

Managed Retreat as a Tool for Disaster Resilience in the US

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Managed Retreat

BBC Sign in

Home KS3 Geography Physical geography Coastal landscapes



Bitesize Coastal management

Coasts can be protected from erosion through hard engineering, like sea walls, and soft engineering, like beach nourishment. These have both positive and negative effects.

Hard engineering

Defence type	Advantages	Disadvantages
 Sea wall	<ul style="list-style-type: none"> Protects the area behind the wall Helps prevent flooding 	<ul style="list-style-type: none"> Very expensive Waves bounce off the wall and scour the beach, removing material Can look ugly
 Groynes	<ul style="list-style-type: none"> Helps to stop longshore drift moving material along the coast Traps sediment and builds up beaches 	<ul style="list-style-type: none"> May create problems elsewhere because they starve other beaches of sediment
 Rip rap or rock armour	<ul style="list-style-type: none"> Large boulders absorb wave energy and reduce the power of the waves 	<ul style="list-style-type: none"> Strong waves can move or undermine the boulders Can look ugly

Soft engineering

Management type	Advantages	Disadvantages
 Beach nourishment	<ul style="list-style-type: none"> Adding more sand or shingle widens the beach and waves lose power travelling across it Looks natural 	<ul style="list-style-type: none"> Doesn't last very long
 Managed retreat	<ul style="list-style-type: none"> Land becomes marsh, slowing waves and reducing erosion Creates new habitats 	<ul style="list-style-type: none"> Land is lost

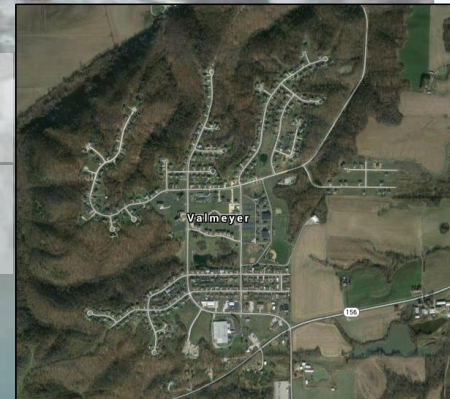
Applies to
Floodplain Management
as well

One option: **Managed Retreat** through **Community Relocation**



Valmeyer,
IL today

Population
1250



Managed Retreat through Community Relocation

Advantages

Managed Retreat through Community Relocation

Advantages

- Permanent elimination of flood risk
- Can be cost-effective
- Avoids piecemeal erosion of community (as with buyouts)
- Can maintain social fabric
- Can be combined with other synergistic benefits, e.g. to environment

Managed Retreat through Community Relocation

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Challenges

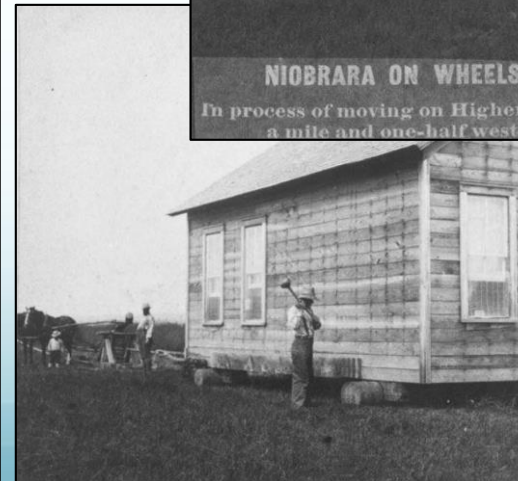
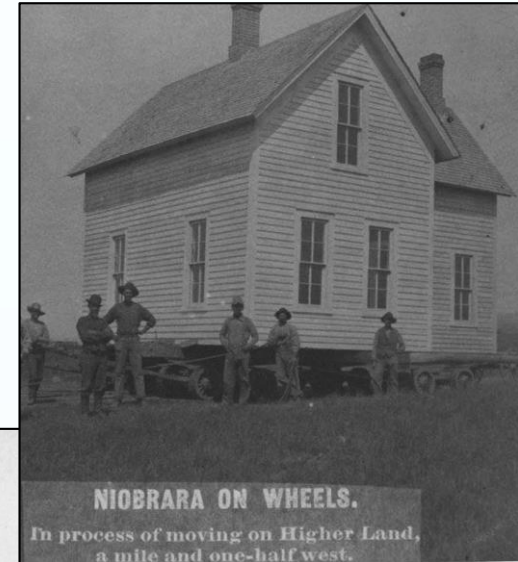
- **Many, and large**
- **but ...** 20-30 US towns have completed partial or complete moves

