

Module 3

Recommended
Strategies for Reducing
Vulnerability and
Exposure



Using FEMA flood maps as your sole source of flooding information is like driving forward using only your rearview mirrors.



Overview

- FEMA National Flood Insurance Program (NFIP)
 - Minimum Regulations
 - Maps - Risk
- Drainage
 - Lack of Regulations

FEMA Federal Minimums

- 44 CFR 59 & 60
- Participation in the NFIP requires adoption of at least minimums.
 - Community has ability to adopt higher standards.
 - CRS rewards adoption of higher standards.

FEMA Flood Insurance Rate Maps (FIRMs)

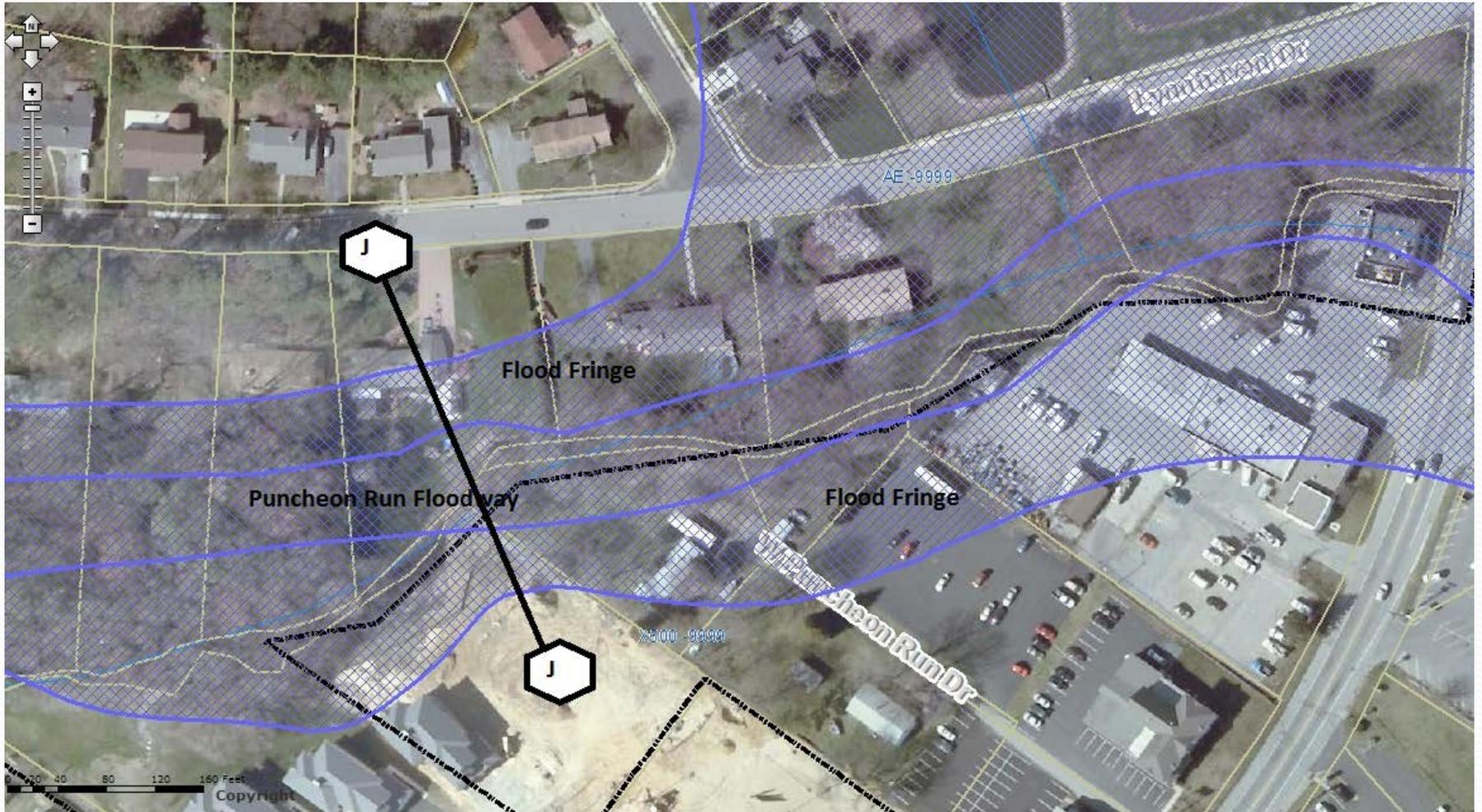
- FIRMs show an analysis of flood scenario based on past events and data.
- Indicate areas of high, moderate, low risk.
- Future conditions not taken into account.
- Margin of error in calculations.
- Mother nature is unpredictable.
- Conditions continuously change – one map will not suffice.

