

PD-ABP-088

USAID University Development Linkage Project:  
Montana and Belize Partnership for Resource Conservation and Development

"Institution Building and Internationalization  
at the University College of Belize and the University of Montana:  
Models for Sustainable Resource Development"  
(936-5063)

Final Project Report



The University of  
**Montana**

**School of Forestry/Montana Forest  
& Conservation Experiment Station**  
The University of Montana  
Missoula, Montana 59812

Phone: (406) 243-5521  
FAX: (406) 243-4845

June 2, 1997

A.I.D.  
POL/CDIE/DI  
Washington, D.C. 20523-1802

Dear A.I.D.:

Enclosed please find 2 copies of the University of Montana - University College of Belize UDLP final report (DAN-5063-A-001116-00). If you have any questions or comments about our project, please contact me at:

Tel. (406)243-4661  
Fax (406)243-6656  
email: [siebert@selway.umt.edu](mailto:siebert@selway.umt.edu)

Thank you very much.

Sincerely,

Stephen F. Siebert  
Associate Professor



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Date: May 25, 1997  
Cooperative Agree. No. DAN-5063-A-00-1116-00  
Project Officer: Gary Bittner  
UM Project Director: Stephen Siebert tel. (406)243-4661; fax (406)243-6656  
email: siebert@selway.umt.edu

This report summarizes the activities undertaken during the five year University of Montana (UM) - University College of Belize (UCB) UDLP grant (October 1991 - March 1997). We include quantitative outputs of linkage activities and review prospects for sustaining project activities initiated under the grant.

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## Executive Summary

### Background:

Over the past decade the nation of Belize has experienced unprecedented economic development, social change and forest conversion. Belize currently confronts growing domestic and international pressures to exploit forest and marine resources, an increasing refugee population and an expanding tourist industry. Belizean educators, government officials and non-governmental conservation organizations have been challenged to address, plan and regulate this growth and development so as to ensure maximum economic advantage and avoid environmental degradation and social disruption.

The University of Montana (UM) and University College of Belize (UCB) collaborated on a 5 year University Development Linkage Project (UDLP). The primary goals of the project were to develop institutional and staff capabilities within UCB to better meet the resource management and development needs of Belizean society, and to contribute to internationalization of UM academic programs. The UM-UCB UDLP is a multi-party arrangement involving the two academic units in the lead, with the Belize Forestry Department (BFD), Ministry of Tourism and Environment, Programme for Belize (PFB), Belize Audubon Society, Belize Center for Environmental Studies), the Association of Tertiary Level Institutions of Belize (ATLIB), and the Lewis and Clark National Forest (LCNF) serving as project collaborators.

The project was administered by Stephen Siebert (1991-97), Peter Koehn (1991-96) and Mark Lusk (1996-97) at UM and Joey Belisle (1991-92), Mustafa Toure (1992-94) and Vincent Palacio (1995-97) at UCB. The project directors were advised by an advisory council comprised of representatives from collaborating government and non-governmental conservation organizations.

### Project Objectives, Activities and Results:

#### **A) Professional training and extension-education capabilities at UCB**

- 1) UM and UCB developed and delivered 23 short, in-country training courses for GOB and NGO personnel in a variety of subjects. Thirteen UM faculty and nine UCB faculty or Belizean researchers provided course instruction. Courses were offered in: Environmental Impact Assessment (twice), Wildlife Inventory Methodology, Wildlife Management, Multiple Use Silviculture, Limits to Acceptable Change in Recreation Management, Development of Tourism Research Capacity, Municipal and Rural Sanitation, Watershed Management and Planning, Ecotourist Guide Training, Ethnopharmacology and Medicinal Plants, Environmental Education, Proposal Design and Writing, Library Services and Computerization, Computer Software and Geographic Information Systems, and Conservation and Development Field Practicum (four times) (see Table 1). LCNF personnel assisted in several of the courses and offered a separate Fire-fighting and Management short course in cooperation with the BFD (three times).
- 2) The project established a planning and advisory process whereby representatives of GOB, conservation NGOs and ATLIB identified and prioritized short and long-term training needs.
- 3) UCB developed and implemented an extension education program that reflects the training needs identified through the planning process.
- 4) UM assisted in the development of staff expertise at UCB to facilitate UCB assumption of short course development and delivery.

**B) Enhance capabilities of UCB faculty and staff**

The project enhanced UCB faculty capabilities in natural resource management through faculty exchanges (seven UM faculty taught at UCB on semester exchanges; see Table 3) and advanced-degree (Ph.D.) training of two UCB faculty in the UM School of Forestry: Vincent Palacio in Recreation Management and Philip Morgan in Watershed Management. The project also provided training for UCB library, accounting, registrar, external relations, book store, and general administrative staff, and in geographic information systems and computer services through on-the-job training and staff exchanges between UM and UCB. A total of 11 UM and 13 UCB staff members participated in staff exchanges between the two schools (see Table 2).

**C) Curriculum development at UCB**

The project supported the development of a new Associate Degree Program in Natural Resource Management at UCB (see Appendix 1). The program admitted its first students in Fall 1996. In addition, UM faculty taught a variety of natural resource-related courses while on semester exchange at UCB.

**D) Library enhancement at UCB and UM**

The project provided funds to expand UCB and UM library holdings in natural resource management and development studies.

**E) Field course in conservation and development**

The project supported an annual, interdisciplinary field course for Belizean and American students and a related semester-long course at UM. The field course was taught by UM forestry and sociology professors, with assistance from UCB faculty. The seminar and field course are now offered on a permanent, alternate year basis at UM.

**F) Research and the transfer of appropriate technology**

The project provided small grants for collaborative research between UM faculty and Belizean counterparts and supported the dissertation research of two Belizean Ph.D. students. A total of six collaborative research projects were supported by the project (see Table 4). The project also provided UCB with a wide range of equipment including: a vehicle, four computers, seven printers, computer software (including ArcView geographic information system capabilities), biological equipment, and books (see Table 5).

**G) Professional development of UM faculty and staff**

The project provided international experiences to 18 UM faculty and staff, most of whom had no previous experience in a developing country. Several UM faculty developed new international research interests as a result of working in Belize.

**H) Curriculum enhancement at UM**

The project enhanced the international and cross-cultural components of existing courses at UM, particularly in the School of Forestry and the Department of Sociology. Faculty participants incorporated or plan to incorporate tropical and/or development issues into regularly offered UM courses based on their experiences in Belize.

**I) International opportunities for students**

The project supported professional internship experiences for ten UM students and three Belizeans (see Table 6). The UM students worked with the Belize Forestry Department and conservation NGOs, while the Belizeans worked with Lewis and Clark National Forest.

### Project Monitoring and Evaluation:

Project monitoring and evaluation was conducted through two complementary processes:

- 1) on-going review by a Project Advisory Council (PAC) in Belize and
- 2) external project evaluations by two outside experts.

A final project evaluation was undertaken by Steve Siebert (UM) in collaboration with Vincent Palacio (UCB) and UDLP project collaborators in March 1997.

### Project Sustainability:

Many of the activities initiated under the UDLP grant will continue after completion of the project. Most importantly, the recently established Natural Resources Management Associate Degree Program at UCB began admitting students in Fall 1996 and enjoys broad support in the public and private sector. UCB and Programme for Belize plan to continue collaborative activities, specifically in professional internship training for UCB Natural Resources Management students (PFB has identified internship opportunities and secured funding support for 10 UCB students to work at Rio Bravo on an annual basis). The two UCB faculty members who are completing Ph.D.s at UM continue to conduct dissertation research and to collaborate with UM faculty. The project planning and advisory process established under the UDLP remains in place to guide future UCB short-course training and extension activities. UM and UCB also plan to continue several activities initiated under the UDLP grant, including: the field practicum, the staff exchange program, the internship program and collaborative research (pending availability of external funding).

The UDLP grant contributed to internationalization of UM academic programs in a number of significant and lasting ways. Faculty involved in teaching and research in Belize (total of 15) have incorporated international resource management issues and materials into over a dozen regularly offered courses at the graduate and undergraduate levels. Several faculty have redirected research activities to include international work as a direct consequence of their experiences in Belize. The two Belize-related courses developed with UDLP support have become a regular part of the UM curriculum. Finally, the cross-cultural experiences gained by UM faculty and staff who participated in the program (total of 25) have enriched and diversified the UM community in ways that are likely to benefit American and foreign students for years to come.

The UDLP effort significantly strengthened UCB institutional and staff capabilities in natural resource management and enriched the international experience and content of UM faculty and curricula. UCB is now well positioned to assume a leadership role in Belizean natural resource management education and to prepare present and future generations of Belizeans in the management of their nation's natural resources.

