Overview of DMHA/DURP/NDPTC Disaster Risk Reduction Programs University of Hawaii

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Executive Director
National Disaster Preparedness Training Center
University of Hawaii

NDPTC
NATIONAL DISASTER PREPAREDNESS TRAINING CENTER
at the University of Hawaii

Overview

National Disaster Preparedness Training Center

Disaster Management Humanitarian Assistance

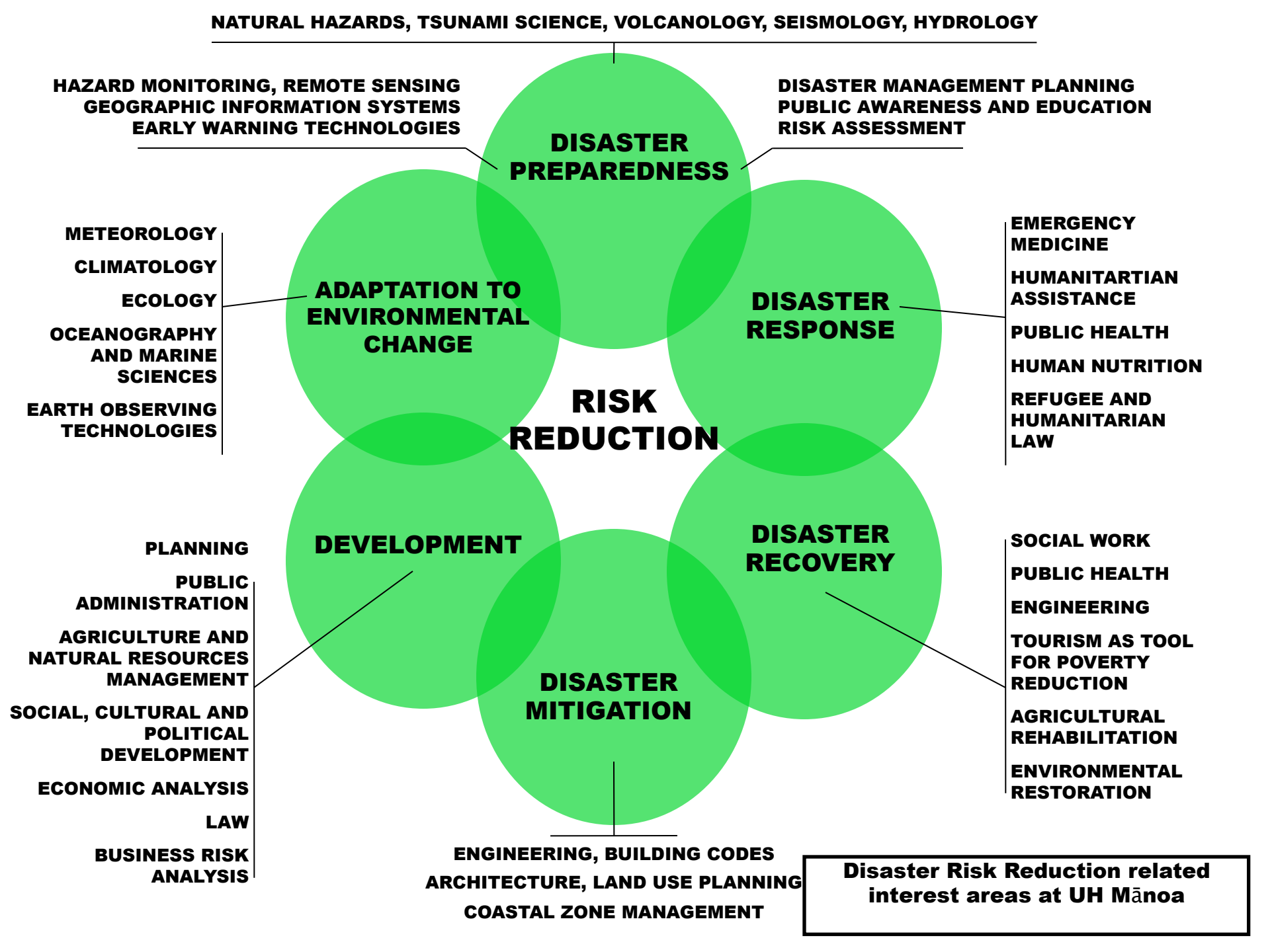
Department of Urban & Regional Planning

Natural Hazards, Coastal Communities, Islands

Spatial Analysis, Risk Assessment, Urban Planning

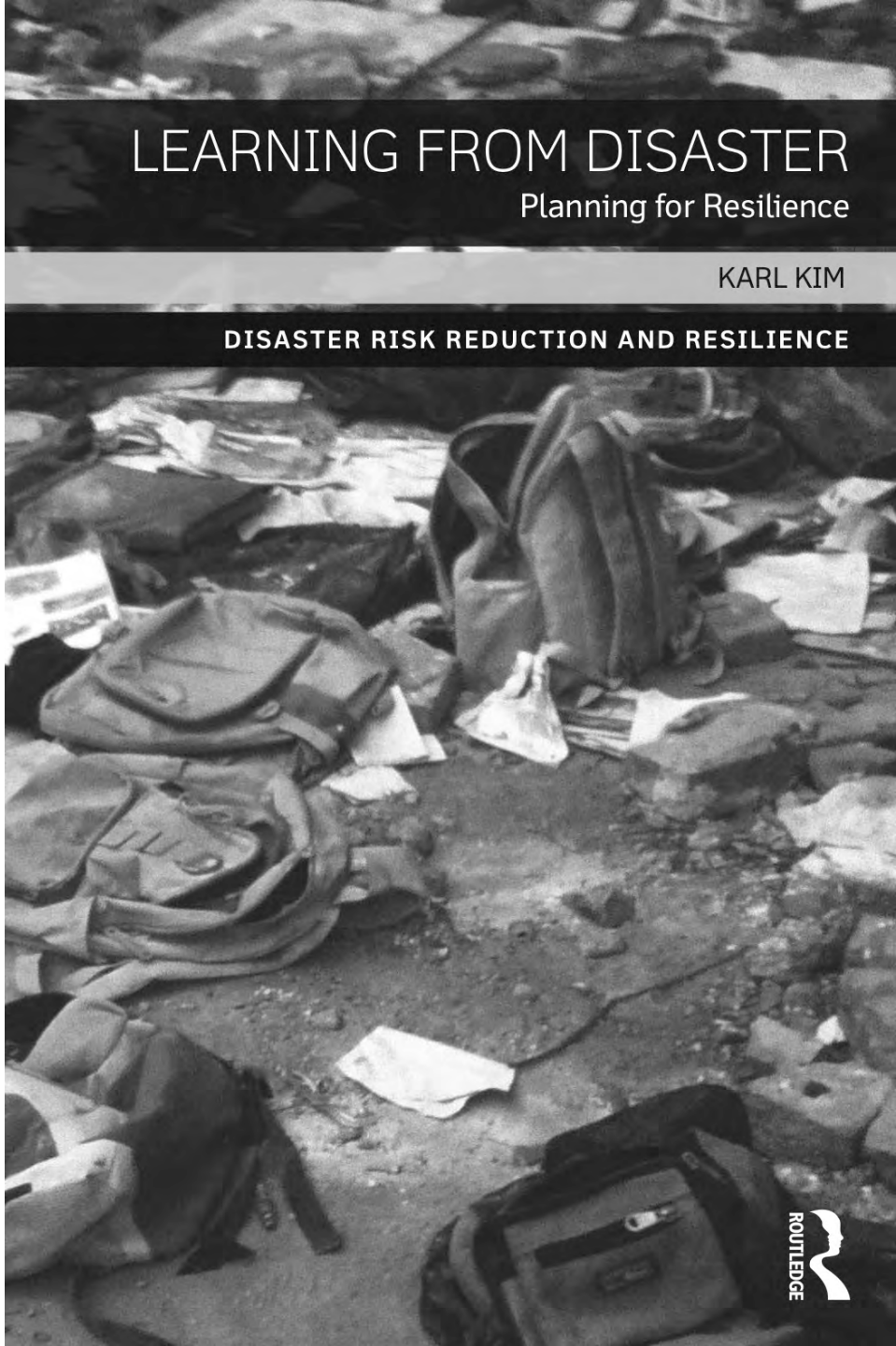
Multiple Hazards/Threats

Impacts (Population, Economic, Social, Ecosystems)


