

Natural And Beneficial Uses for Floodplains

A Common Sense Strategy for Floodplain Management

Wetlands of Delaware

Status, Trends and Future Outlook

presented by

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Association of State Floodplain Managers



**The following presentation
represent the views of the speaker
and may not represent views of the
ASFPM Board or Membership**

This Presentation is Focused on What I Think I know Best, Which is not Much.

ASFPM Mission

Mitigate the losses, costs, and human suffering caused by flooding.

and

Protect the natural and beneficial functions of floodplains.



**Floods are:
Natural Disasters?
or
Manmade Disasters?**

Dr. Gilbert White Stated The Facts:

**“Floods are Acts of Nature; But
Flood Losses Are Largely Acts of
Man”**

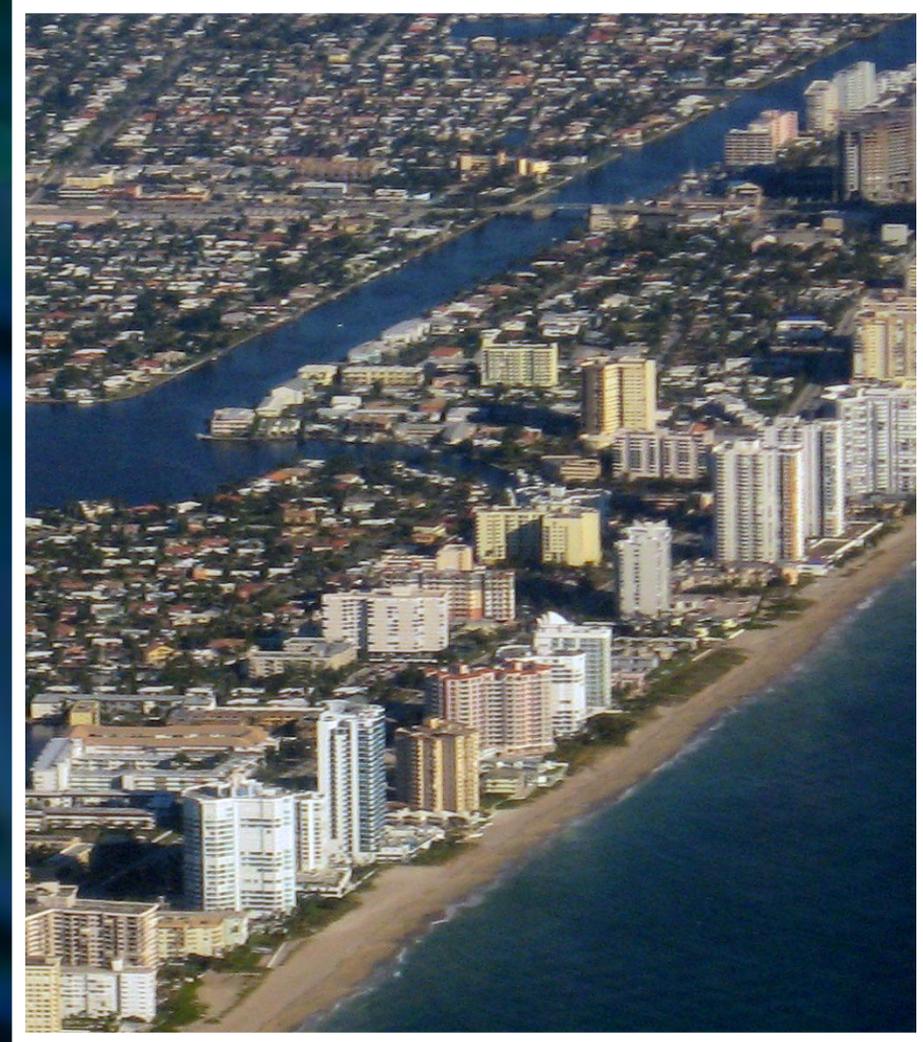
Trends in Flood Damages

- **\$6 billion annually**
- **Four-fold increase from early 1900s**
- **Per Capita Damages increased by more than a factor of 2.5 in the previous century in real dollar terms**
- **Flood losses and reported flood heights are increasing**
- **Demographic Trends indicate great future challenges**
- **More challenges from Sea Level Rise**
- **Even more challenges likely from Climate Change**

Here is an Example of Increased Development in a High Risk Area

Miami Beach 2006

Miami Beach 1926



Joel Gratz © 2006

Wendler Collection

Slide courtesy of Ed Thomas

What is Influencing the Trend?

Current government policy:

- Promotes development in risk areas
- Ignores changing conditions
- Ignores adverse impacts to existing properties
- Undervalues natural floodplain and wetland functions
- Transfers the Cost of Risk from those who benefit to everyone else

ASFPM An Agenda for Action

- **Retreat from/avoid High Risk Areas**
- **Build national data sets using sound science**
- **Use Actuarial Flood Insurance to drive mitigation and wise Use of floodplains**
- **Make No Adverse Impact a universal development standard**
- **Respect the Natural & Beneficial Functions of River & Coastal Floodplains**
- **Apply watershed-based Mitigation Planning, Nationwide**
- **Rehabilitate and restore degraded riparian and coastal resources.**

Postcards From the Floodplain

Flood Management Speech 101

(Conversations from public meetings):

There are two kinds of Levees those that have failed and those that are going to fail

The Flood was natural, It was a Disaster because we got in the way

There is no such thing as flood protection

Yes, I know you flooded, you live in the floodplain that is why it has the word "flood" in it

Yes know you are a US Senator but you still have to pay flood insurance

If you live here you will drown

Floodplain Managers On the Job Training



IT'S CALLED FLOOD
PLAIN BECAUSE IT
IS PLAIN THAT IT
FLOODS!!

REMEMBER "93"

314-241-2122



GREAT RIVERS HABITAT ALLIANCE



Restoring America's Wetlands

If you lived
here you
would be
flooded by
now

Local Political Official: "Wetlands!! My community don't need no stinking wetlands, what a waste of prime waterfront property?"

