

Designing Campuses That Teach Sustainability

Collaborative Partnerships with
Students, Faculty and Staff

AASHE 2006 Conference
Phoenix, Arizona
October 2006

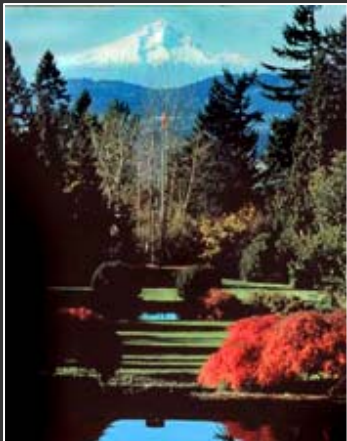
Michael Sestric, Campus Planner



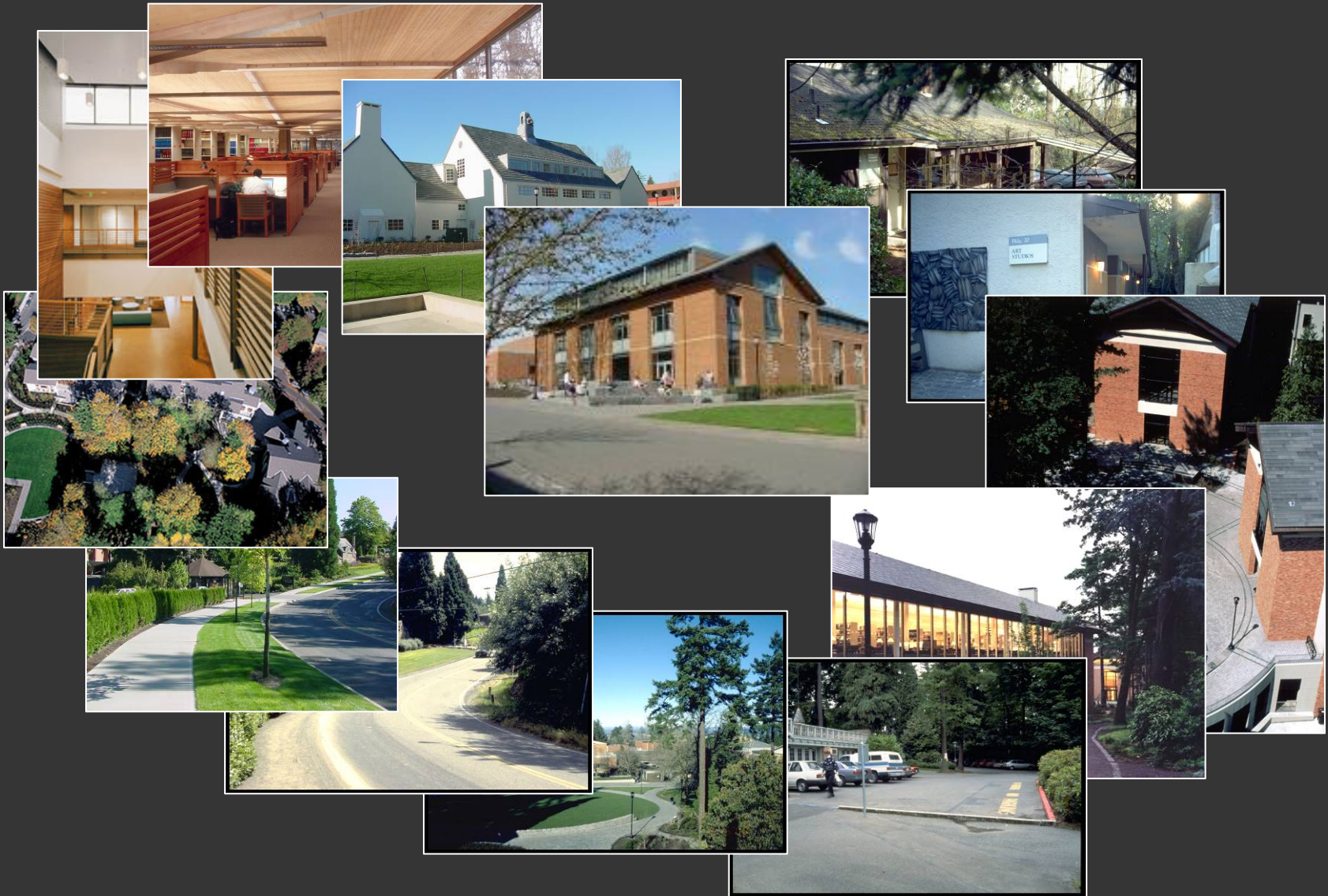
Special thanks to THA Architects, Hoffman Construction Company and the Students and Faculty of Lewis & Clark College for providing important material for this presentation.

Lewis & Clark College

- Residential Liberal Arts College in Portland, Oregon
- Post Graduate Educational Programs in:
 - Law & Teacher Education
- Total enrollment about 3,000
- 60 Buildings, about 1.2M SF, 145 acres.
- Approx. 700 employees



A Decade of Green Building



Finding a Green Building Standard*

- Alternative Standards
 - Natural Step
 - MSDG
 - Earth Advantage
 - LEED™
- Why L&C chose LEED™
 - National Standard
 - Comprehensive
 - Objective



<http://www.naturalstep.org/direct/>

Minnesota Sustainable Design Guide

<http://www.msgd.umn.edu/>



<http://www.portlandgeneral.com/>



<http://www.usgbc.org/>

* First Student Project by Gene Wixson

Principles of Environmental Design



SOCIAL SCIENCES PROJECT GREEN FEATURES

Welcome to Lewis & Clark College's new center for the social sciences, developed to support scholarship and teaching of the highest caliber.

LEED™ categories & key to signage:

- 1 Sustainable Sites**
- 2 Water Efficiency**
- 3 Energy & Atmosphere**
- 4 Materials & Resources**
- 5 Indoor Environmental Quality**
- 6 Innovation & Design Process**

The building's 51,000 square feet include:

- 26 classrooms
- Wireless network access in all flexible-seating classrooms
- 3 classrooms with wired connection to the network at every seat
- 14 classrooms equipped for multimedia presentations
- 54 faculty and staff offices
- 7 rooms for meetings, conferences, and special projects
- 36 interior bicycle parking spaces

The project's design team included Thomas Hacker Architects, Walker Macy landscape architects, CBO Consulting Engineers mechanical and electrical engineering, Harper Hall Peterson Rigbells civil engineering, Portland General Electric's Green Building Services Earth Advantage and LEED® Consultant, and Lewis & Clark students and faculty who served on planning committees for the center and its classrooms. Students: Alexis Babin, Hana Brueck, Brian Gossens, Spencer Thompson, Elana Gueney, and Laurel Nakashima initiated this poster project and helped draft its text. The graphic design firm of Clark Neagley Square, Heather Burke '05 and Brandon Hulse '07, designed this poster series. For more information on the center or green building, please e-mail the Lewis & Clark Office of Campus Planning at planning@clark.edu.

