

Moving to higher ground: Ecosystems, Economics and Equity in the floodplain

Introduction

Olive Branch is an unincorporated community in southern Illinois located in a Mississippi River floodplain. Despite the Mississippi's system of levees, meant to confine the river so it can be used for transportation and to reduce flooding on agricultural and urban regions, major floods in 1993 and 2011 caused extensive, costly damage. These events have had devastating effects on the town of Olive Branch. Over 150 homes and businesses were severely damaged, many demolished. Two years later, the community has yet to recover.

While the levee system keeps floodwaters from inundating the floodplain and allows for farming and urban development on the land bordering the river, man-made alterations to the lower Mississippi create an earthen barrier that severs the river from its floodplain. Floodplain connectivity is important to a healthy river system. Rivers' natural, periodic flooding provides habitat for fish and wildlife, enhances water quality by filtering run-off before it enters the waterway, and actually reduces flooding by storing overflow waters and maintaining the river structure. Additionally, floodplains provide open space natural land uses that include recreational opportunities such as hunting and fishing. Management activities not only affect people living and working in the floodplain, but also have political and economic impacts that extend beyond the floodplain. Diverse interests, such as those of conservation scientists, agricultural producers, or state taxpayers, all have different stakes in how the community of Olive Branch recovers from severe flood damages of 2011 and addresses future flood events.

The Issue

The town is still reeling from the 2011 flood. A slow exodus of some residents has occurred, but many of the remaining citizens have close ties to the area and would love to see Olive Branch make a comeback. The town has been able to secure funding for a buyout of the properties on the floodplain to help the displaced move to higher ground. However, for the buyout to be implemented, the State of Illinois has to provide 25% cost share funds and the benefits have to outweigh the costs. In practice, this means that more than two-thirds of local residents must agree to the buyout, actually sell their property and rebuild in a new chosen location close to town but outside the floodplain. So now a decision must be made about the future of the community. There are three alternative plans on the table, each with pros and cons. They are:

1. ***Do nothing option.*** Do not relocate the town. Residents can decide on their own whether to rebuild their houses on site, move their houses to higher ground or relocate somewhere else. If this is the chosen option, the buyout money will not be usable, though some residents may be able to obtain individual funding to repair their properties. Note that buyout funds are Federal; individual funding for repairs would have to come from the state or the county.
2. ***Restoration option.*** Relocate the town to higher ground and implement a restoration project that would have both conservation and recreational benefits. Biodiversity and habitat quality of floodplain forests, wetlands, and Horseshoe Lake would be enhanced, and recreational opportunities would be improved. Specifically, since habitat for waterfowl has decreased, this option would reclaim agricultural land in the area for

waterfowl habitat. Funding from the buyout would have to be supplemented with restoration funding from state and county sources, and/or private and non profit organizations (such as Ducks Unlimited), to buy land from farmers.

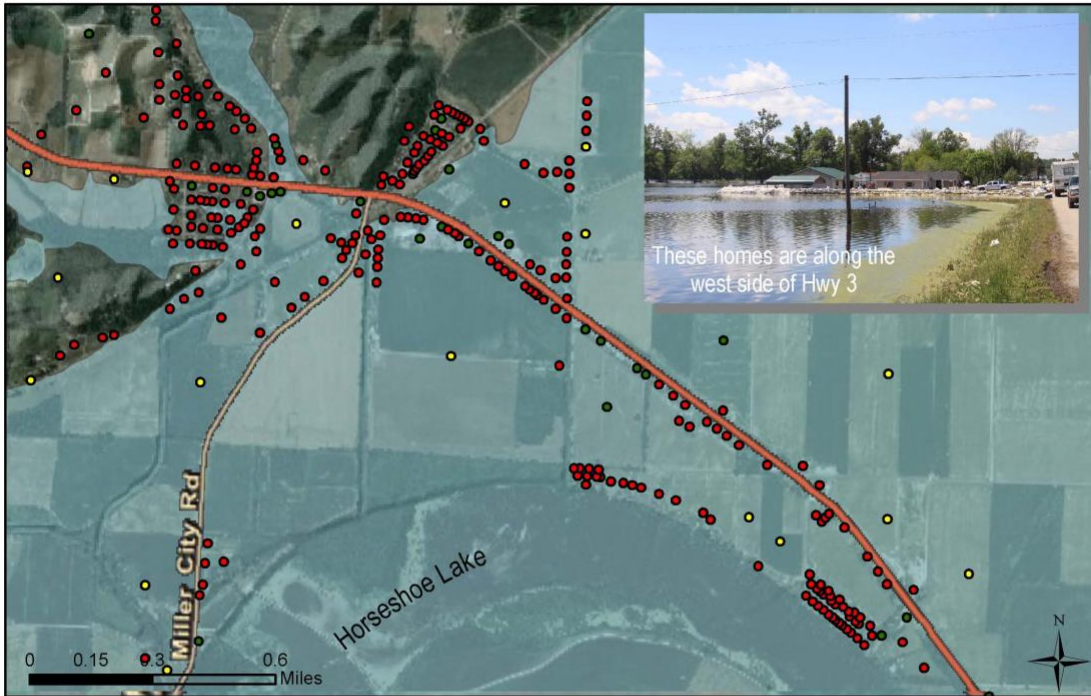
3. ***Agricultural enhancement option.*** Relocate the town to higher ground without restoring habitat. However, because properties are bought back, and there are either no residents or very few residents left on the floodplain, there will be more land available for agricultural activities on the floodplain. Money from the buyout program would not need to be supplemented with other funds.



