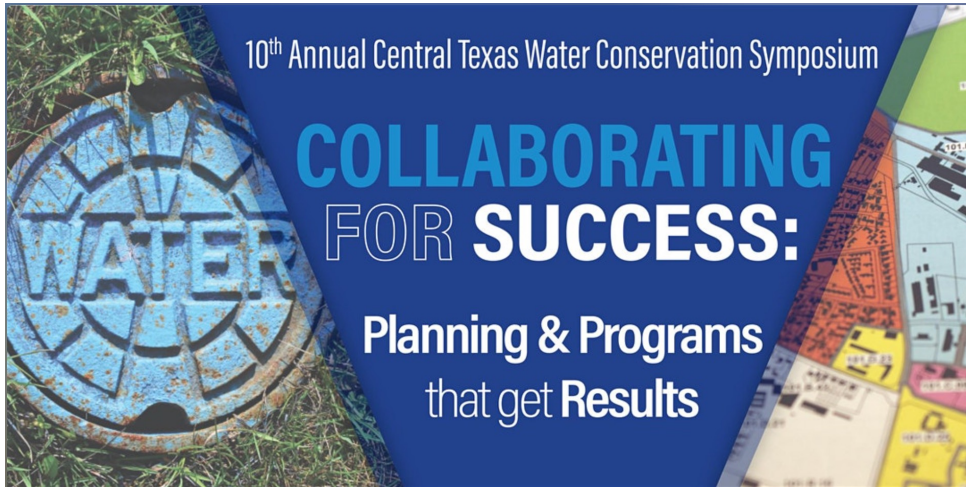
Water + Planning:
The Value of Land Use Planning in Achieving Improved Water Efficiency

Bill Cesanek, AICP
Co-Chair, APA Water + Planning Network

Thursday, February 13, 2020
Austin, Texas



Presentation Topics

- Part 1 -The Challenge: Growth and Resource Constraints
- Part 2 – Uncertainty & Risk
- Part 3 – Planning Resilience
- Part 4 – APA Water + Planning Network

Presentation Idea Map:

- Supply challenges + growth = uncertainty
- Uncertainty also derives from drought, uncontrolled demand, growth, pollution, climate variability
- Uncertainty is reduced by creating resilient solutions
- Resilience is achieved through:
  - integrated approach to meeting demand
  - source water protection & preservation
  - planned management of growth/land use

Growth & Land Development

Increasing Water Demand

Uncertainty / Risk

What's Coming Up: USA GROWTH
Year 2014 to Year 2060

- Increased population = 95 million
- Increased employment = 10 million per decade (40 million total)
- Food/agriculture needed for increased population
- Energy needed for new population & employment
- Growth is mainly in water-conflicted locations

Planners help towns, cities, and regions to plan the location, scale, density, arrangement, and types of this growth…

Texas Growth

TEXAS TRIANGLE

AN EMERGING MEGA REGION

The entire area could become one giant metropolis with a 19 percent growth in residents (more than 3.5 million people)—from 18.14 million in 2015 to 21.65 million in 2030—bringing it close to the current population of the New York City metro area (20.18 million people).

"The TEXAS TRIANGLE IS...

- ✓ Anchored by Austin, Dallas-Fort Worth, Houston and San Antonio metro areas
- ✓ Home to 7 of the states 10 biggest universities
- ✓ Home to 18.14 million residents
- ✓ Home to 53 of the state's 54 Fortune 500 companies. "
- ✓ A 2008 report by urban planners at Texas A&M calls the Triangle "one of the most dynamic urban regions in the nation," rivaling both New York and L.A.
- ✓ If the Triangle's population grows as foreseen, the megaregion will become even more dynamic -- and crowded.

Austin Growth

Between 2010-15, Austin was the 2nd fastest growing city (16%) and MSA (18.8%) in the nation.

Austin is forecast to grow 55% by 2030, or to a population of nearly 2.8 million.

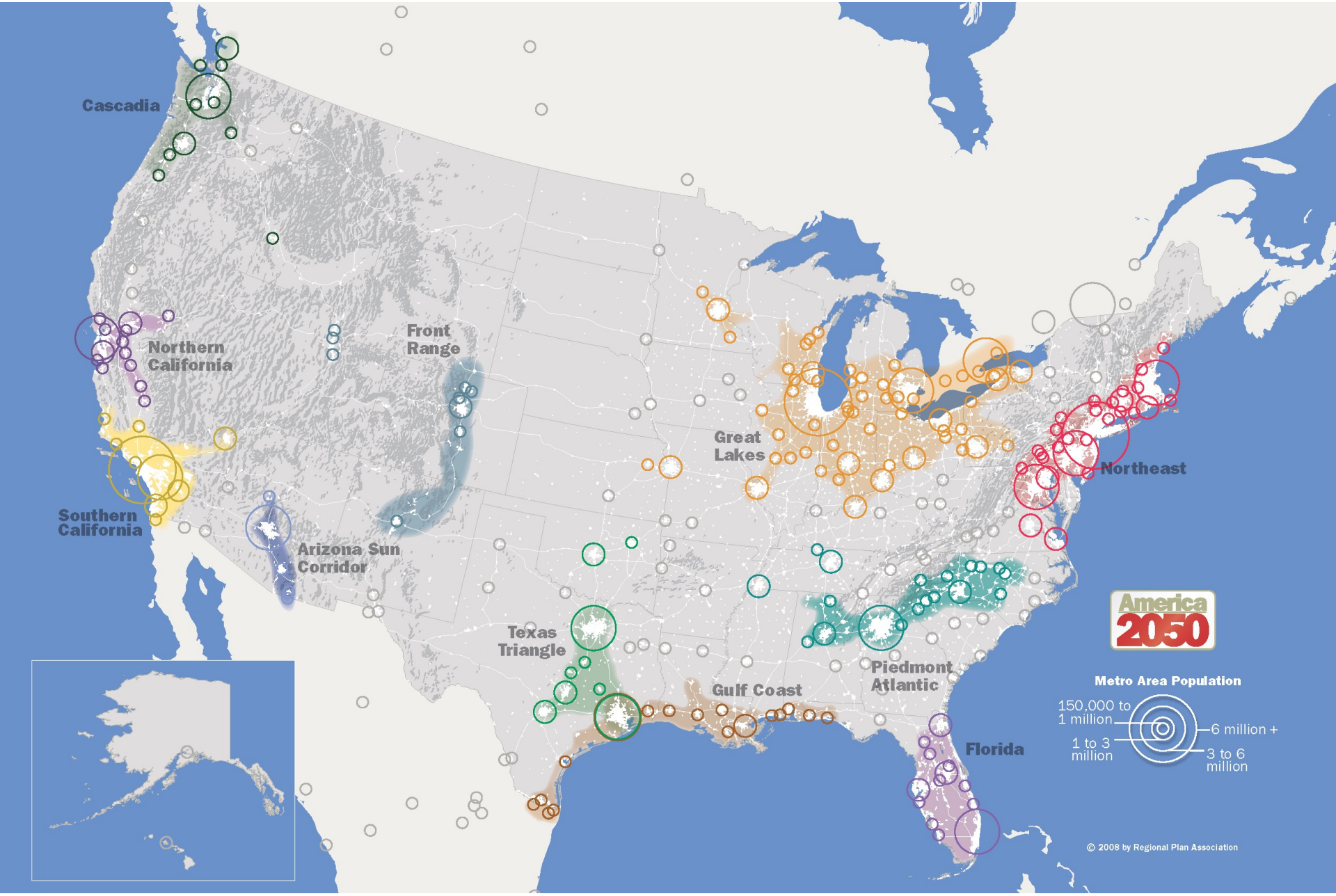
"Austin could become part of a huge megalopolis"

