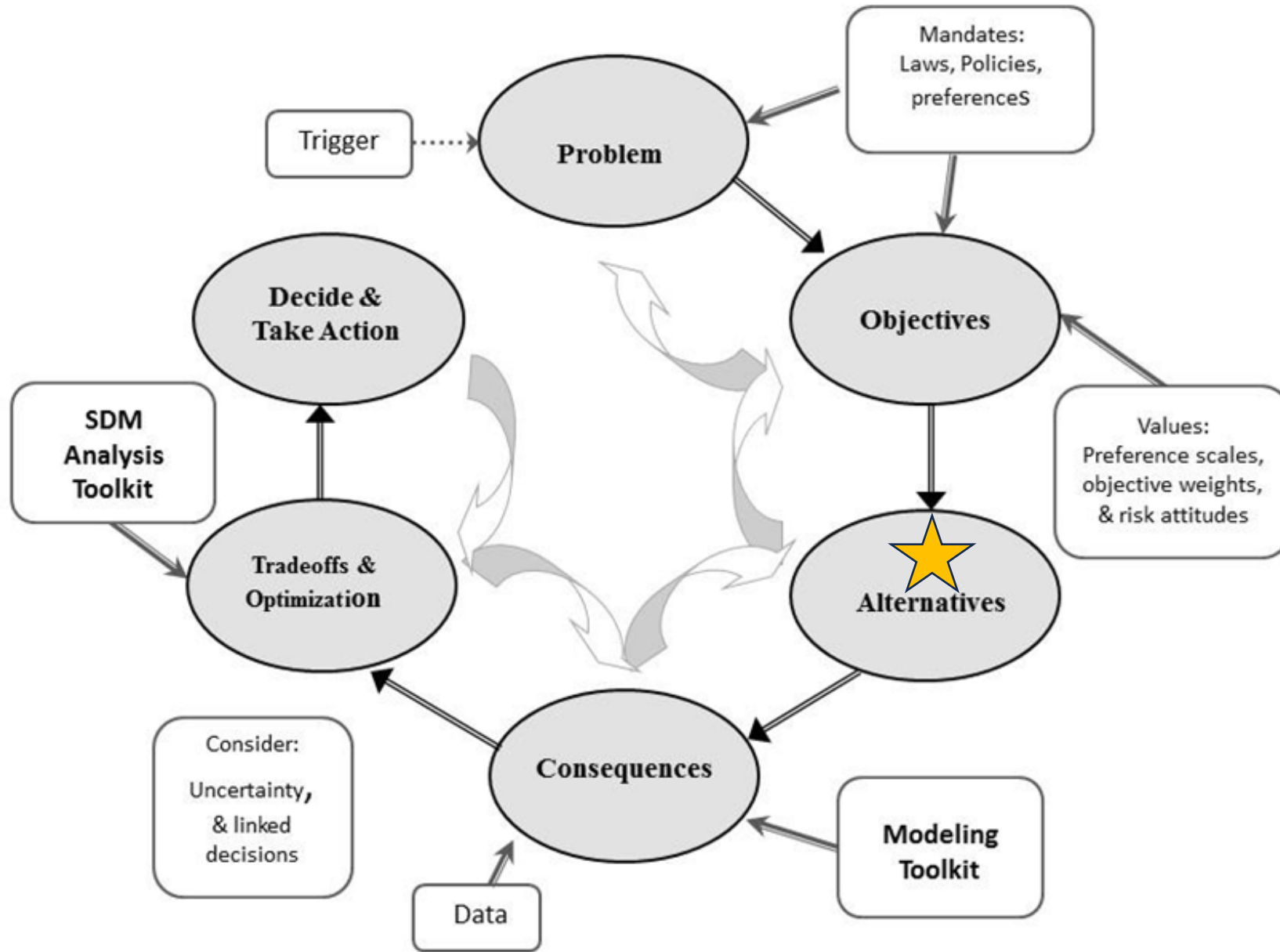# Alternatives

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
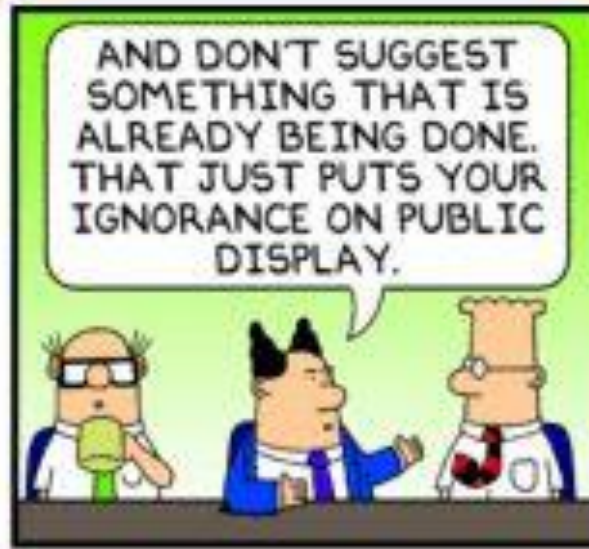
Source: Jean Fitts Cochrane
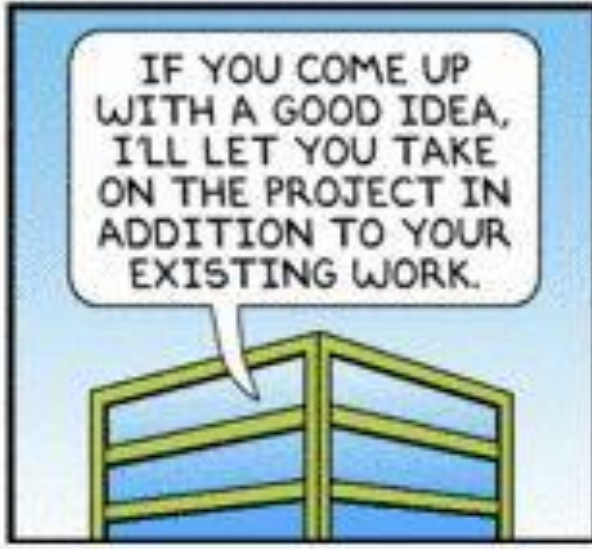
Importance of good alternatives

- A good alternative is one that provides a good chance of achieving objectives

