Estimated 100-Yr Flood Losses: Cerro Gordo County

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Abstract

This map represents the impact that a 100-year flood could have on the residential, commercial, and industrial structures within Cerro Gordo County, IA. The total dollar impact includes potential damages to structures, contents, and agricultural crops.

Introduction

- Located in north-central Iowa, Cerro Gordo county consists of 11 cities and approximately 44,000 total residents, the majority of which live in Mason City
- 161 properties in Mason City eligible for government buyouts after floods of 2008

Objectives

- Determine flood inundation levels for all of Cerro Gordo County, IA
- Calculate estimated damages to structures and contents due to 100-year flood
- Calculate lost revenue to agricultural crops (corn and soybeans) due to 100-year flood

Materials & Methods

All losses were determined from a combination of the following:

- Flood depth mapped at a 3-m resolution (data from the Iowa Flood Center (IFC))
- Occupancy codes, structure value, basement type, and number of floors (data from Cerro Gordo County and Mason City Assessors' office, assumptions when existing data was no available)
- Building and content damages are a function above data(see example below)

DAMAGE FUNCTION CURVES FOR 100-YR FLOOD, 1-2 STORY BLDGS WITH BASEMENT
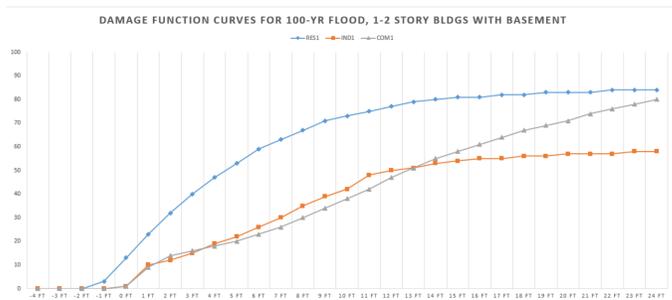
- Soil productivity estimates from Soil Survey Geographic Database (SSURGO) combined with projected 2017 crop prices allowed for estimates of lost revenue at inundated agricultural areas. This analysis assumes that the flood last longer than three days in duration and between July 1 and harvest date.

Projected Losses for 100-yr Flood, by Census Block, for Cerro Gordo County, IA (Mason City and outlying areas)
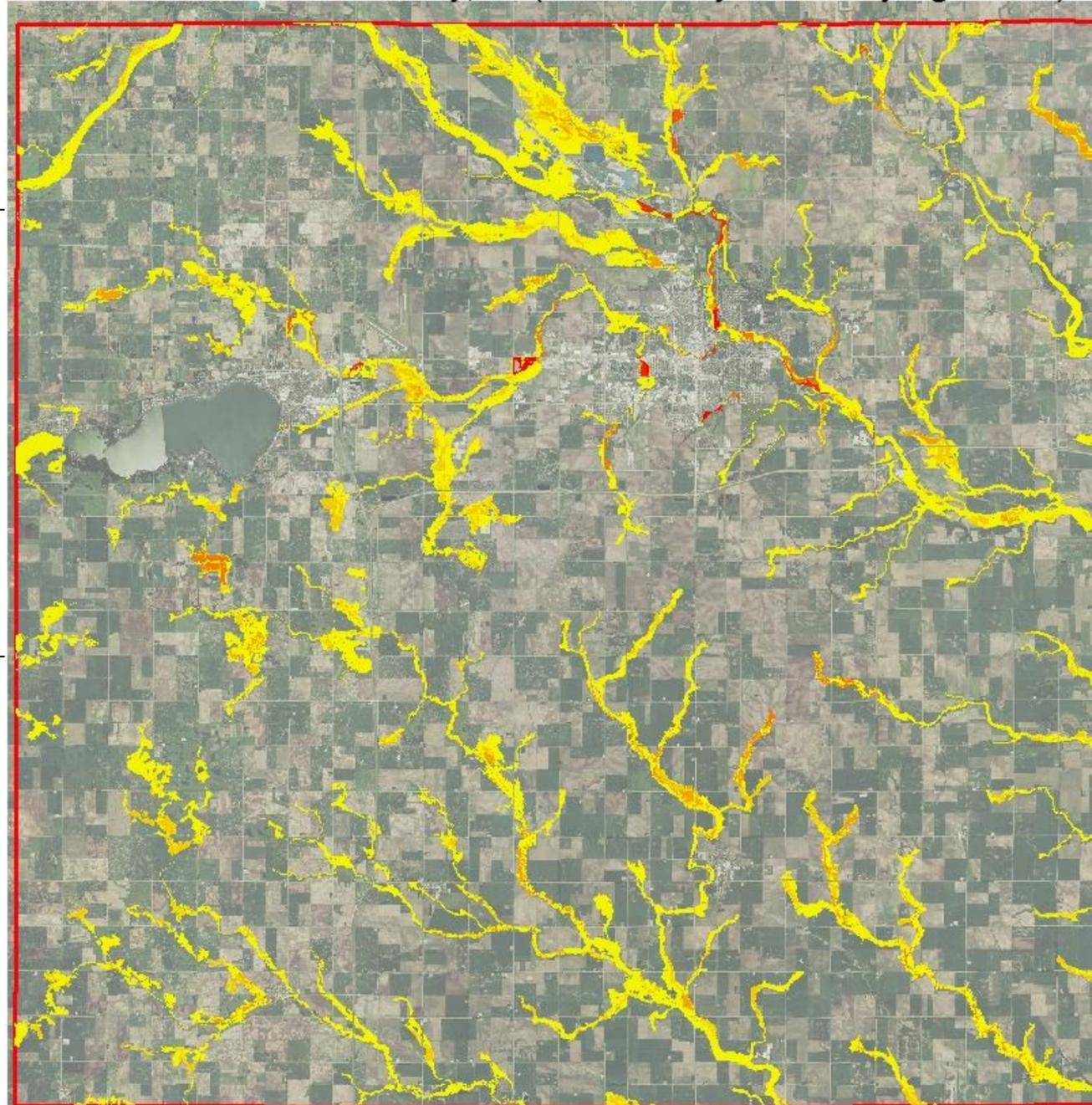
Lost Revenue (Agricultural), Structural and Content Losses (Residential/Industrial/Commercial)

