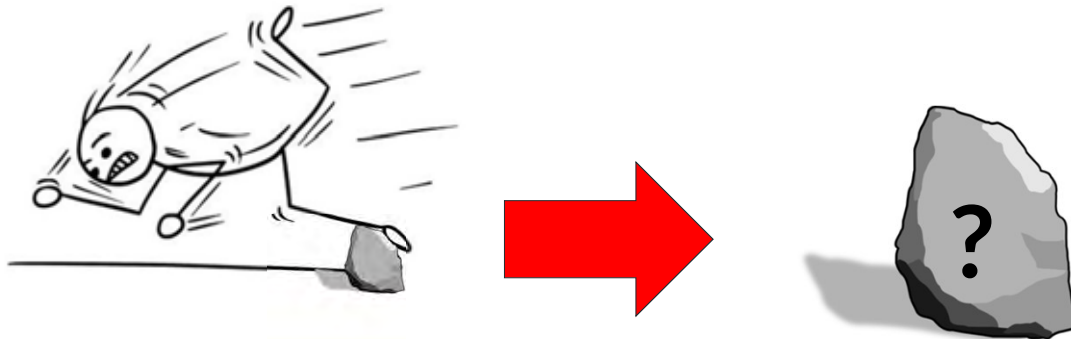


Navigating the  
Watershed Approach Path  
to  
Flood Reduction and Water Quality Improvement:  
**Turning Stumbling Blocks into .....**



Presenting resiliency strategies learned  
from the Iowa Watershed Approach,  
to be documented in ...

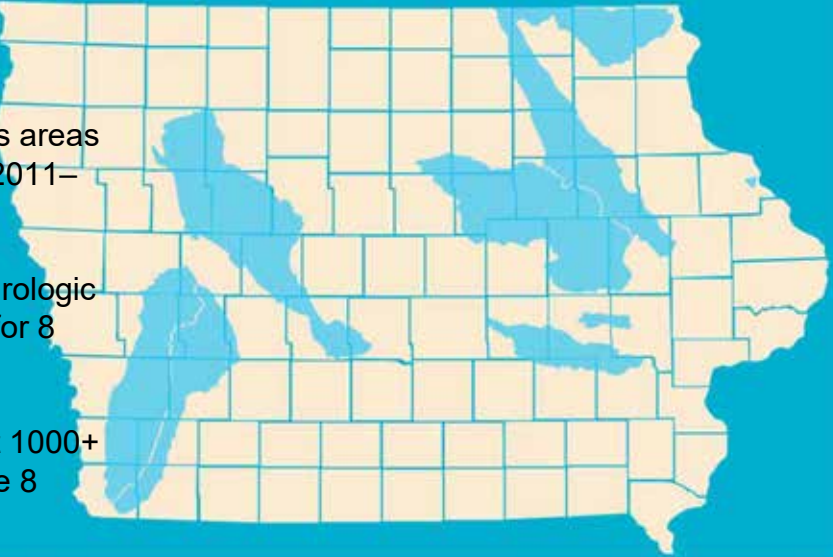
**How to Achieve  
Local Flood Resiliency**

By Iowa Homeland Security and Emergency  
Management Department (HSEMD)



## Iowa Watershed Approach (IWA) Background

- HUD awarded Iowa Watershed Approach nearly \$97M
- To adhere to NDRC requirements, IWA targets areas impacted by floods from 2011–2013
- Watershed plans and hydrologic assessments completed for 8 watersheds
- Millions of \$ to implement 1000+ watershed practices in the 8 watersheds



## Iowa Watershed Approach and HSEMD Deliverable

### Goals of Iowa Watershed Approach

- Reduce Flood Risk
- Improve Water Quality
- Increase Resilience
- Engage Stakeholders through Collaboration and Outreach/Education
- Improve Quality of Life (especially for vulnerable)
- **Develop Program that is Replicable and Scalable**

Iowa HSEMD Resiliency  
Strategies Report:

