INTERNATIONAL COMMUNITY UNIVERSITY RESEARCH ALLIANCES (ICURA)

C-Change ICURA MID-TERM REPORT

PART B (Narrative mid-term report)

The narrative section, Part B of the C-Change ICURA Mid-Term Report, presents the experience to date as well as the indicators and findings of the C-Change ICURA developed to assess progress and results.

As required, Part B of the report is divided into seven specific sections, as follows:

Section I.	One page summary of the ICURA project
Section II.	Community and University Partnerships
Section III.	Research Training and Development
Section IV.	Research and Knowledge Production
Section V.	Knowledge Mobilization
Section VI.	ICURA Performance and Evaluation
Section VII.	Budget Update and Justification

The Part B report is presented in narrative text and with the use of tables and figures to illustrate and present progress and results of the C-Change ICURA to January 2012 within the 25 page limit. Part B is also accompanied by the following appendices (corresponding to narrative sections II through VII):

Appendix B-II	Community and University Partnerships
Appendix B-III	Research Training and Development
Appendix B-IV	Research and Knowledge Production
Appendix B-V	Knowledge Mobilization
Appendix B-VII	Budget Update and Justification

Section I. One Page Summary of the ICURA Project

The C-Change ICURA project: "Managing Adaptation to Coastal Environmental Change: Canada and the Caribbean" develops community capacity toward closing the gap between environmental change, and the need to manage local adaptation efforts in planning for the environmental impacts to communities' physical, economic, and social well-being. The main research objectives of C-Change focus on the communities and the universities as summarized below:

1. Establish alliances in each community, and among researchers in Canada and the Caribbean to collaborate on global research on coastal impacts due to more frequent storm surge, and sea level rise over the longer term and research the ways and means of mitigating local coastal community vulnerabilities and risks.

2. Identify local vulnerabilities and risks by profiling communities' environmental, economic, social, and cultural dimensions through researching local spatial and demographic data used to prepare community action plans for emergencies.

3. Build local capacity by strengthening community institutional arrangements through research on new local management instruments, by training students, and in workshops and meetings with local community partners and participants.

4. Research best practices for curricula in Managing Adaptation to Environmental Change in universities, and in community public schools to raise awareness and train new generations of young people to evaluate and address the integrated, interdisciplinary coastal community systems subject to environmental change.

The academic partners in the alliance include researchers at the University of the West Indies, the University of Ottawa, the University of New Brunswick, the University of British Columbia, Memorial University of Newfoundland, and Université Sainte-Anne. Four paired communities participate in C-Change- Charlottetown, PEI and Georgetown, Guyana; Iqaluit, Nunavut and the Belize Barrier Reef (San Pedro, Ambergris Cay); Gibsons, British Columbia and Grande Riviere, Trinidad and Tobago; and Isle Madame, Cape Breton and the Island of Bequia. The academic partners in the alliance provide the technical innovation and research to the alliance. They are complemented by local Community Partners including representatives from municipal governments, development groups, non-governmental organizations, business associations, and the wider community. Community Partners provide local input, are involved in policy and strategic responses to the threats posed by more frequent storms and storm surges and sea level rise and through their contribution to the development of Community Adaptation Action Plans. The Community Partners form the core of the C-CATs (C-Change Community Action Teams) in interacting with the C-Change researchers.

Section II. Community and University Partnerships

II.1   Overview of Relevance of C-Change Objectives

In C-Change, "communities" are defined broadly as systems comprised of: (1) governance and local decision makers (e.g., municipal governments); (2) private and public infrastructure services (planners and design professionals, utilities and services, insurance); (3) business and economic activity organizations (corporations, small businesses, boards of trade and commerce); (4) citizens' groups (environmental advocates, indigenous communities); and (5) affected individuals (especially special interest or disadvantaged members of the local society who are socially differentiated by poverty and across gender, class, race and age).

Coastal communities under threat in Canada and the Caribbean are susceptible to serious, immediate threats to infrastructure and/or natural environments (e.g. tourism infrastructure, natural resources, habitats, species), and to local area residents (e.g. livelihoods, family structure, cultural assets, and vulnerabilities derived from poverty/gender issues). The eight C-Change coastal communities are presented in Appendix B-II.1, Table B.1 as 4 "twinned" communities in each of Canada and the Caribbean.

The C-Change role in communities is to highlight the existing conditions, vulnerabilities and risks, to evaluate adaptation strategies, and to prioritize preparedness and strategic planning. As noted in Appendix B-II.1, Table B.1, "Coastal Change Communities" C-Change has created alliances among its designated coastal communities in Canada and the Caribbean, and among its participating network of postsecondary institutions.

Through the alliances and contact with community partners, available data and information have been acquired for graduate and undergraduate student use in C-Change research. While there are numerous reports on the general impacts of sea level rise and storm surge from global discussions, e.g., the IPCC (Intergovernmental Panel on Climate Change in which C-Change Co-applicants Forbes and Crabbé participate), C-Change project research applies specifically to the selected C-Change communities and provides the basis for measured and planned evaluation and response to projected coastal storm impacts locally. The collaboration between research and communities has already resulted in increased local awareness moving toward enhancing adaptive capacity, prioritized support for strategic planning, and reflections on local decision-making.

In this context, C-Change objectives, described briefly in the Section I summary above, are itemized in Table 1 below along with their scientific (university research) and societal (local community) relevance.

Table 1. C-Change Objectives and Relevance

No.	Objective	Scientific Relevance	Societal Relevance
1	• Establish university community alliances • Collaborate on research impacts of storm surge and sea level rise	• Applied work • New research opportunities • Localized impact analyses and monitoring for which systems do not exist • Increase local databases • Understand opportunity costs • Enhance knowledge base • Inform local of broader global, national, regional perspectives	• Enhance local knowledge for participant groups • Unify local government, businesses, professional, and community elements around climate issue • Raise priority of issue • Build local capacity • Provide resources amid local scarcity
2	• Profile communities' environmental, economic, social, and cultural axes • Identify spatial vulnerabilities, risks Prepare action plans	• Improve structured local databases • Document risks • Develop risk profiles and local priorities • Applied problem solving	• Improve and document local self awareness • Quantify local priorities and risk • Enhance local emergency preparedness • Provide local plans of action
3	• Build capacity through new local institutional arrangements • Training students • Present community workshops	• Develop understanding of local institutional arrangements, decision making • Enhance communication skills • Engage in active and ongoing HQP program	• Encourage prioritized local infrastructure • Enhance local knowledge for general public • Engage local community students
4	• Research best practices for curricula for Managing Adaptation to Environmental Change in universities, and community public schools • Raise awareness • Train young people to evaluate integrated, interdisciplinary coastal community systems	• Develop legacy on climate issues through education • Attract students to learning and research • Improve publication possibilities • Enhance importance of systems thinking • Influence the importance of bottom-up versus top-down analyses	• Improve infrastructure and decision making • Develop strategic perspective • Maintain links to university research • Enhance local knowledge for general public • Engage local community students • Encourage the engagement of youth in local community affairs

II.2   Emerging Outcomes and Impacts

C-Change acknowledges that coastal change processes are relatively imperceptible and locals are best positioned to manage the slow coastal shifts, severe storm events notwithstanding. For C-Change researchers, the approach is to listen to community concerns, understand community priorities, and establish working relationships with communities to provide opportunities for future applied research, to enhance the community knowledge-base, and to encourage prioritization, planning, and preparedness of coastal climate shifts. Linking university students to applied and highly relevant community projects enhances applied research opportunities, develops students' appreciation for local communities' problems, and continues to provide them with solid experience for their future in academia and in their professional careers.

