

North Pacific LCC Data Platform User Needs Assessment

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NPLCC Need

The creation of Landscape Conservation Cooperatives (LCCs) was called for by the Secretary of the Interior in 2009 to advance common concerns in natural resource science planning and coordination, particularly in the face of changing climate and environmental conditions. To meet these challenges, LCCs are organized as public-private partnerships that can transcend political and jurisdictional boundaries to create more networked approaches to conservation of natural and cultural resources. Partners include U.S. Federal and state agencies, Canadian provincial and federal ministries, Mexican agencies, tribal and first nation entities, local government agencies, nongovernmental organizations, universities and others.

“The North Pacific Landscape Conservation Cooperative promotes development, coordination, and dissemination of science to inform landscape level conservation and sustainable resource management in the face of a changing climate and related stressors.”

(North Pacific LCC mission statement)

At a minimum, the North Pacific Landscape Conservation Cooperative (NPLCC), as with all LCCs, is mandated to provide an on-line data and information platform for stakeholders. A data platform (or data management system) is a software system often comprised of a backbone data management component and a web-based component for collaboration on gathering, sharing and using data¹. The purpose of this is to provide a gateway to the science and information products that the LCC develops, and manage these data according to best practices².

Beyond national requirements, the NPLCC, through outreach to stakeholders, recognized the importance of such a platform for helping meet three of its seven stated goals³:

Goal 4) Promote identification, use, and sharing of science, traditional knowledge and other relevant information to support conservation/sustainable resource management, and adaptive management decisions.

Goal 5) Maximize the availability and accessibility of data and information about large-scale stressors and their impacts on natural and cultural resources, and about conservation/sustainable resource management approaches and effectiveness.

Goal 6) Promote coordination and efficiency of efforts among resource managers and science entities that are addressing science, traditional knowledge and other relevant information to achieve landscape level conservation/sustainable resource management.

¹ Wikipedia, “data hub/data management system.” Retrieved 30 July 2013.

² The National LCCs are developing and adopting a series of best practices for data management.

³ A full discussion of the NPLCC’s mission and goal can be found at NorthPacificLCC.org.



Identifying Unique Opportunities for the NPLCC

This data platform user needs assessment set out to better understand the likely *users* of a NPLCC data platform, the higher level *tasks* those users undertake that could be supported, and the *content* and *functions/capabilities* that support those tasks. The focus has been on identifying the unique role the NPLCC can play given its mission, large trans-boundary geography, and broad stakeholder engagement within the ever growing number of on-line climate change and conservation data portals.

It was made clear by the workshop participants that the NPLCC can best support its mission and meet its goals by playing a strong role in filling the gaps in information development, focusing on its unique trans-boundary and landscape-scale vision, while also leveraging the strengths of existing on-line information portals.

Approach

The ability to access larger integrated datasets can facilitate the investigation of complex biological questions and lead to better informed planning and policy decisions, especially climate change related challenges over large landscapes (Root et al. 2003, Parmesan & Yohe 2003). However, creating an on-line resource with a high degree of usability necessitates adequately scoping user requirements through sufficient user involvement. Interestingly, this is often overlooked and one of the most significant problems is the lack of input from the proposed user community about what their needs are. Studies have shown that fewer than half of most software development projects were considered successful based on basic criteria (Standish Group 2006 cited in Neale et al. 2007). Thus, the NPLCC made a conscious effort to capture user requirements through this and other input.

Usability has many definitions in different contexts, but the International Organization for Standardization (ISO) definition is quite applicable here. It is, “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” (ISO 1998). For this study, usability is simply thought of as a product that is both useful and usable. The basic concept of usability has led to the generation of a set of principles that can guide a user-oriented design process (Neale et al. 2007). These principles include: early and continued focus on users and tasks, empirical design, and iterative design. Measuring the success of a project is also relevant, but is complicated by the subjective assessment by users and is not an exact science. This study did not address success measures as the NPLCC platform is in early stages of development.

The purpose of the Data Platform User Needs Assessment study was to initiate the development of the NPLCC platform with an emphasis on users and their higher level tasks, and gain input on prioritizing for an iterative design approach. Put simply, what work can the NPLCC on-line platform uniquely support, how best to support it, and what currently are the greatest needs. This process has drawn from well-known user-oriented software design principles in the context of a user requirements analysis process (Neale et al. 2007). The questions of on-line platform usability were put forth to representatives of the user community through four focus group workshops spread throughout the NPLCC geography. These discussions have been analyzed with a focus on common themes and ideas that emerged, and the



unique challenges the NPLCC on-line platform could support given its mission and goals. These findings are aimed at NPLCC managers, specifically those involved in designing and maintaining the data platform, the stakeholders that attended the workshops, and other nation-wide LCC activities such as the Integrated Data Management Network project⁴.

