Special Program 2017

Glocal Sustainability: Ecosystem Service and Indigenous Governance

University of British Columbia
6-21 September 2017
Glocal Sustainability: Ecosystem service and Indigenous governance

Objects

Through lectures and field works, the programs facilitate the learning of theoretical and practical aspects of the sustainable society and the leadership theory for undergraduate students. Students will engage in intensive group discussions to develop innovative ideas and practical experiences.

Contents

1. Global sustainability under the climate changing
2. History and culture in British Columbia and Canada
3. Indigenous culture in Canada
4. Educational for Sustainable Development
5. Group meeting and workshop: Students of UBC and HU
6. Educational excursion and field trip
### Special Program for Nitobe College in the University of British Columbia (2017 September)

**Glocal Sustainability: Ecosystem Service and Indigenous Governance**

<table>
<thead>
<tr>
<th>Days</th>
<th>Date</th>
<th>Time</th>
<th>Time Schedule (Daytime)</th>
<th>Lecturers</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Wed Sep 6</td>
<td>Departure/Arrival NH76 (Chitose 18:30 - Haneda 20:05) / NH116 (Haneda 21:50 - Vancouver 14:55)</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2</td>
<td>Thu Sep 7</td>
<td>9:00-12:00</td>
<td>Lecture 1-2: Orientation and Introduction</td>
<td>Prof. William Cheung</td>
<td>Liu Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dr. Vicky Lam</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mr. Ryo Sugiyama</td>
<td>UBC Campus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14:00-17:00</td>
<td>Lecture 3: Visit to Nitobe Memorial Garden</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 3</td>
<td>Fri Sep 8</td>
<td>9:30-11:30</td>
<td>Lecture 5: What is the sustainability in the earth under the global warming?</td>
<td>Prof. William Cheung</td>
<td>Fisheries Centre</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11:00-12:30</td>
<td>Lecture 6: Why Communicate Science?</td>
<td>Dr. Jennifer Gardy</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14:00-15:30</td>
<td>Lecture 7: Sustainability Science</td>
<td>Prof. Rashid Sumaila</td>
<td></td>
</tr>
<tr>
<td>Day 4</td>
<td>Sat Sep 9</td>
<td>Educational Excursion (Stanley Park, Capilano Bridge &amp; Granville Island)</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td>Vancouver</td>
<td></td>
</tr>
<tr>
<td>Day 5</td>
<td>Sun Sep 10</td>
<td>Educational Excursion (Coho Salmon Ceremony)</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td>Vancouver</td>
<td></td>
</tr>
<tr>
<td>Day 6</td>
<td>Mon Sep 11</td>
<td>9:30-11:00</td>
<td>Lecture 8: Ecology and conservation issues for North American Pacific salmon (1)</td>
<td>Prof. Scott Hinch</td>
<td>Liu Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11:00-12:30</td>
<td>Lecture 9: Ecology and conservation issues for North American Pacific salmon (2)</td>
<td>Dr. Nolan Bett</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14:00-15:30</td>
<td>Lecture 10: Salmon as Cultural Keystone Species</td>
<td>Assist. Prof. Kondo</td>
<td></td>
</tr>
<tr>
<td>Day 7</td>
<td>Tue Sep 12</td>
<td>10:00-11:30</td>
<td>Lecture 11: Marine biodiversity in a warming ocean</td>
<td>Dr. Matt Whalen</td>
<td>Liu Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11:45-12:30</td>
<td>Lecture 12: Introduction of tidal ecosystem</td>
<td>Dr. Matt Whalen</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14:00-16:30</td>
<td>Lecture 13: Field work @ Tower Beach</td>
<td>Ms. Coreen &amp; Mr. Andy</td>
<td>Tower Beach</td>
</tr>
<tr>
<td>Day 8</td>
<td>Wed Sep 13</td>
<td>10:00-11:30</td>
<td>Lecture 14: Education for Sustainable Development</td>
<td>Assist. Prof. Xiao</td>
<td>Liu Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13:00-15:00</td>
<td>Lecture 15: researches of Hakai Institute</td>
<td>Dr. Margot Hessing-Lewis</td>
<td>UBC Campus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>15:00-17:00</td>
<td>Lecture 16: visit to the Beauty Biodiversity Museum</td>
<td>Dr. Brian Hunt</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18:00-20:00</td>
<td>Lecture 17: visit to First Nation community</td>
<td>Dr. Wade Smith</td>
<td>Musqueam 101</td>
</tr>
<tr>
<td>Day 9</td>
<td>Thu Sep 14</td>
<td>Educational Excursion (Victoria)</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td>Victoria</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture 18: visit to University of Victoria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 10</td>
<td>Fri Sep 15</td>
<td>Educational Excursion (Victoria)</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td>Victoria</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lecture 19: Royal BC Museum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 11</td>
<td>Sat Sep 16</td>
<td>Activities with host family</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td>Vancouver</td>
<td></td>
</tr>
<tr>
<td>Day 12</td>
<td>Sun Sep 17</td>
<td>Activities with host family</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td>Vancouver</td>
<td></td>
</tr>
<tr>
<td>Day 13</td>
<td>Mon Sep 18</td>
<td>9:30-12:00</td>
<td>Lecture 20: Library research on sustainability science</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td>Main Library</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>UBC Campus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13:30-17:00</td>
<td>Lecture 21: Visit to Museum of Anthropology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 14</td>
<td>Tue Sep 19</td>
<td>10:00-11:30</td>
<td>Lecture 22: Co-production of Plant Knowledge in South America (forestry)</td>
<td>Dr. Janette Bulkan</td>
<td>TBA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>11:45-12:45</td>
<td>Lecture 23: Debriefing &quot;Sustainable Society&quot; <em>(with students of UBC and HU)</em></td>
<td>Assist. Prof. Xiao, Kondo &amp; Pro. Rashid Sumaila</td>
<td>Liu Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14:00-17:00</td>
<td>Lecture 24: Group meeting &amp; Presentation &quot;Sustainable Society&quot; *(including General</td>
<td></td>
<td>UBC Campus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discussion)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18:00-20:00</td>
<td>Farewell Ceremony</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 15</td>
<td>Wed Sep 20</td>
<td>Departure NH115 (Vancouver 16:20 - Haneda 9/21 18:30)</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 16</td>
<td>Thu Sep 21</td>
<td>Arrival NH079 (Haneda 20:00 - Chitose 21:36)</td>
<td>Assist. Prof. Xiao &amp; Kondo</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Main Lecturers

Dr. Rashid Sumaila is a Professor and Director of the Fisheries Economics and Management, UBC Fisheries Centre. He specializes in bioeconomics, marine ecosystem valuation and the analysis of global issues such as fisheries subsidies, illegal fishing, climate change and oil spills.

Dr. Scott Hinch is committed to the study of salmonid ecology, behaviour and physiology, and to providing management systems with information needed for the conservation and sustainable use of fish resources. He is a Professor of Department of Forest Sciences, UBC.

Dr. Mary O'Connor studies the influence of environmental temperature on the dynamics of ecological communities. Her work contributes to our understanding of how patterns of species abundance are related to ocean temperature as it varies from place to place, season to season, and with climate change.

Dr. William Cheung is an Associate Professor with UBC's Changing Research Unit at the Institute for the Ocean and Fisheries, UBC, and Director of Science, Nippon Foundation- Nereus Program. His main research areas include understanding the responses and vulnerabilities of marine ecosystems and fisheries to global change. He published over 80 peer-reviewed publications.

Dr. Vicky W.Y. Lam is a Fisheries Economist and Program Manager at the Nereus Program at the University of British Columbia (UBC). She dedicates herself to a broad range of fisheries related researches. One of Vicky’s research interests is to focus on understanding the socio-economic impacts of global change on marine resources, fisheries and human well-beings.

Dr. Matt Whalen is a postdoctoral fellow with the Hakai Institute, University of British Columbia, and Marine GEO. He is interested in how environmental conditions and interactions among species shape food webs and in how biodiversity at multiple scales determines the stability and functioning of ecosystems.

Dr. Nolan Bett studies Pacific salmon. Using a combination of genetic and behavioural analyses, Bett’s research explores factors that affect olfactory perception in salmon, as well as the potential effects of altered flow patterns on their ability to detect natal chemical cues.

Dr. Margot Hessing-Lewis is a marine ecologist who studies interactions between coastal species, and the linkages between nearshore habitats such as seagrass beds and kelp forests.

Dr. Brian Hunt is a biological oceanographer with broad interests in the structure and function of pelagic marine ecosystems, and their response to climate forcing and anthropogenic impacts. His research focuses on the plankton that form the base of
all pelagic food webs, and extends into the higher trophic levels through research into bottom-up and top-down forcing processes.

**Dr. Wade Smith** is a Postdoctoral Fellow at Plankton Ecosystems Lab. He investigates the life history and population dynamics of fishes to provide new insights and recommendations for improved conservation and management. My research examines the life history attributes and spatial structure of fishes to better understand how these factors contribute to the persistence and resilience of populations.

**Dr. Janette Bulkan** is an Assistant Professor for Indigenous Forestry in the Department of Forest Resources Management in the faculty of Forestry. She is a linguist and anthropologist by training and has work experience in social forestry, participatory resource management, monitoring and evaluation, cultural diversity awareness and protection, and teaching. Her area specializations are South America and the Caribbean.

**Mr. Ryo Sugiyama** is a Curator of the Nitobe Memorial Garden (NMG) at the UBC Botanical Garden and Centre for Plan Research. He will introduce and have a lecture on the NMG.

**Assist. Prof. Shiaki Kondo** is a co-instructor of the Special Program in UBC, who works for Center for Ainu and Indigenous Studies in Hokkaido University. His research interest is Cultural anthropology. He is also working with Athabascan people in Nikolai, AK.

**Dr. Lan Xiao** is an Assistant Professor at the Institute for International Collaboration, Hokkaido University. Her research interests are social education and community education for socially disadvantaged people, such as unemployed, immigrants and the challenged.

**Prof. Masahide Kaeriyama** is a Professor and Senior adviser at the at the Institute for International Collaboration, Hokkaido University. He specializes in marine ecosystem ecology, salmon biology, and sustainability sciences
# Reports of Students

## List of Student Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Major</th>
<th>Grade</th>
<th>Nitobe College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryusuke Yamazaki</td>
<td>Male</td>
<td>School of Engineering</td>
<td>2nd</td>
<td>Yes</td>
</tr>
<tr>
<td>山崎 隆介</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shuichi Teranishi</td>
<td>Male</td>
<td>School of Engineering</td>
<td>3rd</td>
<td>No</td>
</tr>
<tr>
<td>寺西 修一</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yu Nakajima</td>
<td>Female</td>
<td>Faculty of Letters</td>
<td>3rd</td>
<td>Yes</td>
</tr>
<tr>
<td>中島 悠</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kazuha Yamase</td>
<td>Male</td>
<td>School of Engineering</td>
<td>2nd</td>
<td>Yes</td>
</tr>
<tr>
<td>山瀬 和葉</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isamu Takizawa</td>
<td>Male</td>
<td>School of Engineering</td>
<td>3rd</td>
<td>No</td>
</tr>
<tr>
<td>滝沢 勇武</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wakana Endo</td>
<td>Female</td>
<td>School of Fisheries Sciences</td>
<td>2nd</td>
<td>Yes</td>
</tr>
<tr>
<td>遠藤 和可奈</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Glocal Sustainability

-Ecosystem service and indigenous governance-

Special Program for Nitobe College in the University of British Columbia
2017/09/06-21
Hokkaido University, Faculty of Fisheries
Wakana Endo 02169113
1. Summary of Lectures

<Day 2 / Sep 7>

Lectures 1-2: Orientation and Introduction

Prof. William Cheung, Vicky, and Asst. Prof. Xiao and Kondo

The students clarified our expectations for this short exchange program in UBC, and wrote them down. I had 2. The first is: Gain more knowledge about the relations between global warming and the sea. The second is: Learn about marine biodiversity and sustainability.

After this, Vicky introduced us to what sustainability is in the perspective of the UN, which is explained in SDGs. Then Professor William Cheung and Assistant Professor Xiao and Kondo introduced us to UBC. I learned how big the university is: 402 hectares. It is 2.26 times the size of Hokkaido University. There are 50,000 students studying in UBC, out of which 6,000 are exchange students. There are 300 Japanese undergraduate students, and 50 graduate students. The other students in this program and I found a building called Ritsumeikan UBC House, where there are many Japanese students studying abroad. We were able to see that UBC has a big diversity of students studying there.