C-Change research on local adaptation plans and actions represents a commitment to investing in the development of climate adaptation training programs and academic curricula for local public schools, undergraduate, and graduate students. The activities of the C-Change team and key alliances with communities are expected to extend beyond the life of the project to continue the built alliances for enhanced community capability and awareness of coastal environmental co-existence. The Appendix B-II,2 Table B.2, "Emerging Outcomes and Impacts" briefly describes the current and emerging outcomes of the C-Change project and notes the anticipated impacts on researchers and communities overall in Canada and the Caribbean. The narrative below describes examples of outcomes and impacts to date from C-Change activities.

Initial results are already becoming evident. For example, as a result of his research, one of the project's early UWI graduates, Bobby Gossai, has found employment with the C-Change Community Partner of Georgetown, Guyana, where his knowledge and expertise is currently employed to address climate change issue there. In Charlottetown, the Planning Department of the City of Charlottetown is engaged in updating City By-Laws with respect to water level management from coastal flooding, and is including specific sea level rise parameters into their development guidelines based on global (IPCC) scientific information and recently updated and C-Change-generated flood scenarios for Charlottetown (Forbes and Webster). C-Change research has also prompted community planners in Charlottetown to initiate discussions with emergency personnel on how to respond to major roadway flooding and consequent loss of access during an emergency associated with storm surge or sea level rise.

Town planners from the other communities, e.g., Iqaluit and Gibsons, are – as a consequence of C-Change integrating meetings that bring them together - establishing linkages to mobilize shared knowledge of their municipalities' issues, and to examine options on how to address coastal change. These outcomes and linkages are expected to grow and accelerate as the project continues.

II.3 C-Change Governance Structure

The C-Change ICURA teams in Canada and in the Caribbean have developed governance structures that meet their specific needs, and for working collaboratively on Canada-Caribbean issues. The C-Change Secretariats (Canada and the Caribbean) are formed around tight working relationships among the respective management administration teams (including the Co-Director, Operations/Project Manager, and the Administrative Support Staff). Below, Figure 1: C-Change Project Organizational Structure illustrates the linked governance structure of C-Change in Canada and the Caribbean. The Appendix B-II.2: Community and University Partnerships details the respective governance structures in Canada (Figure B.1 "Canada Governance"), and in the Caribbean (Figure B.2 "Caribbean Region Governance").

Figure 1: C-Change Project Organizational Structure
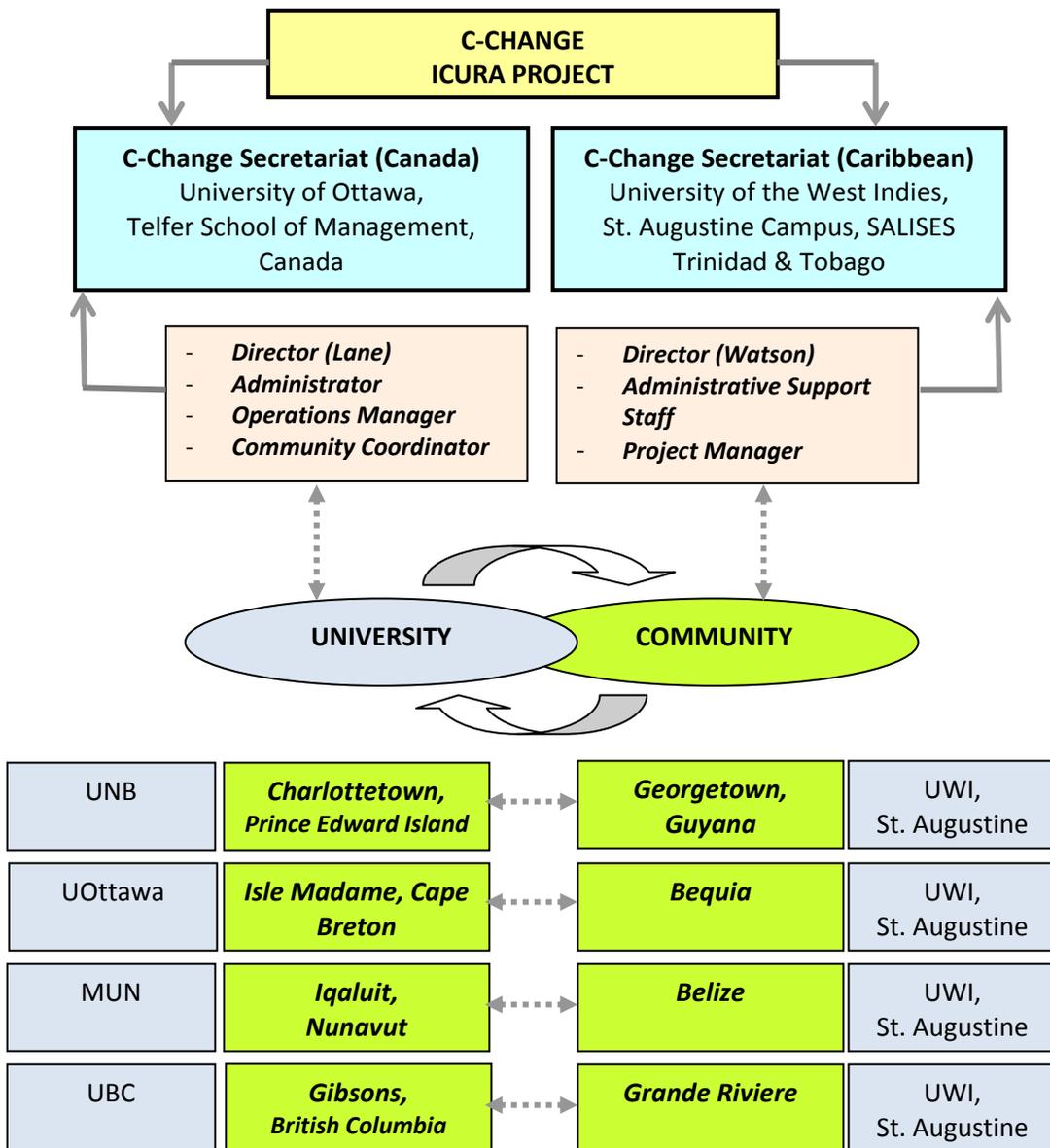
The Secretariats link directly to University-based Co-Applicant researchers, who, as "Community Champions", in turn liaise directly with the Community Partners. The Secretariats are responsible for the coordination including the organization of C-Change University meetings, and meetings in and with the communities. The Secretariats also organize conference activities for the planning and recording of activities, and follow-up action and publication plans. The governance structure established is continually being developed to allow for more timely and broad based communication among team members and, reporting and monitoring of indicators of progress including mechanisms to support deeper involvement in partner collaboration. C-Change governance in Canada and the Caribbean led by the Co-Directors (Lane and Watson, respectively) through the C-Change Secretariats located at the University of Ottawa and at the University of West Indies in St. Augustine. The management teams are responsible for the scientific research coordination and the management operation plans of the project. C-Change governance is defined by its management functions: (a) Administration, (b) Operations Management; (c) Community Coordination, (d) Information Flow, and (e) Financial Management. Appendix B-II.2 "C-Change Organizational Structure" details the C-Change management functions. These functions describe the means and effectiveness of the C-Change ICURA's governance structure in managing key aspects of partnership collaboration that include:

