Mapping Standard Compliant Wetland Data-Supplement

U.S. Fish and Wildlife Service National Wetlands Inventory (NWI)

Introduction

This document is being provided by the NWI Program to clarify Federal Geographic Data Committee (FGDC) Wetland Mapping Standard requirements regarding the target mapping unit (TMU), and to aid in wetland feature interpretation and standard related expectations. For project success, coordination with NWI early in the project initiation process is essential. Data producers (e.g., contractor or cooperator) are encouraged to bring their funders and NWI program staff together to clarify any project specific needs. If potential mapping issues or questions arise, it is the responsibility of the data producer and/or the project funder to work with NWI staff to determine the best path forward.

Background

The U.S. FWS National Wetlands Inventory (NWI) Program continues to update the National Wetlands Data Layer to enhance its applicability. The initial updates have advanced NWI data from a collection of analog maps to a highly detailed geospatial dataset of all wetlands and deepwater habitats within CONUS and guide data creation in Alaska. In 2009, the FGDC in partnership with the USFWS, adopted the Wetlands Mapping Standard (FGDC Document Number FGDC-STD-015-2009). In 2015, the Program updated the national wetlands data layer to include linear features not previously incorporated into the polygonal dataset. Many of these linear features had been created as part of the earlier analog NWI mapping process, but also included features from the U.S. Geological Survey National Hydrography Dataset (NHD) *(NWI version 2)*. These features have always been required by the Wetland Mapping and Classification Standards but were previously not included in the polygonal dataset due to cartographic conventions and limitations.

Mapping Standard Compliant Wetlands Data

The NWI Program strives for data consistency, based on a solid technical rationale that can be defended, recognizing that “one size does *not* fit all.” NWI Coordinators are available to assist in ensuring that only the data necessary to meet the standard are produced.

The FGDC wetland mapping standard requires features that are 0.5 acres in size and 15 feet (4.5 m) in width be included in the polygon data layer (except in Alaska.) Linear habitats that meet the TMU requirement, will remain in the polygonal data layer. However, non-vegetated linear habitats that are beyond the wetland standard (less than 15’ or 0.5 acres), i.e., Narrow Linear Habitats (NLH), will be excluded from the polygonal dataset.

Beginning on October 1, 2022, the NWI data schema will include a linear feature class that can be used to represent NLH features mapped beyond the Wetland Mapping Standard (Figure 1). The NWI Program will provide requirements, oversight, and QC tools to maintain a level of consistency for this mapping effort. A separate NWI linear feature class document (NLH Guidance Document) provides additional information on how to map these features. These data will represent non-vegetated features that may be desired for specific projects but are smaller than the target mapping unit of the National dataset. For contracts originated after October 1, 2022 NWI will not accept NLH features within the polygonal dataset.

Steps to Success

Define Your Target Mapping Unit (TMU)

The FGDC Wetland Mapping Standard sets a TMU of 5 acres in Alaska and 0.5 acre within the rest of the United States and its territories. Any feature with an area greater than the TMU that meets the wetlands classification standard (FGDC 2012) should be included (Figure 1). This includes rivers, streams, and adjacent vegetated wetland buffers (Figures 2 and 3). Narrow features with little or no discernable interior area at a scale of 1:12,000 are excluded from the TMU requirements.

TMU Considerations

1. Source Imagery must be capable of supporting mapping ground conditions at the specified TMU. Data Producers must be cognizant that the imagery used in data production supports the desired TMU to ensure there is not misrepresentation of feature precision.
2. Funding must be sufficient to map all features required by the Wetland Mapping Standard before funds are used to capture data that are not required by the standard.
3. Wetland features captured but are not required should have a clearly defined need.

Feature Inclusion

NWI wetland features are required to be mapped by the FGDC Mapping Standard when the width or area of all combined adjacent wetlands is above the project TMU. However, individual wetlands do not need to be identified separately if they are below the TMU.