Methods

Focus group workshops, each approximately three hours long, were designed to be small in order to encourage engagement (8-12 people excluding project staff), and aimed to include participants from a technical data-gathering, -sharing, and user background, or those thinking about how existing on-line information platforms serve the work they do and the stakeholders they serve. The breadth of NPLCC stakeholders was also represented as best possible, though this study was not designed to be a statistical survey of the NPLCC community.

Workshops were held in Portland, Oregon (5 February 2013, 14 participants), Juneau, Alaska (15 February 2013, 10 participants), Seattle, Washington (15 March 2013, 8 participants), and Vancouver, British Columbia (12 April 2013, 8 participants). Overall 21 U.S. federal and six state agency, three Canadian national and two provincial ministry, one tribal, two conservation-based non-governmental organization, one private company and five academic practitioners attended (Table 1). We are very grateful to these practitioners who took time from their busy schedules to participate.

Table 1. Workshop participants

Workshop	Participants
Portland, OR 5 February 2013	Cindy Lou McDonald (Bureau of Land Management, OR & WA) Kyle Dittmer (Columbia R. Intertribal Fish Commission) Cinamon Moffett (OR Department of Land Conservation & Development) Andy Lanier (OR Department of Land Conservation & Development) Michael Schindel (The Nature Conservancy) Nancy Bunn (National Marine Fisheries Service) Khem So (US Fish & Wildlife Service) Peter Eldred (US Forest Service) Jimmy Kagen (Institute of Natural Resources, Oregon State University / Portland State University) Jen Bayer (US Geological Survey) Jamie Barbour (US Forest Service) Van Hare (Pacific States Marine Fisheries Commission) Jeff Weber (OR Coastal Management Program) Mary Mahaffy (NPLCC)* Tom Miewald (NPLCC)*

⁴ See the Great Northern LCC



Juneau, AK 15 February 2013	Dave Gregovich (AK Department of Fish & Game) Kevin White (AK Department of Fish & Game) Kim Homan (SE Alaska GIS Library, University of Alaska Southeast) Kimberly Vaughan (National Weather Service) Jeff Guyon (National Marine Fisheries Service) Bill Hanson (US Fish & Wildlife Service) Jason Seifert (SE Alaska GIS Library, University of Alaska Southeast) Gary Fisher (US Forest Service) Lyman Thorsteinson (US Geological Survey) Allison Bidlack (Alaska Coastal Rainforest Center, University of Alaska Southeast) Mary Mahaffy by telephone (NPLCC)* Tom Miewald by telephone (NPLCC)*
Seattle, WA 15 March 2013	Michael Case (University of Washington) Brian Cosentino (Washington Department of Fish and Game) Chris Lauver (National Park Service) Mindi Sheer (NOAA Fisheries) Frank Shipley (US Geology Survey) Patricia Tillmann (National Wildlife Federation) Andrea Woodward (US Geological Survey) John Mankowski (NPLCC) Mary Mahaffy (NPLCC)* Tom Miewald (NPLCC)*
Vancouver, BC 12 April 2013	Rory Annett (BC Ministry of Forestry) Anne Braaten (US National Park Service) Louise de Montigny (Ministry Forests, Lands and Natural Resource Operations) Anders Hopperstead (Ministry Forests, Lands and Natural Resource Operations) Gregory Kehm (MLArch) Peter Kiffney (NOAA Fisheries) Kathleen Moore (Canada Wildlife Service) Tory Stevens (BC Parks) Mary Mahaffy (NPLCC)* Tom Miewald by Skype (NPLCC)*

* Project advisor

Each workshop followed the same agenda of discussion topics and facilitation structure which included an initial introduction and background component, and four discussion topics. The order of topics discussed was modified at each workshop to better facilitate discussion flow based on participant input. The general structure is presented here.

At the beginning of each workshop, participants introduced themselves, workshop and project goals were reviewed, and an introduction to the NPLCC, its structure, mission and goals was presented by Mary Mahaffy, the NPLCC Science Coordinator. The following concepts and terminology were also introduced and defined: usability, useful, used, users, tasks, content, function/capabilities, infrastructure vs. interfaces, iterative and tiered, and scale (spatial and temporal). This provided context for the session and also clarified terminology used throughout the workshop.

