Restoring, Retrofitting, and Recoupling Michigan's Great Lakes Shorelands

Annual Meeting – July 21, 2015

UNIVERSITY OF MICHIGAN / MICHIGAN TECH

- RICHARD NORTON (UM) – PROJECT LEAD, COMMUNITY PLANNING
- STEPHEN BUCKMAN (UM) – POST-DOC, COMMUNITY PLANNING
- ZACH RABLE (UM) – RESEARCH ASSOCIATE
- GUY MEADOWS (MTU) – SHORELINE DYNAMICS
- LARISSA LARSEN (UM) – VULNERABILITY ASSESSMENT / ENV PLNG
- PAUL WEBB (UM) – COASTAL WETLANDS HABITATS
- LAN DENG (UM) – FISCAL IMPACT ANALYSIS
- MARIA ARQUERO DE ALARCON (UM) – VISUALIZATION
- JEN MAIGRET (UM) – VISUALIZATION

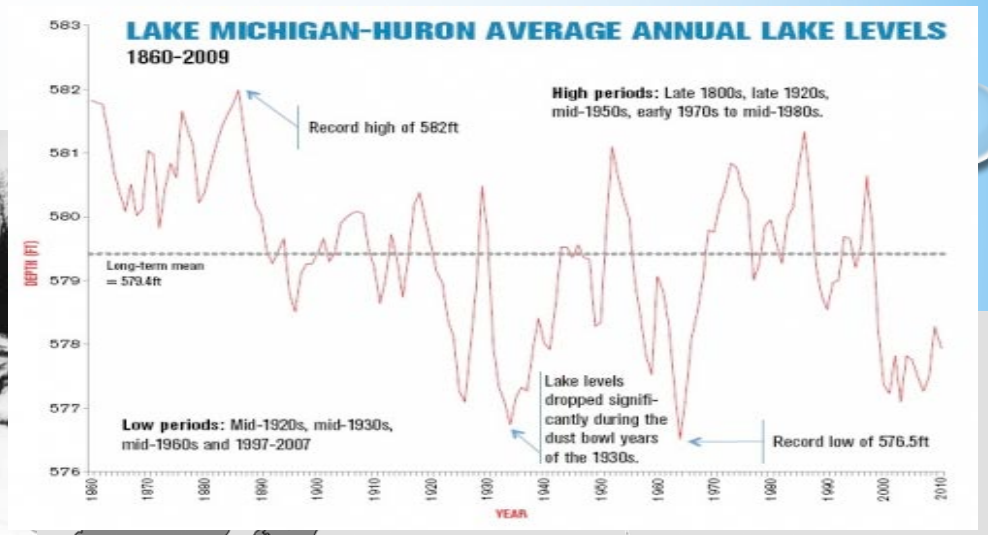
STATE OF MICHIGAN COASTAL ZONE MANAGEMENT

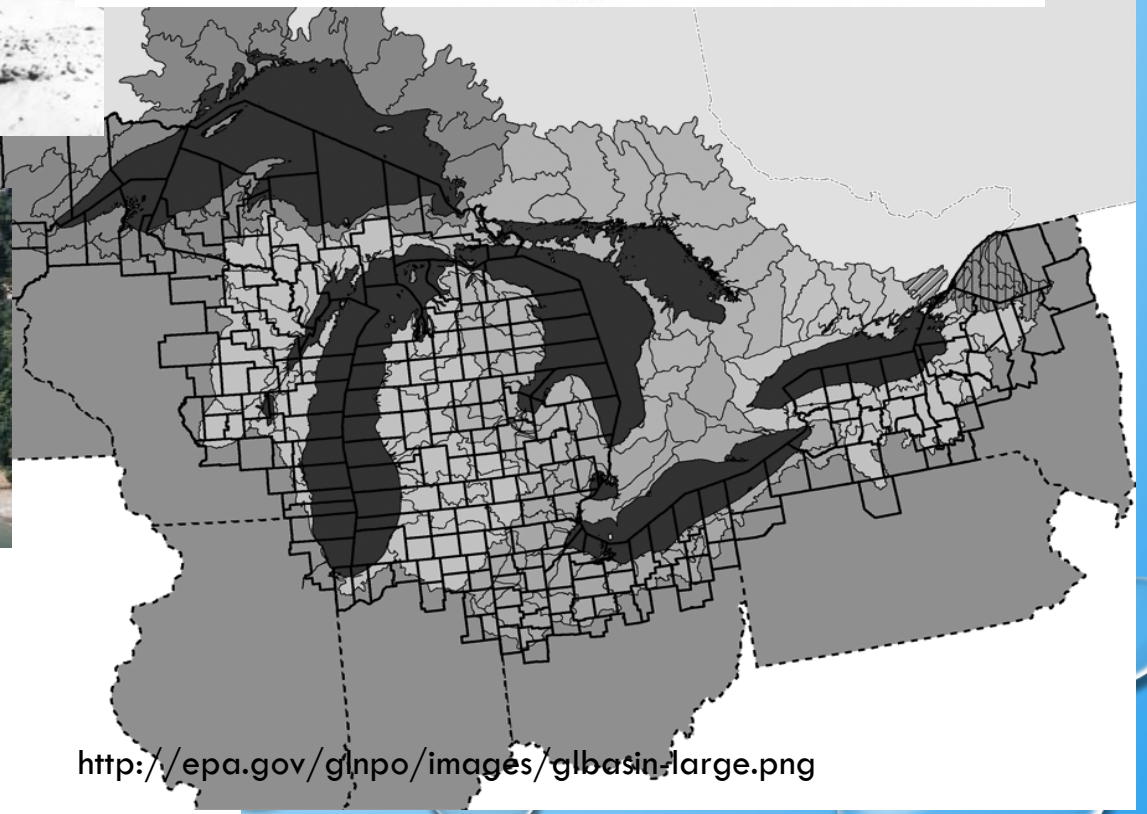
- RONDA WUYCHECK – SHORELAND MANAGEMENT
- MATT WARNER – SHORELAND MANAGEMENT

LIAA

COMMUNITY OUTREACH AND COLLABORATIVE PLANNING

- WHITNEY WAARA, EXEC. DIRECTOR, COMMUNITY PLANNER
- CLAIRE KARNER, COMMUNITY PLANNER
- DUSTY CHRISTENSEN, COMMUNITY PLANNER
- HARRY BURKHOLDER, COMMUNITY PLANNER
- KATIE SIEB, COMMUNITY PLANNER





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CONCEPTUALIZATIONS OF PLANNING

Technocratic

Current Conditions → **Problems / Vision** — ***Analysis:***

- *Measurement / Quantification*
- *Causal Connections*
- *Land Suitability Analysis*
- *Scenario Analysis*

→ **Solutions / Initiatives**

