

Appendix F

CALVIN
College



*CALVIN ENVIRONMENTAL
ASSESSMENT PROGRAM
(CEAP)*

CALVIN COLLEGE EMBRACE OUR PLACE CEAP SHOWCASE

Calvin's Office of Community Engagement within the Provost's Office recently held a week-long festival to commemorate Calvin's connection to and partnership with our community, city, and region. The festival was April 16-23, 2007. Following are highlights of the many ways our academic mission of teaching, learning, research, and scholarship is fulfilled within our place.



STRUCTURE AND FUNCTION OF THE ATHLETIC FIELD PONDS

Semesters of Project: 2000—2006

Faculty: Randy Van Dragt, Department of Biology, Biology 345

Location: Northeast corner of the Calvin College campus

Description: Calvin's athletic field ponds are heavily influenced by runoff from the college campus and surrounding residential areas. For several years, the Biology 345 class evaluated the nature of the human impacts on the ponds and in the end developed management options to improve the water quality in the ponds. Management actions (a berm to trap nutrients and introduction of a large fish predator) were taken in 2000 and 2001 and the effects evaluated in 2006. It appears management actions have resulted in a reduction of the eutrophication of these ponds.



ENVIRONMENTAL IMPACT ASSESSMENT OF EAST CAMPUS DEVELOPMENT ON THE ECOSYSTEM PRESERVE

Semester of Project: 1999

Faculty: Randy Van Dragt, Department of Biology, Biology 345

Location: West and south margins of the Ecosystem Preserve



Description: In the year following the adoption of the 1998 college master plan, the Biology 345 course conducted an environmental impact assessment of the impacts of construction and development on the Ecosystem Preserve. That evaluation led to several design elements incorporated into the East Campus plan, like the water treatment ponds created to condition parking lot runoff before it enters the preserve.



STRUCTURAL AND FUNCTIONAL ASSESSMENT OF THE CREATED WETLAND AT THE COOK VALLEY ESTATES RETIREMENT COMMUNITY

Semesters of Project: 2000—2003

Faculty: Randy Van Dragt, Department of Biology, Biology 345

Location: West of East Paris Road between Lake Drive and Cascade

Description: In 1999 and 2000, Porter Hills Retirement Communities developed the Cook Valley Estates Retirement Community on old muck farmland just west of East Paris Drive in Grand Rapids Township. The project involved the creation of an 8-acre wetland and the permit for wetland construction required that the design firm monitor the development of the wetland and file annual reports on its progress for a five-year period. From 2000 to 2003, the Biology 345 class conducted analyses of the aquatic communities in the wetland that were submitted as part of the annual report to the Michigan Department of Environmental Quality (DEQ).



BUCKTHORN REMOVAL STRATEGIES

Semesters of Project: Individual trials were initiated in fall 2005, spring 2006, and fall 2006. They are ongoing. Successive classes collect data from a previous class and initiate an additional study.

Faculty: David Dornbos, Department of Biology, Biology 243

Location: Around the pond on the north side of the Bunker Interpretive Center (BIC)

Description: The objective of the project is to identify the optimal concentration of glyphosate herbicide required to control common and glossy buckthorn, related invasive non-native shrubs, as an early step in an ecosystem restoration process. The buckthorn species have heavily infested the Calvin campus and surrounding areas, threaten native biodiversity, and detract from the aesthetic beauty of urban-forested areas. The areas surrounding the ponds are heavily infested with buckthorn and are adjacent to high-quality old growth woodlots. Students in Biology 243 cut buckthorn and quickly paint the cut stump surfaces with glyphosate (Roundup herbicide) ranging in concentration from 0 to 41%. Successive groups have, and will continue to, measure the rate that these plants can re-grow from the cut stumps. Two year's results indicate that nearly all untreated stumps re-grow almost immediately. Glyphosate at 20% seems effective in controlling most buckthorn in areas with relatively dry soils, but not near the pond edge. However, 41% glyphosate (the highest concentration possible) is needed to treat most buckthorn in each of the environments tested.



