

2025 LTER Information Management Committee Annual Meeting Report

held virtually via zoom

September 8 & 9, 2025

Participants:

Dan Bahauddin (CDR), Sven Bohm (KBS), Adrienne Canino (NGA), Jason Downing (BNZ), Marty Downs (LNO), Stevan Earl (CAP), Sarah Elmendorf (NWT), Marina Frants (CCE), Mark Gahler (NTL), Hsun-Yi Hsieh (KBS), Gabriel Kamener (FCE), Hillary Krumbholz (MCR), Li Kui (SBC), Jim Laundre (ARC), Sage Lichtenwalner (PAL), Nick Lyon (LNO), Mary Marek-Spartz (MSP), Mary Martin (HBR), Gregory Maurer (JRN), Risa McNellis (PIE), Induja Mohandas (BLE), Kate Morkeski (NES), John Porter (VCR), Suzanne Remillard (AND), Mike Rugge (FCE), Adam Sapp (GCE), Mark Servilla (EDI), Tim Whiteaker (BLE), Yang Xia (KNZ)¹

¹ To prepare this report, the authors used *claude.ai* to summarize community notes and the transcription from the zoom recording of the live meeting. After using this service, the Information Management Committee reviewed, edited, and augmented the content as needed, cross checking against notes taken during the meeting and presentation materials.

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Agenda

2025 LTER IMC Annual Meeting Agenda (Virtual; September 8 and 9)	
Time (Eastern)	Activity
MONDAY	
1:00	Welcome, introduction icebreaker activity, agenda review.
1:45	IM Exec Election (1 member) & EB rep (1)
2:00	Databits - overview of new structure, tour of the google drive, Volunteer for next Databits standby editor [Hillary]
2:15	EDI Report [Greg]
2:30	Short break (10 min)
2:40	LNO Report [Marty]/Strategic plan feedback
3:10	Non tabular data (Greg)
4:00	Adjourn
TUESDAY	
1:00	IMKE - going beyond download counts (Mary M-S, Hillary, Sarah)
1:20	What are you nerding out on - non random groups (all)
1:45	IMKE - AI tools (Li/Mary Martin); PAR reporting - Mary Martin /batch report to PDF_A (Li);
2:00	How do you stay up to date in your research community?
2:20	EML - techniques (random breakouts)
2:45	Short break (15 min)
3:00-3:50	Future of IM roles (random breakouts)
4:00	Adjourn

Meeting materials

A community slide deck for the meeting is in IMC's Google Drive ([2025 IMC Annual Meeting slide deck](#)). Slides from the full meeting program and breakout activities are also reproduced in

[Appendix A](#). A tabbed community notes document is also in the IMC's Google Drive ([2025 IMC Annual Meeting Shared notes](#)).

Welcome and Icebreaker Activity

The meeting began with a welcome from Gabriel Kamener, who reminded participants that the meeting was governed by the LTER Code of Conduct. Gabriel outlined the agenda and noted that meeting transcriptions and AI tools would be used to generate a draft meeting report, with participants having the opportunity to review before finalization.

An icebreaker activity followed, where participants broke into small groups to discuss what they were "nerding out about." Topics included immersive outreach & accessibility; sensing, imaging & field tech; data pipelines, web, and infrastructure; AI/ML applications and challenges; long-term ecological science topics.

IMC Business Meeting

The business portion of the annual meeting consists of IM Executive Committee elections, updates about LTER's participation in ILTER's (International Long-Term Ecological Research) Information Management Committee, updates about DataBits, and updates from two of our partner organizations: the LTER Network Office (LNO), and EDI.

IMExec Election

This year the IM Exec had an opening for one position, and there was an opening for IMC Representative to the LTER Executive Board. The terms for Sarah Elmendorf (IM Exec), and Mary Martin (EB Rep) ended in 2025. There were two nominations for the IM Exec position and three nominations for the EB Rep position.

Statements from IM Exec nominees

Risa McNellis (PIE)

"I am excited for the opportunity to run for a position on the LTER Network IM Executive Committee. I have been the IM at the PIE LTER for three years, where I have been working to improve our data accessibility, increase engagement among our graduate students, and streamline the data publication process. As part of my position, I also manage several of our long-term field sensors and assist with field campaigns, which gives me the opportunity to understand the

unique issues we face as a marsh site and how that impacts our data lifecycle. I would be happy to continue to advocate for improving accessibility to data management practices and increasing engagement from researchers in the data publication process as part of the IM Executive Committee.”

Kate Morkeski (NES)

“One of the best aspects of being an LTER IM is being part of the network of IMs from all the other sites. I would be happy to serve this network as part of the IM Exec. I see opportunities for us to learn more from each other in the form of the tools and practices we use to do our jobs well. As a relatively new IM but with deep roots in LTER site research, I am often curious about what efforts we may be unintentionally duplicating in our data management practices across sites as well as what works best to do this job efficiently. I would be honored to help strengthen our connections to each other in these challenging times and to support the work of all the LTER IMs through serving on the IM Exec committee.”

Statements from EB Rep nominees

Sarah Elmendorf (NWT)

“I will be rolling off the IMExec this term, and willing to take on the role of IM Rep to the LTER executive board. I have some familiarity with the work of the EB from attending the science council meeting in 2024 as Mary Martin (current EB reps) replacement. In my role at Niwot, I exist in the grey area in between IM, data scientist, statistician and ecologist, and am comfortable translating between these different communities.”

Stevan Earl (CAP)

“Change is constant but it feels particularly pronounced. The titanic force of AI is changing not only how information managers work but the very science that we support. At the same time, the fiscal climate, and attitudes about science and education already are affecting the LTER and ecological sciences broadly. Our representative to the Executive Board (EB) always has been an important position within the IMC, but effective communication and integration with the LTER leadership are more important than ever in this landscape. I have appreciated a nice reprieve from service since I last served on IM Exec but am happy to contribute again if I can help, whether that be as the representative to the EB or supporting any of the superb information managers who have contributed to the IM Exec over the years in that role.”

Sven Bohm (KBS)

“As a site data manager with 3 large projects (LTER, GLBRC, LTAR) I deal with a variety of, sometimes conflicting, set of approaches, priorities and processes. So I can bring perspectives from different communities to the position. I am an advocate for accessibly and open well documented data including the analysis pipelines to promote rigorous and reproducible science. I would welcome the chance to contribute to the IM Exec with a focus on the current challenges and opportunities presented by AI and changing requirements and expectations.”

Election outcomes

Risa McNellis was elected to fill the open seat on the IM Executive committee, and Sarah Elmendorf was elected to fill the open seat for EB Rep.

ILTER

Gabriel Kamener provided an update on the ILTER representative position. He noted that Renée Brown would be leaving the position, but that it would remain open for anyone interested. The position involves approximately one virtual meeting per month but does not have funding to support travel.

Databits

Hillary Krumbholz provided updates on Databits. The shared drive folder has been reorganized for clarity, and a Google Form has been created to alert editors when new articles are ready to post. Marina's term as Databits Editor has ended, and the team is moving toward a "standby editor" model. A volunteer was requested for the standby editor position. In addition, there is no requirement on the number of articles per year.

EDI Report - Greg Maurer (EDI/JRN) and Mark Servilla (EDI)

This presentation began with EDI personnel updates, including the departure of Bennett McAfee, a graduate student data curation intern, and Mark's movement toward retirement while still working to support the repository.

Repository statistics were impressive, with approximately 85,000 total published data packages (including revisions), 30,000 LTER datasets, increasing download rates (with most coming directly from EDI rather than DataONE), 15 terabytes of data managed, and nearly 5,000 journal citations.

Infrastructure changes included completed migration to AWS (EC2 cloud for compute, S3 buckets for storage), with stable and affordable costs for virtual machines and storage. Currently, there are no egress costs due to a university agreement with AWS.

Upcoming major infrastructure changes include a new Identity and Access Management (IAM) system that will feature distributed IAM service outside the core repository, management of access control outside of EML, user and site ability to create and manage their own groups, user profiles with internal unique identifiers, and API authentication keys.

Another major change is the single “production” platform, which involves merging staging and production environments, improved stage-to-published workflow, mutable staged data packages, and private access options for staged packages. Data package thumbnails are also being introduced, with options for user-provided thumbnails (JPEG or PNG) at data package and entity levels or system-provided icons for PDF, ZIP, Excel, and tables. Adding thumbnails will be supported via REST API, Data Portal UI, and within EML additional metadata.

The tentative timeline for the changes forecasts the IAM system and thumbnails will be implemented by Nov. 2025, and the single platform by Dec. 2025/Jan. 2026.

ezEML updates include NSF funding award lookup, improved metadata checking, upload of responsible parties from CSV files, direct download of data entities, template management improvements, QUDT unit annotations, and taxonomic tree creation from authorities.

Future planning includes an infrastructure capacity proposal submitted for core repository technology redevelopment and community-driven development projects, including AI-assisted metadata enhancement, data discovery improvements, metadata standards development, and cloud-native data format collaboration with NEON.

Regarding EDI sustainability, EDI is being incorporated as a non-profit (Environmental Data Institute) and working with University of Wisconsin's Alumni Research Foundation. Repository and core services are secure through 2026, though limited personnel budgets may lead to potential team reductions. A meeting with NSF program officers is scheduled for Sep. 2025, and continued collaboration with other repositories on sustainability efforts is ongoing.

The presentation concluded with a call for feedback from LTER Information Managers about which EDI services are most valuable to them and how EDI can best support their work in the future.

LTER Network Office Report and Strategic Plan Feedback - Marty Downs, Director of the Long Term Ecological Research Network Office

Marty Downs presented on LTER Network Office activities and challenges. Key activities included the Synthesis Skills for Early Career Researchers program (25 participants), funding for synthesis working groups continuing at current pace, site exchanges facilitated, site culture survey completed with results reported back to sites, and strategic planning efforts.

Budget and staffing challenges were significant, with the Network Office losing 50% of funding for the coming year. Staff reductions included Gabe and Molly being laid off, Christina's grant ending, and Nick's time reduced by 50%. The remaining staff includes only Marty and Nick (half-time). Participant support is maintained to continue synthesis activities, but the community platform has been closed, with Google Groups now serving as the primary communication tool. There is reduced social media presence and newsletter scope, and uncertain future for all-scientist meetings and other network-wide activities.

The strategic plan discussion focused on looking forward rather than assessing the past strategic plan. Concerns were raised about negative framing of cross-site integration challenges. EcoComDP was discussed as an example of scientists and information managers collaborating effectively. Participants recognized the need to highlight LTER's unique strengths in long-term data collection.

Non-tabular Data Document Breakout - Greg Maurer (EDI/JRN)

Gregory Maurer led a session on revising the "Data Package Design for Special Cases" document. The document was created by an LTER-based working group from 2019-2021, published as a PDF on EDI in 2021, and moved to GitHub Pages in 2022. The session focused on creating GitHub issues for each chapter to frame updates. Breakout groups worked on specific chapters to identify needed revisions, with discussion of possibly forming a new working group to revise the entire document.

Key feedback included the need to revise recommendations for code publishing (codemeta), improve document flow and organization, separate general recommendations from EML-specific guidance, update for newer technologies and practices, and provide better decision frameworks for various data types.

IMKE Talks

The IMKE Lightning Talks returned for their third year at our Annual Meeting, offering quick (~3-minute) presentations focused on tools, techniques, or tips for information management at LTER sites. Participants shared insights on engaging communities beyond download counts, AI tools, and tips or tools to aid NSF PAR (Public Access Repository) submissions. These concise, practical talks were designed to spark interest and provide actionable ideas that IMs from other sites could easily explore further. All presenters submitted slides that are archived in [Appendix A](#).

IMKE - Going Beyond Download Counts

Three presentations shared ways sites are engaging with their communities beyond basic data metrics.

Sarah Elmendorf (NWT) discussed real-time meteorological data sharing with NOAA and National Weather Service for weather forecasting, data-driven art initiatives including "Tempestry" weavings showing temperature changes over time, TundraCam allowing virtual exploration of Niwot Ridge, Mountain Consortium partnership with agencies and nonprofits, and data dashboard with long-term trends and statistical analyses for partner organizations.

Hillary Krumbholz (MCR) presented on collaboration with local NGO Reva Atea on "Te Moana Iti" (Small Ocean) program, developing marine science curriculum for fifth-grade students in Moorea, French Polynesia, creating classroom aquaria with different experiments for hands-on learning, and plans to incorporate MCR data in future curriculum for older students.

Mary Marek-Spartz (MSP) shared information about the Minneapolis-St. Paul Urban LTER's public engagement through research in public spaces, community partnerships driving research questions, Emerald Ash Borer project in North Minneapolis with community-driven data collection, air quality monitoring with lichens and sensors at schools, and development of child-friendly outreach to explain research without causing alarm.

IMKE - AI Tools and PAR Reporting

Li Kui presented on privacy settings for large language models (Claude, ChatGPT, Gemini), demonstrated how to turn off data training in each platform, and announced upcoming Virtual Water Cooler (VWC) sessions on AI topics including AI Information Privacy, AI-powered tools for literature review, and AI tools for EDI metadata collection.

Mary Martin demonstrated using AI (Claude) for transcribing handwritten historical weather records, showed how AI can generate summaries and tables from transcribed data, and noted the importance of quality control and proofreading AI outputs.

The PAR Reporting session (Mary Martin) provided instructions on adding datasets to PAR (Public Access Repository) for NSF annual reports, using the EDI dashboard to get DOIs for datasets published in the past year, and converting PDFs to PDF/A format (Li Kui) for PAR submission using online tools and Adobe Acrobat batch processing.

