



*New Ways to Use Digital Technologies in the Field*  
*May 15-16, 2013*  
*Selkirk College, Castlegar BC*

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New technologies are changing the way that research on aquatic, terrestrial, and human ecology is being carried out. Increasingly, people are taking smartphones, tablets, and other devices into the field to increase their productivity. Citizen science and social media are now becoming effective ways to increase data collection and collaboration. We will offer two days of presentations, posters, panel discussions, hands-on demonstrations, and opportunities for networking with experts, and a workshop summary to help you follow-up on the new things you've learned.

[Click here](#) for abstracts of the oral presentations on May 15.

[Click here](#) for descriptions of demonstrations and mini-courses on May 16.

- The schedule for the demonstrations and mini-courses include here is subject to small changes. After you register for the workshop you will be asked to select your demonstrations or mini-courses, based on this schedule.
- Sessions can accommodate limited numbers of people. Please be ready with a second choice if your favoured session has filled.
- **Note there is no food service on campus on May 16.** You will need to bring your own coffee, snacks, and lunch.

## *List of oral presenters on May 15, 2013*

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## 1. Technology to empower citizen scientists

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Dr. Greg Newman, Natural Resource Ecology Laboratory, Colorado State University

[Gregory.Newman@ColoState.Edu](mailto:Gregory.Newman@ColoState.Edu)

Website: <http://www.citsci.org/>

Citizen science and community-based monitoring programs are increasing in number, breadth, and popularity. These programs operate at multiple spatial and temporal scales, address myriads of issues, generate volumes of scientific data, and involve numerous stakeholders. To be effective, such programs must ask questions, form teams, manage members, identify protocols, collect data, share results, and evaluate success. On face value, these tasks may seem simple. In reality, they are diverse, complex, and demanding of limited program resources. To address these challenges, citizen science programs are increasingly adopting new technologies to improve data collection efficiency and quality. Clearly, a new era of iPad-enabled field data collectors is upon us! However, besides improving data collection and quality, how can technology empower citizen scientists? What does technology offer citizen science programs to improve overall efficiency, empower members, and transform the collective capabilities of such programs to become more strategic and synergistic and yield desirable multi-scale impacts and outcomes? Using several examples, I review technological advancements currently empowering citizen scientists, highlight some consequences of technology adoption, and discuss challenges facing citizen science as this growing field continues to mature and integrate new technology. I conclude by discussing a vision for the future of citizen science and the long term potential of technology-enabled citizen science for conservation and stewardship.

## 2. Hitchhiker's guide to starting mobile data collection

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Jase Zwarich PMIT Systems Architect, Usability, Information Management, Summit Environmental Consultants

[jrz@summit-environmental.com](mailto:jrz@summit-environmental.com)

### Abstract

I think most of us can agree; when we are looking at the first step into mobile data collection we are looking for easy, cheap and/or free right? But diving into the maze of options leaves you with more questions than it does answers about how to get from "A" to "B".

We'll stick out your thumb and hitch a ride as we take a drive through some of the available options to get you started in the mobile data collection arena including how to leverage freeware and balancing your development cost vs efficiency cheque book.

Regardless of the field you are in, data you collect, or the system you use, these options will help you to begin your move down the mobile data collection highway and pick up some tips and tricks along the way.

### Bio

**Jase Zwarich** is an Information Systems Developer, with over 11 years of experience in all aspects of application design and development. Jase's diverse skill set leverages such technologies as relational database design, multiple programming languages, interface design and usability, and CMS (content management systems) to allow provision of customized applications, both in desktop and web-enabled systems. Further to his technical skills as a programmer, Jase leverages his experience in application design, development, testing and implementation into mobile development projects to focus on usability. This allows him to understand client needs and focus on the technology best suited to meeting those needs.

### 3. Clipboard vs. mobile apps: QA/QC in the field

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Rebekka Lindskoog, R.P.Bio. Senior Environmental Scientist/Manager, Information Management, Summit Environmental Consultants  
[RL@summit-environmental.com](mailto:RL@summit-environmental.com)

#### **Abstract**

Many of us struggle capturing field data that is both high quality and is efficient to collect. In my personal experiences I have collected data using many methods; from blank workbooks, to template “write in the rain” forms, to using software on a variety of hand-held computers. I have seen and experienced many trials and tribulations in hopes of finding the perfect balance to keep data collection efficient, but not restrictive, and leverage technology allowing for effortless QA/QC in the field. In this presentation I will provide examples of some of the successes and failures I have seen and experienced related to field data collection.

#### **Bio**

**Rebekka Lindskoog** R.P.Bio. is a Senior Environmental Scientist with more than twelve years’ experience as an environmental professional. Rebekka leads the development of customized software solutions for managing and reporting environmental information. She specializes in the development of science-based reporting tools to support natural resources decision-making processes. Her clients include Government agencies (local, provincial, federal), First Nations in Canada and the USA, and other organizations.

