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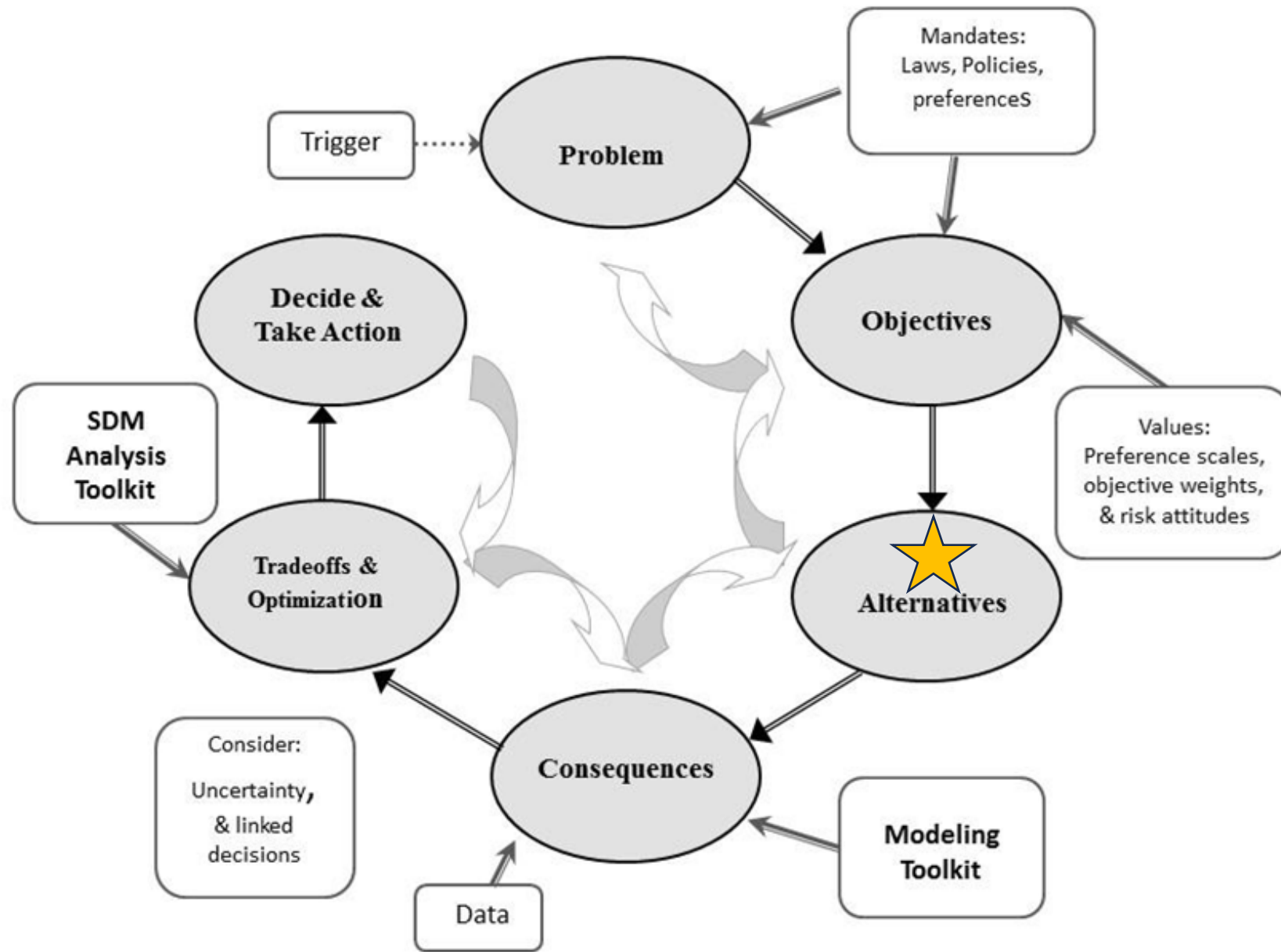
Alternatives

Module 4:

Brielle K Thompson & Michael E Colvin

Workshop: An overview of Structured Decision Making for natural resources,
Midwest Fish and Wildlife Conference 2025, St. Louis, MO