Debris

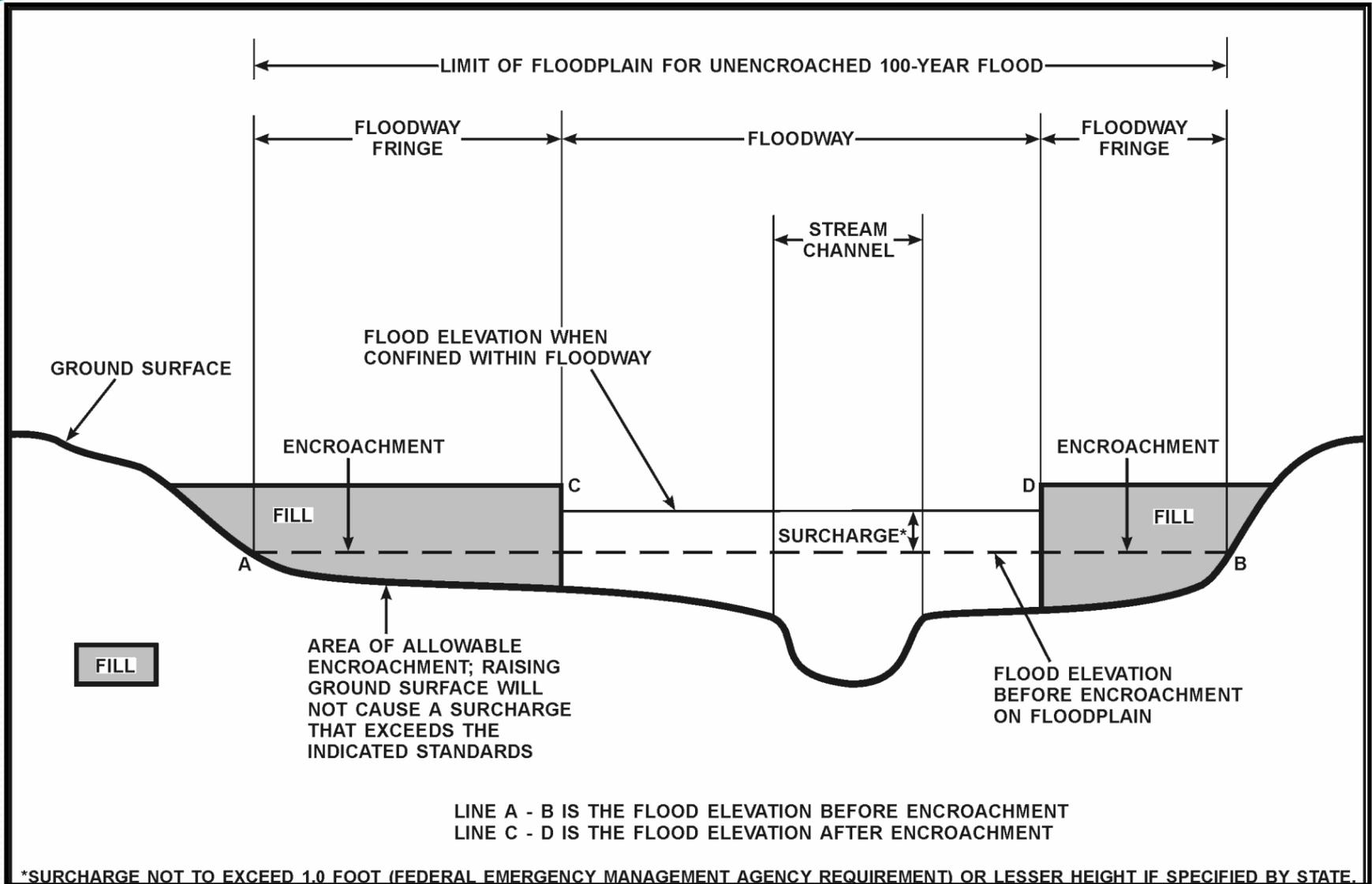


Photo by G. Williams - Seaford 6/26/06

Encroachment



Stream cross section



Floodway data table from FIS

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Brandywine Creek (Lower Reach)								
A	1.62 ¹	447	6,132	4.3	13.6	13.6	14.6	1.0
B	2.31 ¹	168	2,689	9.7	15.5	15.5	16.5	1.0
C	2.94 ¹	230	3,292	8.0	27.1	27.1	27.3	0.2
D	3.40 ¹	142	2,122	12.3	38.3	38.3	39.3	1.0
Chestnut Run								
A	665 ²	190	661	3.0	76.8	76.8	77.6	0.8
B	1,865 ²	162	299	6.7	82.7	82.7	82.7	0.0
C	3,020 ²	121	548	3.6	89.4	89.4	90.4	1.0
D	4,550 ²	81	291	6.9	96.6	96.6	96.7	0.1
Christina River								
A	14,855 ³	616	6,636	4.0	8.8	8.3 ⁴	8.3	0.0
B	18,970 ³	345	3,999	6.7	9.6	9.6	9.6	0.0
C	33,490 ³	1,299	12,579	0.8	12.9	12.9	13.9	1.0
D	39,545 ³	1,275	11,743	0.9	13.3	13.3	14.2	0.9
E	43,300 ³	685	7,482	1.3	13.5	13.5	14.5	1.0
F	45,710 ³	825	9,460	1.0	13.8	13.8	14.7	0.9
G	48,870 ³	700	7,542	1.3	14.1	14.1	15.0	0.9
H	52,165 ³	775	9,248	1.0	14.5	14.5	15.4	0.9
I	56,750 ³	587	6,787	1.4	15.6	15.6	16.4	0.8
J	58,500 ³	753	9,130	1.0	15.7	15.7	16.4	0.7
K	61,700 ³	672	5,291	1.7	16.6	16.6	17.1	0.5
L	63,850 ³	868	5,714	1.6	17.0	17.0	17.5	0.5
M	66,990 ³	700	5,665	1.6	17.8	17.8	18.2	0.4

