

RISK COMMUNICATION WORKSHOP

RENO BEACH NON PROJECT SEGMENT

Date: 11 JUL 2019



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Purpose of Meeting



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- Engage Stakeholders
- Share Understanding of Levee Safety Risks
- Promote Risk Communication



LIST OF INVITED AGENCIES



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INTRODUCTIONS

- USACE Buffalo District
- Lucas County
- Howard Farms Conservancy District
- Metroparks Toledo



AGENDA



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- Levee Safety Program Overview
- Risk Communication
- Screening Level Risk Assessments
- Open Discussion

RISK COMMUNICATION ENGAGEMENT

PART I: LEVEE SAFETY PROGRAM OVERVIEW

Robert W. Remmers, P.E., PMP
Levee Safety Program Manager
Great Lakes & Ohio River Division
Buffalo District
Operations & Technical Support Section



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LRB LSP OVERVIEW



- Subset of ICW Program
- HQUSACE's current focus is on Levee Safety Program
- Includes all 44 FRM Projects - 33 in NY and 11 in OH

– **Definitions:**

- **Projects** – One or more systems/segments
- **Systems** – Continuous protection provided from high ground to high ground
- **Segments** – Portion of system that a particular sponsor is responsible for

Non Project Segment - Is a form of manmade high ground which a federal levee system/segment ties into, whose existence and performance is necessary for excluding flood waters from the leveed area.



GOALS OF THE LEVEE SAFETY PROGRAM



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- Assess the **integrity of FRM projects** and recommend actions to assure the systems do not present unacceptable risks to the public and or property.
- To ensure that projects will **function** as intended, **public safety** is maintained, and the Federal and **local investments** in the projects are maximized.
- To ensure that local sponsors are properly **operating and maintaining** Federally-constructed FRM projects in accordance with project O&M Manuals and LCA's.



GOALS OF THE LEVEE SAFETY PROGRAM



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- To **communicate the risks** associated with FRM projects to the local sponsors, general public, and other stakeholders.
- Develop productive **working relationships** with local sponsors and other stakeholders.



FRM IS A SHARED RESPONSIBILITY



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PROJECT STAKEHOLDERS



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- U.S. Army Corps of Engineers (USACE)
- Local Sponsor
- Sub-Sponsors
- FEMA Region V (OH)
- County EMO's
- State EMO's
- Congressional Interests & Other Political Offices
- General Public (Residential, Commercial, Industrial, etc.)
- Media

RISK COMMUNICATION ENGAGEMENT

PART II: RISK COMMUNICATION

Date: 18 April 2018



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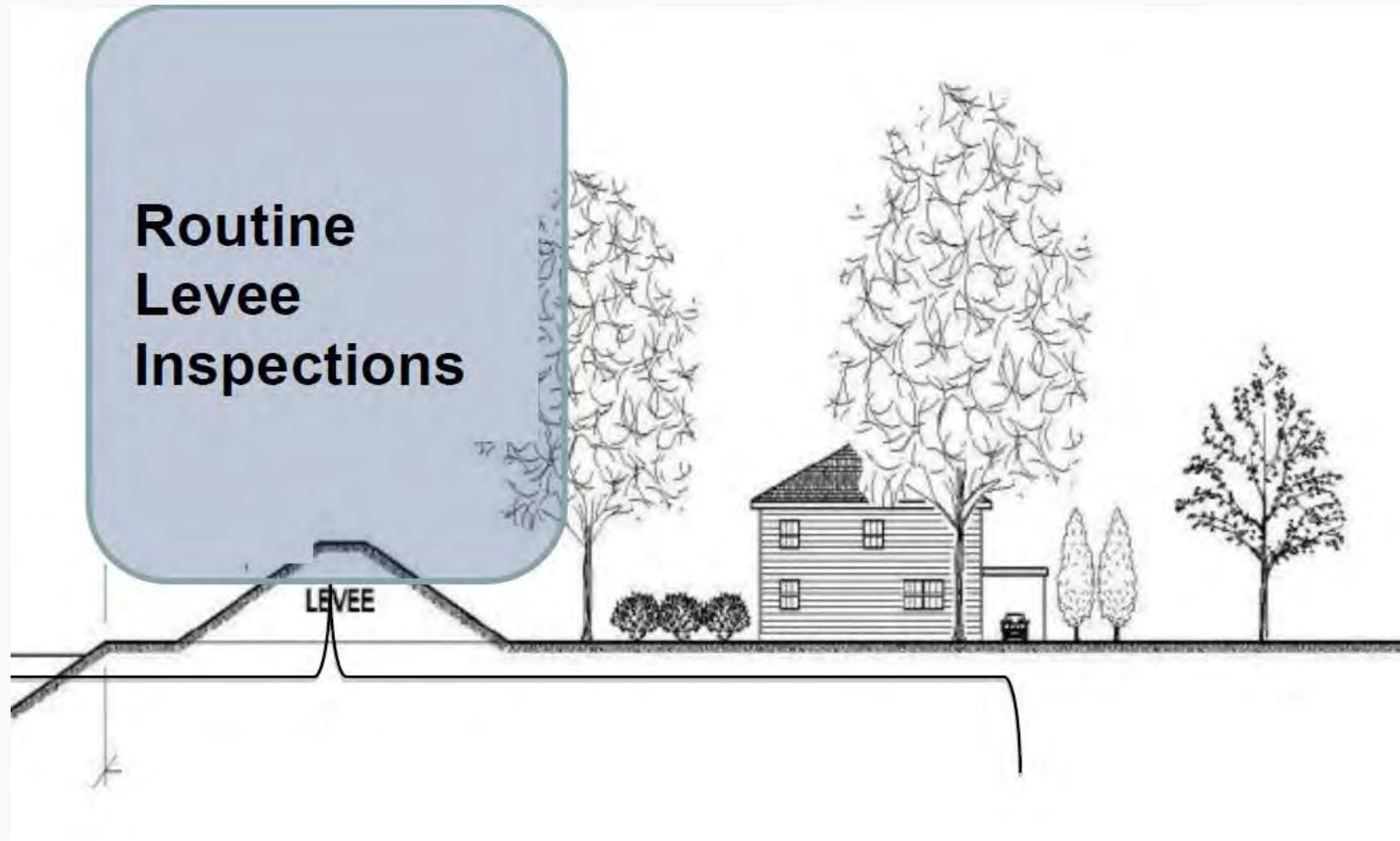




