MID-COAST REGIONAL PLANNING COMMISSION

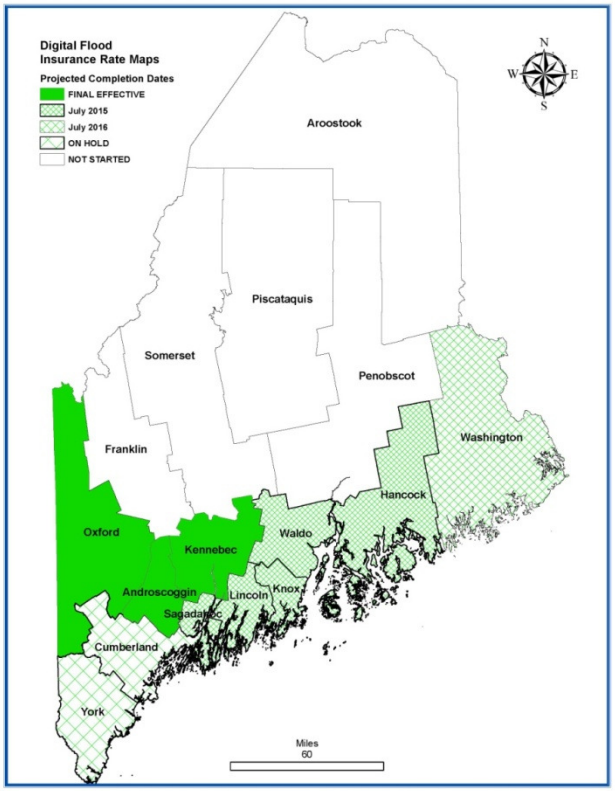
Fall Commission Meeting

Joseph Young, Mapping Coordinator
Maine Floodplain Management
Program 10/24/2013

PRELIMINARY MAP RELEASE SCHEDULE

(tentative)

- 2013
  - November 5th
    - Cumberland and York Counties
  - Temporary Hold (imagery)
    - Sagadahoc, Lincoln, Knox, and Waldo Counties
- 2014
  - Washington and Hancock Counties



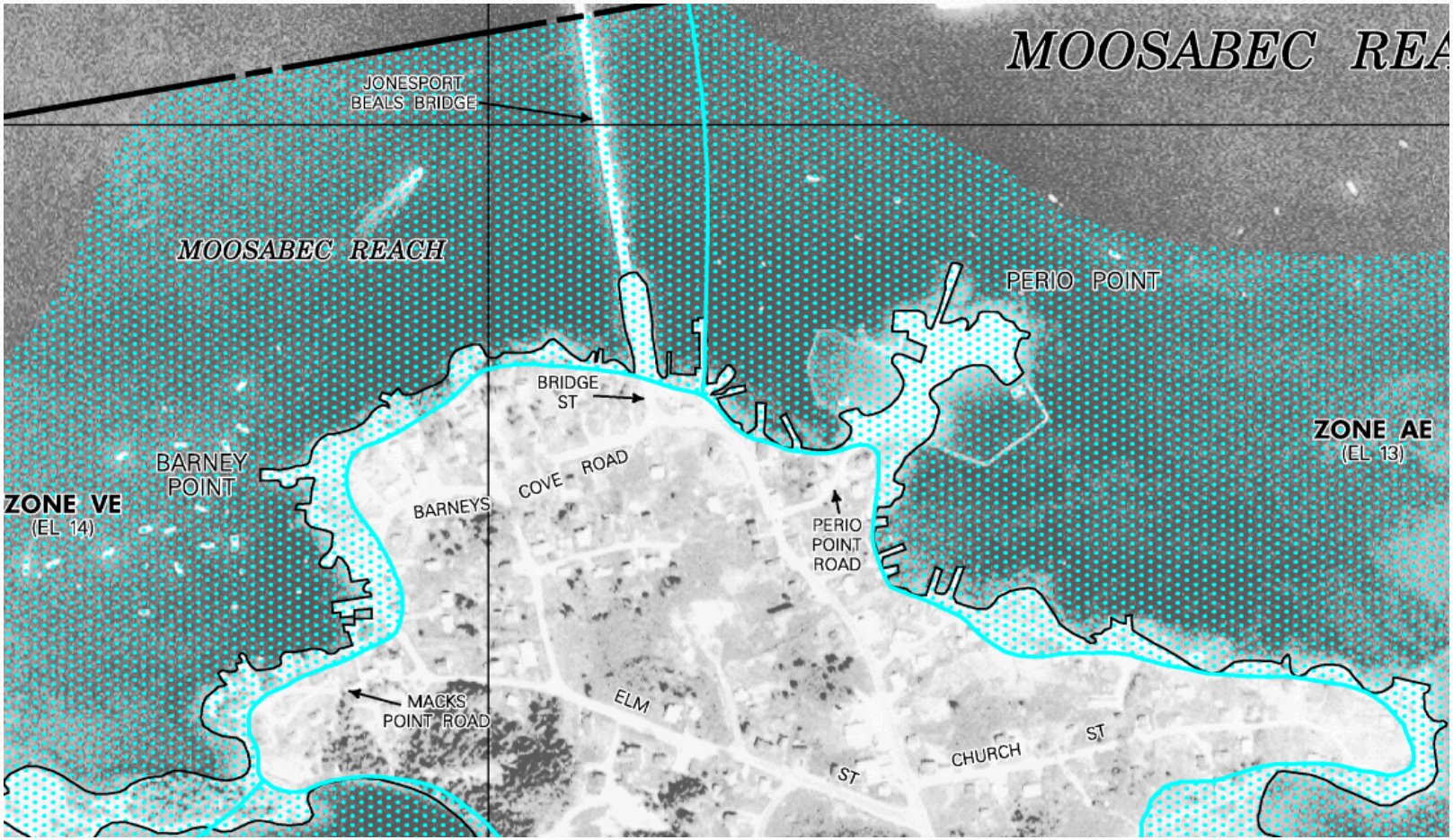
FEMA FLOOD INSURANCE RATE MAPS
MAPPING PROGRESS

FEMA

Maine Department of Agriculture, Conservation and Forestry
Floodplain Management Program
Contact: Joseph Young
Date: 9/30/2013
207-287-8051

