Scoring Guide for Pee Dee Water Management Strategies

Benefits	
1	Localized or marginal
2	Tens of millions of gallons per day
3	Hundreds of thousands or millions of gallons per day

Costs	
1	Limited capital costs ($1 M or less) (for municipalities, industry, and thermo electric); least expensive for agriculture and golf courses
2	$10 M order-of-magnitude (for municipalities, industry, and thermo electric); significant expense for agriculture and golf courses
3	$100s M order-of-magnitude (for municipalities, industry, and thermo electric); most expensive for agriculture and golf courses

Implementatibility	
1	Easy, common, minimal new ground to break
2	May have been done locally but not at statewide scale; will take formal planning and permitting time
3	Not common or never done before in SC; new regulatory or permitting considerations

Timeframe	
1	Short timeframe; common practice; could be done within a couple of years
2	Medium timeframe; 10-year planning and implementation order-of-magnitude
3	Long timeframe; more than 10 years

Demand-side Strategies for Surface and Groundwater

Sector	Strategy	Benefit	Cost	Implement-ability	Time	RBC Member Ranking	Notes
Municipal	Update of Drought Management Plans	3	1	1	1		The River Basin Plan will have multiple recommendations for this
Municipal	Public education on water conservation	3	1	1	1		Costs may be higher per person for smaller providers
Municipal	Residential water audits	1	1	2	2		Public utilities are doing these; required
Municipal	Incentives for low flow indoor fixtures	2	1	1	1		These programs have been around for a while; could reduce water provider revenue
Municipal	Water efficiency standards for new construction	3	1	1	1		Many cities are already doing this
Municipal	Leak detection and water loss control programs	3	2	1	1		This is often "low hanging fruit" for water providers
Municipal	Reclaimed water programs	2	3	3	2		The overall cost-benefit is dependent on individual wastewater and treatment systems
Municipal	Car wash recycling programs	1	1	1	1		Typical ordinances require at least 50% use of recycled water
Municipal	Pricing structures (ex. increasing block rates)	3	1	1	1		Cost effective way to reduce water demand, but could result in lower revenues
Municipal	Landscape irrigation programs and codes	2	1	2	1		Underway; costs can be highly dependent on program features
Municipal	Time-of-day watering limits	2	1	1	1		Requires experience and confidence; enforcement can drive costs up
Municipal	Xeriscaping	1	2	3	2		Cost can vary substantially by installation; requires homeowners to change irrigation practices
Ag/Irrigation	Water audits and center pivot sprinkler retrofits	2	1	1	1		Audits need to be followed by actions to save water. Retrofits can reduce energy costs.
Ag/Irrigation	Cover cropping, conservation tillage, mulch	2	2	1	2		Initial costs can be significant, but can reduce water use, improve yield, and reduce costs over time
Ag/Irrigation	Soil moisture sensors/smart irrigation	1	1	2	2		This strategy is most effective when paired with irrigation scheduling
Ag/Irrigation	Crop selection	1	3	3	3		The market drives crop selection. Low water use crops only effective if they are profitable
Ag/Irrigation	Irrigation scheduling	2	2	2	2		Needs to be done correctly to be effective.
Ag/Irrigation	Drip/Trickle irrigation (for select crops)	2	2	2	3		Can achieve nearly 100% efficiency, but can be costly. Might not be appropriate for lower value crops
Ag/Irrigation	Grass buffers to prevent runoff	1	2	2	1		Helps increase irrigation efficiency and improve water quality
Golf Courses	Wetting agents to reduce water use	1	2	1	2		Commonly used practice
Golf Courses	Water loss control and regular maintenance	3	2	1	1		This can be an important strategy for reducing water demand and costs
Golf Courses	Time-of-day watering practices	2	1	1	1		Commonly used practice. Course needs to remain open and playable during the day
Golf Courses	Soil moisture monitoring	2	2	2	1		Most effective when used with an irrigation scheduling program
Golf Courses	Low-water use landscaping	2	3	2	1		A large-scale landscaping change at a golf course could be expensive
Industrial	Water reuse and recycling	2	2	1	1		Many new industries are doing this
Industrial	Water efficient processes	2	2	2	2		Time, cost, etc. are dependent on the industy and the processes being altered
Industrial	Water loss control and routine maintenance	3	2	1	1		This can be an important strategy for reducing water demand and costs
Industrial	Low flow fixtures, toilets, and appliances	1	1	1	1		Common practice that is straightfoward to implement
Industrial	Develop drought management plans	2	2	1	1		The River Basin Plan will a recommendation for this; industry already reacts to water shortages
Thermoelectric	Reclaimed water	3	2	1	2		Can be expensive to implement depending on the application
Thermoelectric	Switch to combined-cycle natural gas	2	3	3	3		Perhaps not realistic to anticipate the Robinson nuclear plant will convert
Thermoelectric	Energy saving appliances*	1	1	2	2		This is occurring overall, but is generally outside of generators' control

**reduces thermoelectric generation needs*

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Supply-side Strategies for Surface Water