OLD USACE FOCUS



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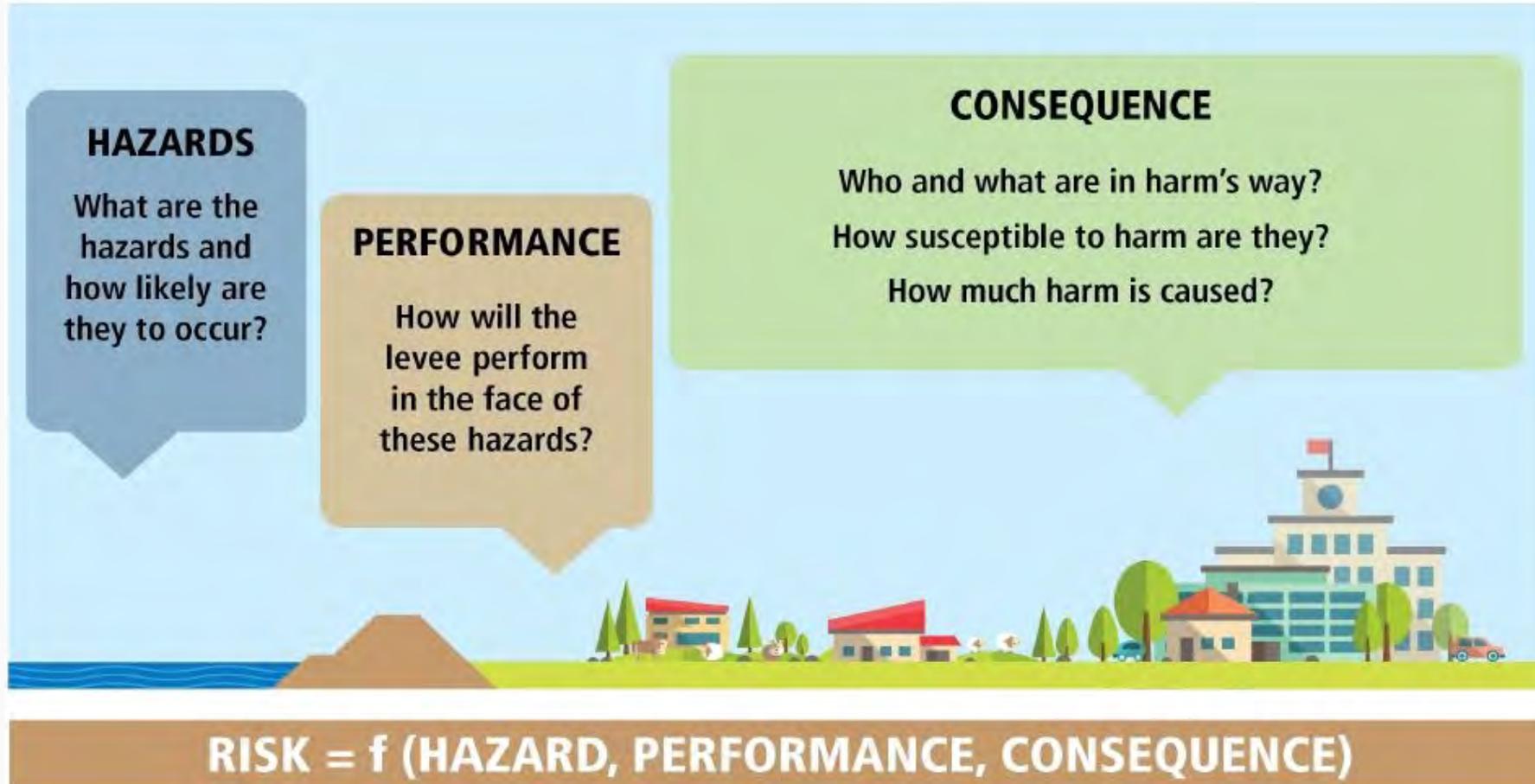
Infrastructure (not People)
Conditions (not Performance)
Inspection Ratings (not Risks)



NEW USACE FOCUS – RISK FRAMEWORK



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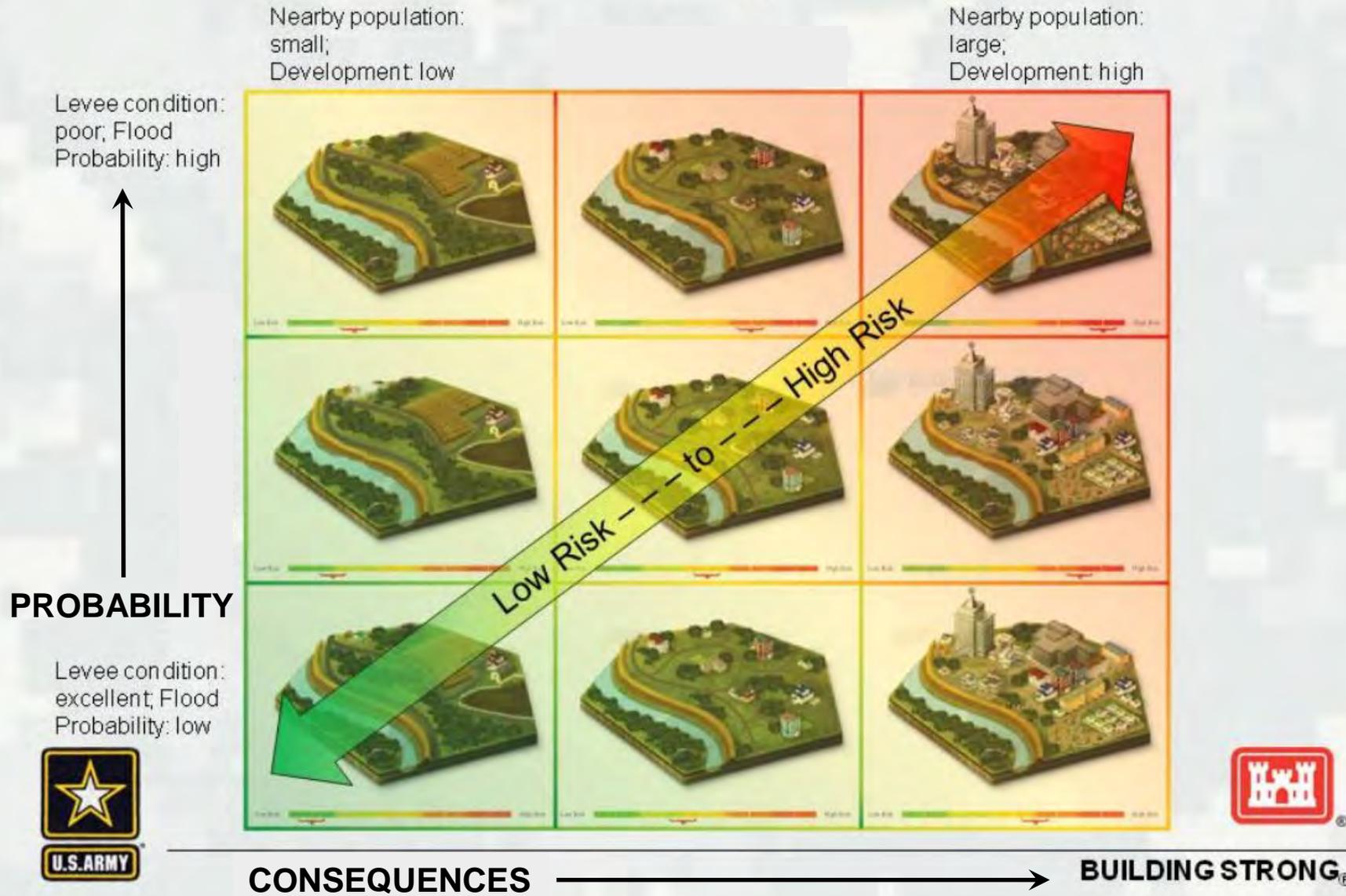




