

Flow 2015: Protecting Rivers and Lakes In the Face of Uncertainty

Recap-So What?

What Next?

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Uncertainty

Can be Your Friend

Your Worst Nightmare

The background of the slide is a solid blue color. In the lower half, there are several decorative elements consisting of concentric circles, resembling ripples in water. These circles are light blue and vary in size and opacity, creating a subtle pattern.

Certainty

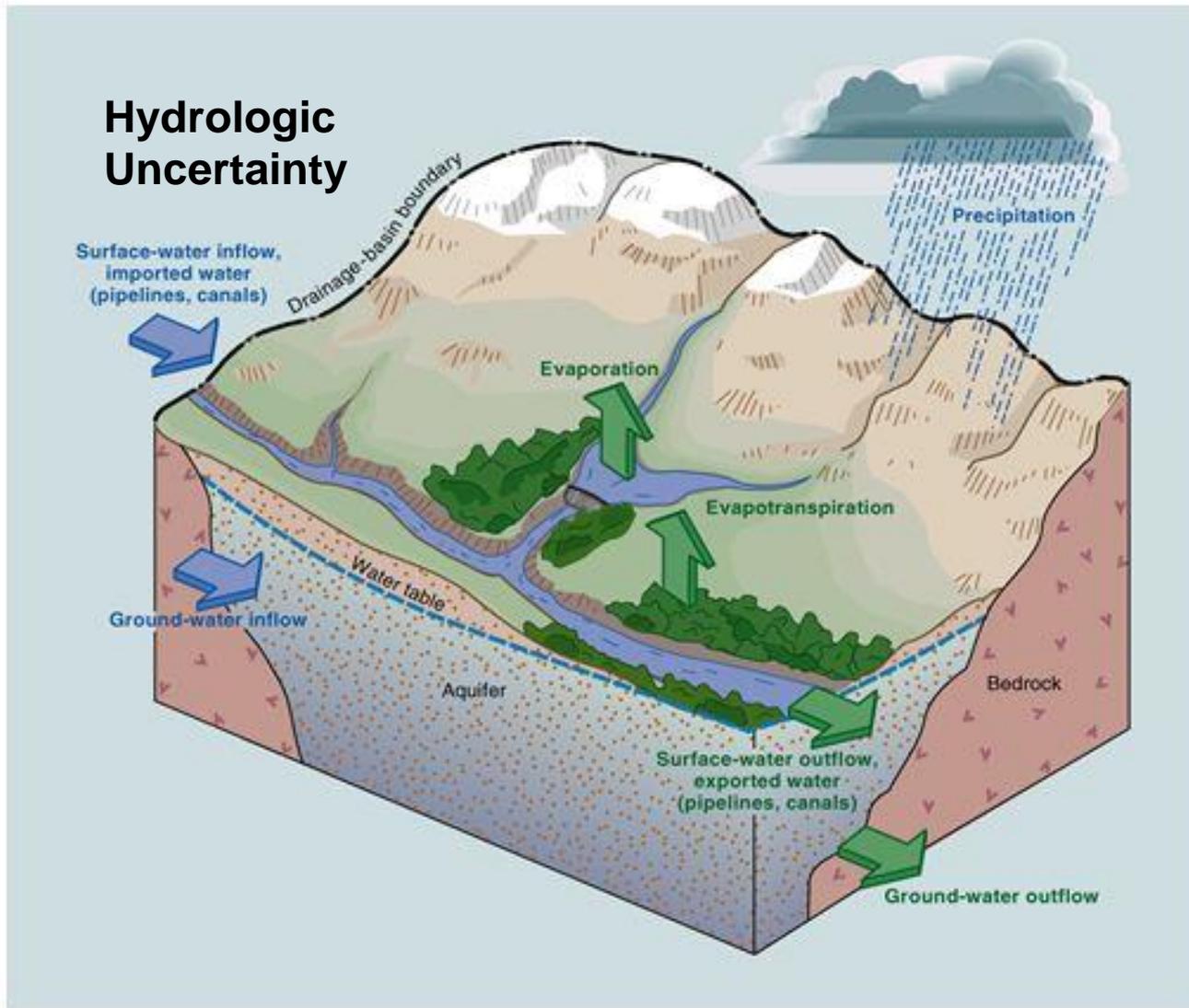
Adequate Amounts of Clean Water:

One of Two Essential Natural Resources

Critical to Life



Hydrologic Uncertainty



Hydrologic Cycle (Water Budget)

Certainty: Role of Hydrology

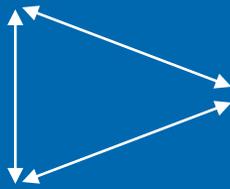
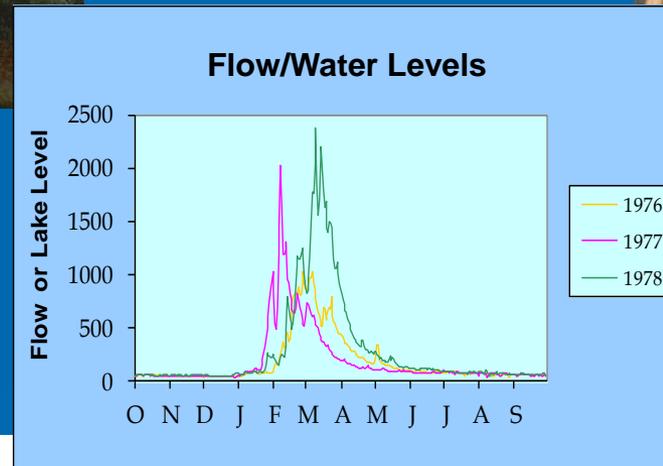
Geomorphology



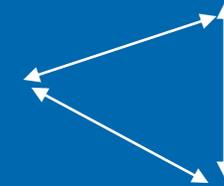
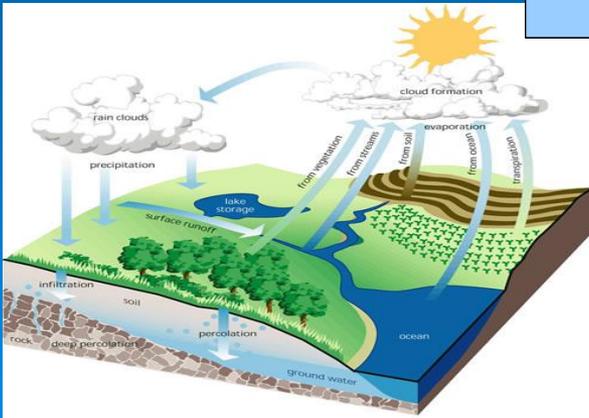
Biology



Hydrology



Connectivity



Water Quality



Water Use Related Uncertainty

Instream:

Water needed* in the water body to support vital ecological functions and uses (includes lakes/wetlands)

Examples:*

- Fish and Wildlife
- Recreation
- Cultural/Aesthetic
- Navigation
- Water Quality

* Ice Conditions, too

Out of Stream:

Water removed from the system or flow regime/water volume/stage altered* (subsurface/groundwater too)

