Scenario-based planning /climate risk narratives

Robert L. Wilby
Professor of Hydroclimatic Modelling
Loughborough University, UK
Tip 1: Evaluate climate and context

Sustainable and Community-Engaged Education: Campuses prioritize environmental sustainability and serve as hubs for sustainable research and innovation.

Skills-Based and Lifelong Learning: Universities shift from degree-based education to micro-credentials, digital badges, and continuous education programs are prominent.

Technologically Integrated Education: Students engage in immersive virtual environments, collaborate with peers globally, and receive personalized instruction from avatar professors.

Decentralized and Globalized Education: Students access diverse courses taught by AI lecturers and study at multiple institutions simultaneously.

See: Wilby and Smith (2023)
Tip 2: Start with people not scenarios

An adaptation option appraisal framework that begins with dialogue about the adaptation options and goals before developing narrative scenarios. Source: Wilby (2022)

Adaptation option: Shoshone Call Relaxation Agreement Priority water right of Xcel Energy relaxes from 40 m³/s to 20 m³/s under specified drought conditions to allow out-of-priority filling of upstream public water supply reservoirs.
Tip 3: Stress test adaptation options

### Narratives

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Probability (P)</th>
<th>Temperature Change (°C)</th>
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</thead>
<tbody>
<tr>
<td><strong>Moderate warming (WM)</strong></td>
<td>P-0%</td>
<td>T+2°C</td>
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<tr>
<td><strong>Dust on snow (DS)</strong></td>
<td>P-10%</td>
<td>T+1°C</td>
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<tr>
<td><strong>Vegetative change (VC)</strong></td>
<td>P-20%</td>
<td>T+2°C</td>
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- **Moderate warming (WM)**: Seasonal precipitation totals are unchanged. Higher temperatures/more heatwaves change the volume and timing of spring/summer runoff.
- **Dust on snow (DS)**: Modest warming and drying increases the annual likelihood of dust on snow events by D%. No other effects.
- **Vegetative change (VC)**: Fewer cold winters reduce mortality amongst infecting beetle populations. Warmer, longer dry conditions stress forests increasing their susceptibility to insect attack. T% of forest dies above reservoirs A, B and C and is permanently replaced by low scrub.

System-wide increase in stored water in reservoirs in the Upper Colorado River Basin. The increase in total storage (%) between weeks 11 to 20 is shown for each narrative, with the Shoshone Call Relaxation Agreement. Under the CNTL scenario, relaxation occurs only 2 of 30 years. Note 4% more water equates to the annual domestic water use of ~300,000 citizens of Denver. Source: [Yates et al. (2015)](https://doi.org/10.1002/wat2.1217)
Empirical estimates of the 500-year drought from an UNSEEN archive of 3618 SEAS5 summers could be used to stress-test resilience of water supply systems. See: Kelder et al. (2022)