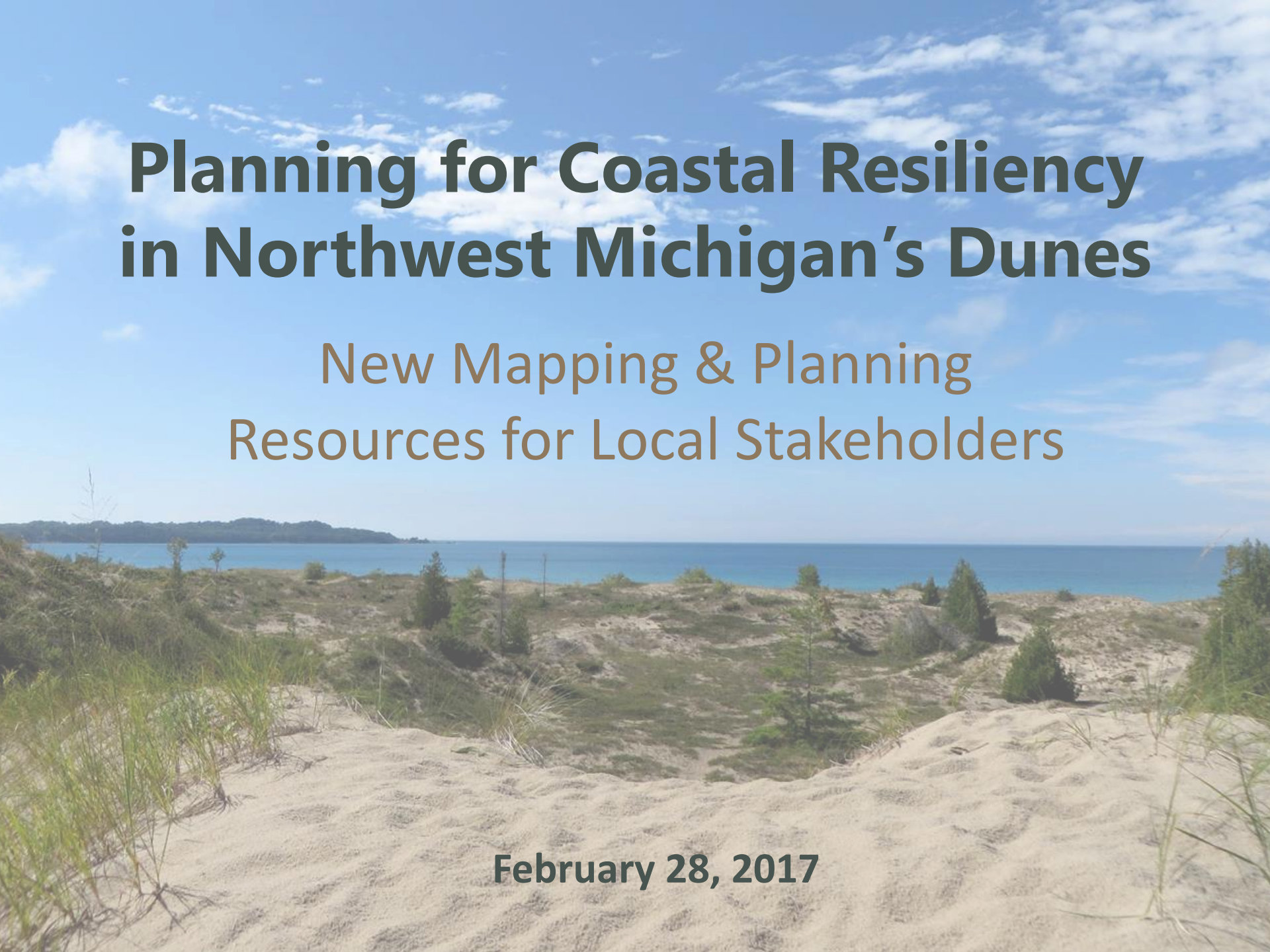


Planning for Coastal Resiliency in Northwest Michigan's Dunes

New Mapping & Planning Resources for Local Stakeholders

February 28, 2017

Project Partners

DEQ Coastal Zone Management Program
- Funding

MNFI
- Digitized dune data
- Created mapping resources

Networks Northwest
- Reviewed NW Michigan policies & best practices
- Developed planning guidebook

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

DEQ

Networks Northwest
Talent / Business / Community

Michigan Natural Features Inventory
Discover. Define. Deliver.

