

Evaluating Trade-offs: Thinking Outside the Black Box

Steve Kennett
Independent Consultant

Dawson City, Yukon
January 18, 2012

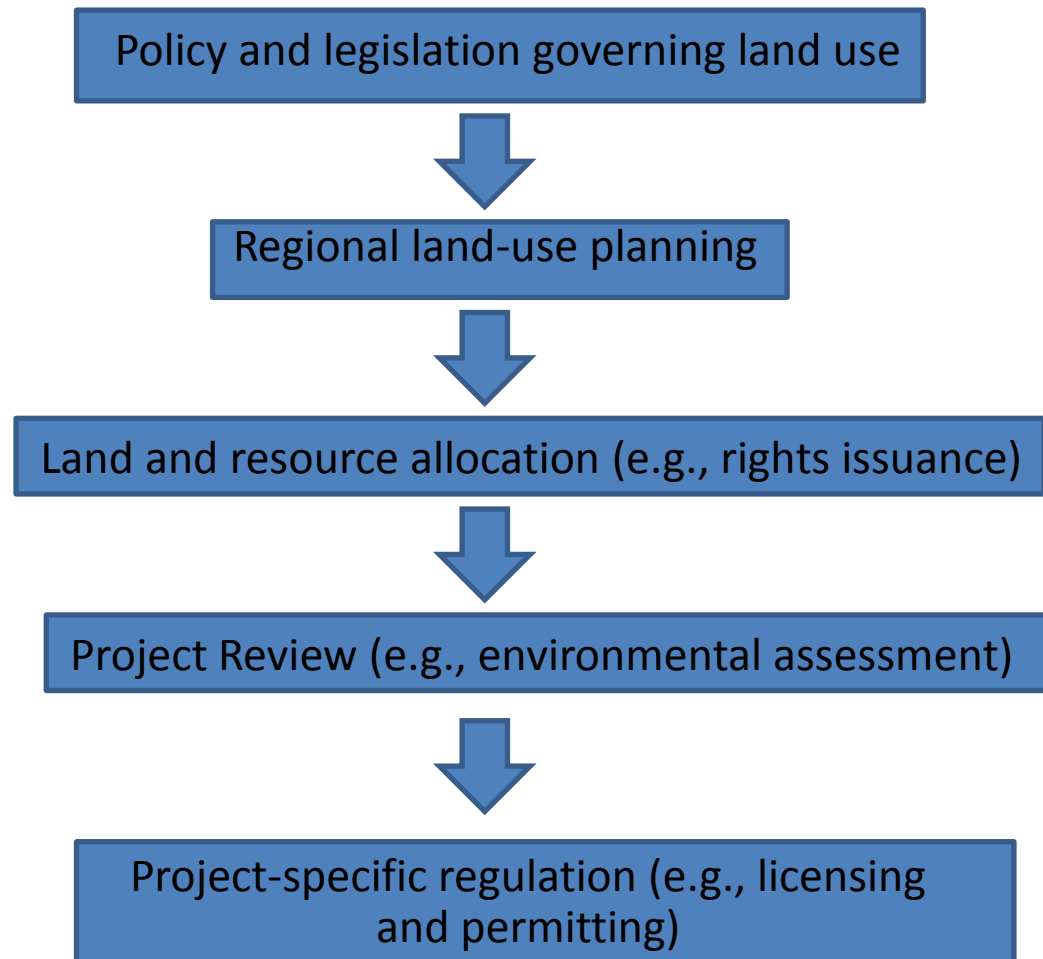
Presentation Outline

- Trade-off Decisions in Planning
- Black Box Decision Making
 - “Name the Game”
- Thinking Outside the Black Box
 - Ideas for trade-off decisions
 - Structured Decision Making

