Iowa's Strategies for Using Hazard Mitigation Planning to Integrate Nature-based Solutions

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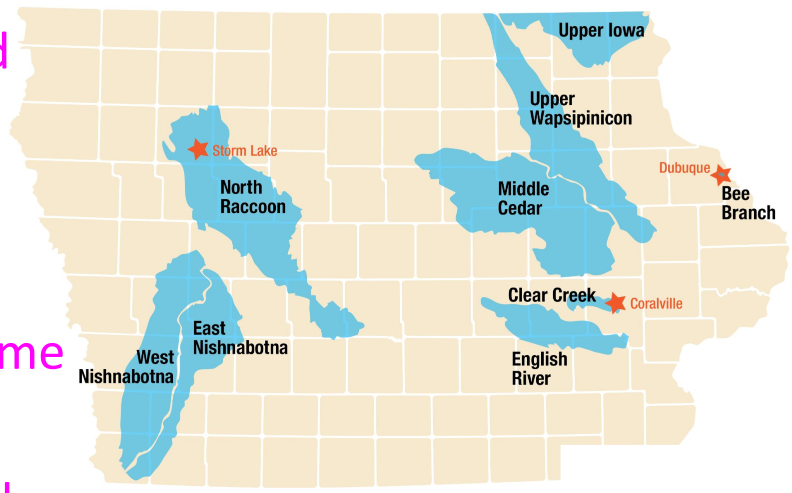
Strategies for Flood Resilience:
A Four Point Guide to Helping Locals with Watershed Approach Flood Reduction

- Resilience strategies report produced as part of the 6-year Iowa Watershed Approach (IWA) project
- Report meant to share lessons learned about flood reduction with a watershed approach

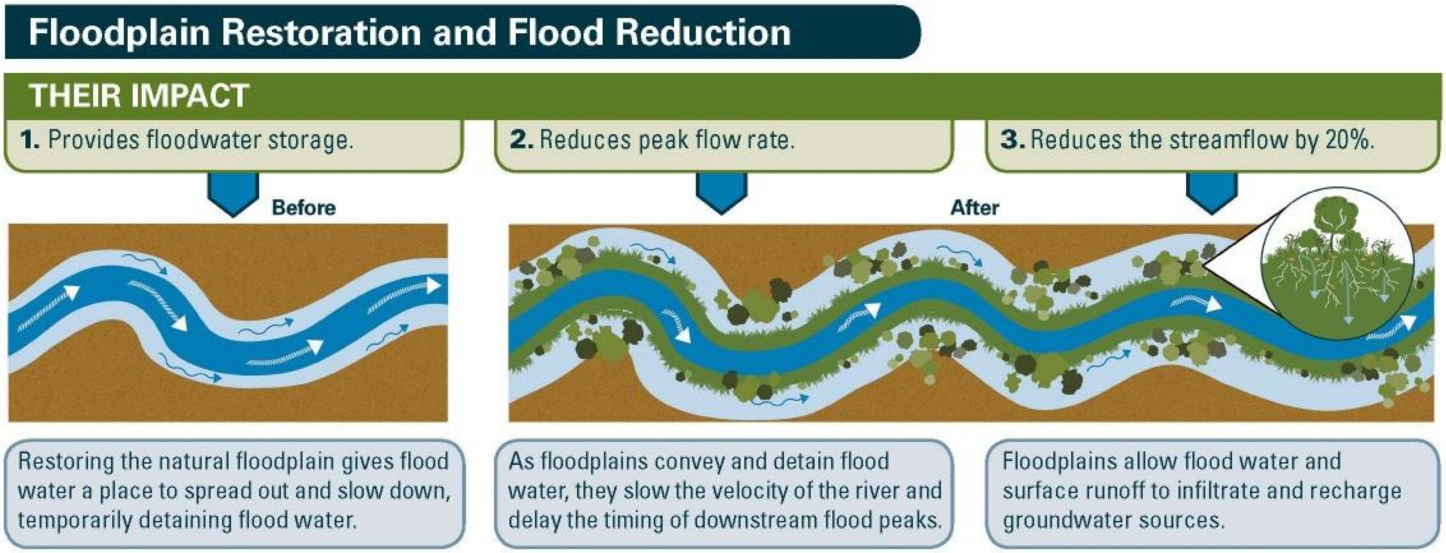
IWA – The Opportunity and Challenge Provided with $97 Million from HUD CDBG-DR:

- Use Watershed Approach to put in practices to reduce flood risk and improve water quality
- Increase resilience
- Engage stakeholders
- Must benefit low/moderate income & those with Most Impacted & Distressed Unmet Recovery Need



IWA Outputs after 6 years:

- Put in over 800 practices that reduce peak flow & improve water quality



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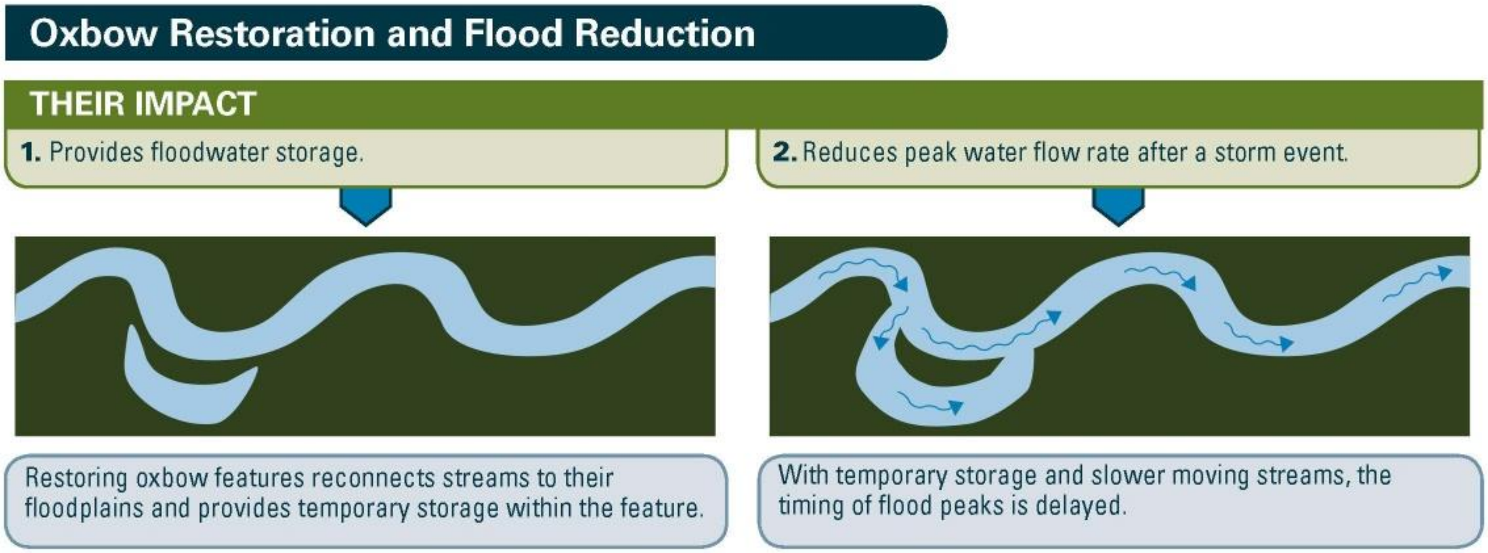

