



Water Use Planning

Translating Sustainability Theory into Practice - Making “Real” Decisions with “Real” People

Siobhan Jackson

BC Hydro Generation

November 3, 2004

CEATI Water Management Workshop, Vancouver BC



About Water Use Planning...

- A bold multi-party framework to clarify our operating scope and to gain broad consent for balanced water management decisions



What is a Water Use Plan

- Technical rules for timing and quantity of flow releases and storage at each facility
- Recognition of changed values since projects constructed and licensed
- Explicit documentation of trade-offs between environmental, social and economic impacts

- BC Hydro submits Water Use Plan
- Strong structure: Provincial 13-step guidelines:

www.lwbc.bc.ca/03water/overview/wup/index.html



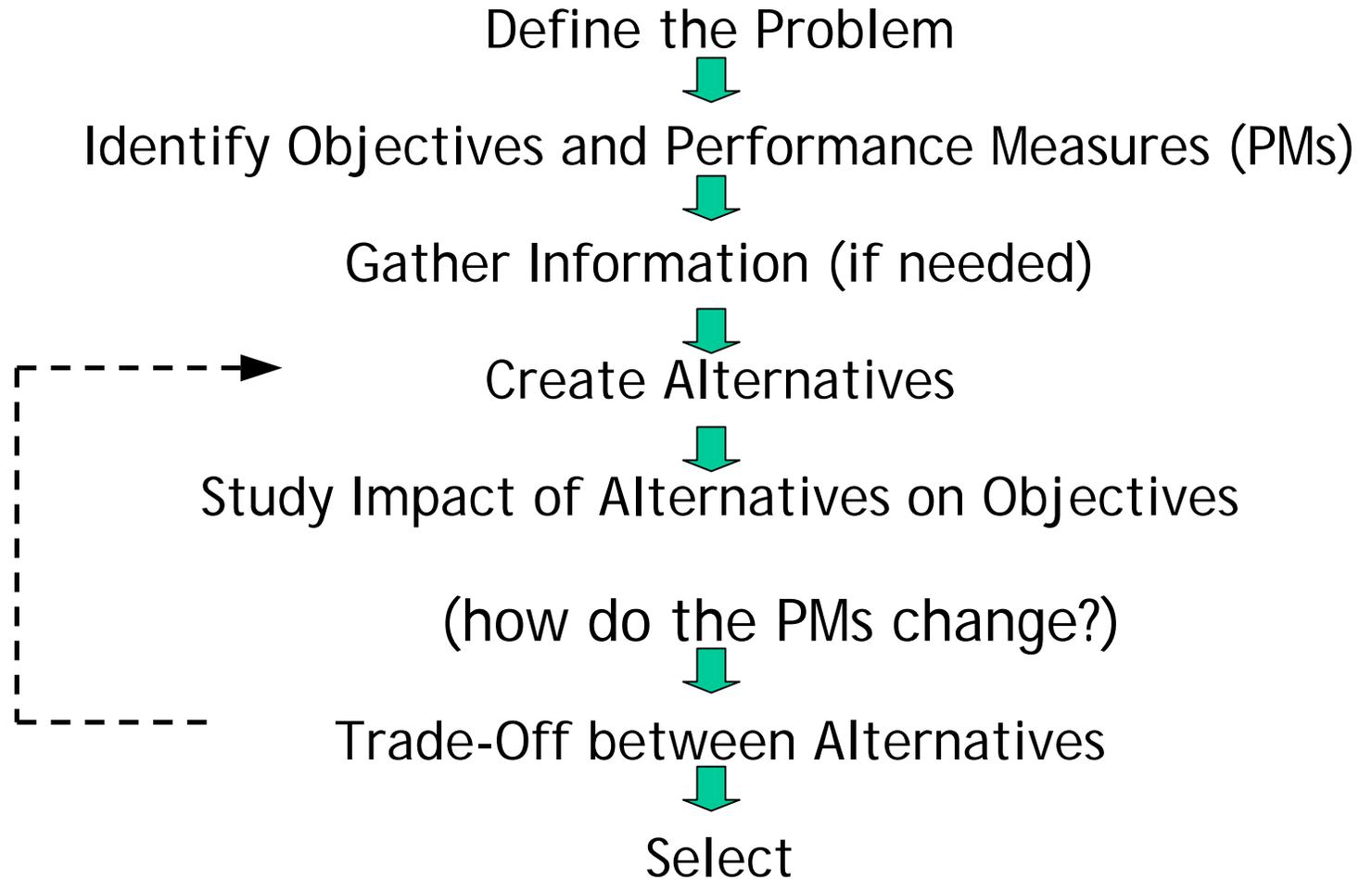
WUP Key Features

- Structured decision process, from explicit objectives through to decisions
- Interest and consensus-base (goal, not mandatory)
- Collaborative, cooperative, inclusive
- Competing objectives; trade-offs usually necessary
- Computer modeling of options / impacts
- Maintains existing regulatory process