OGL
Michigan Office of the Great Lakes

Why Coastal Resiliency?

- Dunes cover 38,400 acres in Northwest Michigan
- Steep slopes, bluffs, dunes, sandy beaches must retain dynamic features to function properly in and as an ecosystem
- Are vulnerable to hazards like erosion that can cause damage to human life and property
- Easily impacted by development; inappropriate development disrupts natural systems and may exacerbate hazards/vulnerability

Coastal resilience **means building the ability of a community to "bounce back" after hazardous events such as hurricanes, coastal storms, and flooding – rather than simply reacting to impacts.**

National Ocean Service (NOAA)

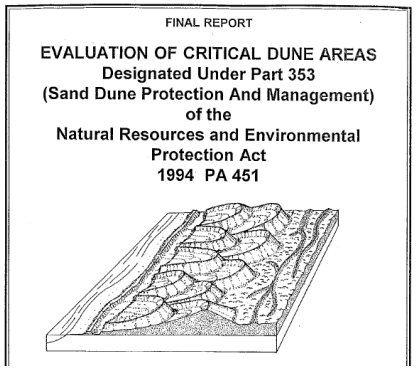
Mapping Coastal Features in NWLP

Provide a digital dataset of all coastal dunes, **<u>regardless of designation or significance</u>**

Provide a digital dataset of the Humphrys Shoretypes (1950s)

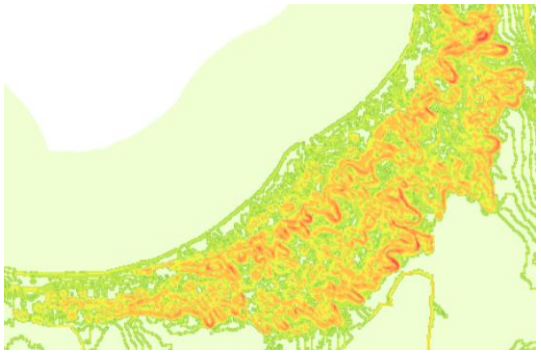
Mapping Coastal Dunes in NWLP

Des. Critical Dunes

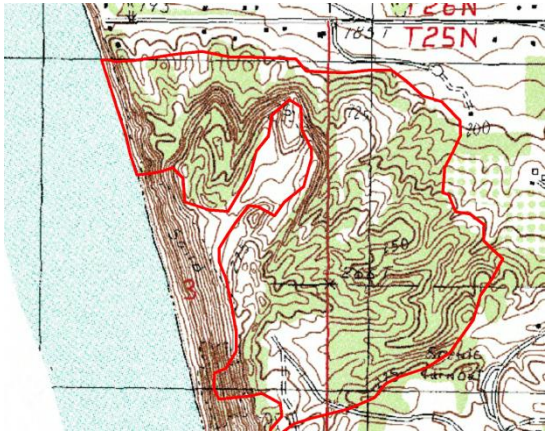

FINAL REPORT

EVALUATION OF CRITICAL DUNE AREAS
Designated Under Part 353
(Sand Dune Protection And Management)
of the
Natural Resources and Environmental
Protection Act
1994 PA 451