What are you nerding out on (non-random groups) - Breakout 1

Participants broke into focused groups to discuss topics distilled from the previous day's icebreaker: 1. AI successes and failures 2. Streaming sensor data 3. Data visualization for non-research audiences 4. Web applications and tools

Group 1 - AI Successes and Failures

This breakout session explored information managers' experiences with artificial intelligence tools, focusing on both successful applications and concerning failures. The discussion revealed a range of perspectives from enthusiastic adoption to strong rejection of AI integration into scientific workflows.

Group Members: Dan Bahauddin (CDR), Adrienne Canino (NGA), Sarah Elmendorf (NWT), Li Kui (SBC), Gabriel Kamener (FCE), Nick Lyon (LNO), Mary Martin (HBR), Induja Mohandas (BLE), Suzanne Remillard (AND), Yang Xia (KNZ)

Key Successes

AI for Coding Assistance

- Dan Bahauddin shared his basic approach of using Gemini (provided by his university) to generate code snippets when struggling with coding challenges
- Several participants found value in using AI to reduce tedious coding tasks

Visual Studio Code Integration

- Sarah Elmendorf highlighted VS Code's AI integration as "revolutionary" for her workflow

- The "diff" feature in VS Code was particularly praised, showing line-by-line changes suggested by AI
- This interface allows users to selectively accept/reject AI suggestions with greater control and transparency

Practical Applications

- Automating documentation (e.g., generating README files with file trees and descriptions)
- Figure customization and tweaking
- Code review capabilities (in one case catching a confidence interval coding error)
- Significant time savings for certain repetitive tasks

Best Practices

- Participants noted the importance of a "measure twice, cut once" mindset when using AI
- Human verification remains essential, particularly for tasks requiring domain expertise
- Github Copilot for Education was mentioned as providing free access to multiple AI models

Key Concerns and Failures

Privacy and Data Embargoes

- One participant shared a concerning example of a colleague uploading scientific data to ChatGPT, potentially violating embargoes by exposing unpublished data to AI training systems
- The "black box" nature of large language models raised significant ethical concerns

Efficiency Issues

- In the metadata creation example, using AI created additional work rather than saving time
- The AI-generated metadata still required extensive human verification
- Time spent prompting and checking AI outputs can sometimes exceed the time needed for direct human work

Quality Control

- AI suggestions often use outdated syntax (trained on code from ~2 years ago)
- Some AI-generated code appears syntactically correct but doesn't function as expected
- AI is not considered suitable for complex statistical analysis or domain-specific tasks

Learning Curve Concerns

- Sarah noted AI tools are "really hard to learn coding from" and potentially "high risk" for beginners
- Using AI requires understanding what to check and how to evaluate suggestions

Additional Insights

- Posit (creators of RStudio) are developing "Positron" with AI integration features
- Different perspectives on AI ranged from enthusiastic adoption to principled rejection ("I hate it. I'll never use it.")
- Information literacy, algorithmic literacy, and AI literacy were mentioned as important frameworks
- Concerns about AI being trained on potentially "bad AI," creating a cycle of problematic outputs

Conclusion

The breakout group revealed the complex landscape of AI adoption within the LTER information management community. While some participants have found significant workflow improvements through careful integration of AI tools, others raised important ethical concerns about data privacy, quality control, and the fundamental assumptions behind AI systems. The discussion highlighted the need for thoughtful policies and best practices around AI use in scientific data management.

Note: Li Kui mentioned an upcoming talk addressing some of the privacy concerns raised during this discussion.

Group 2 - Streaming Sensor Data

This breakout session focused on the challenges and approaches to managing streaming sensor data across LTER sites.

Group members:

Jason Downing (BNZ), Jim Laundre (ARC), Mary Marek-Spartz (MSP), Gregory Maurer (JRN), John Porter (VCR).

Common Challenges

- Multiple participants emphasized that managing sensor data has become extremely time-consuming, with Jim Laundre noting it "almost requires a full-time person"
- Quality control issues are significant, with Jim mentioning that sensor calibration problems might go undetected for "a year or two, or even more"
- Finding cost-effective solutions as proprietary systems become more expensive is a growing concern

Site-Specific Approaches

BNZ (Jason Downing)

- Has been using Vista Data Vision software for approximately 15 years
- The system allowed users to log in, create graphs, and download data from their real-time network
- Originally promoted by Campbell Scientific but now owned by Bentley Incorporated, a European conglomerate
- Becoming prohibitively expensive (\$5,000-\$10,000 annually) despite educational discounts
- Facing critical decisions as this system is how their technicians perform all QAQC and visualization

VCR (John Porter)

- Uses Campbell data loggers connected via 900 MHz wireless networks coupled with WiFi
- Has automated workflows where a shore-based computer downloads data and sends it to UVA hourly
- Scripts run every few hours to ingest new data, eliminate old data, and create graphs
- Older systems dating back to 1995 use SAS while newer ones use R
- Exploring cellular network technologies and LoRa for Internet of Things applications to avoid dependency on large-scale infrastructure
- Particularly interested in solutions for remote precipitation stations to avoid frequent site visits

Other Sites

- **PIE (Risa McNellis)**: Mentioned having live data streams from two weather stations on their website
- **MSP (Mary Marek-Spartz)**: Using cron jobs with the Purple Air API for air quality data
- **ARC (Jim Laundre)**: Previously used Vista Data Vision but discontinued due to cost
- **JRN (Greg Maurer)**: Noted increasing challenges with managing more sensor data at Jornada and getting it to EDI in a timely manner

Additional Topics

- Mary raised questions about using Raspberry Pi ZeroW for camera traps to monitor bumblebees in urban yards
- John Porter mentioned previous challenges with Raspberry Pi camera traps due to power requirements, but noted they should work well in urban settings with access to power

Conclusion

The group identified sensor data management as an increasingly significant burden across LTER sites, with particular challenges in:

1. Sustainability of workflows
2. Quality control and timely detection of sensor problems
3. Cost-effectiveness as data volumes grow
4. Finding alternatives as proprietary solutions become more expensive

Group 3 - Data Viz for a Non-Research Audience

The breakout group discussed data visualization for a non-research audience. Notes the group wrote down are included below, and no transcript of the conversation was submitted.

Group members: Sven Bohm (KBS), Hillary Krumbholz (MCR) Sage Lichtenwalner (PAL), Kate Morkeski (NES)

Sage has worked on OOI Data Lab “textbook” and OOI Data Lab Manual Widgets – using Ocean Observatories data to teach undergrad curriculum

<https://datalab.marine.rutgers.edu/ooi-lab-exercises/>

<https://datalab.marine.rutgers.edu/explorations/notebook3/>

Group 4 - Web Applications and Tools to Use

The breakout group discussed web applications and tools to use. Notes the group wrote down are included below, and no transcript of the conversation was submitted.

Group members: Stevan Earl (CAP), Marina Frants (CCE), Hsun-Yi Hsieh (KBS), Mike Rugge (FCE), Adam Sapp (GCE), Tim Whiteaker (BLE)

Several: lamenting how difficult it can be to find the time to do web development

Tim: Still running on Netlify, and interested to construct data visualizations sensu NWT

Marina: Using Plotly but running into limitations, such as adding a grid.

Tim: Offered several Plotly suggestions to Marina

How Do You Stay Up to Date in Your Research Community - Breakout 2

Breakout groups discussed approaches to staying current. Group 1 focused on social media (especially Blue Sky) for following specific researchers or topics and LinkedIn for professional networking. Group 2 mentioned newsletters like RDM Weekly, LinkedIn Learning, in-person conferences with dedicated hack sessions, brown bag lunches and coffee hours, and research software engineer training at intersecttraining.org. Group 3 highlighted All Scientists Meetings (national and site-level), social media (Blue Sky, Instagram, Signal), and attending graduate student presentations. Group 4 discussed various meeting formats from small groups to full community gatherings and limited use of Slack due to adoption challenges. Group 5 expressed preference for concentrated information delivery over constant social media and value of LTER monthly newsletters and Virtual Water Coolers.

Group 1

Group members: Stevan Earl (CAP), Marina Frants (CCE), Gabriel Kamener (FCE), Sarah Elmendorf (NWT), Nick Lyon (LNO)

Key Resources and Platforms

- **IM Community Engagement**
 - IMKE (Information Management Knowledge Exchange)
 - Virtual Water Coolers
 - Slack for problem-solving (though noted as less frequently used now)
- **Social Media**
 - Bluesky (especially for statistics content)
 - Andrew Heiss (Bayesian statistics)
 - Emily Riederer (R programming)
 - LinkedIn (for climate change community and professional networking)
 - Climate-focused newsletters
 - LinkedIn Learning courses (when institutionally available)
- **Technical Resources**
 - Stack Overflow for coding solutions
 - DuckDuckGo as preferred search engine (easier to avoid AI-generated summaries)
 - The Seascape Models blog:
https://www.seascapemodels.org/blueecology_blog.html (AI resources targeted at scientists)
 - GitHub training resources (despite some resistance to Microsoft products)

Notable Discussions

- Debate on AI vs. human solutions to coding problems
- Ways to avoid AI-generated search summaries (adding "-ai" to Google queries)
- Mixed experiences with Positron as an alternative to VS Code/RStudio

Group 2

Group members: Adrienne Canino (NGA), Induja Mohandas (BLE), Adam Sapp (GCE), Sage Lichtenwalner (PAL), Mike Rugge (FCE)

Key Resources and Platforms

- **Newsletters**
 - Domain-specific group newsletters
 - RDM Weekly (from ESIP): <https://rdmweekly.substack.com>
- **Conferences and Training**
 - RDAP (Research Data Access and Preservation) conferences and listserv

- LinkedIn Learning courses
- In-person IM conferences with breakout sessions and hack events
- Research Software Engineer Training: <https://intersect-training.org/>
- **Local Knowledge Exchange**
 - Brown bag lunches with graduate students and interns
 - PhD dissertation presentations and Q&A sessions
 - Coffee hours or water coolers (scheduled informal meetings)
 - Internal brown bag sessions from experienced team members

Group 3

Group members: John Porter (VCR), Hsun-Yi Hsieh (KBS), Yang Xia (KNZ), Mary E. Marek-Spartz (MSP), Hillary Krumbholz (MCR)

Key Resources and Platforms

- **Meetings and Communities**
 - All-Scientists' meetings (highlighted as particularly valuable)
 - Lab meetings when possible - but that is only a subset of labs - gives an idea on Grad Students
 - Biweekly staff meetings
 - IM Virtual Water Coolers and ESIP groups for technical information
- **Communication Channels**
 - Group Signal (used within MSP LTER as a Slack alternative)
 - Instagram and BlueSky (noted fewer using Twitter now)
- **Other Engagement Methods**
 - Field conversations
 - Annual graduate student meetings
 - Art group "rambles" that researchers often attend
 - Office hours (noted as poorly attended)
- **Communication Tools**
 - Standard emails for responding to students wanting to add data
 - Challenge: identifying which students are LTER-affiliated

Group 4

Group members: Sven Bohm (KBS), Dan Bahaiddin (CDR), Jim Laundre (ARC), Kate Morkeski (NES), Suzanne Remillard (AND)

Key Resources and Platforms

- **Meetings**
 - Local science meetings
 - Executive meetings
 - Lab group meetings (rotating attendance to keep up with different groups)
 - Monthly team meetings (on Zoom, one hour)
 - Annual meetings
- **Research Tracking**
 - Site research project lists
 - Site use request forms to track planned research
 - Individual or group meetings with PIs and graduate students
 - Working groups on specific topics
- **Institutional Resources**
 - Data Science Office Hours (combination of Slack, Zoom, and in-person)

Notable Discussions

- Interest in attending conferences but lack of funding
- Mixed results with Slack adoption (some sites found it ineffective)
- Value of connecting directly with researchers to understand their data needs

Group 5

Group members: Mary Martin (HBR), Jason Downing (BNZ), Gregory Maurer (JRN), Tim Whiteaker (BLE), Risa McNellis (PIE), Li Kui (SBC)

Key Resources and Platforms

- **Publications**
 - Academic journals (ESA, AGU)
- **Communities**
 - ESIP - described as a good community for IMs to participate in
 - LTER Virtual Water Coolers - described as "super valuable" for bringing IMs together regularly
- **Regular Updates**
 - Monthly newsletter or monthly meetings
 - Little traffic on Slack (only a few IMs use it)
- **Other Resources**

- Hacker News (noted as "a little bit useful" but can be a "rabbithole")

Notable Discussions

- Strong preference for the one-page monthly newsletters
- Value of regular meetings to maintain community connection
- Time constraints making it difficult to adopt multiple platforms
- Mixed feelings about social media for professional updates

EML Techniques - Breakout 3

Breakout groups discussed EML workflows and technologies. Many sites are still using traditional metadata database + R/Python/Perl code workflows established approximately 10 years ago, though there is increasing adoption of ezEML for metadata generation. A wide variety of implementation approaches across sites was noted, and discussions covered best practices for specific elements and data types.

Group 1

Group members: Mary Martin (HBR), Dan Bahauddin (CDR), Jim Laundre (ARC), Sarah Elmendorf (NWT), Gregory Maurer (JRN)

This group discussed diverse approaches to EML creation across sites:

- **Mary:** Fully committed to ezEML for all data packages, including updates to existing datasets
- **Jim:** Transitioned to ezEML with researchers initiating datasets before passing to IM for validation - custom systems harder to pass on and maintain
- **Dan:** Using ezEML but with limited collaboration, focuses on making metadata submission comfortable for researchers by collecting metadata in stages
- **Sarah:** Uses a dual approach - ezEML for graduate student one-off datasets (better for learning) but maintains R scripts for core long-term datasets which are easier to update
- **Greg:** Uses a metabase system with R scripts for core datasets but ezEML for student and publication-related datasets

The group highlighted the value of templates with pre-filled information like personnel, geographic areas, and keywords. They discussed the challenges of quality control and

standardization when collaborating with researchers, and expressed interest in AI applications primarily as proofreading tools for metadata consistency.