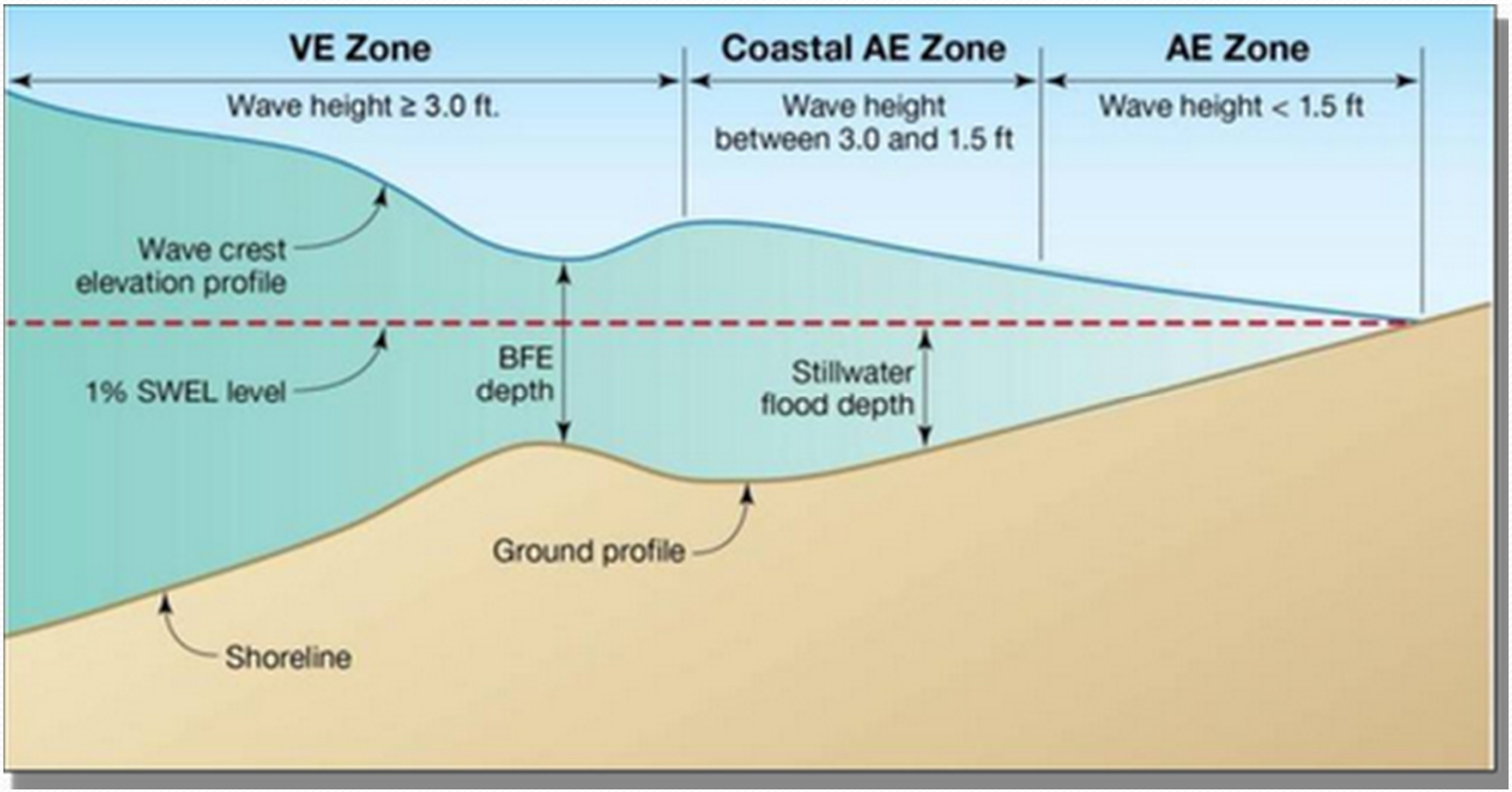
DIGITAL FLOOD INSURANCE RATE MAPS

DFIRM'S



Town of Beals

COASTAL FLOOD ZONES



MAPPING LIMITATIONS

OR:

NOT ALL MAPPING IS CREATED EQUAL

ENGINEERS LOVE EQUATIONS

Runoff equation
A combination of the two previous equations results in a differential equation, whose solution is:

- $Q_2 = Q_1 \exp\{-A(T_2 - T_1)\} + R[1 - \exp\{-A(T_2 - T_1)\}]$

Riverine Forested HGM Interim (FCI Formulas)

$$S = \frac{1000}{CN} - 10$$

$$Q = \frac{(P - I_a)^2}{P - I_a + S}$$

Detention of Storage Water:

$$\left[(V_{dur} * V_{freq}) * \frac{(V_{topo} + V_{cwd} + V_{wood})}{3} \right]$$

Maintain Plant and Animal Community:

$$\frac{\left[V_{tree} + V_{cwd} + V_{rich} + \frac{[V_{basal} + V_{density}]}{2} + \left[\frac{(V_{mid} + V_{herb})}{2} \right] + V_{connect} \right]}{6}$$

Removal & Sequestrian of Elements & Compounds:

$$\frac{\left[V_{wood} + V_{freq} + V_{dur} + \left[\frac{(V_{topo} + V_{cwd} + V_{wood})}{3} \right] + \left[\frac{(V_{detritus} + V_{redox} + V_{sorpt})}{3} \right] \right]}{5}$$

ENGINEERS LOVE EQUATIONS

2.1. Storm surge

The depth-integrated, nonlinear long-wave equations can adequately describe the storm surge generated by tropical cyclones. Adapted from Mastenbroek et al. (1993), the governing equations written in terms of the longitude and latitude (ζ, ψ) spherical coordinates include a continuity equation and two momentum equations in the ξ and ψ directions respectively,

$$\frac{\partial \zeta}{\partial t} + \frac{1}{R\cos\psi}\left[\frac{\partial (Du)}{\partial \xi} + \frac{\partial (Dv\cos\psi)}{\partial \psi}\right] = 0 \tag{1}$$

$$\frac{\partial u}{\partial t} + \frac{u}{R\cos\psi}\frac{\partial u}{\partial \xi} + \frac{v}{R}\frac{\partial u}{\partial \psi} - \left(\frac{u\tan\psi}{R} + C_f\right)v = -\frac{1}{R\cos\psi}\frac{\partial}{\partial \xi}\left(\frac{P_a}{\rho_w} + g\zeta\right) + \frac{1}{\rho_w D}\left(\tau_\xi - \tau_{b\xi} - \frac{1}{R\cos\psi}\frac{\partial S_{\xi\xi}}{\partial \xi} - \frac{1}{R}\frac{\partial S_{\xi\psi}}{\partial \psi}\right) \tag{2}$$

$$\frac{\partial v}{\partial t} + \frac{u}{R\cos\psi}\frac{\partial v}{\partial \xi} + \frac{v}{R}\frac{\partial v}{\partial \psi} + \left(\frac{u\tan\psi}{R} + C_f\right)u = -\frac{1}{R}\frac{\partial}{\partial \psi}\left(\frac{P_a}{\rho_w} + g\zeta\right) + \frac{1}{\rho_w D}\left(\tau_\psi - \tau_{b\psi} - \frac{1}{R\cos\psi}\frac{\partial S_{\psi\xi}}{\partial \xi} - \frac{1}{R}\frac{\partial S_{\psi\psi}}{\partial \psi}\right) \tag{3}$$

