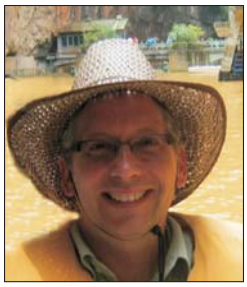
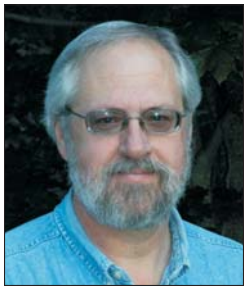

Karen M. M. Steensma


David R. Clements


John R. Wood


Randall Van Dragt


Ben Lowe

Article

Stewarding the Gift of Land: Christian Campuses as Land Management Models

Karen M. M. Steensma, David R. Clements, John R. Wood, Randall Van Dragt, and Ben Lowe

On land holdings of a few to thousands of acres, Christian colleges are preparing the next generation of leaders. We examined the importance of institutional land policies in conveying a sense of place and stewardship to students and campus communities. A survey of forty-three Council for Christian Colleges and Universities (CCCU) colleges found collective ownership of over 15,000 acres, with an average of 65% build-out. In-depth case studies of seven institutions with exemplary land management revealed four key indicators of success: (1) environmental core values from the administration; (2) active faculty involvement in land advocacy; (3) dedicated staff positions; and (4) bioinventories as catalysts for conservation and research.

> *"Creatures, I give you yourselves," said the strong, happy voice of Aslan. "I give you forever this land of Narnia. I give you the woods, the fruits, the rivers … Treat them gently, and cherish them." –C. S. Lewis*[1]

> *[T]he primordial and still continuing dark story of human rapaciousness begins to be accompanied by a vein of light which, however improbably and uncertainly, still accompanies us. This light originates in the idea of the land as a gift – not a free or a deserved gift, but a gift given upon certain rigorous conditions. –Wendell Berry*[2]

Institutions of Christian higher education have been the collective recipients of many acres of land in the past century. Land, as a gift of God, comes to us with an ethical imperative to treat it gently and to cherish it. In regard to Christian college campuses, there are a few distinctive models of land management from which to draw information. The strategy of building ever-bigger structures on vacant parcels of land is a twentieth-century ethos that no longer carries us forward.[3] Students express discontent as they question how campus buildings and grounds are managed; fully 69% of college applicants rank environmental sustainability as important in their college choice.[4] These students, together with many in the larger campus community, are seeking a philosophy of sustainability, not just a catalog of environmental ills. This is a crucial time for creating the context in which discipleship on creation care can happen.[5] Such a concept requires deep sustainability thinking and a clear sense of geographic place: we need to know how to live on the land, not just how to do social justice or create sustainable business models.[6]

Sustainable land management at institutions of higher learning is challenging. Universities face increasing financial pressures, and often lack the ability to assess whether their land holdings are ecologically important. Given many competing demands on these

holdings, should land be managed in a strictly utilitarian way? A utilitarian approach was the default position of most academic institutions examined by Muller and Maehr in a 2000 paper published in the journal *BioScience*.[7] They delivered a strong indictment of the American institutions they assessed, including many schools which, ironically, have been leaders in the field of conservation biology. By and large, these institutions have failed to be proactive in the conservation of their own lands.[8] In this article, we use the same magnifying glass to look specifically at Christian institutions. In addition to the practical need to protect biodiversity, Christians have a biblical mandate to protect creation. Thus, we ask, "Have Christian institutions begun to move beyond utilitarian land management practices? And if so, how?"

Modern Context of Sustainability

In recent years, educational institutions have paid increasing attention to environmental stewardship on their campuses for ethical, economic, and public relations purposes. The concept of "sustainability" has become popular in many forms. Recycling, energy audits, carbon footprinting, and other environmental efforts have complemented the traditional scholarly activities of discussion and debate on such topics.[9] However, in the midst of these "green awakenings,"[10] in terms of stewardship of energy and materials, a business–as-usual attitude is often seen with respect to land. Colleges and universities tend to view their land holdings more as short-term real estate opportunities than as gifts entrusted to them indefinitely.

There are many reasons for managing university land for conservation value, including pedagogical, psychological, aesthetic, and recreational benefits. But Christian colleges, in particular, have a biblical mandate to *steward* the land. Much effort has been exerted to ensure fidelity to biblical ethics at Christian institutions in order to model and integrate Christian values educationally.[11] This has included a strong recent emphasis on ethics of creation care in general,[12] yet little of this renewed interest is focused on the significant impact of land management practices. As in secular institutions, Christian institutions are prone to say one thing but do another regarding sustainable land management. These institutions are often lacking plans, policy, or personnel required to proactively steward the gift of land.

Land stewardship practices were highlighted at the 2006 American Scientific Affiliation (ASA) annual meeting held at Calvin College. Twelve speakers from Christian and secular colleges presented their experiences in a symposium entitled "Stewardship, Conservation and Land Management: A Cross-Campus Checkup."[13] The common theme emerging from this session was the need to identify best practices and share information on the benefits of land use and natural area conservation planning and management. In this article, we report on practices at forty-three institutions in the Council for Christian Colleges and Universities (CCCU) and then focus on seven campuses modeling exemplary land stewardship.

Methodology

In 2006 we surveyed the land management practices of sixty-two CCCU schools.[14] Faculty members designated as representatives of the Au Sable Institute of Environmental Studies on their respective campuses were asked to respond to a thirteen-question land management survey.[15] This was intended to provide a snapshot in time, of land use and planning at the responding institutions. Subsequently we researched CCCU institutional websites for mention of land management and sustainability practices, and interviewed personnel at more than a dozen campuses that had at least a few acres of natural area or agriculture use in order to narrow down choices for case study. In-depth interviews were then conducted with faculty members and staff most involved in land use at seven of the larger and more innovative landowners among these schools. Questions regarding history, size, and management of unbuilt property were asked of each interviewee. Resulting case study descriptions were then verified for accuracy by the interviewees in 2013.