BUCKTHORN RESTORATION PLANTINGS

Semester of Project: Summer 2006

Faculty: David Dornbos, David Warners, Department of Biology, Summer Research Interns

Location: Fieldhouse woodlot/track woodlot/circle road near Maintenance

Description: The objective of this research is to evaluate the optimal density and distribution of native shrub plants to encourage growth of desired species while slowing the invasive capacity of the non-native buckthorn species. Buckthorn, an aggressively invasive non-native shrub, had extensively colonized the western edges of the woodlots near the Fieldhouse and track, effectively out-competing the native shrubs originally there. Our treatments included planting a variety of native shrubs in a grid pattern to replace buckthorn after its removal, among existing buckthorn, and to remove buckthorn but not plant any native plants. This study was initiated in late summer 2006, so no data is available at this time. Our intention in 2007 and in subsequent years is to evaluate the survival or recruitment and growth rates of native shrubs in each of these treatments in comparison with recruitment by buckthorn. Our hypothesis is that native shrub plantings will capture sufficiently more light to retard the rate by which buckthorn can re-infest the restored area.



ASSESSMENT OF NUT-PRODUCING TREE REGENERATION EXPERIMENT

Semester: Fall 2006

Faculty: David Warners, Department of Biology, Biology 243

Description: For this project, two students (Patience Gallagher and David Cutter) evaluated the CEAP project that had been initiated in the fall of 2005 ('Regeneration Experiment of Nut-Producing Trees'). Patience

and David assessed each of the over 1000 seeds that had been planted and evaluated which species had the greatest propagation success. They found that Black walnut and Red oak (approximately 40% germination) were present at significantly higher numbers than the other four species. Evaluation of the potential interactions of these saplings will be done as future CEAP projects and in the end we hope this work will result in a beautiful forest that squirrels (and people!) will love.



REGENERATION EXPERIMENT OF NUT-PRODUCING TREES

Semester of Project: Fall 2005

Faculty: David Warners, Department of Biology, Biology 354

Description: In this research-oriented class, I presented my students with a challenge: to design an experiment that would test whether it was better for nut-producing trees to grow with other seedlings of their own species or with seedlings from different species. After the class designed a replicated experiment, we collected nuts, received permission and assistance from Calvin's grounds department and we planted the full experiment, over 1000 nuts from six species of hickory, oak and black walnut trees.





NATIVE HABITAT CREATION WITH PERENNIAL PRAIRIE PLANTS

Semester of Project: Spring 2003

Faculty: David Warners, Department of Biology, Kenneth Bergwerff, Department of Geology, Geography and Environmental Studies, Biology 112

Location: South of one of the retention ponds alongside the road that leads to Gainey Athletic Complex

Description: In this class, we perform a multiple-week germination experiment to

assess the success of native wildflower seeds in comparison to a non-native invasive plant, Purple loosestrife. After counting the seeds for several weeks, we have the students generate graphs to compare germination success among the approximately 20 species and we then transplant the small seedlings into larger containers. During the last week of class we brought our transplants out to a site just south of one of the retention ponds alongside the road that leads to Gainey Athletic Complex and we planted them into a site where they have become well-established and offer a beautiful fall tapestry of color for humans to enjoy, as well as valuable nectar sources for a wide diversity of pollinators.



DEVRIES HALL WALL NATIVE WOODLAND WILDFLOWER RESTORATION

Semester of Project: Fall 2002

Faculty: David Warners, Department of Biology, Biology 346

Location: Woodchip bed south of DeVries Hall

Description: We spent one of our laboratory periods in the fall of 2002 planting clusters of native wildflowers in a large woodchip bed immediately south of DeVries Hall. This low area just below the brick wall outside DeVries Hall is shaded by a Shagbark hickory and Black cherry trees. Into this site we planted a number of native woodland wildflowers, including Wild leek, Blue-stemmed goldenrod, Zig-zag goldenrod, Big-leaved aster, Cardinal flower, Cut-leaved coneflower, Hairy beard-tongue, Bishop's cap and Wild columbine. The following spring and each successive spring, these wildflowers have emerged and have been augmented with several other species, altogether creating a robust area of native vegetation in the heart of our campus. Many birds (including hummingbirds), insects and mammals have made frequent use of this patch of native habitat and the area continues to grow with additional planting efforts (the most recent of which is planned for the spring of 2007).

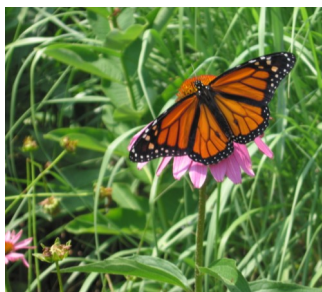


NATIVE HABITAT CREATION WITH PERENNIAL WETLAND PLANTS

Semester of Project: Spring 2002

Faculty: David Warners, Department of Biology, Kenneth Bergwerff, Department of Geology, Geography and Environmental Studies, Biology 112

Location: Just north of the javelin throw area north of the track



Description: In this class we perform a multiple-week germination experiment to assess the success of native wildflower seeds in comparison to a non-native invasive plant, Purple loosestrife. After counting the seeds for several weeks, we have the students generate graphs to compare germination success among the approximately 20 species and we then transplant the small seedlings into larger containers. During the last week of class on a day when it was raining heavily, we outplanted these seedlings to a site that is just north of the javelin throw area, in a low-lying location that had previously been too wet for the grounds maintenance

workers to keep mowed. After the wet sod was removed and the seedlings transplanted, establishment was excellent and this native habitat has been a consistently vibrant area that attracts many birds and butterflies.



