Integrating Water Supply Management And Ecological Flow Requirements

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The Setting and Problem

Suboptimal Policies For Water Supplies Can Result In Negative Impacts To Both Water Supplies And To Ecological Functions

Water Supply Shortages

Inadequate Stream Flows

The Setting and Problem

Addressing these issues involves three areas of water resource management:

- Instream Flow Needs
- Water Supply (Reservoir) Management
- Demand Management

There is very little literature or real-world application integrating these three areas.

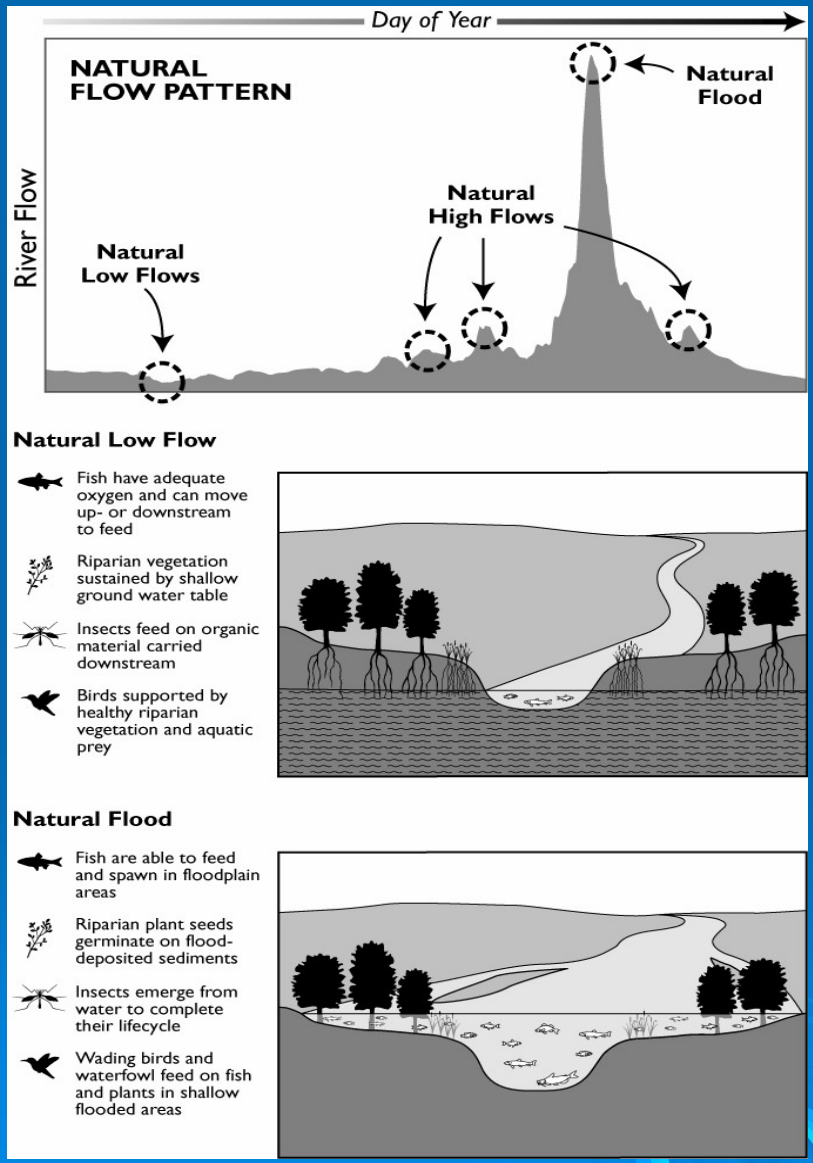
Competition for Water

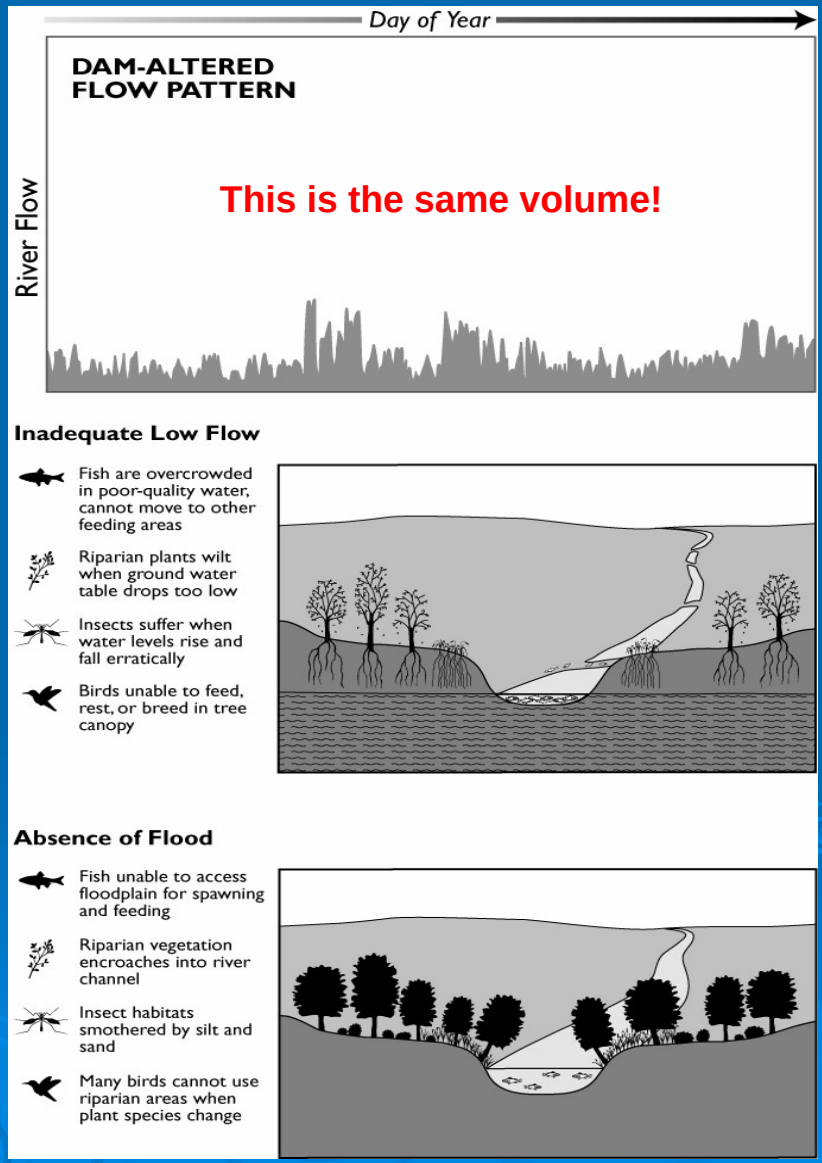
- There is growing awareness that water is in limited supply in the East, especially during droughts
- When there's plenty of water, competition among different water needs should be irrelevant
- Limited state standards exist for instream flow
- Usually there are no standards for water supply reliability
- Usually there are no requirements for the proactive use of drought plans to protect water supplies and the environment

Growing Understanding of Ecological Flow Requirements

- Scientific literature demonstrates that riverine ecosystems need flow variability
- Need to account for "flow components" such as extreme low flow, base flow, high pulses, overbank flows, and floodplain maintenance flows
- By more precisely defining flow needs using these components we can identify improved, balanced water release operating rules

