What Makes a Great Lakes Coastal Community "Resilient"? *and* How to Plan for One?

Coastal Navigator Training

St. Joseph, MI

October 25, 2017

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Urban and Regional Planning Program

University of Michigan

Sustainable / Smart / Resilient Communities *Defined*

Sustainable Development:

"…development that meets the needs of
the present without compromising the the ability
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World Commission on Economic Development, 1987

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- Measured depletion of non-renewable resources
- Intergenerational equity
- More theoretical

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- A response to sprawl
- More concrete / applied

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- Incorporates principles / ideals of sustainable development and smart growth
- Adds responsiveness and adaptability to system shocks (natural and/or economic)
- Goal: return to "normal" or, preferably, something better

Sustainable / Smart / Resilient Communities *Principles*

Sustainable Development:

- Live in harmony with nature
- Livable built environments
- Place-based economy
- Equitable access
- Polluters pay
- Responsible regionalism

Plus public participation

(Berke and Conroy, 2000)

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- Mixed land use
- Compact building design
- Mixed housing opportunities/choice
- Walkable neighborhoods
- Distinctive, attractive communities
- Preserved open space, farmland, natural beauty
- Reinvestment in existing communities
- Multi-modal transportation
- Predictable, fair, cost-effective development decisions
- Citizen / stakeholder participation

(US EPA)

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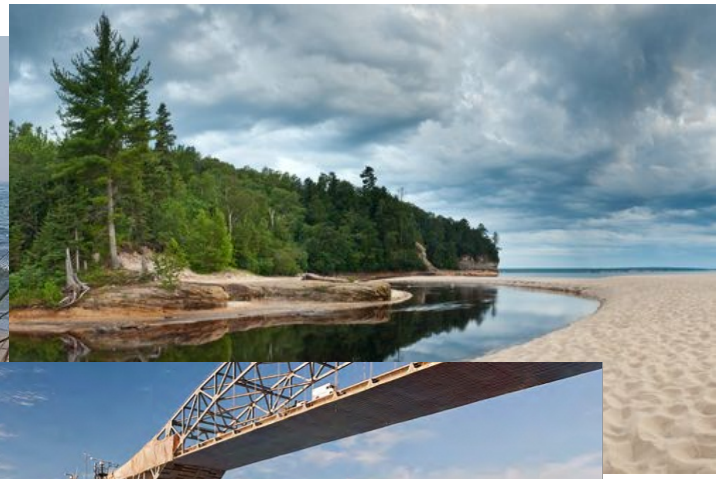
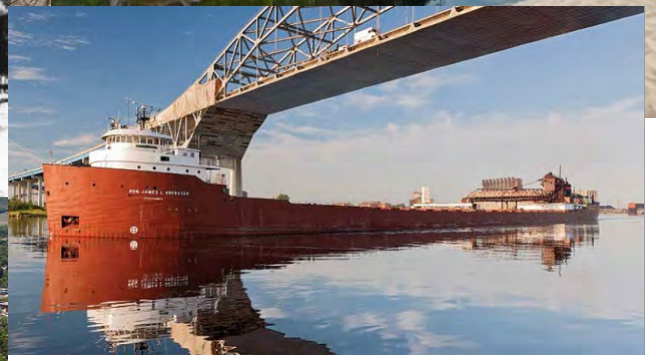
Resiliency:

= ***sustainability*** plus ***smart growth*** *plus*:

- Tailor to threats unique to setting, paying attention especially to hazards and vulnerability
- Use the best data / scientific knowledge available, but don't wait for perfect knowledge
- Employ decision-making tools that account for uncertainty
- Leverage natural systems (green infrastructure) as much as possible
- Adopt "no-regrets" policies





What Makes a Community "Coastal"?

TAUBMAN COLLEGE
architecture + urban planning
University of Michigan

Coastal Areas Defined

By their very nature, coastal zones are mercurial places, formed and reformed constantly by the irresistible forces of the sea. Land and ocean are forever locked in conflict. Marine scientist Jens Sorensen defines a coastal area as "that part of the land affected by its proximity to the sea and that part of the ocean affected by its proximity to the land . . . an area in which processes depending on the interaction between land and sea are most intense" (Clark 1996).

Coastal zones can be wafer-thin strips of coastline not more than a few ters wide, extending from the low-tide mark inland; or they can extend ir far as to include entire watersheds and may run seaward to the continent encompassing the full extent of a country's 200-nautical-mile Exclusive Ec Zone (EEZ) (OECD 1993).

Coastal zone Definition from Business & Finance Dictionaries & Glossaries

BTS Transportation Expressions Trade & Transportation Dictionaries

All United States waters subject to the tide, waters of the Great Lakes and Lake Champlain, specified ports and harbors on inland rivers, waters of the contiguous zone, other waters of the high seas subject to the National Contingency Plan, and the land surface or land substrate, ground waters, and ambient air proximal to those waters. The term "coastal zone" delineates an area of federal responsibility for response action. Precise boundaries are determined by agreements between the Environmental Protection Agency (EPA) and the U.S. Coast Guard (USCG), and are identified in Federal Regional Contingency Plans and Area Contingency Plans. (49CFR194)

By the Bureau of Transportation Statistics.