### 4. GPS Demystified

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Sidney Kwakkel, B.Sc., M.Sc., EIT Geomatics Engineer, Systems Manager, Information Management, Summit Environmental Consultants  
[spk@summit-environmental.com](mailto:spk@summit-environmental.com)

#### **Abstract**

Here’s the scenario. You’re back from the field. You have a few dozen waypoints from your handheld GPS and you’re putting them into your favorite mapping application. You are left scratching your head because you know the points aren’t lining up with the places you visited. In some cases, the waypoints seem way off. What gives? You look

up your GPS handheld's specifications and find that it is accurate to 2-4 metres. What now?

What does GPS accuracy mean anyway? How can I be assured of better precision and accuracy? What do terms like DGPS, RTK and Precise Point Positioning mean? Are there things to look for when buying my next handheld? Will my iPhone/iPad/Yuma suffice as a handheld?

This talk is intended for people who use GPS devices in the field but have no previous knowledge about the technical aspects of GPS. All of the terms in this abstract will be explained and the audience should have a better understanding of how to use GPS effectively in their day-to-day field work.

### **Bio**

**Sidney Kwakkel**, M.Sc., E.I.T. is a Geomatics Engineer with an M.Sc. in Geomatics Engineering and B.Sc. in Botany from the University of Calgary. His proficiency is in translating business process into system architecture and providing consulting services for information handling. His expertise lies in building systems to automate business processes, helping to take operations from small to large scale. His unique models and software recommendations assist clients in attaining efficiency objectives and comply with regulatory operational guidelines. By helping his clients leverage technology to efficiently handle their data, Sidney's clients realize immediate growth potential and economies of scale.

## **5. Automated grain size method in ecohydrology**

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Giles Shearing, Masters candidate, Department of Earth and Environmental Science and Geography, University of British Columbia  
[gilesshearing@hotmail.com](mailto:gilesshearing@hotmail.com)

### **Abstract**

There are over 800,000 small dams worldwide. For hydroelectric dams placed on rivers with large sediment loads, managing sediment has important implications for a river's ecological and morphological processes, as well as successful dam operation. Having an accurate understanding of grain-size distribution throughout the river is key to predicting how the river will react to modified hydraulic and sediment transport regimes. For this study, Wilsey Dam on the Middle Shuswap River is examined to understand the dam's influence on grain-size distributions important to spawning salmon and to

determine available spawning habitat in the river. Representative grain-size distributions sampled throughout the river are used in computer modelling and statistical analysis. For evaluating changes to salmon spawning habitat, underwater grain samples from known spawning sites was required. Conventional grain size sampling methods (e.g., pebble counts) involve significant field time and cause riverbed alteration, often resulting in samples with unrepresentative grain-size distributions. A relatively new sampling method, Automated Grain Sizing (AGS), was modified to allow for the collection of underwater samples. AGS is rapid in the field, non-destructive and captures large sample sizes, although significant laboratory time is required. The modified AGS method involves the use of a waterproof digital camera to capture images of submerged surface grains. Before photographing the area of interest, a scale (linear or quadrat) required for image processing is placed on the channel bottom. Determining sample area is a simple function of the area of the largest grain (b-axis) at each site multiplied by a select value (50-400), dependent on the statistical significance required. For image processing, Digital Gravelometer (DG) by Sedimetrics© is used, a fully automated grain-size analysis software that provides the distribution and statistics of counted grains. A component of DG grain identification and segmentation relies on comparing contrasting grain colours. In the Middle Shuswap River, grain texture characterized by granite-like colour patterns resulted in DG over-segmenting grains when unmodified images were used. Therefore, photo-editing software was used to reduce within-grain colour contrast in images prior to DG processing. The presentation outlines the advantages and current limitations of the modified AGS method, including an overview of field experiences, image modification procedures, and recommended DG processing techniques.

**Bio:**

Giles Shearing is an environmental consultant based in Revelstoke, BC. Mr. Shearing began his career in private consulting working on development and infrastructure projects in the Lower Mainland. After moving inland, Mr. Shearing worked as a Natural Resource Specialist with BC Hydro providing support to Columbia River hydroelectric dams. In 2012, Mr. Shearing started his own firm, SEC Shearing Environmental Consultants, providing environmental services within the Southern Interior of BC. Currently working to complete a Masters of Environmental Science specializing in Ecohydrology, Mr. Shearing is excited to present aspects of his research findings.

## 6. Monitoring rangelands using mobile digital technologies

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Matthew Braun, Range Practices Agrologist, Range Branch, Ministry of Forests, Lands and Natural Resource Operations, Prince George [Matthew.Braun@gov.bc.ca](mailto:Matthew.Braun@gov.bc.ca)

Nancy Elliot, Rangeland Analyst, Range Branch, Ministry of Forests, Lands and Natural Resource Operations, Kamloops [Nancy.Elliot@gov.bc.ca](mailto:Nancy.Elliot@gov.bc.ca)

### **Abstract**

Rangelands in British Columbia (BC) are natural landscapes composed of dense coniferous forests, open coniferous forests maintained by fires, dry valley bottoms with bunch grasses, and deciduous forests with mixed prairie and alpine environments. Ranchers and guide outfitters are allocated use permits (tenures) to graze cattle, horses, sheep, and goats on 34 million hectares of public (Crown) rangelands for four to six months per year. Ranchers interact with other rangeland users, including forestry, recreation, and oil and gas.