COASTAL SPECIAL FLOOD HAZARD MAPPING ACCURACY

- SOME OF THE PARAMETERS USED
  - 1 % EVENT (NOT.2% OR .1%)
  - WIND SPEED
  - WAVE SETUP
  - WAVE RUNUP
  - WAVE HEIGHTS
  - STORM SURGE
  - STILL WATER ELEVATIONS
  - VEGETATION AND STRUCTURE IMPEDIMENTS TO WAVE ACTION
  - STORM DIRECTION AND SPEED

RIVERINE SPECIAL FLOOD HAZARD MAPPING ACCURACY

- SOME OF THE PARAMETERS USED
  - 1% EVENT
  - RUNOFF COEFFICIENTS
  - STORM DURATION
  - RAINFALL AMOUNT

DIGITAL MAPPING ACCURACY

Data Layer	Accuracy (best case)
ORTHOIMAGERY BASE MAP (2' RESOLUTION)	+/- THIRTEEN FEET
TRANSPORTATION (1 TO 24,000 SCALE)	+/- FORTY FEET
TOPOGRAPHY (USGS) (10' CONTOURS)	+/- FIVE FEET (VERTICAL
TOPOGRAPHY (LiDAR) (2' CONTOURS)	+/- ONE FOOT (VERTICAL)
SPECIAL FLOOD HAZARD AREAS	??? VARIABLE???

COASTAL MAPPING

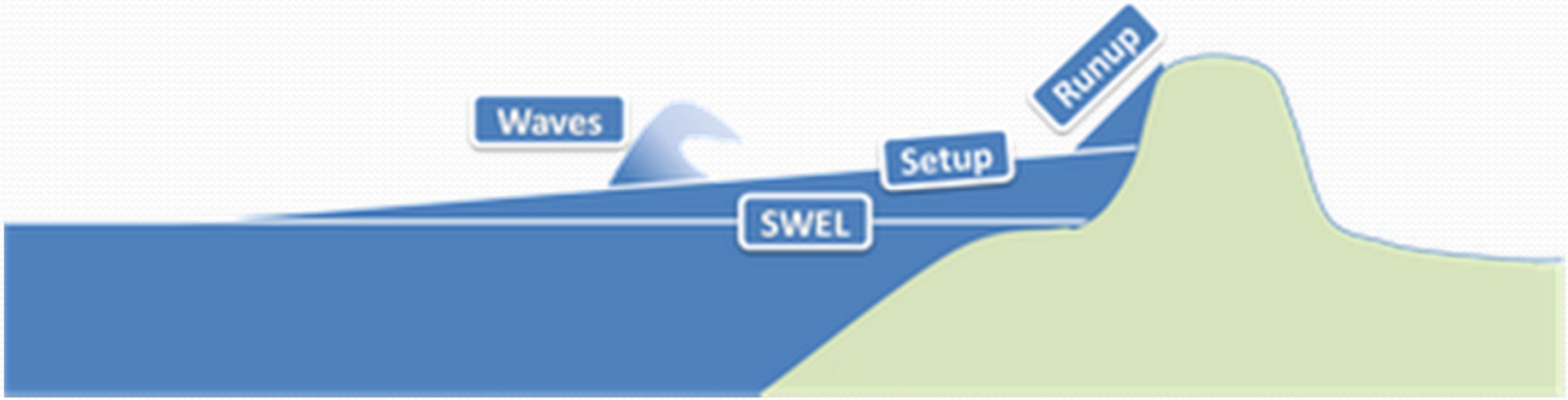
MID-COASTAL WATERSHEDS

- TWO ENGINEERING TEAMS

TRANSECTS


City of Rockland 230076
VE (EL 14)
VE (EL 19)
LERMOND COVE
ROCKLAND HARBOR
Crockett Point
PORT TERMINAL RD
KIMBALL LN
LIME STREET PL
LIME ST
SEA STREET PL
WHARF ST
LINDSEY ST
GROVE ST
MAPLE ST
WHITE ST
GRANITE ST
FOGG ST
TEA ST
LELAND ST
TEMPLE ST
KNOWLTON ST
CURDY ST
COTTAGE ST
BLAKE PL
GAY ST
GAY STREET PL
43
44
1

