



FINAL REPORT

THE CANOPY CONFLUENCE

AUGUST 13-25, 2006

THE EVERGREEN STATE COLLEGE

[**CONFLUENCE:** (noun, from the Latin *confluere*, to flow together): a flowing or meeting together; a joining; a place where a stream flows into a river or a river flows into an ocean...]

SUMMARY:

The Canopy Confluence was an interdisciplinary research and outreach project organized by forest ecologists at The Evergreen State College. We brought together ecologists and artists who collected data, images, and other kinds of information, with an emphasis on forest canopy biota. Our objectives were to collect new scientific data on canopy ecology studies; to gain novel perspectives on the forest from artists; and to develop communication and outreach materials about forest studies to non-scientific audiences. Our three study plots in the western Cascades were part of a chronosequence of forest stands we established in 2001; our plots ranged in age from 100 to 650 years old. During the Confluence, all participants stayed in campgrounds adjacent to the sites; interactions were collegial, supportive, and learningful. Outcomes for scientists included data and images for their studies, several of which will be submitted to scientific journals. Outcomes for artists included inspiration for works created on-site and in the future to their audiences of dance, poetry, and art-oriented audiences. We administered questionnaires before and after the Confluence to document expectations, knowledge gained, and outcomes. Scientists expressed appreciation for being exposed to the aesthetic, emotional, and spiritual elements of the forest that the artists were able to articulate through song, poetry, dance, and visual images. Artists appreciated learning more about different species, ecosystem services, and the degree of interactions amongst different ecosystem components. We also hosted media groups, including journalists, freelance writers, and a television crew from The National Geographic Society. The Confluence could serve as a model for other ecological research groups who wish to extend traditional approaches to include other ways of knowing the forest and ecological systems.

PROJECT HISTORY:

This project grew from the Canopy Database Project, initiated by Nalini Nadkarni, a forest ecologist, and Judy Cushing, a computer scientist, in 1995, to bring together forest canopy researchers and computer scientists to develop informatics tools for canopy ecologists. Our goal was to facilitate collaborative and integrative research among canopy researchers by creating appropriate software and other informatics tools in order to deal with the complex three-dimensional data that describe tree crowns and forest canopies. Part of this project involved collecting our own canopy data on the relationships between forest structure and function as forests develop through time. We established a chronosequence of eight plots (50-950 yrs old) in the western Cascade Mountains of Washington State. We rigged a subset of trees with climbing ropes, collected data on forest structure and function, and environmental conditions. All data are stored in our database, along with software that produces visualizations. This project has received continual support from the Database Activities Program of the National Science Foundation (canopy.evergreen.edu).

This summer, we invited canopy researchers to use our field and data resources to address their own research questions and “build out” the database in many different directions. Seven ecologists from other institutions came to our plots to carry out their own research, drawing on the existing data and depositing their data in our canopy database. This will allow us to “layer” our work in an organized manner and enhance our ability to achieve synthesis, which has been difficult for single-researcher canopy research projects.



Our participating ecologists carried out four projects that included: 1) identifying viral and bacterial disease vectors of arboreal mammals; 2) quantifying the “air space” in the forest with laser technology; 3) quantifying within-tree branch dynamics by re-censusing branches that were measured and tagged five years ago; and 4) documenting the distribution of the residual (for 26 yr) volcanic tephra layer on canopy branch surfaces in a forest stand adjacent to Mt St. Helens.

REASONS TO FOSTER INTERACTIONS BETWEEN ARTISTS AND SCIENTISTS:

The changing state of our human population, with its decreasing contact and appreciation of nature, demands that researchers find new ways to communicate the content and importance of their ecological research to the general public. Participants in the Canopy Confluence provided an intriguing example of how to broaden the way scientists perceive their study organisms and ecosystems. This approach also provided opportunities to collaboratively create materials that inform the general public with nature in unexpected settings: art galleries, concert halls, and coffeehouses. Artists often have access to aesthetic, emotional, and spiritual aspects of nature, and have the “permission” and skills to express these aspects, the same aspects that tend to arouse a sense of stewardship and mindfulness in the general public. Thus, providing arenas where scientists and artists can work together may result in forums that produce scientifically sound materials in forms that have wide appeal to non-scientists and evoke a commitment to conservation.



We invited six artists to participate in the Canopy Confluence (poet, songwriter, visual artists, modern dancers, novelist, see Appendix). Their charge was to absorb what they wished of the science and the scientific approach and methods, and create work that they would play/publish/dance/show to their audiences in the future. Would poetry that our participating poet writes inspire someone at his poetry readings to get interested in forest canopies? Could the modern dance choreographer who has spent time in the canopy with scientists express something of that complex microenvironment to her audiences? We noted that some of this dissemination work will take a fairly long time to “incubate”, e.g., the modern dancers anticipate that their work will require further exposure to other forests and other forest ecologists, and have planned a workshop on forest symbiosis in October, 2006. In contrast, the musician/songwriter was able to create a powerful song about the canopy and what getting to the top of a tree represents during the time he was part of the group.