The use of mobile technologies has played a central role in the Range program's (Ministry of Forests, Lands, Natural Resource Operations, BC Government) efforts to collect standardized field data since the early 2000s. Multiple use of the diverse and large landscape necessitates systematic organization and collection of ecosystem health spatial data to facilitate monitoring by the Range Branch and field staff (agrologists). The monitoring and tracking of rangeland health was previously conducted using ArcPad on handheld computers linked to a GPS. Technology changes have initiated changing platforms to Apple's iPads, where off-the-shelf apps have been explored and utilized for collecting data over the past two years.

Our adoption of digital technologies has proven efficiencies; for example, standardized digital data collection can reduce analysis and summary time by more than 75 percent. Other benefits of using mobile technology include: 1) improved navigation and 2) provision of a visual summary of the extent of a monitoring regime. The cost-effectiveness of subsequent field trips is also enhanced. Using mobile apps on iPads has further proven effective as the tablets provide supportive tools and apps, such as still and video cameras, real-time consultation with decision-makers, and access to digital copies of legislation, policy and field guides.

We have focused our app use on standardized data collection with form tools as well as mapping apps. With field staff working in diverse areas of BC, our app selection has



focused on apps that support offline (disconnected) editing and imagery use. Our current form tool is iAuditor, available for both Apple and Android OS. We have developed a number of forms that are available by cloud download from the iAuditor form collection (see: Agriculture, then Beef sector). Our use of mapping apps centres around supporting individuals with varying skill levels in both app use and geospatial; thus, we use mapping apps which can involve less skill, such as PDF Maps or GPSKit, as well as apps that require more knowledge, such as GISKit, GISRoam, and CartoMobile. Our presentation will provide a background on where we started with mobile data collection, and give an overview of experiences with iPad applications.

## **Bio**

**Matthew Braun** (PAg, MSc) has also been with the Rangeland program of the BC Government since 2006. Matthew's experience and education is in agriculture specifically natural rangelands and the impact of grazing. His time with the forest service has introduced him to many different resource stakeholders with varying perspectives on Crown land. He has found that there is a direct link between how easy monitoring technology is to use and how much monitoring is done.

**Nancy Elliot** (PAg, PhD) has been with the Rangeland program with the BC Government since 2006. Nancy has extensive experience working with First Nations, government staff, ranchers, and others in the use of maps and geospatial technologies. Nancy holds a PhD in Natural Resources and Environment Studies from the University of Northern British Columbia (2008).

## **7. Report-a-Weed: Online Invasive Plant Reporting**

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Nancy Elliot, Rangeland Analyst, Range Branch, Ministry of Forests, Lands and Natural Resource Operations, Kamloops [Nancy.Elliot@gov.bc.ca](mailto:Nancy.Elliot@gov.bc.ca)

Matthew Braun, Range Practices Agrologist, Range Branch, Ministry of Forests, Lands and Natural Resource Operations, Prince George [Matthew.Braun@gov.bc.ca](mailto:Matthew.Braun@gov.bc.ca)

### **Abstract**

The Invasive Species Council (<http://www.bcinvases.ca>), in partnership with the Invasive Plants Program (Rangeland Management, Ministry of Forests, Lands and Natural Resource Operations) released Report-a-Weed (RAW) (<http://www.reportaweedbc.ca/>), an app for Apple and Android platforms in August

2012. RAW is designed to meet the needs of the ever-growing segment of the population who prefer the convenience of mobile applications to collect and report information. RAW uses a citizen science format to collect and submit records of invasive plants. The report is forwarded to specialists who review the information and follow up with local weed committees. RAW also supports identification of invasive species, both through its collection of plant photos, and also by linking device cameras with report submissions.

This presentation will provide a history and overview of RAW, some preliminary results of user statistics, and some comments on future releases.

## **Bio**

**Nancy Elliot** (PAg, PhD) has been with the Rangeland program with the BC Government since 2006. Nancy has extensive experience working with First Nations, government staff, ranchers, and others in the use of maps and geospatial technologies. Nancy holds a PhD in Natural Resources and Environment Studies from the University of Northern British Columbia (2008).

**Matthew Braun** (PAg, MSc) has also been with the Rangeland program of the BC Government since 2006. Matthew's experience and education is in agriculture specifically natural rangelands and the impact of grazing. His time with the forest service has introduced him to many different resource stakeholders with varying perspectives on Crown land. He has found that there is a direct link between how easy monitoring technology is to use and how much monitoring is done.