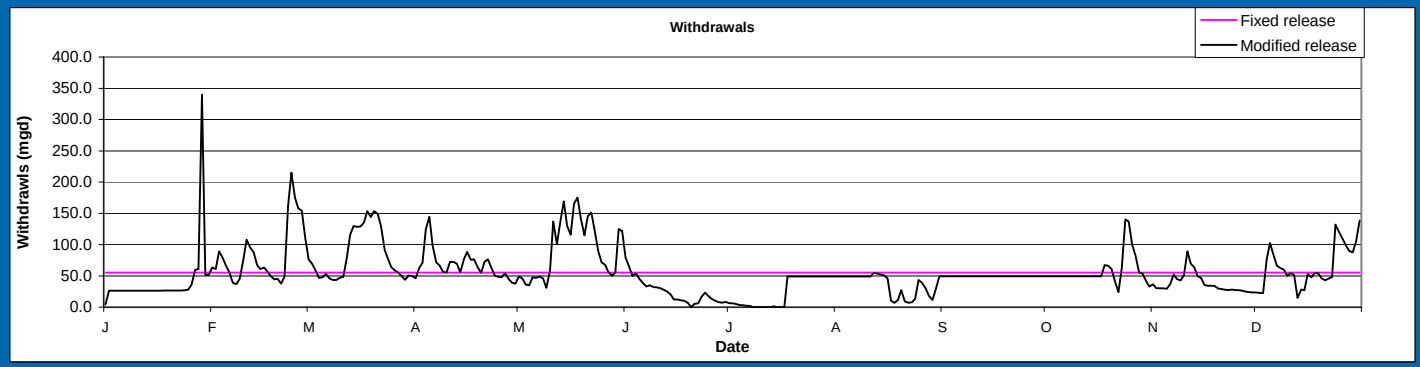
It's Not Just a Matter of Water Volume…

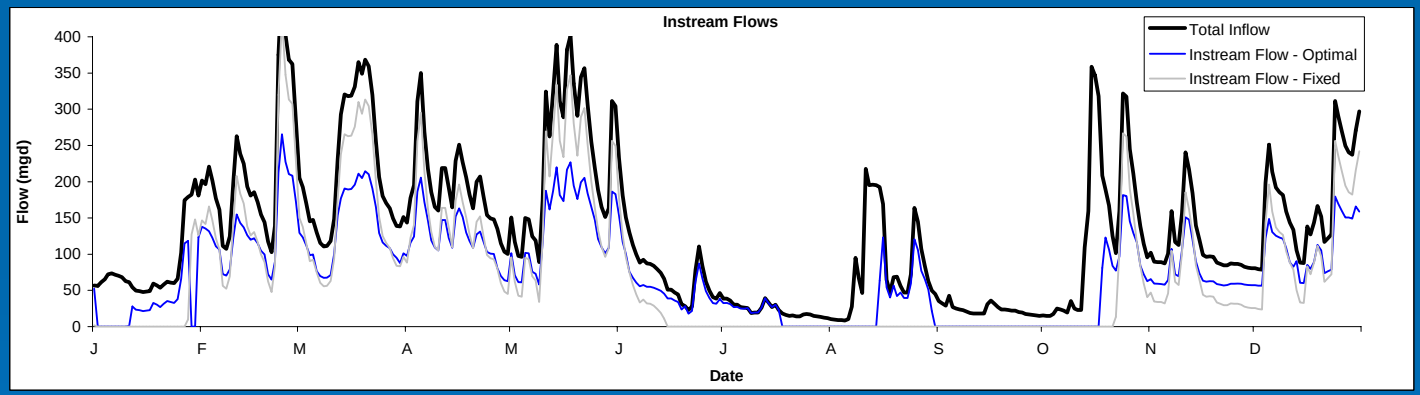


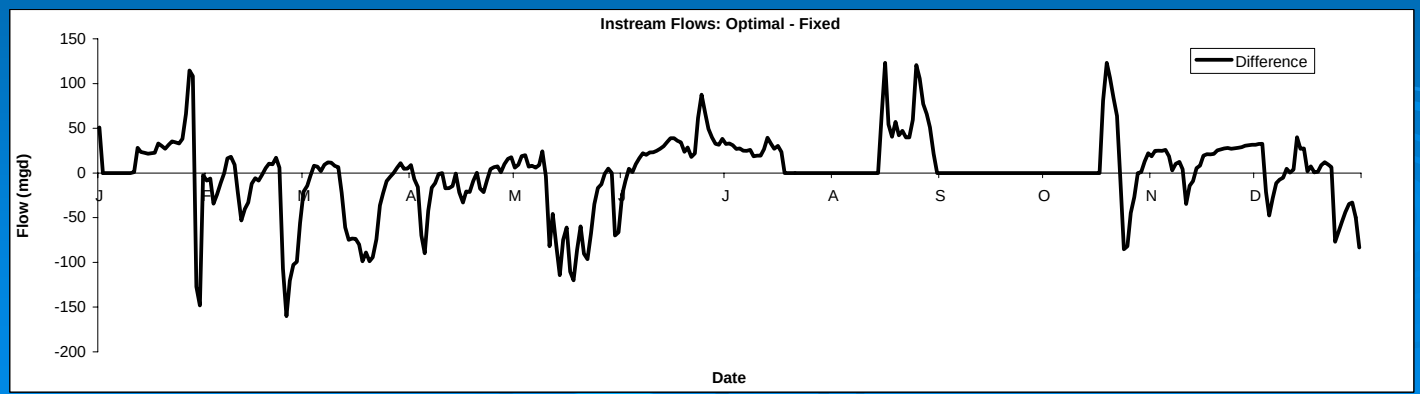


From: Rivers for Life: Managing Water for People and Nature, Postel and Richter

