

# Hazard Planning in Coastal Indiana

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Coastal Resource Planner

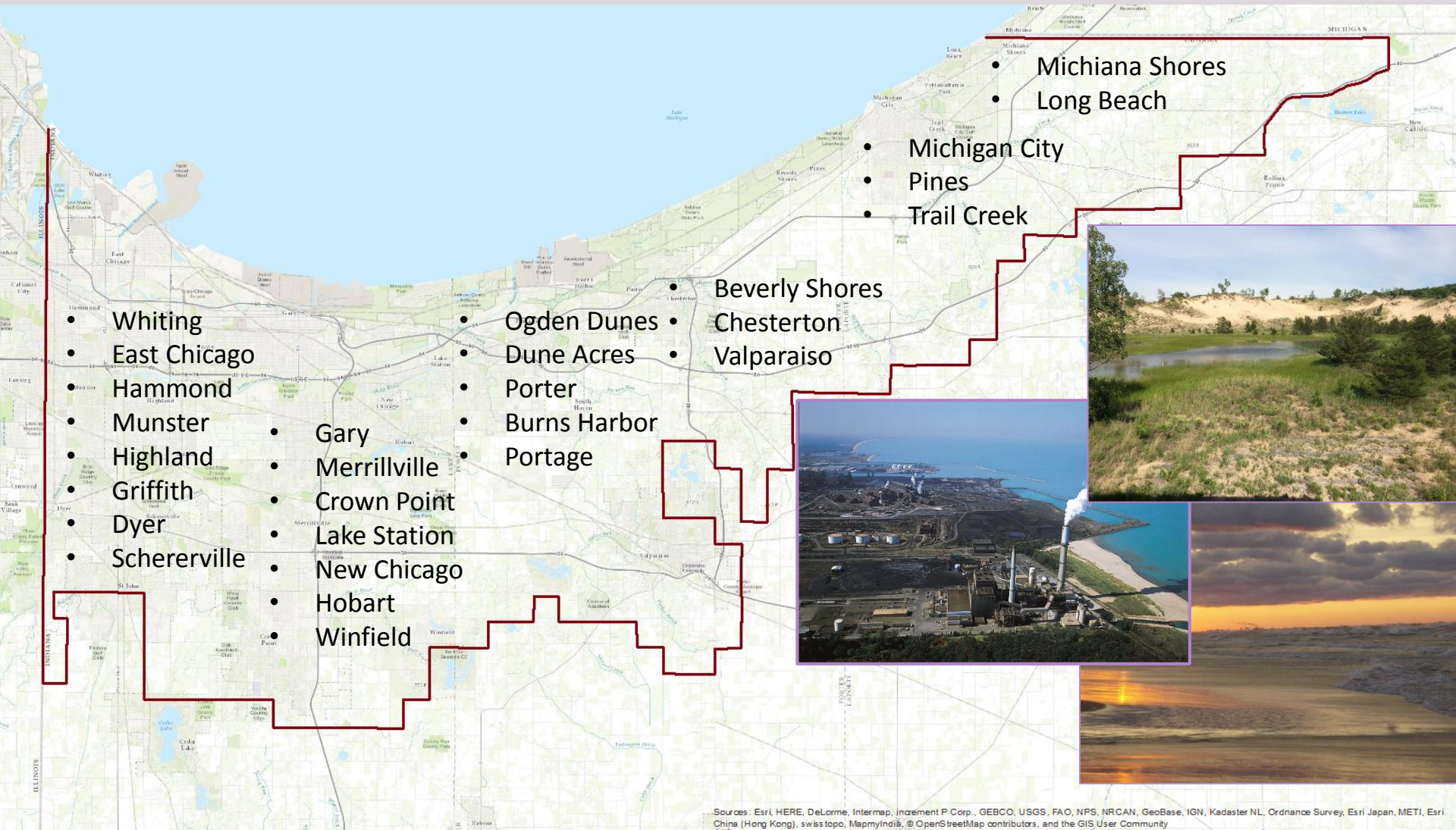
Lake Michigan Coastal Program

Indiana Department of Natural Resources

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# Program Area



# ECOSYSTEMS of the INDIANA COASTAL REGION

## PRAIRIE



## DUNE & SWALE



## RIVER



## SWAMP



## LAKE MICHIGAN



## DUNES



## FOREST



## SAVANNA



## BOG/FEN



## MARSH



**PRAIRIE** A natural community that is dominated by grasses with few or no trees or shrubs. There are a variety of prairie types, depending on soil type, soil conditions, ranging from wet to dry and, depending on soil type, ranging from cold to hot.

**DUNES** Hills, mounds or ridges of wind deposited sand that progressively beach near Lake Michigan. A variety of plant communities are found in Indiana's dune complex which include beach, foredune, and interdune sand soil forest, represented by a variety of grass communities ranging from prairie and savanna to forest.

**DUNE & SWALE** A series of low, flat or near-flat sand ridges (dunes) with deep sand-water wetlands. They are scattered on low ground along Lake Michigan shoreline, primarily in Gary and Hammond. They are represented by a variety of communities, primarily prairie and wetlands on the ridges, marsh and forest in the swales.

**RIVER** A stream with a water-table of 200 square miles or more. A river is that along its course by carrying tributaries and can be further classified by size and gradient.

**SWAMP** It is land dominated by woody plants. Swamps include, but are not limited to, the most common type of swamp found in the coastal region.

**BOG/FEN** It is a type of wetland that is a peat dominated area. The drainage is usually restricted. They often occur in lowland areas, along with low marsh areas, and they can also be found in the coastal region.

**FOREST** A natural community that is dominated by trees with a canopy cover of 30% or more. Forests vary depending on height, soil and moisture conditions. There are three general forest communities in the coastal region: upland forests, floodplain forests and bottomland forests.

**SAVANNA** Communities with a grouping of herbaceous ground cover and a tree canopy cover of less than 30% but more than 10%. The dominant trees are open-habitat species like oak and white oak on sandy soils and bur oak and white oaks on clay soils.