## **8. Timesavers Translated from the field to office: Mobile Government Database (VENUS) and GIS Applications**

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Carrie Nadeau, R.P. Bio Vegetation Ecologist/Environmental Scientist, Summit Environmental Consultants  
[cn@summit-environmental.com](mailto:cn@summit-environmental.com)

### **Abstract**

This presentation will include a colourful synopsis of the Trimble Yuma rugged tablet interface; illustrating applications used in the field for collection of baseline data. A demonstration of how the Yuma tablet was used for direct entry of data in the field into the VENUS database, how a digital portable map is advantageous in the field, and how

you can use these interfaces for your advantage and skip data entry steps in the office. Some 'hicc-ups' were encountered along the way but the end product of both of these applications allowed:

Data entry directly into VPro (VENUS) according to RISC standards in the field eliminating the data entry step at the office;

Upload of shape files in MapWindow (freeware) to use the application for real-time navigation in the field; and

Real-time creation of GIS layers to record plot locations and other point source data.

### **Bio**

**Carrie Nadeau**, B.Sc, R.P.Bio., is a biologist with eight years' experience in environmental consulting. Her background includes baseline terrestrial assessments, environmental impact assessments, plant ecology, wetland and terrestrial restoration, rare and endangered species habitat restoration, fish and fish habitat inventories and assessments and environmental monitoring. She has spent the last year collecting and reporting baseline vegetation and terrestrial information, assessments, and reclamation planning for a proposed mine in Northern BC.

## **9. Rethinking Digital Connections**

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Eva Johansson, Kootenay Camas Project, [kootenaycamas@gmail.com](mailto:kootenaycamas@gmail.com)

Co-author: Valerie Huff, Kootenay Camas Project, [kootenaywild@gmail.com](mailto:kootenaywild@gmail.com)

### **Abstract**

The Kootenay Camas Project is working to raise awareness about camas (*Camassia quamash*) in the West Kootenay. The Kootenay Camas Project seeks to engage the public in making observations and collecting and recording data about camas populations in the Kootenays. We are working to understand the health and status of camas meadows, to identify opportunities for stewardship, and to promote awareness of this important natural and heritage resource. In 2012 we conducted an extensive inventory of camas in the Kootenays and found camas at many new sites. The public reported many of these sites to us, and several of them were in places we would not have known about without public input.

We used digital technology to bring our project to the attention of the public and to solicit public response. Kootenay Camas Project hosts a website with cultural and ecological information about camas in the Kootenays, information about citizen science and various options for submitting camas sightings ranging from postcards, to email and iNaturalist – an app.

Public response to the Kootenay Camas Project has been enthusiastic but digital technology, in particular the app, was not used as much as we had expected. We will discuss public response and our current communication strategy.

## **Bio**

**Eva Johansson** is a professional agrologist. She is a founding member of the West Kootenay Native Plant Study Group. She managed West Kootenay Plants Ltd., a native plant nursery, for 5 years. She has a Master of Science degree with a Major in Earth Science from University of Stockholm and a diploma in Restoration of Natural Systems from University of Victoria. As project coordinator of the Kootenay Camas Project, she is interested to learn more about citizen science, public outreach and the cultivation and propagation of camas.

**Valerie Huff** is a restoration ecologist with a passion for native plants. She has a Bachelor of Science in Agriculture from the University of Guelph, a diploma in Restoration of Natural Systems from the University of Victoria, and a Masters of Science in environmental studies, also from the University of Victoria. Valerie has an environmental consulting company which uses her inter-related areas of expertise: plant science and restoration ecology; computer information management systems and data management; and outreach, training and education.

## 10. Use of a newly developed iPad App for the collection and processing of Water Quality field data to assess fine sediment generation from road networks

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Dave Maloney, Ministry of Forests, Lands and Natural Resource Operations  
[David.Maloney@gov.bc.ca](mailto:David.Maloney@gov.bc.ca)

Brian Carson, Consultant, [brian\\_carson@dccnet.com](mailto:brian_carson@dccnet.com) , Ph. 604 886 3282, 1861  
Lower Road, Roberts Creek B.C. V0N 2W6

### **Abstract:**

The Water Quality Effectiveness Evaluation (WQEE) protocol, under the Forest and Range Evaluation Program (FREP) has been developed primarily to assess the impact of roads on water quality. The Protocol is relatively simple, takes a technician around ½ hour to evaluate one site and provides a clear inventory of forestry induced sediment sources in a watershed and how they might be better managed. Over the past 5 years, over 4000 sites have been evaluated in the 26 forest districts of British Columbia. To date, the evaluation has been conducted using standard field forms with traditional field equipment. The evaluation presently requires use of tables to choose allowable values, and calculators to populate summary columns. In around 10% of cases, shortcomings of the data were noted mostly caused by evaluator choosing illegal values to populate columns, making arithmetic errors and avoiding completion of form until back at office. Data transfer from paper forms to the Information Management System was tiresome and also open to further error. In a recent upgrade to the protocol, Manning's formula introduced to calculate stream discharge. The equation required the use of fractional exponents which could not be easily calculated in the field. For these reasons a more convenient, efficient and accurate means to collect, transpose and manage data was sought.