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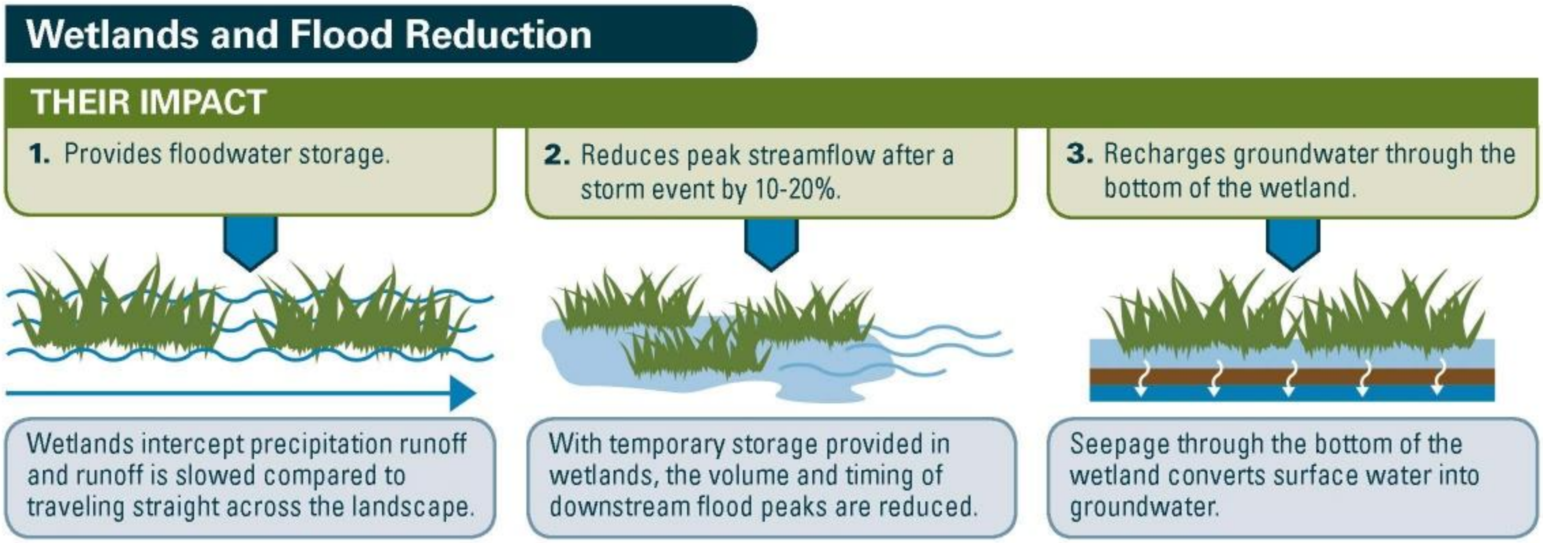

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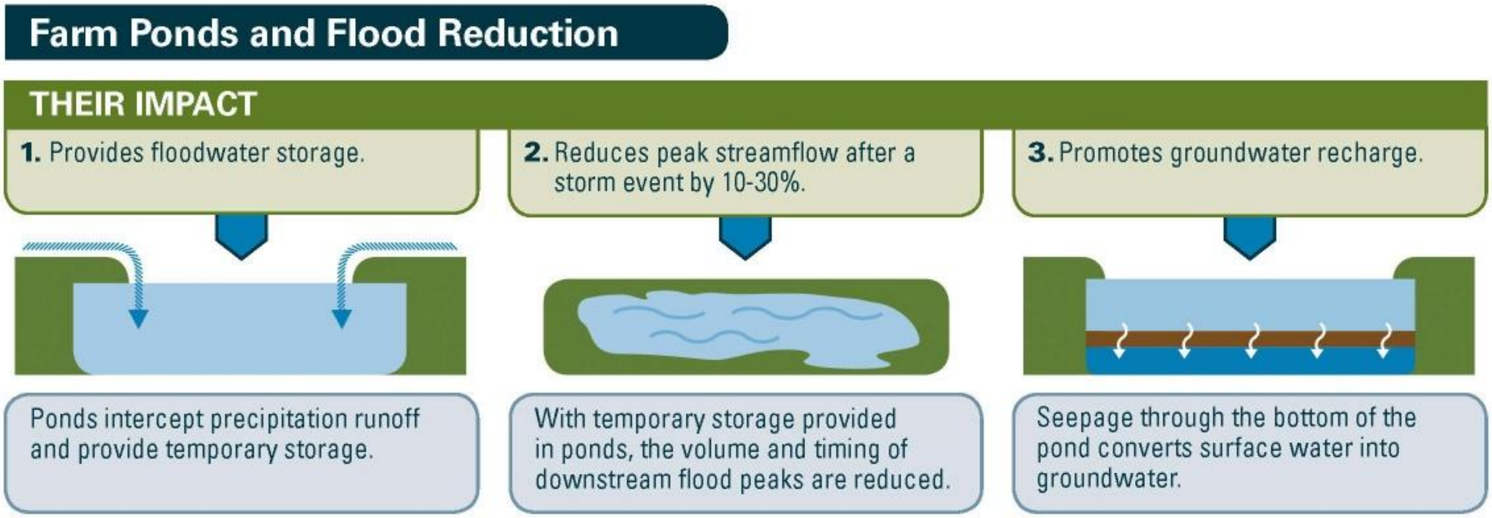

