The High Water Mark:
Policy Lessons Learned from Colorado's 2013 Floods

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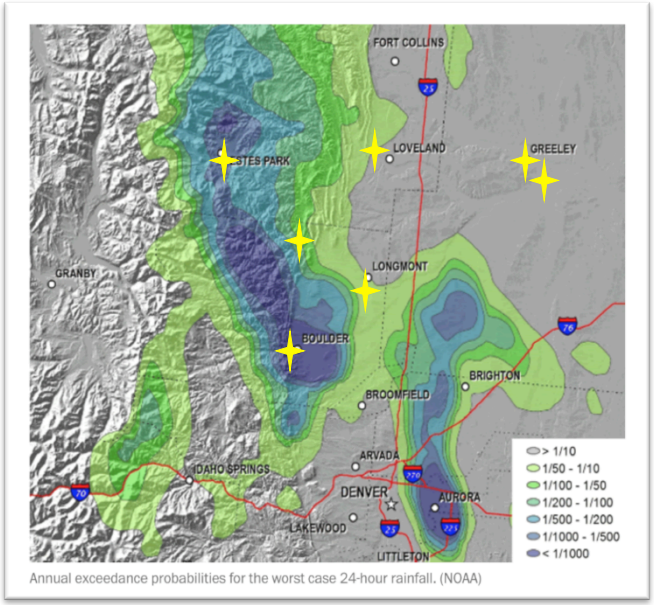
The 2013 Colorado Flood



Annual exceedance probabilities for the worst case 24-hour rainfall. (NOAA)

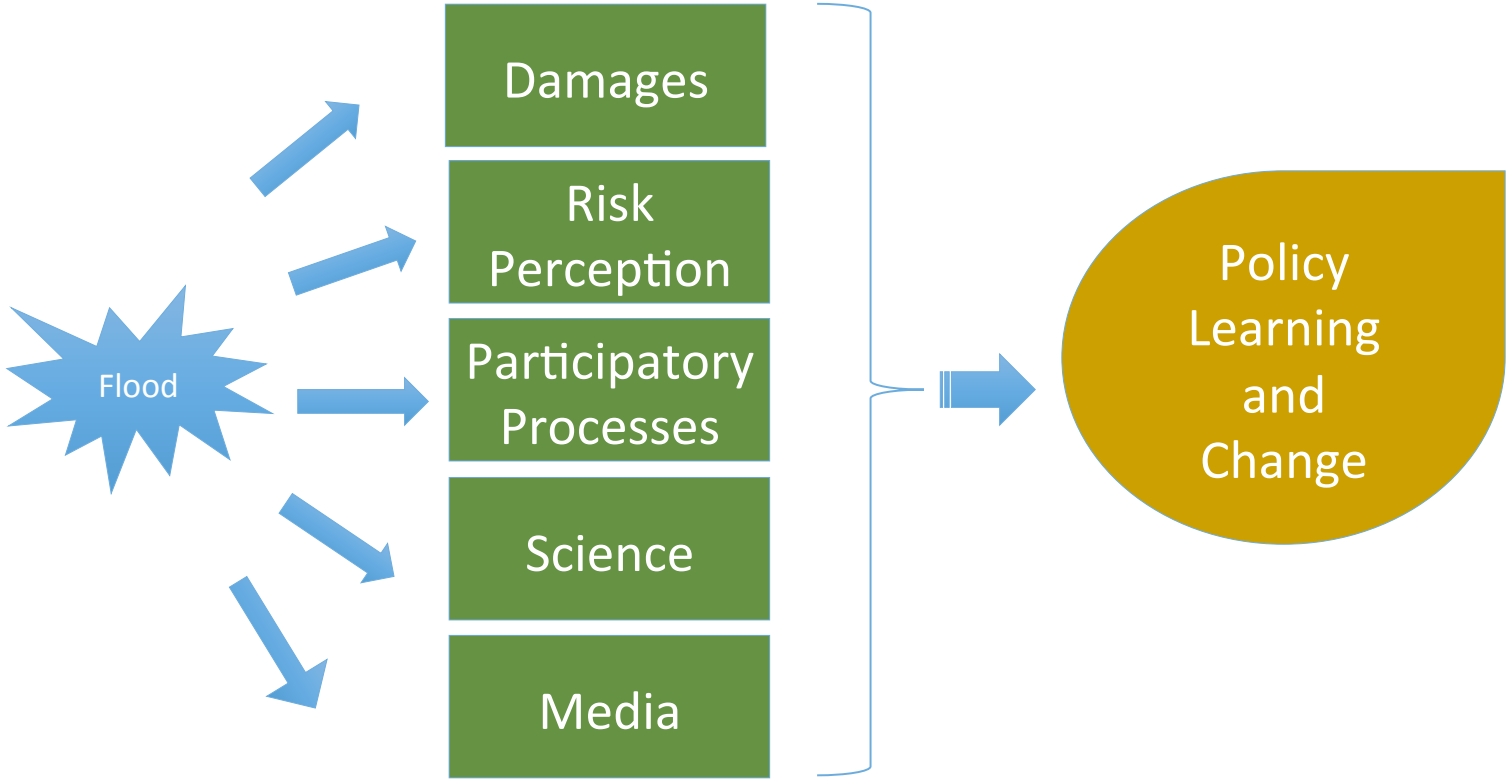
What do communities learn or change in response to extreme events?

