

Local Input Meeting Report



#18

Norman, Oklahoma
Cleveland County Fairgrounds
North Classroom
July 19, 2007

Project Description

The Water Research Institute, at Oklahoma State University, is working under contract with the Oklahoma Water Resources Board to update Oklahoma's Comprehensive Water Plan. The Institute has designed an innovative process that combines citizens' ideas with the assistance of water experts in formulating policy recommendations. This process seeks to rely on the citizens' values for guidance in making tough choices about management of our State's water resources.

The first phase of this process consisted of 42 Local Input Meetings held throughout the State beginning in April 2007, at Beaver and ending on Nov. 15, 2007, at Idabel. The purpose of the meetings was to gather citizens' ideas, questions, suggestions and concerns about Oklahoma's water resources. This report is a comprehensive list of the comments received at this meeting.

In addition to the Local Input Meetings the public participation process consists of four other components. During the second phase, beginning in 2008, the Institute will conduct 11 regional meetings where selected participants will review the comments, consolidate similar issues, and prioritize them. Planning workshop, where participants will work to development management alternatives, is scheduled to begin in 2009. The Oklahoma Academy for State Goals will hold a special Town Hall meeting, in the spring of 2010, where citizens will develop consensus recommendations. These recommendations will be forwarded to the Oklahoma Water Resources Board for consideration/inclusion in a draft updated Comprehensive Water Plan. In the final phase the Institute will again conduct 11 regional meetings. At these meetings, the Institute will receive feedback and implementation suggestions on the draft Water Plan. Comments received at these meetings will be forwarded to the Water Board who will finalize the Plan and submit it to the legislature and the governor.

For more information visit the Institute's website at <http://okwaterplan.info>, email them at waterplan@okstate.edu, or by phone at 405.744.9994. You may also contact the Oklahoma Water Resources Board at www.owrb.ok.gov or 405.530.8800.



Meeting Agenda

Time	Topic	Speaker
6:36 pm	Welcome	Susan Moffat, Educator Cleveland County Cooperative Extension Service
6:39 pm	Purpose of Meeting and Introduction of Staff	Mike Langston, Assistant Director Water Research Institute
6:46 pm	Water Challenges in Oklahoma	Dave Dillon, Director of Water Planning Oklahoma Water Resources Board
7:25 pm	Comments from the public	Public Participants
8:50 pm	Meeting adjourned	

Attendees

Water Research Institute Staff

Mike Langston, Assistant Director
 Jeri Fleming, Communications Manager
 Alison Stone, Administration Specialist

Oklahoma Water Resources Board Staff

Dave Dillon, Director of Water Planning

Oklahoma Cooperative Extension Service Staff

Susan Moffat, Cleveland County Extension Educator

Public Participants

72 citizens

Comments

Eighty-eight comments were received from the meeting participants. Comments were submitted both orally and by comment card. The comments are organized alphabetically by topic. Each comment is preceded by a unique identification number that will remain with the comment throughout the process. *Additional comments were submitted online to the website and are not included below; however, there is a separate report that lists all comments received through the website, by fax, mail and phone.*

Water Management

Agencies

- *Jurisdiction*
 - **Nm5b** The ODEQ and the OWRB should be combined. All water regulations should be consolidated under this agency, which would possibly be led by an elected body similar to the Corporation Commission.
- *State*
 - **Nm27** I would like to see the ODEQ and the OWRB work closer with communities especially in their industrial permitting process to let communities know what is going on in their area. Small communities are not well-informed when industry is built in or just outside city limits. These industries can have negative impacts on the communities and they need help understanding what the impacts can be. Legal notification of the public should be more aggressive.

Conjunctive Management

- **Nm1b** Surface/groundwater connection must be recognized for quantity and quality concerns when allocating water.
- *Legislation*
 - **Nm16a** Surface water and groundwater are connected and the water law has to reflect that reality.
 - **Nm31** Recognize the interaction between surface and groundwater. Streams, lakes, and other surface water sources are inextricably linked to groundwater aquifers. This link is not currently recognized in Oklahoma law. Landowners are free to pump groundwater from alluvial aquifers until streams run dry. Mining companies are free to excavate large pits to a level below groundwater level and then remove as much water as they want.
 - **Nm50g** Specific fish and wildlife related issues: Recognize the link between ground and surface water and integrate both in any permitting process.

