WA Wetland Mapping Inventory
Summary of Survey Responses and Synthesis of Results

DEPARTMENT OF ECOLOGY
State of Washington

Introduction

The Washington State Department of Ecology (Ecology) conducted a statewide survey funded by the Environmental Protection Agency (EPA) through a Wetland Program Development grant to inventory wetland maps and mapping efforts. Ecology connected with voluntary participants from local and Tribal governments, state and federal agencies, and land managers who regulate or manage wetlands. By conducting a targeted survey with follow up interviews aimed at identifying wetland mapping needs and the specifics of how wetland mapping data are being created, Ecology was able to draw meaningful conclusions about the state of wetland mapping in Washington.

Over three-hundred potential contacts were initially contacted via email or phone in combination with outreach via listserv and work group email lists. There was no response from one-hundred and eighty-four potential contacts and five responses of declined interest. Interested participants represented one-hundred and three different agencies, Tribes, private organizations, and government jurisdictions at various levels. Of those one-hundred and three interested participants sixty returned completed surveys and were contacted by Ecology for a follow up interview to discuss survey responses. Figure 1 shows the distribution of survey participants within each sector.

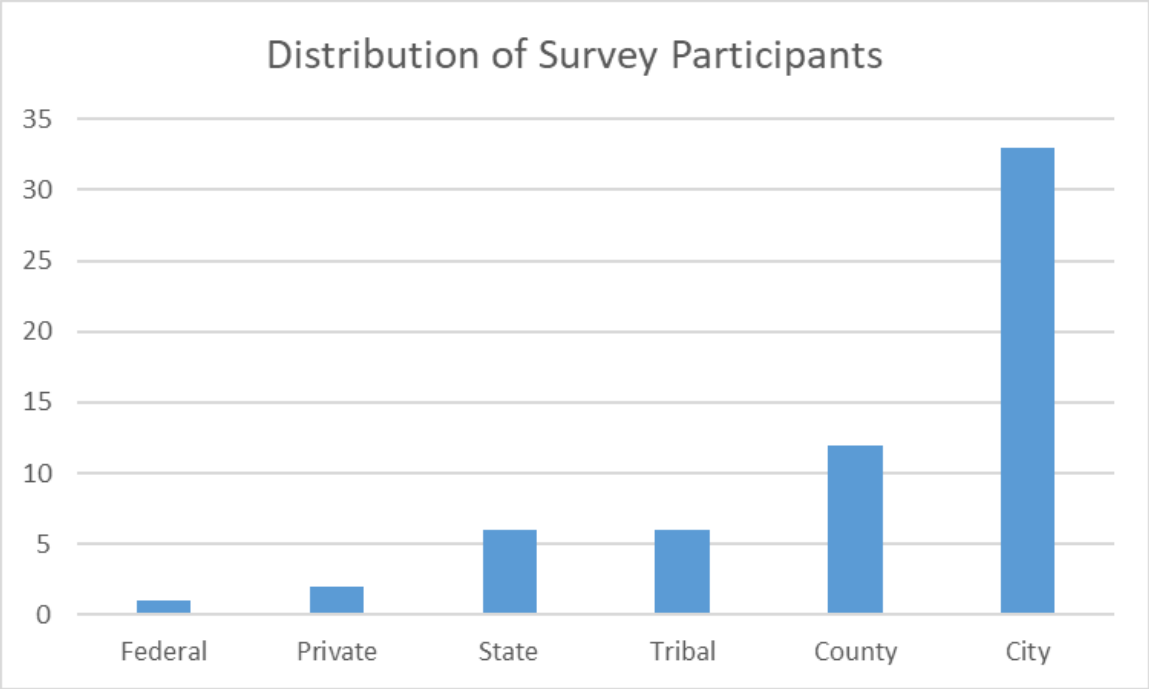

Figure 1: Distribution of Survey Participants shows the number of survey participants separated by their affiliated sector.