Photos from the 2011 flood. Images courtesy of Beth Ellison, Southern Illinois University

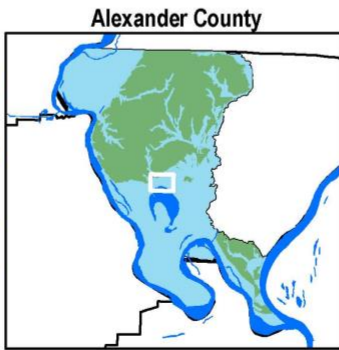
Flooding in Olive Branch, Illinois

Located on the floodplain of the Mississippi River, Olive Branch is susceptible to flooding. Heavy rainfall in April and early May, in conjunction with two levee breaches contributed to devastating flooding in Olive Branch.



The Olive Branch Area

- 100 Year Floodplain
- Structures**
- Residential
- Farm
- Commercial



Flooding Facts

- * Flooding was exacerbated by levee breaches in Alexander County on May 2
- * Highway 3 was impassable through Alexander County for several days
- * Approximately 200 buildings inundated by flooding
- * Average water depth in many buildings was 2-3 feet
- * Most homeowners do not have flood insurance which will cause financial hardship



Created by Southern Illinois University - Carbondale on 5/26/2011. Any questions contact beth.ellison@siu.edu.

Images courtesy of Beth Ellison, Southern Illinois University

The Stakeholders

You will receive a position statement for one of the following four stakeholders:

- Conservation biologists
- Hunter/recreationalists
- Farmers
- Local residents/ property owners

Your goal in this activity will be to put yourself in your assigned character's shoes as best you can, even if your *character's interests may not align with* your own personal viewpoint.

Overview of Assignment

Your ultimate goal is to work in a “consensus building team” to write a 500-700 word letter to State Senator Terry Lawson, who is from Chicago and chairs the committee that needs to approve the 25% cost share. This letter should include four main components: (1) a clear, thorough explanation of the issue, including the environmental, societal, economic, and other aspects; (2) a recommendation for which of the three options above is best, (3) a delineation of the benefits, drawbacks, and other tradeoffs that would be made if the option is adopted, and (4) an outline of the types of information or data that will need to be monitored to ensure the plan's success. Further details are provided in Part III below.

Part I

Your instructor will assign you to one of the four stakeholder groups listed above. Take a few minutes to read your stakeholder's position statement and then gather together with other students representing your assigned stakeholder (this is the “stakeholder group,” not the “consensus building team,” which will form later). Also take a few minutes to review the key issue at hand and the three options being considered. In your stakeholder group discuss the following:

- 1) Given your background and values, which of the three options would be best for you and why?
- 2) What tradeoffs would you have to make if the other two scenarios were adopted instead (in other words, what are the pros and cons of each scenario)?
- 3) Rate your willingness to make each of these tradeoffs. Make sure you know what you want but are also prepared to negotiate with other stakeholders.

