

**SWCS - Science and Policy
Committee: Discussion on
Flooding and Floodplain
Management**

Clark J. Gantzer

1 March 2016

**Science and Policy Committee:
Discussion on Flooding and
Floodplain Management**

Proposals to consider:

1. Viewpoint Articles
 1. Invite Prof. Criss (Washington Univ., St. Louis) to write an feature article.
 2. Solicit a review paper on the state of wetland and floods from the agencies such as the EPA, USACE, USGS, NRCS, and/or National Flood Insurance Program.
2. Develop a SWCS White paper by 2017.
3. Develop a SWCS BOD Resolution on Wetlands and flooding.



History: SWCS Board of Directors. 1992. SWCS adopts wetland policy statement. *Journal of Soil and Water Conservation* 47(6):438-440 (24 years ago)

Given ... the diversity of opinion that exists with respect to wetland protection and restoration efforts. SWCS has adopted the following position:

Position: *Wetlands are valuable and, in many cases, irreplaceable ecosystems.*

The SWCS is committed to the protection of those ecologically and socially important wetlands remaining in North America for the benefit of present and future generations.

Delineation of wetlands

Federal government should not legislate specific wetland delineating criteria, but rather establish a procedure for administering agencies to develop regional delineation guidelines in consultation states/provinces and an independent scientific advisory committee.

Agencies at all levels of government must use equivalent definitions of wetlands for regulatory purposes.



Regulatory programs and their scope

Section 404 of the U.S. Clean Water Act should be amended to make this regulatory program more workable.

Regulations should be restricted in their application to artificial and constructed wetlands.

Mitigation policy

Mitigation through wetland restoration or creation must be an essential component of wetlands management. The U.S. Congress, therefore, should include a statement of mitigation policy in an amendment to the Clean Water Act.



Mitigation policy

Mitigation banking is a useful tool, provided that (a) mitigation banks are used strictly to mitigate unavoidable wetland impacts or losses, (b) impacts are mitigated on-site when possible, (c) banks are located in the same watershed or ecological region as the wetland impacts they mitigate. and (d) banks provide in-kind replacement of wetland functions and values lost.

Nonregulatory approaches

- *Any national wetland protection strategy must involve nonregulatory programs as essential complements to the regulatory program.*
- *Federal government should conduct a thorough assessment to identify key federal programs causing wetland conversion or degradation.*

Nonregulatory approaches

- *States/provinces should identify opportunities to reduce incentives for wetland conversion or degradation.*
- *Local governments should examine their full range of development controls to identify and modify those that promote wetland conversion or degradation.*

Wetland restoration and creation

SWCS supports provisions of the North American Waterfowl Management Plan, the Food Security Act of 1985 and the Food, Agriculture, Conservation and Trade Act of 1990 that encourage and financially support wetland protection efforts



Public education

Educational programs on the values of wetlands and the purposes of regulatory programs can help increase public support for those programs and the ability to predict the outcome of regulatory decisions.

The Fragmentation of Government Role on Wetlands

“While the USGS studies geological and hydrological systems, the U.S. Army Corps of Engineers concentrates on intervention in riverine systems as does the BLM.”

McHarg, Ian L. 1997 Natural factors in planning *Journal of Soil and Water Conservation* 52(1):13-17

The Fragmentation of Government Role on Wetlands

“Regulation mainly reposes in the EPA, but Corps of Engineers are charged with managing wetlands; *the agent which supervised the filling of wetlands is now charged with protecting them!*”

McHarg, Ian L. 1997 Natural factors in planning *Journal of Soil and Water Conservation* 52(1):13-17

The Fragmentation of Government Role on Wetlands

“The **Midwestern floods of 1994** may well have been **enhanced by public actions** - floods as a public gift at great public cost.”

McHarg, Ian L. 1997 Natural factors in planning *Journal of Soil and Water Conservation* 52(1):13-17



**SHARING THE CHALLENGE: FLOODPLAIN
MANAGEMENT INTO THE 21ST CENTURY**

**The Report of the Interagency Floodplain Management
Review Committee June 1994**

The nation has learned floodplain management can reduce vulnerability to damages and create a balance among natural and human uses of floodplains and their related watersheds to meet both social and environmental goals.