COASTAL FACTORS

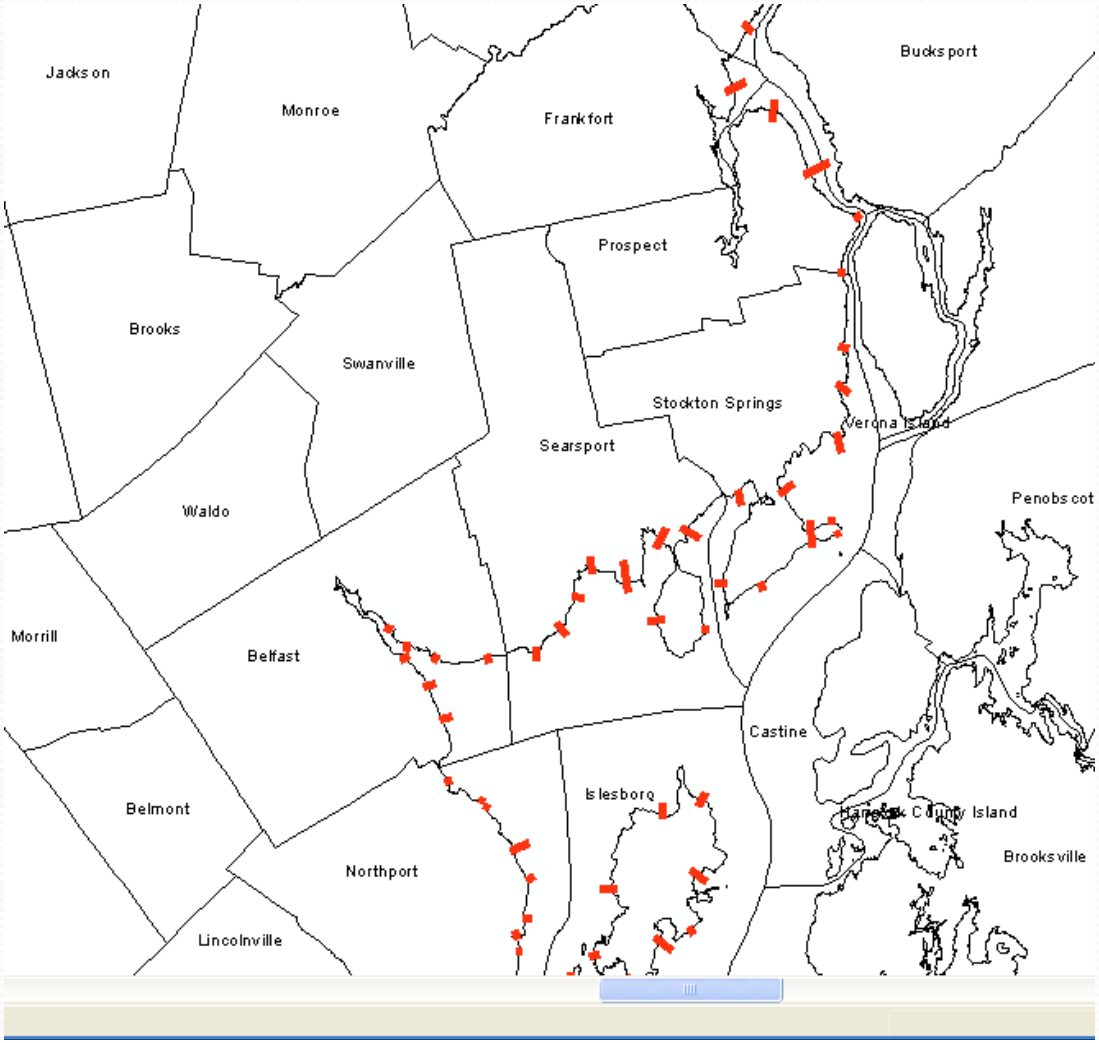


TOTAL TRANSECTS

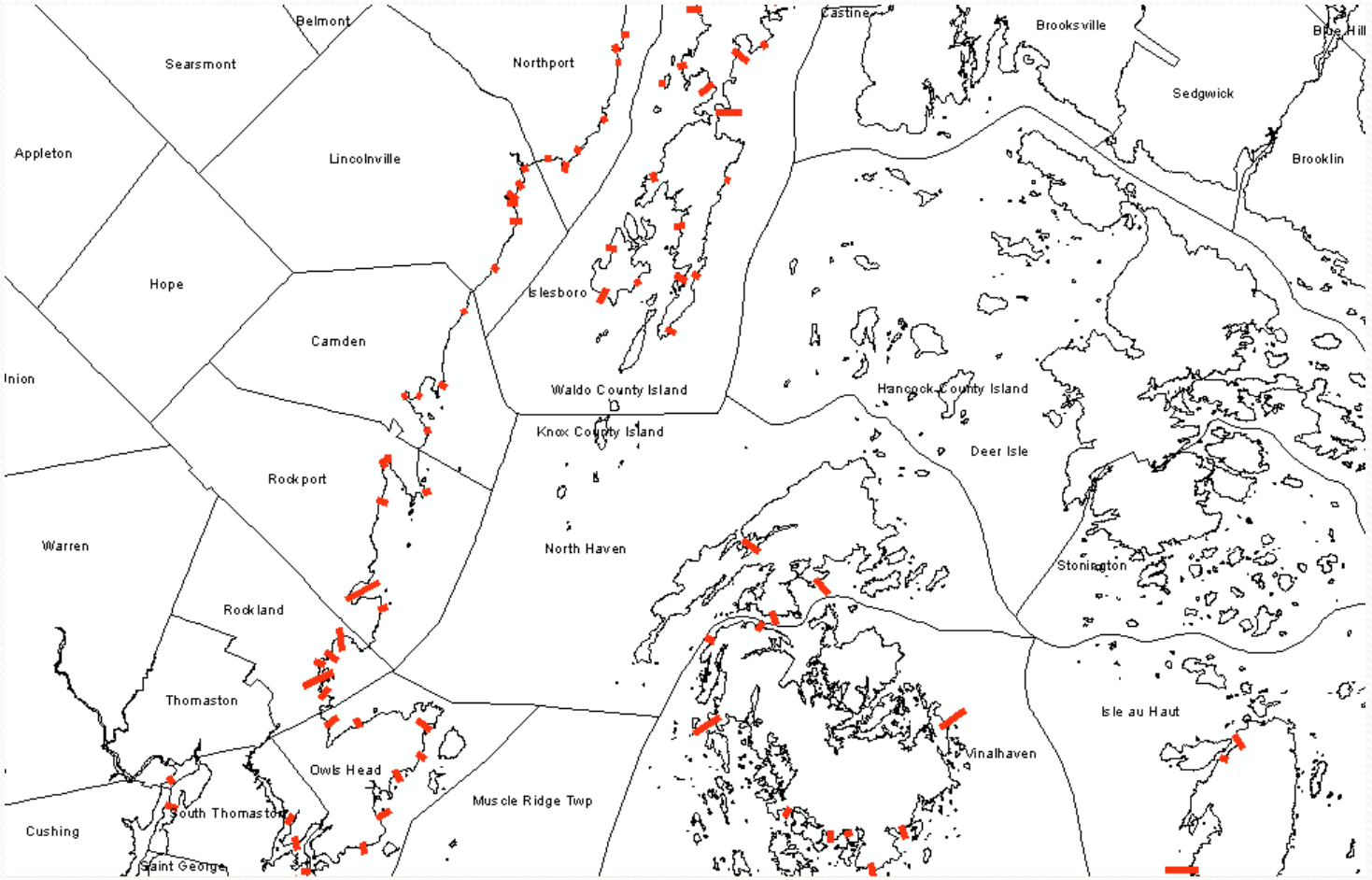
	KNOX	LINCOLN	SAGADAHOC	WALDO
Total Shoreline Miles	705	650	400	160
# of Updated Transects	70	78	55	75

