What We Do: Wetlands, Wildlife Habitat & Flood Hazards in the Root River Watershed

presented by
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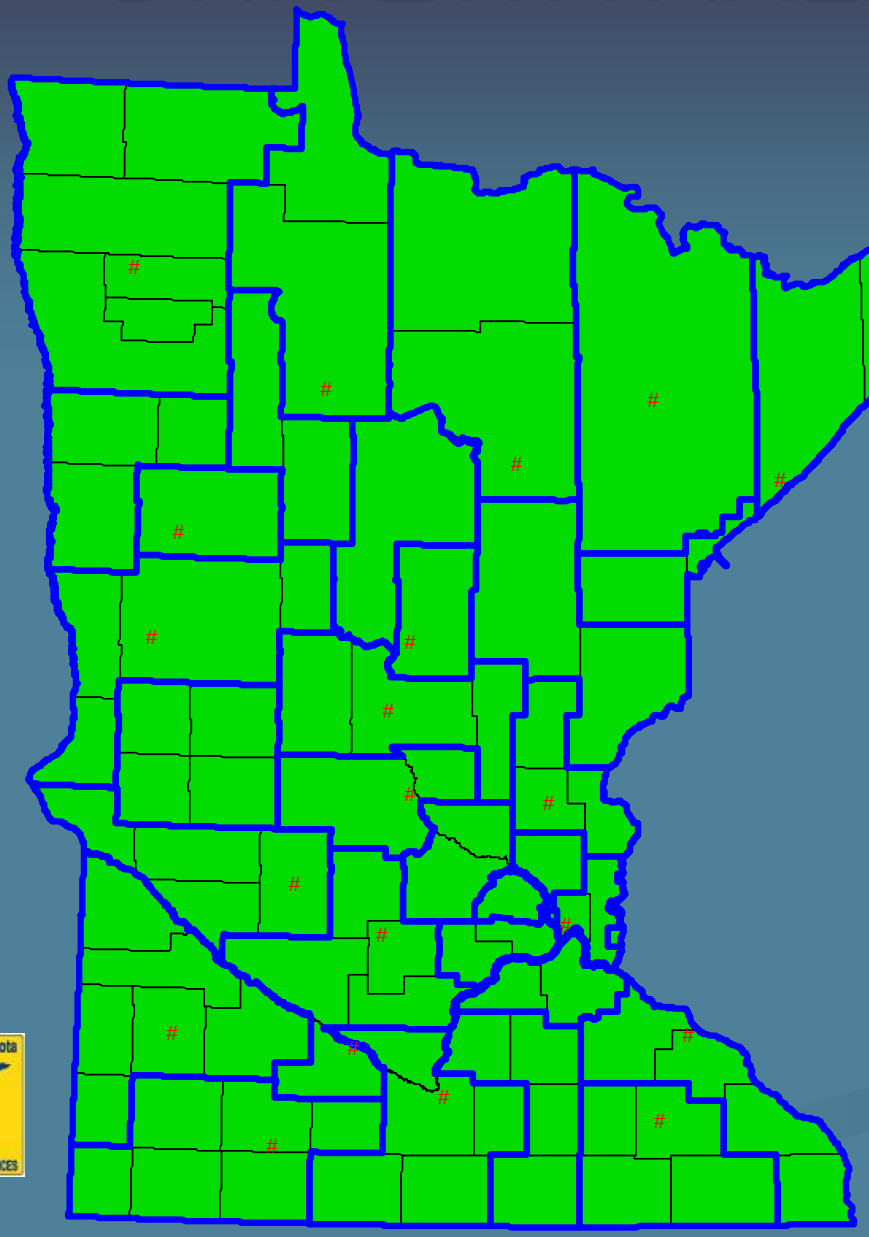
DNR Ecological & Water Resources

EWR Roles In Floodplains

- Regulatory: Work in Public Waters & Water Appropriation Permits
- Land Use oversight & guidance:
  - Shoreland & Floodplain ordinances
  - Higher standards
- Floodplain Mapping
  - Help interpret, determine flood elevations based on best available data
  - Some FEMA funding to do modeling – includes Root River watershed
- Flood Damage Reduction (FDR) Grants
- Clean Water / Habitat related

DNR EWR AREA OFFICES



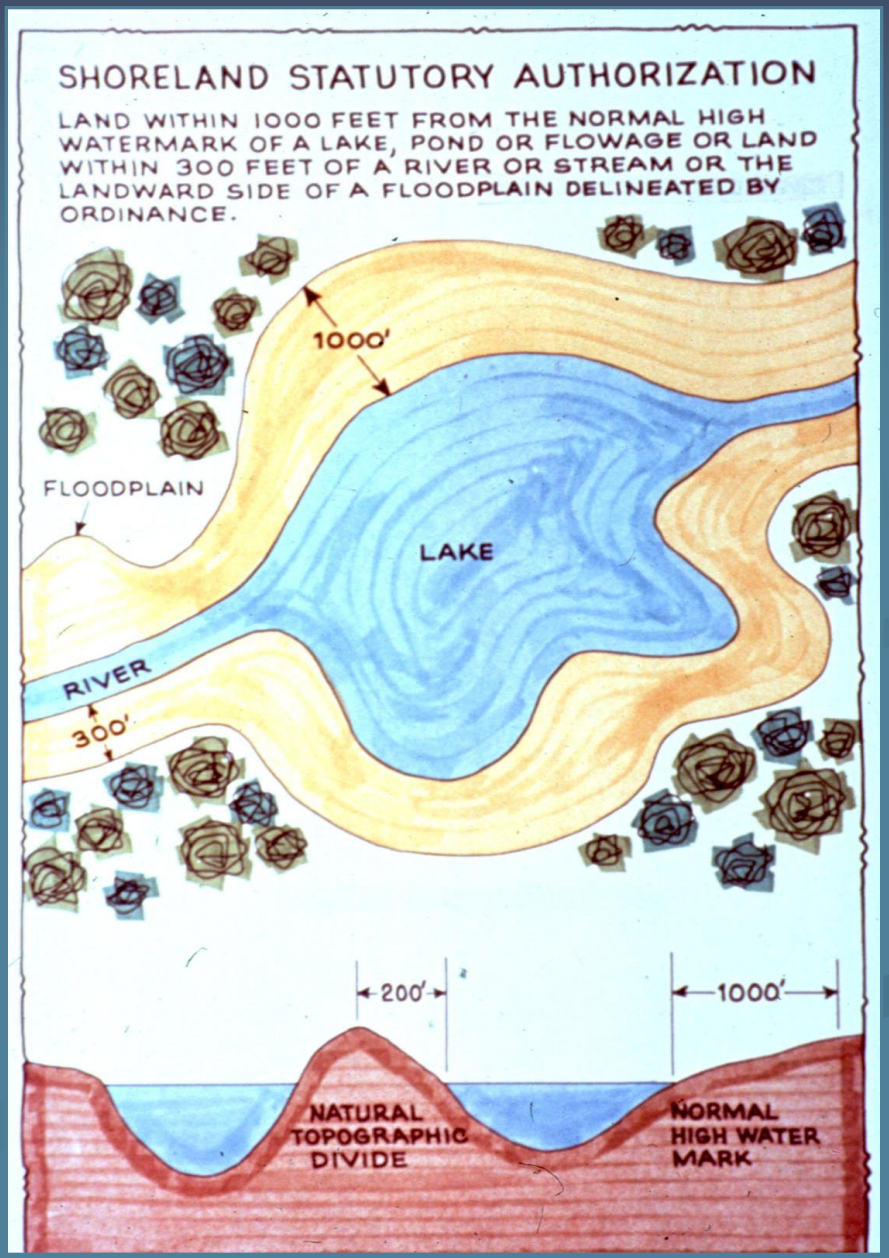
27 Area Hydrologists

Your Main DNR Ecological & Water Resources Contact!

Shoreland Program

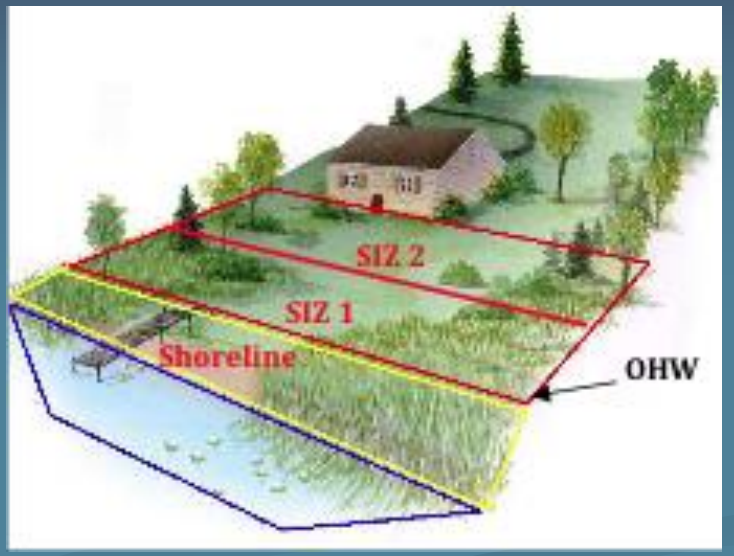
Boundaries of District

- 1000 feet from OHWL for lakes
- 300 feet from OHWL for rivers/streams or floodplain boundary, whichever is greater



Example Shoreland Regulatory Requirements

Lot size



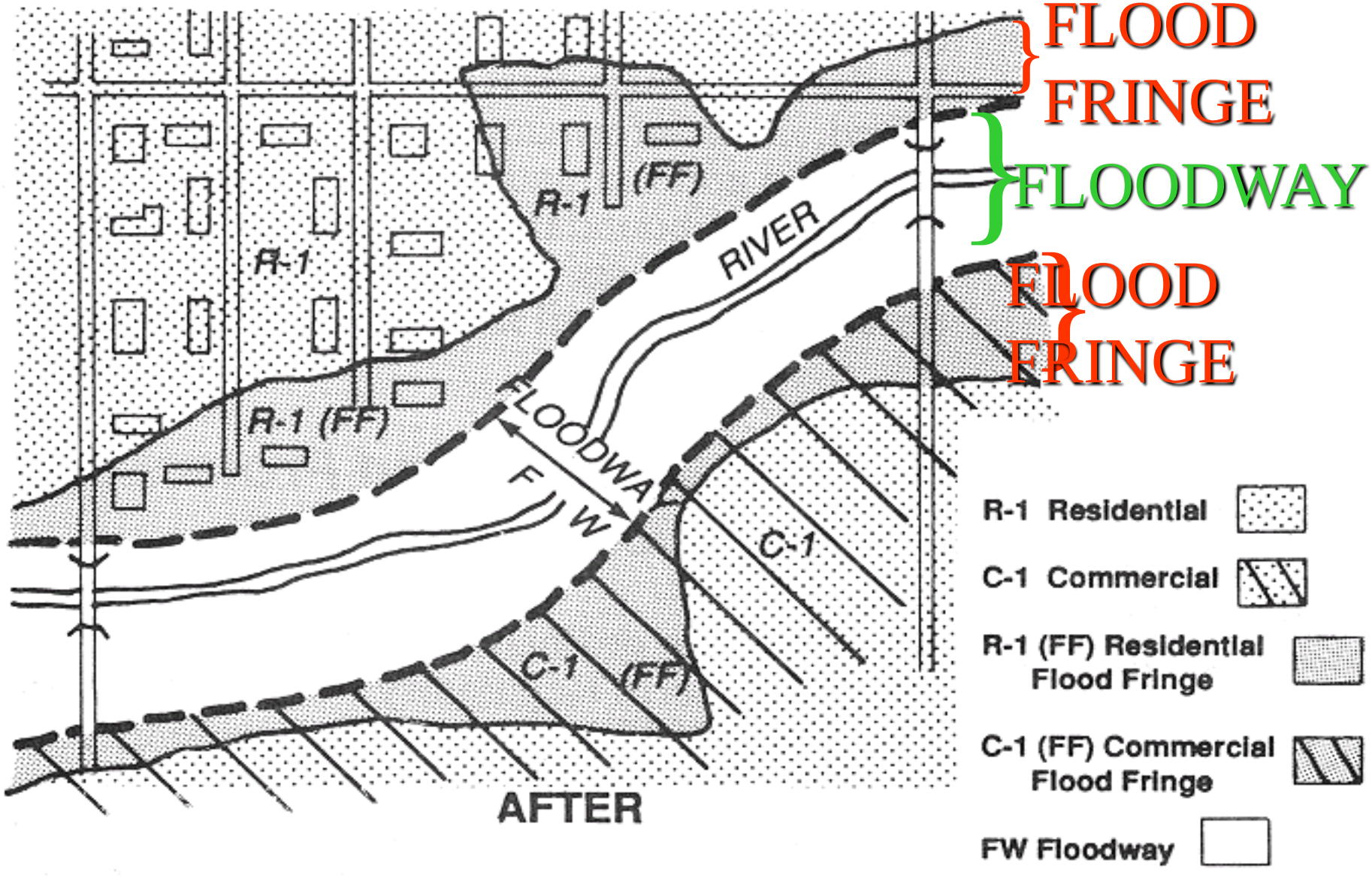
Structure setbacks (OHWL and bluff line)