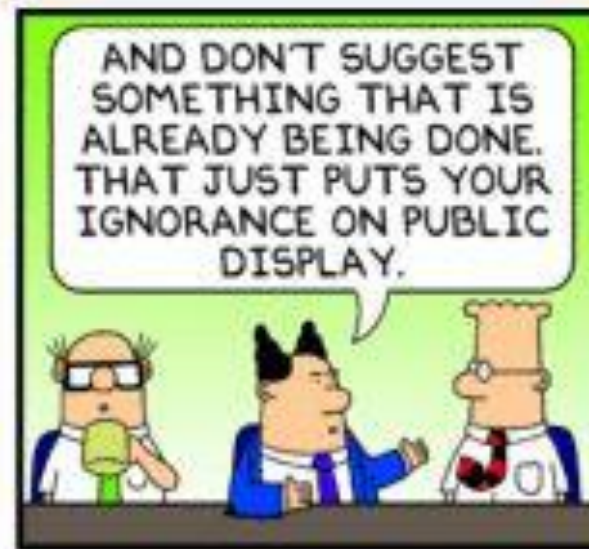
Modified from: Fundamentals of Structured Decision Making TWS Conference Workshop 2023 & an
Overview of Structured Decision-Making Washington Department of Fish and Wildlife 2022-2023



Source: Jean Fitts Cochrane



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Importance of good alternatives

- A good alternative is one that provides a good chance of achieving objectives
- Good alternatives are:
 - Values-focused
 - Fully specified
 - Internally coherent
 - Distinct



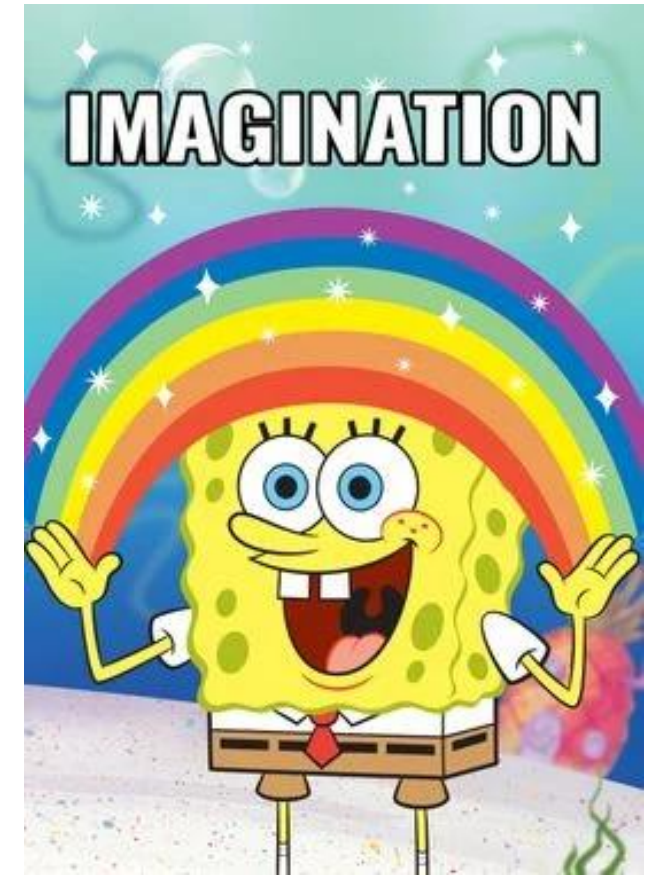
Good alternatives require

- **Imagination**

- Beware of the tendency to limit our ideas to what are thought to be 'practical' alternatives

- **Creativity**

- Think of the widest range of possible alternatives
- Don't let preconceived ideas or constraints be limiting



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Challenges to identifying alternatives

- Falling prey to cognitive biases (e.g., status quo bias)
- Accepting real or perceived constraints
- Evaluating alternatives prematurely

DON'T
STICK
TO THE
STATUS
QUO

Tenor

Suggestions to identify alternatives

1. Focus on fundamental objectives and address conflicting objectives
2. Challenge constraints
3. Visualize
4. Create groups of alternatives
5. Revisit objectives

1. Focus on fundamental objectives and address conflicting objectives

- Create alternatives to achieve the best possible consequences for each fundamental objective, one at a time.
- Then, create hybrid alternatives to satisfy more than one objective. Include conflicting objectives.