Overview of CCCU Respondents

The survey resulted in forty-three responses, for a 69% return rate on the questionnaire. We found that the majority (thirty-nine) of CCCU schools addressed land management issues through a master planning

process. Of these, eleven (26%) also had specific land management plans while only three (7%) had a separate land stewardship policy in place. Together the forty-three campuses controlled approximately 15,600 acres of land. The vast majority of the institutions (thirty-six) owned fifty acres or more, three held 500–1,000 acres, and two had up to 2,000 acres (figure 1). More than one-quarter of these land holdings were already developed, and 26% of the schools were nearing full development capacity, with 76–100% build-out on their land holdings. The majority of campuses were located in suburban or urban land use settings (figure 2), with a minority located in or adjacent to rural or industrial settings.

The primary purpose of undeveloped land holdings among more than half (58%) of respondents was identified to be either investment, space for future expansion, or urban buffer (figure 3). However, 40% also identified natural area values or outdoor classroom uses for a portion of their land holdings, with numerous land-based stewardship activities indicated across these campuses (figure 4).[16] Fifteen campuses had a field station, nature reserve, or property detached from the main campus. These holdings were typically within a few miles of the main campus, while two were over 400 miles away. There were thirteen scientific, outdoor classroom or retreat facilities and two investment or revenue-generating properties (ranching or energy developments).

The majority of college campuses were once located on the outskirts of urban centers. This often reflected the reduced cost of acquiring land for built structures, rather than intentionally taking up the task of land stewardship. These campuses acquired land for a variety of purposes, most of which have little to do with conservation.[17] Urbanization at the rural-urban interface is at the heart of a long list of environmental problems affecting North America

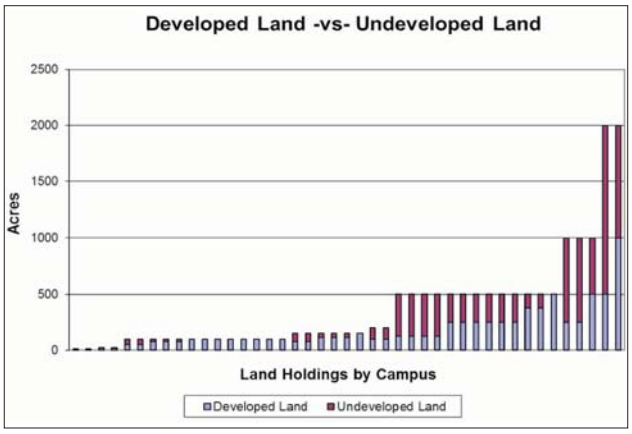


Figure 1. Land holdings and the disposition between built and open space for forty-three faith-based colleges and universities.

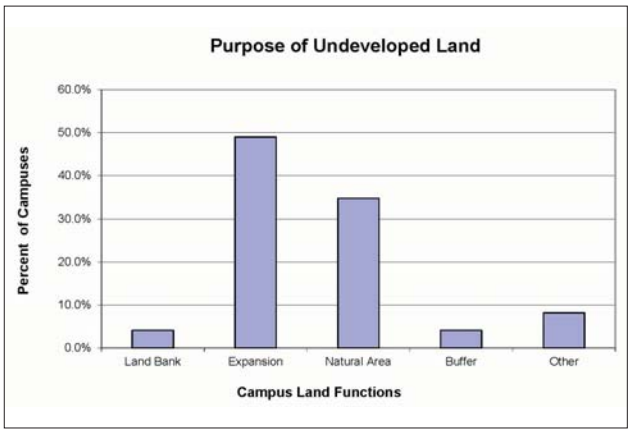


Figure 3. Designated purpose of undeveloped campus open space among forty-three faith-based colleges and universities.

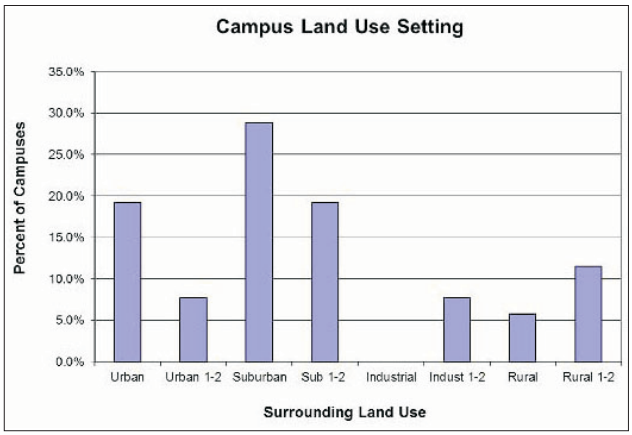


Figure 2. Predominant use of the landscape surrounding campus on one, two, or all sides among forty-three faith-based colleges and universities.

