



Using the Campus as a Teaching and Research Tool

Opportunities for ecologists to link to campus sustainability efforts

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Use the Campus as Teaching Tool



"Using local examples connects classroom curricula to student lives in a way that textbooks do not. Incorporating local examples into classroom activities increases student confidence as it draws upon student experiences and background knowledge while demonstrating the connection between classroom curricula and student experience." (Harnick and Ross 2004)

Pedagogical Reasons



- Students are likely to engage with material that they already know (Kolb 1984, Zull 2002, Lave and Wegner 1990, Sobel 2004)
- Links with service learning, shown to improve learning and student satisfaction (Astin et al, 2000)(Eyler and Giles, 1999), (Eyler et al 2001), (Lui, 2004)
- Using the campus as a study site gives students an opportunity to be part of the campus community in a practical, hands-on way.

Practical Reasons



Simple logistics: Campus-based learning occurs on the campus. Transportation or lodging is not required.

Inexpensive: Campus-based projects can be completed without a budget for field trips.

Examples



- Simple Class Assignment
 - Biodiversity Count (University of Pittsburgh)
- Landscaping Projects
 - Sarita Wetland (University of Minnesota, Twin Cities)
 - 868 student in 17 courses used wetland in classes in 2006
 - 9 independent study projects
 - 6 master's theses
 - 1 dissertation

<http://serc.carleton.edu/introgeo/campusbased/examples>

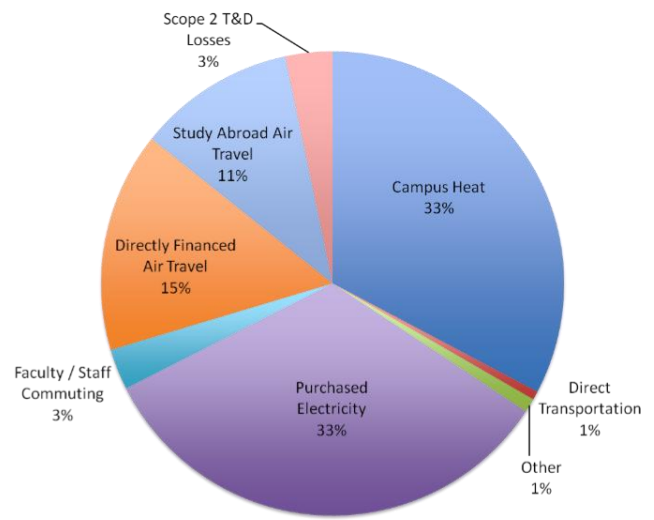
- Resource/ Energy Flows
 - ACUPCC
 - Campus Nitrogen Budgeting

American College & University Presidents Climate Commitment

- Emissions Inventory
- Climate Neutral Plan (includes targets and timetables)
- Two Immediate Steps
 - Subsidized Bus Passes (50% and 20%)
 - As of March 26, increase transit miles by 1612 miles/week
 - Reduced CO_{2e} by 60,081 lbs/academic year
 - Purchase Energy Star Appliances

American College & University Presidents Climate Commitment

Nature Precedings : doi:10.1038/npre.2009.4039.1 : Posted 1 Dec.2009



GHG Emissions Inventory 2008

- Macalester College's Environmental Studies Senior Seminar Class Projects

- GHG Emissions Inventory 1990-2006

- Institutional Climate Neutral Plan Recommendations

Carbon Neutrality Strategy

1. Invest in Energy Efficiency

- Potential cost savings for energy efficiency are significant and should be implemented as soon as possible. These cost savings need to be used to create a self-funding path to carbon neutrality.
- We are still waiting for the results of two large efficiency studies, but preliminary data suggest that these projects can generate around \$250,000 a year.

2. Transition to Carbon-Neutral Fuel Sources

- Electricity – we benefit from the MN Renewable Energy Standard that requires Xcel Energy to generate 30% of their power from renewable sources by 2020.
- Cost-effectively eliminate heating emissions by burning biogas. This does not require any infrastructure changes on campus, saving significantly on capital costs.
- Before transitioning to biogas phase out fuel oil #6 immediately which allows efficiency upgrades to the central boilers such as economizers and an O₂ trim system, which reduce our overall energy demand.