Examples:*

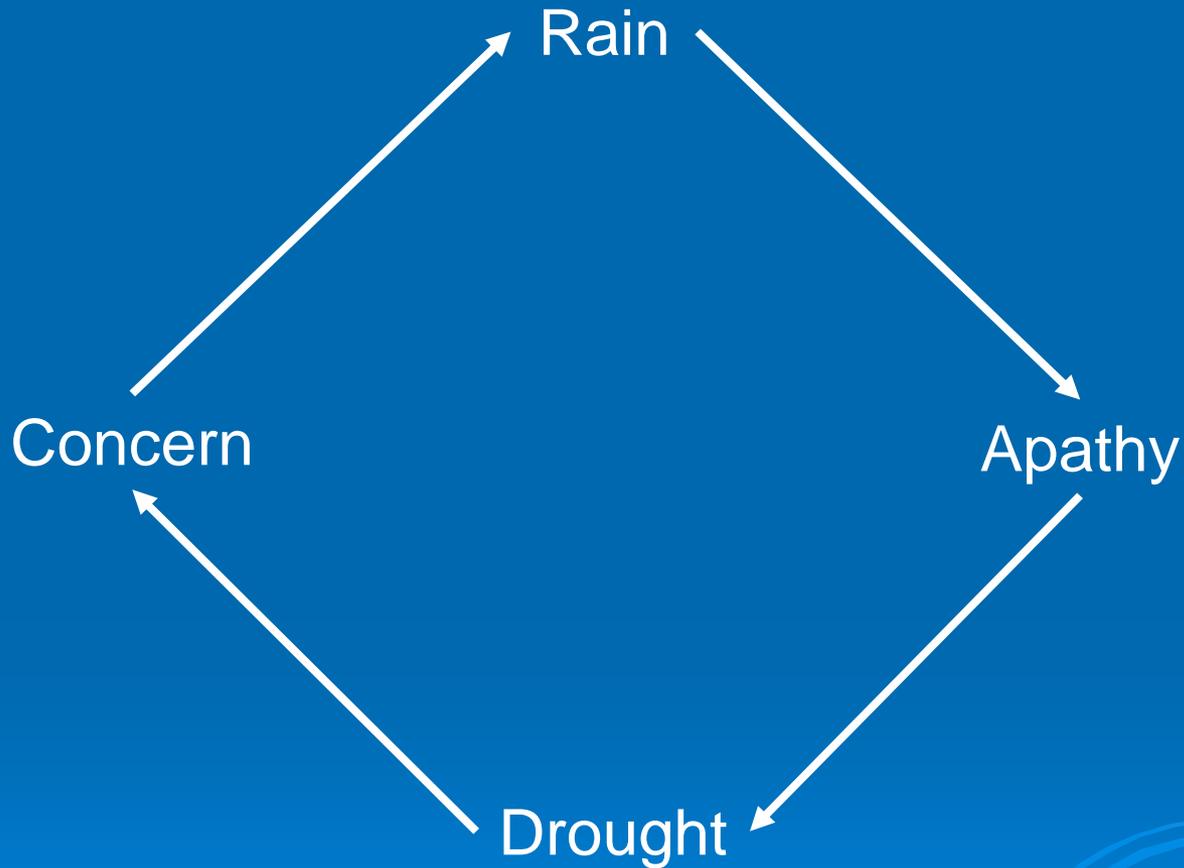
- Power Generation (hydro/fossil fuels/solar)
- Industrial/Manufacturing
- Public/Personal Water Supply
- Irrigation/Agriculture
- Water Export/Transfer
- Hatcheries
- Resource Extraction (Minerals, Timber, Oil, Gas, etc.)
- Ice Roads, Snowmaking, etc.

Instream Flow/Water Level Conservation Uncertainty

No One Size Fits All – Dynamic Status

- **Legal/Institutional/Policy** (2, 4, 6, 8 year shifts)
surface water/groundwater connectivity legally recognized?
water quantity/quality connection legally recognized? Long-term water use planning/water use strategies/priorities/objectives- basin by basin?
- **Flow/Water Level Components (science)**
Desktop or other methods/combinations? Gaging data limitations? Biologic data limitations (mandatory?) Money? Time? Expertise? Other data/analyses limitations? Present status: Intact/Unregulated? Regulated/Altered? –Socially engineered hydrology/biology, Site access, Other?
- **Socioeconomic Values** (how and will they be defined and what roles?
Will they be integrated with long-term water basin planning/multiple water use priorities ? Will they be periodically updated?)
- **Public/Stakeholder Involvement** (how will consensus be reached with all stakeholders on processes and measurable outcomes used to determine water use decisions, timelines, and implementation based on public participation from beginning to end?)