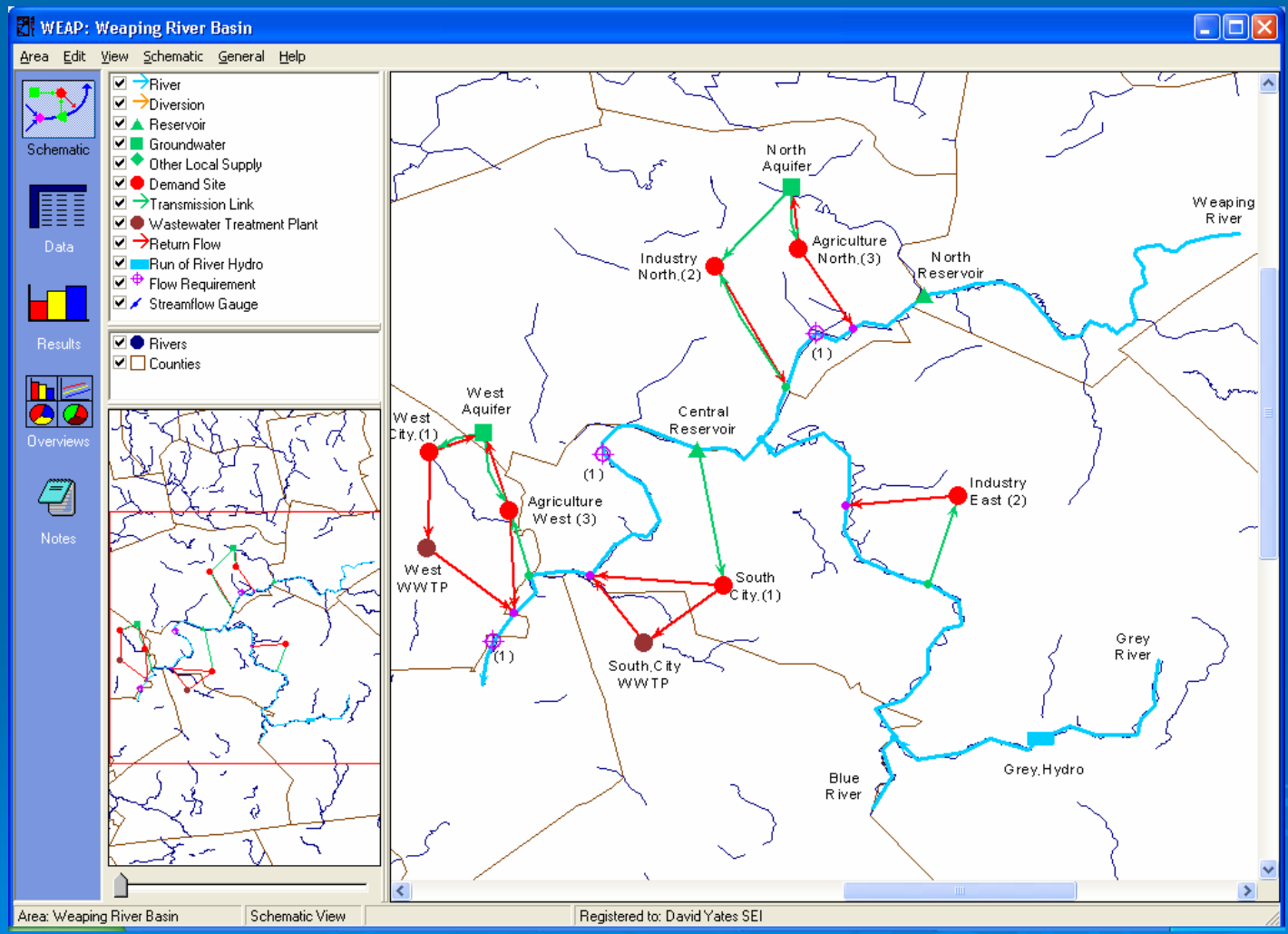
Developing a Decision Support System (DSS) that considers water supply demands, ecological flow requirements and drought management







Delivering the DSS Through a Tested Program: SEI's Water Evaluation and Planning Tool (WEAP)