Agreements and protocols: Under the Secretariats' umbrellas of academic non-proprietary academic research, agreements and protocols for data have been established, e.g., for the non-commercial development of models for research with respect to data on demographics, socioeconomics, and survey information from community members. The Secretariats act effectively as "centres" for establishing agreements through the Universities. The formal use and agreements related to these data will doubtless continue to be an ongoing preoccupation (with respect to use rights in research and in community planning) until the project's end. To date, the approach to reconciling data issues has been to consider well-sourced "best available data" as the basis for ongoing research use and evaluation.

Community Partner involvement: While the Secretariats manage the overall community activity, individual C-Change Co-Applicants, designated as Community Champions, act independently and efficiently (often leveraging time and location) to foster community links to C-Change. Given the spatial challenges of communities in this vast national and international project, C-Change's centralized governance reporting with disbursed researchers in the communities communicating regularly through electronic means, has proven to be an effective operating management structure. It has become obvious that over the course of the project, C-Change researchers have heightened expectations among community partners– a good thing – that pushes team members to respond, as needed, to the mounting community requests for information, the latest data on seal level rise, and community data storm scenario analyses.

Defining research questions: It has been a continually acknowledged that communities' knowledge about their own problems are paramount. As such, C-Change team members are careful to develop their research, and that attributed to student researchers, to community feedback. With respect to C-Change governance, the Community Champion, together with Community Partner involvement and student applied training, have, to date, provided unique and ample opportunities to define and structure applied research in response to community needs.

Allocating resources: C-Change Secretariat foundations in the Universities provide a well-established system for the distribution of project funding to the University-based Co-Applicant researchers. This system is most advantageous to the development of highly qualified personnel (HQP) within and across the national networks of Universities. The project has been somewhat challenged in maintaining a high level of collaborator and community support given the more difficult cases of providing funds to non-University participants. While not debilitating, the C-Change project is seeking more effective funding mechanisms to ensure the ongoing engagement of these participants toward enhancing the operation of the project.

Addressing challenges: To date, the Secretariat has been effective in dealing with significant change, including, in both Canada and the Caribbean, the abrupt loss of the C-Change Administrators. It is noteworthy that these key administrative positions were replaced almost immediately without impairing the ongoing operation of the project.

II.4   Integration of C-Change Teams and Research

Without question, the most challenging issue for the effective and planned operation of C-Change is the integration between the international teams in Canada and the Caribbean. This issue resonates with respect to both the joint research agenda and the integration of the twinned international C-Change communities (see also Appendix B-II.1, Table B.1, "C-Change Coastal Communities").

Since the outset of project discussions beginning with the joint meetings under the LOI (Letter of Intent) award prior to full funding, it has been acknowledged by C-Change university researchers, students, and community partners, that the opportunities to meet together to discuss focused issues have been the most rewarding for all of the participants involved. Although separated by great distances, both between the two regions and within, the research team has made determined efforts to get together as frequently as possible to discuss approaches and coordinate efforts. The Appendix B-II.4 Table B.4, "C-Change Integration Meetings" presents the suite of integrating cross-fertilization and exchange events to date. It is noted that the table below is modified and extracted from the ongoing posted materials found at the C-Change public website where these events are recorded (http://www.coastalchange.ca/index.php/documents/meetings).Reference to the "Agenda & Minutes" column in Table B.4 identifies the documents files available on the

website that provide the C-Change record of the itemized events. These documents identify the presence and participation of C-Change team members at meetings that involved C-Change team members from both Canada and the Caribbean.

As noted in Table B.4, since the LOI meetings in 2008, there have been over 20 meetings among Canada and Caribbean C-Change team members travelling to the others' region on C-Change and on leveraged funding (2008-1; 2009-4; 2010-10; 2011-7). These meetings have normally included a least one community partner who has been very important to the integrating C-Change discussions. In the latter phase of the project, the collaborative work between the communities and training workshops involving the communities will become more prominent. Presentations at the joint team meetings on research being conducted by students and researchers have provided new ideas and approaches to researchers from the other country. This has resulted in a cross-fertilization of ideas among the researchers and a more coordinated approach to the project.

The integrated Canada-Caribbean C-Change conference held in Port-of-Spain, June 1-3 2011, on the theme of "Sustainable Development in Coastal Communities" represented a major organizational initiative on the part of the Caribbean research team, and brought together a wide range of stakeholders of the C-Change project including the Caribbean research team, representatives of the Canadian research team, representatives from three of the four C-Change Caribbean community sites, the Mayor of Gibsons, B.C. and Community Partner, Barry Janyk, and postgraduate students from both the Caribbean and Canadian teams. All team members actively participated in the conference where the community representatives chaired sessions and held panel discussions, and the postgraduate students from both teams presented papers, many for the first time in a conference setting. A retreat was held from June 4-6, 2011, following the C-Change conference at the C-Change community of Grande Riviere. This retreat, organised by the Caribbean team, brought together the academic and community members of the project who had travelled to Trinidad for the conference. In addition to discussion of project methodologies and progress, the concept of a community of practice was advanced at this meeting, as a further link among Caribbean and Canadian communities and ICURA project team members.