Structured Decision Making

Iterative Process





Structured Decision Making Tools

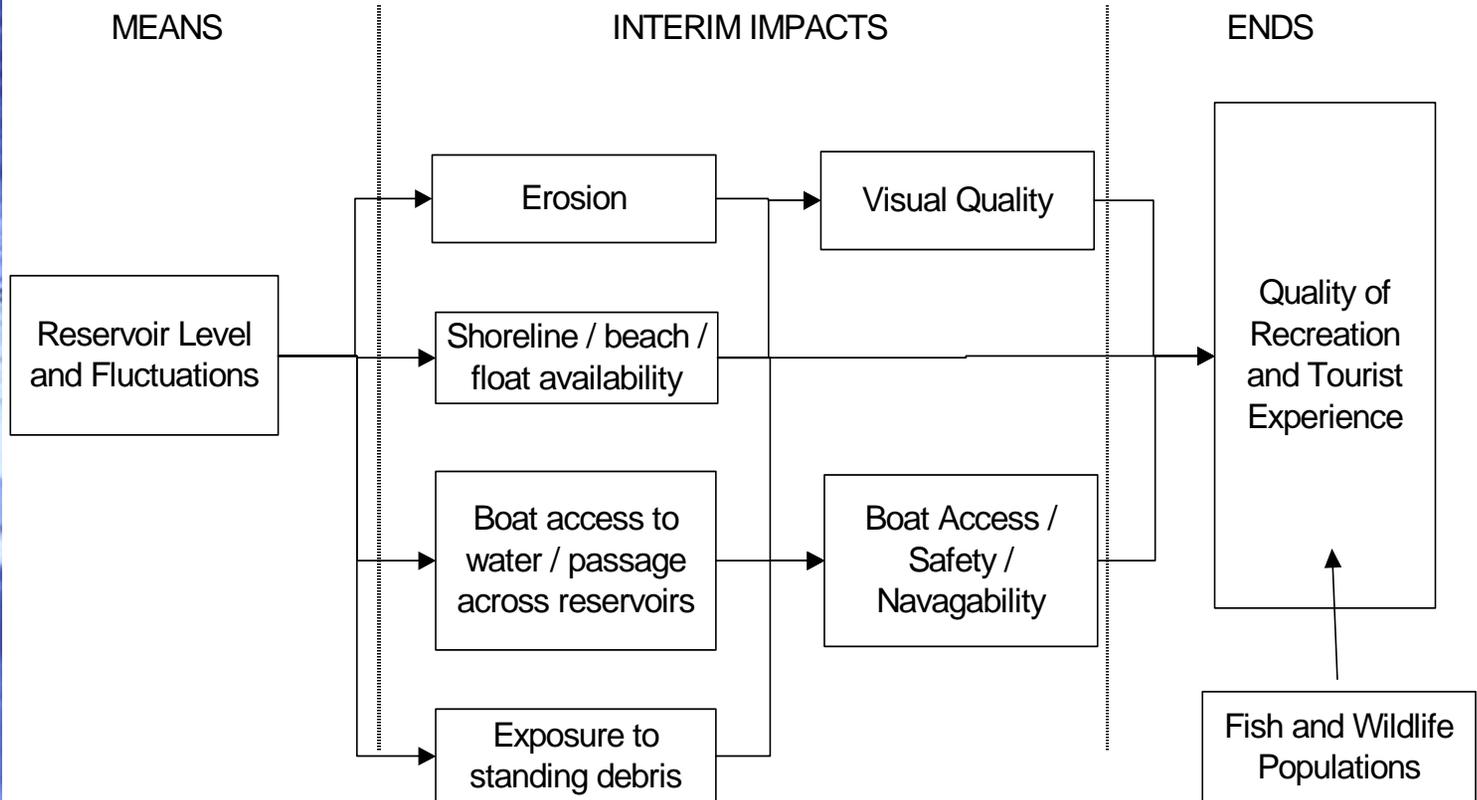
Problem Structuring

- Develop Objectives: what *“really matters”*
- Tools:
 - ④ Objective Hierarchies (Means vs Ends)
 - ④ Influence Diagrams
 - ④ Decision Trees
 - ④ Expert Judgment



