INNOVATIVE MECHANISMS TO PROTECT WATERSHEDS

Three Examples

Pacific Northwest Section
American Water Works Association
Water in Action Conference
Bellevue, Washington
April 30, 2015

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The problem:

A city or water agency owns only a small portion of its watershed.

It can’t buy all of it.

Too much land.

Too expensive.

Too many people live there already.

How does the water utility protect against:

- Poor forest practices (e.g., logging or fire suppression)
- Runoff from farms (e.g., animal waste or pesticides)
- Suburbanization and development
- Discharges from septic tanks and wastewater treatment plants

We'll look at three examples from around the country:

- **New York City**
  - The most ambitious watershed protection program in the nation
  - $1.2 billion invested to date
  - 18 years old

- **Little Rock, Arkansas**
  - A watershed fee raises money for land acquisition
  - 6 years old

- **Eugene, Oregon**
  - A proposed voluntary program with landowners
  - The utility may create a fund or endowment

What makes these places unique?

The city or water agency has:

- Identified significant threats to water quality
- Established priorities for addressing the problem
- Acknowledged it can't achieve its goals by regulation alone
- Made a commitment to invest money in the entire watershed not just within its service territory

The paradigm shift

From:

- Point sources are the culprit
- Regulation will solve the problem
- The polluter pays

To:

- Non-point sources must be addressed as well
- Regulation has its limits – cooperation with landowners is important
- The beneficiary pays something

Example 1: New York City

- Largest unfiltered municipal water system in the nation
  - It treats with UV but does not filter for particulates
  - One of five major cities (Boston, Seattle, San Francisco and Portland, Oregon)
- Supplies water to 9 million people
  - 8 million people in NYC
  - 1 million people in upstate counties
- Average total daily use: 1.2 billion gallons
- Storage: 550 billion gallons in 19 reservoirs and 3 controlled lakes
- 6,700 miles of mains, tunnels and aqueducts
- Primarily a gravity system – water flows south

Who manages this system?

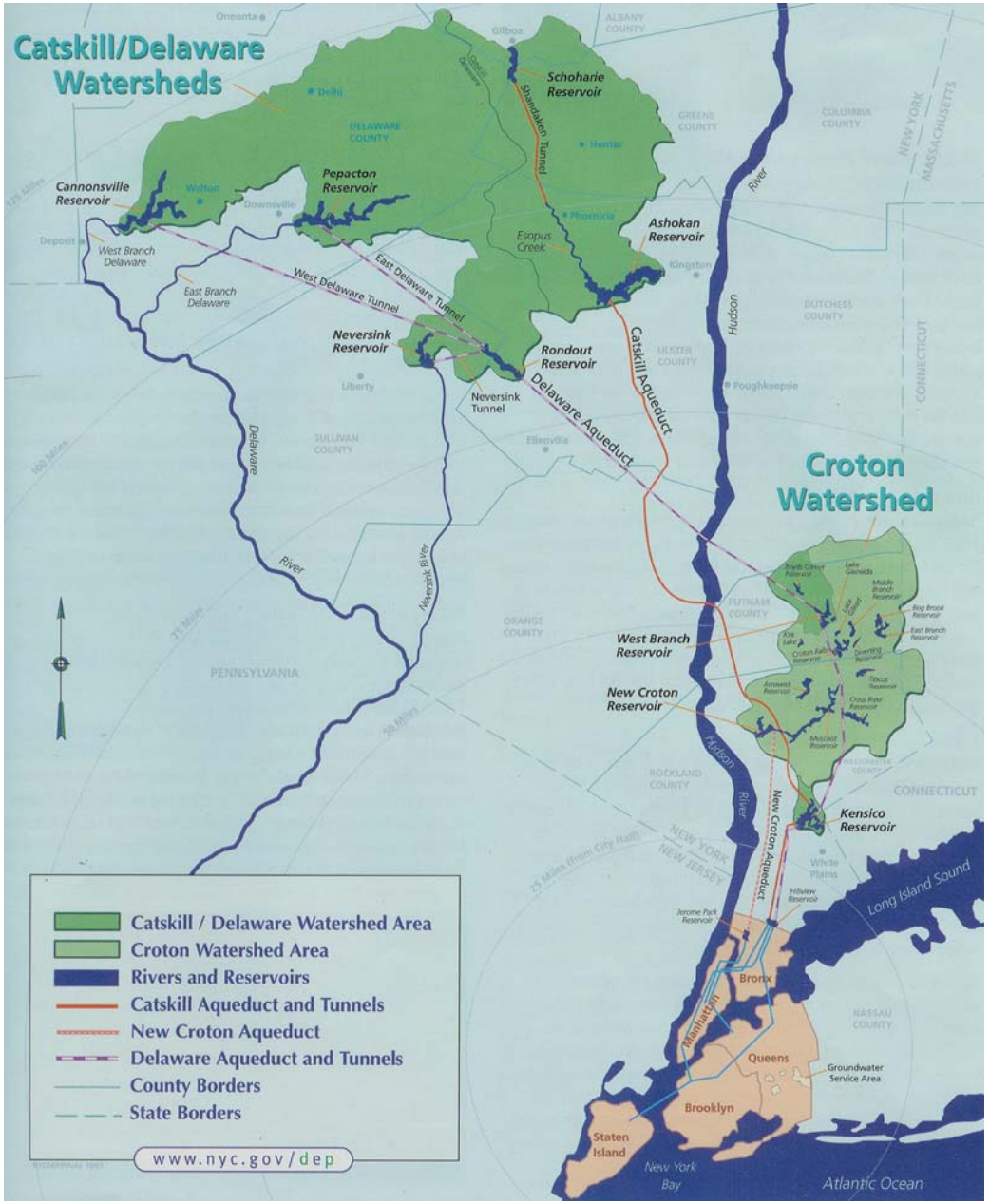
- A city agency, the **Department of Environmental Protection**
  - DEP operates the water, sewer and wastewater system
  - The Bureau of Water Supply (a part of the DEP) manages water supply
- The **Water Board**
  - Leases the water system from the city
  - Sets rates
  - Collects revenue to cover capital and operating needs
- The **Municipal Water Finance Authority**
  - Provides funding for capital projects
  - Issues bonds and other obligations
- The city spends $480 million a year to supply, treat and distribute water

