Selection of Groundwater and Surface Water Management Strategies

Summary of Discussion and Decisions From March and April RBC Meetings

- The RBC **voted** to recommended **establishing Groundwater Areas of Concern in regions where groundwater data and/or groundwater modeling predict water levels drop below the top of the aquifers.**

- The RBC does not want to identify specific **groundwater conditions** but instead focus on a "**desired future condition**" approach in the final Plan recommendations.

Summary of Discussion and Decisions From March and April RBC Meetings

- Straw votes indicated a majority of the RBC were in favor of the following **technical recommendations**. A formal vote will be taken at the June or July meetings, when selecting final recommendations.

1. **SCDNR work with SCDHEC, USGS and other partners (e.g., property owners, well, owners, Capacity Use Areas) to enhance monitoring capabilities in areas where model simulations indicate potential for water levels to drop below the aquifer.**

2. **SCDNR work with SCDHEC and USGS to carve out a regional groundwater model covering the potential groundwater areas of concern and:**

   a. **Further calibrate the model to local land conditions, including seasonal drawdowns.**

   b. **Evaluate seasonal drawdowns through 2070 using the planning scenarios.**

RBC Discussion and Decision Points

1. Discuss Feasibility of **Demand Side** Strategies
2. Discuss Feasibility of **Supply Side** Strategies
    a. Transitioning New Pumping to McQueen Branch
    b. Conjunctive Use and Small Impoundments
3. Discuss Low Flow Surface Water Management Strategy and Surface Water Condition
4. Select and Prioritize Strategies

Portfolios of Water Conservation and Efficiency Strategies

Agricultural Portfolio of Water Efficiency Strategies
Irrigation Equipment Changes
Water Audits and Nozzle Retrofits
Irrigation Scheduling
Soil Management
Crop Variety, Crop Type, and Crop Conversions

Municipal Portfolio of Water Conservation and Efficiency Strategies	
Conservation Pricing Structures	Public Education of Water Conservation
Toilet Rebate Program	Residential Water Audits
Landscape Irrigation Program and Codes	Water Efficiency Standards for New Construction
Leak Detection and Water Loss Control Program	Reclaimed Water Programs
Car Wash Recycling Ordinances	Time-of-Day Watering Limits
Water Waste Ordinance	

