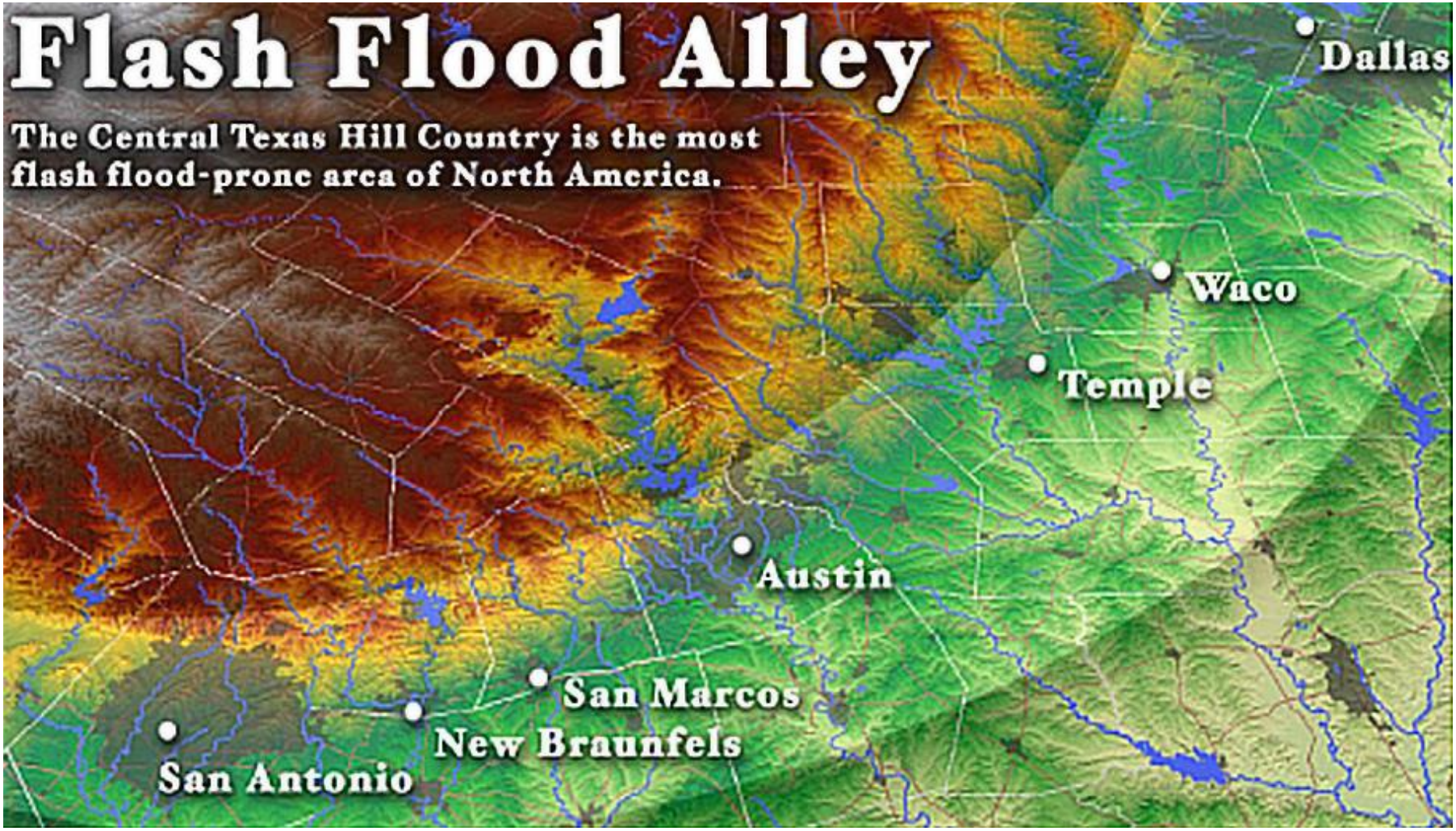
How Floodplains Work

Open Space, Environment, and Sustainability Committee

May 26, 2016

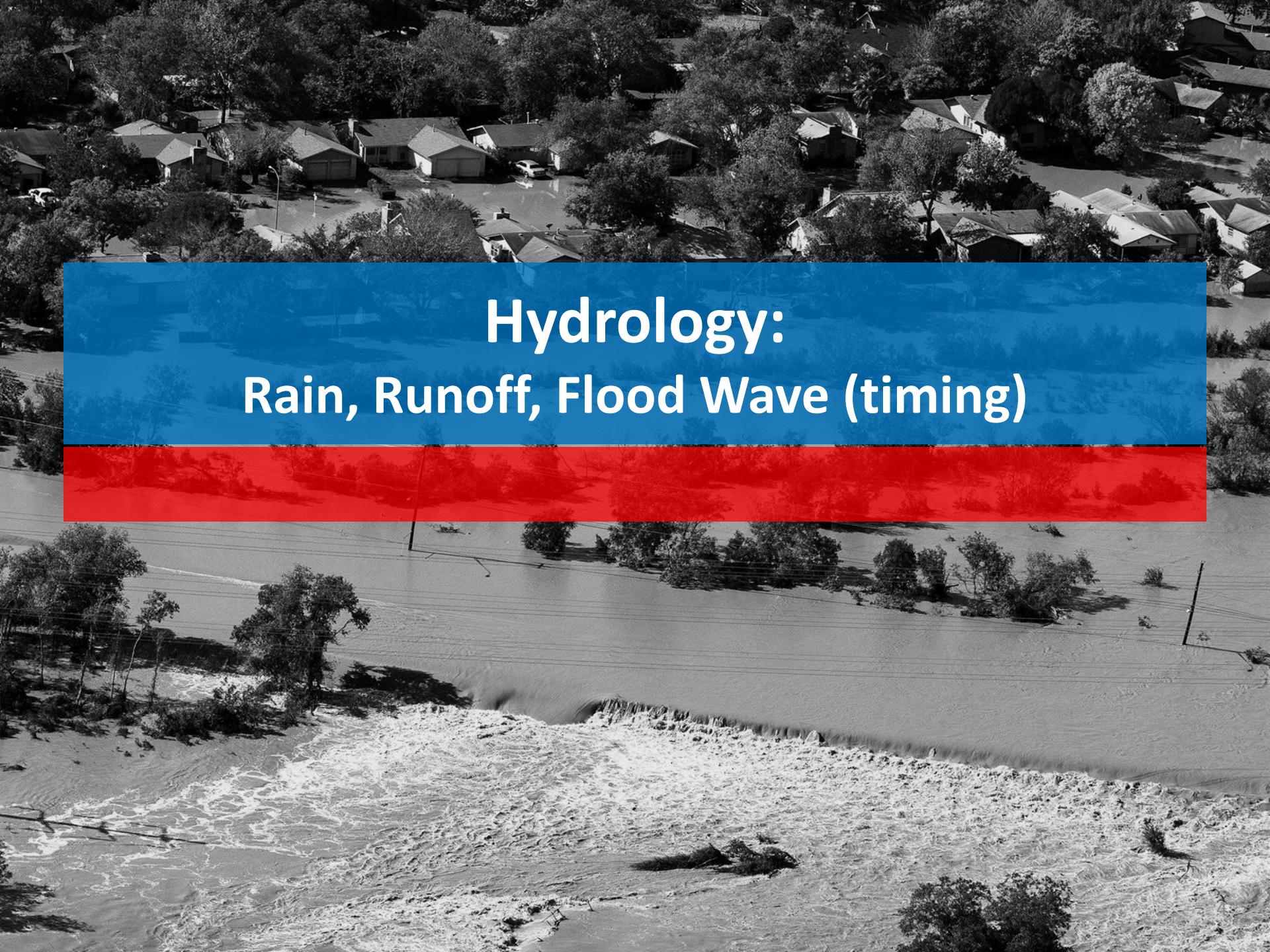
City of Austin
WATERSHED PROTECTION

Floodplains in Flash Flood Alley



What is a Floodplain?

The floodplain is the area of land that is likely to be under water when the creek overtops its banks. In a sense, the floodplain is the full extension of the creek.



Hydrology:
Rain, Runoff, Flood Wave (timing)

Rainfall

- Historical rainfall data
- Statistically derived rainfall data

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- Statistically derived rainfall data
  - 1% annual chance rain (i.e. has a 1% chance of happening every year)
  - Commonly called the 100-year rainfall
  - Can occur multiple times per year
  - Does *not* mean that it will be another 99 years before it happens again
  - 2-year (50%), 10-year (10%), 25-year (4%), 500-year (0.2%)

Rainfall: Actual vs. Hypothetical

- Actual – flood warning

- Hypothetical (design storm) – regulatory

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  - October 30, 2015 = 14 inches, 6 hours
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- Actual – flood warning
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- Hypothetical (design storm) – regulatory
  - 1% annual chance (100-year) rain, 24 hours = 10.2 inches
  - 50% annual chance (2-year) rain, 24 hours = 3.4 inches
  - 0.2% annual chance (500-year) rain, 24 hours = 13.5 inches
- Both depth and duration (intensity) matter

Runoff

- Land use
  - Existing conditions (FEMA)
  - Fully developed conditions (Austin)
- Soils
  - Impervious cover