Cost per transect: Over $10,000

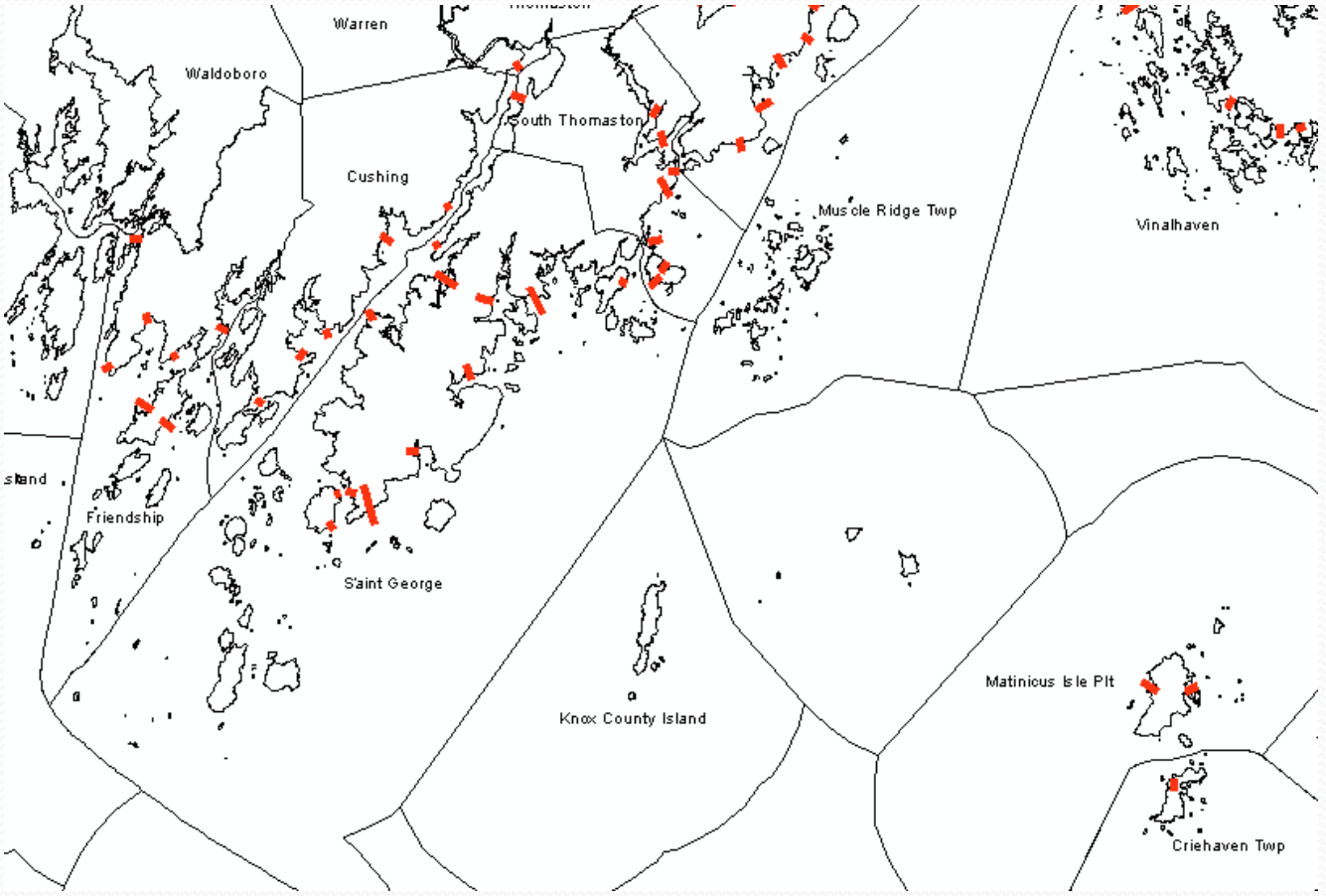
NORTHERN TRANSECTS



CENTRAL TRANSECTS



SOUTHERN TRANSECTS



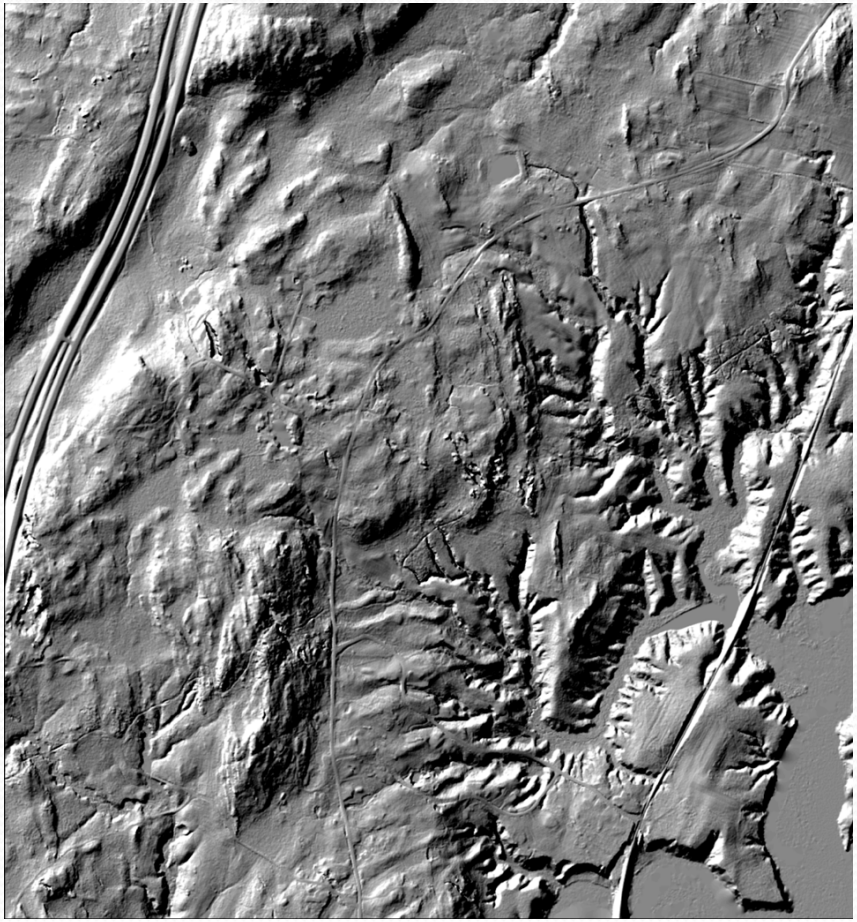
RIVERINE MAPPING

NEW APPROXIMATE ANALYSES

