

LIVING WITH CLIMATE CHANGE

http://www.stltoday.com/business/local/st-louis-s-forecast-calls-for-rain-and-rising-rivers/article_83154fee-8a0e-5dfc-8598-89abc50b46a6.html

St. Louis Post-Dispatch
By Jacob Barker

July 6, 2015

ST. LOUIS • A year before barge traffic slowed and navigation became uncertain on a drought-starved Mississippi River, the mighty waterway was bursting at the seams.

That was 2011, when the U.S. Army Corps of Engineers had to [blow the Birds Point Levee](#) in southeastern Missouri and flood thousands of acres of fertile farmland in order to save the Illinois town of Cairo.

Floods returned in 2013, the year after the drought. Last year and this spring, a high river threatened again.

The Mississippi has always been wild: Just a few inches of rainfall can turn the river from an economic engine into a destructive force. But the flooding of recent years, coupled with the lingering memory of that brutally dry summer of 2012, has some people worried that, this time, it's different.

"These are usually supposed to happen every 25 to 30 years," Derek Hoeferlin, an assistant architecture professor at Washington University who studies river communities, said of the recent extreme weather. "But they're happening back to back to back."

The St. Louis region will be spared coastal cities' conundrum of managing rising sea levels. But it does face another unknown: How will the Mississippi, Missouri and Illinois rivers be affected by a changing climate?

"There's just a sense it's not present here like it is on the coasts," John Hoal, a Washington University urban design professor, said at a [climate adaptation conference](#) in St. Louis in May.

Hoal is working on [a climate change river plan](#) with Hoeferlin, and their research warns that flood levels could increase several feet by mid-century — an addition that could have made [the flood of 1993](#) inundate parts of the city of St. Louis.

The two researchers argue it's time to rethink the region's river policy and recognize the major challenges the region faces in the decades — or years — ahead.

"The system that we have out there today has been designed on a set of criteria that I would argue is no longer valid for the long term," Hoal said. "This is not going to be solved community by community along the river."

A WETTER FUTURE?

Driving the sense of urgency is the increasing number of forecasts that show long-term changes in Midwestern weather patterns. Many climate predictions say [the overall amount of rain](#) here is projected to increase, which could exacerbate river flooding issues that some scientists say have already been getting worse due to other factors.

“You can find models that will dry (the Midwest) in the future and models that say it gets wetter,” said Ken Kunkel, a climate scientist with the National Oceanic and Atmospheric Administration and North Carolina State University. “Most models say it gets wetter.”

Even more definitive than an overall uptick in rain is the expectation that when storms come, they’ll dump more rain at once. The storms in June made the month the second-rainiest ever recorded in Missouri.

“There’s pretty good consensus that rainfall amounts on the heavier storms are likely to become larger,” Kunkel said. “As we get warmer, the amount of water vapor in the atmosphere will almost surely increase.”

Many of those systems carrying that water vapor will move through the Midwest. In St. Louis, a paper written by John Posey, the research director of the East-West Gateway Council of Governments, estimated average annual rainfall here could increase somewhere between 4 percent and 5.1 percent by the 2041-2070 period. He estimated days with at least one inch of rain would increase by roughly one per year, to an average of between 6.1 and 7.1 days annually.

“It really suggests an increase in riverine flooding risk by mid-century,” Posey said at the adaptation conference.

While it’s “pretty clear” that the Midwest is seeing more intense rainstorms, climate change is only one of the variables that the U.S. Army Corps of Engineers has to take into account to manage the river, said Dave Busse, the Corps’ chief of engineering and construction. The Corps always had to contend with changing land use, and its engineers already design projects to handle existing and predicted extremes.

“There’s plenty of time for the infrastructure in the St. Louis region to adapt to any impact we might have from climate change,” Busse said.

But some say the Corps is already underestimating flood levels that are bound to get worse.

Climate change is having a “real and demonstrable effect” on river flooding now, said [Nicholas Pinter](#), a geology professor at Southern Illinois University-Carbondale who studies the rivers and flooding models.

So far, climate change has only been raising river flooding levels by inches. The past and continued building of levees and river navigation structures have a far larger effect on the increased flood levels in recent years, Pinter said.

“It certainly exacerbates all other existing issues related to flooding,” Pinter said. “Add into that intense pressure for new and bigger levees on the upper Mississippi, add into that climate change, and flooding will be an even greater concern than it already is.”

Last week, [a new study from Washington University](#) geology professor Bob Criss said 100-year floods, which officially have a 1 percent annual chance of occurring, were getting higher.

“The official calculations for the ‘100-year’ flood level at St. Louis are about 5.5 feet too low, primarily because they neglect both the tendency for the flood levels to increase over time and the increased volatility we’re seeing with extreme weather swings,” Criss said in a news release announcing the study.

STARTING THE CONVERSATION

Two years ago, Hoeferlin and Hoal, the two Washington university architecture professors, and Dale Morris, a senior economist for The Royal Netherlands Embassy, brought some of the world’s best flood management experts to St. Louis.

That is, they invited the Dutch.

“The Dutch are the gold standard on water management,” Hoeferlin said, explaining that much of their country is below sea level and vulnerable to flooding.