3. Offset the Remaining Emissions

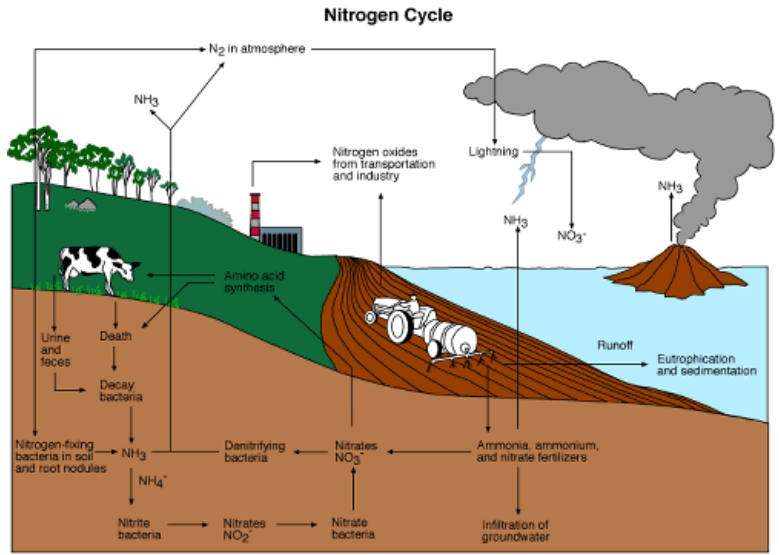
- Full implementation of energy efficiency and transition to biogas are estimated to reduce our total emissions 52% by 2020
- We do not recommend purchasing offsets until 2020 when absolutely necessary.
- If Macalester paid to offset 48% of emissions today the cost would be \$50,000 a year based on pricing used for the IGC offsets.