Vegetation management, Aesthetics / screening

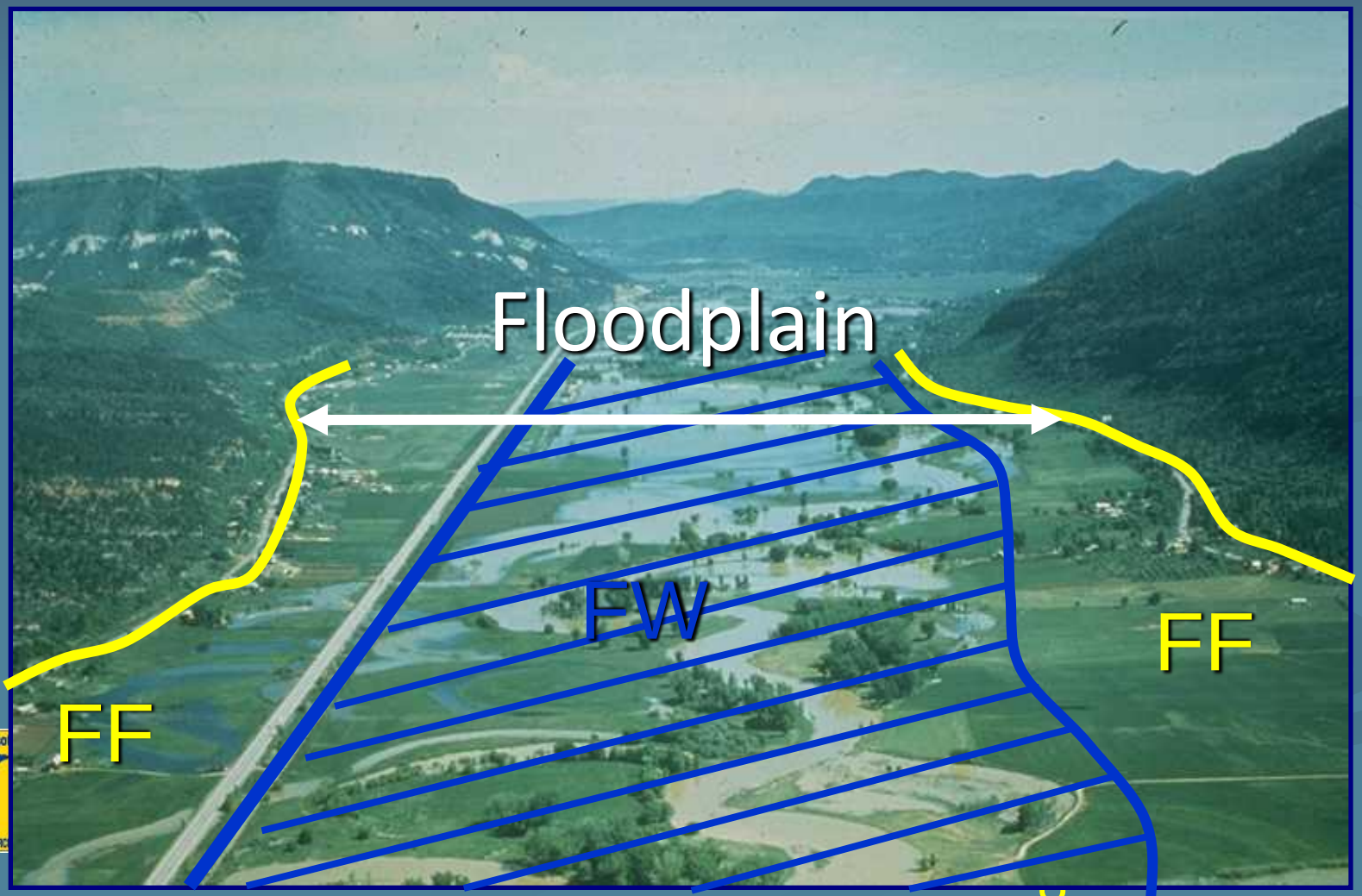
Floodplain Regulatory Roles

- Zoning Authority (city, county or township)
  - Most important!
  - Adopts ordinance, enrolls in National Flood Insurance Program (NFIP), administers & enforces, KEEPS RECORDS
- State – Oversight; technical assistance & training; approve ordinances & some data/mapping; coordinate between FEMA & community (& watersheds, HSEM, etc.)
- Watershed District / Other regional agencies – may have overlapping regulations &/or mitigation projects; often key data source
- FEMA – Oversees NFIP (enrolls; can suspend); produces / approves maps & data

Top View of Floodway vs Flood Fringe



FLOODWAY vs FLOOD FRINGE



Floodplain Regulations

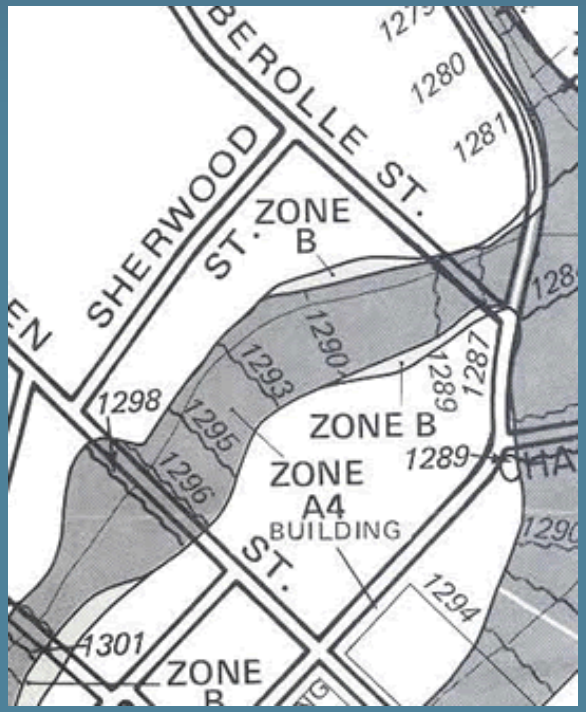
- Floodway – Mainly open space uses
- Flood Fringe: (1) Community determines underlying zoning, (2) have standards to elevate or floodproof
- Encouraging higher standards
  - Limit land uses - e.g., no new development
  - Higher levels of protection - e.g. higher freeboards, no critical facilities, regulate for future floods (“Atlas 14” & meander belts)
  - Clean water or habitat – e.g., buffers, no net loss of storage, reduce runoff (infiltration; impervious surface limits)

FEMA Floodplain Maps – Root River Watershed

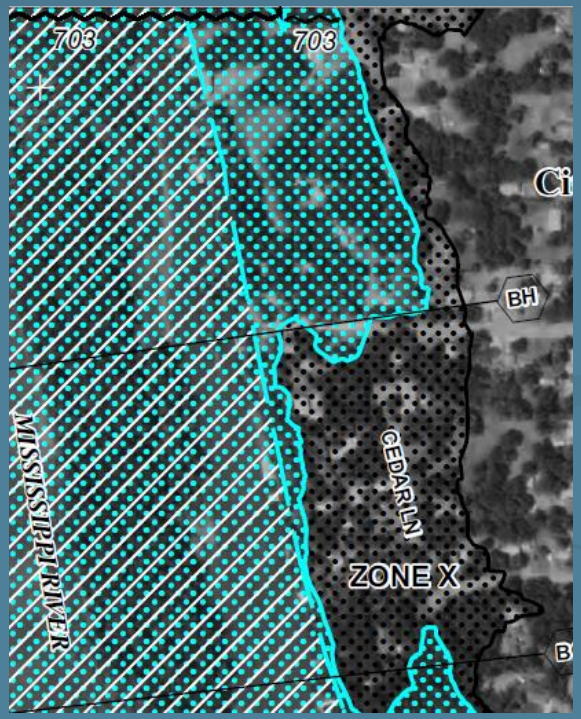
- Current FEMA Maps – 1980s Maps, based on 1970s and 1980s data
- FEMA's Map Update effort:
  - Fillmore County: preliminaries out 6/30/11, open house by fall
  - Houston County: preliminaries expected in September 2014
  - Winona County: Data development in progress

Flood Risk Assessment Methods Evolving . . .

