
WORKSHOP PROGRAM

ADVANCING CITIZEN SCIENCE IN ALBERTA: CHANGING PERSPECTIVES, BREAKING BARRIERS

EDMONTON, ALBERTA

September 26 & 27, 2018

MacEwan University

TABLE OF CONTENTS

3	WORKSHOP ORGANIZERS
4	WORKSHOP OVERVIEW
5-6	AGENDA
7-10	PROGRAM
7-8	Wednesday September 26
9-10	Thursday September 27
11-49	SPEAKER PROFILES & PRESENTATION ABSTRACTS
11-12	Opening Remarks
12	Keynote
12-15	Panel 1
15-17	Panel 2
17-21	Panel 3
21-24	Panel 4
24-33	Lightning Talks
33-49	Posters

Share your experience on social media! #ABCitSci

Alberta Environment and Parks, Environmental Monitoring and Science Division (EMSD)

EMSD is responsible for monitoring, evaluating and reporting on key air, water, land and biodiversity indicators. The division's mandate is to provide open and transparent access to scientific data and information on the condition of Alberta's environment, including specific indicators as well as cumulative effects, both provincially and in specific locations.

EMSD provides provincial environmental monitoring, evaluation and reporting:

- based on sound science and evidence;
- presented in a timely, open and transparent manner; and,
- respects and incorporates community and Traditional Ecological Knowledge from First Nations and Métis people.

This includes providing the information necessary to understand cumulative effects, and to inform the public, policy makers, regulators, planners, researchers, communities, and industry.



The Miistakis Institute

Miistakis has been designing and implementing citizen science projects for over twenty years, and in Alberta for the past decade, to generate data to inform conservation challenges, and create a knowledgeable and engaged citizenry. Miistakis has developed tools and frameworks that contribute to successful programming. Their programs address complex environmental challenges including wildlife mortality on highways, wildlife movement areas and highway mitigation, grizzly bear monitoring, urban amphibian monitoring, and pronghorn movement.

This body of work has positioned Miistakis as a leader in the field of citizen science and they have developed extensive expertise related to program design, user needs, evaluation, tool development, dissemination, volunteer engagement and retention. This practical experience has enabled Miistakis to play an important role in advancing the field of citizen science in Alberta.



**Miistakis
Institute**

WORKSHOP ORGANIZERS

Advancing Citizen Science in Alberta: Changing Perspectives, Breaking Barriers

This two-day workshop will be a gathering place to learn about best practices in the field of citizen science as well as identify priority actions to advance the practice in Alberta.

The workshop objectives are to:

- Provide an opportunity for knowledge exchange and co-learning between practitioners, experts and resource managers on the value and benefits of place-based citizen science in understanding environmental change.
- Highlight best practices in collection of credible, relevant environmental data and information produced through citizen science.
- Assess needs for tools and methods to support collection of credible, relevant environmental data and information.

Workshop participants:

The workshop is for those wanting to further their knowledge of what citizen science is; how to develop, implement and evaluate citizen science initiatives; and how to enhance linkages between citizen collected data and decision making.

Share your experience on social media! [#ABCitSci](#)

WORKSHOP OVERVIEW

AGENDA DAY 1

Wednesday September 26, 2018

7:30 am - 8:30 am	Registration and Breakfast
8:30 am - 9:00 am	Welcome, Introductions and Workshop Overview SPEAKERS: Krista Tremblett, <i>Alberta Environment and Parks</i> - Danah Duke, <i>Miistakis Institute</i> - Dr. Fred Wrona, <i>Chief Scientist, Alberta Environment and Parks</i> - Dr. Michael Quinn, <i>Associate VP Research, Mount Royal University</i>
9:00 am - 10:45 am	PANEL 1. The Field of Citizen Science: Origins, Evolution and Where We Are Today SPEAKERS: Jade Cawthray-Syms, <i>University of Dundee</i> - Lea Shanley, <i>US South Big Data Innovation Hub</i> - Dr. Jennifer Shirk, <i>Citizen Science Association</i>
10:45 am - 11:00 am	Break
11:00 am - 12:15 pm	PANEL 2. Designing, Managing and Assessing Credibility and Relevance of Data in Citizen Science SPEAKERS: - Kat Hartwig, <i>Living Lakes Canada</i> - Gary Redmond, <i>Alberta Capital Airshed</i> - Julie Vastine, <i>Alliance for Aquatic Resources Monitoring</i>
12:15 pm - 1:15 pm	Lunch
1:15 pm - 3:00 pm	PANEL 3. Place-Based Citizen Science in Alberta SPEAKERS: Bill Abercrombie, <i>Alberta Trappers' Association</i> - Robert Anderson, <i>Alberta Conservation Association</i> - Danah Duke, <i>Miistakis Institute</i> - Elliot Fox, <i>Kainai Ecosystem Protection Association</i> - John Paczkowski, <i>Alberta Environment and Parks</i> - Bradley Peter, <i>Alberta Lake Management Society</i>
3:00 pm - 3:15 pm	Break
3:15 pm - 4:30 pm	LIGHTNING TALKS
4:30 pm - 7:00 pm	Networking and Poster Session

AGENDA DAY 2

Thursday September 27, 2018	
7:30 am - 8:30 am	Registration and Breakfast
8:30 am - 8:45 am	Day 1 Summary, Overview of Day 2
8:45 am - 10:15 am	PANEL 4. Connecting Citizen Science and Environmental Decision Making
	SPEAKERS: Elizabeth Hendriks, <i>WWF Canada</i> - Tracy Lee, <i>Miistakis Institute</i> - Tanya Rushcall, <i>Alberta Environment and Parks</i> - KayeDon Wilcox, <i>Alberta Environment and Parks</i>
10:15 am - 10:30 am	Break
10:30 am - 11:45 am	PLENARY WORKING SESSION. Memorandum on Citizen Science: Draft Guiding Principles and Implementation Strategies for Advancing Citizen Science in Alberta
11:45 am - 12:45 pm	Lunch
12:45 pm - 2:00 pm	PLENARY WORKING SESSION. Strategies for Enhancing Data Credibility - What is needed for Alberta?
2:00 pm - 3:15 pm	CONCURRENT BREAKOUT SESSIONS: Air, Water & Biodiversity
3:15 pm - 3:30 pm	Break
3:30 pm - 4:15 pm	CLOSING KEYNOTE
	Dr. Gwendolyn Blue, <i>University of Calgary</i>
4:15 pm - 4:30 pm	Closing Remarks

Share your experience on social media! #ABCitSci

WEDNESDAY PROGRAM

Wednesday September 26, 2018

7:30 – 8:30 AM **Registration and Breakfast**

8:30 – 9:00 AM **Welcome, Introductions and Workshop Overview**

Krista Tremblett, Alberta Environment and Parks (AEP)

Danah Duke, Miistakis Institute

Dr. Fred Wrona, Chief Scientist, AEP

Dr. Michael Quinn, Associate VP Research, Scholarship and
Community Engagement, Mount Royal University

9:00 – 10:45 AM **PANEL 1. The Field of Citizen Science: Origins, Evolution
and Where We Are Today**

In Alberta, there are varying perceptions of what citizen science is – from an engagement tool to a tool to collect rigorous scientific data. The aim of this panel is to put everyone in the room on the same page by building awareness on how the field of citizen science has evolved, common challenges across the field, public involvement in citizen science programs, and opportunities for growth in the field.

Dr. Lea Shanley *Embrace the Bureaucracy: navigating institutional barriers to
citizen science*

Dr. Jennifer Shirk *Deep Roots, Broad Branches - growing a multidisciplinary field*

Jade Cawthray-Syms *How Participatory is our Citizen Science?*

10:45 – 11:00 AM **Break**

11:00 AM – 12:15 PM **PANEL 2: Designing, Managing and Assessing Credibility
and Relevance of Data in Citizen Science**

There are few clear and standardized processes, protocols, and support tools to guide the development, implementation, and evaluation of Alberta-based citizen science projects. This undermines the utility and limits the applicability of data and information generated through citizen science. Through a series of case studies, the Panel aims to highlight methods, guidelines and tools used in citizen science programs to enhance credibility and relevance.

Julie Vastine *Creating Credible Community-Based Stream Monitoring Programs*

Kat Hartwig	<i>Groundwater, CABIN and SHIM Applied Data</i>
Gary Redmond	<i>Air Quality and Citizen Science</i>
12:15 – 1:15 PM	Lunch
1:15 – 3:00 PM	PANEL 3: Place-Based Citizen Science in Alberta
There are a variety of citizen science projects in Alberta ranging along the spectrum of participation (from contributory to co-created), purpose and objectives, and geographic scale (from local to international). This Panel will focus on place-based projects in Alberta with the aim to highlight and learn from local initiatives.	
Robert Anderson	<i>Lessons Learned from Working with Trappers to Conserve Wolverines</i>
Bill Abercrombie	<i>Alberta Wolverine Project</i>
Elliot Fox	<i>Indigenous Citizen Science in Traditional Blackfoot Territory & the Crown of the Continent Ecosystem: Blackfoot Science, Bison Repatriation & the Earthwatch-Kainai Community Fellows</i>
Danah Duke	<i>Exploring the Potential for Place-based Citizen Science to Advance Conservation: lessons learned from Alberta case studies</i>
Bradley Peter	<i>Community Based Monitoring of Alberta's Lake Ecosystems</i>
John Paczkowski	<i>Volunteers Conducting Ecological Research in Alberta Parks – The Kananaskis Region Example</i>
3:00 – 3:15 PM	Break
3:15 – 4:30 PM	Lightning Talks
Jordan Bell	<i>Creating a Biodiversity Network: using a citizen science app to monitor biodiversity in Alberta</i>
Tyler Carlson	<i>Linking Community-Based Monitoring to Water Governance: perceptions of citizen scientists</i>
Tracy Howlett	<i>An Inventory of the Who's and What's of Citizen Science in Alberta</i>
Megan Jensen	<i>Pronghorn Xing: citizen scientists help conserve fastest animal in Canada</i>
Kris Kendell	<i>Alberta Volunteer Amphibian Monitoring Program and Alberta Snake Hibernaculum Inventory</i>
Samantha Managh	<i>Where the Wild Things Are: harnessing the power of citizen scientists</i>
Cory Olson	<i>Going to Bat for Bats: bat roost monitoring using citizen science</i>
Rob Schaufele	<i>Collision Count</i>
Luke Wonneck	<i>Building Wild Bee Monitoring in Alberta</i>
4:30 – 7:00 PM	Networking and Poster Session

THURSDAY PROGRAM

Thursday September 27, 2018

7:30 – 8:30 AM **Registration and Breakfast**

8:30 – 8:45 AM **Day 1 Summary, Day 2 Overview**

Krista Tremblett, Alberta Environment and Parks (AEP)

Danah Duke, Miistakis Institute

9:00 – 10:45 AM **PANEL 4. Connecting Citizen Science and Environmental Decision Making**

Engaging citizens in the scientific process can lead to a deeper understanding of critical environmental issues. There is a strong trend among government agencies and other organizations to incorporate citizen science as a tool to realize science, monitoring, and citizen engagement objectives. However, there is a lack of understanding around how to do so. This panel will highlight strategies and actions to enhance linkages between citizen science data and decision-making.

