Comprehensive Plans and Flooding

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Photo: Wahoo Flooding 1963
Comprehensive Plans

- Nebraska state statutes:
  - Cities & villages: “regulations shall be designed to [...] secure safety from flood” (§19-915)
  - Counties: “such zoning regulations shall be consistent with an adopted comprehensive development plan and designed for [...] such specific purposes as [...] lessening or avoiding the hazards to persons and damage to property resulting from the accumulation or runoff of storm or flood waters.” (§23-114.03)
Required components

- Land use element
- Transportation routes and facilities
- Public facilities
- Energy element
- Annexation policy
Floodplains and Comprehensive Plans

- Streams/rivers are permanent aspects of a community
- Flooding, floodplains, and floodplain management come along with these
- Comprehensive plans should account for these
- Floodplain management requires a long-term strategy
NeDNR Project

- Reviewed 55 plans from across the state – large/small communities
- Evaluated plans based on flood risk in:
  - Factual base
  - Goals
  - Policies & actions
- 60 possible points to create “plan score”
- Score compared with variety of community factors
Evaluations

➢ Factual Base (11 indicators):
  o Delineation of floodplains, buildings subject to flooding, flood map on FLU map

➢ Goals (11 indicators):
  o To reduce damage, preserve flood risk areas for open space, develop outside of floodplain

➢ Actions & Policies (38 indicators):
  o Cluster development, acquisition programs, critical facility protection, rec areas in floodplains
Factual Base

- Flood hazard – description/map
- Floodplain on future land use map
- History of flooding
- Area of community in floodplain
- Number of current population exposed to flood risk
- Number of future population exposed given growth/development scenario
Factual base

- Number and value of public infrastructure exposed to flood risk (water, sewer, roads, etc.)
- Number and value of private structures exposed to flood risk
- Number of critical facilities exposed
- Emergency shelter demand, location, and capacity
- Area of existing preserved open space in floodplain
Data sources

- Hazard mitigation plans
- National Flood Hazard Layer
- FIRM, FIS
- Floodplain management ordinances (typically zoning or building codes)
- NDNR
- NEMA
Findings – factual base

- 75% of plans include flood hazard maps
  - Only 25% show it on the future land use map
- 26% include a history of flooding
- 20% include the area of the community in the floodplain

All of this information is available in the Hazard Mitigation Plan
Goals

- Goals should focus on public safety and allocation of public resources.
- Future growth and development have implications on safety from natural hazards.
- Goals should focus not only on new growth areas but also existing areas subject to flood risk.
Goals

Any goal to:

- Reduce loss of life
- Reduce property loss
- Minimize fiscal impacts of natural disasters
- Reduce damage to existing R, C, I development
- Reduce damage to public facilities
Goals

- Any goal to:
  - Keep critical facilities out of floodplain
  - Develop new areas outside flood risk zones
  - Preserve flood risk areas for open space or recreation
  - Preserve natural functions of floodplains in new growth areas
Findings - goals

- 50% of plans have a goal to preserve flood risk areas for open space or recreation.
- 17% of plans have a goal to preserve natural floodplain functions.
- Just 4% have any goal to reduce damage to existing residential, commercial, or industrial development.
Actions & Policies

- Based on data collected
- Builds upon and attempts to achieve goals
- Wide range of possibilities, not applicable or desirable in every community
Policy Areas

- General policy
- Awareness
- Regulatory
- Incentives
- Control of hazards
- Public facilities and infrastructure
- Disaster recovery
- Emergency preparedness
- Public entity actions
Findings – policies & actions

- 45% of plans recommend a policy to discourage new development in flood risk areas
- 26% of plans suggest cluster developments, but 4% address it in the context of flood risk
- 55% of plans recommend policies for stormwater management
- Just 4% of plans recommend policies to protect critical facilities
Findings – policies & actions

- Except for cluster developments, very few plans recommend any other regulatory or incentive-type program to reduce future flood risk.
- Very few plans recommended any policies toward public facilities or transportation infrastructure and flood risk.
Plan Quality Compared to Insurance in Force

$y = 1E+07x - 4E+07$

$R^2 = 0.4709$
Plan Quality Compared to Number of Policies

\[ y = 61.124x - 157.16 \]

\[ R^2 = 0.3982 \]
Plan Quality Compared to % Residential Structures Insured

\[ y = 0.002x + 0.0241 \]

\[ R^2 = 0.0051 \]
Plan Quality Compared to Total Housing Units

\[ y = 6071.3x - 20007 \]

\[ R^2 = 0.4696 \]
Plan Quality Compared to Number of Losses

\[ y = 4.3154x - 1.9039 \]

\[ R^2 = 0.1367 \]
Plan Quality Compared to % of community in floodplain

\[ y = 0.0006x + 0.1842 \]

\[ R^2 = 9 \times 10^{-5} \]
Conclusions

- Comprehensive plans have room for improvement
- **Safety of citizens** should be included in plans
- **Natural hazards** are an important aspect to be addressed in a long-range plan
- **Planning** is part of the solution
NeDNR Technical Assistance

- Developed resource guide for comprehensive planning
- Met with the 6 main consulting companies that prepare comprehensive plans in Nebraska
- Offered trainings
- Assisted with elements of various plans during the planning process
- Provided language to Pilger Comprehensive Plan (voluntary effort) for future examples for other communities
Thank you!

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