

City of Belfast Climate Action Plan

Draft

MARCH 9, 2023

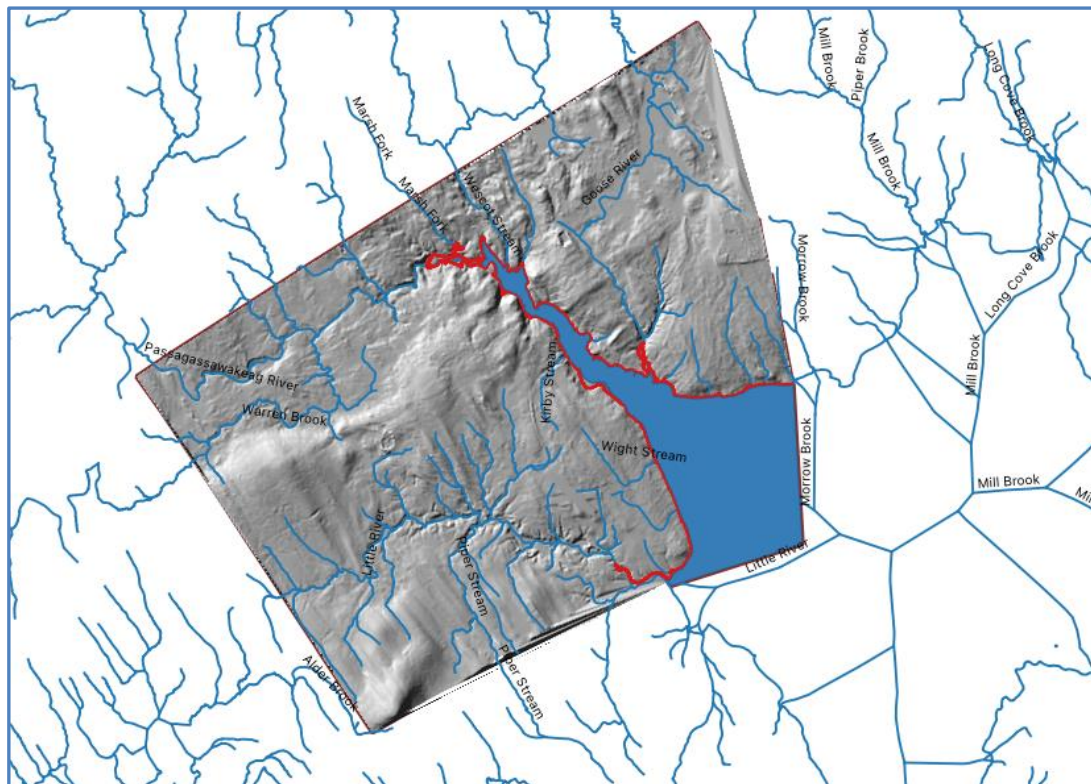


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Why do we need a Climate Action Plan in Belfast?

Global Climate Change poses a supreme challenge to human civilization on Earth, together with all life. The changes are proceeding at a rate that eclipses natural adaptation and evolution. Since the end of the last ice age, about 10,000 years ago, Earth's climate has been in a relatively stable condition that allowed human civilization to flourish. Since the Industrial Revolution began around 200 years ago, we have pumped vast amounts of carbon dioxide and other "greenhouse gasses" into the atmosphere, resulting in global warming that threatens to change our environment, to the point where large portions of the planet may not be suitable for human habitation, and the rest will be very different from the environment in which our civilization developed. Now, we must rely on a distinctively human ability to use our 'big brain' to adapt to, and possibly mitigate, the changes that we have precipitated. Scientists are optimistic: our understanding and technology make us capable of mitigating, and even reversing to a degree, the worst effects of climate change, but only if humans have the will.

Belfast takes justifiable pride in a tradition of citizen involvement and activism in addressing community problems in the interest of making the city a better place for all. One way that involvement is expressed is through citizen advisory committees reporting to the City Council.

On March 20, 2018, the City of Belfast City Council voted unanimously to create the Belfast Climate Crisis Committee [CCC]. In January, 2019, the Mayor of the City of Belfast signed a commitment to the Global Covenant of Mayors. That document committed the City of Belfast to prepare for the impacts of climate change, to develop and formally adopt an assessment of climate hazards and vulnerabilities, and to develop a Climate Action Plan to address them.