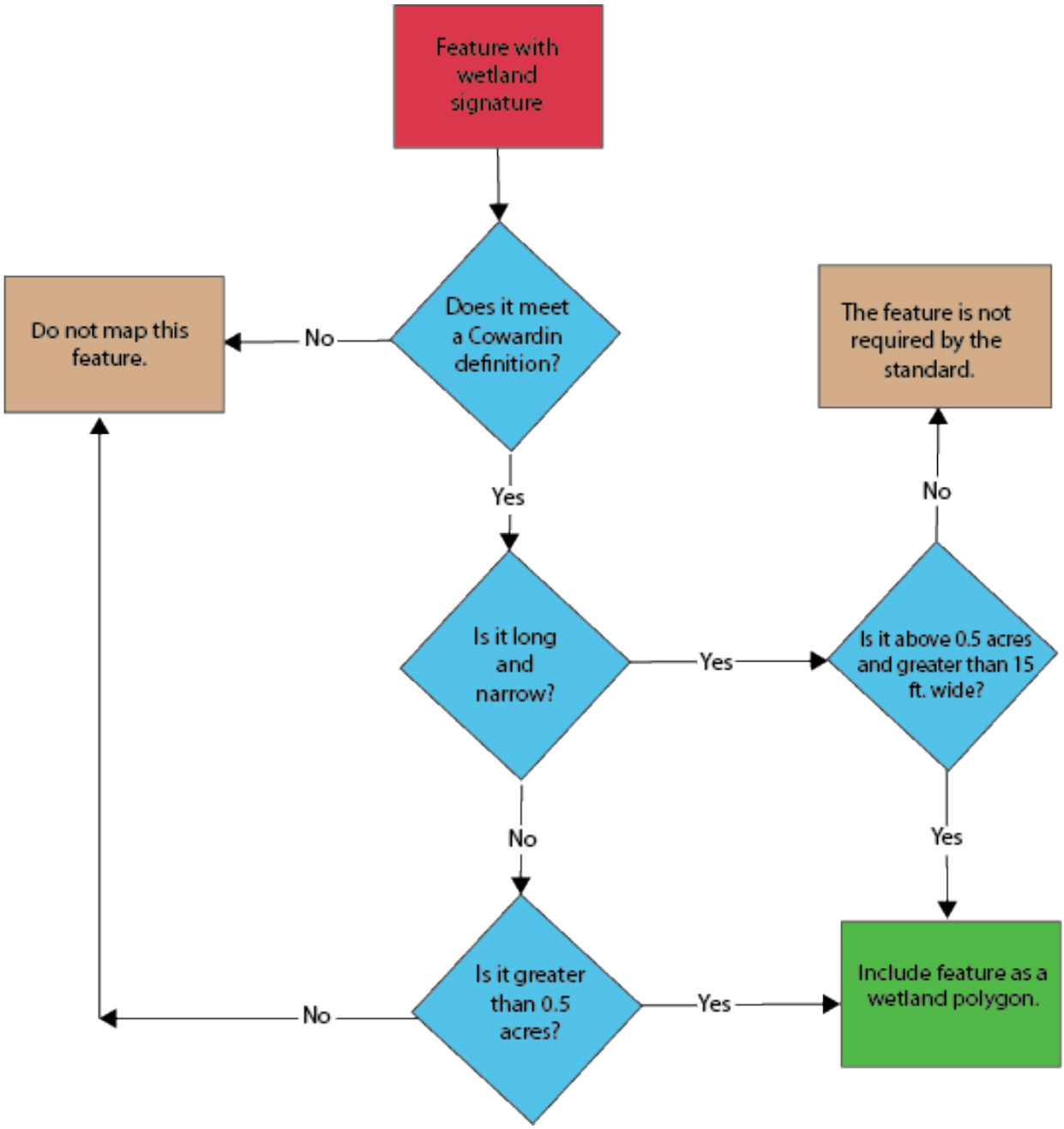

Figure 1-This conceptual model helps to determine if a feature is required to be mapped under the FGDC Wetland Mapping Standard.

Figure 2 -TMU of a feature, is determined by the **combined** area and width of all Cowardin defined wetlands. In these examples, the combined area of two wetland types (A), or one wetland type (B) are above the TMU, and therefore are required to meet the Wetland Mapping Standard. Example (C) is below the TMU and not required to be mapped.

