Problem framing

Module 2:

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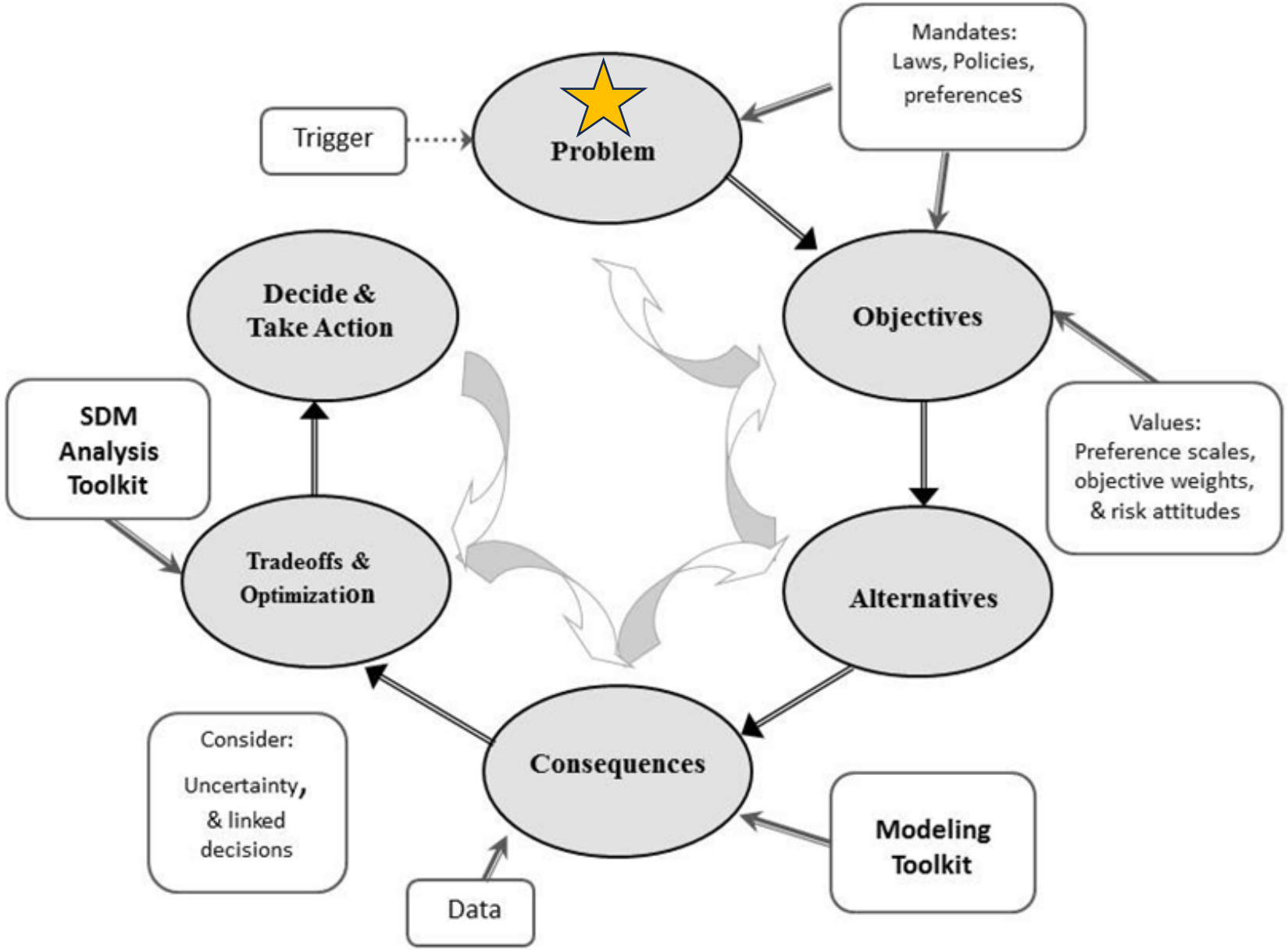
Modified from: Fundamentals of Structured Decision Making TWS Conference Workshop 2023 & an Overview of Structured Decision-Making Washington Department of Fish and Wildlife 2022-2023



Source: Jean Fitts Cochrane

Problem framing

- First and most important task in SDM
- Provides an *a priori*, explicit, and shared understanding of the problem at hand
- Sets bounds on the problem by identifying spatial, temporal, organizational, legal, and other relevant bounds

"A good solution to a well-posed decision problem is almost always a smarter choice than an excellent solution to a poorly posed one."
~ Hammond et al.