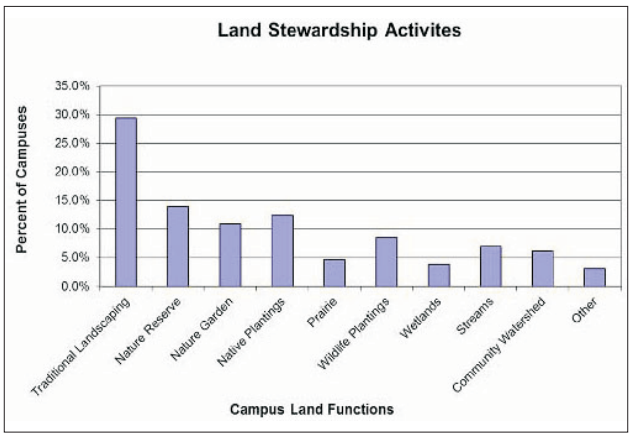


Figure 4. Land-based stewardship activities on forty-three faith-based university and college campuses.

today,[18] and colleges located in these areas face the choice of either becoming part of the problem or taking measures to minimize their impact. Thus campus environmental stewardship has been increasingly seen as a significant educational issue in a variety of institutions.[19]

Most of the more than one hundred CCCU institutions control at least a few acres of undeveloped real estate on or beyond their immediate developed campus. Several campuses own or have long-term leases on 1,000 acres or more of land. A few have undertaken agricultural and natural resource enterprises for pedagogical and revenue-generating purposes. How are these institutions, whether large or small land managers, approaching the lands entrusted to them? Why do they take these approaches?

Case Studies

A variety of campus sizes and intentionality of land-use practices exists among Christian institutions. There are many campuses engaged in excellent care of both small and larger acreage, and it was not our intent to comprehensively rank all of the well-managed CCCU campus lands represented among our respondents. However, several Christian colleges and universities come to the forefront in land management, due either to the sheer volume of land being managed, the uniqueness of lands managed, or

Table 1. Campus Land Management and Planning at Selected CCCU Institutions

Institution	Related majors[1]	Faculty[2]	Staff[3]	Land use articulated[4]	STARS participant[5]	Land description	Acreage with moderate access[6]	Acreage with low access[7]	Total Acreage[8]
Calvin College	Environmental Studies, Biology	2	1	yes	no	Forest, Wetland, Meadow	95	100	195
Dordt College	Environmental Studies, Agriculture	2	0.85	yes	no	Prairie, Wetland, Agriculture	207	13	220
Gordon College	Biology, Environmental Studies	2	1	no	yes	Forest, Wetland	40	360	400
Goshen College	Environmental Studies, Agroecology graduate degree	4	2–4	yes; includes land policy	yes	Forest, Agriculture	65	1,184	1,249
Seattle Pacific University	Ecology, Biology	3	3	yes	yes	Forest, Wetland, Meadow	230	1,100	1,330
Taylor University	Earth and Environmental Science graduate degree	3	1	yes	yes	Forest, Agriculture	606	160	766
Trinity Western University	Environmental Studies, Geography, Biology	2	0.5	yes	no	Forest, Wetland, Meadow, Agriculture	80	129	209

[1]Majors and/or course work requiring or incorporating access to campus lands.
[2]Number of faculty with administrative points related to campus land management; at least one of these faculty members was interviewed for detailed information in each case.
[3]Number of staff with campus land management aspects as part of job description; includes staff interviewed in some cases.
[4]Written vision statement and/or core values statement related to land management, either separately or within a campus master plan.
[5]Sustainability Tracking, Assessment and Rating System™ created by the Association for the Advancement of Sustainability in Higher Education (AASHE). In addition to the four listed here, only two other CCCU schools—King's University and North Park—are registered for STARS.
[6]Number of acres of campus lands in relatively natural state or agricultural use, open to the general campus community or public.
[7]Number of acres of campus lands in relatively natural state or agricultural use, not open to the general campus community or public.
[8]Sum of acreage in categories 6 and 7.

the innovative approaches being taken in management (table 1). Choice of case-study schools was based on the presence of a nature preserve (with significant acreage being actively protected for biodiversity), natural resource management values (agroecology, community gardens, sustainable forestry, fisheries), and the public visibility of managed natural lands.

Case Study #1: Calvin College, Grand Rapids, Michigan

Stewardship of creation has been a strong emphasis at Calvin College for many years. In particular, this movement can be traced back to a "meeting of the minds" held at Calvin in the late 1970s, which produced the well-known primer on creation stewardship entitled *Earthkeeping*[20] (later updated as *Earthkeeping in the Nineties*).[21]

At present, about one-third of the 390-acre campus is in some "state of nature," meaning anything from small rain gardens, to native vegetation plantings by groundskeepers, to the Calvin College Ecosystem Preserve, a 100-acre landscape mosaic of woodlands and wetlands deliberately managed for native biodiversity and utilized for ecological research and environmental education (figure 5). Public trail access is allowed on about one-third of the preserve (figure 6), with student volunteer stewards assisting a faculty member who directs management.

Calvin College is located in the Plaster Creek watershed on the outskirts of Grand Rapids. The college relocated in the 1960s to what was then exurban land after outgrowing an earlier urban location. The college has recently acquired the 65-acre Flat Iron Lake property 30 miles north of campus, which is being inventoried for biodiversity and used as a prairie and limnological research site.

Figure 5. The environmentally friendly Bunker Interpretive Center at the Calvin College Ecosystem Preserve.

Land stewardship practices at Calvin range from landscape-level master planning to retaining and protecting wild areas, to more sustainable maintenance of traditionally landscaped areas. Recently Calvin has been involved in converting some lawn areas to woodland as mitigation for old-growth woodland lost in the process of new building expansion. Calvin has applied both top-down and bottom-up techniques in trying to control eutrophication in two stormwater detention ponds that drain into a nearby lake. Calvin also initiated the Plaster Creek Stewards, a consortium with churches in the watershed, to help conserve Plaster Creek.

Case Study #2: Dordt College, Sioux Center, Iowa

Dordt College distinguishes itself as one of the few CCCU institutions offering degrees related to both agriculture and environmental studies. Agriculture and ecology-purposed holdings total about 220 acres, with prairie and wetland restoration projects as well as the Agriculture Stewardship Center (ASC), all located on or near the main campus.

