Climate Change Adaptation Workshop

September 2013

Climate Change Adaptation in the City of Ann Arbor

Lessons and Highlights from a Half-day workshop

September 25, 2013 - Cobblestone Farms

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Workshop Goals

- How is climate expected to change?
- Where do expected changes overlap with current infrastructure investments (25, 50, 70 years)?
- What are the likely impacts?
- What are our existing strategies?
- Where should we focus staff and fiscal investments?

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Workshop Participants

- 40 city staff - all 4 service areas - 20 city units

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Impacts

Changes in temperature and precipitation throughout the region will lead to many impacts in both built and natural environments:

- Fish
- Water
- Energy
- Forests
- Agriculture
- Biodiversity
- Public Health
- Transportation
- Birds and Wildlife
- Tourism and Recreation

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Impacts – Great Lakes Region

Temperature

- Increased by 2.3°F (1.3°C) from 1968 to 2002.
- Anticipated increase of 1.8 to 5.4°F (1 to 3°C) by 2050.

Precipitation

- Annual average precipitation will likely increase or remain nearly stable.
- Winter and spring precipitation may increase more significantly.

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Impacts – Great Lakes Region

Extreme Weather Events

- Frequency and intensity of severe storms has and will continue to increase.
- Intensity of the heaviest 1% of precipitation events increased by 31% in the Midwest.

Snow and Ice Cover

- From 1973 to 2010, annual average ice coverage on the Great Lakes declined by 71%.

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Impacts – Michigan Climate - 2100

Temperature Change 2100

- Winter + 7 (5-10)°F
- Summer + 9 (5-12)°F
- Extreme heat more common

Precipitation Change 2100

- Increasing in Winter, Spring, Fall
- Decreasing in Summer – drier soils, more droughts
- More extreme events – storms, floods
- Ice cover decline will continue

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Great Lakes Adaptation Assessment - Cities

- Developing adaptation strategies to existing and anticipated climate change.
- Building a network of cities and practitioners across the region.

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GLISA

Great Lakes Integrated Sciences Assessment

- Providing locally relevant historical and future climate data.
- Engaged with partners ranging from cherry farmers to watershed managers to city staff throughout the region.

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Key Climate Changes for A2

Presentation by Dan Brown, GLISA

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30 year period comparisons

- Changes measured in Ann Arbor over the last sixty years.
- Based on historical data from local weather station.
- Compares average temperature and precipitation from 1951 – 1981 to averages from 1981 – 2010.

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What are the Ann Arbor trends?

- Warmer average temperatures
- Warmer low and nighttime temperatures
- More potential for extreme heat and drought
- Shorter winters
- More total precipitation
- More severe precipitation events

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Pre-Workshop Survey

Impacts

- Safety concerns (i.e., roads)
- ↑ storm damage (i.e., downed trees, hail damage)
- ↑ costs for water treatment
- Flooding (roads and homes)
- ↓ need for plowing; ↑ need for de-icing
- ↑ power demand
- ↑ staffing needs
- ↑ sewer back-ups

Existing Strategies

- Property Assessed Clean Energy
- Urban and community forest management plan
- Studying future weather patterns
- ↑ use of technology for advanced public warning
- ↑ plant capacity
- Exploring weather safety aspects for worker protection
- Trying to build units on higher ground – not in floodway