- Good alternatives are:
  - Values-focused
  - Fully specified
  - Internally coherent
  - Distinct

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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
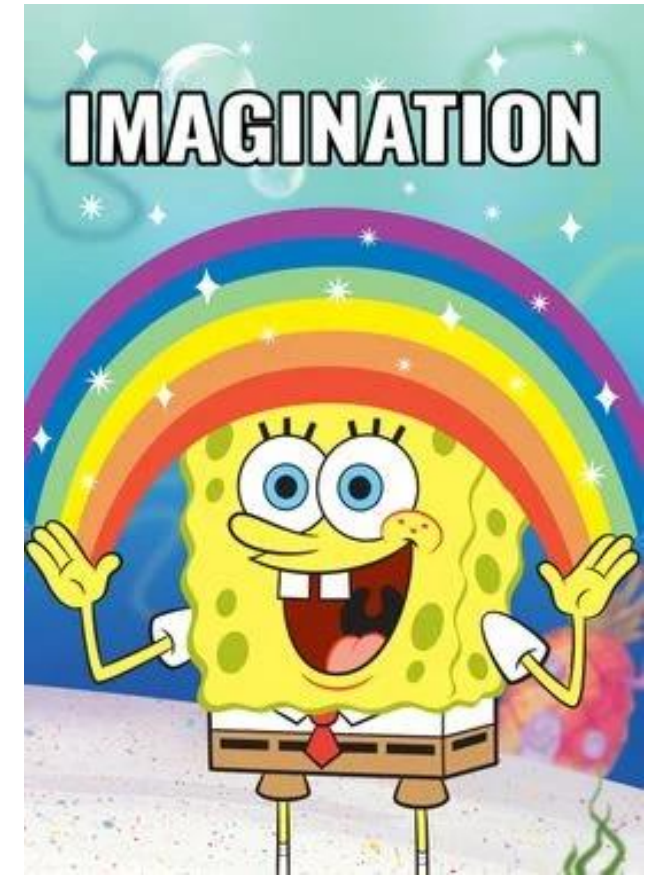
Displate

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?

