COASTAL FLOODING AND CLIMATE-RELATED RISKS IN LAUNTON

General Instructions

In the small, coastal New England Town of Launton, the risks from storms are becoming increasingly dangerous. The town has had three major "100-year storms" in just the past decade that have destroyed homes and businesses. [1] Luckily, no lives have been lost, but local officials and residents are increasingly worried about the fate of the neighborhoods close to the water. If climate change predictions turn out to be right and these recent storms indicate a trend rather than "freak" occurrences, these neighborhoods could be in a precarious situation.

This isn't just a problem in Launton. Residents in neighboring communities as well as Launton are becoming increasingly concerned because no town can afford to keep rebuilding if the storms they have seen in recent years become the "new normal." This problem is urgent, but no community in the area has figured out how to solve it yet. Launton has the opportunity to become a forward-thinking town model for how to reduce risks from climate change.

Launton is home to about 10,000 people year-round, but another 30,000 residents come to Launton in the summer to enjoy its beautiful beaches, New England landscapes, and recreational opportunities. Tourism is a big part of the economy. The eastern part of town along the coast is heavily built up with homes and businesses, while the western part of town is relatively undeveloped.

Launton has three main rivers that drain into the ocean. At the mouths of these rivers are coastal estuaries lined with marshes. Much of the land along the marshes has been protected as the Launton Nature Preserve, which is famous for its beautiful trails and wildlife viewing opportunities.

Launton's coastal areas are some of the most valuable properties in town because of scenic views and easy access to beaches and parks. There are two neighborhoods along the coast in Launton: Plover Beach and Brewer's Cove. Many of the properties in these neighborhoods are summer homes, but other year-round residents have owned homes in these neighborhoods for generations. They love this special place, but high tax rates and flood insurance premiums are making it hard for them to stay.

A map of Launton is provided in Appendix A.

[1] A 100-year storm refers to rainfall totals that have a 1% chance of occurring in any given year.

Launton's Climate Change Adaptation Strategy

The town is currently in the process of preparing an adaptation strategy to minimize the risks associated with climate change. In light of limited resources and a desire to ensure that the strategy gets implemented, town officials have decided to include ideas about adaptation in the updated Comprehensive Plan due out next year. The town's Comprehensive Plan typically addresses zoning, development regulation, future infrastructure, and growth management. This time, though, the update will also include risk reduction, so that Launton can avoid further storm damage and bounce back more easily when severe storms and other climate impacts occur.

Launton has been working with science advisors from nearby Woodson University. The Woodson Science Advisory Team produced a climate risk assessment that charts likely changes in temperature, precipitation, and sea level rise in the years ahead (Appendix B). One of the major risks they have identified is **increased flooding vulnerability in Launton's coastal neighborhoods** caused by:

1. sea level rise
2. increased frequency and intensity of storms, which cause storm surges and river flooding
3. additional residential and commercial development in vulnerable coastal neighborhoods

The town has appointed an official Coastal Resiliency Task Force to figure out the best way to protect coastal neighborhoods from flooding. The Task Force has seven members: Six leaders from the civic, government, and business sectors, and a trained facilitator. The group is looking at the possibility of controlling new development, building new flood protection infrastructure (like seawalls), and requiring vulnerable buildings to be flood-proofed in various ways to address coastal climate-related risks.

Local Politics

The Town Manager has been under increasing pressure to find ways to reduce Launton's vulnerability to major storms. When catastrophic Hurricane Paul recently hit states farther south, many people were left wondering what would happen if that type of storm hit Launton.

The Town Manager is known for sound environmental and fiscal management, but storm impacts and climate change risks threatens that legacy. Launton's finances are tight, so any new public projects will require tax increases or new fees. On the other hand, not preparing properly for flooding and storm damage could impose catastrophic costs down the line.

The Federal Emergency Management Agency (FEMA) and the Environmental Protection Agency (EPA) recently indicated they might be able to provide financial support to communities undertaking risk management efforts. Grants would cover some but not all of the costs of implementing climate adaptation strategies. Town officials are confident that, if they can agree on ways to reduce Launton's vulnerability to climate change, they will be in a good position to secure future FEMA or EPA funding.