    vs. saturated soils
- Basin slope

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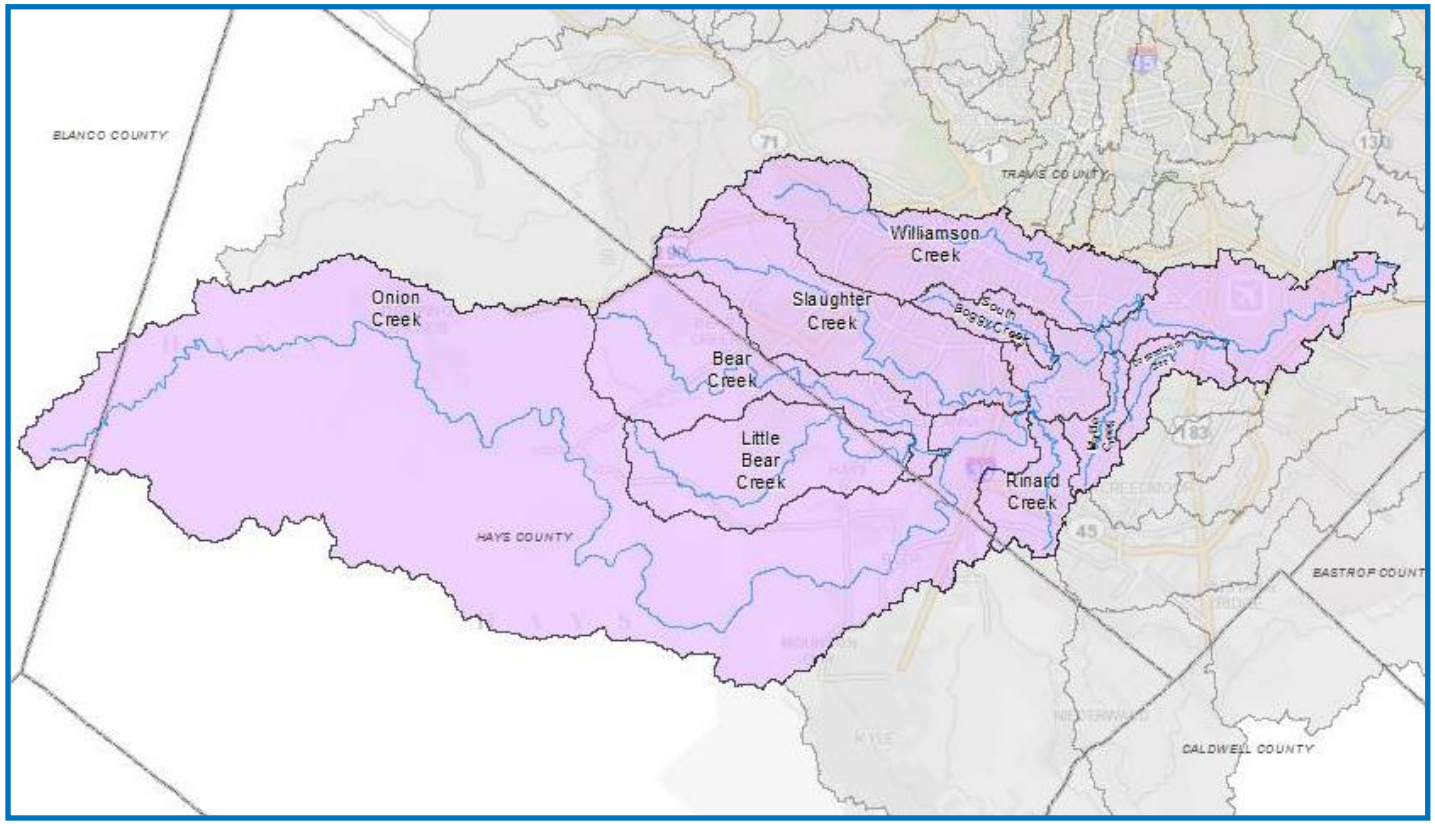
Flood Wave (Timing)

- Tributary timing
- Detention



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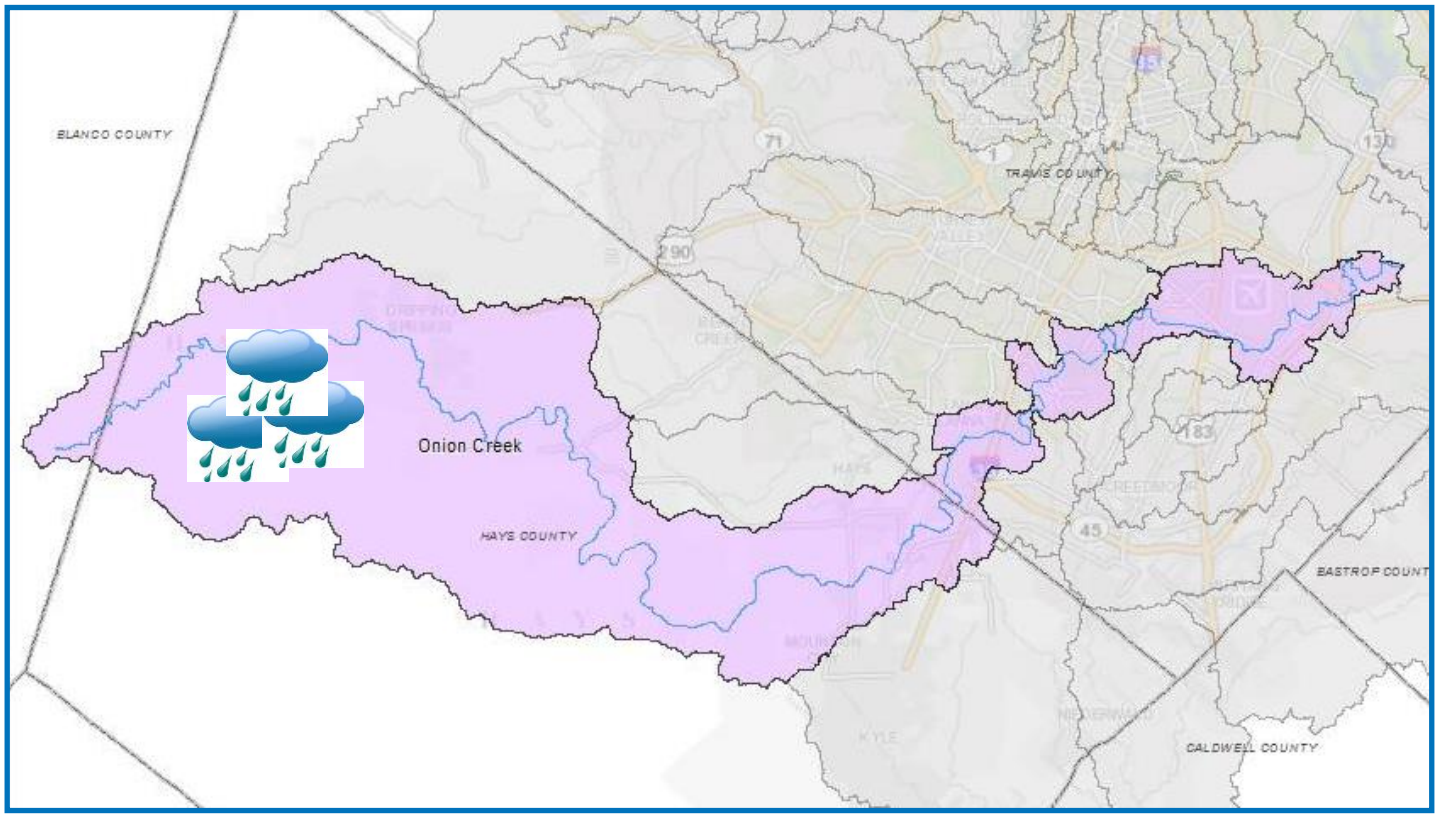