Lecture 3: Visit to Nitobe Memorial Garden

Mr. Ryo Sugiyama kindly explained to us the history of how the Nitobe Memorial Garden came to be. Originally, there was only the stone pillar (Fig 1.) made by Inazo Nitobe’s friends in the streets of Vancouver. Due to World War 2 however, the pillar was treated roughly by Canadian citizens. UBC garden committees thought this was wrong, as they knew the great achievements of Mr. Nitobe Inazo, and decided to make a garden inside the University in memory of him. The garden is elaborated to represent his famous goal, “to become a bridge across the Pacific”. The main land from the entrance symbolizes Japan, and is planted with imported traditional Japanese plants, such as the Japanese maple, rare cherry blossom tree, and the waterfall designed not only for it’s

(Fig. 1/Stone Pillar)
looks, but also the calming sound. Mr. Ryo adjusts the pebbles below the fall to make the perfect sound. Beyond the bridge is the island symbolizing Canada, and there are local fir and maple trees (Fig 2.). The harmony of Japanese and Canadian plants is hard to keep, especially because of the Canadian climate, and the need to use Japanese pruning methods. There is also a tea house called Ichibo-an inside the garden. This tea house plays the important role of introducing traditional Japanese tea ceremony. Through our tour with Mr. Ryo Sugiyama, I felt the great affection Mr. Ryo had for the garden, and I became proud that he was in charge of the garden representing not only Mr. Nitobe Inazo, but also Japan.

Lecture 4: Visit to Botanical Garden

The UBC Botanical Garden is Canada’s oldest university botanic garden, and was established in 1916, making this year it’s 101th anniversary. As Hokkaido University has our own botanical garden, I expected it to be something similar. Hokkaido University Botanical Garden is quite large, and is 13.3 hectares large. However, it surprised me because the UBC Botanical Garden is 44 hectares large meaning it is 3.3 times the size of Hokkaido University Botanical Garden. It is mainly divided into 7 areas: David C. Lam Asian Garden, E.H. Lohbrunner Alpine Garden, BC Rainforest Garden, Carolinian Forest Garden, Food Garden, Harold & Frances Holt Physic Garden, Garry Oak Meadow and Woodland Garden, and other areas including Pacific Slope Garden. UBC Botanical garden is in use for research, conservation, teaching, and public display of temperate plants from around the world. I remember seeing a little part of Japan in here as well, in the David C. Lan Asian Garden. The collection is derived primarily the Himalayas, Japan, Korea and China. It had a rich collection of maple, magnolia, and Hydrangeas. The most memorable area, however, was the E.H. Lohbrunner Alpine Garden. It includes several beds of plants, each representing the mountains of Asia, Africa, North America, Europe, South America, and Australasia. There was a great diversity in the forms of the plants, making it exciting to compare.

<Day 3 / Sep 8>

Lecture 5: What is the Sustainability in the Earth Under the Global Warming?
In this lecture, we learned how global warming affects the ocean, what the impacts of climate change are on marine biodiversity and fisheries, and identified the solutions and opportunities for them.

First of all, I will explain how global warming affects the ocean. Right now, there is 400ppm (parts per million) of CO2 in the air. The atmospheric CO2 level is similar to that of 3-5 million years ago. 93% of the added heat from the air is absorbed into the sea, and so is 28% of CO2. This will lead to lower acidification level, higher temperature and sea level, and Hypoxia. What are the impacts of this on marine biodiversity? As these changes occur, the whole ecology in an area will shift to higher longitude and deeper areas in search of cooler areas to live, causing invasion to the local species. This will mean it will change the effectiveness of protected areas, possibly leading to extinction of important sea creatures such as squid, lobsters, and Pacific Salmon. The solution and opportunities we have is to decrease overfishing to prevent extinction of species, or to use carbon removal options such as ocean fertilization, afforestation and reforestation, and direct air capture. I thought afforestation and reforestation is the simplest and important way to solve global warming, because not only does is absorb CO2 from the air, but it also protects land from the rising sea level.

**Lecture 6: Science Communication**

Ms. Jennifer Gardy

Ms. Jennifer passionately spoke of the importance of science communication. Science communication is not a common topic in Japan, so it was interesting to know about this topic. Ms. Jennifer explained to us that even as scientists, there is a great demand for communication skills. In the science field, there are scenes when you are required to explain your research, or when you have to persuade someone with the right word for grants. As a solution to people suffering in science communication, Ms. Jennifer Gardy recruited a team and created a website with free contents for readers to use, to teach themselves and others science communication. I was personally interested in Ms. Jennifer’s background, because she is an Assistant Professor who sequences DNA, yet she was also interested in writing and wrote articles in a newspaper company. Normally, science and literature seem to be 2 things that are incompatible, yet Ms. Jennifer managed to immerse these two elements. I also am interested in both biology and art, so this lecture made me think that maybe subjects that seem unrelatable may not be so far apart, and can create a new field.

**Lecture 7: Sustainability Science**
In Prof. Rashid Sumaila’s lecture, we expressed a personal meaning of what sustainability is, composed a definition of sustainability, and compared and contrasted our definition.

To start our class, Prof. Rashid Sumaila asked us what our definition of sustainability was. When we put the student’s definitions together, I found that there is not only one definition for this word, but many. In environmental terms, it would mean: Acting so that a resource will stay in the future. In social terms, it means: Giving equal opportunities. As you can see, these 2 definitions describe intergenerational equity and intragenerational equity. In the science field of studies, we focused on the former definition, which is also defined by the UN for SDGs, “Taking actions in a way that let us reach an objective of the present without compromising the ability of the future generations to meet their own needs”. In order to follow this in the field of fisheries, we must prevent overfishing. To manage the number we can fish, we can use the Schaefer model (Fig 3.). In this model, you can see that to gain Maximum Sustainability/Biological yield (Emey), you must fish less than the amount you would fish to gain Maximum Economic Yield (Emsy).

However, depending on how abundant a species is, the line where Fishing Costs Equal to Biological Yields (Eo) will change. It may be difficult, but we must try not to fish more than the Maximum Sustainable/Biological Yield, so that the number of fish will not decrease in the long run.

<Day 6 / Sep 11>

Lecture 8: Ecology and conservation issues or North American Pacific Salmon

Prof Scott Hinch

In this lecture, we learned what the large issues and challenges are for North Pacific Salmon, and then learned what the trends in populations and species are.

There are 3 mains challenges facing the North Pacific Salmon. The first challenge is due to the development of hatcheries. The high density of salmon in a hatchery makes it easier for pathogens to be transmitted to salmons. Research also shows that salmons raised in hatcheries have lower accuracy in mother-river migration. This can threaten the natural local species.
The second challenge is the loss of rivers. Due to construction of barrier dams and land fill in rivers, many salmons are losing their mother-river, which will lead to a great drop in the number of salmons. Finally, we must consider pollution. The pollutant that will most affect humans is mercury, as it cannot be decomposed in organs, remaining in tissues of fishes. As a result, the mercury will end up on our dinner plates in high concentration, and it will cause neurological disorders.

We then learned the main species of salmon around the world. I will introduce the 5 main species living in British Columbia. They are Chinook, Chum, Coho, Pink, and Sockeye. The main species in British Columbia is Sockeye Salmon, while in Japan the majority is Chum Salmon. The Sockeye Salmon in British Columbia are native species, while Chum in Japan are mostly from hatcheries.

**Lecture 9: Navigation in Pacific Salmon**

Dr. Nolan Bett

Dr. Nola Bett introduced to us how salmon navigate their way throughout the ocean. He first introduced several different methods other creatures use, such as Waggle Dance used by bees, magnetic field used by turtles, and Cryptochrome and magnetite by foxes. Salmons are known to mainly use 2 methods to navigate their way for mother-river migration. The first is imprinted chemicals, and next is pheromones. They detect Imprinted Cue and Conspecific Cue, switching from one another to go back to their mother river. Following these cues will increase probability of finding suitable spawn beds, while reducing search related costs.

**Lecture 10: Salmon as Cultural Keystone Species**

Asst. Prof. Kondo Shiaki

Asst. Prof. Kondo explained to us how salmon play an important role not only in ecology, but also in culture. Ceremonies held in UBC start their speech with a particular phrase; “Let us acknowledge that we are seated on the traditional, ancestral, and unceded territory of the Musqueam nation”. This acknowledgment is set in guidelines of UBC. There is also a reconciliation pole in UBC Point Grey campus representing the trajectory the First Nations faced (Fig. 4). I particularly remember the carved Indian Residential schools, with skeletons painted on the lower side. These prove how strong the people in First Nations in Canada are linked to their territories. Looking into their artwork, we realize that many, many of them
include paintings or carvings of salmon. The indigenous people in Canada have strong links with their surrounding natural resources as well. Living on the land longer than anybody else, they knew the best way to fish salmon without losing sustainability. They used fish weirs made of local plants. The key to maintaining salmon in the long run was the material. As plants are organic, they leave room and chances for salmon to reach spawning beds. Yet when immigrants made the same fish weirs out of metal, it rapidly led to overfishing. In conclusion, there will always be important methods that developed through history, which science cannot beat. Integrating indigenous studies with science will give great benefit to our future.

<br />

Lecture 11: Marine Biodiversity in a Warming Ocean  

Dr. Matt Whalen

In this lecture, Dr. Matt Whalen introduced to us what marine biodiversity is, how biodiverse ecology benefits us, and the threats our marine environment is facing.

Marine biodiversity is the variety of life in the world’s oceans, the result of evolutionary processes. Diversification is maintained on the balance of species. There are different levels in biodiversity, starting from Genetic level- Species level- Ecosystem Level. Why is biodiversity important? Let me introduce you to 5 ecosystem functions, and you will understand why it matters. First, the ecosystem provides us with fish production and food. Next, it plays a big role in coastal protection. If there were no kelp/eelgrass/seaweed/sea grass forests, many coasts will be washed away by sea tides. Thirdly, ecosystem purifies water and is required for nutrient cycling. Fourth, it plays a role in carbon sequestration, mitigating climate change. Finally, it is necessary for our cultural and spiritual well-being.

As you can see, marine biodiversity is very important for us. Yet, 60% of marine habitats providing human livelihood is already degraded, still currently facing many threats. For example overfishing, species invasion, and Global Climate Change. By studying the past, present, and future of marine ecology, we might be able to gain some hints of what changes our environment face. However, we must keep in mind that there are actions we can take to prevent further degradation. We can reduce greenhouse gas emissions, set marine protected areas, and protect coastal vegetation.

This lecture reminded me that there are many actions we must take to protect our beautiful marine environment.

<br />

Lecture 12: Biodiversity on the Shore –setting the baseline-
In this lecture, Dr. Matt explained how intertidal zonation occurs. In tidal ecosystems, where there are steep gradients, zonation can be observed due to physical limits, competition, and predation refuge. In Fig 5. (picture of shore in UBC), you can see the starfish eating mussels, yet they cannot go higher due to critical tide limits and their intolerance to physical stress. Since lichens and barnacles have a higher tolerance to physical stress, they will be in a higher area in the gradient. In this ecosystem, the starfish are a keystone specie, having a large effect on the community disproportionate to their biomass.

Through this lecture, we understood that nature creates complex interactions between species and balances out the number of each species.

**Lecture 13: Field Work @Tower Beach**

Ms. Coreen Forbes and Mr. Andy Loudon

In this lecture, my class went to Tower Beach, searched for sea creatures, and observed what we caught. We caught sea louse, barnacles, mussels, limpets, and a couple species of seaweed. We also caught some shells of pacific oysters. Unfortunately, we went to Tower Beach when the tide was high, so we were not able to see the lower areas of zonation. However, I was able to see a glimpse of the upper part. I will list the species from ones in lower zone: Oysters, mussels, limpets, barnacle, and sea louse. I was looking forward to seeing starfish, but I hope to see them sometime when the tide is low.

**<Day 8 / Sep 13>**

**Lecture 14: Education for Sustainable Development**

Asst. Prof. Xiao Lan

Ms. Xiao re-introduced us to SDGs, which the UN announced in 2015. In this lecture, we focused on goals 4, 10, 11, mainly focusing on education, defining and learning the importance of lifelong education. After that, our class divided into two groups, to debate whether every family in the world should have one less children. I belonged to the Negative team, with 3 main reasons for this. The first reason is, because population and ratio of children differ depending on countries. For example, 16 countries including Korea, Japan, Italy have less than 2 children per woman, meaning limiting birth will lead to extinction of human population in these countries. Our second support is, because the reason families in
developing countries such as India have so many children is due to the need of children to help farming, which is needed to support their family. Finally, there is already an example of a country that tried limiting birth: China. They enforced One-Child-Policy, which resulted in declining birth rate and an aging population. From these supporting reasons, the Negative side won the debate to the Affirmative.