## Final Report by Project Objective

**Objective 1:** *Develop UCB's outreach capacity, including the UCB Adult and Continuing Education (ACE) Department, and certificate programs and courses offered through the Development and External Relations Office (DERO).*

### Year 1

UM and UCB reviewed the possible development of a natural resource emphasis within the existing UCB Continuing Education Program.

UM project directors established and met with the Project Executive Committee (PEC) and Project Advisory Council (PAC) in Belize and developed a list of prioritized short courses to be offered during Year One. Project directors worked with UCB counterparts to standardize short course recruitment procedures, streamline short-course administration, develop UCB credit or certificate granting mechanisms, and develop guidelines for course length and format.

Richard Solberg, UM faculty exchangee, worked with UCB counterparts on program administration and on short-course implementation.

UM and UCB developed and offered the following short courses: *Wildlife Management*, taught by Jack Meyers, UCB biology instructor and principal scientist at the Belize Zoo. Fifteen GOB and NGO personnel with natural-resource management responsibilities attended.

*Limits to Acceptable Change*, taught by Steve McCool, UM Professor of Recreation Management. Twelve GOB and NGO managers and planners attended.

*Development of Tourism Research Capacity*, taught by Steve McCool. Twelve GOB and NGO personnel attended.

Lewis and Clark National Forest (LCNF) personnel met with UCB and Belize Forestry Department (BFD) personnel to establish separate, but complementary, short course training in fire fighting and management. LCNF and BFD signed a memorandum of understanding establishing the first Conservation Ambassador Exchange Agreement (later to become Sister Forest Partnership) between a U.S. National Forest and a counterpart forest in a developing country. Oswaldo Sabido, manager of the Mountain Pine Ridge Field Station (BFD), visited with staff at UM and LCNF.

### Year 2

UM and UCB continued to explore natural resource program and curriculum development at UCB. UCB officials identified development of an Associate Degree Program as a potential UDLP objective.

UM and UCB developed and offered the following short courses: *Environmental Impact Assessment*, taught by Tom Nimlos, UM Professor of Soils, and Dick Smith (LCNF). The course was co-sponsored by the Belize Center for Environmental Studies (BCES); 15 people attended.

*Municipal and Rural Sanitation*, taught by Dan Corti, UM Environmental Engineer, and co-taught by seven officials from the Ministry of Health. The course was co-sponsored by the Ministry of Health; 17 people attended.

*Multiple Resource Silviculture*, taught by Kevin O'Hara, UM Assistant Professor of Silviculture, Jim Hurtel (LCNF) and Ken Brewer (Flathead National Forest). The course was co-sponsored by the BFD; 16 Belizean foresters attended.

*National Environmental Education Workshop*, taught by Nimmi Bryant, UCB faculty; 15 people attended.

*Wildlife Inventory Methodology*, taught by Jack Meyer (UCB); 18 people attended.

In addition, UCB collaborated with BCES in developing a year-long Environmental Impact Assessment course. LCNF officials offered a short course on *Fire-fighting Training*, co-sponsored by the BFD.

PEC made the following short-course decisions: UM instructors should spend 2 weeks in Belize, each short course should have a Belizean counterpart instructor, and UCB should improve public-awareness of its programs and activities. PAC appointed a subcommittee to develop proposals for establishing a UCB certificate program in project-related areas, concluded that short courses should have external co-sponsors, identified six short course priority areas, recommended that each short-course leave behind a syllabi and teaching materials for future use by UCB.

An independent, external project evaluation conducted by Steve Cornelius, Director of Latin American Programs at World Wildlife Fund (WWF), recommended that UCB develop external fund-raising abilities, the project prepare a brochure describing project activities, and project personnel participate in a collaborative national training-needs assessment in the natural resource management area.

### Year 3

Sharon Alexander, UM Dean of Continuing Education, worked with DERO at UCB where she developed a topology for short-course delivery and consulted on distance education with UCB, non-governmental organizations (NGOs) and governmental agencies. Bob Campbell, UM Montana Entrepreneurship Center, was on staff exchange with UCB where he helped establish a program to assist small businesses. George Stanley, UM Geology Professor, and John Pierce, UM graduate student, made a brief survey of the terrestrial environment of Calabash Caye and surrounding areas. They also conducted a marine survey of the barrier reef, assessed the reef flat, shallow reef lagoon, and made two trips to the mangroves behind the caye.

Mustafa Touré, UCB faculty and staff, was on staff exchange at UM where he worked on project administration, fund raising and foundation establishment. Sylvia Cattouse, UCB faculty, came to UM on staff exchange where she explored models for an Entrepreneurship Development Trust in Belize with the UM Entrepreneurship Center. Vincent Palacio (UCB) drafted a proposal to conduct a national needs assessment for the Natural Resource Management (NRM) Associate Degree Program and submitted the proposal to NARMAP. Palacio also attended a workshop sponsored by the Ministry of the Environment at Caye Caulker. This meeting reviewed terms of reference for contract workers and developed a public awareness campaign. He also co-facilitated a week-long course on "Proposal Development for Environment/Conservation Projects" in Dangriga with support from USAID (NARMAP).

UM and UCB prepared a brochure describing the UDLP partnership and project goals, objectives and activities (see Appendix 2).

UM and UCB offered the following short courses:  
*Environmental Impact Assessment*, Evan Cayetano (BCES) taught a year-long EIA training course co-sponsored by UCB and BCES. Twenty people completed the course, which grew out of the short course on the same topic offered by Tom Nimlos of UM under the UDLP.

*Watershed Management and Planning*, Don Potts, UM Professor of Watershed Management, and Mark Nienow (LCNF) developed and delivered a short course in the Mountain Pine Ridge which was attended by 15 employees of the BFD, the National Hydrological Service, BCES, Geology and Petroleum Department, and Ministry of the Environment. The BFD co-sponsored the course.



*Ecotourist Guide Training*, Don Jenni, UM Biology Professor, Vincent Palacio (UCB), and Wayne Phillips (LCNF) developed and offered a short course training ecotourist guides to better communicate the life histories of plant and animal species and interpret natural history. The course was co-sponsored by the Belize Tourism Industry Association and facilitated by Maya Mountain Lodge. Nineteen tour guides attended.

LCNF offered a second *Fire-fighting* short course to BFD foresters. BFD officer Domingo Ruiz, spent two weeks in Montana on short course training.

#### **Year 4**

UM and UCB offered the following short courses:  
*Ethnopharmacology and Medicinal Plants*, Rustem Medora, UM Pharmacy Professor, and Rosita Arvigo (Director of Ix Chel Tropical Research Foundation) taught a short course and helped initiate collaboration between herbal healers, pharmacists, UCB faculty and students; 15 pharmacists attended.

*Environmental Conservation*, taught by Francis Marin, Dorian Barrow, and Tim Palacio of UCB in Toledo, Southern Belize.

*Proposal Design and Writing* was taught by Vincent Palacio (UCB); the workshop was co-sponsored by UCB and WWF (NARMAP). Palacio also presented a paper on the status of environmental education in Belize at "The First World Conference on Environmental Education" in Venezuela.

A *Library Services and Computerization* training session was provided by Erling Oelz, UM Librarian. The course was publicized on Belize television.

George Stanley (UM), spent spring semester at UCB where he served as a member of the UCB-Marine Research Centre Board (MRC), advised UCB on the MRC and its Marine Studies program, and taught two science courses.

LCNF offered a third *Fire-fighting* short course to BFD foresters.

#### **Year 5**

Project officers Siebert, Koehn, and Palacio, attended the USAID UDLP workshop in Washington, D.C. Siebert and Palacio collaborated on a poster that publicized the linkage.

Mike Miller, UM OIP staff, provided software training and examples of potential Internet Home Pages to UCB and prepared a home page for UCB on the UM server. During the no-cost extension period, Miller installed and trained UCB faculty and staff in the operation ArcView GIS software. The ArcView capability forms the nucleus of an emerging UCB program in GIS training and education. The ArcView materials (software and teaching guides) were donated by the ESRI company and have a retail value of \$75,000.

Vincent Palacio was appointed Natural Resources Management Officer. This new position consolidated efforts to develop UCB programs in natural resources in cooperation with government agencies, NGO's and foreign universities.

### **Objective 2: Enhance capabilities of UCB faculty and staff**

#### **Year 1**

Vincent Palacio was nominated by UCB and accepted by UM to pursue Ph.D. studies in the School of Forestry. Steve McCool, UM Professor of Recreation Management, served as chair of Palacio's graduate committee and advised him re. research on Belizean tourism and recreation management studies.