WEAP is being made available free to all AwwaRF member utilities

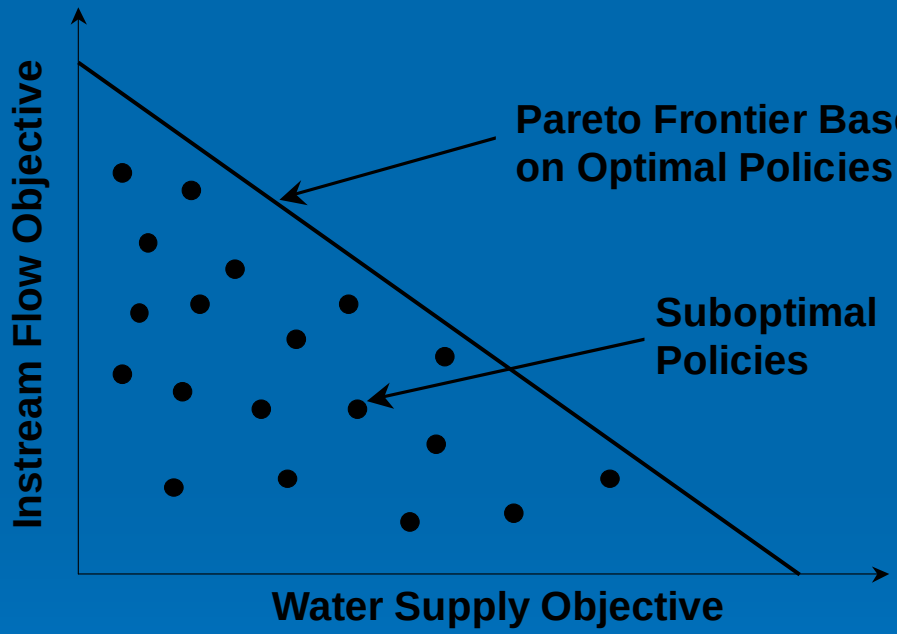
Decision Support System

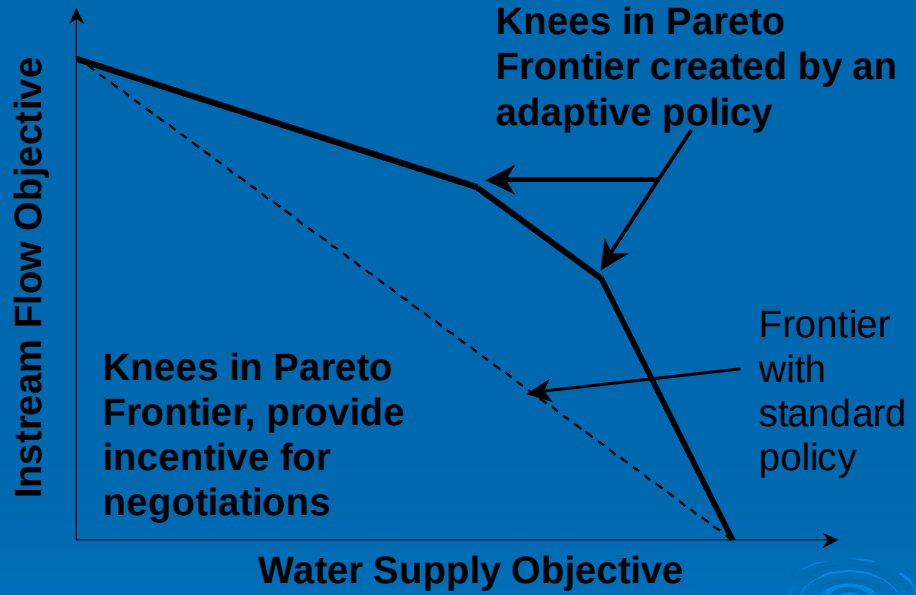
The DSS in WEAP will demonstrate that by:

- refining the quantity and timing of reservoir releases
- actively managing demands through adaptive drought management and conservation measures
- defining key ecological flow parameters more precisely

the reliability of a water supply yield can be maintained and ecological flows requirements can be met on a more consistent basis

