

Sonoma County Water Agency – “Collaboration Platform”



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April 27-28th 2010





Agenda

- Water Management and Data
- Sonoma CWA – Collaboration Platform

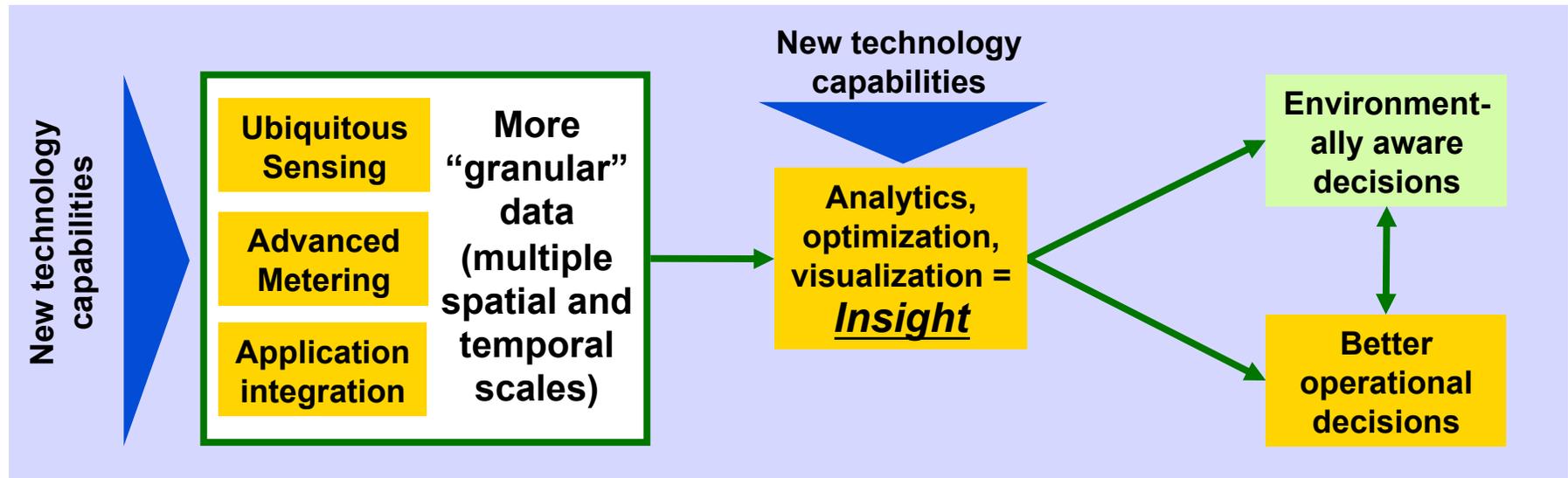


Water Management and Data



“A Smarter Planet”...

- Much of IBM’s “Smarter Planet” activity is based on enhanced understanding of planetary & human systems, and their interactions



- Sensing and metering will be in ever greater detail and ever closer to real time/ continuous.
- Modeling & optimization will be “whole business, real-world, operational”, no longer “function-based, off-line, advisory”
- Result: better decisions and better optimization of operations within available resources





Much of Water Management is Improving Information Flow & Use

*“Today’s decisions and policies will shape our water future...The effectiveness of those decisions **depends on the quality of information** ...In addition to improved water data the United States should **develop and expand ...forecasting and predictive models and systems...** to educate and influence water use behavior of individual[s], businesses and resource managers”*

Source: NSTC, “A Strategy For Federal Science And Technology To Support Water Availability And Quality In The United States, - Report Of The National Science And Technology Council Committee On Environment And Natural Resources Subcommittee on Water Availability and Quality”, September 2007