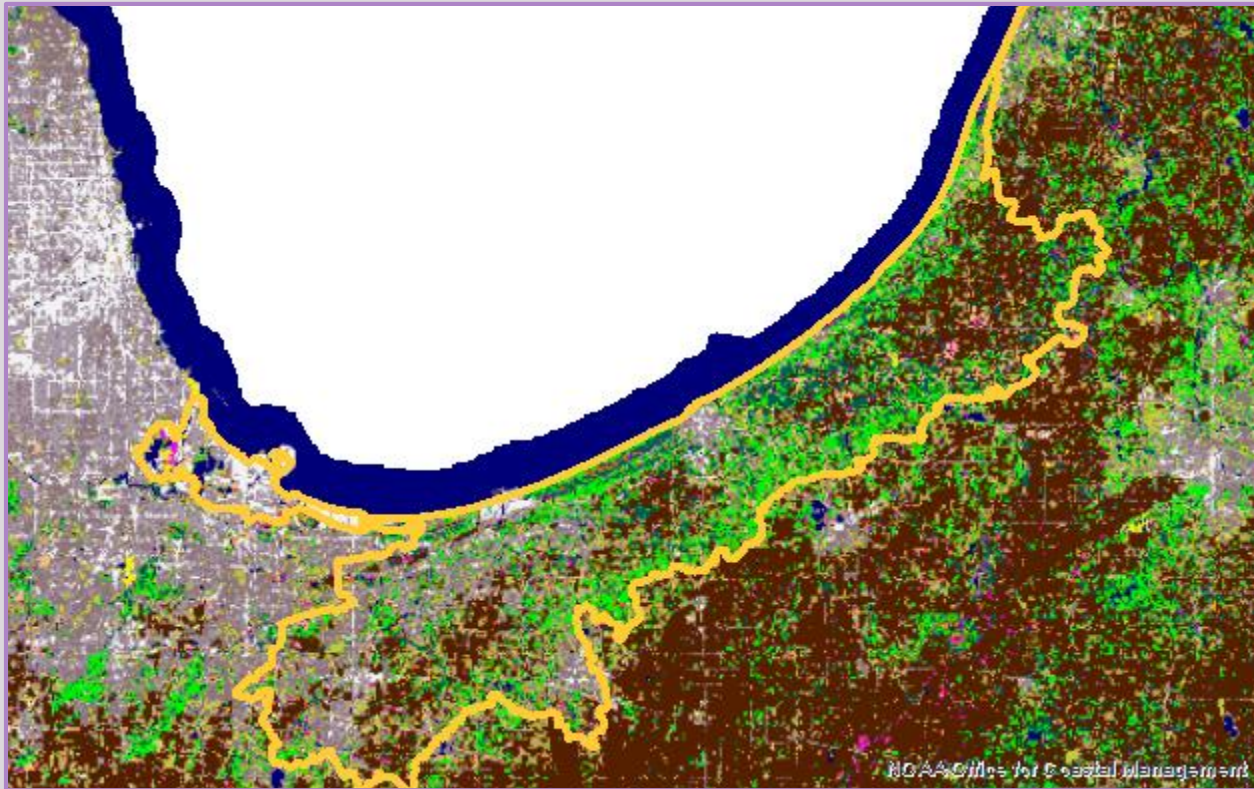
**MARSH** A type of wetland that is dominated by grassland plants. Marshes have water level at above the surface for most of the year.

**LAKE MICHIGAN** Lake Michigan is the second largest of the five Great Lakes. Indiana's shoreline lies along the north Indiana shoreline portion of the lake. This large freshwater ecosystem provides better for recreation, hunting and fishing, property, recreation as well as critical fish and wildlife habitat.

INDIANA LAKE MICHIGAN COASTAL PROGRAM

The Indiana State Department of Natural Resources is an agency of the State of Indiana. It is located at 100 North Senate Avenue, Indianapolis, Indiana 46204-1300. Telephone: 317-232-2000. Website: [www.dnr.in.gov](http://www.dnr.in.gov)

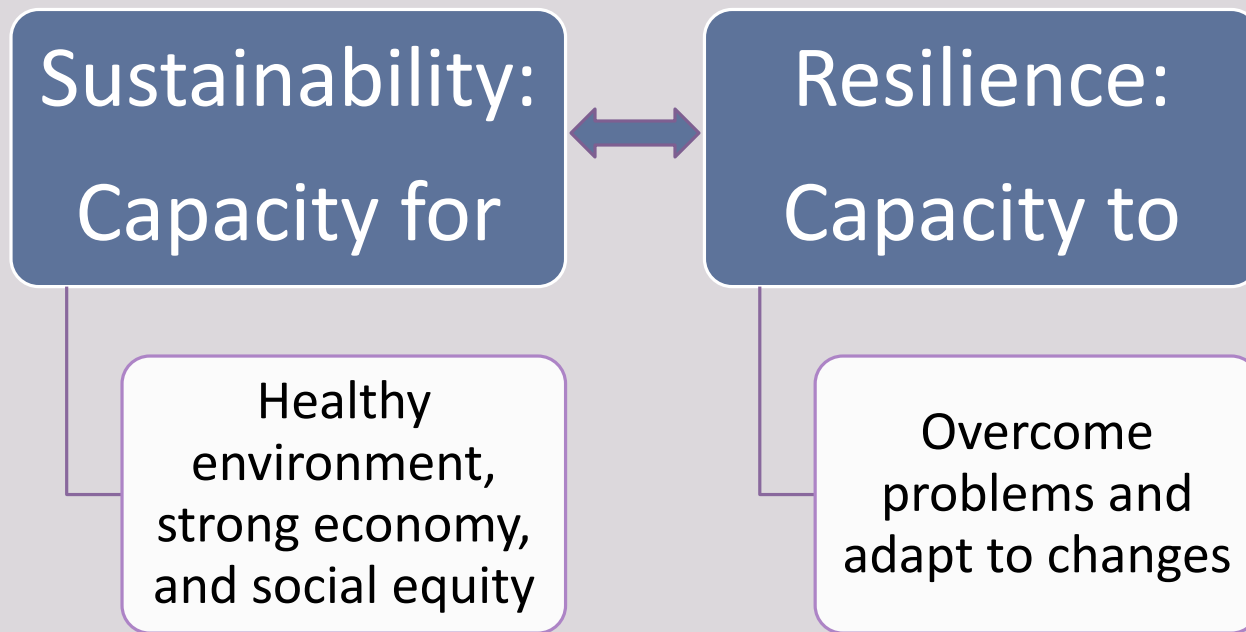
# Present Day Land Use



|                                 | <b>Net Developed Area (%)*</b> | <b>Net Impervious Surface Area (%)*</b> | <b>Net Total Wetlands (%)*</b> |
|---------------------------------|--------------------------------|---|--------------------------------|
| Little Calumet-Galien Watershed | +17.34                         | +13.36                                  | -1.87                          |