The iPad was chosen as the digital platform for data entry and management. The iPad has excellent institutional support, is well known, relatively inexpensive (\$400- \$1000) and can house a wide variety of applications. The authors had originally considered using a simple spreadsheet format that they could develop and modify themselves but quickly recognized the limitations their lack of computer skills would impose on the final product. The iPad TM and FileMaker Go TM were used by Scott Bleackley of Folkstone Design Inc. to address the specific needs of this evaluation procedure. Automated forms, background calculation capabilities, data storage and data processing were all designed with ease of use of field evaluator and the robustness of the data base in

mind. The digital platform generates more reliable data with fewer errors in both entry and calculation than traditional methods. Inputting data into an iPad is much more efficient than using paper forms because many fields are self populated and other values are chosen from simple scroll and pick options. A wide range of digital base maps are available that ensure the evaluator knows exactly where he or she is and exactly where their plots are located. Relevant reference materials, conveniently linked to specific data input decisions enhance the ease with which the Protocol is learned and understood by new and experienced users alike. The iPad has its own camera, video camera, GPS and inclinometer that enable the integration of all field collected data in a simple and convenient manner. Closing observations and comments can be typed, hand written or spoken. The iPad is protected from falls and water by commercially available cases. Apple is strongly promoting the iPad as a field instrument and has initiated an insurance policy available upon purchase that will cover two fatal accidents in its first 2 years of use.

Unquestionably, the use of digital platforms to collect and manage field data will dominate survey procedures in the future. Their benefits are obvious. Their downside is the strength of tradition in natural resource management.

**Bio:**

**David Maloney**, P. Ag. is with the Ministry of Forest and Range in the Kamloops Regional Office. He has a joint appointment with Stewardship and Integrated Resources Sections and acts as Technical advisor in Watershed Science. He presently oversees the developing the Water Quality Effectiveness Evaluation for the Forest and Range Evaluation program (FREP)

**Brian Carson** P.Geo. is a private consultant from Roberts Creek B.C. who has worked extensively locally and internationally in the field of erosion and sediment management.

## *List of demonstrations and mini-courses on May 16, 2013*

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### Are you bringing your personal device?

Please label it with your name.

Please label your device in some way, even with just a piece of tape on the back. There will be lots of devices being used at this workshop and we wouldn't want you to lose track of your personal unit.

- Email addresses are provided for each instructor. You are welcome to contact them for more information.

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## Schedule for May 16 demonstrations and mini-courses

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- This schedule is subject to minor changes. After you register, we will send you an email asking which sessions you 'd like to be part of.
- **NOTE there is no food service on campus on May 16.** You will need to bring your own coffee, drinks, snacks, and lunch.

### Morning

8:30 – 9:30	9:30 – 10:30	10:30 – 11:30	11:30 – 12:30
Shawn Ternan – YSI EXO water monitoring			
Nancy Elliot and Matthew Braun – Rangeland health assessments using a variety of mobile techniques			
	Chris Oman – iPad for navigation and forms		
	Valerie Huff <i>et al.</i> – iNaturalist App		
	Jared Hobbs – iPad for GIS		
Rebekka Lindskoog <i>et al.</i> – Trimble Yuma			

### Afternoon

1:00 – 2:00	2:00 – 3:00	3:00 – 4:00	4:00 – 5:00
Chris Oman – iPad for navigation and forms (repeat)			
Jared Hobbs – iPad for GIS (repeat)			



## 1. Bear trap automation

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Ryan Alter, Inventor

[ryan@alterenterprise.com](mailto:ryan@alterenterprise.com)

<http://automatedbeartrap.com/>

### **Description**

Participants will use the browsers on their own laptops, iPads or smartphones to remotely access the automated bear trap. They will be able to view photographs from inside the trap, view the interior/exterior temperature, raise a closed trap door, rearm the trap and release the door from their laptop, iPad or phone via the internet. This demonstration will include a short outdoor session to connect the internet portion of the class to the real components that make this technology possible.

We will share data collected from the past 4 years, highlighting the improvements to bear and human safety. We will have a handout from the past 4 years of data collection showing several real bear situations and the safety measures provided by the technologically enabled bear trap.

Participants can visit <http://automatedbeartrap.com/> for more information.

45 minutes.

### **Bio**

**Ryan Alter** is the inventor of the Automated Bear Trap. Ryan graduated from Youngstown State with a BS in Environmental Science. Ryan has worked with technology in biology for the past 15 years. He has provided tech support and volunteered with Montana Fish Wildlife and Parks 2009-current. He continues to upgrade and maintain the Automated Bear Trap on a regular basis.