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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
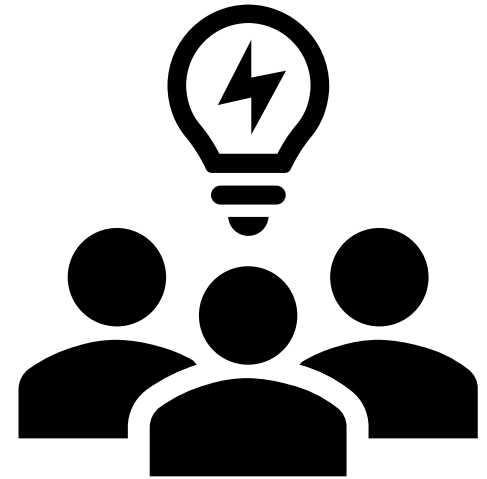
2. Challenge constraints

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 (**C**onsequences) as conceptual models
- Influence diagram:
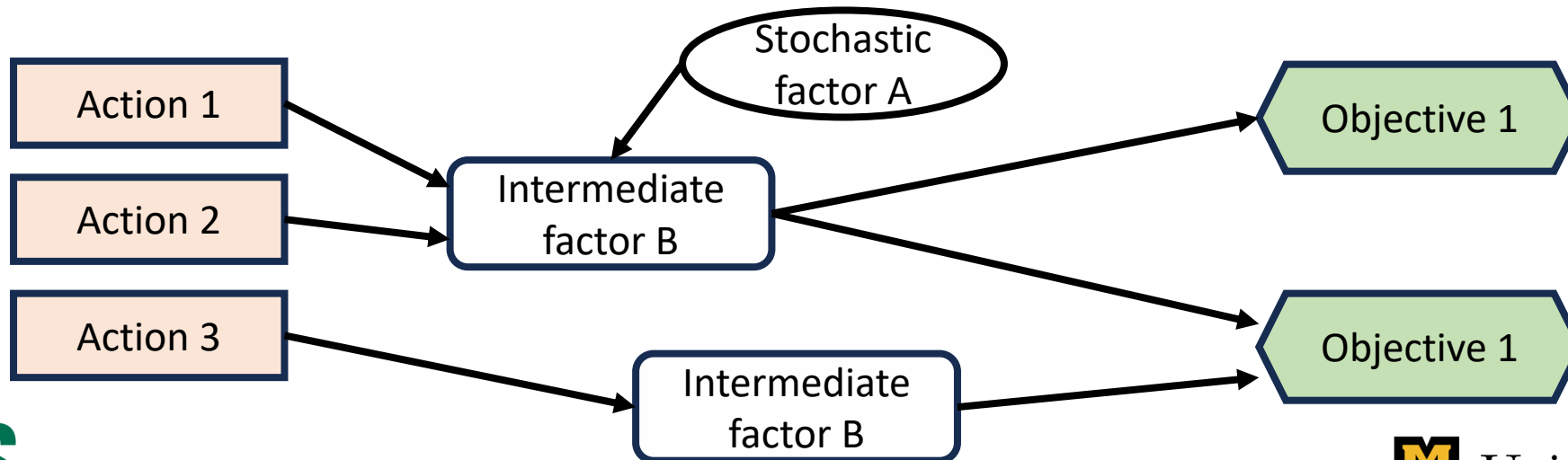
Example: Crane Nest Failure