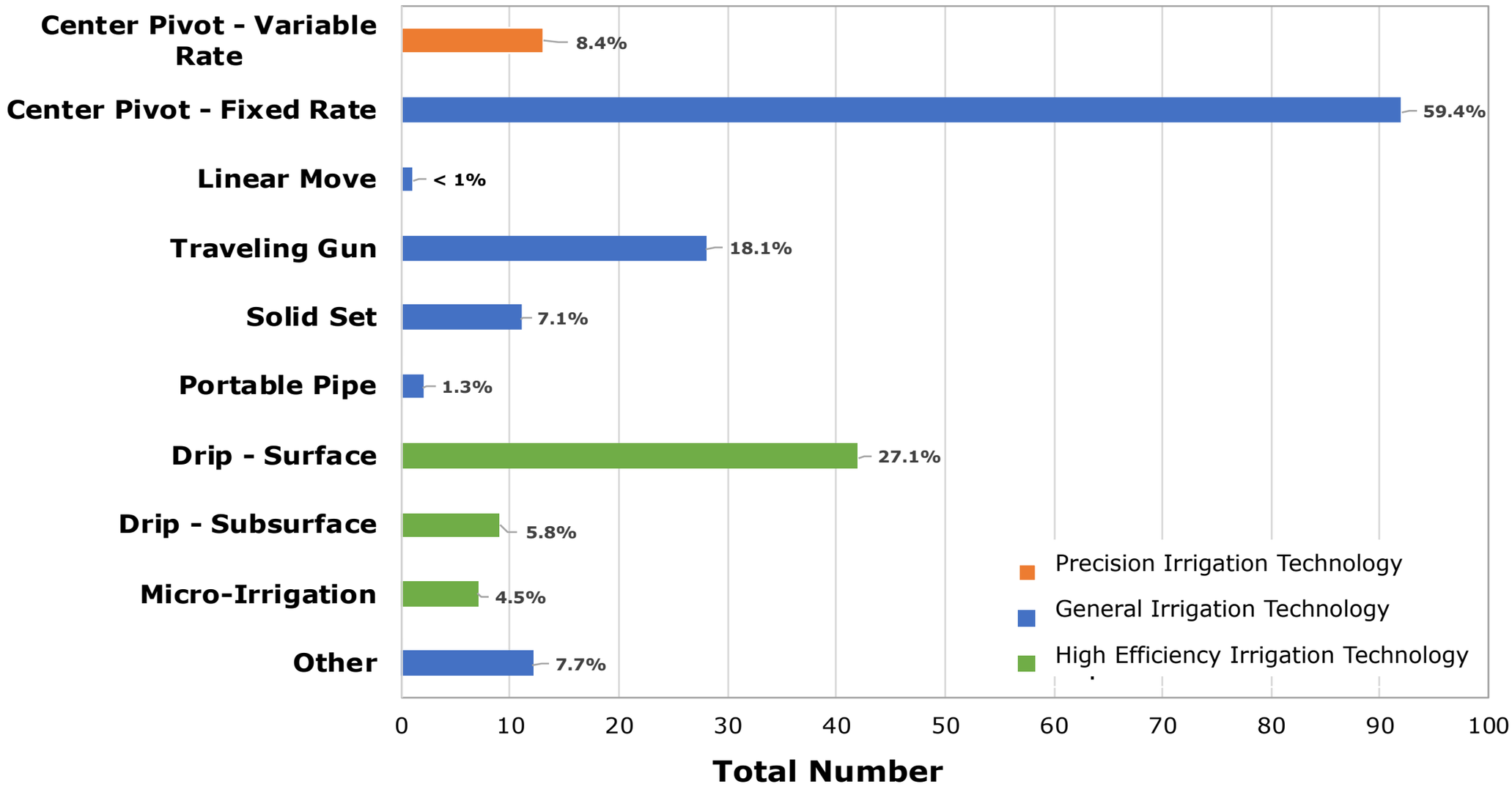
Irrigation Types Used in the Edisto Basin

General	Precision	High Efficiency
Center Pivot – Fixed Rate	Center Pivot – Variable Rate	Center Pivot – Fixed Rate with best nozzle technology
Linear Move		Drip – Surface
Traveling Gun		Drip – Subsurface
Solid Set		Micro – Irrigation
Portable Pipe		
Other		

Source: ***Agricultural Water Use in South Carolina: Preliminary Results of the South Carolina Agricultural Water Use and Irrigation Survey***. South Carolina Water Resources Conference, 2018. Columbia, SC.

Authors: Calvin B. Sawyer, Jeffery Allen, Mathew Smith, Thomas Walker, David Willis, Thomas Dobbins, Derrick Phinney, Kim Counts Morganello, Bryan Smith, Jose Payero, Adam Kantrovich and Nathan Smith.