**Lecture 15: Visit to the Beaty Biodiversity Museum**

We went to the Beaty Biodiversity Museum in the afternoon. I expected to see exhibits similar to Hokkaido University’s Museum, designed for entertainment and education. However, I was taken aback when I didn’t see glass showcases, but instead rows and rows of shelves with specimen. Looking closely, I saw it is based more for educational purposes, and saw some specimens being taken for research purposes. I think this is a proper way of using University Museum. It was also a good experience for me, as I am taking classes to become a curator. The Beaty Biodiversity Museum lets us see the methods they use to preserve specimens. For example, in Fig. 6, you can see skulls wrapped in see-through bags to prevent them from being covered in dust. (Fig. 6/Wrapped Skulls)

**Lecture 16: Researches of Hakai Institute**

Ms. Margot Hessing Lewis, Mr. Briant Hunt, and Mr. Wade Smith

The researchers from Hakai Institute on Calvert Islands. Hakai Institute is a scientific research institution that conducts long-term research at remote locations such as Quadra Island and Calvert Island. They conduct research in various fields such as Marine Science, Sociology, Archaeology, and Forestry. However, they all carry out long-term ecological research. Ms. Margot, Mr. Briant, and Mr. Wade specialize in Marine Science. They said they can observe the effects of Global Warming on the coastal areas. They have a low return of sockeye salmon this year, seeing more jellyfish, the seals, sea birds, and sea stars are dying. The Hakai Institute started its’ research in 2009. It has been less than a decade and they are already seeing visible changes. I accepted this as an urgent message from nature to people, urging us to stop Global Warming.

**Lecture 17: Visit to First Nation Community**
Asst. Prof. Xiao Lan and Kondo Shiaki

We went to First Nations House on Learning to hear how the people in Musqueam are trying to recover their tradition of weaving blankets they used to use in ceremonies. In 1885, due to legislation amending the Indian Act was passed the next year, potlatch is banned in Canada until 1934. Even though the ban was lifted, many traditional artifacts were taken away, including the Musqueam blankets. Weaving skills were passed on by weaving with younger generations, therefore many weaving techniques were lost in these years. The Musqueam people decided to collect the lost blankets from museums around the world, and recover the weaving knowledge. Currently, Debra Sparrow is a Musqueam weaver, artist, and knowledge keeper. Ms. Debra is trying to restore the techniques by observing the old weavings collected.

<Day 9 / Sep 14>
Lecture 18: Visit to University of Victoria

Our class visited the anthropology lab in the University of Victoria. At UVic, they integrate anthropology’s traditional subfields- combining archaeology, cultural and biological anthropology. This was very evident. As you can see in Fig. 7, there were many bones of any animal you can imagine from sea creatures, to mammals on land in their reference room. They use the bones to identify what kind of bone they find in geologic stratums. What makes this UVic collection unique, is that they sort the bones not by animal species, but by bone parts. If you open a shelf labeled ‘skull’, there will be many skulls of different animals, making it easier for anthropologists to identify what species the bone they found in stratum belongs to.

(Fig. 7/UVic Reference Room)

<Day 10 / Sep 15>
Lecture 19: Royal BC Museum

On our second day at Victoria, my class went to Royal BC Museum. The main exhibits in Royal BC Museum can be divided into 4 areas. Modern History Galleries, Natural History Galleries, First Peoples Galleries, and Our Living Languages. I especially enjoyed the Natural History Galleries the most. This gallery focused on the expected affects on British Columbia’s natural environment caused by Global Warming. I was surprised to learn that
sockeye salmon will disappear from British Columbia within the next couple of decades if the temperature rises at this rate. My class and I participated in the Coho salmon ceremony, and knew that salmon is very important not only as a food resource, but also culturally. The extinction of salmon will be devastating history for BC. There was another exhibit that caught my attention. It is an exhibit of a tide pool. It surprised me because there were real fish and sea creatures inside it. We could see the hermit crabs, shrimps, and fish swimming. Normally, museums only have specimens, yet Royal BC Museum had live creatures. I am sure that it will stay vividly in memories of children that visit there.

I also enjoyed Our Living Languages. There were many captions that said “Hello” in the language of First Nation with buttons that play the word, pronounced by the local people. My friend and I tried copying some of them, but many were difficult to pronounce. Captions of how many people speaking the native language still exist appeared, and we noticed that some languages are in danger of extinction.

All in all, I learned many new things about the past, present, future of British Columbia at Royal BC Museum.

<Day 13 / Sep 18>
Lecture 20: Library Research on Sustainability Science

This morning, our class went to the Main Library of UBC. As it was the day before our final presentation, I went straight to the self-study desk area to work on my presentation slides. The UBC library contains a large collection of both physical and digital books. They have more than 7.9 million books, 2.3 million e-books, 5.3 million microforms and 923,000 maps, videos and other multimedia materials. It includes the largest Asian-language materials in North America and the largest biomedical collection in Western Canada. Despite this impressive collection, I didn’t have time to spare for reading these books. The next time I visit UBC, I will definitely look into them.

Lecture 21: Visit to Museum of Anthropology

Asst. Prof Xiao Lan and Kondo Shiaki
In the afternoon, we went to the Museum of Anthropology. Asst. Prof. Kondo Shiaki explained to us the unique displaying method the MOA uses. I recall him asking us this question after we saw the totem poles and house poles, “Do you realize there is something different here from other museums?”. I had a feeling there was something different, but I couldn’t put my hand on what it was until he asked the next question, “How would you normally display historical artifacts?”. It hit me then, that normally, to preserve artifacts, you do not leave them outside, or leave them under the sun (Fig. 8), or else degradation will occur. But Mr. Shiaki explained to us that these totem and house poles were meant to go back to nature, making way for new poles to carry the tradition on, and that to respect the intentions of the First Nation communities, MOA deliberately decided to display these artifacts in this manner.

I understand that the Coast Salish people have had hard times due to the immigrants that settled in Canada, but I think the effort that UBC puts to show respect to these people is a good step towards harmony between different races.

<Day 14 / Sep 19>

Lecture 22: Co-production of plant knowledge in South America

Asst. Prof. Janette Bulkan

On the final morning at UBC, we met Asst. Prof. Janette Bulkan. She is working in the faculty of forestry, with indigenous people in South America to study Cassava, the various species of Cassava, and how they process them to make the poisonous tubers edible. The indigenous people use multiple cropping as a solution to the poor soil of South America. Every time they move to an old field they abandoned, they will find genetically new kinds of Cassava. Although the people do not know of DNA, they know that genetic diversity is needed to sustain their crop. I was amazed that these people can tell apart all the kinds of Cassava, because they all looked so similar to me and they plant more than 10 kinds of Cassava each season. Despite the poison in the tubers of these plants, they traditionally know the right steps to remove the poison. According to Ms. Janette, the poison is strong enough to kill a person if eaten raw, and there are cases of people who died due to wrong processing steps. However, there has not been such cases with local First Nation people.
I think this is another field of study that indigenous people have the upper hand than scientists. There is still much to learn from these people.

**Lecture 23: Group meeting & Presentation “Sustainable Society”**

Prof. Rashid Sumaila, Asst. Prof. Xiao Lan and Kondo Shiaki

To conclude our short study abroad here in UBC, all the students gave a presentation to show what we learned through this program. I presented on sustainability from the perspective of our marine environment. I confirmed the SDGs goals, and out of the goals, and focused on goals 12-15. I explained the reasons why the marine environment is important for us, the major problems it is facing, and the solution to these problems.

The 4 reasons why we should care about the marine environment are, 1: Because they provide us with food resources, 2: It purifies water by nutrient cycling, 3: It mitigates climate change by carbon sequestration, 4: It is important for our cultural and spiritual well-being.

What are the problems it is facing? There are 5 main reasons, 1: Overfishing, 2: Global Warming, 3: Pollution, 4: Invasion Species, 5: Reclaiming Land

Finally, what can we do to stop these problems? There are solutions for the each of these problems. 1: Be informed and know what you eat. 2: Conserve energy, 3: Reduce trash and participate in beach clean-ups, 4: Be responsible of your pets, 5: Speak up and spread knowledge of what you know.

Through my presentation I learned how hard it is to speak up in front of people. I regret to say that my voice was small. I believe I could have prepared earlier, and practiced the speaking part more.

**-My Impression of This Program**

I gained much through this program. Although I was originally interested in Marine Science, I did not know the specific study I was interested in. But now I know that I would like to learn more about marine ecology.

I can now say that I know some of the meanings of sustainability, and moreover, the importance of sustainability for all people on earth. Sustainability cannot be explained from one field of study, and reflects our interdisciplinary future.

Finally, I would like to acknowledge everybody who gave me the support through this program. My parents: for letting me participate, my classmates: for giving me all the good times in Vancouver, my host family: especially Nina for the wonderful Philippine food and Jaelyn, I had fun spending time with you and Aiden, Ms. Xiao Lan, Mr. Kondo Shiaki for taking us to all these places, and finally Prof. Kaeriyama Masahide for giving me the
opportunity to apply to this program. If you did not suggest me to participate, I would not have had the chance to take all these wonderful lectures. And finally, everybody who read my report until the very end, I hope will benefit you in some way.

Staying in Vancouver was an incredible experience I will never forget.

Credits
Adapted Gordon-Schaefer model by Dean Bavington
# University of British Columbia Press 2010
https://www.researchgate.net/figure/233194567_fig2_Figure-2-Adapted-Gordon-Schaefer-model-Credit-Reprinted-with-permission-of-the
UBC blog site Deeper than the Sea by Maggie Bell
https://www.google.co.jp/search?q=intertidal+zonation+UBC&source=lnms&tbnid=isch&sa=X&ved=0ahUKEwjWkZTc6dDWAhUDXrwKHfNQAaoQ_AUICigB&biw=1264&bih=680#imgrc=zQ-AY8zRgnECzM
Interdisciplinary Studies About Sustainability
University of British Columbia
Vancouver, Canada
2017/09/06 ~ 2017/09/21

Yu Nakajima
01152142
Literature Faculty, 3rd-year
Lecture1-2: Orientation and Introduction (William Cheung, Vicky)

I learned that the notion of “sustainability” is broader than I have ever expected. Before taking this lecture, I've thought “sustainability” was environmental sustainability, such as sustainability of ecosystem, nature or resources. However, I understood that this notion includes every discipline and course: namely it covers not only environmental field but also social field and economic field. For example, as the “SUSTAINABLE DEVELOPMENT GOALS” by United Nations shows, eliminating poverty or hunger, giving everyone quality education, or achieving decent work and economic growth and so on. I thought it is impossible to realize sustainable society by changing one part of society only, therefore, we need to have variety of perspectives without being bounded to the classification of department.

Lecture3: Visit to Nitobe Memorial Garden (Ryu Sugiyama)

I learned how Inazo Nitobe is estimated from other countries and was surprised that the garden was made really exquisitely. Japanese plants and Canadian plants were planted oppositely across the river and a bridge was over there. Both of vegetation means each continents and the river means the Pacific Ocean, and the bridge embodies Nitobe’s will to become a mediator between Japan and other foreign countries. I think his will is being realized by this garden even after his death because many foreign people visit this garden and learn about his life, his will, or the character of Japanese garden, and in this way he can introduce Japanese culture to foreign people over generations.

I am also interested in what Mr. Sugiyama said. He said that he researched in his school days how different people feel or are influenced between when they see natural plants and when they see artificial plants. I knew some researches which show the difference between when people see nature and when they see artificial things such as concrete or buildings, but I don’t know whether there are some differences between nature and artificial nature. Therefore, I want to research about it more.

Lecture4: Visit to Botanical Garden

In the Botanical Garden, I saw the word “resilience” for the first time. According to the explanation of the notice there, resilience is “the ability of an ecosystem to maintain or regain its species composition and richness once it has been disturbed.” There are many damages caused naturally such as drought or cold, or caused by human beings such as pollution, logging or invasion. However, if ecosystem have biodiversity they can regain its richness. Therefore, I understood biodiversity is necessary for sustainable ecosystem.