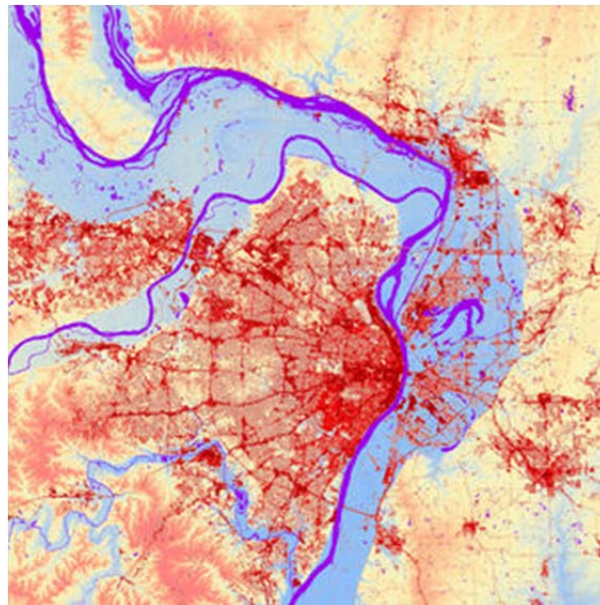


Image courtesy of Washington University and Royal Netherlands Embassy

A map of the St. Louis region shows floodplain, in blue, and developed land, in red.

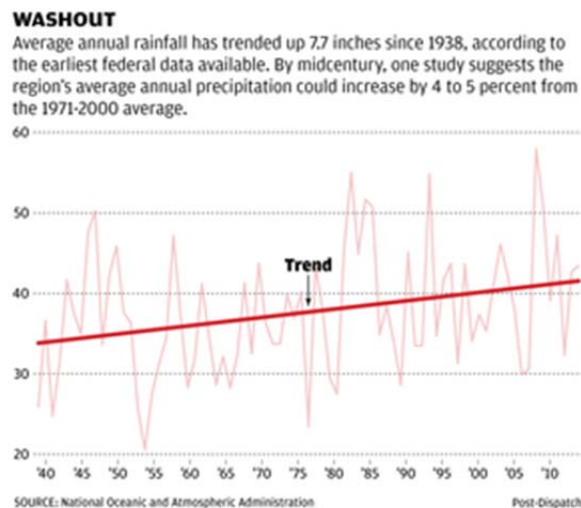
The group sketched out a look at the future of river management in St. Louis. By mid-century, they argue that job will be much harder.

“When you add the climate change projections, a 100-year flood becomes a 40-year flood,” Hoeflerlin said.

His group sketched some long-term solutions for three of the area’s most vulnerable areas: the American Bottoms in Metro East, the Chesterfield Valley and the portion of St. Charles County that sits between the Missouri and the Mississippi rivers.

They pitch a range of ideas — from more floodplain in Chesterfield to stronger levees along the Missouri River. In Metro East, one of their ideas even involves a relief bypass for the Mississippi River, a massive construction project that might seem far-fetched.

But Hoeflerlin, who along with Hoal helped New Orleans develop water management strategies post-Katrina, argues that something has to change or large areas risk inundation. “I don’t think the status quo is going to work,” Hoeflerlin said.



At the very least, the region should build some redundancy beyond its initial flood defenses, he argues. “If that one big levee fails, what’s after that? What’s the redundancy?”

Hoal emphasized that the group’s work should be seen as an effort to “start the conversation” in the St. Louis region. He also wants to make sure it’s seen as more than just a floodplain management plan that prescribes where to build and how big to construct levees. Because it will take years and millions of dollars to revamp the region’s connections to the waterway, Hoal hopes the community uses the projects to solve more than one issue.

“We should be expending those funds not to solve a one-dimensional problem, but ultimately to improve our economy and communities.”

A TALE OF TWO FLOODPLAINS

If all the region’s infrastructure and population were on high ground, like the city of St. Louis, there wouldn’t be as much to worry about.

But that's not how the metro area developed. Metro East's factories and neighborhoods developed decades to a century ago, before people fully realized the long-term risk of the low-lying spot.

Some areas — such as Chesterfield post-1993 — were developed more recently. Future development in flood-prone areas should be given even more scrutiny, some caution.

“We should be protecting property and lives,” Pinter said. “As soon as you're talking about ‘field of dream’ levees — ‘build it and they will come’ — that becomes pretty questionable.”

The 500-year levee built by the Monarch-Chesterfield Levee District did just that, spurring a development boom that has reshaped the once-sleepy floodplain into a bustling suburban commercial center. “A disaster facilitated the largest strip mall in America,” Hoeflerlin mused.

West St. Louis County leaders have proclaimed they aren't worried about the next flood, arguing that their 500-year level will protect them even if a flood like that of 1993 hits again.

But some are of the opinion that all levees, eventually, fail. Building in flood-prone areas amounts to a subsidy from taxpayers, argues Ed Thomas, a former Federal Emergency Management Agency official. Now the head of the Natural Hazard Mitigation Association, Thomas said a flood will eventually overtop what humans have built. Governments should expect that and be prepared.

“There are enormous federal tax and taxpayer payments post-disaster, in addition to funding from charities and foundations,” he said. “And of course the charitable donations that are made, which are in the billions, are in a way a subsidy because they're deducted from federal income taxes.

“We pour forth money post-disaster, but we're not spending money pre-disaster.”