Exploring the Conditions for Digital Service Delivery

NRCan Flood Mapping

March 4, 2021

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Executive summary

The Canadian Digital Service (CDS) ran an Exploration with Natural Resources Canada's (NRCan's) Flood Mapping team, and related programs, from January 25 to February 1. CDS learned about current service delivery conditions, challenges, and opportunities for a flood mapping service. This report provides an overview of findings and recommendations and proposes a roadmap.

Need for a service

Flood mapping is an initiative to bring critical flood risk data into the hands of residents, builders, homebuyers, and emergency planning and preparedness organizations in Canada. Flooding affects the Canadian economy, lives of Canadians, and emergency response reactions and relief. Canada is the only G7 country without a means of consistently communicating flood risks to its citizens, for example, both the United States and the United Kingdom offer easy to access digital services. The need for a flood mapping service is highlighted in the most recent mandate letter for the Minister of Natural Resources.

Findings

The responsibility for flood mapping in Canada doesn't sit with one clear entity. NRCan derives data from multiple sources, these include federal departments, Indigenous groups, provinces, and territories. These stakeholders have differing views about dataset ownership and use. An up-to-date national flood mapping layer is underway, however the process to publish this data is not clearly established.

What data is available is difficult to find and use. Design and user research expertise will support developing a service that is intuitive and accessible for a wide range of users. Feedback will inform how the data can be shared, at what level of granularity, and in what format.

Next steps

With clear federal prioritization and because development has not yet begun, there is a unique opportunity to establish a strong foundation and demonstrate incremental progress in the delivery of a new national flood mapping service. Given this, CDS recommends the following short term objectives to enable a user-centred service delivery model:

1. Reconcile all federal and provincial-territorial governing committees to align on a single federal flood mapping mandate that includes examining opportunities and limitations for the federal government to share this data with the public.
2. Identify the problem and the user groups the Flood Mapping service aims to help.
3. Complete a skills assessment of the team and fill gaps by reassigning, recruiting or contracting talent, to stand up a multidisciplinary service delivery team to build, test, and iterate upon the service.

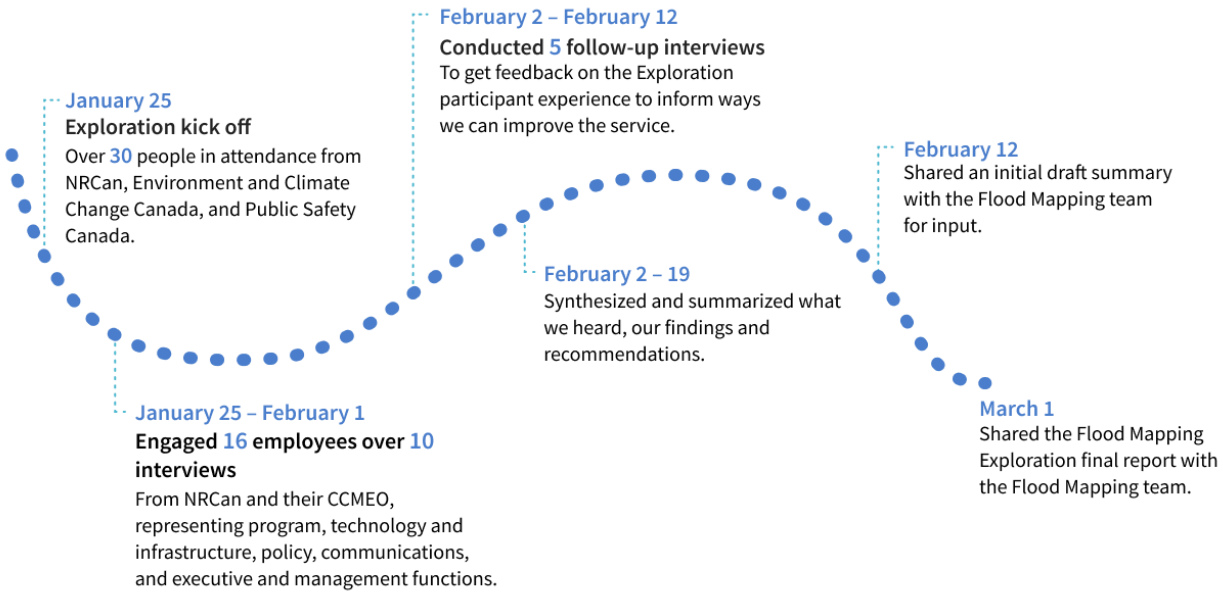
The Flood Mapping Exploration process

Through an Exploration the Canadian Digital Service (CDS) provides tailored recommendations to a partner organization. The Exploration process also helps CDS further its understanding of how teams can best deliver services that meet user needs and what are the challenges to doing so successfully.