Water Data “Pathologies” - And a Prediction

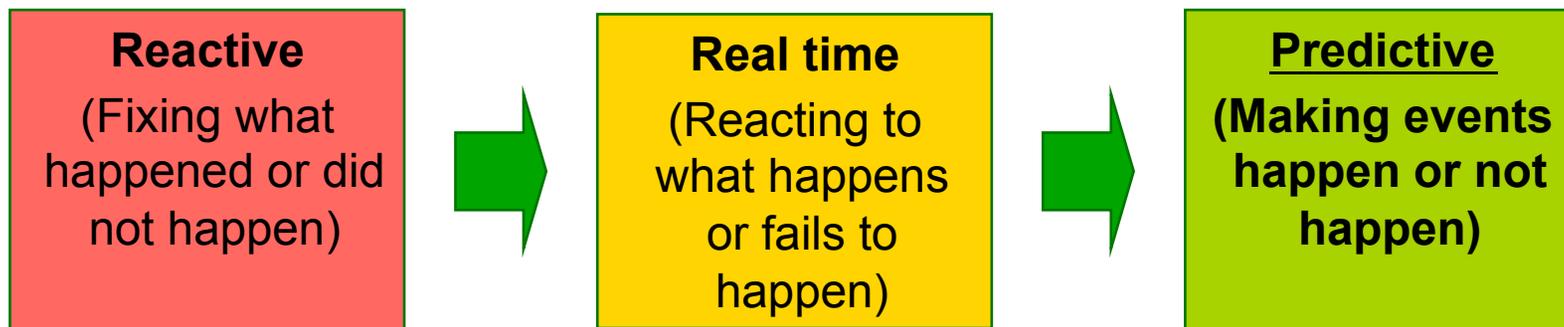
- **No data**
- Data is in the **wrong scale** (spatial or temporal) for the decision
- Data is **fragmented** between different stakeholders:
 - Different formats, scales, frequencies, standards
 - Re-capture of data many times
- **Too much data** to use
- **Incompatible or incomplete models** mean that data is not leveraged
- **Poor visualization** of information impedes effective decision-making
 - “So what’s this telling us?” syndrome

- **Prediction:**
 - *“Unless we solve these data problems, some percentage of whatever we invest in water management (let’s say, 30-50%) will be wasted.*
 - *But we won’t know which 30-50% until something major breaks”.*



Water Management Today Is In the Wrong “Tense”

- With process management in general there is a trend from reactive to predictive management – using real time data about the *preconditions* of events to enhance or prevent those events before they happen
- It hasn't really happened yet in water management...





Examples of How Information and IT Could Help

Issue (from prev page)	How IT could help
Climate change	<ul style="list-style-type: none">▪ Downscaled climate models
Fragmentation of water resource management	<ul style="list-style-type: none">▪ “Collaboration platforms”: enable agencies to share “one version of the truth” and integrate multiple sensor networks and data sets
Missing/fragmented data	<ul style="list-style-type: none">▪ Sensor networks (see below)▪ Application and data integration
Surface water contamination, water availability	<ul style="list-style-type: none">▪ Water flow and quality, run-off management sensing and systems▪ Land-use tools▪ Water accounting systems
Ground water contamination	<ul style="list-style-type: none">▪ Run-off management sensing and systems▪ Groundwater resource mapping
Agricultural practices	<ul style="list-style-type: none">▪ Precision irrigation▪ Run-off management sensing and systems
Social attitudes, water pricing	<ul style="list-style-type: none">▪ Smart metering for water (to enable differential pricing – and in Fresno and Sacramento, pricing at all!)
Leakage, losses	<ul style="list-style-type: none">▪ Smart metering▪ Leak detection and management systems
Risk of levee failure	<ul style="list-style-type: none">▪ Sensing for structural health – “smart levees”▪ Storm surge, topological models▪ High resolution weather forecasting

