



INTERNATIONAL COMMUNITY UNIVERSITY RESEARCH ALLIANCES (ICURA)

C-Change ICURA MID-TERM REPORT

PART B (Narrative Mid-Term Report)

PART B: Appendices

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. Part B is accompanied by the following appendices provided in this section within the 30 page limit (corresponding to each Part B sections II through VII):

- Appendix B-II Community and University Partnerships**
 - B-II.1 C-Change Coastal Communities
 - B-II.2 C-Change Organizational Structure
 - B-II.3 Milestone Framework
 - B-II.4 C-Change Integration Meetings
 - B-II.5 Letters of support from community partners

- Appendix B-III Research Training and Development**

- Appendix B-IV Research and Knowledge Production**

- Appendix B-VII Budget Update and Justification**



Appendix B-II: Community and University Partnerships

This appendix contains materials in support of the C-Change ICURA Mid-Term Report, Part B Narrative submission for Section II – Community and University Partnerships. Appendix B-II contains the following subsections:

- B-II.1 C-Change Coastal Communities
- B-II.2 C-Change Organizational Structure
- B-II.3 Milestone Framework
- B-II.4 List of Letters of support from community partners

Subsection B-II.1 C-Change Coastal Communities

This subsection to Appendix B-II contains the following item:

- 1) Table B.1 – C-Change Coastal Communities
- 2) Table B.2 – Emerging Outcomes and Impacts

Preamble: 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 below in Table B.1 as 4 “twinned” communities in each of Canada and the Caribbean. Table B.1 also notes community threats and vulnerabilities and the C-Change partnerships in the alliance.

Table B.1. C-Change Coastal Communities

Twinned Communities	Characterization	Threats/ Vulnerabilities	Partnerships and Alliances
1. Regional capital cities, city centers at water level			
Charlottetown Prince Edward Island	Provincial capital city and coastal port; Population 60,000, center of industrial and commercial activity; historic downtown	Impacts to infrastructure and historic sites from flooding associated with predicted sea level rise and storm surges	City Council and Planner; Province of PEI; UPEI links; local consultants (DE Jardine)
Georgetown, Guyana	National capital city and coastal port; centre of industrial and commercial activity, Population 215,000; largest city in region, 14' below sea level	Breaching of the protective sea walls and dykes by storm surges, salt water contamination of drinking water supplies	Central Housing and Planning Authority, Chief Planner; Ministry of Agriculture; Ministry of Natural Resources



Twinned Communities	Characterization	Threats/ Vulnerabilities	Partnerships and Alliances
2. Native homeland communities, relatively remote communities, ecotourism sites			
Iqaluit, Nunavut	Territorial capital city in Canada's high North. Population highly sensitive terrestrial and marine Arctic environment Eco-tourism including whale-watching; whale hunting permitted by native peoples using traditional methods; nearby shipping	Melting/destabilization of permafrost areas of shoreline leading to erosion and sedimentation and coastal hydrological and biodiversity changes - leading to impacts on ecosystems, indigenous cultures	Local contacts, team members with experience in working in these communities
Belize Barrier Reef	Island atolls on 300 km section of the 2nd largest reef in world - the Mesoamerican Barrier Reef System, World Heritage Site; destination for half of region's 260,000 tourists, nearby shipping lanes	Impacts from sea level rise and storm surge on coral reefs, and on local tourism and fish and shellfish fisheries	CCCCC, Green Reef Environmental Institute, UNESCO Endangered Area
3. Mainland coastal communities, ecotourism attractions			
Gibsons, British Columbia	Sunshine Coast coastal town, unique location with proximity to Vancouver, popular resort town, significant eco-tourism and hiking and camping area	Impacts from sea level rise and severe storms leading to beach erosion and risk of groundwater exposure to salinisation	Town Council and Planner; local contacts with tourism and environmental groups
Grand Rivière NE Coast, Trinidad and Tobago	Isolated village of fishermen and small crop farmers, popular local eco- tourism area, protected nesting area for giant leatherneck turtles; nearby shipping important agricultural areas	Immediate potential for impacts from sea level rise and severe storms	Turtle Village Trust; UN Environmental Management Authority; Local contacts with tourism and environmental groups
4. Island communities, relatively remote			
Isle Madame, Cape Breton, Nova Scotia	Local fishing and aquaculture area, eco-tourism, archipelago of small isolated coastal communities; historic settlement area for Acadians	Impacts from sea level rise and severe storms on unique transportation links and potential isolation due to infrastructure damage	Regional Municipality of Richmond County Council, CAO, local development association (DIMA), industry (Premium Seafood); University Sainte-Anne
Island of Bequia	Island archipelago and coral reefs. Popular boating area for cruising yachts; marine, eco-tourism based on whale-watching; natural habitats, native peoples' traditional marine activities, nearby shipping lanes	Impacts from sea level rise and severe storms, unique transportation links, potential isolation due to infrastructure damage	Paget Farm S.C.E.O.; Local government



Appendix B-II: Community and University Partnerships (continued)

Subsection B-II.1 C-Change Coastal Communities

This subsection to Appendix B-II contains the following item:

2) Table B.2 – Emerging Outcomes and Impacts

Preamble: 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.

Table B.2. Emerging Outcomes and Impacts

	Outcome	Description	Anticipated impacts on researchers	Anticipated impacts on communities
1	Creation and Communication of Knowledge	Collation and integration of existing and new knowledge on managing adaptation	- opportunities for new research ideas - enhanced engagement of students	- liaison with university, researchers’ knowledge and ideas - contribution to informed decision making
2	Co-Learning	Identification, analysis, dissemination of information on the impacts of changing coastal climate	- further development of applied systems thinking - presentation of new applied knowledge - new sources of data	- development of new alliances and partnerships for sharing and attaining resources - new knowledge for better decision making
3	Decision Support Tools	Integrated modeling scenario analysis, multicriteria decision support tools to improve communities’ capacity to evaluate and assess strategies	- plethora of new applications for research and analysis - opportunities for model testing and validation - enhancement of monitoring devices	- improved basis for logical analyses - better attainment of objectives - enhanced ways and means to engage all community participants in problem solving
4	Monitoring and Evaluation Indicators	Performance indicators to assess spatial and temporal status of communities’ risk	- contribution to applied research in performance management, risk profiling	- determine “on track” transparent decision making - logical framework for resource justification
5	Training	University academic training (HQP), and community-based schools training through curricula development	- response to demand for environmental management - response to university program incentives for new course work	- response to demand for environmental management resources - raised awareness in youth



	Outcome	Description	Anticipated impacts on researchers	Anticipated impacts on communities
6	Community Adaptation Action Plans (CAAPs)	Development of guidelines to respond to a range of climate change scenarios	-response to applied needs in projections -key element for applied student training	-direct response to local planning needs -enhance community preparedness -improves strategic planning skills
7	Governance Institutional Advice	Documentation of cases and “best practices” of institutional arrangements	-provides new insights for further research and idea for student investigation -requires structured, critical analyses	-provides comparable and recognizable information to justify means -encourages process change



Appendix B-II: Community and University Partnerships (continued)

Subsection B-II.2 C-Change Organizational Structure

This subsection to Appendix B-II contains the following items:

- 1) Figure B.1 - C-Change Project Organizational Structure for Canada
- 2) Figure B.2 - C-Change Project Organizational Structure for the Caribbean Region

Preamble: C-Change governance in Canada and the Caribbean sites is 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 secretariat 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. These functions are defined in more detail below.

