

# Quarterly Project Report – Year 5 – Q1

## Team Information

<b>Project:</b>	BaySys
<b>Project Team:</b>	Marine Ecosystem
<b>Budget Year Ending:</b>	2020

## Scope Highlights

**Total Person Days in the Field:** 0

### Major Accomplishments:

- Team 3 participated to the All-Hands meeting in Winnipeg in November 2019. During this workshop, HQPs presented preliminary results and participated to discussions about manuscripts, collaborations and future work.

#### Deschepper

- Presented a poster on “Biogeochemical Modelling of the Hudson Bay” at the 2019 ArcticNet meeting in Halifax (December 2019).
- Held a committee meeting to discuss how and options to overcome the bugs in the progress of the model.
- Started time series analysis of outputs to understand the model dynamics and bugs.

#### PierreJean

- Completed the identification of infaunal organisms collected during ArcticNet 2010 and of epifaunal organisms collected during William Kennedy 2019.

#### Schembri

- Presented results on analysis of regional and seasonal dynamics of zooplankton in Hudson Bay at the 2019 ArcticNet meeting in Halifax (December 2019).
- Finished supervision of undergrad project about surface macrozooplankton in Hudson Bay. The results were presented in a poster at the 2019 ArcticNet meeting and in a presentation at the “Journée de la Recherche” at Laval University (December 2019).

#### Barbedos

- Participated to the ESA Ocean Synergy Course in Greece (November 2019) and presented some work related to BaySys.
- Implemented the Primary Production model of Bélanger et al 2013 in MatLab and started to perform a sensitivity analysis using the bio-optical observations and photosynthetic parameters measured during the BaySys field campaign.
- A paper about “The Marginal Ice Bloom” was sent to co-author for a final revision before submission (expected in January 2020).
- A first draft of the phytoplankton fall bloom paper has been completed. It involves Jenifer Lukovich and Paul Myers from the modeling team. The paper shall be submitted at the end of the winter or in spring.
- A bio-optical description of the HB waters is being done and preliminary results were presented at the GreenEdge final meeting in Nice by Simon Bélanger (November 2019).

#### Matthes

- Analysis and presentation of biological and optical data collected in the Nelson estuary during the BaySys cruise 2018. The data was presented by Laura Dalman in an oral presentation at the 2019 ArcticNet meeting in Halifax (December 2019).
- Analysis of biological and optical data collected in central Hudson Bay during the BaySys cruise 2018. These datasets will be included in two manuscripts about (1) the presence of the sub-ice algae *Melosira arctica* in Hudson Bay and (2) the first estimation of spring primary production in Hudson Bay.
- Preparation of an oral presentation about spring primary production in Hudson Bay at the Ocean Science Meeting in San Diego, USA (February 2020).

#### Jacquemot

- Writing of the manuscript on the microbial community structure on the Nelson-Churchill estuarine system (submission planned in February 2020).
- Bioinformatic analysis for the chapter 2 and 3 of the PhD thesis.
- Presentation of the results of chapter 1 at the Sentinelle North annual meeting in Levis (August 2019).
- Research of financial support for the participation at the ASLO meeting in San Diego, USA (February 2020).

#### Lee

- Finished the calculation of nutrient fluxes from subarctic rivers into Hudson Bay. Lee is now working on a draft paper for this study and is planning to submit it to a scientific journal shortly.

#### Dalman

- Presented results in an oral presentation at the 2019 ArcticNet meeting in Halifax (December 2019) entitled “Response of microalgal communities to a seasonal freshwater gradient in southwestern Hudson Bay, Canada” which uses BaySys data.
- Preparation of a manuscript focused on the above oral presentation that includes data from the 2017 winter and 2018 summer BaySys campaigns.

### Missed Targets:

- None for this quarter.