Construction in the Floodplain

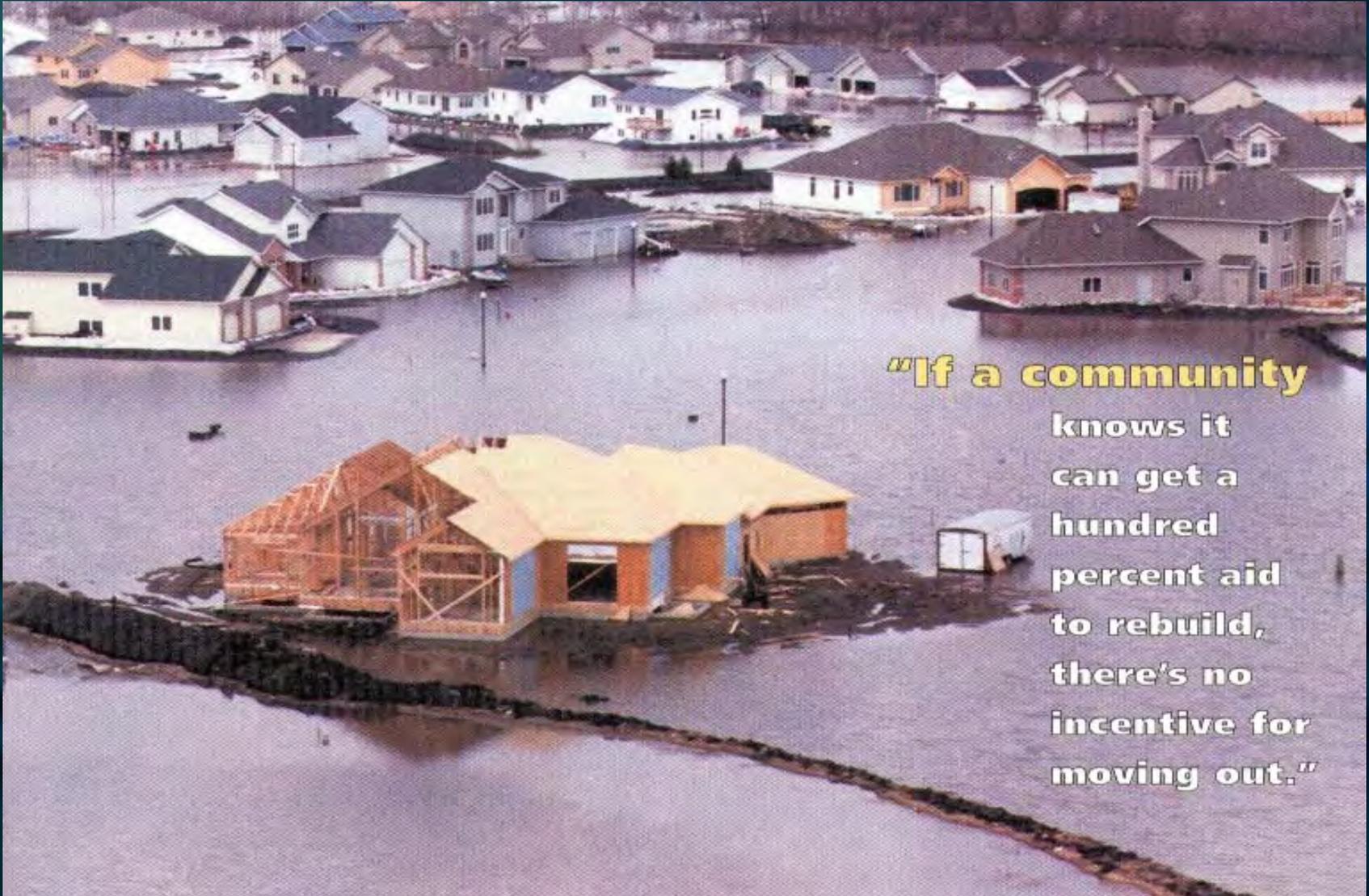
New Fill or Old Riparian Wetland



**My Second Car
is a boat.**



A lake view was not in the Real Estate Brochure



"If a community knows it can get a hundred percent aid to rebuild, there's no incentive for moving out."

Reverse Swimming Pool Concept

Everyone needs there own front end loader

Ceasing to build on the most vulnerable areas would clearly reduce the damage and loss of life.





“Wildlife will love the new road crossing...”



**Revenge of the Wetlands
Coming to a Watershed
Near You**



**When Nice
Streams go Bad:
Story at 11**

**We haven't found
your cabin yet, but
you still have a nice
river view.**



Post Hurricane Katrina: Rebuilding



Slide courtesy of Al
Goodman

Flooding Impacts on People

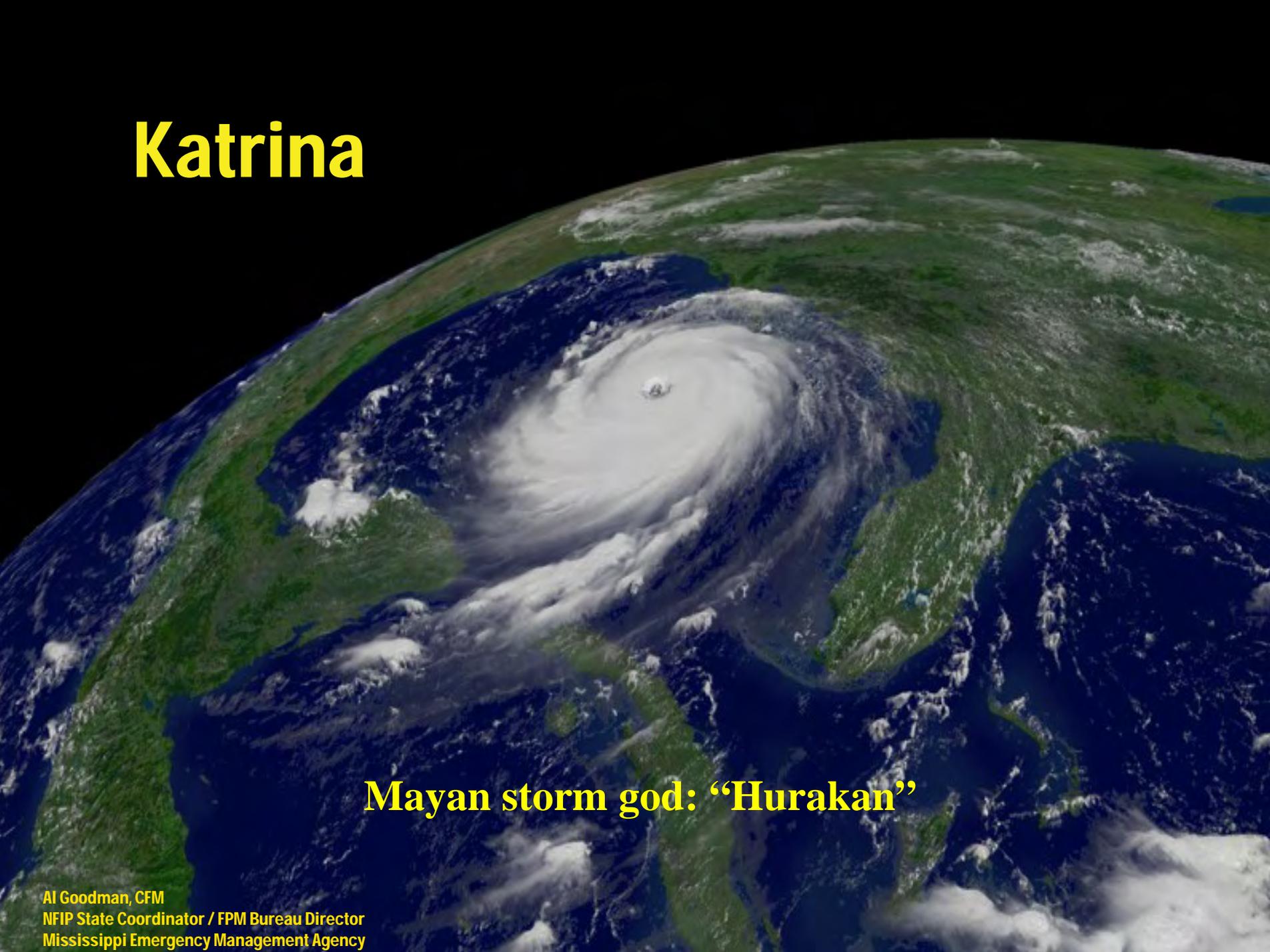
Menomonee River Milwaukee Wisconsin





Menomonee River Milwaukee Wisconsin

Katrina

A satellite image of Hurricane Katrina, showing a well-defined eye and spiral cloud structure over the Gulf of Mexico. The surrounding Earth's surface is visible, including the Gulf of Mexico, the Yucatan Peninsula, and parts of North and Central America.