To orient the teams, CDS began the Exploration with a stakeholder mapping exercise with the Flood Mapping team to understand and document those who would play a role in the service. At a kick off event, the team from CDS met with NRCan Flood Mapping and colleagues to provide an overview of the process and how CDS helps the government to serve people better by examining enabling conditions for digital service delivery.

The following week of the Exploration, CDS team members met with people throughout the organization to learn more about what works well and what some of the challenges are. The CDS team then documented and analyzed the findings, to formulate recommendations for each area of focus for a flood mapping service that is centred on the needs of people who will use the service.

In the final phase of the Exploration, CDS collaborated with NRCan to explore how these findings and recommendations can be put to action in a plan that fits for the team.



Recommendations for a digital flood mapping service

Organizational alignment

There are many stakeholders in the flood mapping space, including groups within NRCan and other government departments, each with their own projects and activities. It is unclear how these efforts fit together and align towards common goals that create value for the intended users of their data, tools, and insights.

In order to fulfill their mandate, the Flood Mapping team has an opportunity now to examine how a service might be delivered to meet user needs. Defining the scope and ownership of the service will help align the organization, and establishing outcomes and indicators will provide a common goal for the team to work towards. These indicators will inform the organization of the success of the service and allow for continuous improvements.

Define the scope of the service

- Define the scope of the proposed flood mapping service, and establish outcomes and indicators for the service, to guide the organization's efforts, help them track progress, and allow for continuous improvement.

Determine who will be responsible for the service

- Assign and empower a single service owner who will be responsible for the end-to-end flood mapping service.
- Bring together, under the single service owner, the various teams within the organization that would contribute to designing, building and maintaining the flood mapping service.

Fund a service delivery team

- Fund and staff at least one service delivery team with the skills needed for the work. Consider funding multiple teams which could include a flood mapping risk information product team, a Flood Mapping data team, and possibly a flood mapping tech infrastructure team.
- Establish early progress indicators to advance and monitor the work of the team(s), e.g., assembling the team(s), obtaining needed authorities, , starting a discovery, identifying outcome criteria, etc.

Empower a multidisciplinary approach

Establishing a multidisciplinary team contributes to the success of a digital service. Multidisciplinary teams reduce overhead, establish important feedback loops, increase the likelihood that the service will be used, and that the service will meet user needs. Having different skill sets on the team will make it possible to adopt a continuous product delivery model which is one of the enabling conditions for staffing a multidisciplinary team (see Appendix B).

Multidisciplinary teams that include a product manager, design researchers, designers, software developers, and policy advisors are core to digital service delivery. These teams have the skill sets to complete each phase of delivery including:

- identifying needs and issues through conducting user research
- generating solutions through design and development
- iterating on the service, and
- evaluating the impact of that iteration through additional research.

When these teams work in the open, documenting and clearly communicating their work, it can be shared for reuse and greater acceptance across the department (or beyond). This collaborative work helps alignment on the objective of delivering a user-centred digital service by making it part of everyone's work.

Assemble the team and fill skill gaps

- Take stock of existing talent within the team and identify any skill gaps with an eye to ensuring the team can design, test, iterate, deliver and sustain services informed by user problems and needs.
- Fill skill gaps by pulling staff from other areas of the organization, initiating hiring processes, and/or contracting support. Support the delivery team's use of modern technology and practices.
- Ensure the Flood Mapping delivery team is empowered to use modern tools and practices, like design research, service design, open source software, and continuous delivery.
- Practice Agile working methods - start with existing internal knowledge of this methodology on the team.
- Support the team by offering them professional development training on digital best practices, including service design.

Work in the open

- Share progress internally and more broadly as the Flood Mapping team researches, develops, and tests a flood mapping risk Information service.
- Make the data not only available but also discoverable and accessible such that people can use the content that is published openly.

Data availability, jurisdiction to operate, and interoperability

Delivering a service for Canadians to access flood risk information depends upon having access to the relevant data, with the permission to share at least some version of that data layer with the public. These dependencies align with some enabling conditions (see Appendix B) for creating and maintaining successful digital services: working in the open and a culture of collaboration. This can be accomplished by gaining a better understanding of who controls that data, defining how it can and ought to be shared, and standardizing the data.

Currently, a few regions have a complete up-to-date flood mapping layer and a team is working on the national data layer. Conflicting information about how the federal government can share flood mapping data with the public and a seeming lack of alignment between provincial and federal authorities are the biggest concerns. A clear mandate around data sharing and more information on when the full data set will be available would address these issues.

Ensure availability of data

- Identify currently available flood mapping datasets that have the required granularity (e.g., New Brunswick). Use these datasets for early development and testing of the service.
- Enable data collection for unmapped areas and areas with low resolution.