In addition, on [Incomplete, Add date], the city council adopted a resolution to enroll in the Community Resiliency Partnership (CRP) that is required to obtain funding from state through the GOPIF. The resolution requires the city to adopt a Climate Action Plan, CAP, which is this document.

This Belfast Climate Action Plan [CAP] is a product of the Climate Crisis committee in furtherance of the commitments by the Global Covenant of Mayors and Maine Won't Wait. It is a plan to implement the commitment asserted by council in the Resolution that accompanies the Community resilience Partnership necessary to obtain grants through GOPIF. The CAP is intended as a living document based on public input, and should continue to be updated, from time to time, since Climate Change will continue. It identifies Actions that accommodate and mitigate the effects of climate change on the community, by emphasizing actions that lead to a resilient community with equity in support of all citizens.

1. Belfast can expect at least a foot of sea-level rise¹ by 2050, and almost 2 feet of sea-level rise by 2100, under the rosiest scenarios of future GHG emissions.
2. The most extreme scenarios indicate that Belfast can expect up to 3 feet of sea-level rise by 2050, and up to 9 feet by 2100.
3. The Maine Climate Council has recommended that every coastal municipality
 - Commit to manage for an intermediate Sea Level Rise scenario of 1.5 feet by 2050 and 4 feet by 2100 (over a baseline year of 2000), and
 - Prepare to manage for a high Sea Level Rise scenario of 3.0 feet by 2050 and 8.8 feet by 2100, depending on the risk tolerance of different kinds of infrastructure.

¹ Sea-level rise figures do not include storm surge, which typically accompanies the highest water events such as that memorialized by the 1978 HWM.

The city of Belfast is adapting to Climate Change and is planning to continue. The City Council created the Climate Crisis Committee in March 2018. The Climate Crisis Committee pursued its mission to gather information, educate the citizens, collaborate with other groups, and advise City Council of actions that will help the city adapt. The Future action items in this document acknowledge the goals identified in “Maine Won't Wait, A Four-Year Plan For Climate Action.” In addition, specific topics relevant to Belfast are presented herein. Climate Action Planning will have to be considered, and reconsidered frequently, to determine circumstances, accomplishments, and vulnerabilities with respect to the future conditions appropriate action goals.

Resolution by the Mayor and City Council

This is where we put city resolution language.

Critical infrastructure

Critical Infrastructure is defined as those common systems and resources that are vital to daily operations in the City and community. These elements are the Wastewater Treatment Plant, roads, the stormwater infrastructure, Marine Resources, and Public Safety Facilities, and a system that ensures food security in times of emergency. Climate change will create a heightened need to protect this Critical infrastructure. The following segments of infrastructure are particularly vulnerable to certain likely elements of climate change.

Wastewater Treatment/Sewage System

Condition

The Wastewater Treatment plant, located at an elevation of 10 to 15 feet above present mean high tide, will be vulnerable to flooding from the storm surge anticipated in the near future.

Accomplishments

The city council approved funding a detailed plan to deal with expected sea level rise. Olver Associates, March 2022. The city approved a detailed plan to deal with expected sea level rise. Olver Associates, March 2022.

Stormwater System

Condition

The Stormwater and drainage system in Belfast is old and needs upgrades. There are frequent incidents of overflow, seepage, wet basements, street flooding, and soil erosion that are caused by failures of the old system.

Accomplishments

On September 20, 2022, Belfast City Council began discussing a plan, produced by Olver Associates, and submitted to the City Manager on September 14, 2022. The plan is called “Stormwater Drainage System Review scope of work project.” The plan was approved by unanimous vote of Council to be partially funded using Federal money, for \$70,000 as a phase 1 (inside the bypass), with a total cost of \$170,000 to complete the entire city.

Roads

Condition

Roads are critical for commerce, public safety, and general mobility in Belfast since there is limited mass transit system. The road system is subject to floods and storm damage. When roads are damaged, emergency vehicles are unable to travel, people are unable to travel to work and to shop, and the costs to repair roads are high.

Accomplishments

The Public Works Department has a standard procedure to replace failing culverts and shoulders when they are damaged by storms and when new streets are paved. The Public Works Department also acts quickly to sweep up gravel and leaves when they endanger the proper functioning of culverts, streets, and ditches.

