

Threat Hazard Identification & Risk Assessment

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A decorative graphic consisting of several horizontal lines of varying lengths and colors (teal, light blue, white) extending from the right side of the slide towards the center.

What is a THIRA?

- It is a process to identify and evaluate hazards and risks.
- Assists in developing capabilities.
- Useful in creating a plan.

Boulder Office of Emergency Management

THIRA

Threat, Hazard Identification & Risk Assessment

Post 2013 Front Range Flooding Disaster
&
2014 Spring Run-off event

February 13, 2014

What are the Threats?



Contributing Factors

- Ground water saturation.
- Reservoirs at capacity
- Snow pack higher than normal.



What are the Hazards?

- Reduced capacity of creeks.
- Debris Dams.
- Creeks that have changed their location.
- Condition of the Creeks.
- Debris flows and landslides.

Sources of Information

- **City and County subject matter experts**
- **Consultants**
- **US Army Corps of Engineers**
- **National Resource Conservatory Service**
- **USGS**
- **National Weather Service**
- **Urban Drainage and Flood Control District**

Planning Assumption #1

- **Reduce Risk**



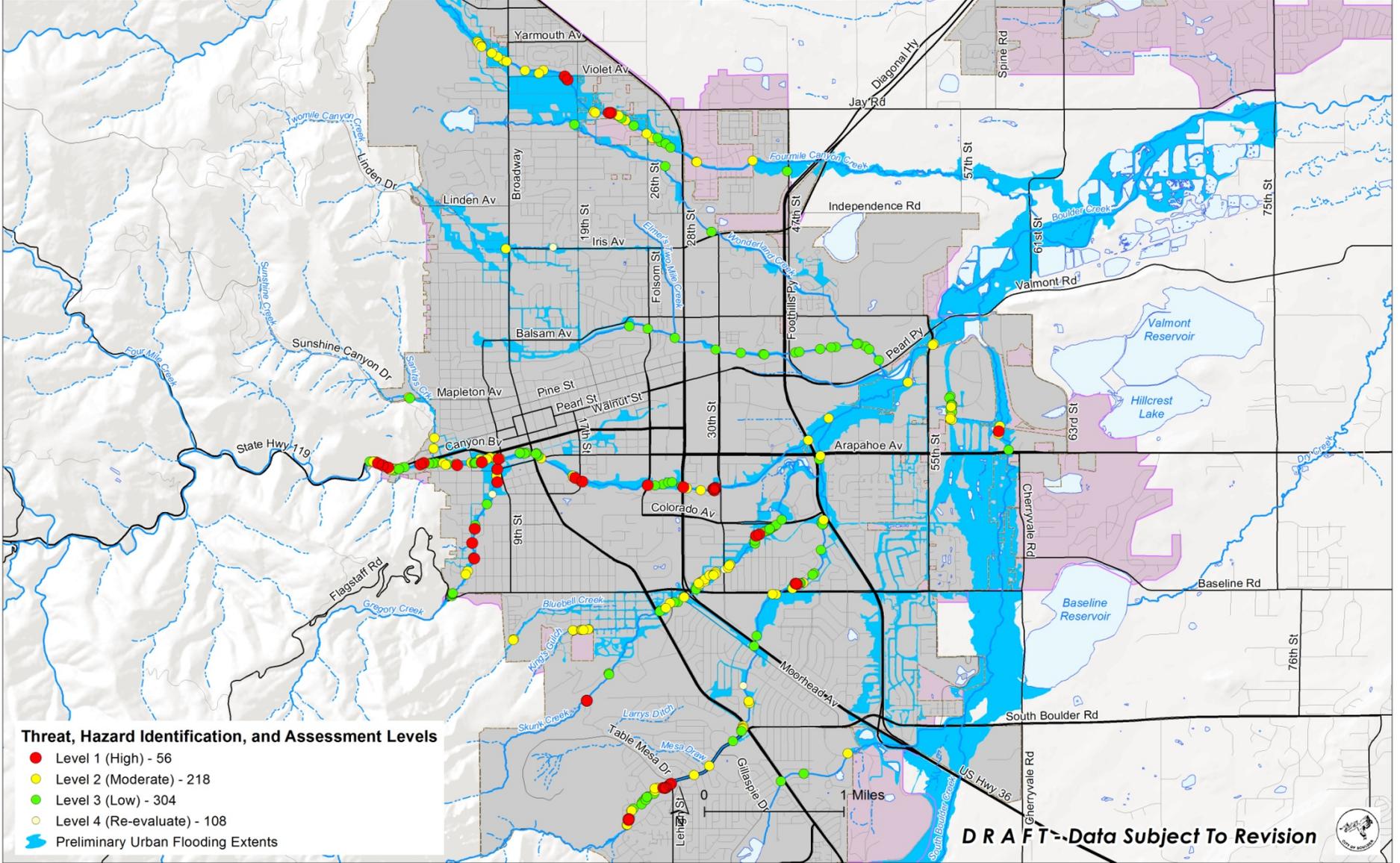
Planning Assumption #2

- **The risk cannot be completely removed or significantly reduced.**
 - Public Education.
 - First Responder Planning.
 - Public Works Planning.
 - Public Warning Refinement.
 - Emergency Evacuation Site & Sheltering.