\*Change between 1996 and 2010, NOAA C-CAP Land Cover Atlas

Although precipitation and lake levels cannot be controlled, property and natural resource damage can be mitigated through **early planning** at the local level.



# Topics

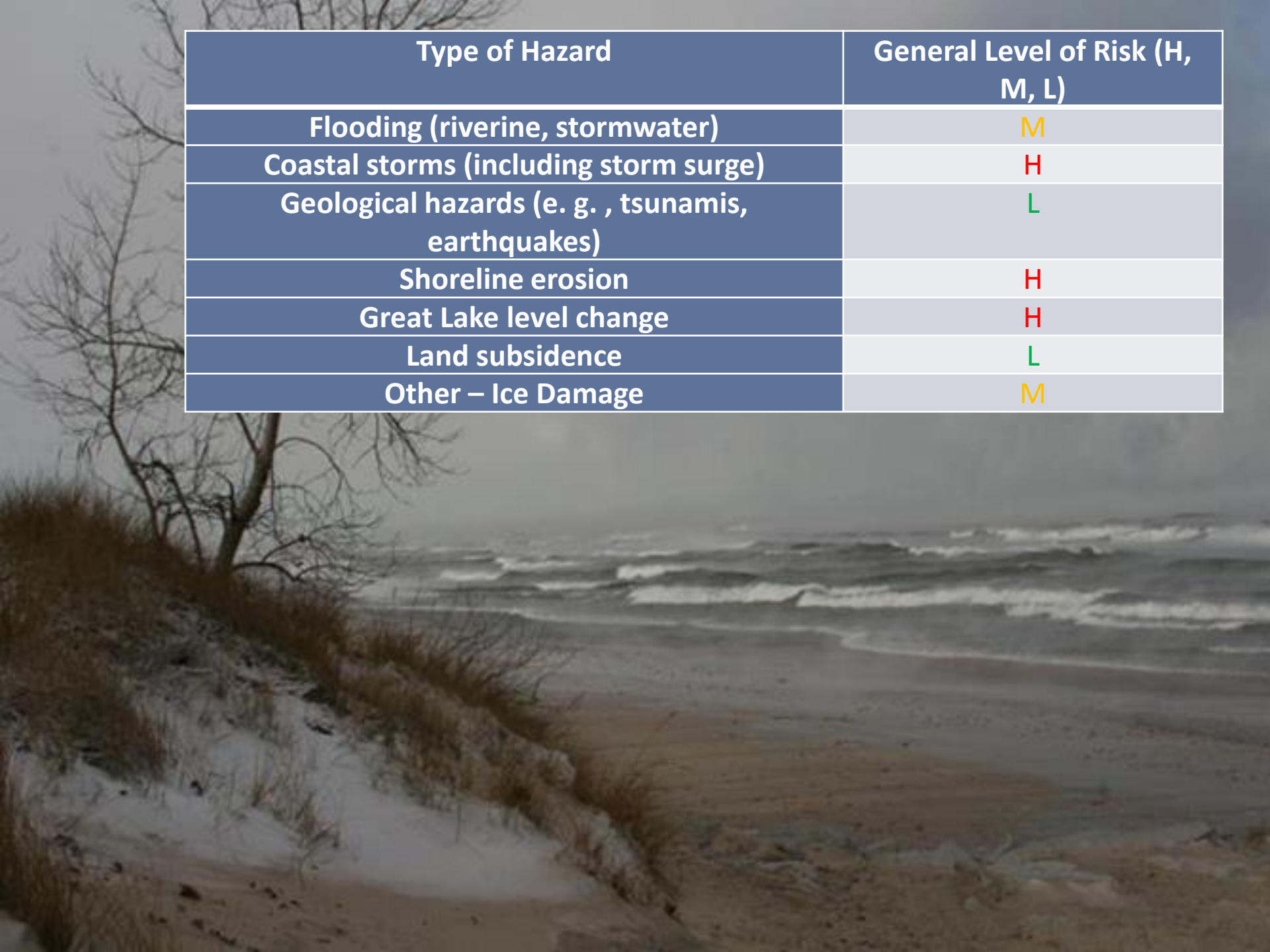
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- Coastal Hazards
- Localized Flooding
- Conservation Planning