NATURAL HAZARDS, TSUNAMI SCIENCE, VOLCANOLOGY, SEISMOLOGY, HYDROLOGY
HAZARD MONITORING, REMOTE SENSING
GEOGRAPHIC INFORMATION SYSTEMS
EARLY WARNING TECHNOLOGIES
DISASTER MANAGEMENT PLANNING
PUBLIC AWARENESS AND EDUCATION
RISK ASSESSMENT
DISASTER PREPAREDNESS
METEOROLOGY
CLIMATOLOGY
ECOLOGY
OCEANOGRAPHY AND MARINE SCIENCES
EARTH OBSERVING TECHNOLOGIES
ADAPTATION TO ENVIRONMENTAL CHANGE
DISASTER RESPONSE
EMERGENCY MEDICINE
HUMANITARTIAN ASSISTANCE
PUBLIC HEALTH
HUMAN NUTRITION
REFUGEE AND HUMANITARIAN LAW
RISK REDUCTION
PLANNING
PUBLIC ADMINISTRATION
AGRICULTURE AND NATURAL RESOURCES MANAGEMENT
SOCIAL, CULTURAL AND POLITICAL DEVELOPMENT
ECONOMIC ANALYSIS
LAW
BUSINESS RISK ANALYSIS
DEVELOPMENT
DISASTER RECOVERY
SOCIAL WORK
PUBLIC HEALTH
ENGINEERING
TOURISM AS TOOL FOR POVERTY REDUCTION
AGRICULTURAL REHABILITATION
ENVIRONMENTAL RESTORATION
DISASTER MITIGATION
ENGINEERING, BUILDING CODES
ARCHITECTURE, LAND USE PLANNING
COASTAL ZONE MANAGEMENT
Disaster Risk Reduction related interest areas at UH Mānoa

Disasters:

- **Magnify what works**
- And what does not...
- **Who has power?**
- Information access?
- **Choices**
- Evacuate
- Shelter in place



National Disaster Preparedness Training Center

OVERVIEW

NDPTC at the UNIVERSITY of HAWAI'I®

NATIONAL DOMESTIC PREPAREDNESS CONSORTIUM

U.S. DEPARTMENT OF HOMELAND SECURITY

FEMA

Phone: 808.956.0600
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ndptc.hawaii.edu

UNIVERSITY OF HAWAII

NATIONAL DOMESTIC PREPAREDNESS CONSORTIUM

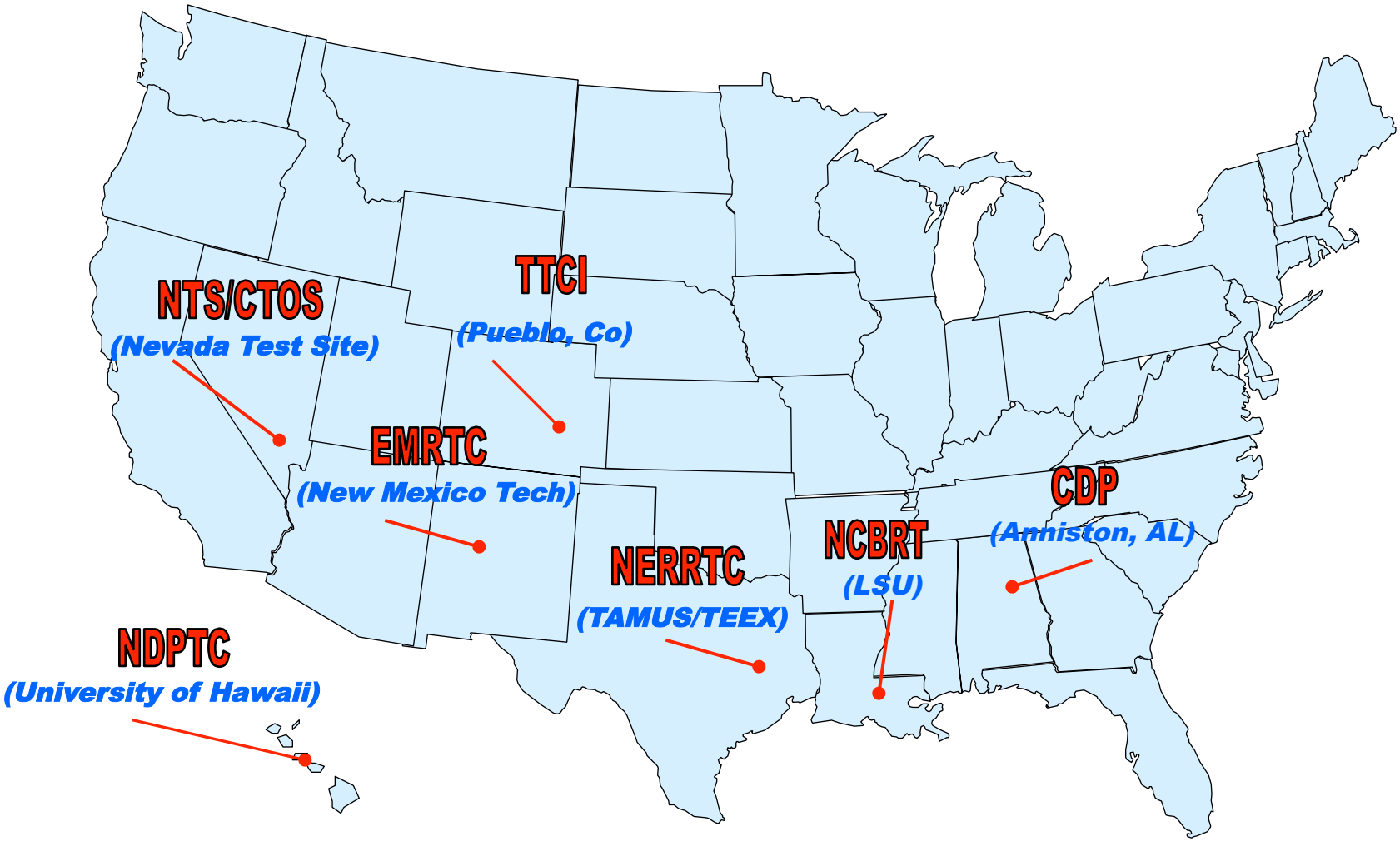
NDPC mission…

To enhance the preparedness of federal, state, local, and tribal emergency responders/first receivers and teams, including non-governmental organizations and the private sector, to reduce the Nation's vulnerability to incidents involving weapons of mass destruction, terrorism and all-hazard high-consequence events by developing, delivering and assessing plans, training, technical assistance and exercises.

NDPC history…

- Originally established by Congressional Mandate September 1998 (House Conference Report [H.R.2267]).
- Reconfirmed in Public Law 107-273 in 2001.
- Membership based on the urgent need to address the serious counterterrorism preparedness needs of our nation's emergency responders within the context of chemical, biological, radiological, and explosive (Weapons of Mass Destruction [WMD]) hazards.
- Expanded to address catastrophic all-hazards events.
- Re-authorized in Homeland Security Legislation January 2007 in HR-1 through FY 2011 and two new members were added to the Consortium (TTCI and UH).

National Domestic Preparedness Consortium



NATIONAL DISASTER PREPAREDNESS
TRAINING CENTER
UNIVERSITY of HAWAI'I
MĀNOA

MISSION STATEMENT

Uniquely positioned geographically and culturally, the ***National Disaster Preparedness Training Center*** *at the University of Hawai ʻi Mānoa will* ***develop and deliver disaster preparedness, response, and recovery training*** *to governmental, private, and non-profit entities, incorporating* ***urban planning*** *with an emphasis on* ***community preparedness*** *and* ***vulnerable at-risk populations.***

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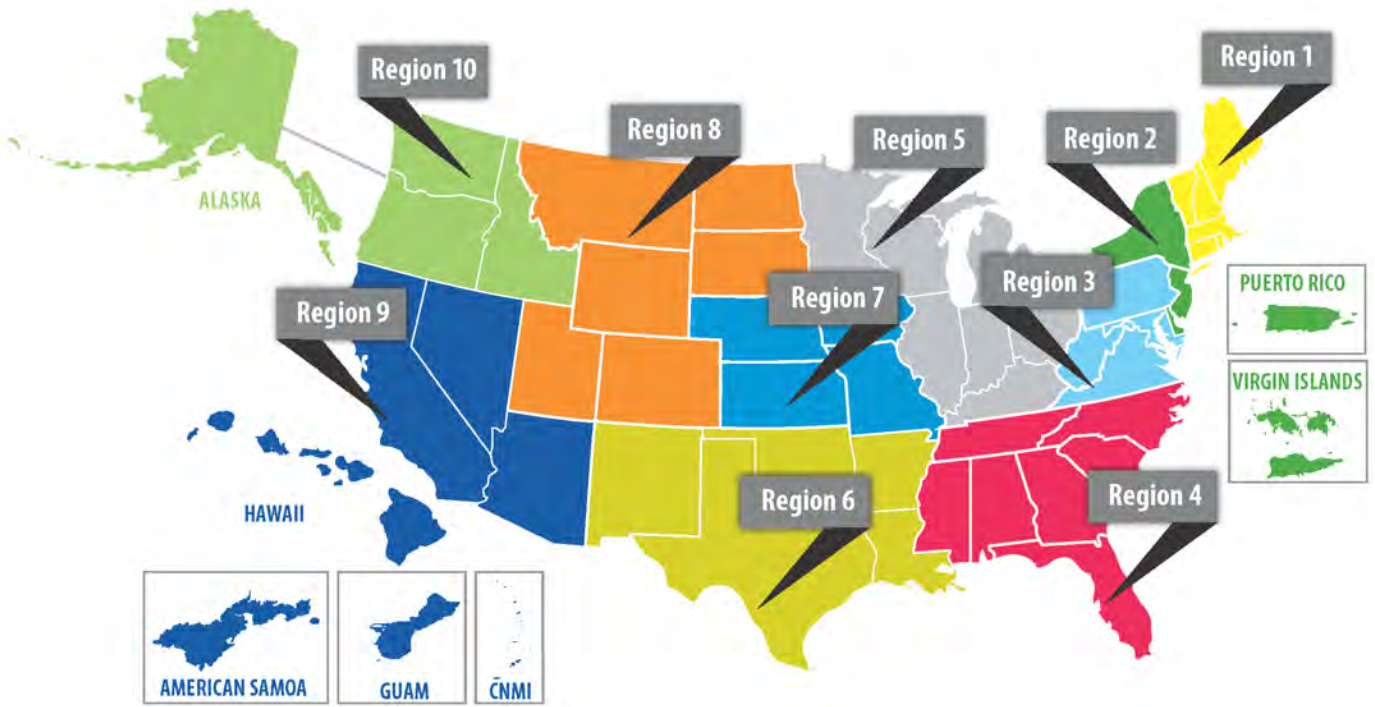
Whole Community