Conservation

- **Nm2g** We have to realize what water is (a non-renewable, precious natural resource).
- **Nm15** The State should require communities to develop a conservation plan especially if they are receiving some sort of financial assistance from the State.
- *Education*
 - **NM16h** There is no leadership for water conservation except at lower levels and this should be included in the plan.
- *Incentives*
 - **Nm2e** When the plan mentions water, we must remember that equals a similar volume of wastewater. Fair water pricing will result in getting people to think about conservation and water as wastewater.
 - **Nm2f** We need to have financial incentives to help farmers switch to low water use equipment.
 - **Nm46** Require communities to establish conservation measures. As a part of receiving State financial assistance or additional water allocation, require communities to have a working water conservation plan.

- *Sustainability*
 - **Nm2b** The plan needs to explicitly include sustainability. The 1995 water plan only mentions the environment 3 - 4 times.
 - **Nm10e** Sustainability of our growth and water supply are inter-related and should be considered together.
 - **Nm37a** We need to ensure all water use is sustainable; particularly groundwater should not be treated as a "mineable" mineral resource.

Economic Impacts

- **Nm18** The environment and economy are interrelated where water is concerned and they should be looked at together. We need to develop a water conscious economy. We need to move away from couching water in terms of the opposition of the economy and the environment.
- **Nm38** All economic and environmental cost must be internalized and accounted for in any calculation for interbasin transfers. There are many costs to air quality, for example, to produce energy from coal fired plants that would be needed to move water over large distances. The production of CO2 and greenhouse gases would be significant.
- *Recreation*
 - **Nm49** Water quantity and quality are integral components for fish and wildlife management and outdoor recreation in Oklahoma. More than 50% of Oklahomans fish, hunt, or participate in wildlife-watching activities and these activities add immensely to the quality of life enjoyed in the State. Surveys show that a major motivation for fishing and hunting is to spend time with family, thereby helping to strengthen family bonds. Fish and wildlife recreation also have a tremendous economic value. The annual economic impact of fishing in Oklahoma is estimated to be \$478 million, while the impact of hunting is \$573 million and the impact of wildlife-watching activities is \$370 million. Clearly, these activities should be given high priority in discussions related to the water necessary for healthy fish and wildlife populations.
 - **Nm50f** Specific fish and wildlife related issues: Require that recreational aspects (especially fishing and hunting) be included in any studies done on economic value/impact of water projects.

Health

- *Ecological*
 - **Nm12a** We need to remember watersheds in Oklahoma that may not be completely used to supply drinking water for people but they do maintain important ecosystems services.
 - **Nm16g** Water quality and run-off issues are vital to our ecological well-being.
 - **Nm20** Sustainability is vital. Part of the plan needs to address the fact that water must be maintained at some level for the health of the environment. If you draw down a lake or aquifer, you are ruining the planet for everybody. Lake Dillon in Colorado has been ruined by Denver pulling the water out and we are at risk for this happening here.
 - **Nm24b** We should not over allocate our water and we need to protect our in-stream flows.
- *Human*
 - **Nm14** I support the establishment of dual (potable/non-potable) systems [for distributing graywater] but the non-potable water should be treated to drinking water standards of at least 10 - 20 years ago to preclude health problems if accidentally consumed.

- **Nm37c** I think we must keep public health and safety foremost.

Infrastructure

- **Nm24c** New reservoirs will flood some of our best land and this can have negative effects.
- *Funding*
 - **Nm10d** Financing of infrastructure is going to be an issue that local communities cannot address alone. Destructive competition among communities will happen if there is not funding assistance.
- *Maintenance*
 - **Nm1f** USDA Soil Conservation Service has provided flood control through their upstream flood control structures that have provided several benefits and there must be a continued effort to rehabilitate these silent sentinels.
- *Needs*
 - **Nm2c** You may be putting the cart before the horse to plan for infrastructure now that may not be needed in the future.
 - **Nm3** In the future, the amount of water Lake Thunderbird supplies will have to be increased to meet growth demands. Increasing the holding capacity of the Lake needs to be studied.
 - **Nm23** Our storage capabilities have decreased in the past 40 years per capita and we should consider expanding our storage capabilities.