Group 2

Group members: Sage Lichtenwalner (PAL), Jason Downing (BNZ), Gabriel Kamener (FCE), Tim Whiteaker (BLE), Nick Lyon (LNO)

This group discussed various approaches with notable insights on the trade-offs between complex and simpler metadata systems:

- Most using ezEML (Sage, Jason, Gabriel) but some use Metabase (Tim)
- Discussion of whether extensive metadata effort is actually being rewarded or utilized
- Budget constraints making simpler systems more attractive
- GitHub repositories used to manage data and code together (Sage shared example: github.com/PAL-LTER/pal-weather)
- ezEML strengths include easier onboarding of graduate students
- Some sites create complementary materials to support EDI documentation
- Semantic annotations (beyond QUDT) and other complex metadata features not yet supported in ezEML

Group 3

Group members: Stevan Earl (CAP), Suzanne Remillard (AND), Mary Marek-Spartz (MSP), Kate Morkeski (NES), Yang Xia (KNZ)

This group discussed the transition between tools and workflows:

- **Yang:** Moving from DEIMS to ezEML, finding the transition relatively smooth
- **Suzanne:** Using a custom relational database mapped to EML; has ezEML template for researchers but finds no time savings
- **Stevan:** Using a scripted approach (homegrown EML assemblyline for CAP)
- **Kate:** Using EMLassemblyline package in R for most datasets, ezEML for one-off student projects
- **Mary:** Finds collaboration in ezEML sometimes challenging with researchers

The group shared experiences with tool transitions and discussed the difficulties maintaining standardization across datasets. Kate shared a GitHub link to a minimal template for EML Assembly Line (<https://github.com/WHOIGit/minimal-edi-package>).

Group 4

Group members: Hillary Krumbholz (MCR), Mike Rugge (FCE), Hsun-Yi Hsieh (KBS), Risa McNellis (PIE)

This group focused heavily on ezEML experiences:

- Extensive use of ezEML across sites, with positive feedback
- Value of collaboration features for working with students and helping them understand data quality
- Templates for personnel and projects save time
- Upload from CSV makes it easier to add information like keywords and taxonomy
- Oxygen used for specialized formatting needs (equations, subscripts, etc.)
- Limited use of AI tools currently, though Grammarly mentioned for text checking
- EDI dashboard tools considered very useful

Group 5

Group members: John Porter (VCR), Adam Sapp (GCE), Li Kui (SBC), Adrienne Canino (NGA), Induja Mohandas (BLE)

This group discussed the historical context and technical aspects of EML:

- Most using metabase-style systems with scripts to generate EML
- John noted that EML was originally controversial, evolving from an exchange format to a standard
- Several options discussed: metabase, ezEML, and templates
- Adrienne exploring transition from existing systems to EDI
- Character sets and special symbols in text identified as persistent challenges
- EML checker tools provide cryptic error messages
- Use of spreadsheet templates to R to SQL for attribute entry

Common Themes Across Groups

1. **Growing adoption of ezEML** - Particularly for new datasets and student work
2. **Dual systems approach** - Many sites maintain separate workflows for core long-term datasets vs. new/one-off datasets
3. **Templates are essential** - Used across tools to ensure consistency and save time
4. **Collaboration features valuable** - ezEML's collaboration capabilities help with training students

5. **Custom vs. standard tools** - Ongoing tension between standardization and site-specific needs
6. **Limited AI application currently** - Interest in potential but cautious approach to implementation
7. **Sustainability concerns** - Consideration of how systems will transition to future staff

Future of IM Roles - Breakout 4

Breakout groups discussed challenges and opportunities for information managers. Challenges included funding uncertainty and potential reductions, the need for increased advocacy for IM within programs, AI technologies creating both opportunities and concerns, and researchers becoming more data-savvy and using external repositories.

New tools and technologies discussed included AI for data processing and quality control, Quarto for documentation, training, and websites, Git and GitHub for collaboration and version control, and the need for more training resources and knowledge sharing.

Opportunities to stay relevant included serving as connectors between research teams and datasets, participating in synthesis groups to highlight IM importance, engaging with communities outside LTER (ESIP, etc.), and developing data dashboards and interactive tools.

Integration with other roles was also discussed, including the blurring lines between IM, data science, and project management, the possibility of rebranding as a "data science committee," and the need for training coordination across sites.

Group 1

Group members: Mary E Marek-Spartz (MSP), Jason Downing (BNZ), Yang Xia (KNZ), Sarah Elmendorf (NWT), Hillary Krumbholz (MCR)

This group focused on the evolving nature of the IM role and the importance of data strategy rather than just data curation:

- **Shifting Role:** Moving from data curation to becoming data strategists, with excitement about AI taking over more curatorial tasks

- **Advocacy and Communication:** Every IM has had to become an advocate for their work and the importance of LTER data
- **Training Challenges:** Difficulty getting researchers and students to attend trainings, with concerns about how to keep training materials current
- **Data Policy Leadership:** Opportunity for IMs to advise on data policy and data management plans
- **Data Sovereignty:** Growing interest in data sovereignty issues and advising researchers on how to avoid extractive data practices
- **Membership and Standards:** Some sites have established formal membership levels and code of conduct to clarify responsibilities
- **GIS Focus:** Interest in reviving the GIS working group to share specialized knowledge
- **Knowledge Sharing:** Discussed creating a library of vetted resources for IM self-learning

Group 2

Group members: Mike Rugge (FCE), Gabriel Kamener (FCE), Greg Maurer (JRN), Induja Mohandas (BLE), Nick Lyon (LNO)

This group discussed technological changes and strategies to keep the IM role relevant:

- **AI Experimentation:** Currently in an experimentation phase with AI tools, looking to find tasks that maximize efficiency with minimal errors
- **Cross-Community Engagement:** Need to encourage communication between LTER and non-LTER communities
- **Tool Adoption:** Discussion of newer tools like Quarto, GitHub, and RStudio adoption across the community
- **Data Volume Challenges:** Increasing data volumes and complexities in handling large datasets
- **Synthesis Participation:** IMs participating in synthesis working groups as a way to stay relevant
- **Professional Development:** Interest in ESIP meetings and clusters for gaining awareness of new technologies
- **Community Resources:** Discussion of creating channels for knowledge sharing around specialized topics

Group 3

Group members: Tim Whiteaker (BLE), Suzanne Remillard (AND), John Porter (VCR), Sage Lichtenwalner (PAL), Hsun-Yi Hsieh (KBS)

This group focused on the core data archiving role and how it might evolve:

- **Core Role:** Emphasis on the fundamental role of getting data archived and into repositories
- **ezEML Assessment:** ezEML is helpful but may not push work down to end users effectively
- **AI as Assistant:** View of AI as a tool similar to having an intern - requires expertise to use effectively
- **Trust Issues:** Concerns about trusting AI outputs without expert oversight
- **QA/QC Importance:** Continued focus on quality assurance and control
- **Visualization Interfaces:** Interest in specialized visualization interfaces and data dashboards
- **Institutional Knowledge:** Concerns about capturing institutional knowledge that isn't documented
- **Future Outlook:** Recognition that IMs will likely be "doing less with less" due to funding cuts

Group 4

Group members: Adrienne Canino (NGA), Dan Bahauddin (CDR), Kate Morkeski (NES), Mary Martin (HBR)

This group highlighted practical challenges and efficiency strategies:

- **Funding Variability:** Extreme variations in funding across sites
- **Repository Requirements:** Challenges when changing repositories due to site visit reviews
- **Workflow Efficiency:** Finding opportunities to save time and money in workflows
- **Templated Approaches:** Success with assembly line and Markdown automated data flows for repeatable tasks
- **Common Tools:** ezEML helping create more similar workflows across sites
- **Data Metrics:** Interest in reporting based on data use metrics
- **Funding Uncertainty:** Concerns about future cuts and timing

Group 5

Group members: Stevan Earl (CAP), Jim Laundre (ARC), Adam Sapp (GCE), Li Kui (SBC), Risa McNellis (PIE)

This group discussed technological adaptation and changing roles:

- **Researcher Independence:** Challenge of researchers bypassing IMs to publish data directly to repositories
- **Role Expansion:** IM role expanding to include more data analysis and visualization
- **Data Format Standardization:** Discussion of ecocomDP and GBIF integration for biodiversity data
- **AI Training:** Development of AI training resources for researchers
- **Coding Efficiency:** Using AI to improve coding speed and efficiency
- **Technical Skills:** Need for IMs to maintain enough technical knowledge to evaluate AI outputs
- **Knowledge Transfer:** Concerns about transitioning from custom systems to more standard approaches

Appendix A: Full-day meeting slides

2025 IMC Annual Meeting



September 8 and 9 2025 - virtual meeting

Welcome

- [LTER Code of Conduct](#)
- [Virtual meeting spreadsheet](#)
- [Shared notes document](#)

Time (Eastern)	Activity
MONDAY	
1:00	Welcome, introduction icebreaker activity, agenda review.
1:45	IM Exec Election (1 member) & EB rep (1)
2:00	Databits - overview of new structure, tour of the google drive, Volunteer for next Databits standby editor
2:15	EDI Report (Greg)
2:30	Short break (10 min)
2:40	LNO Report (Marty)/Strategic plan feedback
3:10	Non tabular data (Greg)
4:00	Adjourn
TUESDAY	
1:00	IMKE - going beyond download counts (Mary M-S, Hillary, Sarah)
1:20	What are you nerding out on - non random groups
1:45	IMKE - AI tools (Li/Mary Martin PAR reporting - batch report to PDF_A (Li);
2:00	How do you stay up to date in your research community?
2:20	EML - techniques (random breakouts)
2:45	Short break (15 min)
3:00-3:50	Future of IM roles.
4:00	Adjourn

Ice Breaker

Break into groups of 4-5

- Talk about what you're nerding out about, taking notes along the way (20 min).
- Rejoin main Zoom meeting and report back (10 min).

What are you nerding out about?

(Can be your research, a side project, a cool paper you read, a hobby, or even a random fact.)

- How did you find out about it?
- What do you find most interesting about it?
- How does it connect to your work or life?
- How have you gone about investigating it?
- If someone else wanted to explore it, where should they start?



IMC Elections - Thank you!



Sarah Elmendorf



Mary Martin

IMC Elections

IM Executive Board Rep:



Sarah Elmendorf



Stevan Earl



Sven Bohm

IM Exec member:

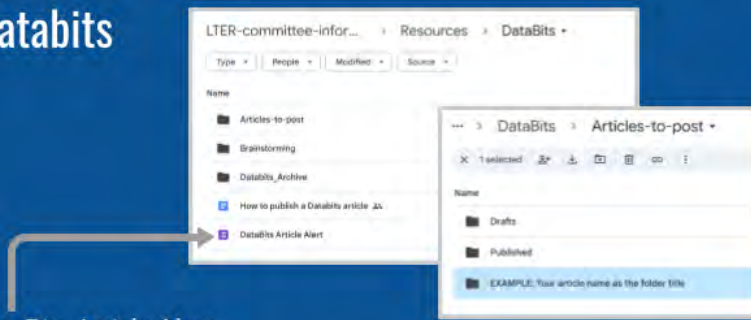


Risa McNellis



Kate Morkeski

Databits



DataBits Article Alert

- Authors will fill out form to let editors know they have uploaded a draft of their article
- [Google Form](#) (located in the DataBits folder)

Standby Editor

- Editor as needed, only when an article is ready for review. Shift away from regularly scheduled articles.

EDI Report

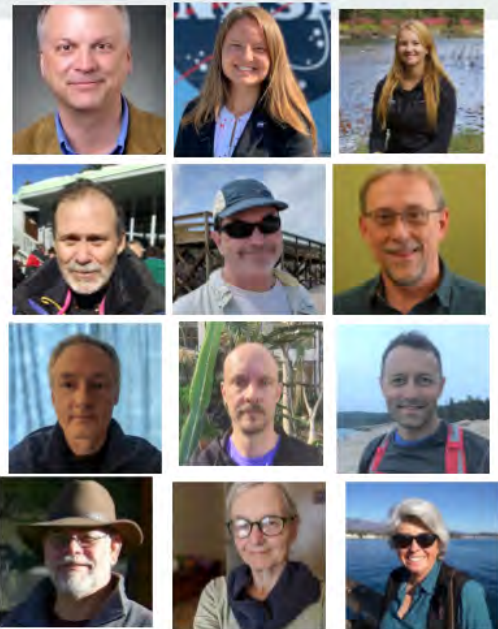
EDI Update 2025

EDI team



Personnel

- Graduate student data curation interns
 - Bennett departed
 - Emma Marchisin and Sophia Skoglund
- Everyone else maintaining!