Elizabeth Hendriks *Assessing Freshwater Health*

Tracy Lee *How do Wildlife Cross the Road? Ask the people who live there!*

Tanya Rushcall *EDDMapS Alberta and Aquatic Invasive Species*

KayeDon Wilcox *GrizzTracker: informing grizzly bear management*

10:15 – 10:30 AM **Break**

10:30 – 11:45 AM **PLENARY WORKING SESSION. Memorandum on Citizen Science: Draft Guiding Principles and Implementation Strategies for Advancing Citizen Science**

Alberta Environment and Parks' chief scientist will be releasing a Citizen Science Memorandum to provide clarity to AEP EMSD staff and partnering organizations regarding the role and appropriate application of citizen science activities in the provincial ambient environmental monitoring and science program. The memorandum is supported by an advisory committee and provides guidance on:

- guiding principles to ensure citizen science projects and activities generate credible and relevant data;
- actions to advance appropriate application of citizen science including methodologies, protocols, capacity building, and tools; and
- case studies that highlight best practices of citizen science programming.

In this session we will introduce draft sections of the memorandum and garner feedback workshop participants on the draft citizen science principles, and strategies and actions for advancing citizen science in Alberta.

Objective: generate feedback and comment on draft principles and strategies and actions for Citizen Science MOU from citizen science practitioners.

11:45 AM – 12:45 PM Lunch

12:45 – 2:00 PM **PLENARY WORKING SESSIONS. Strategies for Enhancing Data Credibility: What is needed for Alberta?**

Data quality is an important consideration in citizen science (CS) projects. The involvement of volunteers adds a component to the study design that needs careful consideration. While all science needs to demonstrate its credibility, the specific context of citizen science and external assumptions lead to specific challenges and opportunities. Strategies are needed to enhance the usefulness of data of CS projects in the research design and data quality assurance.

Objective: generate priority outcomes to address the key challenges related to data credibility.

2:00 – 3:15 PM **CONCURRENT WORKING SESSIONS**

These sessions will provide space for attendees to explore the unique opportunities and challenges to advance citizen science in Alberta in water, air and biodiversity.

- *Biodiversity: better understand recreational use of linear disturbances and ecological responses in Alberta's Eastern Slopes.*
- *Air and Water: Alberta's role in supporting communities of practice, and developing tools and platforms needed to grow the field of citizen science in Alberta.*

3:15 – 3:30 PM **Break**

3:30 – 4:15 PM **Closing Keynote**

Dr. Gwendolyn Blue *Citizen Science as Civic Science: new spaces for reflexive practice?*

4:15 – 4:30 PM **Closing Remarks**

SPEAKER PROFILES & PRESENTATION ABSTRACTS

Opening Remarks

Dr. Fred Wrona

Organization: Alberta Environment and Parks

Speaker Bio: Dr. Fred Wrona is the Chief Scientist for the Government of Alberta, Department of Environment and Parks and the Assistant Deputy Minister for the Environmental Monitoring and Sciences Division. He also continues to have active research programs through his various faculty/research positions in Universities both in Canada and Europe.

He has more than 30 years of experience leading or contributing to numerous environmental programs addressing regional, national and international environmental issues related to ecotoxicology, cold regions hydro-ecology, climate impacts on freshwater ecosystems, integrated and adaptive environmental monitoring program design, and cumulative effects assessments. Dr. Wrona served as the Scientific Director of the Northern River Basins Study (1992-96) and continues to be the scientific program co-lead of the Oil Sands Monitoring Program with Environment Canada. Dr. Wrona has served on numerous national and international scientific advisory and review panels; key examples include: Senior Science Strategist and Advisor with Environment Canada leading the scientific design and implementation of the Joint Oil Sands Monitoring Program in Alberta; Canada's Head Delegate to the Arctic Council's, Arctic Monitoring and Assessment Program; and, Canada's Head Delegate for the UNESCO-International Hydrology Program.

Dr. Michael Quinn

Organization: Mount Royal University

Speaker Bio: Michael Quinn is the AVP - Research, Scholarship & Community Engagement at Mount Royal University. His academic career has spanned a wide range of interdisciplinary environmental and sustainability topics and projects. His love for ecology and natural history found a home in citizen science when he was a teen. In 1987 he coordinated the largest

number of participants ever recorded in a Christmas Bird Count - 1288 right here in Edmonton.

Keynote Presentation

Dr. Gwendolyn Blue

Organization: University of Calgary

Presentation Title: Citizen Science as Civic Science: new spaces for reflexive practice?

Presentation Abstract: Citizen science and participatory monitoring are situated in in a broader social context of civic science in which public participation in scientific research takes different forms. Drawing on the collective discussions from the workshop, this presentation will discuss the advantages and challenges associated with implementing different models of civic science. Central to this presentation is the importance of reflexivity – the examination of existing values, assumptions and power relations– as an important but often neglected component of civic science. This means taking time to surface and examine existing assumptions about science and the publics we imagine ourselves engaging with.

Speaker Bio: Gwendolyn Blue is an Associate Professor in Geography at the University of Calgary. Formally trained in Cultural Studies, her research examines public controversies involving science and technology; public engagement with science and technology; and political, cultural and ethical dimensions of scientific and technological innovations.

PANEL 1. The Field of Citizen Science: Origins, Evolution, and Where We are Today

Dr. Lea Shanley

Organization: US South Big Data Innovation Hub

Presentation Title: Embrace the Bureaucracy: navigating institutional barriers to citizen science

Presentation Abstract: This presentation explores the challenges and opportunities with implementing citizen science across U.S. federal agencies as well as the bureaucracies and operating cultures they contain. Specifically, the origins and progress of the US Federal Community of Practice for Crowdsourcing and Citizen Science (CCS) will be discussed. The

CCS identified several key social, institutional, and legal barriers to government adoption of citizen science. Some of these hurdles are unique to the federal government, but others can be generalized across organizations, such as trust, organizational culture, data quality, and privacy. The CCS then developed and systematically implemented a set of strategies to overcome these hurdles, including collaborating with the White House to build a toolkit and catalog that were incorporated into Citizenscience.gov, and helping to shape a White House policy memo and legislation.

Speaker Bio: Dr. Lea Shanley co-leads the South Big Data Innovation Hub, one of a network of four Hubs launched by the NSF. We serve as a bridge organization, connecting researchers, businesses, and government to apply data science to scientific and societal challenges. Before joining the Hub, she completed a tour of duty as a Presidential Innovation Fellow (PIF) under an Obama White House program, working at NASA to design and guide open science and innovation strategies for Earth and planetary science – including the Asteroid Grand Challenge! She also co-founded the US Federal Citizen Science Community of Practice, helping to shape the Citizen Science White House Memorandum and legislation, and engaging 125 federal staff to build and launch CitizenScience.gov. Previously, she collaborated with digital volunteer communities to develop social media tools for disaster response and humanitarian relief, and built GIS-based decision support systems to empower public participation in local decision-making.

Jennifer Shirk

Organization: Citizen Science Association and Cornell Lab of Ornithology

Presentation Title: Deep Roots, Broad Branches - growing a multidisciplinary field

Presentation Abstract: While the history of citizen science often focuses on environmental sciences, there is a rich tradition of similar research approaches can be found in disciplines as varied as astronomy, meteorology, and public health. Citizen science is also rapidly expanding across research domains both within and beyond the sciences. This growth reflects the ability of citizen science to make distinct, novel, and innovative contributions to scientific understandings, and its success at opening both new opportunities and new appreciations for the ways that science can engage public insight.

As the field of citizen science grows, its use continues to advance discovery, foster innovation, and expand the boundaries of knowledge, revealing new ways to connect

research and public engagement for policy relevance. An inclusive community of practice, one that spans diverse disciplines and definitions, can facilitate more rapid transfer, use, and adaptation of relevant technologies and research approaches to new purposes. Cross-disciplinary networking can help advance practice around concerns shared across all disciplines, such as issues of ethics, democratization, participation, and policy. And a united field can advance the practice in general by demonstrating the broad *social* and *scientific* significance and relevance of exemplary public engagement in research.

For these reasons, organizations like the Citizen Science Association are striving to engage a multidisciplinary conversation. To the theme of this conference, this can require both changing perspectives and breaking barriers – preferably also extending bridges. I will invite conversation about the similarities and meaningful differences across different practices, and strategies for building a multidisciplinary field.

Speaker Bio: Jennifer Shirk works to support citizen science as a field of practice, advancing promising strategies that support integrity in both research and public engagement. As Interim Executive Director of the Citizen Science Association, Jennifer builds collaborations to share transferrable knowledge of practice from across different citizen science communities and contexts. At Cornell, she investigates the social and relational dynamics that play out when scientists, managers, and diverse stakeholders engage in the production of new, collaborative knowledge for resource management. Jennifer has a B.A. in Conservation Biology from Bard College, and an M.S. and Ph.D. in Natural Resources from Cornell University.

Jade Lauren Cawthray-Syms

Organization: University of Dundee

Presentation Title: How Participatory is our Citizen Science?

Presentation Abstract: As the practice of citizen science has burgeoned a number of different approaches have been identified, namely Contributory, Collaborative and Co-created citizen science. And whilst there are a wide variety of ways in which the public can be involved in scientific research, the Contributory approach, where the public are purely involved in data collection or data processing, is the most dominant method used. This approach has led to huge advancements in science, enabling the collection of significantly larger datasets, covering much larger geographic scales and time spans. But whilst

Contributory projects are celebrating huge successes, the more participatory approaches, such as Co-created citizen science, have had little attention. And where the public are more fully involved in the research process a different suite of opportunities exist. Where Contributory projects tend to be driven by the needs and objectives of scientific institutions, Co-created projects offer an opportunity to address questions and concerns identified by communities. Where Contributory projects can collect large scale datasets, Co-created projects offer an opportunity for a more intensive investigation of place-based issues. And where Contributory projects can increase scientific literacy and environmental understanding, Co-created projects offer an opportunity to further build this into agency and empowerment within communities.

This presentation will suggest how far away we are from regularly embracing more participatory forms of scientific research by reflecting on current trends in practice, discussing our existing capacity to successfully deliver such approaches, and highlighting the challenges and considerations that need to be addressed when doing so.