*The nation, however, has not taken full advantage of this knowledge. The US simply has **lacked the focus and incentive** to engage itself seriously in floodplain management.*

**SHARING THE CHALLENGE: FLOODPLAIN
MANAGEMENT INTO THE 21ST CENTURY**

**The Report of the Interagency Floodplain Management
Review Committee (IFMRC) June 1994**

The **IFMRC** proposes a way to manage floodplains by *establishing that all levels of government, all businesses and all citizens have a stake in properly managing the floodplain.*



**SHARING THE CHALLENGE: FLOODPLAIN
MANAGEMENT INTO THE 21ST CENTURY**

**The Report of the Interagency Floodplain Management
Review Committee (IFMRC) June 1994**

All of those who support risky behavior, either directly or indirectly, *must share in floodplain management and in the costs of reducing risk.*

The federal government can lead; but state and local governments must manage their own floodplains. Individual citizens must adjust their actions to the risk they face and bear a greater share of the economic costs.

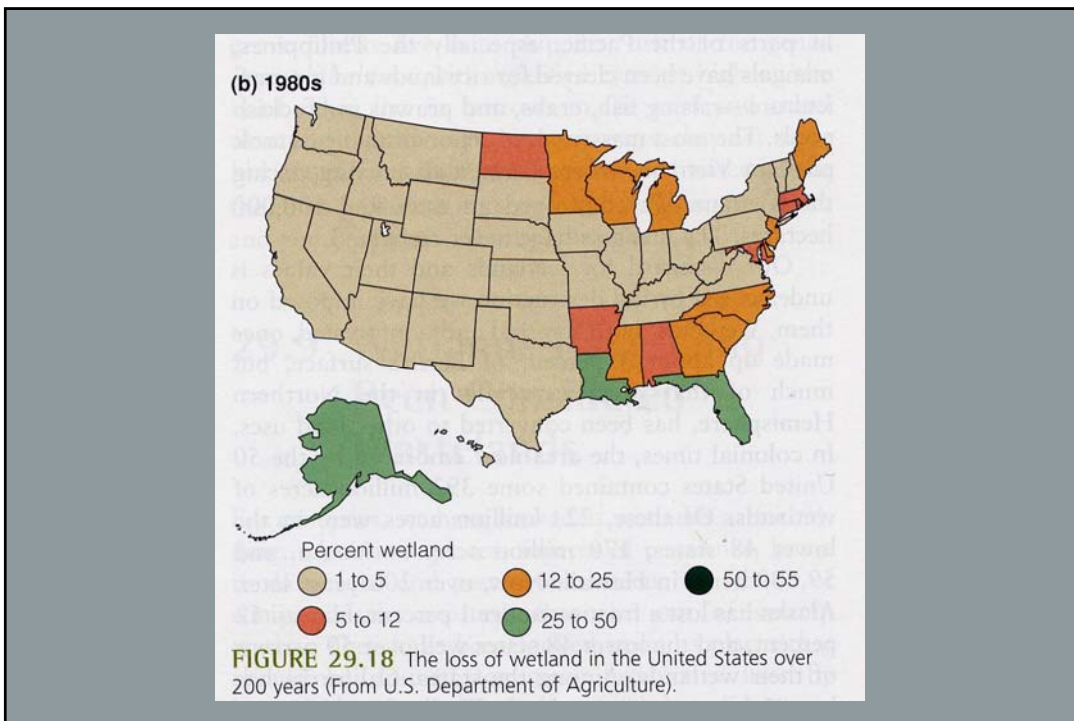
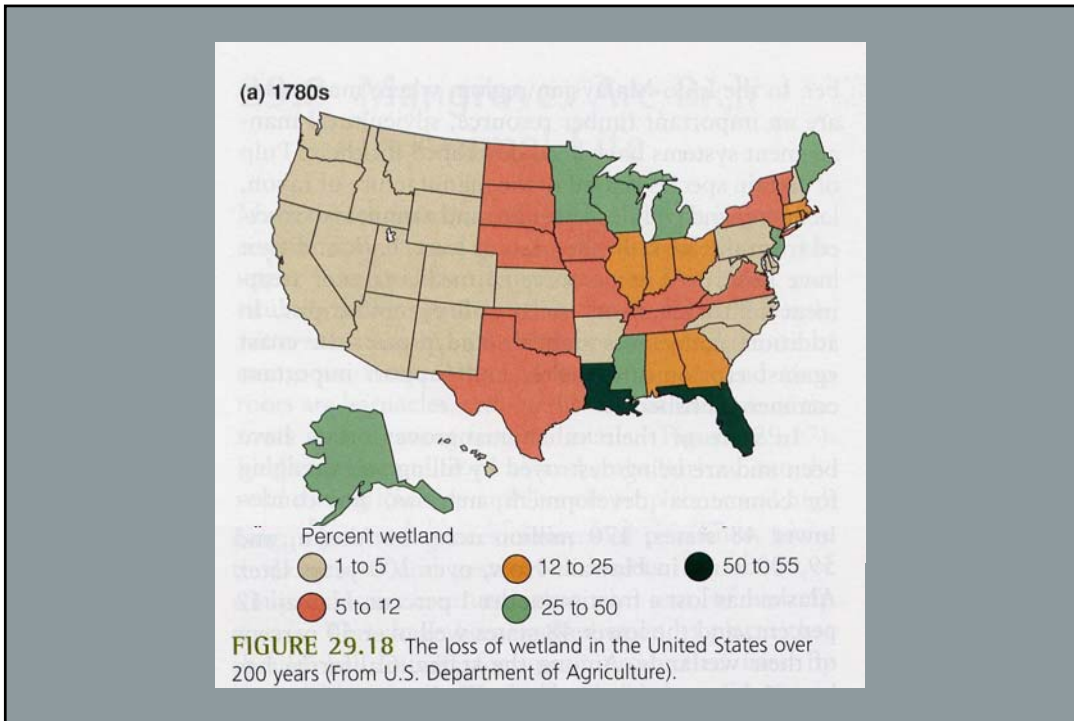
**SHARING THE CHALLENGE: FLOODPLAIN
MANAGEMENT INTO THE 21ST CENTURY**