Unanticipated positive relationships have developed at the local level involving community-based organizations, other levels of government, or through the leadership demonstrated by interested members of a single organization. For example, the multiple local governance organizations that are at work on Isle Madame require participation and leadership not only from the municipal government partner (the Regional Municipality of Richmond County) but also from other local organizations such as the Development Isle Madame Association (DIMA). Charlottetown has reached out beyond its municipal boundaries to invite participation from the other two communities (Cornwall and Stratford) that share its harbour. Iqaluit`s role within Nunavut requires a

broader understanding of management in the North. And, Gibsons must address both strong pro-development and conservation ethics evidenced by its populace.

At the recent team meeting in Ottawa, November 24-26, 2011 (see also Table B.4), unsolicited comments from community representatives noted that they were feeling they were an integral part of the project, having participated in face-to-face discussions on the project, the mid-term report, and finances. More such meetings are an evolving element of the project for which allocated funding is limited. Additional leveraged funding is continually being sought to ensure even greater involvement of researchers and community partners in joint meetings and enhance the effectiveness of the work.

Finally, the key involvement of the communities in this project is acknowledged in the solicitation of letters of support from the C-Change Community Partners. It is particularly heartening for C-Change – and evidence of important community-based work - to note the support of the Community Partners as evidenced by these letters submitted as part of this Mid-Term Report. The list of the submitted letter of support documents are found in Appendix B-II.3, Table B.5, "List of Letters of Support from Community Partners". The hardcopy of the letters are submitted as "Additional Information" in Part C of the Mid-Term Report and as electronic files (PDF format).

II.5   Changes Encountered

Initially, there were problems in organizing the study in Bequia and no C-Change collaborator was appointed there. The unique problems to Belize of coral bleaching and thermal expansion called for different approaches. The decision has been taken to not utilise the entire Belize Barrier Reef as part of the C-Change (Caribbean) work as this scope is simply too broad. Alternatively, two possible sites were considered: Placencia and San Pedro. The former was rejected as opportunities for research were limited and it was determined that it would provide no added value to the project. San Pedro was selected as there are several relevant issues which can be explored in directed research, and the policy context includes opportunities to extract lessons for building adaptive capacity for reef communities generally, from this more focused site and case study. It is not anticipated that the project will be delayed as a consequence of this shift.

In the evolution of the project, it is recognized that research interests vary in the two regions. Canadian work is more oriented to infrastructure and socioeconomic concerns, while Caribbean work is more oriented to biodiversity and development opportunities. Impacts on people and coastal infrastructure have significant deleterious effects on community health and well-being. Significant environmental impacts to coastal biodiversity have a domino effect on coastal resources. These recognized differences do not incur delays, but rather, present broader opportunities to the project as a whole with greater recognition by the researchers for a wider perspective to adaptation to environmental change in communities in both regions.

Section III. Research Training and Development

III.1 Participation in C-Change Research

With respect to research activities, C-Change Co-Applicants, the University-based Co-Applicants, are supported by the staff of the C-Change Secretariat (Canada and the Caribbean regions), by the C-Change Collaborators, by the C-Change Advisory Boards, and, of course, by the Community Partners and the C-Change Research Associates including undergraduate and graduate students. The C-Change website provides a repository for C-Change team members to present their coordinates, interests, and activities in the project. (See also the weblink: www.coastalchange.ca/index.php/the-team for details.)

The description of team participation in research designed to foster knowledge, expertise, and research skills is provided for C-Change research staff in Appendix B-III.1 of the Mid-Term Report, Table B.6 - Research Training and Development. (The definition of the C-Change research staff members functions are defined in further detail in Appendix B-II.2, "C-Change Organizational Structure".) Table B.6 is developed from the ongoing and updated research activities and roles and responsibilities of the C-Change Co-Applicants from the Milestone Report (January 2011), Appendix 4-"Co-applicants' Roles and Responsibilities" available at the C-Change website: http://www.coastalchange.ca/index.php/documents/progress-reports. The following itemize selected key research activities of the C-Change research staff.

Participation in Research (Community Surveys): The ICURA framework's emphasis on community participation represents a novel approach for many of the research team. All too often, academic researchers interact only marginally in applied work, whereas this project requires involvement with communities. Community members have participated actively in designing some research projects, such as the content and the execution of the survey questionnaire used in Gibsons (Co-Applicant Matthews and UBC Ph.D. candidates Vadeboncoeur and DiFrancesco). In the Caribbean, collaboration between the co applicants and the community members facilitated the completion of the physical survey of structures in Grande Riviere (Co-Applicant and Community Champion Teelucksingh). In Bequia and Belize, a similar collaboration resulted in the joint development of a survey to be administered to these communities (Co-Applicants and Community Champions Sookram and Mycoo). In Georgetown, collaboration between community members and co-applicants has resulted in a formal data sharing agreement to support ongoing research and development in that community (Co-Applicant and Community Champion Sutherland). Interactions between researchers and the community facilitate greater understanding of the perspectives, concerns and limitations of community partners. The active participation of community partners in ongoing scientific research also facilitates this experience.

Collaborative cross-disciplinary work: C-Change is an example of inter-disciplinary research, where participants approach problems with certain skills and knowledge that are altered by their interaction with participants from other disciplines (see also Table B.6 for the varied skills and expertise of C-Change researchers). For example, C-Change represents a major collaboration between coastal engineers (partners Baird & Associates) and economists (Co-Director Watson, Crabbé). Collaborative cross-disciplinary work has already begun on the sites of Grande Riviere and Georgetown (Teelucksingh, Sutherland, Mycoo). In Canada, the interaction between the disciplines of planning, engineering and management has changed the viewpoint of researchers and students. At UBC, a climatologist participates in local C-Change meetings of the researchers (Matthews, Vadeboncoeur, DiFrancesco) at that institution in order to ensure that their activities and planning take place in full understanding of the latest information on climate change as it pertains to that coastal area.

Community School Curricula: Opportunities for training and development within communities' elementary and high schools curricula have been universally recommended by Community Partners to raise community awareness and to bring C-Change more fully into the community. Discussions have taken place among community partners on Isle Madame to raise the awareness of school children about the threats to their local environment and to encourage activities in school projects and in the classroom (Isle Madame Community Champion and Co-director (Canada) Lane and Research Associate Clarke). While this opportunity was not originally anticipated in the 2008 C-Change proposal, community partners have instilled this as a stronghold for community communication and the means of a lasting legacy for raising the profile of storm preparedness.