Merriam Webster
(Online)

Coast: The land along or near a sea or ocean

Coastal Zone - Ocean World

Physical

The zone includes the beach, estuaries, the adjacent land draining directly into the coastal waters, and the offshore waters, usually out to the edge of the continental shelf. The physical characteristics are described in Types of Coasts.

Political

1. Many people live in the coastal zone. Overall 38% of the world's population lives within 100 km of the coast or estuaries, and 44% live within 150 km of the coast..
2. *The number of people living within 100 km of the coast increased from roughly 2 billion in 1990 to 2.2 billion in 1995—39 percent of the world's population.* From World Resource Institute, Earthtrends.
   Thus, each year roughly 50 million more people move into the coastal zone worldwide.
3. The coastal zone is important because it is a source of fish and minerals.
4. The coastal zone is an important political entity.

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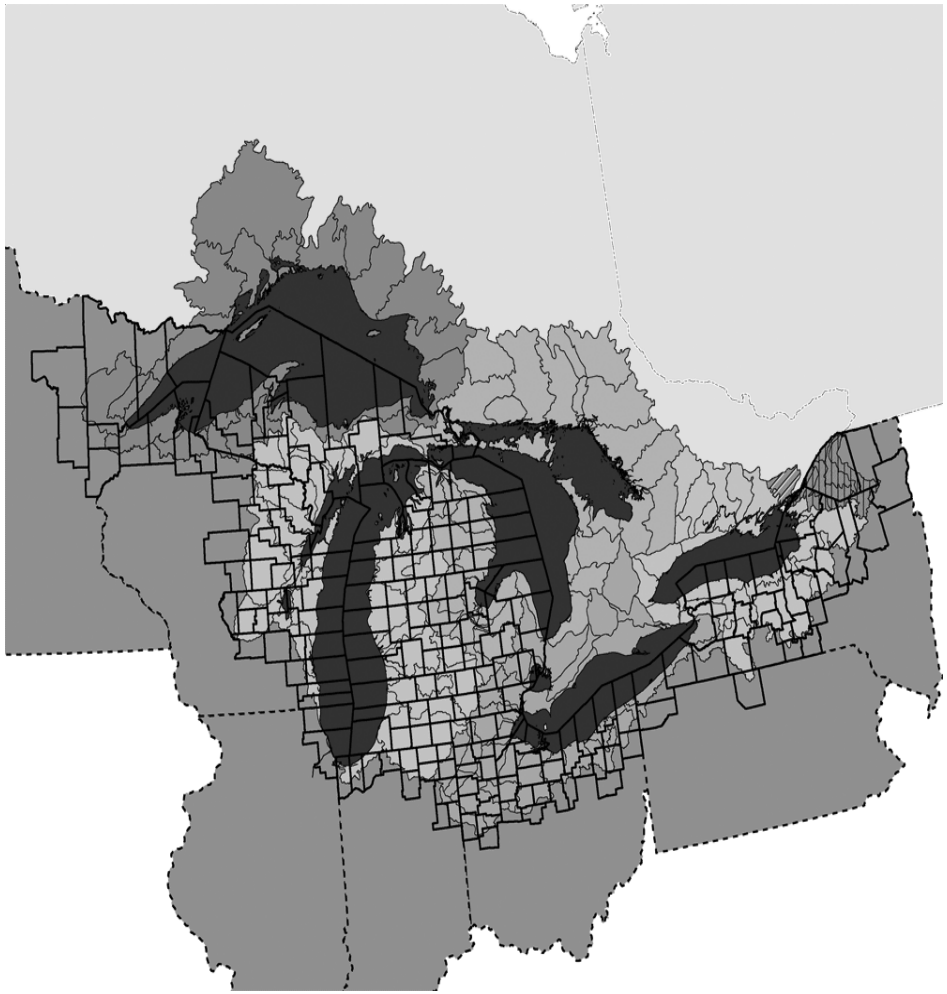
Simply, Great Lakes Coastal Communities touch our "inland seas" – Great Lakes waters (maybe connecting rivers too)

There are a lot of them in Michigan!!