Plan the delivery of a flood mapping data information service

- Establish the timeline for when a national flood mapping dataset will be available. Consider this timeline when planning the roadmap.
- Prioritize data and rollout for high risk, low information areas.

Secure agreement on data sharing within jurisdictions

- Reconcile all federal and provincial-territorial (FPT) governing committees to align on a single federal flood mapping mandate including opportunities and limitations for the federal government to share this data with the public.
- Conduct research on the sensitivity of sharing flood mapping information with the public for stakeholders (e.g., insurance companies, home owners, home buyers). Establish a path forward on how to share the data based on these sensitivities.
- Establish early federal, provincial and territorial progress indicators to advance and monitor the work of the jurisdictions.

Maintain data standards and interoperability

- Continue work on standardizing data and maps and collection of high quality mapping data to support map data layering.
- Build the data and systems underpinning the flood mapping risk information service so that they are flexible and interoperable by design with other platforms and tools (i.e., Federal Geospatial Platform).

Iterative design and user research

User research is a set of activities used to understand and meet the needs of users. Generative and evaluative user research informs each step of the development process. Generative research could look at existing international efforts and their impact, reveal the needs of end-users for flood mapping data in the Canadian context, and document sensitivities in sharing different forms of that data for different stakeholders. Evaluative research would help generate and test hypothesized solutions by examining the performance of different iterations over time. Through ongoing user research, teams can build user-centred services based on evidence that are both usable and useful. Conducting user research is a core enabling condition for service delivery (see Appendix B).

The Canadian Centre for Mapping and Earth Observation (CCMEO) and the Flood Mapping program have conducted user research in the past and the research scientist associated with the team is still engaged in small user research efforts. NRCan's Flood Mapping program does not currently design for a broad audience or systematically involve end users in the design process. Flood Mapping's new mandate and this current effort provide new impetus to restart user research in the organization.

Plan and build user experience research capacity

- Explore using existing UX expertise from the strategic communications team to support UX research. Plan for hiring a UX designer and researcher.
- Begin fostering relationships with organizations that might help connect you with end users, e.g., homeowners associations.
- Leverage existing research expertise in the organization to use qualitative and quantitative data to inform your development process.

Introduce generative research

- Conduct background generative research on comparable services available internationally and the impact of those tools.
- Start conducting generative research to understand outstanding questions about the service:
    - What is the primary goal of the service (flood preparedness, emergency response, changing patterns of land development)?
    - Who is the main audience for this service (homeowners, buyers, citizens generally)?
    - What does this audience want in terms of information on flood risk? In what format?
    - What concerns do other industries have and how do they fit in this landscape?

Grow evaluative research capability for current and future services

- Begin doing small user research studies, e.g., usability studies of existing platforms and portals and prototypes.
- Explore options for intercept survey testing on existing platforms.
- Research and define what success would mean for this service. Do we seek to change behaviour through sharing this information? What is the outcome the team wants to achieve? Outline a methodology to track progress towards that goal.

Building and maintaining technical infrastructure

Building for longevity and interoperability is key to serving users as technology evolves. A continuous delivery model prioritizes the organization's objectives for achieving public value over existing ways of working by building in responsiveness and flexibility from the beginning.

NRCan has a forward thinking approach to their technology and standardization. Work has been done to standardize and consolidate data and maps into the Federal Geospatial Platform (FGP). At the same time, initiatives are funded one at a time leading to different efforts being siloed which limits the organization's ability to maintain and grow their infrastructure as a whole. Instead of working with the existing ecosystem of tools and platforms, each project team builds their own new portal. The current relationship with the Chief Information Officer and Security Branch (CIOSB) has led to some distrust in how work is prioritized, creating concerns for the success of future work.

Ensure timely delivery of development work

- Involve security and privacy early and often in the process of planning and building to ensure new controls aren't identified in the final hours.
- Identify program needs versus Chief Information Officer and Security Branch priorities and their capacity and identify what can be done with other NRCan groups (i.e., work with Federal Geospatial Platform group).

Increase efficiencies and reduce costs

- Take stock of existing technical platforms, tools, portals, etc., and identify areas of overlap and synergy.
- Work with cloud providers to try to reduce cost of services.

Next steps

CDS and Flood Mapping have identified the following three key short term objectives.

1. Reconcile all federal and provincial-territorial governing committees to align on a single federal flood mapping mandate including opportunities and limitations for the federal government to share this data with the public. This is a foundational piece for the service. Many of the initiatives underway with different federal organizations (Environment and Climate Change Canada, Statistics Canada, Public Safety Canada), provinces, territories, Indigenous communities, and municipalities could be linked to this initiative to shape the work NRCan does as it relates to flood mapping.