¹Miles above confluence with Christina River

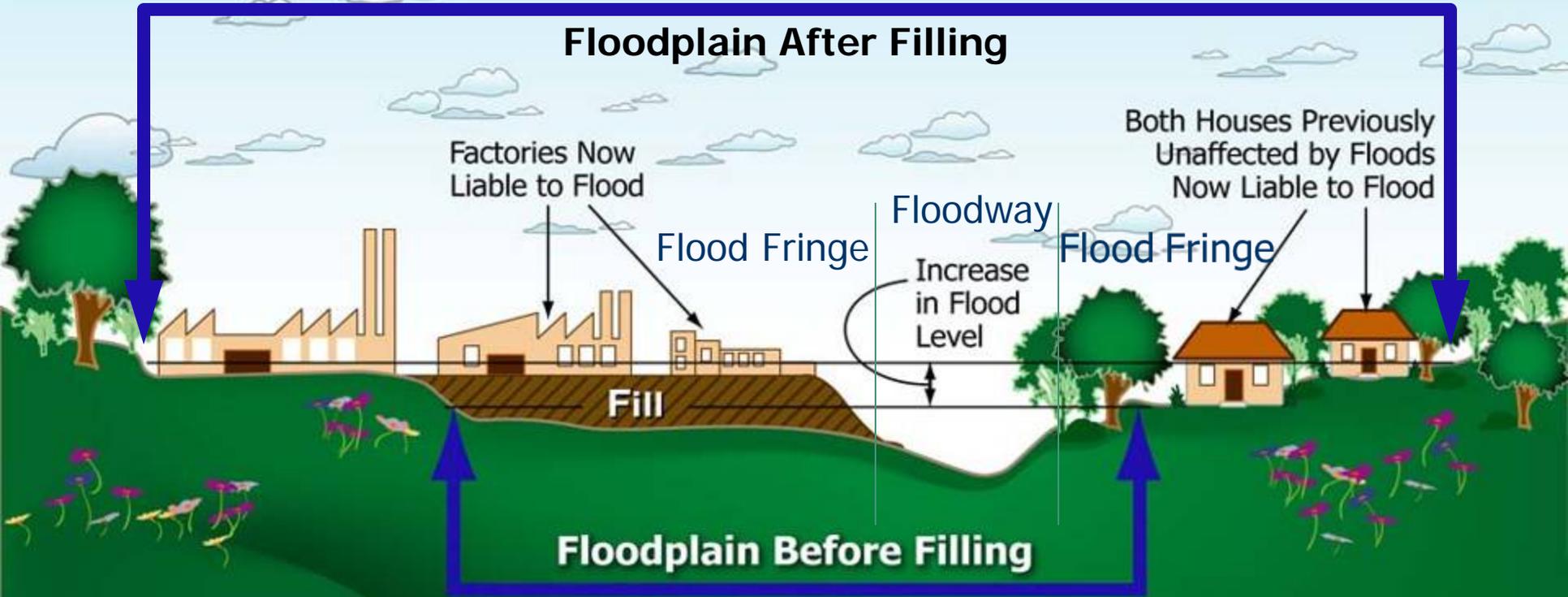
²Feet above confluence with Little Mill Creek

³Feet above the City of Wilmington corporate limits

⁴Elevation computed without consideration of backwater effects from Delaware River