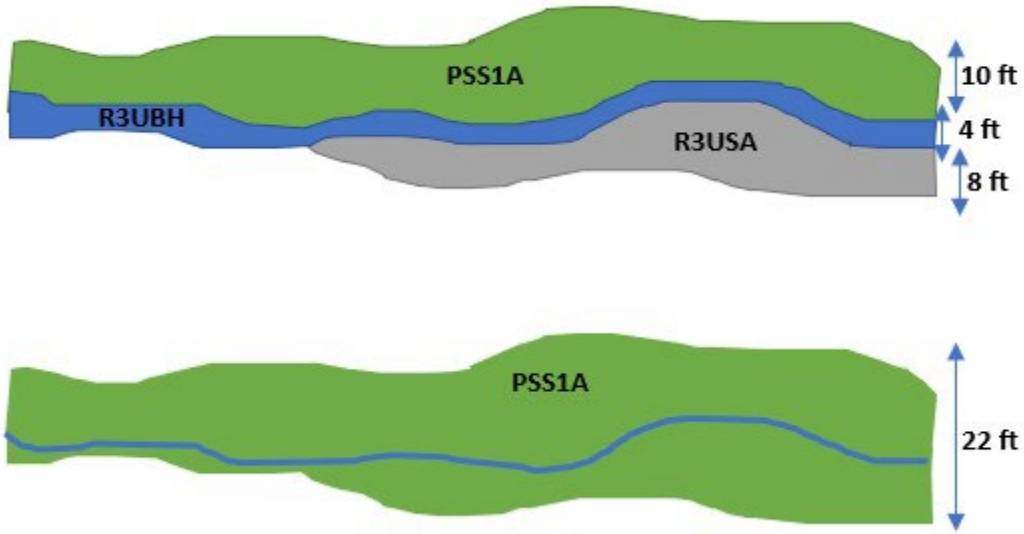

Figure 3– Individually these Cowardin defined polygons do NOT meet the TMU (< 15 ft. or 4.5 m wide).When all polygons are considered together the feature meets TMU requirements and are required to be included in the NWI polygonal data layer. The feature is best represented by the classification that represents the largest area.

Pre-mapping exploration and determination

A pre-mapping exploration of the project area will greatly assist data producers make consistent, project-wide mapping decisions to follow. Certain steps are recommended during the pre-mapping phase.

1. Review and assess a range of features across the project area using imagery, ancillary data, and on-the-ground knowledge to determine how standard compliant features will be identified in the photo interpretive process.
2. Identify the level of project-specific mapping detail of non-vegetated riverine features required. Refer to the guidelines for mapping features below the TMU (National Wetlands Inventory, 2022).
3. Coordinate with NWI staff on any questions regarding pre-mapping decisions.

Figure 4 - 1:12,000 image from Montana. This is a representation of wetland polygons that meet TMU requirements, and are mapped to meet all federal wetland mapping standards.

Clarifying Common Misconceptions

- USGS Topographic Maps and NWI
    - It is not correct to assume that USGS Topographic Maps establish the riverine network of NWI. There is no requirement that all perennial streams in the National Hydrography Dataset (NHD) or on USGS Topographic Maps be mapped as part of the NWI polygonal dataset. Wetland definition (Federal Geographic Data Committee, 2013) and the TMU are used to determine whether a feature should be represented in the polygonal data layer.
- Ephemeral Stream Classification
    - Not all ephemeral streams meet the definition of a wetland. The NWI Program only maps features when they have met the intermittent water regime classification set forth by the Wetland Classification Standard (Federal Geographic Data Committee, 2013) and are larger than the TMU defined by the Wetlands Mapping Standard (Federal Geographic Data Committee, 2009).

- Appropriate Buffer Widths
    - A standard buffer width for an entire project is not always appropriate. Buffer widths should be assigned appropriately to match the conditions on the ground/image and may require multiple buffer widths applied within a given project area.
- Upper extent of riverine features
    - Mapping of the upper extent of riverine features should be driven by the TMU and water regime classification (FGDC 2013). Features should not be included until they reach the TMU, i.e., 15 ft (4.5m) wide.

Map to the higher life form

Mapping should represent average water conditions on the ground and be aligned with the source imagery used in the mapping process. When there are multiple hydrologic signatures within a polygon, map to the highest (i.e., tallest) life form, prioritizing vegetated wetlands. Any automated feature generation (e.g., buffered streams) should be scrutinized to ensure they do not misrepresent palustrine wetlands as riverine features.