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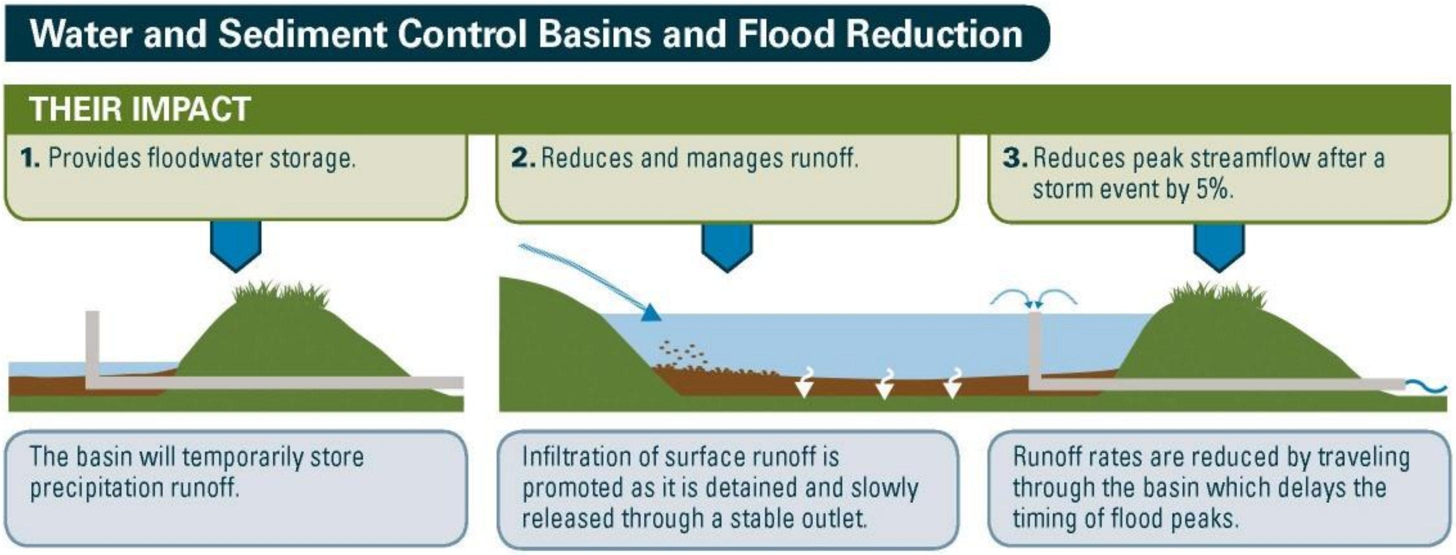

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- Assessment showing expected annualized flood loss per building (statewide)
- Watershed Plans developed for 8 watersheds, addressing flooding and water quality

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- Assessment showing expected annualized flood loss per building (statewide)
- Watershed Plans developed for 8 watersheds, addressing flooding and water quality
- Built local capacity by creating Watershed Management Authorities and other partnerships and connections
- A LOT OF LESSONS LEARNED and Follow-on Activities!

Iowa Watershed Approach (IWA)

Iowa Homeland Security and Emergency Management:

- Produce Resilience Strategies Report
- Report to share lessons learned about flood reduction with a watershed approach

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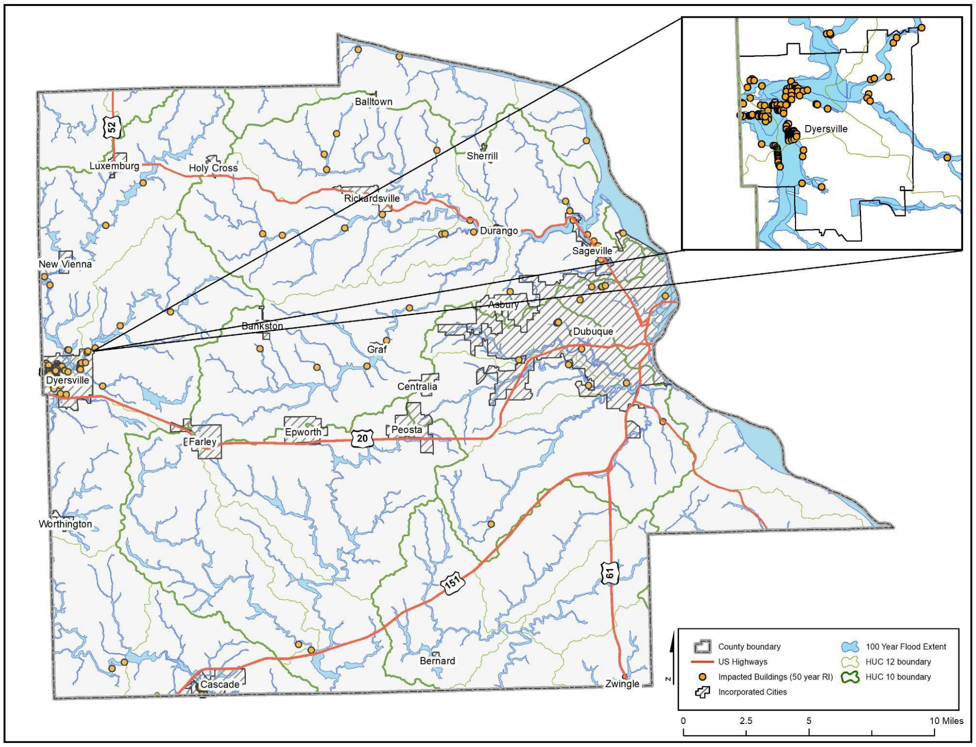
Report at
https://homelandsecurity.iowa.gov/iowa-watershed-approach/

