

Michelle Sullivan Govani's Commentary on "Assisted Migration"

Commentary On
Case: Assisted Migration

In the last decade, assisted migration, "the intentional introduction by humans of an organism beyond its natural range" (Keel et al. 2011, 44; Keel 2005), has gained attention as a radical tool to save species threatened by climate change and habitat destruction (e.g., McLachlan et al. 2007, Hoegh-Guldberg, et al. 2008; Richardson et al. 2009). These environmental changes are in some cases occurring faster than species can adapt or migrate, and the connectivity of landscapes has largely been altered by human developments, blocking would-be migrations as environmental conditions shift (Kolbert 2014).

In this case, the Torreya Guardians have decided that assisted migration is necessary and justified for the *Torreya taxifolia*, a rare and endangered tree species that is native to Florida. Their first and foremost goal is to save the species from extinction that the group claims is driven by climate change combined with the tree's inability to migrate (Torreya Guardians 2016e; Barlow 2009; The Economist 2015; Torreya Guardians 2016b). The group's goal, then, is to move the tree north, where they claim it could and would migrate if there weren't so many barriers.

The Torreya Guardians hope to serve as a model for similar cases, or in their words, "for the kinds of geographic interventions that will be necessary for plants in a warming world" (Torreya Guardians 2016e). In many cases, extinction cannot be prevented without assisted migration (McLachlan et al. 2007). Options are slim and shrinking for species that are threatened by climate change; the high stakes demand "radical strategies" and a "significantly more activist and hands-on approach to species conservation than we have taken in the past" (Minteer and Collins 2010, 1804, 1802).

The Torreya Guardians approach their program systematically, such that they could even claim to have scientific justification. For example, they have developed a set of

"Ecological Standards" that help them to decide whether an endangered species should undergo assisted migration (Beardmore and Winder 2011). They examine species history, risk of extinctions, characteristics of the plant that could portend invasive potential, and overall feasibility of the project (Beardmore and Winder 2011). Their volunteer cultivators keep thorough records of all plants (Torreya Guardians 2016f), and the group uses that data to fulfill their third goal, to "test the efficacy of assisted migration for this and other threatened plants that were 'left behind' in their peak-glacial reserve" (Torreya Guardians 2016e). The Torreya Guardians have also been careful to justify their actions in legal terms, arguing that it's lawful to transport privately owned plants between states and replant in new locations on private property (Torreya Guardians 2016c; Shirey et al. 2011).

Finally, if humans are (at least in part) responsible for the rate and nature of climate and environmental change, humans may have a duty to act to save species from extinction due to climate change. Despite risks of bad or unintended outcomes, they may feel it is worse to do nothing while species go extinct because of anthropogenic climate change (Marris 2011). The Torreya Guardians certainly feel a duty to save *Torreya taxifolia*: "We're just helping the tree get around habitat obstacles that we humans have put in its way" (Barlow 2009).

There are, however, also strong arguments against assisted migration. For example, questions are being raised about the role assisted migration can play within the system of traditional conservation practices which have historically focused on preserving species in their native habitats by setting aside tracts of land as protected areas, as well as lobbying for legislation like the Endangered Species Act of 1973 (Minteer and Collins 2010). Conservation biologists who are proponents of this conventional approach will argue that time, money, and resources should be spent on (1) facilitating natural range shifts by maintaining or restoring habitat connectivity, and (2) working to achieve carbon-management solutions (Hunter 2007). They remain committed to saving endangered species by minimizing human influence, as opposed to intervening further, and they argue that there is no scientific support for assisted migration (e.g., the "Nativist Technocrat" in Neff and Larson 2014). But that doesn't mean a balance can't be struck. Both traditional and newer, more controversial techniques could be used in complimentary ways, with assisted migration being an option, even if just for a small number of species (Appell 2009; Minteer and Collins 2010).