Communications Systems

Condition

Present public communication systems are the wired telephone system, and cellular systems. Emergency and marine services also include VHF radio links. All may be vulnerable to widespread power loss, and the ‘silencing’ of communications.

Accomplishments

Marine Facilities and Access

Condition

Belfast has a robust and energetic Harbor Department. The breakwater docking facilities have been buffeted by storms and they are vulnerable to climate change and sea level rise. There is a plan for the Inner Harbor Improvement Project developed by the Harbor Department.

Accomplishments

[Incomplete] **City of Belfast REPORT ON THE Inner Harbor Improvement Project.** October 31, 2014. Gartley and Dorsky.

Public Shelters

Condition

There are no designated public shelters for intense heat or cold events in Belfast. The city has experienced storms and cold spells (-15 F) that are dangerous to the health of citizens. Shelters should exist and be equipped to cope with intense weather events. Belfast has a large population of senior citizens and other vulnerable citizens. *Needs work.*

Food Security

- Identify food needs and sources for our community.
- Support local food security, distribution, and resilience through expansion of local farming, particularly with organic practices that build soil fertility, and increase crop yields without recourse to pesticides.
- Encourage food-processing cooperatives, shared facilities, gleaning projects, and other approaches to maximizing use of the food we produce.

Carbon Emissions and Transportation systems

Condition

Transport

The primary mode of transportation in Belfast are private automobiles. Belfast, and surrounding communities, lack effective transportation options available in more densely developed communities. (Comprehensive Plan Draft, 2021)

Belfast, like all of the US, has evolved to support auto transport, to the detriment of alternatives such as walking and bicycling, as weather permits.

Quasi-Public Transport options include; Mid-Coast Transportation (WCAP) offers an intra-city Belfast Downtown Area Shuttle (DASH) that operates M/W/F 7 times/day for a low fee structure. Mid Coast Transportation offers Inter-city Flex bus service on a once daily basis to and from surrounding towns, with a one-way fare ranging from \$2.00 to \$3.50.

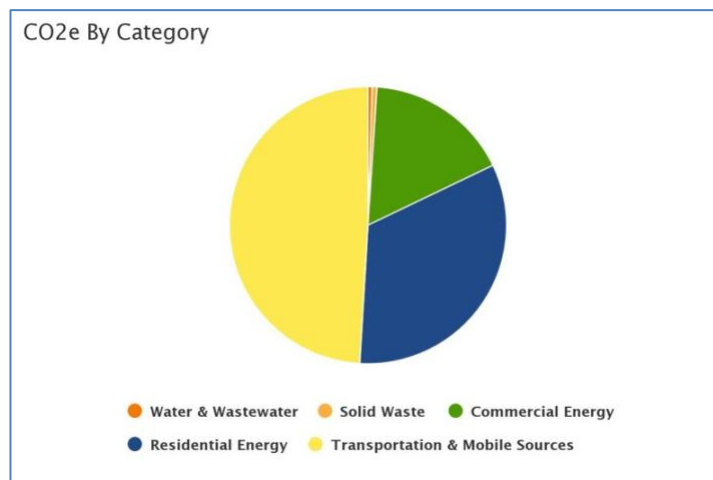
Bicycling, during 6 months of the year, is growing in popularity. Within the Bypass, there are marked bike lanes on major streets. Bike access from the outlying areas is complicated by Rt1/3.

It is clear to anyone living here that the automobile is part of the fabric of Belfast. Most families have more than one vehicle. This is the case because destinations for people of Belfast are often not in Belfast. Therefore, a person must travel to places like Augusta, Bangor, Rockland, or other towns, and Belfast is a also a daily or frequent destination for people from other communities to work or shop.

Greenhouse Gas inventory

When the City of Belfast joined the Covenant of Mayors in 2019, the CCC set out to determine the Greenhouse gas sources. The City of Belfast Climate Crisis Committee worked with ICLEI (Inventory of Communitywide Greenhouse Gas Emissions Local Governments for Sustainability USA) to produce a Greenhouse Gas Inventory (GHGI) in September 2021. 2019.

The inventory determined the sources of Green House Gases per sector.