Training by FEMA Region



REGION	TRAINED	CODE
1	245	
2	2478	
3	470	
4	962	
5	459	
6	272	
7	270	
7	209	
9	2621	
10	993	

> 12,000 in 200 Cities TRAINED TO DATE
60 SMEs/180 Certified Instructors
7 PODs (UW, MSS, UNC, Pratt, etc.)
EMI Leadership Academy – Science of Disasters Course

BUILDING RESILIENT COMMUNITIES THROUGH TRAINING
NATIONAL DISASTER PREPAREDNESS
NDPTC
TRAINING CENTER

Training Courses

- **Risk Assessment Methods**
- *Mapping and Spatial Analysis*
- **Natural Hazards – Tsunami/Volcano/ Hurricane/Flooding/Drought**
- *Damage Assessment/Disaster Coms/Social Media*
- **Economic/Community Recovery Planning**
- *Science of Disasters – FEMA/EMI*

NDPTC
NATIONAL DISASTER PREPAREDNESS TRAINING CENTER
at the University of Hawaii

FEMA Certified Courses

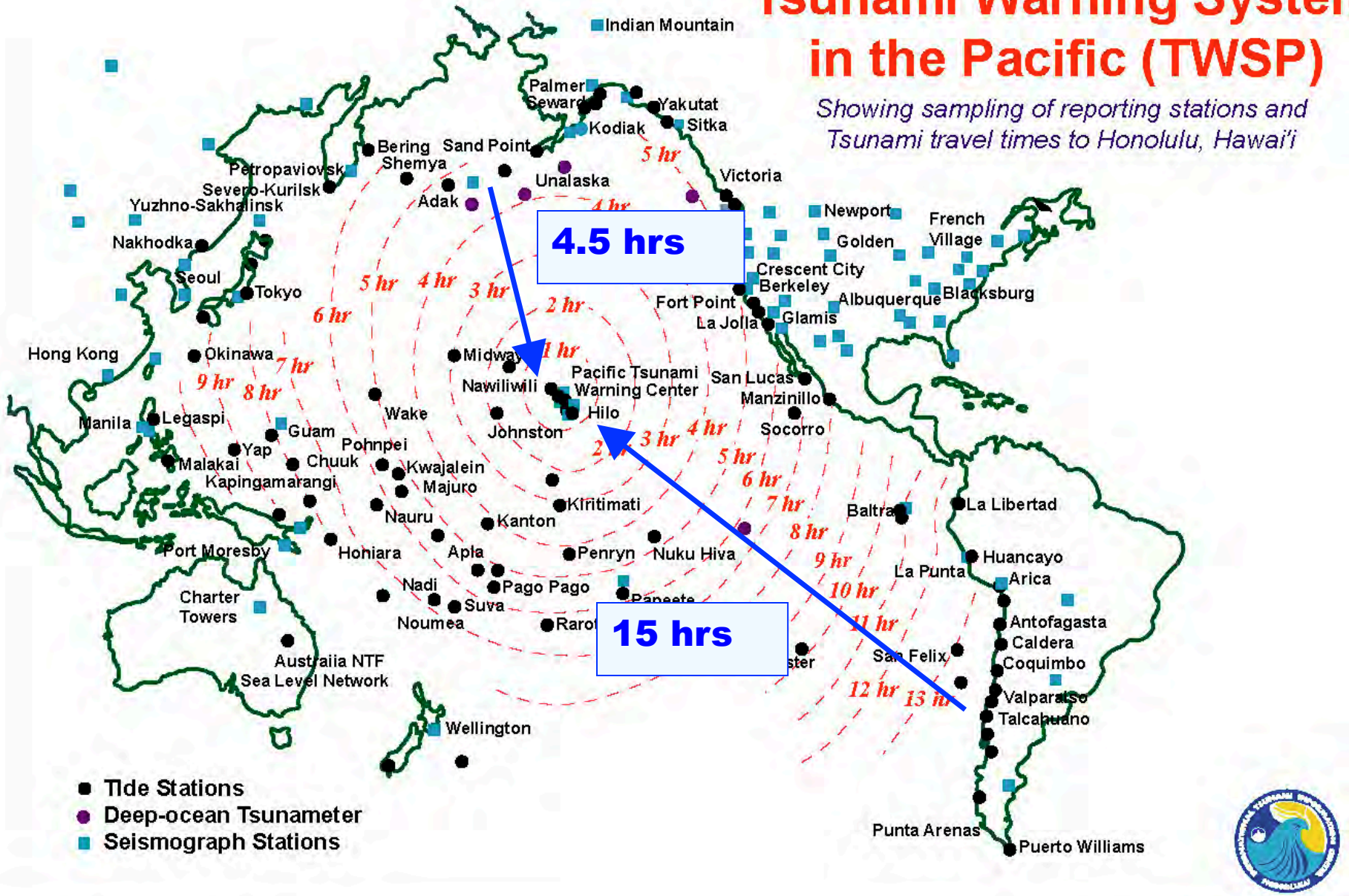
- PADDIE Planning-Analysis-Design-Implementation-Evaluation PROCESS
- Peer Reviewed/Evaluated/
- Kirkpatrick's 4 Levels of Evaluation
- Metrics to Calculate ROIs
- Awareness-Performance-Management
- 31 Core Capabilities

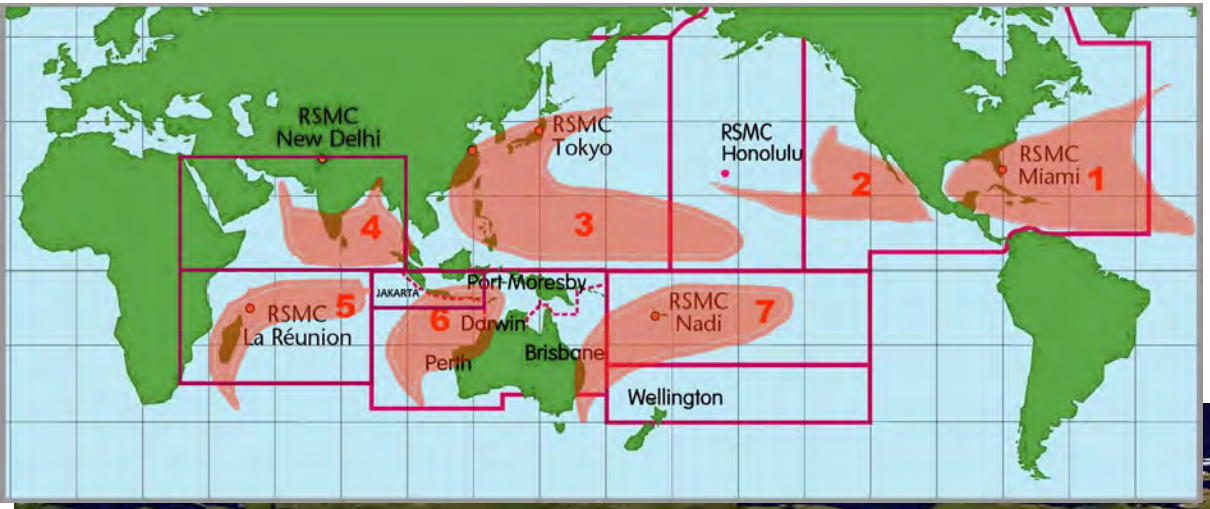
Indonesia Project

- 3 year – funded by USAID
- 2013 - Indonesian Faculty to Hawaii
  - Participated in UH DMHA classes;
  - Shared curriculum
- 2014 – Hawaii Faculty travel to Indonesia
  - Joint offering of classes/workshops
  - Assess training/educational needs
  - Ambon – Ford Foundation/Hope Worldwide
- 2015 – Joint Community Workshops in Indonesia

Tsunami Warning System in the Pacific (TWSP)