Transfer of technology: There has been a transfer of technology skills from Canada to the Caribbean on the development and use of a coastal GIS platform for the capture and display of project data. This has been affected through the multidisciplinary nature of the project teams and their working relationships. Differences between communities has meant that the C-Change project takes place, in effect, in a multi-project environment where each site is at a different point in the project timeline and is advancing at a different pace. This necessitates the cross-transfer of ideas and skills among team members on how to work effectively in such an environment. For example, use of a simplified vulnerability index was presented through C-Change UWI M.Sc. graduate Kira-Lise Leung (supervised by Co-Applicant Michelle Mycoo) to C-Change (Canada) students, the C-Change (Canada) research staff and Canada Community Partners at the recent Canadian team meeting (Ottawa, November 25, 2011 – see also Table B.3 for details).

III.2   Participants' Involvement

The experience, knowledge and skills acquired by students and community-based representatives participating in C-Change are summarized in Appendix B-III, Table B.7- Research Participation: Research Associates & Community Partners. Research associates (students and non-students), and Community Partners are identified in Part A, Section 2 of the Mid-Term Report and included in the list of Table B.7. The Research Team page of the C-Change website presents the coordinates, research work, and interests of C-Change participants (see also: http://www.coastalchange.ca/index.php/the-team for details.) Table B.7 also notes participants' involvement in research activities, skills development and applied collaboration. The following narrative itemizes selected participants' involvement.

Student Development and Exchanges: Overall, C-Change has presented tremendous opportunities for graduate students to build knowledge, expertise and research skills. A number of postgraduate students are excelling in their research fields through their work and experience on the C-Change project. Discussions are currently underway among researchers using leveraged programs to assist in student exchanges. Exchanges will lead to the new insights gained by all team participants.

Data Collection: Students are able to better tailor primary data collection instruments to facilitate more effective targeting of information through experiencing and developing basic data entry and computer analysis. Students' understanding of sampling and sampling techniques as well as various data analysis techniques to interpretation deepened their levels of expertise.

Research Planning: Interaction with community members facilitated a great appreciation of community needs and the importance of research in identifying and developing solutions for national and community based problems.

Presentations at Conferences and Networking: Students who present at conferences enhance their writing skills to support communication with a non-academic audience and gained significant exposure to a national audience. The conferences allow students to network with scholars interested in the similar areas of research and to interact with national and governmental representatives at a professional level. They also allow students to present their findings and ideas to support national development and management of climate change to larger numbers of people than would normally be interested in academic research.

III.3   Monitoring and Training of Students

For many of the graduate students of the Caribbean research team, the C-Change conference held in Trinidad, June 1-3, 2011 represented their first active conference participation, and the first conference presentations of their careers. In Canada,

students have presented the current status of their research at team meetings and smaller workshops as well as larger conferences, e.g., the 2011 World Conference on Natural Resource Modelling. In all cases, the presentations provide them with learning opportunities to consolidate their work, to draw out the key results into a short and effective presentation to others. The researchers, including students, have also learned to adapt their academic presentation content and style to more of a private sector and applied community approach, where real problems are defined and solutions proposed for practical decision making. There is a distinct difference between the two that needs to be understood and accommodated. Science presentations focus on the science (methods, data) while presentations to communities need to assume that the science and the scientists are credible and focus on the local implications and solution to the identified problem.

III.4   Research to Inform Policy

Community participants, with whom the research objectives are shared, are better positioned to continue exploration of solutions to the changing coastal climate in their communities and identify mechanisms to translate research findings into feasible, on-the-ground solutions. Impacts of C-Change community site visits and notes on how research activities have informed the policies or practices of partner organizations are described below. C-Change community site visits have routinely taken place at all C-Change communities. The following describes selected several site visits to Community C-CATs participants where, in each case, unique contexts and the needs of each site and information gathering, priority-setting, decision making, reporting, and application of research deliverables are presented.

Grande Riviere: Since the survey of Grande Riviere was similar to a census, in that nearly all the households have been surveyed in 2010 and 2011, there is greater awareness of the C-Change project and the likely issues which this community will experienced in the future, and a deepening of concern at the community level for coastal change issues. An examination was made of the level of risk that the critical facilities and properties in the community could face in the future by using projections of sea level rise presented via spatial GIS models. Micro-data on socioeconomic characteristics of the community were collected through a face-to-face administered questionnaire. The results of this study may have important policy implications since policy and decision makers will have to act to reduce and/or eliminate risk of exposure of specific areas of the community by implementing adaptation or mitigation measures and directing development away from future high-risk areas.

Georgetown: The survey of Georgetown, Guyana, was the second survey undertaken for the Project following the experience of Grande Riviere noted above. A stratified random sample was taken and the survey carried out. The data collected from Georgetown are to be shared with the Georgetown Statistical Department when that

analysis is completed. The analysis of the data for Grande Riviere and Georgetown will inform local policy.

Iqaluit: Initial analysis of field data was presented to City officials who are using the results to influence infrastructure evaluation and planning. The C-Change workshop attended by a number of Nunavut and Iqaluit officials (partners and potential partners) (see also Appendix B-II.4, Table B.4, "C-Change Integration Meetings", July 2011) provided an opportunity to present the C-Change message and to highlight local research by a C-Change graduate student Scott Hatcher (MUN) (supervised by Co-Applicant and Iqaluit Community Champion Forbes). This promoted a more active role for our partners in forming a C-CAT and becoming thoroughly engaged in C-Change.

Gibsons: Ph.D. candidates Vadeboncoeur and DiFrancesco, supervised by Co-Applicant and Gibsons Community Champion Matthews, together with the C-CAT Community Partners, refined the Gibsons draft survey, interview guide and questionnaire on the adaptive capacity of the community to respond to the challenges posed by environmental changes such as sea level rise and storm surges. The refining process ensured that the tools reflected issues of relevance to the community, using their advice and experience. This is evidence of the C-Change general approach of working with the community rather than simply studying it. Novel approaches were developed for completing the questionnaire, including preparation of the online system available at the website: http://www.envirochange.ca/UBC/Home.html.

Section IV. Research and Knowledge Production

IV.1   Research Activities Status

The description of C-Change research activities are provided in Appendix B-III.3, Table B.3– C-Change Research Components. Table B.3 is updated as part of the Milestone framework (January 2011) and provides a brief description of the main C-Change research activities and of the applied research methodologies. The following narrative describes itemized selected elements of the main C-Change research activities presented in Table B.3.

Climate Change Vulnerability Index: The impact of climate change upon human livelihoods in developing countries is receiving a lot of attention in international circles. Through community profiling and vulnerability assessments, present vulnerabilities are determined by quantifiable and comparable metrics, and these vulnerabilities are to be minimized through effective adaptation strategies. A methodology of a Climate Change Vulnerability Index has been developed by use of the Sustainable Livelihoods Approach. Using an indicator-driven approach that lends itself to quantifiable analysis, a series of attributes is identified for each Pillar, with the overall combination of these attributes leading to the proposed Vulnerability Index. The methodology developed in this project is being empirically applied to all four Caribbean sites.