# Coastal Hazards

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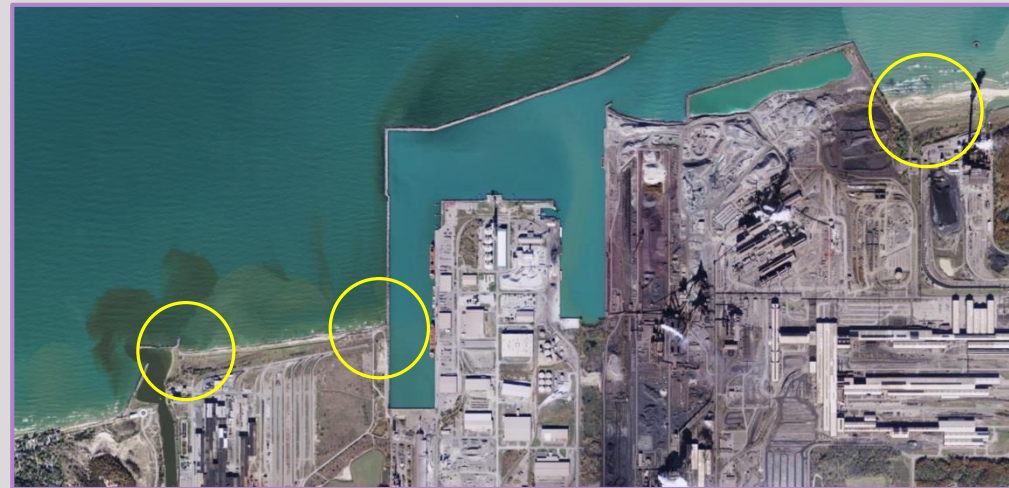
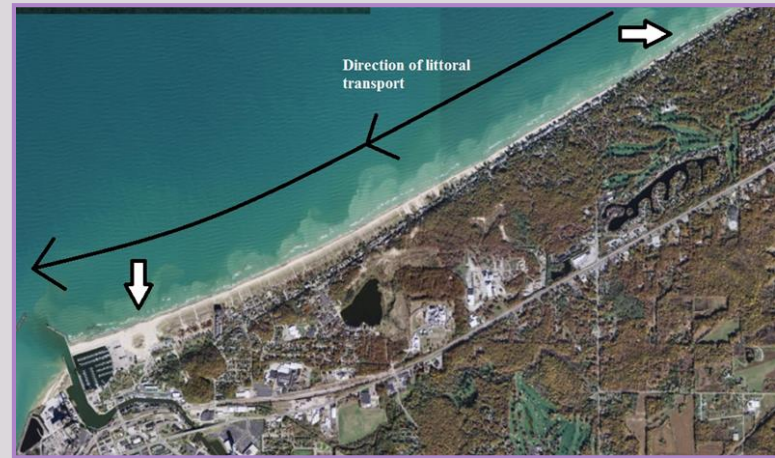




| Type of Hazard                                     | General Level of Risk (H, M, L) |
|--|---------------------------------|
| Flooding (riverine, stormwater)                    | M                               |
| Coastal storms (including storm surge)             | H                               |
| Geological hazards (e. g. , tsunamis, earthquakes) | L                               |
| Shoreline erosion                                  | H                               |
| Great Lake level change                            | H                               |
| Land subsidence                                    | L                               |
| Other – Ice Damage                                 | M                               |

# Indiana's Coastal Hazards

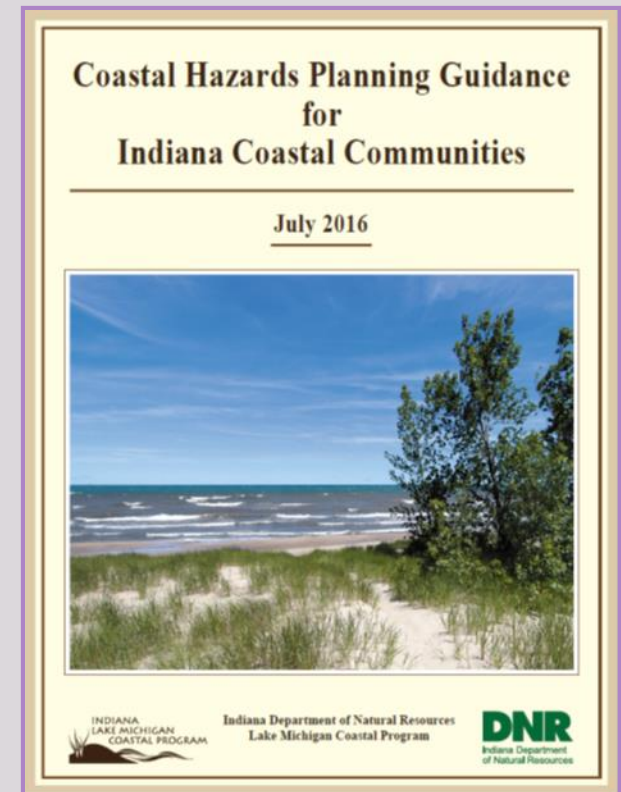
- Altered shoreline dynamics
- Storms and flooding
- Fluctuating lake levels



# Coastal Hazards Planning Guidance

- Guidance document topics
  - Wave and beach dynamics
  - Resilience and sustainability
  - Shoreline structures and community maps
- Model ordinances
  - Overlay Zone
  - Coastal Hazard Setback
  - Shoreline Protection Structures
  - Disclosure of Coastal Hazards
  - Shoreline Vegetation Buffer
  - Site Planning

<http://bit.ly/INCoastalHazards>



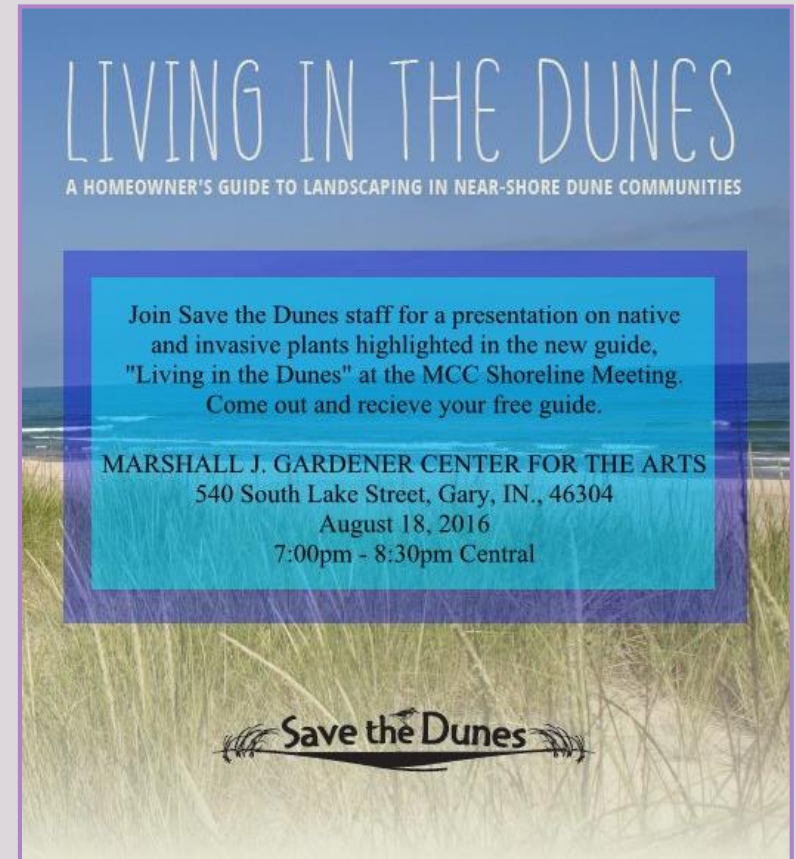
# Example Ordinance: Coastal Hazard Setback