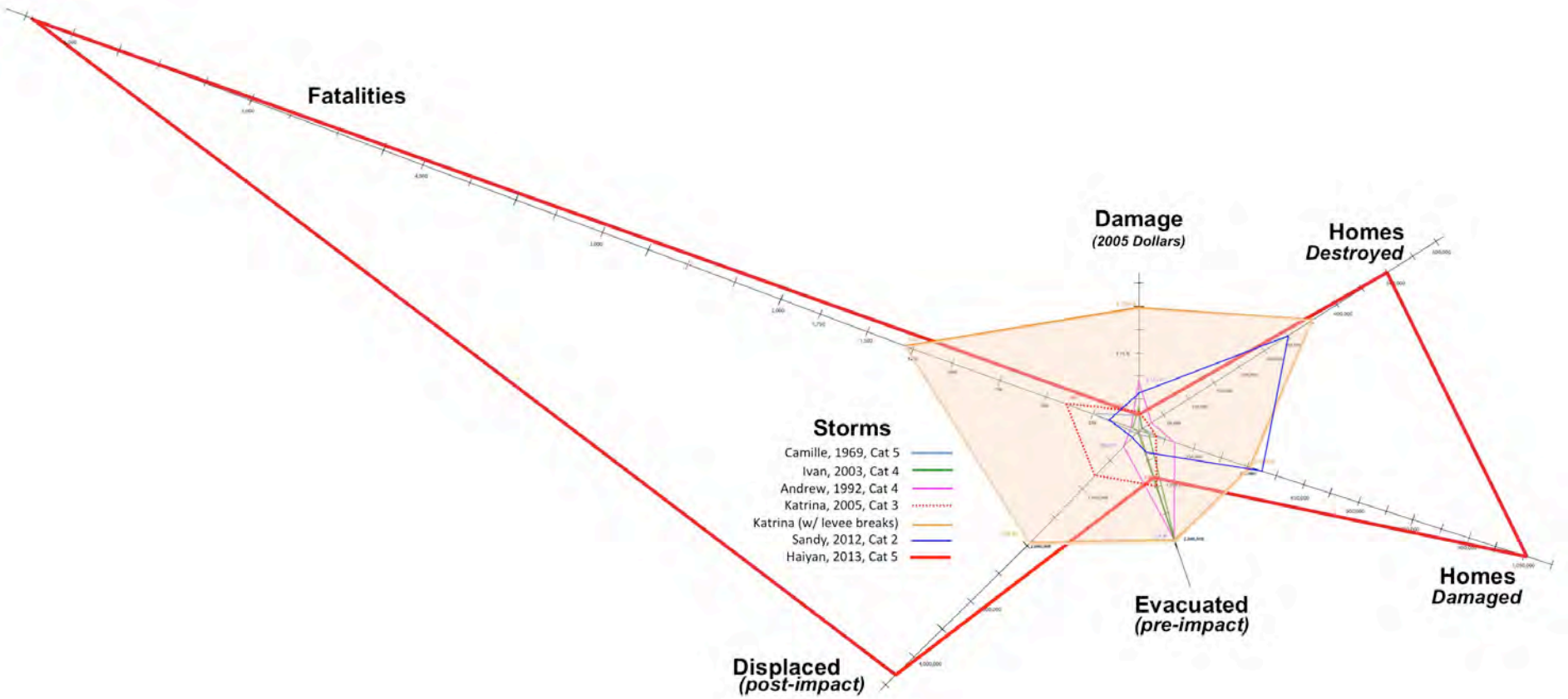
Showing sampling of reporting stations and Tsunami travel times to Honolulu, Hawai'i




RSMC
New Delhi
RSMC
Tokyo
RSMC
Honolulu
RSMC
Miami
1
2
3
4
5
6
7
JAKARTA
Port Moresby
RSMC
La Réunion
Darwin
RSMC
Nadi
Perth
Brisbane
Wellington

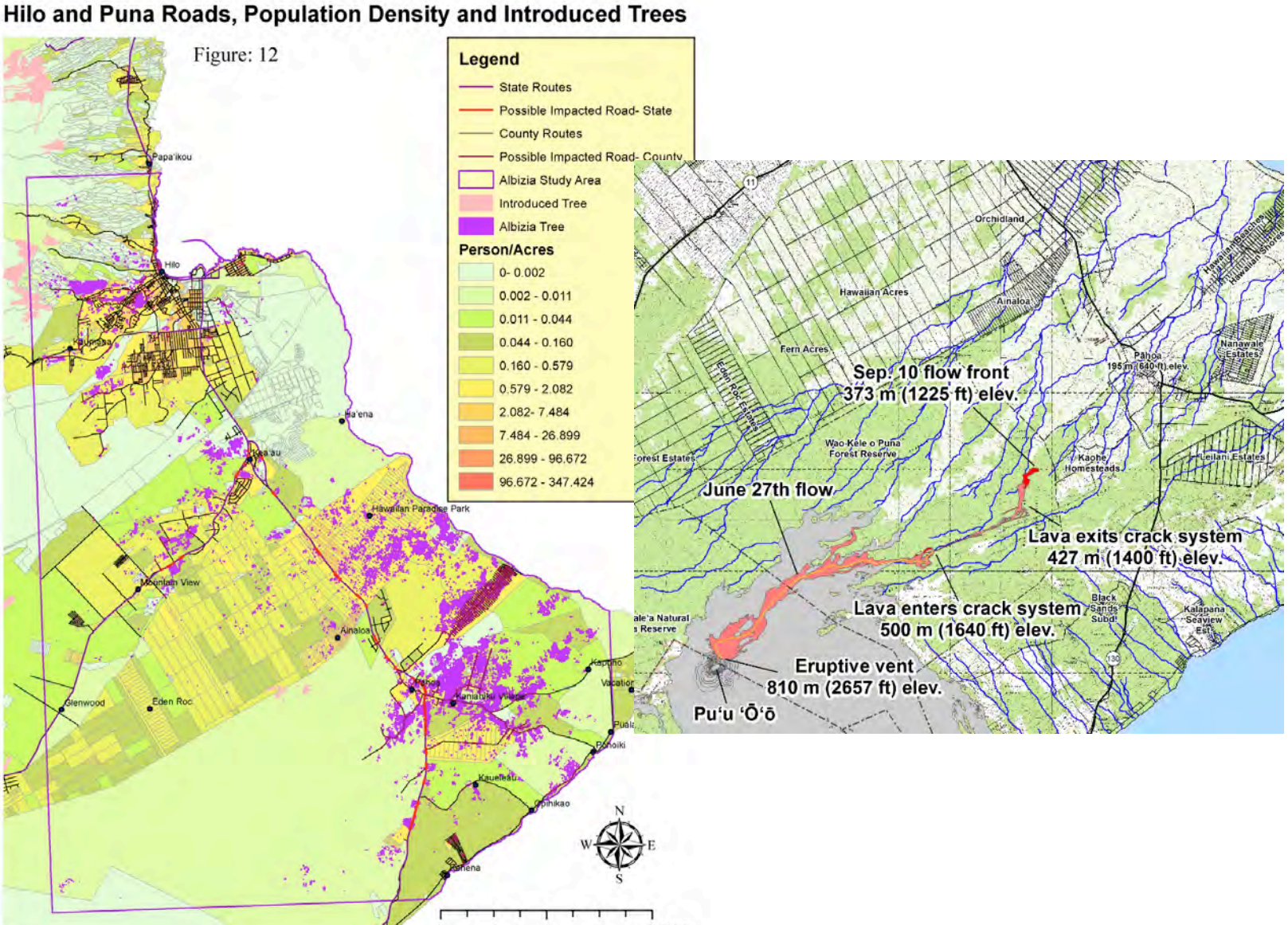
Sandy Impacts

Elderly, Poor, People with Disabilities Disproportionately Affected….