Accomplishments

- Belfast Climate Crisis Committee put in the time and effort to complete this GHGI report, as accurately as possible. A conclusion of the GHGI report is that, as in most cities, private cars and

trucks are responsible for the largest share of local emissions in Belfast. Reducing the use of gasoline and diesel internal combustion engines is the ‘low hanging fruit’ in terms of climate change mitigation. It is also a challenge for one city to accomplish a 50% reduction by 2030 when other states are resistant to this goal. Nevertheless, Belfast has taken steps to encourage the use of Electric Vehicles (EV) by installing at least 5 EV charging stations that run off power from the Belfast City Solar Installations. Belfast will not avoid its obligation to reduce Greenhouse gas emissions.

Electric power System

Condition

A major source of Nationwide GHG emissions is electric power generation. The initiative of converting to an ‘electric economy’ to greatly reduce use of fossil fuels must be accomplished through a rationally staged plan. The vulnerability and capacity limits of the existing electrical generation and distribution model is a major contributor to lack of resilience and power source growth. Resilient sources of electrical energy, with major renewable generation, are the most essential response to a secure future.

In Belfast, many homes are reconfiguring their heating and cooling systems to incorporate new technology such as electric generating solar panels and heat pumps. Ground Source Geothermal is not being used as much as it could be.

Many homes utilize wood fire to supplement their other heat sources such as heat pumps, oil and propane.

Accomplishments

Local solar and heat pump companies are very busy installing products that will reduce our reliance on carbon producing fuels. The industry is in a growth phase in Maine. The number of heat pumps and solar panels are not counted but from observation alone, the number of units is increasing.

Buildings and homes

Condition

The systems we rely on to heat our homes, prepare our food, and provide hot water for cleaning are major contributors to greenhouse gas emissions. Soon, cooling our homes will become an issue. The same considerations apply to commercial and City infrastructure. The transition to an ‘electric economy’ as the energy source is the strategy, but that will require time to implement. Reducing energy loss--and use--in existing and new buildings is essential.

Accomplishments

- The city of Belfast enforces the State Building Codes and Standards, as specified i under Title 25 §2372 and Maine Uniform Building and Energy Code (MUBEC).

Natural Resources

Land and Soils

Condition

Belfast is comprised of 24,536 acres of land, with almost 40% of the land considered either prime farmland or soils of statewide importance. There are seven preserves or conservation areas consisting of more than 200 acres within city limits, as well as thirteen municipal parks. Three parks and fifteen rangeways provide public access to the bay. The greatest threats facing the health of land, foliage and crops are flooding due to increased levels of precipitation and extended periods of drought. The highest recorded levels of precipitation have occurred within the past decade. The classic definition of an “extreme precipitation event” of two or more inches of rain in twenty-four hours now occurs regularly. Flooding and erosion threaten soils, wildlife habitats and food production.

The soils range from coastal sand and rock, and loam and prime agricultural soils, to compact glacial till, and wet areas that are often wetland or hydric soils. In areas that have been urbanized, or managed by man, drainage is not often natural and has been subjected to years of urban engineering and cut and fill, streets and drains and culverts, and springs, some of which are natural, and some that are a result of man’s influence. The soil map shows that most of the land is not prime farmland, but there are areas of important and prime farmland in Belfast. The acreages of soils and their ratings are provided in the table below.