BOTANICAL INVENTORY OF NATURAL AREAS ON CALVIN'S CAMPUS

Semester of Project: Fall 1999

Faculty: David Warners, Department of Biology, Biology 346

Location: Campus-wide

Description: Students in Plant Taxonomy were arranged into ten groups, with each group assigned one of the natural areas on Calvin's main campus (not including the Ecosystem Preserve). Groups performed a thorough botanical inventory of their site and the results were compiled into an overall list for the campus natural areas. In total we identified slightly over 300 species of plants, one-third of which were species that are non-native to Michigan. The most problematic of these non-native plants, European buckthorn, was present in each of the sites. Other non-native plants included several that had been planted as landscaping species, including Honeysuckle, Privet, Periwinkle, Baltic ivy and Flowering crab trees. A strong recommendation that arose from this study was to cease the planting of these invasive species and transition our campus landscaping to include more native species.



ESTABLISHMENT OF WHITE PINE TREES AT THE LAKE DRIVE GREENHOUSE

Semester of Project: Fall 1999

Faculty: David Warners, Department of Biology, Biology 354

Location: West side of Lake Drive Greenhouse

Description: On the first day of class, as both a service learning project and also an opportunity for students to get to know each other, we spent a laboratory section planting 15 small (5-6 foot tall) White pine trees on



the west side of the Lake Drive Greenhouse. The intention was to have these trees eventually grow tall enough to offer late afternoon shade for the plants in the greenhouse. Of the 15 trees originally planted 12 have become established and are growing taller and stronger with each passing year and they are beginning to offer the shade for which they were initially planted.



WETLAND RESTORATION OF WHISKEY CREEK DRAINAGE

Semesters of Project: Multiple Semesters from 1998-2003

Faculty: David Warners, Department of Biology, multiple classes, freshmen during orientation, ESC students and other contributions

Location: Northeast of Seminary Pond

Description: Whiskey Creek originally drained the wetlands of the Ecosystem Preserve through what is now the main Calvin campus, into the seminary pond and then out to the Plaster Creek drainage south of Burton Street. While most of Whiskey creek is now underground, it does emerge for a short section just north and east of the Seminary Pond. This area had been a jumble of weeds until, over the course of 5 years and significant effort by a number of different groups, we transitioned the weedy wetland into a native habitat. Today this area looks quite wild but supports many unusually native wetland plants including Angelica, Elderberry, Yellow loosestrife, Cut-leaved coneflower, Missouri ironweed, Golden alexanders, Tall Meadow rue, Great blue lobelia and the state threatened, Slender beak grass.



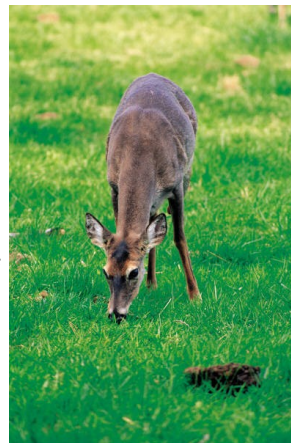
ASSESSMENT OF DEER BROWSE ON NATIVE MICHIGAN SHRUBS

Semesters of Project: Fall 2001, Fall 2002

Faculty: David Warners, John Beebe, Department of Biology
General Botany, Biology 243

Location: North of Prince Conference Center, east of large retention pond

Description: A replicated experimental array of shrub clusters was created along the west edge of the woodland area just east of the large retention pond that is located north of the Prince Conference Center. Each of 20 clusters contained 3 species of native shrub: Red-stemmed dogwood, Common elderberry and Meadowsweet. Students in General Botany spent one lab period in each of two fall semesters quantifying the damage these shrubs endured from browsing deer. We discovered that the deer fed heavily on dogwood and elderberry but essentially did not touch the meadowsweet. Today there are 20 healthy meadowsweet shrubs still persisting in this location, but none of the elderberry or dogwoods have survived.



