



OPTIONS AND RESOURCES FOR LOCAL OFFICIALS IN
SOUTHEASTERN WISCONSIN COASTAL COMMUNITIES

Adapting to a Changing Coast

UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE

Adapting to a Changing Coast

OPTIONS AND RESOURCES FOR LOCAL OFFICIALS IN
SOUTHEASTERN WISCONSIN COASTAL COMMUNITIES

Andrew Mangham, David Hart, Adam Bechle, Gene Clark,
Deidre Peroff, Julia Noordyk, Bert Stitt, Linda Stitt

UNIVERSITY OF WISCONSIN SEA GRANT INSTITUTE

May 2018

PAMELA ADAMS

1958-2017

Pam served on the Mequon Common Council for 23 years until cancer took her life in February 2017.

A passionate champion of natural areas, Pam valued the beauty of Lake Michigan and understood the hazards of living on the coast. Representing a lakefront district, Pam was a conduit for our understanding of the hopes, wishes and concerns of coastal property owners. Over the years, she gave us many tours of Fairy Chasm State Natural Area and arranged public meetings to share community concerns about coastal hazards.

We dedicate this publication in her memory.



INTRODUCTION

One of the unique challenges of living on the shores of the Great Lakes is the variability of their water levels. Since the record low monthly average water level on lakes Michigan and Huron in January 2013, heavy rainfall and low evaporation have driven a rapid rise. This includes a 2.9-foot increase above the record low by July 2014, moving levels back above the long-term average recorded over the past 100 years. Water levels as of July 2017 have increased an additional 1.8 feet but are still 1.6 feet short of the record high monthly average of October 1986. In some sections of the Lake Michigan coast, rising water levels have submerged beaches and brought high-energy waves right up to the toe of lakeside bluffs.

In 2015, a team of investigators representing disciplines including coastal engineering, geology, urban and regional planning, law, policy studies, ecology, landscape architecture and social science led by the University of Wisconsin Sea Grant Institute received funding from the Graham Sustainability Institute at the University of Michigan to explore the impact of changing water levels on coastal bluffs in northern Milwaukee County and southern Ozaukee County. This Great Lakes Water Levels Integrated Assessment identified, reviewed and synthesized existing data and reports and developed more than 60 possible options to help local officials and property owners adapt to a changing coast.

One of the key elements of the University of Wisconsin Sea Grant Institute's approach to



This document presents options that local officials could consider to address changing coastal bluffs and beaches.

the integrated assessment was the community engagement used to identify and assess response options. This engagement was led by a pair of experienced community facilitators and the social science outreach specialist at Wisconsin Sea Grant. It included three community conversations attended by more than 140 people during the summer of 2016 to provide background on water levels and coastal bluff processes and resources to address coastal erosion, as well as listening to hopes, wishes, concerns and issues for a healthy and vital future for coastal bluffs and shores.

This document presents 28 options in 4 themes that local officials in southeastern Wisconsin coastal communities could consider to address changing coastal bluffs and beaches. An important thing to keep in mind while reading this document is the spirit and intentions that helped create this set of options. From

the beginning of our participation in this Integrated Assessment, we wanted to provide a service to the residents and local officials of coastal communities in Wisconsin. Though we drew on the experience and insights of experts in an array of fields ranging from public engagement to regional planning to coastal engineering, our intention was always to provide a set of possible options rather than a set of recommendations. Ultimately, the decisions about what to do in the face of variable lake levels, eroding beaches and unstable bluffs belong to the people that live with those issues.

Keeping that in mind, we present different options that, in some cases, could be considered contradictory. There are options for improved collaboration among coastal property owners, permitting and planning, and alternative funding options. Some of these options may be readily implementable with minimal barriers while other options would require significant legislation or changes to the status quo. We have attempted to provide some of the main benefits and challenges associated with these options, though our list is far from comprehensive. The point of this document is to present a variety of possible options that respond to many of the issues, concerns and hopes that came out of our community engagement meetings and reflect a range of priorities and perspectives. With this in mind, we are hopeful that some options will emerge as innovative ideas to build resilience to coastal hazards that result from variable Great Lakes water levels and storms.

CONTENTS

Dedication	3
Introduction	5
THEME 1: COLLABORATION AND FACILITATION	9
Non-Binding Collaboration With Neighbors.....	10
Visioning and Facilitated Collaboration	12
Dynamic Concept Mapping / VCAPS	14
Neighborhood Associations	16
Public-Private Partnerships.....	18
Facilitated Assessments for Planning	20
THEME 2: FUNDING	23
Cost-Sharing Framework	24
Incentives	26
Creation of an Aid Fund for Coastal Properties	28
Revolving Loan Fund	30
Addition of Coastal Erosion Components to Hazard Mitigation Plans	32
Great Lakes Regional Agreements	34

THEME 3: PERMITTING GUIDELINES	37
New Coastal Homeowner Tutorial	38
Fee to Fund Site Monitoring in Permits	40
Revision of Permitting Process for Offshore Structures	42
Risk Assessment and Disclosure Requirement for Property Sales	44
Erosion Control Permit Requirements That Mitigate Down-Drift Issues	46
Require Proof that Retreat Is Not an Option Before Permitting Shore Structures	48
Prohibit Shore Structures	50
THEME 4: ANALYSIS, PLANNING AND POLICIES	53
Coordinated Ordinances Among Municipalities	54
Bluff Vegetation Ordinances	56
Policy Review and Response Mechanism	58
Develop Growth Management Plans	60
Purchase of At-Risk Properties	62
Purchase or Transfer of Development Rights	64
Adopting a Long-Lot Format for New Subdivisions	66
Develop Coastal Capital Improvement Plans	68
Bluff Stability and Shore Erosion Insurance	70
Acknowledgements	73
Credits	74



THEME 1: COLLABORATION AND FACILITATION

- NON-BINDING COLLABORATION WITH NEIGHBORS
- VISIONING AND FACILITATED COLLABORATION
- DYNAMIC CONCEPT MAPPING / VCAPS
- NEIGHBORHOOD ASSOCIATIONS
- PUBLIC-PRIVATE PARTNERSHIPS
- FACILITATED ASSESSMENTS FOR PLANNING

NON-BINDING COLLABORATION WITH NEIGHBORS

Who?

Homeowner

Purpose?

Share costs, improve planning

Challenges?

Communication and cooperation

Scope?

Local

New Legislation?

No

Individual citizens can join together in informal groups to address risks from coastal erosion. These group collaborations can help to share costs, implement larger and more effective measures and avoid unanticipated repercussions from certain structures, such as increased erosion of neighboring shorelines resulting from the construction of a revetment.

BENEFITS	CHALLENGES
Can spread out costs of projects	Requires clear communication and cooperation
Can lead to larger-scale, better-coordinated projects	
Reduces unanticipated impacts on neighbors	

Resources

“Working with Engineers and Contractors on Shore Protection Projects,” is a University of Wisconsin Sea Grant Institute resource for homeowners.

readywisconsin.wi.gov/CoastalErosion/WorkingWithEngineersWISCUG12007.pdf

The Bay-Lake Regional Planning Commission provides a guide for communities who want to plan for coastal hazards

baylakerpc.org/media/46890/coastal%20planning%20guide.pdf

The University of Wisconsin Stevens Point has a guide to starting a lake association. While it focuses on inland lakes, many of the strategies discussed here would work for groups of neighbors on the Great Lakes coastlines.

uwsp.edu/cnr-ap/UWEXLakes/Pages/organizations/associations/starting-la.aspx

“The Wisconsin Great Lakes Chronicle,” a publication by the Wisconsin Coastal Management Program, has many stories of citizen involvement in coastal projects.

doa.state.wi.us/Documents/DIR/Coastal%20Management/Program%20Docs/Chronicle13-web.pdf



Related Options

Visioning and Facilitated Collaboration

Dynamic Concept Mapping / VCAPS

Neighborhood Associations

Public-Private Partnerships

Cost-Sharing Framework

Non-binding collaboration images: Local citizens work together to clean up South Shore Beach in Milwaukee (top left).

Citizen groups work together to protect natural resources, like this coastal ravine in Lion's Den Gorge Nature Preserve, in Ozaukee County, Wis. (top right).

Volunteers staff a boat wash to prevent the spread of aquatic invasive species (bottom).

VISIONING AND FACILITATED COLLABORATION

Who?

Homeowner/municipal government

Purpose?

Share costs, improve planning

Challenges?

Communication and cooperation

Scope?

Local

New Legislation?

No

Individual citizens can join together in informal groups to address risks from coastal erosion, sharing costs, implementing larger-scale measures and avoiding unanticipated repercussions. While informal collaborations between neighbors can often be extremely effective, some groups find it useful to have a meeting facilitated by a community engagement specialist and go through a visioning exercise in which multiple ideas are laid out and discussed within the context of the agreed-upon values of the group. This often leads to clearer, more effective planning with greater consensus.

BENEFITS	CHALLENGES
Can spread out costs of projects	Requires clear communication and cooperation
Can lead to larger-scale, better-coordinated projects	Requires an experienced community facilitator
Reduces unanticipated impacts on neighbors	
Improves long-range planning	
Can ease cooperation and communication with local government	

Resources

The American Planning Association discusses visioning in the context of community planning. planning.org/research/postdisaster/briefingpapers/visioning.htm

The University of Wisconsin-Stevens Point and the University of Wisconsin-Extension provide a publication that discusses visioning in a variety of contexts.

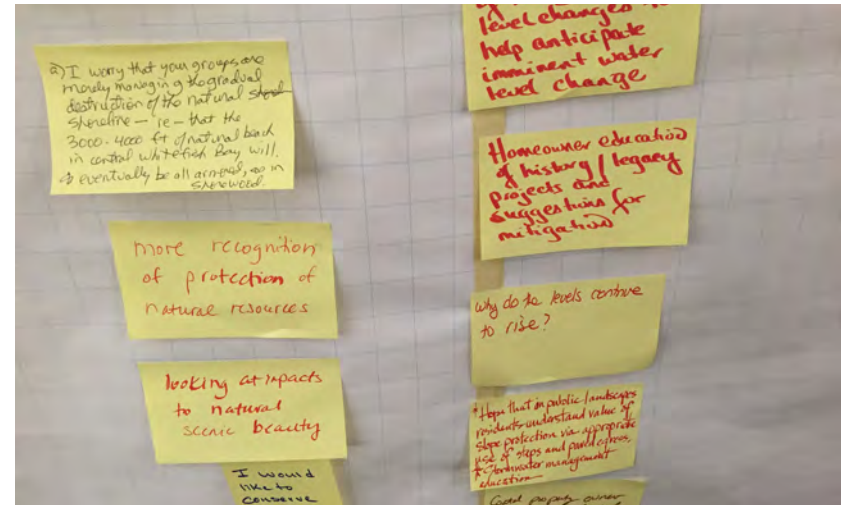
uwsp.edu/cnr-ap/clue/Documents/publicProcesses/Using_Visioning_in_Comprehensive_Planning_Process.pdf

Dane County and the University of Wisconsin-Extension offer an overview of visioning and provides extra resources.

fyi.uwex.edu/danecountycommunitydevelopment/organizational-development/strategic-visioning-resources/

NOAA's Office for Coastal Management provides a training manual for planning and facilitating collaborative meetings.

coast.noaa.gov/data/digitalcoast/pdf/planning-and-facilitating-collaborative-meetings.pdf



Visioning and facilitated collaboration images:
 Visioning and facilitated collaboration can take many forms. Meetings that include a visioning component often have exercises that help generate ideas, express concerns and find common ground among the members before specific plans or goals begin to be developed.

Related Options

Dynamic Concept Mapping / VCAPS

Non-Binding Collaboration with Neighbors

Neighborhood Associations

Cost-Sharing Framework

Develop Growth Management Plans

Develop Coastal Capital Improvement Plans

Facilitated Assessments for Planning

DYNAMIC CONCEPT MAPPING / VCAPS

Who?

Homeowner/municipal government

Purpose?

Share costs, improve planning

Challenges?

Communication and cooperation

Scope?

Local

New Legislation?

No

VCAPS stands for vulnerability, consequences and adaptation planning scenarios. This is an approach to planning that identifies long-term and short-term vulnerabilities and then evaluates the consequences of various planning scenarios that could be implemented to address those vulnerabilities. Facilitated use of this approach at the neighborhood/community level aids in prioritizing and refining plans and leads to a more resilient approach to planning for coastal erosion.

BENEFITS	CHALLENGES
Can spread out costs of projects	Requires clear communication and cooperation
Can lead to larger-scale, better-coordinated projects	Requires an experienced meeting facilitator
Improves long-range planning	
Can ease cooperation and communication with local government	
Provides framework for evaluating multiple scenarios	

Resources

This website gives a thorough overview of the VCAPS idea, the process used in VCAPS and specific case studies where VCAPS has been used for coastal planning in the U.S. There is also a user guide.

