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**The Canadian Geodetic Datum Dependencies Survey of 2022  
— *Report on rationale, distribution, results, and next steps***

**C.M.I. Robin, G. Cross, and M. Walker**

**2025**

**Canada**

# **The Canadian Geodetic Datum Dependencies Survey of 2022 — *Report on rationale, distribution, results, and next steps***

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# Introduction

The United States National Geodetic Survey (NGS) plans to adopt new geometric reference frames in 2025; for the continental USA it will be the North American Terrestrial Reference Frame of 2022 (NATRF2022). It will be separated from the North American Datum of 1983 (NAD83), the currently federally adopted frame in both Canada and the U.S., by up to 1.5 meters at the Canada-U.S. border. To ensure continued datum compatibility, the Canadian Geodetic Survey (CGS) plans to adopt NATRF2022 federally in parallel with the US.

Also in 2025, NGS will adopt a new geoid-based height system, called the North American-Pacific Geopotential Datum of 2022 (NAPGD2022), moving from their current leveling-based datum. Canada has had a geoid-based height system since 2015, called the Canadian Geodetic Vertical Datum of 2013 (CGVD2013). However, CGS plans to adopt a new version of CGVD2013, realized by an updated geoid model being developed in collaboration with NGS.

CGS is actively collaborating with NGS to define and realize both NATRF2022 and a new geoid model to ensure our datums are not only compatible, but also of the highest available accuracy for both countries.

In Canada, however, provinces and municipalities have the authority to regulate reference system requirements for legal and other purposes (e.g. land survey registries, data acquisition contracts, etc.). As a result, different versions of NAD83(CSRS) and CGVD are adopted, in use, and encoded in regulations for each jurisdiction. Figure 1 shows the NAD83(CSRS) adoption history, illustrating the patchwork of adopted reference frames across provincial jurisdictions and how it has evolved over time. Currently, this creates differences up to the decimeter level at boundaries where jurisdictions are operating in two different systems, although differences between versions of NAD83(CSRS) have decreased significantly over time. Nevertheless, this situation requires significant expertise and effort to accommodate, and is even more complex at the municipal level. With the introduction of NATRF2022, offsets will reach the 1.5 m level, and blunders will become much more significant for many geospatial applications.

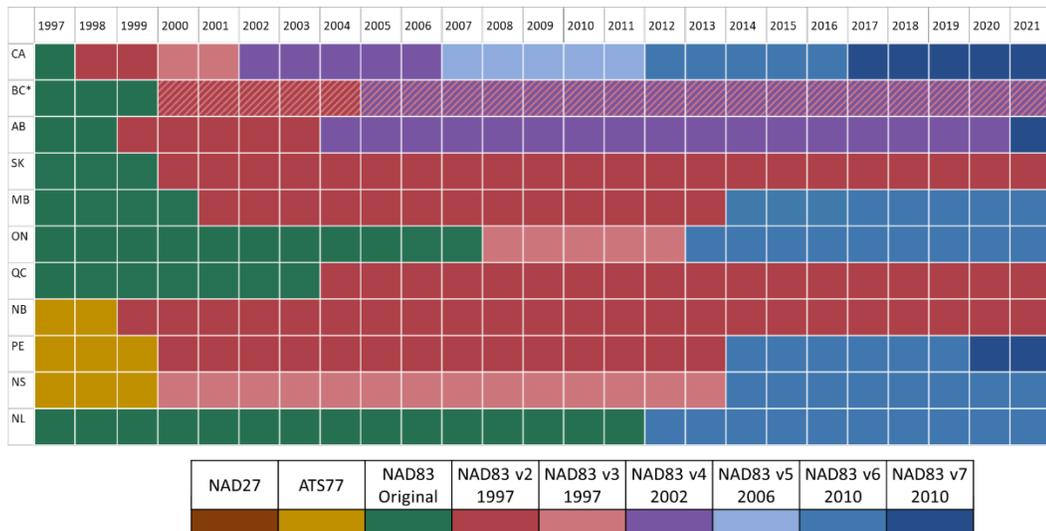


Figure 1. History of NAD83(CSRS) version adoptions by Canadian provinces. The federally adopted geometric reference frame has been NAD83(CSRS) v7, at epoch 2010, since 2017. \* BC has adopted different systems on the mainland and Vancouver Island.