Data stats

1. Data publications from over 130 countries:
 - a. Total - 85,344 (including LTER Landsat and Ecotrends)
 - b. EDI + LTER - 33,393
 - c. LTER - 30,328
2. Data downloads (since 2019):
 - a. Total - 17,060,504 (including DataONE System)
 - b. User - 5,116,278 (including DataONE user requests ~1%)
3. Data volume managed - 14.7TB
4. Recognized journal citations:
 - a. Data packages cited - 4,750 (LTER 3,524)
 - b. Unique publications - 2,150
5. Number of represented researchers - 5,279
6. 53% data packages list NSF funding, 507 unique NSF award IDs



Global extent of EDI data packages

Scope and growth areas

Basic research

LTER

NEON-derived products
 Other large projects (e.g., EFI, Carey Lab, MSB-EcoKGML, LAGOS, OBFS and sites, LakeView)
 Smaller projects

Land Management & non-profit

Ohio Wetlands Monitoring
 CA Nature Reserve Network
 CA Central Valley Project Improvement Act (USBR, USFWS)
 CA Department of Water Resources

Municipalities

City of Seattle, WA



non-LTER scopes, like "edi"

- Often requiring curation assistance
- Many of these are growth areas

67% of our datasets have funding information, of those over 87% list NSF funding, 507 unique NSF award IDs are listed



Infrastructure changes in 2025

- Transition to AWS EC2 (compute) and S3 (storage) was successful!
- We are monitoring VM and storage costs; they seem stable and affordable.
- Network ingress/egress are not charged under our university agreement.*

**this may not always be the case...*



EDI Major Infrastructure Changes on the horizon

- Identity and Access Management (IAM)
- Single “production” platform
- Data package thumbnails



Identity and Access Management (IAM)

- Distributed IAM service
- Non-EML access control
- User managed groups
- User profiles with internal unique identifiers
- API authentication keys



Single “production” platform

- Merge production and staging infrastructure into one system
- Support for “staged-to-published” workflow
- Staged data packages are:
 - Mutable, including full delete
 - Without a DOI
 - Can be fully private, no public access
- Published data package are:
 - Immutable
 - Receives a DOI
 - Must provide metadata public access



Data package thumbnails

- User provided thumbnail images for:
 - Data package
 - Data package entities
- Not tied to immutable data package resources
- Must be either JPEG or PNG and less than 50kb
- System provided thumbnails for certain data types (e.g., PDF, Zip, Excel, Tables)
- Add by:
 - REST API
 - Data Portal UI
 - Within EML additional metadata (via ezEML or other)



Timeline (tentative)

- IAM: November 2025
- Single platform: December 2025/January 2026
- Thumbnails: November 2025



ezEML - New Features

- NSF Funding Award lookup
- Improved Error/Metadata Checking
- Load Responsible Parties from CSV files
- Download Entity links
- Template management features improved
- Automatic QUDT Units Annotations
- Taxonomic expansion from authorities (in progress)
- Numerous UI refinements



ezCatalog - coming soon

- Updated UI
- Thumbnails!



Waiting in wings: Repository Infrastructure Refresh

Submitted to NSF DBI Infrastructure Capacity for Biological Research - Beginning Fall 2026 timeframe?

Goals:

- Cloud-centric to manage data at scale
- Microservice design for cost efficiency, scalability, resilience, and agility
- Integration of multi-CSP services, including commercial and institutional
- Software transition from Java to Python



Community-driven development

- EDI repository enhancements
 - AI-assisted metadata enhancement (read data table → generate entity and column metadata)
 - Data discovery (faceted search, knowledge graphs (still))
- Community data and metadata standards
 - Expanding ecomDP in partnership with NEON
 - Making environmental/biological data "FAIR for AI" and "AI-ready"
 - Sample inventories with SESAR2-issued IGSNs
- Data publishing collaborations
 - Publishing and using cloud-native data formats (also with NEON)
 - Getting EDI & LTER data to GBIF (still...)

We would love to help LTER IMs and get you involved!

EDI sustainability

In 2023 EDI began a strategic planning pilot program through NSF's TIP directorate

We worked with an "embedded" entrepreneurial expert from Noble Reach (Matthew Stadler) to determine a sustainable path for EDI

EDI has incorporated as a non-profit (Environmental Data Institute)

We are seeking cooperation and support from Universities and other partners.

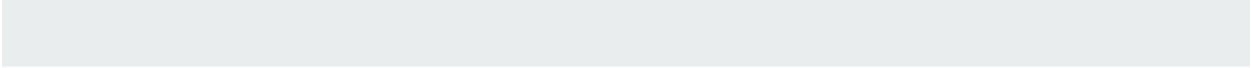
There are still MANY open questions right now



What are we learning?

1. Standing up a nonprofit and reaching sustainability takes time (more than we thought)
2. We still need NSF and LTER support in the interim
3. We are strongly committed to our data preservation & reuse mission, AND to *envisioning and supporting the future of LTER data.*
4. The U.S. science funding and data security environment is highly uncertain right now.

We're currently optimistic, but EDI has entered a high-risk period!




So whats next?

The EDI repository and its core services (like ezEML) are secure and supported for the medium-term future.

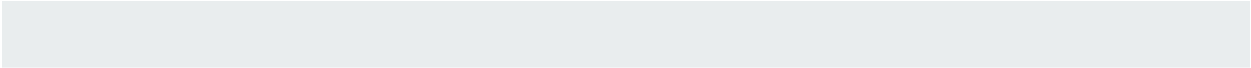
Personnel budgets are limited and EDI's team may thin out.

We meet with NSF program officers this month.

We are working on sustainability collaborations with other repositories.

EDI would like to hear from you!

- What EDI services are most valuable to your work as an LTER IM?
- How should we be supporting you and LTER?




What questions do you have?

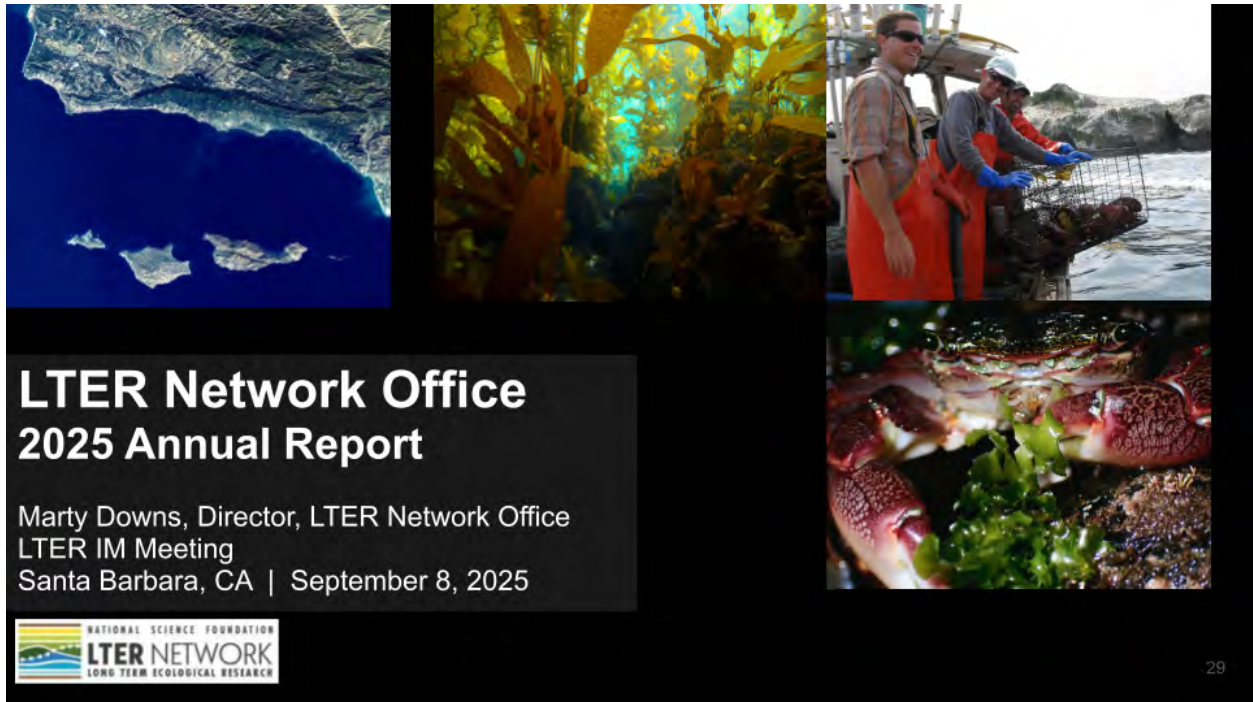


Thanks!

EDI is supported by NSF (under
Award Numbers [#2223103](#) and
[#2223104](#)) - views expressed in
this presentation do not
necessarily reflect those of NSF.

General EDI inquiries: info@edirepository.org
EDI support: support@edirepository.org

LNO Report



LTER Network Office 2025 Annual Report

Marty Downs, Director, LTER Network Office
LTER IM Meeting
Santa Barbara, CA | September 8, 2025



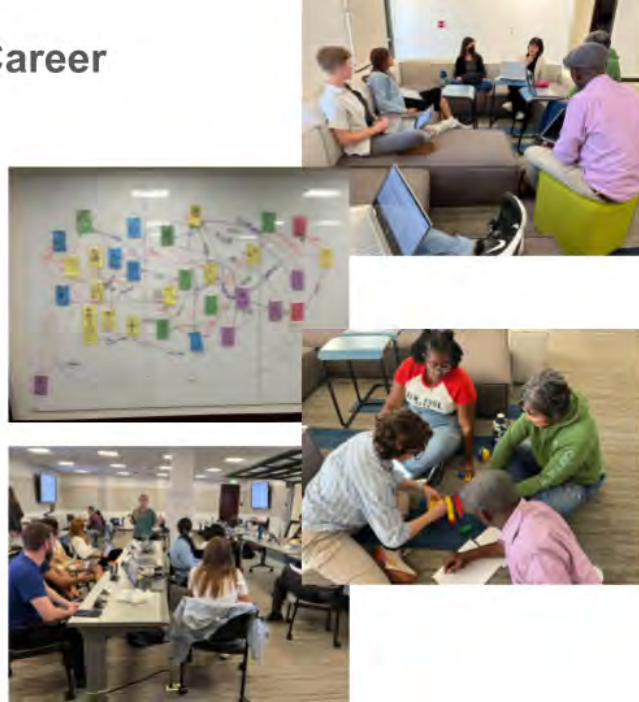
29

Major LNO Activities

- Synthesis Skills for Early Career Researchers
- Synthesis Working Groups
- Site Exchanges
- Site Culture Survey
- Crisis Response
- Downsizing
- Strategic planning and resource development

Synthesis Skills for Early Career Researchers

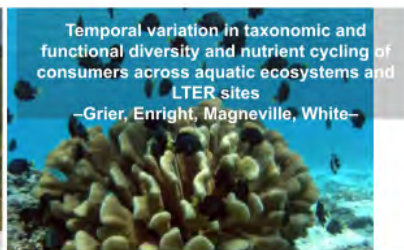
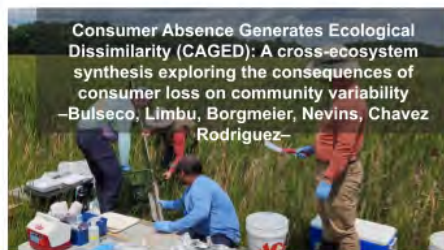
- 25 participants
- 17 sites
- 4 small group projects
- 7 project mentors
- 19 networking speakers
- 10 co-creators
- 1 ESA Symposium
- [17 course modules](#) available for re-use



2024 Full Synthesis Working Groups



2025 SPARC Synthesis Working Groups



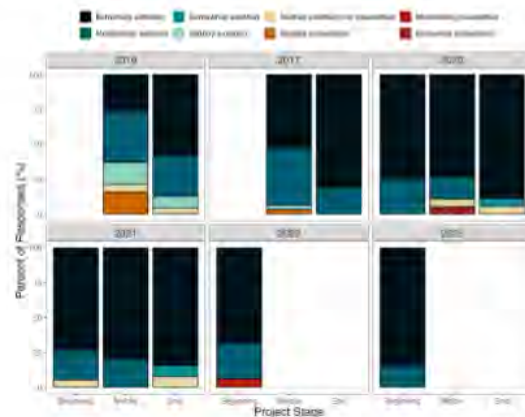
Recent Synthesis Working Group Products

- Harms, T. K. *et al.* [Fire influence on land-water interactions in aridland catchments](#). *Bioscience* **75**, 30–46 (2025).
- Lowman, H. *et al.* [Persistent and lagged effects of fire on stream solutes linked to intermittent precipitation in arid lands](#). *Biogeochemistry* (2024).
- Lamontagne, J. M. *et al.* [Community Synchrony in Seed Production is Associated With Trait Similarity and Climate Across North America](#). *Ecol. Lett.* **27**, e14498 (2024).
- Bondaruk, V. F. *et al.* [Aridity modulates grassland biomass responses to combined drought and nutrient addition](#). *Nat Ecol Evol* (2025).
- Smith, M. D. *et al.* [Extreme drought impacts have been underestimated in grasslands and shrublands globally](#). *Proc. Natl. Acad. Sci. U. S. A.* **121**, e2309881120 (2024).
- Johnson, K. *et al.* [Climate, Hydrology, and Nutrients Control the Seasonality of Si Concentrations in Rivers](#). *J. Geophys. Res.-Biogeosci.* **129**, e2024JG008141 (2024).
- Johnson, K. *et al.* [Establishing fluvial silicon regimes and their stability across the Northern Hemisphere](#). *Limnol. Oceanogr. Lett.* (2024).
- Malhotra, A. *et al.* [Fine root and soil carbon stocks are positively related in grasslands but not in forests](#). *Commun Earth Environ* **6**, 497 (2025).
- Byrnes, J. E. K. & Dee, L. E. [Causal Inference With Observational Data and Unobserved Confounding Variables](#). *Ecol. Lett.* **28**, e70023 (2025).
- Luo, M. *et al.* [Short time series obscure compensatory dynamics in ecological communities](#). *Nat Ecol Evol* 1–9 (2025) doi:[10.1038/s41559-025-02757-w](https://doi.org/10.1038/s41559-025-02757-w). & news article: The length of time series affects patterns of species synchrony. *Nat Ecol Evol* 1–2 (2025) doi:[10.1038/s41559-025-02778-5](https://doi.org/10.1038/s41559-025-02778-5).