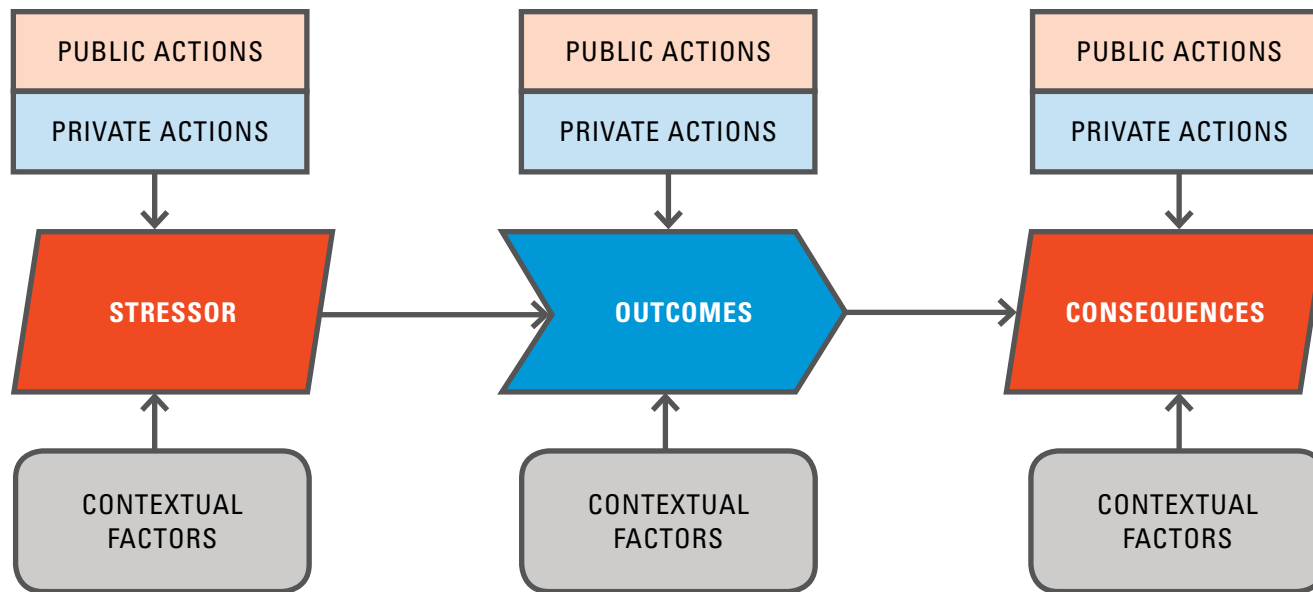
vcapsforplanning.org/

The South Carolina Sea Grant Consortium provides several examples of VCAPS being used by coastal communities in the Carolinas.

scseagrant.org/Content/?cid=251

Similarly, the North Carolina Sea Grant program provides a detailed case study of VCAPS in use for the town of Plymouth, N.C.

ncseagrant.ncsu.edu/program-areas/coastal-hazards/community-assessment/



Related Options

Visioning and Facilitated Collaboration Facilitated Assessments for Planning Addition of Coastal Erosion Components to Hazard Mitigation Plans

VCAPS images: VCAPS is a planning framework that provides a simple and effective format for community planning. The first step is to consider an event or process that could be aggravated by environmental conditions, called a climate stressor. The public and private actions and context are laid out to see what current conditions affect that stressor. Then additional events or processes that could occur as a result of that stressor, called outcomes, are discussed. Finally, the consequences of those outcomes are carefully described.

Communities can use the VCAPS framework to consider the actions that they can take at each step of that process to mitigate potential consequences and clarify planning priorities (bottom left).

The VCAPS process has been used effectively in a number of locations including Plymouth, N.C. (bottom right).

NEIGHBORHOOD ASSOCIATIONS

Who?

Homeowner

Purpose?

Share costs, improve planning

Challenges?

Communication and cooperation

Scope?

Local

New Legislation?

No

While informal collaborations between neighbors can be very effective, sometimes it is preferable to have clearer guidelines about responsibilities and expectations. Several models exist to clarify these questions. One tried-and-true model is the neighborhood association. These can be very informal or can involve elected officials and voluntary dues. Neighborhood associations are often confused with homeowners associations. Homeowners associations are even more structured than most neighborhood associations and include agreed-upon rules and regulations focused more on building and safety issues. Both types of association are models that could be considered when a group of citizens works together to address coastal erosion issues.

BENEFITS	CHALLENGES
Can spread out costs of projects	Requires clear communication and cooperation
Can lead to larger-scale, better-coordinated projects	Can limit development options of property owners
Improves long-range planning	
Can ease cooperation and communication with local government	
Provides avenue for preventing undesirable practices	

Resources

The city of Madison provides a description of the pros and cons of neighborhood associations and how to go about forming them.

cityofmadison.com/dpced/planning/neighborhood-associations/1606/

The city of Madison maintains a list of neighborhood associations found throughout Madison, Wis. These follow a variety of structures from formal to informal.

cityofmadison.com/dpced/planning/neighborhood-association-contacts/1608/

Environmental groups like the Alliance for the Great Lakes are a common form of non-binding collaboration. Their website discusses projects they are involved with around the Great Lakes, including areas in Wisconsin.

greatlakes.org/

The Great Lakes Information Network pulls together links to various organizations and resources concerned with a wide range of environmental issues in the Great Lakes Region. Their “watersheds” section provides links to a large range of non-governmental citizens groups that are excellent examples of people coming together to address environmental challenges.

great-lakes.net/links/envt/orgs_water.html#sheds



Related Options

Visioning and Facilitated Collaboration

Dynamic Concept Mapping / VCAPS

Cost-Sharing Framework

Incentives

Creation of an Aid Fund for Coastal Properties

Revolving Loan Fund

Neighborhood associations images:

Neighborhood associations can often be helpful when coordinating with government agencies. Here the Breezy Point, N.Y., (top left) homeowners association talks with an official from the USACE about recovery plans following Hurricane Sandy.

There are different models for neighborhood associations, ranging from informal groups to improvement districts to homeowners associations. All provide a framework for residents to come together to create a plan for addressing local concerns.

PUBLIC-PRIVATE PARTNERSHIPS

Who?

Homeowner/businesses/
municipal government

Purpose?

Share costs, improve
planning

Challenges?

Communication and
cooperation

Scope?

Local

New Legislation?

Maybe

This form of collaboration differs from previous options in that it doesn't directly involve homeowners. A public-private partnership (PPP) is a cooperative arrangement between public agencies and private businesses. The exact nature of these arrangements varies widely, but they generally bring together the skills and assets of the public and private sectors to deliver a service or facility for the use of the general public. In this context, a PPP could be used to help with hazard mitigation or recovery, build resilience to coastal hazards or implement low-impact development and green infrastructure.

BENEFITS	CHALLENGES
Can reduce costs of projects	Choosing best PPP model is challenging
Can improve quality of design and construction of new structures	Often requires some public funds collected in the form of fees or taxes
	Requires clear guidance from legislature about the roles and responsibilities of each entity

Resources

The Federal Emergency Management Agency (FEMA) discusses the benefits of PPPs for emergency management in the article "Building Better Resiliency-Together." Not only is this a great discussion of how PPPs can be used for resiliency, but the article also provides a great introduction to the formation of PPPs and the different models that can be used.

www.fema.gov/public-private-partnerships

The Environmental Protection Agency discusses PPPs at the community scale as an approach for more effective stormwater management in the following article. This is a useful change of perspective to consider when thinking about PPPs, which are more commonly used at a state or national level.

epa.gov/waterfinancecenter/community-based-public-private-partnerships

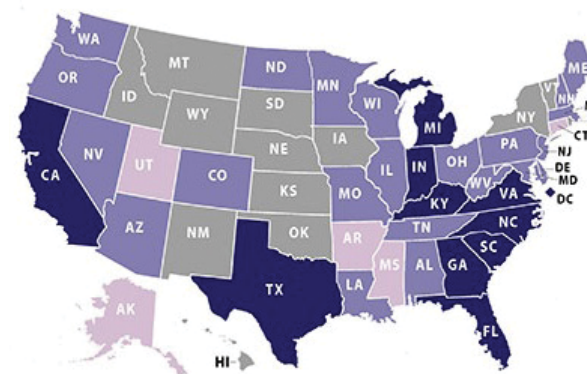
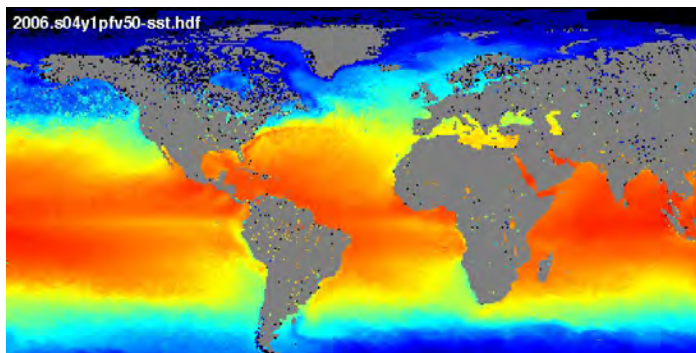
In 2007, the European Union launched the Concepts and Science for Coastal Erosion Management (CONSCIENCE) to enhance the implementation of scientific coastal erosion management. This report not only gives a good overview of coastal erosion issues but specifically calls out PPPs in a case study from Britain.

conscience-eu.net/documents/concise-report-final.pdf



Related Options

- Visioning and Facilitated Collaboration**
- Dynamic Concept Mapping / VCAPS**
- Neighborhood Associations**
- Cost-Sharing Framework**
- Incentives**
- Creation of an Aid Fund for Coastal Properties**
- Revolving Loan Fund**
- Great Lakes Regional Agreements**
- Develop Coastal Capital Improvement Plans**
- Develop Growth Management Plans**
- Addition of Coastal Erosion Components to Hazard Mitigation Plans**



- P3s are not authorized
- P3s are authorized in one primary sector
- P3s are limited or project specific
- P3s are authorized in one primary sector

Public-private partnerships images: In the face of increasingly frequent and powerful natural hazards, FEMA has begun to actively foster a number of public-private partnerships to leverage capability for emergency management (top).

PPPs don't always have to occur in a tangible sector such as transportation or emergency management. The National Oceanic and Atmospheric Administration is working with several companies, including Amazon, to make their digital data freely accessible to the public to help innovation and development (bottom left).

This map (bottom right) shows the status of enabling legislation for PPPs by state as of January 2017. Wisconsin currently has enabling legislation for PPPs, but it is defined only for the transportation sector.

FACILITATED ASSESSMENTS FOR PLANNING

Who?

Homeowner/businesses/
municipal government

Purpose?

Support planning

Challenges?

Communication and
cooperation

Scope?

Local

New Legislation?

No

All of the collaboration options require some form of property or community assessment. This assessment might rate and prioritize the various hazards in an area; it could provide an up-to-date estimation of property values, or it could combine several factors. These assessments help clarify the needs of an area and inform both citizen collaborations and municipal planning efforts. Bringing in an external professional to facilitate this assessment ensures that it is being carried out properly and brings confidence and clarity to the process.

BENEFITS	CHALLENGES
Clarifies priorities	Requires external professionals
Identifies strategies	Requires approval by local government
Supports informed, large-scale planning	Requires agreement from private property owners

Resources

The New Jersey Coastal Management program has an excellent step-by-step guide for communities to use available resources and data to put together their own community vulnerability index to see how well they are currently prepared for coastal hazards and to identify areas that need improvement. A document like this could be adapted for Wisconsin.

state.nj.us/dep/cmp/docs/ccvamp-final.pdf

Minnesota Sea Grant has a short article that helps property owners and individuals assess their readiness for hazards associated with climate change.

seagrant.umn.edu/newsletter/2013/01/getting_real_about_climate_change.html

This Minnesota Sea Grant publication uses self-assessment checklists and indexes to assist communities in identifying areas of strengths and areas of strength and weaknesses in hazard preparedness.

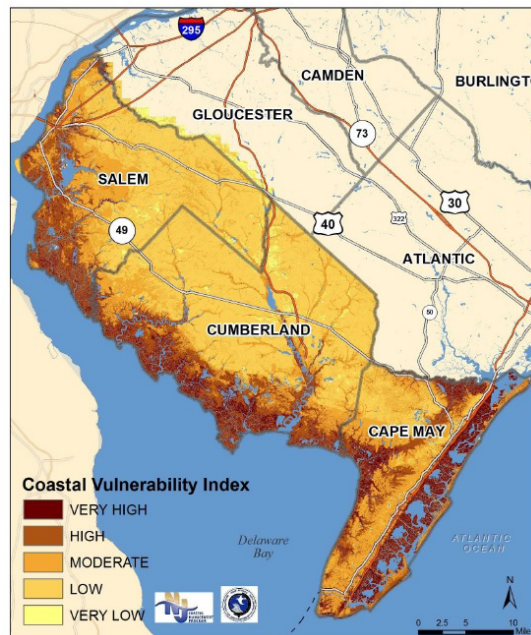
greatlakesresilience.org/sites/default/files/library_reference_2012_SeaGrant_SelfAssessmentToAddressClimateChangeReadinessInYourCommunity.pdf

Maine Sea Grant recently helped several fishing communities in Maine perform assessments of their vulnerability to natural hazards. This story provides a great illustration of how a facilitated assessment helped with planning.

seagrant.umaine.edu/research/projects/fishing-community-resilience

BUILT ENVIRONMENT AND INFRASTRUCTURE	YES	NO
Does critical infrastructure (i.e., storm sewer, culverts) exist that is susceptible to extreme storm events?		
Is there significant shoreline infrastructure (residences, water and wastewater treatment, tourism, transportation, industry) within the Special Flood Hazard Areas (100-year flood on NFIP maps)?		
Will it take more than 3 days to clear roads and bridges blocked by storm debris after a 100-year storm event or greater?		
Will it take more than 3 days for road washouts to be passable after a 100-year storm event or greater?		
Will ports and marinas be affected by an extreme weather event (high winds, water levels fluctuations)?		
Are there shoreline structures in your region (such as levees, piers, or breakwaters) susceptible to extreme storm events, large waves, or water level fluctuations ¹ ?		
Is there land subsidence today in the shoreline areas of your community that threaten the built environment?		
Is it difficult for public transportation routes to reach residents unable to evacuate on their own if evacuation is required for health and safety purposes?		
TOTAL		

¹ For water level fluctuations, consider the highest and/or lowest water level on record as a benchmark for an extreme water level.