+ Fiscal Impact

Collaborative

General Comprehensive / Master Planning

+

Climate Adaptation Planning

BACKGROUND: DRIVERS OF RESEARCH

CHALLENGE OF **PLANNING** FOR & **MANAGING** GREAT LAKES SHORELANDS:

- IN THE FACE OF **GLOBAL CLIMATE CHANGE**
- GIVEN CURRENT INSTITUTIONAL ARRANGEMENTS
  - **STATE** REGULATION OF SHORELINES
  - ***LOCAL*** *REGULATION / DEVELOPMENT MANAGEMENT OF SHORELANDS (AND LARGER COMMUNITY)*
  - **UNCERTAINTIES** (LAKE WATER LEVEL VARIABILITY) AND **CONTESTATIONS** (PLANNING AND PRIVATE PROPERTY RIGHTS)

BACKGROUND: RESEARCH QUESTION

RESEARCH QUESTION: HOW DO THE USE OF **COLLABORATIVE** / **CLIMATE ADAPTATION** / **SCENARIO-BASED** PLANNING PROCESSES AFFECT COMMUNITY PLANNING OUTPUTS AND, ULTIMATELY, OUTCOMES?

- GREAT LAKES COASTAL COMMUNITIES / SETTINGS
- MEASURING "GOODNESS" IN TERMS OF EFFECTIVE SHORELAND MANAGEMENT
- COMMUNITY SUSTAINABILITY AND RESILIENCE IN THE FACE OF CLIMATE CHANGE

PROJECT OVERVIEW: A MULTI-DIMENSIONAL APPROACH

- TWO-COMPONENT PROJECT: DOING & STUDYING WHILE DOING (PAR)
- INTEGRATING: PLANNING, ACADEMIC RESEARCH, TECHNICAL GUIDANCE DEVELOPMENT
- OVERALL RESEARCH / PROJECT DESIGN:
  - CONDUCT COMMUNITY PLANNING
  - INCORPORATE TECHNICAL ANALYSES
  - EVALUATE THE INFLUENCE ON UPDATED PLANS, MANAGEMENT DECISIONS
  - PREPARE TECHNICAL GUIDANCE MATERIALS