Speaker Bio: Jade is a PhD student at the University of Dundee, Scotland, UK. With a Bachelors degree in Ecology and Conservation from Anglia Ruskin University, Cambridge, and a Masters in Science Communication from Imperial College London, Jade has spent the last 10 years working across the public and voluntary sector around public engagement with science and the environment. Before starting her PhD research Jade spent two years delivering national citizen science projects at the Natural History Museum, London. Her PhD research explores how co-created approaches to scientific research can support communities in taking action on the issues that matter to them.

PANEL 2. Designing, Managing and Assessing Credibility and Relevance of Data in Citizen Science

Julie Vastine

Organization: Alliance for Aquatic Resource Monitoring (ALLARM) - Dickinson College

Presentation Title: Creating Credible Community-based Stream Monitoring Programs

Presentation Abstract: How can we maximize limited budget dollars at the local, state, regional, and national levels so that the necessary measures are being taken today that do not compromise the integrity of our natural resources in the future? In the United States, with budget restraints it has become increasingly difficult at the state level to monitor and

assess state waterways, as a result, more attention has been focused on community-based data collection opportunities.

The goal of most volunteer stream monitoring programs is to ensure that well-trained volunteers collect data of known quality. Despite decades of demonstrating that volunteers can and do collect representative data, government agencies, scientists and often the general public are sometimes reluctant to use data not collected by “experts”. Therefore, volunteer water quality monitoring programs must build and maintain credibility. There are a number of tools that facilitate building data credibility in the United States. This presentation will highlight a regional monitoring initiative and the tools used to verify that volunteers are collecting data of known quality.

Speaker Bio: Julie Vastine is the director of the Alliance for Aquatic Resource Monitoring (ALLARM) at Dickinson College in Carlisle, Pennsylvania. She is responsible for leadership of the ALLARM program and providing technical assistance to communities interested in using science as a tool for change in Pennsylvania and New York. Julie has worked in the volunteer monitoring/citizen science field for fifteen years. In 2014, she was appointed to the National Water Quality Monitoring Council as the co-volunteer monitoring chair. In 2018, she was elected to the Citizen Science Association. In addition to working with communities, Julie enjoys hiking, biking, cooking, and yoga.

Kat Hartwig

Organization: Living Lakes Canada

Presentation Title: Generating Credible Community-Based Data: Examples from British Columbia

Presentation Abstract: This presentation provides examples of the Community Based Water Monitoring done or coordinated by Living Lakes Canada.

Examples of the monitoring includes; CABIN Canadian Aquatic Bio monitoring Network) and trainings for Indigenous and non Indigenous water monitoring groups; Ground water monitoring in the Columbia Basin; Sensitive Habitat Inventory Monitoring (SHIM) and examples of data and outcomes applied in decision making.

Speaker Bio: Kat grew up in southeastern BC and has been involved in international, national and regional environmental advocacy relating to sustainable tourism, endangered species, corporate social responsibility and water-based ecosystem health since 1983. As co-founder

and executive director of Living Lakes Canada Kat continues to advocate for land and water policy and protection mechanisms necessary to support biodiversity, source water protection and climate resilient communities. She participates as an advisor and on the board for multiple water groups and continues to facilitate water stewardship with all levels of government and First Nations through cross-sector corporate, academic and NGO partnerships and collaborations.

Gary Redmond

Organization: Alberta Capital Airshed

Presentation Title: Air Quality and Citizen Science

Presentation Abstract: This presentation will provide a brief overview of the local airshed, what air quality monitoring is present today, how and why citizen science is being encouraged, and what some of the challenges are to incorporating citizen science data into decision making.

Speaker Bio: Gary Redmond has been the Executive Director of the Alberta Capital Airshed since 2011. Gary has an extensive background in not-for-profit management, multi-stakeholder facilitation and emergency management. Gary has worked within Government, Industry and ENGO sectors including as the National Coordinator of Disaster Services for the Red Cross and a delegate with the International Red Cross. Gary has also served on advisory committees for the National Energy Board, the Canadian Association of Petroleum Producers and the Alberta Energy Regulator.

PANEL 3. Place-based Citizen Science in Alberta

Bill Abercrombie

Organization: Alberta Trappers' Association

Robert Anderson

Organization: Alberta Conservation Association

Presentation Title: Alberta Wolverine Project - lessons learned from working with trappers to conserve wolverines

Presentation Abstract: Biologists and resource users sometimes address conservation

questions from a different background and point of view. But when members of Alberta Trappers' Association approached Alberta Conservation Association with a proposal to partner on a wolverine research project, it provided a unique opportunity to combine strengths and work together towards common objectives. Through the course of a five-year initiative that involved more than 150 trappers, far more was achieved than could have been by either organization working alone. Trappers provided not only a valuable asset in terms of data collection in remote, backcountry areas, but also input into how the study should be designed and implemented. Biologists contributed by helping to design methods, ensure consistency, and analyze and report on data. We discuss the partnership approach that we took to design a study that could tackle shared objectives, and provide recommendations for others from the lessons we learned along the way.

Speaker Bio (B. Abercrombie): Currently President of Alberta Trappers Association. President and senior consultant for Bushman Inc a wildlife management and consulting company. Life long trapper and conservationist my goal is to facilitate collaborative research between the trapping community and the scientific/academic community to further sustainable wildlife management and conservation in Alberta.

Speaker Bio (R. Anderson): Robert's introduction to multi-stakeholder research came when he began studying Alberta's woodland caribou as part of his graduate thesis in the late 1990s. Over the past 20 years, he's worked on a wide range of conservation topics and has come to see that far more can be achieved by engaging user groups and landowners in addressing environmental issues than could ever be accomplished by scientists working alone. He and his family currently make their home in Crowsnest Pass, Alberta, where they enjoy a variety of outdoor pursuits in the mountains.

John Paczkowski

Organization: Alberta Environment and Parks, Parks Division

Presentation Title: Volunteers Conducting Ecological Research in Alberta Parks—the Kananaskis Region Example

Presentation Abstract: In this presentation we will explore how a well-organized group of volunteers are integral to ecological research in Kananaskis Country. Volunteers contribute to various projects including the collection and analysis of wildlife and human use monitoring using remote cameras and trail counters. We will discuss volunteer organizational structure,

safety, motivation, logistics and management. This inspirational volunteer group, not only contributes to provincially and regionally important data sets, but also have evolved into a highly empowered stewardship group for Alberta Parks.

Speaker Bio: John is a biologist who has concentrated his career on wildlife research and conservation, mainly with large carnivores. John uses wildlife research as a lens to focus decisions on the protection and management of Alberta Parks and adjacent lands. John is fortunate to work with a dedicated team of ecology volunteers in the Kananaskis Region. He welcomes collaboration with other scientists, students and the public. John lives and works in Canmore.

Bradley Peter

Organization: The Alberta Lake Management Society

Presentation Title: Community-based Monitoring of Alberta's Lake Ecosystems

Presentation Abstract: The Alberta Lake Management Society (ALMS) is a non-profit, charitable organization which was founded in 1991. One of ALMS' main programs, the LakeWatch program, is a volunteer-based lake water quality monitoring program which has monitored over 100 unique lakes throughout Alberta. Rather than train citizen scientists to complete the monitoring independently, nearly all LakeWatch data is collected by trained staff working alongside citizen scientists. While this model allows for the collection of highly technical data, it can also act as a limitation in terms of capacity (number of lakes) and reach (geographical range of lakes). To improve on this model, ALMS introduced a new LakeKeepers program which equips citizen scientists to generate data independently of ALMS staff. ALMS programs have benefited from partnerships with the Provincial government and have empowered stewards to use environmental data for lake management. The successes and limitations of ALMS' monitoring programs will be explored in this presentation.

Speaker Bio: Bradley Peter is the Executive Director of the Alberta Lake Management Society. Bradley has spent 8 years working on community based monitoring projects including projects monitoring for water chemistry, aquatic invasive species, and aquatic plants.

Danah Duke

Organization: Miistakis Institute

Presentation Title: Exploring the Potential for Place-based Citizen Science to Advance Conservation: lessons learned from Alberta case studies

Presentation Abstract: Citizen science projects range from global, distributed, big data initiatives to local, in-person, place-based projects. While large-scale initiatives can address spatial and temporal barriers impacting specific scientific outcomes, place-based citizen science has the potential impact local decision-making, address local conservation concerns and engage local citizens to take environmental action.

The Miistakis Institute takes a place-based citizen science approach to address a diversity of conservation issues. We do this because society is facing complex conservation challenges and we believe stronger sustainable solutions engage citizens in better understanding the issue, contributing personal knowledge and experience, and implementation.

From over 14 years of experience in designing and implementing place-based citizen science programs across Alberta addressing a broad range of conservation issues including wildlife connectivity and movement, grizzly bear conservation, and wetland health we have gained critical insight to the elements that lend to implementation of successful citizen science programs. These include: addressing the inherent tensions that exist between citizen engagement and science goals, diversity of skill sets required for successful program design, establishing data quality and validation components, alignment of data needs and community interest, investing adequate resources to ensure program implementation and recognizing the importance of building a community of support for citizen science programs.

By building public knowledge about environmental issues and their causes and providing opportunities to engage in these issues, place-based citizen science projects have the potential to support environmental monitoring and decision-making in Alberta and enhance conservation outcomes.

Speaker Bio: Danah has been the Executive Director of the Miistakis Institute for the past 17 years. The Miistakis Institute is a not for profit environmental research institute affiliated with Mount Royal University in Calgary Alberta. Miistakis scientifically investigates environmental challenges, analyzes policy implications, develops decision support tools, and catalyzes community conservation action to realize environmental benefits and outcomes. Her role as the ED of Miistakis puts Danah at the interface between academia, policy and decision-making and community conservation. Through her tenure at Miistakis, Danah has developed skills in various conservation related disciplines that include policy analysis, research design, wildlife management, transportation ecology, citizen science and ecosystem

services. Her experience also includes non-profit management and governance, facilitation and collaboration and community engagement. Danah holds M.Sc. in Environmental Biology and Ecology at the University of Alberta and a B.Sc. in Biology from McMaster University.

Elliot Fox

Organization: Kainai Ecosystem Protection Association

Presentation Title: Indigenous Citizen Science in Traditional Blackfoot Territory & the Crown of the Continent Ecosystem: Blackfoot Science, Bison Repatriation & the Earthwatch-Kainai Community Fellows

Speaker Bio: Elliot is a member of the Kainai (Blood Tribe) First Nation (Blackfoot Confederacy) who has worked in natural resource conservation and land management in southwest Alberta for the past 24 years. He's a graduate of the Renewable Resource Management, Environmental Science Diploma Program at Lethbridge College (1994). Elliot has worked with Parks Canada (Waterton Lakes), Alberta Fish & Wildlife and the Blood Tribe as a fish, wildlife, forestry and rangeland technician and manager. He just completed his second year of employment with the Earthwatch Institute as a co-lead technician with the Restoring Fire, Wolves and Bison to the Canadian Rockies Research Expedition based in Waterton Lakes National Park.