COMPARE RISKS ACROSS USACE



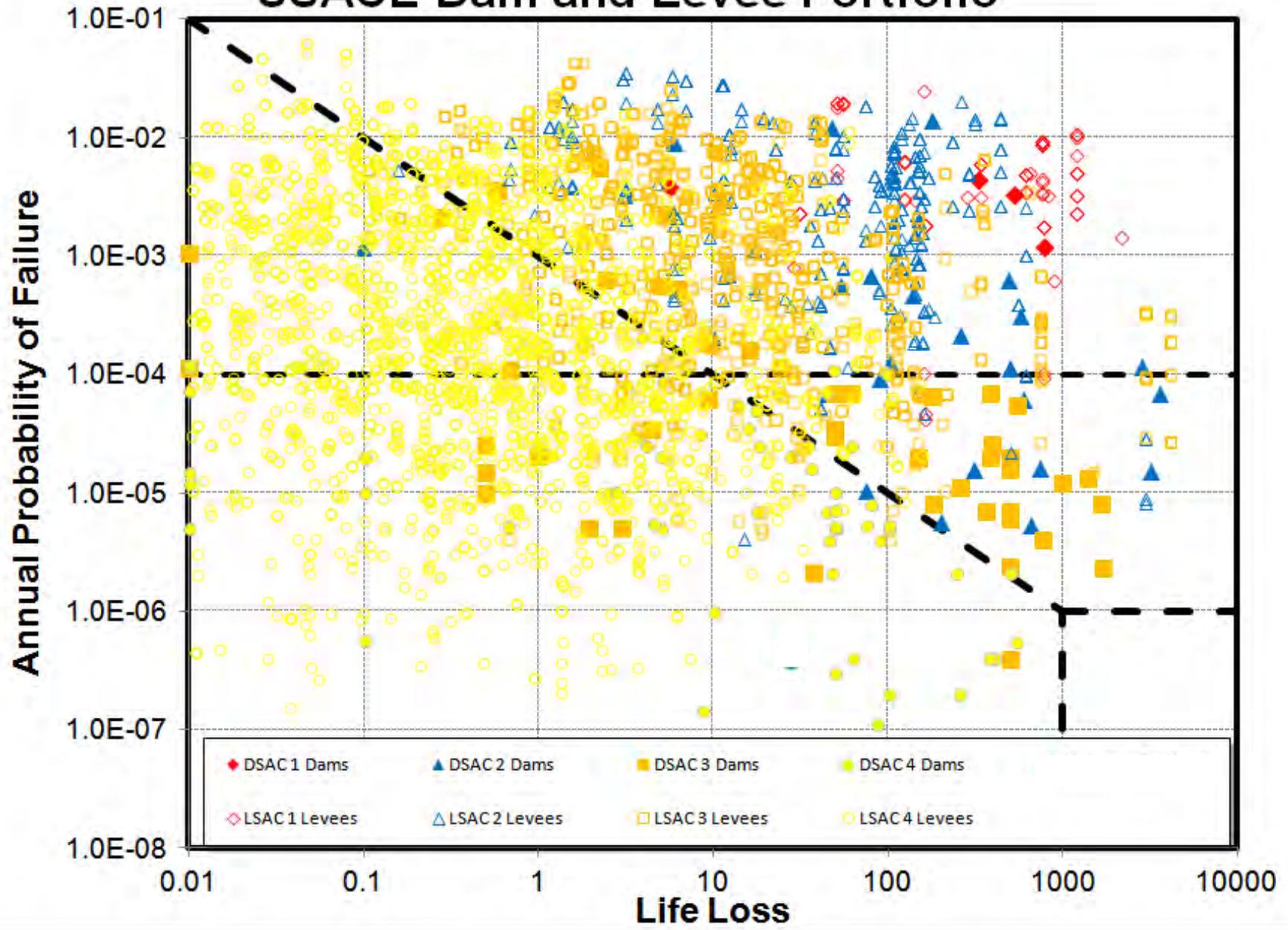
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USACE Dam and Levee Portfolio





SCREENING LEVEL RISK ASSESSMENTS (LEVEE SCREENINGS)



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- Modeled in a Levee Screening Tool
- Developed with USACE District SMEs
- Reviewed by USACE Division, National Cadre, Levee Safety Senior Oversight Group, & USACE HQ



LEVEE SCREENING TOOL (LST)



- Framework for Risk Informed Decision Making

- Inputs:

- Flood Loading (Hazards)
- Performance
- Consequences



- Outputs:

- Computations
- Risk Graphs & Charts
- Risk Characterizations

LST is NOT a Black Box:

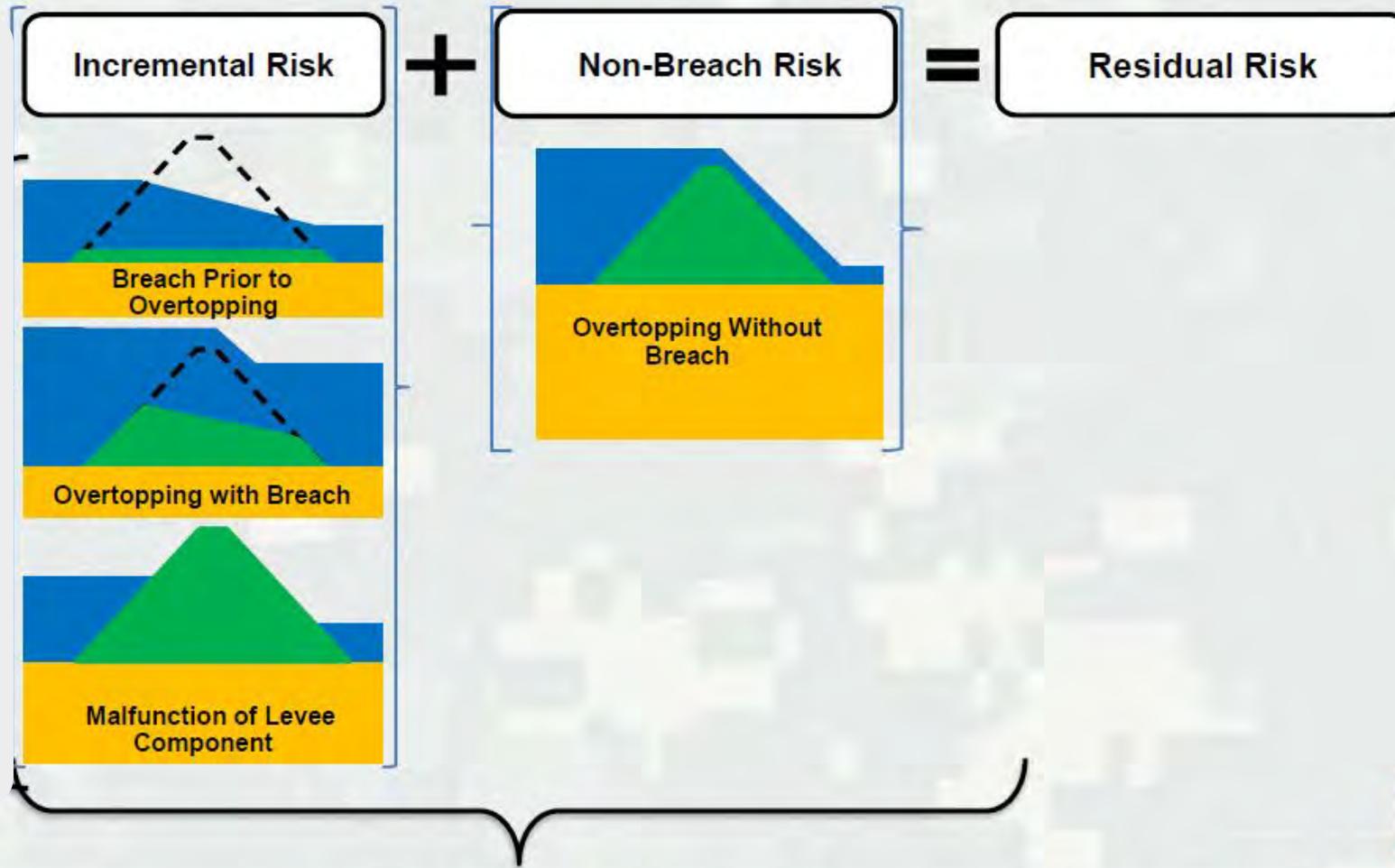
Outputs from the tool must still be interpreted by decision makers to make credible and transparent Risk Management decisions.



FLOOD LOADING (HAZARDS)



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Basis for Risk Communication



BUILDING STRONG®



FLOOD LOADING INPUT



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ACE = Annual Chance of Exceedence

- How Frequently is the Levee Expected to be Loaded?
- How Frequently is the Levee Expected to Overtop?
- Flood History?
- Other Information Readily Available?



PERFORMANCE – MODES AND INDICATORS



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Mode	Indicator	Mode	Indicator
Embankment and Foundation Seepage and Piping	Unwanted Vegetation Growth	Closure Systems	Condition
	Encroachments		Supply, Storage, and Security
	Settlement		Operational history
	Cracking		Miscellaneous items
	Animal Control	Floodwall Stability	Unwanted Vegetation Growth
	Culverts / Discharge Pipes		Encroachments
	Under Seepage Relief Wells / Toe Drainage Systems		Concrete Surfaces
	Seepage		Tilting, Sliding, or Settlement of Concrete Structures
Embankment Stability	Unwanted vegetation growth	Floodwall Underseepage and Piping	Foundation of Concrete Structures
	Encroachments		Underseepage Relief Wells / Toe Drainage Systems
	Cracking		Unwanted Vegetation Growth
	Depressions / Rutting		Encroachments
	Slope Stability	Underseepage Relief Wells / Toe Drainage Systems	
	Settlement	Seepage	
	Underseepage Relief Wells / Toe Drainage Systems	Culverts / Discharge Pipes	
Embankment Erosion	Sod Cover		
	Erosion / Bank Caving		
	Riprap Revetments and Bank Protection		
	Revetments other than Riprap		



PERFORMANCE - INDICATOR RATINGS



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➤ Low Likelihood (LL) =

Unlikely to contribute to a failure.