Similarly, there are two height systems currently in operation in Canada – Canadian Geodetic Vertical Datum of 1928 (CGVD28), a legacy leveling-based system, and the federally adopted gravimetric system (CGVD2013) which is realized by a geoid model. Figure 2 shows the provincially adopted and used height systems. Differences between these are on the order of 10 cm to 1 m; in addition to the risk of blunders, this situation calls for significant additional effort, as many agencies are required to provide reference coordinates and other data in both systems.

|    | Adopted  | Published online | Available upon request | Used               |
|----|----------|------------------|------------------------|--------------------|
| BC | CGVD28   | CGVD28           |                        | CGVD28<br>CGVD2013 |
| AB | CGVD28   | CGVD28           |                        | CGVD28<br>CGVD2013 |
| SK | CGVD28   |                  |                        | CGVD28             |
| MB | CGVD2013 |                  | CGVD2013<br>CGVD28     | CGVD2013<br>CGVD28 |
| ON | CGVD28   | CGVD28           |                        | CGVD28<br>CGVD2013 |
| QC | CGVD28   | CGVD28           |                        | CGVD28<br>CGVD2013 |
| NB | CGVD2013 | CGVD2013         |                        | CGVD2013<br>CGVD28 |
| PE | CGVD2013 |                  |                        | CGVD2013<br>CGVD28 |
| NS | CGVD2013 | CGVD2013         |                        | CGVD2013<br>CGVD28 |
| NL | CGVD28   | CGVD28           |                        | CGVD28<br>CGVD2013 |
| YT | CGVD2013 | CGVD2013         |                        | CGVD2013<br>CGVD28 |
| NT | CGVD2013 | CGVD2013         |                        | CGVD2013<br>CGVD28 |
| NU | CGVD2013 | CGVD2013         |                        | CGVD2013<br>CGVD28 |

Figure 2. Current height systems adopted, used, and made available by provincial geodetic agencies. The federally adopted height system has been CGVD2013 since 2015.

Therefore, in parallel with the US adoption of NATRF2022 and NAPGD2022, NRCan is leading a national effort to adopt both NATRF2022 and a new version of CGVD2013 as unified reference frames across provincial and other jurisdictions across the country. This effort is coordinated with provincial and federal partners through the Unified Reference Frame (URF) Task Team of the Canadian Geodetic Reference System Committee (CGRSC). In parallel, provincial CGRSC members are also working towards unified reference frame adoption with their partners and stakeholders, such as provincial surveyor associations and municipalities.

Reference frame usage and their regulatory dependencies vary widely across jurisdictions, with different approaches having been taken around reference frame implementation and maintenance, regulations, policies, specifications, standards etc. Provinces will have unique paths to both achieve reference frame unification provincially and support it nationally, requiring varying levels of effort, stakeholder engagement, and expertise. For example, New Brunswick has legislated within their survey's act which reference system plans must be tied to while other provinces have left this choice to municipalities. As such, there will not be a "one-size fits all" approach for provincial datum modernization. Nevertheless, provincial and national geodetic bodies agree that modernization to NATRF2022 and a new version of CGVD2013 provides a unique opportunity to aim for national reference frame unification.

To gauge part of the effort required to achieve unification, the URF Task Team prepared a Regulatory Dependencies Survey for broad distribution across multiple stakeholder groups. The goals of this survey were to:

- Provide CGRSC members information on the effort required to update reference frames encoded in regulations, policies, and standards across different sectors.
- Raise awareness of Reference Frame Modernization efforts in Canada.
- Engage with affected stakeholders, and understand where to focus future outreach efforts.
- Gather feedback from stakeholders on their requirements, motivation and readiness to move to a unified reference system in Canada.

## **Survey distribution and response**

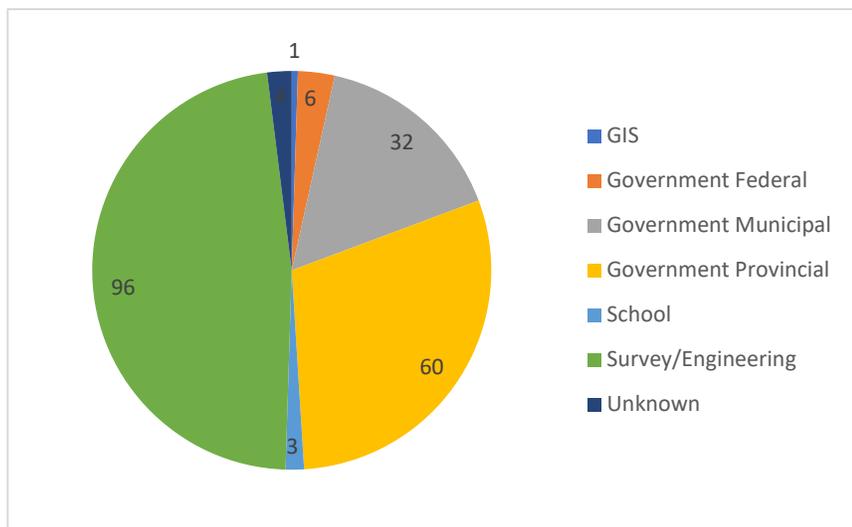
The URF developed a series of questions, included in Appendix A. These questions were aimed at understanding where reference frame usage was adopted in regulations, policies and standards, and how federal and provincial stakeholders understood and were impacted by them. Questions regarding migration of data to a new reference system were not included, as these were thought to address data user groups rather than regulatory groups; in practice, however, significant overlap was found between these stakeholders. Comments were received which addressed data migration challenges as well as regulatory change.