Evolution of Environmental Management



Planning and the Decision-Making Hierarchy



Key Roles for Planning

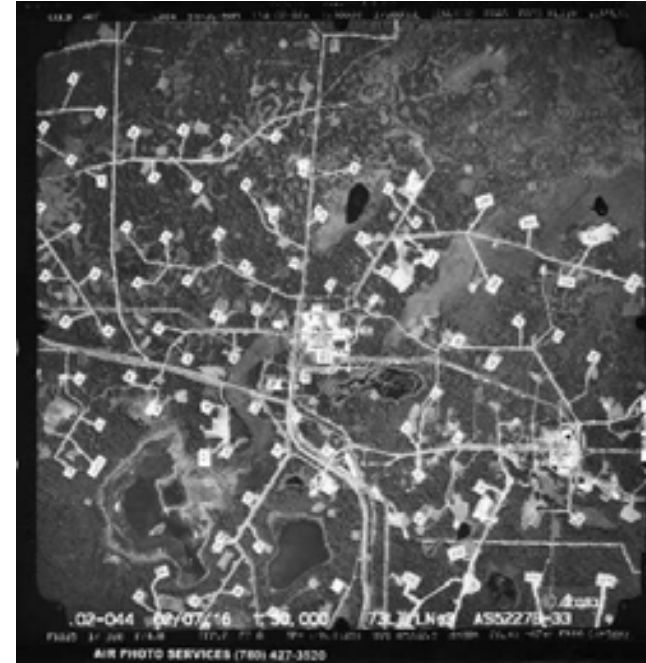
- Self-determination
 - Means to identify desired future states for different parts of the landscape
 - Focus on objectives and how to achieve them
- Regulatory effectiveness, efficiency and predictability
 - Sets context for decision making at lower levels in the hierarchy

Land-use Conflicts



Selected photos courtesy of Brad Stelfox

Cumulative Effects



Planning and Sustainability: Living within Limits



The Planning and Cumulative Effects Mantra



Everything

Everywhere

All the time

Universe of Trade-off Decisions



Activity – type, intensity, impacts

Space

Time

Trade-off Decisions: A Black Box?

Figure 1. Planning - Developing Initial Biodiversity Targets for Trade-off Analysis

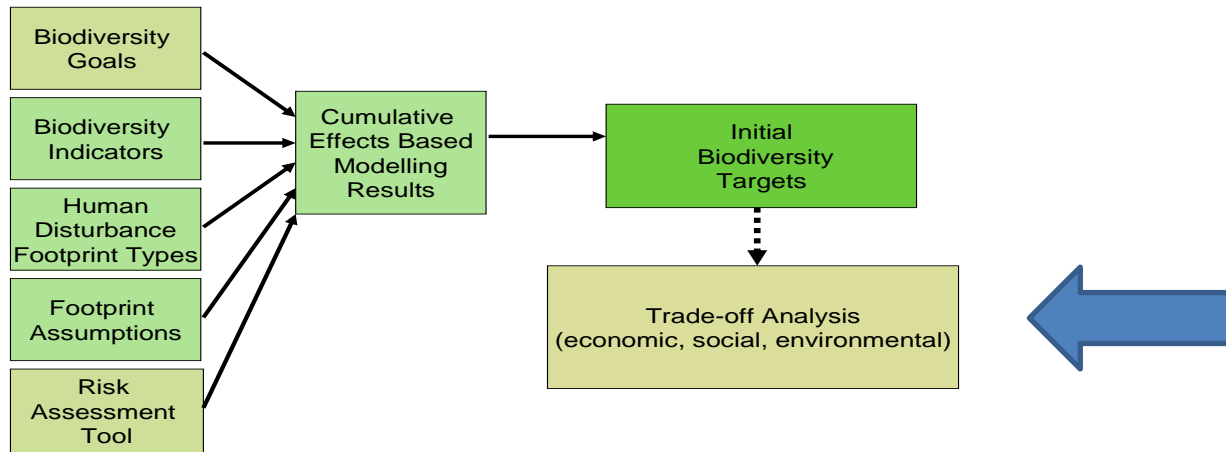
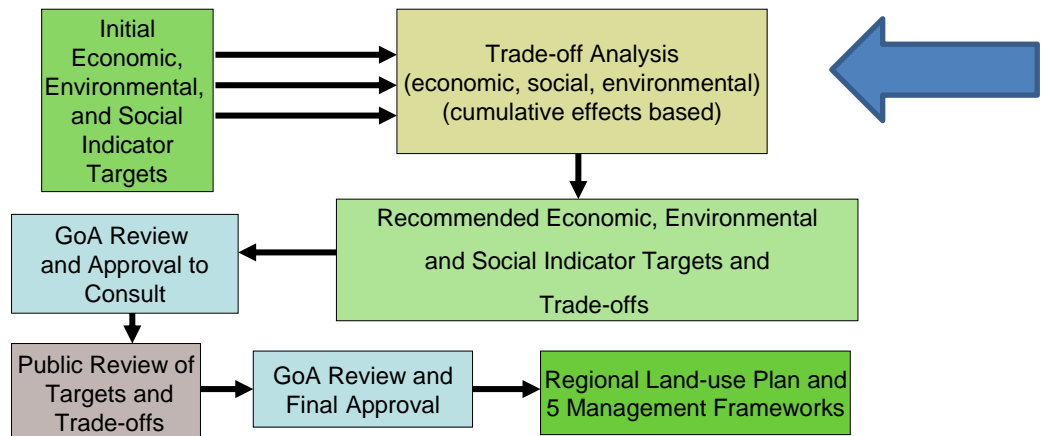