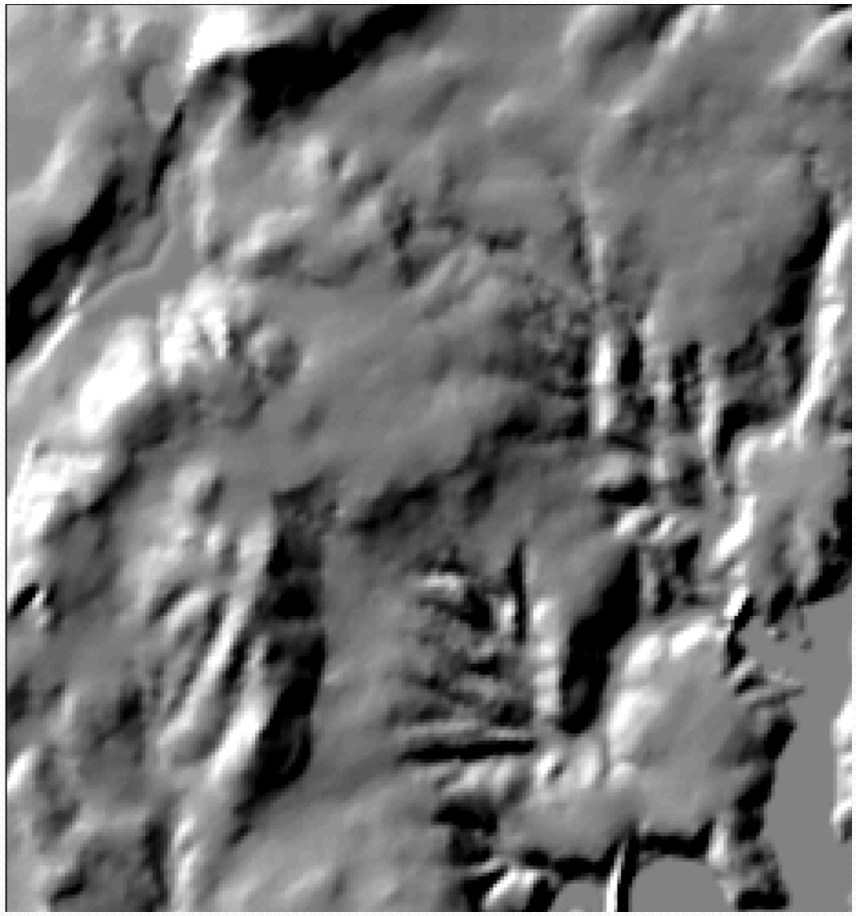
RIVERINE SPECIAL FLOOD HAZARD MAPPING ACCURACY

- SOME OF THE PARAMETERS
  - RUNOFF COEFFICIENTS
  - STORM DURATION
  - RAINFALL AMOUNT
  - 1% EVENT

LiDAR VS USGS

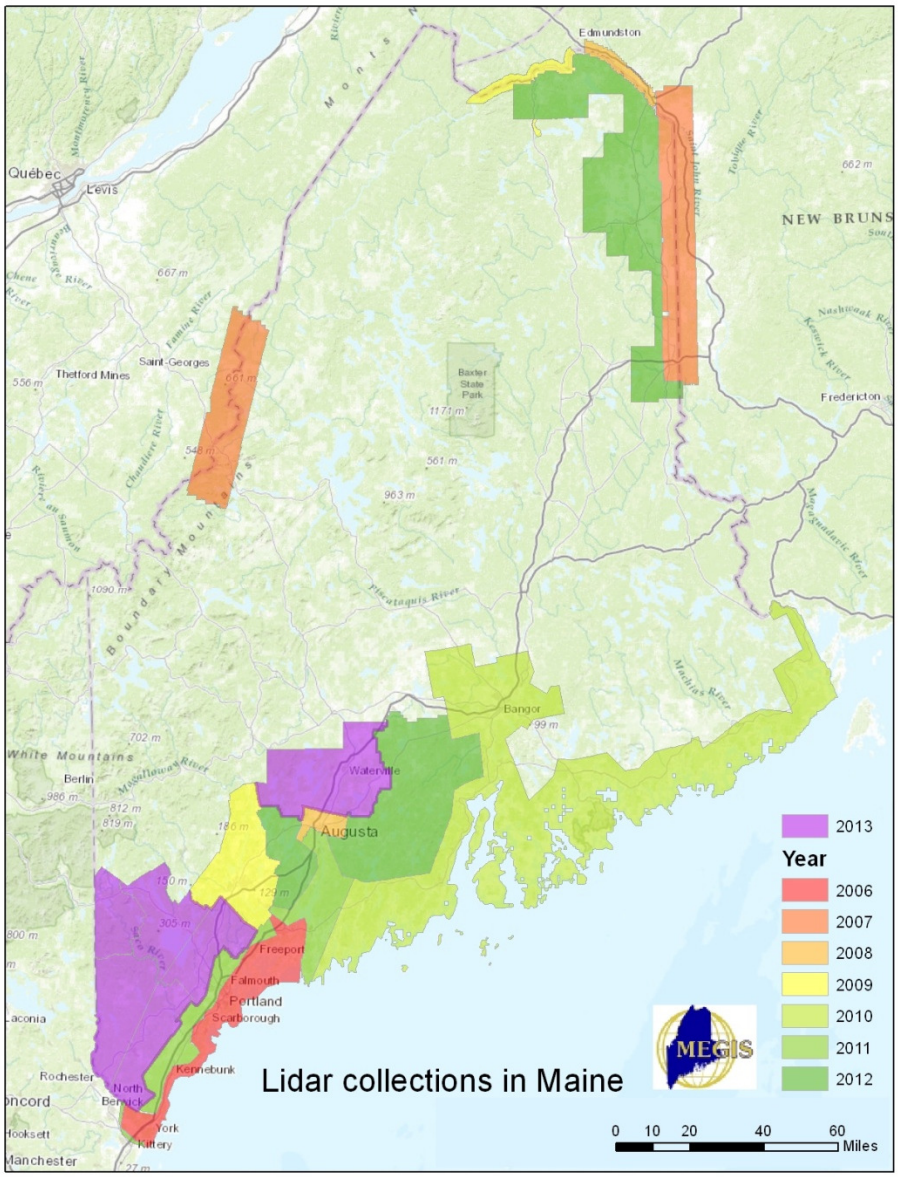


