# Dashboards & Data Management

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Synthesis

NSERC ResNet
Annual General Meeting
2021-5-7

# Agenda

- Retrospective
- Storymap
- Dashboard
- Data Portal
- Upcoming Work
- Data Essentials

# Retrospective - 1st AGM (May 2020)

- Dashboard should:
  - Democratize decision-making by providing an interactive portal to data, information, and sometimes interpretation to answer a variety of questions about the status and trends of selected ES and natural capital in working landscapes in Canada
    - identify, compare, and learn about *types* of SES (social-ecological systems) in Canadian working landscapes
    - Information at a variety of scales & resolutions, on a variety of services, with different boundaries (watersheds, political boundaries, etc.)
  - Reflect the reciprocal relationships between ecosystems, ES, and people, visualizing and exploring multiple values around nature. Reflect our ES framework (natural capital, co-production, ES, benefits to people, demands, management)
- We might have multiple users, so should consider multiple dashboards
  - Must have a clear user in mind to develop a clear dashboard
- Can include data collected by other sources, including StatsCan, NRCan, ECCC, citizen science, traditional knowledge, etc.

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# Retrospective - SAC & Monthly Meeting (Spring 2021)

- Who is the ResNet dashboard user?
  - Landscape: Watershed-scale planner, tribal elder, anyone wanting to increase their role in local planning
  - National: researcher visualizing trends in time and space, Federal employee using dashboard for communication,
- What does she use the dashboard for?
  - Landscape: someone doing multiple jobs with limited capacity, access to data and tech, trying to predict and mitigate trade-offs among users with multiple sources of information (local knowledge and academic research)
  - National (research): someone trying to understand state and trends of environment across Canada with limited computational infrastructure, frustrated by dispersed data and incomplete standardization across previous projects and programs
  - National (Fed employee): someone trying to understand the ecological ramifications of policy decisions, trade agreements.

# Retrospective - SAC & Monthly Meeting (Spring 2021)

*ResNet dashboards are used because they are a recognized, authoritative source of synthesized information that is accurate, timely, integrated, coherent, complete, easily accessible, reproducible, sourced, consistent, and interpretable.*

- Enable coordination and conversation
- Support spatial planning around trade-offs (prediction, mitigation, conversation)
  - Allow visualization of the outcomes of different decisions
- Support use of knowledge from multiple sources, including traditional and local knowledge
- Provide accurate, reliable data, somewhat pre-digested, but also allowing investigation of problems we didn't anticipate
  - One pre-digestion might be state of progress towards international targets such as SDGs
- Make visible information about links between people and nature (even if not self-identified as a need)
- Be multi-scalar

# Data Apps Overview

|  | Story Map | Dashboard | Data Portal |
|---|---|---|---|
| Description | Medium for communicating research activities | Tool for summarizing research results | Platform for documenting and disseminating datasets |
| Driver | Narrative | Need | Curation |
| Audience | General public | Decision makers | Researchers |
| Objective | Engaging | Reporting | Collaborating |

# Storymap

- Multimedia presentation ('scrollytelling')
- Engage broad audience
- Showcase ResNet work
- Tells the story *we* decide to tell, not the story the user wants to discover
- Interactions:
    - Expose greater detail
    - Provide context
    - Link to technical resources

Montérégie Prototype!