Figure 2. Planning - Building Land-use Plans and Management Frameworks



Diagrams from a draft discussion paper are for illustrative purposes only

NAME THE (BLACK BOX DECISION-MAKING) GAME*

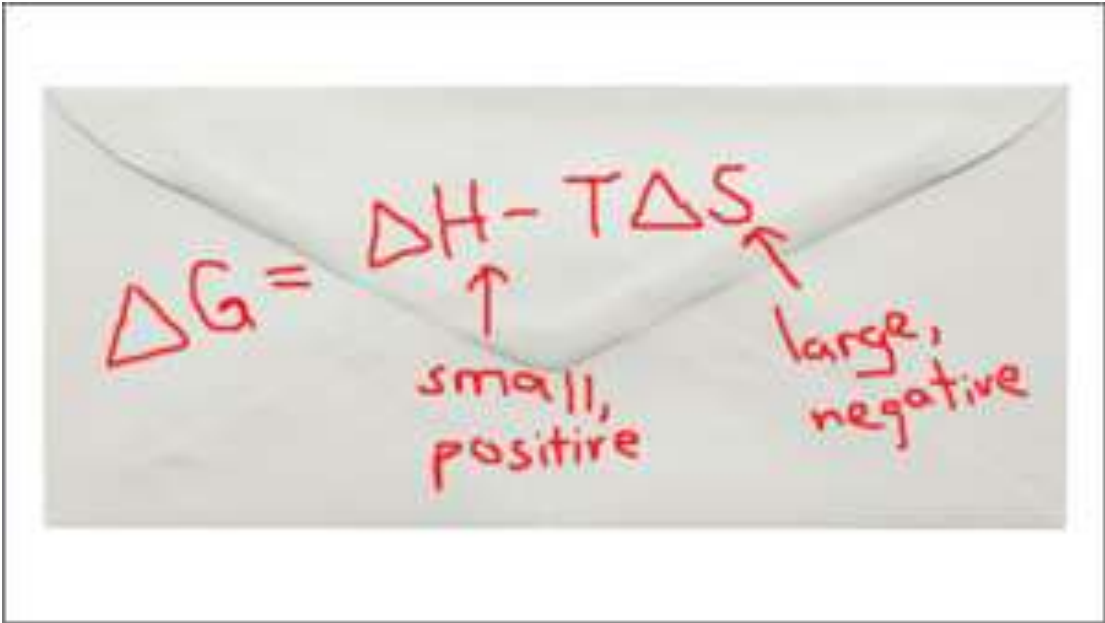
***Any similarity with actual decision making in Yukon is unintended and purely coincidental**