Planning Assumption #3

- **A flood or landslide will happen**
 - A problem is identified and reported by residents.
 - Public works responds.
 - Communications notifies response agencies and provides public warnings.
 - Residents implement personal plans.
 - EOC support is initiated.
 - Sheltering plans are implemented.





Threat, Hazard Identification, and Assessment Levels

- Level 1 (High) - 56
- Level 2 (Moderate) - 218
- Level 3 (Low) - 304
- Level 4 (Re-evaluate) - 108
- Preliminary Urban Flooding Extents

0 1 Miles

D R A F T - Data Subject To Revision



The Assessment-

- **A Threat Priority Rating was established for each site.**
- **Emergency Mitigation Measures were identified to assist with recovery and preparations for spring runoff.**

Numbers by Threat Rating-

City of Boulder

- 56 – Level 1
- 218 – Level 2
- 304 – Level 3
- 108 – Level 4

County

- 90 – Level 1
- 83 – Level 2
- 16 – Level 3
- 17 – Level 4

Threat Level 1

- **Level 1- The probability and risk is high**
 - **Woody debris damming, blocking culverts or bridges.**
 - **Deposition of sediment reducing capacity.**
 - **Bank erosion or avulsions will not handle creek flow.**
 - **Structures are in great danger of being impacted by spring run-off.**

Threat Level 2

- **Level 2- Moderate probability and risk**
 - **Same issues as Level 1 but to a lesser degree**

Threat Level 3

- **Level 3- Low probability and risk**
 - **Woody debris has a lower potential to cause damage unless unexpected conditions are present.**
 - **Deposition of sediment is not likely to cause flooding unless higher stream flows occur.**
 - **Bank erosion or avulsions will not cause flooding unless extreme conditions are present.**
 - **Structures unlikely to be in danger from spring run-off unless extreme conditions are present.**

Threat Level 4

- **Level 4-**
 - **Needs to be evaluated after the spring run-off and the risk re-evaluated.**

By Emergency Mitigation Measures-

City of Boulder

- 174 Bank Stabilization
- 159 Debris Removal
- 3 Berm Construction
- 261 Sediment Removal
- 1 Stream Design/Realignment
- 10 Culvert Damage
- 55 Drop Structures
- 23 Flood Walls
- 38 Significant Homes Damage
(excludes homes totally destroyed)

Boulder County

- 43 Bank Stabilization
- 94 Debris Removal
- 3 Berm Construction
- 18 Restore Conveyance
- 2 Stream Design/Realignment
- 28 Culvert Assessment
- 17 Significant Home Damage
(excludes homes totally destroyed)

Other Conditions

- **Timing**
- **Unpredictability**
- **Funding**
- **Presentation of Hazards**

Target Capabilities Required

Threat

- Spring Run-Off
- Woody Debris
- Thunderstorms
- Debris flows and landslides

Capabilities needed to handle

- Remove to a 5 year flood event.
- Remove sediment within 200 feet of all infrastructure.
- Community preparedness meetings.
- First responder flood plan.
- Public warning protocol.
- Evacuation and sheltering plan.

Completed Target Capabilities

- Risk and Hazard Assessments. - Completed
- Community preparedness. - Ongoing
- Emergency response plans. - Improved
- Public warning. – In Place
 - Outdoor warning system
 - Everbridge telephone warning system
 - Weather Service
 - News agencies
 - BCARES

Plans

- **Public Works and County Roads Debris and Landslide Response Plan.**
- **Boulder County Operational Flood Response Plan.**
- **Boulder Resource Mobilization Plan.**
- **Boulder Emergency Operations Plan.**
- **Boulder Emergency Operations Center Operations Manual.**
- **Boulder Evacuation and Sheltering Plan.**

Conclusion

- **Action Steps Required to prepare for spring runoff and thunderstorms.**
 - **FEMA Threat Reduction in Rivers and Creeks Program.**
 - **Community messaging and preparedness.**
 - **Emergency Response plans and coordination.**
 - **Roadway and infrastructure response plans.**
 - **Currently we are actively working to deal with threats.**



Questions?