Fifty-five percent of the participants were from a city level jurisdiction, twenty percent were with a county level jurisdiction, ten percent of participants represented Tribal and state regulatory bodies respectively, three percent were from private consulting firms, and two percent (one participant) was associated with a federal agency. This distribution was disproportionate between sectors but representative of the ratio of agencies relative to each other throughout the state, with the exception of private consulting firm representation.

Overview of wetland data needs

The survey was created with two sections: one focused on questions related to wetland mapping data needs and the other focused on questions related to wetland mapping data creation. All participants provided responses to the wetland data needs section, and only participants who actually create wetland mapping data provided responses to that section. The wetland data needs section primarily focused on:

- What public data sets were being used
- How they were being used
- Whether or not they met a participant's needs
- What kinds of data would be helpful for them in the future regarding their work with wetlands

The most prevalent dataset in use by participants is the US Fish and Wildlife Service's National Wetland Inventory (NWI). As shown in Figure 2, sixty-three percent of participants rely upon NWI to conduct their wetlands work. City jurisdictions primarily relied on internal datasets, or data from the county level and NWI to inform their decision-making processes. If a city had a good process for creating their own wetlands data derived from permit applications, wetland delineations, or other resources, then they tended to rely solely on their internal data set. Other data sets of note were the Washington Department of Natural Resources (DNR) Streams data and Wetlands of High Conservation Value data, Washington Department of Fish and Wildlife's (WDFW) Priority Habitat and Species data, Ecology's Modeled Wetlands and Coastal Atlas resources, National Oceanic and Atmospheric Administration (NOAA), Coastal Change Analysis Program (C-CAP) land cover data, and Natural Resource Conservation Service Soil Survey (SSURGO) data.