LOGISTICS

Participants were in the field together for varying lengths of time between August.13-25. Trees in our study sites (100, 500 and 650 yrs old) had been mapped and measured, and all participants had access to these data via the web and printouts. Prior to the Confluence, Evergreen staff obtained required permits for research activities. Informal exchange of ideas and information occurred throughout the day in the field as scientists and artists worked together to rig trees, collect data, and check mammal traps. A camp cook provided meals and eased logistics workloads to maximize time for interactions. A major time for discussions among participants occurred at dinner and around the campfire in the evenings, which was facilitated by having a professional cook to plan, prepare, and serve meals.



MEDIA PRESENCE:

In our efforts to disseminate our work to a broad public audience, we engaged media representatives. The National Geographic Society sent a camera crew to one site to film research and artists' activities. Their program will air in mid-October on "Wild Chronicles", their prime time PBS television program. The Evergreen State College sent representatives to write a story for the alumni magazine. A freelance writer from Canada will make submissions for a variety of environmental online and paper magazines.



CONCLUSIONS:

The Canopy Confluence was significant for three reasons. First, data for each of the science projects was collected and will be analyzed and written up for the scientific literature. Second, wide disciplinary boundaries were crossed by interactions among scientists and between scientists and artists. Third, this was a formal exploration of how the different approaches of scientists and artists might complement each other to disseminate the complexity and importance of forest ecology to an extremely broad range of scientific and non-scientific audiences.



ACKNOWLEDGMENTS:

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two of our students. Thanks to Sarah Greene for help with research permits, Roman Dial for his excellent research contributions, Robert Van Pelt for establishing and ably collecting data from the sites, and to Willy Towanda Fenske for her help with logistics and contributions to the spirit of the project. Anne Fiala provided unflagging research support for all of these activities.

Submitted by:

Nalini M. Nadkarni, Ph.D.

Member of the Faculty

President, International Canopy Network

The Evergreen State College

Olympia, Washington 98505

(360) 867 6621

WEBSITES: www.evergreen.edu/ican; www.researchambassador.com; www.evergreen.edu/walkway;
www.evergreen.edu/canopylab; canopy.evergreen.edu



Participant Name & Institution

Aspects of Scientific Studies and Creative Activities

SCIENTISTS

Nalini Nadkarni & Anne Fiala
Students: G. Becker, G. Horton,
DJ Cox, Evergreen State College
Janet Foley, Nate Nieto
Univ. of California – Davis
Roman Dial
Alaska Pacific University

- Branch dynamics – tracking the growth and death of branches in the 1kcs trees that were climbed five years ago to examine differences between now and then.
- The effects of ash deposition, host tree species, crown position, and stand age on the diversity and community composition of epiphytic bryophyte (and possibly) lichen communities.
- disease ecology of vector-transmitted diseases among small mammals in old growth and second growth forests of the Pacific NW.
- Measure canopy variables (space, structure, light, wind, and vapor pressure deficit), and collect arthropods in a mature forest canopy

ARTISTS

John Calderazzo, poet
Ann Eriksson, writer, Vancouver
Island
Jodi Lomask & Zack Bernstein
Capacitor, Inc.
Dana Lyons,
Songwriter and guitarist
Chuck Willyard, painter

- Created poetry associated with forest canopy research projects.- wrote and read poems to group; plans to read and publish poetry to humanities audiences
- followed up on her 2005 interaction with canopy scientists to “truth” a novel that she is writing about a canopy researcher
- explored symbiotic interactions in canopy in preparation for new modern dance piece; shared “dance language” with group in parking lot of campground; climbed into canopies to experience three-dimensional aspects of tree canopies
- integrated forest canopy access experience into song; shared song-making process with group; presented song to group, discussed plans to relate it to environmental issues
- observed and photographed light in forest profile; plans to integrate forest canopy images into pieces of 2-D visual art (oil & acrylics)

OTHER SCIENTIFIC PARTICIPANTS

Silke Werth,
University of California – Los
Angeles

(These participants used our field sites and data at times other than the Canopy Confluence field times)

- document genetic diversity of the canopy lichen *Ramalina menziesii* and *Lobarina pulmonaria* in young managed vs. old-growth stands
- identify unique genotypes or alleles in old-growth forests

Participant Name & Institution

Aspects of Scientific Studies and Creative Activities

SCIENTISTS

Alison Styring,
Evergreen State College

- investigate relationships between forest dynamics and breeding bird ecology, especially nest-site-selection/ patterns of nest reuse by intensive nest searching and monitoring of select species

Dave Shaw,
Oregon State University
Rick Meinzer, JC Domec,
Oregon State University

- quantify development of mistletoe in Douglas-fir/western hemlock forests
- examine influence of western hemlock dwarf mistletoe influence on forest structure
- characterize aspects of tracheid anatomy by collecting shoots and stem samples

Ann Auman,
Pacific Lutheran University

- study canopy and forest floor soil microbial activity, a follow-up to 2005 collections
- document influence of canopy-held volcanic ash from Mt St Helens on canopy microbial activity