Hydro-illogic Cycle Uncertainty



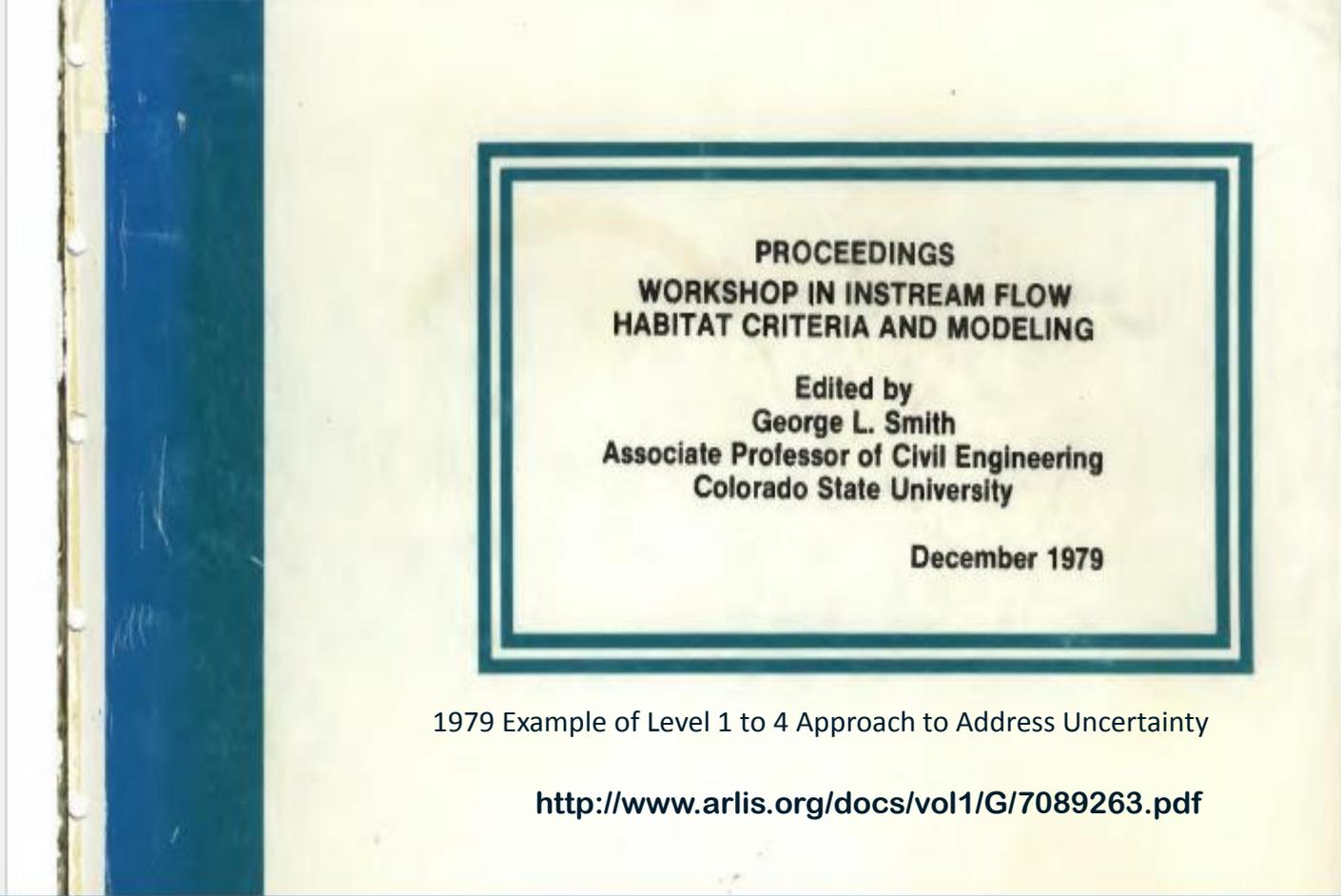
Generational Uncertainty

- Institutional Lobotomy
- Institutional Alzheimer's/Senility



Address Uncertainty Proactively

- Apply IFC's 10 Principles for Flow/Water Levels (2004)
- Develop/Update/Implement Water Use Basin Plans
- Take Actions to Prevent versus Restore/Rehabilitate
- Monitor Outcomes – Adapt if Needed
- Share Stakeholder Knowledge/Experiences (Positive & Negative): e.g. IFC, AFWA, WSWC, & Other State/Provincial/Territorial; USFWS, USGS & Other Federal; Tribal; IJC, IBWC, & Other International, Local Governmental; Academic & Professional Organizations; NGO, Private Sector, NFHP, & Other Water Stakeholder Interests Networking)
- Bridge the Past, Present, and Future
(research historical and current literature, terminology evolution, take snapshots over time, develop/implement/track long-term water basin water use priorities/actions/results-all stakeholders)