The watershed consists of three areas:

- **Croton**
  (east of Hudson River)

- **Catskills**
  (west of Hudson)

- **Delaware**
  (west of Hudson)



Water from Croton is now filtered

The Catskills/Delaware watershed is not:

- Supplies 90% of NYC's water needs
- One million acres
- 125 miles north of NYC
- 80,000 people live there

The problem

- Runoff from farms and development
- Poor forestry practices
- Excess nutrients, especially phosphorus
- Turbidity

The legal regime

- 1989 Surface Water Treatment Rules issued by the EPA
- The focus was on human health risks
- The rules developed criteria for when filtration was required

EPA's role

- It has the power to REQUIRE the construction of a filtration plant
- It can grant waivers
- The city has to qualify for "avoidance" – it can avoid building a filtration plant -- if it can demonstrate:
  - Objective criteria -- the water system is not a source of waterborne disease
  - Operational criteria – it uses disinfection to inactivate *giardia*
  - Watershed control – the city has identified activity that can adversely affect water quality
- The waiver is called a Filtration Avoidance Determination ("FAD")

NYC's dilemma:

It was going to spend lots of money on watershed restoration

OR

It was going to spend even more money to build and maintain a filtration plant

The breakthrough triggered in the mid-1990s when:

- Governor Pataki convened stakeholders in a neutral location
- Concerted effort to tone down rhetoric
- No negotiations in the press
- NYC's realization it would cost:
    - $5-6 billion to build the filtration plant
    - $250 million or more in annual operation/maintenance costs
    - Other cheaper alternatives were available
    - Other entities, like the state and local governments upstream, had to cooperate
- Upstream landowners realized they could benefit, too
    - NYC would pay for improvements
    - Cooperative approach

The eventual result

- The 1997 New York City Watershed Memorandum of Agreement
- Multiple signatories
    - The city
    - The state
    - EPA
    - Watershed counties, towns and villages
    - Environmental groups and nonprofits
- In return, EPA issued a preliminary FAD

How does it work?