Resilience Strategies Report

A Four Point Guide to Helping Locals with Watershed Approach Flood Reduction

Strategy 1: POWAR Floods



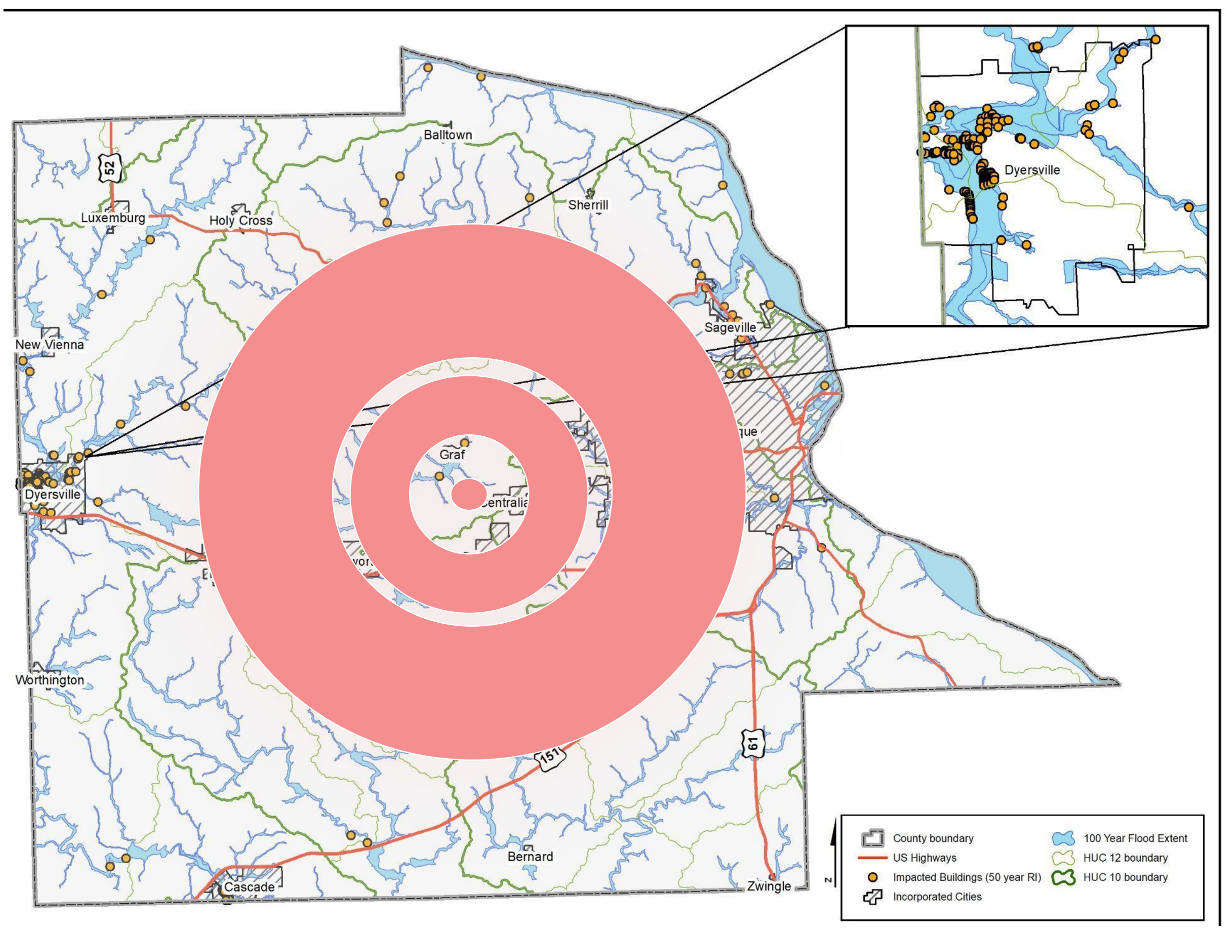
Where do we put watershed approach practices in this county?

Distribute all around?
That's fair, right?

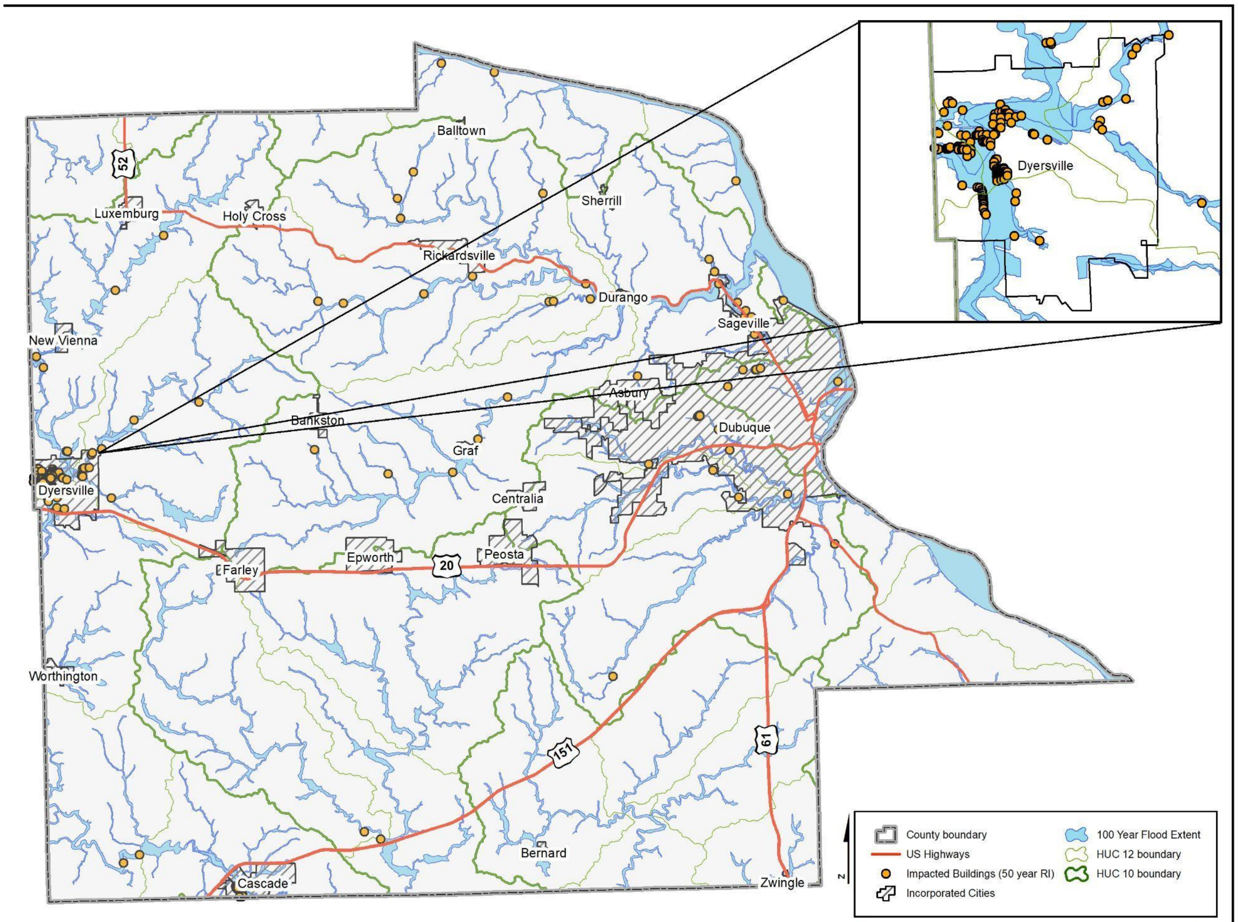
Where people willing to put in match $?