- Actions (rectangles)
- Stochastic factors (ovals)
- Intermediate factors (rounded rectangles)
- Objectives (hexagons)
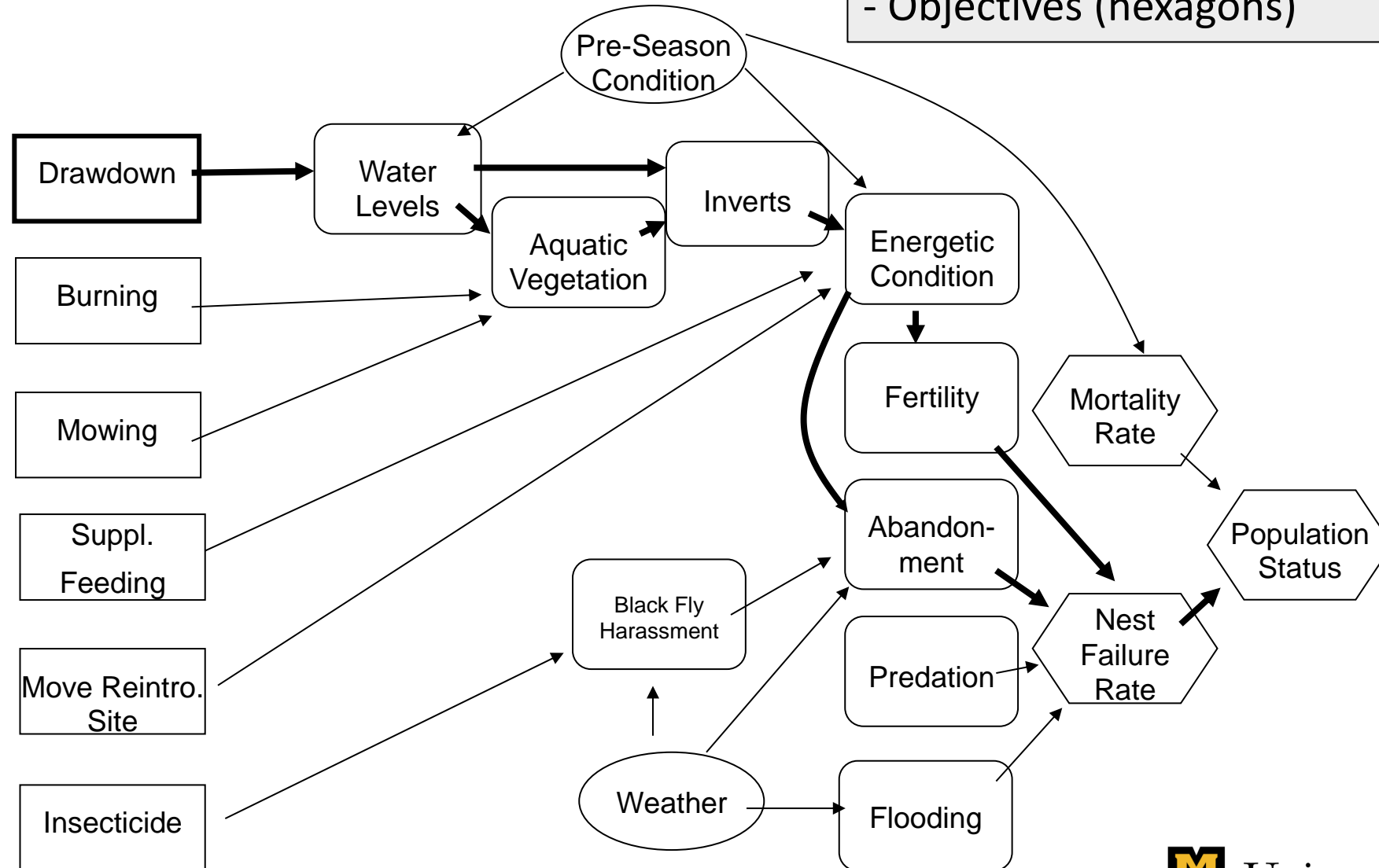
4. Create groups of alternatives

- Groups of alternatives includes portfolios and strategies

JARGON ALLERT!!