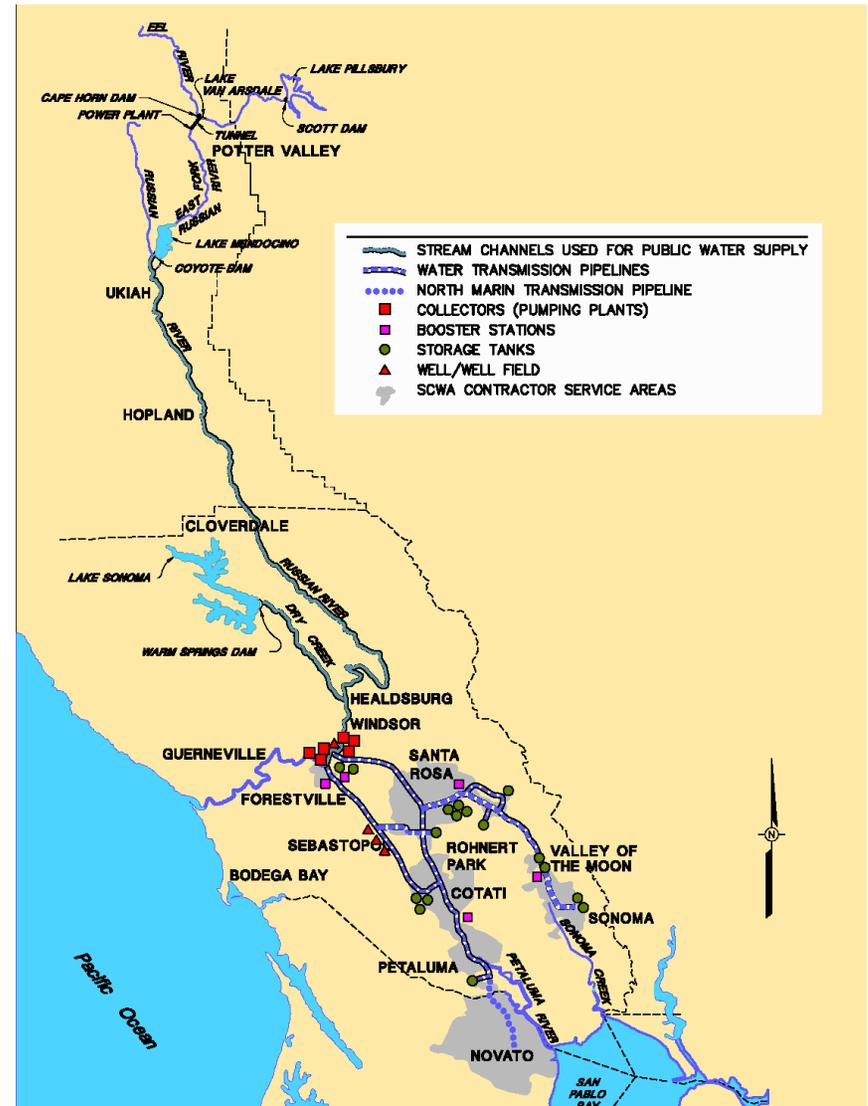


Sonoma CWA – Collaboration Platform



Sonoma CWA - Background

- Microcosm of California
- Wholesale water supplier to over 600,000 people
 - Nine retail contractors
- Primary source is Russian River with supplemental groundwater
- Need to move water from source to users
- Russian River and transmission pipelines really one single integrated system
 - River used for water conveyance
 - World's largest river-bank filtration system





Sonoma CWA - Issues

- Increased demand
 - Population growth
 - Wine and other industries
- Environmental regulations
 - Flow management – vine spraying, reduced summer flows
 - Endangered species protection
- Drought
- Climate Change
 - Rainfall/river flows
 - Seasonality, summer temperature
- Flood protection