➤ Moderate Likelihood (ML) =

May contribute to a failure. Large amount of uncertainty about performance (existing studies/past performance)

➤ High Likelihood (HL) =

Will likely contribute to a failure.



CONSEQUENCES ANALYSIS



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- Levee Area Population and Property Value
 - National Levee Database (NLD)
 - Hazus - FEMA
- Refined Distribution of People based on Evacuation Effectiveness
 - Evacuation Planning
 - Public Awareness
 - Warning Effectiveness
 - Transportation System Congestion
 - Warning Time (overtopping v. breach)





LEVEE SAFETY ACTION CLASSIFICATION (LSAC)



- USACE Organizational Consistency
- Guide Decisions in Portfolio Management Process
- Enhances “State of the Infrastructure”
Communication

LSAC = Urgency of Action



WHAT DOES THE LSAC TELL US?



- Numerical value that indicates Urgency for Action across USACE Portfolio.
- Provides a framework to discuss Risk Management associated with levee systems and drive actions to reduce risk.
- Enables consistent communication on the relative risk associated with living within a leveed area.
 - Levee's Expected Performance (Flood Probability & Condition)
 - Consequences of Non-Performance



NON PROJECT LEVEE SEGMENT OVERVIEW



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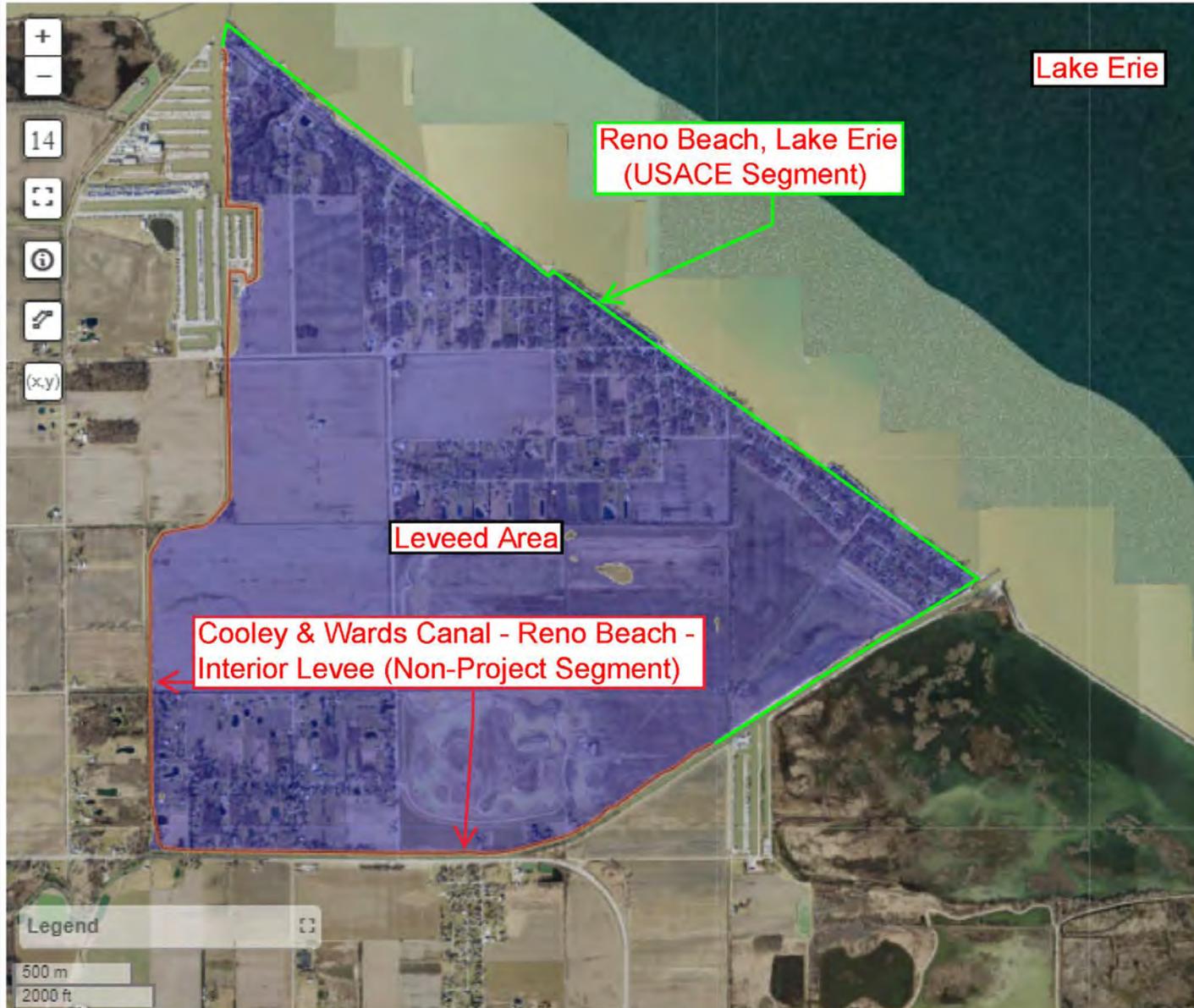
- **USACE District:** Buffalo (LRB)
- **Segment Name:** Cooley & Wards Canals – Reno Beach – Interior Levee
- **Description:** Levee segment consists of an earthen levee along Cooley Canal and Wards Canal.
- **Non-Project Segment:** The line of protection from this levee segment connects to a USACE levee segment (Reno Beach, Lake Erie) to form a continuous line of protection.
- **Federal System Name:** Reno Beach, Lake Erie
- **PL 84-99 Status:** Inactive
- **Identity of Owner/Operator of NPS:** Various
- **Years of Construction:** Unknown
- Population and Assets
 - Total Population 1,124
 - Total Assets \$115 million



SEGMENT MAP



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PERFORMANCE – MODES AND INDICATORS



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Mode	Indicator	Mode	Indicator
Embankment and Foundation Seepage and Piping	Unwanted Vegetation Growth	Closure Systems	Condition
	Encroachments		Supply, Storage, and Security
	Settlement		Operational history
	Cracking		Miscellaneous items
	Animal Control	Floodwall Stability	Unwanted Vegetation Growth
	Culverts / Discharge Pipes		Encroachments
	Under Seepage Relief Wells / Toe Drainage Systems		Concrete Surfaces
	Seepage*		Tilting, Sliding, or Settlement of Concrete Structures*
Embankment Stability	Unwanted vegetation growth	Floodwall Underseepage and Piping	Foundation of Concrete Structures
	Encroachments		Underseepage Relief Wells / Toe Drainage Systems
	Cracking		Unwanted Vegetation Growth
	Depressions / Rutting		Encroachments
	Slope Stability*	Underseepage Relief Wells / Toe Drainage Systems	
	Settlement	Seepage*	
	Underseepage Relief Wells / Toe Drainage Systems	Culverts / Discharge Pipes	
Embankment Erosion	Sod Cover		
	Erosion / Bank Caving*		
	Riprap Revetments and Bank Protection		
	Revetments other than Riprap		

* Primary Indicators



EMBANKMENT AND FOUNDATION SEEPAGE AND PIPING SUPPORTING PHOTOS



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EMBANKMENT STABILITY SUPPORTING PHOTOS



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Numerous Slope Instability Issues