However, I wonder the technology of genetic recombination is appropriate or permitted in order to keep biodiversity of animals or plants. At first look, creating
variety of animals and plants by Genetic recombination seems effective for biodiversity, but I think it is mere a short-term view. The number of species may increase temporarily by genetic recombination technology, but in a long-term look, this is likely to break the balance of ecosystem and consequently ruin a diversity. Therefore, I think we should not create a diversity or intervene in ecosystem without enough knowledge about the long-term influence by genetic recombination technology. We should conserve species or support ecosystem.

Lecture 5: What is the sustainability in the earth under the global warming? (William Cheung)

Through this lecture I learned the global warming is a serious problem which influences on even diplomatic relations. When the sea temperature increases, fishes will move to the part of ocean which is deeper or higher, and consequently countries near the equator would not be able to catch fishes. As a result, the problem of how to decide a fishery area between countries will occur. Moreover, if a number and kind of fish one country can catch change or is limited, people’s eating habits will also change. Therefore, global warming is a very big problem which influences on even relationship between countries and culture.

Lecture 6: Why communicate science? (Dr. Jennifer Gardy)

The argument about the necessity of making non-scientist know about science often have been pointed out these days. I think, however, even if how many books scientist published or how strong they insist the importance of science, general people probably won’t be interested in science positively. Dr. Jennifer had been using some attractive illustrations of cats all the time during her presentation, and I thought it may be effective to use pictures or illustrations in order to attract people. Now it is difficult to feel close to science in daily life because scientific technology level has become very high. I wonder using illustrations can not only attract non-scientist but also eliminate that image about science.

Lecture 7: Sustainability Science (Racid sumaila)

I relearned the notion of a sustainability throughout a figure of three pillars of sustainability: environmental, economic, social pillar. Regarding a definition of sustainability, I think there are some definitions which don’t involve plants, animals or any other non-human things: for example, “Sustainable development involves devising a social and economic system, which ensures that these goals are sustained, i.e., that real incomes rise, that educational standards increase, that the health of the nation improves, that the general quality of life is advanced.” (Pearce, Makandia and Barbier,
Lecture 8: Ecology and conservation issues for North America Pacific salmon (1) (Scott Hinch)

Through this lecture, I could become conscious about not only direct human impacts but also indirect human impacts against salmon. About direct human impacts I had already known “overharvesting” is a serious problem, but the word “by-catch” was new to me. I think solving this completely is quite difficult because it is impossible to control the habitat or the direction to swim of marine creatures. Therefore, we should think about how we can release creatures without harming them.

Lecture 9: Ecology and conservation issues for North America Pacific salmon (2) (Dr. Nolan Bett)

In this lecture, almost all of the content was new to me but it was good opportunity to know about Salmon and navigation. The most surprising thing for me is that Pacific salmon use the earth’s magnetic field to orient themselves in the ocean. I am interested in this and tried to research about it again on the Internet after coming back to Japan. There are many hypotheses about salmon’s navigation method such as using their sense of smell, the ocean current, the sun direction or earth’s magnetic field and so on, but there seems still be not an established theory. Regarding the theory of using earth’s magnetic field, there is a research which denies this. According to the experiment conducted by professor Hiroshi Ueda in Hokkaido university, even salmon whose magnetic sense is upset could return to the river they were born. (Japanese Economic Newspaper “How do salmon find the river they were born?” https://www.nikkei.com/article/DGXZO15472390Z20C10A9000000/ 2017/09/27) They probably use some method at the same time, but there are still many unclear things. I think it is important to know about the habits of creatures in order to think about sustainability of ecosystem.

Lecture 10: Salmon as Cultural Keystone Species (Kondo)

I studied in this lecture that indigenous people’s knowledge attracts many scientists these days and is used in the medicine or science field. Indigenous knowledge is strongly bounded to the environment surrounds people living there, therefore, indigenous knowledge is key when to conserve a sustainability. However, according to this lecture, scientist or government (I couldn’t remember accurately) didn’t pay for indigenous people nevertheless many modern medicines were invented through learning indigenous knowledge. I want to know more about this: concretely what medicine was made, why the money was not paid, what did indigenous people respond to not being paid or was there any conflict between indigenous people and scientists or government and so on. I also think this problem about learning from indigenous
knowledge and paying is strongly related to a sustainability, because indigenous people may deny to teach their knowledge to scientist if payment is not enough and consequently we would not be able to get excellent medicine. If so, we might lose an opportunity to solve a disease which may be overcome with their knowledge. I think this problem is associated with us over generations.

**Lecture11: Marine biodiversity in a warming ocean (Dr. Matt Whalen)**

This lecture focused on not only importance of a biodiversity but also methods to measure it, and it was interesting. In order to measure it, we need to compare past and present, and to do it we need some information or data. However, unfortunately change has already happened and we didn't notice it when we notice that change is important, professor said. It is quite difficult to estimate long-term effects, therefore, I think we should carefully be concern about and record even what looks unrelated at that time.

**Lecture12: Introduction of tidal ecosystem (Dr. Matt Whalen)**

I learned the “intertidal zonation” for the first time and it was quite beautiful. There are also keystone species in zonation such as sea stars or sea otters, and these keystone predators contribute to keep sustainable environment by preventing kelp or mussels from colonizing all space.

**Lecture13: Field work @ Tower Beach (Coreen, Andy)**

In this lecture I saw and touched a sea star directly for the first time. I was surprised that it has an eye each tips of its arms. When we turned over it, I also observed that the sea star putting out their tentacles to return. It was a wonderful experience. In the Tower Beach, we could not see a lot of species because a tide was very high, but I was able to see many barnacles clinging to rocks or sea weeds. I want to watch zonation someday.

**Lecture14: Education for Sustainable Development (Xiao)**

It was pointed out that education is quite important to realize sustainable development but it is very expensive under the present situation. I have learned about the reproduction of social class. Though it is said that every people can enter high-level school with appropriate effort by equal paper examination, one’s family class (or circumstances of family or parents) actually is strongly related to the children’s educational achievement and future occupation. Now the ration of people enter high school is almost 100 percent in Japan but there are still many children who cannot go to even elementary school or junior high school around the world. This is a very serious, fundamental problem. However, salary for teachers in elementary, junior high, and high school is not appropriate and they are under overworking. This is also big serious
problem. I think the latter should be firstly solved but it needs a fundamental reform by government.

**Lecture 15: Visit to the Beaty Biodiversity Museum (Xiao, Kondo)**

I was surprised the amount of exhibitions and couldn’t watch all of them. In the entrance, there was a big blue whale bone. According to the explanation there, that whale was struck and killed by a ship in 1987 and washed near the northwestern coast of Prince Edward Island. Then the government buried her on the beach to be clean by natural processes, and in 2008 a team unearthed the whale for display at this museum. In order to display, a lot of efforts were required such as getting rid of the smelly oil and repairing over a thousand pieces of bone, and there was cooperation between biologists and artist. I think it is good if such cooperation can be seen in any other field.

**Lecture 16: Researches of Hakai Institute (Margot Hessing-Lewis, Brian Hunt, Wade Smith)**

The name “Hakai” seems be inspired by the Hakai Consercancy, which is the largest marine protected area on the BC coast, but I had wondered what “Hakai” means. Though Hakai is a word from indigenous language, the researchers also seemed not to know the true mean.

There are various people from various fields and they cooperate to research in Hakai Institute. They also seem conduct their research with cooperation of indigenous people. There seems to be a meeting place and they have opportunities to meet and talk to indigenous people. Moreover, something like lecture for children also seems to be held there. I think cooperation between people from different field is important in order to consider problems from a variety of perspectives.
Lecture 17: Visit to First Nation community (Xiao, Kondo)

People in the community accepted us very pleasantly nevertheless we were really strangers. I learned the history of a blanket. According to their speaking, first nations people had tradition to sew a blanket and pass it to a traveler as a token of their pride of being first nations. They seemed never to receive anything from a traveler, just giving, because a blanket is their pride. Now they are trying to correct blankets spread by travelers in order to exhibit them. Regarding the method to sew, it seemed to be once extinct, but one lady in the community is trying to regain the sewing knowledge. However, she said it was quite difficult. I think regaining something which is once extinct is very difficult, therefore, it is important to pass a technology or knowledge to next generation. It must be possible because now the technology of digital devices has highly developed.

Lecture 18: Visit to University of Victoria (Xiao, Kondo)

We visited the department of archeology in university of Victoria. A large number and kinds of bone was kept there. Some bone seemed to be corrected from general people or a hunter who found animals dead. The bone in this picture is bird’s bone, and this is the base of wings. Only birds have this kinds of bone. It was interesting.

Lecture 19: Royal BC Museum (Xiao, Kondo)

I was interested in the corner of endangered languages in the north coast of Vancouver. A greeting phrase of each language were exhibited so that we can hear the pronunciation of them directly by pushing the button. Some were very similar, others were distinct. I also could know about the number of native speaker of that languages,
and I was very surprised at the shortness of them. Most of them were about from 0.5 percent to 2 percent. There were some languages which no longer have native speakers. I also thought that the languages spoken near to the ocean are more endangered than that near to the inland.

**Lecture20: Library research on sustainability science**

I prepared my presentation in studying space in the library. I wish I had searched some books about sustainability or first nations.

**Lecture21: Visit to Museum of Anthropology (1) (Xiao, Kondo)**

The most surprising thing for me was the way to exhibit of totem poles. In this museum in UBC, totem poles were exposed sun light directly as this picture and there are some of them even in outside of museum. It is common to avoid any natural influences such as sun light or wind because they give a lot of damages for conservation of exhibits. However, these totem poles were exhibited along with indigenous people’s intention. They think all they have to do is making totem poles again if it is damaged or decay. I learned that indigenous people think decay is natural processes and they do not have to be afraid of it. Decay looks opposite from sustainability, however, it is not always so. If the knowledge or the technique is passed to next generation, sustainability would be realized.
The report of short term overseas study special Program at UBC

02160117
Ryusuke Yamazaki

Contents

1 Introduction
2 Summery of lectures
3 Summery of overall about the program
1 Introduction

When I was 14 years old, Tohoku earthquake and tsunami was occurred. Since then, I have been interested in natural disaster prevention. During my searching Google about natural disaster, I first know the word “Sustainability” which I could not understand it very well. In the summer, I participate in the program to study “Sustainability”

2 Summery of lecture

Lecture 1
Orientation and introduction
We were introduced Dr. William Cheung. He is the professor of UBC. He explained the meaning of sustainability. From the view of fishery, sustainability means the situation fish can be captured enough to feed us even in the future.

Lecture 2
Orientation and introduction
We took the lecture of Dr. Vicky. She introduced us the concept about sustainability. Her lecture was unique because she used the quiz to proceed the lecture. I thought sustainability was difficult concept, however, her lecture made me understood the concept of “sustainability” more smoothly. From her lecture, the meaning of sustainability depends on the field, however, it is common that not only today’s strive but also future’s strive.

Graph 1 17 goals for sustainability society

Lecture 3
Visit to Nitobe memorial garden
After taking the Orientation, we went to the Nitobe memorial garden. This garden was created for the memorial of Inazo Nitobe, who died at Victoria. The garden was mixed with Japanese culture and Canadian vegetation because it is the symbol of friendships between Canada and Japan. The garden has the memorial tower which represents the history
between Canada and Japan. In WW2, the memorial tower was devastated because of anti Japanese movement. After WW2, the memorial tower was renewed by helping local people, and made the Japanese garden and tea ceremony room as the token of reconciliation between Japan and Canada. Knowing the history from background, I felt the complex feeling that cannot be represented words

Lecture 4
Visit to botanical garden

We went to the botanical museum. This museum was collected species all over the world and research the way to preserve endangered species. It is considered the symbol of UBC because UBC is the University which is famous for research of sustainability. After finishing the activity, we were explained by Dr. Kondo about the native American in Canada. He taught us the totem pole and tragedy of Indian boarding school. I have not gotten interested in the study of indigenous people at all, however, I was eager to know about native American after listening his talk.

Graph 2 Totem pole

Lecture 5

What is the sustainability in the earth under the global warming?

We took the lecture of Pro. William Cheung again. He confirmed the definition of sustainability from the view of fishery and the reason why increasing of CO2 affects the ecosystem of marine and threaten the sustainability. I learned not only the climate changes, but also the pH of sea will be lower if it continues the increase of CO2, and the habitat of
marine creature will be changed. The change of habitat of sea creature affects the economic and make conflict between countries. This lecture realized us that these events threaten not only the sustainability of fishery but also the sustainability of economy, and we should make the plan to counterpart the emission of CO2 anyway.