1. Focus on fundamental objectives and address conflicting objectives

Example: Rare Snakes

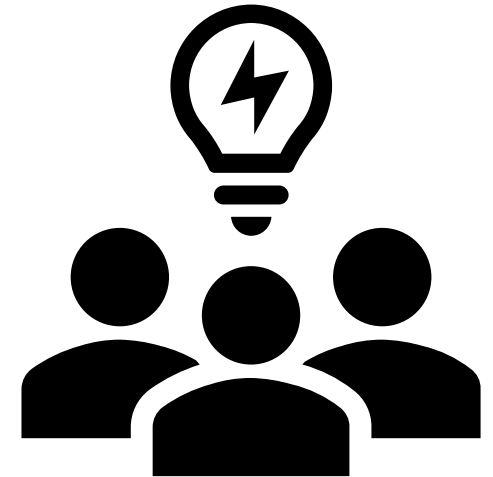
- Problem/concern:
 - Many rare snakes are killed during capture
- Objectives:
 - Minimize capture mortality
 - Maximize pet industry
- Alternatives:
 - Status quo – do nothing
 - Ban sale of snakes
 - Others?



2. Challenge constraints

Tips:

- Distinguish real and perceived constraints
- Don't anchor on initial set of options
- Don't evaluate – just develop
- Give people time and permission to be creative



2. Challenge constraints

Example: Bird translocation

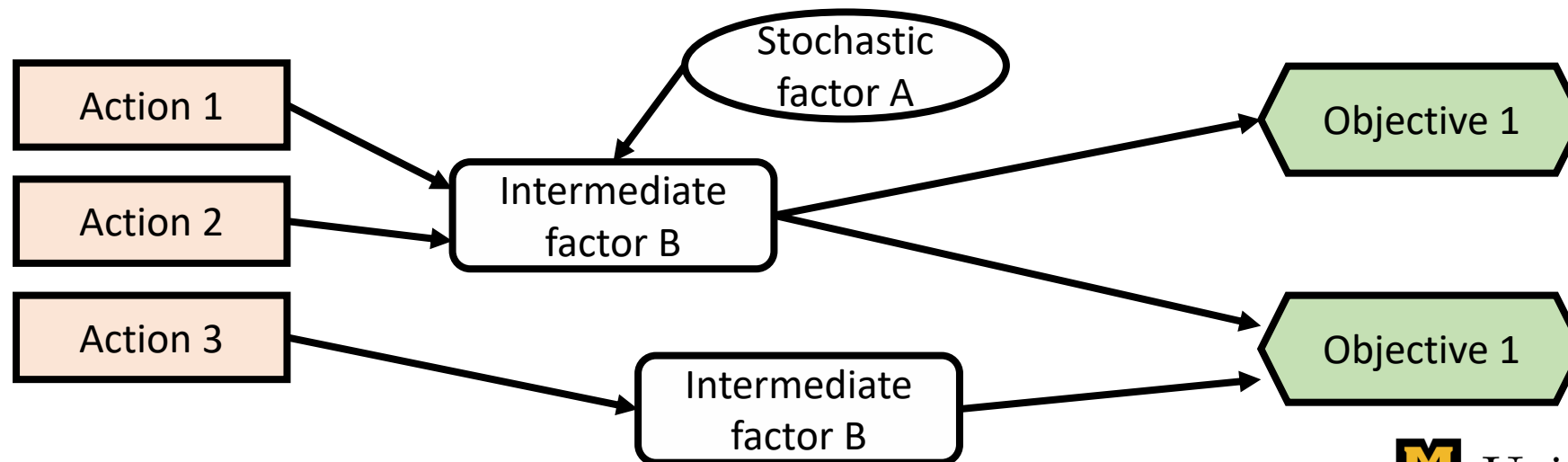
Which of several islands should an endangered bird be translocated?

- Perceived constraint: Introduced predators on Island A make it unsuitable
- What are some creative alternatives?