Niobrara, Nebraska

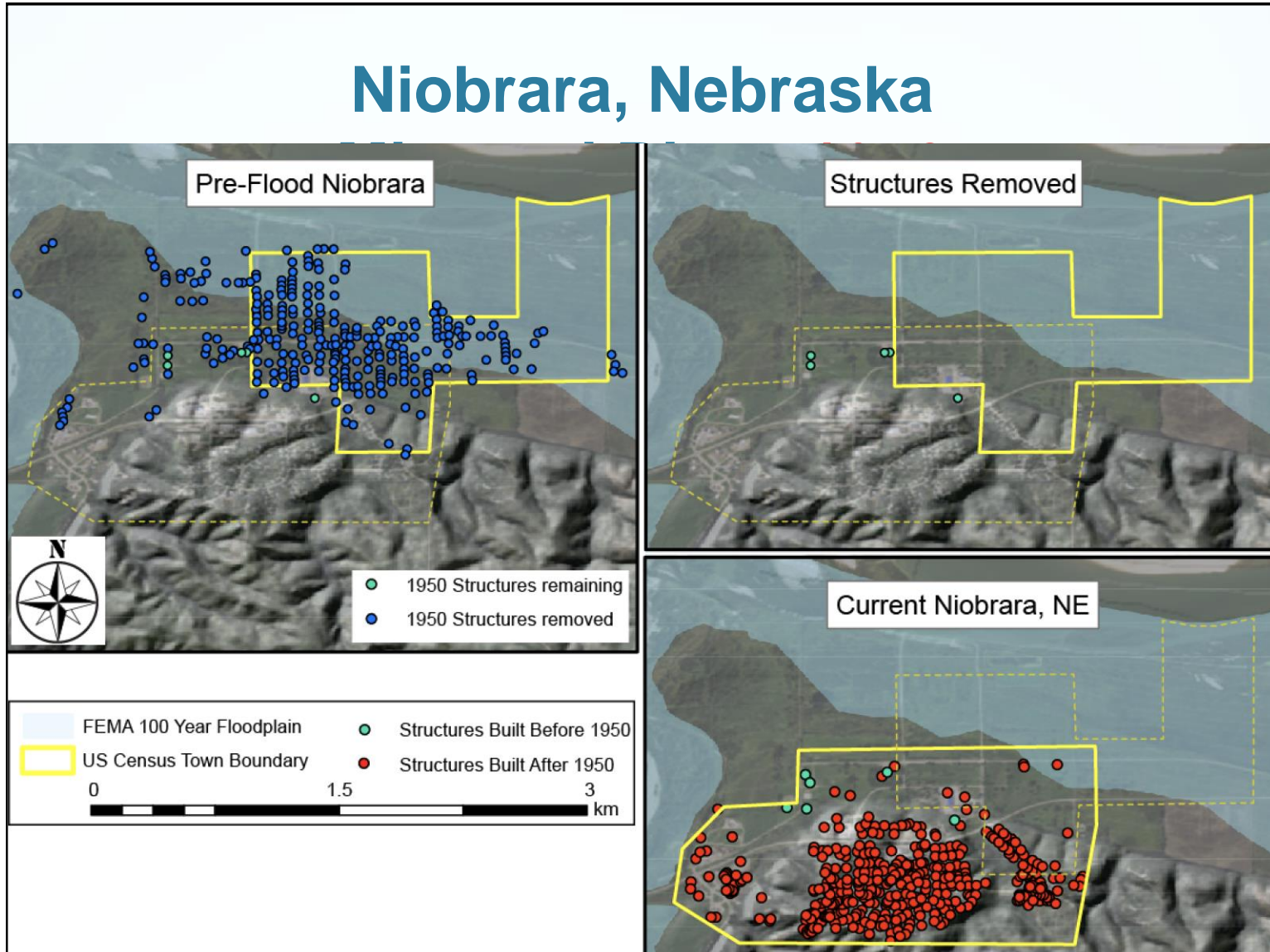
Missouri River, 1881



Niobrara, Nebraska Missouri River, 1881



Niobrara, Nebraska

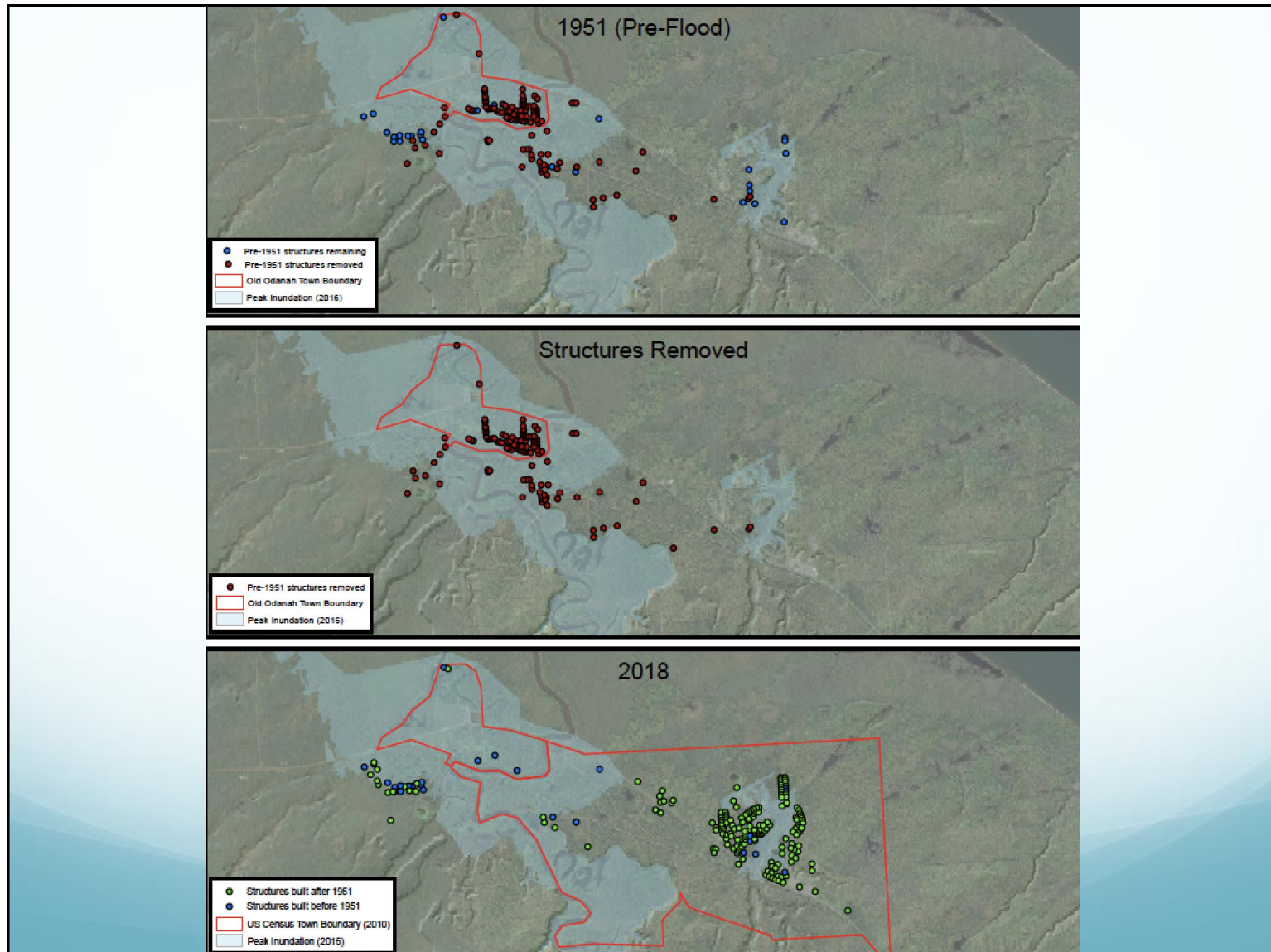


The Great Ohio River Flood, 1937: Shawneetown, IL & Leavenworth, IN



Odanah, WI: ~1974

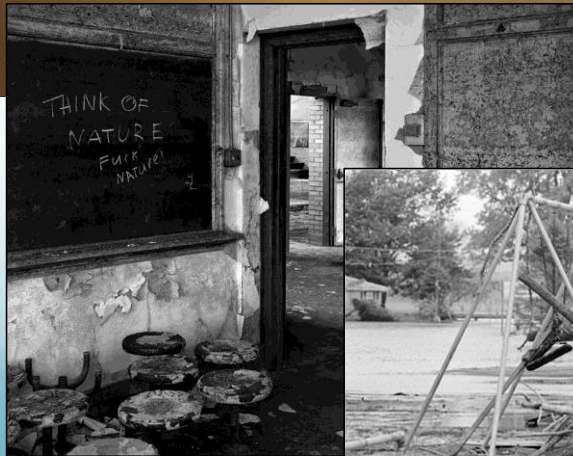




Great Midwestern US Flood of 1993



Valmeyer, IL: 1993



UNIVERSITY COUNCIL ON WATER RESOURCES
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Moving a Community in the Aftermath of the Great 1993 Midwest Flood