## 2. BioBlitz with iNaturalist

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Valerie Huff, Kootenay Native Plant Society [valeriehuff@gmail.com](mailto:valeriehuff@gmail.com)

Eva Johansson, Kootenay Native Plant Society [kootenaywild@gmail.com](mailto:kootenaywild@gmail.com)

Ian Parfitt, Selkirk Geospatial Research Centre [iparfitt@selkirk.ca](mailto:iparfitt@selkirk.ca)

### Description

Participants will use the iNaturalist app in a Bioblitz on the Selkirk College grounds. We will have a 2 hour field blitz, followed by an hour in a classroom to upload, compile and analyze our observations. Using personal smartphones and iPads (we will have some available for participant use), we will discover and map as many living organisms in a two-hour field session, to compile species lists.

We will give an overview of creating an iNaturalist project including adding custom observation fields, setting geoprivacy and using observation rules to limit acceptable types of observations. Participants will be shown how to make observations for the project, then we will make as many observations as possible in the selected area during the remaining time.

Returning to the college, we will upload our observations, attempt to identify as many organisms as possible, and create species lists from our survey. We will discuss the option of linking to Flickr and Facebook accounts to encourage increased participation on a project, as well as web-based uploading of digital photos to the site.

3 hours.

**Pre-skills:** A general familiarity with the use of a smartphone or iPad is recommended.

### Bring

Bring your smartphone, tablet or laptop pre-loaded with the iNaturalist app, which works on iOS and Android platforms. This device will travel into the field with you. iNaturalist is a free app, available for download at the AppStore and in Android Market. Participants should explore the iNaturalist.org website **beforehand** to familiarize themselves with the service. A good introduction is available here:

<http://www.inaturalist.org/pages/getting+started>

Bring outdoor clothing.

Optional items to bring include digital camera, laptop, Blackberry phone.

**Bio:**

Valerie Huff and Eva Johansson are a project coordinators for the Kootenay Camas Project which encourages public participation in field research. We use iNaturalist to record field data and encourage citizen science reports on camas occurrence and phenology.

**Ian Parfitt** is the coordinator of the Selkirk Geospatial Research Centre, and has been developing tools for integration of citizen science data into the Columbia Basin Biodiversity Atlas.

### 3. Using an iPad for navigation and completing field forms

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Chris Oman RPF, Forest Practices Board  
[chris.oman@gov.bc.ca](mailto:chris.oman@gov.bc.ca)

**Description**

Participants will learn:

- How to use the free application (Avenza PDF Maps) application to navigate, drop placemarks, and measure distance and area using georeferenced PDF maps, all without a cell signal or wifi.
- Where to find free georeferenced PDF maps.
- How to create PDF forms using Adobe Acrobat.
- How to use the PDF Expert application to view and mark-up PDF documents, complete PDF forms, and attach photos and maps.
- How to back up files to cloud services.
- How to use multitasking gestures to maximize efficiency.
- How to summarize form data using Adobe Acrobat and Microsoft Excel.

2 hours

**Pre-skills:** General knowledge of how to use an iPad or iPhone.

**Bring:**

1. Bring outdoor clothing. You can practice your new skills outside on campus.
2. Chris will have his “iPad quick reference guide” handout available at the course..

3. Your iPad or iPhone pre-loaded with the software below.

**Note: Your iPad must be a 3G or 4G model** to receive GPS signals. Avenza PDF Maps and PDF Expert also work on an iPhone, but you may have to squint.

Do you have an Android tablet?

A beta version of Avenza PDF Maps for Android is available:

<http://www.pdf-maps.com/android/beta/register> .

Note that PDF Expert is not currently available for Android.

You will be sent a few files to use for exercises during the course.

- If you do not have an iPad, please let us know, because Chris is bringing a few extras. Chris is going to project his iPad onto a screen so you can follow along even without an iPad.

Preload your iPad with the free Avenza PDF Maps app:

<https://itunes.apple.com/ca/app/avenza-pdf-maps/id388424049?mt=8>

If participants wish to view, mark-up and fill out PDF forms, the PDF Expert app costs \$10.00 ,available at: <https://itunes.apple.com/app/pdf-expert-fill-forms-annotate/id393316844?mt=8>

**Bio:**

Chris spearheaded the integration of iPads into the Forest Practices Board audit program in 2012. After a season of field testing and training co-workers, he is ready to share his experience and insights with others. Chris's recent presentation at the ABCFP annual general meeting on this topic was well-received and shows there is a lot of interest in using tablets to do fieldwork.

## 4. Mobile applications: hands-on experience with a Trimble Yuma ruggedized tablet

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Rebekka Lindscoog, R.P.Bio. Senior Environmental Scientist/Manager, Information Management (Summit Environmental Consultants Inc.) [RL@summit-environmental.com](mailto:RL@summit-environmental.com)

Sidney Kwakkel, B.Sc., M.Sc., EIT Geomatics Engineer, Systems Manager, Information Management (Summit Environmental Consultants Inc.)