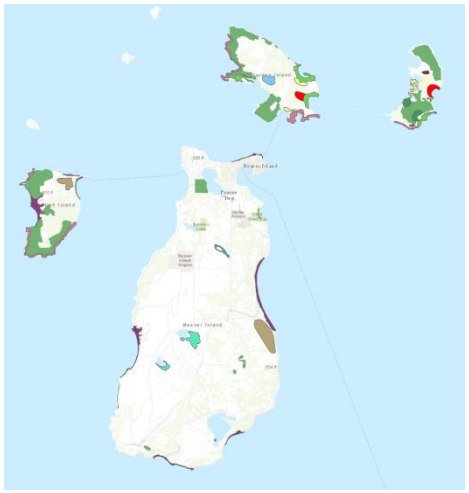
SSURGO Soils Data



USGS Topo Quads

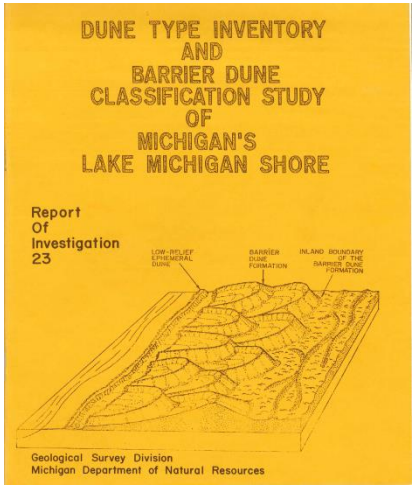


MNFI Database



Aerial imagery

Buckler, 1978-79

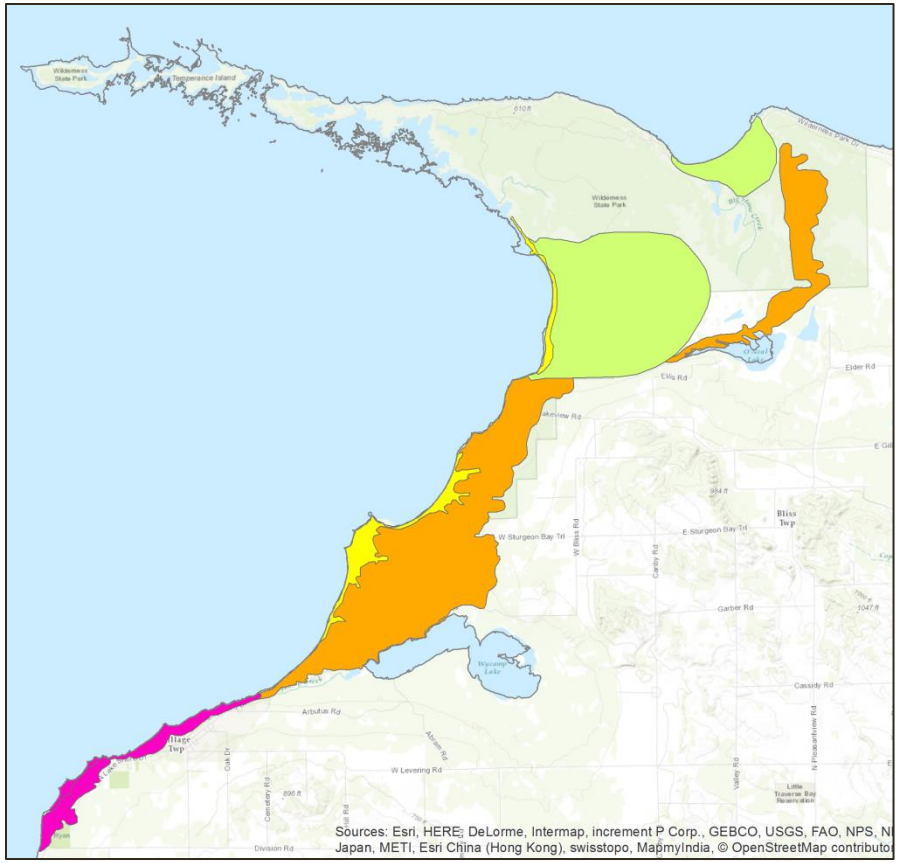

DUNE TYPE INVENTORY
AND
BARRIER DUNE
CLASSIFICATION STUDY
OF
MICHIGAN'S
LAKE MICHIGAN SHORE

Report
Of
Investigation
23

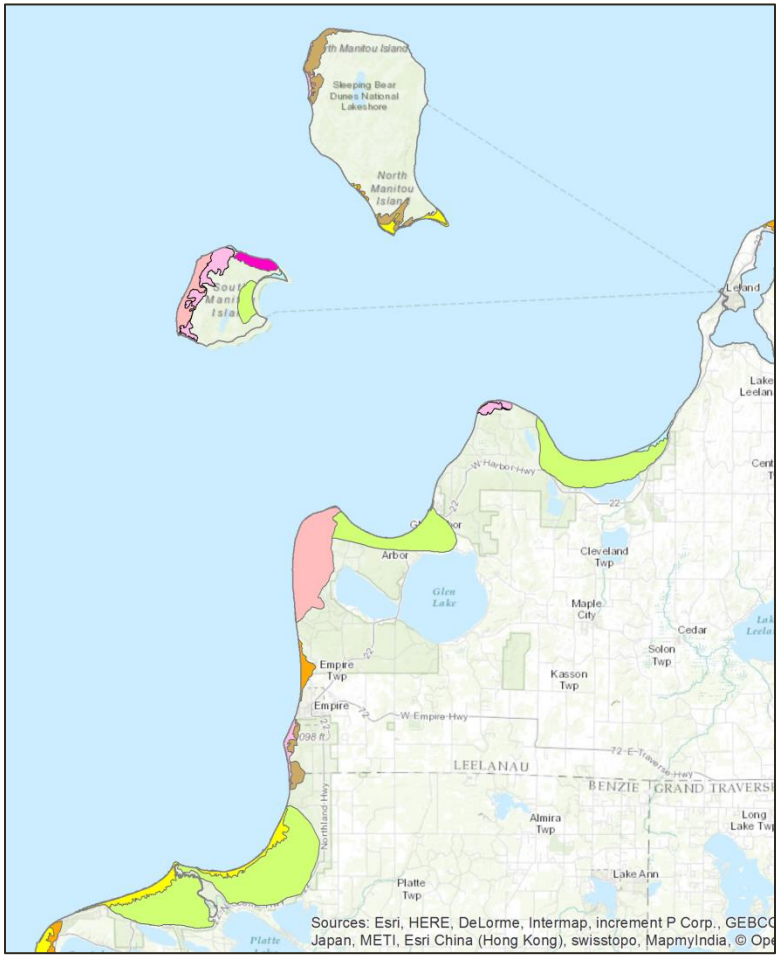
Geological Survey Division
Michigan Department of Natural Resources