### Task Updates

*This list displays tasks that are currently not marked as complete and are assigned to your project team.*

*Select an entry from the list below you can view its current details and then click Insert Task Update below to include an update in your report.*

ID	Task	% Complete	Status
41	Task 3.1 Assess the timing of Primary Production	90	Results are being analyzed and manuscripts will be published soon.
42	Task 3.2 Estimate the magnitude of Primary Production	90	Results are being analyzed and manuscripts will be published soon.
43	Task 3.3 Evaluate nutrient processing along freshwater-marine gradients	90	Results are being analyzed and manuscripts will be published soon.
44	Task 3.4 Phase 1 Biogeochemical modeling	100	Completed.
45	Task 3.4 Phase 2 Biogeochemical modeling	90	On track.

**Completed** **On Track** **Potential Issue** **Behind Schedule**

### Risk Updates

*The list below displays risks associated with the project that have been highlighted for your project team.*

*Select an entry to see the details associated with it.*

Risk	Cancellation of the 2017 summer cruise
------	--

<b>Details</b>	Cancellation of the 2017 summer cruise (leg1) of the CCGS Amundsen. This cruise was supposed to be the main sampling program for most of the HQP projects under Team 3.
<b>Leading indicator</b>	NA
<b>Action plan</b>	The summer cruise was re-scheduled.

*Use the fields below to enter an update for the risk or issue.*

ID	Risk	Status
	Cancellation of the 2017 summer cruise	Main sampling was done during the 2018 Amundsen leg1. Data is being analyzed.

### Current Quarter Spending

*Enter your team expenses for the reporting period. The values entered should represent the cumulative amount for the budget year up to the end of the quarter. If no expenses have been incurred for a category then please enter a zero amount.*

	Amount	Description
<b>1. SALARIES AND BENEFITS</b>		
Graduate Students	41 621\$	Salaries for HQPs.
PDF's and RA	219\$	Salaries for RA (sample preparation for sequencing for Lovejoy).
Technical Staff	882\$	Salary for technical staff (Archambault).
<b>2. EQUIPMENT OR FACILITY</b>		
Purchase or Rental	0\$	No expense.
Operations and Maintenance	93\$	Replacement of lab material (Lovejoy).
<b>3. MATERIALS AND SUPPLIES</b>		
Total Cost	2 726\$	Kits and material for extracting and amplifying DNA (Lovejoy).
<b>4. TRAVEL EXPENSES</b>		
Conferences	0\$	No expense.
Field Work	0\$	No expense.

Project Related Travel	2 008\$	Training on biodiversity modeling (Pierrejean). Participation to All-Hands meeting in Winnipeg (Lovejoy and Jacquemot).
Central Planning Meetings	0\$	No expense.
Dissemination Costs	2 000\$	Publication of two papers (Bélangier).
TOTAL	49 549\$	

#### IN-KIND CONTRIBUTIONS

Organization	Contribution <i>(cumulative to end of quarter)</i>	Description
University Laval	\$15,000	Contribution from Laval University

### Budget Explanation

#### STATEMENT OF ACCOUNT

##### Budget Statement

All expenditures have been done according to schedule. The only deviation from the plan was a few thousand dollars used to pay the partial salary of a PDF.

##### Cash Contributions

##### Expenditure Tracking

*Provide a PDF copy of the University's expense report containing cumulative expenses spent on the BaySys project for this fiscal year.*

### Research Team

Team Member	Overview of Participation and Scientific Contributions
Frédéric Maps	Supervising and training HQP Deschepper.
Jean-Éric Tremblay	Supervising nutrient database and supervising HQPs

	Deslongchamps, Gagnon, Blondeau and Lee.
Louis Fortier	Replaced by Frédéric Maps.
Connie Lovejoy	Supervising and training HQP Jacquemot.
Simon Bélanger	Supervising and training HQP Barbedo de Freitas.
Philippe Archambault	Supervising and training HQP Marie PierreJean.
C.J. Mundy	Supervising and training HQPs Matthes and Dalman.
Gabriele Deslongchamps	Coordinating planning, reporting, communications.
Jonathan Gagnon	No more work to be done.
Sylvain Blondeau	No more work to be done.
Inge Deschepper	Working on her project.
Sarah Schembri	Working on her project.
Loïc Jacquemot	Working on his project.
Lucas Barbedo de Freitas	Working on his project.
Janghan Lee	Working on his project.
Lisa Matthes	Working on her project.
Laura Dalman	Graduated from her master.