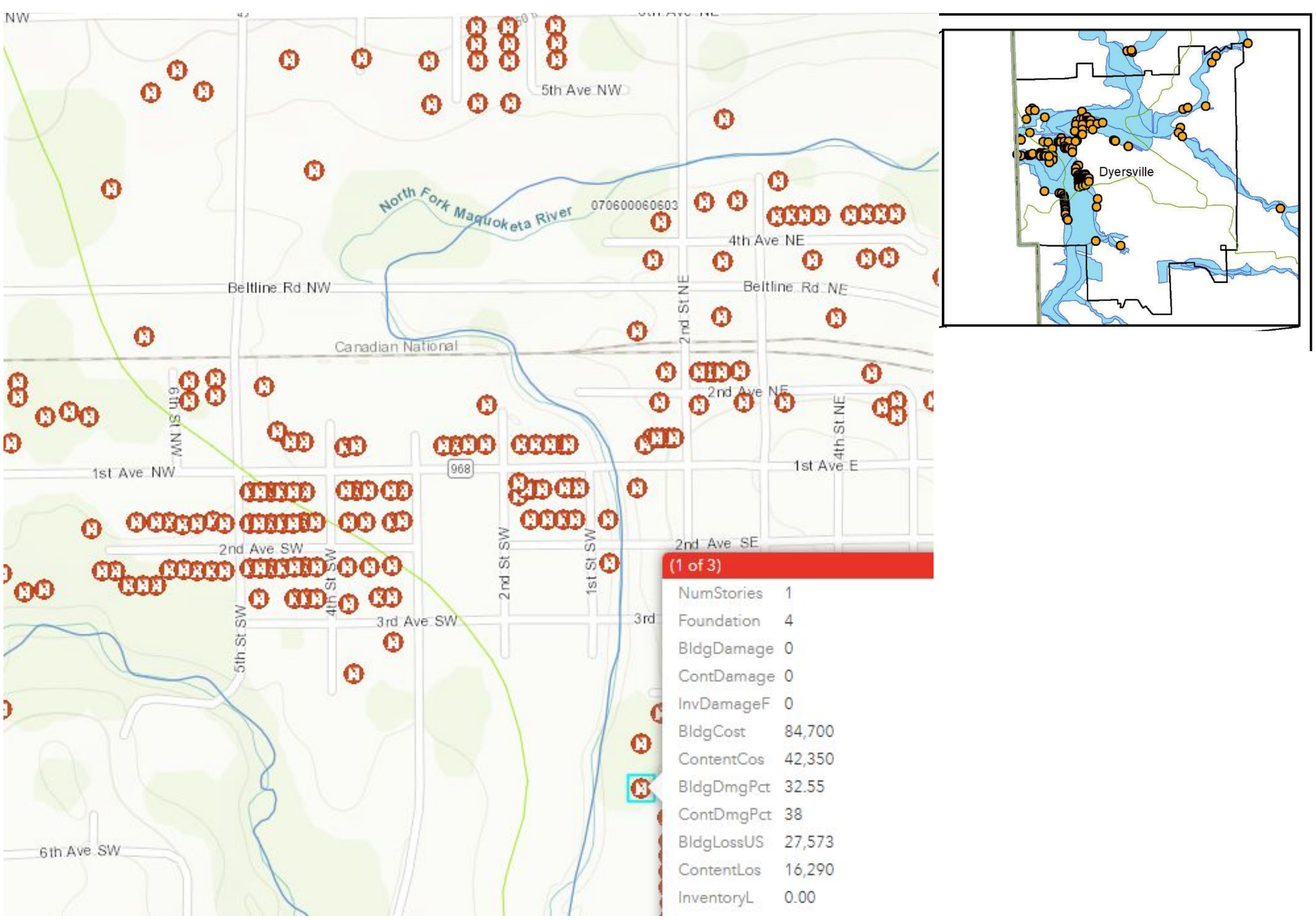
Close to Mississippi?
Most water there

Target the center?
Works in archery!



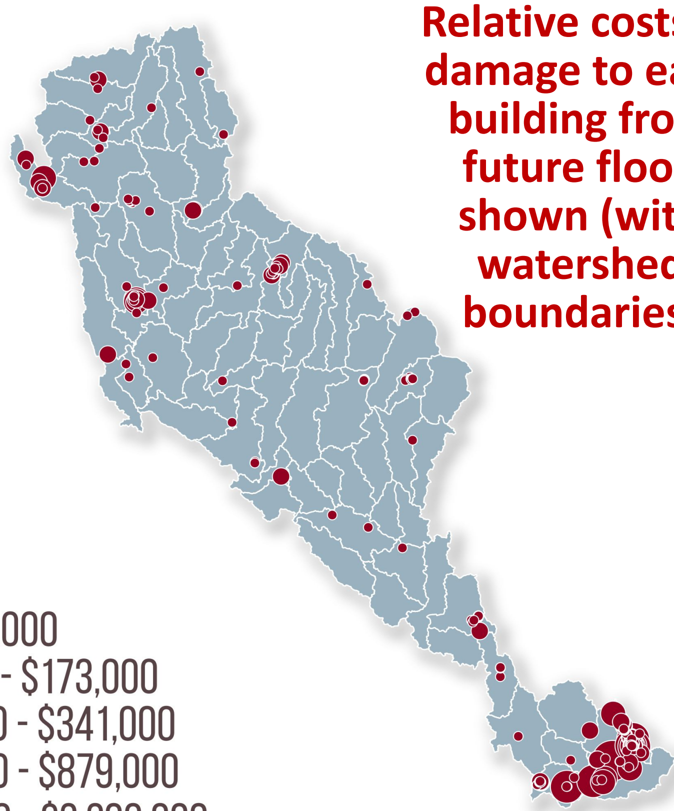
If you know where future flood damage is most likely, and know $ amounts of such damage, then you can start to focus.





