Online Ethics Center
FOR ENGINEERING AND SCIENCE

# Assisted Migration

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## Description

This case explores ethical issues surrounding assisted migration of endangered species. In particular, it focuses on Torreya taxifolia, an evergreen conifer tree endemic to Florida, and an activist group, Torreya Guardians, that has been distributing trees to sites outside the endemic range, including in North Carolina, Tennessee, Ohio, Michigan, Wisconsin, New Hampshire, and Oregon.

## Abstract

This biodiversity case is part of a larger collection of Life and Environmental Science ethics education resource sets on ethics of emerging biotechnologies, big data in the life sciences, human enhancement, and biodiversity. Doctoral students from Arizona State University’s Center for Biology and Society developed the resources under the direction of Karin Ellison and Joseph Herkert between 2014 and 2019.

## Body

Along a short, slim stretch of the Apalachicola River between the northern Florida panhandle and southern Georgia, lies a cool, shady ravine, home to the last native stand of *Torreya taxifolia.* This evergreen conifer tree is an endemic and

endangered species of Florida, said to be threatened by a combination of fungal disease and shifting environmental conditions due to climate change (Smith and Trulock 2010; Barlow and Martin 2004; Barlow 2009; The Economist 2015; Torreya Guardians 2016a). Though the trees used to grow to heights around 60 feet, they currently exist only in a juvenile and diminishing state (Smith and Trulock 2010; Barlow and Martin 2004).

The Florida *Torreya* first suffered a decline in the 1950s, when it is thought a fungal pathogen felled all the large adult specimens (reviewed in Smith and Trulock 2010). Today, only stump sprouts and seedlings remain, and they are in such decline that the USFWS declared the *Torreya* a federally endangered species in 1986 (USFWS 1986). Still in 2010, in the last updated endangered species plan, the USFWS declared that “given the lack of seed production in the wild and potentially a decline due to a disease, all population viability models predict extinction” (Schwartz et al. 2000; USFWS 2010, 11).

With fewer than 1000 plants left in the endemic stand, Connie Barlow, a writer, naturalist, and concerned citizen, decided she must act (Greenfieldboyce 2011). She claims that climate change, particularly rising temperatures, threatens to kill off the stand entirely (Barlow 2009; The Economist 2015; Torreya Guardians 2016b). So, in 2004, she founded the Torreya Guardians, “a self-organized group of naturalists, botanists, ecologists, and others with a deep concern for biodiversity protection, who have chosen to use the internet as a tool for discussing ideas, posting plans, and taking a variety of actions in behalf of our most endangered conifer tree: *Torreya taxifolia*” (Torreya Guardians 2016c).

The Torreya Guardians claim that the tree species could have naturally migrated North with the retreating glaciers 15,000 years ago, but poor surrounding soils, the extinction of large herbivores (i.e., seed distributers), and the presence of increasing numbers of wildfires due to human activity are all possible reasons that the species remains stuck in place (Barlow and Martin 2004; Barlow 2009). To save the tree, the Torreya Guardians first proposed assisted migration in 2004 (Barlow and Martin). In 2005, Barlow joined forces with a botanist and *Torreya taxifolia* expert, Lee Barnes, to initiate a seed distribution scheme that has become the center of an ‘assisted migration’ project. The group has now distributed trees to sites outside the endemic range, including in North Carolina, Tennessee, Ohio, Michigan, Wisconsin, New Hampshire, and Oregon (Torreya Guardians 2016a).

According to group leader and founder, Barlow, she felt the assisted migration method was (and is) an “easy, legal, and cheap” way to protect the endangered tree species from extinction. First, anyone with access to the web (and some private land) can apply to take part in a test planting via the group’s website (Torreya Guardians 2016d). And although they’ve been called “ecological vigilantes” (The Economist 2015), it’s also legal. Distribution of endangered plants and seeds is lax, particularly within states, and then once privately owned, individuals can go across state lines with their plant property as they please (Shirey and Lamberti 2011). Finally, this scheme is cheap, requiring only small out of pocket expenses from volunteers to initiate and maintain plantings.

The group also advocates a ‘deep time’ perspective that can change perceptions of what constitutes a “native” species (Barlow 2009). For example, the Torreya Guardians claim the tree species lived in what is now the northern parts of the Appalachian region in previous periods of warmth over the last 2.5 million years. Thus, when the Torreya Guardians move a tree to Ohio, they are returning the tree to its prehistoric range (Greenfieldboyce 2011).

**Discussion Questions:**

1. Do humans have a duty to protect *Torreya taxifolia* from extinction? Why or why not? If so, can assisted migration fulfill our duty to this species in peril? Why or why not?
2. Is inaction worse than acting, even if the consequences are risky? Explain.
3. Does assisted migration comport with traditional preservation strategies? Why or why not? How could assisted migration be utilized in conjunction with other measures to prevent extinction?
4. Assisted migration efforts by the Torreya Guardians are considered legal under federal law. Does that justify their actions? Are there other moral considerations outside of the law that should factor in a decision to move a plant species? Is so, what are they?
5. What constitutes a native vs. non-native species? What scientific, geographical, temporal, legal, and other terms should be considered in the distinction? Why those terms?

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**Link**

The Torrey Guardians
http://www.torreyaguardians.org/

## Notes

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License


## Resource Type

Case Study / Scenario

## Parent Collection

Biodiversity Collection

## Topics

Climate Change
Community and Participatory Research
Controversies
Ethics and Society
Research and Practice

## Discipline(s)

Ecology and Evolutionary Biology
Forestry and Forest Science
Life and Environmental Sciences
Plant Sciences