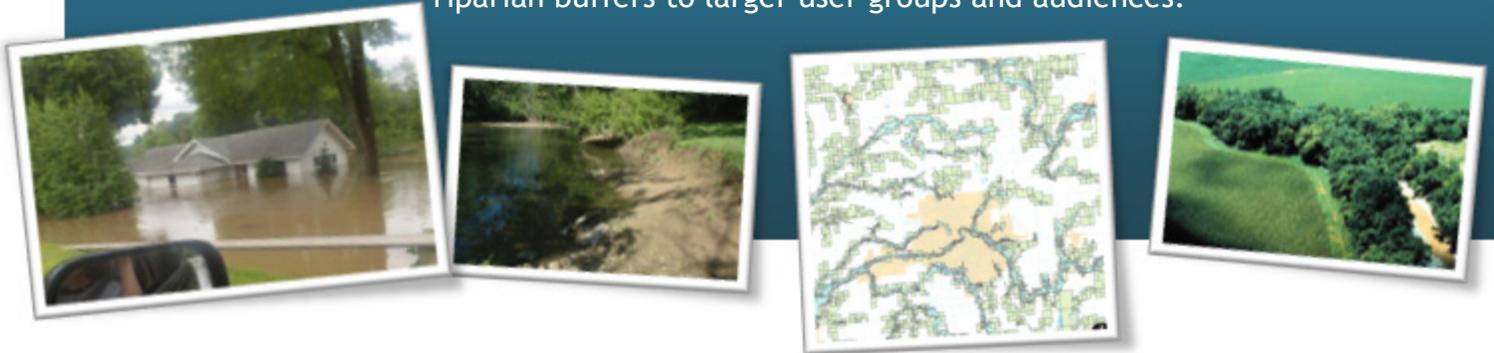
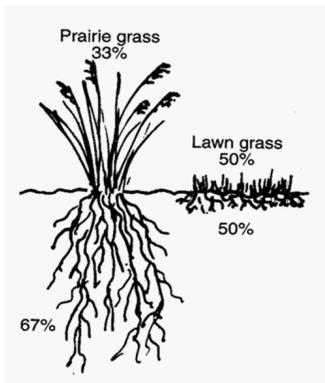


Community Based Strategies

Framing our environmental concerns along side safety issues will help to make the case for riparian buffers to larger user groups and audiences.



Safety is an issue at the core of FEMA's mission and the primary driver behind Indiana's Model Floodplain Ordinance. The ordinance's primary objective is to prevent instability to the flood plain elevation due to new development. Stable floodplains enable better estimates of flood impact and guide preventative action.



However, due to man-made hydromodification, many streams in Indiana are unstable. The result is erosion and inconsistent fluxes in sediment as streams seek a state of dynamic equilibrium. Extreme sedimentation can effect stream dynamics and may lead to augmentation of base flood levels. Vegetation (riparian habitat) can help play a role in bank stability. Root density and cover help armor banks against these dynamic forces.

Commonly, vegetation is seen as an obstacle to water flow - (see roughness coefficient in Mannig's Formula). Hydraulic modeling can predict the degree of impact vegetation removal has on water flow. Depending on the scale of the stream, many times the value of vegetation as a erosion control measure outweighs the cost of increased friction. In any case, it is important to recognize that failing vegetation can cause havoc to drainage if not maintained.

$$V = \frac{k}{n} R_h^{2/3} \cdot S^{1/2}$$

Mannings Formula

http://en.wikipedia.org/wiki/Manning_formula



The DNR's Indiana Drainage Handbook includes guidance on streambank/ riparian maintenance. It outlines a compromise strategy for dealing with vegetation in a way that ensures ease of maintenance, and facilitates riparian stabilization (guiding how and where to remove vegetation). Many communities fail to follow this guidance. Specific stream maintenance 'Best Management Practices' - outlined in the drainage handbook - could be written into the existing FEMA floodplain ordinance or be the basis for the development of new zones.

DNR's Indiana Drainage Handbook

<http://www.in.gov/dnr/water/4892.htm>

State of Indiana Model Ordinance for Flood Hazard Areas



Modify Existing Floodplain Ordinance

www.in.gov/dnr/water/files/IndianaModelOrdinance.pdf

The Indiana Drainage Handbook's guidance on selective vegetation removal can be added into existing ordinances to guide maintenance activities. This language can prevent the unnecessary removal of vegetation and thus the compounding impacts of bank erosion. Think about commonly understood erosion hazards like velocity, fill, grading, and dredging, and note their similarity to sloughing, head cuts, incision, aggregation and degradation. Familiarizing yourself with the Model Ordinance and stream dynamics is an important first step when talking to local officials.

Create New Zoning Modeled after FEMA Sample Ordinance

<http://www.epa.gov/owow/NPS/ordinance/buffers.htm>

The EPA provides guidance and sample language for riparian ordinances for your community. Many of these ordinances are designed to cover all streams in your county (not just streams mapped by FEMA as part of the NFIP program). Linking the additional ordinances to the floodplain ordinance may help draw the connection between vegetation, bank stability, floodplain stability, and human safety.

Change Zoning Incrementally. Focus on most Significant Areas

The zoning reform process, and its demand on the community, can be a challenging process. It often requires many landowner affidavits, public notices, and legal descriptions. Many communities manage hundreds of miles of streams which have thousands of stream parcel owners. The time and cost of zoning reform can deter action.

Communities can overcome this barrier by starting small. Consider developing a study that ranks riparian areas to help prioritize focus. Start with parcels that have a greater urgency for conservation zoning (or repair) and build upon gains achieved as a community.

Remember...

Zoning is only one way to protect riparian habitat. Many incentives exist through state and federal programs that help make it more financially viable to preserve these areas. Conservation easements and private sector conservancy groups are additional options for land owners. Don't limit your efforts to zoning reform only!