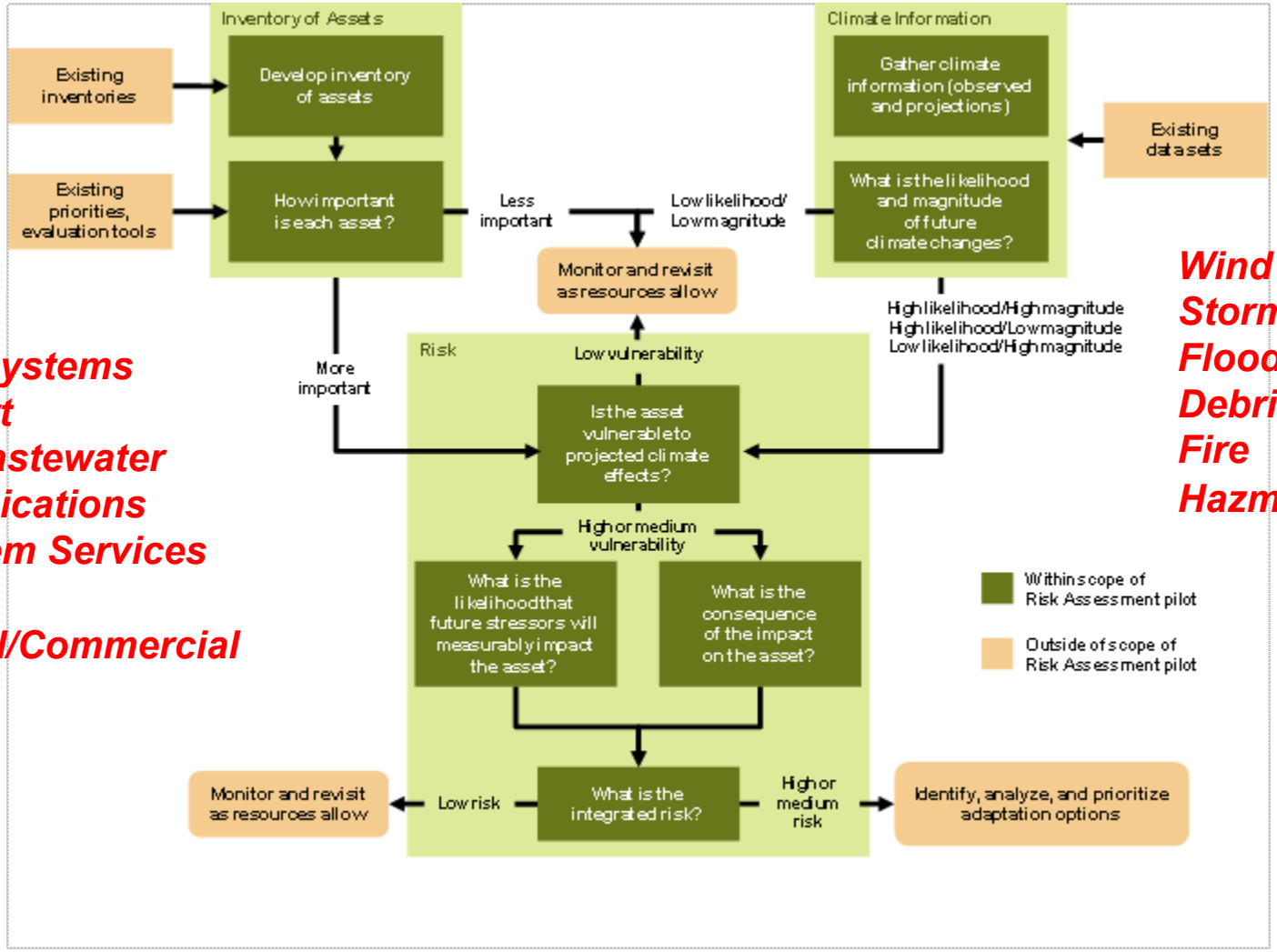

Fatalities
Damage
(2005 Dollars)
Homes
Destroyed
Storms
Camille, 1969, Cat 5
Ivan, 2003, Cat 4
Andrew, 1992, Cat 4
Katrina, 2005, Cat 3
Katrina (w/ levee breaks)
Sandy, 2012, Cat 2
Haiyan, 2013, Cat 5
Homes
Damaged
Evacuated
(pre-impact)
Displaced
(post-impact)

Hurricane Iselle

Puna – Multiple Hazards



Inventory->RISK<-Hazard

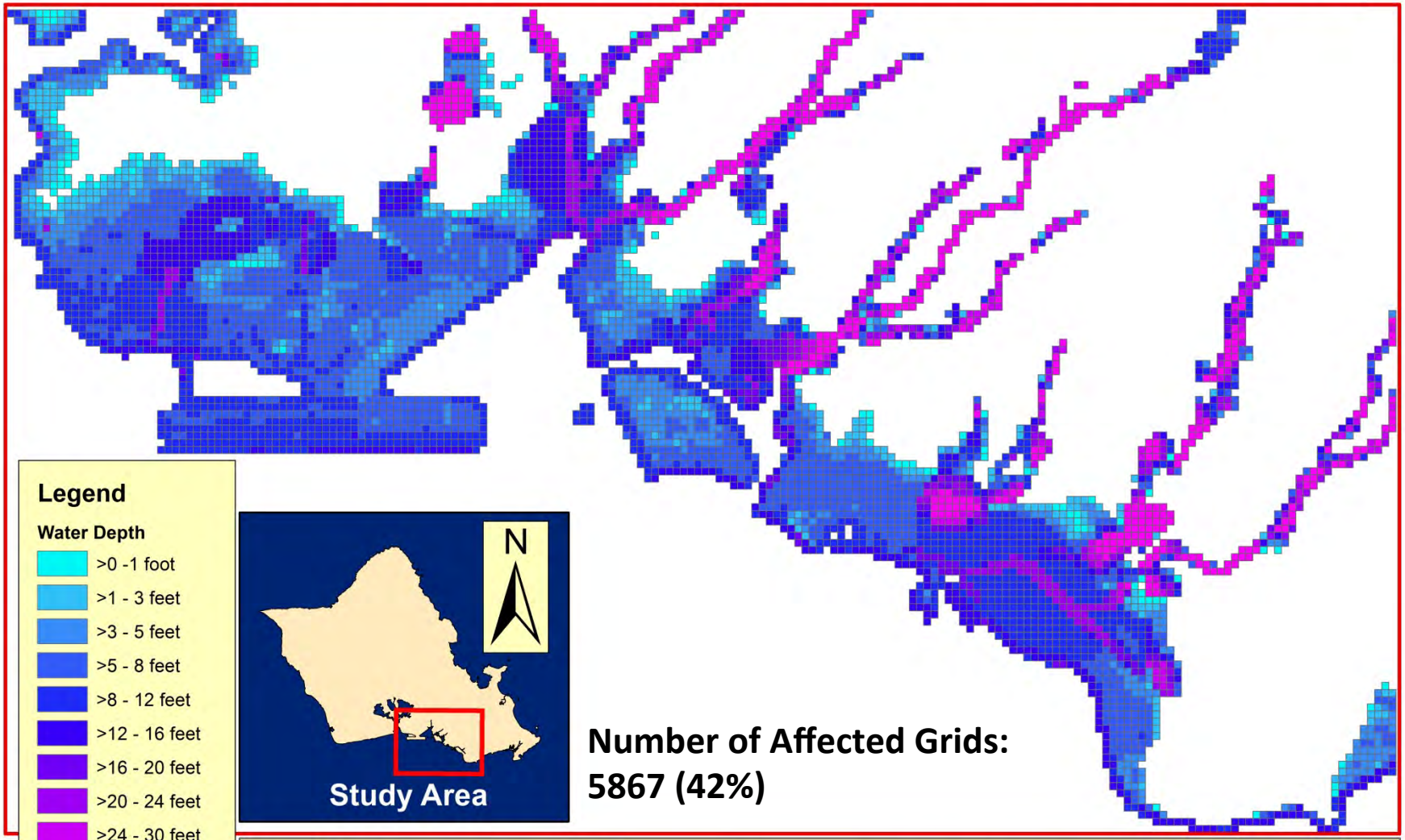


Energy Systems
Transport
Water/Wastewater
Communications
Ecosystem Services
Housing
Industrial/Commercial

Wind
Storm Surge
Flooding
Debris
Fire
Hazmat

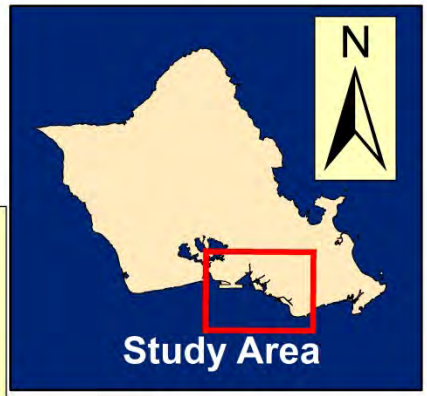
http://www.fhwa.dot.gov/hep/climate/conceptual_model62410.htm

Inundation due to SLR, Tsunami, Hurricane Storm Surge and Inland Flooding



Note: Water depth based on the maximum height of raster grids for three hazards inside the 100 x 100 grid: (1) worst possible Tsunami run-up based on historical earthquakes; (2) hurricane storm surge based on Iniki (Cat 4) hurricane with simulated storm paths to produce maximum of maximum (MOM) water levels on southern shore of Oahu; (3) inland flooding of 500 year return period. A sea level rise of 1 meter is included in both tsunami run-up and hurricane

Ruling Hazard: Predominate Hazard for the Grid



Legend

Ruling Hazard

- Hurricane SS
- Tsunami RUP
- Riverine Flood

0 0.5 1 2 3 4 Miles

Datum: NAD 1983; Projection: UTM Zone 4N

Note: The ruling hazard is the hazard which contributes to the maximum height of water in the raster grid. Other hazard could be present in the raster grid.