- Most promising measure for minimizing damages to coastal property
- Establish a “no development” area a certain distance from the edge of the lake
- Effective setback will take into account historic lake level fluctuations



# Example Ordinance: Shoreline Vegetation Buffer

- Require natural vegetation remain or be restored to protect the ecology and aesthetic of the duneland ecosystem
- Selective pruning and limited tree removal
- Partner with local nonprofits to provide homeowner education



# Shoreline Geodatabase for Community Mapping

- Purpose
  - Create a single GIS shoreline inventory database for coastal region
  - Develop clearinghouse of coastal data
- Completed in 2013
- 65 layers
  - land use
  - structures
  - historic
  - shoreline dynamics

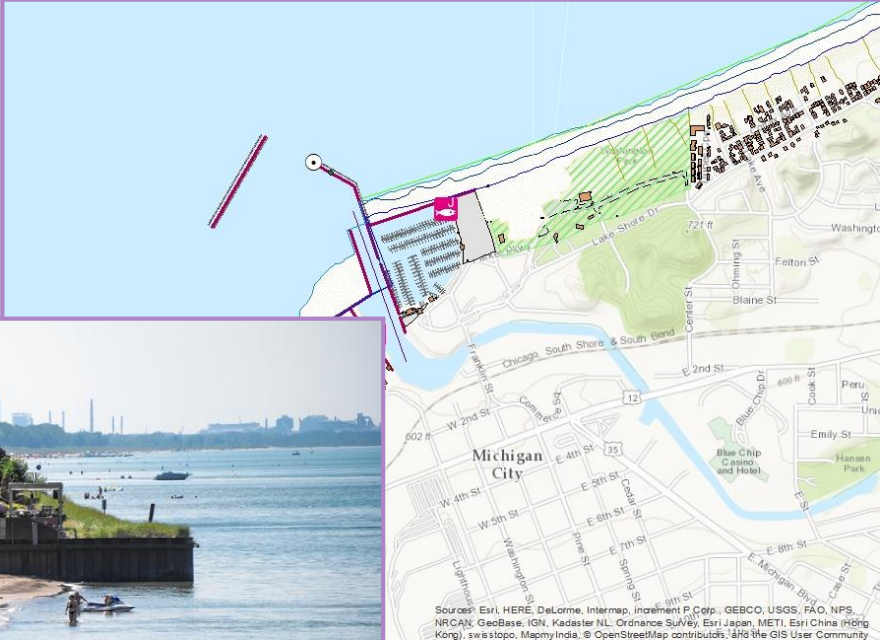
<http://bit.ly/INCoastalHazards>



# Data Sources

- Northwest Indiana Regional Planning Commission (NIRPC)
- Indiana DNR – Multiple Divisions
- IndianaMAP
- Lake County
- LaPorte County
- Porter County
- Multiple Shoreline Communities
- Indiana Department of Local Government and Finance (IDLGF)
- Indiana Geological Survey
- U.S. Fish and Wildlife Service (FWS)
- Federal Emergency Management Agency (FEMA)
- U.S. Census
- Port of Indiana
- National Resources Conservation Service (NRCS)
- NOAA
- Steve Davis, DNR Division of Water