“The Hydrologic and Economic Limitations of the Proposed Storm Water Integration System for Howard Hall”, Graham Gilbert, May 2002

SKETCH #1 - PLAN VIEW

EXISTING WELL AND PUMP

REFLECTING POOL
(IRRIGATION WATER STORAGE)

HOWARD HALL

The Fundamentals of Hydrology

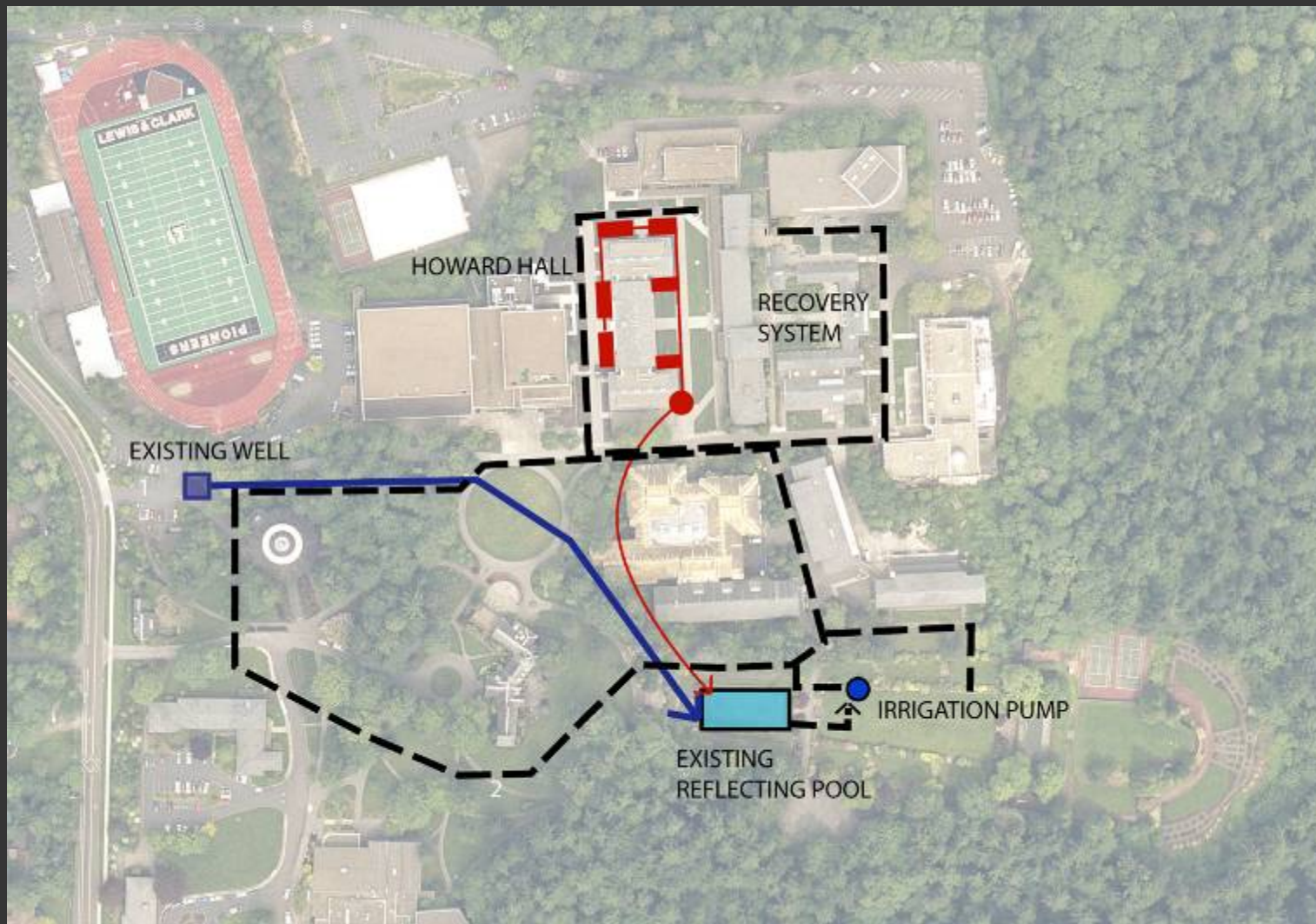
- “Capturing Runoff Water from Howard Hall: A Hydrologic Analysis”, Becky Zentmyer, May 2002

“It is possible to augment summer irrigation demands by 48% using captured runoff water. There is more than enough water to supply the demand from flushing toilets in the building.”