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

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4a. Creating <u>portfolios</u>

- 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 <u>portfolios</u>

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
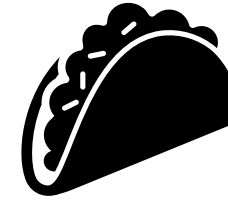 5) Repeat steps 2-4 for each strategy

4b. Creating <u>strategies</u>
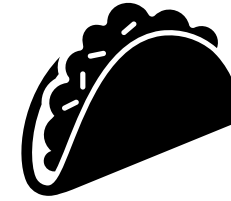
- Strategy table: Chipotle menu

Themes of ingredients:	Meat	Rice, Beans, and Veggies	Top It Off
	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 <u>strategies</u>

- Strategy table: Chipotle menu

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

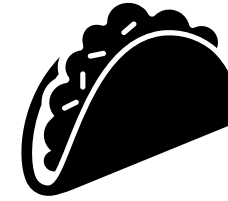# 4b. Creating <u>strategies</u>

- Strategy table: Chipotle menu

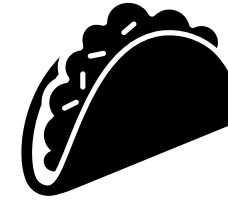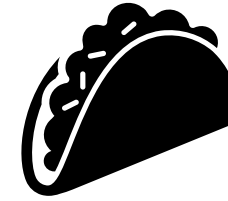| Themes of ingredients:	Meat	Rice, Beans, and Veggies	Top It Off
Strategies (aka burritos): **"The Barnyard"**	None	Brown rice	None
	Steak	**White rice**	Salsa (Mild)
	Carnitas	Black beans	**Salsa (Hot)**
	Chicken	**Pinto beans**	Sour cream
	Barbacoa	Fajita veggies	Tomatillo
			Chili-Corn salsa
			Lettuce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

4b. Creating <u>strategies</u>

- Strategy table: Chipotle menu

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

# 4b. Creating <u>strategies</u>

- **Final strategy table**: Chipotle menu

| Themes→ ↓ Strategies	Meat	Rice, Beans, and Veggies	Top It Off
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 <u>strategies</u>
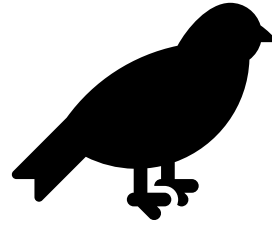
- Example: Threatened species recovery

Themes:	Habitat Protection	Predator Control	Enhance Population	Alternative Economic Activity
	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 <u>strategies</u>
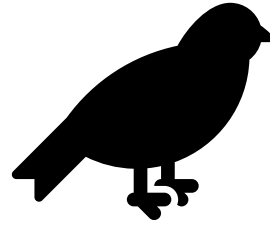
- **Final strategy table** for threatened species recovery,

Themes→ ↓ Strategies	*Habitat Protection*	*Predator Control*	*Enhance Population*	*Alternative Economic Activity*
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
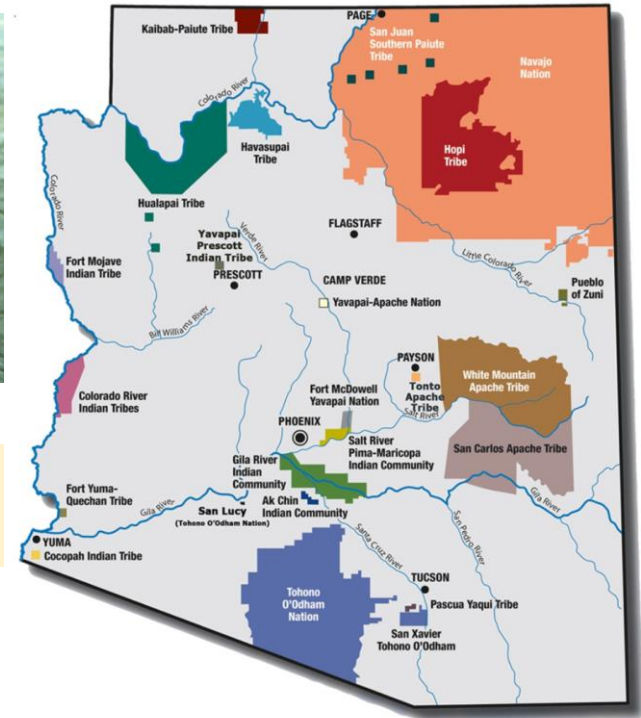
Case study: (Runge et al. 2011)

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

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Exercise: Generate Alternatives

Hint:

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

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