Mayan storm god: “Hurakan”

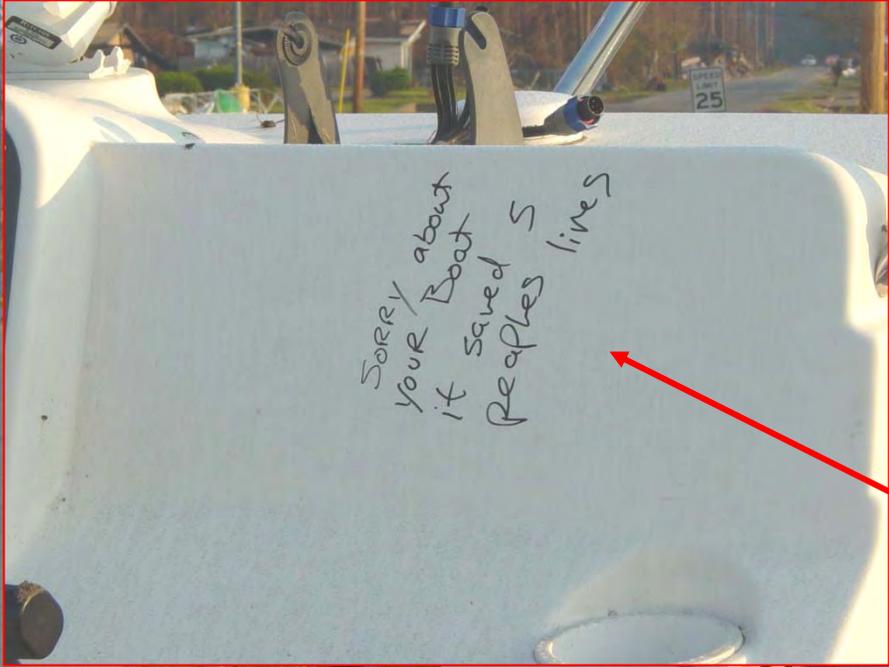




END OF THE ROAD
Local volunteers rescue the Taylor family from the roof of their car, stranded by rising waters, along U.S. 90 in Bay St. Louis, Mississippi.







Natural And Beneficial Functions

Natural Stream Evolution in a Watershed

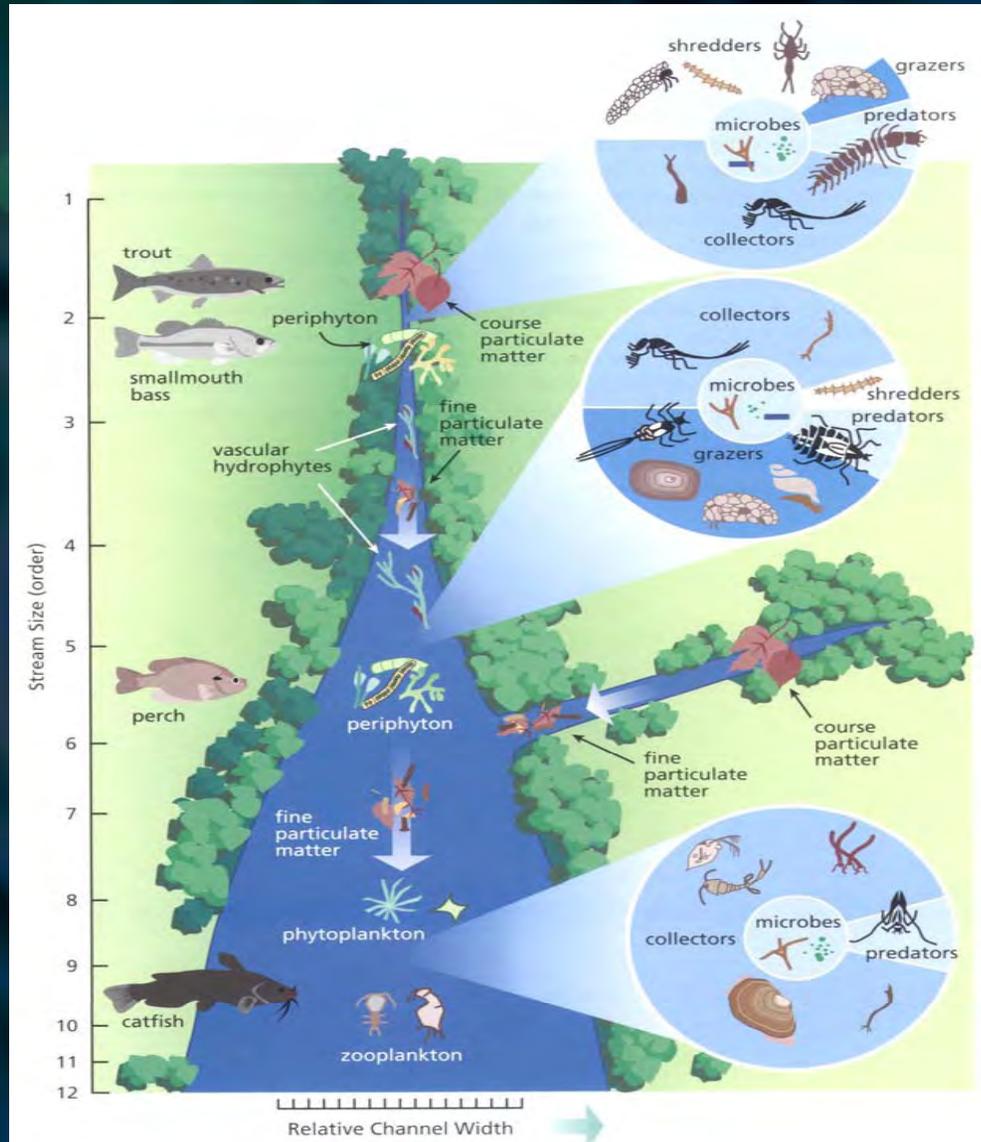


Figure 1.34: The River Continuum Concept. The concept proposes a relationship between stream size and the progressive shift in structural and functional attributes. Source: Vannote et al. (1980). Published with the permission of NRC Research Press.

Stream Evolution and Land-Use

**1-5% Impervious:
Minor Stream Impacts**



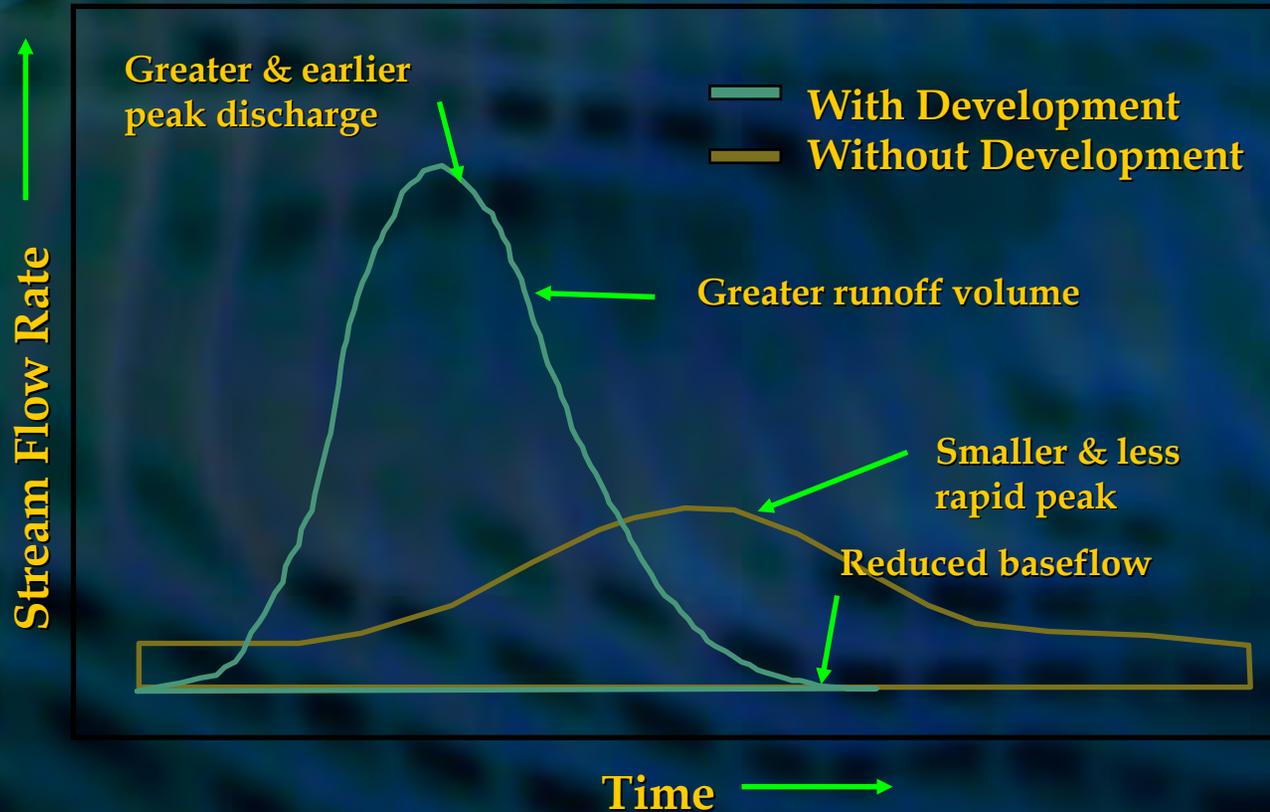
**10-25% Impervious:
Stream is Impacted**