Irrigation Types Used by Survey Respondents Statewide



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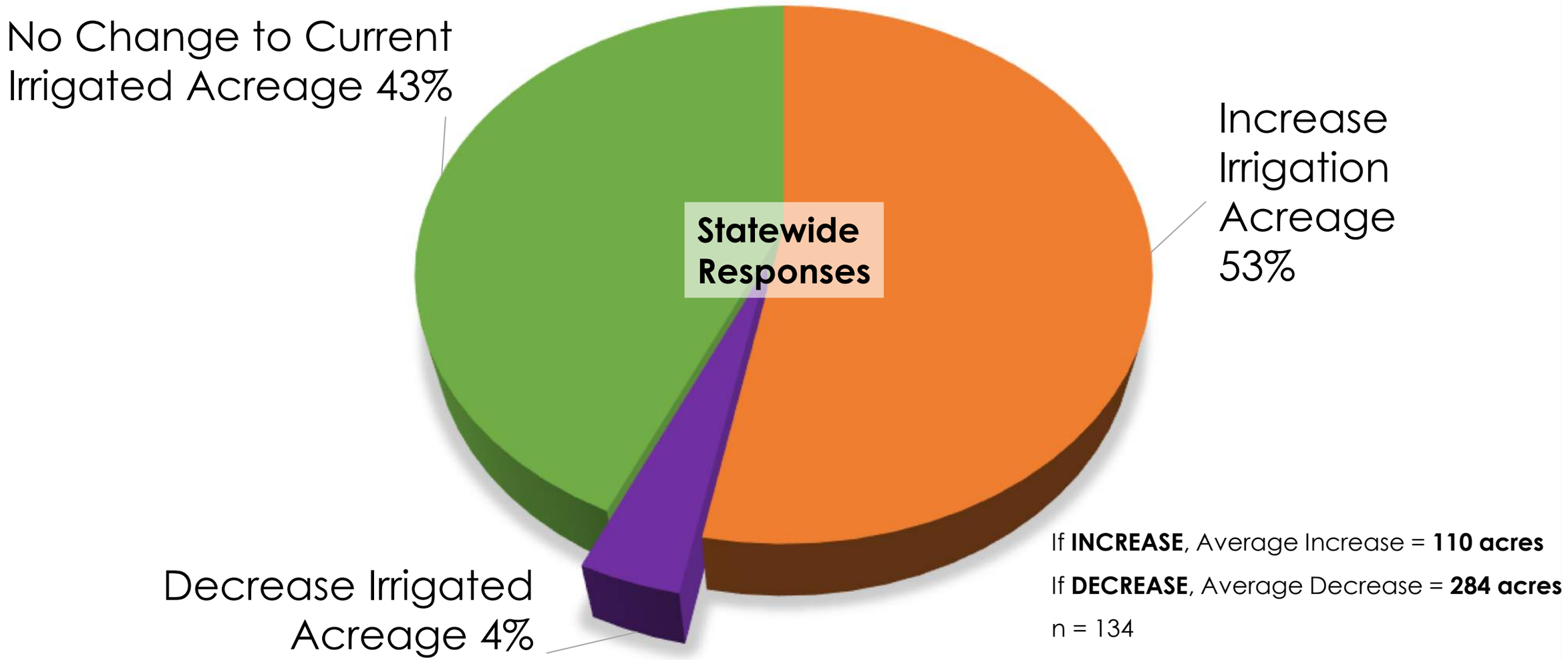
Do You Plan to Increase or Decrease Irrigated Acreage?