Dennis M. Knobloch

Former Mayor, Valmeyer, Illinois

During my high school years in the second half of the 1960's, many towns were spent in World War II. Even though many of these towns had taken place less than 25 years earlier, they, like most of the information in our school textbooks, seemed like "ancient" history because they occurred prior to my existence on this earth.

My perception of Valmeyer, Illinois' previous encounters with the Mississippi River was much the same. Valmeyer was incorporated in 1899. The St. Louis Valley Railroad had built a line through the area at the turn of the century. Businessmen and homes sprang up in support of and as a result of the railroad's presence. At that time, farming also provided a good livelihood for many individuals. Successful crop yields were by-product of the rich, river bottom soil. Valmeyer's location at the base of the towering Mississippi River bluff to the east provided its residents with breathtaking scenery every season of the year. What a wonderful place to live!

Valmeyer lies about three miles from the main channel of the Mississippi—on the right, not of flood. Flooding was not a concern for anyone in the community until 1943. In the spring of that year, floodwaters overtopped a small agricultural levee and spread across the community, bringing life to Valmeyer as a swimming hole. Graduates remembered for the Valmeyer High School Class of 1943 had to be postponed because the school grounds were covered with muddy brown feet of water. Cars had to be abandoned, and boats were used to travel the Village's Main Street. As floodwaters receded, residents quickly shovelled out the mud, washed

down all their belongings, and moved back into their homes.

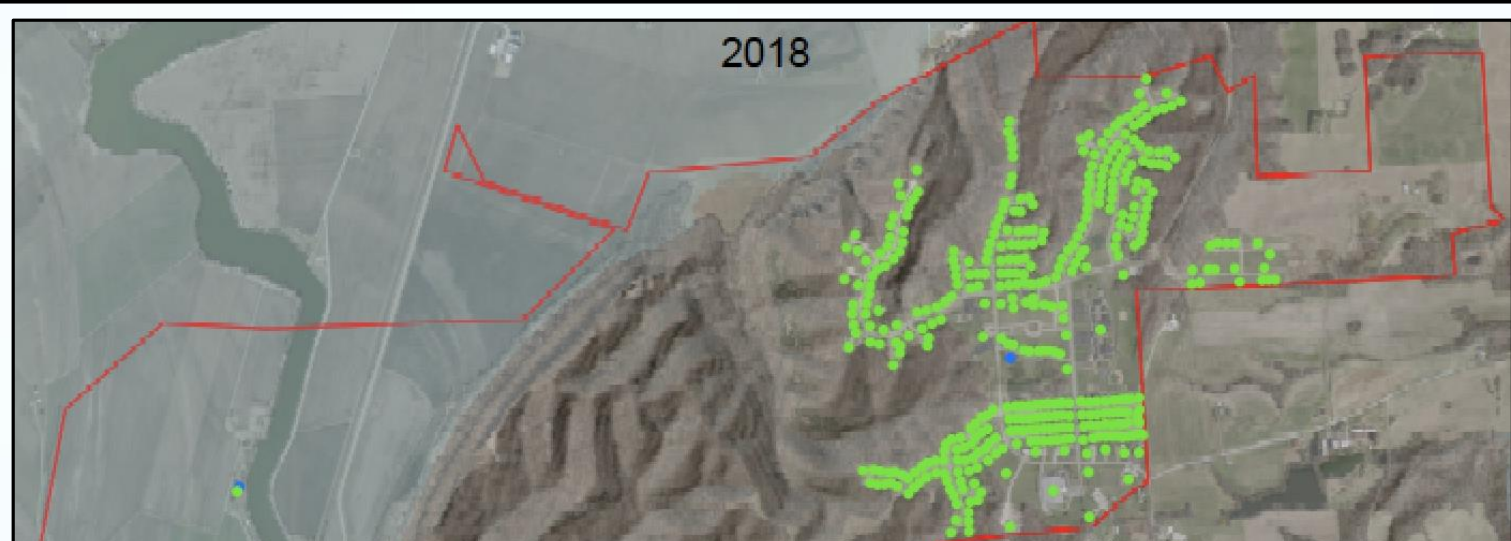
Residents of Valmeyer had battled the Mississippi River and suffered a minor setback, but they still felt victorious because they were all unscathed, comfortably back in their homes. However, less than twelve months later, the River was once again knocking on the door of Valmeyer's homes. Not only did these floods reduce the wealth of the Mississippi in 1943 and 1944, but also in 1947, when the onset of Valmeyer was flooded once again. This series of floods—three in five years—had not produced major devastation, but it definitely had Valmeyer's citizens looking over their shoulders for the next Mississippi's next visit.