Carrie Nadeau, R.P.Bio Vegetation Ecologist/Environmental Scientist (Summit Environmental Consultants Inc.)

Jase Zwarich, Information Systems Developer (Summit Environmental Consultants Inc.)

### Description

This session will give you hands-on experience with a Trimble YUMA tablet. This workshop includes 2.5 hours in the classroom and 1.5 hours in the field. The workshop will give you the chance to work with the YUMA tablet in the classroom, collect two different sets of data with the YUMA in the field in groups (and one data set on paper for comparison), and a look at the data back in the classroom. We will discuss data collection efficiencies in the field, QA/QC, and database development. An open session at the end will be slated for those who would like more time to practice with a YUMA.



The session will be organized as follows:

1. Description of YUMA's, data systems, mobile applications and individual hands-on time.
2. Field Data Collection Sessions:  
The class will be broken into three groups. Each group collect all three sets of data below. Discussion to follow in the classroom.

### *Data Set 1: Traditional Collection*

- Clip board
- Field Data sheets (waterproof)
- GPS Handheld
- Paper Map w UTM grid

### *Data Set 2: Freeware Data Collection*

- YUMA
- Excel database file on YUMA
- MAPWINDOW Freeware
- GPS Handheld

### *Data Set 3: Customized Data Collection*

- YUMA
- Customized Database
- MAPWINDOW (with customized applications)
- GPS Handheld

**4 hours.**

**Pre-skills:** No pre-reading or knowledge required, just an interest in data management. Use of a handheld GPS and orienteering skills would be helpful but not necessary.

### **Bring**

Equipment is supplied. Expect to be outside on campus trails for an hour, bring appropriate clothing.



### **Bio:**

This workshop will be presented by a team from Summit Environmental Consultants Inc. These four individuals bring different perspectives to using technology in the field.

**Rebekka Lindskoog R.P.Bio.** is a Senior Environmental Scientist with more than twelve years' experience as an environmental professional. Rebekka leads the development of customized software solutions for managing and reporting environmental information. She specializes in the development of science-based reporting tools to support natural resources decision-making processes. Her clients include Government agencies (local, provincial, federal), First Nations in Canada and the USA, and other organizations.

**Sidney Kwakkel, M.Sc., E.I.T.** is a Geomatics Engineer with an M.Sc. in Geomatics Engineering and B.Sc. in Botany from the University of Calgary. His proficiency is in translating business process into system architecture and providing consulting services

for information handling. His expertise lies in building systems to automate business processes, helping to take operations from small to large scale. His unique models and software recommendations assist clients in attaining efficiency objectives and comply with regulatory operational guidelines. By helping his clients leverage technology to efficiently handle their data, Sidney's clients realize immediate growth potential and economies of scale.

**Carrie Nadeau, B.Sc, R.P.Bio.**, is a biologist with eight years' experience in environmental consulting. Her background includes baseline terrestrial assessments, environmental impact assessments, plant ecology, wetland and terrestrial restoration, rare and endangered species habitat restoration, fish and fish habitat inventories and assessments and environmental monitoring. She has spent the last year collecting and reporting baseline vegetation and terrestrial information, assessments, and reclamation planning for a proposed mine in Northern BC.

**Jase Zwarich** is an Information Systems Developer, with more than 11 years of experience in all aspects of application design and development. Jase's diverse skill set leverages such technologies as relational database design, multiple programming languages, interface design and usability, and CMS (content management systems) to allow provision of customized applications, both in desktop and web-enabled systems. Further to his technical skills as a programmer, Jase leverages his experience in application design, development, testing and implementation into mobile development projects to focus on usability. This allows him to understand client needs and focus on the technology best suited to meeting those needs.

## 5. Rangeland health assessments using a variety of techniques

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Matthew Braun, Ministry of Forests, Lands and Natural Resource Operations – Range Branch

[Matthew.braun@gov.bc.ca](mailto:Matthew.braun@gov.bc.ca)

Nancy Elliot, Ministry of Forests, Lands and Natural Resource Operations – Range Branch

[Nancy.elliott@gov.bc.ca](mailto:Nancy.elliott@gov.bc.ca)

### Description

We will be examining, in detail, field data collection experiences using iPad apps. We have customized off-the-shelf apps and will also demo Report-a-Weed, an app created through a partnership between the Invasive Species Council and Range Branch. Participants will be given an overview of the Ministry of Forests, Lands and Natural Resource Operations' old electronic device data collection system (iPAQ connected via Bluetooth to a GPS) and the efficiency involved. We then will give a short explanation of how and why we have been moving to smartphone/tablet technology over the last year and our experiences with that transition.

Participants will use their device to navigate to the mock rangeland health inspection site and then do a Rangeland Health Assessment and collect and submit a Report-a-Weed report. A Rangeland Health iBook will be made available.