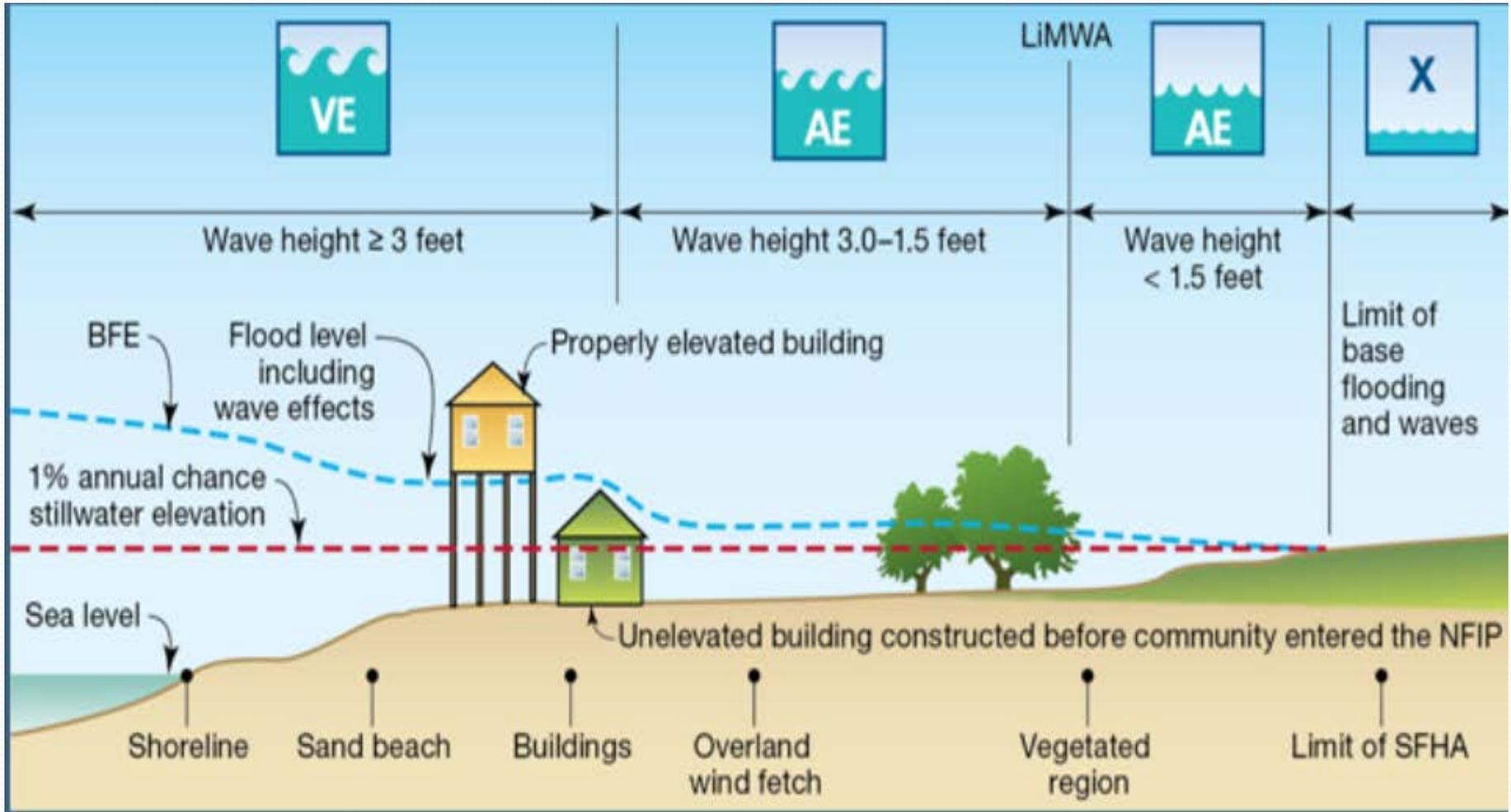
BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
13.6	13.6	14.6	1.0
15.5	15.5	16.5	1.0
27.1	27.1	27.3	0.2
38.3	38.3	39.3	1.0
76.8	76.8	77.6	0.8
82.7	82.7	82.7	0.0
89.4	89.4	90.4	1.0
96.6	96.6	96.7	0.1

Today's Floodplain Is Not Necessarily Tomorrow's Floodplain



If large areas of the floodplain are filled, then there will be an increase in the land area needed to store flood waters. This means your home or business may be impacted.

