

COMMENT



Response to Reynolds et al. (2024), Accurately Characterizing Climate Change Scenario Planning in the U.S. National Park Service

Laurie Yung^a, Daniel J. Murphy^b, Daniel R. Williams^c, Carina Wyborn^d, and Courtney Schultz^e

^aDepartment of Society & Conservation, College of Forestry & Conservation, University of Montana, Missoula, MT, USA; ^bDepartment of Anthropology & School for Environment and Sustainability, University of Cincinnati, Cincinnati, OH, USA; ^cRocky Mountain Research Station, United States Forest Service, Ft. Collins, CO, USA; ^dInstitute for Water Futures, Fenner School of Environment and Society, Australian National University, Canberra, Australia; ^eForest and Rangeland Stewardship, Warner College of Natural Resources, Colorado State University, Ft. Collins, CO, USA

ABSTRACT

A response to comment by Reynolds et al. (2024) Accurately Characterizing Climate Change Scenario Planning in the U.S. National Park Service.

ARTICLE HISTORY

Received 9 June 2024
Accepted 21 October 2024

KEYWORDS

Climate change
adaptation; scenario
planning; governance;
futuring; public lands

We greatly appreciate Reynolds et al. (2024), *Accurately Characterizing Climate Change Scenario Planning in the U.S. National Park Service*, a comment on Murphy et al. (2025) *Understanding Perceptions of Climate Change Scenario Planning in United States Public Land Management Agencies*. In this comment, Reynolds et al. (2024) outline the incredible resources that the National Park Service (NPS) and United States Geologic Survey (USGS) have developed for agency staff and other land managers interested in utilizing scenario planning to better adapt to climate change. We agree that these agencies have provided much-needed leadership and foresight in this arena, which has greatly benefited public land managers. The NPS was an early adopter of scenario planning (see Cole and Yung 2010 for a case study of early NPS scenario planning in Joshua Tree National Park). In Murphy et al. (2025), we recognize that “the National Park Service Climate Change Response Program has created tools and guidance as well as built capacity to support park-specific scenario planning processes.”

In their comment, Reynolds et al. (2024) helpfully point out that the title of our article, *Understanding Perceptions of Climate Change Scenario Planning in United States Public Land Management Agencies*, does not fully capture the way in which scenario planning has been adopted “unevenly” across the federal land management agencies. In the body of the article, we took the opportunity to describe this “unevenness,” explaining that “there has also been an uneven uptake of scenario-based processes

CONTACT Daniel J. Murphy  murphdl@ucmail.uc.edu  Department of Anthropology & School for Environment and Sustainability, University of Cincinnati, Cincinnati, OH, USA.

© 2025 Taylor & Francis Group, LLC

across public land management, particularly at the US federal level, and a preference in some resource management arenas for more traditional forecasting tools.” We outlined some of the differences between the agencies in more detail in this passage:

For instance, although the National Park Service has embraced the use of scenarios (National Park Service 2021) and the USDA Forest Service Resources Planning Act Assessment of 2020 provides a number of scenario tools (Joyce and Coulson 2020), there is a limited (though growing) number of published public lands cases for managers to draw on as models for planning and decision-making (for some examples, see Murphy et al. 2016; Murphy et al. 2017; Glick, Stein, and Edelson 2011; Clifford et al. 2020; Cross et al. 2012; Wyborn et al. 2015; Chapin et al. 2010). In the United States National Park Service (NPS) scenario processes have been institutionalized through the Climate Change Response Program. However, agencies like the US Forest Service (FS) have not exhibited consistent or widespread use of these techniques, despite investment in valuable research clusters like the USFS Strategic Foresight Group. Instead, planners have increasingly relied on climate change vulnerability assessments and the Climate Change Response Framework to integrate climate vulnerability information and adaptation actions into planning processes (Timberlake and Schultz 2019; Ontl et al. 2020).