Part II

Next, your instructor will assign you to a “consensus building team” comprised of one representative from each of the four stakeholder groups. In your team complete the following:

- 1) Allow each representative 1-2 minutes to introduce themselves – give your name and background information.
- 2) Next, allow each representative 4-5 minutes to explain which option they support and why.

- 3) Try to decide upon the option that your group thinks will best meet everyone's needs and desires. Of course, there will be benefits and drawbacks to whichever option you agree upon. Compile a list of these major benefits and drawbacks, as these will help you write your letter.

Part III

As a group, your consensus building team should now write a letter to State Senator Terry Lawson. Your letter must include the following components:

- 1) *Explanation of the environmental, societal, and economic aspects of the issue.* Assume that your audience – the senator – is completely unaware of Olive Branch's dilemma. In your own words (i.e., without quoting the introduction to this exercise), describe the situation that Olive Branch is facing. Be sure to convey to the senator how this is not merely an environmental restoration issue, but a community problem that has local economic and societal ramifications.
- 2) *Recommendation for the best option.* Clearly state the option that your team thinks is best.
- 3) *Benefits and drawbacks of this option.* Why is this the best option? Show the senator that you are thoughtful citizens who have considered multiple perspectives on the issue. Lay out the benefits and drawbacks.
- 4) *How to proceed.* Think of the types of information or data that will need to be monitored to ensure the plan's success. Even if your team argues that the town should not be moved, are there any economic, environmental, or other types of indicators that should be tracked to ensure that the community is prospering?

Part IV

Select a representative from your team to read aloud your letter to the class. Listen as other teams read their letters. Did other teams make different decisions? How did their rationale compare to yours? Your instructor will moderate a class discussion.

Part V

Debrief, led by your instructor.

Dr. Chris Grady, conservation biologist

Position Statement

You, Dr. Chris Grady, are a conservation biologist at a local university who has been studying wetlands and floodplain habitats in the Mississippi River basin and other large river systems for 20 years. You understand the ties that many local residents have to their neighborhoods and town, but you think that it would be best for the town to relocate out of the floodplain. You recognize that catastrophic floods are inevitable in this region and you know that data suggest flood frequency is increasing in the United States (Figure 1¹), including the Upper Mississippi River. Furthermore, even though the region has experienced drought in recent years (e.g., 2012) the frequency of large floods has increased with climate change and this trend is expected to continue². You studied both major floods affecting Olive Branch – 1993 and 2011 – as well as a few smaller floods, and you know that while some residents do not wish to experience such disasters again, others are willing to risk it because of close ties to their homes and community.

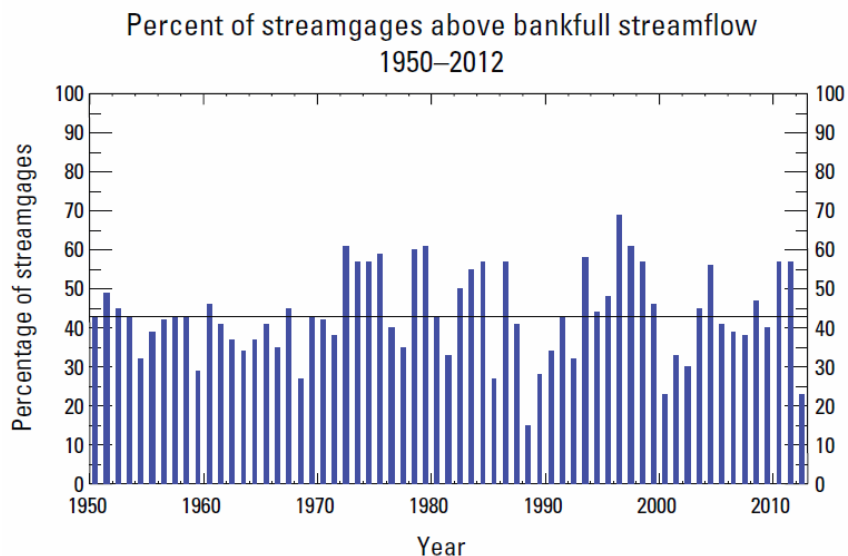


Figure 1. Bankfull streamflow is defined as the highest daily mean streamflow value expected to occur once every 2.3 years. Data are from streams in the U.S. Geological Survey’s National Streamflow Information Program (Obtained from Jian et al.¹).