Legend: $0 - 7000 | $7001-20000 | $20001 - 40000 | $40001 - 60000 | $60001 - 95000 | $95001 - 200000 | $200001 - 800000

0   2   4   8 Miles

N
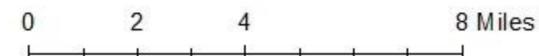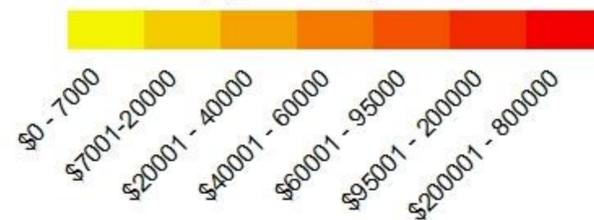
Discussions & Conclusions

Estimates of Building Damages form 100-year flood event is shown below.

Estimate of Damages from 100-yr flood event, Cerro Gordo County, IA

	Building Damages	Content Damages	Total Damages
Agricultural Buildings	$19,600	$62,200	$81,800
Commercial Buildings	$400,300	$1,401,700	$1,802,000
Industrial Buildings	$29,700	$82,600	$112,200
Residential Buildings	$2,937,800	$982,900	$3,920,700
All Buildings	$3,387,300	$2,529,500	$5,916,800

- The average damage for 28 agricultural buildings in the 100-year floodplain is $700. The maximum and minimum agricultural damages are $3,120 and $7 respectively.
- The average damage for 33 commercial buildings in the 100-year floodplain is $12,130. The maximum and minimum agricultural damages are $167,054 (COM1) and (COM1) $90 respectively.
- The average damage for 3 industrial buildings in the 100-year floodplain is $9,900. The maximum and minimum industrial damages are $16,480 and $2,430 respectively.
- The average damage for 81 residential buildings in the 100-year floodplain is $36,270. The maximum and minimum residential damages are $318,640 and $120 respectively.

- Estimates of lost revenue from agriculture are shown below with different percent damages. Based on these estimates, lost revenue for 100% agricultural loss could be higher than total property loss.

Estimate of Lost Revenue from Agriculture for 100-yr flood, Cerro Gordo County, IA

	45% Loss	75% Loss	100% Loss
Ag Losses	$3,110,396	$5,183,994	$6,911,992

- Estimations could deviate from real damages or lost revenue, due to the assumptions made during the calculation process.

References and Contributors

- Hazus software from the Federal Emergency Management Agency (FEMA)
- Iowa Flood Center (IFC)
- Parcel data from the Cerro Gordo County Assessors Office
- Soil Productivity estimates from Soil Survey Geographic Database (SSURGO)
- Land cover map from the National Land-Cover Database 2011 (NLCD)
- Crop price estimates from the Risk Management Agency (RMA)

All data preliminary