Related Options

- Public Officials Workshop Series**
- Homeowner Workshop Series**
- Tours of Coastal Adaptation**
- Visioning and Facilitated Collaboration**
- Dynamic Concept Mapping / VCAPS**
- Addition of Coastal Erosion Components to Hazard Mitigation Plans**

Facilitated assessments for planning images:

Facilitation can be aided by assessment checklists or indexes, like this one (top) from the Minnesota Sea Grant publication “A Self-Assessment to Address Climate Change Readiness in Your Community.” This approach helps communities identify areas of strengths and areas of need to help guide their planning.

One of the best ways to facilitate an assessment of planning needs is to give community members the tools to do the assessment themselves. The New Jersey Office of Coastal Management has developed a method for turning readily available data into powerful visualizations of coastal vulnerability to help communities figure out exactly where their weak points are (left).

Facilitation can come in the form of a service. Maine Sea Grant went out to four fishing communities and assessed the resiliency of local economies in the face of changing regulations (right). They packaged their findings into a report with recommendations that the fishing communities could discuss and consider as they planned for the future.

THEME 2: FUNDING

- **COST-SHARING FRAMEWORK**
- **INCENTIVES**
- **CREATION OF AN AID FUND FOR COASTAL PROPERTIES**
- **REVOLVING LOAN FUND**
- **ADDITION OF COASTAL EROSION COMPONENTS TO HAZARD MITIGATION PLANS**
- **GREAT LAKES REGIONAL AGREEMENTS**

COST-SHARING FRAMEWORK

Who?

Homeowner/municipal government

Purpose?

Share costs, improve planning

Challenges?

Communication and cooperation

Scope?

Local

New Legislation?

No

One benefit of collaboration options is that citizens can pool resources to implement larger-scale, higher-quality measures to address coastal erosion. In these cases it is very useful to develop an agreed-upon framework for how the costs are going to be shared. Indeed, a cost-sharing plan is an integral part of both business improvement and neighborhood improvement districts, and it even shows up in informal neighborhood associations.

BENEFITS	CHALLENGES
Spreads out cost of projects	Requires clear communication and cooperation
Can lead to larger-scale, better-coordinated projects	Requires recognition/approval from local government
Improves long-range planning	
Can ease cooperation and communication with local government	
Provides framework for roles and responsibilities	

Resources

“The Neighborhood Improvement District Handbook,” a guide to establishing a neighborhood improvement district, including approaches to sharing costs, is published by the city of Milwaukee.

city.milwaukee.gov/ImageLibrary/Groups/cityDCD/projects/NID/pdf/NIDHandbookrfm.pdf

“A Guide to Smart Growth and Cultural Resource Planning” is a publication prepared by the Wisconsin Historical Society. Chapter seven discusses business improvement districts as a method for funding projects.

www.1kfriends.org/wp-content/uploads/2009/11/A-Guide-to-Smart-Growth-and-Cultural-Resource-Planning.pdf

The city of Madison, Wis., maintains a list of neighborhood associations found throughout the city. These follow a variety of structures and cost-sharing plans and can give prospective association members plenty of ideas to think about.

cityofmadison.com/dpced/planning/neighborhood-association-contacts/1608/



Related Options

Non-Binding Collaboration with Neighbors

Neighborhood Associations

Incentives

Creation of an Aid Fund for Coastal Properties

Revolving Loan Fund

Cost-sharing framework images: Green infrastructure projects such as this rain garden (top) are often implemented by business or neighborhood improvement districts.

Cathedral Park in Milwaukee, Wis., (left) has undergone several improvements after being included in a Milwaukee neighborhood improvement district.

The historic Sherman Park neighborhood of Milwaukee, Wis., (right) has been included in an improvement district as part of a commonly used strategy to preserve cultural and historic resources.



INCENTIVES

Who?

Municipal or state government

Purpose?

Share costs, improve planning

Challenges?

Consensus on practices to incentivize

Scope?

Coastal communities

New Legislation?

Yes

Municipal or state authorities can provide incentives in the form of tax credits, deductions or exemptions to encourage development and management best practices that result in more resilient or lower-impact coastal communities. Examples include tax incentives for capturing or rerouting storm runoff away from a bluff or establishing and maintaining native vegetation on the face of a bluff.

BENEFITS	CHALLENGES
Promotes more resilient coastal communities	Requires legislative approval and administration
Lowers costs for particular practices	Requires understanding of and consensus on desirable practices
Improves long-range planning	Incentives may reduce tax revenue collected

Resources

“The Great Lakes Coastal Resilience Planning Guide” provides an excellent case study of Ozaukee County, Wis., describing incentives county and local communities are using to minimize risky development along the Lake Michigan coastline, including policy tools such as transfer of development rights. greatlakesresilience.org/

The Water Environment Federation provides an overview of common types of incentive programs used to encourage the use of green infrastructure methods for managing stormwater. stormwater.wef.org/2013/01/five-types-of-green-infrastructure-incentive-programs/

The U.S. Environmental Protection Agency also provides a list of common incentive strategies communities can use to encourage green infrastructure and low-impact development. epa.gov/sites/production/files/2015-09/documents/bbfs7encouraging.pdf

The Urban Land Institute, an international consortium of planning professionals, provides a document that sets guidelines for sound coastal development. One of the 10 principles they discuss is the use of market-based incentives to encourage appropriate development. uli.org/wp-content/uploads/ULI-Documents/Ten-Principles-for-Coastal-Development.pdf

Related Options

Non-Binding Collaboration with Neighbors

Neighborhood Associations

Cost-Sharing Framework

Public-Private Partnerships

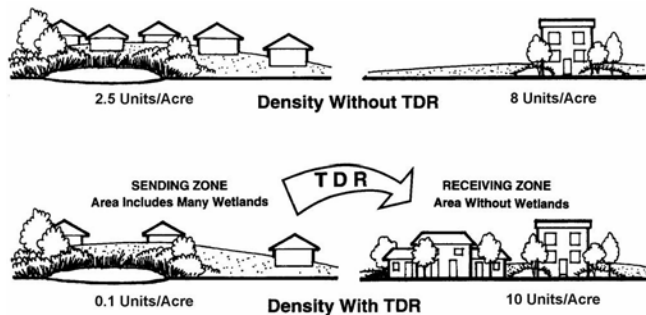
Creation of an Aid Fund for Coastal Properties

Revolving Loan Fund

Purchase of At-Risk Properties

Purchase or Transfer of Development Rights

Facilitated Assessments for Planning



Incentives images: How might we use incentives in Wisconsin? One way could be to incentivize the “greening” of hard shore protection by adding vegetation behind a revetment or sea wall (top). The incentive could be a subsidy for the cost of installation or a discount on the permitting fee.

Incentives come in many forms, including complex planning tools such as the transfer of development rights approach (bottom left), which allows a developer to purchase the development rights in one area and then use those to build developments that are taller or denser than current zoning would normally permit.

Incentives have been used with great success in the area of green infrastructure and stormwater management. The city of Portland, Ore., has an incentive program that subsidizes the expense of putting in roof gardens that mitigate heat and stormwater runoff (bottom right). In many communities, stormwater utilities will offer a rebate if homeowners trap runoff in rain barrels or simply direct their downspouts away from impervious surfaces.

CREATION OF AN AID FUND FOR COASTAL PROPERTIES

Who?

Municipal or state government

Purpose?

Lower costs

Challenges?

Establishing fund may result in additional taxes/fees

Scope?

Coastal communities

New Legislation?

Yes

While some property owners have the resources to relocate their home or make alterations to a bluff or shore on their property, many do not. This option considers the creation of a pool of emergency funds that could be accessed by homeowners or communities for high-risk properties. These funds could come from a number of sources such as fees added to permits, additional taxes or leftover emergency funds.

BENEFITS	CHALLENGES
Provides funds for property owners in need	Requires legislative approval and administration
	May involve additional taxes and fees to develop funds
	Requires clear criteria for receiving funds
	Could be perceived as benefit for the few at the cost of the many

Resources

For survivors of a federally declared disaster, the Federal Emergency Management Agency (FEMA) has a website for assistance applications.

[fema.gov/individual-disaster-assistance](https://www.fema.gov/individual-disaster-assistance)

Similarly, Wisconsin Emergency Management provides information about the Wisconsin Disaster Fund.

[emergencymanagement.wi.gov/recovery/disaster-fund-WDF.asp](https://www.emergencymanagement.wi.gov/recovery/disaster-fund-WDF.asp)

The “public assistance” page on the Wisconsin Emergency Management website discusses different types of assistance that communities can get to not only recover from disasters but also mitigate vulnerability to future disasters.

[emergencymanagement.wi.gov/recovery/public-assistance.asp](https://www.emergencymanagement.wi.gov/recovery/public-assistance.asp)

Wisconsin Emergency Management also has a site for individual assistance.

[emergencymanagement.wi.gov/recovery/public-assistance.asp](https://www.emergencymanagement.wi.gov/recovery/public-assistance.asp)



Related Options

Cost-Sharing Framework

Incentives

Revolving Loan Fund

Great Lakes Regional Agreements

Creation of an aid fund for coastal properties

images: Aid can involve longer-term projects such as the restoration of homes damaged by natural disasters (top and bottom left).

Aid can involve immediate assistance during a disaster (top right).

New York State recently authorized the Lake Ontario-St. Lawrence Seaway Flood Relief and Recovery Grant Program Homeowner Recovery Fund to provide money to help property owners with Lake Ontario flood and erosion damage (bottom right).

REVOLVING LOAN FUND

Who?

Municipal or state government

Purpose?

Lower costs

Challenges?

Clear rules for loan application and repayment

Scope?

Coastal communities

New Legislation?

Yes

A pool of capital can be established for use to partially fund property owner activities and/or provide community development block grants to address low- to moderate-income properties or properties where there is significant risk to health and safety. These funds could be designated for particular best practices by a community (e.g., buying out high-risk properties, draining groundwater on bluffs, rerouting runoff away from bluffs to storm sewers, etc.). The important difference between this option and the aid fund option is that any funds given out would be in the form of loans to be repaid over time.

BENEFITS	CHALLENGES
Provides funds for property owners in need	Requires legislative approval and administration
Eases perceived fairness of funds with repayment requirement	May involve additional taxes and fees to establish funds initially
Mitigates need for taxes and fees to maintain funds with repayment requirement	Requires clear criteria for receiving and repaying funds

Resources

The Council of Development Finance Agencies provides an overview of revolving loan funds, including a discussion of different ways they can be used and administered, how to start a revolving loan fund and several working examples.

cdfa.net/cdfa/cdfaweb.nsf/ordredirect.html?open&id=rlfactsheet.html

The city of Madison administers a capital revolving loan fund.

cityofmadison.com/dpced/economicdevelopment/madison-capital-revolving-fund/226

The Wisconsin State Energy Office administers a clean energy manufacturing revolving loan fund.

stateenergyoffice.wi.gov/section.asp?linkid=1846&locid=160

Related Options

Public-Private Partnerships

Cost-Sharing Framework

Neighborhood Associations

Incentives

Creation of an Aid Fund for Coastal Properties



Revolving loan fund images: Revolving loan funds can be used for a variety of purposes. These can range from maintenance of existing erosion control measures, such as a crumbling revetment (top), to large-scale projects such as a park (bottom left), to installation of new erosion control measures such as sand fences (right).



ADDITION OF COASTAL EROSION COMPONENTS TO HAZARD MITIGATION PLANS

Who?

Municipal government

Purpose?

Improve resiliency

Challenges?

Requires revision of hazard mitigation plans

Scope?

Local

New Legislation?

No

Hazard mitigation plans are developed by communities to ensure that they are prepared for natural disasters. This option was originally developed in the context of funding, as there are federal funds available to implement erosion mitigation measures, but it's also useful to discuss these issues in a hazard mitigation plan from the perspective of what communities are actually going to do when a hazard arises.

BENEFITS	CHALLENGES
Promotes awareness of erosion control as a component of long-term planning	Requires revision of hazard mitigation plan
May allow communities to access funding	

Resources

The Federal Emergency Management Agency (FEMA) has a Hazard Mitigation Grant Program that provides aid to communities that seek to improve their hazard mitigation plans following a disaster. www.fema.gov/hazard-mitigation-grant-program

The Wisconsin Emergency Management program has information about hazard mitigation, various assistance programs for communities that want to qualify for funding by adding specific components to their hazard mitigation plans and success stories from around the state.

emergencymanagement.wi.gov/mitigation/default.asp

"The Great Lakes Coastal Resilience Planning Guide" includes case studies and local stories discussing hazard mitigation efforts throughout the Great Lakes Region.

greatlakesresilience.org

The Bay-Lake Regional Planning Commission provides a guide for hazard mitigation planning for coastal communities.

baylakerpc.org/media/46893/coastal%20hazards%20planning%20guide_june%202007.pdf



Related Options

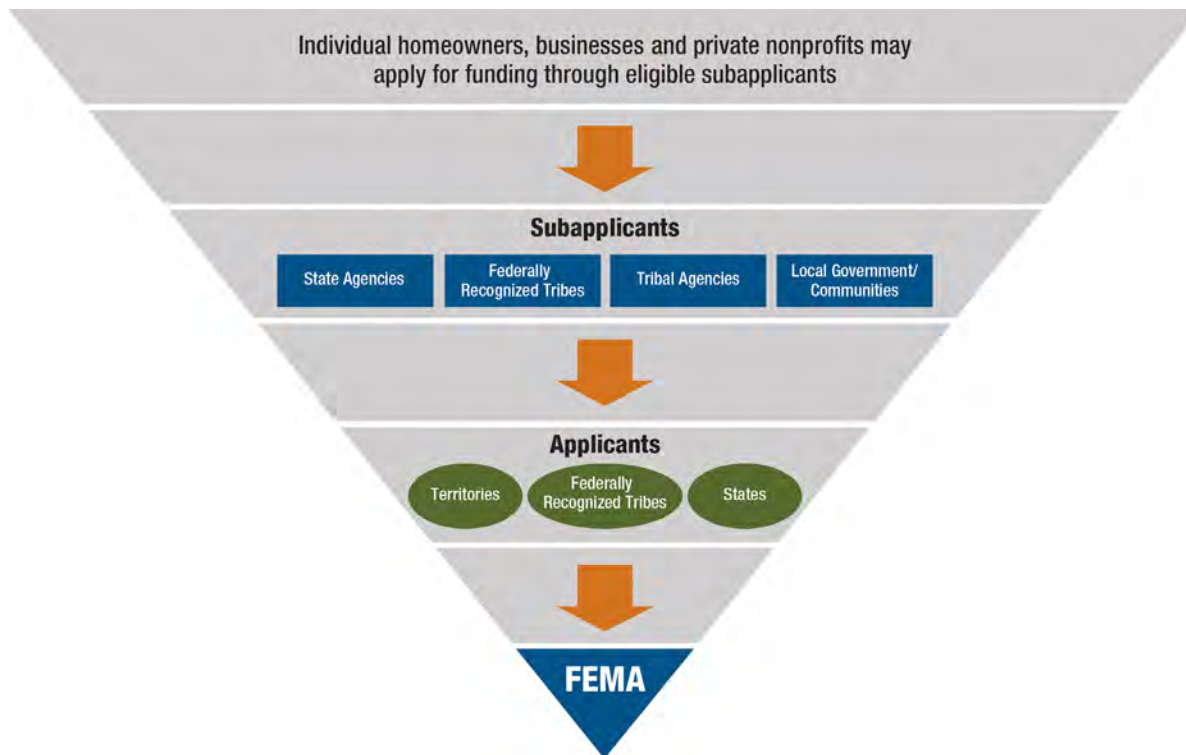
Develop Growth Management Plans

Develop Coastal Capital Improvement Plans

Addition of coastal erosion components to hazard mitigation plans images: Communities that face serious threats from coastal erosion (left) may be eligible for assistance if they have developed erosion control strategies and adding them to an updated hazard mitigation plan.