The survey was launched on September 13, 2022, in French and English. It was sent to federal and provincial survey associations who shared them with their members. It was also sent by federal and provincial CGRSC members individually to partners and stakeholders, who were also encouraged to circulate it more widely. The survey was left open until June 2023, as new contacts were identified, and the survey was introduced at a variety of concurrent outreach events.

A total of 155 English and 54 French responses have been received at this time, including input from all provinces. High-level results are summarized below.

## Summary of Results

Responses indicated that there is considerable variation in expectations about changes required to adopt NATRF2022. While many important organizations are aware of the expected changes not all groups have a full understanding of the time and effort required to make these changes. The charts below illustrate this, and provide some insight into the reasons for the variations in both expectations and understanding.



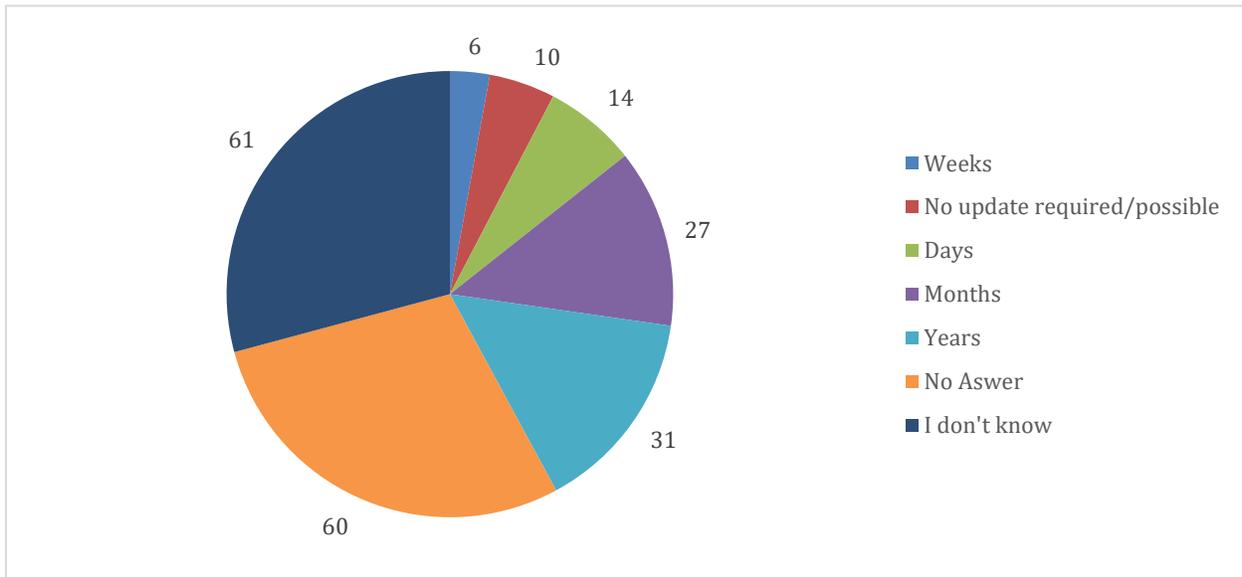
*Figure 3. Response by agency type*

Responses were received from all provinces, with the largest number coming from Ontario, Alberta, British Columbia, and Quebec. Geomatics companies were the largest single responders, there may be many GIS respondents in this category but most of the respondents listed as geomatics are from the Land Survey Community. The next largest group of respondents were government organizations with six federal, 60 provincial, and 32 municipal respondents respectively. Additional organizations included three schools, one GIS company and five unknown organizations (Figure 3).

One hundred twenty-one respondents answered positively to the question regarding awareness of legislations, regulations, standards, or policies that are tied to a particular datum. Thirty-three responded that they were not aware of any regulatory ties to datums; in this case, they were only asked to refer the survey to someone who might be aware.

Question 3 was a question regarding what datums were regulatory dependent. Common answers were as expected with NAD83(CSRS) (various versions) being the most used for horizontal datum applications such as property and infrastructure mapping in provinces across Canada; however, some are still in NAD27. For vertical datums used in airspace, flood mapping, coastal protection and tidal data, CGVD2013 was the most common although some still use CGVD28.