UM developed a campus-wide process for the recruitment and selection of faculty and staff exchangees. UM's first staff exchangee, Carol Gable of the

Controller's Office, worked in the UCB accounts office where she developed a computerized system for UCB accounting and assisted UCB counterparts conduct an inventory of fixed assets. Karen Card of the UCB Personnel Office worked with the UM Human Resource and Accounts offices in personnel management and admissions services on staff exchange to UM.

Joey Belisle (UCB) studied project budget and accounting practices, project monitoring and evaluation, and a means of enhancing the Project Advisory Council, while on staff exchange to UM.

A vehicle (1992 Ford Ranger pickup) was purchased and delivered to Belize for use by project participants and at the conclusion of the project for general use by UCB faculty and staff.

#### **Year 2**

Palacio completed the first year of his doctoral studies during which time he participated in conferences on parks, recreation, and wilderness management; conducted preliminary research on the motivation of travelers to Belize; and prepared and presented a paper on nature tourism visitation to Belize at the 2nd International Eco-tourism Conference in Caracas, Venezuela.

Richard Solberg, UM Biology Professor and Administrator, was on semester exchange to UCB where he drafted a document to establish a UCB Faculty Senate; made recommendations on UCB policies regarding faculty appointments, promotion, and tenure; led an evaluation of the UCB central administration and Belmopan Junior College; served as advisor to UCB faculty; and consulted with campus personnel on budgetary policies and procedures.

The following staff exchanges were undertaken:

Ismael Hoare (UCB) worked with UM counterparts regarding cafeteria, housing, recreation, pharmacy, health services, and career service delivery.

Enid McKoy (UCB) worked in the UM Registrar's Office regarding graduation requirements, transcript preparation, student registration, and student and peer advising.

Elizabeth Pancake (UM) worked with counterparts in the UCB DERO and Accounts Offices where she set up spreadsheets for direct cost and cost match, and initiated a process for gathering cost-share information.

#### **Year 3**

Philip Morgan of UCB was accepted into a Ph.D. program in the School of Forestry to study watershed management under the supervision of Don Potts. Palacio completed all graduate coursework, his Ph.D. qualifying exam and returned to UCB to assume teaching and project administration duties, and to conduct dissertation research.

Angel Cal, President of UCB, traveled to UM where he met with senior UM administrators and reviewed future activities and exchanges to be undertaken through the UDLP.

Rien Plog, UCB faculty, visited UM where he participated in an international conference on refugee training and development assistance, and consulted with UM faculty on teaching and research.

The following staff exchanges were undertaken:

Mustafa Touré (UCB) worked at UM on faculty and staff exchanges and UDLP project planning, and met with UM personnel regarding foundation development and fund raising, international higher-education management issues, housing, community service, and outreach programs that could be applied at UCB.

Sylvia Cattouse (UCB Business Administration Department) met with UM administrators in the School of Business Administration to explore curriculum

development and instructional issues for application at UCB.

Don Habbe (UM Provost/Vice President for Academic Affairs, Emeritus), was on staff exchange at UCB where he worked on institutional review processes for accreditation, advised UCB faculty and staff on how to carry-out internal evaluations and means of conducting external evaluations.

#### **Year 4**

Palacio assumed responsibility of the UCB UDLP Project Director position and served as acting DERO Director. He also participated in a training seminar sponsored by the Caribbean Tourism Organization and Belize Tourist Board. Morgan continued graduate studies in watershed-planning and management at UM and drafted a dissertation research proposal.

George Stanley (UM) collaborated with Gail Bradley-Miller (UCB) on marine-studies curriculum and the UCB Marine Research Center (MRC) at Calabash Caye.

The following staff exchanges were undertaken:  
Alex Williams (UCB lecturer and associate-degree coordinator at Belmopan Junior College) worked at UM and the College of Technology on project administration and management issues.

Larry Vernon (Library Director at UCB) participated on a staff exchange at the UM Mansfield Library. Erling Oelz (UM Mansfield Library) was on staff exchange to UCB. They worked on upgrading UCB library services, including literature searches, use of CD ROM and Internet, and computerization of reference materials and searches.

#### **Year 5**

Morgan completed all required coursework at UM, passed his Ph.D. qualifying examinations, and returned to UCB to commence dissertation research and teaching responsibilities at UCB. Support for Morgan's dissertation research on the leaching of pesticides in groundwater and Palacio's research on ecotourism were partially supported by the UDLP.

Mustafa Touré completed a management strategy for Turneffe Atoll that comprised part of his M.S. thesis at University of West Indies, Barbados. The work was partially supported by the UDLP.

The following staff exchanges were undertaken:  
Arylee Evans, UCB bookstore staff, worked on bookstore administration and management at UM.

Rich Hamma, UM Project Accountant, worked on project accounting and cost match at UCB.

Mike Miller, UM OIP staff, installed and provided training in the use of GIS and other computer software at UCB.

Angel Cal, President of UCB, traveled to UM where he met with administrators and reviewed final activities and exchanges to be undertaken through the UDLP, and potential activities to continue after completion of the project.

### **Objective 3: Curriculum and course development at UCB**

#### **Year 1**

UM faculty and UCB counterparts reviewed curriculum and program development in environmental sciences, and exchanged ideas regarding the most appropriate course formats for UM faculty on exchange at UCB. UCB expressed interest in developing an interdisciplinary environmental-science program to include terrestrial and marine, and biophysical and social science emphases

over the course of the UDLP grant. This initiative was strongly supported by Belizean project collaborators in the public and private sectors.

Steve McCool (UM faculty exchangee to UCB) assisted with the development of a semester-length course dealing with opportunities and constraints to tourism development with UCB counterparts.

#### **Year 2**

Richard Solberg (UM faculty exchangee to UCB) drafted "terms of reference" for the newly constituted UCB Academic Dean's Council; prepared proposals for variable-credit course offerings, new-degree offerings at UCB; participated in UCB catalog production and curriculum planning; taught a class in genetics; and assisted in curriculum development and design in environmental sciences. Solberg also prepared a paper on reorganizing the sciences at UCB.

Steve Siebert, UM Associate Professor in Forestry, and Jill Belsky, UM Associate Professor of Sociology, provided UCB with syllabi and reading materials used in two new UM courses, "Belize: Society and Environment" and "Belize: Conservation and Development" (a field course in Belize) for possible incorporation into the UCB curriculum.

UCB initiated planning for an Associate Degree in NRM. UCB hired a lecturer to teach and assist in program development in conjunction with the project director. Philip Morgan (UCB), Vincent Palacio (UCB), and Steve Siebert (UM) prepared a draft curriculum for the new NRM program.

#### **Year 3**

UCB and UM project collaborators refined the curriculum for the NRM program. UM collaborators reviewed the draft and forwarded it to the UCB administration for review.

UCB entered into an agreement with Coral Caye Conservation (CCC) of the United Kingdom re. development of a marine sciences field station at Calabash Caye. UCB explored opportunities to establish an academic program in marine sciences with a field component on Calabash Caye.

#### **Year 4**

John Douglas, UM Anthropology Professor, participated on a faculty exchange to UCB where he taught two classes: "Social Science Research Methods" (45 students) and "Introduction to Anthropology" (35 students).

George Stanley, UM Geology Professor, was on faculty exchange to UCB where he taught a course entitled "Marine Biology and the Marine Environment" to 15 students, gave a series of lectures and slide presentations on Belize's coral reef at St. Johns College, served as a member of the UCB-Marine Research Center board, and assisted in the development of a new undergraduate degree program in Marine Studies.

UCB completed a draft of the Associate Degree program in NRM, including curriculum and program objectives. The program includes integrated studies in Coastal/Marine Resources, Terrestrial Resources, and Recreation Resources. The clientele are anticipated to be government and NGO personnel in the natural resource sector.

#### **Year 5**

UCB finalized course requirements, continued to develop course syllabi, and initiated student-recruitment efforts for the NRM program. The first group of students began studies in August, 1996. Public and private sector interest in the NRM program is strong and student recruiting prospects appear good, thus the program appears to be financially viable for UCB.

Rita Sommers Flanagan, UM Counseling Professor, was on faculty exchange to UCB where she taught a psychology course and advised UCB students.

Jim Gannon, UM Biology Professor, was on faculty exchange to UCB where he took over biology teaching responsibilities for a UCB faculty member studying abroad.

Jack Kirkley, Western Montana University Biology Professor, was on faculty exchange to UCB where he taught courses in vertebrate zoology and ecology.