Lecture 6
The lecture of Dr. Jennifer “Why communicate science”
Prof. Xiao’s lecture was changed to 9/13, and we took the lecture of Dr. Jennifer. She is the researcher of biology. She taught why communication between researcher and social is important. First, many people think science field is very difficult and drop out the science in school days. To defeat what is called “science allergy” She suggest using cartoon and anime in the science lecture. From the lecture, I remembered the drop-out high school students who I teaches as TA, and I wonder if the student can continue the high school’s life provided they took such the classes.

Lecture 7
We took the lecture of Prof. Rashid Sumaila. He is society scientist from Nigeria. He defined the meaning of sustainability from a lot of perspective, and made us define what sustainability society is by doing debate. We realized there are many definition of sustainability, however, the goal for making sustainability society not only presents strive not only future is same. I wonder how physics engineering, my major, is applied for sustainability society.

Excursion
We were taken Stanley park and visit aquarium. The aquarium was not only exhibition but also research center for endangered species like botanical museum at UBC. We went to the Granville island, too. At the island, Coho salmon festival is held. Coho salmon festival is for knowing the importance of salmon for Vancouver citizen. Salmon festival is origin of native American festival, therefore it also plays the role of preserve of native American culture for Vancouver citizen, too. From the festival, we realize how Vancouver city try to preserve the native American culture and salmon.

Lecture 8
Ecology and conservation issues
Dr. Hinch taught us the reason why the number of captured salmon were decreased. He said dam construction destroyed spawning spot and overfishing. From the result we realized we have to do environmental assessment before making dam construction or structure that can affect environment. And I know salmon’s life ecology depends on itself. Some salmon go to ocean immediately when they grow up, other remain the river until they die. Salmon is common in Japanese food, especially Hokkaido, however, I realized there are many unknown things about common things. For the experience, I decided to try to research unknown things among common things.

Lecture 9
Navigation in salmon
Dr. Bett taught about the salmon’s way to decide the direction. For the experiment, Imprint chemicals prefers to hormone. The reason is considered that the tendency helps salmon to make genetic diversity. Making the genetic diversity is the best for surviving the species and I realized instincts of creature are based on maintain their offspring in the future. Before taking the class, I was not interested in biology, however, I learned how creature was programmed like AI to survive itself, and I would like to know biology more and more.

Lecture10
Salmon as cultural key stone species
Prof. Kondo did the lecture about salmon from the view of cultural anthropology. By taking the lecture, we understand what indigenous study is and the importance of salmon for native American. Prof. Kondo defined Indigenous study as the study that has its core the scholarly inquiry into Aboriginal society and societies. After defining, he explained the reason why indigenous knowledge is important for preserving salmon. Indigenous knowledge is based on the lifestyle from ancient, therefore, there are many useful knowledge to live. He also said that it is important interdisciplinary approaches are necessary when scientific knowledge is sometimes against their knowledge. Before taking the lecture, I thought indigenous study is ancient study and valueless for daily life, however, I realized studying cultural anthropology makes our society sustainability.

Lecture11
Marine biodiversity in the warming ocean
Dr. Matt is the lecturer for us. He explained the situation of increasing CO2 and higher temperature is abnormal since earth was born how global warming changes the habitat of the marine creatures. By higher the temperature, eggplants, which is seaweeds for laying eggs, will be extinct and move to north. That will be catastrophic for marine creatures. The effect of global warming cannot be estimated for scientists because earth has not experienced this kind of events. By taking the lecture, I realized global warming is abnormal phenomena and threaten the sustainability society.

Lecture12,13
Introduction of tidal ecosystem and field work at the coast
Dr. matt explained the tidal ecosystem for us. Intertidal zone is severe because temperature and salinity often changes dramatically due to the rise and fall of the tide. He explained ecosystem zone were divided three section, high tide level, mid tide level, and low tide level. The section was divided by the population of sea stars. After the lecture, we went to the tower beach to know the marine creature of intertidal zone. By exploring the intertidal zone, we find there are many creatures in the intertidal zone and resistance of creature against severe environment.

Lecture14
Education for sustainability development
Dr. Xiao explained the education for sustainability society. She defined sustainability society as the society which ensures the health and vitality of human life and culture and of nature’s capital for present and future. To achieve the sustainability society, UN proposed the education for sustainable development (ESD). Taking the lecture, it is important to be
taken ESD for students, however, there are many students who lacks interested in gaining new knowledge, especially science field. I thought what should I make the students be more interested in ESD.

Lecture15
Researches of Hakai institute

In the lecture, there are three researchers of Hakai institute coming. Hakai institute is the research institute. It researches long term scientific research especially environment. Environmental problem and natural question are so complex that only one field cannot solve therefore there are many researchers who majors not only biology but also chemical, mathematics, fishery and so on. I thought Hakai institute represents diversity of the research and can promote the sustainability society.

Visiting beauty biodiversity museum

After taking the lecture of Hakai institute, we went to the beauty biodiversity museum at UBC. There are many beautiful and precious specimens in the museum from moss to dinosaur. This museum is not only showing specimen but touching species directly. Form the view, I thought the UBC is truly University because UBC teaches all those who comes in.

Lecture16
Visiting to first nation community

We visited first nation community’s lecture explaining the knit which is unique to native American. The knit is often used to the admire of other people, and these goods were export to many other countries to trade. Canadian government forbidden to make the towel to eliminate the culture of native American until 1970s therefore there are very few craftsmen of the knit. Also, the knit represents the sprits of native American and not for trade goods, the community calls on the knit to return to native American. Knowing the activity, I realized native American activity to restore their culture is zealously.

Lecture17
Excursion to University of Victoria

We moved to Victoria to know the Victoria. After eating lunch, we went to University of Victoria(UVIC). UVIC is famous for anthropology. We learned about the fossil and the feature of bones. It was surprised that UVIC has many specimen of sea mammal and research the effect of climate changes. Like UBC, UVIC has the memorial museum of native American and totem pole.

Lecture18
Excursion to museum of British Colombia

We visited museum of British Colombia to know the environment and native American culture. To my impressive point, there are a lot of exhibitions of native American from tableware to replica of native American’s house. Also a lot of native American languages are displayed. To tell the truth I felt little fear to exhibition because the layout of museum is like graveyard. I wonder the layout represents the sorrow of native American who are forbidden to live with their origin culture and language.

Lecture19
Library research of sustainability science

We visited the library of UBC to research the sustainability society. I researched the book about education because I wanted to know the Education for sustainability, however, it was so short time to stay the library that I cannot read the books about education very well. To my reflection points, I should have researched what kind of book is there beforehand by visiting UBC on Saturday and Sunday.

Lecture20
Visiting to museum of Anthropology

We visited museum of Anthropology (MOA) to know anthropology. To my big surprise, the display is different from museum of British Colombia. I felt a kind of fear to exhibitions of museum of British Colombia, on the other hands, the display of MOA is open, therefore, I did not feel the fear. According to Prof.Kondo, this display is asked by native American not to define native American culture as past but culture as present. For example, totem pole was not exposed to sunlight in Museum of British Colombia not to be decay, on the other hands, MOA’s totem pole was exposed to sunlight. If totem pole were decay, just make another one. This kind of thought represents new type of museum.

Lecture21
Coproduction of plant knowledge in south America

The lecture was engaged by Prof.Janette Bulkan. She was born in Guyana. She researches about the Cassava which are paid attention as the counterparts of global warming. Many Japanese thinks cassava is not unfamiliar with, however, this is used tapioca. According to her lecture, cassava has strong resistance against dry and barren places. This feather is the reason why they are often planted in Guyana. Collecting cassava and removing the poison of cassava is women’s work, therefore, Guyanan society is matrilocal (Which means woman is the dominant of the position in the society) I supposed indigenous society is man-dominated, however, I found out this idea is not always correct.

Lecture22
Presentation “Sustainability society”

From taking the lecture 1 to 21, I thought it is essential for us to take education for sustainability development (ESD)and everyone should know how to make sustainability society, however, there are many students who lack the interest of gaining new knowledge. From my experience working as TA for poor grade students, those who lacks interest gaining new knowledge lacks primary knowledge (knowledge studied in elementary school). For the reasons, I did presentation how important the primary education is. I do not know the theory of education because I have not taken the lecture about education, however, I decided to take the lecture about education next semester.

Summery of overall

I took this programs to understand what the sustainability is and to know how to apply physics engineering to sustainability at first. By taking the lecture about sustainability, there are three things I have learned. Firstly, we realized how variety definition of sustainability is, however, the process for not only today but also for the future is common. To define my
own concept of sustainability, I realized the importance of my major, physic engineering. Also, education for sustainability society is important and everyone must know about it. To make everyone know, we have to innovate the primary education because the ignorance of gaining new knowledge is blamed for lack of primary education’s knowledge. At last, we cannot make sustainability society by one field. A lot of field are required to make the sustainability therefore I decided to communicate a lot of researcher who majors different field. I would like to represent the gratitude to those who make the chances to study sustainability for us.
We studied at Vancouver in Canada for two weeks. For me, it was my first time abroad, I had uneasy thoughts and fun thoughts. First, I think I will write down troubles in Canada. The most troublesome thing is the problem of meals. In Canada, junk food such as hamburgers and pizzas was the main and the healthy eating habits could be lost. However, hamburgers and pizza were often roughly made and tasty. However, from the sense of the Japanese, the homestay cuisine was very bad and hard every day. Also, shops in Canada were more expensive than in Japan. And I was perplexed how much I could give you the system of chips. Usually it seems that you should deliver about 15% of the price. I’ve written bad places in Canada so far, but do not misunderstand, Canada was a wonderful country. It is commonplace that there are good places and bad places compared with Japan. I will touch about them in writing in the content of the lecture unit from now.

Since the schedule suddenly changed, the time series does not flow for the number of the lecture.

Lecture 1, 2  Orientation and Introduction

In the 1, 2 lectures we mainly learned about what sustainability is and introduced ourselves. But since all the lessons were related to sustainability, here I studied what is sustainability and what sustainability brings. I was taught that Environmental, Economic and Social constitute Sustainable Development. It was also very easy to understand the circle graph showing those relationships. In this lesson, I learned about education for sustainable development, in particular. Education for Sustainable Development aims to enable the next generation of leaders to imagine and create more sustainable futures for people and planet. ESD is relevant to any course and any career path. I also learned that there are 17 main goals of Sustainable Development. The lesson was in quiz format and it was intrigued.

Lecture 3  Visit to Nitobe Memorial Garden

Nitobe Inazou is a famous person in Hokkaido University, but he is a well-known person in Vancouver. He died in Vancouver. We visited the garden in UBC that is related to such Nitobe Inazou. Although it is in the university, it was a wonderful quality garden
as if I came to Kyoto. Also, various contrivances were given to the garden. For example, I was amazed at how high the water falls and the shape and shape of the stone, in order to make the sound of river water strike the stone comfortable. The island in the pond represents a turtle. The bridge over the pond was deliberately zigzagged, and some ingenuity to entertain various landscapes was seen. It turned out that various techniques were used when making the garden.

Lecture 4 Visit to Botanical Garden

We then visited the Botanical Garden. I was very surprised that UBC still has a full-fledged garden. This Botanical Garden was quite spacious, and it was very interesting as there were nine types of gardens on exhibition. There were lots of squirrels at the UBC school and I felt the wonderfulness of Canada in the place where majestic nature is felt even among universities. As a garden I felt that the Japanese garden was firmly considered and the best in the world garden.

Lecture 5 What is the sustainability in the earth under the global warming?

In this lecture, I learned about sustainability in global warming. Global warming causes sea level rise and sea ecosystem destruction. For those, graphs of changes in carbon dioxide concentration and temperature rise were easy to understand. I also learned about a meeting in the world on efforts to reduce carbon dioxide and promises to reduce carbon dioxide somewhat for each country.

Lecture 6 Why Communicate Science

In this lecture, I got classes mixed with the actual UBC students. This lecture was for graduate students, and it was contents on how to convey science to people who are not scientists. The speed that the presenter speaks was fast, but the pronunciation was beautiful and it was very easy to hear. First, it was interesting to talk about what we should focus on what we talk about at Ground meeting, Conference and Public talk. For the Ground meeting, we focus on methods and results. If it is a conference, we focus on conclusions. And for Public talk, we focus on background, conclusions and big impact. I certainly thought it was right. And I learned that it is also important to replace words used in science with words used by ordinary people. For example, in science, change the place of using error to mistake or incorrect for ordinary people.
Lecture 7  Sustainable Science

In this lecture, the professor who was the most authoritative in this study was doing. The content of this lecture was to share everyone’s thoughts about what sustainability is. And I learned about connection with science. The professor’s way of speaking was slow, I felt dignity. He is a very nice person personally and I liked him well.