Structured Decision Making Tools

Simple Influence Diagram - Reservoir Recreation





Structured Decision Making Tools

Complex Influence Diagram - River Fish

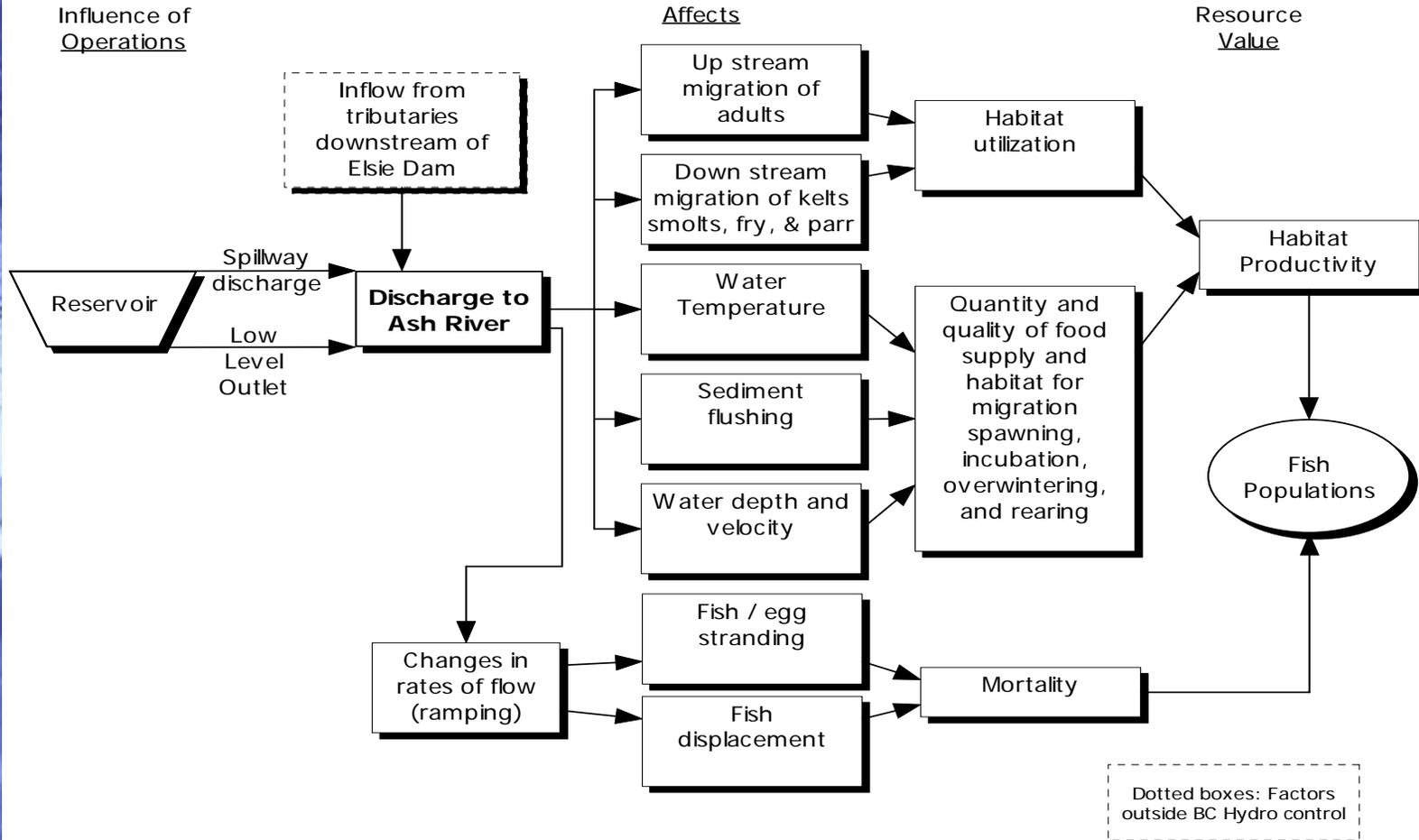


Fig 5.2 Ash Fish-Rivers



Structured Decision Making Tools

Assessing Impacts

- Purpose: Specify the impact of each alternative on each objective

- Tools:
 - ⊗ Develop Measures for each objective area (quantitative over qualitative)
 - ⊗ Models (operations, power, environmental, social)
 - ⊗ Expert Judgment