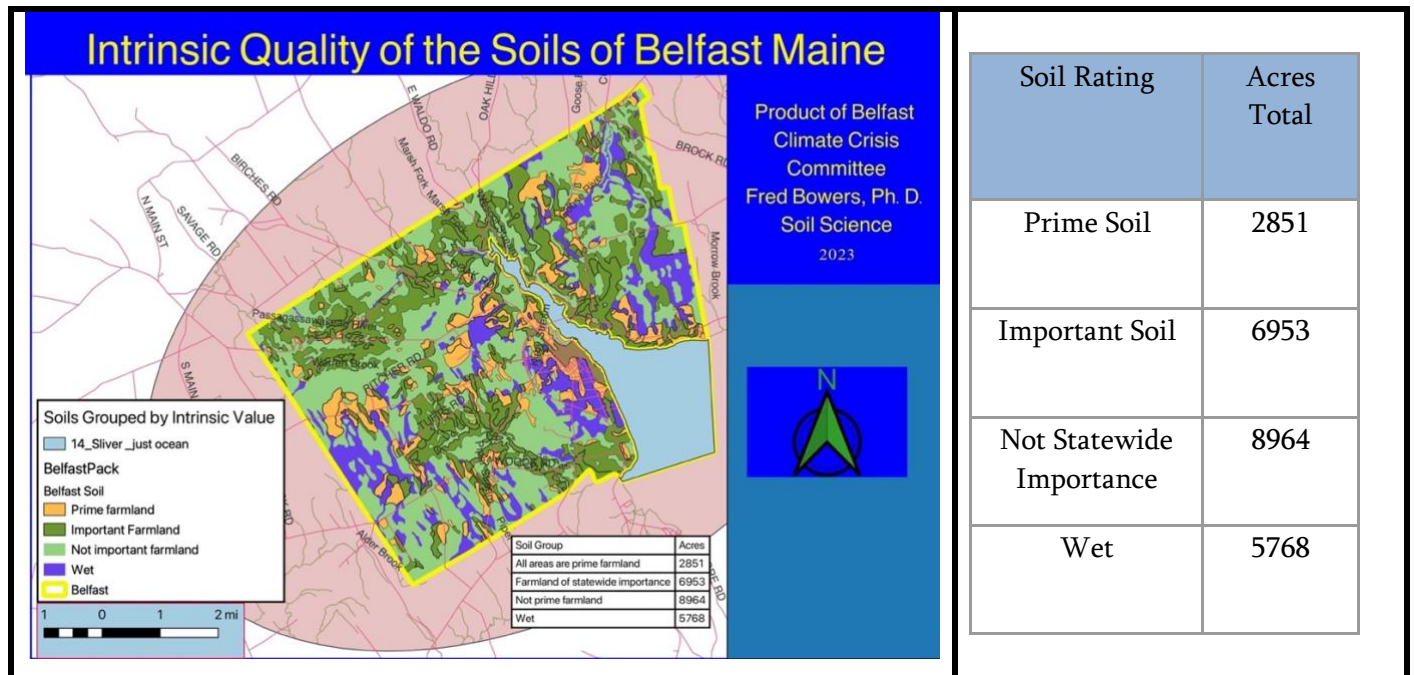


Figure 1 Intrinsic Value of Soils of Belfast

Accomplishments

- All of Belfast Climate Dialogues (ABCD) public presentation (Oct. 18, 2022) on creating resilience for storms and flooding.
- All of Belfast Climate Dialogues (ABCD) public presentation (Jan. 24, 2023) on effects of climate change and the landscape and local environments.

- All of Belfast Climate Dialogues (ABCD) public presentation (Feb. 2, 2023) on rain gardens and other water management techniques.
- Climate Crisis Committee discussion with Coastal Mountain Land Trust on ways to collaborate on land preservation.
- Conducted Ocean Street Neighborhood survey on flooding and erosion

Shoreline

Condition

Belfast's location at the mouth of the Passagassawakeag River estuary on Belfast Bay and Penobscot Bay includes approximately 240 parcels of land with frontage. The shoreline is under increasing stress from sea level rise and storm surge. Predictions hold that Belfast can expect at least a foot of sea-level rise by 2050, and almost 2 feet of sea-level rise by 2100, under the best scenarios of future GHG emissions. The most extreme scenarios indicate that Belfast can expect up to 3 feet of sea-level rise by 2050, and up to 9 feet by 2100. Intensity, frequency and duration of severe storms, especially those that increasingly come from the south-southeast, have caused extensive damage and threaten to overwhelm existing structures. Clean-up and restoration from the recent storm of December 2022 is estimated to cost \$120,000. Much of the western shore of Belfast faces severe risk. Beach erosion and damage to marshes, seagrass beds, and other vegetation threaten habitats for fish, birds and insects.