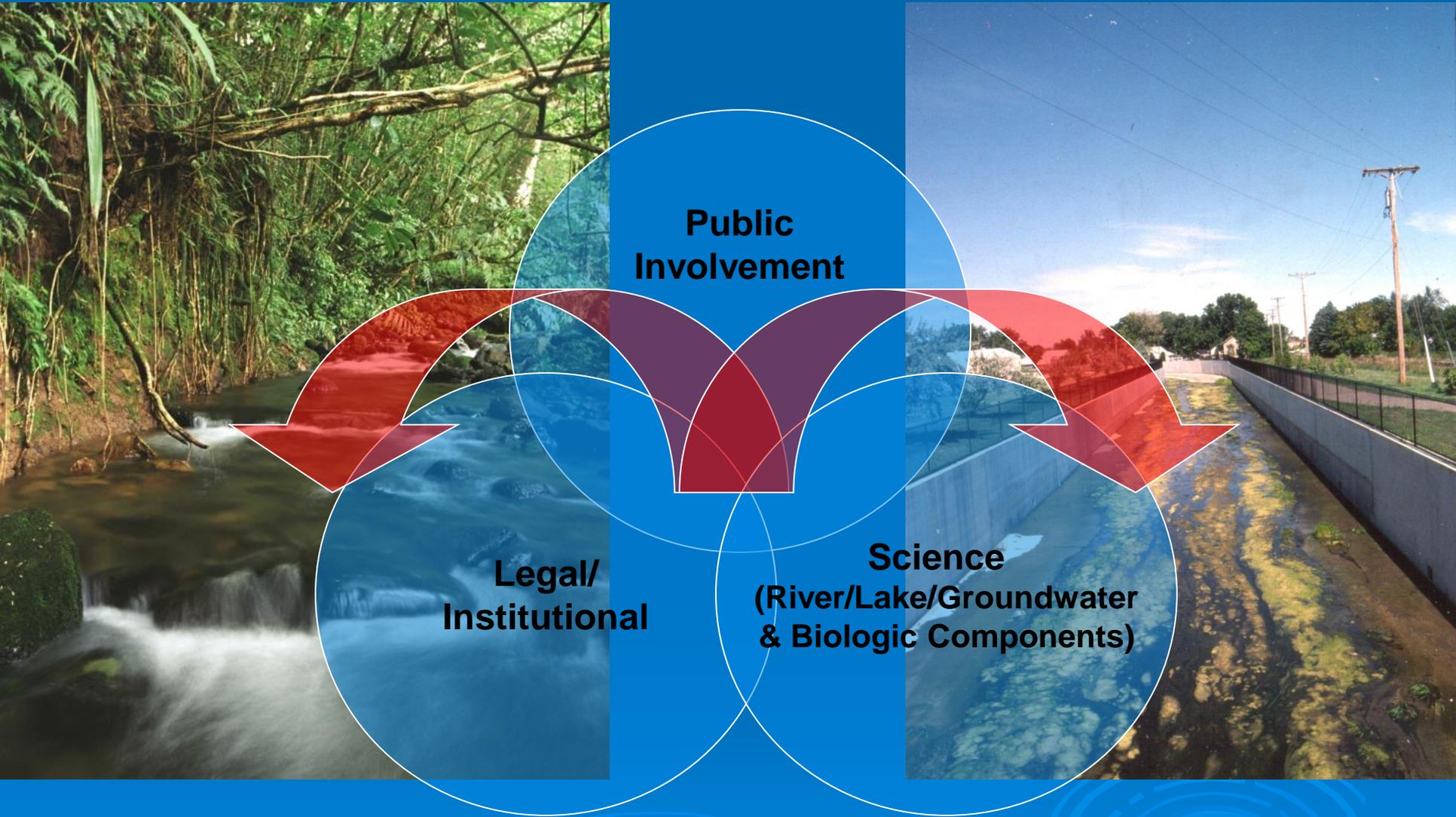
1979 Example of Level 1 to 4 Approach to Address Uncertainty

<http://www.arlis.org/docs/vol1/G/7089263.pdf>

Summary Recommendations

- Network with IFC Representatives
- Network with Other Experts
- Network with All Stakeholders
- Remember to Integrate Lentic Water Levels
- Water Quantity/Quality Linkages
- Surface Water/Groundwater Linkages
- **Gaging, Gaging, Gaging, Gaging!!!!**

Questions ?



How well we integrate each element will affect how the world looks and our quality of life.

Thank You!

Instream Flows

*for Riverine Resource
Stewardship*
Revised Edition