- (a) The C-Change Administrators for Canada (Cunningham/Fahey) and the C-Caribbean (Joseph/Sheppard) assist the researchers in organizing meetings, research workshops, travel coordination, and liaison activities among co-applicants, collaborators, partners, research associates and students, as well as accounting for expenses, reporting to the University finance offices, submitting members' travel reimbursements, and managing and maintaining contributions to the C-Change website and the C-Change Social Networking site.
- (b) The Operations Manager (Clarke) prepared and monitors the C-Change Work Plan that incorporates ongoing content and milestones, as previously submitted in the Milestone Framework Report (January 2011) (and updated) for monitoring and tracking C-Change operations. In this way, the main research components of the Work Plan (Appendix B-II.2 – Milestone Framework) and monitors activities taking place as scheduled, and assists in the identification and implementation of needed changes in structure, budget or timing. The Project Operations Manager collaborates with the parallel research being conducted across sites in Canada and the Caribbean.
- (c) The Community Coordinator (Mercer Clarke) links the activities of the researchers (co-applicants, collaborators, research associates and students) with the Community Partners. The Community Coordinator works closely with the Co-Director, the Community Champions, and inaugurates the Community Actions Teams (C-CATs) into “communities of practice” in establishing linkages and delivery of the main research and outcomes delivery to the communities.
- (d) Information flow between the international Secretariats and team members is via electronic communication (telephone and email) and the exclusive C-Change website and the C-Change Social Network (Facebook) site to facilitate the exchange



of information and free flow of data, shared knowledge, and regular feedback among C-Change community and university members. These sites launched in April 2010 continue to grow and to capture C-Change team activities.

C-Change Website - www.coastalchange.ca

C-Change Social Network Site - www.facebook.com/coastalchange

- (e) Financial Management is being carried out independently for each site (Ottawa and St. Augustine) through the auspices of SSHRC and IDRC respectively, and via the University of Ottawa and University of the West Indies, St. Augustine University financial administrations. Disbursement of funding allocations to eligible project co-applicants are renewed annually via “Transfer of Funds” agreements between the respective universities that include identification of the co-applicants roles and responsibilities under the project.



Figure B.1: C-Change Project Organizational Structure for Canada

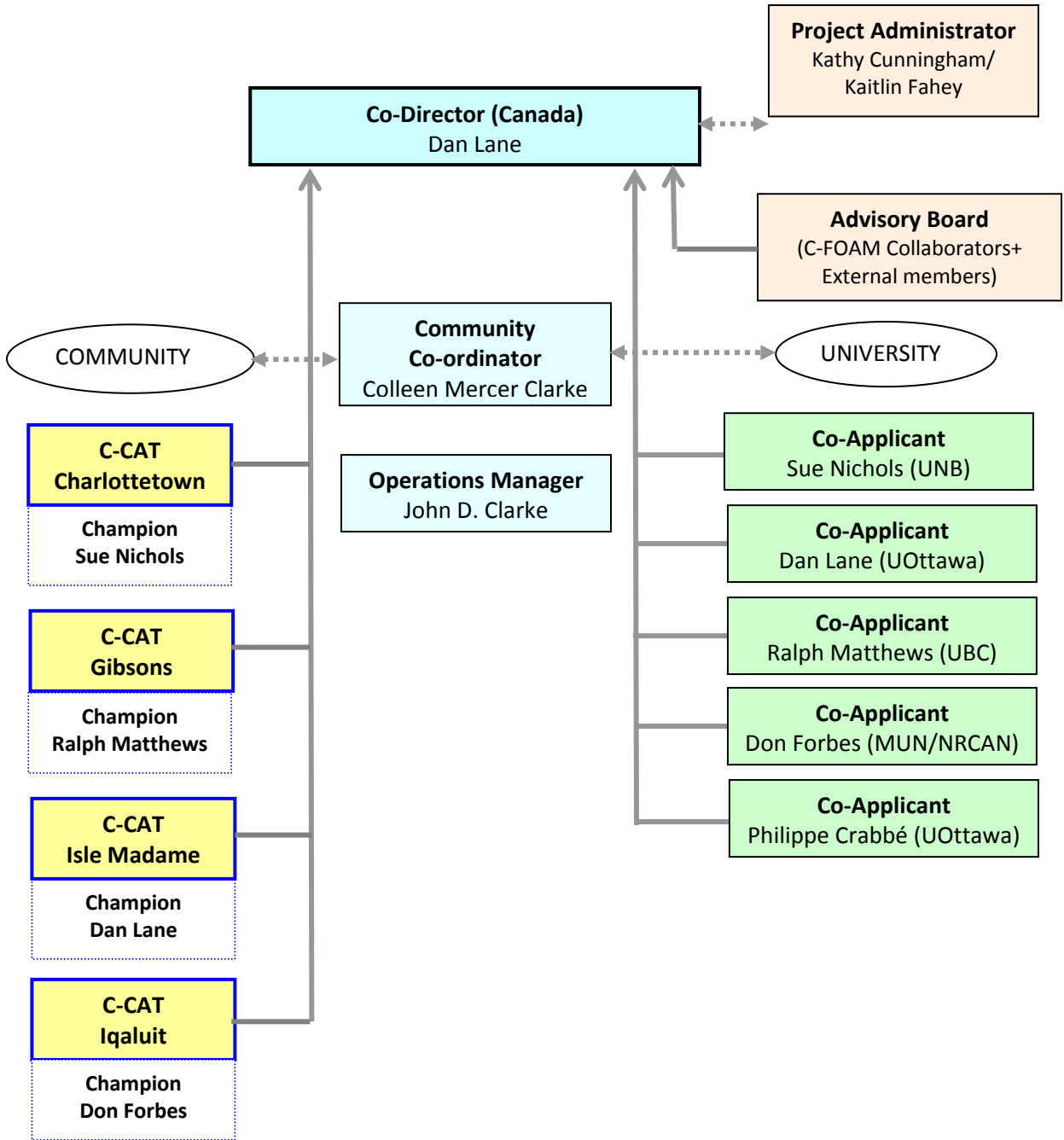
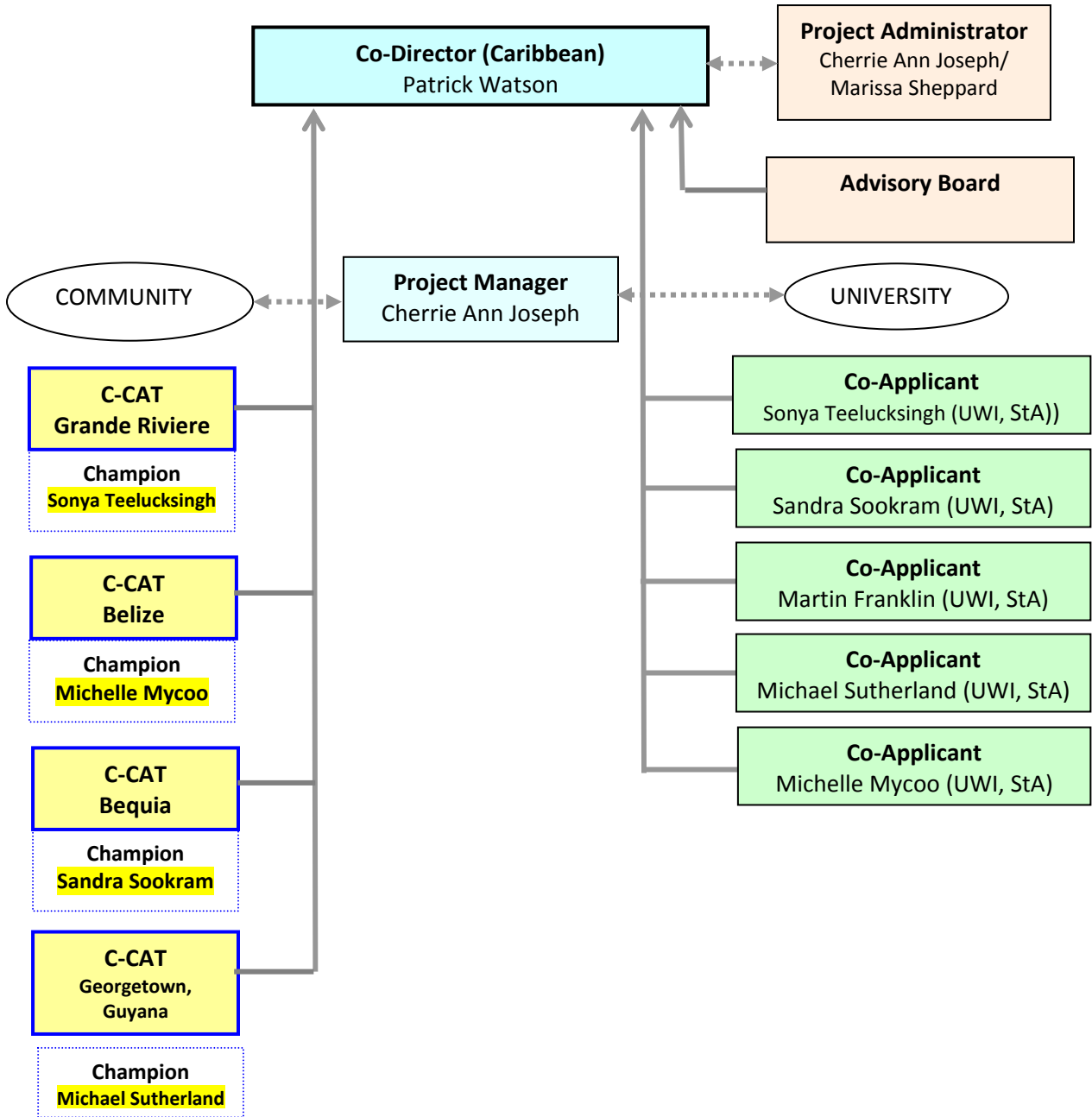