2 million

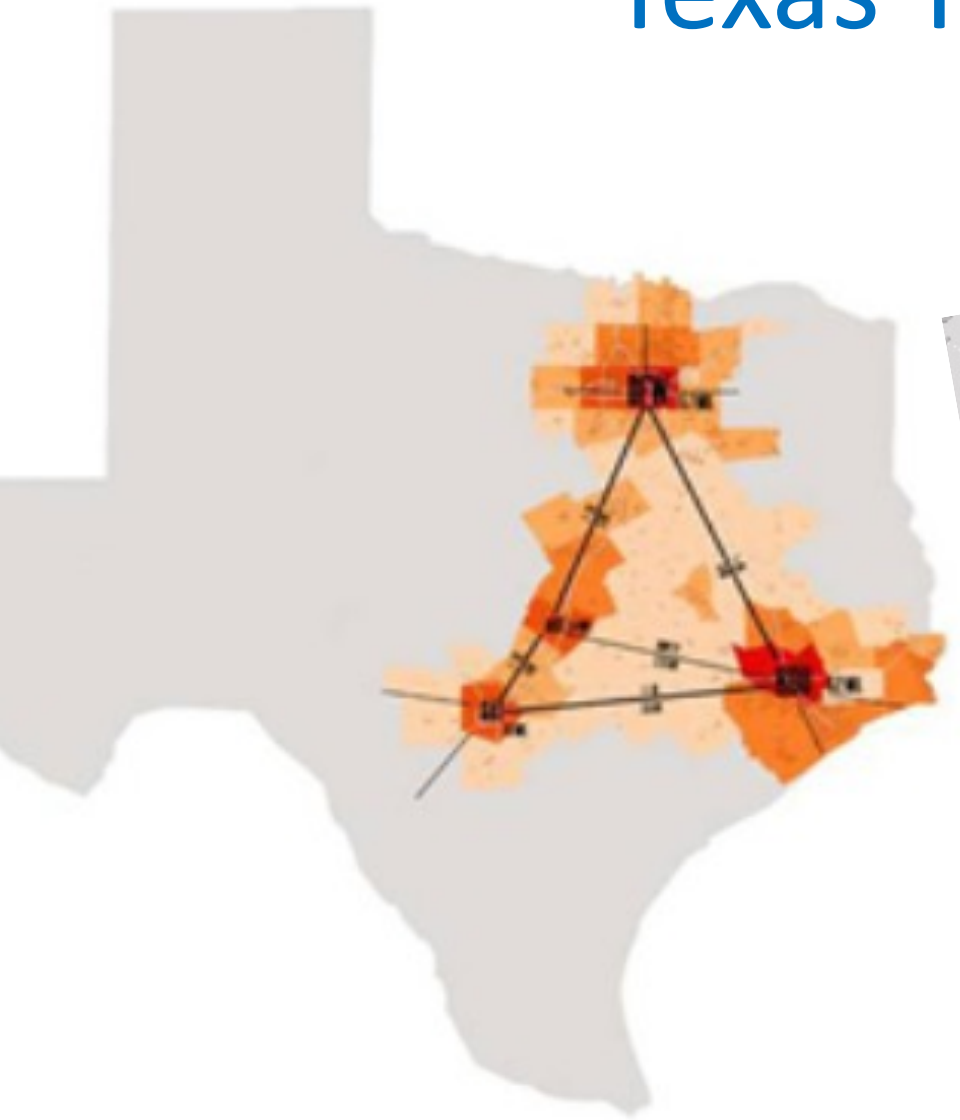
Austin area population in 2015

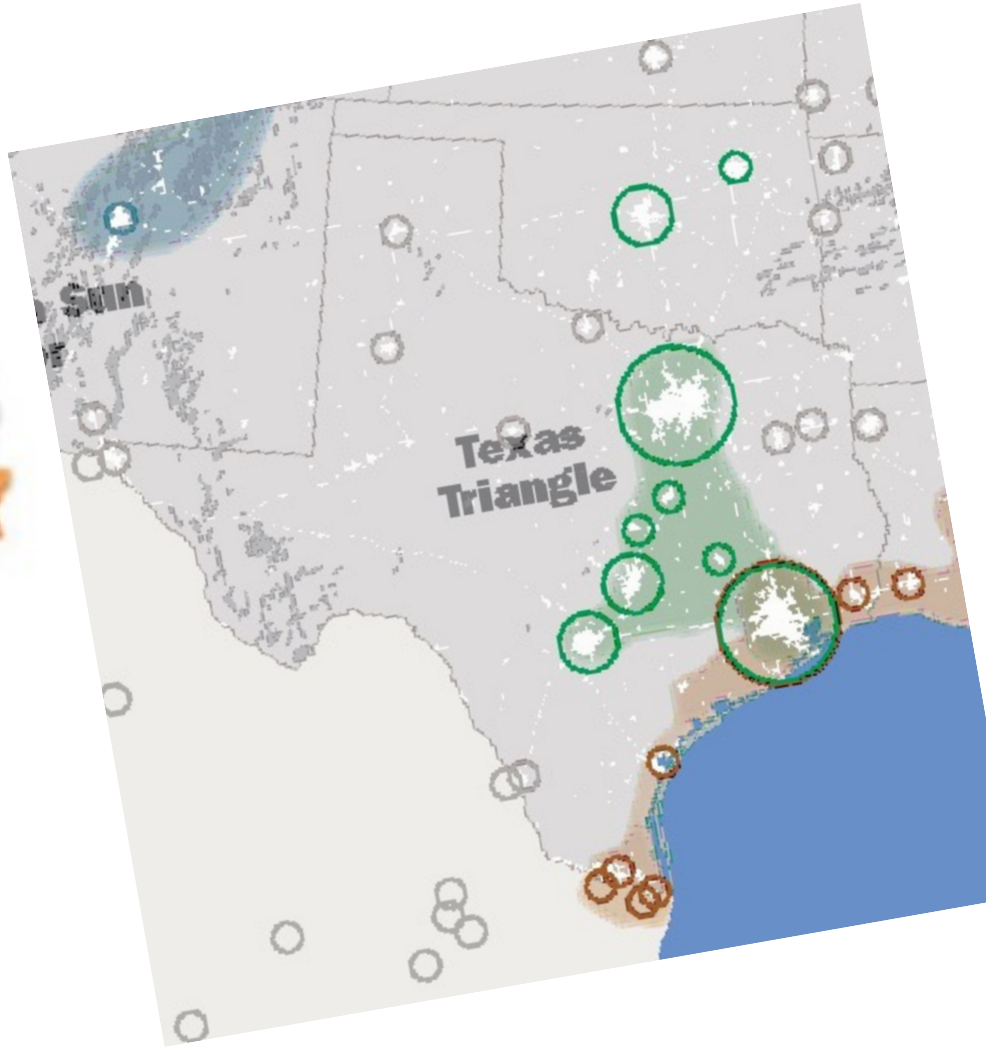
2.44 million

Austin area population in 2030 (projected)


Cascadia
Northern California
Front Range
Southern California
Arizona Sun Corridor
Great Lakes
Northeast
Texas Triangle
Gulf Coast
Piedmont Atlantic
Florida
America 2050
Metro Area Population
150,000 to 1 million
1 to 3 million
3 to 6 million
6 million +
© 2008 by Regional Plan Association

Texas Triangle





Megaregions

America 2050

- What urban, environmental, and economic functions are best captured at this scale?
- How are individual megaregions engaging in economic competition amongst one another? How are cities within competing?
- What policy levers are missing to enable planning at this scale?
- How will the incredible economic ascent of this region stress available resources?

Planning Approaches to Resilience:

- One Water
- Comp Plan
- Smart Growth

Water: A Top Ten Planning Issue

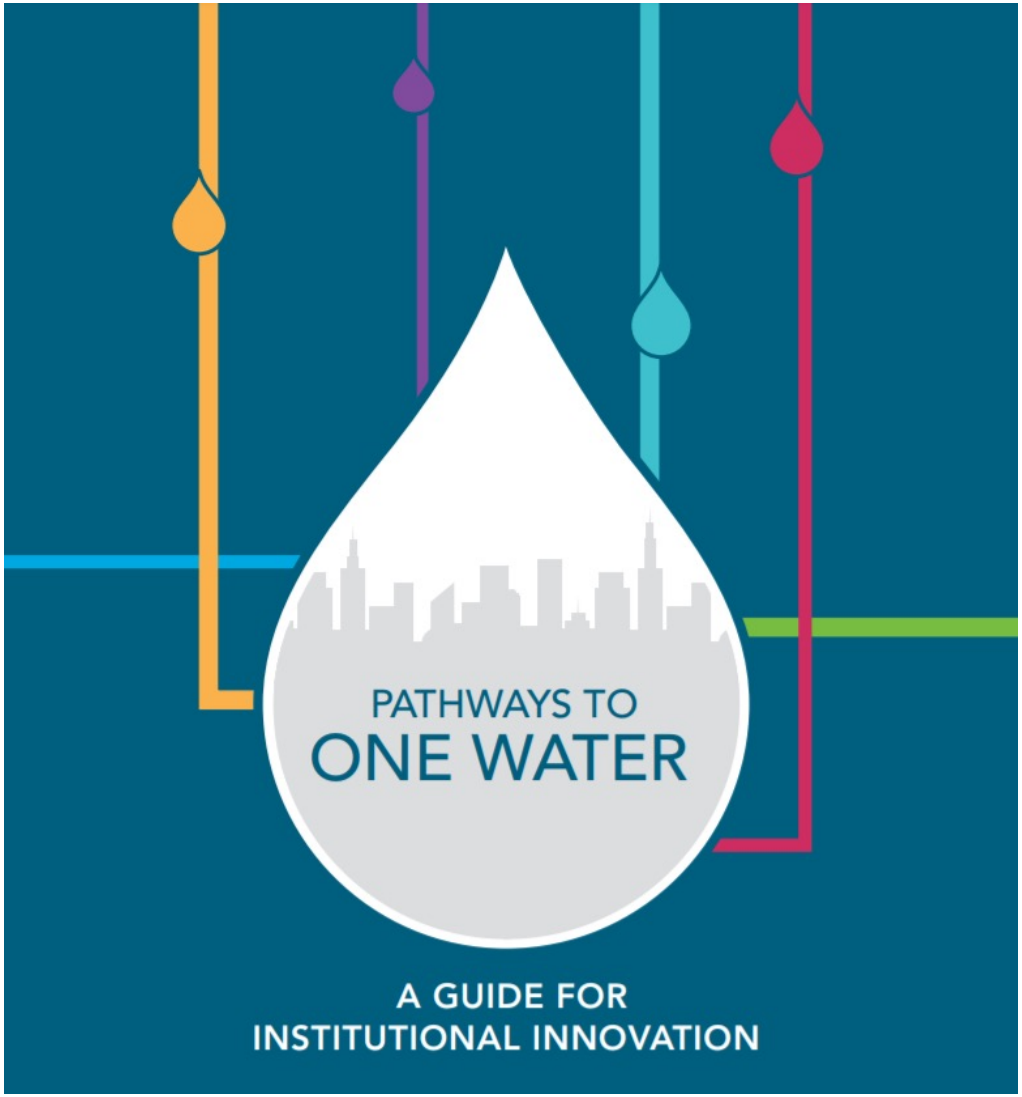
- 2016 Planner Water Survey
- Water is a top or top ten issue (91% of 900 respondents)
- Concerns:
  - ✓ Stormwater mgmt (82%)
  - ✓ Flooding (70%)
  - ✓ Water supply (67%)
  - ✓ Water resource/env. degradation (62%)
  - ✓ Flooding