PROSPECTIVE FLOOD DAMAGES

Relative costs of damage to each building from future flood shown (with watershed boundaries)



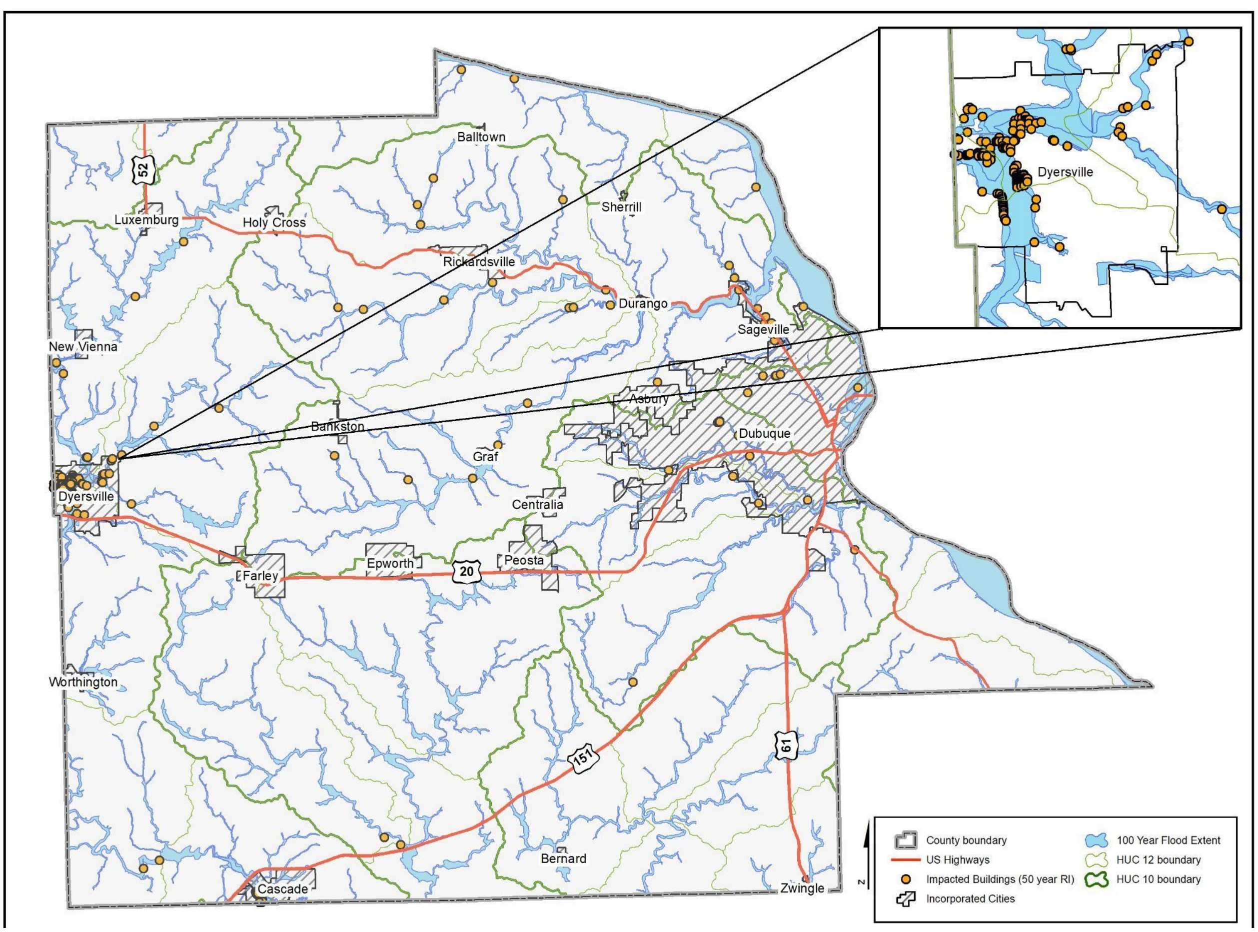
- $0 - $53,000
- $53,000 - $173,000
- $173,000 - $341,000
- $341,000 - $879,000
- $879,000 - $2,290,000

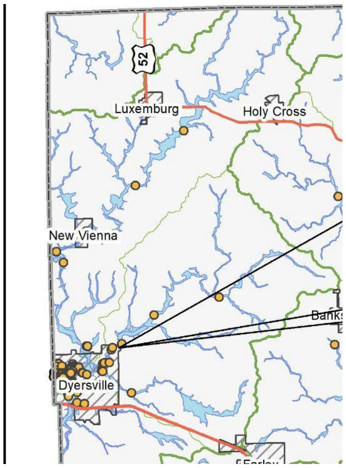
In this watershed, where do we focus?

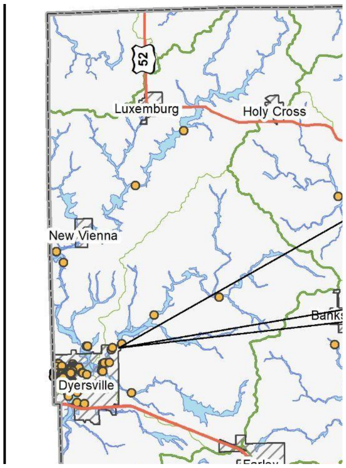
Greatest $ damage is at the south end of watershed.

So, spend our limited $ by putting practices upstream from there?

In the ~2500 square miles upstream?