# Shoreline Geodatabase for Community Mapping



Source: Kyle Telechan, Post-Tribune

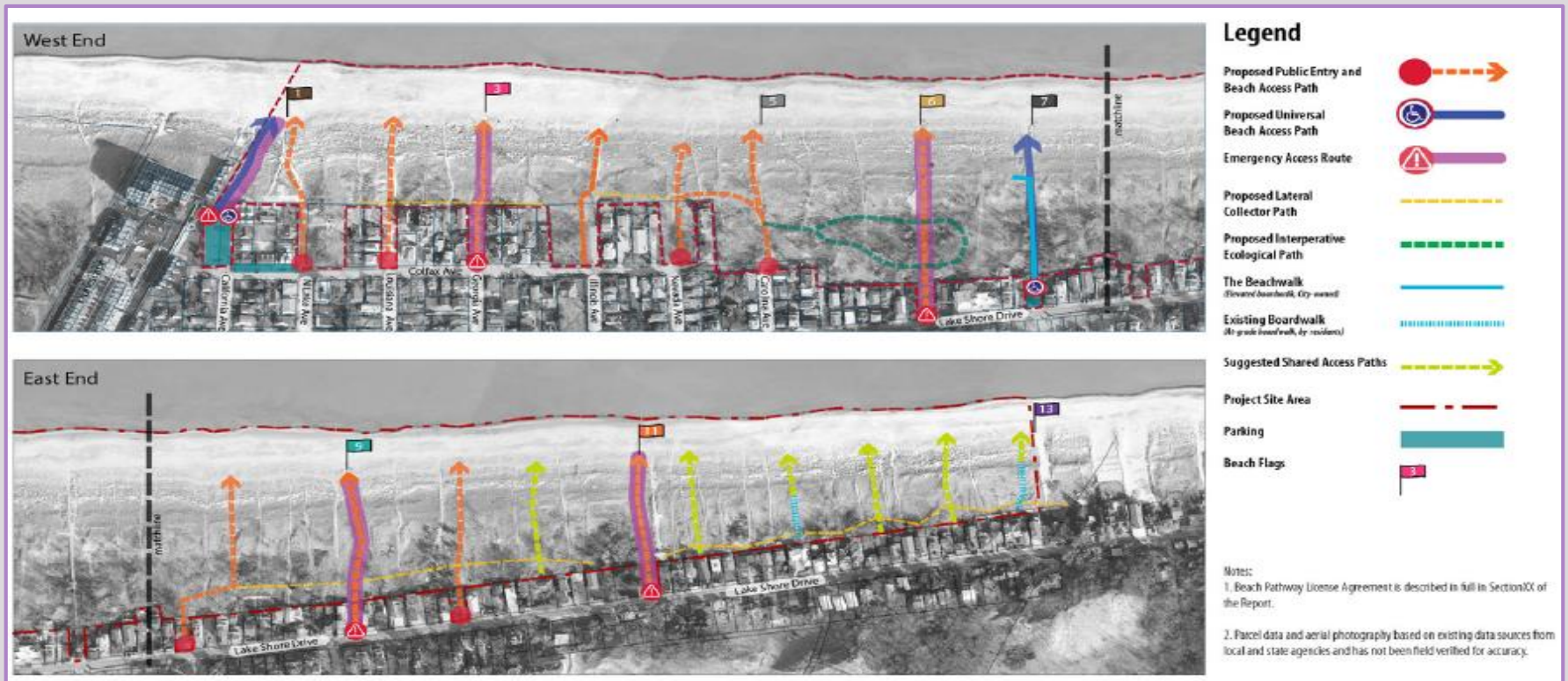


# Project: Michigan City Esplanade Plan

Grant Applicant: Michigan City, Parks and Recreation Department

Year: 2011

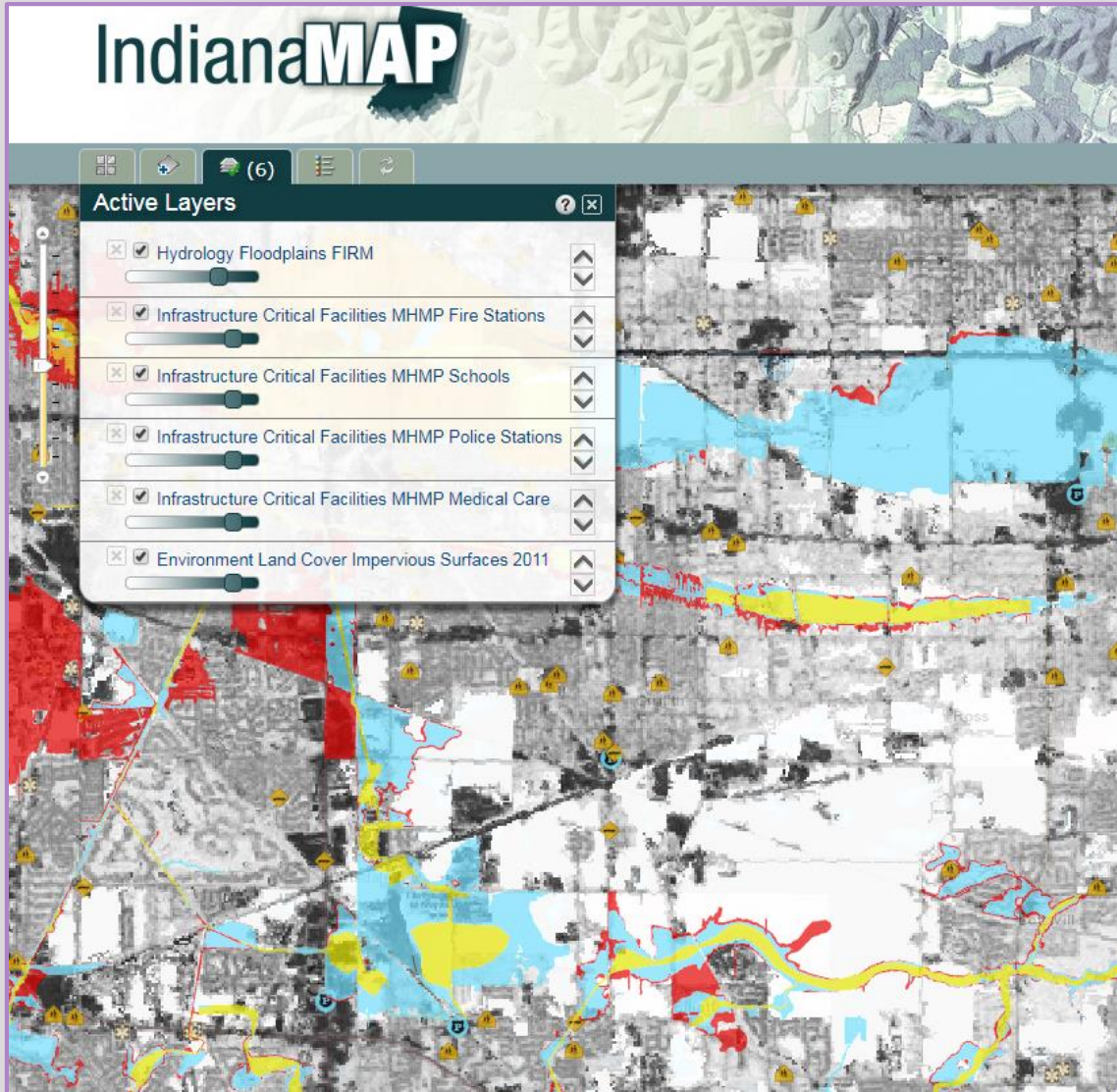
Cost: \$27,000



# Localized Flooding

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# IndianaMAP Templates



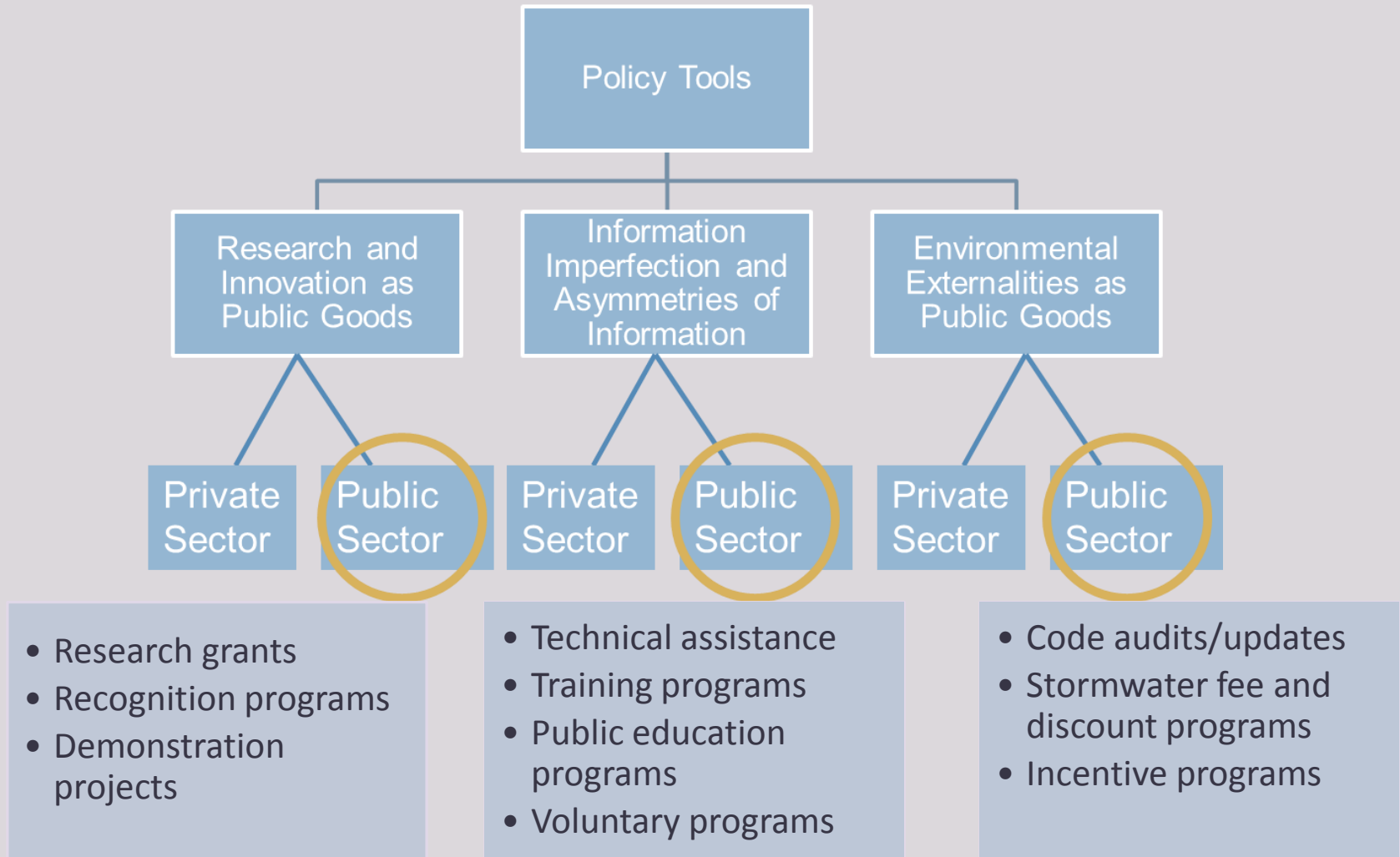
[Hazard Map](#): Layers—Critical Facilities (2011), Impervious Cover (2014), and FEMA FIRM (2016)

[Socioeconomic Map](#): Layers—Demographics (2000 Census) and FEMA FIRM (2016)

[Land Use Map](#): Layers—Land Use (2011) and FEMA FIRM (2016)


[Natural Resources Map](#): Layers—Tree Canopy (2001), Impervious Cover (2014), and FEMA FIRM (2016)

# Policy Tool Framework




# Resource Library

Floodplain Administrator's Guide




Indiana Department of Natural Resources



Revised September 2014

State of Indiana  
Model Ordinance  
for  
Flood Hazard Areas



**TIPPING POINT  
PLANNER**

Supporting Sustainable Communities in Great Lakes States

Effective December 31, 2016