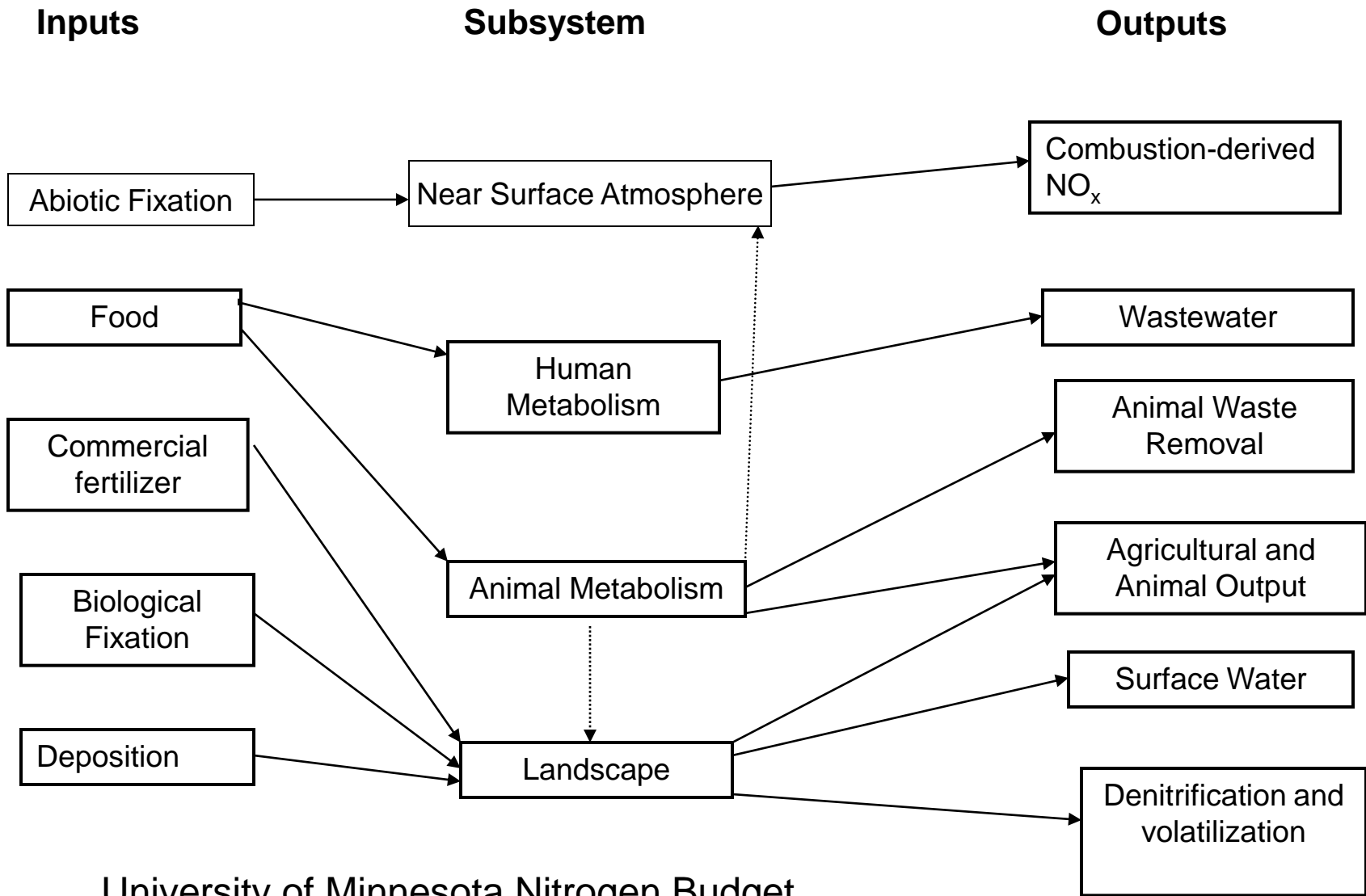
Resource and Energy Flow Example

- Nitrogen Budget

- Urban Nitrogen Budget
Central Arizona