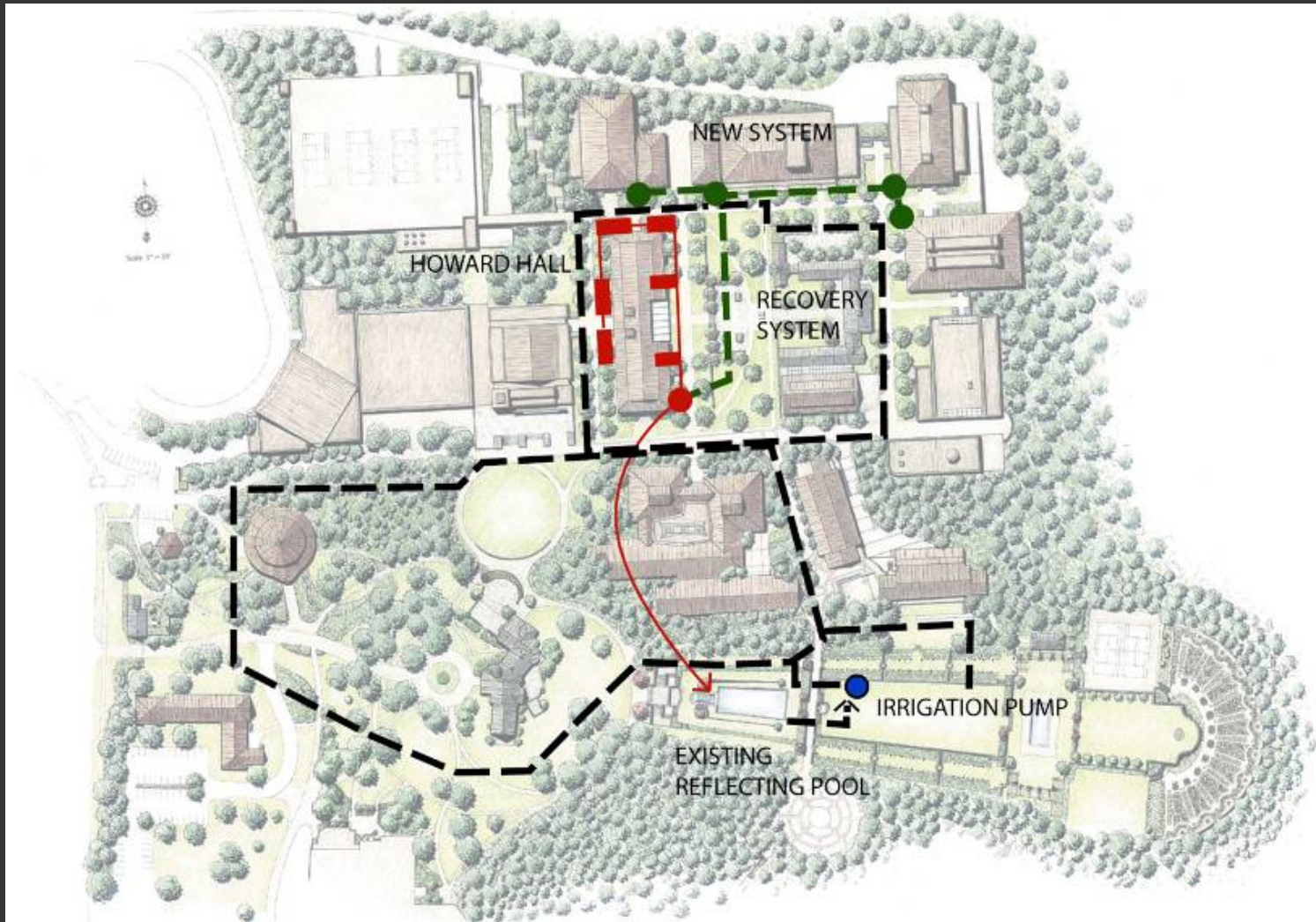
The Fundamentals of Hydrology

- Walker Macy design solution



The Fundamentals of Hydrology

- Walker Macy design solution



Environmental & Natural Resource Econ

- “The Energy Efficiency of Off-Campus Housing vs New On-Campus Housing”, Sarah Laufer, Cristina Marino, Maren Olson, May 2001

“If you add up the cost of rent, heat, hot water, other utilities, security deposit, general maintenance and commuting, living in Sellwood would not prove to be less expensive than living on campus. By living in (Roberts) you could save up to \$38.18 per month”



Senior Seminar in Environmental Studies

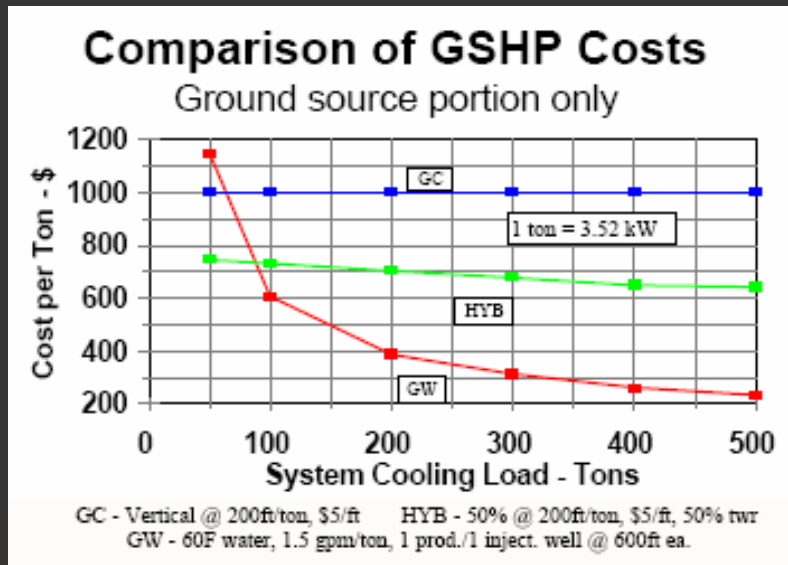
- “An analysis of the Use and Effectiveness of Natural Storm Water Mitigation Systems at Lewis & Clark College”, Steven Walsh, Dec 2002

“ Even though this study presents TSS removal readouts for a single day, it provides a snap shot of what could possibly be of concern: the inability for mitigation systems placed on campus to effectively remove up to 70% of total suspended solids.”



Energy & The Environment

- “Feasibility of Ground Source Heat Pump Study at Lewis & Clark College”, Kat Mullins, Aaron Vandenberg, and Adrienne Zuckerman, May 2005



“ a site needs to be chosen for the piping to run in a vertical or horizontal layout. In some commercial applications, a vertical system requires the same amount of square footage as the footprint of the building itself,..... Horizontal systems often require a much larger area. With a new construction project, there are alternative methods of helping save space by designing piping in a stacked design—with two to four pipes running parallel to each other—as well as wrapping the pipe around the perimeter of the building footprint. This may provide a significant boost to the feasibility of constructing a GSHP system on the Lewis & Clark campus.”

Senior Seminar in Environmental Studies

- “Guidelines for College-Level Greenhouse Gas Emissions Inventories”, Julian Dautremont-Smith, May 2002
- “Building to Kyoto Compliance” , Julian Dautremont-Smith, May 2003
- “Campus Planning for Climate Change”, Julian Dautremont-Smith and Michael Sestric, July 2005

“the study demonstrates that only in one of the 9 scenarios is there any real possibility of Kyoto compliance. Even then, meeting Kyoto in the scenario requires new buildings to be twice as efficient as the current most efficient building.”