If **INCREASE**, Average Increase = **110 acres**

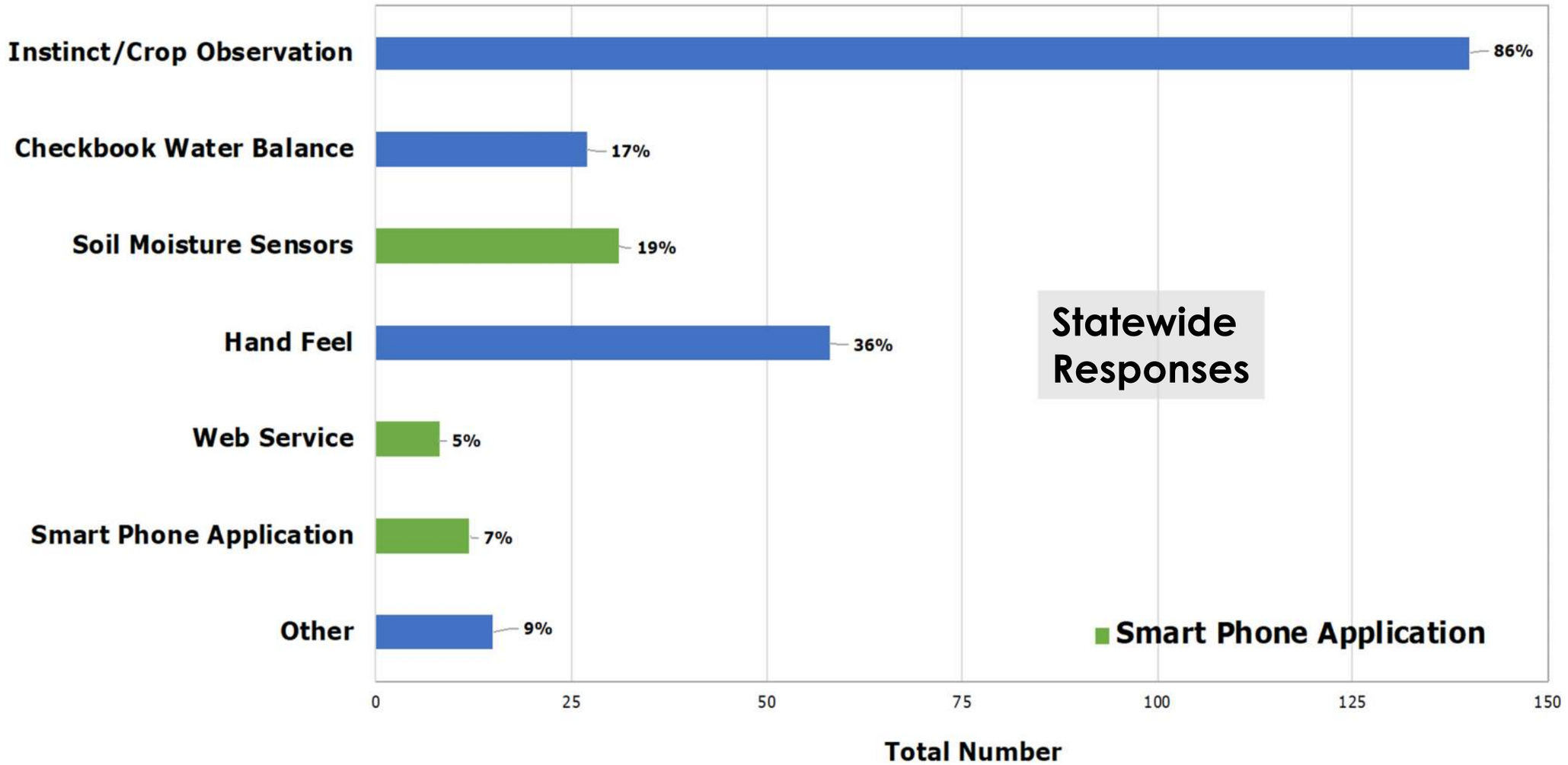
If **DECREASE**, Average Decrease = **284 acres**

n = 134

Source: ***Agricultural Water Use in South Carolina: Preliminary Results of the South Carolina Agricultural Water Use and Irrigation Survey***. South Carolina Water Resources Conference, 2018. Columbia, SC. **Authors:** Calvin B. Sawyer, Jeffery Allen, Mathew Smith, Thomas Walker, David Willis, Thomas Dobbins, Derrick Phinney, Kim Counts Morganello, Bryan Smith, Jose Payero, Adam Kantrovich and Nathan Smith.

Irrigation Scheduling Methods Used By Respondents

(Producers could respond with more than one method)



Source: ***Agricultural Water Use in South Carolina: Preliminary Results of the South Carolina Agricultural Water Use and Irrigation Survey***. South Carolina Water Resources Conference, 2018. Columbia, SC. **Authors:** Calvin B. Sawyer, Jeffery Allen, Mathew Smith, Thomas Walker, David Willis, Thomas Dobbins, Derrick Phinney, Kim Counts Morganello, Bryan Smith, Jose Payero, Adam Kantrovich and Nathan Smith.

Portfolios of Water Conservation and Efficiency Strategies

Important Considerations:

- Water users have different financial and technical resources.
- Not every strategy is applicable to every water user.
- Due to potential future limitations on water availability, it is becoming increasingly important to use water as efficiently as possible.