EVALUATION OF THREE REMOVAL STRATEGIES ON THE INVASIVE SHRUB, BUCKTHORN

Semesters of Project: Fall 2000-Fall 2003

Faculty: David Warners, John Beebe, Department of Biology, Biology 243

Location: Ecosystem Preserve

Description: In an area of the Ecosystem Preserve that had been heavily invaded by a non-native shrub, Buckthorn, we had students in multiple years evaluate three removal strategies for their efficiency (amount of time required for treatment) and effectiveness (regrowth of buckthorn in subsequent years after treatment). In groups students treated buckthorn by cutting the shrubs, cutting shrubs and painting the cut stumps with Round-up herbicide or injecting the shrub trunks with a small capsule of Round-up herbicide. Each year students spent one hour treating buckthorn shrubs and one hour evaluating the work done by students during the previous year. The stumps that were just cut always grew back with multiple new stems the following year. Stumps cut and painted with herbicide effectively killed the shrubs approximately 90% of the time. Those injected with herbicide capsules also resulted in approximately 90% mortality. However, the injection method was far more time-efficient than cutting, allowing more than twice as many shrubs to be treated per unit time compared with cutting and painting.



COLIFORM AND E. COLI LEVELS IN WATER FROM PONDS & OTHER WATER RESERVOIRS ON CALVIN'S CAMPUS

Semesters of Project: Fall 2001, 2003, 2005

Faculty: Arlene J. Hoogewerf, Department of Biology, Fall 2001, 2003, 2005 classes, Microbiology 336

Location: Campus-wide



Description: Water is used in all aspects of life: drinking, cooking, and recreational use just to name a few. Because of the wildlife present on Calvin's campus, the ponds could contain *E. coli* from animal feces. The Environmental Protection Agency (EPA) has guidelines concerning the quality of water used for drinking, partial body contact, and total body contact. The EPA uses *E. coli* bacteria counts to determine if a body of water is safe for human contact. While many

coliforms are commonly found in decaying matter in soil, *E. coli* is only found in fecal matter from warm-blooded animals, and thus is a useful measure of the presence of feces in water. This study was designed to assess the number of coliform and *E. coli* bacteria present in the various ponds and other water reservoirs on the Calvin College campus, providing information that can be used by faculty and students who use the water for research and recreational purposes. Students sampled the amount of coliform and *E. coli* bacteria in various ponds in 2001, 2003, and 2005 and found that the levels of *E. coli* bacteria per 100 ml water consistently exceeded the EPA guidelines for partial body contact in Ravenswood Pond and the newly constructed drainage ponds near the Prince Conference Center, while levels in North, South, and Seminary Ponds exceeded the limits in 2001 and 2003, but not in 2005. The levels of *E. coli* bacteria in Whiskey Pond were consistently lower than EPA guidelines. These data suggest that individuals

entering Ravenswood and the drainage ponds should wear protective clothing, and that the current practices of throwing new Resident Assistants in the Seminary Pond are not a significant health risk.



WATER CHEMISTRY FOR SUSTAINABLE ENVIRONMENTAL ASSESSMENT

Semesters of Project: Fall semester, 1997-2006 (10 years)

Faculty: Mark Muyskens, Karen Muyskens, Doug Vander Griend, Kumar Sinniah, Department of Chemistry and Biochemistry, CHEM103LH

Location: Map location – NE end of Whiskey pond (the project covered the whole campus, but Whiskey pond is representative, and where the field station will be located)



Description: The surface water analysis service-learning project for the Calvin College campus in the Honors General Chemistry Laboratory has completed its tenth year. The project, with its start in the inaugural year of the Calvin Environmental Assessment Project (CEAP), 1997-2006, has involved about 200 students and four faculty members in collecting over 3000 measurements of water quality from a dozen surface water sites. The project has proved to be sustainable over a 10-year period that includes reconstruction of athletic fields and major new construction adjacent to the ecosystem preserve.



WATER AND AIR ANALYSIS IN ANALYTICAL CHEMISTRY

Semesters of Project: Fall 1996-2006

Faculty: Kumar Sinniah, Department of Chemistry and Biochemistry, CHEM201

Location: Athletic Field Ponds, Nature Preserve Ponds, Buffer Ponds near Prince Conference Center, Paint Studio in Calvin's Art Department

Description: Students in Analytical Chemistry have examined the chemistry of pond waters in the athletic field ponds and the nature preserve ponds over a period of 11 years. The project has been part of CEAP since its inception, and has involved over 200 students examining the water hardness, total dissolved solids, conductivity, dissolved oxygen, and a number of anions present in the waters. The analytical chemistry students have also examined the indoor air-quality of the paint studio at Calvin for several years.