EMBANKMENT EROSION SUPPORTING PHOTOS



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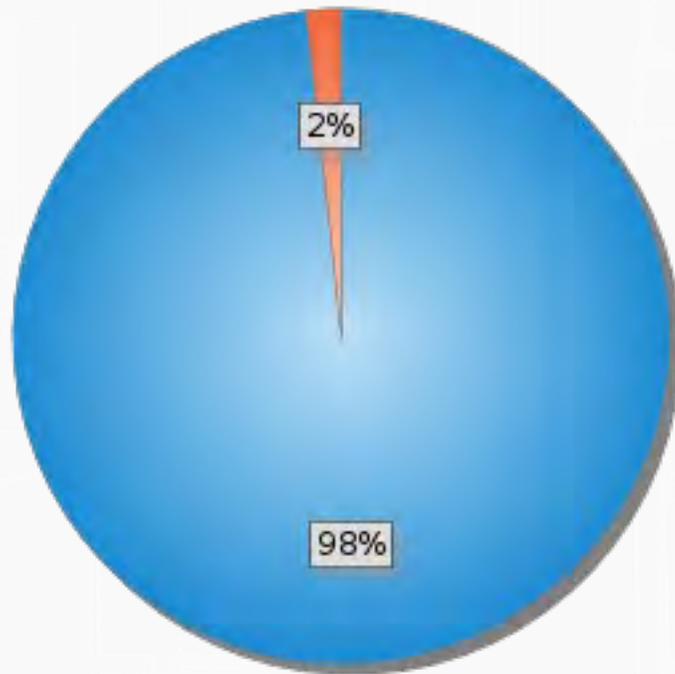


CONTRIBUTION TO LIKELIHOOD OF INUNDATION BY FLOOD SCENARIO



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- Poor Performance Prior To Overtopping
- Overtopping

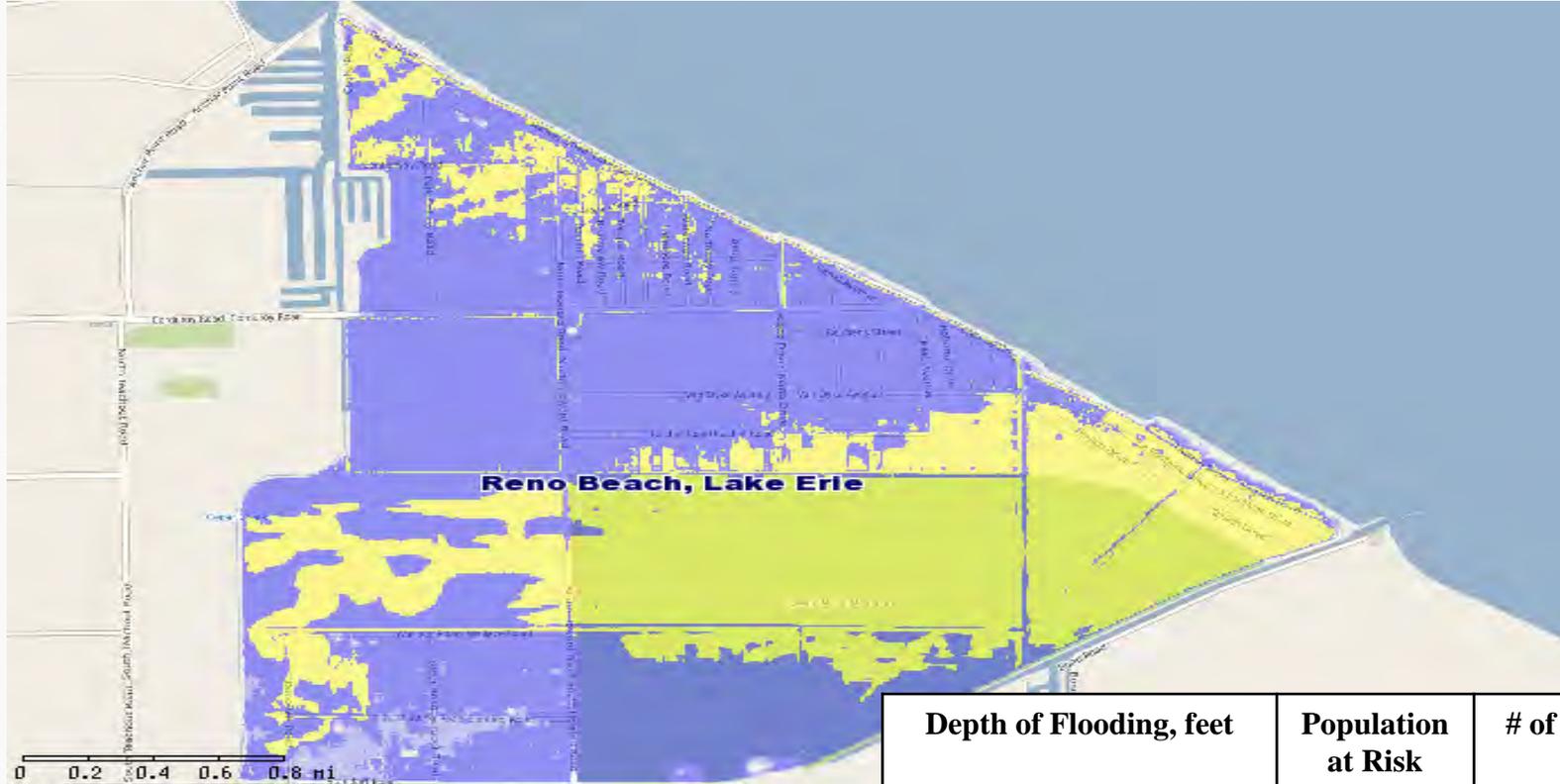




POTENTIAL FLOOD IMPACTS



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Depth of Flooding, feet	Population at Risk	# of Structures	Property Value (\$1,000's)
0-2	77.0	68.5	\$18,269.51
2-6	228.1	241.5	\$54,105.19
6-15	207.6	207.9	\$43,220.86
> 15	0.0	0.0	\$0.00
TOTAL	512.7	518.0	\$115,595.57



RISK CHARACTERIZATION



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The NPS has various degrees of maintenance deficiencies that could potentially lead to a breach during overtopping (unwanted vegetation root penetrations, poor animal control, slope instability, & inaccessibility).

The resiliency of the Non-Project Segment is unknown

Portions of the community are below lake level.

These deficiencies contribute to an elevated level of risk supported by the analysis of the Levee Screening Tool.