About Today's Meeting

This is the third—and a very important—meeting of the **Coastal Resiliency Task Force.** At its first meeting the group arranged for a professional facilitator, established ground rules, and was briefed on Woodson University's climate change risk assessment (Appendix B). In the second meeting, with the help of the facilitator, the group discussed different ways of managing coastal storm surges and flooding and produced a number of potential options (Appendix C). At today's meeting, the Task Force must decide on what strategies they will recommend to the Town Manager regarding how to:

1. reduce the risks facing existing neighborhoods (such as through building seawalls, flood-proofing buildings, or buying back at-risk homes and businesses).
2. reduce risks associated with new construction and development as Launton grows.

The group should keep in mind that the Town Manager is asking for policy advice and doesn't need all the particulars right now. **Don't get lost in the details; you don't have a lot of time.** To reach agreement the Task Force must have the support of **at least five out of six participants**.

Members of the Task Force

Town Planner*:* The Town Planner oversees all planning efforts in Launton including zoning code revisions and updates to the Comprehensive Plan. S/he is knowledgeable about climate risks to the community and the environment and is focused on Launton's long-term environmental and fiscal health. The Town Planner wants to reach an agreement that allows Launton to begin to reduce risks now, before the consequences of inaction get worse.

Emergency Management Director*:* The Town's Emergency Management Director is very concerned about the impact of extreme weather events on coastal neighborhoods and infrastructure – not just flooding but also heat waves and power outages from storms. The Director wants to ensure that evacuation procedures are in place to protect residents and visitors in an emergency. There has been increasing pressure on the emergency management budget because Launton has recently experienced so many serious storms.

Town Councilor: The Town Council representative is especially concerned about protecting the town's economy and way of life. The Councilor is acutely aware that the majority of the town's year-round, voting residents do not live near the coast and are reluctant to spend money protecting expensive vacation homes. However, s/he understands how important coastal businesses and tourism are to the town's economy and tax base.

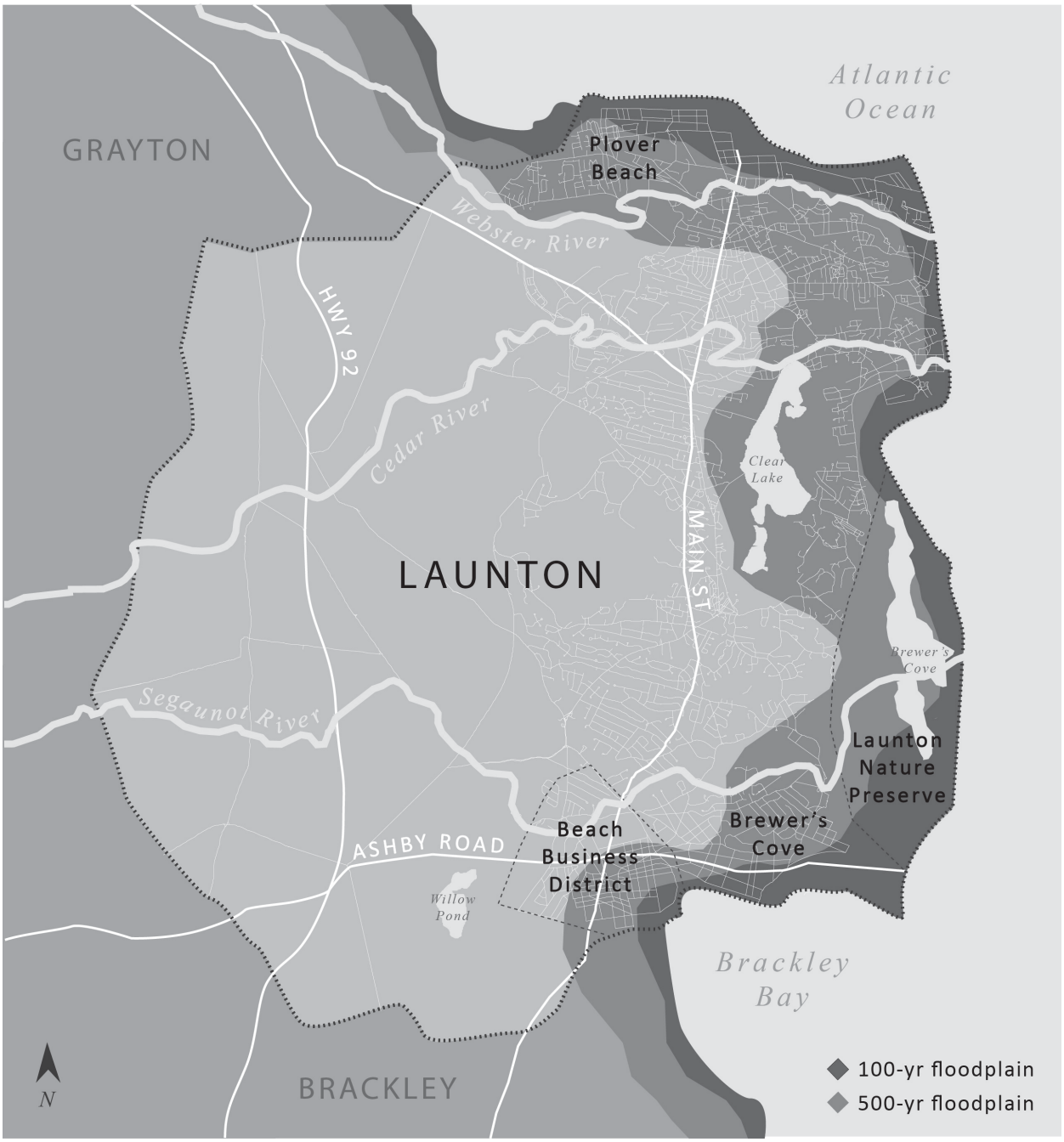
Executive Director of the Great Coast Regional Land Trust*:* A non-profit that has been operating in Launton for over ten years, the Land Trust is dedicated to preserving undeveloped land and helping monitor beach and water quality. The Executive Director of the Land Trust is particularly concerned about the health of the marsh ecosystem and wants to stop sprawling development in inland watersheds. S/he is on the Task Force because the Land Trust has been a valuable partner in helping the town with land conservation and environmental monitoring.