Importantly, Murphy et al. (2025) describes research focused on understanding “*perceptions* of the utility of scenario processes in public land planning” (emphasis added). Our goal was not to “accurately” describe scenario planning or existing agency resources and guidelines, but rather to understand the perceptions of agency staff and partners who had participated in scenario planning processes. Schuurman et al. (2022) and Reynolds et al. (2023), both cited in the comment by Reynolds et al. (2024), provide valuable descriptions of how scenario planning has been implemented in National Parks and “testimonials” from some of the managers involved in these projects. These examples contain useful insights and help managers envision how scenario planning works in real-world contexts. However, Schuurman et al. (2022) and Reynolds et al. (2023) differ in important ways from rigorous social science research designed to understand perceptions across an interview sample (note that Murphy et al. (2025) utilized in-depth semi-structured interviews, not “surveys” as described by Reynolds et al. (2024) – this has important implications for generalizability). Our interviewees were guaranteed confidentiality, asked a similar set of questions to enable comparability across the sample, and purposively selected based on criteria related to study goals, and our interview data was systematically analyzed using protocols common in qualitative social science.

Given our focus on perceptions and our use of social science methods, it is not surprising that the perceptions of our interviewees differ somewhat from Reynolds et al. (2024), who are much more familiar with agency resources, guidelines, and management case studies. In Murphy et al. (2025) we highlight the work of other researchers who have noted a similar misalignment with regard to scenario planning: “This broader definition of scenarios remains, as Bengston (2019) point out, largely “invisible” to most natural resource scientists and managers despite widespread use in certain contexts, including the National Park Service Climate Change Response Program (see National Park Service 2021).” As Bennett (2016) explains, “like and unlike groups and individuals can perceive the same situation in vastly different ways.” In fact, numerous social science studies document the ways in which perceptions differ, including in ways that one group might characterize as “inaccurate.” For example,

Craig, Yung, and Borrie (2012) found that Blackfeet tribal members believed that gathering plant material inside Glacier National Park was prohibited, despite the existence of a permitting system that enabled this activity.

Indeed, Reynolds et al. (2024) comment and our response provide a useful example of an instance where the perceptions of agency staff do not fully align with existing agency resources and policies, which requires that we interrogate this disconnect. Instead of characterizing these misalignments as “inaccuracies,” we’re inspired by Reynolds et al. (2024) to more carefully examine the barriers that exist to adopting scenario planning in the federal land management agencies, barriers that might include lack of knowledge and capacity, and also the perceptions of agency staff about the utility of scenario planning.

References

- Bengston, D. N. 2019. Futures research methods and applications in natural resources. *Society & Natural Resources* 32 (10):1099–113. doi: [10.1080/08941920.2018.1547852](https://doi.org/10.1080/08941920.2018.1547852).
- Bennett, N. J. 2016. Using perceptions as evidence to improve conservation and environmental management. *Conservation Biology* 30 (3):582–92. doi: [10.1111/cobi.12681](https://doi.org/10.1111/cobi.12681).
- Chapin, F. S., E. S. Zavaleta, L. A. Welling, P. Deprey, and L. Yung. 2010. Planning in the context of uncertainty: Flexibility for adapting to change. In *Beyond naturalness: Rethinking park and wilderness stewardship in an era of rapid change*, ed. D. N. Cole, and L. Yung. Washington D.C.: Island Press.
- Clifford, K., L. Yung, W. R. Travis, R. Rondeau, B. Neely, I. Rangwala, N. Burkardt, and C. Wyborn. 2020. Navigating climate adaptation on public lands: How views on climate change and scale interact with management approaches. *Environmental Management* 66 (4):614–28. doi: [10.1007/s00267-020-01336-y](https://doi.org/10.1007/s00267-020-01336-y).
- Cole, D. N., and L. Yung. 2010. *Beyond naturalness: Rethinking park and wilderness stewardship in an era of rapid change*. Washington D.C.: Island Press.
- Craig, D. R., L. Yung, and W. T. Borrie. 2012. “Blackfeet belong to the mountains”: Hope, loss, and Blackfeet claims to Glacier National Park, Montana. *Conservation and Society* 10 (3):232. doi: [10.4103/0972-4923.101836](https://doi.org/10.4103/0972-4923.101836).
- Cross, M. S., E. S. Zavaleta, D. Bachelet, M. L. Brooks, C. A. F. Enquist, E. Fleishman, L. J. Graumlich, C. R. Groves, L. Hannah, L. Hansen, et al. 2012. The adaptation for conservation targets (ACT) framework: A tool for incorporating climate change into natural resource management. *Environmental Management* 50 (3):341–51. doi: [10.1007/s00267-012-9893-7](https://doi.org/10.1007/s00267-012-9893-7).
- Glick P., B. A. Stein, and N. A. Edelson, eds. 2011. *Scanning the conservation horizon: A guide to climate change vulnerability assessment*. Washington D.C.: National Wildlife Federation.
- Joyce, L. A., and D. Coulson. 2020. Climate scenarios and projections: A technical document supporting the USDA Forest Service 2020 RPA Assessment. Gen. Tech. Rep. RMRS-GTR-413. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 85. p. doi: [10.2737/RMRS-GTR-413](https://doi.org/10.2737/RMRS-GTR-413).
- Murphy, D., C. Wyborn, L. Yung, D. R. Williams, C. Cleveland, L. Eby, S. Dobrowski, and E. Towler. 2016. Engaging future climate change vulnerability and adaptation using landscape-scale iterative scenario-building. *Human Organization* 75 (1):33–46. doi: [10.17730/0018-7259-75.1.33](https://doi.org/10.17730/0018-7259-75.1.33).
- Murphy, D. J., L. Yung, C. Schultz, B. A. Miller, C. Wyborn, and D. R. Williams. 2025. Understanding perceptions of climate change scenario planning in United States public land management agencies. *Society & Natural Resources* 38 (3):269–88. doi: [10.1080/08941920.2023.2172240](https://doi.org/10.1080/08941920.2023.2172240).
- Murphy, D. J., L. Yung, D. R. Williams, and C. Wyborn. 2017. Rethinking climate change adaptation and place through a situated pathways framework: A case study from the Big Hole Valley, USA. *Landscape and Urban Planning* 167:441–50. doi: [10.1016/j.landurbplan.2017.07.016](https://doi.org/10.1016/j.landurbplan.2017.07.016).