A century-old farm, sitting adjacent to the campus, accounts for sixty of these acres. Twenty-five acres are dedicated to experimental agriculture, fifteen acres to farmstead buildings and a soccer field, and twenty acres to upland prairie and wet prairie restoration sites. This area has become an island of open space, including public access, bike trails, and interpretive functions. The sustainable agriculture

Figure 6. The Calvin College Ecosystem Preserve information board includes public outreach information.

demonstration project at this location is focused on energy use under different cropping regimes.

Several miles from campus are an additional 155 acres. This outlying land includes 24 certified-organic acres, allowing variety yield testing for small grains, rotated with corn and soybeans. Other acreage produces conventional commodities such as corn, soybeans, alfalfa, oats, and wheat, along with experimental crops such as amaranth and sweet sorghum. Thirteen acres within this outlying land have been placed in the USDA Conservation Reserve Program wetland and riparian restoration. Native prairie seed has been used for part of this restoration work.

Dordt has a dedicated 0.75 farm manager/greenhouse position that is topped up with seasonal student workers in summer. A 0.1 equivalent maintenance worker is also dedicated seasonally. Various faculty members have undertaken the prairie curator role, and agriculture and environmental studies faculty assignments are closely integrated. Both the ASC and the Dordt College Prairie have mission statements, and agriculture and environmental studies from a Christian stewardship perspective are strongly supported by the administration.

Case Study #3: Gordon College, Wenham, Massachusetts

Gordon College has long had a strong environmental ethic, including mandatory recycling since 1988, biodiesel production, and green chemistry research. Faculty members have been prominent in the Christian environmental movement.[22]

The 400-acre Gordon/Chebacco Woods are conserved by the college and two bordering towns, with the help of a group of conservation nonprofits. With native trees, vernal pools, permanent ponds, and numerous hiking trails, the landscape provides excellent opportunities for stewardship initiatives within an increasingly developed region north of Boston.

Conservation is partly intentional and partly an accident of history and topography. As the college grew, buildings were clustered due to wet lowlands. As a result of wetland regulations, 90% of the college's holdings are unbuildable. Construction of a parking lot on peatland during a dry year in the 1950s illustrated that such development was unwise: the parking lot soon began to sink and return to marsh. Decades later, the degraded marsh was restored by the removal of blacktop, the addition of flood control features, and the planting of thousands of wetland plants. Because of these realities, the college put much of the large wooded parcel into conservancy.

The conserved forests are facing a number of stressors from changing climate, including pests such as the hemlock wooly adelgid. Decades ago, biology faculty encouraged the college to switch from using a sewage drainage field to a town sewer. More recently, the biology department has inventoried plants and freshwater resources to highlight the natural value of the land. Current efforts include use of the trails and ponds as educational sites, and research on vernal pools and invasive species. Hundreds of elementary students have visited Gordon on field trips through a General Electric grant. Student interest in sustainability has also resulted in the development of an on-campus organic garden, more local foods in the cafeteria, and composting.

Case Study #4: Goshen College, Goshen, Indiana

Goshen College is one of a small group of Christian campuses that have signed onto the Evangelical Climate Initiative, the American College and University Presidents' Climate Commitment, and the Sustainability Tracking and Assessment Rating System (STARS).[23] Goshen offers an undergraduate major in environmental science, a summer intensive program in agroecology, a sustainability semester in residence, and a Master of Arts in environmental education. The last three programs, along with the Institute for Ecological Regeneration, are based out of the Merry Lea Environmental Learning Center near Wolf Lake.

Goshen's main campus has a physical footprint of 158 acres, including a twenty-acre woodlot, and a two-acre retention pond converted into a wetland rain garden and seeded with prairie grasses and wildflowers. Grounds staff are also converting additional acreage from mowed lawn into native prairie. Goshen also maintains a 40-acre site in neighboring Michigan, managed to control invasive shrubs, and completely undeveloped except for a rustic cabin retreat site.

In addition to these holdings, Goshen is well known for its 1,189-acre Merry Lea tract. This land includes an environmental learning center, a farmstead for hosting local school groups, the Glacial Retreat Center, and the LEED Platinum-certified Reith Village. Undeveloped natural areas make up approximately 1,123 acres, which are crisscrossed by well-managed walking trails. This diverse preserve includes habitats ranging from vernal pools, bogs, and lakes to meadows, prairies, and forests. All food and landscaping waste at Merry Lea is composted to support the agroecology program.

Merry Lea has a full-time director of land management, mandated to conserve diversity in native plant and animal habitats.[24] This includes controlling invasive species using hand tools, mechanical equipment, and herbicides. Prescribed burning is utilized to maintain early successional wildlife habitat, to restore wetlands, and to preserve the prairie, savanna, and oak woodlands.

Case Study #5: Seattle Pacific University, Seattle, Washington

Seattle Pacific University (SPU) is completely integrated into an urban setting in the Queen Anne Hill area of Seattle, with less than one acre of undeveloped land at the home campus which includes a small urban wildlife habitat area. In 2009, an organic vegetable garden, the Seattle Pacific Agriculture for the Community and Environment project, was installed on an adjacent vacant lot.