### Other

*Please provide any additional information/comments as required.*

## BaySys Project – Individual Team Quarterly Update

**Date Submitted: February 2020**

**Budget Year Ending: 2020      Quarter: Q1**

### 1. TEAM IDENTIFICATION

Team Number: 4  
Team Name: Carbon  
Prepared by: D. Capelle, T. Papakyriakou, Z. Kuzyk, C. Guéguen, B. Else  
Submitted by (University Team Lead): T. Papakyriakou

### 2. SCOPE - HIGHLIGHTS OF THE PERIOD

**Number of man-days in the field this quarter:**

0

#### Accomplishments

- Carbon budget manuscript accepted for publication in Progress in Oceanography pending minor revisions
- Forwarded draft of Phase II report
- Began work using box-model and FW/Marine Model output to see if future/past changes in HB physical system has significant effects on C-system (pCO<sub>2</sub> and aragonite-saturation).
- Submitted manuscript on surface water pCO<sub>2</sub>

#### Missed Targets

- 

### 3. ACTIVITY TRACKING

Started Activities According to Project Schedule	Schedule line	% Complete	Status
4.1 Fall Cruise		100	Completed
4.2 Winter Camp		100	Completed
4.3 Bay-Wide Survey		100	Completed
4.4 Remote Sensing extrapolation of surface pCO <sub>2</sub>		60	Potential Issue
4.5 Biogeochemical Modeling (BIGCIIM)		40	Behind Schedule

Completed On Track Potential Issue Behind Schedule

4. UPDATE RISKS/ISSUES					
Update Existing Risk Items					
Risk Item	Status				
Delay in obtaining DIC/TA data	Resolved				
Eddy covariance flux estimates delayed by departure of B. Butterworth (PDF)	Resolved; new PDF (Richard Sims) is working on eddy covariance data.				
Biogeochemical Model integration with NEMO delayed	Work is on-going, but behind schedule. In parallel we are running BLING with NEMO, and BLING will provide preliminary insight into response of carbon system to future climate and river flow regimes until BIGCIIM simulations have been completed.				
4.4 Remote Sensing extrapolation of surface pCO <sub>2</sub>	This work is progressing slower than anticipated and we are exploring options for accelerating progress.				
New Risk Items					
Risk Item	Potential Impact	Response Strategy	Leading Indicator	Action Plan	Status
4.4 Remote Sensing extrapolation of surface pCO <sub>2</sub>	Req'd for the PII report	Explore benefits of additional HQP on the issue	Feedback from lead HQP	Exploring options	Monitoring the situation



BaySys Project – Quarterly Update

<b>5. BUDGET TABLES</b>							
Item	Current Year Annual Budget	Actual - Expenses to End of Quarter				Balance	Projected Expenses to March 31
		1 <sup>st</sup> Qrt Expenses (to Oct 1-Dec 31 2019)	2 <sup>nd</sup> Qrt Expenses (to March 31 2020)	3 <sup>rd</sup> Qrt Expenses (to June 30 2020)	4 <sup>th</sup> Qrt Expenses (to Sept 30 2020)		
1. Salaries & benefits							
a) Graduate students		2405.14					
b) PDF's							
c) Technical Staff							
2. Equipment or facility							
a) Purchase or rental		153.38					
b) Operations & maintenance costs							
3. Material & Supplies							
4. Travel Expenses							
a) Conferences							
b) Field work							
c) Project related travel							
d) Central planning meetings		1574.70					
5. Dissemination costs							
<b>Total</b>		4133.22					