Yesterday



Today



Tomorrow

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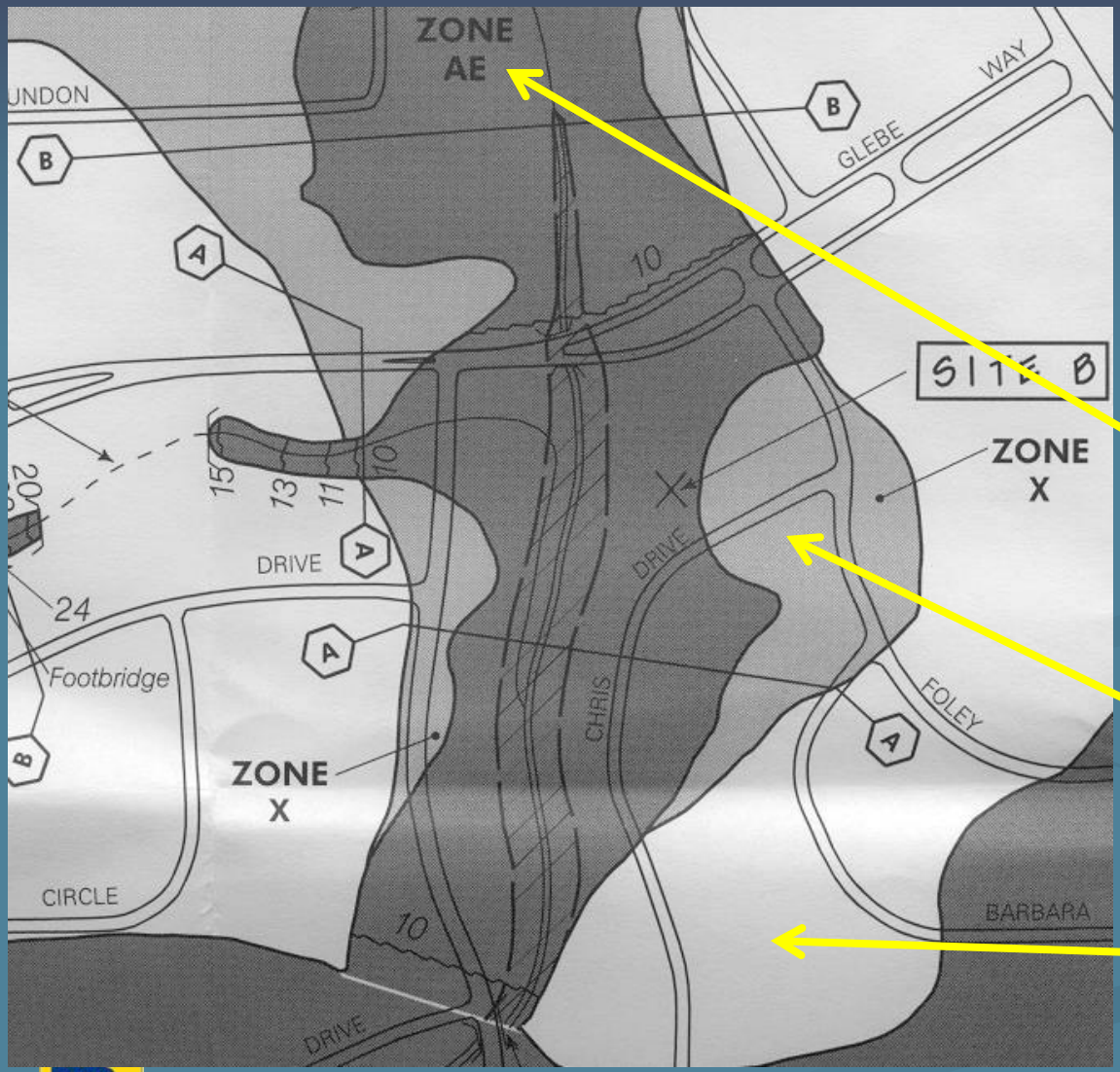
Sample FEMA Map with SFHA



National Standard of "100-year flood" chosen

High Flood Risk

- Zone A & AE (old)
- Zone A & AE (new)

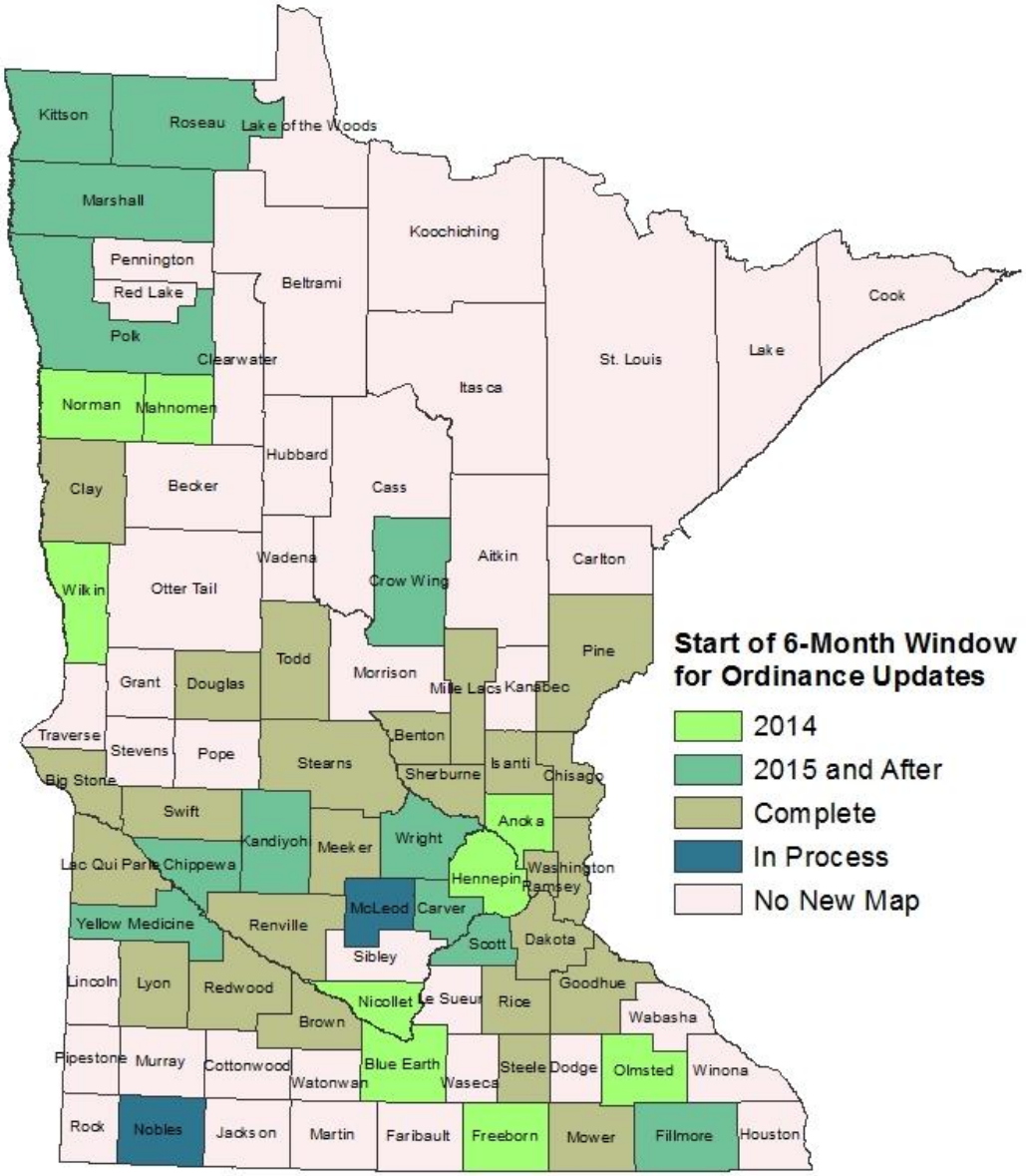
Medium Flood Risk

- Zone B (old maps)
- Zone X (shaded)

Low Flood Risk

- Zone C (old maps)
- Zone X (unshaded)

Status of County Floodplain Map Updates



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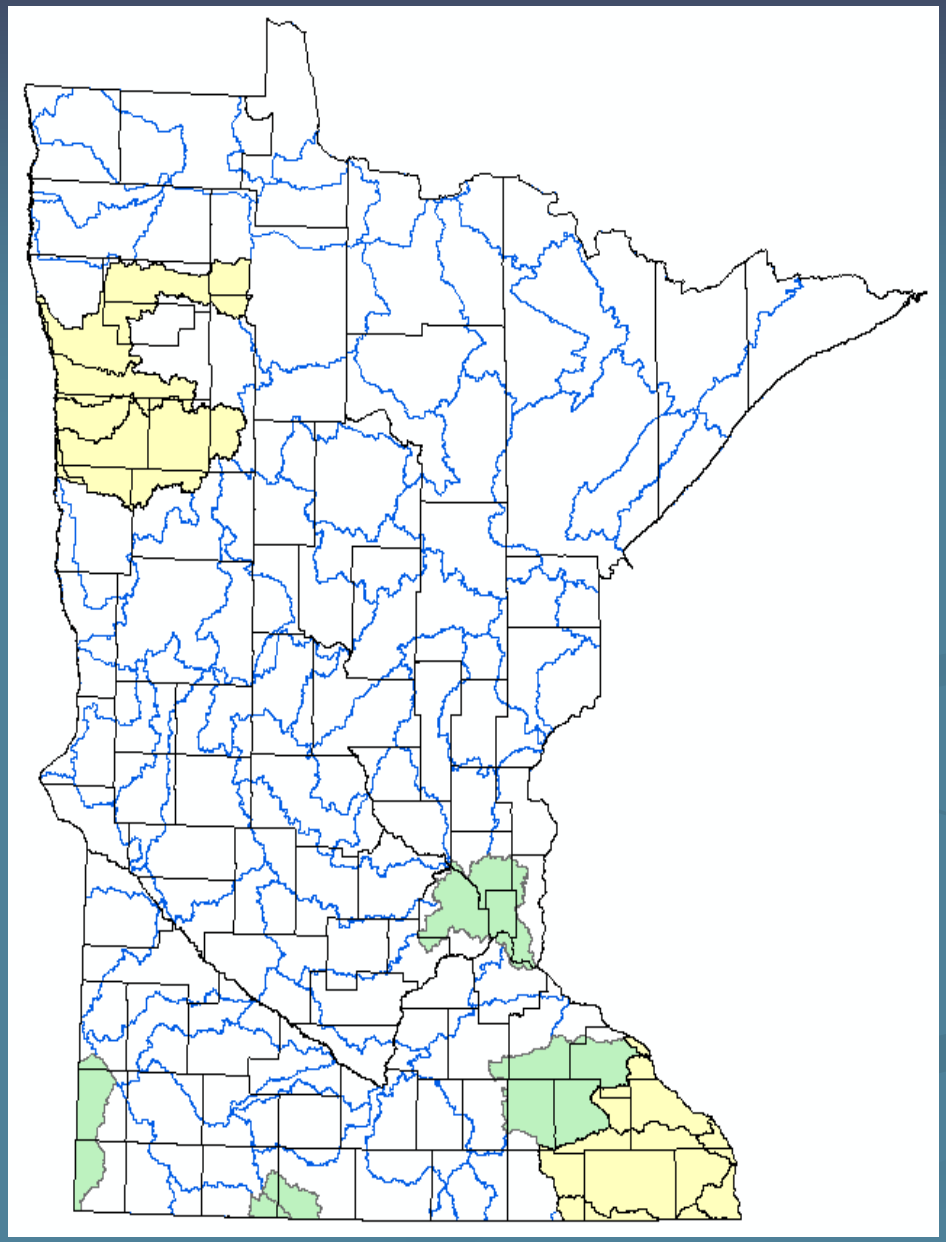
FEMA's Latest Map Update Effort "Risk MAP"

- Watershed based – at HUC8 level
- Funding to provide supporting data for A Zones (no flood elevations on FEMA map, but supporting data)
- Possibly FEMA map updates (Digital Flood Insurance Rate Maps – DFIRMs)
- Non-regulatory products to assist with reducing risk

FEMA's Risk MAP "Action Discovery"

- FEMA recently added Risk Map "Action Discovery" meetings in Root River watershed
- Meeting Dates:
  - July 9th (pm) Winona county
  - July 10th (am) Houston county
  - July 10th (pm) Group meeting at Lanesboro
- Purpose of meetings:
  - Talk about flood reduction projects being considered
  - Can the floodplain data be formatted in a different way to be useful for those projects?