https://apps.nsercresnet.ca/story/monteregie/
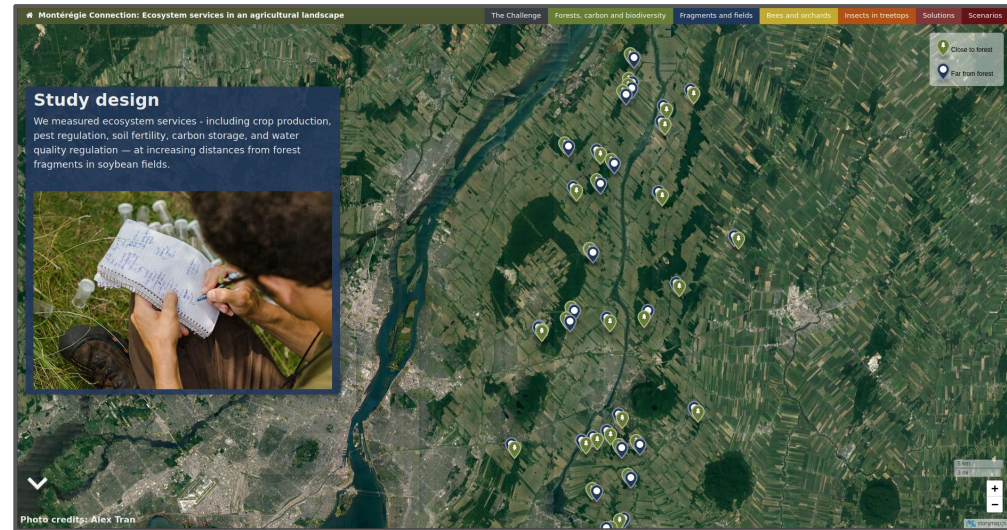


Developed by Dr. Guillaume Larocque, QCBS

# Thoughts, Insights, Questions

Would this be useful in your landscape? Why or why not?

What research would you need to do to put together a storymap? Are there plans to do this type of work?

bit.ly/agm21-feedback-story

# Dashboard

- Addresses specific user need:
  - Authoritative reporting
    - Synthesize multiple datasets
    - Summarize state of affairs
  - Model exploration
    - Visualize outcomes of scenarios / decisions
  - ...
- Interactions:
  - Define area of interest
  - Filter underlying data
  - Adjust model parameters
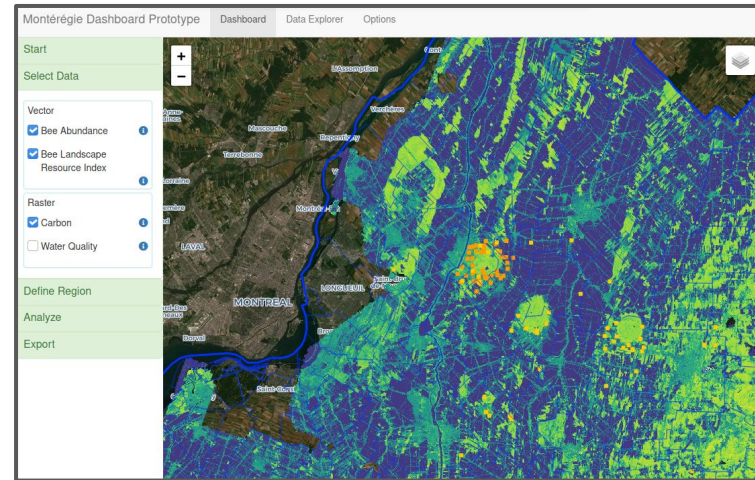
# Dashboard

Key needs:

- Accessibility
- Clear interface
- Support diverse use cases
- Integrate many data types
- Query data directly
- Easy access to metadata
- Download results

Development approach:

- Initial prototype and proof of concept
    - Not driven by research question
- Modular framework
- Extensible interface
- Expose complexity through interaction
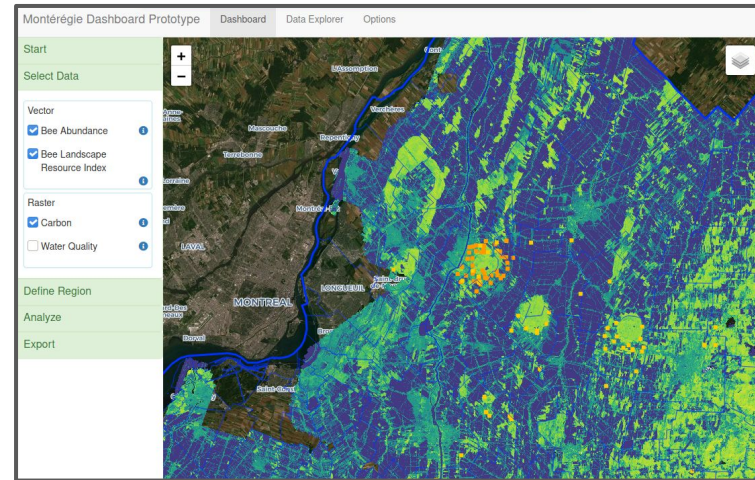
# Dashboard: Status