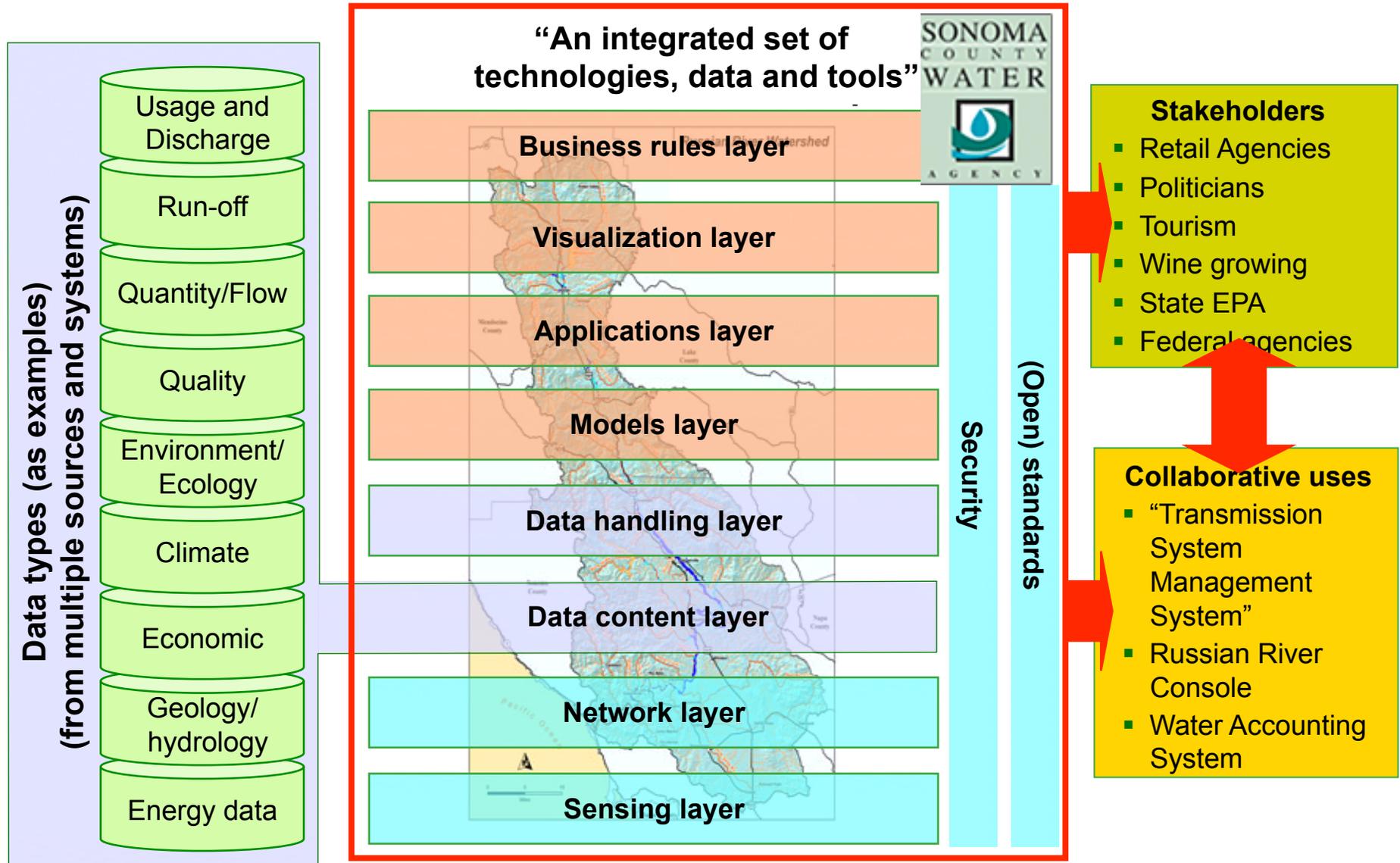
Project Objectives

- Create a “collaboration platform” for SCWA and its retail contractors, including:
 - a common operating picture of the Russian River and district Transmission System
 - Integration of SCADA systems
 - Collaboration and data sharing tools for operators in each agency
- Use information sharing and transparency to:
 - Enable greater levels of trust
 - Elevate the quality of the debate
- Provide a platform for future data gathering (see later slide)