Risk MAP HUC8 Study Areas



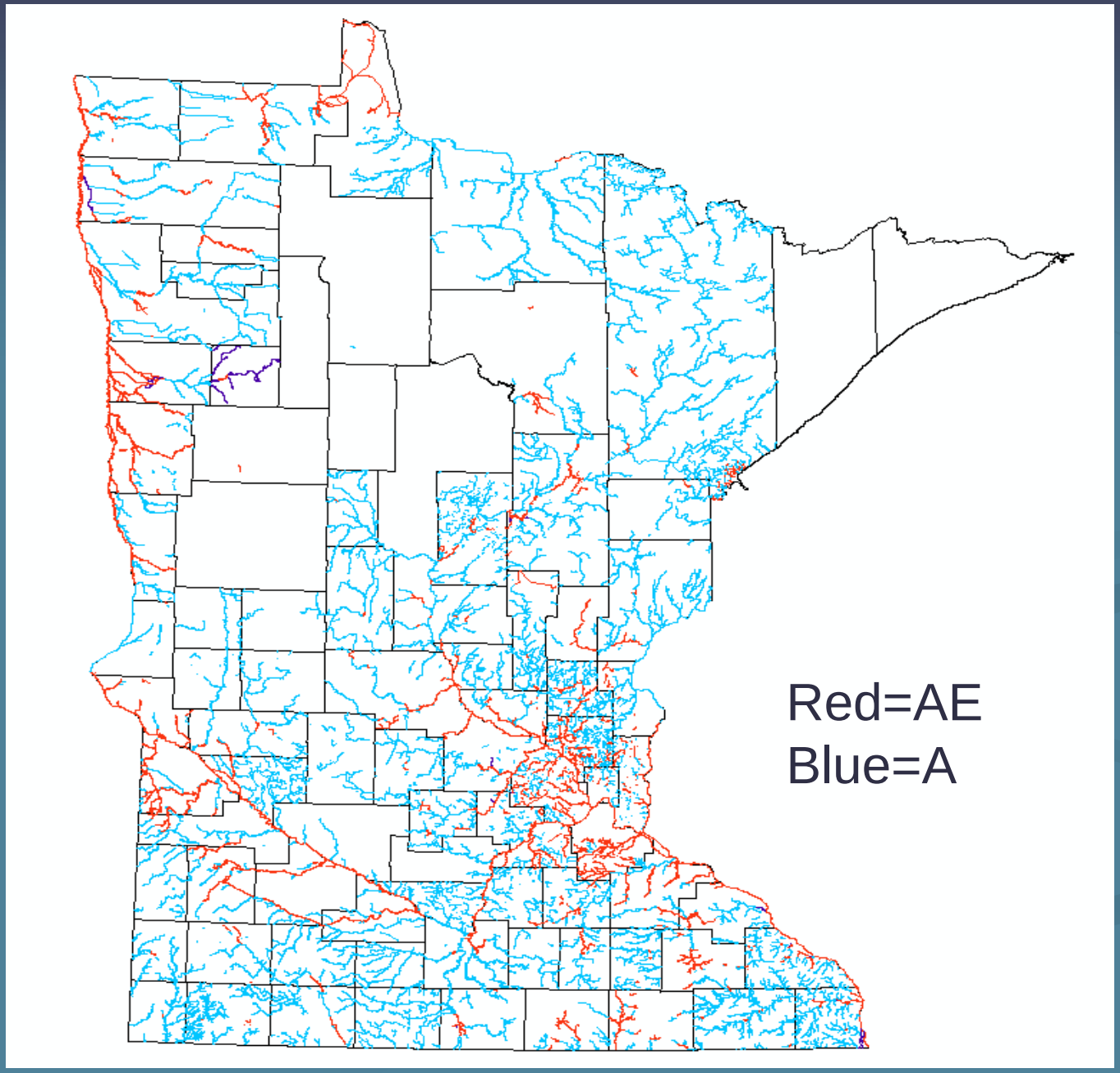
Yellow = Study in-progress

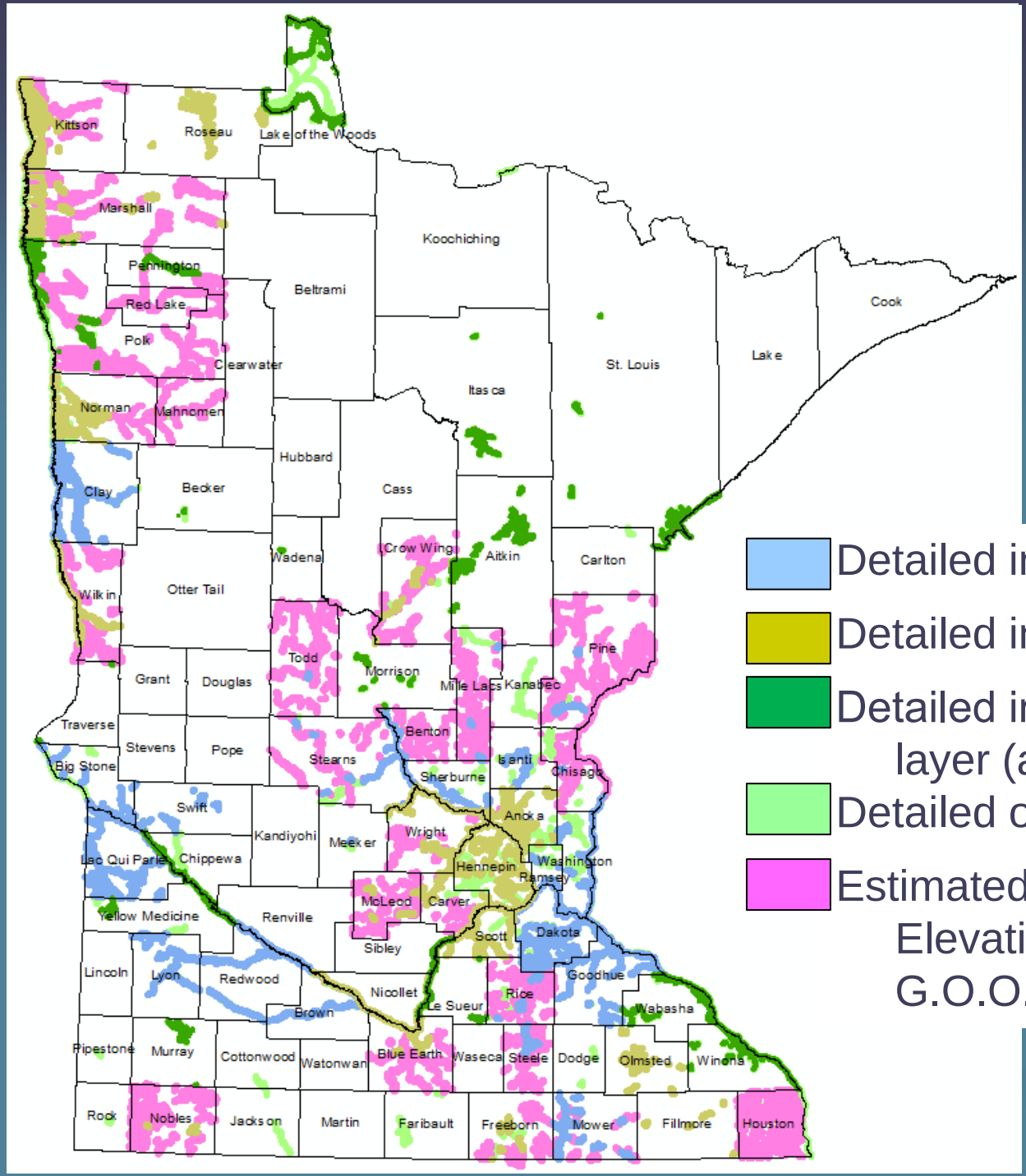
Green = 2013 start

Risk MAP in Root River Watershed

- Supporting HEC-RAS models for all A Zones (in progress – Houston & Winona modeling done; Houston Co portion QC done by FEMA; Winona portion QC to be done by FEMA)
- Limited detail models can be used to:
  - Make zoning decisions
  - Apply for Letters of Map Amendments (LOMAs)
  - Evaluate potential projects for: clean water, habitat, reducing risk, etc.

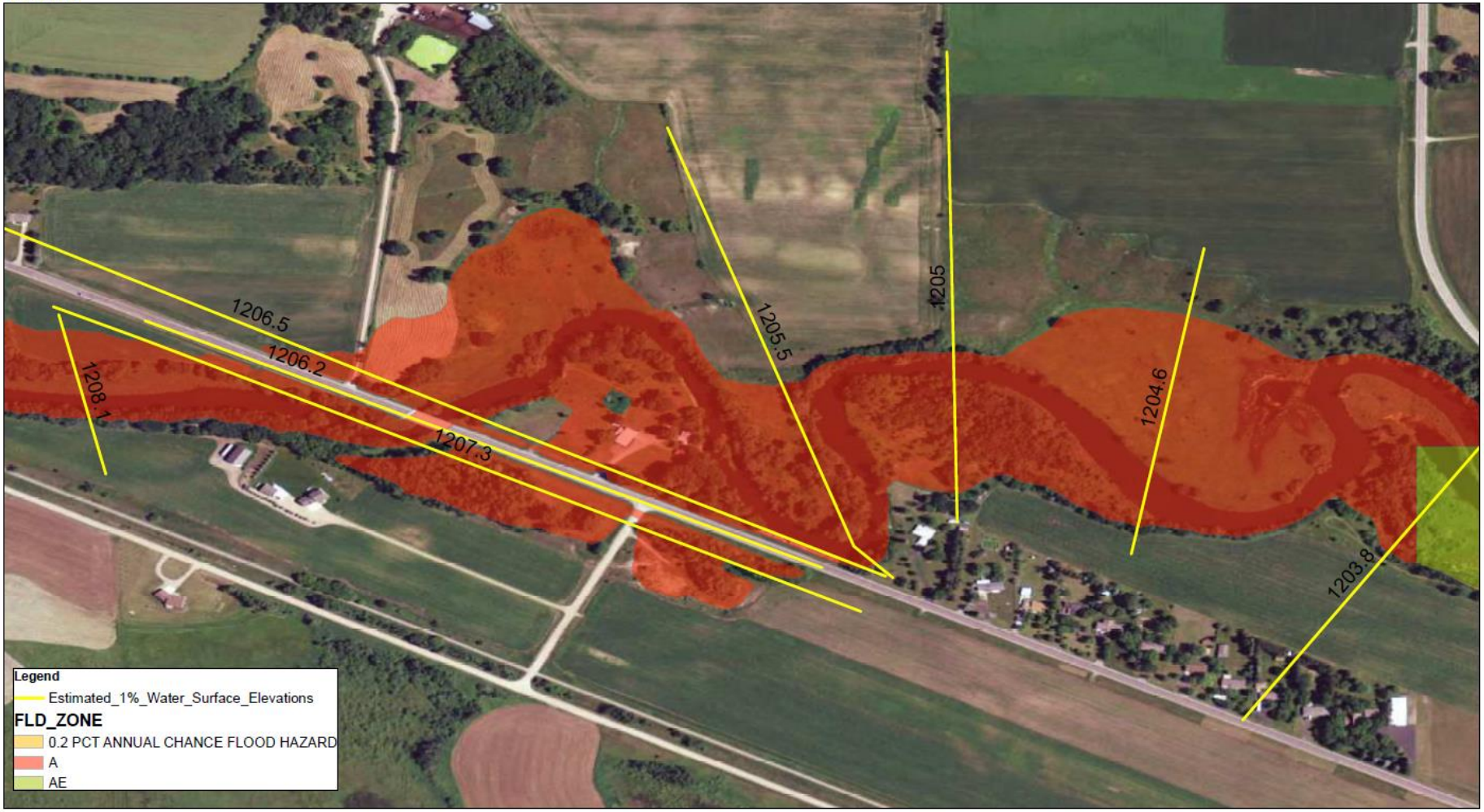
FEMA Mapped Floodplains





- Detailed in Effective DFIRM
- Detailed in Preliminary DFIRM
- Detailed in “FEMA Unmodernized” layer (aka Q3)
- Detailed on Paper Maps
- Estimated 1% Water Surface Elevation (available soon in G.O.O.D.)