FEMA provided assistance to a Wisconsin community in Bark Bay (right) to repair a culvert that was constantly flooding the area.

This graphic from FEMA (bottom) gives an overview of the process by which communities can apply for hazard mitigation funding.



GREAT LAKES REGIONAL AGREEMENTS

Who?

State/federal government

Purpose?

Lower costs, improve planning

Challenges?

Requires brokering between multiple state and national governments

Scope?

Interstate to international

New Legislation?

Yes

The states and Canadian provinces that border the Great Lakes have entered into agreements regarding the sharing and management of these resources. This option considers building on that history and developing further agreements to develop a truly regional, coordinated approach to living on the shores of the Great Lakes. These agreements could involve funds for particular projects and even the ability to act as an intermediate authority between the international and state governments, combining the regulatory powers of the federal government with the local expertise of the state governments.

BENEFITS	CHALLENGES
Provides regional framework for coastal development	Requires agreement and approval from multiple governments, including state, federal and international
Provides avenue for addressing coastal erosion issues arising from practices occurring in other states or Canadian provinces	
Combines regional perspective with interstate/international authority	
Could serve as primary body for supporting coastal development and emergency aid around the Great Lakes	

Resources

The Great Lakes-St. Lawrence River Basin Water Resources Council, sometimes called the Compact Council, was established in 2008 when the Great Lakes-St. Lawrence River Basin Water Resources Compact became state and federal law. This council only contains the U.S. Great Lakes states and handles American legislation that affects the compact. Their website describes the legally binding interstate compact that exists between U.S. Great Lakes states and the Canadian provinces of Ontario and Quebec. This compact details how states manage and use the Great Lakes Basin's water supply.

glscompactcouncil.org/

A similar organization is the Great Lakes-St. Lawrence River Basin Water Resources Regional Body. This body not only includes the U.S. Great Lakes states but also the provinces of Ontario and Quebec, and it handles international agreements between the U.S. and Canada.

glsregionalbody.org/

The Great Lakes Alliance provides this overview of the Great Lakes Compact as well as describing a recent case involving Waukesha, Wis., that put the Great Lakes Compact to the test.

greatlakes.org/campaigns/protecting-great-lakes-water/

The Wisconsin Department of Natural Resources provides an overview of the Great Lakes Compact that goes into more detail on legislative activities in Wisconsin that went into implementing the compact.

dnr.wi.gov/topic/greatlakes/compact.html

Related Options

Public-Private Partnerships

Cost-Sharing Framework

Neighborhood Associations

Incentives

Creation of an Aid Fund for Coastal Properties

Revolving Loan Fund

Facilitated Assessments for Planning

Dynamic Concept Mapping / VCAPS

Visioning and Facilitated Collaboration

Great Lakes regional agreements images: Great Lakes regional agreements of one type or another have existed since the 1980s. In 2008, the Great Lakes Compact (left) became state and federal law and created a governing council made up of American states and Canadian provinces that had land falling within the Great Lakes Basin (left). This council has a range of limited powers, including the ability to make controversial decisions, such as allowing the city of Waukesha, Wis., part of which falls outside the Great Lakes Basin, to withdraw water from the Great Lakes. This option asks the question: “How could the Great Lakes Compact or similar agreement be used to benefit coastal property owners dealing with coastal hazards?”



THEME 3: PERMITTING GUIDELINES

- NEW COASTAL HOMEOWNER TUTORIAL
- FEE TO FUND SITE MONITORING IN PERMITS
- REVISION OF PERMITTING PROCESS FOR OFFSHORE STRUCTURES
- RISK ASSESSMENT AND DISCLOSURE REQUIREMENT FOR PROPERTY SALES
- EROSION CONTROL PERMIT REQUIREMENTS THAT MITIGATE DOWN-DRIFT ISSUES
- REQUIRE PROOF THAT RETREAT IS NOT AN OPTION BEFORE PERMITTING SHORE STRUCTURES
- PROHIBIT SHORE STRUCTURES

NEW COASTAL HOMEOWNER TUTORIAL

Who?

Municipal or state government

Purpose?

Improve development practices

Challenges?

Requires development of tutorial resources

Scope?

Coastal communities

New Legislation?

Yes

Many coastal erosion issues can be made worse by using inappropriate solutions, methods or materials. Often these mistakes arise from a lack of understanding of the principles behind bluff and shore erosion and the suitability of various nature-based or structural response options. One solution to this problem might be to require citizens purchasing a home on the coast to complete a tutorial, giving them the tools they need to make informed and responsible decisions. This could be a requirement set in place by law, or governments could take a softer approach and offer a one-time tax credit to homeowners who complete the tutorial.

BENEFITS	CHALLENGES
Raises understanding of coastal erosion issues among homeowners	Requires legislative approval and administration
Promotes improved homeowner practices	Requires development of appropriate resources

Resources

Maine Sea Grant has a tutorial that guides homeowners through their property, pointing out hazards to look for and offering suitable options for addressing them.

seagrants.umaine.edu/coastal-hazards-guide

The idea of requiring homeowners to complete a tutorial may seem unusual, but it is an approach that has been in place for a long time. Several types of loans include a homebuyer tutorial program as a condition of qualifying for the loan. An example is the Freddie Mac CreditSmart Steps to Homeownership Tutorial, which is a necessary step in qualifying for one of their mortgage programs.

freddiemac.com/creditsmart/tutorial.html

Related Options

Addition of Coastal Erosion Components to Hazard Mitigation Plans

Risk Assessment and Disclosure Requirement for Property Sales



New coastal homeowner tutorial images:

Tutorials about financing a home and managing a mortgage are already required for some lending programs. This option proposes that first-time property owners purchasing a home on the shore or bluff be required to take a tutorial about bluff stability, erosion and appropriate methods and materials for stabilization and erosion control. Tutorials could instruct new homeowners on warning signs, such as water seeping from the face of the bluff (top left) or a small slump on the bluff that suggests stability problems (top right). Tutorials could also include discussions of various response options, including environmentally friendly options such as living shorelines (bottom).

FEE TO FUND SITE MONITORING IN PERMITS

Who?

Municipal or state government

Purpose?

Support site monitoring

Challenges?

Increased cost in permitting

Scope?

Statewide

New Legislation?

Yes

Many erosion-control structures such as revetments, sea walls or groins can fail for reasons ranging from poor practices to bad luck. Failure to catch problems before they become severe can result in costly maintenance. An extra fee added to site permits for shore structures could be used to fund a monitoring specialist who would examine and assess new structures for a specified time period to catch any problems before they turn into full-blown failures.

BENEFITS	CHALLENGES
Provides funds for monitoring impacts of new and existing coastal structures	Requires legislative approval and administration
Develops informational resources to support improved planning and development	Will raise costs of permitting

Resources

The Wisconsin Department of Natural Resources provides information on the permitting guidelines for Great Lakes coastal structures. They recommend that property owners invest in professionals with the capability to perform site monitoring after installation. In Wisconsin, as in many states, it is the responsibility of the property owners to monitor and maintain shore structures. This option considers funding appointed monitoring officials by developing a fund derived from permit fees.

dnr.wi.gov/topic/waterways/shoreline/greatLakesErosionControl.html

Related Options

New Coastal Homeowner Tutorial

Erosion Control Permit Requirements That Mitigate Down-Drift Issues

Revision of Permitting Process for Offshore Structures

Require Proof that Retreat Is Not an Option Before Permitting Shore Structures

Prohibit Shore Structures



Fee to fund site monitoring in permits images:

This option proposes developing funds to provide for monitoring the conditions of structures and natural features along the Wisconsin coastline. Periodic monitoring is important for maintenance, allowing communities to identify sea walls with significant erosion (left) or revetments that have collapsed (bottom left). It is also important for early detection of potential bluff collapses, where cracks and slumping can be indicators of an imminent threat (bottom right).



REVISION OF PERMITTING PROCESS FOR OFFSHORE STRUCTURES

Who?

State government

Purpose?

Allow specific practices

Challenges?

Potential risk to aquatic environments, increased navigation hazards

Scope?

Statewide

New Legislation?

Yes

The Wisconsin shore of Lake Michigan is subject to such strong waves that the use of living shoreline approaches to control erosion is simply not effective in many areas. One option is to use offshore breakwaters to lower wave energy to the point where living shoreline approaches would be effective. However, permitting for offshore structures is complicated by the state's responsibility to safeguard the public trust and minimize navigation hazards on the Great Lakes. This option considers a revision of those rules to set up criteria that might allow breakwater structures in high-risk areas provided they are backed by living shoreline approaches.

BENEFITS	CHALLENGES
Supports use of living shoreline practices rather than shore armoring	Requires legislative approval and administration
	May increase risk to navigation and cause harm to aquatic environment

Resources

The lake shore erosion decision matrix on the Wisconsin Department of Natural Resources (WDNR) website guides citizens through appropriate permits. Readers will note that permanent offshore breakwater structures are prohibited in most waterways.

dnr.wi.gov/topic/waterways/shoreline/lakeErosion-text.html

There are some exemptions to the prohibition against offshore breakwater outlined in NR 328 subchapter II.

docs.legis.wisconsin.gov/code/admin_code/nr/300/328/II

While revising the permitting process for offshore structures to allow for structures in the Great Lakes under certain conditions may seem like an attractive option, changing the way that the WDNR handles regulation can be a delicate matter. This article from "Wisconsin Lawyer" discusses changes to WDNR guidelines that occurred in the 2011-2012 legislative year and points out some of the potentially negative impacts to easing restrictions.

wisbar.org/newspublications/wisconsinlawyer/pages/article.aspx?Volume=85&Issue=8&ArticleID=8667



Related Options

- New Coastal Homeowner Tutorial**
- Fee to Fund Site Monitoring in Permits**
- Erosion Control Permit Requirements That Mitigate Down-Drift Issues**
- Require Proof that Retreat Is Not an Option Before Permitting Shore Structures**
- Prohibit Shore Structures**

Revised offshore permits images: Currently, only certain types of structures are permitted in Wisconsin. Offshore breakwaters (top) are not permitted except for a few exceptions. The structures that are allowed have to be on the shoreline at the ordinary high water mark, as with a revetment or sea wall (bottom left). This option considers a revision of those rules that might allow for offshore breakwaters in certain areas used in combination with living shoreline approaches (bottom right).

RISK ASSESSMENT AND DISCLOSURE REQUIREMENT FOR PROPERTY SALES

Who?

Municipal or state government

Purpose?

Raise awareness of hazards

Challenges?

Requires standardized system for assessing risk

Scope?

Coastal communities

New Legislation?

Yes

Some homeowners have found themselves in the frustrating position of only discovering problems with a home after purchase. Coastal property owners may discover erosion issues affect their homes much like non-coastal property owners discover undisclosed problems like foundation or drainage issues. This situation can arise from simple ignorance of risk factors rather than any intent to hide flaws. This option would be a change for existing Wisconsin real estate disclosure, requiring that a risk assessment be performed on a property at the point of sale so that homeowners can be made aware of any issues and how they could be addressed.

BENEFITS	CHALLENGES
Raises understanding of coastal hazards among property owners/developers	Requires legislative approval and enforcement
Avoids preventable emergencies arising from uninformed development	Requires impartial, standardized assessment of risk

Resources

The Pew Charitable Trusts, an independent non-profit organization, published this recent article calling for a national requirement for disclosing flood history and risk when selling homes. Though the article is focused on homes located within areas covered by the National Flood Insurance Program, the issues discussed here could easily be extended to coastal erosion hazards.

pewtrusts.org/en/research-and-analysis/blogs/compass-points/2017/01/17/home-sellers-should-disclose-flood-history-and-risk-to-buyers

The state of California does have a required natural hazard disclosure statement for property sales, including flooding, fire and earthquakes. A document like this could also be easily adapted for Wisconsin to include erosion risks.

nolo.com/sites/default/files/CAHazards.pdf



Related Options

Public Officials Workshop Series

Bluff Stability and Shore Erosion Insurance

Facilitated Assessments for Planning

Risk assessment and disclosure requirement for property sales images: The key to implementing this kind of requirement is to have an agreed-upon standard for the measurement of “risk” with regards to bluff stability and erosion. This standard could be a simple designation of high-risk/low-risk based on past recession rates, as was done in Michigan when the state designated areas of the coastline as high-risk erosion areas (top left) based on measurements of erosion over the past 40 years, or it could be based on predictive models showing where the bluff edge could be in the future. The important point is that while a property may look like it’s safely set back from the bluff now, with 30 years of erosion it could be facing the same threat seen along some parts of the Lake Michigan shore right now (bottom).

