stonington-2018-comprehensive-plan\\_final.pdf?1598555062](https://www.geiconsultants.com/https://www.stoningtonmaine.org/_cmsupl/docs/stonington-2018-comprehensive-plan_final.pdf?1598555062)

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Supported by Stephenie MacLagan at the Island Institute

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Supported by Stephenie MacLagan at the Island Institute, Kathleen Billings Town Manager, Stonington Maine and Ciona Ulbrich. Task Force has liked meetings with Leila Pike. She and Nathan Dill did the report for the town of Islesboro,

[http://townofislesboro.com/fileadmin/Departments/selectmen/minutes/IslesboroMeeting-5-31-2017\\_final\\_reduced.pdf](http://townofislesboro.com/fileadmin/Departments/selectmen/minutes/IslesboroMeeting-5-31-2017_final_reduced.pdf)

## **Summary of Task Force Recommendations**

### **Short Term (1-2 yrs)**

-See Objective 6, pages 10-13 for specific recommendations regarding vulnerable roads and structures in Blue Hill.

The Sea Level Rise task force of Blue Hill recommends that the town take an approach in committing to manage for 1.1-1.8 feet of sea level rise by 2050 and 3.0-4.6 feet of sea level rise by 2100. Additionally, the task force recommends that the town of Blue Hill prepares for significantly higher sea level rise scenarios including 3 feet by 2050 and 8.8 feet by 2100.

-Town to agree on its own planning scenario for estimated 2050 and 2100 sea level rise forecasts and storm surge forecasts. - Establish a SLR committee (govt plus citizens or just govt?) to help direct the project of responding to SLR.

-Consider establishing funding streams and a municipal reserve fund to serve as the town match for planning of projects that support resiliency efforts focused on town properties. For example, look at harbor fees and boat excise taxes which are low compared to surrounding towns.

-In addition to agreeing on a Capital Improvement Plan for the wastewater treatment plant with Olver, carry out a fiscal sustainability plan for all the Town's SLR needs including roads, the cemetery, wharves etc.

-Review Town's insurance policy to confirm adequate flood coverage including in-ground infrastructure ex: wharves-not generally considered as insurable property as opposed to piers and floats.

-Review existing Town policies, ordinances and regulations on flooding and emergency management for possible updates (Ex: shelter capacity, emergency procedures, shoreland stabilization etc).

-Collaborate with the Hancock County Emergency Management Agency on additional training of first responders for flooding related emergency and

evacuation planning and on updating the Town's emergency management plan as required by Hancock County Emergency Management Agency.

-Schedule an update to the town's comprehensive land use planning process to ensure the integration of flood and storm hazard mitigation and compliance with state law and federal and state funding requirements. One of the most important points made by state planners and funders was that Blue Hill needed to have an updated comprehensive plan that was consistent with the state's Growth Management Act and many federal funding requirements if the Town was to be competitive for most of the limited grant funds and subsidized loan programs..

-Continue exploring what the Town can do to set an example with respect to emissions reduction on town properties such as solar energy and waste management.

-Maintain inclusion, support and recognition of an experienced local expert in the person of Jim Fisher.

-Arrange for time given by non paid contributors to projects like this task force to be recognized as in kind services. This will be very helpful for meeting matching funds for grants.

-The town works with the Road Commissioner and the Maine DOT to coordinate and prioritize road repairs including upsizing culverts and rising road beds in order to mitigate the risks related to sea level rise.

-Review all of Objective 5 - Preferred adaptive strategy for each element of infrastructure, considering cost, complexity and sustainability.

### **Mid-Term (3-5 yrs)**

-Identify drinking water wells serving public water systems in danger of flood inundation (Maine Climate Council recommendation)



-Work with state agencies to develop programs to educate and assist private well owners to assess vulnerability of private drinking water wells to flood inundation and provide resources to help mitigate vulnerabilities (Maine Climate Council recommendation)

-The Science and Technical Subcommittee recommends that regional sea level rise scenarios be revisited at least every four years

## **Bibliography**

### **Documents:**

- Hancock County Maine Hazard Mitigation Plan 2018, prepared by Hancock County Emergency Management Agency
- Adaptation to Sea Level Rise Chapter, Comprehensive Plan, Planning Board of York, Maine, November 2013
- Maine Flood Resilience Checklist, Maine Coastal Program, Maine Department of Agriculture, Conservation and Forestry, August 2017
- Blue Hill Amendments to the Shoreland Zoning Ordinance, March 2002
- Blue Hill Edits and Amendments to the Shoreland Zoning Ordinance, April 2010
- Blue Hill Shoreland Zoning Ordinance, May 1994
- Floodplain Management Ordinance for the Town of Blue Hill, Maine, July 2016
- A Report From the Coastal and Marine Working Group of the Maine Climate Council, June 2020 (revised) -Adaptation Planning Study for the Downtown Waterfront Area in Damariscotta Maine
- Damariscotta Downtown Flood Protection and Municipal Parking Lot Improvement Project Request for Proposals, June 2020
- Sea Level Rise and Storm Surge, Maine Climate Change Scientific and Technical Subcommittee, a Scientific Assessment of Climate Change and its Effect in Maine, February 2020
- Town of Stonington Comprehensive Plan, March 2018
- “Extraordinary Increase of Coastal Flooding in US Due to Sea Level Rise, Report Says”. Fox News, July 15, 2020
- “Emissions Slashed Today Won’t Slow Warming Until Mid-Century”, The Economist. July 11, 2020