Development of a Survey Template: The issue of data paucity in developing countries leads to a reliance on primary data collection for the quantification of the Capital Pillars with the development of a Survey Template that can be applied to coastal Caribbean communities. Ultimately, when populated with data, this template will enable the quantification of the proposed Vulnerability Index, therefore quantifying climate impacts on sustainable livelihoods, and identifying the pathways of adaptive measures via which vulnerabilities can be reduced.

Climate Change Adaptation and Mitigation Strategies: Simulation exercises for a variety of policy options and exogenous shocks are conducted on the Vulnerability Index to examine how both the index and its sub-components would be impacted. These simulations inspire adaptation and mitigation strategies at the governmental, community and household levels. These strategies will enable communities to adopt appropriate measures to deal with climate change collectively and effectively. In addition, the methodology and survey template used in these calculations can be replicated to other communities, and the policy prescriptions developed for the project study sites can also be mirrored to other Caribbean sites of similar structure.

IV.2   Key Achievements to Date

Evidence from C-Change Community Partners (Appendix B-II.5, Table B.5 "Lists of Letters of support from community partners"), the project's ability to attract top notch graduate researchers, and the ongoing and elevated importance of coastal community threats and vulnerabilities, provide a welcome backdrop for the attainment of the C-Change objectives. Since the outset of its work as a funded ICURA (Fall of 2009), global attention to coastal impacts from sources such as the UNFCCC COPs in Copenhagen, Cancun, and Durban have brought attention to the C-Change agenda. Locally, C-Change community partners are universally looking to the C-Change University-Community alliance to: (i) keep communities abreast of the latest scientific data; (ii) elevate regional and national governments about the resource limitations and needs of local and municipal governments; and (iii) provide new scientific information about local vulnerabilities. As such, the C-Change message is an "easy sell". The issue for the alliance in the latter part of the project is to manage expectations and move closer to applied adaptive solutions as part of the key objectives of the project.

The key objectives (as noted above in Section I of Part B of the Mid-Term Report) are to: (1) establish community alliances; (2) identify local vulnerabilities; (3) build local capacity and institutional support; and (4) raise awareness through new knowledge and training, are continuing to be realized through several key achievements summarized in Table 2 below.

Table 2. C-Change Key Achievements To Date

Key C-Change Achievement	Description	Program Objective Correspondence	Scientific & Social relevance
I. C-Change International Conferences	"The Sustainable Development of Coastal Communities: Challenges and Solutions" Port-of-Spain, Trinidad, June 2011; "World Conference on Natural Resource Modeling", June 13-17, 2011, Ottawa	1) support community alliances 2) research local vulnerabilities 3) raise awareness	1)Integrating functions: Brought together co-applicants, collaborators 2)Facilitated interaction among the community groups 3)Enabled significant Caribbean and Canadian student participation, conference presentations
II. Community Partnerships	Community Groups engaged with participation ranging from community members to professional	1) develop community alliances 2) gather information on local vulnerabilities 3) query local capacity and institutional support 4) raise awareness	1)Enrich the applied research agenda 2)Enables dialogue between community groups and co-applicants 3)Facilitates communication within and across Canada and Caribbean communities 4)New knowledge
III. Student Involvement/ Training	Funded by the project and supervised and now working in industry, government	1) research local community issues 2) research local vulnerabilities 3) understand local capacity and institutional arrangements 4) raise awareness	1)Building HQP capacity 2)Develop skills relevant to climate change adaptation needs coastal communities 3)Presents new knowledge
IV. New Data and Knowledge Generation	Storm/flood data updates; spatial data	1) research local issues and vulnerabilities 2) describe local capacity and institutional arrangements 3) raise awareness	1)Builds new databases of environmental and climate information in the data-poor environments 2)Generate new research insights
V. Leveraged funding* *See also Appendix B.VII, Table B.11	PPGIS; LACREG SSHRC Aid to Conference Grant Telfer C-FOAM BP T&T (Conference support)	1) raise awareness to support all objectives	TTD 44,225.00 PPGIS; SSHRC $16,200 Aid to Conference Grant Program; Telfer C-FOAM $20,000 annually for 3 years; BP T&T (Conference support)

Section V. Knowledge Mobilization

V.1   Implementation of Dissemination Plans and Examples

The implementation of C-Change knowledge mobilization through project dissemination plans is outlined in the Milestone Framework (January 2011) of Appendix B-II.2, Table B.3 - C-Change Research Components. The following narrative presents examples of how C-Change knowledge mobilization efforts are advancing the objectives of the C-Change ICURA project.

Conferences: The Conference "Sustainable Development of Coastal Communities: Challenges and Solutions" held in Port-of-Spain, Trinidad in June 2011 increased national awareness of the impact of climate change on coastal communities. A total of one hundred and five people participated in the conference and 34 papers were presented on various topics (See Appendix C) related to climate change. Fully half of these papers were from the C-Change team, both academic and community partners. Presenters represented Canada, Guyana, Jamaica, Martinique, South Africa, Trinidad and Tobago and the United States. The presence by the Minister of Housing and the Environment at the conference contributed to an increase in the level of political awareness of the impact of coastal change and elevated the project to significance on the national agenda and enhanced the opportunity for influencing national policy. The post conference retreat focused on orienting participants to the objectives and potential benefits of the project and was attended by special invitees comprising community partners (from Bequia, Guyana, Trinidad and Gibsons), project researchers and students.

Community feedback has indicated the need for educational materials so that teachers can convey the C-Change messages to children. This is a development which the team has identified and responded to by developing lesson plans and other materials that teachers can use as part of its curriculum development thrust to both university programs and elementary and secondary schools in C-Change communities. The transfer of knowledge to school children has both short-and long-term benefits. In the short term, children will impress this information on their parents and foster changes in their thinking and actions. Longer term and perhaps more importantly, these children will be the leaders and decision makers who will have to address the issues. Research work on best practices in school curriculum and the development of draft C-Change-motivated lessons plans for elementary and high school grades based on the Province of Ontario curriculum program in Isle Madame (C-Change Research Associate and Ontario Certified Teacher Clarke) and the fact that some schools in Port-of-Spain have adopted the Ontario curriculum, implies that the C-Change research in this area is widely applicable. Discussions have already begun regarding the distribution and discussion of these educational materials to communities and their schools and will continue into 2012.