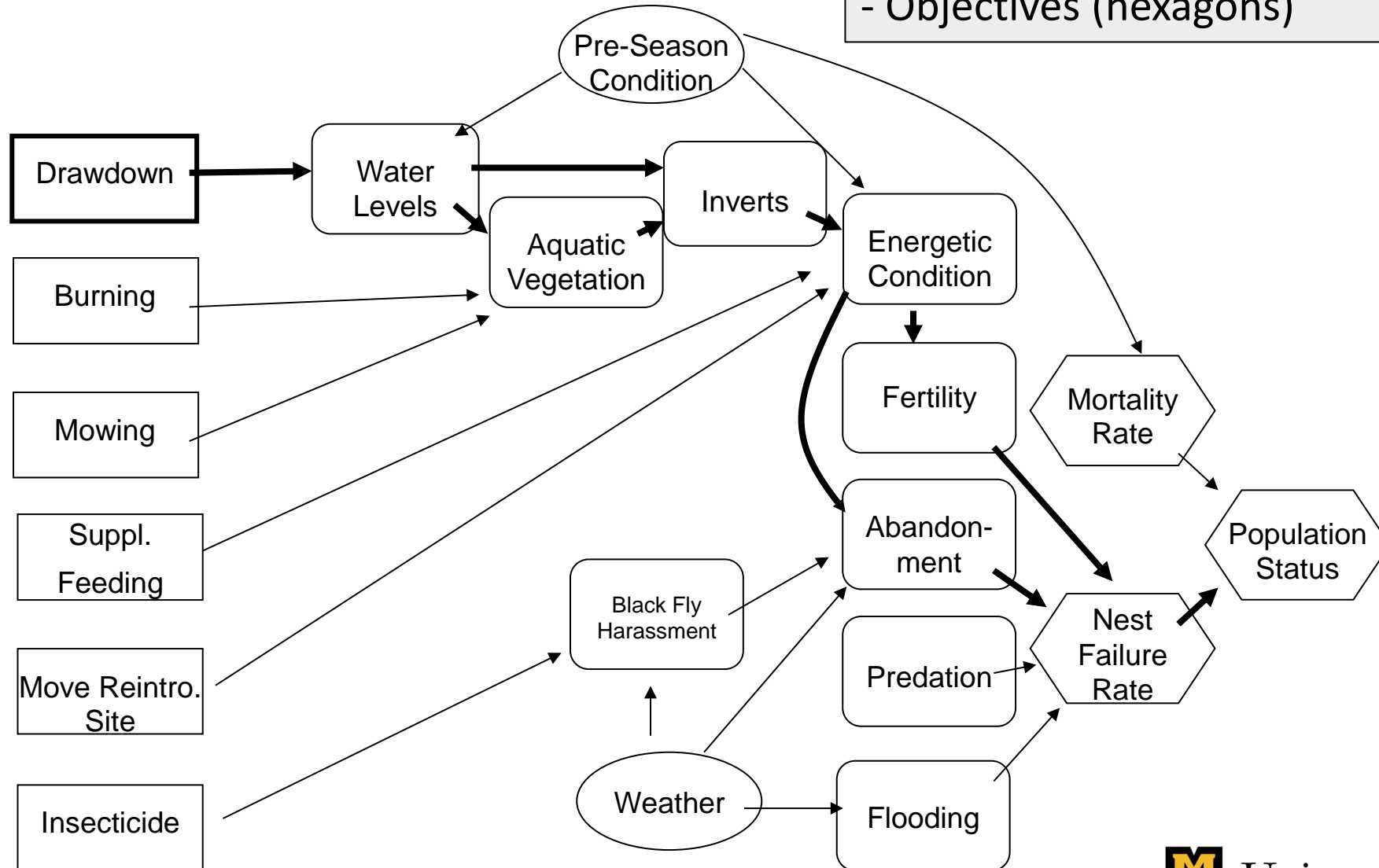
3. Visualize

- Use influence diagrams to sketch key relationships in the system
- Visualizing relationships can help generate new ideas
- Influence diagrams can then serve a role in the next step (Consequences) as conceptual models
- Influence diagram:



Example: Crane Nest Failure

- Actions (rectangles)
- Stochastic factors (ovals)
- Intermediate factors (rounded rectangles)
- Objectives (hexagons)



4. Create groups of alternatives

- Groups of alternatives includes portfolios and strategies

JARGON ALERT!!