Planning

- **Nm1g** We need to shorten the time period of the water planning process.
- **Nm2a** Oklahoma stands to be a model for other arid regions if the plan is put together right.
- **Nm6b** The Kiamichi basin is the most prolific watershed in Oklahoma and less than 1% is being utilized. If we don't use it, Texas will.
- **Nm8** We should keep scientific studies and policymaking bodies separate because one will influence the other.
- **Nm20b** The planning process needs to be sped up as the federal courts are getting involved and Texas may say they are entitled to water out of federal reservoirs.
- **Nm25** We should speed up the planning process because we are under the gun with the situation with Texas
- *Interstate Cooperation*
 - **Nm7** We should partner with other states to plan for basin-wide water resource utilization.
 - **Nm37d** I believe public pressure will expand Oklahoma water policy beyond our borders to a regional issue in the near future, like it or not.
- *Priorities*
 - **Nm6c** We need to put the citizens of Oklahoma first and domestic use should have priority over other uses.
 - **Nm37b** Because water shortages are going to become more common, prioritizing water uses will become necessary.

- *Public Participation Process*
 - **Nm21** Twenty-five percent of the people of Oklahoma fish. The quality and quantity of water in lakes and streams are important to their quality of life. Anglers and boaters need to be included in the planning process.
 - **Nm50c** Specific fish and wildlife related issues: Recreational activities need to be given high priority, and representatives from all resource agencies and recreational stakeholder groups should be included, in any water discussions.
 - **Nm50h** Specific fish and wildlife related issues: Require ODWC and other appropriate stakeholder involvement in planning for future water development projects where recreation is likely to be a component.
- *Regional Differences*
 - **Nm10b** There are regional issues with water quality not just quantity and this must be addressed.
 - **Nm16e** We need leadership for municipalities and other agencies to provide water and have a plan for dealing with drought. We need regional solutions for this.
- *Research*
 - **Nm43** Combine surface and groundwater sources in determining total State water availability and use. It seems contrary to permit surface water rights on a "use it or lose it" basis. While we agree surface water rights should not be "stock piled" or hoarded with no intended use, proper planning for long-term water supply needs should have a segment of conservation measures built in and not discouraged.

Policy/Regulations

- *Federal Regulations*
 - **Nm50a** Specific fish and wildlife related issues: Working with Congress to designate recreation as an authorized purpose of federal reservoirs.
- *State Regulations*
 - **Nm10c** Storm water needs to be added to wastewater and other pollution sources when addressing water quality.
 - **Nm16c** We should allocate some water [in reservoirs] as an emergency reserve.
 - **Nm16d** You should not be allowed to drain an aquifer - drawdown should not exceed the recharge rate.
 - **Nm16f** The way water permits are granted today promotes use not conservation [and this should be corrected].
 - **Nm28** There should be a website developed that takes all the legal notices (permits, construction projects, including anything with an environmental impact statement) and display the property description in a map format so that it is easy for people to see where the affected land is.
 - **Nm36** To help combat the problem of capping bad [domestic water] wells, perhaps both the homeowner and the driller could put up bond money. If the well is salty [or otherwise bad], the bond money would pay to cap it. If the well is good, the money is given back.

- *Taxes*
 - **Nm1d** Cities or communities with surface water impoundments should pay ad valorem taxes or other tax to the area where the impoundments are located to compensate those areas for the loss of their surface water.
 - **Nm1e** There should be a statewide fee for each finished water tap off the water main. The fee should be used for water planning, infrastructure development, land conservation practices and water conservation practices in urban and rural areas.
 - **Nm5a** There should be an examination of all types of consumptive uses for possible tax purposes. If water is sold, then there should be a tax placed on the sale of that water for the consumptive use.
 - **Nm35** The legislature needs to form a "super-regional" taxing entity to pay for the supply source and the infrastructure to provide safe, clean water for drinking, recreation, and industry.
- *Water Rights*
 - **Nm1a** Groundwater rights should and must continue to be with the surface owner. There should be no separation.
 - **Nm2d** There cannot be privatization of water.
 - **Nm24d** Ownership of water should be private but we also may need to consider consortiums coming and buying up water rights.
 - **Nm33** End private ownership of groundwater. Under current law, groundwater is owned by the landowner, unlike stream water which is owned by the public. Water is too precious a resource to be subject to the whims of private ownership and should be held as a public trust.
- *State Statutes*
 - **Nm10a** The State water plan has to be centered on water conservation and the current water law of "use it or lose" is counter-productive.
 - **Nm29** End groundwater mining. Current Oklahoma law allows OWRB to issue groundwater use permits based on as assumed 20-year lifetime for the aquifer. This is completely unsustainable. Allowing groundwater to be used up within 20 years is shortsighted and short changes future generations. Groundwater allocations should be limited to a perpetually sustainable amount.
 - **Nm50b** Specific fish and wildlife related issues: Enact legislation to maintain adequate in-stream flows to ensure quality habitats.