Policy Change After Disaster

Understanding the processes and arrangements that lead to policies to reduce community vulnerability to future events (Berke et al., 1993).

- Including how policies are formed and decided, and what actors are influential in this process

Broad Conceptual Framework



The Literature: Recovery

Guiding questions:

1. Does the type of public participation matter?
2. Does the extent of damage matter?
3. Do resources matter?
   a. Individual
   b. Community
4. Do perceptions of future risk matter?

Research Methods

7 communities flooded in 3 counties

1. Document collection and coding

- (n≈3,000) All community-level decisions over 3 years (City Council, Commissions/Boards)

2. Recovery stakeholder interviews

- (n=24 Round 1; n=23 Round 2; Round 3 in progress)

3. Recovery stakeholder survey & Resident survey

- Stratified random sample of residents (flooded/non-flooded)
  - (Residents: 7% - 16% response rates varying across communities; Round 2 in March 2017)
- Stakeholders involved in recovery: government personnel, boards and commissions
  - (Stakeholders: 30% response rate Round 1/ 43% Round 2/ 22% Round 3)

Case Study Community Demographics

County (population)	Community	Approx. Size (2014)	Median Household Income (2010-2014)	Racial Demographics (White and Hispanic/Latino)	Education: College Degree or Higher (25 years old +)
Boulder (313,333)	Boulder	105,112	$58,062	83% 8.7%	71.5%
	Longmont	90,237	$60,218	69.3% 24.6%	37.1%
	Lyons	2,102	$93,844	90.9% 5.7%	57.8%
Larimer (324,122)	Loveland	72,651	$55,580	84.8% 11.7%	34%
	Estes Park	6,165	$56,236	83.1% 14%	44.7%
Weld (277,670)	Greeley	98,596	$47,342	59.3% 36%	25.6%
	Evans	20,473	$47,798	53.4% 43.1%	16%

Findings

Participation, Resources, and Risk

Extent and Type of Flood Damage

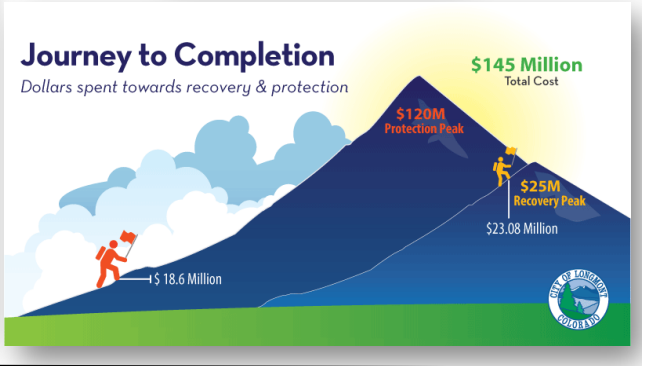
	Flood damage	Resource Availability
Boulder	Extensive open space damage Moderate infrastructure & residential	Cost within city capacity
Longmont	Extensive damage to parks and river corridor; Moderate infrastructure damage	Cost within city capacity with insurance, FEMA, State, and new fees
Lyons	Extensive damage to businesses, infrastructure, residences, parks	Costs far exceeds town capacity
Loveland	Moderate infrastructure and commercial damage; Damage to parks	Costs within city capacity with insurance, FEMA, and State
Estes Park	Moderate to extensive infrastructure damage (no road access); commercial & residential/private property damage	Costs within town capacity with insurance, FEMA, and State
Evans	Extensive damage to specific areas, both infrastructure & residential	Costs far exceeds town capacity
Greeley	Minimal damage; some debris removal	Minimal costs

Findings: Variation in Process

Community	City/Town Council	Elected or Appointed Advisory Commission/Board	Flood Task Force	Public Meeting	Total
Boulder	4	29	0	10	**43**
Longmont	29	19	0	11	**59**
Lyons	0	0	35	4	**39**
Loveland	16	25	0	3	**44**
Estes Park	19	18	1	3	**41**
Evans	10	6	4	0	**20**
Greeley	3	5	0	2	**10**
Total Flood Meetings	**81**	**102**	**40**	**33**	**256**

[1]Only documented meetings were included in these counts.