Data generation from ancillary data sources

Derived features

Data derived from elevation models can be extremely useful in identifying streams and other narrow habitats. Using ancillary data to determine feature inclusion is acceptable and encouraged where ancillary datasets exist for an entire project area. Feature widths and horizontal accuracy are ultimately determined by the imagery, so it is important that all features be an accurate representation of the wetland and align with the source imagery. Features generated using ancillary data can remain in their original position if they meet horizontal accuracy requirements.

USGS Hydrography Datasets

NHD and Elevation Derived Hydrography (EDH) are valuable resources for riverine feature identification. NHD High Resolution maintains a horizontal positional accuracy standard using a scale of 1:24,000, while newer and more precise EDH is accurate relative to higher resolution Digital Elevation Models (DEMs). This presents some challenges when attempting to incorporate these features into the NWI data layer since NWI feature widths and horizontal accuracies are determined by and evaluated using aerial photography or fine resolution multispectral imagery. In some cases, features contained within NHD or EDH may need to be spatially adjusted to meet NWI accuracy standards. However, if the existing NHD or EDH data are determined to fall within the NWI horizontal accuracy standard, interpreters are encouraged to maintain their original position.

Regional or Geographic Differences

Arid, Semi-Arid regions

Arid regions of the country follow the same guidelines for feature inclusion laid out in the Wetland Mapping Standard and described above. If the feature has discernable internal area at 1:12,000 (i.e., wider than 15 ft. (4.5 m), is above the TMU, and meets the FGDC Classification for Wetlands and Deepwater Habitats, it is required to be represented as a polygon and included in the NWI data layer.

Alluvial fans/Braided Streams

Project outcomes and objectives should be considered when discussing with a NWI staff how best to represent alluvial fans and braided streams. Braided streams in the arid southwest are bound by the banks forming the outer limits of the

depression within which the braiding occurs (Federal Geographic Data Committee, 2013) An example of a standard compliant representation of a braided stream can be seen in Figure 4.