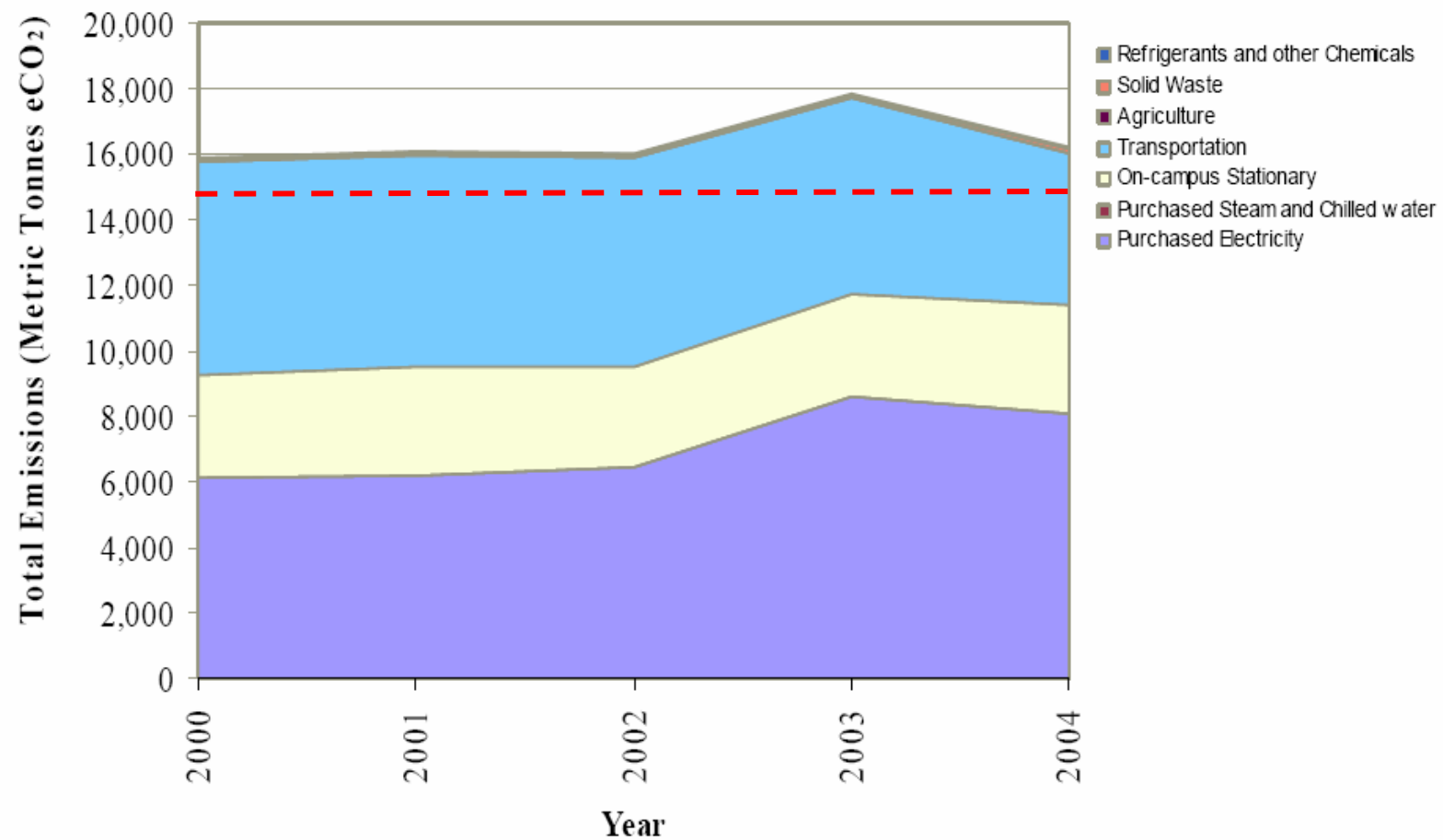


October 24, 2003
Portland, Oregon

**“As Senate debates
greenhouse gas caps,
Lewis & Clark College
is first to achieve Kyoto
Protocol compliance.”**

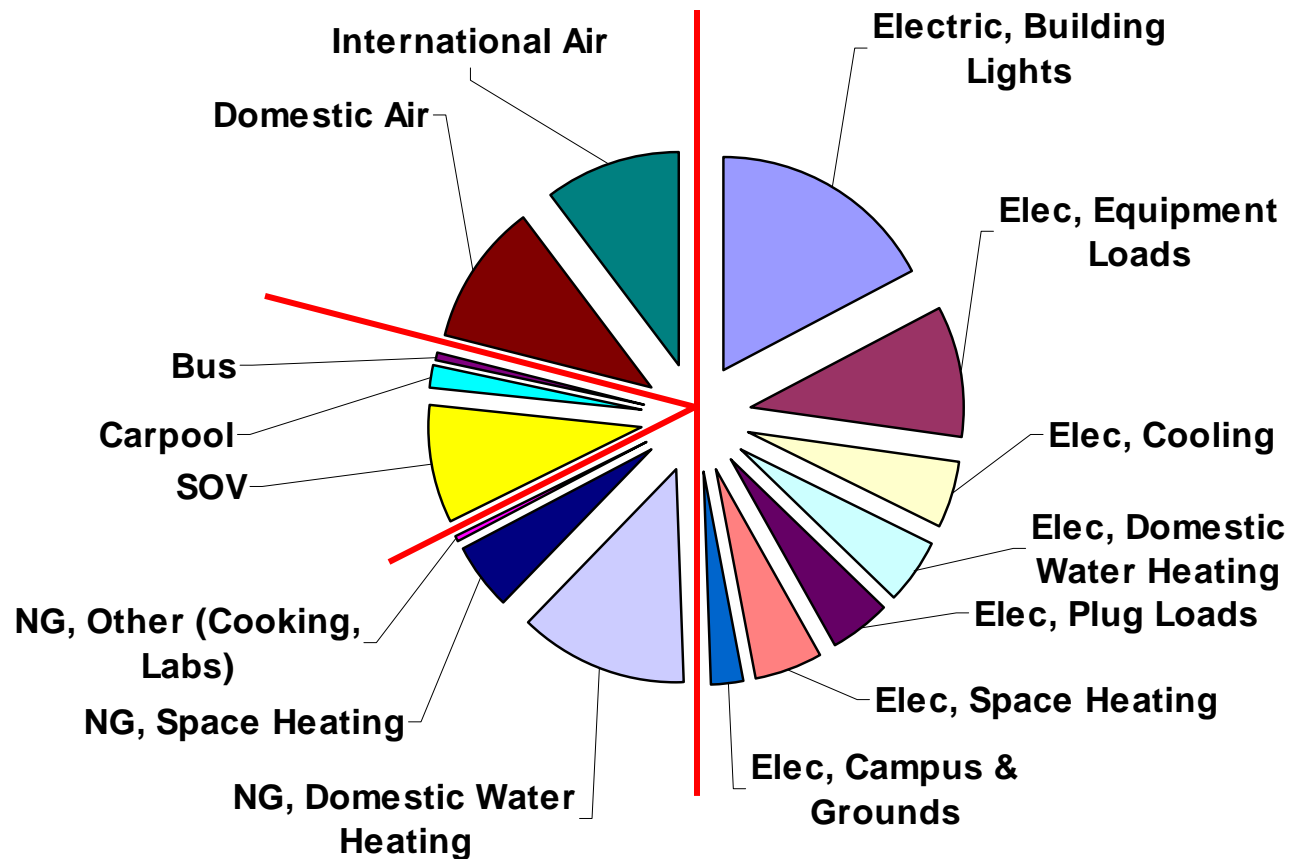


Laura Matson '05 and Brian Erickson '06



Total Emissions for Lewis and Clark College in CO2 Equivalent (eCO2)