**Objective 4:** UCB/UM library enhancement

**Year 1**

Library advisory groups were established at UM and UCB and began prioritizing library acquisition needs.

**Year 2**

The UM and UCB library advisory groups compiled lists of books and journals for purchase under the UDLP grant. UCB purchased books on research methods, natural resource management and development. UM purchased materials on resource management, development, and Belizean studies. UM's Division of Biological Sciences donated approximately 50 textbooks to UCB.

**Year 3**

Steve Siebert (UM) prepared a bibliography of Belizean references and forwarded copies of reference materials to UCB. The UM Mansfield Library purchased international development materials as part of a UDLP matching grant.

**Year 4**

Erling Oelz (UM) worked on staff exchange at UCB where he presented a three-day workshop on the processing of library materials, automation, and reference servicing.

**Year 5**

The UM and UCB library advisory groups recommended acquisition of additional reference materials with UDLP funds. The bibliography of Belizean references was updated by Siebert and shared with UCB.

**Objective 5:** Development of a field practicum in Belize

**Year 1**

Steve Siebert (UM) completed preliminary arrangements for an annual field course following site visits and consultation with the directors of the Monkey Bay Wildlife Sanctuary, Programme For Belize, the Belize Audubon Society, and the Belize Center for Environmental Studies. Preparation of course syllabi; identification of field exercises, sites and housing; and course advertisement to UM students and Belizeans were undertaken.

**Year 2**

Siebert and Belsky (UM) developed and taught a new semester-length course "Belize: Society and Environment" at UM (established as a prerequisite for UM participants in the field course), and the first field practicum "Belize: Conservation and Development". Field course participants included 5 Belizeans and 5 UM students. In the practicum, students worked in and around three protected areas where they conducted ecological and socioeconomic surveys and assessed opportunities and constraints to protected areas management.

### **Year 3**

Siebert and Belsky taught "Belize: Society and Environment" and "Belize: Conservation and Development". Ten students (including three Belizeans) were enrolled in the UM course, while the field course was offered to 5 UM students and 3 Belizeans. UCB assumed responsibility for recruiting and selecting Belizean participants and for developing some of the field exercises. Vincent Palacio (UCB) served as a co-instructor in the field course.

### **Year 4**

Siebert and Belsky taught "Belize: Society and Environment" and "Belize: Conservation and Development". Lisa Curran, post-doctoral scholar at Harvard University, served as a volunteer instructor in the field course. Twelve students were enrolled in the UM course and nine students (five UM and 4 Belizeans) participated in the field course. Philip Morgan (UCB) served as a co-instructor in the field course.

### **Year 5**

Siebert and Belsky revised and taught both the UM and Belize field courses. Fifteen students enrolled in "Belize: Society and Environment", while 30 UM students applied for the five UM openings in the field course. They also prepared a proposal to offer both courses on a permanent, alternate year basis commencing in 1998.

## **Objective 6: Collaborative Research Projects**

### **Year 1**

UM Project Directors created a small grants funding mechanism to encourage collaborative research between UM faculty and Belizean counterparts. Steve McCool (UM), Vincent Palacio (UCB) and Joy Vernon (Belize Tourism Board) collaborated on an investigation of values and interests among international tourists traveling to Belize and their perception of limits to acceptable change.

### **Year 2**

McCool (UM) collaborated with Palacio (UCB) and Vernon in the preparation of a survey regarding motivations of foreign tourists who visit Belize. Palacio traveled to Belize to conduct the survey as part of preliminary dissertation research.

Siebert and Belsky (UM) were awarded a grant from U.S. Man and Biosphere for research on "Socioeconomic and Ecological Considerations of Tie-Tie (*Desmoncus* sp.): Sustained Yield Harvesting and Use in Rio Bravo and Gale's Point, Belize." The research provided funding support for several Belizean students. Siebert also received a grant from the UM University Grant Program for research on the same topic.

### **Year 3**

Palacio and McCool presented a paper regarding sectoral development and differentiation of ecotourism in Belize at the 2nd International Eco-tourism Conference in Caracas, Venezuela.

### **Year 4**

John Douglas (UM) and Mustafa Touré (UCB) conducted collaborative research regarding public awareness of and interest in archaeology. They surveyed 514 people and found that Belizeans were aware of the benefits that archaeology provides tourism and that Belizeans viewed archaeology as a national heritage that must be protected and studied for future generations.

Philip Morgan (UCB) and Bill Woessner (UM) reviewed opportunities to conduct collaborative research on groundwater pollution and sampling in Belize.

George Stanley (UM) and Gail Bradley-Miller (UCB) conducted collaborative research on coral diversity in Belizean reefs. The project supported two Belizean biology students who assisted in identification and labeling of corals and other marine organisms and in the development of a permanent coral display in the entrance foyer of the main UCB building.

Mustafa Touré (UCB) and Siebert (UM) collaborated in a proposal in which Toure prepared a management strategy for the development of terrestrial and marine resources on Turneffe Atoll. The strategy comprised a portion of Touré's Masters thesis.

UM and UCB project personnel met with LCNF staff regarding collaborative research possibilities. The group identified comparative watershed management research in the Mountain Pine Ridge of Belize and the Tenderfoot Creek Experimental Forest in Montana as a potential research topic. Siebert (UM) drafted a research prospectus that proposed assessing and comparing the hydrologic responses of forest management practices in the two areas. Research will be pursued pending acquisition of funding support.

#### **Year 5**

Rita Sommers-Flanagan (UM), Ms. Jimenez (UCB) and Pride Belize conducted collaborative research on sexual abuse survival in Belize City.

Rustem Medora (UM) and Rosita Arvigo (Ix Chel) conducted collaborative research on medicinal plants in the Cayo District.

Bill Woessner (UM Geology Professor) and Philip Morgan (UCB) collaborated on Morgan's dissertation research sampling methodologies and field sites re. the fate and movement of pesticides in the Belize River watershed.

### **Objective 7: Professional development of UM faculty and staff**

#### **Year 1**

Procedures for selecting UM faculty, short course, and staff exchange participants were developed. UCB and UM completed all arrangements for visiting faculty and staff.

#### **Year 2**

Richard Solberg (UM) and Steve McCool (UM) completed faculty exchanges at UCB and gave presentations on their experiences to interested UM faculty and staff. McCool redirected research activities to include international protected areas issues as a result of his experiences.

Elizabeth Pancake (UM) was able to respond more effectively to UDLP and UCB needs, especially re. reporting and budgeting after working at UCB.

#### **Year 3**

Don Potts (UM) and Bob Campbell (UM) incorporated insights and experience from working in Belize into teaching, research and extension activities in Montana. George Stanley (UM) explored research opportunities for UM faculty and students with the Marine Research Center sponsored by the Coral Caye Conservation (CCC) while participating on a faculty exchange.

Steve Siebert and Jill Belsky incorporated Belizean materials into UM Forestry and Sociology courses and enlarged their international research activities under the UDLP. Steve McCool presented a short training course on limits of acceptable change in tourism development at an International Eco-Tourism Conference in Puerto Rico which grew out of a short course he first presented in Belize.

#### **Year 4**

The teaching and research implications associated with UM faculty teaching in Belize were assessed by interviewing all UM faculty who had worked to date in Belize. All faculty participants (Jill Belsky, Sociology; Kevin O'Hara, Forestry; Steve McCool, Forestry; Don Potts, Forestry; George Stanley, Geology; Steve Siebert, Forestry; and Don Jenni, Biology) had incorporated Belizean subject matter and/or tropical and development issues into regular UM courses.

#### **Year 5**

Siebert and Belsky presented an invited paper based on their field work in Belize at the "Conservation and Community Development in the Selva Maya of Belize, Guatemala and Mexico" in Chetumal, Mexico.

Rita Sommers-Flanagan, Jim Gannon, Bill Woessner and Jack Kirkley (UM) acquired their first international work experience in a developing country through the project and all indicated that they plan to incorporate their newly-gained knowledge and experience into future teaching and research activities.

#### **Objective 8: Enhance UM international and cross-cultural curriculum**

#### **Year 1**

Meetings were held with members of the UM International Committee and the International Forestry Committee to review the Montana-Belize Partnership and ways in which the project might enhance the international content of UM curricula.

Three UM faculty (Potts, McCool, Belsky) traveled to Belize in December of 1991 (under non-UDLP funding) and revised course syllabi to include Belizean topics in regularly offered UM courses based upon their experiences.

#### **Year 2**

Siebert and Belsky developed and offered the first Belize seminar and field courses (both offered annually for the duration of the project). Siebert incorporated Belizean material into his Tropical Forest Management and International Conservation and Development courses.