PANEL 4. Connecting Citizen Science and Environmental Decision Making

Elizabeth Hendriks

Organization: World Wildlife Fund-Canada

Presentation Title: Assessing Freshwater Health

Presentation Abstract: Canadians deserve to know the state of their country's watersheds. Unfortunately, however, Canada does not have an easily accessible, national system for reporting the health of freshwater ecosystems across the country and the threats they face. WWF has been working to address this issue. WWF-Canada, to date, has identified 15 of 25 watersheds as data deficient. To address that, we're working with a range of partners to develop a national citizen science program. We're using citizen scientists because, given the complexities of the impacts on freshwater, as well as Canada's immense size and geographic

diversity, citizen scientists are far more nimble and able to do this work. We are doing this to ensure we can address the most pressing issues undermining the well-being of freshwater wildlife and build solutions to ensure the health of freshwater ecosystems across Canada.

Speaker Bio: Elizabeth Hendriks is Vice-President of the National Freshwater Programme at WWF-Canada, one of Canada's oldest conservation organizations. She has fifteen years of experience working nationally and internationally on water policy and last year, she led the release of the first national assessment of the health and stressors of Canada's freshwater. With her team she is now working to reverse the decline of freshwater ecosystems across the country with the intersection of policy, technology, and community building. She received her BA in International Development from Dalhousie University and her Masters from the University of Waterloo.

Tracy Lee

Organization: Miistakis Institute

Presentation Title: How do Wildlife Cross the Road? Ask the people who live there!

Presentation Abstract: Miistakis Institute has developed a number of citizen science programs aimed at improving human and wildlife safety and reducing habitat fragmentation across highways in multiple jurisdictions. A key information gap in these programs relates to accurate spatial records of animal vehicle collisions, limiting our ability to present a defensible business case for governments to invest in mitigation infrastructure. There are proven strategies to enable safe movement of wildlife across highways, but we lacked knowledge on best locations for mitigation, citizen engagement in the issue, and political will. Citizen science programs have helped to address the knowledge gap, build an engaged community and foster political will. Data collected by citizens has been used to support identification of areas with high animal vehicle collisions, highlight the value of investment in standardizing data collection tools, and contribute novel research findings to the field of transportation ecology. We present lessons learned on how to connect citizen science data with decision making from over 10 years of experience of implementing place-based transportation ecology citizen science programs. For example, keys to success include, data collection has a specified purpose, inclusion of quality control measures, data is collected at a scale appropriate to the decision being made, decision makers are included in the development of program; and data is shared with decision makers in appropriate format. We

present these lessons using case studies from citizen science place based programs developed by Miistakis.

Speaker Bio: Tracy is a senior project manager at the Miistakis Institute, a research institute affiliated with Mount Royal University, which brings people and ideas together to promote healthy communities and landscapes. Tracy acquired her M.Sc. from the University of Calgary, Resources and the Environment Program. Tracy's graduate work, in association with the Miistakis Institute, focused on the development and assessment of a citizen science project to monitor wildlife movement across a major highway.

Tracy has helped developed numerous research citizen science programs such as Call of the Wetland, GrizzTracker, Pronghorn Xing, RoadWatchBC and Collision Count.

Tanya Rushcall

Organization: Alberta Environment and Parks

Presentation Title: EDDMapS Alberta and Aquatic Invasive Species

Presentation Abstract: Thanks to the support of the Alberta Invasive Species Council, Albertans now have the ability to report and view invasive species distributions from their smart phones. EDDMapS (Early Detection & Distribution Mapping System) is a web-based mapping system, from the University of Georgia, for documenting invasive species distribution. An interactive web interface engages participant submission through their observations and enables the public to view results and negative monitoring locations for regulated invasive species and others of heightened concern. The Alberta Aquatic Invasive Species program currently monitors for zebra and Quagga mussels and spiny waterflea, only 3 of 52 prohibited aquatic invasive species, and relies heavily on partners like the Alberta Monitoring and Science Division, Alberta Lake Management Society, and the Alberta Irrigation Projects Association. Public reporting further enables rapid response from program staff and partners on an operational level, which has been used and will continue to be used to inform future policy and legislation, monitoring, and education gaps for the program.

Speaker Bio: Tanya Rushcall is the Aquatic Invasive Species Biologist and certified pesticide applicator for Alberta's Aquatic Invasive Species Program. Tanya received a Bachelor of Science from the University of Alberta in 2010. She has worked with the Government of Alberta in multiple roles including Fisheries Management and in her current role, which

focuses on the response to new and existing aquatic invasive species such as flowering rush, Phragmites, Prussian carp, and goldfish.

KayeDon Wilcox

Organization: Alberta Environment and Parks

Tracy Lee

Organization: Miistakis Institute

Presentation Title: GrizzTracker: informing grizzly bear management

Presentation Abstract: Addressing complex sustainability challenges requires innovative approaches that integrate stakeholders, science, technology, and community engagement. Citizen science is a growing approach to engage the public in science to improve societal outcomes associated with learning, community action and knowledge production. We will introduce GrizzTracker, an established citizen science program developed by a multi stakeholder partnership to improve monitoring of grizzly bear populations and garner support from Albertans to implement conservation action. The Alberta Grizzly Bear Recovery Plan recognizes that people are integral to achieving recovery success and establishing or improving community engagement in support of grizzly bear conservation is vital. GrizzTracker serves as a prototype for involving Albertans in monitoring and managing species at risk.

Lightning Talks

Cory Olson

Organization: Alberta Community Bat Program, Wildlife Conservation Society Canada

Presentation Title: Going Bats for Bats: bat roost monitoring using citizen science

Presentation Abstract: Bats are among the most common and abundant wildlife in human communities. Some bat species have come to rely on anthropogenic structures, such as barns and attics, as sites for roosting and rearing offspring. In some areas, these sites may support the majority of the bat population, representing critical habitat for bats that needs to be managed as part of bat conservation and recovery strategies. As these locations are typically on private land, public participation is important for managing bats. An exotic

invasive fungus, which causes white-nose syndrome in bats, is causing catastrophic declines in North America's hibernating bat populations and is expected to reach Alberta. Affected species include the Little Brown Bat, which is Alberta's most common bat and the most likely to occupy buildings.

Wildlife Conservation Society Canada began the Alberta Community Bat Program in 2015 to promote bat conservation and to use citizen science to collect much-needed information on bats in human communities. The public is encouraged to submit roost observations and provide annual monitoring. Participants are asked to provide a guano (bat poop) sample, which allows reliable, inexpensive genetic species identification. Reports can be made directly to the program, or through a partner organization.

Public submissions will be used to better understand the use of buildings by bats and to contribute to bat monitoring through the North American Bat Monitoring Program. Identified roost sites are also important as potential locations for administering potential probiotic treatments for white-nose syndrome, which are currently in development.

Speaker Bio: Cory Olson is a wildlife biologist and Program Coordinator for the Alberta Community Bat Program, which he helped start in collaboration with WCS Canada and the Government of Alberta. He is leading the development of several public outreach and education projects relating to bats and other wildlife, including a citizen science project to collect information on roosting bats. He first got involved with bats at the University of Calgary, where he completed an MSc degree focusing on bat ecology. Over the last 10 years, he has been involved with several bat research and monitoring projects in western Canada.

Jordan Bell

Organization: Alberta Biodiversity Monitoring Institute (ABMI)

Presentation Title: Creating a Biodiversity Network: using a citizen science app to monitor biodiversity in Alberta

Presentation Abstract: Citizen science typically refers to research collaborations between scientists and volunteers to expand opportunities for scientific data collection and provide community members access to science information (Cornell). Citizen science initiatives are becoming increasingly popular, and organizations, informal groups, and individuals across Alberta are hosting or participating in numerous citizen science activities. These activities, however, often take place in isolation of each other.

With the growing prevalence of biodiversity data collected by Albertans, the lack of a platform where anyone can contribute and share their citizen science data became apparent. Building off experience gained from its provincial monitoring program, the Alberta Biodiversity Monitoring Institute developed NatureLynx--a mobile and desktop citizen science application--to facilitate the establishment of a biodiversity network within Alberta. Users can record, share, and browse species observations of Alberta taxa, and sightings uploaded to the app are verified by taxonomic experts. Users can also create and join “Groups” through which individuals with common interests can share observations, and/or participate in targeted projects with specific research objectives called “Missions”.

“Groups” and “Missions” allow any individual or group that currently collects, or plans to collect, biodiversity data space to encourage users to participate in their initiatives. Furthermore, virtually all data contributed--whether via a specific “Group” or “Mission” or not--is publically available to the NatureLynx community, and can be used for any kind of downstream analysis. As the user base grows, the hope is that the value of having a central repository for citizen science data will be more fully realized.

Speaker Bio: As the Citizen Science Coordinator at the Alberta Biodiversity Monitoring Institute, Jordan Bell is responsible for the development of ABMI’s citizen science application, NatureLynx. In addition, Jordan assists the ABMI’s land access program to secure access to key monitoring locations throughout the province. Jordan also participates in a variety of outreach and knowledge translation activities on behalf of the ABMI.

Kris Kendell

Organization: Alberta Conservation Association

Presentation Title: Alberta Volunteer Amphibian Monitoring Program and Alberta Snake Hibernaculum Inventory

Presentation Abstract: Alberta Conservation Association (ACA) delivers the Alberta Volunteer Amphibian Monitoring Program (AVAMP) and the Alberta Snake Hibernaculum Inventory (ASHI), in partnership with Alberta Environment and Parks. AVAMP is a long-term community survey of amphibians initiated in 1992 under the auspices of the Declining Amphibian Population Task Force established by the Species Survival Commission (SSC) of the World Conservation Union (IUCN). ASHI was initiated in 2000 and asks for voluntary information about snake dens and general reptile sightings. AVAMP and ASHI data collected

by volunteers are submitted to ACA using an online data entry form on ACA's website. Participants contribute to the advancement of amphibian and reptile conservation through submission of voluntary data on their own time, without direct supervision from ACA. These initiatives are an effective and economical means to collect basic data (i.e., species, date, location and surveyor) that can be used by researchers, government, educators, writers, and consulting companies. Importantly, these data provide general distribution information for amphibian and reptile populations in the province and, along with other data, assist in updating the general status of herpetofauna in Alberta and can help inform land-use planning. AVAMP and ASHI also provide opportunities for constructive dialog between scientists and the public. All data collected is entered into Fish and Wildlife Management Information System (FWMIS) database. FWMIS provides a central repository where government staff, industry and the public can store and access fisheries and wildlife data. AVAMP data is an important contribution to this knowledge base.

Speaker Bio: As a biologist with Alberta Conservation Association, Kris Kendell has focused much of his career on citizen science, habitat stewardship, monitoring, translocation and outreach initiatives that relate to amphibians and reptiles.

