

ARKANSAS WATER USE AND REGULATIONS

December 18, 2015

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Efforts to Improve Municipal Water Use Practices

- **Water Reduction Goals**
- **Methods of Reducing Water Withdrawal**
- **Measuring Success**
- **Economic Benefits**

Water Reduction Goals

- Vary across the country and globe
 - From 1% annually to 20% annually
 - A good range is 1% to 5%
 - 20% drastic – likely not attainable
 - Communities in California have achieved 13-15%

- **Central Arkansas Water Supply - Surface Water**
 - Lake Maumelle
 - Greers Ferry
 - Lake DeGray
 - Lake Ouachita
 - Others

- **Arkansas Water Reduction Goal**
 - Always a goal and good idea to conserve
 - Most important in the Summer and Fall
 - Reduce demand on treatment
 - Reduce demand on infrastructure
 - Maintain reasonable water rates
 - Reduce wastewater treatment

Western U.S. Reduction Goals

- **California – 5% to 20% annually**
- **Oklahoma – 5% annually**
- **Some states have shortages now and will face shortages in the future**
- **Must conserve year-round**
- **Must control and capture stormwater runoff**

Main Sources of Water Use - Arkansas

- **Municipal – 4%**
- **Agricultural – 73%**
- **Thermoelectric Power Generation – 20%**
- **Self Supplied Industry – 1%**
- **Mining – 1%**
- **Livestock – 1%**

Municipal Water Conservation

- **Establish water conservation goals**
 - Must make sense for area and source
 - Groundwater source conservation very important
 - As groundwater sources are depleted – water quality can suffer
- **Implement water rate structures**
 - Tiered rate structure
 - Affordable for efficient users
 - Higher for excessive use
 - Additional revenue dedicated to fund conservation

- **Fund water conservation efforts**
- **Implement water reducing fixtures for residential and business**
- **Adopt outdoor watering ordinances**
 - **Implement behavioral practices for outdoor watering**
 - **Automation for irrigation systems**
 - **Tiered rate structure for irrigation - seasonal**

How to Conserve Water

- **Engineering Practices**
 - **Plumbing Fixtures**
 - Low Flush Toilets
 - Low Flow Showerheads
 - Faucet Aerators
 - Pressure Reduction
 - Water Reuse/Recycling
 - Transmission Upgrades/Repairs – need annual budget

- **Behavioral Practices**
 - **Residential Water Use Habits**
 - **Outdoor Habits**
 - **Rate Structures Change Behavior**