Figure 7. Professor Eric Long and students have been conducting long-term ecological research on the deer of Blakely Island (foreground). The SPU dining hall / classroom / laboratory (background) incorporates earth-friendly design and materials. (Carina Long photo)

Off-campus parcels, however, place SPU on the upper end of Christian institutions in terms of undeveloped land holdings. The SPU Blakely Island Field Station, in the San Juan Island archipelago, encompasses 980 acres of mostly undeveloped land. The vast majority of this private island, including two lakes, is owned by SPU or available for educational use via easements. The Thomas B. Crowley family donated the land, custom-built the facility, and initially paid for facility management. Today, endowments created by the Crowleys and others underwrite the facility. A covenant with other island landowners allows access to most saltwater frontage on the island, and restrictive covenants protect the land from development. A full-time manager lives onsite year-round, with one biology faculty member serving as scientific director, while other faculty members spearhead various research projects (figure 7). Much of the land is under sustainable forestry management, with substantial pond and wetland areas in addition to five acres of field station facilities.

SPU also owns Camp Casey on Whidbey Island, encompassing 350 acres, of which 120 are undeveloped. A full-time manager lives onsite year-round. This acreage is adjacent to a similar habitat managed by the nonprofit Whidbey Camano Land Trust and includes the threatened golden paintbrush, *Castilleja levisecta*. Interaction with the nearby Pacific Rim Institute for Environmental Stewardship, an Au Sable Institute offshoot, allows scientific outreach.

Case Study #6: Taylor University, Upland, Indiana

Taylor University has a strong reputation as a champion of environmental stewardship among Christian campuses. In 2003, the college expanded a decades-old undergraduate environmental science program by adding a new graduate degree offering. Based out of the Randall Environmental Studies Center, this became the first Master of Environmental Science degree offered by a CCCU institution.[25]

Taylor's main campus has a physical footprint of approximately 200 acres, including a 55-acre state-registered nature preserve. Much of the campus is traditional lawn, though grounds staff have increased native tree plantings and unmowed grass areas over the years in an effort to beautify the

campus. There is a restored stream corridor leading to the eight-acre Taylor Lake site on the edge of campus, and a five-acre wet meadow that is left unmowed to support the growth of wetland plants.

In addition, the earth and environmental science department partnered with Avis Industrial Corporation to establish the nearby 25-acre Avis-Taylor Prairie Restoration. Taylor faculty and graduate students use this mature tall-grass prairie for various research projects, including the impact of management techniques on the development of the plant community, especially forb species.

In 2006, Taylor acquired an additional 686 acres of largely forested land, including an 80-acre forest preserve adjacent to the main campus and the Mississinewa River. The site contains multiple distinct wet- to dry-forest communities, active and fallow agricultural fields, and research projects, including tree planting.

Case Study #7: Trinity Western University, Langley, British Columbia

Salmon-bearing tributaries of the Fraser River criss-cross the campus of Trinity Western University (TWU). In its 50-year history, TWU has faced numerous riparian setback issues, but it has gradually embraced the pedagogical and research benefits of its natural setting. Events integral to land management included the formation of an ecological stewardship committee to address facilities impacts, the initiation of an environmental studies degree, and the acquisition of nature preserve areas.

Figure 8. The TWU wetland area adjacent to the Salmon River is home to many fish, bird, reptile, amphibian, and mammal species.

On the home campus, the Ecosystem Study Area (ESA) encompasses approximately 80 acres of second-growth temperate rainforest. This includes the Salmon River, its tributaries and wetlands (figure 8), and old-field meadow areas. The ESA serves multiple uses for recreation, reflection, and science lab/field activities. Most of the land is off-limits to development due to stream buffers and inclusion in the province's Agricultural Land Reserve program. An additional 57 acres of adjacent agricultural land includes ten acres of orchard and a community vegetable garden. The ESA hosts an outdoor salmon education program for hundreds of elementary students each spring (figure 9).

TWU also owns 72 acres on Salt Spring Island, off Vancouver Island. The Crow's Nest Ecological Research Area includes extensive Garry oak meadows. This endangered ecosystem serves as a field course and research site for students, faculty, and other scientists.[26]

Although budget cuts have reduced staffing, an ESA manager has been key to managing these land holdings. A Rocha Canada and TWU also created a joint field resource position that was tasked with an ongoing biodiversity inventory. An endangered mollusk (the Oregon forestsnail, *Allogona townsendiana*[27]), an endangered butterfly (the Propertius duskywing, *Erynnis propertius*[28]), and other threatened species have been uncovered. The inventory resulted in additional conservation steps to protect the land, with a side benefit of

Figure 9. The Salmon in the Valley elementary school program at TWU provides experiential learning opportunities to hundreds of children each year.

providing grant-funded conservation research experience for faculty and students.

Successful Strategies

There are men charged with the duty of examining the construction of the plants, animals, and soils which are the instruments of the great orchestra. These men are called professors. Each selects one instrument and spends his life taking it apart and describing its strings and sounding boards. This process of dismemberment is called research. The place for dismemberment is called a university.

–Aldo Leopold[29]

Several commonalities appear in the case studies of successful campus land management approaches. Not surprisingly they center around people. The key to good land stewardship lies in faculty, staff, and administrators who daily embody the heart of a collective mission to love the Lord, serve one another, and care for creation. We find that these three groups of individuals and one practice play vital roles in campus land management.

1. Support of stewardship values from the *administration*, including articulation into institutional vision.

University administration must balance competing demands. Garnering support for stewardship values from administration is never easy. Each of the Christian institutions profiled here has an ongoing story of the challenge of convincing leadership to adopt a vision for land management. University leaders, by and large, have little experience in the science or praxis of environmental stewardship. Ultimately, success in any institutional venture rests in gaining broad support from administrators, including upper-level management. The general model for achieving such a consensus comprises a core group of dedicated natural science faculty who engage administrators and students on land issues, advocate protection, and work to inculcate conservation values for the sake of educational vitality and for the land's intrinsic value. Certainly that is the story repeated at Calvin, Dordt, Gordon, and Trinity Western (figure 10).