- **Alternatives** = general term for complete, comparable solutions to a decision problem
- **Actions** = alternatives formed by individual options
- **Strategies and Portfolios** = alternatives formed by combinations of actions

4a. Creating portfolios

- Portfolio: a combination of **like** elements arranged in a set
- The elements themselves can be actions
 - e.g., set of research projects, funding allocation
- The combination now represents a single alternative
 - e.g., stock portfolio
- Constraints often limit number of possible portfolios
 - e.g., total budget for allocation across projects

4a. Creating portfolios

Example: portfolios for invasive species removal

Objectives: maximize acres restored and minimize cost

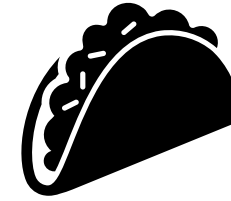
Target sp.	Costs (\$K)	Acres restored
A	15	14
B	7	18
C	3	7
D	12	32
A+B	(15+7 ≠) 18	(14+18 ≠) 29
...
B+C+D	20	40
A+B+C+D	30	52



4b. Creating strategies

- Strategy: alternative combining multiple **unlike** elements:
- Strategy table:
 - 1) Group similar actions into themes (columns)
 - 2) Create distinct strategies that represent different approaches or emphasize different objectives
 - 3) Select the actions in each column/theme that fit each strategy
 - 4) Combine selected elements into an alternative
 - 5) Repeat steps 2-4 for each strategy

4b. Creating strategies

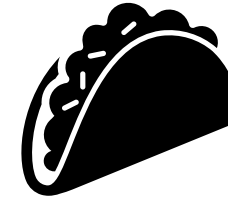


- Strategy table: Chipotle menu

<i>Themes of ingredients:</i>	<i>Meat</i>	<i>Rice, Beans, and Veggies</i>	<i>Top It Off</i>
	None	Brown rice	None
	Steak	White rice	Salsa (Mild)
	Carnitas	Black beans	Salsa (Hot)
	Chicken	Pinto beans	Sour cream
	Barbacoa	Fajita veggies	Tomatillo
			Chili-Corn salsa
			Lettuce
			Guacamole
			Cheese



4b. Creating strategies

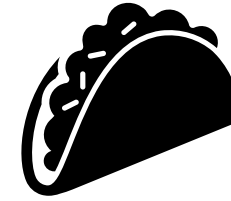


- Strategy table: Chipotle menu

<i>Themes of ingredients:</i>	<i>Meat</i>	<i>Rice, Beans, and Veggies</i>	<i>Top It Off</i>
Strategies (aka burritos): <u>"Brielle's favorite"</u>	None Steak Carnitas <u>Chicken</u> Barbacoa	<u>Brown rice</u> White rice <u>Black beans</u> Pinto beans <u>Fajita veggies</u>	None <u>Salsa (Mild)</u> Salsa (Hot) Sour cream Tomatillo Chili-Corn salsa <u>Lettuce</u> <u>Guacamole</u> <u>Cheese</u>



4b. Creating strategies

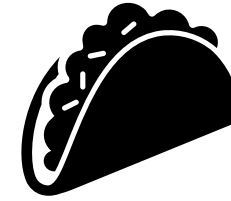


- Strategy table: Chipotle menu

<i>Themes of ingredients:</i>	<i>Meat</i>	<i>Rice, Beans, and Veggies</i>	<i>Top It Off</i>
Strategies (aka burritos): <u>"The Barnyard"</u>	None <u>Steak</u> <u>Carnitas</u> <u>Chicken</u> Barbacoa	Brown rice <u>White rice</u> Black beans <u>Pinto beans</u> Fajita veggies	None Salsa (Mild) <u>Salsa (Hot)</u> Sour cream Tomatillo Chili-Corn salsa Lettuce Guacamole Cheese



4b. Creating strategies

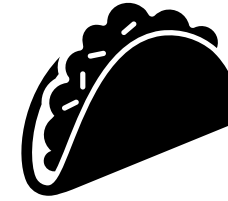


- Strategy table: Chipotle menu

<i>Themes of ingredients:</i>	<i>Meat</i>	<i>Rice, Beans, and Veggies</i>	<i>Top It Off</i>
Strategies (aka burritos): <u>"The Veggie"</u>	<u>None</u> Steak Carnitas Chicken Barbacoa	<u>Brown rice</u> White rice <u>Black beans</u> <u>Pinto beans</u> <u>Fajita veggies</u>	None <u>Salsa (Mild)</u> Salsa (Hot) <u>Sour cream</u> Tomatillo <u>Chili-Corn salsa</u> <u>Lettuce</u> <u>Guacamole</u> <u>Cheese</u>