American Planning Association
Making Great Communities Happen

APA Water Survey – Summary of Results
May 2016 — APA Water Working Group

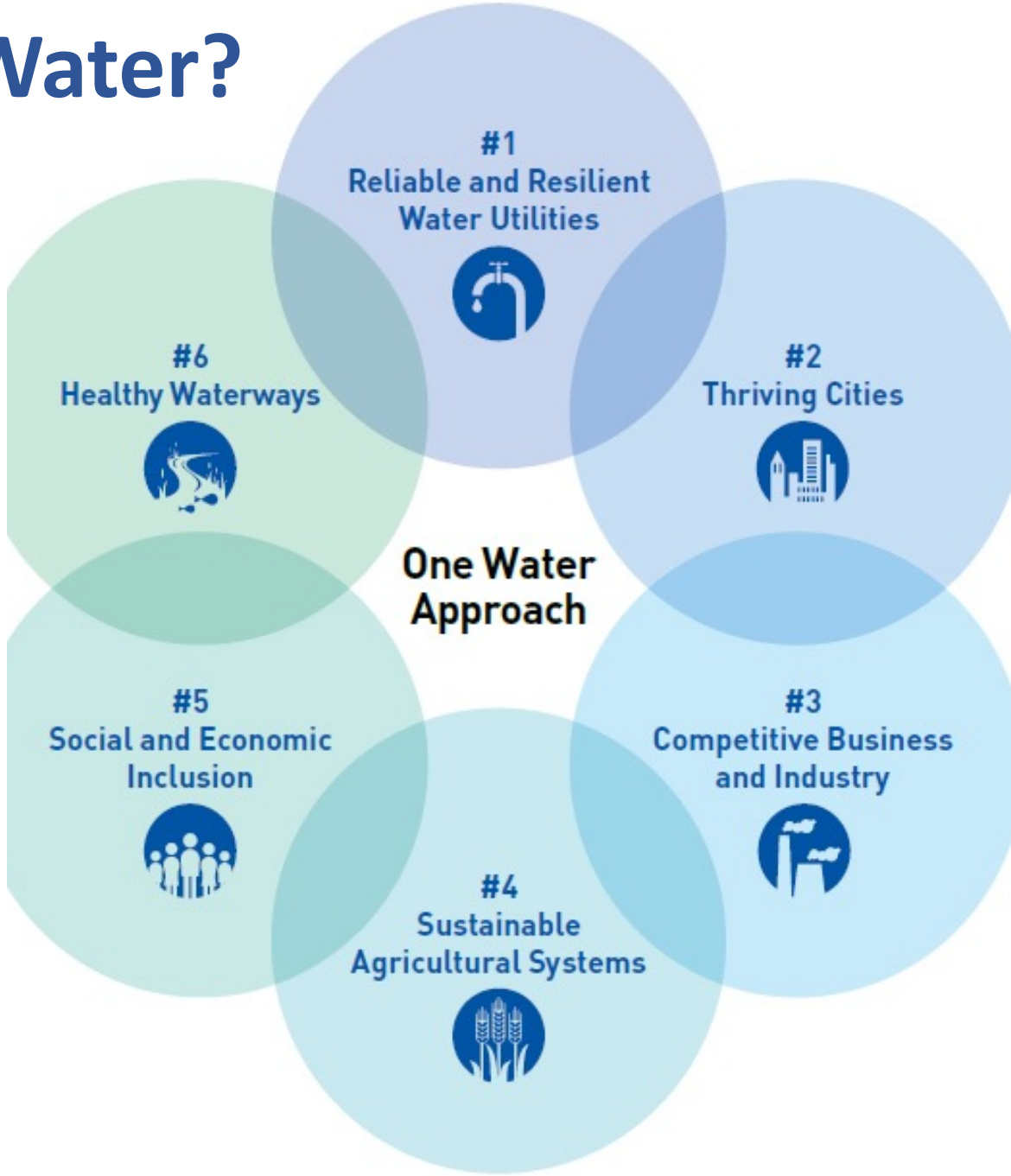
One Water offers new strategies to pursue efficient Water Management

- Sometimes known by other names… IWRM
- Examples: One Water LA; Colorado Water Plan; Green City Clean Waters, PA; and more!



What is One Water?

- One water is a *management strategy* for water that emphasizes the science and hydrology of all waters being interconnected
- Implementing One Water requires *interdisciplinary engagement* to bring all the professionals in water together, so all work is connected and synergistic.
- Eliminating disconnected and silo management provides a pathway to *sustainable water decision-making*.



History of Water Management

1. Opportunistic Utilization of Available Water
2. Engineered Storage and Conveyance
3. Addition of Water Treatment Technologies
4. Non-Point Source Pollution Control
5. Restored Ecologic and Hydrologic Balance; Closed Loop; Stormwater Infiltration/Storage

The Water Supply City (early 1800's)

The Sewered City (mid-late 1800's)

The Drained City (mid 1900's)

The Waterways City (late 1900's)

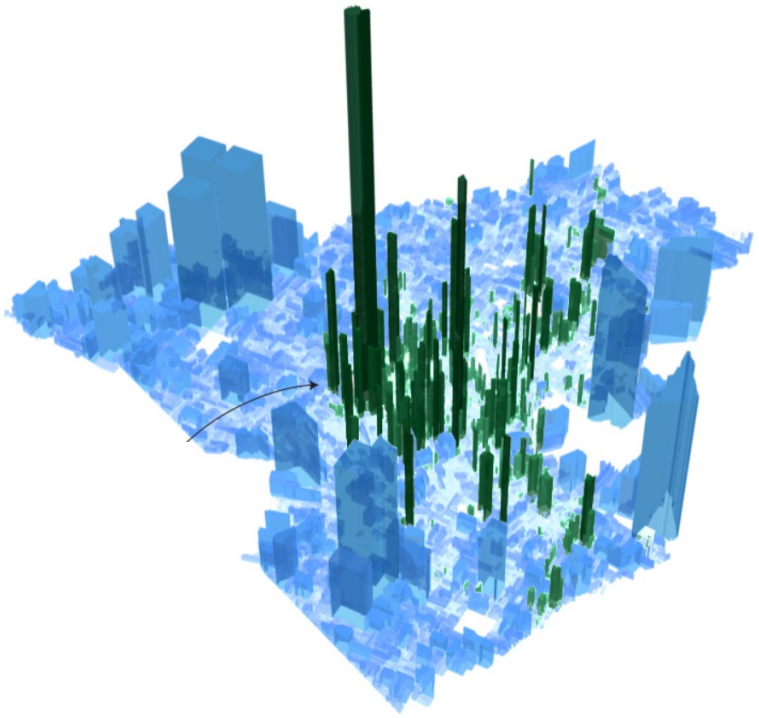
The Water Cycle City (2000's)

The Water Sensitive City (future)

Information derived from:
Vladimir Novotny and Paul Brown (2007). *Cities of the Future: Towards Integrated Sustainable Water and Landscape Management*. London: IWA Publishing, and, Rebekah Brown et al. (2008); *"Transitioning to Water Sensitive Cities: Historical, Current and Future Transition States,"* https://web.sbe.hw.ac.uk/staffprofiles/bdgsa/11th_International_Conference_on_Urban_Drainage_CD/ICUD08/pdfs/618.pdf