PHOTO: BRYAN ALLEN/CORBIS

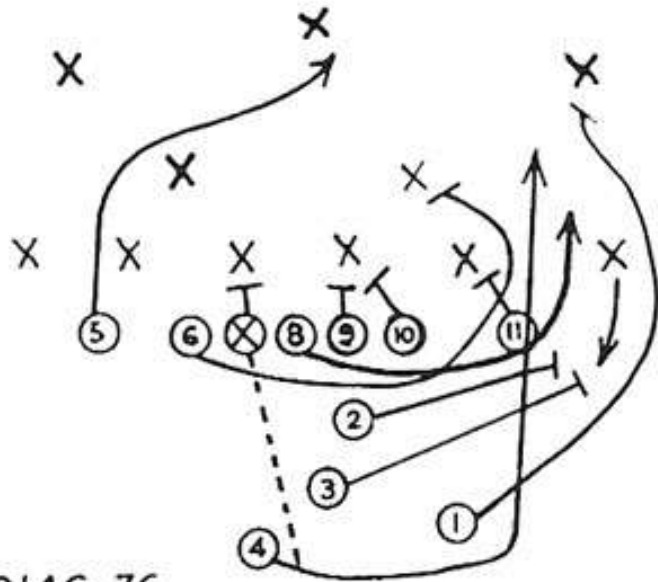