Figure B.2: C-Change Project Organizational Structure for the Caribbean Region





Appendix B-II: Community and University Partnerships (continued)

Subsection B-II.3 Milestone Framework

This subsection to Appendix B-II contains the following items:

- 1) Table B.3 - C-Change Research Components

As per the IDRC Milestone Framework (January 2011), Section 3.2 PROGRAM OF RESEARCH, this appendix outlines the updated C-Change ICURA's main research components. The main research components table below is developed from the activities specified in the expanded work plan. Table B.3 provides details of the main research components, current status and changes that have occurred since the original proposal. As noted in the Milestone Framework (January 2011) report, the details of each major component evolve with the progress of the project, especially as related to the developing contacts with C-Change communities in Canada and the Caribbean, and increasing linkage to the project community partners. See also Part A, Section 3, Research and Knowledge Production, table item 1 of this Mid-Term Report.

Table B.3 - C-Change Research Components

Project Activity/Title	Project Co-Applicants	Research Objectives & Methods	Dissemination Plans/Results	Time Frame (start/end)
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PROJECT COMPONENT – GOVERNANCE (Note 1)

Annual Funding Allocations	Co-Directors: Lane, Watson	Research Associate support for research (Undergraduate, Graduate)	Reports, Theses, Papers, Publications	Sept - Dec (Annually 2009-2015)
Hirings: Administrator, Coordinator, Operations Manager	Lane, Watson	Governance and ongoing management, community co-ordination, planning	Managem't, accounting, community tools, resources	Initial: Jan-Feb 2009; Renewal Oct- Nov 2011
Management and Organization	Secretariats: Administrators: (Fahey and Sheppard) (Joseph and Cunningham) Coordinator: (Mercer Clarke) Ops Manager: (Clarke)		Ongoing Organiz'n Monitoring work	Ongoing: Sept 2009 throughout project



Project Activity/Title	Project Co-Applicants	Research Objectives & Methods	Dissemination Plans/Results	Time Frame (start/end)
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PROJECT COMPONENT – COMMUNITY UNIVERSITY ALLIANCES (Note 2)

Establish community profiles	Community Champions	Direct Community-University links & Communication	Identify Community Partners leads	Since June 2009 Completed for some communities
Establish Action Teams (C-CATS ²)	Community Coordinator; Co-Directors; Community Champions Co-Directors; Secretariat	Formalize Comm-Univer relationships Data collection, surveying, priorities Identify community risks, assets, storm damage scenarios	Produce community profile reports	Established since June 2009 February 2011 C-CATs since June 2009 (ongoing)
Establish Advisory Boards	Coordinator; Co-Directors; Champions Co-Directors; Secretariat		Creation of ICURA research framework	Boards formed since April 2010
Regular Community Meetings	Community Champions, Community Partners			Regular meetings since 2009

PROJECT COMPONENT – GIS SPATIAL ANALYSIS FRAMEWORK (NOTE 3)

Negotiate data sharing use agreements	Nichols, Forbes, Sutherland	Identify priority data requirements	ID data gaps	Sept 2009 - Dec 2011
Develop GIS architecture	Nichols, Sutherland, Forbes	Sea level rise (SLR), flood simulation model development	Spatial data available for analysis	Jan 2010 – May 2011
Spatial Socioecon Analysis	Nichols, Crabbé, Teelucksingh, Mycoo, Watson, Lane, Matthews	Enhance GIS data and its use in communities	Socio-econ data for analysis	Sept 2009 - June 2012