Implemented:

- Info panels for layer descriptions
- Pull data from ResNet Data Portal
- Query attributes
- Browse attribute tables
- Filter data by drawing polygon

In Progress:

- Dynamic plots/figures
- Export reports and data

Planned:

- Tutorial, help prompts
- More methods for filtering data
- Analysis widgets
- Dynamic styling
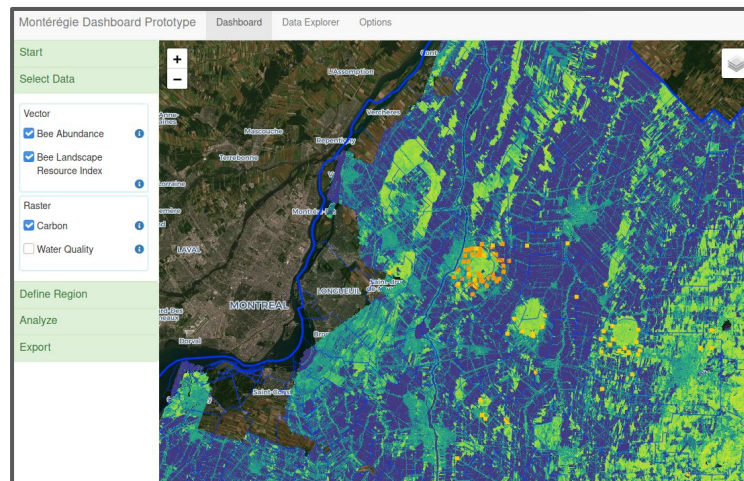
# Thoughts, Insights, Questions

- Additional features?
  - Core functionality missing
  - Tools specific to your work
- Are you interested in using a template to create your own custom dashboard?

bit.ly/agm21-feedback-dashboard

# Data Portal

Platform for sharing and publishing internal data

- Open source
- Self-service submission/management
- Metadata catalogue and standards
- View, style, combine layers
- Query attributes
- Share interactive maps
- Download datasets for further analysis



GeoNode

**MANAGEMENT AND PUBLICATION OF GEOSPATIAL DATA**

Users can upload geospatial data from different file types, including Shapefile and GeoTiff.

RASTER DATA

VECTOR DATA

METADATA

Securely stores geospatial data.

DATA MANAGEMENT TOOLS

Designed to be extended and modified; it can even be integrated into existing platforms.

Specialized tools to analyze geospatial data.

DATA MIXING

Open standards are compatible with external layers from OpenStreetMap, Google Satellite or elsewhere.

MAPS CREATION / MAP VISUALIZATION

Features a web-based styles editor to create maps.

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# Data Portal: Status

- GeoNode 3.2 released early May
  - Cool new features!
  - Fixed existing issues!
  - Introduced new issues!
- Development ongoing
  - Read-only mode
- Once stable
  - Announcement email
  - User registration instructions

# Data Portal

Guided Tour:

- User registration
- Adding layers
- Manage metadata
- Browse layers
- View/Manage layers
- Create maps
- Additional features