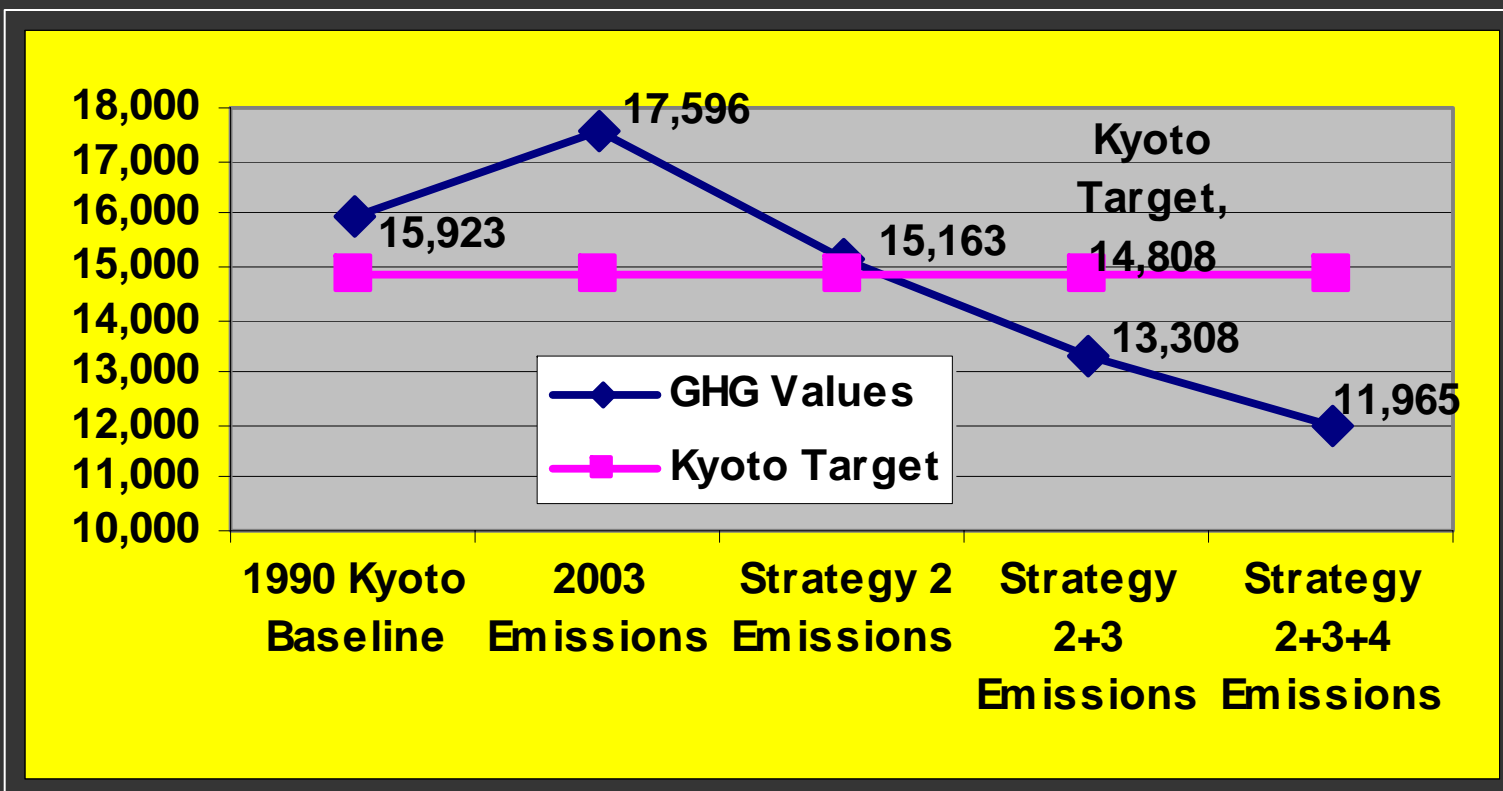
GHG Distribution, 2003



Lewis & Clark's GHG Reductions Test Strategies:

- **Strategy 1:** Right Size the Campus
- **Strategy 2:** Improve energy efficiency:
 - Of existing structures by 25% and
 - Raise new structures from LEED Gold to LEED Platinum with 20% improvement in energy profile.
 - Go beyond LEED Platinum?
- **Strategy 3:** Build “net zero walk-to-school” housing
- **Strategy 4:** Selective on-site energy production:
 - Photovoltaics
 - Solar H2O
 - Ground Source Heat Pumps
 - Co-Generation
 - Wind, Geothermal, etc.

Cumulative Results with Strategy 2+3+4



Senior Seminar in Environmental Studies

- “Stream Buffers: Portland Healthy Streams?”, Steven Buback and Meredith Haaman, Dec 2002

“ We found that Arnold Creek with a buffer size of approximately 30’, had significantly greater water quality as compared to Tryon Creek with a buffer of 500’.