Phoenix LTER

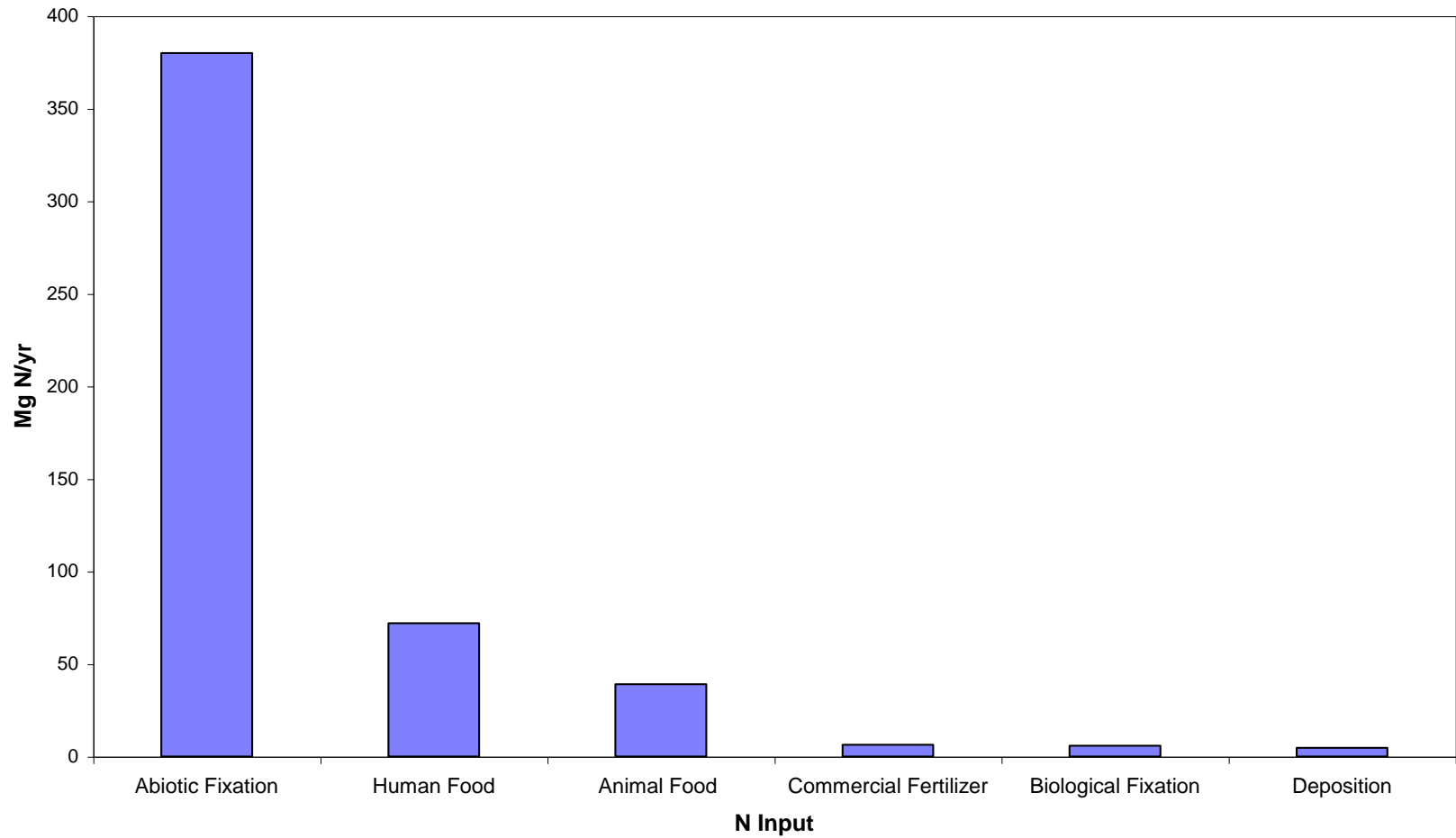
- Inputs to urban and agriculture order of magnitude higher than desert.