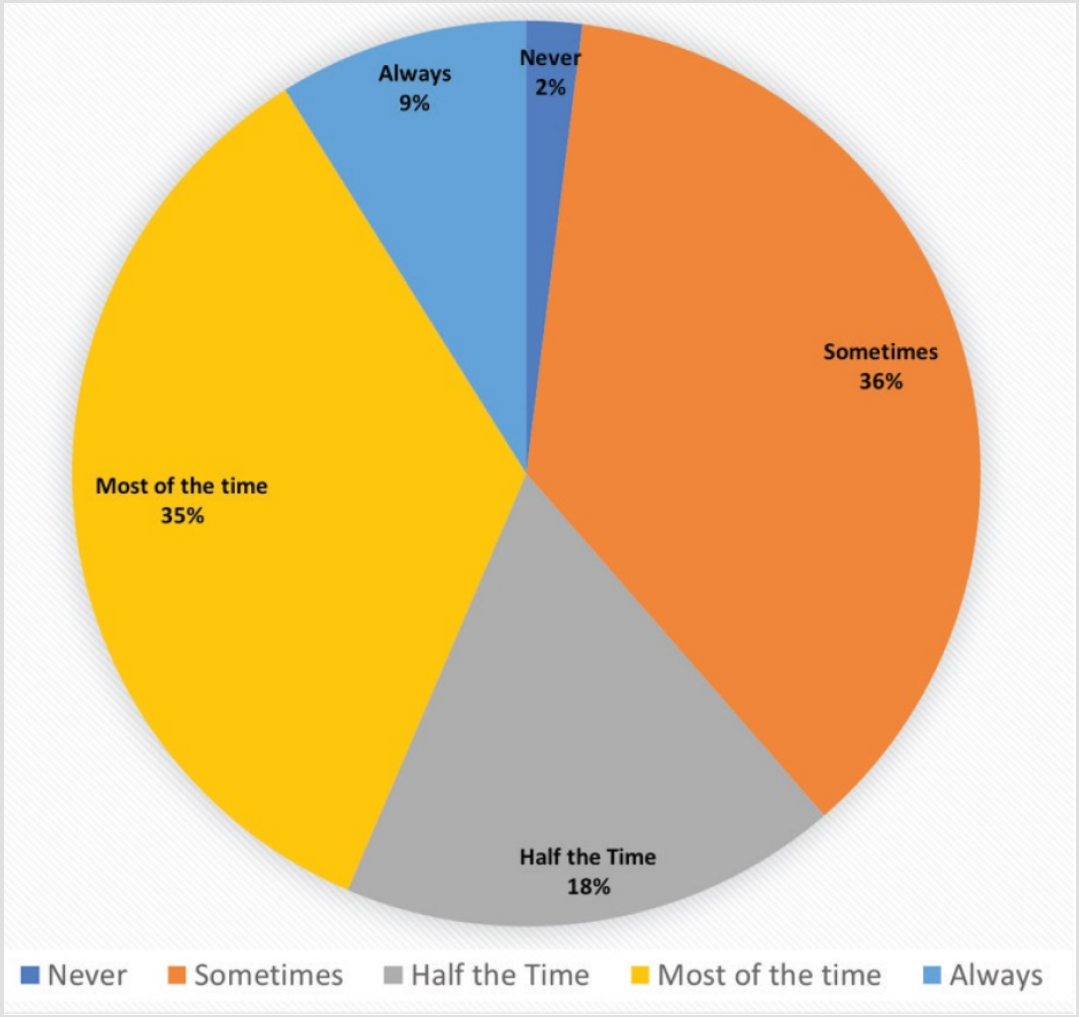
Key Challenges

- Lack of processes to better connect
- Water professions are not adequately collaborative
- Data hoarding or difficult-to-integrate data sources
- No incentives for interdisciplinary education
- Planners not sufficiently involved in water decisions, due to agency fragmentation/isolation



The percentage of time collaboration between water and planning agencies occurs in the jurisdictions of Water Research Foundation survey respondents.

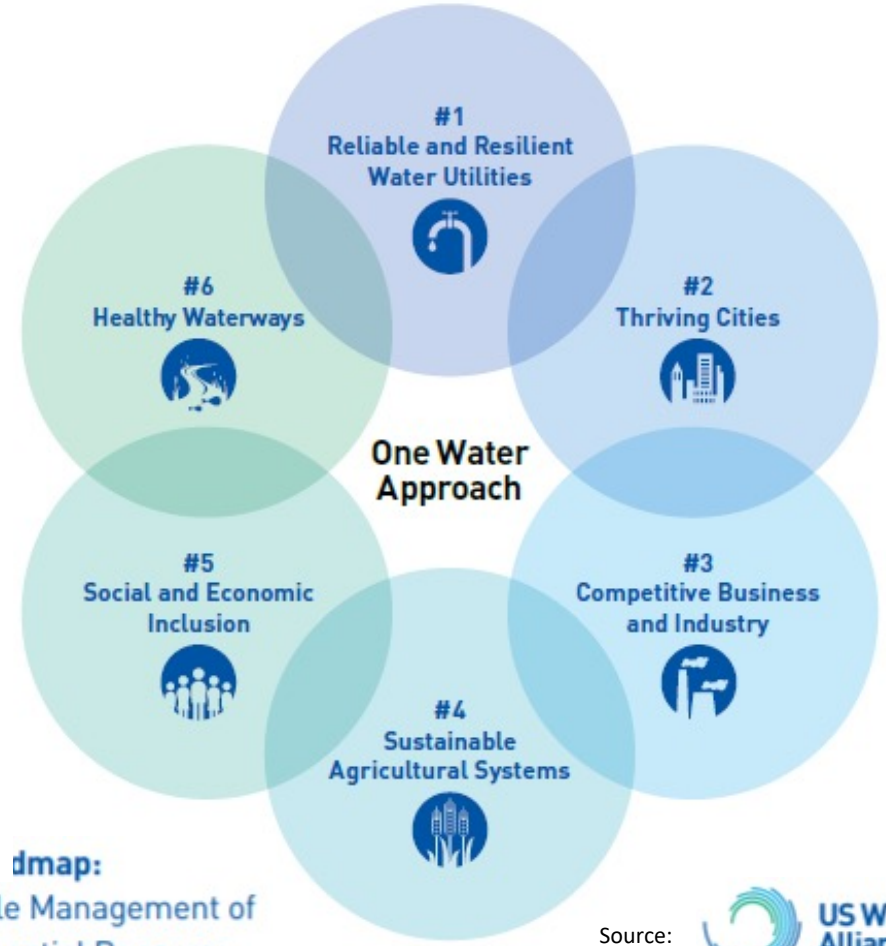
Source: Stoker et al. forthcoming.



2%	36%	18%	35%	9%

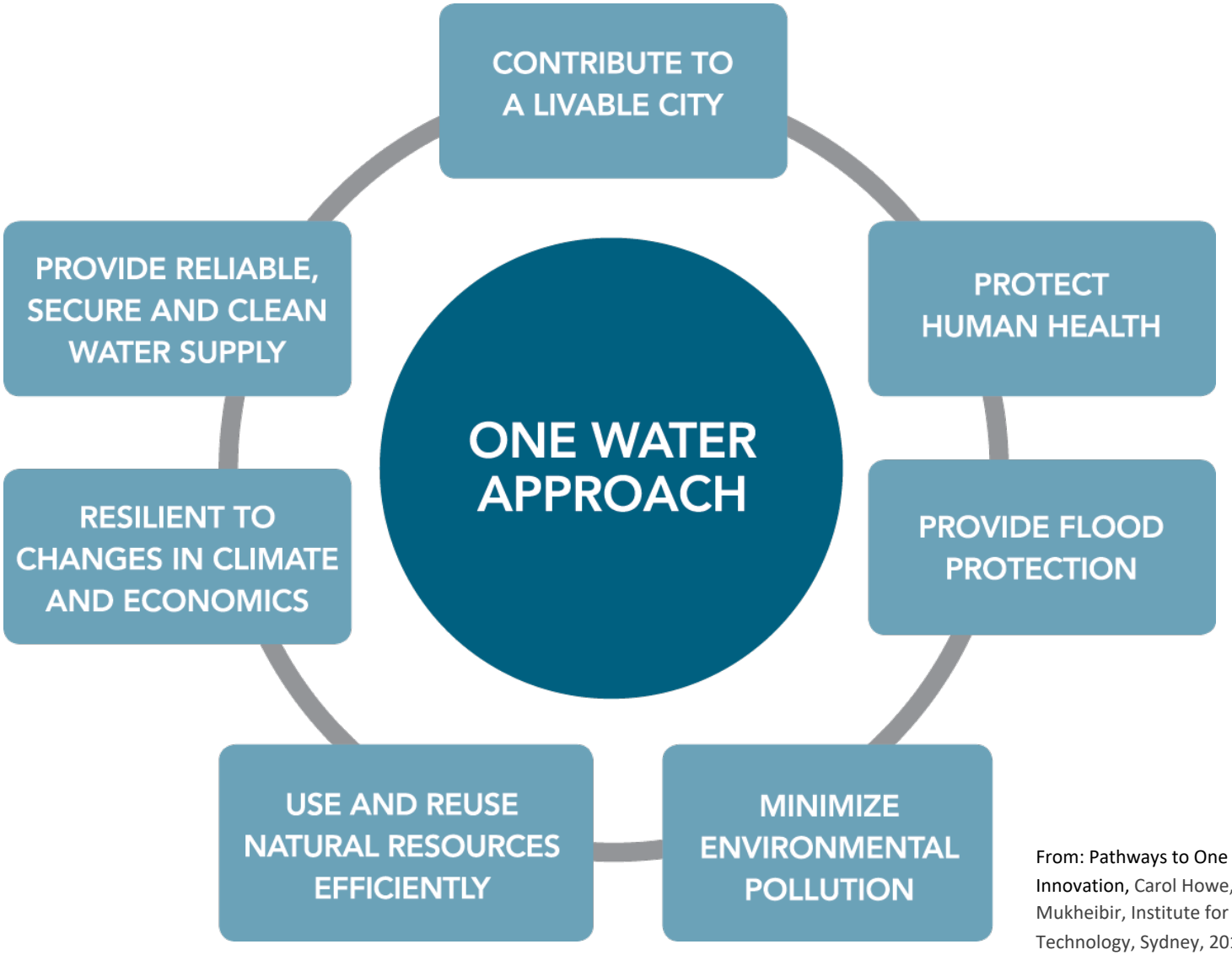
One Water Mgmt Issues in Towns

- Land Use & Development Water Demands
- Climate Variability
- Future Water Sources/Capacity
- Aging Infrastructure
- Sewer System Capacity
- CSOs, Water Quality, and Public Health
- Flooding
- Social Equity



Source: US Water Alliance

One Water Synergies



From: Pathways to One Water, A Guide for Institutional Innovation, Carol Howe, ForEvaSolutions and Pierre Mukheibir, Institute for Sustainable Futures, University of Technology, Sydney, 2015, Water Environment Research Foundation

One Water Implementation

- One Water is an *implementation approach* to managing water resources to achieve long-term resilience and reliability, balancing both community and ecosystem needs.
  - (Paulson, Broley, and Stephens 2017)
- Using One Water principles cities integrate their water management approaches wherever possible. *Water management should be integrated into every city decision, from master planning to land use to economic development planning to complete streets*
  - (adapted from Mayors Innovation Project, June 2016)

One Water Management recognizes that integrated management of supply, wastewater, and stormwater all contribute to *better source water* by improving runoff & discharge quality, reducing withdrawals, and conserving aquatic environments.

Top Consensus-Based Policy Priorities

- Centralize Water Data
- Apply Science to Policy
- Remove Obsolete Registered Diversions
- Encourage Agricultural Innovation
- Seek Non-Potable Uses of Class B Waters
- Improve Statewide Water Conservation
- Coordinate with Other Plans
- Encourage Regional Solutions
- Protect Water by Protecting Land
- Educate Citizens and Officials

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Incorporating Water in a Comprehensive Plan

BABBITT CENTER
FOR LAND AND WATER POLICY

A Center of the Lincoln Institute of Land Policy

Erin Rugland
Babbitt Center for Land
and Water Policy

Why Integrate Water & Land Use Planning?