Sector	Strategy	Benefit	Cost	Implement-ability	Time	RBC Member Ranking	Notes
New or Increased Storage	New impoundments, ponds, reservoirs, tanks	3	3	2	3		New impoundments are effective, but permitting and envionmental impacts may be hurdles
New or Increased Storage	Dredging (pond deepening)	2	2	1	2		Costs and benefits dependent on the pond
New or Increased Storage	Reservoir expansion (raising dam height)	3	3	1	3		Expanding existing reservoirs generally viewed more favorably than building new
New or Increased Storage	Aquifer storage and recovery	2	1	2	2		Effective way to store water while minimizing losses
Water Reclamation	Water reuse systems (non-potable)	2	3	2	2		The overall cost-benefit is dependent on individual wastewater and treatment systems
Water Reclamation	Direct potable reuse	2	3	2	3		Can require lots of outreach and education for public acceptance
Water Reclamation	Stormwater capture and treatment	2	2	1	2		If used for non-potable purposes (i.e. park irrigation), treatment needs can be minimal
Conjunctive Use	Using groundwater to augment surface water	3	3	2	3		Would likely focus groundwater use in drought conditions

Supply-side Strategies for Groundwater

Sector	Strategy	Benefit	Cost	Implement-ability	Time	RBC Member Ranking	Notes
New Supply	Drill new or supplemental wells into lesser-used aquifer formations	3	2	2	2		Common; cost share would make more feasible
New Supply	Desalination	2	3	3	3		Uncommon in SC
Water Reclamation	Water reuse systems (non-potable)	2	3	2	2		Size and scope specific
Water Reclamation	Direct potable reuse	2	3	2	3		Limited (no) applications in SC; permitting
Water Reclamation	Reuse for aquifer storage and recovery	2	3	3	3		Been discussed over last 20 years; no applications yet
Conjunctive Use	Use surface water to supplement groundwater	2	2	2	3		Florence provides a good example; permitting
Conjunctive Use	Aquifer storage and recovery	2	2	2	2		Common with treated water in SC
Conjunctive Use	Stormwater capture and use - potable	1	2	3	3		Limited (no) applications in SC; permitting
Conjunctive Use	Stormwater capture and use - non-potable	1	2	2	3		Limited (no) applications in SC; permitting

Policy and Technical Recommendations

Sector	Recommendation	Benefit	Cost	Implement-ability	Time	RBC Member Ranking	Notes
Policy	Surface water withdrawal registrations should be limited to actual need	3	1	3	2		Legislative action or rule changes needed to implement
Policy	Develop a cost share program to drill deeper wells into aquifer units that have less development pressure	1	2	2	3		Legislative action or budget realignment may be needed to implement
Policy	Fund a joint compact between SC and NC for the Yadkin-Pee Dee Basin	3	3	3	3		Could require legislative action and extensive coordination
Policy	The State should fund an implementation organization in the future	3	2	2	3		Will require coordination and consensus with PPAC, etc.
Policy	RBCs (where applicable) should consider coastal community (tidal) issues	3	1	1	2		Will require new models and analysis tools
Policy	Water utilities should update their drought management plan and response ordinance every 5 years	2	1	1	1		The River Basin Plan will include this recommendation
Policy	Drought impact observations should be submitted through the Condition Monitoring Observer Reports (CMOR)	1	1	1	1		The River Basin Plan will include this recommendation; useful for drought response
Policy	Provide ongoing funding for plan implementation (admin, tech, projects)	3	3	2	2		Legislative action or budget realignment may be needed to implement
Policy	Support and fund water education programs	2	2	2	2		Legislative action or budget realignment may be needed to implement
Policy	Provide guidance on how RBCs should interface with other organizations	1	1	1	1		Useful for future direction of RBCs
Policy	Use water supply information to evaluate the viability of new industries	1	1	2	1		May require development of local criteria and data sets
Technical	Future Pee Dee RBC planning efforts should consider water quality	2	2	2	2		Degree of implementability dependent on how water quality is considered
Technical	Extend surface water modeling to coastal areas	3	1	1	2		Will require new models and analysis tools
Technical	Install additional surface water gaging stations in headwater areas	1	3	1	2		Known technology and systems, but requires funding and coordination
Technical	Install additional groundwater monitoring in future growth areas	1	3	1	2		Known technology and systems, but requires funding and coordination
Technical	Study the water quantity and quality impacts of land use changes	2	2	1	2		Similar studies have been conducted
Technical	Incorporate future climate change projections or hydrologic conditions in future scenarios	3	2	1	3		Climate change data sets are available, but developing local hydrology can be time consuming
Technical	Create more Doppler radar capabilities to help with storm prediction and data collection	2	3	1	2		Known technology and systems, but requires funding and coordination
Technical	Future Pee Dee RBC planning efforts should consider flooding	3	2	2	2		Degree of implementability dependent on how flooding is considered
Technical	Better understand the drivers of unsustainable groundwater withdrawals	1	1	1	1		Data sets are likely available but may need to be assembled
Technical	Evaluate the quantity of effluent from dischargers to assess reuse potential	1	1	2	3		Data sets are likely available but may need to be gathered and assembled

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