# GCSC Seminar Series

## Tuesday, April 2, 2019
## 4:00-5:00 PM

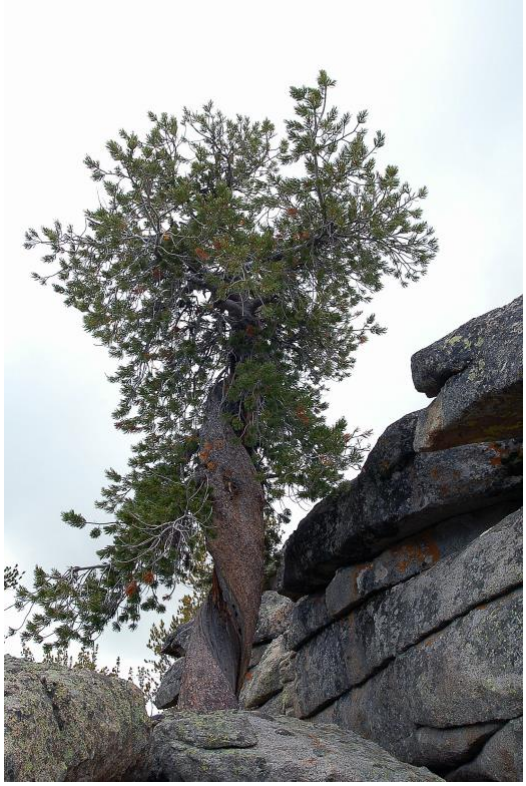
210 ASB
(Aline Skaggs Building)

*ALL ARE WELCOME*

Refreshments & meet the speaker at 3:45

**Diana F. Tomback**
Professor, Department of Integrative Biology, University of Colorado Denver

# "Biodiversity catastrophe in real time: Loss of five-needle white pine communities and cascading consequences"



*White pine forest communities provide important ecosystem services, including snow retention. They are declining precipitously from a combination of exotic disease, large-scale outbreaks of mountain pine beetles, fire suppression, overexploitation, and the impacts of climate warming.*

GLOBAL CHANGE AND SUSTAINABILITY CENTER
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## Abstract

North American forests are facing unprecedented challenges including invasive pests and pathogens, native pest outbreaks, drought, and large-scale fires—threats stemming from both hyper-globalization and climate change. Western North America (including Mexico) comprises a center of biodiversity for conifers in general and a region unique for its diversity of "five-needle" white pine communities (Family Pinaceae, Genus Pinus, Subgenus Strobus, Sections Quinquefoliae and Parrya). Among its ten five-needle white pines, there are pines that are the world's tallest and longest living; pines that live on sky islands; pines dependent on birds for seed dispersal and on fire for community renewal; pines that serve as ecosystem foundation and keystone species; and, pines historically important to indigenous cultures and mainstays of logging economies. White pine forest communities are declining precipitously from a combination of exotic disease, large-scale outbreaks of mountain pine beetles, fire suppression, overexploitation, and the impacts of climate warming. Whitebark pine (Pinus albicaulis and limber pine (Pinus flexilis) are listed as endangered in Canada, and whitebark pine is being evaluated for listing in the United States. Two examples of cascading impacts are described: 1) Whitebark pine is a major component of northern Rocky Mountain treeline communities, which provide important ecosystem services, including snow retention. 2) Several five-needle white pines depend on Clark's nutcracker (Nucifraga columbiana), a keystone seed disperser whose services interconnect many different conifer species. Where whitebark pine mortality is high, nutcrackers are declining in subalpine forest communities in the northern Rocky Mountains. Can the five-needle white pines be saved? Restoration strategies are being developed and implemented, especially for whitebark pine, but the scale, cost, and multi-generational effort will require major national commitment.

## Bio

Diana F. Tomback is Professor of Integrative Biology at the University of Colorado Denver, with expertise in forest ecology and conservation biology. For her pioneering studies on whitebark pine, she received a U.S. Forest Service Centennial Conservation Award in 1991 and was elected Fellow of the American Ornithologists' Union in 1994. Tomback was lead editor of the book, Whitebark Pine Communities: Ecology and Restoration, published by Island Press in 2001. This work is a primary information source for the U. S. Fish & Wildlife Service status review of whitebark pine under the ESA. Author of more than 100 peer-reviewed publications, she and her students have conducted research on Clark's nutcracker and/or whitebark pine in National Parks and National Forests across the U.S. and Canada. In 2001, Tomback and colleagues started the Whitebark Pine Ecosystem Foundation (WPEF) http://www.whitebarkfound.org, a science-based non-profit.