

# **North American Wetlands Conservation Act**

## ***CANADA GIS DATA STANDARDS***

*(Only for grants that have ended)*

**February 2024**

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## **Purpose**

The North American Wetland Conservation Act (NAWCA) programs are working to create a repository of project data to capture, store, analyze, manage, and present data linked to locations where NAWCA funds have been used to conserve habitat. To facilitate comprehensive project tracking we've created a spatial database where geospatial vector data layers (shapefiles) defining exact project locations and size can be stored (files provided by grantee/partner organizations). These data sets will be incorporated into regional and national databases and made available to a wide range of users. In order for this to occur effectively, certain standards and product specifications must be followed. This document provides general standards for spatial data collection and submission.

## **Data Definitions**

A shapefile is a digital vector storage format consisting of several files that contain a set of points, arcs, or polygons (or features) which denote the location, shape, and attributes of a geographic feature. Polygons are representations of areas. A polygon is defined as a closed line or perimeter which completely encloses a contiguous space. Spatial data submitted to the NAWCA program should consist of a shapefile containing several polygons representing each tract where activities funded with NAWCA (grant) or partner (match) funding occurred. Each activity must be represented as a polygon. A project shapefile must be submitted as part of the NAWCA final reporting package. Each polygon should only encompass one activity; however, polygons representing different activities may overlap.

## **Spatial Data Content**

Each NAWCA funded project shapefile must contain features and attributes associated with each activity which occurred as a result of NAWCA or partner funding (grant and match). Non-match properties should **not** be included in any spatial data submitted. Only one shapefile should be created for each NAWCA funded project. This shapefile may contain multiple polygons representing different activities achieved as part of the NAWCA funded project.

All final NAWCA data submissions must include only tracts directly impacted with NAWCA or associated partner funding. Do not include proposed NAWCA areas within a final NAWCA data submission. Proposed NAWCA must be submitted separately as part of the proposal process.

## **Spatial Data Submission Format**

All activity spatial data for a given NAWCA project must be submitted as an ArcGIS shapefile contained in a zip file. A zip file should contain only one shapefile which provides spatial information for all tracts (polygons) involved in a project. The submitted zip file containing the shapefile must have the ".zip" file extension suffix. The zip file prefix should be the same as the project proposal title, i.e. "Cape May Peninsula II.zip" (see the assistance award for the full name of the project).

## Shapefile Component Requirements

These shapefile components must be provided for each NAWCA dataset that is submitted:

- .shp** – Feature geometry file
- .dbf** – Attribute table
- .shx** – Shape index file
- .prj** – Projection file
- .xml** – Metadata file (see the [Metadata Format](#) section for more information)

Any other extensions that are submitted are extra, but do not delete these.

## Shapefile Naming Convention

All submitted shapefiles must comply with the following shapefile naming convention. This naming convention applies to the prefix of all components of the shapefile, including the metadata record. The naming convention is as follows:

<Project Title>\_<DBHC 4-digit Project Number>

Project Title: Refers to the title used on the NAWCA assistance award. This title should contain no spaces.

“DBHC 4-Digit Project Number” Refers to the four-digit number assigned to the project via the DBHC database. Your NAWCA grant administrator will provide you this number.

Example:

Shapefile name = **CapeMayPeninsulaII\_4288**

## *Programmatic Projects*

Programmatic projects linked by the same assistance award number should submit separate shapefiles of activities for each phase. Each phase of a programmatic award has a unique Project Number.

## **Spatial Data Attributes (Minimum requirements)**

All NAWCA project data submitted must have the following attributes contained in the attribute table (.dbf) of the shapefile (not incl. Esri mandatory shapefile attributes):

OBJECTID – Automatically assigned.

Shape – Polygon. If your shapefile is in Polygon ZM format, please convert it to a standard Polygon.

ProjectNum – Long integer; Default. Project number is the unique four-digit number provided by the grant administrator.

ActType – Text; Length: default. Activity type: fee acquisition, conservation easement, conservation agreement, crown land transfer, lease agreements, cooperative land use agreements, Crown Designation, donation (transfer of title), enhancement, management, stewardship.

Duration – Text; Length: default. Tenure of activity in years.  
 Tract\_Name – Text; Length: Default. Name of tract as listed in final report tract table.  
 Acreage – Double; Default Precision and Scale. Total acreage of wetland and upland components.  
 Funding – Text; Length: default. Funding Categories: Grant, Match, Non-Match.  
 Muni or City – Text; Length: default. Municipality or city.  
 Province – Text; Length: default. 2 or 3 letter province abbreviation.  
 Latitude – Double; Default Precision and Scale.  
 Longitude – Double; Default Precision and Scale.  
 Holder – Text; Length: default. Final Title Holder.  
 Shape\_Length – Automatically assigned.  
 Shape\_Area – Automatically assigned.

<input checked="" type="checkbox"/> Visible	<input type="checkbox"/> Read Only	Field Name	Alias	Data Type	<input checked="" type="checkbox"/> Allow NULL	<input type="checkbox"/> Highlight	Number Format	Domain	Default	Length
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	OBJECTID	OBJECTID	Object ID	<input type="checkbox"/>	<input type="checkbox"/>	Numeric			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Shape	SHAPE	Geometry	<input checked="" type="checkbox"/>	<input type="checkbox"/>				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ProjectNum	ProjectNum	Long	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	ActType	ActType	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Duration	Duration	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Tract_Name	Tract_Name	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Acreage	Acreage	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Funding	Funding	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Muni	Muni	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	City	City	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Province	Province	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Latitude	Latitude	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Longitude	Longitude	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Holder	Holder	Text	<input checked="" type="checkbox"/>	<input type="checkbox"/>				255
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Shape_Length	Shape_Length	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Shape_Area	Shape_Area	Double	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Numeric			

Figure 1. An example of the attribute table field view in ArcGIS Pro.