MI's Great Lakes Jurisdictions (Touching a Lake)

	Total	Great Lakes	Percent
Village	262	24	9%
City	273	43	16%
Twp	1,241	183	15%
County	83	41	49%
Total	1,859	291	16%



Planning for Great Lakes Coastal Community Resilience: Planning Issues

Issues

- Climate change
  - Increased droughts
  - Increased heat waves (tempered by lake effects)
  - Increase storminess (frequency, intensity)
  - Ecosystem / public health effects (disease vectors)
- Layered upon natural lake level fluctuations

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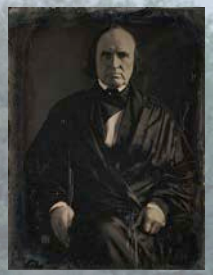
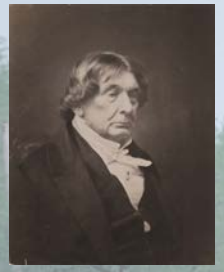
} Coastal hazard threats (inundation, high-energy waves)

- Heat (social) vulnerability
- Economic sustainability (tourism, facilities, industry)
- Fairness (disaster mitigation, recovery, equity in opportunities / impacts)

Key Legal Doctrines

Police Power Prerogative


John McLean


Lemuel Shaw

To protect public health, safety, morals, and the general welfare (viewed expansively).

Public Trust Doctrine


Justinian


H. de Bracton


Matthew Hale

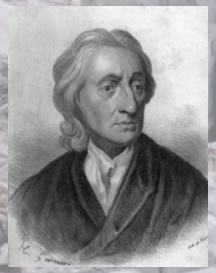

Jos. Angell


James Kent

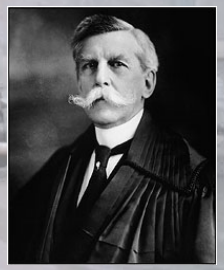
Things common to all: the air, running water, the sea, and the shores of the sea.

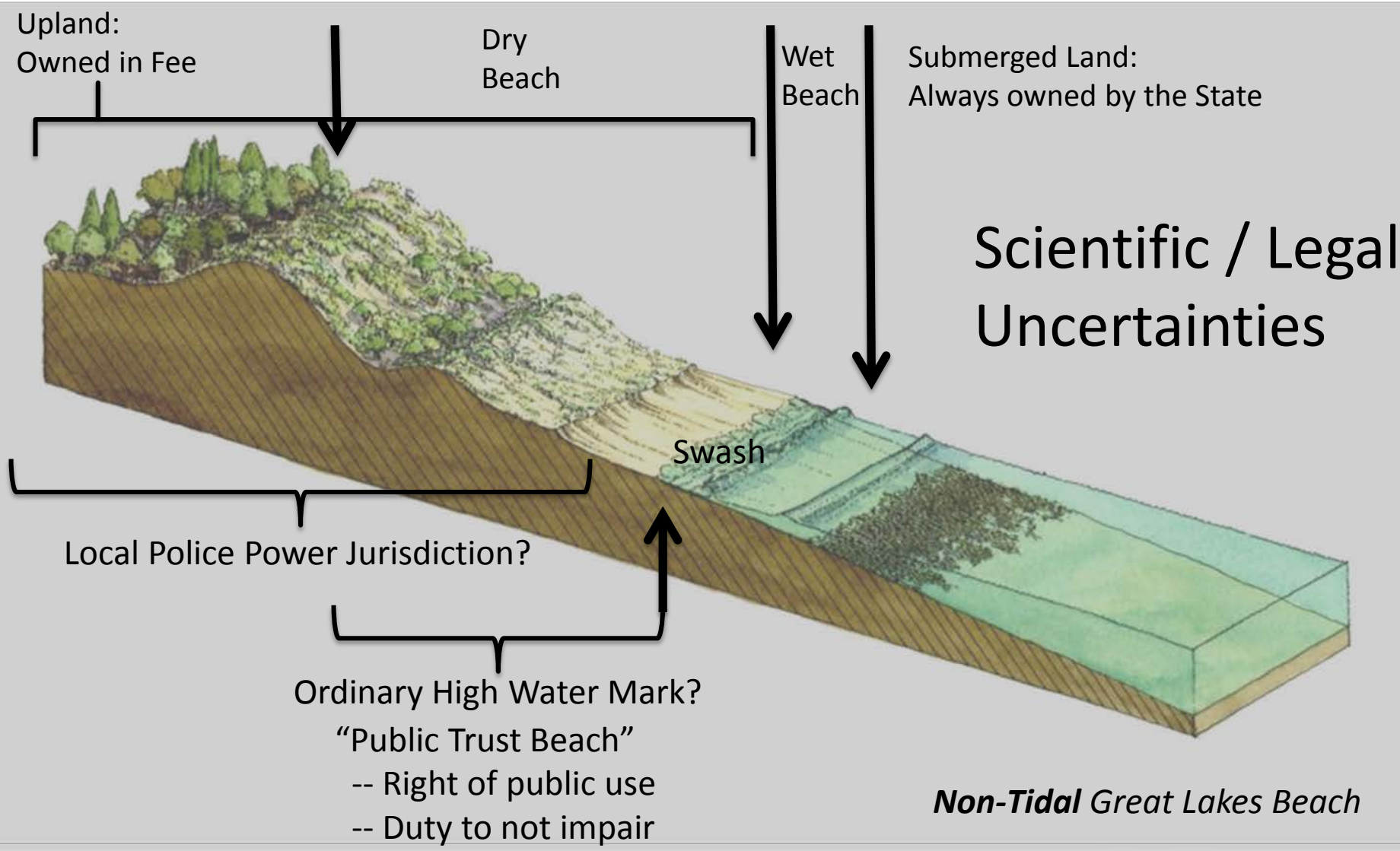
Right to reasonably use and exclude (as against governmental abuse).