**50-75% Impervious: Stream is
Severely Impacted**

Hydrology and Hydraulics

Impacts of Development on Streams



Sediment Transport

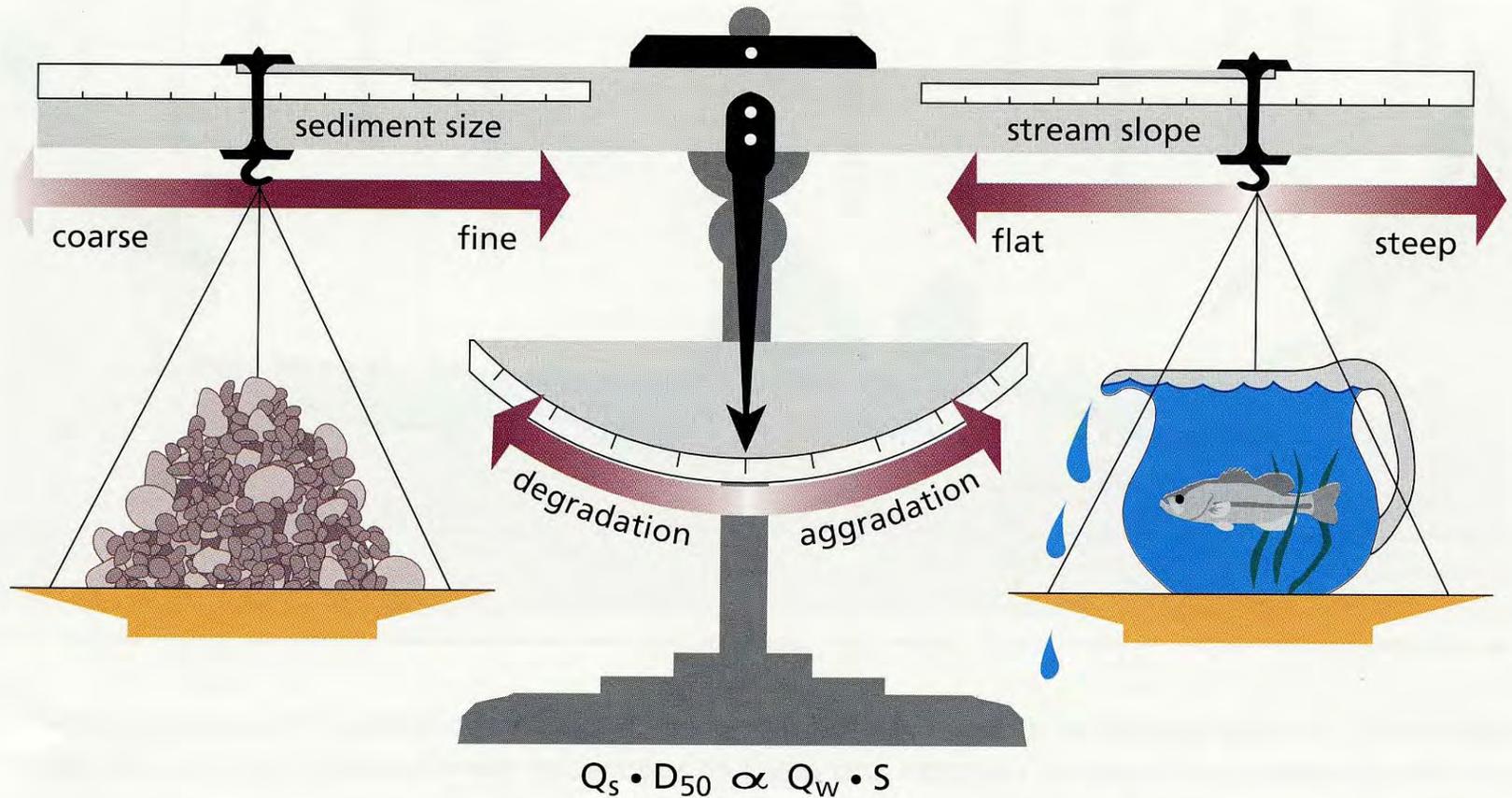


Figure 1.13: Factors affecting channel degradation and aggradation. The "size" of the channel is determined by the stream's energy, the slope, and the flow of water in balance with the size and quantity of the sediment particles the stream moves.

Source: Rosgen (1996), from Lane, *Proceedings*, 1955. Published with the permission of American Society of Civil Engineers.

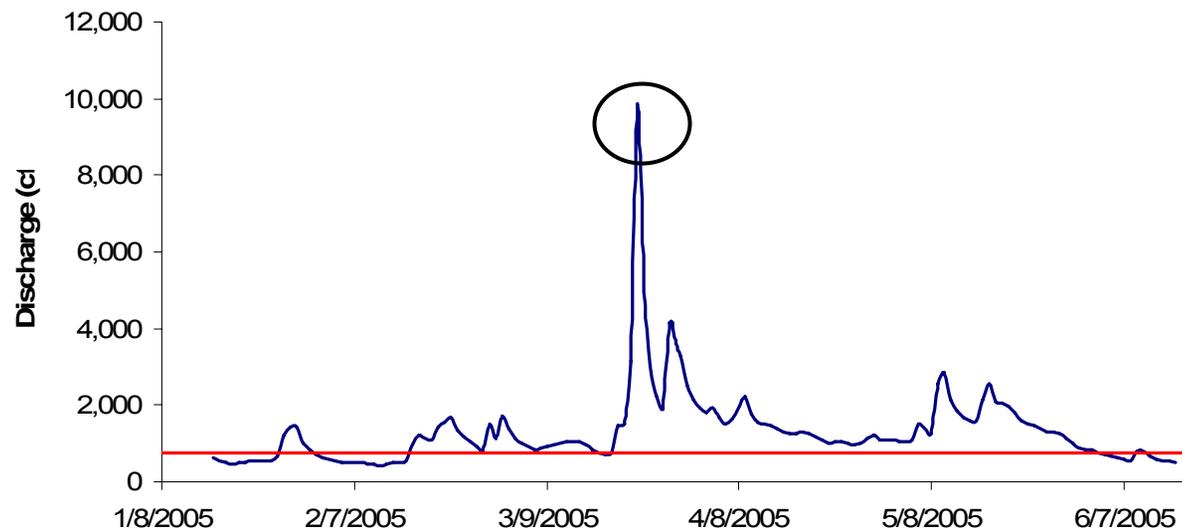
A photograph of a small urban stream. The water is turbid and brown, indicating sediment. The stream flows through a rocky bed. On the right bank, there is a steep, eroded bank of reddish-brown soil with exposed tree roots. The background shows a line of trees, some with green leaves and some bare. The overall scene suggests a stream affected by urban runoff and erosion.