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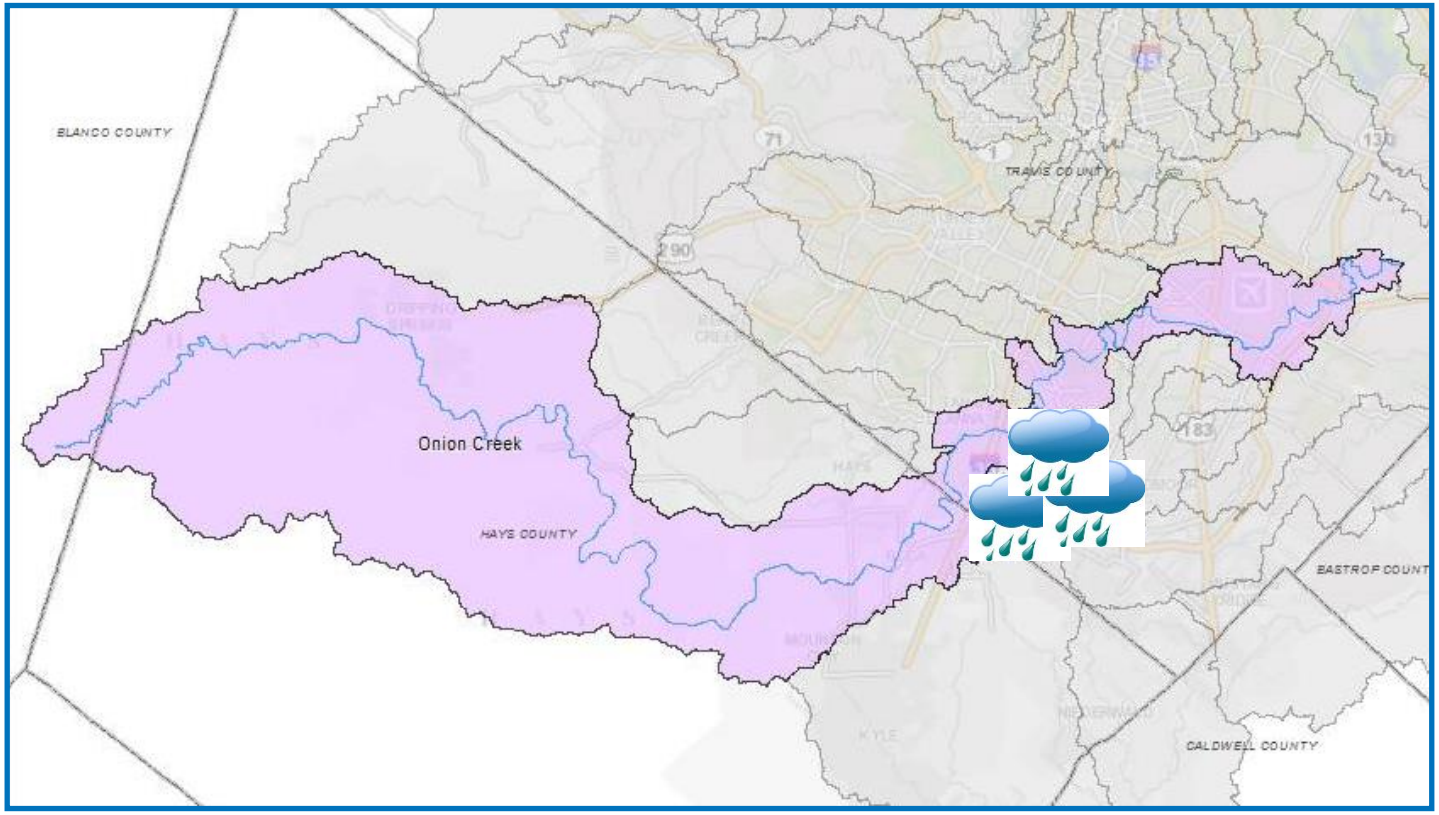