2. Active involvement of *faculty* in advocacy for land and in conservation-related research.

Although students represent a strong voice for change at educational institutions, the reality that drives long-term change is concerted, patient effort by faculty members alongside successive generations of students. The language of a faculty position as a calling as opposed to simply a career is often used at Christian colleges and universities.[30] This special calling represents an opportunity among faculty members who make the study of God's creation and its stewardship a significant part of their life's work. Efforts to engage in restoration research and management of creation at off-campus sites would be clearly hypocritical if such faculty members ignored serious environmental issues on their own campuses. Indeed, many faculty members at the profiled campuses have devoted years of effort to campus stewardship. Often this is a thankless task. Scholarship opportunities arising from such efforts can be limited, and strong environmental advocacy may be met with derision, indifference, or opposition in the campus community. One remedy is the formation of stakeholder groups, such as the Ecological Stewardship Committee established since 1994 at Trinity Western. Any decision-making process that engages a broad spectrum of the community will be helpful.

3. Dedicated *staff* positions related to land management.

The third hallmark of successful, proactive land management is the provision of dedicated staff. This is a step that advances the process from the theoretical to the practical. Although faculty and administrators may agree on a vision, someone must carry it out. Certainly, students can be part of the equation. At Calvin, for example, students have been actively engaged in planting native species, controlling invasive species, and other earth-friendly activities such as reducing Calvin's carbon foot-

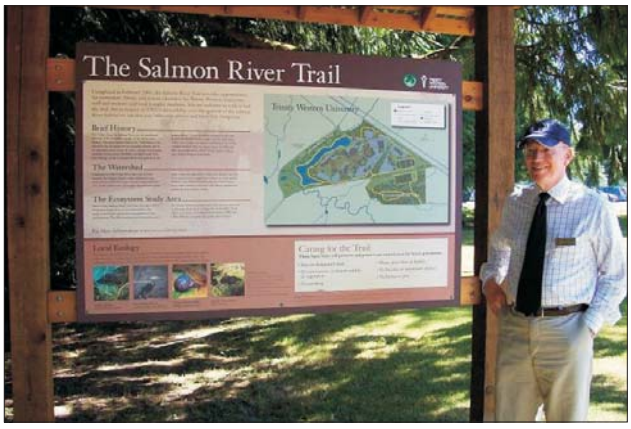


Figure 10. TWU President Jonathan Raymond supports conservation values, including public trail access through parts of the campus Ecosystem Study Area.

print.[31] At the same time, it is difficult to integrate active land management into the busy schedules of faculty and students, and in many of the institutions examined, dedicated staff positions were key in providing a sustained approach. In cases where staff positions are not created or maintained, it is difficult to fulfill the vision set out by faculty.[32] Such staff positions are costly investments to be sure, but can actually recover many costs normally incurred as a result of hiring outside consultants or payment of fines for infractions of government regulations.

4. *Bioinventory* and *mapping* to lay out *ecological value* of the managed land, which may then be translated to *economic value* to the institution.

The roles of land management staff can be tremendously varied and multifaceted. But one key role is in helping fulfill the fourth characteristic of successful land management: inventory and monitoring. Whether the land in question is newly acquired or subject to long-term restoration treatments, knowing what is there is vital to its stewardship. Extensive inventories of species and physiographic characteristics have been carried out for each of the seven institutions reviewed. The species inventory of the 100-acre Calvin Preserve is exhaustive. The thirteen-acre wetland placed in the Conservation Reserve Program by Dordt is well characterized. Species in the four hundred acres stewarded by Gordon are well known to professors and students there. Similarly, the land holdings of Goshen, Seattle Pacific, Taylor, and Trinity Western are also mapped and inventoried (figure 11). Placing the resulting species lists onto websites facilitates collaboration with government agencies and other interested parties.[33] Ecosystems are dynamic and restoration efforts must be adequately resourced in order to monitor the success of these long-term efforts. This may require sacrificial attitude and effort, but it can also lead to unique research and restoration funding opportunities.

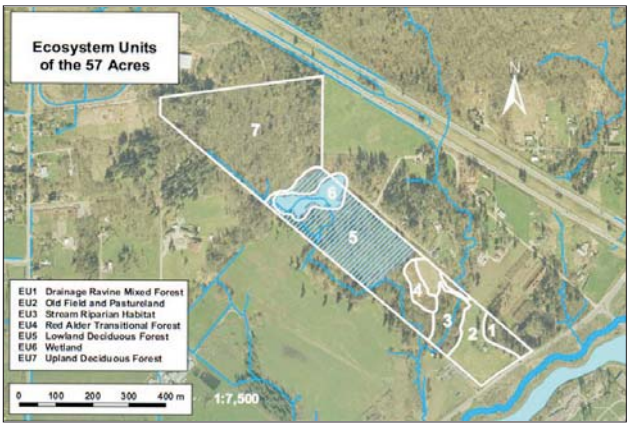


Figure 11. TWU-managed land holdings have been extensively inventoried and mapped by biology, environmental studies, and geography faculty and students.

Benefits of Land Stewardship within a Christian Land Ethic

We have reported the strategies used by some of the CCCU schools to successfully manage their land holdings, but what are the benefits of managing within the framework of a specific Christian land ethic? Improved ecosystem services, reduced utility and infrastructure costs, and research funding opportunities are all economic benefits that can be realized from progressive land management policies. Of equal importance is the effect of these practices on all members of the campus community, and indeed on all who look to Christian higher education for examples of innovation and excellence. For students who have seen ubiquitous native plantings, eaten from a community garden, or studied at a field site, the impressions will have a lasting impact on their thinking and their actions regarding the creation. This becomes the less-tangible, but crucial long-term benefit of campus land management, the prophetic landscape for the future.