**Small Urban Stream With
Sediment Issues**

Hydrological variability and functional floodplains



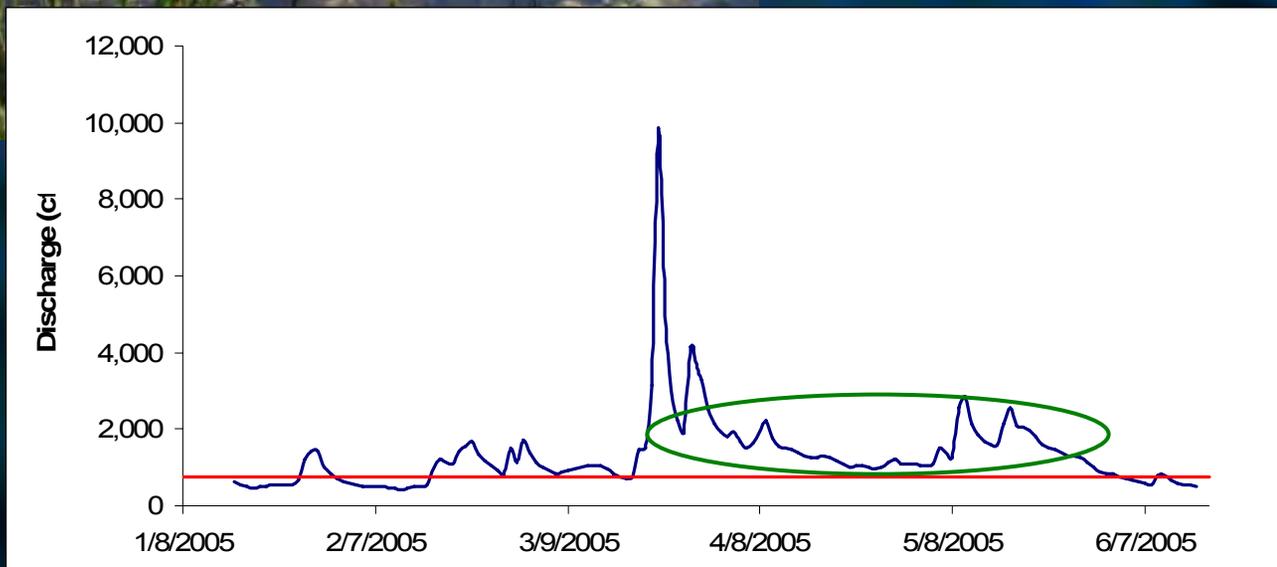
Large flood events perform geomorphic work, sediment deposition, leading to topographic heterogeneity, which promotes floodplain forest regeneration.



Hydrological variability and functional floodplains



Small Floods lead to food web productivity and native fish habitat (spawning and rearing). "Floodplain Activation Flood" Important to Maintain Quality Wetlands



Ecologically functional floodplains

- Connectivity between river and floodplain habitats
- Variable hydrology
- Critical Habitat