NYC agreed (among other things) to:

- Buy land in watershed
- Pay for wastewater treatment upgrades
- Pay for septic tank rehabilitation and replacement
- Pay for stormwater controls
- Pay for nonprofit entities to develop voluntary Best Management Practices (“BMPs”) for farmers and forest landowners

The parties agreed to create:

- The Watershed Protection and Partnership Council (umbrella group)
  - A state-funded regional forum to coordinate and insure implementation
  - 27 public and nonprofit entities
- The Catskill Watershed Corporation
  - Nonprofit entity
  - Pays for replacing failed septic systems
  - Gives grants to schools

In addition, there's a Watershed Agricultural Council

- Nonprofit entity
- Works with farmers to create plans to mitigate nonpoint sources
    - Now prepared 353 Whole Farm Plans ("WFPs")
    - Covered 100,000 acres
- Purchases development rights on farms
    - Signed 150 conservation easements for 24,000 acres
- Works with forest land owners to create Best Management Practices
    - Prepared 1,200 plans for 230,000 acres

18 Years Later, what's the status?

- The FAD expires May 2017
- NYC has spent approximately $1.2 billion on upstream protection efforts
    - Purchased 173,000 acres from willing sellers
    - Upgraded wastewater treatment plants (public and private)
    - Built a UV light disinfection plant for the Catskills/Delaware system
    - Worked with forest and farm owners to implement BMPs
- The watershed is cleaner in most cases than it was in 1997

Where did the money go?

Program	Spent to Date (in millions)
Land acquisition	$606
Wastewater plant upgrades (private)	402
Wastewater plant upgrades (public)	240
Farms and forestry	165
Stream management	113
New infrastructure	97
Miscellaneous programs	97
Septic tank rehabilitation and maintenance	90
Community wastewater program	47
East of Hudson (Croton) non-point control	33
Future stormwater controls	32
Stormwater retrofits	24
Kensico water quality protection	20
Sewer extension	10
Alternate septic tank design	3
TOTAL	**$1,200**

Source: NYC Department of Environmental Protection

The city pays ongoing maintenance/operation costs at wastewater plants

Challenges:

- Must get new FAD in two years
- The State of New York (not EPA) now has primacy to issue the FAD
  - The state Department of Environmental Conservation issues a Water Supply Permit (as they do for municipalities)
  - The state Department of Health issues the FAD, if warranted
- NYC must continue to demonstrate that rules and regulations are enforced
- NYC must maintain the partnership program
- NYC must continue land acquisitions

The cost of building a filtration plant is now estimated at $10 billion, and the operation and maintenance costs are in the neighborhood of $1 million a day.