GROUP COMMUNICATION

Semester of Project: Fall 2001

Faculty: Kathi Groenendyk, Department of Communication Arts and Sciences, CAS 240

Location: Campus-wide

Description: Groups of students researched a local problem related to Calvin's environmental quality and used a problem-solving model to develop the best solution. Each group detailed the problem, past attempts to solve it, criteria to judge the solutions, the various possible solutions, and the best solutions according to the criteria. Students had the option to contact relevant committees or people with their reports if they think certain actions are appropriate.



ECONOMIC EVALUATION OF THE PROPOSED NEW PARKING AND MASS TRANSIT POLICY

Semester of Project: Fall 2005

Faculty: John Tiemstra, Department of Economics and Business
Environmental Economics and Public Policy, Econ 332

Location: Campus-wide

Description: A cost-effectiveness analysis of the proposed new policy, with recommendations for effective implementation.



ECONOMIC EVALUATION OF THE CAMPUS RECYCLING PROGRAM

Semester of Project: Fall 2005

Faculty: John Tiemstra, Department of Economics and Business
Environmental Economics and Public Policy, Econ 332

Location: Campus-wide

Description: A cost-effectiveness analysis of the existing program, with recommendations for improvements in structure and implementation.



CAMPUS TRANSPORTATION SUSTAINABILITY ANALYSES

Semester of project: Fall 1999, Fall 2002, Fall 2006

Faculty: Thomas Tilma, AICP, Adjunct, Department of Geology, Geography, and
Environmental Studies, Geography 351

Location: Campus-wide

Description: Feasibility analysis of improving campus transit connections to The Rapid's Central Station, to Amtrak passenger rail service, and to Gerald R. Ford International Airport; improving bus stops along Burton Street; improving pedestrian and disabled access across Burton Street, from Burton Street into the campus, along Lake Drive, and from Lake Drive into the campus; redesigning Burton Street and Lake Drive cross sections/pavement markings for traffic calming and bicycle safety; improving pedestrian safety and traffic flow at internal campus intersections and in the west parking lot; improving external bicycle lane/route connections, bicycle access along campus roadways, and campus bicycle storage facilities; and, providing incentives for transit use, ride sharing, bicycling, and living near campus.



WIND ENERGY DEMONSTRATION PROJECT

Semesters of Project: Fall 2006, Spring 2007

Faculty: Matthew Heun, Department of Engineering, ENGR333/Wind Energy Interest Group (WEIG)

Location: SE Corner of Nature Preserve, across from the GRCHS Gainey Field Tennis Courts

Description: Our project is to install a 1.8 kW wind turbine on Calvin's campus to provide educational opportunities for the college and community and to demonstrate the viability of wind energy in inland West Michigan. The ENGR333 class worked with Calvin's administration to develop a project plan in fall 2006. WEIG took over the project after the fall 2006 semester. The implementation process includes ordering the turbine and instrumentation systems, developing a construction schedule, and developing the project kiosk and website. This project is one of 3 that demonstrate renewable energy resources at Calvin. The other projects include the solar photovoltaic system atop the Bunker Interpretive Center and the solar thermal system atop the Science Building.



STUDENTS ON THE MOVE: UNDERSTANDING CAMPUS SPATIAL BEHAVIOR

Semesters of project: Spring 1999, Spring 2000

Faculty: Henk Aay, Department of Geology, Geography and Environmental Studies, Geography 110

Location: Campus-wide

Description: This assignment asked students to keep track of and map their movements on campus for one week. It identified for each student their personal activity spaces on campus as related to academic, social and extra/co-curricular behavior. From the daily working/sketch maps, students prepared a final map that clearly displayed and also summarized the statistics of their spatial behavior. Students compared their maps and spatial behavior with those of others and wrote short essays accounting for the differences. The results were organized into posters.



THE GEOGRAPHY OF THE GLOBAL ECONOMY PROJECT 1



Semester of Project: Fall 1997

Faculty: Janel Curry, Department of Geology, Geography and Environmental Studies

Location: Campus-wide

Description: A foodshed, similar to a watershed, traced the flow of food from its origin to its final destination. In order to better understand the Calvin College foodshed, students collected data from the Calvin Food Service that provided a traceable inventory. Type, quantity, and origin (as best as could be determined) were determined, indexed, and charted with the intent of eventually being mapped. This study helped us to

gain a better understanding of Calvin's position in both the global and local economy and provided information that could become the basis for environmentally responsible decision-making in regards to feeding students and staff.