PROJECT COMPONENT - COMMUNITY ANALYSES (NOTE 4)

Vulnerability, Resilience, Adaptive Capacity and	Crabbé, Watson Lane	Soft systems, System Dynamics modeling; Storm modeling, storm simulation	Historical, current storm data Global, local	Sept 2009 - Feb 2012
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Project Activity/Title	Project Co-Applicants	Research Objectives & Methods	Dissemination Plans/Results	Time Frame (start/end)
Risk Indices	Forbes	Assets at risk, Coastal change	models; index def'n's;	Dec 2009 - Dec 2012
Photo-documentation /VGI	Nichols, Sutherland, Forbes, Lane	Inventory coastal shifts, develop electronic platform for community spatial engagement	storm projections Coastal erosion impacts	
Institutional Arrangements	Matthews	Best practices in local government	Improved structures	Sept 2009- Dec 2014
Community Priorities and Surveying	Teelucksingh Lane, Matthews	Decision making framework, strategy evaluation	Survey analysis results; Valuations	July 2010-ongoing

PROJECT COMPONENT – IMPACT OF STORM SCENARIOS (NOTE 5)

Develop various impact scenarios	Community Champions	Data for decision analysis, evaluation of strategies	AHP DM-model hierarchy	Sept 2010 - Sept 2011
Assess adaptive capacity and resilience	Co-Applicants, Community Partners	Meet/Discuss Communities models, projections	feedback on tradeoffs strategies, objectives	Jan 2011 - July 2012
Develop adaptation alternatives	Co-Applicants, Community Partners	Preparation of analysis for MCDM model	MCDM AHP model results	Sept 2011- Dec 2012
Evaluate alternatives	Co-Applicants, Community Partners	AHP problem formulation and analysis	Ranked alternatives	Dec 2011- February 2013

PROJECT COMPONENT – CAPACITY BUILDING (NOTE 6)

Develop adaptation action plans (CAAPs)	All members	Preparation for Community meetings and feedback	Community Workshops	2011 – 2014
Develop new university curricula	Champions Lane, Watson, Advisory Boards	Presentation of University academic committees	University program offerings	2012-2014
Community guidelines, response plans	Community Champions	Preparation of guidelines and response plans	Report generation Community storm simulations	2015
Present community workshops	Community Champions	Preparation of community workshops	Feedback, co-learning	2012-2015 ongoing



Notes to the Table:

1 C-Change Governance was completed (hirings) in 2009 and was renewed due to changes (See Mid-Term Report Part A) in the Fall of 2011; Operations management and Administration now stabilized; functions are ongoing (management, monitoring, funding allocation) for the life of the project.

2 Community-University Action Teams or C-CATs, reflect the unique contexts of each C-Change Community in Canada and the Caribbean. Meetings have taken place with and in all communities with partners. Formation of formal C-CATs are continuing. Community profiles research have been completed for Georgetown (Sutherland, Gossai, Mycoo, Leung), Grande Riviere (Teelucksingh, Sutherland), Belize (Ambergris Cay) (Osuala, Watson), Charlottetown (Forbes, Nichols, Hartt, Lane), Isle Madame (Pakdel, Mostofi, Lane), and Gibsons (Matthews, Vadeboncoeur, DiFrancesco); profiles for Iqaluit and Bequia are under development.

3 GIS Framework activity has been underway in all C-Change communities. Data sharing agreements prepared for Canadian universities and for some communities (Gibsons, Isle Madame). Some spatial data have been collected in the Caribbean (Grande Riviere) and limited (benchmark data) have been collected in Canada (Isle Madame). Analysis of the data has begun in both the Caribbean and Canada and will continue. Sea level rise models and storm scenarios impact simulations and damage projections using GIS architecture are being developed.

4 Community Analyses have been initiated and will be ongoing over the project. Socioeconomic data questionnaires have been developed and applied in some Caribbean (Grande Riviere) and Canadian (Gibsons) communities. Community members (Isle Madame) have been engaged to observe the ongoing and historical coastal changes. Storm simulation models (e.g., the effect of flooding) have been developed for many communities (Grande Riviere, Charlottetown, Isle Madame, Georgetown).

5 Preliminary Storm Scenario Impact modeling and vulnerability indices have been developed, indicating areas where improvements and refinements are needed in the future.

6 Capacity Building in the communities remains the key element of the C-Change project. Community workshops, training, and the production – with community assistance – of Community guidelines (CAAPs) is marked by prioritizing community strategic planning and improved institutional and decision making.



Appendix B-II: Community and University Partnerships (continued)

Subsection B-II.4 C-Change Integration Meetings

This subsection to Appendix B-II contains the following letters from C-Change Community Partners (included as pdf files):

- 1) Table B.4 – C-Change Integration Meetings

Table B.4 C-Change Integration Meetings

Date	Meeting and Location	Agenda / Minutes
June 22-25, 2008	Canada - Caribbean ICURA Team Workshop & LOI Full Proposal Preparation (Ottawa, ON)	2008.06.22 Agenda 2008.06.22 Minutes
June 4, 2009	ICURA Pre-announcement (Ottawa, ON)	2009.06.04 Agenda 2009.06.04 Minutes
June 28-July 2, 2009	IDRC-SSHRC Formal ICURA Announcements. (Ottawa, ON)	2009.06.28 Agenda
December 13-15, 2009	Milestone Framework Meeting. (Ottawa, ON)	2009.12.13 Agenda 2009.12.14 Minutes
December 15, 2009	General Team Meeting. (Ottawa, ON)	2009.12.15 Agenda 2009.12.15 Minutes
February 18, 2010	Canada-Caribbean Team, (Ottawa, ON)	2010.02.18 Agenda
March 23-26, 2010	C-Change meetings pre-SALISES Conference, Port-of-Spain, Trinidad, (Watson, Lane, Sutherland, Henry, Mycoo, Teelucksingh, students) (St. Augustine, T&T)	2010.03.23 Agenda
April 22, 2010	Presentation as a keynote speaker at Prince Edward Island Climate Change Symposium (Charlottetown, PEI) (Forbes)	Presentation file available
April 26 – 27, 2010	Presentation of C-Change M.Sc. thesis work at the Statistics Canada Socio-economic Conference 2010 (Gatineau, PQ) (Hartt, Mostofi, Pakdel)	Presentations and Abstracts available
May 9-11, 2010	C-Change Meeting with UOttawa and UNB Fredericton Research Associates (Tienah invited), (Ottawa, ON)	2010.05.09 Agenda
May 31, 2010	C-Change UOttawa Meetings on Systems Dynamics (Crabbé, Lane and students) (Ottawa, ON)	2010.05.31 Agenda
July 25-29, 2010	Coastal Zone Canada conference on Healthy Oceans - Strong Coastal Communities (Charlottetown, PEI) (Mercer Clarke, Clarke, Lane, Nichols, students)	Conference Program & Abstracts Available
June 28 to July 2, 2010	Participation in the Fourth World Congress of Environmental and Resource Economists (Montreal, PQ) (Watson, Sutherland, Teelucksingh)	Conference Program & Abstracts Available
October 4-6, 2010	SSHRC-IDRC ICURA Workshop (Ottawa, ON)	2010.10.04 Agenda
Nov 31-Dec	C-Change Presentation to IDRC (Ottawa); meetings with	Presentation file