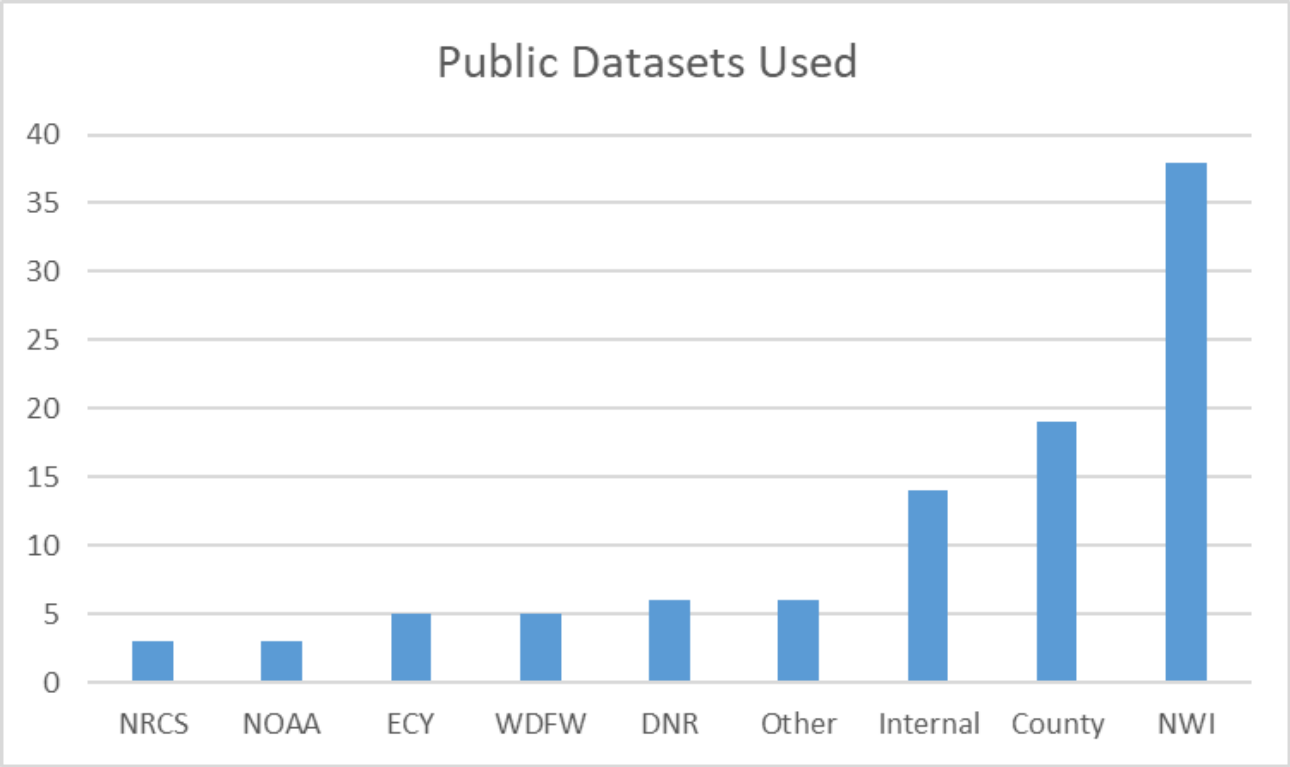

Figure 2: Public Datasets Used categorizes datasets available publicly by the organization to which they belong.

When asked whether participants felt the data that was currently publicly available to them met their needs to efficiently manage their wetlands work, the majority answered "No". Approximately sixty-three percent of participants indicated that their needs were not being met as shown in Figure 3. Of the thirty-seven percent that felt their needs were being met, thirty-two percent relied primarily on internal datasets that they created, not needing to reference external datasets such as NWI. Therefore, only twenty-five percent of participants felt that publicly available data were able to meet their needs, illustrating a clear need for improved wetland data throughout the state.

During interviews, the primary issue with the currently available public data is that it is often outdated, inaccurate, and not site specific enough to the needs of end users. For example, NWI is a dataset that was derived primarily from photo interpretation of aerial imagery beginning in the early 1980's and is often mapped at a large scale of 1:24k. Wetland polygons from this dataset tend to serve as a general guide of potential wetland presence. However, NWI often under maps wetland presence, polygon boundaries regularly do not match those observed of wetlands in the field or when compared to updated aerial imagery, and NWI often indicates false positives of wetland presence in clearly upland areas. These issues have fostered distrust in the data set by many of the participants interviewed, but it is still heavily relied on due to lack of a better resource available to wetland managers and regulatory bodies. This raises concerns of wetlands being missed during property and permit reviews, and that protective actions are not always being triggered appropriately due to the use of unreliable data. This is important because many regulatory agencies rely on wetland geospatial data such as NWI to trigger regulatory permitting actions and instigate further review of properties for critical areas.