Lecture 8,9  Ecology and conservation issues for North American Pacific salmon

These two lectures were the most interesting lectures for me. Because fishing is my hobby and I caught salmon in the last summer vacation. There were two kinds of salmon I knew, but in the class I came out with 5 kinds, I was surprised, among them sockeye salmon was whole red body and interesting. I found out the kinds of salmon that can be taken for each country in the world. And I was disappointed by the fact that the number of shakers was decreasing by the construction of the dam. Canada’s nature is wonderful so please keep it from now on. In the lesson, I also learned about what salmon will depend on and climb the river. Are they equipped instinctively of them? Or are they deciding on the spot on the spot?

Lecture 10  Salmon as Cultural Keystone Species

In this lecture I learned how salmon was important for indigenous people in Canada.
The indigenous people caught salmon mainly by the net. Alaskan salmon was also mentioned. There are King Salmon in Alaska which is said to be the largest among salmon. I wanted to go and see it at once.

**Lecture 11,12**  Marine biodiversity in a warming ocean and Introduction of tidal ecosystem

In this lecture I learned about the ecosystem in the sea and the ecosystem in the island. Global warming has led to the collapse of various ecosystems of living organisms, which also hurt human beings. Humans must fully understand this and make efforts to protect the ecology of living beings.

**Lecture 13**  Field work @ Tower Beach

I did field work at the beach in the UBC. I thought it was wonderful that there was a beach in the university. It was a fieldwork with content to search as many living creatures as possible. At first I was thinking that there are plenty of creatures in Canada because nature is majestic. But I could not find many organisms. The creatures that I found were small crabs, shellfish, algae, and funamusi. The reason for this was that the time was just at the high tide. I was a bit disappointed at that point, but I was glad that I could have met beautiful seas and beautiful creatures.

**Lecture 14**  Education for Sustainable Development

We learned about sustainable society. What is sustainable society? A sustainable society is one that ensures the health and vitality of human life and culture and of nature’s capital. We divided into two groups to discuss whether to reduce or increase the number of children. I thought that I should increase the number of children, but in the discussion I was in the position that I thought that children should be reduced. Only after I was in that position, I learned about the good aspects of reducing children. For example, it is about improving the quality of education for one person and eliminating food shortage.

**Lecture 15**  researches of Hakai institute

The Hakai institute is a scientific research, teaching and meeting center established by Eric Peterson and Christina Munck on Calvert Island, a remote island on the exposed Pacific edge of the Great Bear Rainforest on the Central Coast of British Colombia,
A member of Hakai institute actually came. They talked about active activities such as archeology, earth science, terrestrial ecology, marine ecology. Indeed they were organizations doing sustainability in a wide area. The name Hakai seems to be inspired by the Hakai Lukvaru resort, the largest marine protected area on the BC coast located about 400 kilometers north of Vancouver.

Lecture 16 visit to First Nation community

We have participated in parties centered around the descendants of indigenous people in Canada. I am grateful to them for inviting me to such a place. I got a lavish buffet dinner at the party. This party seems to intend to have more people know about Canadian indigenous culture. Among them, they talked about the cottons that the indigenous people were making. The carpet was beautiful with patterns that are thought mathematically used. In Canada there are so many places to see various things about indigenous peoples. There are many museums and totem poles in the UBC school. Many things relating to indigenous people such as key holders are also sold to shops in the town of Vancouver. Canadian respect, respect for indigenous people was seen.

Lecture 17 visit to University of Victoria

The city of Victoria was quite beautiful, developed and tasteful. It was a wonderful place not in Japan. Such a wonderful city in Victoria, the University of Victoria also had a different atmosphere from UBC. The school and the building are very beautiful. And I felt like using the land widely. There, I showed the tools used by indigenous people, I showed specimens of bones of all Canadian creatures, and saw the restored buildings used for indigenous gatherings. Again there were many related things to indigenous people.

Lecture 18 Royal BC Museum

The museum was largely divided into exhibits of Canadian creatures and indigenous peoples’ exhibits. The exhibition of living things was widely exhibited from what was in ancient times in Canada to what exists in modern times. Among them, the full size mammoth was impressive. The main thing of this museum was also the indigenous people’s display. Masks were exhibiting fear and dignity by exhibiting them in dark places. Many houses, tools, clothing etc used by indigenous people were displayed. Also, how to pick up salmon and whales, rituals and so on were also exhibited. I was deeply impressed by the depth of the museum exhibits and the goodness of the exhibition.
Lecture 19  Library research on sustainability science

This time was preparing for a presentation to refrain on the next day in the school library. The library was different from Japan, the book was put in a unique arrangement, so I was puzzled at first. But I asked a staff member and found my own book. I was planning to announce about salmon and fishing and I studied about it.

Lecture 20  visit to Beauty Biodiversity Museum

We visited indigenous museums in the UBC. The museum was displayed differently from the museum in Victoria. While the museum in Victoria is going to preserve the ruins in the case forever, the museum in the UBC exposed the ruins as if they were outside and were in the way of exhibiting it directly hit the light. This was actually how they were used at that time so they are exhibited that way. It is an idea that we should repair as the ruins decline. This museum also has exhibits that are not enough for experts even if they had a week. I thought that UBC is a wonderful university.

Lecture 21  Co-production of Plant Knowledge in South America

In this lecture I learned about sustainability in the Amazon region of South America. The story of how cassava was used was interesting. It was related to the story of clothes I heard when I went to indigenous parties. Also, the building where the lecture was given was architecturally interesting, making good use of the colonnade and making public space and private space. First I thought that a big long pillar was made of one tree, but according to the professor, it was made by compressing the pulp.

Lecture 22  Presentation “Sustainable Society”

It is time to present the lessons in the last two weeks in front of everyone else. I made a presentation in English on salmon and angler relationship. I posted a photo of Pink Salmon I caught last time, explained about the type of salmon, introduced how to fish modern fish and how to fish indigenous fish and mentioned about the decrease in the number of modern salmon. I could not speak English smoothly than I thought. It may be due to tension, but I realized that I had few opportunities to actually speak. And I wanted to be able to speak more English by that experience. I think that is the biggest thing I got through this study.
Also we went to Stanley Park and the Coho Salmon Festival on holiday. In Stanley Park I went to the aquarium, I think that it is better than Japan. There were many kinds of living things and various attractions. In the festival, I was mainly looking at the sea on the coast, the magnificent nature of Canada was pleasant. I became able to understand sustainability with a broad meaning through lecture and fieldwork in various viewpoints. And I thought that I would like to become able to speak English more fluently through my study abroad. Thank you!
Special Program at UBC
Hokkaido University
Department of Engineering
Shuichi Teranishi

【Introduction】

We went to UBC in Canada for 2 weeks and were composed of 6 students from several faculties. It’s Literature, Fisheries, Engineering (Civil, Architecture, Metal, Applied physics). The theme is Sustainability. Also, I had a purpose how my major is useful for a better society.

【What we learned】

Lectures 1-2: Orientation and Introduction

We mainly studied at Liu Institute, and it was so cold (so you need to prepare outerwear). This is the first lecture there.

First, Vicky introduced about Sustainability briefly. She said, Sustainability consists of Environment, Economic, Social. It will be very meaningful later. Also, she introduced about 17 SUSTAINABLE DEVELOPMENT GOALS. We studied all of them later, especially the 14 LIFE BELOW WATER. It was fun because she gave me several quiz.

Lecture 3: Visit to Nitobe Memorial Garden

There is the garden where is about 5 minutes on foot from Liu Institute. It was made with respect to the spirit of Nitobe Inazo as a scholar, educator, diplomat, and there was a stone monument carved with the words of Mr. Nitobe's wish, "I wish to become a bridge across the Pacific." in the garden. In this garden, a lot of Japanese style was adopted, and the plants there were also mixed with Canada and Japanese ones. By the way, the gardener as administrator there was also a Japanese. I was impressed the complex of the garden. For example, in key places in the garden, by allowing the room to have much space, visitors could walk without seeing their feet, making ingenuity on the scenery in front.

Lecture 4: Visit to Botanical Garden

This large garden on the UBC premises takes about an hour to see and explore everything, so I listened to it and gave up looking around all. Originally I am not interested in flowers in the sense of gardening at all,
also I just came to Canada and I had a lot of jet lag and I was sleepy. So I would like you to forgive me that I relaxed this time about an hour on the bench. Sorry...

Lecture 5: What is Sustainability in the earth under the global warming?
This lecture was held by William and was one of the most interesting lectures for me. It consists of changing oceans in a high CO2 world, Impacts of climate change on marine biodiversity and fisheries, and Identifying. Mainly, he said, rising temperature of the sea surface leads to changes in catch species by country, also he demonstrated this situation using us as country respectively.

Lecture 6: Why Communicate Science?
This was an abrupt plan. It is mainly on teaching science to non scientists. Also, as it was a classroom presentation for graduate students and professors at UBC, speaker 's English speaking speed was very fast and it was difficult to hear. However there was the thing I impressed by her speech. It is that purpose is different depending on the conversational style, for example, in a group discussion, the method and result are the object, but in the conference only the conclusion drawn from that is the objective.

Lecture 7: Sustainability Science
I think that this lecture was a lecture that was confident about the theme called Sustainability. First of all, six students talked about how to define Sustainability. Also, not all of them are mistakes, but Dr. Rashid have defined “Sustainable development as development that meets the needs of the present without compromising” here. I remember that as the population increases, competition occurs and productivity may decrease, so it is necessary to consider the balance between population and productivity.

Lecture 8: Ecology and conservation issues for North America Pacific salmon
This lecture was done by Dr. Scott Hinch. Here I mainly learned that the salmon catch of each country and the proportion of the species picked up by that area are very different. For example, sock eye is the kind of salmon that can be taken most in Canada, chum is like in Japan. However, only 10~15 percent of salmon stocks status data are assessed,
so we cannot focus on assessing them in much detail. Besides, we have learned a lot of things, for example in Vancouver, there were many rivers which were originally lost so many salmon that cannot go upstream, but the pictures of the last that salmon striking the street is the most impressive for me.

Lecture 9: **Navigation in Pacific Salmon**

Postdoctoral researcher Nolan Bett talked to us about what is a Navigation, what do you think about Navigation? It’s a process of determining how to move from one location to another location. Then, how do animals navigate? For example, pacific salmon has the earth’s magnetic field to orient themselves in the ocean but, in river, they use smell to locate their homestream. Describing about it in detail, imprinted chemical are the primary directional cue, and pheromones appear to act as a secondary cue. I thought that can I speak only about salmons have the ability called Magnetics, do they have much better ability than people, or have humans degenerate their abilities?

Lecture 10: **Salmon as Cultural Keystone Species**

The content of this lecture was very easy to understand and interesting to me. First of all, we received explanation as to why we must know about indigenous peoples by learning about Sustainability. This is because many of contemporary science and technology has evolved from the wisdom of indigenous peoples. Also, human societies all across the global have developed rich sets of experiences and explanations relating to the environment they live in. Moreover, while there is a good aspect that a state of good quality river can be built up for salmon fry by the Beaver Dam, we heard that there is a bad aspect that the beaver dam prevents the salmon from running up, and I learned the ecology of the complexity of the system cycle.

Lecture 11: **Debriefing “Sustainability Society” with Discussion**

In this lecture, after receiving an explanation about the Sustainability development explained in the introduction, we all discussed "Is it right that having one few child to improve Sustainability". In the explanation about Sustainability development, the teacher of Xiao Lan is paying attention to QUALITY EDUCATION which is number 4 of SUSTAINABLE DEVELOPMENT GOALS, I also heard stories about the difference between equality and fairness and the gap with reality. In the discussion, just because that language is English, I was keenly aware of
the lack of English skills as well as frustration that I cannot convey what I want to say.

Lecture 12-13: Marine biodiversity in a warming ocean & Introduction of tidal ecosystem

We are told about the concept of niche. In particular, starfish usually live in deep water, but as the sea level rises or falls, the place where it lives moves to a shallow place, so the residential area of the sea creatures that originally lived in a shallow place was eroded. Also due to the descent of the sea level, the sea creatures that were in shallow water may be dried up by sunlight. This story was that I heard it in classes for freshman, so it was very easy to understand. It was this time that I first touched the starfish in my life.