V.2 Knowledge Dissemination Tools

From a broader perspective, knowledge dissemination is occurring through the C-Change web site http://www.coastalchange.ca/ (launched in April 2010). The website is the communication tool for linking communities within each region (Canada and the Caribbean), and between the regions. The website is also the depository of project information, as well as a forum for commentary by all participating members through the social networking links to Facebook (www.facebook.ca/coastalchange/).

Information on project meetings, a calendar of related events, reports, and community profiles, among other things, are all available on public users of the C-Change website. As of December 15, 2011, there were 8984 recorded visits to the website. As an example of the frequency of monthly visits, the totals for the last few months are: October 2011, 740; November 2011, 3928; December 2011 (to the 15th), 2452. (It is acknowledged that the last few months' usage are slightly inflated due to the Mid-Term Report preparation work and webpage updating from recent C-Change community meetings and activity). With regard to the C-Change Social Network (Facebook) page, Table 3 - C-Change Facebook Site Report is an excerpt from the December 14, 2011 weekly Facebook report on usage statistics.

Table 3. C-Change Facebook Site Report (December 14, 2011)

C-Change: Managing Adaptation to Environmental Change

155 monthly active users⬆0 since last week

151 people like this⬆1 since last week

19 wall posts or comments this week⬆16 since last week

96 visits this week⬆27 since last week

The website is continually updated and maintained by the C-Change (Canada) Administrator (Kathy Cunningham) acting on behalf of the entire C-Change team in Canada and the Caribbean. The C-Change Social Network site is contributed to by a wide representation of the interested C-Change public with postings of text, comments, discussions, photos, and events information by C-Change researchers, students, and community members.

C-Change newsletters have been published in April 2010 (Volume I) and March 2011 (Volume II) as a means of disseminating information on the project to all partners and other interested individuals. The Winter 2012 edition has been drafted and awaits final printing and distribution (expected release date: January 2012).

Section VI. ICURA Performance and Evaluation

VI.1   Implementation of Monitoring and Evaluation Plan

Consistent monitoring and evaluation has been a challenge for C-Change. The different approaches taken in Canada and in the Caribbean to setting up the C-CATs is a good illustration, where the same evaluation method is not valid for both areas. As a consequence, evaluation has usually taken place in the context of overall indicators, the achievement of broad objectives. In Canada, one approach to more consistent assessment of progress was the implementation of quarterly reporting on activities and budgets. Although this has not been entirely successful, it has allowed for a measure of evaluation as well as assisting in the preparation of progress reports. Quarterly reporting is integrated with a statement of each lead researcher's role, responsibilities and expected deliverables in the project before funds can be transferred to them to support the upcoming year's work. This has been in place from the inception of the project. These measures have been successful in that allocations to the researchers have been adjusted to fit the circumstances.

Working with team members across the array of countries participating in the Caribbean region has presented some challenges. The following mechanisms will be put in place to ensure greater synchronisation: developing a regular web meeting schedule and sticking to the schedule; supporting teams at all levels by providing simple templates and support where necessary to get teams organized and keep team members focussed on the expected outcomes of the projects; promoting idea sharing by ensuring remote, web-based, face-to-face and/or brainstorming sessions using Skype and web-based resources.

VI.2   Use of performance and evaluation information

The Milestone Framework (January 2011) of Appendix B-II.2, Table B.3 - C-Change Research Components, was developed as a planning tool for the monitoring of project progress. This framework is used not only to monitor the achievement of project objectives and deliverables going forward, but to report on the relevant and related research activity completion.

The Caribbean Team will also be exposed to training on Fundamentals of Project Management and the Logical Framework Method in February 2012 through integrated team meetings. Further to that training, the Caribbean team plans to undertake a one day retreat to re-baseline the project through to completion in 2014. Subsequent to that, a formal monitoring plan with monthly updates and status reports to support more effective monitoring and evaluation will be put in place.

Likert scale indicators on several aspects of our work have been developed as another measure to evaluate progress. Input below to Table 4 – Attainment of Community Objectives Feedback has been provided by both the research team members and by community partners and C-CAT members. The results presented are a synthesis of all the comments provided.

Table 4 uses a 5-point Likert scale indicator on the attainment of the community objectives, as set out in the project proposal. While the proposal envisaged formal C-CATs, they have evolved to be less formal in Canada and more formal in the Caribbean.

Table 4. Attainment of Community Objectives Feedback

Attainment of Community Objectives	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Establish formal community-university alliances					X
Strengthen community institutional arrangements & relationships				X	
Establish long-term linkages between university and community				X	
Prepare Community Adaption Action Plans			NA		

As in Table 4 above, Table 5 - Attainment of Research and Knowledge Production Objectives Feedback, uses a 5-point Likert scale indicator on the attainment of the research objectives, as also compiled from the project proposal.

Table 5. Attainment of Research and Knowledge Production Objectives Feedback

Research and Knowledge Production Objectives Have Been Achieved	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
Creation and Communication of Knowledge					X
Co-Learning				X	
Decision Support Tools				X	
Monitoring and Evaluation Indicators				X	
Capacity Building, Training			X		
Community Adaptation Action Plans (CAAPs)			NA		
Governance Institutional Advice			NA		

Section VII. Budget Update and Justification

Preamble to the budget update. This narrative report on the C-Change budget and spending monitors and tracks project expenses related to SSHRC financial reporting *pro forma* statements for personnel, travel and subsistence and other costs related to the operations and delivery of the project work. The scope of C-Change involves national and international networks of researchers and their students, administrators, collaborators, and community partners all who have personal and professional commitments to the C-Change message. It has been the experience of the C-Change team and its leadership that the C-Change ICURA has evoked considerable applied interest and expectations among C-Change participants. As such, at the point of this Budget Update and Justification, it is necessary to acknowledge the considerable – and unaccounted for – non-compensated efforts of the entire cast of C-Change members. These efforts need to be acknowledged not only for their recognition and extent, but also for the volition of those members who have to date and (hopefully) will continue to contribute in ways that add considerable value to the C-Change project. Throughout the course of the project, members have voluntarily prepared documents, made agenda contributions, conference and paper abstracts for themselves and others, prepared presentations, offered advice, edited documents, reviewed papers, promoted the work of the project, contributed to discussions, brought forth new ideas, and generally added value to C-Change that we acknowledge cannot be either monitored, tracked or otherwise accounted for in any budget justification. While this behaviour may be characteristic of academe, the alliance to communities (often under-resourced and by necessity in a work-for-value, professional environment) challenges this and even calls into question the effectiveness of the arrangement with its reliance on the goodwill of participants without the benefit of financial incentive.