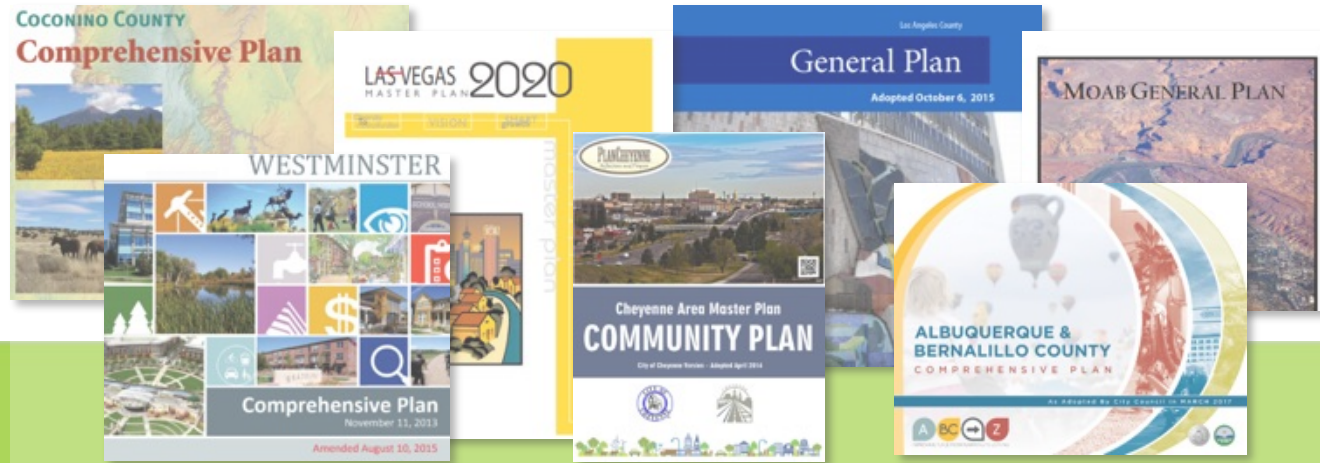
Land use determines water demand and can impact both water supply and quality

Interviews with Colorado water providers revealed:

1. **Land use planning and development approval influence water use**
2. **Long-range planning and development approval processes are two important points of collaboration**
3. **All providers can collaborate with land use authorities**
4. **Much value in technical assistance & tools**

Why Comp Plans?

- Foundational to other land use efforts
- Coordination of goals among plans & departments
- Public engagement important
  - Where does your water come from?
  - Comp plans are more accessible to the public than water resources plan; water information needs to be somewhere the public will interact with it.



Planning Process

Coordinate

a cross-departmental team to share data, review existing plans, and inform the process.

Understand water resources data, scenarios, opportunities, and risks in the present and future.

Plan for land and water integration and establish metrics to track progress toward goals.

Act to implement the comprehensive plan and its water-related goals.

Water Element *and* Water Throughout

- Water elements provide a dedicated section to tackle ‘all things water’
- Water should be included in other elements/policies as appropriate
  - *For example:*
    - "Do not significantly increase potential additional water service demands by approving **annexation developments** or **up-zoning property** until an engineered plan for replacing the existing water treatment system is adopted, adequate financing is identified, and sufficient water rights are established." (Rico 2004 Plan, p. 15)
    - "Preserve creeks, wetlands, and other water features in their natural state. Use these features for water quality enhancement, stormwater management, open space and recreational purposes when appropriate. Use vegetative buffers to **protect wetlands** and other water features **from development encroachment**.“ (Aurora 2009 Plan, p.153)

What Water Mgmt Topics Should be Considered in Comprehensive/Master Plans?

Current State of Water

- Where does our water come from?
- How much do we have?
- How is it used?
- Which sectors and land use types use the most? The least?
- Is our water infrastructure sufficient and reliable?

Future Resiliency

- What is our population growth?
- What are our development expectations?
- Do current water supplies line up with these projections?

Land Use Tools

- How does our urban form impact our water use?
- Is water used efficiently indoors?
- Is water used efficiently outdoors?
- How does land use impact our watersheds?

Understand Current Water Management

Where does our water come from?

How much do we have?

- Water Supply
- Water Conservation

How is it used?

Which sectors and land use types use the most? The least?

- Water Demand
- Water Management
- Water Financing

Is our water infrastructure sufficient and reliable?

- Water and Wastewater Infrastructure
- Water Quality

Future Resilience: Questions to ask

What is our population growth?

- Projected Population Change

What are our development expectations?

- Projected Development & Land Use Change
- Water Demand Drivers

Do current water supplies line up with these projections?

- Forecasting Water Supply/Demand
- Water-Related Hazard Mitigation
- Water Supply Augmentation
- Water Equity

Land Use Tools for Water Efficiency

Are we collaborating on water?	• Collaborating on both Land/Water
Does our development process consider water?	• "Show Me the Water" Requirements • Water in Development Review
How does our urban form impact our water use?	• Water Efficient Urban Form and Zoning Regulations
Is water used efficiently indoors?	• Building/Plumbing Policies
Is water used efficiently outdoors?	• Landscaping/Irrigation Policies • Stormwater Management
How does land use impact our watersheds?	• Water for Ecosystem Functions

Land use tools available to assist water goals:

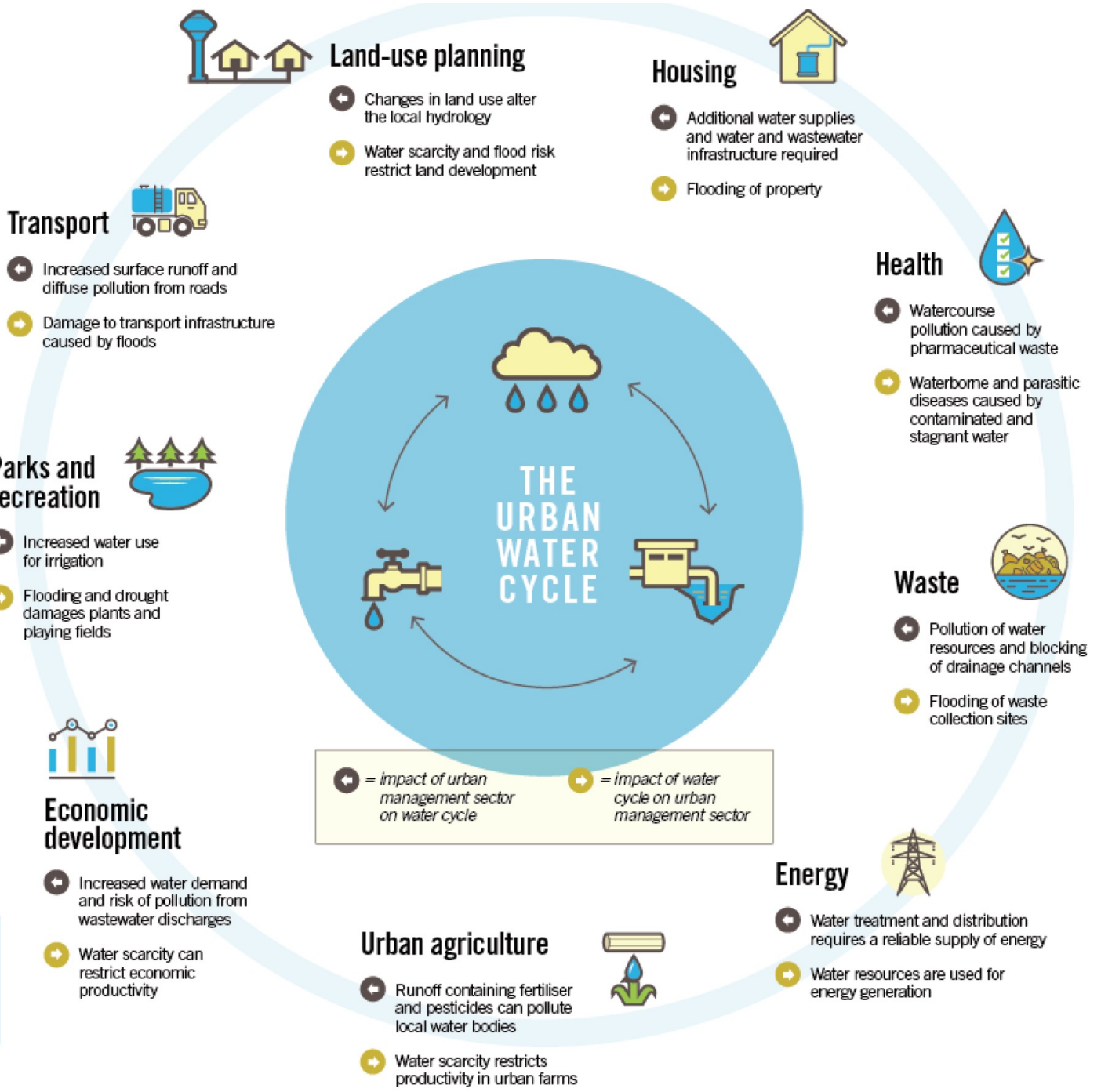
Are we collaborating on water?	• Collaboration across disciplines/plans: water master plans + comprehensive plans
Does our development process consider water?	• "Show Me the Water" Requirements • Water involved in Development Plans
How does our urban form impact our water use?	• Water Efficient Urban Design + Zoning Regulations
Is water used efficiently indoors?	• Building + Plumbing Policies + Codes
Is water used efficiently outdoors?	• Landscaping/Irrigation Policies + Ordinances • Stormwater Management Best Practices
How does land use impact our watersheds?	• Water for Ecosystem Functions • Overlay/Protection Zones

https://www.lincolninst.edu/incorporating-water-community-planning

What is smart growth?

