

## Connecting Hazard Mitigation to Local Planning and Regulation

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**Hazards occur naturally.**

**Disasters only occur when man  
gets in the way of hazards.**

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## Hazard mitigation

- ◆ Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.
  - ◆ 44 CFR 201.2 (Federal regulations implementing the Disaster Mitigation Act of 2000)

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## Disaster Mitigation Act of 2000

- ◆ Under the Federal DMA municipalities are required to develop local hazard mitigation plans (LHMP) to be eligible for several types of pre- and post-disaster grants from FEMA.
- ◆ Intent is to identify risks, and to identify and implement risk reduction strategies.

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## Iowa city & county LHMP status

- ◆ [http://www.iowahomelandsecurity.org/documents/hazard\\_mitigation/HM\\_LocalPlanStatus.pdf](http://www.iowahomelandsecurity.org/documents/hazard_mitigation/HM_LocalPlanStatus.pdf)

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## Disaster Mitigation Act of 2000

- ◆ Time has revealed several challenges to LHMP implementation:
  - ◆ The LHMP is often considered in isolation from other local policies and actions.
    - ◆ The LHMP is often prepared by one department or group, the local comprehensive plan prepared by another.
    - ◆ The goals and strategies that are a natural fit into land development planning and regulation never make the leap.
  - ◆ In many communities the LHMP is seen simply as the key to funding, LHMP itself – or at least the action steps not tied to federal funding – is not seen as a 'plan of action.'
  - ◆ The length, level of detail and 'all hazards' approach is overwhelming to many smaller communities.

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## Iowa Smart Planning

- ◆ The Smart Planning Act presents an opportunity to close the gap by drawing hazard mitigation into a document that the community (hopefully) sees as a plan for future action.
  - ◆ Use to identify key priorities.
  - ◆ Action steps that do/do not require external funding.
  - ◆ Land use-related.
  - ◆ Provide another opportunity for citizen input.

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## Hazard language from Smart Planning Act

- ◆ "A municipality's comprehensive plan developed using the guidelines under this section shall address prevention and mitigation of, response to, and recovery from a catastrophic flood."
  - ◆ *Iowa Code 18B.2(3)*

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## Comprehensive plan elements

1. Public participation
2. Issues and opportunities
3. Land use
4. Housing
5. Public infrastructure and utilities
6. Transportation
7. Economic development
8. Agricultural and natural resources
9. Community facilities
10. Community character
11. **Hazards**
12. Intergovernmental collaboration
13. Implementation

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## Hazard element

- ◆ "Objectives, policies, and programs that identify the natural and other hazards that have the greatest likelihood of impacting the municipality or that pose a risk of catastrophic damage as such hazards relate to land use and development decisions, as well as the steps necessary to mitigate risk *after considering the local hazard mitigation plan approved by the federal emergency management agency.*"
  - ◆ *Iowa Code 18B.2(2)(k).*

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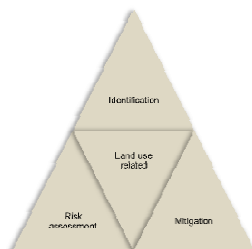
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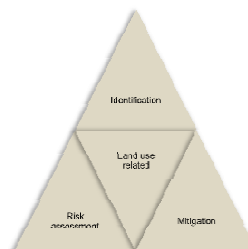
## Hazard element



- ◆ Hazard identification
- ◆ Risk assessment
- ◆ Hazard mitigation

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## Hazard element



- ◆ Hazard identification
- ◆ Risk assessment
- ◆ Hazard mitigation
- ◆ Sound familiar?

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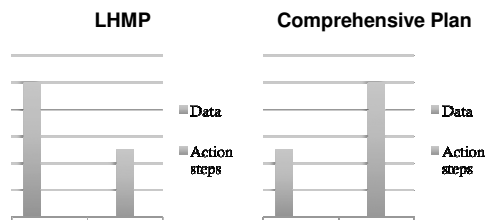
# Find your LHMP!