Job Count in Flooded Areas

Description	No of Grids	Tourism	Const & Manuf	Health & Services	Retail & Wholesale	Others	Total
All Grids	**13,969**	**50,371**	**15,550**	**107,443**	**40,809**	**67,146**	**281,319**
Not Flooded	**8,102**	**5,694**	**2,634**	**26,553**	**7,693**	**25,999**	**68,573**
Flooded	**5,867**	**44,677**	**12,916**	**80,890**	**33,116**	**41,147**	**212,746**
	42%	**89%**	**83%**	**75%**	**81%**	**61%**	**76%**
0 to 1ft	627	1,629	2,013	13,666	3,956	6,770	28,034
1 to 3ft	2,709	10,695	5,306	36,740	14,107	13,541	80,389
3 to 5ft	1,376	28,595	4,308	18,606	12,412	16,429	80,350
5 to 8ft	526	1,912	904	6,633	1,552	2,875	13,876
8 to 12ft	321	1,592	338	3,765	841	923	7,459
12 to 16ft	164	223	42	1,128	234	354	1,981
16 to 20ft	61	4	1	49	11	161	226
20 to 24ft	40	-	2	288	2	90	382
24 to 30ft	20	26	-	12	1	4	43
30 to 58ft	23	1	2	3	-	-	6

Source: Infogroup Business Listing, ESRI, 2010

Economic Output in Flooded Areas

Description	No of Grids	Tourism	Const & Manuf	Health & Services	Retail & Wholesale	Other	Total
All Grids	**13,969**	**3,207**	**4,006**	**13,809**	**19,725**	**2,972**	**43,719**
Not Flooded	**8,102**	**405**	**829**	**3,403**	**3,702**	**554**	**8,892**
Flooded	**5,867**	**2,802**	**3,177**	**10,406**	**16,023**	**2,418**	**34,827**
	42%	**87%**	**79%**	**75%**	**81%**	**81%**	**80%**
0 to 1ft	627	121	574	1,927	2,205	730	5,557
1 to 3ft	2,709	697	1,290	4,590	6,118	808	13,503
3 to 5ft	1,376	1,772	980	2,171	6,501	698	12,123
5 to 8ft	526	110	206	909	716	53	1,993
8 to 12ft	321	80	99	638	330	42	1,189
12 to 16ft	164	20	26	145	150	83	425
16 to 20ft	61	0.35	0.53	7.44	2.29	4.82	15.42
20 to 24ft	40	-	0.33	16.05	0.21	-	16.58
24 to 30ft	20	2.23	-	0.95	0.10	-	3.28
30 to 58ft	23	0.07	1.06	0.05	-	0.25	1.42

in Million Dollars , Source: Infogroup Business Listing, ESRI, 2010

Assessment Framework

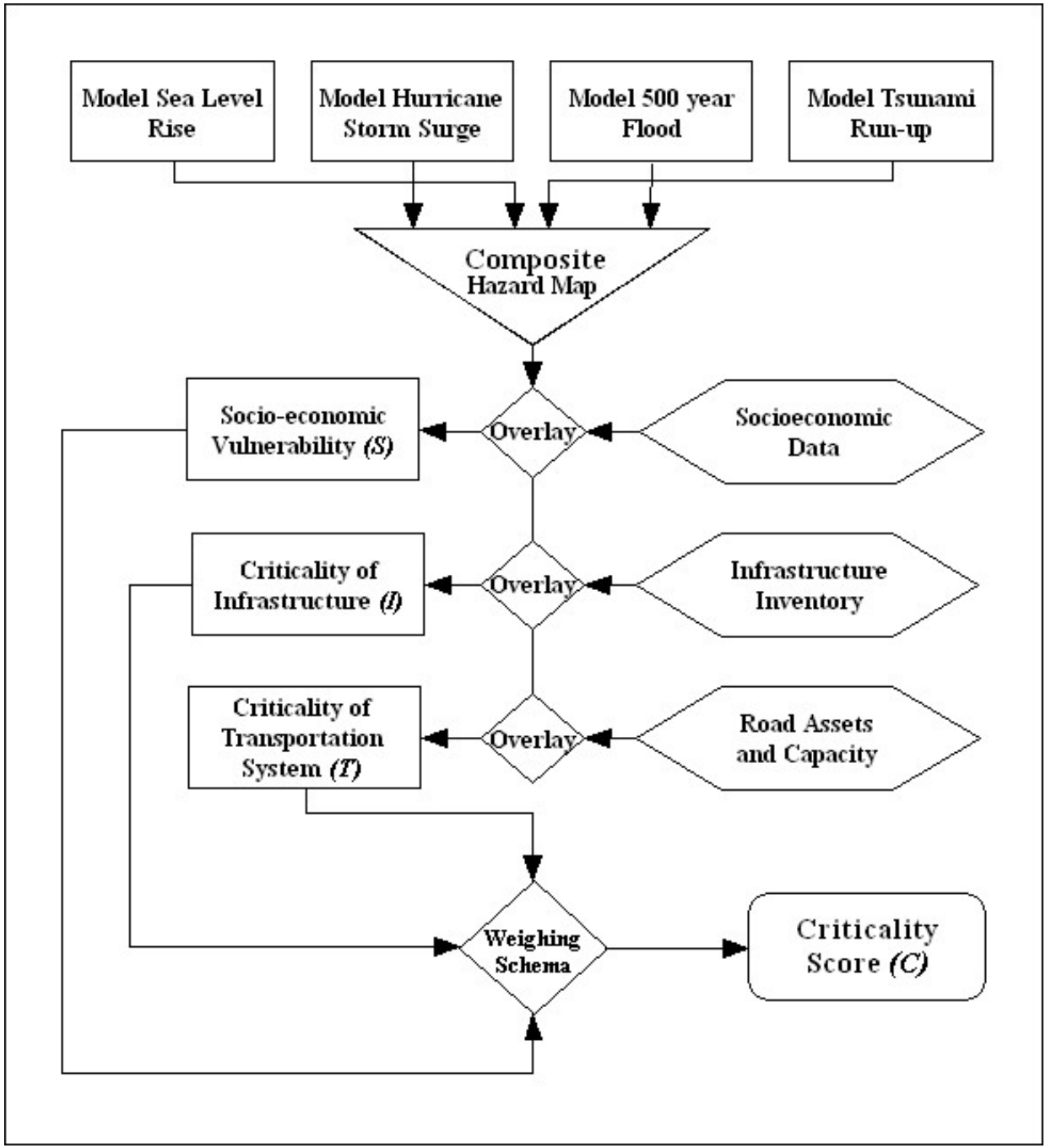
C = f (S, I, T)

C is overall criticality;

S is socio-economic vulnerability;

I is severity in terms of critical infrastructure facilities; and

T is criticality of the transportation system



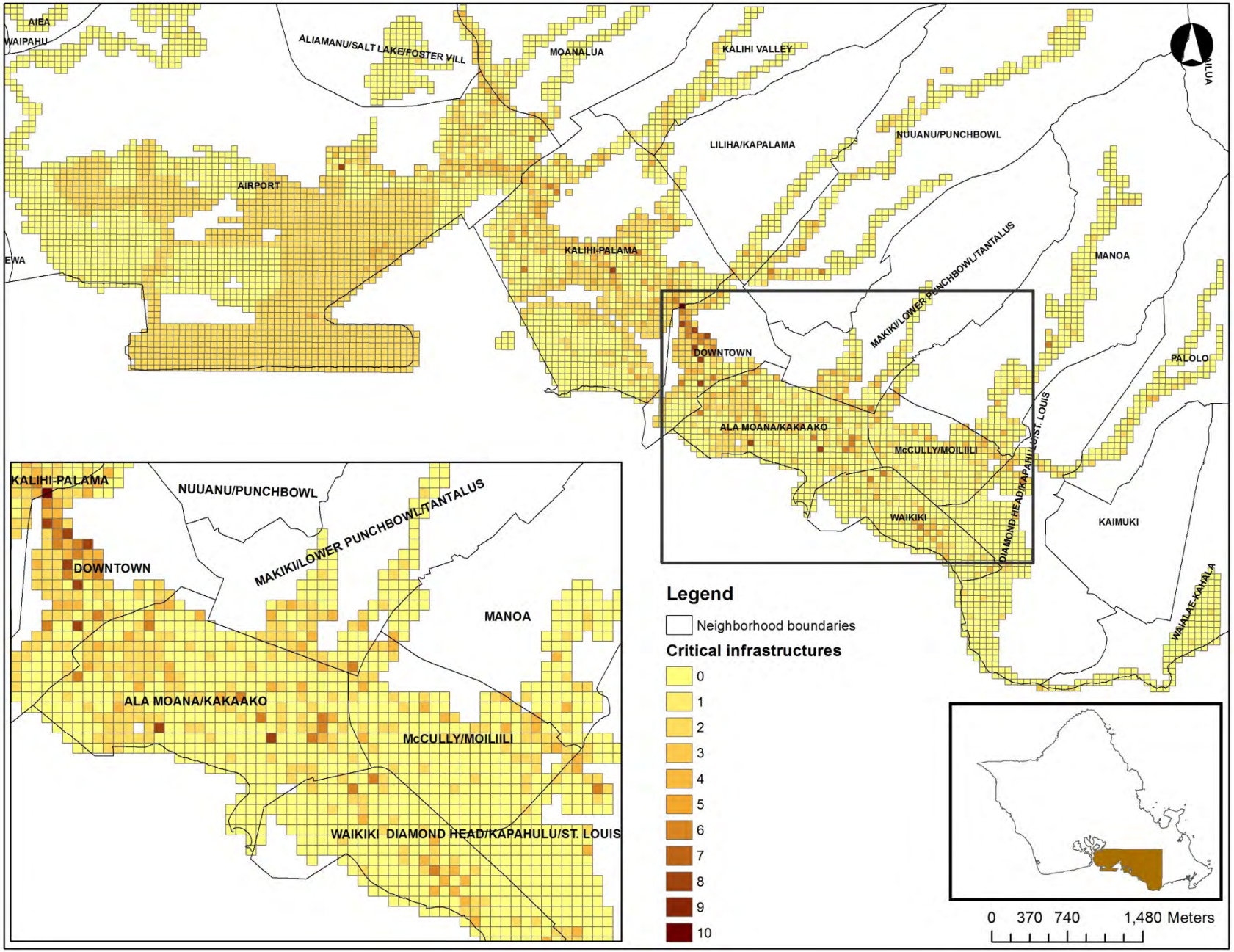
Socio-economic vulnerabilities

- based on:
  - Seniors (age 65 and over)
  - Young children (toddlers) (age 5 and under)
  - Persons with disabilities
  - Non-English speaking population
  - population with high school or lower education
  - Low income households
  - Households without motor vehicles
  - Renter occupied housing units
- 90 percentile and above considered as vulnerable group in each grid cell.