Some Coastal Dune Results

- Overall Dune Sites (48)
  - Total Acres = 38,400 acres
  - Largest Site = WSP
  - Mapped 37% (10,400 ac) more acres
  - 75% in public ownership



Some Coastal Dune Results



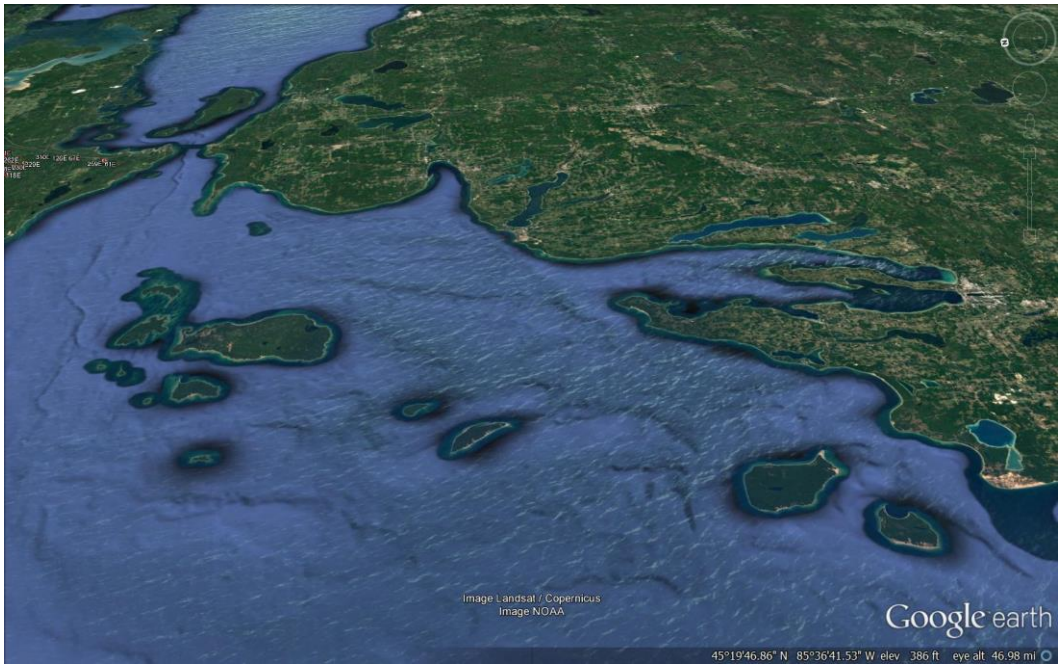
- 9 Different Types of Dunes (93 polygons)
  - Formation, Perched, and Vegetation
  - Sleeping Bear Dunes = highest diversity
  - Wooded Dune and Swale Complexes 42% of total acres (16,330 ac)