4b. Creating strategies

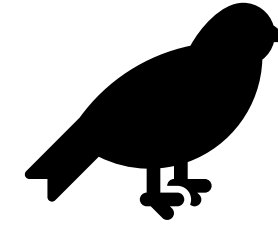


- Final strategy table: Chipotle menu

Themes→ ↓ Strategies	<i>Meat</i>	<i>Rice, Beans, and Veggies</i>	<i>Top It Off</i>
Brielle's Favorite	Chicken	Brown rice, Black beans, Veggies	Salsa (mild), Chili-corn, Lettuce, Guacamole, Cheese
The Barnyard	Steak, Carnitas, Chicken	White rice, Pinto beans	Salsa (hot), Cheese
The Veggie	None	Brown rice, Black beans, Pinto beans, Veggies	Salsa (mild), sour cream Chili-corn, Lettuce, Guacamole, Cheese



4b. Creating strategies

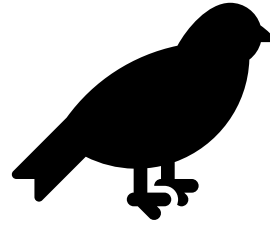


- Example: Threatened species recovery

<i>Themes:</i>	<i>Habitat Protection</i>	<i>Predator Control</i>	<i>Enhance Population</i>	<i>Alternative Economic Activity</i>
	Status Quo	Status Quo Harvest (5%)	None	None
	Ban logging in critical habitat	Increase harvest rate of predator to 10%	Maternity Pens	Promote sustainable harvest of species through lottery
	Develop linkage corridors	Increase harvest rate of predator to 50%	Captive Breeding Translocate	Promote non-consumptive recreation



4b. Creating strategies



- Final strategy table for threatened species recovery,

Themes→ ↓ Strategies	<i>Habitat Protection</i>	<i>Predator Control</i>	<i>Enhance Population</i>	<i>Alternative Economic Activity</i>
Status Quo	Status Quo	Status Quo Harvest (5%)	None	None
“On the Go” (Dispersal)	Develop linkage corridors	Increase harvest rate of BNEG to 10%	Translocate	Promote non-consumptive recreation
Increase Pop to Carrying Cap	Ban logging in critical habitat	Increase harvest rate of BNEG to 50%	Captive Breeding	Promote non-consumptive recreation



5. Revisit objectives

- Once an initial set of alternatives you may want to:
 - Be sure you've properly separated fundamental from means objectives
 - Clarify the statement of objectives
 - Identify if additional objectives exist

General tips:

- SDM is iterative, don't stop looking for alternatives
- Create first, evaluate later
- Consider alternatives that ...
 - Are an ongoing process
 - Gather more information
- Treat 'unique' alternatives as real and subject to the same evaluation as other alternatives

Case study: (Runge et al. 2011)

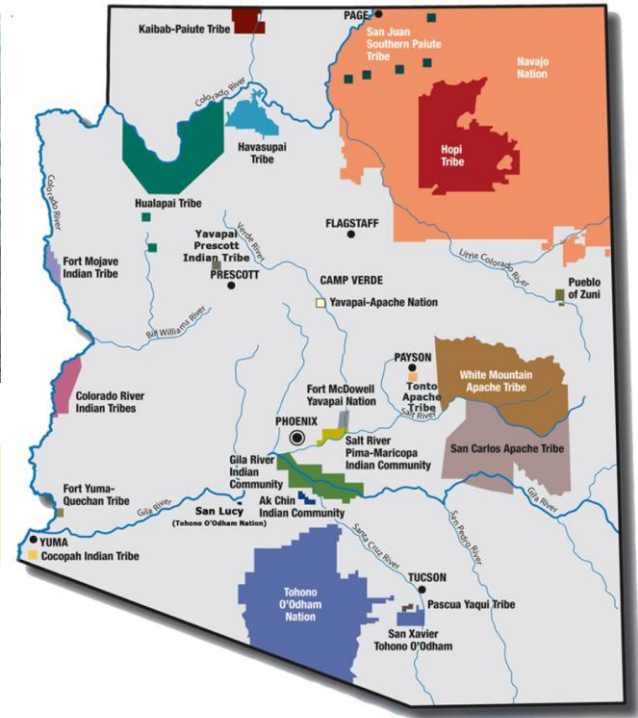
- See attachment of case study description (CaseStudyDescription.pdf)



Exercise: Generate Alternatives

Hint:

- Revisit objectives
- Be creative
- Consider whether alternatives are portfolios or strategies



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