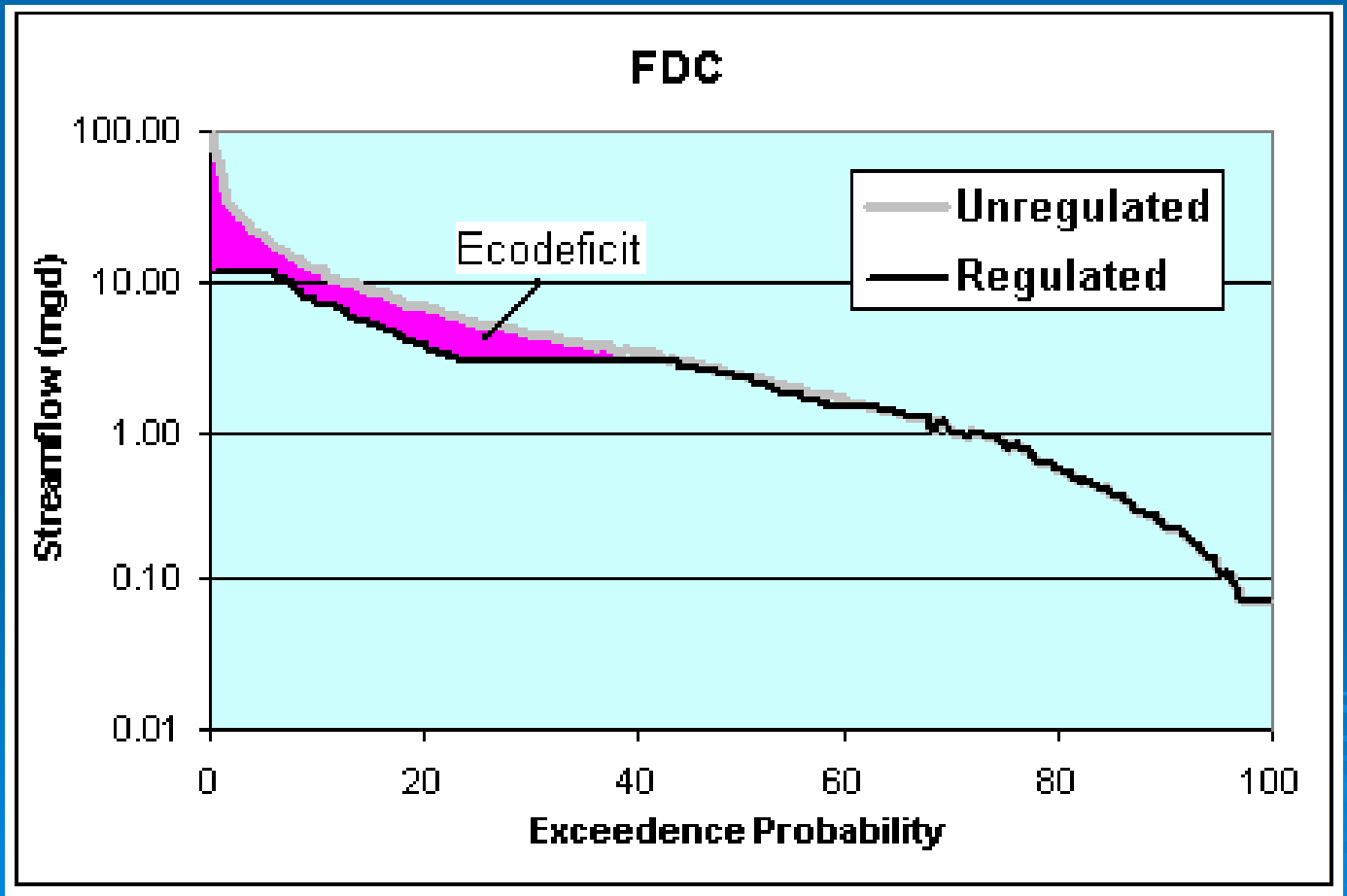
Using Optimization to Define Potential Solutions