# Read it!

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## LHMP vs. Comp plan



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## Identifying hazards

- ◆ Your LHMP contains an extensive lists of potential hazards created from external data sources and local knowledge.
  - ◆ State hazard mitigation plan.
  - ◆ FEMA FISs, FIRMs and DFIRMs.
  - ◆ NWS.
  - ◆ Old-timers.

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## Identifying hazards

- ◆ Common hazards in the Midwest:
  - ◆ Floods
  - ◆ Tornados, high winds
  - ◆ Extreme snow/ice events
  - ◆ Field fires
  - ◆ Industrial fires, accidents, explosions, chemical/gas releases.
  - ◆ Derailments resulting in explosions, releases.

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## Identifying hazards

- ◆ Common hazards in the Midwest (*with land use planning and regulation implications*):
  - ◆ Floods
  - ◆ Tornados, high winds
  - ◆ Extreme snow/ice events
  - ◆ Field fires
  - ◆ Industrial fires, accidents, explosions, chemical/gas releases.
  - ◆ Derailments resulting in explosions, releases.

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## Identifying hazards

- ◆ Maps showing natural hazard areas
  - ◆ Floodplains
- ◆ Existing land use maps and textual explanations of industrial and other hazard areas
  - ◆ Industries – chemicals and processes used
  - ◆ Rail lines
- ◆ Textual accounts of past disaster events that caused significant damage.
  - ◆ Tornados, windstorms

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## Risk assessment

- ◆ LHMP will contain hazard probabilities
  - ◆ 100-year floodplain is a probability (1% chance of flooding annually).
  - ◆ Not capable of quantification: High, Medium, Low
- ◆ These are probabilities that a hazard will occur, *not* the magnitude or scale of the disaster should a hazard occur.

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## Risk assessment

- ◆ "Vulnerability" in LHMP parlance.
  - ◆ What is *at risk*? Maps showing...
    - ◆ Public infrastructure and facilities (buildings, roads, plants, parks)
    - ◆ Private investments (homes, businesses, industries)
  - ◆ What is the *risk of loss*?
    - ◆ Some quantified/quantifiable (15 buildings in 1% floodplain)(\$\$ loss due to structural damage)(HAZUS-MH estimates of \$\$ loss)
    - ◆ Most not quantified, but rather estimated.

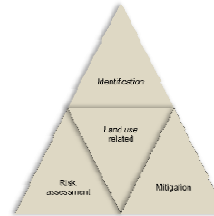
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## Risk assessment

- ◆ **Analysis beyond LHMP**, into comprehensive planning
  - ◆ Projecting *future* growth and development.
  - ◆ What is the extent of *future loss* that may result if existing plans, zoning, subdivision regulations are carried out (or *not* carried out), or if planned public improvements or capital projects are carried out? (development magnets: roads and pipes)(levees that could cause catastrophic loss in case of failure).
  - ◆ In other words, where does the 'no action' option take us?

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## Hazard mitigation

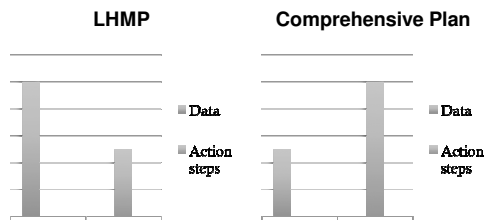


- ◆ So far we've largely described the information reflected in an LHMP.

- ◆ Now what?

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## LHMP vs. Comp plan



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## Barriers to action

- ◆ Plan implementation often suffers due to citizens' resistance to implement controversial strategies.
- ◆ (Un)willingness to endure limitations on personal choices.
  - ◆ Acquisition, relocation.
  - ◆ Stricter building and zoning regulations.

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## Barriers to action

- ◆ Implementation also suffers because of public's (un)willingness to pay for mitigation measures.
  - ◆ Elevation, floodproofing.
- ◆ ...over and above what can be done with OPM.
  - ◆ Acquisitions.
  - ◆ 'build us a levee.'

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## Hazard mitigation

- ◆ *Citizen involvement is key to setting priorities for hazard mitigation measures.*
- ◆ Hazard mitigation measures stand a greater chance of being implemented if the planning process includes effective citizen involvement to generate *understanding of, and appreciation for* the risks they face.