RBC Decisions

Agricultural Portfolio of Water Efficiency Strategies	Recommend?	Priority?
Water Audits and Nozzle Retrofits		
Irrigation Equipment Changes		
Soil Management and Cover Cropping		
Irrigation Scheduling		
Crop Variety, Crop Type, and Crop Conversions		
Future technologies		

Portfolios of Water Conservation and Efficiency Strategies

RBC Decisions

Municipal Portfolio of Water Conservation and Efficiency Strategies	Recommend?	Priority?
Conservation Pricing Structures		
Toilet Rebate Program		
Landscape Irrigation Program and Codes		
Leak Detection and Water Loss Control Program		
Car Wash Recycling Ordinances		
Water Waste Ordinance		
Public Education of Water Conservation		
Residential Water Audits		
Water Efficiency Standards for New Construction		
Reclaimed Water Programs		
Time-of-Day Watering Limits		
Others?		

RBC Discussion and Decision Points

1. Discuss Feasibility of **Demand Side** Strategies
2. Discuss Feasibility of **Supply Side** Strategies
    a. Transitioning New Pumping to McQueen Branch
    b. Conjunctive Use and Small Impoundments
3. Discuss Low Flow Surface Water Management Strategy and Surface Water Condition
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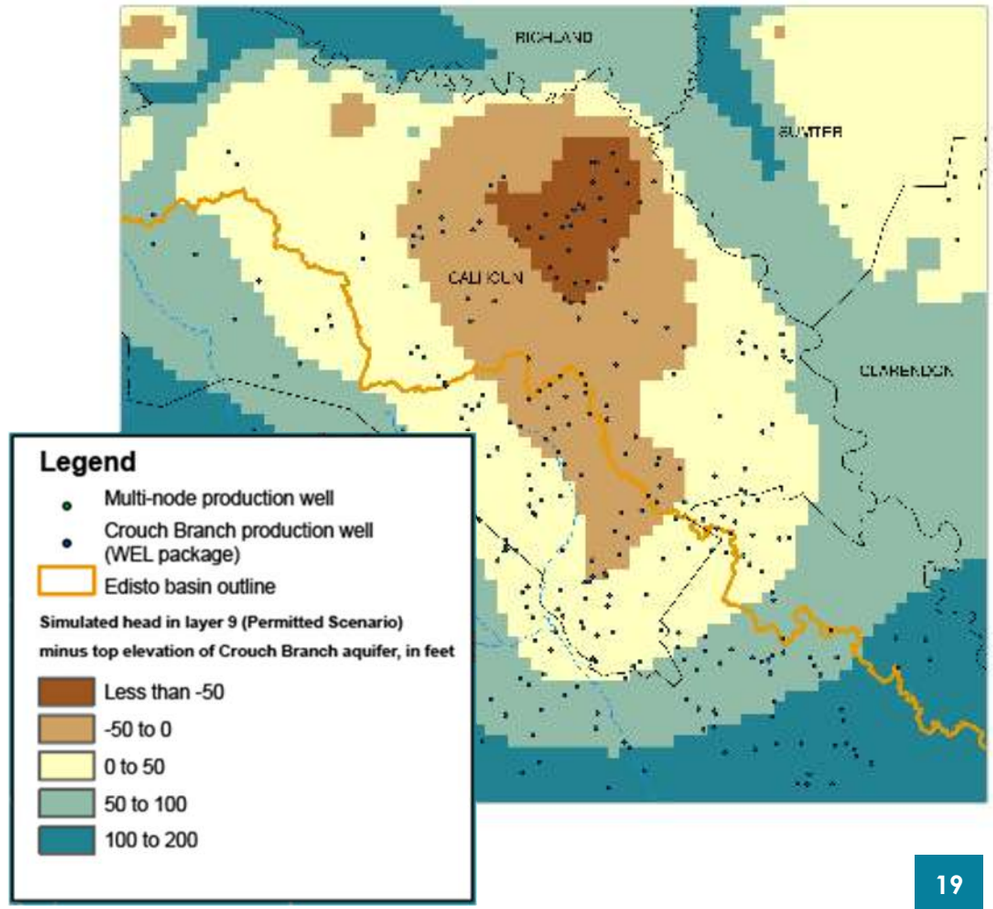
Transitioning New Pumping to McQueen Branch in the Calhoun County Area of Concern

