



National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

NPS I&M Standard Operating Procedure: Custom Data - Custom Areas of Analysis for use in Landscape Dynamics

Version 1.0

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Summary

This SOP provides guidance for submitting custom Areas of Analysis (AOA) for use in analyzing Landscape Dynamics statistics.

Version History					
Previous Version No.	Date of Revision	Changes	Made by	Reason	Updated Version No.
	20160727	Initial version	Michelle Kineth		1.0

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Overview

Custom Areas of Analysis (AOAs) are considered relevant spatial areas within which a Network or Cooperator would like Landscape Dynamics statistics calculated – they are areas of analysis to be included in addition to the standard AOAs automatically calculated (Park, 30km, HUC12) for most indicators.

This SOP provides guidance to Networks or cooperators on providing custom AOA data. This SOP will not provide explicit direction for HOW to prepare custom data, rather this SOP will describe what is required of the state of the data in order for it to be incorporated quickly and seamlessly into the processing steps for Landscape Dynamics statistics. The custom AOA geodatabase should be emailed to the IMD Central Office as specified on page 6 in the Post-Processing section.

NOTE: Network-provided park boundaries that differ from park boundaries derived from Land Resources Division updates are not considered a custom AOA EXCEPT when the Network-provided park boundary is an area to use in addition to the standard AOA set derived from LRD. If networks wish to provide alternative or different park boundaries for use in Landscape Dynamics (to explicitly replace any boundary provided by LRD), contact Lisa Nelson directly, lisa_l_nelson@nps.gov. Note: alternate network provided park bounds are not shared with Land Resources.

Custom AOAs will be updated annually – all custom AOAs should be submitted for inclusion before **September 1**. Any custom AOA submissions received after that date will not be included until the following year.

Summary of Custom AOA Requirements (see details in Processing Requirements section):

1. File geodatabase with one or more feature datasets containing custom AOA feature classes
2. Within each feature dataset are individual feature classes (multipart) for each custom AOA, and one combined feature class (singlepart) that contains all individual feature classes within that feature dataset.
 - a. Combined feature class should be named meaningfully and be identified by the type of AOAs (and geography, if relevant). Examples: CONUS_AOA_Watersheds, Alaska_AOA_Ecoregion, AOA_ManagementZones
 - b. All individual feature classes must be named with the following convention:
 <CODE>_<NAME>_AOA_<SUFFIX>
 Where:
 <CODE> = Network 4-letter code, OR 'IMD' if custom AOAs not from a Network
 <NAME> = whatever the name of the AOA, can be anything as long as identifiable to end users

- <SUFFIX> = identifier for type of AOA
- c. Within all feature class attribute tables in a feature dataset (combined and individual) there must be a field 'UNIT_CODE' (text, any length needed) that matches <CODE>_<NAME> for all feature classes. This field cannot contain spaces or special characters other than '_' (underscore).
 - d. See **Processing Requirements** below for additional requirements (including metadata).

Questions? Contact mailto:michelle_kinseth@contractor.nps.gov.

Requirements

Technical requirements are based on the processing needs of the data and may include, among others:

- ArcGIS
- Understanding of file formats, spatial references, multipart versus singlepart data, and topology rules
- MS Word
- Other, as needed to accomplish requirements included herein (*add as needed*)

Pre-Processing Requirements

Document all steps taken to process and prepare custom AOA data for use with Landscape Dynamics and attach them as Appendix 2 to this document.

Processing Requirements – Custom Area of Analysis (AOA)

Custom AOA data must be in the following spatial reference, based on geographical location:

- North America (US, Canada, Mexico) = USA Contiguous Albers Equal Area Conic USGS (NAD83) (WKID: 102039)
- CONUS = USA Contiguous Albers Equal Area Conic USGS (NAD83) (WKID: 102039)
- Puerto Rico and USVI = USA Contiguous Albers Equal Area Conic USGS (NAD83) (WKID: 102039)
- Alaska = Alaska Albers Equal Area Conic (NAD83) (WKID: 3338)
- Hawaii = UTM Zone 5N NAD83 (WKID: 26905)
- American Samoa = NAD_1983_HARN_UTM_Zone_2S (WKID: 2195)
 - If necessary, when re-projecting use Transformation = WGS_1984_(ITRF00)_To_NAD_1983 + NAD_1983_HARN_To_WGS_1984_2
- Guam = WGS_1984_UTM_Zone_55N (WKID: 32655)
 - If necessary, when re-projecting use Transformation = "WGS_1984_(ITRF00)_To_NAD_1983"
- CN Mariana Islands = WGS_1984_UTM_Zone_55N (WKID: 32655)
 - If necessary, when re-projecting use Transformation = "WGS_1984_(ITRF00)_To_NAD_1983"

Required File Format = ESRI File GDB (v10.2), Feature Datasets, Feature Classes

Required Final Output = Each unique AOA as a multipart feature class within a feature dataset; one combined/merged singlepart feature class, per feature dataset (topologically correct*)

Naming convention:

All AOA feature classes must have "NNNN" (4-letter Network Code) OR "IMD" (if not from a Network) at the front and "_AOA_<suffix>" at the end of each identifying name. The name of each feature class, MINUS "_AOA_<suffix>" should match exactly the text value in required field "UNIT_CODE", as described below.

The <suffix> (AOA type identifier) can be anything determined meaningful by the user, but must be consistent within feature datasets. See the example below.

The combined/merged feature class (singlepart) within a feature dataset must contain all the individual features classes from within the respective feature dataset. If any boundaries are adjacent or coincident they should be topologically correct* (if possible).

***Note on topology:**

If there are multiple custom AOAs that are adjacent or have coincident boundaries, make sure topology is enforced or understand that any AOAs that have overlapping area will also have overlapping statistical outputs. This means overlapping areas may be counted more than once in some (or all) statistical outputs if topology rules are not applied.

Creating New Custom AOAs for use with Landscape Dynamics

To create a custom AOA geodatabase for use with Landscape Dynamics, please use the following as a detailed example of the above-described naming conventions and organizational structure. This structure must be adhered to regardless of level of complexity of custom AOAs, or the number of custom AOAs.

Required Attribute Fields for all Feature Classes

UNIT_CODE (Text, any length needed) = field that contains the unique identifying name of each AOA within the feature dataset. No spaces or special characters are allowed in this field, aside from underscore (" _ "). If the source of the custom AOA GDB is an IMD Network, the 4-letter Network code would preface the name in UNIT_CODE. If the source is not a network, 'IMD' would preface all names in UNIT_CODE. See below for more on field 'UNIT_CODE'.

PARK_CODE (Text, 4) = If the custom AOA is park-based, include four-digit park code. If custom AOA is not park-based, leave this field blank.

FULL_NAME (Text, any length needed) = Full identifying name of feature (i.e. XYZ Watershed, ABCD Ecoregion)

AREA_SQKM (Float/Double) = Calculate geometry of AOA in km² after ALL editing, processing, and repairing is done, and data is in final spatial reference (as noted above)