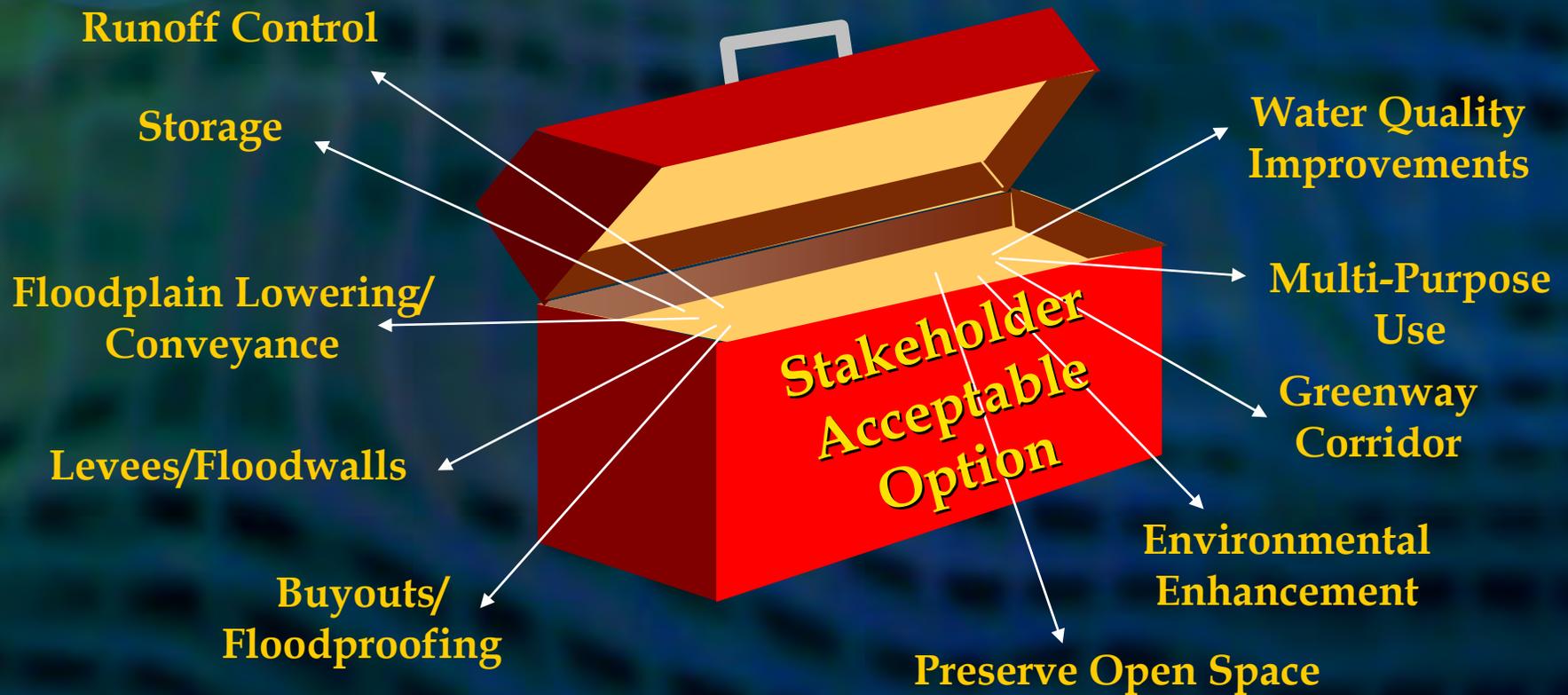
Watershed Management

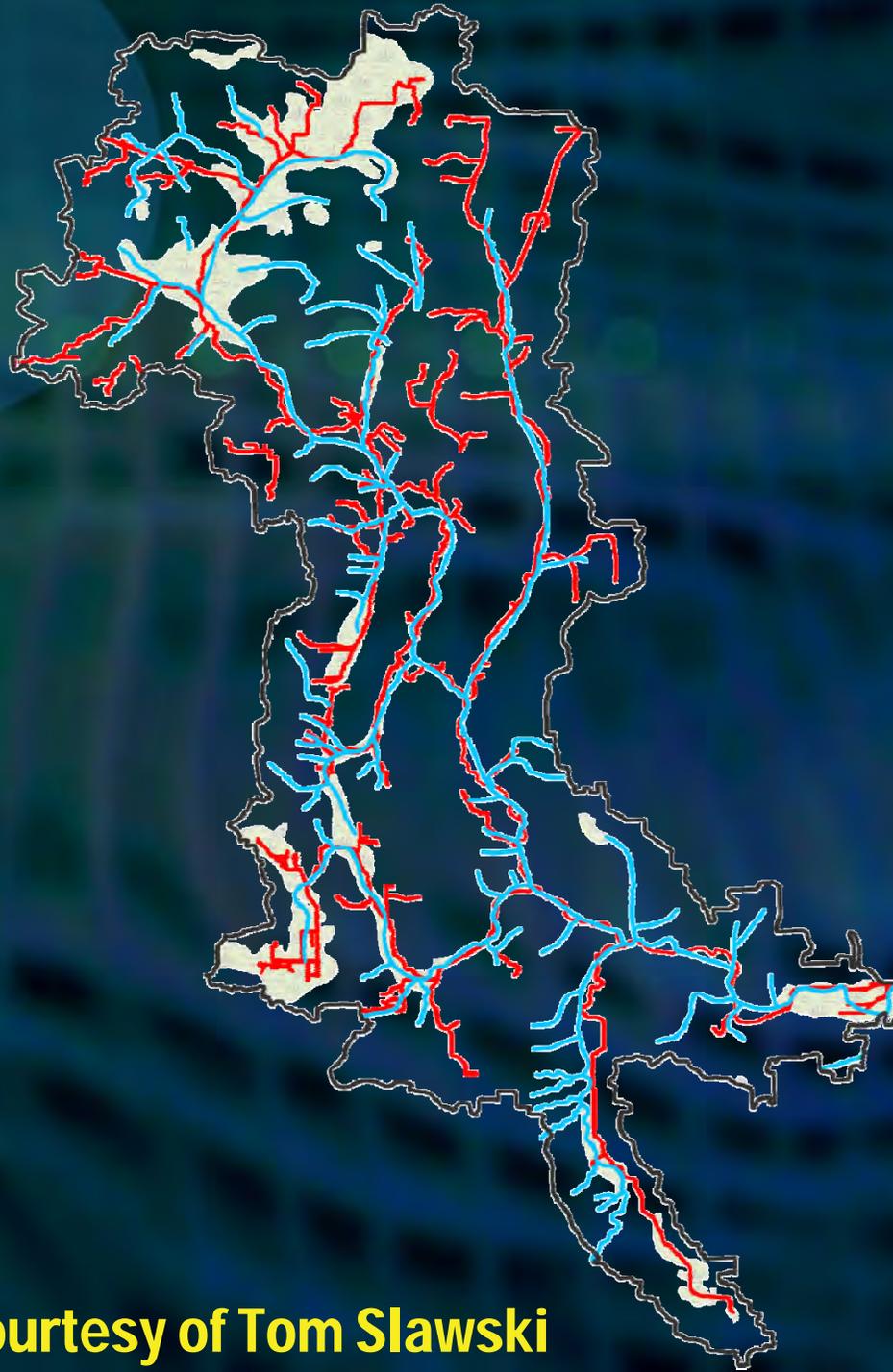
Flood Management

Watershed Management Strategy

- Assign more weight to environmental management and sustainability for flood management projects.
- Encourage the collection of the biologic, geomorphic, and other data needed to make flood management decisions
- Support the development and implementation of watershed planning at all levels of government (financial carrot and stick).
- Make financing sustainable floodplain management more attractive to local and regional governments
- Emphasis sustainability in pre- and post-disaster mitigation. Require environmental mitigation as a condition for federal disaster assistance.
- Change criteria for levee construction to include the hydraulic, biologic, and geomorphic processes of the affected stream

We Have Tools for Developing "good" Watershed Management Options





Menomonee River

Year 1836

Vs

Year 2009

Slide Courtesy of Tom Slawski

Kinnickinnic River

Year 1836

Vs

Year 2009



Slide Courtesy of Tom Slawski

KK River Historic Channel Before 1960



KK River Channel After 1960 “New and Improved”