Conservation Technology

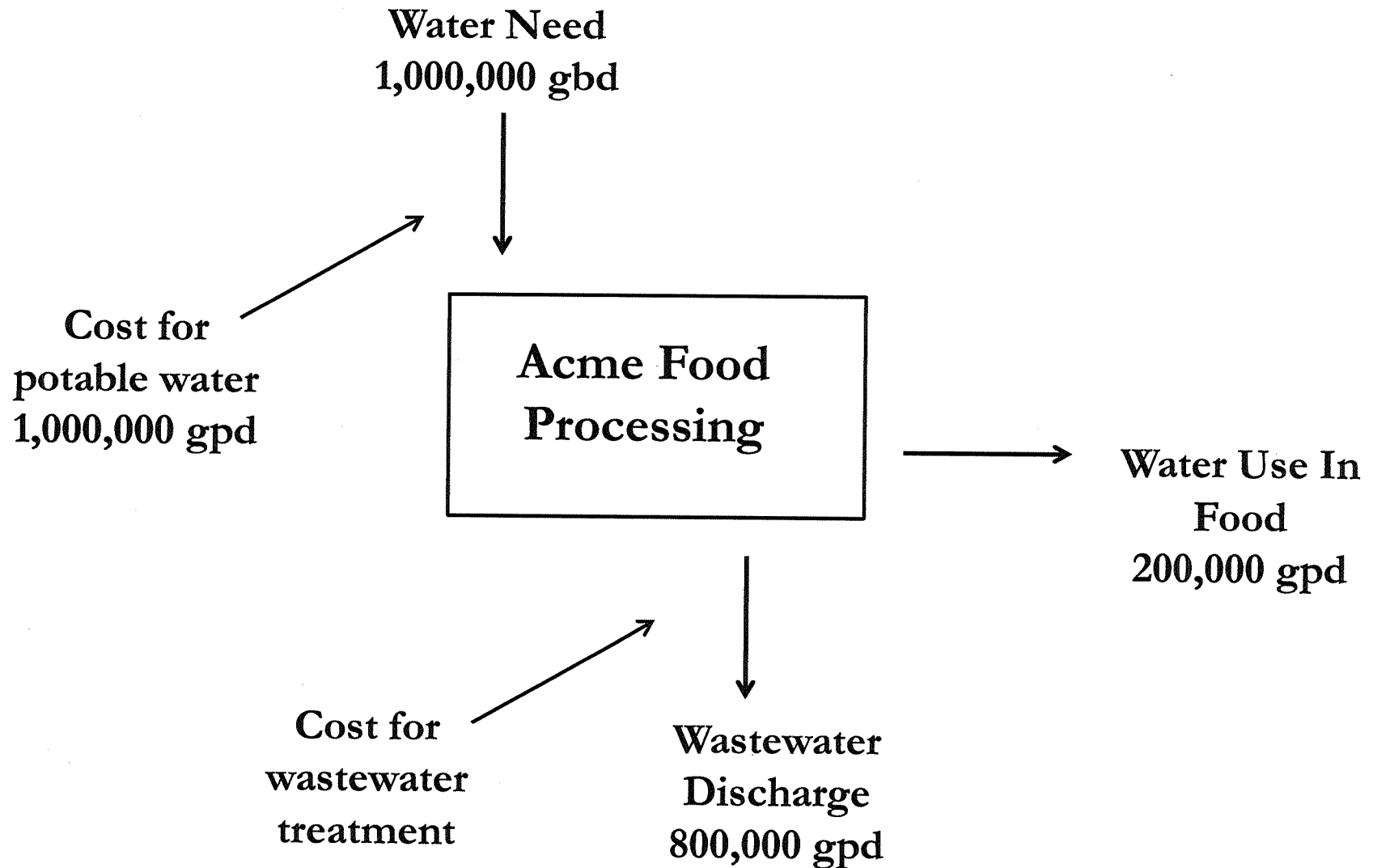
- **New Construction Graywater Technology**
 - Use of graywater for irrigation
 - Distributed by surface or subsurface systems
 - Does not spray into the air
 - Incentives for reuse systems to encourage builders