Kris says the most rewarding aspect of what he does is forming working relationships and friendships with landowners, volunteers and fellow naturalists. Kris believes the greatest strides in conservation will come through education and stewardship, and working together to provide solutions to our most pressing conservation issues.

In his spare time, Kris enjoys creating aquarium biotopes as an aquarium hobbyist and aspires to expand into fish breeding for conservation.

Luke Wonneck

Organization: Alberta Native Bee Council; and, Agroforestry and Woodlot Extension Society

Presentation Title: Building Wild Bee Monitoring in Alberta

Presentation Abstract: Wild pollinators provide crucial ecosystem services, but currently face a number of threats that include habitat loss, pesticide use, novel diseases, and climate change. It is difficult to estimate the effects of these threats on wild pollinator population levels in Alberta due to a lack of baseline data across most of the province. Further, while public interest and concern related to wild pollinators have been growing, conservation efforts have at times been hindered by uncertainty and misinformation. In response, the

recently formed Alberta Native Bee Council has initiated two wild pollinator monitoring programs. The first, the “Bumblebee Box Monitoring Program”, has received funding from Mount Royal University’s Institute for Environmental Sustainability. It involves providing members of the public with bumblebee box kits that, once built and installed, can be monitored to provide insight into local bumblebee population levels year-to-year. The second program, the “Provincial Native Bee Monitoring Program”, has been established through collaboration with Alberta Agriculture and Forestry and financial support from the Alberta Conservation Association. It involves distributing blue vane traps to wildfire lookouts throughout the green zone of Alberta. The wild bees captured in these traps will be processed in a series of “work-bees” involving public volunteers. Both of these programs are in their infancy, and will continue to be developed and adapted to meet their goal of building both scientific understanding of wild pollinator population levels across Alberta, and public understanding of wild pollinators, the threats they face, and potential solutions to these threats.

Speaker Bio: Luke is a Director of the Alberta Native Bee Council, and Agroforestry Technician with the Agroforestry and Woodlot Extension Society (AWES). With AWES, Luke’s primary responsibilities involve designing and implementing agroforestry projects, and developing and disseminating information on relevant management practices in the form of factsheets, presentations, and workshops. Prior to AWES, Luke worked for the United Nations Environmental Program in Washington DC, Wildsight in Invermere BC, and the City of Calgary. Luke has a MSc in Environmental Policy from the University of Oxford, and a BSc in Environmental Science from the University of Calgary.

Megan Jensen

Organization: Miistakis Institute

Presentation Title: Pronghorn Xing: citizen scientists help conserve fastest animal in Canada

Presentation Abstract: Authors: Megan Jensen and Tracy Lee, Miistakis Institute, Paul Jones, Alberta Conservation Association, and Dr. Andrew Jakes, National Wildlife Federation.

In the Northern Sagebrush Steppe (NSS), pronghorn undertake daily and seasonal migratory movements to meet life requirements. Across this region, highways fragment the landscape and cause direct mortality and/or disrupt movement patterns. Pronghorn Xing is a citizen science program developed to ground truth seasonal migratory pinch-points identified by

connectivity modeling across highways in the NSS and increase public engagement in pronghorn science and conservation. Information on wildlife sightings collected by the public will enable us to better understand where pronghorn and other wildlife are commonly crossing, involved in collisions, or moving adjacent to the highway. Ultimately this will lead to development of informed strategies to reduce wildlife vehicle collisions while ensuring the safe passage of wildlife across highways. The generated information will be shared with Government officials in Alberta, Saskatchewan and, Montana. Recently, this successful program has been brought to Northern Montana and is being used by local high school science classes as a long-term monitoring project. Our hope is to engage as many local communities as possible. We share preliminary findings to show utility of the program.

Speaker Bio: Megan Jensen began her career in the environmental field after attending Lethbridge College and the University of Lethbridge. She spent five years working with Alberta Conservation Association with the Pronghorn Project and with MULTISAR. Megan and her husband relocated to Medicine Hat in 2016 and she began working as the Local Project Coordinator for Pronghorn Xing in 2017. In addition to her position as the Local Project Coordinator, Megan is also employed as the Natural Area Manager for southeast Alberta with Nature Conservancy Canada.

Rob Schaufele

Organization: Miistakis Institute

Presentation Title: Collision Count: Improving Human and Wildlife Safety on Highway #3

Presentation Abstract: Hwy #3 through the Crowsnest Pass has the third highest volume of traffic for a mountain pass in Alberta, resulting in high numbers of Wildlife/vehicle collisions; a concern for both human safety and wildlife connectivity.

Collision Count is a Citizen Science project where participants collect data on the numbers of roadkill at specific wildlife mortality hotspots.

Project Goals:

- To undertake pre and post mitigation monitoring to evaluate the effectiveness of highway mitigation for improved wildlife connectivity and human safety
- Assess the cost effectiveness of investment in mitigation infrastructure along Highway #3
- Establish a correction factor for the number of roadkill recorded through pick up and removal, (the dataset used to determine wildlife /vehicle collision hotspots).

Methods:

- Participants walk specific transects at three potential mitigation sites once per week and record observations of animal carcasses on a smartphone app.

Results:

- CC participants walked 1052 transects over 4 years and reported 60 animal carcasses at 3 sites off of the highway right of way. Highway maintenance contractors, who drove the roadway daily, reported 41 carcasses from the right of way.
- Mitigation constructed at Emerald Lake in 2016 (a CC transect site) seems to be successful (non-statistical) as collisions have reduced from 5/yr to 1/yr.

The ratio of wildlife carcasses found by highway maintenance (on right of way) and reported by CC participants (off highway right of way) was 1:1.5 supports applying a correction factor to highway maintenance roadkill data at a minimum of 1.5 for every reported roadkill.

Speaker Bio: Rob has been the local coordinator for Collision Count since the project's beginning in 2014.

From 2003 to 2010, he was the local coordinator for Road Watch in the Pass, another Miistakis Citizen Science project. When funding for Road Watch dried up, he ran the project (with his wife Loretta) on a volunteer basis.

Rob moved from Edmonton to the Crowsnest Pass in 1998. He lives very close to the Hwy #3 and sees a lot of roadkill 😞 so is very passionate about working towards mitigation to improve the safety of wildlife and people on the roadway.

Samantha Managh

Organization: City of Calgary

Presentation Title: Where the Wild Things Are: harnessing the power of citizen scientists

Presentation Abstract: Cities are increasingly becoming home to wildlife that have adapted to urban living and are quickly developing into ecological hotspots. Calgary is at the forefront of this evolution given our proximity to the Rocky Mountains and the development pressures occurring there (hello bears and cougars). The climate is changing causing animals not previously found in Calgary to be seen with more regularity (raccoons anyone?) and, with the abundance of food in our urban setting, we attract species that are highly adaptable in their

diet (#wileycoyote). Recognizing this, Calgary Parks has begun a multi-year wildlife camera study to better understand our wild neighbors. This project uses wildlife trail cameras to capture data about habitat use and wildlife movement around our urban environment with the aim of enhancing citizen eco-literacy through participatory stewardship action. Citizen-generated image classifications, through the Calgary Captured page at Zooniverse.org are a cost-effective means for Calgary Parks to understand species movement and barriers to movement, to enhance urban development and ecological network planning now and in the future.

Speaker Bio: Samantha is a Parks Ecologist with Calgary Parks, Urban Conservation. She began her career at a not for profit environmental research institute. Through her time there, she developed skills in various conservation related disciplines that include spatial analysis, research design, wildlife management, transportation ecology and citizen science. Currently in her role with the Calgary Parks she is responsible for city wide landscape analysis and leading its citizen science programming. When not at work she can be found on the side of the soccer field all day every day... because kids. And when not doing that she tries to spend as much time in the outdoors as possible doing fun things like hike, ski, canoe, ride etc. Really anything but soccer.

Tracy Howlett

Organization: Alberta Environment and Parks – Environmental Monitoring and Science Division (EMSD)

Presentation Title: An Inventory of the Who's and What's of Citizen Science in Alberta

Presentation Abstract: Through 2015 and 2016, the Miistakis Institute was contracted by EMSD to produce a report which would establish “a foundation for the Chief Scientist and EMSD to understand the state of citizen science in Alberta and beyond, and to demonstrate the value of citizen science in supporting and advancing the development and implementation of an environmental science program”. The report concluded with four key recommendations the fourth of which was the development of a citizen science hub to share resources and widely promote citizen science in Alberta. To support this recommendation, the report included an inventory of citizen science initiatives available for Albertans to participate in. Through the summer of 2017, EMSD employed a summer student to revisit the inventory and build upon it. The student, Zizhao (Finn) Wang, also produced a

recommendation for the creation of a central portal or hub from which interested Albertan's could access a variety of citizen science applications and information.

In this presentation, the preliminary inventory will be shared as well as considerations for next steps in the development of a hub for sharing citizen science information in Alberta. This presentation accompanies a poster which will provide more detail and hopefully support the ongoing conversation around tools to support citizen science in Alberta. Interested participants are encouraged to connect with the speaker at the poster presentation session and share their thoughts.

Speaker Bio: Tracy Howlett has worked for the Government of Alberta for just over six years and is currently the Knowledge Translation Lead with the Indigenous Knowledge, Community Monitoring and Citizen Science Branch of AEP's Environmental Monitoring and Science Division.

Tracy has a background in environmental science and geography with a focus on Geographic Information Systems. She recently received her MSc from the University of Warwick where she studied Intercultural Communication. Over the past 15 years, Tracy has worked extensively with Indigenous groups across western Canada and has spent much of her career working at the intersection of Indigenous Knowledge and western science.

Tyler Carlson

Organization: Simon Fraser University

Presentation Title: Linking Community-Based Monitoring to Water Governance: perceptions of citizen scientists

Presentation Abstract: This research assesses the structures and functions of community-based monitoring programs across Canada. Drawing on a nationwide survey of over one hundred organizations, we explore the reasons why communities undertake CBM, the monitoring protocols they follow, and the outcomes of CBM as perceived by citizen scientists. Our results indicate that CBM is driven by a diverse range of motivations; most CBM programs utilize standardized monitoring protocols; and linkages between data and water management are particularly strong at local and regional scales. More broadly, we posit that designing CBM programs based on local motivations, employing robust methods, and establishing collaborative partnerships remain key elements in CBM, and will ensure

communities can continue playing a formative role in the monitoring of freshwater resources.

Speaker Bio: Tyler Carlson is a researcher in the School of Resource and Environmental Management at Simon Fraser University, where he studies the evolving role of citizen science in water governance in Canada. His research is affiliated with SFU Adaptation to Climate Change Team, Living Lakes Canada, and Coquitlam River Watershed Roundtable.