Critical Infrastructure

- 23 different infrastructure facilities such as:
  - police and fire stations
  - emergency shelters
  - hospitals
  - pumping facilities
  - refineries, etc.,
- Presence of a facility within the grid cell increased the score in critical infrastructure vulnerability

Critical Infrastructure



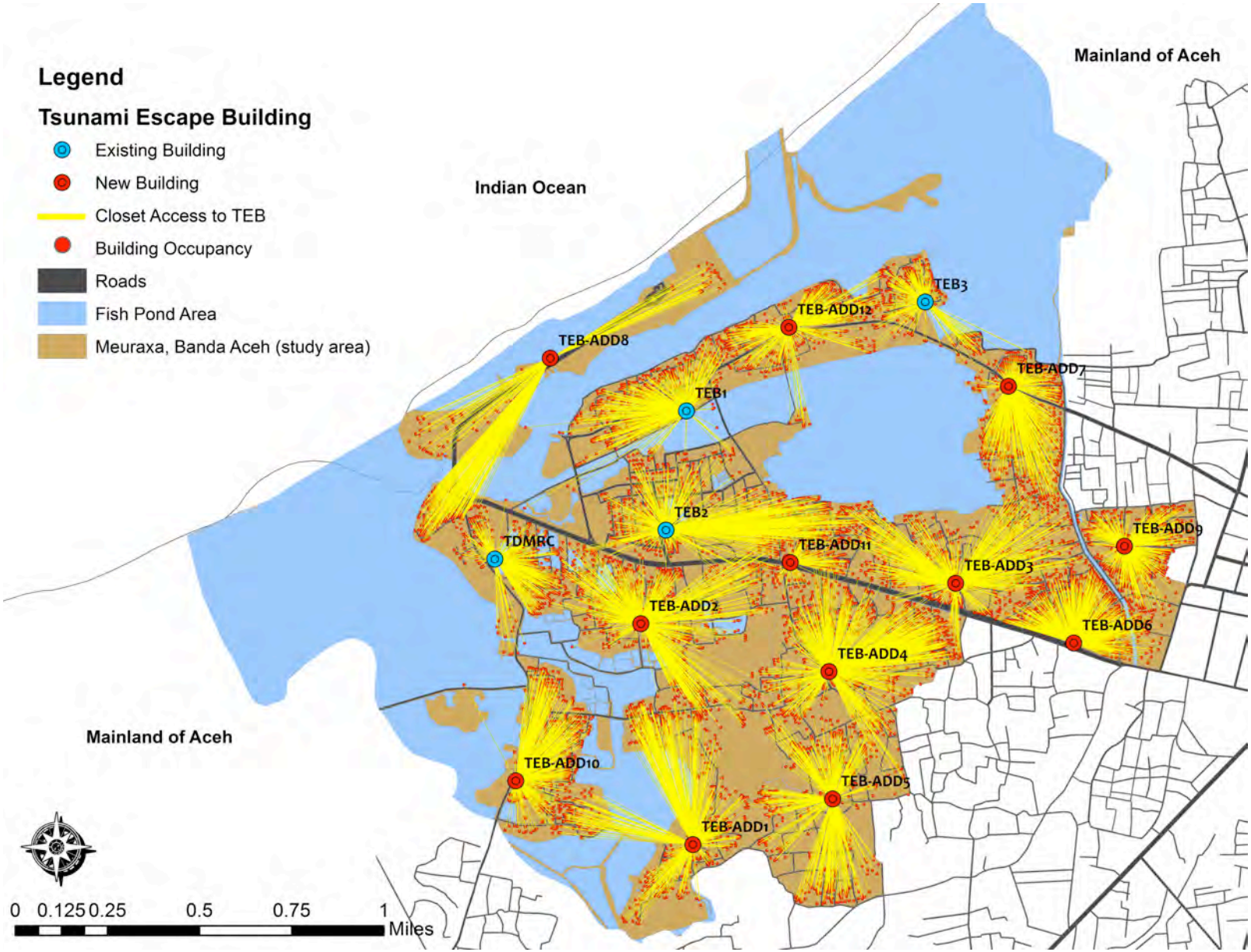
Transportation Systems Criticality

- Three attributes of transportation system examined:
  - road assets within the grid cell
  - road capacity (vehicle/hour *total roadway length)
  - origin and destination points geocoded from NHTS 2001 Oahu add-on data from the Oahu MPO
- Higher value of road assets, capacity and OD points in a grid increased transportation criticality score

Combined Risk Score

- Critical nodes, links, zones
- Focus on high-risk areas for preparedness, response, recovery, and mitigation;
- Look for clusters or connections between high risk cells to develop strategies of mitigation and adaptation;
- Can be used for benchmarking, over time and between location.

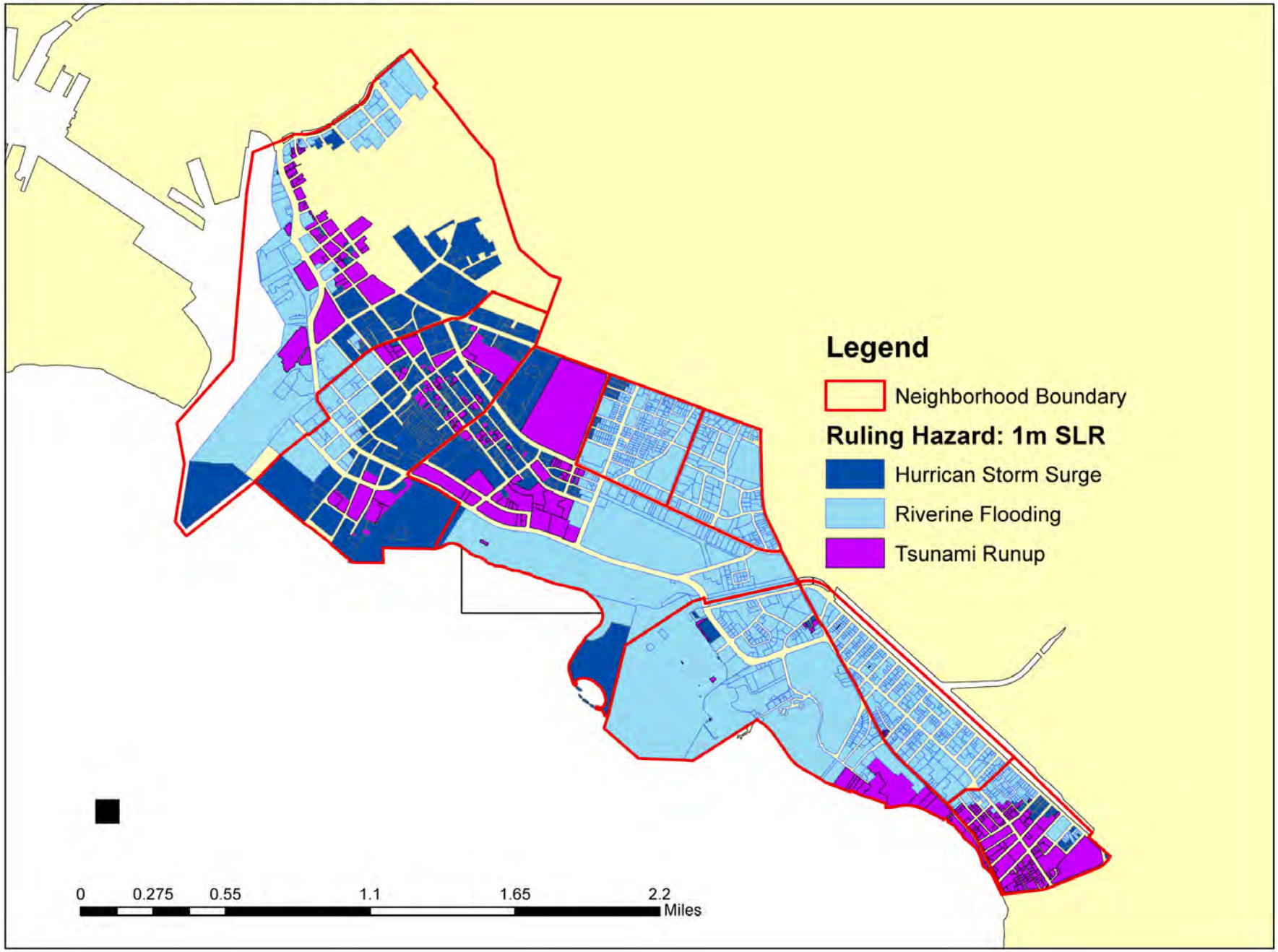
TEBs in Banda Aceh



Future Work and Improvements

- Use of flood depths and the severity of the flooding instead of flood zone-fragility curves
- Validation of 100 x 100 meter spatial unit of analysis
- Assess criticality of specific links or roadway segments or nodes or specific addresses or locations of facilities (more micro-level, instead of regional or neighborhood analysis)