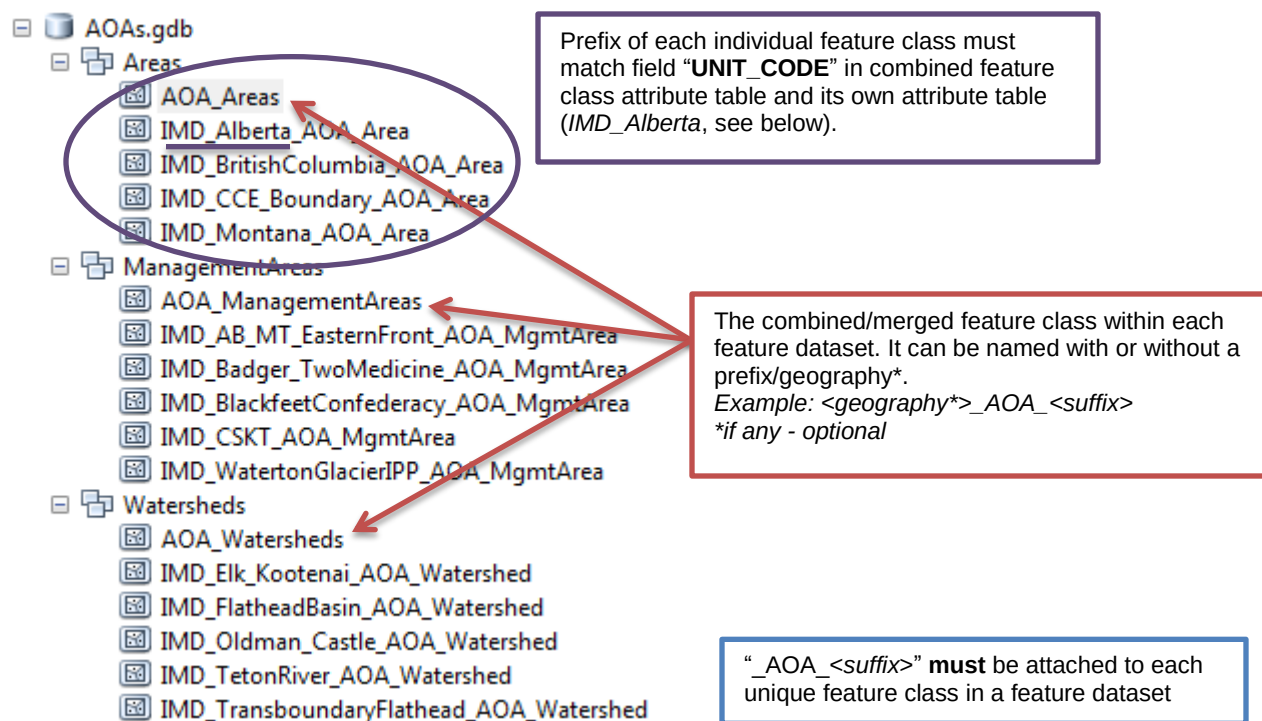
SOURCE (Text, 50+) = who/where original data was obtained (NPS, USFS, NRCS, County, State, digitized by xyz person, etc)

CREATED_BY (Text, 50+) = the author/contact of the custom polygon boundary – the person or group (Network, Park, cooperator) responsible for submitting the polygon to IMD-GIS for use in Landscape Dynamics, and declaring it as "official" for this use. This field may be the same as SOURCE in some cases.

DATE_AOA (Text,10) = The date the AOA polygon(s) was finalized for use. Please use format 'YYYY/MM/DD'. (NOTE: do not use data type 'Date' for this field)

All feature classes can have any other number of additional attribute fields, but all fields noted here are required for all feature classes.

Complete a matrix of indicator by AOA (see Appendix 1) to indicate what statistics are desired for each AOA being submitted.

Example Custom AOAs.gdb from non-Network source:

As noted above, the value in "UNIT_CODE" for the combined feature class (shown below, red outline) and for the unique feature class (shown below, blue outline) must match the prefix of the name given to the unique AOA feature class (minus "_AOA_<suffix>", see illustration above).

****Not all required attribute fields are shown****

AOA_Areas							
	OBJECTID *	SHAPE *	UNIT_CODE	FULL_NAME	AREA_SQKM	SHAPE_Length	
	1	Polygon	IMD_Montana	Montana	380957	3047635.535229	38
	2	Polygon	IMD_Alberta	Alberta	663196.6	3868557.630658	66
	3	Polygon	IMD_BritishColumbia	British Columbia	949110.4	30230481.436894	94
	4	Polygon	IMD_CCE_Boundary	Crown of the Continent	72138.5	2078778.130748	72

IMD_Alberta_AOA_Area							
	OBJECTID *	Shape *	UNIT_CODE	FULL_NAME	AREA_SQKM	Shape_Length	S
	1	Polygon	IMD_Alberta	Alberta	663196.6	3868557.630658	663

Additional requirements, hints, and useful information:

- Repair geometry should be run on all custom AOA feature classes prior to area calculation.
- If the source of this custom AOA GDB was an IMD Network, the 4-letter Network code would replace 'IMD' in all feature class names, and in 'UNIT_CODE' field.
- The Feature Dataset can be named anything meaningful, though it is recommended to maintain the use of the AOA type (<suffix>), even in the feature dataset (as noted above, feature dataset = Watersheds, feature classes = "AOA_Watershed").