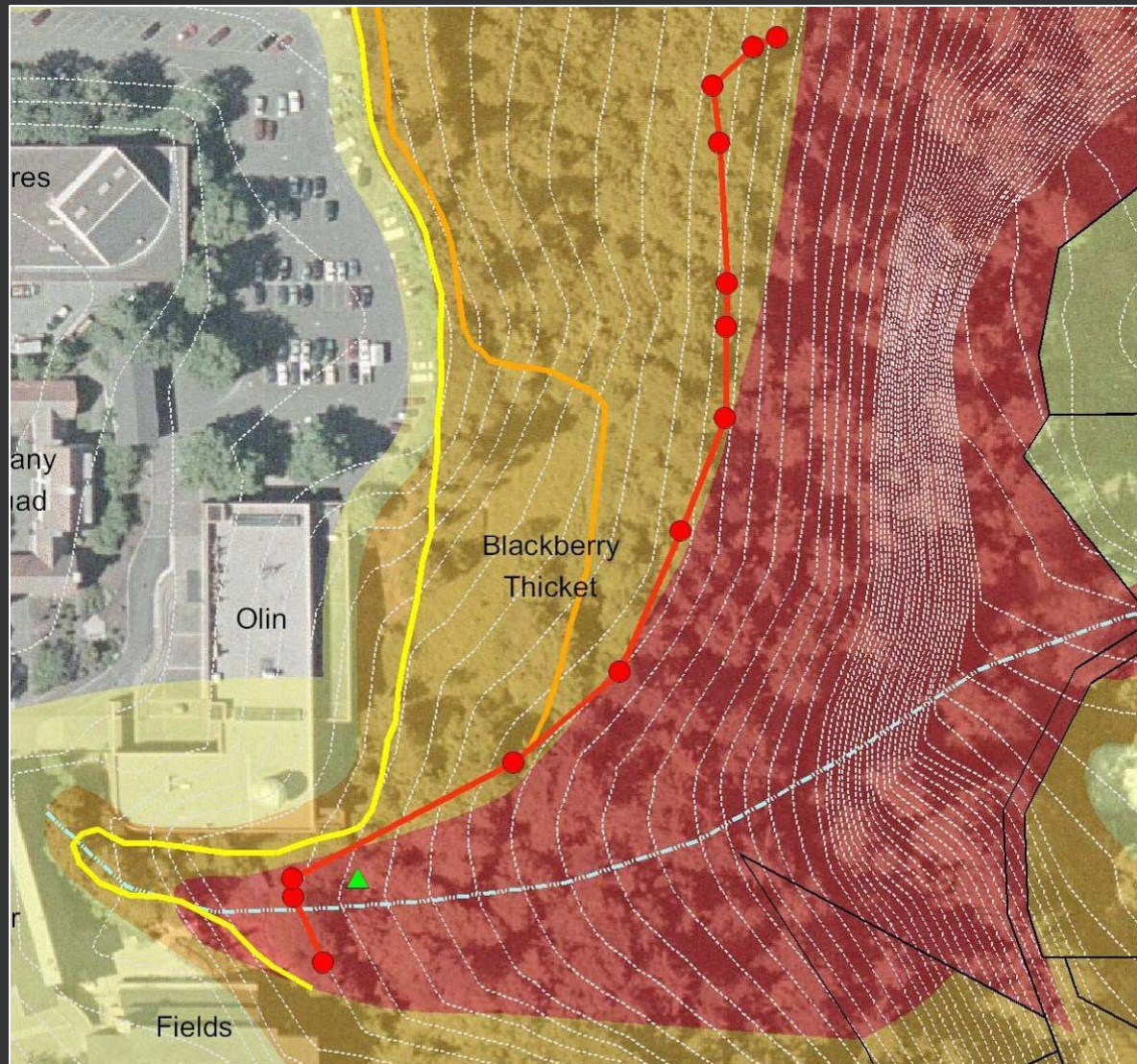


Healthy Portland Streams Internships, Summer 2003



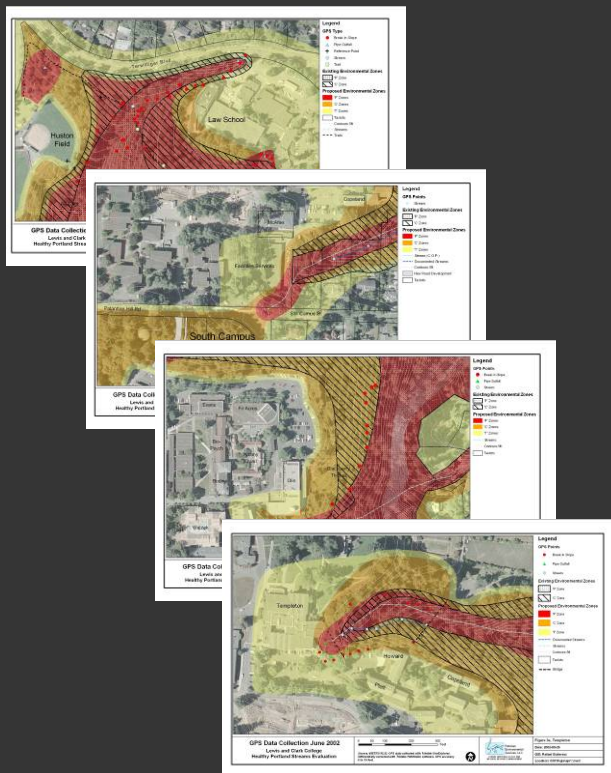
Three student interns funded by Campus Planning assist environmental planners to collect and evaluate information about the environmental protection zones that surround the campus

Healthy Portland Streams Internships, Summer 203



Healthy Portland Streams Internships, Summer 2002

- Casey Fagre, Team Leader,
- Steven Buback, Laura Czarniecki, Team Members

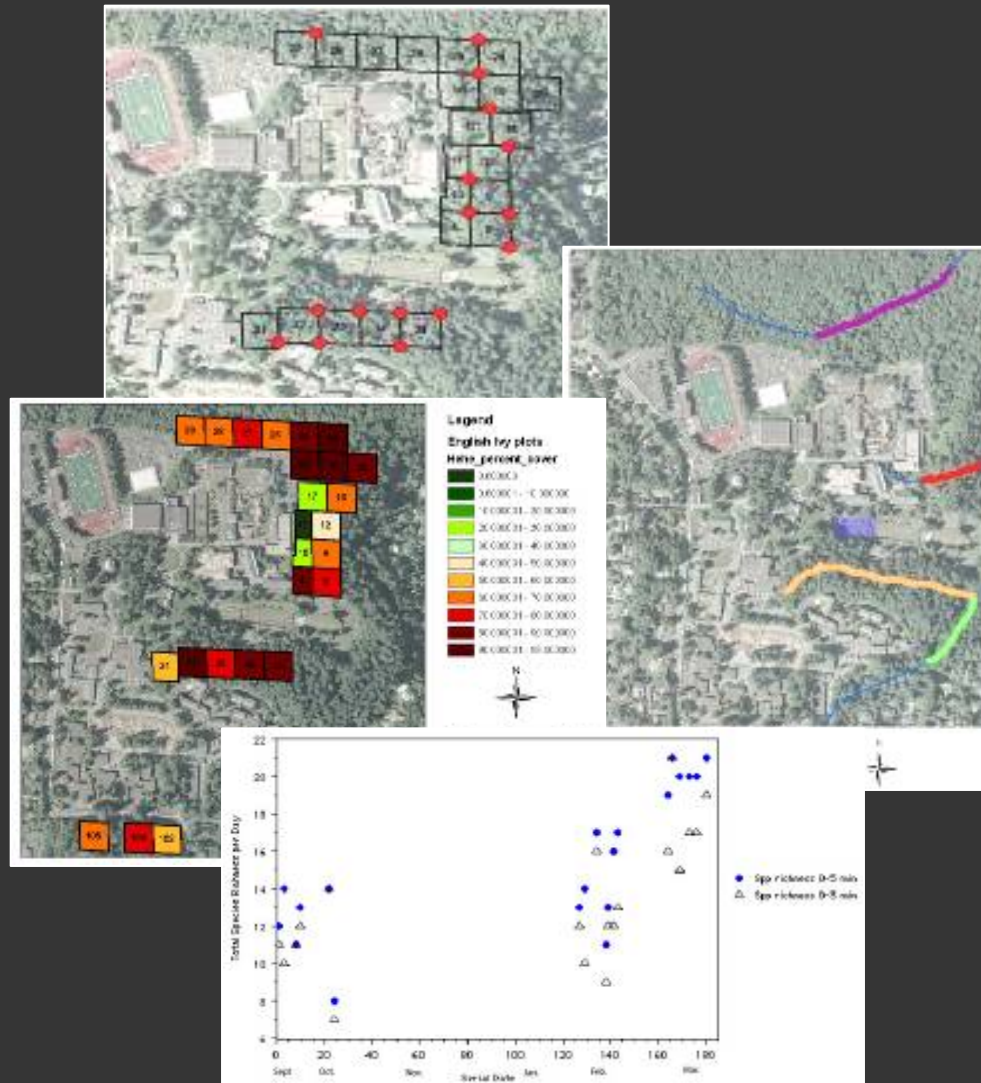


“Based on our investigations of the four areas above, we feel that the proposed e-zones are generally correct when looking at the overall picture of campus. However, there are some specific areas that should be considered for modification. These are mostly likely mapping errors due to the tree canopy cover on the aerial maps that COPBOP was working from.