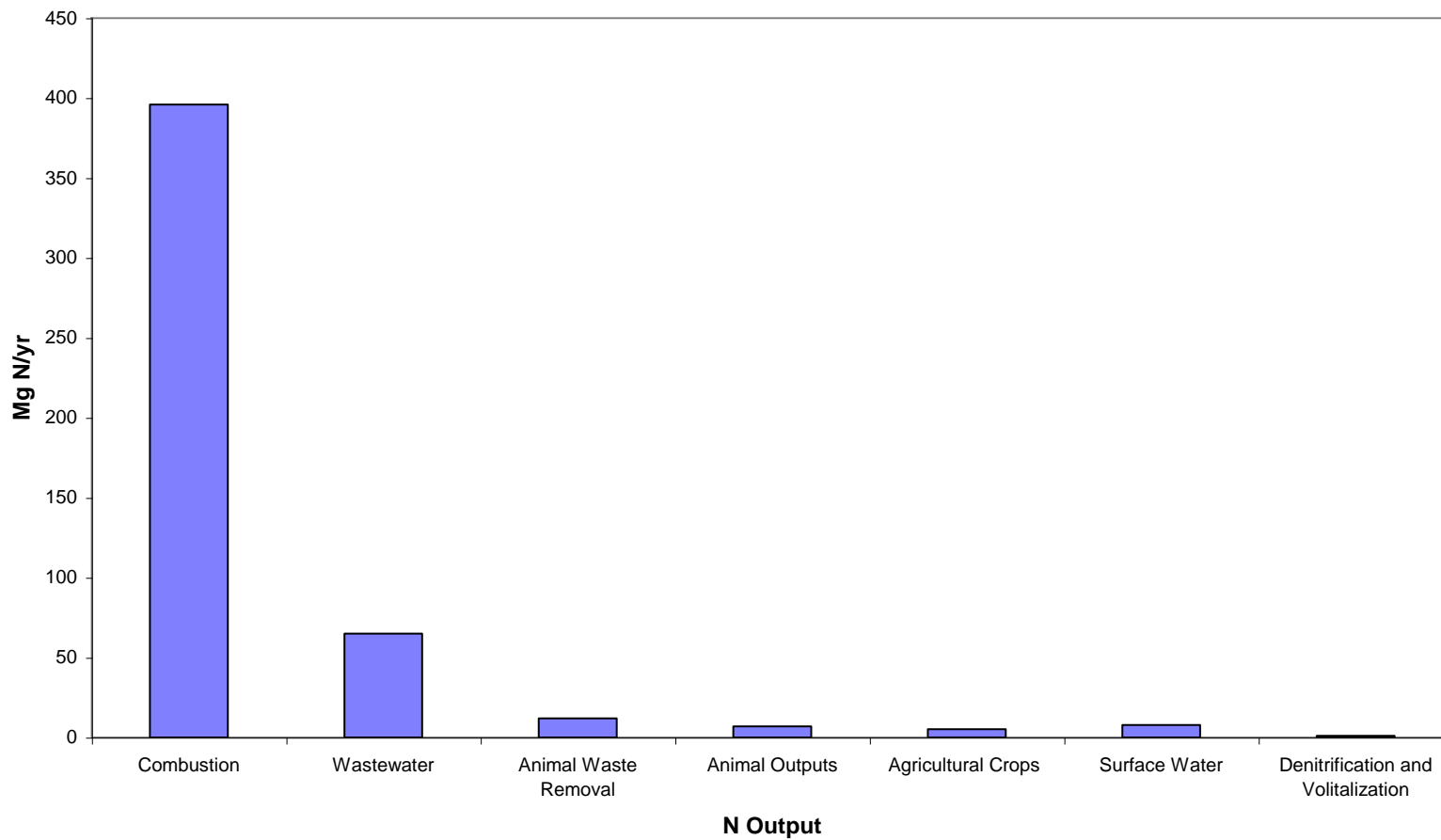
University of Minnesota Nitrogen Budget
(Savanick, Baker, Perry, 2007)

U of M Nitrogen Input



U of M Nitrogen Output

Nature Precedings : doi:10.1038/npre.2009.4039.1 : Posted 1 Dec 2009



How to Incorporate Campus Projects?



1. Find Appropriate Projects for the Class
2. Find Resources and People
3. Students Present Information to the Community
4. Assess Student Projects
5. Archive Student Projects

<http://serc.carleton.edu/introgeo/campusbased/howto.html>

Recommendations for Ecologists



- Engage With Your Sustainability Office (if you don't have one engage with Facilities Management).
- Use the Presidents Climate Commitment as an Educational Opportunity
- Utilize the LTER Urban Ecology Research and apply the concepts to the campus



HOME

ABOUT US

ACADEMICS

AWARDS

CAMPUS DATA

COMMITTEES

INITIATIVES

ORIENTATION MATERIAL

POLICY

PRESS

PUBLICATIONS

POSSIBLE STUDENT PROJECTS

 Contact the Sustainability Office, unless noted differently (shansen@macalester.edu)

Category	Possible Disciplines	Topics
Academic Integration	Education/Enviro Ed	Research educational opportunities with
Academic Integration	Education/Enviro Ed	Create database of all sustainability focu
Assessment	Environmental Studies	Update the 2004 State of the Campus re
Community Engagement	Art	Create banners for Zero Waste events.
Community Engagement	Art	Create logo for sustainability events .
Community Engagement	Education/Enviro Ed	Develop sustainability tour activities for
Community Engagement	Education/Enviro Ed	Create hands-on displays and activities

Useful Resources

Resources for Macalester College Faculty

www.macalester.edu/sustainability/

Science Education Resource Center

serc.carleton.edu/introgeo/campusbased/index.html

National Wildlife Federation Campus Ecology Program

www.nwf.org/campusecology

Association for the Advancement of Sustainability in Higher Education

www.aashe.org

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