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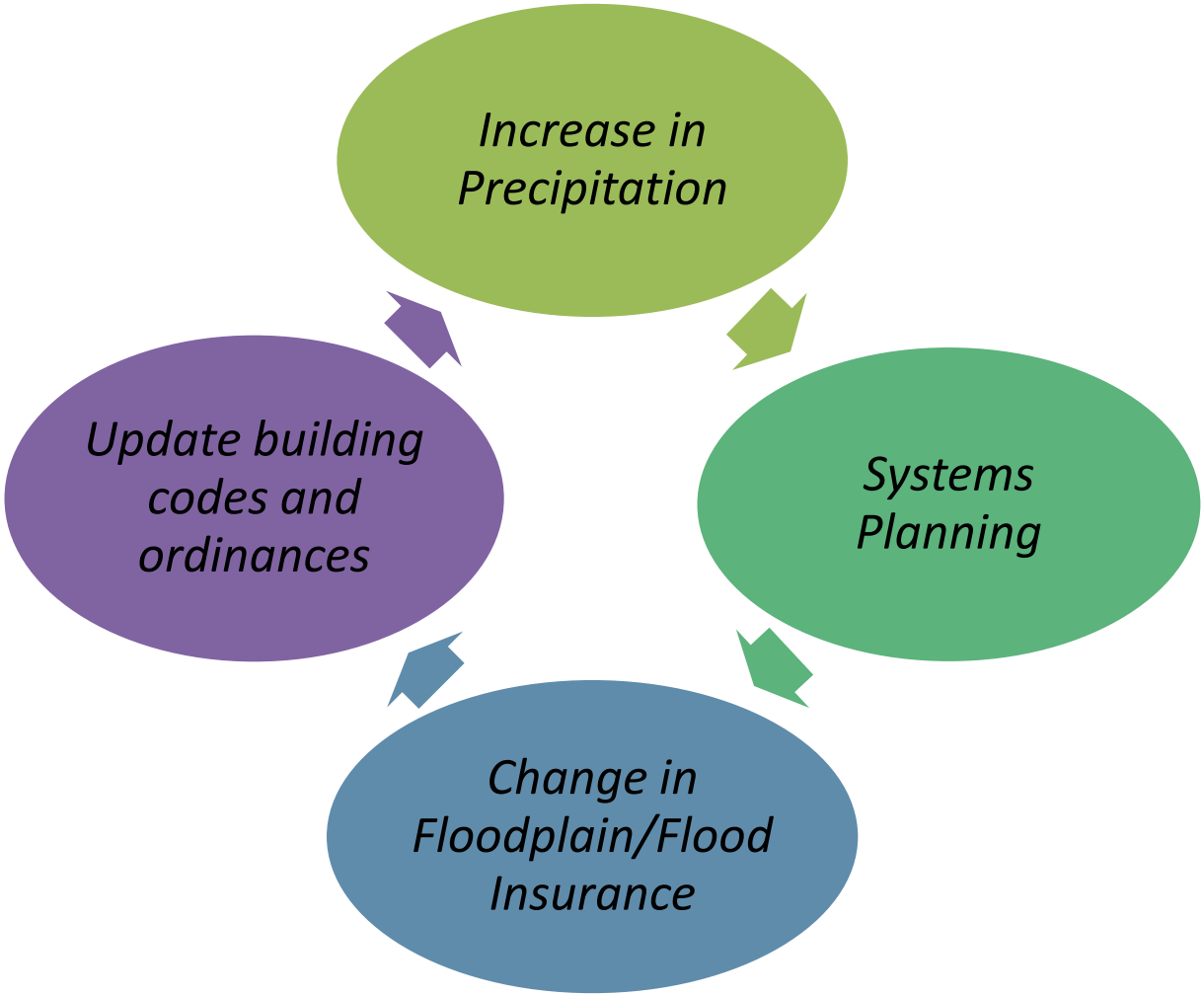
Linking Impacts to Strategies



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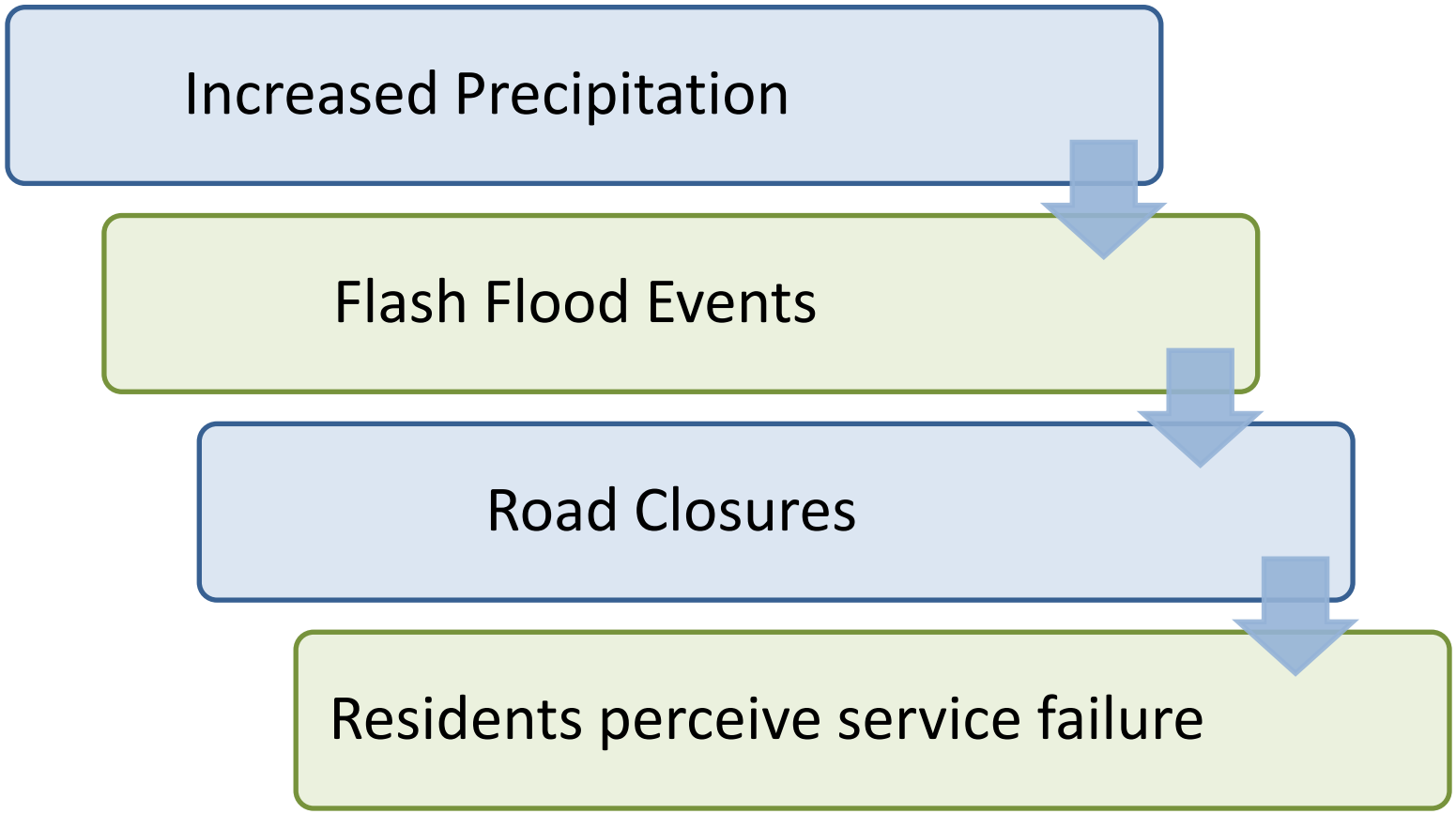
Visualizing Cascading Impacts