FLAT IRON CREEK: TOPOGRAPHY OF LAND SURROUNDING A STREAM SEGMENT



Semester of Project: Fall 2006

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Gabriel DeJong, Jennifer Goedhart, John Lamsma and Michele Ritsema

Location: Flat Iron Creek on the Rottman property deeded to Calvin College

Description: This study produced and interpreted a topographic map of an area around Flat Iron Creek, a small stream

draining into Flat Iron Lake. Methods included surveying with a total station and field observations of creek and drainage area characteristics. Results showed a broad, flat-bottomed flood plain with Flat Iron Creek meandering between two sloping vegetated banks. The study results may be important as development increases around Flat Iron Creek and more is learned about the impact of agricultural activities on lacustrine and riverine systems.



A STUDY OF THE DRAINAGE BASIN OF SOUTH POND – CALVIN COLLEGE ECOSYSTEM PRESERVE

Semester of Project: Fall 2006

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Laura Smit, Katie Baumann and Laurie Koning

Location: South Pond in Calvin College Ecosystem Preserve

Description: This study investigated the topography and drainage of the area surrounding South Pond near the recently built Bunker Interpretive Center. Methods included making field observations of surface runoff patterns during heavy rainfall and using a total station to survey and map the topography surrounding South Pond and the Bunker Interpretive Center. Results show that the drainage divides are the walking paths on the western, northern and eastern sides of the pond, along with the berm to the south of the Bunker Interpretive Center. The constructed topography and sidewalks of the Bunker Interpretive Center inhibit direct surface runoff from flowing north into South Pond. Instead, water is directed to three sewer drains.



SOIL ANALYSIS FROM THE CALVIN COLLEGE CAMPUS AND SURROUNDING AREA

Semesters of Project: Fall 2000, 2001, 2003, 2004, 2006

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Locations: Various locations on or near campus including the Ecosystem Preserve, the Physical Education woodlots, and Church of the Servant

Description: During their lab period, teams of students dug soil pits and analyzed the soils characteristics at their locations. Each team handed in their field notes along with an illustration of the soil profile (generated from the collected data) and a comparison of their results with the Soil Survey of Kent County soils unit for the location. Soil pit locations were chosen each year to provide soils information about some locations of interest to Calvin College or its neighbors, such as locations in the Ecosystem Preserve or the Physical Education woodlots.



TOPOGRAPHIC PROFILES FROM THE CALVIN COLLEGE CAMPUS

Semesters of Project: Fall 1999—2004, 2006

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Locations: Various locations on campus including near Whisky Creek in Ecosystem Preserve, east side of Ecosystem Preserve, beginning of cross-country course near East Paris, and Physical Education woodlots

Description: During their lab period, teams of students surveyed the topography along straight lines in the designated study area using stadia rods, hand levels and measuring tapes. The students generated a topographic profile from their data. Study areas were chosen each year to provide topographic information about some location of interest to Calvin College. Examples included profiles along sampling lines for an ongoing study in the Ecosystem Preserve and profiles from the Physical Education woodlots.



INFLUENCE OF A NEWLY-CREATED TOPOGRAPHY AND WATER DRAINAGE SYSTEM ON THE SOUTH POND IN THE CALVIN COLLEGE ECOSYSTEM PRESERVE

Semester of Project: Fall 2004

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Tony Westrate, Mike Kingma and Peter Lion

Location: South Pond in Calvin College Ecosystem Preserve

Description: This study investigated the topography and drainage of the South Pond near the newly constructed Bunker Interpretive Center. Methods included surveying and mapping the topography with a total station and field observations of drainage patterns.



A STUDY OF THE RETENTION POND NEAR THE ECOSYSTEM PRESERVE, CALVIN COLLEGE

Semester of Project: Fall 2004



Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Melinda Campbell and Greg Hoogland

Location: Near the North Pond in Calvin College Ecosystem Preserve

Description: This study investigated a small pond adjacent to the North Pond in the Ecosystem Preserve to determine the cause of the pond

overflow observed in spring 2003. Methods included surveying local topography, testing infiltration rates, measuring pond water levels, observing drainage patterns and analyzing precipitation data. Results show that the pond most likely overflowed from high amounts of precipitation and drainage from surface runoff coming from the landscaping, buildings and topographic features immediately surrounding the pond.