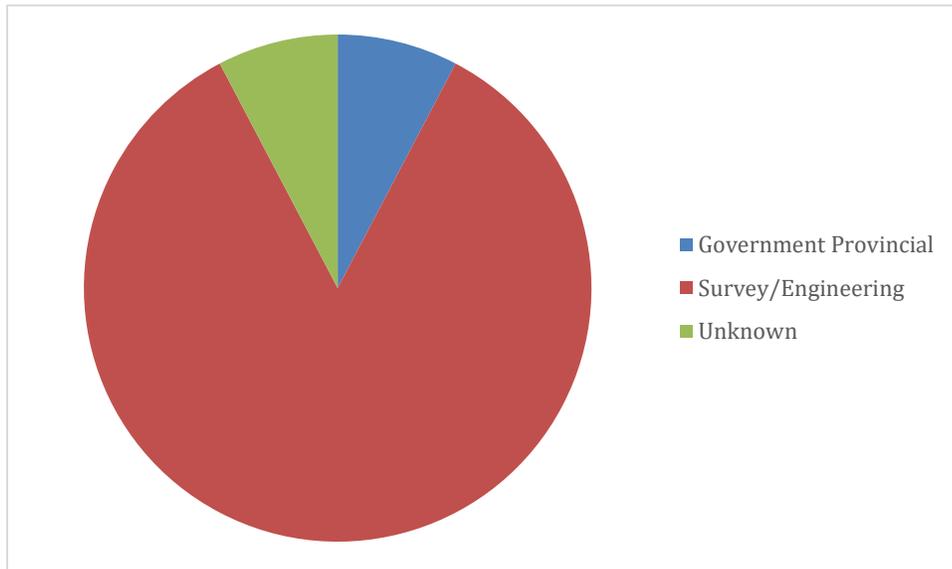
Some time was spent understanding the considerable variation in the results of the next question (Figure 4). The breakdown of level of effort estimates, indicated as an expected time to completion, is: 3% estimated a few weeks; 5% said an update was not required or possible; 7% estimated it would take days; 13% estimated months; and 15% estimated a year or more. Most concerning was that 30% did not answer and 30% did not know how long it would take.



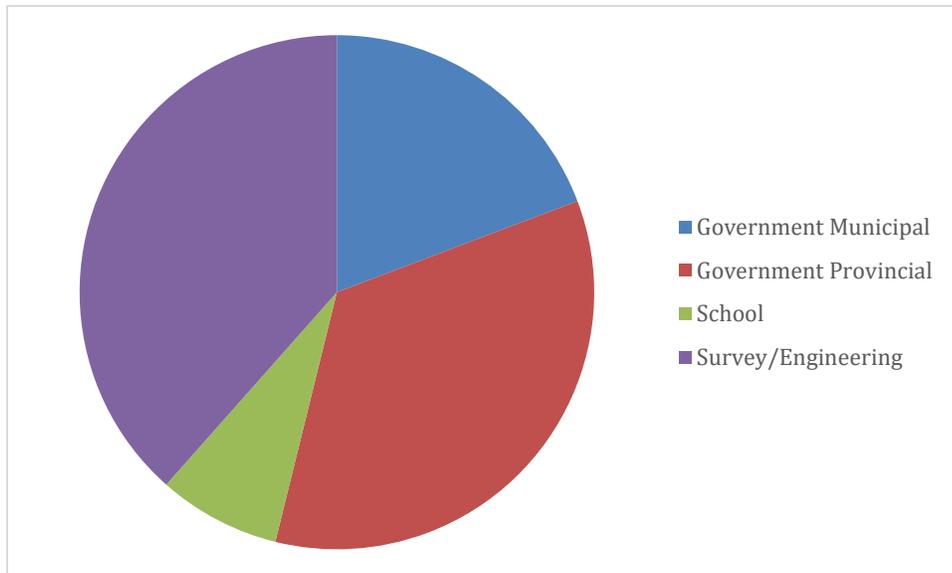
*Figure 4. The anticipated level of effort required to update the regulatory dependencies to a new geodetic system.*

Additional insight is gained by sorting the results in Figure 4 by type of agency. Many of the respondents who estimated it would take days were from private surveying and engineering firms (Figure 5). This category includes collectors of data who operate in the required datum, but may not be concerned with large data holdings that need to be transformed. They are also not the agencies who would need to make regulatory change. Therefore some of these respondents might not know the effort required or be personally concerned about it. For them, it would indeed just take a few days to update a software to a version which has the tools to use the new datums and transformations. They may nevertheless be concerned with the time to update their workflows for new transformations and potentially new transformation tools in their hardware and software.

However, agencies who manage data holdings and databases, and have the authority to manage regulations, are expected to invest a lot more effort. Figures 5 to 7 show the increased anticipated effort with level of jurisdiction. Agencies that expect the transition to take days include a small number of provincial groups; agencies that expect the transition to take months include Municipal and Provincial groups; and agencies that expect the transition to take months include all levels of government. We note that some private survey and engineering firms also anticipated months to year of effort; but in many cases, they appeared to be answering this on behalf of their public agencies, based on past delays they have observed between federal and provincial adoption of new datums. In other cases, they may also collect and hold data layers or legal plans.



*Figure 6. Agencies that expect the transition to take days.*



*Figure 5. Agencies that expect the transition to take months.*

The last question enquired about anticipated challenges or opportunities that informed their answers, which could include considerations such as international standards affecting their operations. One of the most common issues is legacy data, with many respondents saying that they have many years of data that would need to be transformed. There were also comments about survey monuments and software.