RBC Motion:

The RBC recommends that responsible agencies and stakeholders consider encouraging new pumping in areas of concern come from aquifers that can support the additional withdrawals. One example indicted by modeling was the area of concern in the Crouch Branch of Calhoun County. Here the RBC recommends that future pumping be transitioned to the McQueen Branch, if monitoring suggest continued, increasing drawdowns in the Crouch Branch aquifer.

High Growth Scenario



Other Supply-Side Strategies

- **Small Impoundments**
  - Common in the Edisto basin
  - Enhance availability during dry/low flow periods; build resilience
- **Conjunctive Use**
  - The use of both groundwater and surface water resources
  - In the Edisto, this mostly refers to the use of groundwater to supplement surface water during low flow periods.
- **Does the RBC want to include these as recommended supply-side strategies in the Plan?**

RBC Discussion and Decision Points

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Proposed Low Flow Management Strategy and Surface Condition

- **Purpose –** Address identified shortage at CWS Intake during High Demand Scenario and allow for some water to remain in river (environmental flow)
- **Approach –** Trigger incremental shifts to other sources for upstream surface withdrawers able to do so and/or temporarily reduce demand where possible
- Some may shift more than others based off their ability to do so and the condition of the other water source
- Includes establishment of a Surface Condition of 332 cfs at Givhans Ferry (20% of median flow)

Proposed Low Flow Management Strategy

20% Increments Percent Below MIF	River Flow Range (cfs) Lower	Upper	Basin-wide % Reduction in SW Withdrawals
0 - 20%	266	332	20%
20 - 40%	199	266	40%
40 - 60%	133	199	60%
60 - 80%	66	133	80%
80 - 100%	0	66	100%

Here, MIF is set at 20% of the median daily flow, which is 332 cfs at Givhans Ferry

Mean vs. Median Flow Comparison at Givhans Ferry

	Model Scenario			
	UIF	*Current Use*	*BAU 2070*	*HD 2070*
Frequency (of days) with Flow Below 20% Mean Daily Flow (487 cfs)	3.4%	6.6%	10.8%	14.7%
Frequency (of days) with Flow Below 20% Median Daily Flow (332 cfs)	0.2%	1.8%	5.6%	8.6%

Proposed Low Flow Management Strategy

20% Increments

20% Increments	River Flow Range (cfs)		Basin % Shift	CWS % Shift off Edisto			CWS Not to Exceed	
Percent Below MIF	Bottom	Top	or Reduction	Flow Trigger	Permitted	Peak Demand	cfs	MGD
0-20%	266	332	20%	312	72%	20%	124	80
20-40%	199	266	40%	260	79%	40%	93	60
40-60%	133	199	60%	174	86%	60%	62	40
60-80%	66	133	80%	87	91%	75%	39	25
80-100%	0	66	100%					
**Shift to conjunctive use, another source or curtailment.*				**CWS shifts demand to Bushy Park Res. or Goose Creek Res. sources.*				