Longmont Communication and Outreach



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Findings: Variation in Process

EVANS

"In fact, we had a—we were having almost every day a public meeting at 10:00 to just update folks on where it was going. This was an interesting event. If you were north of 23rd street, you probably never knew anything happened except we got a lot of rain because once you got beyond—well, actually once you got beyond 35th, you weren't in the no-flush zone; you're in another basin, and so that goes to a different plant. And so we have a community that about almost 2/3rds of the community was initially affected by the no-flush, but once that was done, the event was over for them. And then, of course, we have the folks on the east side, who some of whom lost everything." EV-01

Findings: Variation in Process

LYONS

"We had our kickoff meeting. And we invited the entire public. We did door-to-door flyers, hand delivered to every person saying we want your input. And last night we had about 500 there." LY-01

Risk Perceptions and Causal Understanding

1. **Perceptions of future flood risk**
   - Associated with perception of severity of community damage
2. **Community damage and recovery perception**
   - Lower perceptions associated with residence in FEMA high risk zone
     - Counterintuitive
       - Deep core beliefs re man vs. nature?
       - Protections provided by FEMA/insurance?
3. **Floodplain development and landuse change beliefs**
   - Associated with higher future risk perception

Major Research Findings

1. **There are a diversity of stakeholder/participatory processes across communities**
   - Vary on openness, deliberativeness, and diversity of stakeholders
   - Vary on decision authority
2. **Resource-limited communities may hold more deliberative decision processes out of need**
   - Fewer personnel, less expertise within government
3. **Perceptions of risk vary within local governments**
   - **Type of expertise** (infrastructure vs. general admin)
     - Negatively associated with risk perception
   - **Past flood experience**
     - Positively related to problem severity

Lessons Learned

- ***Public Process Matters***
  - *More deliberative processes are taking place in most damaged communities and may lead to longer-term resilience*
- ***Resources may inhibit more deliberative public processes***
  - *Professionalized staff can 'take care of it'*
- ***Most policy changes are:***
  - *Incremental*
  - *Not focused on long-term adaptation and resilience*
- ***Equity within and across communities***
  - *Unless they form partnerships (as Boulder County has done), smaller communities may get lost or underfunded*
  - *Marginalized populations not engaged in recovery decisions*

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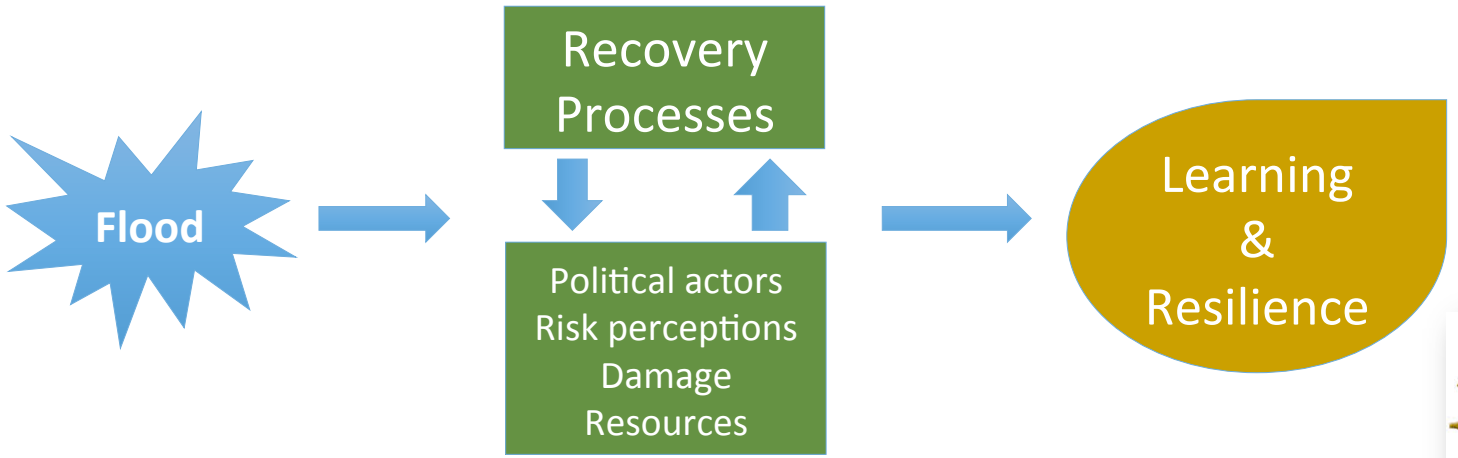
Next Steps

- Finish data collection this year
- Analyze policy outcomes after recovery
- Prepare report and hold workshop (Fall 2017)



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Reducing our vulnerability to become more resilient to the risks we face
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Policy Learning and Political Context: Analyzing Responses to Colorado's Extreme Flood Events of 2013
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