As Wes Jackson has suggested, we should "consult the genius of the place"[34]—meaning, the genius of the land itself—in all of our consideration of human impact, if we are to retain our ecological capital. Today, in our maturing Christian academic institutions, we must begin to ask, "What does land stewardship really mean?" There are many proscriptive dimensions to land stewardship still needing exploration. We need to see the land through new eyes. As this survey and these case studies have shown, academics at Christian institutions are leading in new directions, with innovative strategies. Yet there is much to be learned about the practical matter of caring for the creation, and a biblical understanding of the gift is the place to start. ⌘

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About the Authors

Karen M. M. Steensma *is an associate professor of biology and environmental studies at Trinity Western University in Langley, BC, teaching zoology, ecology, and marine biology courses. Her research has centered on conservation and agro-ecology. A past board member of A Rocha USA, she is also co-owner of a third-generation commercial dairy farm near Lynden, Washington.*

David Clements *is a professor of biology and environmental studies at Trinity Western University in Langley, BC. He was the first chair of the TWU Ecological Stewardship Committee, a founding board member of A Rocha Canada, and is currently the president of the Canadian Weed Science Society.*

John Wood *was born in Japan, grew up on a clear-cut in western Washington, and completed his BA in biology at North Park University on the banks of the Chicago River. He has a life-long interest in theology and nature. His PhD is from the University of California, Berkeley, in stream ecology and insect behavior. His current research is on the behavior of urban white-tailed jackrabbits, human-nature interactions, and edible insects. Wood is professor of biology and environmental studies and the Dean of the Faculty of Natural Sciences at The King's University College, Edmonton, AB.*

Randy Van Dragt *is professor of biology at Calvin College. He is an ecologist with interests in ecosystem management and restoration. He has designed and supervised construction of several nature preserves and for more than twenty-five years has directed the Calvin College Ecosystem Preserve, a 100-acre natural area on the Calvin College campus. For nearly two decades, he has taught restoration ecology at the Au Sable Institute of Environmental Studies. He is currently chair of the Board of Trustees of Pacific Rim Institute for Environmental Stewardship on Whidbey Island, WA, where he is involved in the restoration of a native outwash prairie on the Institute's campus.*

Ben Lowe *is director of Young Adult Ministries at the Evangelical Environmental Network, and the National Spokesperson for Young Evangelicals for Climate Action. He is the author of* Green Revolution *(IVP 2009) and also serves as the board chair of the Au Sable Institute.*

Notes

[1]Clive Staples Lewis, *The Magician's Nephew* (New York: HarperCollins, 1954).

[2]Wendell Berry, *The Gift of Good Land: Further Essays Cultural and Agricultural* (New York: North Point Press, 1982), 270.

[3]Wendell Berry, *Home Economics: Fourteen Essays by Wendell Berry* (San Francisco, CA: North Point Press, 1987), 96–7.

[4]Jillian Berman, "College Students Are Flocking to Sustainability Degrees, Careers," *USA Today*, August 3, 2009, http://www.sas.upenn.edu/lps/news_091109_01; and see Mary Beth Marklein, "College Hopefuls Look for Green Universities," *USA Today*, September 15, 2011, http://www.usatoday.com/news/education/2011-04-20-green-college-campus-princeton-review.htm.

[5]Eric Norregaard and Kendra Juskus, eds., "Green Awakenings: Stories of Stewardship and Sustainability from the Next Generation," *Renewal: Students Caring for Creation* (2010), http://renewingcreation.org/resources/840/the-green-awakenings-report-2010/.

[6]Many efforts to improve campus sustainability are restricted primarily to aspects not directly related to land management; for example, the STARS (Sustainability Tracking Assessment and Rating System) program on North American campuses developed by AASHE (The Association for the Advancement of Sustainability in Higher Education). See https://stars.aashe.org/; the STARS rating system does include a "Grounds Category" that rates institutions on "integrated pest management," "native plants," "wildlife habitat," participation in the "Tree Campus USA" program, "snow and ice removal," and "compost." However, this category could be expanded considerably to incorporate additional aspects of land stewardship, and only a single criterion addresses large land holdings, that is, "wildlife habitat."

[7]Robert N. Muller and David S. Maehr, "Are Universities Leaders in the Stewardship of Conservation Lands?" *BioScience* 50, no. 8 (2000): 707–12.

[8]Ibid. A number of case studies illustrating policies and practices on US campuses are presented in Muller and Maehr. They reported that, despite the gift of a 5,866-acre parcel of land to the University of California at Santa Barbara with a "no sale" clause in 1967, the university managed to overturn this clause in 1990 and entertain proposals to subdivide the land to fund other university enterprises. However, pressure from the local conservation community and conservation-minded faculty resulted in the entire parcel being preserved for conservation. They also reported the acquisition by the University of Florida of 2,043 acres of land containing a mature second-growth stand of long-leaf pine that was home to the federally endangered red-cockaded woodpecker. Despite the endangered status of the bird, logging of the parcel to support university revenues continued, and the woodpecker was extirpated from the site by 1983. In a third case study, Muller and Maehr narrated a sequence of events surrounding a 14,786-acre parcel of land acquired by the University of Kentucky. Despite the conservation value of the land, timber was removed and coal mining was advocated to increase university revenues. And in the five specific case studies that they described, no clear policies or management plans have emerged

regarding land conservation; they maintain that this is a consistent theme among US institutions.

[9]For example, see K. Hailey, "Building a Sustainable Institution," *University Manager* (Fall 2008): 35–40.

[10]Michael M'Gonigle and Justine Starke, *Planet U: Sustaining the World, Reinventing the University* (Gabriola Island, BC: New Society Publishers, 2006).