Stearns County
Estimate of Base Flood Elevations (1% Annual Chance Flood)

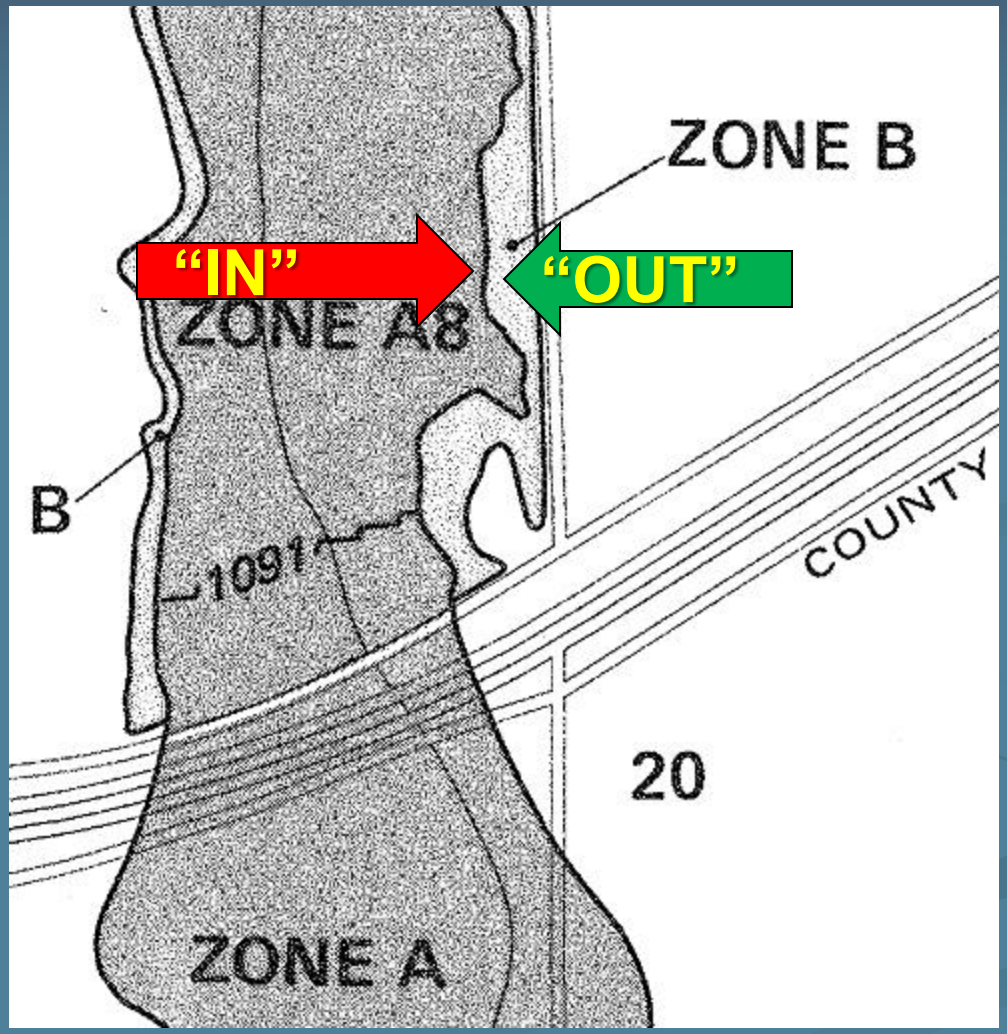


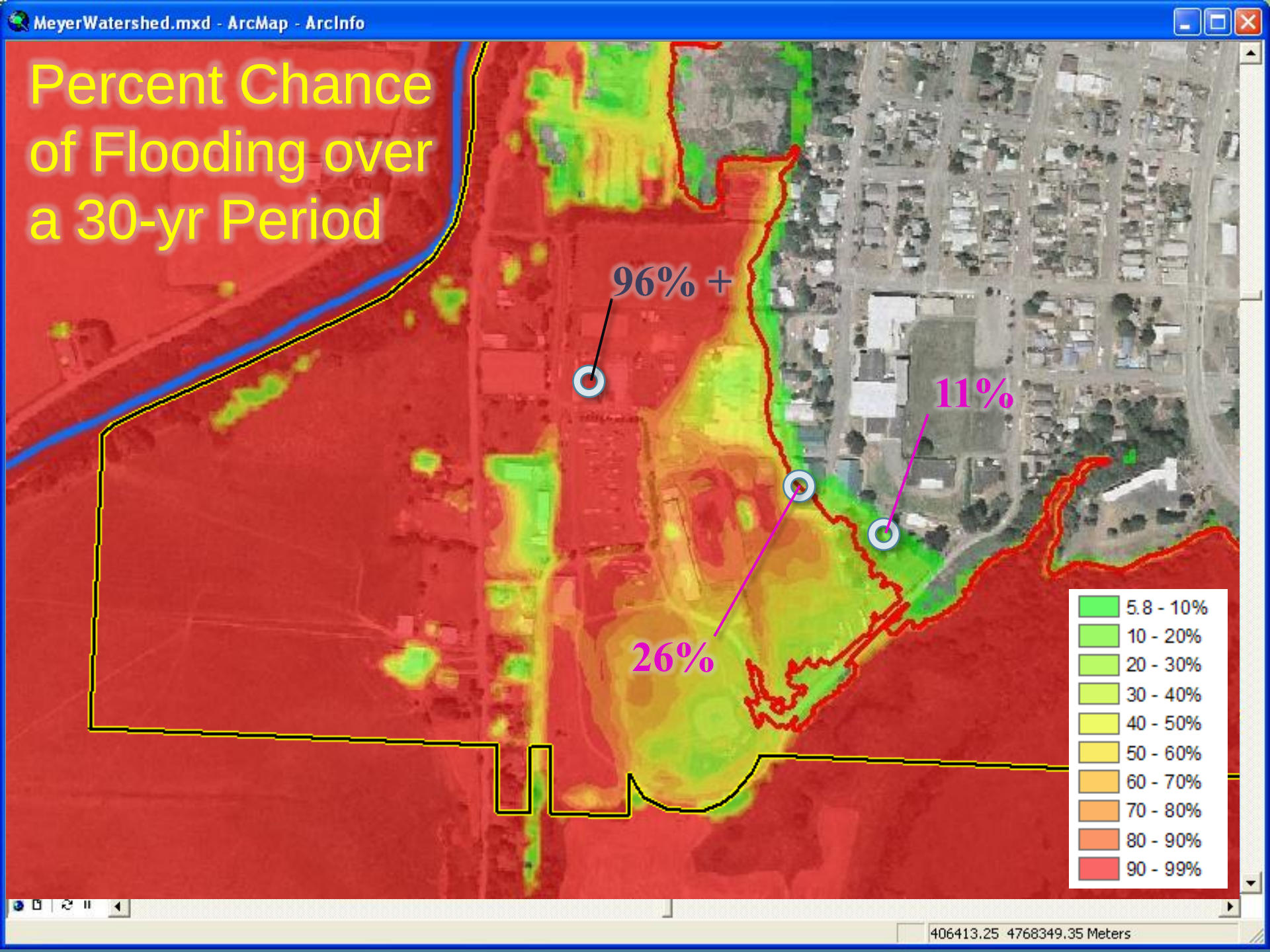
*Note: Not to Scale
Elevations are NAVD 1988

Risk MAP in Root River Watershed

- With digital flood elevation maps, and LiDAR, can possibly do depth grids or future conditions maps
  - Public outreach
  - Higher standards

Flood Risk is Seen as Black & White! How Do We Change?




MeyerWatershed.mxd - ArcMap - ArcInfo
Percent Chance of Flooding over a 30-yr Period
96% +
11%
26%
5.8 - 10%
10 - 20%
20 - 30%
30 - 40%
40 - 50%
50 - 60%
60 - 70%
70 - 80%
80 - 90%
90 - 99%
406413.25 4768349.35 Meters

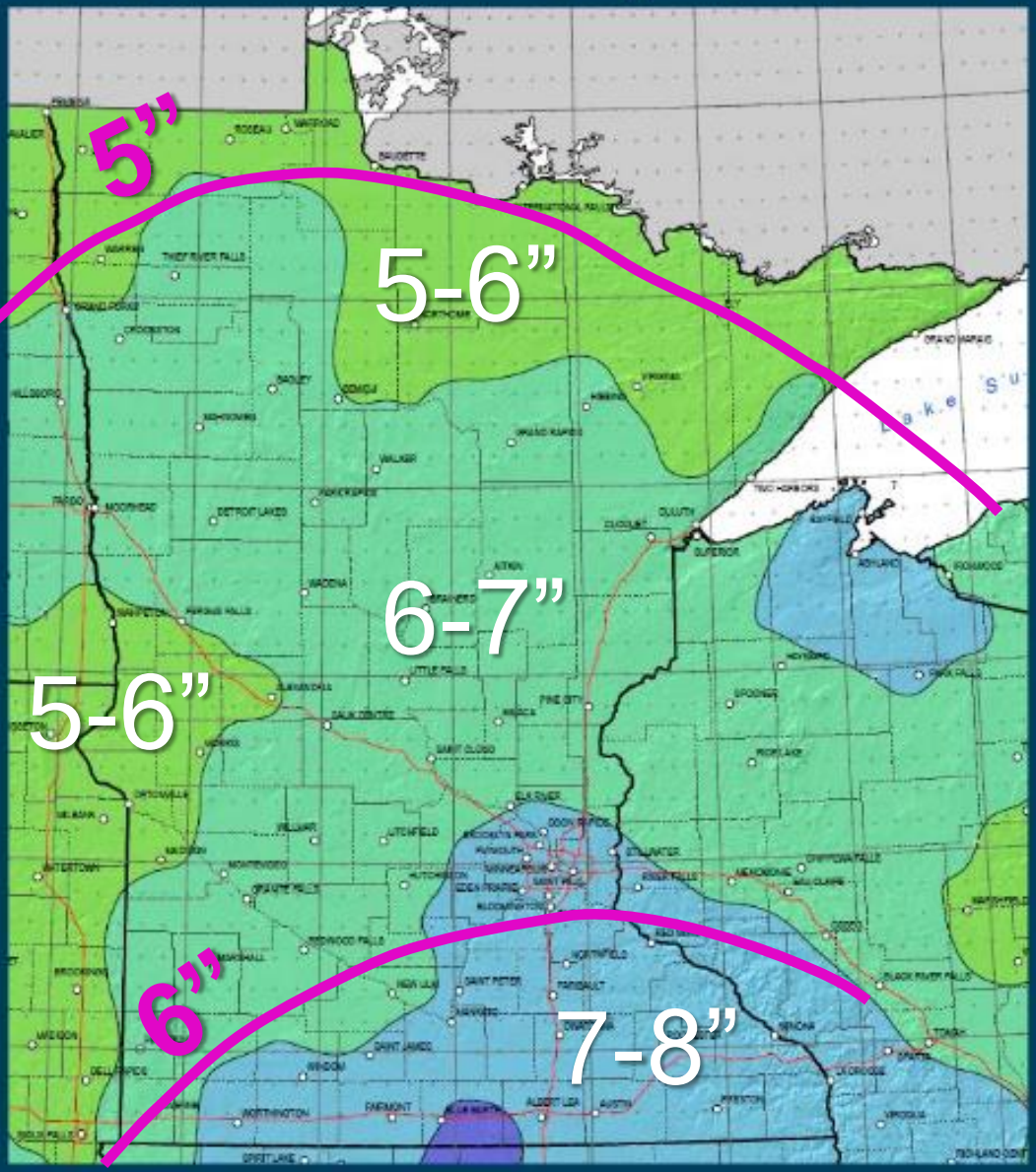
Manage for Future Floods

- Adopt preliminary maps and other studies
- Atlas 14; changing precipitation patterns
- Regulate to future development / future flood levels
- Protect the meander belt and other natural systems, where appropriate