Working Group Funding
Cohort
2023
2021
2020
2017

Data and Process Papers

- Brun, J. *et al.* Enabling data-driven collaborative and reproducible environmental synthesis science. *Methods Ecol. Evol.* **16**, 1061–1074 (2025).
- Nigro, K. M. *et al.* Co-mast: Harmonized seed production data for woody plants across US long-term research sites. *Ecology* e4463 (2024) doi:[10.1002/ecy.4463](https://doi.org/10.1002/ecy.4463).
- Tiegs, S. D. *et al.* Human activities shape global patterns of decomposition rates in rivers. *Science* **384**, 1191–1195 (2024).
- Costello, D. *et al.* Data from: Human activities shape global patterns of decomposition rates in rivers. Zenodo <https://doi.org/10.5281/zenodo.11035638> (2024).



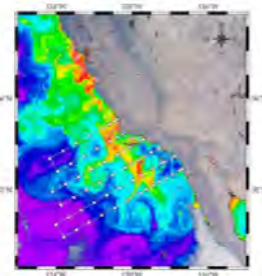
Site Exchanges

Mingyu Zhang, a doctoral student with Dr. Peter Raymond at the Plum Island LTER, traveled to the Virginia Coast Reserve LTER to improve models of carbon transport and compare methods for measuring air-water gas exchange. [Read more](#)

Dr. Marguerite Mauritz, an investigator at Jornada LTER, spent about 10 days working with Dr. Marcie Litvak at the Sevilleta LTER to improve techniques for measuring CO₂ exchange in drylands. [Read more](#)

Alexandra Cabanelas Bermudez, a doctoral student with Dr. Heidi Sosik at the Northeast Shelf LTER will travel to the California Current LTER to learn the ZooScan plankton imaging system. [Read More](#)

Margaret Baker, a doctoral student with Sven Kranz at the California Current LTER, traveled to Dr. Tom Kelly's lab at the Northern Gulf of Alaska LTER to build skill in – and improve tools for using – bio-optical sensors in marine systems. [Read more](#)



Site Culture Survey

- LTER Network is undergoing a demographic shift
- Site rankings in each focus area have been shared with PIs and BP committee reps
- Next work is to lean into practices that have proven effective.

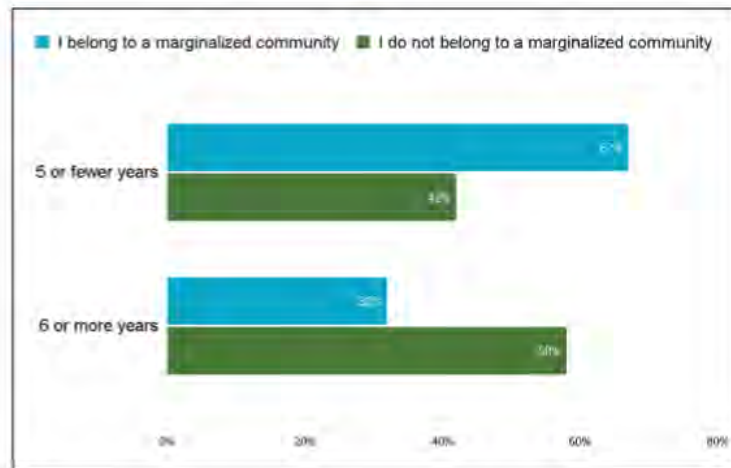
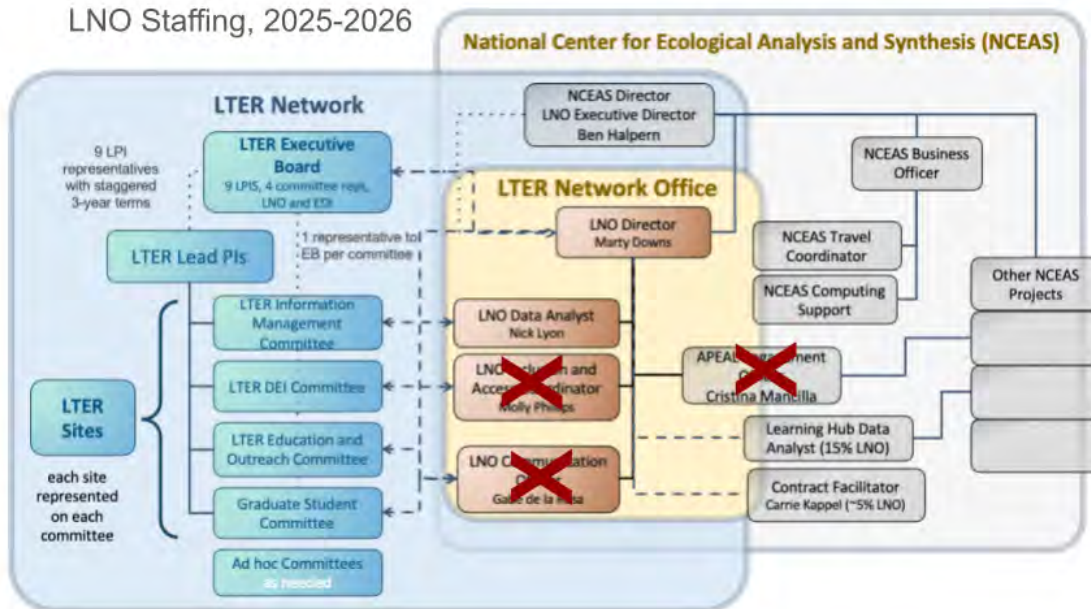
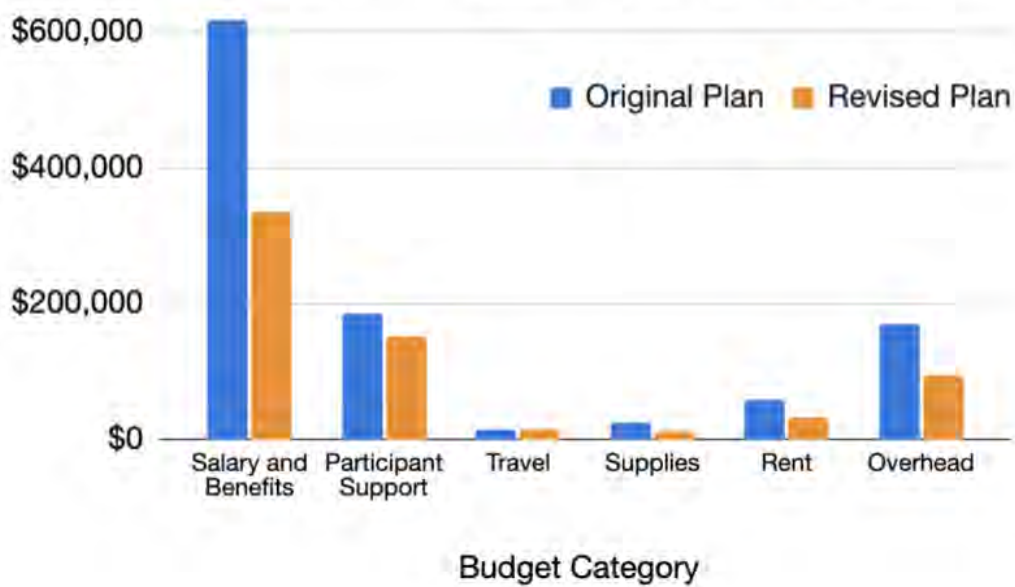


Figure 2: Marginalized identity status across tenure categories (5 or fewer years, 6 or more years) with the LTER.

LNO Staffing, 2025-2026



Original and Revised Plans (09/01/25-08/31/26)



Communication/Coordination

Audience	Purpose	Communication Channel
Broader Scientific Community	Find us, know what we do, know how to get in touch	Website
Network and partners (including NSF)	Attend and contribute to events; maintain awareness	Newsletter
Standing committees and interest groups	Mission-critical communications with defined audiences	Email (Google Groups)
Network interest groups and close partners	Peer-to-peer information sharing and discussion	Community Forum
Network interest groups	Connect across roles; Generate a sense of belonging	Monthly Community Calls (likely reduced but not eliminated)
Most relevant for ECRs	Promote events, jobs, short-turnaround announcements	Social Media (reduced scope)
Standing committees and interest groups	Ephemeral, quick-turnaround messaging	Slack (maintained, but not supported/expanded)

Budget Mitigation Approaches

Meetings

- Virtual PI Meetings
- Mixers at national meetings
- Cross-site personnel exchanges
- Seek funding for topical workshops
- Email discussion list is always available, but rarely used.

Eliminated

- Funding for EB Chair
- Membership dues in ILTER

Maintaining, for now

- Existing Synthesis Commitments
- SSECR, with some external seats
- 2 virtual field safety trainings
- Newsletter, email lists

Expanding, where possible

- Partnering with data creators
- Partnering with land and water managers
- Funding applications, variety of sources
- Data science training

Discussion

[Strategic Plan](#)



Non-tabular Data Best Practices

1. History and purpose of the document
2. What we're doing today
3. How to move forward in the future

Data Package Design for Special Cases

Created by a large, LTER-based working group in 2019-2021

[Published in EDI](#) in 2021

Moved to [EDI GitHub repo](#) in 2022

Has accumulated a few issues since

A new maintenance and publishing workflow needs to be discussed!

What we're doing today

Go to the breakout for [your assigned chapter](#) (1-7)

Follow the [instructions in our group notes](#)

To summarize:

- Discuss your assigned chapter with the group
- Fill in the issue template (GitHub or notes tab in instructions above)
- GitHub coordinator will tidy up and file the issue

After ~25 minutes lets report back & discuss next steps!

What's next for this document?

Major takeaway for each chapter (report out)

Create a new working group?

Should this be EDI-driven or LTER-driven?

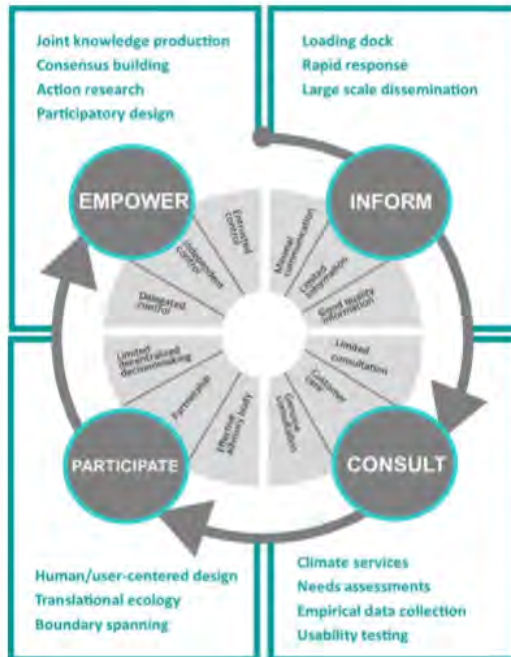
Is editing in GitHub doable?

DAY 2

IMKE Session 1 - Going Beyond Download Counts

Beyond Download Counts

Niwot Ridge



Modes of community partnership

Wheel of participation (Bamzai-Dodson 2021; <https://doi.org/10.1175/WCAS-D-21-0046.1>)



Modes of community partnership



Wheel of participation (Bamzai-Dodson 2021; <https://doi.org/10.1175/WCAS-D-21-0046.1>)



Modes of community partnership

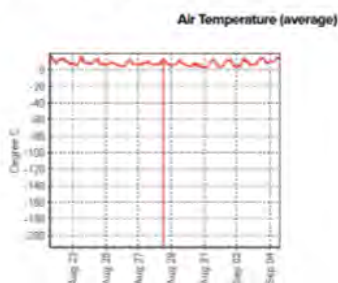


Small aircraft pilots would like real-time met data to see if it is safe (too windy, too cloudy) to fly at low altitudes over the Continental divide

Wheel of participation (Bamzai-Dodson 2021;
<https://doi.org/10.1175/WCAS-D-21-0046.1>)

Modes of community partnership

Saddle Station Data (3528 Meters)



Small aircraft pilots would like real-time met data to see if it is safe (too windy, too cloudy) to fly at low altitudes over the Continental divide

<https://nwt.lternet.edu/real-time-met>



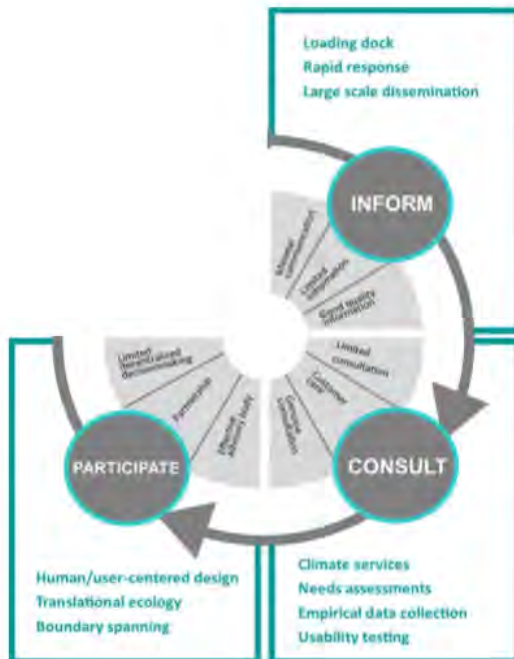
Modes of community partnership



Wheel of participation (Bamzai-Dodson 2021;
<https://doi.org/10.1175/WCAS-D-21-0046.1>)



- “Observations are received in real time at the NWS forecast office in Boulder and fed promptly to the publicly available databases MADIS (<https://madis.ncep.noaa.gov/>) and MesoWest. (<https://mesowest.utah.edu/>) The data are used by NWS staff in hour-by-hour forecasting and warning operations to assess conditions above timberline and the potential for damaging winds to descend to lower elevations.”
- “You have the best data (accuracy and redundancy) in our area of responsibility!”
- <https://x.com/NWSBoulder/status/1598374985587953684>
<https://x.com/NWSBoulder/status/1881555221186494653>



Modes of community partnership

Wheel of participation (Bamzai-Dodson 2021; <https://doi.org/10.1175/WCAS-D-21-0046.1>)

Broader Impacts: Data Driven Art Initiatives

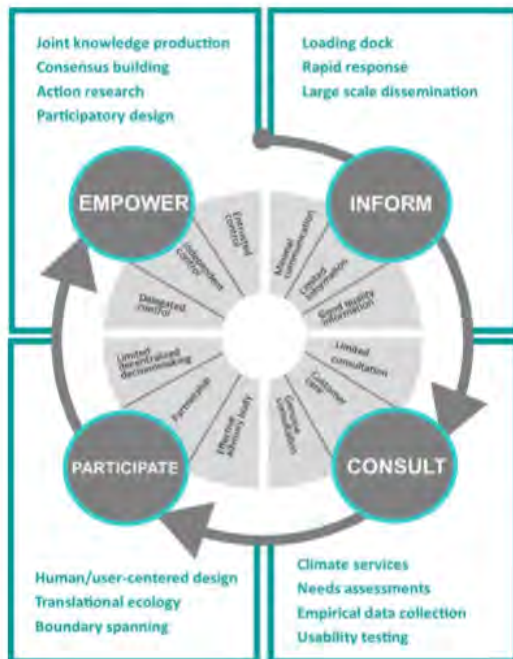
Tempestry project with Casey Middle School



In 2022, Casey AVID students brought their comparisons of daily high temps in 1921 and 2021 Boulder and Mazatlan, Mexico to the Right Here, Right Now Global Climate Summit.