Discussion Topic One explored the unique role the NPLCC can play in information sharing. This included, for example, discussion around managing resources on a landscape scale, trans-agency and trans-



boundary opportunities, facilitating interconnections, easing discovery, meta-search opportunities, data standardization, and what the data platform should not try to be. This discussion session shifted participant thinking away from existing norms and into exploring the unique opportunities the NPLCC has in promoting information sharing within the region. It also seemed to engaged and stimulate the interest of participants.

Discussion Topic Two introduced the user requirements analysis concepts of *users*, *tasks*, *content*, and *function/capabilities*. These concepts were then in turn related to each other in this way: *users* undertake *tasks* by analyzing data (*content*) using analysis tools (*functions/capabilities*). Defining users, while often an initial focus of information platform development, was not emphasized. For the sake of this discussion, the workshop participants were considered a cross section of potential *users* – allowing discussion to focus on the more important higher-level tasks that participants undertook and the tools and data they used to complete those tasks. *Tasks* were defined as the analyses undertaken that support conservation and management goals. Tasks that participants do now, and tasks that participants would like to do but can't, and the reasons why these tasks were possible or not were discussed in depth. *Content* is data and information that support tasks. The kinds of content and sources currently used by participants and the content that would benefit participants' work, but not yet available, were discussed. Often, the discussion about available and desired data expanded to identifying unique data needs the NPLCC could focus on. *Functions/capabilities* are the tools used to discover, access, explore, process and analyze *content* in support of *tasks*. The functions and capabilities of data platforms currently used by participants to do the work they do were discussed, along with how these could evolve and improved.

Discussion Topic Three was an exploration of the strengths and weaknesses of existing data platforms. The representative on-line data platforms briefly explored and discussed included: Data Basin, South Atlantic LCC, CAKEx, LC Map/Science Base, Cal-Adapt, Data BC, NOAA Digital Coast, NPLCC Prioritization Tool, and California Climate Commons. This discussion was used to identify content and functions/capabilities that were appreciated in the work participants were undertaking, and how they might be evolved by and improved upon by the NPLCC. Also, this exploration emphasized that many existing data platforms are doing an excellent job of supporting existing work and that the NPLCC data platform ought to complement and not duplicate what already exists. Regionally relevant platforms were prioritized at each workshop. Due to time constraints, not all of the data platforms listed were discussed at all workshops.

Discussion Topic Four reviewed key input from the first three discussions to identify the important and unique tasks the NPLCC data platform could support, the content needed to undertake those tasks, and the functions and capabilities that could support those tasks. Connections were mapped between the tasks, content, and functions/capabilities, and a prioritization structure was established by participants.



Workshop Finding and Synthesis

Common Themes Identified Across the NPLCC Geography

Common themes emerged from discussions around tasks, content, and functions/capabilities at the four workshops. Along with these common themes, a handful of unique issues emerged at each workshop that also warranted emphasis. Combined, these highlight the unique opportunities the NPLCC ought to consider when developing its on-line data platform.

The common themes have been organized by the task, content, and function/capability structure used in the workshops, and are briefly summarized here:

- Tasks – finding and accessing information, determining data quality and limitations, managing resources, publishing information;
- Content - landscape-scale information and other data opportunities, meta-data, traditional ecological and local knowledge;
- Function/capability - finding and accessing information, supporting the practitioner community, security & access control.

The following section describes these common themes in more detail. The called out ‘suggested platform components’ emphasize potentially beneficial platform components or features that could support discussed tasks, facilitate access and exploration of content, or are key suggested functions and capabilities. Those listed under ‘General’ are themes that came up repeatedly and were either cross-cutting or did not fit under the Tasks, Content, and Function/Capability structure.

1. Tasks

A. Finding and Accessing Information

Easing data discovery was a core need identified in all the workshops. Participants universally considered finding and gaining access to data a considerable challenge for their projects. However, participants did not expect nor want the NPLCC on-line platform to attempt to house all data. In the ever growing world of on-line data portals, the NPLCC platform ought to focus on acting as a clearinghouse or intelligent bridge between related database portals through sophisticated search services that link across multiple portals. Also, datasets are updated and expanded over time and a way to highlight updates was discussed.