These attributes represent the minimum requirements. Other data attributes can be provided with the shapefiles but will not be included in the NAWCA geodatabase. All existing attributes will be maintained with the original shapefile submitted.

Z coordinates and M values are not supported in the NAWCA geodatabase and are not allowed in the shapefile data. For a complete description of Z and M values, please consult the Esri ArcGIS documentation at:

<https://support.esri.com/en-us/products/arcgis-pro> (for current ArcGIS Pro version)

<https://www.esri.com/en-us/arcgis/products/arcgis-desktop/resources> (for older ArcGIS versions)

### Spatial Dataset Projection

NAWCA shapefiles need to be submitted in Geographic Coordinate System – WGS84 datum (GCS\_WGS\_1984). The Well-Known Text (WKT) description of this projection found in the shapefile projection file (.prj) component should contain the following:

GCS\_WGS\_1984  
WKID: 4326  
Authority: EPSG  
Angular Unit: Degree (0.0174532925199433)  
Prime Meridian: Greenwich (0.0)  
Datum: D\_WGS\_1984  
Spheroid: WGS\_1984  
Semimajor Axis: 6378137.0  
Semiminor Axis: 6356752.314245179  
Inverse Flattening: 298.257223563

Custom projections are not supported. All submitted shapefiles **MUST** possess a projection file (.prj). All shapefiles not possessing a .prj file will be rejected and the user will be prompted to re-submit the dataset.

### **Feature Types**

Polygonal and linear feature types are supported for NAWCA data. Feature resolution and geometry validation specifications are the same for both linear and polygonal data.

Features can be multi-part or single part or a combination of both in the same dataset. Multi-part features are allowed where appropriate if you wish to combine multiple NAWCA polygons into a single record.

### **Feature Resolution**

The spatial resolution of NAWCA data cannot exceed 1 meter. Data sets with a resolution greater than 1m will need to be generalized to 1m or courser before submission.

Shapefiles derived from base layers that are calculated rather than manually drawn are more likely to exceed the 1 meter resolution limit. If your shapefile is based on such a layer, we recommend you reduce the resolution by simplifying the shapefile before upload.

For example, with Esri's ArcGIS Pro application, one can perform the simplification operation:

*Geoprocessing Toolbox → Cartography Tools → Generalization → Simplify Polygon.*

We recommend a simplification tolerance of at least 1 meter (the tolerance is the maximum deviation between the original polygon and the resulting polygon).

### **Geometry Validation**

All shapefiles must have valid geometry before submission. In ArcGIS, run the “Check Geometry” or “Repair Geometry” tool as necessary on each shapefile before upload. If you are using another GIS application to develop your shapefile, consult the

documentation on geometry validation and geometry correction methods available for that GIS software.

Performing this validation ensures that all lines, polygons, and multi-polygons conform to the OpenGIS Simple Features Specification: <https://www.ogc.org/standard/sfa/>.

Specifically, it ensures that:

- The shell and holes of polygons do not self-intersect.
- Holes touch the shell or another hole at a single point only. This means that holes do not intersect one another at multiple points or in a line segment.
- Polygon interiors are connected (This is implied by the previous statement.)
- The element Polygons in a Multi-Polygon touch at only a finite number of points (i.e., they do not touch in a line segment).
- The interiors of the element Polygons in a Multi-Polygon are disjoint (i.e., they do not cross).

### **Shapefile Metadata Format**

All submitted shapefiles are required to have ISO 19115 (North American Profile) compliant metadata records. It is strongly recommended that you develop any new metadata records or reformat existing records to the ISO 19115 metadata specification as this is the accepted metadata standard by USFWS.

The metadata records can be created using the Esri ArcGIS metadata tools or using other ISO compliant metadata creation tools.

With Esri's ArcGIS Pro application, metadata can be easily configured by following these steps:

Project → Options → Metadata → Choose Metadata style ISO 19115-3 XML Schema Implementation

The naming convention for the metadata files is the same as for other shapefile files. See the [Shapefile Naming Convention](#) section of this document for a description of the required file name prefixes. Any NAWCA datasets submitted without compliant metadata will not be accepted for distribution.

Documentation on this metadata format can be found at: <https://www.fgdc.gov/metadata/>.

### **Metadata References**

ISO 19115 (NAP) Metadata Profile - This document describes the ISO 19115 (NAP) metadata standard:

<https://www.fgdc.gov/standards/projects/incits-11-standards-projects/NAP-Metadata/napMetadataProfileV101.pdf/view>

Esri ArcGIS Metadata Reference – This link provides information on the creation of metadata documents using the Esri ArcGIS Metadata tools:

<https://pro.arcgis.com/en/pro-app/3.1/help/metadata/view-and-edit-metadata.htm>

### **Shapefile Submission**

Geospatial data submission is a required component of project final reporting. Please include a zip file of shapefiles associated with the NAWCA project and email these to your FWS project officer. In lieu of ArcGIS, users may utilize another GIS application package capable of creating spatial data (Google Earth Pro, QGIS, etc.). However, before submitting these files please contact the NAWCA GIS coordinator for submittal and data quality guidance.

### **More Information about Shapefile Submission**

For more information about how to submit NAWCA spatial data, contact:

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