<b>Other Organizations In-Kind Contributions</b>							
Item	Current Year Annual Budget	Actual - to End of Quarter				Balance	Projected Expenses to March 31
		1 <sup>st</sup> Qrt Expenses (Oct 1-Dec 31 2019)	2 <sup>nd</sup> Qrt Expenses (to March 31 2020)	3 <sup>rd</sup> Qrt Expenses (to June 30 2020)	4 <sup>th</sup> Qrt Expenses (to Sept 30 2020)		
University of Manitoba		11250					
Trent/Sherbrooke							
University of Calgary		5500					
ArcticNet/MEOPAR							
Other							
<b>Total</b>		16750					

**6. BUDGET EXPLANATION**

**Statement of Account**

*Budget Statement - Using the template below; describe the status of your current budget for the fiscal year. Explain any deviations from your originally funded budget proposal and justification. Provide a short description of expenses as well as cash & in-kind contributions to your project for the fiscal year. Provide a justification if you expect a carryover of your originally approved annual budget for the fiscal. **Note that account reconciliation will be conducted as per the research agreement.***

**Short Description**

- Travel expenses for All Hands Meeting in Winnipeg, software/hardware for sample analysis/interpretation, grad student salaries.
- PhD studentship for Mohamed Ahmed.

In-kind contributions (Hours, Equipment, Materials, Field Work, Services):

*Provide a brief description of the in-kind contributions made towards the project this quarter.*

- Postdoctoral support for Richard Sims (working 10% time on BaySys project).

BaySys Project – Quarterly Update

-NSERC PDF award to D. Capelle  
 -Salaries and scholarships for support staff, grad students, and post-docs.

**Expenditure Tracking**

*Provide a PDF copy of the University's expense report containing cumulative expenses spent on the BaySys project for this fiscal year.*

**7. Research Team**

*Please provide an overview of the participation in and scientific contributions to the project for each member of the research team (principal investigator, co-investigators, collaborators, company and government scientists, research associates, postdocs, students, etc.).*

<b>Team Member</b>	<b>Overview of participation and scientific contributions to the project</b>
Bob Gill (Manitoba Hydro)	Industry oversight
Tim Papakyriakou (UM)	Project lead. Recruitment. Steering committee meeting and field planning.
Brent Else (University of Calgary)	Recruited PhD student to begin work on Task 4.4 (remote sensing of carbon system) and Post Doc working on ship-based flux
Mohamed Ahmed (University of Calgary, PhD)	Completed candidacy exam. (Task 4.4)
Céline Guéguen (Université de Sherbrooke)	Recruitment of PhD student and began work on photochemistry and microbial alteration (H4.1)
Sohidul Islam (Trent PhD)	Photodegradation of DOM (H4.1)
Lisa Miller (IOS, DFO)	Analysis of water samples from fall and winter BaySys experiments
Zou Zou Kuzyk (UM)	Recruitment and field planning (H4.1 & 4.2). Organic carbon system and sediment analysis
Zakhar Kazmiruk (UM PhD)	Preparation: mineralization of organic matter in the estuary and Bay (H4.1); Fall cruise and one leg of Winter program
Samantha Huyghe (UM MSc)	Planning: Sediments, organic carbon system and paleo discharge analysis (T4; H4.2)
Dave Capelle (PDF, UM)	Carbon System in Hudson Bay (participated in winter program and led water column and river sampling on for spring 2019 Bay-wide survey)
Brian Butterworth (PDF, now in Wisconsin)	(former HQP) ship-based flux system
Richard Sims (PDF, Calgary)	ship-based flux system

--	--

**8. OTHER**

*Please provide any additional information/comments as required.*

*"Insert Text Here"*

## BaySys Project – Individual Team Quarterly Update

Date Submitted: 1 February 2020

Budget Year Ending: 2020      Quarter: Q1

### 1. TEAM IDENTIFICATION

Team Number: 5  
Team Name: Contaminants  
Prepared by: Kathleen Munson, Fei Wang  
Submitted by (University Team Lead): Fei Wang