Regionalization

- **Nm1c** Any new water development projects should be regional in nature. Rural water districts must be included in that regional development plan.
- **Nm6a** I would like to applaud the legislature and OWRB for taking this planning initiative. We need to get Oklahoma water to the people in Oklahoma that need it most. OKC has developed their water infrastructure through the Atoka pipeline; we can expand on that system and pick up the Kiamichi basin to bring water to central Oklahoma, but we should not let OKC do it solo and other municipalities should be involved in a consortium to do so.
- **Nm44** Encourage regionalization. Help communities look beyond their borders to join with other communities in developing long-term water solutions for the larger area. To help assure smaller communities that they will be treated fairly as customers of larger

communities, if requested, allow water rates between communities to be reviewed by the Corporation Commission for fairness.

Sales and Transfers

- *Interstate*
 - **Nm19b** I heard from a Texas water official that Texas can support their population growth for the next 25 years with current water supplies; they just can't water their lawns. So, they want our water to water their lawns.
 - **Nm24a** I don't think Texas needs our water. We need to take care of ourselves and our future need before providing water to other states. If we start providing water to Texas, we will not be able to stop because of the way the courts have ruled regarding drinking water supplies.
 - **Nm26** We should consider getting a reallocation of water from Lake Meredith and letting it flow back to us through the Beaver/Canadian river.
 - **Nm47** The "Oklahoma" Comprehensive Water Plan should prioritize all of Oklahoma's needs before considering out-of-state requests.
- *Intrastate*
 - **Nm20a** Those of us in Central Oklahoma that don't want to send water to western Oklahoma should not be taking water from southeastern Oklahoma
 - **Nm22** Maybe we should consider treating the water at the source and then pump it [rather than pumping the water first and then treating it]. This would give the people in the source area an economic benefit and prevent transfer of unwanted organisms.
 - **Nm32** Avoid large-scale water transfers. The necessity of large water imports to an area is a significant indicator that local carrying capacity has been exceeded. These transfers may not be sustainable in the long run. Dependency on water transfers should be avoided.
 - **Nm34** Central Oklahoma needs to be able to access water from areas of the State where water is plentiful (Sardis Lake for example).
 - **Nm41** Central Oklahoma Master Conservancy District uses water from Lake Thunderbird to supply Norman, Midwest City, and Del City. Currently these cities supply water to approximately 175,000 persons. The number served will rise to approx. 225,000. The capacity of Lake Thunderbird will be met in a few years. Augmentation by additional sources will be required (probably from southeast Oklahoma). COMCO will be pleased to support and cooperate.
 - **Nm50d** Specific fish and wildlife related issues: Limit interbasin water transfers to avoid transport of aquatic nuisance species.

Water Treatment

- *Natural*
 - **Nm40** Let's solve stormwater problems and impaired lake problems by utilizing planned (engineered) wetlands to purify waters as other cities have done, i.e. Orlando, Tucson, Humbolt County, California, Phoenix, etc. A wetlands area in the watershed of Little River could be utilized as another OU Biological Station, a recreational park and bird sanctuary, a tourist attraction, a biking path, etc. Wetlands enhance sustainability, the economy, and the quality of life, not to mention conservation.

Watershed Management

- **Nm50e** Specific fish and wildlife related issues: Ensure that public access to public water for all recreational purposes is maintained/enhanced.

Water Sources

Recycled Water

- **Nm12b** We need to think about water reuse the water can be treated to the point it can be added back into lakes.
- *Waste Water*
 - **Nm17** The plan should encourage reuse of properly treated wastewater. As a condition of their wastewater treatment plant permits, communities should be required to reuse a percentage of their treated effluent
 - **Nm45** Encourage re-use of properly treated wastewater. Support or even require communities to re-use a portion of their wastewater stream for irrigation, industrial use and/or augmentation of the community's pretreated water supplies.