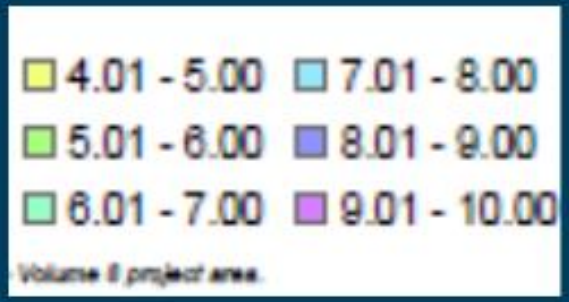
TP-40: 100 year-24 hour

TP-40: based on 1960 data; less stations; shorter record

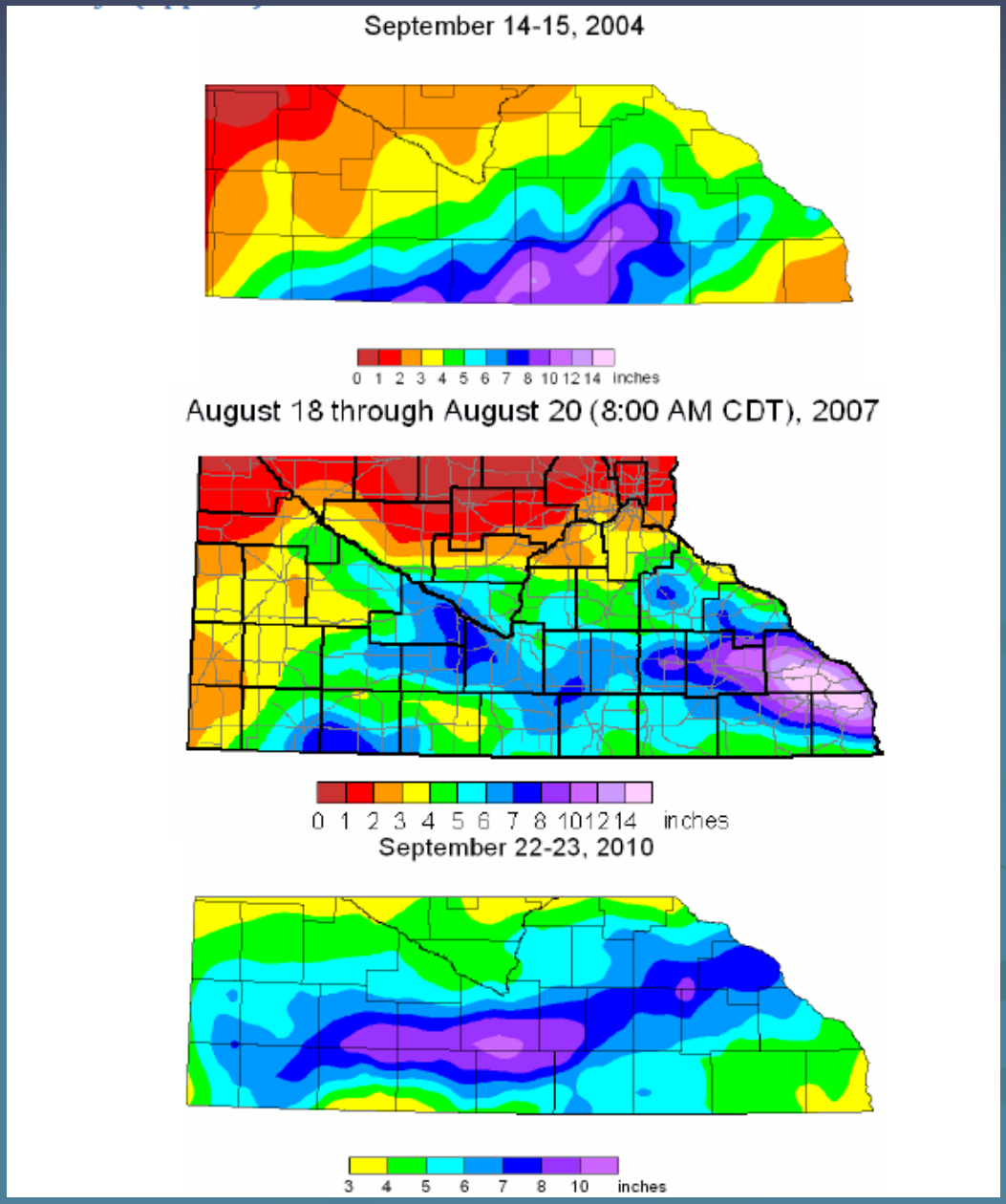
Atlas 14: 100 year–24 hour



–TP-40



‘~1000-yr’ events in Southern MN in last decade



Charlotte-Mecklenburg Floodplain Map Areas

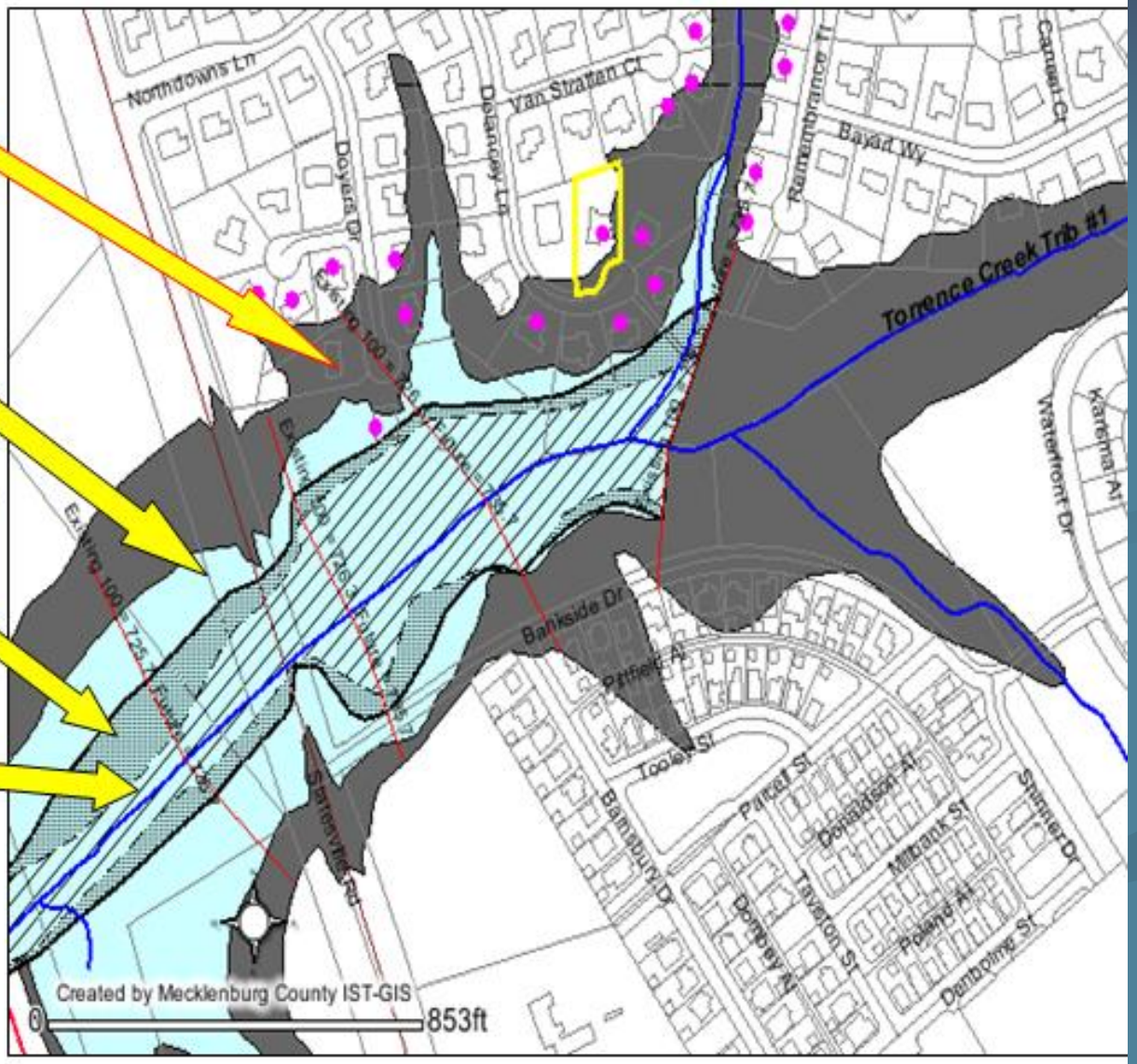
Community Flood Fringe Area
New Construction or Additions Need to be Elevated.
Flood Insurance Usually Not Required