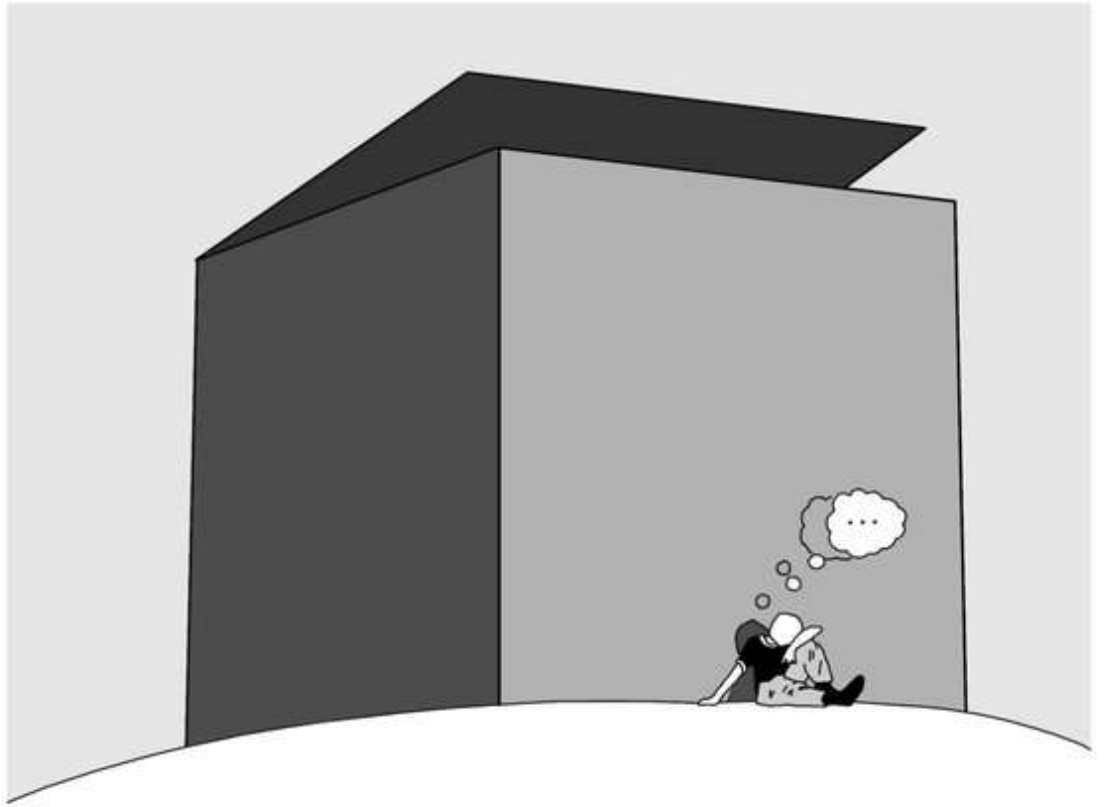
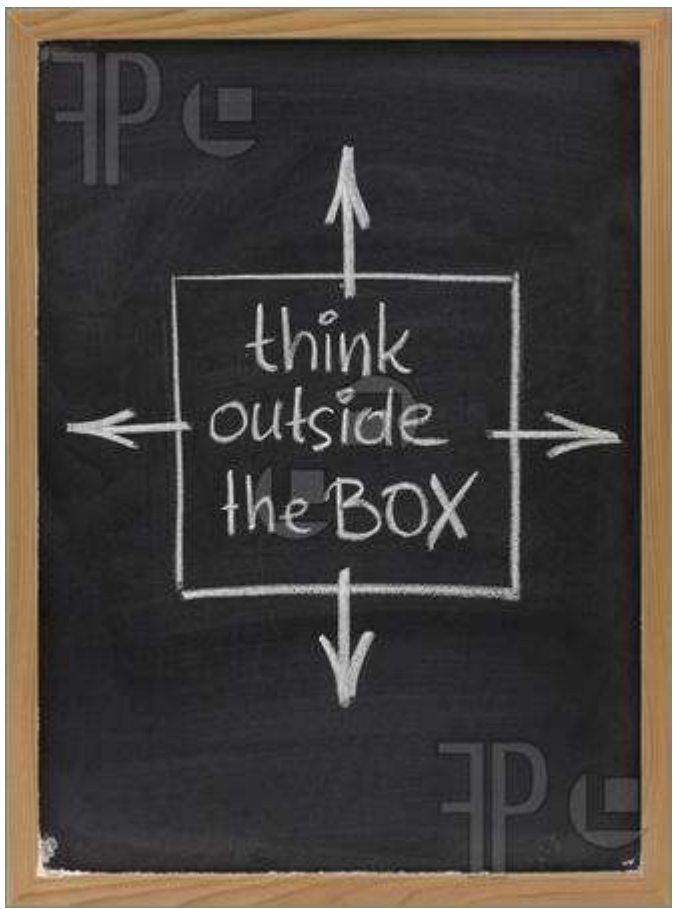