- If custom AOAs span various Geographic Areas (as defined on page 3, i.e. PACN, SFCN), those AOAs for each explicit geographic area must be in unique feature datasets, even if projections are the same (as with PR-USVI and CONUS), or AOA types are the same.
- Calculate AREA_SQKM last, after all edits are done, after any changes in spatial reference are done, and after geometry is repaired.

Questions? Contact mailto:michelle_kinseth@contractor.nps.gov.

ANY custom AOA GDB submitted that does not fit the required structure outlined here will be sent back to the submitter for correction.

Updating Existing Custom AOAs for use with Landscape Dynamics

If submitting updates to an existing custom AOA GDB, or if adding new areas to an existing custom AOA set:

1. Incorporate updates/changes and/or new AOA(s) to existing AOA GDB
 - a. Make sure the Date field is properly edited for any new and/or updated AOAs
2. Resubmit ENTIRE custom AOA GDB, including any AOAs that did NOT change.
3. Include with submission of custom AOA GDB a list of what AOAs were changed/updated/added.
 - a. Also include an updated indicator matrix indicating what indicators are desired for the new AOAs (Appendix 1)
4. Deadline of **September 1**, annually.

If there is any confusion or question about updating a custom AOA GDB, contact mailto:michelle_kinseth@contractor.nps.gov.

Metadata for Custom AOAs

Minimally, please make sure the spatial data metadata for each AOA feature class (and the combined feature class) includes some description/definition of the AOA, and contact information to the source/creator of AOA.

Post-Processing

1. Complete a matrix of AOA and indicators as shown in Appendix 1.
2. Attach all custom AOA processing steps as Appendix 2.
3. Add custom AOA author(s) name(s) to SOP title and use as citation/source for any reports related to these AOAs.
4. Email SOP and final custom AOA File GDB in a zip folder to michelle_kinseth@contractor.nps.gov.
 - a. If data is too large for email, contact Michelle to arrange for alternative delivery methods.
5. Deadline of **September 1**, annually.

Be sure to maintain a copy of this SOP and all custom AOA processes locally; this SOP is your source for citations within reports that use any custom AOAs created via the attached methods (Appendix 2).

IMD-CO will not be responsible for custom AOA SOPs on behalf of Networks or Cooperators.

NOTE! Notification of custom AOA updates, changes, additions, etc, are the sole responsibility of the Custom AOA user (Network, Cooperator, etc). Unless otherwise notified, Landscape Dynamics will continue to use and calculate statistics on the most recent set of Custom AOAs submitted, regardless of date they were submitted.

Appendices

Appendix 1: Custom Area(s) Of Analysis (AOA) and Indicator Matrix

Please complete a matrix similar to this for all indicators, by AOA. Text file, excel spreadsheet, or word doc are all valid formats.

	Custom AOA*	Notes
Conservation Status (ownership, gap status)		
Housing Density (hdd)		
Land Cover Area per Category (lac)		
Land Cover Natural vs Converted (lnc)		
Land Cover Impervious Surface (lpi)		
Pattern Density (pden)		
Pattern Morphology (pm)		
Population Total/Density (ptt/pdd)		
Road Density (rdd)		
Area without Roads (awr)		

*Custom AOA means only AOAs referenced explicitly in this SOP, unless otherwise specified. Custom AOAs can be grouped into one column (as shown), or listed individually across the top. Indicate, but AOA, all landscape dynamics indicators desired for each AOA. Please provide notes if there are caveats for specific indicators or specific custom AOAs.

Appendix 2: Custom Area(s) Of Analysis (AOA) Processing Steps

Please attach custom AOA processing details here