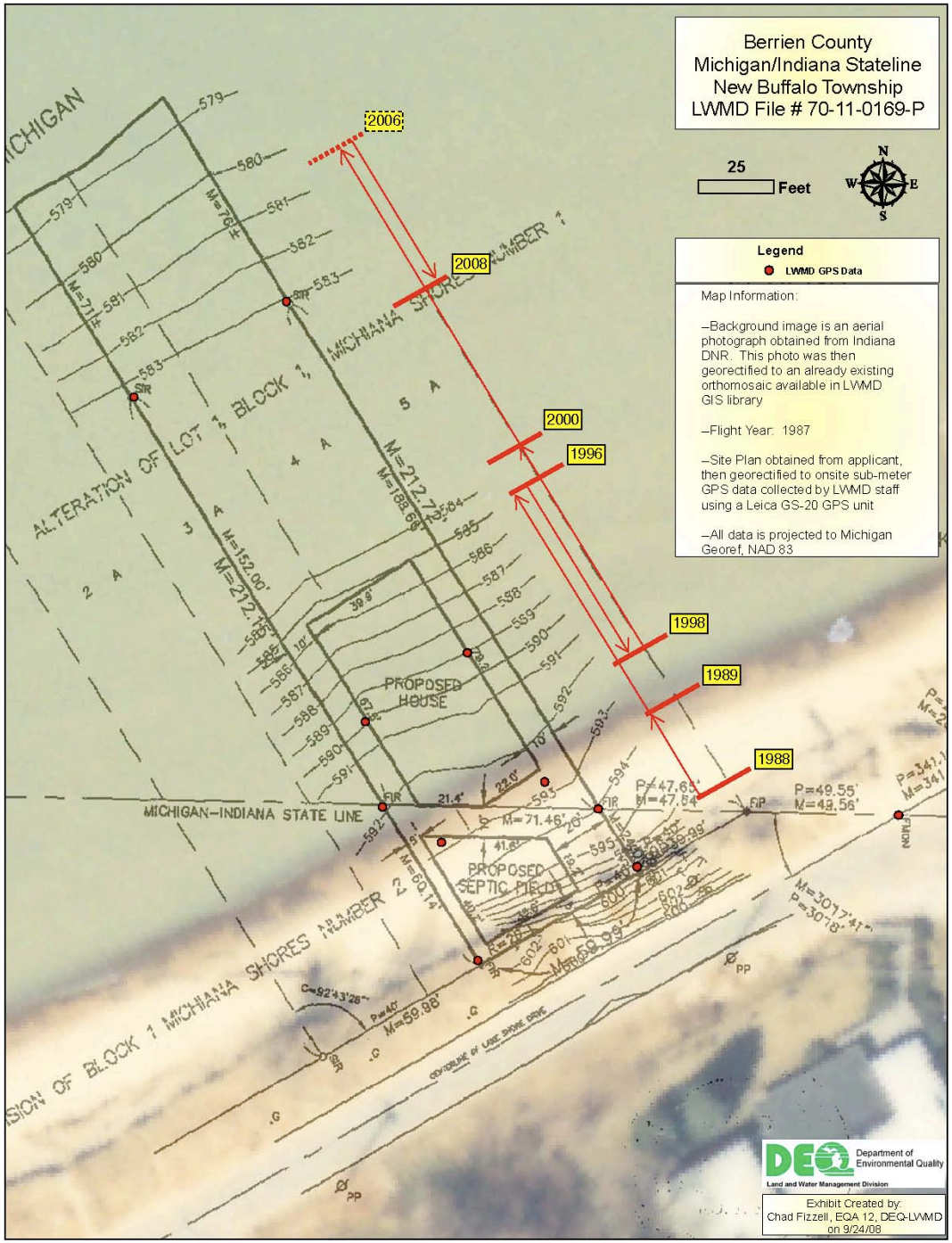
Private Property Rights


John Locke


W. Blackstone


O.W. Holmes, Jr.


