What is Decision Support?

- **Process and Tools**
  - **Process**
    - Logical sequence of planning steps
    - Structured series of interactions
    - Meetings, workshops, and other settings in which stakeholders interact
  - **Tools**
    - Data categorization and display
    - Analytical
    - Interpretative
- **Process and Tools for solving problems that are:**
  - Too complex for humans alone
  - Too qualitative for computers alone
Situational Analysis

- What is the current environment of stakeholder interaction?
- What level of technical analysis have been conducted to date?
  - Available Data
  - Tools or models
**Situational Analysis Grid**

<table>
<thead>
<tr>
<th>Stakeholder Environment</th>
<th>Intense Litigation</th>
<th>Suspicious Distrust</th>
<th>Shared Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Technical Models</td>
<td>Work it out in court</td>
<td>Emphasis on identification of common objectives and agreed-upon data and tools to move this way</td>
<td>Emphasis on process that applies tools to identify preferred, integrated solutions</td>
</tr>
<tr>
<td>Technical Challenges</td>
<td>Arbitration by technical expert? Seek a regulatory solution?</td>
<td>Emphasis on understanding objectives and making decisions that establish policy direction (or that set the stage for future, more friendly decision-making)</td>
<td>Emphasis on joint exploration of technical situation -- development of tools necessary to understand problem and support decision-making according to objective</td>
</tr>
<tr>
<td>No Data or Known Relationships</td>
<td>?</td>
<td>Dialogue process (no tools)</td>
<td>Heavy emphasis on problem definition and front end</td>
</tr>
</tbody>
</table>

**Applying Your Situational Analysis**

*Interrelationship of the problem, the process we apply, and the tools we choose*

- **Problem Definition**
- **Process Design**
- **Tool Selection**

*Defining the problem, designing a process, and selecting tools happens no matter where you are on the situational analysis grid*
Incorporating Tools into the Process

Categorizing tools

- Data gathering and information
  - Databases
  - GIS
- Analytical Tools
  - Hydrologic & hydraulic models
  - System simulation models
  - Optimization models
- Interpretative Tools
  - Benefit Cost Ratio
  - Decision trees
  - Multi-objective score cards
Relationship of Interpretive and Analytical Tools

Interpretive Tools

Objectives and criteria

Decisions

Alternative analysis and sensitivity analysis

Technical data

Analytical Tools

Tool Selection
Tool Selection

Select the tool appropriate for
- Planning environment
- Accuracy required to make a decision
- Decisions to be made
- System characteristics
- Decisionmaker preference and tolerance: complexity constraint
- Project constraints: funding, schedule, resources, information

Planning Environment Categories

<table>
<thead>
<tr>
<th>Planning Jurisdiction:</th>
<th>Planning Scope:</th>
<th>Planning Stage:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What level of the government is involved?</td>
<td>How many functions are included?</td>
<td>What level of planning?</td>
</tr>
<tr>
<td>1. International</td>
<td>1. Multisectoral</td>
<td>1. Policy</td>
</tr>
<tr>
<td>2. Federal</td>
<td>2. Several Sectors</td>
<td>2. Framework</td>
</tr>
<tr>
<td>2.5 Interstate (regional)</td>
<td>3. Sectoral</td>
<td>3. General Appraisal</td>
</tr>
<tr>
<td>3.5 Intrastate (regional)</td>
<td>5. Functional</td>
<td>5. Functional</td>
</tr>
<tr>
<td>4. Local</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Private</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From: Water Resources Planning and Management by Helweg
Consequences of not selecting the “right” tool

- Level of detail too low to addresses the objectives and measures
- Cost too high or time frame too long to address a policy level objective
- Data too limited so that the detailed model requires many unjustified assumptions
- Lack of credibility with stakeholders
Tools Addressed Today

- **Analytical Tools**
  - Supply-Demand Model - Groves
  - STELLA (Simulation Model) - Rodrigo
    - Simulation model
  - CALSIM Water Transfers Tool - Muneevar
    - Systems analysis tool
  - CALVIN - Lund
    - Economic-engineering optimization model
  - WEAP - Purkey
    - Simulation model

- **Interpretive Tools**
  - Criterium Decision Plus – Swanson & Dowling
    - Multi-attribute rating technique
  - Gaming Tools - Bourez