### 2. SCOPE - HIGHLIGHTS OF THE PERIOD

Number of person-days in the field this quarter: 0

#### Accomplishments

- Participation in November all-hands meeting to discuss cross-team interactions and contributions to Phase II report and executive summary.
- Ongoing data evaluation of analyzed samples of mercury, organic matter, and inorganic matter.
- Initiation of Nelson River Estuary manuscript to combine historical, winter Nanuk campaign, and bay-wide cruise data (Task 5.1); met with Manitoba Hydro (K. Wong, K. Sydor) to discuss Manitoba Hydro hydrodynamic model for incorporation in manuscript.
- James Singer (MSc#2) defended thesis.
- Ongoing data analysis of inorganic matter and organic matter suspended sediment from Nelson River watershed and Hudson Bay.

#### Missed Targets

- None.

### 3. ACTIVITY TRACKING

Task Updates	Task ID	% Complete	Status
Task 5.1 Relationship between mercury methylation and organic matter remineralization	51	75	On Track
Task 5.2 Suspended Sediment and Organic Matter Fingerprinting	52	85	On Track
Task 5.3 Mass balance modeling of methylmercury in Hudson Bay	53	80	On Track

Completed On Track Potential Issue Behind Schedule

4. UPDATE RISKS/ISSUES					
Update Existing Risk Items					
Risk Item		Status			
Hydro-Quebec historical data is not provided (10)		<b>Behind Schedule</b> Limited data have been acquired and transferred by Manitoba Hydro from Hydro-Quebec. Some raw data and reports, but no mercury data for water or fish, have been obtained.			
Availability of Manitoba Hydro sediment data (11)		<b>Behind Schedule</b> Updated request for sediment data is being prepared to present to Manitoba Hydro.			
Delay of bay-wide sampling due to cancellation of 2017 BaySys cruise.		<b>Behind Schedule</b> Additional Hudson Bay sampling was attempted in October mooring recovery cruise, but prevented due to cruise cancellation.			
New Risk Items					
Risk Item	Potential Impact	Response Strategy	Leading Indicator	Action Plan	Status

BaySys Project – Quarterly Update

<b>5. BUDGET TABLES</b>							
Item	Current Year Annual Budget	Actual - Expenses to End of Quarter				Balance	Projected Expenses to March 31
		1 <sup>st</sup> Qrt Expenses (to Oct 1-Dec 31 2018)	2 <sup>nd</sup> Qrt Expenses (to March 31 2019)	3 <sup>rd</sup> Qrt Expenses (to June 30 2019)	4 <sup>th</sup> Qrt Expenses (to Sept 30 2019)		
1. Salaries & benefits							
a) Graduate students		13,401.49					
b) PDF's							
c) Technical Staff	-	10,254.86					
2. Equipment or facility							
a) Purchase or rental	-						
b) Operations & maintenance							
3. Material & Supplies		360.77					
4. Travel Expenses							
a) Conferences	-						
b) Field work	-						
c) Project related travel							
d) Central planning meetings	-						
5. Dissemination costs	-						
<b>Total</b>		24,017.12					
<b>Other Organizations In-Kind Contributions</b>							
Item	Current Year Annual Budget	Actual - to End of Quarter				Balance	Projected Expenses to March 31
		1 <sup>st</sup> Qrt Expenses (Oct 1-Dec 31 2018)	2 <sup>nd</sup> Qrt Expenses (to March 31 2019)	3 <sup>rd</sup> Qrt Expenses (to June 30 2019)	4 <sup>th</sup> Qrt Expenses (to Sept 30 2019)		
University of Manitoba							
University of Quebec at							
University of Laval							
Trent University							
University of Calgary							
University of Alberta							
Other ArcticNet							
<b>Total</b>							