<https://outreach.colorado.edu/article/middle-schoolers-use-needlework-to-make-a-point-about-climate-change/>





Modes of community partnership

Wheel of participation (Bamzai-Dodson 2021; <https://doi.org/10.1175/WCAS-D-21-0046.1>)

Mountain Consortium



COLORADO FOREST
RESTORATION INSTITUTE
COLORADO STATE UNIVERSITY



DENVER BOTANIC
GARDENS



Data Dashboard:

<https://nwt.lternet.edu/datadashboard>

Examples:

Air Temperature

CO₂

Precipitation

Soil Moisture

In the works:

- Links to code to produce figures
- Remaining pages

Cautionary tales:

- Hardest part is gap-filling or otherwise statistically adjusting for missing data/sensor turnover, not the figure making
- Pages have been very popular even internally among NWT researchers

Going beyond download counts

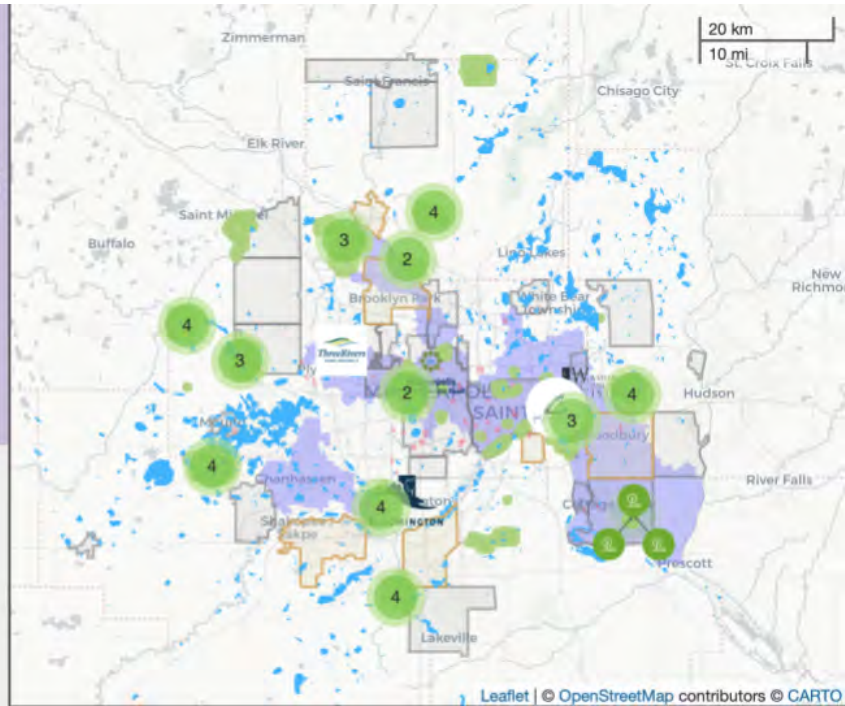
Mary Marek-Spartz

IMC Annual meeting
Sept 9 2025



Most of
MSP's
research sites
are in highly
public areas

[MSP LTER study area](#)

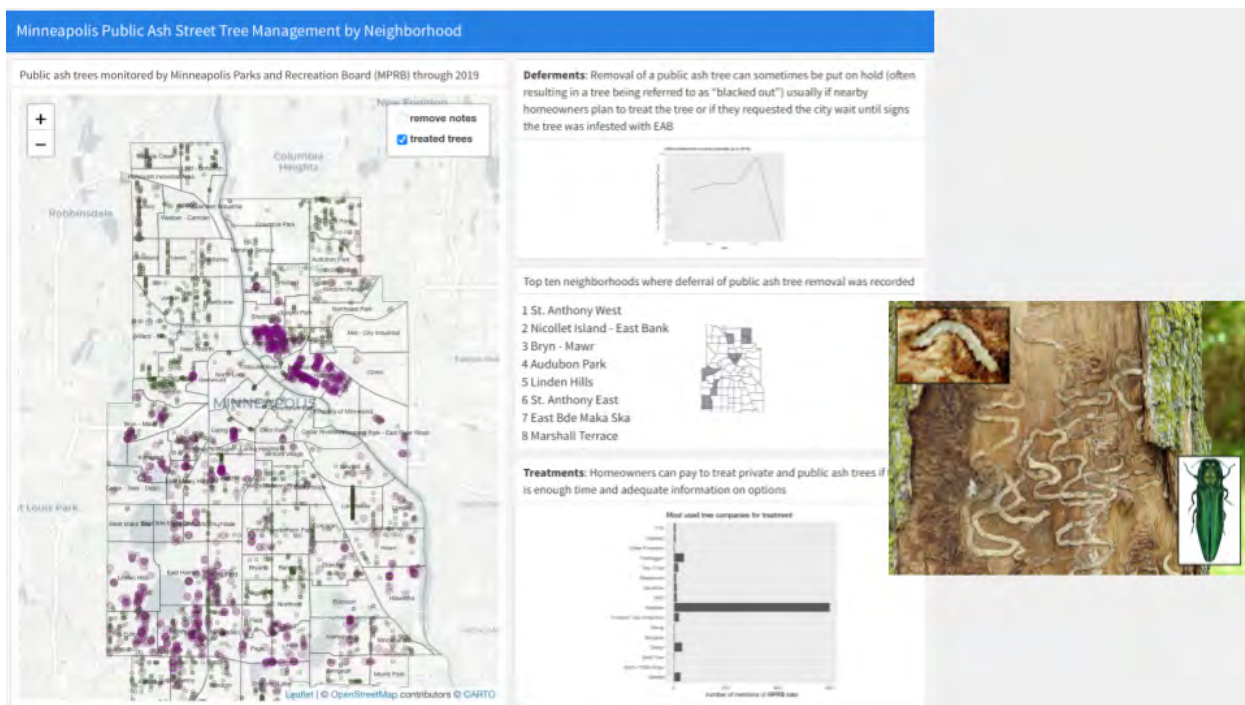
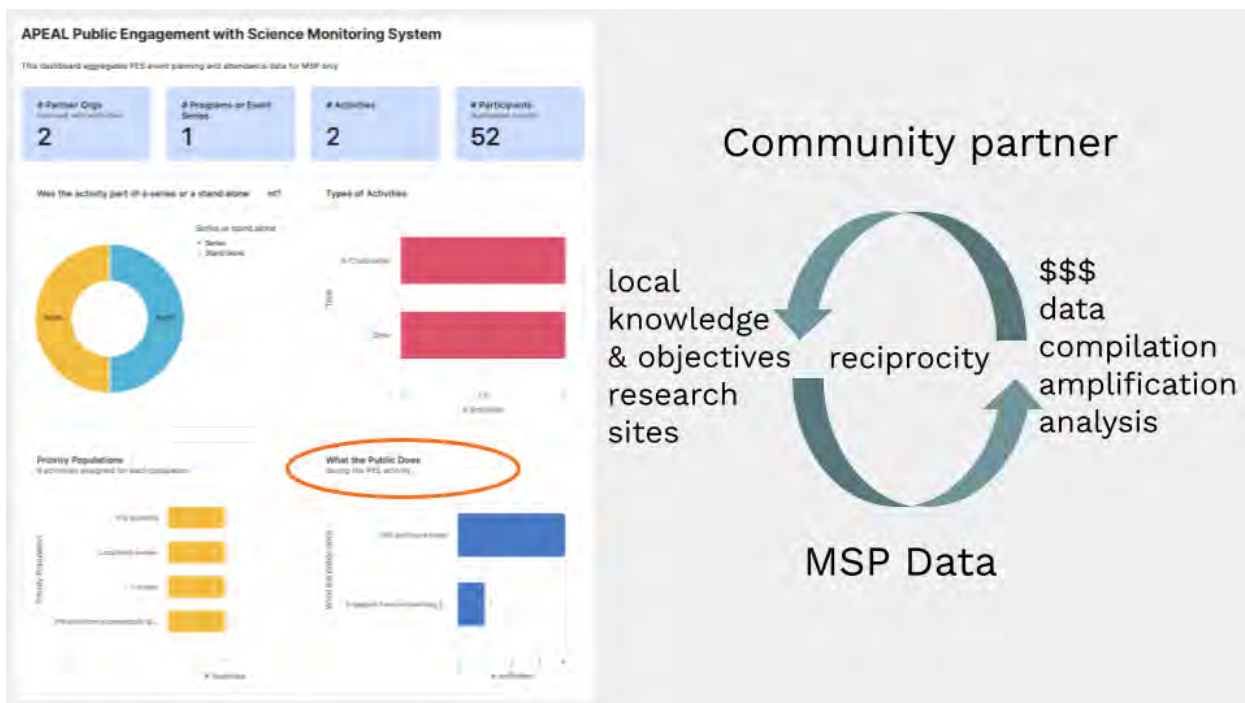


MSP LTER Engagement

RQ 4: Community
engagement
research

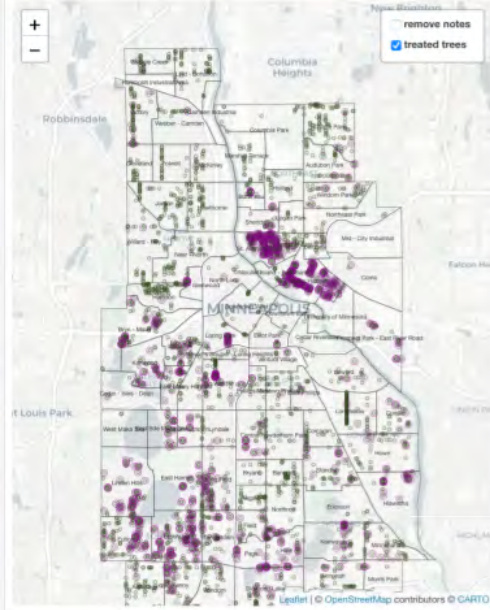
Bell Museum of
Natural History

Information Management



Minneapolis Public Ash Street Tree Management by Neighborhood

Public ash trees monitored by Minneapolis Parks and Recreation Board (MPRB) through 2019

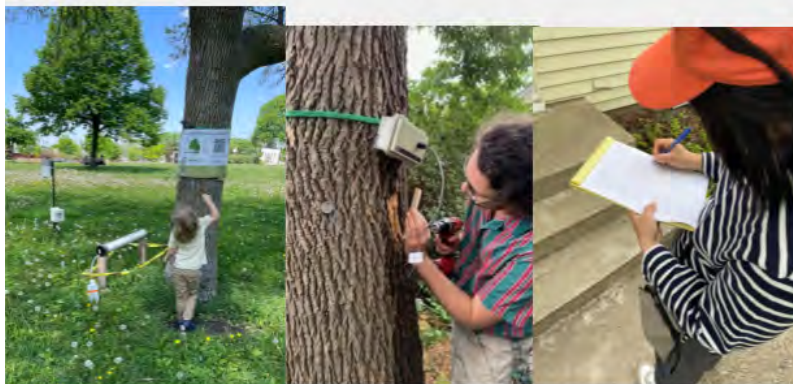
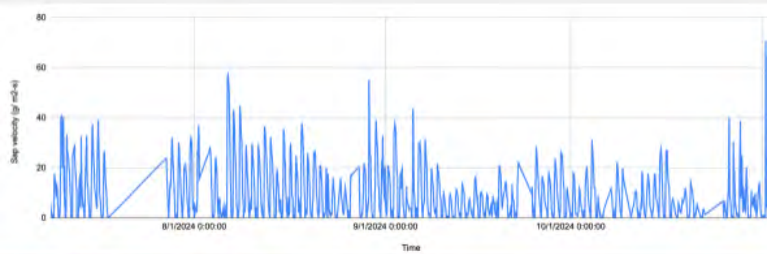
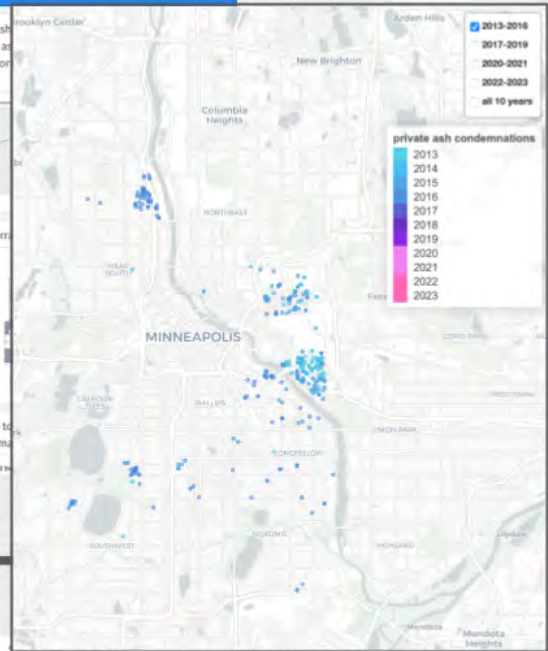


Deferments: Removal of a public ash tree resulting in a tree being referred to as a homeowner plan to treat the tree or if the tree was infested with EAB.