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Warmer Average Temperatures

Impacts on Service Delivery

- ↑ swimming/canoeing
- ↑ pesticide/herbicide use
- ↓ winter fleet demands
- ↓ road damage
- Challenging working conditions, worker safety/fatigue
- Shifts in species (trees, plants, insects)
- ↑ costs and maintenance

Strategies Identified

- Diversify tree species, landscape ordinances, and street trees
- More sustainable energy
- Water conservation/education
- Drought resistant trees and vegetation (landscape standards, tree planting, education)
- Equipment modification (canopies, cooling areas)

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Warmer Low/Nighttime temps

Impacts on Service Areas

- ↓ salt sand de-icing
- ↑ party activity
- ↑ visitors pools & golf courses
- ↑ demand on grid
- Longer construction season
- ↑ energy costs in summer (electricity)
- ↓ heat costs in winter (natural gas)
- Greater biological nutrient removal

Strategies Identified

- Buildings change in architecture, efficiency, etc
- Incentivizing efficiency improvements
- Identify key areas (for heat interventions) with poorer residents
- Encourage alternative landscaping: natives & rain gardens

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Shorter Winters

Impacts on Service Areas

- ↓ snow removal
- Shift in outdoor recreation
- ↓ ice removal at dams
- ↑ H20 usage during 'shoulder seasons'
- ↑ frost law period
- ↑ freeze/thaw
- ↑ mental health (less SAD)
- Impacts on plant life - different crops due to amount of dormancy
- Impact on natural infrastructure

Strategies Identified

- Reevaluate programming and staffing needs
- Increase and improve long term planning efforts
- Attain better predictions of economic growth – tourism, migration, etc.

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More Total Precipitation

Impacts on Service Areas

- ↑ runoff/flooding
- ↑ road repairs
- ↓ irrigation – revenue
- Change in flood plains, flood insurance
- Current 10 yr storm design standard inadequate
- More difficult to soften water
- ↑ mowing
- More changing species/ vegetation management

Strategies Identified

- Ordinance prohibiting flood plain development
- Incentives to repurpose flood plain properties
- Incentives for green infrastructure
- Increase WWTP capacity and treatment separators

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More Severe Precipitation

Impacts on Service Areas

- ↑ flooding (contamination, run-off, CSOs)
- ↑ property damage
- ↑ staffing at dams
- ↑ power failures
- ↑ health Impacts
- Negative impact on emergency team response
- Communication limitations without power access
- Regulatory agency punitive results
- Localized flooding in parks

Strategies Identified

- More porous surfaces
- Flood mitigation efforts
- Educate, communicate and collaborate across the city and other agencies
- On site source control, greater infiltration, evaporation
- Reduce facility/property damage through grading, drain off site and storage of rain, cisterns, rain barrels
- More targeted outreach, more table top exercises

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More Extreme Heat/Drought

Impacts on Service Areas

- Negative impacts on water and wastewater systems
- Water restrictions
- ↑ in energy usage – rise in CO_2 emissions
- Health impacts of people who must work outside (city staff and residents)
- Impacts on cultural events (Art Fair heat!)
- Fire suppression issues

Strategies Identified

- Targeted tree planting
- Affordable housing, evaluate cooling needs, funding opportunities, partnerships with DTE, Feds, contractors
- Cooling center (Miller & Baker)