In some areas, further information would be helpful to assessing the accuracy of the proposed e-zones. We recommend that the sources of water flow be more thoroughly investigated in order to determine whether or not a component of the water is unrelated to the storm water runoff and surface drainage systems that are in place there.”

Biology Senior Honors Thesis

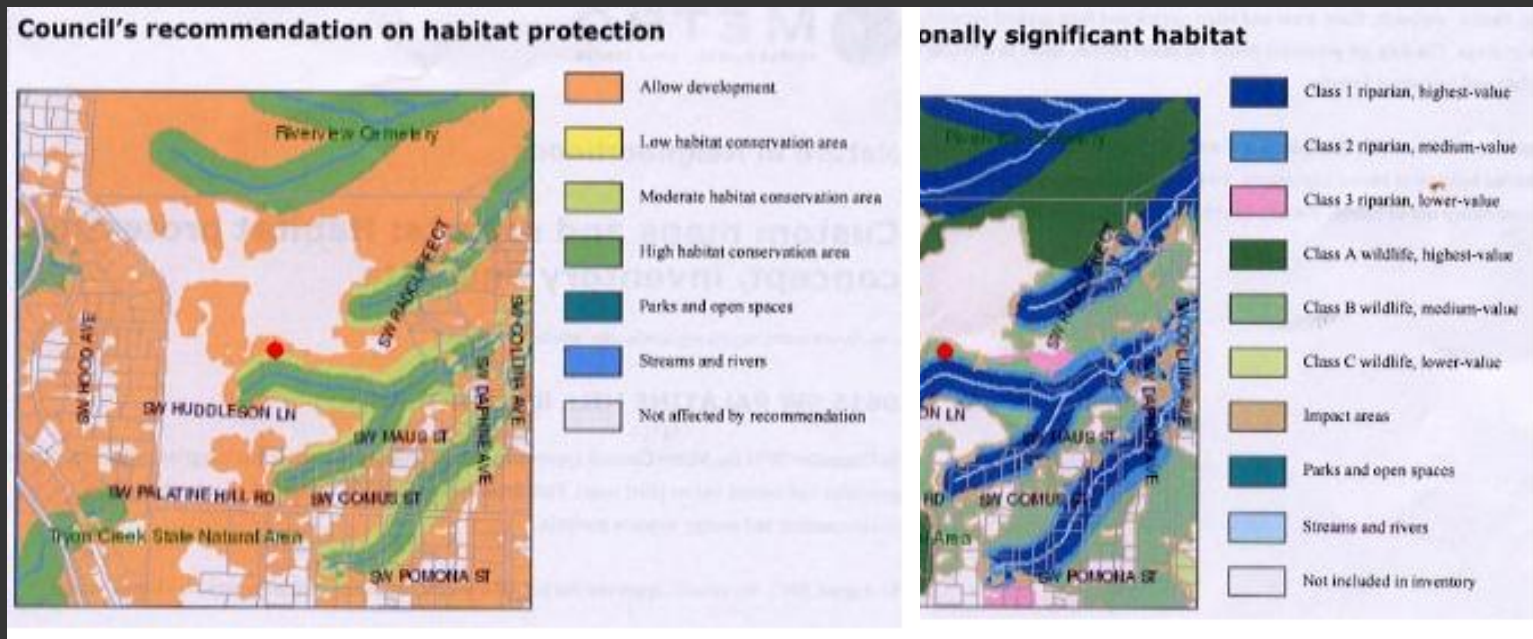
- “Design and Implementation of an Ecological monitoring Program for the Lewis and Clark College Campus” Brian Erickson, May 2006



“..... studying urban ecology on a college campus makes it possible to apply many principles of ecology and restoration to the immediate landscape. This fact turns college campus natural areas into teaching laboratories. The coupling of prime location, an environmental ethos, a desire to maintain natural areas, and the potential for applied research makes the study of urban ecology at Lewis & Clark College worthwhile and feasible.”

Senior Seminar in Environmental Studies

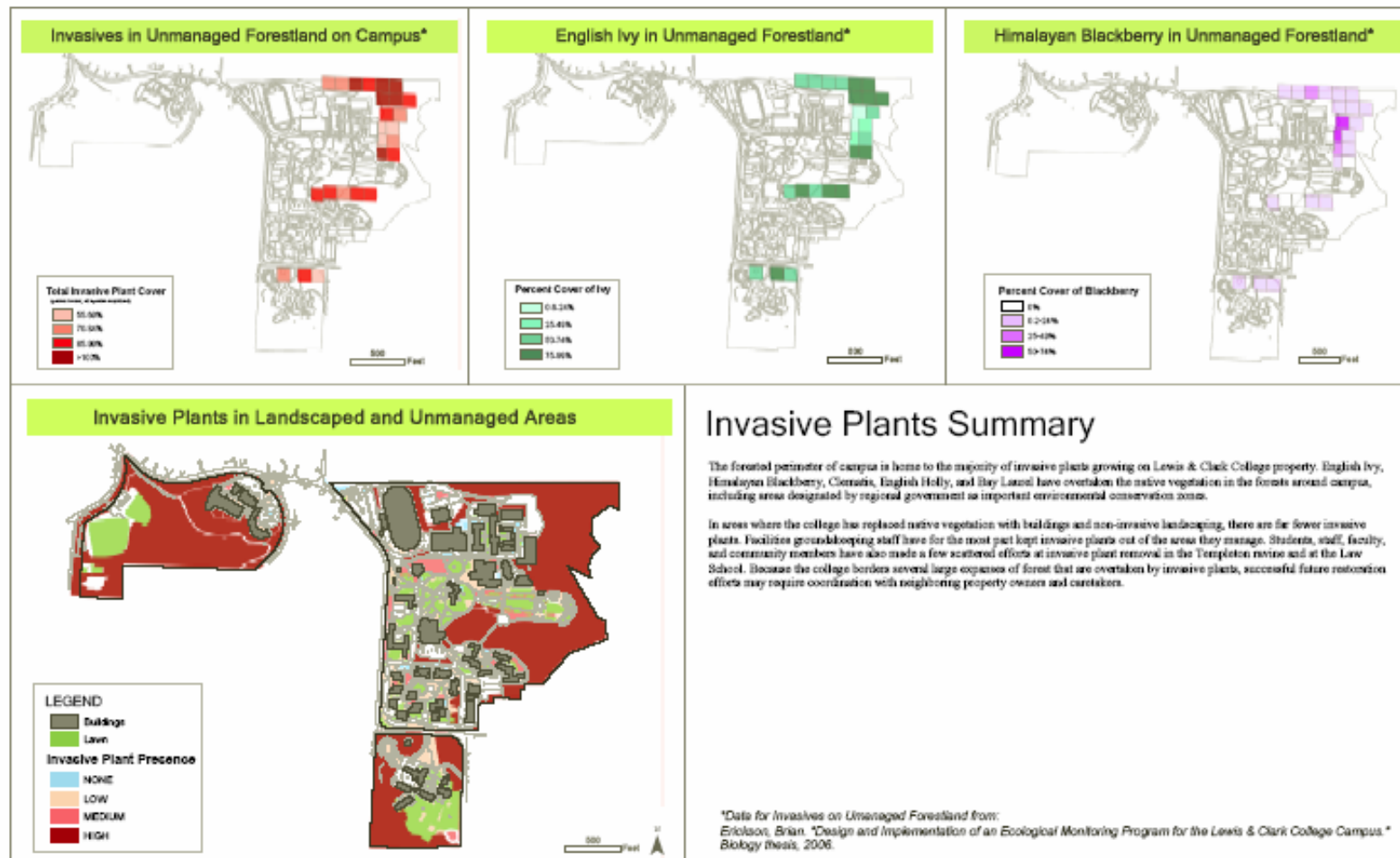
- “Riparian Ecosystem Analysis: Science and Policy”, Lauren Senkyr, Dec 2005