TWO-TIERED RESEARCH DESIGN

TIER 1: TECHNICAL ANALYSES AND ANALYTICAL METHOD/TRAINING CONTENT DEVELOPMENT

- **RESEARCH GOALS:**
  - DEVELOP TECHNICAL ANALYSES THROUGH SCENARIO-BASED ASSESSMENTS
  - PREPARE ANALYTICAL PROTOCOLS / TRAINING PROGRAMS
- **METHOD:** COLLABORATION WITH LIAA PLANNING STAFF; MULTIPLE MEETINGS (AS APPROPRIATE) W/ COMMUNITY ACTION TEAMS (CAT) AND PUBLIC OFFICIALS

TWO-TIERED RESEARCH DESIGN

Tier 2: Evaluation of Collaborative Planning for Shoreland Management in Face of Climate Change

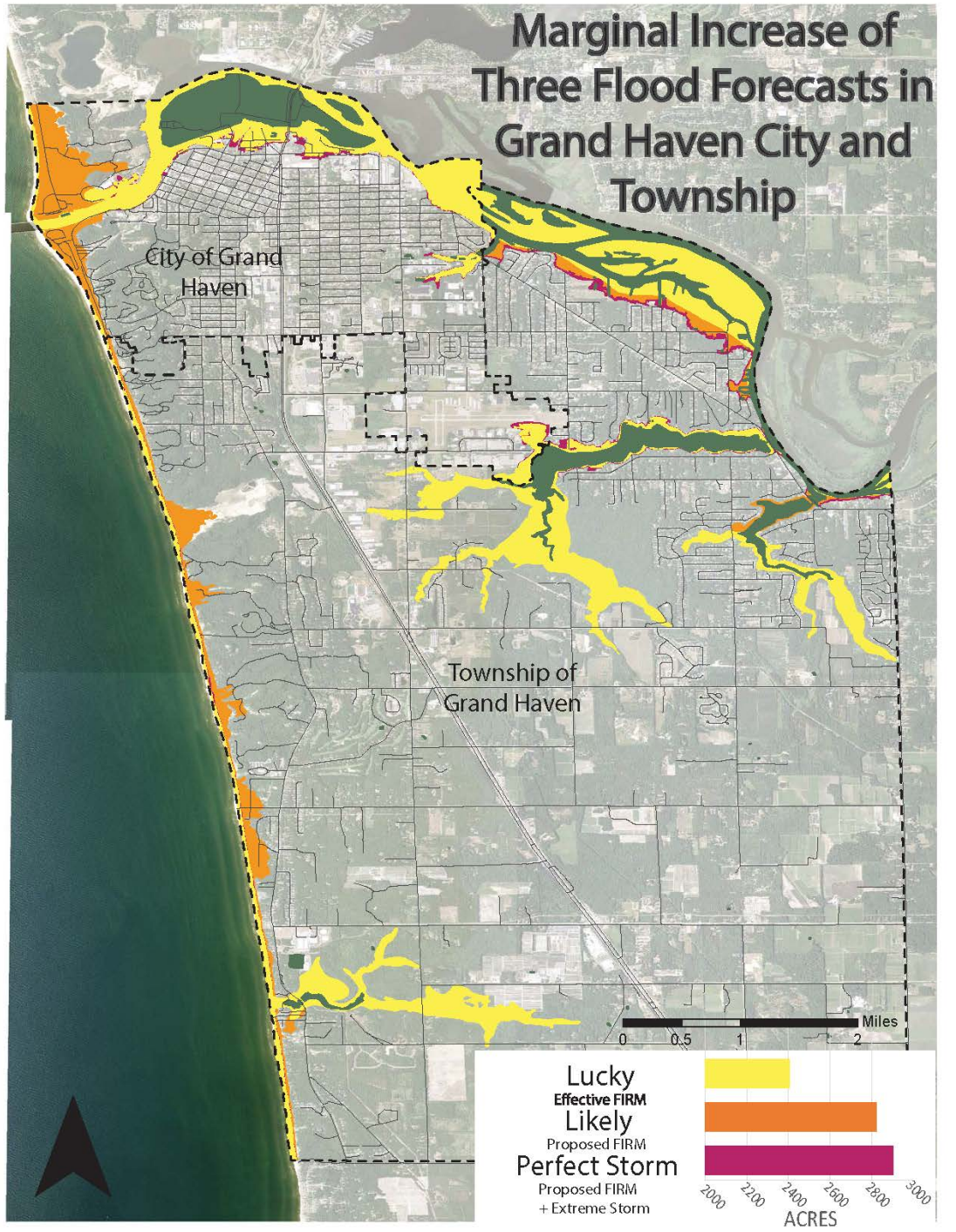
Cases	Pre-test	Treatment	Post-test
Full Treatment	Analyze plans and zoning codes; Pre-test survey	Full technical collaboration / scenario-based assessment on master plan (Ludington, St. Joseph, Grand Haven)	Analyze new plans, zoning codes; Post-test survey
Partial Treatment	Analyze plans and zoning codes; Pre-test survey	Reduced collaboration on master plan (Monroe, East Jordan)	Analyze new plans, zoning codes; Post-test survey
No Treatment	Review initial master plan	Non LIAA/UM master plan	Analyze new plan, zoning code; Survey