2. Identifying the stakeholder group and problem the NRCan Flood Mapping team is aiming to help. Once a clear picture has been formed of what other organizations are doing and what is needed, NRCan can start to explore the stakeholder roles and problems they will be looking to solve. Regardless of the stakeholder, Flood Mapping can employ the delivery methodology CDS recommends to meet the needs of these other users throughout the service continuum.

3. Complete a skills assessment of the team and fill gaps by reassigning, recruiting or contracting talent, to stand up a multidisciplinary service delivery team to build, test, and iterate upon the service. No matter what is uncovered and decided through the recommendations mentioned above, Flood Mapping will be providing a service to users and will benefit from user research and user design skill sets on the team.

Proposed roadmap

Start right away

HIGH PRIORITY

Organizational alignment

Define the scope of the proposed flood mapping service, and establish outcomes and indicators for the service, to guide the organization's efforts, help them track progress, and allow for continuous improvement.

HIGH COMPLEXITY

Empower a multidisciplinary approach

Take stock of existing talent within the team and identify any skill gaps with an eye to ensuring the team can design, test, iterate, deliver and sustain services informed by user problems and needs.

LOW COMPLEXITY

Data availability and jurisdiction

Identify currently available flood mapping datasets that have the required granularity (e.g., New Brunswick). Use these datasets for early development and testing of the service.

LOW COMPLEXITY

Data availability and jurisdiction

Begin to reconcile all federal and provincial-territorial (FPT) governing committees to align on a single federal flood mapping mandate including opportunities and limitations for the federal government to share this data with the public.

HIGH COMPLEXITY

Iterative design and user research

Begin fostering relationships with organizations that might help connect you with end users, e.g., homeowners associations.

MED COMPLEXITY

MEDIUM PRIORITY

Data availability and jurisdiction

Establish the timeline for when a national flood mapping dataset will be available. Consider this timeline when planning the roadmap.

HIGH COMPLEXITY

Building and maintaining technical infrastructure

Identify program needs versus Chief Information Officer and Security Branch priorities and their capacity and identify what can be done with other NRCan groups (i.e., work with Federal Geospatial Platform group).

MED COMPLEXITY

Empower a multidisciplinary approach

Support the team by offering them professional development training on digital best practices, including service design.

LOW COMPLEXITY

Iterative design and user research

Explore using existing UX expertise from the strategic communications team to support UX research. Plan for hiring a UX designer and researcher.

LOW COMPLEXITY

LOW PRIORITY

Building and maintaining technical infrastructure

Continue work on standardizing data and maps and collection of high quality mapping data.

MED COMPLEXITY

Data availability and jurisdiction

Prioritize data and rollout for high risk, low information areas.

MED COMPLEXITY

Empower a multidisciplinary approach

Practice Agile working methods - start with existing internal knowledge of this methodology on the team.

MED COMPLEXITY

Start in the near term

HIGH PRIORITY

Organizational alignment

Fund and prioritize a service delivery team with the skills needed for the work.
- Consider funding multiple teams, like a flood mapping rik information service team, a flood mapping data team, and possibly a flood mapping technical infrastructure team.

HIGH COMPLEXITY

Organizational alignment

Establish early progress indicators to advance and monitor the work of the team(s), e.g., assembling the team(s), obtaining needed authorities, , starting a discovery, identifying outcome criteria, etc.

HIGH COMPLEXITY

Organizational alignment

Assign and empower a single service owner who will be responsible for the end-to-end flood mapping service.

LOW COMPLEXITY

Organizational alignment

Bring together, under the single service owner, the various teams within the organization that would contribute to designing, building and maintaining the flood mapping service.

HIGH COMPLEXITY

Empower a multidisciplinary approach

Fill skill gaps by pulling staff from other areas of the organization, initiating hiring processes, and/or contracting support.

HIGH COMPLEXITY

Iterative design and user research

Start conducting generative research to understand outstanding questions about the service.

LOW COMPLEXITY

Data availability and jurisdiction

Conduct research on the sensitivity of sharing flood mapping information with the public for stakeholders (e.g., insurance companies, home owners, home buyers). Establish a path forward on how to share the data based on these sensitivities.

MED COMPLEXITY

MEDIUM PRIORITY

Iterative design and user research

Conduct background research on comparable services available internationally and the impact of those tools on the end-users and other stakeholders.

LOW COMPLEXITY

Iterative design and user research

Research and define what success would mean for this service. Do we seek to change behaviour through sharing this information? What is the outcome the team wants to achieve? Outline a methodology to track progress towards that goal.

MED COMPLEXITY

LOW PRIORITY

Data availability and jurisdiction

Enable data collection for unmapped areas and areas with low resolution.

MED COMPLEXITY

Start in the mid term

HIGH PRIORITY

Building and maintaining technical infrastructure

Take stock of existing technical platforms, tools, portals, etc., and identify areas of overlap and synergy.