2 METER DEM

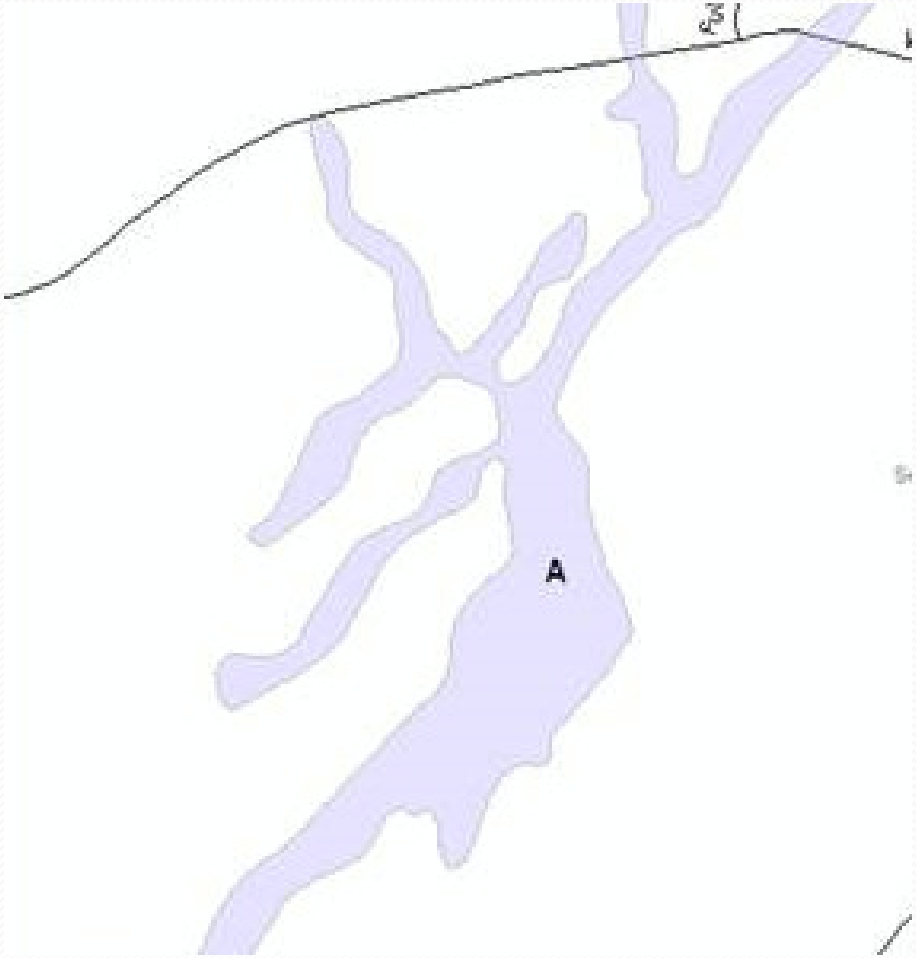


10 METER DEM

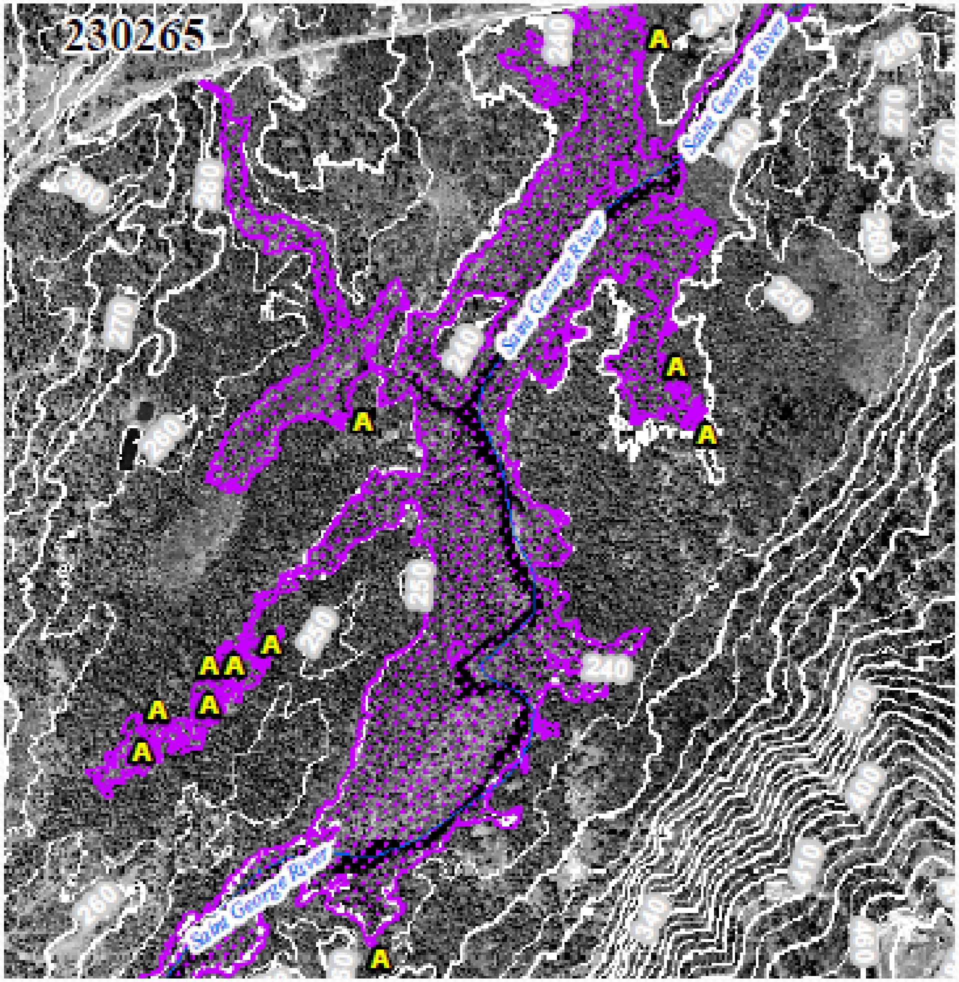
LiDAR A MOST IMPORTANT TOOL



SEARSMONT (old approximate A)



SEARSMONT (new approximate A)