- **Rainwater Harvesting**

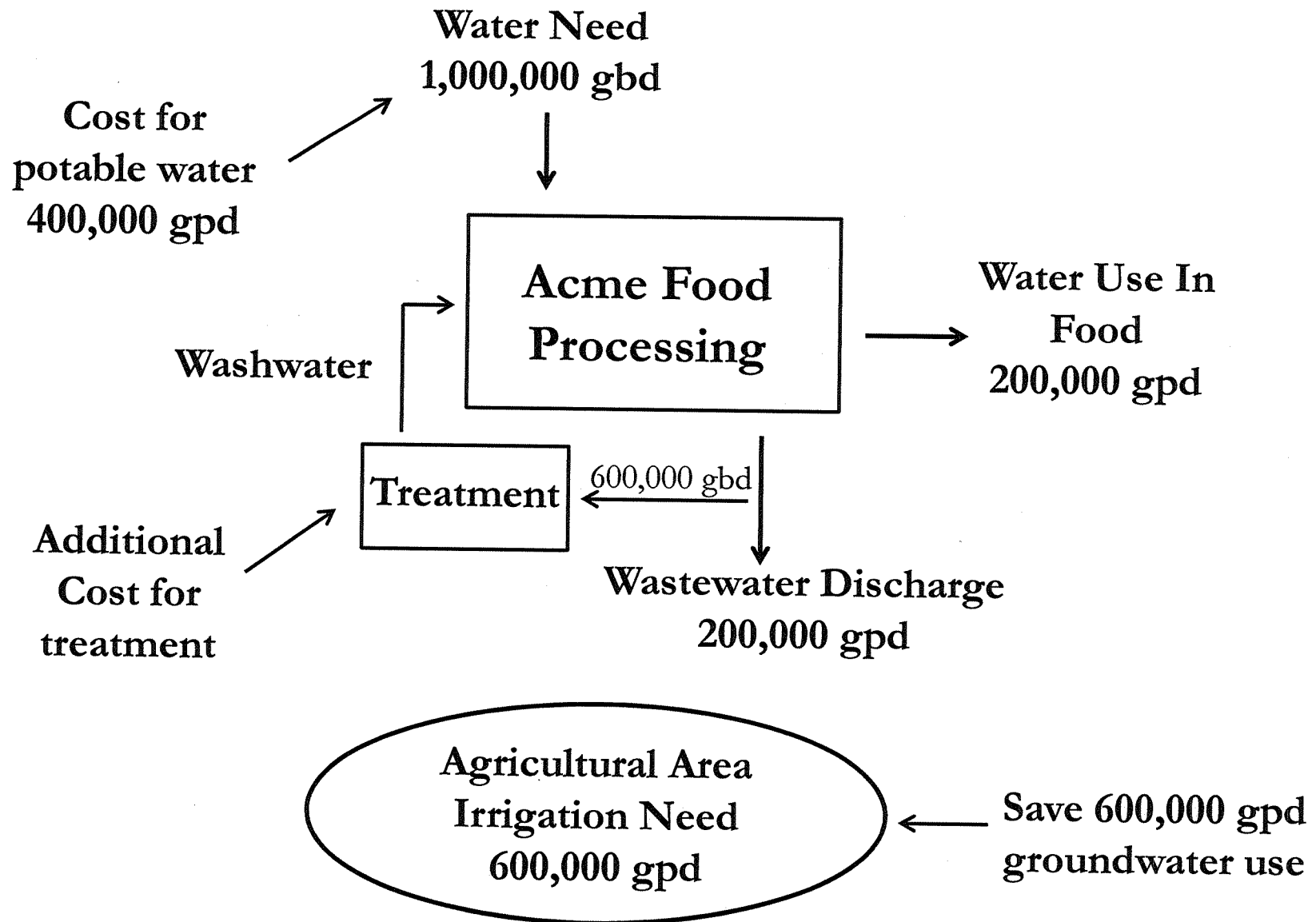
- Main focus is on irrigation of landscaping and sports complexes
- Planned residential developments
- Water features
- Stormwater controls
- Pollution reduction

- **Recycling/Reuse – Industry**
 - **Cooling water recycling**
 - **Wash water treatment reuse**
 - **Direct reuse – not applicable for some industry**
 - **Requires treatment**
 - **Requires planning**
 - **Benefits**
 - **Less water purchase**
 - **Less wastewater treatment costs**

Typical Food Processor Water Use



Recycle/Reuse Typical Food Processor



Safe Drinking Water Act

30th Anniversary

- **Safe Drinking Water Act (SDWA) passed by Congress 1974**
 - **Protect Public health by regulating drinking water supply**
 - **Primarily focused on Water treatment**

Amended in 1986 & 1996

- **1996 Amendments enhanced source water protection**
- **Operator training**
- **Funding for water system improvements**
- **Public Information**

SDWA 1996 Amendment Highlights

- **Consumer Confidence Reports**
- **Cost Benefit Analysis**
- **Drinking Water State Revolving Fund**
- **Microbial Contaminants & Disinfection by products**
- **Operator Certification**
- **Public Information & Consultation**
- **Small Water Systems**
- **Source Water Assessment Programs**

Major Components of SDWA

- **Protection & Prevention**
- **National Drinking Water Standards**
- **Funding Assistance**
- **Compliance & Enforcement**
- **Public Information**

SDWA Infrastructure Needs

- **1996 SDWA Amendments established**
 - **“The Drinking Water State Revolving Fund”**
- **Between FY 1997 & FY 2004 Congress appropriated 6.96 billion for the DWSRF.**
- **Needs Assessment found**
 - **Current needs total \$200 billion**
 - **Future needs total \$150 billion**
 - **Total \$350 billion**

Needs Assessment Breakdown

- **Storage** \$ 30 billion
- **Treatment** \$ 65 billion
- **Source** \$ 16 billion
- **Transmission & Distribution** \$ 230 billion
- **Other** \$ 9 billion