That's why NYC cares

Example 2: Central Arkansas Water

Location: Little Rock, Arkansas

- Serves 400,000 people
- Average daily use: 60 million gallons
- Relies on two man-made lakes
    - Lake Maumelle supplies 2/3 of water
        - One of the cleanest lakes in the South
        - Watershed contains multiple jurisdictions
    - Lake Winona supplies 1/3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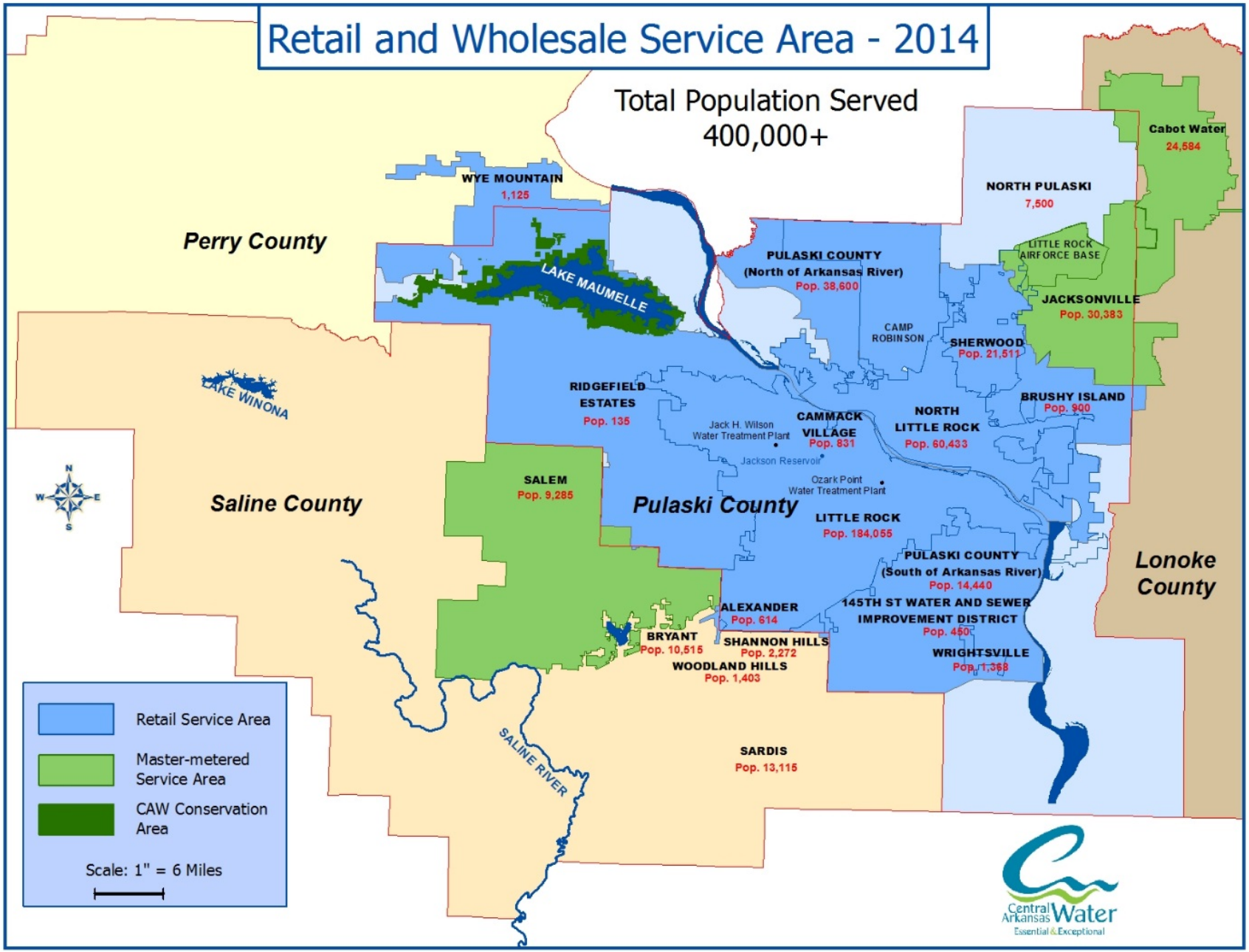
KS
Missouri
Bull Shoals Lake
Bentonville
Rogers
Beaver Lake
Springdale
Fayetteville
Ozark Mts.
Mountain Home
Mammoth Spring S.P.
Black River
Paragould
White River
Jonesboro
Fort Smith
Arkansas River
Russellville
Magazine Mtn.
Ouachita Mts.
Lake Ouachita
Conway
White River
Little Rock
Arkansas
West Memphis
TN
Mississippi River
Oklahoma
Mena
Hot Springs
Millwood Lake
Crater of Diamonds State Park
Pine Bluff
Arkansas River
Mississippi
Hope
Texarkana
Red River
Ouachita River
El Dorado
MISSISSIPPI DELTA REGION
65 mi
65 km
Texas
Louisiana
Mississippi River
ARKANSAS
LOW / HILLS / MOUNTAINS
CLICK HERE FOR LARGER MAP