This series of floods caused such severe damage to crops and farmland that local farmers lobbied the U. S. Army Corps of Engineers (USACE) to "fix" their problem. Legislators viewed the necessary funding, and construction began on a new levee system along the entire western boundary of Missouri County late in 1947. This levee, which would protect approximately 40,000 acres of farmland from the Village of Valmeyer, was completed in 1950 and was listed as one of the best ever built by the USACE.

In 1973, high river levels created some sewage problems, but the 25 year old levee was strong enough to withstand the Mississippi, and no flood waters reached the community. The levee was doing its job, and with every dry day that passed, Valmeyer residents gained more confidence in the effectiveness of this earthen structure. Valmeyer's battle with floods was relegated to the pages of "recent history."

Journal of Contemporary Water Research & Education

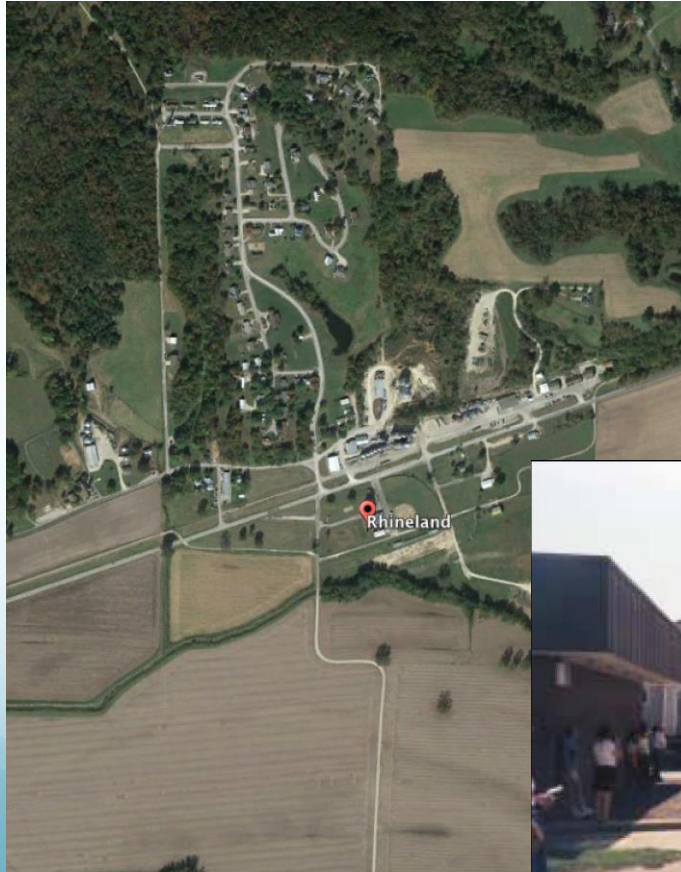
UCORR



**Funding sources for Valmeyer, Illinois relocation, 1993-1996
(Information from D. Knobloch, written communication)**

	1994 dollars	2018 dollars
Federal Emergency Management Agency	\$12,500,000	\$21,753,000
Illinois Emergency Management Agency	\$1,000,000	\$1,740,240
Department of Commerce and Consumer Affairs	\$12,000,000	\$20,882,880
Federal Housing Administration	\$500,000	\$870,120
Local funding sources	\$2,000,000	\$3,480,480
Cost of acquiring land for new town	\$3,000,000	\$5,220,720
TOTAL	\$31,000,000	\$53,947,440