EROSION CONTROL PERMIT REQUIREMENTS THAT MITIGATE DOWN-DRIFT ISSUES

Who?

State government

Purpose?

Maintain sediment budget in lakes

Challenges?

Increases permitting costs for most shore protection practices

Scope?

Statewide

New Legislation?

Yes

One reason state agencies have moved away from hard structural shore protection like revetments or groins is that they trap sediment and prevent it from moving throughout the nearshore lake system. This results in beaches down-drift of the structures being starved of sediment and disappearing over time. One possible way to deal with this problem is to add an additional fee to any structure that would trap or remove sediment, scaling that fee with the scale of the impact. Those extra funds could be used for beach nourishment or artificial beach projects. Another option would require structures like groins to be pre-filled or over-filled with sand in an effort to minimize their interruption to sediment transport.

BENEFITS	CHALLENGES
Mitigates impacts of development on sediment transport in the lakes	Requires legislative approval and enforcement
Provides funds that could be used for beach nourishment and other projects	Raises permitting costs for specific practices
	Determining appropriate fee could be difficult, and would vary with each situation

Resources

The Wisconsin Department of Natural Resources (WDNR) addresses erosion erosion control and storm-water management plans, focusing specifically on site-specific runoff.

dnr.wi.gov/topic/stormwater/construction/erosion_control.html

The WDNR provides guidance on current regulations for erosion control structures, focusing on using appropriate techniques and materials to minimize negative impacts on adjacent properties.

dnr.wi.gov/topic/waterways/shoreline/greatLakesErosionControl.html

Erosion of the shoreline is often discussed from a purely negative standpoint, as a threat to property. However, erosion and sediment transport are also important parts of the natural ecosystem.

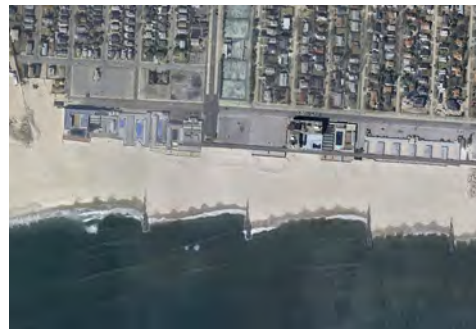
greatlakesresilience.org/climate-environment/climate-natural-processes

This University of Wisconsin Sea Grant Institute publication also discusses the importance of erosion and sediment transport, as well as information about how certain structures can affect these processes.

publications.aqua.wisc.edu/product/great-lakes-coastal-shore-protection-structures-and-their-effects-on-coastal-processes/

The Ohio Department of Natural Resources' Lake Erie shore erosion management plan is a large-scale strategy that examines the importance of sediment transport.

coastal.ohiodnr.gov/erosion



Related Options

**New Coastal Homeowner Tutorial
Fee to Fund Site Monitoring in Permits**

**Revision of Permitting Process for
Offshore Structures**

**Require Proof that Retreat Is Not
an Option Before Permitting Shore
Structures**

Prohibit Shore Structures

Erosion control permit requirements that mitigate down-drift issues images: Sediment has accumulated on one side of this sheet metal groin and eroded on the other (top). Sediment flows throughout the Great Lakes nearshore region in a process called littoral drift. One concern with shore structures is that they interfere with this important natural process.

The state of Washington has defined certain areas as protected feeder bluffs, such as this one in Dungeness Spit (bottom left). Armoring of these bluffs is prohibited because they contribute needed sediment to the littoral drift system.

A major concern with shore structures is their effects on nearby properties. It can be difficult to get permits for groins because they increase the rate of downdrift erosion, a process well illustrated by this image of a groin field in Long Island, N.Y. (bottom right).

REQUIRE PROOF THAT RETREAT IS NOT AN OPTION BEFORE PERMITTING SHORE STRUCTURES

Who?

State government

Purpose?

Decrease armoring/
alteration of coastline

Challenges?

Limits property rights

Scope

Statewide

New Legislation?

Yes

In the interest of preserving the natural processes of the coastline, such as sediment flow and circulation in the lake and coastal habitats, a more restrictive stance could be taken with regards to permitting. One approach used in other states would be to require property owners to demonstrate that moving a house away from the bluff top or shore is not a feasible option before approving a permit for an erosion control or bluff stabilization project.

BENEFITS	CHALLENGES
Promotes resilient coastal communities by pushing property owners to relocate buildings rather than rely on erosion control or bluff stabilization practices	Requires legislative approval and enforcement
Protects coastal ecosystem and lake sediment budget	Limits property owner options
Mitigates costly emergency scenarios by promoting development outside of high-risk zones	

Resources

The state of Alabama has a law very similar to the option proposed here. Code 335-8-2-.08(4) states that bulkheads and retaining walls on the beach will only be permitted if property owners demonstrate that non-structural approaches, including retreat, are not feasible.

adem.state.al.us/alEnviroRegLaws/files/Division8.pdf

This report from Connecticut summarizes regulations around coastal structures in the East Coast. Some states ban structures; some provide an order of preference for erosion control methods.

cga.ct.gov/2012/rpt/2012-R-0074.htm

This case study in the Great Lakes Coastal Resilience Planning Guide discusses the city of St. Joseph in Michigan, which passed a “no-build” shore ordinance, the first of its kind in the state of Michigan.

greatlakesresilience.org/case-studies/land-use-zoning/engaging-communities-promote-coastal-zoning

“Coastal Ordinance Provisions in Wisconsin Communities” is a publication by Alan Lulloff of the Association of State Floodplain Managers written in partnership with the Wisconsin Coastal Management Program. It is a thorough review of current coastal regulations in Wisconsin.

floods.org/ace-files/Projects/Coastal_Regs_WI_Communities_2016.pdf

Related Options

Erosion Control Permit Requirements That Mitigate Down-Drift Issues

Prohibit Shore Structures

Coordinated Ordinances Among Municipalities

Purchase of At-Risk Properties

Proof of retreat images: Some states have restrictions on shore structures. In Alabama, certain structures are only allowed if retreat from the shore is not a feasible option (left). In North Carolina, there is an outright ban on shore structures (top right). In Wisconsin, we are seeing areas where homes are threatened and cannot retreat (bottom right). These are cases where emergency shore protection could be considered.



PROHIBIT SHORE STRUCTURES

Who?

State government

Purpose?

Decrease armoring/
alteration of coastline

Challenges?

Limits property rights

Scope?

Statewide

New Legislation?

Yes

In the interest of preserving the natural processes of the coastline, such as sediment flow and circulation in the nearshore region of the lake and coastal habitats, a more restrictive stance could be taken with regards to permitting shore structures, something that has been done by other coastal states. The strictest version of this approach is to prohibit permitting any erosion control structures or bluff stabilization projects except in circumstances where there is a direct threat to human life.

BENEFITS	CHALLENGES
Promotes resilient coastal communities by forcing property owners to relocate buildings rather than rely on erosion control or bluff stabilization practices	Requires legislative approval and enforcement
Protects coastal ecosystem and lake sediment budget	Limits property owner options

Resources

This report from Connecticut summarizes regulations around coastal structures in the East Coast. Some states ban structures; some provide an order of preference for erosion-control methods.

cga.ct.gov/2012/rpt/2012-R-0074.htm

“Learn NC” was a program run for several years by the University of North Carolina. This posting discusses the tough legislation banning shore structures in North Carolina.

learnnc.org/lp/editions/nchist-recent/6374

This case study in the “Great Lakes Coastal Resilience Planning Guide” discusses the city of St. Joseph in Michigan, which passed a “no-build” shore ordinance, the first of its kind in the state of Michigan.

greatlakesresilience.org/case-studies/land-use-zoning/engaging-communities-promote-coastal-zoning



Related Options

Erosion Control Permit Requirements That Mitigate Down-Drift Issues

Require Proof That Retreat Is Not an Option Before Permitting Shore Structures

Coordinated Ordinances Among Municipalities

Purchase of At-Risk Properties

Prohibit shore structures images: Some states, like North Carolina, have enacted a total ban on hard structures on the shoreline to preserve beaches and dunes (top left).

The main concern in these states is sediment trapping by certain structures. Here (top right) a groin field has trapped sediment on the up-drift side while allowing erosion on the down-drift side.

Wisconsin allows hard shore protection structures, but other structures are banned. Offshore breakwaters such as these are not permitted except in certain areas. This particular structure was put into place before stronger restrictions on this type of structure were instituted (bottom).

THEME 4: ANALYSIS, PLANNING AND POLICIES

- COORDINATED ORDINANCES AMONG MUNICIPALITIES
- BLUFF VEGETATION ORDINANCES
- POLICY REVIEW AND RESPONSE MECHANISM
- DEVELOP GROWTH MANAGEMENT PLANS
- PURCHASE OF AT-RISK PROPERTIES
- PURCHASE OR TRANSFER OF DEVELOPMENT RIGHTS
- ADOPTING A LONG-LOT FORMAT FOR NEW SUBDIVISIONS
- DEVELOP COASTAL CAPITAL IMPROVEMENT PLANS
- BLUFF STABILITY AND SHORE EROSION INSURANCE

COORDINATED ORDINANCES AMONG MUNICIPALITIES

Who?

Municipal/state government

Purpose?

Promote consistent development practices

Challenges?

Building consensus on ordinances

Scope?

Coastal communities

New Legislation?

Yes

One issue that came up several times in our discussions with coastal residents was the lack of consistency with regards to rules and regulations along the coast. One example was a municipality that had regulations about removing vegetation along the bluff right next to a municipality that had no such regulations and allowed clear cutting of the bluffs. If the various communities along the coast worked together to coordinate shore and bluff development and management ordinances, it would not only alleviate the confusion and frustration we heard from coastal residents but also promote a coordinated regional response to living on the coast.

BENEFITS	CHALLENGES
Consistent ordinances mitigate impacts from poor practices of particular locations	Requires communication and consensus among multiple municipalities
Improved development and management practices would result in more resilient coastal communities	Could ease some existing regulations and tighten others
Coordination could build a framework for regional cooperation	

Resources

“Protecting Coastal Investments,” a Sea Grant publication by Professor Brian W. Ohm of the University of Wisconsin Urban and Regional Planning Department, discusses examples of regulations for Wisconsin’s Coastal Communities.

aqua.wisc.edu/publications/PDFs/ProtectingCoastalInvestments.pdf

The Southeast Wisconsin Regional Planning Commission provides a set of model ordinances for shoreland zoning to help communities improve their coastal management. Models such as these could form the backbone of a coordinated set of municipal ordinances.

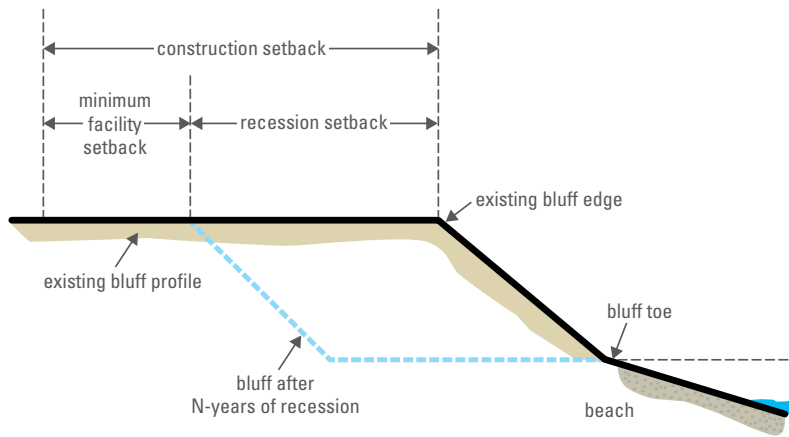
sewrpc.org/SEWRPC/communityassistance/ModelOrdinancesGuides.htm

This report from Connecticut summarizes regulations around coastal structures in East Coast states. Some states ban structures; some provide an order of preference for erosion control methods.

cga.ct.gov/2012/rpt/2012-R-0074.htm

“Coastal Ordinance Provisions in Wisconsin Communities” is a publication by Alan Lulloff of the Association of State Floodplain Managers written in partnership with the Wisconsin Coastal Management Program. This publication provides a thorough review of coastal regulations in Wisconsin.

floods.org/ace-files/Projects/Coastal_Regs_WI_Communities_2016.pdf



Related Options

Prohibit Shore Structures

Require Proof that Retreat Is Not an Option Before Permitting Shore Structures

Erosion Control Permit Requirements That Mitigate Down-Drift Issues

Coordinated ordinances images: Municipalities along the Wisconsin coast could work together to come up with a set of common ordinances that cover a range of topics. These could include a common technique for determining an appropriate setback distance for bluff construction (top left). They could also include prohibitions against the use of improper material for shore armoring (bottom) or provide guidelines on shoreland zoning, such as was done when St. Joseph, Mich., defined a no-build area on their shorelines.

BLUFF VEGETATION ORDINANCES

Who?

Municipal or state government

Purpose?

Improve development and management practices

Challenges?

Requires guidance on best practices

Scope?

Coastal communities

New Legislation?