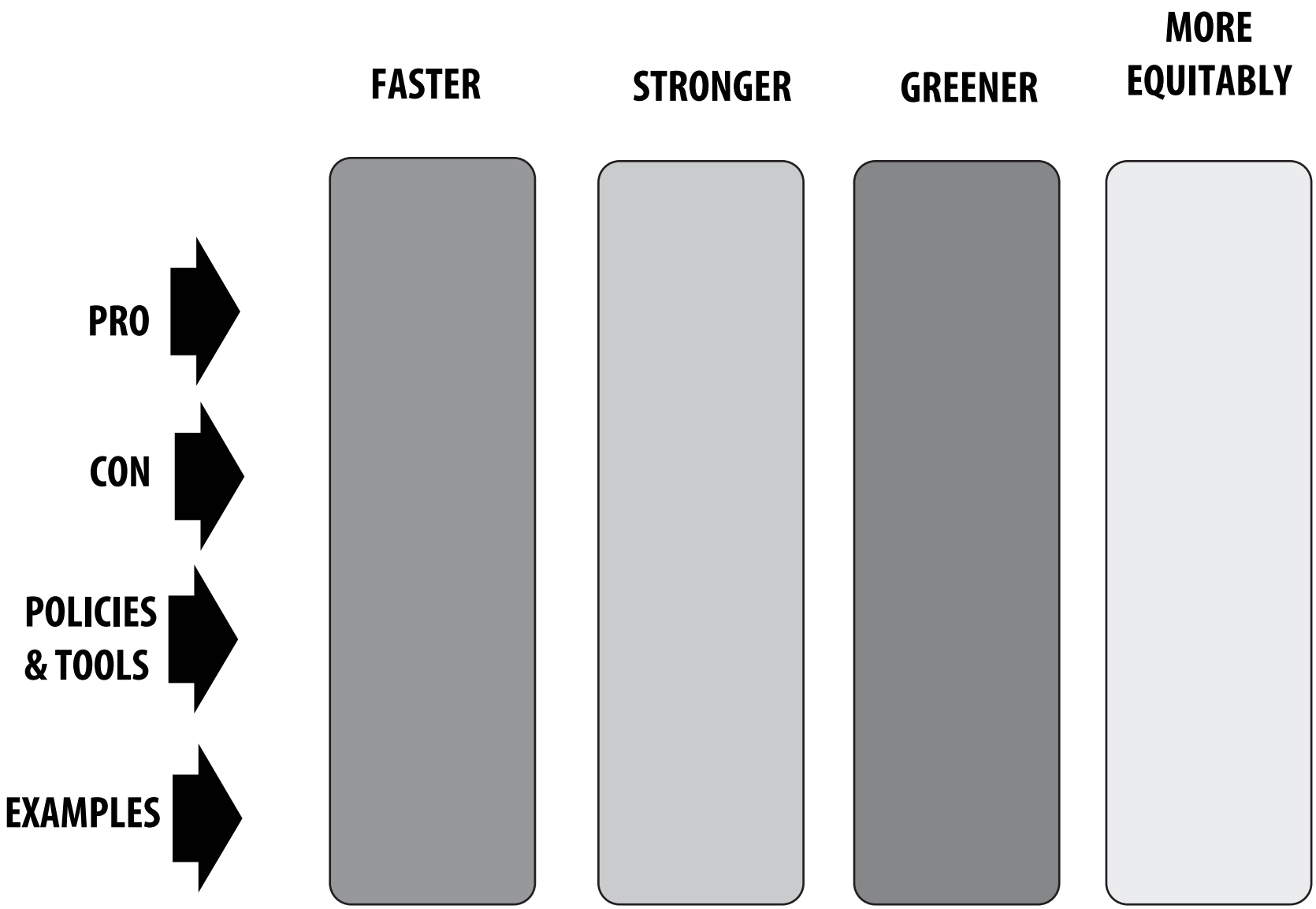
Map 8: Ruling Hazard with 1m Sea Level Rise



Planning Approaches

- Location of hazards…
- Criticality (population/infrastructure)
- Typology of response/mitigation:
  - Detection/warning/alert
  - Evacuation
  - Shelter-in-place
  - Barriers/Retention/Pumping/other?
  - Safe-to-Fail v. fail safe approaches
  - Zoning/No-build zones/limited use
  - Training/Exercise/Drills/Design Workshops
  - Increased Sustainability and Resilience…

RECOVERY TRADE-OFFS



Comparing Choices for Communities Building Back after Disaster

EXAMINING APPROACHES TO DISASTER RECOVERY

Disasters are rare events that cause deaths and injuries, as well as property losses and significant disruptions in a community. They are different from ordinary emergencies, because they overwhelm local capacity to respond, provide relief, and recover. While we tend to focus on the physical destruction associated with tornadoes, hurricanes, flooding, and acts of terrorism, disasters also wreak havoc with our systems of governance and community engagement. During crises, we hope for swift, informed, and careful decision-making. The need for trust and confidence in our systems of gathering information, conducting damage assessments, analyzing risks and vulnerabilities, making decisions and acting are heightened during disasters, especially when lives are at stake. The needs for democracy and deliberation are just as pressing before, during, and after disasters. Multi-sector collaboration is especially needed in the recovery of communities. Communities face tough choices in building back after disasters. The need for citizen empowerment is evident. Four approaches to disaster recovery and deliberation emerge.

	BUILD BACK FASTER	BUILD BACK STRONGER	BUILD BACK GREENER	BUILD BACK MORE EQUITABLY
	Under this approach, disasters are seen an events which disrupt the normal system of participation and engagement but these are temporary, hopefully, short-term impacts. Build on what was there before, restore and bring back on-line the democratic processes for planning and building back community as quickly as possible.	Rebuilding homes or businesses after a disaster is the right time to incorporate change to prevent future disaster damages. Rebuild structures and communities should be able to better withstand future hazards.	Another approach focuses on the need for significant change in the community following disaster. Simply going back to what was there before is not sufficient. Disasters provide an opportunity to rethink not just the physical environment, but also changing the management of energy, water, and other resources, to achieve greater efficiencies and increased sustainability.	Disasters expose inequities and weaknesses within our systems of hazard identification, alerting and informing vulnerable populations, and those at-risk of harm. Disaster discourse and deliberation should concentrate on identifying vulnerable populations and ensuring that their risks from disasters are reduced. Concentrating most on those most harmed by disaster will help to build resilience against future disasters.
WHAT CAN BE DONE ?	• Fast-track permits • Reduce red tape • Facilitate funding • Restore what was lost • Top down, Redevelopment Czar • ICS ▶Recovery Operations • P.D.R.P. (Pre-Disaster Recovery Plan)	• Stronger building codes • Improved land use planning • Stronger permitting inspection • CRS (Community Rating System) • Buyouts/ • Eminent Domain • Lot Consolidation • Land readjustment	• Environmental assessments. • Energy audits • Ecosystem services • Education • Green buildings • Greener lifestyles	• Rebuild low income/socially disadvantaged areas first • Prioritize based on social status • Assess needs prior to event • Elderly, poor, minority groups, should be helped the most
SUPPORTERS	• Want normalcy as soon as possible • Address Immediate Needs • Emphasize Safety/Security • Decrease psychological impacts • Restore Community	• Safer over long term/short term • Buildings/Community safer • Increase confidence • Insurance premiums lower	• Healthier communities • Secondary benefits • New industries • Innovation • Increase efficiency • Remake image	• Improved social welfare • Less dependency leads to great self sufficiency • Reduce suffering • Safer, happier communities • Co-benefits
OPPONENTS	• Little Risk Reduction • Hide vulnerabilities • Democracy compromised • Lost opportunity • Status quo benefits (at best)	• More expensive • Greater displacement • Change in land use/activities • Slower • Too much government	• Increased cost over the short-term • Traditional business loss • Newcomers • Inequities (who can afford) • Few programs/ institutions to support • Funding?	• Expensive – More conflict • Social engineering • Requires gout intervention • Harder to measure success • Harder sell
TRADE OFFS	• Lost voices for change • Less interruption but higher long-term risk • Speed vs. deliberation	• Moral hazard • Privileges engineering over other disciplines • Opportunity costs	• Disadvantaged groups suffer • Longer term investment addressing immediate social needs • Public Buy-in harder	• Less vulnerable, more dissatisfied • Hardest to achieve • Business vs. Social justice • Higher taxes • Biggest change • Scariest

Training/Education Opportunities

- Partner with Universities
- Train with NGOs and other partners
- Community Design Workshops
- Engage communities in Rebuilding/Recovery
- Tradeoffs: Faster, Stronger, Greener, More Equitably
- What is “building back better?”

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National Disaster Preparedness
Training Center

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