Suggested Platform Component → Sophisticated search services that connect to multiple on-line database platforms.

Suggested Platform Component → Ability to explore data visually, if only simply before using.

B. Determining Data Quality and Limitations

This task was discussed at all four workshops for both empirical and modeled data. Before data can be used, its assumptions, uncertainties, usable scale, other limitations and quality parameters require review. A standardized way for quickly reviewing this information would make comparisons between



datasets easier. Of additional help would be the identification of key datasets vetted for certain uses by the user community.

Suggested Platform Component → Comprehensive meta-data system that is standardized and comparable

C. Managing Resources

One of the main goals of the NPLCC and its on-line data platform is to support the primary resource management tasks of practitioners. While there are countless resources being managed throughout the NPLCC geography, many would particularly benefit from the NPLCC's geographic and trans-boundary foci. Managing the following resources were tasks identified by workshop participants that would benefit from NPLCC data platform support: salmon, migratory species, grizzly bears, watersheds (hydrology), and more generally, temperate coastal rainforest ecosystems, connectivity, and latitudinal migration of habitats. Beyond this, practitioners would like to receive generalized support such as access to synthesized and vetted products to speed their incorporation of climate change information, and support in correlating ecosystem change to climate data. Additionally, users discussed the benefits of having access to a database of management practices and other features to support the practitioner community. (See Function/Capability – Supporting the Practitioner Community section below for further detail on this topic.)

Suggested Platform Component → Data platform content and function/capability that support the management of salmon, migratory species, grizzly bears, watersheds (hydrology), temperate coastal rainforest ecosystems, connectivity, and the latitudinal migration of habitats.

D. Publishing Information

Workshop participants would like to see the NPLCC's on-line platform evolve into a well curated, high-traffic location to publish data and products. However, it was repeatedly brought up that easing the publishing process and incorporating platform features that added value to products through sharing and collaboration would encourage participation.

Suggested Platform Component → Easy data uploading and comprehensive meta-data system

2. Content

A. Landscape-scale Information and Other Unique Data Opportunities

The landscape-scale approach and unique geography of the NPLCC were an important context in most discussions. The leadership role the NPLCC can play in smoothing trans-boundary data issues and facilitating the generation of consistent and appropriately scaled modeling and other data for large portions of the NPLCC geography is greatly anticipated. The vetting and promotion of foundational or core datasets from which most research projects can build on would be a great asset and was emphasized in all four workshops. Of equal importance to ecological data, is information about management practices, monitoring activities, the community of practitioners, traditional and local ecological knowledge, region-relevant bibliography, socio-economic data, etc.. There was consistently



enthusiasm to identify information gaps the NPLCC could facilitate filling during the workshops. Although this was not the focus of the study these identified content needs are listed in Appendix A as a byproduct of these discussions.

Suggested Platform Component → Visualization tools to allow users to locate and patch together datasets.

Suggested Platform Component → Database, delivery and search tools for information such as management practices over the landscape, traditional ecological knowledge, and socio-economic data.

Suggested Platform Component → Central location within the platform for curated foundational and core landscape scale and trans-boundary datasets and reports

Suggested Content → Integrated trans-boundary data & landscape-scale data

B. Meta-Data

Being able to easily determine and compare limitations, assumptions and uncertainties in any dataset, either modeled or empirical, was determined to be crucial. Although progress toward more standardized data was a repeated goal, the user community would benefit greatly from a standardized meta-data system within the NPLCC on-line platform. This meta-data system could also contain data summaries, main point and trend information, or other ways to quickly review information. Sophisticated tools for searching meta-data were also identified as important.

Suggested Platform Component → Comprehensive meta-data system that is standardized and comparable

C. Traditional and Local Ecological Knowledge

Incorporating traditional and local ecological knowledge into natural resource management is one of the goals of the NPLCC, and was emphasized in all four workshops. The on-line storage and presentation of this information raises access and security challenges.

Suggested Platform Component → Sufficient access control and security to house traditional ecological knowledge and other proprietary or official data

3. Function/Capability

A. Finding and Accessing Information

(See Finding and Accessing Information under Tasks above)

B. Supporting the Practitioner Community

Bringing together practitioners and coordinating collaboration within the region is a goal of the NPLCC. While existing on-line platforms, such as CAKEx.org, focus on case studies and the community of adaptation practitioners, the NPLCC platform could focus on the region and support specialized community oriented services. Being able to access who is doing what and where within the NPLCC



geography was recommended in the workshops. This could include relevant monitoring, planning, and policy development.