Date	Meeting and Location	Agenda / Minutes
1, 2010	Sutherland, Watson, Teelucksingh (Ottawa, ON)	available
June 1-3, 2011	The Sustainable Development of Coastal Communities: Challenges and Solutions Conference, (Port-of-Spain, T&T)	Conference Program & Abstracts Available
June 4-6, 2011	Grande Riviere C-Change Community meetings (Grande Rivière, T&T)	Minutes & Agenda available in draft
June 13-17, 2011	World Congress of the Natural Resource Modeling Association on the Adaptation to the Changing Climate (Ottawa, ON)	Conference Program & Abstracts Available
July 14-17, 2011	Annual Congress of the Canadian Society of Landscape Architects, (Iqaluit, NU)	Conference Program & Abstracts Available
November 24, 2011	SSHRC-IDRC ICURA Meetings–C-Change (Canada) Advisory Board meeting on Curriculum (Ottawa, ON)	2011.11.24 Agenda 2011.11.24 Minutes
November 25-26, 2011	SSHRC-IDRC ICURA Meetings - Co-Applicants and Partners, (Ottawa, ON)	2011.11.24-26 Agenda 2011.11.25 Minutes 2011.11.26 Minutes
November 25, 2011	SSHRC-IDRC ICURA Meetings - Research Associates (Ottawa, ON)	2011.11.25 Agenda 2011.11.25 Minutes



Appendix B-II: Community and University Partnerships (continued)

Subsection B-II.5 Letters of Support from community partners

This subsection to Appendix B-II contains the following list of letters of support from C-Change 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).

- 1) Table B.5 – List of Letters of Support

Table B.5 List of Letters of Support

No.	C-Change Community	C-Change Partner	Title	Affiliation
1	Charlottetown	Don Poole	City Planner	City of Charlottetown, Prince Edward Island
2	Gibsons	Michael Epp	Municipal Planner	Town of Gibsons, British Columbia
3	Isle Madame	Warren Olsen	Chief Administrative Officer (CAO)	Regional Municipality of Richmond County, Cape Breton
4	Isle Madame	Michelle Thériault	Directrice, Centre de recherche marine	Université Sainte-Anne, Petit de Grat, Cape Breton
5	Isle Madame	Bruce Joshua	Directeur	Université Sainte-Anne, Petit de Grat, Cape Breton
6	Isle Madame	Joan Clannon	Administrator	Development Isle Madame Association (DIMA)
7	Iqaluit	Meaghan Leach	Director of Engineering and Sustainability	City of Iqaluit, Nunavut



Appendix B-III: Research Training and Development

This appendix contains materials in support of the C-Change ICURA Mid-Term Report, Part B Narrative submission for Section III – Research Training and Development.

Appendix B-III contains the following:

- 1) Table B.6 - Research Training and Development
- 2) Table B.7 – Research Participation: Research Associates and Community Partners

Preamble: The description of team participation in research designed to foster knowledge, expertise, and research skills is provided for C-Change research staff in Table B.5 below. The definition of the C-Change research staff members are defined in further detail in Appendix B-II.2, “C-Change Organizational Structure”. Table B.5 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>.

Table B.6 - Research Training and Development

C-Change Co-Applicant	C-Change Affiliation	Participation/Event	Expertise Skills
Watson	Co-Director (Caribbean) UWI, St. Augustine	Conference organizer Conference Chair Conference Session Chair Conference Presenter Meetings Chair Thesis supervisor Media spokesperson	-Leader in (a) Survey Design and Implementation (b) Social and Economic Impact Analysis -Development of vulnerability indices for use in social and economic impact analysis; -Development of models for estimating impacts of sea-level rise from historical data
Franklin	Co-Applicant Community Champion - Grande Riviere (Joint) UWI, St. Augustine	Conference Session Chair Conference Presenter Thesis supervisor	-Leader on ICT related issues -Contributor in the development, application, and implementation of Checkland’s Soft Systems Methodology (SSM)
Mycoo	Co-Applicant Community Champion – Belize UWI, St. Augustine	Conference Session Chair Conference Presenter Thesis supervisor	-Contributor on the development of community geographic models for the Belize Barrier Reef -liaison with the development of geographic models of the Canadian and Caribbean sites - GIS for environmental, physical and social descriptions for coastal communities



Sookram	Co-Applicant Community Champion – Bequia UWI, St. Augustine	Conference Session Chair Conference Presenter Thesis supervisor	-Leader (with Patrick Watson) on collection and analysis of social and economic data -Contributor in the development, application, and implementation of Checkland’s Soft Systems Methodology (SSM)
Sutherland	Co-Applicant Community Champion – Georgetown, Guyana UWI, St. Augustine	Conference organizer Conference Presenter Meetings Chair Thesis supervisor	-Leader on the development of community geographic models for the Caribbean sites -liaison with the development of geographic models of the Canadian sites -Contributor to the C-Change team in the development, application, and implementation of community engagement via Checkland
Teelucksingh	Co-Applicant Community Champion – Grande Riviere UWI, St. Augustine	Conference organizer Conference Session Chair Conference Presenter Meetings Chair Thesis supervisor	-Leader on Climate Change issues and coastal environmental analysis -Contributor in the development, application, and implementation of Checkland’s Soft Systems Methodology (SSM)
Lane	Co-Director (Canada) Community Champion – Isle Madame U Ottawa	Conference organizer Conference Chair Conference Presenter Meetings Chair Keynote speaker Thesis supervisor Media Spokesperson	-Management scientist -Simulation modeling -decision analysis -Strategic planning -Multicriteria problem solving
Crabbé	Co-Applicant U Ottawa	Conference Session Chair Conference Presenter Thesis supervisor	-Economist and Climate researcher, -modeling community profile dynamics using Systems Dynamics (SD) -developing the notion of community vulnerability indicators, storm surge threat potential, and adaptive capacity measures



Forbes	Co-Applicant Community Champion – Iqaluit MUN/NRCan	Conference organizer Conference Session Chair Conference Presenter Keynote speaker Thesis supervisor	-Geographic modeler and Climate researcher -modeling geographic information on water level elevation for Canadian sites -lead in updating existing data including LIDAR in selected locations
Matthews	Co-Applicant Community Champion – Gibsons UBC	Conference Session Chair Conference Presenter Meetings Chair Keynote Speaker Thesis supervisor	-Sociology and Climate researcher -modeling social status, community perceptions re threat of coastal environmental change -emphasis on adaptive capacity, risk profiles, and institutional arrangements -lead in community surveying and analysis with a base in Gibsons
Nichols	Co-Applicant Community Champion – Charlottetown UNB (Fredericton)	Conference organizer Conference Session Chair Conference Presenter Keynote speaker Meetings Chair Thesis supervisor	-Geomatics Researcher -responsible for geographic information for Canadian sites -lead on GIS platform development -assist on proper use, management of data -coordinate with Caribbean Geomatics Researcher -develop communities geomatics use guidelines



Appendix B-III: Research Training and Development (continued)

Preamble: The experience, knowledge and skills acquired by students and community-based representatives participating in C-Change are summarized in Table B.7 below. 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 C-Change Bibliography – Appendix A1, Table A1. The Research Team page of the C-Change website shows the coordinates, research work, and interests of 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.