- National Park Service. 2021. *Planning for a changing climate: Climate-smart planning and management in the national park service*. Fort Collins, CO: National Park Service.
- Ontl, T., M. K. Janowiak, C. W. Swanston, J. Daley, S. Handler, M. Cornett, S. Hagenbuch, C. Handrick, L. McCarthy, and N. Patch. 2020. Forest management for carbon sequestration and climate adaptation. *Journal of Forestry* 118 (1):86–101. doi: [10.1093/jofore/fvz062](https://doi.org/10.1093/jofore/fvz062).
- Reynolds, J. H., M. E. Miller, A. Runyon, G. W. Schuurman, J. Littell, P. Sousanes, T. Olliff, L. Perez, W. Carr, D. Lawrence, et al. 2023. Planning for future climates at Wrangell-St. Elias: Mainstreaming park-based actions. *Alaska Park Science* 22:110–27.
- Reynolds, J. H., B. W. Miller, G. W. Schuurman, W. A. Carr, A. J. Symstad, J. E. Gross, and A. N. Runyon. 2024. Accurately characterizing climate change scenario planning in the U.S. National Park Service: Comment on Murphy et al. 2023. *Society & Natural Resources* 38:293–298. doi: [10.1080/08941920.2024.2310226](https://doi.org/10.1080/08941920.2024.2310226).
- Schuurman, G. W., B. W. Miller, A. J. Symstad, A. C. Runyon, and B. C. Robb. 2022. Overcoming “analysis paralysis” through better climate change scenario planning. *Park Science* 36 (1). <https://www.nps.gov/articles/000/overcoming-analysis-paralysis-through-better-climate-change-scenario-planning.htm>
- Timberlake, T. J., and C. A. Schultz. 2019. Climate change vulnerability assessment for forest management: The case of the US Forest Service. *Forests* 10 (11):1030. <https://www.fs.usda.gov/managing-land/sc/vulnerability-assessments>. doi: [10.3390/f10111030](https://doi.org/10.3390/f10111030).
- Wyborn, C., L. Yung, D. Murphy, and D. R. Williams. 2015. Situating adaptation: How governance challenges and perceptions of uncertainty influence adaptation in the Rocky Mountains. *Regional Environmental Change* 15 (4):669–82. doi: [10.1007/s10113-014-0663-3](https://doi.org/10.1007/s10113-014-0663-3).