Changing coast



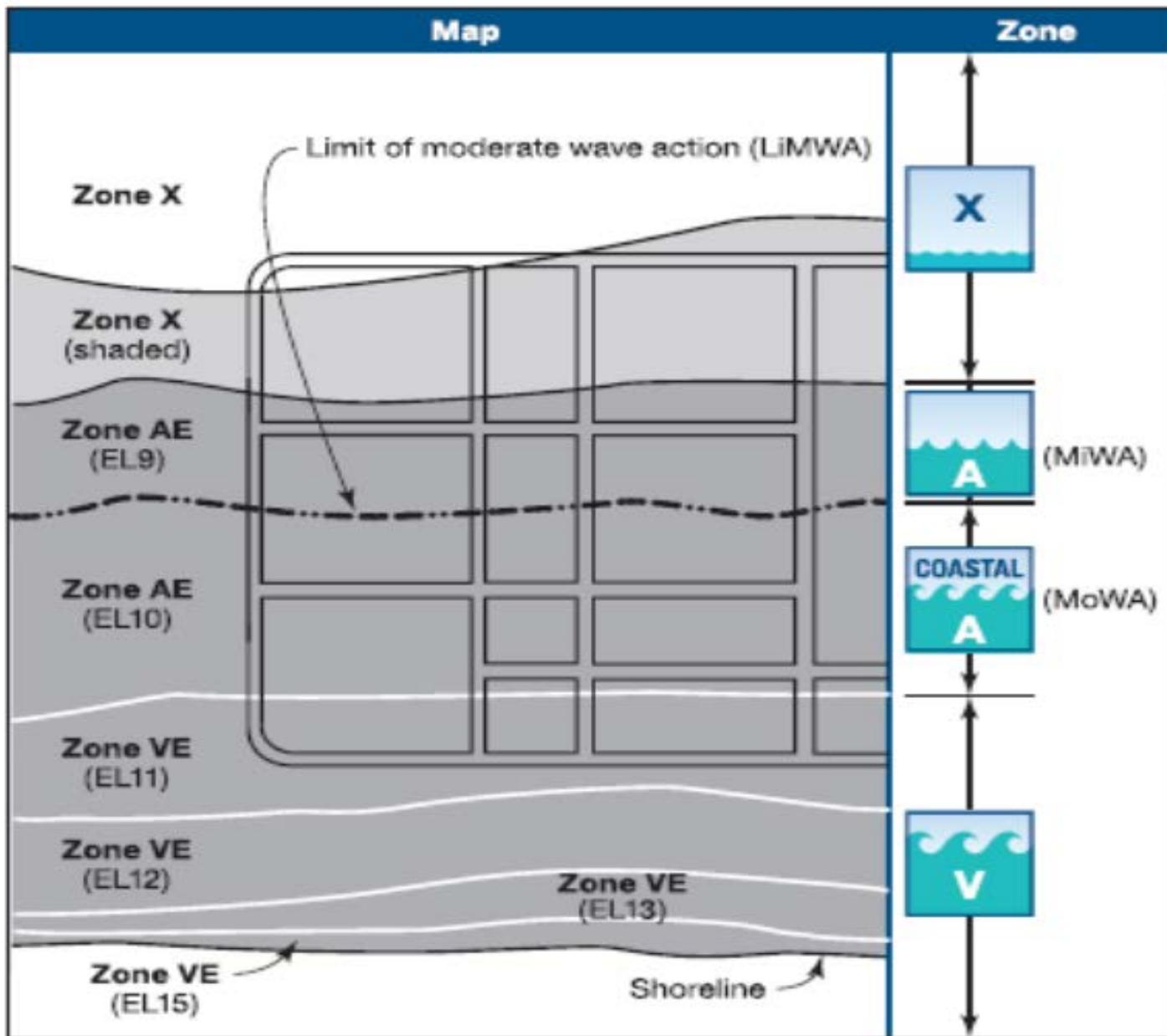
Erosion



Broadkill Beach 10/31/12



Photo by T. Pratt 11/8/12



Coastal Const.
Manual

FIRMs do not account for the following:

- Shoreline erosion, wetland loss, subsidence, and relative sea level rise
- Upland development or topographic changes
- Degradation or settlement of levees and floodwalls
- Changes in storm climatology (frequency and severity)
- The effects of multiple storm events

Floodplain issues

- Development in Areas Without Sufficient Floodplain Mapping and Flood Data
- Inadequate Building Standards
- Inconsistent and / or Minimum Code Provisions
- Lack of Enforcement of Existing Standards
- Real Estate Disclosure form

Improved Floodplain Regulations and Enforcement

Benefits:

- Lowers the cost of flood insurance.
- Avoiding NFIP probation ensures continued insurance availability.
- Reduce flood damage and expensive drainage solutions.



EXAMPLE: ELEVATING ABOVE THE MINIMUM CONSTRUCTION ELEVATION (concluded)

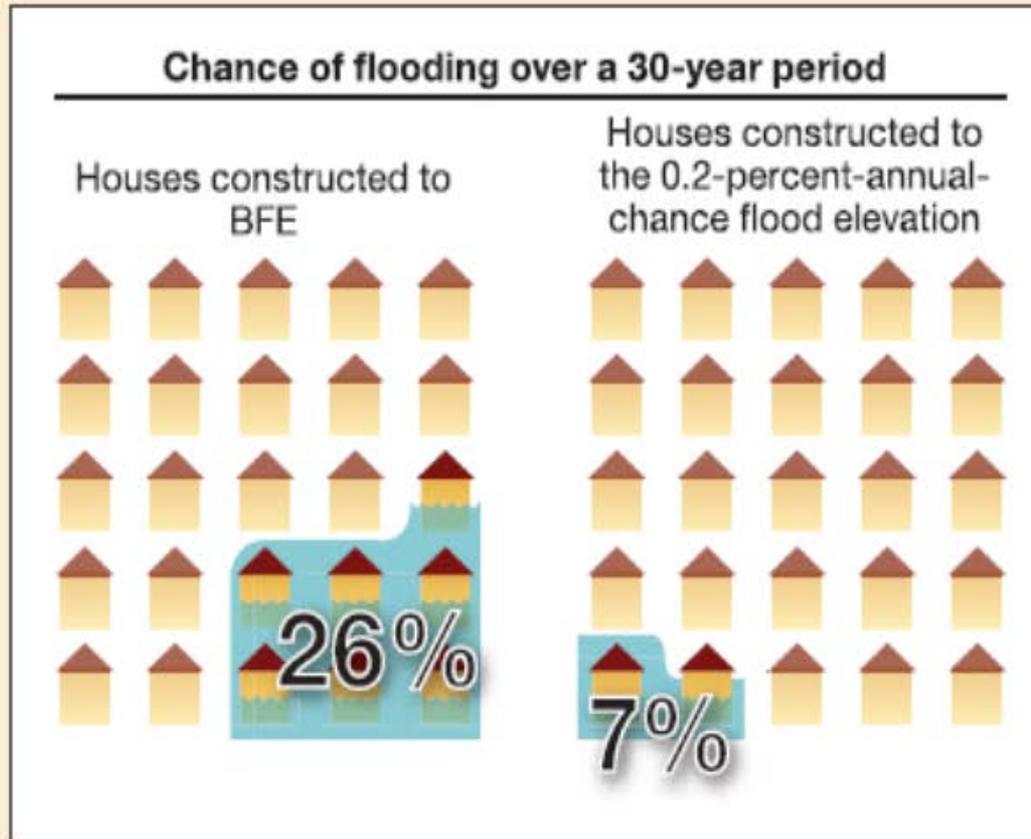


Illustration A:
Comparison of the percent chance of houses being flooded over a 30-year period after being elevated to the BFE (left) and the 0.2-percent-annual-chance flood elevation (right)

