What Makes a Great Lakes Coastal Community “Resilient”? 
and How to Plan for One?

Coastal Navigator Training
St. Joseph, MI
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Sustainable / Smart / Resilient Communities Defined

*Sustainable Development*: 
“...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

*World Commission on Economic Development, 1987*
Sustainable / Smart / Resilient Communities

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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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**Smart Growth:**
- 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”?
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 meters wide, extending from the low-tide mark inland; or they can extend 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 Economic Zone (EEZ) (OECD 1993).

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 36% 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)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Great Lakes</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village</td>
<td>262</td>
<td>24</td>
<td>9%</td>
</tr>
<tr>
<td>City</td>
<td>273</td>
<td>43</td>
<td>16%</td>
</tr>
<tr>
<td>Twp</td>
<td>1,241</td>
<td>183</td>
<td>15%</td>
</tr>
<tr>
<td>County</td>
<td>83</td>
<td>41</td>
<td>49%</td>
</tr>
<tr>
<td>Total</td>
<td>1,859</td>
<td>291</td>
<td>16%</td>
</tr>
</tbody>
</table>
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
Planning for Great Lakes Coastal Community Resilience: Planning Issues

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- 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

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

Coastal hazard threats (inundation, high-energy waves)
**Key Legal Doctrines**

**Police Power Prerogative**

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

**Private Property Rights**

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

**Public Trust Doctrine**

*Things common to all: the air, running water, the sea, and the shores of the sea.*
Upland: Owned in Fee

Dry Beach

Submerged Land: Always owned by the State

Wet Beach

Local Police Power Jurisdiction?

Ordinary High Water Mark?
   “Public Trust Beach”
   -- Right of public use
   -- Duty to not impair

Swash

Non-Tidal Great Lakes Beach

Scientific / Legal Uncertainties
Legal Uncertainties

Two Ordinary High Water Marks:

- “natural” (beach walking)
- “elevation” (regulatory)
Potential Consequences of No Local Control
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

<table>
<thead>
<tr>
<th>Climate Future Mgt Option</th>
<th>“Lucky” ↓ Lake / ↓ Stormy</th>
<th>“Expected” ~ Lake / ~ Stormy</th>
<th>“Perfect Storm” ↑ Lake / ↑ Stormy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Conditions</strong></td>
<td>Lucky / Current</td>
<td>Expected / Current</td>
<td>Uh-Oh / Current</td>
</tr>
<tr>
<td><strong>Future Buildout: Current Zoning</strong></td>
<td>Lucky / Buildout</td>
<td>Expected / Buildout</td>
<td>Uh-Oh / Buildout</td>
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<tr>
<td><strong>Future Buildout: Adopt BMPs</strong></td>
<td>Lucky / BMPs</td>
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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?