Lecture 14: Field work @ Tower Beach

About the marine biodiversity and its habitat, I went to the beach in the UBC and looked for creatures there. The scenery was very nice and it felt good.

(At the Tower beach)
Lecture 15: **Researches of Hakai Institute**

At this time, a few researchers came to lecture from ecological laboratory called Hakai Institute located in Canada. The contents of the lecture seemed a bit difficult, but I was able to spend a precious time, such as showing the animation of the aerial photographs using the drone. Also, I asked a difficult question about how civil engineering I majored in the research can do, but answered that nature and infrastructure are deeply involved. My academic field has various relationships and involvement, so learning motivation came to me.

Lecture 16: **Visit to the Beauty Biodiversity Museum**

At first, very big skeletal model of whale welcomed us at the entrance hall. This museum has a shape with one floor spread like a flat shop. The subject of the exhibition varied from insects to marine creatures, and things like that. There was a theater here, and I saw a movie about the spawning of a fish there. However, I forgot what kind of fish it was. I do not remember details, but I was only surprised by the power of the stuffing. I thought that the way of exhibition was arranged in a decentralized way, so I want to say that please make it easier to see.

Lecture 17: **Visit to First Nation community**

First Nation community was like a meeting of indigenous communities in Canada, and we participated in it. Initially, I was worried that I might bother them, but all the people there were friendly. They were mainly talking about their traditional blankets. If my memory is right, the blanket was also used as a trade item with the world. It is still present and is kept in various museums. The knit seams were only coarse. When I heard this story, I learned that there are identities of indigenous peoples in that knit, I was surprised to think that there are many other such things in the world.

Lecture 18: **Library researches on sustainability science**

My presentation was planned to announce what we learned only from the professor's lecture so far, so we never actually got knowledge by using books. However, I had the impression that there were many students in the library. Also, there is an image that the library keeps quiet in Japan, but at the UBC library it seems that there are many students actively discussing.

Lecture 19: **Visit to Museum of Anthropology**
The museum here is very famous and it is in the UBC. I was surprised by the number of exhibits. For the indigenous peoples, the totem pole was mainly exhibited, but there were exhibits of Japanese as well.

(the famous sculpture that *Raven and the First Men*)

Lecture 20: **Co-production of Plant Knowledge in South America**

The lecture at the Department of Forestry was about the cassava that is closely related to the indigenous peoples of Ghana. It is known as a tapioca in Japan. Cassava can be cultivated even in an adverse environment, but poisoning removal processing is necessary to be edible. Also, I learned that it has restrictions on use, such as potatoes that have been removed from the skin for poison removal, are rotten unless processed on the spot.

Lecture 21: **Presentation “Sustainable Society”**

This was our last presentation. There were few professors and their students so all the students seemed like feeling nervous. Presentation in
English and response to questions at that time was my first experience, so now I think that it was a very valuable opportunity for me. I mainly derived the conclusion that functionality of the whole earth is defined by multiplication of diversity and the ability of that kind, and that it is Sustainability. In myself, that idea is still kept. Also, I think that I was glad that I could listen to all students' presentations without fail.

【Excursion】

・Stanley park
   I went to Stanley park twice, and because the weather was sunny in both, I felt very comfortable and left memories. Stanley park had various things such as aquarium, tennis court, beach and totem poles. Especially the cycling was very excited.

・Victoria
   Victoria is an island, located about 1 hour and 30 minutes by ferry. I went to the university in the neighborhood and went to Royal BC Museum, but I was surprised at the beauty of the street than anything else. I think you will understand if you look at the picture below.
【Impact on my future studies and life】

To be honest, before going to Canada, I thought that it would be better if I could use emotional expressions by means other than languages even though English could not be used. However, I realized that I couldn’t express to that little emotion of myself without a language. Therefore, it goes without saying that there was desire to learn the language. Also, I learned how blessed Japan is on this trip and how easy it is to live. From now on, I will take pride in being a Japanese citizen like this, willing to learn ambitiously and want to live proudly.
Short-term study abroad in University of British Columbia -Sustainability-

Hokkaido University
Yamase Kazuha
Department of engineering, 2nd

I have studied in University of British Columbia (UBC) for about 2 weeks (09/06~09/21) with 5 members and 2 teachers. The ways were very various. Lectures in Liu Institute, field work on seaside, museum, visit laboratory in other university, and so on. In this report, I would like to show “What I learned” and “What I felt” in each of lectures.

[Day1]
I left Chitose Airport for YVR at 18:30, via Haneda Airport, and arrived there at 3:00PM. I was very sleepy because I hadn’t been abroad in my life. But when I arrived in YVR, I was very impressed. My friend Yaka, who lived in Vancouver, was waiting for me! He stood in front of the exit with the sketchbook written “Welcome Yamase!” in Chinese(?). After arrival explanation about homestay, he talked to us and saw us off.
We were not supposed to take a lecture in Day1, so we went straight to host family by cab. I was so tired because of long flight, I just said hello to host family and started to prepare the lecture in Day2.

[Day2]
As usual, I was lost in UBC campus because I was stranger. Although I checked how to get Liu Institute (our classroom), I was wandering the campus for an hour. After a long journey, I managed to get there. In a few minutes I got there, two persons came into the room. One is William Cheung and the other is Vicky Lam.
Here, I would like to describe the lectures they gave us.

**Lecture. 1 Orientation and Introduction**  
**by William Cheung**

This lecture was the class we took for the first time in this program, so most of us were nervous. The class was introduction of the classes we would take for 2 weeks. At the beginning of the class, he asked us “What will you study in this program?” In my turn, I answered that I would like to learn “What the sustainability is” and “practicing English discussion.” I would like you to know whether I could achieve at the end of this report.

**Lecture. 2 Sustainability**  
**by Vicky Lam**

She gave us the lecture about the definition of sustainability. It was very easy to understand her lecture for us because some quizzes contained in it. The following is the explanation about her lecture contents. First of the lecture, she showed sustainability has 3 pillars. The Picture 2 is quoted from her slides. One is Environmental aspect and the other is Economic aspect. The rest of three is Social aspect. When we try to achieve Sustainability, we can think these three pillars. Here, it is important to maintain the balance because we couldn’t keep our life levels. In the case of ignoring Environmental part, a plenty of species would be extinct. There will be such
influence on our world if we ignored the others. Therefore, the balance is very important to sustain our earth.

And she told about “Sustainable Development Goals (SDG).” There are 17 goals (Picture 1). UNESCO made these goals in order to achieve the goals, all countries working with.

Lecture. 3 Visit to Nitobe Memorial Garden

By Ryu Sugiyama

We went to Nitobe Memorial garden after Lecture.1 and 2, and we were supposed to see the gardener there. He was Ryu Sugiyama. He explained how and why this garden was made. As you can understand from its name, this garden was made to praise what Nitobe Inazo did for the world. Do you know the words he left behind? It is “I wish to become a bridge across the Pacific.” This garden was made as “a bridge across the Pacific.” Namely, Kannosuke Mori, the gardener who designed this garden, intended to make not a simple Japanese garden but a complex garden that had the both aspects of Japan and Canada. In concrete, there are Japanese maple trees and Canadian ones in the garden. Mr. Sugiyama said that it was difficult to match Canadian trees to the scene of Japanese garden.

Lecture. 4 Visit to Botanical Garden

Next, we went to Botanical Garden by walk. To be honest, I think it was tiresome to look around the garden because of jet lag. But I was impressed by the beauty of the garden while walking around there. This garden is divided for each theme. For example, “Food Garden”, “Carolinian Garden”, “BC Rainforest Garden”. In each of gardens, I could feel the nature of BC and learn various plants from the explanations on the signs.

[Day3]

In Day3, we took lectures from 2 professors. The first professor was William Cheung, who held an orientation for us in Day1. And second one is Rashid

Lecture. 5 What is the sustainability in the earth under the global
warming? By William Cheung

The carbon emission by burning fossil fuels is always increasing. In 2014, 545 tons of Carbon was emitted into the air. As you know, these carbon (CO2) promotes the Global Warming. In this situation, ocean plays a great role. Ocean is said to get the heat and CO2 in the atmosphere. Concretely, ocean makes 28% of CO2 absorbed and gets 93% of added heat from the air. But there is limit, of course. Now, we can see that ocean is getting close to the limit. The line charts in the slides of the lecture indicated that ocean would be more acidic and hotter in the future.

Now, let’s move on to the influence on fisheries and marine biodiversity. When the water temperature gets higher as above, the fish living there will move to the other colder sea area than the place. The reason is maintaining their body temperature. Namely, they move to higher latitudes or deeper sea areas. Then, the ecosystem will be changed. Because of this, people living along the coast might not be able to get the fish that they could get ever. This often causes many problems between countries on the coast. Therefore, we must cooperate with other countries in order to sustain the world.

After the lecture by William, we audited the class for graduates. The speaker was Dr. Jennifer Gardy. Her English was very fluent (maybe fast?), I could understand just 50% of her massage. But her humorous slides helped me to understand the contents.

Lecture. 6 Why communicate Science?

By Jennifer Gardy

She talked about the importance of communication in science. As I described, I couldn’t understand the whole massage. But I could get two things from her slides and the pieces of her talking.

First is “Understanding my audience.” This means that we should talk contents, adapting our presentation to types of your audience. Please imagine that you will attend a conference and give a presentation for audience. Perhaps it was held for local resident, and maybe it was held for professionals. When the target is local resident, we have to explain the background to them more clearly because they don’t have technical knowledge. When the target is professionals, we can cut the
time to explain the basic knowledge and talk about more technical and concrete subjects.

Second is “Finding my massage.” Someone think that it is natural to talk to others, but if the theme we talk is very complicated, we sometimes lose the points of our presentation while talking. It is essential to make sure of the massages.

By Rashid Sumaila

He stressed “Maximum Sustainable Yield (MSY)” in his lecture. MSY is the word in Population ecology. This word means “the largest yield (or catch) that can be taken from a species' stock over an indefinite period.”

This strategy was developed in Belmar, New Jersey. Nowadays, overfishing is the big problem around the world. In such a situation, MSY shows us the appropriate fishery amount in a scientific way. To understand this concept, we watched the video of David Suzuki, a famous environmentalist in B.C.

[Day5]

Visit to Stanley Park

We assembled in Stanley Park in the morning.

First, we went to Vancouver Aquarium. I was impressed with the way to show animals. In Otaru Aquarium, one of aquarium in Japan, the animals were in the pool, so I could only look at the animal itself. In contrast, the animals in Vancouver Aquarium looked very fresh as if they were wild creatures. The fish tanks were the almost same shape as natural river or ocean. Therefore, we can see how the animals act in their environment. Also, the show was different from the Japanese one. Japanese shows were aimed to entertain the audience, as dolphins jump high from the pool into the air. On the other hand, the breeders of this aquarium explained the characteristics or body features of the dolphins or the killer whale for the almost whole show time, instead of entertaining the audience. Here, I would like to describe the knowledge I got in the show. The dolphin in this show
had the white belly and the black back. The reason why they have such parts of body is camouflage. From above dolphins, we are facing submarine. The lower the water depth is, the less lights can reach the depth. Because of this state, we will see the ocean back, so the back of the dolphin can blend with the surrounding sea color. We can say the same thing as the white belly. I was satisfied to obtain some knowledge about marine creatures and I became more interested in the biodiversity.

After buying some souvenir of Vancouver Aquarium, we got in the bus heading to Ambleside Park. the Coho Salmon Festival held there on Sep 10. We arrived there and had some beverages along the coast. There was very good place to take a selfie, so we enjoyed taking pictures each other.

【Day6】

On Day6, we took lectures about the ecology of salmons and the role that the salmons play in B.C. The reason why I participated in this program was an interest in salmons, so I was looking forward to taking these classes. Particularly, I was curious to the mother-river homing system of salmons, so I listened the lectures, focusing on this theme.

Lecture. 8 Ecology and conservation issues for North American Pacific salmon (1) By Scot Hinch

There are various kind of salmons in B.C. For example, sockeye salmon that turns their body color into bright red in breeding season, or Coho salmon living in Hokkaido and B.C. coast and so on. Each kind of salmons has their own characteristics and swims around a world in the way of their own. Therefore, the catch composition is different in each area.