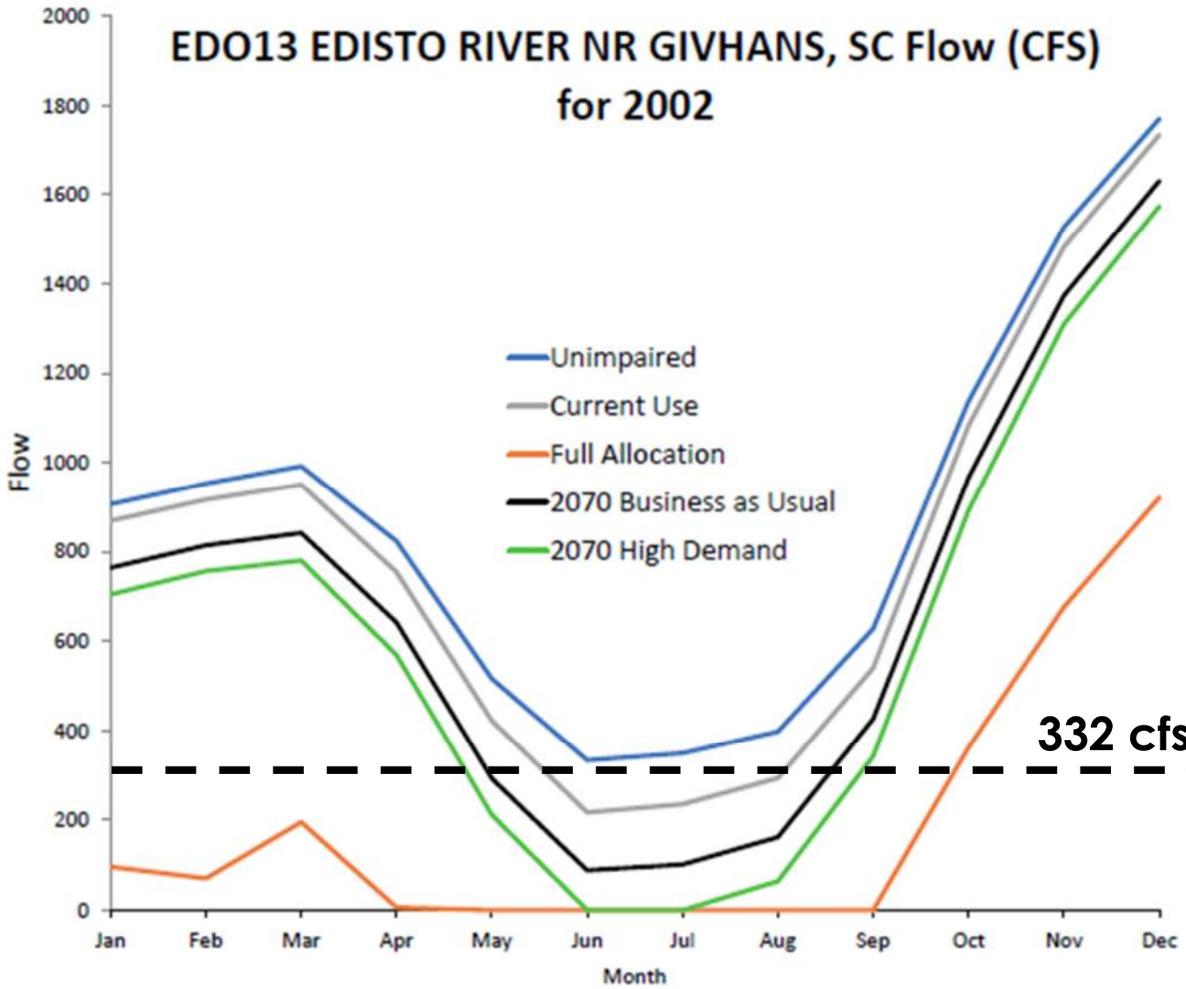
**The 40%+ curtailment may be borne more by some than others depending on each operations capabilities and the condition of the other conjunctive sources!*