We will:

- Explain what we have used in the past and why it will soon be obsolete
- Introduce several new apps that we have been using to replace ArcPad and detail our experiences
- Connect to our forms via cloud
- Introduce Report A Weed app
- Go outside and use some of the apps
- Navigate using several different apps
- Fill out forms using several different apps
- Export data from several apps
- Generate reports using several different apps
- Generate a Report A Weed report and submit
- Go back inside and look at what the reports look like back in the office.



1 hour.

## **Bring**

Your iPad or iPhone.

The devices we use are Apple products and the apps are available on iTunes. Some of the apps are also available for Android devices. That does not mean someone with an Android device could not participate, but we cannot offer as much support for them.

The session begins indoors and moves outside for most of the time. Bring appropriate clothing.

## **Pre-skills**

Participants need to have general familiarity with their smartphone or tablet. They should have tried using their device offline (i.e. outside of cellular coverage) at least once.

## **Apps**

The following is a list of apps that we have tested and some of us use. Most users have at least some of these apps and other users may be willing to download at least the free ones. We will post a list of apps that will be used during the demo, with supportive materials, to registrants before the workshop.

We will make sample forms and spatial data available to participants the day we meet. I have listed the apps we have tested based on the best working in each category. We will use these apps to do a mock range inspection filling out our forms as well as reporting a weed through the Report-A-Weed.

### **GIS Apps/Navigation Apps**

- Avenza PDF Maps
- GPS Kit HD
- CartoMobile
- Navfree GPS Canada
- iGIS for iPad
- GIS Kit
- ArcGIS
- GeoMobile for ArcGIS

### **General Use**

- Cisco AnyConnect
- Dropbox
- Mail+ for Outlook

SignMyPad

### **Data Collection/Field Tools**

FieldNotes Pro

iAuditor, Form Tools

iBooks

iTunes U

seeLevel – visual clinometer

Calculator Pro

Theodolite HD

Commander Compass Lite

Units Converter

Weather Eye

### **Bio:**

**Nancy Elliot and Matthew Braun** have been using handheld collection devices to assess rangeland health for 7 years. Matthew has been the guinea pig for new devices and software as it has become available and then responsible training staff on how to use various devices. His role also includes supporting people after the initial training with whatever problems or issues they might have. Nancy also trains new staff and supports staff learning new devices. Her expertise in mapping and spatial data is vital when a new device needs to be put to the test.

## **6. Using iPads for GIS applications in the field**

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Jared Hobbs, Ministry of Forests, Lands and Natural Resource Operations.

[jared.hobbs@gov.bc.ca](mailto:jared.hobbs@gov.bc.ca)

As a senior biologist, project manager and a provincial program lead for the Identified Wildlife Management Strategy, I have been using iPad technology in the field for two years on several different projects. I provide training as well as hands-on experience to familiarize project field technicians with the function and power of this technology for field use. Once trained, my project technicians use iPads extensively for navigation, habitat model testing and to record and report observations of species at risk.

This is an information packed three hour course with an outdoor component. I will demonstrate how to use GISRoam and GPS Kit for various field applications. At the end of the course, participants will understand how to load GIS information, such as shape files, raster data and garmin files, onto an iPad. They will also understand how to create shape files on the iPad and export the data into formats suitable for use in ArcView on a

PC. We will also describe methods to mark waypoints (and to store associated data and images with each waypoint) in the field, record track logs and perform "go-to" functions. Finally, we will also explore some additional technologies that I find useful for field application such as use of the sound recording feature on the iPad, the camera, reference document storage and note-taking applications.

### **Pre-skills**

Course participants will require a basic understanding of GIS applications or GPS navigation and use in a field setting. Ideally, course participants will know how to use ArcView to create the necessary shape files they will be loading onto their iPad. This is necessary for participants to maximize the gains that they will realize using iPads in the field. At a reduced level, at the very least, I would expect that course participants are familiar with the use of GPS units and have a requirement, in their job, to use GIS applications in the field.

### **Bring**

Participants should bring their own iPads preloaded with GIS Roam. Download GIS Roam at <http://gisroam.com/> or go to the app store and search for it. You can download the free version but if you want to create a membership so that you can use your own shape files that costs \$10. This is optional for the course. Jared is bringing a few extra iPads. If you do not have an iPad you can follow along with as Jared demonstrates the applications and their functionality on the projector

- Data for the course will be supplied at the course.

## 7. YSI EXO: The latest technology for water monitoring

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Shawn Ternan, Hoskin Scientific Ltd.

[sternan@hoskin.ca](mailto:sternan@hoskin.ca)

YSI's new EXO water quality data sondes offer significant new advancements that have not previously been available on an instrument of this kind. In a classroom setting, Shawn will provide a general overview of YSI's water quality sondes and the applications they can be used for, and also provide more detailed information about the new features unique to the EXO sondes and how these features can simplify the collection of water quality data while improving data quality.

Hoskin Scientific Ltd. is the exclusive Canadian distributor of YSI water quality sondes. Shawn is a factory-trained YSI product specialist and has over fifteen years of experience with their products.

45 minutes.