Common errors:

- Decision makers naturally jump to thinking about alternatives
- We assume the problem has defined itself, so we don't frame the problem or think about what we really want to achieve.
- Alternative focused thinking → narrow problem framing → omission of important objectives

Defining “problems” as decisions

- Making **decisions** is the **problem**
  - Think about word problems in math class

- Sometimes we fail to realize that the problem revolves around a decision

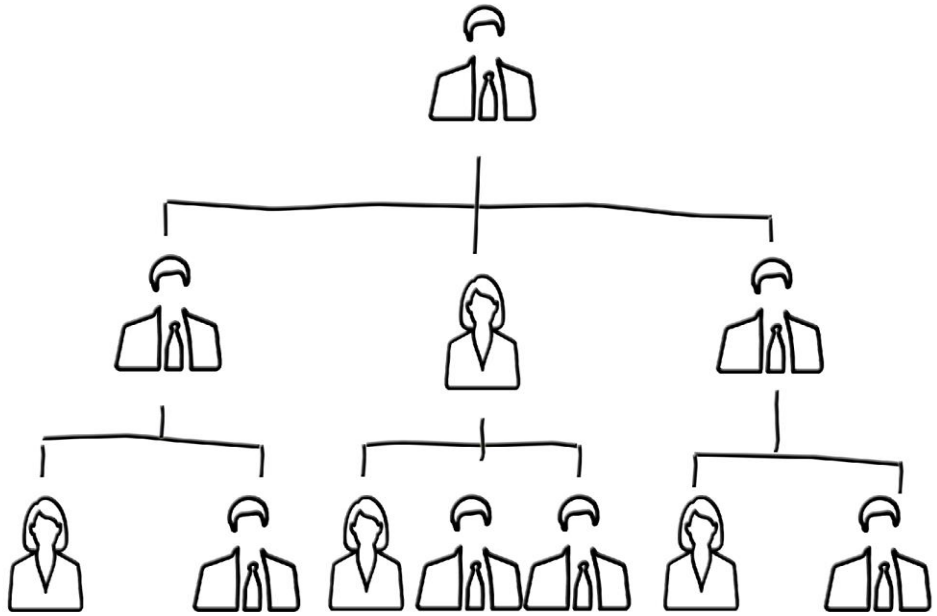
- Deciding between a finite set of alternative courses of action should be the focus of problem solving (i.e., decision making)

Elements of problem framing

1. Identify the decision maker(s)
2. Identify other key players
3. Consider legal and regulatory contexts
4. Consider the decision structure
5. Consider the type of analysis required
6. Revise as needed

1. ID the decision maker(s)

- **Who has the authority to commit to action?**
  - Can be surprisingly difficult/complex!
- **Some scenarios**
  - Single decision-maker
  - Multiple decision-makers
    - Willing to work together for joint aims
    - Competing with each other (not SDM)
  - Delegated authority
    - E.g., Governor → Director→ Administrator



- **Failure to ID & include all DMs in the process will make things difficult and confusing**

2. ID other key players

- Decision Implementers
- Stakeholders/ interest groups
- The public
- Technical advisors

3. Consider the legal and regulatory context

- Particularly for decisions by public agencies
- What laws confer authority for the decision?
- How does the legislation or associated regulations bound the decision problems?

- Example: USFWS is the decision maker and must follow Migratory Bird Treaty Act regulations

4. Consider the decision structure

- **Frequency & Timing -** How often? When? Are other decisions linked?
- **Scope -** How large, broad, complicated is the decision?
- **Objectives** – Roughly, what are the desired outcomes? Single or multiple objectives? Conflicting objectives?
- **Actions** – Roughly, what kinds of alternatives are being chosen from?
- **Constraints -** Legal, financial, political, perceived or real constraints?
- **Uncertainty -** What degree of uncertainty is present? Can it be ignored?

5. Consider the type of analysis required

- To choose among alternatives, what sort of analysis will be required?
- How much detail is needed?
- Do the data and analytical methods exist?
- Do you have access to the expertise?
- Is uncertainty an impediment?
- What class of decision problem do you have?