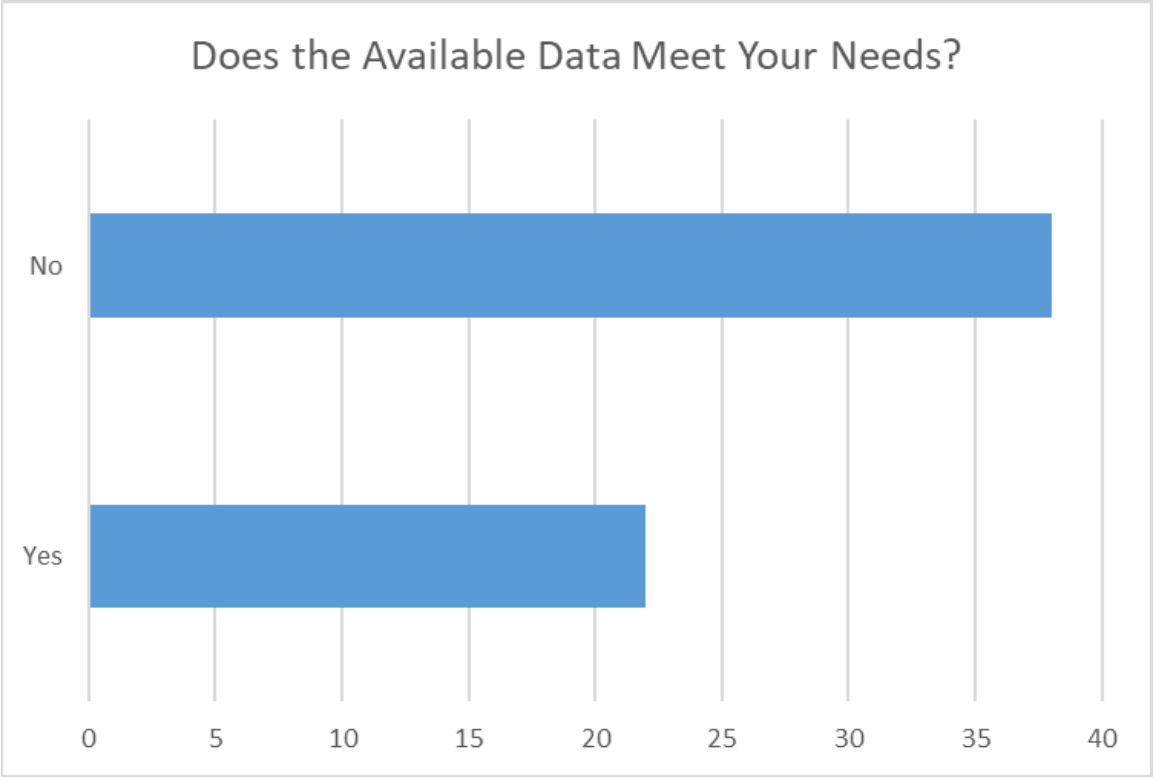

Figure 3: Does the Available Data Meet Your Needs? shows the distribution of whether publicly available data meets participants needs.

When asked what other types of data would be helpful, most participants clearly indicated a need for updated high-resolution data. Most participants responded that they would welcome all data that could help with wetland rating determinations, critical areas reviews, and data that would aid in permitting processes. Participants specifically identified a need for updated streams data, more up to date and accessible high resolution aerial imagery and LiDAR data, high resolution Land Use and Land Cover (LULC) data, and any other type of hydrologic data that would be useful at a site-specific scale, such as groundwater mapping, surface water flow, etc.

Overview of wetland data creation

Participants who created data filled out the wetland data creation section of the survey in addition to the wetland data needs section. This section had technical questions regarding the processes and methods used to create the data, to what standard it was created, what formats it is in, and how often it is maintained and updated. Approximately sixty-three percent of participants created their own wetlands data for reference as shown in Figure 4.