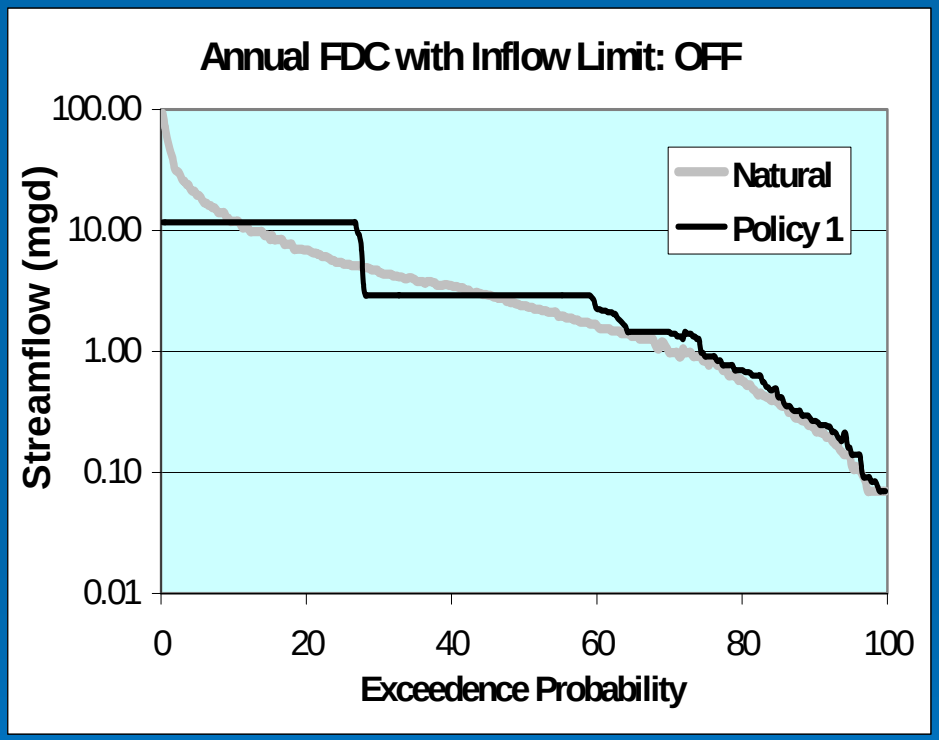


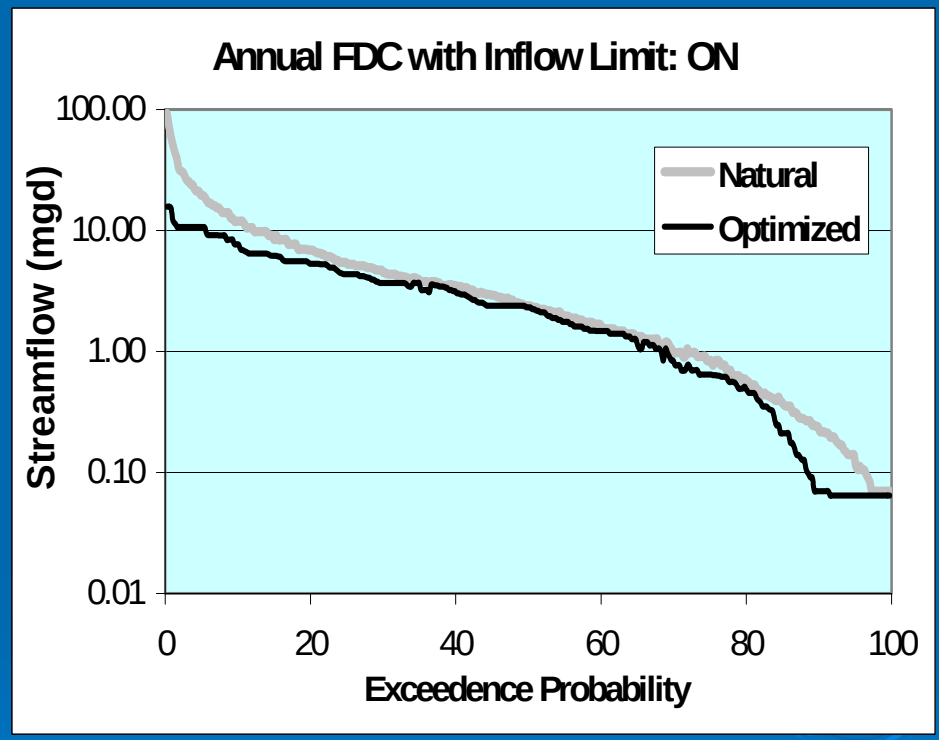
Zero-sum dilemma addressed through adaptive management approaches designed to modify both water supply and instream flow requirements

The Ecodeficit - An New Measure to Evaluate Water Supply Reliability in Relation to Ecological Flow Needs