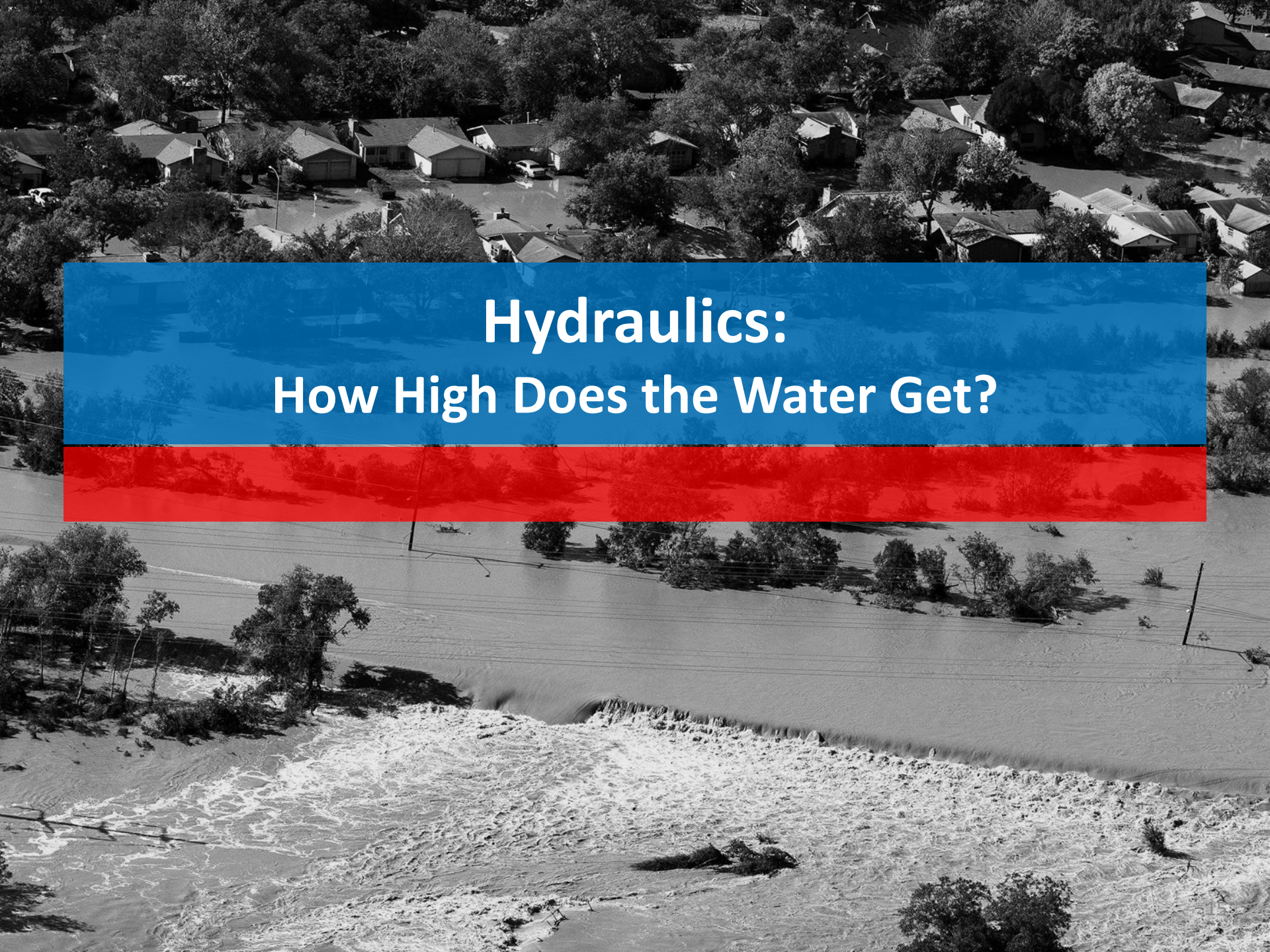
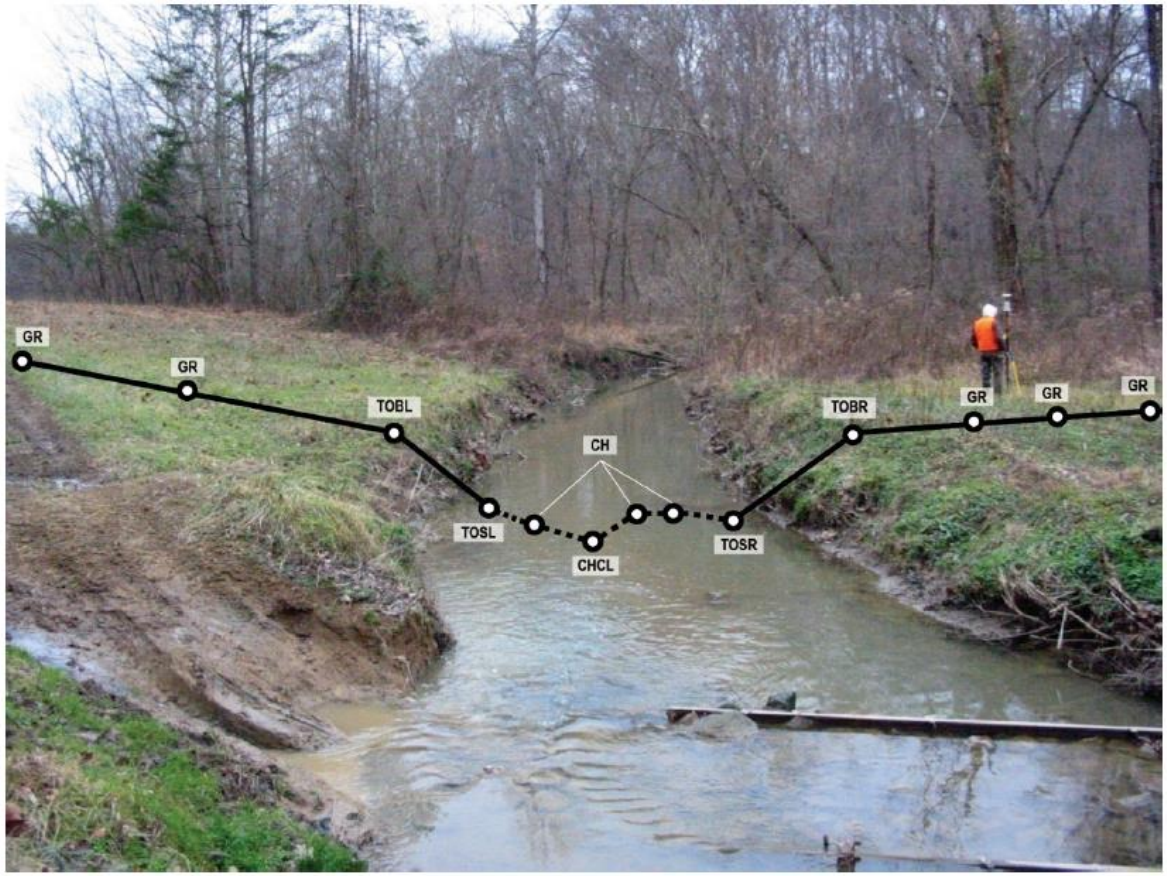