Upland:
Owned in Fee
Dry
Beach
Wet
Beach
Submerged Land:
Always owned by the State
Scientific / Legal
Uncertainties
Swash
Local Police Power Jurisdiction?
Ordinary High Water Mark?
"Public Trust Beach"
-- Right of public use
-- Duty to not impair
Non-Tidal *Great Lakes Beach*



Legal Uncertainties

Two

Ordinary High Water Marks:

- "natural" (beach walking)
- "elevation" (regulatory)

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University of Michigan

Potential Consequences of No Local Control

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Legal / Policy Analyses and Options

Figure 5. Updated extent of potential flooding and/or high-energy waves under "Lucky," "Expected," and "Perfect Storm" climate future conditions for the City of Grand Haven North Shore district.

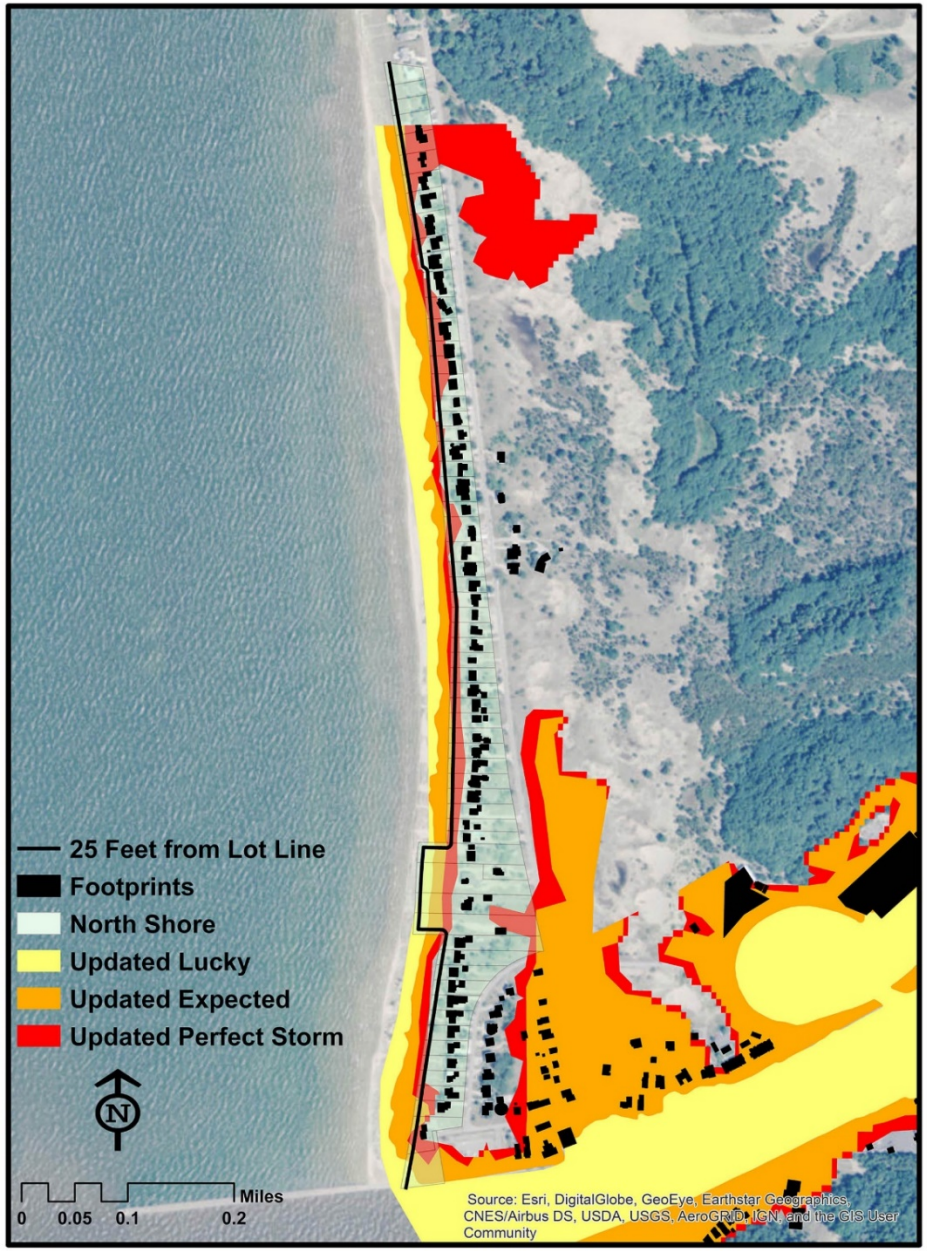
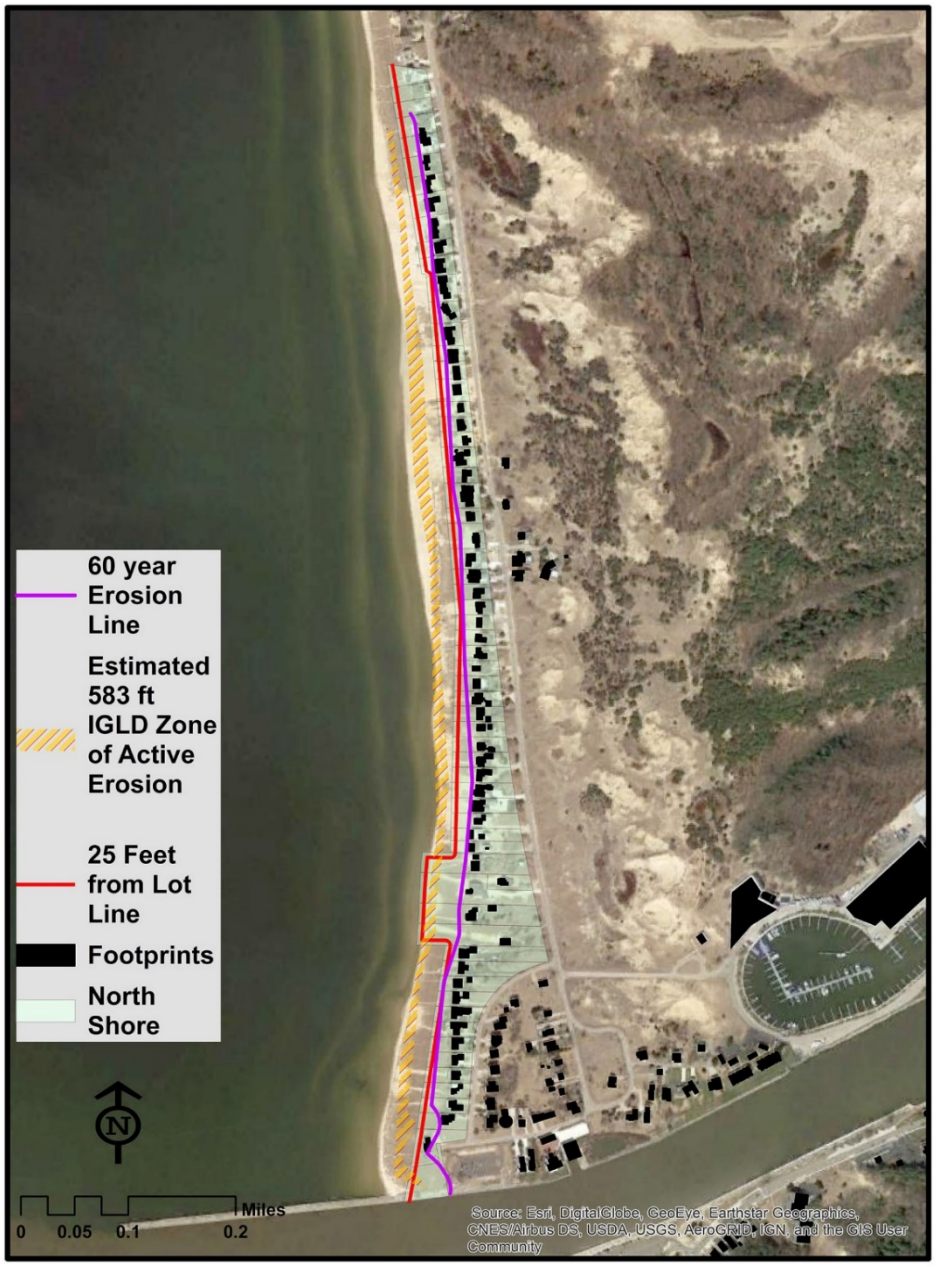
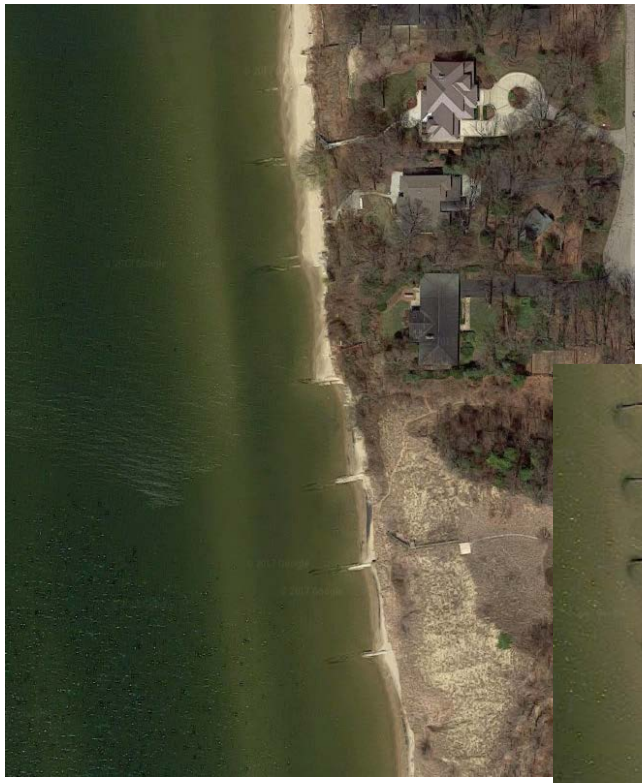
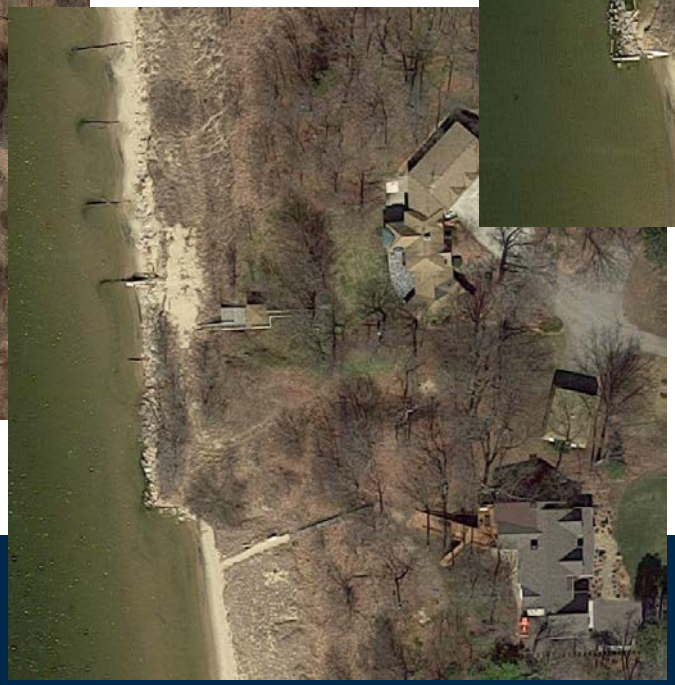