**How to Achieve Local  
Flood Resilience**

# How to Achieve Local Flood Resilience

## CONTENTS



- How To Be Better Prepared for Flood Response
- How To Be Better Prepared for Flood Recovery
- **How to do Flood Mitigation . . . .  
WITH A WATERSHED APPROACH!**

Strategies in this “How-to” report  
discovered through the  
Iowa Watershed Approach

## How to Achieve Local Flood Resilience

### Flood Resiliency Goals:

Reduce flood risk to  
life, structures, personal property, crops, pasture and livestock,  
while improving, not degrading, water quality  
and sustaining, not threatening, wildlife habitat and ecological use  
through cost-effective methods.

(cost-effective =  
benefits greater than costs when considering initial costs + operations/maintenance)

Recover quickly  
with contingencies and recovery programs in place  
to handle impacts without chaos or long-term catastrophe.

**So, what are some things we've learned about reducing floods while improving water quality?**

- 1. Only certain practices are suited for both**
- 2. Only certain locations will result in both**
- 3. Certain factors must be considered to be cost-effective and to get certain funding**

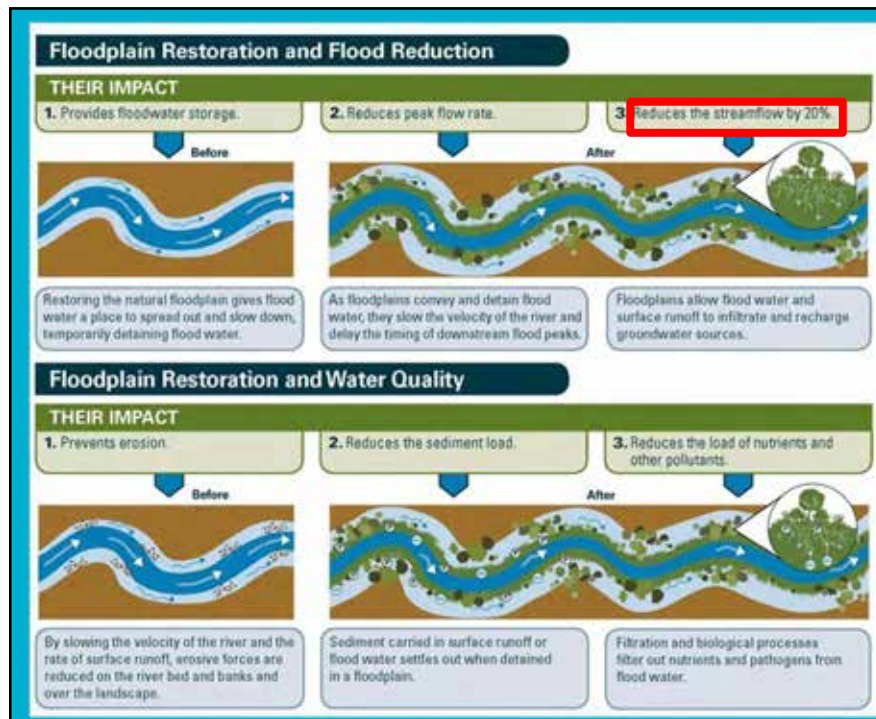
- 1. Only certain practices are suited for both  
flood reduction & water quality improvement**

**What are they?**

## In other words- What stones will kill two birds?



“Stones” = Methods/Management practices that can both  
Mitigate flood impacts  
AND  
Improve water quality



## Floodplain Restoration

## Oxbow Restoration

### Oxbow Restoration and Flood Reduction

#### THEIR IMPACT

1. Provides floodwater storage.

2. Reduces peak water flow rate after a storm event.



Restoring oxbow features reconnects streams to their floodplains and provides temporary storage within the feature.

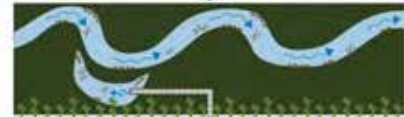
With temporary storage and slower moving streams, the timing of flood peaks is delayed.