Structured Decision Making Tools

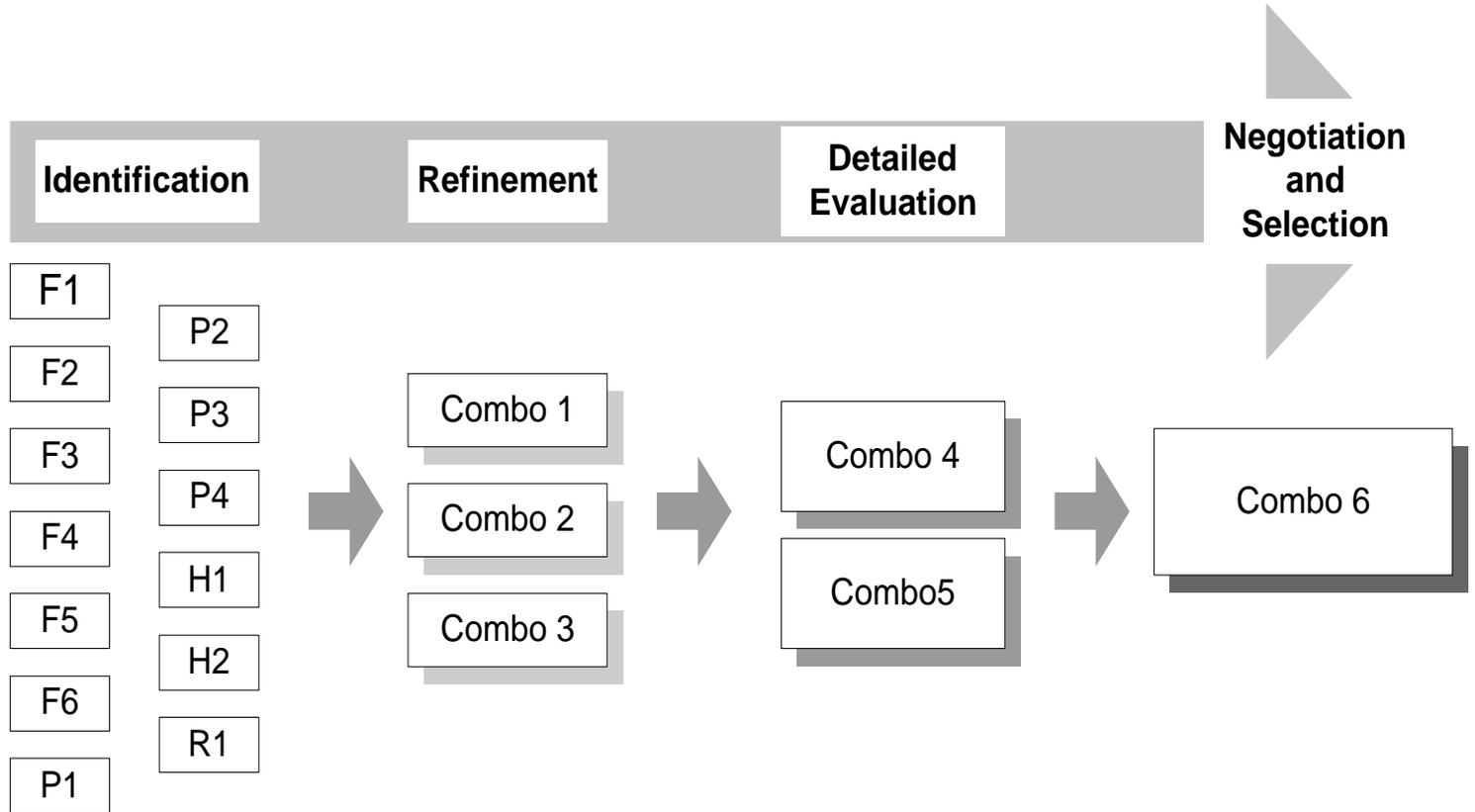
Gathering Information

- Jointly select studies based on objectives, measures, and means (what can be changed?)
- Useful discussion - acceptance of results or why do study? Just use your “gut feeling” now and save the study money and time!
- Study development tools:
 - Ⓢ Screening studies (PM, VOI, Costs, etc.)
 - Ⓢ Impact Hypotheses
 - Ⓢ Expert Judgment
 - Ⓢ Comprehensive Monitoring (AM)



Structured Decision Making

Identifying and Selecting an Alternative





Structured Decision Making Tools

The Tough Part - Articulating Values and Choices

- It is not about choosing between “right and wrong” but weighing between “two rights”
- The objectives represent the things that matter for society - the decision represents striking a balance between them
- Challenge: The Analysts job is to help decision-makers to:
 - ⓐ articulate their values with the alternatives before them
 - ⓐ understand the trade-offs in their decision
 - ⓐ merge individual values into a shared decision



Structured Decision Making Tools

“The Decision Analysts Tool-Kit”

TOOL:

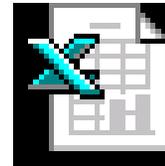
- Consequence Tables
- Sensitivity
- Pairwise comparisons
- Dominance Analysis
- Direct Choice
- Swing Weighting

WHAT IT DOES:

- visual aid to #'s, differences
- reduces # of attributes
- reduces alternatives
- reduces alternatives
- ranks by attribute preference
- rank indicators by *sensitivity* across alternatives



The “ART” of Presenting Technical Information: Consequence Table



Interactive