“The results of the assessment suggest that the site does not currently perform the ecological functions of Class 1 riparian habitat, mainly because of invasion by non-native plant species. Nature in Neighborhoods achieves its goals of conserving this land, but the ordinance does not protect or adequately assess the habitat’s ecological significance. I propose a restoration plan for maintaining the ecological integrity of the site that involves continued monitoring and assessment, removal of invasive species, revegetation, and adoption of improved land management practices. ..”

Campus GIS Mapping 2006:

TJ Harrison, Megan McBride and Alyssa King, Campus Planning Interns

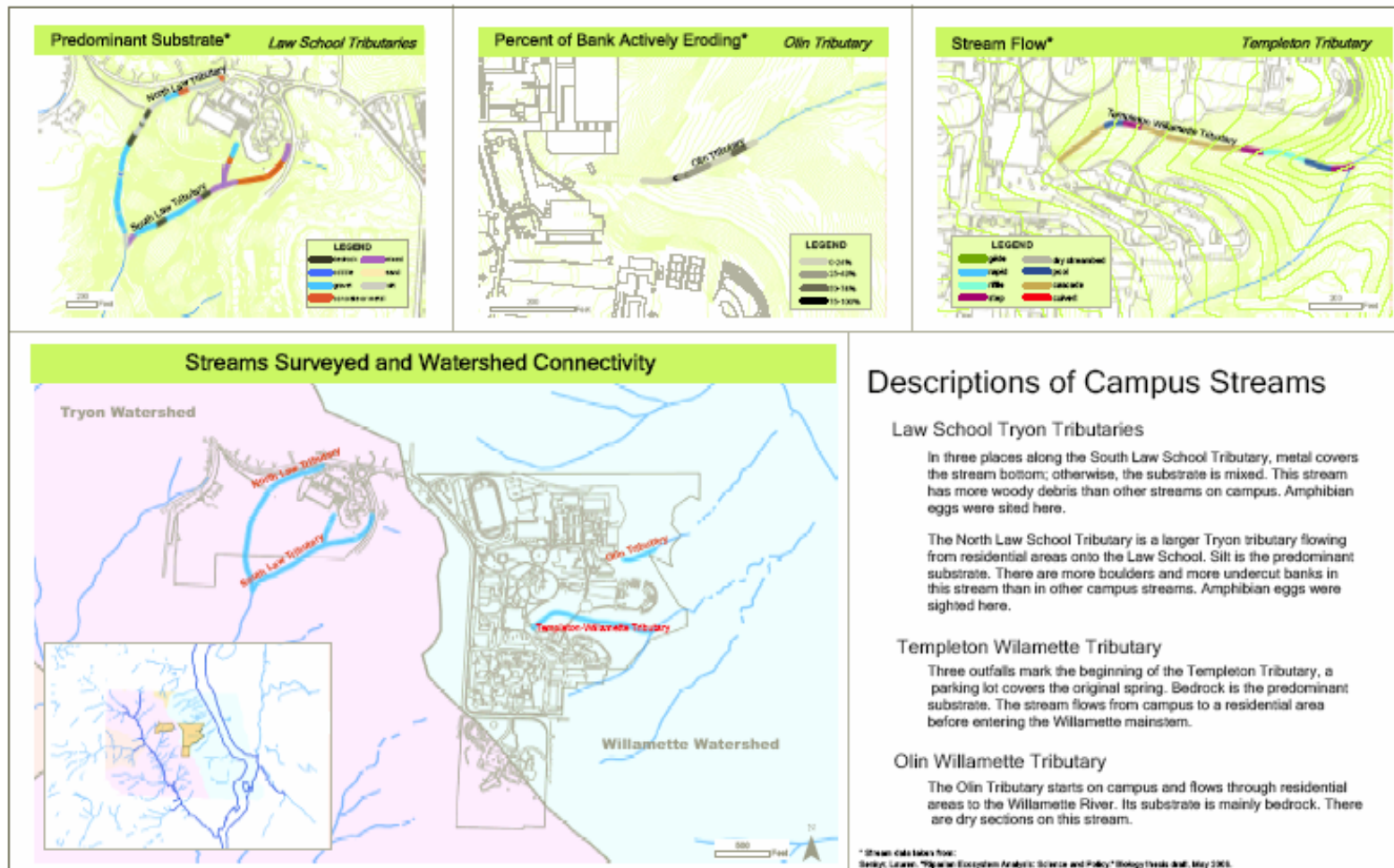


Ecology: Invasive Plants

*Campus Planning
 Lewis & Clark College (August 2006)
 Cartographer: TJ Harrison*

Campus GIS Mapping 2006:

TJ Harrison, Megan McBride and Alyssa King, Campus Planning Interns



Ecology: Aquatic Habitat Survey Results

*Campus Planning
Lewis & Clark College (August 2006)
Cartographer: TJ Harrison*

Principles & Lessons Learned

- **Administrators** must be willing to work with students and faculty to develop mutually beneficial educational opportunities.
- **Faculty** must be willing to
- **Students** must be interested in
- Funding must be available for professional assistance, paper and pencil, work study, etc.
- Most A&E consultants will welcome an opportunity to involve students in projects.
- Student participation must be consider a learning experience but they still need the skills to pull it off.
- <http://www.lclark.edu/dept/planning/previousproj.html>