- "Smart growth" covers a range of development and conservation strategies that help protect our health and natural environment and make our communities more attractive, economically stronger, and more socially diverse.
- Development decisions affect many of the things that touch people's everyday lives — their homes, their health, the schools their children attend, the taxes they pay, their daily commute, the natural environment around them, economic growth in their community, and opportunities to achieve their dreams and goals. **What, where, and how communities build will affect their residents' lives for generations to come.**

APA: Collaborating on Water & Planning



Collaborating on Water and Planning: A Perspective for Planners

By Vicki Elmer, Carol Howe, Philip Stoker, and Gary Pivo

Source Water Protection

Source Water Protection

- US Safe Drinking Water Act (SDWA) established EPA's Source Water Assessment and Protection Programs
- SDWA mandated specific program elements, most notably Source Water Assessment (SWA)
- Other than controlling point source discharges, most Source Water Protection measures are voluntary in nature - based on reducing the impacts of land development: residential, commercial, agricultural, timber…
- Does the authority exist to protect source waters using planning mechanisms under state or local laws?

Source Water Collaborative

- Prepared **A PLANNER'S GUIDE**
  May 2017
- "Advice Worth Drinking (Your Water, Your Decision): How today's land-use decisions can protect tomorrow's water supply"
  - Prepared by the Source Water Collaborative
  - American Planning Association (APA) – led the development of the Guide
  - Available at http://sourcewatercollaborative.org/guide-for-land-use-planners/

- American Planning Association
- American Rivers
- American Water Works Association
- Association of Clean Water Administrators
- Association of Metropolitan Water Agencies
- Association of State and Territorial Health Officials
- Association of State Drinking Water Administrators
- Clean Water Action
- Clean Water Fund
- Environmental Finance Center Network
- Ground Water Protection Council
- Groundwater Foundation
- National Association of Conservation Districts
- National Association of Counties
- National Environmental Services Center
- National Ground Water Association
- National Rural Water Association
- North American Lake Management Society
- River Network
- Rural Community Assistance Partnership
- Smart Growth America
- Soil and Water Conservation Society
- The Trust for Public Land
- U.S. Department of Agriculture - Farm Service Agency
- U.S. Department of Agriculture - Natural Resources Conservation Service
- U.S. Endowment for Forestry and Communities
- U.S. Environmental Protection Agency
- U.S. Forest Service (Northeastern Area)
- U.S. Geological Survey
- Water Systems Council

Issues & Challenges

Land development can greatly impact source waters:

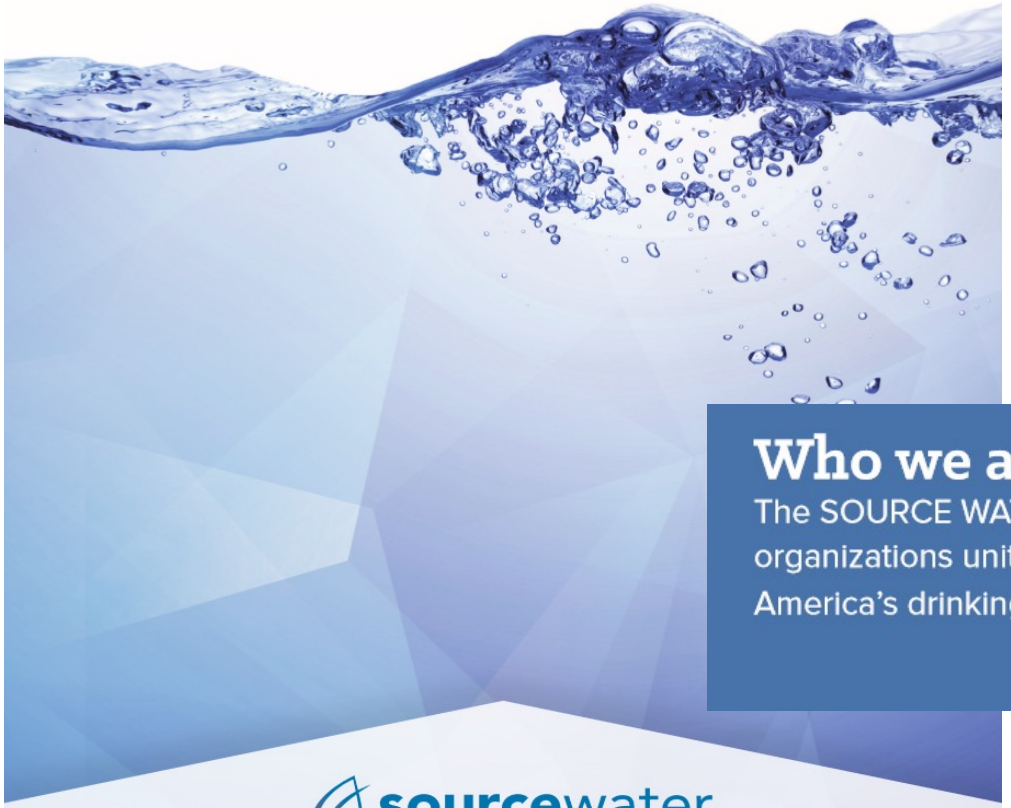
- increased impervious cover from land development (roads, parking lots, buildings, etc.) increases surface runoff and streamflow, decreases ground water recharge, and reduces base flow in streams
- poor stormwater management practices (gray infrastructure) affect storm flow & water quality
- septic installation in residential and commercial development can exceed the capacity of ecosystems to assimilate nutrients
- urbanization can intensify floods and erosion
- significant natural resources, including wetlands, stream corridors, & native habitats often degraded in urban and agricultural areas

Advice Worth Drinking

YOUR WATER. YOUR DECISION.

How today's land-use decisions
can protect tomorrow's water supply

A PLANNER'S GUIDE



Who we are

The SOURCE WATER COLLABORATIVE is a coalition of 27 national organizations united to protect the lakes, rivers and aquifers supplying America's drinking water. www.sourcewatercollaborative.org/about

sourcewater COLLABORATIVE

Source Water Protection – Planners Guide

LONG RANGE VISIONING Goal-setting exercises (> 20-year outlook)	• Include ground and surface water experts and water utilities in visioning exercises. • Include Source Water Assessments and water budget data in all build-out or alternative scenario analysis. • Link source water protection objectives to other long-range goals, such as land conservation, forest management, habitat protection, compact development, stormwater and watershed management, water/waste water utility planning, and nonpoint source pollution reduction.
PLAN MAKING (a) Comprehensive (master or general) plans, (b) Sub-area plans (neighborhood plans, corridor plans, downtown plans, etc.), (c) Functional plans (stormwater plans, waste water management, water plans, open space plans, etc.)	• Include a critical and sensitive areas element with a strong source water component in the comprehensive plan (using up-to-date data about point and nonpoint threats). • Include maps and narrative describing the physical properties of aquifer and wellhead protection areas (ground water contour, cones of depression, surface water contributors) as well as surface water resources important for current and future drinking water sources. Contact your water utility to get information on your Source Water Protection Area. • Preserve natural features and land-use elements that protect surface and ground water. • Develop stormwater management plans that keep pollutants out of drinking water sources. • Consider including source water impacts in open space planning.
REGULATIONS/INCENTIVES Carrots and sticks to implement plans (zoning ordinances, subdivision regulations, urban area boundaries, transfer of development rights, other incentives)	• Adopt ordinances and regulations such as wellhead protection overlay zones, riparian buffers, stormwater management ordinances, underground storage tank safety regulations, land-use controls in flood plains, and nitrate loading regulations. • Encourage compact settlement patterns by allowing increased density and in-fill around existing urban areas, allowing or requiring cluster development, and adopting programs for transfer of development rights. • Use non-regulatory tools to spur smart growth such as permit streamlining, tax incentives, developer incentives, density bonuses, technical assistance, and the use of public-private partnerships for implementing best stormwater management practices.

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Source Water Protection – Planners Guide

DEVELOPMENT PROJECT REVIEW
Review and approval of all aspects of the built environment being proposed (residential subdivisions, mixed use developments, commercial and industrial developments, transportation facilities, utilities, etc.)

- Require applicants for development projects to submit appropriate information on drinking water sources as part of their initial application submission.
- Refer submitted plans to source water experts as part of the plan review process and include these experts in technical review committees.
- Require source water protection measures to be incorporated into plans by private developers as a condition of approval.
- Promote Low Impact Development practices that minimize impervious surfaces and runoff, and increase on-site recharge.

PUBLIC INVESTMENT
Capital projects undertaken by towns, cities, counties, states, and the federal government

- Make sure that public investments in a capital improvements program adopted by a town, city, or county do not include measures that threaten source water supplies.
- Be sure that the design and location of public investments such as roads, transit, buildings, and other public structures and facilities are sensitive to source water issues.
- Pass bond issues to acquire fee and less-than-fee interest in land conservation and green infrastructure impacting drinking water. Green infrastructure can lower the cost of treating drinking water for your community (learn more at www.wri.org/publication/natural-infrastructure).
- Use land acquisition, stormwater retrofits, and other restoration projects to protect source water. Water suppliers, land trusts, and others can help you implement these measures.