- Road Evaluation Report for Town of Blue Hill Maine, CES Inc., February 2020
- Talking Points On The First Street Foundation Flood Risk Model, Association of State Floodplain Managers, June 2020
- Stonington Waterfront Adaptation Plan, and Assessment of Current Conditions and Recommended Future Steps Prepared by the Stonington Waterfront Steering Committee with Technical assistance from Hancock County Planning Commission, February 2016
- Town of Blue Hill Emergency Operations Plan, Hancock County, Revised August 2017
- Town of Blue Hill’s Harbor Ordinance 2006
- Sea Level Rise Summary from Maine Climate Council , June 2020
- Blue Hill Property and Casualty Pool, Breakdown of Coverage, Risk Management Services, Maine municipal Association, July 2020
- Town of Stonington Flood Vulnerability Assessment and Adaptation Plan for Municipality Owned Infrastructure, Coastal Community Grants Reports
- Adapting Stonington Working Waterfront: Implementation Strategy for Resilience, Hancock County Planning Commission, March 2016
- “The World is Growing Concrete Coasts: The Eco-Friendly Alternatives to Ocean Concrete”. 11August 2020, BBC.com
- Program Statement for FY 20-21 Coastal Community’s Grant Program, issued by Municipal Planning Assistance Program, Maine Department of Agriculture, Conservation and Forestry and the Maine Coastal Program Maine Department of Marine Resources
- “Scientific Assessment of Climate Change and Its Effects on Maine, Maine Climate Council Scientific and Technical Subcommittee, June 2020
- Coastal Grant Case Studies on Climate Resiliency, Municipal Planning Assistance Program, Maine Coastal Program -Maine Flood Resilience Checklist: a

Self-Assessment Tool for Maine's Coastal Communities to Evaluate Vulnerability to Flood Hazards and Increase Resilience. Also contains links to mapping resources. Available through the Maine Geological Survey.

-10 Part Municipal Climate Adaptation Guidance Series, Maine Municipal Planning Assistance Program, Maine Department of Agriculture, Conservation and Forestry

-Island Institute

<http://www.islandinstitute.org/climate-impacts>

The goal of the Island Institute's climate project is to:

- Help Maine's island and coastal communities better understand the risks related to storm damage, and how these risks are projected to change due to sea level rise;
- Give communities the tools to translate this increased understanding into informed decision-making and actionable steps to enhance resiliency;
- Establish durable networks to support future understanding of scientific data, decision-making, and preparation, applicable to a broad range of potential natural and manmade disasters.

## Maps:

-FEMA Flood Maps of Bluehill, Maine

<https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd&extent=-68.60333214035079,44.40694680709801,-68.56646785964914,44.422273898630415>

- [Accessing Preliminary Pending and Effective Flood Insurance Rate Maps on the FEMA Map Service Center and Maine Flood Hazard Map \(PDF 0.5MB\)](#)
- View the [Maine Flood Hazard Map](#) application. This interactive web map contains the following flood hazard layers:
  - National Flood Hazard Layers (NFHL): This layer contains the most current digital FIRM maps accepted and approved by FEMA.
  - Q3 Flood Maps: This is a layer of digitized flood zones from the old, approximate data. It should be used with confirmation from the official, printed FIRM maps.

-Coastal Risk Tool

<https://maps.coastalresilience.org/maine/>

Rising sea levels will impact Maine's coast in many different ways. One important effect will be the inundation of roads, which will prevent access to homes and businesses as roads are flooded. Use this tool to explore how rising sea levels will affect roads in coastal cities and towns, see where road networks will be inaccessible to emergency responders, and how that relates to the overall social vulnerability of the community. Social vulnerability is provided for each coastal block group, based upon 17 socioeconomic and demographic factors.

-SLOSH maps for Blue Hill (Sea, Lake and Overland Surges from Hurricanes). , Maine Geological Survey.

<https://www.maine.gov/dacf/mgs/hazards/slosh/faq.htm>

Displays areas that would be potentially inundated due to Category 1, 2, 3 or 4 hurricanes at mean high tide. Data is meant to support emergency and evacuation planning purposes.

-Town of Stonington: Estimated Valuation of Property (2011) Threatened by Flooding under Various Scenarios

<http://www.hcpme.org/stonington/coastal/StoningtonValuationThreatenedbyFlooding2-22-16.jpg>

-Cost of Sea Level Rise: Vinalhaven (a story book created by Island Institute)

<https://islandinstitute.maps.arcgis.com/apps/MapJournal/index.html?appid=7f1cf3b3f8a243bdb9393a87397aaca>

This story is created with the Story Map Journal application in ARC GIS online

We of the Task Force were delighted to be invited to participate in this project. We were educated and inspired by the work and the people we encountered. We trust that the Select Board will find this document to be helpful for future planning purposes.

We sincerely wish you success,

Nellie Haldane & Beckett Slayton, Co-Chairs