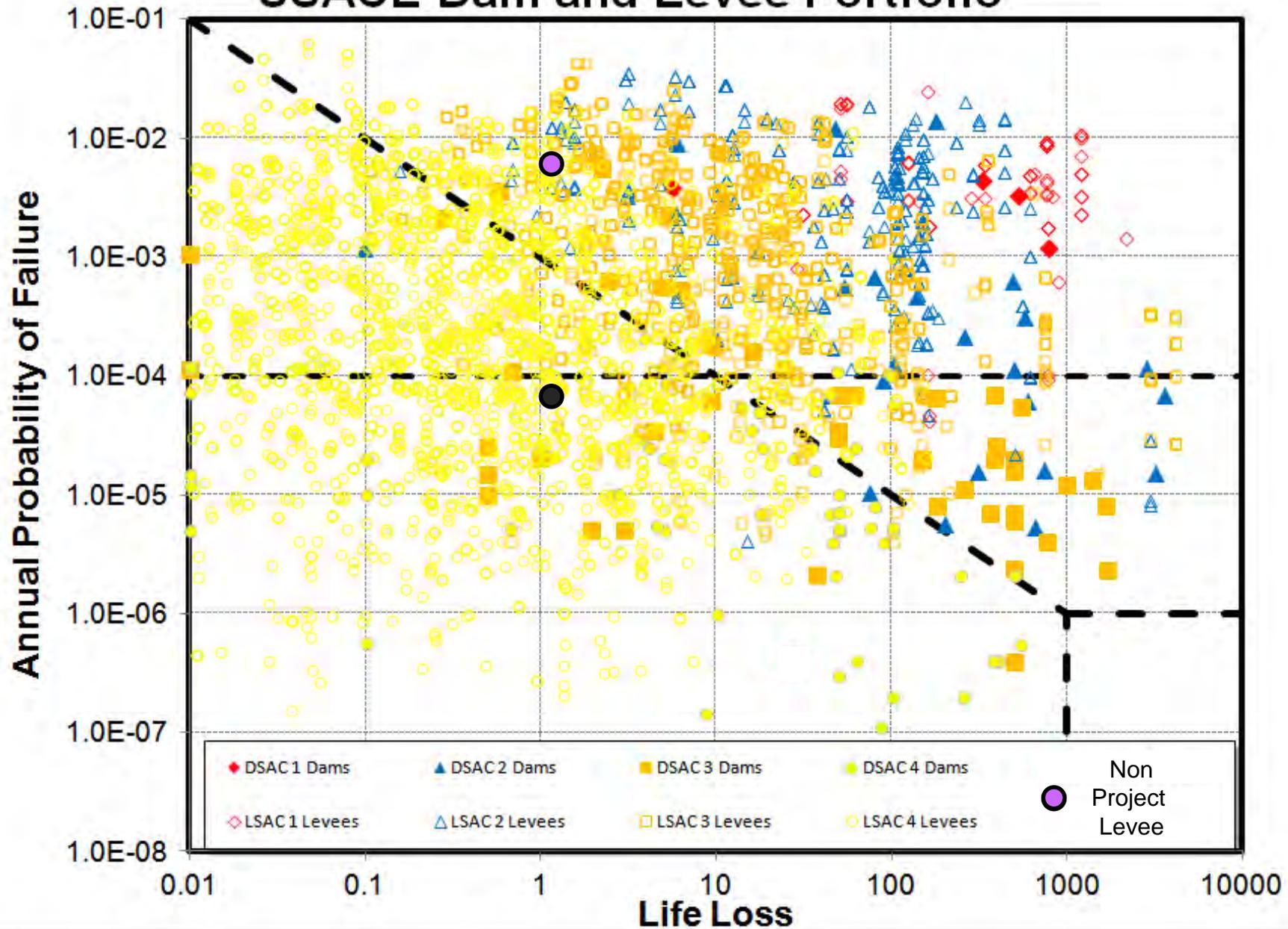
Medium Urgency of Action



USACE Dam and Levee Portfolio



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RECOMMENDATIONS



USACE recommends that deficiencies are corrected (erosion, remove vegetation, repair/enhance embankments).

Verify NPS crest elevations

Highest priority should be repairing the extensive erosion on the waterside slopes and installing erosion protection.

USACE will continue to strongly encourage the Stakeholders to prepare and maintain a thorough Emergency Action Plan (to include the Non-Project Segment) that addresses flood-fighting, warning, and evacuation measures in the event of impending flooding.

Consider a public commination effort to discuss overall risks to area residents.



EMERGENCY ACTION PLANS (EAP'S)



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- Required as part of Inspection Checklist.
- EAP's should be project specific.
- EAP's are living documents and should be updated periodically.
- All personnel involved in flood fighting efforts should be familiar with plan BEFORE disaster strikes.
- Training exercises are recommended.



EMERGENCY ACTION PLANS (EAP'S)



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- **Items to include in an EAP:**

- Chain of Command and POC info.
- Description of various flood stages and actions to be taken.
- Flood fighting access points should be identified.
- Weak points and likely failure modes and locations should be identified.
- Information on where emergency supplies, materials, and equipment are stored, or can be obtained on short notice.
- An evacuation plan - details should be communicated to public before a disaster strikes, as part of risk communication efforts.



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FRM PROJECTS SERVE A PURPOSE

ANNUAL FLOOD DAMAGE REPORT



ANNUAL FLOOD DAMAGE REPORT



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- Annual memorandum providing information on storm events and associated flood damage in LRB

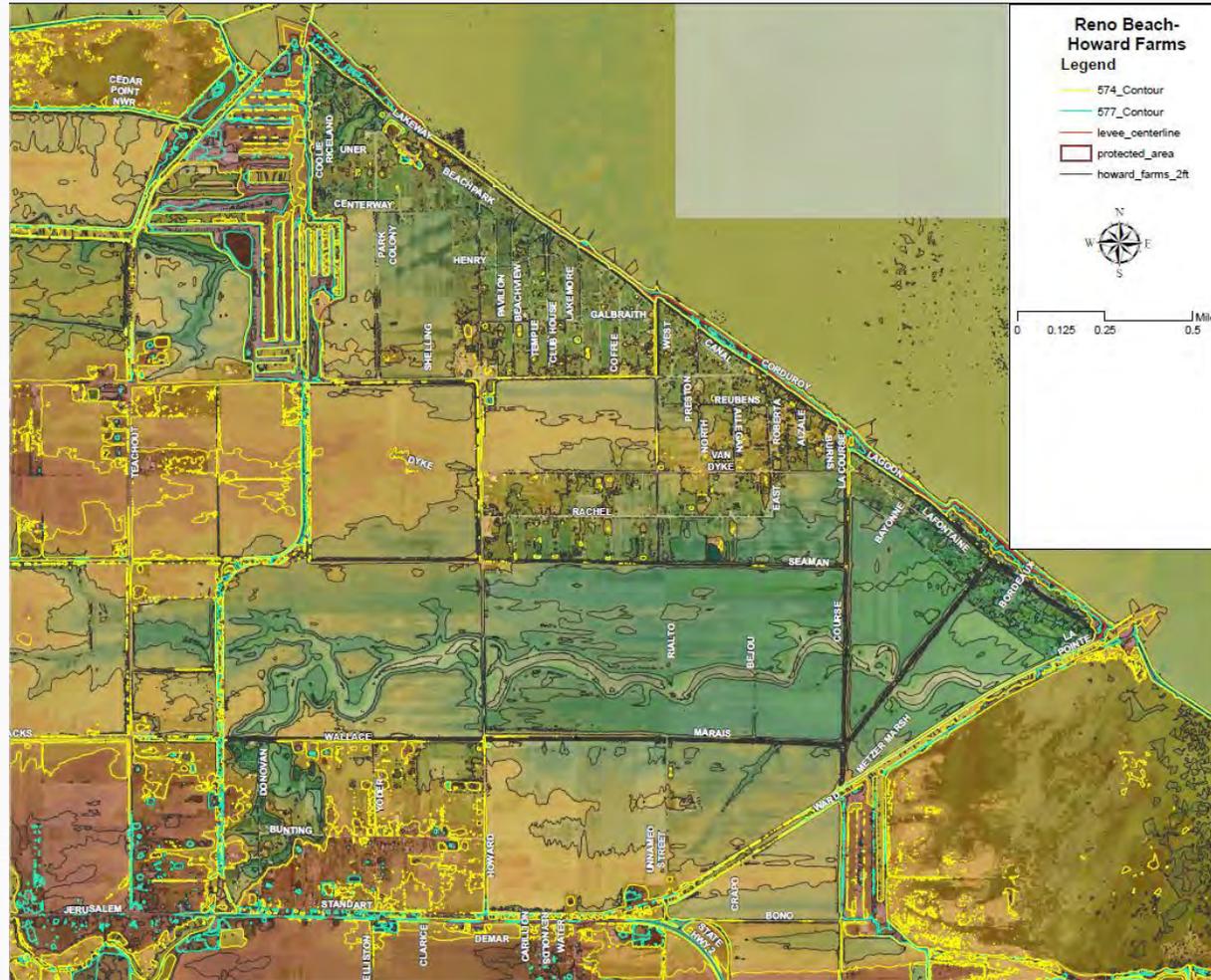
Ohio		
Project	Damages Prevented (\$)	Cumulative Damages Prevented (\$)
Eastlake, Oh.	\$38,700	\$373,600
Euclid Creek @ Euclid	\$574,600	\$10,776,000
Lake Erie @ Point Place	\$1,971,500	\$39,764,700
Reno Beach & Howard Farms, Lucas, Oh	\$2,355,500	\$36,262,100
Swan Creek @ Toledo, Oh.	\$434,300	\$4,933,500
Sandusky River @ Fremont	\$70,600	\$32,406,100
Total	\$5,445,200	\$124,516,000