SDWA Watershed – Based NPDES Permitting

- **Watershed- based NPDES permitting emphasizes all stressors within a hydrologically defined basin, rather than addressing individual pollutant sources.**
- **Watershed-based permitting will vary from watershed to watershed.**
 - **Different types of industry**
 - **Different types of watersheds**
 - **Different pollutants**

- **Goal is to develop NPDES permits that protect the entire watershed.**
- **Residential Communities within the watershed can be permitted.**

ADEQ Regulation No. 2 - “Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas”

- **Anti-degradation Policy**
 - Existing Water Uses
 - High Quality Waters
 - Outstanding Resource Waters
 - Thermal Discharges

Water Body Uses

- Designated Uses
 - Extraordinary Resource Waters
 - “This beneficial use is a combination of the chemical, physical and biological characteristics of a water body and its watershed which is characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential and intangible social value.”
 - Ecologically Sensitive Waters
 - “This beneficial use identifies segments known to provide habitat within the existing range of threatened, endangered or endemic species of aquatic or semi-aquatic life forms.”

– Natural and Scenic Waters

- “This beneficial use identifies segments which have been legislatively adopted into a state or federal system.”

– Primary Contact Recreation

- “This beneficial use designates waters where full body contact is involved. Any streams with watersheds of greater than 10 mi² are designated for full body contact. All streams with watersheds less than 10 mi² may be designated for primary contact recreation after site verification.”

– Secondary Contact Recreation

- “This beneficial use designates waters where secondary activities like boating, fishing or wading are involved.”

– Fisheries

- “This beneficial use provides for the protection and propagation of fish, shellfish and other forms of aquatic life....”

General Standards

- Nuisance Species
 - “All waters shall be free from substances attributed to man-caused point or non point source discharges in concentrations that produce undesired aquatic life or result in the dominance of nuisance species.”

- **Mixing Zones**

- “Mixing zones are allowed for all parameters not specifically excluded in Reg. 2.404 and the effects of wastes on the receiving stream shall be determined after the wastes have been thoroughly mixed with the mixing zone volume. Outfall structures should be designated to minimize the extent of mixing zones to ensure rapid and complete mixing....”
- “Mixing zones are not allowed for the parameters of bacteria or oil and grease, or where the background flow is less than the critical flow...”

- **Biological Integrity**

- “For all waters with specific fisheries use designated in Appendix A, aquatic biota should not be impacted....”

- **Color**

- “True color shall not be increased in any waters to the extent that it will interfere with present or projected future uses of these waters.”

- **Taste and Odor**

- **“Taste and odor producing substances shall be limited in receiving waters to concentrations that will not interfere with the production of potable water by reasonable water treatment processes, or impart unpalatable flavor to food, fish or result in offensive odors arising from the waters or otherwise interfere with the reasonable use of the water.”**

- **Solids, Floating Material**

- “Receiving waters shall have no distinctly visible solids, scum or foam of a persistent nature, nor shall there be any formation of slime, bottom deposits or sludge banks.”

- **Toxic Substances**

- **“Discharges shall not be allowed into any water body which, after consideration of the zone of initial dilution, the mixing zone and critical flow conditions, will cause toxicity to human, animal, plant or aquatic life or interfere with normal propagation, growth, and survival of aquatic biota.”**

- **Oil and Grease**

- “Oil, grease or petrochemical substances shall not be present in receiving waters to the extent that they produce globules or other residue or any visible, colored film on the surface or coat the banks and/or bottoms of the water body or adversely affect any of the associated biota.”

Specific Water Quality Analytical Standards

- Temperature
- Turbidity
- pH
- Dissolved Oxygen
- Radioactivity
- Bacteria
- Nutrients
- Phosphorus

Protection of Groundwater from Surface/Subsurface Discharges

- **Perform Vernability Assessment**
- **Periodic Sampling/Analysis**
- **Monitor Contaminant Sources**
- **Communicate with Industry and Others**

Source Water Assessments

- **Groundwater Assessments are more difficult than Surface Water**
- **Delineate source water assessment area**
- **Conduct an inventory of potential sources of contamination**
- **Determine susceptibility**
- **Release results to the public**

Delineate the Assessment Area

- **Use maps and information on flow of underground water**
 - **USGS**
 - **Arkansas Department of Health**
- **Use Topographic Maps to draw boundaries**
- **Map the Geology of the Area**