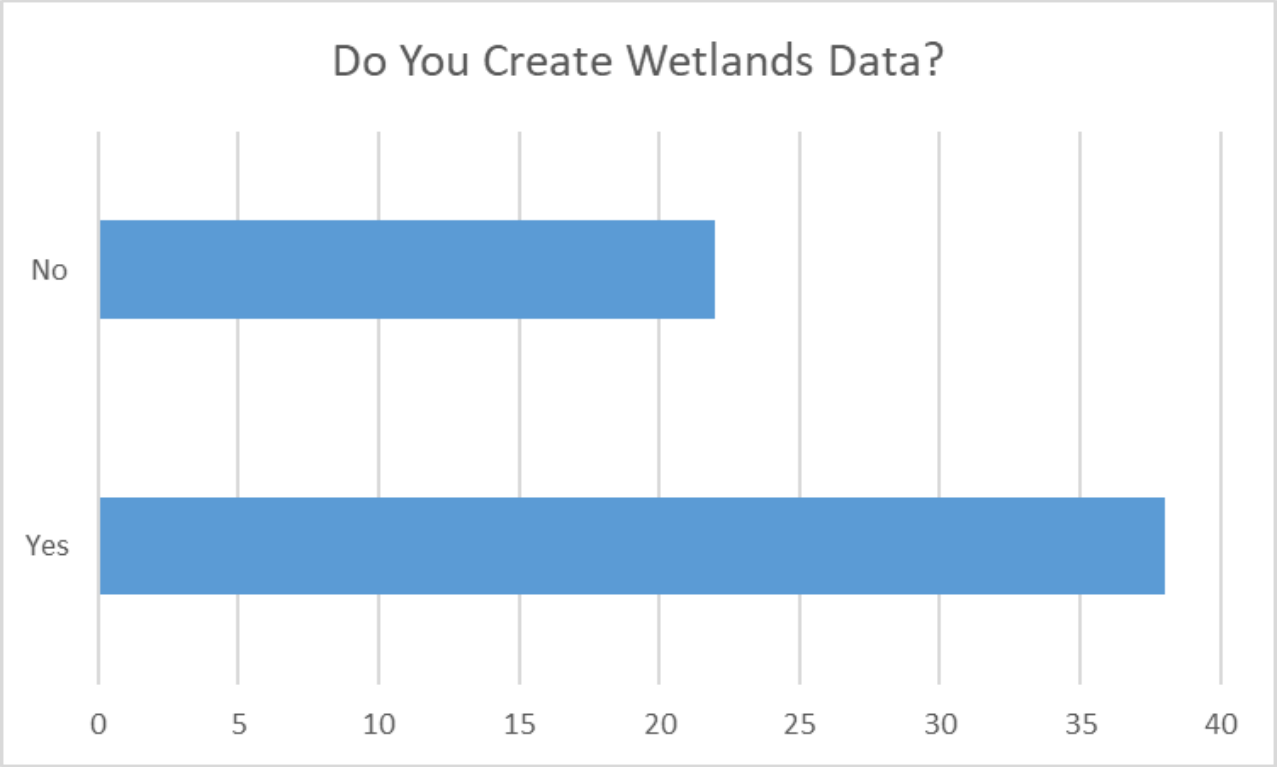

Figure 4: Do You Create Wetlands Data? shows the distribution of whether survey participants created wetlands data.

In total, from all of the participants that indicated that they created wetlands data, there were sixty-one data sets captured by the survey. The interpretation of what constituted wetland data creation did vary between participants. Some participants indicated that they did create wetlands data, but they really combined multiple public datasets into a single wetlands dataset for easier use, or just queried public data to suit their needs. If we look at data that only specifically creates or models wetlands data outside of basic manipulation of public data sets, then the number of created wetland datasets is reduced to fifty-seven.

As seen in Figure 5, a small portion of participants relied solely on either field verified data, permit data, or a combination of the two sources for data creation. Most participants who created data also used an approach of combining multiple sources, using all the data available to them to try and create the best insight into wetlands in their area. This often-meant layers were created that included wetland polygons from permit and field verified data, remotely sensed data interpretation, NWI, and other pre-existing wetlands data. These conglomerate data sets provided a more detailed insight into the potential for wetlands across the landscape, but due to the variety of sources included in the creation of the data, accuracy of individual wetland polygons was variable and dependent on their source.