Based on your expertise, you believe that after the town moves, the best course of action will be to return the land its original, natural floodplain functions because restoring wetlands, Horseshoe Lake, and other floodplain habitat will benefit the region in multiple ways in the long term. First, wetlands act as a “sponge” and attenuate flood waters, even during large floods. Second, wetlands can function as a “filter” by removing sediment, chemicals, and nutrients from much of the agricultural and residential runoff from the watershed, which improves water quality in the river and Horseshoe Lake. Third, wetlands provide critical habitat to fish, bald eagles, waterfowl, turtles, cypress trees, and other desirable species. The land around Olive Branch is of particular value because it is home to 41 State-endangered species and five Federal endangered

¹ Jian, Xiaodong, Wolock, D.M., Lins, H.F., and Brady, Steve, 2013, Streamflow of 2012—Water Year Summary: U.S. Geological Survey Fact Sheet 2013–3026, 8 p., <http://pubs.usgs.gov/fs/2013/3026>.

² Milly, P.C.D., Wetherald, R.T., Dunne, K.A., and Delworth, T.L.. 2002. Increasing risk of great floods in a changing climate. *Nature*. 415: 514-517.

species³. Finally, all of these functions contribute to cultural and recreational ecosystem services, such as fishing, hunting, boating, and bird watching. Previously, many of these recreational activities formed a key component of the local and regional economy. However, you also have a potentially controversial opinion that a moratorium may need to be placed on some of these recreational activities, as habitat restoration will take up to a decade to complete. Additionally, the initial costs of restoration may be quite substantial given that soils, vegetation, and hydrology all must be restored for the floodplain wetlands to function as sponges, filters, and quality habitats. These costs would be supported in part by federal grants, but local tax increases would also be needed. But based on data and results from similar restoration projects, you are confident that investing the time, money, and effort into floodplain restoration at Olive Branch will pay off in the long run.

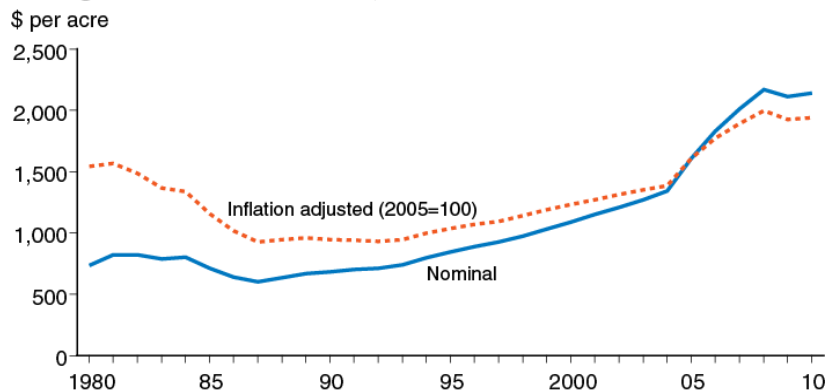
³Illinois Department of Natural Resources. 2013. Illinois Threatened and Endangered Species by County. Illinois Natural Heritage Database. URL: http://www.dnr.illinois.gov/ESPB/Documents/ET_by_County.pdf; U.S. Fish and Wildlife Service. 2013. Illinois County Distribution Federally Endangered, Threatened, and Candidate Species. URL: <http://www.fws.gov/midwest/endangered/lists/illinois-cty.html>.

Jesse Wilson, farmer
Position statement

Your name is Jesse Wilson and you are a farmer in Southern Illinois. Your wife is a kindergarten teacher in the town of Anna where you both live with your toddler son, JJ, but most of your fields are down by Olive Branch. Your dad is part retired and lives in town as well, but he helps you farm. You grow mostly beans and corn, and you own 200 acres and rent 150. Your family has farmed in Olive Branch for over a hundred years, and your grandparents used to live in town, in the old part of town, up the hill, which is out of the floodplain. You are really against this habitat restoration project, because you think it's just a fancy way to rob farmers of their livelihood and to increase your taxes.