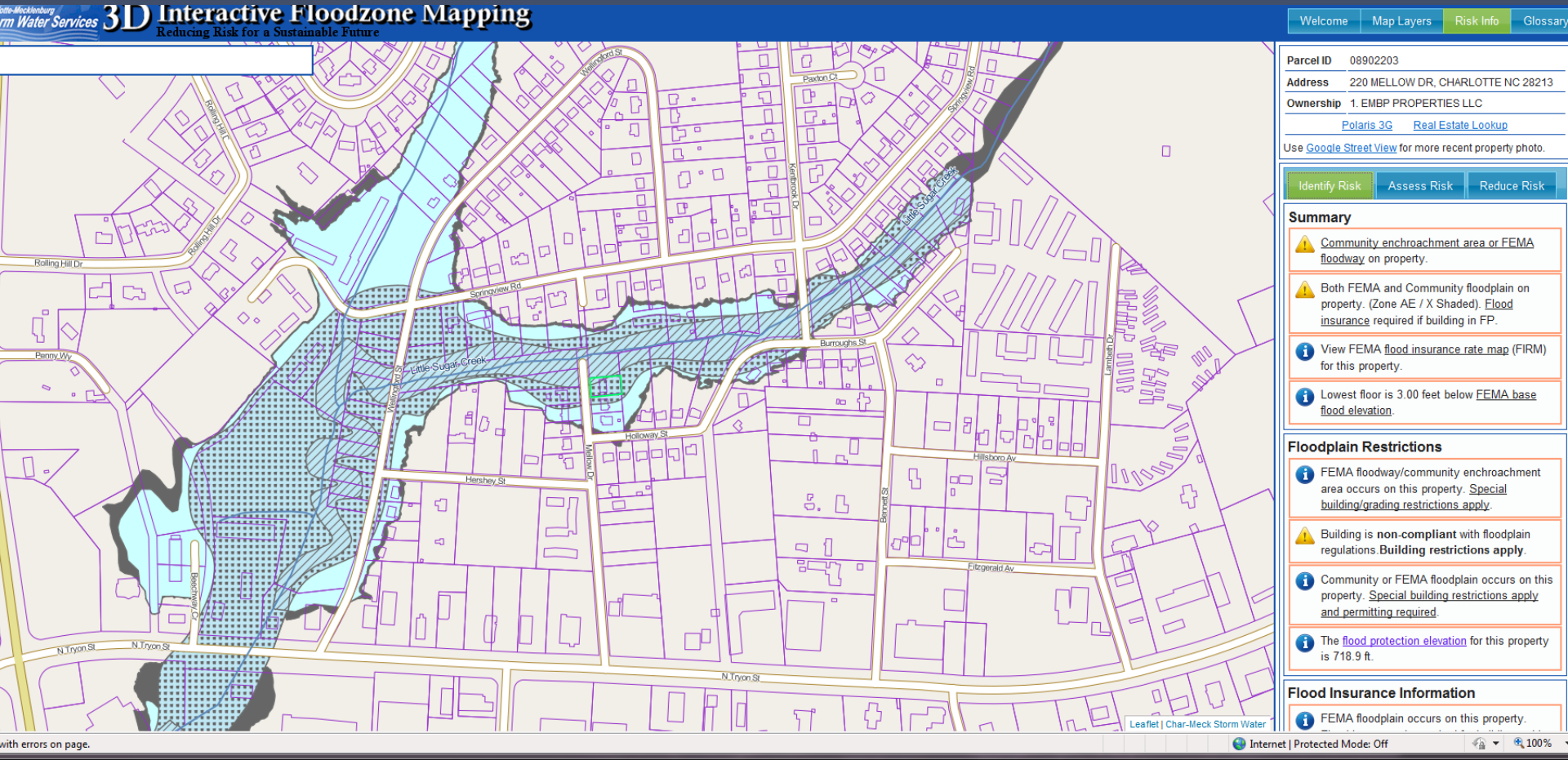
FEMA Floodplain
Flood Insurance Required
New Construction or Additions Need to be Elevated

Community Encroachment Area Many Restrictions on Placing **ANYTHING** here.
Local Review and Approval Required

FEMA Floodway Encroachment Area
Many Restrictions on Placing **ANYTHING** here. FEMA AND Local Review and Approval Required

More Information: 704-3363728





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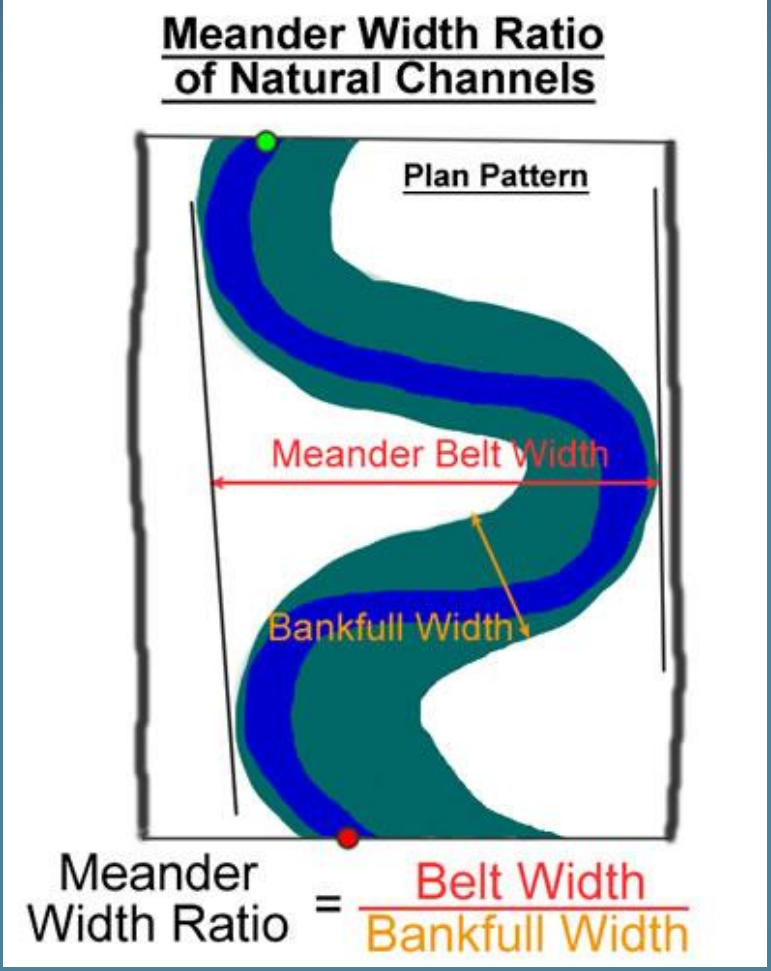
- http:/ / maps.co.mecklenburg.nc.us/ 3dfz/

Protect the Meander Belt

Protect the Meander Belt



- Allows river to take its natural course across a valley bottom
- Reduces streambank erosion and sedimentation

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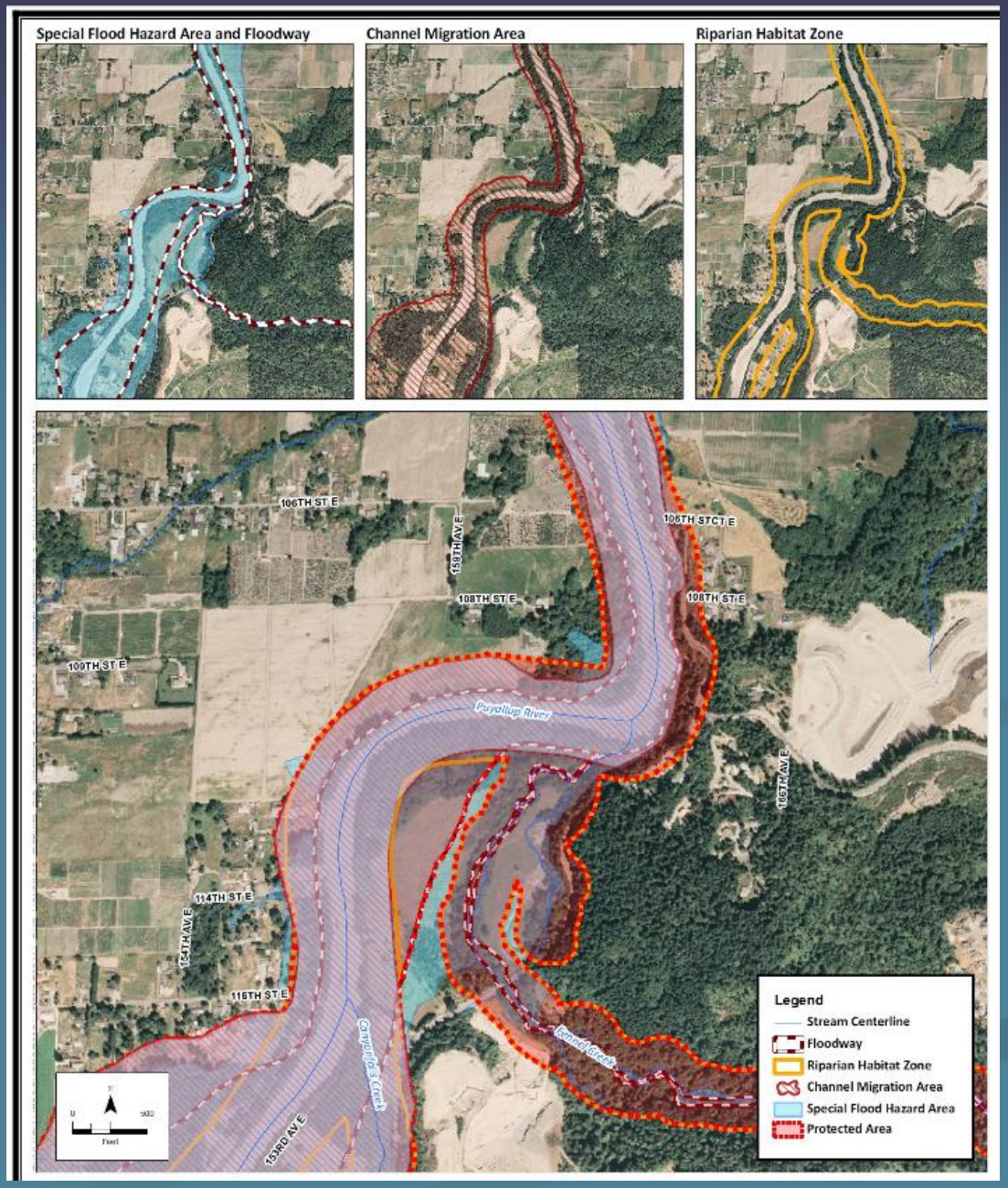
Example from Pierce County, Washington