52
Luxemburg
Holy Cross
New Vienna
Dyersville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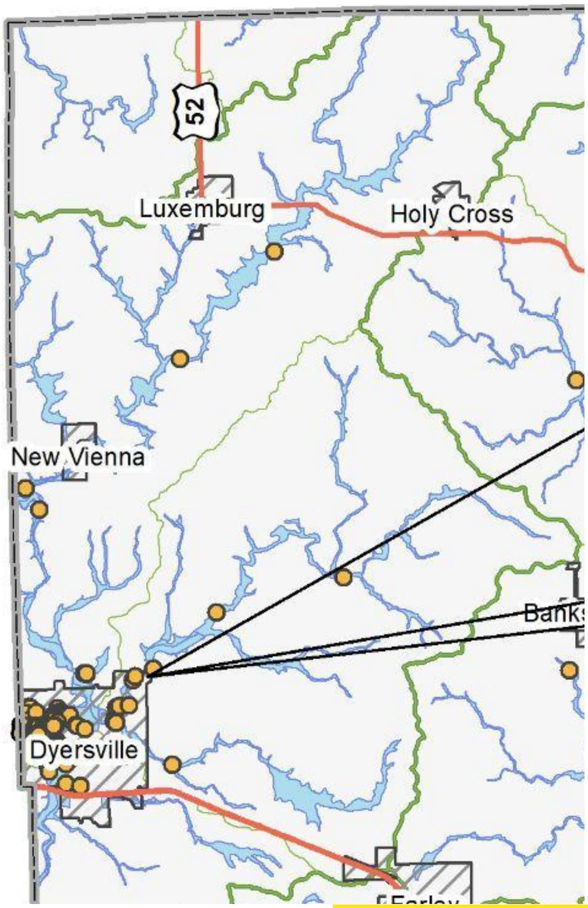


Dyersville has lots of building damage from flooding

BUT, not a lot of upstream area
(most flooding comes from just 2 HUC 12s)

So, it has a greater Potential Of using a Watershed Approach to Reduce Floods - because there is:

1. A smaller watershed area above the flood impact zone

and

2. Greater $ damage in the flood impact zone

If you understand these two factors:

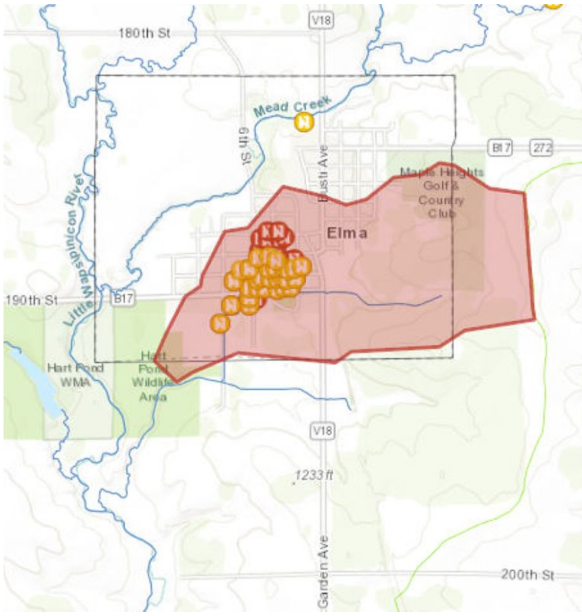
1. The smaller the watershed above flood impact area, the fewer practices are needed to reduce flood levels;
2. The greater the $ damage of flood impact area, the more opportunity for reducing potential flood losses.

Then you can find where you have real PoWAR!

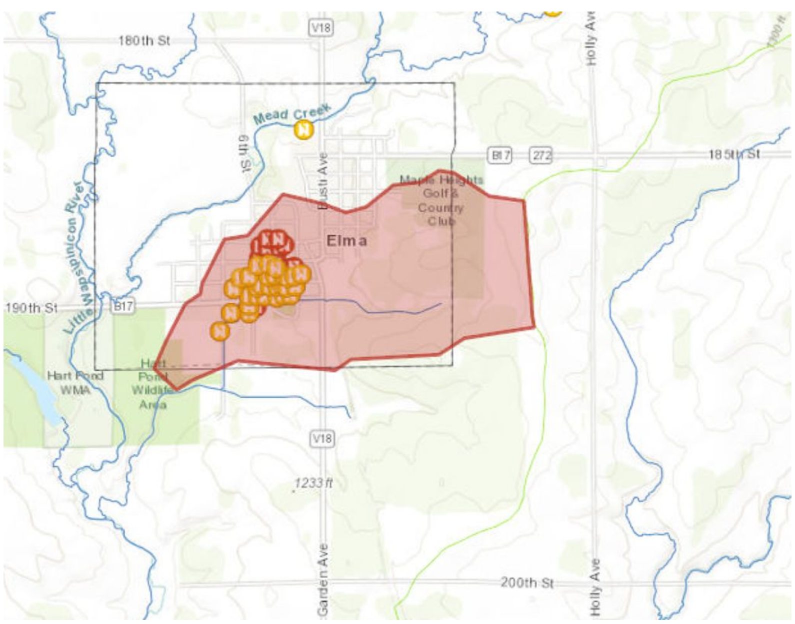
PoWAR =

Potential Of using a Watershed Approach for Reducing floods

Example: Elma



POWAR Floods Ratio= $ loss from potential flooding / Watershed Area (acres)



Evaluating the Potential Of using a Watershed Approach to Reduce Floods for Elma:

Building Loss[1]	$23,644
+Content Loss[1]	$7,667
+Inventory Loss[1]	$22
=Total Annual Avg. Loss[1]	$31,333
Divided by	
Total Upstream Drainage Acres	425
Elma's POWAR Floods ratio=	**74**

1 Loss shown is annualized loss. Loss amounts determined for several recurrence intervals. Then, these were combined by annualizing them using Simpson's Rule.

Find and start with areas with greatest "POWAR"

P otential
O f using a
W atershed
A pproach for
R educing Floods

POWAR = $ Flood Damage / Area Upstream

The higher the POWAR Floods ratio, the more likely watershed approach flood reduction can be achieved.

Examples:	Decorah	Dyersville	Dunkerton	Sumner
Building Loss	$5,204,944	$4,132,327	$843,495	$109,013
Content Loss	$2,245,117	$1,677,718	$355,331	$45,472
Inventory Loss	$76,314	$212,689	$55,981	$83,606
Total Loss	$7,526,375	$6,022,734	$1,254,807	$238,091
Divided by				
Total Upstream Drainage Acres	304,988	75,476	63,120	30,820
= PoWAR	**25**	**80**	**20**	**8**

Iowa Silver Jackets Project:
Find watersheds with highest POWAR Floods ratios

- Calculate POWAR Floods ratios for all Iowa (using HSEMD flood loss estimates)
- USACE & partners will also examine other factors that indicate greater potential, such as slope and how many locations there are suitable for various types of watershed approach best management practices
- Once study completed, communities with high POWAR ratios to be notified
- For some areas with highest POWAR Floods ratios, Preliminary Investigation Feasibility Reports to be completed as first step in NRCS Watershed and Flood Prevention Operations (WFPO) program