Yes

The risk of bluff collapse can be significantly increased by removing the vegetation along the top and face of the bluff. Dense vegetative cover slows the rate of erosion during rainfall events and removes water within the bluff soil. Developing and implementing ordinances that promote best practices, such as maintaining a certain amount of land cover by native vegetation, could be a very cost-effective step towards stabilizing bluffs.

BENEFITS	CHALLENGES
Improves bluff stability through ordinances that promote healthy vegetative cover	Requires legislative approval and enforcement
Promotes less invasive, more cost-effective approaches to dealing with bluff stability and erosion issues	Requires guidelines to recommend appropriate plant choices
Improves quantity and quality of bluff habitat	

Resources

“Protecting Coastal Investments,” a Sea Grant publication by Professor Brian W. Ohm of the University of Wisconsin Urban and Regional Planning Department, discusses examples of regulations for Wisconsin’s Coastal Communities, including a discussion of vegetation ordinances.

aqua.wisc.edu/publications/PDFs/ProtectingCoastalInvestments.pdf

“Managing Coastal Hazard Risks on Wisconsin’s Dynamic Great Lakes Shoreline” is a publication by Alan Lulloff of the Association of State Floodplain Managers written in partnership with the Wisconsin Coastal Management Program. The final section of the report that focuses on adaptation strategies and offers several recommendations, including some related to using vegetation to stabilize bluffs.

floods.org/ace-files/Projects/ManagingCoastalHazardRisks_WI_2015.pdf

“Vegetative Best Management Practices: A Manual for Pennsylvania and Lake Erie Bluff Landowners” is a free publication made available by Pennsylvania Sea Grant that discusses the appropriate use of vegetation on bluffs. Along with a comprehensive discussion of the science behind vegetative stabilization and recommendations for specific species, chapter nine of this publication discusses regulations.

seagrant.psu.edu/sites/default/files/BluffBook2007FINALweb.pdf

“Coastal Ordinance Provisions in Wisconsin Communities” is a publication by Alan Lulloff of the Association of State Floodplain Managers written in partnership with the Wisconsin Coastal Management Program. This publication provides a thorough review of coastal regulations in Wisconsin.

floods.org/ace-files/Projects/Coastal_Regs_WI_Communities_2016.pdf



Related Options

Coordinated Ordinances Among Municipalities

Prohibit Shore Structures

Require Proof that Retreat Is Not an Option Before Permitting Shore Structures

Erosion Control Permit Requirements That Mitigate Down-Drift Issues

Bluff vegetation ordinances images: Ordinances relating to vegetation on bluffs could set guidelines for appropriate techniques during the early planting phase, such as putting in erosion breaks (top left) and ensuring that grasses are used instead of trees on steep slopes (top right) to avoid falling trees tearing out parts of the bluff face. Bluff vegetation ordinances could also be extended to provide regulations for the appropriate use of vegetation along the shoreline (bottom).

POLICY REVIEW AND RESPONSE MECHANISM

Who?

Municipal or state government

Purpose?

Develop more adaptive planning/management practices

Challenges?

Consensus on conditions that initiate policy review

Scope?

Coastal communities

New Legislation?

Yes

Resilient coastal communities are communities that can adapt to changing conditions. One way to support this would be to have a mechanism in place that allowed communities to review their rules and regulations in the light of changing conditions. Municipalities could decide on a set of criteria that would trigger a review of ordinances. Those criteria could be as simple as a review that happens every five to 10 years, or the criteria could include environmental conditions such as specified rise or fall in lake levels or a specified threshold of rainfall. When these criteria are met, the municipalities would have the opportunity to review their policies and make changes that would allow for more sensible development and management on the coast. Another version of this option is to have certain responses in place when criteria are met. For example, if the rate of beach erosion rises past a certain threshold, a community might decide to limit structures that prevent sediment from entering and moving throughout the Great Lakes nearshore regions, such as revetments and groins.

BENEFITS	CHALLENGES
Supports the ability to adapt management ordinances to changing conditions, which promotes more resilient communities	Requires legislative approval
Provides periodic opportunities to re-examine ineffective/unpopular policies and regulations	Requires consensus on criteria that result in a policy review

Resources

Policy review mechanisms are part of an approach to planning referred to as “adaptive management.” This approach is designed to allow communities and organizations to be flexible and respond to changes in policy needs. Several examples of policy review mechanisms in different contexts are given below. “Managing for the Unknowns: Adaptive Resource Management” is an article published by the Georgetown Public Policy Review. It provides a good introduction to the concept of adaptive management and the role of review and response mechanisms.

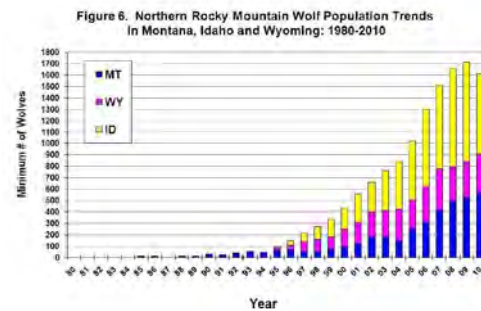
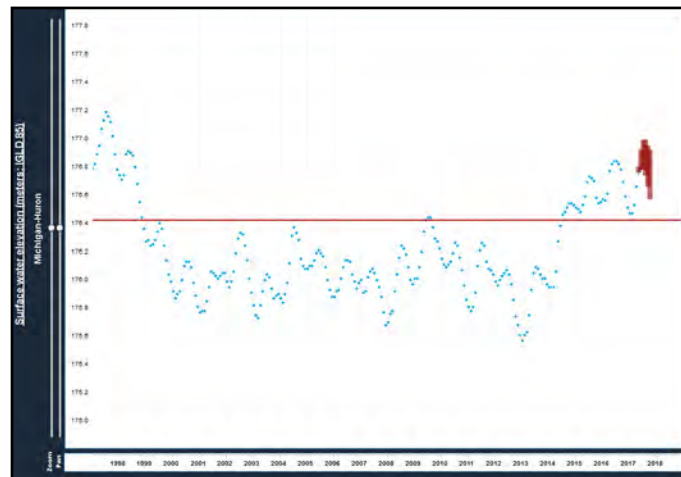
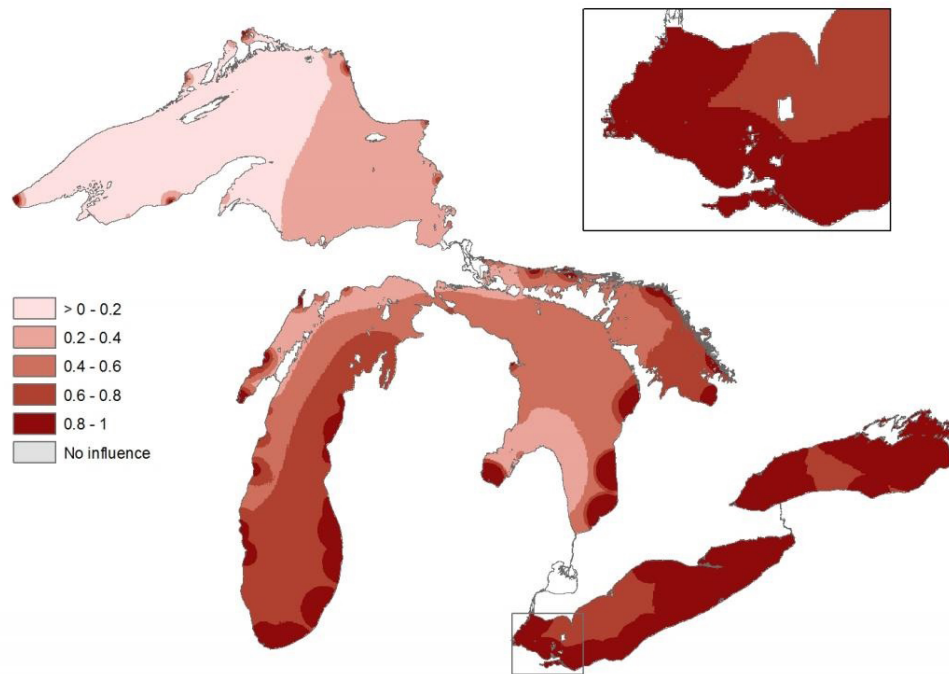
gppreview.com/2012/04/15/managing-for-the-unknowns-adaptive-resource-management/

“Decision Making Triggers in Adaptive Management” is a publication produced by the USDA Pacific Northwest Research Station that describes several examples of decision-making triggers used in management plans for federal lands and wildlife. In each case, the trigger described is not simply a predetermined period of time but rather a specific environmental condition.

fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5367512.pdf

“The Tipping Point Planner” is an adaptive management tool developed by the Illinois-Indiana Sea Grant Institute to help land use planners identify the impacts of certain practices on the health of a watershed.

tippingpointplanner.org/



Related Options

Visioning and Facilitated Collaboration
Dynamic Concept Mapping / VCAPS
Facilitated Assessments for Planning
Develop Growth Management Plans
Develop Coastal Capital Improvement Plans

Policy review mechanism images: The idea behind a policy review mechanism is to choose criteria that trigger an automatic review of management strategy. Tools like these exist throughout the field of natural resources management. Criteria can range from the concentration of phosphorous going into the Great Lakes (top), to to the number of breeding pairs of wolves in a given state (bottom right), to a particular rise or fall in lake levels (bottom left).

DEVELOP GROWTH MANAGEMENT PLANS

Who?

Municipal government

Purpose?

Develop long-term growth plan to promote resiliency

Challenges?

Building consensus on growth management plan

Scope?

Local

New Legislation?

No

A growth management plan is a policy strategy used by communities to make sure that a town grows in a way that minimizes poor practices in development, including urban sprawl, or to ensure that services will be sufficient to meet the demand of a larger population. Often called “smart growth,” these plans incorporate strategies such as impact fees, specialized zoning and urban growth boundaries. Communities along the coast might implement or revise their growth management plans in such a way as to minimize the need for costly bluff stabilization or erosion control measures.

BENEFITS	CHALLENGES
Improves long-term planning	Requires consensus on plan
Promotes future resiliency in growing communities through more carefully directed development	Can limit development and management options
Can mitigate impact of development on coastal ecosystems	

Resources

The Municipal Research and Services Center is a state of Washington non-profit organization that helps communities with planning. They provide a good introduction to the idea of growth management plans. mrsc.org/Home/Explore-Topics/Planning/General-Planning-and-Growth-Management/Comprehensive-Planning-Growth-Management.aspx

The Southeastern Wisconsin Regional Planning Commission helps communities in Southeastern Wisconsin with a wide range of planning issues, including comprehensive plans. sewrpc.org/SEWRPC.htm

Community planning can be supported and improved with the use of good tools. An example of such a tool is the Community Health and Resources Management (CHARM) Model. This tool allows planners to explore various development scenarios and their impacts on the environment. communitycharm.org/

“Minimizing Bluff Top Development Risk” is a case study from the “Great Lakes Coastal Resilience Planning Guide” that focuses on strategies for addressing high-risk bluff properties in Wisconsin. The case study discusses the science of bluff erosion and the tools used to estimate erosion rates for bluffs and then looks at how Ozaukee County has taken that information into account in its comprehensive planning strategy.

greatlakesresilience.org/case-studies/land-use-zoning/minimizing-bluff-top-development-risk



Related Options

Visioning and Facilitated Collaboration

Dynamic Concept Mapping / VCAPS

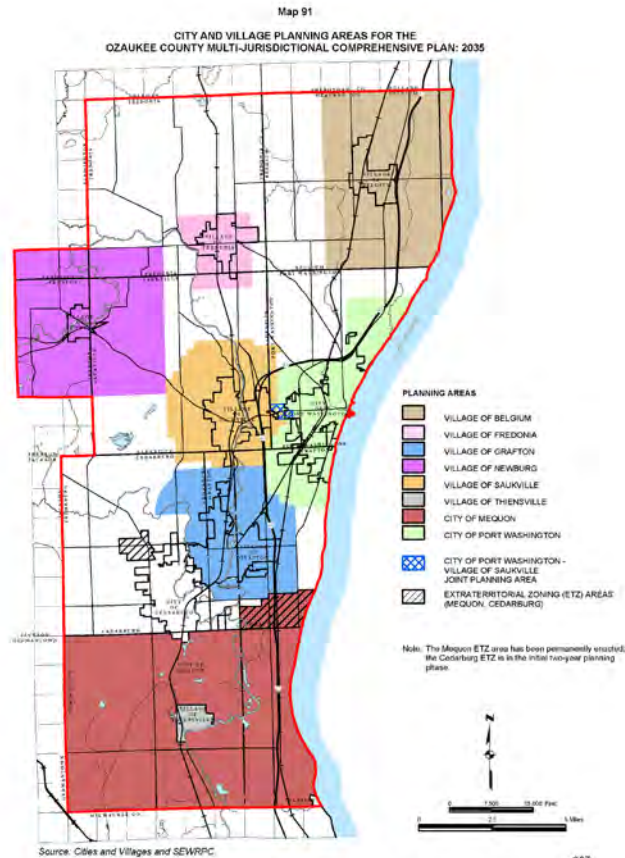
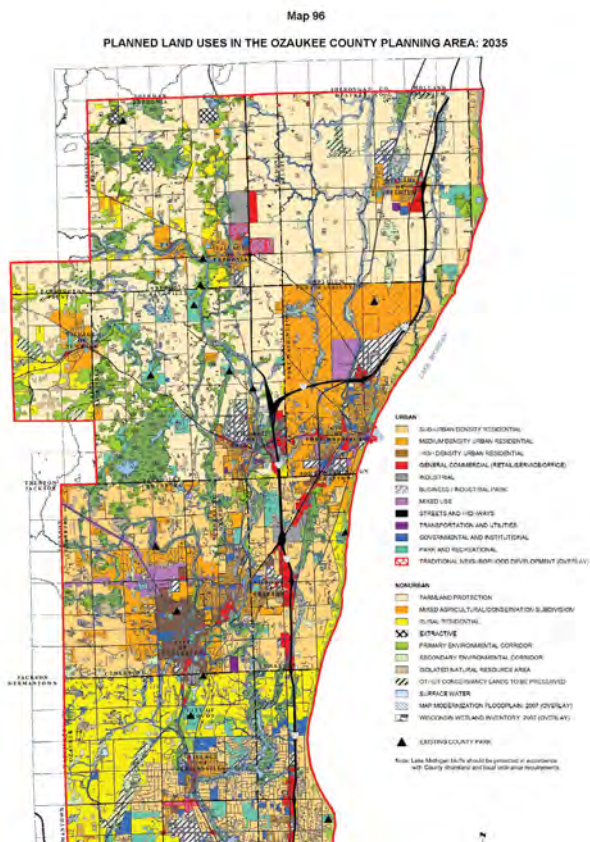
Cost-Sharing Framework

Facilitated Assessments for Planning

Develop Coastal Capital Improvement Plans

Develop growth management plans images:

Growth management plans, sometimes called comprehensive plans, help communities plan for future growth. They help regions locate and install green infrastructure (top left) define zoning (bottom left) and set an urban growth boundary (bottom right).