Table B.7 – Research Participation: Research Associates & Community Partners

Name/ Affiliation	Activities/ Experience	Skills Development	Community Collaboration
NEW STUDENTS (Since January 2011)			
Barghi, Sara UOttawa MSc Systems Science	<ul style="list-style-type: none"> • Conference presentation 	<ul style="list-style-type: none"> • Data collection & entry • Data analysis/modelling 	Gibsons, Isle Madame
Ilgelich Nadimi UOttawa MSc Systems Science	<ul style="list-style-type: none"> • C-Change meeting participation • MSc thesis research 	<ul style="list-style-type: none"> • Computer skills (use of specialized software) • Proposal writing / preparation • Research planning 	All communities
Mostofi Camare, Hooman UOttawa MSc completed in Systems Science	<ul style="list-style-type: none"> • University course work • Teaching Assistantship • Research Assistantship 	<ul style="list-style-type: none"> • Report thesis writing • Presentation at Conferences • Publication experience • Networking 	Isle Madame
Pakdel, Sahar UOttawa MSc completed in Systems Science		<ul style="list-style-type: none"> • GIS tools • Water management modeling • AHP decision modelling 	Isle Madame
Hartt, Maxx UOttawa MSc completed in Systems Science		<ul style="list-style-type: none"> • Systems Dynamics • Soft Systems Analysis • MCDM 	Charlottetown
Tienaah, Titus UNB MSc in Geodesy and Geomatics Engineering			Isle Madame
Rak, Andriy UNB MSc in Geodesy and Geomatics Engineering			Isle Madame
Beard, Tracey UWI MSc in Urban and Regional Planning	<ul style="list-style-type: none"> • Conference presentation • C-Change 	<ul style="list-style-type: none"> • Data collection & entry • Data analysis/modelling • Computer skills (use of 	Belize



Name/ Affiliation	Activities/ Experience	Skills Development	Community Collaboration
Finch, Keston UWI MSc in Coastal Engineering	meeting participation • MSc thesis research	specialized software) • Proposal writing / preparation	All Caribbean communities
Fortune, Hannah UWI MSc in Urban and Regional Planning	• University course work • Teaching Assistantship	• Research planning • Report thesis writing • Presentation at Conferences	Belize/Bequia
Ganase, Sherry Ann UWI MPhil Economics	Research Assistantship	• Publication experience • Networking	All Caribbean communities/Grande Riviere
Lynch, Nolana UWI MPhil in Science		• GIS tools • Water management modeling	Georgetown
Seeram, Amit UWI MSc in Geoinformatics		• AHP decision modelling • Systems Dynamics • Soft Systems Analysis	Grande Riviere
Singh, Demi UWI MSc in Geoinformatics		• MCDM	Bequia
Bowen, Kyana UWI MSc Urban and Regional Planning			Grande Rivière
Hosein, Farah UWI BSc			Grande Rivière
Joseph, Alana UWI			Grande Rivière
Udika, Rudo UWI			Belize
Wilson, Michael UWI BSc			Grande Rivière
COMMUNITY RESEARCHERS AND PARTNERS AND STAFF			
Boudreau, Aleasha Research Associate Centre de recherche marine, Université Sainte-Anne, Petit de Grat Campus, Isle Madame	• Conference presentation • C-Change meeting participation	• Data collection & entry • Data analysis/modelling • Computer skills (use of specialized software) • Proposal writing / preparation • Research planning • Presentation at Conferences • Publication experience	Isle Madame
Clarke, Alexander Research associate Certified Ontario Teacher	• Conference presentation • C-Change meeting participation	• Data collection & entry • Data analysis/modelling • Computer skills (use of specialized software) • Proposal writing /	Isle Madame



Name/ Affiliation	Activities/ Experience	Skills Development	Community Collaboration
		preparation • Research planning • Presentation at Conferences • Networking	
Epp, Michael Town Planner, Town of Gibsons, B.C. Gibsons Community Partner	• C-Change meeting participation	• Research planning	Gibsons
Joshua, Bruce Directeur, Université Sainte-Anne, Petit de Grat Campus, Isle Madame Isle Madame Community Partner	• C-Change meeting participation	• Research planning	Isle Madame
Leach, Meaghan Director of Engineering and Sustainability, Town of Iqaluit, Nunavut Iqaluit Community Partner	• Conference presentation • C-Change meeting participation	• Research planning	Iqaluit
Janyk, Barry Mayor of Gibsons (up to November 2011) Gibsons Community Partner	• Conference presentation • C-Change meeting participation	• Research planning • Presentation at Conferences • Networking	Gibsons
Marchand, Josette Director- Recreation, Leisure & Community Relations, Regional Municipality of Richmond County Isle Madame Community Partner	• C-Change meeting participation	• Research planning	Isle Madame



Appendix B-IV: Research and Knowledge Production

This appendix contains materials in support of the C-Change ICURA Mid-Term Report, Part B Narrative submission for Section IV – Research and Knowledge Production. Appendix B-IV contains the following subsections:

- 1) Table B.8 – Research Annotations

Preamble. Annotated descriptions of selected C-Change research work are provided below in Table B.9 – Research Annotations.

Table B.8 – Research Annotations

An examination was made of the level of risk that the critical facilities and properties in the community of Grande Riviere (**The Vulnerability of Coastal Communities to Sea-level Rise: A case study of Grande Riviere, Trinidad and Tobago March 2011**) was completed by using projections of sea-level rise presented via spatial GIS models. Micro-data on socioeconomic characteristics of the community was 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

Climate Change and Physical Development Threats, Challenges and Adaptation Responses in Coastal Communities: Grande Riviere, Trinidad – April 2010 investigated the challenges of climate change, associated sea level rise, beach erosion and physical development on leatherback turtle nesting and eco-tourism. It then explores engineering, physical planning and eco-design adaptation responses to minimise negative effects on the coastal environment and its community. Finally, it makes recommendations for building the coping capacities of coastal communities affected by climate change and physical development. A key finding of this paper is that when a projected minimum sea level rise scenario employing a geographic information system model is applied, the beach area, which is essentially the nesting habitat of leatherback turtles, may be altered. Another important finding is that the fragile habitat zone is further disturbed by physical development such as resorts and their activity that are located in close proximity to these sites. One conclusion is that some adaptation measures can be undertaken by communities once they are exposed to training. Another conclusion is that the mapping output from this research is useful as a communication tool for building adaptation capacity among affected coastal communities. It also serves to inform policymaking and regulatory stakeholders in the



preparation of physical planning and design guidelines aimed at promoting sustainable coastal communities.