Posters

Jordan Bell

Organization: Alberta Biodiversity Monitoring Institute (ABMI)

Poster Title: Creating a Biodiversity Network: using a citizen science app to monitor biodiversity in Alberta

Poster Abstract: Citizen science typically refers to research collaborations between scientists and volunteers to expand opportunities for scientific data collection and provide community members access to science information (Cornell). Citizen science initiatives are becoming increasingly popular, and organizations, informal groups, and individuals across Alberta are hosting or participating in numerous citizen science activities. These activities, however, often take place in isolation of each other.

With the growing prevalence of biodiversity data collected by Albertans, the lack of a platform where anyone can contribute and share their citizen science data became apparent. Building off experience gained from its provincial monitoring program, the Alberta Biodiversity Monitoring Institute developed NatureLynx--a mobile and desktop citizen science application--to facilitate the establishment of a biodiversity network within Alberta. Users can record, share, and browse species observations of Alberta taxa, and sightings uploaded to the app are verified by taxonomic experts. Users can also create and join "Groups" through which individuals with common interests can share observations, and/or participate in targeted projects with specific research objectives called "Missions".

"Groups" and "Missions" allow any individual or group that currently collects, or plans to collect, biodiversity data space to encourage users to participate in their initiatives. Furthermore, virtually all data contributed--whether via a specific "Group" or "Mission" or not--is publically available to the NatureLynx community, and can be used for any kind of

downstream analysis. As the user base grows, the hope is that the value of having a central repository for citizen science data will be more fully realized.

Speaker Bio: As the Citizen Science Coordinator at the Alberta Biodiversity Monitoring Institute, Jordan Bell is responsible for the development of ABMI's citizen science application, NatureLynx. In addition, Jordan assists the ABMI's land access program to secure access to key monitoring locations throughout the province. Jordan also participates in a variety of outreach and knowledge translation activities on behalf of the ABMI.

Michael Bisaga and Colin Hanusz

Organization: Lakeland Industry and Community Association

Poster Title: Jesse Lake: making 'scents' of a smelly problem

Poster Abstract: In 2016, LICA's Portable Air Monitoring System (PAMS) was deployed in Bonnyville to address an issue that residents talk about – the “unpleasant smell from Jessie Lake”. PAMS data showed a number of exceedances of the Alberta Ambient Air Quality Objective (AAAQO) for hydrogen sulphide (H₂S). While values were above the AAAQO (thus creating an odour nuisance), adverse health effects are not expected to occur until levels, much higher than those detected by LICA, are reached.

Water samples were collected in 2017 with the assistance of local residents. Most analytes were within typical ranges for shallow wetland-type systems. However, Jessie Lake also had very high total phosphorus concentrations. High phosphorus in a lake accelerates algae growth, often causing a bloom. Later, as the algae dies, H₂S gas is released during decomposition. This decomposition is likely responsible for perennial summertime odours in Bonnyville.

To resolve the odour issue, phosphorous in and entering Jessie Lake needs to be reduced. Some efforts are already underway. In 2018, 5200 native tree species seedlings were planted in the riparian zone. Community volunteers cleared the shorelines of invasive weeds and litter. Interpretive signage was installed in adjacent greenspaces. Lastly, shore-washed algae and vegetation are routinely collected and disposed of.

Further phosphorous mitigation measures are being considered. Additional air monitoring is planned and coordinated, local resident delivery of follow-up water sampling is underway. The direct and collaborative involvement of the public in collection and analysis of data gives

LICA's efforts credence; the project is buoyed by strong stakeholder interest, including municipal governments and local industry.

Lindsay Day

Organization: The Gordon Foundation

Poster Title: DataStream: advancing data-sharing for collaborative water stewardship

Poster Abstract: Community-based and government supported water monitoring initiatives are generating valuable information to track the health, changes and impacts on freshwater. Yet barriers to data sharing and reusability remain chronic issues that hamper the ability to leverage this information to its full potential.

DataStream is designed to address this challenge by providing an open access, independent platform for sharing water quality data. DataStream is free to use and is designed to make it easy for monitoring groups to share, quality control, visualize and download data. With a searchable database, contributors and other data users can access monitoring data collected by others across watersheds in a common data format that is based on internationally recognized standards.

DataStream is led nationally by The Gordon Foundation and delivered in collaboration with regional monitoring networks. DataStream was first piloted in the Mackenzie River Basin where it was built in collaboration with the Government of the Northwest Territories. Following its success in the Mackenzie Basin, DataStream is now being scaled up and is expanding into other regions including Atlantic Canada and the Lake Winnipeg Watershed.

As we face increasingly complex environmental changes, solid, transparent and open data infrastructure will be foundational to support informed decision-making and sustain healthy freshwater ecosystems. This poster presentation will explore how DataStream is helping to advance citizen science and leverage monitoring efforts by providing an open-access hub for sharing water data.

Speaker Bio: Lindsay Day is the DataStream Coordinator at The Gordon Foundation. In this role she works with communities and other collaborators to continually grow and improve DataStream, an online, open-access platform for sharing water quality data. Lindsay holds a Masters of Science in Epidemiology and has a background in health and science communications. She is passionate about working with others to improve how we live with, and care for, water in Canada.

Sarah Elmeligi

Organization: Alberta Environment and Parks, Parks Division

Poster Title: Making the Most of Citizen Scientists in Brown Bear Studies in Canada's Rocky Mountain National Parks

Poster Abstract: Grizzly bear research projects in the Canadian Rocky Mountains lend themselves to citizen science because: 1) the study area is large and home to a very low density bear population, and 2) engaging the public in grizzly bear recovery is an essential component of the provincial recovery plan.

This interdisciplinary research examined grizzly bear habitat use around hiking trails in Canadian Rocky Mountain National Parks. Trail use data by both bears and people was collected through a series of remote cameras on hiking trails; and social data was collected through a survey of trail users assessing support for various grizzly bear-related management strategies. Volunteers participated in one or more 'teams' based on their interest and ability. One team was responsible for installation and collection of remote cameras, another for conducting visitor surveys at trailheads, and a third for data entry (classifying remote camera images). By offering a range of volunteer options we were able to attract over 90 volunteers. From 2013 to 2015 volunteers contributed 420 person-days of work in the placement and retrieval of remote cameras and 160 person-days of survey data collection (this does not include the work of the data entry team, the work of two student interns (200 person-days) or the professional research team).

An informal survey of volunteers upon project completion showed that most volunteers rated their experience positively, they were pleased to contribute to "something larger" and be part of "crucial" scientific conservation research. The scope of this project was only possible with the help of these volunteers.

Speaker Bio: Sarah Elmeligi, PhD, currently works as a Facility Planner for Alberta Parks, Kananaskis Region. Her career has focused on human-wildlife coexistence and the impact of recreation on wildlife. Her interdisciplinary work examines landscapes holistically, aiming to create management recommendations that balance biological and social needs. Her PhD focused on grizzly bear habitat use and trail user support for management options along trails in the Rocky Mountain National Parks. During her Masters, she investigated the impacts

of bear-viewing tourism on grizzly bears and visitor satisfaction. She has also worked in the environmental non-profit sector working with diverse stakeholders to address landscape scale conservation issues across western Canada.

Dorothy Hill

Organization: Mount Royal University

Poster Title: Retrofitting New Technology into an Existing Long-term Citizen Science Program: field test of the “Birdbox App”

Poster Abstract: Co-authors: Dorothy Hill, Lynn Moorman, Kendra Garbutt, and Alice Liboiron.

“Bluebird trails” are networks of bird nest boxes erected along fence lines to provide nesting habitat for native bluebirds and other cavity nesting species. The trails are maintained and monitored by volunteers who collect data on nest box use and nesting success. Bluebird trail monitors have been active within Alberta for more than 30 years making this one of the longest continuous citizen science projects in the province. Data are typically collected on paper data collection sheets and then submitted to Area Leaders who must transcribe and summarize the data. Transcription into spreadsheets is a time-consuming activity that can result in volunteer fatigue among the Area Leaders. Moreover, the geospatial data associated with the nest boxes is under-utilized. Using a spreadsheet provided by one of the Area Leaders, we customize Esri’s Collector Application to streamline the data collection and transcription process. We then recruited citizen scientists from two bluebird trail organizations (Calgary Area Nest-box Monitors and Ellis Bird Farm Ltd.) to field test the efficacy of the “Birdbox App”. The App was not found to save time in field data collection. The technology itself was an issue in the field – technical issues, difficulties reading the screen in bright sunlight, and a diminished outdoor experience were cited as drawbacks. The main advantages of the App appear to be reduced workload for the Area Leaders and the resulting geospatially referenced nest box data which allows for more in-depth analyses of the factors that may be influencing nest box use and nesting success.

Speaker Bio: Dorothy Hill is an Associate Professor in the Department of Biology at Mount Royal University in Calgary. Her expertise is the conservation and ecology of grassland birds and she has written and/or reviewed several species status reports for the Committee on the Status of Endangered Wildlife in Canada, Alberta Environment and Parks, Alberta

Conservation Association, and the International Union for the Conservation of Nature. Dorothy's interest in citizen science as a conservation and education tool was sparked by her attendance at a workshop on Public Participation in Scientific Research organized and hosted by the Miistakis Institute.

Tracy Howlett

Organization: Alberta Environment and Parks – Environmental Monitoring and Science Division (EMSD)

Poster Title: An Inventory of the Who's and What's of Citizen Science in Alberta

Poster Abstract: Through 2015 and 2016, the Miistakis Institute was contracted by EMSD to produce a report which would establish “a foundation for the Chief Scientist and EMSD to understand the state of citizen science in Alberta and beyond, and to demonstrate the value of citizen science in supporting and advancing the development and implementation of an environmental science program”. The report concluded with four key recommendations the fourth of which was the development of a citizen science hub to share resources and widely promote citizen science in Alberta. To support this recommendation, the report included an inventory of citizen science initiatives available for Albertans to participate in. Through the summer of 2017, EMSD employed a summer student to revisit the inventory and build upon it. The student, Zizhao (Finn) Wang, also produced a recommendation for the creation of a central portal or hub from which interested Albertans could access a variety of citizen science applications and information.

In this presentation, the preliminary inventory will be shared as well as considerations for next steps in the development of a hub for sharing citizen science information in Alberta. This presentation accompanies a poster which will provide more detail and hopefully support the ongoing conversation around tools to support citizen science in Alberta. Interested participants are encouraged to connect with the speaker at the poster presentation session and share their thoughts.

Speaker Bio: Tracy Howlett has worked for the Government of Alberta for just over six years and is currently the Knowledge Translation Lead with the Indigenous Knowledge, Community Monitoring and Citizen Science Branch of AEP's Environmental Monitoring and Science Division.