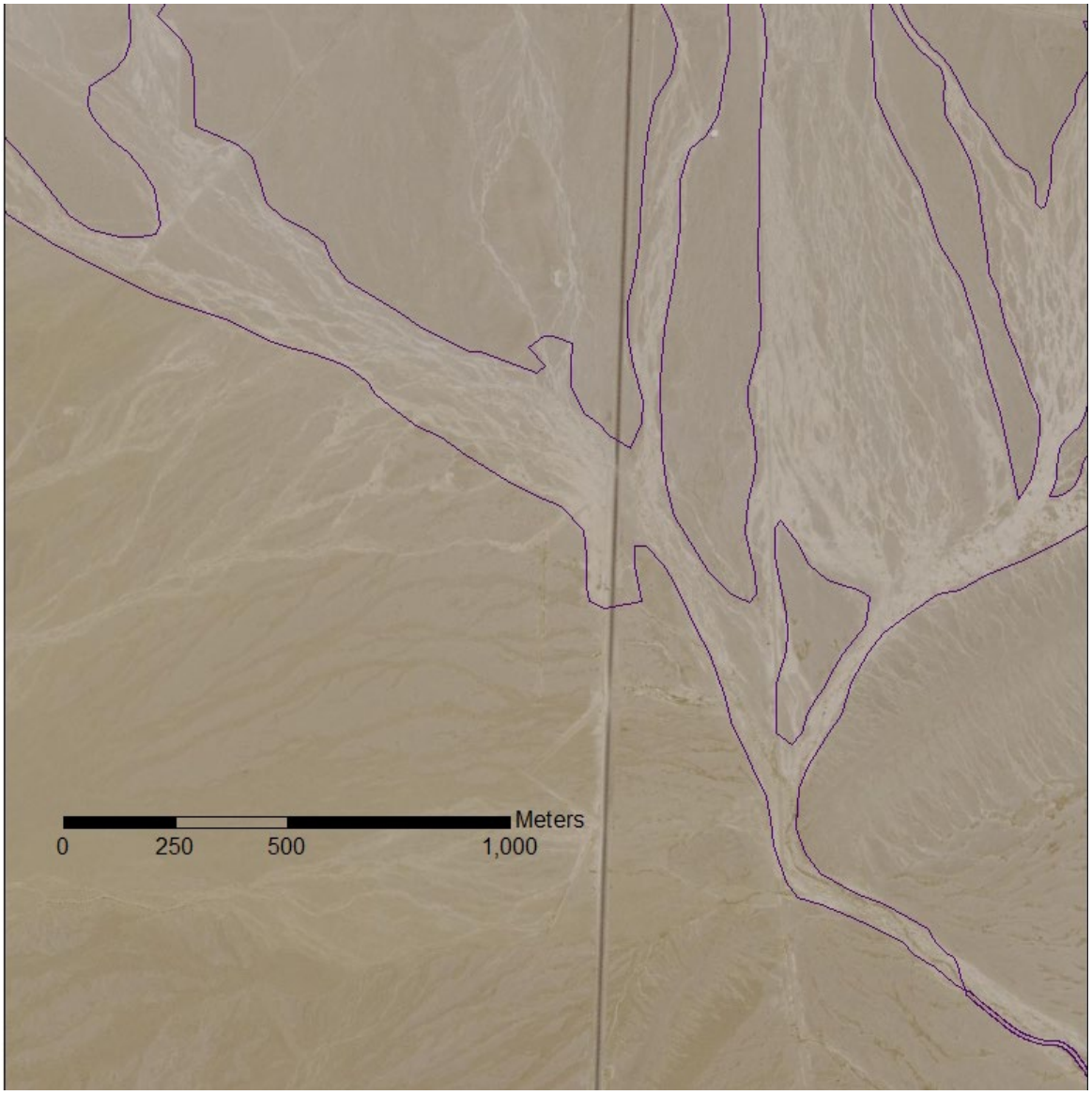

Figure 5 - Braided streams are defined and represented as one large polygon. Communication with NWI staff is essential to understanding how best to represent features in a way that is standard compliant.

Features under Upland Canopy

Project areas with an abundance of vegetation that visually obstructs viewing of wetland and deepwater features should rely on ancillary data sources to map the features obscured by vegetation. Leaf-off imagery, elevation data, NHD/EDH are essential to finding and mapping wetland features that meet the mapping standard.

Connectors

Culverts

Spatial continuity of hydrologic features is important (but not required) to accurately represent wetland and deepwater habitats. Imagery can provide evidence that a connection via a culvert or other anthropogenic feature is present. The assumption of a connection should be made if there is no evidence on an image to suggest that water flow is being impeded or slowed. Decisions to connect features through roads or other uplands will be left up to the data producer depending on project objectives.

Ditches

Ditches can provide important connections and habitat. Representation of ditches and other man-made features within NWI data is consistent with the FGDC Classification Standard. If a ditch has visible internal area at 1:12,000 (i.e., wider than 15 ft. (4.5 m), is above 0.5 acres, and can be defined using the FGDC Wetland Classification Standard, then it is required to be included in the NWI polygonal layer.

Bridges

Non-vegetated wetlands and riverine habitats that connect under a bridge that does not impound or impede water exchange should be represented as one continuous polygon. Imagery and ancillary data sources can be used to differentiate between bridges and causeways.

Appropriate lumping of features

Lumping and splitting of wetland features based on classification is a project level decision, provided the features in question are below the TMU. All features larger than the TMU that meet the wetland classification standard are required to be split from other polygons.

Alaska

FGDC Wetland Mapping Standards in Alaska

In Alaska, the FGDC standard requires the following minimum thresholds: 1) a Target Mapping Unit of 5 acres, 2) image scale of 1:63,360 and 3) base image spatial resolution of 5 meters, although more detailed data can be provided if desired. Imagery must be used that can support the required ground accuracy within the project objectives. The National Wetlands Mapping Standard includes a parenthetical reference to linear features greater than 15 ft. wide (4.5 m) at 1:12,000 scale that translates to linear features greater than 30 ft. wide at 1:24,000 or 80 ft. wide at 1:63,360 in Alaska.

Polygonal features in Alaska will be incorporated up to the resolution of the CONUS TMU (.5 acres) before requiring implementation of a linear feature class.

Riverine Features and the Cowardin Classification in AK

The National Wetlands Inventory conventions prioritize collection of wetland features over riverine features and this convention will be reinforced through quality control using evidence from imagery and/or field work. River width will be based on an average width over a reach between confluences.

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References

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