DIAG. 76



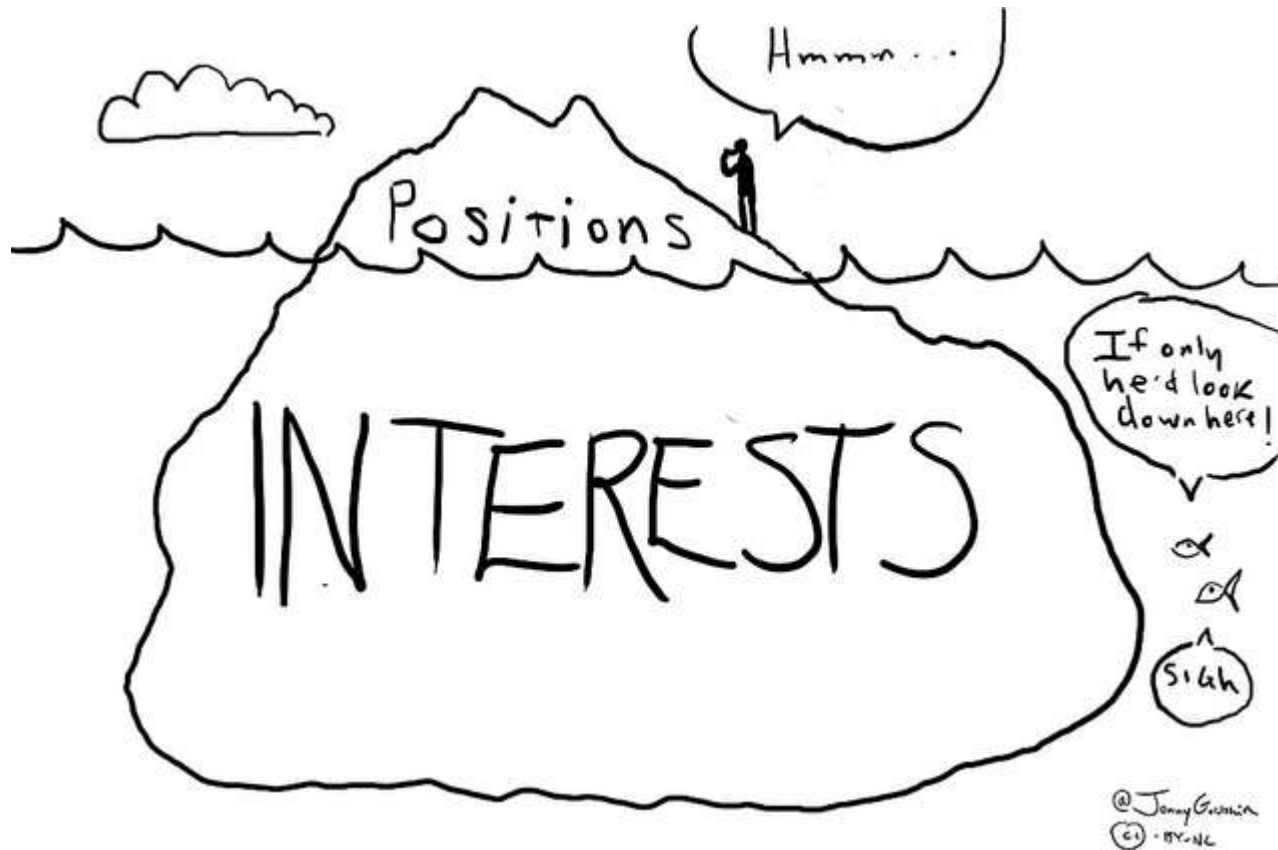




Attributes of Good Trade-off Decision Making

- **Systematic**
 - structured approach to dealing with complex issues that ensures both analysis and deliberation
- **Rigorous**
 - based on the best available information and analysis, including explicit treatment of risk and uncertainty
- **Transparent**
 - reasons for decisions should be clear to all interested parties

Focus on interests, not positions



Set Direction for Planning

LARP Terms of Reference

What issues will Cabinet provide guidance on?

The Balance Between Development and Environment

Economic development is important for creating jobs and prosperity for Albertans. But development must be balanced with protection of the environment, to ensure current and future generations have clean airsheds, watersheds and landscapes and healthy ecosystems. The RAC will be given guidance about how to strike this balance in the region.



“He’s right. We screwed up.”