New Funding for Source Water Protection and Reducing Land-based Pollution: Farm Bill and WIFIA

G. Tracy Mehan, III

The new five-year Farm Bill and the Water Infrastructure Finance and Innovation Act of 2014 (WIFIA) are two important and significant funding opportunities to deal with land-based pollution, unregulated nonpoint or diffuse runoff, negatively impacting water quality and drinking water sources.

Putting (Drinking) Water into the Planning Process

- Integrate source water protection into planning activities:
  - Sustainable water source provides reduced treatment needs and increased availability
  - Increases public health by protecting from toxic chemicals and disease-causing pathogens
  - Need greater collaboration among partners, such as water system operators, land use planners, land owners, watershed organizations, and regulators

Examples of Putting (Drinking) Water into the Planning Process

- Connecticut State Water Plan
- Water Management in Colorado
- Chicago Metropolitan Planning Council: Drinking Water 123
- Babbitt Center – Incorporating Water into Community Planning

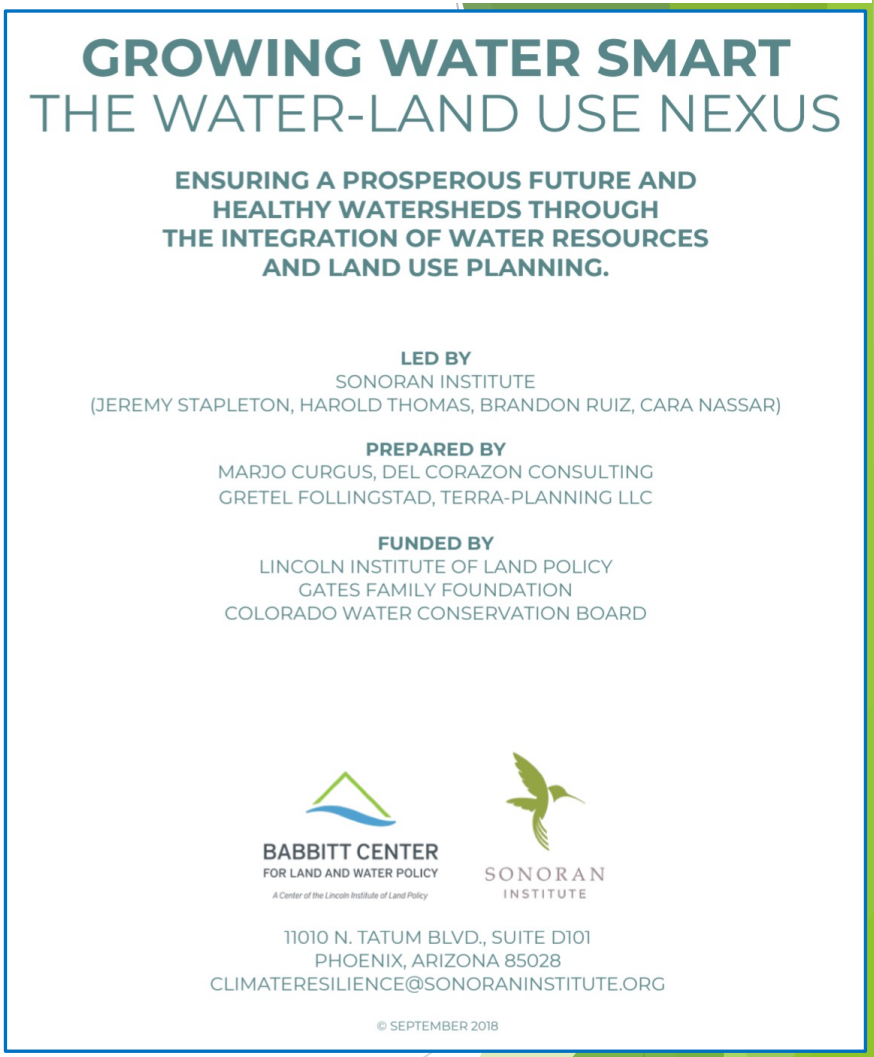
Water Mgmt Innovation in Colorado

- Colorado Senate Bill 15-008 & Colorado Water Plan:
  - Goal: by 2025, 75% of Coloradans will live in communities that have *incorporated water-saving (efficient) actions into land-use planning*.
- Colorado Growing Water Smart Program
  - Introduces communities to a full range of communications, public engagement, planning, and policy implementation tools.
  - Ten Colorado cities and counties involved to date
  - Teaches local participants how to integrate land use and water planning to realize watershed health and community resiliency goals and better address and plan for land development and water needs.
  - https://sonoraninstitute.org/resource/growing-water-smart-workbook/

NALMS 2019
Burlington | Vermont

Community Opportunities for Integrating Water & Land Use

INTERVENTION POINT	MECHANISMS
1. Planning & Policy Making	Water Plans Comprehensive Plans Capital Improvement Plans
2. Pre-Development	Water Adequacy Requirements
3. At Development Review	Zoning and Subdivision Regulations Annexation Policies Planned Development Policies Development Agreements
4. At Building & Construction	Building, Plumbing and Landscaping Codes
5. Post-Occupancy Education	Conservation & Efficiency Incentives Outdoor Watering Restrictions Water Budgets & Auditing



Chicago Metropolitan Planning Council: Drinking Water 123

Guide contents

1

Meet your water: An introduction

Understanding Drinking water in northeast Illinois

- Sources
- Treatment
- Infrastructure

2

Your water's keeper: Utilities and regulators

Understanding drinking water management and laws

- Utility management
- Regulation

3

Murky waters: The challenges we face

Understanding drinking water issues in our region

- Supply constraints
- Pollution
- Crumbling infrastructure
- Fragmented systems
- Climate change

GO

Taking action: Your guide to important practices

Understanding the actions you need to take

- Protect your source
- Ensure you have enough
- Maintain your infrastructure
- Finance your system
- Plan and coordinate with your neighbors
- Engage your community

https://drinkingwater123.metroplanning.org/

APA Water & Planning Network

- Promote understanding about water science and engineering.
- Explore how land use affects the health and integrity of the water environment.
- Improve skills of planners to manage water more sustainably and more equitably.
- Create better connections between planners and water professionals; new mechanisms for interaction.
- Advance planning methods that support an "One Water“ approach.

American Planning Association Water & Planning Network: Mission Statement

- Operate as a communications and information sharing network, connecting members to the best planning practices that reflect current research, science, policy and technology regarding water resources.
- Create better and more frequent connections and engagement between planners, design professionals, and water professionals by establishing new mechanisms for interdisciplinary interaction.
- The WPN seeks to advance planning methods and interactions that support an integrated approach to water management, known as "**One Water**" management.

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Net Blue: Supporting Water-Neutral Community Growth

Alliance for Water Efficiency

river NETWORK
connecting people · saving rivers

ENVIRONMENTAL LAW • INSTITUTE®

The Model Ordinance Worksheet

- We built an ordinance-development tool, not just a model ordinance, because:
  - Variety of settings: constraints, governing entities, enabling laws
  - We anticipate a variety of users (not just lawyers)
  - It is intended to assist with outreach
- This tool is intended to help the users identify and think about critical issues

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NET BLUE WATER NEUTRAL GROWTH

Net Blue: Supporting Water-Neutral Community Growth

Net Blue is a collaborative initiative of the Alliance for Water Efficiency, the Environmental Law Institute, and River Network to support sustainable community growth. The project team members developed a model ordinance that communities can tailor and customize to create a water demand offset approach meeting local needs. Communities in different regions throughout the United States were consulted to help develop the model ordinance and the offset components, and to ensure that the program is adaptable to many different political climates, legal frameworks, and environmental challenges.

The Net Blue Project is divided into four parts:

1. Initial Offset Research
2. Model Ordinance
3. Offset Methodology
4. Community Outreach

Project Advisory Committee

A project advisory committee of experts in water resources, water law, and planning and zoning helped guide the project. The three organizations wish to express their heartfelt gratitude for the time and insights donated by these experts to the project.

Illustration of change:

Sustainable water resources

In the past, cities imported water supplies from far away, discharged wastewater into receiving waters, and diverted stormwater away from city into receiving waters.