Coastal Construction Manual

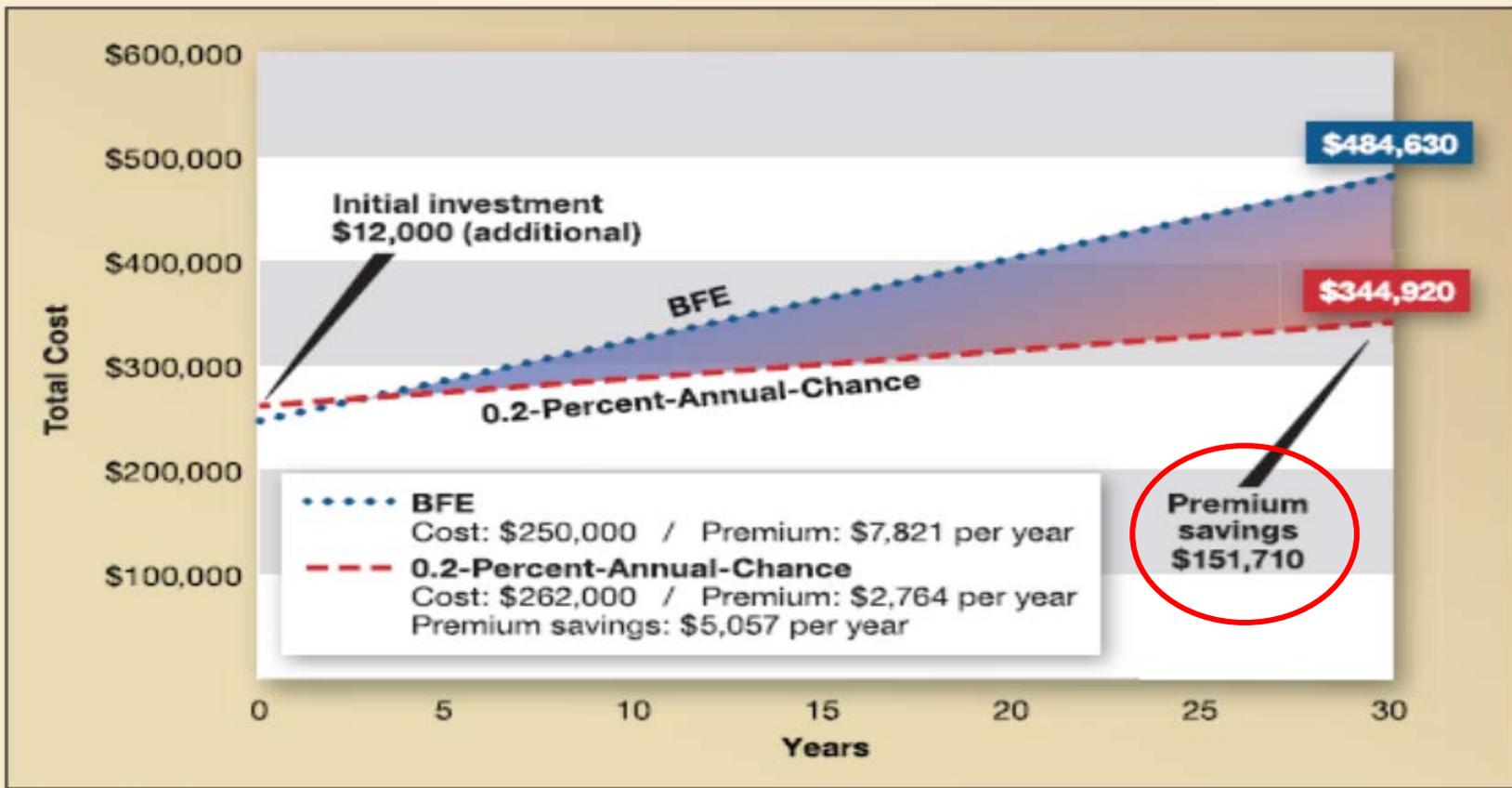


Illustration B:

Comparison of the total cost over a 30-year period for a house elevated to the BFE (dotted line) and a house elevated to the 0.2-annual-chance flood elevation (dashed line)

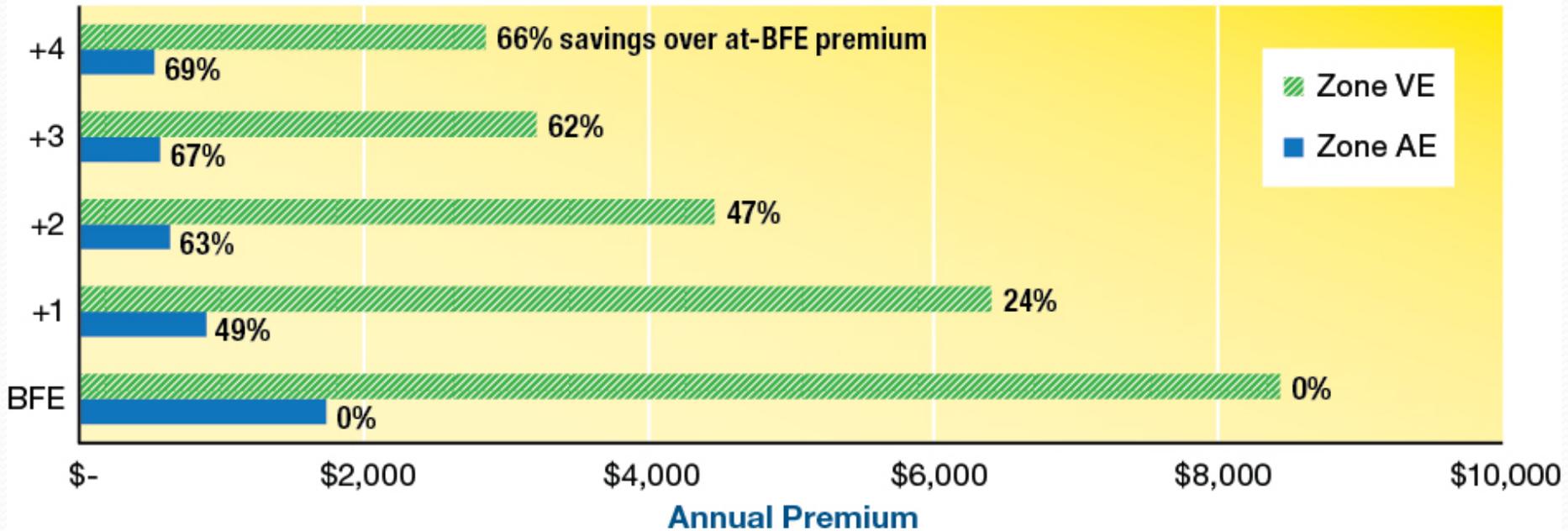
Note:

This example includes the cost of adding 3 feet of freeboard above the BFE, elevating the house to the 0.2-percent-annual-chance flood elevation. The difference in elevation between the BFE and the 0.2-percent-annual-chance flood actually varies by location.

Example premiums calculated using the NFIP Flood Insurance Manual, May 1, 2011, for a Zone V structure free of obstructions. Premiums include building (\$250,000), contents (\$100,000), and associated fees including Increased Cost of Compliance.

Coastal Construction Manual

Lowest Floor Elevation Relative to BFE



Note: Annual premiums calculated using the *NFIP Flood Insurance Manual*, October 3, 2013, for a one-story single-family home with no basement, no enclosure, and full replacement coverage. Premiums are based on the maximum available coverage of building coverage of \$250,000 for building and \$100,000 for contents coverage. Zone V building is assumed to be free of obstructions.

Other considerations

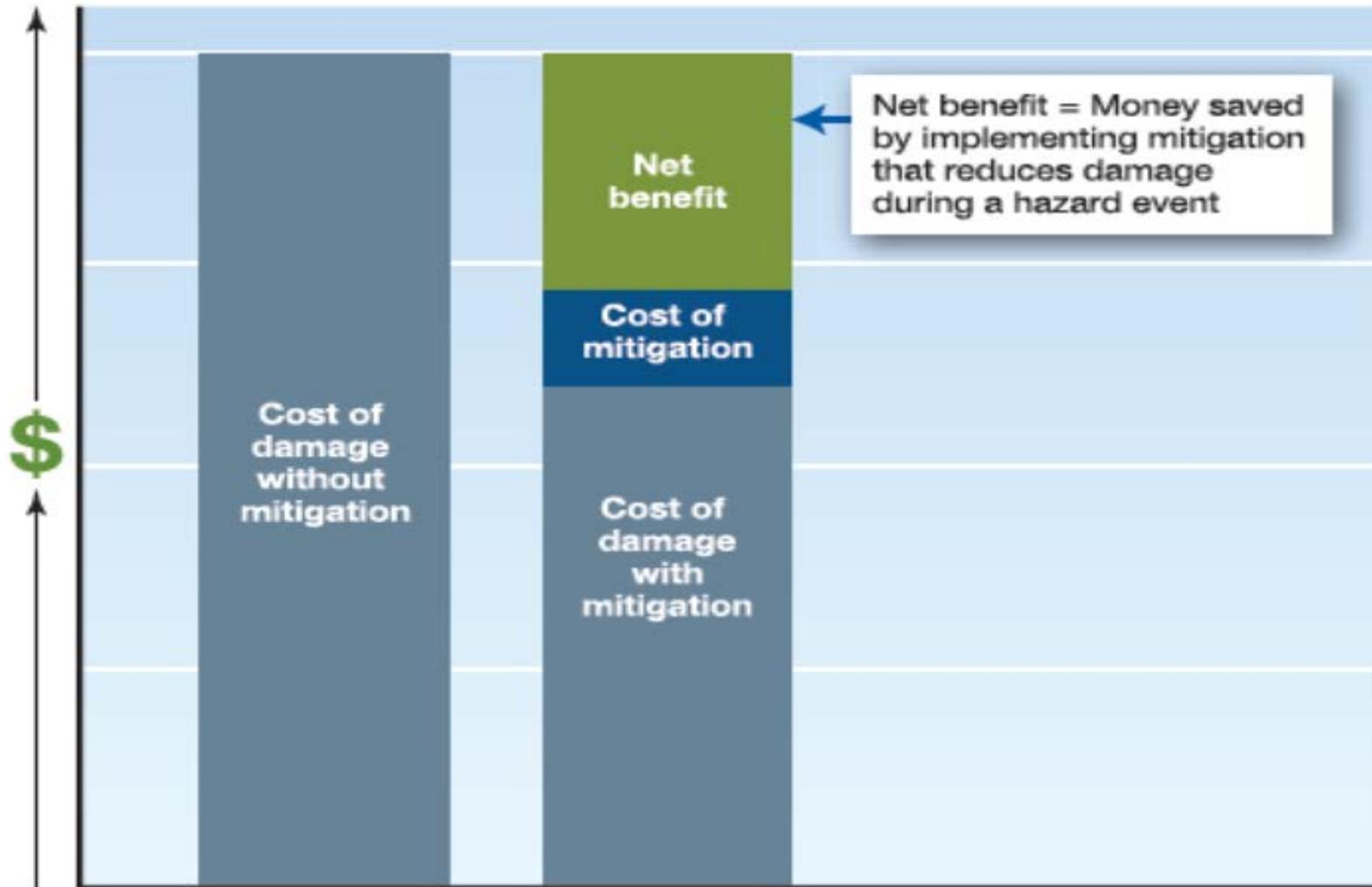


- Few if any standards existing for development immediately adjacent to the floodplain or outside mapped floodplains.
- ~25% of flood damages nationally occur to structures which are outside a FEMA-mapped floodplain.