Hydraulics:
How High Does the Water Get?

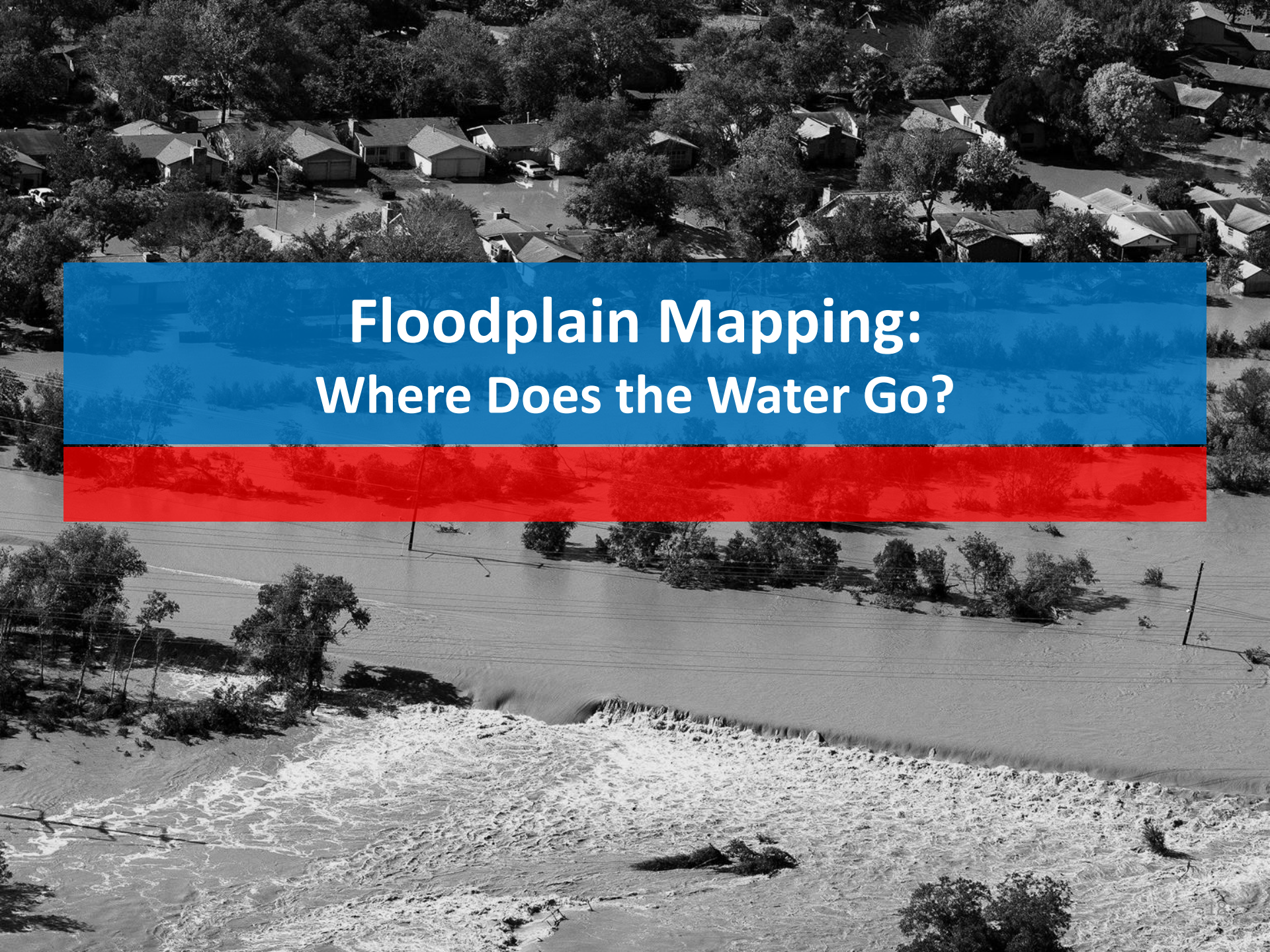
Floodplain Hydraulics

- Survey and topographic data
- Channel/floodplain shape



Floodplain Hydraulics