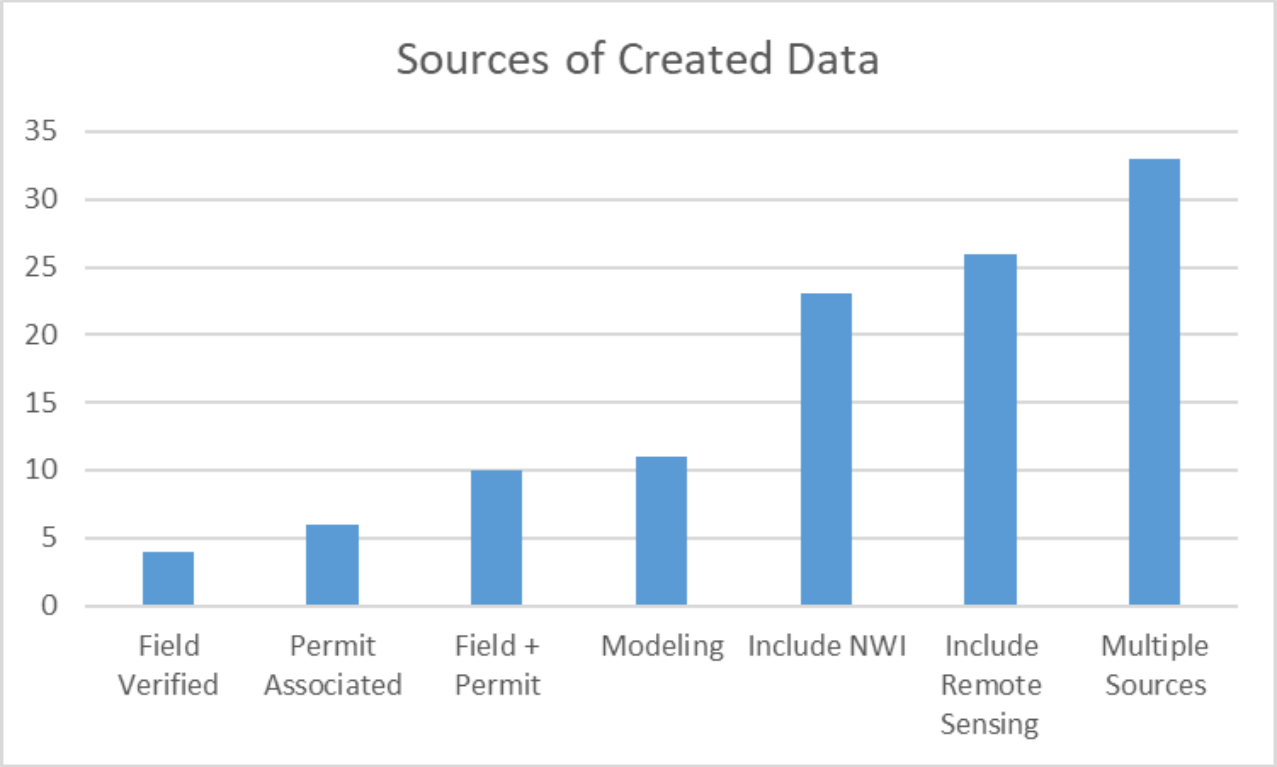

Figure 5: Distribution of the sources of the data sets created by survey participants.

For these types of data sets including a "Source" field in the attribute table was an important variable to include in the data structure. Other important attribute fields of note included by those who create wetlands data were:

- Wetland ID
- Wetland Type
- Wetland Class (Cowardin, HGM, etc.)
- Wetland Rating
- Rating System used
- Date Sampled/Delineated
- Name of Delineator

When considering the accuracy and methodology of using field verified and permit-related data, not all participants digitized their data in the same way. Some relied on a "heads up" method of just using visual cues/aids on the landscape to reference (draw) a physical map of a wetland location when creating a digital version. Others had a more technical approach to their digitization methodology by scanning in physical copies of wetland delineations and using georeferencing tools to assign the correct location. This is an important consideration to account for when looking at the wetlands data currently available throughout the state. One measure of quality assurance and metadata consistency is checking whether the data created are compliant with Federal Geographic Data Committee (FGDC) guidance

(e.g., Wetlands Mapping Standard[1]). This is a standard set forth from a federal level to maintain consistency on metadata standards for created data. Data such as NWI must meet FGDC standards, as well as any mapping project undertaken under federal funding. Forty-eight percent of participants who created data indicated that they maintained their data to FGDC standards as shown in Figure 6.