Executive Director of the Launton Chamber of Commerce: The Chamber's mission is to advance business interests in Launton. Many of the Chamber's members do not believe that climate change is a serious threat. They are more concerned with the day-to-day challenges of running their businesses and do not support new regulations on new development or tax increases.

Chairperson of the Brewer's Cove Neighbors Association*:* The Association is comprised of homeowners who live along the coast. Some members are skeptical about climate change, but they all know that some parts of the neighborhood are now at risk from storms. Many of the Association's members are not year-round residents and do not vote in the town. They do have political clout, though, because they pay so much in taxes. Other Association member families have lived in Brewer's Cove for generations and are deeply attached to the neighborhood.

Facilitator: The Task Force invited a trained, neutral facilitator to help move the discussion along and keep the parties engaged. Everyone has agreed to work with this facilitator.

Appendix A: Map of Launton



Appendix B: Risk Assessment Memo

From: Scientific Advisory Committee
To: Launton Coastal Resiliency Task Force
Re: Climate Change Risk Assessment

This memo provides key information from the risk assessment prepared by Woodson University. Task Force members may want to consider these forecasts when developing a coastal risk management strategy.

The following potential impacts are especially relevant:

- **Sea level rise** may:
  - increase beach erosion
  - submerge low-lying land and marshes
  - increase flooding due to higher storm surges during severe storms
- **There may be more extreme precipitation events**, resulting in:
  - heavier coastal and river flooding
  - increased hazards from erosion of beaches and stream banks

Sea Level Rise

Climate models project that the sea level will rise by approximately:

- 0.5 ft - 0.8 ft in the short term (2010-2039)
- 1 ft - 1.7 ft in the medium term (2040-2069)
- 2 ft - 4.7 in the long term (2070-2099)

Extreme Precipitation Events

Historically, Launton has experienced an average of 8.5 extreme precipitation events (defined as four inches of rain in 48 hours) per decade. Because these events are often highly destructive, there is great concern about them increasing in frequency. The best estimates are that these events are likely to change as follows:

- One to two additional events per decade in the medium term (2040-2069). This represents an increase of 12% to 24% from today
- Two to four additional events per decade in the long term (2070-2099), or an increase of 24% to 48% from today

Given the combined effects of the increased frequency of extreme precipitation events and sea level rise, the boundaries of Launton's floodplains will likely shift in the future. By 2050, it's likely that the 500-year floodplain will become the new 100-year floodplain, meaning the risk of flooding will increase from a predicted once per 500 years to once per 100 years in this area. The increase in risk to properties within today's 100-year floodplain is even more dramatic.