#### **Year 3**

UM Dean of the College of Arts and Sciences hired several new faculty members to expand UM curricula and research in international resource management, development, and culture. Several of the hires were in Latin American and development studies and reflected an attempt to build upon the internationalization activities initiated under the UDLP.

Don Jenni (UM) incorporated knowledge and experience he acquired in Belize into UM biology courses.

#### **Year 4**

John Douglas (UM) incorporated Belizean archaeological information into his Mesoamerican Prehistory class in Anthropology. Jill Belsky incorporated Belizean materials and perspectives into several Sociology classes including: Society and Environment and Sociology of International Development. Kevin O'Hara (UM) incorporated Belizean materials into Multiple Resource Silviculture, Advanced Silviculture, and Forest Stand Dynamics. Steve McCool (UM) included case studies regarding ecotourism growth in Belize in three courses: Introduction to Recreation, Recreation Planning and Advanced Wildlands Recreation Management.

#### **Year 5**

Rita Sommers-Flanagan (Counseling), Jim Gannon (Biology), Bill Woessner (Geology) and Jack Kirkley (Western Montana University) are incorporating case



study materials and insights acquired through their work in Belize into regularly offered UM courses.

**Objective 9:** *Provide internship opportunities for students*

**Year 1**

Steve Siebert consulted with personnel from Monkey Bay Wildlife Sanctuary, Programme For Belize, Belize Audubon Society, Belize Center for Environmental Studies, Belize Forestry Department, and the Belize Zoo concerning internship opportunities for UM students. Internships for two UM students were developed: Rick Anderson with Monkey Bay Wildlife Sanctuary and Margaret Jacklich with the Belize Zoo. Anderson made an inventory of vegetation and soils, conducted a socioeconomic survey of two villages adjacent to the preserve, and explored topics for graduate study. Jacklich worked on nature trail construction and the preparation of interpretive materials for the Belize Zoo. Both internships were funded with non-UDLP funds.

**Year 2**

Siebert identified and developed internship assignments for three UM students: Jim Huinker and Bob Rogers with the BFD (re. forest inventory and pine seedling selection and management) and Jeff Martin with the Belize Zoo (re. developing environmental education materials). Siebert and the intern sponsors developed an evaluation form which was used to review these and future interns.

**Year 3**

Siebert arranged and supervised three internships for UM students: Charles Clark conducted a socioeconomic study of forest conservation and community/agricultural development in the Cayo District for the Ministry of Economic Development and the BFD; Denis Carrell worked with Monkey Bay Wildlife Sanctuary regarding the development of low-input sustainable agricultural practices and small-scale energy generation projects, and Jennifer Snorsky conducted research in Gale's Point on conflicts between protected-areas management and resource conservation. Her internship was funded by a grant from the U.S. Man and Biosphere program to Belsky and Siebert.

Siebert arranged an internship for Vincent Palacio (UCB) with LCNF to work in a variety of natural resource management capacities in Montana. LCNF provided room, board and transportation expenses for Palacio, and provided him with diverse experiences in natural resource and recreation management.

**Year 4**

Gaston Magrinat completed an internship with the BFD where he worked on forest inventory and management projects involving regeneration of Caribbean Pine in the Mountain Pine Ridge. Former intern Charles Clark completed his M.S. thesis on Property Rights and Forest Conservation in San Antonio, Cayo, Belize. As a result of his Belize experience, he applied for and was awarded a Fulbright Grant to conduct research on the same topic in Guatemala commencing in late 1995.

Siebert arranged internships for Philip Morgan (UCB) and Jose Mendoza (Belize Ministry of Tourism and the Environment) with LCNF. LCNF again provided support for the students. Morgan collaborated with LCNF researchers in Ten Mile Creek watershed management studies. Mendoza worked in the field with LCNF staff, with particular emphasis in environmental monitoring.

**Year 5**

Anne Orlando worked as an intern with the BFD on biodiversity assessment studies at the Mountain Pine Ridge Station. UM graduate students Christine Lenches, Tammy Mildenstein and Sam Stier conducted literature reviews and

completed synthesis papers on various tropical forest conservation and management topics for use in future field and seminar courses at UM.

**Objective 10:** *Develop internal advisory group for project planning, monitoring, and evaluation*

**Year 1**

UM and UCB established two UDLP project advisory groups, a Project Executive Committee (PEC) comprised of UM and UCB project administrators and a Project Advisory Council (PAC) comprised of UM and UCB project administrators and representatives from other project collaborators, including: the Belize Forestry Department, Ministry of Tourism and the Environment, Belize Audubon Society, Programme for Belize, and Belize Center for Environmental Studies. The first meeting of PAC was convened and the group initiated a project needs assessment, prioritized needs, and approved specific project activities. PEC met several times.

**Year 2**

PEC reviewed faculty and staff exchanges, project implementation, short-course sponsorship and evaluations, cost sharing, collaborative research opportunities, and contracted services; and agreed to work within the existing UCB curriculum so as to avoid overextending resources with the establishment of certificate programs.

PAC assessed the delivery of short courses, the change in UCB project personnel, and reviewed the content, number, participants, and logistics of the short courses delivered to date. PAC held its first annual Planning Retreat, a two-day meeting with GOB, NGO, and UCB participation. Members drafted the "Third Year Project Workplan" as a mechanism for developing and prioritizing project activities from UCB's perspective.

Steve Cornelius, Latin American Program Director of World Wildlife Fund, conducted an external project evaluation. He concluded that development of environmental-science curriculum is a high priority, that more effort needs to be made to involve the NGO and GOB communities; and that project communication needs to be clarified and made more frequent at all levels and among all the participating organizations to ensure project success.

**Year 3**

PAC met twice and played an increasingly active role in guiding UCB's outreach efforts. PEC met several times during the year and continued to direct project activities.

Richard Vengroff, University of Connecticut, conducted a mid-term project evaluation. He made several recommendations regarding ways to improve project administration, management and overall effectiveness.

**Year 4**

PAC met once to review UDLP activities and the new UCB Natural Resource Management program. PEC met several times.

**Year 5**

Steve Siebert (UM) led a final project evaluation in Belize and Montana with UCB, NGO, GOB and LCNF project collaborators. Plans to conduct an independent external evaluation and a final project workshop were canceled when 5<sup>th</sup> year budget funding was reduced by USAID. During the final evaluation, project collaborators assessed the UDLP effort in terms of administration, management and activities; identified activities warranting continuation after conclusion of the project; and prepared a draft timetable for future collaborative teaching, research and extension activities.

## Project Sustainability

UM, UCB and other project collaborators initiated a wide variety of activities that will be continued after completion of the UDLP. Most importantly, UCB developed an Associate Degree Program in Natural Resources Management, which enjoys broad support in the Belizean public and private sectors and has generated great interest among students. The NRM program, which developed directly from UM-UCB collaboration and UDLP support, is a timely and relevant response to Belizean natural resource management needs. The program appears to be economically viable and to have excellent prospects for continuing and perhaps expanding.

The UDLP also supported UCB development of natural resource management-related capabilities in short course training, Geographic Information Systems, and environmental impact assessment. UCB is currently exploring the possibility of offering intensive, short courses in environmental impact assessment and ecotourist guide training on a regular basis. UCB also developed an environmental impact assessment manual for use throughout Belize and plans to continue to expand and refine its use. Computer equipment and software provided through UDLP funding and donations secured by UM provide UCB with some of Belize's most advanced GIS/ArcView capabilities. UCB intends to develop and expand its GIS services, particularly in environmental and land use planning, and expand its extension education and external contract work in the public and private sectors. The project planning and advisory process (PAC) established under the UDLP remains in place to help guide future UCB short-course training and extension activities. In summary, UCB is now a major player in Belizean natural resource education, short course training and extension, and has the institutional and staff capability to continue to expand its educational, research and extension activities.

As a result of collaborative activities initiated by UM under the UDLP, UCB and PFB have developed an excellent working relationship in natural resource education and training. UCB and PFB plan to continue collaborative efforts, specifically in professional internship training for UCB NRM students (PFB has identified internship opportunities and secured funding to support 10 UCB student interns at Rio Bravo each year).

The ability of UCB to pursue collaboration with NGOs, GOB and other institutions, and for its faculty to develop independent research projects and field courses may depend upon greater freedom and flexibility by the UCB administration. External project evaluators have recommended that UCB decentralize and streamline administrative practices and control. However, UCB faculty, particularly young faculty, continue to express frustration and concern over their limited freedom and ability to work independently (whether in research or teaching).