Coastal Dunes: Ownership Opportunities

Site #	Site Name	Dune Type	County	Township	Size (acres)	% Private	HREA
1	South Manistee	Complex Dune Field	Manistee	Filer	121	100	Yes
2	Barr	Parabolic	Manistee	Manistee	215	100	Yes
3	Onekema	Complex Dune Field	Manistee	Onekema	301	100	Yes
4	Onekema North	Parabolic	Manistee	Onekema	301	90	Yes
5	Arcadia Bluffs	Complex Dune Field	Manistee	Arcadia	109	100	Yes
7	Lower Herring Lake	Complex Dune Field	Benzie	Blaine	127	100	Yes
8	Green Point	Parabolic	Benzie	Blaine	165	50	Yes
9	Elberta South	Parabolic	Benzie	Gilmore	276	96	Yes
10	Elberta	Parabolic	Benzie	Gilmore	294	83	
11	Frankfurt North	Parabolic	Benzie	Crystal Lake	110	98	Yes
12	Crystal Lake	Parabolic	Benzie	Crystal Lake/Lake	809	70	Yes
26	North Lake Leelanau	Parabolic	Leelanau	Leland	834	60	
27	North Torch Lake	Complex Dune Field	Antrim	Torch Lake	655	83	
29	Grand Traverse Bay North	Complex Dune Field	Leelanau	Leelanau	64	100	
30	Cathead Point	Parabolic	Leelanau	Leelanau	139	100	
35	South Fox Island	Parabolic	Leelanau	Leelanau	1,132	66	
37	Iron Ore Bay	Complex Dune Field	Charlevoix	Peaine	215	70	
38	Cable Bay	Complex Dune Field	Charlevoix	Peaine	31	67	
39	Greenes Bay	Parabolic	Charlevoix	Peaine	317	84	
40	Sand Bay North	Wooded dune and swale	Charlevoix	Peaine	420	85	
42	Donegal Bay	Parabolic	Charlevoix	Peaine/St James	799	62	
44	Lookout Point	Complex Dune Field	Charlevoix	St. James	64	80	