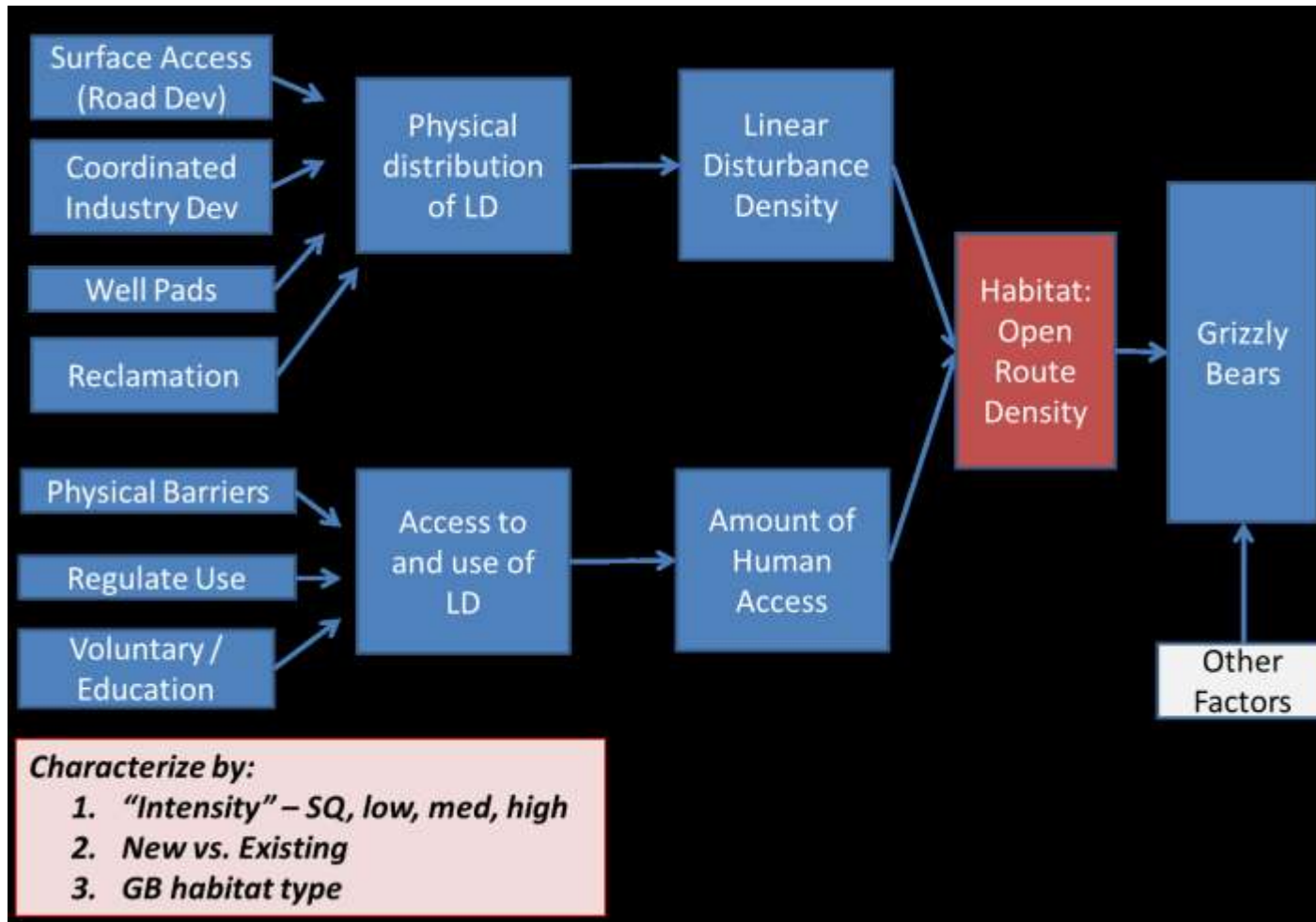
Explore Options Across Space and Time



Use other Decision Support Tools for Trade-off Analysis – e.g., Marxan

| Design Element | Marxan Objective | Marxan Target |
|-----------------------------------|---|--|
| Coarse filter | | |
| Ecosystem representation | a) Represent all Natural Subregions b) Represent all forest patch types ² | 14.3%; 20%; 25%; 30%; 35%; 40% |
| Low industrial footprint | Minimize linear feature density | On/off |
| Large size | Maximize CA clumping | On/off |
| Connectivity | Maximize CA clumping | On/off |
| Fine filter | | |
| Species at risk | Include caribou and grizzly range | 20%; 40%; 60%; 90% |
| Riparian headwaters | Include Foothills headwaters | 20%; 40%; 60%; 90% |
| Environmentally Significant Areas | Include ESAs on public lands | 20%; 40%; 60%; 90% |
| General | | |
| Low opportunity cost | Minimize NPV of petroleum and forestry resources ³ | On/off |
| Regional distribution | Represent all LUF zones | Equal to ecosystem representation target |

Expand the Policy and Management Toolkit



Means-Ends diagram showing the linkages between policy and management options for linear disturbance and access management and Grizzly Bear habitat: Open Route Density – Alberta Environment and Water & Compass Resource Management Ltd.