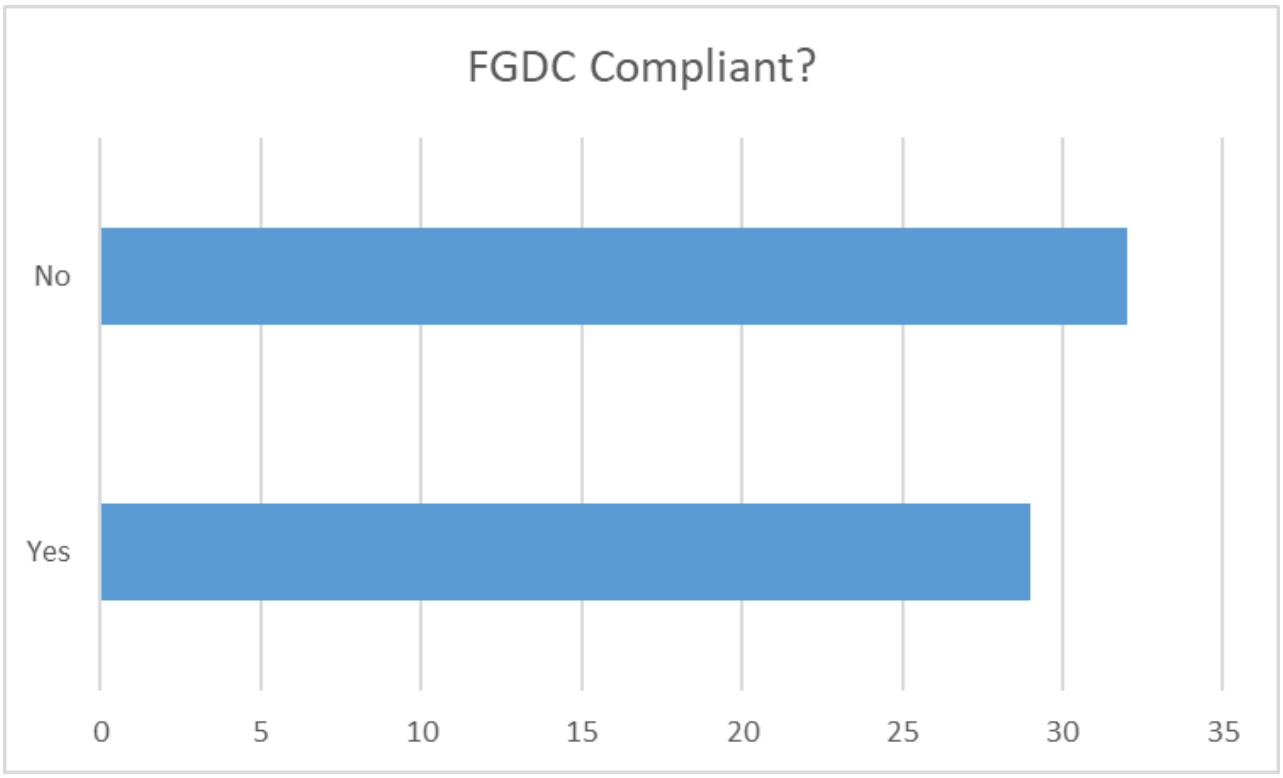

Figure 6: Distribution of created data sets that are FGDC compliant.

It is also important to understand the accessibility of the wetland data that are being created. Survey participants were asked if the data they created were available to the public, or if the data were private. Of the sixty-one data sets that were created by participants, fifty-eight percent are publicly available for access to anyone who may be interested shown in Figure 7. Those that created publicly available data sets were also asked to share a weblink to access their data, which will be shared on the Ecology hosted webpage of wetland mapping resources. The other forty-two percent of data sets were kept private for various reasons such as the data set was considered incomplete, the data are considered sensitive and wetland locations did not want to be disclosed, or the data set was considered for internal use only to trigger regulatory actions or investigation into wetland presence.

[1] Federal Geographic Data Committee. (2009). *Wetlands Mapping Standard* (FGDC-STD-015-2009). https://www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands-mapping