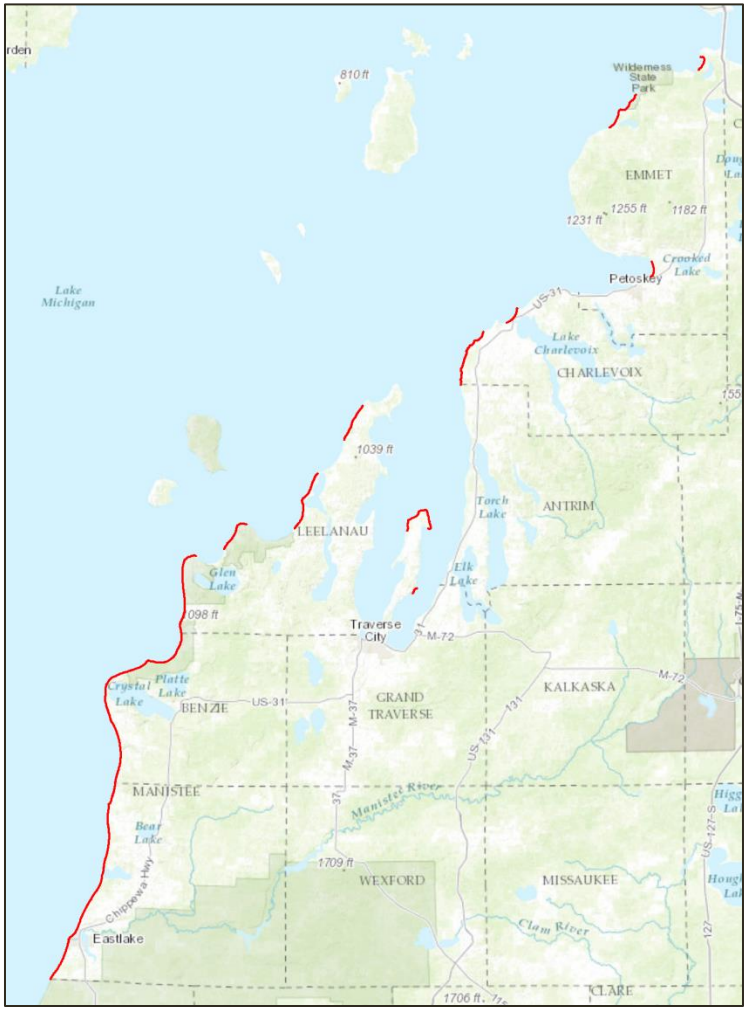
Mapping Shoretypes in the NWLP

- Humphrys Shoretypes (1950s)
- By foot and boat
- Promote cottage development
- Shoretypes = 113
- Data fields = soils, slope, bluff height, beach width, vegetation, erosion potential, nearshore depth, upland desc.



Mapping Shoretypes in NWLP

- Erosion Potential
  - Med/High
  - Low
  - None



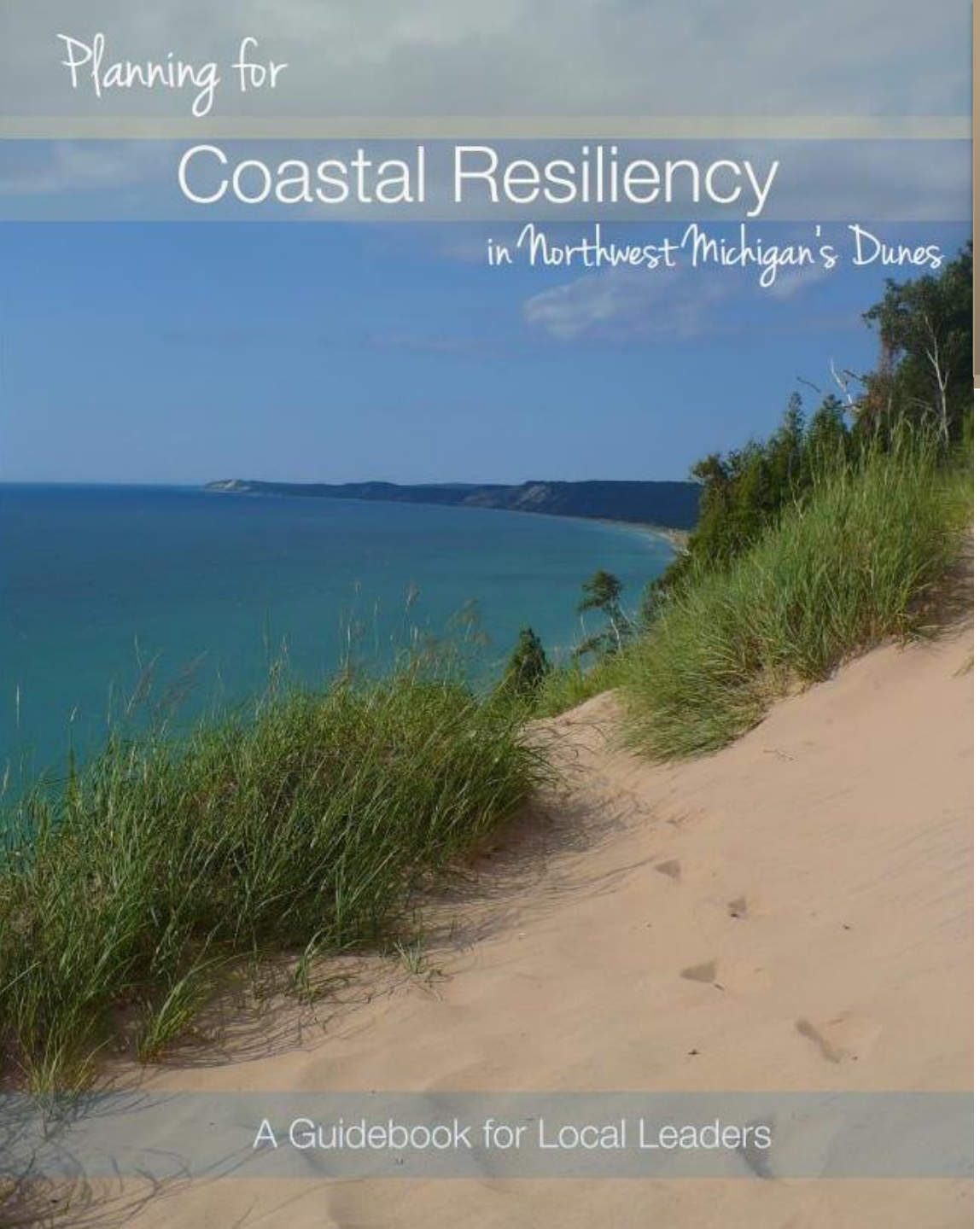
Where to Get the Information?