Suggested Platform Component → Discussion forum components, database structure, and search and mapping services tailored to supporting the practitioner community.

C. Security & Access Control

Concerns around data security and access control were raised in workshop discussions. For example, tribal and first-nation traditional ecological knowledge is often culturally sensitive and will require controlled dissemination. Certain official weather service data, and some proprietary or sensitive species location data would also require secure storage and controlled access.

Suggested Platform Component → Adequate access control and security systems

4. General

A. Clarity of intent and what can/can't be found on the platform

The workshop participants consistently emphasized that the NPLCC on-line platform will need to clearly describe its role and services to position itself among the ever increasing number of related on-line data portals. The usability of the NPLCC on-line platform will be enhanced by focusing on unique opportunities both within the existing on-line portals and through the NPLCC mission, goals, and geography.

Suggested Platform Component → Home page content clarifying platform intent and describing data content

B. Provide access to curated, synthesized, and vetted products

Workshops included researchers who regularly gathering raw data into large datasets for analysis. However, this process was identified as resource intensive. The need for easy to access and curated foundational products and datasets was emphasized. The general feeling was that practitioners needed well founded information to ease the first steps into addressing climate change in their work. Additionally, policy development often requires data that meet Data Quality Act standards.

Suggested Content → Curated review literature or reports that are periodically updated

C. Appeal to the Breadth of Audience and Range of Skills

There is a great challenge in meeting the needs of users with a broad range of backgrounds and skills. However participants thought the success of the NPLCC in meeting its goals necessitates addressing this challenge. It was suggested that there be a division within the on-line platform with each component addressing this range of needs.

Suggested Platform Component → Create different paths within the platform structure to address different needs and levels of skill



D. Strategic positioning within the ever expanding world of portals

The NPLCC data platform ought to complement and not duplicate what already exists. The platform would benefit from employing interfaces and infrastructure familiar to users, but not attempt to duplicate existing content. Linking to or even interlinking existing databases instead of trying to swallow them up was important. Additionally, up front clarity on the platform's intent and what can or can't be found there was widely supported by participants.

Suggested Platform Component → Use functions/capabilities, such as mapping and visualization tools, that are familiar to users to encourage use.

Suggested Platform Component → Sophisticated search services that link to multiple on-line database platforms, and not duplicate existing data platform content and services.

Themes Identified by Geography

The NPLCC spans a large latitudinal geography from Alaska to Northern California including two countries. Workshops were held at strategic locations across this geography to capture input that differed according to regional management and conservation tasks. This was especially true for the Vancouver, BC workshop where discussions followed distinctly different themes. The participant input that stood out from the common themes across the NPLCC geography is summarized below.

1. Portland, OR

Workshop discussion brought out the following unique themes in Portland.

- A. Tasks
 - (Same as those reported across the NPLCC geography above)
- B. Content
 - Compilation of local planning activities – what is really happening on the ground, including on private lands.
- C. Function/capability
 - Data standardization and minimum criteria requirements that tie into Western Governors Association, NOAA, and other standards under development

2. Juneau, AK

Workshop participants identified Alaska's management challenges and data needs as different from Washington, Oregon, and California. Below are the unique tasks, content and features/capabilities identified by participants.

- A. Tasks
 - Ecosystem community level understanding of change with salmon and watersheds as management priorities.
 - Glacier to estuary dynamics
- B. Content
 - Snowfall prediction data backed up with core sample validation



- Data at appropriate scales for Alaska with its highly variable microclimates in mountainous & fiord-like areas.
 - Oceanic data for salmon
 - Oil spill data
- C. Function/capability
- Facilitate coordination and collaboration between Alaska and British Columbia data generators and users

3. Seattle, WA

- A. Tasks
- Managing within the land to sea continuum (terrestrial-freshwater-estuary-coast). Both ecological and jurisdictional issues.
 - Managing unique temperate coastal rainforest ecosystems and landscape scale.
 - Salmon
 - Transboundary habitat connectivity
 - Identifying, locating and learning from similar efforts
 - Accessing proprietary data
- B. Content
- Land cover and vegetation data at site or unit of action scale
 - Human population data, both current and projections, that are trans-boundary and trans-border
 - Evaluation of ecosystem services
 - Water use within watersheds
- C. Feature/Capability
- (Same as those reported across the NPLCC geography above)