House with proposed basement under construction just outside the floodplain filled with groundwater.

In conclusion



“Floods are an act of God,
but flood losses are
largely an act of man.”

-Gilbert F. White

Drainage issues

- Easements
- Obstructions
- Conveyance
- Lot grading

Obstructions

Willful or negligent obstruction.



Conveyance Systems



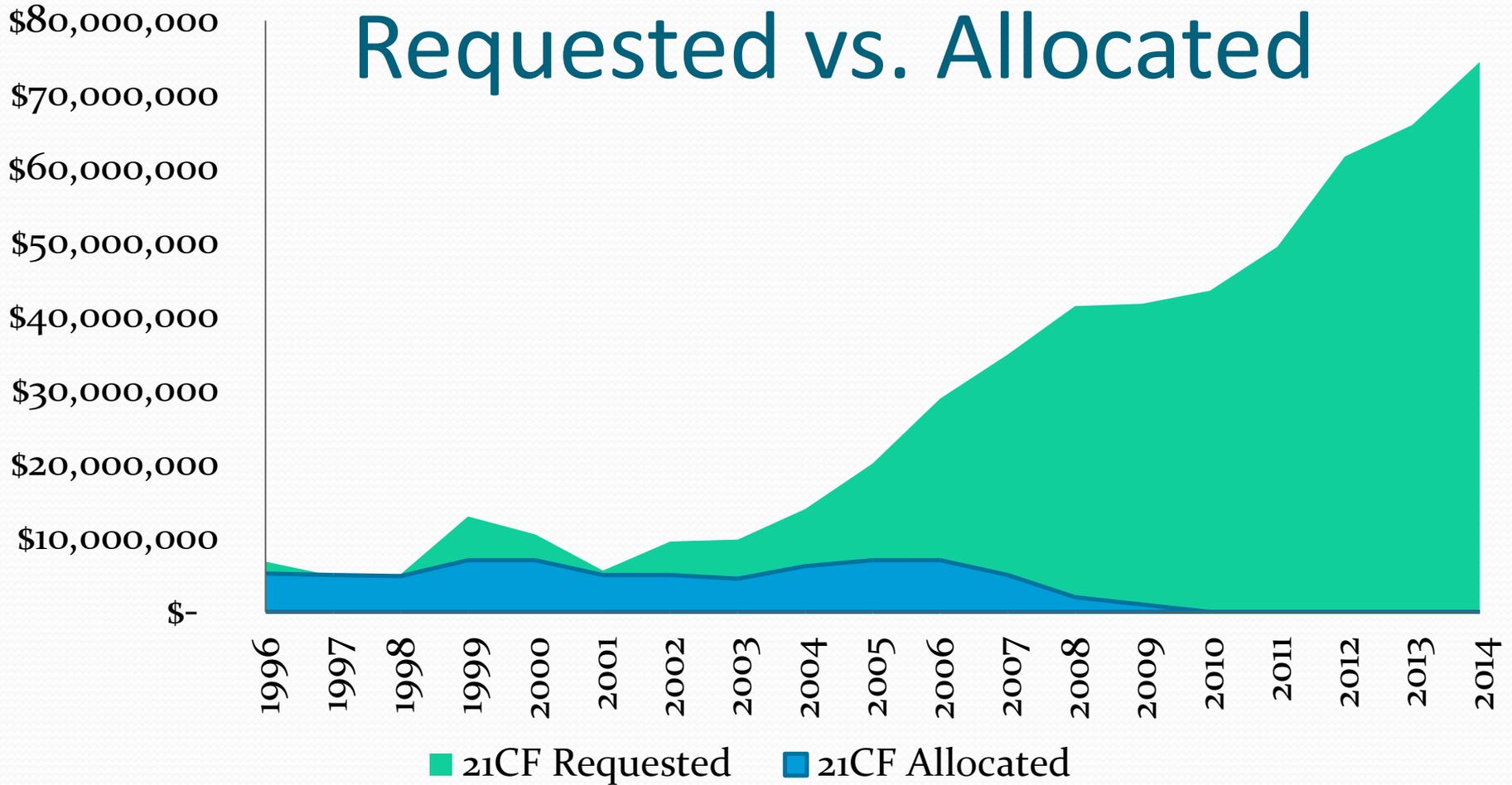
Lot grading



The reality

- Over 331 square miles or 17% of Delaware's land mass is within a mapped 100 year floodplain.
- Approximately 621 road miles and over 18,000 structures are in the 100-year floodplain.
- State expenditures each year to resolve drainage problems have cost taxpayers an estimated \$65 million since 1996.

21st Century Funds Requested vs. Allocated



Bottom Line.

- This process is not sustainable.
- Lets be proactive and stop creating more issues.
- Let's build with a “one and done” mindset.

Questions?

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