LOW COMPLEXITY

Iterative design and user research

Conduct generative research to understand outstanding questions about the service.

LOW COMPLEXITY

Data availability and jurisdiction

Establish early federal, provincial and territorial progress indicators to advance and monitor the work of the jurisdictions.

HIGH COMPLEXITY

Empower a multidisciplinary approach

Ensure the flood mapping delivery team is empowered to use modern tools and practices, like design research, service design, open source software, and continuous delivery.

MED COMPLEXITY

Data availability and jurisdiction

Build the data and systems underpinning the Flood Mapping Risk Information service so that they are flexible and interoperable by design with other platforms and tools (i.e., Federal Geospatial Platform).

MED COMPLEXITY

Iterative design and user research

Begin to build, test, and iterate upon the service. Develop low and then higher fidelity prototypes. Begin building out the service. Conduct user research studies on each iteration including usability studies of existing platforms, prototypes, and finally the service.

HIGH COMPLEXITY

MEDIUM PRIORITY

Iterative design and user research

Leverage existing research expertise in the organization to use qualitative and quantitative data to inform your development process.

LOW COMPLEXITY

LOW PRIORITY

Building and maintaining data and technical infrastructure

Work with cloud providers to try to reduce cost of services.

LOW COMPLEXITY

Start in the long term

HIGH PRIORITY

Empower a multidisciplinary approach

Share progress internally and more broadly as the Flood Mapping team researches, develops, and tests a flood mapping risk information service. Make the data not only available but also discoverable and accessible such that people can use the content that is published openly.

LOW COMPLEXITY

Iterative design and user research

Explore options for conducting additional user research in the organization, e.g., intercept survey testing on existing platforms.

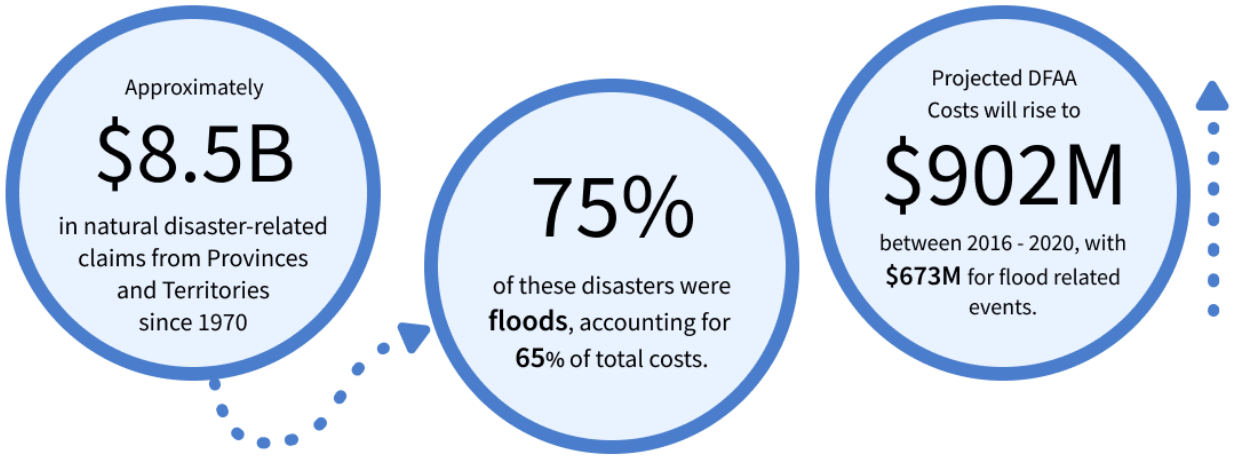
LOW COMPLEXITY

Appendix A: What We Heard

Throughout the Exploration, we spoke to teams within your organization. This is what we heard from you in terms of what's important, what you're doing well, and what you think is needed. We've analyzed this data against the conditions that enable or block digital service delivery to make recommendations on key areas of focus.

About flood mapping

The magnitude and frequency of floods in Canada have increased considerably in recent years, as have associated recovery costs. Canada is without a national flood insurance arrangement. The federal government acts as the insurer of last resort for uninsurable damage from large-scale disasters through the Disaster Financial Assistance Arrangements (DFAA).



There have been approximately $8.5B in natural disaster-related claims from provinces and territories since 1970. Seventy-five percent of these disasters were floods, accounting for sixty-five percent of total costs. These costs continue to escalate as climate change increases the frequency and severity of floods. In fact, a 2016 report of the Parliamentary Budget Officer projected that DFAA costs would rise to $902M per year between 2016 and 2020, with $673 million specifically for flood-related events. Additional insured and uninsured flood losses cost Canadians hundreds of millions of dollars annually, through taxes and direct losses borne by homeowners.