[11]Bernard Ramm, *The Christian College in the Twentieth Century* (Grand Rapids, MI: Eerdmans, 1963); Arthur F. Holmes, *Building the Christian Academy* (Grand Rapids, MI: Eerdmans, 2001).

[12]Muller and Maehr, "Are Universities Leaders in the Stewardship of Conservation Lands?"

[13]Ben Lowe, *Green Revolution: Coming Together to Care for Creation* (Downers Grove, IL: InterVarsity Press, 2009); Matthew K. Heun, David Warners, and Henry E. DeVries II, "Campus Carbon Neutrality as an Interdisciplinary Pedagogical Tool," *Perspectives on Science and Christian Faith* 61, no. 2 (2009): 85–98; J. Matthew Sleeth, *Serve God, Save the Planet* (White River Junction, VT: Chelsea Green, 2006); Steven Bouma-Prediger, *For the Beauty of the Earth: A Christian Vision for Creation Care* (Grand Rapids, MI: Baker, 2001).

[14]Two faith-based institutions included in the survey, Gustavus-Adolphus College and Pepperdine University, are not members of either the Au Sable Institute or the CCCU networks, but were included because of personal contacts.

[15]Questionnaire and a poster based on partial data was presented by The King's University College Environmental Studies Internship Reflections class (Themis-Marie Laffitte, Ben Peterson, Jonathan Bakker, Ike Asagwara) at the 61st Annual Meeting of the American Scientific Affiliation, Calvin College, 2006.

[16]See Norregaard and Juskus, *Green Awakenings*, for an extensive review of student-led sustainability activities on CCCU campuses. http://renewingcreation.org/resources/green-awakenings-report/.

[17]Muller and Maehr, "Are Universities Leaders in the Stewardship of Conservation Lands?"

[18]For example, see Tracy Stobbe, G. Cornelis van Kooten, and Geerte Cotteleer, "Externalities and Valuation of Farmland in the Urban Fringe," Farm Level Policy Brief, Agriculture and Agri-Food Canada, May 2007, http://www.learnnetwork.ualberta.ca/en/FarmLevel/Publications/PolicyBriefs.aspx.

[19]Peggy Barlett and Geoffrey W. Chase, eds., *Sustainability on Campus: Stories and Strategies for Change* (Cambridge, MA: Massachusetts Institute of Technology, 2004); Anthony D. Cortese and Amy S. Hattan,"Education for Sustainability as the Mission of Higher Education," *International Journal of Sustainability in Higher Education* 3, no. 1 (2010): 48–52; Tara Wright, "University Presidents' Conceptualizations of Sustainability in Higher Education," *International Journal of Sustainability in Higher Education* 11, no. 1 (2009): 61–73; Leith Sharp, "Higher Education: The Quest for the Sustainable Campus," *Sustainability: Science, Practice, and Policy* 5, no. 1 (2009): 1–8.

[20]Loren Wilkinson, ed., *Earthkeeping: Christian Stewardship of Natural Resources* (Grand Rapids, MI: Eerdmans, 1980).

[21]Loren Wilkinson, ed., *Earthkeeping in the Nineties: Stewardship of Creation* (Grand Rapids, MI: Eerdmans, 1991).

[22]Richard Wright, "Tearing Down the Green: Environmental Backlash in the Evangelical Sub-Culture," *Perspectives on Science and Christian Faith* 47, no. 2 (1995): 80–91.

[23]At this time (December 2011), six CCCU institutions are enrolled in STARS.

[24]Land management practices have been well documented at Merry Lea since Goshen first acquired the land in 1980, and more detailed information can be found online at http://merrylea.goshen.edu/.

[25]At least two other campuses (Goshen College and Lipscomb University) have since added environment- and sustainability-related graduate programs.

[26]Emily K. Gonzales and David R. Clements, "Plant Community Biomass Shifts in Response to Mowing and Fencing in Invaded Oak Meadows with Nonnative Grasses and Abundant Ungulates," *Restoration Ecology* 18, no. 5 (2010): 753–61.

[27]Karen M. M. Steensma, Patrick L. Lilley, Heather M. Zandberg, "Life History and Habitat Requirements of the Oregon Forestsnail, *Allogona townsendiana* (Mollusca, Gastropoda, Pulmonata), in a British Columbia Population," *Invertebrate Biology* 128, no. 3 (2009): 232–42; Amanda B. Edworthy, Karen M. M. Steensma, Heather M. Zandberg, Patrick L. Lilley, "Dispersal, Home-Range Size, and Habitat Use of an Endangered Land Snail, the Oregon Forestsnail *(Allogona townsendiana),*" *Canadian Journal of Zoology* 90 (2012): 875–83.

[28]Alicia Marshall, "Populations of *Erynnis propertius* at Selected Sites on Salt Spring Island, British Columbia," *Garry Oak Ecosystem Recovery Team Research Colloquium 2008 Proceedings* (2008): 13–4.

[29]Aldo Leopold, *A Sand County Almanac, and Sketches Here and There; with Other Essays from Round River* (New York: Oxford University Press, 1948, 1966).

[30]Holmes, *Building the Christian Academy*, 102–3; Walter R. Hearn, *Being a Christian in Science* (Downers Grove, IL: InterVarsity Press, 1997), 51.

[31]Heun, Warners, and DeVries, "Campus Carbon Neutrality as an Interdisciplinary Pedagogical Tool."

[32]For example, at Gordon College (Dorothy Boorse, personal communication); at Trinity Western University there have been recent reductions in land management staff capacity.

[33]http://twu.ca/sites/ecosystem/species/default.html.

[34]Wes Jackson, *Consulting the Genius of the Place* (Berkeley, CA: Counterpoint, 2010), ix.