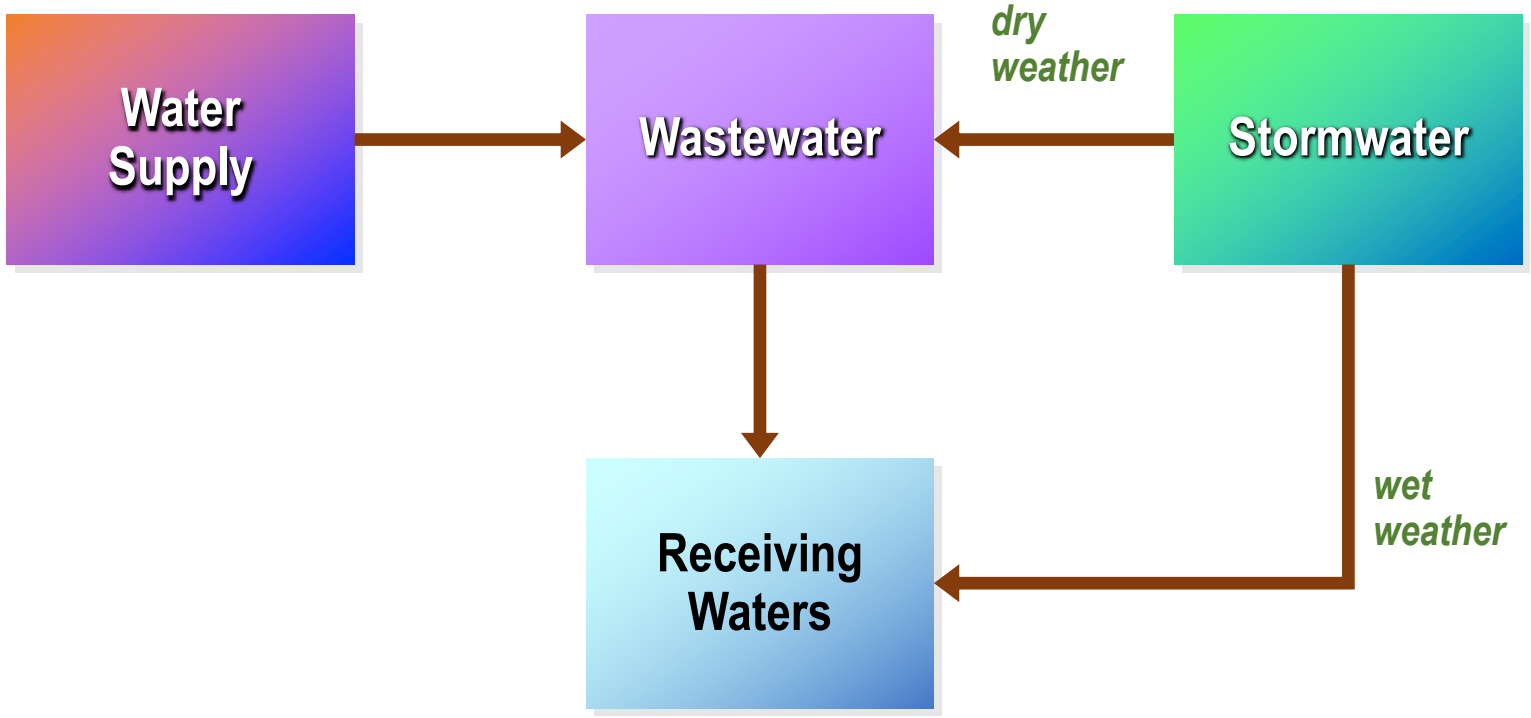
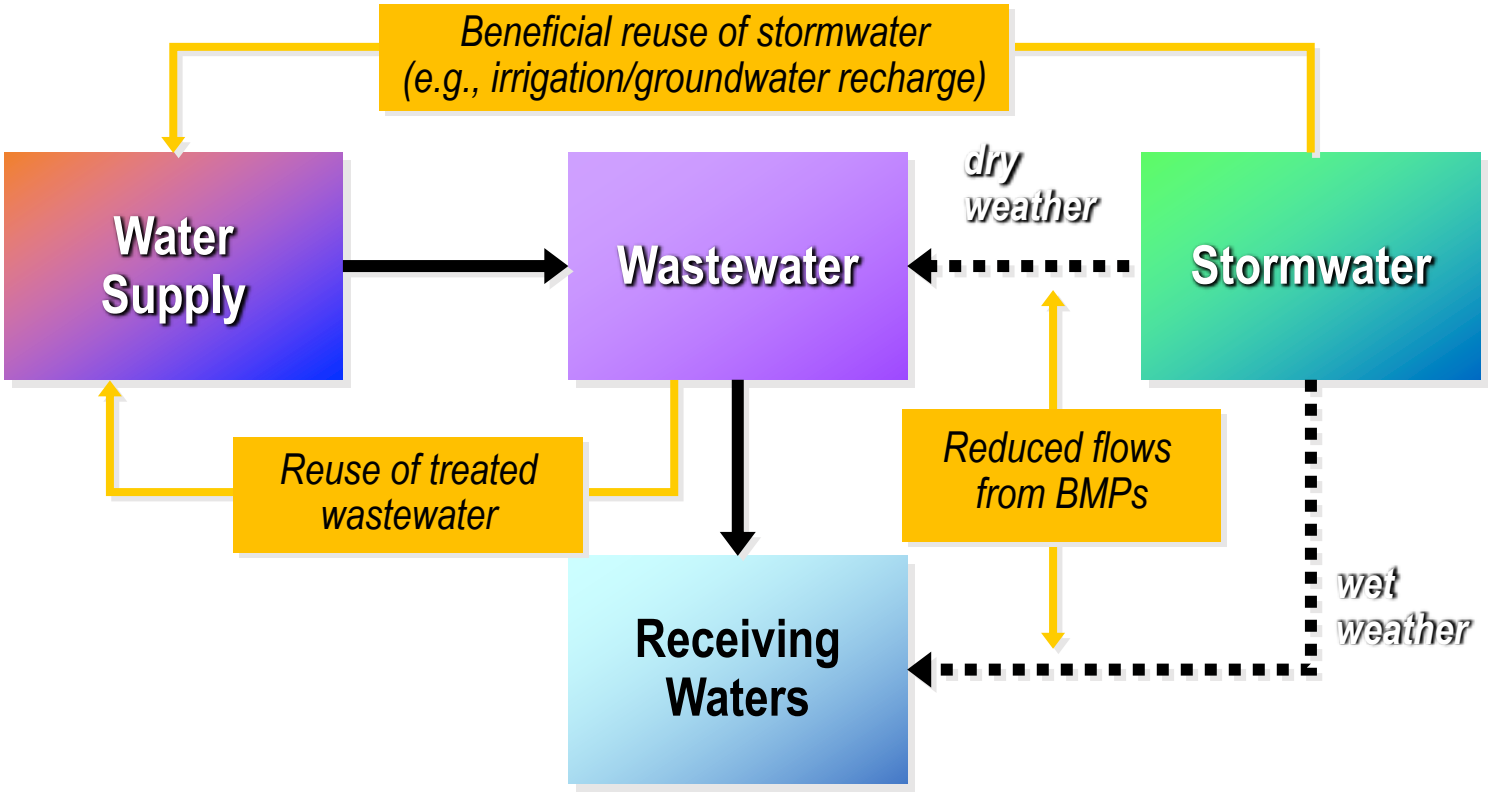


Illustration of change:

Sustainable water resources

In the future, cities will reuse wastewater, reduce stormwater and find ways to beneficially reuse it, and reduce the need for importing water supplies — in other words become more self-sufficient.



Selected Resources

- Source Water Collaborative: Resources, tools, case studies and links to practitioners.
- American Water Works Association: Resource community for the drinking water industry compiling the latest science, guidance, and tools for Source Water Protection.
- EPA Ground Water and Drinking Water Program; Smart Growth Program: Information on source water assessments, protection efforts, partnerships, outreach, and other smart growth tools to protect sources of drinking water.
- Smart Growth Network: A coalition of developers, planners, government officials, community groups and other stakeholders.

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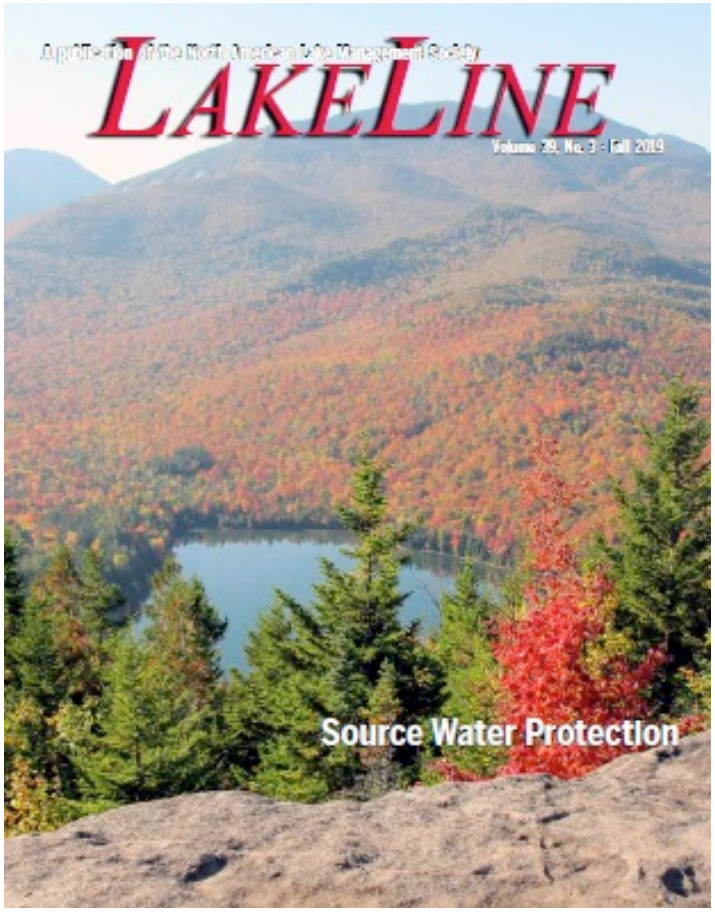
Selected Resources

- NALMS



Source Water Protection

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Resources

Integrated Water Management with Urban Design
Philip Stoker and Gary Pivo
(WE&RF Project No. SIWM10C15)

Integrating Land Use and Water Resources: Planning to Support Water Supply Diversification

Coordinated Planning Guide: A How-To Resource for Integrating Alternative Water Supply and Land Use Planning

Becky Fedak and Drew Beckwith

(WRF Project No. 4623A; 4623B)

Planners and Water, APA PAS Report 588

William Cesanek, Vicki Elmer, Jennifer Graeff

American Planning Association, 2017

Presentation Idea Map:

- Supply challenges + growth = uncertainty
- Uncertainty also derives from drought, uncontrolled demand, growth, pollution, climate variability
- Uncertainty is reduced by creating resilient solutions
- Resilience is achieved through:
  - integrated approach to meeting demand
  - source water protection & preservation
  - planned management of growth/land use

Thank You !

Water + Planning:
The Value of Land Use Planning in Achieving Improved Water Efficiency

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10th Annual Central Texas Water Conservation Symposium
Collaborating for Success: Planning & Programs that get Results