Let’s move on the trends in B.C. coast. Compared with the status in southern America, salmon stock status in not bad but not great. 6.4% of the stocks in B.C. are at high risk of extinction, and 1.4% are extinct. The cause of this state is said to be the dam in Columbia River. However, Fraser River (the main river of B.C.) doesn’t have a dam, so the influence on fish such as salmons might be less. In addition, another cause might be urbanization. we often bury some rivers to build our house there.
The theme of this lecture was “mother-river homing system of salmons.” Firstly, navigation is the process of determining how to move from one location to another location. Similar as humans, it is known that a lot of animals have navigation ability and each animal have the way to navigate themselves. For example, the position of the sun or the Polarized light. What I most interested in was the way to use the geomagnetic influence. As you know, the earth is a tremendous huge magnet. In this situation, the animals that have “magnetite” or “chriptchrome” can feel the geomagnetism and use to go to one location. These are like a receptor of magnetism, and certain specific animals have ones.

Moving on the topic of salmons. The external stimulus receptors of salmons are almost the same as human’s ones. The difference is just magnetoreceptors. Salmons have magnetoreceptors near ones’ nose. Then, to know how salmons come back to their natal rivers, the researchers attach balloons to the salmons and made one receptor useless. They put such salmons on a forked river, one is natal river and another is non-natal one. And then, they observe whether the salmons would stray or not. Here, imprinted chemicals in natal river and conspecific pheromones are the two factors that are considered to play a big role of mother-river homing system. About first one, each river contains the specific chemicals, and they imprinted on the immature salmons. Therefore, the mature salmons would trace the chemicals of their natal river. About second one, conspecific pheromones, salmons have the characteristics to be together with
conspecific ones. Then, salmons sniff the pheromones the conspecific ones give off. Over lots of experiments and collecting data, it was found that both these are essential to come back home, but imprinted cues are prior to conspecific cues.

<table>
<thead>
<tr>
<th>Lecture.</th>
<th>10</th>
<th>Salmons</th>
<th>Cultural</th>
<th>Keystone</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Shiaki Kondo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

He talked about two themes, “what indigenous study is” and “the biological and cultural importance of salmons.”

Interdisciplinary thinking and discussion enriches the studies in every fields. On this assumption, we also shouldn’t go thorough how to think in indigenous perspective. Therefore, the culture of indigenous peoples around the world has to sustain.

Salmons are at the top level of food chain, so ones are strongly involved in the environment biologically. In addition, in indigenous communities, particularly North Pacific Rim, salmons are not only food but also cultural keystone species.

[Day7]

<table>
<thead>
<tr>
<th>Lecture.</th>
<th>11</th>
<th>Marine biodiversity in a warming ocean</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Matt Whalen</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Diversity is connected to stability. It is possible to make less the risk of extinction all together because the characteristics every species have are all different. The trouble like terrible disasters might make s kind of species extinct, but it is possible that others could be alive in such a trouble.

Then, how can we measure biodiversity and effects? It is guess from the past, comparing with present creatures. But there are some problems to do it. I will introduce the representative two obstacles. The first is “Invasion.” This word means that the creatures (or bacteria) not living in one place naturally come to the other place and invade the environment. In worst case, it is possible that invaders make the protoctist extinct. As you can understand from recent, most of invasion are caused by human. For example, shipping and trade of agricultural products. We have to keep these in mind when we think about the transition of biodiversity. The second is “Global climate change.” We should remember that global climate change is not only global warming but also el nino and la nina and so on.
Lecture. 12 Introduction of tidal ecosystem

By Matt Whalen

We took an introduction as the preparation of Lecture. 13 Field Work along Tower Beach. There is “Zonation” in the coast subject to tidal action. Briefly stated, this word means that sea creatures choose the living height near water surfaces to adapt them to tidal action. The factors are Temperature-Dry, Competition and Predation, that is, every sea creature near water surfaces lives not to be eaten by its predator, competing with others.

Lecture. 13 Field work @ Tower Beach

By Coreen

After having lunch, Coreen and Andy gave a brief lecture about the system of tide and the zonation in North West Coast. To explain them, Andy wore a blue T-shirt and played a “tide.” Furthermore, he brought a big starfish in the classroom and talked about its organ, pointing each part of it.

And then we left Liu Institute to the coast. We had to go down a very steep slope, so we were tired when we got to the coast.

They told us to pick up living things on the shore and check its name from the picture book. I found two kinds of barnacle and a kind of algae. I was so interested in this seaweed. I didn’t know this name, but in Japan I have seen a seaweed which resembles this one. The name of the seaweed was “Ana Ao Sa (Hole Blue Seaweed)”. These seaweeds have holes on their bodies similarly, but the holes of Japanese seaweed (Ana Ao Sa) is made innately and the holes of Canadian seaweed is made by being eaten by other creatures. This is biodiversity!!
Lecture. 14 Education for Sustainable Development
By Xiao Lan

She talked about the importance of education for sustainability, quoting Quality Education (one of SDGs). What she stressed was ESD (Education for Sustainable Development). She meant that everyone has an opportunity to benefit from quality education and encouraged discussion. There were 6 students as I said before, so the half of three are for this idea and the others are against. I was one of against members. Because not only there was not enough time to discuss but also English discussion itself was very difficult, we couldn’t exchange opinions each other enough. At the same time, I felt I should practice English discussion.

Lecture. 15 Discuss with researcher of Hakai Institute
By Margot Hessing-Lewis
Brian Hunt
Wade Smith

On this day, the lecture style was different from usual one. The lecturers were three, Margot and Brian and Wade. We asked them some questions prepared on the previous day, they answer the questions. My question was “how metals play roles in B.C.” Brian answered this question. He said that metals have two influences. The first is the role of nutrition. The specific metals in the ionic form are the essential nutrition for living things. For example, potassium and sodium, magnesium and calcium. These ionic metals bond with other chemical substances and then work as nutrition in every organ. The second is “Biological Accumulation.” Metals can be nutrition for living things, but at the same time, those can be toxicant. One of the most painful pollution, Minamata Disease was caused of Mercury, 80 heavy metal. These harmful metals gradually accumulate in the bodies of the predators on the top of food chain. Then, when we eat the fish polluted by harmful metal, it was terribly toxic. If we had them, the possibility to be dead would be much high. Because of it, we, particularly people from the department of engineer, have to be aware of pollutions. It seems that there are some pollution problems along Fraser River, a main river in B.C. So, we should
solve the problems to improve the recent state of the environment positively. What I wanted to ask them was the material aspects of metals, but fortunately I could know I lost sight of the aspects of metals as above. For the other 5 questions, three lecturers politely and clearly answered and explained the additional information to us.

**Lecture. 16 Visit to the Beaty Biodiversity Museum**

Before we enter this glazed building, we cannot help seeing the skeletons of Blue Whale when we go through nearby. There were many exhibitions of various animals on land and in marine, or in ancient times. It might take hours to look around all the exhibitions. Furthermore, we could learn the creature more from Picture 6. Blue igns.

**Lecture. 17 Visit to First Nation community**

When we arrived at the Band Office Lower Boardroom, First Nation community, people in the house got outside and welcomed to us. Furthermore, they served meals for us. I surely appreciated their kindness. Many people including us attended this event, Musqueam 101. The speakers were two indigenous women. They told about indigenous blankets. Long years ago, some of the Canadian indigenous people, First Nations, gave the handmade blankets to the travelers. Because of this, the blankets of them are scattered around the world. But the movement to return blankets is held for the sustainability of indigenous people. At the age of the world war, the indigenous people were banned making blankets because of segregation, so the next generations couldn’t succeed how to make their kinds of blankets. And then, the know-how to weave their traditional blankets was lost through a long time. To break through this situation, following the way to weave old blankets, the Musqueam People have
been trying to remake tradition blankets in the way unchanged since olden times. They said it was very difficult to weave the blankets with complex designs for the persons who didn’t know the way completely. But the people will manage to do it, cooperating with their companies.

[Day9]
We assembled at Liu Institute in the morning, and met the man who would have a navigation and drive the Benz wagon while our staying in Victoria. He was Wam. He was so kind and talked about various topics while driving. We got the waterfront and left Vancouver to Victoria by ferry. The scenery from the ferry heading to Victoria was breathtakingly beautiful for sure. Wam said we could see some seals from ferry in 100%, but we couldn’t see ones when we came back to Vancouver. That is very regretful for me. In two days of Victoria, we visited University of Victoria and Royal BC Museum.

Visit to University of Victoria
Firstly, we went to University of Victoria and met the woman studying there. Her majored in archaeology. She showed her laboratory and the storeroom of various animals’ bones. There are hundreds of bones unknown for us in the room. When we asked her about bones, she politely answered us. After that, we visit the buildings where indigenous people study. There were some unique paintings and totem poles. In the center of the wooden house that indigenous people dance in, the imitation of fire made of glass, so we can imagine the situation of ceremony easily.

[Day10]
Visit to Royal BC Museum
In the second day in Victoria, we visited Royal BC Museum. The exhibitions in the museum was exiting and easy to understand for everyone. For example, voice announce or video, the way to display them and something copying from originals. There were various exhibits about indigenous culture, history and nature in B.C. and so on. Particularly, I focused on the indigenous culture in B.C. It was little dark
and dry in the exhibition room because we should maintain the good situation for preserving these exhibits.

【Day13】

Lecture. 18 Visit to Museum of Anthropology
We visited Museum of Anthropology (MOA) in the morning. Like Royal BC Museum, there a lot of exhibits in MOA. But as you can know from the name, the exhibits displaying there were historical things of human, not nature. For example, totem poles and monuments made by indigenous people, the apparatus used by indigenous people in the past. Moreover, there was modern art corner in the back of the museum.

What I most impressed with was the way to display totem poles. Usually, as we can know, the things easy to deteriorate, like a wooden one, should be preserved in the best condition. It is said as common knowledge. But the wooden totem poles in MOA were exposed to sunlight. Therefore, in the perspective of preservation, it is bad condition. The reason why they displayed in this way is “Sustainability” of Anthropology. When these totem poles are deteriorated by external stimulus, the indigenous people can mend or rebuild them as long as the way repair or rebuild is succeeded to next generations from previous predecessors. Furthermore, the situation that the totem poles are exposed to sunlight is natural for indigenous people, so they should be the places where they should be. For two reasons, how to display totem poles in MOA is different from Victoria.
Lecture. 19 Co-production of Plant Knowledge in South Africa

By Janette Bulkan

In the Forestry Centre of UBC, we took the last lecture from Janette Bulkan. She talked about Cassava in Guyana. Cassava is a kind of plant in Africa and an essential protein source for people living there. Cassava has some unique characteristics. One of the good aspects is easiness to grown up. Cassava can be brought up in infertile and thin soil without maintaining the condition. The soil in Africa is so thin and infertile, so these aspects are matched to the districts. Also, People in Africa bring up Cassava in the way of rotational agriculture. This method is changing the field where the crops raised every few years. In contrast, one of the bad aspects is toxicity. The toxin of Cassava has so bad influence on our human body that Non-indigenous people died because of the toxin of Cassava. But indigenous people know how to remove poison from Cassava because the predecessors hand over the knowledge to their descendants. I thought it is sustainability too.

Presentation

In the end of this program, we were supposed to present what we learned while 2 weeks. To take our presentation, Mr.Rashid and some graduates came to Liu Institute. I didn’t hear the graduates come, so we became being nervous. But they were so kind. They listened to our little poor English seriously and asked some questions to us.

I chose “the Metals in B.C.” as my theme because I major in material engineering. In my presentation, I talked about the coppers playing a sacred role for one of First Nations and what we can learn from this.

I have started preparing the presentation since Day11, but we had not enough time to prepare, so my presentation was not completed. If we could conduct the presentation by Japanese, we could have managed to say what we would like to say. However, we had to conduct our presentation by English, so I couldn’t tell the main point and answer questions. I’m so sorry that and I determined practicing and improving my English.

Farewell Ceremony
After our presentation, farewell party was held in the restaurant near UBC. Many people being engaged in this program came and talked to us.

[Day15]
Finally, it was the last day of this program. I have been shy while staying there, so I couldn’t have enough communication with host family and housemates. I should get communication skills and practice English. I said such a thing to host mother and father when I left the house, they said to me “You can do it!” I swore not to waste the time I stayed in Vancouver and to challenge studying abroad.

[What I felt through this program]
Through this Short-term study abroad program, I could get not only the various knowledge from the lectures but also the atmosphere in a foreign country. To see the culture of Vancouver, I can look at my country, Japan, objectively. Then, I can be conscious to the points that Japan should emulate and the good aspects that other countries should know. Anyway, I would like to know the various culture in the world and study abroad.

[References]
“Sustainable Development Goals logo”
· “MSY wikipedia” https://en.wikipedia.org/wiki/Maximum_sustainable_yield
· the slides of the lecturers