CONTOUR MAP



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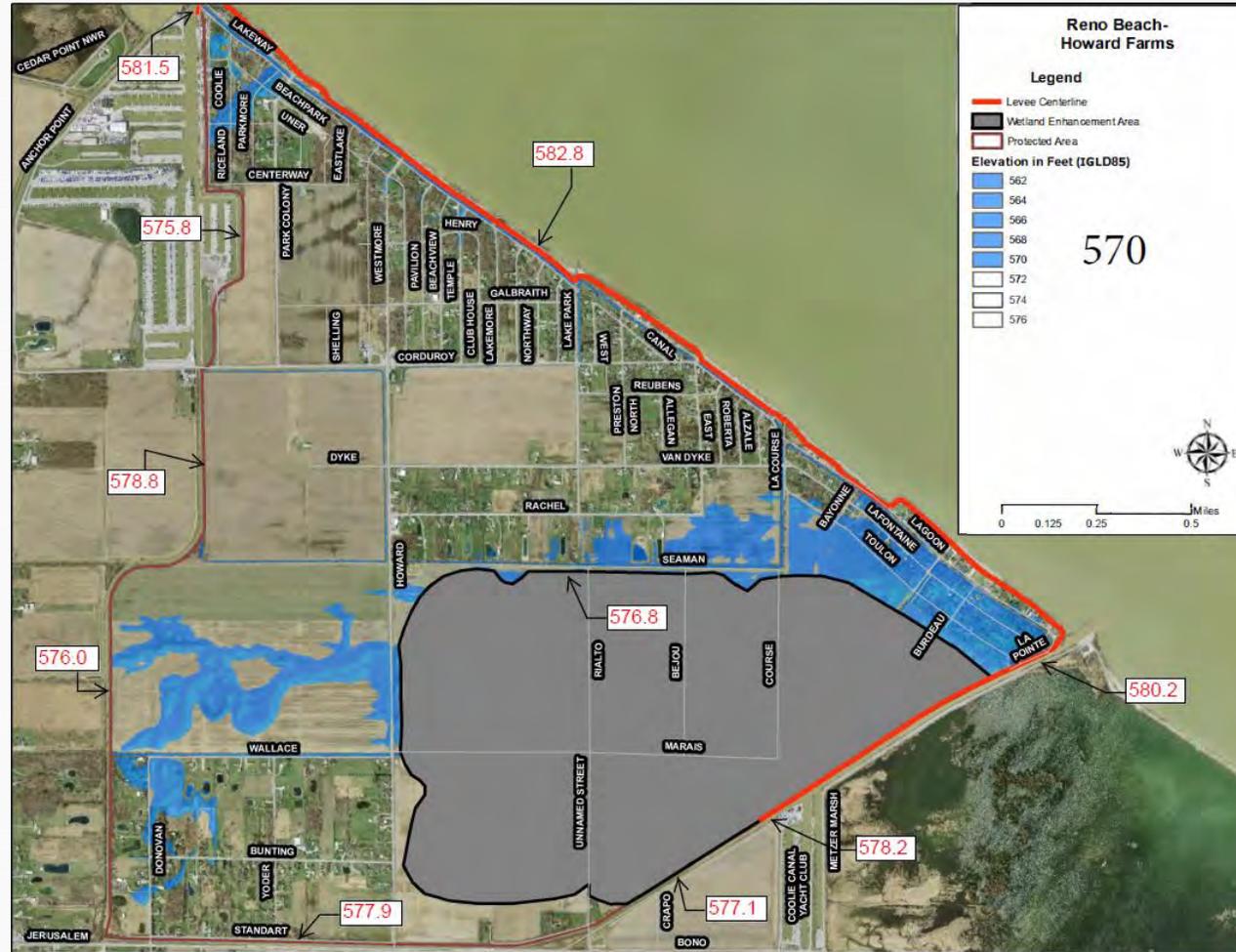




LAKE LEVEL 570



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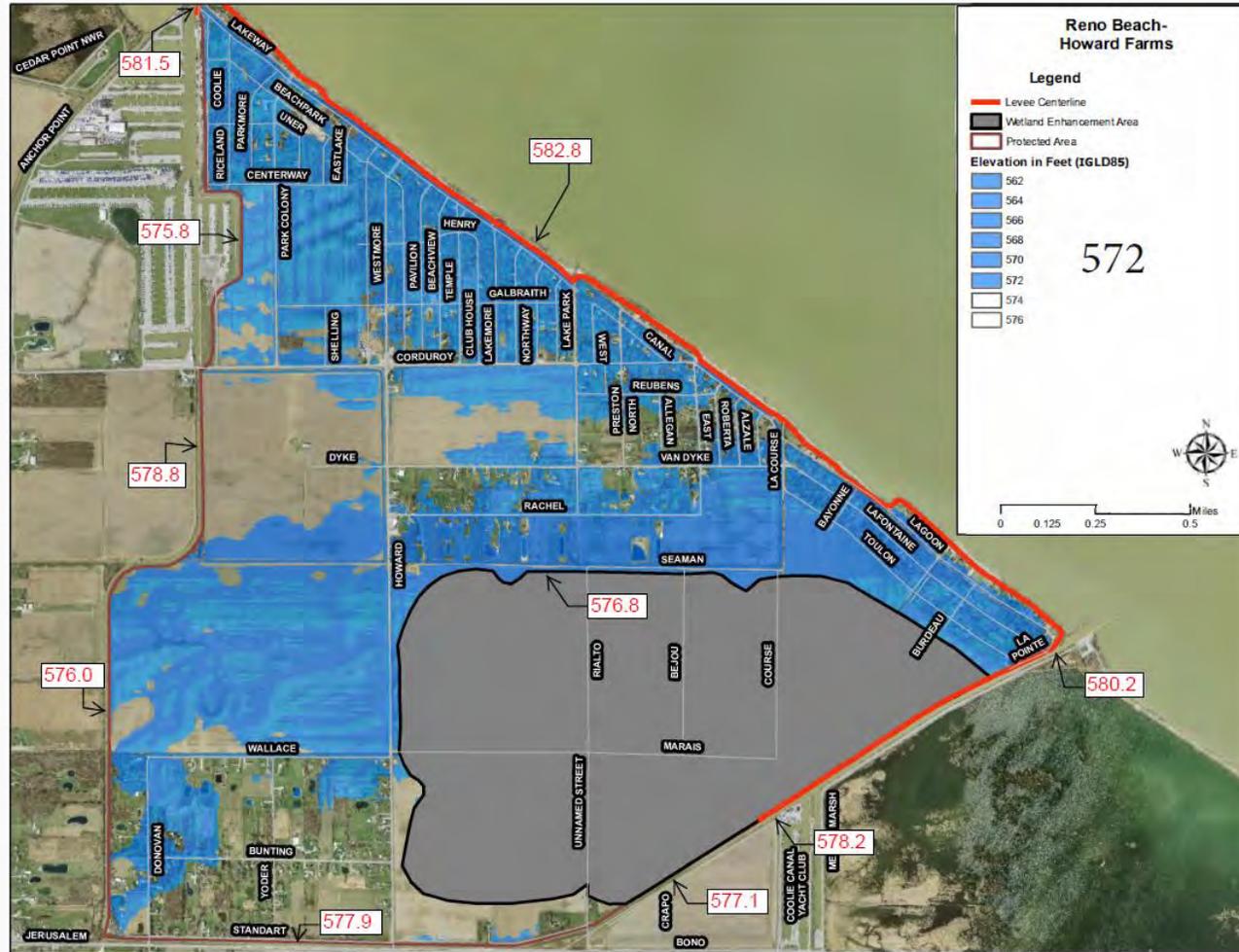