Top ten neighborhoods where deferrals occurred:

- 1 St. Anthony West
- 2 Nicollet Island - East Bank
- 3 Bryn - Mawr
- 4 Audubon Park
- 5 Linden Hills
- 6 St. Anthony East
- 7 East Bde Maka Ska
- 8 Marshall Terrace

Treatments: Homeowners can pay to have their trees treated if there is enough time and adequate information.



Calling for N Mpls Research Partners

UMN researchers have been working alongside organizations in N. Minneapolis to address the problem of EAB infestation from the City of Minneapolis Park Board. We are seeking researchers or local firms who have the ability to assist their monitoring ash trees, and adding data from open to show from assessing ash trees' benefits to a wider and existing network.

UMN Sponsors EAB Treatment & Data Collection

Proposed Set-up

You Monitor Tree Health on Data Dashboard

Example Dashboard

Benefits of Participation

- Participate in research and/or provide a service to the community.
- Collaborate with university researchers to identify the health of trees in the community.
- Use back access of data (openly or for Minneapolis only).
- Learn more about your tree health on data dashboard.

Contact them at research@minneapolis.gov if you are interested to learn more!

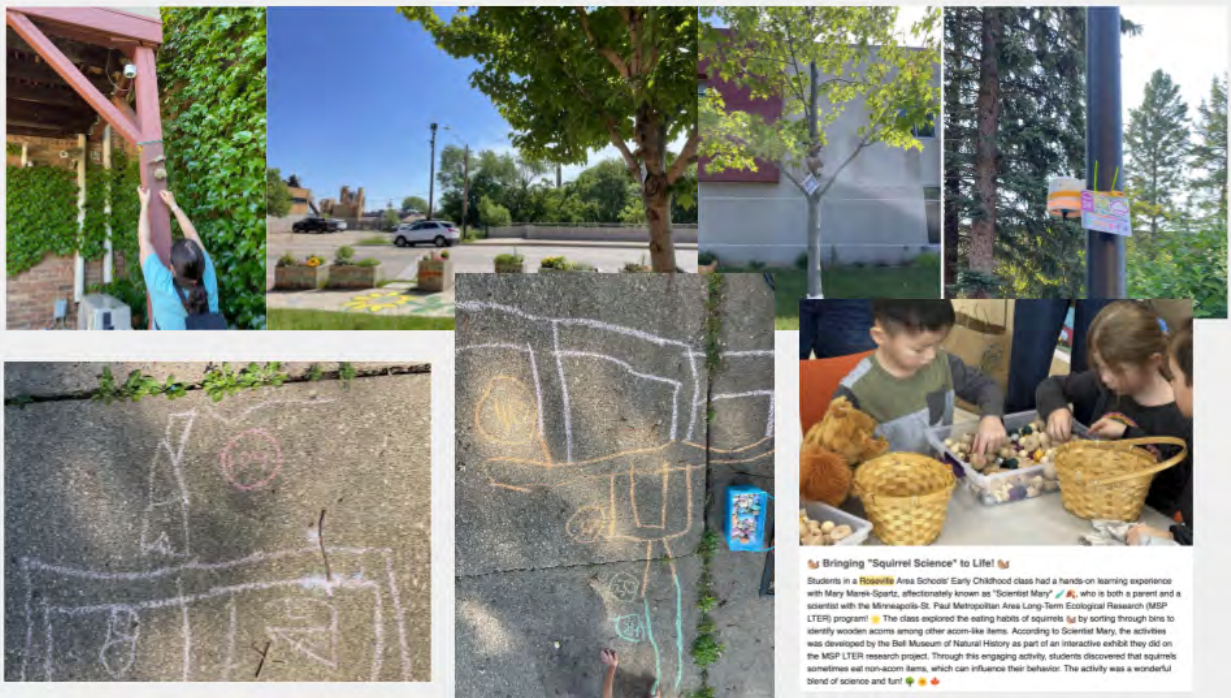
We want to know:

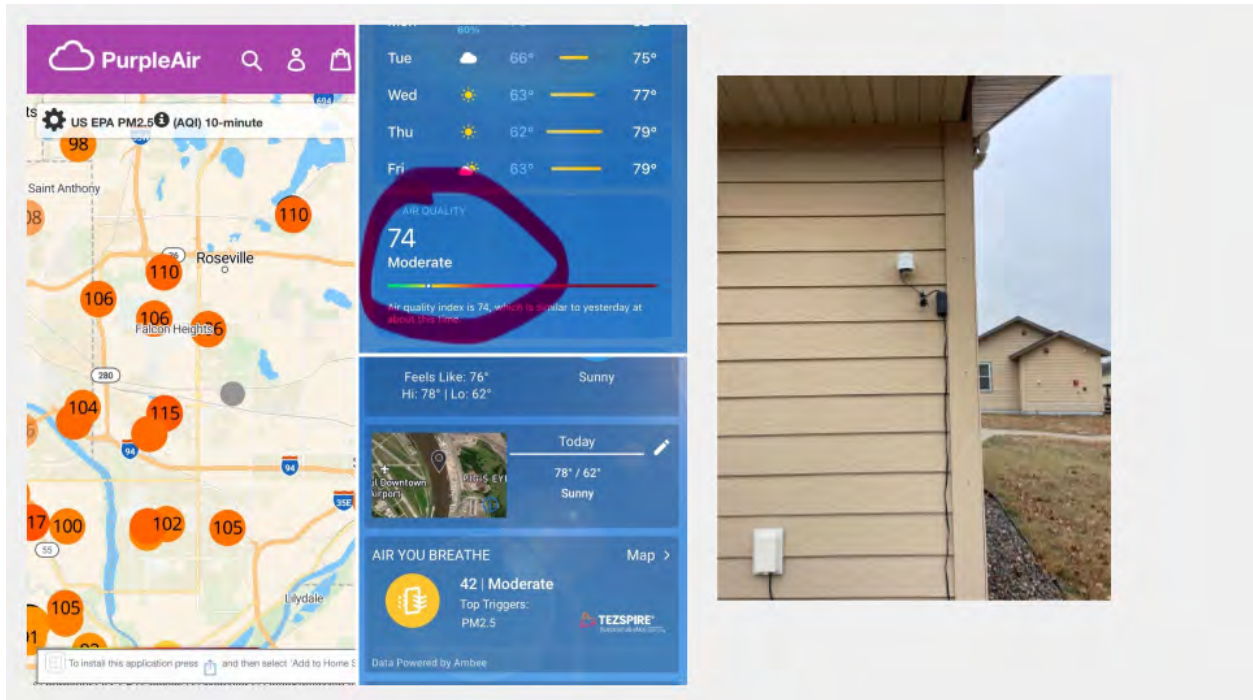
- How much data do you have?
- How well do they use up ash and ash and their surroundings?
- How well do they do this while running Emerald Ash Borer (EAB) treatment?

What we've found so far:

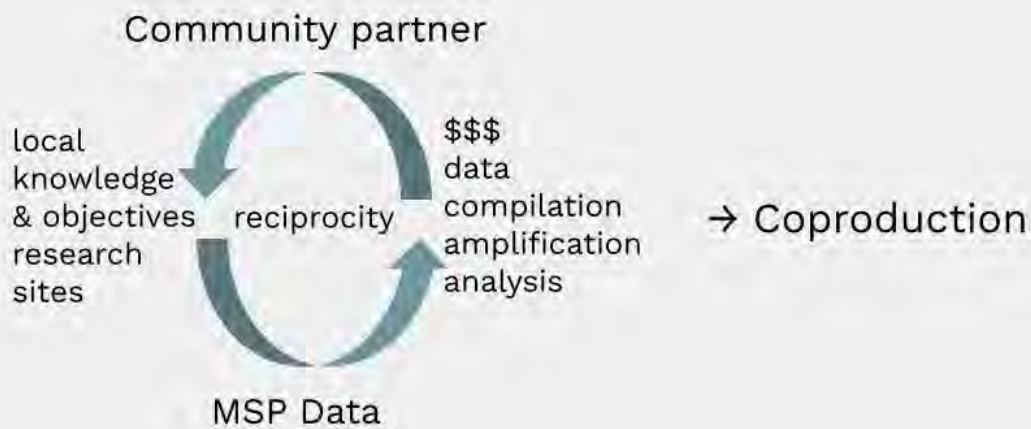
1. EAB treatment generally works well (right photos and video from laptops, but it is not always successful (left photos)).
2. Trees with healthier canopies (as measured by photos) have higher transpiration (T_g) and are more resilient to drought.

Logos: University of Minnesota, Saint Paul, Minneapolis, St. Louis, LTER Network, and others.

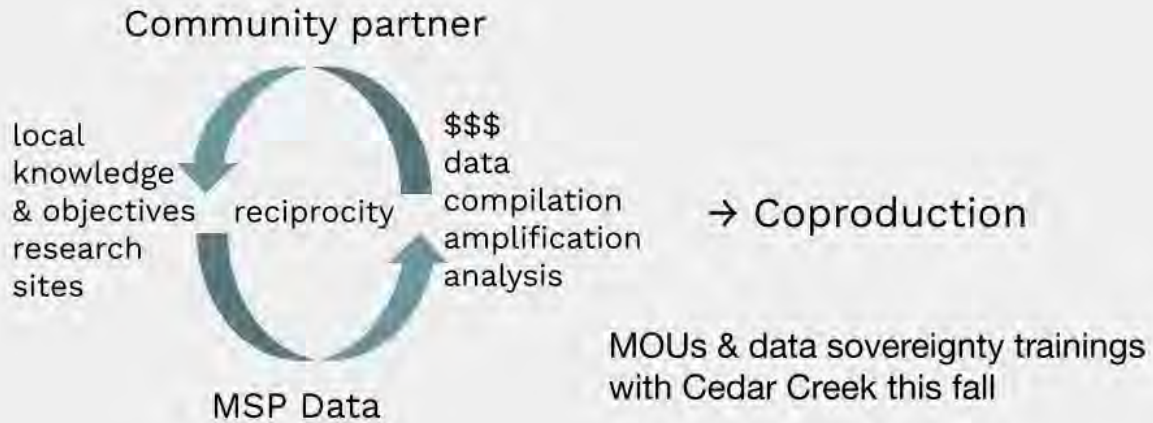




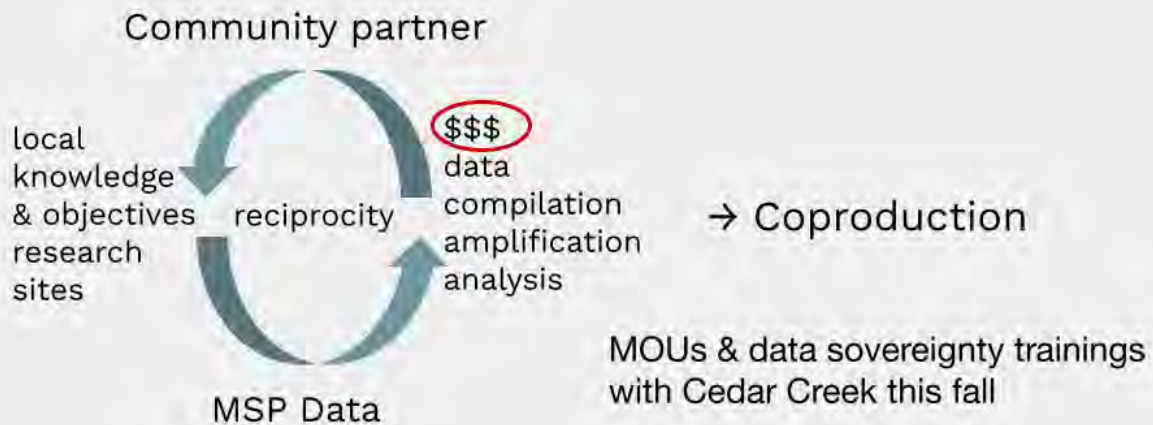
Future directions (???)



Future directions (???)



Future directions (???)



