

**Building and Refining Scenarios  
Part 4c – Developing Detailed Scenarios**

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## **Phases in Scenario Planning**

- I. Preparing for the process
- II. Building and refining scenarios**
- III. Using scenarios to evaluate, prioritize, and implement management actions

## Building Scenarios: Steps

1. Refine scope and focus question
2. Identify key external drivers
3. Assess and prioritize critical drivers
4. Explore and select scenario logics
5. Develop outlines of time evolution
6. Develop scenario narratives
7. Evaluate scenarios

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- 5. Develop outlines of time evolution**
  - Beginning, middle, end
  - Legacy components ('pre-determined')
  - Surprise

## Comparison of 3 Scenarios for JOTR

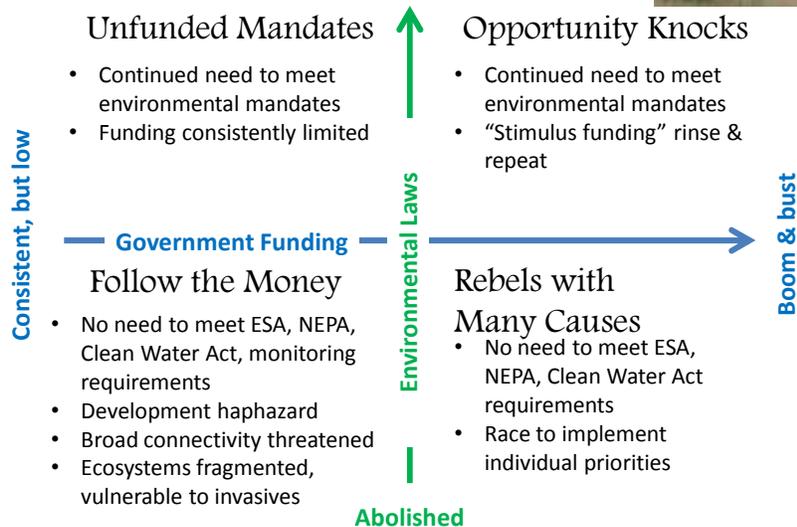
	Summer Soaker	When it Rains it Pours	Dune
IPCC Emission Scenario	B1	A1B	A1F
Rate of CO <sub>2</sub> emissions	Slowest rate of increase	Increases moderately	Steepest rate of increase
Temperature	Increases	Increases	Increases
Precipitation	Decreases in winter and spring; <b>Increases in summer</b> ; little or no change overall	<b>Increase in extremes</b> (drought in summer, storms in winter); overall decrease	<b>Decreases overall</b> and seasonally
Vegetation: non-native annual grasses	Decrease in current community; potential new suite of invasives emerge	<b>Increase</b>	Increase initially; decrease over time
Vegetation: native grasses	<b>Increase</b>	<b>Decrease</b>	Decrease
Vegetation: Joshua trees and other woody veg	Decrease and move to higher elevations	Decrease	Decrease
Fire regime	Slightly more intense, <b>mosaic</b> pattern	<b>More intense</b> , mainly after wet years	More intense initially, <b>decrease over time</b> , as vegetation decreases
Native animal species	Decrease in Mojave species, increase in Sonoran species	Decrease	Decrease

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## Cienegas Upland System



Current laws continue



Unfunded Mandates [CONSISTENT, LOW FUNDING – CURRENT LAWS ] / Habooby Trap [HI SUMMER WINDS – DRY WINTER]



- **Climate factors:** Long-term drying and wind erosion.
- **2020:** Increased fire risk, grass mortality. Heterogeneous decrease in grass cover.
- **2050:** Conversion to shrub/scrub. Less connectivity, fuel load and fire risk. But, limited ability to recover or maintain ground cover.
- **2100:** Loss of soil productivity, large bare patches, scoured landscape
- **Challenge:** How to transition type conversion with minimal soil exposure, no matter the species, while meeting ESA obligations?

Follow the Money [CONSISTENT LOW FUNDING – LAWS ABOLISHED]/Tucson Good Ol' Days [EARLY MONSOON – DECREASE TROPICAL CYCLONES]



- **Climate factors:** precipitation favorable. Still, warming, seasonal shifts.
- **2020:** Regulation removal favors “land grabs”, speculation, economic priorities. Agriculture & exurban development increase haphazardly, facilitating buffleggrass spread.
- **2050:** groundwater stress due to development, mining projects. Recreational demands up. Buffleggrass dominant upland species.
- **2100:** Many threatened/endangered species gone.
- **Challenge:** How to ensure expanse of native vegetation under development pressures, absent regulations, even under a productive climate?

**Opportunity Knocks** [BOOM & BUST FUNDING – CURRENT LAWS]/**No Analog** [LATE MONSOON – INCREASE TROPICAL CYCLONES]



- **Climate factors:** severe pre-monsoon stress, extreme precipitation events
- **2020:** warmer drought produces grassland mortality, stress on ranching, funding infusions (similar to 1930s programs)
- **2050:** conversion to annual grasslands, lower diversity, pressure on landowners/ranchers, but without federal support. No funds to replace destroyed flood control structures.
- **2100:** continuous disturbance, erosion. Emphasis on protecting human structures and communities.
- **Challenge:** How can we use surge funding effectively to deal with continuous disruption and disturbance, including extreme events?

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### 6. Develop scenario narratives

- All scenarios have “good” and “bad” parts
- Characters
- Plot lines: Winners/losers, Crisis/response, Generations (new cultures), Perpetual transition, others...



**Images can be effective for story telling**



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## Criteria for Vetting Scenarios

### What is a good scenario?

- Decision making power: relevant and challenging
- Plausible, with internal logical consistency
- Divergent
- Memorable



Climate Complacency: Is Anyone Out There?



Colorado Creeps North: Wheel Spinning



Race to Refuge: Big Problems, Big Solutions

Table 4. Workshop participant (n=25) rating of how well each scenario met the criteria (1=not at all, 2=somewhat, 3=mostly, 4=very well). Criteria are listed in order of their priority.

Evaluation Criteria	Colorado Creeps North/Wheel Spinning	Climate Complacency/Is Anyone Out There?	Race to Refuge/Big Problems, Big Solutions
Relevant	3.5	3.6	3.1
Creative	3.3	3.3	3.2
Legitimate	3.1	3.1	2.6
Credible	3.3	3.2	2.3

## Develop scenario narratives

**Objective:** Create a compelling story for each scenario

- Important elements of a compelling story: actors, plots, time evolution, connect to values and focus
- Describe the management challenge, but not the response

### Activity 7

- Newspapers and Novels