In comments throughout the survey, regulatory and other dependencies defining reference system usage were specifically named for most provinces, and included provincial legislation/regulation, land surveys acts, municipal bylaws, standards of practice and contract specifications. The most common applications mentioned included: legal surveys; hydroelectricity, flood mapping, and nautical charts; construction & engineering; natural resources; accommodations for climate change; and aviation and air space.

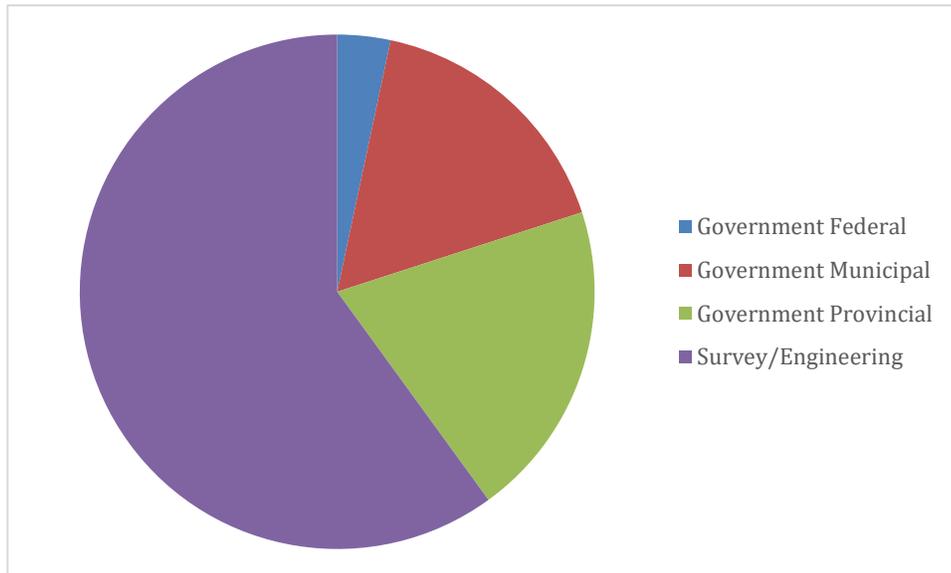


Figure 7. Agencies that expect the transition to take years.

## Statements of note

A number of interesting comments were received on the anticipated challenges and opportunities expected in the process of reference frame unification, including, but not limited to, issues strictly related to addressing regulatory dependencies. They provide more context on the summary of results described by the analysis in the Summary of Results above.

With only a few exceptions, respondents were supportive of reference system modernization and unification. One recurring motivation from both the public and private sector is the need for expertise, tools, and time to ensure that data is aligned in the correct frame. Another related motivation noted is decreased risk of blunders when all jurisdictions work in the same unified frame; and this included unification with the US, which, as a larger market, dominates the requirement from geospatial software companies.

We highlight a few comments here, which are also included in a larger set found in Appendix B:

*“In the above, assuming adoption time for our company specifically, and that NRCan (or similar) tools are in place to support the change, we are able to use whichever datum is appropriate. Note that this does not mean a frictionless adoption - we will be dealing with information in various legacy datums for many, many years into the future with different levels of time commitment required to work with each.”- private land surveyor, NL*

*“If treaty maps currently dependent on the existing regulatory geodetic datum will require updating to accommodate a new system, those maps will need to be updated in a tripartite system requiring all parties to the treaties to work collaboratively to update and possibly amend the treaties including legislative processes. There are 4 treaties with 8 First Nations*

*and Canada involved.*” - **representative of the Ministry of Indigenous Relations and Reconciliation, Victoria, BC**

*“I do not think we should update, as it pertains to legal plans & coordinate systems. We will have years of legal plans that are filed (not subject to change), on the current published systems. This is impossible to retroactively fix. Likewise, years of survey data based on those plans (the re-usable raw data) would have to be converted in order to use the new system, which would be a monumental pain. In essence rendering years of work futile.*

*In my opinion it would be easier to program a software element (like new GPS driven cars) to switch datums at a border, just like having an on-the-fly coordinate system in GIS.*

*Backwards-compatibility is one of the most important items for various software’s we choose. I think that these coordinate systems shifts and the problems they create need to be looked at in a similar manor.”* **private land surveyor, BC**

*“As surveyors, I believe we are quite adept at completing our work and providing our data to whatever specifications a client or project require. In my opinion, uniformity in datum standards across the country, or across north America would provide easier or more accurate data sharing. And would reduce error, and therefore costs, with data sharing among government and industry.”* - **private land surveyor, BC**

*“HRM has a lot of stakeholders that would need to be educated and trained on a new system. Updated software would need to be obtained.”*- **municipal civil servant, Halifax NS**