4. Vancouver, WA

- A. Tasks
- Easing access of Environment Canada data
 - Facilitating access to provincial agency generated data
 - Integrate ministry, NGO, academic, and private data using and generating activities within the province
 - Cross-walking and translating units, terms, methods for data across borders
 - Manage forestry productivity changes
 - Managing grizzly bear
 - Accessing older data
- B. Content
- Include BC Atlas project data, and marine and coastal report data
 - Landform mapping and enduring features
- C. Feature/Capability
- (Same as those reported across the NPLCC geography above)



Recommendations

The recommendations that emerge from this study are derived from workshop participants' input on the higher level tasks users undertake, and the content and functions/capabilities that can support those tasks. These recommendations are aimed at informing the initial and ongoing development of the NPLCC on-line data platform in two ways, 1) suggesting key capabilities of the platform's interface and infrastructure, and 2) suggesting specific content and categories of content needing unique accommodation. The ranking of these recommendations is based on their repetition across all four workshops.

Higher Initial Priority

Finding and Accessing Information – A sophisticated search service with at least a simple mapping component that queries internal databases and also links seamlessly to related external data platforms should be a main component of the NPLCC on-line platform. (See Finding and Accessing Information under Tasks above for additional details.)

Landscape-scale Information and Other Unique Data Opportunities – Leveraging the landscape-scale and trans-boundary focus of the LCCs was a key component of participant excitement for the NPLCC. Also, bringing traditional and local ecological knowledge along with socio-economic information more into the mainstream of natural resource management was determined to be important.

Meta-data – A comprehensive and standardized meta-data system was considered essential. Participants emphasized the frustration when meta-data was not sufficient to help make decisions about the usability of a data set. Comprehensive and standardized meta-data would make comparisons easier, and could even contain brief summaries, data trends, and community commentary.

Positioning within the ever expanding world of portals – The NPLCC's platform would benefit from employing interfaces and infrastructure familiar to users, but not attempt to duplicate existing content. Workshop participants suggested using familiar mapping and visualization tools to avoid having to learn another complex interface, if possible. Linking to or even interlinking existing databases instead of trying to swallow them up was important. Additionally, up front clarity on the platform's intent and what can or can't be found there was widely supported by participants.

Supporting the Practitioner Community – Bringing together practitioners and coordinating collaborating was important. This would be enhanced by interface and infrastructure components that would help users access who was doing what and where within the NPLCC geography.

Lower Initial Priority

Appeal to the Breadth of Audience and Range of Skills – Platform and NPLCC effectiveness will require appealing to and serving users with a broad range of backgrounds and skills.

Publishing Information – Easing or actively facilitating publishing of data on the site by users.



Managing Resources – Development of resources helpful for managing specific resources, or cataloging and communicating management practices and activities.

Security & Access Control – Controlling access to certain traditional or local ecological knowledge and other sensitive or official data will need to be a component of the platform.

Conclusions

The North Pacific Landscape Conservation Cooperative (NPLCC), as with all LCCs, is mandated to provide an on-line data and information platform for stakeholders. The purpose of this is to provide a gateway to the science and information products that the LCC develops and manage these data according to best practices. The NPLCC has made a conscious effort to begin capturing user requirements through engaging stakeholders across its geography in this workshop-based user needs assessment. It was made clear by the workshop participants that the NPLCC can best support its mission and meet its goals by playing a strong role in filling the gaps in information development, focusing on its unique trans-boundary and landscape-scale vision, while also leveraging the strengths of existing on-line information portals. The NPLCC is now poised to begin the development of its on-line data platform.

As supported by the user-oriented software design principles literature, this user needs assessment focused on the *tasks* users currently or would like to undertake, and the *content* and *functions/capabilities* that currently or would be desired to support these tasks.

Common themes identified across the NPLCC geography included:

- Tasks – finding and accessing information, determining data quality and limitations, managing resources, publishing information;
- Content - landscape-scale information and other data opportunities, meta-data, traditional ecological and local knowledge;
- Function/capability - finding and accessing information, supporting the practitioner community, security & access control.

