Methodologies for Evaluating Water Availability

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Methods for Evaluating Water Availability

- Formal approach described in Planning Framework (Section 4).
- Based, in part, on methodologies used in Texas for evaluating water availability.
- Provides consistency – designates a common set of definitions and processes to use across the State.

Big Picture – this is a gap analysis, the RBC will be determining where and when demand exceeds supply under varying demand scenarios and deciding how to manage water to close the gaps.
Methods for Evaluating Surface Water Availability

• Definitions:

• **Physically Available Surface Water Supply** – maximum amount of water occurring 100% of the time at a location on a surface water body, with no defined conditions applied on the surface water body.

• **Surface Water Supply** – maximum amount of water available for withdrawal 100% of the time at a location on a surface water body without violating any applied **Surface Water Conditions** on the surface water source and considering upstream demands.

• **Surface Water Conditions** – a physical limitation on the amount of water that can be withdrawn from a surface water source and are independent of water demand.

• **Surface Water Shortage** – occurs when the water demand exceeds the **Surface Water Supply** for any water user in the basin.

• **Reaches of Interest** – specific stream reaches that may have no identified Surface Water Shortage but experience undesired impacts, environmental or otherwise, determined from current or future water-demand scenarios or proposed water management strategies.

*Surface water volumes highlighted in the following hydrographs are for illustrative purposes only.*
Physically Available Surface Water Supply

Maximum amount of water occurring 100% of the time at a location on a surface water body, with no defined conditions applied on the surface water body.
Surface Water Conditions

Conditions which physically limit the amount of water that can be withdrawn from a surface water source and are independent of water demand.

Current Surface Water Demand Scenario

ED005 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC Flow (CFS)

Surface Water Condition (80 cfs)

Conditions are for planning purposes only - not legally binding
Surface Water Supply

Maximum amount of water available for withdrawal 100% of the time at a location on a surface water body without violating any applied Surface Water Conditions on the surface water source and considering upstream demands.
Impacts on Physically Available Surface Water Supply from Increased Demand

25-year Water-Demand Projection

Period of Record
Low Flow
Physically Available Surface Water Supply

91 cfs

EDO05 SOUTH FORK EDISTO RIVER NEAR DENMARK, SC Flow (CFS)
Impacts on Surface Water Supply from Increased Demand

25-year Water-Demand Projection

Monthly Average Streamflow (cfs)

Surface Water Condition (80 cfs)

Surface Water Supply (11 cfs)
Surface Water Shortage

Occurs when the water demand exceeds the Surface Water Supply for any water user in the basin.
Reaches of Interest

*Specific stream reaches that may have no identified Surface Water Shortage but experience undesired impacts, environmental or otherwise, determined from current or future water-demand scenarios or proposed water management strategies.*
Methods for Evaluating Surface Water Availability

- RBCs will determine (Phase II):
  - Surface Water Conditions, if any
  - Surface Water Supply at nodes of interest
  - All Surface Water Shortages
  - Reaches of Interest

- Surface Water Management Strategies will be developed and evaluated (Phase III):
  - **Surface Water Management Strategy** – any water management strategy proposed to eliminate a Surface Water Shortage, reduce a Surface Water Shortage, or generally increase Surface Water Supply.
    - Examples: conservation measures, conjunctive use, new supplies, etc.
    - Effectiveness and feasibility of each strategy will be evaluated.
    - Impacts of strategies on Reaches of Interest will be evaluated.

- **River Basin Plan will document Surface Water Supply, Shortages, Reaches of Interest, and recommended Surface Water Management Strategies.**
Performance Measures

To facilitate analyses, RBCs may also:

- Develop **Performance Measures** — quantitative measures of change in a user-defined condition from an established baseline used to assess the performance of a proposed water management strategy or combination of strategies.
  - % Change in monthly minimum flow or 5\(^{th}\) percentile flow
  - % Change in Surface Water Supply
  - % Change in number and/or magnitude of Surface Water Shortages
  - Impacts on Regulatory Minimum Instream Flow (20-30-40% MDF)

<table>
<thead>
<tr>
<th>Scenario</th>
<th>No. of Shortages/ % Reduction</th>
<th>% Reduction in Maximum Shortage</th>
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</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td><strong>Strategy 1</strong></td>
<td>14 (39%)</td>
<td>80%</td>
</tr>
<tr>
<td><strong>Strategy 2</strong></td>
<td>18 (22%)</td>
<td>50%</td>
</tr>
</tbody>
</table>

![Graph showing water shortages over time]
Strategic Nodes

- Designated by RBC and designed to facilitate analyses.
- Definition: a location on a surface water body or aquifer designated to evaluate the cumulative impacts of water management strategies for a given model scenario and serves as a primary point of interest from which to evaluate a model scenario’s Performance Measures.

Examples:
- USGS streamflow gage locations
- Outlets of tributaries of interest

South Fork Edisto near Denmark Gage