**The Report of the Interagency Floodplain Management
Review Committee (IFMRC) June 1994**

To ensure a long-term, nationwide approach to floodplain management, the **IFMRC** proposes legislation to develop and fund a *national Floodplain Management Program* with principal responsibility and *accountability at the state level.*

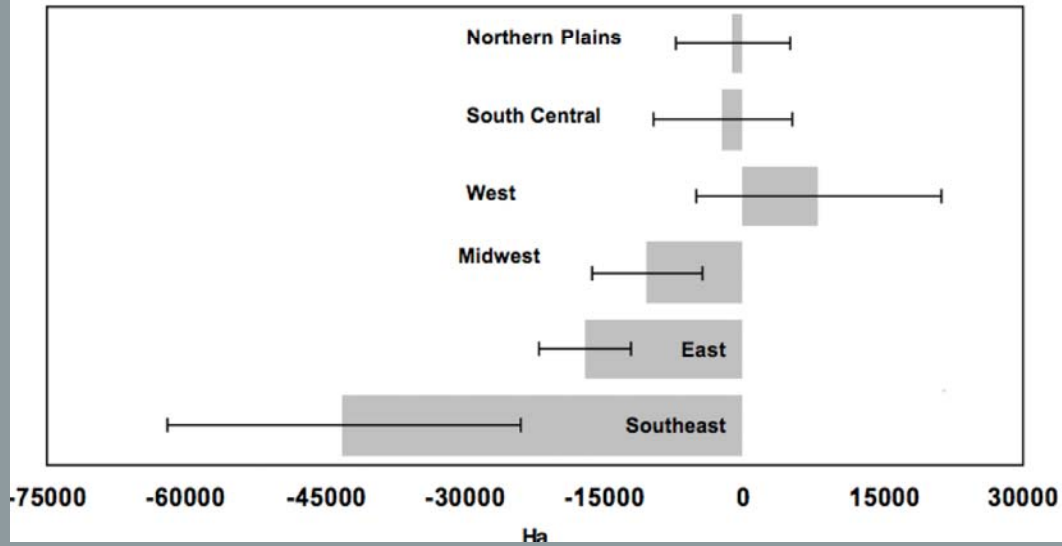
It also proposes *revitalization of the federal Water Resources Council*, limited *restoration of some basin commissions for basin-wide planning*, and issuance of a *Presidential Executive Order requiring federal agencies to follow floodplain management principles in the execution of their programs.*





Natural Resources Conservation Service, USDA

Figure 2. Net change in wetland extent between 1992 and 1997 within NRCS administrative regions*



Natural Resources Conservation Service

Current Status on Watershed rehabilitation program

- Flood control efforts have been ZERO funded
- Not terminated, but loss of staff resources limit efforts.

Flood Insurance Rates Increase On April 1 APRIL 01, 2015

About a million people will see their premiums double. The rate increase is part of an effort to bring down the debt for the program which subsidizes insurance for people living in flood zones.