PURCHASE OF AT-RISK PROPERTIES

Who?

Municipal government

Purpose?

Restrain/remove development in high-risk areas

Challenges?

Requires risk assessment, funds for property purchase

Scope?

Local

New Legislation?

No

One technique used by communities that face significant flooding risk is to gradually buy out properties that are in the most high-risk areas of a flood plain. This helps move people out of high-risk areas and prevents further development, providing a buffer of open land in the event of a flood. A similar approach could be taken by coastal communities in Wisconsin. Coastal communities could identify properties that have a significant risk of bluff collapse or flooding during rising lake levels and buy out the homeowners in an effort to help them relocate to a safer area and avoid having to enact more expensive erosion control or bluff stabilization measures.

BENEFITS	CHALLENGES
Provides aid for homeowners in high-risk zones	Requires risk assessment
Promotes resiliency by gradually removing and restraining development in high-risk zones	Requires funds for property purchases
Protects coastal ecosystem and sediment budget of lake by focusing on retreat rather than shore armoring	
Can prevent costly emergency measures	

Resources

The Federal Emergency Management Agency (FEMA) discusses property acquisition as a strategy for towns suffering from frequent flooding. A similar approach could be used for properties on rapidly eroding bluffs and shorelines.

www.fema.gov/news-release/2014/05/28/communities-plagued-repeated-flooding-property-acquisition-may-be-answer

“Minimizing Bluff Top Development Risk” is a case study from the Great Lakes Coastal Resilience Planning Guide that specifically focuses on strategies for addressing high-risk bluff properties in Wisconsin. The case study discusses the science of bluff erosion and the tools used to estimate erosion rates for bluffs and then looks at how Ozaukee County has taken that information into account in its comprehensive planning strategy. Many planning tools are discussed, including buyouts.

greatlakesresilience.org/case-studies/land-use-zoning/minimizing-bluff-top-development-risk



Related Options

**Purchase or Transfer of
Development Rights**

Dynamic Concept Mapping / VCAPS

Facilitated Assessments for Planning

Develop Growth Management Plans

Purchase of at-risk properties images: Property acquisition is commonly used to move people out of high-risk flood zones by buying out properties that experience repeated flooding. In Wisconsin, maps of erosion rates could be developed to show the locations of properties that would be at risk from bluff erosion within a given time frame. Properties that appear to be at near-term risk could be candidates for purchase by a federal, state or local agency.

PURCHASE OR TRANSFER OF DEVELOPMENT RIGHTS

Who?

Municipal government

Purpose?

Restrain/remove development in high-risk areas

Challenges?

Requires risk assessment, funds for property purchase

Scope?

Local

New Legislation?

No

Transfer of development rights (TDR) or easements are tools used in urban planning for various situations, such as protecting farmland or conserving ecologically important areas. Property owners sell development rights on their land to a buyer who can use those rights for denser development of another location. The property owner still owns the actual land and can use it, but an easement is placed on the property to prevent further development. Communities along the coast could use this approach to start building a buffer zone of protected land along the bluffs and shorelines so that natural erosion processes could proceed uninhibited and communities could avoid costly erosion control or bluff stabilization projects.

BENEFITS	CHALLENGES
Provides aid for homeowners in high-risk zones	Requires risk assessment
Promotes resiliency by gradually removing and restraining development in high-risk zones	Requires funds for property purchases
Protects coastal ecosystem and sediment budget of lake by focusing on retreat rather than shore armoring	
Can prevent costly emergency measures	

Resources

The city of Mequon in Ozaukee County, Wis., has used a TDR strategy to great effect in preserving open space throughout the city. This article discusses how Mequon's TDR program has succeeded.

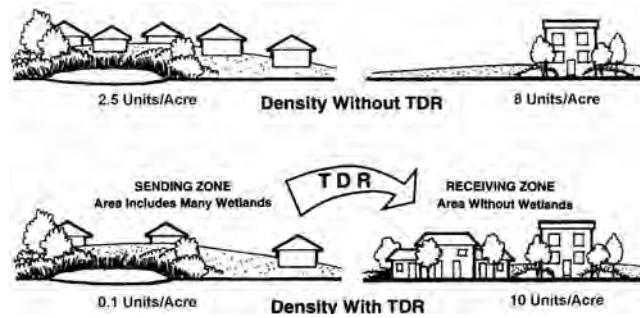
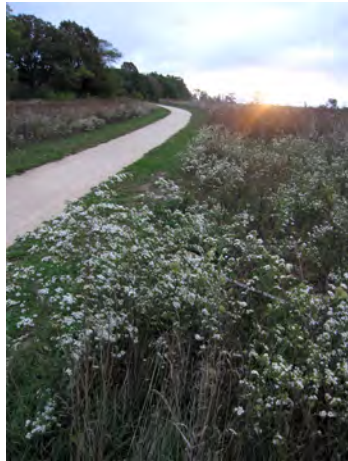
smartpreservation.net/mequon-wisconsin/

Gathering Waters, Wisconsin's Alliance for Land Trusts, provides a good discussion of conservation easements on an FAQ page.

gatheringwaters.org/about-land-trusts/conservation-options-for-landowners/conservation-easements/conservation-easements-faq/

"Minimizing Bluff Top Development Risk" is a case study from the "Great Lakes Coastal Resilience Planning Guide" that specifically focuses on strategies for addressing high-risk bluff properties in Wisconsin. The case study discusses the science of bluff erosion and the tools used to estimate erosion rates for bluffs and then looks at how Ozaukee County has taken that information into account in its comprehensive planning strategy. Many planning tools are discussed, including erosion control easements and TDRs.

greatlakesresilience.org/case-studies/land-use-zoning/minimizing-bluff-top-development-risk



A report from the National Oceanic and Atmospheric Administration’s resources discusses how states have used easements and TDRs to put together no-build areas along ocean and Great Lakes shorefronts. coast.noaa.gov/czm/media/nobuildareas.pdf

Related Options

Purchase of At-Risk Properties

Dynamic Concept Mapping / VCAPS

Facilitated Assessments for Planning

Develop Growth Management Plans

Purchase or transfer of development rights images: Transfers or purchases of development rights allow the owners of one piece of land to sell the development rights on that land to another parcel of land, giving that area the ability to develop more intensively than would be allowed under the zoning ordinances for that parcel (top right). This technique allows municipalities to preserve sensitive or historic areas in the form of land trusts (bottom) or nature preserves. The city of Mequon in Ozaukee County, Wis., used the TDR strategy to protect the Mequon Nature Preserve (top left) by selling the development rights of bordering parcels.

ADOPTING A LONG-LOT FORMAT FOR NEW SUBDIVISIONS

Who?

Municipal government

Purpose?

Ease relocation of structures away from eroding bluffs

Challenges?

Difficult to implement in areas that are already developed

Scope?

Local

New Legislation?

Yes

Relocating homes away from a rapidly eroding or unstable bluff top can often be much more effective and less expensive than re-grading the bluff or adding a revetment to stabilize the bluff toe. However, relocating a home requires lot space. One approach that would make this strategy easier to implement would be to use a long-lot format for new subdivisions in which the parcels are laid out in long strips perpendicular to the coast, providing room for a home to move back in the event that it becomes necessary to do so.

BENEFITS	CHALLENGES
Eases relocation of at-risk structure by providing property buffer away from coastline	Difficult to implement in already developed areas
Protects coastal ecosystem and sediment budget of lake by focusing on retreat rather than shore armoring	

Resources

The long-lot format was first put to use in Quebec, when tenant farmers were granted parcels of land in exchange for rental payments in the form of goods and natural resources. As many of the settlers of the time were more interested in the fur trade than in farming, maximizing river-front access drove the development of narrow strips of land called long lots or ribbon farms. This practice was carried forward throughout North America, wherever the French settled. This article from the University of Wisconsin-Green Bay discusses the use of the long-lot system in Wisconsin.

uwgb.edu/wisfrench/library/maps/jung/frmaps.htm

The Federal Emergency Management Agency (FEMA) Coastal Construction Manual has some excellent discussions of recommended zoning and subdividing practices for shoreline properties in chapter four. The recommendations for shoreline properties include laying out lots in narrow strips perpendicular to the shoreline, with each lot having room for a house to retreat and access to a road. Here, FEMA is essentially recommending the use of a long-lot format for coastal properties.

www.fema.gov/media-library/assets/documents/3293

Related Options

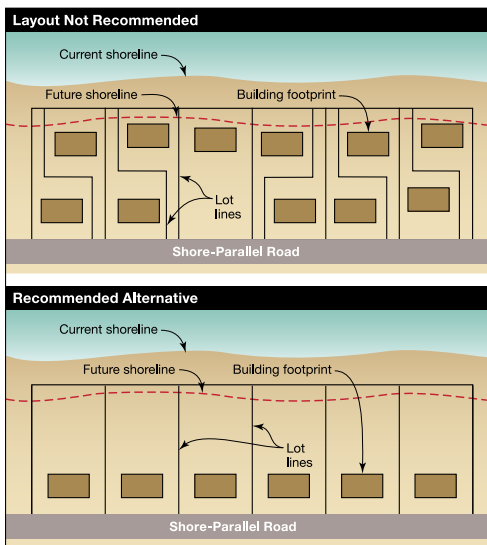
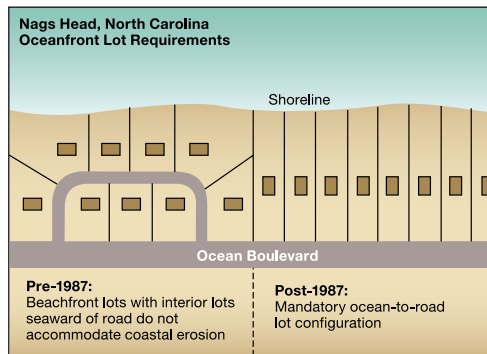
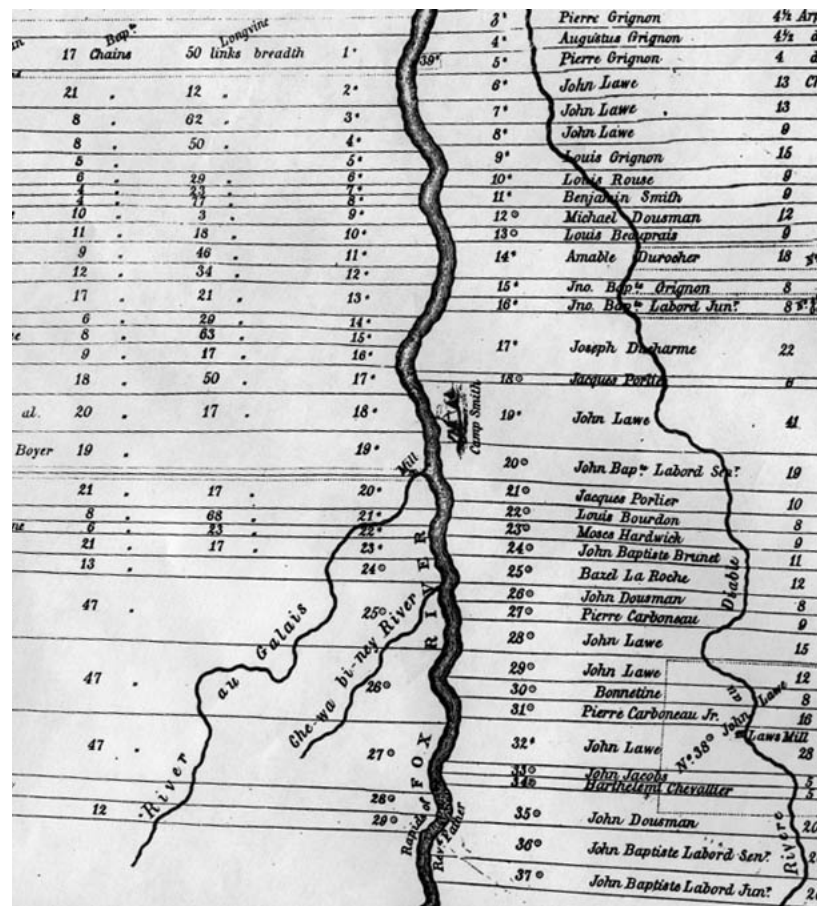
Creation of an Aid Fund for Coastal Properties

Revolving Loan Fund

Purchase of At-Risk Properties

Purchase or Transfer of Development Rights

Require Proof that Retreat Is Not an Option Before Permitting Shore Structure



Adopting a long-lot format for new subdivisions images: The idea of laying out lots in narrow strips along the water is as old as European settlement in North America. French settlers used exactly that approach along the Fox River when they settled near Green Bay, Wis. (left). While they were interested in trade and having ready access to a transportation route, this approach is also useful for building resiliency on coastal properties.