The UDLP grant made significant and lasting contributions to the internationalization of UM academic programs. Specifically, 15 UM faculty have incorporated international resource management issues and materials into dozens of regularly offered courses at the graduate and undergraduate levels and several faculty have developed international research activities as a direct consequence of their experiences in Belize. Two new, interdisciplinary courses (the Belize field and semester seminar courses) were developed with UDLP support and are now offered on a permanent basis. Finally, the cross-cultural experiences gained by UM faculty and staff who worked with Belizeans have enriched the UM community in ways that are difficult to quantify, but that are likely to benefit American and foreign students for years to come.

UM and UCB plan to continue to collaborate in a number of areas after completion of the UDLP. The two UCB faculty members who are completing Ph.D.s at UM continue to conduct dissertation research and to collaborate with UM faculty. Additional collaborative research between UCB natural resource faculty and UM faculty from the School of Forestry and the Division of

Biological Sciences will be pursued pending funding availability. UM and UCB plan to continue to collaborate on the field practicum (next scheduled offering is Spring 1998), the staff exchange program (pending availability of funds for travel and per diem), and opportunities for faculty to teach and/or study at each others institutions. The UM Western Montana campus at Dillon and UCB are exploring the possibility of collaborating in teacher training programs.

The UDLP project provided UM faculty, staff and students with valuable international experiences which significantly enhanced the international content the UM curricula. The UDLP project also significantly strengthened UCB institutional and staff capabilities in natural resource management through education, training and the provision of appropriate technology. UCB is now well-positioned to assume a leadership role in Belizean natural resource education and management issues, and in preparing present and future generations of Belizeans in the conservation and management of their nation's natural resources.

Table 1: Short Course Training Offered

<u>Instructors</u>	<u>Course Offered</u>	<u>Date</u>
Jack Meyers (UCB)	Wildlife Management	1991
	Wildlife Inventory Methodology	1992
Steve McCool (UM)	Limits to Acceptable Change (Tourism)	1992
	Development of Tourism Research	1992
Tom Nimlos (UM)	Environmental Impact Assessment	1992
Richard Smith (LCNF)		
Dan Corti (UM)	Municipal and Rural Sanitation	1992
Kevin O'Hara (UM)	Multiple Resource Silviculture	1992
Jim Hurtel (LCNF)		
Ken Brewer (Flathead NF)		
Nimmi Bryant (UCB)	Environmental Education	1992
Sharon Alexander (UM)	Topology for Short Course Delivery and Distance Education	1992
Don Potts (UM)	Watershed Management and Planning	1993
Mark Nienow (LCNF)		
Don Jenni (UM)	Ecotourist Guide Training	1993
Vincent Palacio (UCB)		
Wayne Philip (LCNF)		
Vincent Palacio (UCB)	Proposal Design and Development	1993
Rustem Medora (UM)	Ethnopharmacology and Medicinal Plants	1994
Rosita Arvigo (Ix Chel)		
Francis Marin (UCB)	Environmental Conservation	1994
Dorian Barrow (UCB)		
Tim Palacio (UCB)		
Evan Cayetano (BCES)	Environmental Impact Assessment	1994-95
Vincent Palacio (UCB)	Environmental Impact Assessment	1995-96
Erling Oelz (UM)	Library Services and Computerization	1995
Mike Miller (UM)	Geographic Information Systems & Computer Software	1996-97
Bill Woessner (UM)	Water quality monitoring and research consultation	1996
Steve Siebert (UM)	Conservation and Development Field Practicum (offered annually)	1992-96
Jill Belsky (UM)		
LCNF staff	Firefighting and Management	1992-95

**Table 2: Staff Exchanges Between UM and UCB**

<u>Name</u>	<u>Activities</u>	<u>Date</u>
Steve Siebert (UM)	Administration, field course instruction, intern supervision, program development & evaluation, research (3-6 weeks annually)	1991-97
Peter Koehn (UM)	Administration (1 week annually)	1991-95
Joey Belisle (UCB)	Project budgeting, accounting, monitoring and evaluation	1992
Karen Card (UCB)	Personnel management and administration	1992
Carol Gable (UM)	Computerized accounting and inventory	1992
Sylvia Cattouse (UCB)	Models for an Entrepreneurship Center	1992
Bob Campbell (UM)	Small business program development	1992
Oswaldo Sabido (BFD)	Short Course Training (LCNF)	1992
Domingo Ruiz (BFD)	Short Course Training (LCNF)	1992
Vincent Palacio (UCB)	Pursue Ph.D. Studies at UM	1992-94
Ismael Hoare (UCB)	Short course and service delivery	1993
Enid McKoy (UCB)	Registrar activities and management	1993
Sharon Alexander (UM)	Distance learning & continuing education	1993
Elizabeth Pancake (UM)	Financial management	1993
Philip Morgan (UCB)	Pursue Ph.D. studies at UM	1993-95
Mustafa Touré (UCB)	Administration, faculty and staff exchanges, fund raising and foundation development	1993
Sylvia Cattouse (UCB)	Curriculum and program development	1993
Don Habbe (UM)	Administration, accreditation process, and external project evaluation	1993&94
Angel Cal (UCB)	Administration and future collaboration	1994&96
Rien Plog (UCB)	Conference and curriculum development	1994
Alex Williams (UCB)	Project administration and management	1994
Larry Vernon (UCB)	Library services and computerization	1994
Erling Oelz (UM)	Library services and computerization	1994
Arylee Evans (UCB)	Bookstore administration and management	1996
Rich Hamma (UM)	Financial accounting and reporting	1996
Mike Miller (UM)	GIS and Internet development	1996&97

Table 3: UM Faculty Semester Exchanges at UCB

<u>Name</u>	<u>Activities</u>	<u>Date</u>
Steve McCool Forestry	teaching and research	1992
Richard Solberg Biology	administration and teaching	1992
George Stanley Geology	teaching, program development and research	1995
John Douglas Anthropology	teaching and research	1995
Rita Sommers- Flanagan Counseling	teaching and research	1996
Jim Gannon Biology	teaching	1996
Jack Kirkley Biology	teaching and research	1997

Table 4: UDLP-Supported Research

<u>Name</u>	<u>Research Topic</u>	<u>Date</u>
Steve McCool (UM) Vincent Palacio (UCB) Joy Vernon (Belize)	Ecotourism	1992
John Douglas (UM) Mustafa Toure (UCB)	Archeology education	1994
George Stanley (UM) Gail Bradley-Miller (UCB)	Coral reef diversity	1994
Mustafa Toure (UCB) Steve Siebert (UM)	Turneffe Atoll management strategy	1995
Rita Sommers-Flanagan (UM) Ms. Jimenez (UCB) Pride Belize	Sexual abuse	1996
Rustem Medora (UM) Rosita Arvigo (Ix Chel)	Medicinal plants	1996
Vincent Palacio (UCB)	Dissertation research re. tourism	1996
Philip Morgan (UCB)	Dissertation research re. pesticides in the Belize River	1996
other: Steve Siebert (UM) Jill Belsky (UM)	Socioeconomic and ecological aspects of <i>Desmoncus</i> sp.	1993-95 (funded by USMAB)



Table 5: Resources Provided to UCB

Resources Provided to UCB through UDLP or Other Project Funds

- \* Tuition, fees and stipend expenses for two UCB faculty at UM (9 semesters)
- \* Travel and per diem for 14 UCB faculty and staff to work at UM
- \* 1 Project Vehicle (1992 Ford Ranger pick-up truck)
- \* 4 Computers (one 486 DX25, two Pentium 100 c/CD Rom with 14" monitors, one Compaq 286 laptop)
- \* 7 Printers (2 Epson 2S inkjets, 2 Epson LX300 Impacts, 3 HP color inkjets)
- \* Computer equipment (12 keyboards, 6 Syquest EZ-230 removable hard drives with cartridges)
- \* Computer software (1 MAP Info GIS program; 10 ArcView lab kits with 2 instructional media units; and Adobe Photoshop, Windows 95, Windows 3.1 and DOS 6.2 software)
- \* Other equipment (Biological experimentation lab kits with chemicals, 1 Yeasu UX500 radio)
- \* Research (\$7,000 to UCB faculty for individual and collaborative research)
- \* Books (\$2,000 and donations)
- \* Subcontracted funds for communication, supplies, vehicle maintenance, etc.