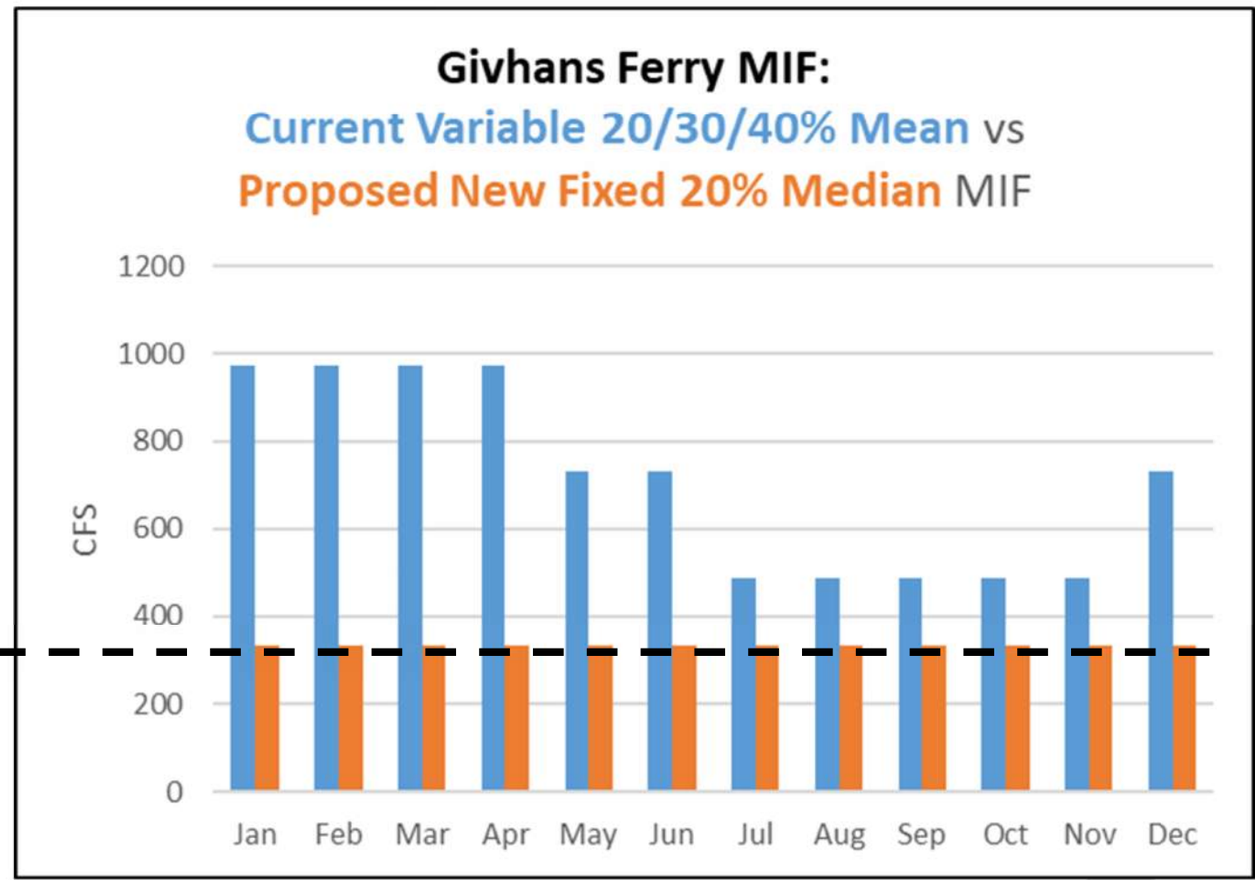
Proposed Low Flow Management Strategy

- Rather than triggering full curtailment as is the position of the law for Minimum Instream Flow (MIF) on new users, this low flow management strategy would trigger incremental shifts to other sources for all **upstream surface withdrawers able to do so** equal to the amount the surface condition at the bottom of the basin has been exceeded.
- **Some may shift more than others** based off their ability to do so and the condition of the other source.
- The goal of all the **resource stretching management strategies** is to reduce the times the surface condition will be exceeded and conversely, the number of times such a low flow management strategy would need to be triggered.

Proposed Surface Condition of 332 cfs at Givhans Ferry

20% median at Givhans Ferry represents a value between the unimpaired and current use monthly minimum (i.e., point at which management strategies involving withdrawals could minimize further drops in river flow during a drought)





Does the RBC want to establish a Surface Water Condition and/or Low Flow Management Strategy?