Tracy has a background in environmental science and geography with a focus on Geographic Information Systems. She recently received her MSc from the University of Warwick where she studied Intercultural Communication. Over the past 15 years, Tracy has worked extensively with Indigenous groups across western Canada and has spent much of her career working at the intersection of Indigenous Knowledge and western science.

Quamrul Huda

Organization: Alberta Environment and Parks – Environmental Monitoring and Science Division

Poster Title: Citizen Science and Community Based Air Monitoring Network through Micro Sensor Based Integrated Systems

Poster Abstract: Citizen science (CS) and community based monitoring (CBM) approaches provide opportunities for citizens and communities to contribute in environmental monitoring. In Alberta, implementation of CS and CBM can provide significant support to the government's goals of accurately evaluating and reporting on the conditions of the environment. Presently, a limited number of low footprint affordable systems exist for ambient monitoring of selective air parameters (e.g. particulate matters, temperature, relative humidity, etc.). These systems lack the accuracy and consistency in performance and a commonly acceptable quality assurance/control process does not exist. The systems offer vendor specific web portals for data observation, and do not meet existing design and performance specifications for integration into a provincial data warehouse. Data security and transparency of these commonly used citizen science air-monitoring tools in general lack the trust and credibility for applications in environmental decision making.

In this poster, we demonstrate a micro sensor based air-monitoring system (micro station), developed under the Alberta Environment and Parks Innovation Fund Project, for citizen science and community based monitoring programs in the province. The micro stations will allow monitoring of a number of air parameters through custom integration of off-the-shelf micro sensors on a shoebox-sized footprint. The micro stations are intended to be deployable with minimal logistical requirements. The systems would allow secure acquisition, transmission and archival of data to support environmental decision making. These micro sensor based integrated systems can provide a viable option for integration of environmental data from small communities to local, regional and provincial scale.

Speaker Bio: Quamrul Huda received his Ph.D. in silicon photonics from University of Manchester, U.K. under the Commonwealth Scholarship Award. He had his post-doctoral research in Nanoelectronics Research Institute, Japan. He worked as a Professor in Electrical & Electronic Engineering in Bangladesh University of Engineering & Technology. He moved to Canada in 2009 and worked at University of Alberta as a Research Associate where he prototyped a small footprint integrated tunable laser for spectroscopic gas sensing. He joined Alberta Environment and Parks in 2013 and has been working on advanced air monitoring technologies.

Megan Jensen

Organization: Miistakis Institute

Poster Title: Pronghorn Xing: citizen scientists help conserve fastest animal in Canada

Poster Abstract: Authors: Megan Jensen and Tracy Lee, Miistakis Institute, Paul Jones, Alberta Conservation Association, and Dr. Andrew Jakes, National Wildlife Federation.

In the Northern Sagebrush Steppe (NSS), pronghorn undertake daily and seasonal migratory movements to meet life requirements. Across this region, highways fragment the landscape and cause direct mortality and/or disrupt movement patterns. Pronghorn Xing is a citizen science program developed to ground truth seasonal migratory pinch-points identified by connectivity modeling across highways in the NSS and increase public engagement in pronghorn science and conservation. Information on wildlife sightings collected by the public will enable us to better understand where pronghorn and other wildlife are commonly crossing, involved in collisions, or moving adjacent to the highway. Ultimately this will lead to development of informed strategies to reduce wildlife vehicle collisions while ensuring the safe passage of wildlife across highways. The generated information will be shared with Government officials in Alberta, Saskatchewan and, Montana. Recently, this successful program has been brought to Northern Montana and is being used by local high school science classes as a long-term monitoring project. Our hope is to engage as many local communities as possible. We share preliminary findings to show utility of the program.

Speaker Bio: Megan Jensen began her career in the environmental field after attending Lethbridge College and the University of Lethbridge. She spent five years working with Alberta Conservation Association with the Pronghorn Project and with MULTISAR. Megan and her husband relocated to Medicine Hat in 2016 and she began working as the Local

Project Coordinator for Pronghorn Xing in 2017. In addition to her position as the Local Project Coordinator, Megan is also employed as the Natural Area Manager for southeast Alberta with Nature Conservancy Canada.

Nicole Kahal

Organization: Miistakis Institute

Poster Title: Now you see them, Now you don't! What's happening in Calgary Wetlands?

Poster Abstract: Call of the Wetland is a citizen science program developed to monitor amphibians as an important biodiversity indicator in the City of Calgary. Developed by the Miistakis Institute and partners, Call of the Wetland aims to better understand the health of wetlands within the City of Calgary and build a community of knowledgeable citizens to champion wetland protection and restoration.

Three years of data collected by volunteer citizen scientists will be used to determine presence or absence of amphibian species in Calgary wetlands. Occupancy modeling will be undertaken on the species data collected. The results will help inform the City of Calgary BiodiverCity Strategy, and will be shared with City planners.

We present two years of findings and share lessons learned based on the design and implementation of an urban citizen science program.

Speaker Bio: Nicole works with the Miistakis Insitute as a Project Coordinator on the Call of the Wetland citizen science project and the Calgary Captured wildlife monitoring project. Nicole holds a Bachelor of Science in Environmental and Water Resource Economics from the University of Arizona and a Master of Environmental Science and Management from the University of California Santa Barbara.

Kris Kendell

Organization: Alberta Conservation Association

Poster Title: Alberta Volunteer Amphibian Monitoring Program and Alberta Snake Hibernaculum Inventory

Poster Abstract: Alberta Conservation Association (ACA) delivers the Alberta Volunteer Amphibian Monitoring Program (AVAMP) and the Alberta Snake Hibernaculum Inventory

(ASHI), in partnership with Alberta Environment and Parks. AVAMP is a long-term community survey of amphibians initiated in 1992 under the auspices of the Declining Amphibian Population Task Force established by the Species Survival Commission (SSC) of the World Conservation Union (IUCN). ASHI was initiated in 2000 and asks for voluntary information about snake dens and general reptile sightings. AVAMP and ASHI data collected by volunteers are submitted to ACA using an online data entry form on ACA's website. Participants contribute to the advancement of amphibian and reptile conservation through submission of voluntary data on their own time, without direct supervision from ACA. These initiatives are an effective and economical means to collect basic data (i.e., species, date, location and surveyor) that can be used by researchers, government, educators, writers, and consulting companies. Importantly, these data provide general distribution information for amphibian and reptile populations in the province and, along with other data, assist in updating the general status of herpetofauna in Alberta and can help inform land-use planning. AVAMP and ASHI also provide opportunities for constructive dialog between scientists and the public. All data collected is entered into Fish and Wildlife Management Information System (FWMIS) database. FWMIS provides a central repository where government staff, industry and the public can store and access fisheries and wildlife data. AVAMP data is an important contribution to this knowledge base.

Speaker Bio: As a biologist with Alberta Conservation Association, Kris Kendell has focused much of his career on citizen science, habitat stewardship, monitoring, translocation and outreach initiatives that relate to amphibians and reptiles.

Kris says the most rewarding aspect of what he does is forming working relationships and friendships with landowners, volunteers and fellow naturalists. Kris believes the greatest strides in conservation will come through education and stewardship, and working together to provide solutions to our most pressing conservation issues.

In his spare time, Kris enjoys creating aquarium biotopes as an aquarium hobbyist and aspires to expand into fish breeding for conservation.

Holly Kinas, Tracy Lee, Danah Duke

Organization: Miistakis Institute

Jen DeMone, Coral Sawatzky

Organization: Mount Royal University

Poster Title: Quality Control Considerations for Public Engagement in Urban Biodiversity Monitoring

Poster Abstract: Call of the Wetland is a citizen science program developed to monitor amphibians as an important biodiversity indicator in a large urban municipality in Canada. In Calgary, 90% of pre-settlement wetlands have been lost. To maintain and restore wetlands in and around the City of Calgary, there is a need to promote awareness and better understanding of wetland health. To inform the health of Calgary's wetlands, "Call of the Wetland", a citizen science program has been developed to monitor amphibians as an important indicator. Currently very little is known about amphibians in the City of Calgary.

One important component to citizen science programs is considering quality control measures. For Call of the Wetland, participants may not be trained wildlife biologists increasing the potential to misclassify species or provide false negatives while surveying wetlands. To assess this issue Acoustic Recording Units were set up at a random selection of Calgary wetlands in order to evaluate observer accuracy. The quality control component provides data validation so results can be used to inform biodiversity planning by the City of Calgary and the Province of Alberta. We will present methodology and findings from the first two years of the program.

Dianne McIsaac and Julie Carter

Organization: Wood Buffalo Environmental Association

Poster Title: Community Odour Monitoring Program (COMP) App

Poster Abstract: The Wood Buffalo Environmental Association (WBEA) is a multi-stakeholder, consensus-based organization leading in state-of-the-art environmental monitoring to enable informed decision-making. WBEA has monitored and reported air quality in north-eastern Alberta in the Regional Municipality of Wood Buffalo since 1997. The WBEA is the largest and most integrated of Alberta's airsheds and monitors a region which has the highest number of large industrial emitters. The WBEA collects air quality measurements within a network comprised of 28 industrial, attribution, community, background, and meteorological air monitoring stations.

The WBEA launched an app as part of the Community Odour Monitoring Program (COMP), which seeks to gain a better understanding of how odour events in the region relate to ambient air quality. The app allows community members to submit information about

ambient odours as they experience them, and directly involves citizens in identifying and monitoring odours to determine the impact on residents. The information is submitted to a database, which is compared to the ambient air data collected at the WBEA's 28 ambient air monitoring stations located throughout the region. The COMP app allows for public participation in addressing a common and important air quality concern.

Our poster will highlight key functions of the app, the process used to collect data from community members, and the relationship between the citizen experience and data collected at the WBEA's ambient air monitoring stations.

The COMP app is available for download in both iTunes and Google Play. For more information on all WBEA initiatives, visit www.wbea.org.

Speaker Bio: Dianne McIsaac and Julie Carter are the Stakeholder Engagement Coordinators for the Wood Buffalo Environmental Association (WBEA). Dianne holds a BSc, Major in Environmental Science, and a MSc, Environmental Practice. She came to the WBEA from the oil sands industry, where she worked as an Environmental Technician from 2007 to 2012, and then as an Environmental Coordinator/Scientist from 2012 to 2017. Julie has over a decade of experience as a trusted advisor for public and private sector clients. She holds a BBA, a Project Management Certification, an IAP2 Foundations Certificate (public engagement), and is currently completing a MA in Leadership.

Matthew Parsons

Organization: Environment and Climate Change Canada

Poster Title: Small Air Quality Sensor Applications to Improve Community Engagement in Western Canada

Poster Abstract: Environment and Climate Change Canada recognizes the value of small, inexpensive air quality sensors and their potential for improving community engagement around air quality issues. Western and northern Canada remains a challenge for air quality monitoring due to the number of small, remote communities—particularly first nations communities—at risk for forest fire smoke impacts in a diverse range of terrains and climates. This work describes preliminary efforts and results from a pilot project to assess the applicability of small air quality sensors to improve community engagement and their

potential role in providing air quality information and tools to decision makers in small communities.