Appendix C: Summary of Coastal Hazard Risk Management Options

Options for Reducing Risks to Existing Coastal Development

Option	Costs to Town	Who Pays?	Future Benefits	Future Costs
Option A: Protect **Pursue Seawall Strategy** Currently, building new seawalls is illegal under state law. Yet many property owners want to build new small walls to protect their property or want the town to build a large municipal wall. Under this strategy, the town would agree to lobby the state for a rule change or legislative exemption to allow new seawalls.	$ - $$$$ Public expense depends on private vs. public construction of seawalls	Individual property owners pay for seawalls on their property. The town would pay for a municipal seawall.	Seawalls can provide a high level of protection to homes and businesses if flood conditions do not exceed the design capacity of the walls. However, seawalls built today would have to function under changing precipitation patterns and sea levels for at least the next 50 years.	Building and maintaining seawalls will be expensive. If a seawall fails, the damage to properties that relied on it can be extremely high. Seawalls increase beach erosion and reduce beach access. They also increase flooding and erosion risks to neighboring areas.
Option B: Accommodate **Expand Flood-proofing Ordinance to the 500-Year Flood Plain** Currently, all new or remodeled buildings in the 100-year floodplain are required to be raised to at least the 100-year flood elevation. An expanded flood-proofing ordinance would raise the required flood-proofing elevation to the 500-year flood elevation, requiring homes and businesses in a wider area to raise their homes. Other kinds of flood-proofing could be considered, in addition to elevating buildings.	$ - $$ Costs will depend on the property	Property owners pay to flood-proof their homes. If the town subsidizes flood-proofing, the cost of subsidies will be paid by the town.	A flood-proofing ordinance would require new and remodeled homes to accommodate flooding in their design, making them more likely to survive storm surges and flooding. An expanded flood-proofing ordinance could also help property owners stay ahead of changing flood insurance requirements, which would help residents secure lower insurance rates.	Flood-proofing increases the cost of building and remodeling buildings in coastal neighborhoods. Flood-proofing will also not prevent all damage to homes, although it will greatly reduce damage in most flooding incidences.
Option C: Retreat **Buyback Program for At-Risk Development** The town would work with at-risk property owners to buy their properties and return them to a natural state.	$$$$	The town pays for the buy-back program.	This would help home and business owners move out of the most vulnerable areas and could provide green spaces to act as buffers against future storms.	The town would no longer collect property tax on the properties it buys back. Buyback participants would need to move and may leave the town.

Options for Reducing Risk Associated with Future Coastal Development

Option	Costs	Who Pays?	Future Benefits	Future Costs
Option A: Protect **Focus on Upgrading Coastal Infrastructure** The town would raise or re-route coastal roads, increase road drainage, and build a more robust sewer and water infrastructure to handle sea level rise and bigger storms in coastal neighborhoods.	$$$-$$$$$ The public expense would vary based on the level of upgrades the town pursues.	The town pays through higher fees and taxes.	This would protect coastal roads and water infrastructure from the impacts of climate change, which would reduce the neighborhood's vulnerability to big storms. It would also reduce erosion and pollution due to culvert failures or sewage overflows.	High costs would be incurred if future storms exceed design capacity of infrastructure upgrades.
Option B: Retreat **Encourage New Development Inland** The town would adopt new economic development incentives to encourage future development away from the coast. The town could also increase zoning densities in inland areas.	$ Incentives would mean reduced property taxes collected from inland businesses	The town pays through tax incentives on inland development.	New economic development. An economy and tax base that is less vulnerable to coastal storms.	Increased sprawl could increase costs of town infrastructure, and development in watersheds could increase flooding from runoff.
Option C: Retreat **Encourage New Development Inland, Combined with a Town Conservation Plan** Similar to Option B, the town would encourage new development inland through tax and zoning incentives. It would also adopt a conservation plan to prevent inland sprawl. Elements of the conservation plan could include land purchase or low impact development (LID) regulations to reduce storm water runoff on new inland developments.	$$$	The town and property owners pay in the form of potentially increased development, regulatory, and administrative costs.	New economic development. An economy and tax base that is less vulnerable to coastal storms. Environmental and tourism benefits from land conservation.	Development regulations could increase the cost of future development. Conservation through land acquisition would involve additional costs for land purchase and maintenance.