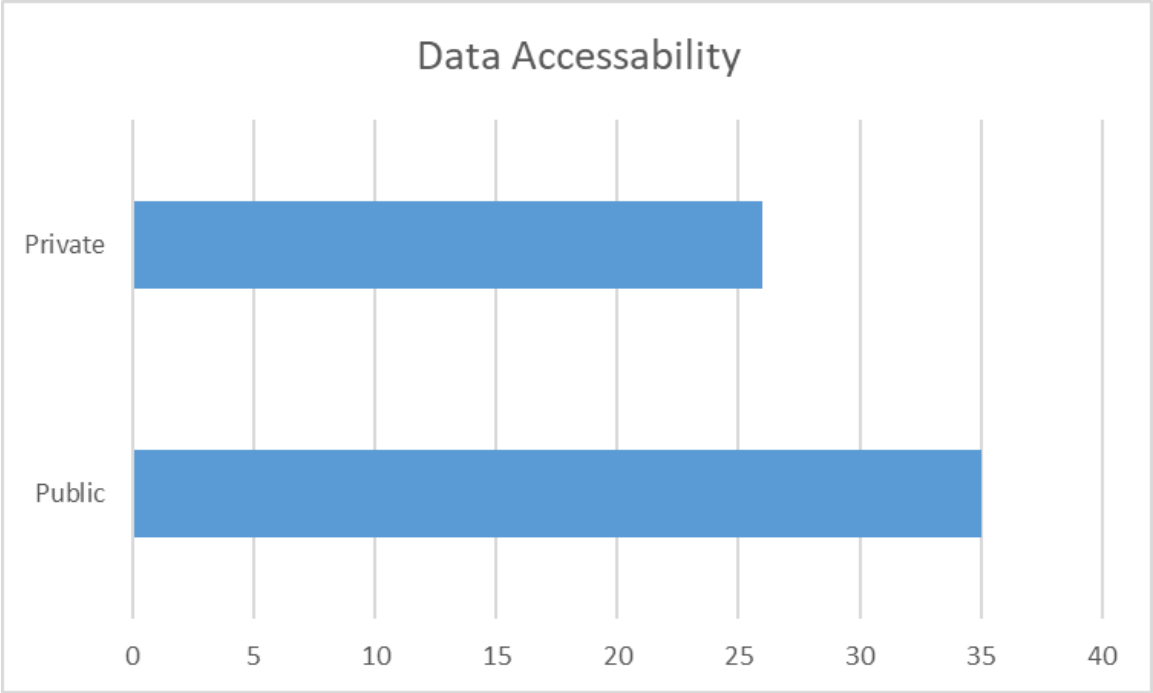

Figure 7: Distribution of created data sets that are either publicly available or private.

Conclusions

Looking forward, it is clear that the current publicly available wetland data are problematic in accuracy and scale for site specific wetland interpretation, and they are not meeting the needs for the majority of end users. NWI is the most heavily relied on dataset across the broadest range of users. It would greatly benefit the State of Washington to update the NWI data for the state. Other states, such as Minnesota, have already led an effort of this scale and it would be useful to look at their strategy and how it may translate to Washington. An update like this would have both advantages and disadvantages.

The NWI data are housed outside of state resources, it is an already well-known dataset, and it is already accessible by all end users. The biggest issue with NWI is scale; survey participants often commented that NWI is not site-specific enough to their needs. Smaller wetlands are often overlooked in NWI mapping, and these are the wetlands most needed to be mapped by jurisdictions such as cities. The data standards for NWI limit the scale of application and the data may not be able to meet the needs for smaller scales, yet the statewide coverage and standards set by NWI make it a valuable asset that would be worth updating with the use of current imagery and ancillary data. A consolidated effort of updating NWI mapping for the entire state would require a large amount of funding and would benefit from coordination among multiple agencies, jurisdictions, Tribal, and non-governmental organizations.

Throughout the process of administering the survey and conducting follow up interviews, it became evident that cities see the most field-verified wetland data through delineation reports, permit reviews, and other regulatory processes. Some cities have the capacity and already have a good method for digitizing their wetland data and consolidating them into a software such as a GIS. Other cities simply did

not have the capacity or resources to do this, or if they did have the capacity, they did not know how to best approach the task. This indicates a need for guidance and standardization for digitizing wetland data across the state. This would provide entities with direction for accurately and consistently translating new and historic physical wetland data into a digital format. Furthermore, it would begin to lay the groundwork for the standardization of wetland data across the state, and for the potential to consolidate site-specific wetland data into a statewide dataset in the future.

Publication information

This report is available on the Department of Ecology's publications web page.[2]

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