### Oxbow Restoration and Water Quality

#### THEIR IMPACT

1. Sediment is deposited in the streambed rather than being carried downstream.

2. 56% nitrate load reduction.



Natural stream meanders create slower moving water, allowing sediment to fall out of suspension.

The meandering stream system can naturally process and cycle nutrients. Discharging tile lines into the oxbow can therefore serve as a tile nitrate treatment practice.

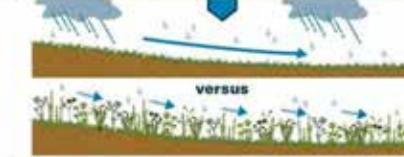
## Perennial Cover – Up to 40% Peak Flow Reduction (but less or no reduction if ground frozen or saturated)

### Perennial Cover and Flood Reduction

#### THEIR IMPACT

1. Reduces overland flow and streamflow by 40%.

2. Reduces runoff rate.



An enhanced root system, greater soil organic matter and increased vegetative water use cause more water infiltration, better soil water holding capacity and less surface ponding.

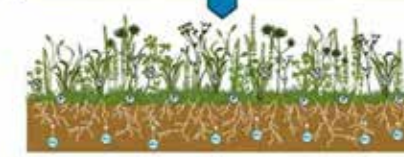
Vegetative cover obstructs and slows surface runoff.

### Perennial Cover and Water Quality

#### THEIR IMPACT

1. Prevents soil erosion and downstream sedimentation.

2. Reduces nitrate-N and phosphorus loads by 85% and 75%.

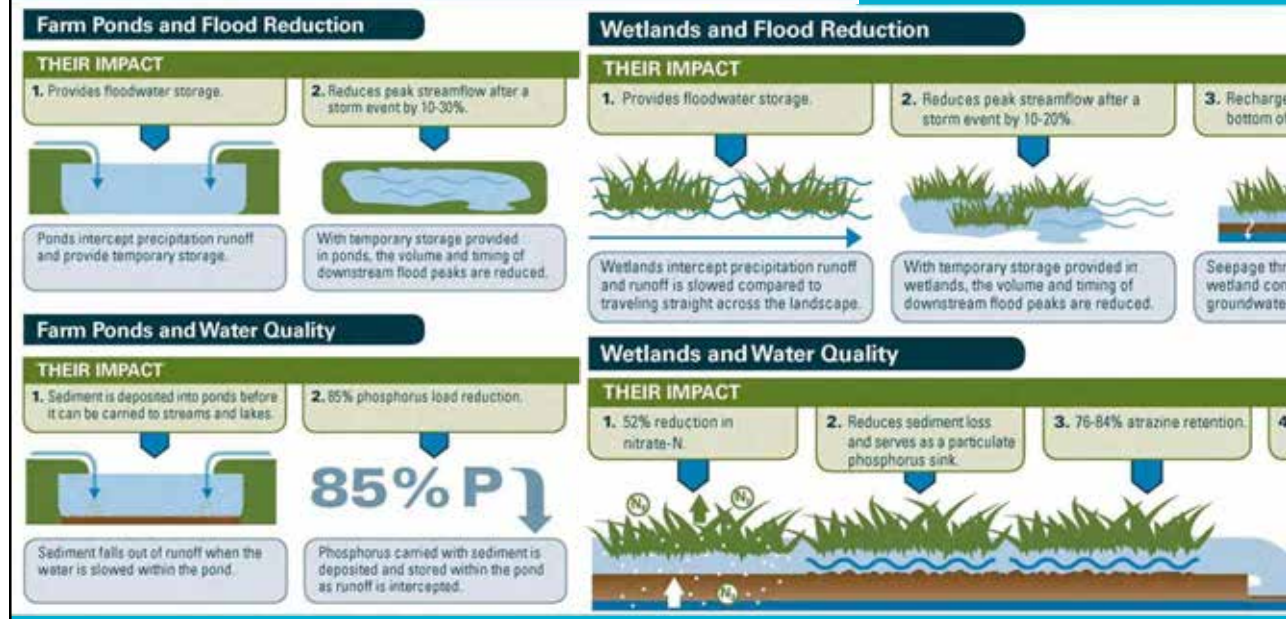


Soil detachment by water and wind is prevented with reduced surface runoff and increased vegetative cover. This also reduces concentrated flow and gully erosion.