REMEMBER

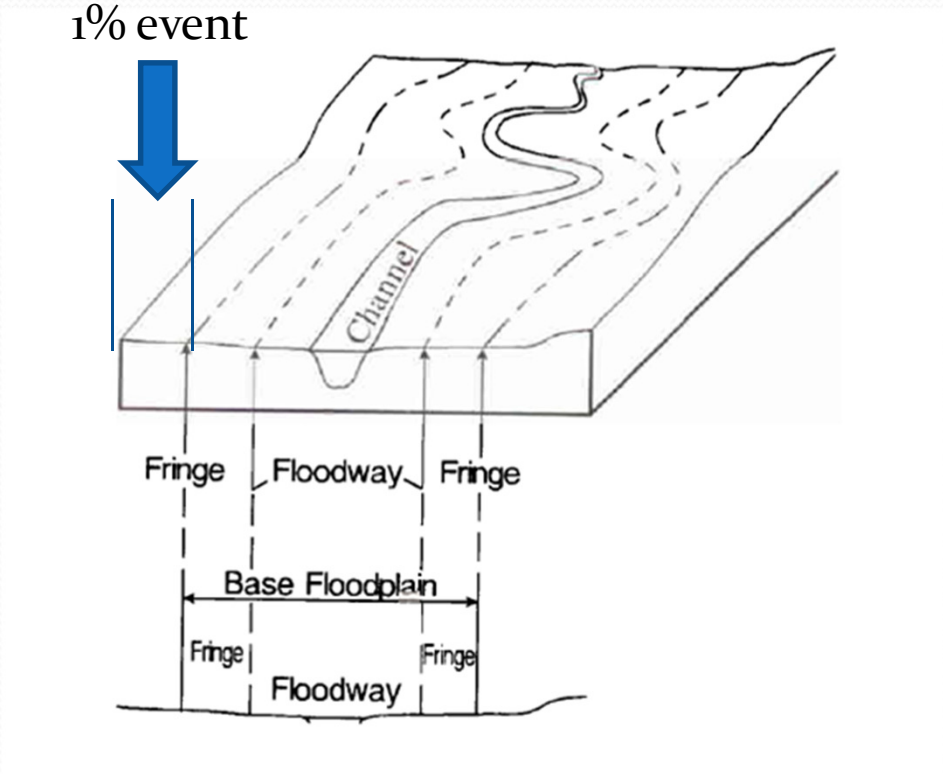
A FLOOD INSURANCE RATE MAP

NOT A FLOODPLAIN MAP

- Maps the 1% event
- 25%~ of disaster claims are out side of the mapped SFHA

FLOODING PROFILE

Greater than the
1% event



1% event is covered but not the less frequent events which may be much larger

FLOOD MAPPING ROULETTE

(PROBABILITY OF FLOODING)

TIME PERIOD	EVENT				
	10% (10 YR)	4% (25 YR)	2 % (50 YR)	1 % (100 YR)	.02 % (500 YR)
1 YEAR	10 %	4.0 %	2.0 %	1.0 %	.02 %
10 YEARS	65.1	33.5 %	18.3 %	9.6 %	2.0 %
20 YEARS	87.8	55.8 %	33.2 %	18.2 %	3.9 %
50 YEARS	99.5	87.0 %	63.6 %	39.5 %	9.5 %
100 YEARS	99.97	98.3%	86.7 %	63.4 %	18.1 %
200 YEARS				87.0 %	

26% IS THE CHANCE YOU WILL BE FLOODED DURING A 30 YEAR MORTGAGE

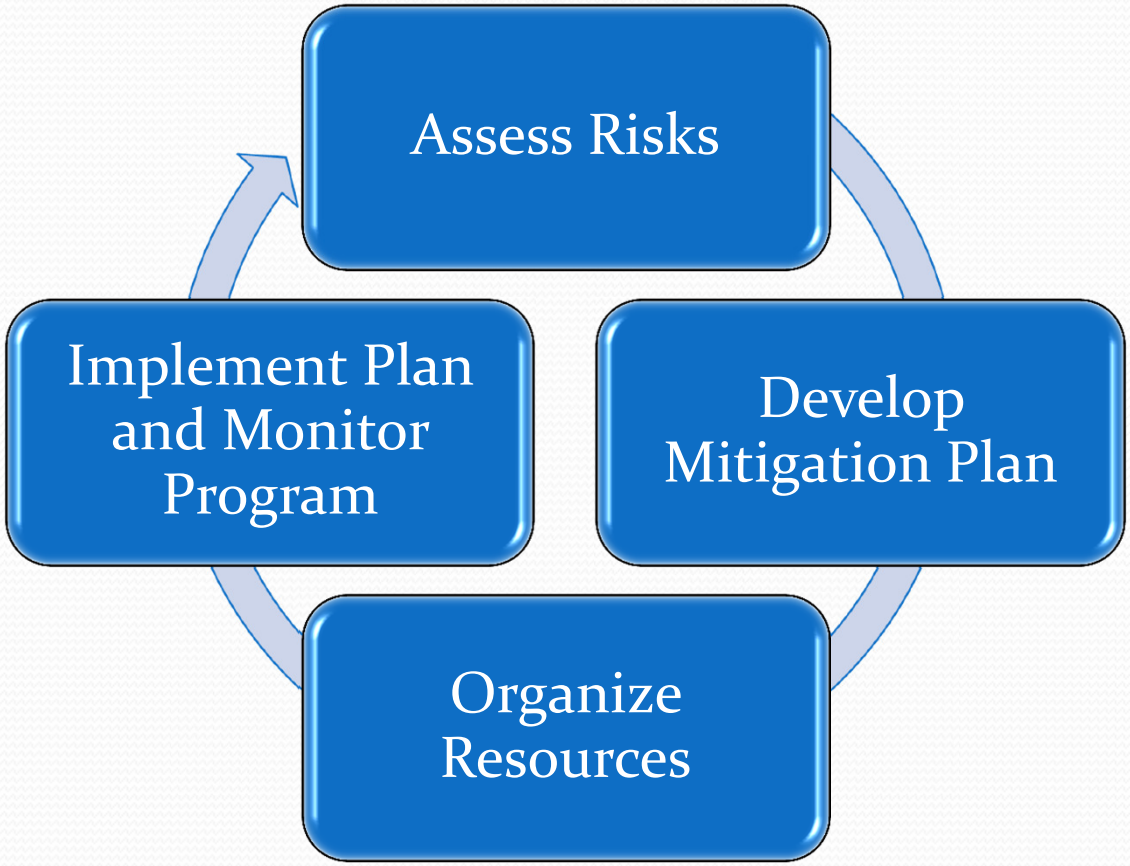
OTHER RISKS

RISK	ANNUAL PROBABILITY
FLOODING WITHIN THE SFHA*	1.000
HOUSE FIRE	0.276
DYING AT AGE 10	0.000091
DYING AT AGE 30	0.001419
DYING AT AGE 65	0.016182

* This assumes an accurately modeled and delineated SFHA

MITIGATION

PLANNING FOR RESILIENCY



ELEVATION

IT CAN HAPPEN HERE

Waves estimated at 20 to 25 feet caused coastal flooding in some York County towns : Gregory Rec/Staff Photographer Portland Press Herald 3/8/2013

SCITUATE MASSACHUSETTS
3/7/2013

Waves crashing over a sea wall and into houses
(Denise Lavoie, Associated Press in the Lewiston Sun Journal)

OLD ORCHARD BEACH
FEBRUARY 8, 1978

QUESTIONS

Actually it can happen here!