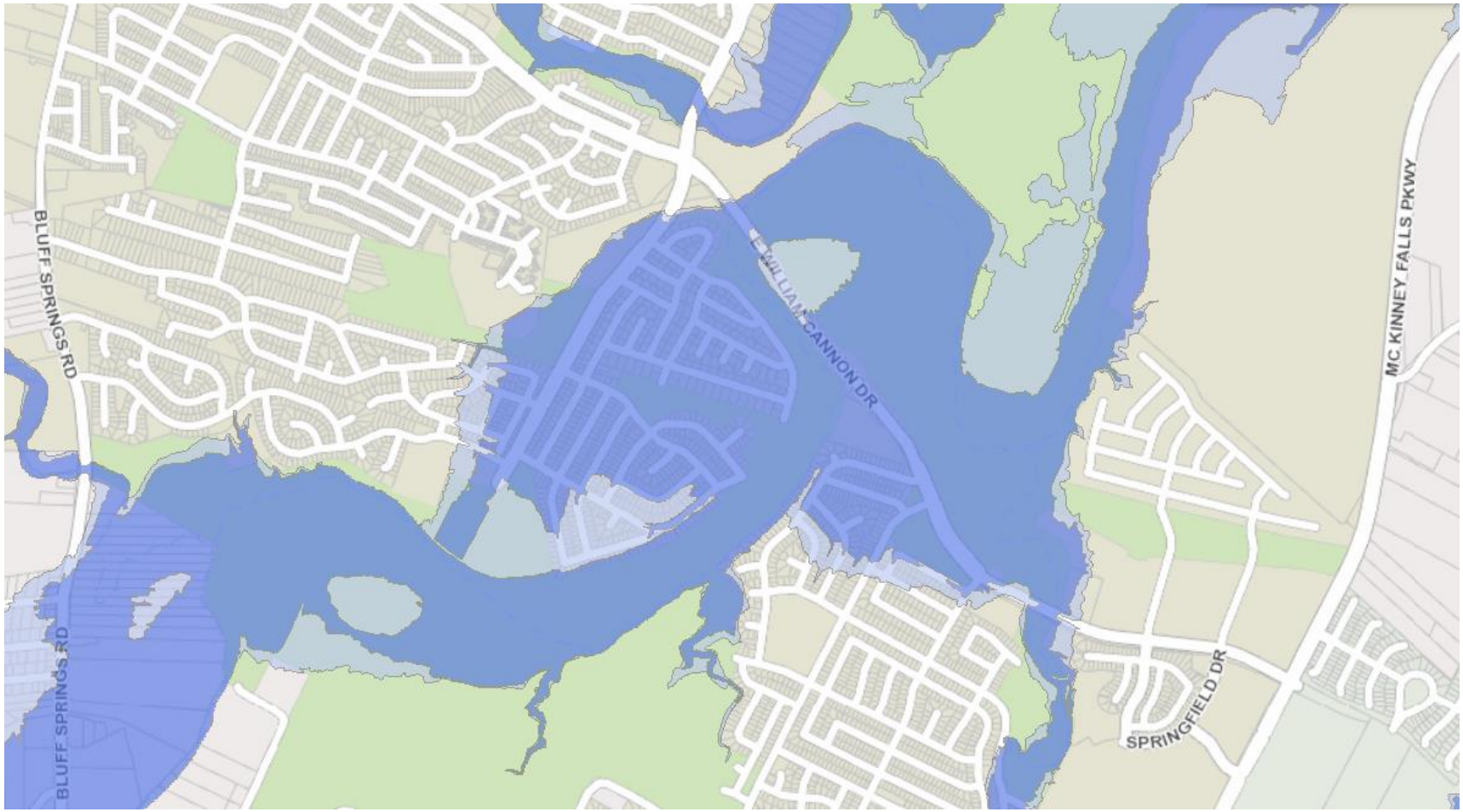
- Friction
  - Roughness – vegetation,
    rock-lined channel, concrete, etc.
- Obstructions
  - Bridges, culverts,
    weirs
  - Buildings