Accomplishments

- (2019) Installed a weather station on City pier with funding from the City Council and the Gulf of Maine Research Institute (GMRI). Broadcasting on Weather Underground on KMEBELFA20(2019-20) Installed 6 coastal flooding observation posts to capture photographic evidence of flood levels, in collaboration with National Weather Service/NOAA. Funding came from Belfast and GMRI.
- (2020) Installed a tide gauge at the harbor with a radar unit to measure tide levels. Project done in collaboration with Belfast Area High School students and with funding from Belfast and GMRI. BAHS students independently installed a companion ultrasonic sensor tide gauge at the same location on the pier.
- (2021) Installed US Harbors Divirod gauge at end of the breakwater to measure sea level elevations.
- (2021) Installed two posts on the Harborwalk [at foot of breakwater and near Front Street Shipyard] which monument Belfast's "high water mark" (Jan. 1978), and which illustrate the predicted moderate and high water levels in the event of a similar event in 2050, taking into account sea level rise. Project done in collaboration with the Army Corps of Engineers Silver Jackets and other state and federal agencies.
- Held Shoreland Property Owners' meeting (July 6, 2022) to present information about the coming impact of our changing climate on shoreline properties. All of the property owners of record on the shoreline in the Belfast City limits were invited as the primary audience, but the event was advertised and open to the general public.
- Created website with valuable resources for public information, such as "Sea Change in the Gulf of Maine: Outlook for Belfast."

Forests

Condition

Belfast has a long history of human occupation. Indigenous people occupied this area by around 10,000 years ago, and modified the forest somewhat before the Europeans arrived, but only minimally, since they used fire and stone tools to provide shelter and to clear land for food crops.

The Europeans cut down most of the original forest because they were seeking to harvest the large stands of White Pine and Oak and Maple. Now, the original forest occurs only as fragments. Most of the land has been cleared for agriculture and homesites, except outside of the Bypass where there are more densely forested areas interspersed with farmland. Other disturbances, such as fire and windthrow occur, sometimes naturally, and the forest has changed and has been replaced by a combination of Street trees, Native and Non-native trees and shrubs and weeds, and lawn grass. We must recognize that Belfast is a Successional Forest that is disturbed from time to time or harvested and never becomes a mature “climax” forest.

As urbanization continues, clearing of forests for homes and commercial use will generally continue. Clearing of forests will impact forest habitat. Furthermore, insect pests and climate change are resulting in changes to the habitat.

Habitat migration is occurring too. Insect pests and climate change are resulting in changes to the habitat. Bird migration patterns are changing, and species arrive earlier than previously. Humans have introduced species that compete with the native species, and migratory bird routes have changed. We must encourage the good species and discourage the invasive species and learn to maintain the habitat in a healthy condition.

Forests are particularly good at long term capture (sequestering) of carbon and keeping it out of the atmosphere. The USDA Forest Service provides a calculator tool called “iTree” that calculates tree canopy and benefits derived by forests. The benefits are calculated and are as follows in the table below.

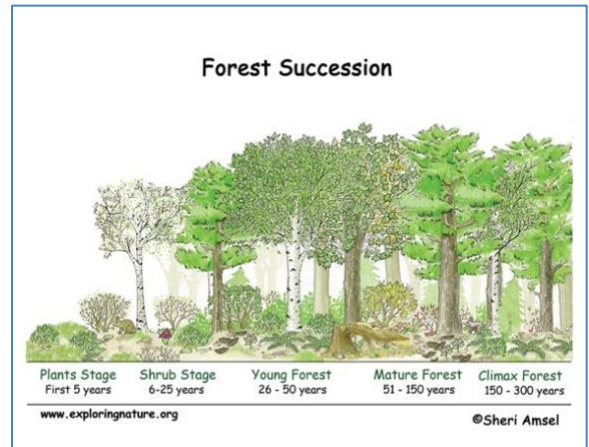


Table 1. Forest Benefits to Belfast (2021 data)

Subject	Numerical Value
Tree canopy	60.44%
Forest Acres	13,166 acres
impervious surfaces	1,047 acres
Carbon Sequestered	10,651 tons
CO ₂ Equivalent ¹	39,055 tons
Runoff Avoided	9 MG/yr
Rainfall Intercepted	1,066 MG/yr
Carbon Monoxide	5,349, lb./yr
Ozone	599,347, lb./yr
Nitrogen Dioxide	97,423, lb./yr
Sulfur Dioxide	4,956, lb./yr
PM	25,190, lb./yr
Carbon Storage	526,583 tons
CO ₂ Equivalent ¹	1,930,805 tons

CO₂ = Carbon dioxide, PM_{2.5} = Particulate matter 2.5 microns or less, tn =Short ton (US), t = Tonne / metric ton, MG/yr = Millions of gallons per year, m³/yr = Cubic meters per year, lb./yr = Pounds per year, kg/yr = Kilograms per year