- **Map the Land Use**
 - Industrial
 - Residential
 - Agriculture
- **Define the Water Table**

Conduct an Inventory of Potential Sources of Contamination

- **Landfills**
- **Industrial Facilities**
- **Underground Injection Wells**
- **Above ground & Underground fuel storage**
- **Residential & Commercial septic systems**
- **Agricultural areas**
- **Wastewater land application areas**
- **Abandoned wells**

Susceptibility of Water Supply Contamination

- **Map the Sources of Contamination within the assessment Area**
- **Map Geology in the area**
- **Determine Radius of influence of groundwater wells**
- **Assign susceptibility rankings on the potential sources – low, medium to high**
- **Prioritize contamination source & sites**

Release Assessment to Public

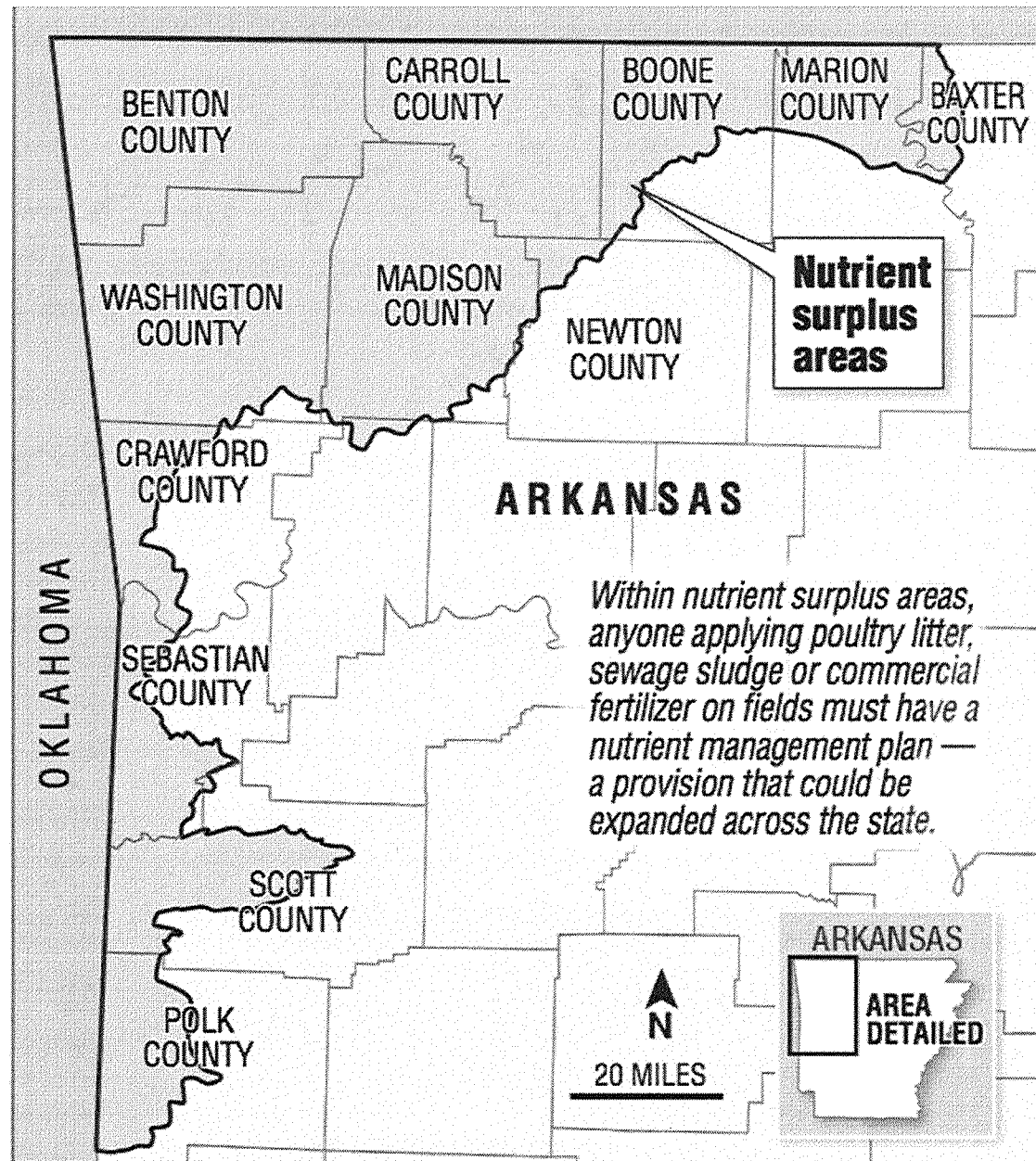
- **Annual Water Quality Report**

**Nutrient Management
and
Water Quality Concerns**

Nutrients of Concern

- Nitrogen
- Phosphorus
- Nitrogen has several forms
 - Nitrates & Nitrites
- NO_3 – Nitrate most common end form
- NO_3 – Traits
 - Highly Soluble – will follow groundwater flow

Nutrient Surplus Area of Arkansas



SOURCE: Arkansas Natural Resources Commission

Arkansas Democrat-Gazette

Reason for High NO_3 in Groundwater Levels

- Applications to close
 - Sinkholes
 - Rock Outcroppings
- Leaky manure storages
- Over application of N
- Application prior to stormwater runoff events

Historical Nutrient Focus

- Minimize NO₃
- Karst topography concerns
 - Direct pathways
 - > Sinkholes
 - > Springs
 - > Caves
 - > Fracture rocks
 - Little soil filtering
 - Can be like “pipe flows”

Current Nutrient Focus

- **Phosphorus**
 - **Naturally Occurring**
 - **Essential for Crop Production**
 - **Excess P leads to Water Quality Concerns**
 - **Not considered Public Health Issue**
 - **Environmental Concern**
- **Lake Eutrophication**

Eutrophication

- Applies to surface water
- Lakes age naturally
- Eutrophication is accelerated aging