Levees, rip-rap and channelization



Biological Impacts

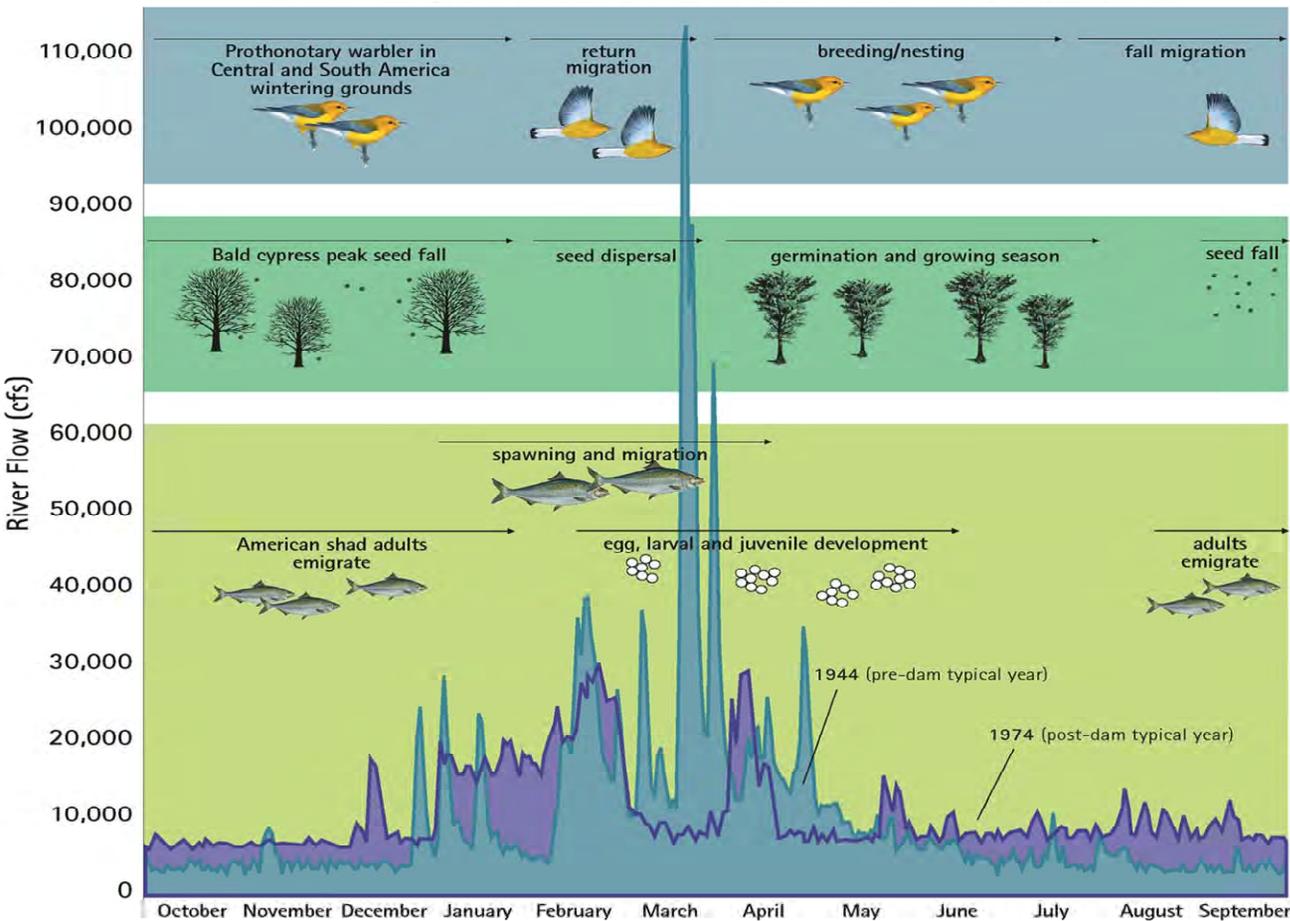


**Reared in
river habitat**

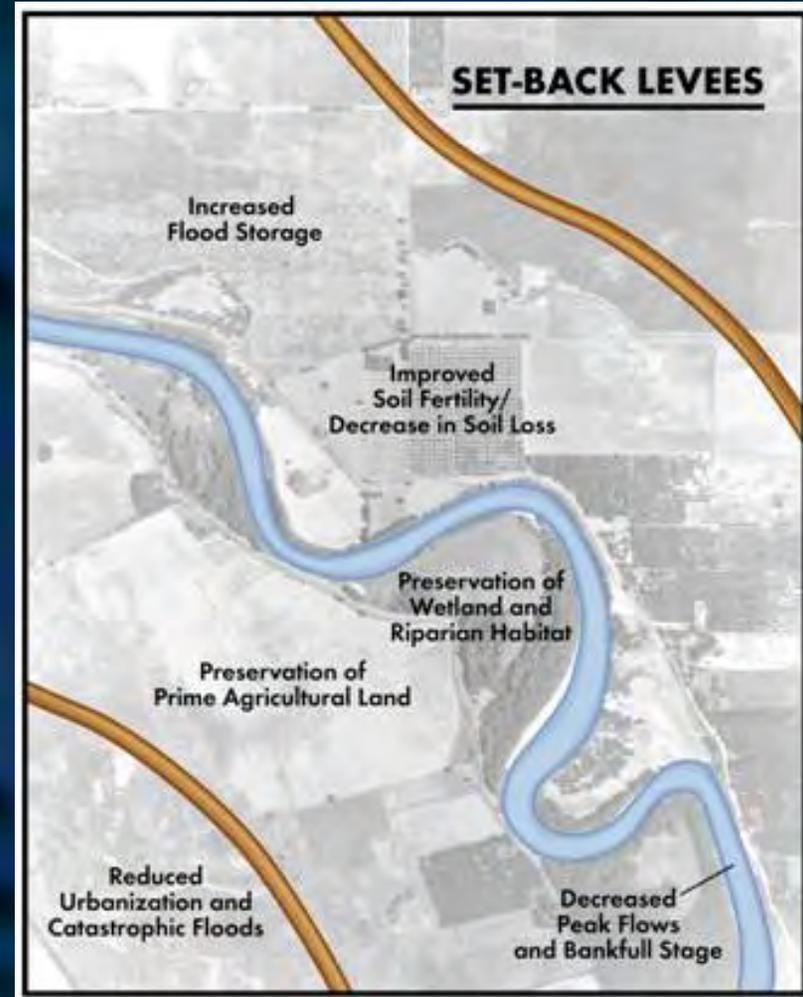
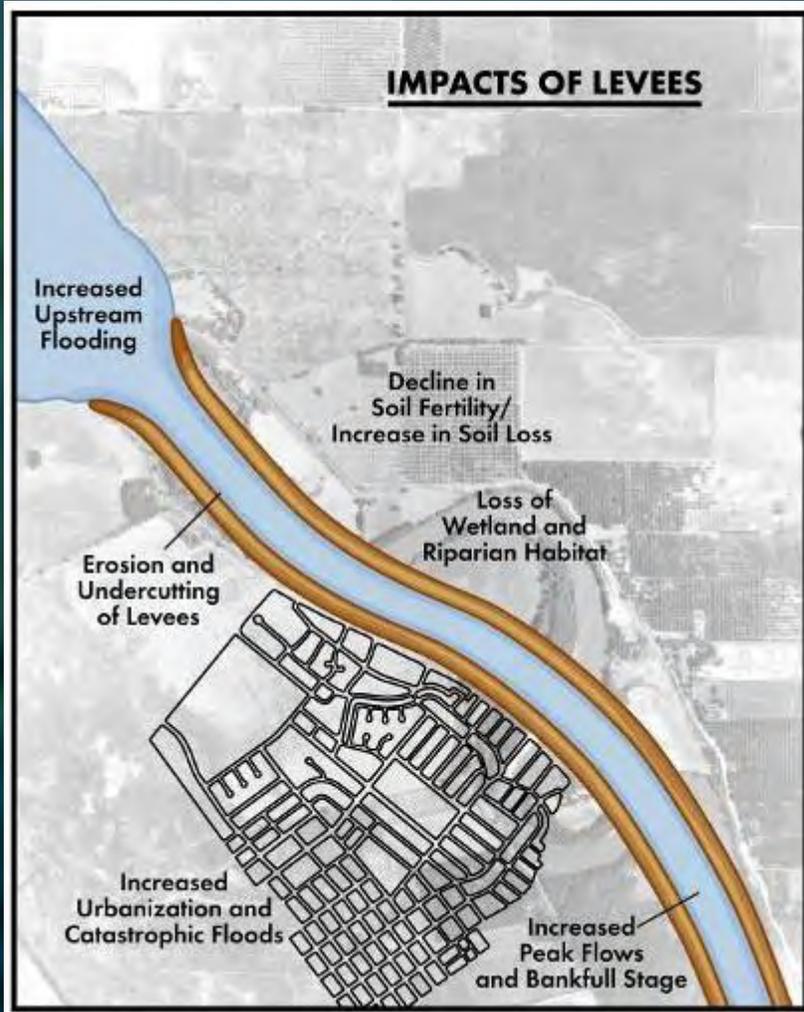


**Reared in
floodplain habi**

Flow Regulation Impacts Species Diversity in both Aquatic and Terrestrial



Floodplain restoration and protection Give the river room provides storage and saves riparian wetlands



Stream Rehabilitation Flood plain lowering



Before



Stream Rehabilitation

After



- **Cost \$2000/LF**
- **Minimized Floodplain**
- **Property Acquisition?**

Kinnickinnic River, Milwaukee Wisconsin Old Version of an "Improved" Channel



Projected Kinnickinnic River Channel Really Improved



Rehabilitating Urban Streams

Old Ideas



New Ideas



Small Project Can Have a Huge Impact... in urban areas

Channel Restoration Improved Fishing and Water Quality



**So you can't tell your Grey Infrastructure
from Your Green Infrastructure**

and

**Your Watershed is Looking a little grey
around the roots**

Tired of Large Regional Detention to Replace Lost Flood Storage That Costs \$60 Million



Rebuilding wetlands got you down because they just never turn out right



Do Not Despair Use: Source Control

**New and Improved for all Stormwater Runoff,
Before, During and after Development
Reduces Flooding, Improves Water Quality,
and Getting rid of that ugly Grey will add years
to your watershed**

Send Away for your Free Catalog Today

**If you act now you will get a free Certified Floodplain Manager of your Very own
Not Available in all states
Operators are standing by**

Every DROPS COUNTS



•Rain
Gardens



•Rain
Barrels

Promote
BMP's...



•Stormwater
Trees



•Downspout
Disconnection



•Green
Roofs

Greenseams Land Purchases Superimposed on Downtown Milwaukee



MMSD
Rain
barrels



More than
10,000
SOLD

LAKE MICHIGAN



INITIATIVE

6,298 Plants Sold for rain Gardens



Rain Gardens



**Drainage =
7,500 sq. ft.**

Before

Rain Gardens



Benefits:

- Slows storm water runoff
- Protects water quality
- Aesthetics

Facility = 574 sq. ft.