*“Different levels of regulation - even though datums are defined provincially, many people dealing with the geospatial data work in municipal bodies, and therefore it is the responsibility of each local body to ensure they are using the correct datums.*

*Lack of Geomatics Experts in Public Works - most local bodies that receive geospatial data hand it over to their GIS department. In my experience these departments have lots of GIS knowledge but lack the expertise or even the manpower to properly deal with geodetic parameters and transformations.”* - **private land surveyor, BC**

*“I believe that the evolution of reference systems is necessary to keep up with the evolution of plate movements and the harmonization of our borders with the United States.”* – **private land surveyor, QC (translated from French).**

*“In 1991, while employed by the Bureau de consultants en gestion du territoire (BCGT), I contributed to an impact study on the implementation of NAD83 on behalf of the Service de la géodésie du Québec and the Canadian Geodetic Surveys.*

*History repeats itself in 2022. Among other things, in this transition, organizers will have to determine if the planimetric / height difference is significant. If any, the potential impacts will be technical, functional, informational and organizational in nature..”* – **private land surveyor, QC (translated from French).**

*“Indirectly, I am thinking of the directory of dams and the elevations mentioned, hydrometric data, tide gauge data for the calculation of Metonian cycles to help delimit the tidal zones of the river and the Gulf, data from the Quebec cadastre and those from the RDE, etc. The regular integrations of surveys to be published in the RDE which is always in NAD83 and not in NAD83SCRS like almost all land surveys!” – provincial civil servant, QC (translated from French).*

## Next Steps

In addition to this high-level report, CGRSC members have reviewed the relevant individual survey results, and are using them to guide their efforts towards the adoption of unified reference systems in their jurisdictions. As noted above, updating regulatory dependencies will be very different for each province. Therefore, specific regulatory dependencies and implications for provincial reference frame unification plans will be summarized in a secondary part of this report available for CGRSC members only. Considerations will include:

- The level of effort and expertise required;
- Which agencies will need to be involved; and
- How reference frame usage should be encoded in regulations and policies.
  - For instance, to avoid the need for regulatory change when frames are updated, regulations could refer to ‘NATRF2022’, or even more broadly to the current federally adopted reference system.

## Summary

Canada plans to modernize the Canadian Spatial Reference System (CSRS) through the adoption of a new geometric reference frame and an updated height system in 2025, in parallel with the US. The CGRSC is using this opportunity to modernize and unify reference frames used at the provincial and municipal levels. To support migration to the new frames, the CGRSC released a Regulatory Dependencies Survey to gather stakeholder feedback on challenges and opportunities related to updating reference frame usage requirements encoded in regulations and policies. Another goal was to gather information on knowledge gaps to inform future outreach efforts. Most provinces received sufficient responses to guide planning and resourcing efforts towards migration to a modernized CSRS. In general, the idea of a unified national adoption appears well received by most stakeholders despite resource limitations and the effort it will require.

# Appendix A – Regulatory Dependencies Survey Questions

4/28/23, 10:02 AM

Geodetic Datum Dependencies Survey

## Geodetic Datum Dependencies Survey

**Purpose:** Identify legislation, regulations, standards, policies or by-laws dependent upon a geodetic datum across Canada. This will help to gauge the amount of work required to migrate to a new datum.

What is a geodetic reference frame? It is a reference surface (such as sea level) that allows positions to be assigned using a coordinate system. Geodetic reference frames are fundamental to survey work and creating maps. They exist in both horizontal and vertical dimensions. Example vertical frames include the Canadian Geodetic Vertical Datum of 1928 (CGVD28) and the Canadian Geodetic Vertical Datum of 2013 (CGVD2013). Example horizontal reference frames include the North American Datum of 1927 (NAD27) and the North American Datum of 1983 (NAD83). In Canada, many jurisdictions have adopted different versions of these reference systems, resulting in risk of blunder and inefficiencies for geospatial projects which cross jurisdictions or use different technologies.

The US National Geodetic Survey (NGS) is adopting new horizontal and vertical geodetic reference systems in 2025. The Canadian Geodetic Survey (CGS) is collaborating with NGS and the provinces to ensure that our datums are compatible and of the highest available quality. A unified reference system across Canada and North America will avoid 1.5-2 meter offsets at our border, and provide efficiencies for modern positioning applications for all sectors and jurisdictions. See this [NRCAN pamphlet](#) for more information on the importance of this change.

This survey is sponsored by the Canadian Geodetic Reference Systems Committee (CGRSC). For more information, please contact one of our CGRSC members: <http://cgrsc.ca/members/>

\* Indicates required question

1. Please identify the name and location of your organization (E.g, Dept. of Transportation and Infrastructure Renewal, Nova Scotia, City of Brandon, Manitoba) \*

2. Are you aware of any legislation, regulations, standards, policies, by-laws or other official requirement to use a particular datum within your area of business? \*  
Examples include municipal by-laws for vertical building offsets from CGVD28 or CGVD2013, the requirement for highway construction plans to be made with respect to NAD83(CSRS), and the need for official maps to refer to NAD83(CSRS).