In Sea Level Rise Modelling in Support of Socioeconomic Impact Analysis: Grande Riviere, Trinidad & Tobago – May 2011 - Sea level rise models based upon IPCC projections were constructed using hydrographic and topographic surveying techniques, and GIS. The results show that between 44% and 68% of the beach area may disappear based on simulations in sea level rise. Informed by these projected scenarios, the community of Grande Riviere can gain some understanding of possible beach loss and coastal inundation due to sea level rise, and its potential impact upon sea turtle nesting sites. The community can then take the appropriate steps to mitigate or adapt to the threat. The GIS model, used in this manner, can be an effective communication tool and assist in building community capacities to deal with the potential threat of sea level rise.

The study **Assessing Vulnerability to Climate Change in Small Island Developing States: A Proposed Methodological Framework** assesses and analyzes factors (social, economic and environmental) that impact vulnerability/resilience in Small Island Developing States with emphasis on the Caribbean region. First the concept of vulnerability and alternative ways of measurement are reviewed. Attributes of Small Island Developing States (SIDS) and climate change impacts with regards to assessing vulnerability in Caribbean region are examined. A methodological framework for assessing vulnerability/resilience in SIDS with emphasis on the Caribbean region is proposed in this study. Vulnerability indicators should accurately capture the vulnerabilities of these island nations to climate change. Different models and frameworks have been proposed over the years to accurately measure vulnerability and resilience to climate change but this study differs in that it seeks to capture or account for varying indicators within the SIDS of Caribbean extraction that aid in the estimation of their vulnerability/resilience to climate change.

In Quantifying Climate Impacts on Sustainable Livelihoods in Coastal Caribbean Communities: The Development of a Vulnerability Index, the impact of climate change upon human livelihoods in developing countries is receiving a lot of attention in international circles. Ultimately, livelihood impacts are a function of vulnerabilities. Through vulnerability assessments, it is possible to determine present vulnerabilities by quantifiable and comparable metrics, and to minimise these vulnerabilities through effectively implemented adaptation strategies. Against this background, this paper develops the methodology of a Climate Change Vulnerability Index by use of the Sustainable Livelihoods Approach. Sustainable Livelihoods are assumed to be a function of a series of 5 Capital Pillars, where external global forces such as climate change will impact upon human livelihoods via an impact upon the components of this “Capital Pentagon”. 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. We reflect for each Pillar on its



nature, its importance and how it can be quantified and measured. The issue of data paucity in developing countries leads to a reliance on primary data collection for the quantification of this Capital Pentagon, 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 indentifying the pathways of adaptive measures via which vulnerabilities can be reduced.

In **“The Importance Of Nature To Coastal Communities In Small Island Developing States: Community Perceptions Of Biodiversity And Ecosystem Services In Grande Riviere, Trinidad”**, the village of Grande Riviere is located on the north-eastern coast of the island of Trinidad, a small and relatively isolated coastal community, is characterized by low income levels, little formal education and high unemployment. Within this context, the geographic area of the community is also particularly rich in biodiversity and natural fauna: in particular, it is the location of one of the major nesting sites of the endangered leatherback turtles around which a growing eco-tourism industry is developing. A community survey is administered to assess the attitudes and opinions of the residents on their interactions with nature, and the eco-tourism surrounding the turtle nesting. A two-step methodology is then applied. Firstly, indices for provisioning, regulating and cultural components of ecosystem services are created with the application of Factor Analysis using Principal Components. Secondly, these created indices are entered as dependent variables in a variable set that also includes demographic variables and variables related to the eco-tourism and leatherback turtles. General to specific modeling within the context of Ordered Probit models is then undertaken, to determine what are the significant components that influence community perceptions of the use of nature in their daily lives.

In **Linking Vulnerability, Adaptation and Mitigation in SIDS: Climate Change and the Community of Grande Riviere, Trinidad**, this study investigates the vulnerability level of the coastal community of Grande Riviere, Trinidad to climate change by developing and empirically applying a Vulnerability Index. Five pillars were developed that comprised different indicators and sub-indicators. These were then populated with a combination of primary and secondary data. The composite index suggested a scoring of 0.3371 as the vulnerability level for Grande Riviere, with the most and least vulnerable pillars being the human and social capital pillars respectively. Simulation exercises for a variety of policy options and exogenous shocks were conducted to examine how the index and its components would be impacted. These simulations led to a series of adaptation and mitigation strategies for climate change at the governmental, community and household levels. The end results underscore the need for communities of small island states such as Grande Riviere to adopt appropriate measures to deal with climate change collectively and effectively.



Appendix B-VII: Budget Update and Justification

This appendix contains materials in support of the C-Change ICURA Mid-Term Report, Part B Narrative submission for Section VII – Budget Update and Justification. Appendix B-VII contains the following subsections:

- 1) Table B.9 – Leveraged Funding Awards
- 2) Table B.10– Financial Statements

Preamble. As part of the key C-Change achievements, Table B.9 provides information about selected leveraged funding to C-Change researchers. The evidence provided (in the forms of awards notices provided in the Part C documentation) is given for the following:

Table B.9 – Leveraged Funding Awards

Item	Program	Recipient	Description	Award Amount
1	Canada-Latin American and the Caribbean Research Exchange Grants (LACREG)	Sutherland, Nichols	Multidisciplinary spatial modeling of socioeconomics, management, geomatics engineering to support adaptation planning to sea-level rise	\$14,775CDN (2012)
2	PPGIS	Sutherland, Nichols, Tienaah	VGI technical work with Canada and Caribbean integration	\$ 44,225TT (2012) (\$7,100CDN)
3	SSHRC Aid for Conference and Workshops	Lane and Moll	2011 World Conference on Natural Resource Modeling	\$16,200CDN (2011)
4	C-FOAM (Telfer School of Management)	Lane	Canadian-Fisheries, Oceans, Aquaculture Management (C-FOAM) Research Cluster	\$10,000CDN/yr (2006-2008) \$20,000CDN/yr (2009-2011)



Appendix B-VII: Budget Update and Justification (continued)

Preamble. Tables B.10a, b, and c provide information on the proposed, actual-to-date, and predicted expenditures for the C-Change project in (a) Canada (SSHRC); (b) the Caribbean region (IDRC); and (c) consolidated for the project as a whole as follows:

- Table B.10a - SSHRC Funding Budgeted, Actual and Projected Expenditures for C-Change (Canada)
- Table B.10b - IDRC Funding Budgeted, Actual and Projected Expenditures for C-Change (Caribbean)
- Table B.10c - Consolidated Financials – SSHRC and IDRC Funding Budgeted, Actual and Projected Expenditures for C-Change