Appendix D: Glossary of Relevant Terms

Climate Change Adaptation

Climate change adaptation is a phrase that is used to broadly describe ways of planning or preparing for changes in the climate and related consequences. Adaptation can refer to physical changes, such as raising roads to withstand stronger storm surges, as well as policy and planning changes, such as using all public buildings as cooling centers during heat waves. Adaptation is different from climate change mitigation, which refers to efforts to reduce greenhouse gas emissions, such as through driving electric vehicles or using renewable energy.

100-year Storm

A 100-year storm is a storm that produces so much precipitation in such a short period of time that it is expected to occur only once every 100 years. The "100-year storm" has a 1% chance of occurring in any given year.

Seawalls

Seawalls are structures built along the coast to protect land and buildings on the shore from erosion and flooding. Like dikes or levees, they are often higher or taller than the land would be naturally. The term seawall may refer to a small structure built to protect an individual property or much larger structures that are built to protect sizeable sections of towns and cities. Below are two examples of what seawalls might look like.

Flood-proofing Ordinance

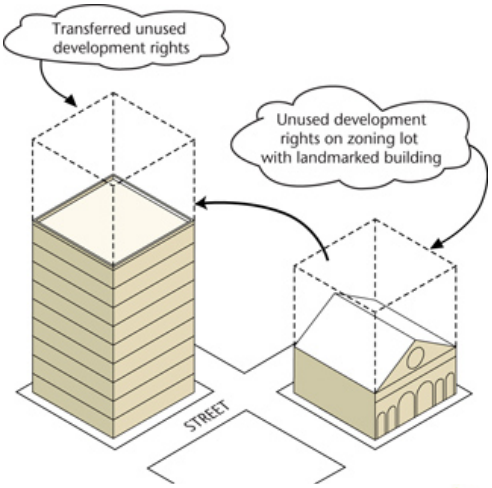
A flood-proofing ordinance is a local law requiring buildings in areas with a certain level of flooding risk to either be elevated above a certain flood level or be built to withstand a flood without suffering too much damage.

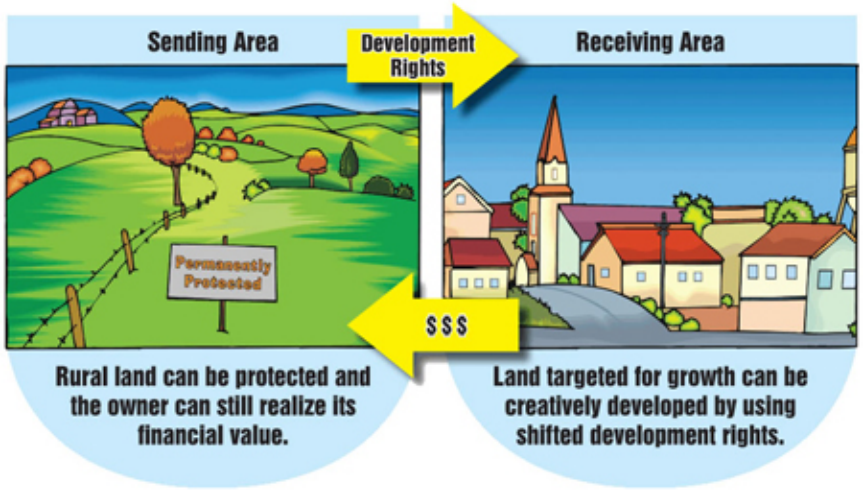
Buyback or Buyout Program

Towns and cities may use a buyback or buyout program to purchase private land that is at high risk of flooding or that has experienced severe flooding in the past, and then to convert this land to a condition that can withstand flooding and provide some measure of flood protection to other nearby properties.

Transfer of Development Rights (TDR)

Transfer of Development Rights is a zoning procedure that allows a property owner to sell his/her right to develop a parcel of property to another owner with property in an area that is more amenable to development. By constraining development in one area and promoting more it in another, TDR provides property owners of restricted areas the opportunity to realize their property's financial value by selling the development rights. Below are two examples:





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