Natural Resources Canada's (NRCan's) Canada Centre for Mapping and Earth Observation (CCMEO) Branch has a mandate to complete national flood risk mapping for Canada by 2023 and inform

Canadians about the flood risk for their own properties. The mandate letter that includes this initiative is fairly broad in its scope.

Canada is the only country in the G7 without comprehensive flood mapping information available to its citizens at the national level. The flood mapping team highlighted examples such as the city of New Orleans where flood risk information was provided in an accessible manner based on civic address.

About opportunity

To deliver on the Canada Centre for Mapping and Earth Observation (CCMEO) Branch's mandate to provide flood risk data to the public, the Flood Mapping group is currently working on a person-centred service where Canadians can access relevant, trustworthy information on the subject. The assumption is that residents, municipalities, and other jurisdictional governments could use risk data to prepare for floods. Homebuyers and builders could use the service to make informed decisions about where to purchase or develop housing. And, in the long -term, this flood risk data will enable the federal government to make better decisions about who receives flood-related disaster recovery payouts.

The goal for the service is for it to be usable and widely accessible to Canadians who could benefit from having access to this information. While delivering a modern service represents a shift for the organization, the branch has more than 15 years experience publishing data in the open through online portals, access to cloud-based computing, and renewed focus on client services.

Flood Mapping currently lacks some expertise and capacity to develop and maintain a successful flood risk service. The organization is mainly composed of scientists and engineers who design systems for *other* scientists and engineers. The Flood Mapping team has limited capacity in design and user research and has little contact with the people who could use the service.

Questions persist about how much flood mapping data the federal government can and should share with the public.

Organizational alignment

- The Canada Centre for Mapping and Earth Observation (CCMEO) has a mandate and has the expertise in flood mapping to support the development and delivery of a service.

    - We heard, public safety is responsible for policy, NRCan is responsible for data to inform policies
- That positioning could serve it well as it competes for funding among other federal actors within NRCan and across government, particularly if it can demonstrate the value of its flood mapping data, products, and services.
- The Director General and Assistant Deputy Minister (ADM) are very supportive
- Senior leadership: “CCMEO needs to shine”.
- Management is supportive of building a tool that meets the users’ needs.
- We heard that funding is commonly project based and timebound, and not typically informed by the public value created with and for users.
- Project based funding hinders continuous improvement, support for existing products and services.
- If funding is secured, a flood mapping service would be established as a top priority for the Flood Mapping team.
- The model being proposed is based on lessons learned in the past to get the highest possible return.

Empower a multidisciplinary approach

You have a desire for a user-centred focus.

- Flood Mapping’s branch, the Canada Centre for Mapping and Earth Observation, sees itself primarily as a technology organization that is transitioning towards a delivery model that creates public value with and for the users of its flood mapping services. There is a desire and need for user-centred design and outcomes (e.g., discoverable, accessible, relevant, and reliable services).
- Currently, the team is focused on the science aspects of their work and do not tend to incorporate modern design practices or understand user-centred design.
- Building services with end user in mind would be a cultural shift – "it’s not natural for us"
- The team expects pushback with making language and content more understandable (less scientific jargon) because of the science-based nature of the organization.
- We heard unanimous support from stakeholders for working with CDS to help them take practical steps towards a user-centred approach, such as:
    - Helping disseminate information to Canadians in a usable way, having the flood mapping group be a model for change and an example to other departments.
    - Helping define how to better connect with end users.
    - Helping initiate change in the way the team thinks.

Taking an iterative approach is part of the planned roll out.

- Flood Mapping is planning to have an iterative focus for the roll out of a tool – first looking at web presence and then expanding to more than data.

- Flood Mapping is currently delivering the guidelines iteratively, getting feedback and updating them.
- Running pilots is part of the culture, however, pilots aren't always iterated on and are often isolated one-offs.

Skills gaps need to be addressed to effectively deliver the service.

- In house delivery capability gaps and a dependence on others (e.g., CDS or vendors) that would need to be addressed to realize and sustain those outcomes via its service delivery.
- There are program managers but no product managers that have a broader view on the product and consider multiple stakeholders including the end users of the service.
- There is one accessibility analyst but no accessibility team.
- Even though there is no accessibility team, the communications team is especially adamant about focusing on accessibility when involved with web content.
- Strategic and others in Communications are familiar with some UX practices and use them in their work. The communications team invests in UX training so they're familiar with the processes since there are no dedicated UX resources.
- There's concern that adding the right people and finding the right talent is difficult.
- Program managers are able to make working level decisions; executives have the final say. Anything that is published requires approval.

Data availability, jurisdiction to operate, interoperability

Flood Mapping and the branch, the Canada Centre for Mapping and Earth Observation (CCMEO), have a proven history of publishing data in the open. Several limitations impact what data is available for a potential flood mapping service.