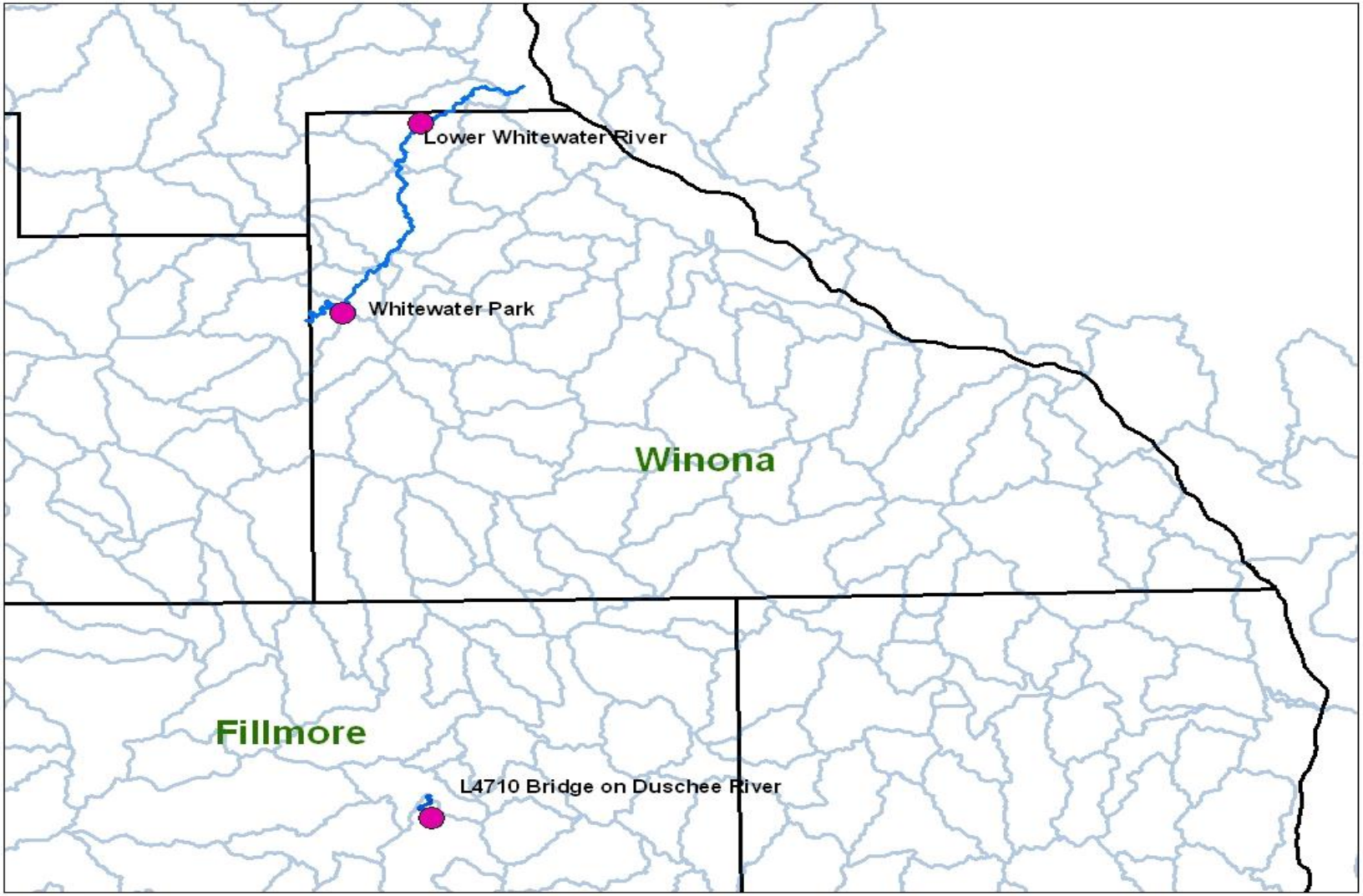
- riparian habitat zone, 150’ – 250’ salmon habitat, spawning and shelter
- channel migration area (meander protection) – 50’ buffer



Clean Water / Habitat

- DNR staff from Floodplain program & Stream Habitat program working together on culvert designs. Consideration of:
  - Geomorphology, and
  - Positive affects on flood mitigation
- Related resource: Association of State Floodplain Managers (ASFPM) – Natural Beneficial Functions (NBF) committee working on related projects (see www.floods.org)

Examining Floodplain Connectivity in Three Locations



Streams carry water and sediment

Whitewater Channel Widths

On-channel Culverts

$y = 14.463x^{0.2443}$

$R^2 = 0.1243$

Natural Channels

$y = 0.2489x^{1.2498}$

$R^2 = 0.7749$

Drainage Area

Channel Width

0 10 20 30 40 50 60

0 10 20 30 40 50 60 70 80

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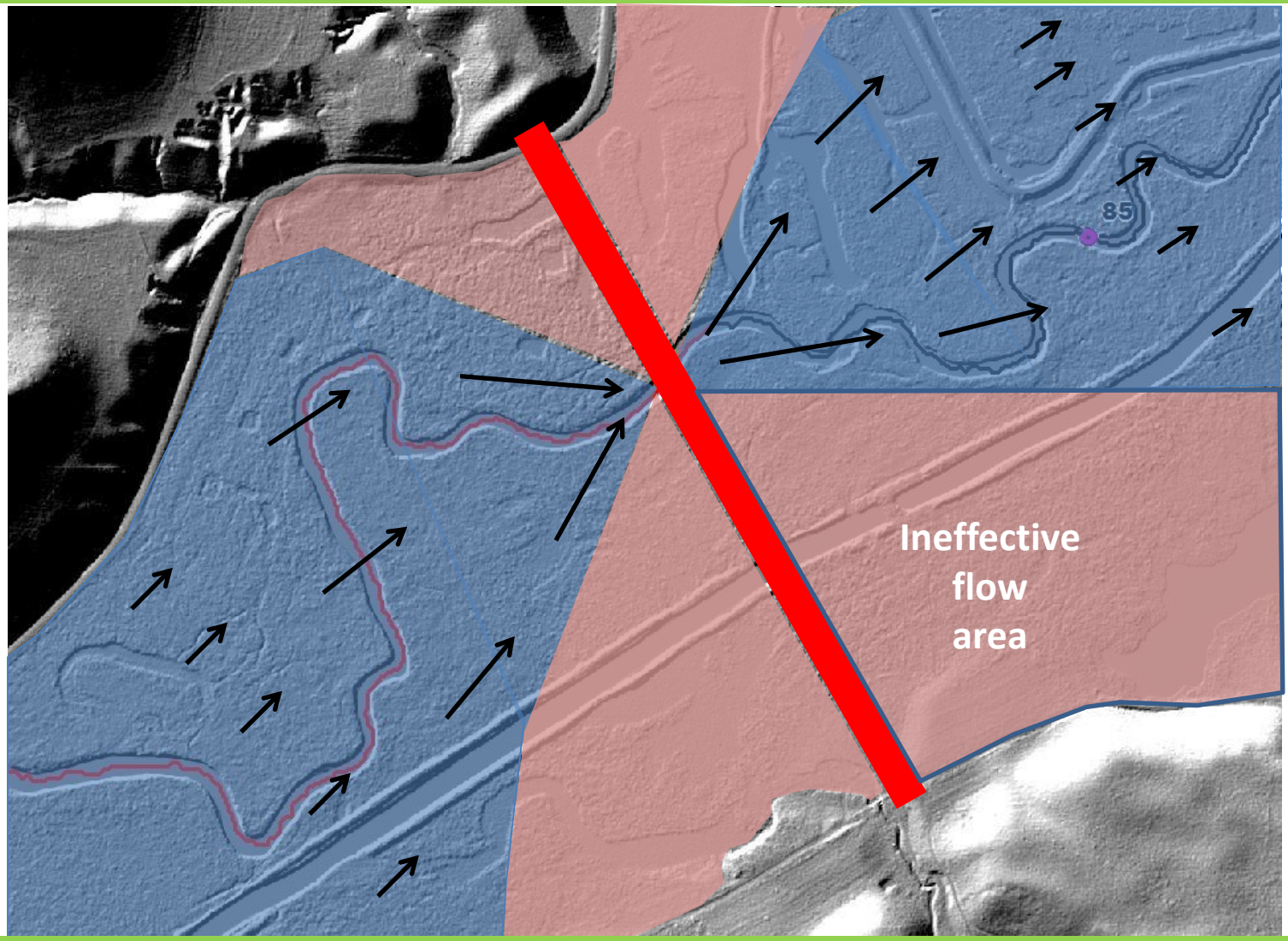
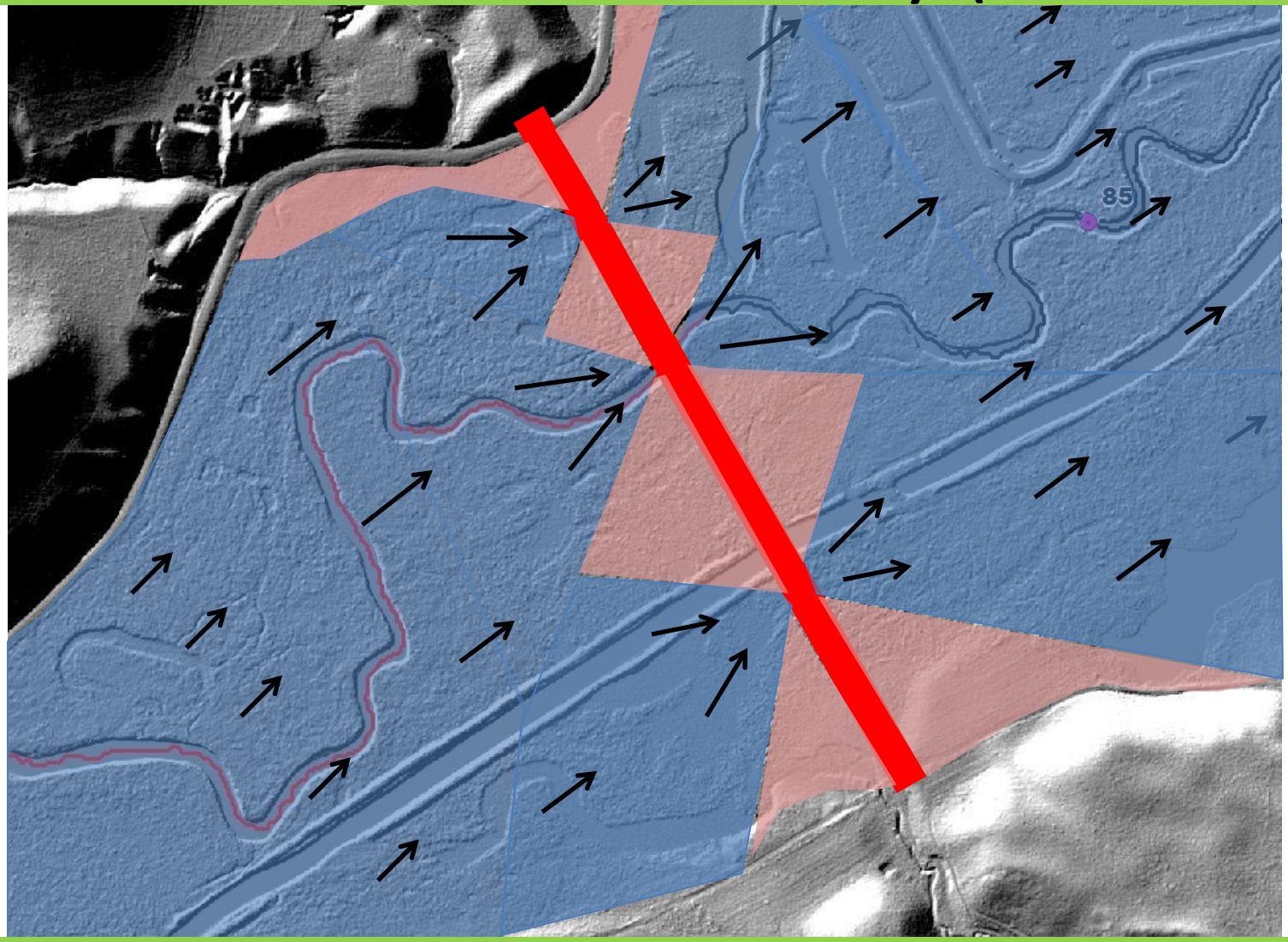
Preliminary data plotted

Floodplain Conveyance through confinement, no floodplain connectivity



Typically found approach to increasing conveyance

Floodplain Conveyance with minimal connectivity (2 culverts)



Preferred Approach: address floods on floodplain

In Summary – How Can DNR Floodplain Program Help?

- Guidance with FEMA & State regulatory requirements, & flood insurance
- Help with higher standards wording
- Provide best available data on 1% annual chance flood elevations - for zoning decisions, flood insurance requirements and Letters of Map Amendments (LOMAs)
- Share lessons learned from research and pilot efforts – e.g., culvert designs for better habitat/stability, meander belts