Floodplain Mapping:
Where Does the Water Go?

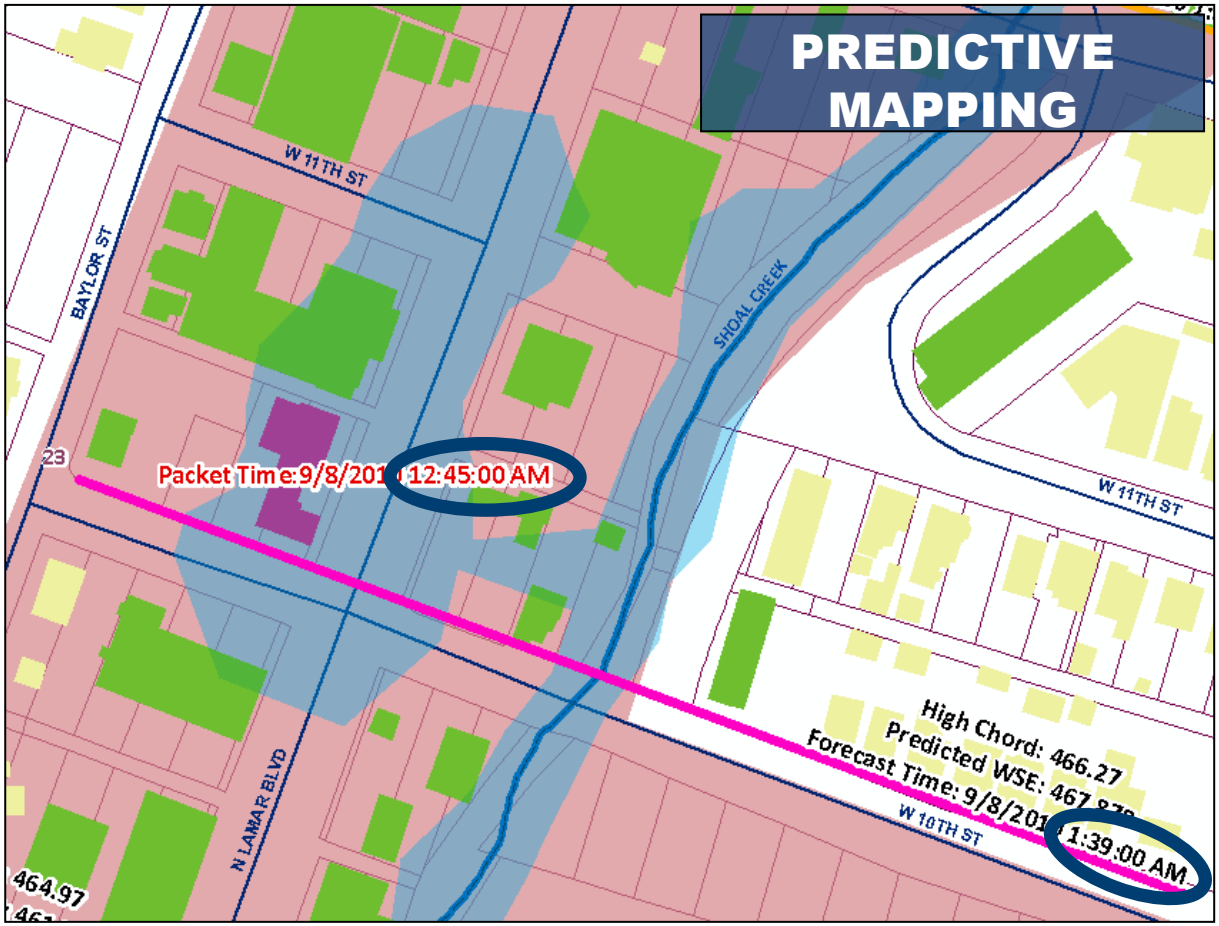
Floodplain Mapping

- Hypothetical – regulatory – ATXfloodpro.com



Mapping: Hypothetical vs. Actual

- Actual – flood warning



Importance of Floodplain Knowledge

- Understand risk
  - ~ 5,100 buildings in 100-year floodplain
  - ~ 400 roadway crossings in 100-year floodplain
- Prevent future flooding
  - Development regulations
- Mitigate existing flooding

Flood Mitigation Policies

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- Acquisition and Relocation
  - Follow Federal Uniform Relocation Act
  - FMTF recommends consistency with recent buyouts

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Questions

City of Austin
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