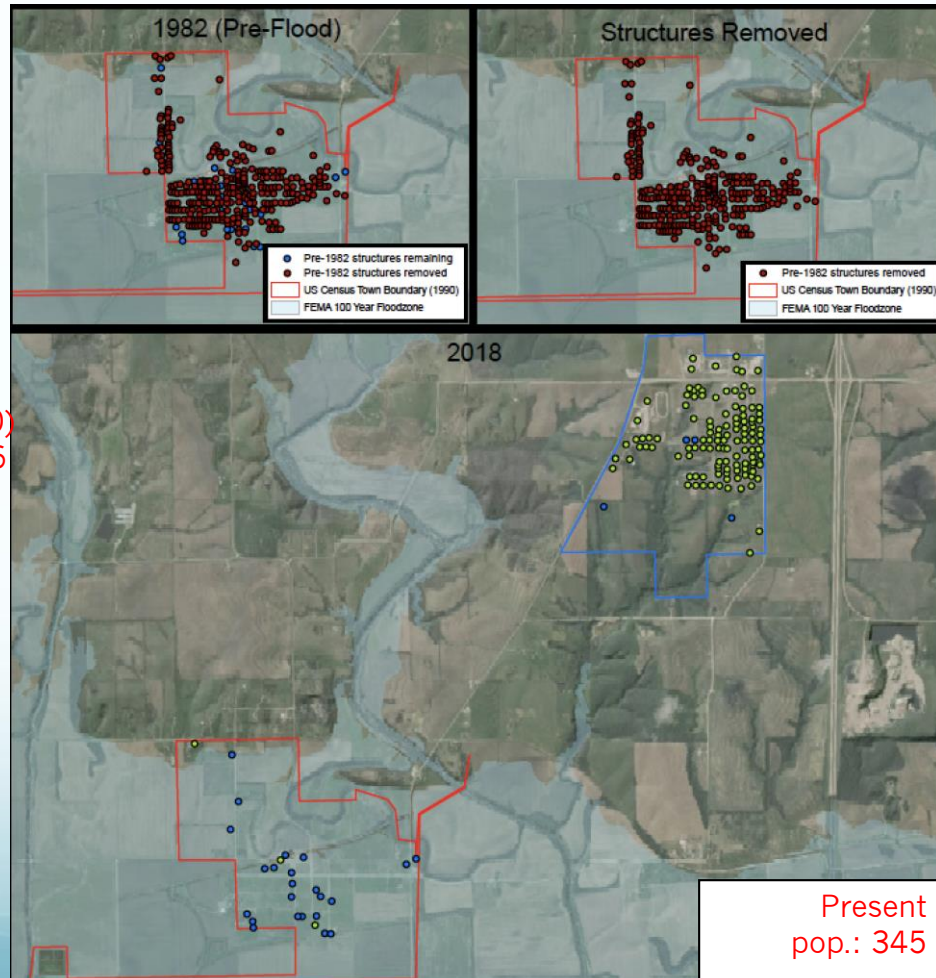
Rhineland, MO: 1993



Pattonsburg, MO: 1993

Moved after
town was
flooded 33
times

Pre-flood (1990)
population: 416



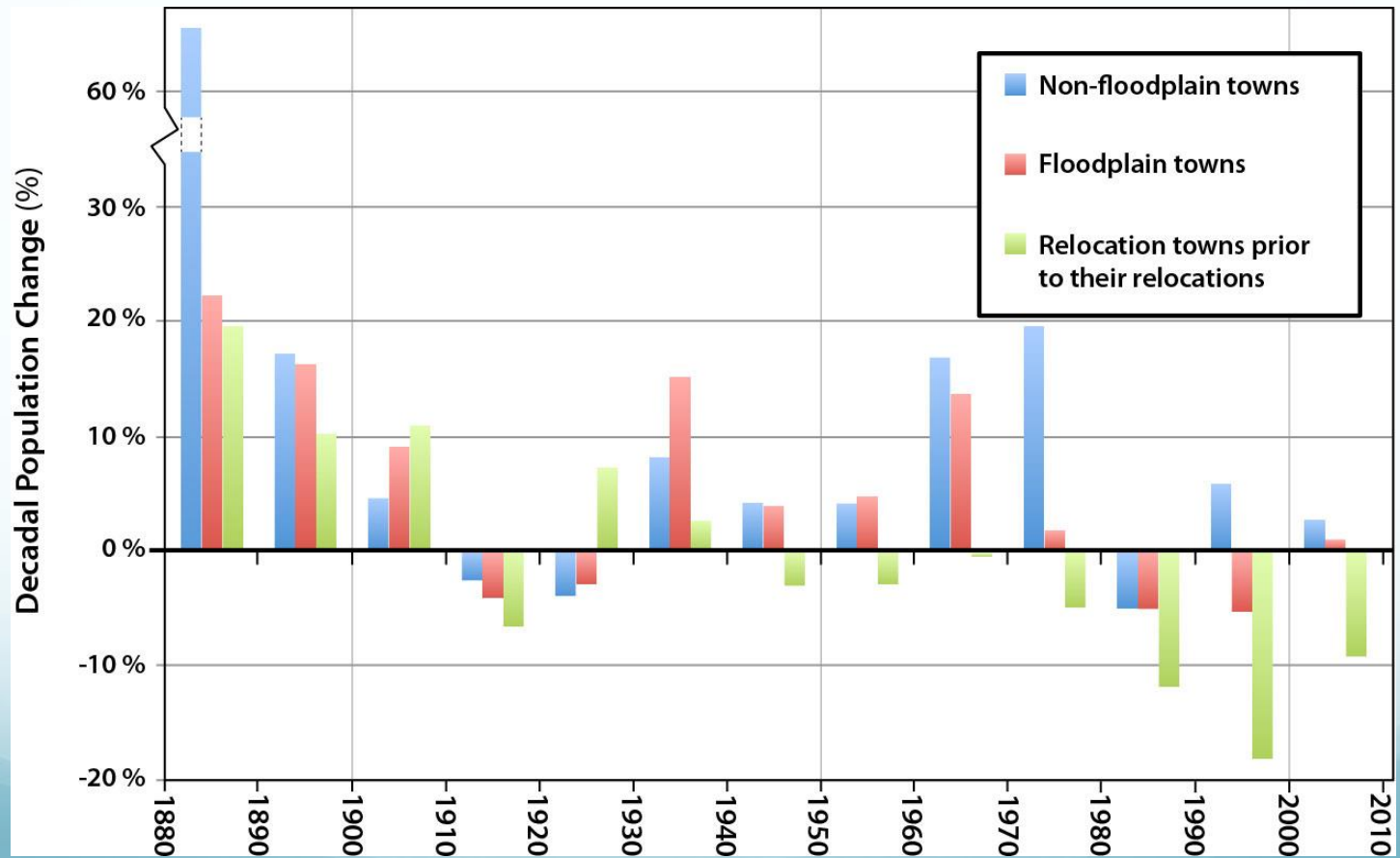
Pattonsburg, MO: 1993

There is a final chapter in the history of old Pattonsburg. During the summer of 1998, a Hollywood film crew used the abandoned buildings as a movie set in filming **"Ride With The Devil,"** a dramatic recreation of William Quantrill's infamous raid on Lawrence, Kansas,



Analyses & Discussion ... Lots, e.g.:

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Recent US Relocations

Including: other full relocations, partial relocations, extensive buyouts, town *removals*, and **relevant lessons**

Recent US Relocations

Isle de Jean Charles

In 2016, **Isle de Jean Charles, LA** was awarded \$52 million from the NDRC for resettlement



ISLE DE JEAN CHARLES – NEW COMMUNITY MASTER PLAN (HOUMA, LA)



Other Key Case Studies

Grundy, Virginia



The Bee: Danville, Va., Thursday, April 7, 1977 3-B

Grundy: A City Destroyed

GRUNDY, Va. (AP) — "Grundy as a town no longer exists."

That's how the resident of a nearby community described his view of the stricken area. Barbara Berry, the mayor of this south-western Virginia town ravaged by flood waters, said Wednesday the situation is critical.

"The town is devastated," she said.

"Nearly all of our businesses, without exception, have been destroyed. Our business losses alone will exceed \$10 million."

The worst flooding in the history of this section of the state has left thousands homeless here and in Buchanan County.

Officials said at least 2,000 homes have been destroyed or damaged to the point of being uninhabitable.

Grundy, a town of 3,000, has railroad water and most of the town is without electricity or telephone service. The streets are covered with mud and silt and water in some areas of the town reaches a depth of 15 feet.

Travel through Grundy has been restricted. Mayor Berry has imposed a 7 a.m. to 6 p.m.

Many of the homeless are staying in the Grundy Elementary School, where the Red Cross has set up a shelter and is providing free meals and clothing.