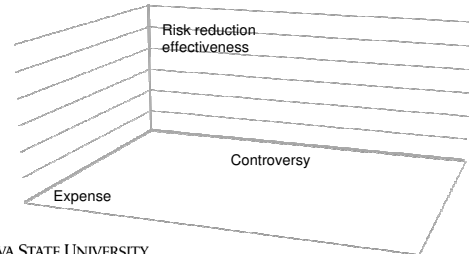
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## Hazard mitigation

- ♦ Selection of mitigation measures depends on the public's determination of the *level of risk they are willing to assume*, taking into account
  - ♦ Best estimate of risk.
  - ♦ Willingness to pay.
  - ♦ Willingness to endure limitations on personal choice.

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## Hazard mitigation dimensions



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## Flood mitigation measures

### Structural

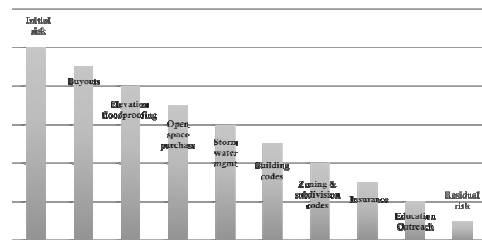
- ♦ Levees/floodwalls
- ♦ Reservoirs
- ♦ Channel modifications
- ♦ Bridge/culvert improvements
- ♦ Storm sewer upgrades

### Nonstructural

- ♦ Stricter ordinances
  - ♦ Floodplain, Zoning, Subdivision,
- ♦ Stricter building codes
- ♦ Buyouts
- ♦ Greenspace acquisition
- ♦ Easements
- ♦ Building elevation

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## Managing risk



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## Data for risk assessment

- ♦ See slides 19-25.
  - ♦ What are the hazards?
  - ♦ What are the probabilities?
  - ♦ What is our vulnerability?
- ♦ Communicate *risk*, not lines on a map.

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## Communication of risk

- ♦ During the life of a 30-year mortgage, there is < 1% chance that a home will burn.
- ♦ There is a 26% chance that it will flood if in the special flood hazard area.
  - ♦ Chances increase to 39% over a 50-year period.

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## Communication of reward

- ◆ Adopting stricter regulations for future development is estimated to save \$x million in losses, vs. continuing with existing regulations.

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## Communication of reward

- ◆ Each \$1 spent by FEMA on hazard mitigation results in \$4 in societal losses avoided.
  - ◆ National Institute of Building Sciences (2005)

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## Communications

- ◆ Do you, as a builder or developer, want your name on a development that's under water?

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## Data for public meetings

- ◆ What is our menu of options?
  - ◆ Structural v. non-structural.
- ◆ APA/FEMA provide extensive menus of options, and examples of where they have been successfully implemented.

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## Communication of expense

What can be done with  
OPM?



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What can be done  
on our own?



and for how  
much?

## How to pay for it

- ◆ [A] multi-year financing plan for implementing identified mitigation measures to reduce the vulnerability of buildings, infrastructure, and people to natural hazards that may be incorporated into the local governments operating or capital budget and capital improvement program.
  - ◆ *APA Growing Smart Legislative Guidebook* – The hazard element of a comprehensive plan.

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## Priority setting

What do we have the  
*capacity* to implement?



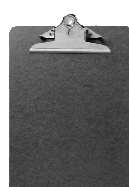
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For what must we seek  
outside assistance?



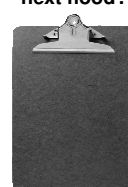
## Priority setting

What can we do in  
1 year, 3 years, 5 years?



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What should be our  
priority actions after the  
next flood?



## Priority setting

- ◆ Priorities of actions for eliminating or minimizing inappropriate and unsafe development in identified natural hazard areas when *opportunities arise*, including regulatory measures, the identification and prioritization of properties deemed appropriate for acquisition, or structures and buildings deemed suitable for elevation, retrofitting, or relocation.
  - ◆ Florida Statutes – Coastal zone management plan

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## For all goals, objectives

- ◆ What is the mitigation measure?
- ◆ Who is responsible for implementing?
- ◆ What are the steps to implementing?
- ◆ When must it be completed?

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## Discussion

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