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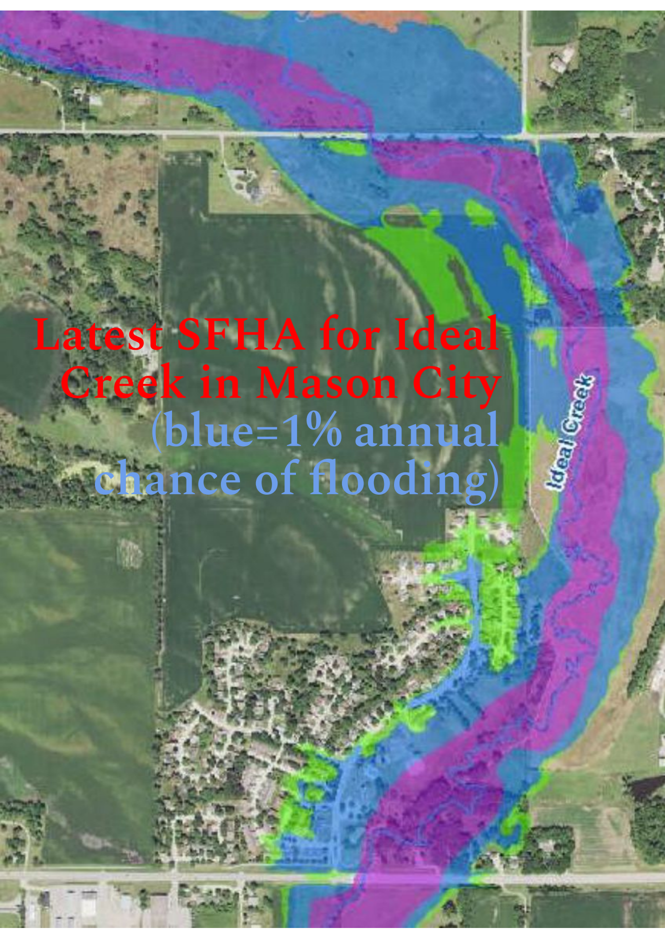
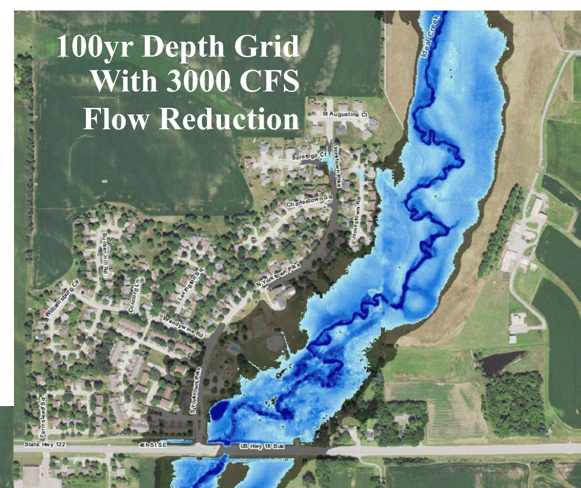
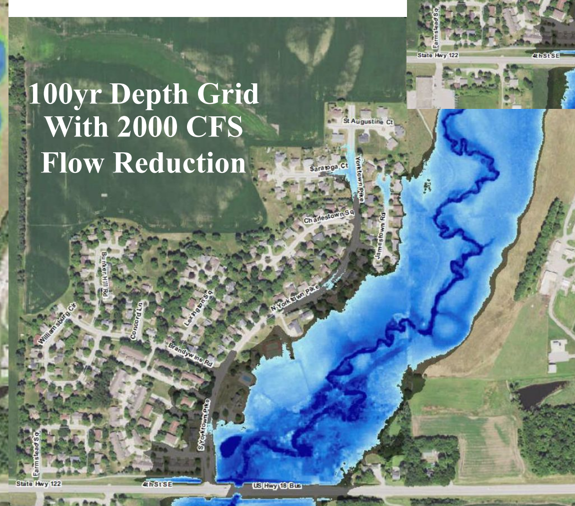
1. Examine a watershed area's potential of using a watershed approach to reduce floods (i.e. calculating POWAR Ratios)
2. Help communities determine how much streamflow must be reduced to reduce flood impacts
   A. Through help from Iowa DNR through RiskMAP RTTA (e.g. Mason City, Oelwein, Cherokee, Wolford, Garwin)



Example from Report Provided by RTTA Contractor





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   - B. Through NRCS' Watershed Flood Prevention Operations (WFPO) planning grant
   - C. Through help from USACE through Silver Jackets project (e.g. Hartley)

     (Can access help from these or other resources through "Help CUT Flooding" at https://survey123.arcgis.com/share/173a7b57b0d7497780c2a501e69a8462)

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3. Help communities get engineering and other technical assistance in order to apply for grant funding opportunities

   - WHY? Communities need engineering and other assistance to determine & compare costs and benefits, and complete other requirements for developing an application for FEMA/other funding

Problem: When city hires engineer, no guarantee they will come up with BCR>1

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   A. Through NRCS' Watershed Flood Prevention Operations (WFPO) planning grant
   B. Through FEMA BRIC Direct Technical Assistance
   C. Through FEMA BRIC Project Scoping –
   Also starting statewide BRIC-funded Project Scoping to allow quick responsiveness in helping communities

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   C. Through FEMA BRIC Project Scoping
   D. Through FEMA HMGP Advance Assistance

Current Projects and Next Steps in Iowa for

Integrating Nature-based Strategies in Hazard Mitigation Planning

- NRCS' WFPO planning grant in northern Dubuque County
- FEMA BRIC Direct Technical Assistance for Cherokee and Riverton
- FEMA BRIC Project Scoping for:
  - Vinton
  - Hartley
  - Dyersville
  - Oelwein *(Engineer's analysis shows upstream practices reduce flood damage to 100+ buildings!)*
- FEMA HMGP Advance Assistance for Mason City and English River in Iowa County
- Finishing POWAR Floods #s
- **COMING SOON:** Comprehensive, statewide flood mitigation strategy that considers watershed approach flood mitigation, flood buy-outs, levees and other solutions and outlines where and under what conditions different strategies are best applied

Questions?

Contact Jim Marwedel at
jim.marwedel@iowa.gov

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4. Provide additional funding for construction and implementation of watershed approach flood reduction projects