Mark only one oval.

- Yes Skip to question 3  
 No Skip to question 6

Skip to question 3

**Geodetic datum - regulatory dependencies**

3. Please provide details of the regulatory geodetic datum dependencies. \*

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4. Please indicate the anticipated level of effort required to update the regulatory dependencies to a new geodetic system: \*

Mark only one oval.

- Days  
 weeks  
 months  
 years  
 I don't know  
 No update required/possible

- 5. Please describe the anticipated challenges or opportunities that led you to choose this answer (e.g. international standards affecting your operations.)

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*Skip to question 7*

**Referral**

- 6. If the answer is No or Don't Know, do you have any recommendations on who should be contacted regarding this survey?

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**Submission**

- 7. Thank you for participating in this survey. Your answers will help inform the path for migration to a modernized geodetic reference system in Canada. If you have any further comments, please enter them below.

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## Appendix B – Statements of note

*“I assume it would take sometime to change to a new datum on a national level. But, I believe for us as a private business will not take very long to adapt once everything this in place. I will say it would take a couple of months.”* **land surveyor, Nova Scotia**

*“If treaty maps currently dependent on the existing regulatory geodetic datum will require updating to accommodate a new system, those maps will need to be updated in a tripartite system requiring all parties to the treaties to work collaboratively to update and possibly amend the treaties including legislative processes. There are 4 treaties with 8 First Nations and Canada involved. Please check in with representatives from Crown Indigenous Relations Canada - Treaty Implementation.”*  
**representative of the Ministry of Indigenous Relations and Reconciliation, Victoria, BC**

*“If a new standard is adopted, it will require a regulatory change which needs to go through Cabinet. We will need to recalculate our minimum building elevations under the new datum and update our regulatory schedules reflecting any changes. Presumably these changes would also need to be adopted by municipalities whose building permit processes are impacted by the Coastal Protection Act. There should be no impact on the ground in terms of where people can and cannot build.”-*  
**municipal civil servant, Nova Scotia**

*“We have already updated to NAD83(CSRS) CGVD2013. It took months & significant effort on our part & our partners at the Province of NS to 1) validate our method 2) to migrate our GIS holdings from ATS77, CGVD28. After the GIS update, we also had to account for a process to update legacy survey files. We also logged a ticket with ESRI to incorporate WKID 8083 into their software so we could stop using a custom coordinate system which allowed for proper projection on-the-fly by the software and ESRI business partner applications. This was probably a year in process. Once incorporated into ESRI's software we had to migrate our GIS data again to WKID 8083, from the custom coordinate system even though they were the same spatial location. This was a matter of making the software aware this was a recognized defined coordinate system. This got us off WGS84 in our web applications.”-* **municipal water utility employee, Nova Scotia**

*“I do not think we should update, as it pertains to legal plans & coordinate systems. We will have years of legal plans that are filed (not subject to change), on the current published systems. This is impossible to retroactively fix. Likewise, years of survey data based on those plans (the re-usable raw data) would have to be converted in order to use the new system, which would be a monumental pain. In essence rendering years of work futile.*

*In my opinion it would be easier to program a software element (like new GPS driven cars) to switch datums at a border, just like having an on-the-fly coordinate system in GIS.*

*Backwards-compatibility is one of the most important items for various software's we choose. I think that these coordinate systems shifts and the problems they create need to be looked at in a similar manor. Sometimes the back-end data should be left alone, and just have a new front end transformation used to coordinate between the systems.*

*If it is another forced change, I would anticipate the "years" be expanded to "decades". CGVD2013 is still not fully implemented (additional measurements/consultations) needed in BC, and we've been hearing that it is coming for 5+ years.*

*Don't change systems. Keep us on 1983CSRS.*

*If you do change. It better be done right and have everything from here to Mexico, and only have one datum for the next century, so that all data & works can be built on without being in a state of flux."*- **private land surveyor, BC**

*"WGS84 shares the same origin as the new NATRF reference, therefore compatibility is effectively better aligned than with NAD83. Most products produced by CHS have a minimum scale where the difference between NAD83 and WGS84/ITRF/NATRF would be negligible. Special super scaled products might require datum transformations which will depend on commercial GIS vendors to provide software tools."*- **federal public servant, Canadian Hydrographic Service (Fisheries and Oceans Canada)**

*"HRM has a lot of stakeholders that would need to be educated and trained on a new system. Updated software would need to be obtained."*- **municipal civil servant, Halifax NS**

*"a new vertical datum is not a challenge but new horizontal datum we are not sure"*- **municipal civil servant, BC**