TOPOGRAPHIC SURVEY OF 3204 BURTON STREET, GRAND RAPIDS, MI

Semester of Project: Fall 2003

Student Authors: Jelling Lai, Tommy Byker and Teresa Woolworth

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Location: 3204 Burton Street (property across from Burton St. entrance to main campus)

Description: This study collected geomorphic information at 3204 Burton Street that was the proposed site for future development by Calvin College/Woodlawn CRC. Methods included surveying and mapping the topography with a total station, investigating soil characteristics with a soil pit, and looking for the presence of peat pockets. Results showed that the property has a gradual descending slope to a small stream in the southwest corner of the property. The soil type was Glynwood Loam (Kent County Soil Survey unit 18B). No evidence of peat pockets was found.



PLASTER CREEK RESEARCH PROJECT

Semester of Project: Fall 2002

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Yolanda Ritsema, Mammie Hutchful, Nathan Ykema and Kristy Jamieson

Location: Plaster Creek in southeast Grand Rapids

Description: This study investigated stream characteristics and processes at



a portion of Plaster Creek adjacent to provide information to a private property owner interested in installing a retaining wall. Methods included measuring stream channel characteristics and sediments, stream velocity, flow patterns, and erosion rates. Results showed that stream depths and amounts of erosion changed over a four-week period in November. The results from Plaster Creek, an urban stream, were compared with the characteristics of Teeswater Creek, a rural stream in Bruce County, Ontario.



EAST CAMPUS RETENTION POND MAPPING AND PRESERVE GRID EXTENSION

Semester of Project: Fall 2002

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Brandt Eisenga and Lynette Van Brandt

Location: Calvin College Ecosystem Preserve

Description: This project extended the existing study grid system in the Ecosystem Preserve to include the new retention ponds on Calvin's east campus. The new grid system points were set out with a compass and tape measure. The perimeter of the retention ponds was surveyed with a total station to determine the shapes and surface areas of the ponds, as well as their relative elevations. The study results provide reference data and accessible reference points for use in future studies of this area of the Ecosystem Preserve.



DRAINAGE PATTERNS IN CALVIN COLLEGE'S ECOSYSTEM PRESERVE, GRAND RAPIDS, MI

Semester of Project: Fall 2002

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Julie De Boer, Aaron DeVries and Jared Zimmerman

Location: Whiskey Creek in Calvin College Ecosystem Preserve

Description: This study investigated the topography and drainage of a section of Whiskey Creek in the Ecosystem Preserve. Methods included surveying with a total station to map the topography and making field observations of drainage characteristics. Results showed that Whiskey Creek is the major drainage basin in the Ecosystem Preserve. The map and field observations indicate areas of erosion from runoff and areas where most of the precipitation infiltrates the ground.



THE EAST CAMPUS RETENTION POND OF CALVIN COLLEGE

Semester of Project: Fall 2001

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Author: Michelle Freeman

Location: Near the Calvin College Ecosystem Preserve

Description: This study investigated the largest of the new retention ponds on the east

campus of Calvin College. Methods included using GPS data to create a map of the pond and its surroundings, interpreting the geomorphology of the site, and establishing baseline data for future studies. Results showed that the highest elevations of the pond area occurred at the west side of the pond. The pond had little or no vegetation in the mapped area, and mass wasting processes and soil erosion were adding sediments to the pond.



A GEOMORPHIC ASSESSMENT OF THE PHYSICAL EDUCATION WOODLOTS ON CALVIN COLLEGE'S CAMPUS IN GRAND RAPIDS, MI



Semester of Project: Fall 2001

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Emily Hoekwater and Jeanette Henderson

Location: Physical Education Woodlots

Description: This study assessed the soil and topographic features of the upper and lower woodlots near the Physical Education building to provide

geomorphic information in response to the proposal to put a new Health and Fitness Center. Preliminary topographic and soil data were collected by the entire geomorphology class during two labs. Further study at selected sites included collecting more topographic data and soil cores. The data were used to generate topographic maps indicating soil types for each woodlot. Results showed that the general soil type was Glynwood loam (Kent County Soil Survey unit 18B) which is poorly suited to building development. The study recommended that alternative locations for the proposed Health and Fitness Center be considered.



ANALYSIS OF SEVEN FACTORS ON GROUNDWATER IN THE CALVIN COLLEGE ECOSYSTEM PRESERVE

Semester of Project: Fall 1999

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Luke Blacquiere and Rachel Broersma

Location: Calvin College Ecosystem Preserve

Description: Not available.