ArcGIS Online: Northwest LP Coastal Resiliency

http://mnfi.maps.arcgis.com/home/item.html?id=cdfc4ef5483b4630b220eed57daaeee8

StoryMap – Coastal Dunes of Michigan's NWLP

http://mnfi.maps.arcgis.com/apps/MapSeries/index.html?appid=a2232d34a57644baac2687f5481033c2



A Guidebook for Local Governments

- State regulations address Critical Dunes and High Risk Erosion Areas
- Local Roles
  - State and federal permitting provides only “piecemeal” protections
  - Local governments must take the lead on policies, plans, and “nonstructural” resiliency techniques

Planning Issues & Techniques

- Master Plans
- Recreation Plans
- Conservation
- Hazard Mitigation Planning
- Zoning

Zoning Issues & Techniques

- Shoreline Protection Setbacks
- Limitations on Shoreline Structures
- Environmental Impact Statements
- Bluff Protection Zones
- Overlay Districts
- Coordinating with Related Regulations

	# Communities	Sample Plans & Ordinances
Zoning provisions		
Bluff protection zoning	19	Emmet County; Onekama Township, Manistee County
Greenbelts/vegetative buffers	34	Milton Township, Antrim County; Emmet County; Bingham Township, Leelanau County
Limit removal of shore cover	32	Village of Elk Rapids, Antrim County; Village of Suttons Bay, Leelanau County
Limit shoreline structures	42	Hayes Township, Charlevoix County; Crystal Lake Township, Benzie County
Environmental impact statement	18	Leelanau Township, Leelanau County; Emmet County; Filer Township, Manistee County
Overlay districts	23	Leelanau Township, Leelanau County; Emmet County; Manistee Township, Manistee County
Coordinated site plan review/state and federal permitting	22	Leelanau Township, Leelanau County; Charlevoix Township, Charlevoix County
Cluster development	44	Gilmore Township, Benzie County; Glen Arbor Township, Leelanau County

Guidebook Resources

- Case Studies
- Sample Master Plan Language
- Coastal Resiliency Planning Process Checklist
- Links to adopted local ordinances
- ArcGIS Online dune type and cover maps
- Coastal Resiliency Story Map

Available online at:

http://www.networksnorthwest.org/coastalresiliency