The National Flood Insurance Program (NFIP) program is up for reauthorization before in Sept. 30, 2017. Congress is expected to address the reauthorization of Biggert-Waters Flood Insurance Reform Act of 2012



In this FEMA map of the Meramec River near Valley Park, Mo., the **light blue** corresponds to the floodplain area that can be expected to be inundated in a 100-year flood. The **green** and **brown** areas together are the river's floodway as it was defined in 1995. The floodway was redrawn and substantially narrowed in 2015 (brown) and the landfill (squared off pyramid) that once encroached on the floodway now lies outside of it. *Credit: Bob Criss*



The Mississippi River came close to overtopping the levee at St. Louis in 1993, during a flood that was well above the 200-year level and in places reached the official 500-year level. Read more at: <http://phys.org/news/2016-02-missouri-manmade-calamity-scientist.html#jCp>

"People want to blame the rain, but this is mostly us," Criss said. "It's a manmade disaster." <http://phys.org/news/2016-02-missouri-manmade-calamity-scientist.html#jCp>

During the New Year's flood, ~7,000 buildings near St. Louis were damaged, two interstate highways were closed for several days, the community of Valley Park was evacuated, and two Metropolitan Sewer District plants were swamped so that sewage was dumped directly into the water.

The flood killed more than 20 people in Missouri and Illinois, caused several hundred million dollars of damage, and left millions of tons of debris in its wake.

River Management and Flooding: The Lesson of December 2015–January 2016, Central USA

ABSTRACT: The winter storm of Dec. 23–29, 2015 delivered heavy rainfall deluging East-Central Missouri. Record high river levels were set at many sites, but **damages were most pronounced in developed floodplain areas, particularly where high levees were built or river channels greatly narrowed.**

Criss, R.E. and M. Luo. 2016. River management and flooding: The lesson of December 2015–January 2016, central USA. *Journal of Earth Science* 27: 117-122.
doi:10.1007/s12583-016-0639-y.

River Management and Flooding: The Lesson of December 2015–January 2016, Central USA

An average of 20 cm of rain that mostly fell in three days impacted the entire 10 300 km² Meramec Basin. Compared to the prior record flood of 1982, the highest relative stage (+1.3 m) on Meramec River occurred at Valley Park proximal to (1) a new levee, (2) a landfill in the floodway, (3) large floodplain construction fills, and (4) tributary creek basins impacted by suburban sprawl. Even though only a small fraction of the 1.8 million km² Mississippi River watershed above St. Louis received extraordinary rainfall during this event, the huge channelized river near and below St. Louis rapidly rose to set the 3rd-highest to the highest stages ever, exhibiting the flashy response typical of a much smaller river.

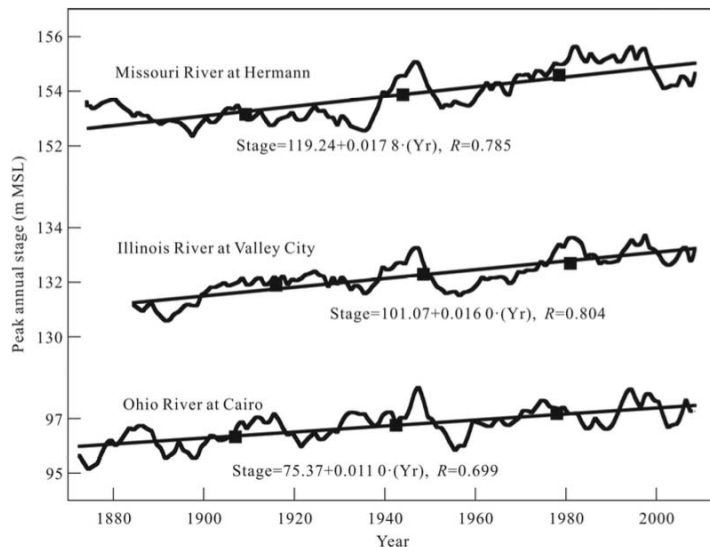


Statistics of evolving populations and their relevance to flood risk

ABSTRACT: Many factors such as climate change and in-channel structures are causing flood levels to rise, so realistic estimation of future flood levels must take such secular changes into account. New equations provide estimates of water levels for “100-year” floods in the USA Midwest that are 0.5 to 2 m higher than official calculations that assume stationarity.

These equations also show that flood levels will continue to rise by several centimeters per year. This rate is nearly ten times faster than the rise of sea level, and thus represents one of the fastest

Criss, R.E. 2016. Statistics of evolving populations and their relevance to flood risk. Journal of Earth Science: 1-7.



Criss, R.E. 2016. Statistics of evolving populations and their relevance to flood risk. Journal of Earth Science: 1-7.

CONCLUSIONS

Historical data on major Midwestern rivers in the USA show that *flood levels are increasing*.

These effects must be incorporated in calculations of expected flood levels to accurately define present day risk.

When applied to historical flood records show that the stages officially estimated for “100-year” flood levels are too low, generally by 1 to 2 m.

Moreover, these levels will continue to rise by several cm/y, a *damaging trend that dwarfs the rate of rise of sea level.*

Criss, R.E. 2016. Statistics of evolving populations and their relevance to flood risk. Journal of Earth Science: 1-7.