A COMPARISON OF THE TOPOGRAPHY, SOIL, AND VEGETATION IN THE CALVIN COLLEGE ECOSYSTEM PRESERVE

Semester of Project: Fall 1999

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Amy Bush and Britta Magnuson

Location: Calvin College Ecosystem Preserve



Description: This study examined the relationship between soil, vegetation, and local topography at three sites of varying habitats in the Calvin College Ecosystem Preserve. Methods included using GPS technology, quadrat sampling, and standard soil analysis with the use of a soil corer. Results showed a relationship between vegetation and soil texture, along with a correlation between topography, soil moisture, and vegetation.



COMPARISON OF SOILS ON A SLOPE IN CALVIN'S NATURE PRESERVE

Semester of Project: Fall 1999

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Authors: Mike Christians, Andrew Rupke, Justin Smalligan and Alan Waddilove

Location: Calvin College Ecosystem Preserve

Description: This study investigated how the properties of soils change as a function of slope. Fieldwork was conducted on a slope in the Calvin College Ecosystem Preserve. Methods included surveying a straight-line transect on the slope; analyzing soil characteristics at 1-meter deep soil pits at the top, middle and bottom of the slope; and analyzing soil characteristics from 5 soil cores at locations along the transect. Study results were not conclusive concerning the effects of the slope. Most of the observed soil differences could be attributed to differences in soil types unrelated to slope.



SUCCESSION: A PRODUCT OF GLACIATION; A PALYNOLOGICAL STUDY OF WHISKEY POND, CALVIN COLLEGE, GRAND RAPIDS, MI

Semester of Project: Fall 1999

Faculty: Deanna van Dijk, Department of Geology, Geography and Environmental Studies, Geog/Geol 311

Student Author: Jason Douma

Location: Whiskey Pond in the Calvin College Ecosystem Preserve



Description: This study used palynology (the study of fossil pollen) to investigate prehistoric plant communities as a way of understanding land surface changes after deglaciation in the Calvin College Ecosystem Preserve. Sediment samples were collected from Whiskey Pond and the pollens were identified to develop a pollen profile. Results showed that spruce trees were the earliest evidence of vegetation, followed by pine trees, which were slowly succeeded by a mix of deciduous trees and a selection of non-arboreal plant life.



CALVIN GARBAGE PROJECT (CGP)

Semester of Project: Spring 1999

Faculty: Bert de Vries, Department of History, IDIS 240

Location: Campus-wide



Description: The Calvin College Garbage Project (CGP). The CGP was an archaeological assessment of the rubbish produced by the Calvin College campus community, conducted by the students of IDIS 240, "Introduction to Archaeology." Inspiration and some methodology came from the Arizona Garbage Project, a pioneering archaeological program for studying modern American cultural habits (see Rathje, William, and Murphy, Cullen, Rubbish! The

Archaeology of Garbage, Harper-Collins, 1992). On the academic side the project provided an exercise in staging fieldwork, data recording, report writing and interpretation and publication (on the Web). On the practical side, the project was a study of the culture of the Calvin College community, but had the special 'service' goal of providing background data for improving disposal, recycling and composting procedures.

The project was under the auspices of CEAP, and was carried out in cooperation with the students of the ESC, about 15 of who volunteered for the actual fieldwork. The fieldwork consisted of a detailed cataloguing of the rubbish put out at seven selected collection stations on a typical April 1999 weekday by seven teams made up of a class member and two student volunteers. A preliminary report was presented in poster form at the CEAP poster session. A comprehensive report, based on the students' individual reports, was prepared during the summer, and placement of data, reports and interpretations was put on a website.



ELECTRICAL MEASUREMENTS

Semester of Project: Spring 1998

Faculty: David Van Baak, Department of Physics, Physics 182

Description: The Physics 182 class began modeling energy use and costs using an energy meter. This meter, which fits between an appliance and the electrical wall plug, was used to monitor home and campus cost/impact by duty cycle, number of devices, etc.



CAMPUS ENVIRONMENTAL ATTITUDE & BEHAVIOR ASSESSMENT: PART 2

Semester of Project: Spring 2007

Faculty: Rachel Venema (Staff), Sociology & Social Work 320

Location: Campus-wide

Description: This study reports findings from a campus-wide assessment of current beliefs, attitudes, and behaviors of the Calvin community regarding the environment (N=1145). This study also provides a quantitative and qualitative comparative analysis to a baseline assessment conducted through CEAP and the Social Research Methods class in 1998. Data collection methods include a web-based questionnaire administered to faculty, staff, and students, as well as in-depth interviews with key informants on campus. Findings from this study hope to present data that will inform campus initiatives and decision-making.





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