By this Mid-Term Report, and on behalf of all who have added value to C-Change to date, and in future work, C-Change acknowledges the contributions and legacies that members have made to achieving the universally accepted C-Change objectives within the Community-University alliances that have been formed. The C-Change leadership wishes to acknowledge these contributions while affirming that it will, to the best of its ability, not take these contributions for granted, nor betray the spirit and well-meaning sense of their offering. Moreover, we also acknowledge that members' appreciable work represent the personal driving force behind further contribution to the overall program, and inspire the C-Change leadership to continue its efforts. Finally, and also to this end, the C-Change leadership wishes to acknowledge the support of the funders, SSHRC and IDRC, toward realizing C-Change Community-University alliances.

VII.1   Budget Report to Date

The budget analysis that follows is based on actual financial data to November 2011 plus anticipated spending to the end of the fiscal year, March 31, 2012. Expenditures beyond this date are projected.

In summary, the project overall Canada and the Caribbean is underspent at this point in time. The project has, however, supported more students than planned. The Caribbean part of the project is slightly ahead of schedule in the context of disbursements to students at the undergraduate and the Masters levels, (see also below Table 6 – Total C-Change Disbursements). Individually, the Caribbean budget is underspent while the Canadian budget is overspent as summarized in Table 6 below. At current trends, C-Change is projected to be slightly overspent but it will have supported more students than planned. Overspending is anticipated to be offset by leveraged funding from ongoing increases in external (cash) support.

Table 6. Total C-Change Disbursements

Region	Budget to Year 3 CDN$	Actual + Projected to Year 3 CDN$	Budget to Year 5 CDN$	Projected to Year 5 CDN$
Canada	567,500	573,232	976,500	973,632
Caribbean	591,000	387,000	991,000	990,950
Consolidated	1,158,500	960,360	1,958,500	1,964,582

In Canada, the proposal indicated that more support for undergraduate students than has actually occurred whereas the Caribbean engaged more undergraduates than proposed. Through the first three years of the project, the total number of Canadian students supported has exceeded the planned numbers even with its lack of undergraduate involvement. The results are similar for the Caribbean, with the addition of undergraduates. The annual totals, showing proposed/actual, are shown in the Table 7– Annual Student Engagement to Date.

On the Canadian side, student numbers may drop slightly in the latter part of the project if researchers are unwilling to initiate a new Masters or Doctoral program, a 2 and 5 year proposition respectively, when the funding from C-Change will expire before completion of the degree.

A detailed budget report is shown in Appendix B-VII, Tables B.10a,b, and c for the financials for (a) SSHRC (Canada) funds, (b) IDRC (Caribbean) funds separately, and for (c) the consolidated (SSHRC and IDRC) project funds. The following paragraphs expand on the financial *pro forma* reports with more detailed information on key points.

Table 7. Annual Student Engagement to Date

Region	Graduate Students	Year 1 proposed/actual	Year 2 proposed/actual	Year 3 proposed/actual
Canada	Undergraduate	0 / 0	1 / 0	2 / 0
	Masters	2 / 4	2 / 5	3 / 5
	Doctorate	2 / 2	3 / 2	3 / 5
Caribbean	Undergraduate	4 / 0	3 / 8	4 / 0
	Masters	4 / 6	5 / 6	5 / 7
	Doctorate	1 / 1	1 / 1	1 / 3

Personnel (Student) Salaries: The changes in student numbers have been reflected in the student costs in the Canadian budget, where costs slightly exceed the proposed budget, except for the final year where a small reduction in costs may occur, as noted above. Caribbean student costs were slower to start but are projected to continue at higher than budgeted levels.

The proposed budget provided for a postdoctoral salary to oversee and coordinate the project but it was realized that a series of typical one year postdocs would lead to a lack of continuity. Therefore, the funds were directed towards administrative staff, often recent graduates, who could provide longer term continuity. In addition, project management staff have been hired to coordinate specific project activities. While this was not envisaged in the proposal, these staff have added invaluable insights, direction and hours to the project, often at costs far below market value. It is expected their salaries will continue to the end of the project.

Travel Costs: Travel costs have exceeded the budget in Years 2 and 3, as contact with the communities increased. Regular contact with each community individually has been necessary to foster the development and operation of the C-CATs that has necessitated unforeseen travel to communities. These costs were not planned in the budget. In the last half of the project, increased travel to the communities planned as part of the capacity building and training aspects of knowledge mobilization will exceed budgeted amounts. The unforeseen necessity of bringing all the communities together for cross fertilization and to promote and establish communities of practice among them and the researchers will add to the costs that will exceed the budget. Such a workshop is currently being planned for early fall 2012: another is planned for 2013. Additional funding will be sought to cover these extra but very important costs.

Administrative Costs: Part of the increased costs for project management staff in Canada has been compensated by decreased expenses for computers and supplies. The decrease in these expenses has not impaired the execution of the project in any way. This simply reflects changes that occur between the initial planning and the implementation of a project as the understanding of the work and its execution matures.

VII.2   Detailed Budget Justification

The detailed budget information is provided in Appendix B-VII, "Detailed Budget Justification" and is found in the 3 appendix tables: Tables B.10a,b, and c as referred to above.

With respect to the last 2 years of the project, the revised budget projection for Year 4 exceeds the proposed budget as a result of the planned community workshop discussed above. This meeting is planned to include both Canadian and Caribbean communities, as well as students in the project. The location for this meeting is yet to be determined. Ideally, C-Change proposes to meet at one of the C-Change community sites to demonstrate impacts and responses in a real situation. In doing so, C-Change acknowledges that there would be added costs, as the communities are not located at central but coastal points that would require elevated overall air and other travel fare for participants. A smaller but significant budget is also allocated for a larger planned Community Workshop on site in Year 5. Additional leveraged funding will be sought for these workshops to ensure that they achieve the desired outcome without being unduly hampered by costs.

The increased expenditures in Years 4 and 5 will also be used to support knowledge mobilization activities such as workshops and seminars in the communities. These activities will bring the results of the science to the communities, along with options for how the risks can be mitigated. The researchers expect to assist the communities in discussions of their options in this regard, and in the development of the Community Adaption Action Plans (CAAPs) (see also Appendix B-II.3, Table B.2, "Emerging Outcomes and Impacts" for more details).

External cash and leveraged funding has generally been modest in Canada principally due to the global economic downturn. Nevertheless, the Caribbean team has raised considerable additional funding to supplement the expenses involved in planning and running the C-Change conference in Trinidad in 2011 (see also Table B.4, "C-Change Integration Meetings" for details). Similarly, the Canadian team has also supplement the C-Change co-sponsorship of the 2011 World Conference on Natural Resource Modelling with additional SSHRC funding. The indication, despite tight funding opportunities, suggests that C-Change can be successful in leveraged funding toward achieving the project objectives.