TABLE B.10a: SSHRC Funding Budgeted, Actual and Projected Expenditures for C-Change (Canada)

	Year 1		Year 2		Year 3		Year 4		Year 5	
	Budget	Actual	Budget	Actual	Budget	Actual + Projected	Budget	Projected	Budget	Projected
1. Personnel costs										
Student salaries & benefits										
Undergraduate	0	0	9000	0	18000	0	18000	0	18000	0
Masters	24000	40590	24000	90480	36000	57941	36000	60000	36000	40000
Doctorate	30000	27125	45000	44485	45000	42417	45000	40000	45000	30000
Total Student Personnel costs	54000	67715	78000	134965	99000	100358	99000	100000	99000	70000
Non-student salary & benefits										
Postdoctoral	31500	0	31500	0	31500	0	31500	0	31500	0
Other	25000	7722	25000	79035	25000	75744	25000	75000	25000	75000
Total Non-Student Personnel	56500	7722	56500	79035	56500	75744	56500	75000	56500	75000
Total Personnel Costs	110500	75437	134500	214000	155000	176102	155000	175000	155000	145000
2. RTS Requested (SSHRC)	10000	5000	10000	5000	10000	5000	10000	5000	10000	5000
3. Travel, subsistence costs										
Total team travel, subsistence	17500	5791	17500	19022	17500	34772	17500	22000	17500	20000
Students travel, subsistence	7500	0	7500	6817	7500	3304	7500	7000	7500	6000
Total Travel, Subsistence	25000	5791	25000	25839	25000	38076	25000	29000	25000	26000
4. Other expenses										
Professional/Tech services	2500	3984	2500	1349	2500	9600	2500	6400	2500	3000
Supplies + Computers	25000	84	10000	2210	4500	400	4500	1000	4500	1000
Other Expenses	7500	1585	5000	1788	2500	1987	2500	2000	2500	2000
Total Other Expenses	35000	5653	17500	5347	9500	11987	9500	9400	9500	6000
Total	180500	91881	187000	250186	200000	231165	200000	218400	200000	182000

NOTES

1. Budget refers to the annual request for funds submitted to SSHRC in the proposal
2. Actual refers to the amount of SSHRC funds spent in in the fiscal year
3. Projected refers to the funds expected/planned to be spent in the year or the remainder of the current year
4. RTS funding of \$10,000 was only partially used



TABLE B.10b: IDRC Funding Budgeted, Actual and Projected Expenditures for C-Change (Caribbean)

	Year 1		Year 2		Year 3		Year 4		Year 5	
	Budget	Actual	Budget	Actual	Budget	Actual + Projected	Budget	Projected	Budget	Projected
1. Personnel costs										
Student salaries & benefits										
Undergraduate	18000	3750	27000	18593	36000	33917	36000	42500	36000	42500
Masters	48000	1042	60000	47979	60000	71250	60000	75000	60000	75000
Doctorate	15000	0	15000	0	15000	25000	15000	30000	15000	30000
Total Student Personnel costs	81000	4792	102000	66932	111000	130167	111000	147500	111000	147500
Non-student salary & benefits										
Postdoctoral	0	0	0	0	0	0	0	0	0	0
Other	20000	0	20000	4375	20000	33724	20000	35000	20000	35000
Total Non-Student Personnel	20000	0	20000	4375	20000	33724	20000	35000	20000	35000
Total Personnel Costs	101000	4792	122000	71307	131000	163891	131000	182500	131000	182500
3. Travel, subsistence costs										
Total team travel, subsistence	40000	4644	400000	48334	40000	51348	40000	60000	40000	60000
Students travel, subsistence	15000	375	15000	432	16000	5042	17500	25000	17500	25000
Total Travel, Subsistence	55000	5019	55000	48766	56000	56390	57500	85000	57500	85000
4. Other expenses										
Professional/Tech services	2500	0	2500	0	2500	14247	2500	21476	2500	15000
Supplies + Computers	25000	0	9000	7525	4500	3927	4000	2698	4000	2698
Other Expenses	14000	3021	6000	1659	5000	6534	5000	12000	5000	15000
Total Other Expenses	41500	3021	17500	9184	12000	24708	11500	36174	11500	32698
Total	197500	12832	194500	129257	199000	244989	200000	303674	200000	300198

NOTES

1. Budget refers to the annual request for funds submitted to IDRC in the proposal
2. Actual refers to the amount of IDRC funds spent in in the fiscal year
3. Projected refers to the funds expected/planned to be spent in the year or the remainder of the current year
4. Budget did not include funds for bringing communities together



TABLE B.10c: Consolidated Financials – SSHRC and IDRC Funding Budgeted, Actual and Projected Expenditures for C-Change

	Year 1		Year 2		Year 3		Year 4		Year 5	
	Budget	Actual	Budget	Actual	Budget	Actual + Projected	Budget	Projected	Budget	Projected
1. Personnel costs										
Student salaries & benefits										
Undergraduate	18000	3750	36000	18953	54000	33917	54000	42500	54000	42500
Masters	72000	41632	84000	138459	96000	129191	96000	135000	96000	115000
Doctorate	45000	27125	60000	44485	60000	67417	60000	70000	60000	60000
Total Student Personnel costs	135000	72507	180000	201897	210000	230525	210000	247500	210000	217500
Non-student salary & benefits										
Postdoctoral	31500	0	31500	0	31500	0	31500	0	31500	0
Other	45000	7722	45000	83410	45000	109468	45000	110000	45000	110000
Total Non-Student Personnel	76500	7722	76500	83410	76500	109468	76500	110000	76500	110000
Total Personnel Costs	211500	80229	256500	285307	286500	339993	286500	357500	286500	327500
2. RTS Requested (SSHRC)	10000	5000	10000	5000	10000	5000	10000	5000	10000	5000
3. Travel, subsistence costs										
Total team travel, subsistence	57500	10435	57500	67356	57500	86120	57500	82000	57500	80000
Students travel, subsistence	22500	375	22500	7249	23500	8346	25000	32000	25000	31000
Total Travel, Subsistence	80000	10860	80000	74605	81000	94466	82500	114000	82500	111000
4. Other expenses										
Professional/Tech services	5000	3984	5000	1349	5000	23847	5000	27876	5000	18000
Supplies + Computers	50000	84	19000	9735	9000	4327	8500	3698	8500	3698
Other Expenses	21500	4606	11000	3447	7500	8521	7500	14000	7500	17000
Total Other Expenses	76500	8674	35000	14531	21500	36695	21000	45574	21000	38698
Total	378000	104763	381500	379443	399000	476154	400000	522074	400000	482198

NOTES

1. Budget refers to the annual request for funds submitted to SSHRC in the proposal
2. Actual refers to the amount of SSHRC funds spent in the fiscal year
3. Projected refers to the funds expected/planned to be spent in the year or the remainder of the current year
4. RTS funding of \$10,000 was only partially used
5. Budget did not include funds for bringing communities together