Consequence Table



Swing-Weighting Example



Swing Weight
Example



Decision Challenges: Our Experience

- Challenge is behavioural, not technical
 - ⊗ People anchor on the status quo
 - ⊗ Losses viewed greater than gains
 - ⊗ Underestimate uncertainty (science overconfidence)
 - ⊗ Focus on solutions (positions) rather than figuring out what matters (interests)
 - ⊗ Disproportionate time spent gathering information rather than understanding the trade-offs
 - ⊗ Regulators' acceptance of process and shared decision making
 - ⊗ Prefer to study, debate, hesitate - anything but make a decision



BC Hydro's Water Use Planning

■ For more information:

🌐 Website: <http://www.bchydro.com>

🌐 Email: siobhan.jackson@bchydro.com



More "ART" - Understanding Differences using Pairwise Comparison

Moving From Alternative:

WinterSiphon

To Alternative:

RecOnly

In the MEDIAN YEAR, Results In:

Recreation

 An increase in Rec Quality of 17.1 days

Annual Revenue

 A decrease in Net Annual Revenue of 0.3 \$m / yr

Fish - Jones Creek

 An increase in NA - Viable habitat - Q>20% MAD of 2 days/year

 A decrease in Anad - Fish Index of 42.2

Fish - Reservoir

 A decrease in Reservoir Fish Index of 14.3

Fish - Herrling Sidechannel

 An increase in Spawning - Average Sp of 3325.4 WUA (sq m)

 A decrease in Spawning - Average Cum Hab var of 1064.2 WUA (sq m)

Wildlife

 A decrease in Wildlife Weighted Average of 27.9 Area (000 sqm)

Flood

 An increase in Red Flag Index of 0.8 Events over 40 years

GHG

 A decrease in GHG inc relative to SQ License of 0.1 kTCO2e / yr