- Characterized by excessive plant growth
- Requires N, P & K
- P usually limiting factor

- **Results**

- **Off flavor drinking water**
- **Lower oxygen levels**
- **Reproduction and shifts in aquatic populations**

Current Nutrient Focus

- **N** still addressed
- **P** is primary concern
- State and Federal regulation require **NMP** to consider **P**
- **NMP** in the Surplus Area must be written by a “Certified” plan writer

Land Development Within The Watershed

- **Hot Topic – Lake Maumelle
(CAW vs. Deltic Timber) – Good & Bad**
- **Largest Concern – stormwater runoff from development**

Residential Development Only – not too bad

- **Lawn fertilizer**
- **Herbs and pesticides**
- **Construction runoff**
- **Oil and grease from roads**
- **Sanitary sewer overflows**
- **Septic system discharges**

Residential Development plus Commercial Development – concerns

- **Same as above**
- **More parking lots – more oil and grease**
- **Potential for other chemicals and wastes**
- **Typically commercial development is limited**

Permitting Issues

- **National Environmental Policy Act**
- **Wetlands**
 - **Wetlands within Water Supply Development**
 - Potential wetlands need to be assessed and delineated as part of the site selection process.
 - You can request a delineation from the USCOE
 - USCOE will delineate the site. They will fit the work into their work schedule.
 - Time frame can be 6 months to 12 months.

Perform Site Reconnaissance

- **Can affect site selection greatly**

Effects of Floodplains on Real Estate

- **Land Value**
- **Development restrictions**

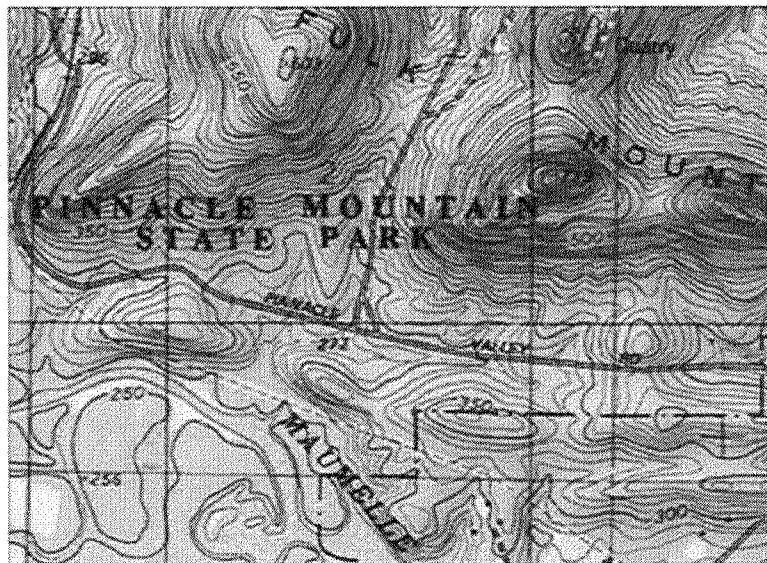
- There is a good chance that some wetlands will be encountered in site selection – After all, development of a water supply will involve a stream of some sort.
- The water supply site begins with a stream
- Chances are good there are wetlands around the periphery of the stream
- Determine the location of the impoundment structure
- Can wetland be avoided?