Figure 9. Approximate Location of a 60-year Erosion Line in the North Shore District

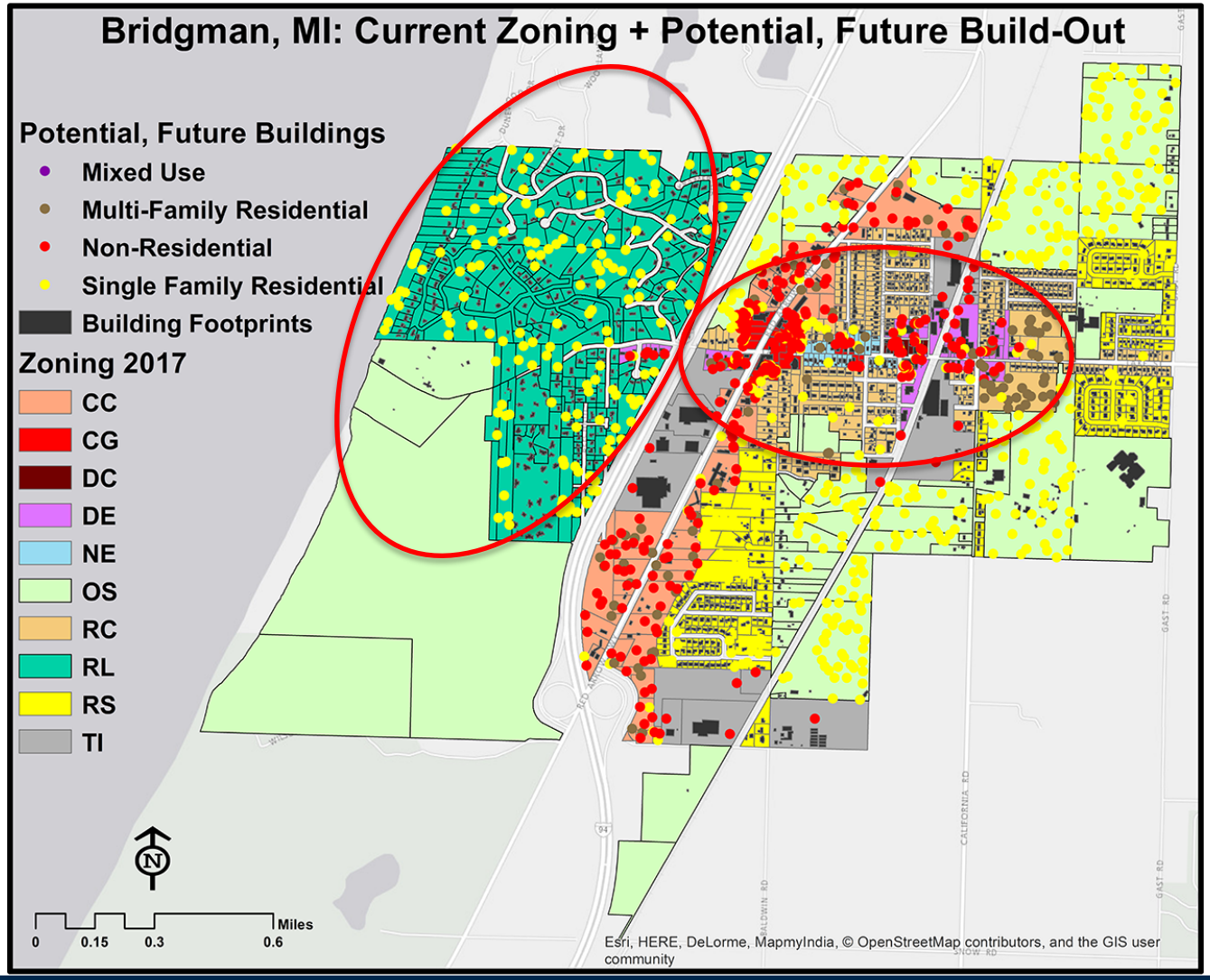


Looming Legal / Policy Problem: Shoreline Armoring

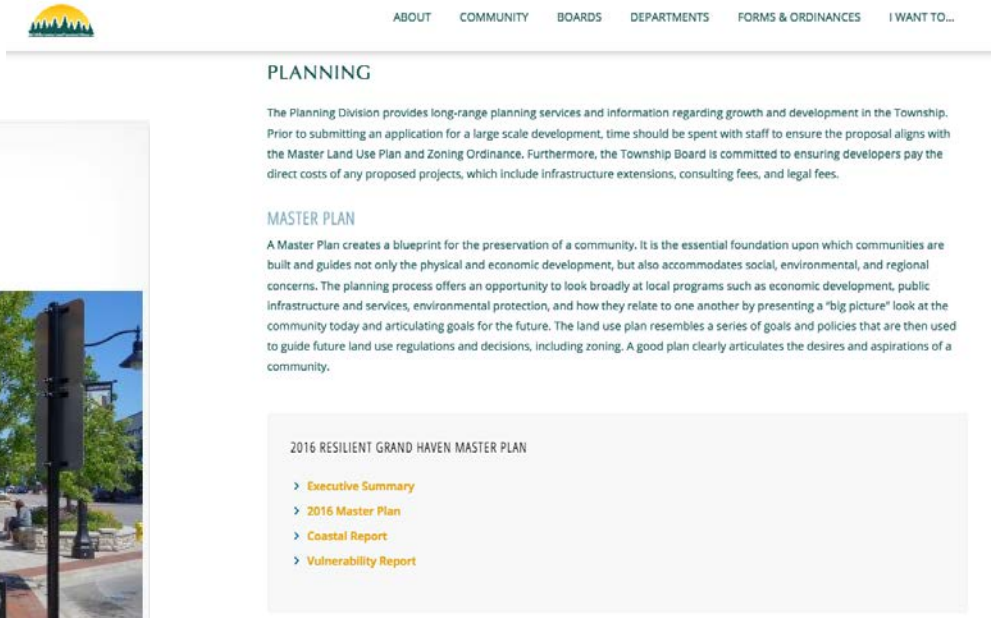




Another: Coastal Dune Development



What Can Coastal Communities Do?
Local Master Planning



Planning – MPEA
Zoning – MZEA
General Police Power Ordinances
Infrastructure Policies / CIPs
Networked Plans / Management

Planning for Great Lakes Coastal Community Resilience: Data and Resources

- FEMA NFIP and related maps
- GIS data layers with multiple sources and features
- Historic aerial photos
- Coastal viewers (e.g., “Digital Coast”)
- Multiple published/on-line handbooks and “tools”
- *Community members’ collective historic experiences and knowledge*
- *Innovative and energetic local leadership*

Planning for Great Lakes Coastal Community Resilience: Approach

Addressing Uncertainty: Scenario-Based Planning

Climate Future Mgt Option	*"Lucky"* ⇣ Lake / ⇣ Stormy	*"Expected"* ~ Lake / ~ Stormy	*"Perfect Storm"* ⇡ Lake / ⇡ Stormy
Current Conditions	Lucky / Current	Expected / Current	Uh-Oh / Current
Future Buildout: Current Zoning	Lucky / Buildout	Expected / Buildout	Uh-Oh / Buildout
Future Buildout: Adopt BMPs	Lucky / BMPs	Expected / BMPs	Uh-Oh / BMPs

For Each Scenario, Analyze Potential Impacts On:

- Land use (acreage, critical facilities, structures at risk)
- Fiscal (economic values of developed land at risk)
- Environmental / social wellbeing (wetlands, other natural features, cultural features)

Planning for Great Lakes Coastal Community Resilience: No-Regrets Policies

- Stormwater Management / Low Impact Development
- Preserve and Restore Wetlands / Natural Features
- Adopt setbacks / buffers from high-risk zones
- Promote clean energy
- Promote local, place-based, diverse economic development
- Promote equitable social and economic opportunities
- Engage the full community
- Do it all again (iterate and adapt)!!

Questions?