This assessment was a first step in a long-term user engagement. The NPLCC is encouraged to continue the dialogue with its users to further its understanding of the evolution of tasks they undertake, and gain input the NPLCC data platform's success. Measuring the success of a data platform project is not an exact science and depends on the assessment by its users. Assembling a NPLCC data platform implementation team to periodically assess progress and success could be beneficial. This team could judge the achievement of the initial requirements and goals, including the suggestions presented here, and structure usability tests by users to fine tune platform features/capabilities. It could also work to survey the extent of uptake and use, and solicit feedback from the broader end-user group. It is important to note that the ability to measure success is highly dependent on a thorough and appropriate initial design. The NPLCC will have reached a milestone when it launches the first version of its data platform. And, this milestone is anticipated by a user community who sees the NPLCC playing a strong role in data sharing and collaboration throughout its geography.



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Appendix A – Identified Data Gaps the NPLCC and the Data Platform Could Help Addressing

Below are listings of data sets, data set improvements, and other information that were identified during workshop discussion as better supporting existing or new analysis tasks. These are included here in no particular order as an initial list of ideas suggested by representative data platform users that can be further explored and prioritized with formal input and discussion. If a geographic extent is not specifically listed, the intent was that data would span as much of the NPLCC geography as possible with focus on addressing trans-boundary/trans-border challenges.

This list is not the results of a systematic survey, but is a best effort to include the ideas that came up during the workshops. Identifying existing data gaps was not a focus of this project.

Portland, OR Workshop

- Phenological data
- Species interaction data
- Invasive and opportunistic species risk data
- Location and information of active survey and monitoring work including who, what, methods, etc.
- Continuous and broader climate data (modeling) that spans NPLCC geography
- Compiled, synthesized and regularly updated information for key climate parameters from literature
- Local planning activity and policies, what is actually happening on the ground. Including private lands.
- Ecoregional assessment information, but at a finer scale than is currently being collected. Including “condition” information for key species
- Improved and standardized starting point or foundational data sets. Those datasets upon which most projects seem to start. E.g. road layer for whole geography.
- Expand on PMAP.
- State of the landscape type reports
- Data to support investigation of major climate related changes. Ocean acidification was discussed as a significant data gap.
- Foundational data: e.g. road layer across jurisdictions.

Juneau, AW Workshop

- Socio-economic data
- Foundational data: key model outputs regularly updated
- Local and traditional ecological knowledge
- Access and improve data that are “almost usable.”
- Snow quality impacts and modeling for better forecasting, preparation, and response. Snowfall, temperature, and ground-truthing (snow core samples).



- Species population level management: tracking data, resource selection, species distribution/presence absence, and seasonal habitat use.
- Hydrology
- Nutrient availability and distribution
- Oceanic data for salmon
- Oil spill data
- Local climate conditions, microclimate, scales and relevance to uniqueness and topography of Alaska.
- Ground-truthing of climate and other models
- Glacier-to-estuary dynamics
- Disease
- Invasives
- Linked nearshore and stream temp data
- Land cover data at appropriate scales
- Oceanic change: plankton, nutrients, currents
- Salmon data outside LCC
- Global weather pattern, Pacific Decadal Oscillation.

Seattle, WA Workshop

- Migratory species, large scale data
- Traditional ecological knowledge
- Land to sea transition: terrestrial, fresh water, estuary, coastal. Addressing data fragmentation issues
- Wildlife connectivity – international and into adjacent LCCs
- Data specific for temperate rainforest ecosystems
- Salmon
- Tie into Arid Lands Initiative
- Foundational data: address trans-boundary inconsistencies, schemes/classifications
- ‘Good’ vegetation data, at scale of unit of action
- Human population, etc. data. Current and future modeling.
- Climate change and human footprint
- Species habitat modeling
- Climate-smart hydrology network and monitoring data
- Modeling coastal inundation for whole LCC coast. Including erosion and sediment transport.
- Water use within watershed
- Watershed land use
- Soils data
- Significant barriers
- Tribal/human ecological reliance



Vancouver, BC Workshop

- Flyway data
- Existing data or platforms that ought to be linked to: BC Atlas Project, Marine & Coastal reports (2006), State of Environment reports, Pacific Climate Impacts Consortium, Data BC
- Land cover and use
- InfoRain / EcoTrust data and as a good approach to learn from
- Synthesized salmon data for region
- BC shore zone data, align multiple classification schemes
- National land cover data type data for BC. CEC land cover mapping data
- Sea level rise and impacts to estuaries
- Species distribution change
- Forest productivity changes
- Trans-border vegetation cover
- Landform and enduring features data
- Access to older data in general
- Estuaries and wetlands data
- Stream hydrology data
- Data useful for managing grizzly bear
- Latitudinal migration of habitats and vegetation