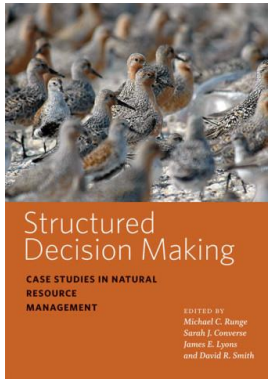
Classes of decision problems

- Certain decision structures appear again and again.
- Being able to recognize these classes of decision problems helps structure the problem and identify analytical tools.

6 “Classes” of Decisions**

1) Prediction Problems
2) Multiple Objective problems
3) Portfolio Problems
4) Risk Problems
5) Information Problems
6) Dynamic Problems

**THESE WILL NOT BE COVERED IN DEPTH TODAY but see (Runge et al. 2020 textbook)



6. Revise as needed

- Problem framing is one of the most difficult steps.

- The problem definition is likely to change as you proceed with development

- Adopt iterative/ **rapid prototyping** as an approach to development of a decision analysis

  - “Good enough for now, safe enough to try”

Problem framing: decision statement

- About a paragraph long (or sometimes a very long, run-on sentence)
- Captures the essential outline of the problem
- Helps participants focus
- Reframes a vague task as a decision to be solved

Problem framing: decision statement questions

Answering the following questions:

- **Decision Maker** – Who will make the decision?
- **Trigger** – Why does a decision need to be made? Why does it matter?
- **Action** – What is the decision? What action needs to be taken?
- **Constraints** – legal, financial, political? Are these perceived or real?
- **Frequency and Timing** – Periodicity of decision. Are other decisions linked to this one?
- **Scope** – How broad or complicated is the decision?
- **'Class' or Type of Decision Problem** – Which of the six classes does the decision fall into? What are the impediments to making the decision?

The equation for problem framing

Using the following template:

"Decision Maker (**D**) is trying to do **X** to achieve **Y** over time **Z** and in place **W** considering **B**."

where,

D = the Decision maker(s)

X = the type(s) of action that needs to be taken

Y = the ultimate goal(s) to be achieved by "X"

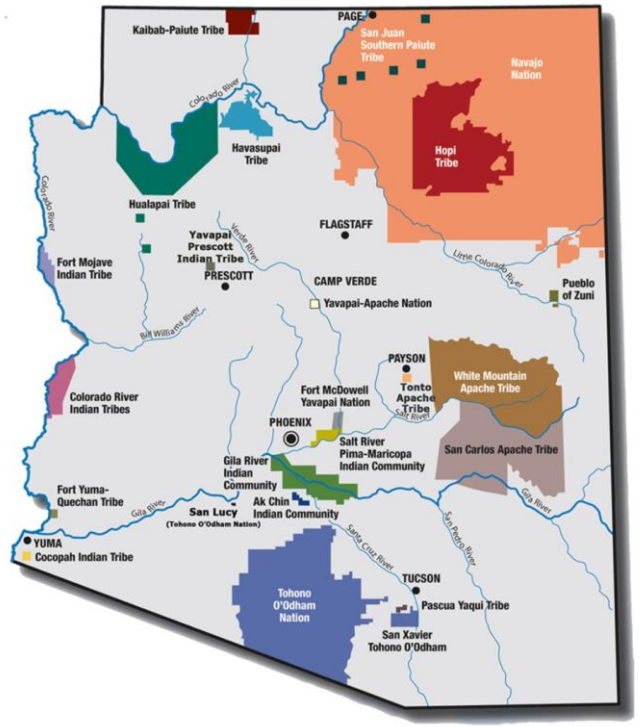
Z = the temporal extent of the decision problem.

W = the spatial extent of the decision problem

B = potential constraints (legal, financial, and political) and important uncertainties (scientific or other)

Case study: (Runge et al. 2011)

- See attachment of case study description (CaseStudyDescription.pdf)



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Exercise: Generate a decision statement

Hint: remember the equation…

"Decision Maker (D) is trying to do X to achieve Y over time Z and in place W considering B."

Problem framing is hard!

- It's worth taking the time to get it right…

"I used to think that decision analysis helped solve decision problems, but now I include figuring out what the decision problem is as a key, and perhaps the most important, part of decision analysis."

~Ralph Keeney

"Never enough time to do it right… always enough time to do it over"

~Anonymous