The Collaboration Platform - Concept





Pilot system – Function Supported

- Single portal integrating SCADA systems of SCWA, Santa Rosa, Cotati and Rohnert Park
 - Flow, pressure, tank levels
 - Turbidity, pH, chlorine residuals
- USGS stream gauge data
- ACE flow data from dams
- Weather forecasting
- Operator support:
 - Bulletin board
 - Alerts and alarms
 - Live chat
 - Geographical and system-map views, with full zoom and pan as needed

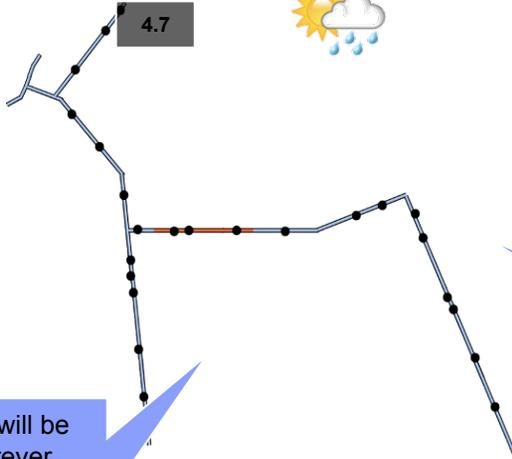


SONOMA COUNTY WATER AGENCY

COLLABORATION PLATFORM

CONSERVATION
OPTIMIZATION
INFORMATION
EFFICIENCY
COLLABORATION

Weather Icon – click on it to get forecast details



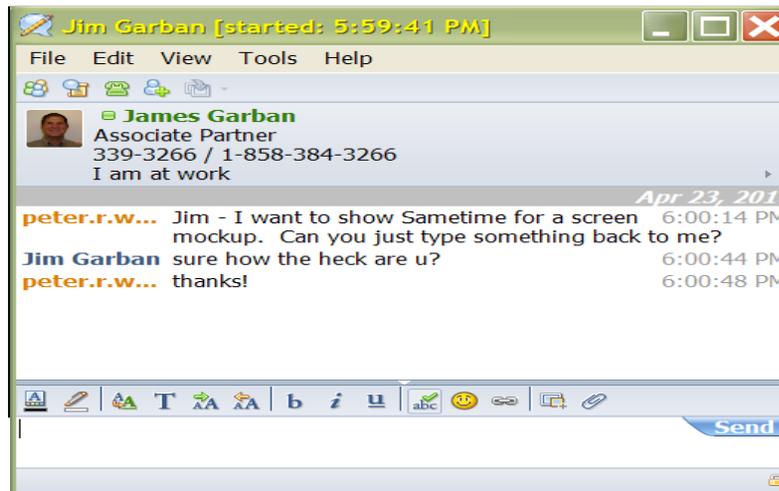
Mapped alarms

Listed Alarms

Numerical Data will be displayed wherever appropriate. (River levels, tank levels, etc). Screen to be refreshed automatically every 15-30 minutes)

Current SOP

The current operating conditions of the system (Operator Updated text)



Planned outages, maintenance and important information (Operator updated text)



Pan & Zoom system map to focus on specific elements and areas

System maps will not be duplicative of the SCADA systems. Instead, they are focused on illustrating the data integration occurring in the Collaboration Platform and answering core questions: **Total production, Total Storage, River Levels, Flow, & expected precipitation**