What are you nerding out on - breakout groups

IMKE Session #2

Using AI to extract data from handwritten documents



HUBBARD BROOK ECOSYSTEM STUDY

FIELD NOTES

FROM: MONDAY 17 FEB 2003 TO: SUNDAY 23 FEB 2003

GENERAL INFORMATION (compiled by: DB)

Day	Date	Weather	TEMP°F (High/Low)	Precip (inches) (Station/PV Farm)
MON	17 FEB 2003	Cloudy, high solid ovc slowly lowering to heavy, low ovc (warming up at last!) snow fls eve; slight winds	17.0° 0.0°	.02" .02"
TUE	18 "	Cloudy, heavy ovc, snow early morn ("Blizzard of 03") to mid-day (4-10 fluff); ovc lifting aftn; light snow eve; slight winds incr. to mod. late eve	26.0° 14.0°	.27" .22"
WED	19 "	Partly cloudy early, mod. ovc breaking up to mostly sunny, broken thin ovc w/ scat. low clouds (WARM! roadside melt); slight winds w/ occ. gusts	34.0° 21.0°	φ φ
THU	20 "	Sunny, hazy, scat. clouds morn; clearing to cloudless, CAVU; unseasonably WARM! (roadside melt); mod. winds decr. to slight	43.0° 23.0°	φ φ
FRI	21 "	Sunny, hazy, cloudless warming quickly (roadside melt), incr. haze & scat. clouds mid- day bldg to thin ovc late aftn; slight winds	48.0° 23.0°	φ φ
SAT	22 "	Cloudy, heavy ovc, rain showers 2nd wet snow aftn; drizzle eve; (WARM; road-side melt); slight winds or calm	41.0° 24.0°	φ φ
SUN	23 FEB '03	Cloudy, heavy ovc; foggy; light rain, drizzle morn; occ. flurries aftn-eve (1- fls); slight winds or calm	34.0° 21.0°	φ φ

Here is the verbatim transcription of the field notes:

HUBBARD BROOK ECOSYSTEM STUDY

FIELD NOTES

FROM: MONDAY 17 FEB 2003 TO: SUNDAY 23 FEB 2003

GENERAL INFORMATION (compiled by: DB) Day | Date | Weather | TEMP°F (High/Low) | Precip (inches) (Station/PV Farm)

MON 17 FEB 2003 | Cloudy, high solid ovc | 17.0° | 0.0° | .02" | .02"
slowly lowering to heavy, low ovc (warming up at last!)
snow fls eve; slight winds

TUE 18 "" | Cloudy, heavy ovc, snow | 26.0° | 14.0° | .27" | .22"
early morn ("Blizzard of 03") to mid-day (4-10 fluff); ovc lifting
aftn; light snow eve; slight winds incr. to mod. late eve

WED 19 "" | Partly cloudy early, mod. ovc | 34.0° | 21.0° | φ | φ
breaking up to mostly sunny, broken thin ovc w/ scat. low clouds
(WARM! roadside melt); slight winds w/ occ. gusts

THU 20 "" | Sunny, hazy scat. clouds | 43.0° | 23.0° | φ | φ
morn; clearing to cloudless, CAVU; unseasonably WARM!
(roadside melt); mod. winds decr. to slight

FRI 21 "" | Sunny, hazy, cloudless | 48.0° | 23.0° | φ | φ
warming quickly (roadside melt), incr. haze & scat. clouds mid-
day bldg to thin ovc late aftn; slight winds

SAT 22 "" | Cloudy, heavy ovc, rain showers | 41.0° | 24.0° | φ | φ
2nd wet snow aftn; drizzle eve; (WARM; road-side
melt); slight winds or calm

SUN 23 FEB '03 | Cloudy, heavy ovc; foggy; | 34.0° | 21.0° | φ | φ
light rain, drizzle morn; occ. flurries aftn-eve (1-
fls); slight winds or calm

MM please transcribe verbatim. note that on the right side there is a column for min/max/mean temperature, type of snow, and precip in inches. Sometimes the main entry overlaps with this tabular entry. please transcribe verbatim and then summarize the important points in a table

Summary Table of Important Weather Points:

Date	Key Weather	Temperature Range (°F)	Precipitation	Notable Conditions
Mon 2/17	Cloudy, snow flakes evening	0° to 17°	0.02"	Warming trend beginning
Tue 2/18	Heavy snow ("Blizzard of 03")	14° to 20°	0.27"/0.22"	4-10" fluffy snow accumulation
Wed 2/19	Partly cloudy to mostly sunny	21° to 34°	None	Warm! Roadside melting
Thu 2/20	Sunny, clear CAVU	23° to 43°	None	Unseasonably warm, roadside melting
Fri 2/21	Sunny, hazy	23° to 48°	None	Warmest day, roadside melting
Sat 2/22	Cloudy, rain and wet snow	26° to 41°	0.25"/0.21"	Warm with mixed precipitation
Sun 2/23	Cloudy, foggy, light rain	21° to 34°	0.25"/0.24"	Turning colder by evening

The week shows a dramatic weather pattern starting with the "Blizzard of 03" on Tuesday, followed by an unseasonably warm period (reaching 48°F on Friday), then returning to cooler, wetter conditions by the weekend. Significant snowmelt occurred during the warm period.

For more examples of IM use of AI see this databits article:



Leveraging Generative AI: Applications for the LTER Network

<https://lternet.edu/stories/leveraging-generative-ai-applications-for-the-lter-network/>

Where are the data policy toggle for LLMs

Claude.ai

Claud.ai website first login

Account → Settings

Updates to Consumer Terms and Policies

An update to our Consumer Terms and Privacy Policy will take effect on **September 28, 2025**. You can accept the updated terms today.

What's changing?

You can help improve Claude
Allow the use of your chats and coding sessions to train and improve Anthropic AI models. Change anytime in your [Privacy Settings](#).

Updates to data retention
To help us improve our AI models and safety protections, we're extending data retention to 5 years.

[Learn more and read the Consumer Terms and Privacy Policy](#)

Accept **Not now**

These changes take effect immediately upon confirmation.

Settings

Profile
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Claude Code

Data privacy
Anthropic believes in transparent data practices.
Learn how your information is protected when using Anthropic products and our [Privacy Center](#) and [Privacy Policy](#) for more details.
You've selected **data off**.
[View account settings](#)

Privacy settings

Export data **Export data**

Shared chats **Manage**

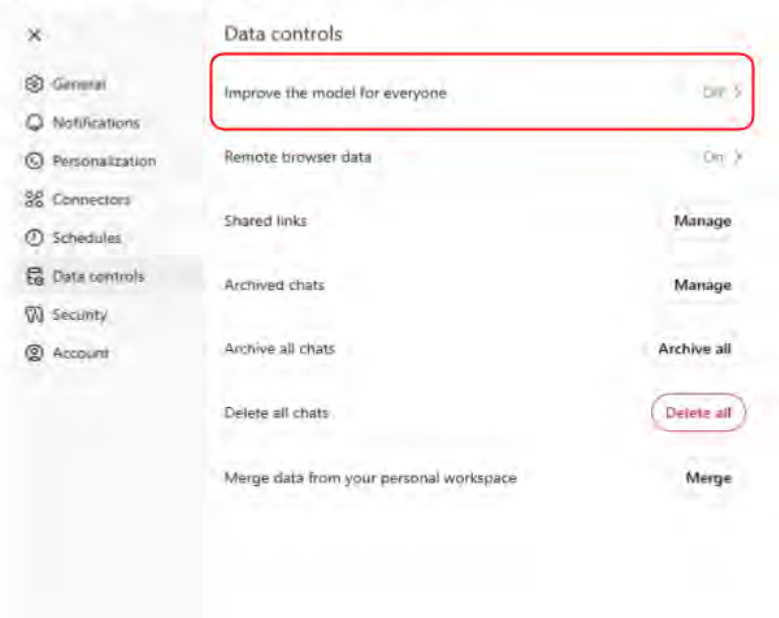
Location metadata
Allow Claude to use your location metadata (city/region) to improve product suggestions. [Learn more](#) **On**

Help improve Claude
Allow the use of your chats and coding sessions to train and improve Anthropic AI models. [Learn more](#) **On**

Where are the data policy toggle for LLMs

ChatGPT

Account → Settings



Where are the data policy toggle for LLMs

Gemini

Account → Setting → Activity

Gemini Apps Activity

Keep activity

Keeping your activity lets you pick up chats where you left off anytime and helps improve Google services, including AI models. When this setting is off, Google still saves chats for 72 hours to respond to you and help keep Gemini safe.

On

On since August 5, 2025

Deleting activity older than 18 months

Improve Google services with your audio and Gemini Live recordings.

[Learn more](#) about these settings

Google protects your privacy and security. [Manage My Activity](#) verification

Delete

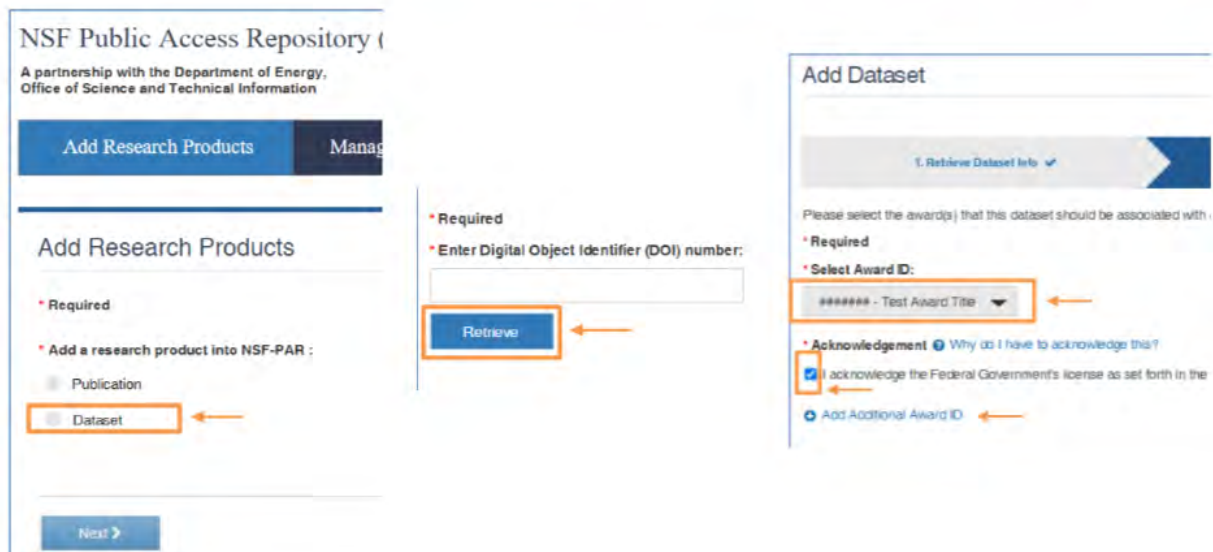
Using NSF-PAR to add data products to research.gov reports



Screenshots to follow (and more details) from:

https://resources.research.gov/common/attachment/Desktop/How_to_Add_Datasets_to_NSF-PAR.pdf

https://resources.research.gov/common/attachment/Desktop/How_to_Add_Datasets_to_NSF-PAR.pdf



NSF Public Access Repository (A partnership with the Department of Energy, Office of Science and Technical Information)

Add Research Products

Add Research Products

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☐ Publication

☒ Dataset

*** Required**

*** Enter Digital Object Identifier (DOI) number:**

Retrieve

Add Dataset

1. Retrieve Dataset Info

Please select the award(s) that this dataset should be associated with.

*** Required**

*** Select Award ID:**

***** - Test Award Title

*** Acknowledgement** Why do I have to acknowledge this?

☒ I acknowledge the Federal Government's license as set forth in the

Add Additional Award ID

Black-throated Blue Warbler capture histories, Hubbard Brook Experimental Forest

Citation Details

This dataset provides body measurements and encounter histories for black-throated blue warblers. Birds were captured in mist nets, given unique combinations of colored leg bands and a numbered, aluminium USGS leg band, and aged as either yearlings or older breeders based on plumage characters. Standard body measurements were taken, following Pyle 1997 (Pyle, P. 1997. Identification guide to North American birds. Slate Creek Press, Bolinas, CA). All birds were released unharmed after banding and measurements were completed. Capture histories were generated from resightings of banded individuals on three gridded study... [more »](#)

Award ID(s):	1637085
PAR ID:	10395934
Author(s) / Creator(s):	Halfworn, Michael T; Kauer, Sara A; Sillett, Scott; Webster, Michael S; Holmes, Richard T; Rodenhouse, Nicholas L
Publisher / Repository:	Environmental Data Initiative
Date Published:	2022-01-01
Format(s):	Medium: X
Sponsoring Org:	National Science Foundation

Dataset:

<https://doi.org/10.8073/pasta/d4137fae50280b91d93c9fc099f7cc07>

Have feedback or suggestions for a way to improve these results?
[Let us know!](#)

Citation Formats

MLA

APA

Chicago

BibTeX

Export Metadata

Auto-population of Dataset in Your In-progress Project Report

Your dataset added to the NSF-PAR will auto-populate in your in-progress project report in Research.gov within a few hours. Verify your dataset has auto-populated in your in-progress project report by checking that the NSF-PAR ID listed in the Product Status column matches the NSF-PAR ID provided to you on the NSF-PAR Add Dataset – Confirmation page

Datasets entered in NSF-PAR are displayed as Other Product > Dataset in your in-progress project report

Listed NSF-PAR ID should match the NSF-PAR ID on the NSF-PAR Add Dataset - Confirmation

Product Type	Citation / Description	Product Status	Year	Status	Actions
Other Product Dataset	Data and Research Materials (e.g. Cell lines, DNA probes, Animal records) Last Name, Middle Init, First Init, (Publication Year), Title of Dataset, (Version V2), Repository Name. doi:10.1503/science.2500335 Citation details	Added to NSF-PAR PAR ID: 123456	2022	Complete	Edit in NSF-PAR Delete from Report
Journal or Journal Conference Paper	Last Name, Middle Init, First Init, (Publication Year), Title of the Article, Last Name, Middle Init, First Init, (Ed.), Title of Periodical, volume doi:10.1111/XXXXX Full Text Citation details	Available in NSF-PAR PAR ID: 123457	2018	Complete	Edit in NSF-PAR Delete from Report

How to convert PDF to PDF-A

1. Online tool:

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- Only 1 pdf at a time, limited number of files per day at no cost and without registration.

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- You could choose to customize your workflow
- Check [here](#) for validation

Staying up to date in your research community

EML Techniques - breakouts

Future of IM Roles

What new challenges does the IM role face?

What new tools or technologies will affect the IM role, and how?

What are the opportunities for the IM role to stay relevant?

How will the IM role integrate with other roles like data scientists, AI specialists, or knowledge managers?

Which skills will become essential for future information managers, and which may become less relevant?

What strategies can IMs use to keep their knowledge and skills current in a fast-changing environment?