Speaker Bio: Matthew Parsons is a Senior Air Quality Scientist with Environment and Climate Change Canada, based out of Edmonton, AB. Dr. Parsons has managed many of the regional air quality monitoring programs under the Meteorological Service of Canada including atmospheric mercury and VOC programs in the Alberta Oil Sands region and also criteria air contaminant monitoring in western Canada. Recently, Dr. Parsons has started to develop MSC's small sensor program for air quality monitoring. Dr. Parsons' educational background specialized in laboratory- and field-based aerosol chemistry research at the University of British Columbia, Colorado State University, and the University of Alberta.

Gary Redmond

Organization: Albert Capital Airshed

Poster Title: Air Quality and Citizen Science

Poster Abstract: This poster will provide a brief overview of the local airshed, what air quality monitoring is present today, how and why citizen science is being encouraged, and what some of the challenges are to incorporating citizen science data into decision making.

Speaker Bio: Gary Redmond has been the Executive Director of the Alberta Capital Airshed since 2011. Gary has an extensive background in not-for-profit management, multi-stakeholder facilitation and emergency management. Gary has worked within Government, Industry and ENGO sectors including as the National Coordinator of Disaster Services for the Red Cross and a delegate with the International Red Cross. Gary has also served on advisory committees for the National Energy Board, the Canadian Association of Petroleum Producers and the Alberta Energy Regulator.

Rob Schaufe

Organization: Miistakis Institute

Poster Title: Citizen Scientists help improve human and wildlife safety on Highway 3

Poster Abstract: Authors: Rob Schaufele, Tracy Lee and Kim Rondeau (Miistakis Institute) and Elizabeth Anderson, Monica Bartha, Emilie Bien, Chris Clarke, Cindy Crane, Shirley Enzol, Gary Enzol, Travis Huss, Tracey Kaisner, Barbara Koch, Victor Koch, Glenda Newsted, Loretta Schaufele, Gerry Smith, Dorthy Smith, Chris Weickert, Sue Weickert, Nelson White and Kat Williams (Super Awesome Collision Count participants)

Highway 3 in Southern Alberta is a recognized fracture zone for wildlife in the Canadian Rocky Mountains. Miistakis Institute and partners recommended key areas where highway mitigation (for example underpass and fencing) would help wildlife move safely across the highway and reduce the number of animal vehicle collisions (AVC). Alberta Transportation implemented recommended mitigation strategies at Crowsnest/Emerald Lake site by installing fencing to tie into an existing underpass and jump-outs in 2016. We aimed to understand if these measures are effective in reducing AVCs and helping wildlife move safely across the highway.

Collision Count, a citizen science program, was developed where participants walk specified routes at three mitigation sites one a week and report observations of animal carcasses using a smartphone application.

Collision Count Participants walked 1052 transects over 4 years and reported 60 animal carcasses at the three sites away from the highway right of way. While highway maintenance contractors drove the road daily and reported 41 animal carcasses from the highway right of way. Key findings are presented on evaluating the mitigation strategy to reduce wildlife vehicle collisions at Crowsnest/Emerald Lakes using citizen collected data.

Speaker Bio: Rob has been the local coordinator for Collision Count since the project's beginning in 2014.

From 2003 to 2010, he was the local coordinator for Road Watch in the Pass, another Miistakis Citizen Science project. When funding for Road Watch dried up, Rob ran the project (with his wife Loretta) on a volunteer basis.

Rob moved from Edmonton to the Crowsnest Pass in 1998. He lives very close to the Hwy #3 and sees a lot of roadkill 😞 so he is very passionate about working towards mitigation to improve the safety of wildlife and people on the roadway.

Péter Sólymos

Organization: Alberta Biodiversity Monitoring Institute

Poster Title: Citizens Help with Automated Recording Units and Camera Traps to Support Conservation Science and Decision-making in Alberta

Poster Abstract: Citizen science (CS) can and have produced enormous amounts of data worldwide that are being used to address pressing conservation questions. The most common type of CS data is a documented detection of a species: a photo, an audio record, or a field note, often entered into a common database through an app. For obvious reasons, users almost never document the absence of the species, therefore the name, “presence-only” data. However, knowing the locations or times when a species is not detected is valuable for scientific analyses. Unlike presence-only data, presence-absence data sets inform about baseline prevalences and can correct for sampling biases due to the opportunistic and accessibility-driven nature of the data collection.

The Alberta Biodiversity Monitoring Institute (ABMI) collects data via automated recording units and camera traps that are deployed through the province each year. The audio and image files are stored and tagged through a system called WildTrax. The resulting data are used to describe habitat associations and spatial distribution of species. In our poster, we describe the data collection and data entry systems, and show the results from modeling. WildTrax is capable of storing data from CS projects (from units and cameras deployed by citizens), provide a standardized platform for computer aided and crowd sourced species identification, thus adding useful information on mammals and birds in Alberta, and ultimately benefiting conservation science and decision-making.

Speaker Bio: Péter Sólymos is a statistical ecologist with a research focus on developing and applying computational techniques for big data sets to better inform biodiversity conservation and natural resource management over large spatial scales. He is interested in understanding how cumulative effects of human development affect species. He is developing new algorithms and methodologies for more efficient data-information-knowledge pipelines.

Zoey Wang and Ron Zurawell

Organization: Alberta Environment and Parks – Environmental Monitoring and Science Division (EMSD)

Poster Title: Engaging Indigenous Peoples in Alberta's Regional Lake Monitoring Program – a case study

Poster Abstract: Water is of cultural and spiritual importance to Indigenous peoples and is seen as the interconnection among all living beings. Indigenous communities across Alberta have concerns and questions about water quality and quantity in their local rivers, lakes and wetlands.

Alberta has been conducting long-term collection of chemical, physical, and biological information on Alberta lakes. In 2016, the program expanded to include lakes of interest to Indigenous communities. The Indigenous Lake Monitoring Program, embedded in the provincial long-term lake monitoring program, began with the North Wabasca Lake Monitoring project – a coordinated effort between Alberta Environment and Parks (AEP) and Bigstone Cree First Nation (BCN). The goals of the project were to address lack of water quality information for North Wabasca Lake; provide additional training in water monitoring to a BCN Lands Officer; and, where possible, find opportunities to apply Traditional Ecological Knowledge (TEK) to science-based lake monitoring. Water quality data was collected over five seasonal sampling trips by AEP field staff and Lands Officer of BCN. AEP scientists worked with BCN Lands Department to generate a report that could be presented to the community.

The North Wabasca Lake Monitoring project filled a gap in scientific data and provided a First Nation staff the opportunity to gain technical skills and experience in water monitoring. The project also contributed to a respectful relationship between scientists and the BCN Lands Department.

The program is currently being evaluated by EMSD and community partners. Success factors identified through the initial project review include importance of setting common goals; ensuring open and timely communication; acknowledgement and attribution of local knowledge; and respect for cultural and scientific protocols.

Speaker Bio: Z. Wang: Ziyun (Zoey) Wang works with Indigenous communities in Alberta towards developing and implementing an inclusive environmental monitoring program that addresses local and regional concerns and interests. Since 2014, Zoey has been leading and supporting pilot programs to build relationships and technical capacity in Alberta's Indigenous communities. Projects that Zoey led and is leading include Wabasca Lake Monitoring Project, and Environmental Monitoring Technician Training Pilot.

Zoey holds a Masters Degree in Resource and Environmental Management from Dalhousie University. Zoey currently works in the Indigenous knowledge, Community Monitoring and

Citizen Science Branch as a Community Engagement Coordinator within Environmental Monitoring and Science Division, Government of Alberta.

R. Zurawell: Ron is an Aquatic Scientist with the Watershed Sciences Branch of EMSD. Ron joined the Alberta Government as a Limnologist in 2003 and has been responsible for coordinating provincial lake monitoring programs ever since. Ron earned his Ph.D. in Aquatic Ecology from the Department of Biological Sciences at the University of Alberta. His Ph.D. thesis research investigated the prevalence of the cyanobacterial toxin – microcystin – in central Alberta lakes and its effects on aquatic biota. While Ron has been primarily involved in cyanotoxin monitoring and research for over 20 years, he also worked in the areas of municipal drinking water quality and source water protection, focusing on waterborne pathogens. Ron is a strong advocate of community-based monitoring and citizen science programs and is a past Board Member with the Alberta Lake Management Society and Regional Director of the North American Lake Management Society.

Zheng Yang

Organization: Alberta Environment and Parks (AEP) – Environmental Monitoring and Science Division (EMSD)

Poster Title: Performance Evaluation of Portable Air Monitoring Platforms (PAMPs) for Community-Based Air Monitoring and Citizen Science

Poster Abstract: As Alberta residents pay more and more attention to the environment of the province, more citizens have an increasing interest in the citizen science of environmental monitoring. As a province with frequent forest fires and industrial releases, air quality has always been a hot topic of concern. Many citizens hope to have more extensive community-based air monitoring systems. Some citizens prefer to use affordable and reliable monitors to measure the air quality more locally.

Portable air monitoring platforms (PAMPs) open an exciting opportunity for people to use this technology for a wide range of applications beyond traditional regulatory monitoring, because they are smaller, easier to deploy, use less power and cost less than conventional air monitoring stations. As such, they are identified in the draft Alberta 5-Year Air Quality and Deposition monitoring plan as an alternative monitoring technology. Various PAMP systems, including compact and modularly designed monitoring systems, miniature sensor-based

integrated systems, etc. have become commercially available as the market is expanding rapidly.

EMSD is leading a project comparing various PAMPs with conventional air monitoring stations to assess their accuracy, reliability, durability, etc. Advantages and features will be identified for tested system for applications in various projects, including expansion of air monitoring networks, community-based air monitoring, and citizen science initiatives, etc. It will also recommend methodologies, guidelines and tools for enhancing credibility of data and results from PAMPs. In the poster we will discuss the technology used in PAMPs, as well as methods we use to evaluate their performance.

Speaker Bio: Zheng Yang is an Air Monitoring Scientist in EMSD, AEP. He holds a B.Sc. in chemistry from Peking University in China and a Ph.D. in physical chemistry from UBC. He has extensive experience in advanced optical instruments, laser optics, and physical chemistry. He was the only award winner for “Chinese Government Award for Outstanding Students Abroad” in physical chemistry in Canada for 2010. Since he joined the GOA, he has been leading and working on multiple projects, including developing and applying advanced environmental monitoring technologies in air monitoring, monitoring network assessment, community odour monitoring and reporting, satellite remote sensing, etc.

Share your experience on social media! #ABCitSci