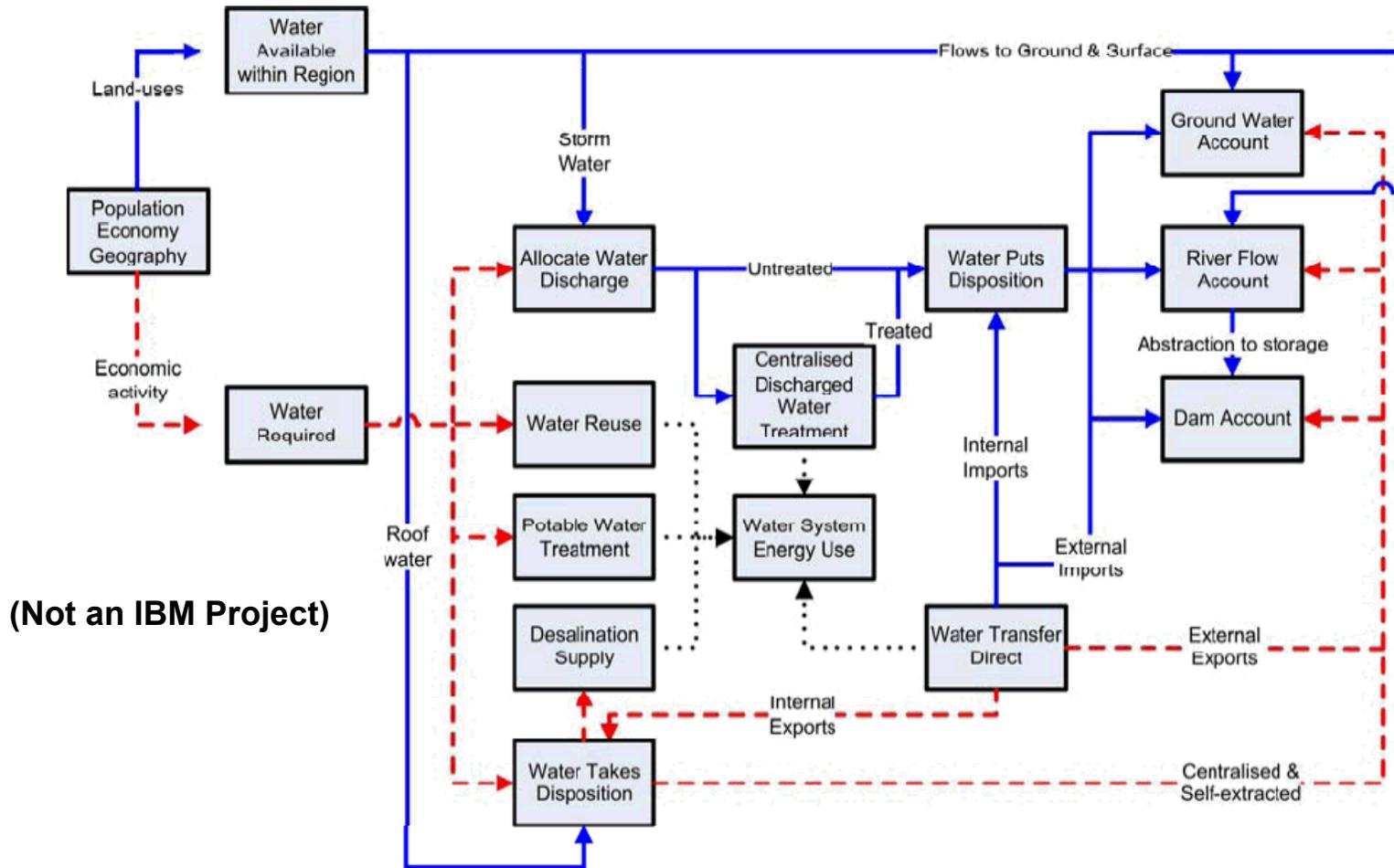
Future developments?

- Add remaining retail contractors
- Add higher resolution weather forecasting, frost warnings etc
- Integrate NOAA/ACE/USGS pilot on precipitation modeling
 - Create an emergency management support tool
- Additional sensors and data sources
- Support pumping optimization and leak detection
- Better integration with asset management
- Collect ecosystem data
 - Round out to create “Russian River Console”
- Integrate with groundwater models etc to create “Water Accounting System” (see next slide)
 - Enable truly integrated water resource management





Water Accounting System: Example from Australia



(Not an IBM Project)

"A Water Accounting System for Strategic Water Management": GM Turner, TM Baynes, BC MacInnis, Socio-economics and the environment in discussion, CSIRO Working Papers, 2008-14



Thank you!