Despite the potential for integrated management strategies, there are still those who resist assisted migration, citing human arrogance; humans could never know enough about an ecosystem to be certain whether a relocated species will become invasive or not (Greenfieldboyce 2011; Minter and Collins 2010). Indeed, there is incredible potential for relocated species to become invasive in new habitats (Greenfieldboyce 2011; Davidson and Simkanin 2008; Ricciardi and Simberloff 2009; Seddon et al. 2009). Related, contested definitions of native vs. non-native species (which are more likely to become invasive) have come into play. To justify their actions, for example, the *Torreya* Guardians question the ways in which native species are defined. Does history matter and to what depth of time? If the *Torreya taxifolia* lived in mid-east to northeast North America between 2.5 and 65 million years ago, migration to that location today, with the assistance of the *Torreya* Guardians, could be interpreted as a movement into an older species range (Greenfieldboyce 2011; Barlow 2009). *Torreya* Guardians founder, Connie Barlow, calls this a "deep-time" perspective:

"A deep-time perspective... opens up a new line of questioning: where would the native range for species X have been during a peak interglacial -- or during even more ancient times (species of genus *Torreya* coexisted with Cretaceous dinosaurs) when global climate was even warmer than it is today?" (Barlow 2009, 168-169).

Still, contesting a definition does not erase the potential for negative impacts on other species when transplanting *Torreya taxifolia* outside its current range. The *Torreya* Guardians may not be properly assessing the situation, including the status of *Torreya taxifolia*, as well as the invasive or disease-transmission potentials of the species (Greenfieldboyce 2011).

For instance, the group claims that climate change is the driving force of extinction, but researchers from the University of Florida have found that the main reason for the decline of the species continues to be a fungal species of *Fusarium* and not climate change (Smith and Trulock 2010; Smith et al. 2011). Currently, there are no options for managing the disease. This call into question the legitimacy of the scientific standards used by the *Torreya* Guardians. Also, it raises the issue of under which scenarios assisted migration is defensible: should the species be threatened by climate change and other anthropogenic factors to justify assisted migration? If *Torreya taxifolia* are threatened by a pathogen, as opposed to climate change,

should they be relocated? And what if the species' demise is caused by a combination of natural and anthropogenic factors in unknown proportions? How much fault demands action?

Further complicating decision making around this issue are questions of the terms of debate and who decides. First, though it may be tempting to couch these discussions into technical terms, there are clearly political, legal, and ethical elements as well. In an analysis of the arguments used in assisted migration literature, most rhetoric was found to have "implicit or explicit evaluative terms" (e.g., what is the appropriate level of risk? which species should we move? etc.) (Klenk and Larson 2013). Similarly, in a classification of four varying perspectives on assisted migration among conservation practitioners, Neff and Larson (2014) discovered that "disagreements... were defined by value-based and policy-strategic considerations as least as much as they were by varied understandings of technical issues" (1). The central non-technical 'considerations' include regulating the practice of assisted migration, as well as assigning the distribution of limited resources for conservation projects (Klenk and Larson 2013). Given that these are not solely scientific considerations, this raises questions about who should be involved in the debate:

"The debate over [assisted migration] has been concentrated in the scientific community, but at its core is a political and societal debate about the role of science and the public in shaping the future of our ecosystems..." (Klenk and Larson 2013, 17).

When it comes to assisted migration for endangered species, who should make the decisions? To what degree should decisions and practice be public, professional, and/or scientific? (Minteer and Collins 2010, 1803). This corresponds to the final listed goal of the Torreya Guardians: "To nurture citizen-professional collaborations and a high degree of volunteerism in the service of biodiversity" (Torreya Guardians 2016e). The group believes that as concerned citizens and advocates, they have a duty and a *right* to decide and act. And the experts with the US Fish and Wildlife Service have taken note, recommending that the USFWS biologists "foster a working relationship" with the advocacy group (USFWS 2010, 18). But there are conservation professionals who feel that such a risky method, if carried out, should be in the hands of experts (Neff and Larson 2014; Shirey and Lamberti 2011). As demonstrated in this case, advocacy groups can be influential stakeholders, but how much influence should advocacy groups like the Torreya Guardians have in shaping

public policy?