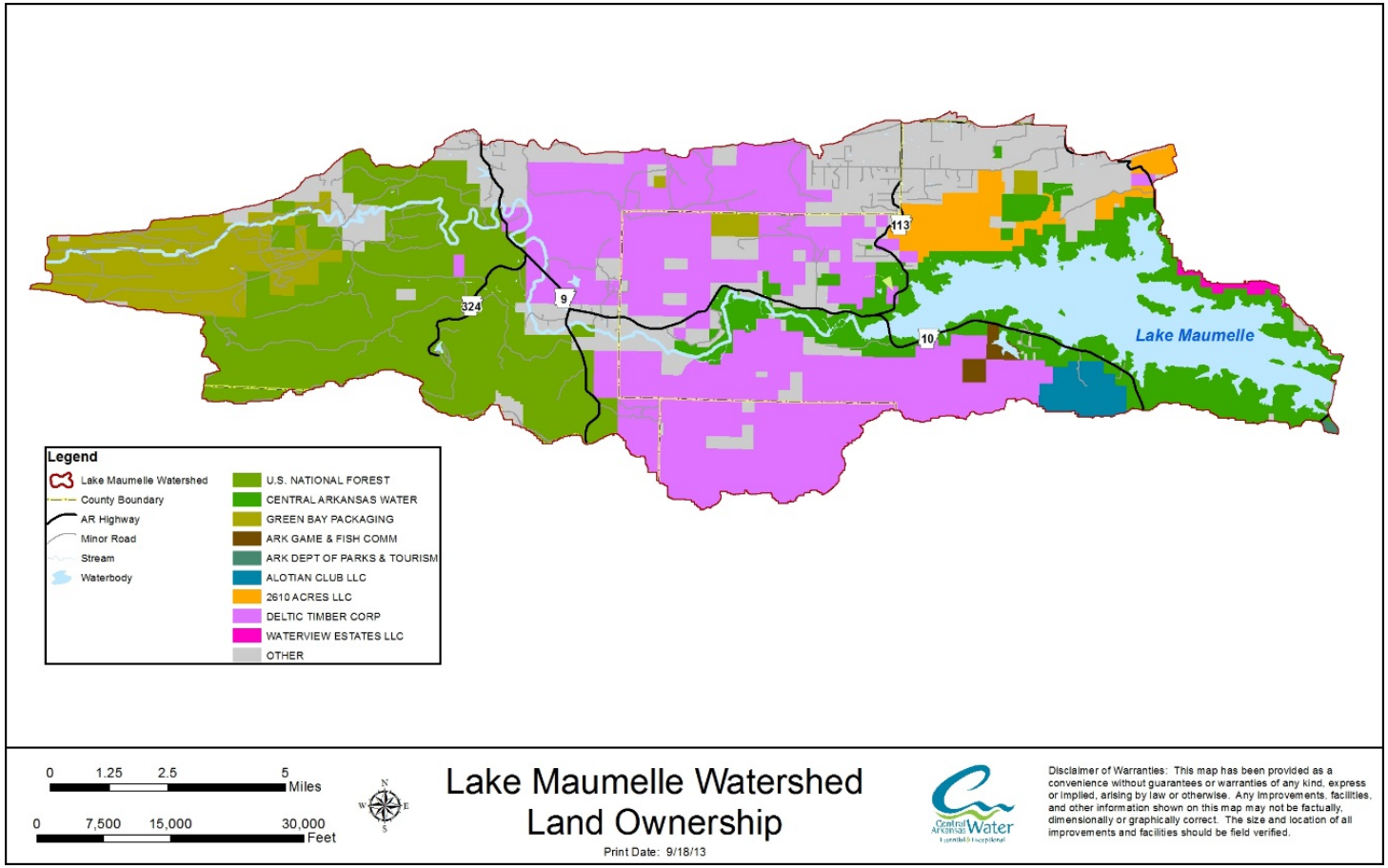
Structure of the utility

- A public agency with a 7-member Board of Commissioners
- Formed in 2001
- A merger of water utilities in the City of Little Rock and the City of North Little Rock
- 280 employees

The concern: Increased development and risk of pollution around Lake Maumelle

- The watershed is 88,000 acres
- 90% of the watershed is forested
- 8% is farm and pasture land
- 2% is developed with roads and houses
- 53% of the land is in private hands
- Potential for significant (but gradual) suburban development
- Oil pipeline runs near the lake


Retail and Wholesale Service Area - 2014
Total Population Served
400,000+
Perry County
Saline County
Pulaski County
Lonoke County
WYE MOUNTAIN
1,125
LAKE MAUMELLE
LAKE WINONA
PULASKI COUNTY
(North of Arkansas River)
Pop. 38,600
NORTH PULASKI
7,500
Cabot Water
24,584
LITTLE ROCK
AIRFORCE BASE
JACKSONVILLE
Pop. 30,383
CAMP
ROBINSON
SHERWOOD
Pop. 21,511
RIDGEFIELD
ESTATES
Pop. 135
BRUSHY ISLAND
Pop. 900
CAMMACK
VILLAGE
Pop. 831
Jack H. Wilson
Water Treatment Plant
NORTH
LITTLE ROCK
Pop. 60,433
Jackson Reservoir
Ozark Point
Water Treatment Plant
SALEM
Pop. 9,285
LITTLE ROCK
Pop. 184,055
PULASKI COUNTY
(South of Arkansas River)
Pop. 14,440
ALEXANDER
Pop. 614
145TH ST WATER AND SEWER
IMPROVEMENT DISTRICT
Pop. 450
BRYANT
Pop. 10,515
SHANNON HILLS
Pop. 2,272
WOODLAND HILLS
Pop. 1,403
WRIGHTSVILLE
Pop. 1,368
SARDIS
Pop. 13,115
SALINE RIVER
Retail Service Area
Master-metered
Service Area
CAW Conservation
Area
Scale: 1" = 6 Miles
Central Arkansas Water
Essential & Exceptional