Table 6: Student Internships Completed


<u>Intern Name</u>	<u>Internship Sponsor</u>	<u>Date</u>
Americans:		
Rick Anderson	Monkey Bay Wildlife Sanctuary	1992
Peggy Jacklich	Belize Zoo	1992
Jeff Martin	Belize Zoo	1993
Bob Rogers	Belize Forestry Department	1993
Jim Huinker	Belize Forestry Department	1993
Charles Clark	Ministry of Economic Development & Belize Forestry Department	1994
Denis Carrell	Monkey Bay Wildlife Sanctuary	1994
Jennifer Snorsky	Gale's Point/Manatee	1994
Gaston Magrinat	Belize Forestry Department	1995
Anne Orlando	Belize Forestry Department	1996
Belizeans:		
Vincent Palacio	Lewis and Clark N.F.	1993
Philip Morgan	Lewis and Clark N.F.	1994
Jose Mendoza	Lewis and Clark N.F.	1994

Appendix 1: UCB Natural Resource Management Brochure

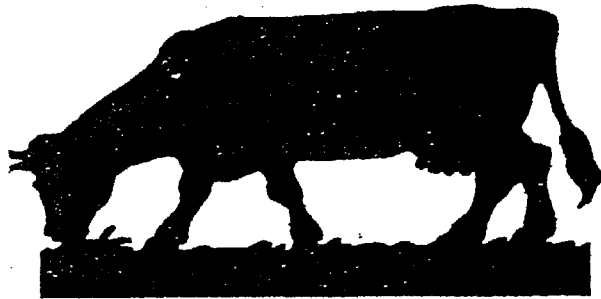
# INTEGRATED NATURAL RESOURCES MANAGEMENT PROGRAMME



## Aim

 The aim of the Integrated Natural Resources Management Program is to prepare students to work in industry, government and non-government agencies in areas related to natural resource management, environmental quality, (including regulation and enforcement), and environmental impact

# INTEGRATED NATURAL RESOURCES MANAGEMENT PROGRAMME



## Objectives

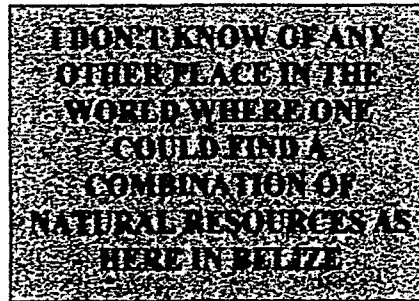
- 1) Provide basic skills in research and management of coastal/marine, terrestrial and recreation resources;
- 2) Conduct Surveys and monitoring of various ecosystems;
- 3) To provide entrepreneurial skills in natural resources related careers;
- 4) Equip graduates with resource interpretation skills;
- 5) To prepare graduates for entry into higher degree programs at the undergraduate level.
- 6) Promote sustainable forestry practices (timber extraction, reforestation, non-extractive use of forestry)

## Admission Requirements

- All applicants seeking admission must:
- a) have taken either Biology, Physics or Chemistry at a secondary level;
  - b) sit the UCB Placement Examination;

- (c) complete application procedures along with two letters of recommendation.

Provision is made for applicants under the categories of transient and auditing students.



## Training Needs

The principal beneficiaries of this programme will be government departments as well as non-governmental organizations involved with management and conservation of Belize's natural resources. The coastal/marine component of the program should directly benefit Fisheries Department, Coastal Zone Management, and Aquaculture industries by providing trained personnel for recruitment. Water and Sewage Authority, Forestry, Public Health Bureau, and the Department of Environment will benefit by having recruits trained in the terrestrial aspects of this program. The Ministry of Tourism and the Environment as well as private enterprises built around eco-tourism will benefit from training in Integrated Natural Resources Management.

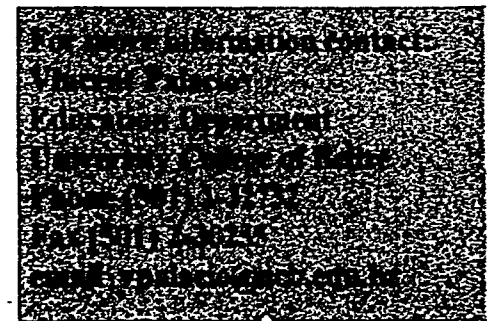
## Integrated Natural Resources Management

49 Semester Credit Hours

NRMP 101	Environmental Conservation and Development
NRMP 102	Environmental Conservation and Development
NRMP 105	Introduction to Marine Biology
NRMP 204	Environmental Impact Assessment
NRMP 205	Environmental Geology
NRMP 206	Forestry Management
NRMP 209	Social Forestry
NRMP 210	Hospitality/Tourism
NRMP 214	Coastal Zone Management
NRMP 250	Independent Project
NRMP 299	Seminar
NRMP 300	Internship

## Certification

Students will not be allowed to graduate if they have an F in any of the core courses (are listed below) or any of the prerequisite courses. Students must have a cumulative GPA of 2.5 before they are offered an Associate Degree in Applied Science.



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**Semester Sequence of  
Courses**

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**Semester I**

ENGL 111	College English I
CMPS 140	Introduction to Computer
SOCL 121	Introduction to Sociology
MATH 121	Intermediate Algebra
NRMP 101A	Environ. Conservation & Dev.
BIOL 121	General Biology

**Semester II**

BIOL 122	General Biology 2
NRMP 102	Environ. Conservation & Dev.
NRMP 105	Introduction to Marine Ecology
NRMP 209	Social Forestry
PHIL 210	Ethics
GSTU 101	Study Skills
PSYC 121	Introduction to Psychology

**Semester III**

SPAN 111	Intermediate Spanish
HIST 201	Belizean History
ENGL 112	Col. English II (Tech. Writing)
ECOL 200	Field Ecology
NRMP 206	Forestry Management
ECOL 201	Ecology Lab
CHEM 121	General and Physical Chemistry

**Semester IV**

PHYS 150	Physics for the Natural Sciences-
NRMP 205	Environmental Geology
NRMP 204	Environ. Impact Assessment
NRMP 250	Independent Project
NRMP 207	Solid Waste Management
NRMP 299	Seminar

**Semester V**

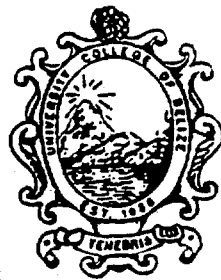
NRMP 210	Hospitality/Tourism
NRMP 214	Coastal Zone Management
NRMP 208	Solid Waste Management
Span 112	Advanced Spanish
COMP 141	Data Analysis

**Semester VI**

NRMP 300	Internship
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Appendix 2: UM-UCB UDLP Brochure



**THE UNIVERSITY COLLEGE  
OF BELIZE  
&  
THE UNIVERSITY OF MONTANA**

**PARTNERSHIP FOR  
NATURAL-RESOURCE MANAGEMENT  
& SUSTAINABLE DEVELOPMENT**

**SUPPORTED BY USAID UNIVERSITY  
DEVELOPMENT LINKAGE PROJECT**



University of  
**Montana**



## BACKGROUND

The nation of Belize is at a crossroads. While the country remains well-forested and possesses abundant natural resources, Belize faces threats to its social and environmental fabric, including pressure to exploit resources for short-term gain, a large influx of refugees from Central America, and a burgeoning nature-based tourism industry. The challenge confronting Belizean society and institutions involves how to develop and manage its natural resources so as to derive maximum economic advantage and to avoid undesirable environmental and social effects.

The University College of Belize (UCB), Belize's only four-year institution of higher education, was established in 1986 to provide education and training to meet the nation's development needs. UCB currently offers degree programs in business, teacher training, and English as a second language. UCB is moving to expand its curriculum through development of an Associate Degree program in natural-resource management at its new campus in Belmopan. UCB also has been designated as the national institution for training in environmental management. UCB and Coral Caye Conservation are developing a Marine Research Center on Calabash Caye in consultation with The University of Montana.

In 1992, The University College of Belize and The University of Montana (UM) formed a partnership for Natural-Resource Management and Sustainable Development. This partnership has two primary goals:

- to develop UCB staff and institutional capabilities in environmental science and sustainable resource management
- to contribute to the internationalization of University of Montana academic programs

The partnership is supported by a University Development Linkage Project (UDLP) grant from the U.S. Agency for International Development. The University College of Belize and The University of Montana are the principal participants in the UDLP project, but the Association of Tertiary Level Institutions of Belize, Belize Forestry Department, Belize Ministry of Tourism and the Environment, Programme for Belize, Belize Audubon Society, Belize Center for Environmental Studies, and the Lewis and Clark National Forest of the USDA Forest Service also participate. All parties planned and agreed to the linkage agreement, which entails major investments in staff and capital by the participants.