You are very proud to own your own land – your dad worked really hard and planned extensively to make sure it could be passed on to you – and you want to keep farming. You do not see why these ecology people want to come to your town and tell you and your family how to live and what to do on your private property. You know that American farmers feed the world, and wonder how this country is going to keep doing that if they keep taking away people's land. In the last 10 years or so, while farming has become more profitable thanks to higher crop prices, it has also become a much more expensive activity – the price of machinery, fuel, seed and fertilizers has increased. The cost of agricultural land has also gone up, which makes it really hard to expand your operation, and makes it hard for young farmers in general (Fig 1).

Average farm real estate values, 1980-2010



Source: USDA, National Agricultural Statistics Service.

Fig. 1 – Average farm real estate value, 1980-2010.

Source: Nickerson et al. 2012⁴.

You also know that the average age of the US farmer is increasing (Fig.2), and you are worried about what is going to happen to agriculture in this country. At a local level, you are concerned that even if they let you keep your fields, if they buy land around them you may have trouble getting in and out, and that the US Department of Agriculture office nearby in Tamms may close.

⁴ Nickerson, C., M. Morehart, T. Kuethe, J. Beckman, J. Ifft, and R. Williams. 2012. Trends in U.S. Farmland Values and Ownership. U.S. Department of Agriculture Economic Research Service Economic Information Bulletin No. (EIB-92) 55 pp. URL: <http://www.ers.usda.gov/publications/eib-economic-information-bulletin/eib92.aspx#.UgvgLm1wMaM>

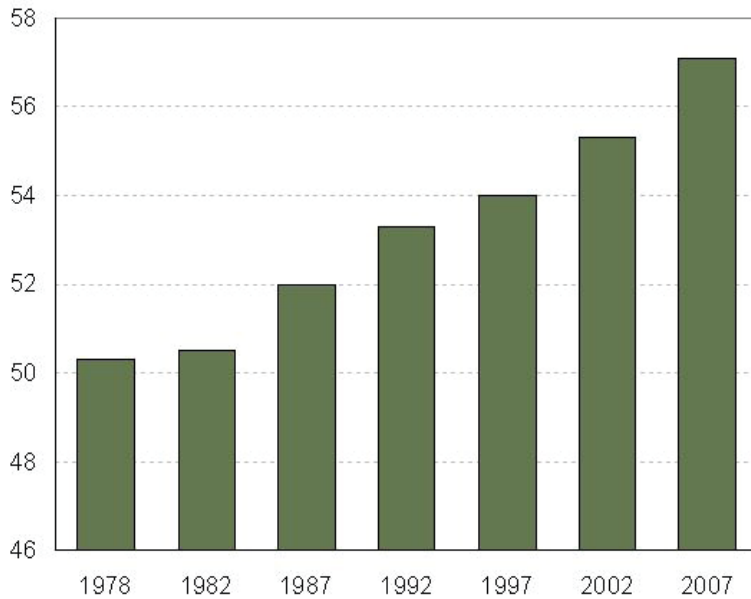


Fig. 2 – Average age of farm principal operators 1978-2007.
 Source: USDA NASS 2007⁵.

You personally do not hunt, but you have nothing against hunters, in fact, you have good buddies who hunt and you look forward to Thanksgiving, when your brother in law brings smoked duck he's hunted himself. However, you know that there is a lot of land in Southern Illinois already in parks, national forest and nature preserves. You think that there is plenty of non productive land around here already, and what we should do is cut down some trees, not plant more grass.

⁵ U.S. Department of Agriculture National Agricultural Statistical Service. 2007. 2007 Census of Agriculture Demographic Overview. URL: http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Fact_Sheets/Demographics/demographics.pdf

Bill Jackson, hunter/recreationalist
Position statement

You are Bill Jackson, a 6th grade teacher in Carbondale, Illinois, and an avid recreational hunter. Your wife, Ella, is a financial planner who works from home 2 days per week and commutes to Marion, Illinois the other three days. You and Ella have four children. The 3 youngest boys attend the same elementary school in Carbondale where you teach. The oldest, named Kiley, is a freshman at the local high school. You and she have been waterfowl hunting together for several years now and it has become both of your favorite weekend activities. Your oldest son, Reed, is 11 now and is starting to come along on goose hunting day trips. Your family lives right outside town in an old farmhouse on 20 acres of land. The Jacksons are known for hosting barbeques and for being active in the community church. From April to November, your family goes fishing, hunting, and camping as often as possible in the numerous natural areas within the Shawnee National Forest right in Southern Illinois.