2,528 people live in the watershed now

- Mixed land ownership but large timber holdings
- Gray area is very rural
- There's no immediate regulatory threat – EPA is not breathing down their neck
- But potential for suburban development
- CAW wants to be proactive

What has CAW done so far?

- In 2009, it levied a watershed protection fee – it's shown on the bill
    - One of a handful of water utilities to use this approach
        - Raleigh
        - Bellingham
        - Denver
    - Educates consumers about the problem
- 45-cent charge per month per meter
- Raises about $1 million per year
- The money goes primarily for buying land
- To date, it has purchased almost 1,800 acres around Lake Maumelle
    - Those purchases supplement 6,500 acres owned before the fee was levied
- Spent $27.7 million since 2009
- It now owns about 24% of the watershed

Prepared a Watershed Management Plan (2007)

The plan led to new regulations:

- Prohibiting direct wastewater discharges
- Regulating new subdivisions
- Imposing a county-wide pollutant limit
- Adopting county watershed zoning

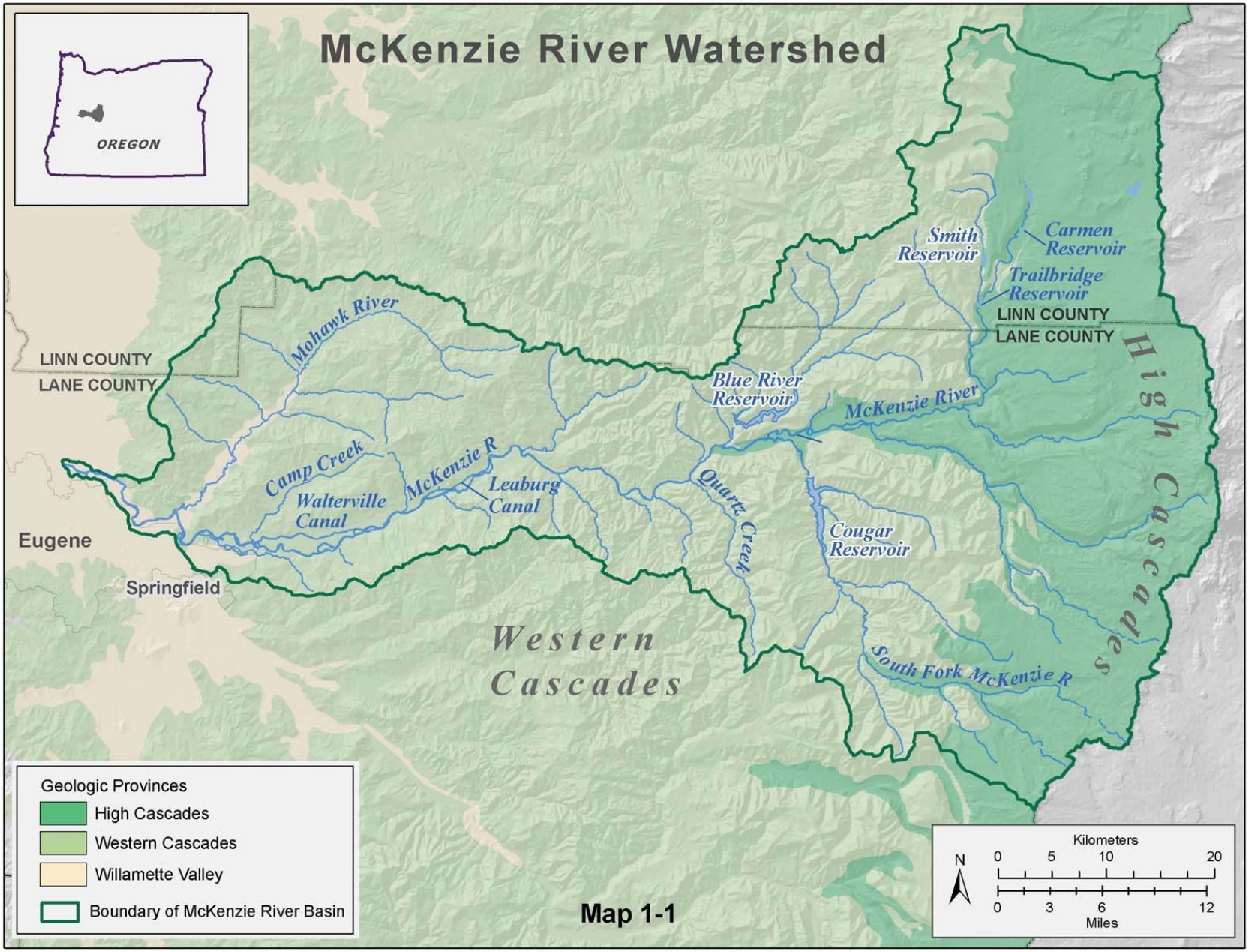
Plans for the next 15 years:

- Protect additional acres
- Spend $15 million of dedicated CAW funds
- Leverage more money through grants
- Allow only limited development in the watershed
- Address risks of oil pipeline
- Rigorously monitor water quality

Example 3: Eugene, Oregon

Eugene Water & Electric Board ("EWEB") is the utility

- Serves 200,000 people
- Average daily use: 21 million gallons
- Source of water: the McKenzie River
  - 90 miles long
  - Source in the Cascade Mountains
  - Flows east to west to Eugene
  - Tributary of the Willamette
  - A clean river now -- few water quality problems


McKenzie River Watershed
OREGON
LINN COUNTY
LANE COUNTY
Mohawk River
Camp Creek
Walterville Canal
McKenzie R
Leaburg Canal
Eugene
Springfield
Western Cascades
Blue River Reservoir
Quartz Creek
McKenzie River
Smith Reservoir
Carmen Reservoir
Trailbridge Reservoir
LINN COUNTY
LANE COUNTY
High Cascades
Cougar Reservoir
South Fork McKenzie R
Geologic Provinces
High Cascades
Western Cascades
Willamette Valley
Boundary of McKenzie River Basin
Kilometers
0 5 10 20
N
0 3 6 12
Miles

Map 1-1

Structure of the utility

- Formed in 1911
- Supplies electricity and water
- Chartered by the City of Eugene
- A public agency with a 5-member Board of Directors elected by districts

The watershed

- It is about 850,000 acres
- Almost 95% of the watershed is forested
- EWEB and the Army Corps have dams on the main steam and tributaries
- The headwaters are owned by the U.S. Forest Service

The problem

- The city owns only one (1) percent of its watershed
- The middle part of the river is largely in private hands
- Increased development along the river
- 15,000 people live there
- Many small landowners
- The potential for piecemeal development
- The utility is concerned about slow, steady degradation

The proposed regulatory approach

- In 2010, EWEB and others suggested a 200-foot setback for new upstream construction

- The response – the pushback – an infringement of property rights

- EWEB began looking for alternatives

The Voluntary Incentive Program ("VIP")

- A cooperative approach
- The goal is to incentivize good stewardship to protect and restore forests
- The target: 8,200 acres along the river
- Negotiating with 16 landowners – a pilot program
- Total cost of the pilot: $300,000

What's the long-term plan?

- Use EWEB money to protect forests
- Align multiple funding sources (e.g., federal, state and private)
- Establish monitoring program for the water to show a return on investment
- Create a watershed fund managed by a 501c(3)

The benefits of a foundation/endowment:

- A new entity focused on the entire watershed
- Supported by EWEB with a stable source of money
    - A watershed charge paid by all customers?
      Like Central Arkansas Water
    - Other sources, too?
- Could leverage EWEB funds with other government funds
- Could leverage private funds, too
- It can therefore align funding sources across multiple agencies and shareholders
- Landowners collect metrics for funders to ensure proper use of the money

The downside and challenges:

- It’s complicated
- Many stakeholders
- Governance issues – who has the final control over expenditures?
- Unchartered territory

Has it been done before?