After



Stormwater Trees

This needs lots of Explaining Lucy

**Trees hold rain
to reduce
storm water
runoff.**



Green Streets: Sustainable Storm Water Management



Before



After

**Curb extensions instead of new, bigger pipes under street for storm water flows
Green infrastructure can be used when its cost \approx grey infrastructure.**



**Storm water runs off
of public streets in dense
urban area.**

**Green Streets collect
runoff and allow it to
soak in to the ground
as soils and plants
clean the water.**



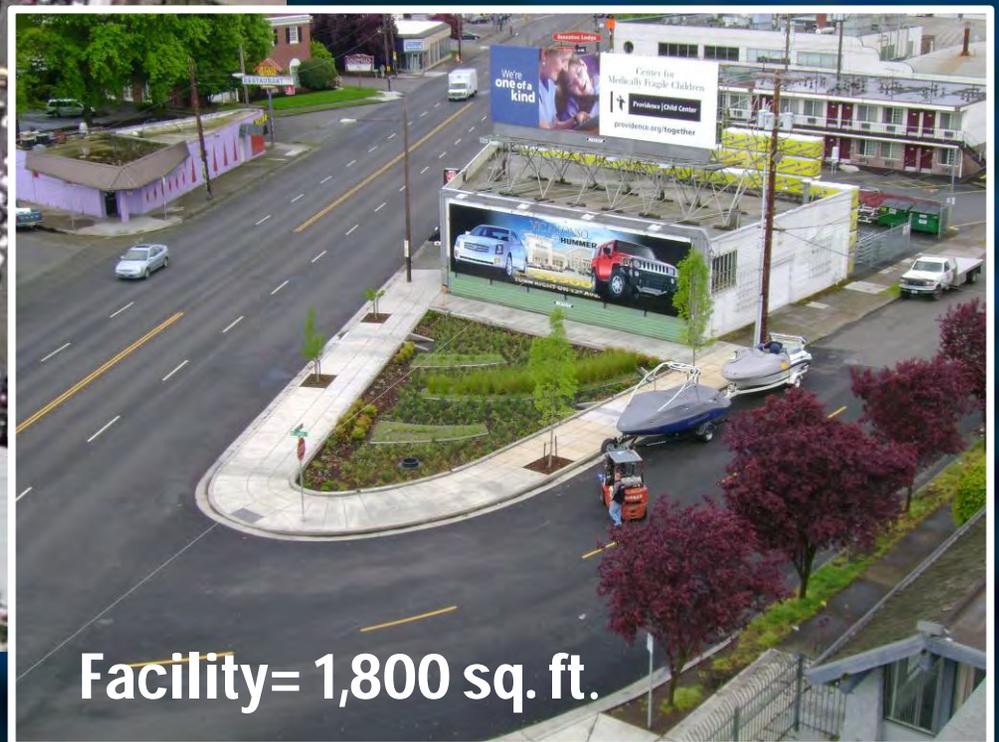
Green Streets Cont.



Every Space Counts

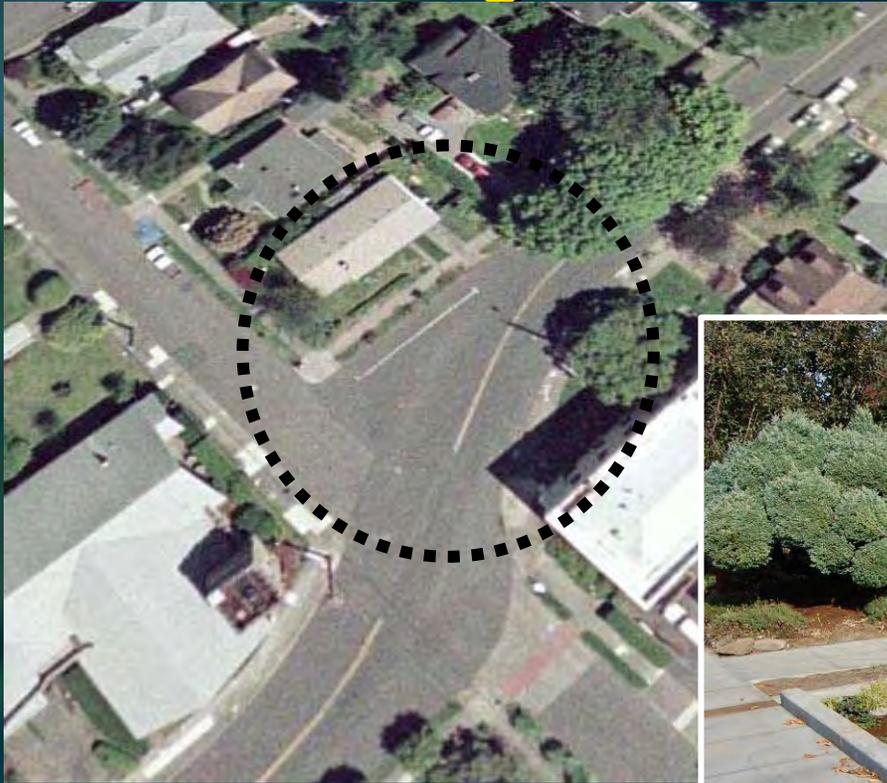


Drainage= 13,700 sq. ft.



Facility= 1,800 sq. ft.

Re-Use for Pedestrian Safety and Storm Water Management



Drainage= 6,850 sq. ft.



Facility= 510 sq. ft.

Street Drainage (Portland Oregon)

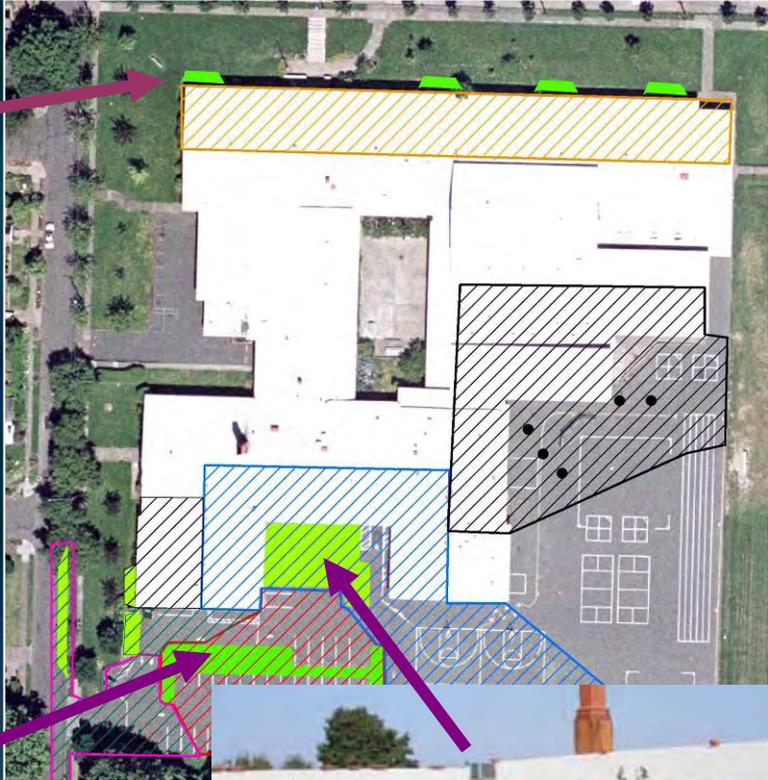


Managing storm water at surface adds beauty and improves rent

Impervious Surface Modification (Includes Roofs)



Downspout Planter 825 sq. ft.



Rain Garden 2,000 sq. ft.



Parking Lot Facility 1425 sq. ft.

Urban Wetland/Raingarden improved Water Quality & Reduced Quantity of Stormwater Runoff



CONCLUSION

Current Approaches Create Future Disasters

If we continue to encourage at-risk development and ignore the impact to others, can we accept the consequences...

... and, are you willing to pay for it?

Remember always keep a canoe handy