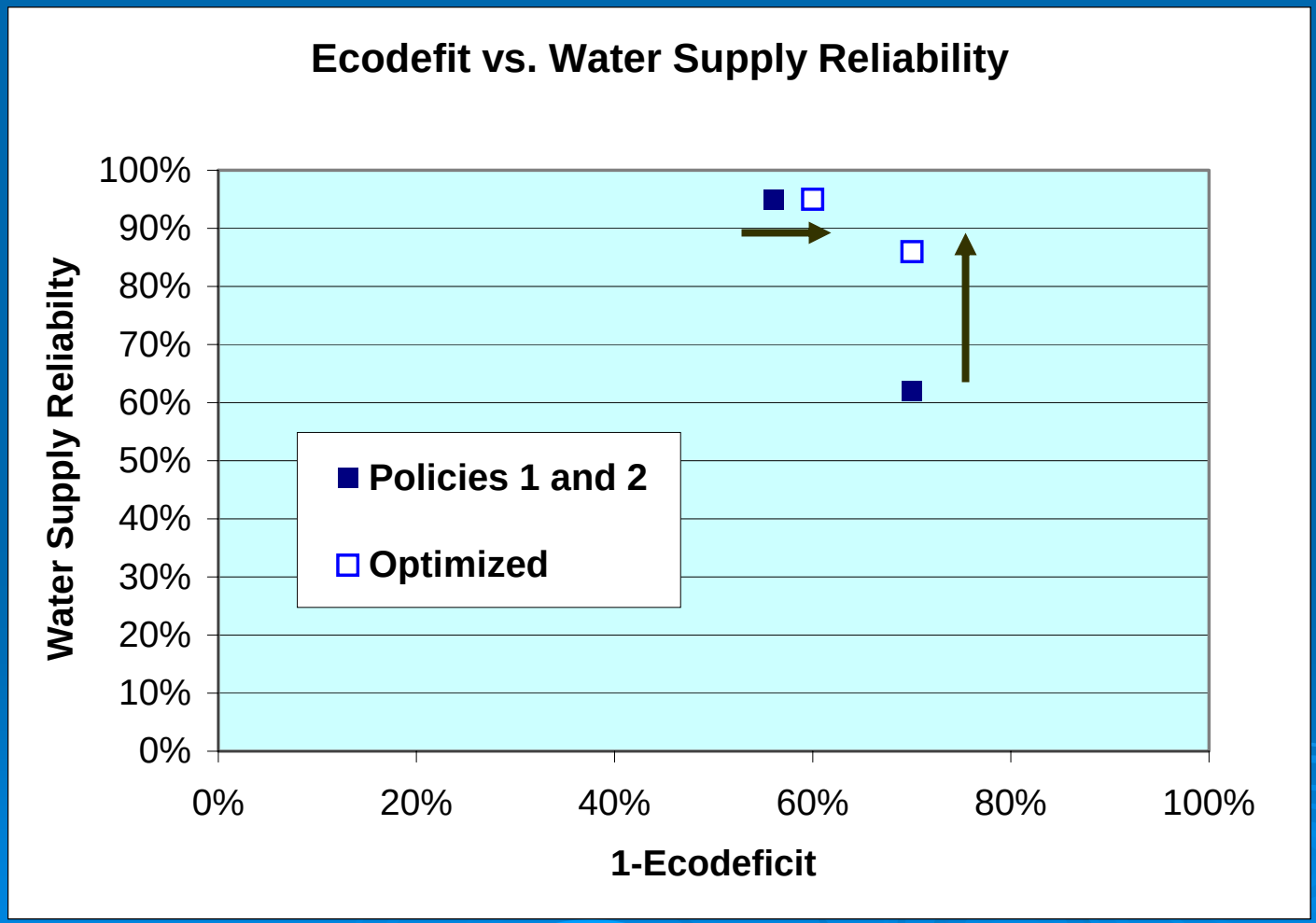
Evaluating Instream Flow Policies Using Ecodeficit





Initial Modeling Based on Seasonal Minimum Flow Requirements vs. Optimized Releases

Finding Gains for both Water Supply and Ecosystems



Expected Outcomes

1. Demonstration Projects- Testing Approach with Water Suppliers in New England
2. Application for the Eight Mid-Atlantic and New England States Developing Streamflow Policies
3. Assist Federal Agencies – USGS/EPA/USFWS- Efforts on Flow Issues
4. Potential Global Reach through the Water Evaluation and Assessment Planning (WEAP)
5. Articles in both Environmental and Water Management Journals

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