The Grundy Hospital, which was evacuated earlier this week when its basement was flooded, was offering only emergency services Wednesday. Its patients were evacuated to Harrison after the hospital lost electricity.

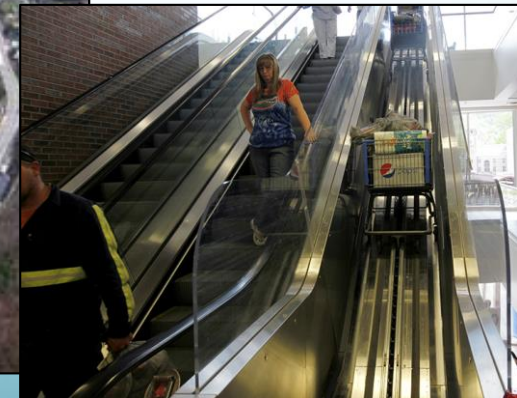
Many of the roads leading to Grundy are extremely hazardous in places, with patches of mud having been torn away.

Buchanan County Administrator Andrew May said there are still pockets of people who are isolated by the flood and have been without food for three days.

Rescue teams and members of a National Guard unit were preparing Wednesday night to launch a search for the isolated residents.

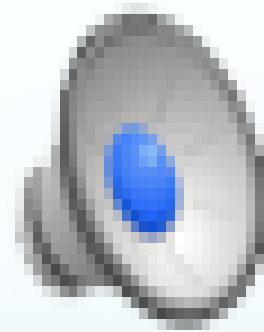
Portable tanks have been located in various parts of town to provide drinking water for residents. A limit of five gallons per person per day has been set.

Only one grocery store was open Wednesday, but Mrs. Berry said that food supplies are



Looking forward:

At least 12 Alaskan Native villages exploring relocation



Looking beyond the US:



Rising from the Floodwater – The Relocation of the Town of Grantham

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Looking beyond the US:



Fiji's Relocation Guideline (Draft)



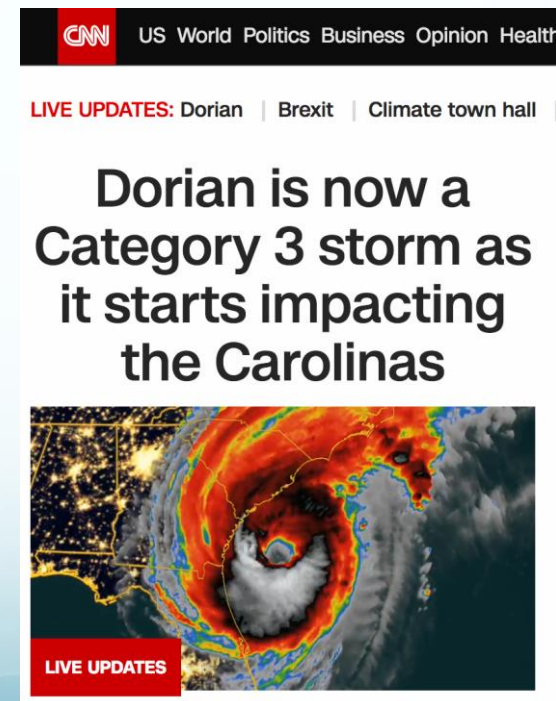
Looking beyond the US:

Onagawa, Tohoku Prefecture, February 2016



Take-Aways

- **Relocation can be** a cost-effective and holistic solution for select communities
- There are **past examples** (*both successes and failures*) to learn from
- And climate change and spiraling flood damages call for a broad portfolio of solutions for the future



And ...

And ...

Managed Retreat: Global Lessons for Success

?

Tuesday April 14, 2020

National Academy of Sciences

2101 Constitution Ave. NW, Washington DC

1:00pm - 4:30pm

?

Global Lessons for Success:

The event in Washington in 2020 will emphasize practical lessons learned for future managed retreat and community relocation efforts in the US and worldwide.

Format: At this initial planning stage, the following format is proposed:

- Keynote presentations
- Moderated panel discussion
 - Moderator: **Rebecca Herscher, NPR Science Correspondent**
- Audience discussion
- Reception & continued discussion

?

Targeted Audience: We imagine that the invitees to this event will

include **up to 125 total participants:**

- International development agencies (e.g., USAID, World Bank)
- Diplomatic community (especially, Pacific Island and Southern and Southeast Asian countries)
- National Academies Members and Staff
- NGOs focuses on sustainability
- Academic researchers