Surface Water

- *Both Quality and Quantity*
 - **Nm19a** Fish and wildlife are dependant on high quality and quantity of water and hunting and fishing have a huge impact (\$1.5 billion) on the state's economy.
- *Quantity*
 - **Nm16b** We should leave water in streams for vegetation and wildlife and for downstream use.

Water Uses

Conservation Use

- *Reuse*
 - **Nm13** The plan should promote residential and small-scale commercial - graywater reuse and rainwater capture these should be given educational and technical support and if possible subsidies. Cities should be encouraged to develop dual system potable/non-potable water supplies.

Ecological Use

- *Habitat*
 - **Nm30** Preserve in stream flows. Minimum flows in streams are necessary to support a healthy aquatic community and provide ecological benefits. A mechanism to determine the minimum flow amount and to ensure that it is available must be developed.

Storage Use

- **Nm39** The size of pool [storage capacity of the reservoir] would be salvaged and water quality enhanced with conservation low water dams on every tributary in the Lake Thunderbird watershed to catch silt before it reaches the Lake.

ADDENDUM

Category Descriptions

- **Water Management**

- Agencies – Includes, but is not limited to, federal, state, and local agencies. Also includes rural water districts, jurisdictional issues, and additional funding needs by individual agencies
 - Federal – Comments regarding federal agencies that are not necessarily related to a law or regulation
 - Funding – Additional federal, state, or local funding opportunities for various projects
 - Jurisdiction – Limiting, expanding, or consolidating agency jurisdiction
 - Local – Includes cities, conservation districts, and other locally led authorities
 - Rural Water Districts – Suggestions that would affect rural water districts
 - State – Comments regarding State agencies
- Conjunctive Use/Management – Consideration of the interaction between ground and surface water
 - Legislation – Changes in Oklahoma law to recognize/not recognize the interaction of ground and surface water
 - Research – Identification of additional research needs concerning conjunctive use
- Conservation – Decreasing use and preservation of Oklahoma’s water resources
 - Education – Conservation education and educational resources
 - Incentives – State or local incentives to encourage water conservation
 - Research – Directed at water conservation measures
 - Sustainability – The continuous long-term availability of water resources
 - Technology – Equipment or other innovations intended to help conserve water
- Economic Impacts – The effects water has on the State’s economy
 - Development – Increased housing, industry, tourism, or other types of development requiring water resources
 - Population Change – The effect population change has on local and State economies
 - Recreation & Tourism – The impact recreation and tourism have on the State’s economy as well as the effect water management has on recreation and tourism
 - Regulations – The effect both federal and State regulation has on water districts
 - Sales – Concerns regarding the effect the sale of water will have on the State’s or basin of origin’s economy
- Health – The effect water quality and water quantity have on both human health and the environment
 - Ecological – The environmental impacts of water quality and water quantity
 - Health – The health effects resulting from a lack of available good quality potable water
- Infrastructure – Includes, but is not limited to, drinking water and waste water treatment facilities, pipelines, dams and other associated structures
 - Needs – New infrastructure needs
 - Maintenance – Maintenance of existing infrastructure

- Funding – Additional, continued or increased State or federal funding opportunities
- Planning – Comments regarding the planning process for the Oklahoma Comprehensive Water Plan
 - Interstate Cooperation – Working with surrounding states to avoid conflicts regarding water flowing into and out of Oklahoma
 - Priorities – The prioritization of water usage during times of shortage to avoid later conflicts
 - Public Participation Process – Comments regarding issues with the public participation process
 - Regional Difference – Recognizing water availability, uses, and rainfall variations across the State
 - Research – Identification of possible research needs during the planning process
 - Revision – The need for updating the plan more frequently than once every 10 years or so
- Policy/Regulations – Comments regarding various State and federal statutes (laws) and regulations (rules)
 - Adjudication – Court involvement in the management of Oklahoma’s water resources
 - Enforcement – Enforcement of current laws and regulations by the appropriate agency
 - Federal Regulations – Comments about federal laws and regulations
 - Incentives – Federal and State incentive programs to promote compliance with laws and regulations
 - State Regulations – Comments about State regulations or rules
 - Permits – Comments about the permitting process
 - Water Rights – Comments about regulations concerning water rights
 - Taxes – The levying of taxes to collect money for various reasons
 - State Statutes – Comments regarding Oklahoma’s water law
- Regionalization – the consolidation of water treatment facilities or other infrastructure by municipal and/or rural water districts
 - Funding – Federal or State funds available to help facilitate regionalization
 - Incentives – To help encourage regionalization of water treatment facilities
- Sales & Transfers – The artificial movement of water either in-state (intrastate) or out-of-state (interstate)
 - Compensation – Who should be compensated, how should they be compensated, and how much should they be compensated if water is sold or transferred
 - Control – Concerns about who would control the water and land if water is sold or transferred
 - Interstate – Out-of-state water sale or transfer
 - Intrastate – In-state water sale or transfer
- Water Rights – Who has the right to control or use ground or surface water
 - Private Property Rights – Rights to groundwater on private property
 - Permitted Water Rights – Both surface and groundwater permitted water rights
 - Native American Rights – Tribal claims to both surface and groundwater