*"Many agencies will need to assess and determine if they are ready to change the standards that they are responsible for setting out. As an example, BC has not yet adopted CGVD2013 because our control infrastructure could not be easily and accurately updated. However, flood plane mapping in BC has adopted CGVD2013 so as a land surveyor I have to be very careful to research what the true datum/reference frame is for each task I do and then have the knowledge and tools to be able to produce the relevant product. The potential for error with multiple systems is considerable so the more systems that are actively in use the more opportunity for a problem to arise. Most municipalities do not have the expertise to understand the differences, so it becomes a real challenge to comply with bylaws that are not accurately written. I can appreciate the need and desire to regularly refine and improve these systems. Philosophically it makes sense to me to stay current and to work to have more accurate positions as new data and new technologies emerge.*

*The challenge is that the typical user and regulator do not have the sophistication to set good requirements for those that need to produce and certify products with specific elevations and/or positions that are referred to specific datums/reference frames. Add to that the cost to the provinces and local governments to maintain infrastructure and records when these changes occur, and the likelihood of structures and services being installed in the wrong locations increased exponentially."*- **private land surveyor, BC**

*"Different levels of regulation - even though are datums are defined provincially, many people dealing with the geospatial data work in municipal bodies, and therefore it is the responsibility of each local body to ensure they are using the correct datums.*

*Lack of Geomatics Experts in Public Works - most local bodies that receive geospatial data hand it*

over to their GIS department. In my experience these departments have lots of GIS knowledge but lack the expertise or even the manpower to properly deal with geodetic parameters and transformations.

For example I recently put together an RFP for a survey for a Regional District where they wanted the deliverables using the CGVD2013a vertical datum even though CGVD28 HTv2.0 is the provincially mandated vertical datum. Furthermore, geospatial data being provided to the district such as location Certificates and As-built Record Drawings refer to the CGVD28 HTv2.0 datum. This could cause some real issues down the road if data sets are referenced relative to each other. In order to transition to a new datum, there will need to be support from all levels of government and likely legislation mandating the transition to the new datum. However, I don't think any public bodies have manpower that would be required to transform all existing geospatial data to the newly used datum. I believe this is a large reason why many provinces have yet to even adopt CGVD2013a as their vertical datum” - **private land surveyor, BC**

“I do not have a good handle on the amount of work required to adopt a new datum. As surveyors, I believe we are quite adept at completing our work and providing our data to whatever specifications a client or project require. In my opinion, uniformity in datum standards across the country, or across north America would provide easier or more accurate data sharing. And would reduce error, and therefore costs, with data sharing among government and industry.” - **private land surveyor, BC**  
“(Note: this isn't an exhaustive list, further work will have to be done to determine the full scope of impact to the municipality.) Municipal environment so the process to change over could be quite complicated as we pass down requirements to third parties that do work for the municipality. A bylaw may need to be written up. We would have to convert some of our historical data to the new coordinate system and datum. This would include our control networks, including our integrated survey monuments, the municipal GIS and associated data. We would have to switch over the datums for all our engineering drawings. A determination would have to be made for a switch over date and there would probably be a period where we work in both the new and old systems. The survey department will have to update GNSS units to the new datum and coordinate system and ensure that it is getting third party corrections in the appropriate coordinate system and datum for its GNSS units.” - **municipal civil servant, BC**

“In the above, assuming adoption time for our company specifically, and that NRCan (or similar) tools are in place to support the change, we are able to use whichever datum is appropriate. Note that this does not mean a frictionless adoption - we will be dealing with information in various legacy datums for many, many years into the future with different levels of time commitment required to work with each.” - **private land surveyor, NL**

“The offset of 2.2 metres is well below the geographical tolerances required (e.g.  $\pm 100$  metres in urban areas) at the DFRP.” – **federal public servant (translated from French).**

“The CMM's RCI-2019-78 flood zone maps, the PET airport zoning by-law, the standards of the Cadastral Registration Branch, the flood zones of the municipal by-laws... Legislators are not usually the quickest of stakeholders.” – **private surveyor, QC (translated from French).**

*“I believe that the evolution of reference systems is necessary to keep up with the evolution of plate movements and the harmonization of our borders with the United States.” – private land surveyor, QC (translated from French).*

*“In 1991, while employed by the Bureau de consultants en gestion du territoire (BCGT), I contributed to an impact study on the implementation of NAD83 on behalf of the Service de la géodésie du Québec and the Canadian Geodetic Surveys.*

*History repeats itself in 2022. Among other things, in this transition, organizers will have to determine if the planimetric / height difference is significant. If any, the potential impacts will be technical, functional, informational and organizational in nature..” – private land surveyor, QC (translated from French).*

*“Indirectly, I am thinking of the directory of dams and the elevations mentioned, hydrometric data, tide gauge data for the calculation of Metonian cycles to help delimit the tidal zones of the river and the Gulf, data from the Quebec cadastre and those from the RDE, etc. The regular integrations of surveys to be published in the RDE which is always in NAD83 and not in NAD83SCRS like almost all land surveys!” – provincial civil servant, QC (translated from French).*