National Flood Insurance Program  
Community Rating System

**Coordinator's  
Manual**

FIA-15/2013

FEMA



**Multi-Hazard Mitigation Plan**

Lake County



Lake County Emergency Management Agency  
2000 West 40<sup>th</sup> Street  
Corydon, Indiana 46037-1514

The Public Center  
1200 Riverside Boulevard  
Indianapolis, IN 46202



Office for Coastal Management  
**DIGITALCOAST**



**NORTHWEST INDIANA  
StormWater Advisory**

MUNICIPAL HANDBOOK

GREEN INFRASTRUCTURE  
RETROFIT POLICIES

MANAGING WET WEATHER WITH  
GREEN INFRASTRUCTURE

MUNICIPAL HANDBOOK

INCENTIVE MECHANISMS

# Upcoming Project: Wetlands Mapping and Protection

- Three part strategy
  - Wetlands protection model ordinance
  - Updated coastal wetlands mapping
  - Wetland functionality assessment
- 2017-2019



Ivanhoe Dune and Swale Nature Preserve in Gary, IN ©Susan MIHalo/TNC

# Project: LaPorte County Stormwater Fiscal Incentives Analysis

## STORMWATER FISCAL INCENTIVES ANALYSIS



**INDIANA**  
*The City of LaPorte*

A cooperative analysis funded by the Cities of Michigan City, LaPorte and LaPorte County and the Lake Michigan Coastal Program.