Science and Policy Committee: Discussion on Flooding and Floodplain Management

Proposals to consider:

1. Viewpoint Articles
 1. Invite Prof. Criss (Washington Univ., St. Louis) to write an feature article.
 2. Solicit a review paper on the state of wetland and floods from the agencies such as the EPA, USACE, USGS, NRCS, and/or National Flood Insurance Program.
2. Develop a SWCS White paper by 2017.
3. Develop a SWCS BOD Resolution on Wetlands and flooding.



Recent JSWC papers dealing with flooding
published from 1982- 2016.

Eisenhauer, D.E., D.M. Manbeck and T.H. Stork. 1982. Potential for groundwater recharge seepage from flood-retarding reservoirs in south central Nebraska. *Journal of Soil and Water Conservation* 37: 57-60.

Anderson, M.W. 1988. The Little Lost River flood control plan: A case history. *Journal of Soil and Water Conservation* 43: 391-393.

Soil Water Conservation Society. 1992. SWCS adopts wetland policy statement. *Journal of Soil and Water Conservation* 47: 438-440.

Snyder, D. and S.P. Bruner. 1994. The Galloway Report: New floodplain management or business as usual? *Journal of Soil and Water Conservation* 49: 528-534.

Soil Water Conservation Society. 1994. SWCS view: Modified small watershed program can be basis for resource management solutions. *Journal of Soil and Water Conservation* 49: 514-515.

DeLaney, T.A. 1995. Benefits to downstream flood attenuation and water quality as a result of constructed wetlands in agricultural landscapes. *Journal of Soil and Water Conservation* 50: 620-626.

Nelson, L.S. and A. Kalmar. 1995. Building a constituency base for open-space protection in the metro-rural interface: A case study. *Journal of Soil and Water Conservation* 50: 34-38.

Robinson, A. 1995. Small and seasonal does not mean insignificant: Why it's worth standing up for tiny and temporary wetlands. *Journal of Soil and Water Conservation* 50: 586-590.

McHarg, I.L. 1997. Natural factors in planning. *Journal of Soil and Water Conservation* 52: 13-17.

Manale, A. 2000. Flood and water quality management through targeted, temporary restoration of landscape functions: Paying upland farmers to control runoff. *Journal of Soil and Water Conservation* 55: 285-295.

Shultz, S.D. and J.A. Leitch. 2003. The feasibility of restoring previously drained wetlands to reduce flood damage. *Journal of Soil and Water Conservation* 58: 21-29.

Van Liew, M.W., J.D. Garbrecht and J.G. Arnold. 2003. Simulation of the impacts of flood retarding structures on streamflow for a watershed in southwestern Oklahoma under dry, average, and wet climatic conditions. *Journal of Soil and Water Conservation* 58: 340-348.

Manale, A.P., S. Hanson and B. Bolles. 2006. Waffles are not just for breakfast anymore: The economics of mitigating flood risks through temporary water storage on agricultural land in the Red River Basin. *Journal of Soil and Water Conservation* 61: 52A-57A.

DeVuyst, E.A., D.A. Bangsund and F.L. Leistritz. 2009. An economic analysis of the Waffle. *Journal of Soil and Water Conservation* 64: 7-16. doi:10.2489/jswc.64.1.7.

Lowery, B., C. Cox, D. Lemke, P. Nowak, K. Olson and J. Strock. 2009. The 2008 Midwest flooding impact on soil erosion and water quality: Implications for soil erosion control practices. *Journal of Soil and Water Conservation* 64: 166A. doi:10.2489/jswc.64.6.166A.

Nowak, P. 2009. Lessons learned: Conservation, conservationists, and the 2008 flood in the US Midwest. *Journal of Soil and Water Conservation* 64: 172A-174A. doi:10.2489/jswc.64.6.172A.

Kemper, W.D. and C.E. Bongert. 2012. Economics of alternatives for managing intense rainfall on agricultural watersheds. *Journal of Soil and Water Conservation* 67: 11A-16A. doi:10.2489/jswc.67.1.11A.

Olson, K.R. and L.W. Morton. 2013. Impacts of 2011 Len Small levee breach on private and public Illinois lands. *Journal of Soil and Water Conservation* 68: 89A-95A. doi:10.2489/jswc.68.4.89A.

Olson, K.R. and L.W. Morton. 2014. The 2011 Ohio River flooding of the Cache River Valley in southern Illinois. *Journal of Soil and Water Conservation* 69: 5A-10A. doi:10.2489/jswc.69.1.5A.

