

## **Van Gundy student research grant awarded for 2025**

*The proposals were reviewed by the Evaluations Committee, composed of former board members Bryan Donner, Cyndi Smith, and Kathy Tonnessen, and Nutcracker Notes editor and associate director Bob Keane. The WPEF grant is funded by proceeds of the silent auction held at each annual science and management meeting. In addition, John Van Gundy generously funds an annual grant, administered by the WPEF, that must have a connection to climate change.*

***RUBY OLSSON**, a PhD student with Dr. Carina Wyborn in the Institute for Water Futures at Australian National University, was chosen as this year's recipient of the Van Gundy grant.*

## **How are resource managers responding to ecological transformation in alpine landscapes: a case study of whitebark pine and Australian snow gum**

*Ruby Olsson, Australian National University*

### ***Background and Objectives***

Conservation outcomes are critically dependent on understanding the human dimensions of environmental issues (Bennett *et al.* 2017). Anthropogenic climate change is driving ecological transformation, defined as the dramatic and potentially irreversible shift in multiple ecological characteristics of an ecosystem. This transformation is particularly evident in forest ecosystems, where tree species dieback is becoming increasingly common. Two notable examples are the whitebark pine (*Pinus albicaulis*) dieback in North America and snow gum (*Eucalyptus pauciflora*) decline in the Australian Alps. Both species are subject to pest infestations and ecological transformation driven by changing fire regimes and climate change (Jacobs and Anderson 2019, Tomback and Sprague 2022, Brookhouse 2024).

My research examines how natural resource managers are responding to ecological transformation using a comparative case study analysis of whitebark pine and snow gum dieback. These case studies share many characteristics, although North American managers have been grappling with threats to whitebark pine for several decades and have developed extensive restoration actions (Tomback *et al.* 2022) compared to the relatively new challenge facing Australian managers. A comparative analysis of these two contexts allows for mutual learning to understand how different policy and social contexts impact climate adaptation decisions.

As part of this research, I will examine the role of climate adaptation frameworks in assisting managers respond to ecological transformation, particularly the Resist-Accept-Direct (RAD) framework. The Resist-Accept-Direct (RAD) framework emerged from the United States as an assessment tool to assist natural resource managers respond to ecological transformation, and is now gaining traction in Australia. However, the practical application of RAD in diverse ecological and institutional contexts remains understudied.

This research seeks to answer:

1. How are natural resource managers responding to ecological transformation?
2. What is RAD's utility in assisting this response?

3. How does current conservation policy, including cornerstone legislation such as the Endangered Species Act (USA) and threatened species listing (Australia), enable or constrain managers' capacity to respond?
4. How can researchers and managers work together to respond to ecological transformation in the context of uncertain information?

### ***Study Plan***

This social science research will adopt a qualitative case study approach to compare the experiences of managing high alpine ecological transformation under climate change in Australia and the United States. I will undertake the following research over the next two years:

- Semi-structured interviews with land managers and researchers: about 20 North American interviews in Montana and Alberta,
- About 20 Australian interviews,
- Workshops between Australian managers and researchers, and
- A workshop at the WPEF fall conference which will present the preliminary analysis of the Australian and US interviews, to provide an opportunity to share experiences and insights across continents.

### ***Measures of Success***

This research will develop practical insights to inform management and policy responses that will enable managers of high elevation ecological systems to address the challenges associated with ecological transformation under climate change. My PhD will include four publications, and the comparative analysis will specifically be covered in two publications: "The utility of the 'Resist, Accept, Direct' (RAD) framework in responding to ecological transformation: Opportunities, challenges, and lesson learned from USA and Australia" and "Threatened species legislation and our changing conservation paradigm".

I will further share my research through the High-Elevation Five-Needle White Pines webinar series and *Nutcracker Notes*. I plan to facilitate an online meeting between the North American and Australian managers involved so they can share their respective management experiences in the context of my findings.

### ***Literature Cited***

Brookhouse, MT. 2024. Incidence and severity of *Phoracantha*-induced decline within high-elevation eucalypt woodlands are strongly associated with elevation and land management. *Forest Ecology and Management* 561:121872. <https://doi.org/10.1016/j.foreco.2024.121872>.

Jacobs, P, and G Anderson. 2016. Australian Alps climate futures: taking action now to strengthen resilience. 26 & 27 July 2016. Summary Report. University House, Australian National University, Canberra, Australia.

Bennett, NJ, R Roth, SC Klain, K Chan, P Christie, DA Clark, G Cullman, D Curran, TJ Durbin, G Epstein, A Greenberg, MP Nelson, J Sandlos, R Stedman, TL Teel, R Thomas, D Veríssimo, and C

Wyborn. 2017. Conservation social science: understanding and integrating human dimensions to improve conservation. *Biological Conservation* 205:93-108. <https://doi.org/10.1016/j.biocon.2016.10.006>.

Tomback, DF, and E Sprague. 2022. The national whitebark pine restoration plan: restoration model for the high elevation five-needle white pines. *Forest Ecology and Management* 52:120204. <https://doi.org/10.1016/j.foreco.2022.120204>.

Tomback, DF, RE Keane, AW Schoettle, RA Sniezko, MB Jenkins, CR Nelson, AD Bower, CR DeMastus, E Guiberson, J Krakowski, MP Murray, ER Pansing, and J Shamhart. 2022. Tamm review: current and recommended management practices for the restoration of whitebark pine (*Pinus albicaulis* Engelm.), an imperiled high-elevation Western North American forest tree. *Forest Ecology and Management* 522:119929. <https://doi.org/10.1016/j.foreco.2021.119929>.

**For e-newsletter:**

The 2025 Van Gundy student research grant has been awarded to Ruby Olsson, a PhD student with Dr. Carina Wyborn in the Institute for Water Futures at Australian National University. Ruby will be investigating how resource managers are responding to ecological transformation in alpine landscapes by conducting a case study of whitebark pine and Australian snow gum. Both species are declining and are subject to pest infestations and ecological transformation driven by changing fire regimes and climate change. Ruby will conduct semi-structured interviews and workshops with land managers and researchers in Montana, Alberta, and Australia during her research.