Grant Applicant: LaPorte County

Year: 2011

Cost: \$52,500

Types of Incentives Explored:

- Stormwater fee discount
- Development incentives
- Watershed stewardship incentives
- Community-led green infrastructure grants
- BMP installation financing
- Recognition programs

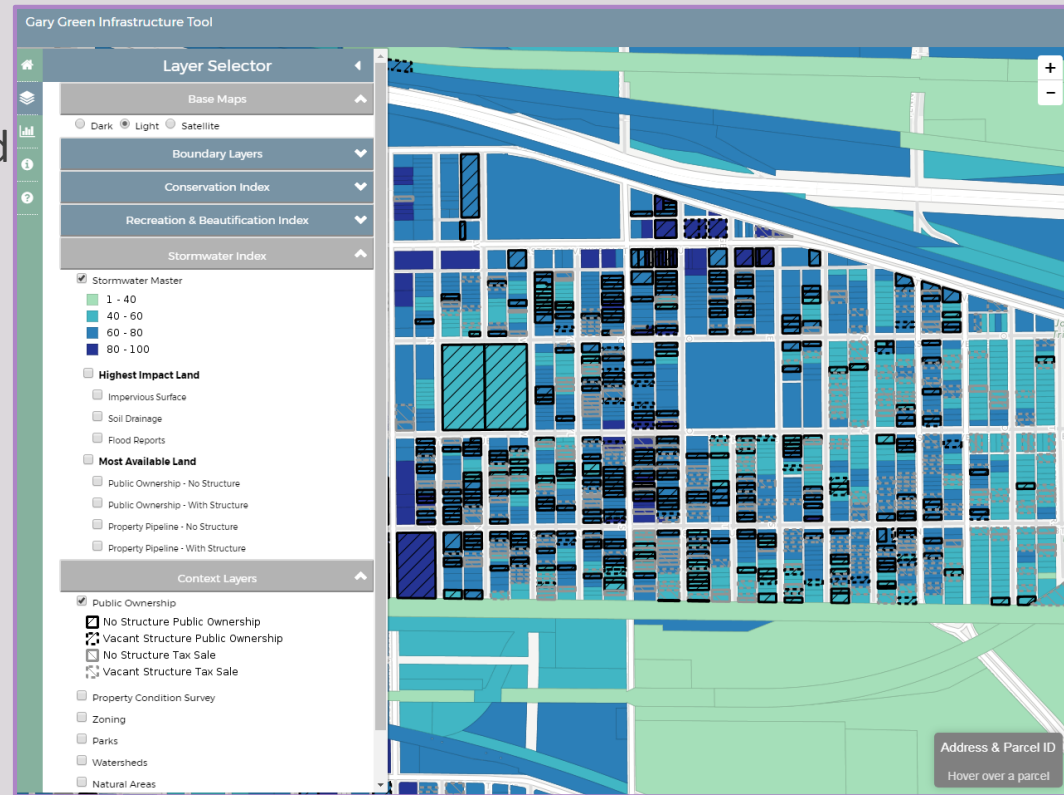
# Project: Gary Green Infrastructure Master Plan

Grant Applicant: City of Gary, Department of Planning and Redevelopment

Year: 2017

Cost: \$80,000

- City worked with Delta Institute and Dynamo Metrics to develop green infrastructure prioritization tool
- Indices
  - Recreation and Beautification
  - Stormwater Management
  - Conservation
- Public engagement and internal coordination process
- Zoning code updates and design guidelines



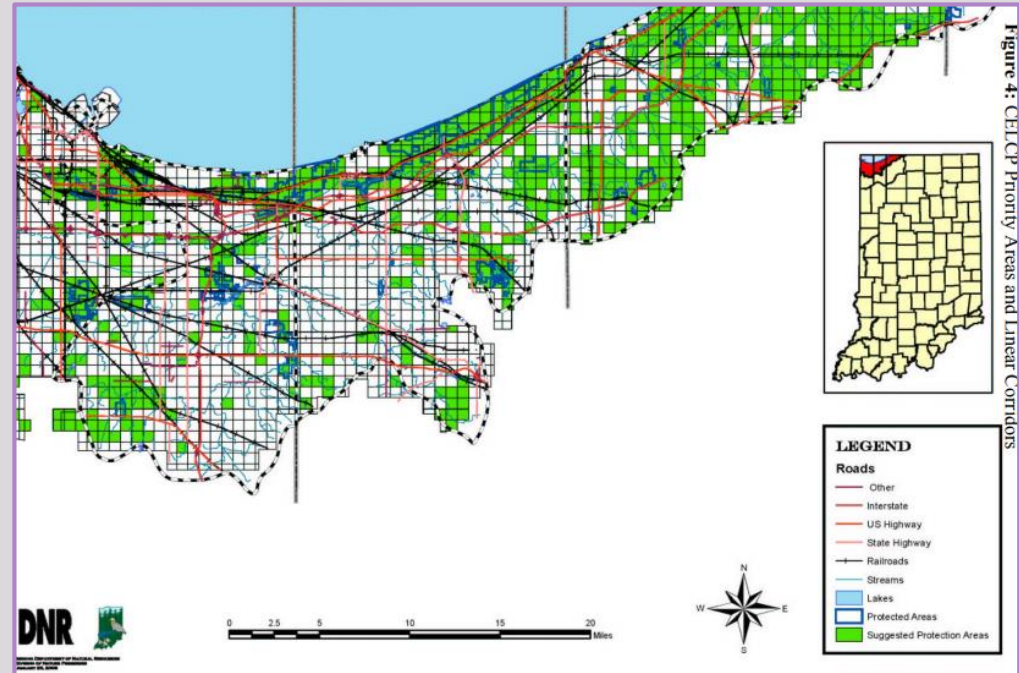


# Conservation Planning

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# Coastal Program Initiatives

- Coastal and Estuarine Land Conservation Program (CELCP) plan was developed by LMCP with partners and identifies biologically important areas within the Lake Michigan watershed
- Coastal Program funded projects
  - Land acquisition strategy
  - Tree inventory & mgmt. plans
  - Green infrastructure plans



# Greenways + Blueways Plan

- Northwestern Indiana Regional Planning Commission (NIRPC)'s plan to develop corridors that have multiple benefits--conservation, recreation, water quality and quantity



# Project: Gary Green Link



Architect: UrbanWorks, Ltd.

Grant Applicant: City of Gary, Department of Environmental Affairs

Year: 2003

Cost: \$100,000

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<http://www.in.gov/dnr/lakemich/>