# Data Portal: Tour

User Registration & Management

- Linked to email
- Organize users by group
- Social features
- Shared login with other platforms
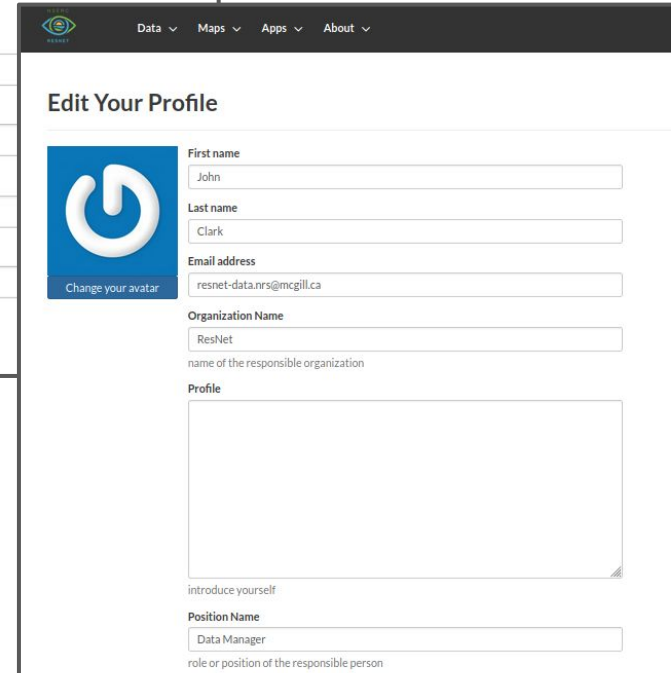
# Data Portal: Tour

Adding Layers

- Browse local machine and select
- Formats include
    - Vector: shapefile, geopackage, geojson
    - Raster: geotiff
- Size limitation
    - Issues uploading files > 200 mb
    - Coordinate with data team
- Set permissions



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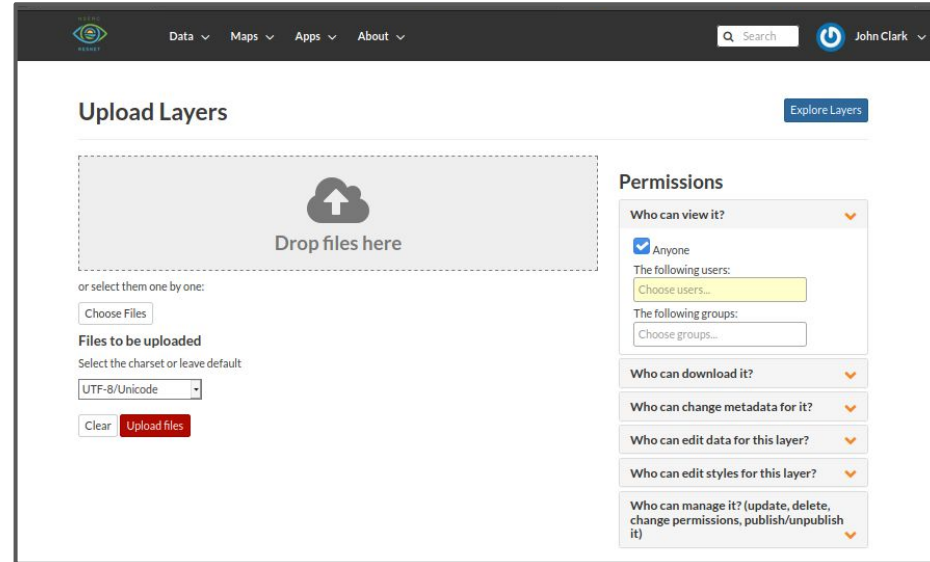
# Data Portal: Tour

Manage Metadata

- Methods
  - Wizard
  - Advanced Edit
  - Upload Existing
- Customize to our needs
  - ISO standards
  - Keywords, regions, etc
- Integrated Validation

# Data Portal: Tour

## Browse Layers

- Organization/Indexing
  - Keywords
  - Categories
  - Groups (eg landscape, theme)
  - Regions
  - Extent
- Visibility controls
  - Permissions set by owner
  - Group membership



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# Data Portal: Tour

View/Manage Layers

- Create styles
- Attribute definitions
- Download data
- Access services (eg WMS)
- Edit permissions