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Common Impacts across Service Areas

- Public health
- Water quality and quantity
- Plant species – tree canopy stress
- Staffing needs timing, location, and responsibilities
- Infrastructure – flooding risk, freeze/thaw stress, extended heat stress

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Common Strategies across Service Areas

- Increase tree diversity and canopy
- Update ordinances and building codes, especially in flood plains
- Increase education and outreach (including to tenants)
- Create incentives for private property green infrastructure and efficiency improvements

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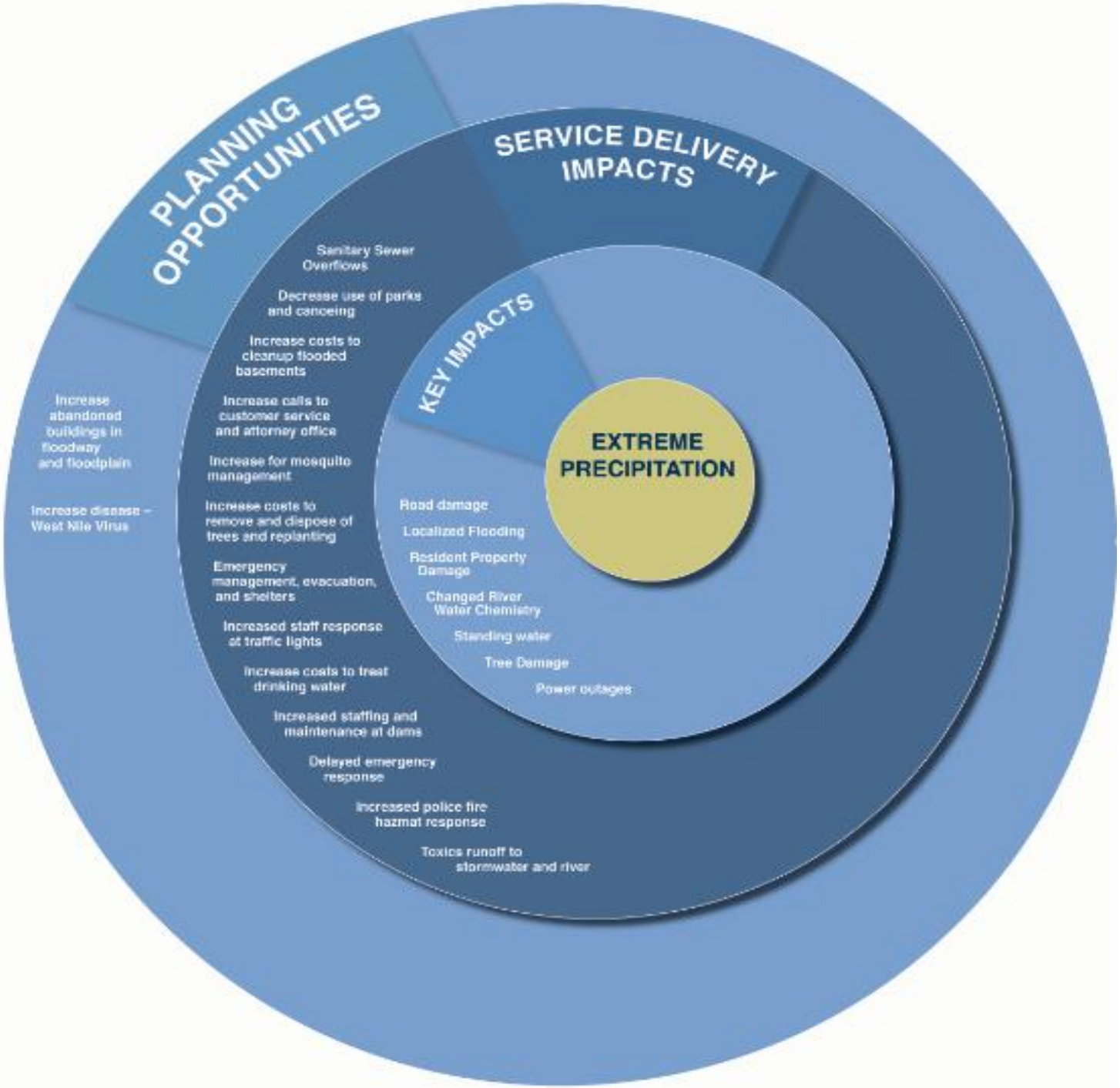

COMMUNITY IMPACTS

Rightsizing infrastructure to climate changes

Increase rainwater capture and reuse
Increase abandoned buildings in floodway/ plain

Support future funding for greenbelt land purchases around Ann Arbor

Evacuation Planning
Increase grey water reuse

Promote conversion to green roofs for commercial and industrial buildings