You have a history of sharing data and a mandate to support doing so.

- Flood Mapping and CCMEO have a history of publishing data in the open and new mandate to do so.
- Been online and sharing data openly for 15+ years .
- The open mapping project shares data by definition in multiple formats so that people with and without geo mapping software can access the data.
- There has been a recent mandate to 'get the data to people'
    - NRCan has formed a dissemination team with the mandate to reach out to the public and share data. This team includes members from all divisions within the branch however, this team is not dedicated to the dissemination problem, the dissemination work is on top of the members regular work.
    - The Federal Geospatial Platform will allow for people to use and reuse more of the data.

- Additionally, NRCan shares data through the open data portal which allows more people to access data.

There is some sensitivity around sharing data.

- Several people discussed the sensitivity of the data and limitations in sharing it.
- A thought that "just because we have the data does not mean we should share it".
- Being transparent about the risk of flooding for a particular property could affect the real estate market. How to release this data is sensitive.
- Institutional memory of how sharing flood mapping data in QC resulted in confusion and negative press.

Flood mapping is multi-jurisdictional.

- The flood mapping ecosystem is complex. It is composed of federal, Indigenous, provincial, territorial, municipal, academic, private, non-profit and other actors that play a role in informing people in Canada about flood risks.
- Internally, there is confusion about who owns flood risk (Public Safety Canada? Environment and Climate Change Canada? NRCan?). Stakeholders want to enhance understanding of who handles what as it relates to flood mapping.
- Most provinces and territories agree on standardization and single source of truth for sharing info and data, BUT, some said they still want to be the official source of info for their own province or territory.
- There are competing interests and tensions to navigate and manage, e.g., data sharing and providing risk levels associated with properties and locations (homeowner safety and awareness versus property values).
- However, there may be a workaround in that if the tool or service adds a level of analysis, then federal government can share the data derivative.

Flood mapping data quality and availability varies.

- Existing flood mapping data is in different formats so the team cannot release maps as if they were all the same.
- Only a few up-to-date flood mapping datasets are ready currently. It may take a year or longer to prepare the nationwide flood mapping layer.

Collaboration with other departments has improved.

- There has been a recent shift in support of collaboration and re-building relationships across departments and jurisdictions, from new executives, but roadblocks still exist with collaborating across other departments:
    - The Chief Information Officer and Security Branch has not been able to deal with the requirements identified by the team.

- Communications not supportive/not able to action their requirement ('they run away')
- Big files are worked on through collaboration with different departments but IT is still single silo and little opportunity to work together and connect.
- There is no 'one owner' for the whole of NRCan website for comprehensibility & consistent messaging to Canadians.

Data generation is underway and will be completed over the next year.

- Some of the data is outdated (10-15 years old) or not granular enough for flood mapping
- Data collection for full area will take a year to complete.
- Data provided to NRCan from other parties often has conditions (NRCan can't share outside of federal family).
- There are other organizations collecting data and maybe duplicating effort.
- We have data from public safety based on areas that have evoked emergency measures.

Sharing experience and outputs present some challenges.

- Desire and history to share by Communications teams but there are constraints.
- Some tension between the Minister who wants to share success and working level people who want to communicate about their process.
- From Comms perspective, some challenges on when to discuss projects. They want to talk about the process as well as outcomes but when things are "half-baked" or funding uncertain they risk managing expectations incorrectly.
- The team reports good working relationships and communication across silos. An outreach team conducts stakeholder engagements including workshops, articles, newsletters, guidelines and feedback sessions from FM community and PTs.

Users and conducting design research

There is a history of design research with the people who use the services.

- There is precedent for conducting user research. People in the organization have run surveys, gathered usage data and run workshops in the past.
- Heard from several interviewees that they want to build an accessible platform and want to meet the needs of the public. Some understanding that talking to users is central for this effort.
- Dissemination team and Laura have the task to build services that are people-centred.
- Good working relationship with PCO and an understanding of POR versus user research.
- Strategic and other people in Communications are familiar with some UX practices and use them in their work.

There is recent renewed interest in doing design research along with delivering a service that meets needs.

- Dissemination team looking to connect with end-users.
- Support from management to build a tool that meets the user's needs.
- Proof of concept for potential flood mapping solution has been completed by research.

Leadership for a time, did not encourage (maybe discouraged user testing). Organization has lost their connection with end users.

- Real and perceived barriers to conducting user research including having the data openly available and not requiring login. Shared data pipeline means harder to conduct intercept testing. And, lost touch with end-users and stakeholders. People in org not sure how to do research on a group of potential users.

There are real and perceived barriers to conducting user research.