Accomplishments

- Belfast has a very active volunteer Garden Club, and the Belfast Parks department participates in activities that increase the planting of trees for the future, for pollinator plants and habitat, and as well, planting vegetation for aesthetic purposes. The Belfast Parks department works closely with the Waldo County Soil and Water Conservation District.
- The Coastal Mountain Land Trust has established several forest preserves in and around Belfast.
- “Project Canopy” and Belfast “GreenStreets” are two programs that the City of Belfast that encourages the planting and care of trees. For example, since 1980, “GreenStreets” has been planting and caring for trees throughout Belfast neighborhoods from the east side to outer Main Street to the Belfast Waterfront, in City Parks, on private and public property, school yards and cemeteries, court houses and fire houses: GreenStreets volunteer group has planted many hundreds of the trees we pass by every day. The City of Belfast also has a tree ordinance, and a Tree Warden. Belfast has conducted an inventory of street trees and has been actively eliminating trees that are old or diseased.

Public Health Guidelines

Condition

The COVID19 Pandemic illuminated some of the challenging demands we can expect will be placed on our public health systems in the future. Climate change will continue to create health-related challenges, including development and spread of unfamiliar disease vectors, as well as possible future mass migrations/displacements of human and animal populations that may cause or exacerbate future pandemics

and other public health emergencies. In general, Belfast is a healthy place to live, and is not too densely populated, though a substantial part of its community is elderly, disabled and/or economically challenged. The city government recognized the need to take protective actions during the Pandemic. The city required that meetings be held using Zoom technology when things were at their worst.

Accomplishments

The city has a well-staffed and equipped hospital, and offices of numerous doctors, dentists and other health care providers. Belfast implemented actions that were appropriate to protect its citizens and visitors during the Pandemic.

Community Outreach

A key to implementing actions for accommodation to and mitigation of the effects of Climate Change is a lack of understanding of this enormously complex problem. We all need to be on the same page to make good decisions on policy and spending of public funds.

Condition

The Belfast Free Library has developed a wealth of information regarding through the All of Belfast Climate Dialogues ABCD program. It is all documented and available on line.

The Climate Crisis Committee convenes meetings and symposia, educates the citizens, and collaborates with other statewide groups such as A Climate To Thrive (ACTT) and Local Leads the Way (LLTW).

Accomplishments

- The Climate Crisis Committee and the Belfast Library All of Belfast Climate Dialogues ABCD program helped organize and lead a Belfast Senior College course at the Hutchinson Center in March-April 2023 entitled “Climate Change; Impacts on Forests, Farms, Habitat, and Sustainability of All living things”. This course was open to all citizens over 50 years old. It involved many of the local land preservation entities such as the Coastal Mountains Land Trust, the Georges River Land Trust, the Belfast Bay Watershed Coalition, and the Waldo County Soil and Water Conservation District. The purpose was to spread the word regarding the likely impacts of Climate Change on the local habitat, which includes Belfast.
- Numerous All of Belfast Climate Dialogues ABCD meetings have been held over the past few years and are documented on the All of Belfast Climate Dialogues ABCD website.

Plan for the next Generation

Conditions

Even the best laid plans are diluted and defeated by the pressure to deal with immediate crises. Climate change is sure to generate that pressure. However, the future of Belfast will be the responsibility of the next generations, and this aging generation must strive to produce a healthy legacy.

Our first duty is to understand and educate citizens about the challenges ahead, that will be caused by climate change. No one really knows when problems will arise. Many years may go by before sea level rises

to a dangerous level, and nobody knows how weather and climate will drive citizens to respond to changes like heating and cooling and precipitation.

Climate Change is our future, whether we like it or not. All citizens and friends of Belfast must continue to acknowledge, understand, and respond sensibly to Climate Change.

Accomplishments

- Belfast created the Climate Crisis Committee in 2018.
- The Climate Crisis Committee produced this CAP and provided it as a report to the City Council and Mayor and City Manager.
- The Climate Crisis Committee works with the Belfast Area High School (BAHS). BAHS students are invited to participate as members of the committee. The teachers work with students to teach skills that have produced a tidal gauge system, a weather station, and some other technical devices that will provide critical information regarding climate and sea level change.