Fig 1- Habitat for ducks and geese on a restored wetland in Van Buren County, Iowa.
Source: Photo by Lynn Betts, USDA Natural Resources Conservation Service

Recent flooding of the Mississippi River in 2011 devastated the community of Olive Branch in Alexander County, Illinois. With the town considering a community-scale move to higher ground, you are very interested in how this situation will play out. You and Ella are eager to see what the community residents decide to do after Congress decides whether or not to fund the buyouts of property owners in the floodplain. One of the possible ideas is to change the land area in the floodplain where the town currently exists to a natural wetland where ducks and other birds will congregate, providing a new space for hunting. As you and your family are residents of Jackson County, Illinois, your tax dollars will be used to carry out the community move and possible wetland rehabilitation. You are interested to know what kind of habitat will be created there and what kinds of recreational activities may be available. While it is a large financial investment, there are many potential benefits to the creation of a restored wetland in the floodplain. As an outdoorsman, you understand how reconnected floodplains provide critical

habitat for some species of migratory birds and enhance the health of river systems where folks fish and recreate. You support the Olive Branch relocation and are hopeful that a restoration project in its place will attract waterfowl and other wildlife so that you and your kids can share hunting and fishing trips to the new recreation area.

Reese Johnson, local resident/property owner
Position statement

You, Reese Johnson, are one of 300 families in Olive Branch. You are a 36-year-old single parent. You work as a checker and assistant manager at the local grocer. You have been employed full-time by the grocer for 10+ years, but due to recent employee cutbacks, you are exhausted from making up the work of others. Sadly, your partner died from lung cancer three years ago and you are raising two teenagers, a 15-year-old daughter and a 17-year-old son, on a meager budget. Fortunately, as they grow older they have been able to make small financial contributions to the household. For example, your daughter babysits for a neighbor after school and your son works during the farming high season. But this monetary assistance is minor and your household income remains under the poverty threshold of \$19,500.

Your family has deep ties to the town and region. Your paternal line has lived in Olive Branch for 3 generations and in Illinois for 5; your oldest known relative immigrated from Germany in 1852. The home you grew up in has been passed down through multiple generations, from your grandfather, to your father, to you. You and your little brothers were all born in the house and your husband proposed to you on the front porch. You have memories of your children in the backyard picking berries in the summer and building snow forts in the winter. Further, you know firsthand that Olive Branch is a great place to raise a family. It is a safe and quiet town where you know your neighbors. You do not fret when your son comes in late and forgets to lock the front door and you never worried about your kids playing in the front yard. In other words, Olive Branch is your home and your heart.

But there is much that worries you. As a native resident of Olive Branch, you remember the major floods - 1993 and 2011 - and can easily recall the extensive damage to your home. But each time, you and your neighbors come together to rebuild. As a community you support one another and begin again. Therefore you believe a suggestion to move the town and all its inhabitants is both unnecessary and ludicrous. Professionally, you do not want a longer commute each day to the grocer. And personally, you are nervous about how the move would disrupt your neighborhood dynamics, and you do not want your kids to have to transition to a new school.

And you are angry. The poor perception of the town is part of a larger trend. Neither Congress nor people outside of Olive Branch value your community. This is just another example of America killing off rural communities, one town at a time. You represent rural America, yet the population that shares your way of life is shrinking. You have lost friends and family to the suburbs and big city. People leave this town and others like it for exhausting jobs or pretentious schools. They choose to give up the quiet roads, the star-filled night sky, and the sense of community. But you know the value of rural America. In fact, you know your town is worth investing in. The people of Olive Branch cherish hard work, strong families and clean air. The town has their own way of life. Olive Branch's people, traditions and geography should be saved.

Your priority in regards to flood management is simply what is best for your children and your community. You urge political officials to invest in Olive Branch and keep the town intact. Neither you nor your neighbors will accept buyout funds. Instead, you advocate for an investment from state-wide taxpayers and federal grants, in order to prepare the town for future floods and possible response to a future disaster.

Here are some pictures of your community in the recent flood:



Above your son helps your brother-in-law with the boat.



Above is the main road leading into town.