- Having the data openly available and not requiring login.
- Shared data pipeline means harder to conduct intercept testing.
- Lost touch with end-users and stakeholders...people in org not sure how to do research on a group of potential users.

Building and maintaining technical infrastructure

Cloud infrastructure is costly and not fully available.

- Public cloud infrastructure can get expensive when storing lots of data and requiring heavy computer power to process but SSC cloud storage and processing is more expensive.
- Budgeting for continued cloud storage and computing needs to be considered when funding horizontal platforms.
- Protected B Cloud has been delayed due to changing security guardrails.
- Flood Mapping's branch, the Canada Centre for Earth Observation Branch, relies on other groups with competing priorities to administer their cloud infrastructure (Chief Information Officer and Security Branch and Shared Services Canada).

A cohesive digital solution is needed.

- It's difficult to get data onto the web, things are disjointed or don't meet the needs of the teams.
- FGP is used across government departments, provinces, territories and municipalities - provides a pipe for others to put data into or get data from.
- There are many portals and many initiatives each serving a single purpose, some with overlaps.

- Maps are not all standardized - making it hard to make models and recommendations from all of them.

Appendix B: Explorations Backgrounder

About the Canadian Digital Service

The Canadian Digital Service (CDS) was established in 2017 to help address the gap between Canadians' expectations and federal service delivery, and the Government of Canada's track record delivering IT projects. CDS works with partner organizations to improve government services for the people who use them, builds capacity across government for human-centred service design and iterative development, and provides advice to inform government decisions about digital investments.

About CDS Explorations

Often departments approach CDS for help, but it is hard to know how we might best support them without having a better picture of the service opportunity and the delivery conditions and practices in place. By conducting an Exploration, we help the department take stock while building our own understanding to inform potential next steps.

Through discussions with executives, team members and departmental representatives across a variety of functional areas, like policy, IT, program delivery, communications, legal, and privacy, CDS looks at the existing conditions and practices and the extent to which they enable digital service delivery. CDS uses the following criteria to inform recommendations to improve digital delivery within a particular service context and opportunity:

- establishing and empowering multidisciplinary teams;
- conducting user research to make service design decisions informed by user feedback;
- practicing continuous improvement;
- working in the open;
- cultivating a culture of collaboration; and,
- shifting to a service delivery model (i.e., ensuring prioritization and funding for digital services, including talent development and recruitment and access to modern tools and infrastructure).

This structured look-under-the-hood approach helps us deliver timely, incremental value to the department, and gives us the information we need to inform if and how CDS might continue to partner.

This could be, for example, through consulting, an embedded service design and delivery team, or by connecting them to CDS platform services.

Appendix C: Enabling Conditions for Digital Service Delivery

Establishing and empowering multidisciplinary teams

Multidisciplinary teams – combining design researchers, designers, software developers, and a product manager into a single team – are the core unit of digital service delivery. Traditionally, IT projects are delivered by isolated IT teams, adding significant overhead, eliminating important feedback loops, and leading to legacy systems and services. Overcoming this requires changes to departmental processes, funding priorities, and structures.

Conducting user research

User research – direct research and testing with the people who will use a service – is instrumental in building user-centred designs. It ensures that services meet real needs and provide a smooth user experience. Many departments are not equipped to conduct this type of research due to perceived policy constraints, including public opinion research and privacy, and/or because they lack the in house expertise to do so.

Practicing continuous improvement

Making small, steady improvements to a service – and quickly deploying them to get feedback from real users – is how leading technology firms build great products. Traditionally in government, IT projects lock in requirements based on lengthy upfront planning, without the ability to course correct based on feedback from users, and changes to services are deployed very infrequently. Overcoming this requires changes to how projects are approved and funded, how infrastructure (e.g., cloud) is accessed, and the tools available for software development and web publishing.

Working in the open

Working in the open – sharing lessons-learned, successes and failures, performance data, and software code publicly – is an important function of service delivery teams. This can be a significant departure for some risk-averse IT and service delivery teams. Navigating existing government communications approval processes and culture can discourage teams from working in the open.

Cultivating a culture of collaboration

A collaborative, or generative, culture is one of high cooperation, skilled communicators, and shared risks. A high-trust culture that supports creativity and change cultivates an environment of continuous improvement. Innovation and failure are viewed through a lens of curiosity and learning. This kind of generative, adaptive culture has been shown to be a predictor of both productivity and job satisfaction.

Shifting to a continuous delivery model

A delivery model reflects the purpose of an organization or program, and articulates what it does, how it works, and who is involved to create or enable public value.
Delivery models in government can avoid becoming path dependent or over reliant on existing ways of working when continuously improved and responsive to shifting contexts and needs.
They can position the organization or program, and the value it is aiming to create, relative to and interconnected with, other actors and organizations aiming to influence the same system and people, and enable similar outcomes.

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