- Several innovative government-supported funds
  - Great Lakes Protection Fund
  - Environmental Endowment of New Jersey
  - Nebraska Environmental Trust
- But only one existing utility-sponsored watershed fund:
  - Created in 1999 by the South Central Connecticut Regional Water Authority
    - Location: New Haven
    - Principal: $1.7 million
    - Purchased land (a small amount)
- A second more ambitious fund just unveiled for the Savannah River – too early to say more

Conclusion

- Innovative approaches to watershed protection are occurring around the country
- Each watershed has its own challenges and solutions
- Creative mechanisms offer a new promise
- But the investments must:
    - Last for the decades
    - Have a stable source of funding
    - Reflect broad community support

Thank you. Questions?

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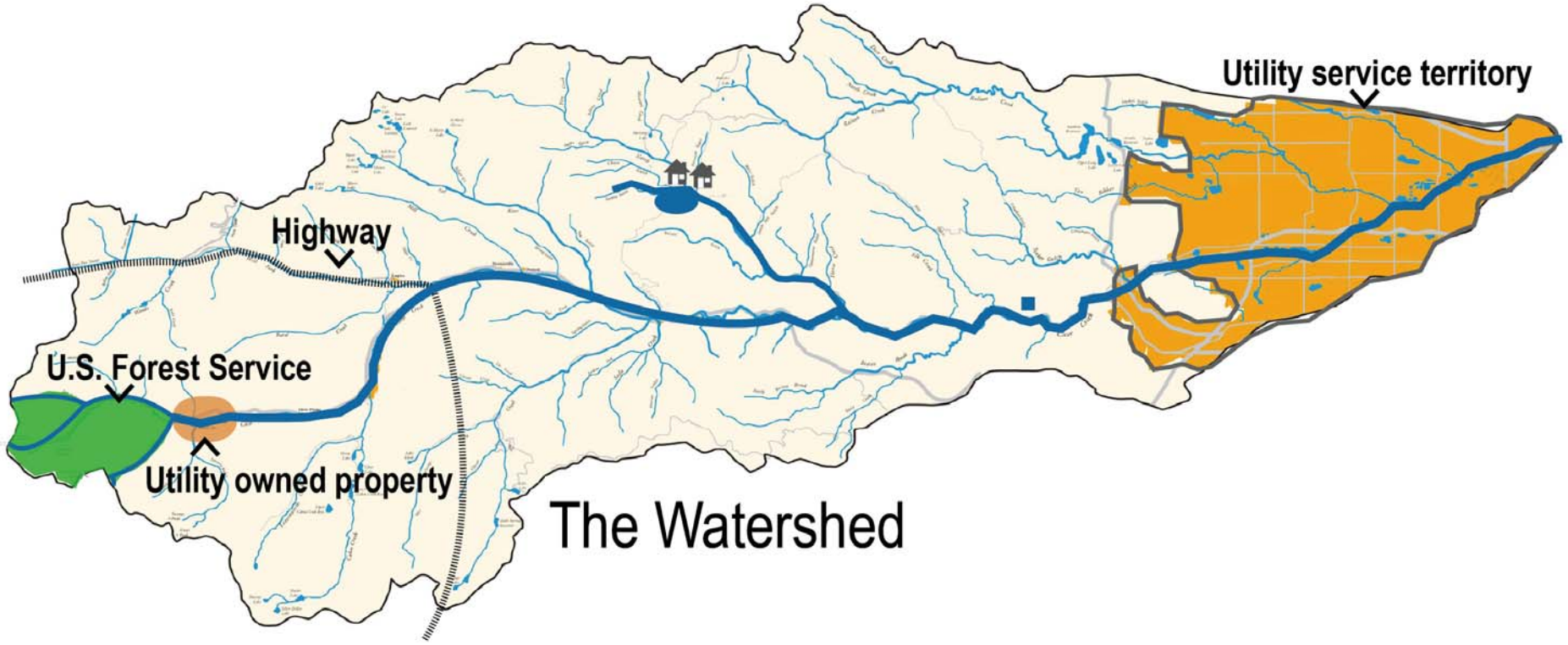
Utility service territory
Highway
U.S. Forest Service
Utility owned property
The Watershed