OUTPUTS:
SCENARIO-BASED PLANNING

Development ***Future Condition***	***Lucky***	***Expected***	***Perfect Storm***
Current	Scenario 1A Land Use Environmental Fiscal	Scenario 1B	Scenario 1C
Potential Build out	Scenario 2A	Scenario 2B	Scenario 2C
Best Management	Scenario 3A	Scenario 3B	Scenario 3C

OUTPUTS:
MAPPING HIGH-RISK ZONES

	Minimum Input (Existing FEMA FIRMs + USGS DEM)	Wave Run-up Study Only (VE, AO, & Additional AE Zones)	HAZUS Level 2 Only (DEM + Depth Grids used to supplement analysis)	Full Input (all components available)
Lucky	Wave = None Flood = FIRM BFE (A & AE Zones)	Wave = None Flood = FIRM BFE (A & AE Zones)	Wave = None Flood = 2% Storm + Low still water elevation	Wave = None Flood = 2% Storm + Low still water elevation
Expected	Wave = OHWM & DEM for Pseudo VE Flood = FIRM BFE (A & AE Zones)	Wave = Mapped VE Flood = FIRM BFE (A, AO, & AE Zones)	Wave = None (OHWM inundation on coast) *and/or* Pseudo VE Flood = 1% Storm + Avg. still water elevation	Wave = Mapped VE Flood = 1% Storm + Avg. still water elevation
Perfect Storm	Wave = HHWM & DEM for Pseudo VE Flood = FIRM BFE (A & AE Zones) + 0.2% (shaded X Zones)	Wave = Mapped VE Flood = FIRM BFE (A, AE, & AO Zones) + 0.2% (shaded X Zones)	Wave = None (HHWM inundation on coast) *and/or* Pseudo VE Flood = 0.2% Storm + High still water elevation	Wave = Mapped VE Flood = 0.2% Storm + High still water elevation


Marginal Increase of Three Flood Forecasts in Grand Haven City and Township
City of Grand Haven
Township of Grand Haven
Miles
0
0.5
1
2
Lucky
Effective FIRM
Likely
Proposed FIRM
Perfect Storm
Proposed FIRM
+ Extreme Storm
2000
2200
2400
2600
2800
3000
ACRES