The FEMA “Coastal Construction Manual” provides a clear recommendation that new subdivisions should have room for relocation and have common access to a road should evacuation become necessary (bottom right). This idea became law in North Carolina in 1987. A diagram of two subdivisions shows that after 1987 the distribution of lots followed what could be called a long-lot format (top right). Using this approach for new subdivisions along the Lake Michigan coast in Wisconsin could be an effective tool to improve resiliency.

DEVELOP COASTAL CAPITAL IMPROVEMENT PLANS

Who?

Municipal government

Purpose?

Improve resiliency

Challenges?

Consensus on short-term development goals

Scope?

Local

New Legislation?

Yes

Capital improvement plans are short-range plans (four to 10 years) that prioritize capital improvement projects in a community. The plan lays out the projects, specifies the equipment and costs associated with the projects, and presents options for developing funds to implement the projects. This option could be used by coastal communities to develop erosion control and bluff stabilization projects in those areas where the risk is highest and the ability to move people out of the risk zone is limited. Capital improvement plans are found throughout the nation. While this option requires legislation, that legislation happens at the community level, rather than the state or federal level. Communities simply need to approve the capital improvement plan as part of approving their budget.

BENEFITS	CHALLENGES
Promotes resiliency through coordinated planning	Requires consensus on development goals
Provides mechanism for periodic re-examination of particular strategies	

Resources

“Planning Implementation Tools,” a publication by the University of Wisconsin-Stevens Point Center for Land Use Education, provides a good overview of capital improvement plans.

uwsp.edu/cnr-ap/clue/Documents/PlanImplementation/Capital_Improvement_Plan.pdf

For a more in-depth guide to the process of developing and implementing capital improvement plans, along with example language, look at this capital improvements plan guide from the state of Michigan.

michiganbusiness.org/cm/Files/Redevelopment_Ready_Communities/CIP-guide.pdf

Related Options

Visioning and Facilitated Collaboration

Dynamic Concept Mapping / VCAPS

Cost-Sharing Framework

Facilitated Assessments for Planning

Develop Growth Management Plans



Capital improvement plan images: Capital improvement plans can be used to identify the resources for small-scale green infrastructure projects such as this stormwater bioretention cell in Milwaukee (top left).

They can also be used for large-scale efforts such as Klode Park in Whitefish Bay, Wis. Following a bluff collapse in Whitefish Bay, local officials put together a plan that included bluff regrading, breakwaters and groins, turning a disaster into a public asset (top right).

The short-range nature of capital improvement plans helps municipalities prioritize projects. This revetment was overtopped during a particularly strong storm. While it still provides some protection, it is in need of repair. This is a good example of the kind of maintenance project that could be included in a capital improvement plan (bottom).

BLUFF STABILITY AND SHORE EROSION INSURANCE

Who?

State or federal government

Purpose?

Financial support for homeowners

Challenges?

Requires standardized risk assessment and rate table

Scope?

Statewide to national

New Legislation?

Yes

In areas with significant flood risk, insurance tools have been developed to provide protection to homeowners. Premiums are scaled to the risk of flooding and standardized across the nation. Using a similar approach to bluff stability and erosion could give property owners a tool that helps them plan for the worst. Developing bluff stability and shore erosion insurance rates would not only protect homeowners in a way that is fair and doesn't require taxes or fees for non-coastal residents but might also ultimately discourage development in the highest risk areas in the first place.

BENEFITS	CHALLENGES
Provides financial support for homes threatened by coastal erosion processes	Requires standardized assessment of risk and associated insurance rates
Provides financial incentive to avoid development in high-risk areas	
Provides financial support that is not financed by taxes or fees for non-coastal residents	

Resources

To participate in the National Flood Insurance Program (NFIP), communities must adopt and enforce a floodplain management ordinance to reduce flood risk to new construction in high-risk floodplain zones called "special flood hazard areas." In return, the federal government makes flood insurance available. The Federal Emergency Management Agency (FEMA) has more information.

www.fema.gov/national-flood-insurance-program

The NFIP Community Rating System recognizes a community's efforts to reduce flooding risk through various methods. Depending on the activities taken and the quality of the floodplain management plan, a community can reduce flood insurance premiums by as much as 45%.

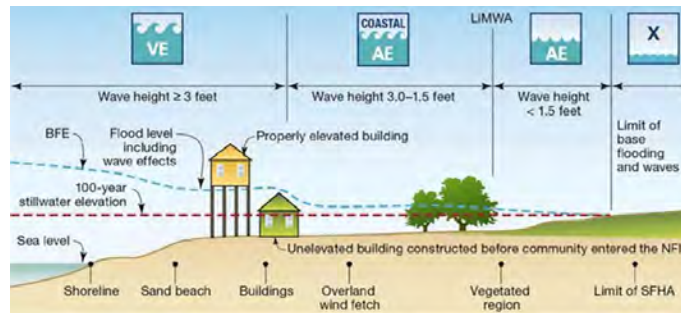
www.fema.gov/community-rating-system

The NFIP addresses flooding around rivers and on the coast. Coastal High Hazard Areas, regions of a coastline that are especially vulnerable to storm surges, are designated as VE zones on flood insurance rate maps and come with special requirements to qualify for insurance. Currently, FEMA is in the process of updating the floodplain insurance rate maps for the Great Lakes and is identifying VE zones.

www.fema.gov/great-lakes-coastal-information

Erosion that is a direct result of a episodic flood event is covered by flood insurance, but long-term erosion like that experienced on most Great Lakes bluffs is not. However, communities can improve their Community Rating System score, and lower insurance rates, by implementing specific erosion-control activities, such as establishing setback ordinances.

[fema.gov/media-library-data/20130726-1755-25045-9869/crs_credit_coastal_erosion.pdf](https://www.fema.gov/media-library-data/20130726-1755-25045-9869/crs_credit_coastal_erosion.pdf)



Related Options

Risk Assessment and Disclosure Requirements for Property Sales

Develop Growth Management Plans

Purchase of At-Risk Properties

Purchase or Transfer of Development Rights

Addition of Coastal Erosion Components to Hazard Mitigation Plans

Bluff stability and shore erosion insurance

images: This FEMA draft workmap for coastal flood insurance (left), illustrates the expected flood elevations and flooding type for the 1% chance storm event. While this workmap is not finalized, the final version of these maps will be used to determine flood insurance rates.

A home in Grafton, Wis., before and after the bluff in front of the property collapsed. Typical insurance policies do not cover this type of risk because bluff failures are considered a long-term hazard due to continual erosion by waves rather than a single episodic event like a flood (top right).

This infographic (bottom) from FEMA illustrates the important details of a “Special Flood Hazard Area.” Notice that to enter the NFIP, the homes located in the V zone closest to the shore need to be elevated above a certain predicted depth. Adapting this approach to erosion would likely require that homes be located a minimum distance away from the bluff to qualify for insurance.

ACKNOWLEDGEMENTS

Options for “Adapting to a Changing Coast” associated with the Great Lakes Water Levels Integrated Assessment in Wisconsin were generated through a series of interviews with project investigators and partners from September 2016 to January 2017. The authors thank the experts listed below for sharing their ideas for promoting a healthy and resilient coast.

John Janssen, professor, School of Freshwater Sciences, University of Wisconsin-Milwaukee

Jenny Kehl, associate professor, University of Wisconsin-Milwaukee

Jim LaGro, professor, Department of Planning and Landscape Architecture, University of Wisconsin-Madison

David Mickelson, emeritus professor and senior scientist, Department of Geoscience, University of Wisconsin-Madison

Brian Ohm, professor, Department of Planning and Landscape Architecture, University of Wisconsin-Madison

Chin Wu, professor, Department of Civil and Environmental Engineering, University of Wisconsin-Madison

Alan Lulloff, science services program director, Association of State Floodplain Managers

Mike Hahn, director, Southeastern Wisconsin Regional Planning Commission

Kate Angel, federal consistency and coastal hazards coordinator, Wisconsin Coastal Management Program

Kathi Kramasz, water regulations and zoning specialist, Wisconsin Department of Natural Resources

Roxanne Gray, mitigation section supervisor, Wisconsin Emergency Management

Katie Sommers, state hazard mitigation officer, Wisconsin Emergency Management

Caitlin Shanahan, disaster response and recovery planner, Wisconsin Emergency Management

CREDITS

PHOTOGRAPHY

Non-Binding Collaboration: image 1, Jane Harrison, Wisconsin Sea Grant; image 2, Wisconsin Sea Grant; image 3, Kenneth Caspar, Creative Commons.

Visioning and Facilitated Collaboration: image 1, Creative Commons; image 2, Wisconsin Sea Grant.

Dynamic Concept Mapping /VCAPS: both photographs, South Carolina Sea Grant Institute.

Neighborhood Associations: image 1, U.S. Army Corps of Engineers, New

York; image 2, City of Milwaukee Neighborhood Associations; image 3, Norm Tyler, Creative Commons.

Public-Private Partnerships: image 1, National Conference of State Legislatures; image 2, FEMA; image 3, NOAA.

Facilitated Assessments for Planning: image 1, New Jersey Office of Coastal Management; image 2; South Carolina Sea Grant; image 3, Maine Sea Grant.

Cost-Sharing Framework: image 1, David Suls, Golden Triangle Business Improvement District; image 2, image licensed for reuse under the Creative Commons ShareAlike 3.0 Unported license; image 3, image licensed for reuse under the Wikimedia Commons license.

Incentives: image 1, Michigan Department of Environmental Quality; image 2, Wikimedia Commons; image 3, NOAA.

Creation of an Aid Fund for Coastal Properties: image 1, FEMA; image 2, FEMA; image 3, Wisconsin Sea Grant and Wisconsin Coastal Management; image 4, Mary Austerman, New York Sea Grant.

Revolving Loan Fund: image 1, 2 and 3, Wisconsin Sea Grant and Wisconsin Coastal Management.

Addition of Coastal Erosion Components to Hazard Mitigation plans: image 1 and 2, FEMA; image 3, Wisconsin Sea Grant and Wisconsin Coastal Management.

Great Lakes Regional Agreements: image 1 and 2, Great Lakes-St Lawrence River Basin Water Resources Regional Body; image 3, courtesy of WaukeshaDiversion.org.

New Coastal Homeowner Tutorial: image 1 and 2, Wisconsin Sea Grant and the Wisconsin Coastal Management Program; image 3, NOAA.

Fee to Fund Site Monitoring: image 1, 2 and 3, Wisconsin Sea Grant and the Wisconsin Coastal Management Program.

Revised Offshore Permits: image 1 and 2, Wisconsin Sea Grant and the Wisconsin Coastal Management Program; image 3, NOAA.

Risk Assessment and Disclosure Requirement for Property Sale: image 1, Baird and Associates, taken from Great Lakes Coastal Resilience Planning Guide; image 2, Michigan Department of Environmental Quality; image 3, Wisconsin Sea Grant and the Wisconsin Coastal Management Program.

Erosion Control Permit Requirements That Mitigate Down-Drift Issues: image 1, Wisconsin Sea Grant and the Wisconsin Coastal Management Program; image 2, Eric Frommer, licensed for reuse under the Creative Commons ShareAlike 2.0 Generic License; image 3, USGS EarthExplorer.

Proof of Retreat: image 1, public domain, no attribution required; image 2, image licensed for reuse under the Creative Commons ShareAlike 2.0 Generic License; image 3, Wisconsin Sea Grant and the Wisconsin Coastal Management Program.

Prohibit Shore Structures: image 1, Released into public domain by original author; image 2, US Army Corps of Engineers; image 3, Sea Grant and the Wisconsin Coastal Management Program.

Coordinated Ordinances: image 1, Sea Grant and the Wisconsin Coastal Management Program; image 2, Sea Grant and UW-Extension; image 3, Sea Grant.

Bluff Vegetation Ordinances: image 1, Wisconsin Sea Grant and the Wisconsin Coastal Management Program; image 2, Massachusetts Coastal Zone Management Program; image 3, Wisconsin Sea Grant and the Wisconsin Coastal Management Program.

Policy Review Mechanism: image 1, NOAA; image 2, USFWS; image 3, Great Lakes Environmental Assessment and Mapping Project.

Develop Growth Management Plans: image 1, SEWRPC; image 2, Kevin Miyazaki; image 3, City of Fitchburg, Wis.

Purchase of At-Risk Properties: image 1, FEMA; image 2, Baird and Associates, taken from Great Lakes Coastal Resilience Planning Guide.

Purchase or Transfer of Development Rights: image 1, Michigan Department of Environmental Quality; image 2, Vermont Natural Resources Council; image 3, city of Mequon.

Adopting a Long-Lot Format for New Subdivisions: image 1, University of Wisconsin-Green Bay; image 2 and 3 FEMA.

Capital Improvement Plan: image 1, Aaron Volkening; licensed for reuse under the Creative Commons Attribution 2.0 Generic License, images 2 and 3, Wisconsin Sea Grant and the Wisconsin Coastal Management Program.

Bluff Stability and Shore Erosion Insurance: image 1, Barry Sullivan, Ozaukee County; image 2, NOAA; image 3, FEMA.

WRITERS

Andrew Mangham, David Hart, Adam Bechle, Gene Clark, Deidre Peroff, Julia Noordyk, Bert Stitt, Linda Stitt

EDITORS

Moira Harrington and Elizabeth White

DESIGNER

Yael Gen

Printed locally using Wisconsin-manufactured, FSC® certified paper containing 10% post-consumer recycled content

©2018 University of Wisconsin Sea Grant Institute

JUNE 2018 WISCU-H-18-001



seagrant.wisc.edu