Obtain Corps of Engineers Determination of the Delineated Wetlands

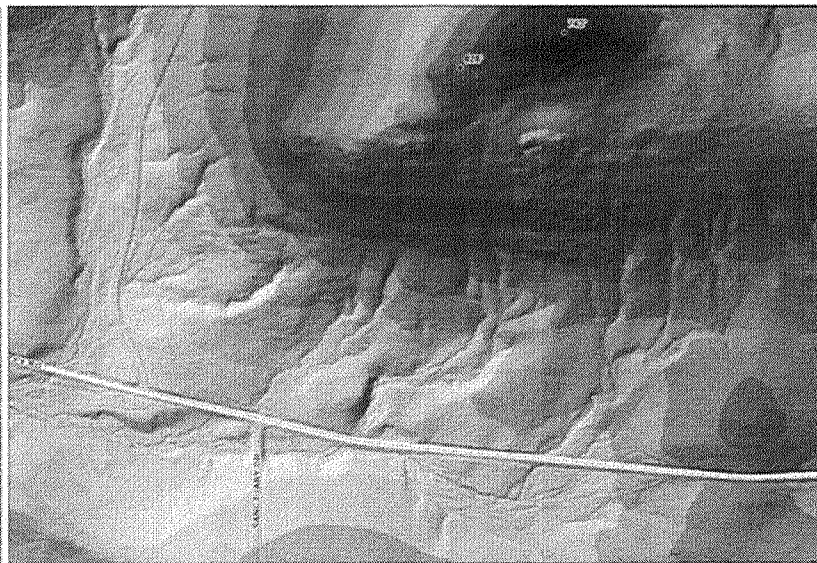
- Corps issues the official determination**
- Corps will review consultant delineation to determine what wetland areas the U.S. will take jurisdiction over**
- Corps will issue a letter with maps that indicated jurisdictional wetlands**

- **Delineation of the entire site**
- **Nationwide Permit – there are 44
Nationwide Permits – not likely that one fits
water supply development**
- **Individual Permit – most likely**
 - **Time frame 120 to 180 days**
 - **Public Comment period**
 - **Fed & State agencies review and
comment**

- The entire site should be investigated - 10 acre, 40 acres, 400 acres
- The Corps will not accept piecemeal projects
- Submit the development plan with the delineation for best result
 - It is best to submit a proposed development plan with the delineation for Corps review
 - Corps will issue a determination letter and will indicate what type of permit may be required



TOPOGRAPHIC VIEW
SCALE: N.T.S.



LIDAR IMAGE (PACS)
SCALE: N.T.S.



CIVIL ENGINEERING AND ENVIRONMENTAL SERVICES 1201 N. Main, Little Rock, AR 72201 (501) 782-1234 FAX (501) 782-1235 WWW.CES-INC.COM		SHEET TITLE AERIAL AND LIDAR PHOTOGRAPHS		ARKANSAS WATER LAWS AND REGULATIONS	
PROJECT NO. 100-0000		DATE DEC. 17, 2010		LITTLE ROCK, ARKANSAS	
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Mitigation Plans

- Offer a wetland mitigation plan with development plan
- On-site mitigation
- Off-site mitigation
- Water Supply is now a wetland

Construction Stormwater Rules

- **Part of the Clean Water Act**
- **Requires an ADEQ Stormwater Permit for construction**

- **May require local city or county permit**
- **Land within watershed should monitor stormwater runoff – issue individual permits if necessary – jurisdictional questions – local and county ordinances**