- Water Security – Natural and man-made threats affecting water supplies
 - Disasters – Natural or man-made disasters affecting either water infrastructure or supply
 - Terrorism – Terrorist attack on water infrastructure or supply
- Water Treatment – Includes both natural and man-made water treatment suggestions
 - Artificial – Technologies for treating both drinking and waste water
 - Natural – Ecological (environmental) ways of treating both drinking, and waste water i.e. wetlands
- Watershed Management – The management of land, including development that affects water quality and water quantity
- **Water Uses**
 - Agriculture Use – The way water is used in the agriculture industry
 - Biofuels Growth – Suggestions and concerns regarding the increased growth of crops for biofuels
 - Commercial Use – The use of water by commercial enterprises such as small businesses, etc.
 - Conservation Use – Suggestions and concerns regarding various ways to use water in a way that will conserve it
 - Reuse – The reuse of various water supplies such as treated wastewater, gray water, and storm water run-off
 - Ecological Use – Maintaining sufficient water levels to ensure the health of wildlife and ecosystems e.g. in-stream flows
 - Habitat – Water uses to protect wildlife habitat
 - Research – Identification of additional research needs regarding the ecological use of water
 - Hydropower Use – The use of dams to produce electricity
 - Industrial Use – The use of water by factories, power plants and other industrial uses
 - Biofuels Processing – The use of water in processing biofuels in the State
 - Mining Use – The use of water in the mining industry
 - Oil & Gas Use – The use of water by the oil and gas industry
 - Private Domestic Use – Household water that is not supplied by a municipality or rural water district and includes both ground and surface water
 - Wells – The use of private domestic wells
 - Public Domestic Use – Household water that is supplied by a municipality or rural water district
 - Municipality – Household water supplied by a town or city
 - Rural Water District – Household water supplied by a Rural Water District
 - Recreational Use – The use of water for recreation and to promote tourism
 - Aesthetics – Concerns about the aesthetic beauty of Oklahoma’s water resources
 - Boating – The use of water for water recreation such as boating
 - Fishing – The use of water for fishing in the State’s water resources
 - Golf Courses – The use of water in maintaining the State’s golf courses
 - Storage – The storage of water in reservoirs, or in aquifers either naturally or artificially; may also include other storage methods such as cisterns
 - Transportation Use – The use of water to maintain Oklahoma’s navigation channels, i.e. McClellan-Kerr Navigation System

- **Water Sources**

- *Both* Ground and Surface Water – Comments referring to *both* surface and groundwater concerns
 - Quantity – The quantity of *both* surface and groundwater
 - Quality – The quality of *both* surface and groundwater
 - Both – *Both* the quality and quantity of surface and groundwater
- Climate – The effect climate has on water sources including global warming and rain
- Groundwater – Concerns about the State's groundwater
 - Quantity – The quantity of groundwater
 - Quality – The quality of groundwater
 - Both – *Both* the quality and quantity groundwater
- Recycled Water – Non-traditional sources of water
 - Waste Water – Treated waste water as a water source
 - Gray Water – Gray water (water that comes usually from washing machines, showers, bathtubs, etc.) as a water source
- Surface Water – Concerns about the State's surface water
 - Quantity – The quantity of surface water
 - Quality – The quality of surface water
 - Both – *Both* the quality and quantity of surface water