Incorporate Monitoring and Adaptive Management

Check

Monitor, evaluate, report and adjust performance of actions and plans against economic, environmental, and social objectives

Provincial Vision, Desired Outcomes and Guiding Principles

- Healthy economy supported by our land and natural resources
- Healthy ecosystems and environment
- People-friendly communities with ample recreational and cultural opportunities

Continuous Improvement System supported by Building Information, Knowledge and Tools

- Science, traditional knowledge and experience
- Improved connections
- Strategic research
- Knowledge transfer
- Technology and tools
- Stewardship initiatives
- Collaboration and partnerships

Do (consistent with regional plans)

- Transitional strategy
- Immediate priorities
- Addressing policy gaps
- Timeframe for implementing the Land-use Framework

Plans: Provincial, Regional and Local

- Provincial leadership
- Land-use planning system
- Regional planning
- Local planning
- Appeal mechanisms



SDM 101



Presentation excerpts included with permission of Dan Ohlson, Compass Resource Management Ltd.

<http://www.compassrm.com/>
<http://structureddecisionmaking.org>

Dan Ohlson
Compass Resource Management Ltd.

Structured Decision Making (SDM)



The formal use of common sense for decision problems that are too complex for the informal use of common sense.”

Ralph Keeney

SDM



- A Process = a set of core steps
 - Flexible, scalable and iterative
 - Facilitation - informed by the behavioural sciences
- A set of structuring tools from the decision sciences
 - Objectives hierarchies
 - Influence diagrams
 - Decision trees
 - Strategy / option portfolios
 - Consequence tables
 - Structured expert judgments
 - Multi-attribute trade-off analysis
- The integration of analysis and deliberation

Graham's Truck

- Graham is thinking of buying a truck.
- He needs it primarily for hauling building materials around over the next five years, but also has kids...



Graham's Truck

- He makes a long list of all the things he should consider...
 - Cost, payload, colour, mileage, cupholders, cd player, sunroof, tire condition, # passengers etc



Graham's Truck

- He trims them to the ones that *really matter* to him:

| Objective | Evaluation Criteria | Direction |
|--------------|---------------------|-----------|
| Price | \$ | less |
| Fuel Economy | L / 100 km | less |
| Mileage | kilometres | less |
| Bed Size | feet | more |
| Payload | pounds | more |
| Passengers | # | more |



Graham's Truck

- Then he's off shopping...



Graham's Truck

- He decides start by doing his homework on six of them:

| Objective | Attribute | Direction | Truck 1 | Truck 2 | Truck 3 | Truck 4 | Truck 5 | Truck 6 |
|--------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Price | \$ | L | \$ 14,000 | \$ 18,500 | \$ 18,000 | \$ 24,000 | \$ 25,000 | \$ 25,000 |
| Fuel Economy | L / 100 km | L | 9 | 9 | 9 | 13 | 13 | 13 |
| Mileage | kilometres | L | 160,000 | 60,000 | 80,000 | 60,000 | 60,000 | 80,000 |
| Bed Size | feet | H | 6.50 | 6.50 | 6.50 | 7.00 | 5.00 | 5.00 |
| Payload | pounds | H | 1,200 | 1,200 | 1,200 | 1,800 | 1,400 | 1,400 |
| Passengers | # | H | 4 | 4 | 4 | 4 | 5 | 5 |

Graham's Truck

- But how can he decide which one is best?
 - Go to excel.....



Simple Example: Key Points

- 1 Decided first on decision scope, structure
- 2 Narrowed in on key objectives and developed criteria
- 3 Collected information (consequence table) = a technical task
- 4 Selected a preferred alternative = a value judgement
(.... reasonable people may disagree)

Conclusion – Beyond the Black Box

- Where we are:
 - Integrated regional planning and a recognition of the need to make trade-off decisions
- Where we want to be:
 - Trade-off decision making in planning that is:
 - Systematic
 - Rigorous
 - Transparent