# Data Portal: Tour

Create Maps

- Combine layers
- Adjust styles
- Save and share



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# Data Portal: Tour

Additional Features

- Remote Services
  - Access data from external map servers
- Documents
  - Upload supporting information
- Apps Catalogue

# Thoughts, Insights, Questions

- Are there aspects of the Data Portal you're excited to use? Concerned?

bit.ly/agm21-feedback-portal

# Upcoming:

- ● User Survey
  - ○ Research Environment
  - ○ Current Practices
  - ○ Support Priorities
- ● Workshops
  - ○ ResNet Data Orientation
    - ■ First session Fall 2021
  - ○ Data Portal Onboarding
  - ○ Data Management

- ● Data Policy and Documentation
  - ○ Data Management Plan
    - ■ Roles and responsibilities
    - ■ FAIR, CARE principles
  - ○ In depth guidelines and best practices
    - ■ File formats
    - ■ Metadata
    - ■ Projections
    - ■ Data types

# Data Essentials:

What do you need to track this summer?

- External Data
- Internal Research
- Field Work

*Remember, more in depth guidelines will be available soon!*
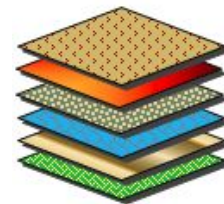
# Data Essentials: External Data

**Document your inputs!**

Always document:

- Source (URL, platform, point of contact)
- Attribute definitions (description, units)
- Processing steps
  - Initial projection
  - Transformations

When possible:

- Preserve an unmodified copy
- Retrieve existing metadata
- Licensing and usage agreements
- Share your findings with the network!

# Data Essentials: Internal Research

**Document your workflow!**

- Coding
  - Use versioning
  - Comment as you go
- Create a "readme.txt"
  - Describe directory structure
  - Document outputs
    - Attribute description
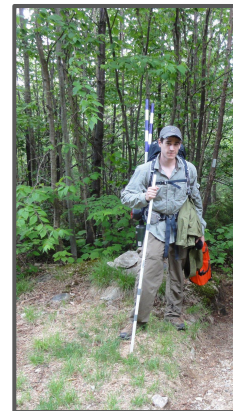    - Projection
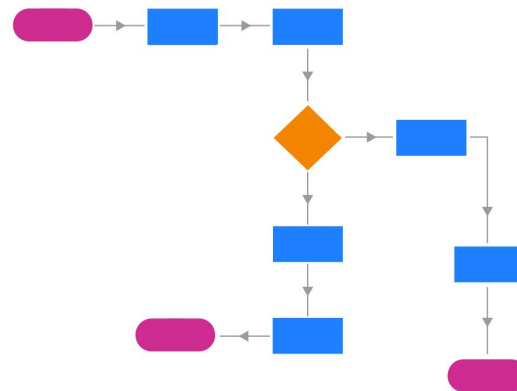
**Maintain backups!**

# Data Essentials: Field Work


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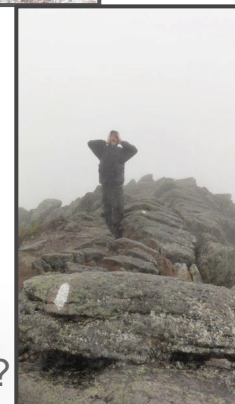RESNET


Day 001

Establish a data plan before heading out

Organize, digitize, and clean your data early and often

Take pictures!

- Amplify your research impact
- Great resource for ResNet


Day 1??

# Data Essentials: Resources

"Good enough practices in scientific computing" - Wilson et al 2017 http://bit.ly/agm21-scicomp

"Data Organization in Spreadsheets for Ecologists" - Data Carpentry http://bit.ly/agm21-sheets

"Metadata Questionnaire" - USGS http://bit.ly/agm21-metaqs


Shared dataset discovery doc: http://bit.ly/ResNetDataDoc

ResNet Slack channel: 'data'

Contact John Clark: resnet-data.nrs@mcgill.ca


Additional thoughts, comments, or feedback?
bit.ly/agm21-feedback-general