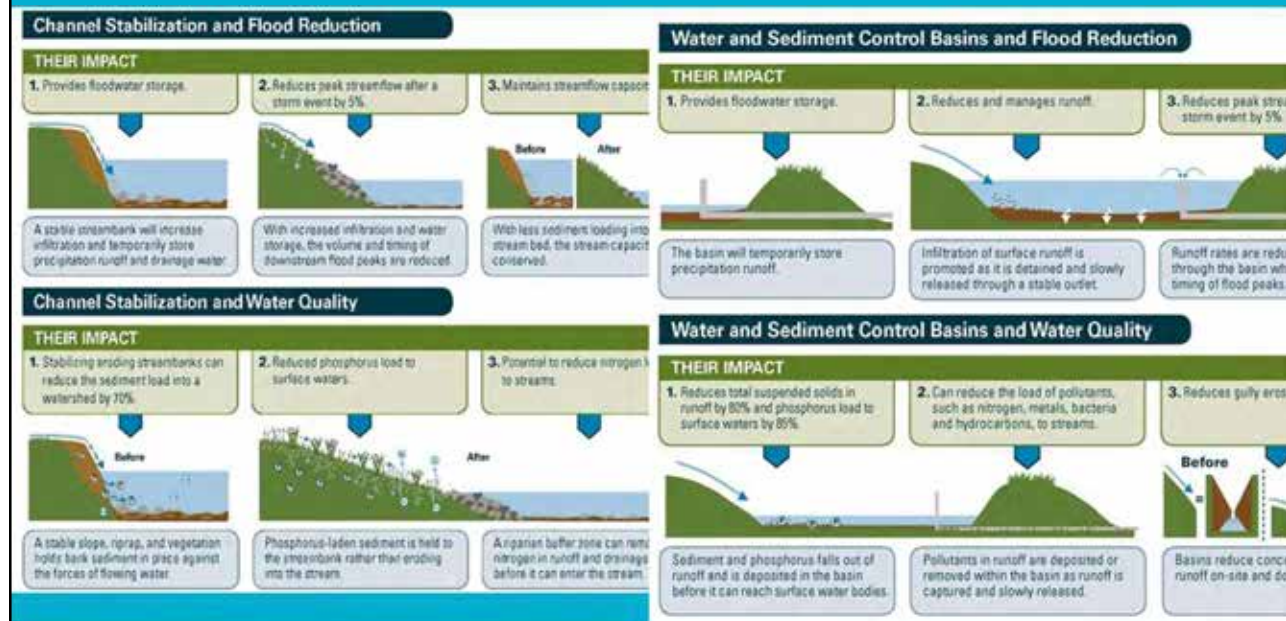
Permanent vegetation converts excess nutrients to stable organic forms within biomass. Additionally, phosphorus-laden sediment remains in the field with reduced erosion.



## Distributed Storage: 10-30% Flow Reduction



## “Stones”/Methods with 5% Streamflow Reduction



**So, will throwing all these stones around reduce peak flow?**

Yes, BUT  
Reducing  
Peak Flow  
is **NOT**  
Reducing Flooding!

Doing any of these practices does not necessarily mean you reduce flooding...

BUT, it could!



***Not only do you need a stone  
the right size, you need to be  
able to aim it right to kill two  
birds!***



**So, how do you aim it?**

1. Only certain practices are suited for both
2. Only certain locations will result in both  
flood reduction & water quality improvement

## How to Aim Your Stones: Identify areas of greatest flood damage