There is broad consensus among Government of Belize policy makers, Belizean non-governmental conservation organizations, and international conservation and development organizations regarding the importance of improving local resource- and tourism-management capabilities. To meet this challenge, the UCB-UM Partnership has two principal objectives:

- to provide short-term professional training to Belizean government and NGO environmental-conservation personnel
- to enhance UCB staff and institutional capabilities in resource management so as to enable UCB to assume future educational and training responsibilities

The latter objective is supported by advanced degree training for Belizeans at The University of Montana and semester-long faculty exchanges by relevant UM professors at UCB. The partnership also promotes collaborative research among UCB and UM faculty and seeks to strengthen the international content of UM's graduate and undergraduate programs. The

project is administered through the Development and External Relations Office at UCB and the Office of International Programs at UM.

## PROFESSIONAL TRAINING

UCB and UM develop and deliver short training courses for GOB and NGO resource-management professionals. To date, the partnership has provided training courses in: environmental-impact assessment, wildlife-inventory methodology, wildlife management for protected areas managers, multiple-use silviculture, limits to acceptable change in recreation, solid-waste management, watershed management and planning, and training of ecotourist guides.

## STAFF & INSTITUTIONAL DEVELOPMENT AT UCB

The UDLP project has supported advanced studies at The University of Montana by two UCB faculty members. One is working on a Ph.D. in recreation management; the other on a Ph.D. in watershed management. The two institutions have exchanged administrative staff in management, accounting, small-business development, academic affairs, distance education, computerized library data-base management, registrar-related responsibilities, student services, and fund raising and foundation development.

## CURRICULUM DEVELOPMENT AT UCB

UCB currently is developing an Associate Degree program in Natural-Resource Management at its new Belmopan campus. The Resource Management degree will offer three areas of emphasis: terrestrial-resource management, marine-resource management, and recreation/tourism management. UM faculty also work closely with UCB faculty and staff on development of UCB's marine-studies

curriculum. UM exchange faculty have contributed by teaching courses at UCB in genetics, anthropology, social science research methods, and marine studies. The partnership also supports the acquisition of library materials at UCB.

#### **COLLABORATION BETWEEN UCB & UM**

The project supports an interdisciplinary field course each year on opportunities for and constraints on conservation and development in Belizean protected areas. The field course is offered to UCB and UM students and to Belizean NGO and GOB personnel, and is directed by UCB and UM faculty. The partnership also provides small grants to support collaborative studies between Belizean researchers and UM faculty. The emphasis is on collaborative research in the fields of forest conservation, marine ecology, nature tourism, social-impact assessment, sustainable development, archeological awareness, refugee settlement, ethnopharmacology, and related resource-management issues.

#### **PROJECT PLANNING & ADVISING**

The project has established an advisory council (PAC) through which representatives of ATLIB, GOB, and Belizean conservation NGOs identify and prioritize short- and long-term education and training activities. PAC also is relied upon to disseminate information about project activities and to assess project-implementation and management efforts. Members include representatives of UM, UCB, UCB/Belmopan Junior College, Ministry of Natural Resources, Ministry of Human Resources, Ministry of Tourism and the Environment, GOB Training Unit, Belize Zoo, Programme for Belize, Belize Audubon Society, Belize Centre for Environmental Studies, Belize

Institute of Management, and USAID.

#### **PROJECT DIRECTOR'S MESSAGE**

*MR. VINCENT PALACIO, PROJECT DIRECTOR  
ACTING DEVELOPMENT &  
EXTERNAL RELATIONS OFFICER*

Enhanced training, education, and institutional capacity in natural-resource management are central to Belize's economic future. The University College of Belize is committed to providing education that contributes to Belizean economic development and resource conservation. Our faculty stand ready to collaborate with domestic and international counterparts in the establishment of appropriate educational programs.

#### **PROJECT OFFICER'S MESSAGE**

*DR. ISMAIL BIN YAHYA*

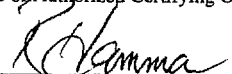
Belize and UCB offer a unique setting for education and training in natural-resource management and sustainable development. The UCB-UM Partnership for Natural-Resource Management and Sustainable Development represents an important step forward in Belize's efforts to prepare present and future generations for the challenge of managing the country's resources in a sustainable, productive, and equitable manner. UCB is prepared to work with Belizean and international institutions in the development of relevant training and academic programs.

#### **FOR MORE INFORMATION CONTACT:**

Mr. Vincent Palacio or Dr. Ismail bin Yahya  
The University College of Belize  
P.O. Box 990, Belize City, Belize  
Telephone: 501-02-32732; 33; 35  
FAX: 501-02-30255

# FINANCIAL STATUS REPORT

(Long Form)

1. Federal Agency and Organizational Element to Which Report is Submitted <b>A.I.D.</b>		2. Federal Grant or Other Identifying Number Assigned By Federal Agency <b>DAN-5063-A-00-1116-00</b>		OMB Approval No. <b>0348-0039</b>		Page <b>1</b> of <b>1</b>	
3. Recipient Organization (Name and complete address, including ZIP code) <b>The University of Montana Business Services 3211 Missoula, MT 59812</b>							
4. Employer Identification Number <b>81-6001713</b>		5. Recipient Account Number or Identifying Number <b>3211</b>		6. Final Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		7. Basis <input type="checkbox"/> Cash <input checked="" type="checkbox"/> Accrual	
8. Funding/Grant Period (See Instructions) From: (Month, Day, Year) <b>9/30/91</b>		9. Period Covered by this Report To: (Month, Day, Year) <b>03/31/97</b>		From: (Month, Day, Year) <b>01/01/97</b>		To: (Month, Day, Year) <b>03/31/97</b>	
10. Transactions:				I Previously Reported		II This Period	
				III Cumulative			
a. Total outlays				1,600,408.61		39,961.55	
b. Refunds, rebates, etc.							
c. Program income used in accordance with the deduction alternative							
d. Net outlays (line a, less the sum of lines b and c)				1,600,408.61		39,978.75	
<b>Recipient's share of net outlays, consisting of:</b>							
e. Third party (in-kind) contributions							
f. Other Federal awards authorized to be used to match this award				136,902.00		0.00	
g. Program income used in accordance with the matching or cost sharing alternative							
h. All other recipient outlays not shown on lines e, f or g				1,032,589.00		21,078.00	
i. Total recipient share of net outlays (sum of lines e, f, g and h)				1,169,491.00		21,078.00	
j. Federal share of net outlays (line d less line i)				430,917.61		18,900.75	
k. Total unliquidated obligations							
l. Recipient's share of unliquidated obligations							
m. Federal share of unliquidated obligations							
n. Total federal share (sum of lines j and m)						449,818.36	
o. Total federal funds authorized for this funding period						450,000.00	
p. Unobligated balance of federal fund (Line o minus line n)						181.64	
<b>Program Income, consisting of:</b>							
q. Disbursed program income shown on lines c and/or g above							
r. Disbursed program income using the addition alternative							
s. Undisbursed program income							
t. Total program income realized (Sum of lines q, r and s)							
11. Indirect Expense		a. Type of Rate (Place "X" on appropriate line) <input type="checkbox"/> Provisional <input type="checkbox"/> Predetermined <input type="checkbox"/> Final <input type="checkbox"/> Fixed					
		b. Rate <b>0.00%</b>		c. Base <b>0.00</b>		d. Total Amount <b>0.00</b>	
						e. Federal Share <b>0.00</b>	
12. Remarks: Attach any explanations deemed necessary or information required by Federal Sponsoring agency in compliance with governing legislation.							
13. Certification: <b>I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents.</b>							
Typed or Printed Name and Title <b>Richard Hamma</b> Accountant						Telephone (Area code, number and ext) <b>(406) 243- 5132</b>	
Signature of Authorized Certifying Official 						Date Report Submitted <b>20-May-97</b>	

#### Appendix 4: Abbreviations

ACE	Adult and Continuing Education, UCB
ATLIB	Association of Tertiary Level Institutions of Belize
BCES	Belize Center for Environmental Studies
BFD	Belize Forestry Department
CCC	Coral Caye Conservation
DERO	Development and External Relations Office, UCB
GIS	Geographic Information Systems
GOB	Government of Belize
LCNF	Lewis and Clark National Forest
MRC	Marine Resources Centre, UCB
NGO	Non-governmental Organization
NARMAP	Natural Resource Management Project
NRM	Natural Resource Management Program, UCB
OIP	Office of International Programs, UM
PAC	Project Advisory Council
PEC	Project Executive Committee
PfB	Programme for Belize
UCB	University College of Belize
UDLP	University Development Linkage Project
UM	University of Montana