## 6. BUDGET EXPLANATION

### Statement of Account

*Budget Statement - Using the template below; describe the status of your current budget for the fiscal year. Explain any deviations from your originally funded budget proposal and justification. Provide a short description of expenses as well as cash & in-kind contributions to your project for the fiscal year. Provide a justification if you expect a carryover of your originally approved annual budget for the fiscal. **Note that account reconciliation will be conducted as per the research agreement.***

### Short Description

*Provide a brief description of the items identified under each category of the budget table.*

#### Cash contributions (BaySys & Other Sources):

*Provide a brief description (and amounts) of funding sources provided outside of the BaySys project.*

#### In-kind contributions (Hours, Equipment, Materials, Field Work, Services):

*Provide a brief description of the in-kind contributions made towards the project this quarter.*

### Expenditure Tracking

*Provide a PDF copy of the University's expense report containing cumulative expenses spent on the BaySys project for this fiscal year.*



## BaySys Project – Quarterly Update

### 7. Research Team

*Please provide an overview of the participation in and scientific contributions to the project for each member of the research team (principal investigator, co-investigators, collaborators, company and government scientists, research associates, postdocs, students, etc.).*

<b>Team Member</b>	<b>Overview of participation and scientific contributions to the project</b>
Feiyue Wang (PI)	Project lead – mercury methylation and mass budget; supervision of MSc#2 and PDF#1. Commented on MSc#2 thesis during final preparation and served on thesis committee.
Allison Zacharias (co-PI)	Project co-lead; participation in data sharing, attended BaySys all-hands meeting
Sarah Wakelin (co-PI)	Project co-lead; participation in data sharing, attended BaySys all-hands meeting
Kathleen Munson	PDF#1 – project coordination, mercury methylation and mass budget; quality control of sediment and water column data; data interpretation; presentation of team update at BaySys all-hands meeting; revision of fish mercury manuscript; meeting with Manitoba Hydro for discussion of Nelson River Estuary model; commented on MSc#2 thesis during preparation.
James Singer	MSc#2 – submitted written thesis draft to MSc committee and Manitoba Hydro for comment period; defended MSc thesis and submitted final thesis draft to U. Manitoba graduate office. Completed BaySys responsibilities.
Zou Zou Kuzyk (Teams 4-5)	Lead on particulate organic matter sources and transport; data interpretation; quality control of organic matter fingerprinting analysis; participation in BaySys all-hands meeting; meeting with Manitoba Hydro for discussion of Nelson River estuary model; served on MSc#2 thesis committee.
Tassia Stainton	MSc#1 – Completed BaySys participation in May 2019.
Samantha Huyghe	MSc#4 – inprocessing of HB watershed sediment cores for organic matter fingerprinting analysis; analysis of radiocarbon data for sedimentation rates in Hudson Bay.
David Lobb	Sediment budget and fingerprinting - (inorganic); participation in planning sessions; training PhD#1 (co-supervision with Philip Owens).
Masoud Goharrokhi	PhD#1 – sediment budgeting and fingerprinting (inorganic): Analyses of sediments and sediments source materials for particle size and radiochemistry for fingerprinting. Manuscript preparation.
Robie Macdonald	Data evaluation and consultation.
Philip Owens	Sediment budgeting and fingerprinting (inorganic); training PhD#1 (co-supervision with David Lobb).
Ellen Pettricrew	Sediment and organic matter fingerprinting – supervision of MSc#1, data interpretation.
Gary Stern	Supervision of PDF#1. Supervision of zooplankton and benthic organism total mercury analysis. Quality control of total and methyl mercury data from completed analysis.
Evelyn Ang	Technician – sediment methylmercury analysis.
Shiva Lashkari	Technician – quality control of total and methyl mercury data from completed analysis.

### 8. OTHER

*Please provide any additional information/comments as required.*

BaySys Project – Quarterly Update

*"Insert Text Here"*