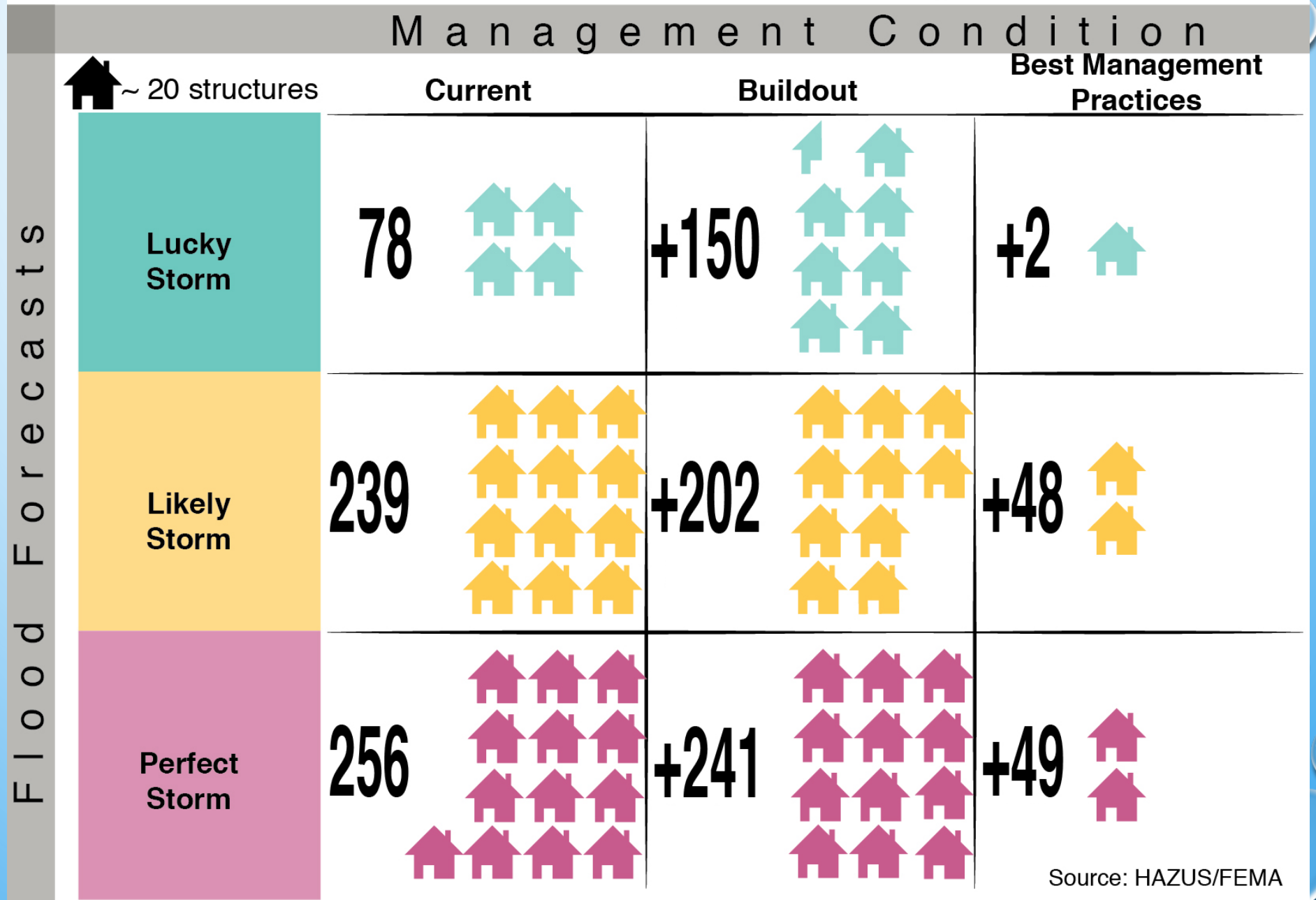
OUTPUTS:
GRAND HAVEN LAND USE IMPACT ANALYSIS

STRUCTURES

DRAFT

City of Grand Haven

Buildings Impacted Under Different Flood & Management Scenarios



Source: HAZUS/FEMA

OUTPUTS:

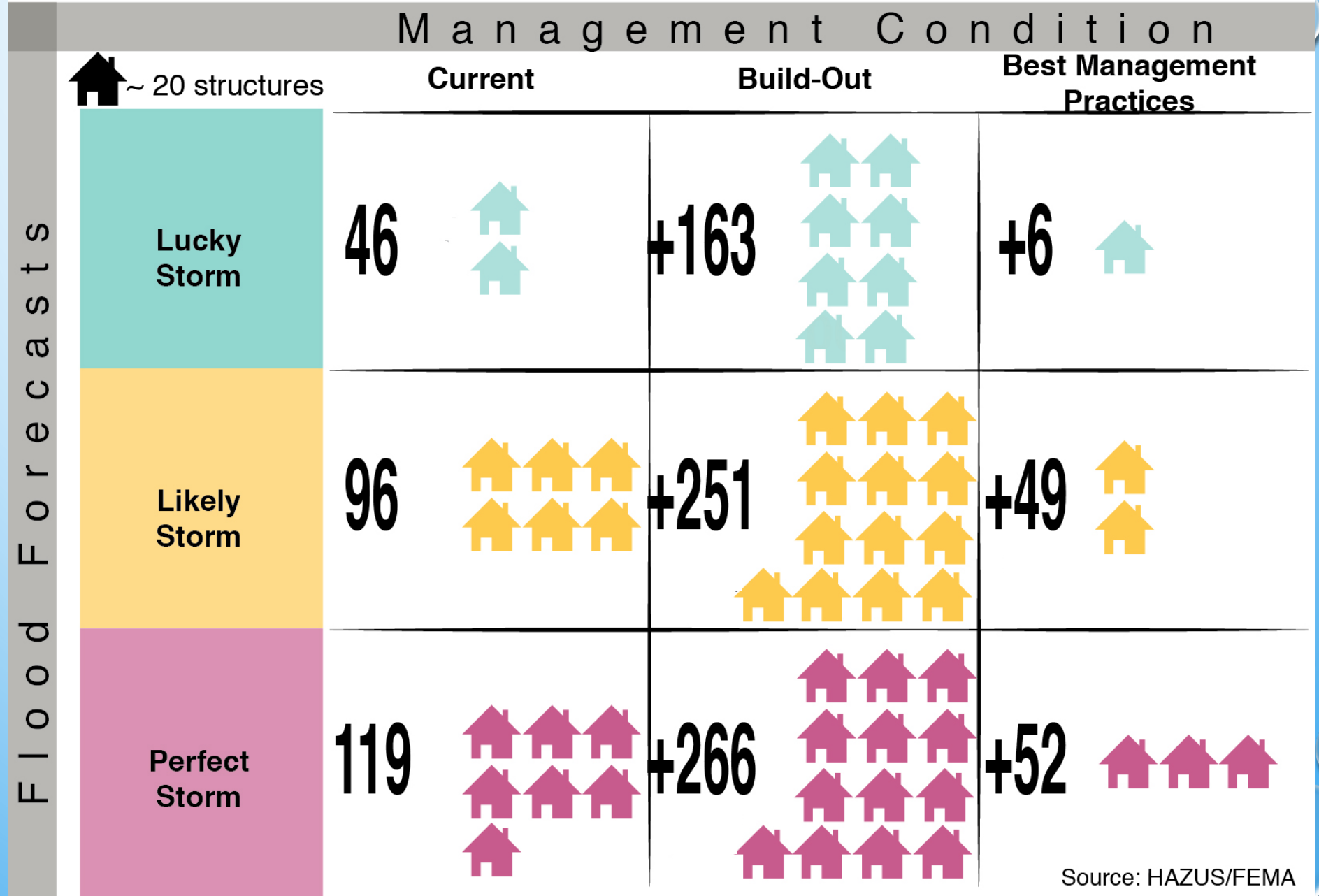
GRAND HAVEN LAND USE IMPACT ANALYSIS

STRUCTURES

DRAFT

Grand Haven Township

Buildings Impacted Under Different Flood & Management Scenarios



Source: HAZUS/FEMA

OUTPUTS:

GRAND HAVEN FISCAL IMPACT ANALYSIS (PARTIAL)

DRAFT

CURRENT	Grand Haven City		Grand Haven Township	
Within hazard zones:	***Lucky***	***Expected***	***Lucky***	***Expected***
Total Units	668	692	699	809
Total Tax Base ($)	46.5 mil	54.5 mil	107.7 mil	136.5 mil
Potential Property Tax Loss ($)	1.6 – 2.5 mil	1.9 – 2.9 mil (17% Increase)	2.8 – 4.8 mil	3.5 – 6.0 mil (28% Increase)

END USER ENGAGEMENT: NATURE OF MEETINGS

- ENGAGED IN *OPEN FORUM* PLANNING MEETINGS WITH **LUDINGTON, ST JOSEPH,** AND **GRAND HAVEN**
  - PRESENTED INFORMATION TO THE COMBINED PLANNING COMMISSIONS, ELECTED BOARDS, AND GENERAL COMMUNITY, AND ENGAGED THE COMMUNITY IN DIALOGUE THAT IS CENTERED ON THE INFORMATION DISCUSSED THAT NIGHT, SUCH AS MASTER PLANNING GOALS, COMMUNITY STRENGTHS AND WEAKNESSES, ETC.
- *ADDITIONAL* MEETINGS IN **LUDINGTON, ST JOSEPH, GRAND HAVEN**
  - KEY PUBLIC ELECTED / ADMINISTRATIVE OFFICIALS
  - LOCAL CAT MEETINGS
- **MAP / MCKENNA ASSOCIATES** TRAINING FOR LOCAL OFFICIALS
  - TRAINING PROGRAM CONTENT UNDER DEVELOPMENT
  - TRAINING TO BE DELIVERED LATE SUMMER / EARLY FALL