LAKE LEVEL 572



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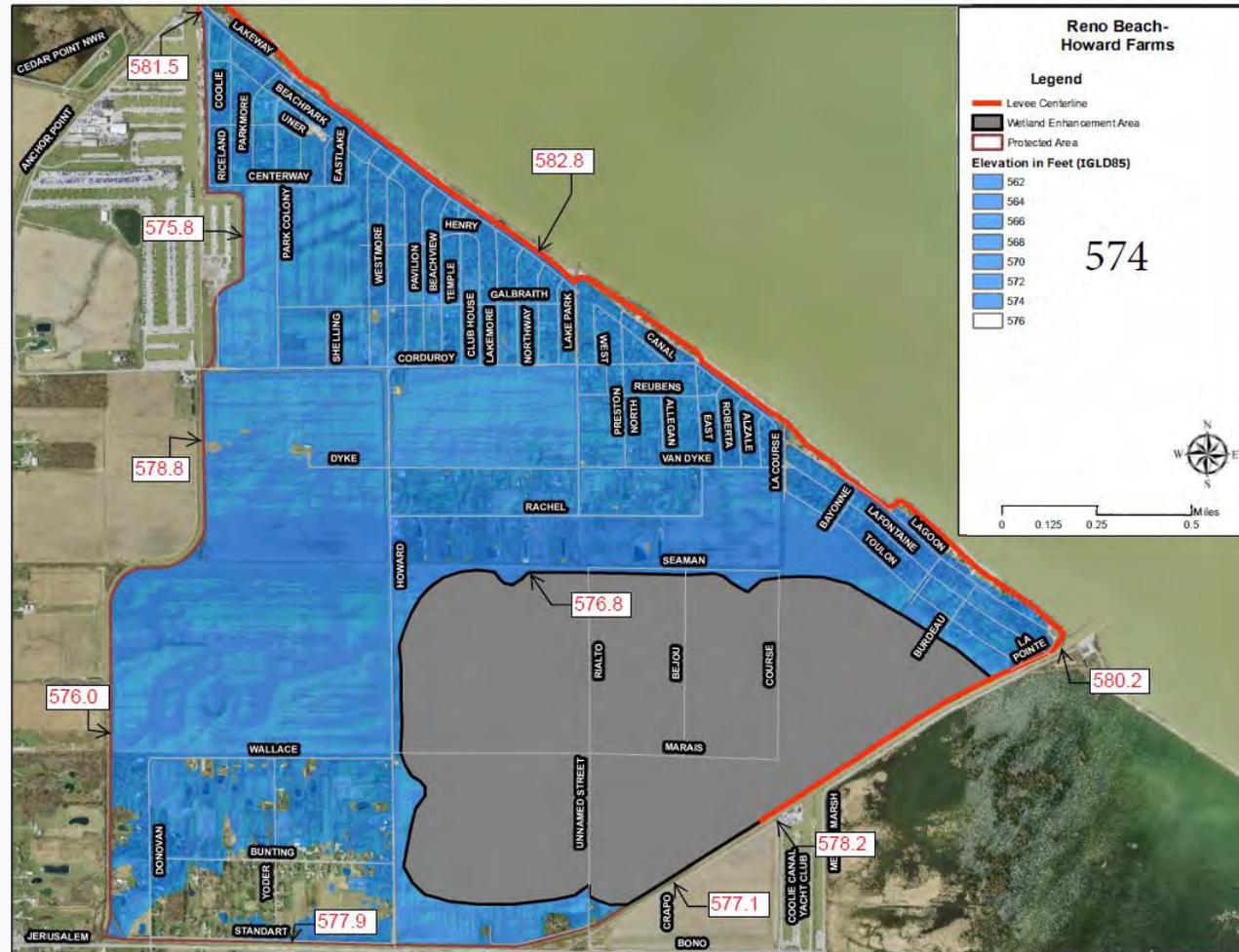




LAKE LEVEL 574



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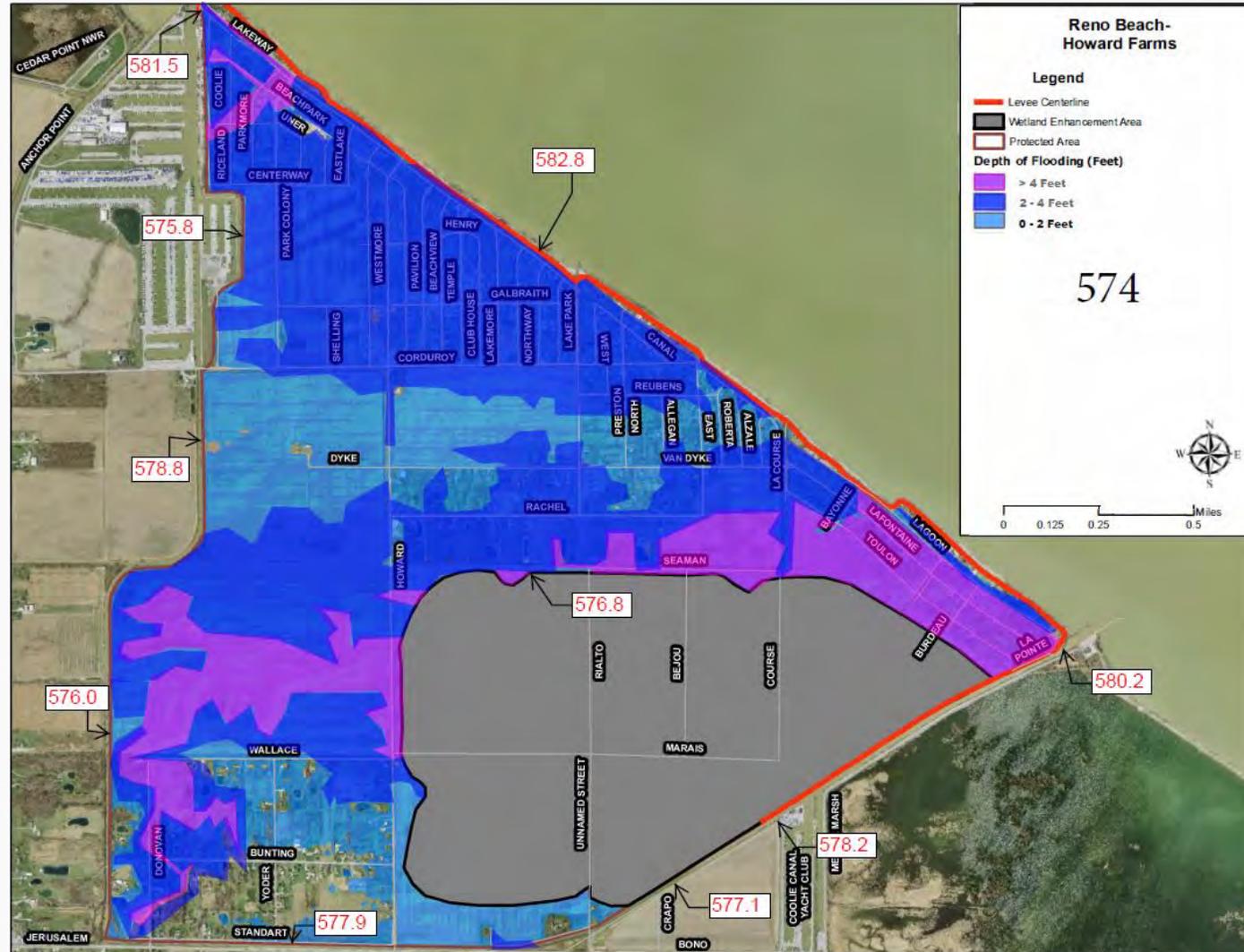




LAKE LEVEL 574 – DEPTH GRID



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OPEN DISCUSSION